IPv6 Ready Phase-2
Mobile Node

Self Test Specification
for Mobile Node

Technical Document
Revision 3.2.0

IPv6 Forum http://www.ipv6forum.org
IPv6 Logo Committee http://www.ipv6ready.org

Modification Record

Revision 3.2.0 November 1, 2007
NEW
Added the IPsec advanced function "Fine-Grain Selectors" based on RFC4877.
- "Reference standards" in "1 Overview"
- IPsec setting in "3.1 Common Setup-1"
- Packet figure in "5. Common Packets" and "6. Test Specification"
Improvement
- make more detail Sequence chart in "6. Test Specification"
- make more detail Packet figure in "6. Test Specification"
Correct
"3. Common Setup"
- Correction the IPsec Parameter.
Editorial
Title, footer, and copyright were fixed.

Version 3.1.6 July 9, 2007
The copyright was updated.

Version 3.1.5 July 18, 2006
Correction of cover and Acknowledgements.

Version 3.1.4 June 2, 2006
MN-2-1-3-2-015, 2-2-1-1-039, MN-2-1-4-2-014, MN-3-2-1-2-029,
MN-3-4-1-2-006, MN-4-2-1-1-015, MN-5-1-2-1-021
Typo in [PROCEDURE]
- “fileld” -> “field”.

Version 3.1.3 February 3, 2006
The sequence of the test item was changed in “6.1 Generate HoA”.
MN-3-1-1-1-001, MN-3-1-1-1-009
- The source of Echo Request is changed from HA0 to CN0.

Version 3.1.2 June 20, 2005
The document file was converted from HTML into PDF, and the composition of the document was changed.

Version 3.1.1 June 9, 2005
MN-4-2-2-2-010
- fixed mistake of Packet Format fig "1. ICMP Parameter Problem Data".
MN-4-1-2-2-010
- fixed mistake of Packet Format fig "8.ICMP Echo Request Data".
MN-3-1-3-3-001

- fixed mistake of Packet Format fig "19.Binding Update Data".

MN-4-1-1-3-001

- fixed mistake of Packet Format fig "30.Binding Update Data".

MN-4-1-2-3-001

- fixed mistake of Packet Format fig "23.Binding Update Data".

Version 3.1.0 June 6, 2005

HTML document

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Principle Authors:
- IPv6 Promotion Council, Certification Working Group,
  Mobile IPv6 Sub Working Group

Commentators:
- IRISA-INRIA

Introduction

The IPv6 forum plays a major role to bring together industrial actors, to develop and deploy the new generation of IP protocols. Contrary to IPv4, which started with a small closed group of implementers, the universality of IPv6 leads to a huge number of implementations. Interoperability has always been considered as a critical feature in the Internet community.
Due to the large number of IPv6 implementations, it is important to provide the market a strong signal proving the level of interoperability across various products.
To avoid confusion in the mind of customers, a globally unique logo programme should be defined. The IPv6 logo will give confidence to users that IPv6 is currently operational. It will also be a clear indication that the technology will still be used in the future. To summarize, this logo programme will contribute to the feeling that IPv6 is available and ready to be used.

The IPv6 Logo Programme consists in three phases

Phase 1 :
In a first stage, the Logo will indicate that the product includes IPv6 mandatory core protocols and can interoperate with other IPv6 implementations.

Phase 2 :
The "IPv6 ready" step implies a proper care, technical consensus and clear technical references. The IPv6 ready logo will indicate that a product has successfully satisfied strong requirements stated by the IPv6 Logo Committee (v6LC).
To avoid confusion, the logo "IPv6 Ready" will be generic. The v6LC will define the test profiles with associated requirements for specific functionalities.

Phase 3 :
Same as Phase 2 with IPsec mandated.

Table of Contents

[I] IPv6 Ready Logo Phase 2 Mobile IPv6
Self Test Specification for Mobile Node

1 Overview

This document organization tests by group based on related test methodology or goals. Each group begins with a brief set of comments pertaining to all tests within that group. This is followed by a series of description blocks; each block a single test. The format of the description block is as follows:

Description block

[Purpose]	The PURPOSE is the short statement describing what the test attempts to achieve. It is usually phrased as a simple assertion of the future or capability to be tested.
[CATEGORY]	The CATEGORY shows you who need to satisfy the test shortly.
[REQUIREMENT OF TEST]	The REQUIREMENT describes the condition of the NUT.
[TOPOLOGY]	The TOPOLOGY describes the network used in the test.
[TEST SETUP]	The TEST SETUP describes how to initialize and configure the NUT before starting each test. If a value is not provided, then the protocol's default value is used.
[INITIALIZATION]	The INITIALIZATION describes step-by-step instructions for carrying out the setting before the test.
[PROCEDURE]	The PROCEDURE describes step-by-step instructions for carrying out the test.
[JUDGMENT]	The JUDGEMENT describes expected result. If we can observe as same result as the description of Judgment, the NUT passes the test.
[REFERENCES]	The REFERENCE section contains some parts of specification related to the tests. It also shows the document names and section numbers.

Reference to Common

Refer to a common part for some blocks because there are only several kinds of content.

Reference to Common packets

The reference to Common packets in [INITIALIZATION] and [PROCEDURE] is described.

- Refer to the packet simply.
  Example)
  5. Send Binding Update. (Refer to X.X.X)

- The packet is referred to, and amplification is described.
  Example)
  5. Send Binding Update(Sequence No=10000). (Refer to X.X.X)
  6. Receive Binding Acknowledgement. (HA0 -> NUTX) (Refer to X.X.X)
     # The Lifetime field is less than or equal to 60 seconds.

- Especially, the packet of the focus supplements the field to which it pays attention with the table form.
  Example)
  5. Send Binding Update. (Refer to X.X.X)

IPv6 Header	Source Address		MN (Link, global)
	Destination Address		NUT (Link, global)
Destination Option	Home Address of Mobile Node		MN (Link, global)
Mobility Header	MH Type		5
	A		1
	H		0
	Sequence		10000
	Lifetime		60
Mobility options	Nonce Indices	Home Nonce Index	any
		Care-of Nonce Index	any
	Binding Authorization Data	Authenticator	any

Acronyms

CN	- Correspondent Node
HA	- Home Agent
MN	- Mobile Node
HL	- Home Link
FL	- Foreign Link
HoA	- Home Address
CoA	- Care-of Address
Re-Reg	- Re-Registration
De-Reg	- De-Registration
Co-Reg	- Correspondent Registration
BCE	- Binding Cache Entry
BLE	- Binding Update List Entry
ICMPv6	- Internet Control Message Protocol for IPv6
DHAAD	- Dynamic Home Agent Address Discovery
HAAD	- Home Agent Address Discovery
MPD	- Mobile Prefix Discovery

MPS	- Mobile Prefix Solicitation
MPA	- Mobile Prefix Advertisement
BRR	- Binding Refresh Request
RR	- Return Routability
HoTI	- Home Test Init
CoTI	- Care-of Test Init
HoT	- Home Test
CoT	- Care-of Test
BU	- Binding Update
BA	- Binding Acknowledgement
BE	- Binding Error

Reference standards

This documentation covers the functions specified in the IETF RFC and Mobile IPv6 Test Profile listed below.

(1) RFC3775: Mobility Support in IPv6
(http://www.ietf.org/rfc/rfc3775.txt)

(2) RFC3776: Using IPsec to Protect Mobile IPv6 Signaling between Mobile Nodes and Home Agents
(http://www.ietf.org/rfc/rfc3776.txt)

(3) RFC4877: Mobile IPv6 Operation with IKEv2 and the Revised IPsec Architecture
(http://www.ietf.org/rfc/rfc4877.txt)

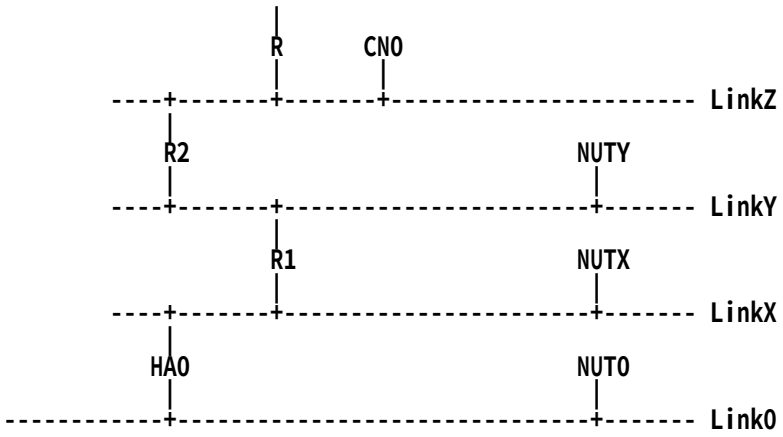
(4) IPv6 Ready Logo Phase-2 Mobile IPv6 Policy
(http://www.ipv6ready.org/about_phase2_test.html)

(5) IPv6 Ready Logo Phase-2 Mobile IPv6 Test Specification Profile
(http://www.ipv6ready.org/about_phase2_test.html)

2 Common Topology

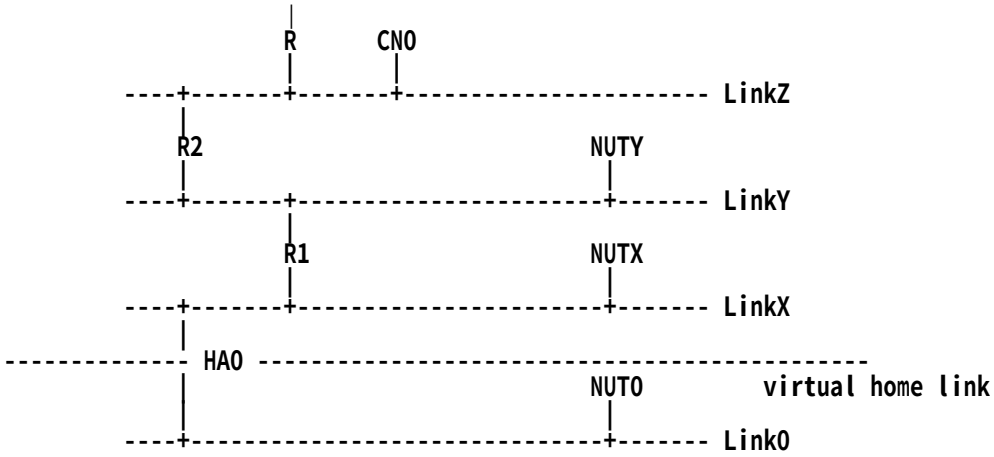
2.1 Common Topology-1

- In the case of Real Home Link



Link0	global	3ffe:501:ffff:100::/64	home link
LinkX	global	3ffe:501:ffff:102::/64	
LinkY	global	3ffe:501:ffff:103::/64	
LinkZ	global	3ffe:501:ffff:104::/64	
HA0 (Link0)	global	3ffe:501:ffff:100:200:ff:fe00:a0a0	
	link-local	fe80:: 200:ff:fe00:a0a0	
	ether	00:00:00:00:a0:a0	
R1 (LinkX)	global	3ffe:501:ffff:102:200:ff:fe00:a4a4	
	link-local	fe80:: 200:ff:fe00:a4a4	
	ether	00:00:00:00:a4:a4	
R2 (LinkY)	global	3ffe:501:ffff:103:200:ff:fe00:a6a6	
	link-local	fe80:: 200:ff:fe00:a6a6	
	ether	00:00:00:00:a6:a6	
CN0 (LinkZ)	global	3ffe:501:ffff:104:200:ff:fe00:a8a8	
	link-local	fe80:: 200:ff:fe00:a8a8	
	ether	00:00:00:00:a8:a8	
NUT0 (Link0)	global	3ffe:501:ffff:100:: <InterfaceID>	Home address
	link-local	fe80::<InterfaceID>	
	ether	<InterfaceID>	
NUTX (LinkX)	global	3ffe:501:ffff:102::<InterfaceID>	Care-of address
NUTY (LinkY)	global	3ffe:501:ffff:103::<InterfaceID>	Care-of address

- In the case of Virtual Home Link

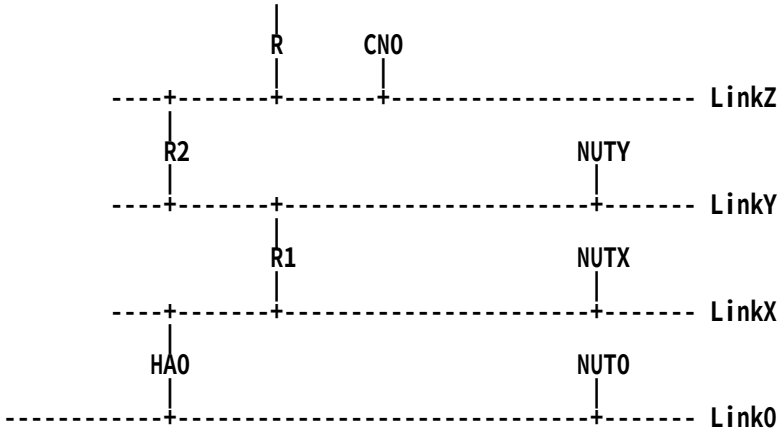


Link0	global	3ffe:501:ffff:100::/64	virtual home link
LinkX	global	3ffe:501:ffff:102::/64	
LinkY	global	3ffe:501:ffff:103::/64	
LinkZ	global	3ffe:501:ffff:104::/64	
HA0 (Link0)	global	3ffe:501:ffff:100:200:ff:fe00:a0a0	
	link-local	fe80:: 200:ff:fe00:a0a0	
	ether	00:00:00:00:a0:a0	
R1 (LinkX)	global	3ffe:501:ffff:102:200:ff:fe00:a4a4	
	link-local	fe80:: 200:ff:fe00:a4a4	
	ether	00:00:00:00:a4:a4	
R2 (LinkY)	global	3ffe:501:ffff:103:200:ff:fe00:a6a6	
	link-local	fe80:: 200:ff:fe00:a6a6	
	ether	00:00:00:00:a6:a6	
CN0 (LinkZ)	global	3ffe:501:ffff:104:200:ff:fe00:a8a8	
	link-local	fe80:: 200:ff:fe00:a8a8	
	ether	00:00:00:00:a8:a8	
NUT0 (Link0)	global	3ffe:501:ffff:100::<InterfaceID>	Home address
	link-local	fe80::< InterfaceID>	
	ether	<InterfaceID>	
NUTX (LinkX)	global	3ffe:501:ffff:102::<InterfaceID>	Care-of address
NUTY (LinkY)	global	3ffe:501:ffff:103::<InterfaceID>	Care-of address

2.2 Common Topology-2

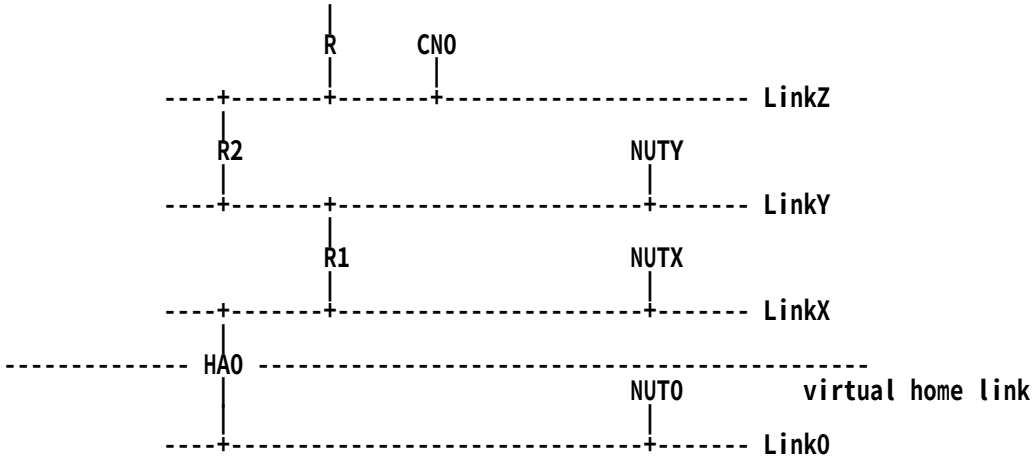
R2 in Link Y has same Link Local address as R1 in Link X.

- In the case of Real Home Link



Link0	global	3ffe:501:ffff:100::/64	home link
LinkX	global	3ffe:501:ffff:102::/64	
LinkY	global	3ffe:501:ffff:103::/64	
LinkZ	global	3ffe:501:ffff:104::/64	
HA0 (Link0)	global	3ffe:501:ffff:100:200:ff:fe00:a0a0	
	link-local	fe80:: 200:ff:fe00:a0a0	
	ether	00:00:00:00:a0:a0	
R1 (LinkX)	global	3ffe:501:ffff:102:200:ff:fe00:a4a4	
	link-local	fe80:: 200:ff:fe00:a4a4	
	ether	00:00:00:00:a4:a4	
R2 (LinkY)	global	3ffe:501:ffff:103:200:ff:fe00:a4a4	
	link-local	fe80:: 200:ff:fe00:a4a4	
	ether	00:00:00:00:a4:a4	
CN0 (LinkZ)	global	3ffe:501:ffff:104:200:ff:fe00:a8a8	
	link-local	fe80:: 200:ff:fe00:a8a8	
	ether	00:00:00:00:a8:a8	
NUT0 (Link0)	global	3ffe:501:ffff:100:: <InterfaceID>	Home address
	link-local	fe80::<InterfaceID>	
	ether	<InterfaceID>	
NUTX (LinkX)	global	3ffe:501:ffff:102::<InterfaceID>	Care-of address
NUTY (LinkY)	global	3ffe:501:ffff:103::<InterfaceID>	Care-of address

- In the case of Virtual Home Link

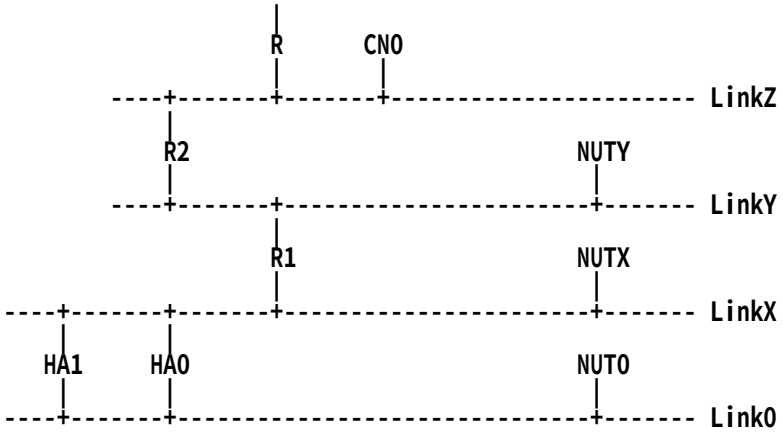


Link0	global	3ffe:501:ffff:100::/64	virtual home link
LinkX	global	3ffe:501:ffff:102::/64	
LinkY	global	3ffe:501:ffff:103::/64	
LinkZ	global	3ffe:501:ffff:104::/64	
HA0 (Link0)	global	3ffe:501:ffff:100:200:ff:fe00:a0a0	
	link-local	fe80:: 200:ff:fe00:a0a0	
	ether	00:00:00:00:a0:a0	
R1 (LinkX)	global	3ffe:501:ffff:102:200:ff:fe00:a4a4	
	link-local	fe80:: 200:ff:fe00:a4a4	
	ether	00:00:00:00:a4:a4	
R2 (LinkY)	global	3ffe:501:ffff:103:200:ff:fe00:a4a4	
	link-local	fe80:: 200:ff:fe00:a4a4	
	ether	00:00:00:00:a4:a4	
CN0 (LinkZ)	global	3ffe:501:ffff:104:200:ff:fe00:a8a8	
	link-local	fe80:: 200:ff:fe00:a8a8	
	ether	00:00:00:00:a8:a8	
NUT0 (Link0)	global	3ffe:501:ffff:100::<InterfaceID>	Home address
	link-local	fe80::< InterfaceID>	
	ether	<InterfaceID>	
NUTX (LinkX)	global	3ffe:501:ffff:102::<InterfaceID>	Care-of address
NUTY (LinkY)	global	3ffe:501:ffff:103::<InterfaceID>	Care-of address

2.3 Common Topology-3

There are two home agents.

- In the case of Real Home Link

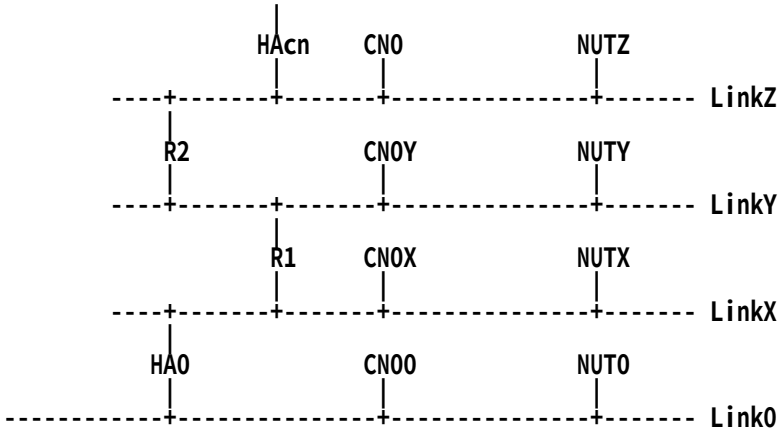


Link0	global	3ffe:501:ffff:100::/64	home link
LinkX	global	3ffe:501:ffff:102::/64	
LinkY	global	3ffe:501:ffff:103::/64	
LinkZ	global	3ffe:501:ffff:104::/64	
HA0 (Link0)	global	3ffe:501:ffff:100:200:ff:fe00:a0a0	
	link-local	fe80:: 200:ff:fe00:a0a0	
	ether	00:00:00:00:a0:a0	
HA1 (Link0)	global	3ffe:501:ffff:100:200:ff:fe00:a1a1	
	link-local	fe80:: 200:ff:fe00:a1a1	
	ether	00:00:00:00:a1:a1	
R1 (LinkX)	global	3ffe:501:ffff:102:200:ff:fe00:a4a4	
	link-local	fe80:: 200:ff:fe00:a4a4	
	ether	00:00:00:00:a4:a4	
R2 (LinkY)	global	3ffe:501:ffff:103:200:ff:fe00:a6a6	
	link-local	fe80:: 200:ff:fe00:a6a6	
	ether	00:00:00:00:a6:a6	
CN0 (LinkZ)	global	3ffe:501:ffff:104:200:ff:fe00:a8a8	
	link-local	fe80:: 200:ff:fe00:a8a8	
	ether	00:00:00:00:a8:a8	
NUT0 (Link0)	global	3ffe:501:ffff:100:: <InterfaceID>	Home address
	link-local	fe80::<InterfaceID>	
	ether	<InterfaceID>	
NUTX (LinkX)	global	3ffe:501:ffff:102::<InterfaceID>	Care-of address
NUTY (LinkY)	global	3ffe:501:ffff:103::<InterfaceID>	Care-of address

2.4 Common Topology-4

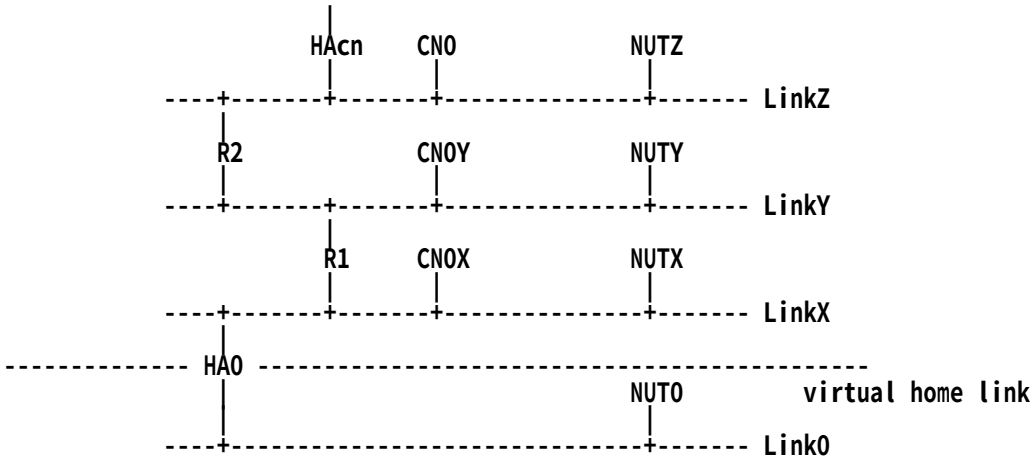
Correspondent node operates as Mobile Node.

- In the case of Real Home Link



Link0	global	3ffe:501:ffff:100::/64	home link
LinkX	global	3ffe:501:ffff:102::/64	
LinkY	global	3ffe:501:ffff:103::/64	
LinkZ	global	3ffe:501:ffff:104::/64	CN0 home Link
HA0 (Link0)	global	3ffe:501:ffff:100:200:ff:fe00:a0a0	
	link-local	fe80:: 200:ff:fe00:a0a0	
	ether	00:00:00:00:a0:a0	
R1 (LinkX)	global	3ffe:501:ffff:102:200:ff:fe00:a4a4	
	link-local	fe80:: 200:ff:fe00:a4a4	
	ether	00:00:00:00:a4:a4	
R2 (LinkY)	global	3ffe:501:ffff:103:200:ff:fe00:a6a6	
	link-local	fe80:: 200:ff:fe00:a6a6	
	ether	00:00:00:00:a6:a6	
CN0 (LinkZ)	global	3ffe:501:ffff:104:200:ff:fe00:a8a8	
	link-local	fe80:: 200:ff:fe00:a8a8	
	ether	00:00:00:00:a8:a8	
CN0Y	global	3ffe:501:ffff:103:200:ff:fe00:a8a8	
CN0X	global	3ffe:501:ffff:102:200:ff:fe00:a8a8	
CN00	global	3ffe:501:ffff:100:200:ff:fe00:a8a8	
NUT0 (Link0)	global	3ffe:501:ffff:100:: <InterfaceID>	Home address
	link-local	fe80::<InterfaceID>	
	ether	<InterfaceID>	
NUTX (LinkX)	global	3ffe:501:ffff:102::<InterfaceID>	Care-of address
NUTY (LinkY)	global	3ffe:501:ffff:103::<InterfaceID>	Care-of address
NUTZ (LinkZ)	global	3ffe:501:ffff:104::<InterfaceID>	Care-of address

- In the case of Virtual Home Link



Link0	global	3ffe:501:ffff:100::/64	virtual home link
LinkX	global	3ffe:501:ffff:102::/64	
LinkY	global	3ffe:501:ffff:103::/64	
LinkZ	global	3ffe:501:ffff:104::/64	CN0 home Link
HA0 (Link0)	global	3ffe:501:ffff:100:200:ff:fe00:a0a0	
	link-local	fe80:: 200:ff:fe00:a0a0	
	ether	00:00:00:00:a0:a0	
R1 (LinkX)	global	3ffe:501:ffff:102:200:ff:fe00:a4a4	
	link-local	fe80:: 200:ff:fe00:a4a4	
	ether	00:00:00:00:a4:a4	
R2 (LinkY)	global	3ffe:501:ffff:103:200:ff:fe00:a6a6	
	link-local	fe80:: 200:ff:fe00:a6a6	
	ether	00:00:00:00:a6:a6	
CN0 (LinkZ)	global	3ffe:501:ffff:104:200:ff:fe00:a8a8	
	link-local	fe80:: 200:ff:fe00:a8a8	
	ether	00:00:00:00:a8:a8	
CN0Y	global	3ffe:501:ffff:103:200:ff:fe00:a8a8	
CN0X	global	3ffe:501:ffff:102:200:ff:fe00:a8a8	
NUT0 (Link0)	global	3ffe:501:ffff:100::<InterfaceID>	Home address
	link-local	fe80::< InterfaceID>	
	ether	<InterfaceID>	
NUTX (LinkX)	global	3ffe:501:ffff:102::<InterfaceID>	Care-of address
NUTY (LinkY)	global	3ffe:501:ffff:103::<InterfaceID>	Care-of address
NUTY (LinkZ)	global	3ffe:501:ffff:104::<InterfaceID>	Care-of address
NUTZ (LinkZ)	global	3ffe:501:ffff:104::<InterfaceID>	Care-of address

3 Common Setup

3.1 Common Setup-1

- Reboot NUT
- Enable MN function
  - Turn on MN functions
- Initialize IPsec configuration
- Set IPsec configuration

  The tests require following configurations, If a related message is used.

  *SA7 and SA8 are not used on the all test.

  - MN-HA0 SA1/SA2, Transport mode, Binding Update/Binding Acknowledgement
    - SA1 (Transport mode, Binding Update)

SPI	0x111 (273)	
Source address	NUT0	3ffe:501:ffff:100::<Interface ID>
Destination address	HA0	3ffe:501:ffff:100:200:ff:fe00:a0a0
Mode	ESP Transport	
Upper Layer		Mobility Header (default)
		Binding Update Message (Advanced Function "Fine-Grain Selectors")
encryption algorithm	3des-cbc (default)	
	key	V6LC-111--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-111--1234567890

    - SA2 (Transport mode, Binding Acknowledgement)

SPI	0x112 (274)	
Source address	HA0	3ffe:501:ffff:100:200:ff:fe00:a0a0
Destination address	NUT0	3ffe:501:ffff:100::<Interface ID>
Mode	ESP Transport	
Upper Layer		Mobility Header (default)
		Binding Acknowledgement Message (Advanced Function "Fine-Grain Selectors")
encryption algorithm	3des-cbc (default)	
	key	V6LC-112--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-112--1234567890

  - MN-HA0 SA3/SA4, Tunnel mode, Return Routability Signaling
    - SA3 (Tunnel mode, Return Routability Signaling)

SPI	0x113 (275)

Source address	NUT0	3ffe:501:ffff:100::<Interface ID>
Destination address	HA0	3ffe:501:ffff:100:200:ff:fe00:a0a0
Mode	ESP Tunnel	
Upper Layer		Mobility Header (default)
		Home Test Init Message (Advanced Function "Fine-Grain Selectors")
encryption algorithm	3des-cbc (default)	
	key	V6LC-113--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-113--1234567890

- SA4 (Tunnel mode, Return Routability Signaling)

SPI	0x114 (276)	
Source address	HA0	3ffe:501:ffff:100:200:ff:fe00:a0a0
Destination address	NUT0	3ffe:501:ffff:100::<Interface ID>
Mode	ESP Tunnel	
Upper Layer		Mobility Header (default)
		Home Test Message (Advanced Function "Fine-Grain Selectors")
encryption algorithm	3des-cbc (default)	
	key	V6LC-114--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-114--123456

➢ MN-HA0 SA5, Transport mode, Prefix Discovery

- SA5 (Transport mode, Prefix Discovery)

SPI	0x115 (277)	
Source address	NUT0	3ffe:501:ffff:100::<Interface ID>
Destination address	HA0	3ffe:501:ffff:100:200:ff:fe00:a0a0
Mode	ESP Transport	
Upper Layer		ICMP Header (default)
		Mobile Prefix Solicitation Message (Advanced Function "Fine-Grain Selectors")
encryption algorithm	3des-cbc (default)	
	key	V6LC-115--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-115--1234567890

- SA6 (Transport mode, Prefix Discovery)

SPI	0x116 (278)	
Source address	HA0	3ffe:501:ffff:100:200:ff:fe00:a0a0
Destination address	NUT0	3ffe:501:ffff:100::<Interface ID>
Mode	ESP Transport	
Upper Layer		ICMP Header (default)

		Mobile Prefix Advertisement Message (Advanced Function "Fine-Grain Selectors")
encryption algorithm	3des-cbc (default)	
	key	V6LC-116--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-116--1234567890

- MN-HA0 SA7/SA8, Tunnel mode, Payload Packets
  - SA7 (Tunnel mode, Payload Packets)

SPI	0x117 (279)	
Source address	NUT0	3ffe:501:ffff:100::<Interface ID>
Destination address	HA0	3ffe:501:ffff:100:200:ff:fe00:a0a0
Mode	ESP Tunnel	
Upper Layer		X (No using)
encryption algorithm	3des-cbc (default)	
	key	V6LC-117--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-117--1234567890

  - SA8 (Tunnel mode, Payload Packets)

SPI	0x118 (280)	
Source address	HA0	3ffe:501:ffff:100:200:ff:fe00:a0a0
Destination address	NUT0	3ffe:501:ffff:100::<Interface ID>
Mode	ESP Tunnel	
Upper Layer		X (No using)
encryption algorithm	3des-cbc (default)	
	key	V6LC-118--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-118--123456

- MN-HA1 SA1/SA2, Transport mode, Binding Update/Binding Acknowledgement
  - SA1 (Transport mode, Binding Update)

SPI	0x211 (529)	
Source address	NUT0	3ffe:501:ffff:100::<Interface ID>
Destination address	HA1	3ffe:501:ffff:100:200:ff:fe00:a1a1
Mode	ESP Transport	
Upper Layer		Mobility Header (default)
		Binding Update Message (Advanced Function "Fine-Grain Selectors")
encryption algorithm	3des-cbc (default)	
	key	V6LC-211--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-211--1234567890

- SA2 (Transport mode, Binding Acknowledgement)

SPI	0x212 (530)	
Source address	HA1	3ffe:501:ffff:100:200:ff:fe00:a1a1
Destination address	NUT0	3ffe:501:ffff:100::<Interface ID>
Mode	ESP Transport	
Upper Layer		Mobility Header (default)
		Binding Acknowledgement Message (Advanced Function "Fine-Grain Selectors")
encryption algorithm	3des-cbc (default)	
	key	V6LC-212--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-212--1234567890

➢ MN-HA1 SA3/SA4, Tunnel mode, Return Routability Signaling

- SA3 (Tunnel mode, Return Routability Signaling)

SPI	0x213 (531)	
Source address	NUT0	3ffe:501:ffff:100::<Interface ID>
Destination address	HA1	3ffe:501:ffff:100:200:ff:fe00:a1a1
Mode	ESP Tunnel	
Upper Layer		Mobility Header (default)
		Home Test Init Message (Advanced Function "Fine-Grain Selectors")
encryption algorithm	3des-cbc (default)	
	key	V6LC-213--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-213--1234567890

- SA4 (Tunnel mode, Return Routability Signaling)

SPI	0x214 (532)	
Source address	HA1	3ffe:501:ffff:100:200:ff:fe00:a1a1
Destination address	NUT0	3ffe:501:ffff:100::<Interface ID>
Mode	ESP Tunnel	
Upper Layer		Mobility Header (default)
		Home Test Message (Advanced Function "Fine-Grain Selectors")
encryption algorithm	3des-cbc (default)	
	key	V6LC-214--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-214--123456

➢ MN-HA1 SA5/SA6, Transport mode, Prefix Discovery

- SA5 (Transport mode, Prefix Discovery)

SPI	0x215 (533)	
Source address	NUT0	3ffe:501:ffff:100::<Interface ID>

Destination address	HA1	3ffe:501:ffff:100:200:ff:fe00:a1a1
Mode	ESP Transport	
Upper Layer		ICMP Header (default)
		Mobile Prefix Solicitation Message (Advanced Function "Fine-Grain Selectors")
encryption algorithm	3des-cbc (default)	
	key	V6LC-215--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-215--1234567890

- SA6 (Transport mode, Prefix Discovery)

SPI	0x216 (534)	
Source address	HA1	3ffe:501:ffff:100:200:ff:fe00:a1a1
Destination address	NUT0	3ffe:501:ffff:100::<Interface ID>
Mode	ESP Transport	
Upper Layer		ICMP Header (default)
		Mobile Prefix Advertisement Message (Advanced Function "Fine-Grain Selectors")
encryption algorithm	3des-cbc (default)	
	key	V6LC-216--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-216--1234567890

➢ MN-HA1 SA7/SA8, Tunnel mode, Payload Packets

- SA7 (Tunnel mode, Payload Packets)

SPI	0x217 (535)	
Source address	NUT0	3ffe:501:ffff:100::<Interface ID>
Destination address	HA1	3ffe:501:ffff:100:200:ff:fe00:a1a1
Mode	ESP Tunnel	
Upper Layer		X (No using)
encryption algorithm	3des-cbc (default)	
	key	V6LC-217--12345678901234
Authentication algorithm	hmac-sha1 (default)	
	key	V6LC-217--1234567890

- SA8 (Tunnel mode, Payload Packets)

SPI	0x218 (536)	
Source address	HA1	3ffe:501:ffff:100:200:ff:fe00:a1a1
Destination address	NUT0	3ffe:501:ffff:100::<Interface ID>
Mode	ESP Tunnel	
Upper Layer		X (No using)
encryption algorithm	3des-cbc (default)	
	key	V6LC-218--12345678901234
Authentication	hmac-sha1 (default)	

algorithm	key	V6LC-218--123456

4 Common Initialization

None

5 Common Packets

5.1 ICMPv6 Router Solicitation

5.1.1 Router Solicitation

IPv6 Header	Source Address	(link-local/global)
	Destination Address	(All-routers multicast address)
ICMPv6 Header	Type	133
Source Link Layer Option	Type	1
	Link Layer Address	(ether)

5.2 ICMPv6 Router Advertisement

5.2.1 Router Advertisement (Router)

IPv6 Header	Source Address	(link-local/global)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
	H Flag	0
Prefix Information Option	Type	3
	A Flag	1
	R Flag	0/1
	Prefix	(prefix/global)

5.2.2 Router Advertisement (Home Agent)

IPv6 Header	Source Address	(link-local/global)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
	H Flag	1
Prefix Information Option	Type	3
	R Flag	1
	Prefix	(global)
Home Agent Information Option	Type	8
	Preference	>0
	Lifetime	>0

5.3 ICMPv6 Neighbor Solicitation

5.3.1 Neighbor Solicitation (Duplicate Address Detection)

IPv6 Header	Source Address	0::0 (Unspecified address)
	Destination Address	(Solicited-node multicast address)
ICMPv6 Header	Type	135
	Target Address	(link-local/global)

5.3.2 Neighbor Solicitation (Address Resolution)

IPv6 Header	Source Address	(link-local/global)
	Destination Address	(Solicited-node multicast address)
ICMPv6 Header	Type	135
	Target Address	(global)
Source Link Layer Option	Type	1
	Link Layer Address	(ether)

5.3.3 Neighbor Solicitation (Neighbor Unreachability Detection)

IPv6 Header	Source Address	(link-local/global)
	Destination Address	(link-local/global)
ICMPv6 Header	Type	135
	Target Address	(link-Local/global)

5.4 ICMPv6 Neighbor Advertisement

5.4.1 Neighbor Advertisement (unsolicited)

IPv6 Header	Source Address	(link-local/global)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	136
	S Flag	0
	Target Address	(link-local/global)
Target Link Layer Option	Type	2
	Link Layer Address	(ether)

5.4.2 Neighbor Advertisement (solicited)

IPv6 Header	Source Address	(link-local/global)
	Destination Address	(link-local/global)
ICMPv6 Header	Type	136
	S Flag	1
	Target Address	(link-local/global)
Target Link Layer Option	Type	2
	Link Layer Address	(ether)

5.5 ICMPv6 Destination Unreachable

5.5.1 Destination Unreachable

IPv6 Header	Source Address	(global)
	Destination Address	(global)
ICMPv6 Header	Type	1
	Code	3
	Payload Date	Any

5.5.2 Destination Unreachable (tunneled)

IPv6 Header	Source Address	(global)
	Destination Address	(global)
IPv6 Header	Source Address	(global)
	Destination Address	(global)
ICMPv6 Header	Type	1
	Code	3
	Payload Date	Any

5.6 ICMPv6 Parameter Problem

5.6.1 Parameter Problem

IPv6 Header	Source Address	(global)
	Destination Address	(global)
ICMPv6 Header	Type	4
	Code	0/1/2
	Pointer	Any
	Payload Date	Any

5.6.2 Parameter Problem (tunneled)

IPv6 Header	Source Address	(global)
	Destination Address	(global)
IPv6 Header	Source Address	(global)
	Destination Address	(global)
ICMPv6 Header	Type	4
	Code	0/1/2
	Pointer	Any
	Payload Date	Any

5.7 ICMPv6 Echo request

5.7.1 Echo request

IPv6 Header	Source Address	HA/CN (global)
	Destination Address	MN (global)
ICMPv6 Header	Type	128
	Code	0
	Identifier	Any
	Sequence Number	Any
	Payload Data	Any

5.7.2 Echo request (tunneled)

IPv6 Header	Source Address	HA (global)
	Destination Address	MN (care-of , global)
IPv6 Header	Source Address	HA/CN (global)
	Destination Address	MN (home, global)
ICMPv6 Header	Type	128
	Code	0
	Identifier	Any
	Sequence Number	Any
	Payload Data	Any

5.7.3 Echo request w/ Type2 Routing Header

a) from HA to MN, basic

IPv6 Header	Source Address	HA (global)
	Destination Address	MN (care-of, global)
Type 2 Routing Header	Home Address	MN (home, global)
Encapsulating Security Payload	Security Parameters Index	Any
	Sequence Number	Any
	Initialization Vector	Any
ICMPv6 Header	Type	128
	Code	0
	Identifier	Any
	Sequence Number	Any
	Payload Data	Any

b) from HA to MN, Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA (global)
	Destination Address	MN (care-of, global)
Type 2 Routing Header	Home Address	MN (home, global)
ICMPv6 Header	Type	128
	Code	0
	Identifier	Any
	Sequence Number	Any
	Payload Data	Any

c) from CN to MN

IPv6 Header	Source Address	CN (global)
	Destination Address	MN (care-of, global)
Type 2 Routing Header	Home Address	MN (home, global)
ICMPv6 Header	Type	128
	Code	0
	Identifier	Any
	Sequence Number	Any
	Payload Data	Any

5.7.4 Echo request w/ Home Address option (tunneled)

IPv6 Header	Source Address	HA A (global)
	Destination Address	MN A (care-of, global)
IPv6 Header	Source Address	MN B (care-of, global)
	Destination Address	MN A (home, global)
Destination Option Header	Home Address	MN B (home, global)
ICMPv6 Header	Type	128
	Code	0
	Identifier	Any
	Sequence Number	Any
	Payload Data	Any

5.7.5 Echo request w/ Type2 Routing Header and Home Address option

IPv6 Header	Source Address	MN B (care-of, global)
	Destination Address	MN A (care-of, global)
Type 2 Routing Header	Home Address	MN A (home, global)
Destination Option Header	Home Address	MN B (home, global)
ICMPv6 Header	Type	128
	Code	0
	Identifier	Any
	Sequence Number	Any
	Payload Data	Any

5.8 ICMPv6 Echo reply

5.8.1 Echo reply

IPv6 Header	Source Address	MN (global)
	Destination Address	HA/CN (global)
ICMPv6 Header	Type	129
	Code	0
	Identifier	Any
	Sequence Number	Any
	Payload Data	Any

5.8.2 Echo reply (tunneled)

IPv6 Header	Source Address	MN (care-of, global)
	Destination Address	HA (global)
IPv6 Header	Source Address	MN (home, global)
	Destination Address	HA/CN (global)
ICMPv6 Header	Type	129
	Code	0
	Identifier	Any
	Sequence Number	Any
	Payload Data	Any

5.8.3 Echo reply w/ Home Address option

a) from MN to HA, Basic

IPv6 Header	Source Address	MN (care-of, global)
	Destination Address	HA (global)
Destination Option Header	Home Address	MN (home, global)
Encapsulating Security Payload	Security Parameters Index	Any
	Sequence Number	Any
	Initialization Vector	Any
ICMPv6 Header	Type	129
	Code	0
	Identifier	Any
	Sequence Number	Any
	Payload Data	Any

b) from MN to HA, Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	MN (care-of, global)
	Destination Address	HA (global)
Destination Option Header	Home Address	MN (home, global)
ICMPv6 Header	Type	129
	Code	0
	Identifier	Any
	Sequence Number	Any
	Payload Data	Any

c) from MN to CN

IPv6 Header	Source Address	MN (care-of, global)
	Destination Address	CN (global)
Destination Option Header	Home Address	MN (home, global)
ICMPv6 Header	Type	129
	Code	0
	Identifier	Any
	Sequence Number	Any
	Payload Data	Any

5.8.4 Echo reply w/ Type2 Routing Header and Home Address option

IPv6 Header	Source Address	MN-A (care-of, global)
	Destination Address	MN-B (care-of, global)
Type 2 Routing Header	Home Address	MN-B (home, global)
Destination Option Header	Home Address	MN-A (home, global)
ICMPv6 Header	Type	129
	Code	0
	Identifier	Any
	Sequence Number	Any
	Payload Data	Any

5.9 Binding Refresh Request

5.9.1 Binding Refresh Request

IPv6 Header	Source Address	CN (global)
	Destination Address	MN (home, global)
Mobility Header	Payload Proto	59
	Header Len	0
	MH Type	0
	Reserved	0
	Checksum	Any
	Reserved	0

5.9.2 Binding Refresh Request (tunneled)

a) Basic

IPv6 Header	Source Address	HA (global)
	Destination Address	MN (care-of, global)
Encapsulating Security Payload	Security Parameters Index	Any
	Sequence Number	Any
	Initialization Vector	Any
IPv6 Header	Source Address	CN (global)
	Destination Address	MN (home, global)
Mobility Header	Payload Proto	59
	Header Len	0
	MH Type	0
	Reserved	0
	Checksum	Any
	Reserved	0

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA (global)
	Destination Address	MN (care-of, global)
IPv6 Header	Source Address	CN (global)
	Destination Address	MN (home, global)
Mobility Header	Payload Proto	59
	Header Len	0
	MH Type	0
	Reserved	0
	Checksum	Any
	Reserved	0

5.10 MIPv6 Home Test Init

5.10.1 Home Test Init

IPv6 Header	Source Address	MN (home, global)
	Destination Address	CN (global)
Mobility Header	Payload Prot	59
	Header Len	1
	MH Type	1
	Reserved	0
	Checksum	Any
	Reserved	0
	Hot Init Cookie	Any

5.10.2 Home Test Init (tunneled)

IPv6 Header	Source Address	MN (care-of, global)
	Destination Address	HA (global)
Encapsulating Security Payload	Security Parameters Index	Any
	Sequence Number	Any
	Initialization Vector	Any
IPv6 Header	Source Address	MN (home, global)
	Destination Address	CN (global)
Mobility Header	Payload Prot	59
	Header Len	1
	MH Type	1
	Reserved	0
	Checksum	Any
	Reserved	0
	Hot Init Cookie	Any

5.10.3 Home Test Init from other MN B (tunneled)

a) Basic

IPv6 Header	Source Address	HA A (global)
	Destination Address	MN A (care-of, global)
Encapsulating Security Payload	Security Parameters Index	Any
	Sequence Number	Any
	Initialization Vector	Any
IPv6 Header	Source Address	MN B (home, global)
	Destination Address	MN A (home, global)
Mobility Header	Payload Prot	59
	Header Len	1
	MH Type	1
	Reserved	0
	Checksum	Any
	Reserved	0
	Hot Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA A (global)
	Destination Address	MN A (care-of, global)
IPv6 Header	Source Address	MN B (home, global)
	Destination Address	MN A (home, global)
Mobility Header	Payload Prot	59
	Header Len	1
	MH Type	1
	Reserved	0
	Checksum	Any
	Reserved	0
	Hot Init Cookie	Any

5.11 MIPv6 Care-of Test Init

5.11.1 Care-of Test Init

IPv6 Header	Source Address	MN (care-of, global)
	Destination Address	CN (global)
Mobility Header	Payload Prot	59
	Header Len	1
	MH Type	2
	Reserved	0
	Checksum	Any
	Reserved	0
	Care-of Init Cookie	Any

5.11.2 Care-of Test Init from other MN B (tunneled)

a) Basic

IPv6 Header	Source Address	HA A (global)
	Destination Address	MN A (care-of, global)
Encapsulating Security Payload	Security Parameters Index	Any
	Sequence Number	Any
	Initialization Vector	Any
IPv6 Header	Source Address	MN B (care-of, global)
	Destination Address	MN A (home, global)
Mobility Header	Payload Prot	59
	Header Len	1
	MH Type	2
	Reserved	0
	Checksum	Any
	Reserved	0
	Care-of Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA A (global)
	Destination Address	MN A (care-of, global)
IPv6 Header	Source Address	MN B (care-of, global)
	Destination Address	MN A (home, global)
Mobility Header	Payload Prot	59
	Header Len	1
	MH Type	2
	Reserved	0
	Checksum	Any
	Reserved	0
	Care-of Init Cookie	Any

5.12 MIPv6 Home Test

5.12.1 Home Test

IPv6 Header	Source Address	CN (global)
	Destination Address	MN (home, global)
Mobility Header	Payload Prot	59
	Header Len	2
	MH Type	3
	Reserved	0
	Checksum	Any
	Home Nonce Index	Any
	Home Init Cookie	0
	Home Keygen Token	Any

5.12.2 Home Test (tunneled)

IPv6 Header	Source Address	HA (global)
	Destination Address	MN (care-of, global)
Encapsulating Security Payload	Security Parameters Index	Any
	Sequence Number	Any
	Initialization Vector	Any
IPv6 Header	Source Address	CN (global)
	Destination Address	MN (home, global)
Mobility Header	Payload Prot	59
	Header Len	2
	MH Type	3
	Reserved	0
	Checksum	Any
	Home Nonce Index	Any
	Home Init Cookie	0
	Home Keygen Token	Any

5.12.3 Home Test to other MN B (tunneled)

a) Basic

IPv6 Header	Source Address	MN A (care-of, global)
	Destination Address	HA A (global)
Encapsulating Security Payload	Security Parameters Index	Any
	Sequence Number	Any
	Initialization Vector	Any
IPv6 Header	Source Address	MN A (home, global)
	Destination Address	MN B (home, global)
Mobility Header	Payload Prot	59
	Header Len	2
	MH Type	3
	Reserved	0
	Checksum	Any
	Home Nonce Index	Any
	Home Init Cookie	0
	Home Keygen Token	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	MN A (care-of, global)
	Destination Address	HA A (global)
IPv6 Header	Source Address	MN A (home, global)
	Destination Address	MN B (home, global)
Mobility Header	Payload Prot	59
	Header Len	2
	MH Type	3
	Reserved	0
	Checksum	Any
	Home Nonce Index	Any
	Home Init Cookie	0
	Home Keygen Token	Any

5.13 MIPv6 Care-of Test

5.13.1 Care-of Test

IPv6 Header	Source Address	CN (global)
	Destination Address	MN (care-of, global)
Mobility Header	Payload Prot	59
	Header Len	2
	MH Type	4
	Reserved	0
	Checksum	Any
	Care-of Nonce Index	Any
	Care-of Init Cookie	Any
	Care-of Keygen Token	Any

5.13.2 Care-of Test to other MN B (tunneled)

a) Basic

IPv6 Header	Source Address	MN A (care-of, global)
	Destination Address	HA (global)
Encapsulating Security Payload	Security Parameters Index	Any
	Sequence Number	Any
	Initialization Vector	Any
IPv6 Header	Source Address	MN A (home, global)
	Destination Address	MN B (care-of, global)
Mobility Header	Payload Prot	59
	Header Len	2
	MH Type	4
	Reserved	0
	Checksum	Any
	Care-of Nonce Index	Any
	Care-of Init Cookie	Any
	Care-of Keygen Token	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	MN A (care-of, global)
	Destination Address	HA (global)
IPv6 Header	Source Address	MN A (home, global)
	Destination Address	MN B (care-of, global)
Mobility Header	Payload Prot	59
	Header Len	2
	MH Type	4
	Reserved	0
	Checksum	Any
	Care-of Nonce Index	Any
	Care-of Init Cookie	Any
	Care-of Keygen Token	Any

5.14 MIPv6 Binding Update

5.14.1 Binding Update to HA at foreign link/home link

IPv6 Header	Source Address	MN (care-of/home, global)
	Destination Address	HA (global)
Destination Option Header	Home Address	MN (home, global)
Encapsulating Security Payload	Security Parameter Index	Any
	Sequence	Any
	Initialization Vector	Any
Mobility Header	Payload Prot	59
	Header Len	3
	MH Type	5
	Reserved	0
	Checksum	Any
	Sequence Number	Any
	A Flag	1
	H Flag	1
	L Flag	Any
	K Flag	Any
	Reserved	0
	Lifetime	Any
Alternate Care-of Address Option	Type	3
	Option Length	16
	Address	MN (care-of/home, global)

5.14.2 Binding Update to HA at home link

IPv6 Header	Source Address	MN (home, global)
	Destination Address	HA (global)
Encapsulating Security Payload	Security Parameter Index	Any
	Sequence	Any
	Initialization Vector	Any
Mobility Header	Payload Prot	59
	Header Len	3
	MH Type	5
	Reserved	0
	Checksum	Any
	Sequence Number	Any
	A Flag	1
	H Flag	1
	L Flag	Any
	K Flag	Any
	Reserved	0
	Lifetime	0
Alternate Care-of Address Option	Type	3
	Option Length	16
	Address	MN (home, global)

5.14.3 Binding Update to CN at foreign link/home link

IPv6 Header	Source Address	MN (care-of/home, global)
	Destination Address	CN (global)
Destination Option Header	Home Address	MN (home, global)
Mobility Header	Payload Prot	59
	Header Len	3
	MH Type	5
	Reserved	0
	Checksum	Any
	Sequence Number	Any
	A Flag	Any
	H Flag	0
	L Flag	0
	K Flag	0
	Reserved	0
	Lifetime	Any
Nonce Indices Option	Option Type	4
	Option Length	4
	Home Nonce Index	Any
	Care-of Nonce Index	Any
Binding Authorization Data Option	Option Type	5
	Option Length	12
	Authenticator	Any

5.14.4 Binding Update to CN at home link

IPv6 Header	Source Address	MN (home, global)
	Destination Address	CN (global)
Mobility Header	Payload Prot	59
	Header Len	3
	MH Type	5
	Reserved	0
	Checksum	Any
	Sequence Number	Any
	A Flag	Any
	H Flag	0
	L Flag	0
	K Flag	0
	Reserved	0
	Lifetime	0
Nonce Indices Option	Option Type	4
	Option Length	4
	Home Nonce Index	Any
	Care-of Nonce Index	Any
Binding Authorization Data Option	Option Type	5
	Option Length	12
	Authenticator	Any

5.14.5 Binding Update from other MN B (tunneled)

a) Basic

IPv6 Header	Source Address	HA A (global)
	Destination Address	MN (care-of, global)
Encapsulating Security Payload	Security Parameter Index	Any
	Sequence	Any
	Initialization Vector	Any
IPv6 Header	Source Address	MN B (care-of, global)
	Destination Address	MN A (home, global)
Destination Option Header	Home Address	MN B (home, global)
Mobility Header	Payload Prot	59
	Header Len	3
	MH Type	5
	Reserved	0
	Checksum	Any
	Sequence Number	Any
	A Flag	Any
	H Flag	0
	L Flag	0
	K Flag	0
	Reserved	0
	Lifetime	Any
Nonce Indices Option	Option Type	4
	Option Length	4
	Home Nonce Index	Any
	Care-of Nonce Index	Any
Binding Authorization Data Option	Option Type	5
	Option Length	12
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA A (global)
	Destination Address	MN A (care-of, global)
IPv6 Header	Source Address	MN B (care-of, global)
	Destination Address	MN A (home, global)
Destination Option Header	Home Address	MN B (home, global)
Mobility Header	Payload Prot	59
	Header Len	3
	MH Type	5
	Reserved	0
	Checksum	Any
	Sequence Number	Any
	A Flag	Any
	H Flag	0
	L Flag	0
	K Flag	0
	Reserved	0
	Lifetime	Any
Nonce Indices Option	Option Type	4
	Option Length	4
	Home Nonce Index	Any
	Care-of Nonce Index	Any
Binding Authorization Data Option	Option Type	5
	Option Length	12
	Authenticator	Any

5.14.6 Binding Update to delete from other MN B (tunneled)

a) Basic

IPv6 Header	Source Address	HA A (global)
	Destination Address	MN A (care-of, global)
Encapsulating Security Payload	Security Parameter Index	Any
	Sequence	Any
	Initialization Vector	Any
IPv6 Header	Source Address	MN B (care-of, global)
	Destination Address	MN A (home, global)
Destination Option Header	Home Address	MN B (home, global)
Mobility Header	Payload Prot	59
	Header Len	3
	MH Type	5
	Reserved	0
	Checksum	Any
	Sequence Number	Any
	A Flag	Any
	H Flag	0
	L Flag	0
	K Flag	0
	Reserved	0
	Lifetime	Any
Alternate Care-of Address Option	Type	3
	Option Length	16
	Address	MN B (home, global)
Nonce Indices Option	Option Type	4
	Option Length	4
	Home Nonce Index	Any
	Care-of Nonce Index	Any
Binding Authorization Data Option	Option Type	5
	Option Length	12
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA A (global)
	Destination Address	MN A (care-of, global)
IPv6 Header	Source Address	MN B (care-of, global)
	Destination Address	MN A (home, global)
Destination Option Header	Home Address	MN B (home, global)
Mobility Header	Payload Prot	59
	Header Len	3
	MH Type	5
	Reserved	0
	Checksum	Any
	Sequence Number	Any
	A Flag	Any
	H Flag	0
	L Flag	0
	K Flag	0
	Reserved	0
	Lifetime	Any
Alternate Care-of Address Option	Type	3
	Option Length	16
	Address	MN B (home, global)
Nonce Indices Option	Option Type	4
	Option Length	4
	Home Nonce Index	Any
	Care-of Nonce Index	Any
Binding Authorization Data Option	Option Type	5
	Option Length	12
	Authenticator	Any

5.15 MIPv6 Binding Acknowledgement

5.15.1 Binding Acknowledge from HA at foreign link/home link

IPv6 Header	Source Address	HA (global)
	Destination Address	MN (care-of/home, global)
Type2 Routing Header	Home Address	MN (home, global)
Encapsulating Security Payload	Security Parameter Index	Any
	Sequence	Any
	Initialization Vector	Any
Mobility Header	Payload Prot	59
	Header Len	3
	MH Type	6
	Reserved	0
	Checksum	Any
	Status	Any
	K Flag	Any
	Reserved	0
	Sequence	Any
	Lifetime	Any

5.15.2 Binding Acknowledge from HA at home link

IPv6 Header	Source Address	HA (global)
	Destination Address	MN (home, global)
Encapsulating Security Payload	Security Parameter Index	Any
	Sequence	Any
	Initialization Vector	Any
Mobility Header	Payload Prot	59
	Header Len	3
	MH Type	6
	Reserved	0
	Checksum	Any
	Status	Any
	K Flag	0
	Reserved	0
	Sequence	Any
	Lifetime	0

5.15.3 Binding Acknowledge from CN at foreign link/home link

IPv6 Header	Source Address	CN (global)
	Destination Address	MN (care-of/home, global)
Type2 Routing Header	Home Address of Mobile Node	MN (home, global)
Mobility Header	Payload Prot	59
	Header Len	3
	MH Type	6
	Reserved	0
	Checksum	Any
	Status	Any
	K Flag	Any
	Reserved	0
	Sequence	Any
	Lifetime	Any
Binding Authorization Data Option	Option Type	5
	Option Length	12
	Authenticator	Any

5.15.4 Binding Acknowledge from CN at home link

IPv6 Header	Source Address	CN (global)
	Destination Address	MN (home, global)
Mobility Header	Payload Prot	59
	Header Len	3
	MH Type	6
	Reserved	0
	Checksum	Any
	Status	Any
	K Flag	Any
	Reserved	0
	Sequence	Any
	Lifetime	0
Binding Authorization Data Option	Option Type	5
	Option Length	12
	Authenticator	Any

5.15.5 Binding Acknowledge to other MN B

a) Basic

IPv6 Header	Source Address	MN A (care-of, global)
	Destination Address	HA A (global)
Encapsulating Security Payload	Security Parameter Index	Any
	Sequence	Any
	Initialization Vector	Any
IPv6 Header	Source Address	MN A (home, global)
	Destination Address	MN B (care-of, global)
Type2 Routing Header	Home Address	MN B (home, global)
Mobility Header	Payload Prot	59
	Header Len	3
	MH Type	6
	Reserved	0
	Checksum	Any
	Status	Any
	K Flag	0
	Reserved	0
	Sequence	Any
	Lifetime	Any
Binding Authorization Data Option	Option Type	5
	Option Length	12
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	MN A (care-of, global)
	Destination Address	HA A (global)
IPv6 Header	Source Address	MN A (home, global)
	Destination Address	MN B (care-of, global)
Type2 Routing Header	Home Address	MN B (home, global)
Mobility Header	Payload Prot	59
	Header Len	3
	MH Type	6
	Reserved	0
	Checksum	Any
	Status	Any
	K Flag	0
	Reserved	0
	Sequence	Any
	Lifetime	Any
Binding Authorization Data Option	Option Type	5
	Option Length	12
	Authenticator	Any

5.16 MIPv6 Binding Error

5.16.1 Binding Error

IPv6 Header	Source Address	CN (global)
	Destination Address	MN (care-of/home, global)
Mobility Header	Payload Prot	59
	Header Len	2
	MH Type	7
	Reserved	0
	Checksum	Any
	Status	1/2
	Reserved	0
	Home Address of Mobile Node	MN (global)/Unspecified

5.16.2 Binding Error from other (tunneled)

a) Basic

IPv6 Header	Source Address	HA (global)
	Destination Address	MN (care-of, global)
Encapsulating Security Payload	Security Parameters Index	Any
	Sequence Number	Any
	Initialization Vector	Any
IPv6 Header	Source Address	CN (global)
	Destination Address	MN (home, global)
Mobility Header	Payload Prot	59
	Header Len	2
	MH Type	7
	Reserved	0
	Checksum	Any
	Status	1/2
	Reserved	0
	Home Address of Mobile Node#A	MN (global)/Unspecified

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA (global)
	Destination Address	MN (care-of, global)
IPv6 Header	Source Address	CN (global)
	Destination Address	MN (home, global)
Mobility Header	Payload Prot	59
	Header Len	2
	MH Type	7
	Reserved	0
	Checksum	Any
	Status	1/2
	Reserved	0
	Home Address of Mobile Node#A	MN(global)/Unspecified

5.16.3 Binding Error to other (tunneled)

a) Basic

IPv6 Header	Source Address	MN (care-of, global)
	Destination Address	HA (global)
Encapsulating Security Payload	Security Parameters Index	Any
	Sequence Number	Any
	Initialization Vector	Any
IPv6 Header	Source Address	MN (home, global)
	Destination Address	CN (global)
Mobility Header	Payload Prot	59
	Header Len	2
	MH Type	7
	Reserved	0
	Checksum	Any
	Status	1/2
	Reserved	0
	Home Address of Mobile Node#A	MN (global)/Unspecified

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	MN (care-of, global)
	Destination Address	HA (global)
IPv6 Header	Source Address	MN (home, global)
	Destination Address	CN (global)
Mobility Header	Payload Prot	59
	Header Len	2
	MH Type	7
	Reserved	0
	Checksum	Any
	Status	1/2
	Reserved	0
	Home Address of Mobile Node#A	MN (global)/Unspecified

5.17 ICMP Home Agent Address Discovery Request

5.17.1 HAAD request

IPv6 Header	Source Address	MN (global)
	Destination Address	(Home-Agents anycast address)
ICMPv6 Header	Type	144
	Code	0
	Checksum	Any
	Identifier	Any
	Reserved	Any

5.18 ICMP Home Agent Address Discovery Reply

5.18.1 HAAD reply

IPv6 Header	Source Address	HA (global)
	Destination Address	MN (care-of, global)
ICMPv6 Header	Type	145
	Code	0
	Checksum	Any
	Identifier	Any
	Reserved	0
	Home agent Addresses	HAs (global)

5.19 ICMP Mobile Prefix Solicitation

5.19.1 MPS

IPv6 Header	Source Address	MN (care-of, global)
	Destination Address	HA (global)
Destination Option Header	Home Address of Mobile Node	MN (home,. global)
Encapsulating Security Payload	Security Parameters Index	Any
	Sequence Number	Any
	Initialization Vector	Any
ICMPv6 Header	Type	146
	Code	0
	Checksum	Any
	Identifier	Any
	Reserved	0

5.20 ICMP Mobile Prefix Advertisement

5.20.1 MPA

IPv6 Header	Source Address	HA (global)
	Destination Address	MN (care-of, global)
Type2 Routing Header	Home Address	MN (home, global)
Encapsulating Security Payload	Security Parameters Index	Any
	Sequence Number	Any
	Initialization Vector	Any
ICMPv6 Header	Type	147
	Code	0
	Checksum	Any
	Identifier	Any
	M flag	0
	O flag	0
	Reserved	0
Prefix Information Option	Type	3
	Valid Lifetime	Any
	Preferred Lifetime	Any
	Prefix	(Link0, prefix/global)

6. Test Specification: Mobile Node operation

6.1 Generate HoA

6.1.1 MN-3-1-1-1-001 - Generate HoA using RFC2462

[PURPOSE]

MN-3-1-1-1-001 - Generate HoA using RFC2462

[CATEGORY]

HOST : ADVANCED FUNCTION (REAL HOME LINK)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

NUT creates home address with RFC2462 in home link: YES

[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

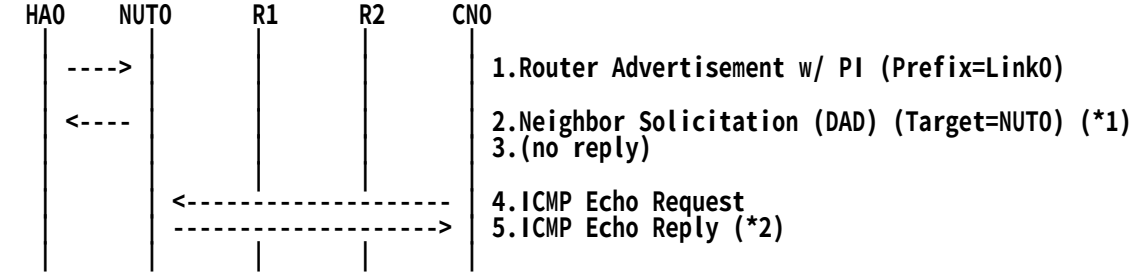
[TEST SETUP]

Refer to 3.1 Common Setup-1

[INITIALIZATION]

NONE

[PROCEDURE]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)

IPv6 Header	Source Address	HA0 (Link0, link-local)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
Prefix Information Option	Type	3
	Prefix Length	64
	A Flag	1
	Prefix	(Link0, prefix/global)

2. Receive Neighbor Solicitation (DAD). (Unspecified -> solicited-node multicast) (*1) (Refer to 5.3.1)

IPv6 Header	Source Address	0::0 (Unspecified address)
	Destination Address	NUT0 (Link0, Solicited-node multicast address)
ICMPv6 Header	Type	135
	Target Address	NUT0 (Link0, link-local)

3. (no reply)
   # Wait during 1 second.
4. Send ICMP Echo Request. (CN0 -> NUT0) (Refer to 5.7.1)
   # Destination address is set to Home Address of mobile node.

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

5. Receive ICMP Echo Reply. (NUT0 -> CN0) (*2) (Refer to 5.8.1)

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: HA0 receives Neighbor Solicitation(DAD).
Then, check whether this packet fills all of the following.
- The target address is a link local address.

(*2) PASS: CN0 receives ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6

6.1.2 MN-3-1-1-1-009 - Set the static home prefix at home-link

[PURPOSE]

MN-3-1-1-1-009 - Set the static home prefix at home-link

[CATEGORY]

HOST : ADVANCED FUNCTION (REAL HOME LINK)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

NUT has home prefix and creates home address with RFC2462: YES

[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

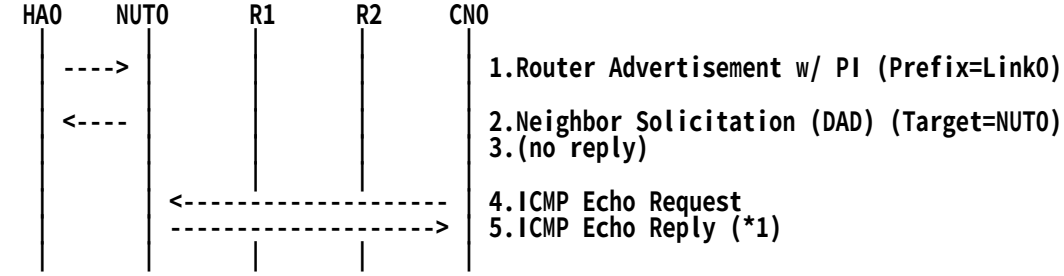
[TEST SETUP]

Refer to 3.1 Common Setup-1

[INITIALIZATION]

NONE

[PROCEDURE]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)

IPv6 Header	Source Address	HA0 (Link0, link-local)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
Prefix Information Option	Type	3
	Prefix Length	64
	Prefix	(Link0, prefix/global)

2. Receive Neighbor Solicitation (DAD). (Unspecified -> solicited-node multicast) (Refer to 5.3.1)

IPv6 Header	Source Address	0::0 (Unspecified address)
	Destination Address	NUT0 (Link0, Solicited-node multicast address)
ICMPv6 Header	Type	135
	Target Address	NUT0 (Link0, link-local/global)

3. (no reply)

Wait during 1 second.

4. Send ICMP Echo Request. (CN0 -> NUT0) (Refer to 5.7.1)

Destination address is set to Home Address of mobile node.

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

5. Receive ICMP Echo Reply. (NUT0 -> CN0) (*1) (Refer to 5.8.1)

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6

6.1.3 MN-3-1-1-1-010 - Set the static home prefix at foreign-link

[PURPOSE]

MN-3-1-1-1-010 - Set the static home prefix at foreign-link

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NUT has home prefix and creates home address with RFC2462: YES

[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

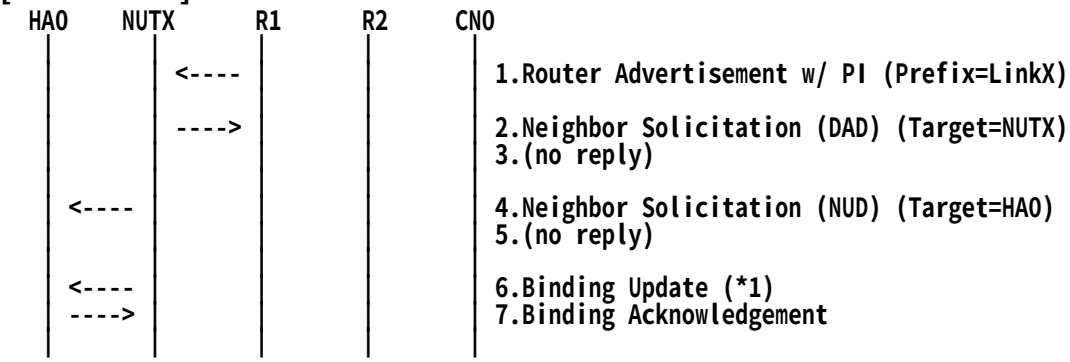
[TEST SETUP]

Refer to 3.1 Common Setup-1

[INITIALIZATION]

NONE

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

IPv6 Header	Source Address	R1 (LinkX, link-local)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
Prefix Information Option	Type	3
	Prefix Length	64
	A Flag	1
	Prefix	(LinkX, prefix/global)

2. Receive Neighbor Solicitation (DAD). (Unspecified -> solicited-node multicast) (Refer to 5.3.1)

IPv6 Header	Source Address	0::0 (Unspecified address)
	Destination Address	NUTX (LinkX, Solicited-node multicast address)
ICMPv6 Header	Type	135
	Target Address	NUTX (LinkX, link-local)

3. (no reply)
   # Wait during 1 second.
4. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
5. (no reply)

Wait during a maximum of 3 seconds(RFC2461).

6. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

7. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update.

Then, check whether this packet fills all of the following.

- Home Address destination option is set to a static address.

[REFERENCES]

RFC3775 Mobility Support in IPv6

6.2 Generate CoA

6.2.1 MN-3-2-1-1-001 - Generate CoA using RFC2462 at foreign-link

[PURPOSE]

MN-3-2-1-1-001 - Generate CoA using RFC2462 at foreign-link

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

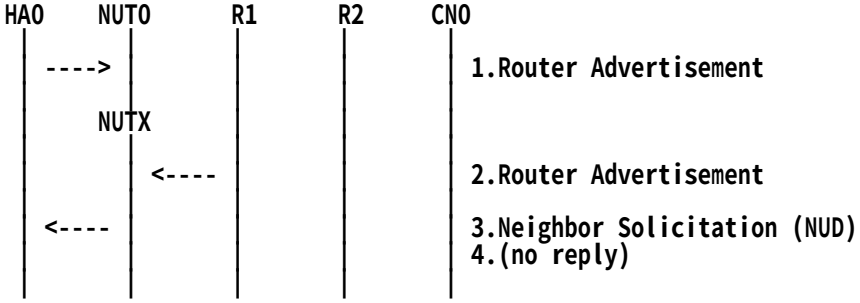
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

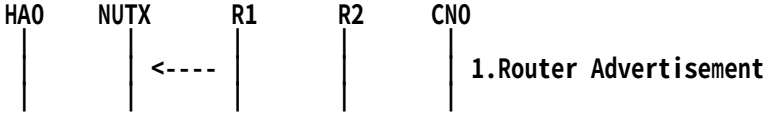
[INITIALIZATION]

- In the case of Real Home Link



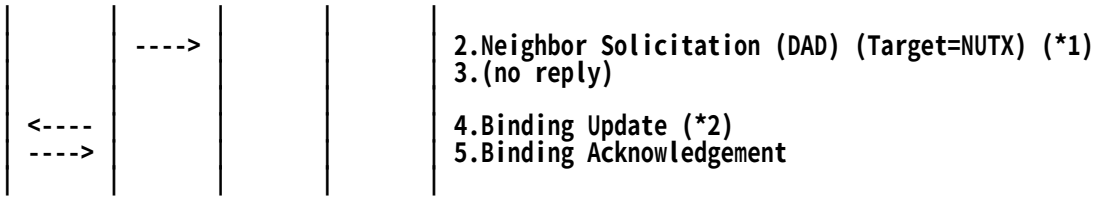
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

IPv6 Header	Source Address	R1 (LinkX, link-local)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
Prefix Information Option	Type	3
	Prefix Length	64
	A Flag	1
	Prefix	(LinkX, prefix/global)

2. Receive Neighbor Solicitation (DAD). (Unspecified -> solicited-node multicast) (*1) (Refer to 5.3.1)

IPv6 Header	Source Address	0::0 (Unspecified address)
	Destination Address	NUTX (LinkX, Solicited-node multicast address)
ICMPv6 Header	Type	135
	Target Address	NUTX (LinkX, link-local)

3. (no reply)

Wait during a maximum of 3 seconds(RFC2461).

4. Receive Binding Update. (NUTX -> HA0) (*2) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

5. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: R1 receives Neighbor Solicitation(DAD).
Then, check whether this packet fills all of the following.
- The target address is a link local address.

(*2) PASS: HA0 receives Binding Update.
Then, check whether this packet fills all of the following.
- Alternate Care-of Address option is set to a Care-of Address.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.5.2

6.3 Movement Detection

6.3.1 MN-3-3-1-1-003 - Use Neighbor Unreachability Detection (Target Address=global)

[PURPOSE]

MN-3-3-1-1-003 - Use Neighbor Unreachability Detection (Target Address=global)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

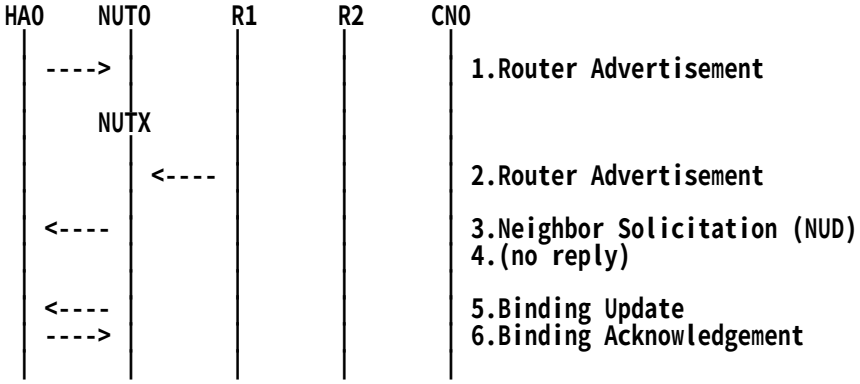
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

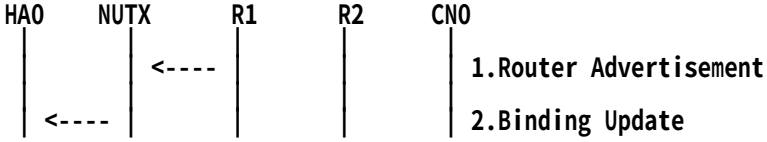
[INITIALIZATION]

- In the case of Real Home Link



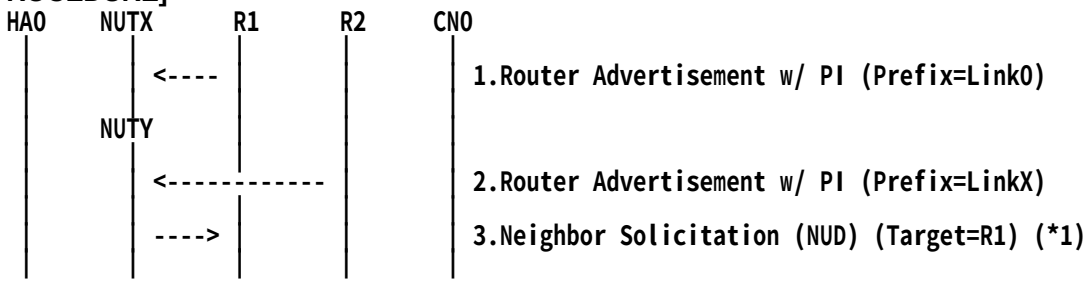
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

IPv6 Header	Source Address	R1 (LinkX, link-local)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
Prefix Information Option	Type	3
	Prefix Length	64
	Prefix	(LinkX, prefix/global)

2. Send Router Advertisement. (R2 -> R2_allnode_multi) (Refer to 5.2.1)

IPv6 Header	Source Address	R2 (LinkY, link-local)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
Prefix Information Option	Type	3
	Prefix Length	64
	Prefix	(LinkY, prefix/global)

3. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (*1) (Refer to 5.3.3)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	R1 (LinkX, global)
ICMPv6 Header	Type	135
	Target Address	R1 (LinkX, global)

[JUDGMENT]

(*1) PASS: R1 receives Neighbor Solicitation(NUD).
Then, check whether this packet fills all of the following.
- The target address is set to R1 global address of Router Advertisement[1].

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.5.1

6.3.2 MN-3-3-1-1-005 - Routers use the Router Address (R) bit (The link-local addresses of Routers are not globally unique)

[PURPOSE]

MN-3-3-1-1-005 - Routers use the Router Address (R) bit (The link-local addresses of Routers are not globally unique)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

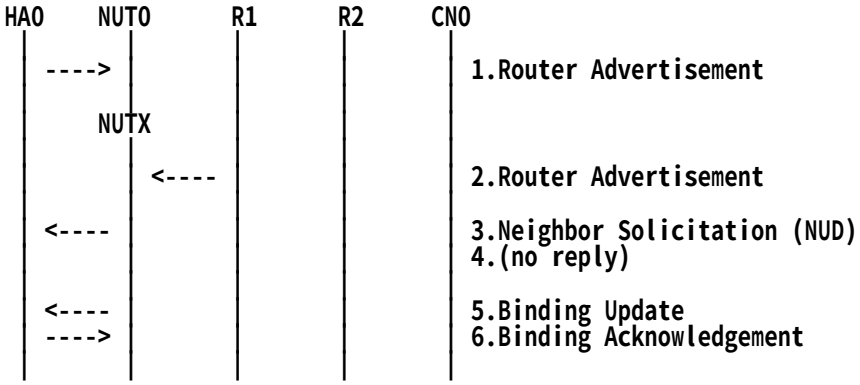
Refer to 2.1.1.2 Common Topology-2

[TEST SETUP]

Refer to 3.1 Common Setup-1

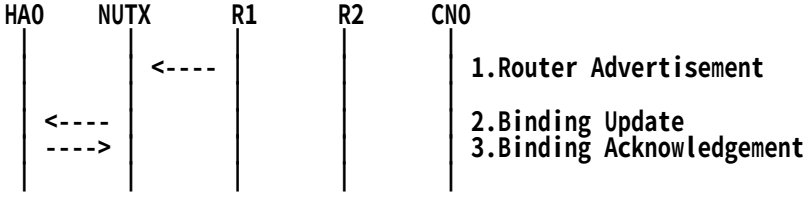
[INITIALIZATION]

- In the case of Real Home Link



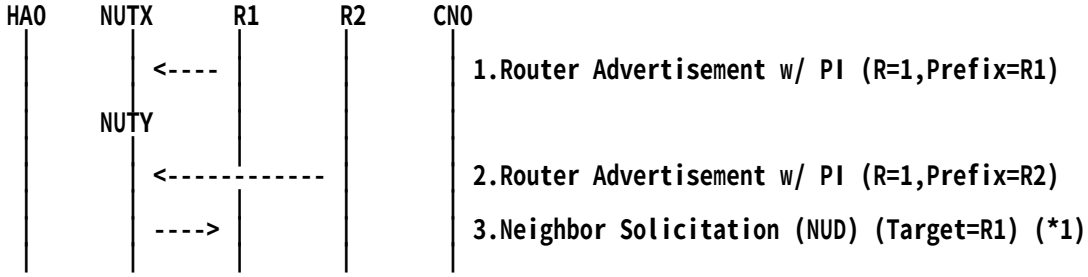
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
   # Link Local Address is same of R2 (fe80::200:ff:fe00:a4a4)
   # The Router Address (R) bit is ON, since that provides a global address of R1.

IPv6 Header	Source Address	R1 (LinkX, link-local)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
Prefix Information Option	Type	3
	Prefix Length	64
	R Flag	1
	Prefix	R1 (LinkY, global)

2. Send Router Advertisement. (R2 -> R2_allnode_multi) (Refer to 5.2.1)
   # Link Local Address is same of R1 (fe80::200:ff:fe00:a4a4)
   # The Router Address (R) bit is ON, since that provides a global address of R2.

IPv6 Header	Source Address	R2 (LinkY, link-local)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
Prefix Information Option	Type	3
	Prefix Length	64
	R Flag	1
	Prefix	R2 (LinkY, global)

3. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (*1) (Refer to 5.3.3)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	R1 (LinkX, global)
ICMPv6 Header	Type	135
	Target Address	R1 (LinkX, global)

[JUDGMENT]

(*1) PASS: R1 receives Neighbor Solicitation(NUD).
Then, check whether this packet fills all of the following.
- The target address is set to R1 global address of Router Advertisement [1].

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.5.1

6.3.3 MN-3-3-1-1-002 - Use the old router when the old router is reachable

[PURPOSE]

MN-3-3-1-1-002 - Use the old router when the old router is reachable

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

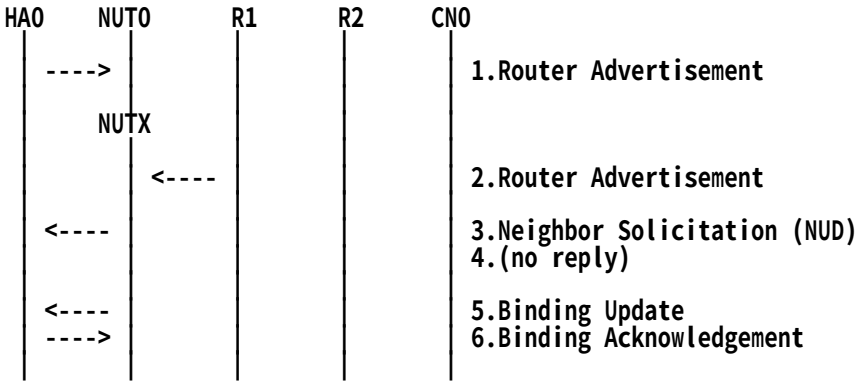
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

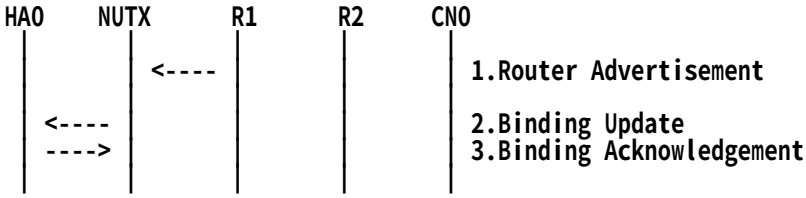
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

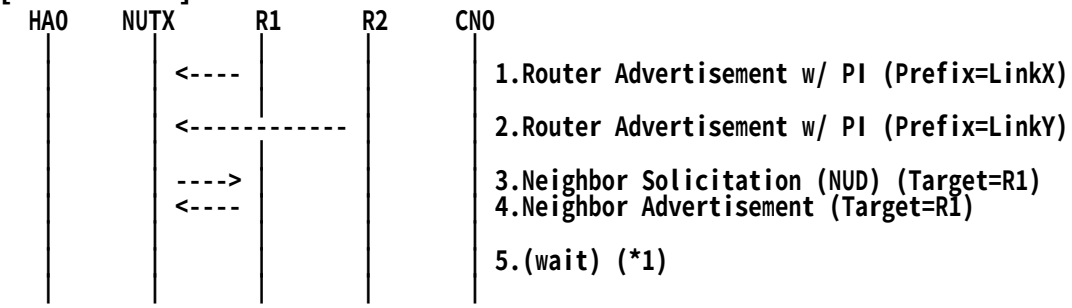
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Send Router Advertisement. (R2 -> R2_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	R1 (LinkX, global)
ICMPv6 Header	Type	135
	Target Address	R1 (LinkX, global)

4. Send Neighbor Advertisement. (R1 -> NUTX) (Refer to 5.4.2)

IPv6 Header	Source Address	R1 (LinkX, global)
	Destination Address	NUTX (LinkX, global)
ICMPv6 Header	Type	136
	R Flag	1
	S Flag	1
	Target Address	R1 (LinkX, global)
Target Link Layer Option	Link Layer Address	R1 (ether)

5. (wait) (*1)

[JUDGMENT]

(*1) PASS: HA0 does not receive Binding Update(Care-of Address NUTY).

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.5.1

6.3.4 MN-3-3-1-1-004 - Invalidate CoA on the unreachable link

[PURPOSE]

MN-3-3-1-1-004 - Invalidate CoA on the unreachable link

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

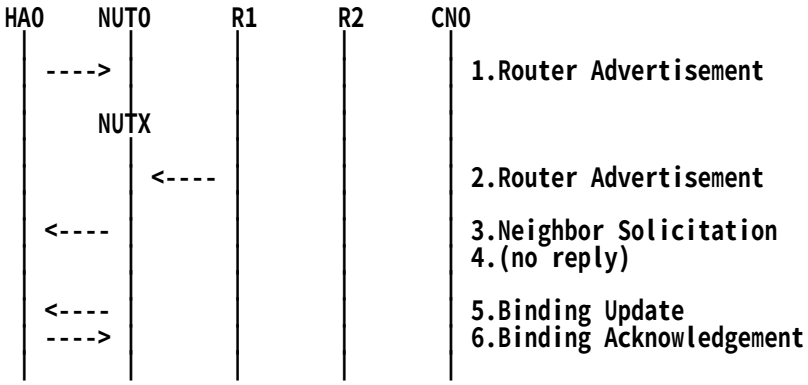
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

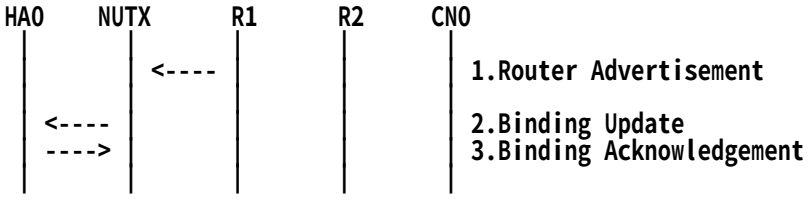
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

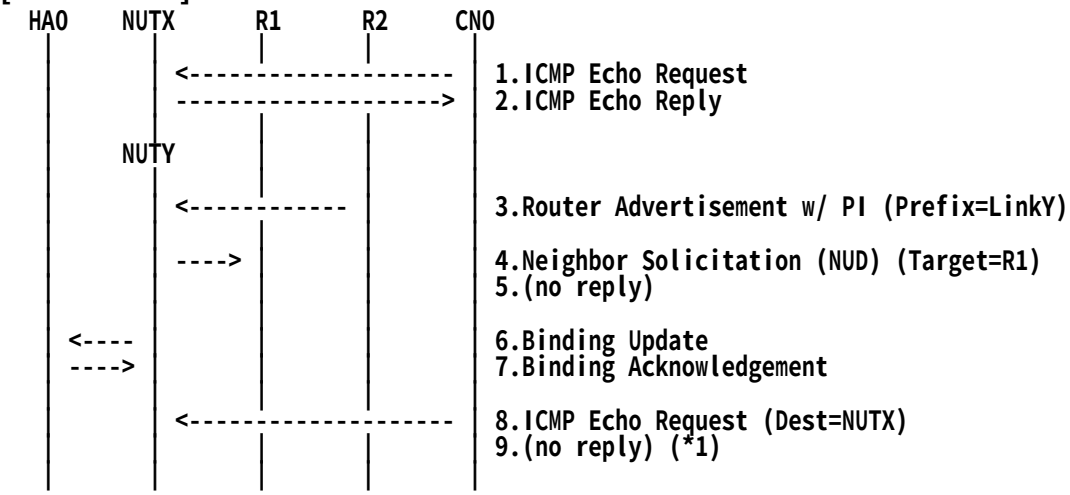
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (CN0 -> NUTX) (Refer to 5.7.1)
2. Receive ICMP Echo Reply. (NUTX -> CN0) (Refer to 5.8.1)
3. Send Router Advertisement. (R2 -> R2_allnode_multi) (Refer to 5.2.1)
4. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
5. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
6. Receive Binding Update. (NUTY -> HA0) (Refer to 5.14.1)
7. Send Binding Acknowledgement. (HA0 -> NUTY) (Refer to 5.15.1)
8. Send ICMP Echo Request. (CN0 -> NUTX) (Refer to 5.7.1)
   # The Destination Address is set to old Care-of Address.

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
ICMPv6 Header	Type	128

9. (no reply) (*1)

[JUDGMENT]

(*1) PASS: CN0 does not receive ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.5.3

6.4 Home Registration

6.4.1 Sending BU

6.4.1.1 MN-2-1-1-1-001 - Sending BU (after moving from home)

[PURPOSE]

MN-2-1-1-1-001 - Sending BU (after moving from home)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

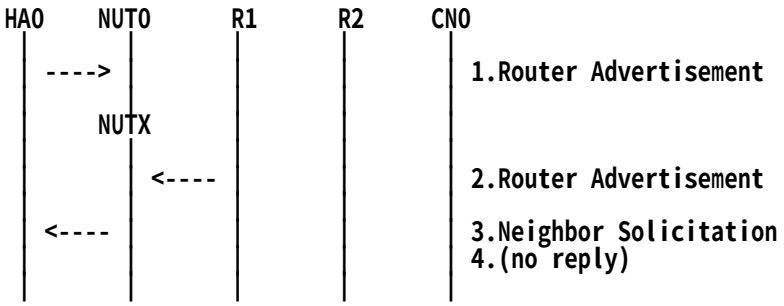
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

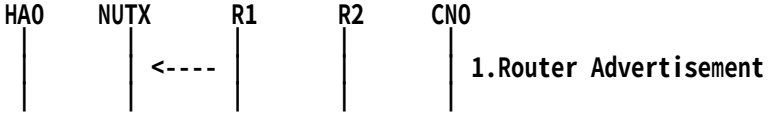
[INITIALIZATION]

- In the case of Real Home Link



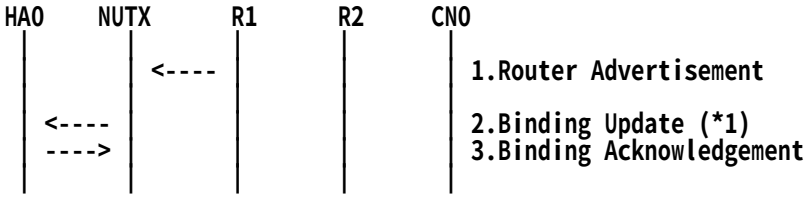
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1 SPI
Mobility Header	MH Type	5
	Sequence Number	Any
	A Flag	1
	H Flag	1
	L Flag	0/1
	Rserved	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update,

Then, check whether this packet fills all of the following,

- The Acknowledge(A) bit is set to ON.
- The Home Registration(H) bit is set to ON.
- The Reserved is cleared.
- The Home Address destination option is included, and,
  - This option is placed as the right location.
  - The Home Address field is set to the Home Address.
- The Alternate Care-of Address mobility option is included, and,
  - The Care-of Address field is set to the Care-of Address.
- The Nonce Indices mobility option is not included.
- The Binding Authorization Data mobility option is not included.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.1, 11.3.2, 11.5.3, 11.1

RFC3776 Using IPsec to Protect Mobile IPv6 Signaling Between Mobile Nodes and Home Agents

See Section 4.1, 4.2, 4.3, 4.4

6.4.1.2 MN-2-1-1-1-002 - Valid BU (L = ON)

[PURPOSE]

MN-2-1-1-1-002 - Valid BU (L = ON)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

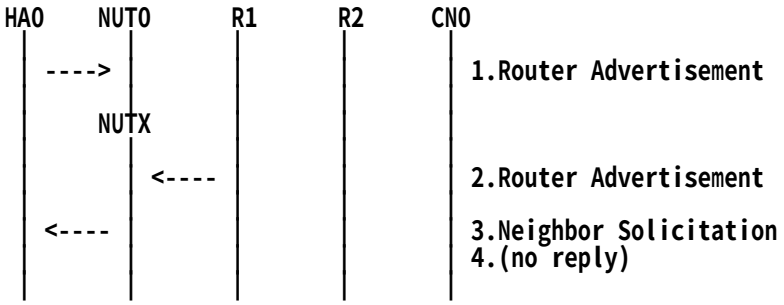
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

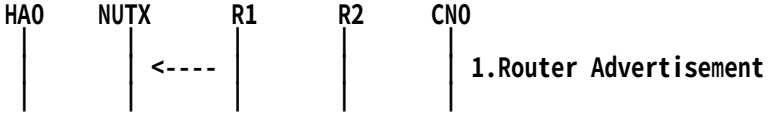
[INITIALIZATION]

- In the case of Real Home Link



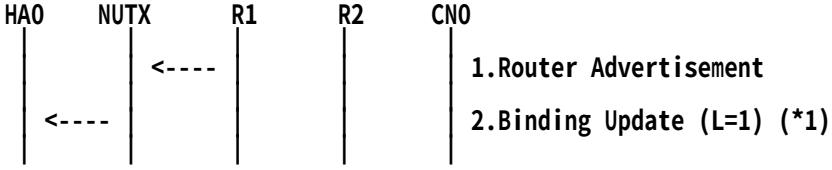
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	A Flag	1
	H Flag	1
	L Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update,

Then, check whether this packet fills all of the following,

- The Link-Local Address Compatibility(L) bit is set up normally.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.1

6.4.1.3 MN-2-1-1-1-004 - Valid BU (K = OFF by manual key management)

[PURPOSE]

MN-2-1-1-1-004 - Valid BU (K = OFF by manual key management)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NUT sets (K) bit in BU which is transmitted to HA: NO

[TOPOLOGY]

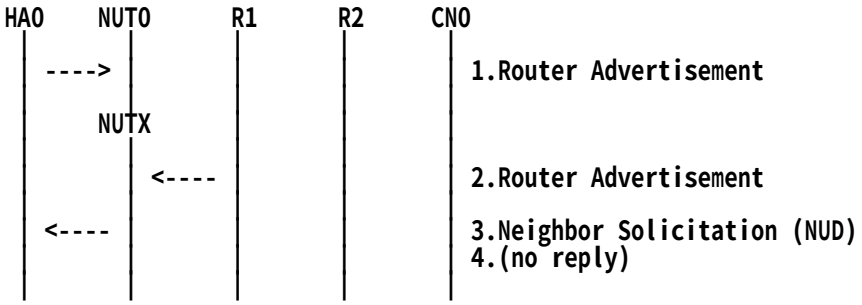
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

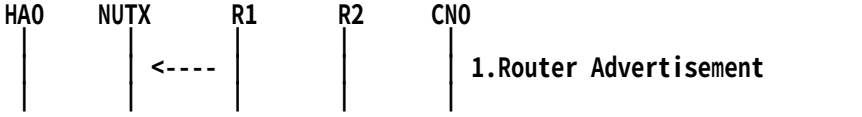
[INITIALIZATION]

- In the case of Real Home Link



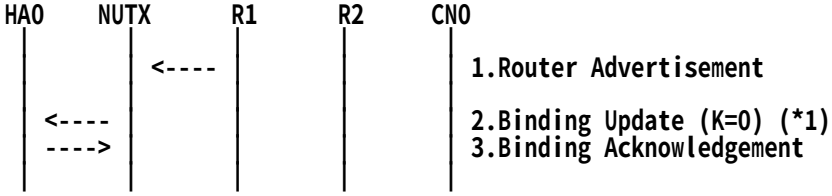
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	A Flag	1
	H Flag	1
	K Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update,

Then, check whether this packet fills all of the following,

- The ESP Header is included.
- The Key Management Mobility Capability(K) bit is set to OFF.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.1, 6.1.7

6.4.1.4 MN-2-1-1-1-006 - Valid Lifetime (Lifetime of HoA > Lifetime of CoA)

[PURPOSE]

MN-2-1-1-1-006 - Valid Lifetime (Lifetime of HoA > Lifetime of CoA)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

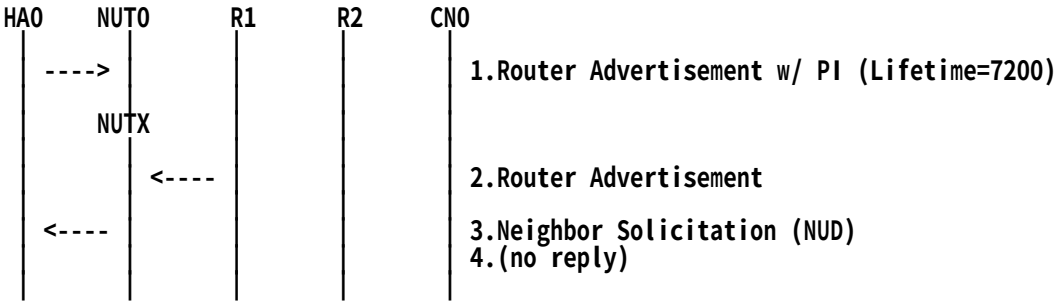
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

[INITIALIZATION]

- In the case of Real Home Link

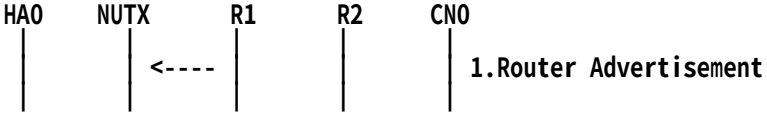


1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
   # The Valid Lifetime field and the Preferred Lifetime field in the
   # Prefix Information option are set to 7200 (seconds).

IPv6 Header	Source Address	HA0 (Link0, link-local)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
Prefix Information Option	Type	3
	Valid Lifetime	7200
	Preferred Lifetime	7200
	Prefix	(Link0, prefix,global)

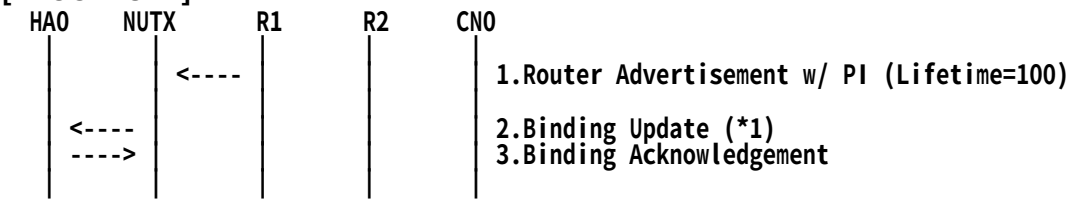
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
   # The Valid Lifetime field and the Preferred Lifetime field in the Prefix Information option
   # are set to 100 (seconds).

IPv6 Header	Source Address	R1 (LinkX, link-local)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
Prefix Information Option	Type	3
	Valid Lifetime	100
	Preferred Lifetime	100
	Prefix	(LinkX, prefix/global)

2. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	A Flag	1
	H Flag	1
	Lifetime	Any (<= 25)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update,
Then, check whether this packet fills all of the following,
- The Lifetime field is set less than the remaining lifetime of the Care-of Address.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.1

RFC2462 IPv6 Stateless Address Autoconfiguration
See Section 5.5.3.

6.4.1.5 MN-2-1-1-1-007 - Valid Lifetime (Lifetime of HoA < Lifetime of CoA)

[PURPOSE]

MN-2-1-1-1-007 - Valid Lifetime (Lifetime of HoA < Lifetime of CoA)

[CATEGORY]

HOST : ADVANCED FUNCTION (REAL HOME LINK)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

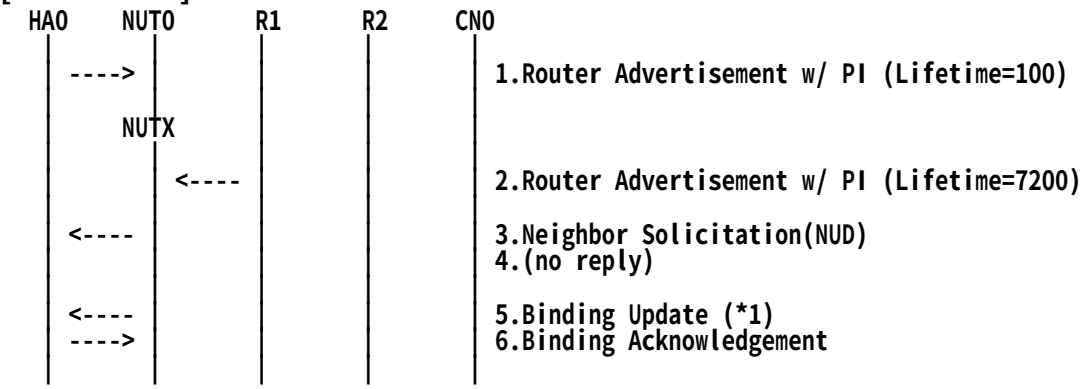
[TEST SETUP]

Refer to 3.1 Common Setup-1

[INITIALIZATION]

NONE

[PROCEDURE]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
   # The Valid Lifetime field and the Preferred Lifetime field in the Prefix Information option
   # are set to 100 (seconds).

IPv6 Header	Source Address	HA0 (Link0, link-local)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
Prefix Information Option	Type	3
	Valid Lifetime	100
	Preferred Lifetime	100
	Prefix	(Link0, prefix,global)

2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
   # The Valid Lifetime field and the Preferred Lifetime field in the Prefix Information option
   # are set to 7200 (seconds).

IPv6 Header	Source Address	R1 (LinkX, link-local)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
Prefix Information Option	Type	3
	Valid Lifetime	7200
	Preferred Lifetime	7200
	Prefix	(LinkX, prefix/global)

3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
5. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	A Flag	1
	H Flag	1
	Lifetime	Any (<= 25)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update,
Then, check whether this packet fills all of the following,
- The Lifetime field is set less than the remaining lifetime of the Home Address.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.1

RFC2462 IPv6 Stateless Address Autoconfiguration
See Section 5.5.3.

6.4.1.6 MN-2-1-1-1-008 - Sending BU (after the expiration of home registration)

[PURPOSE]

MN-2-1-1-1-008 - Sending BU (after the expiration of home registration)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

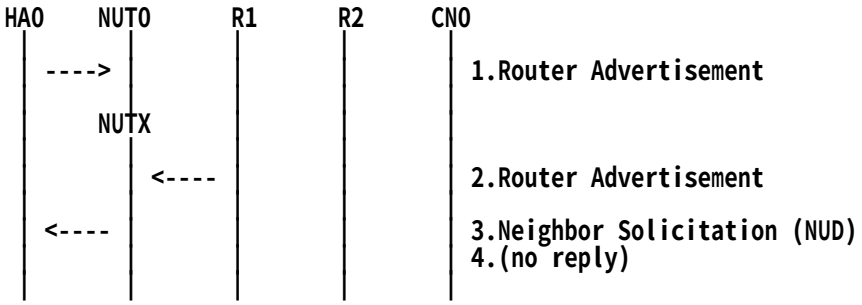
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

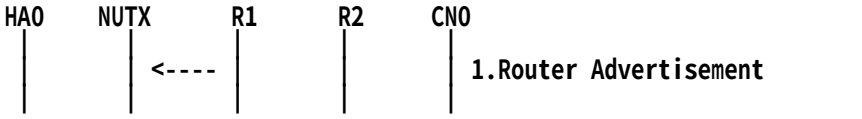
[INITIALIZATION]

- In the case of Real Home Link



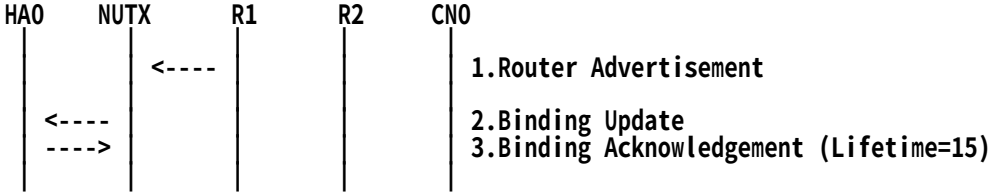
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

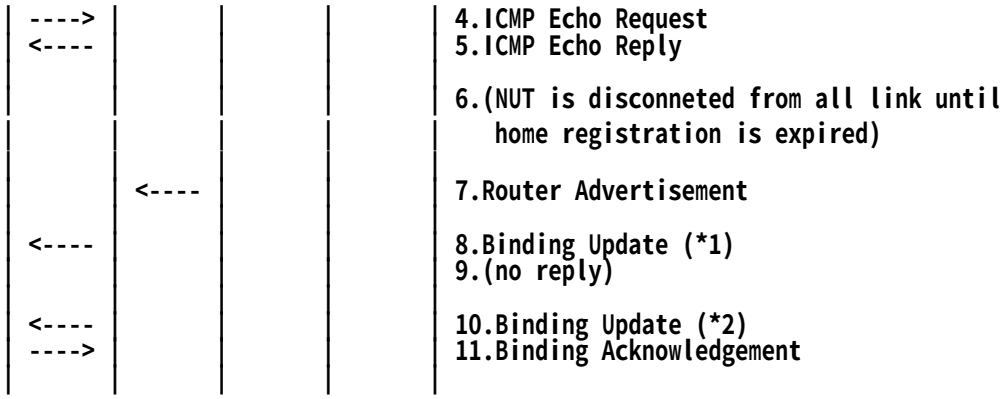
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Lifetime field is less than or equal to 60 seconds.
4. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

5. Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option) (Refer to 5.8.3)
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	129

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

6. (out of all link)
   # NUT is disconneted from all link until home registration is expired
7. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
8. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
Alternate Care-of Address Option	Type	3
	Option Length	16
	Address	NUTX (LinkX, global)

9. (no reply)
10. Receive Binding Update. (NUTX -> HA0) (*2) (Refer to 5.14.1)
11. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update.

(*2) PASS: HA0 receives the retransmitted Binding Update.

Then, check whether this packet fills all of the following,

- The initial retransmission timer is set to InitialBindackTimeoutFirstReg.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.1, 11.8

6.4.1.7 MN-2-1-1-1-013 - Retransmissions & Back off (Use InitialBindackTimeoutFirstReg as the initial retransmission timer)

[PURPOSE]

MN-2-1-1-1-013 - Retransmissions & Back off (Use InitialBindackTimeoutFirstReg as the initial retransmission timer)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NUT re-transmits BU to HA for valuable BA: YES/NO

[TOPOLOGY]

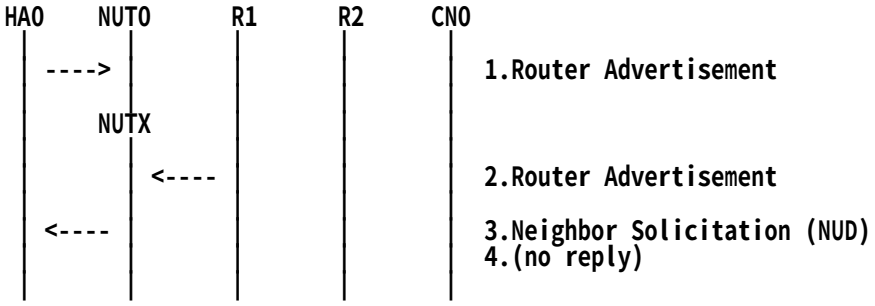
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

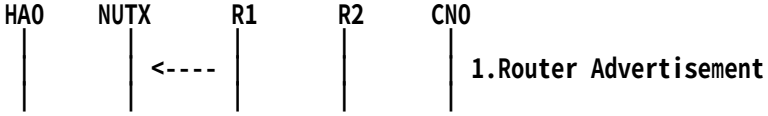
[INITIALIZATION]

- In the case of Real Home Link



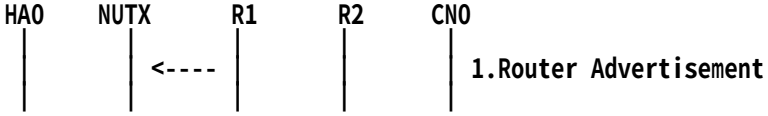
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

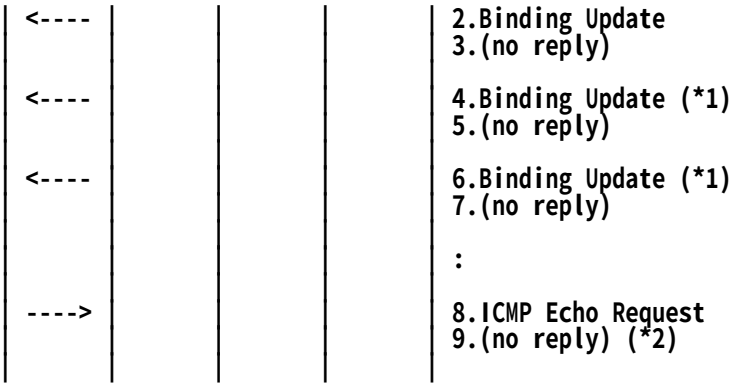
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. (no reply)
4. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[2])
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

5. (no reply)
6. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)
7. (no reply)
8. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
9. (no reply) (*2)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits BU to HA for valuable BA: YES
  (*1) PASS: HA0 receives the retransmitted Binding Update.
  Then, check whether this packet fills all of the following,
  - Sequence Number value greater than that used.
  - The initial retransmission timer is set to InitialBindackTimeoutFirstReg.
  - Timeout period is doubled upon each retransmission.
  - Transmit until the retransmission interval becomes MAX_BINDACK_TIMEOUT.

  (*2) PASS: HA0 does not receive ICMP Echo reply.

- NUT re-transmits BU to HA for valuable BA: NO
  (*1) PASS: HA0 does not receive retransmitted Binding Update.
  (*2) PASS: HA0 does not receive ICMP Echo reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.8, 13, 11.7.1, 11.1

6.4.2 Receiving BA

6.4.2.1 MN-2-2-1-1-001 - BU accepted (Status = 0)

[PURPOSE]

MN-2-2-1-1-001 - BU accepted (Status = 0)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

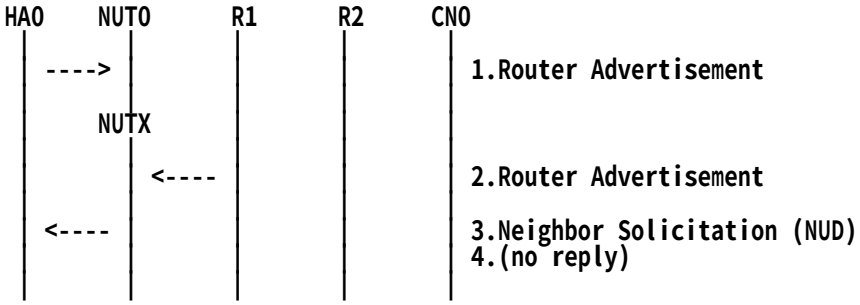
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

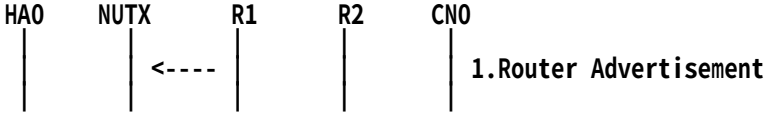
[INITIALIZATION]

- In the case of Real Home Link



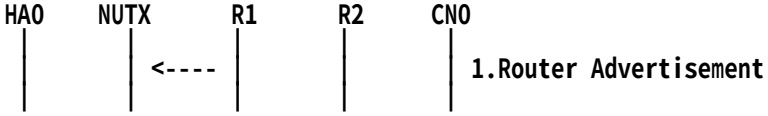
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

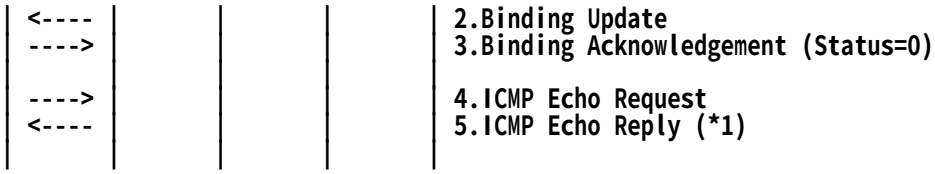
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Status field is set to 0 (Binding Update accepted).

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA2_SPI
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[2])
	Lifetime	Any (>0, <= BU[2])

4. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

5. Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option) (*1) (Refer to 5.8.3)
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	129

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: HA0 receives ICMP Echo Reply with Home Address Option.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.3, 9.2.

RFC3776 Using IPsec to Protect Mobile IPv6 Signaling Between Mobile Nodes and Home Agents
See Section 4.1, 4.2, 4.3, 4.4.

6.4.2.2 MN-2-2-1-1-039 - BU accepted (Invalid Mobility Header Reserved)

[PURPOSE]

MN-2-2-1-1-039 - BU accepted (Invalid Mobility Header Reserved)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

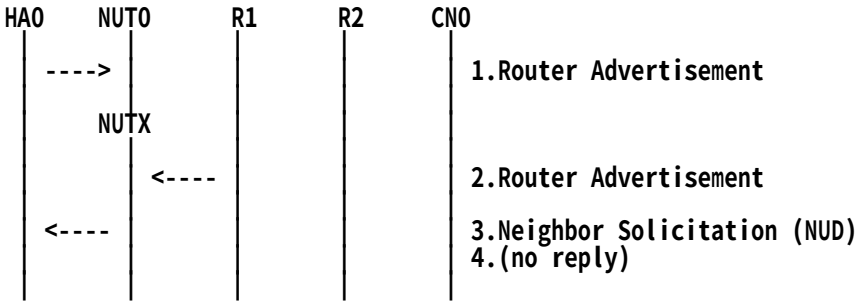
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

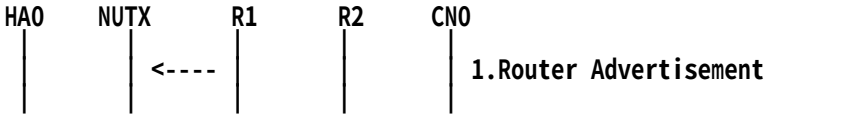
[INITIALIZATION]

- In the case of Real Home Link



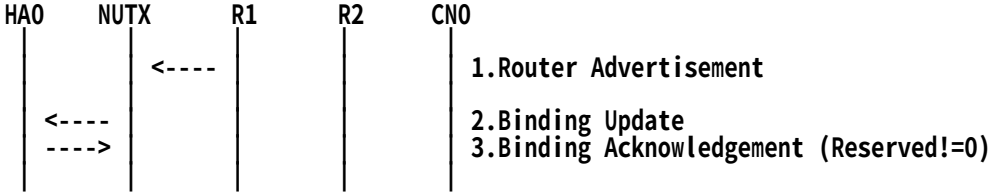
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Status field is set to 0(Binding Update accepted).
   # The Reserved field is not set to 0.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA2_SPI
Mobility Header	MH Type	6
	Reserved	Any (!=0)
	Status	0
	Reserved	Any (!=0)
	Lifetime	Any (> 0, <= BU[2])

4. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

5. Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option) (*1) (Refer to 5.8.3)
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	129

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: HA0 receives ICMP Echo Reply with Home Address Option.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 6.1.1, 6.1.8, 11.7.3, 9.2.

6.4.2.3 MN-2-2-1-1-014 - BU accepted (K = OFF by manual key management)

[PURPOSE]

MN-2-2-1-1-014 - BU accepted (K = OFF by manual key management)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NUT sets (K) bit in BU which is transmitted to HA: NO

[TOPOLOGY]

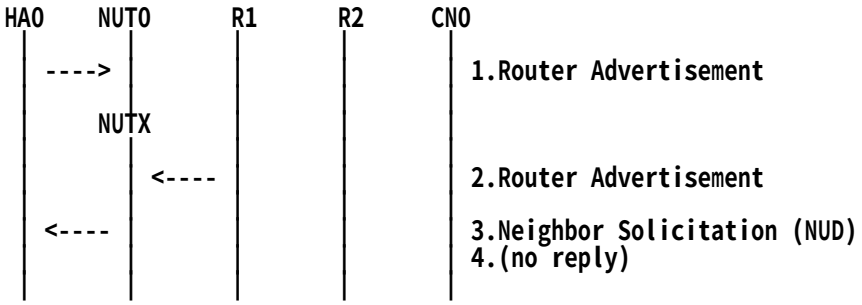
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

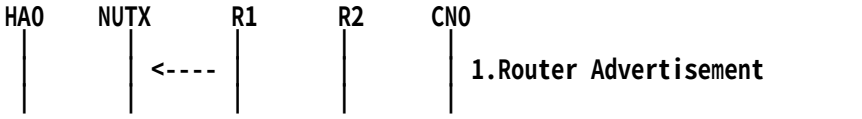
[INITIALIZATION]

- In the case of Real Home Link



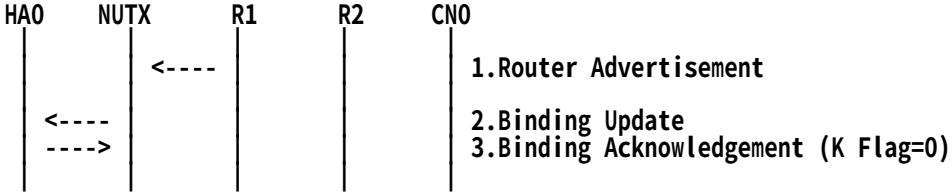
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Status field is set to 0 (Binding Update accepted).
   # The K bit field is set to 0.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA2_SPI
Mobility Header	MH Type	6
	Status	0
	K flag	0
	Lifetime	Any (> 0, <= BU[2])

4. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

5. Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option) (*1) (Refer to 5.8.3)
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	129

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: HA0 receives ICMP Echo Reply with Home Address Option.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.3, 10.3.1

6.4.2.4 MN-2-2-1-1-020 - Valid Lifetime (Lifetime of BA < Lifetime of BU)

[PURPOSE]

MN-2-2-1-1-020 - Valid Lifetime (Lifetime of BA < Lifetime of BU)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

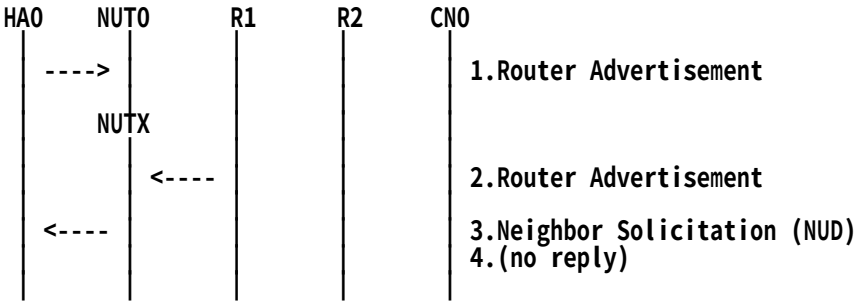
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

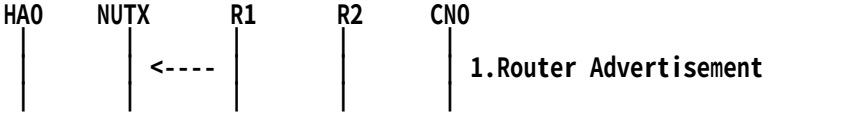
[INITIALIZATION]

- In the case of Real Home Link



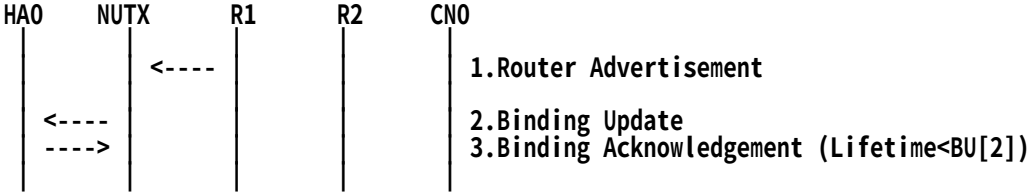
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

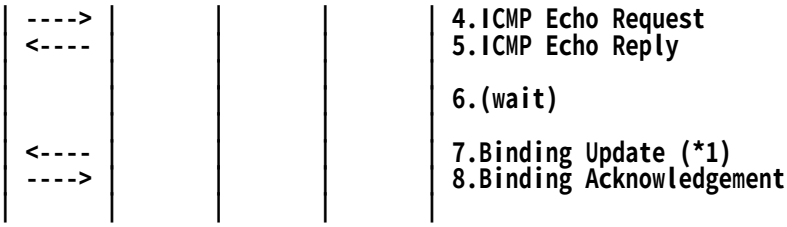
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The value of Lifetime is less than BU[2].
   # The Binding Refresh Advice mobility option is not included.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA2_SPI
Mobility Header	MH Type	6
	Staus	0
	Lifetime	Any (< BU[2])

4. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

5. Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option) (Refer to 5.8.3)
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	129

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

6. (wait)
   # Wait during a maximum of the lifetime value in the Binding Acknowledgement [3].
7. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	A Flag	1
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

8. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update before the expiration of the following period,
- The remaining lifetime of the home registration set to the lifetime of the Binding Acknowledgement [6].

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.3

6.4.2.5 MN-2-2-1-1-026 - Valid Lifetime (Refresh Interval of BA < Lifetime of BU)

[PURPOSE]

MN-2-2-1-1-026 - Valid Lifetime (Refresh Interval of BA < Lifetime of BU)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

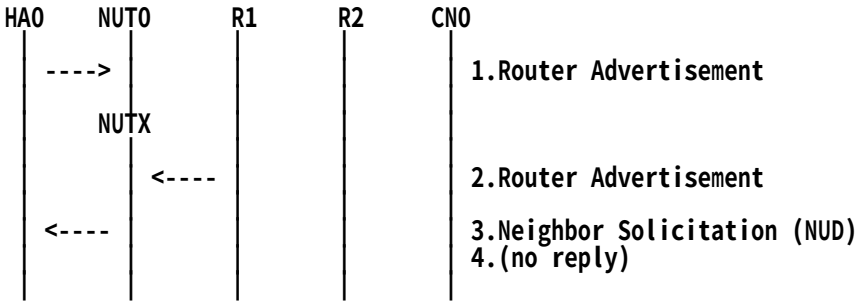
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

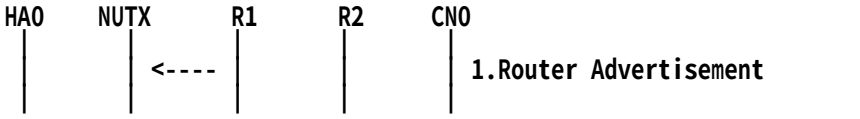
[INITIALIZATION]

- In the case of Real Home Link



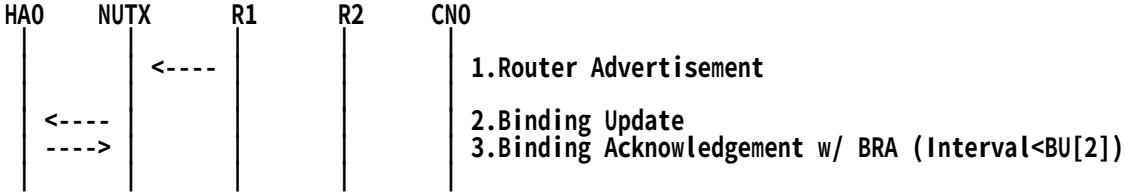
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

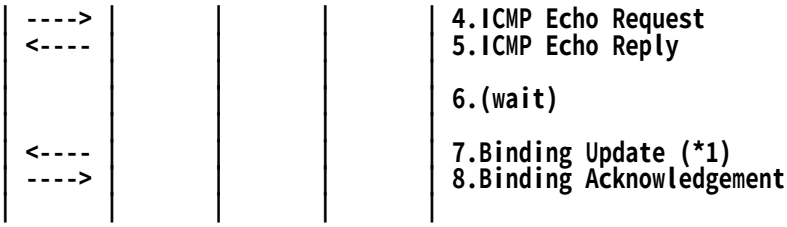
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The value of Refresh Interval is less than BU[2].

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	Any
	Sequence	Any
	Initialization Vector	Any
Mobility Header	MH Type	6
	Status	0
	Lifetime	(= BU[2])
Binding Refresh Advice Option	Interval	Any (<= BU[2])

4. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

5. Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option) (Refer to 5.8.3)
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	129

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

6. (wait)
   # Wait during a maximum of the Refresh Interval in the Binding Acknowledgement [3].
7. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	A Flag	1
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

8. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update message before the expiration of the following period,
- The remaining lifetime of the home registration which set to
the Refresh Interval of the Binding Acknowledgement.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.3

6.4.2.6 MN-2-2-1-1-002 - BU accepted (Status = 1)

[PURPOSE]

MN-2-2-1-1-002 - BU accepted (Status = 1)

[CATEGORY]

HOST: ADVANCED FUNCTION (MPD)

[REQUIREMENT OF TEST]

Function of Mobile Prefix Discovery: YES

[TOPOLOGY]

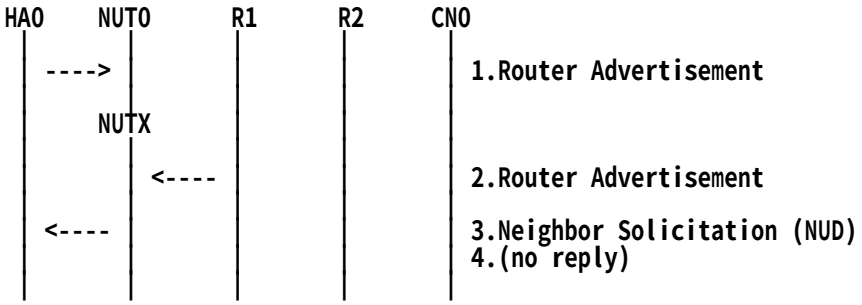
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

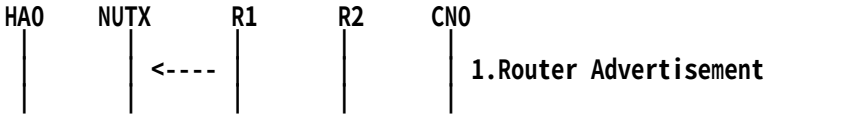
[INITIALIZATION]

- In the case of Real Home Link



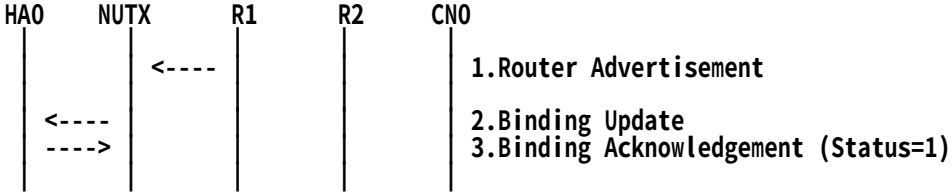
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

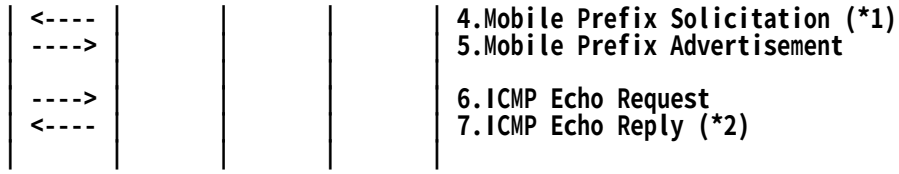
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Status field is set to 1 (accepted but prefix discovery necessary).

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA2_SPI
Mobility Header	MH Type	6
	Status	1
	Lifetime	Any (> 0, <= BU[2])

4. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option) (*1)
   (Refer to 5.19.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address of Mobile Node	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	146
	Code	0
	Checksum	Any
	Identifier	Any
	Reserved	0

5. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
   (Refer to 5.20.1)
6. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header)
   (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

7. Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option) (*2) (Refer to 5.8.3)
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	129

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: HA0 receives Mobile Prefix Solicitation.

(*2) PASS: HA0 receives ICMP Echo Reply with Home Address Option.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.3, 11.7.1.

6.4.2.7 MN-2-2-1-1-033 - BU accepted (Status = 2-127)

[PURPOSE]

MN-2-2-1-1-033 - BU accepted (Status = 2-127)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

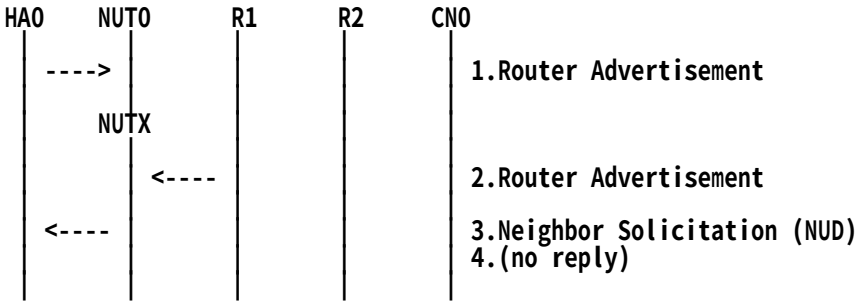
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

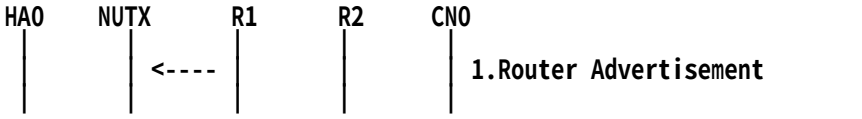
[INITIALIZATION]

- In the case of Real Home Link



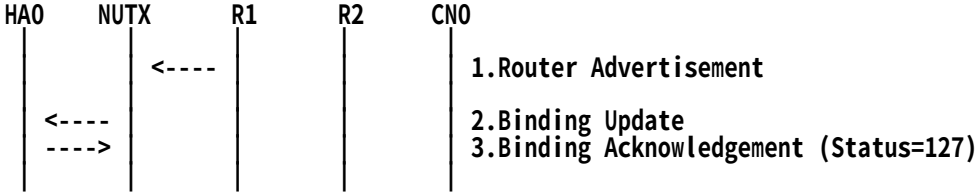
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Status field is set to the value (127) except 0 and 1.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA2_SPI
Mobility Header	MH Type	6
	Status	127
	Lifetime	Any (> 0, <= BU[2])

4. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

5. Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option) (*1)
   (Refer to 5.8.3)
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	129

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: HA0 receives ICMP Echo Reply with Home Address Option.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.3

6.4.2.8 MN-2-2-1-1-003 - BU rejected (Status = 128)

[PURPOSE]

MN-2-2-1-1-003 - BU rejected (Status = 128)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NUT re-transmits BU to HA for BA(status 128): YES/NO

[TOPOLOGY]

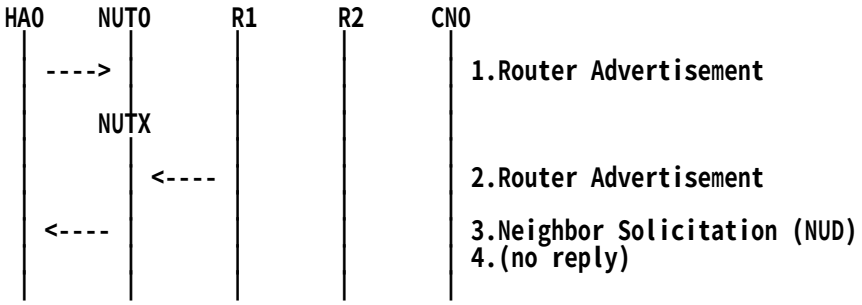
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

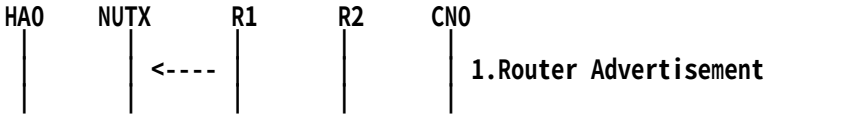
[INITIALIZATION]

- In the case of Real Home Link



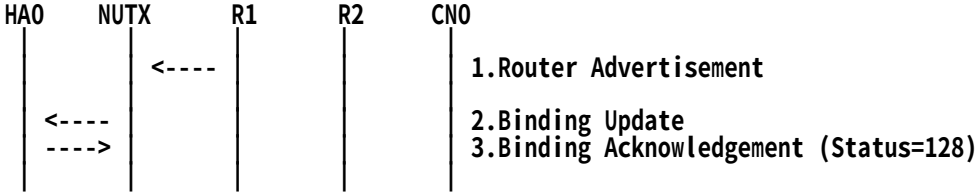
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

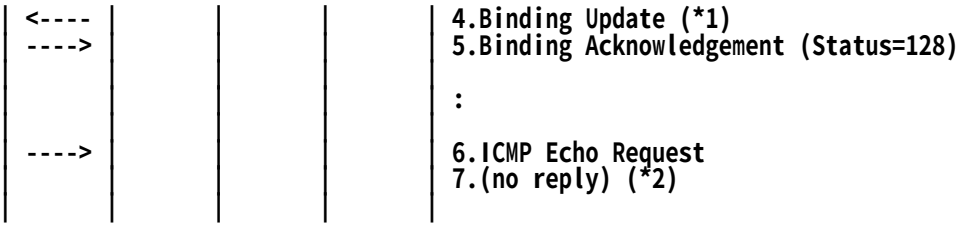
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Status field is set to 128 (Reason unspecified).

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA2_SPI
Mobility Header	MH Type	6
	Status	128

4. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[2])
	A Flag	1
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

5. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Status field is set to 128(Reason unspecified).
6. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

7. (no reply) (*2)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits BU to HA for BA(status 128): YES
  (*1) PASS: HA0 receives the retransmitted Binding Update.
  Then, check whether this packet fills all of the following,
  - Sequence Number value greater than that used.
  (*2) PASS: HA0 does not receive ICMP Echo reply.

- NUT re-transmits BU to HA for BA(status 128): NO
  (*1) PASS: HA0 does not receive retransmitted Binding Update.

(*2) PASS: HA0 does not receive ICMP Echo reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.3

6.4.2.9 MN-2-2-1-1-010 - BU rejected (Status = 135)

[PURPOSE]

MN-2-2-1-1-010 - BU rejected (Status = 135)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NUT re-transmits BU to HA for BA(status 135): YES/NO

[TOPOLOGY]

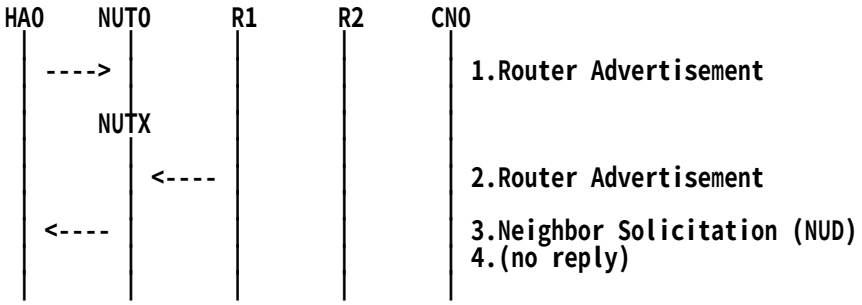
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

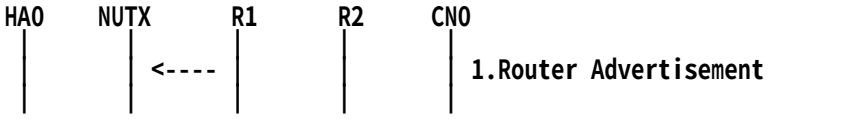
[INITIALIZATION]

- In the case of Real Home Link



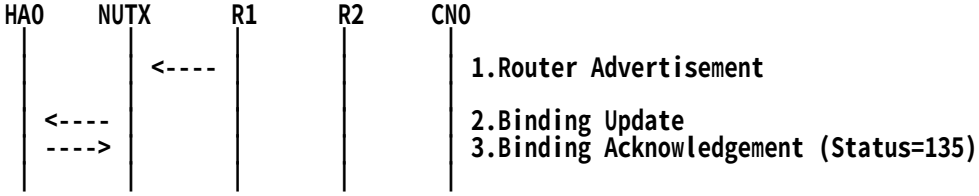
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

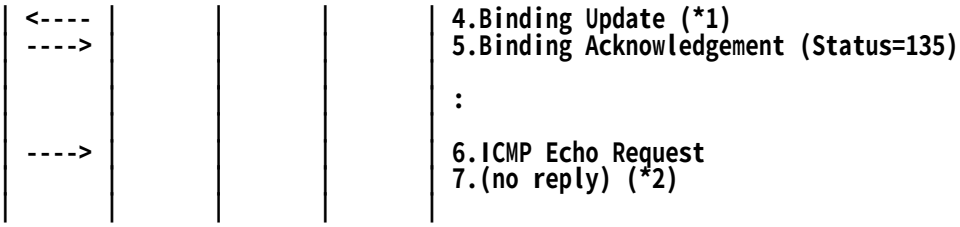
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Status field is set to 135 (Sequence number out of window).

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA2_SPI
Mobility Header	MH Type	6
	Status	135
	Sequence Number	Any

4. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (> BA[3])
	A Flag	1
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

5. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Status field is set to 135(Sequence number out of window).
6. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

7. (no reply) (*2)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits BU to HA for BA(status 135): YES
  (*1) PASS: HA0 receives the retransmitted Binding Update.
  Then, check whether this packet fills all of the following,
  - The Sequence Number field is set to the following value of the Sequence Number field of Binding Acknowledgement.

  (*2) PASS: HA0 does not receive ICMP Echo reply.

- NUT re-transmits BU to HA for BA(status 135): NO

(*1) PASS: HA0 does not receive the retransmitted Binding Update.
(*2) PASS: HA0 does not receive ICMP Echo reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.3, 11.7.1

6.4.2.10 MN-2-2-1-1-016 - Valid Sequence Number (Status = 135 & Sequence Number=65535)

[PURPOSE]

MN-2-2-1-1-016 - Valid Sequence Number (Status = 135 & Sequence Number=65535)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NUT re-transmits BU to HA for BA(status 135): YES/NO

[TOPOLOGY]

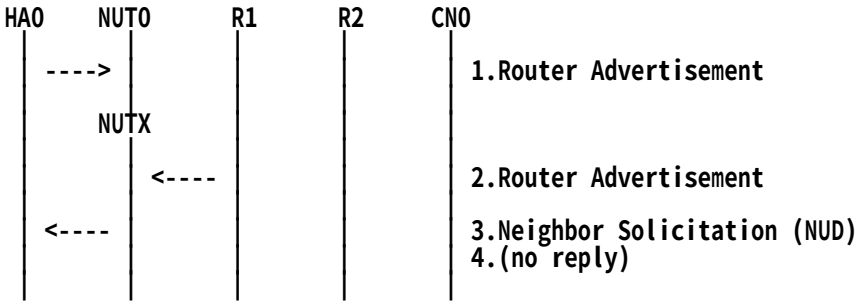
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

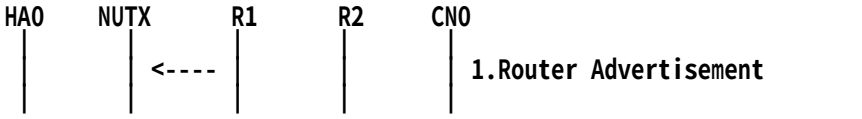
[INITIALIZATION]

- In the case of Real Home Link



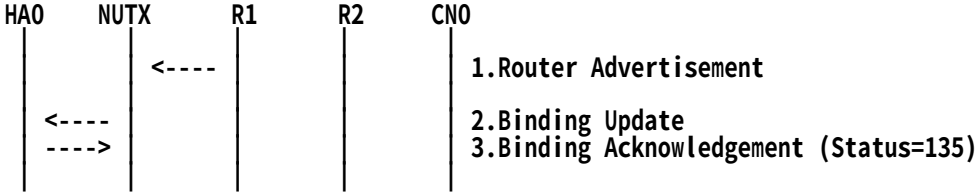
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Status field is set to 135(Sequence Number out of window).
   # The Sequence Number field is 65535(the maximum value of modulo 2**16).

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA2_SPI
Mobility Header	MH Type	6
	Status	135
	Sequence Number	65535

4. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (<32767)
	A Flag	1
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

5. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update,
Then, check whether this packet fills all of the following,
- The Sequence Number field is set to the minimum value.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.1

6.4.2.11 MN-2-2-1-1-017 - Invalid Sequence Number (BA != BU)

[PURPOSE]

MN-2-2-1-1-017 - Invalid Sequence Number (BA != BU)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NUT re-transmits BU to HA for valuable BA: YES/NO

[TOPOLOGY]

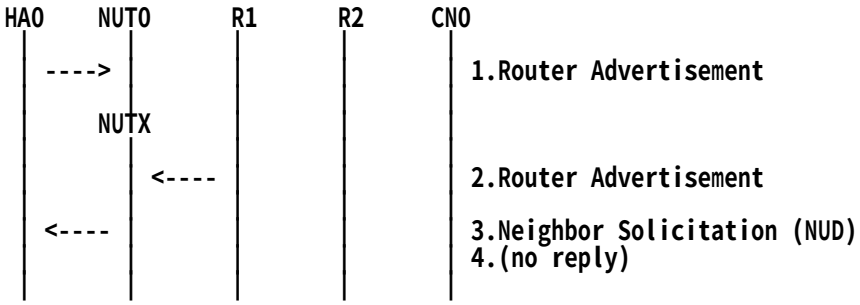
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

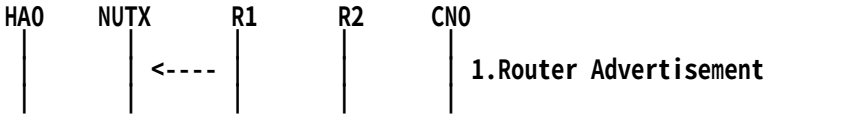
[INITIALIZATION]

- In the case of Real Home Link



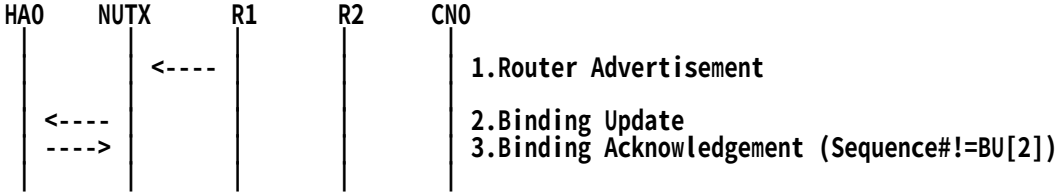
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

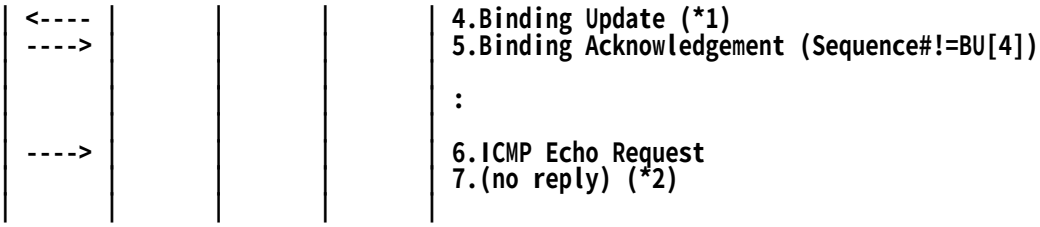
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Sequence Number field does not match the Sequence Number sent by BU[2].

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA2_SPI
Mobility Header	MH Type	6
	Staus	0
	Sequence Number	(!= BU[2])

4. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[2])
	A Flag	1
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

5. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Sequence Number field does not match the Sequence Number sent by BU[4].
6. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

7. (no reply) (*2)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits BU to HA for valuable BA: YES

(*1) PASS: HA0 receives the retransmitted Binding Update.
Then, check whether this packet fills all of the following,
- Sequence Number value greater than that used.
- The initial retransmission timer is set to InitialBindackTimeoutFirstReg.
- Timeout period is doubled upon each retransmission.

(*2) PASS: HA0 does not receive ICMP Echo reply.

- NUT re-transmits BU to HA for valuable BA: NO

(*1) PASS: HA0 does not receive the retransmitted Binding Update.

(*2) PASS: HA0 does not receive ICMP Echo reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.3

6.4.2.12 MN-2-2-1-1-038 - BA which is not protected by IPsec

[PURPOSE]

MN-2-2-1-1-038 - BA which is not protected by IPsec

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NUT re-transmits BU to HA for valuable BA: YES/NO

[TOPOLOGY]

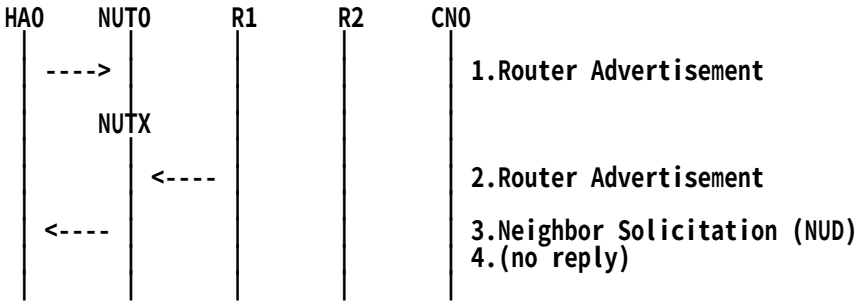
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

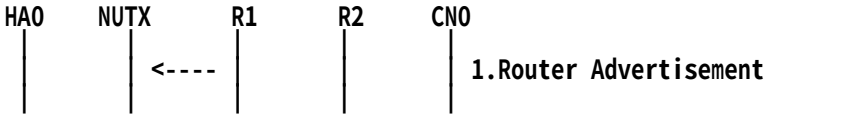
[INITIALIZATION]

- In the case of Real Home Link



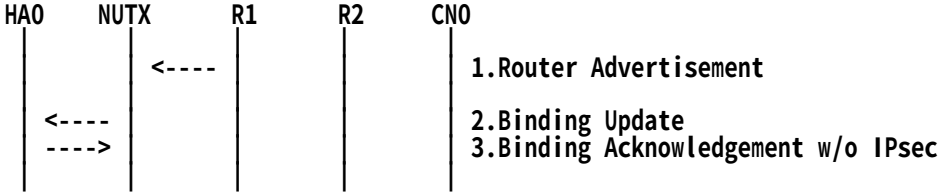
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

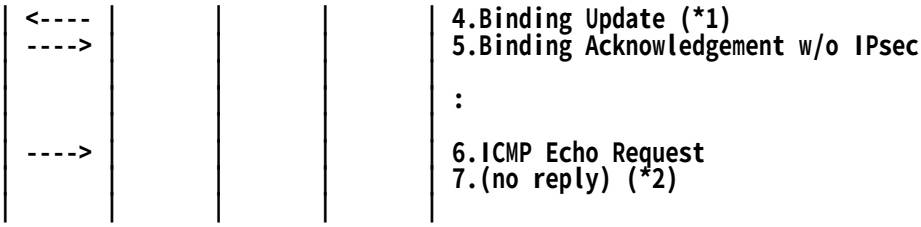
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # BA which is not protected by IPsec.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	6
	Status	0

4. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[2])
	A Flag	1
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

5. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
6. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

7. (no reply) (*2)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits BU to HA for valuable BA: YES
  (*1) PASS: HA0 receives the retransmitted Binding Update.
  Then, check whether this packet fills all of the following,
  - Sequence Number value greater than that used.
  - The initial retransmission timer is set to InitialBindackTimeoutFirstReg.
  - Timeout period is doubled upon each retransmission.
  (*2) PASS: HA0 does not receive ICMP Echo reply.

- NUT re-transmits BU to HA for valuable BA: NO
  (*1) PASS: HA0 does not receive the retransmitted Binding Update.

(*2) PASS: HA0 does not receive ICMP Echo reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.3

6.5 Home Re-Registration

6.5.1 Sending BU

6.5.1.1 MN-2-1-2-1-001 - Sending BU (after moving from foreign to foreign)

[PURPOSE]

MN-2-1-2-1-001 - Sending BU (after moving from foreign to foreign)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

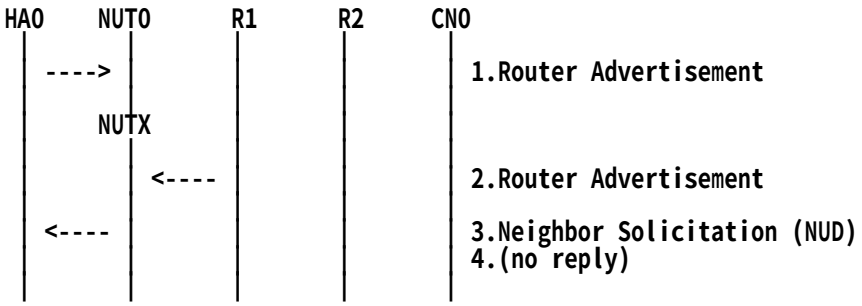
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

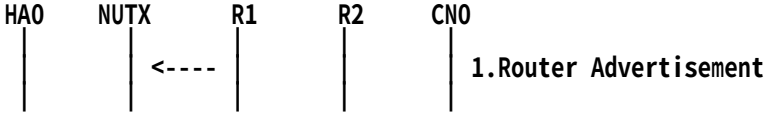
[INITIALIZATION]

- In the case of Real Home Link



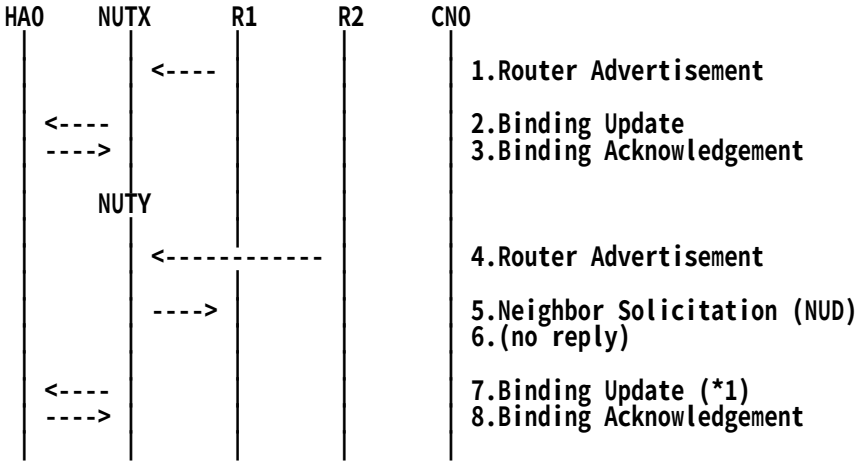
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
4. Send Router Advertisement. (R2 -> R2_allnode_multi) (Refer to 5.2.1)
5. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
6. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
7. Receive Binding Update. (NUTY -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTY (LinkY, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[2])
	A Flag	1
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTY (LinkY, global)

8. Send Binding Acknowledgement. (HA0 -> NUTY) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update message,
Then, check whether this packet fills all of the following,
- The Sequence Number is set more than that in the previous Binding Update.
- The Alternate Care-of Address mobility option is included, and,
  - The Care-of Address field is set to the Care-of Address.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.1, 11.1, 11.5.1

6.5.1.2 MN-2-1-2-1-004 - Sending BU (before the expiration of home registration)

[PURPOSE]

MN-2-1-2-1-004 - Sending BU (before the expiration of home registration)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

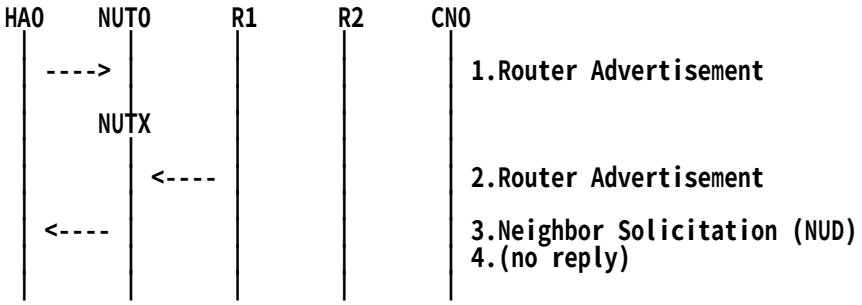
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

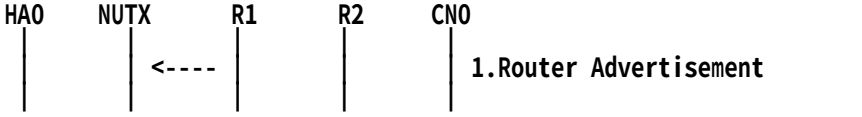
[INITIALIZATION]

- In the case of Real Home Link



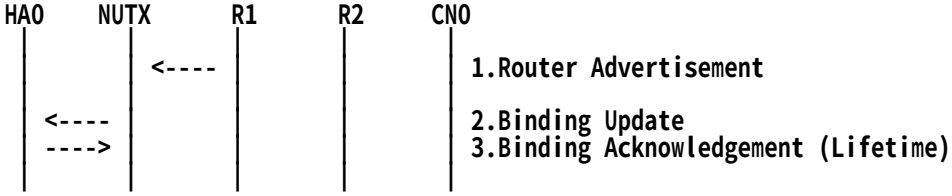
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

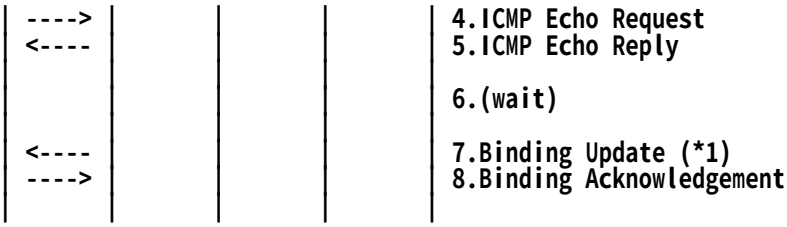
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
4. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

5. Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option) (Refer to 5.8.3)
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	129

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

6. (wait)
   # Wait during a maximum of the lifetime value in the Binding Acknowledgement [3].
7. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[2])
	A Flag	1
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

8. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update before the expiration of the following period,
- The remaining lifetime of the home registration.

Then, check whether this packet fills all of the following,
- The Sequence Number is set more than that in the previous Binding Update.
- The Alternate Care-of Address mobility option is included, and,
  - The Care-of Address field is set to the Care-of Address.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.1, 11.1, 11.7.3, 11.4.1.

RFC2462 IPv6 Stateless Address Autoconfiguration

See Section 5.5.3.

6.5.1.3 MN-2-1-2-1-005 - Sending BU (when the lifetime for a changed prefix decreases)

[PURPOSE]

MN-2-1-2-1-005 - Sending BU (when the lifetime for a changed prefix decreases)

[CATEGORY]

HOST: ADVANCED FUNCTION (MPD)

[REQUIREMENT OF TEST]

Function of Mobile Prefix Discovery: YES

[TOPOLOGY]

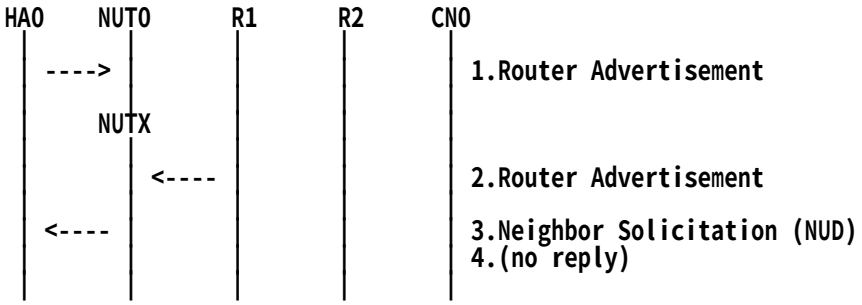
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

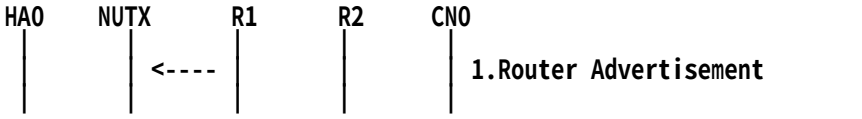
[INITIALIZATION]

- In the case of Real Home Link



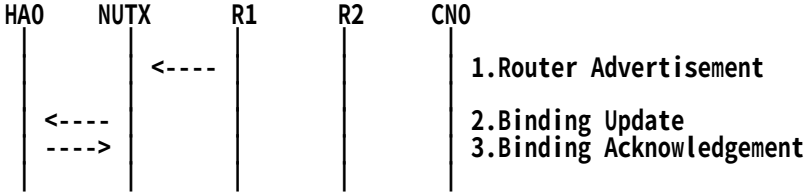
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

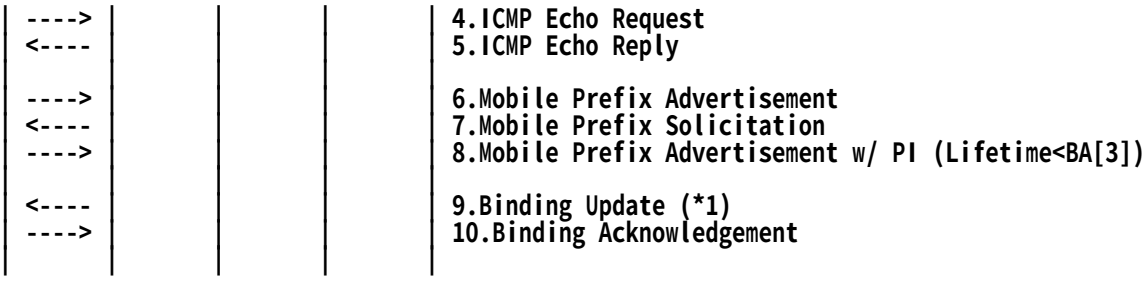
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
4. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

5. Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option) (Refer to 5.8.3)
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	129

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

6. Send unsolicited Mobile Prefix Advertisement.
   (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.20.1)
   # The Valid Lifetime is set less than the remaining lifetime of the home registration.
   # The Preferred Lifetime is set less than the remaining lifetime of the home registration.
7. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option)
   (Refer to 5.19.1)
8. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
   (Refer to 5.20.1)
   # The Valid Lifetime is set less than the remaining lifetime of the home registration.
   # The Preferred Lifetime is set less than the remaining lifetime of the home registration.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6 Header	Type	147
	Code	0
	Identifier	(=MPS[7])
Prefix Information Option	Type	3
	Valid lifetime	Any (< BA[3])
	Preffered lifetime	Any (< BA[3])

9. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[2])
	A Flag	1
	H Flag	1
	Lifetime	Any (<= MPA[8])
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

10. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update message,

Then, check whether this packet fills all of the following,

- The Sequence Number field is set more than the Sequence Number in the previous Binding Update[2].
- The Lifetime field is set less than Valid Lifetime in Mobile Prefix Advertisement[8].
- The Alternate Care-of Address mobility option is included, and,
  - The Care-of Address field is set to the Care-of Address.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.1, 11.4.2

6.5.1.4 MN-2-1-2-1-006 - Retransmissions & Back off (Use INITIAL_BINDACK_TIMEOUT as the initial retransmission timer)

[PURPOSE]

MN-2-1-2-1-006 - Retransmissions & Back off (Use INITIAL_BINDACK_TIMEOUT as the initial retransmission timer)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NUT re-transmits BU to HA for valuable BA: YES/NO

[TOPOLOGY]

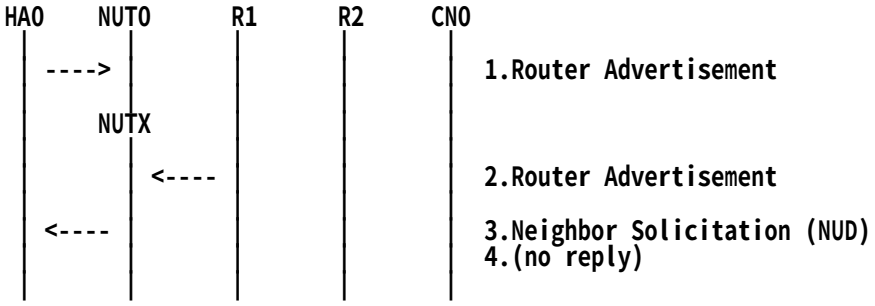
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

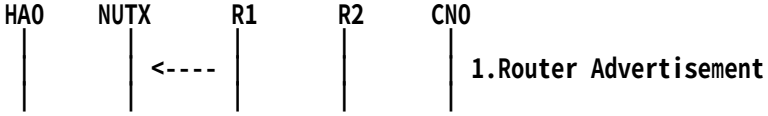
[INITIALIZATION]

- In the case of Real Home Link



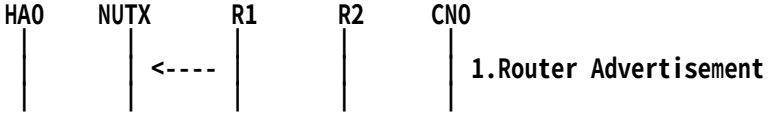
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

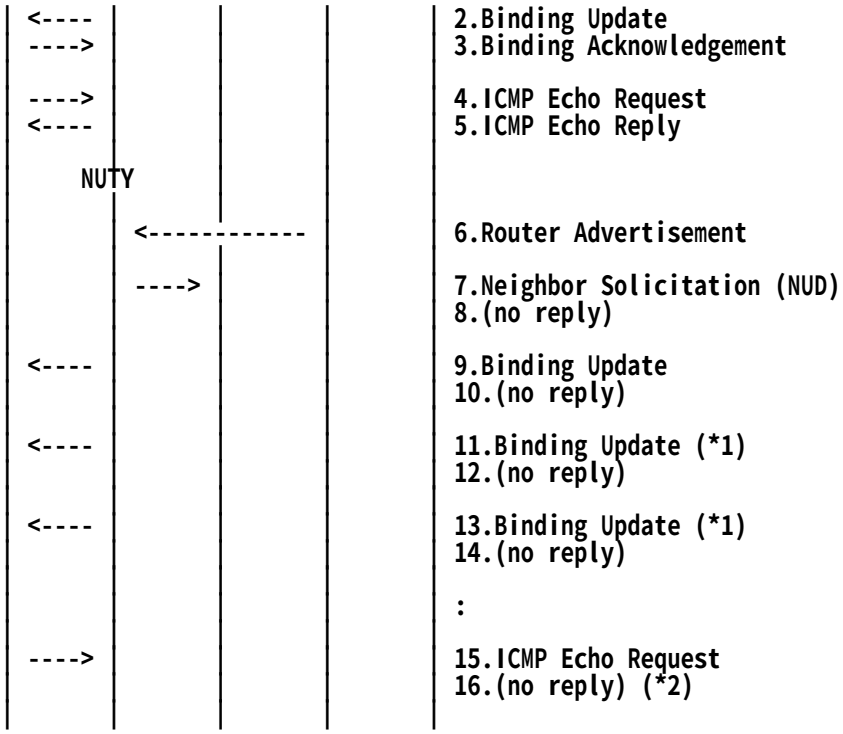
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
4. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

5. Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option) (Refer to 5.8.3)

   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	129

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

6. Send Router Advertisement. (R2 -> R2_allnode_multi) (Refer to 5.2.1)
7. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
8. (no reply)

   # Wait during a maximum of 3 seconds(RFC2461).
9. Receive Binding Update. (NUTY -> HA0) (Refer to 5.14.1)

10. (no reply)
11. Receive Binding Update. (NUTY -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTY (LinkY, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[2])
	A Flag	1
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTY (LinkY, global)

12. (no reply)
13. Receive Binding Update. (NUTY -> HA0) (*1) (Refer to 5.14.1)
14. (no reply)
15. Send ICMP Echo Request. (HA0 -> NUTY with Type2 Routing Header) (Refer to 5.7.3)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

16. (no reply) (*2)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits BU to HA for valuable BA: YES
  (*1) PASS: HA0 receives the retransmitted Binding Update.
  Then, check whether this packet fills all of the following,
  - Sequence Number value greater than that used.
  - The initial retransmission timer is set to INITIAL_BINDACK_TIMEOUT.
  - Timeout period is doubled upon each retransmission.
  - Transmit until the retransmission interval becomes MAX_BINDACK_TIMEOUT.

  (*2) PASS: HA0 does not receive ICMP Echo reply.

- NUT re-transmits BU to HA for valuable BA: NO
  (*1) PASS: HA0 does not receive retransmitted Binding Update.
  (*2) PASS: HA0 does not receive ICMP Echo reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.8, 12, 11.7.1, 11.1

6.6 Returning Home

6.6.1 Sending BU

6.6.1.1 MN-2-1-3-1-007 - Sending Neighbor Solicitation for the home agent's address

[PURPOSE]

MN-2-1-3-1-007 - Sending Neighbor Solicitation for the home agent's address

[CATEGORY]

HOST : ADVANCED FUNCTION (REAL HOME LINK)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

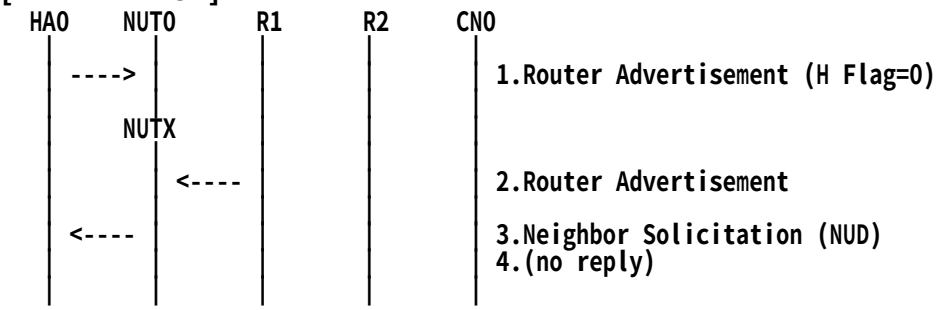
[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

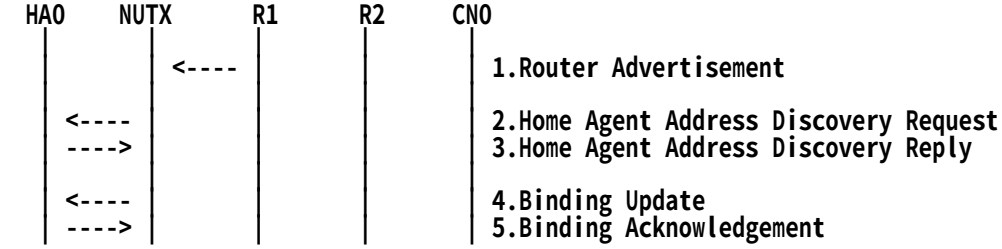
Refer to 3.1 Common Setup-1

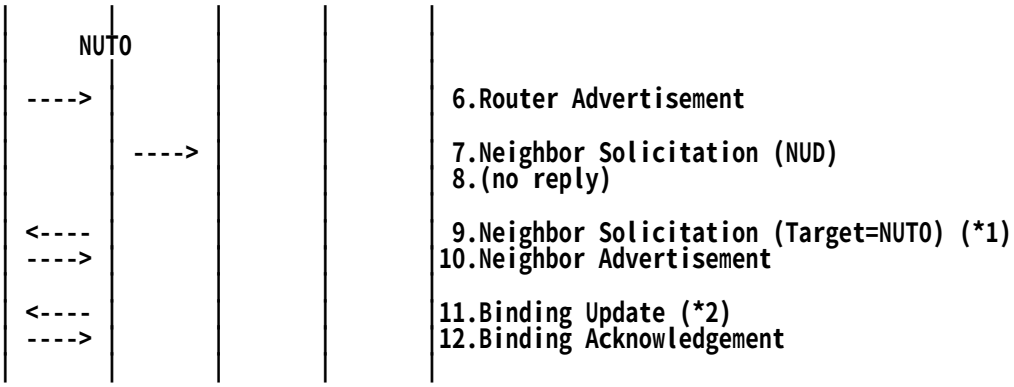
[INITIALIZATION]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.1)
   # H Flag = 0 and Not include HA information.
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Home Agent Address Discovery Request. (NUTX -> NUT0_ha_any) (Refer to 5.17.1)
3. Send Home Agent Address Discovery Reply. (HA0 -> NUTX) (Refer to 5.18.1)
4. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
5. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
6. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.1)
7. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
8. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
9. Receive Neighbor Solicitation. (Unspecified -> solicited-node multicast) (*1) (Refer to 5.3.1)

IPv6 Header	Source Address	0::0 (Unspecified address)
	Destination Address	NUT0 (Link0, Solicited-node multicast address)
ICMPv6 Header	Type	135
	Target Address	NUT0 (Link0, global)

10. Send Neighbor Advertisement. (HA0 -> unsolicited-node multicast) (Refer to 5.4.1)

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	(Link0, Unsolicited-node multicast)
ICMPv6 Header	Type	136
	S Flag	0
	Target Address	NUT0 (Link0, global)
Target Link Layer Option	Link Layer Address	HA0 (ether)

11. Receive Binding Update. (NUT0 -> HA0) (*2) (Refer to 5.14.1)
    - w/ Home Address option

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[4])
	A Flag	1
	H Flag	1
	Lifetime	0
Alternate Care-of Address Option	Type	3
	Address	NUT0 (Link0, global)

    - w/o Home Address option

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[4])
	A Flag	1
	H Flag	1
	Lifetime	0
Alternate Care-of Address Option	Type	3
	Address	NUT0 (Link0, global)

12. Send Binding Acknowledgement. (HA0 -> NUT0) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Neighbor Solicitation.

(*2) PASS: HA0 receives Binding Update.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.5.4

6.6.1.1 MN-2-1-3-1-001 - Sending BU of de-registration

[PURPOSE]

MN-2-1-3-1-001 - Sending BU of de-registration

[CATEGORY]

HOST : ADVANCED FUNCTION (REAL HOME LINK)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

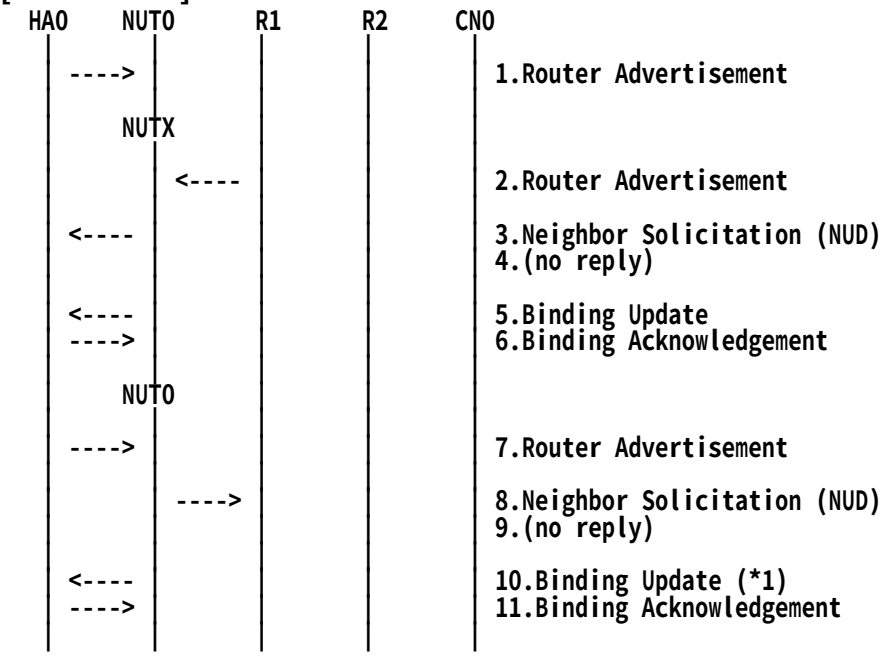
[TEST SETUP]

Refer to 3.1 Common Setup-1

[INITIALIZATION]

NONE

[PROCEDURE]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
5. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)

6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
7. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
8. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
9. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
10. Receive Binding Update. (NUT0 -> HA0) (*1) (Refer to 5.14.1)
    - w/ Home Address option

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[5])
	A Flag	1
	H Flag	1
	Lifetime	0
Alternate Care-of Address Option	Type	3
	Address	NUT0 (Link0, global)

    - w/o Home Address option

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[5])
	A Flag	1
	H Flag	1
	Lifetime	0
Alternate Care-of Address Option	Type	3
	Address	NUT0 (Link0, global)

11. Send Binding Acknowledgement. (HA0 -> NUT0) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update,
Then, check whether this packet fills all of the following,
- The Source Address is set to the Home Address.
- If the Home Address destination option is included,
  - This option is placed as the right location.
  - The Home Address field is set to the Home Address.
- The Acknowledge(A) bit is set to ON.
- The Home Registration(H) bit is set to ON.
- The Sequence Number is set more than that in the previous Binding Update.
- The Lifetime field is cleared.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.1, 11.5.4

RFC3776 Using IPsec to Protect Mobile IPv6 Signaling Between Mobile Nodes and Home Agents
See Section 3.1

6.6.2 Receiving BA

6.6.2.1 MN-2-2-2-1-027 - Receiving Neighbor Solicitation for home address

[PURPOSE]

MN-2-2-2-1-027 - Receiving Neighbor Solicitation for home address

[CATEGORY]

HOST : ADVANCED FUNCTION (REAL HOME LINK)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

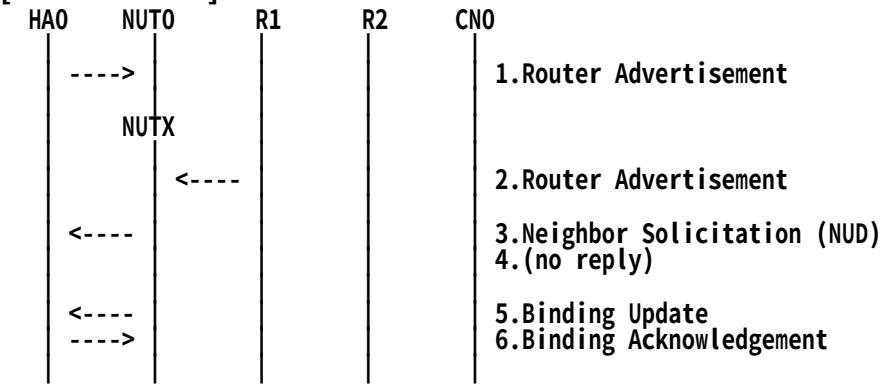
[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

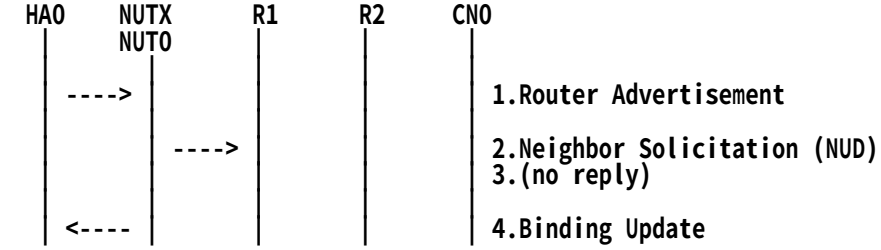
Refer to 3.1 Common Setup-1

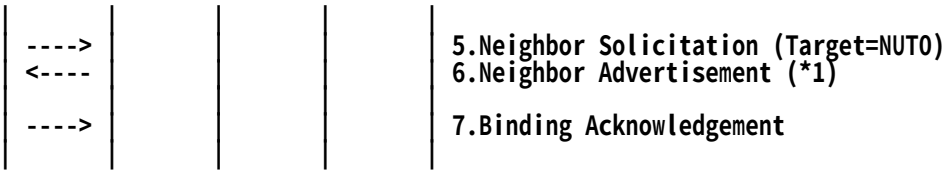
[INITIALIZATION]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]





1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
3. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
4. Receive Binding Update. (NUT0 -> HA0) (Refer to 5.14.1)
5. Send Neighbor Solicitation. (HA0 -> NUT0) (Refer to 5.3.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUT0 (Link0, Solicited-node multicast address)
ICMPv6 Header	Type	135
	Target Address	NUT0 (Link0, global)
Source Link Layer Option	Link Layer Address	HA0 (ether)

6. Receive Neighbor Advertisement. (NUT0 -> HA0) (*1) (Refer to 5.4.2)

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	HA0 (Link0, global)
ICMPv6 Header	Type	136
	S Flag	1
	Target Address	NUT0 (Link0, global)
Target Link Layer Option	Link Layer Address	NUT0 (ether)

7. Send Binding Acknowledgement. (HA0 -> NUT0) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Neighbor Advertisement.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.5.4

6.6.2.2 MN-2-2-2-1-001 - BU of de-registration accepted (Status = 0)

[PURPOSE]

MN-2-2-2-1-001 - BU of de-registration accepted (Status = 0)

[CATEGORY]

HOST : ADVANCED FUNCTION (REAL HOME LINK)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

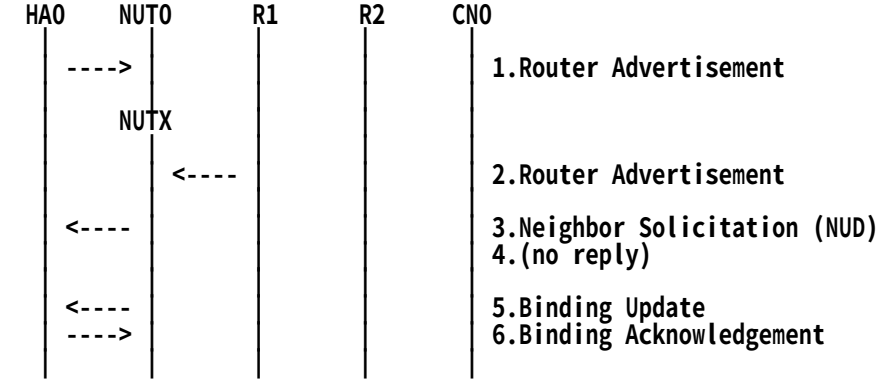
[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

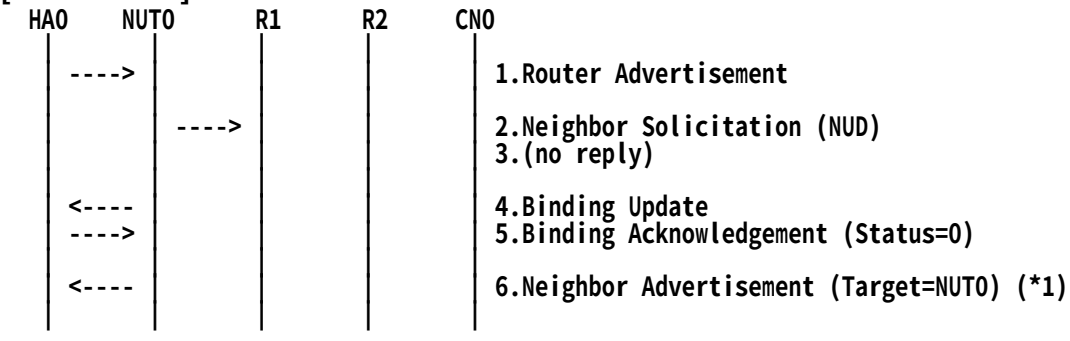
Refer to 3.1 Common Setup-1

[INITIALIZATION]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
3. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
4. Receive Binding Update. (NUT0 -> HA0) (Refer to 5.14.1)
5. Send Binding Acknowledgement. (HA0 -> NUT0) (Refer to 5.15.1)
   # The Destination Address is set to the Home Address.
   # The Status field is set to 0(Binding Update accepted).
   # The Sequence # field is set to the Sequence # in the Binding Update[4].
   # The Lifetime field is set to 0.
   # The Binding Authorization Data mobility option is not included.
   # The Binding Refresh Advice mobility option is not included.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUT0 (Link0, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA2_SPI
Mobility Header	MH Type	6
	Status	0
	Sequence	(= BU[4])
	Lifetime	0

6. Receive Neighbor Advertisement. (NUT0 -> NUT0_allnode_multi) (*1) (Refer to 5.4.1)

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	(Link0, Unsolicited-nodeulticast address)
ICMPv6 Header	Type	136
	S Flag	0
	O Flag	1
	Target Address	NUT0 (Link0, global)
Target Link Layer Option	Link Layer Address	NUT0 (ether)

[JUDGMENT]

(*1) PASS: HA0 receive Neighbor Advertisement.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.3, 11.5.4

6.6.3 Neighbor Discovery

6.6.3.1 MN-3-4-1-1-001 - Sending NA (Target Address = link-layer address)

[PURPOSE]

MN-3-4-1-1-001 - Sending NA (Target Address = link-layer address)

[CATEGORY]

HOST : ADVANCED FUNCTION (REAL HOME LINK)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

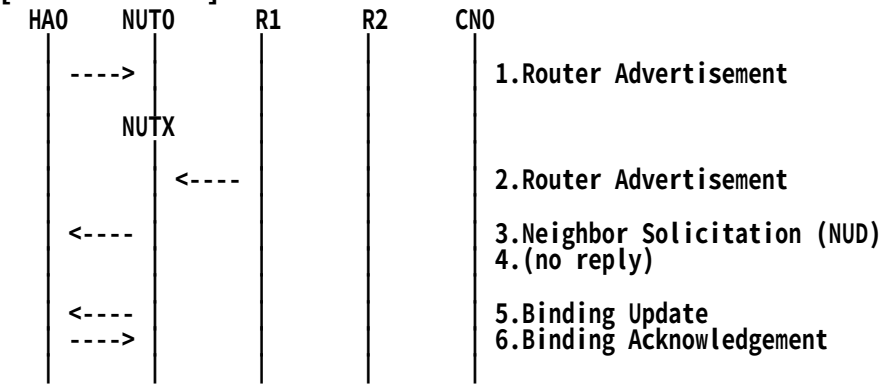
[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

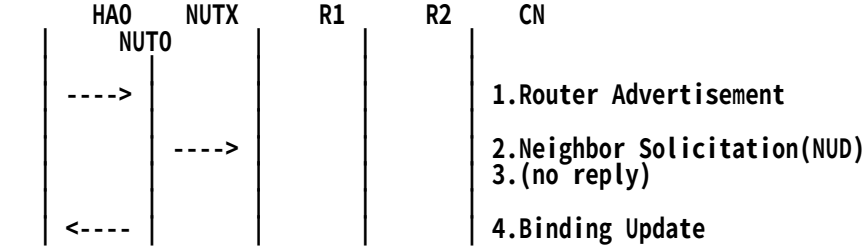
Refer to 3.1 Common Setup-1

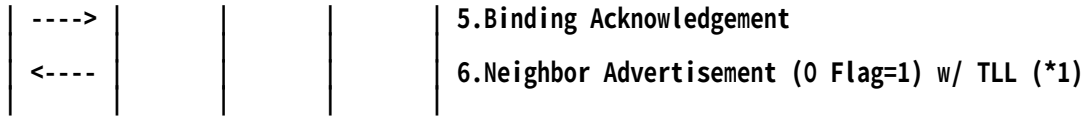
[INITIALIZATION]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]





1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
3. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
4. Receive Binding Update. (NUT0 -> HA0) (Refer to 5.14.1)
5. Send Binding Acknowledgement. (HA0 -> NUT0) (Refer to 5.15.1)
6. Receive Neighbor Advertisement. (NUT0 -> NUT0_allnode_multi) (*1) (Refer to 5.4.1)

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	(Link0, Unsolicited-node multicast address)
ICMPv6 Header	Type	136
	R Flag	0
	S Flag	0
	O Flag	1
	Target Address	NUT0 (Link0, global)
Target Link Layer Option	Link Layer Address	NUT0 (ether)

[JUDGMENT]

(*1) PASS: HA0 receives Neighbor Advertisement.
Then, check whether this packet fills all of the following.
- The target address is set to the Home Address.
- The Solicited flag is cleared.
- The Override flag is set to ON.
- The Target Link-layer Address option is set to self link-layer address.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.5.4

6.6.3.2 MN-3-4-1-1-002 - Returning home (after the expiration of home registration)

[PURPOSE]

MN-3-4-1-1-002 - Returning home (after the expiration of home registration)

[CATEGORY]

HOST : ADVANCED FUNCTION (REAL HOME LINK)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

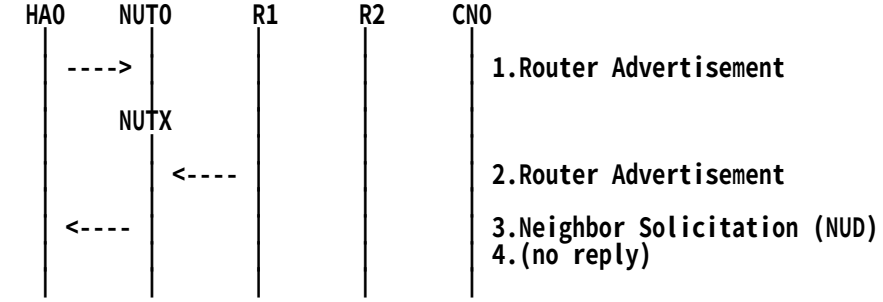
[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

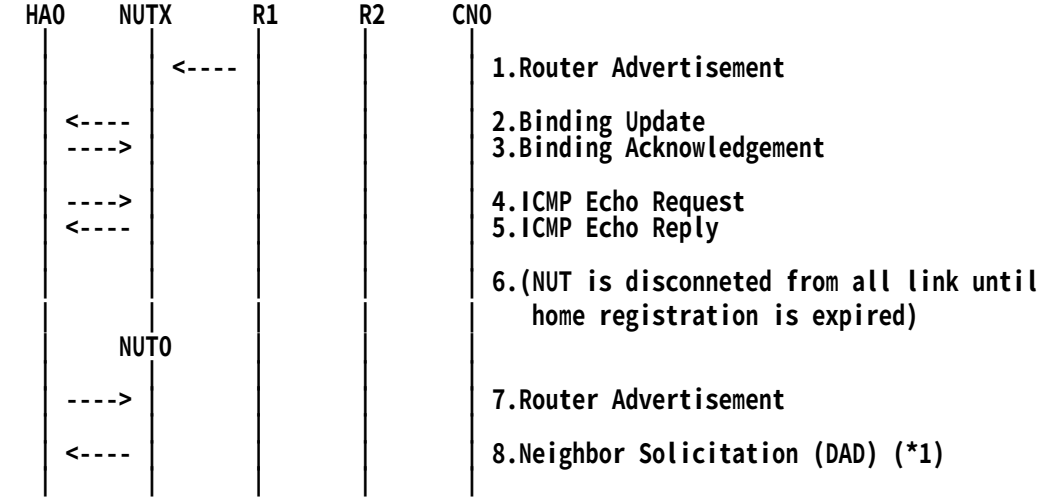
Refer to 3.1 Common Setup-1

[INITIALIZATION]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
4. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

5. Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option) (Refer to 5.8.3)
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	129

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

6. (wait)
   # NUT is disconneted from all link until home registration is expired.
7. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
8. Receive Neighbor Solicitation (DAD). (Unspecified -> solicited-node multicast) (*1) (Refer to 5.3.1)

IPv6 Header	Source Address	0::0 (Unspecified address)
	Destination Address	NUT0 (Link0, Solicited-node multicast address)
ICMPv6 Header	Type	135
	Target Address	NUT0 (Link0, link-local address)

[JUDGMENT]

(*1) PASS: HA0 receives Neighbor Solicitation(DAD).
Then, check whether this packet fills all of the following.
- The target address is a link local address.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.5.4

6.7 Correspondent Registration

6.7.1 Sending HoTI

6.7.1.1 MN-2-1-1-2-001 - Sending HoTI (when receiving the tunneled packet from unknown node)

[PURPOSE]

MN-2-1-1-2-001 - Sending HoTI (when receiving the tunneled packet from unknown node)

[CATEGORY]

HOST : ADVANCED FUNCTION(RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

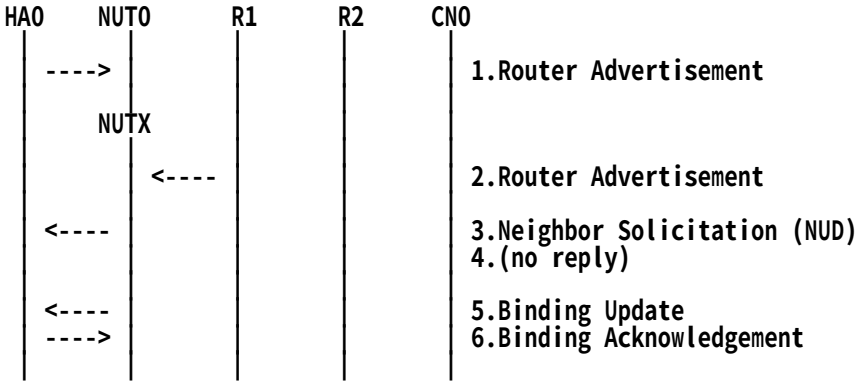
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

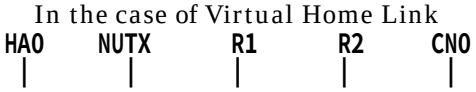
[INITIALIZATION]

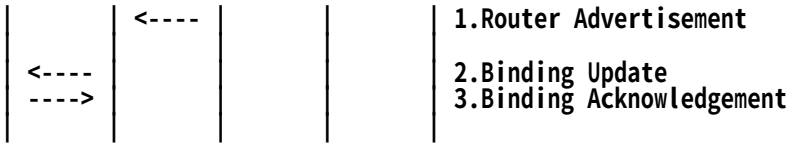
- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

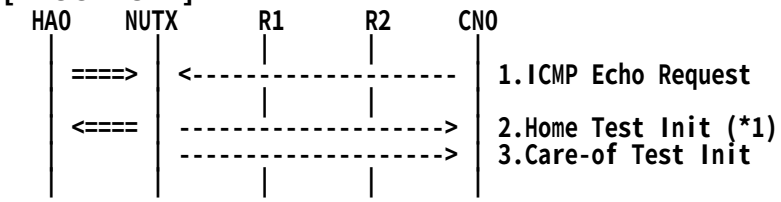
- In the case of Virtual Home Link





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.10.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	1

3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)

[JUDGMENT]

(*1) PASS: HA0 receives Home Test Init.

Then, check whether this packet fills all of the following.

- The Source Address(outer) is set to primary Care-of Address.
- The Destination Address(outer) is set to HA address.
- The Destination Address(inner) is set to the Source Address(inner) of ICMP Echo Request[1].
- The Source Address(inner) is set to the Destination Address(inner) of ICMP Echo Request[1].

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.6, 11.6.1, 11.7.2, 11.3.1, 11.3.2, 11.6.3

RFC3776 Using IPsec to Protect Mobile IPv6 Signaling Between Mobile Nodes and Home Agents

See Section 4.1, 4.2, 4.3, 4.4

6.7.1.2 MN-2-1-1-2-019 - Sending HoTI (when receiving the tunneled packet after the expiration of correspondent registration)

[PURPOSE]

MN-2-1-1-2-019 - Sending HoTI (when receiving the tunneled packet after the expiration of correspondent registration)

[CATEGORY]

HOST : ADVANCED FUNCTION(RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-registers with CN: NO

[TOPOLOGY]

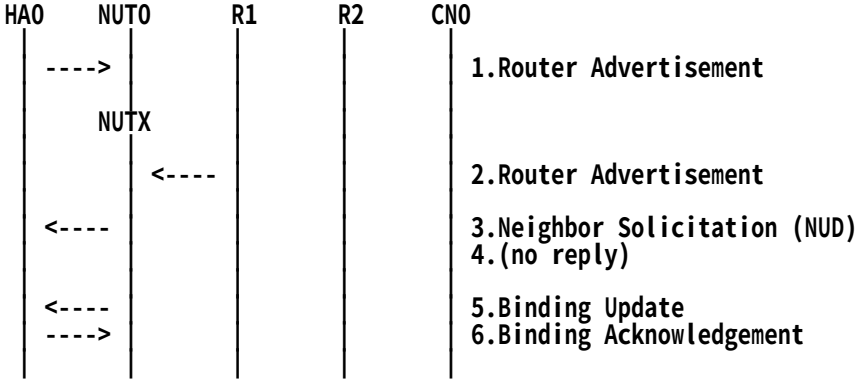
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

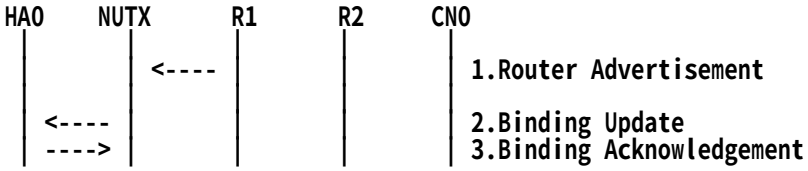
[INITIALIZATION]

- In the case of Real Home Link



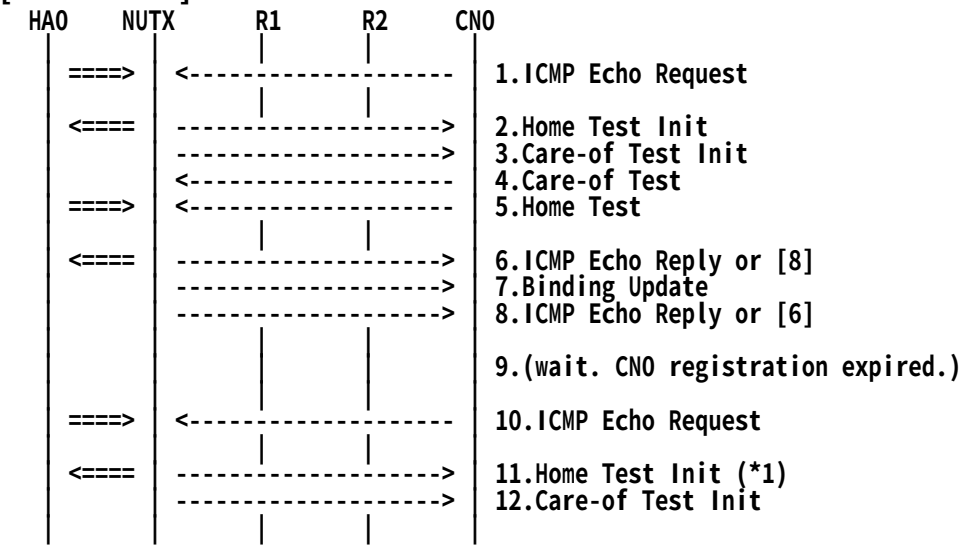
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. (wait)
   # CN0 registration expired.
10. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
11. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.10.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN (LinkZ, global)
Mobility Header	MH Type	1

12. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)

[JUDGMENT]

(*1) PASS: CN0 receives Home Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.6, 11.7.2

6.7.1.3 MN-2-1-1-2-009 - Sending HoTI for each CN in BUL (after home re-registration)

[PURPOSE]

MN-2-1-1-2-009 - Sending HoTI for each CN in BUL (after home re-registration)

[CATEGORY]

HOST : ADVANCED FUNCTION(RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

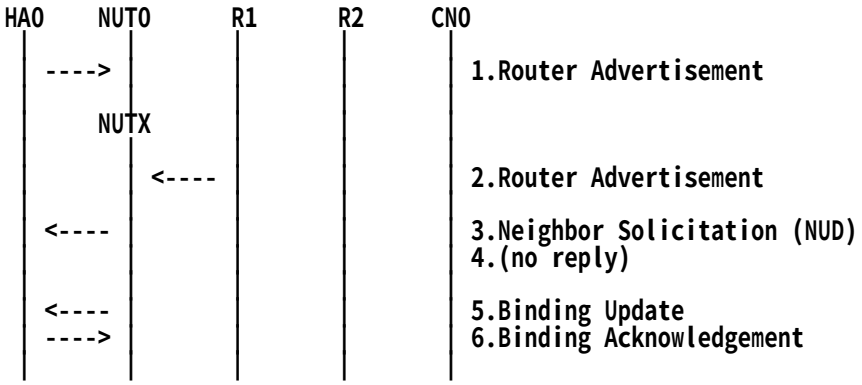
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

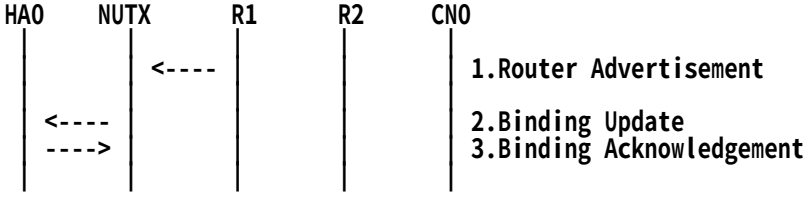
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

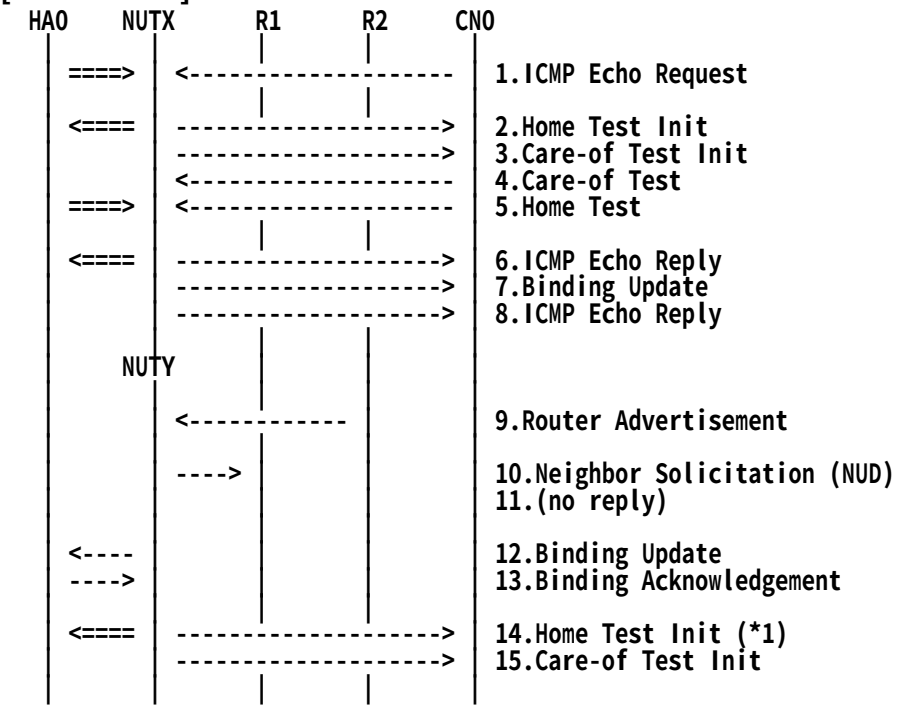
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. Send Router Advertisement. (R2 -> R2_allnode_multi) (Refer to 5.2.1)
10. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
11. (no reply)
    # Wait during a maximum of 3 seconds(RFC2461).
12. Receive Binding Update to HA0. (NUTY -> HA0) (Refer to 5.14.1)
13. Send Binding Acknowledgement. (HA0 -> NUTY) (Refer to 5.15.1)
14. Receive Home Test Init. (out: NUTY -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.10.2)

IPv6 Header	Source Address	NUTY (LinkY, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	1

15. Receive Care-of Test Init. (NUTY -> CN0) (Refer to 5.11.1)

[JUDGMENT]

(*1) PASS: CN0 receives Home Test Init.

When home nonce is reused, Home Test Init may not transmit.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.6, 11.7.2, 5.2.7

6.7.1.4 MN-2-1-1-2-017 - Sending HoTI (when the lifetime for a changed prefix decreases)

[PURPOSE]

MN-2-1-1-2-017 - Sending HoTI (when the lifetime for a changed prefix decreases)

[CATEGORY]

HOST : ADVANCED FUNCTION(RETURN ROUTABILITY(AND MPD))

[REQUIREMENT OF TEST]

Function of Return Routability: YES

Function of Mobile Prefix Discovery: YES

[TOPOLOGY]

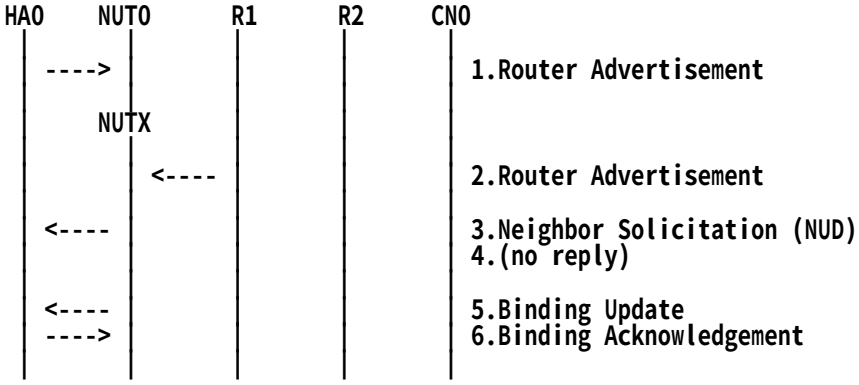
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

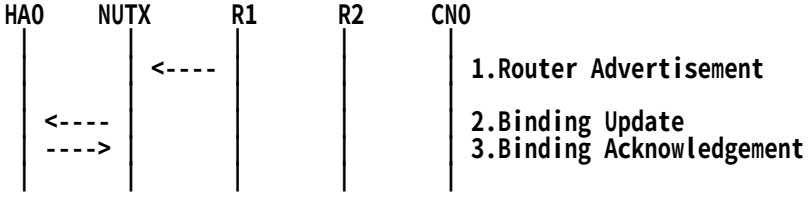
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

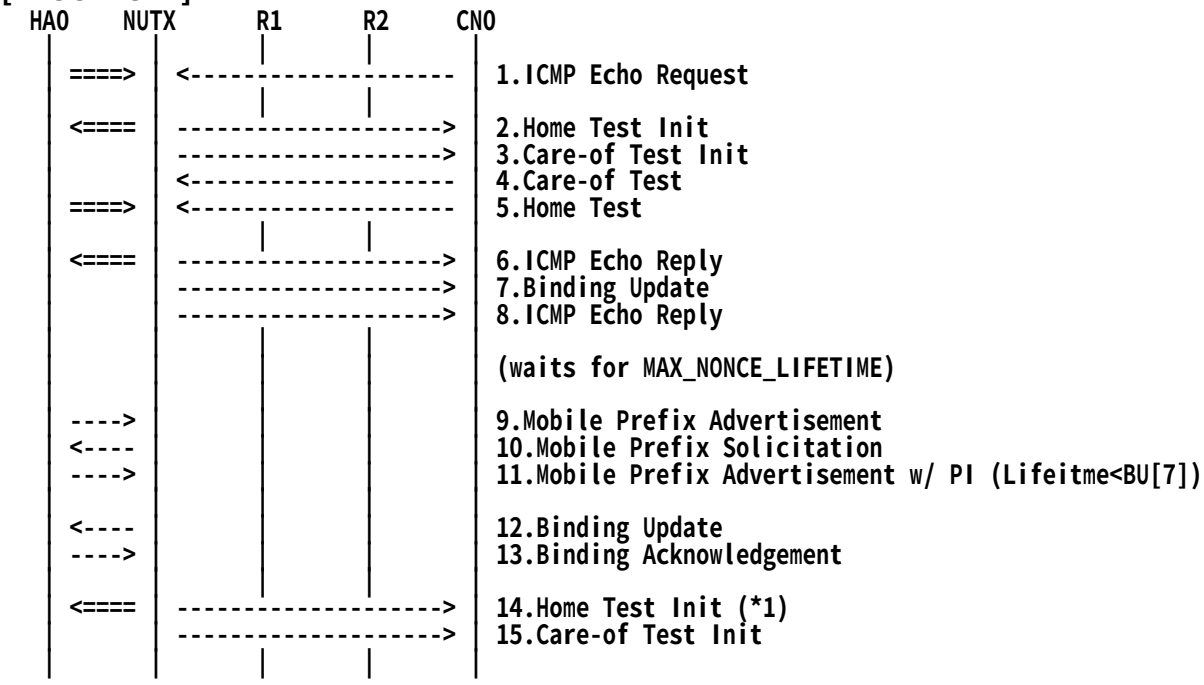
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option).
   (Refer to 5.8.3)
9. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
   (Refer to 5.20.1)
   # The Identifier is unsolicited.
10. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option)
    (Refer to 5.19.1)
11. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
    (Refer to 5.20.1)
    # The Identifier is set to the Identifier value from the Mobile Prefix Solicitation [10].
    # The Valid Lifetime and Preferred Lifetime is set to less than Binding Lifetime.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6 Header	Type	147
	Identifier	(= MPS[10])
Prefix Information Option	Type	3
	Valid lifetime	Any (< BU[7])
	Preferred lifetime	Any (< BU[7])

12. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
13. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
14. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.10.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	1

15. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)

[JUDGMENT]

(*1) PASS: CN0 receives Home Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.6, 11.7.2, 11.4.2

6.7.1.5 MN-2-1-1-2-028 - Don't send HoTI (when receiving the tunneled packet (inner dst != HoA))

[PURPOSE]

MN-2-1-1-2-028 - Don't send HoTI (when receiving the tunneled packet (inner dst != HoA))

[CATEGORY]

HOST : ADVANCED FUNCTION(RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

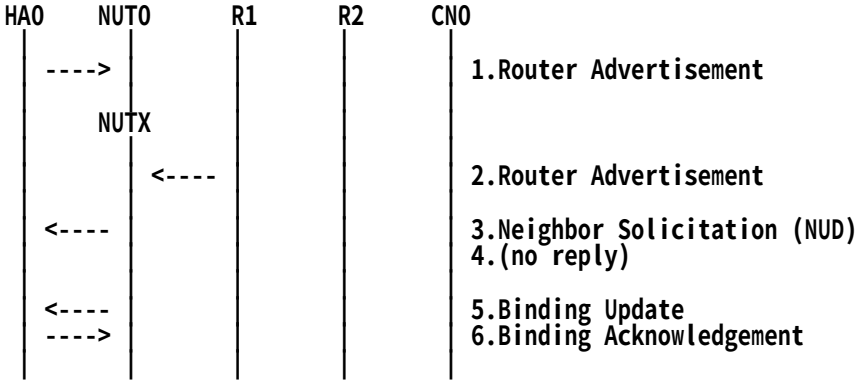
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

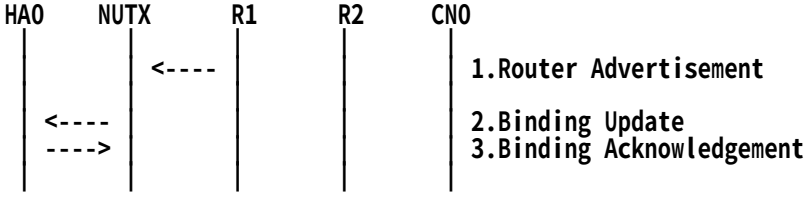
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

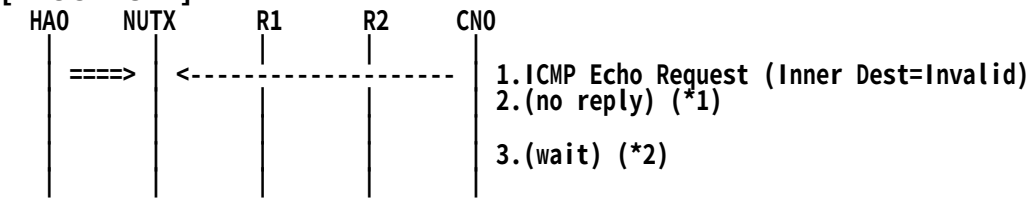
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> Not NUT0) (Refer to 5.7.2)
   # Dstination Address of inner packet is not set to the NUT0.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	Invalid address
ICMPv6 Header	Type	128

2. (no reply) (*1)
3. (wait) (*2)
   # Wait during 32 (MAX_BINDACK_TIMEOUT) seconds.

[JUDGMENT]

(*1) PASS: CN0 does not receive ICMP Echo Reply.
(*2) PASS: CN0 does not receive Home Test Init and Care-of Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.2, 11.3.3

6.7.1.6 MN-2-1-1-2-004 - Don't send HoTI (when receiving the tunneled packet (inner src == outer src))

[PURPOSE]

MN-2-1-1-2-004 - Don't send HoTI (when receiving the tunneled packet (inner src == outer src))

[CATEGORY]

HOST : ADVANCED FUNCTION(RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

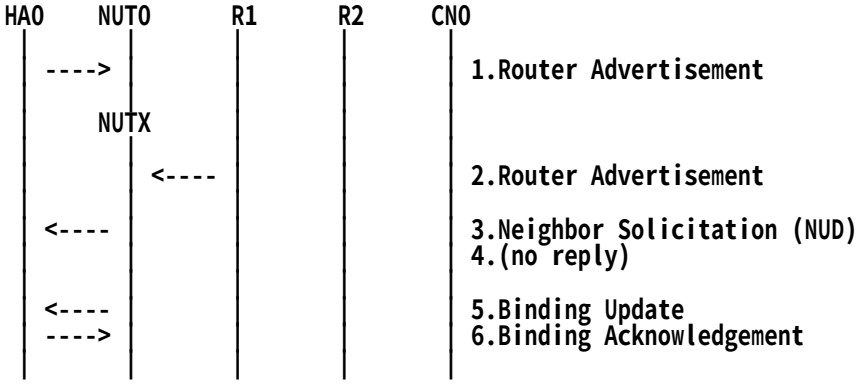
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

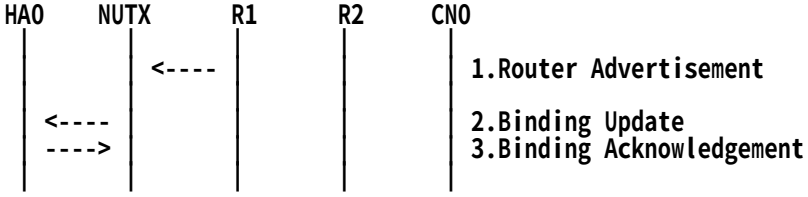
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

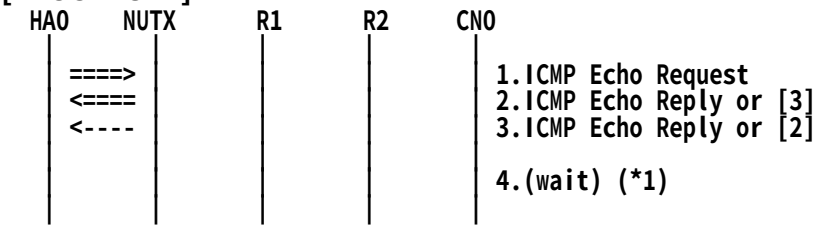
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: HA0 -> NUT0) (Refer to 5.7.3)
   # Source Address of outer packet and inner packet is set to the same.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

2. Receive ICMP Echo Reply or [3]. (out: NUTX -> HA0, in: NUT0 -> HA0) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	HA0 (Link0, global)
ICMPv6 Header	Type	129

3. [2] or Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option)
   (Refer to 5.8.2)
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	129

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

4. (wait) (*1)
   # Wait during 32 (MAX_BINDACK_TIMEOUT) seconds.

[JUDGMENT]

(*1) PASS: HA0 does not receive Home Test Init and Care-of Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.2

6.7.1.7 MN-2-1-1-2-006 - Don't start the return routability procedure (when receiving the packet directly from known node)

[PURPOSE]

MN-2-1-1-2-006 - Don't start the return routability procedure (when receiving the packet directly from known node)

[CATEGORY]

HOST : ADVANCED FUNCTION(RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

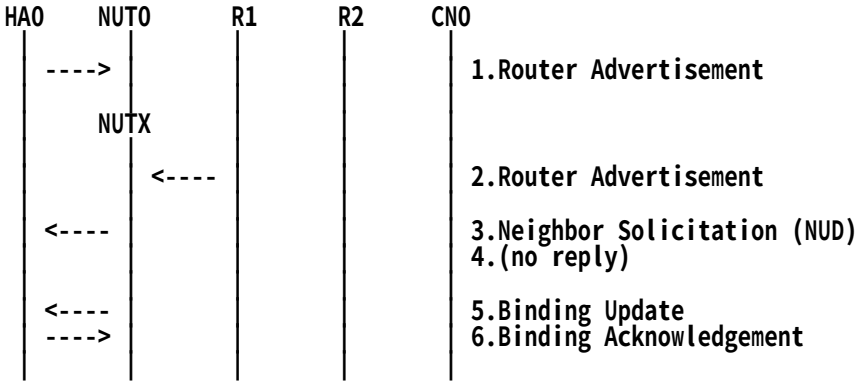
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

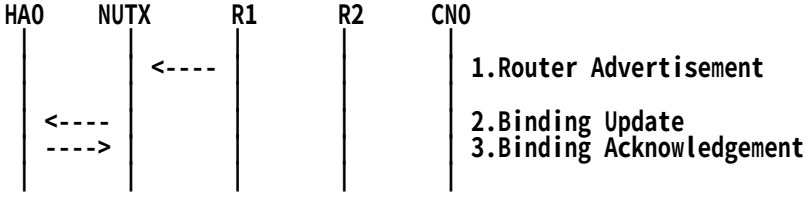
[INITIALIZATION]

- In the case of Real Home Link



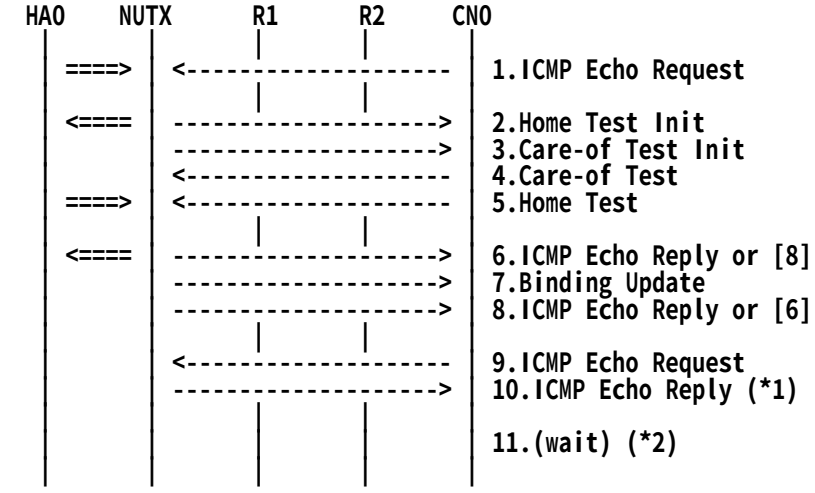
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

10. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (*1)
    (Refer to 5.8.3)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

11. (wait) (*2)
    # Wait during enough timer.

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply with Home Address Option.
(*2) PASS: CN0 does not receive Home/Care-of Test Init and Binding Update.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.6, 11.7.2, 11.3.1

6.7.1.8 MN-2-1-1-2-010 - Retransmissions & Back off (Use INITIAL_BINDACK_TIMEOUT as the initial retransmission timer)

[PURPOSE]

MN-2-1-1-2-010 - Retransmissions & Back off (Use INITIAL_BINDACK_TIMEOUT as the initial retransmission timer)

[CATEGORY]

HOST : ADVANCED FUNCTION(RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-transmits HoTI for valuable HoT: YES/NO

[TOPOLOGY]

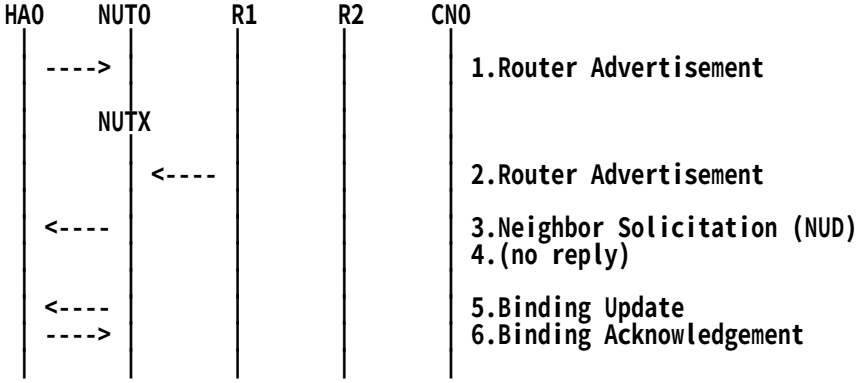
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

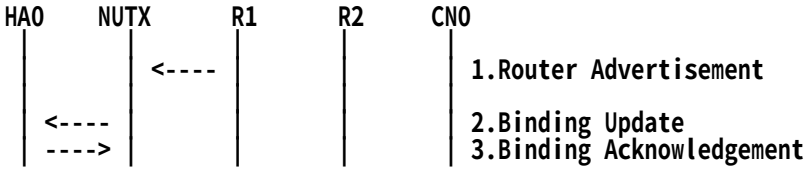
[INITIALIZATION]

- In the case of Real Home Link



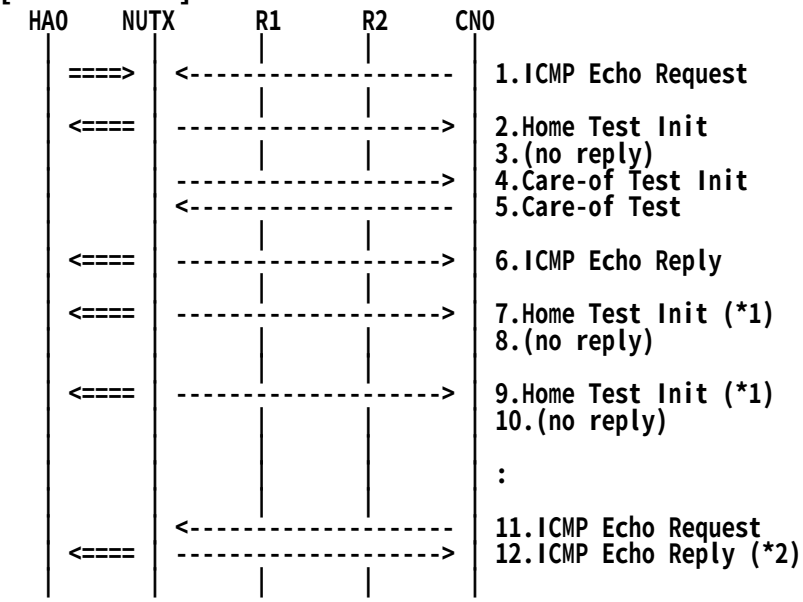
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. (no reply)
4. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
5. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.10.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any (newly generated)

8. (no reply)
9. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.10.2)
10. (no reply)
11. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
12. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits HoTI for valuable HoT: YES
  (*1) PASS: CN0 receives the retransmitted Home Test Init.

Then, check whether this packet fills all of the following.
- Home Init Cookie is set to new cookie value.
- The initial retransmission timer is set to INITIAL_BINDACK_TIMEOUT.
- Timeout period is doubled upon each retransmission.

(*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

- NUT re-transmits HoTI for valuable HoT: NO

(*1) PASS: CN0 does not receive the retransmitted Home Test Init.

(*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.8, 11.1

6.7.1.9 MN-2-1-1-2-015 - Check not to support the Route Optimization

[PURPOSE]

MN-2-1-1-2-015 - Check not to support the Route Optimization

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

Function of Return Routability: NO

[TOPOLOGY]

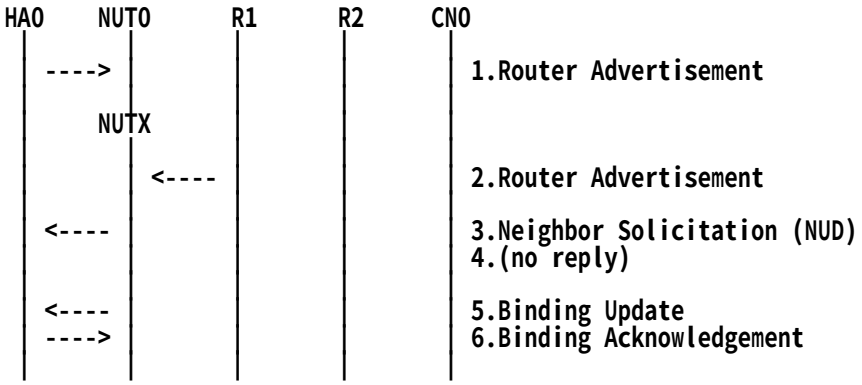
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

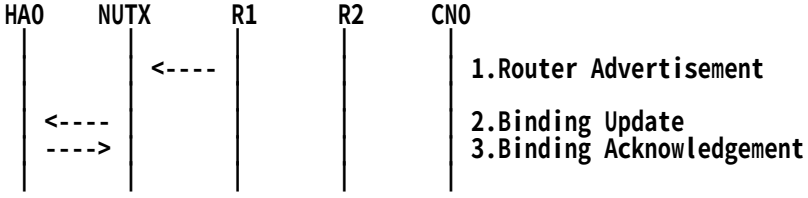
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

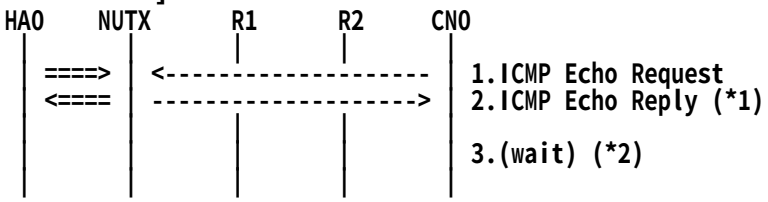
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

2. Receive ICMP Echo Reply. (out: NUTX -> HA0 in: NUT0 -> CN0) (*1) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

3. (wait) (*2)
   # Wait during enough timer.

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply by reverse tunneling.

(*2) PASS: CN0 does not receive Home/Care-of Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.6, 11.7.2, 8.5

6.7.1.10 MN-2-1-1-2-016 - Check to disable the Route Optimization

[PURPOSE]

MN-2-1-1-2-016 - Check to disable the Route Optimization

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT discriminates whether it optimizes to CN or not: YES

done: CN0 3ffe:501:ffff:104:200:ff:fe00:a8a8

none: CN1 3ffe:501:ffff:104:200:ff:fe00:a9a9

[TOPOLOGY]

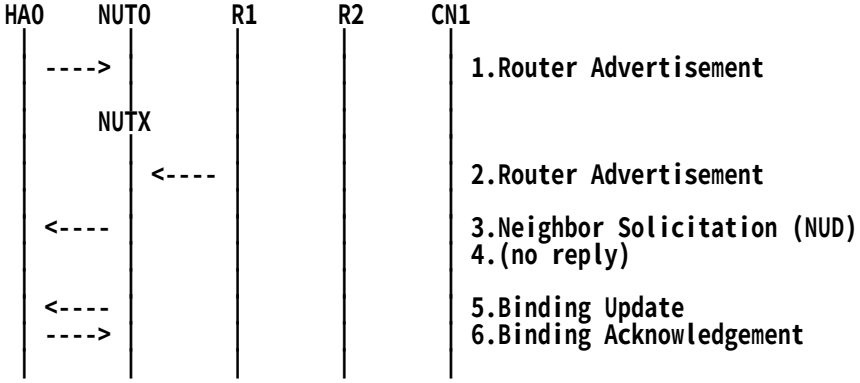
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

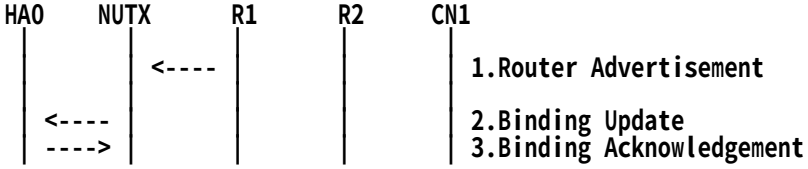
[INITIALIZATION]

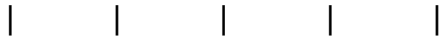
- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

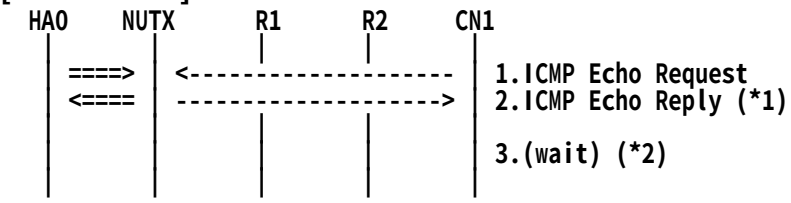
- In the case of Virtual Home Link





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN1 -> NUT0) (Refer to 5.7.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN1 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

2. Receive ICMP Echo Reply. (out: NUTX -> HA0 in: NUT0 -> CN1) (*1) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN1 (LinkZ, global)
ICMPv6 Header	Type	129

3. (wait) (*2)
   # Wait during enough timer.

[JUDGMENT]

(*1) PASS: CN1 receives ICMP Echo Reply by reverse tunneling.
(*2) PASS: CN1 does not receive Home/Care-of Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.6, 11.7.2, 8.5

6.7.2 Receiving HoT

6.7.2.1 MN-2-1-3-2-001 - Receiving HoT after CoT

[PURPOSE]

MN-2-1-3-2-001 - Receiving HoT after CoT

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

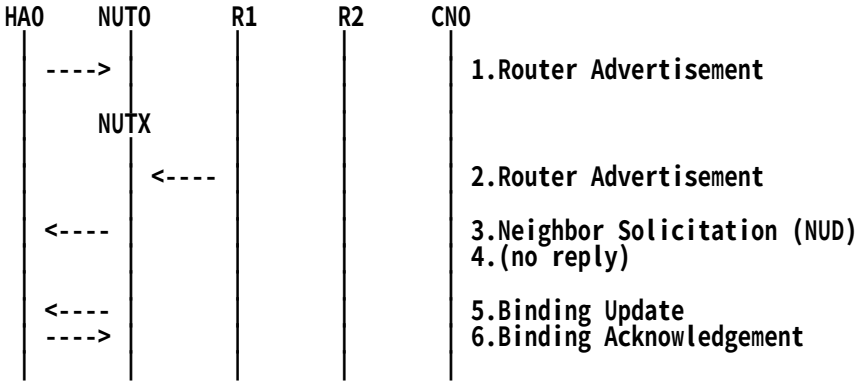
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

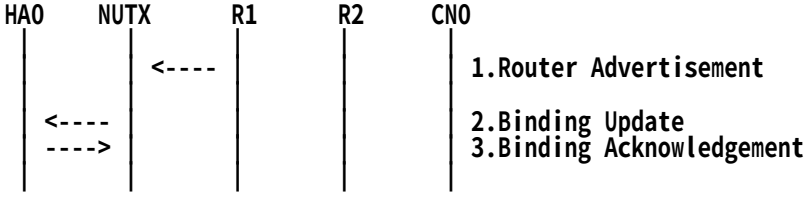
[INITIALIZATION]

- In the case of Real Home Link



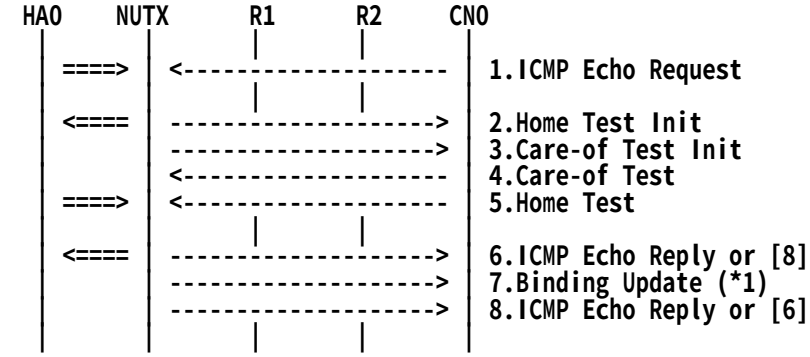
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	3
	Home Nonce Index	Any
	Home Init Cookie	(= HoTI[2])

6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5

8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Upadate.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.6.2, 11.6.3, 9.2

RFC3776 Using IPsec to Protect Mobile IPv6 Signaling Between Mobile Nodes and Home Agents

See Section 4.1, 4.3, 4.4

6.7.2.2 MN-2-1-3-2-007 - Receiving HoT before CoT

[PURPOSE]

MN-2-1-3-2-007 - Receiving HoT before CoT

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

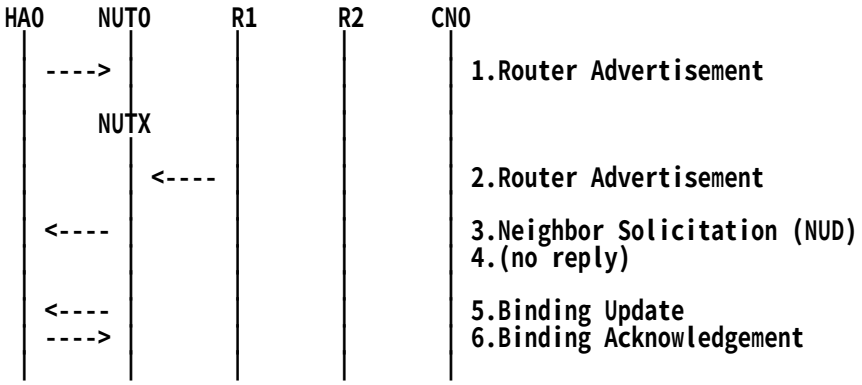
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

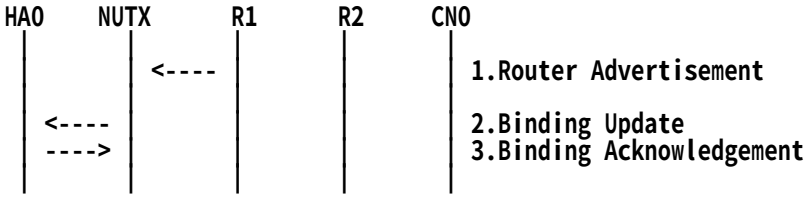
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

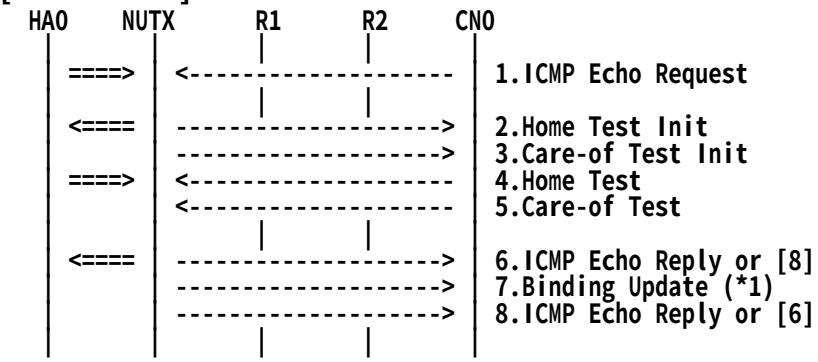
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	3
	Home Nonce Index	Any
	Home Init Cookie	(= HoTI[2])

5. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[4])
	Care-of Nonce Index	(= CoT[5])
Binding Authorization Data Option	Option Type	5

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[4])
	Care-of Nonce Index	(= CoT[5])
Binding Authorization Data Option	Option Type	5

8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Upadate.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.6.2

6.7.2.3 MN-2-1-3-2-015 - Receiving HoT (Invalid Mobility Header Reserved)

[PURPOSE]

MN-2-1-3-2-015 - Receiving HoT (Invalid Mobility Header Reserved)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

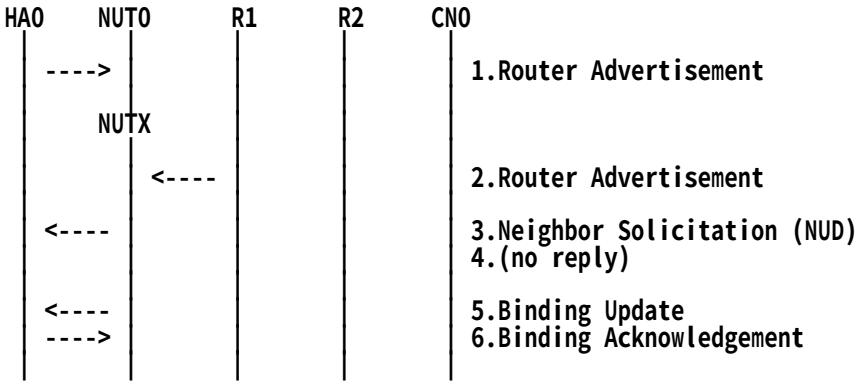
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

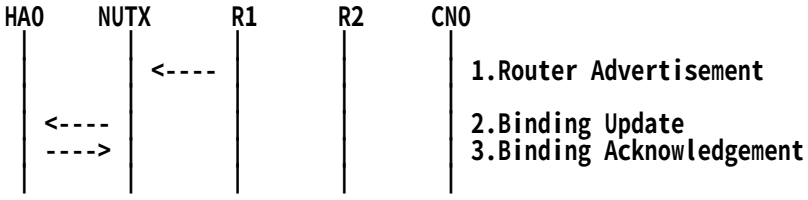
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

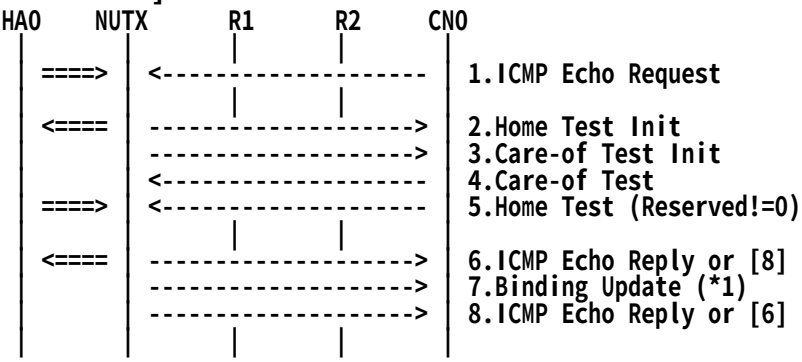
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
   # The Reserved field is not set to 0.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4 SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	3
	Reserved	Any (!=0)
	Home Nonce Index	Any
	Home Init Cookie	(= HoT[2])

6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	MN (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	MN (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5

8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Upadate.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 6.1.1, 11.6.2, 11.6.3, 9.2

6.7.2.4 MN-2-1-3-2-008 - Receiving twice HoT

[PURPOSE]

MN-2-1-3-2-008 - Receiving twice HoT

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

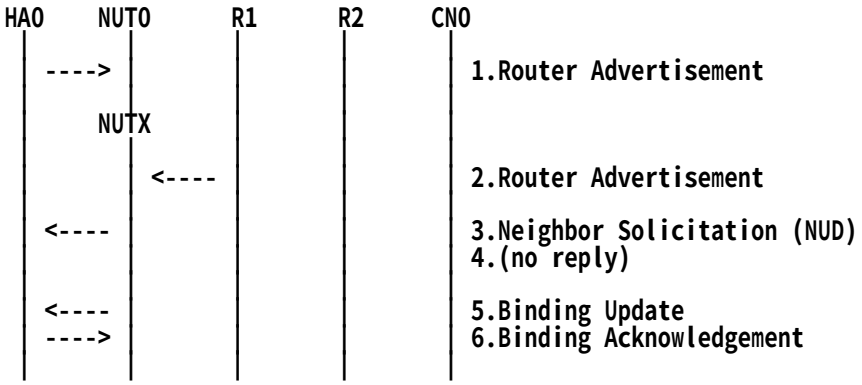
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

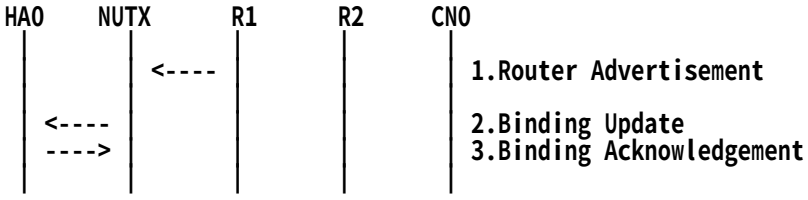
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

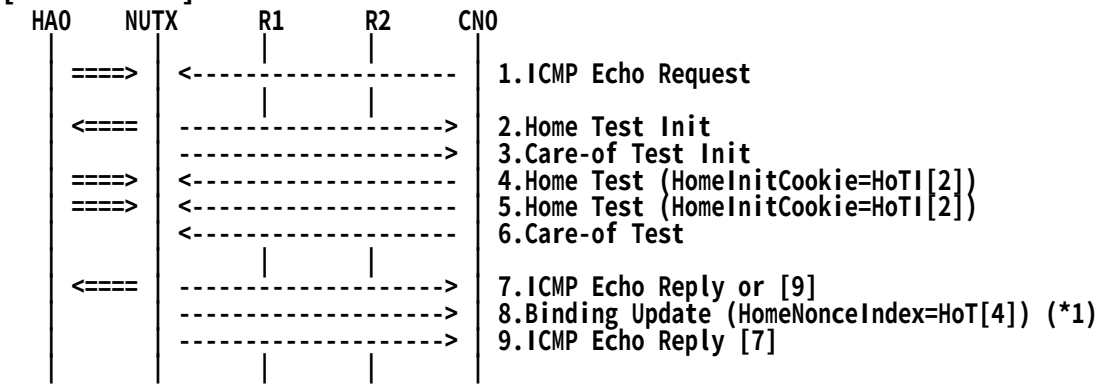
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	3
	Home Nonce Index	Any
	Home Init Cookie	(= HoTI[2])

5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
   # The Home Nonce Index is set to a different value [4].

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	3
	Home Nonce Index	Any (!= HoT[4])
	Home Init Cookie	(= HoTI[2])

6. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
7. Receive ICMP Echo Reply or [9]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
8. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[4])
	Care-of Nonce Index	(= CoT[6])
Binding Authorization Data Option	Option Type	5

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[4])
	Care-of Nonce Index	(= CoT[6])
Binding Authorization Data Option	Option Type	5

9. [7] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Upadate.
Then, check whether this packet fills all of the following.
- The Home Nonce Index is set to the Home Test [4].

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.6.2

6.7.2.5 MN-2-1-3-2-002 - Receiving Delayed HoT

[PURPOSE]

MN-2-1-3-2-002 - Receiving Delayed HoT

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-transmits HoTI for valuable HoT: YES

[TOPOLOGY]

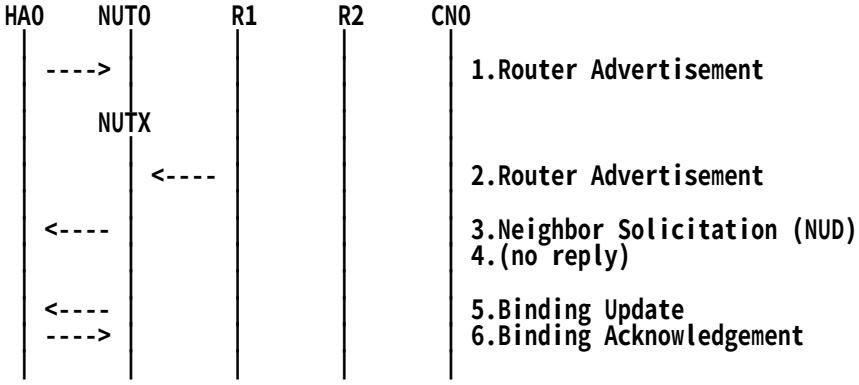
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

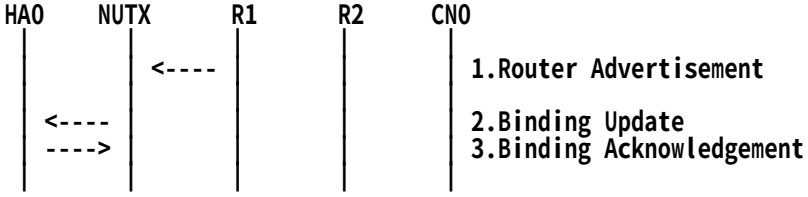
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

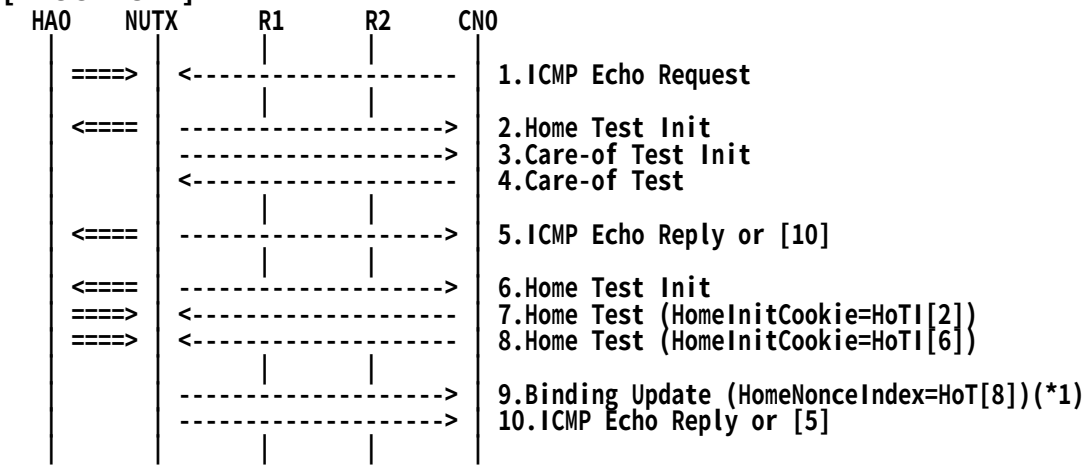
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Receive ICMP Echo Reply or [10]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
6. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
7. Send Home Test for [2]. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	3
	Home Nonce Index	Any
	Home Init Cookie	(= HoTI[2])

8. Send Home Test for [6]. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	3
	Home Nonce Index	Any
	Home Init Cookie	(= HoTI[6])

9. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[8])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)

Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[8])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

10. [5] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
    (Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Upadate.
- The Home Nonce Index is set to latest Home Test.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.6.2, 11.8

6.7.2.6 MN-2-1-3-2-003 - Invalid cookie (HoT != HoTI)

[PURPOSE]

MN-2-1-3-2-003 - Invalid cookie (HoT != HoTI)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-transmits HoTI for valuable HoT: YES/NO

[TOPOLOGY]

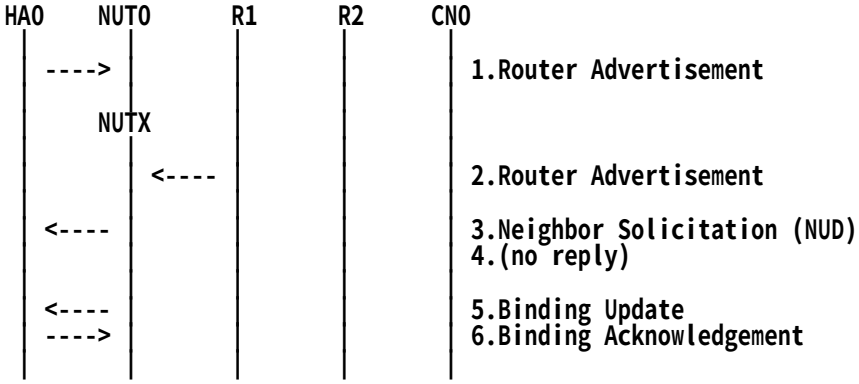
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

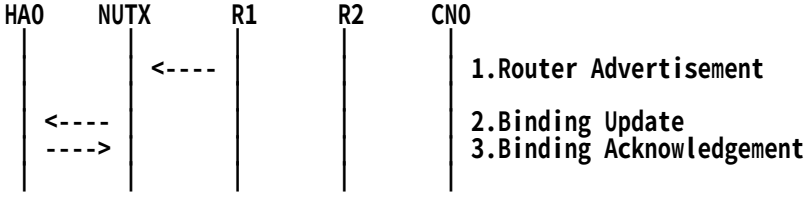
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

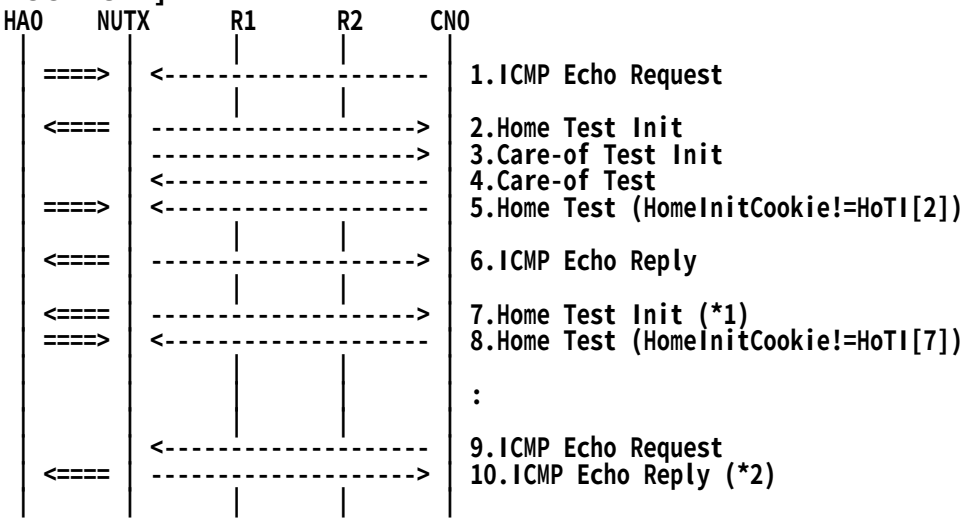
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
   # Set the value of cookie which does not match to Home Test Init [2].

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	3
	Home Nonce Index	Any
	Home Init Cookie	Any (!= HoTI[2])

6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.10.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any (newly generated)

8. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
   # Set the value of cookie which does not match to Home Test Init [7].
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
10. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits HoTI for valuable HoT: YES
  (*1) PASS: CN0 receives the retransmitted Home Test Init.

- Home Init Cookie is set to new cookie value.
- The initial retransmission timer is set to INITIAL_BINDACK_TIMEOUT.
- Timeout period is doubled upon each retransmission.

(*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

- NUT re-transmits HoTI for valuable HoT: NO

(*1) PASS: CN0 does not receive the retransmitted Home Test Init.

(*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.6.2, 11.8

6.7.2.7 MN-2-1-3-2-004 - Invalid inner src address

[PURPOSE]

MN-2-1-3-2-004 - Invalid inner src address

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-transmits HoTI for valuable HoT: YES/NO

[TOPOLOGY]

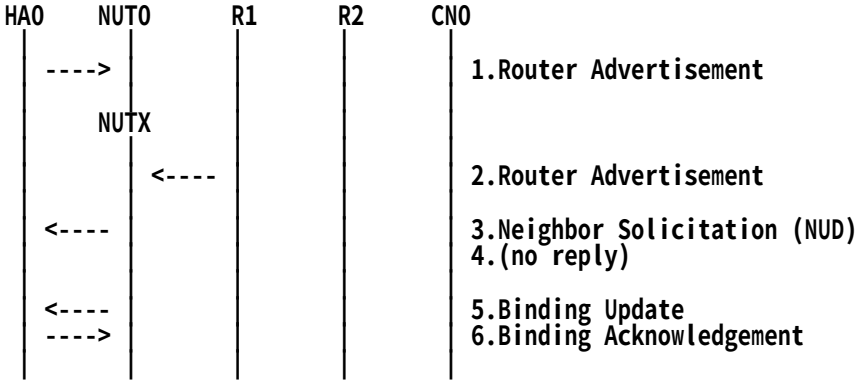
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

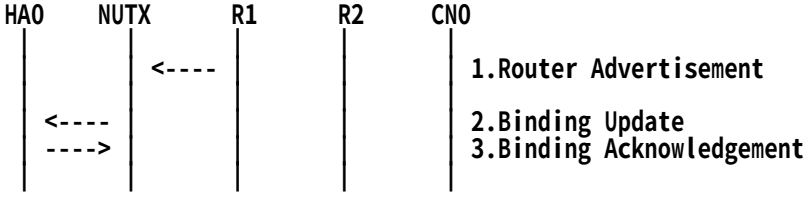
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

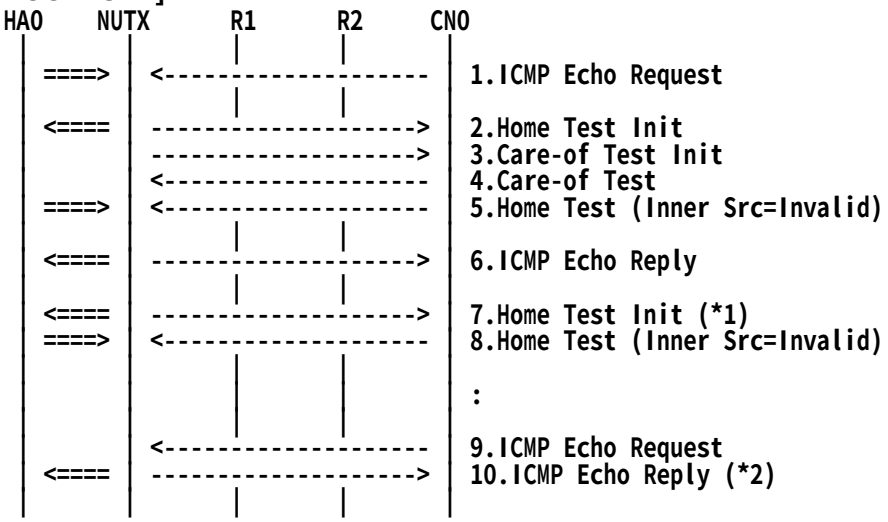
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
   # CN0 source address is wrong.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4 SPI
IPv6 Header	Source Address	Invalid address
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	3
	Home Nonce Index	Any
	Home Init Cookie	(= HoTI[2])

6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.10.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3 SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any (newly generated)

8. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
   # CN0 source address is wrong.
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
10. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits HoTI for valuable HoT: YES
  (*1) PASS: CN0 receives the retransmitted Home Test Init.

- Home Init Cookie is set to new cookie value.
- The initial retransmission timer is set to INITIAL_BINDACK_TIMEOUT.
- Timeout period is doubled upon each retransmission.

(*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

- NUT re-transmits HoTI for valuable HoT: NO

(*1) PASS: CN0 does not receive the retransmitted Home Test Init.

(*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.6.2, 11.8

6.7.2.8 MN-2-1-3-2-011 - Receiving unexpected HoT from unknown node

[PURPOSE]

MN-2-1-3-2-011 - Receiving unexpected HoT from unknown node

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

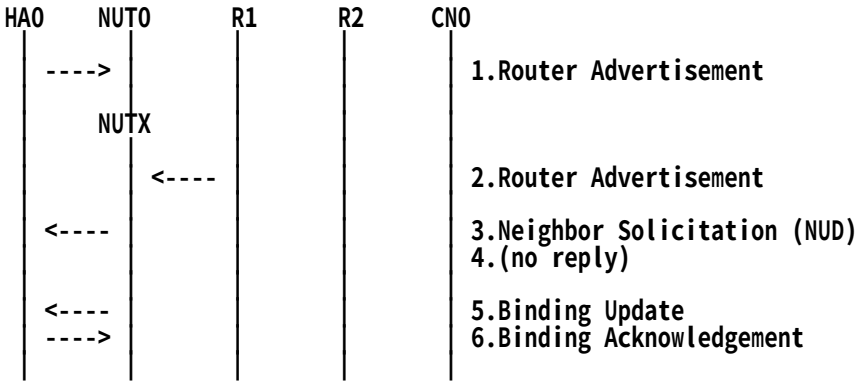
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

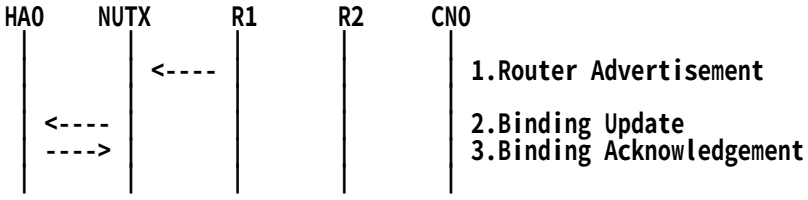
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

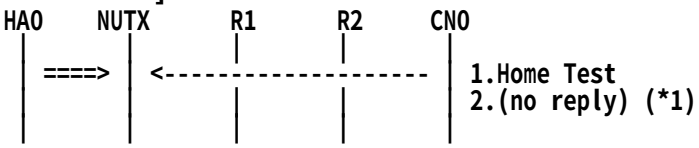
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	3
	Home Nonce Index	Any
	Home Init Cookie	Any

2. (no reply) (*1)

[JUDGMENT]

(*1) PASS: CN0 does not receive the Return Routability procedure messages.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.6.2, 11.7.2

6.7.2.9 MN-2-1-3-2-012 - Receiving unexpected HoT from known node

[PURPOSE]

MN-2-1-3-2-012 - Receiving unexpected HoT from known node

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

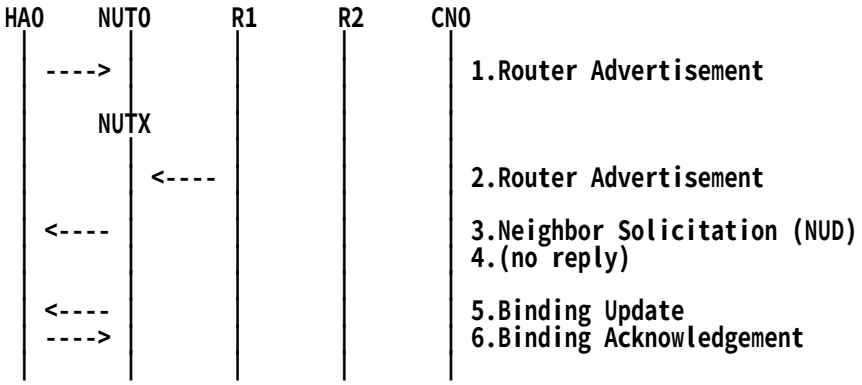
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

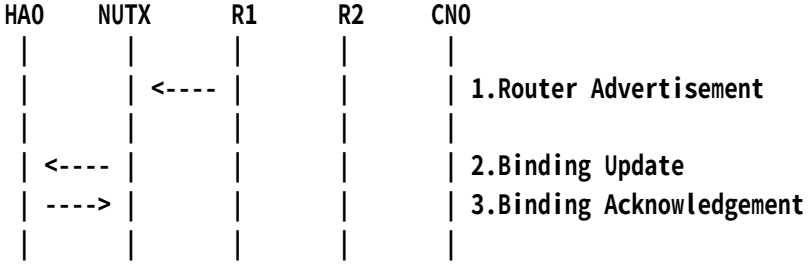
[INITIALIZATION]

- In the case of Real Home Link



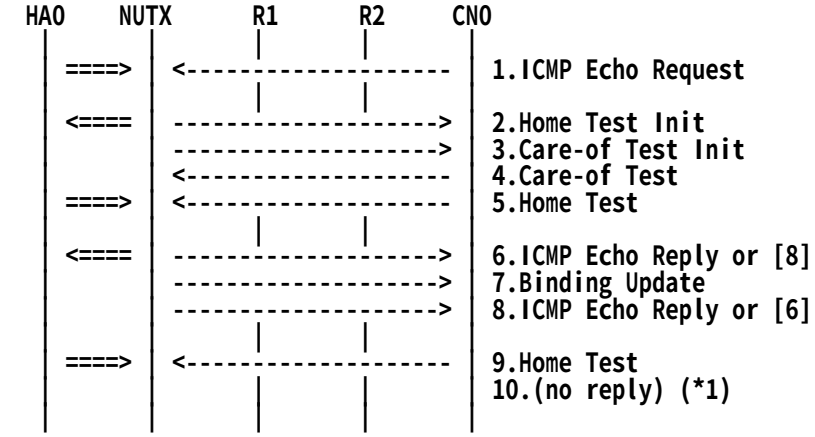
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
9. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4 SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	3
	Home Nonce Index	Any
	Home Init Cookie	Any

10. (no reply) (*1)

[JUDGMENT]

(*1) PASS: CN0 does not receive the Return Routability procedure messages

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.6.2, 11.7.2

6.7.3 Sending CoTI

6.7.3.1 MN-2-1-2-2-001 - Sending CoTI (when receiving the tunneled packet from unknown node)

[PURPOSE]

MN-2-1-2-2-001 - Sending CoTI (when receiving the tunneled packet from unknown node)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

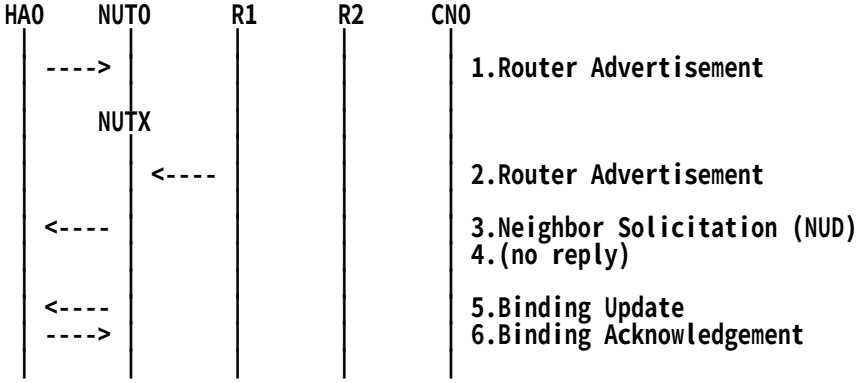
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

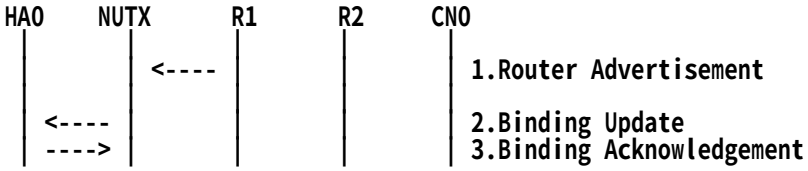
[INITIALIZATION]

- In the case of Real Home Link



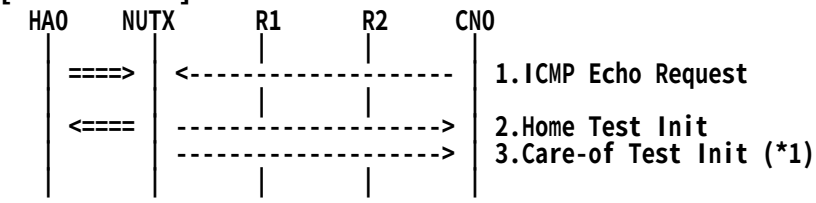
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (*1) (Refer to 5.11.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	2

[JUDGMENT]

(*1) PASS: CN0 receives Care-of Test Init.

Then, check whether this packet fills all of the following.

- The Source Address is set to primary Care-of Address.
- The Destination Address is set to The Source Address(inner) packet of ICMP Echo Request [1].

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.6, 11.6.1, 11.7.2

6.7.3.2 MN-2-1-2-2-019 - Sending CoTI (when receiving the tunneled packet after the expiration of correspondent registration)

[PURPOSE]

MN-2-1-2-2-019 - Sending CoTI (when receiving the tunneled packet after the expiration of correspondent registration)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-registers with CN: NO

[TOPOLOGY]

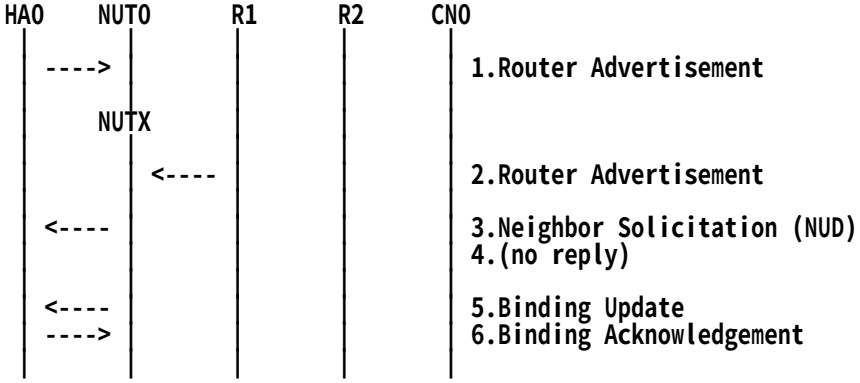
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

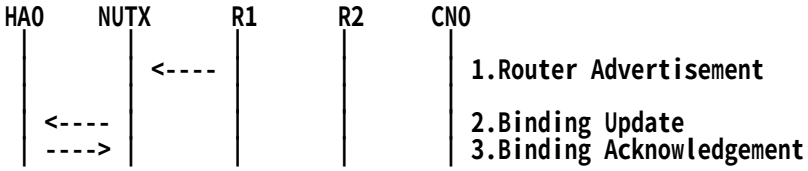
[INITIALIZATION]

- In the case of Real Home Link



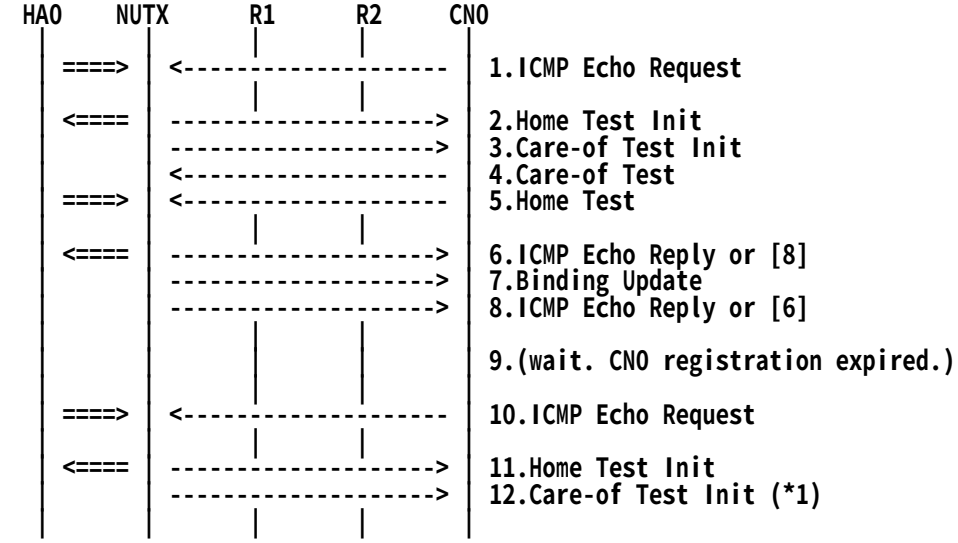
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. (wait)
   # CN0 registration expired.
10. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
11. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
12. Receive Care-of Test Init. (NUTX -> CN0) (*1) (Refer to 5.11.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	2

[JUDGMENT]

(*1) PASS: CN0 receives Care-of Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.6, 11.7.2

6.7.3.3 MN-2-1-2-2-009 - Sending CoTI for each CN in BUL (after home re-registration)

[PURPOSE]

MN-2-1-2-2-009 - Sending CoTI for each CN in BUL (after home re-registration)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

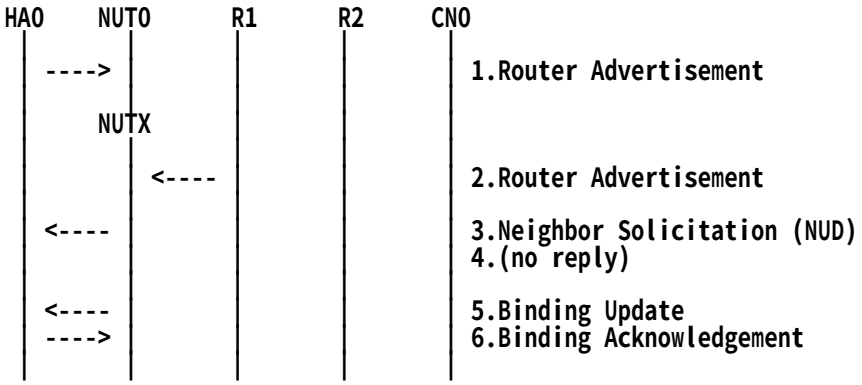
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

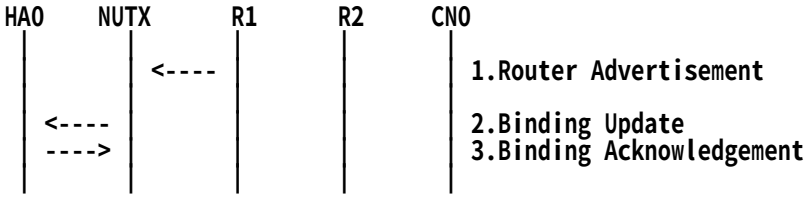
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

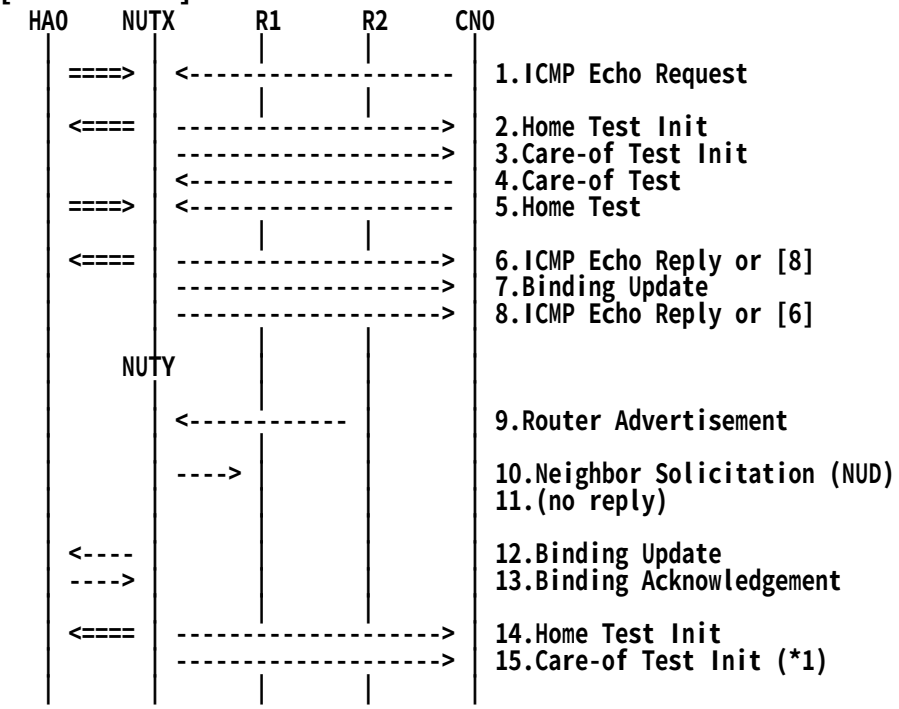
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. Send Router Advertisement. (R2 -> R2_allnode_multi) (Refer to 5.2.1)
10. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
11. (no reply)
    # Wait during a maximum of 3 seconds(RFC2461).
12. Receive Binding Update to HA0. (NUTY -> HA0) (Refer to 5.14.1)
13. Send Binding Acknowledgement. (HA0 -> NUTY) (Refer to 5.15.1)
14. Receive Home Test Init. (out: NUTY -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
15. Receive Care-of Test Init. (NUTY -> CN0) (*1) (Refer to 5.11.1)

IPv6 Header	Source Address	NUTY (LinkY, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	2

[JUDGMENT]

(*1) PASS: CN0 receives Care-of Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.6, 11.7.2, 5.2.7

6.7.3.4 MN-2-1-2-2-017 - Sending CoTI (when the lifetime for a changed prefix decreases)

[PURPOSE]

MN-2-1-2-2-017 - Sending CoTI (when the lifetime for a changed prefix decreases)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY(AND MPD))

[REQUIREMENT OF TEST]

Function of Return Routability: YES

Function of Mobile Prefix Discovery: YES

[TOPOLOGY]

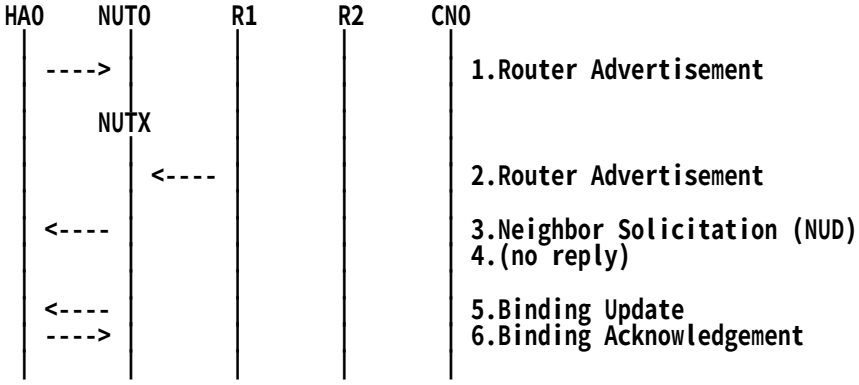
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

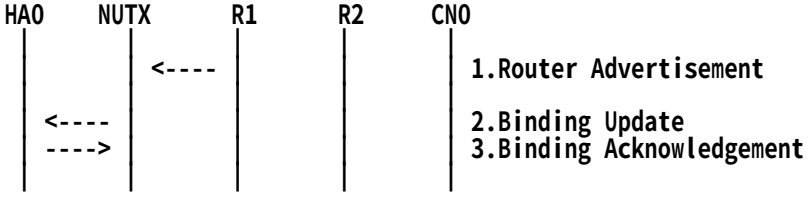
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

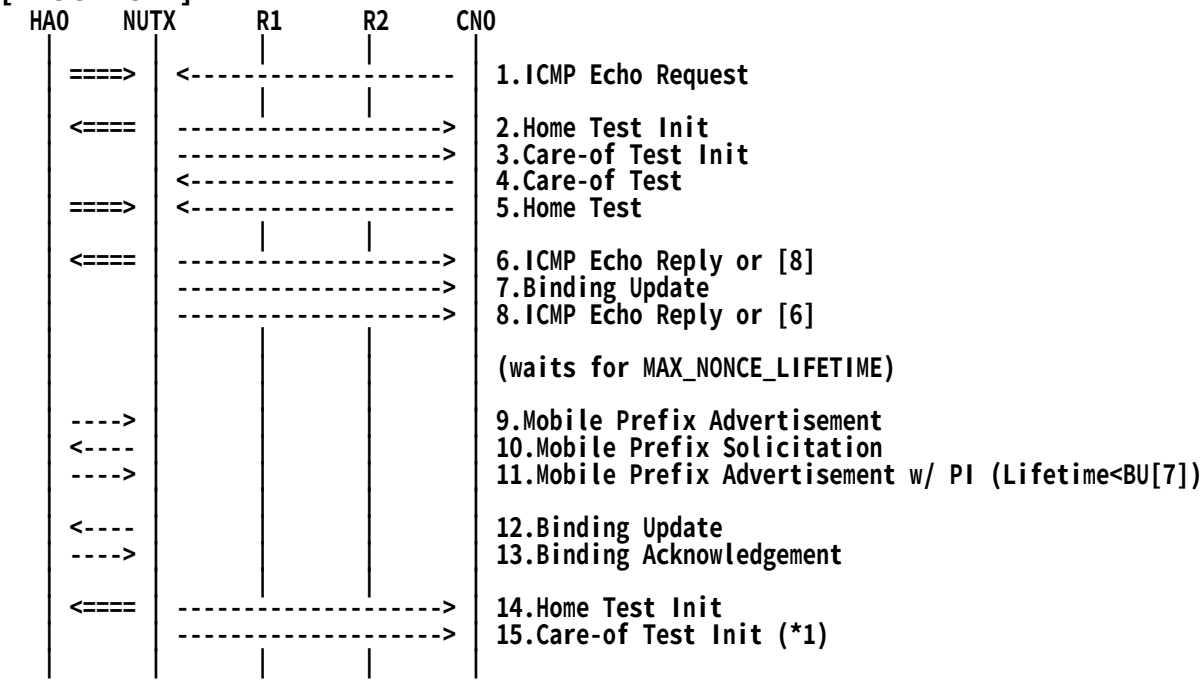
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
   (Refer to 5.20.1)
   # The Identifier is unsolicited.
10. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option)
    (Refer to 5.19.1)
11. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
    (Refer to 5.20.1)
    # The Identifier is set to the Identifier value from the Mobile Prefix Solicitation [10].
    # The Valid Lifetime and Preferred Lifetime is set to less than Binding Lifetime.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6 Header	Type	147
	Identifier	(= MPS[10])
Prefix Information Option	Type	3
	Valid lifetime	Any (< BU[7])
	Preferred lifetime	Any (< BU[7])

12. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
13. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
14. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
15. Receive Care-of Test Init. (NUTX -> CN0) (*1) (Refer to 5.11.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	2

[JUDGMENT]

(*1) PASS: CN0 receives Care-of Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.6, 11.7.2, 11.4.2

6.7.3.5 MN-2-1-2-2-004 - Don't send CoTI (when receiving the tunneled packet (inner src == outer src))

[PURPOSE]

MN-2-1-2-2-004 - Don't send CoTI (when receiving the tunneled packet(inner src == outer src))

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

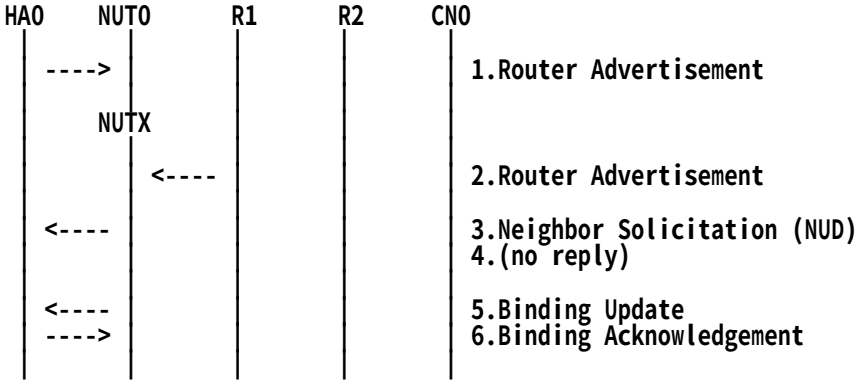
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

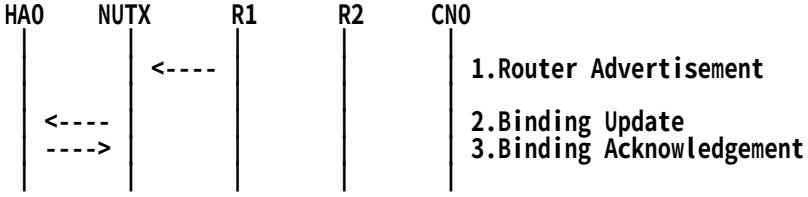
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

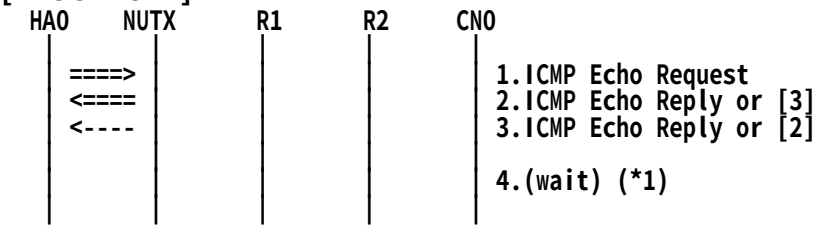
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: HA0 -> NUT0) (Refer to 5.7.2)
   # Source Address of outer packet and inner packet is set to the same.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

2. Receive ICMP Echo Reply or [3]. (out: NUTX -> HA0, in: NUT0 -> HA0) (Refer to 5.8.3)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	HA0 (Link0, global)
ICMPv6 Header	Type	129

3. [2] or Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option)
   (Refer to 5.8.3)
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	129

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

4. (wait) (*1)
   # Wait during 32 (MAX_BINDACK_TIMEOUT) seconds.

[JUDGMENT]

(*1) PASS: CN0 does not receive Home/Care-of Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.2

6.7.3.6 MN-2-1-2-2-010 - Retransmissions & Back off (Use INITIAL_BINDACK_TIMEOUT as the initial retransmission timer)

[PURPOSE]

MN-2-1-2-2-010 - Retransmissions & Back off (Use INITIAL_BINDACK_TIMEOUT as the initial retransmission timer)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-transmits CoTI for valuable CoT: YES/NO

[TOPOLOGY]

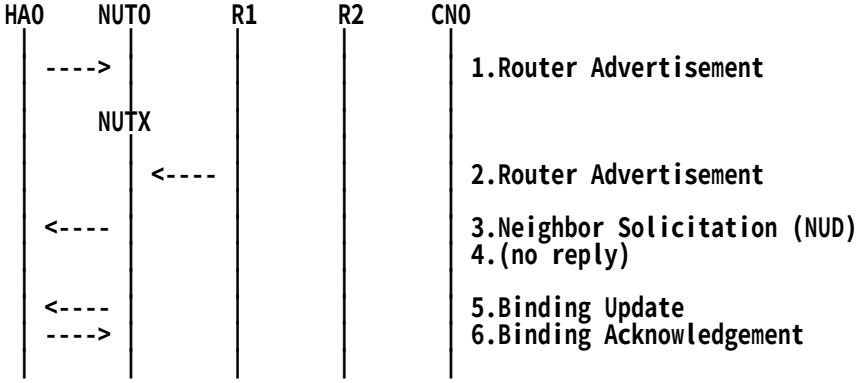
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

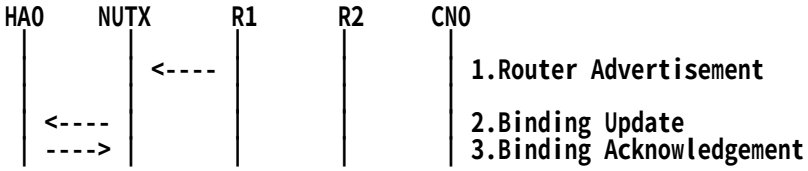
[INITIALIZATION]

- In the case of Real Home Link



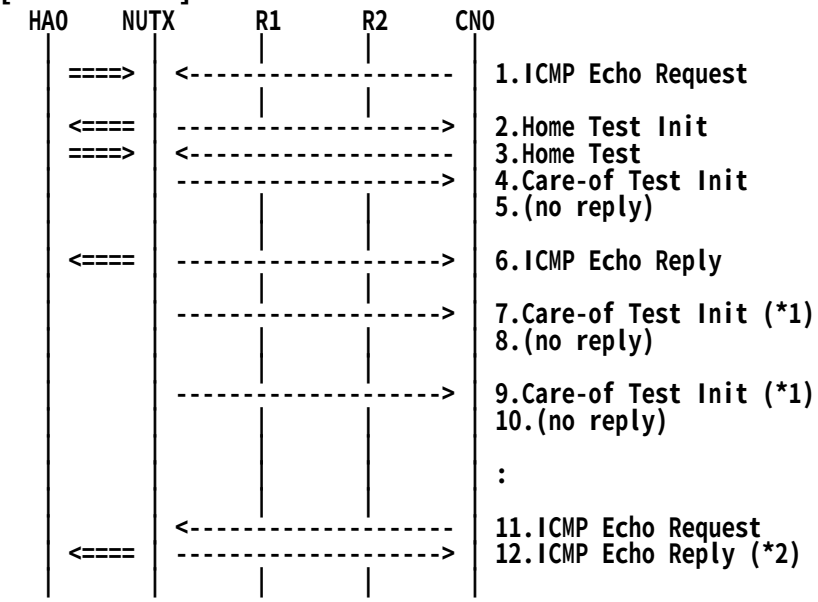
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
4. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
5. (no reply)
6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Care-of Test Init. (NUTX -> CN0) (*1) (Refer to 5.11.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any (newly generated)

8. (no reply)
9. Receive Care-of Test Init. (NUTX -> CN0) (*1) (Refer to 5.11.1)
10. (no reply)
11. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
12. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits CoTI for valuable CoT: YES

(*1) PASS: CN0 receives the retransmitted Care-of Test Init.
Then, check whether this packet fills all of the following.

- Care-of Init Cookie is set to new cookie value.
- The initial retransmission timer is set to INITIAL_BINDACK_TIMEOUT.
- Timeout period is doubled upon each retransmission.

(*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

- NUT re-transmits CoTI for valuable CoT: NO

(*1) PASS: CN0 does not receive the retransmitted Care-of Test Init.

(*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.8, 11.1.

6.7.4 Receiving CoT

6.7.4.1 MN-2-1-4-2-001 - Receiving CoT before HoT

[PURPOSE]

MN-2-1-4-2-001 - Receiving CoT before HoT

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

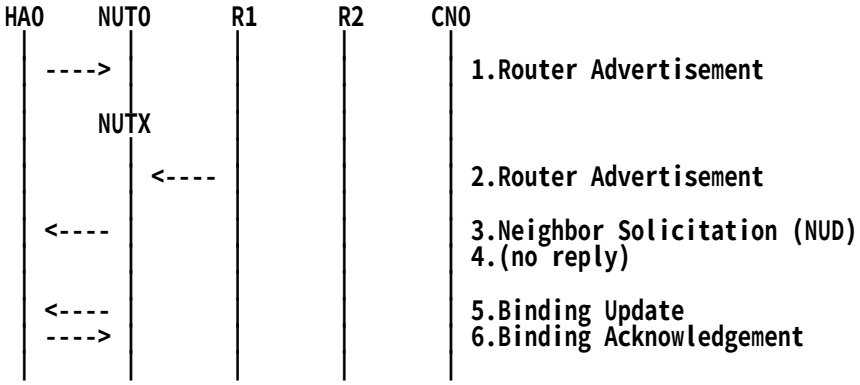
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

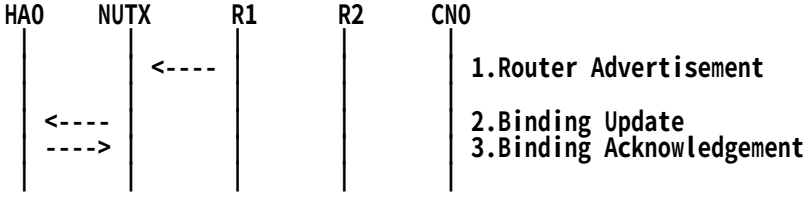
[INITIALIZATION]

- In the case of Real Home Link



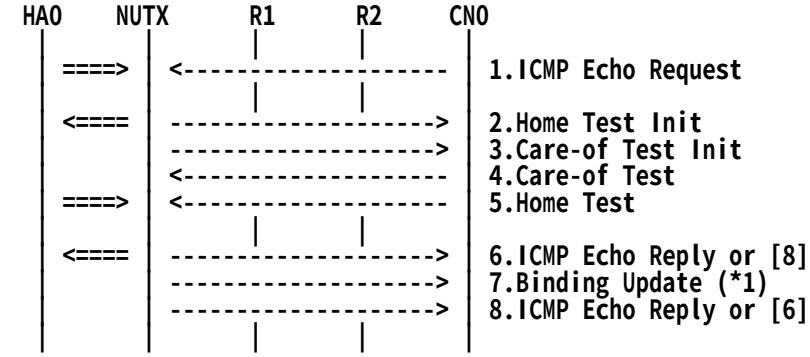
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	4
	Care-of Nonce Index	Any
	Care-of Init Cookie	(= CoTI[3])

5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5

8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Upadate.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.6.2, 9.2

6.7.4.2 MN-2-1-4-2-006 - Receiving CoT after HoT

[PURPOSE]

MN-2-1-4-2-006 - Receiving CoT after HoT

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

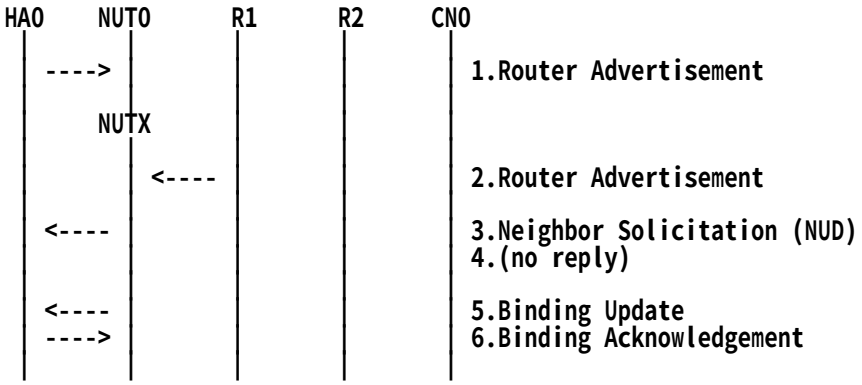
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

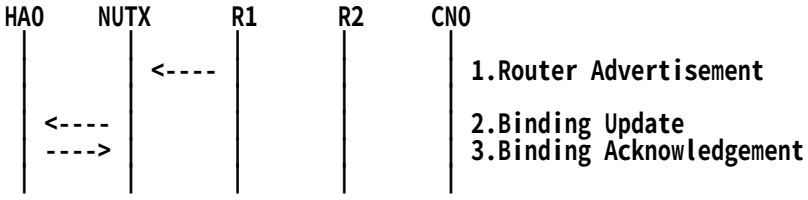
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

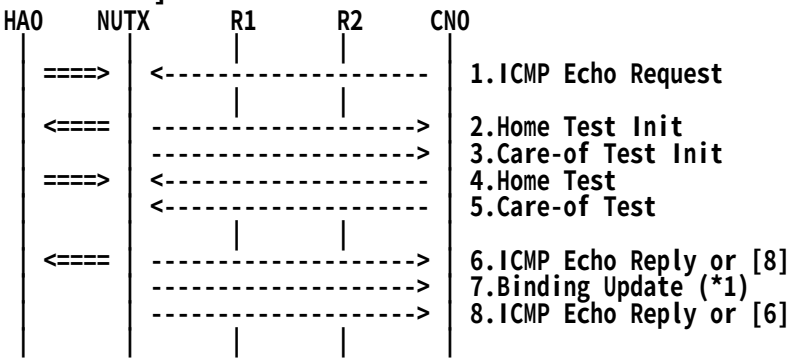
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
5. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	4
	Care-of Nonce Index	Any
	Care-of Init Cookie	(= CoTI[3])

6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[4])
	Care-of Nonce Index	(= CoT[5])
Binding Authorization Data Option	Option Type	5

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[4])
	Care-of Nonce Index	(= CoT[5])
Binding Authorization Data Option	Option Type	5

8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Upadate.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.6.2

6.7.4.3 MN-2-1-4-2-014 - Receiving CoT (Invalid Mobility Header Reserved)

[PURPOSE]

MN-2-1-4-2-014 - Receiving CoT (Invalid Mobility Header Reserved)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

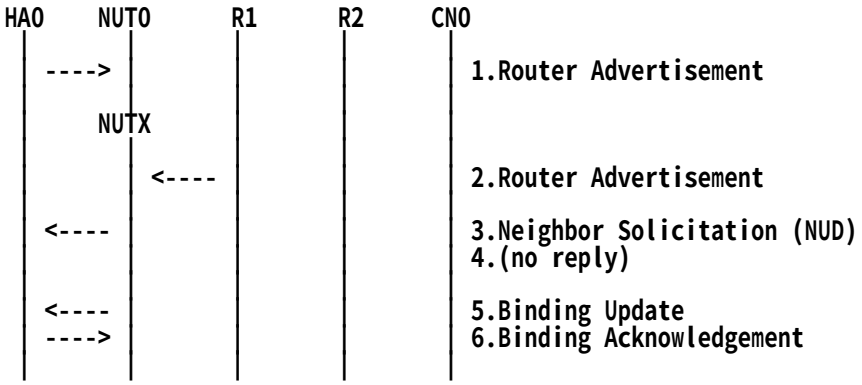
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

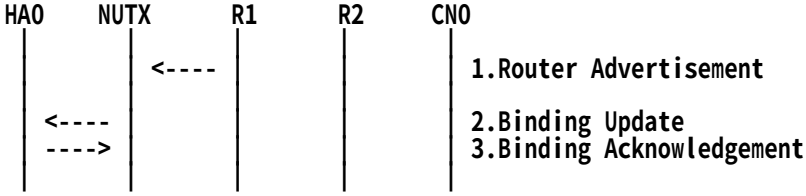
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

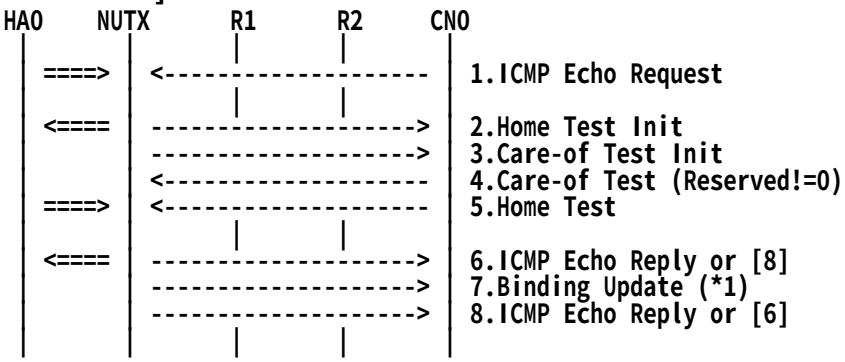
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
   # The Reserved field is not set to 0.

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	4
	Reserved	Any (!= 0)
	Reserved	Any (!=0)
	Care-of Nonce Index	Any
	Care-of Init Cookie	(= CoT[3])

5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5

8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Upadate.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 6.1.1, 11.6.2, 9.2

6.7.4.4 MN-2-1-4-2-007 - Receiving twice CoT

[PURPOSE]

MN-2-1-4-2-007 - Receiving twice CoT

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

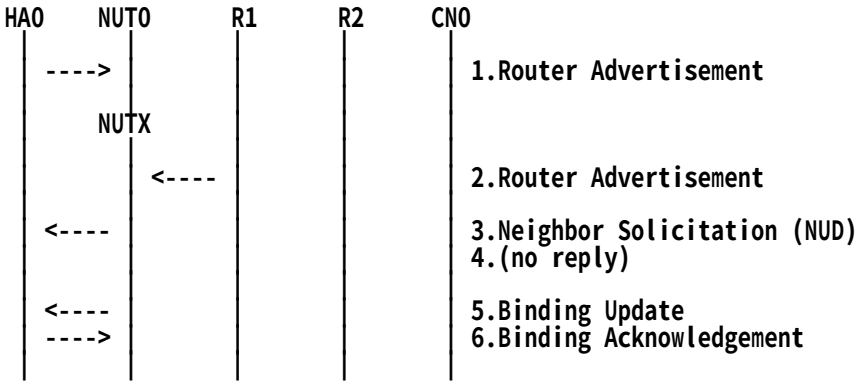
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

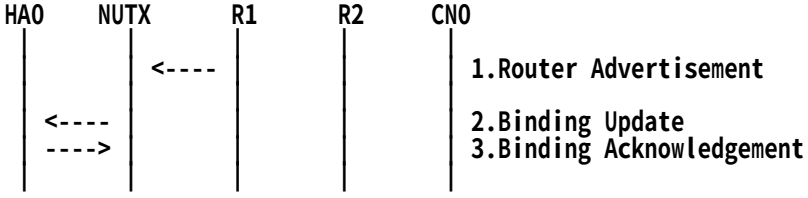
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

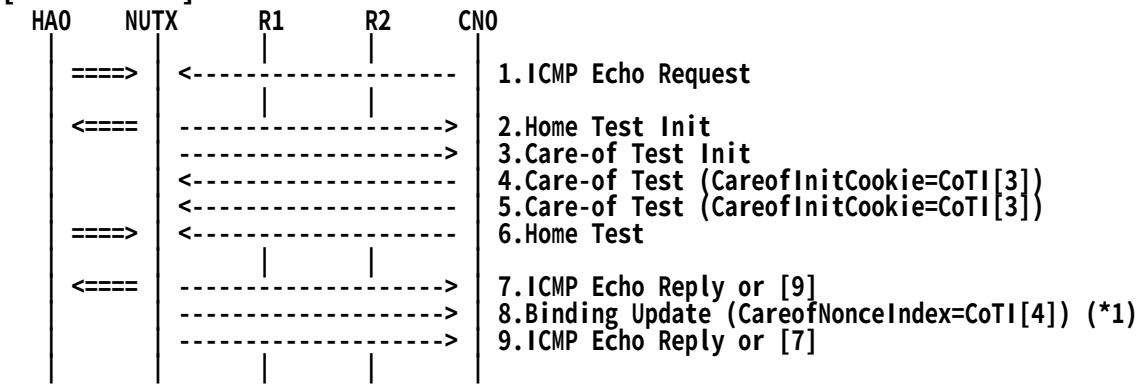
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	4
	Care-of Nonce Index	Any
	Care-of Init Cookie	(= CoT[3])

5. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
   # The Care-of Nonce Index is set to a different value [4].

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	4
	Care-of Nonce Index	Any (!= CoT[4])
	Care-of Init Cookie	(= CoT[3])

6. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
7. Receive ICMP Echo Reply or [9]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
8. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[2])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[2])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5

9. [7] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receive Binding Upadate.

Then, check whether this packet fills all of the following.

- The Care-of Nonce Index is set form Care-of Test [4].

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.6.2

6.7.4.5 MN-2-1-4-2-002 - Receiving Delayed CoT

[PURPOSE]

MN-2-1-4-2-002 - Receiving Delayed CoT

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-transmits CoTI for valuable CoT: YES

[TOPOLOGY]

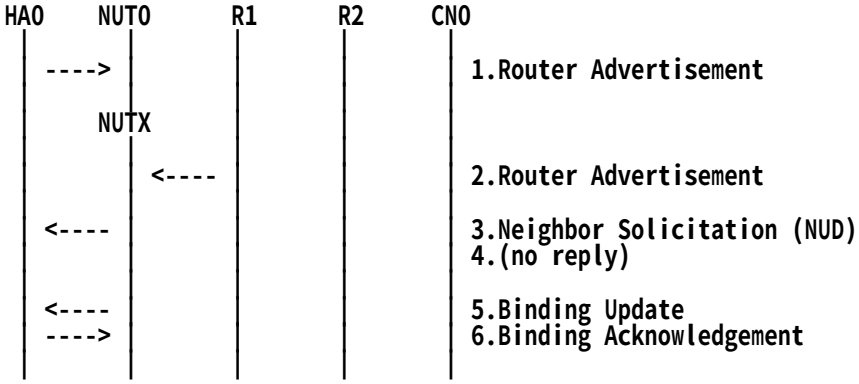
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

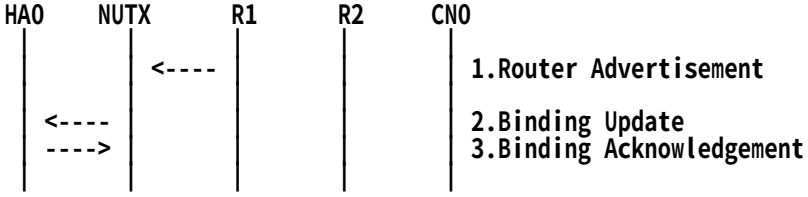
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

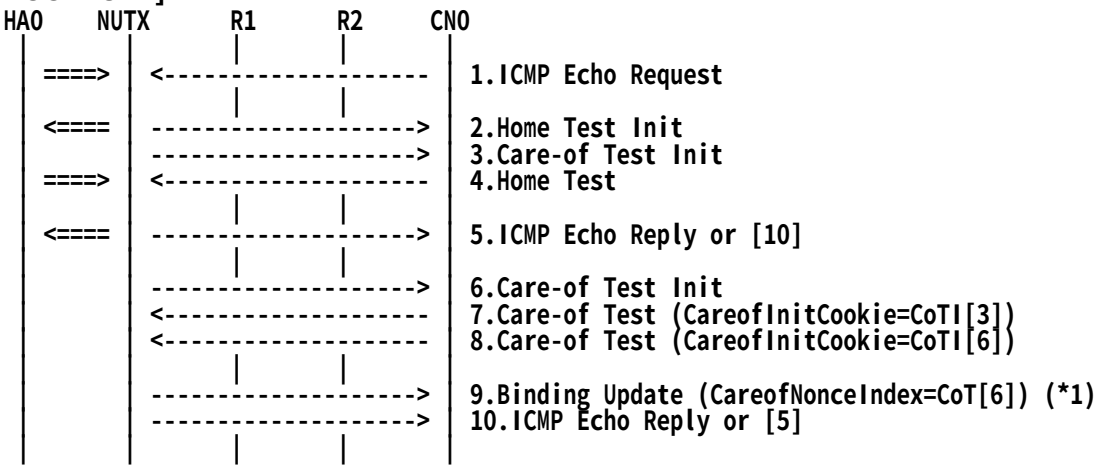
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
5. Receive ICMP Echo Reply or [10]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
6. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
7. Send Care-of Test for [3]. (CN0 -> NUTX) (Refer to 5.13.1)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	4
	Care-of Nonce Index	Any
	Care-of Init Cookie	(= CoTI[3])

8. Send Care-of Test for [6]. (CN0 -> NUTX) (Refer to 5.13.1)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	4
	Care-of Nonce Index	Any
	Care-of Init Cookie	(= CoTI[6])

9. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[4])
	Care-of Nonce Index	(= CoT[8])
Binding Authorization Data Option	Option Type	5

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[4])
	Care-of Nonce Index	(= CoT[8])
Binding Authorization Data Option	Option Type	5

10. [5] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
(Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Upadate.
- The Care-of Nonce Index is set to latest Care-of Test.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.6.2, 11.8

6.7.4.6 MN-2-1-4-2-003 - Invalid cookie (CoT != CoTI)

[PURPOSE]

MN-2-1-4-2-003 - Invalid cookie (CoT != CoTI)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-transmits CoTI for valuable CoT: YES/NO

[TOPOLOGY]

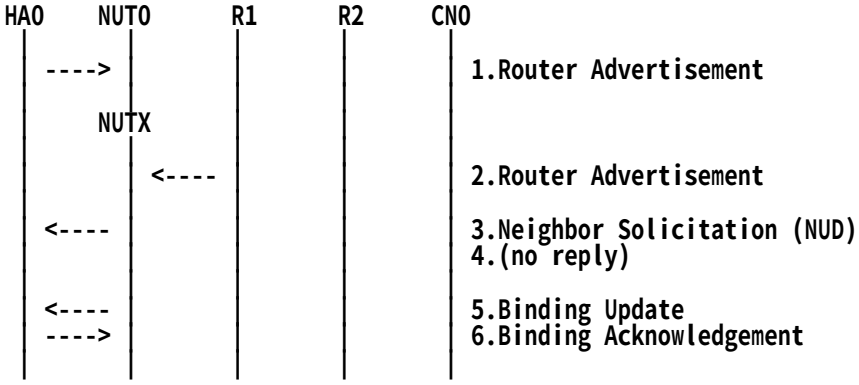
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

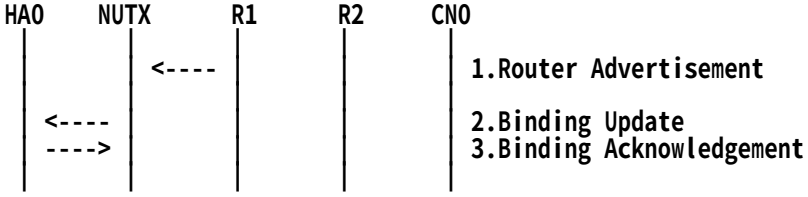
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

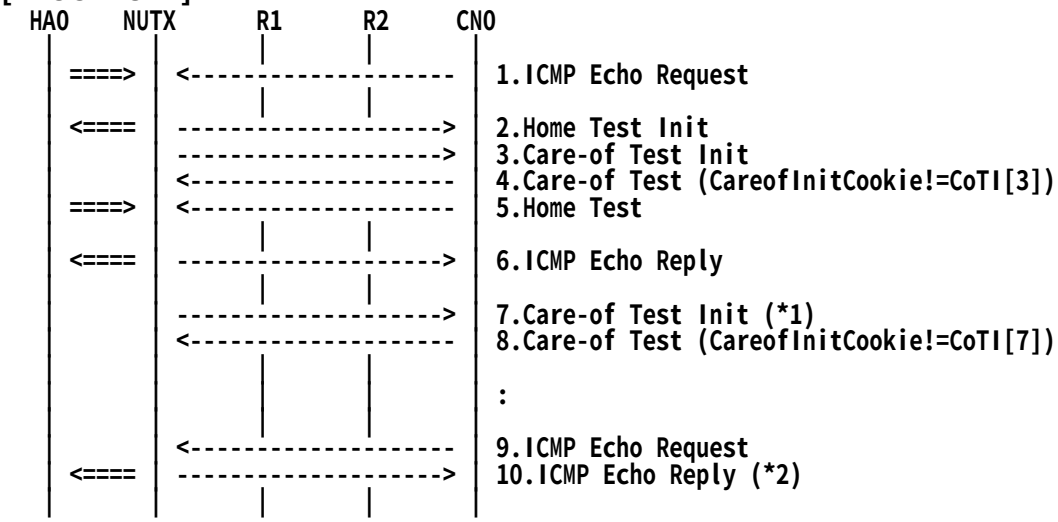
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
   # Set the value of cookie which does not match to Care-of Test Init [3].

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	4
	Care-of Nonce Index	Any
	Care-of Init Cookie	Any (!= CoTI[3])

5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Care-of Test Init. (NUTX -> CN0) (*1) (Refer to 5.11.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any (newly generated)

8. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
   # Set the value of cookie which does not match to Care-of Test Init [7].
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
10. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits CoTI for valuable CoT: YES
  (*1) PASS: CN0 receives the retransmisson of Care-of Test Init.
  - Care-of Init Cookie is set to new cookie value.
  - The initial retransmission timer is set to INITIAL_BINDACK_TIMEOUT.
  - Timeout period is doubled upon each retransmission.

(*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

- NUT re-transmits CoTI for valuable CoT: NO
  (*1) PASS: CN0 does not receive the retransmitted Care-of Test Init.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.6.2, 11.8

6.7.4.7 MN-2-1-4-2-004 - Invalid source address

[PURPOSE]

MN-2-1-4-2-004 - Invalid source address

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-transmits CoTI for valuable CoT: YES/NO

[TOPOLOGY]

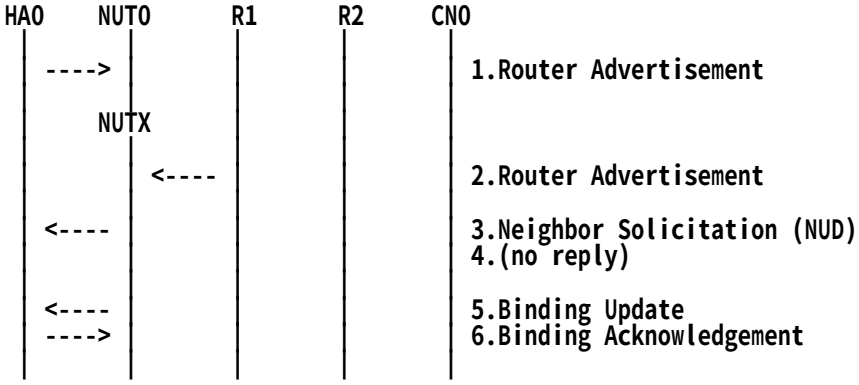
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

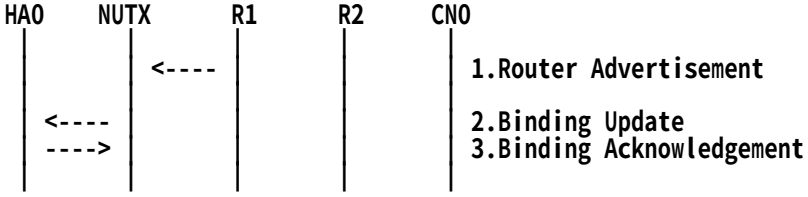
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

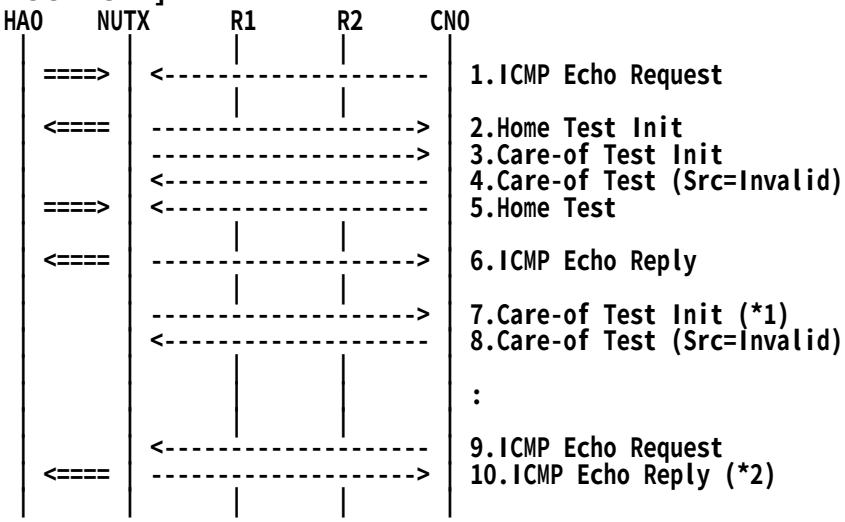
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.3)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
   # CN0 source address is wrong.

IPv6 Header	Source Address	Invalid address
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	4
	Care-of Nonce Index	Any
	Care-of Init Cookie	(= CoTI[3])

5. Send Home Test. (out: HA0 -> NUTX, in: CN1 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Care-of Test Init. (NUTX -> CN0) (*1) (Refer to 5.11.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any (newly generated)

8. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
   # CN0 source address is wrong.
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
10. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits CoTI for valuable CoT: YES
  (*1) PASS: CN0 receives the retransmisson of Care-of Test Init.
  - Care-of Init Cookie is set to new cookie value.
  - The initial retransmission timer is set to INITIAL_BINDACK_TIMEOUT.
  - Timeout period is doubled upon each retransmission.

(*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

- NUT re-transmits CoTI for valuable CoT: NO
  (*1) PASS: CN0 does not receive the retransmitted Care-of Test Init.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.6.2, 11.8

6.7.4.8 MN-2-1-4-2-010 - Receiving unexpected CoT from unknown node

[PURPOSE]

MN-2-1-4-2-010 - Receiving unexpected CoT from unknown node

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

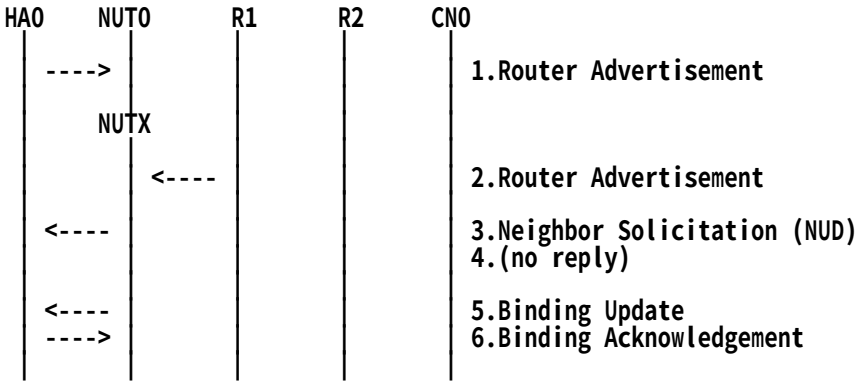
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

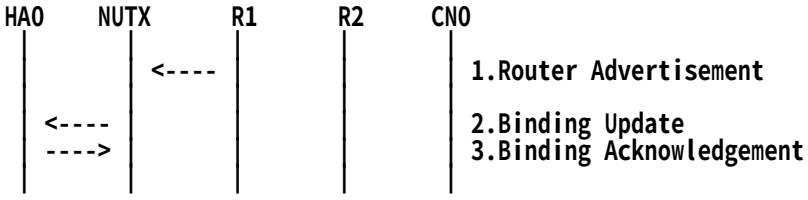
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

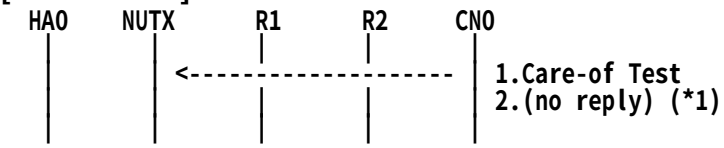
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	4
	Care-of Nonce Index	Any
	Care-of Init Cookie	Any

2. (no reply) (*1)

[JUDGMENT]

(*1) PASS: CN0 does not receive the Return Routability procedure message.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.6.2

6.7.4.9 MN-2-1-4-2-011 - Receiving unexpected CoT from known node

[PURPOSE]

MN-2-1-4-2-011 - Receiving unexpected CoT from known node

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

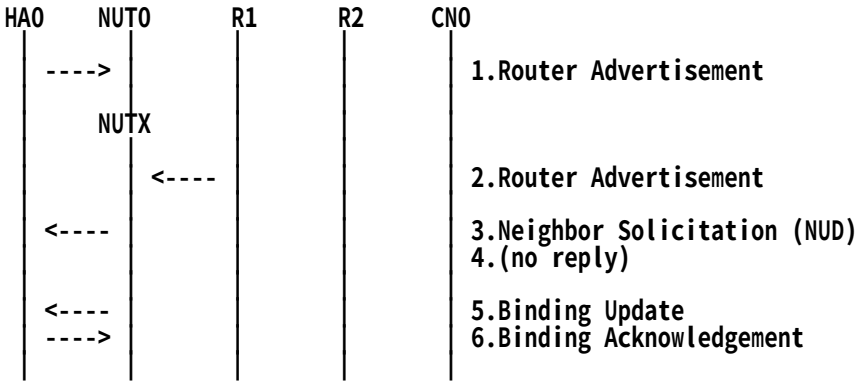
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

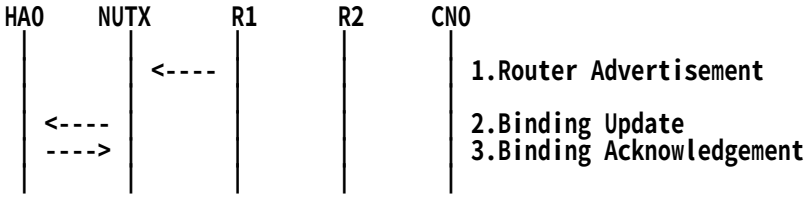
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

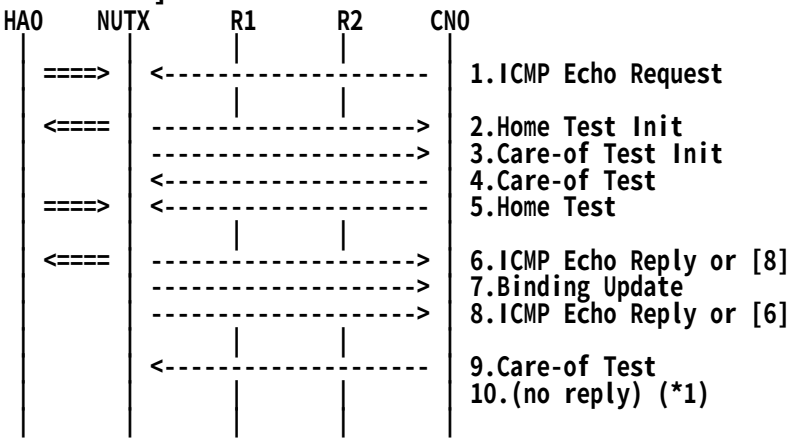
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
9. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	4
	Care-of Nonce Index	Any
	Care-of Init Cookie	Any

10. (no reply) (*1)

[JUDGMENT]

(*1) PASS: CN0 does not receive the Return Routability procedure messages.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.6.2

6.7.5 Sending BU

6.7.5.1 MN-3-1-1-2-001 - Sending BU to CN

[PURPOSE]

MN-3-1-1-2-001 - Sending BU to CN

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

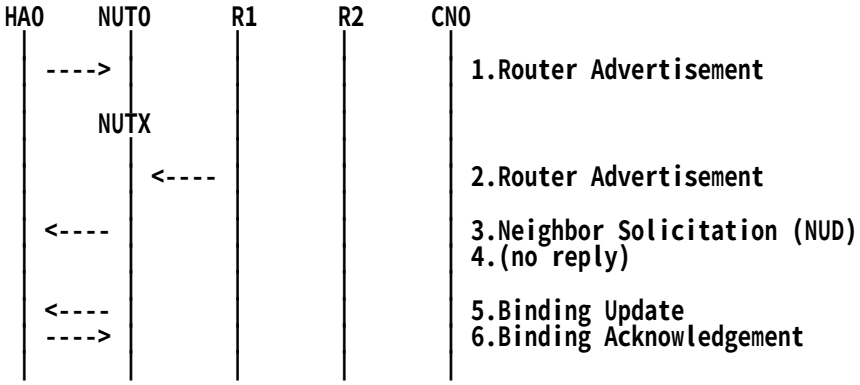
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

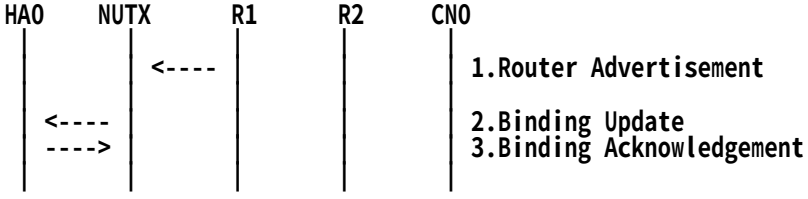
[INITIALIZATION]

- In the case of Real Home Link



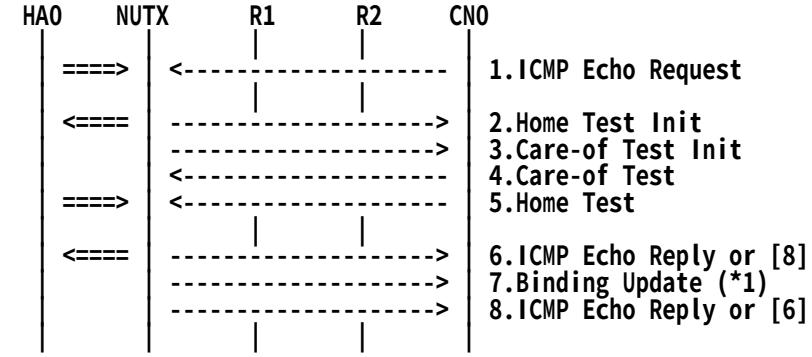
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	K Flag	0
	Lifetime	Any (< 420 sec)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	K Flag	0
	Lifetime	Any (< 420 sec)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Update.

Then, check whether this packet fills all of the following.

- The Destination Address is CN address.
- The home registration(H)bit is cleared.

- The Key Management Mobility Capabilibty(K)bit is cleared.
- Check whether the Lifetime fills all of the following.
  - The Lifetime is set less than MAX_RR_BINDING_LIFE(420seconds).
  - The Lifetime is set less than the remaining lifetime of the home registration.
  - The Lifetime is set less than the remaining lifetime of Care-of Address.
- Home Address destination option is included, and,
  - This option is placed as the right location.
  - This option is set to Home Address(unicast routable address).
- Nonce Indices mobility option is included, and,
  - Home Nonce Index is equal to the value in Home Test message.
  - Care-of Nonce Index is equal to the value in Care-of Test message.
- Authorization Data mobility option is included, and,
  - This option is placed as the right location.
  - The Authenticator value has the valid value.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.2, 9.5.1, 11.4.2, 11.7.1, 11.1

6.7.5.2 MN-3-1-1-2-002 - Valid BU (A=OFF)

[PURPOSE]

MN-3-1-1-2-002 - Valid BU (A=OFF)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT sets (A) bit in BU which is transmitted to CN: NO

[TOPOLOGY]

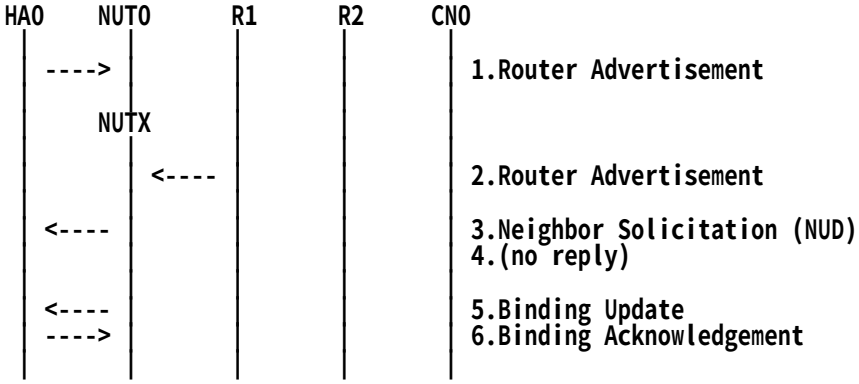
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

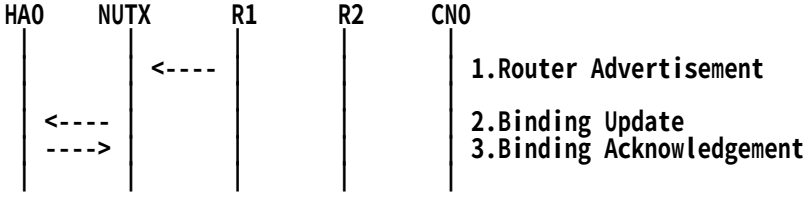
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

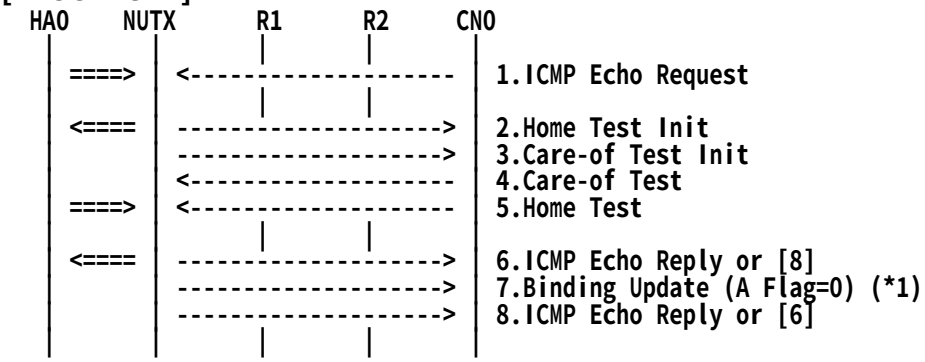
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   # The Acknowledge(A)bit is cleared.
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	A Flag	0
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	A Flag	0
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0with Home Address Option)
   (Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Update.
Then, check whether this packet fills all of the following.
- The Acknowledge(A)bit is cleared.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.2

6.7.5.3 MN-3-1-1-2-003 - Valid BU (A=ON)

[PURPOSE]

MN-3-1-1-2-003 - Valid BU (A=ON)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT sets (A) bit in BU which is transmitted to CN: YES

[TOPOLOGY]

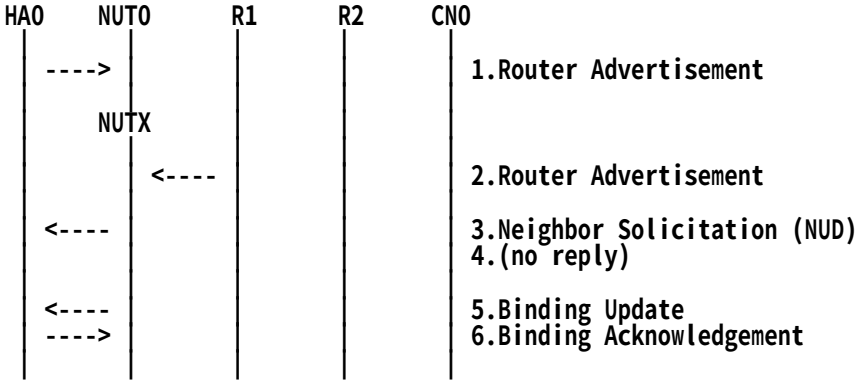
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

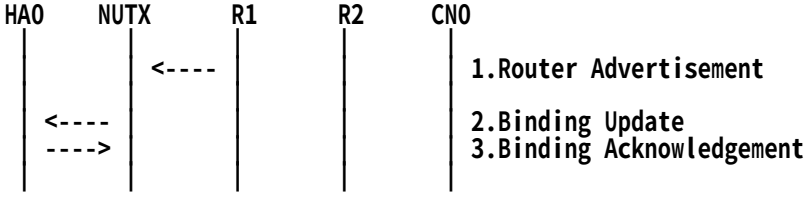
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

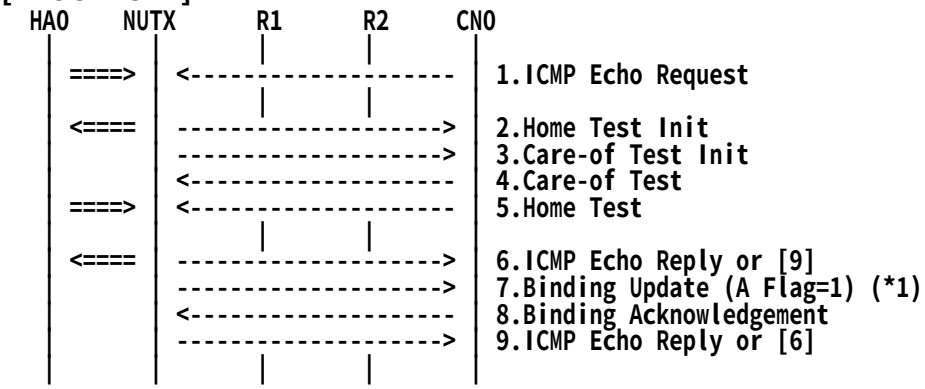
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [9]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

8. Send Binding Acknowledgement to NUTX. (CN0 -> NUTX) (Refer to 5.15.3)
9. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Update.
Then, check whether this packet fills all of the following.
- The Acknowledge (A) bit is set to ON (1).

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.2

6.7.5.4 MN-3-1-1-2-004 - Valid BU of registration (src address == CoA or Alternate CoA option == CoA)

[PURPOSE]

MN-3-1-1-2-004 - Valid BU of registration (src address == CoA or Alternate CoA option == CoA)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

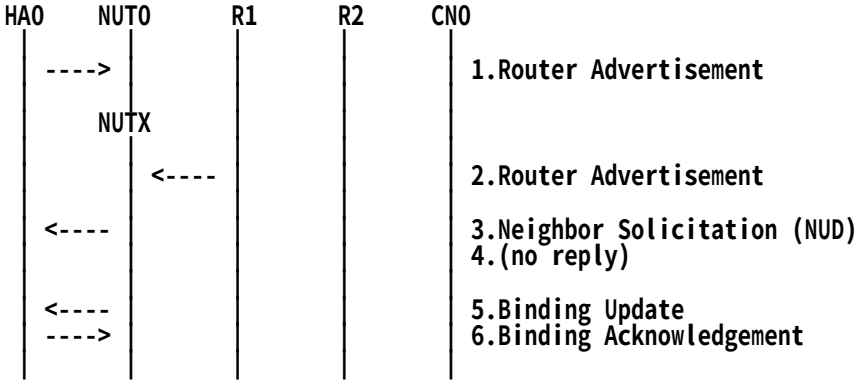
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

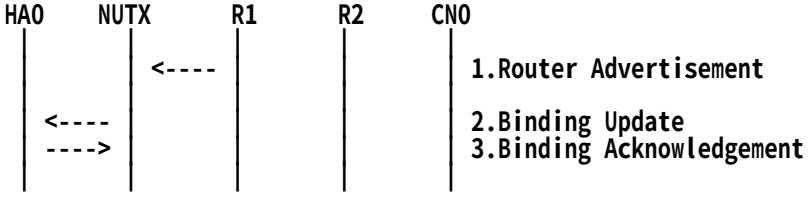
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

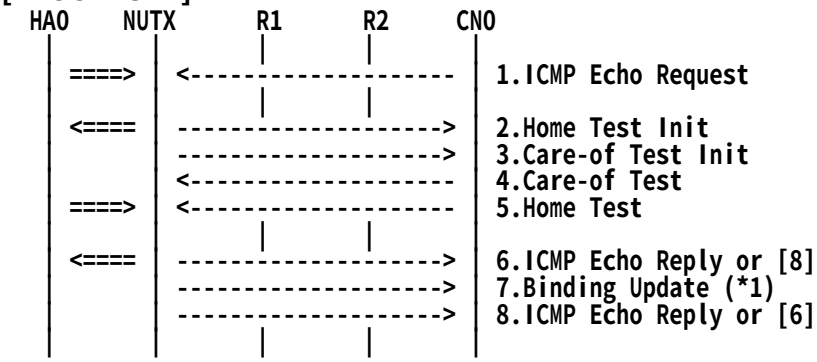
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.1)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Update.
Then, check whether this packet fills all of the following.
- Either the Source Address or the Alternate Care-of Address mobility option is set to the Care-of Address.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.2, 5.2.6

6.7.5.5 MN-3-1-1-2-006 - Retransmissions & Back off (Use INITIAL_BINDACK_TIMEOUT as the initial retransmission timer)

[PURPOSE]

MN-3-1-1-2-006 - Retransmissions & Back off (Use INITIAL_BINDACK_TIMEOUT as the initial retransmission timer)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES
NUT sets (A) bit in BU which is transmitted to CN: YES
NUT re-transmits BU to CN for valuable BA: YES/NO

[TOPOLOGY]

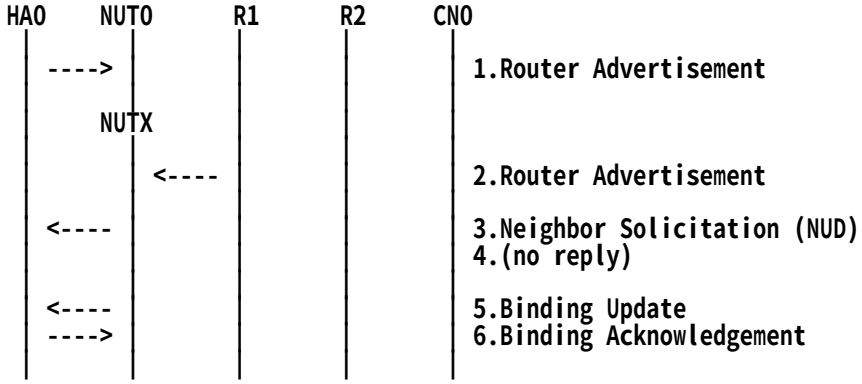
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

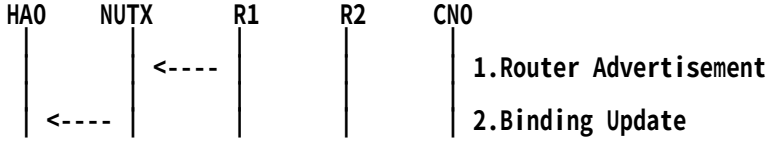
[INITIALIZATION]

- In the case of Real Home Link



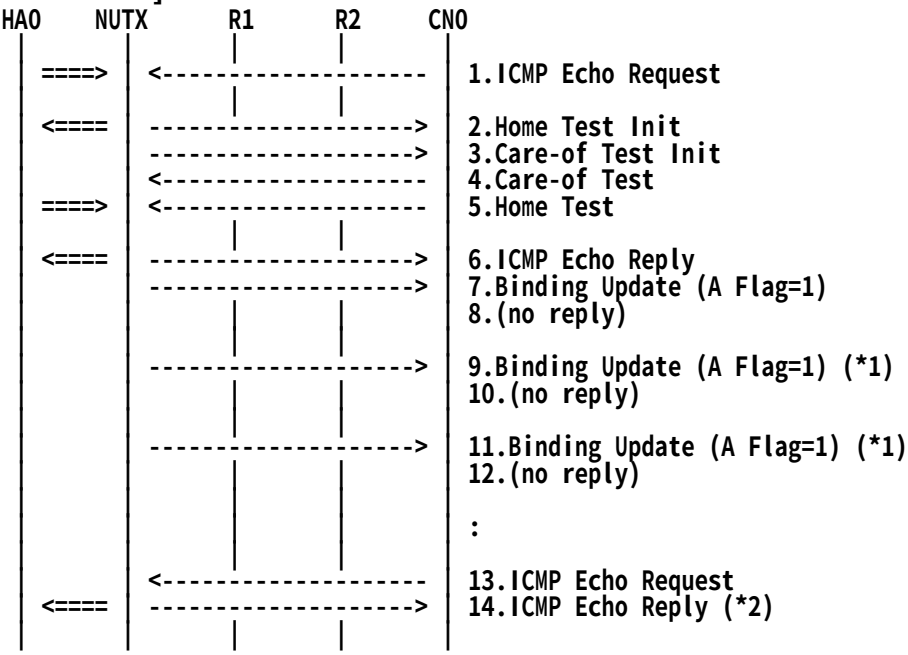
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. (no reply)
9. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[3])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)

Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[3])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

10. (no reply)
11. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
12. (no reply)
13. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

14. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6	Type	129

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits BU to CN for valuable BA: YES
  (*1) PASS: CN0 receives the retransmitted Binding Update.
  Then, check whether this packet fills all of the following.
  - Sequence Number value greater than that used.
  - The initial retransmission timer is set to INITIAL_BINDACK_TIMEOUT.
  - Timeout period is doubled upon each retransmission.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

- NUT re-transmits BU to CN for valuable BA: NO
  (*1) PASS: CN0 does not receive the retransmitted Binding Update.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.2, 11.8, 11.1

6.7.6 Receiving BA

6.7.6.1 MN-3-2-1-2-001 - BU accepted (Status=0)

[PURPOSE]

MN-3-2-1-2-001 - BU accepted (Status=0)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT sets (A) bit in BU which is transmitted to CN: YES

[TOPOLOGY]

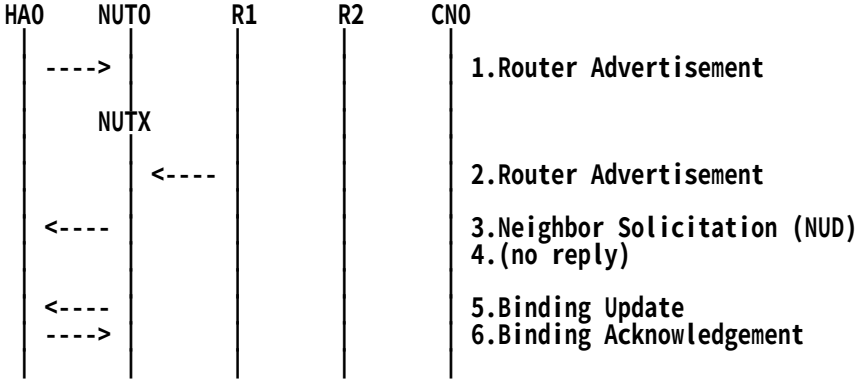
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

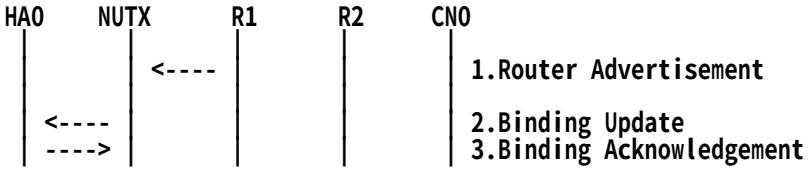
[INITIALIZATION]

- In the case of Real Home Link



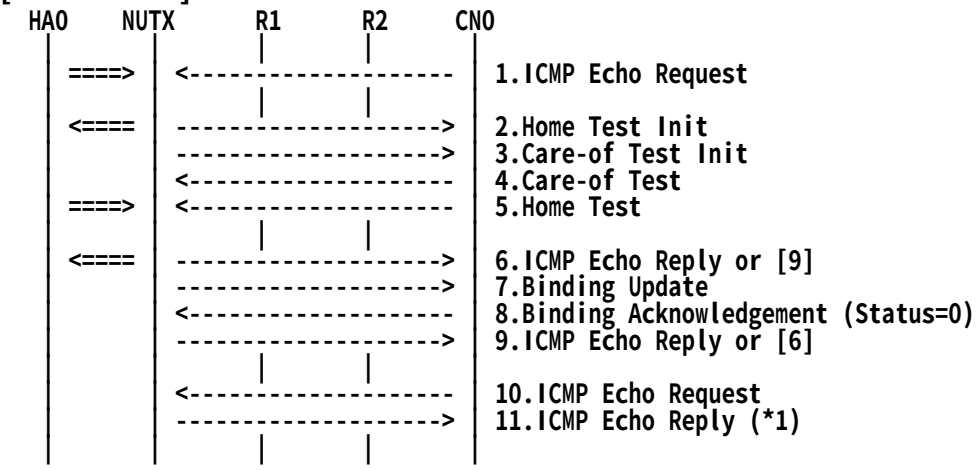
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [9]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. Send Binding Acknowledgement to NUTX. (CN0 -> NUTX) (Refer to 5.15.3)
   # The Status field is set to 0(Binding Update accepted).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address of Mobile Node	NUT0 (Link0, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[7])
	Lifetime	Any (> 0, <= BU[7])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

9. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
10. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

11. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (*1)
    (Refer to 5.8.3)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	129

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply with Home Address Option.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.3, 9.5.1, 9.2

6.7.6.2 MN-3-2-1-2-029 - BU accepted (Invalid Mobility Header Reserved)

[PURPOSE]

MN-3-2-1-2-029 - BU accepted (Invalid Mobility Header Reserved)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT sets (A) bit in BU which is transmitted to CN: YES

[TOPOLOGY]

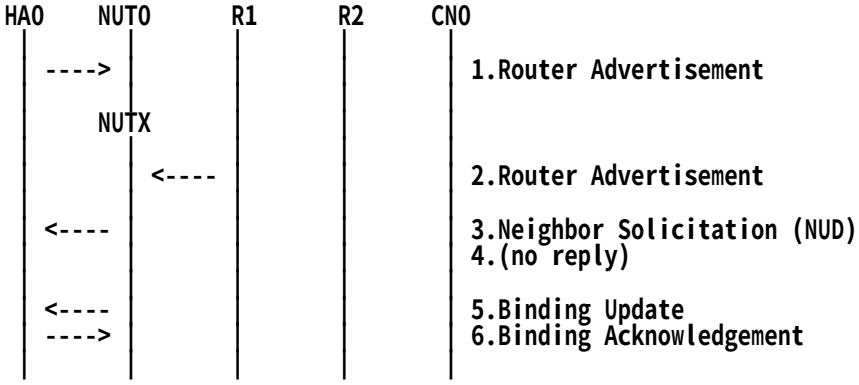
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

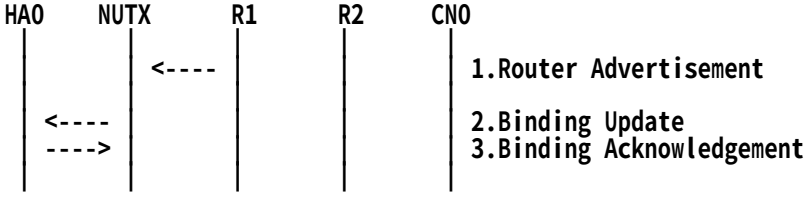
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

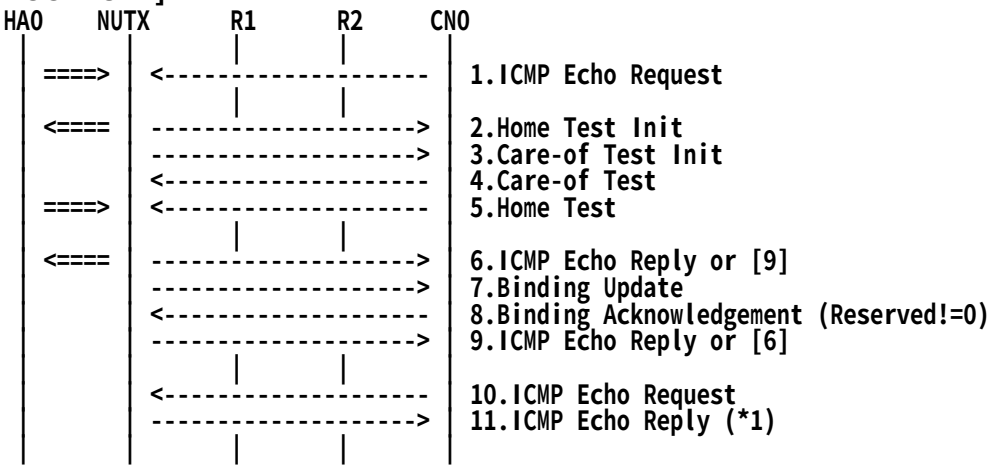
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [9]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. Send Binding Acknowledgement to NUTX. (CN0 -> NUTX) (Refer to 5.15.3)
   # The Status field is set to 0 (Binding Update accepted).
   # The Reserved field is not set to 0.

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address of Mobile Node	NUT0 (Link0, global)
Mobility Header	MH Type	6
	Reserved	Any (!= 0)
	Status	0
	Reserved	Any (!= 0)
	Sequence Number	(= BU[7])
	Lifetime	Any (> 0, <= BU[7])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

9. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
10. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

11. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (*1)
    (Refer to 5.8.3)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	129

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply with Home Address Option.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 6.1.1, 6.1.8, 11.7.3, 9.5.1, 9.2

6.7.6.3 MN-3-2-1-2-017 - Valid Lifetime (Lifetime of BA < Lifetime of BU)

[PURPOSE]

MN-3-2-1-2-017 - Valid Lifetime (Lifetime of BA < Lifetime of BU)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT sets (A) bit in BU which is transmitted to CN: YES

[TOPOLOGY]

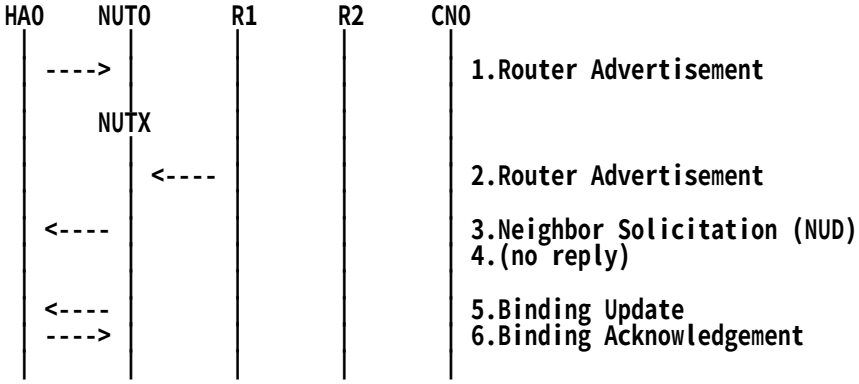
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

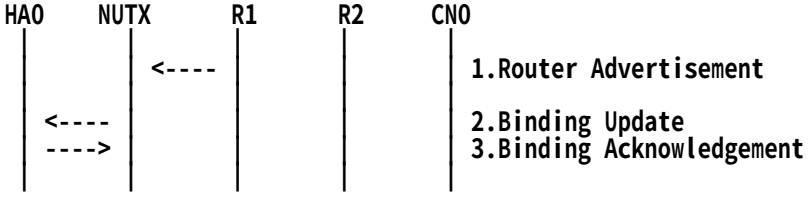
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

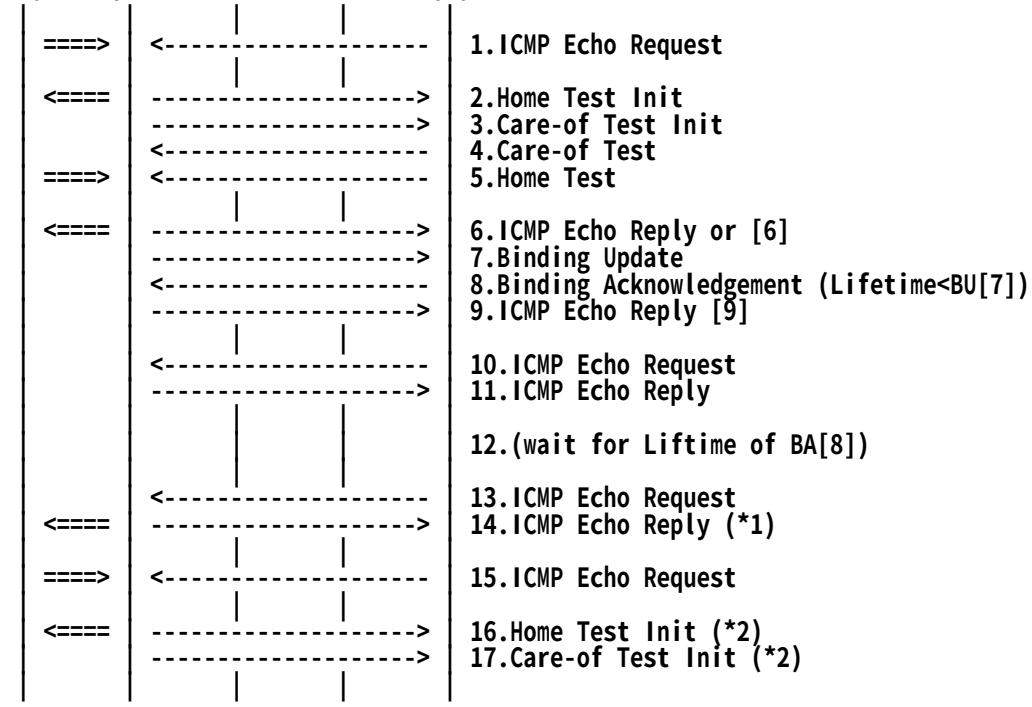
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [9]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. Send Binding Acknowledgement to NUTX. (CN0 -> NUTX) (Refer to 5.15.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address of Mobile Node	NUT0 (Link0, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[7])
	Lifetime	Any (> 0, < BU[7])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

9. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
10. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
11. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
12. (wait)
    # Wait during the Lifetime value of Binding Acknowledgement[8].
13. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header). (Refer to 5.7.3)
14. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.8.2)
15. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

16. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.10.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPIAny
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any (newly generated)

17. Receive Care-of Test Init. (NUTX -> CN0) (*2) (Refer to 5.11.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any (newly generated)

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply by reverse tunneling.

(*2) PASS: CN0 receives Home/Care-of Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.3, 11.3.3

6.7.6.4 MN-3-2-1-2-018 - Valid Lifetime (Lifetime of BA == Lifetime of BU)

[PURPOSE]

MN-3-2-1-2-018 - Valid Lifetime (Lifetime of BA == Lifetime of BU)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT sets (A) bit in BU which is transmitted to CN: YES

[TOPOLOGY]

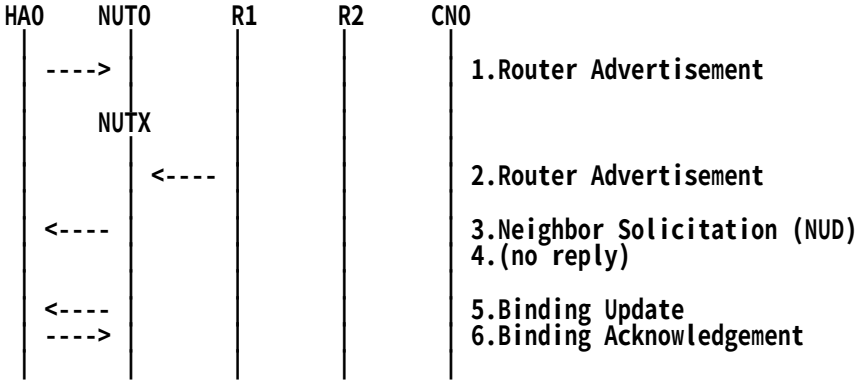
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

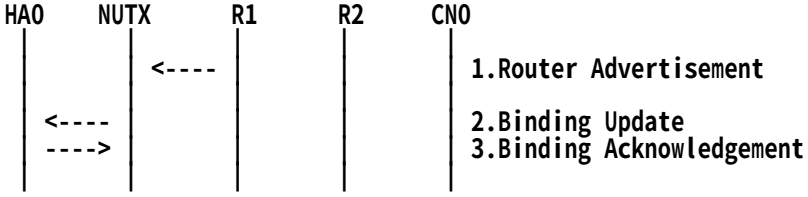
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

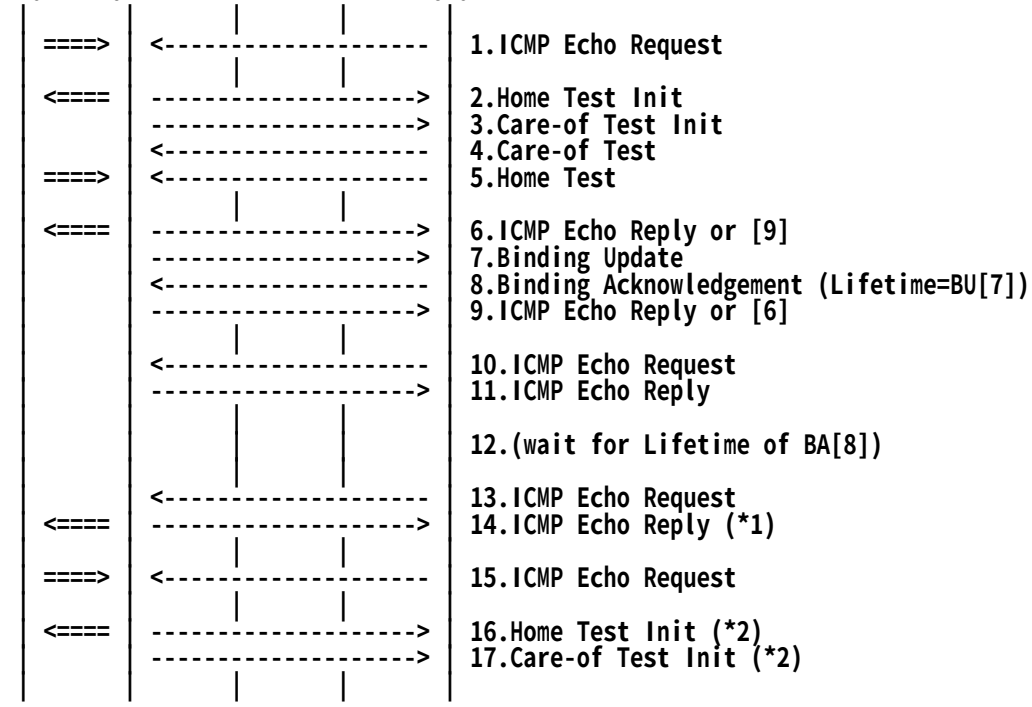
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [9]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. Send Binding Acknowledgement to NUTX. (CN0 -> NUTX) (Refer to 5.15.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address of Mobile Node	NUT0 (Link0, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[7])
	Lifetime	(= BU[7])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

9. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
10. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
11. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.2)
12. (wait)
    # Wait during the Lifetime value of Binding Update[7].
13. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
14. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.8.2)
15. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

16. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.10.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any (newly generated)

17. Receive Care-of Test Init. (NUTX -> CN0) (*2) (Refer to 5.11.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any (newly generated)

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply by reverse tunneling.

(*2) PASS: CN0 receives Home/Care-of Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.3, 11.3.3

6.7.6.5 MN-3-2-1-2-003 - BU rejected (Status = 128)

[PURPOSE]

MN-3-2-1-2-003 - BU rejected (Status=128)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-transmits BU to CN for BA(status 128) YES/NO

[TOPOLOGY]

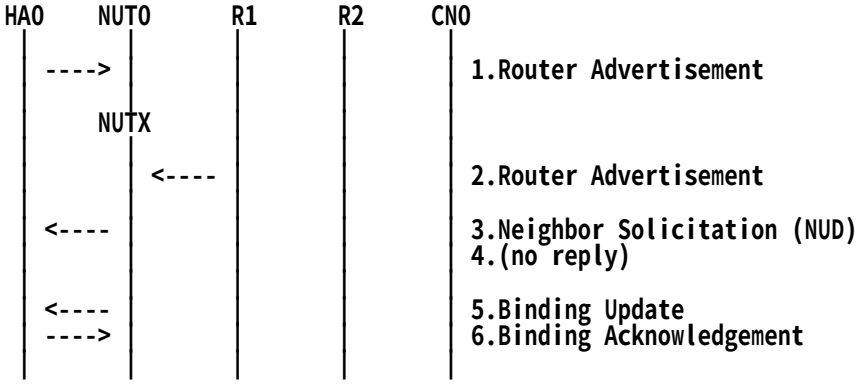
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

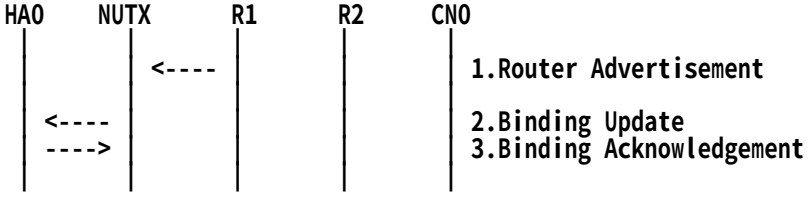
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

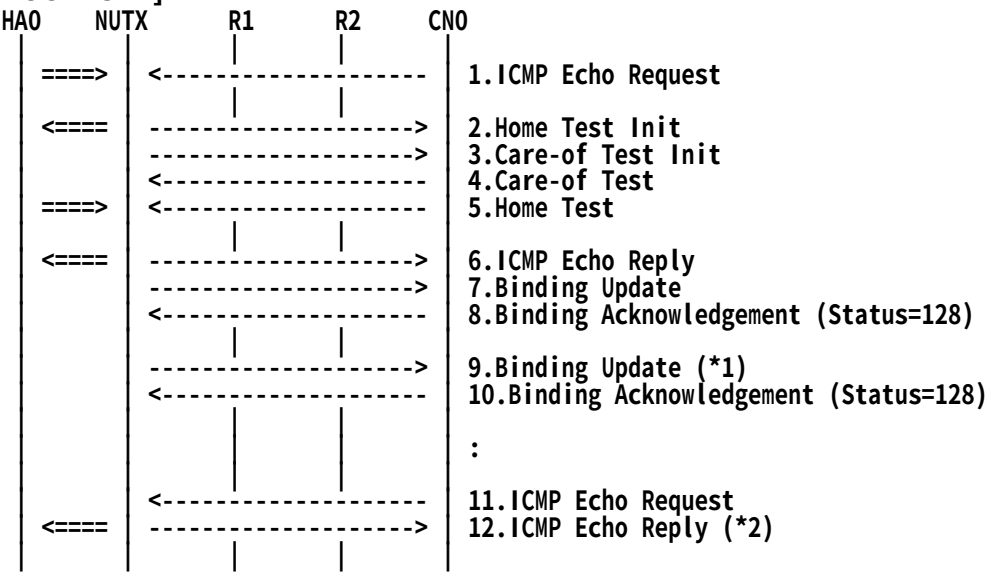
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. Send Binding Acknowledgement to NUTX. (CN0 -> NUTX) (Refer to 5.15.3)
   # The Status field is set to 128 (Reason unspecified).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address of Mobile Node	NUT0 (Link0, global)
Mobility Header	MH Type	6
	Status	128
	Sequence Number	(= BU[7])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

9. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any (> 0)

Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

10. Send Binding Acknowledgement to NUTX. (CN0 -> NUTX) (Refer to 5.15.3)
    # The Status field is set to 128 (Reason unspecified).
11. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

12. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6	Type	129

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits BU to CN for BA (status 128): YES
  (*1) PASS: CN0 receives the retransmitted Binding Update.
  Then, check whether this packet fills all of the following,
  - Sequence Number value greater than that used.
  (*2) PASS: CN0 receives the ICMP Echo Reply by reverse tunneling.

- NUT re-transmits BU to CN for BA (status 128): NO
  (*1) PASS: CN0 does not receive the retransmitted Binding Update.
  (*2) PASS: CN0 receives the ICMP Echo Reply by reverse tunneling.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.3, 11.7.1, 6.1.8, 9.5.4

6.7.6.6 MN-3-2-1-2-010 - BU rejected (Status = 135)

[PURPOSE]

MN-3-2-1-2-010 - BU rejected (Status=135)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-transmits BU to CN for BA(status 135): YES/NO

[TOPOLOGY]

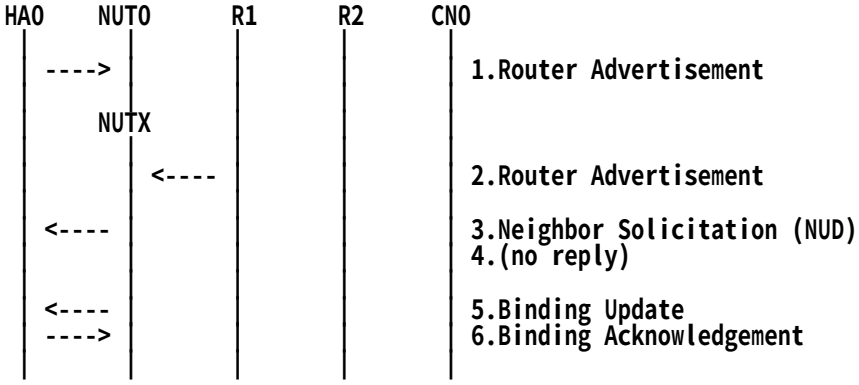
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

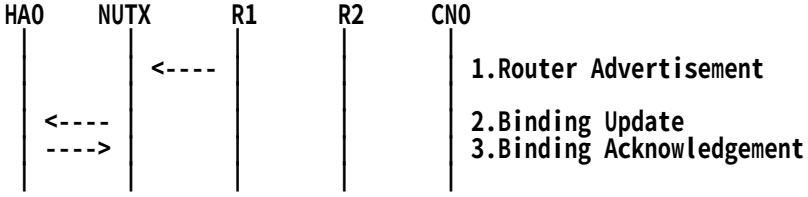
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

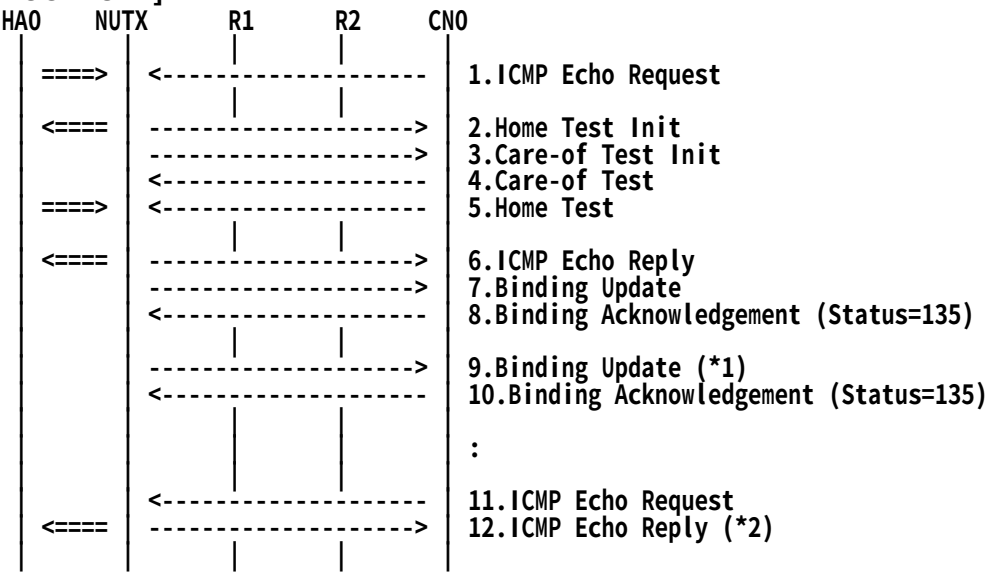
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. Send Binding Acknowledgement to NUTX. (CN0 -> NUTX) (Refer to 5.15.3)
   # The Status field is set to 135(Sequence number out of window).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address of Mobile Node	NUT0 (Link0, global)
Mobility Header	MH Type	6
	Status	135
	Sequence Number	Any
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

9. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BA[8])
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(=HoT[5])
	Care-of Nonce Index	(=CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BA[8])
	H Flag	0
	Lifetime	Any (> 0)

Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(=HoT[5])
	Care-of Nonce Index	(=CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

10. Send Binding Acknowledgement to NUTX. (CN0 -> NUTX) (Refer to 5.15.3)
    # The Status field is set to 135(Sequence number out of window).
11. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

12. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6	Type	129

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits BU to CN for BA(status 135): YES
  (*1) PASS: CN0 receives the retransmitted Binding Update.
  Then, check whether this packet fills all of the following,
  - The Sequence Number field is set to the following value of the Sequence Number field of Binding Acknowledgement.

  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

- NUT re-transmits BU to CN for BA(status 135): NO
  (*1) PASS: CN0 does not receive the retransmitted Binding Update.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.3, 11.7.1, 6.1.8, 9.5.1, 9.5.4

6.7.6.7 MN-3-2-1-2-014 - Invalid Sequence Number (BA != BU)

[PURPOSE]

MN-3-2-1-2-014 - Invalid Sequence Number (BA != BU)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES
NUT sets (A) bit in BU which is transmitted to CN: YES
NUT re-transmits BU to CN for valuable BA: YES/NO

[TOPOLOGY]

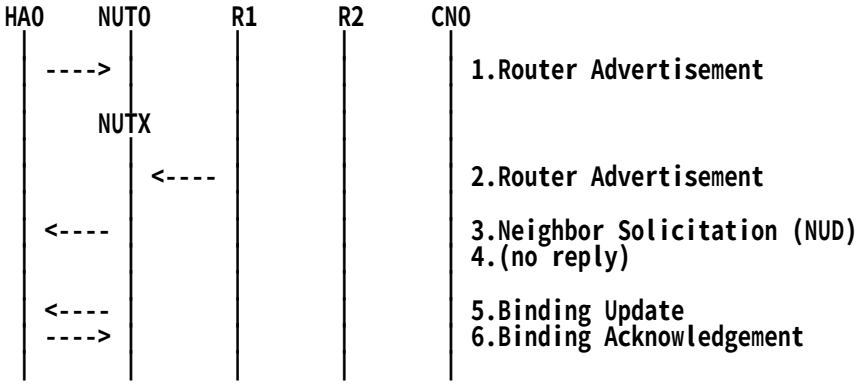
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

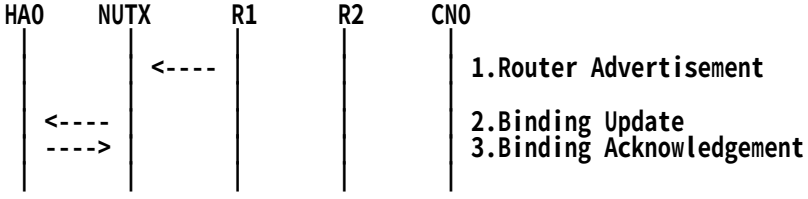
[INITIALIZATION]

- In the case of Real Home Link



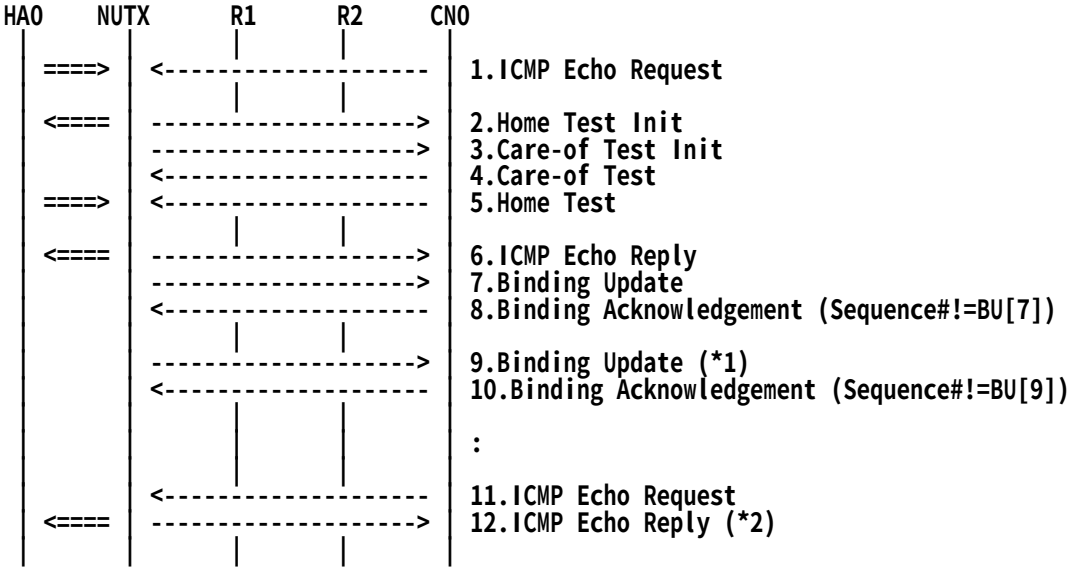
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. Send Binding Acknowledgement. (CN0 -> NUTX) (Refer to 5.15.3)

   # The Sequence Number field is not set to the Sequence Number in the Binding Update.

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address of Mobile Node	NUT0 (Link0, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	Any (!= BU[7])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

9. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])

	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

10. Send Binding Acknowledgement. (CN0 -> NUTX) (Refer to 5.15.3)
    # The Sequence Number field is not set to the Sequence Number in the Binding Update.
11. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

12. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6	Type	129

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits BU to CN for valuable BA: YES
  (*1) PASS: CN0 receives the retransmitted Binding Update.
  Then, check whether this packet fills all of the following,
  - Sequence Number value greater than that used.
  - The initial retransmission timer is set to INITIAL_BINDACK_TIMEOUT.
  - Timeout period is doubled upon each retransmission.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

- NUT re-transmits BU to CN for valuable BA: NO
  (*1) PASS: CN0 does not receive the retransmitted Binding Update.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.3

6.7.6.8 MN-3-2-1-2-023 - Unrecognized mobility option (Binding Refresh Advice option)

[PURPOSE]

MN-3-2-1-2-023 - Unrecognized mobility option (Binding Refresh Advice option)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT sets (A) bit in BU which is transmitted to CN: YES

[TOPOLOGY]

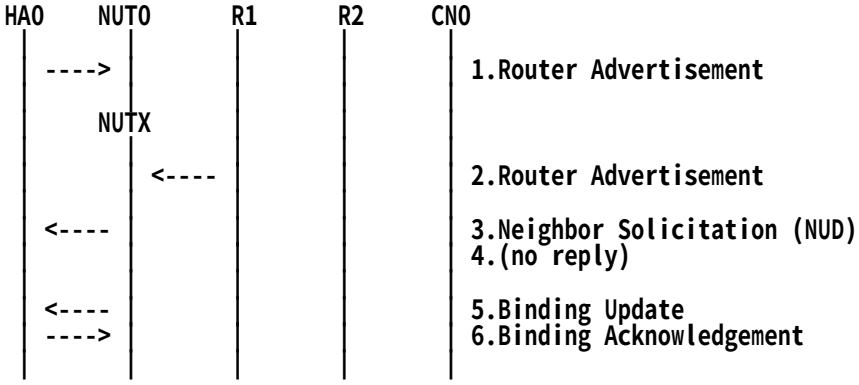
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

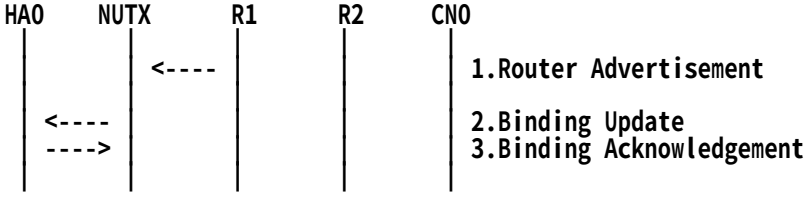
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

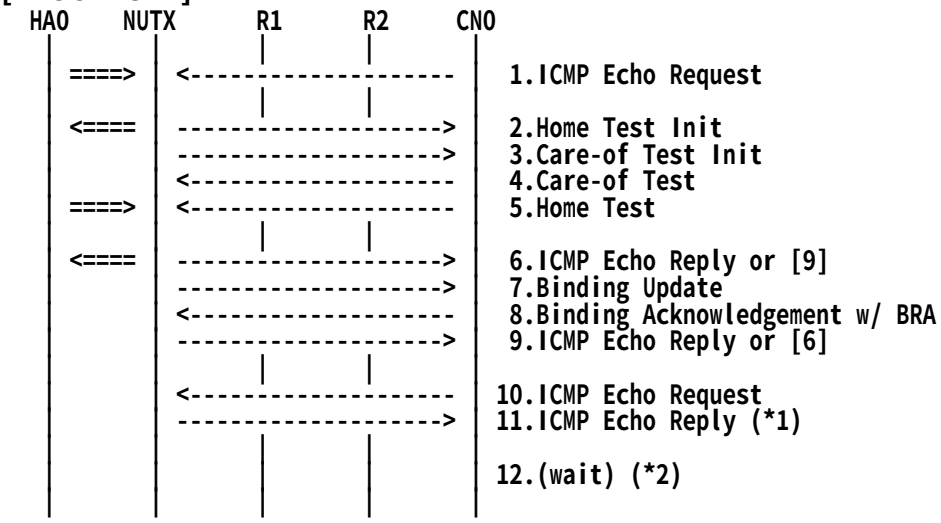
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [9]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. Send Binding Acknowledgement to NUTX. (CN0 -> NUTX) (Refer to 5.15.3)
   # Binding Refresh Advice mobility option is included.
   # The Refresh Interval field is set to the half of Lifetime field.

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Status	0
	Sequence Number	(= BU[7])
	Lifetime	Any (> 0)
Binding Refresh Advice Option	Option Type	2
	Refresh interval	(= BU[7] / 2)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

9. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
10. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

11. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (*1)
    (Refer to 5.8.3)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	129

12. (wait) (*2)

Wait during the Refresh Interval of Binding Acknowledgement [8].

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply with Home Address Option.

(*2) PASS: CN0 does not receive Binding Update.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.3, 6.1.8, 6.2.4

6.7.6.9 MN-3-2-1-2-024 - Invalid Authorization Data

[PURPOSE]

MN-3-2-1-2-024 - Invalid Authorization Data

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES
NUT sets (A) bit in BU which is transmitted to CN: YES
NUT re-transmits BU to CN for valuable BA: YES/NO

[TOPOLOGY]

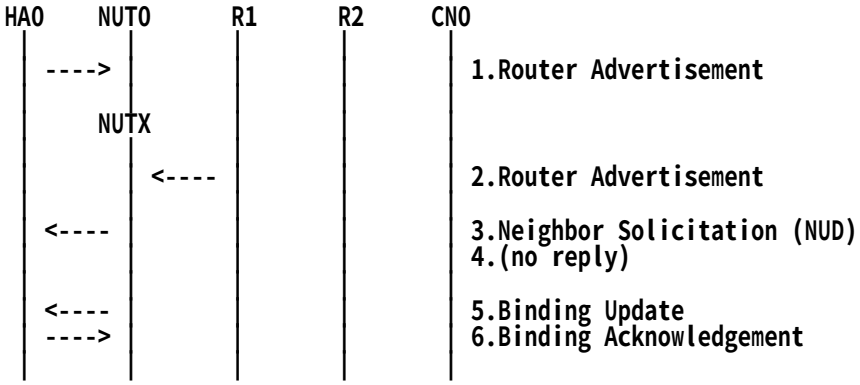
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

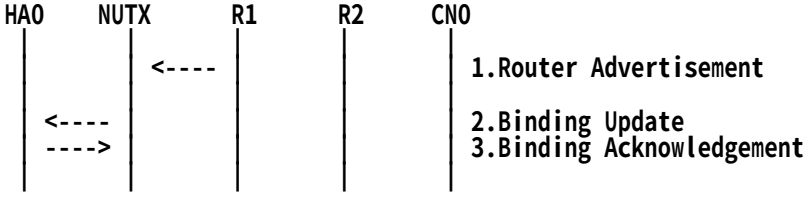
[INITIALIZATION]

- In the case of Real Home Link



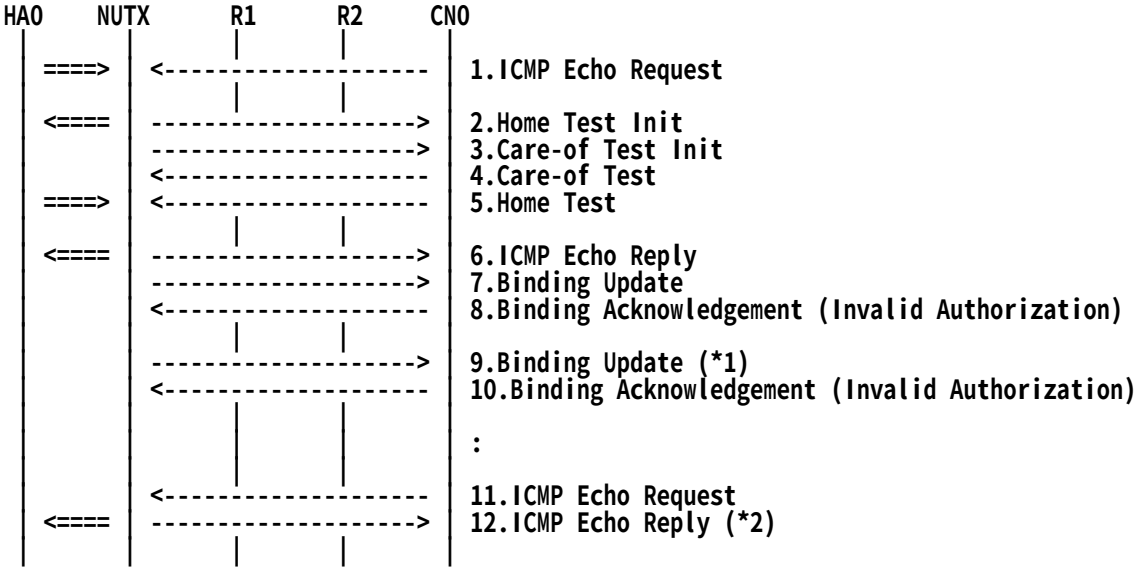
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to *5.7.3)*
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. Send Binding Acknowledgement. (CN0 -> NUTX) (Refer to 5.15.1)

   # Invalid Authorization Data

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address of Mobile Node	NUT0 (Link0, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[7])
	Lifetime	Any (> 0, <= BU[7])
Binding Authorization Data Option	Option Type	5
	Authenticator	Invalid data

9. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5

	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

10. Send Binding Acknowledgement. (CN0 -> NUTX) (Refer to 5.15.3)
    # Invalid Authorization Data
11. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

12. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6	Type	129

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits BU to CN for valuable BA: YES
  (*1) PASS: CN0 receives the retransmitted Binding Update.
  Then, check whether this packet fills all of the following,
  - Sequence Number value greater than that used.
  - The initial retransmission timer is set to INITIAL_BINDACK_TIMEOUT.
  - Timeout period is doubled upon each retransmission.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

- NUT re-transmits BU to CN for valuable BA: NO
  (*1) PASS: CN0 does not receive the retransmitted Binding Update.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.3

6.7.6.10 MN-3-2-1-2-025 - The Binding Authorization Data mobility option be not the last option

[PURPOSE]

MN-3-2-1-2-025 - The Binding Authorization Data mobility option be not the last option

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES
NUT sets (A) bit in BU which is transmitted to CN: YES
NUT re-transmits BU to CN for valuable BA: YES/NO

[TOPOLOGY]

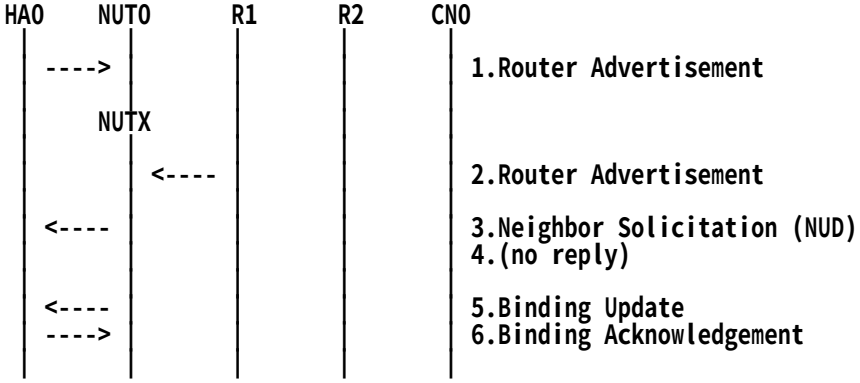
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

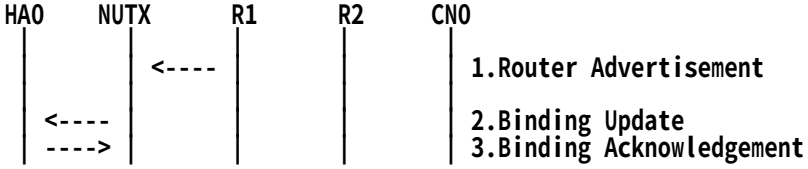
[INITIALIZATION]

- In the case of Real Home Link



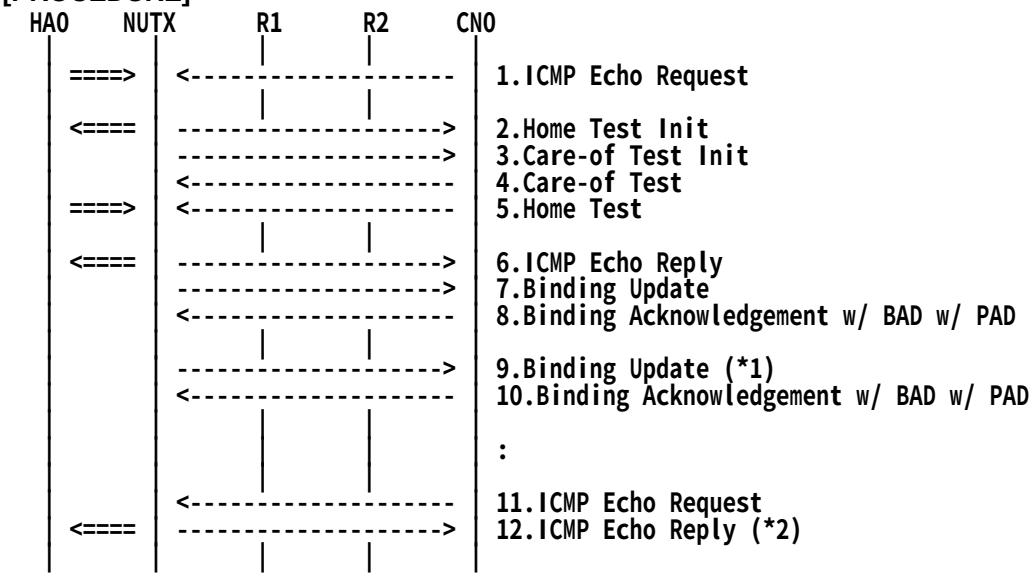
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. Send Binding Acknowledgement. (CN0 -> NUTX) (Refer to 5.15.3)

   # The Binding Authorization Data mobility option be not the last option

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address of Mobile Node	NUT0 (Link0, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[7])
	Lifetime	Any (> 0, <= BU[7])
Binding Authorization Data Option (Illegal location)	Option Type	5
	Authenticator	Any
Padding	-	-

9. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)
   - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

   - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)

	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

10. Send Binding Acknowledgement. (CN0 -> NUTX) (Refer to 5.15.3)
    # The Binding Authorization Data mobility option be not the last option
11. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

12. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6	Type	129

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits BU to CN for valuable BA: YES
  (*1) PASS: CN0 receives the retransmitted Binding Update.
  Then, check whether this packet fills all of the following,
  - Sequence Number value greater than that used.
  - The initial retransmission timer is set to INITIAL_BINDACK_TIMEOUT.
  - Timeout period is doubled upon each retransmission.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

- NUT re-transmits BU to CN for valuable BA: NO
  (*1) PASS: CN0 does not receive the retransmitted Binding Update.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.3

6.7.7 Sending BU (Re-Registration)

6.7.7.1 MN-3-1-2-2-006 - Sending BU (before the expiration of correspondent registration)

[PURPOSE]

MN-3-1-2-2-006 - Sending BU (before the expiration of correspondent registration);

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-registers with CN: YES

[TOPOLOGY]

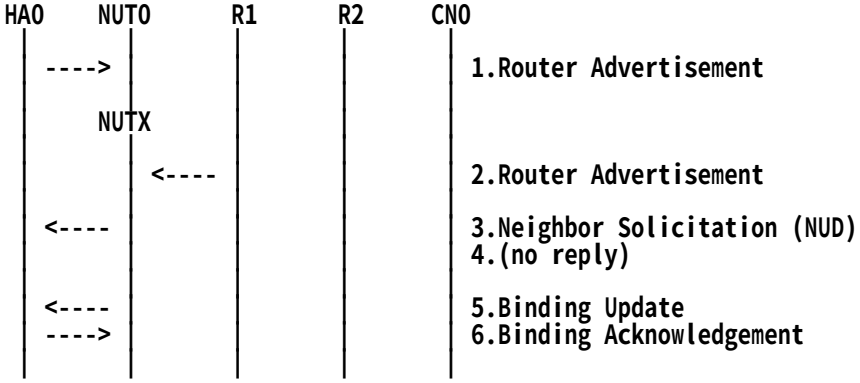
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

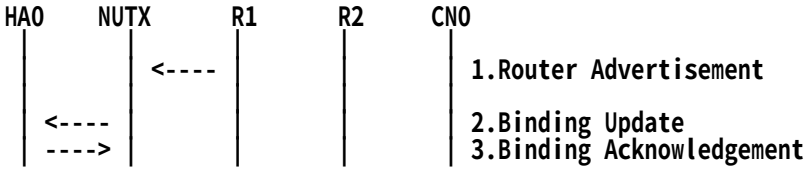
[INITIALIZATION]

- In the case of Real Home Link



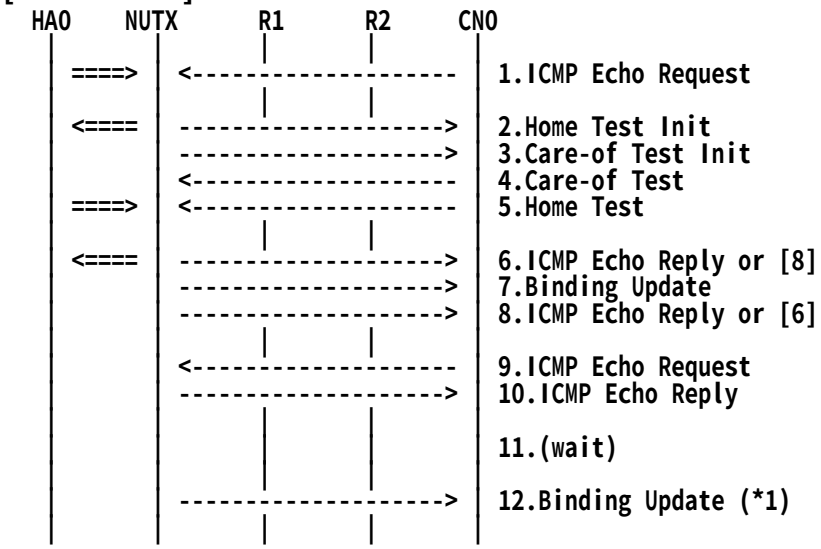
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.3)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.1)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
10. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
11. (wait)
12. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)

- w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

- w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0

	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[4])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

[JUDGMENT]

(*1) PASS: CN0 receives Binding Update before the expiration of the following period,

- The remaining lifetime of the correspondent registration.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.2, 9.5.1, 11.7.3

6.7.7.2 MN-3-1-2-2-004 - Sending BU for each CN in BUL (after home re-registration)

[PURPOSE]

MN-3-1-2-2-004 - Sending BU for each CN in BUL (after home re-registration)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

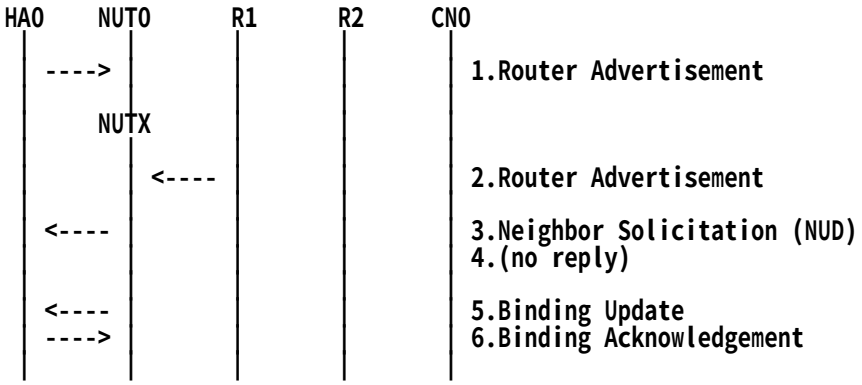
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

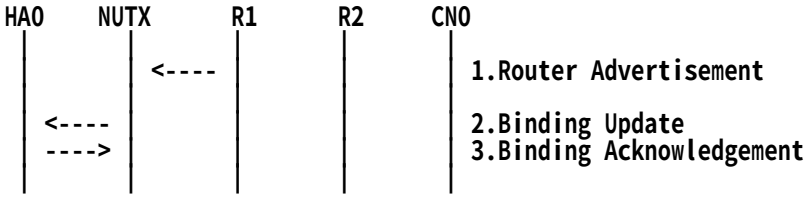
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

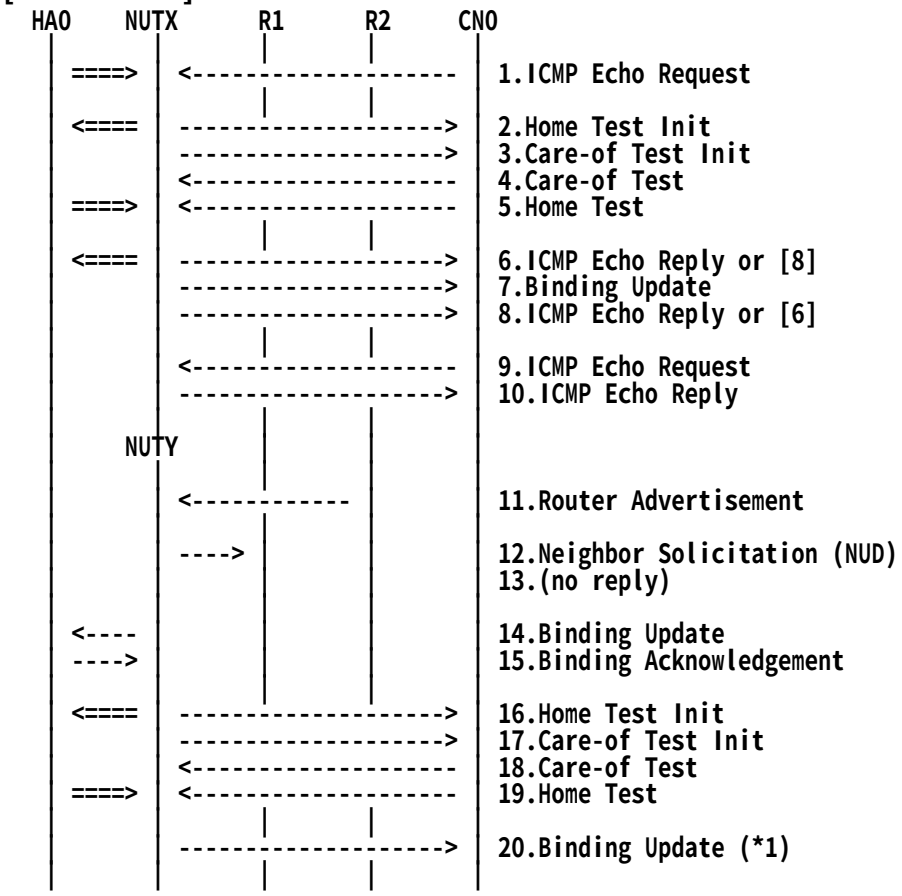
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
10. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
11. Send Router Advertisement. (R2 -> R2_allnode_multi) (Refer to 5.2.1)
12. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
13. (no reply)
    # Wait during a maximum of 3 seconds(RFC2461).
14. Receive Binding Update to HA0. (NUTY -> HA0) (Refer to 5.14.1)
15. Send Binding Acknowledgement. (HA0 -> NUTY) (Refer to 5.15.1)
16. Receive Home Test Init. (out: NUTY -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)

17. Receive Care-of Test Init. (NUTY -> CN0) (Refer to 5.11.1)
18. Send Care-of Test. (CN0 -> NUTY) (Refer to 5.13.1)
19. Send Home Test. (out: HA0 -> NUTY, in: CN0 -> NUT0) (Refer to 5.12.2)
20. Receive Binding Update to CN0. (NUTY -> CN0) (*1) (Refer to 5.14.3)

- w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTY (LinkY, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[19])
	Care-of Nonce Index	(= CoT[18])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

- w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTY (LinkY, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[19])
	Care-of Nonce Index	(= CoT[18])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

[JUDGMENT]

(*1) PASS: CN0 receives Binding Update.

Then, check whether this packet fills all of the following.

- The Destination Address is CN address.
- The Sequence Number is set more than that in the previous Binding Update.
- Check whether the Lifetime fills all of the following.
  - The Lifetime is set less than MAX_RR_BINDING_LIFE(420seconds).
  - The Lifetime is set less than the remaining lifetime of the home registration.
  - The Lifetime is set less than the remaining lifetime of Care-of Address.
- Nonce Indices mobility option is included, and,
  - Home Nonce Index is equal to the value in Home Test message.
  - Care-of Nonce Index is equal to the value in Care-of Test message.
- Authorization Data mobility option is included, and,
  - This option is placed as the right location.
  - The Authenticator value has the valid value.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.2, 9.5.1, 11.4.2, 11.5.1, 11.1, 11.7.1

6.7.7.3 MN-3-1-2-2-002 - Valid BU of re-registration (src address == CoA or Alternate CoA option == CoA)

[PURPOSE]

MN-3-1-2-2-002 - Valid BU of re-registration (src address == CoA or Alternate CoA option == CoA)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

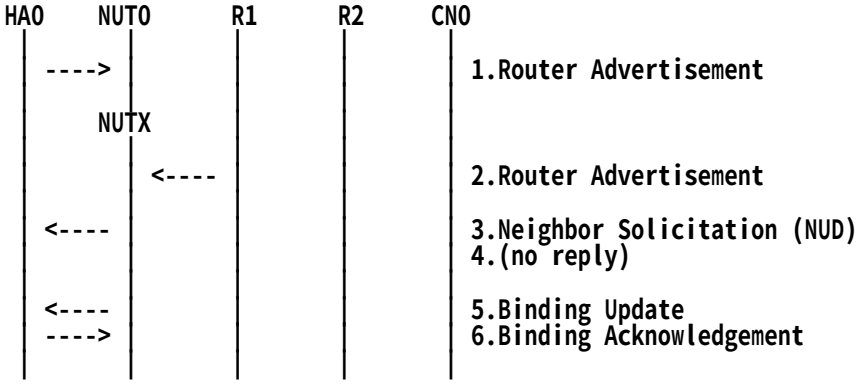
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

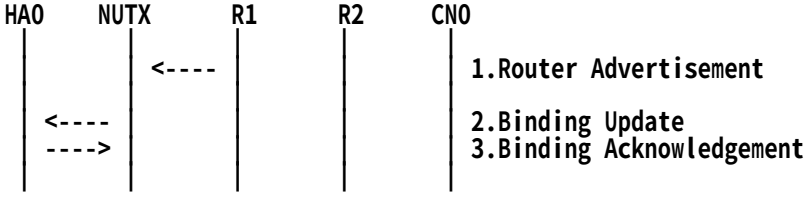
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

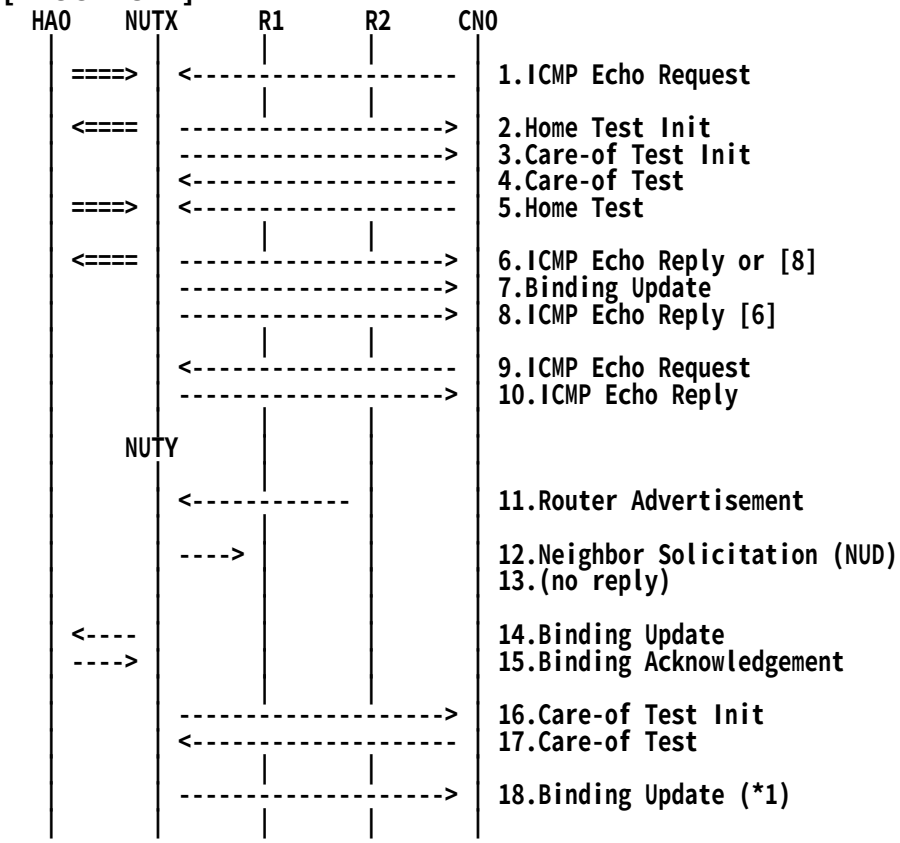
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
10. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
11. Send Router Advertisement. (R2 -> R2_allnode_multi) (Refer to 5.2.1)
12. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
13. (no reply)
14. Receive Binding Update. (NUTY -> HA0) (Refer to 5.14.1)
15. Send Binding Acknowledgement. (HA0 -> NUTY) (Refer to 5.15.1)
16. Receive Care-of Test Init. (NUTY -> CN0) (Refer to 5.11.1)
17. Send Care-of Test. (CN0 -> NUTY) (Refer to 5.13.1)
18. Receive Binding Update to CN0. (NUTY -> CN0) (*1) (Refer to 5.14.3)

- w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTY (LinkY, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[17])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

- w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTY (LinkY, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[5])
	Care-of Nonce Index	(= CoT[17])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

[JUDGMENT]

(*1) PASS: CN0 receives Binding Update.

Then, check whether this packet fills all of the following.

- Either the Source Address or the Alternate Care-of Address mobility option is set to the Care-of Address.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.2, 5.2.6

6.7.7.4 MN-3-1-2-2-001 - Sending BU to CN (when the lifetime for a changed prefix decreases)

[PURPOSE]

MN-3-1-2-2-001 - Sending BU to CN (when the lifetime for a changed prefix decreases)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY(AND MPD))

[REQUIREMENT OF TEST]

Function of Return Routability: YES

Function of Mobile Prefix Discovery: YES

[TOPOLOGY]

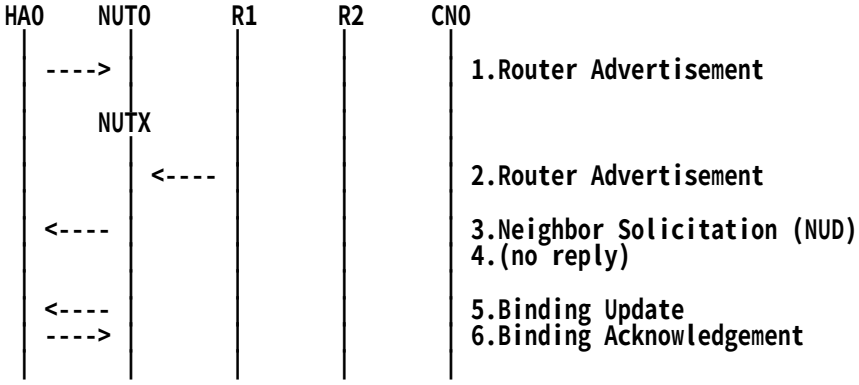
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

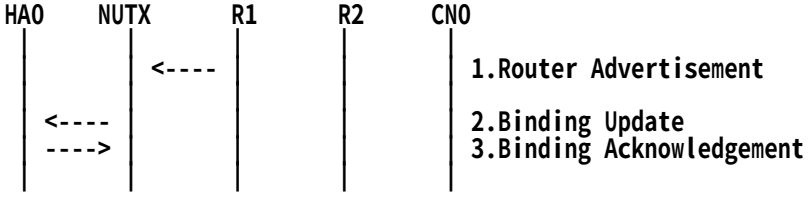
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.1)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

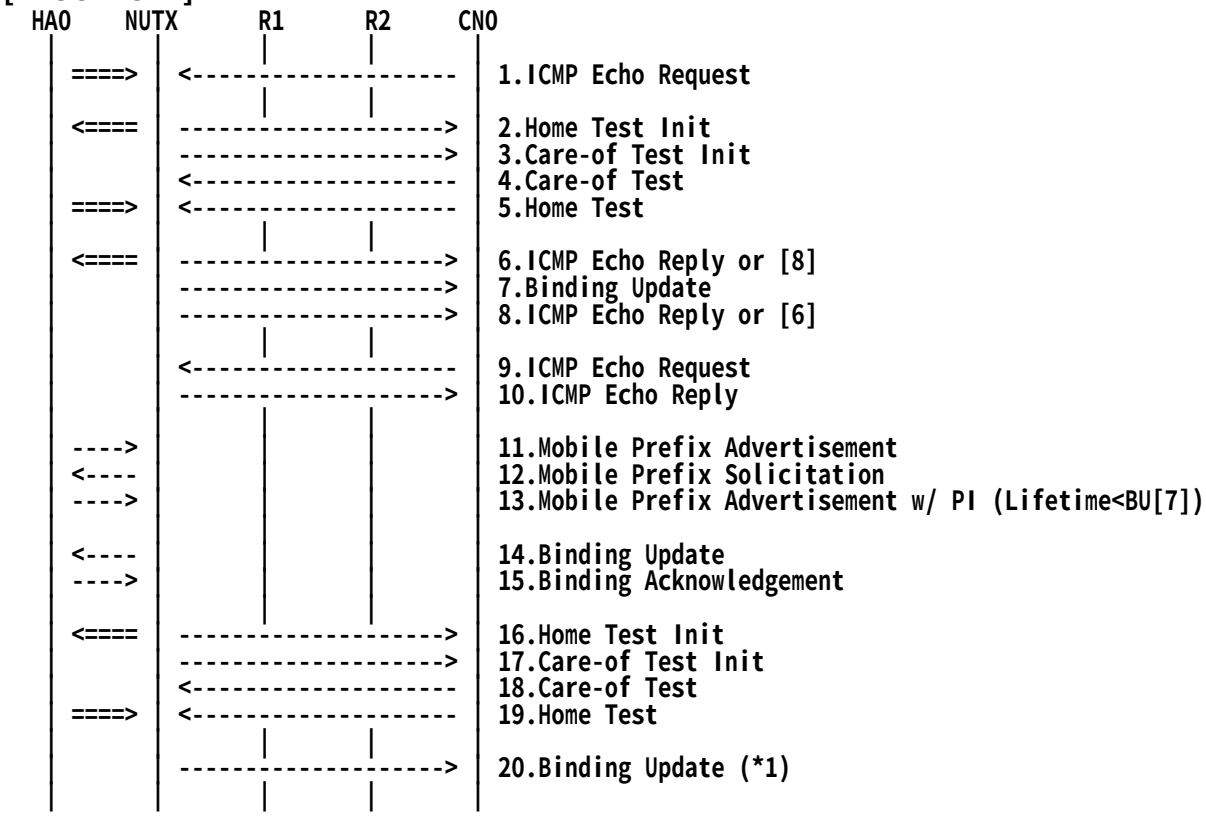
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
10. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
11. Send unsolicited Mobile Prefix Advertisement.
    (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.20.1)
12. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option)
    (Refer to 5.19.1)
13. Send solicited Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
    (Refer to 5.20.1)
    # The Valid Lifetime is set less than the remaining lifetime of the correspondent
    # registration.

The Preferred Lifetime is set less than the remaining lifetime of the correspondent
registration.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
Mobility Header	Type	147
	Identifier	(= MPS[12])
Prefix Information Option	Type	3
	Valid lifetime	Any (< BU[7])
	Preferred life time	Any (< BU[7])

14. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
15. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
16. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
17. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
18. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
19. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
20. Receive Binding Update to CN0. (NUTX -> CN0) (*1) (Refer to 5.14.3)

- w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	Any (= HoT[19])
	Care-of Nonce Index	Any (= CoT[18])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

- w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	Any (= HoT[19])
	Care-of Nonce Index	Any (= CoT[18])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

[JUDGMENT]

(*1) PASS: CN0 receives Binding Update.

Then, check whether this packet fills all of the following.

- The Destination Address is CN address.
- The Sequence Number is set more than that in the previous Binding Update.
- The Home Registration(H) bit is set not to ON.
- Check whether the Lifetime fills all of the following.
  - The Lifetime is set less than MAX_RR_BINDING_LIFE(420seconds).
  - The Lifetime is set less than the remaining lifetime of the home registration.
  - The Lifetime is set less than the remaining lifetime of Care-of Address.
- Nonce Indices mobility option is included, and,
  - Home Nonce Index is equal to the value in Home Test message.
  - Care-of Nonce Index is equal to the value in Care-of Test message.
- Authorization Data mobility option is included, and,
  - This option is placed as the right location.
  - The Authenticator value has the valid value.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.2, 9.5.1, 11.4.2, 11.7.1

6.7.8 Returning Home

6.7.8.1 MN-3-1-3-2-001 - Sending BU of de-registration

[PURPOSE]

MN-3-1-3-2-001 - Sending BU of de-registration

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

Function of Return Routability: YES

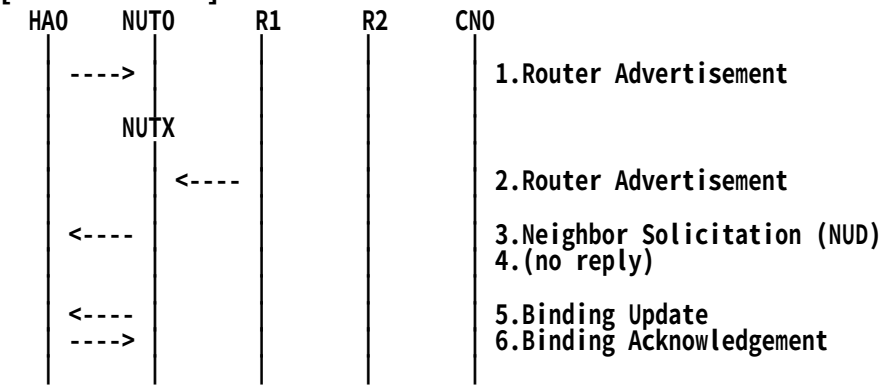
[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

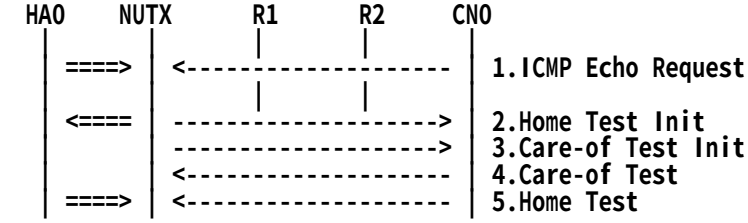
Refer to 3.1 Common Setup-1

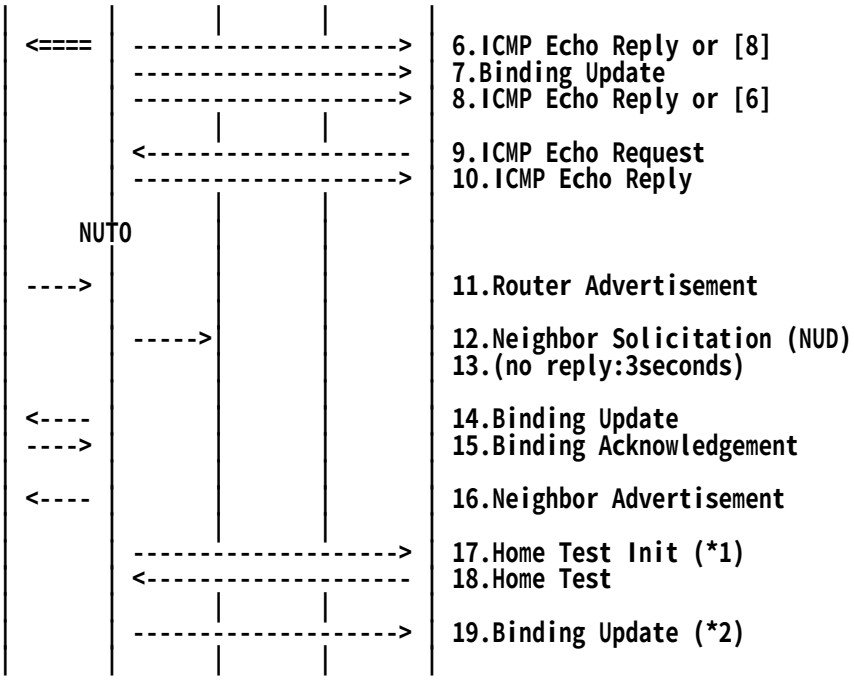
[INITIALIZATION]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]





1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
10. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
11. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
12. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
13. (no reply)
    # Wait during a maximum of 3 seconds(RFC2461).
14. Receive Binding Update to HA0. (NUT0 -> HA0) (Refer to 5.14.1)
15. Send Binding Acknowledgement. (HA0 -> NUT0) (Refer to 5.15.1)
16. Receive Neighbor Advertisement. (NUT0 -> NUT0_allnode_multi) (Refer to 5.4.1)
17. Receive Home Test Init. (NUT0 -> CN0) (*1) (Refer to 5.10.1)

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any (newly generated)

18. Send Home Test. (CN0 -> NUT0) (Refer to 5.12.1)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	3
	Home Nonce Index	Any
	Home Init Cookie	(= HoT[17])

19. Receive Binding Update to CN0. (NUT0 -> CN0) (*2) (Refer to 5.14.3)
    - w/ Home Address Option

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	K Flag	0
	Lifetime	0
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[18])
	Care-of Nonce Index	Any
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

- w/o Home Address Option

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	K Flag	0
	Lifetime	0
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[18])
	Care-of Nonce Index	Any
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

[JUDGMENT]

(*1) PASS: HA0 does not receive Home Test Init.

(*2) PASS: CN0 receives Binding Update.

Then, check whether this packet fills all of the following.

- The Destination Address is CN address.
- The home registration(H)bit is cleared.
- The Key Management Mobility Capabilibty(K)bit is cleared.
- Check whether the Lifetime fills all of the following.
  - The Lifetime is set to zero.
- Nonce Indices mobility option is included, and,
  - Home Nonce Index is equal to the value in Home Test message.
- Authorization Data mobility option is included, and,
  - This option is placed as the right location.
  - The Authenticator value has the valid value.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.2, 6.1.7, 11.5.4

RFC3776 Using IPsec to Protect Mobile IPv6 Signaling Between Mobile Nodes and Home Agents

See Section 4.2

6.7.9 Receiving BRR

6.7.9.1 MN-3-4-1-2-001 - Receiving BRR

[PURPOSE]

MN-3-4-1-2-001 - Receiving BRR

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT accepts BRR: YES

[TOPOLOGY]

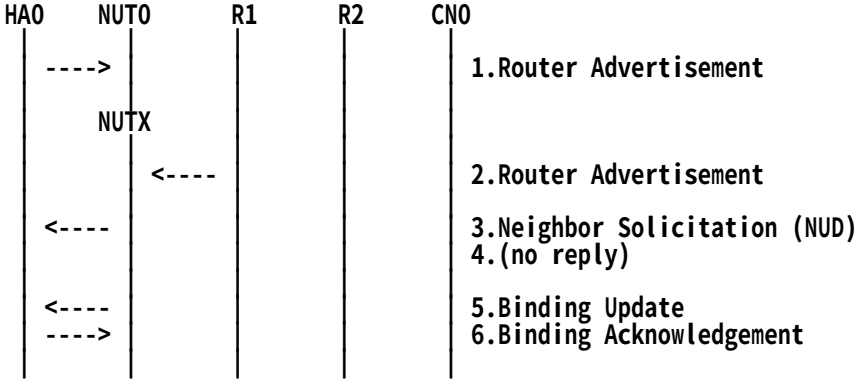
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

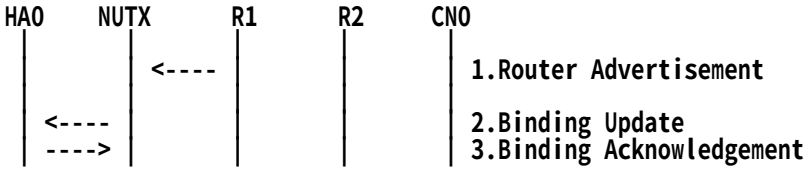
[INITIALIZATION]

- In the case of Real Home Link



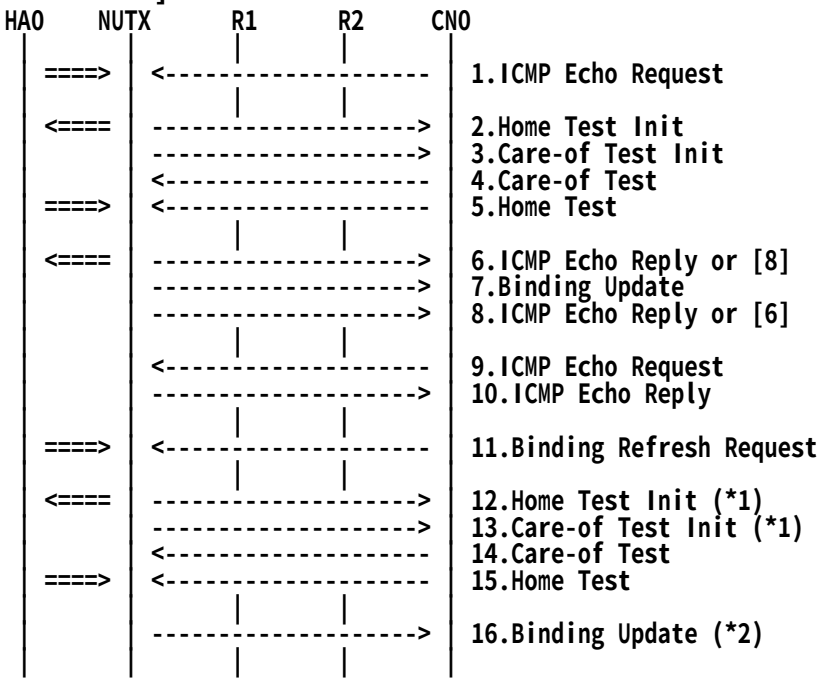
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
10. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
11. Send Binding Refresh Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.9.2)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4 SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	0

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	0

12. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.10.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	1

13. Receive Care-of Test Init. (NUTX -> CN0) (*1) (Refer to 5.11.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	2

14. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
15. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
16. Receive Binding Update to CN0. (NUTX -> CN0) (*2) (Refer to 5.14.3)

- w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[15])
	Care-of Nonce Index	(= CoT[14])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

- w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[15])
	Care-of Nonce Index	(= CoT[14])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

[JUDGMENT]

(*1) PASS: CN0 receive Home/Care-of Test Init.

(*2) PASS: CN0 receives Binding Update.

Then, check whether this packet fills all of the following.

- Check whether the Lifetime fills all of the following.
  - The Lifetime is set less than MAX_RR_BINDING_LIFE(420seconds).
  - The Lifetime is set less than the remaining lifetime of the home registration.
  - The Lifetime is set less than the remaining lifetime of care-of address.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.4, 11.3.3

6.7.9.2 MN-3-4-1-2-006 - Receiving BRR (Invalid Mobility Header Reserved)

[PURPOSE]

MN-3-4-1-2-006 - Receiving BRR (Invalid Mobility Header Reserved)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT accepts BRR: YES

[TOPOLOGY]

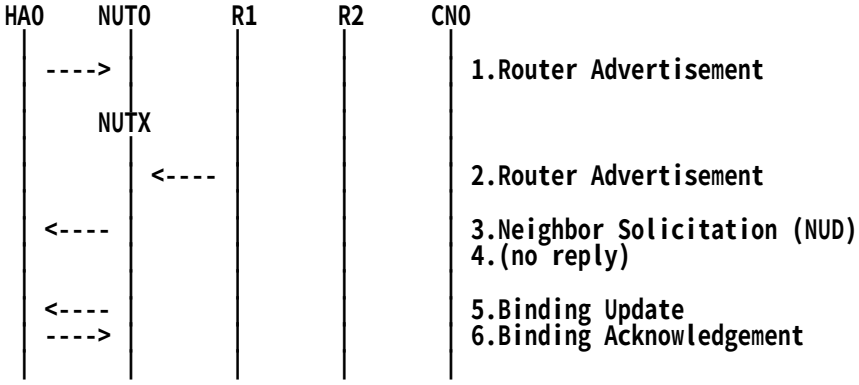
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

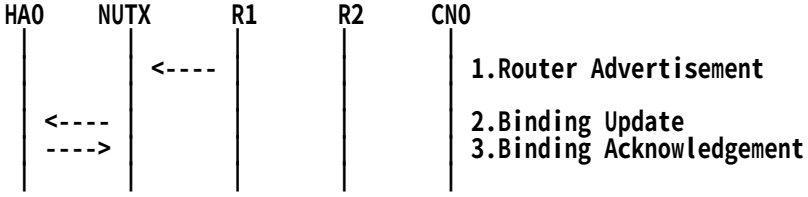
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

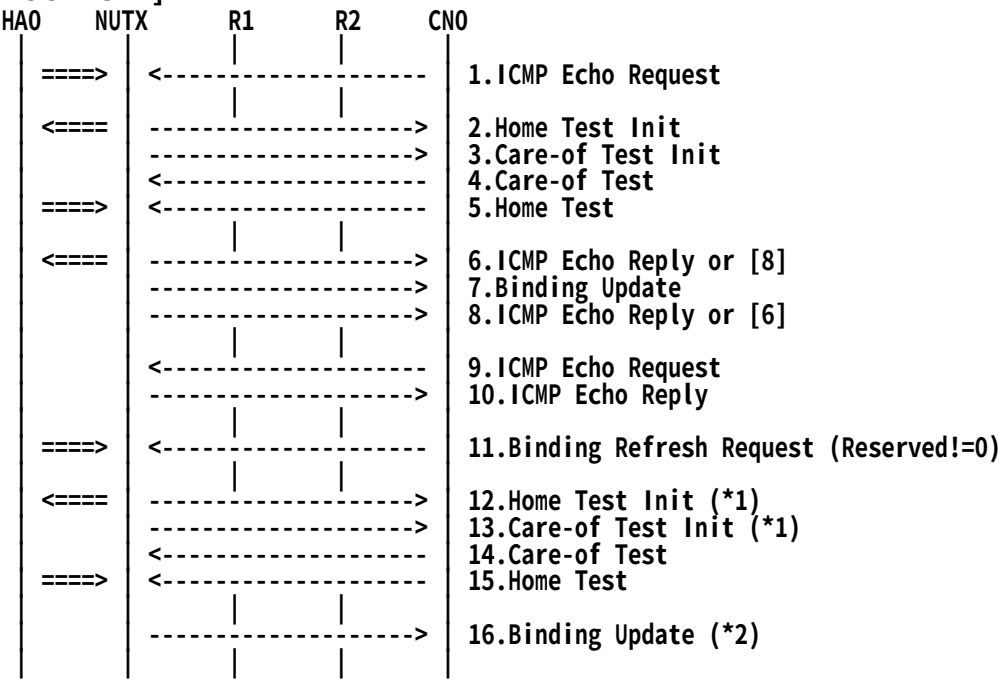
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.1)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
10. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
11. Send Binding Refresh Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.9.2)
    # The Reserved field is not set to 0.
    a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	0
	Reserved	Any (!= 0)
	Reserved	Any (!= 0)

    b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	0
	Reserved	Any (!= 0)
	Reserved	Any (!= 0)

12. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.10.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	1

13. Receive Care-of Test Init. (NUTX -> CN0) (*1) (Refer to 5.11.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	2

14. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
15. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
16. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
    - w/o Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[15])
	Care-of Nonce Index	(= CoT[14])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

    - w/ Alternate Care-of Address Option

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[7])
	H Flag	0
	Lifetime	Any
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[15])
	Care-of Nonce Index	(= CoT[14])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

[JUDGMENT]

(*1) PASS: CN0 receive Home/Care-of Test Init.

(*2) PASS: CN0 receives Binding Update.

Then, check whether this packet fills all of the following.

- Check whether the Lifetime fills all of the following.
  - The Lifetime is set less than MAX_RR_BINDING_LIFE(420seconds).
  - The Lifetime is set less than the remaining lifetime of the home registration.
  - The Lifetime is set less than the remaining lifetime of care-of address.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 6.1.1, 6.1.2, 11.7.4, 11.3.3

6.7.9.3 MN-3-4-1-2-005 - Receiving BRR from unknown node

[PURPOSE]

MN-3-4-1-2-005 - Receiving BRR from unknown node

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

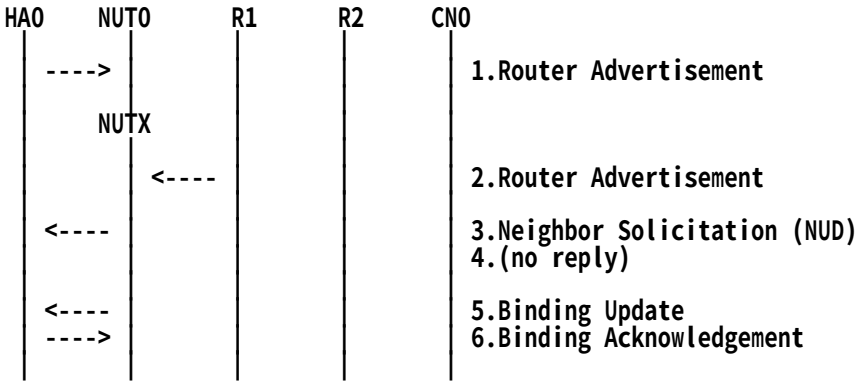
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

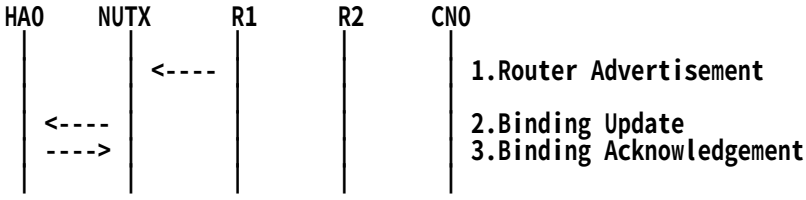
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

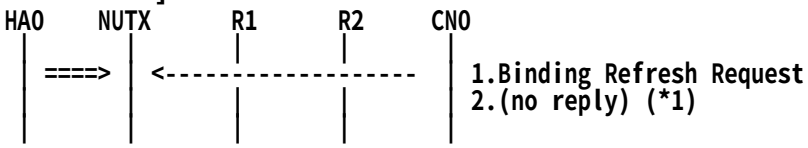
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send Binding Refresh Request. (CN0 -> NUTX) (Refer to 5.9.1)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	0

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	0

2. (no reply) (*1)

[JUDGMENT]

(*1) PASS: CN0 does not receive the Return Routability procedure messages.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.4, 6.1

6.8 Dynamic Home Agent Address Discovery

6.8.1 Sending HAAD-Request

6.8.1.1 MN-5-1-1-1-001 - Sending HAAD-Request at home-link

[PURPOSE]

MN-5-1-1-1-001 - Sending HAAD-Request at home-link

[CATEGORY]

HOST : ADVANCED FUNCTION (DHAAD)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

Function of Dynamic Home Agent Address Discovery: YES

NUT transmits HAAD Request on Home Link: YES

[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

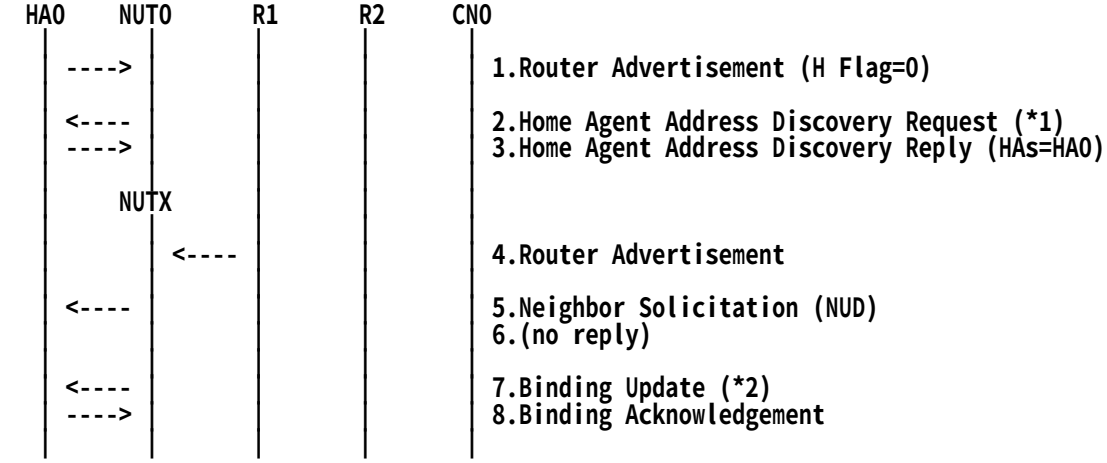
[TEST SETUP]

Refer to 3.1 Common Setup-1

[INITIALIZATION]

NONE

[PROCEDURE]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.1)
   # The Home Agent (H) bit is clear.

IPv6 Header	Source Address	HA0 (Link0, link-local)
	Destination Address	(All-nodes multicast address)
ICMPv6 Header	Type	134
	H Flag	0
Prefix Information Option	Type	3
	Prefix Length	64

	R Flag	0/1
	Prefix	(Link0, prefix/global)

2. Receive Home Agent Address Discovery Request. (NUT0 -> NUT0_ha_any) (*1) (Refer to 5.17.1)

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	(Link0, Home-Agents anycast address)
ICMPv6 Header	Type	144
	Code	0
	Identifier	Any
	Reserved	0

3. Send Home Agent Address Discovery Reply. (HA0 -> NUT0) (Refer to 5.18.1)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA6 SPI
ICMPv6 Header	Type	145
	Code	0
	Identifier	(=HAAD[2])
	Reserved	0
	Home Agent Address	HA0 (Link0, global)

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	145
	Code	0
	Identifier	(=HAAD[2])
	Reserved	0
	Home Agent Address	HA0 (Link0, global)

4. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
5. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
6. (no reply)

   # Wait during a maximum of 3 seconds(RFC2461).
7. Receive Binding Update. (NUTX -> HA0) (*2) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1 SPI
Mobility Header	MH Type	5
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

8. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Home Agent Address Discovery Request.
Then, check whether this packet fills all of the following.
- The destination address is set to a home Agents anycast address.
- The reserved field is cleared.

(*2) PASS: HA0 receives Binding Update.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.4.1

6.8.1.2 MN-5-1-1-1-005 - Sending HAAD-Request at foreign-link

[PURPOSE]

MN-5-1-1-1-005 - Sending HAAD-Request at foreign-link

[CATEGORY]

HOST : ADVANCED FUNCTION (DHAAD)

[REQUIREMENT OF TEST]

Function of Dynamic Home Agent Address Discovery: YES

[TOPOLOGY]

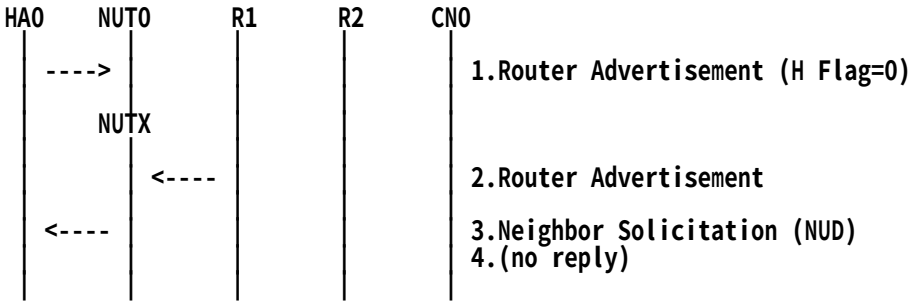
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

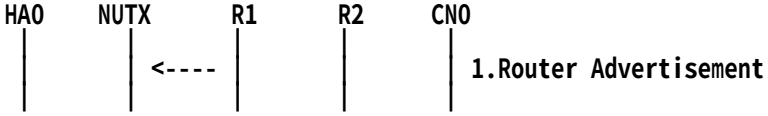
[INITIALIZATION]

- In the case of Real Home Link



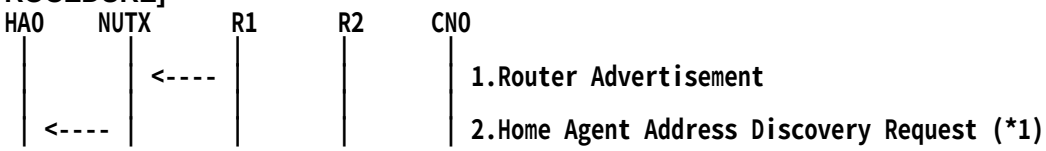
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.1)
   # The Home Agent (H) bit is clear.
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

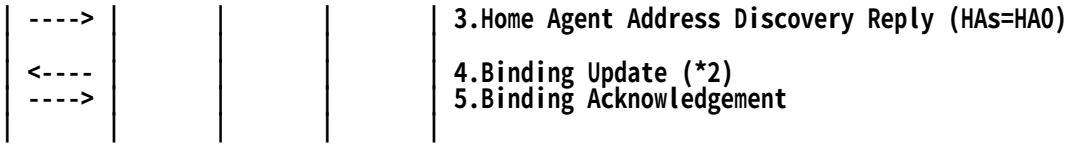
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Home Agent Address Discovery Request. (NUTX -> NUT0_ha_any) (*1) (Refer to 5.17.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	(Link0, Home-Agents anycast address)
ICMPv6 Header	Type	144
	Code	0
	Identifier	Any
	Reserved	0

3. Send Home Agent Address Discovery Reply. (HA0 -> NUTX) (Refer to 5.18.1)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (Link0, global)
ICMPv6 Header	Type	145
	Code	0
	Identifier	(=HAAD[2])
	Reserved	0
	Home Agent Address	HA0 (Link0, global)

4. Receive Binding Update. (NUTX -> HA0) (*2) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	H Flag	0
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

5. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Home Agent Address Discovery Request.
Then, check whether this packet fills all of the following.
- The source address is set to a Care-of Address.
- The destination address is set to a home Agents anycast address.
- The reserved field is cleared.

(*2) PASS: HA0 receives Binding Update.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.4.1

6.8.1.3 MN-5-1-1-1-006 - Retransmissions & Back off (Use INITIAL_DHAAD_TIMEOUT as the initial retransmission timer)

[PURPOSE]

MN-5-1-1-1-006 - Retransmissions & Back off (Use INITIAL_DHAAD_TIMEOUT as the initial retransmission timer)

[CATEGORY]

HOST : ADVANCED FUNCTION (DHAAD)

[REQUIREMENT OF TEST]

Function of Dynamic Home Agent Address Discovery: YES
NUT re-transmits HAAD Request for valuable HAAD Reply: YES/NO

[TOPOLOGY]

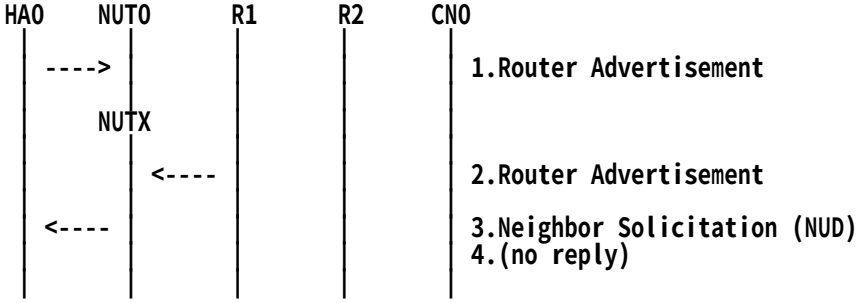
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

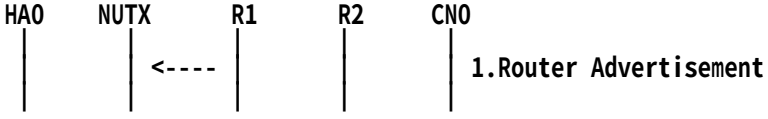
[INITIALIZATION]

- In the case of Real Home Link



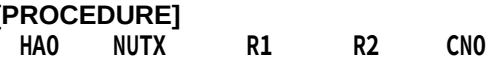
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.1)
   # The Home Agent (H) bit is clear.
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

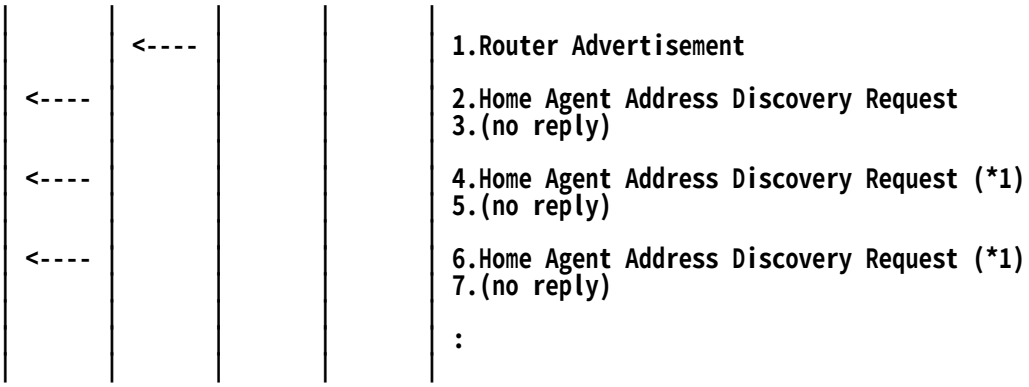
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Home Agent Address Discovery Request. (NUTX -> NUT0_ha_any) (Refer to 5.17.1)
3. (no reply)
4. Receive Home Agent Address Discovery Request. (NUTX -> NUT0_ha_any) (*1) (Refer to 5.17.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	(Link0, Home-Agents anycast address)
ICMPv6 Header	Type	144
	Code	0
	Identifier	Any (newly generated)

5. (no reply)
6. Receive Home Agent Address Discovery Request. (NUTX -> NUT0_ha_any) (*1) (Refer to 5.17.1)
7. (no reply)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits HAAD Request for valuable HAAD Reply: YES

(*1) PASS: HA0 receives the retransmitted Home Agent Address Discovery Request.
Then, check whether this packet fills all of the following.
- The initial retransmission timer is set to INITIAL_DHAAD_TIMEOUT.
- Timeout period is doubled upon each retransmission.
- This retransmission MAY be repeated up to a maximum of DHAAD_RETRIES attempts.

- NUT re-transmits HAAD Request for valuable HAAD Reply: NO

(*1) PASS: HA0 does not receives the retransmitted Home Agent Address Discovery Request.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.4.1

6.8.2 Receiving HAAD-Reply

6.8.2.1 MN-5-1-2-1-002 - Receiving HAAD-Reply at home-link

[PURPOSE]

MN-5-1-2-1-002 - Receiving HAAD-Reply at home-link

[CATEGORY]

HOST : ADVANCED FUNCTION (DHAAD)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

Function of Dynamic Home Agent Address Discovery: YES

NUT transmits HAAD Request on Home Link: YES

[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

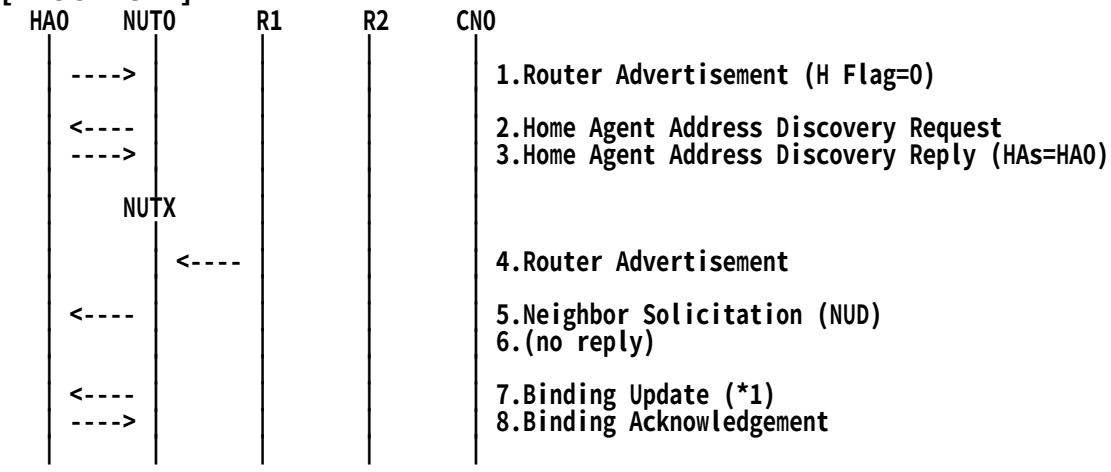
[TEST SETUP]

Refer to 3.1 Common Setup-1

[INITIALIZATION]

NONE

[PROCEDURE]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.1)
   # The Home Agent (H) bit is clear.
2. Receive Home Agent Address Discovery Request. (NUT0 -> NUT0_ha_any) (Refer to 5.17.1)
3. Send Home Agent Address Discovery Reply. (HA0 -> NUT0) (Refer to 5.18.1)
   # The Home Agent Addresses field contains global IP address for HA0.
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)

	Destination Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA6_SPI
ICMPv6 Header	Type	145
	Code	0
	Identifier	Any (= HAAD[2])
	Reserved	0
	Home Agent Address	HA0 (Link0, global)

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	145
	Code	0
	Identifier	Any (= HAAD[2])
	Reserved	0
	Home Agent Address	HA0 (Link0, global)

4. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
5. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
6. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
7. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address	Type	3
	Address	NUTX (LinkX, global)

8. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update.
Then, check whether this packet fills all of the following.
- The destination address is set to HA address of Home Agent Address Discovery Reply[3].

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.4.1

6.8.2.2 MN-5-1-2-1-016 - Receiving HAAD-Reply at foreign-link

[PURPOSE]

MN-5-1-2-1-016 - Receiving HAAD-Reply at foreign-link

[CATEGORY]

HOST : ADVANCED FUNCTION (DHAAD)

[REQUIREMENT OF TEST]

Function of Dynamic Home Agent Address Discovery: YES

[TOPOLOGY]

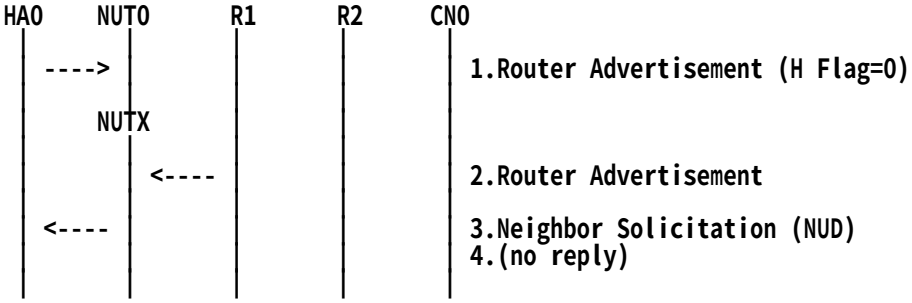
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

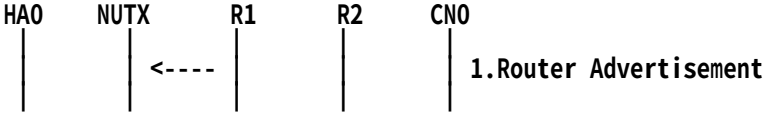
[INITIALIZATION]

- In the case of Real Home Link



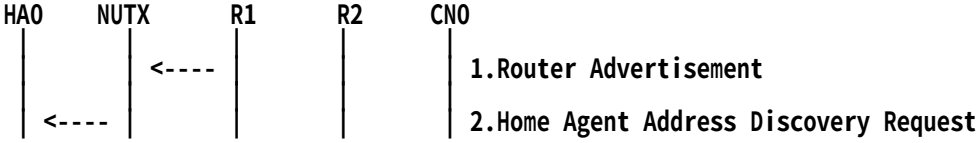
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.1)
   # The Home Agent (H) bit is clear.
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

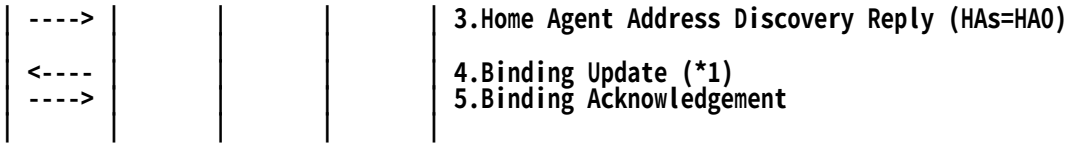
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Home Agent Address Discovery Request. (NUTX -> NUT0_ha_any) (Refer to 5.17.1)
3. Send Home Agent Address Discovery Reply. (HA0 -> NUTX) (Refer to 5.18.1)
   # The Home Agent Addresses field contains global IP address for HA0.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
ICMPv6 Header	Type	145
	Code	0
	Identifier	Any (= HAAD[2])
	Reserved	0
	Home Agent Address	HA0 (Link0, global)

4. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address	Type	3
	Address	NUTX (LinkX, global)

5. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update.

Then, check whether this packet fills all of the following.

- The destination address is set to HA address of Home Agent Address Discovery Reply[3].

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.4.1

6.8.2.3 MN-5-1-2-1-021 - Receiving HAAD-Reply (Invalid ICMP Header Reserved)

[PURPOSE]

MN-5-1-2-1-021 - Receiving HAAD-Reply (Invalid ICMP Header Reserved)

[CATEGORY]

HOST : ADVANCED FUNCTION (DHAAD)

[REQUIREMENT OF TEST]

Function of Dynamic Home Agent Address Discovery: YES

[TOPOLOGY]

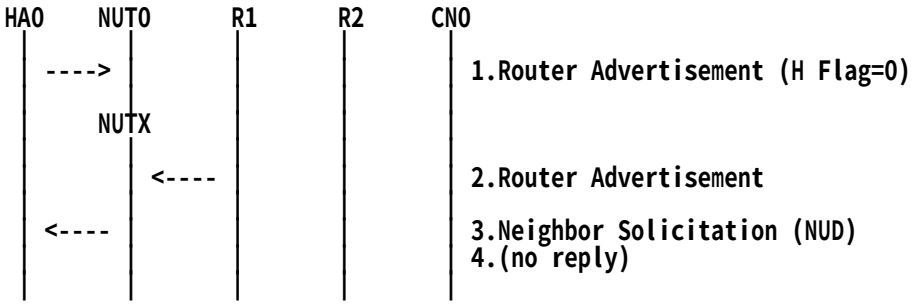
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

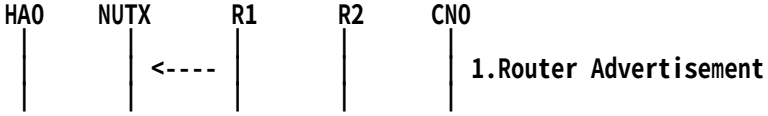
[INITIALIZATION]

- In the case of Real Home Link



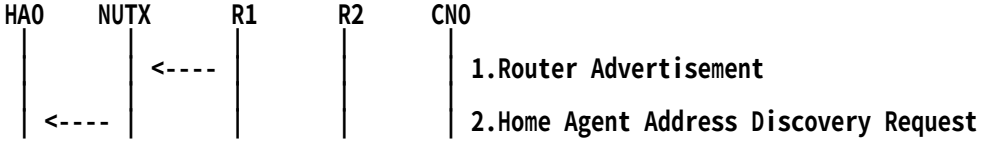
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.1)
   # The Home Agent (H) bit is clear.
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

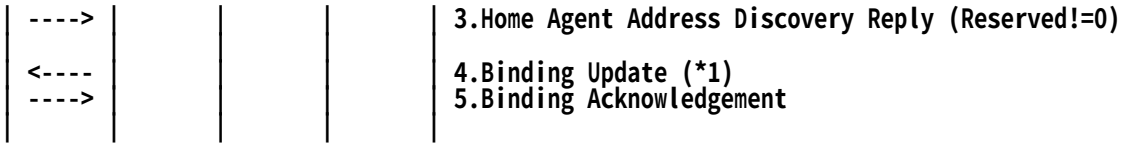
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Home Agent Address Discovery Request. (NUTX -> NUT0_ha_any) (Refer to 5.17.1)
3. Send Home Agent Address Discovery Reply. (HA0 -> NUTX) (Refer to 5.18.1)
   # The Home Agent Addresses field contains global IP address for HA0.
   # The Reserved field is not set to 0.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
ICMPv6 Header	Type	145
	Code	0
	Identifier	Any (= HAAD[2])
	Reserved	Any (!= 0)
	Home Agent Address	HA0 (Link0, global)

4. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

5. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update.

Then, check whether this packet fills all of the following.

- The destination address is set to HA address of Home Agent Address Discovery Reply[3].

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 6.6, 11.4.1

6.8.2.4 MN-5-1-2-1-026 - Receiving HAAD-Reply from the 1st HA of HAAD-Reply (1st=HA0 & 2nd = HA1)

[PURPOSE]

MN-5-1-2-1-026 - Receiving HAAD-Reply from the 1st HA of HAAD-Reply (1st=HA0 & 2nd = HA1)

[CATEGORY]

HOST : ADVANCED FUNCTION (DHAAD)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

Function of Dynamic Home Agent Address Discovery: YES

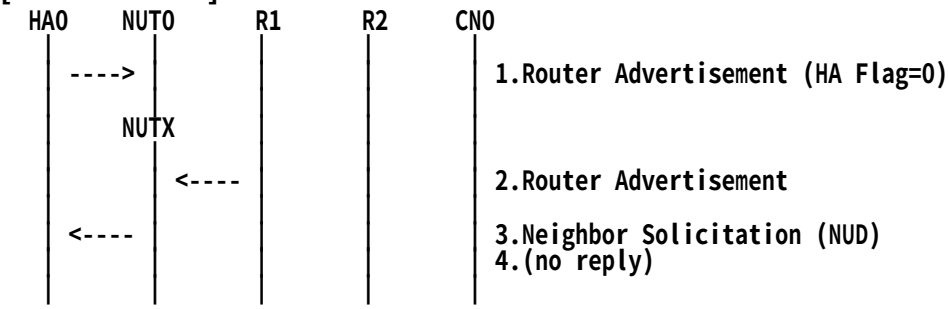
[TOPOLOGY]

Refer to 2.1.1.3 Common Topology-3

[TEST SETUP]

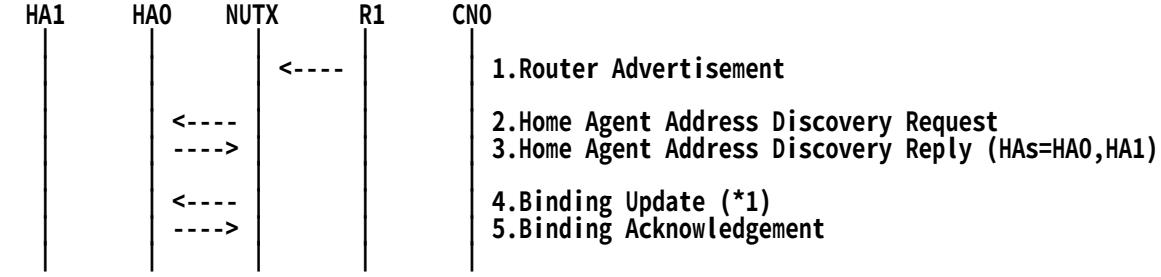
Refer to 3.1 Common Setup-1

[INITIALIZATION]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.1)
   # The Home Agent (H) bit is clear.
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Home Agent Address Discovery Request. (NUTX -> NUT0_ha_any) (Refer to 5.17.1)
3. Send Home Agent Address Discovery Reply. (HA0 -> NUTX) (Refer to 5.18.1)
   # The Home Agent Addresses field contains global IP address for HA0.
   # The Home Agent Addresses field contains global IP address for HA1.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
ICMPv6 Header	Type	145
	Identifier	(= HAAD[2])
	Home Agent Address	HA0 (Link0, global)
	Home Agent Address	HA1 (Link0, global)

4. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

5. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update.

Then, check whether this packet fills all of the following.

- The destination address is set to HA0 address of Home Agent Address Discovery Reply[3].

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.4.1

6.8.2.5 MN-5-1-2-1-027 - Receiving HAAD-Reply from the 2nd HA of HAAD-Reply (1st=HA1 & 2nd = HA0)

[PURPOSE]

MN-5-1-2-1-027 - Receiving HAAD-Reply from the 2nd HA of HAAD-Reply (1st=HA1 & 2nd = HA0)

[CATEGORY]

HOST : ADVANCED FUNCTION (DHAAD)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

Function of Dynamic Home Agent Address Discovery: YES

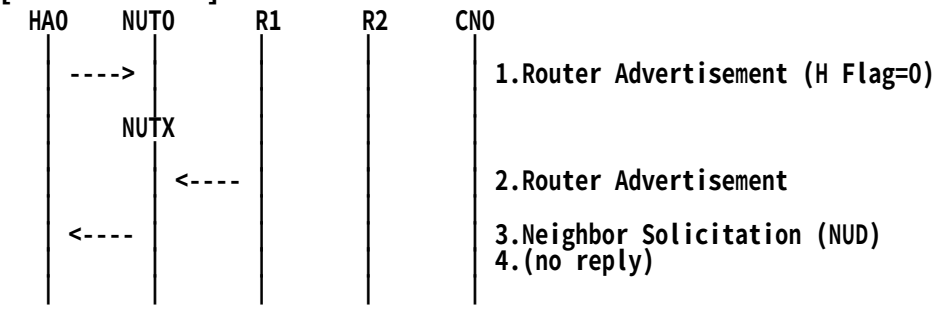
[TOPOLOGY]

Refer to 2.1.1.3 Common Topology-3

[TEST SETUP]

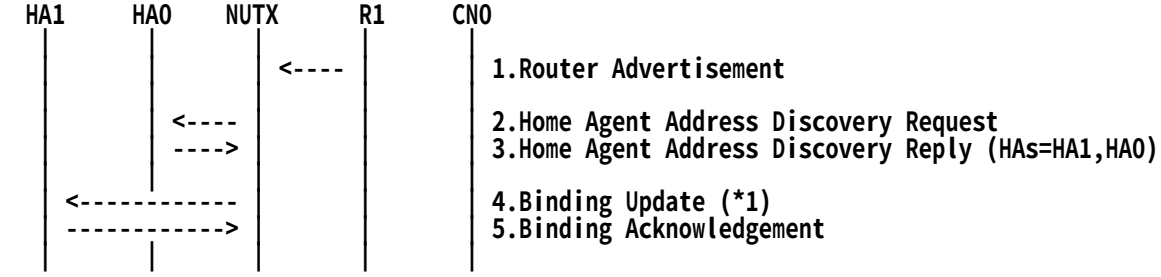
Refer to 3.1 Common Setup-1

[INITIALIZATION]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.1)
   # The Home Agent (H) bit is clear.
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Home Agent Address Discovery Request. (NUTX -> NUT0_ha_any) (Refer to 5.17.1)
3. Send Home Agent Address Discovery Reply. (HA0 -> NUTX) (Refer to 5.18.1)
   # The Home Agent Addresses field contains global IP address for HA1.
   # The Home Agent Addresses field contains global IP address for HA0.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
ICMPv6 Header	Type	145
	Identifier	(= HAAD[2])
	Home Agent Address	HA1 (Link0, global)
	Home Agent Address	HA0 (Link0, global)

4. Receive Binding Update. (NUTX -> HA1) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA1 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI (for HA1)
Mobility Header	MH Type	5
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

5. Send Binding Acknowledgement. (HA1 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA1 receives Binding Update.
Then, check whether this packet fills all of the following.
- The destination address is set to HA1 address of Home Agent Address Discovery Reply[3].

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.4.1

6.8.2.6 MN-5-1-2-1-028 - Trying instead the next home agent returned during dynamic home agent address discovery

[PURPOSE]

MN-5-1-2-1-028 - Trying instead the next home agent returned during dynamic home agent address discovery

[CATEGORY]

HOST : ADVANCED FUNCTION (DHAAD)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

Function of Dynamic Home Agent Address Discovery: YES

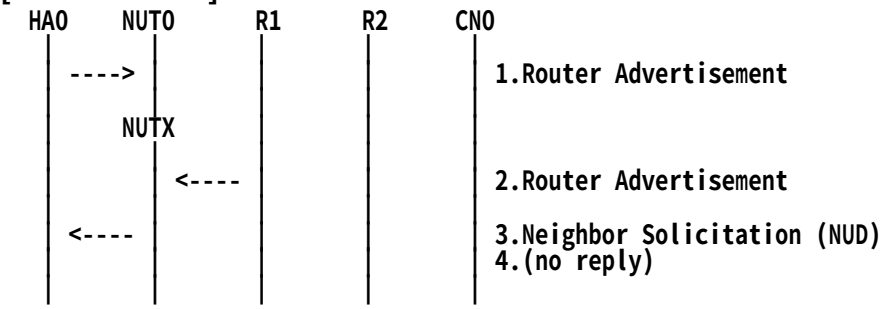
[TOPOLOGY]

Refer to 2.1.1.3 Common Topology-3

[TEST SETUP]

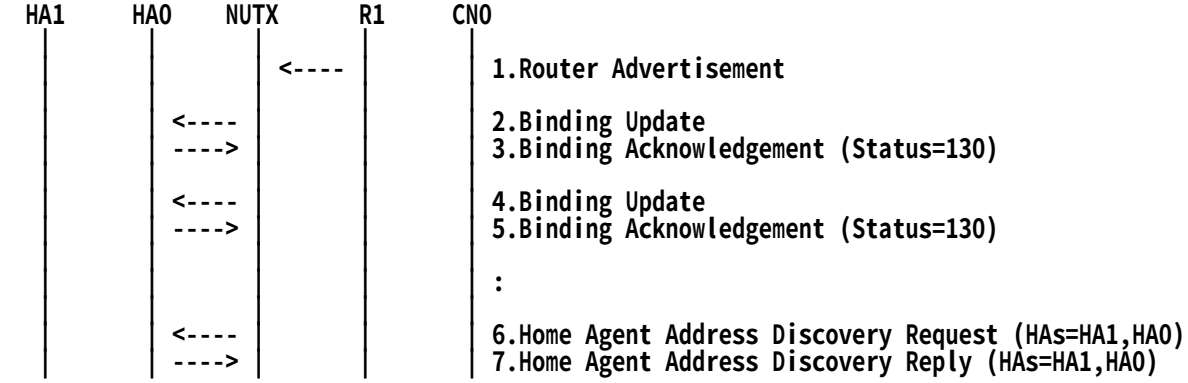
Refer to 3.1 Common Setup-1

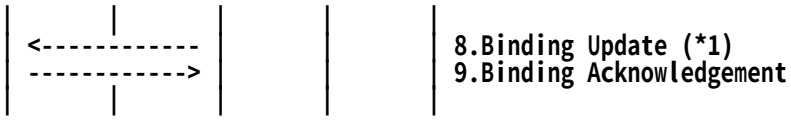
[INITIALIZATION]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Status field is set to 130 (Insufficient resources).
4. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
5. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Status field is set to 130 (Insufficient resources).
6. Receive Home Agent Address Discovery Request. (NUTX -> NUT0_ha_any) (Refer to 5.17.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	(Link0, Home-Agents anycast address)
ICMPv6 Header	Type	144
	Identifier	Any

7. Send Home Agent Address Discovery Reply. (HA0 -> NUTX) (Refer to 5.18.1)
   # The Home Agent Addresses field contains global IP address for HA1.
   # The Home Agent Addresses field contains global IP address for HA0.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
ICMPv6 Header	Type	145
	Identifier	(= HAAD[2])
	Home Agent Address	HA1 (Link0, global)
	Home Agent Address	HA0 (Link0, global)

8. Receive Binding Update. (NUTX -> HA1) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA1 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1 SPI (for HA1)
Mobility Header	MH Type	5
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

9. Send Binding Acknowledgement. (HA1 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA1 receives Binding Update.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.4.1

6.8.2.7 MN-5-1-2-1-029 - Sending BU to the 2nd HA of HAAD-Reply (1st=HA0 (failed in binding) & 2nd = HA1)

[PURPOSE]

MN-5-1-2-1-029 - Sending BU to the 2nd HA of HAAD-Reply(1st=HA0(failed in binding) & 2nd = HA1)

[CATEGORY]

HOST : ADVANCED FUNCTION (DHAAD)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

Function of Dynamic Home Agent Address Discovery: YES

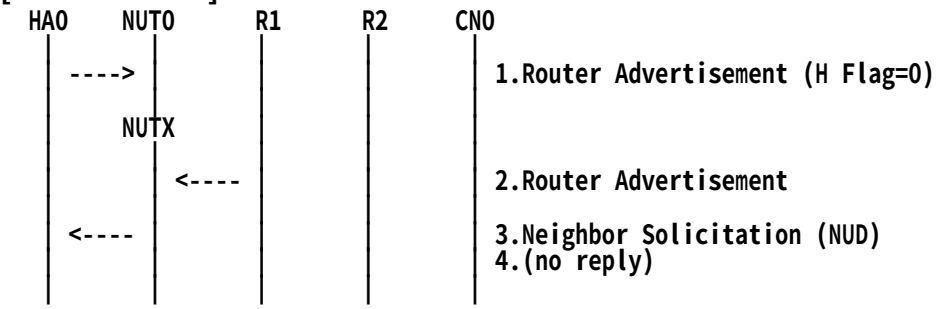
[TOPOLOGY]

Refer to 2.1.1.3 Common Topology-3

[TEST SETUP]

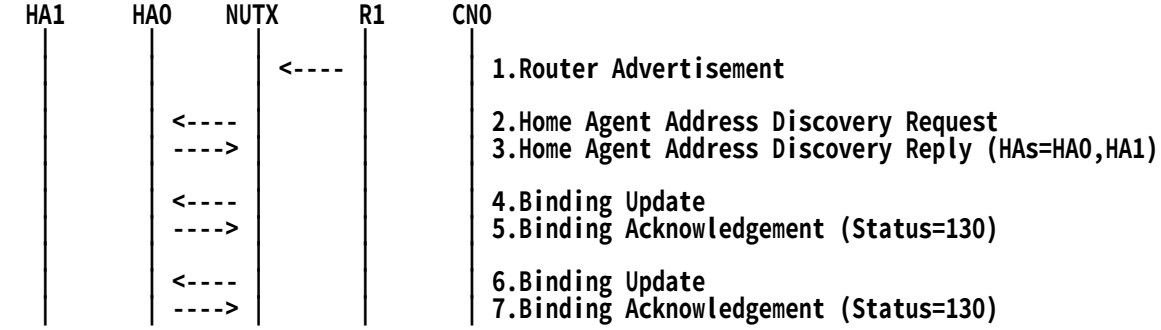
Refer to 3.1 Common Setup-1

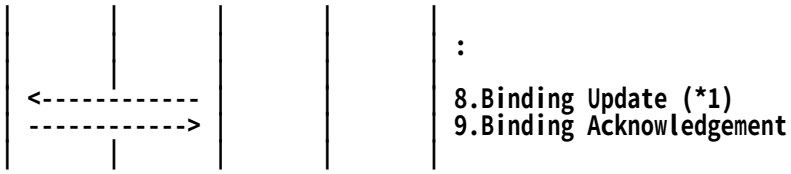
[INITIALIZATION]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.1)
   # The Home Agent (H) bit is clear.
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

[PROCEDURE]





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Home Agent Address Discovery Request. (NUTX -> NUT0_ha_any) (Refer to 5.17.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	(Link0, Home-Agents anycast address)
ICMPv6 Header	Type	144
	Identifier	Any

3. Send Home Agent Address Discovery Reply. (HA0 -> NUTX) (Refer to 5.18.1)
   # The Home Agent Addresses field contains global IP address for HA0.
   # The Home Agent Addresses field contains global IP address for HA1.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
ICMPv6 Header	Type	145
	Identifier	(= HAAD[2])
	Home Agent Address	HA0 (Link0, global)
	Home Agent Address	HA1 (Link0, global)

4. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
5. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Status field is set to 130 (Insufficient resources).
6. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
7. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Status field is set to 130 (Insufficient resources).
8. Receive Binding Update. (NUTX -> HA1) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA1 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI (for HA1)
Mobility Header	MH Type	5
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

9. Send Binding Acknowledgement. (HA1 -> NUTX) (Refer to 5.15.1)

[JUDGMENT]

(*1) PASS: HA1 receives Binding Update.

Then, check whether this packet fills all of the following.

- InitialBindackTimeoutFirstReg seconds pass before sending a Binding Update to the next home agent.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.4.1, 11.7.1

6.9 Mobile Prefix Discovery

6.9.1 Sending MPS

6.9.1.1 MN-4-1-1-1-001 - Sending MPS (before the HoA becomes invalid)

[PURPOSE]

MN-4-1-1-1-001 - Sending MPS (before the HoA becomes invalid)

[CATEGORY]

HOST : ADVANCED FUNCTION (MPD)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

Function of Mobile Prefix Discovery: YES

[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

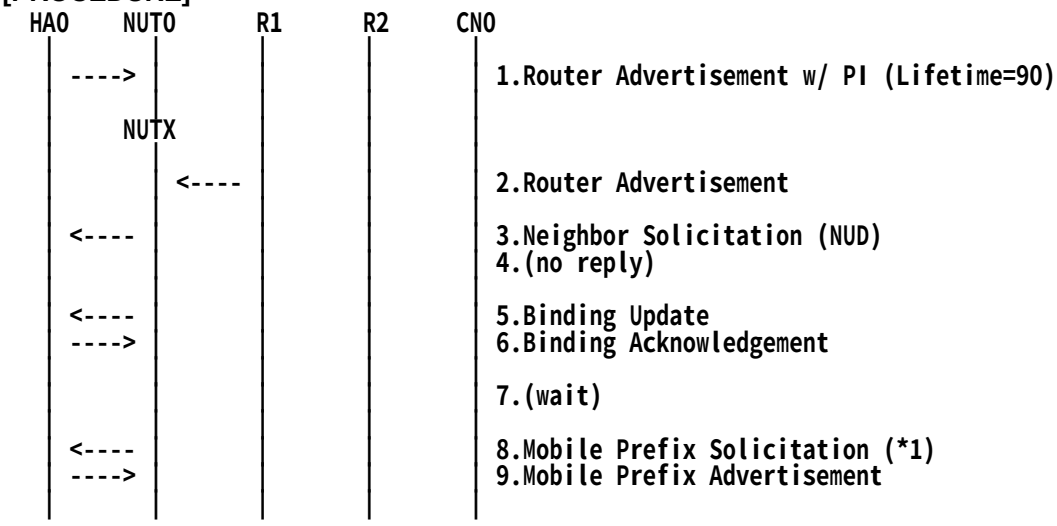
[TEST SETUP]

Refer to 3.1 Common Setup-1

[INITIALIZATION]

NONE

[PROCEDURE]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
   # The Prefix Information option is included, and,
   # - The Preferred Lifetime field is set to 90 seconds.
   # - The Valid Lifetime field is set to 90 seconds.

2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
5. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
7. (wait)
   # Wait during a maximum of the remaining valid lifetime of the Home Address.
8. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option) (*1) (Refer to 5.19.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address of Mobile Node	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	146
	Code	0
	Identifier	Any
	Reserved	0

9. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.20.1)

[JUDGMENT]

(*1) PASS: HA0 receives Mobile Prefix Solicitation,
Then, check whether this packet fills all of the following,
- The lifetime of the Home Address does not expire.
- The Source Address is set to Care-of Address.
- The Destination Address is set to HA address.
- The Reserved field is cleared.
- The Home Address destination option is included, and,
- This option is placed as the right location.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.4.2, 6.7

RFC2462 IPv6 Stateless Address Autoconfiguration
See Section 5.5.3

RFC3776 Using IPsec to Protect Mobile IPv6 Signaling Between Mobile Nodes and Home Agents
See Section 4.1, 4.2, 4.3, 4.4

6.9.1.2 MN-4-1-1-1-002 - Sending MPS (after receiving unsolicited MPA)

[PURPOSE]

MN-4-1-1-1-002 - Sending MPS (after receiving unsolicited MPA)

[CATEGORY]

HOST : ADVANCED FUNCTION (MPD)

[REQUIREMENT OF TEST]

Function of Mobile Prefix Discovery: YES

[TOPOLOGY]

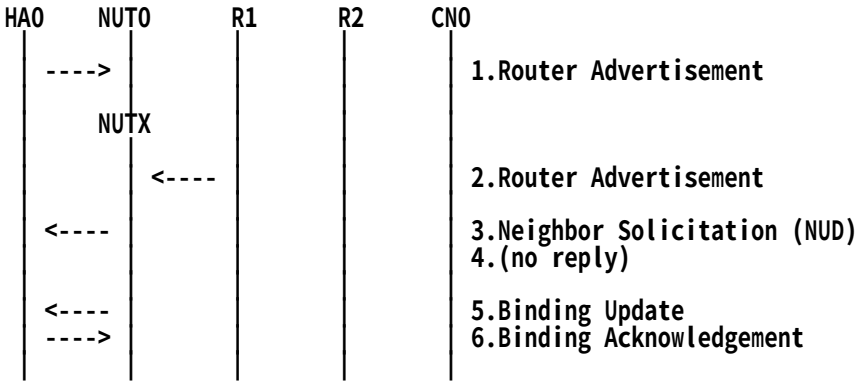
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

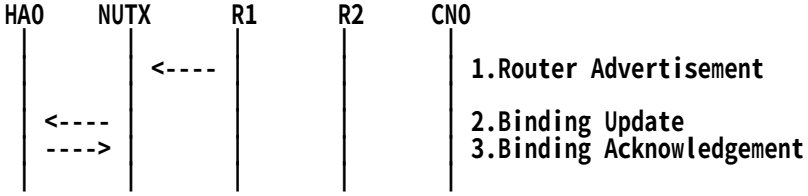
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

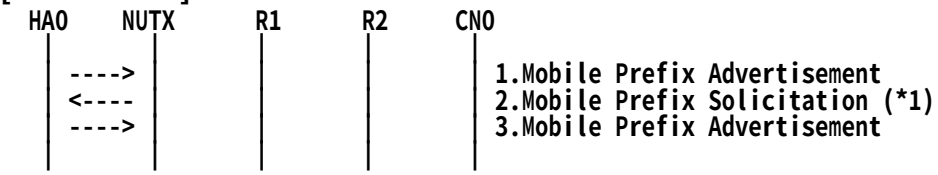
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send unsolicited Mobile Prefix Advertisement.
   (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.20.1)
   # The Identifier field is set to the random value.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6 Header	Type	147
	Code	0
	Identifier	Any
Prefix Information Option	Type	3
	Valid Lifetime	Any
	Preferred Lifetime	Any

2. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option) (*1)
   (Refer to 5.19.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address of Mobile Node	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	146
	Code	0
	Identifier	Any
	Reserved	0

3. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
   (Refer to 5.20.1)

[JUDGMENT]

(*1) PASS: HA0 receives Mobile Prefix Solicitation.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.4.3

6.9.1.3 MN-4-1-1-1-004 - Retransmissions & Back off (Use INITIAL_SOLICIT_TIMER as the initial retransmission timer)

[PURPOSE]

MN-4-1-1-1-004 - Retransmissions & Back off (Use INITIAL_SOLICIT_TIMER as the initial retransmission timer)

[CATEGORY]

HOST : ADVANCED FUNCTION (MPD)

[REQUIREMENT OF TEST]

Function of Mobile Prefix Discovery: YES

NUT re-transmits MPS for valuable MPA: YES/NO

[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

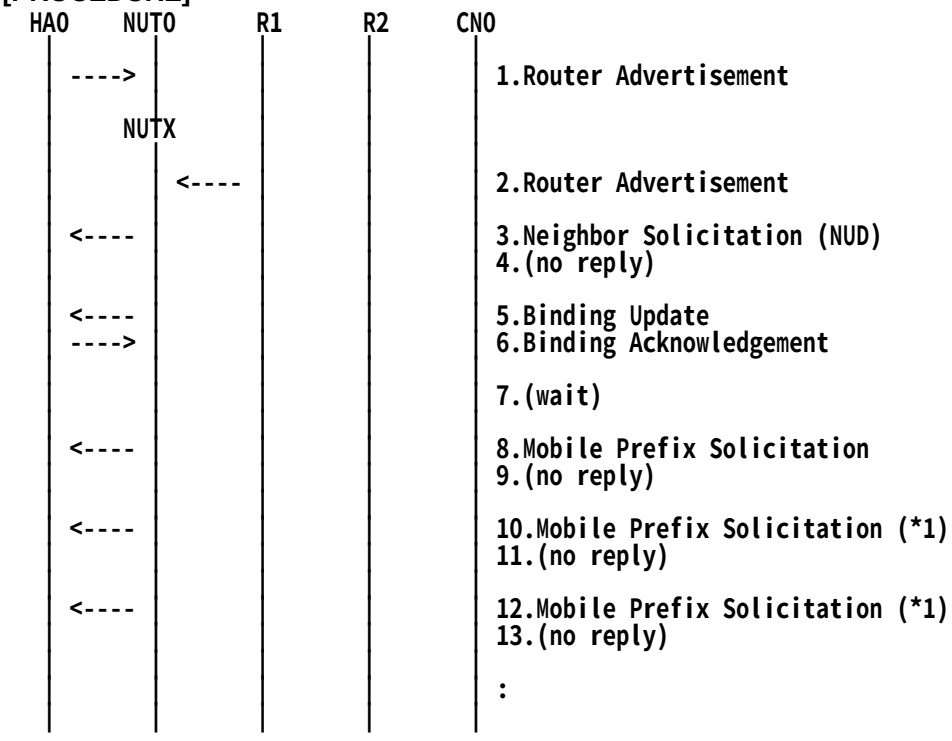
[TEST SETUP]

Refer to 3.1 Common Setup-1

[INITIALIZATION]

NONE

[PROCEDURE]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)

The Prefix Information option is included, and,
- The Preferred Lifetime field is set to 90 seconds.
- The Valid Lifetime field is set to 90 seconds.

2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
5. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
7. (wait)
   # Wait during a maximum of the remaining valid lifetime of the Home Address.
8. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option)
   (Refer to 5.19.1)
9. (no reply)
   # Wait during a maximum of the remaining valid lifetime of the Home Address.
10. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option) (*1)
    (Refer to 5.19.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address of Mobile Node	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	146
	Identifier	Any (newly generated)

11. (no reply)
    # Wait during a maximum of the remaining valid lifetime of the Home Address.
12. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option) (*1)
    (Refer to 5.19.1)
13. (no reply)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits MPS for valuable MPA: YES
  (*1) PASS: HA0 receives the retransmitted Mobile Prefix Solicitation.
  Then, check whether this packet fills all of the following,
  - The initial retransmission timer is set to INITIAL_SOLICIT_TIMER.
  - Timeout period is doubled upon each retransmission.

- NUT re-transmits MPS for valuable MPA: NO
  (*1) PASS: HA0 does not receives the retransmitted Mobile Prefix Solicitation.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.8, 12

RFC2462 IPv6 Stateless Address Autoconfiguration
See Section 5.5.3

6.9.2 Receiving MPA

6.9.2.1 MN-4-2-1-1-001 - Receiving solicited MPA

[PURPOSE]

MN-4-2-1-1-001 - Receiving solicited MPA

[CATEGORY]

HOST : ADVANCED FUNCTION (MPD)

[REQUIREMENT OF TEST]

Function of Mobile Prefix Discovery: YES

[TOPOLOGY]

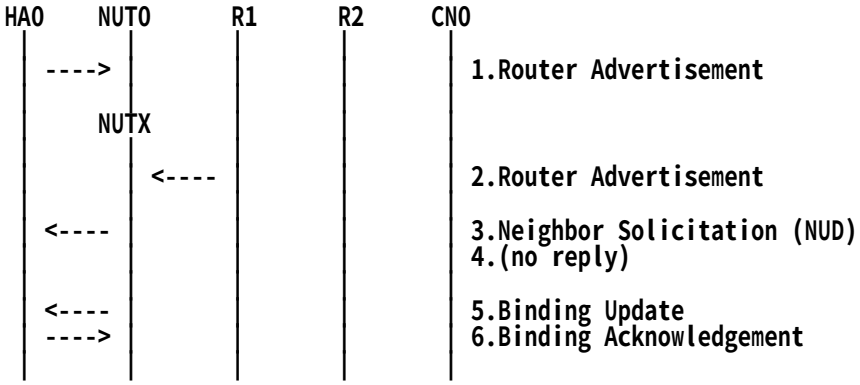
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

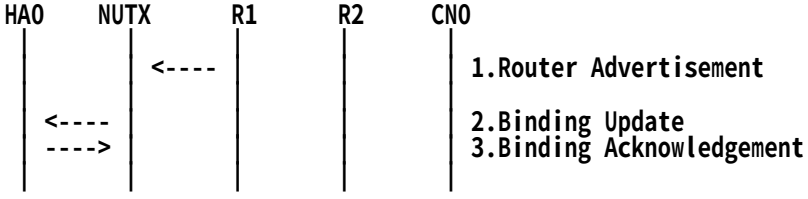
[INITIALIZATION]

- In the case of Real Home Link



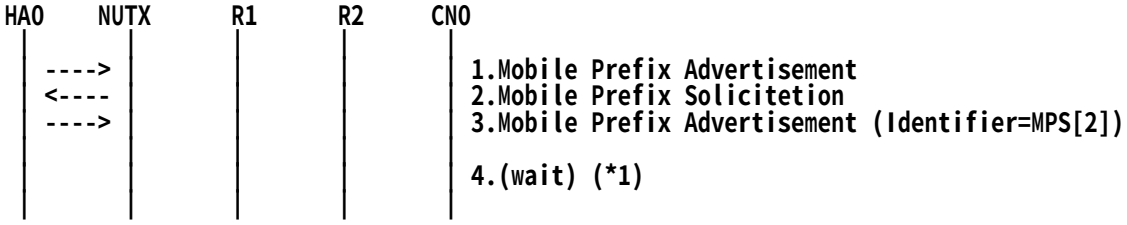
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send unsolicited Mobile Prefix Advertisement.
   (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.20.1)
   # The Identifier field is set to the random value.
2. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option)
   (Refer to 5.19.1)
3. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
   (Refer to 5.20.1)
   # The Source Address is set to HA address.
   # The Destination Address matches Source Address in the Mobile Prefix Solicitation.
   # The Type2 Routing Header is included.
   # The Identifier field matches the Identifier field in the Mobile Prefix Solicitation.
   # The Prefix Information option is included, and,
   # - The Router Address(R) flag is set to ON.
   # - The Valid Lifetime is not changed.
   # - The Preferred Lifetime is not changed.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6 Header	Type	147
	Code	0
	Identifier	(= MPS[2])
Prefix Information Option	Type	3
	R flag	1
	Valid life time	Not changed
	Preferred lifetime	Not changed
	Prefix	HA0 (Link0, global)

4. (wait) (*1)
   # Wait during enough retransmission timer.

[JUDGMENT]

(*1) PASS: HA0 receives Mobile Prefix Solicitation.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.4.3, 6.8

RFC3776 Using IPsec to Protect Mobile IPv6 Signaling Between Mobile Nodes and Home Agents
See Section 4.1, 4.2, 4.3, 4.4

6.9.2.2 MN-4-2-1-1-015 - Receiving solicited MPA (Invalid ICMP Header Reserved)

[PURPOSE]

MN-4-2-1-1-015 - Receiving solicited MPA (Invalid ICMP Header Reserved)

[CATEGORY]

HOST : ADVANCED FUNCTION (MPD)

[REQUIREMENT OF TEST]

Function of Mobile Prefix Discovery: YES

[TOPOLOGY]

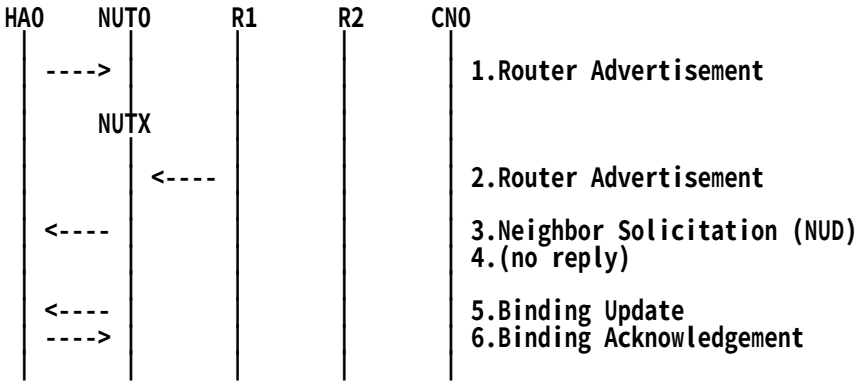
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

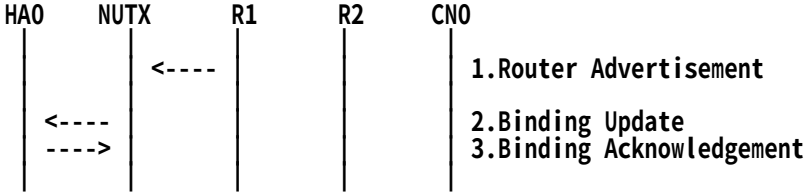
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

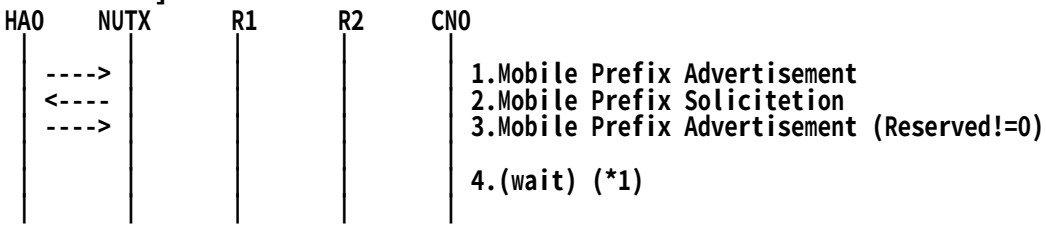
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send unsolicited Mobile Prefix Advertisement.
   (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.20.1)
   # The Identifier field is set to the random value.
2. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option)
   (Refer to 5.19.1)
3. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
   (Refer to 5.20.1)
   # The Source Address is set to HA address.
   # The Destination Address matches Source Address in the Mobile Prefix Solicitation.
   # The Type2 Routing Header is included.
   # The Identifier field matches the Identifier field in the Mobile Prefix Solicitation.
   # The Reserved field is not set to 0.
   # The Prefix Information option is included, and,
   # - The Router Address(R) flag is set to ON.
   # - The Valid Lifetime is not changed.
   # - The Preferred Lifetime is not changed.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6 Header	Type	147
	Code	0
	Identifier	(= MPS[2])
	Reserved	Any (!= 0)
Prefix Information option	Type	3
	R flag	1
	Valid life time	Not changed
	Preferred lifetime	Not changed
	Prefix	HA0 (Link0, globa)

4. (wait) (*1)
   # Wait during enough retransmission timer.

[JUDGMENT]

(*1) PASS: HA0 does not receive the retransmitted Mobile Prefix Solicitation.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 6.8, 11.4.3

6.9.2.3 MN-4-2-1-1-004 - Valid solicited MPA (the change of Valid and Preferred Lifetime)

[PURPOSE]

MN-4-2-1-1-004 - Valid solicited MPA (the change of Valid and Preferred Lifetime)

[CATEGORY]

HOST : ADVANCED FUNCTION (MPD)

[REQUIREMENT OF TEST]

Function of Mobile Prefix Discovery: YES

[TOPOLOGY]

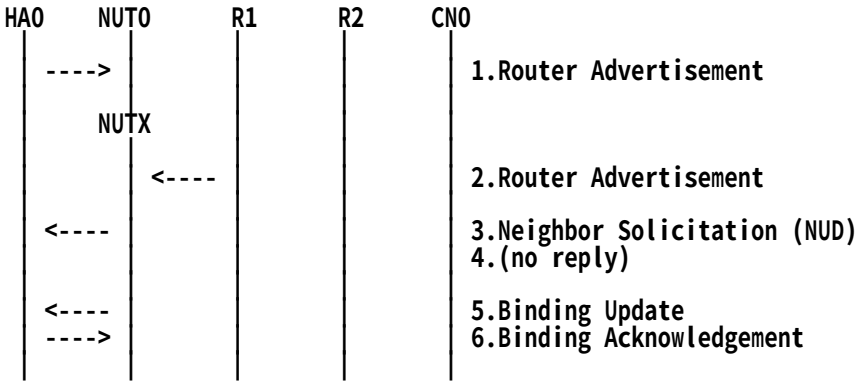
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

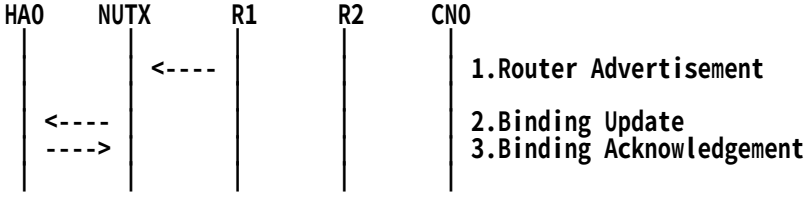
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

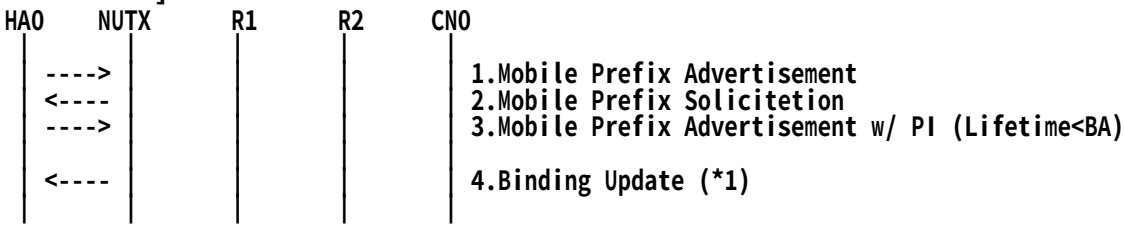
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send Mobile Prefix Advertisement.
   (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.20.1)
2. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option)
   (Refer to 5.19.1)
3. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
   (Refer to 5.20.1)
   # The Prefix Information option is included, and,
   # - The Valid Lifetime is set less than the remaining lifetime of the home registration.
   # - The Preferred Lifetime is set less than the remaining lifetime of the home registration.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6 Header	Type	147
	Identifier	(= MPS[2])
Prefix Information Option	Type	3
	Valid lifetime	Any (< Binding Lifetime)
	Preferred lifetime	Any (< Binding Lifetime)

4. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	H Flag	1
	Lifetime	Any (< MPA[3])
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update,
Then, check whether this packet fills all of the following,
- The Lifetime field is set less than Valid and Preferred Lifetime in the solicited Mobile Prefix Advertisement [3].

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.4.3, 11.4.2, 6.4, 6.4.1, 6.8, 7.2

6.9.2.4 MN-4-2-1-1-012 - Receiving solicited MPA from unknown HA

[PURPOSE]

MN-4-2-1-1-012 - Receiving solicited MPA from unknown HA

[CATEGORY]

HOST : ADVANCED FUNCTION (MPD)

[REQUIREMENT OF TEST]

Function of Mobile Prefix Discovery: YES

NUT re-transmits MPS for valuable MPA: YES/NO

[TOPOLOGY]

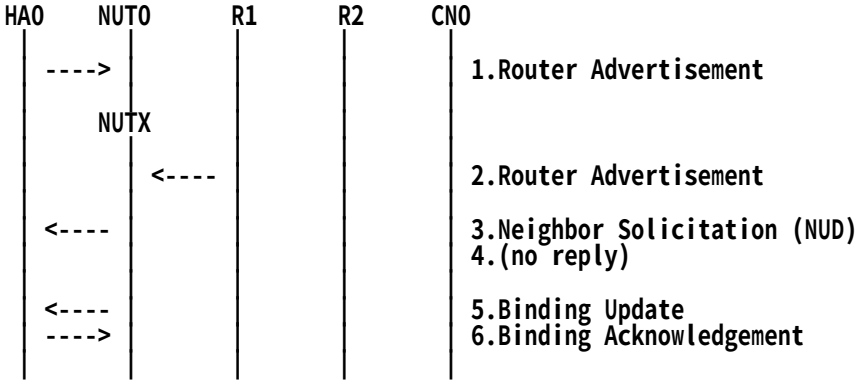
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

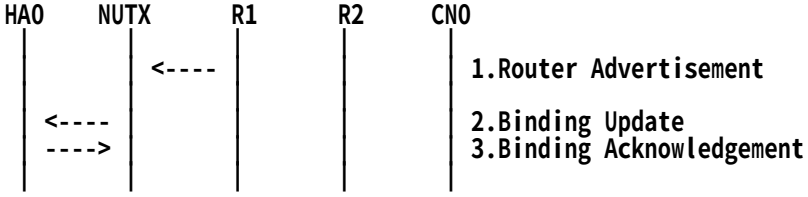
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

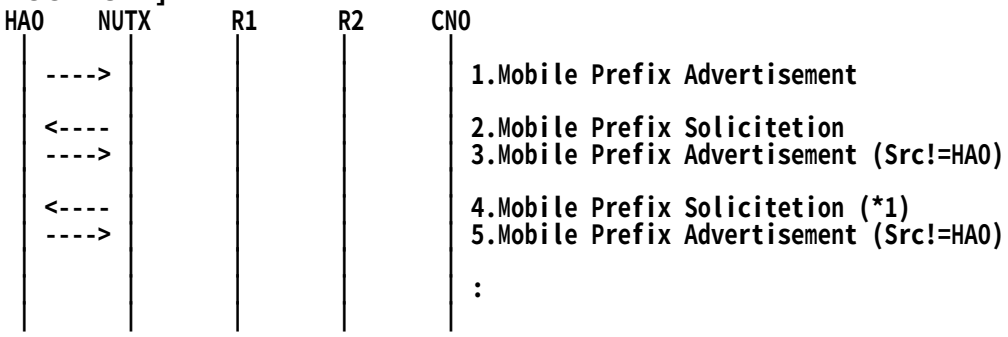
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send unsolicited Mobile Prefix Advertisement.
   (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.20.1)
   # The Identifier field is set to the random value.
2. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option)
   (Refer to 5.19.1)
3. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
   (Refer to 5.20.1)
   # The Source Address is not set to HA0 address.

IPv6 Header	Source Address	Invalid address (HA1)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI (for HA1)
ICMPv6 Header	Type	147
	Identifier	(= MPS[2])
Prefix Information Option	Type	3

4. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option) (*1)
   (Refer to 5.19.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address of Mobile Node	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	146
	Identifier	Any (newly generated)

5. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
   (Refer to 5.20.1)
   # The Source Address is not set to HA address.

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits MPS for valuable MPA: YES
  (*1) PASS: HA0 receives the retransmitted Mobile Prefix Solicitation.

- NUT re-transmits MPS for valuable MPA: NO
  (*1) PASS: HA0 does not receives the retransmitted Mobile Prefix Solicitation.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.4.3

6.9.2.5 MN-4-2-1-1-013 - Invalid solicited MPA (no Type2 Routing Header)

[PURPOSE]

MN-4-2-1-1-013 - Invalid solicited MPA (no Type2 Routing Header)

[CATEGORY]

HOST : ADVANCED FUNCTION (MPD)

[REQUIREMENT OF TEST]

Function of Mobile Prefix Discovery: YES

NUT re-transmits MPS for valuable MPA: YES/NO

[TOPOLOGY]

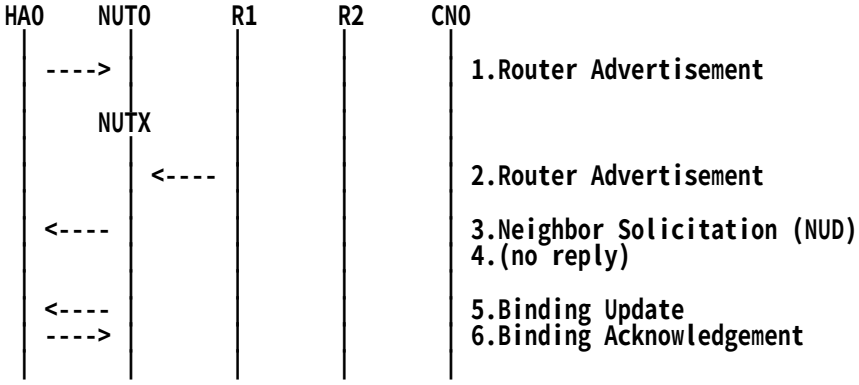
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

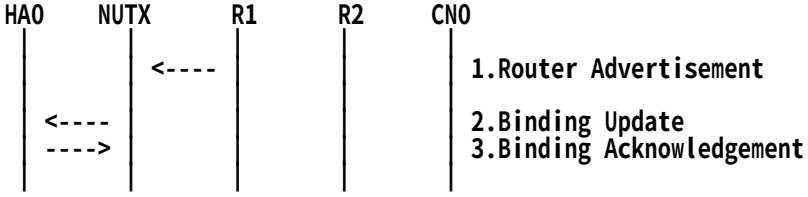
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

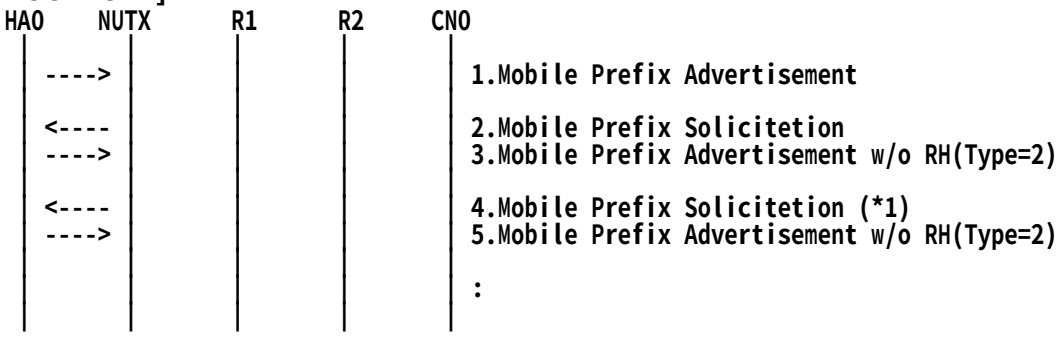
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send unsolicited Mobile Prefix Advertisement.
   (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.20.1)
   # The Identifier field is set to the random value.
2. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option)
   (Refer to 5.19.1)
3. Send Mobile Prefix Advertisement. (HA0 -> NUTX) (Refer to 5.20.1)
   # without Type2 Routing Header.

IPv6 Header	Source Address	HA0 (Link0 global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6 Header	Type	147
	Code	0
	Identifier	(= MPS[2])
Prefix Information Option	Type	3

4. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option) (*1)
   (Refer to 5.19.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address of Mobile Node	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	146
	Identifier	Any (newly generated)

5. Send Mobile Prefix Advertisement. (HA0 -> NUTX) (Refer to 5.20.1)
   # without Type2 Routing Header.

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits MPS for valuable MPA: YES
  (*1) PASS: HA0 receives the retransmitted Mobile Prefix Solicitation.

- NUT re-transmits MPS for valuable MPA: NO
  (*1) PASS: HA0 does not receives the retransmitted Mobile Prefix Solicitation.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.4.3

6.9.2.6 MN-4-2-1-1-014 - Invalid Identifier (MPS != MPA)

[PURPOSE]

MN-4-2-1-1-014 - Invalid Identifier (MPS != MPA)

[CATEGORY]

HOST : ADVANCED FUNCTION (MPD)

[REQUIREMENT OF TEST]

Function of Mobile Prefix Discovery: YES

NUT re-transmits MPS for valuable MPA: YES/NO

[TOPOLOGY]

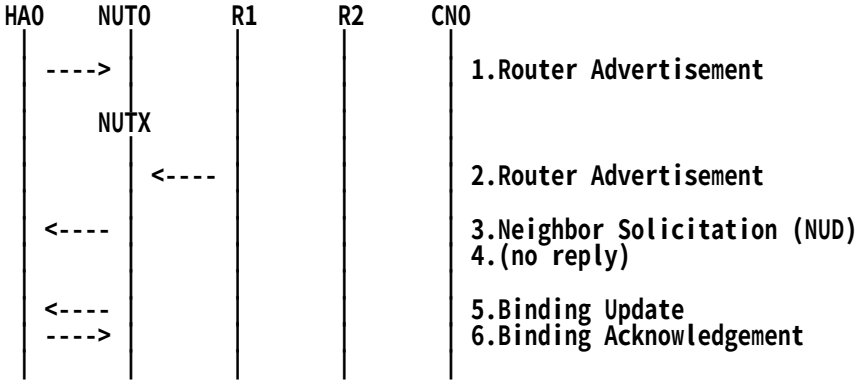
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

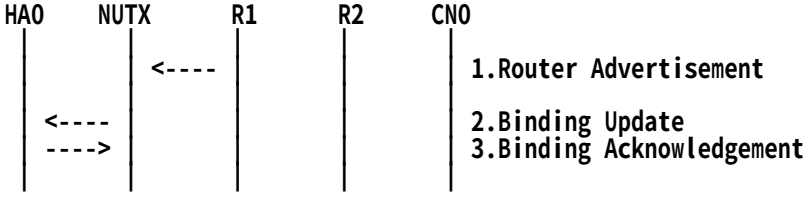
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

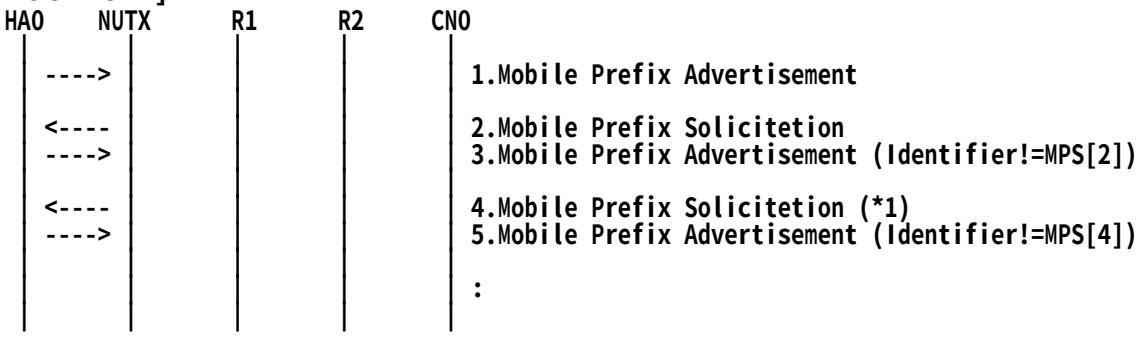
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send unsolicited Mobile Prefix Advertisement.
   (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.20.1)
   # The Identifier field is set to the random value.
2. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option)
   (Refer to 5.19.1)
3. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
   (Refer to 5.20.1)
   # The Identifier field does not match the Identifier field in the Mobile Prefix
   # Solicitation[2].

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6 Header	Type	147
	Identifier	Any (!= MPS[2])

4. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option) (*1)
   (Refer to 5.19.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address of Mobile Node	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5_SPI
ICMPv6 Header	Type	146
	Identifier	Any (newly generated)

5. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
   (Refer to 5.20.1)
   # The Identifier field does not match the Identifier field in the Mobile Prefix
   # Solicitation[2].

[JUDGMENT]

(*1) PASS: HA0 receives the Mobile Prefix Solicitation for unsolicited Mobile Prefix Advertisement.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.4.3

6.9.2.7 MN-4-2-1-1-019 - Unrecognized option (the option other than Prefix Information option)

[PURPOSE]

MN-4-2-1-1-019 - Unrecognized option (the option other than Prefix Information option)

[CATEGORY]

HOST : ADVANCED FUNCTION (MPD)

[REQUIREMENT OF TEST]

Function of Mobile Prefix Discovery: YES

[TOPOLOGY]

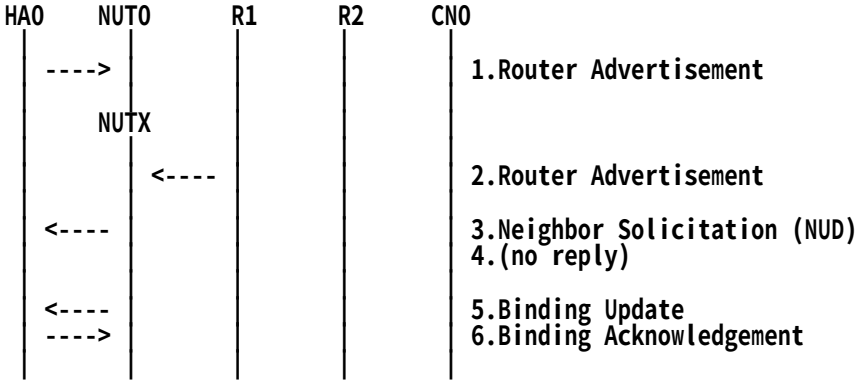
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

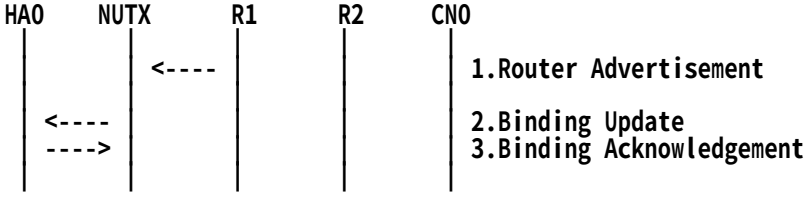
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

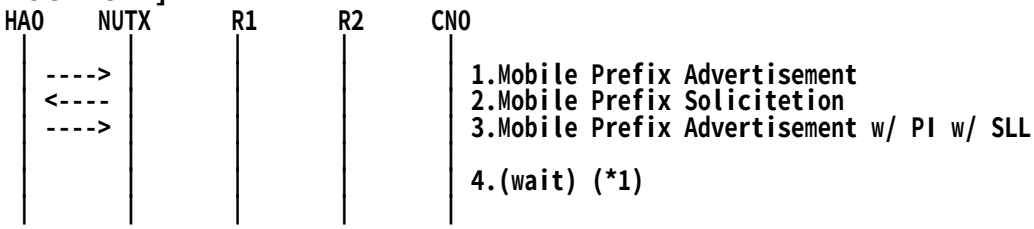
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send unsolicited Mobile Prefix Advertisement.
   (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.20.1)
   # The Identifier field is set to the random value.
2. Receive Mobile Prefix Solicitation. (NUTX -> HA0 with Home Address Option)
   (Refer to 5.19.1)
3. Send Mobile Prefix Advertisement. (HA0 -> NUTX with Type2 Routing Header)
   (Refer to 5.20.1)
   # The option other than Prefix Information option is included.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6 Header	Type	147
	Identifier	(= MPS[2])
Prefix Information Option	Type	3
Source Link Layer Option	Type	1

4. (wait) (*1)
   # Wait during enough retransmission timer.

[JUDGMENT]

(*1) PASS: HA0 does not receive the retransmitted Mobile Prefix Solicitation.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 6.8

6.10 Binding Error

6.10.1 Sending BE

6.10.1.1 MN-6-2-1-1-003 - Receiving invalid BA (invalid MH Type) from HA

[PURPOSE]

MN-6-2-1-1-003 - Receiving invalid BA (invalid MH Type) from HA

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

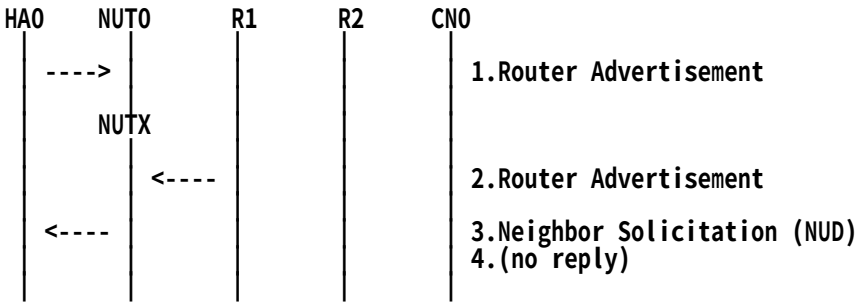
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

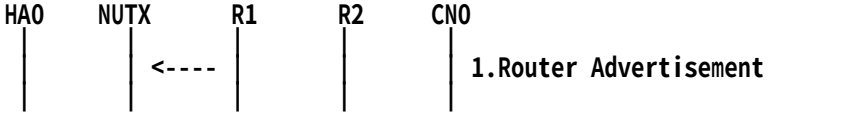
[INITIALIZATION]

- In the case of Real Home Link



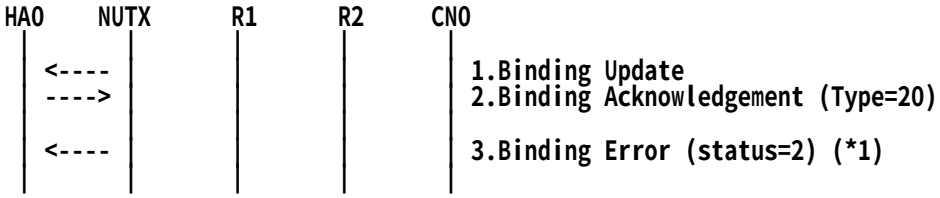
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]



1. Receive Binding Update. (NUTX -> HA0) (Refer to 5.2.1)
2. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.14.1)
   # The MH Type field in Mobility Header is set invalid value.
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA2_SPI
Mobility Header	MH Type	20 (!= 6,> 7)
	Staus	0

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Mobility Header	MH Type	20 (!= 6,> 7)
	Staus	0

3. Receive Binding Error. (NUTX -> HA0) (*1) (Refer to 5.15.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Mobility Header	MH Type	7
	Status	2
	Home Address	0::0 (Unspecified address)

[JUDGMENT]

(*1) PASS: HA0 receives Binding Error.

Then, check whether this packet fills all of the following.

- The Status field is set to 2 (unrecognized MH Type value).
- The Home Address field is set to the unspecified address.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.2, 9.2, 9.3.3

6.10.1.2 MN-4-2-1-2-010 - Receiving invalid HoT (invalid MH Type) from CN

[PURPOSE]

MN-4-2-1-2-010 - Receiving invalid HoT (invalid MH Type) from CN

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

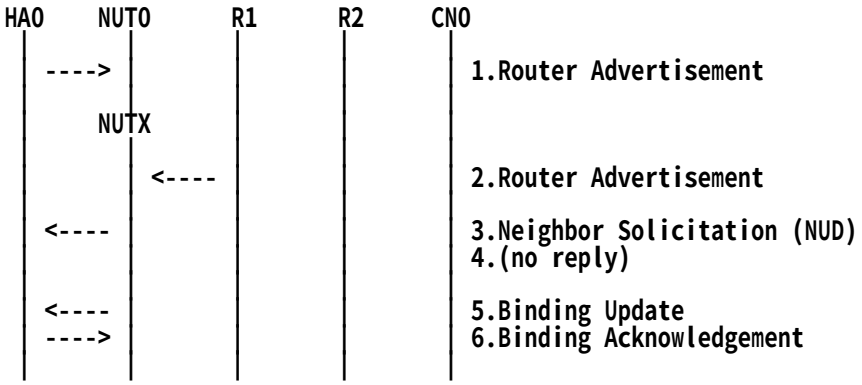
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

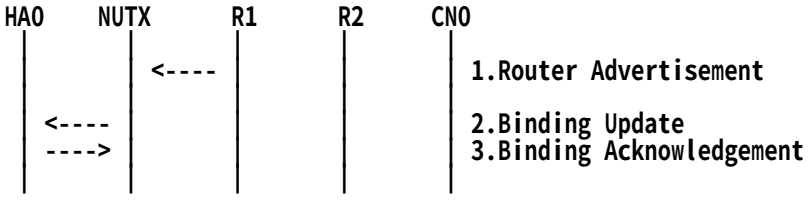
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

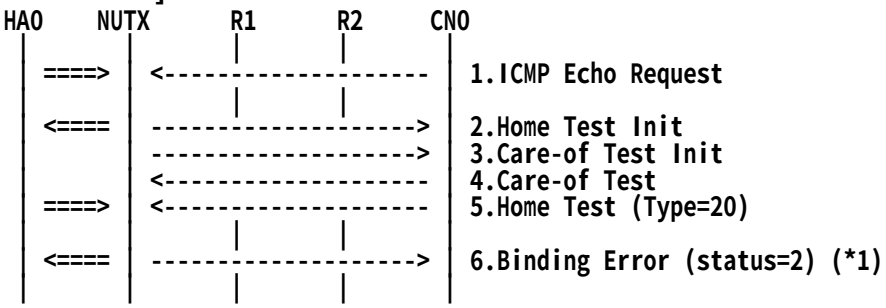
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
   # The MH Type field in Mobility Header is set invalid value (20).
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	20 (!= 3,> 7)

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	20 (!= 3,> 7)

6. Receive Binding Error. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.16.3)
   a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	7
	Status	2
	Home Address	0::0 (Unspecified address)

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	7
	Status	2
	Home Address	0::0 (Unspecified address)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Error by reverse tunneling.
Then, check whether this packet fills all of the following.
- The Status field set to 2 (unrecognized MH Type value).

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.2, 9.2, 9.3.3

6.10.1.3 MN-4-2-1-2-015 - Receiving invalid CoT (invalid MH Type) from CN

[PURPOSE]

MN-4-2-1-2-015 - Receiving invalid CoT (invalid MH Type) from CN

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

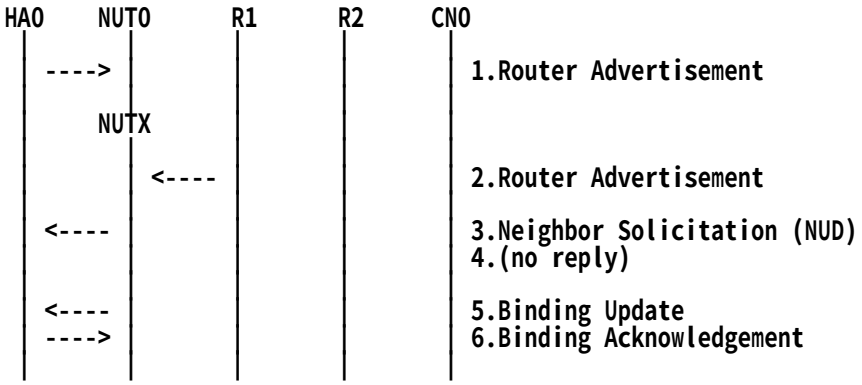
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

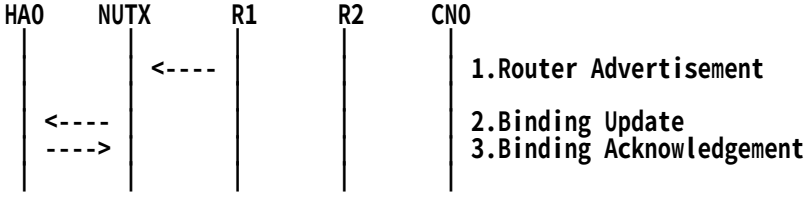
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

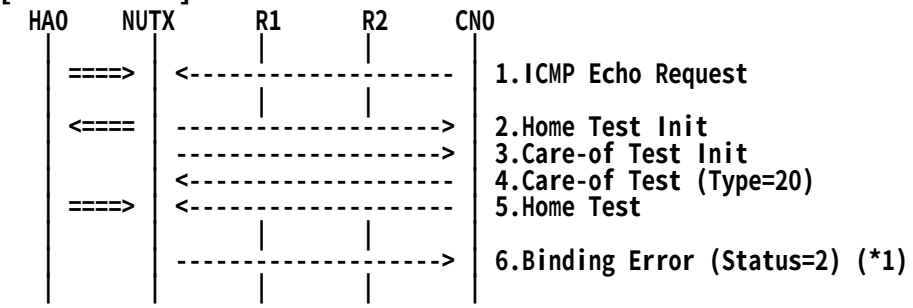
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
   # The MH Type field in Mobility Header is set invalid value (20).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	20 (!= 4,> 7)

5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive Binding Error. (NUTX -> CN0) (*1) (Refer to 5.16.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	7
	Status	2
	Home Address	0::0 (Unspecified address)

[JUDGMENT]

(*1) PASS: CN0 receives Binding Error.

Then, check whether this packet fills all of the following.

- The Status field set to 2 (unrecognized MH Type value).

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.2, 9.2, 9.3.3

6.10.2 Receiving BE

6.10.2.1 MN-3-3-1-2-004 - Receiving BE (Status = 1)

[PURPOSE]

MN-3-3-1-2-004 - Receiving BE (Status = 1)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

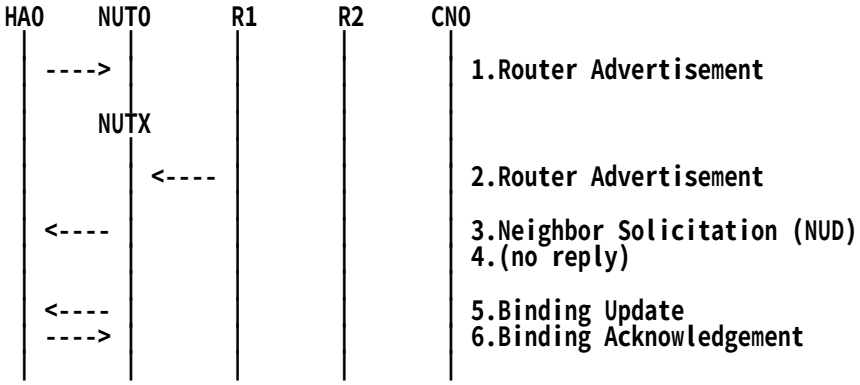
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

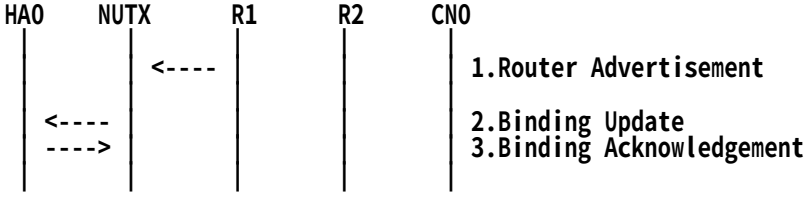
[INITIALIZATION]

- In the case of Real Home Link



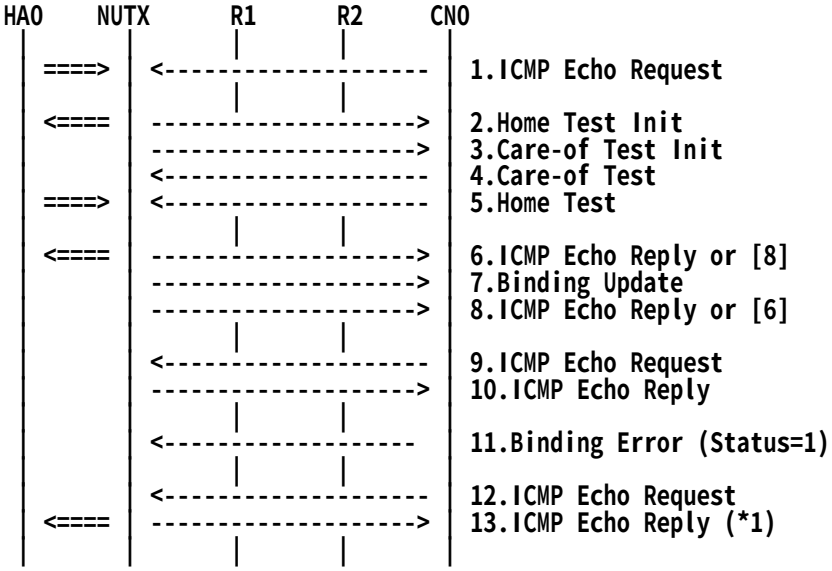
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
10. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
11. Send Binding Error. (CN0 -> NUTX) (Refer to 5.16.1)

The Status field is set to 1 (Unknown binding for Home Address destination option).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	7
	Status	1
	Home Address	NUT0 (Link0, global)

12. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

13. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply by reverse tunneling.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.3.6, 9.3.3

6.10.2.2 MN-3-3-1-2-009 - Receiving BE (Status = 2) after sending CoTI

[PURPOSE]

MN-3-3-1-2-009 - Receiving BE (Status = 2) after sending CoTI

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

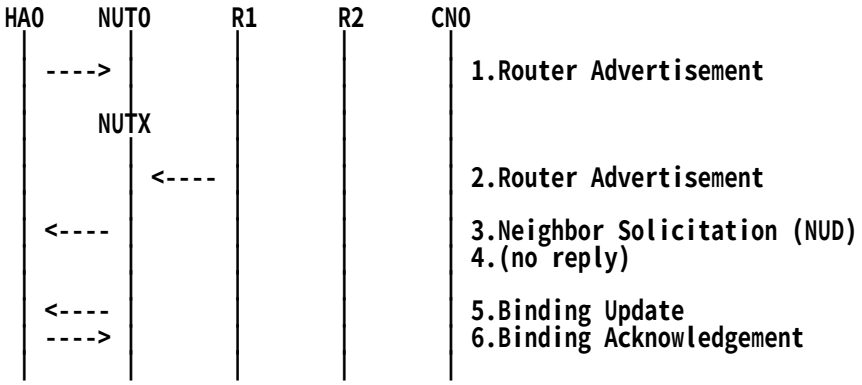
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

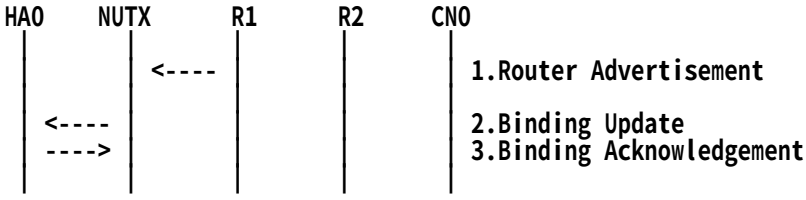
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

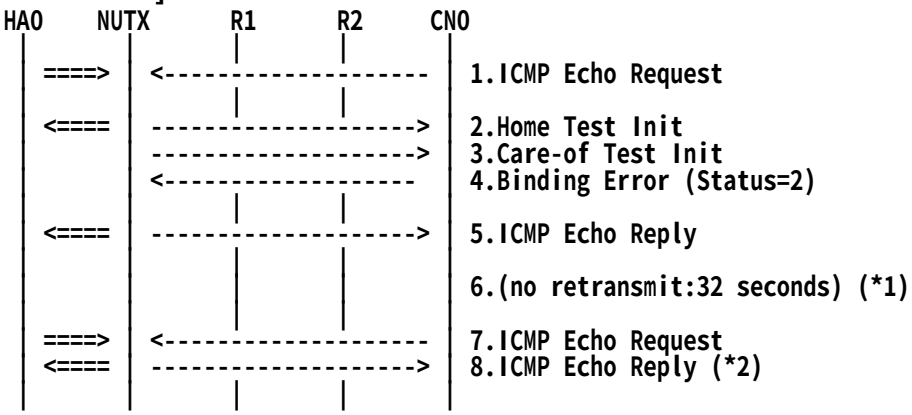
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Binding Error to NUTX. (CN0 -> NUTX) (Refer to 5.16.1)
   # The Status field is set to 2 (Unrecognized MH Type value).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	7
	Status	2
	Home Address	0::0 (Unspecified address)

5. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
6. (no retransmit)
   # Wait during 32(MAX_BINDACK_TIMEOUT) seconds. (*1)
7. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

8. Receive ICMP Echo Reply.(out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)
   # Wait during 32(MAX_BINDACK_TIMEOUT) seconds.

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: CN0 does not receive the retransmitted Care-of Test Init.

(*2) PASS: CN0 receives ICMP Echo Reply by reverse tunneling.

Then, check whether this packet fills all of the following.

- CN0 does not receive Home Test Init or Care-of Test Init within the retransmission timeout period.(MAX_BINDACK_TIMEOUT).

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.3.6

6.10.2.3 MN-3-3-1-2-011 - Receiving BE (Status = 2) after sending HoTI

[PURPOSE]

MN-3-3-1-2-011 - Receiving BE (Status = 2) after sending HoTI

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

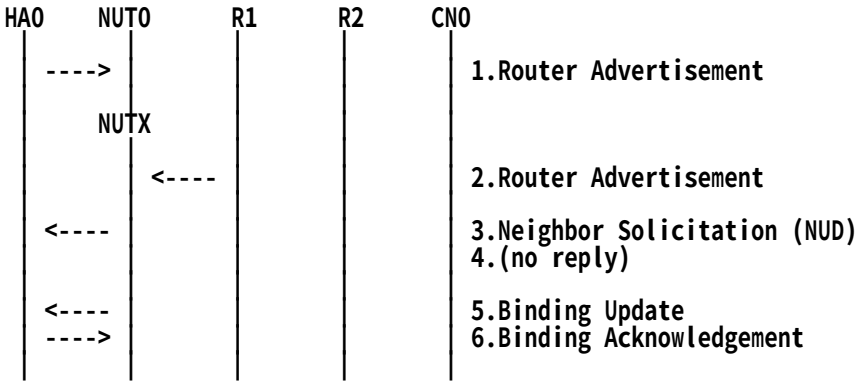
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

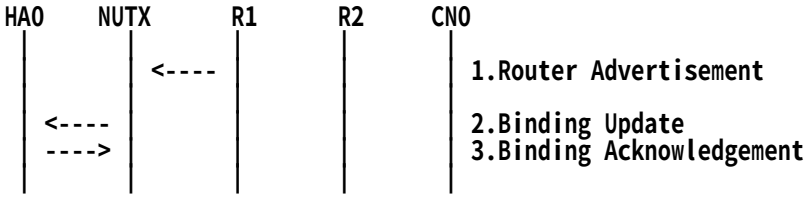
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

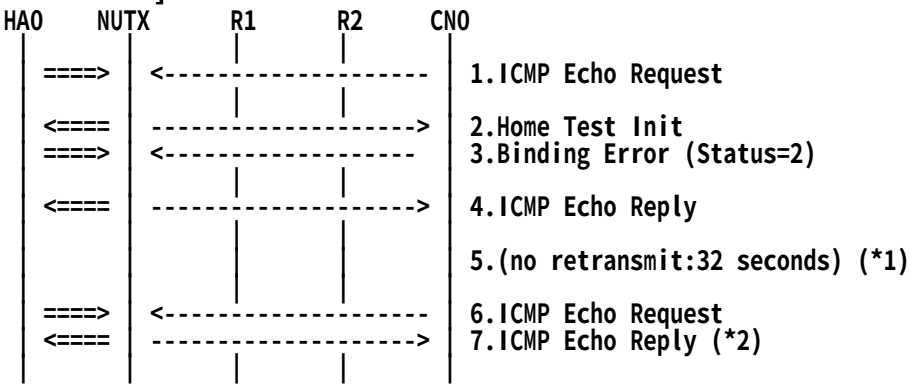
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Send Binding Error to NUTX. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.16.2)
   # The Status field is set to 2 (Unrecognized MH Type value).
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	7
	Status	2
	Home Address	0::0 (Unspecified address)

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	7
	Status	2
	Home Address	0::0 (Unspecified address)

4. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
5. (no retransmit)
   # Wait during 32(MAX_BINDACK_TIMEOUT) seconds. (*1)
6. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

7. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)
   # Wait during 32(MAX_BINDACK_TIMEOUT) seconds.

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: CN0 does not receive the retransmitted Home Test Init.

(*2) PASS: CN0 receives ICMP Echo Reply by reverse tunneling.
Then, check whether this packet fills all of the following.

- CN0 does not receive Home Test Init or Care-of Test Init within the retransmission timeout period.(MAX_BINDACK_TIMEOUT).

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.3.6

6.10.2.4 MN-3-3-1-2-001 - Receiving BE (Status = 2) after sending BU (A = ON)

[PURPOSE]

MN-3-3-1-2-001 - Receiving BE (Status = 2) after sending BU(A = ON)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT sets (A) bit in BU which is transmitted to CN: YES

[TOPOLOGY]

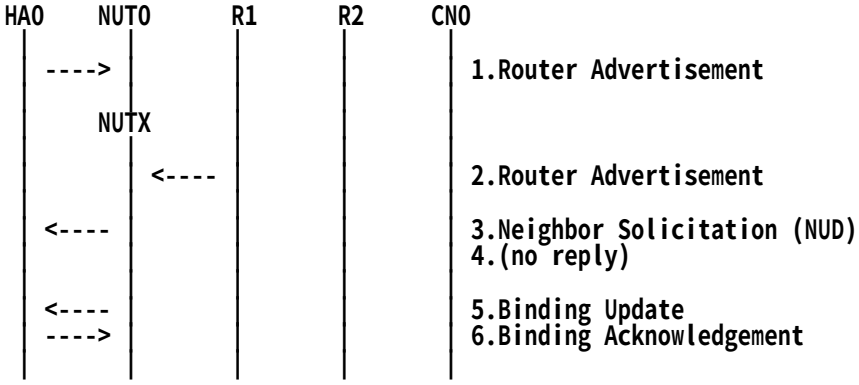
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

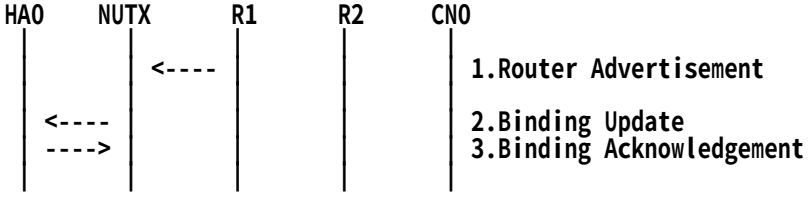
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

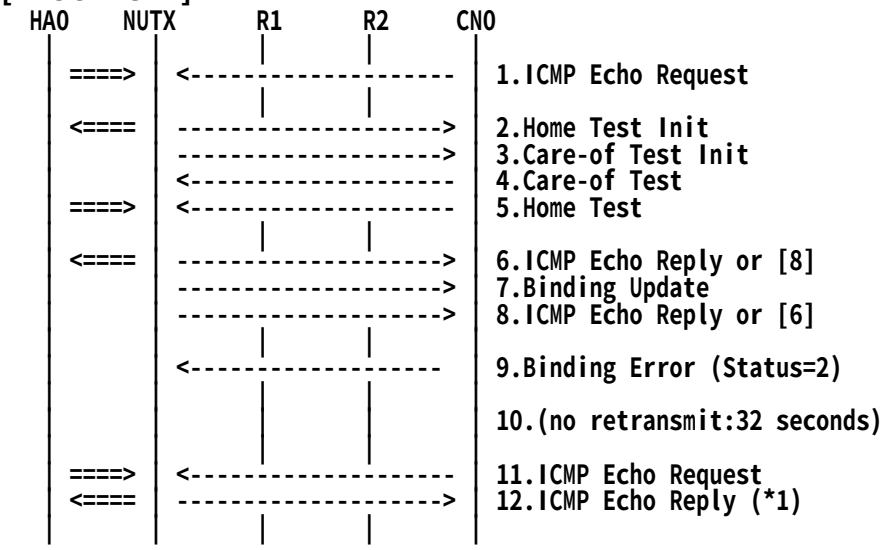
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. Send Binding Error. (CN0 -> NUTX) (Refer to 5.16.1)
   # The Status field is set to 2 (unrecognized MH Type value).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	7
	Status	2
	Home Address	NUT0 (Link0, global)

10. (no retransmit)
    # Wait during 32(MAX_BINDACK_TIMEOUT) seconds.
11. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

12. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.8.2)
    # Wait during 32(MAX_BINDACK_TIMEOUT) seconds.

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply by reverse tunneling.
Then, check whether this packet fills all of the following.
- CN0 does not receive Home Test Init or Care-of Test Init within the retransmission timeout period.(MAX_BINDACK_TIMEOUT).

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.6, 9.3.3

6.10.2.5 MN-3-3-1-2-002 - Receiving unexpected BE (Status = 2) after sending BU (A = OFF)

[PURPOSE]

MN-3-3-1-2-002 - Receiving unexpected BE (Status = 2) after sending BU(A = OFF)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT sets (A) bit in BU which is transmitted to CN: NO

[TOPOLOGY]

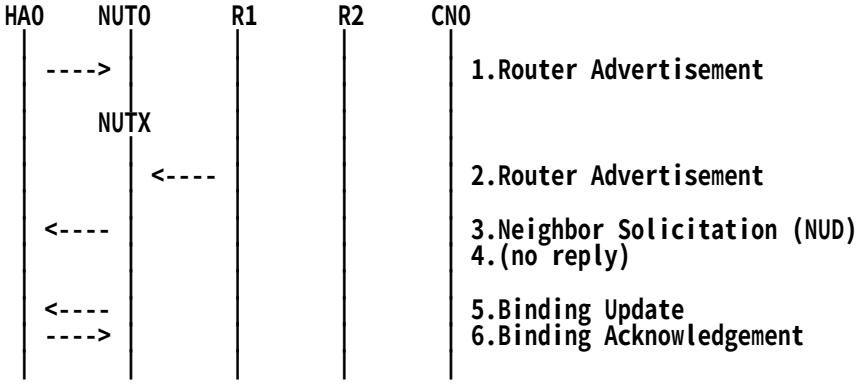
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

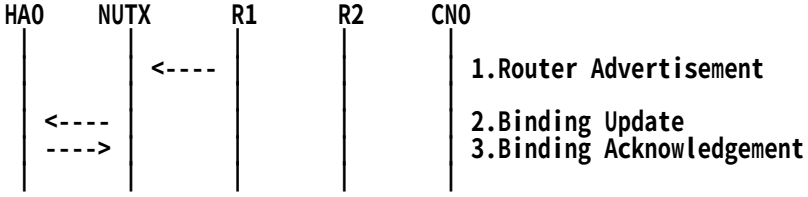
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

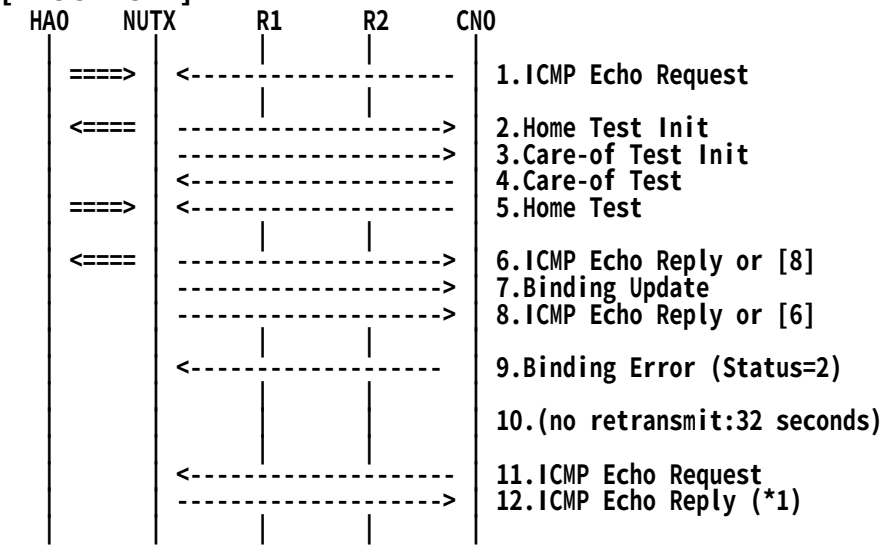
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. Send Binding Error. (CN0 -> NUTX) (Refer to 5.16.1)
   # The Status field is set to 2 (unrecognized MH Type value).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	7
	Status	2
	Home Address	NUT0 (Link0, global)

10. (no retransmit)
    # Wait during 32(MAX_BINDACK_TIMEOUT) seconds.
11. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

12. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (*1)
    (Refer to 5.8.3)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply by Home Address Option.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.6, 9.3.3

6.10.2.6 MN-3-3-1-2-007 - Receiving unexpected BE (Status = 2) from unknown node

[PURPOSE]

MN-3-3-1-2-007 - Receiving unexpected BE (Status = 2) from unknown node

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

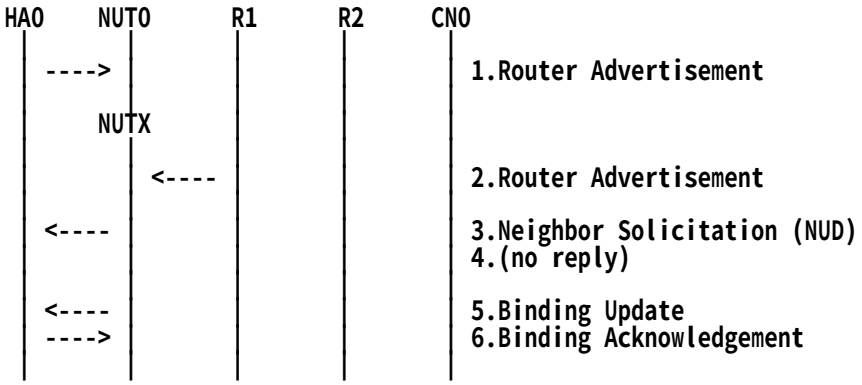
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

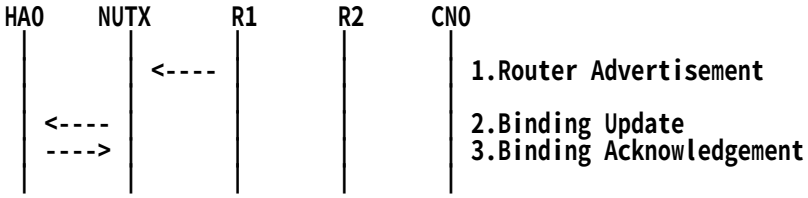
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

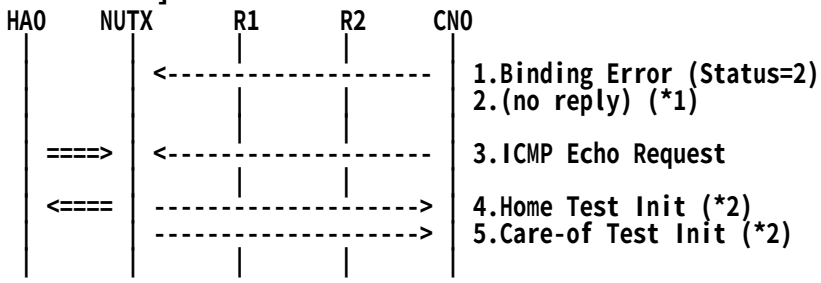
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send Binding Error. (CN0 -> NUTX) (Refer to 5.16.1)
   # The Status field is set to 2 (unrecognized MH Type value).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	7
	Status	2
	Home Address	0::0 (Unspecified address)

2. (no reply) (*1)
3. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
4. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.10.2)
5. Receive Care-of Test Init. (NUTX -> CN0) (*2) (Refer to 5.11.1)

[JUDGMENT]

(*1) PASS: CN0 does not receive the Return Routability procedure messages.
(*2) PASS: CN0 receives the Return Routability procedure messages.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.6

6.11 ICMP Error

6.11.1 Sending ICMP ERROR

6.11.1.1 MN-6-2-1-1-004 - Receiving invalid BA (invalid checksum) from HA

[PURPOSE]

MN-6-2-1-1-004 - Receiving invalid BA (invalid checksum) from HA

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NUT re-transmits BU to HA for valuable BA: YES/NO

[TOPOLOGY]

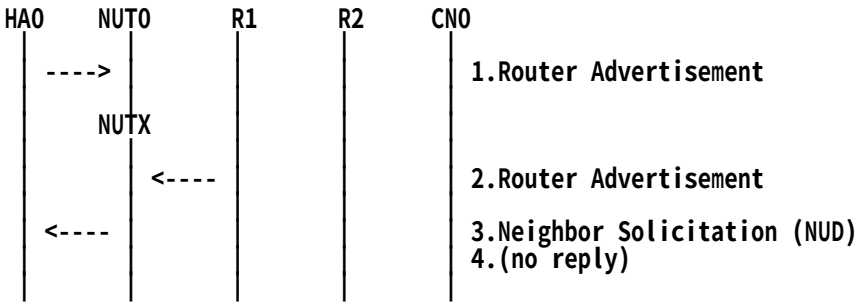
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

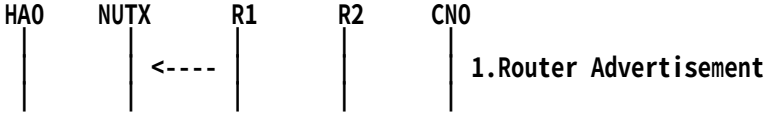
[INITIALIZATION]

- In the case of Real Home Link



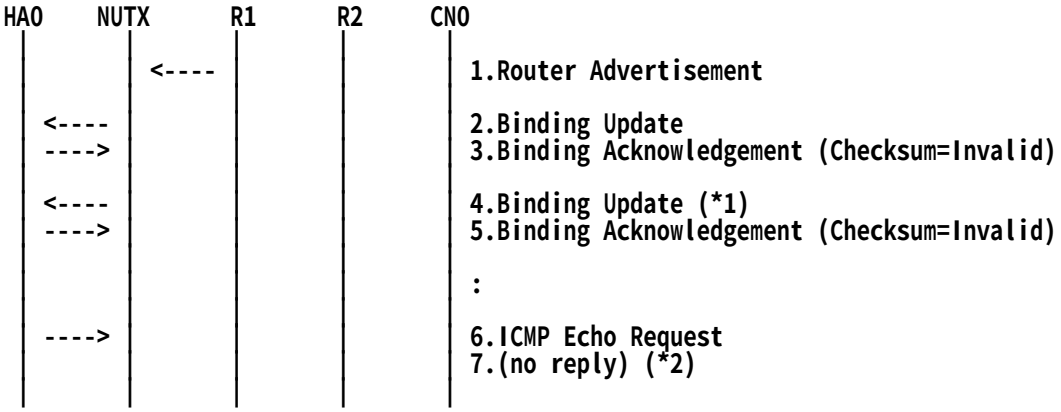
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

[PROCEDURE]



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Checksum field in Mobility Header has the invalid values.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA2_SPI
Mobility Header	MH Type	6
	Checksum	Invalid value
	Status	0
	Sequence Number	(= BU[3])
	Lifetime	Any (> 0)

4. Receive Binding Update. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[3]
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

5. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
   # The Checksum field in Mobility Header has the invalid values.
6. Send ICMP Echo Request. (HA0 -> NUTY with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6 Header	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

7. (no reply) (*2)

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits BU to HA for valuable BA: YES
  (*1) PASS: HA0 receives the retransmitted Binding Update.
  (*2) PASS: HA0 does not receive ICMP Echo reply.

- NUT re-transmits BU to HA for valuable BA: NO

(*1) PASS: HA0 does not receive the retransmitted Binding Update.

(*2) PASS: HA0 does not receive ICMP Echo reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.2, 9.2

6.11.1.2 MN-4-2-1-2-007 - Receiving invalid HoT (invalid checksum) from CN

[PURPOSE]

MN-4-2-1-2-007 - Receiving invalid HoT (invalid checksum) from CN

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-transmits HoTI for valuable HoT: YES/NO

[TOPOLOGY]

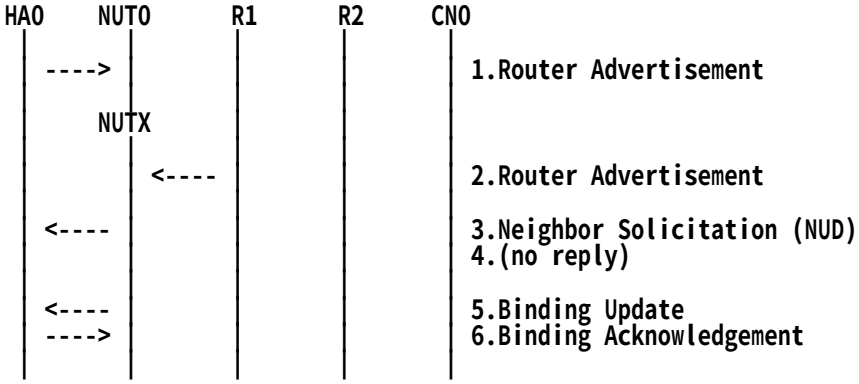
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

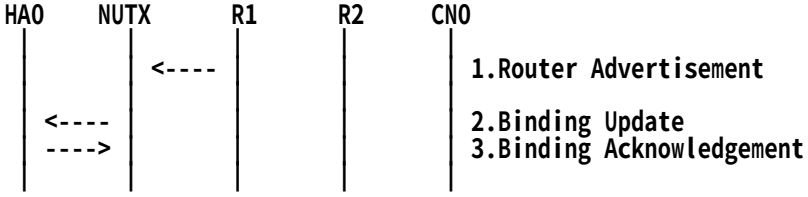
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

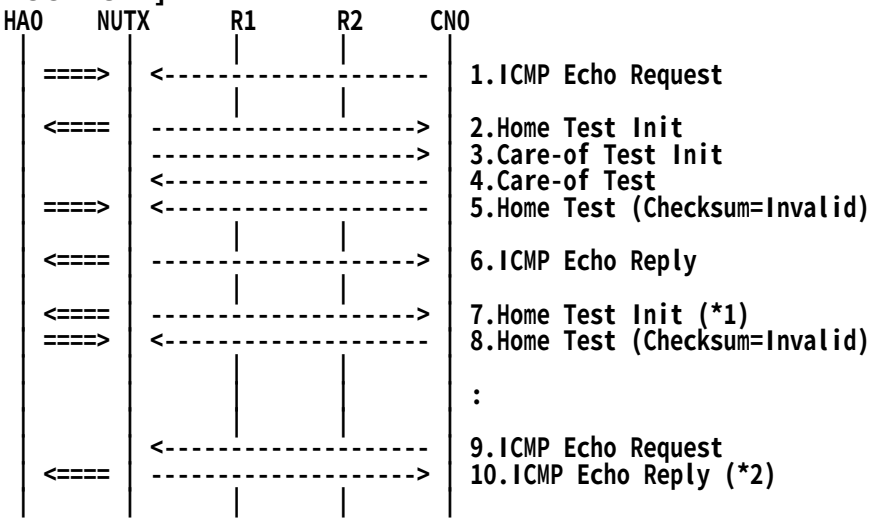
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
   # The Checksum field in Mobility Header has the invalid values.

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	3
	Checksum	Invalid value
	Home Init Cookie	(= HoTI[2])

6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.10.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any (newly generated)

8. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
   # The Checksum field in Mobility Header has the invalid values.
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

10. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits HoTI for valuable HoT: YES
  (*1) PASS: CN0 receives the retransmitted Home Test Init.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

- NUT re-transmits HoTI for valuable HoT: NO
  (*1) PASS: CN0 does not receive the retransmitted Home Test Init.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.2, 9.2

6.11.1.3 MN-4-2-1-2-011 - Receiving invalid CoT (Payload Proto != IPPROTO_NONE) from CN

[PURPOSE]

MN-4-2-1-2-011 - Receiving invalid CoT (Payload Proto != IPPROTO_NONE) from CN

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

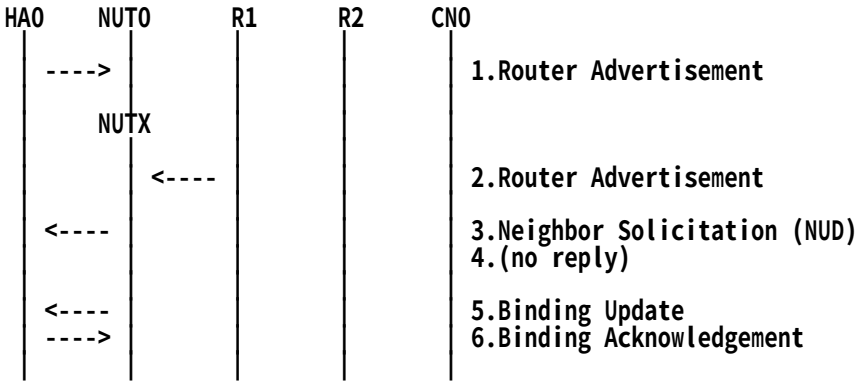
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

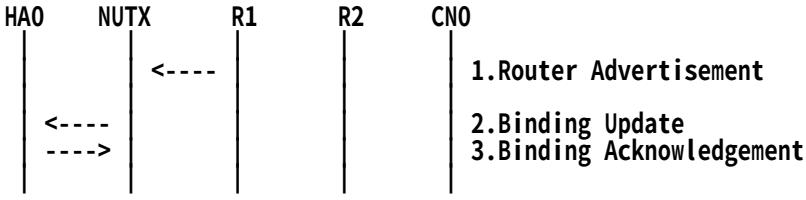
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

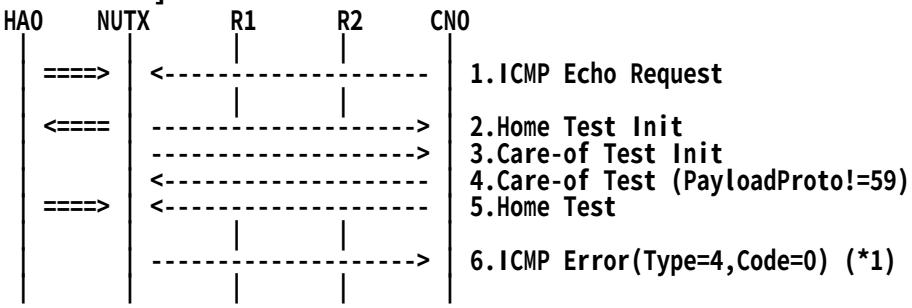
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
   # The Payload Proto field in Mobility Header is set to
   # the values other than IPPROTO_NONE (59 decimal).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	Payload Prot	Any (!= 59)
	MH Type	4

5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Parameter Problem, Code 0. (NUTX -> CN0) (*1) (Refer to 5.6.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	4
	Code	0
	Pointer	40
	Packet	(= CoT[4])

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Parameter Problem(Code 0).
Then, check whether this packet fills all of the following.
- The checksum has the valid value.
- The Type field is set to 4 (Parameter Problem).
- The Code field is set to 0.
- The Pointer field point at the Payload Proto field.
- The Source Address is set to Care-of Address.
- The Destination Address is set to CN address.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.2, 9.2

6.11.1.4 MN-4-2-1-2-012 - Receiving invalid CoT (Header Len != 2) from CN

[PURPOSE]

MN-4-2-1-2-012 - Receiving invalid CoT (Header Len != 2) from CN

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

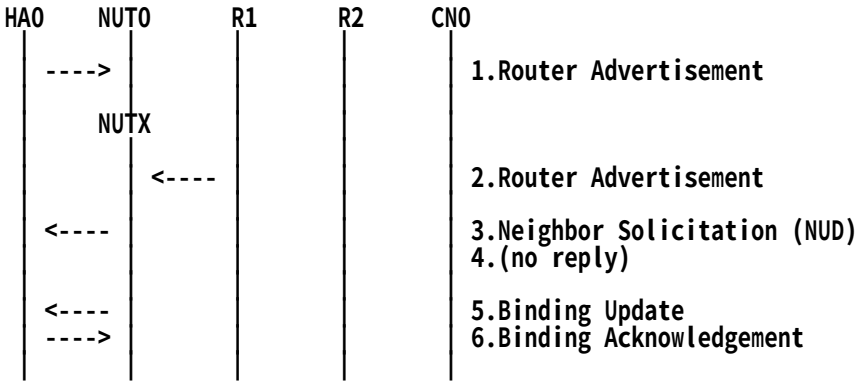
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

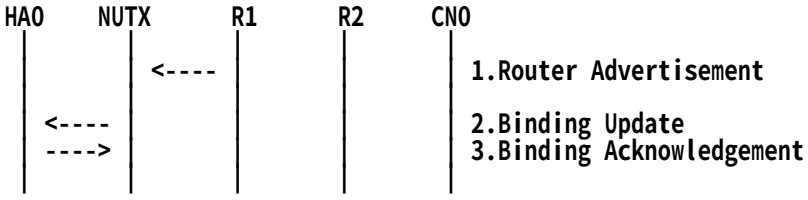
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

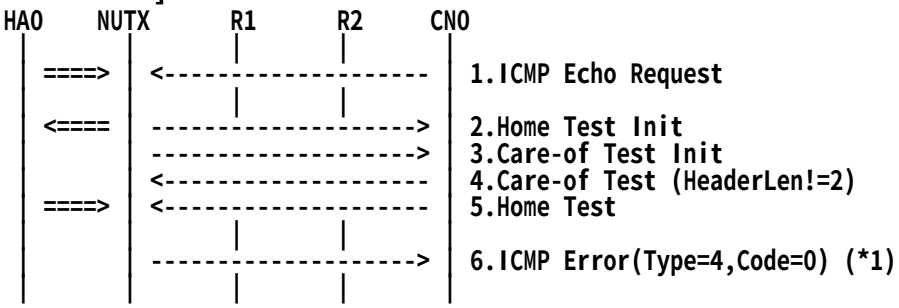
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
   # The Header Len field in Mobility Header is not set 2.

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	Header Len	Any (!= 2)
	MH Type	4

5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.1)
6. Receive ICMP Parameter Problem, Code 0. (NUTX -> CN0) (*1) (Refer to 5.6.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	4
	Code	0
	Pointer	41
	Packet	(= CoT[4])

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Parameter Problem (Code 0).
Then, check whether this packet fills all of the following.
- The Pointer field point at the Header Len field.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.2, 9.2

6.11.1.5 MN-4-2-1-2-013 - Receiving invalid CoT (invalid checksum) from CN

[PURPOSE]

MN-4-2-1-2-013 - Receiving invalid CoT (invalid checksum) from CN

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-transmits CoTI for valuable CoT: YES/NO

[TOPOLOGY]

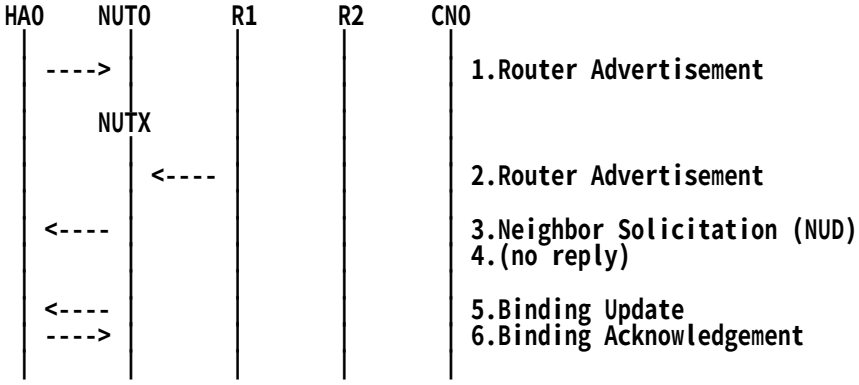
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

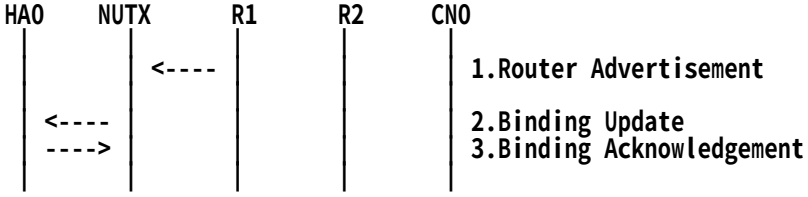
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

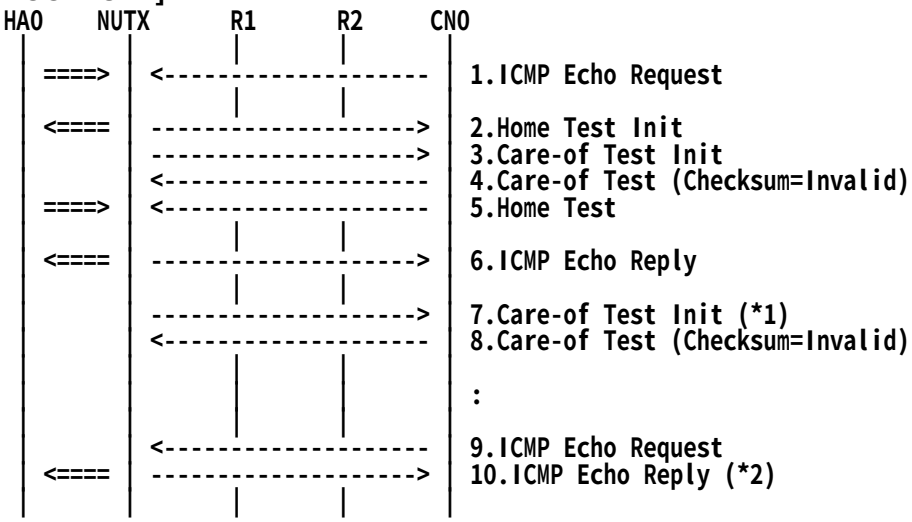
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
   # The Checksum field in Mobility Header has the invalid values.

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Mobility Header	MH Type	4
	Checksum	Invalid value
	Care-of Init Cookie	(= CoTI[3])

5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Care-of Test Init. (NUTX -> CN0) (*1) (Refer to 5.11.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any (newly generated)

8. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
   # The Checksum field in Mobility Header has the invalid values.
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

10. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*2) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

[JUDGMENT]

The judgment changes by the following settings of "INITIALIZATION 1. Requirement of Test".

- NUT re-transmits CoTI for valuable CoT: YES
  (*1) PASS: CN0 receives the retransmisson of Care-of Test Init.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

- NUT re-transmits CoTI for valuable CoT: NO
  (*1) PASS: CN0 does not receive the retransmitted Care-of Test Init.
  (*2) PASS: CN0 receives the tunneled ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.2, 9.2

6.11.2 Receiving ICMP ERROR

6.11.2.1 MN-4-2-2-2-005 - Receiving ICMP error (Type = 4, Code = 1) after sending CoTI

[PURPOSE]

MN-4-2-2-2-005 - Receiving ICMP error (Type = 4, Code = 1) after sending CoTI

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

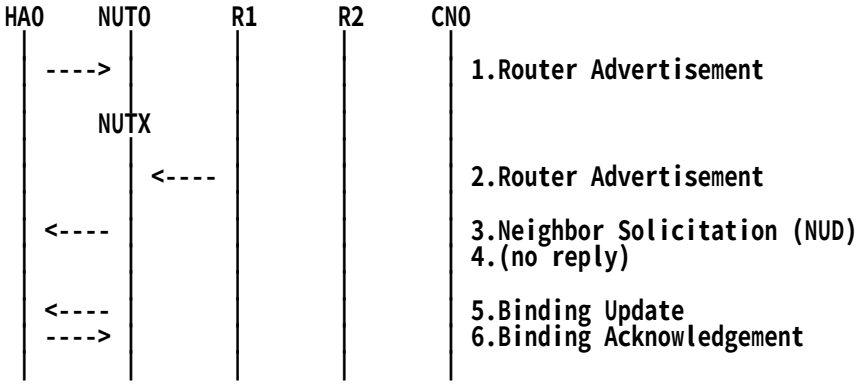
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

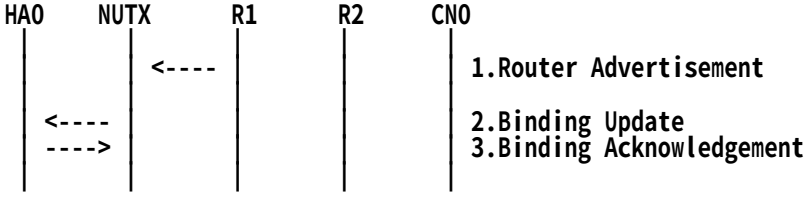
[INITIALIZATION]

- In the case of Real Home Link



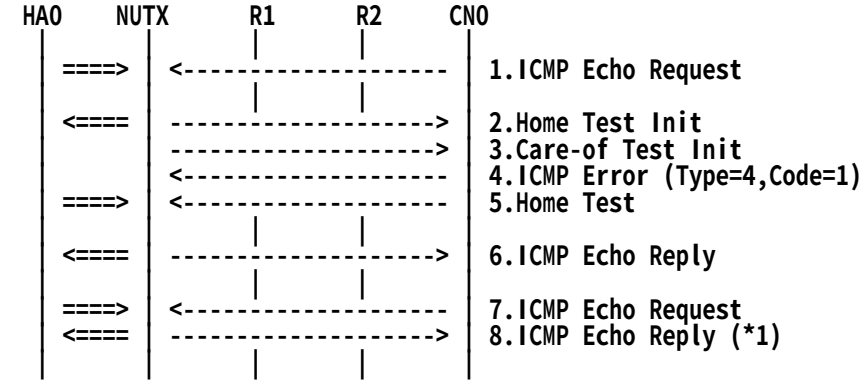
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send ICMP Parameter Problem, Code 1. (CN0 -> NUTX) (Refer to 5.6.1)
   # The Type field is set to 4 (Parameter Problem).
   # The Code field is set to 1 (unrecognized Next Header type encountered).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
ICMPv6 Header	Type	4
	Code	1
	Pointer	6
	Packet	(= CoTI[3])

5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

8. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply by reverse tunneling.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.5, 11.1, 11.6.2.

6.11.2.2 MN-4-2-2-2-007 - Receiving ICMP error (Type = 4, Code = 1) after sending BU to CN

[PURPOSE]

MN-4-2-2-2-007 - Receiving ICMP error (Type = 4, Code = 1) after sending BU to CN

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

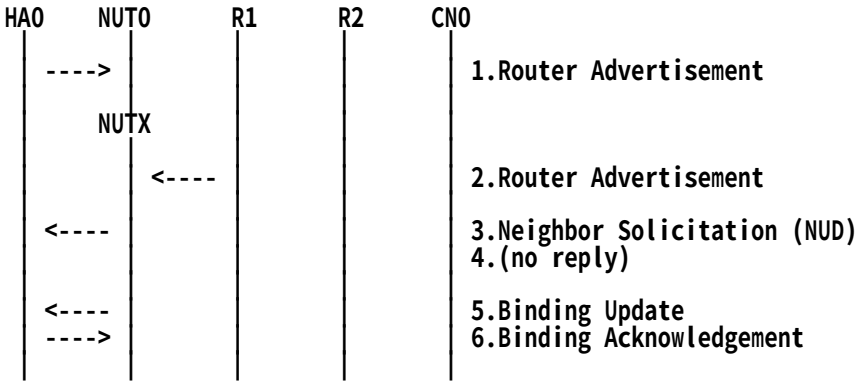
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

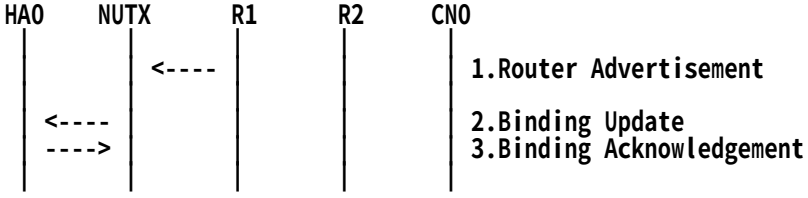
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

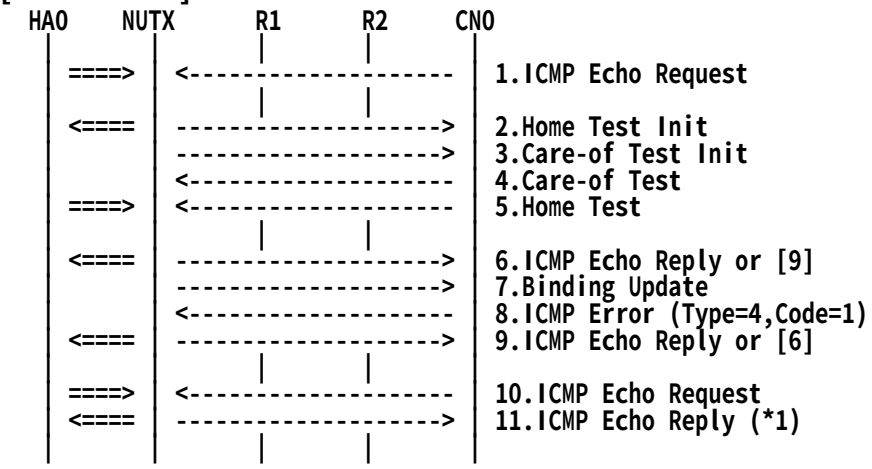
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [9]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. Send ICMP Parameter Problem, Code 1. (CN0 -> NUTX) (Refer to 5.6.1)
   # The Type field is set to 4 (Parameter Problem).
   # The Code field is set to 1 (unrecognized Next Header type encountered).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
ICMPv6 Header	Type	4
	Code	1
	Pointer	40
	Packet	(= BU[7])

9. [6] or Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
10. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)

IPv6 Header	Source Address	HA (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

11. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply by reverse tunneling.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.5, 11.1.

6.11.2.3 MN-4-2-2-2-012 - Receiving ICMP error (Destination Unreachable) after sending HoTI

[PURPOSE]

MN-4-2-2-2-012 - Receiving ICMP error (Destination Unreachable) after sending HoTI

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

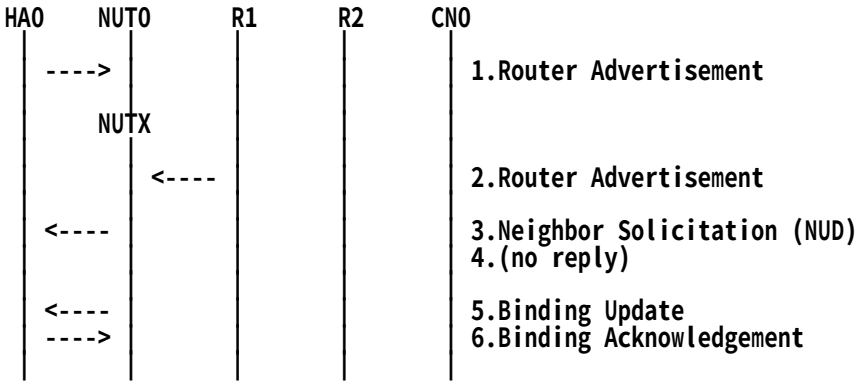
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

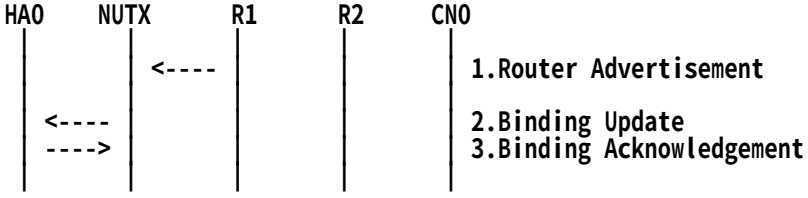
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

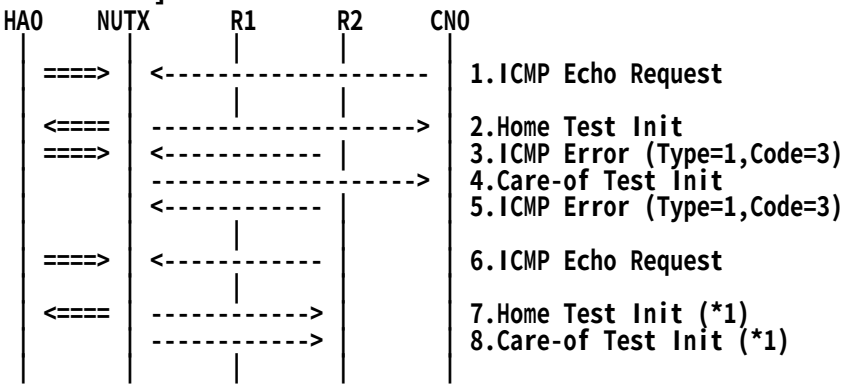
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Send ICMP Destination Unreachable. (out: HA0 -> NUTX, in: R2 -> NUT0) (Refer to 5.5.2)
   # The Type field is set to 1 (Destination Unreachable).
   # The Code field is set to 3 (address unreachable).

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	R2 (LinkY, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	1
	Code	3
	Packet	(= HoTI[2])

4. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
5. Send ICMP Destination Unreachable. (R2 -> NUTX) (Refer to 5.5.1)
   # The Type field is set to 1 (Destination Unreachable).
   # The Code field is set to 3 (address unreachable).

IPv6 Header	Source Address	R2 (LinkY, global)
	Destination Address	NUTX (LinkX, global)
ICMPv6 Header	Type	1
	Code	3
	Packet	(= CoTI[4])

6. Send ICMP Echo Request. (out: HA0 -> NUTX, in: R2 -> NUT0) (Refer to 5.7.2)
7. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> R2) (*1) (Refer to 5.10.2)
8. Receive Care-of Test Init. (NUTX -> R2) (*1) (Refer to 5.11.1)

[JUDGMENT]

(*1) PASS: R2 receives Home/Care-of Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.5

6.11.2.4 MN-4-2-2-2-010 - Don't start the return routability procedure (when receiving ICMP error)

[PURPOSE]

MN-4-2-2-2-010 - Don't start the return routability procedure (when receiving ICMP error)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

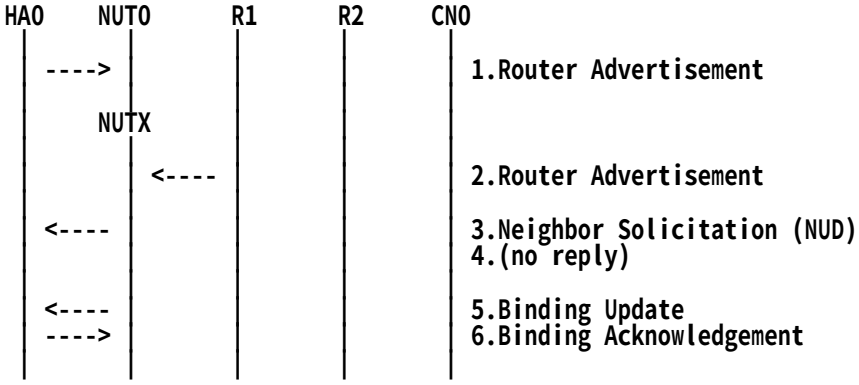
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

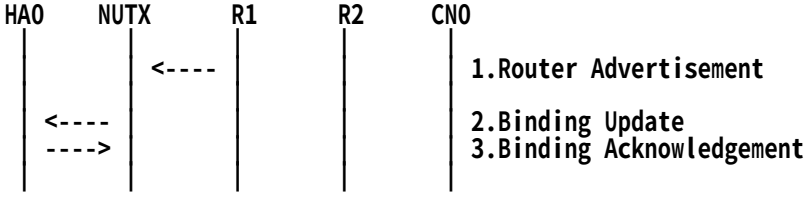
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

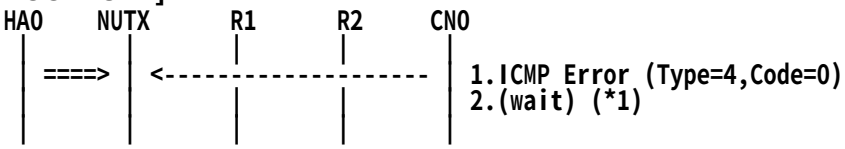
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Parameter Problem, Code 0. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.6.2)
   # The Type field is set to 4 (Parameter Problem).
   # The Code field is set to 0 (erroneous header field encountered).

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	4
	Code	0
	pointer	24
	Packet	unknowm

2. (no transmit) (*1)

[JUDGMENT]

(*1) PASS: CN0 does not receive Home/Care-of Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.5

6.11.2.5 MN-4-2-2-2-011 - Receiving ICMP error (Type = 4, Code = 2) from registered CN

[PURPOSE]

MN-4-2-2-2-011 - Receiving ICMP error (Type = 4, Code = 2) from registered CN

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

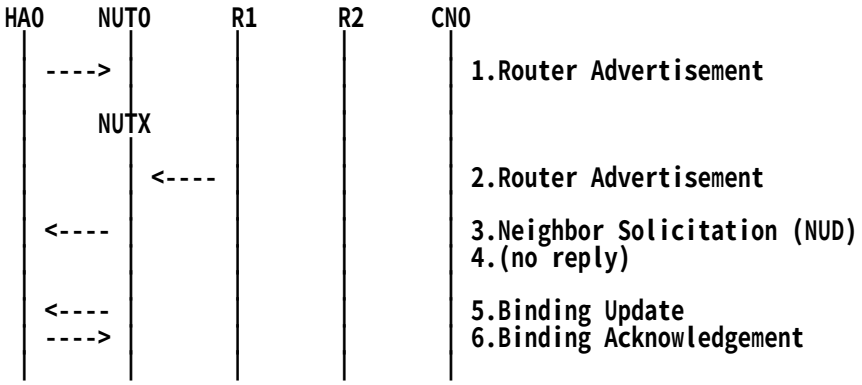
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

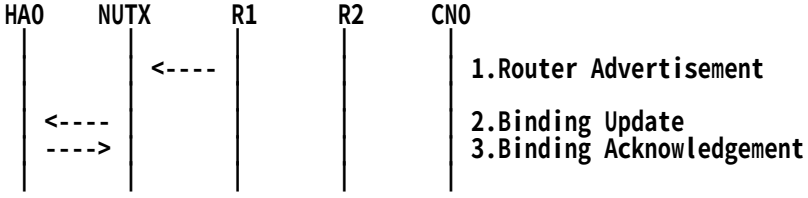
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

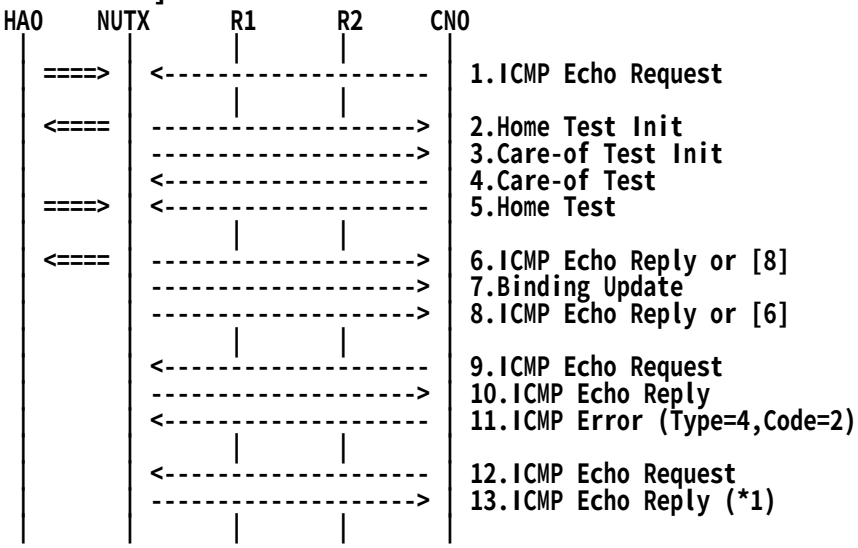
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
10. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)
11. Send ICMP Parameter Problem, Code 2. (CN0 -> NUTX) (Refer to 5.6.1)
    # The Type field is set to 4 (Parameter Problem).
    # The Code field is set to 2 (unrecognized IPv6 option encountered).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
ICMPv6 Header	Type	4
	Code	2
	Pointer	46
	Packet	(= Echo[10])

12. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
13. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (*1)
    (Refer to 5.8.3)

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply with Home Address Option.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.5

6.12 Payload Packet

6.12.1 Sending Payload Packet

6.12.1.1 MN-4-1-1-2-001 - Sending the packets via HA

[PURPOSE]

MN-4-1-1-2-001 - Sending the packets via HA

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

Function of Return Routability: NO

[TOPOLOGY]

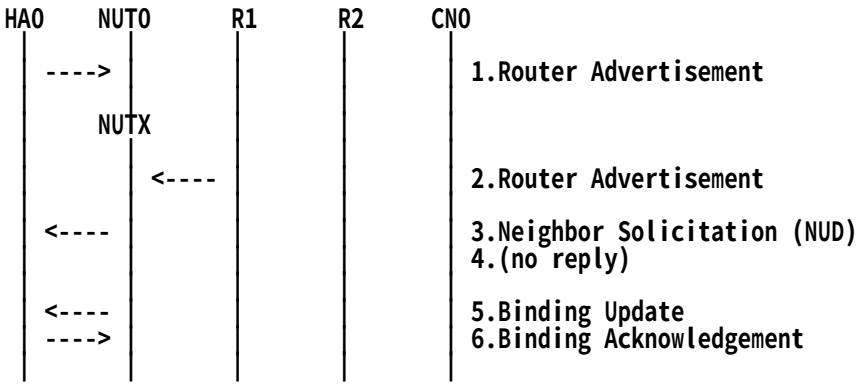
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

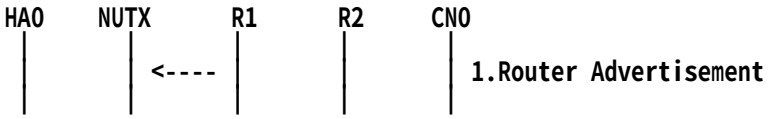
[INITIALIZATION]

- In the case of Real Home Link



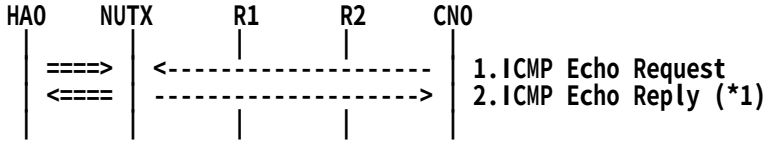
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

2. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1)
(Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply by reverse tunneling.
Then, check whether this packet fills all of the following.
- The Destination Address(outer) is set to HA address.
- The Source Address(outer) is set to Care-of Address.
- The Destination Address(inner) is set to CN address.
- The Source Address(inner) is set to Home Address.
- Home Address destination option is not included.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.1, 9.3.1, 11.3.2, 11.3.3.

RFC3776 Using IPsec to Protect Mobile IPv6 Signaling Between Mobile Nodes and Home Agents
See Section 4.1, 4.3, 4.4.

6.12.1.2 MN-4-1-1-2-002 - Sending the packets directly to CN

[PURPOSE]

MN-4-1-1-2-002 - Sending the packets directly to CN

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

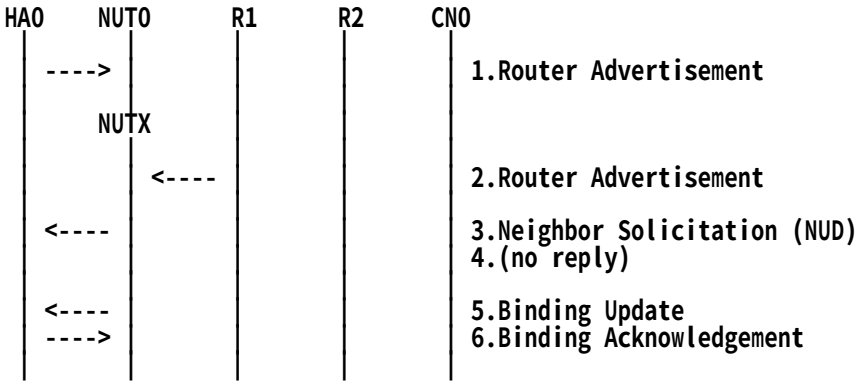
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

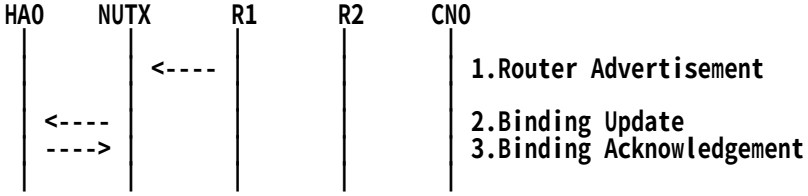
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

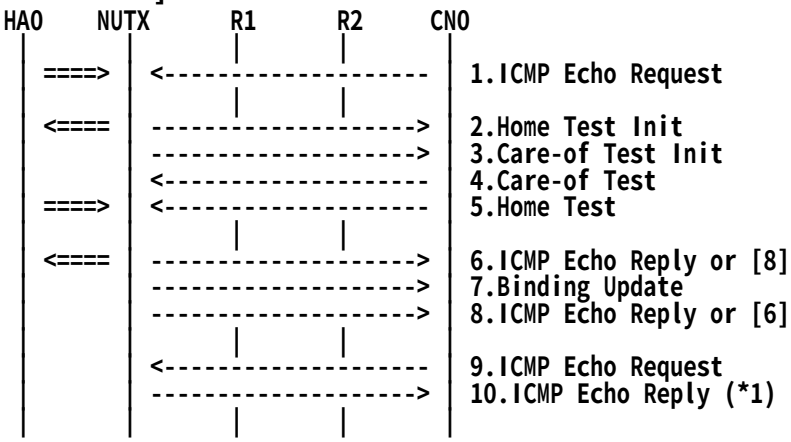
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

10. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (*1)
    (Refer to 5.8.3)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply with Home Address Option.
Then, check whether this packet fills all of the following.
- The Source Address is set to care-of address.
- Home Address destination option is included.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.1, 11.3.2.

6.12.1.3 MN-4-1-1-2-004 - Sending the packets while it is at home-link

[PURPOSE]

MN-4-1-1-2-004 - Sending the packets while it is at home-link

[CATEGORY]

HOST : ADVANCED FUNCTION (REAL HOME LINK)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

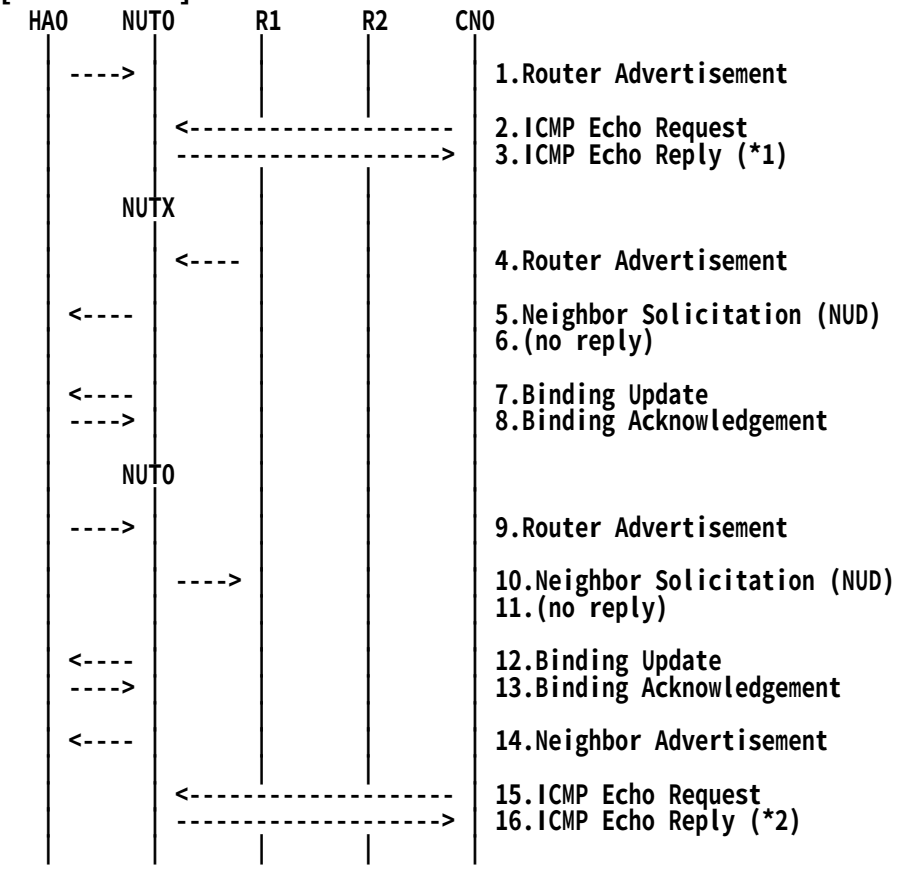
[TEST SETUP]

Refer to 3.1 Common Setup-1

[INITIALIZATION]

NONE

[PROCEDURE]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)

2. Send ICMP Echo Request. (CN0 -> NUT0) (Refer to 5.7.1)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

3. Receive ICMP Echo Reply. (NUT0 -> CN0) (*1) (Refer to 5.8.1)

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

4. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
5. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
6. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
7. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
8. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
9. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
10. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
11. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
12. Receive Binding Update to HA0. (NUT0 -> HA0) (Refer to 5.14.1)
13. Send Binding Acknowledgement. (HA0 -> NUT0) (Refer to 5.15.1)
14. Receive Neighbor Advertisement. (NUT0 -> NUT0_allnode_multi) (Refer to 5.4.1)
15. Send ICMP Echo Request. (CN0 -> NUT0) (Refer to 5.7.1)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

16. Receive ICMP Echo Reply. (NUT0 -> CN0) (*2) (Refer to 5.8.1)

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply.
Then, check whether this packet fills all of the following.
- The Source Address is set to Home Address.
- Home Address destination option is not included.

(*2) PASS: CN0 receives ICMP Echo Reply.
Then, check whether this packet fills all of the following.
- The Source Address is set to Home Address.
- Home Address destination option is not included.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.1, 11.5.4

6.12.1.4 MN-4-1-1-2-005 - Sending the packets after deleting the BUL entry

[PURPOSE]

MN-4-1-1-2-005 - Sending the packets after deleting the BUL entry

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

NUT re-registers with CN: NO

[TOPOLOGY]

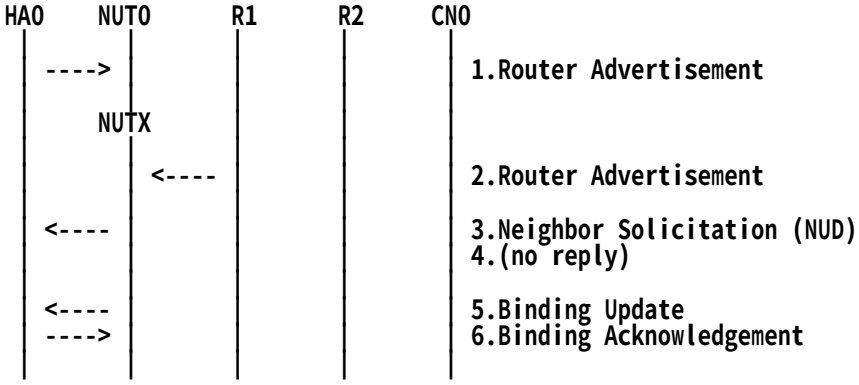
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

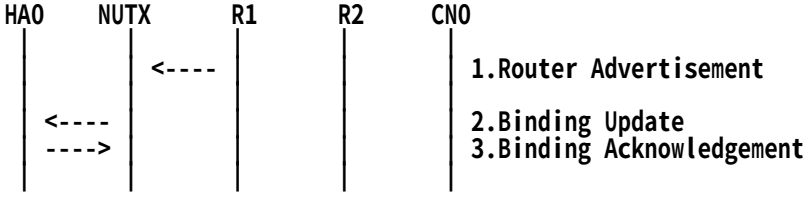
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

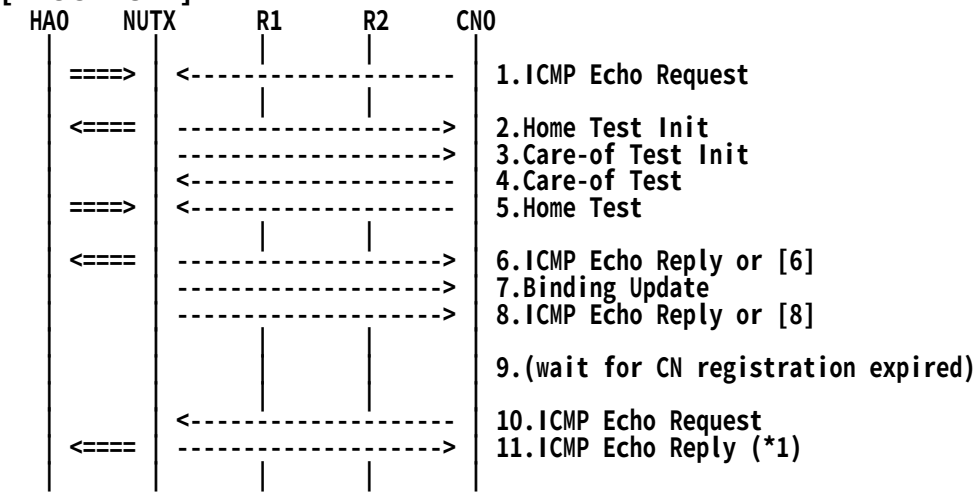
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. (wait)
   # Wait during the lifetime in the Lifetime field of Binding Update[7].
10. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

11. Receive ICMP Echo Reply. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.8.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply by reverse tunneling.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.1, 11.3.3, 11.1

6.12.1.5 MN-4-1-1-2-006 - Sending Neighbor Discovery message (does not use home address destination option)

[PURPOSE]

MN-4-1-1-2-006 - Sending Neighbor Discovery message (does not use home address destination option)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

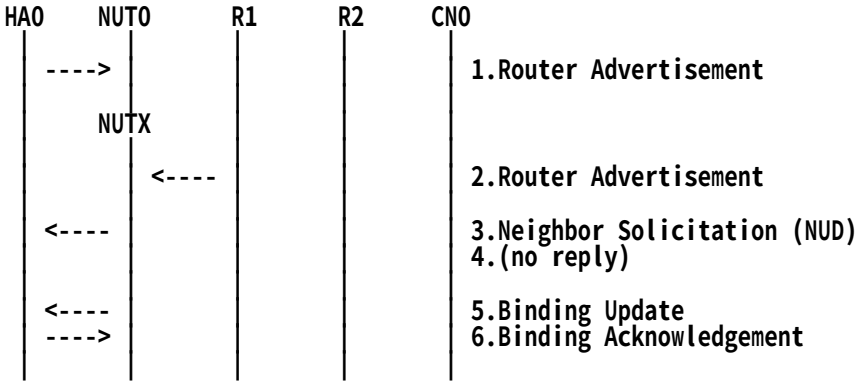
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

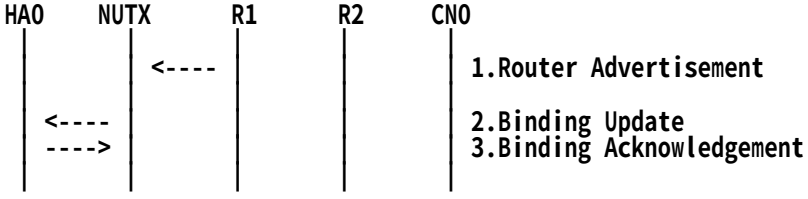
[INITIALIZATION]

- In the case of Real Home Link



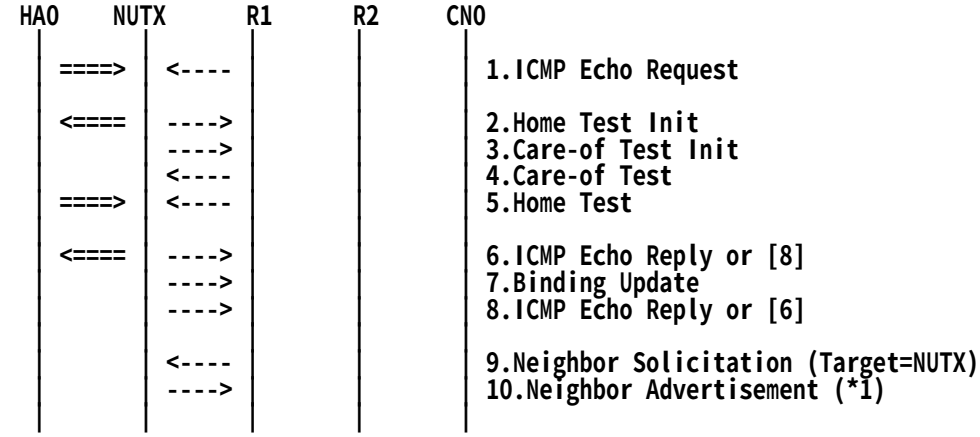
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: R1 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> R1) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> R1) (Refer to 5.11.1)
4. Send Care-of Test. (R1 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: R1 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> R1) (Refer to 5.8.2)
7. Receive Binding Update to R1. (NUTX -> R1) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> R1 with Home Address Option)
   (Refer to 5.8.3)
9. Send Neighbor Solicitation. (R1 -> NUTX) (Refer to 5.3.2)

IPv6 Header	Source Address	R1 (LinkX, global)
	Destination Address	NUTX (LinkX, global)
ICMPv6 Header	Type	135
	Target Address	NUTX (LinkX, global)

10. Receive Neighbor Advertisement. (NUTX -> R1) (*1) (Refer to 5.4.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	R1 (LinkX, global)
ICMPv6 Header	Type	136
	Target Address	NUTX (LinkX, global)

[JUDGMENT]

(*1) PASS: R1 receives Neighbor Advertisement.
Then, check whether this packet fills all of the following.
- Home Address destination option is not included.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.1

6.12.2 Receiving Payload Packet

6.12.2.1 MN-4-1-2-2-007 - Receiving the packets while it is at home-link

[PURPOSE]

MN-4-1-2-2-007 - Receiving the packets while it is at home-link

[CATEGORY]

HOST : ADVANCED FUNCTION (REAL HOME LINK)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

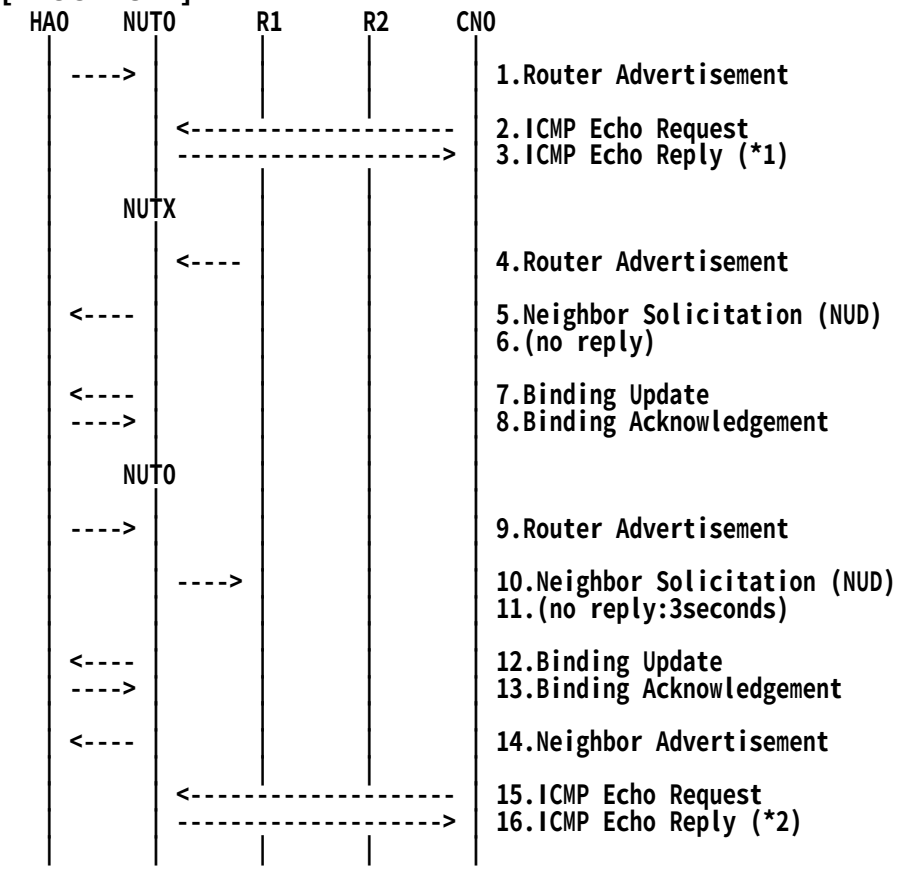
[TEST SETUP]

Refer to 3.1 Common Setup-1

[INITIALIZATION]

NONE

[PROCEDURE]



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send ICMP Echo Request. (CN0 -> NUT0) (Refer to 5.7.1)
   # The Destination Address is set to Home address.

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

3. Receive ICMP Echo Reply. (NUT0 -> CN0) (*1) (Refer to 5.8.1)

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

4. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
5. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
6. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
7. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
8. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
9. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
10. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
11. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
12. Receive Binding Update to HA0. (NUT0 -> HA0) (Refer to 5.14.1)
13. Send Binding Acknowledgement. (HA0 -> NUT0) (Refer to 5.15.1)
14. Receive Neighbor Advertisement. (NUT0 -> NUT0_allnode_multi) (Refer to 5.4.1)
15. Send ICMP Echo Request. (CN0 -> NUT0) (Refer to 5.7.1)
   # The Destination Address is set to Home Address.

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

16. Receive ICMP Echo Reply. (NUT0 -> CN0) (*2) (Refer to 5.8.1)

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply.
Then, check whether this packet fills all of the following.
- The Source Address is set to Home Address.
- Home Address destination option is not included.

(*2) PASS: CN0 receives ICMP Echo Reply.
Then, check whether this packet fills all of the following.
- The Source Address is set to Home Address.
- Home Address destination option is not included.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.1, 11.5.4

6.12.2.2 MN-4-1-2-2-006 - Receiving the packets (link-local address)

[PURPOSE]

MN-4-1-2-2-006 - Receiving the packets (link-local address)

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

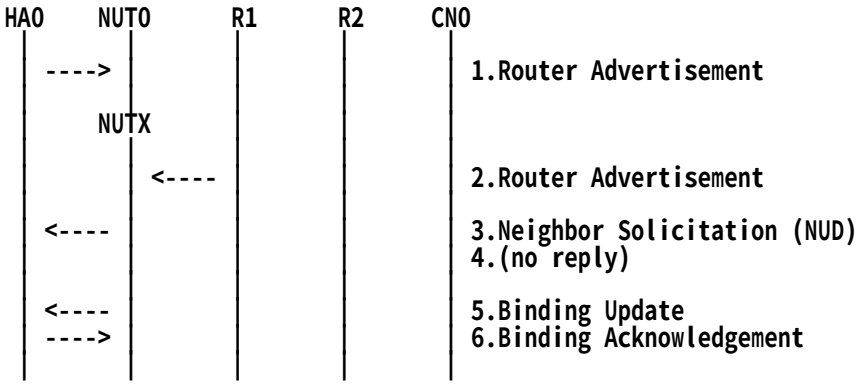
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

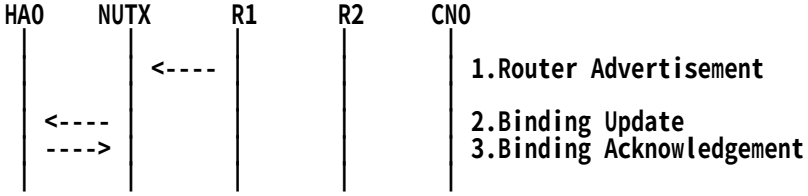
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

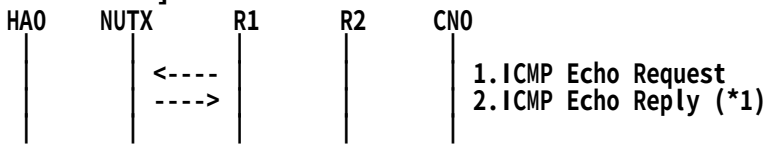
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (R1_link_local -> NUTX_link_local) (Refer to 5.7.1)
   # The Destination Address is set to link-local address(Care-of Address).

IPv6 Header	Source Address	R1 (LinkX, Link-local)
	Destination Address	NUTX (LinkX, Link-local)
ICMPv6 Header	Type	128

2. Receive ICMP Echo Reply. (NUTX_link_local -> R1_link_local) (*1) (Refer to 5.8.1)

IPv6 Header	Source Address	NUTX (LinkX, Link-local)
	Destination Address	R1 (LinkX, Link-local)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: R1 receives ICMP Echo Reply.
Then, check whether this packet fills all of the following.
- The Source Address is not set to Home Address.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.1

6.12.2.3 MN-4-1-2-2-010 - Receiving the packets directly with invalid care-of address

[PURPOSE]

MN-4-1-2-2-010 - Receiving the packets directly with invalid care-of address

[CATEGORY]

HOST : BASIC FUNCTION

[REQUIREMENT OF TEST]

NONE

[TOPOLOGY]

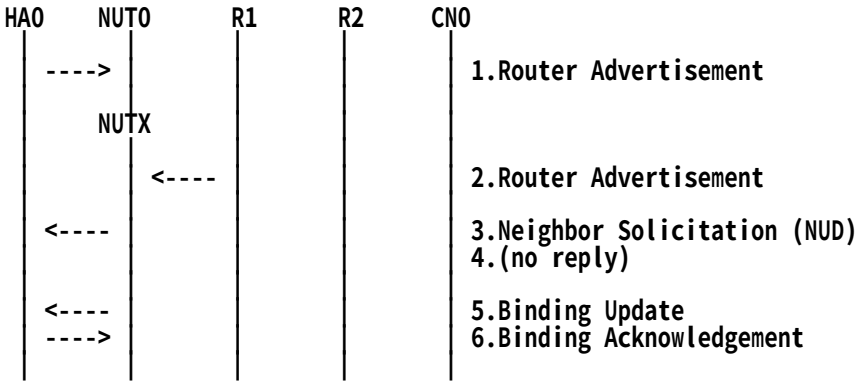
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

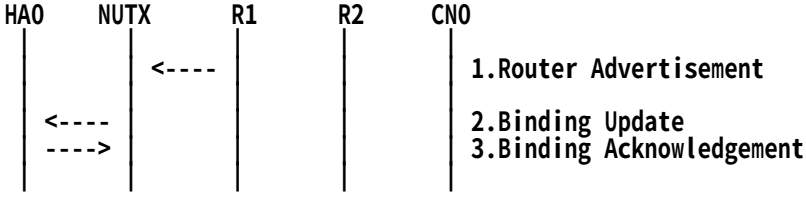
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

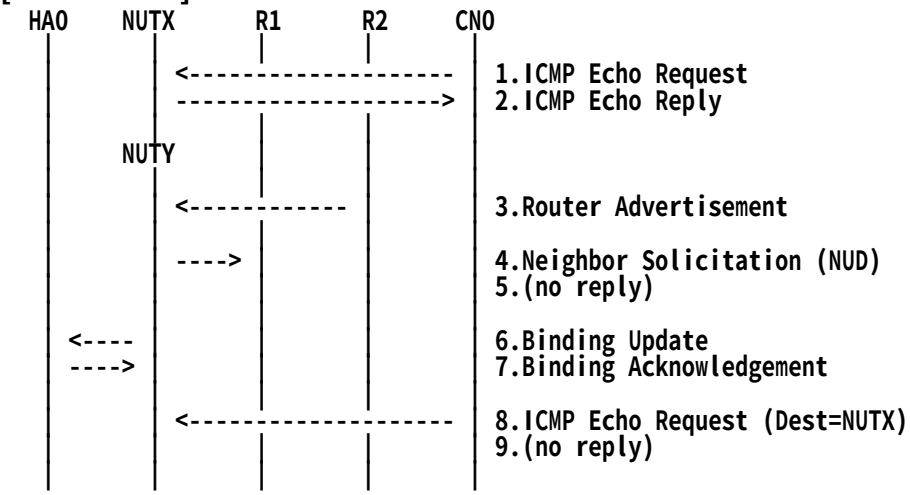
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (CN0 -> NUTX) (Refer to 5.7.1)
2. Receive ICMP Echo Reply. (NUTX -> CN0) (Refer to 5.8.1)
3. Send Router Advertisement. (R2 -> R2_allnode_multi) (Refer to 5.2.1)
4. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
5. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
6. Receive Binding Update to HA0. (NUTY -> HA0) (Refer to 5.14.1)
7. Send Binding Acknowledgement. (HA0 -> NUTY) (Refer to 5.15.1)
8. Send ICMP Echo Request. (CN0 -> NUTX) (Refer to 5.7.1)
   # The Destination Address is set to invalidated Care-of Address (NUTX).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	Old Care-of Address
ICMPv6 Header	Type	128

9. (no reply)

[JUDGMENT]

(*1) PASS: CN0 does not receive ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.5.3

6.12.2.4 MN-4-1-2-2-003 - Receiving the packets directly from known CN

[PURPOSE]

MN-4-1-2-2-003 - Receiving the packets directly from known CN

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

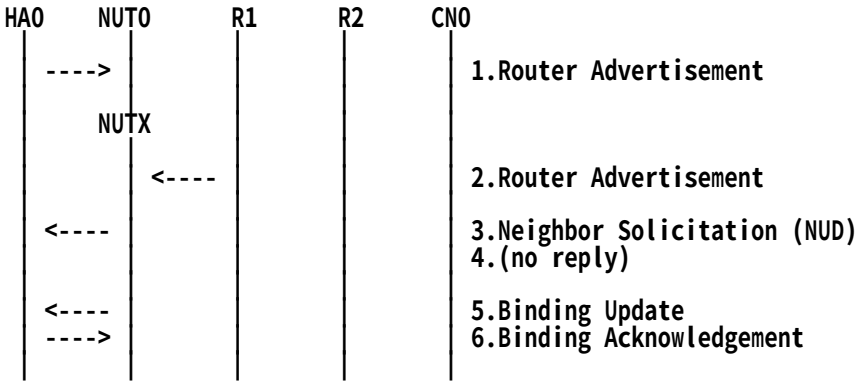
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

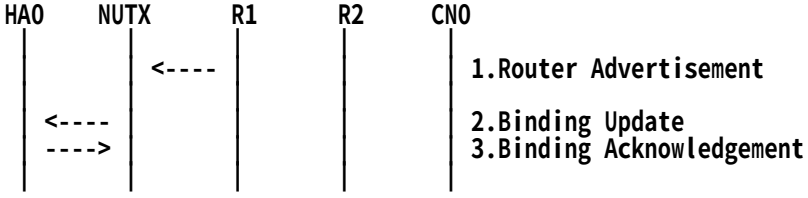
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

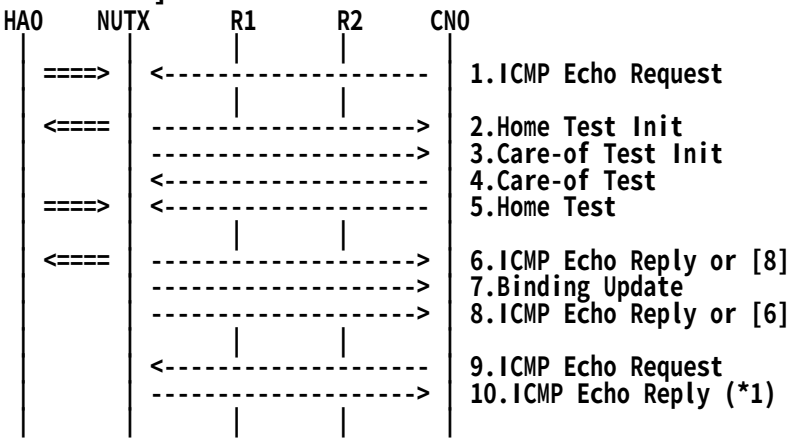
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

10. Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (*1)
    (Refer to 5.8.3)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: CN0 receives ICMP Echo Reply by Home Address Option.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.3

6.12.2.5 MN-4-1-2-2-004 - Invalid type2 routing header (length != 2)

[PURPOSE]

MN-4-1-2-2-004 - Invalid type2 routing header (length != 2)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

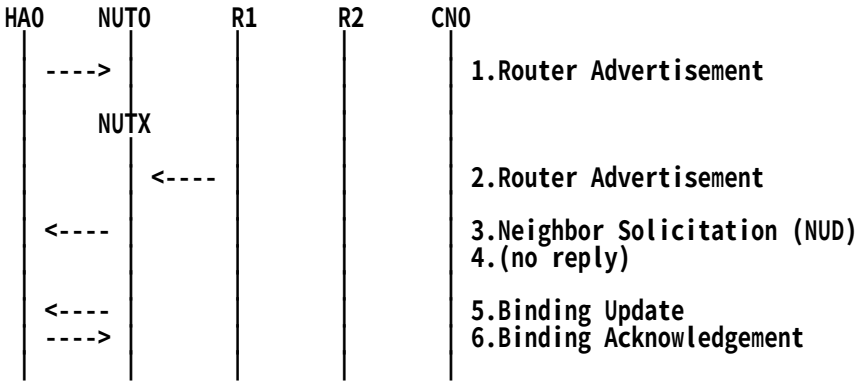
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

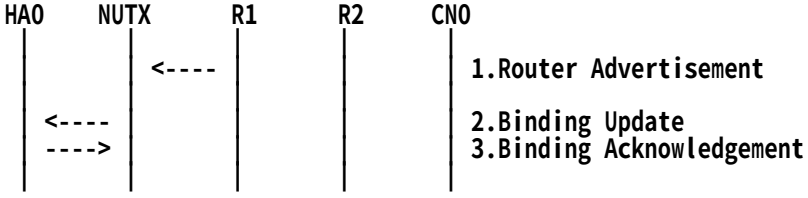
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

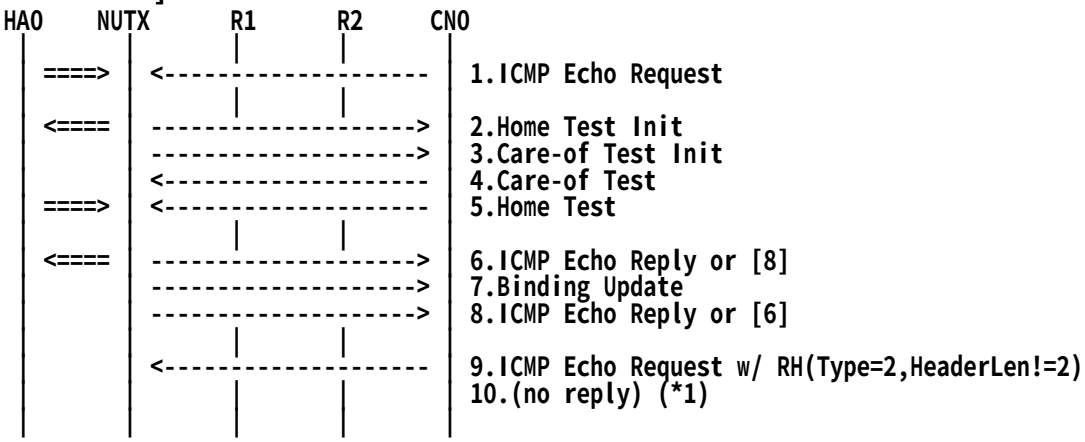
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   # The length field in Type2 Routing Header is set to the invalid value (4).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Header ext length	4 (!= 2)
	Segment left	1
	address	NUT0 (Link0, global)
	address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

10. (no reply) (*1)
    # Wait during the lifetime in the Lifetime field of Binding Update [7].

[JUDGMENT]

(*1) PASS: CN0 does not receive ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.3

6.12.2.6 MN-4-1-2-2-005 - Invalid type2 routing header (segments left != 1)

[PURPOSE]

MN-4-1-2-2-005 - Invalid type2 routing header (segments left != 1)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

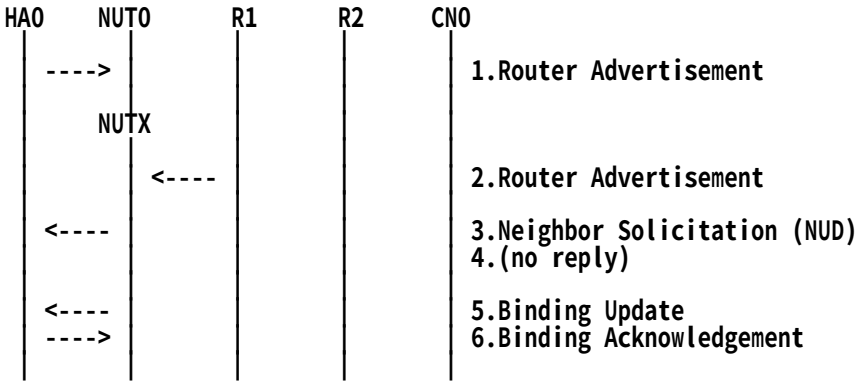
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

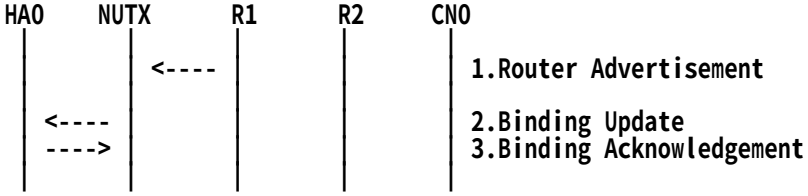
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

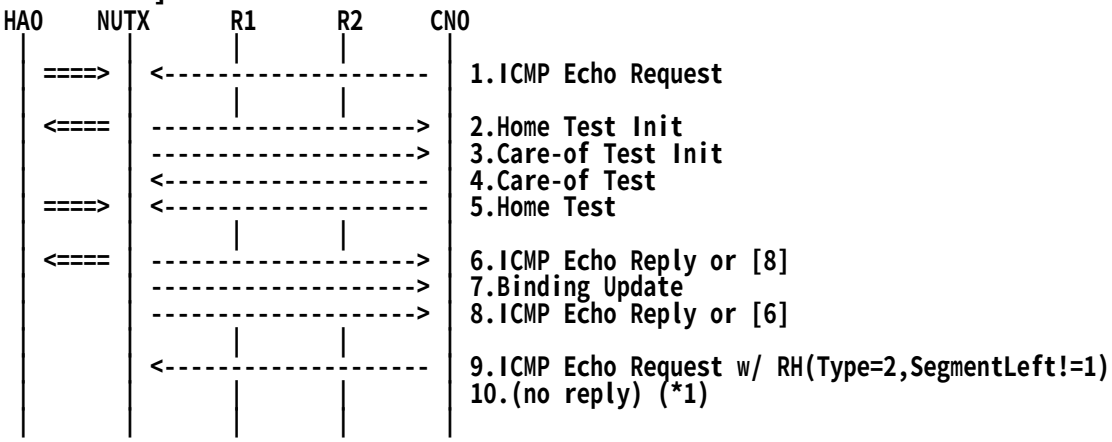
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   # The Segments Left field in Type2 Routing Header is set to the invalid value (0).

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Header ext length	2
	Segment left	0 (!= 1)
	address	NUT0 (Link0, global)
ICMPv6 Header	Type	128

10. (no reply) (*1)
    # Wait during the lifetime in the Lifetime field of Binding Update [7].

[JUDGMENT]

(*1) PASS: CN0 does not receive ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.3

6.12.2.7 MN-4-1-2-2-011 - Invalid type2 routing header (Invalid Home Address)

[PURPOSE]

MN-4-1-2-2-011 - Invalid type2 routing header (Invalid Home Address)

[CATEGORY]

HOST : ADVANCED FUNCTION (RETURN ROUTABILITY)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

[TOPOLOGY]

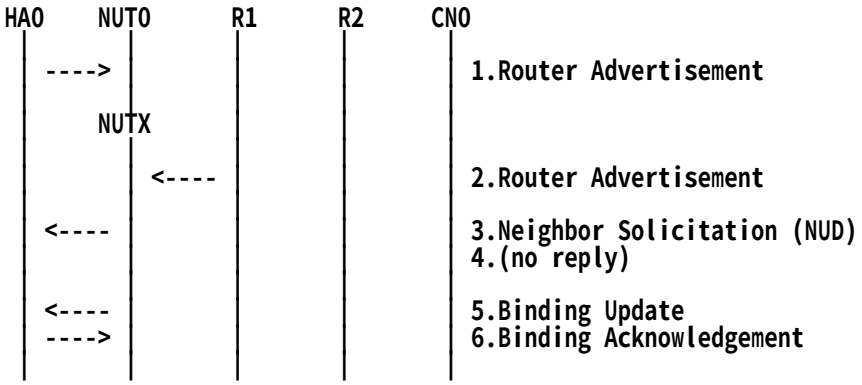
Refer to 2.1.1.1 Common Topology-1

[TEST SETUP]

Refer to 3.1 Common Setup-1

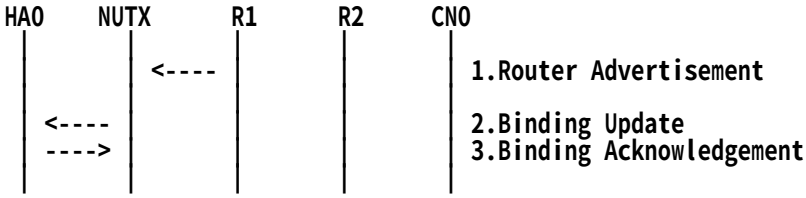
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

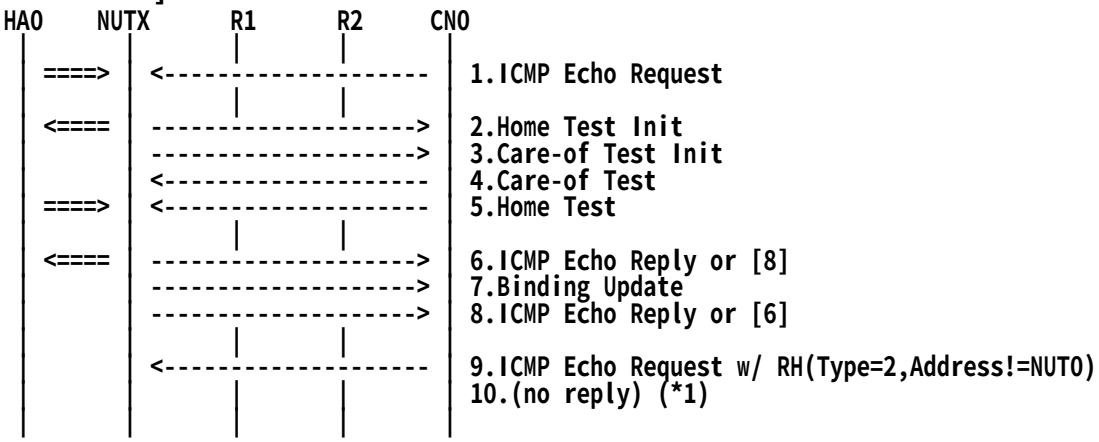
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)

3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)
9. Send ICMP Echo Request. (CN0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   # The Home Address field in the routing header is not set to the home address of NUT.

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Header ext length	2
	Segment left	1
	Home Address	Invalid address
ICMPv6 Header	Type	128

10. (no reply) (*1)
    # Wait during the lifetime in the Lifetime field of Binding Update [7].

[JUDGMENT]

(*1) PASS: CN0 does not receive ICMP Echo Reply.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.3.3

6.13 IPsec SA

6.13.1 manual configuration

6.13.1.1 MN-1-1-2-1-001 - Use the manual configuration of security association between MN and HA

[PURPOSE]

MN-1-1-2-1-001 - Use the manual configuration of security association between MN and HA

[CATEGORY]

HOST : ADVANCED FUNCTION (REAL HOME LINK)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES

[TOPOLOGY]

Refer to 2.1.1.1 Common Topology-1

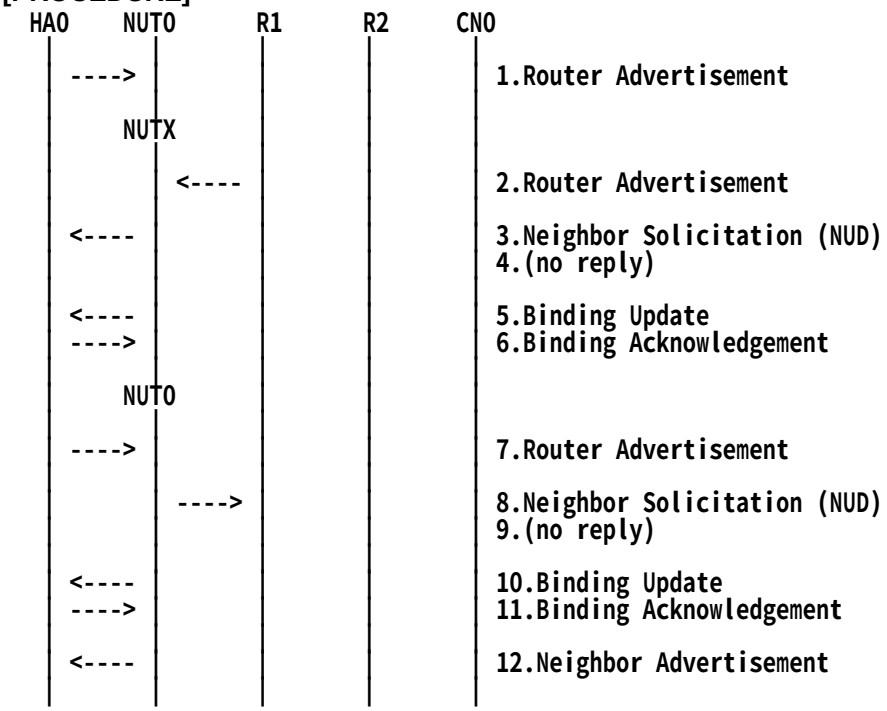
[TEST SETUP]

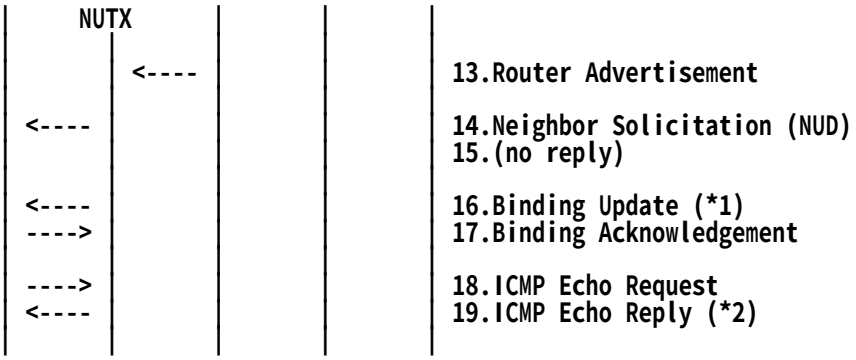
Refer to 3.1 Common Setup-1

[INITIALIZATION]

NONE

[PROCEDURE]





1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
7. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
8. Receive Neighbor Solicitation (NUD). (NUTX -> R1) (Refer to 5.3.3)
9. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
10. Receive Binding Update to HA0. (NUT0 -> HA0) (Refer to 5.14.1)
11. Send Binding Acknowledgement. (HA0 -> NUT0) (Refer to 5.15.1)
12. Receive Neighbor Advertisement. (NUT0 -> NUT0_allnode_multi) (Refer to 5.4.1)
13. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
14. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
15. (no reply)
   # Wait during a maximum of 3 seconds(RFC2461).
16. Receive Binding Update to HA0. (NUTX -> HA0) (*1) (Refer to 5.14.1)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA1_SPI
Mobility Header	MH Type	5
	H Flag	1
	Lifetime	Any (> 0)
Alternate Care-of Address Option	Type	3
	Address	NUTX (LinkX, global)

17. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA2_SPI
Mobility Header	MH Type	6
	Status	0
	Lifeitme	Any (>. 0)

18. Send ICMP Echo Request. (HA0 -> NUTX with Type2 Routing Header) (Refer to 5.7.3)
   a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA6_SPI
ICMPv6	Type	128

   b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

19. Receive ICMP Echo Reply. (NUTX -> HA0 with Home Address Option) (*2)
(Refer to 5.8.3)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA5 SPI
ICMPv6 Header	Type	129

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6 Header	Type	129

[JUDGMENT]

(*1) PASS: HA0 receives Binding Update.
Then, check whether this packet fills all of the following.
- The ESP header is included.
- The Acknowledge(A) bit is set to ON.
- The Home Registration(H) bit is set to ON.
- The Alternate Care-of Address mobility option is included.
  - The Care-of Address field is set to the Care-of Address.

(*2) PASS: HA0 receives ICMP Echo Reply with Home Address Option.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.1, 6.1.7

RFC3776 Using IPsec to Protect Mobile IPv6 Signaling Between Mobile Nodes and Home Agents
See Section 4.2

6.14 Mobile to Mobile

6.14.1 Route Optimization

6.14.1.1 MN-2-1-1-2-002 - Receiving the packet (including home address destination) by tunneling

[PURPOSE]

MN-2-1-1-2-002 - Receiving the packet (including home address destination) by tunneling

[CATEGORY]

HOST : ADVANCED FUNCTION (MOBILE TO MOBILE)

[REQUIREMENT OF TEST]

Function of Real Home Link: YES
Function of Return Routability: YES
Function of Mobile to Mobile: YES

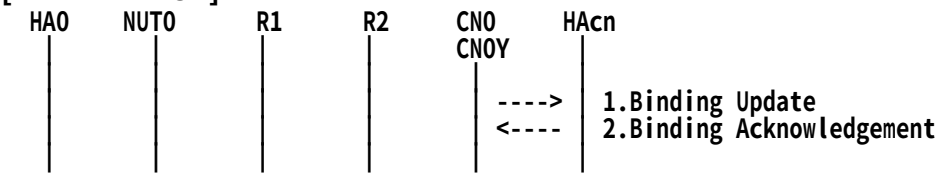
[TOPOLOGY]

Refer to 2.1.1.4 Common Topology-4

[TEST SETUP]

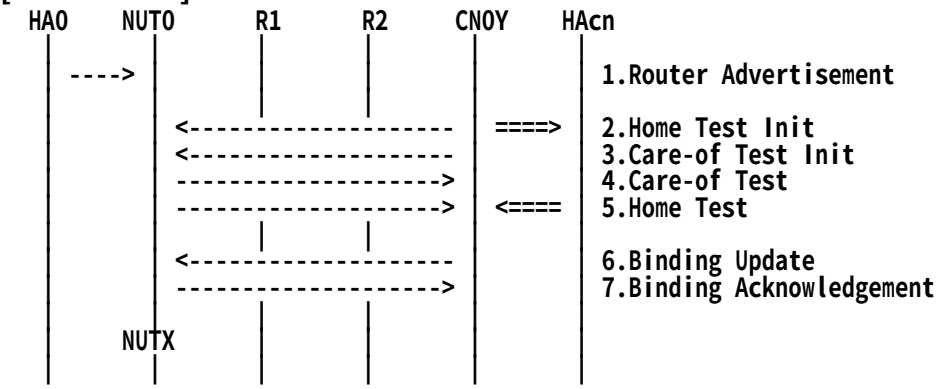
Refer to 3.1 Common Setup-1

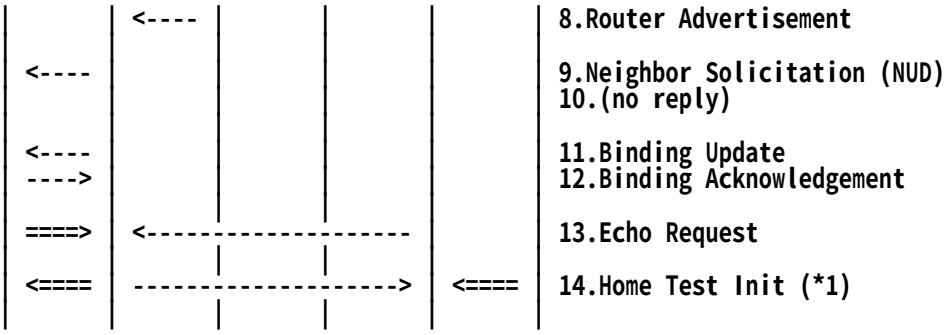
[INITIALIZATION]



1. Receive Binding Update to HAcn. (CN0Y -> HAcn) (Refer to 5.14.1)
2. Send Binding Acknowledgement. (HAcn -> CN0Y) (Refer to 5.15.1)

[PROCEDURE]





1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Home Test Init. (CN0 -> NUT0) (Refer to 5.10.1)
3. Send Care-of Test Init. (CN0Y -> NUT0) (Refer to 5.11.1)
4. Receive Care-of Test. (NUT0 -> CN0Y) (Refer to 5.13.1)
5. Receive Home Test. (NUT0 -> CN0) (Refer to 5.12.1)
6. Send Binding Update. (CN0Y -> NUT0) (Refer to 5.14.3)
7. Receive Binding Acknowledgement. (NUT0 -> CN0Y) (Refer to 5.15.3)
8. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
9. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
10. (no reply)
    # Wait during a maximum of 3 seconds(RFC2461).
11. Receive Binding Update. (NUTX -> HA0) (Refer to 5.14.1)
12. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
13. Send Echo Request. (out: HA0 -> NUTX, in: CN0Y -> NUT0 with Home Address Option) (Refer to 5.7.4)

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
ICMPv6	Type	128

14. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.10.2)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	1

[JUDGMENT]

(*1) PASS: HA0 receives Home Test Init.
- The Destination Address(inner) is set to Home Address of ICMP Echo Request[13].

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 11.7.2, 9.3.1, 6.1.

6.14.1.2 MN-2-1-1-2-003 - Don't start the return routability procedure (when receiving the tunneled CoTI)

[PURPOSE]

MN-2-1-1-2-003 - Don't start the return routability procedure (when receiving the tunneled CoTI)

[CATEGORY]

HOST : ADVANCED FUNCTION (MOBILE TO MOBILE)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

Function of Mobile to Mobile: YES

[TOPOLOGY]

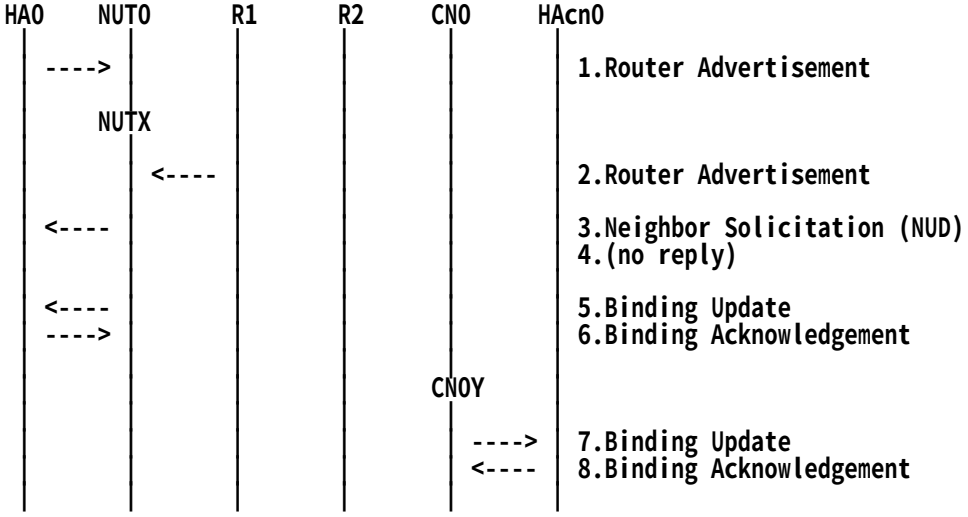
Refer to 2.1.1.4 Common Topology-4

[TEST SETUP]

Refer to 3.1 Common Setup-1

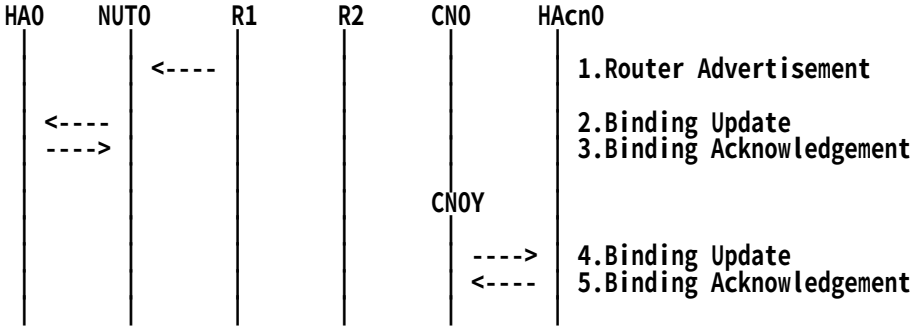
[INITIALIZATION]

- In the case of Real Home Link



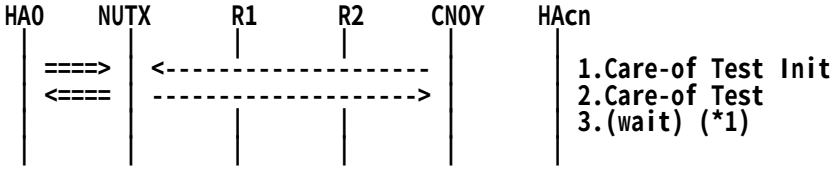
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
7. Receive Binding Update to HAcn. (CN0Y -> HAcn) (Refer to 5.14.1)
8. Send Binding Acknowledgement. (HAcn -> CN0Y) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)
4. Receive Binding Update to HAcn. (CN0Y -> HAcn) (Refer to 5.14.1)
5. Send Binding Acknowledgement. (HAcn -> CN0Y) (Refer to 5.15.1)

[PROCEDURE]



1. Send Care-of Test Init. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.11.2)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

2. Receive Care-of Test. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.13.2)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[1])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[1])

3. (wait) (*1)

Wait during 32 seconds.

[JUDGMENT]

(*1) PASS: CN0Y does not receive Home Test Init and Care-of Test Init.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 11.7.2, 6.1.

6.14.1.3 MN-2-1-1-3-001 - Sending HoT by reverse tunneling (after receiving the tunneled HoTI)

[PURPOSE]

MN-2-1-1-3-001 - Sending HoT by reverse tunneling (after receiving the tunneled HoTI)

[CATEGORY]

HOST : ADVANCED FUNCTION (MOBILE TO MOBILE)

[REQUIREMENT OF TEST]

Function of Return Routability: YES
Function of Mobile to Mobile: YES

[TOPOLOGY]

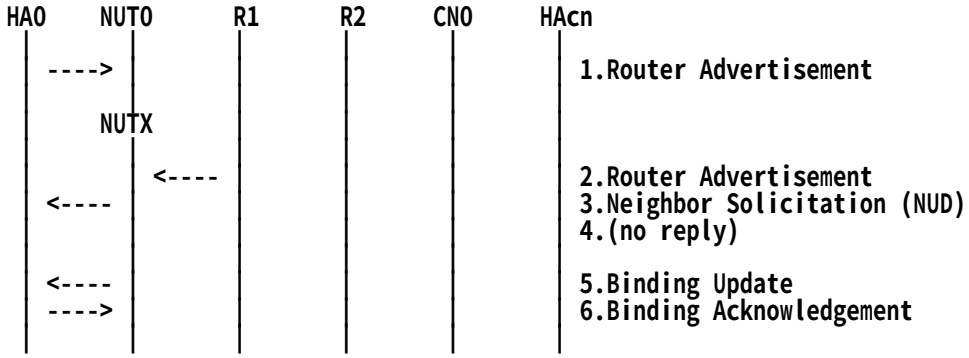
Refer to 2.1.1.4 Common Topology-4

[TEST SETUP]

Refer to 3.1 Common Setup-1

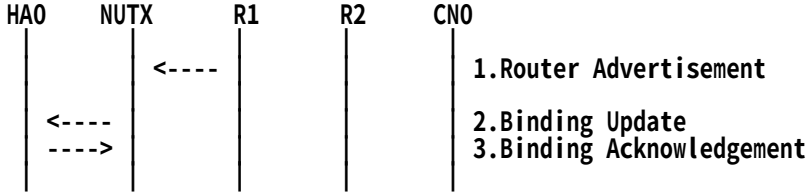
[INITIALIZATION]

- In the case of Real Home Link



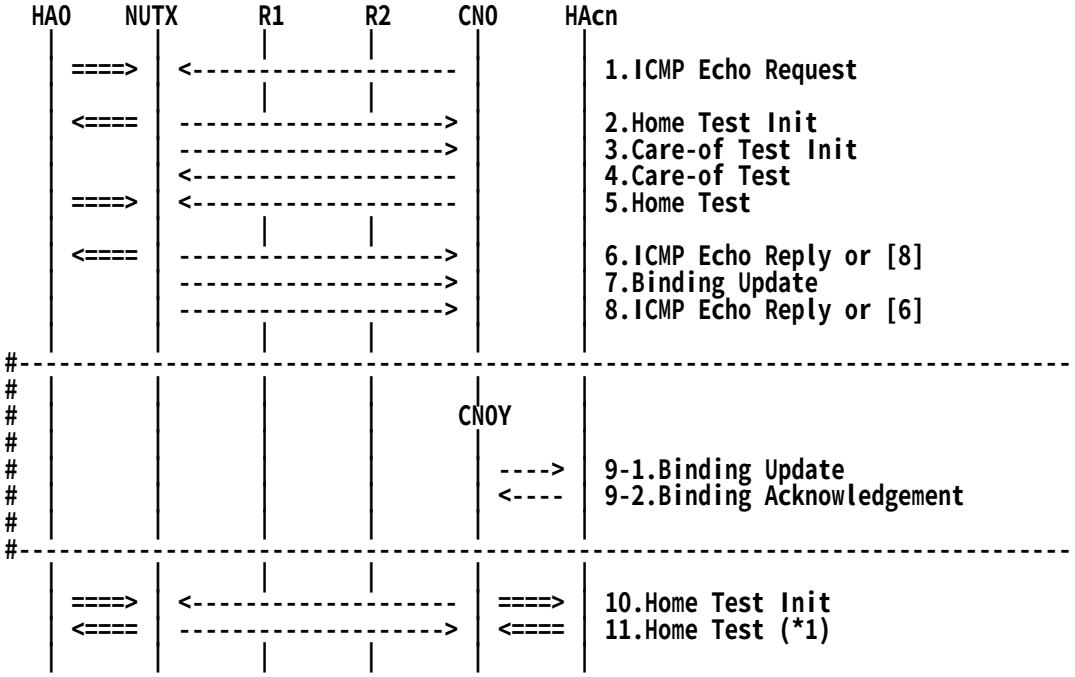
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)

#----------

9-1. Receive Binding Update to HAcn. (CN0Y -> HAcn) (Refer to 5.14.1)

9-2. Send Binding Acknowledgement. (HAcn -> CN0Y) (Refer to 5.15.1)

#----------

10. Send Home Test Init. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.10.3)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4 SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)

Mobility Header	MH Type	1
	Home Init Cookie	Any

11. Receive Home Test. (out: NUTX -> HA0, in: NUT0 -> CN0) (*1) (Refer to 5.12.3)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[10])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[10])

[JUDGMENT]

(*1) PASS: CN0Y receives Home Test by reverse tunneling.

Then, check whether this packet fills all of the following.

- The Source Address(outer) is set to primary Care-of Address.
- The Destination Address(outer) is set to HA address.
- The Destination Address(inner) is set to the Source Address(inner) of Home Test Init[10].
- The Source Address(inner) is set to Home Address.
- The Type2 routing header option is not included.
- The Home Address destination option is not included.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 6.1, 9.4.1, 9.4.3

6.14.1.4 MN-2-1-2-3-001 - Sending CoT by reverse tunneling (after receiving the tunneled CoTI)

[PURPOSE]

MN-2-1-2-3-001 - Sending CoT by reverse tunneling (after receiving the tunneled CoTI)

[CATEGORY]

HOST : ADVANCED FUNCTION (MOBILE TO MOBILE)

[REQUIREMENT OF TEST]

Function of Return Routability: YES
Function of Mobile to Mobile: YES

[TOPOLOGY]

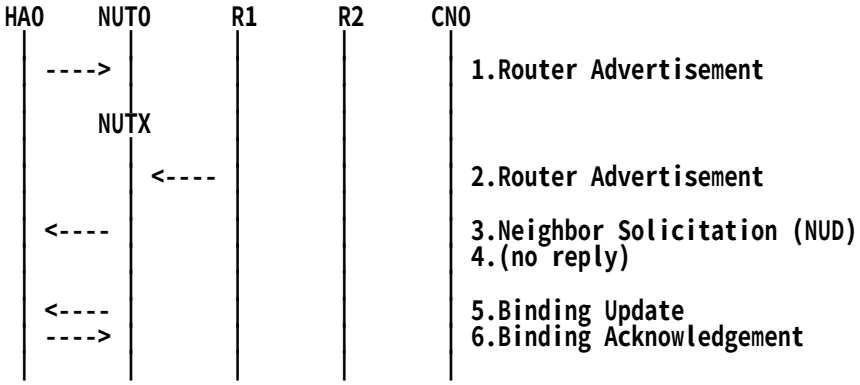
Refer to 2.1.1.4 Common Topology-4

[TEST SETUP]

Refer to 3.1 Common Setup-1

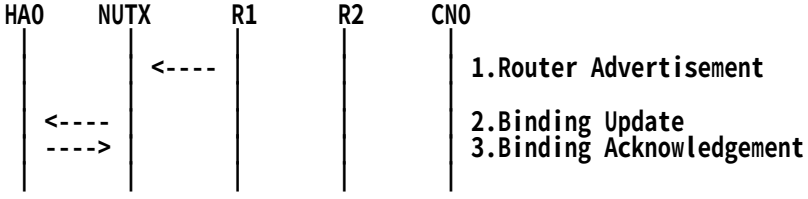
[INITIALIZATION]

- In the case of Real Home Link



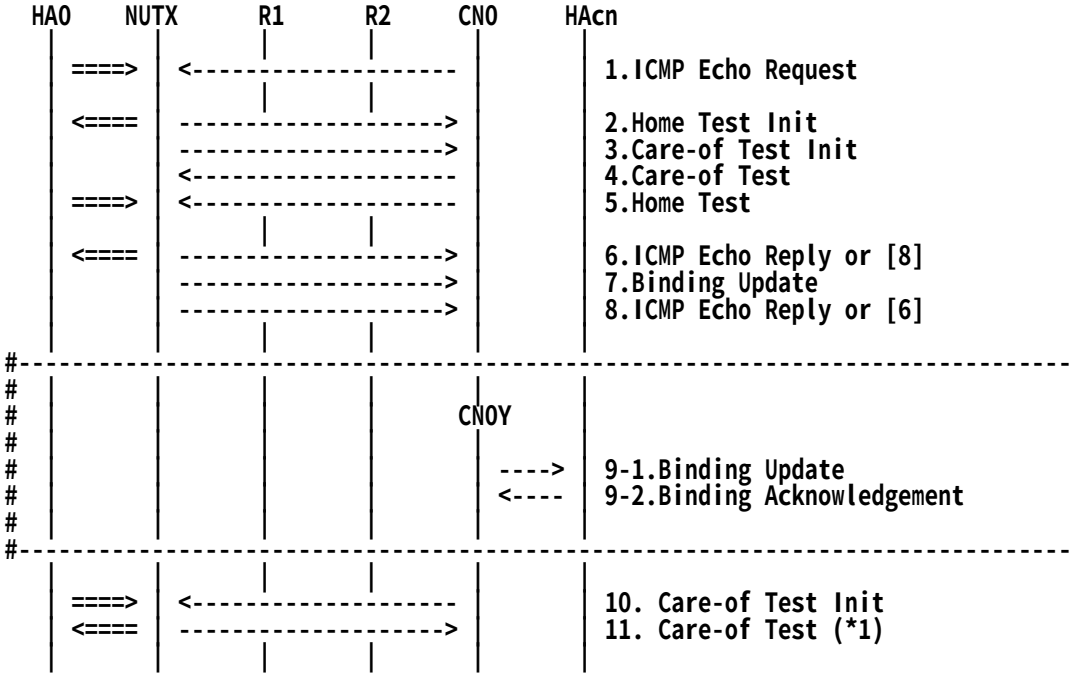
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)

#----------

9-1. Receive Binding Update to HAcn. (CN0Y -> HAcn) (Refer to 5.14.1)

9-2. Send Binding Acknowledgement. (HAcn -> CN0Y) (Refer to 5.15.1)

#----------

10. Send Care-of Test Init. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.11.2)
    a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4 SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

    b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)

Mobility Header	MH Type	2
	Care-of Init Cookie	Any

11. Receive Care-of Test. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (*1) (Refer to 5.13.2)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[10])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[10])

[JUDGMENT]

(*1) PASS: CN0Y receives Care-of Test by reverse tunneling.

Then, check whether this packet fills all of the following.

- The Source Address(outer) is set to primary Care-of Address.
- The Destination Address(outer) is set to HA address.
- The Destination Address(inner) is set to the Source Address(inner) of Care-of Test Init[10].
- The Source Address(inner) is set to Home Address.
- The Type2 routing header option is not included.
- The Home Address destination option is not included.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 6.1, 9.4.2, 9.4.4

6.14.2 Home Registration and Correspondent Registration

6.14.2.1 MN-3-1-1-3-001 - Sending BA by reverse tunneling (after receiving the tunneled BU)

[PURPOSE]

MN-3-1-1-3-001 - Sending BA by reverse tunneling (after receiving the tunneled BU)

[CATEGORY]

HOST : ADVANCED FUNCTION (MOBILE TO MOBILE)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

Function of Mobile to Mobile: YES

[TOPOLOGY]

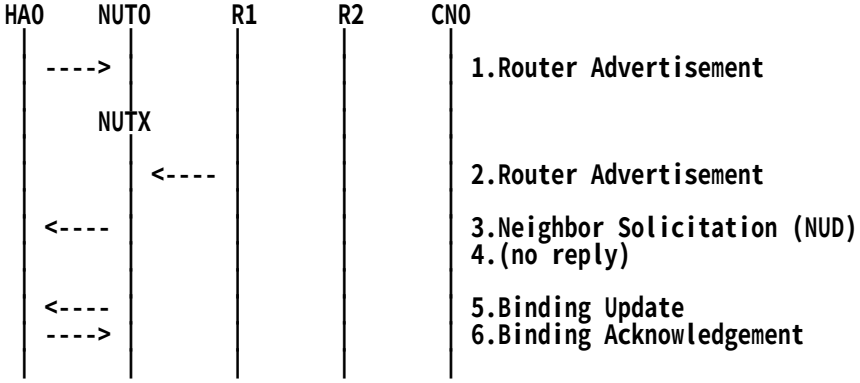
Refer to 2.1.1.4 Common Topology-4

[TEST SETUP]

Refer to 3.1 Common Setup-1

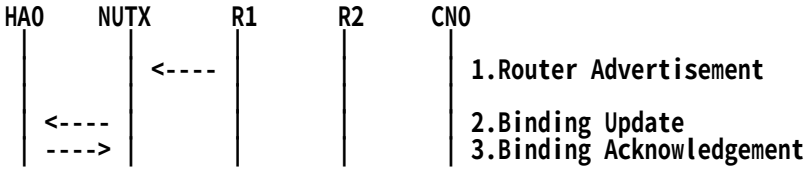
[INITIALIZATION]

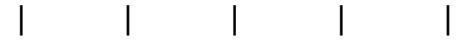
- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

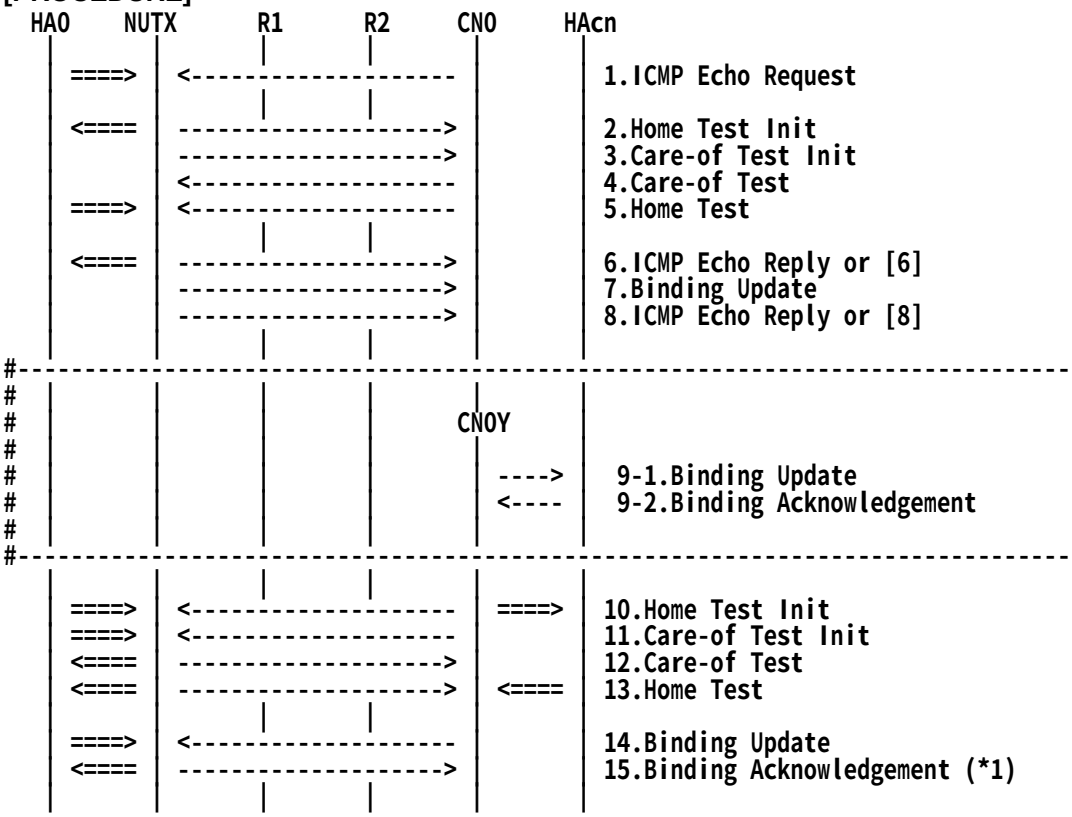
- In the case of Virtual Home Link





1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)

#---

9-1. Receive Binding Update to HAcn. (CN0Y -> HAcn) (Refer to 5.14.1)

9-2. Send Binding Acknowledgement. (HAcn -> CN0Y) (Refer to 5.15.1)

#---

10. Send Home Test Init. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.10.3)
    a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)

	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

11. Send Care-of Test Init. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.11.2)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

12. Receive Care-of Test. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.13.2)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[11])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[11])

13. Receive Home Test. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.12.3)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[10])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[10])

14. Send Binding Update. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.14.5)

The Acknowledge(A) bit is set to ON.

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameter Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any

	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[13])
	Care-of Nonce Index	(= CoT[12])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[13])
	Care-of Nonce Index	(= CoT[12])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

15. Receive Binding Acknowledgement. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (*1)
(Refer to 5.15.5)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[14])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[14])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

[JUDGMENT]

(*1) PASS: CN0Y receives Binding Acknowledgement by tunneling.
Then, check whether this packet fills all of the following.
- The Source Address(outer) is set to primary Care-of address.
- The Destination Address(outer) is set to HA address.
- The Destination Address(inner) is set to the Source Address(inner) of Binding Update[14].
- The Source Address(inner) is set to Home Address.
- The Home Address destination option is not included.
- The status is set to 0.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 6.1

6.14.2.2 MN-3-1-2-3-001 - Sending BU (before the expiration of home registration)

[PURPOSE]

MN-3-1-2-3-001 - Sending BU (before the expiration of home registration)

[CATEGORY]

HOST : ADVANCED FUNCTION (MOBILE TO MOBILE)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

Function of Mobile to Mobile: YES

[TOPOLOGY]

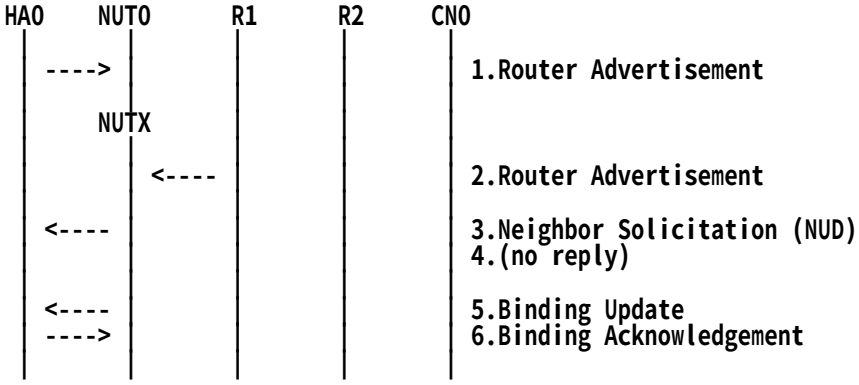
Refer to 2.1.1.4 Common Topology-4

[TEST SETUP]

Refer to 3.1 Common Setup-1

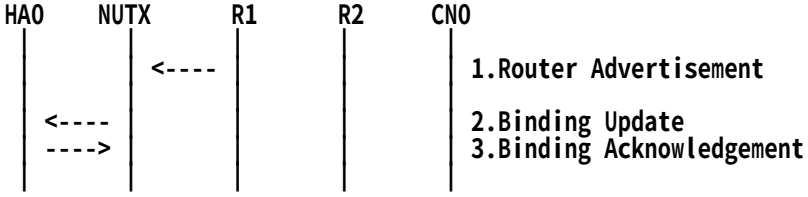
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

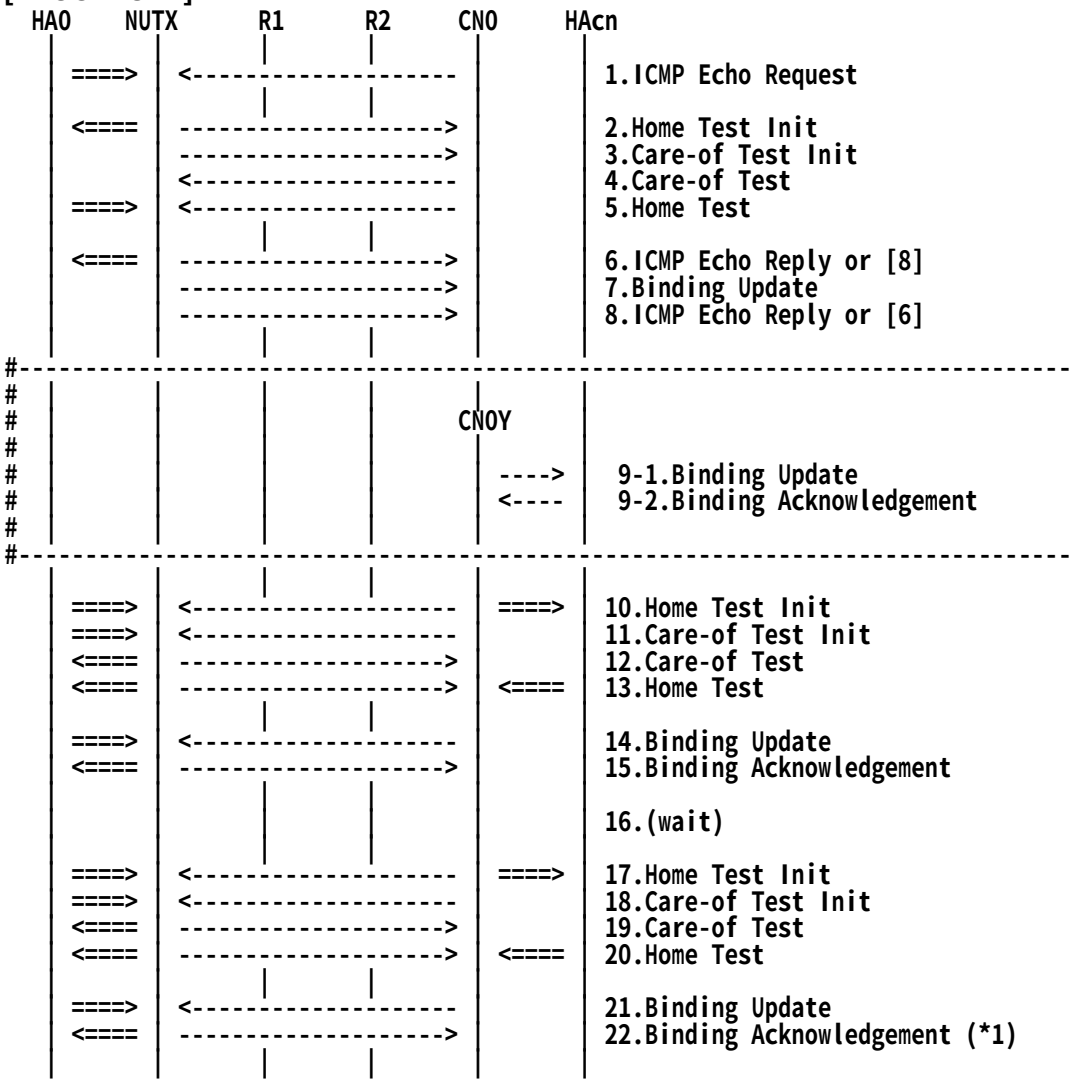
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)

#----------

9-1. Receive Binding Update to HAcn. (CN0Y -> HAcn) (Refer to 5.14.1)

9-2. Send Binding Acknowledgement. (HAcn -> CN0Y) (Refer to 5.15.1)

#---

10. Send Home Test Init. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.10.3)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

11. Send Care-of Test Init. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.11.2)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

12. Receive Care-of Test. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.13.2)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[11])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[11])

13. Receive Home Test. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.12.3)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[10])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[10])

14. Send Binding Update. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.14.5)

The Acknowledge(A) bit is set to ON.

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameter Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[13])
	Care-of Nonce Index	(= CoT[12])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[13])
	Care-of Nonce Index	(= CoT[12])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

15. Receive Binding Acknowledgement. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.15.5)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[14])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[14])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

16. (wait)

17. Send Home Test Init. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.10.3)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

18. Send Care-of Test Init. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.11.2)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

19. Receive Care-of Test. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.13.2)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[18])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[18])

20. Receive Home Test. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.12.3)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[17])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[17])

21. Send Binding Update. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.14.5)

The Acknowledge(A) bit is set to ON.

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameter Index	SA3_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[14])
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Optiom	Option Type	4
	Home Nonce Index	(= HoT[20])
	Care-of Nonce Index	(= CoT[19])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)

	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[14])
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[20])
	Care-of Nonce Index	(= CoT[19])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

22. Receive Binding Acknowledgement. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (*1)
(Refer to 5.15.5)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[21])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[21])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

[JUDGMENT]

(*1) PASS: CN0Y receives Binding Acknowledgement by tunneling.
Then, check whether this packet fills all of the following.
- The Source Address(outer) is set to primary Care-of Address.
- The Destination Address(outer) is set to HA address.
- The Destination Address(inner) is set to the Source Address(inner) of Binding Update[14].
- The Source Address(inner) is set to Home Address.
- The Home Address destination option is not included.
- The status is set to 0.

[REFERENCES]

RFC3775 Mobility Support in IPv6
See Section 6.1

6.14.2.3 MN-3-1-3-3-001 - Sending BU (when the lifetime for a changed prefix decreases)

[PURPOSE]

MN-3-1-3-3-001 - Sending BU (when the lifetime for a changed prefix decreases)

[CATEGORY]

HOST : ADVANCED FUNCTION (MOBILE TO MOBILE)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

Function of Mobile to Mobile: YES

[TOPOLOGY]

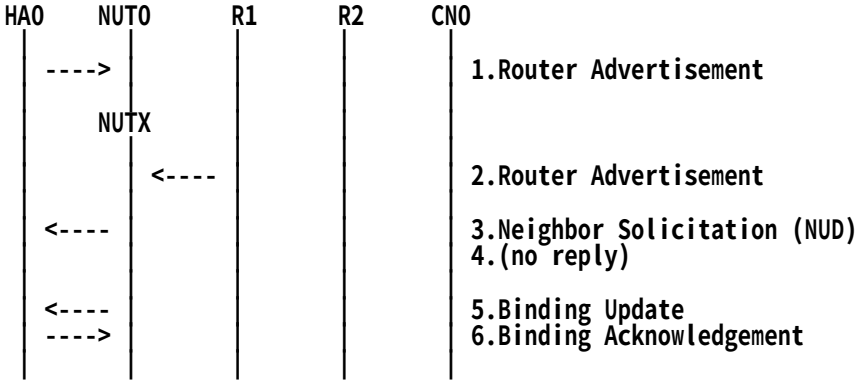
Refer to 2.1.1.4 Common Topology-4

[TEST SETUP]

Refer to 3.1 Common Setup-1

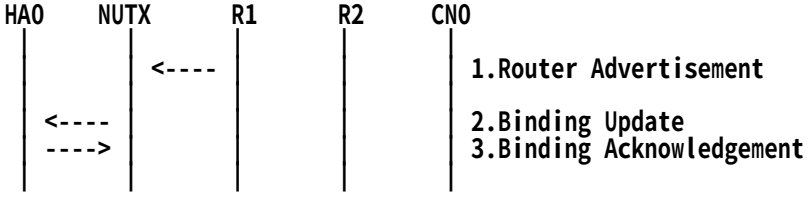
[INITIALIZATION]

- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

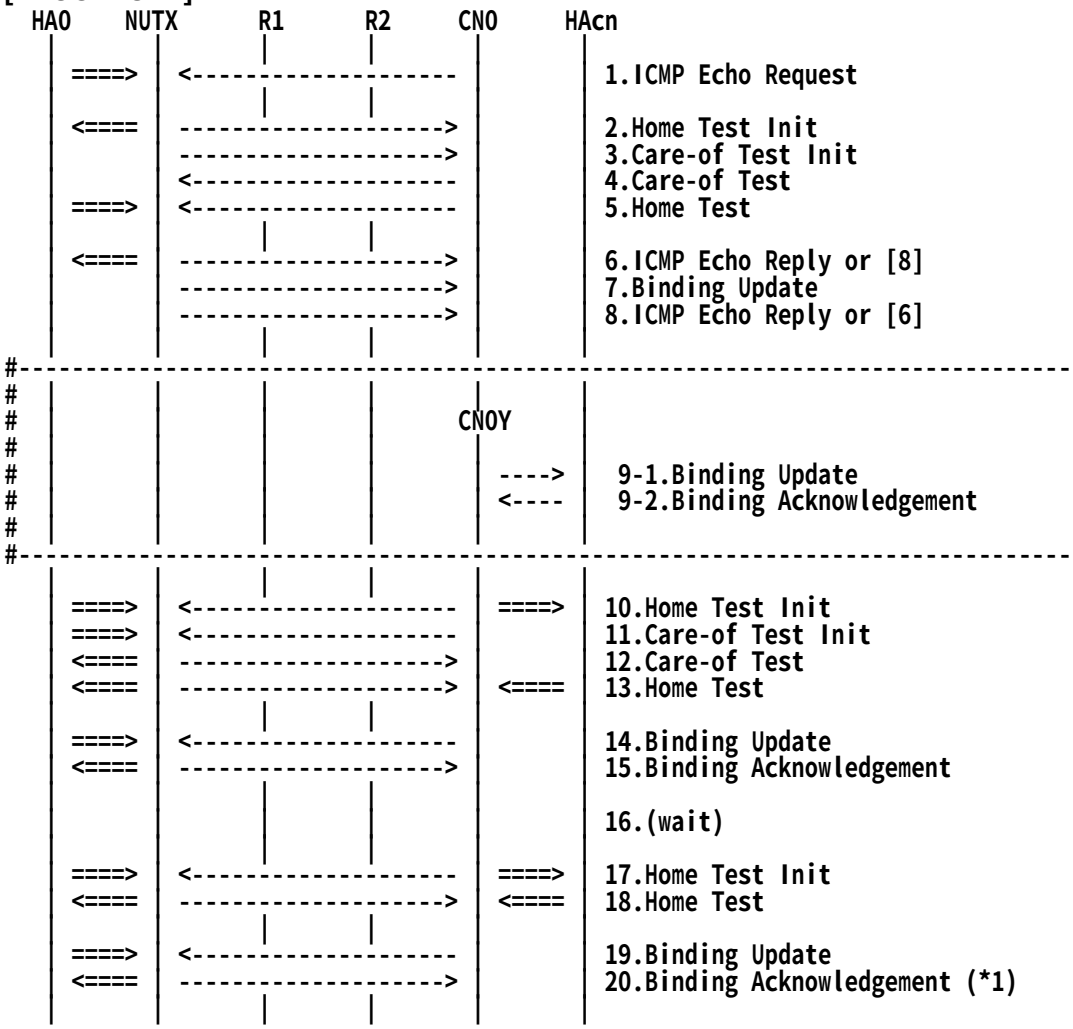
- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)

2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option)
   (Refer to 5.8.3)

#---

9-1. Receive Binding Update to HAcn. (CN0Y -> HAcn) (Refer to 5.14.1)
9-2. Send Binding Acknowledgement. (HAcn -> CN0Y) (Refer to 5.15.1)

#---

10. Send Home Test Init. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.10.3)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

11. Send Care-of Test Init. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.11.2)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

12. Receive Care-of Test. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.13.2)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[11])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[11])

13. Receive Home Test. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.12.3)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[10])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[10])

14. Send Binding Update. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.14.5)

The Acknowledge(A) bit is set to ON.

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)

	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameter Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[13])
	Care-of Nonce Index	(= CoT[12])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[13])
	Care-of Nonce Index	(= CoT[12])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

15. Receive Binding Acknowledgement. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.15.5)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[14])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[14])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

16. (wait)

17. Send Home Test Init. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.10.3)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

18. Receive Home Test. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.12.3)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[17])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[17])

19. Send Binding Update. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.14.5)

The Acknowledge(A) bit is set to ON.

Lifetime is zero.

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameter Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[14])
	A Flag	1
	H Flag	0
	Lifetime	0
Alternate Care-of Address Option	Type	3
	Address	CN0 (LinkZ, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[18])
	Care-of Nonce Index	Any
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[14])
	A Flag	1
	H Flag	0
	Lifetime	0
Alternate Care-of Address Option	Type	3
	Address	CN0 (LinkZ, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[18])
	Care-of Nonce Index	Any
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

20. Receive Binding Acknowledgement. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (*1) (Refer to 5.15.5)

Type2 routing header is included.

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[19])
	Lifetime	0
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)

Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[19])
	Lifetime	0
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

[JUDGMENT]

(*1) PASS: CN0Y receives Binding Acknowledgement by tunneling.

Then, check whether this packet fills all of the following.

- The Source Address(outer) is set to primary Care-of Address.
- The Destination Address(outer) is set to HA address.
- The Destination Address(inner) is set to the Source Address(inner) of Binding Update[19].
- The Source Address(inner) is set to Home Address.
- The Home Address destination option is not included.
- The status is set to 0.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 6.1

6.14.3 General packet send and receiving

6.14.3.1 MN-4-1-1-3-001 - Send and receive the packets (including type2 routing header and home address destination)

[PURPOSE]

MN-4-1-1-3-001 - Send and receive the packets (including type2 routing header and home address destination)

[CATEGORY]

HOST : ADVANCED FUNCTION (MOBILE TO MOBILE)

[REQUIREMENT OF TEST]

Function of Return Routability: YES
Function of Mobile to Mobile: YES

[TOPOLOGY]

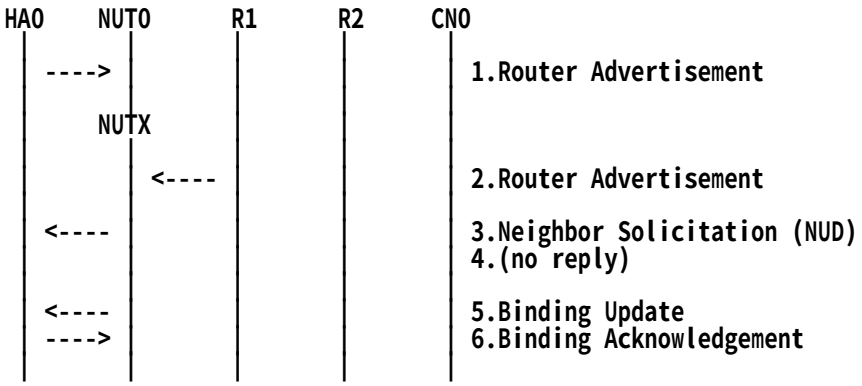
Refer to 2.1.1.4 Common Topology-4

[TEST SETUP]

Refer to 3.1 Common Setup-1

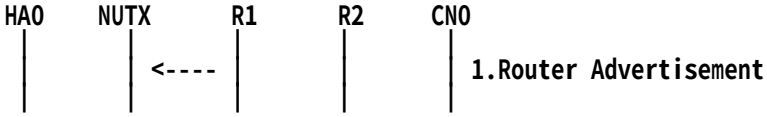
[INITIALIZATION]

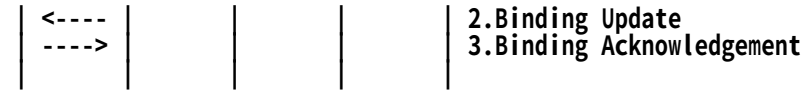
- In the case of Real Home Link



1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

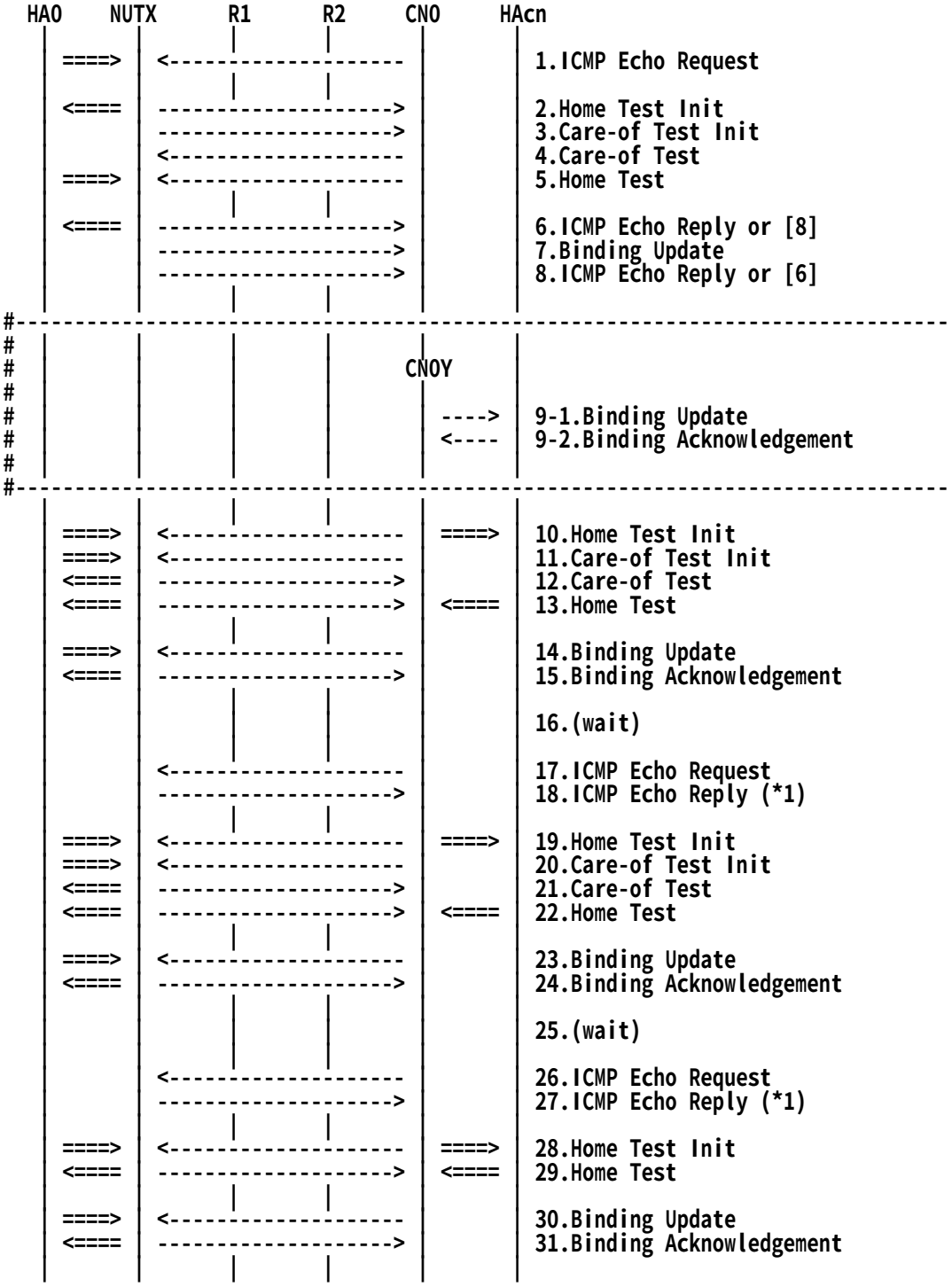
- In the case of Virtual Home Link

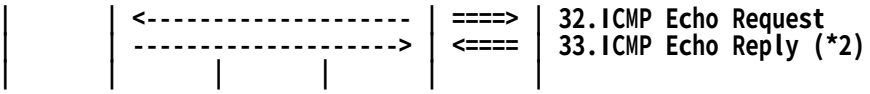




1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]





1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)
5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0 with Home Address Option) (Refer to 5.8.3)

#---

9-1. Receive Binding Update to HAcn. (CN0Y -> HAcn) (Refer to 5.14.1)
9-2. Send Binding Acknowledgement. (HAcn -> CN0Y) (Refer to 5.15.1)

#---

10. Send Home Test Init. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.10.3)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

11. Send Care-of Test Init. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.11.2)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

12. Receive Care-of Test. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.13.2)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[11])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)

IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[11])

13. Receive Home Test. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.12.3)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[10])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[10])

14. Send Binding Update. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.14.5)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameter Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[13])
	Care-of Nonce Index	(= CoT[12])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[13])
	Care-of Nonce Index	(= CoT[12])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

15. Receive Binding Acknowledgement. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.15.5)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[14])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0

	Sequence Number	(= BU[14])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

16. (wait)
17. Send ICMP Echo Request. (CN0Y -> NUTX with Type2 Routing Header and Home Address Option) (Refer to 5.7.5)

IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
ICMPv6	Type	128

18. Receive ICMP Echo Reply. (NUTX -> CN0Ywith Type2 Routing Header and Home Address Option) (*1) (Refer to 5.8.4)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0Y (LinkY, global)
Type 2 Routing Header	Home Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	129

19. Send Home Test Init. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.10.3)
    a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

    b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

20. Send Care-of Test Init. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.11.2)
    a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

    b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

21. Receive Care-of Test. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.13.2)
    a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[20])

    b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[20])

22. Receive Home Test. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.12.3)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[19])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[19])

23. Send Binding Update. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.14.5)

The Acknowledge(A) bit is set to ON.

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameter Index	SA3_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[14])
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Optiom	Option Type	4
	Home Nonce Index	(= HoT[22])
	Care-of Nonce Index	(= CoT[21])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[14])
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[22])
	Care-of Nonce Index	(= CoT[21])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

24. Receive Binding Acknowledgement. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.15.5)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[23])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[23])
	Lifetime	(> 0)

Binding Authorization Data Option	Option Type	5
	Authenticator	Any

25. (wait)
26. Send ICMP Echo Request. (CN0Y -> NUTXwith Type2 Routing Header and Home Address Option) (Refer to 5.7.5)
27. Receive ICMP Echo Reply. (NUTX -> CN0Ywith Type2 Routing Header and Home Address Option) (*1) (Refer to 5.8.4)
28. Send Home Test Init. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.10.3)
    a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

    b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

29. Receive Home Test. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.12.3)
    a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[28])

    b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[28])

30. Send Binding Update. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.14.6)
    # The Acknowledge(A) bit is set to ON.
    a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameter Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[23])
	A Flag	1
	H Flag	0
	Lifetime	0
Alternate Care-of Address Option	Type	3
	Address	CN0 (LinkZ, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[29])
	Care-of Nonce Index	Any
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

    b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[23])
	A Flag	1
	H Flag	0
	Lifetime	0

Alternate Care-of Address Option	Type	3
	Address	CN0 (LinkZ, global)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[29])
	Care-of Nonce Index	Any
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

31. Receive Binding Acknowledgement. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.15.5)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[30])
	Lifetime	0
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[30])
	Lifetime	0
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

32. Send ICMP Echo Request. (CN0 -> NUTX) (Refer to 5.7.3)

IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	128

33. Receive ICMP Echo Reply. (NUTX -> CN0) (*2) (Refer to 5.8.3)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	129

[JUDGMENT]

(*1) PASS: CN0Y receives ICMP Echo Reply with Type2 Routing Header and Home Address Option.

Then, check whether this packet fills all of the following.

- The Destination Address is set to the Source Address of ICMP Echo Request [17 and 26] (=Care-of address of Correspondent Node).
- The Source Address is set to the Destination Address of ICMP Echo Request [17 and 26] (=Care-of address of Mobile Node).
- The Type2 routing header option is included, and,
  - This option is placed as the right location.
  - The Home Address field is set to the Home Address of Correspondent Node.
- The Home Address destination option is included, and,
  - This option is placed as the right location.
  - The Home Address field is set to the Home Address of Mobile Node.

(*2) PASS: CN0 receives ICMP Echo Reply with Home Address Option.

Then, check whether this packet fills all of the following.

- The Destination Address is set to the Source Address of ICMP Echo Request [32] (=Home address of Correspondent Node).
- The Source Address is set to the Destination Address of ICMP Echo Request [32] (=Care-of address of Mobile Node).
- The Type2 routing header option is not included.
- The Home Address destination option is included, and,
  - This option is placed as the right location.
  - The Home Address field is set to the Home Address of Mobile Node.

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 6.1, 9.3.1, 9.3.2, 11.3.1, 11.3.3

6.14.4 Binding Error

6.14.4.1 MN-4-1-2-3-001 - Sending BE by reverse tunneling

[PURPOSE]

MN-4-1-2-3-001 - Sending BE by reverse tunneling

[CATEGORY]

HOST : ADVANCED FUNCTION (MOBILE TO MOBILE)

[REQUIREMENT OF TEST]

Function of Return Routability: YES

Function of Mobile to Mobile: YES

[TOPOLOGY]

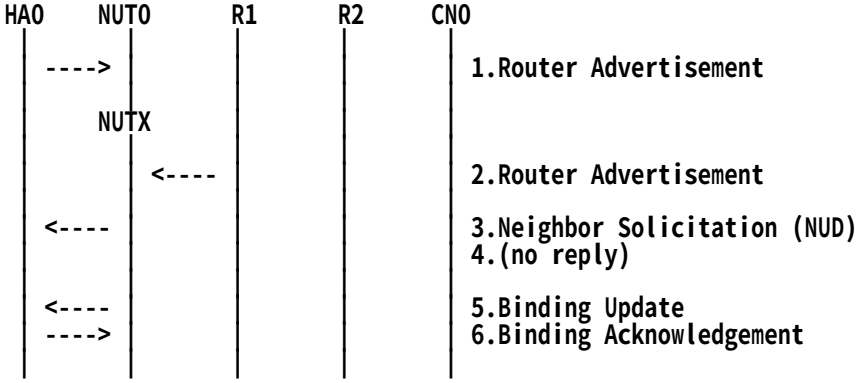
Refer to 2.1.1.4 Common Topology-4

[TEST SETUP]

Refer to 3.1 Common Setup-1

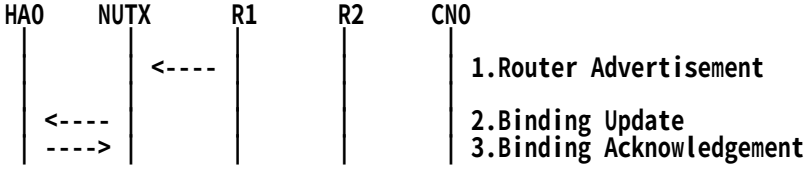
[INITIALIZATION]

- In the case of Real Home Link



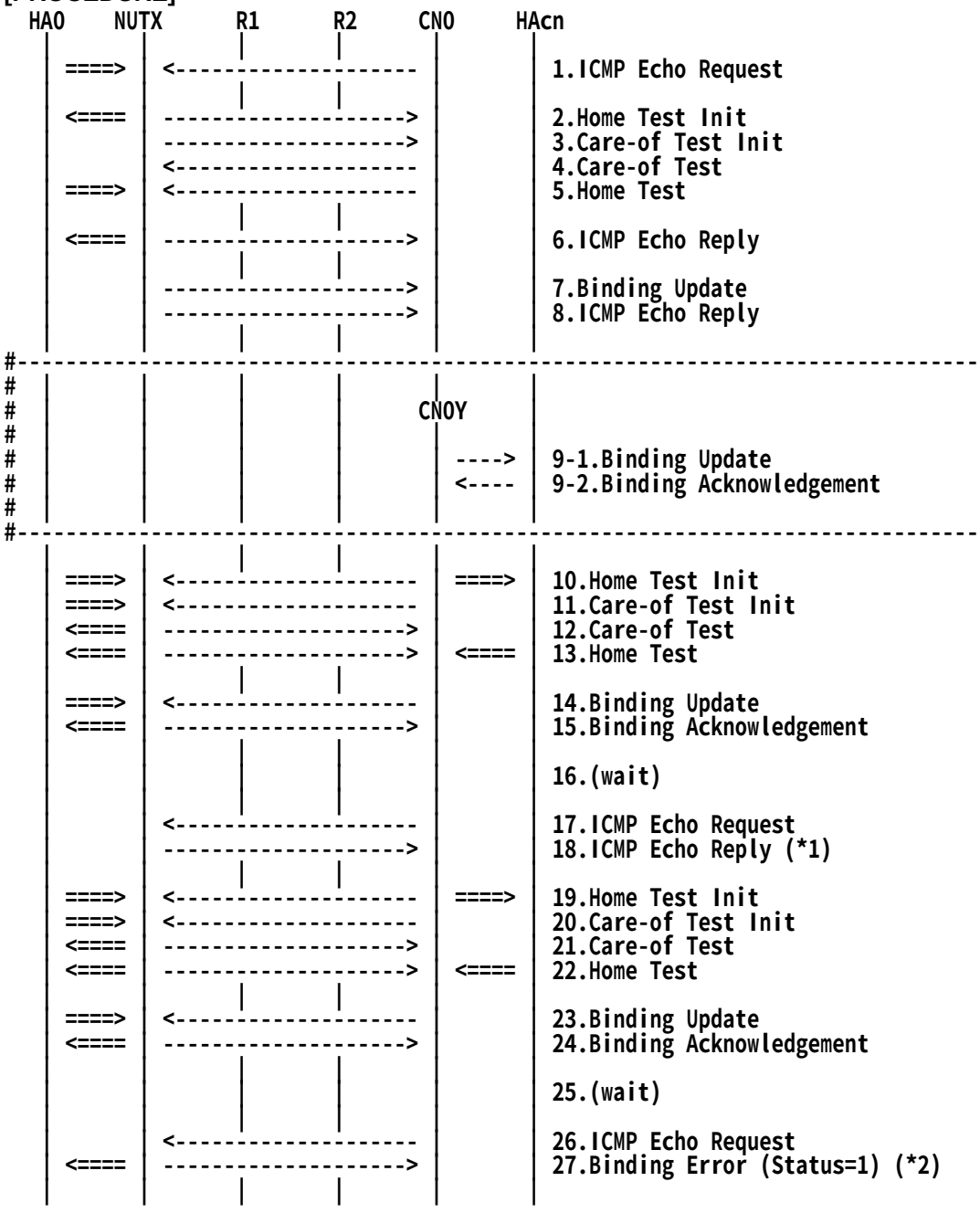
1. Send Router Advertisement. (HA0 -> HA0_allnode_multi) (Refer to 5.2.2)
2. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
3. Receive Neighbor Solicitation (NUD). (NUT0 -> HA0) (Refer to 5.3.3)
4. (no reply)
5. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
6. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

- In the case of Virtual Home Link



1. Send Router Advertisement. (R1 -> R1_allnode_multi) (Refer to 5.2.1)
2. Receive Binding Update to HA0. (NUTX -> HA0) (Refer to 5.14.1)
3. Send Binding Acknowledgement. (HA0 -> NUTX) (Refer to 5.15.1)

[PROCEDURE]



1. Send ICMP Echo Request. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.7.2)
2. Receive Home Test Init. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.10.2)
3. Receive Care-of Test Init. (NUTX -> CN0) (Refer to 5.11.1)
4. Send Care-of Test. (CN0 -> NUTX) (Refer to 5.13.1)

5. Send Home Test. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.12.2)
6. Receive ICMP Echo Reply or [8]. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.8.2)
7. Receive Binding Update to CN0. (NUTX -> CN0) (Refer to 5.14.3)
8. [6] or Receive ICMP Echo Reply. (NUTX -> CN0with Home Address Option)
(Refer to 5.8.3)

#---

9-1. Receive Binding Update to HAcn. (CN0Y -> HAcn) (Refer to 5.14.1)
9-2. Send Binding Acknowledgement. (HAcn -> CN0Y) (Refer to 5.15.1)

#---

10. Send Home Test Init. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.10.3)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

11. Send Care-of Test Init. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.11.2)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

12. Receive Care-of Test. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.13.2)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[11])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[11])

13. Receive Home Test. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.12.3)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)

Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[10])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[10])

14. Send Binding Update. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.14.5)

The Acknowledge(A) bit is set to ON.

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameter Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[13])
	Care-of Nonce Index	(= CoT[12])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any
	A Flag	1
	H Flag	0
	Lifetime	Any (> 0)
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[13])
	Care-of Nonce Index	(= CoT[12])
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

15. Receive Binding Acknowledgement. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.15.5)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[14])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[14])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

16. (wait)

17. Send ICMP Echo Request. (CN0Y -> NUTX with Type2 Routing Header and Home Address Option) (Refer to 5.7.5)

IPv6 Header	Source Address	CN0Y (LinkY, global)

	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
ICMPv6	Type	128

18. Receive ICMP Echo Reply. (NUTX -> CN0Ywith Type2 Routing Header and Home Address Option) (*1) (Refer to 5.8.4)

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	CN0Y (LinkY, global)
Type 2 Routing Header	Home Address	CN0 (LinkZ, global)
Destination Option Header	Home Address	NUT0 (Link0, global)
ICMPv6	Type	129

19. Send Home Test Init. (out: HA0 -> NUTX, in: CN0 -> NUT0) (Refer to 5.10.3)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0 (LinkZ, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	1
	Home Init Cookie	Any

20. Send Care-of Test Init. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.11.2)

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Mobility Header	MH Type	2
	Care-of Init Cookie	Any

21. Receive Care-of Test. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.13.2)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[20])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	4
	Care-of Init Cookie	(= CoTI[20])

22. Receive Home Test. (out: NUTX -> HA0, in: NUT0 -> CN0) (Refer to 5.12.3)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA4_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[19])

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0 (LinkZ, global)
Mobility Header	MH Type	3
	Home Init Cookie	(= HoTI[19])

23. Send Binding Update. (out: HA0 -> NUTX, in: CN0Y -> NUT0) (Refer to 5.14.6)

The Acknowledge(A) bit is set to ON.

a) Basic

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
Encapsulating Security Payload	Security Parameter Index	SA3_SPI
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[14])
	A Flag	1
	H Flag	0
	Lifetime	0
Nonce Indices Optiom	Option Type	4
	Home Nonce Index	(= HoT[22])
	Care-of Nonce Index	Any
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	HA0 (Link0, global)
	Destination Address	NUTX (LinkX, global)
IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUT0 (Link0, global)
Destination Option Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	5
	Sequence Number	Any (> BU[14])
	A Flag	1
	H Flag	0
	Lifetime	0
Nonce Indices Option	Option Type	4
	Home Nonce Index	(= HoT[22])
	Care-of Nonce Index	Any
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

24. Receive Binding Acknowledgement. (out: NUTX -> HA0, in: NUT0 -> CN0Y) (Refer to 5.15.5)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameter Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[23])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Type2 Routing Header	Home Address	CN0 (LinkZ, global)
Mobility Header	MH Type	6
	Status	0
	Sequence Number	(= BU[23])
	Lifetime	(> 0)
Binding Authorization Data Option	Option Type	5
	Authenticator	Any

25. (wait)

26. Send ICMP Echo Request. (CN0Y -> NUTX with Type2 Routing Header and Home Address Option) (Refer to 5.7.5)

IPv6 Header	Source Address	CN0Y (LinkY, global)
	Destination Address	NUTX (LinkX, global)
Type 2 Routing Header	Home Address	NUT0 (Link0, global)

Destination Option Header	Home Address	CN0 (LinkZ, global)
ICMPv6	Type	128

27. Receive Binding Error (Status=1). (out: NUTX -> HA0, in: NUT0 -> CN0Y) (*2)
(Refer to 5.16.3)

a) Basic

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
Encapsulating Security Payload	Security Parameters Index	SA3_SPI
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	7
	Status	1
	Home Address	CN0 (LinkZ, global)

b) Advanced Function "Fine-Grain Selectors"

IPv6 Header	Source Address	NUTX (LinkX, global)
	Destination Address	HA0 (Link0, global)
IPv6 Header	Source Address	NUT0 (Link0, global)
	Destination Address	CN0Y (LinkY, global)
Mobility Header	MH Type	7
	Status	1
	Home Address	CN0 (LinkZ, global)

[JUDGMENT]

(*1) PASS: CN0Y receives ICMP Echo Reply with Type2 Routing Header and Home Address Option.

(*2) PASS: HA0 receives Binding Error by reverse tunneling.

Then, check whether this packet fills all of the following.

- The Destination Address(outer) is set to HA address.
- The Source Address(outer) is set to primary care-of address.
- The Destination Address(inner) is set to the Source Address of ICMP Echo Request[24].
- The Source Address(inner) is set to Home Address.
- The Home Address destination option is not included.
- The Type2 routing header option is not included.
- The Home Address of Binding Error is set to the HomeAddress destination option of ICMP Echo Request[24].

[REFERENCES]

RFC3775 Mobility Support in IPv6

See Section 6.1, 9.3.3, 11.3.6

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