

# **IPv6 Consortium**

# Core Operations Test Report Revision 1.0

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Joe Contact Company A 1 Main Street Durham, NH 03820

Mr. Joe Contact,

Enclosed are the results from the IPv6Ready PhaseII Logo Base Specification testing performed on:

Device A. MAC Address aa-bb-cc-dd-ee-ff. Console "show config" command reports software version Release abcd.

This testing pertains to a set of standard requirements, put forth in RFC2460-2463, 1981 and 2373. The tests performed are part of the IPv6Ready PhaseII Base Specification Test Suite, which is available on the UNH InterOperability Lab's website:

ftp://ftp.iol.unh.edu/pub/ipv6/testsuites/IPv6\_Ready\_Test\_Specification\_Core\_Protocols.pdf

As always, we welcome any comments regarding this Test Suite.

During the testing process, the following issues were uncovered:

Test	Result
v6LC.1.2.15.A	The RUT sent an ICMPv6 Parameter Problem message with an incorrect Pointer field
	of 0x1 after receiving a packet with a Routing Header with an odd Header Extension
	Length.
<u>v6LC.1.2.15.E</u>	The RUT sent a Destination Unreachable message instead of discarding the echo
	request from TN2 and transmitting an ICMP Time Exceeded – Hop Limit Exceeded
	message.
<u>v6LC.1.2.15.F</u>	The RUT sent a Destination Unreachable message instead of discarding the echo
	request from TN2 and transmitting an ICMP Time Exceeded – Hop Limit Exceeded
	message.
<u>v6LC.2.1.6.A,B</u>	The Retransmit Timer variable could not be configured by system management.
v6LC.2.1.18.I,K,O	After receiving a Neighbor Advertisement while in state REACHABLE with certain
	bits set, the NUT did not change to the new state STARE and did not transmit a uni-
	cast Neighbor Solicitation after DELAY_FIRST_PROBE_TIME
<u>v6LC.2.2.8.B</u>	The RUT transmitted Router Advertisements with an incorrect Router Lifetime field
	of 120 seconds.
<u>v6LC.2.2.9.B</u>	The RUT transmitted Router Advertisements more than once every 3 seconds.
<u>v6LC.3.1.3.D,H</u>	The NUT did not send a solicited Neighbor Advertisement for it's autoconfigured
	link-local address, indicating that the NUT did not ignore the received DAD
	Neighbor Solicitation
<u>v6LC.4.1.6.A,B</u>	The NUT did not include a Fragment header in the Echo Reply after receiving a
	Packet Too Big message from JR1

If you have any questions about the test procedures or results, please feel free to contact me via e-mail at <u>itester@iol.unh.edu</u> or by phone at 608-862-2804.

Regards,

John Tester

The following table contains the test results and their meanings.

Result	Interpretation
PASS	The NUT was observed to exhibit conformant behavior.
FAIL	The NUT was observed to exhibit non-compliant behavior.
PASS with Com-	The NUT was observed to exhibit conformant behavior, however there are additional com-
ments	ments supplied.
Warning	The NUT was observed to exhibit behavior that is not recommended.
Refer to	From the observations, a valid pass or fail could not be determined. An additional explana-
Comments	tion of the situation is included.
Not Applicable (N/A)	The NUT does not support the technology required to perform these tests.
Not Available	Due to testing station or time limitations, the tests could not be performed, or were performed in a limited capacity.
Not Tested (N/T)	Not tested due to time constraint of the test period.
Borderline	The observed values of the parameter is valid at one extreme, and invalid at the other extreme.
Informative	Results are for informative purposes only and are not judged on a pass or fail basis.

AND

# Section 1: RFC 2460

These tests are designed to verify the readiness of an IPv6 implementation vis-àvis the IPv6 Base specification.

## **Group 1: IPv6 Header**

The following tests cover the fields in the basic IPv6 header.

Test #		Result	
<u>v6LC.1.1.1</u>	Version Field	Α	PASS
Purpose: Verify that	a node properly processes the Version field of received packets.	M	
Comments on Test I	Procedure	$)   \langle \rangle$	
	n ICMPv6 Echo Request to the NUT with version fields of 4, 0, 5, 7, and 15 lid ICMPv6 Echo Request.	S with eac	h packet
Comments on Test	Results		
	t crash or generate invalid packets. The NUT responded to the second Echo d version field of 6.	o Request t	rom
Test #		Result	
<u>v6LC.1.1.2</u>	Traffic Class Non-Zero –End Node	A	PASS
Purpose: Verify that value in transmitted p	a node properly processes the Traffic Class field of received packets and g	generates a	valid
Comments on Test J	rocedure		
A. TN1 transmits an	n ICMPv6 Echo Request with a Traffic Class field of 32, a non-zero value to	o the NUT	2
Comments on Test I	Results		
	ted an Echo Reply. The Traffic Class field is zero. The NUT does not sup ass field, so the Traffic Class field in the Echo Reply is zero.	port a spec	cific use

Test #		Result	
<u>v6LC.1.1.3</u>	Traffic Class Non-Zero –Intermediate Node (Routers Only)	Α	PASS
<b>Purpose</b> : Verify tha value in transmitted p	t a router properly processes the Traffic Class field of received packets and	generates	a valid
Comments on Test 1			
	n ICMPv6 Echo Request with a Traffic Class field of 32, a non-zero value to	o TN2, wi	th a first
Comments on Test I	Results		
	rded the Echo Request. The Traffic Class field is passed on to TN2 unchang ecific use of the Traffic Class field, so the Traffic Class field in the Echo Re		
Test #		Result	
<u>v6LC.1.1.4</u>	Flow Label Non-Zero		ASS ASS
<b>Purpose</b> : Verify that value in transmitted p	t a node properly processes the Flow Label field of received packets and ge	nerates a v	valid
Comments on Test I			
to the NUT. B. <i>RUT forwards N</i>	on-Zero Flow Laber: TN1 transmits an ICMPv6 Echo Request with a Flow Jon-Zero Flow Label (Routers Only): TN1 transmits an ICMPv6 Echo Requ o TN2's Global Address with a first hop through the RUT.		
Comments on Test	Restrits		
Label field, the B. The RUT forwar	The Flow Label field is zero. The NUT does not support flow Label in the Echo Reply is zero. reded the Echo Reply from TN1 to TN2. The RUT does not support the use unchanged in the forwarded packet.		

Test #		Result	
v6LC.1.1.5	Payload Length	Α	PASS
		В	PASS
Purpose: Verify that	t a node properly processes the Payload Length field of received packets.		•
Comments on Test	Procedure		
of 0x33 (51) to t	Even: TN1 transmits an ICMPv6 Echo Request that has an IPv6 header wi	•	-
Comments on Test	Results		
	ated an Echo Reply, indicating successful processing of the packet. ated an Echo Reply, indicating successful processing of the packet.	566	
Test #		Result	
<u>v6LC.1.1.6</u>	No Next Header after IPv6 Header	Α	PASS
Deres V		B	PASS
Comments on Test 1	pper behavior of a node when it encounters a Next Header value of 59 (no n Procedure	ext neader	).
Comments on Test	Trocedure		
A. NUT Receives N	o Next Header: TNT transmits an JCMPv6 Echo Request to the NUT, which	ch contains	s an IPv6
header with a Ne	ext Header of 59 and an ICMPv6 Echo Request Header following the IPv6	header.	
B. RUT Forwards I	No Next Header Routers Only TN1 transmits an ICMPv6 Echo Request	containing	an IPv6
header with a Ne	ext Header of \$9 to TM2's Global Address with a first hop through the RUT	•	
Commonte or Tott			
Comments on Test			
A. The NUT did no	t send any packets in response to Packet A.		
B. The RUT forwar	ded the Echo Request to TN2. The octets after the IPv6 header with a Nex	t Header f	ield of 59
(the ICMPv6 Re	quest octets) were unchanged.		

Test a	#		Result	
<u>v6L(</u>	C.1.1.7	Unrecognized Next Header	Α	PASS
			В	PASS
Purp field.		at a node generates the appropriate response to an unrecognized or unexpect	ted Next H	eader
Com	ments on Test	Procedure		
р С В. <i>Ц</i> І	NUT, which has lestined for the Unexpected Nex	<i>Vext Header in IPv6 Header (Multiple Values):</i> TN1 transmits an ICMPv6 I is an IPv6 header with a Next Header field of 136. This is followed by a val NUT. Repeat with all unrecognized Next Header values between 137 and it <i>Header in IPv6 Header:</i> TN1 transmits an ICMPv6 Echo Request to the h a Next Header field of 0. The actual extension header that follows is a Fr 135.	id Echo Re 254. NUT, whic	equest, ch has an
Com	ments on Test	Domita		
t B. T t	he valid Echo F The NUT sent a ion encountered	countered), and a pointer field of 0x06 (offset of the Next Header field). The Requests that follow each version of the Echo Requests with unrecognized r in ICMPv6 Parameter Problem message to TN1 with a code field of 2 (unre d) and a Pointer field of 0x2e (offset of the Fragment ID in the Fragment He cho Request and did not send a reply to TN1.	lext header cognized I	values. Pv6 Op-
Test a	#		Result	
	<u>C.1.1.8</u>	Hop Limit Zero - End Node	Α	PASS
in tra Com A. T	nsmitted packet ments on Test	at a node correctly processes the Hop Limit field of received packets and ge ts. <b>Procedure</b> ICMPv&Echo Request with a Hop Limit field of zero to the NUT.	nerates a v	alid value
	ments on Test	ated an Echo Reply with a Hop Limit field value of greater than zero.		

Test #		Result	
<u>v6LC.1.1.9</u>	Hop Limit Decrement – Intermediate Node (Routers Only)	Α	PASS
Purpose: Verify that	t a router correctly processes the Hop Limit field of received packets and ge	enerates a v	valid
value in transmitted	packets.		
Comments on Test	Procedure		

A. TN1 transmits an ICMPv6 Echo Request to TN2's Global Address with a first hop through the RUT. The Hop Limit field is set to 15.

#### **Comments on Test Results**

A. The RUT forwarded the Echo Request to TN2 with the Hop Limit field decremented to 14.

InterOperability Lab

IPv6 Ready Logo Program Phase II Test Report Core Protocols

## **Group 2: Extension Headers and Options**

The following tests cover the processing of options and extension headers, particularly the Hop-by-Hop Options, Destination Options, and Routing headers.

Test #		Result	
v6LC.1.2.1	Next Header Zero	Α	PASS
	t a node discards a packet that has a Next Header field of zero in a header o an ICMPv6 Parameter Problem message to the source of the packet.	ther than a	n IPv6
Comments on Test l	Procedure		
A. TN1 transmits an Header field of z	n ICMPv6 Echo Request to the NUT, which has a Hop-by-Hop Options heatero.	ader with a	Next
Comments on Test	Results		
Header type enc	n ICMPv6 Parameter Problem message to TN1 with a Code field of 1 (unrepounder), and a Pointer field of 0x28 (offset of the Next Header field of) the F JT discarded the Echo Request and did not send an Echo Reply to TN1.		
Test #		Result	
v6LC.1.2.2	No Next Header after Extension Header	Α	PASS
		В	PASS
Purpose: Verify pro	per behavior of a node when it encounters a Next Header value of 59 (no n	ext header	).
with a Next Nea B. Intermediate No	transmits an ICMPv6 Echo Request to the NUT, which contains a Destinat		
Comments on Test	Results		
	t send any packets in response to the Echo Request. redd the Echo Request to TN2 on Link A. The octets past the end of the here	ader whose	e Next

Header field contains 59 are unchanged.

		-	
Test #		Result	
<u>v6LC.1.2.3</u>	Unrecognized Next Header in Extension Header – End Node	Α	PASS
		В	PASS
	t a node discards a packet with an unrecognized or unexpected next heade	r in an exte	nsion
	an ICMPv6 Parameter Problem message to the source of the packet.		
Comments on Test	Procedure		
<ul> <li>Destination Opt This is repeated</li> <li>B. Unexpected Nex tion Options hea header, whose options</li> </ul>	<i>ext Header in Extension Header (Multiple Values):</i> TN1 transmits an IPve ons header with a Next Header field of 136, followed by a valid Echo Rece with all unrecognized Next Header values between 137 and 254. <i>t Header in Extension Header:</i> TN1 transmits an ICMPv6 Echo Request, der with a Next Header field of 60. The actual extension header that follo ffset is 0x10E0 (so that the first 8 bits of this 13 bit field would be 135). T the more bit is clear. (If processed as a Destination Options header, this w agth equals 4.)	which has ws is a Fra he second	NUT. a Destina- gment reserved
-		741	
Next Header typ NUT sent an Ec Header packet ( B. From the Next H Destination Opt NUT sent an IC encountered). T	n ICMPv6 Parameter Problem message to TN1. The ICMPv6 Code field the encountered). The ICMPv6 Pointer field was 0x28 toffset of the Next Pho Reply in response to the valid Echo Requests sept by TN1 after each un	leader field necognized ant header an Option T gnized IPv	<ul> <li>I). The</li> <li>I Next</li> <li>to be a</li> <li>Type. The</li> <li>6 Option</li> </ul>

Tes	t #		Result	
<u>v6</u> I	<u>.C.1.2.4</u>	Extension Header Processing Order	Α	PASS
			B	PASS
			С	PASS
			D	PASS
Pu	rpose: Verify tha	t a node properly processes the headers of an IPv6 packet in the correct ord	er.	
Co	mments on Test	Procedure		
B.	mits an Echo Re header, in that or has a Payload Le <i>Destination Opti</i> Echo Request th order. The Dest Length that is no <i>Fragment Heade</i> Echo Request th order. The IPv6	tions Header precedes Fragment Header, Error from Destination Options H quest that has a Hop-by-Hop Options header, Destination Options header, a rder. The Destination Options header has an unknown Option Type of 135. ength that is not a multiple of 8 octets, and the Fragment header has the M-b tions Header precedes Fragment Header, Error from Fragment Header: Th at has a Hop-by-Hop Options header, Destination Options header, and Frag ination Options header has an unknown Option Type of 7. The IPv6 header of a multiple of 8 octets, and the Fragment header has the M-bit set. Er precedes Destination Options Header, Error from Fragment Header. Th at has a Hop-by-Hop Options header, Error from Fragment Header. Th at has a Hop-by-Hop Options header, Fragment header has the M-bit set. Er precedes Destination Options Header, Fragment header, and Destination Op- header has a Payload Length that is not a multiple of 8 octets, and the Frag- Destination Options header has an unknown Option Type of V35.	nd Fragm The IPv6 bit set. V1 transmi r has a Pay J1 transmi tions head	ent 5 header ts an er, in that bload ts an er, in that
D.	<i>Fragment Heade</i> mits an Echo Re header, in that or	er precedes Destination Options Header, Error from Destination Options A quest that has a Hop-by-Hop Options header, Fragment header, and Destina rder. The IPv6 header has a Payload Length that is not a multiple of 8 octet have the M-bit set. The Destination Options header has an unknown Option	tion Options, and the	ons Fragment
Co	mments on Test	Results		
A.	The NUT sent at tion Encountered Header). The N	n ICMP of Parameter Problem message to TN1 with a Code field of 2 (Unred) and Pointer field of 0x32 (offset of the Option type field in the Destination of the UT discarded the Bcho Request from TN1.	on Option	S
B.	encountered), and carded the Echo	n IGMPv6 Parameter Broblem message to TN1 with a Code field of 0 (error d Pointer field of 0x04 (offset of the Payload Length field in the IPv6 Head Request from TN1.	ler). The	NUT dis-
C.	encountered), an	NICMPV6 Parameter Problem message to TN1 with a Code field of 0 (error Pointer field of 0x04 (offset of the Payload Length field in the IPv6 Head Request from TN1.		
D.	The NUT sent at tion Encountered	ICMPv6 Parameter Problem message to TN1 with a Code field of 2 (Unred), and Pointer field of 0x3A (offset of the Option type field in the Destinat UT discarded the Echo Request from TN1.		

Tes	t #	Result	
v6]	C.1.2.5 Option Processing Order	A	PASS
101		B	PASS
		C	PASS
Pu	<b>rpose</b> : Verify that a node properly processes the options in a single header in the order of o	ccurrence.	
Co	mments on Test Procedure		
A.	First Option has Most Significant Bits $00_b$ , Next has Most Significant Bits $01_b$ : TN1 transit to the NUT that has a Destination Options header with four unknown Options. The Option 135, and 199.		
B.	First Option has Most Significant Bits $00_b$ , Next has Most Significant Bits $10_b$ : TN1 transit to the NUT that has a Destination Options header with four unknown Options. The Option 199, and 71.		
C.	<i>First Option has Most Significant Bits 00</i> <sub>b</sub> , <i>Next has Most Significant Bits 11</i> <sub>b</sub> : TN1 transit to the NUT's Link-Local address that has a Destination Options header with four unknown tion Types are 7, 199, 71, and 135.		
Co	mments on Test Results	$\nabla \zeta \uparrow$	
A. B. C.	The NUT silently discarded the ICMPv6 Echo Request and did not send any Packets to TT The NUT sent an ICMPv6 Parameter Problem message to TN1 with a Code field of 2 (unit tion encountered) and a Pointer field of 0x30 (offset of the Option Type field of the second discarded the Echo Request sent by TN1 and did not send a Reply. The NUT sent an ICMPv6 Parameter Problem message to TN1 with a Code field of 2 (unit tion encountered) and a Pointer field of 0x30 (offset of the Option Type field of 2 (unit discarded the Echo Request sent by TN1 and did not send a Reply.	ecognized 1 1 option). T recognized 1	The NUT
	SAMUEL		

Test #		Result	
v6LC.1.2.6	Option Processing, Hop-by-Hop Options Header – End Node	A	PASS
	option rocessing, nop by nop options neader - End rode	B	PASS
		C	PASS
		D	PASS
		E	PASS
		F	PASS
		G	PASS
		H	PASS
highest order two b Comments on Tes	t Procedure		
Options B. PadN Option: PadN Option. C. Most Significa with an unkno D. Most Significa with an unkno E. Most Significa Options heade F. Most Significa Options heade G. Most Significa address that ha H. Most Significa	TN1 transmits an ICMPv6 Echo Request that has a Hop-by-Hop Options TN1 transmits an ICMPv6 Echo Request that has a Hop-by-Hop Options <i>nt Bits 00<sub>b</sub></i> : TN1 transmits an ICMPv6 Echo Request that has a Hop-by-Hop wn Option Type of 7. <i>nt Bits 01<sub>b</sub></i> : TN1 transmits an ICMPv6 Echo Request that has a Hop-by-Hop wn Option Type of 71. <i>nt Bits 10<sub>b</sub></i> , <i>unicast destination</i> : TN1 transmits an ICMPv6 Echo Request r with an unknown Option Type of 135. <i>nt Bits 11<sub>b</sub></i> , <i>unicast destination</i> : TN1 transmits an ICMPv6 Echo Request r with an unknown Option Type of 199. <i>nt Bits 10<sub>b</sub></i> , <i>multicast destination</i> : TN1 transmits an ICMPv6 Echo Request r with an unknown Option Type of 199. <i>nt Bits 10<sub>b</sub></i> , <i>multicast destination</i> : TN1 transmits an ICMPv6 Echo Request as a Hop-by-Hop Options header with an unknown Option Type of 135. <i>nt Bits 11<sub>b</sub></i> , <i>multicast destination</i> : TN1 transmits an ICMPv6 Echo Request as a Hop-by-Hop Options header with an unknown Option Type of 135.	header with hop Options I lop Options I that has a Ho that has a Ho st to a local n	a 6 byte header header p-by-Hop p-by-Hop hulticast
<ul> <li>A. The NUT sent</li> <li>B. The NUT sent</li> <li>C. The NUT skip</li> <li>D. The NUT did in</li> <li>E. The NUT sent tion encounter</li> <li>The NUT disc contained in th</li> <li>The</li> </ul>	an Echo Reply to TN1. an Echo Reply to TN1. an Echo Reply to TN1. ped the unknown option and the header was processed. The NUT sent an not generate any packets sent to TN1. The NUT discarded the Echo Requ an ICMPv6 Parameter Problem message to TN1. The Code field was 2 (need) and the Pointer field was 0x2A (offset of the option field of Hop-by -F arded the Echo Request, and did not send and Echo Reply. The invoking the Parameter Problem message did not exceed the minimum Ipv6 MTU, and source Address of the Parameter Problem Message was the same as the I 1's Echo Request Packet.	est. unrecognized Iop Options I Echo Reques nd: Destination A	IPv6 Op- neader). t packet ddress in
F. The NUT sent tion encounter			

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- G. The NUT sent an ICMPv6 Parameter Problem message to TN1. The Code field was 2 (unrecognized IPv6 Option encountered) and the Pointer field was 0x2A (offset of the option field of Hop-by -Hop Options header). The NUT discarded the Echo Request, and did not send and Echo Reply. The invoking Echo Request packet contained in the Parameter Problem message did not exceed the minimum Ipv6 MTU, and:
  - The Destination Address of the Parameter Problem Message was the same as the Source Address in TN1's Echo Request Packet.
- H. The NUT did not generate any packets sent to TN1. The Echo Request was discarded, as the destination address was multicast. The NUT did not send an ICMPv6 Parameter Problem message.

Test	:#		Result	
	C.1.2.7	Options Processing, Hop-by-Hop Options Header – Intermediate	Α	PASS
TUL	<u>C.1.2.7</u>	Node (Routers Only)	B	PASS
			C	PASS
			D	PASS
			E	PASS
			F	PASS
			G	PASS
			H	PASS
Pur	<b>pose</b> : Verify the	at a router properly processes both known and unknown options, and acts i	n accordan	
		bits of the option.		
Con	nments on Test	Procedure		
A.	Pad1 Option: 7	N1 transmits an ICMPv6 Echo Request that has a Hop-by-Hop Options h	eader with	ix Pad1
	Options		5.5	د
B.	PadN Option:	ΓN1 transmits an ICMPv6 Echo Request that has a Hop-by-Hop Options h	eader with	a 6 byte
	PadN Option.	$\frown$	$() ) \land ($	\
		t Bits 00 <sub>b</sub> : TN1 transmits an ICMPv6 Echo Request that has a Hop-ky-Ho	p Options\h	leader
		n Option Type of 7.		· .
		t Bits $01_b$ : TN1 transmits an ICMPv6 Echo Request that has a Hop-by-Ho	Qptions h	leader
		n Option Type of 71.		1 11
		t Bits $10_b$ , unicast destination: TN1 transmits an ICMPvb Echo Request the units on unknown Option Type of 125	at has a Ho	р-ву-нор
		with an unknown Option Type of 135. t Bits 11 <sub>b</sub> , unicast destination: TN1 transmits an ICMPv6 Echo Request th	at has a Ua	n hy Uon
		with an unknown Option Type of 199.	at has a no	р-оу-пор
		<i>t Bits 10<sub>b</sub>, multicast destination</i> : TN1 transmits an ICMPv6 Echo Request	to a local m	ulticast
		a Hop-by-Hop/Options/header with an unknown Option Type of 135.	io a local II	lutileast
		t Bits 1/2, multicast destination. TN1 transmits an ICMPv6 Echo Request	to a local m	ulticast
	address that has	a Hop-by-Hop Options header with an unknown Option Type of 199.		
	-			
Con	nments on Test	Results		
	$\square$			
A.	The RUT must	forward the Echo Request to TN2.		
		forward the Echo Request to TN2.		
		ption is skipped and the header is processed. The RUT must forward the H	cho Reque	st to TN2
		not forward the Echo Request to TN2. The Echo Request is discarded.		
		n ICMPv6 Parameter Problem message to TN1. The Code field was 2 (un		
		d) and the Pointer field was 0x2A (offset of the option field of Hop-by -Ho		
		ded the Echo Request, and did not forward it to TN2. The invoking Echo	Request pa	cket con-
		rameter Problem message did not exceed the minimum Ipv6 MTU, and:	(D 1	
C		Destination Address was the same as the Source Address in TN1's Echo Re		
		n ICMPv6 Parameter Problem message to TN1. The Code field was 2 (un d) and the Pointer field was 0x2A (offset of the option field of Hop-by -Ho	0	1
		ded the Echo Request, and did not forward it to TN2. The invoking Echo		
		rameter Problem message did not exceed the minimum Ipv6 MTU, and:	request pa	exer con-
		Destination Address was the same as the Source Address in TN1's Echo Ro	auget Dool	ot
C		n ICMPv6 Parameter Problem message to TN1. The Code field was 2 (un		
		1) and the Pointer field was us $ZA$ (offset of the option field of Hop-by -Ho		
	The RUT discar	d) and the Pointer field was 0x2A (offset of the option field of Hop-by -Ho ded the Echo Request, and did not forward it to TR1. The invoking Echo	Request pa	cket con-
		ded the Echo Request, and did not forward it to TR1. The invoking Echo	Request pa	cket con-
	tained in the Par			

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Test #		Result	
v6LC.1.2.8	Option Processing, Destination Options Header	Α	PASS
	• F ····· • F ····· • F ·····	B	PASS
		<u> </u>	PASS
		D	PASS
		E	PASS
		F	PASS
		G	PASS
		H	PASS
Purpose: Verify t nighest order two l Comments on Tes	*	acts in accordanc	e with the
<ul> <li>the NUT.</li> <li>PadN Option: tion, to the NU</li> <li>Most Signification (Signification)</li> <li>Most Signification)</li> <li>Most Signification</li> </ul>	ant Bits $00_b$ : TN1 transmits an Echo Request, that has a Destination C type of 7, to the NUT. <i>Int Bits 01<sub>b</sub></i> : TN1 transmits an Echo Request, that has a Destination C type of 71, to the NUT. <i>Int Bits 10<sub>b</sub></i> , <i>unicast destination</i> : TN1 transmits an Echo Request, that in unknown Option type of 135, to the NUT. <i>Int Bits 11<sub>b</sub></i> , <i>unicast destination</i> : TN1 transmits an Echo Request, that in unknown Option type of 109, to the NUT. <i>Int Bits 10<sub>b</sub></i> , <i>multicast destination</i> : TN1 transmits an Echo Request, se a Destination Options header with an unknown Option Type of 135, to <i>unt Bits 11<sub>b</sub></i> , <i>multicast destination</i> : TN1 transmits an Echo Request, se a Destination Options header with an unknown Option Type of 135, to <i>unt Bits 11<sub>b</sub></i> , <i>multicast destination</i> : TN1 transmits an Echo Request, se a Destination Options header with an unknown Option Type of 135, to <i>unt Bits 11<sub>b</sub></i> , <i>multicast destination</i> : TN1 transmits an Echo Request, se a Destination Options header with an unknown Option Type of 199, to	ler with a 4 byte k options header wit ptions header wit thas a Destination t has a Destination nt to a local multi to the NUT. ent to a local multi	adN Op- han un- h an un- n Options n Options cast ad-
A. The NUT sent B. The NUT sent	an Echo Reply to TN1. an Echo Reply to TN1. option in the Destination Options header was skipped and the header	was processed. 7	The NUT
D. The NUT did E. The NUT sent Option encour NUT discarde Error Message • The S the E • The I	not generate any packets sent to TN1. The Echo Request was discard and ICMPv6 Parameter Problem message to TN1 with a Code field of netered) and a Pointer field of 0x2A (offset of the option field of Destin d the Echo Request and did not send a Reply. The invoking Echo Re- e did not exceed the minimum IPv6 MTU, in addition: Source Address of the Parameter Problem Message was the same as the cho Request Packets sent from TN1. Destination Address was the same as the Source Address in the Echo I	of 2 (unrecognized nation Options hea quest packet inclu ne Destination Add	d IPv6 ader). The ded in the dress in
Option encour NUT discarde Error Message • The S	and ICMPv6 Parameter Problem message to TN1 with a Code field of ntered) and a Pointer field of 0x2A (offset of the option field of Destin d the Echo Request and did not send a Reply. The invoking Echo Re- e did not exceed the minimum IPv6 MTU, in addition: Source Address of the Parameter Problem Message was the same as the cho Request Packets sent from TN1.	nation Options hea quest packet inclu	ader). The ded in the

- The Destination Address was the same as the Source Address in the Echo Request Packet sent from TN1.
- G. The NUT sent and ICMPv6 Parameter Problem message to TN1 with a Code field of 2 (unrecognized IPv6 Option encountered) and a Pointer field of 0x2A (offset of the option field of Destination Options header). The NUT discarded the Echo Request and did not send a Reply. The invoking Echo Request packet included in the Error Message did not exceed the minimum IPv6 MTU, in addition:
  - The Destination Address in the Parameter Problem message was the same as the Source Address in the Echo Request Packet sent from TN1.
- H. The NUT did not generate any packets sent to TN1. The Echo Request was discarded and not replied to, since the destination address was multicast. The NUT did not send an ICMPv6 Parameter Problem message.

Test	t #		Result	
<u>v6L</u>	<u>C.1.2.9</u>	Responding to Routing Header - End Node	Α	PASS
Pur	pose: Verify that	t a node properly responds to an IPv6 packet destined for it that contains all	outing he	ader.
Cor	nments on Test l	Procedure	1	}
A.	If the NUT is a F	Host, TR1 transmits a Router Advertisement to the all node multicast addre	6 (FE02.	(1) The
л.		ment includes a Prefix Advertisement with a global prefix and the L and A		
		x Lifetimes are long enough such that they fo not expire during the test. If		
		a default route with TR1 as the next hop. TR1/then transmits an Echo Req		
		the sent by the NUT. TR1 transmits a Neighbor Advertisement. After an E		
		vards an Echo Request that has a Routing Header with three segments which		
	NUT.	valus an Ecno Request that has a Routing fleater with three segments which	ii is uestiii	eu for the
	NOI.			
Cor	nments on Test l	Results		
Α.	The NUT added	TR1 to its Default Router List, configured a global address, and computed I	Reachable	Time.
	The NUT Solicit	ed TR hand sent an Echo Reply to TR1, no other packets were sent, indicati	ng the NU	JT's NCE
		REACHABLE. The NUT transmitted an Echo Reply to TN2's Global A		
	as a first hop. T	e Echo Reply did not contain a Routing Header.		-

Test #		Result	
v6LC.1.2.10	Unrecognized Routing Type - End Node	Α	PASS
an unrecognized Ro		outing hea	der with
Comments on Test	Procedure		
Router Adverti Router and Pre router, configu Observe the pa ceived, TR1 fo ments Left valu	Host, TR1 transmits a Router Advertisement to the all-nodes multicast addressement includes a Prefix Advertisement with a global prefix and the L and A fix Lifetimes are long enough such that they do not expire during the test. In the a default route with TR1 as the next hop. TR1 then transmits an Echo Receives sent by the NUT. TR1 transmits a Neighbor Advertisement. After an arwards an Echo Request that has a Routing Header with a Routing Type value of 0. The Echo Request is destined for the NUT.	bits set. T f the NUT quest to the Echo Repl	The is a e NUT. y is re-
Comments on Test	Results	-14	
The NUT Solic for TR1 is in st	d TR1 to its Default Router List, configured a global address, and computed ited TR1 and sent an Echo Reply to TR1, no other packets were sent, indica ate <b>REACHABLE</b> . The NUT ignored the unrecognized Routing Type value set with an Echo Reply sent to TN2 with TR1 as the first-hop.	tiping the NI	J's NCI
		Result	
Test #	Unrecognized Routing Type / Intermediate Node (Routers Only)	Result	

A. Configure a default route with TR1 as the next hop. TR1 and TR2 transmit an Echo Request to the RUT. Observe the packets sent by the RUT. TR1 and TR2 transmit a Neighbor Advertisement. After an Echo Reply is received, TN2 transmits an Echo Request that has a Routing Header with a Routing Type value of 33 and Segments Left value of 1. The Echo Request is destined for TN1 and has a first hop through the RUT.

**Comments on Test Results** 

Comments on Test Procedure

A. The RUT should have discarded the Echo Request from TN2 and transmitted an ICMP Parameter Problem message, Code 0, and a pointer field of 0x2A (the offset of the Routing type field of the Routing Header) to the global address of TN2.

Test #		Result	
v6LC.1.2.12	Routing Header Reserved Field – End Node	Α	PASS
Purpose: Verify the non-zero Reserved f	at a node properly processes an IPv6 packet destined for it that contains a Ro ield.	outing hea	der with
<b>Comments on Test</b>	Procedure		
Router Advertis Router and Pref router, configur serve the packe	Host, TR1 transmits a Router Advertisement to the all-nodes multicast addre ement includes a Prefix Advertisement with a global prefix and the L and A fix Lifetimes are long enough such that they do not expire during the test. If e an address with the advertised prefix. TR1 then transmits an Echo Requess ts sent by the NUT. TR1 transmits a Neighbor Advertisement. After an Ech o the NUT, an Echo Request that has a Routing Header with a non-zero rese	bits set. T the NUT t to the N o Reply is	The is a UT. Ob- s received
Comments on Test	Results		}
		<u>, , , , , ,</u>	
The NUT Solic for TR1 is in sta	I TR1 to its Default Router List, configured a global address, and computed ted TR1 and sent an Echo Reply to TR1, no other packets were sent indicat ate <b>REACHABLE</b> . The NUT ignored the non-zero reserved field and transr obal Address using TR1 as the first hop.	ing the M	UT's NC
The NUT Solic for TR1 is in sta ply to TN2's Gl	ited TR1 and sent an Echo Reply to TR1, no other packets were sent indicat the <b>REACHABLE</b> . The NUT ignored the non-zero reserved field and transr	ing the M	T's NC Eeho Re-
The NUT Solic for TR1 is in sta ply to TN2's Gl Test # v6LC.1.2.13	ited TR1 and sent an Echo Reply to TR1, no other packets were sent indicat the <b>REACHABLE</b> . The NUT ignored the non-zero reserved field and transr	ing the Minited and Minited and Minited and Minister And	t PASS

A. The RUT Solicited TR1 and sent an Echo Reply to TR1, no other packets were sent, indicating the RUT's NCE for TR1 is in state **REACHABLE**. The RUT ignored the non-zero reserved field and forwarded the Echo Request to TR1's Global Address. The RUT did not change the value of the reserved field when the packet was forwarded.

Test #		Result	
v6LC.1.2.14	Routing Header Processing – End Node	Α	PASS
		В	PASS
Purpose: Verify th	at a node properly processes an IPv6 packet destined for it that contains a Rout	ting head	er.
<b>Comments on Test</b>	Procedure		
(FF02::1). The set. The Router is a router, conf	If the NUT is a Host, TR1 transmits a Router Advertisement to the all-nodes a Router Advertisement includes a Prefix Advertisement with a global prefix and and Prefix Lifetimes are long enough such that they do not expire during the t igure a default route with TR1 as the next hop. TR1 then transmits an Echo Re the packets sent by the NUT. TR1 transmits a Neighbor Advertisement. After s complete.	d the L an test. If the equest to	nd A bits le NUT the
	on Length Odd: TR1 transmits an Echo Request to the NUT that has a Routing ension Length value of 5.	g Header	with an
B. Address[i] is M	<i>Souting Header as TR1's Solicited-Node Multicast Address.</i>	et with th	e first
and computed F	<b>Results</b> up for Each Part: The NUT added TR1 to its Default Router List, configured eachable Time. The NUT Solicited TR1 and sent an Echo Reply to TR1, no o the NUT's NCE for TR1 is in state <b>REACHABILE</b> .	a global a ther pack	address, acts were
A. The NUT ignor NUT responded	ed the invalid field of the Routing Header and processed the Echo Request from to TN1 with an Echo Reply.	m TN1.	The
B. The NUT ignor	ed the invalid field of the Routing Header and processed the Echo Request from to TN1 with an Echo Reply.	m TN1.	The

Test #		Result	
v6LC.1.2.15	Routing Header Processing – Intermediate Node (Routers Only)	Α	FAIL
		В	PASS
		С	PASS
		D	PASS
		E	FAIL
		F	FAIL
		G	PASS
Purpose: Verify	that a router properly processes an IPv6 packet destined for it that contains a	_	
Comments on Te		0	
<ul> <li>the RUT. Ob ply is receive</li> <li>A. Header Exten Extension Le</li> <li>B. Segments Ley with a Segme tined for TN</li> <li>C. Address[i] is Routing Heaa RUT as the fi</li> <li>D. Destination i address of the as the first he</li> <li>E. Hop Limit = the IPv6 head</li> <li>G. Valid Proces</li> </ul>	s <i>Multicast</i> : TN2 transmits an Echo Bequest that has a Routing Header to an e RUT's Solicited-Node Marticast Address. The Echo Request is destined for	After an Ed with an odd inst hop. as a Routing Echo Reque d for TN1 w IPv6 destina TN1 with t hit field of va mit field of va	tho Re- Header Header st is des- ess in the ith the tion he RUT alue 0 in alue 1 in
Comments on Te	st Results		
Observations of S were sent, inc	etup for Each Part: The RUT Solicited TR1 and sent an Echo Reply to TR1, licating the RUT's NCE for TR1 is in state <b>REACHABLE</b> . carded the Echo Request and sent an ICMPv6 Parameter Problem message to	-	
dress. The P According to message, Coo	arameter Problem message had a code field of 0, and an invalid Pointer field or RFC 2460, Section 4.4: "If the header extension length is odd, send an ICMP le 0, to the Source Address, pointing to the Hdr Ext Len field, and discard the	of 0x01. Parameter I packet."	Problem
0, with a Poir	e RUT should have sent to TN2's Global Address an ICMPv6 Parameter Prob ter field of 0x29 (offset of the Header Extension Length field of the Routing carded the Echo Request and sent an ICMPv6 Parameter Problem message to	Header).	
dress. The P ments Left fi	arameter Problem message had a code field of 0, and a Pointer field of 0x2B ( eld of the Routing Header). carded the Echo Request.		

1

E.	The RUT discarded the Echo Request and transmitted a Destination Unreachable message to TN2's Global Address.
	According to RFC2460, Section 4.4: "If the Ipv6 Hop Limit is less than or equal to 1, send an ICMP Time Exceeded – Hop Limit Exceeded in Transit message to the Source address and discard the packet"
	Therefore, the RUT should have discarded the Echo Request from TN2 and transmitted an ICMPv6 Time Exceeded – Hop Limit Exceeded in Transit Message to TN2's Global Address.
F.	The RUT discarded the Echo Request and transmitted a Destination Unreachable message to TN2's Global Address.
	According to RFC2460, Section 4.4: "If the Ipv6 Hop Limit is less than or equal to 1, send an ICMP Time Exceeded – Hop Limit Exceeded in Transit message to the Source address and discard the packet"
	Therefore, the RUT should have discarded the Echo Request from TN2 and transmitted an ICMPv6 Time Exceeded – Hop Limit Exceeded in Transit Message to TN2's Global Address.
G.	The RUT transmitted the Echo Request to TR1 with the following values:         • IPv6 Source Address         • IPv6 Destination Address         • Hop Limit         • Hop Limit         • Hdr. Ext. Length         • Routing Type         • Segments Left         • Address[1]         • Address[2]         • Address[3]
	SGUL

# **Group 3: Fragmentation**

The following tests cover fragmentation in IPv6.

Tes	st #		Result
<b>v6</b> I	LC.1.3.1	Fragment Reassembly	A PASS
			B PASS
			C PASS
			D PASS
			E PASS
			F PASS
		t a node correctly reassembles fragmented packets and disting	guishes between packet fragment
		dress, Destination Address, and Fragment ID.	
Co	mments on Test	Procedure	
A.		<i>re Valid</i> : TN1 transmits 3 Fragments. Each has the same So	
B.		nent ID. The fragments come in normal order with the correct revealed or the correct revealed or the reverse order: TN1 transmits 3 Fragments. Each has been been supported on the revealed of	
D.	tination Address	s, and Fragment ID. The fragments come in reverse order with	h the correct fragment offsets
C.	Fragment Ids D	iffer Between Fragments: TN1 transmits 3 Fragments. The f	ragments come in normal order
	with the correct	fragment offsets. The first and last fragments have a Fragme	nt ID of 2999, while the second
		ID of 3000. The Source and Destination Address of each pac	
D.	Source Addresse	es Differ Between Fragments: (TN1 transmits 3 Fragments.)	he fragments come in normal or-
	der with the cor	rect fragment offsets. The first and last fragments have a Sou	rce Address of the Link-Local ad
		hile the second has a different Source Address. The Destinat	ion Address and Fragment IDs of
-	each packet is th	le same.	
E.	Destination Add	ress Differ Between Prognants: TN1 transmits 3 Fragments.	The fragments come in normal
	order with the c	prect fragment offsets. The first and last fragments have a D TNN, while the second has a different Source Address. The	Source Address of the Link-
	IDs of each pack	cet is the same	Source Address and Fragment
F.	Reassemble to 1	500 TNI transmits 3 Fragments Each has the same Source	Address Destination Address
	and Fragment II	500: TNI transmits 3 Fragments. Each has the same Source A. The fragments come in normal order with the correct fragments frag	nent offsets, however, the pav-
	loads of each fra	agment are modified so that the reassembled packet size is 150	00.
	$\langle \circ \rangle$	74	
Co	mments on Test	Results	
A.	The NUT transr	nitted an Echo Reply to TN1 in response to the reassembled E	Scho Request
<i>В</i> .		nitted an Echo Reply to TN1 in response to the reassembled E	
C.		of transmit an Echo Reply to TN1, due to the Echo Request no	
		ent IDs. The NUT transmitted an ICMPv6 Time Exceeded M	
	it received the fi		
D.	The NUT did no	ot transmit an Echo Reply to TN1, due to the Echo Request no	t being reassembled because of
		Addresses. The NUT transmitted an ICMPv6 Time Exceeded	d Message to TN1 sixty seconds
		the first fragment.	
E.		t transmit an Echo Reply to TN1, due to the Echo Request no	
		ation Addresses. The NUT transmitted an ICMPv6 Time Exce	eeded Message to TN1 sixty sec-
г		eived the first fragment.	
F.	The NUT respon	nded to the Echo Request from TN1.	

Test #		Result	
v6LC.1.3.2	Reassembly Time Exceeded		PASS
<u>vol.C.1.5.2</u>	Reassembly Thile Exceeded	A B	PASS PASS
		C B	PASS
		D	PASS
<b>Purnoso:</b> Vorify the	t a node takes the proper actions when the reassembly time has been exceed		
Comments on Test 1			CKCL.
There is a 55-see B. <i>Time Exceeded I</i> second delay bet C. <i>Time Exceeded</i> , D. <i>Time Exceeded</i> , Comments on Test I A. The NUT's rease Echo Reply to T B. The NUT's rease mit an Echo Rep ECMPv6 Time I properties: • The Co • The um • The Sor quest P • The De • The Sor quest P • The De • The siz IPv6 M C. The NUT's rease mit an Echo Rep ECMPv6 Time I properties: • The Co • The NUT's rease mit an Echo Rep ECMPv6 Time I properties: • The Co • The um	sembly timer expired just after it received the second and third fragments, an N1 in response to the reassembled Echo Request. sembly timer expired just before it received the second and third fragments, by to TN1 since the Echo Request could not be reassembled in time. The N Exceeded Message to TN1 sixty seconds after it received the first fragment, de Field has a value of 1 (Fragment Reassembly Time Exceeded) used field was initialized to zero urce Address of the Packet was the same as the Global Destination Address acket estination Address was the same as the Global Source Address of TN1's Echo e of the invoking Echo Request packet included in the Error Message did no	rder. There ents. fragments and transmit and dransmit with the fo of TN1's E o Request I ot exceed m and did no UT transmit with the fo	ted an t trans- itted an llowing Ccho Re- Packet ninimum t trans- itted an llowing
quest P • The De	estination Address was the same as the Global Source Address of TN1's Eche of the invoking Echo Request packet included in the Error Message did no	o Request I	

Test #		Result	
<u>v6LC.1.3.3</u>	Fragment Header M-Bit Set, Payload Length Invalid	A	PASS
ments), but which ha	1 at a node takes the proper actions when it receives a fragment with the M-bit s as a Payload Length that is not a multiple of 8 bytes.	set (more	frag-
<b>Comments on Test</b>	Procedure		
	In Echo Request that has a Fragment Header with the M-bit set. The Payload nultiple of 8 octets.	length is 2	21,
<b>Comments on Test</b>	Results		
ICMPv6 Param Pointer field of	ot transmit an Echo Reply to TN1, since the fragment was discarded. The NU eter Problem message to TN1 with a Code Field of 0 (erroneous beader field 0x04 (offset of the Payload Length field of the IPv6 header)	encounter	itted an ), and a
Test #		Result	
<u>v6LC.1.3.4</u>	Stub Fragment Header	Α	PASS
Purpose: Verify that	at a node accepts the offset zero fragment with the More Fragments flag clear		
ments flag clear	in Echo Request that has a Fragment Header with a Fragment Offset of 0 and	the More	Frag-
Comments on Test A. The NUT trans	Results nitted an Echo Reply, which did not include a fragment header, to TN1.		

# Section 2: RFC 2461

These tests are designed to verify the readiness of an IPv6 implementation vis-àvis the Neighbor Discovery specification.

## **Group 1: Address Resolution and Neighbor Unreachability Detection**

The following tests cover Address Resolution and Neighbor Unreachability Detection in IPv6.

			M	
Test #	ŧ		Result	<u>,</u>
<u>v6LC</u>	<u>.2.1.1</u>	On-link Determination	A B C D	PASS PASS PASS PASS
Purp	ose: Verify that	t a node correctly determines that a destination is on-tink.	<u> </u>	IADD
	ments on Test I			
A. L B. G C. G th D. G L c	ink-local Addre Global Address, Global Address, ne "L-Bit" set ( Global Address, ength of 64, the over TN2(s Glo	ess: TN1 transmits an Echo Request with TN1's Link-Local source address. No Default Rouver: TN1 transmits an Echo Request with TN1's Global Addr On-link Prefix covers TN1: TR1 transmits a Router Advertisement with a Pre on link) and prefix of TN1's Global Prefix. On-link Prefix does not cover TN2: TR1 transmits a Router Advertisement with e"A-Bit" set (on-link) and prefix of TN1's Global Prefix. The Prefix Advertise obal Address. TN2 transmits an Echo Request with TN2's Global Address.	fix Leng	ix
Comr	ments on Test l	Results		
tł	hat the NUT has	/ ' Neighbor Solicitation with a Target Address equal to TN1's Link-Local address s successfully determined that TN1 was on-link. e no routers on the link, the NUT considered all global addresses as being on-ling		
N N	UT sent a Neig UT has success	ghbor Solicitation with a Target Address equal to TN1's Global Address, an ind sfully determined that TN1 was on-link.	dication t	hat the
a	s on-link. The	ddress was covered by the on-link prefix. Hence, the NUT considered TN1's NUT sent a Neighbor Solicitation with a Target Address equal to TN1's Globa ne NUT successfully determined that TN1 was on-link.		
D. T d	'N2's Global Ac ress as off-link.	ddress was not covered by the on-link prefix. Hence, the NUT considered TN. The NUT sent a Neighbor Solicitation with a Target Address equal to TR1's IUT successfully determined that TN2 was off-link.		

		Result	;
6LC.2.1.2	Resolution Wait Queue	Α	PAS
		В	PAS
urpose: Verify that	t a node properly queues packets while waiting for address resolution of the	next hop.	
Comments on Test 1	Procedure		
<ul> <li>Neighbor Adver dress of TN1's L</li> <li>Multiple Queues group of 4 Echo the Router flag r</li> </ul>	CN1 transmits an Echo Request 3 times, each time incrementing its ID. TN1 tisement with the Router flag not set, and the Solicited and Override flags set. ink-Local Address, in response to any Neighbor Solicitations from the NUT TN1 transmits an Echo Request 3 times, each time incrementing its ID, for Requests, with increasing ID numbers. TN1 and TN2 transmit Neighbor Address of either TN2's Link-Local Address, in response to any Neighbor Solicitations from the Solicited and Override flags set, and a Target Address of either TN2's Link-Local Address, in response to any Neighbor Solicitations from the Solicitations from the Solicitation for the Solicita	et, and a Tar C llowed by dvertiseme er TN1 is L	rget Ad another nts with
<ul> <li>The NUT transm lowed by Echo F quests sent by T to complete was</li> <li>The NUT transm lowed by Echo F quests sent by T to complete was Neighbor Solicit response to the 4 NUT, an indicati</li> </ul>	nitted a Neighbor Solicitation with a Target Address equal to TNU's Link Loc Replies in response to the 3 Requests. The Echo Replies corresponded to the N1 to the NUT, an indication that the queuing of backets while waiting for a done successfully. The number of Echo Replies was not less than 1. nitted a Neighbor Solicitation with a Target Address equal to TN1's Link-Loc Replies in response to the 3 Requests. The Echo Replies corresponded to the N1 to the NUT, an indication that the queuing of backets while waiting for a done successfully. The number of Echo Replies corresponded to the N1 to the NUT, an indication that the queuing of backets while waiting for a done successfully. The number of Echo Replies was not less than 1. The N tation with a Target Address equal to TN2's Link-Local address, followed by Requests. The Echo Replies corresponded to the last 3 Echo Requests sent ion that the queuing of packets while waiting for address resolution to compli- te number of Echo Replies was not less than 1.	at 3 Ech ddress reso cal address last 3 Ech ddress reso UT transm Echo Rep by TN2 to	o Re- olution , fol- to Re- olution , itted a lies in o the
Test #		Result	
6LC.2.1.3	Prefix Information Option Processing, On-link Flag (Hosts Only)	A	N/A
			1 1,11
	t a host properly processes the on-link flag of a Prefix Information Option.		

A. TR1 transmits a Router Advertisement with a Lifetime of 100 seconds, Reachable time of 10 seconds, a Retrans Interval of 1 second, with a Valid and Preferred Prefix Lifetime of 20 seconds a prefix of TR1's Global Prefix and the on-link flag set. TR1 then transmits an Echo Request. TR1 does not respond to Neighbor Solicitations from the HUT. TR1 transmits the same Router Advertisement, but with the on-link flag clear. TR1 then transmits an Echo Request , and does not respond to Neighbor Solicitation from the HUT.

#### **Comments on Test Results**

A. This test is performed on Hosts only.

Test #		Result
<u>v6LC.2.1.4</u>	Prefix Invalidation (Hosts Only)	A N/A
Purpose: Verify that	a host takes the appropriate actions when the Invalidation Timer expires for a	Prefix List entry.
Comments on Test P	rocedure	
interval of 1 seco and the on-link fl Neighbor Advert Neighbor Solicita	Router Advertisement with a Lifetime of 100 seconds, Reachable time of 10 seconds and, with a Valid and Preferred Prefix Lifetime of 10 seconds a Prefix of TR1's ag set. TR1 then transmits an Echo Request to the HUT's Link-Local address isement with the Router Flag clear, and the Solicited and Override flags set, in ations from the HUT. TR1 transmits the same Router Advertisement as previous did Lifetime fields set to 0. TR1 then transmits an Echo Request to the HUT's Link-Local to the HUT's Link-Local address are fields set to 0. TR1 then transmits an Echo Request to the HUT's Link-Local to the HUT's Link-Local address fields set to 0. TR1 then transmits an Echo Request to the HUT's Link-Local to the HUT's Link-Local to the HUT's Link-Local address fields set to 0. TR1 then transmits an Echo Request to the HUT's Link-Local to 0. TR1 then transmits an Echo Request to the HUT's Link-Local to 0.	s Global Prefix . TR1 transmits a response to any usly, but with the
Comments on Test R	Results	
A. This test is perfor	rmed on Hosts only.	30
	615170.	-
Test # v6LC.2.1.5	Host Prefix List (Hosts Only)	ResultA-BN/A
<ul> <li>the on-link flag set.</li> <li>Comments on Test P</li> <li>A. Prefix Lifetime has able time of 600 and the flux of 600 and the flux of 600 and the flux. TR then the Valid and Preferring and Echo Recute Router Advert</li> <li>B. Prefix Lifetime up seconds, a Reach link-local Echo Relicitations from the on-link flag set, Vonds, retransmitting</li> </ul>	as not Expired: TRU transmits a Router Advertisement with a Lifetime of 20 s seconds and a Retranstime of 1 second, and no Prefix option. TR1 transmits a UT, and transmits a Neighbor Advertisement in response to any Neighbor Soli transmits the same Router Advertisement, but with the Prefix option header, th ed Lifetimes of 10 seconds, and a prefix of TN1's Global Prefix. After 8 second the second second second second second second by the prefix of the NUT's Link-Local address, the source address is covered by the pr	seconds, a Reach- a link-local Echo citations from the e on-link flag set, nds TN1 trans- refix advertised in a Lifetime of 20 . TR1 transmits a y Neighbor So- ption header, the fix. After 8 sec- quest to the
Comments on Test R	Results	
Comments on Test I		
These tests are perform	med on Hosts only.	

Test #		Resu	lt
v6LC.2.1.6	Neighbor Solicitation Origination, Address Resolution	Α	FAIL
		В	FAIL
	at a node properly originates Neighbor Solicitations when trying to resolve	e the address of	of a
neighbor. Comments on Test	Duccodum		
Comments on Test	Procedure		
Test Setup 1.1 terval value to from the NUT. TR1 and create (Packet A) fror vertisements. I B. <i>Neighbor Solic</i> Setup 1.1 with value to 1 seco NUT. Wait for create a Neight from its Global	<i>itation Origination, Target Address Being Link-Local</i> : If the NUT is a how with a Retransmit Interval value of 1 second. If the NUT is a router, confi 1 second. TR1 transmits an Echo Request to the NUT and responds to Ne Wait for an Echo Reply from the NUT. This should cause the NUT to re a Neighbor Cache entry for TR1 in state <b>REACHABLE</b> . TN1 transmits its Link-Local address to the NUT's Link-Local address. TN1 does not Repeat with a Retransmit Interval value of 5 seconds. <i>itation Origination, Target Address Being Global</i> : If the NUT is a host, p a Retransmit Interval value of 1 second. If the NUT is a router, configure nd. TR1 transmits an Echo Request to the NUT and responds to Neighbor an Echo Reply from the NUT. This should cause the NUT to resolve the bor Cache entry for TR1 in state <b>REACHABLE</b> . IN1 transmits an Esho Address to the NUT's Global Address. TN1 does not send any Neighbor ransmit Interval value of 5 seconds.	gure the Retra ighbor Solicit solve the addr an Echo Requised an Echo Requised and any Neig proom Comm the Retransmi Solicitations address of TR Request (Pack	ansmit In- ations ress of lest ghbor Ad- on Test in Interval from the C1 and let A)
Comments on Test	Results		
equal to TN1's licitation per se number of Neig be repeated wit Management, a According to J	Packet A (referenced above) the NUT transmitted Neighbor Solicitations of Link-Local Address at intervals of 1 second. The NUT transmitted no mo cond. Each Weighbor Solicitation had a Source Link-Layer Address Optic Subor Solicitations was 3, which is equal to MAX_MULTICAST_SOLICI h a Retransmit value of 5 seconds because that variable was unable to be c and the external behavior of the device did not change. RFC 2461, Section 6.2.1: "A router MUST allow for [Neighbor Solicitation ed by system management. [] an implementation is not required to have	re than 1 Neig on. The maxin T. This test co configured by n Retransmit I	ghbor So- mum ould not System [nterval]
ternal behavio HopLimit, Ret Therefore, the	r is consistent with that described in this document. [] Some of these hose ransTimer, and ReachableTime) apply to all nodes including routers." NUT should have allowed for the configuration of the Neighbor Solicitati	st variables (e. on Retransmit	.g., Cur- t Interval
dress at interve	to that it transmitted Neighbor Solicitations with a Target Address equal to als of 5 seconds.		
equal to TN1's licitation per se number of Neig be repeated wit	Packet A (referenced above), the NUT transmitted Neighbor Solicitations v Link-Local Address at intervals of 1 second. The NUT transmitted no mo econd. Each Neighbor Solicitation had a Source Link-Layer Address Optic ghbor Solicitations was 3, which is equal to MAX_MULTICAST_SOLICI h a Retransmit value of 5 seconds because that variable was unable to be c and the external behavior of the device did not change.	re than 1 Neig on. The maxir T. This test co	ghbor So- num puld not
to be configure ternal behavio	RFC 2461, Section 6.2.1: "A router MUST allow for [Neighbor Solicitation ed by system management. [] an implementation is not required to have r is consistent with that described in this document. [] Some of these hose ransTimer, and ReachableTime) apply to all nodes including routers."	[it] so long as	its ex-

Therefore, the NUT should have allowed for the configuration of the Neighbor Solicitation Retransmit Interval to 5 seconds so that it transmitted Neighbor Solicitations with a Target Address equal to TN1's Global Address at intervals of 5 seconds.

Test #		Result	
v6LC.2.1.7	Neighbor Solicitation Origination, Reachability Confirmation	Α	PASS
Purpose: Verify the	at a node properly originates Neighbor Solicitations when trying to confirm	the reachal	bility of a
neighbor.			
<b>Comments on Test</b>	Procedure	1	
Advertisement the NUT to add Router and Pref terval value is 1 ure Base Reach sponds to Neigl NUT to resolve is to transmit ar is to send a Nei ABLE_TIME * transmit an Ech <b>Comments on Test</b> A. In response to the TN1's bink every 1 second sponse to Pack transmitted an tions with the	host, TR1 transmits a Router Advertisement to the all-nodes multicast address includes a Prefix Advertisement with a global prefix and the L and A bits so TR1 to its Default Router List, configure a global address, and compute Re- ix Lifetimes are long enough such that they do not expire during the test. To second. If the NUT is a router, configure a default route with IR1 as the able Time for the Router to 30 seconds. TR1 transmits an Boho Request to bor Solicitations from the NUT. Wait for an Echo Repty from the NUT. To the address of TR1 and create a Neighbor Gathe entry for TR1 in state <b>RE</b> Echo Request (Packet A) from its Link-Local address to the NUT's Link-I ghbor Advertisement upon receiving Neighbor Solicitations from the NUT. MAX_RANDOM_FACTOR) seconds so that the NCE of TN1 transit to st o Request (Packet A) from TN1 Link-Local address to the NUT's Link-Local defaults Packet A, the NUT transmitted Neighbor Solicitations with a Target Address -Local Address at intervals of 1 second. The NUT then transmitted 1 Neigh Once the Neighbor Advertisement was received from TN1, the NUT sent et A. The NCE of TN1 was set to state <b>REACHABLE</b> . In response to Pac Echo Reply. After (DELAY_FIRST_PROBE_TIME) the NUT transmitted UT's Link-Local address being the source address and TN1's Link-Local The maximum number of Neighbor Solicitations that the NUT can transmit	en This sho bachable Th The Retrans next hop an the NUT at This should ACHABLI Local addre Wait (RE. tate STALE cal address. ss equal to nbor Solicit an Echo Re ket A, the N l Neighbor 1 address as t	uld cause me. The mit In- d config- nd re- cause the E. TN1 ss. TN1 ACH- 2 and then ation eply in re- NUT Solicita-

Test #		Degral4	
		Result	<b>D</b> A GG
<u>v6LC.2.1.8</u>	Invalid Neighbor Solicitation Handling	A	PASS
		B	PASS
		C	PASS
		D	PASS
		E	PASS
		F	PASS
		G H	PASS PASS
Dumogo, Vonify the	t a node takes the meaner estions upon resaint of an involid Neighbor Soliai		PASS
Comments on Test	at a node takes the proper actions upon receipt of an invalid Neighbor Solici		
<ul> <li>A. Invalid Target A Link-Local Add</li> <li>B. Invalid Destinat Address (::), De local Address.</li> <li>C. Invalid Source I to the Unspecifi</li> <li>D. Invalid Hop Lin</li> <li>E. Invalid Hop Lin</li> <li>E. Invalid Checksu lid.</li> <li>F. Invalid ICMP co G. Invalid ICMP L</li> <li>H. Option of Lengt</li> </ul>	ddress: TN1 transmits a Neighbor Solicitation from its Link-Local Address ress the Target Address is set to the All Nodes Multicast. <i>ion Address:</i> TN1 transmits a Neighbor Solicitation with a Source Address stination Address of the NUT's Link-Local Address and a Target Address of <i>ink-layer Address Option:</i> TN1 transmits a Neighbor Solicitation with a So ed Address (::) and a Destination of the Solicited Node Multicast Address o <i>it:</i> TN1 transmits a Neighbor Solicitation (Packet A) with the Hop Limit set <i>m:</i> TN1 transmits a Neighbor Solicitation (Packet A) with the ICMP code <i>ength:</i> TN1 transmits a Neighbor Solicitation (Packet A) with the ICMP Code <i>ength:</i> TN1 transmits a Neighbor Solicitation (Packet A) with the ICMP Code <i>ength:</i> TN1 transmits a Neighbor Solicitation (Packet A) with the ICMP Code <i>ength:</i> TN1 transmits a Neighbor Solicitation (Packet A) with the ICMP Le	of the Uns funce Addre f the ????? t to 254. sum set to 1. ngth set to	pecified s Link- ess equal be inva-
Test #		Result	
v6LC.2.1.9	Neighbor Solicitation Processing, No NCE	A	PASS
10110.4010/		B	PASS
<b>Purpose</b> : Verify that is no NCE exists for	at a node properly updates its neighbor cache upon receipt of neighbor solici that neighbor.	_	
Comments on Test	Procedure		
B. Multicast Neigh	or Solicitation: TN1 transmits a Neighbor Solicitation (Packet A). abor Solicitation: TN1 transmits a Neighbor Solicitation (Packet B).		
Comments on Test	Results		
to the Neighbor DELAY. After B. The NUT shoul should reply to	ed a Neighbor Cache Entry for TN1 and set the state of the Entry to STALE. Solicitation (Packet A) by sending a Neighbor Advertisement and set the st DELAY_FIRST_PROBE_TIME, the NUT sent a Unicast Neighbor Solicit d create a Neighbor Cache Entry for TN1 and set the state of the Entry to S' Neighbor Solicitation B by sending a Neighbor Advertisement and set the s r DELAY_FIRST_PROBE_TIME, the NUT should send a Unicast Neighbor	ate of the H ation to TN ΓALE. Th tate of the	Entry to 11. e NUT Entry to

Test #		Result	ţ
v6LC.2.1.10	Neighbor Solicitation Processing, NCE State INCOMPLETE	A	PASS
		В	PASS
Purpose: Verify th	at a node properly updates its neighbor cache upon receipt of neighbor so	licitations w	hen the
NCE of the neighbo	r is in state INCOMPLETE.		
<b>Comments on Test</b>	Procedure		
Solicitation (Pa B. <i>Multicast Neig</i>	<i>bor Solicitation:</i> TN1 transmits an Echo Request (Packet A) and then TN acket B). <i>hbor Solicitation:</i> TN1 transmits an Echo Request (Packet A) and then T itation (Packet C).		
<b>Comments on Test</b>	Results		5
NUT sent a mu NUT sent its qu its link-layer ad ing a Neighbor LAY_FIRST_F B. The NUT creat sent a multicast its queued Echo layer address fo Neighbor Athe	ed a Neighbor Cache Entry for TN1. TN1 set the state of the Entry to UN ticast Neighbor Solicitation to TN1 which after receiving VN1's Neighbor eued Echo Reply to TN1. The NUT then updated the NCE of TN1 to stat dress for TN1 accordingly. The NUT replied to the Neighbor Solicitation Advertisement and set the state of the Entry to DELAY. After DE- ROBE_TIME, the NUT sent a Unicast Neighbor Solicitation to TN1. ed a Neighbor Cache Entry for TN1 and set the state of the Entry to INCC Neighbor Solicitation to TN1 which after receiving TN1's Neighbor Sol Reply to TN1. The NUT then updated the NCE of TN1 to state STALE r TN1 accordingly. The NUT replied to the Neighbor Solicitation (Packe rtisement and set the state of the Entry to DELAY. After DELAY_FIRS cast Neighbor Solicitation to TN1.	or Solicitatio te STALE au n (Packet B) DMPLETE. icitation, the and updated t C) by sendi	n, the nd updated by send- The NUT NUT send l its link- ing a

Fest #		Result	;
v6LC.2.1.11	Neighbor Solicitation Processing, NCE State REACHABLE	A	PASS
		В	PASS
		С	PASS
		D	PAS
Purpose: Verify	that a node properly updates its neighbor cache upon receipt of neighbor s	olicitations wl	
	bor is in state <b>REACHABLE</b> .		
Comments on Te	st Procedure		
<ul> <li>transmits a so sends out the licitation (Paulicast Neig)</li> <li>B. Unicast Neig TN1 transmitter TN1 send Neighbor Sol</li> <li>C. Multicast Neighbor Sol</li> <li>C. Multicast Neighbor Sol</li> <li>D. Multicast Neighbor Sol</li> <li>D. Multicast Neighbor Sol</li> <li>TN1 transmitter TN1 send Neighbor Sol</li> </ul>	hbor Solicitation with the same SLLA: TN1 transmits an Echo Request (F blicited Neighbor Advertisement (Packet B). The NCE should be set to <b>R</b> Echo Reply. TN1 transmits another Echo Request (Packet A) and TN1 to taket C). hbor Solicitation with a different SLLA: TN1 transmits an Echo Request is a solicited Neighbor Advertisement (Packet B). The NCE should be set so ut the Echo Reply. TN1 transmits another Echo Request (Packet A) an icitation (Packet C) with a different address as the Source Link)layer Add ighbor Solicitation with the same SLLA: TN1 transmits an Echo Request is a solicited Neighbor Advertisement (Packet B). The NCE should be set so ut the Echo Reply. TN1 transmits another Echo Request (Packet A) an icitation (Packet C) with a different SLLA: TN1 transmits an Echo Request is a solicited Neighbor Advertisement (Packet B). The NCE should be set so ut the Echo Reply. TN1 transmits another Echo Request is a solicitation with a different SLLA: TN1 transmits an Echo Request is a solicited Neighbor Advertisement (Packet B). The NCE should be set so ut the Echo Reply. TN1 transmits another Echo Request (Packet A) an icitation (Packet D). ighbor Solicitation with a different SLLA: TN1 transmits an Echo Request so ut the Echo Reply. TN1 transmits another Echo Request (Packet A) an icitation (Packet D).	EACHABLE ansmits a Net Packet A) and to REACHA d TNI transmiress. (Packet A) and to REACHA d TN1 transmit t (Packet A) and d TN1 transmit t (Packet A) and t to REACHA d TN1 transmit	after TN ghbor So d then ABLE at its a d then ABLE at its a nd then ABLE at
sent a multica should send in and updated in ceiving the Ec NUT did not	tted a Neighbor Cache Entry for TN1 and set the state of the Entry to INC st Neighbor Solicitation to TN1, which after receiving TN1's Neighbor A squeued Echo Reply to TN1. The NUT then updated the NCE of TN1 to s Jink-layer address for TN1 accordingly. Because the NUT is in state <b>RI</b> tho Request from TN1, the NUT sent an Echo Reply. After DELAY_FIR send a unicast Neighbor Solicitation to TN1. The NUT did not update the Neighbor Solicitation (Packet C) by sending a Neighbor Advertisement.	dvertisement, state <b>REACH</b> E <b>ACHABLE</b> , ST_PROBE_7 NCE of TN1,	the NU <sup>T</sup> HABLE after re TIME, the the NU <sup>T</sup>
<ol> <li>The NUT creaters sent a multicaters should send it and updated in ceiving the Econ NUT did not stand updated T (Packet C). The state of the state of</li></ol>	The Area of the NUT send a unicast Neighbor Solicitation to TN1, which after receiving TN1's Neighbor A sequence the NUT to TN1. The NUT then updated the NCE of TN1 to as link-layer address for TN1 accordingly. Because the NUT is in state <b>RI</b> sho Request from TN1, the NUT sent an Echo Reply. After DELAY_FIR send a unicast Neighbor Solicitation to TN1. The NUT updated the NCE of TN1's Link-layer address to its new Link-layer address from the received I he NUT replied to Neighbor Solicitation (Packet C) by sending a Neighbor entry to DELAY. After DELAY_FIRST_PROBE_TIME, the NUT sen N1 with the Target set the new Link-Layer address of TN1.	dvertisement, state <b>REACH</b> EACHABLE, ST_PROBE of TN1 to state Neighbor Solic or Advertiseme	the NUT HABLE , after re- TIME, the STALE citation ent and s
C. The NUT cre sent a multica should send it and updated in ceiving the Ec	ated a Neighbor Cache Entry for TN1 and set the state of the Entry to INC st Neighbor Solicitation to TN1, which after receiving TN1's Neighbor A s queued Echo Reply to TN1. The NUT then updated the NCE of TN1 to is link-layer address for TN1 accordingly. Because the NUT is in state <b>RI</b> tho Request from TN1, the NUT sent an Echo Reply. After DELAY_FIR	dvertisement, state <b>REACH</b> EACHABLE, ST_PROBE_7	the NUT <b>HABLE</b> , after re- TIME, th

NUT did not send a unicast Neighbor Solicitation to TN1. The NUT did not update the NCE of TN1, the NUT

replied to the Neighbor Solicitation (Packet D) by sending a Neighbor Advertisement. TN1 stayed in state **REACHABLE**.

D. The NUT created a Neighbor Cache Entry for TN1 and set the state of the Entry to INCOMPLETE. The NUT sent a multicast Neighbor Solicitation to TN1, which after receiving TN1's Neighbor Advertisement, the NUT should send its queued Echo Reply to TN1. The NUT then updated the NCE of TN1 to state **REACHABLE** and updated its link-layer address for TN1 accordingly. Because the NUT is in state **REACHABLE**, after receiving the Echo Request from TN1, the NUT sent an Echo Reply. After DELAY\_FIRST\_PROBE\_TIME, the NUT did not send a unicast Neighbor Solicitation to TN1. The NUT updated the NCE of TN1 to state STALE and updated TN1's Link-layer address to its new Link-layer address from the received Neighbor Solicitation (Packet C). The NUT replied to Neighbor Solicitation (Packet C) by sending a Neighbor Advertisement and set the state of the Entry to DELAY. After DELAY\_FIRST\_PROBE\_TIME, the NUT sent a unicast Neighbor Solicitation to TN1 with the Target set the new Link-Layer address of TN1.

Test #		Result	
v6LC.2.1.12	Neighbor Solicitation Processing, NCE State STALE )	A PAS	SS
		B PAS	SS
		C PAS	SS
		D PAS	SS
Purpose: Verify	that a node properly updates its neighbor cache apon receipt of neighbor solic	itations when the	
NCE of the neigh	bor is in state STALE.		
Comments on Te	est Procedure		
A. Unicast Neig	hbor Solicitation with the same SLLA: TN1 transmits an Echo Request (Packe	et A) and then TN	<b>J</b> 1
transmits a s	olicited Neighbor Advertisement (Packet B). The NCE should be set to <b>REA</b>	CHABLE after T	ΓN1
sends out the	EchorReply. TNI transmits another Echo Request (Packet A) and waits (RE	ACHABLE_TIM	E *
	DOM_FACTOR) seconds to transmit a Neighbor Solicitation		
(Packet C).			
	schoor Solicitation with a different SLLA: TN1 transmits an Echo Request (Pac		
	ts a solicited Neighbor Advertisement (Packet B). The NCE should be set to I		fter
	ut the Echo Reply. TN1 transmits another Echo Request (Packet A) and waits		
	E * MAX_RANDOM_FACTOR) seconds to transmit a Neighbor Solicitation	with a different a	ıd-
	Source Link-layer Address (Packet C).	1	
	eighbor Solicitation with the same SLLA: TN1 transmits an Echo Request (Pac		۰£
	ts a solicited Neighbor Advertisement (Packet B). The NCE should be sent to the sout the Echo Reply. TN1 transmits another Echo Request (Packet A) and w		ai-
	E * MAX_RANDOM_FACTOR) seconds to transmit a Neighbor Solicitation		
(Packet D).	E · MAA_KANDOW_PACTOR) seconds to transmit a Neighbor Solicitation		
	righbor Solicitation with a different SLLA: TN1 transmits an Echo Request (Pa	acket $\Delta$ ) and then	<b>.</b>
	its a solicited Neighbor Advertisement (Packet B). The NCE should be sent to		
	Is out the Echo Reply. TN1 transmits another Echo Request (Packet A) and w		ui
	E * MAX_RANDOM_FACTOR) seconds to transmit a Neighbor Solicitation		ad-
	Source Link-layer Address (Packet D).		
	•		
Comments on To	est Results		
A. The NUT cre	ated a Neighbor Cache Entry for TN1 and set the state of the Entry to INCOM	IPLETE. The NU	JT
	ast Neighbor Solicitation to TN1, which after receiving TN1's Neighbor Adve		
should send i	ts queued Echo Reply to TN1. The NUT then updated the NCE of TN1 to sta	te REACHABLE	E

and updated its link-layer address for TN1 accordingly. Because the NUT is in state **REACHABLE**, after receiving the Echo Request from TN1, the NUT sent an Echo Reply. After DELAY\_FIRST\_PROBE\_TIME, the NUT did not send a Unicast Neighbor Solicitation to TN1. The NUT should update the NCE of TN1 to state STALE, and after transmitting the Neighbor Solicitation (Packet C), the NUT did not update its NCE and the NUT stayed in state STALE. The NUT replied to the Neighbor Solicitation by sending a Neighbor Advertisement and set the state of the TN1's Entry to DELAY. After DELAY\_FIRST\_PROBE\_TIME, the NUT sent a unicast Neighbor Solicitation to TN1.

- B. The NUT created a Neighbor Cache Entry for TN1 and set the state of the Entry to INCOMPLETE. The NUT sent a multicast Neighbor Solicitation to TN1, which after receiving TN1's Neighbor Advertisement, the NUT should send its queued Echo Reply to TN1. The NUT then updated the NCE of TN1 to state **REACHABLE** and updated its link-layer address for TN1 accordingly. Because the NUT is in state **REACHABLE**, after receiving the Echo Request from TN1, the NUT sent an Echo Reply. After DELAY\_FIRST\_PROBE\_TIME, the NUT did not send a Unicast Neighbor Solicitation to TN1. The NUT should update the NCE of TN1 to state STALE, and the NUT should update TN1's Link-Layer address to its new Link-Layer address from the received Neighbor Solicitation (Packet C). The NUT did not update the NCE of TN1 and stayed in state STALE. The NUT replied to the Neighbor Solicitation by sending a Neighbor Advertisement to TN1's new Link-Layer address and set the state of the TN1's Entry to DELAY. After DELAY\_FIRST\_PROBE\_TIME, the NUT sent a unicast Neighbor Solicitation to TN1 using the new link-layer address as the Target.
- C. The NUT created a Neighbor Cache Entry for TN1 and set the state of the Entry to INCOMPLETE. The NUT sent a multicast Neighbor Solicitation to TN1, which after receiving TN1's Neighbor Advertisement, the NUT should send its queued Echo Reply to TN1. The NUT then updated the NCE of TN1 to state **REACHABLE** and updated its link-layer address for TN1 accordingly. Because the NUT is in state **REACHABLE**, after receiving the Echo Request from TN1 the NUT sent an Echo Reply. After DELAY\_FIRST\_PROBE\_TIME, the NUT did not send a Unicast Neighbor Solicitation to TN1. The NUT should update the NCE of TN1 to state **STALE**, and after transmitting the Neighbor Solicitation (Packet D), the NUT did not update its NCE and the NUT stayed in state STALE. The NUT replied to the Neighbor Solicitation by sending a Neighbor Advertisement and set the state of the TN1 is Entry to DELAY. After DELAY\_FIRST\_PROBE\_TIME, the NUT sent and set the state of the TN1 is Entry to DELAY. After DELAY\_FIRST\_PROBE\_TIME, the NUT sent and set the state of the TN1 is Entry to DELAY. After DELAY\_FIRST\_PROBE\_TIME, the NUT sent and set the state of the TN1 is Entry to DELAY. After DELAY\_FIRST\_PROBE\_TIME, the NUT sent a unicast Neighbor Solicitation to TN1.
- D. The NUT created a Neishbor Cache Entry for TN1 and set the state of the Entry to INCOMPLETE. The NUT sent a multicast Neighbor Solicitation to TN1, which after receiving TN1's Neighbor Advertisement, the NUT should send its queued Echo Reply to TN1. The NUT then updated the NCE of TN1 to state **REACHABLE** and updated its link-fayer address for TN1 accordingly. Because the NUT is in state **REACHABLE**, after receiving the Echo Request from TN1, the NUT sent an Echo Reply. After DELAY\_FIRST\_PROBE\_TIME, the NUT did not send a Unicast Neighbor Solicitation to TN1. The NUT should update the NCE of TN1 to state **STALE**, and the NUT should update TN1's Link-Layer address to its new Link-Layer address from the received Neighbor Solicitation (Packet D). The NUT did not update the NCE of TN1 and stayed in state STALE. The NUT replied to the Neighbor Solicitation by sending a Neighbor Advertisement to TN1's new Link-Layer address and set the state of the TN1's Entry to DELAY. After DELAY\_FIRST\_PROBE\_TIME, the NUT sent a unicast Neighbor Solicitation to TN1 using the new link-layer address as the Target.

Test #	ŧ		Result		
<u>v6LC</u>	<u>.2.1.13</u>	Neighbor Solicitation Processing, NCE State PROBE	Α	PASS	
			В	PASS	
			С	PASS	
			D	PASS	
		t a node properly updates its neighbor cache upon receipt of neighbor solici	tations wh	en the	
		is in state Probe.			
Comr	nents on Test l	Procedure			
al fr L. B. U ar fr L. as C. M an fr L. D. M an fr L.	so transmits a l om the NUT. T AY_FIRST_PF <i>Inicast Neighbo</i> and also transmit om the NUT. T AY_FIRST_PF is the Source Lin <i>Initicast Neighb</i> and also transmit om the NUT. T AY_FIRST_PF <i>Initicast Neighb</i> and also transmit om the NUT. T AY_FIRST_PF	r Solicitation with the same SLLA: TN1 transmits an Echo Request (Packet Neighbor Advertisement (Packet B) to the NUT after receiving any Neighbor The NUT should update the NCE of TN1 to state STALE and waits (DE- ROBE_TIME) seconds to transmit a Neighbor Solicitation (Packet C). r Solicitation with a different SLLA: TN1 transmits an Echo Request (Packet as a Neighbor Advertisement (Packet B) to the NUT after receiving any Nei The NUT should update the NCE of TN1 to state STALE and waits (DE- ROBE_TIME) seconds to transmit a Neighbor Solicitation (Packet C) with a hk-Layer Address. bor Solicitation with the same SLLA: TN1 transmits an Echo Request (Pack as a Neighbor Advertisement (Packet B) to the NUT after receiving any Nei The NUT should update the NCE of TN1 to state STALE and waits (DE- ROBE_TIME) seconds to transmit a Neighbor Solicitation (Packet C) with a hk-Layer Address. bor Solicitation with the same SLLA: TN1 transmits an Echo Request (Pack as a Neighbor Advertisement (Packet B) to the NUT after receiving any Nei The NUT should update the NCE of TN1 to state STALE and waits (DE- ROBE_TIME) seconds to transmit a Neighbor Solicitation (Packet D). bor Solicitation with a different SLLA: TN1 transmits an Echo Request (Pack as a Neighbor Advertisement (Packet B) to the NUT after receiving any Nei The NUT should update the NCE of TN1 to state STALE and waits (DE- ROBE_TIME) seconds to transmit a Neighbor Solicitation (Packet D). bor Solicitation with a different SLLA: TN1 transmits an Echo Request (Pack as a Neighbor Advertisement (Packet B) to the NUT after receiving any Nei The NUT should update the NCE of TN1 to state STALE and waits (DE- ROBE_TIME) seconds to transmit a Neighbor Solicitation (Packet D) with a the Layer Advertise	et A) to the ghoor Soli a different set A) to the ghbor Soli cket A) to the ghbor Soli	ions e NUT citations address e NUT citations the NUT citations	
Comr	nents on Test I	Results			
00111					
se sta N	ent an Echo Rep ate PROBE by CE and stayed	d the NCE of TN1 to state STALE. After receiving the Echo Request from Ity and entered state DELAY. After DELAY_FIRST_PROBE_TIME, the sending a unicast Neighbor Solicitation to TN1. The NUT did not update the in state PROBE. The NUT retransmitted its unicast Neighbor Solicitation (	NUT transine state of ' (Packet C)	itioned to TN1's to TN1.	
se sta N fre N ac	ent an Echo Rep ate PROBE by CE and stayed om the received UT replied to t ddress and set th	d the NCE of TN1 to state STALE. After receiving the Echo Request from oly and entered state DELAY. After DELAY_FIRST_PROBE_TIME, the l sending a unicast Neighbor Solicitation to TN1. The NUT did not update th in state PROBE. The NUT updated TN1's Link-layer address to its new lin d Neighbor Solicitation (Packet C) and then updated the state of TN1's NCI he Neighbor Solicitation by sending a Neighbor Advertisement using TN1' he state of the TN1's Entry to DELAY. After DELAY_FIRST_PROBE_TI or Solicitation to TN1 using the new Link-layer address as the Target.	NUT trans ne state of ' nk-layer ad E to STAL s new Link	itioned to TN1's dress E. The c-Layer	
C. The second se	he NUT update ent an Echo Rep ate PROBE by CE and stayed	d the NCE of TN1 to state STALE. After receiving the Echo Request from oly and entered state DELAY. After DELAY_FIRST_PROBE_TIME, the sending a unicast Neighbor Solicitation to TN1. The NUT did not update the in state PROBE. The NUT retransmitted its unicast Neighbor Solicitation (	NUT transine state of ' (Packet D)	itioned to TN1's to TN1.	
se sta N fre	ent an Echo Rep ate PROBE by CE and stayed om the received	d the NCE of TN1 to state STALE. After receiving the Echo Request from oly and entered state DELAY. After DELAY_FIRST_PROBE_TIME, the l sending a unicast Neighbor Solicitation to TN1. The NUT did not update th in state PROBE. The NUT updated TN1's Link-layer address to its new lin d Neighbor Solicitation (Packet D) and then updated the state of TN1's NCI he Neighbor Solicitation by sending a Neighbor Advertisement using TN1'	NUT trans ne state of ' nk-layer ad E to STAL	itioned to TN1's dress E. The	

address and set the state of the TN1's Entry to DELAY. After DELAY\_FIRST\_PROBE\_TIME, the NUT sent a unicast Neighbor Solicitation to TN1 using the new Link-layer address as the Target.

Test #		Result	
v6LC.2.1.14	Neighbor Solicitation Processing, Anycast (Routers Only)	Α	PASS
Purpose: Verify t	hat a router properly processes a Neighbor Solicitation for an anycast add	ress.	
Comments on Tes	t Procedure		
A. TN1 transmits	a Neighbor Solicitation to the RUT's Subnet-Router anycast address.	5	7
<b>Comments on Tes</b>	t Results	$\cap$	1
MAX_ANYC	ald responds to TN1 by sending a Neighbor Advertisement between 0 and AST_DELAY_TIME after it receives the Neighbor Soficitation. The RU d contain a value of 0 in the override flag field.	I's Neighbor	Adver-
Test #		<b>D 1</b>	
		Result	
<u>v6LC.2.1.15</u>	Invalid Neighbor Advertisement Handling	A	PASS
		B	PASS
		С	PASS
		D	PASS
		E	PASS
		F	PASS
		G	PASS
	hat a node takes the proper actions upon receipt of an invalid Neighbor Ad	dvertisement.	
Comments on Tes	t Procedure		
Neighbor Adv	<i>invalid NA (Solicited Flag</i> ==1): TN1 transmits an Echo Request to the vertisement (Packet A) with the Solicited flag set to 1. <i>invalid NA (Hop Limit</i> == 254): TN1 transmits an Echo Request to the N		
	vertisement (Packet A) with the Hop Limit set to 254.		
	<i>invalid NA (Invalid Checksum):</i> TN1 transmits an Echo Request to the N	UT. TN1 tra	nsmits
	vertisement (Packet A) with an invalid checksum.		
	<i>invalid NA (ICMP code! = zero):</i> TN1 transmits an Echo Request to the	NUT. TN1 ti	ansmits
	vertisement (Packet A) with the ICMP code set to 1.		
	invalid NA (ICMP length $< 24$ octets): TN1 transmits an Echo Request t	o the NUT. 7	'N1
	ghbor Advertisement (Packet A) with the ICMP length set to 16.		
	<i>invalid NA (target == multicast address):</i> TN1 transmits an Echo Reque	st to the NUT	. TN1
	ghbor Advertisement (Packet A) with the Target Address set to the solicite		
Link-Local ad			
	<i>invalid NA (option length</i> $==$ <i>zero)</i> : TN1 transmits an Echo Request to the	e NUT TN1	transmit

G. *NUT receives invalid NA (option length* ==*zero):* TN1 transmits an Echo Request to the NUT. TN1 transmits Neighbor Advertisement (Packet A) with the Option length set to 0.

### **Comments on Test Results**

A. The NUT transmitted a Neighbor Solicitation to TN1's solicited-node multicast address. The NUT then transmitted a Neighbor Solicitation to TN1's solicited-node multicast address.

- B. The NUT transmitted a Neighbor Solicitation to TN1's solicited-node multicast address. The NUT then ignored the Neighbor Advertisement sent by TN1 and continued to transmit Neighbor Solicitations to TN1's solicited-node multicast address.
- C. The NUT transmitted a Neighbor Solicitation to TN1's solicited-node multicast address. The NUT then ignored the Neighbor Advertisement sent by TN1 and continued to transmit Neighbor Solicitations to TN1's solicited-node multicast address.
- D. The NUT transmitted a Neighbor Solicitation to TN1's solicited-node multicast address. The NUT then ignored the Neighbor Advertisement sent by TN1 and continued to transmit Neighbor Solicitations to TN1's solicited-node multicast address.
- E. The NUT transmitted a Neighbor Solicitation to TN1's solicited-node multicast address. The NUT then ignored the Neighbor Advertisement sent by TN1 and continued to transmit Neighbor Solicitations to TN1's solicited-node multicast address.
- F. The NUT transmitted a Neighbor Solicitation to TN1's solicited-node multicast address. The NUT then ignored the Neighbor Advertisement sent by TN1 and continued to transmit Neighbor Solicitations to TN1's solicited-node multicast address.
- G. The NUT transmitted a Neighbor Solicitation to TN1's solicited-node multicast address. The NUT then ignored the Neighbor Advertisement sent by TN1 and continued to transmit Neighbor Solicitations to TN1's solicited-node multicast address.

Test #		Result	
v6LC.2.1.16	Neighbor Advertisement Processing, No NCE	Α	PASS
		В	PASS
		С	PASS
		D	PASS
		Ε	PASS
		F	PASS
		G	PASS
		Н	PASS
	at a node silently discards a Neighbor Advertisement if the target d	oes not have a Neis	ghbor
Cache entry.			<u> </u>
Comments on Test	Procedure		
			\
	with $S = 0$ , $O = 0$ , and TLLA: TR1 transmits Neighbor Advertisence	nt (Packer A), which	ch after
P Pagaining NA	an Echo Request to the NUT. with $S = 0$ , $O = 1$ , and TLLA: TR1 transmits Neighbor Advertisement	nt (Dolokart B) tubi	Th ofter
	an Echo Request to the NUT.	in (Packer b), which	ch alter
	with $S = 1$ , $O = 0$ , and TLLA: TR1 transmits Neighbor Advertiseme	nt (Packet C), which	ch after
	an Echo Request to the NUT.		
D. Receiving NA v	with $S = 1$ , $\hat{O} = 1$ , and TLLA: TR1 transmits Neighbor Advertiseme	ent (Packet D), which	ch after
TN1 transmits	an Echo Request to the NUT.		
E. Receiving NA v	with $S = 0$ , $\dot{O} = 0$ , and NO TLLA. TR1 transmits Neighbor Advertise	ement (Packet A) v	without
the Target Link	-layer Address Option, which after TN1 transmits an Echo Request	to the NUT.	
F. Receiving NA v	with $S = 0$ , $O = 1$ , and NO TILA: TRI transmits Neighbor Advertise	ement (Packet B) v	without
the Target Link	-layer Address Option, which after TN1 transmits an Echo Request	to the NUT.	•.•
G. Receiving NA v	with $S = 1$ , $p \neq 0$ , and $NO$ TLLA. TR1 transmits Neighbor Advertis	ement (Packet C) v	without
LI Pagaining MA	-layer Address Option, which after TN1 transmits an Echo Request vith $S = X$ , $O \neq I$ and NO TLLA: TR1 transmits Neighbor Advertise	to the NUT.	without
the Target Link	Layer Address Option, which after TN1 transmits an Echo Request	to the NUT	without
the ranger Link	Raver Audiess (Sphon, which are) Tivi transmits an Echo Request		
Comments on Tes	Results		
A-H. For each part	, after receiving the Neighbor Advertisement from TN1, the NUT d	id not transmit anv	packets
	s be created for TR1. After receiving the Echo Request from TN1,		
	for TN1 and set the state of the Entry to INCOMPLETE. The NUT		
G 11 14 14	-		-

Solicitation to TN1.

Test #		Result	
v6LC.2.1.17	Neighbor Advertisement Processing, NCE State INCOMPLETE	A	PASS
		B	PASS
		C	PASS
		D	PASS
		E	PASS
<b>Purpose</b> : Verify the Neighbor Advertise	nat a node properly updates its Neighbor Cache from the INCOMPLETE statement	-	
Comments on Tes			
<ul> <li>lowing the Ectissement with the NCE of The transmitted by</li> <li>B. Receiving NA lowing the Ectissement with NUT and the Ectissement with A lowing the Ectissement with and the NCE ets transmittee</li> <li>E. Receiving MA Local address Neighbor Adv</li> </ul>	with $S = 1$ and $O = 1$ : TN1 transmits an Echo Request to the NUT's Link-I ho Request, after observing traffic transmitted by the NUT, TN1 transmits a both the Solicited and Override flags set. Observe both the packets transmit N1 on the NUT. TN1 then transmits an Echo Request. Lastly, again observe the NUT and the NCE of TN1 on the NUT. with $S = 1$ and $O = 0$ : TN1 transmits an Echo Request to the NLT's Link- ho Request, after observing traffic transmitted by the NUT. TN1 transmits a the Solicited flag set, and the Override flag clear. Observe both the packets NCE of TN1 on the NUT. TN1 then transmits an Echo Request. Lastly, again itted by the NUT and the NCE of TN1 on the NUT. with $S = 0$ and $O = 1$ : TN1 transmits an Echo Request to the NUT's Link- ho Request, after observing traffic transmitted by the NUT, TN1 transmits a hitted by the NUT and the NCE of TN1 on the NUT. with $S = 0$ and $O = 1$ : TN1 transmits an Echo Request to the NUT's Link- ho Request, after observing traffic transmitted by the NUT, TN1 transmits a the Solicited flag clear, and the Override flag set. Observe both the packets NCE of TN1 on the NDT. TN1 then transmits an Echo Request. Lastly, again itted by the NUT and the NCE of TN1 on the NUT. with $S = 0$ and $O = 0$ : TN1 transmits an Echo Request to the NUT's Link- ho Request, after observing traffic transmitted by the NUT, TN1 transmits a both the Solicited and Override flags clear. Observe both the packets transmit if NU on the NUT. TN1 then transmits an Echo Request. Lastly, again ob the Solicited and Override flags clear. Observe both the packets transmit of TN1 on the NCE of TN1 on the NUT. without Target Link-Layer Address Option: TN1 transmits an Echo Request Following the Echo Request, after observing traffic transmitted by the NU ertisement without any Target Link-Layer Address Option. Lastly, again of by the NUT and the NCE of TN1 on the NUT.	Neighbor 4 thed by the both the p Local addre Neighbor 4 transmitted ain observe Local addre Neighbor 4 transmitted ain observe Local addre Local addre Local addre Neighbor 4 transmitted	Adver- NUT and ackets ess. Fol- Adver- d by the both the ess. Fol- Adver- d by the both the ss. Fol- Adver- ie NUT the pack- T's Link- ismits a
state of the Ence ceived the Net NCE for TN1 ABLE. The N	ed the Echo Request from TN1, the NUT created a Neighbor Cache Entry f try to <b>INCOMPLETE</b> . The NUT sent a multicast Neighbor Solicitation to ghbor Advertisement from TN1, the NUT sent the queued Echo Reply to T with the received Target Link-layer Address and changed the state of the N UT sent only an Echo Reply to TN1 since the NUT is in state <b>REACHAB</b> PROBE_TIME, the NUT did not send a unicast Neighbor Solicitation to TR	TN1. Afte N1 and upd CE to <b>REA</b> LE. After I	er it re- lated its .CH-
B. After it receiv state of the En ceived the Nei NCE for TN1 ABLE. The N	ed the Echo Request from TN1, the NUT created a Neighbor Cache Entry f try to <b>INCOMPLETE</b> . The NUT sent a multicast Neighbor Solicitation to ghbor Advertisement from TN1, the NUT sent the queued Echo Reply to T with the received Target Link-layer Address and changed the state of the N UT sent only an Echo Reply to TN1 since the NUT is in state <b>REACHAB</b> PROBE_TIME, the NUT did not send a unicast Neighbor Solicitation to T	or TN1 and TN1. Afte N1 and upd CE to <b>REA</b> LE. After I	er it re- lated its CH-
C. After it receiv state of the En	ed the Echo Request from TN1, the NUT created a Neighbor Cache Entry f try to <b>INCOMPLETE</b> . The NUT sent a multicast Neighbor Solicitation to ghbor Advertisement from TN1, the NUT sent the queued Echo Reply to T	or TN1 and TN1. Afte	er it re-

NCE for TN1 with the received Target Link-layer Address and changed the state of the NCE to **STALE**. The NUT sent only an Echo Reply to TN1 since the NUT is in state **STALE**. After DE-LAY FIRST PROBE TIME, the NUT sent a unicast Neighbor Solicitation to TN1.

- D. After it received the Echo Request from TN1, the NUT created a Neighbor Cache Entry for TN1 and set the state of the Entry to INCOMPLETE. The NUT sent a multicast Neighbor Solicitation to TN1. After it received the Neighbor Advertisement from TN1, the NUT sent the queued Echo Reply to TN1 and updated its NCE for TN1 with the received Target Link-layer Address and changed the state of the NCE to STALE. The NUT sent only an Echo Reply to TN1 since the NUT is in state STALE. After DE-LAY\_FIRST\_PROBE\_TIME, the NUT sent a unicast Neighbor Solicitation to TN1.
- E. After it received the Echo Request from TN1, the NUT created a Neighbor Cache Entry for TN1 and set the state of the Entry to **INCOMPLETE**. The NUT sent a multicast Neighbor Solicitation to TN1. The NUT ignored the NA transmitted by TN1. There was no change in the neighbor cache for TN1 as it should stay in state **INCOMPLETE**. The NUT continued to send multicast Neighbor Solicitations to TNT.

InterOperability Lab

C C A 1 19						Result	
v6LC.2.1.18	Neighbor Ad	lvertisement P	rocessing, NC	CE State REACHA	BLE	Α	PASS
	8		8/			В	PASS
						С	PASS
						D	PASS
						E	PASS
						F	PASS
						G	PASS
						H	PASS
						I	FAIL
						J	PASS
						ĸ	FAIL
						L	PASS
						M	PASS
				$\frown$	()	N	PASS
				1501		0	FAIL
						P	PASS
<b>Purpose</b> : Verify that	a node prope	lv updates its N	leighbor Cach	e from the REACH	ABLE	-	
Neighbor Advertisem	1 1	-j apaatos 165 1			June	-pointeee	-p: 01 a
Comments on Test P							
	Solicited	Overnide			Update L	ink-	
Destination	flag 🦯	flag	TLLA	V New State	Layer Ad		Part
Unicast	clean,	lear	nome	REACHABLE	no		А
Unicast		set	none	REACHABLE	no		В
Unicast	, set	clear	none	REACHABLE	no		С
Unicast	set	Ilset	none	REACHABLE	no		D
Unicast	Clear	clear	same	REACHABLE	no		E
Unicast	elean	set	same	REACHABLE	no		F
	set	set clear	same same	REACHABLE REACHABLE	no no		F G
Unicast							
Unicast Unicast	set	clear	same	REACHABLE	no		G
Unicast Unicast Unicast	set set	clear set	same same	REACHABLE REACHABLE	no no		G H
Unicast Unicast Unicast Unicast	set set clear	clear set clear	same same different	REACHABLE REACHABLE STALE	no no no		G H I
Unicast Unicast Unicast Unicast Unicast	set set clear clear	clear set clear set	same same different different	REACHABLE REACHABLE STALE STALE	no no no yes		G H I J
Unicast Unicast Unicast Unicast Unicast Unicast	set set clear clear set	clear set clear set clear	same same different different different	REACHABLE REACHABLE STALE STALE STALE	no no no yes no		G H I J K
Unicast Unicast Unicast Unicast Unicast Unicast Unicast	set set clear clear set set	clear set clear set clear set	same same different different different different	REACHABLE REACHABLE STALE STALE STALE REACHABLE	no no yes no yes		G H J K L
Unicast Unicast Unicast Unicast Unicast Unicast Multicast	set clear clear clear set set clear	clear set clear set clear set clear	same same different different different same	REACHABLE REACHABLE STALE STALE STALE REACHABLE REACHABLE	no no yes no yes no		G H J K L M
Unicast Unicast Unicast Unicast Unicast Unicast Multicast Multicast	set clear clear set set clear clear	clear set clear set clear set clear set	same same different different different same same	REACHABLE REACHABLE STALE STALE STALE REACHABLE REACHABLE REACHABLE	no no yes no yes no no		G H J K L M N

#### **Comments on Test Results**

A. The NUT created a Neighbor Cache Entry for TN1 and set the state of the entry to **INCOMPLETE**, after it received the first Echo Request. This caused the NUT to send a multicast Neighbor Solicitation to TN1. After the first Neighbor Advertisement was received, the NUT went to state **REACHABLE**. Therefore, it replied and, after DELAY\_FIRST\_PROBE\_TIME, the NUT did not send a unicast Neighbor Solicitation to TN1. After the NUT received the test Neighbor Advertisement according to the table above, and an Echo Request from TN1, it updated the state of TN1's NCE and the LLA according to the table. After receiving the second Echo Request, the NUT reacted as follows:

#### Parts A-H and L-N to REACHABLE

After receiving the Echo Request from TN1, the NUT should send an Echo Reply. After DELAY\_FIRST\_PROBE\_TIME, the NUT should not send a unicast Neighbor Solicitation to TN1.

Part L

The NUT's Echo Reply should be sent to the new updated link-layer destinated dress of TN1.

#### Parts J and P to STALE

The NUT's Echo Reply should be sent to the new updated link-layer destination address of TN1. The Neighbor Solicitation should use the new link-layer address in the Target field.

I,K,O. After receiving the Echo Request, the NUT sent an Echo Reply. After DELAY\_FIRST\_PROBE\_TIME, the NUT did not transmit a unicast Neighbor Solicitation to TN1, indicating that the NUT did not enter state STALE.

According to RFC 2461, Section 72.5. When a Neighbor Cache Entry is in state REACHABLE, the entry should be changed to state STALE upon receiving a Neighbor Advertisement based upon the Solicited and Override flags and whether or not the new Link Local Address is equal to the previously cached value.

Therefore, while the NUT was in state REACHABLE after receiving the Neighbor Advertisement with certain bits set, the Neighbor Cache Entry should have been updated to state STALE.

n a<del>c</del>

v6LC.2.1.19						Result	
	Neighbor	Advertiseme	nt Processing	, NCE State STAI		Α	PASS
				,,	F	В	PASS
						С	PASS
						D	PASS
						E	PASS
					F	F	PASS
					-	G	PASS
					F	H	PASS
					F	I	PASS
					_	J	PASS
					-	J K	PASS
						L	PASS
						M	PASS
					$\neg ( \land ) \downarrow$	N	PASS
				15	_ \	0	
					)	P	PASS
Purpose: Verify that			ita Naiahhan (	The field for the			PASS
Neighbor Advertiser		perty updates	its Neighbor (	ache from the STA	The state upon re	ceipt of a	
0				+ V / f = 1			
Comments on Test	Procedure						
		$\square$					
	C - 12 - 24 - 3						
Destination	Solicited	Override	TILA	New State	Update Link-		;
	flag	<u></u>			Layer Address	s Part	;
Unicast	flag clear	flag clear	pone	STALE	Layer Address no	s Part	
Unicast Unicast	flag clear clear	flag clear set	none	STALE STALE	Layer Address no no	A B	
Unicast Unicast Unicast	flag clear clear	flag clear set clear	none none	STALE STALE REACHABLE	Layer Address no no no	s Part	
Unicast Unicast Unicast Unicast	flag clear clear set set	flag clear set dlear	none none none	STALE STALE REACHABLE REACHABLE	Layer Address no no no no	s Part A B C D	
Unicast Unicast Unicast Unicast Unicast	flag clear clear clear set set clear	flag clear dlear set clear	none none none same	STALE STALE REACHABLE REACHABLE STALE	Layer Address no no no no no	s Part A B C D E	;
Unicast Unicast Unicast Unicast Unicast Unicast	flag clear clear clear set set clear clear	flag clear clear clear set	none none none same same	STALE STALE REACHABLE REACHABLE STALE STALE	Layer Address no no no no no no	s Part A B C D E F	
Unicast Unicast Unicast Unicast Unicast Unicast	flag clear clear set set clear clear clear	flag clear set clear set clear	none none none same same same	STALE STALE REACHABLE REACHABLE STALE STALE REACHABLE	Layer Address no no no no no no no no	s Part A B C D E F G	
Unicast Unicast Unicast Unicast Unicast Unicast Unicast	flag clear clear set set clear clear set set	flag clear set clear set clear set set	none none none same same same same	STALE STALE REACHABLE REACHABLE STALE STALE REACHABLE REACHABLE	Layer Address no no no no no no no no no no	Part           A           B           C           D           E           F           G           H	
Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast	flag clear clear set set clear set set clear	flag clear set clear set clear set clear	none none none same same same same different	STALE STALE REACHABLE REACHABLE STALE STALE REACHABLE REACHABLE STALE	Layer Address no no no no no no no no no	S         Part           A         B           C         D           E         F           G         H           I         I	
Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast	flag clear clear set set clear clear clear clear	flag clear set clear set clear set clear set clear set	none none none same same same same different different	STALE STALE REACHABLE REACHABLE STALE STALE REACHABLE REACHABLE STALE STALE	Layer Address no no no no no no no no yes	Part           A           B           C           D           E           F           G           H           I           J	
Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast	flag clear clear set clear clear set clear clear clear set	flag clear set clear set clear set clear set clear set clear	none none none same same same different different different	STALE STALE REACHABLE REACHABLE STALE STALE REACHABLE REACHABLE STALE STALE STALE STALE	Layer Address no no no no no no no no no yes no	Part           A           B           C           D           E           F           G           H           J           K	
Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast	flag clear clear set clear clear set clear clear clear clear set set set	flag clear set clear set clear set clear set clear set clear set clear set	none none none same same same different different different different	STALE STALE REACHABLE REACHABLE STALE STALE REACHABLE STALE STALE STALE STALE REACHABLE	Layer Address no no no no no no no no no no	Part           S           A           B           C           D           E           F           G           H           I           J           K           L	
Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast	flag clear clear set clear clear set clear clear clear set set clear clear	flag clear set clear set clear set clear set clear set clear set clear set clear	none none none same same same same different different different different same	STALE STALE REACHABLE REACHABLE STALE REACHABLE REACHABLE STALE STALE STALE REACHABLE STALE REACHABLE STALE	Layer Address no no no no no no no no no no	Part           A           B           C           D           E           F           G           H           I           J           K           L           M	
Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Multicast	flag clear clear set set clear clear clear clear set set set clear clear clear	flag clear set clear set clear set clear set clear set clear set clear set clear set clear	none none none same same same same different different different different same same same	STALE STALE REACHABLE REACHABLE STALE STALE REACHABLE STALE STALE STALE REACHABLE STALE STALE STALE STALE STALE STALE	Layer Address no no no no no no no no yes no yes no yes no no no no no no no no no no	Part           A           B           C           D           E           F           G           H           I           J           K           L           M	
Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast Unicast	flag clear clear set clear clear set clear clear clear set set clear clear	flag clear set clear set clear set clear set clear set clear set clear set clear	none none none same same same same different different different different same	STALE STALE REACHABLE REACHABLE STALE REACHABLE REACHABLE STALE STALE STALE REACHABLE STALE REACHABLE STALE	Layer Address no no no no no no no no no no	Part           A           B           C           D           E           F           G           H           I           J           K           L           M	

#### **Comments on Test Results**

A. The NUT created a Neighbor Cache Entry for TN1 and set the state of the entry to **INCOMPLETE**, after it received the first Echo Request. This caused the NUT to send a multicast Neighbor Solicitation to TN1. After the first Neighbor Advertisement was received, the NUT went to state **REACHABLE**. Therefore, it replied and, after DELAY\_FIRST\_PROBE\_TIME, the NUT did not send a unicast Neighbor Solicitation to TN1. After waiting (REACHABLE\_TIME \* MAX\_RANDOM\_FACTOR) seconds the NUT transitioned to state **STALE**. After the NUT received the test Neighbor Advertisement according to the table above, and an Echo Request from TN1, it updated the state of TN1's NCE and the LLA according to the table. After receiving the second Echo Request, the NUT reacted as follows:

#### Parts C,D,G,H and L to REACHABLE

After receiving the Echo Request from TN1, the NUT should send an Echo Reply. After DELAY\_FIRST\_PROBE\_TIME, the NUT should not send a unicast Neighbor Solicitation to TN1.

#### Part L

The NUT's Echo Reply should be sent to the new updated tink-layer destination dress of TN1.

### Parts A,B,E,F,I-K, and M-P to STALE

After receiving the Echo Request from TN), the NUT should send an Echo Reply. After DELAY\_FIRST\_PROBE\_TIME, the NUT should send a unicast Neighbor Solicitation to TN1.

Parts J and P

The NUT's Echo Reply should be sent to the new updated link-layer destination address of TN1. The Neighbor Solicitation should use the new link-layer address in the Target field.

ad

Test #						Result	
v6LC.2.1.20	Neighbor A	dvertisemen	t Processing	, NCE State PROI	BE	Α	PASS
					-	В	PASS
					-	С	PASS
					_	D	PASS
					-	Е	PASS
						F	PASS
					-	G	PASS
					-	Н	PASS
					-	Ι	PASS
					-	J	PASS
						K	PASS
					- 5-	L	PASS
						Μ	PASS
					( )	Ν	PASS
				15	$\gamma ( ) $	0	PASS
					$\mathcal{I} \cap \mathcal{I}$	Р	PASS
Purpose: Verify that	a node prope	erly updates it	s Neighbor (	ache from the RRC	BE state upon re	eceipt of a	
Neighbor Advertisem	ent.					-	
<b>Comments on Test P</b>	rocedure						
		1	15				
	Solicited	<b>Override</b>		New State	Update Link	- Part	
Destination	flag 🦯	<b>∫∫ faag   ∖</b>	TLIA	New State	Layer Addres	s Pari	
Unicast	clear	, clear	none	PROBE	no	А	
Unicast	clean	set	none	PROBE	no	В	
Unicast	set V	clear	none	REACHABLE	no	С	
Unicast 🔪	set	set	none	REACHABLE	no	D	
Unicast	clear	Clear	same	PROBE	no	E	
Unicast	etear	set	same	PROBE	no	F	
Unicast	set	clear	same	REACHABLE	no	G	
Unicast	set	set	same	REACHABLE	no	Н	
Unicast	clear	clear	different	PROBE	no	Ι	
Unicast	clear	set	different	STALE	yes	J	
Unicast	set	clear	different	PROBE	no	K	
Unicast	set	set	different	REACHABLE	yes	L	_
Multicast	clear	clear	same	PROBE	no	M	
Multicast	clear	set	same	PROBE	no	N	
Multicast	clear	clear	different	PROBE	no	0	
Multicast	clear	set	different	STALE	yes	P	
the target address Check the NCE of LAY_FIRST_PR	s is TN1's Li of the NUT a ROBE_TIME	nk-Local addr nd observe the ) seconds, rec	ress. TN1 th e packets bei heck the NC	s Link-Local addres en transmits a link- ing transmitted by th E and again observe ith fields set accord	local Echo Reque ne NUT. After w e the packets bein	est to the N aiting (DE ng transmit	UT. - ted

### **Comments on Test Results**

A. The NUT created a Neighbor Cache Entry for TN1 and set the state of the entry to STALE, after it received the first Neighbor Advertisement. It replied to the first Echo Request and transitioned to state **DELAY**. After waiting (DELAY\_FIRST\_PROBE\_TIME) seconds the NUT transitioned to state PROBE, and transmitted a unicast Neighbor Solicitation to TN1. After the NUT received the test Neighbor Advertisement according to the table above, and possibly also an Echo Request from TN1, it updated the state of TN1's NCE and the LLA according to the table, and the NUT reacted as follows: Parts C,D,G,H and L to REACHABLE After receiving the Echo Request from TN1, the NUT should send an Echo Reply. After DELAY FIRST PROBE TIME, the NUT should not send a unicast Neighbor Solicitation to TN1. Part L The NUT's Echo Reply should be sent to the new updated link-layer destination-ad dress of TN1. Parts J and P to STALE After receiving the Echo Request from TN1, the NUT should send an Echo Reply After DELAY\_FIRST\_PROBE\_TIME, the NUT should send a unicast Neighbor Solicitation to TN1. The NUT's Echo Reply should be sent to the new updated link-laster destination address of TN1. The Neighbor Solicitation should use the new link-layer address in the Target field.

Parts A,B,E,F,I,K, and M-0 to PROBE

The NUT should send a unicast Neighbor Solicitation to TN1.

Test #		Result	
<u>6LC.2.1.21</u>	Neighbor Advertisement Processing, R-bit Change (Hosts Only)	A-D	N/A
	t a host takes appropriate actions when a neighbor who is a router starts tran	nsmitting N	Jeighboi
	the Router flag clear.		
Comments on Test	Procedure		
<ul> <li>the RUT. Obser ply is received so</li> <li>A. TR1 transmits a Router Lifetime Global Prefix. ' packets sent by tisement with th</li> </ul>	Router Advertisement without a Source Link-layer Address Option and the = 20 seconds; Reachable Time = 100 seconds; Retransmit Interval = 1 seconds in the transmits an Echo Request destined for the HUT's Global Address the HUT. TR1 responds to any Neighbor Solicitation from the HUT with a e Router, Solicited, and Override flags set. Observe the packets sent by the	After an E following nd: Prefix s. Observe Neighbor HUT. TR	values: = TR1' the Adver- t trans-
Observe the pace TR1 transmits a Router Lifetime Global Prefix. 7 packets sent by tisement with the mits a Neighbor packets sent by	Advertisement, which has only the Router Flag not set. TN1 again transmikets sent by the HUT. Perform the common cleaning procedure. Router Advertisement without a Source Link layer Address Option and the = 20 seconds; Reachable Time = 100 seconds; Retransmit Interval - 1 seconds in the transmits an Echo Request destined for the HUT's Global Address the HUT. TR1 responds to any Neighbor Solicitation from the HUT with a e Router, Solicited, and Override flags set. Observe the packets sent by the Advertisement, which has no flags set. TN1 again transmits an Echo Request the HUT. Perform the common cleaning procedure.	following ond; Prefix s. Observe Neighbor HUT. TR est. Obser	values: = TR1' the Adver- 1 trans- ve the
Router Lifetime Global Prefix. ' packets sent by tisement with th mits a Naighbor Observe the pac	Router Advertisement without a Source Link-layer Address Option and the =20 seconds, Reachable Time = 100 seconds; Retransmit Interval = 1 seconds in the reasonable an Echo Request destined for the HUT's Global Address the HUT. TR1 responds to any Neighbor Solicitation from the HUT with a e Router, Solicited, and Override flags set. Observe the packets sent by the Advertisement, which has only the Override Flag set. TN1 again transmits lets sent by the HUT. Perform the common cleanup procedure.	ond; Prefix s. Observe Neighbor HUT. TR an Echo F	= TR1' the Adver- 1 trans- Request
Router Lifetime Global Prefix. ' packets sent by tisement with th mits a Neighbor	Router Advertisement without a Source Link-layer Address Option and the = 20 seconds; Reachable Time = 100 seconds; Retransmit Interval = 1 seconds in the transmits an Echo Request destined for the HUT's Global Address the HUT. TR1 responds to any Neighbor Solicitation from the HUT with a e Router, Solicited, and Override flags set. Observe the packets sent by the Advertisement, which has only the Solicited Flag set. TN1 again transmits kets sent by the HUT. Perform the common cleanup procedure.	ond; Prefix 5. Observe Neighbor HUT. TR	= TR1' the Adver- 1 trans-

### **Comments on Test Results**

# **Group 2: Router and Prefix Discovery**

The following tests cover Router and Prefix Discovery in IPv6.

Test #		Result	
v6LC.2.2.1	Router Solicitation (Hosts Only)	Α	N/A
	t a host sends valid Router Solicitations at the appropriate time.		
Comments on Test	Procedure		
A. Reboot the HUT	C. Observe the packets transmitted by the HUT.		
Comments on Test	Results		
A. This test is perfo	ormed on Hosts only.	<u> {</u> ]]	

Test #		Result	
v6LC.2.2.2	Router Solicitations, Solicited Router Advertisement (Host Only)	A-F	N/A
Purpose: Verify that	at a host sends valid Router Solicitations at the appropriate time.		
<b>Comments on Test</b>	Procedure		
			_
	Vertisement, No Source Link-layer Address Option: Reboot the HUT. After		
	ation, TR1 transmits a Router Advertisement without a Source Link-layer Advertisement without a Source Link-layer Advertise the Link is a source Link layer Advertise and the layer		
	is the Link-Local address of TR1. The Hop Limit is 255, the ICMP Code is lid. After waiting RTR_SOLICITATION_INTERVAL+MAX_RTR_SOLIC		
	kets transmitted from the HUT.	TIATION_I	DELAI,
	<i>lvertisement, Source Link-layer Address Option:</i> Reboot the HUT. After the	UIITarana	mite o
	ion, TR1 transmits a Router Advertisement with a Source Link-layer Address		
	is the Link-Local address of TR1. The Hop Limit is 255, the ICMP Code is		
	lid. After waiting RTR_SOLICITATION_INTERVAL+MAX_RTR_SOLIC		
	kets transmitted from the HUT.		
	Advertisement, Global Source Address: Reboot the HUT. After the HUT tra	fismits a Be	outer
	1 transmits a Router Advertisement with a Source Address equal to the Gldt		
but is valid else	where. The Hop Limit is 255, the ICMP Code is 0, the ICMP Checksum is	ralid. After	waiting
RTR_SOLICITA	ATION_INTERVAL+MAX_RTR_SOLICITATION_DELAY observe the pa	ckets transi	mitted
from the HUT.			
D. Invalid Router A	Advertisement, Bad Hop Limit: Reboot the HUT. After the MUT transmits a	Router Sol	icita-
tion, TR1 transr	nits a Router Advertisement without a Source Dink Laver Address Option. T	he Source A	Address
	al address of TR1. The Hop Limit is 2, the ICMP Code is 0, the ICMP Chec		
	_SOLICITATION_ENTERVAL+MAX_RTR_SOLICITATION_DELAY, ob	serve the pa	ickets
transmitted from	n the HUA		a a
E. Invalid Router A	Advertisement, Bad ICMP Checksum: Reboot the HUT. After the HUT tran	smits a Rou	ter So-
licitation, TRT t	ransmits a Requer Advertisement without a Source Link-layer Address Optic -Local address of TRL. The Hop Limit is 255, the ICMP Code is 0, the ICM	n. The Sou	Irce Ad-
	valting RTR_SOLICITATION_INTERVAL+MAX_RTR_SOLICITATION_I		
	mitted from the HUT.	JELAI, 00	serve
	Advertisement, Bad ICMP Code: Reboot the HUT. After the HUT transmits	a Router S	olicita-
	nits a Router Advertisement without a Source Link-layer Address Option. T		
	al address of TR1. The Hop Limit is 255, the ICMP Code is 1, the ICMP Ch		
	FR_SOLICITATION_INTERVAL+MAX_RTR_SOLICITATION_DELAY,		
transmitted from			1
<b>Comments on Test</b>	Results		
These tests are perfo	rmed on Hosts only.		

Test #		Result	
v6LC.2.2.3	Host Ignores Router Solicitations (Host Only)	A-C	N/A
	at a host ignores Router Solicitations and does not update its Neighbor Cache		
Comments on Test			
		. 11	0
	<i>cicast Destination</i> : TN1 transmits a Router Solicitation with a Source Link-la Router multicast address. After waiting (REATRANS_TIMER * MAX_ * C		
	ransmits a link-local Echo Request to the HUT. After waiting 2 seconds, obs		
transmitted by t	1 6	serve une pa	ickets
•	<i>icast Destination</i> : TN1 transmits a Router Solicitation with a Source Link-la	ver Address	option
	s multicast address. After waiting (REATRANS_TIMER * MAX_ * CAST		
	smits a link-local Echo Request to the HUT. After waiting 2 seconds, observ		
transmitted by t	he HUT.	M	
C. Link-Local Uni	cast Destination: TN1 transmits a Router Solicitation with a Source Link-Fay	)er)Address	Option
to the Link-Loc	al address of the HUT. After waiting (REATRANS_TIMER * MAX_ * CA	stzsofic	IT) (3
	ransmits a link-local Echo Request to the HUT. After waiting 2 seconds, ob	erve the pa	ickets
transmitted by t		1	
Comments on Test	Pagulta Contraction of the second sec		
Comments on Test	Results		
These tests are perfe	ormed on Hosts only.		
These tests are period			
v6LC.2.2.4	Router Ignores Invalid Router Solicitations (Routers Only)	Α	PASS
		В	PASS
		С	PASS
$\frown$		D	PASS
$(\sim$		Ε	PASS
		F	PASS
	at a router ignores invalid Router Solicitations.		
Comments on Test	Procedure		
$\smile$			
	<i>t</i> 255: TN1 transmits a Router Solicitation with an IPv6 Hop Limit of 254.	Otherwise,	the
	ion is valid. Observe the packets transmitted by the RUT.	< 1 1	0.1
	<i>um is not valid:</i> TN1 transmits a Router Solicitation with an invalid ICMPve	o checksum	. Oth-
	ter Solicitation is valid. Observe the packets transmitted by the RUT. <i>s not 0:</i> TN1 transmits a Router Solicitation with an invalid ICMPv6 code of	1 Othorn	visa tha
	ion is valid. Observe the packets transmitted by the RUT.	1. Otherw	ise, the
	<i>is less than 8 Octets:</i> TN1 transmits a Router Solicitation with an ICMPv6 1	enoth of 6	Other-
	r Solicitation is valid. Observe the packets transmitted by the RUT.		2
	<i>th 0:</i> TN1 transmits a Router Solicitation that contains an Option with length	n 0. Otherw	vise, the
	ion is valid. Observe the packets transmitted by the RUT.		
F. Unspecified IP	source address and a source link-layer address option: TN1 transmits a Rou		
	fied source address and a Source Link-layer Address Option. Otherwise, the	Router Sol	icitation
is valid. Observ	ve the packets transmitted by the RUT.		
<u> </u>			
<b>Comments on Test</b>	Kesuits		

A-F. The RUT discarded the Router Solicitation from TN1 and did not transmit a corresponding Router Advertisement within MAX\_RA\_DELAY\_TIME (0.5) seconds.

Test #		Result	t
<u>v6LC.2.2.5</u>	Router Sends Valid Router Advertisement (Routers Only)	Α	PASS
Purpose: Verify that	t a router sends valid Router Advertisements.		
Comments on Test	Procedure		
A. TN1 transmits a	valid Router Solicitation. Observe the packets transmitted by the RUT.		
Comments on Test	Results		
<ul> <li>IP Source</li> <li>The IP Ho router.</li> <li>If the mess</li> <li>ICMP Che</li> <li>ICMP Cool</li> <li>ICMP lengt</li> </ul>	hitted valid Router Advertisements that satisfied all of the following validity of Address is a link-local address. p Limit field has a value of 255, i.e., the packet could not possibly have been sage includes an IP Authentication Header, the message authenticates correct ecksum is valid. le is 0. gth (derived from the IP length) is 16 or more octets.	forwarde	d by a
Test #		Result	ł
v6LC.2.2.6	Router Does Not-Send Router Advertisements on Non-advertising	A	PASS
<u>101/0.4.4.0</u>	Interface (Routers Only)	B	PASS
<b>Purnose</b> Verify that	t a router does not send Router Advertisements on non-advertising interfaces	_	

Purpose: Verify that a router does not send Router Advertisements on non-advertising interfaces Comments on Test Procedure

- A. No advertising interface: Configure one interface (Interface A) on the RUT to be a non-advertising interface. Configure TR1 to transmit a Router Solicitation to the RUT on Interface A. Observe the packets transmitted by the RUT on Interface A.
- B. Advertising interface. If the RUT supports two network interface, configure the first (Interface A) to be an advertising interface, and the second (Interface B) to be a non-advertising interface.

### **Comments on Test Results**

A. The RUT did not send any Router Advertisements out on Interface A (referenced above).

B. The RUT sent out Router Advertisements out on Interface A (referenced above), and did not send any Router Advertisements out on Interface B (referenced above).

Test #		Resul	t
v6LC.2.2.7	Sending Unsolicited Router Advertisements (Routers Only)	Α	PASS
	at a router sends the first few advertisements (up to		
	R_ADVERTISEMENTS) from an interface when it becomes an advertising	g interface	at an
	alue of MAX_INITIAL_RTR_ADVERT_INTERVAL (16) seconds.		
<b>Comments on Test</b>	Procedure		
MaxRtrInterval	terface on the RUT to be an advertising interface with a MinRtrAdvInterval of 10 seconds, and observe the packets transmitted out on this interface.	of 5 secon	ds and a
Comments on Test	Results	$ \rightarrow $	
no greater than Router Advertis vInterval (5) an	nitted the first MAX_INITIAL_RTR_ADVERTISEMENT (3) at randomly MAX_INITIAL_RTR_ADVERT_INTERVAL (16) seconds. After that, the ements at randomly chosen intervals that lie between the interface's configu d MaxRtrAdvInterval (10) and it did not transmit Router Adventisements no nRtrAdvInterval (5) seconds.	RUT trans re MinRtr	mitted d-
Test #		Resul	t
v6LC.2.2.8	Ceasing to Be An Advertising Interface (Routers Only)	A	PASS
		В	PASS
Purpose: Verify the interface. Comments on Test	at a router sends correct Router Advertisements when its interface ceases to	be an adver	rtising

Comments on Test Procedure

- A. Ceasing to be an advertising interface: Configure an interface on the RUT to be an advertising interface. After a few seconds, configure the same interface to discontinue being a adverting interface.B. Disabled IP forwarding capability: Configure an interface on the RUT to be an advertising interface and
- disable the RUT's IP forwarding capability.

**Comments on Test Results** 

- A. The RUT SHOULD have, upon disabling Router Advertisements on the interface, sent out no more than MAX\_FINAL\_RTR\_ADVERTISEMENTS with a Router Lifetime field of zero.
- B. The RUT SHOULD have, upon disabling IP forwarding capabilities, transmitted all subsequent Router Advertisements with a Router Lifetime Field of zero.

Test #		Resul	t
v6LC.2.2.9	Processing Router Solicitations (Routers Only)	Α	PASS
		В	FAIL
	hat a router correctly processes Router Solicitations and transmits Router Adv	ertisement	s.
Comments on Tes	t Procedure		
Address is the B. <i>MIN_DELAY_</i> MaxRtrAdvIn	<i>LAY_TIME:</i> TN1 transmits Router Solicitation A twice, 3 seconds apart. The all-routers multicast address. <i>BETWEEN_RAS:</i> Configure the RUT with a MinRtrAdvInterval of 30 second serval of 40 seconds. TN1 transmits Router Solicitation B twice, 2 seconds ap dress is the all-routers multicast address.	ls and a	'n
Comments on Tes	4 Doculás	MF	
the receipt of e B. The RUT inco onds. According to F address MUST	RFC 2461, Section 6.2.6: "Router Soficitations in which the Source Address is NOT update the router's Neighbor Eache." RUT should have continued to transport advertisements at least MIN_DELAY	EEN_RAS	S (3) sec cified
Test #			
		Resul	1
v6LC.2.2.10 Purpose: Verify the router in use fa Comments on Tes	hat a host maintains at least two routers in its Default Router List and will swi	A tch routers	N/A when
seconds after, to any Neighb of 1 second an	Router Advertisement A with a Retransmit Interval of 1 second and the L-Bit TR1 transmits Packet A, an Echo Request. TR1 transmits a Neighbor Advert or Solicitations from the HUT. TR2 transmits Router Advertisement B with F d the L-Bit set to 1. When Reachable Time expires, and the HUT solicits TR1 re transmitted by TR1.	isement in Retransmit	respons Interval
Comments on Tes	t Results		
A. This test is per	formed on Hosts only.		

Test #		Result	;
v6LC.2.2.11	Router Advertisement Processing, Validity (Hosts Only)	A-F	N/A
Purpose: Verify th	at a host properly discards an invalid Router Advertisement.		
Comments on Test	Procedure		
<ul> <li>TR1. The Rou HUT.</li> <li>B. Hop Limit less tisement is vali</li> <li>C. Invalid Checks Advertisement</li> <li>D. Invalid ICMP of ment is valid of</li> <li>E. Invalid ICMP of vertisement is valid</li> <li>F. Option of Leng tisement is valid</li> </ul>	Address: TR1 transmits the Router Advertisement. The Source Address is the ter Advertisements is valid otherwise. Then TR1 transmits a link-local Echo R than 255: TR1 transmits the Router Advertisement. The Hop Limit is 2. The d otherwise. Then TR1 transmits a link-local Echo Request to the HUT. <i>um:</i> TR1 transmits the Router Advertisement. The ICMP Checksum is invalid is valid otherwise. Then TR1 transmits a link-local Echo Request to the HUT. <i>Code:</i> TR1 transmits the Router Advertisement. The ICMP Code is 1. The R therwise. Then TR1 transmits a link-local Echo Request to the HUT. <i>Code:</i> TR1 transmits the Router Advertisement with an ICMP length of 14. The R therwise. Then TR1 transmits a link-local Echo Request to the HUT. <i>Code:</i> TR1 transmits the Router Advertisement with an ICMP length of 14. The R therwise. Then TR1 transmits a link-local Echo Request to the HUT. <i>Code:</i> TR1 transmits the Router Advertisement with an ICMP length of 14. The R therwise. Then TR1 transmits a link-local Echo Request to the HUT. <i>Code:</i> TR1 transmits the Router Advertisement with an ICMP length of 14. The R therwise. Then TR1 transmits a link-local Echo Request to the HUT. <i>Code:</i> TR1 transmits the Router Advertisement with an option of length 0. The R therwise. Then TR1 transmits a link-local Echo Request to the HUT. <i>Results</i> or med on Hosts only.	equest to Router A I. The Ro Duret Adv The Route	the dver- outer ertise- er Ad-
Fest #		Result	
v6LC.2.2.12	Router Advertisement Processing, Cur Hop Limit	A	PASS
	Router Flove usement Trocessing, Cut Hop Emine	B	PASS
Purpose: Verifver	at a host properly processes the Cur Hop Limit field of a Router Advertisemen	-	1100
Comments on Test			
Hop Limit valt B. Non-Zero: TN	N1 transmits an Echo Request to the NUT. TR1 transmits a Router Advertises e of 0 (Zero) followed by an Echo Request to the NUT. 1 transmits an Echo Request to the NUT. TR1 transmits a Router Advertiseme e of 15 followed by an Echo Request to the NUT.		
Comments on Test	Results		
A. The NUT respondent	onded to the Request from TN1. The NUT responded again to the Request from the Echo Reply should be the same as was used in step 2. Id have replied to the second Echo Request from TN1 with a Hop Limit value		1

Test #		Result	t
v6LC.2.2.13	Router Advertisement Processing, Router Lifetime (Hosts Only)	A-C	N/A
Purpose: Verify	that a host properly processes a Router Advertisement and the Router Lifetime	field withi	n it.
<b>Comments on Te</b>	st Procedure		
20 seconds ar ond for 19 sec	<i>the Updated with Same Lifetime:</i> TR1 transmits the Router Advertisement with ad Reachable time of 600 seconds. TN2 transmits a global Echo Request to the conds. TR1 transmits the same Router Advertisement as before. TN2 transmite HUT every second for 21 seconds.	e HUT ever	y sec-
Router Adver HUT. TR2 tr Echo Request	<i>the Set to Zero:</i> TN2 transmits a global Echo Request to the HUT. Shortly after tisement with Router Lifetime set to zero followed by TN2 transmits a global 1 ansmits a Router Advertisement with Router Lifetime set to zero and TN2 trans- to the HUT. TR3 transmits a Router Advertisement with Router Lifetime set is a global Echo Request to the HUT.	Echo Reque soluts a glo	est to the bal
after, TR1 tra Echo Request transmits a gl	the Set to Five; Allowed to Expire: TN2 transmits a global Echo Request to the number of the number of the Number Advertisement with Router Lifetime set to 5 followed by TN2 to the HUT. TR2 transmits a Router Advertisement with Router Lifetime set to bal Echo Request to the HUT. TR3 transmits a Router Advertisement with Router Tr2 transmits a global Echo Request to the HUT. TR3 transmits a Router Advertisement with Router Tr2 transmits a global Echo Request to the HUT.	transmits a to 5 and TI	l global N2
Comments on Te	st Results		
These tests are per	formed on Hosts only.		
Test #		Dogral	L
	Delte Milder what Decessing Decelete Time	Result	
<u>v6LC.2.2.14</u>	Router Adventisement Processing, Reachable Time	AB	N/A PASS
Purpose: Vorify	that a host updates its BaseReachableTime variable and re-computes its Reach	-	
	Touter Advertisement with a specified Reachable Time.	able i lille V	arrable
upon recerpt of a	Average prevention with a specified Reachable Time.		

**Comments on Test Procedure** 

- A. *RA Processing Reachable Time (Host Only):* TR1 transmits the Router Advertisement with a Router Lifetime of 0 seconds and a Reachable Time of 10 seconds. TN1 transmits a link-local Echo Request to the HUT every second for 40 seconds. TN1 must reply to any Neighbor Solicitations from the HUT. TR1then transmits the Router Advertisement with a Reachable Time of 40 seconds. TN1 transmits a link-local Echo Request to the HUT every second for 140 seconds.
- B. Reachable Time Configuration (Routers Only): Configure the RUT to transmit Router Advertisements with a Router Lifetime value of 0 seconds and a Reachable Time of 10 seconds. TN1 transmits a link-local Echo Request to the RUT. TN1 must reply to any Neighbor Solicitations from the RUT. TN1 transmits a link-local Echo Request to the HUT every second for 40 seconds.

### **Comments on Test Results**

- A. This test is performed on Hosts only.
- B. The RUT should solicit for TN1's link-local address and transmit an Echo Reply. The RUT should transmit a Neighbor Solicitation with a Target Address of TN1's link-local address at an interval between 5 and 15 seconds.

Test #		Result	
v6LC.2.2.15	Router Advertisement Processing, Neighbor Cache (Hosts Only)	A-F	N/A
Purpose: Verify that	t a host properly updates its Neighbor Cache upon receipt of a Router Adverti	sement.	
Comments on Test	Procedure		
	no NCE: TR1 transmits Router Advertisement A with Reachable Time set to	10 second	ls and
	val set to 1 second. TR1 transmits an Echo Request to the HUT.		
	NCE INCOMPLETE: TR1 transmits Echo Request B. TR1 does not respond		
	m the HUT. TR1 transmits Router Advertisement A with Reachable Time set	to 10 sec	onds
	Interval set to 1 second.	~	
	hanged, NCE REACHABLE: TR1 transmits Echo Request B. TR1 does not r		
	tations from the HUT followed by TR1 transmitting Neighbor Advertisement		
	ement A with a different Source Link-layer Address. TR1 transmits an Echo	Request to	o the
HUT.		$) \setminus \setminus_{i}$	
D. RA with SLLA u	nchanged, NCE REACHABLE: TR1 transmits Echo Request B TR1 does no	respond	to any
Neignbor Solici	tations from the HUT followed by TR1 transmitting Neighbor Advertisement	L. YRL	ansmi
HUT.	ement A with the same Source Link-layer Address. TR transmits an Echo R	equest to	tne
E. RA with SLLA c	hanged, NCE PROBE: TR1 transmits Echo Request B. TR1 does not respond	to any N	aiabhc
E. NA with SLLA C. Solicitations fro	m the HUT followed by TR1 transmitting Neighbor Advertisement C. TR1 th	on transn	vite
Echo Request B	. TR1 transmits Router Adventisement A with a different Source Link-layer A	ddress 7	ΠLS FR 1
	no Request to the HUT.	luuress.	11(1
F. RA with SLLA u	nchanged, NCE PROBE: TRI transmits Echo Request B. TR1 does not respo	ond to any	,
Neighbor Solici	tations from the HUT followed by TRT transmitting Neighbor Advertisement	C. TR1 t	hen
	Request B TRI transmits Router Advertisement A with the same Source Link		
TR1 transmits a	n Echo Request to the HUT.		
Comments on Test	Results		
These test are perfor	ned on Hosts only.		
$\overline{\mathbf{A}}$			
$\overline{\}$			
$\bigcirc$			

# **Group 3: Redirect Function**

The following tests cover the Redirect function in IPv6.

Test #				Result
<u>v6LC.2.3.1</u>	<b>Redirected On-link:</b>			A-H N/A
	* * * * *	sses valid Redirect m	essages when redirected on-link.	
Comments of	n Test Procedure			
	IPv6 Destination Ad-	TLLA Op-	Redirected Packet Op-	Par
	dress	tion	tion	
	Link-local (NUT)	No	No	
	Link-local (NUT)	No	Yes	(B)
	Link-local (NUT)	Yes	$\mathbb{N}_{0}$	Ve
	Link-local (NUT)	Yes	Yes Y	D
	Global (NUT)	No	Np	E
	Global (NUT)	No	Kes	F
	Global (NUT)	Yes	No	G
	Global (NUT)	Yes	Yes	Н
Part A. throug				
	Destination Addresses	, TLLA Options, and	l Redirected Packet Options: TR	1 forwards an
	Echo Request to the H	IUT. The Source Ac	ldress is the off-link global address	s of TN1. The
/			of the HUT. TR1 transmits a Red ess is the global address of TN1.	
			e Redirect message contains a Tai	
N N			n according to the table above. T	
			ldress is the off-link global address	
	Destination Address is			
	~	-		
Comments of	n Test Results			
Therest	C			
These tests ar	e performed on Hosts only.			

Test #	Result	
v6LC.2.3.2	Redirected On-link: Suspicious (Hosts Only) A-C	N/A
Purpose: Verify that	t a host properly processes suspicious Redirect messages when redirected on-link.	
Comments on Test	Procedure	
address of TN1. to the HUT. The address of TN1. also contains an	<i>nized:</i> TR1 forwards an Echo Request to the HUT. The Source Address is the off-link The Destination Address is the global address of the HUT. TR1 transmits a Redirect re ICMPv6 Destination Address is the global address of TN1. The Target Address is the The Redirect message contains a Target Link-layer Address option. The Redirect mess unrecognized option. TR1 forwards an Echo Request to the HUT. The Source Address ddress of TN1. The Destination Address is the global address of the HUT.	nessag globa sage
B. Reserved Field i global address o message to the F the global addre zero Reserved fi	s Non-zero: TR1 forwards an Echo Request to the HUT. The Source Address is the of f TN1. The Destination Address is the global address of the HUT. TR1 transmits a Re IUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address of TN1. The Redirect message contains a Target Link-layer Address option and has eld. The Redirect message also contains an unrecognized option. TR1 forwards an Ee G. The Source Address is the off-link global address of TN1. The Destination Address	direct ress is a non- ho Re-
C. Target Address i dress is the off-1 transmits a Redi Target Address i tion but the Targ message also co dress is the off-1	not Covered by On-link Prefix: TR1 forwards an Echo Request to the HUT. The Source ink global address of TN1. The Destination Address is the global address of the HUT. rect message to the HUT. The ICMPv6 Destination Address is the global address of TN is the global address of TN1. The Redirect message contains a Target Link-layer Addres the Address of the global address of TN1 is not covered by an on-link prefix. The Redi- tations an unrecognized option. TRV forwards an Echo Request to the HUT. The Source ink global address of TN1. The Destination Address is the global address of the HUT.	TR1 N1. Th ess op- frect
Comments on Test		

Tes	t #		Result	
<u>v6</u>	<u>.C.2.3.3</u>	Redirected On-link: Invalid (Hosts Only)	A-I	N/A
		t a host properly processes invalid Redirect messages when redirected on-link		
Co	mments on Test l	Procedure		
А.	dress is the off-li then transmits a The Target Addr	Address is Global: TR1 forwards an Echo Request from TN1 to the HUT. The global address of TN1. The Destination Address is the global address of the Redirect message to the HUT. The ICMPv6 Destination Address is the global ess is the link-local address of TN1. The Redirect message contains an incorr link global address of TN2). Next, TR1 forwards an Echo Request from TN1	ne HUT. address o ect IPv6 S	TR1 of TN1. Source
В.	The Source Addr HUT. <i>Redirect Source</i> HUT. The Source of the HUT. TR	Address is not the current first-hop router: TR1 forwards an Echo Request from TR4 Address is not the current first-hop router: TR1 forwards an Echo Request from Address is the off-link global address of TN1. The Destination Address is to 1 then transmits a Redirect message to the HUT. The ICMPv6 Destination Address is TN1. The Target Address is the link-local address of TN1. The Redirect message to the HUT.	on TN1 t he global dress is t	to the address he
C.	incorrect IPv6 Set to the HUT. The address of the HI <i>Hop Limit is not</i> link global addre Redirect message	purce Address (the link-local address of TR2). Next, TR1 forwards an Echo R Source Address is the off-link global address of TA1. The Destination Addre UT. 255: TR1 forwards an Echo Request from TN1 to the HUT. The Source Address so of TN1. The Destination Address is the global address of the HUT. TR1 to to the HUT. The ICMPv6 Destination Address is the global address of TN1	equest fro ess is the dress is th hen transi . The Tai	om TN1 global e off- mits a rget
D.	Next, TR1 forwa of TN1. The De <i>ICMPv6 Code is</i> link global addre Redirect nessag Address is the lin	ak-local address of TN1 The Redirect message contains an incorrect IPv6 Ho rds an Echo Request from VN1 to the HUT. The Source Address is the off-lin stination Address is the global address of the HUT. <i>not 0:</i> TR1 forwards an Echo Request from TN1 to the HUT. The Source Address so of TN1 The Destination Address is the global address of the HUT. TR1 the to the HUT. The ICMPv6 Destination Address is the global address of TN1 bit-local address of TN1. The Redirect message contains an incorrect ICMPv6 rds an Echo Request from TN1 to the HUT. The Source Address is the off-lin rds an Echo Request from TN1 to the HUT. The Source Address is the off-lin	hk global ddress is hen transi The Tai 5 Code of	address the off- mits a get 1.
E.	of TN1. The De ICMPv6 Checks the off-link glob transmits a Redin Target Address i sum. Next, TR1	stination Address is the global address of the HUT. <i>In is invalid:</i> TR1 forwards an Echo Request from TN1 to the HUT. The So al address of TN1. The Destination Address is the global address of the HUT. rect message to the HUT. The ICMPv6 Destination Address is the global address is the link-local address of TN1. The Redirect message contains an incorrect I forwards an Echo Request from TN1 to the HUT. The Source Address is the The Destination Address is the global address of the HUT.	urce Add TR1 the ress of TN CMPv6 C	ress is m V1. The Check-

- F. *ICMPv6 Destination Address is Multicast:* TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR1 then transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TN1. The Redirect message contains an ICMPv6 Destination Address of the All-nodes multicast address. Next, TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT.
- G. *Target Address is Multicast:* TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR1 then transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TN1. The Redirect message contains an ICMPv6 Target Address of the All-nodes multicast address. Next, TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT.
- H. ICMPv6 length is less than 40 Octets: TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR1 then transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TN1. The Redirect message contains an invalid ICMPv6 Length of 39 bytes. Next, TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address is the off-link global address of TN1. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT.
  I. Option has Length Zero: TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the
- I. Option has Length Zero: TR1 forwards an Echo Request from TN to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR1 then transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TN1. The Redirect message contains an Option with length 0. Next, TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Provide the HUT and the source Address is the off-link global address of TN1. The Redirect message contains an Option with length 0. Next, TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1.

### Comments on Test Results

Test #					Result	
v6LC.2.	3.4	Redirected to Alter	nate Router: Valid	(Hosts Only)	A-I	N/A
Purpose	: Verify that	t a host properly proce	esses valid Redirect r	nessages when redirected on-linl	κ.	
Comme	nts on Test	Procedure				
	IPve	Destination	TLLA	<b>Redirected Packet</b>	Part	
		Address	Option	Option		
	Link	-local (NUT)	No	No	А	
	Link	-local (NUT)	No	Yes	В	
	Link	-local (NUT)	Yes	No	C	
	Link	-local (NUT)	Yes	Yes	D	
	Gl	obal (NUT)	No	No	/ Æ /	
	Gl	obal (NUT)	No	Yes	)	
	Gl	obal (NUT)	Yes	No	$\int \langle G \rangle$	
	Gl	obal (NUT)	Yes	Yas	K/	
Parts A-I	H: Destina	tion Addresses, TLLA	Options, and Redive	cted Packet Options: TRL forwa	rds an Echo	Re-
	quest to	the HUT. The Source	e Address is the off-l	ink global address of TN1. The	Destination	Ad-
	dress 1s	the global address of t	the HUT. Next, TR	transmits a Router Advertiseme	int with a no	n-zero
	Router	Lifetime and a Source	Link-layer Address	option. Following is, TR1 transi	nits a Redire	ect mes-
	sage to	the HUI. The ICMPV	6 Destination Addre	ss is the global address of TN1.	The Target	Address
				ssage contains a Target Link-laye		
				ove. Shortly After, TR1 forward		
				obal address of TN1. The Destin	hation Addre	ess 1s
		al address of the HUI				<b>T1</b>
				TR1 forwards an Echo Request to		
				N1. The Destination Address is		
	ot the F			age to the HUT. The ICMPv6 D	estination A	ddress

is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect messaxe contains a Target Link-layer Address option or Redirected Packet option according to the table above. Shortly after, TR1 forwards an Echo Request to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT.

Comments on Test Results

<ul> <li>Purpose: Verify that a host properly processes suspicious Redirect messages when redirected on-link.</li> <li>Comments on Test Procedure</li> <li>A. Option Unrecognized: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 then forwards an Echo Request to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option. The Redirect message also contains an unrecognized option. TR1 forwards an Echo Request to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT.</li> <li>B. <i>Reserved Field is Non-zero</i>: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A Poits et. JR1 then forwards an Echo Request to the HUT. TR2 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address of TN1. The Target Address is the off-link global address of TN2. The Redirect message contains a Target Link-layer Address on TN1. The Concert Advertisement with a non-zero Router Tife TR1 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address on TN1. The Target Address is the off-link global address of TN2. The Redirect message contains a Target Link-layer Address on TN1. The Concert Advertisement with a non-zero Router Lifetime and a Source Link-layer Address on TN1. The Concert Advertisement to the all-nodes multicast address of TN1. The Destination Add</li></ul>	Test #	Rest	ılt	
<ul> <li>Comments on Test Procedure</li> <li>A. Option Unrecognized: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 then forwards an Echo Request to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option. The Redirect message also contains an unrecognized option. TR1 forwards an Echo Request to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT.</li> <li>B. Reserved Field is Non-zero: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 then forwards an Echo Request to the HUT. TR2 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Router Advertisement with a non-zero Router Tiement and a Source Link-layer Address option. TR1 Transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Router Advertisement to the all-nodes multicast address of TR2. The Redirect message contains a Target Link-layer Address of TN1. The Source Address is the off-link global address of TN1. The Destination Address is the</li></ul>	v6LC.2.3.5	Redirected to Alternate Router: Suspicious (Hosts only) A-C	N,	/A
<ul> <li>A. Option Unrecognized: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 then forwards an Echo Request to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option. The Redirect message also contains an unrecognized option. TR1 forwards an Echo Request to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT.</li> <li>B. Reserved Field is Non-zero: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. JR1 then forwards an Echo Request to the HUT. TR2 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Rotirect message to the HUT. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1. TR2 transmits a Rotirect message to the HUT. The Source Address is the forwards an Echo Request of the HUT. TR2 transmits a Rotirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Source Address is the link-local address or TR2. The Redirect message contains a Target Link-layer Address option. The Redirect message to the HUT. The Destination Address is the global address of transmits a Rotirect message also contains a non-zero Reserved field. TR1 forwards an Echo Request to the HUT. The S</li></ul>	Purpose: Verify that	at a host properly processes suspicious Redirect messages when redirected on-link.		
<ul> <li>Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 then forwards an Echo Request to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Router Adverse is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option. The Redirect message also contains an unrecognized option. TR1 forwards an Echo Request to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT.</li> <li>B. <i>Reserved Field is Non-zero:</i> TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 then forwards an Echo Request of the HUT. TR2 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Destination Address is the global address of TN1. The Cource Address is the global address of TR2. The Redirect message contains a Target Link-layer Address option. The Redirect message to the HUT The ICMPv6 Destination Address is the global address of TN1. The Destination Address is the global address of TN1. The Cource Address is the off-link global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1. The Cource Address is the off-link global address of TN1. The Destination Address is the global address of TN1. The Cource Address is the off-link global address of TN1. The Destination Address is the global address of the HUT.</li> &lt;</ul>	<b>Comments on Test</b>	Procedure		
wards an Echo Request to the HUT. The Source Address is the off-link global address of TN1. The Destina- tion Address is the global address of the HUT.	<ul> <li>A. Option Unrecog Advertisement i wards an Echo I tion Address is Lifetime and a S ICMPv6 Destin TR2. The Redit an unrecognized address of TN1.</li> <li>B. Reserved Field Router Advertiss forwards an Ech nation Address Router Lifetime The ICMPv6 Do TR2. The Redit a non-zero Rese global address of C. Target Address cast address. TI bits set. TR1 th TN1. The Dest non-zero Router the HUT. The I address of TR2. also contains a wards an Ech</li> </ul>	<i>mized</i> : TR1 transmits a Router Advertisement to the all-nodes multicast address. The neludes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 the Request to the HUT. The Source Address is the off-link global address of TN1. The source Address is the off-link global address of TN1. The global address of the HUT. TR2 transmits a Router Advertisement with a non-zee Source Link-layer Address option. After, TR1 transmits a Redirect message to the H ation Address is the global address of TN1. The Target Address is the link-local addrest message contains a Target Link-layer Address option. The Redirect message to the H ation Address is the global address of TN1. The Target Address is the link-local addrest message contains a Target Link-layer Address option. The Redirect message als a option. TR1 forwards an Echo Request to the HUT. The Source Address is the global address is the global address of the HUT. <i>Sono-zero:</i> TR1 transmits a Router Advertisement to the all-nodes multicast addres ement includes a Prefix Advertisement with a global prefix and the L and A bits set. To Request to the HUT. The Source Address is the off-link global address of TN1. The Source Address is the off-link global address of TN1. The Source Address is the off-link global address is the global address of TN1. The Target Address is the link-local address of TN1. The Source Address is the off-link global address is the global address of TN1. The Target Address is the global address of TN1. The Source Address is the global address of TN1. The Source Address is the global address of the HUT. <i>Note Target Address is the global address of TN1</i> . The Source Address is the global address of the HUT. <i>Not Covered by On-link Prefix:</i> TR1 transmits a Router Advertisement to the all-node to the Router Advertisement includes a Prefix Advertisement with a global prefix and the non-and address is the global address of the HUT. The Source Address is the off-link global address is the global address of the HUT. <i>Not Covered by On-li</i>	en for- Destina ro Rout UT. The tess of contail link glo contail link glo contail link glo contail the Des zero the HU address to contail ff-link les mult e L and address nent win message e link-lon nessage R1 for-	ti- ter he oba hen sti- UT ss o ins ti- ti- ti A ss o ith a e to oca

Tes	t #		Result	t
v6L	<u>.C.2.3.6</u>	Redirected to Alternate Router: Invalid (Hosts Only)	A-I	N/A
Pur	pose: Verify th	at a host properly processes invalid Redirect messages when redirected on-lir	ık.	
Coi	nments on Test	Procedure		
	The Router Ad forwards an Ec The Destination zero Router Lif HUT. The ICM address of TR2 of TN2). TR1 dress of TN1. <i>Redirect Source</i>	<i>e Address is Global:</i> TR1 transmits a Router Advertisement to the all-nodes a vertisement includes a Prefix Advertisement with a global prefix and the L and ho Request from TN1 to the HUT. The Source Address is the off-link global a Address is the global address of the HUT. TR2 transmits a Router Advertise time and a Source Link-layer Address option. After, TR1 transmits a Redired IPv6 Destination Address is the global address of TN1. The Target Address . The Redirect message contains an incorrect IPv6 Source Address (the off-link forwards an Echo Request from TN1 to the HUT. The Source Address is the global address of the HUT. The Source Address is the <i>global address is the global address</i> of the HUT. The Source Address (the off-link forwards an Echo Request from TN1 to the HUT. The Source Address is the <i>global address of the HUT</i> . The Source Address is the <i>global address of the HUT</i> . The Source Address is the <i>global address of the HUT</i> . The Source Address is the <i>global address of the HUT</i> . The Source Address is the <i>global address of the HUT</i> .	d A bits se address of ement with ect messag is the fink- nk global off-link gl sement to	et. TR1 f TN1. n a non- e to the local address lobal ad the all-
	nodes multicas the L and A bit global address Advertisement a Redirect mess Address is the (the off-link glo dress is the off-	address. The Router Advertisement includes a Prefix Advertisement with a set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Ad of TN1. The Destination Address is the global address of the HUT. TR2/transition and a source Link-layer Address option. Af sage to the HUT. The ICMPv6 Destination Address is the global address of Tr1. The ICMPv6 Destination Address is the global address of Tr1. The ICMPv6 Destination Address is the global address of Tr1. The ICMPv6 Destination Address is the global address of Tr1. The ICMPv6 Destination Address is the global address of Tr2. The Redirect message contains an incorrect IPv6 Sobal address of TR2. The forwards an Echo Request from TN1 to the HUT. link global address of TN1. The Destination Address is the global address of TN1.	elobal pre- dress is the rismits a Ro ter, TR1 tr TN1. The ' Source Ado The Sour the HUT.	ix and off-lin outer ransmits Target dress cce Ad-
	Advertisement Echo Request f tion Address is Lifetime and a ICMPv6 Destin TR2. The Red from TN1 to th the global addr	at 255: TR1 transmits a Router Advertisement to the all-nodes multicast addr includes a Prefix Advertisement with a global prefix and the L and A bits set. rom TN1 to the HUT. The Source Address is the off-link global address of T the global address of the HUT. TR2 transmits a Router Advertisement with a Source Link-layer Address option. After, TR1 transmits a Redirect message haton Address is the global address of TN1. The Target Address is the link-l redt message contains an incorrect IPv6 Hop Limit of 254. TR1 forwards an e HUT. The Source Address is the off-link global address of TN1. The Dest ess of the HUT.	TR1 forv N1. The I a non-zero to the HU7 ocal addres Echo Requination Ad	vards an Destina Router F. The ss of uest ldress is
D.	Advertisement Echo Request f tion Address is Lifetime and a ICMPv6 Destin TR2. The Red	<i>Is not 0:</i> TR1 transmits a Router Advertisement to the all-nodes multicast add includes a Prefix Advertisement with a global prefix and the L and A bits set. rom TN1 to the HUT. The Source Address is the off-link global address of T the global address of the HUT. TR2 transmits a Router Advertisement with a Source Link-layer Address option. After, TR1 transmits a Redirect message nation Address is the global address of TN1. The Target Address is the link-line rect message contains an incorrect ICMPv6 Code of 1. TR1 forwards an Ech T. The Source Address is the off-link global address of TN1. The Destination of the HUT.	TR1 forv N1. The I a non-zero to the HUT ocal addres to Request	vards an Destina Router F. The ss of from

- E. ICMPv6 Checksum is invalid: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains an incorrect ICMPv6 Checksum. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the off-link global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the difference of the HUT.
- F. ICMPv6 Destination Address is Multicast: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-fine global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains an ICMPv6 Destination Address is the off-fine Router Address is the off-fine Router Source Address is the off-fine Router Source Address is the off-fine Router Source Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains an ICMPv6 Destination Address is the off-fine Router Source Address is the source Source Source Source Address is the Source Address of TR2. The Router Source Source Source Source Source Address is the off-fine Router Source Address is the source Address of TR1. The Destination Address is the global address of the HUT.
- G. Target Address is Multicast: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains a Target Address of the All-nodes multicast address. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the All-nodes multicast address. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the All-nodes multicast address. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT.
  H. ICMPv6 length is lass num +0 Octats. TR1 transmits a Router Advertisement to the all-nodes multicast ad-
- H. ICMPv6 length is less han 40 octets. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains an invalid IPv6 Length of 39 bytes. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the HUT.
- I. Option has Length Zero: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. After, TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains an Option with length 0. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains an Option with length 0. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1.

### **Comments on Test Results**

These tests are performed on Hosts only.

IPv6 Ready Logo Phase II Test Report Core Protocols

Test #		Result	t
v6LC.2.3.7	Redirected Twice (Hosts Only)	Α	N/A
Purpose: Verify that	at a host properly processes valid Redirect messages twice for the same destin	nation.	
<b>Comments on Test</b>	Procedure		
a Prefix Adverti to the HUT. Th address of the H Link-layer Address the off-link glob a Router Advert transmits a Redi Target Address The Source Address HUT.	Router Advertisement to the all-nodes multicast address. The Router Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo the Source Address is the off-link global address of TN1. The Destination Address option. TR1 also forwards an Echo Request from TN1 to the HUT. The bal address of TN1. The Destination Address of TN1. The Destination Address of TN1. The Destination Address is the global address of the HU tisement with a non-zero Router Lifetime and a Source Link-layer Address of the HUT. The ICMPv6 Destination Address is the global address is the global address of TR3. After, TR1 forwards an Echo Request from Address is the global address is the global address is the global address is the global address of TN1. The Destination Address is the global address is the global address of the HUT. The ICMPv6 Destination Address is the global address is the global address of TR3. After, TR1 forwards an Echo Request from the sis is the off-link global address of TN1. The Destination Address is the global address is the global address is the global address is the global address of TN1. The Destination Address is the global address is the global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1.	Request fr dress is the e and a Sou Source A T. TR3 tra- ption. TR3 dress of T. TN1 to th	rom TN e global arce ddress i ansmits 2 also N1. Th e HUT.
Comments on TestA. This tests is per	formed on Hosts only.		

v6LC.2.3.8         Invalid Option (Hosts Only)         A-C         N/A           Purpose:         Verify that a host ignores invalid options in Redirect messages and processes the remainder of the Redirect normally.         Comments on Test Procedure           A.         Path MTU Option:         TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Route Lifetime and a Source Link-layer Address option. TR1also transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the global address of TR2. The Redirect message contains a Path MTU Option. Afterwards, TR1 forwards an Echo Request from TN1 to the HUT. TR2 transmits a Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Router Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the global address of TN1. The Destination Address is the	Test #	Resul	t
<ul> <li>Path MTU Option: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Route Lifetime and a Source Link-layer Address of TN1. The Target Address is the global address of the HUT. TR2 transmits a Redirect message to the HUT. The Common TR1 as a chirect message to the HUT. The Source Address is the off-link global address is the global address of TR2. The Redirect message contains a Path MTU option. Afterwards, TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1. The Source Address is the global address of TN1. The Source Address is the global address of TN1. The Destination Address is the global address of the HUT.</li> <li>B. <i>Prefix Information Option:</i> TR1 transmits a Router Advertisement with a global prefix and the L and A bits set. TR1 for wards an Echo Request from TN1 to the HUT. The Source Address of TN1 The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. The Source Address of TN1 The target Address is the link-local address of TN1. The ICMPv6 Destination Address is the global address of TN1 The Target Address is the link-layer Address as the off-link global address of TN1. The Destination Address is the global address of TN1 The Target Address is the link-local address of TN2. The Redirect message contains a Prefix Layer massing a Router Advertisement with a non-zer Router Lifetime and a Source Link-layer Address is the off-link global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the</li></ul>	v6LC.2.3.8	Invalid Option (Hosts Only) A-C	N/A
<ul> <li>Comments on Test Procedure</li> <li>A. Path MTU Option: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Route Lifetime and a Source Link-layer Address of TN1. The Target Address is the global address of TN1. The Target Address is the global address of TN1. The Target Address is the global address of TN1. The Target Address is the global address of TN1. The Target Address is the global address of TN1. The Source Address is the global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1. The Source Address is the global address of TN1. The Destination Address is the global address of the HUT.</li> <li>B. Prefix Information Option: TR1 transmits a Router Advertisement to the all-hodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 for wards an Echo Request from TN1 to the HUT. The Source Address is the off link global address of TN1. The Destination Address is the global address of TN1. The Target Address is the link-local address of TN1. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains a Prefix Information Option: TR1 transmits a Router Advertisement to the all-hodes multicast address of TR2. The Redirect message contains a Prefix Information Address is the global address of TN1. The Destination Address is the global address of TN1. The Target Address is the link-local address of TN1. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message conta</li></ul>	Purpose: Verify th	at a host ignores invalid options in Redirect messages and processes the remainder of th	ie Redi
<ul> <li>A. Path MTU Option: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Route Lifetime and a Source Link-layer Address option. TR1also transmits a Redirect message to the HUT. The Cource Address is the global address of TR2. The Redirect message contains a Path MTU option. Afterwards, TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of TN1. The Target Address is the global address of the HUT.</li> <li>B. Prefix Information Option: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address option. TR2 transmits a Reducer Advertisement with a non-zero Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address of TN1. The Target Address is the link-local address of TN1. The Destination Address is the global address of TN1. The Z transmits a Reducer Advertisement with a non-zero Router Lifetime and a Source Link-layer Address option. TR1 absorts applied to the HUT. The Source Address is the link-local address of TR2. The Redirect message contains a Prefix Information Duiton. Afterwards, TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Larget Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains a Prefix Information Duiton. Afterwards, TR1 forwards</li></ul>			
<ul> <li>vertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destin tion Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Route Lifetime and a Source Link-layer Address option. TR1also transmits a Redirect message to the HUT. The ECMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains a Path MTU option. Afterwards, TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1. The Destination Address is the global address of TN1. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT.</li> <li>B. <i>Prefix Information Option:</i> TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of the HUT. TR2 transmits a Router Advertisement with a non-zer Router Lifetime and a Source Link-layer Address option. TR1 also transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains a Prefix Information Option. Afterwards, TR1 forwards an Echo Request from TN1 to the HUT. The Source Address is the off-link global address of TN1. The Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains a Prefix Information Option. Afterwards, TR1 forwards an Echo Request from TN1 to the HUT.</li></ul>	Comments on Test	Procedure	
Comments on Test Results	vertisement ind Echo Request i tion Address is Lifetime and a ICMPv6 Destri TR2. The Red TN1 to the HU global address B. <i>Prefix Informa</i> Router Adverti wards an Echo Destination Ad Router Lifetim The ICMPv6 I of TR2. The R quest from TN dress is the glo C. <i>Source Link-la</i> The Router Ad forwards an Echo Destination Ad Grwards an Echo Destination Ad forwards an Echo Zero Router Lifetim HUT. The ICH address of TR2 wards an Echo Destination Ad	cludes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwar from TN1 to the HUT. The Source Address is the off-link global address of TN1. The the global address of the HUT. TR2 transmits a Router Advertisement with a non-zero Source Link-layer Address option. TR1also transmits a Redirect message to the HUT, nation Address is the global address of TN1. The Target Address is the link-local addres irect message contains a Path MTU option. Afterwards, TR1 forwards an Echo Reques T. The Source Address is the off-link global address of TN1. The Destination Address of the HUT. <i>tion Option:</i> TR1 transmits a Router Advertisement to the all-nodes multicast address sement includes a Prefix Advertisement with a global prefix and the L and A bits set. The Request from TN1 to the HUT. The Source Address is the off-link global address of T ldress is the global address of the HUT. TR2 transmits a Router Advertisement with a e and a Source Link-layer Address option. TR1 as unasmits a Redirect message to the deficet message contains a Prefix Information option. Afterwards, TR1 forwards an Ec 1 to the HUT. The Source Address is the off-link global address of 1 to the HUT. The Source Address is the off-link global address of a Prefix Advertisement with a global prefix and the L and A bits set. 1 to the HUT. The Source Address is the off-link global address of TN1. The Destination address of the HUT. Were Address of the HUT. TR2 transmits a Redirect message to the set of the HUT. The Source Address is the off-link global address of 1 to the HUT. The Source Address is the off-link global address of TN1. The Destination address of the HUT. 1 to the HUT. The Source Address is the off-link global address of 1 to the HUT. The Source Address is the off-link global address of 1 to the HUT. The Source Address of TN1. The Carget Address multicast a vertisement induces a Prefix Advertisement with a global prefix and the L and A bits set the Request from TN1 to the HUT. The Source Address of TN1. The Target Addre	rds an Destination o Route The ess of st from s is the The TR1 for N1. The TR1 for N1. The TR1 for N1. The TR1 for N1. The con-zer e HUT. address cho Re- ion Ad address et. TR f TN1. th a nor to the -local 1 for-

Test #		Result	t
v6LC.2.3.9	No Destination Cache Entry (Hosts Only)	Α	N/A
	at a host properly processes a Redirect message when there is no entry for	the destination	on in the
host's Destination C			
Comments on Test	Procedure		
a Prefix Advert HUT. The ICM address of TR2 TR2. Afterwar	a Router Advertisement to the all-nodes multicast address. The Router Ad isement with a global prefix and the L and A bits set. TR1 transmits a Re MPv6 Destination Address is the global address of TN1. The Target Addr . The Redirect message contains a Target Link-Layer option with the link ds, TR1 forwards an Echo Request from TN1 to the HUT. The IPv6 Sou ress of TN1. The IPv6 Destination Address is the global address of the H	edirect messag ess is the link <-layer addres rce Address is	ge to the -local s of
Comments on Test	Results	$\overline{n}$	
A. This tests is per	rformed on Hosts only.	NL	ſ

Test #				Result		
v6LC.2.3.10	<b>3.10</b> Neighbor Cache Updated, No Neighbor Cache Entry (Hosts Only)		A-D	N/A		
Purpose: Verify	that a host properly updates its Ne			MP Redirec	et Mes-	
sage.						
<b>Comments on Te</b>	est Procedure					
TLLA Option	Redirected Packet Option	New NC State	Link-layer		Part	
No	No	No NCE	Unchanged		Α	
Yes	No	STALE	Updated		В	
Yes	Yes	STALE	Updated		С	
Yes	Yes, packet > 1280	STALE	Upda		D	
	tion, No Redirected Packet Option					
	o the all-nodes multicast address.					
a global prefi	x and the L and A bits set. TR1 tr	ansmits a Redirect message to the	he HUY. The	IGMPv6De	estina-	
tion Address	is the global address of TN2. The	Target Address is the link-local	adaress of TR	2. The Rec	ahovo	
B TLIA Option	ains a Target Link-layer Address of , No Redirected Packet Option, Li	nk-laver Address Undared. TR	transmite a R	outer Adve	above.	
	ll-nodes multicast address. The Re					
global prefix	and the L and A bits set. TR1 trai	asmits a Redirect message to the	HUT The IC	MPv6 Desi	tina-	
tion Address	is the global address of TN2. The	Target Address is the Vinkalocal	address of TR	2. The Red	direct	
message cont	ains a Target Link-layer Address	option or Redirected Packet opti	on according to	o the table a	above.	
C. TLLA Option	LLA Option, Redirected Packet Option, Link-layer Address Updated. TR1 transmits a Router Advertisen					
to the all-nod	es multicast address The Router	Advertisement includes a Prefix	Advertisemen	t with a glo	obal	
prefix and the	e L and A bits set. TRA transmits	a Redirect message to the HUT.	The ICMPv6	Destination	ı Ad-	
dress is the g	lobal address of TN2. The Target	Address is the link-local addres	s of TR2. The	Redirect m	iessage	
contains a Ta	rget Link-layer Address option or	Redirected Packet option accord	ling to the tabl	e above.		
D. TLLA Option	, Oversized Redwected Packet Opt	tion, Link-layer Address Update	d: TRI transn	nts a Route	r Ad-	
	o the all-nodes multicast address.					
	$\mathbf{x}$ and the L and A bits set. TR1 tr					
	is the global address of TN2. The ains a Target Link-layer Address of					
message com	anis a target Link-layer Address (	option of Reunceleu Facket Opti			100vc.	
Comments on To	est Results					

Fes	t #			F	lesult	
<b>6</b> I	<u>.C.2.3.11</u> N	leighbor Cache Updated from S	tate INCOMPLET	E (Hosts Only)	A-D	N/A
age		host properly updates its Neighbo	or Cache entry upon i	receipt of a valid ICMP	Redirect	Mes
	TLLA Option	Redirected Packet Option	New NC State	Link-layer Address	Part	
	No	No	INCOMPLETE	Unchanged	Α	
	Yes	No	STALE	Updated	В	
	Yes	Yes	STALE	Updated	C	
	Yes	Yes, packet > 1280	STALE	Updated		
8.	sage contains a Tar <i>TLLA Option, No I</i> Request to the HU' HUT. The ICMPv	al address of TN2. The Target A rget Link-layer Address option or <i>Redirected Packet Option, Link-la</i> T. TR2 does not reply to Neighb 6 Destination Address is the glob	Redirected Packet of yer Address Updated or Solicitations. TRI al address of TN2. T	otion according to the ta A TR2 transmits a link- transmits a Redirect m The Target Address is the	ble abov local Ech essage to e link-loo	e. 10 the cal
	tion according to th TLLA Option, Redi	irected Packer Option, Link-layer	Address Updated: 1	TR2 transmits a link-loc	al Echo F	le-
		TR2 does not reply to Neighbor S 6 Destination Address is the glob				

D. TLLA Option, Overseed Redirected Packet Option, Link-layer Address Updated: TR2 transmits a link-local Echo Request to the HUT. TR2 does not reply to Neighbor Solicitations. TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option or Redirected Packet option according to the table above.

### **Comments on Test Results**

Test	#				Result	
v6L(	C.2.3.12	Neighbor Cache Updated from S	State REACHABLI	E (Hosts Only)	A-E	N/A
Purp	ose: Verify that	a host properly processes a Redired	ct message when the	re is no entry for the de	estination	in the
host <sup>7</sup>	s Destination Ca	che.	-	-		
Com	ments on Test P	rocedure				
-	TLLA Option	Redirected Packet Option	New NC State	Link-layer Addres	s Part	;
	No	No	REACHABLE	Unchanged	Α	
	Same	No	REACHABLE	Unchanged	В	
	Different	No	STALE	Updated	C	
	Different	Yes	STALE	Updated	D	
	Different	Yes, packet > 1280	STALE	Updated	E	
A	No TLLA Option	, No Redirected Packet Option, Lin	k-laver Address Unc	changed TRI and DR	each tran	nsmit

- A. No TLLA Option, No Redirected Packet Option, Link-layer Address Unchanged TR1 and TR2 each transmit a Router Advertisement to the all-nodes multicast address. The Router Advertisements include a Prefix Advertisement with a global prefix and the L and A bits set. This should cause the NUT to add TR1 and TR2 to its Default Router List, configure a global address, and compute Reachable Time.) R1 and TR2 each transmit an Echo Request to the NUT and respond to Neighbor Solicitations from the NUT. Wait for Echo Replies from the NUT. This should cause the NUT to resolve the addresses of TR1 and TR2 and ereate a Neighbor Cache entry for each router in state REACHABLE. TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option or Redirected Packet option according to the table above. Afterwards, TR2 transmits a link-local Echo Request to the HUT.
- B. TLLA Option, No Redirected Packet Option, Link-bayer Address Unchanged: TR1 and TR2 each transmit a Router Advertisement to the all-nodes multicast address. The Router Advertisements include a Prefix Advertisement with a global prefix and the L and A birs set. This should cause the NUT to add TR1 and TR2 to its Default Router List, configure a global address, and compute Reachable Time. R1 and TR2 each transmit an Echo Request to the NUT and respond to Neighbor Solicitations from the NUT. Wait for Echo Replies from the NUT. This should cause the NUT to resolve the addresses of TR1 and TR2 and create a Neighbor Cache entry for each router in state REACHABLE. TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option or Redirected Packet option according to the table above. Afterwards, TR2 transmits a link-local Echo Request to the HUT.
- C. TLLA Option, No Redirected Packet Option, Link-layer Address Updated: TR1 and TR2 each transmit a Router Advertisement to the all-nodes multicast address. The Router Advertisements include a Prefix Advertisement with a global prefix and the L and A bits set. This should cause the NUT to add TR1 and TR2 to its Default Router List, configure a global address, and compute Reachable Time. R1 and TR2 each transmit an Echo Request to the NUT and respond to Neighbor Solicitations from the NUT. Wait for Echo Replies from the NUT. This should cause the NUT to resolve the addresses of TR1 and TR2 and create a Neighbor Cache entry for each router in state REACHABLE. TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option or Redirected Packet option according to the table above. Afterwards, TR2 transmits a link-local Echo Request to the HUT.

- D. TLLA Option, Redirected Packet Option, Link-layer Address Updated: TR1 and TR2 each transmit a Router Advertisement to the all-nodes multicast address. The Router Advertisements include a Prefix Advertisement with a global prefix and the L and A bits set. This should cause the NUT to add TR1 and TR2 to its Default Router List, configure a global address, and compute Reachable Time. R1 and TR2 each transmit an Echo Request to the NUT and respond to Neighbor Solicitations from the NUT. Wait for Echo Replies from the NUT. This should cause the NUT to resolve the addresses of TR1 and TR2 and create a Neighbor Cache entry for each router in state REACHABLE. TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option or Redirected Packet option according to the table above. Afterwards, TR2 transmits a link-local Echo Request to the HUT.
- E. TLLA Option, Oversized Redirected Packet Option, Link-layer Address Updated: TR1 and TR2 each transmit a Router Advertisement to the all-nodes multicast address. The Router Advertisements include a Prefix Advertisement with a global prefix and the L and A bits set. This should cause the NUT to add TR1 and TR2 to its Default Router List, configure a global address, and compute Reachable Time. R and VR2 each transmit an Echo Request to the NUT and respond to Neighbor Solicitations from the NUT. Wail for Echo Replies from the NUT. This should cause the NUT to resolve the addresses of TR1 and TR2 and create a Neighbor Cache entry for each router in state REACHABLE. TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option or Redirected Packet option according to the table above. Afterwards, TR2 transmits a link-local Echo Request to the HUT.

### **Comments on Test Results**

Test	#				Result	
v6LC.2.3.13 Neighbor Cache Updated from State STALE (Hosts Only)						N/A
<b>Purpose</b> : Verify that a host properly updates its Neighbor Cache entry upon receipt of a valid ICMP Redirect Message.						
Com	ments on Test P	rocedure				
	TIIA Ondian	Dedinested Deshet Ontion	Norr NC State	Tink lower Addre		
Г	TLLA Option		New NC State	Link-layer Addre		l
-	No	No	STALE	Unchanged	A	
	Same	No	STALE	Unchanged	В	
	Different	No	STALE	Updated	∠ C	
	Different	Yes	STALE	Updated	D	
	Different	Yes, packet > 1280	STALE	Updated	ΓE	
A	No TLLA Option	, No Redirected Packet Option, Link	k-layer Address Unc	hanged. TR transm	ijts a Route	er Ad-

A. No TLLA Option, No Redirected Packet Option, Link-layer Address Unchanged. TR httansmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement meludes a Prefix Advertisement with a global prefix and the L and A bits set. TR2 transmits an unsolicited Router Advertisement with a Source Link-layer Address option to the all-nodes multicast address. Afterwards, TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option or Redirected Packet option according to the table above. TR2 transmits a link-local Echo Request to the HUT.

- B. TLLA Option, No Redirected Packet Option, Link-laxer Address Unchanged: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR2 transmits an unsolicited Router Advertisement with a Source Link-layer Address option to the all-nodes multicast address. Afterwards, TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option or Redirected Packet option according to the table above. TR2 transmits a link-local Echo Request to the HUT.
- C. TLLA Option No Redirected Packer Option, Link-layer Address Updated: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the Land A bits set. TR2 transmits an unsolicited Router Advertisement with a Source Linklayer Address option to the all-nodes multicast address. Afterwards, TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option or Redirected Packet option according to the table above. TR2 transmits a link-local Echo Request to the HUT.

- D. TLLA Option, Redirected Packet Option, Link-layer Address Updated: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR2 transmits an unsolicited Router Advertisement with a Source Link-layer Address option to the all-nodes multicast address. Afterwards, TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option or Redirected Packet option according to the table above. TR2 transmits a link-local Echo Request to the HUT.
- E. TLLA Option, Oversized Redirected Packet Option, Link-layer Address Updated: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR2 transmits an unsolicited Router Advertisement with a Source Link-layer Address option to the all-nodes multicast address. Afterwards, TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option of Redirect Packet option according to the table above. TR2 transmits a link-local Echo Request to the HUT.

These tests are performed on Hosts only.

Test #					Result	
v6LC.2.	<u>3.14</u> N	Neighbor Cache Updated from S	tate PROBE (Hosts	s Only)	A-E	N/A
Purpose	: Verify that a	host properly updates its Neighbo	or Cache entry upon	receipt of a valid ICM	IP Redired	ct Mes-
sage.	-			-		
Comme	nts on Test Pro	ocedure				
Т	LLA Option	<b>Redirected Packet Option</b>	New NC State	Link-layer Addre	ss Par	t
	No	No	PROBE	Unchanged	А	
	Same	No	PROBE	Unchanged	В	
	Different	No	STALE	Updated	νc	
	Different	Yes	STALE	Updated	D	
	Different	Yes, packet $> 1280$	STALE	Updated	V V E	

A. No TLLA Option, No Redirected Packet Option, Link-layer Address Unchanged. TR https://www.commun.com/www.commun.com/wwww.com/www.com/www.co

- B. TLLA Option, No Redirected Packet Option, Link-layer Address Unchanged: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR2 transmits an unsolicited Router Advertisement with a Source Link-layer Address option to the all-nodes multicast address. Also, TR2 transmits a solicited Neighbor Advertisement for its link-local address to the HUT. Afterwards, TR2 transmits an Echo Request from its link-local address is the global address of TN2. The Target Address is the link-local address of TR2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option or Redirected Packet option according to the table above.
- C. *TLLA Option, No Redirected Packet Option, Link-layer Address Updated:* TR1 transmits a Router Advertisement to the all nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR2 transmits an unsolicited Router Advertisement with a Source Link-layer Address option to the all-nodes multicast address. Also, TR2 transmits a solicited Neighbor Advertisement for its link-local address to the HUT. Afterwards, TR2 transmits an Echo Request from its link-local address is the global address of TN2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option or Redirected Packet option according to the table above.

- D. TLLA Option, Redirected Packet Option, Link-layer Address Updated: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR2 transmits an unsolicited Router Advertisement with a Source Link-layer Address option to the all-nodes multicast address. Also, TR2 transmits a solicited Neighbor Advertisement for its link-local address to the HUT. Afterwards, TR2 transmits an Echo Request from its link-local address to the HUT. TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option or Redirected Packet option according to the table above.
- E. TLLA Option, Oversized Redirected Packet Option, Link-layer Address Updated: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR2 transmits an unsolicited Router Advertisement with a Source Link-layer Address option to the all-nodes multicast address. Also, TR2 transmits a valicited Neighbor Advertisement for its link-local address to the HUT. Afterwards, TR2 transmits an Echo Request from its link-local address to the HUT. TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN2. The Target Address is the link-local address of TR2. The Redirect message contains a Target Link-layer Address option or Redirected Packet option according to the table adove.

These tests are performed on Hosts only.

Test #			Result	t			
v6LC.2.3.15	5	Invalid Redirect does not Update Neighbor Cache (Hosts Only)	A-I	N/A			
Purpose: V	Purpose: Verify that a host properly processes invalid Redirect messages when redirected on-link.						
<b>Comments</b>	on Test l	Procedure					
The Roy transmit The Tar Address	uter Adv ts a Redi rget Add s (the off	Address is Global: TR1 transmits a Router Advertisement to the all-nodes r ertisement includes a Prefix Advertisement with a global prefix and the L an rect message to the HUT. The ICMPv6 Destination Address is the global ad ress is the link-local address of TR2. The Redirect message contains an inco E-link global address of TN2). After, TR2 transmits a link-local Echo Request Address is not the surrent first hon neutrar. TR1 transmits a Pouter Adverti	d A bits se dress of T rrect IPv6 st to the H	et. TR1 N1. Source UT.			
nodes n the L ar global a an incon Request	nulticast nd A bits nddress o rrect IPv t to the H		global pret on Address nessage co a link loc	fix and s is the ontains cal Echo			
Adverti Redirec Address After, T	sement i et messag s is the li TR2 trans	255: TR1 transmits a Router Advertisement to the all-hotes multicast address ncludes a Prefix Advertisement with a global prefix and the L and A bits set: the to the HUT. The ICMPv6 Destination Address is the global address of TN nk-local address of TR2. The Redirect message contains an incorrect IPv6 F smits a link-local Echo Request to the HUT.	TR1 tran 1. The Ta Iop Limit	asmits a arget of 254.			
Adverti Redirec Address ter, TR2	sement i et messag s is the li 2 transm	s not 0: TR1 transmits a Router Advertisement to the all-nodes multicast add ncludes a Prefix Advertisement with a global prefix and the L and A bits set. te to the HUT: The ICMPv6 Destination Address is the global address of TN nk-local address of UR2. The Redirect message contains an incorrect ICMP its a link-local Echo Request to the HUT.	TR1 tran 1. The Ta v6 Code of	asmits a arget f 1. Af-			
Router A transmit The Tar Checks	Advertis ts a Redi rget Add um., Af	in invalue: TR1 transmits a Router Advertisement to the all-nodes multic empirical design of the Advertisement with a global prefix and the L and A rect message to the HUT. The ICMPv6 Destination Address is the global ad ress is the link-local address of TR2. The Redirect message contains an inco en TR2 transmits a link-local Echo Request to the HUT.	bits set. T dress of T rrect ICM	'R1 'N1. Pv6			
address set. TR TN1. T	. The Ro 1 transm The Targ	ption Address is Multicast: TR1 transmits a Router Advertisement to the all- buter Advertisement includes a Prefix Advertisement with a global prefix and hits a Redirect message to the HUT. The ICMPv6 Destination Address is the et Address is the link-local address of TR2. The Redirect message contains a of the all-nodes multicast address. After, TR2 transmits a link-local Echo Re	the L and global add n ICMPv6	d A bits dress of 6 Desti-			

- G. Target Address is Multicast: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains a Target Address of the All-nodes multicast address. After, TR2 transmits a link-local Echo Request to the HUT.
- H. ICMPv6 length is less than 40 Octets: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains an invalid IPv6 Length of 39 bytes. After, TR2 transmits a link-local Echo Request to the HUT.
- I. Option has Length Zero: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set TR1 transmits a Redirect message to the HUT. The ICMPv6 Destination Address is the global address of TN1. The Target Address is the link-local address of TR2. The Redirect message contains an Option with length 0. After, TR2 transmits a link-local Echo Request to the HUT.

These tests are performed on Hosts only.

**Comments on Test Results** 

Test #		Result	;
v6LC.2.3.16	Redirect - Transmit (Routers Only)	Α	PASS
		В	PASS
		С	PASS
$\frown$		D	PASS
Purpose: Verify th	at a fouter properly handles transmission of Redirect messages.		
Comments on Tes	t Procedure		

Comments on Test Procedure

- A. Send Redirect: TRU transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TN1 transmits an Echo Request to TN2's unicast global address with prefix X and a first hop through the RUT.
- B. *Send Redirect to Alternate Router:* TN1 transmits an Echo Request to TN2's unicast global address and a first hop through the RUT.
- C. *Source not neighbor:* TN1 transmits an Echo Request to TN2 with a first hop through the RUT. The Source Address is TN1's address with an off-link prefix.
- D. *Destination Multicast:* TN1 transmits an Echo Request to TN2's solicited-node multicast address with a first hop through the RUT.

#### **Comments on Test Results**

A. The RUT transmitted a Redirect message with the following values:

IPv6 Source	Link-Local address of RUT
IPv6 Destination	TN1's address (used in Echo Request's Source Address)
Target	TN2's unicast global address with prefix X
Destination	TN2's unicast global address with prefix X
TLL Option	TN2's link-layer address if known
Redirected Header	TN1's Echo Request without total packet exceeding 1280 bytes.

B. The RUT transmitted a Redirect message with the following values:

IPv6 Source Link-Local address of RUT

<b>IPv6 Destination</b>	TN1's address (used in Echo Request's Source Address)
Target	TR1's link-local address
Destination	TN2's unicast global address
TLL Option	TR1's link-layer address if known
Redirected Header	TN1's Echo Request without total packet exceeding 1280 bytes.

Parts C-D: The RUT did not send a Redirect message.

Test #         v6LC.2.3.17       Redirect – Receive (Routers Only)         Purpose:       Verify that a router properly handles reception of Redirect messages.         Comments on Test Procedure       Comments on Test Procedure         A.       TR1 and TR2 each transmit a Router Advertisement to the all-nodes multicast address. The R tisements include a Prefix Advertisement with a global prefix and the L and A bits set. This St NUT to add TR1 and TR2 to its Default Router List, configure a global address, and compute TR1 and TR2 each transmit an Echo Request to the NUT and respond to Neighbor Solicitation Wait for Echo Replies from the NUT. This should cause the NUT to resolve the addresses of	hould cause the Reachable Time.
<ul> <li>Purpose: Verify that a router properly handles reception of Redirect messages.</li> <li>Comments on Test Procedure</li> <li>A. TR1 and TR2 each transmit a Router Advertisement to the all-nodes multicast address. The R tisements include a Prefix Advertisement with a global prefix and the L and A bits set. This set NUT to add TR1 and TR2 to its Default Router List, configure a global address, and compute TR1 and TR2 each transmit an Echo Request to the NUT and respond to Neighbor Solicitation</li> </ul>	Couter Adver- hould cause the Reachable Time.
<ul> <li>Comments on Test Procedure</li> <li>A. TR1 and TR2 each transmit a Router Advertisement to the all-nodes multicast address. The R tisements include a Prefix Advertisement with a global prefix and the L and A bits set. This is NUT to add TR1 and TR2 to its Default Router List, configure a global address, and compute TR1 and TR2 each transmit an Echo Request to the NUT and respond to Neighbor Solicitation</li> </ul>	hould cause the Reachable Time.
A. TR1 and TR2 each transmit a Router Advertisement to the all-nodes multicast address. The R tisements include a Prefix Advertisement with a global prefix and the L and A hits set. This R NUT to add TR1 and TR2 to its Default Router List, configure a global address, and compute TR1 and TR2 each transmit an Echo Request to the NUT and respond to Neighbor Solicitation	hould cause the Reachable Time.
tisements include a Prefix Advertisement with a global prefix and the L and A bits set. This set NUT to add TR1 and TR2 to its Default Router List, configure a global address, and compute TR1 and TR2 each transmit an Echo Request to the NUT and respond to Weighbor Solicitation	hould cause the Reachable Time.
and create a Neighbor Cache entry for each router in state REACHABLE TR1 then forwards quest from TN2 to the RUT. The Destination Address is the global address of the RUT. Also Redirect message to the RUT. The ICMPv6 Destination Address is the global address of TN2 Address is the link-local address of TR2. Afterwards, TR1 forwards an Echo Request from T The Destination Address is the global address of the RUT.	s an Echo Re- o, TR1 transmits a 2. The Target
Comments on Test Results	
A. The RUT sent an Echo Reply with a first hop through TR1. The RUT still sent an Echo Reply through TR1, indicating the RUT did not change its routing table with information from TR1' sage.	

# Section 3: RFC 2462

These tests are designed to verify the readiness of an IPv6 implementation vis-àvis the IPv6 Stateless Address Autoconfiguration specification.

# **Group 1: Address Autoconfiguration and Duplicate Address Detection**

The following tests cover Address autoconfiguration and duplicate address detection in IPv6.

	-	$\int$
Test #		Result
v6LC.3.1.1	Address Autoconfiguration and Duplicate Address Detection	A PASS
Purpose: Verify that	t a node can properly initialize on a network using address autocopriguration	and communicate
with other on-link pa	rtners.	
Comments on Test	Procedure	
A. Initialize all the	devices on Link B. Allow time for all devices on Link B to perform stateless	address autocon-
	DAD. Transmit a DAD NS from TN1 with the Target Activess set to the NUT	
dress.		
Comments on Test	Results	
	rmed DAD on its rentative address for its interface on Link B sending DupAd	
mits Neighbor S	plicitations, every Retrans Timer. The NUT also assigned the tentative address	ss to its interface.
The NUT the tra	ansmit a Solicited NA for its autoconfigured link-local address.	
C		

Test #		Resul	t
v6LC.3.1.2	Receiving DAD Neighbor Solicitations and Advertisements	Α	PASS
		В	PASS
		С	PASS
		D	PASS
Purpose: To ver	ify that a node can properly process neighbor solicitations and advertisements	performing	Dupli-
	ection while the node is also performing DAD.		
Comments on Te	est Procedure		
A. NUT receive	s DAD NS (target != NUT): First, initialize all devices on Link B. After TN1	receives a I	DAD NS
message from	n the NUT. Configure TN1 to transmit DAD Neighbor Solicitation A with the	Target Ad	dress set
to TN1's linl	k-local address. TN1 transmits a NS with the Target Address set to the NUT's	-link-local	address.
B. NUT receive	s DAD NS (target == NUT): First, initialize all devices on Link B. After TN1	receives	DAD
NS message	from the NUT. Configure TN1 to transmit DAD Neighbor Solicitation A with	the Target	Address
	JT's tentative link-local address. TN1 transmits a NS with the same target add		
first DAD N	S.	V / r	1
C. NUT receive	s DAD NA (target != NUT): First, initialize all devices on Link B (After TN)	receives a	DAD
NS message	from the NUT. Configure TN1 to transmit DAD Neighbor Solicitation A with	the Target	Addres
set to the NU	JT's tentative link-local address. TN1 transmits a NS with the target address so	et to the NU	JT's
link-local ad	dress.		
D. NUT receive	s DAD NA (target $==$ NUT): First, initialize all devices on Link B. After TN	1 receives a	l DAD
NS message	from the NUT. Configure TN1 to transmit DAD Neighbor Solicitation A with	the Target	Addres
set to the NU	JT's tentative link-local address. TN1 transmits a NS with the same target add	ress used fo	or the
first DAD N	s.		
Comments on Te	st Results		
A. The NUT sil	ently ignored the DAD WS. The NUT completed the DAD process and assign	the tentativ	ve ad-
dress to its in	Herface. The NVT did transmit a Solicited NA for its autoconfigured link-loca	l address.	
B. The NUTree	ceived more DAD NS messages than expected with its tentative link-local additional additional descent additional addi	ress as the T	Farget
	NUT then determined its tentative address is a duplicate and should not assig		
	nterface. The NUT did not transmit a Solicited NA for its autoconfigured link-		
	ently ignored DAD NA. The NUT completed the DAD process and assign the		ddress to
	The NUT did transmit a Solicited NA for its autoconfigured link-local address		
	termined its tentative address is not unique and did not assign the tentative add	ress to its i	nterface
The NUT die	d not transmit a Solicited NA for its autoconfigured link-local address.		

Test	:#		Result	
v6L	C.3.1.3	Validation of DAD Neighbor Solicitations	Α	PASS
			В	PASS
			С	PASS
			D	FAIL
			E	PASS
			F	PASS
			G	PASS
			Н	FAIL
			Ι	PASS
			J	PASS
		at a node can properly initialize on a network using address autoc	onfiguration and comn	nunicate
	other on-link p			
Con	nments on Test	Procedure (	$\sim 10/11$	
B. C.	receives a DAI length set to 16 dress. <i>NUT receives i</i> DAD NS mess 254. TN1 trans <i>NUT receives i</i> TN1 receives a Destination add target address s <i>NUT receives i</i> DAD NS mess set to the all-ne NUT's link-loc <i>NUT receives i</i>	<i>nvalid DAD NS (ICMP length &lt; 24 octets):</i> First, initialize all de D NS message from the NUT, configure TN1 to transmit Neighbor 5. TN1 transmits a valid Solicited NS with the target address set to <i>nvalid DAD NS (HopLimit !=255):</i> First, initialize all devices on age from the NUT, configure TN1 to transmit Neighbor Solicitati- smits a valid Solicited NS with the target address set to the NUT's <i>nvalid DAD NS (Dst = WUT's tentative address):</i> First, initialize DAD NS message from the NUT configure TN1 to transmit Neighbor set to the NUT's tentative link-local address. TN1 transmits set to the NUT's tentative link-local address. TN1 transmits <i>nalid DAD NS (Dst = allnode):</i> First, initialize all devices on Li age from the NUT, configure TN1 to transmit Neighbor Solicitati- des multicast address. TN1 transmits a valid Solicited NS with the address. <i>malid DAD NS (ICMP code!= zero):</i> First, initialize all devices of NS message from the NUT, configure TN1 to transmit Neighbor Solicitati- set of DAD NS (ICMP code!= zero): First, initialize all devices of NS message from the NUT, configure TN1 to transmit Neighbor Solicitati- set of DAD NS (ICMP code!= zero): First, initialize all devices of NS message from the NUT, configure TN1 to transmit Neighbor Solicitati- set of DAD NS (ICMP code!= zero): First, initialize all devices of NS message from the NUT, configure TN1 to transmit Neighbor Solicitati- set of DAD NS (ICMP code!= zero): First, initialize all devices of NS message from the NUT, configure TN1 to transmit Neighbor Solicitations and the set of the NUT, configure TN1 to transmit Neighbor Solicitations and the set of the NUT, configure TN1 to transmit Neighbor Solicitations and the set of the NUT, configure TN1 to transmit Neighbor Solicitations and the set of the NUT, configure TN1 to transmit Neighbor Solicitations and the set of the	Solicitation A with the othe NUT's link-local Link B. After TN1 re- on A with the Hoplimi s link-local address. all devices on Link B. ghbor Solicitation A w a valid Solicited NS w nk B. After TN1 recei on A with Destination he target address set to on Link B. After TN1	e ICMH ad- ceives a t set to After rith the ith the ith the ves a address the re-
F.	code set to 1. T NUT receives i	ΓN1 transmits a valid Solicited NS with the target address set to th <i>nvalid DAD NS (Invalid Checksum):</i> First, initialize all devices o	ne NUT's link-local ad n Link B. After TN1 r	dress. eceives
		ssage from the NUT, configure TN1 to transmit Neighbor Solicita 1 transmits a valid Solicited NS with the target address set to the		
G.	NUT receives i TN1 receives a Target Address	<i>nvalid DAD NS (target == multicast address):</i> First, initialize all DAD NS message from the NUT, configure TN1 to transmit Nei set to the solicited multicast of the NUT's tentative link-local address ith the target address set to the NUT's link-local address.	devices on Link B. A ghbor Solicitation A w	fter vith the
H.	<i>NUT receives i</i> DAD NS mess	<i>nvalid DAD NS (contains SLL):</i> First, initialize all devices on Lir age from the NUT, configure TN1 to transmit Neighbor Solicitati AC address. TN1 transmits a valid Solicited NS with the target a	on A containing a SLL	Option

- I. NUT receives valid DAD NS (Reserved Field): First, initialize all devices on Link B. After TN1 receives a DAD NS message from the NUT, configure TN1 to transmit Neighbor Solicitation A with the Reserved field set to 0xFFFFFFFF. TN1 transmits a valid Solicited NS with the target address set to the NUT's link-local address.
- J. NUT receives valid DAD NS (contains TLL): First, initialize all devices on Link B. After TN1 receives a DAD NS message from the NUT, configure TN1 to transmit Neighbor Solicitation A containing a TLL Option set to TN1's MAC address. TN1 transmits a valid Solicited NS with the target address set to the NUT's link-local address.

- A. The NUT silently ignored the invalid DAD NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured link-local address.
- B. The NUT silently ignored the invalid DAD NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured link-local address.
- C. The NUT silently ignored the invalid DAD NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured link-local address.
- D. The NUT did not silently ignore the invalid DAD NS. The NUT did not transmit a Solicited NA for its autoconfigured link-local address.

According to RFC 2462, Section 5.4.1: "A node MUST silently discard any Neighbor Solicitation or Advertisement message that does bit pass the validity checks specified in (DISCOVERY]."

Therefore, the NUT should have silently discarded the invalid DAD Neighbor Solicitation and continued with the DAD process before transmitting a Solicited Neighbor Advertisement for its autoconfigured link-local address.

- E. The NUT silently isnoted the DAD NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured link-local address.
- F. The NUT silently ignored the DAD NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured link-local address.
- G. The NUT shere y ignored the invalid DAD NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured link-local address.
- H. The NUT did not silently ignore the invalid DAD NS. The NUT did not transmit a Solicited NA for its autoconfigured link-local address.

According to RFC 2462, Section 5.4.1: "A node MUST silently discard any Neighbor Solicitation or Advertisement message that does bit pass the validity checks specified in [DISCOVERY]."

Therefore, the NUT should have silently discarded the invalid DAD Neighbor Solicitation and continued with the DAD process before transmitting a Solicited Neighbor Advertisement for its autoconfigured link-local address.

- I. The NUT ignored the contents of the Reserved field. The NUT did not assign the tentative address to its interface. The NUT did not transmit a Solicited NA for its autoconfigured link-local address.
- J. The NUT ignored any options they do not recognize and continued processing the message. The NUT also did not assign the tentative address to its interface. The NUT did not transmit a Solicited NA for its autoconfigured link-local address.

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		Result
76LC.3.1.4	Receiving Invalid Neighbor Advertisements	A PAS
		<b>B</b> PAS
		C PAS
		D PASS
		E PAS
		F PAS
		G PAS
		H PAS
		I PAS
Purpose: Verify the	at a node can properly ignore invalid neighbor advertisements while	le performing Duplicate Ad-
ress Detection.		
<b>Comments on Test</b>	Procedure	
	(	
A. NUT receives i	nvalid DAD NA (ICMP length < 24 octets): First, initialize all dev	rices on Link R. After TN1
receives a DAI	NS message from the NUT, configure TN1 to transmit Neighbor	Advertisement & with the
ICMP length se	t to 16. TN1 transmits a valid Solicited NS with the target address	s set to the NUT's link-local
address.		
B. NUT receives i	nvalid DAD NA (HopLimit != 255): First, initialize all devices on	Link B. After TN1 receives
DAD NS mess	age from the NUT, configure TNT to transmit Neighbor Advertises	ment A with the Hoplimit se
to 254. TN1 tr	ansmits a valid Solicited NS with the target address set to the NUT	"s link-local address.
	nvalid DAD NA (ICMP code! = cero): First, initialize all devices of	
	sage from the NFT, configure TN1 to transmit Neighbor Advertis	
	ransmits a valid Solicited NS with the target address set to the NU	
D. NUT receives i	nvalid DAD NA (Invalid Checksum) First, initialize all devices or	h Link B. After TN1 receives
a DAD NS mes	sage from the NUT, configure PN1 to transmit Neighbor Advertis	sement A with an invalid
	m. TN1 transmits a valid Solicited NS with the target address set	to the NUT's link-local ad-
dress.		
E. <i>NUT receives i</i>	avalla DAO NA (SolicitedFlag ==1): First, initialize all devices of $avalla DAO NA (SolicitedFlag ==1)$	n Link B. After TN1 receive
a DAD NS-mes	sage from the NUT, configure TNT to transmit Neighbor Advertis	sement A with Solicited flag
	ransmits a valid Solicited NS with the target address set to the NU	
	avalid DAD NA (target == multicast address): First, initialize all	
	DAD NS message from the NUT, configure TN1 to transmit Neig	
	ress set to the solicited multicast of the NUT's tentative link-local	address. INI transmits a
	NS with the target address set to the NUT's link-local address.	a an Linh D. After TNI as
	<i>nvalid DAD NA (option length</i> $==$ <i>zero):</i> First, initialize all device	
	NS message from the NUT, configure TN1 to transmit Neighbor A th set to 0. TN1 transmits a valid Solicited NS with the target add	
local address.	in set to 0. This transmits a valid Solicited ins with the target add	less set to the NUT's link-
	alid DAD NA (Reserved Field): First, initialize all devices on Lin	k B After TN1 receives a
	age from the NUT, configure TN1 to transmit Neighbor Advertiser	
	FFFFFF. TN1 transmits a valid Solicited NS with the target addr	
local address.	a vano solicito no viti de la get audi	Cos set to the IVO I S IIIK-
	alid DAD NA (contains SLL): First, initialize all devices on Link	<b>B</b> After TN1 receives a $D\Delta$
	om the NUT, configure TN1 to transmit Neighbor Advertisement A	
	address. TN1 transmits a valid Solicited NS with the target addre	
address.	address. The dationals a valid bolleted his with the darget addre	55 567 10 the 140 1 5 mik-1007
uuu1055.		
Comments on Test	Results	
southernes on rest		

- A. The NUT silently ignored the invalid DAD NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured Link-Local Address.
- B. The NUT silently ignored the invalid DAD NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured Link-Local Address.
- C. The NUT silently ignored the invalid DAD NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured Link-Local Address.
- D. The NUT silently ignored the invalid DAD NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured Link-Local Address.
- E. The NUT silently ignored the DAD NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured Link-Local Address.
- F. The NUT silently ignored the DAD NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured Link-Local Address.
- G. The NUT silently ignored the invalid DAD NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured Link-Local Address.
- H. The NUT ignored the contents of the Reserved field. The NUT did not assign the tentative address to its interface. The NUT also did not transmit a Solicited NA for its autoconfigured Link-Local Address.
- I. The NUT ignored any options they do not recognize and continue processing the message. The NUT did not assign the tentative address to its interface. The NUT also did not transmit a Solicited NA for its autoconfigured Link-Local Address.

Test #	Result					
v6LC.3.1.5 Receiving Neighbor Solicitations for Address Resolution	Α	PASS				
	В	PASS				
Purpose: Verify that a node can properly ignore neighbor solicitations performing address resolution while per-						
forming Duplicate Address Detection.						
Comments on Test Procedure						

- A. *NUT receives NS (src == unicast):* First, initialize all the devices on Link B. After TN1 receives a DAD NS message from the NUT. Configure TN1 to transmit Neighbor Solicitation A. TN1 transmits a DAD NS with the Target Address set to the NUT's Link-Local Address.
- B. NUT receives NS (Src == unicast && Dst == NUT's tentative address): First, initialize all the devices on Link B. After TN1 receives a DAD NS message from the NUT. Configure TN1 to transmit Neighbor Solicitation A with the Destination Address set to the NUT's tentative Link-Local Address. TN1 transmits a DAD NS with the Target Address set to the NUT's Link-Local Address.

- A. The NUT silently ignored the NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured Link-Local Address.
- B. The NUT silently ignored the NS. The NUT did complete the DAD process and assign the tentative address to its interface. The NUT also transmitted a Solicited NA for its autoconfigured Link-Local Address.

# **Group 2: Router Advertisement Processing and Address Lifetime**

The following tests cover Router Advertisement processing and address lifetime expiry in IPv6.

Test #		Result	
<u>v6LC.3.2.1</u>	Address Lifetime Expiry (Hosts Only)	Α	N/A
	t a host can properly handle expired or invalid addresses.		
Comments on Test 1	Procedure		
with a valid life dress set to the l message for add waiting 10 secon	Il devices on Link B. TR1 sends out ONE Router Advertisement on Link B. time set to 40 seconds. TR1 transmits a NS message for address resolution winvUT's Global Address for Prefix "X". After waiting 35 seconds, TR1 transmites resolution with the target address set to the NUT's Global Address for Prefix, TR1 transmits a NS message for address resolution with the target address for Prefix, TR1 transmites a NS message for address resolution with the target address for Prefix, TR1 transmites a NS message for address resolution with the target address for Prefix, TR1 transmites a NS message for address resolution with the target address for Prefix, TR1 transmites a NS message for address resolution with the target address for Prefix, TR1 transmites a NS message for address resolution with the target address for Prefix, TR1 transmites a NS message for address resolution with the target address for Prefix, TR1 transmites a NS message for address resolution with the target address for Prefix, TR1 transmites a NS message for address resolution with the target address for Prefix, TR1 transmites a NS message for address resolution with the target address for Prefix, TR1 transmites a NS message for address resolution with the target address address for Prefix, TR1 transmites address for Prefix, TR1 tr	th the targ nits again refix 'W'l.	get ad- a NS After
	ormed on Hosts only.		
Test #		Result	
v6LC.3.2.2	Multiple Prefixes and Network Renumbering (Hosts only)	A	N/A
Purpose: To verify network when its site	hat a host configured with multiple prefixes can communicate with another h	ost on a d	ifferent
Comments on Test	Procedure // J		
tisements on Lin NS message for and "Y". After dress resolution	discontinue to send RA's for Prefix "X" and also configure TR1 to send out & B with Prefix "Y" with a Valid Lifetime of 30 seconds. Then, configure T address resolution with the Target Address set to the HUT's Global Address waiting 11 seconds for Prefix "X" to timeout, configure TR1 to transmit a NS with the Target Address set to the HUT's global address for Prefix "X" and " o transmit a NS message for address resolution with the target address set to the fix "Y".	R1 to tran for Prefix message Y". After	smit a "X" for ad- rwards,
Comments on Test 1	Results		
A. This test is perfo	ormed on Hosts only.		

Test #		Result	
v6LC.3.2.3	Prefix-Information Option Processing (Hosts Only)	A-I	N/A
	t a host properly processes the Prefix Information Option in the Router Adv	vertisement	
Comments on Test	Procedure		
<ul> <li>Router Advertist tisement with a Autonomous fla Prefix "Y" with get address set to NS message for ter waiting 20 s HUT's global a</li> <li>B. Autonomous Fl all-nodes multication and the L and Autonomous Fla and Fla Autonomous Fl</li></ul>	ement with multiple Prefix Options: First, initialize all devices on Link B. sement to the all-nodes multicast address. The Router Advertisement include global prefix and the L and A bits set. TR1 transmits a Router Advertisement as set, NextHop=255, and multiple prefix options, Prefix "X" with a valid life a valid lifetime of 40s. After, TR1 transmits a NS message for address reso to the HUT's global address for Prefix "X" and "Y". After waiting 21 second address resolution with the target address set to the HUT's global address econds, TR1 transmits a NS message for address resolution with the target a ddress for Prefix "Y". <i>ag not set:</i> First, initialize all devices on Link B. TR1 transmits a Router A vast address. The Router Advertisement includes a Prefix Advertisement we bits set. TR1 transmits a Router Advertisement A with the Autonomous the semits a NS message for address resolution with the target address set to the assist a NS message for address resolution with the Autonomous the semits a NS message for address resolution with the target address set to the assist a NS message for address resolution with the target address set to the assist a NS message for address resolution with the target address set to the	les a Prefix A ent with the ifetime of 20 olution with the ds, TR1 tran for Prefix X address set to dvertisemen inha global ag not set. A	Adver- )s and the tar- nsmits a K". Af- o the nt to the prefix After-
C. <i>Prefix is set to l</i> to the all-nodes prefix and the I	ink-local prefix: First, initialize all devices on Link B. TRU transmits a Ro multicast address. The Router Advertisement includes a Prefix Advertisem and A bits set. TR1 transmits Router Advertisement A with the prefix set , TR1 transmits a NS message for address resolution with the target address	ent with a g	lobal al pre-
D. Preferred lifetin ment to the all global prefix an 30 seconds. Af	or Prefix $X$ me > valid lifetime: First, initialize all devices on Link B. TR1 transmits a nodes multicast address. The Router Advertisement includes a Prefix Adve d the L and A bits set. TR1 transmits Router Advertisement A with the pre terwards, TR1 transmits a NS message for address resolution with the targe ddress for Prefix $X$ ".	rtisement wi ferred lifetin	ith a ne set to
E. <i>Prefix length</i> > all-nodes multiplication and the L and A	V28 bits: First, initialize all devices on Link B. TR1 transmits a Router Advertisement includes a Prefix Advertisement we bits set. TR1 transmits Router Advertisement A with a Prefix Length set to NS message for address resolution with the target address set to the HUT's	ith a global p o 128. After	prefix rwards,
all-nodes multion and the L and A	64 bits: First, initialize all devices on Link B. TR1 transmits a Router Advertisement address. The Router Advertisement includes a Prefix Advertisement w bits set. TR1 transmits Router Advertisement A with a Prefix Length set to NS message for address resolution with the target address set to the HUT's	ith a global p o zero. Afte	prefix erwards

- G. (64 bits < prefix length < 128 bits): First, initialize all devices on Link B. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits Router Advertisement A with a Prefix Length set to 120. Afterwards, TR1 transmits a NS message for address resolution with the target address set to the HUT's global address for Prefix "X".
- H. *Valid Lifetime is zero:* First, initialize all devices on Link B. TR1 transmits a Router Advertisement to the allnodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits Router Advertisement A with the Valid Lifetime set to zero. Afterwards, TR1 transmits a NS message for address resolution with the target address set to the HUT's global address for Prefix "X".
- I. *Invalid RA with Hop Limit 254:* First, initialize all devices on Link B. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits Router Advertisement A with a Hop Limit set to 254. Afterwards, TR1 transmits a NS message for address resolution with the target address set to the HUT's global address for Prefix "X".

These tests are performed on Hosts only.

Test #	Result	t
v6LC.3.2.4 Prefix-Information Option Processing, Lifetime (Hosts Only)	A-D	N/A
Purpose: Verify that a host properly updates its Address List upon receipt of Prefix Information	on Options.	
Comments on Test Procedure		
<ul> <li>A. Prefix Lifetime greater than Stored Lifetime: First, initialize the HUT on Link B. TR1 travertisement to the all-nodes multicast address. The Router Advertisement includes a Pref with a global prefix and the L and A bits set. TR1 transmits Router Advertisement A wit 30 seconds. After waiting 10 seconds, TR1 transmits a Router Advertisement with a prefix and a Valid Lifetime of 60 seconds. After waiting 25 seconds, TR1 transmits a Nouter Advertisement with a prefix and a Valid Lifetime of 60 seconds. After waiting 25 seconds, TR1 transmits a NS resolution with the target address set to the HUT's global address for Prefix "X".</li> <li>B. Prefix Lifetime greater than 2 hours: First, initialize the HUT on Link B. TR1 transmits ment to the all-nodes multicast address. The Router Advertisement includes a Prefix and a Valid Lifetime and A bits set. TR1 transmits Router Advertisement A with a Valid After, TR1 transmits a Router Advertisement with a prefix of Slobal Prefix and a Valid Lifetime to hours and 45 seconds, TR1 transmits a NS message for address reget address set to the HUT's global address for Prefix "X".</li> <li>C. Prefix Lifetime less than the Stored Lifetime and the Stored Lifetime to less than 1 hours? HUT on Link B. TR1 transmits a Router Advertisement to the all-node multicast address tisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR Advertisement A with its L flag set and its retransmit intelval set to 1 second. Following transmits a Router Advertisement with a global prefix and a Valid Lifetim After waiting 35 seconds, TR1 transmits aNS message for address. The Ruiter Advertisement A with a Ruiter Advertisement with a global prefix and the L and A bits set. TR Advertisement A with a Ruiter Advertisement with a global prefix and the L and A bits set. TR Advertisement A with a Ruiter Advertisement with a global prefix and the L and A bits set. TR Advertisement A with a Ruiter Advertisement with a global prefix and the L and A bits set. TR Advertise</li></ul>	ix Advertiser h a Valid Lif ix of TR1's C message for a Router Advertisement with Lifetime of alid Lifetime of alid Lifetime solution with First, initiali s. The Route R1 transmits the last RA, ' ne of 30 second get address s itialize the H outer Advert is Router A uter Advertis 1 seconds, Tio bal address s	nent retime of Global address vertise- ith a f 3hrs. e of 2hn the tar ze the r Adver Router TR1 onds. et to the IUT on isement dver- iement R1 for Pre-

These tests are performed on Hosts only.

# Section 4: RFC 1981

These tests are designed to verify the readiness of an IPv6 implementation vis-àvis the Path MTU Discovery IPv6 specification.

		Result
<u>v6LC.4.1.1</u>	Confirm Ping	A PASS
		B PASS
		C PASS
	at a node can reply to variable sized ICMP Echo Requests.	
Comments on Test	Procedure	
	(	
	Request 64 octets: TR1 transmits a Router Advertisement to the	
	vertisement includes a Prefix Advertisement with a global prefix a	
	cho Request from TN2 to the NUT. The packet size of the Echo R	
	Request 1280 octets: TR1 transmits a Router Advertisement to the	
I ne Router Ad	lvertisement includes a Prefix Advertisement with a global prefix a the Request from TN2 to the NUT. The packet size of the Echo R	and the L and A bits set. IRI
$C$ ICMP $_{\rm b}$ $E_{\rm c}$	Request 1500 octets: TR1 transmits a Router Advantisement to the	equest is 1280 octets.
C. ICMF vo Echo The Router Ad	lvertisement includes a Prefix Advertisement with a global prefix a	and the L and A bits set TR1
	the Request from TN2 to the NUT. The packet size of the Echo R	
for wards an Ec	no request non nice to high to the methods be of the Eeno R	equest is 1500 octors.
Comments on Test	Results	
	an Echo Reply to TR1 64 octets in packet size.	
B. The NUT sent	an Echo Reply to TRY 1280 octets in packet size.	
C. The NUT sent	an Echo Reply to TR1 1500 octets in packet size.	
		Result
v6LC.4.1.2	Stored PMTU	A PASS
v6LC.4.1.2 Purpose: Verify th	at a node can store Path MTU information for multiple destination	A PASS
v6LC.4.1.2 Purpose: Verify th	at a node can store Path MTU information for multiple destination	A PASS
Comments on Test	at a node can store Path MTU information for multiple destination <b>Procedure</b>	A PASS IS.
v6LC.4.1.2 Purpose: Verify th Comments on Test A. TN1 sends an I	at a node can store Path MTU information for multiple destination <b>Procedure</b> Echo Request on-link to the NUT with packet size equal to 1500 o	A PASS is. ctets. TR1 forwards an Echo
v6LC.4.1.2 Purpose: Verify th Comments on Test A. TN1 sends an I Request from 7	at a node can store Path MTU information for multiple destination <b>Procedure</b> Echo Request on-link to the NUT with packet size equal to 1500 o FN2 to the NUT with packet size equal to 1500 octets. Afterwards	A PASS is. ctets. TR1 forwards an Echo s, TR1 forwards an Echo Re-
volt C.4.1.2 Purpose: Verify th Comments on Test A. TN1 sends an I Request from T quest from TN2	at a node can store Path MTU information for multiple destination <b>Procedure</b> Echo Request on-link to the NUT with packet size equal to 1500 o TN2 to the NUT with packet size equal to 1500 octets. Afterwards 3 to the NUT with packet size equal to 1500 octets. TR1 then tran	A PASS is. ctets. TR1 forwards an Echo s, TR1 forwards an Echo Re- ismits a Packet Too Big mes-
v6LC.4.1.2 Purpose: Verify th Comments on Test A. TN1 sends an I Request from T quest from TN: sage to the NU	at a node can store Path MTU information for multiple destination <b>Procedure</b> Echo Request on-link to the NUT with packet size equal to 1500 o FN2 to the NUT with packet size equal to 1500 octets. Afterwards 3 to the NUT with packet size equal to 1500 octets. TR1 then tran T for the Echo Reply to TN2, which contains an MTU field with a	A PASS is. ctets. TR1 forwards an Echo s, TR1 forwards an Echo Re- ismits a Packet Too Big mes- a value of 1400. TN1 sends an
v6LC.4.1.2 Purpose: Verify th Comments on Test A. TN1 sends an I Request from 7 quest from TN: sage to the NU Echo Request of	<ul> <li>at a node can store Path MTU information for multiple destination</li> <li>Procedure</li> <li>Echo Request on-link to the NUT with packet size equal to 1500 o</li> <li>FN2 to the NUT with packet size equal to 1500 octets. Afterwards</li> <li>3 to the NUT with packet size equal to 1500 octets. TR1 then tran</li> <li>T for the Echo Reply to TN2, which contains an MTU field with a</li> <li>on-link to the NUT with packet size equal to 1500 octets. TR1 for</li> </ul>	A PASS as. ctets. TR1 forwards an Echo s, TR1 forwards an Echo Re- asmits a Packet Too Big mes- a value of 1400. TN1 sends an orwards an Echo Request from
volt C.4.1.2 Purpose: Verify th Comments on Test A. TN1 sends an I Request from T quest from TN3 sage to the NU Echo Request of TN2 to the NU	at a node can store Path MTU information for multiple destination <b>Procedure</b> Echo Request on-link to the NUT with packet size equal to 1500 o FN2 to the NUT with packet size equal to 1500 octets. Afterwards 3 to the NUT with packet size equal to 1500 octets. TR1 then tran T for the Echo Reply to TN2, which contains an MTU field with a	A PASS is. ctets. TR1 forwards an Echo s, TR1 forwards an Echo Re- ismits a Packet Too Big mes- value of 1400. TN1 sends an orwards an Echo Request from ls an Echo Request from TN3

to the NUT with packet size equal to 1500 octets. TR1 transmits another Packet Too Big message to the NUT for the Echo Reply to TN3, which contains an MTU field with a value of 1280. TN1 sends an Echo Request on-link to the NUT with packet size equal to 1500 octets. TR1 forwards an Echo Request from TN2 to the NUT with packet size equal to 1500 octets. Afterwards, TR1 forwards an Echo Request from TN3 to the NUT with packet size equal to 1500 octets.

### **Comments on Test Results**

A. The NUT sent three Echo Replies, one to TN1, one to TN2, and one to TN3. The NUT then responded to the three Echo Requests. The Echo Replies to TN1 and TN3 were no larger than 1500 octets. The NUT also did not have to fragment these packets. The NUT correctly fragmented its Echo Reply to TN2 with each fragment no larger than 1400 octets. The NUT again responded to the three Echo Requests. The Echo Reply to TN1 should be no larger than 1500 octets. The NUT did not have to fragment this packet. The NUT correctly fragmented its Echo Reply to TN1 should be no larger than 1500 octets. The NUT did not have to fragment this packet. The NUT correctly fragmented its Echo Reply to TN2 with each fragment no larger than 1400 octets. After, the NUT correctly fragmented its Echo Reply to TN3 with each fragment no larger than 1280 octets.

Test #       Result         y6LC.4.1.3       Non-zero ICMPv6 Code       A       PASS         Purpose: Verify that a node properly processes a Packet Too Big message with a non-zero ICMPv6 Code field.       Comments on Test Procedure         A. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement uncludes a Prefix Advertisement with a global prefix and the L and A bits set_TR1 forwards an Echo Request from TN2 to the NUT. Also, TR1 transmits a Packet Too Big message to the NUT, which contains an invalid ICMPv6 Code field value of 0xFF. The MTU field is set to T280. A transmits an Echo Request from TN2 to the NUT.         Comments on Test Results       A. The NUT responded to the Echo Request using TR1 as a first hop. The NUT did correctly fragment its response to the Echo Request using TR1 as a first hop. The NUT did CMPv6 Code field and processed the Packet Too Big message. The fragmented packets were not larger than 1280 octets in size.         Test #       Kefuet PMTU On-link       A       PASS         Purpose: Verify that a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement in the alims-local destination.       A       PASS         Comments on Test Result       A. The NUT responded to the Echo Request using TR1 as a first hop. The NUT did correctly fragment its response to the Echo Request using TR1 as a first hop. Indicating the NUT ignored the invalid ICMPv6 Code field and processed the Packet Too Big message. The fragmented packets were not larger than 1280 octets in size.         Test #       Kefuet PMTU On-link       A       PASS<	Test #		D	
Purpose:       Verify that a node properly processes a Packet Too Big message with a non-zero ICMP 6 Code field.         Comments on Test Procedure       A. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Ronter Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Edu Request from TN2 to the NUT. Also, TR1 transmits a Packet Too Big message to the NUT, which contains an invalid ICMPv6 Code field value of 0xFF. The MTU field is set to 1280. Piterwards, TR1 forwards an Echo Request from TN2 to the NUT.         Comments on Test Results       A. The NUT responded to the Echo Request using TR1 as a first hop. The NUT did correctly fragment its response to the Echo Request from Big message. The fragmented packets were not larger than 1280 octets in size.         Test #       Result         v6LC.4.1.4       Refuce PMTU On-link       A       PASS         Purpose:       Verify that a node properly processes a Packet Too Big message indicating a reduction in Path MTU for a link-local destination.       Comments on Test Results         A. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits a link-local Echo Request to the NUT on Big message indicating a reduction in Path MTU for a link-local Echo Request to the NUT. Afterwards, TR1 transmits a Packet Too Big message to the NUT with an MTU of 1280. Following the Too Big Message, TR1 transmits another link-local Echo Request to the NUT.				-
Comments on Test Procedure         A. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Exho Request from TN2 to the NUT. Also, TR1 transmits a Packet Too Big message to the NUT, Munch contains an invalid ICMPv6 Code field value of 0xFF. The MTU field is set to T280. Afterwards, TR1 forwards an Echo Request from TN2 to the NUT.         Comments on Test Results         A. The NUT responded to the Echo Request using TR1 as a first top. The NUT did correctly fragment its response to the Echo Request using TR1 as a first hop, indicating the NUT ignored the invalid ICMPv6 Code field and processed the Packet Too Big message? The fragmented packets were not larger than 1280 octets in size.         Test #         Vol C.4.1.4       Result         Vol Content of the PMTU On-link         A PASS         Purpose: Verify thad a node properly processes a Packet Too Big message indicating a reduction in Path MTU for a link-local destination.         Comments on Test Procedure         A. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits a link-local Echo Request to the NUT. Afterwards, TR1 transmits a Packet Too Big message to the NUT with an MTU of 1280. Following the Too Big Message, TR1 transmits another link-local Echo Request to the NUT.			11	
<ul> <li>A. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Romer Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Edno Request from TN2 to the NUT. Also, TR1 transmits a Packet Too Big message to the NUT, which contains an invalid ICMPv6 Code field value of 0xFF. The MTU field is set to T280. Afterwards, TR1 forwards an Echo Request from TN2 to the NUT.</li> <li>Comments on Test Results</li> <li>A. The NUT responded to the Echo Request using UR1 as a first top. The NUT did correctly fragment its response to the Echo Requestions of the Packet Too Big message. The fragmented packets were not larger than 1280 octets in size.</li> <li>Test #</li> <li>Result</li> <li>Yol C.4.1.4</li> <li>Refuee PMTU On-link</li> <li>Result</li> <li>Yol C.4.1.4</li> <li>Refuee PMTU On-link</li> <li>Result</li> <li>A PASS</li> <li>Purpose: Verify that a node properly processes a Packet Too Big message indicating a reduction in Path MTU for a link-local destination.</li> <li>Comments on Test Procedure</li> <li>A. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits a link-local Echo Request to the NUT. Afterwards, TR1 transmits a Packet Too Big message to the NUT with an MTU of 1280. Following the Too Big Message, TR1 transmits another link-local Echo Request to the NUT.</li> </ul>			6 Code	field.
a Prefix Advertisement with a global prefix and the L and A bits set. TR1 forwards an Educ Request from TN2 to the NUT. Also, TR1 transmits a Packet Too Big message to the NUT, which contains an invalid ICMPv6 Code field value of 0xFF. The MTU field is set to T280. A terwards, TR1 forwards an Echo Request from TN2 to the NUT.  Comments on Test Results  A. The NUT responded to the Echo Request using TR1 as a first hop. The NUT did correctly fragment its response to the Echo Request using TR1 as a first hop. The NUT did correctly fragment its response to the Echo Request using TR1 as a first hop. The NUT did correctly fragment its response to the Echo Request Too Big message. The fragmented packets were not larger than 1280 octets in size.  Test # Result Refuee PMTU On-link A PASS Purpose: Verify that a node properly processes a Packet Too Big message indicating a reduction in Path MTU for a link-local destination. Comments on Test Procedure  A. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits a link-local Echo Request to the NUT. Afterwards, TR1 transmits a Packet Too Big message to the NUT with an MTU of 1280. Following the Too Big Message, TR1 transmits another link-local Echo Request to the NUT.	Comments on Test	Procedure	1-1-	
<ul> <li>A. The NUT responded to the Echo Request using TR1 as a first hop. The NUT did correctly fragment its response to the Echo Request using TR1 as a first hop, indicating the NUT ignored the invalid ICMPv6 Code field and processed the Packet Too Big message. The fragmented packets were not larger than 1280 octets in size.</li> <li>Test # Result</li> <li>Vol.C.4.1.4 Refuce PMTU On-link A PASS</li> <li>Purpose: Verify that a node properly processes a Packet Too Big message indicating a reduction in Path MTU for a link-local destination.</li> <li>Comments on Test Procedure</li> <li>A. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits a link-local Echo Request to the NUT. Afterwards, TR1 transmits a Packet Too Big message to the NUT with an MTU of 1280. Following the Too Big Message, TR1 transmits another link-local Echo Request to the NUT.</li> </ul>	a Prefix Adverti TN2 to the NUT ICMPv6 Code f	sement with a global prefix and the L and A bits set. TR1 forwards an Eddo I C. Also, TR1 transmits a Packet Too Big message to the NUT, which contains ield value of 0xFF. The MTU field is set to T280. Afterwards, TR1 forwards	Request f	rom lid
<ul> <li>A. The NUT responded to the Echo Request using TR1 as a first hop. The NUT did correctly fragment its response to the Echo Request using TR1 as a first hop, indicating the NUT ignored the invalid ICMPv6 Code field and processed the Packet Too Big message. The fragmented packets were not larger than 1280 octets in size.</li> <li>Test # Result</li> <li>Vol.C.4.1.4 Refuce PMTU On-link A PASS</li> <li>Purpose: Verify that a node properly processes a Packet Too Big message indicating a reduction in Path MTU for a link-local destination.</li> <li>Comments on Test Procedure</li> <li>A. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits a link-local Echo Request to the NUT. Afterwards, TR1 transmits a Packet Too Big message to the NUT with an MTU of 1280. Following the Too Big Message, TR1 transmits another link-local Echo Request to the NUT.</li> </ul>	Comments on Test	Results		
vol.C.4.1.4       Refluce PMTU On-link       A       PASS         Purpose:       Verify that a node properly processes a Packet Too Big message indicating a reduction in Path MTU for a link-local destination.       Comments on Test Procedure         A.       TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits a link-local Echo Request to the NUT. Afterwards, TR1 transmits a Packet Too Big message to the NUT with an MTU of 1280. Following the Too Big Message, TR1 transmits another link-local Echo Request to the NUT.	sponse to the Ec field and proces	ho Requestrusing TR1 as a first hop, indicating the NUT ignored the invalid I	CMPv6	Code
<ul> <li>Purpose: Verify that a node properly processes a Packet Too Big message indicating a reduction in Path MTU for a link-local destination.</li> <li>Comments on Test Procedure</li> <li>A. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits a link-local Echo Request to the NUT. Afterwards, TR1 transmits a Packet Too Big message to the NUT with an MTU of 1280. Following the Too Big Message, TR1 transmits another link-local Echo Request to the NUT.</li> </ul>	Test #		Resul	t
<ul> <li>Purpose: Verify that a node properly processes a Packet Too Big message indicating a reduction in Path MTU for a link-local destination.</li> <li>Comments on Test Procedure</li> <li>A. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits a link-local Echo Request to the NUT. Afterwards, TR1 transmits a Packet Too Big message to the NUT with an MTU of 1280. Following the Too Big Message, TR1 transmits another link-local Echo Request to the NUT.</li> </ul>	v6LC.4.1.4	Reduce PMTU On-link	A	PASS
<ul> <li>a link-local destination.</li> <li>Comments on Test Procedure</li> <li>A. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits a link-local Echo Request to the NUT. Afterwards, TR1 transmits a Packet Too Big message to the NUT with an MTU of 1280. Following the Too Big Message, TR1 transmits another link-local Echo Request to the NUT.</li> </ul>			in Path N	ITU for
A. TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits a link-local Echo Request to the NUT. Afterwards, TR1 transmits a Packet Too Big message to the NUT with an MTU of 1280. Follow- ing the Too Big Message, TR1 transmits another link-local Echo Request to the NUT.				
a Prefix Advertisement with a global prefix and the L and A bits set. TR1 transmits a link-local Echo Request to the NUT. Afterwards, TR1 transmits a Packet Too Big message to the NUT with an MTU of 1280. Following the Too Big Message, TR1 transmits another link-local Echo Request to the NUT.	Comments on Test	Procedure		
Comments on Test Results	a Prefix Advertito to the NUT. Af	sement with a global prefix and the L and A bits set. TR1 transmits a link-loc terwards, TR1 transmits a Packet Too Big message to the NUT with an MTU	al Echo l	Request
	Comments on Test	Results		

A. The NUT responded to the Echo Request. The NUT did correctly fragment its response to the Echo Request, indicating the NUT processed the Packet Too Big message. The fragmented packets were no larger than 1280 octets in size.

Test #		Result
<u>v6LC.4.1.5</u>	Reduce PMTU Off-link	A PASS
	t a node properly processes a Packet Too Big message indicating a reduction	in Path MTU for
a link-local destination		
Comments on Test	Procedure	
a Prefix Adverti TN2 to the NUT 1400 octets. TF transmits anothe warding an Ech <b>Comments on Test</b>		Request from MTU field set to 0 octets. TR1 ed by, TR1 for-
the Echo Reque fragmented pack sponse to the Ec	nded to the Request using TR1 as the first hop. The NUT did correctly fragme st using TR1 as a first hop, indicating the NUT processed the Packet Too Big cets were no larger than 1400 octets in size Again, The NUT did correctly fra the Request using TR1 as a first hop, indicating the NUT processed the Packet mented packets were no larger than 1280 octets in size.	message. The agment its re-
Test #		D14
		Result
<u>v6LC.4.1.6</u>	Receiving MIU Below IPv6 Winimum Link MTU	A FAIL
<b>Durnese:</b> Verify the	t a node does not reduce its estimate of the Path MTU below the IPv6 minimu	B FAIL
Comments on Test		
vertisement incl Echo Request fr message to the T TN2 to the NUT B. <i>MTU equal to 5</i> Advertisement i Echo Request fr message to the I	<ul> <li>x0: TR1 transmits a Router Advertisement to the all-nodes multicast address.</li> <li>udes a Prefix Advertisement with a global prefix and the L and A bits set. The on TN2 to the NUT. The packet size is 1280 octets. Also, TR1 transmits a FNUT, which contains an MTU field of 0x0. Afterwards, TR1 forwards an Ecl. The packet size is 1280 octets.</li> <li><i>12:</i> TR1 transmits a Router Advertisement to the all-nodes multicast address ncludes a Prefix Advertisement with a global prefix and the L and A bits set.</li> <li>transmits a Router Advertisement to the all-nodes multicast address ncludes a Prefix Advertisement with a global prefix and the L and A bits set.</li> <li>to m TN2 to the NUT. The packet size is 1280 octets. Also, TR1 transmits a H NUT, which contains an MTU field 512 octets. Afterwards, TR1 forwards an e NUT. The packet size is 1280 octets.</li> </ul>	R1 forwards an Packet Too Big ho Request from s. The Router TR1 forwards an Packet Too Big
Comments on Test	Results	
ply Packet despite re	T responded to the second Echo Request without including a Fragment heads cereiving a Packet Too Big message from TR1.	
ing a Next-Hop MT	460, Section 5: "[] The originating IPv6 node may receive a Packet Too Bi U less than 1280. In that case, the IPv6 node is not required to reduce the size 1280, but MUST include a Fragment header in those packets []".	0 0 1
	should have responded to the second Echo Request with an Echo Reply packa	

Therefore, the NUT should have responded to the second Echo Request with an Echo Reply packet that included a Fragment header after receiving the Packet Too Big message fromTR1.

Test #		Result	t
v6LC.4.1.7	Increase Estimate	Α	PASS
		В	PASS
	at a node does not increase its estimate of the MTU for a path due to a Packet	Гоо Big n	nessage.
Comments on Test	Procedure		
tisement include Request from T message to the the NUT with p The MTU field size is 1500 oct B. <i>MTU equal to C</i> Router Advertis wards an Echo Packet Too Big quest from TN2 sage to the NUT the NUT. The p Comments on Test Parts A-B: The NU to the P sage T he pas	Dx1FFFFFFF: TR1 transmits a Router Advertisement to the all-nodes multical sement includes a Prefix Advertisement with a global prefix and the L and A b Request from TN2 to the NUT with packet size equal to 1500 octets. TR1 then message to the NUT. The MTU field is 1304 octets. Afterwards, TR1 forward to the NUT with packet size equal to 1500 octets. TR1 mansmits another Pac T. The MTU field of 0x1FFFFFFF. Afterwards, TR1 forwards an Echo Reque packet size is 1500 octets.	orwards a clear Too uest from ge to the VUT. The NUT. The st addres pits set. The n transmit rds an Ecl cket Too H est from T ment the n et Too Bi 1 as a firs	n Echo Big TN2 to NUT. e packet s. The R1 for- ts a no Re- Big mes- TN2 to response g mes- st hop so Yoo Big
v6LC.4.1.8	Router Advertisement with MTU Option (Hosts Only)	A	N/A
	tt a host properly processes a Router Advertisement with an MTU option.		
<b>Comments on Test</b>			
The Router Adv forwards an Ecl another Router	<i>e due to MTU option:</i> TR1 transmits a Router Advertisement to the all-nodes a vertisement includes a Prefix Advertisement with a global prefix and the L and no Request from TN2 to the HUT with packet size equal to 1500 octets. TR1 Advertisement with an MTU option set to 1280 to the all-nodes multicast addition fragmented Echo Request from TN2 to the HUT with reassembled packet size and the transmits a Router Advertisement of the transmits a Router Advertisement to the all-nodes multicast addition.	d A bits see then trans ress. Afte	et. TR1 smits erwards,

octets.

## **Comments on Test Results**

A. This test is performed on Hosts only.

IPv6 Ready Logo Phase II Test Report Core Protocols

Test # Result			t
v6LC.4.1.9	Checking For Increase in PMTU	Α	PASS
Purpose: Verify the	at a node waits the proper amount of time to check for PMTU increases.		
Comments on Test	Procedure		
a Prefix Advert quest from TN2 Echo Request f	a Router Advertisement to the all-nodes multicast address. The Router Advertisement with a global prefix and the L and A bits set. Afterwards, TR1 for 2 to the NUT. TR1 also transmits a Packet Too Big message to the NUT from TN2 to the NUT. The MTU field of the Too Big Message is 1304 or Request from TN2 every 30 seconds for 5 minutes after the Packet Too B	orwards an Ec and TR1 forwa ctets. Also, Tl	ho Re- ards an R1 for-
Comments on Test	Results		
indicating it pro 1304 octets in s	onded to the Echo Request. The NUT did correctly fragment the response occessed the Packet Too Big Message from TR1. The fragmented packets size. The NUT did not transmit any packets larger than 1304 octets for 5 Packet Too Big Message from TR1.	were no large	r than
Test #		Result	1
<u>/6LC.4.1.10</u>	Multicast Destination One Router	Α	N/T
Purpose: Verify the Comments on Test	at a node properly chooses the PMTU for multicast destinations.		
A. Transmit an IC the multicast ac field of 1450 and a destination including an M size equal to N Big Message to NUT with pack transmits a Pac sent, transmit a	MPv6 Echo Request from the NUT with packet size equal to 1500 octets dress of FFRE:11:2. TR1 transmits a Packet Too Big Message to the NU Again, transmit an ICMPv6 Echo Request from the NUT with packet size on to the multicast address of FF1E::1:2. TR1 transmits a Packet Too Big TU field of 1400. Once again, transmit an ICMPv6 Echo Request from t 500 octets and a destination to the multicast address of FF1E::1:2. TR1 tr the NUT including an MTU field of 1300. Now, transmit an ICMPv6 E et size equal to 1400 octets and a destination to the multicast address of F ket Too Big Message to the NUT including an MTU field of 1350. For th n ICMPv6 Echo Request from the NUT with packet size equal to 1400 oct address of FF1E::1:2.	equal to 1500 Message to th he NUT with p ansmits a Pack cho Request fr F1E::1:2. TR he last packet to	) octets e NUT packet cet Too rom the 1 to be
Comments on Test			

A. When the NUT transmitted an Echo Request to FF1E::1:2, it automatically fragmented the packets sent. The NUT, despite being configured on the appropriate interfaces with an MTU greater than 1280, continued to fragment its packets. The test was not able to be completed as a result.

Test #		Result	t _
v6LC.4.1.11	Multicast Destination – Two Router	A	N/T
Purpose: Verify t	hat a node properly chooses the PMTU for multicast destinations when received	ing PTB m	essages
from more than on	e router.		
<b>Comments on Tes</b>	t Procedure		
the multicast field of 1480. and a destinat including an 1 size equal to Too Big Mess Echo Request FF1E::1:2. T 1360. For the	CMPv6 Echo Request from the NUT with packet size equal to 1500 octets and address of FF1E::1:2. TR1 transmits a Packet Too Big Message to the NUT in Again, transmit an ICMPv6 Echo Request from the NUT with packet size eq ion to the multicast address of FF1E::1:2. TR1 transmits a Packet Too Big Me ATU field of 1440. Once again, transmit an ICMPv6 Echo Request from the N 500 octets and a destination to the multicast address of FF1E::1:2. TR1 trans- ages to the NUT including an MTU field of 1400 and one of 1360. Again, tra from the NUT with packet size equal to 1500 octets and a destination to the n R1 transmits two Packet Too Big Messages to the NUT including an MTU fiel last packet to be sent, transmit an ICMPv6 Echo Request from the NUT with and a destination to the multicast address of FF1E::1:2.	ncluding ar ual to 1500 ssage to th NUT with 1 mits two P unsmit an I unsmit an I unsmit at 10 unsmit at 1280	MTU octets e NUT packet acket CMPv6 dress of and of
<b>Comments on Tes</b>	t Results		
NUT, despite	T transmitted an Echo Request to FEFE::1:2, it automatically fragmented the p being configured on the appropriate interfaces with an MTU greater than 1280 ackets. The test was not able to be completed as a result.		

# Section 5: RFC 2463

These tests are designed to verify conformance with the Internet Control Message Protocol for the Internet Protocol Version 6 Specification.

Test			Result		
<u>v6L</u>	<u>C.5.1.1</u>	Transmitting Echo Requests	Α	PASS	
Pur	Purpose: Verify that a node properly transmits ICMPv6 Echo Requests.				
Con	Comments on Test Procedure				
A.	a Prefix Adverti	Router Advertisement to the all-nodes multicast address. The Router Advertisement with a global prefix and the L and A bits set. Use Ping for any available Requests) to send an Echo Request from the NUT to TNP's Link-Local addressed	le applic		
Con	nments on Test l	Results			
A.	The NUT sent a Local Address. equal to 0.	n Echo Request to TN1 The Destination Address of the Packet was be same The checksum was also be valid. The Type field was equal to 128 and the Co	as TN1's ode field v	Link- was	
Test	:#		Result		
v6L	C.5.1.2	Replying to Echo Requests	Α	PASS	
			B	PASS	
			С	PASS	
Pur	pose: Verity that	t/abode properly replies to ICMPv6 Echo Requests.			
	nments on Test-I				
	The Router Adv transmits an ICM Local address. <i>Request sent to g</i> Router Advertis	<i>Link-Local address:</i> TR1 transmits a Router Advertisement to the all-nodes mertisement includes a Prefix Advertisement with a global prefix and the L and MPv6 Echo Request to the NUT's Link-Local address. The source address is <i>global address:</i> TR1 transmits a Router Advertisement to the all-nodes multicatement includes a Prefix Advertisement with a global prefix and the L and A b	A bits se TN1's Li ast addres its set. T	et. TN1 nk- ss. The TN1	
	transmits an ICN dress.	APv6 Echo Request to the NUT's Global Address. The source address is TN1	l´s Globa	l Ad-	
C.	Request sent to a The Router Adv transmits an ICM	<i>multicast address:</i> TR1 transmits a Router Advertisement to the all-nodes mu ertisement includes a Prefix Advertisement with a global prefix and the L and MPv6 Echo Request to the All-Nodes Link-Local Scope Multicast address (FF s TN1's Link-Local address.	A bits se	et. TN1	
Con	nments on Test I	Results			
A.		n Echo Reply to TN1. The Source Address of the Packet was the same as the s of TN1's Echo Request packet, while the Destination Address was the same a			

Source Address of TN1's Echo Request packet. The NUT sent an Echo Reply to TN1 with a valid checksum.

- B. The NUT sent an Echo Reply to TN1. The Source Address of the Packet was the same as the Global Destination Address of TN1's Echo Request packet, while the Destination Address was the same as the Global Source Address of TN1's Echo Request packet. The NUT sent an Echo Reply to TN1 with a valid checksum.
- C. The NUT sent an Echo Reply to TN1. The Source Address of the Packet was one of the NUT's unicast addresses belonging to the interface on which the Echo Request was received. This was either a Link-Local or Global address. The Destination Address was TN1's local address Echo Request packet. The NUT sent an Echo Reply to TN1 with a valid checksum.

Test #		Result		
<u>v6LC.5.1.3</u>	Destination Unreachable Message Generation	Α	PASS	
	$\bigcirc (\bigcirc)$	В	PASS	
		С	PASS	
		D	PASS	
Purpose: Verify that a node properly generates Destination Upreachable Messages.				
Comments on Test	Procedure			

- A. *Route Unreachable Routers Only:* TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TN1 transmits an ICMPv6 Echo Request to an off-link address with a prefix that does not exist.
- B. Address Unreachable Routers Only: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TN1 transmits an ICMPv6 Echo Request to an on-link address that does not exist. The prefix should be set to the prefix assigned by the RUT.
- C. Port Unreachable + Unk-Local Address All Nodes: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TN1 transmits a UDP Packet with the destination port field set to 9000. The source address is TN1's Link-Local address.
- D. Port Unreachable Global Address All Nodes: TR1 transmits a Router Advertisement to the all-nodes multicast address. The Router Advertisement includes a Prefix Advertisement with a global prefix and the L and A bits set. TN1 transmits a UDP Packet with the destination port field set to 9000. The source address is TN1's Global address.

- A. The RUT sent a Destination Unreachable Message to TN1. The Source Address of the Packet was one of the RUT's unicast addresses, while the Destination Address was the same as the Source Address in TN1's Echo Request packet.
- B. The RUT sent a Destination Unreachable Message to TN1. The Source Address of the Packet was one of the RUT's unicast addresses, while the Destination Address was the same as the Source Address in TN1's Echo Request packet. The Code field was set to "3". The invoking Echo Request packet included in the Error Message did not exceed minimum IPv6 MTU.
- C. The NUT sent a Destination Unreachable Message to TN1. The Source Address of the Packet was one of the NUT's unicast addresses, while the Destination Address was the same as the Link-Local Source Address in TN1's packet. The Code field was set to "4". The invoking Echo Request packet included in the Error Message did not exceed minimum IPv6 MTU.

D. The NUT sent a Destination Unreachable Message to TN1. The Source Address of the Packet was one of the NUT's unicast addresses, while the Destination Address was the same as the Global Source Address in TN1's packet. The Code field was set to "4". The invoking Echo Request packet included in the Error Message did not exceed minimum IPv6 MTU.

Test #		Result	,
v6LC.5.1.4	Packet Too Big Message Generation (Routers Only)	Α	PASS
		B	N/T
	at a router properly generates Packet Too Big Messages.		
<b>Comments on Test</b>	Procedure		
a Prefix Adver using the RUT	a Router Advertisement to the all-nodes multicast address. The Router Ad tisement with a global prefix and the L and A bits set. TNL transmits and as the first-hop with a packet size of 1500 octets.	cho Request	o TN2
B. TR1 transmits	a Router Advertisement to the all-nodes multicast address. The Router Ad	lvertisement i	ncludes
a Prefix Adver	tisement with a global prefix and the L and A bits set. FWI transmits an E g the RUT as the first-hop with a packet size of 1500 octets.	cho Request t	0
<b>Comments on Test</b>	Results		
PMTU limitation	ransmit a Packet Poo Big message to TN1, as it could not forward the Echons. ITU field of Packet Too Big Message was set to 1280.	o Request due	to
<ul> <li>The Solution</li> <li>(to The Documentation)</li> </ul>	ource Address of the Packet was one of the RUT's unicast addresses for its		
■ The in MTU.	voking Echo Request packet included in the Error Message did not exceed	l minimum IP	v6

Test #			4
Test #		Resul	1
<u>v6LC.5.1.5</u>	Hop Limit Exceeded (Time Exceeded Generation) (Routers Only)	A	PASS
Deres age. Verify the	te a norten muna ale annontes Time En es de d'Massacce de ller Limitenes e	B	PASS
Comments on Test	at a router properly generates Time Exceeded Messages the Hop Limit was ex	ceeded in	transit.
Advertisement the Packet A E B. <i>Decrement Hop</i> Router Adverti transmits the Pa <b>Comments on Test</b> A. The RUT disca TN2. The RUT B. The RUT disca	<ul> <li><i>mit 0:</i> TR1 transmits a Router Advertisement to the all-nodes multicast address includes a Prefix Advertisement with a global prefix and the L and A bits set the Request to TN2 with a first hop of the RUT.</li> <li><i>Limit to 0:</i> TR1 transmits a Router Advertisement to the all-nodes multicast sement includes a Prefix Advertisement with a global prefix and the L and A acket B Echo Request to TN2 with a first hop of the RUT.</li> <li><b>Results</b></li> <li>rded the ICMPv6 Echo Request from TN1. Therefore, it did not forward the C sent a Time Exceeded Message to TN1 with a code field value of 0 rded the ICMPv6 Echo Request from TN1. Therefore, it did not forward the C sent a Time Exceeded Message to TN1 with a code field value of 0 rded the ICMPv6 Echo Request from TN1. Therefore, it did not forward the C decremented the Hop Limit to 0 and sent a Time Exceeded Message to TN1</li> </ul>	. TN1 tran t address. bits set. T Echo Req Echo Req	The N1 uest to
Test #		Dogul	4
		Resul	1
v6LC.5.1.6	Erroneous Header Field (Parameter Problem Generation) at a node property generates Parameter Problem Messages for an Erroneous F	A	PASS
a Prefix Adver quest to the NU of the packet is	Router Advertisement to the all-nodes multicast address. The Router Advertisement with a global prefix and the L and A bits set. TN1 transmits the Pack T. The Source Address of the Packet is set to TN1's Global address. The D set to the NUT's Global address.	ket A Ech	o Re-
<b>Comments on Test</b>	Results		
sent a Parameter	ded the ICMPv6 Echo Request from TN1. Therefore, it did not send an Echo Problem Message to TN1 with a code field value of 0 (Erroneous Header Fi load Length is not a multiple of 8 octets. The Pointer Field was be 0x04 (offset of the Payload Length field). The Source Address of the Packet was the same as the Global Destination . Echo Request packet. The Destination Address was the same as the Global Source Address of TN packet. The invoking Echo Request packet included in the Error Message did not e IPv6 MTU.	eld encour Address o N1's Echo	ntered) f TN1's Request

Test #		Resul	t
<u>v6LC.5.1.7</u>	Unrecognized Next Header (Parameter Problem Generation)	Α	PASS
	t a node properly generates Parameter Problem Messages when an Unrecogn	ized Next	Header
type is encountered.			
Comments on Test	Procedure		
a Prefix Adverti quest to the NU	Router Advertisement to the all-nodes multicast address. The Router Advertisement with a global prefix and the L and A bits set. TN1 transmits the Pack T. The Source Address of the Packet is set to TN1's Global address. The Deset to the NUT's Global address.	ket A Ech	o Re-
Comments on Test	Results	5	
A. The NUT discar NUT sent a Para encountered).	rded the ICMPv6 Echo Request from TN1. Therefore, it did not send an Hch ameter Problem Message to TN1 with a code field value of 1 (Unrecognized The Pointer Field was 0x28 (offset of the Next Header field). The Source Address of the Packet was the same as the Global Destination Echo Request packet. The Destination Address was the same as the Global Source Address of TN packet. The invoking Echo Request packet included in the Error Message did not e IPv6 MTU.	Next Hea Address o 11's Echo	der type f TN1's Request
Test #		Resul	t
<u>v6LC.5.1.8</u>	Unknown Informational Message Type	A	PASS
	t a node properly bandles the reception of an ICMPv6 Packet with an Unkno	wn Inforr	national
Message Type value			
Comments on Test	Procedure		
Prefix Advertise	Router Advertisement to the all-nodes multicast address. The Router Advert ment with a global prefix and the L and A bits set. TN1 transmits an ICMPv type field value of 255 to the NUT.		
Comments on Test	Results		
A. The NUT silent	ly discarded the ICMPv6 Informational Message from TN1.		

	: #		Result	t
<u>v6L</u>	<u>C.5.1.9</u>	Error Condition With ICMPv6 Error Message (Routers Only)	Α	PASS
			B	PASS
			C	PASS
			D	PASS
			E	PASS PASS
Pur	nose <sup>.</sup> Verify the	1 at a router properly handles the reception and processing of an ICMPv6 E	-	
	es an error.		ioi message	unat m
Cor	nments on Test	Procedure	4	
A.	vertisement to t with a global pr	awed Destination Unreachable Code 0 with Address Unreachable: TR1 t the all-nodes multicast address. The Router Advertisement includes a Pre- refix and the L and A bits set. TN1 transmits a Destination Unreachable Destination" to the RUT with the Destination Address set to an on-rink ad	fix Advertiser Error Messag	nent e for
B.	<i>Reception of Fl</i> tisement to the global prefix an	awed Destination Unreachable Code 3 with Hop Limit = 0. TR1 transmi all-nodes multicast address. The Router Advertisement includes a Prefix ad the L and A bits set. TN1 transmits a Destination Unreachable Error M to the RUT with the Hop Limit set to Zero in the IPv6 header and with a D	Advertisemen lessage for "A	t with a
C.	<i>Reception of Fl</i> tisement to the global prefix ar ceeded in Trans	awed Time Exceeded Code 0 with No Route To Restruction: TR1 transmi all-nodes multicast address. The Router Advertisement includes a Prefix ad the L and A bits Set. INI transmits a Time Exceeded Error Message for sit" to the RUT with the Destination Address set to an off-link address that	Advertisemen or "Hop Limit t does not exi	it with a Ex- st.
	Reception of Fl tisement to the global prefix ar sembly Time E	awed Tune Endeeded Code I with No Route To Destination: TR1 transm all-nodes multicast address. The Router Advertisement includes a Prefix nd the Land A bits set. TN1 transmits a Time Exceeded Error Message for xceeded' to the RUT with the Destination Address set to an off-link address	its a Router A Advertisemen or "Fragment ] ess that does r	dver- at with a Reas- aot exist
E.	all-nodes profit) and the L and A	dwed Packet Too Big with Address Unreachable: TR1 transmits a Router cast address. The Router Advertisement includes a Prefix Advertisement bits set. TN1 transmits a Packet Too Big Error Message to the RUT wit on-link address that does not exist.	with a global	prefix
F.	Reception of Fl all-nodes multi- and the L and A	<i>awed Parameter Problem with Hop Limit</i> = $0$ : TR1 transmits a Router A cast address. The Router Advertisement includes a Prefix Advertisement A bits set. TN1 transmits a Parameter Problem Error Message to the RUT and IPv6 header and with a Destination Address set to an off-link address.	with a global	prefix
Cor	nments on Test	Results		
A.		ot send a Destination Unreachable Error Message with Code 3 to TN1 wh		a Desti-
п		able Message with Code 0 for which it cannot resolve a destination address ot send a Time Exceeded message with Code 0 to TN1 when it receives a		Jnreach-
в		vith Code 3 that contains a Hop Limit of 0.	2 connucion (	
B.			•, •	
в. С.		ot send a Destination Unreachable Error Message with code 0 to TN1 whe	en it receives	a Time
C.	Exceeded Mess	age with Code 0 for which it cannot route.		
	Exceeded Mess The RUT did n			

F. The RUT did not send a Time Exceeded Error Message with code 0 to TN1 when it receives a Parameter Problem Message that contains a Hop Limit of 0.

Test #		Resul	t
v6LC.5.1.10	Error Condition With Multicast Destination	Α	PASS
		В	PASS
<b>Purpose:</b> Verify the cast Destination Add	at a node properly handles the reception of an error condition caused by a patheress.	acket with a	a Multi-
<b>Comments on Test</b>	Procedure	4	
<ul> <li>Router Advertiater transmits a UD dress. The dest</li> <li>B. Echo Request For The Router Advertistic an IC fragment is 0 (the fragment is 0 (the fragment is 0).</li> <li>Comments on Test</li> <li>A. The NUT did nunreachable point</li> </ul>	ot send a Destination Unreachable Error Message to TN1 when it receives a rt. ot send a Time Exceeded Error Message to TN1 60 seconds after it receives	bits set. cal multica (Q.) s multicast and A bits s The offset	TN1 st ad- address. set. TN1 t of the

Test #		Resul	t
v6LC.5.1.11	Error Condition With Non-Unique Source - Unspecified	A	PASS
		В	PASS
		С	PASS
		D	PASS
<ul> <li>address that does r</li> <li>Comments on Tes</li> <li>A. UDP Port Unaddress. The set. TN1 tranaddress. The set. TN1 tranaddress (::). T</li> <li>B. Echo Request dress. The Rest. Configurent to Link A (to the default linasmaller than in 1500 octets to C. Echo Request nodes multicathe L and A be ment is 0 (the address (::).</li> <li>D. Echo Request vertisement to with a global Source Addres</li> </ul>	hat a node properly handles the reception of an error condition caused by a ot uniquely identify a single node. <b>t Procedure</b> reachable (Routers and Hosts): TR1 transmits a Router Advertisement to t Router Advertisement includes a Prefix Advertisement with a global prefix smits a UDP Packet to the NUT's Global address with a Source Address se The destination port is set to 9000. (Make sure the NUT is not listening on <i>Too Big (Routers Only):</i> TR1 transmits a Router Advertisement to the all- puter Advertisement includes a Prefix Advertisement with a global prefix a e the RUT with a link MTU equal to the IPv6 minimum link MTU (1280 of TN2) and Enable the RUT's interface to Link A. Configure all offer interface to the slink MTU to Link B. TN1 transmits an ICMPv6 Echo Request with a to TN2 with a first hop through the RUT. The Source Address is set to the u <i>Reassembly Timeout (Routers and Hosts):</i> TR1 transmits a Pretix Advertisement with its set. TN1 transmits an ICMPv6 Echo Request Fragment to the NUT. The first fragment) and the More Fragments Flag is set. The Source Address is with Unknown wortion in Destination Options (Routers and Hosts): TR1 tra- tist and the U and A bits set. TN1 transmits an ICMPv6 Echo Request is s is set to the unspecified address. The Router Advertisement includes a Prefix with Unknown wortion in Destination Options (Routers and Hosts): TR1 tra- tist fragment) and the More Fragments Flag is set. The Source Address is with Unknown wortion in Destination Options (Routers and Hosts): TR1 tra- tist is set to the unspecified address (::). It includes a Destination Options H on of type 135. (Highest Order bits set to 10 <sub>b</sub> ).	he all-nodes it and the L and to the unspec- port 9000.) nodes multid nodes multid nodes multid nodes on its in accession the R b Link A show tal message sin specified add sement to the h a global pre- the offset of the s set to the un ansmits a Roo fix Advertise to the NUT. T	multicast d A bits ecified ast ad- A bits iterface UT with ild be ize of dress (::) all- efix and e frag- specified uter Ad- ment he
<b>Comments on Tes</b>	t Results		
	not send a Destination Unreachable Error Message to TN1 when it receive	s a UDP pack	tet for an
unreachable p		Duć Daha Da	
	not send a Packet Too Big Error Message to TN1 when it receives an ICM r it to send on its outgoing interface.	rvo Echo Red	juest tha
	not send a Time Exceeded Error Message to TN1 60 seconds after it receiv	vas tha first fr	aamont
	5 Echo Request.	es me mst m	agment
	, Leno Request.		

D. The NUT did not send a Parameter Problem Error Message when it receives an ICMPv6 Echo Request with an unknown option with highest bits 10<sub>b</sub>.

Test	t #		Result	t
v6L	C.5.1.12	Error Condition With Non-Unique Source - Multicast	Α	PASS
		•	В	PASS
			С	PASS
			D	PASS
		t a node properly handles the reception of an error condition caused by a pack uniquely identify a single node.	et with a	source
	nments on Test			
001				
A.	address. The Reset. TN1 transm	achable (Routers and Hosts): TR1 transmits a Router Advertisement to the all outer Advertisement includes a Prefix Advertisement with a global prefix and hits a UDP Packet to the NUT's Global address with a Source Address set to t cast address. The destination port is set to 9000. (Make sure the NUT is not	the L and he TNI's	d A bits s Solic-
	dress. The Rou set. Configure to to Link A (to The the default link smaller than its 1500 octets to The Multicast addre		e L and A on its in on the R c A shoul essage siz licited-N	A bits terface UT with Id be ze of ode
	nodes multicast the L and A bits ment is 0 (the fi licited-Node Ma		lobal pre set of the	fix and e frag- [1's So-
D.	vertisement to the with a global pr Source Address	ish Whenowe Option in Destination Options (Routers and Hosts): TR1 transm the all nodes multicast address. The Router Advertisement includes a Prefix A effx and the L and A bits set. TN1 transmits an ICMPv6 Echo Request to the is set to TN1's Solicited-Node Multicast address. It includes a Destination O gnized Option of type 135. (Highest Order bits set to 10 <sub>b</sub> ).	dvertiser NUT. T	nent he
Cor	nments on Test	Results		
A.		ot send a Destination Unreachable Error Message to TN1 when it receives a U	DP pack	et for an
B.		τ. ot send a Packet Too Big Error Message to TN1 when it receives an ICMPv6 E t to send on its outgoing interface.	Echo Req	uest that
C.		ot send a Time Exceeded Error Message to TN1 60 seconds after it receives th	e first fra	igment
D.	The NUT did no	bits send a Parameter Problem Error Message when it receives an ICMPv6 Echo in with highest bits $10_b$ .	Request	t with ar

Test	#		Result	t
v6L	C.5.1.13	Error Condition With Non-Unique Source – Anycast (Routers Only)	Α	PASS
			В	PASS
			С	PASS
			D	PASS
		t a node properly handles the reception of an error condition caused by a packet	et with a	source
	ments on Test I	uniquely identify a single node. Procedure		
B.	Advertisement i UDP Packet to t dress. The desti <i>Echo Request To</i> Advertisement i RUT with a link and Enable the I MTU for its asso link MTU to Lin	achable: TR1 transmits a Router Advertisement to the all-nodes multicast add ncludes a Prefix Advertisement with a global prefix and the L and A bits set. he NUT's Global address with a Source Address set to the TR1's Subnet-Rou nation port is set to 9000. (Make sure the NUT is not listening on port 9000.) to Big: TR1 transmits a Router Advertisement to the all-nodes pullicast addres ncludes a Prefix Advertisement with a global prefix and the L and A bits set. MTU equal to the IPv6 minimum link MTU (1280 octets) on its interface to RUT's interface to Link A. Configure all other interfaces on the RUT with the pociated media type. The link MTU for RUT's interface to Link A should be so the B. TN1 transmits an ICMPv6 Echo Request with a total message size of 15 through the RUT. The Source Address is set to TR1's Subnet-Router Anycast	THI trai ter Anycess. The Configur Link A Cefault naller tha 600 octet	e Router re the to TN2) link an its s to TN2
C.	Echo Request R The Router Adv transmits an ICN	<i>eassembly Timeout:</i> TR1 transmits a Router Advertisement to the all-nodes mu ertisement includes a Prefix Advertisement with a global prefix and the L and MPv6 Echo Request Fragment to the NUT. The offset of the fragment is 0 (the agments Flag is set. The Source Address is set to the TR1's Subnet-Router Advertise	ulticast a A bits s e first fra	ddress. et. TN1 agment)
D.	Echo Request w nodes multicast the L and A bits TR1's Subnet R	ith Unknown Option in Destination Options: TR1 transmits a Router Advertise address. The Router Advertisement includes a Prefix Advertisement with a gl set. TN1 transmits an ICMPv6 Echo Request to the NUT. The Source Addre outer Anydast Address. It includes a Destination Options Header with the uni- (Highest Order bits set to $10_b$ ).	ement to lobal pre ess is set	the all- fix and to
Com	ments on Fest)	Results		
		ot send a Destination Unreachable Error Message to TN1 when it receives a U	DP pack	et for ar
	unreachable por			
		t send a Packet Too Big Error Message to TN1 when it receives an ICMPv6 E to send on its outgoing interface.	cho Req	uest tha
		t to send on its outgoing interface.	e firet fr	agment
	of an ICMPv6 E	e e		igment
		ot send a Parameter Problem Error Message when it receives an ICMPv6 Echo	Doguos	. •.1