

IPv6 CONSORTIUM TEST SUITE

Address Architecture
Interoperability Test Specification

Technical Document

Version 1.3



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INTRODUCTION

Overview

The University of New Hampshire's InterOperability Laboratory (IOL) is an institution designed to improve the interoperability of standards based products by providing an environment where a product can be tested against other implementations of a standard. This suite of tests has been developed to help implementers evaluate the functionality of their products that support IPv6 Addresses Architecture. This test suite has been designed to test the interoperability of the device under test with the specification in RFC 4291, 4193, 4007, 3879, 3484, and 2526. Successful completion of all tests contained in this suite does not guarantee that the tested device will operate with other devices that implement IPv6 Address Architecture. However, these tests provide a reasonable level of confidence that the Node Under Test will function well in most multi-vendor environments with this implementation.

Abbreviations and Acronyms

DAD: Duplicate Address Detection
DHCPv6: Dynamic Host Configuration Protocol for IPv6
NS: Neighbor Solicitation
NUT: Node Under Test
RUT: Router Under Test
TN: Testing Node
TR: Testing Router
ICMP: Internet Control Messaging Protocol

TEST ORGANIZATION

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

- Test Label:** The Test Label and Title comprise the first line of the test block. The Test Label is composed of the short test suite name, the group number, and the test number within the group, separated by periods.
- Purpose:** The Purpose is a short statement describing what the test attempts to achieve. It is usually phrased as a simple assertion of the feature or capability to be tested.
- References:** The References section lists cross-references to the specifications and documentation that might be helpful in understanding and evaluating the test and results.
- Test Setup:** The Test Setup section describes the configuration of all devices prior to the start of the test. Different parts of the procedure may involve configuration steps that deviate from what is given in the test setup. If a value is not provided for a protocol parameter, then the protocol's default is used.
- Procedure:** This section of the test description contains the step-by-step instructions for carrying out the test. These steps include such things as enabling interfaces, unplugging devices from the network, or sending packets from a test station. The test procedure also cues the tester to make observations, which are interpreted in accordance with the observable results given for that test part.
- Observable Results:** This section lists observable results that can be examined by the tester to verify that the NUT is operating properly. When multiple observable results are possible, this section provides a short discussion on how to interpret them. The determination of a pass or fail for each test is usually based on how the NUT's behavior compares to the results described in this section.
- Possible Problems:** This section contains a description of known issues with the test procedure, which may affect test results in certain situations.

REFERENCES

The following documents are referenced in these texts:

- [RFC 4193] R. Hinden, B. Haberman. "Unique Local IPv6 Unicast Addresses". RFC 4193, October 2005.
- [RFC 4291] R. Hinden, S. Deering, "IP Version 6 Addressing Architecture", RFC 4291, February 2006.
- [RFC 4007] S. Deering, B. Haberman, T. Jinmei, E. Nordmark, B. Zill, "IPv6 Scoped Address Architecture", RFC 4007, March 2005.
- [RFC 3879] C. Huitema, B. Carpenter, "Deprecating Site Local Addresses". RFC 3879, September 2004.
- [RFC 3484] R. Draves, "Default Address Selection for Internet Protocol version 6 (IPv6)", RFC 3484, February 2003.
- [RFC 2526] D. Johnson, S. Deering, "Reserved IPv6 Subnet Anycast Addresses", RFC 2526, March 1999
- [RFC 4862] Thomson, S. and T. Narten. "IPv6 Stateless Address Autoconfiguration". RFC 4862, September 2007.
- [RFC 3315] R. Droms, J. Bound, B. Volz, T. Lemon, C. Perkins, M. Carney. "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)". RFC 3315, July 2003.
- [RFC 4443] A. Conta, S. Deering, M. Gupta, Ed. "Internet Control Message Protocol for the Internet Protocol Version 6 (IPv6) Specification". RFC 4443, March 2006.

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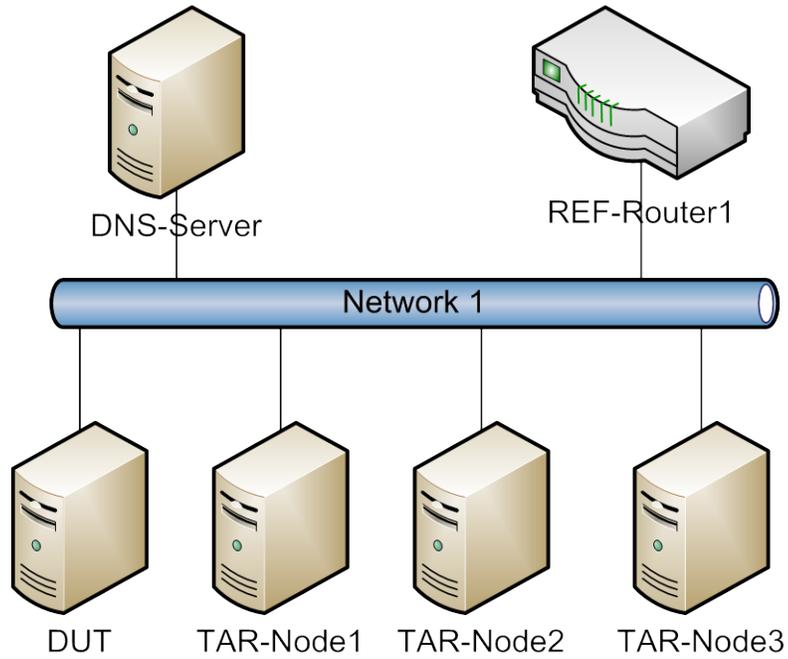
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General Node Requirements

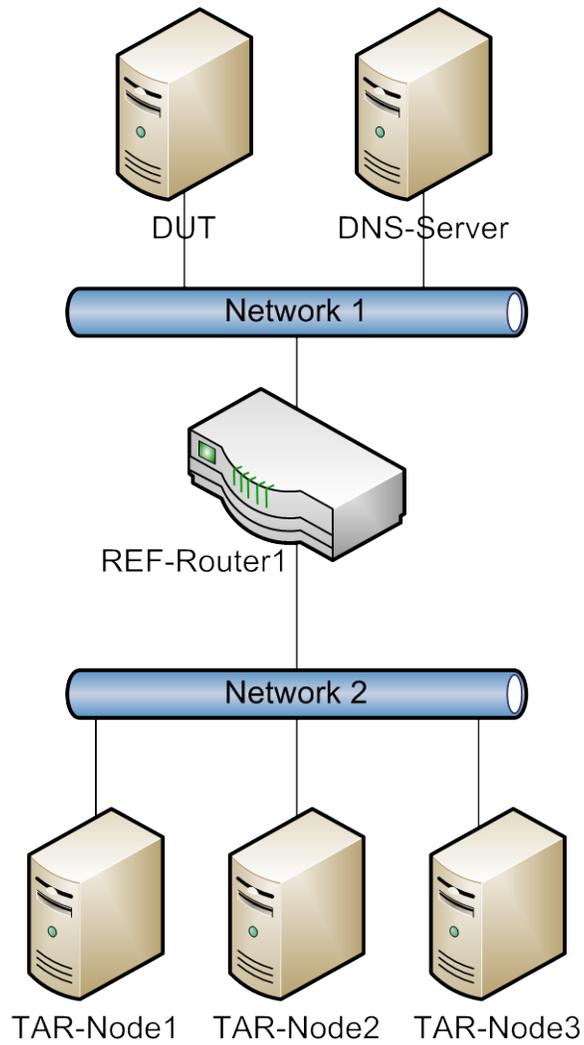
- **Host**
 - Ability to configure a global address and default router by receipt of Router Advertisement.
- **Router**
 - Ability to transmit Router Advertisements with a positive AdvValidLifetime.
 - Ability to transmit Router Advertisements with a positive AdvDefaultLifetime.
- **Host and Router**
 - Ability to use a ping6 application and print out results indicating the receipt of an ICMPv6 Echo Reply.

Test Topology

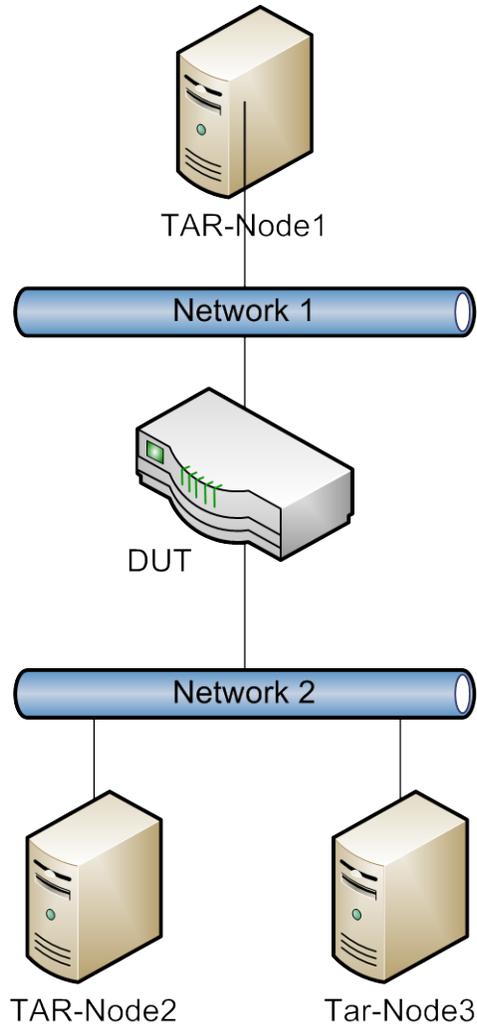
Topology 1



Topology 2



Topology 3



Group 1: IPv6 Node

Scope

These tests are designed to verify a nodes behavior regarding IPv6 Address Architecture.

Overview

The tests in this group verify interoperability of a node regarding the assignment of IPv6 addresses according to RFC 4291, 4007, 4193, 3879, and 3484.

Test AddrInterop.1.1: IPv6 Scoped Address

Purpose: To verify that an IPv6 node can properly scope IPv6 addresses.

References:

- [RFC 4007] - [Section 7](#) and [8](#)
- [RFC 4291] – [Section 2.5](#)

Test Setup: Connect the devices as shown in [Topology 1](#). Configure REF-Router 1 to transmit Router Advertisement with a valid global Prefix.

Procedure:

Part A: Sending link-local scope

1. Transmit ICMPv6 Echo Requests from the DUT to the link local address of TAR-Node1.
2. Observe the packets transmitted on all networks.
3. Transmit ICMPv6 Echo Request from the DUT to the link local address of TAR-Node2.
4. Observe the packers transmitted on all networks.
5. Transmit ICMPv6 Echo Request from the DUT to the link local address of TAR-Node3.
6. Observe the packets transmitted on all networks.

Part B: Sending global scope

7. Transmits ICMPv6 Echo Requests from the DUT to the global address of TAR-Node1.
8. Observe the packets transmitted on all networks.
9. Transmits ICMPv6 Echo Requests from the DUT to the global address of TAR-Node2.
10. Observe the packets transmitted on all networks.
11. Transmits ICMPv6 Echo Requests from the DUT to the global address of TAR-Node3.
12. Observe the packets transmitted on all networks.

Part C: Receiving link-local scope

13. Transmit ICMPv6 Echo Request from TAR-Node1 to the link local address of the DUT.
14. Observe the packets transmitted on all networks.
15. Transmit ICMPv6 Echo Request from TAR-Node2 to the link local address of the DUT.
16. Observe the packets transmitted on all networks.
17. Transmit ICMPv6 Echo Request from TAR-Node3 to the link local address of the DUT.
18. Observe the packets transmitted on all networks.

Part D: Receiving global scope

19. Transmit ICMPv6 Echo Request from TAR-Node1 to the global address of the DUT.
20. Observe the packets transmitted on all networks.
21. Transmit ICMPv6 Echo Request from TAR-Node1 to the global address of the DUT.
22. Observe the packets transmitted on all networks.
23. Transmit ICMPv6 Echo Request form TAR-Node2 to the global address of the DUT.
24. Observe the packets transmitted on all networks.

Observable Results:

- *Part A:*

Step 2: The DUT must transmit ICMPv6 Echo Requests to the link local address of TAR-Node1 on Network 1. TAR-Node1 must transmit ICMPv6 Echo Replies to the link local address of the DUT.

Step 4: The DUT must transmit ICMPv6 Echo Requests to the link local address of TAR-Node2 on Network 1. TAR-Node2 must transmit ICMPv6 Echo Replies to the link local address of the DUT.

Step 6: The DUT must transmit ICMPv6 Echo Requests to the link local address of TAR-Node3 on Network 1. TAR-Node3 must transmit ICMPv6 Echo Replies to the link local address of the DUT.

- *Part B:*

Step 8: The DUT must transmit ICMPv6 Echo Requests to the global address of TAR-Node1 on Network 1. TAR-Node1 must transmit ICMPv6 Echo Replies to the link local address of the DUT.

Step 10: The DUT must transmit ICMPv6 Echo Requests to the global address of TAR-Node2 on Network 1. TAR-Node2 must transmit ICMPv6 Echo Replies to the global address of the DUT.

Step 12: The DUT must transmit ICMPv6 Echo Requests to the global address of TAR-Node3 on Network 1. TAR-Node3 must transmit ICMPv6 Echo Replies to the global address of the DUT.

- *Part C:*

Step 14: TAR-Node1 must transmit ICMPv6 Echo Request to the link local address of the DUT on the Network 1. The DUT must transmit ICMPv6 Echo Replies to the link local address of TAR-Node1.

Step 16: TAR-Node2 must transmit ICMPv6 Echo Request to the link local address of the DUT on the Network 1. The DUT must transmit ICMPv6 Echo Replies to the link local address of TAR-Node2.

Step 18: TAR-Node3 must transmit ICMPv6 Echo Request to the link local address of the DUT on the Network 1. The DUT must transmit ICMPv6 Echo Replies to the link local address of TAR-Node3.

- *Part D:*

Step 20: TAR-Node1 must transmit ICMPv6 Echo Request to the global address of the DUT on the Network 1. The DUT must transmit ICMPv6 Echo Replies to the global address of TAR-Node1.

Step 22: TAR-Node2 must transmit ICMPv6 Echo Request to the global address of the DUT on the Network 1. The DUT must transmit ICMPv6 Echo Replies to the global address of TAR-Node2.

Step 24: TAR-Node3 must transmit ICMPv6 Echo Request to the global address of the DUT on the Network 1. The DUT must transmit ICMPv6 Echo Replies to the global address of TAR-Node3.

Possible Problems:

- Parts A and B may be omitted for a passive node.

Test AddrInterop.1.2: Default Source Address Selection

Purpose: To verify that a node properly selects the proper default source address.

References:

- [RFC 3484] –[Section 5](#)

Test Setup: Connect the devices as shown in [Topology 1](#) for Part A. Connect the devices as shown in [Topology 2](#) for parts B to D.

Procedure:

Part A: Prefer appropriate scope

1. Configure REF-Router1 to transmit valid Router Advertisements with Prefix X on Network 1. If the DUT is a router Prefix X is configured on Network 1.
2. Transmit ICMPv6 Echo Request from the DUT to the global address of TAR-Node1.
3. Observe the packets transmitted on all networks.
4. Transmit ICMPv6 Echo Request from the DUT to the global address of TAR-Node2.
5. Observe the packets transmitted on all networks.
6. Transmit ICMPv6 Echo Request from the DUT to the global address of TAR-Node3.
7. Observe the packets transmitted on all networks.

Part B: Avoid deprecated addresses (Host only)

8. Configure REF-Router1 to transmit Router Advertisement with Prefix X and Y on Network1. Prefix X is configured with a preferred and valid lifetimes that last the entire test. Prefix Y is configured with a preferred lifetime shorter than valid lifetime. Configure REF-Router1 to transmit Router Advertisements with a unique global prefix on Network 2.
9. Transmit ICMPv6 Echo Requests from the DUT to TAR-Node1.
10. Observe the packets transmitted on all networks.
11. Transmit ICMPv6 Echo Requests from the DUT to TAR-Node2.
12. Observe the packets transmitted on all networks.
13. Transmit ICMPv6 Echo Request from the DUT to TAR-Node3.
14. Observe the packets transmitted on all networks.
15. Wait for preferred lifetime to expire.
16. Transmit ICMPv6 Echo Request from the DUT to TAR-Node1.
17. Observe the packets transmitted on all networks.
18. Transmit ICMPv6 Echo Request from the DUT to TAR-Node2.
19. Observe the packets transmitted on all networks.
20. Transmit ICMPv6 Echo Request from the DUT to TAR-Node3.
21. Observe the packets transmitted on all networks.

Part C: Prefer home addresses

22. Configure the DUT to have two addresses, one care-of address and one home address. This may be done by configuration or setting up Mobile IPv6.
23. Transmit ICMPv6 Echo Request from the DUT to TAR-Node1.
24. Observe the packets on all networks.
25. Transmit ICMPv6 Echo Request from the DUT to TAR-Node2.
26. Observe the packets on all networks.

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27. Transmit ICMPv6 Echo Request from the DUT to TAR-Node3.
28. Observe the packets on all networks.

Part D: Use longest matching prefix

29. Configure REF-Router1 to transmit Router Advertisements with a Prefix of 3000::/64 and 3000:0001::/64 on Network 1. If the DUT is a router configure a prefix of 3000::/64 and 3000:0001::/64 on Network 1.
30. Configure REF-Router1 to transmit a Router Advertisements with a Prefix of 3000:0001:0002::/64 on Network 2. If the any TAR-Node is a router configure a prefix of 3000:0001:0002::/64 on Network 2.
31. Transmit ICMPv6 Echo Request from the DUT to TAR-Node1.
32. Observe the packets transmitted on all networks.
33. Transmit ICMPv6 Echo Request from the DUT to TAR-Node2.
34. Observe the packets transmitted on all networks.
35. Transmit ICMPv6 Echo Request from the DUT to TAR-Node3.
36. Observe the packets transmitted on all networks.

Observable Results:

- *Part A*
 - Step 3:** The DUT must transmit ICMPv6 Echo Requests using a global source address to TAR-Node1. TAR-Node1 must transmit ICMPv6 Echo Replies to the DUT.
 - Step 5:** The DUT must transmit ICMPv6 Echo Request using a global source address to TAR-Node2. TAR-Node2 must transmit ICMPv6 Echo Replies to the DUT.
 - Step 7:** The DUT must transmit ICMPv6 Echo Requests using a global source address to TAR-Node3. TAR-Node3 must transmit ICMPv6 Echo Replies to the DUT.
- *Part B*
 - Step 10:** The DUT must transmit ICMPv6 Echo Requests using either Prefix X or Y source address to TAR-Node1. TAR-Node1 must transmit ICMPv6 Echo Replies to the DUT.
 - Step 12:** The DUT must transmit ICMPv6 Echo Requests using either Prefix X or Y source address to TAR-Node2. TAR-Node2 must transmit ICMPv6 Echo Replies to the DUT.
 - Step 14:** The DUT must transmit ICMPv6 Echo Requests using either Prefix X or Y source address to TAR-Node3. TAR-Node3 must transmit ICMPv6 Echo Replies to the DUT.
 - Step 17:** The DUT must transmit ICMPv6 Echo Requests using either Prefix X source address to TAR-Node1. TAR-Node1 must transmit ICMPv6 Echo Replies to the DUT.
 - Step 19:** The DUT must transmit ICMPv6 Echo Requests using either Prefix X source address to TAR-Node2. TAR-Node2 must transmit ICMPv6 Echo Replies to the DUT.
 - Step 21:** The DUT must transmit ICMPv6 Echo Requests using either Prefix X source address to TAR-Node3. TAR-Node3 must transmit ICMPv6 Echo Replies to the DUT.
- *Part C*
 - Step 24:** The DUT must transmit ICMPv6 Echo Request using the home address as the source address to TAR-Node1. TAR-Node1 must transmit ICMPv6 Echo Replies to DUT.
 - Step 26:** The DUT must transmit ICMPv6 Echo Request using the home address as the source address to TAR-Node2. TAR-Node2 must transmit ICMPv6 Echo Replies to DUT.
 - Step 28:** The DUT must transmit ICMPv6 Echo Request using the home address as the source address to TAR-Node3. TAR-Node3 must transmit ICMPv6 Echo Replies to DUT.
- *Part D*
 - Step 32:** The DUT must transmit ICMPv6 Echo Requests using 3000:0001::/64 as the source address to TAR-Node1. TAR-Node1 must transmit ICMPv6 Echo Replies to the DUT.

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Step 34: The DUT must transmit ICMPv6 Echo Requests using 3000:0001::/64 as the source address to TAR-Node2. TAR-Node2 must transmit ICMPv6 Echo Replies to the DUT.

Step 36: The DUT must transmit ICMPv6 Echo Requests using 3000:0001::/64 as the source address to TAR-Node3. TAR-Node1 must transmit ICMPv6 Echo Replies to the DUT.

Possible Problems:

- This test may be omitted if the device is a passive node.
- Part C may be omitted if the node doesn't support mobility.
- Part D may be omitted if the node doesn't support more than one global address.

Test AddrInterop.1.3: Default Destination Address Selection

Purpose: To verify that a node properly selects the correct address.

References:

- [RFC 3484] –[Section 6](#)

Test Setup: Connect the devices as shown in [Topology 1](#) for Part A thru D. Connect the devices as shown in [Topology 2](#) for part E.

Procedure:

Part A: Prefer matching scope

1. REF-Router1 transmits Router Advertisement without any prefix information on Network 1. If the DUT is a router no global address is configured on Network 1.
2. Configure DNS-Server with TAR-Node1 link local and a global address for “node1.test.example.com”, TAR-Node2 link local and global address for “node2.test.example.com”, TAR-Node2 link local and global address for “node3.test.example.com”.
3. The DUT transmits an ICMPv6 Echo Request for “node1.test.example.com”.
4. Observe the packets transmitted on all networks.
5. The DUT transmits an ICMPv6 Echo Request for “node2.test.example.com”.
6. Observe the packets transmitted on all networks.
7. The DUT transmits an ICMPv6 Echo Request for “node3.test.example.com”.
8. Observe the packets transmitted on all networks.

Part B: Avoid deprecated addresses (Host Only)

9. Configure REF-Router1 to transmit Router Advertisement with Prefix X and Y on Network1. Prefix X is configured with a preferred and valid lifetimes that last the entire test. Prefix Y is configured with a preferred lifetime shorter than valid lifetime.
10. Configure DNS-Server with TAR-Node1 Prefix X and Prefix Y global addresses for “node1.test.example.com”, TAR-Node2 Prefix X and Y global addresses for “node2.test.example.com”. TAR-Node3 Prefix X and Y global addresses for “node3.test.example.com”.
11. Wait for the preferred lifetime to expire.
12. The DUT transmits an ICMPv6 Echo Request for “node1.test.example.com”.
13. Observe the packets transmitted on all networks.
14. The DUT transmits an ICMPv6 Echo Request for “node2.test.example.com”.
15. Observe the packets transmitted on all networks.
16. The DUT transmits an ICMPv6 Echo Request for “node3.test.example.com”.
17. Observe the packets transmitted on all networks.

Part C: Prefer home addresses (Mobile devices only)

18. Configure the DUT to have two addresses, one care-of address and one global home address. This may be done by configuration or setting up Mobile IPv6.
19. Configure DNS-Server with TAR-Node1 link local address and global addresses for “node1.test.example.com”, TAR-Node2 link local address and global addresses for “node2.test.example.com”, TAR-Node3 link local address and global addresses for

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“node3.test.example.com”.

20. The DUT transmits an ICMPv6 Echo Request for “node1.test.example.com”.
21. Observe the packets transmitted on all networks.
22. The DUT transmits an ICMPv6 Echo Request for “node2.test.example.com”.
23. Observe the packets transmitted on all networks.
24. The DUT transmits an ICMPv6 Echo Request for “node3.test.example.com”.
25. Observe the packets transmitted on all networks.

Part D: Prefer smaller scope

26. REF-Router1 transmits Router Advertisements with Prefix X on Network1. If the DUT or any TAR-Node is a router configure Prefix X on Network 1.
27. Configure DNS-Server with TAR-Node1 link local address and a global address for “node1.test.example.com”, TAR-Node2 link local address and a global address for “node2.test.exmpale.com”, TAR-Node3 link local address and a global address for “node3.test.example.com”.
28. The DUT transmits an ICMPv6 Echo Request for “node1.test.example.com”.
29. Observe the packets transmitted on all networks.
30. The DUT transmits an ICMPv6 Echo Request for “node2.test.example.com”.
31. Observe the packets transmitted on all networks.
32. The DUT transmits an ICMPv6 Echo Request for “node3.test.example.com”.
33. Observe the packets transmitted on all networks.

Part E: Use longest matching prefix

34. REF-Router1 transmits Router Advertisements with Prefix 3000::/64 and 3F44::/64 on Network 1. If the DUT is a router configure a prefix of 3000::/64 and 3F44::/64 on Network 1.
35. REF-Router2 transmits Router Advertisements with Prefix 3001::/64 and 3FFE::/64 on Network 2. If any TAR-Node is a router configure a prefix of 3001::/64 and 3FFE::/64 on Network 2.
36. Configure DNS-Server with the global addresses of TAR-Node1 on Network 2 for “node1.test.example.com”, the global addresses of TAR-Node2 on Network 2 for “node2.test.example.com”, the global addresses of TAR-Node3 on Network 2 for “node3.test.example.com”.
37. The DUT transmits an ICMPv6 Echo Request for “node1.test.example.com”.
38. Observe the packets transmitted on all networks.
39. The DUT transmits an ICMPv6 Echo Request for “node2.test.example.com”.
40. Observe the packets transmitted on all networks.
41. The DUT transmits an ICMPv6 Echo Request for “node3.test.example.com”.
42. Observe the packets transmitted on all networks.

Observable Results:

- *Part A*
 - Step 4:** The DUT must transmit ICMPv6 Echo Request with TAR-Node1 link local address as the destination address. TAR-Node1 must transmit ICMPv6 Echo Replies to the DUT.
 - Step 6:** The DUT must transmit ICMPv6 Echo Request with TAR-Node2 link local address as the destination address. TAR-Node2 must transmit ICMPv6 Echo Replies to the DUT.
 - Step 8:** The DUT must transmit ICMPv6 Echo Request with TAR-Node3 link local address as the destination address. TAR-Node3 must transmit ICMPv6 Echo Replies to the DUT.
- *Part B*

Step 13: The DUT must transmit and ICMPv6 Echo Request with TAR-Node1 Prefix X address as the destination address. TAR-Node1 must transmit ICMPv6 Echo Replies to the DUT.

Step 15: The DUT must transmit and ICMPv6 Echo Request with TAR-Node2 Prefix X address as the destination address. TAR-Node2 must transmit ICMPv6 Echo Replies to the DUT.

Step 17: The DUT must transmit and ICMPv6 Echo Request with TAR-Node3 Prefix X address as the destination address. TAR-Node3 must transmit ICMPv6 Echo Replies to the DUT.

- *Part C*

Step 21: The DUT must transmit an ICMPv6 Echo Request with TAR-Node1 global address as the destination address. TAR-Node1 must transmit ICMPv6 Echo Replies to the DUT.

Step 23: The DUT must transmit an ICMPv6 Echo Request with TAR-Node2 global address as the destination address. TAR-Node2 must transmit ICMPv6 Echo Replies to the DUT.

Step 25: The DUT must transmit an ICMPv6 Echo Request with TAR-Node3 global address as the destination address. TAR-Node3 must transmit ICMPv6 Echo Replies to the DUT.

- *Part D*

Step 29: The DUT must transmit an ICMPv6 Echo Request with TAR-Node1 link local address as the destination address. TAR-Node1 must transmit ICMPv6 Echo Replies to the DUT.

Step 31: The DUT must transmit an ICMPv6 Echo Request with TAR-Node2 link local address as the destination address. TAR-Node2 must transmit ICMPv6 Echo Replies to the DUT.

Step 33: The DUT must transmit an ICMPv6 Echo Request with TAR-Node3 link local address as the destination address. TAR-Node3 must transmit ICMPv6 Echo Replies to the DUT.

- *Part E*

Step 38: The DUT must transmit an ICMPv6 Echo Request with the 3001::/64 global address of TAR-Node1 as the destination address. TAR-Node1 must transmit ICMPv6 Echo Request to the DUT.

Step 40: The DUT must transmit an ICMPv6 Echo Request with the 3001::/64 global address of TAR-Node2 as the destination address. TAR-Node2 must transmit ICMPv6 Echo Request to the DUT.

Step 42: The DUT must transmit an ICMPv6 Echo Request with the 3001::/64 global address of TAR-Node3 as the destination address. TAR-Node3 must transmit ICMPv6 Echo Request to the DUT.

Possible Problems:

- This test may be omitted if the device is a passive node.
- If the DUT doesn't support DNS another application that allows a list of destination address is acceptable.
- This test may be omitted if no application exists that allows for a list of destination address to the DUT.
- Part C may be omitted if the DUT doesn't support mobility.
- Part D may be omitted if the DUT doesn't support more then one global address.

Test AddrInterop.1.4: Unique Local IPv6 Addresses

Purpose: To verify that a node properly uses unique local IPv6 address.

References:

- [RFC 4193] –[Section 4](#)

Test Setup: Connect the devices as shown in [Topology 1](#) for all parts.

Procedure:

Part A: Transmitting Unique Local IPv6 Address

1. REF-Router transmits valid Router Advertisement with a unique local prefix on Network 1. If the DUT or any TAR-Node is a router configure a unique local address on Network 1.
2. The DUT transmits an ICMPv6 Echo Request to TAR-Node1 unique local address.
3. Observe the packets transmitted on all networks.
4. The DUT transmits an ICMPv6 Echo Request to TAR-Node2 unique local address.
5. Observe the packets transmitted on all networks.
6. The DUT transmits an ICMPv6 Echo Request to TAR-Node3 unique local address.
7. Observe the packets transmitted on all networks.

Part B: Receiving Unique Local IPv6 Address

8. REF-Router transmits valid Router Advertisement with a unique local prefix on Network 1. If the DUT or any TAR-Node is a router configure a unique local address on Network 1.
9. TAR-Node1 transmits an ICMPv6 Echo Request to the unique local address of the DUT.
10. Observe the packets transmitted on all networks.
11. TAR-Node2 transmits an ICMPv6 Echo Request to the unique local address of the DUT.
12. Observe the packets transmitted on all networks.
13. TAR-Node3 transmits an ICMPv6 Echo Request to the unique local address of the DUT.
14. Observe the packets transmitted on all networks.

Observable Results:

- *Part A*
 - Step 3:** The DUT must transmit an ICMPv6 Echo Request with TAR-Node1 unique local address as the destination address. TAR-Node1 must transmit ICMPv6 Echo Replies to the DUT.
 - Step 5:** The DUT must transmit an ICMPv6 Echo Request with TAR-Node2 unique local address as the destination address. TAR-Node2 must transmit ICMPv6 Echo Replies to the DUT.
 - Step 7:** The DUT must transmit an ICMPv6 Echo Request with TAR-Node3 unique local address as the destination address. TAR-Node3 must transmit ICMPv6 Echo Replies to the DUT.
- *Part B*
 - Step 10:** TAR-Node1 must transmit an ICMPv6 Echo Request with the DUT unique local address as the destination address. The DUT must transmit ICMPv6 Echo Replies to TAR-Node1.

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Step 12: TAR-Node2 must transmit an ICMPv6 Echo Request with the DUT unique local address as the destination address. The DUT must transmit ICMPv6 Echo Replies to TAR-Node2.

Step 14: TAR-Node3 must transmit an ICMPv6 Echo Request with the DUT unique local address as the destination address. The DUT must transmit ICMPv6 Echo Replies to TAR-Node3.

Possible Problems:

- Part A may be omitted if the DUT is a passive node.

Test AddrInterop.1.5: Deprecating Site Local Addresses

Purpose: To verify that a node properly deprecates IPv6 site local address.

References:

- [RFC 3879] –[Section 4](#)

Test Setup: Connect the devices as shown in [Topology 1](#) for all parts.

Procedure:

Part A: Transmitting Site Local IPv6 Address

1. REF-Router transmits valid Router Advertisement with a site local prefix on Network 1. If the DUT or any TAR-Node is a router configure a site local address on Network 1.
2. The DUT transmits an ICMPv6 Echo Request to TAR-Node1 site local address.
3. Observe the packets transmitted on all networks.
4. The DUT transmits an ICMPv6 Echo Request to TAR-Node2 site local address.
5. Observe the packets transmitted on all networks.
6. The DUT transmits an ICMPv6 Echo Request to TAR-Node3 site local address.
7. Observe the packets transmitted on all networks.

Part B: Receiving Site Local IPv6 Address

8. REF-Router transmits valid Router Advertisement with a site local prefix on Network 1. If the DUT or any TAR-Node is a router configure a site local address on Network 1.
9. TAR-Node1 transmits an ICMPv6 Echo Request to the site local address of the DUT.
10. Observe the packets transmitted on all networks.
11. TAR-Node2 transmits an ICMPv6 Echo Request to the site local address of the DUT.
12. Observe the packets transmitted on all networks.
13. TAR-Node3 transmits an ICMPv6 Echo Request to the site local address of the DUT.
14. Observe the packets transmitted on all networks.

Observable Results:

- *Part A*
 - Step 3:** The DUT must transmit an ICMPv6 Echo Request with TAR-Node1 unique local address as the destination address. TAR-Node1 must transmit ICMPv6 Echo Replies to the DUT.
 - Step 5:** The DUT must transmit an ICMPv6 Echo Request with TAR-Node2 unique local address as the destination address. TAR-Node2 must transmit ICMPv6 Echo Replies to the DUT.
 - Step 7:** The DUT must transmit an ICMPv6 Echo Request with TAR-Node3 unique local address as the destination address. TAR-Node3 must transmit ICMPv6 Echo Replies to the DUT.
- *Part B*

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Step 10: TAR-Node1 must transmit an ICMPv6 Echo Request with the DUT unique local address as the destination address. The DUT must transmit ICMPv6 Echo Replies to TAR-Node1.

Step 12: TAR-Node2 must transmit an ICMPv6 Echo Request with the DUT unique local address as the destination address. The DUT must transmit ICMPv6 Echo Replies to TAR-Node2.

Step 14: TAR-Node3 must transmit an ICMPv6 Echo Request with the DUT unique local address as the destination address. The DUT must transmit ICMPv6 Echo Replies to TAR-Node3.

Possible Problems:

- Part A may be omitted if the DUT is a passive node.

Group 2: IPv6 Router

Scope

These tests are designed to verify a router behavior regarding IPv6 Address Architecture.

Overview

The tests in this group verify interoperability of a router regarding the assignment of IPv6 addresses according to RFC 4291, 4007, 4193, 3879, and 3484.

Test AddrInterop.2.1: Routing Unique Local IPv6 Addresses

Purpose: To verify that a router properly routes unique local IPv6 address.

References:

- [RFC 4193] –[Section 4.1](#)

Test Setup: Connect the devices as shown in [Topology 3](#) for all parts.

Procedure:

1. Configure a unique local address on Network 1 and Network 2 on the DUT. The DUT must transmit RA's with unique local addresses on Network 1 and Network 2. If a TAR-Node is a router configure a unique local address.
2. The TAR-Node1 transmits an ICMPv6 Echo Request to TAR-Node2 unique local address.
3. Observe the packets transmitted on all networks.
4. The TAR-Node1 transmits an ICMPv6 Echo Request to TAR-Node3 unique local address.
5. Observe the packet transmitted on all networks.

Observable Results:

Step 3: The DUT must forward the Echo Request from TAR-Node1 to TAR-Node2. The DUT must forward the Echo Reply from TAR-Node2 to TAR-Node1.

Step 5: The DUT must forward the Echo Request from TAR-Node1 to TAR-Node3. The DUT must forward the Echo Reply from TAR-Node3 to TAR-Node1.

Possible Problems:

- None.

Test AddrInterop.2.2: Routing Deprecated Site Local Addresses

Purpose: To verify that a node properly routes deprecated IPv6 site local address.

References:

- [RFC 3879] –[Section 4](#)

Test Setup: Connect the devices as shown in [Topology 3](#) for all parts.

Procedure:

1. Configure a site local address on Network 1 and Network 2 on the DUT. The DUT must transmit RA's with site local addresses on Network 1 and Network 2. If a TAR-Node is a router configure a site local address.
2. The TAR-Node1 transmits an ICMPv6 Echo Request to TAR-Node2 site local address.
3. Observe the packets transmitted on all networks.
4. The TAR-Node1 transmits an ICMPv6 Echo Request to TAR-Node3 site local address.
5. Observe the packet transmitted on all networks.

Observable Results:

Step 3: The DUT must forward the Echo Request from TAR-Node1 to TAR-Node2. The DUT must forward the Echo Reply from TAR-Node2 to TAR-Node1.

Step 5: The DUT must forward the Echo Request from TAR-Node1 to TAR-Node3. The DUT must forward the Echo Reply from TAR-Node3 to TAR-Node1.

Possible Problems:

- None.