# IPv6 Consortium

## Core Interoperability Test Report Revision 1.1

**InterOperability Lab — 121 Technology Drive, Suite 2 — Durham, NH 03824 — (603) 862-2804**

| | | |
|---|---|---|
| Consortium Manager: | Ben Schultz | schultz@iol.unh.edu |
| Technician: | John Doe | jdoe@iol.unh.edu |


January 1, 2003

Mr(s). Vendor
Company Name
Main Street
Anyplace, Anywhere 90210

Mr(s). Vendor,
Enclosed are the results from the IPv6 Core Interoperability testing performed on the DEVICE NAME HERE, identified as the NUT, Node Under Test.

The following additional devices were used in conjunction with the NUT described above:

Host: Microsoft Windows.NET Server
Host: Sun Microsystems Solaris 5.8
Host: Redhat Linux 9
Host: etc…

Router: Cisco Systems 7200
Router: Hitachi GR2000
Router: etc…

This testing pertains to a set of standard requirements, put forth in RFCs 2460, 2461, 2462, 2463, and 1981. The tests performed are part of the IPv6 Core Interoperability Test Suite, which is available on the UNH InterOperability Lab's website:

ftp://ftp.iol.unh.edu/pub/ipv6/testsuites/IPv6_Interop_Plan.pdf

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

During the testing process, the following issues were uncovered:

| Test | Result |
|---|---|
| **IP6.2.2.1** | The NUT failed to perform Duplicate Address Detection. |

If you have any questions about the test procedures or results, please feel free to contact me via e-mail at jdoe@iol.unh.edu or by phone at 603-862-2804.

Regards,

John Doe

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 Comments** | The NUT was observed to exhibit conformant behavior, however this behavior deviated from previous compliant results. An additional explanation of the situation is included. |
| **WARN** | The NUT was observed to exhibit behavior that is not recommended. |
| **Refer to Comments** | From the observations, a valid pass or fail could not be determined. An additional explanation of the situation is included. |
| **Not Applicable** | 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** | 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. |

## Group 1: Basic Interoperability

The following tests verify that the NUT is able to engage in basic communication in an IPv6 environment.

| Test # | | Result | |
|---|---|---|---|
| IP6.2.1.1 | **ICMP Echo Interoperability** | **A** | **PASS** |
| | | **B** | **PASS** |

**Purpose**: To verify that a successful ICMPv6 Echo Request, Echo Reply exchange can be achieved in both directions.

**Comments on Test Procedure**

A. ICMP Echo Requests were sent from the global address of H1 to the global address of H2. The frames received by H1 and H2 were observed. ICMP Echo Requests were sent from the global address of H2 to the global address of H1. The frames received by H1 and H2 were observed.
B. ICMP Echo Requests were sent from the link-local address of H1 to the link-local address of H2. The frames received by H1 and H2 were observed. ICMP Echo Requests were sent from the link-local address of H2 to the link-local address of H1. The frames received by H1 and H2 were observed.

**Comments on Test Results**

A. DR1 forwarded all ICMP Echo Requests destined for a host on Network1 or Network2 to the appropriate link. H2 received all the ICMP Echo Requests sent from H1 and responded with ICMP Echo Replies destined for the global address of H1. H1 received all the ICMP Echo Requests sent from H2 and responded with ICMP Echo Replies destined for the global address of H2.
B. H2 received all the ICMP Echo Requests sent from H1 and responded with ICMP Echo Replies destined for the link-local address of H1. H1 received all the ICMP Echo Requests sent from H2 and responded with ICMP Echo Replies destined for the link-local address of H2.

| Test # | | Result | |
|---|---|---|---|
| IP6.2.1.2 | **TCP Interoperability** | **A** | **PASS** |
| | | **B** | **PASS** |

**Purpose**: To verify that a successful TCP connection can be achieved between IPv6 implementations from various vendors.

**Comments on Test Procedure**

A. A telnet session was initiated between H1 (Client) and H2 (Server). A telnet session was initiated between H2 (Client) and H1 (Server). H1 and H2 were ensured to be able to communicate properly off-link. Telnet sessions were terminated.
B. A telnet session was initiated between H1 (Client) and H2 (Server). A telnet session was initiated between H2 (Client) and H1 (Server). H1 and H2 were ensured to be able to communicate properly on-link. Telnet sessions were terminated.

**Comments on Test Results**

A. DR1 forwarded all frames destined for a host on Network1 or Network2 to the appropriate link. H2 and H1 were able to communicate via the telnet protocol without interruption.
B. H2 and H1 were able to communicate via the telnet protocol without interruption.

| Test # | | Result | |
|---|---|---|---|
| IP6.2.1.3 | **UDP Interoperability** | **A** | **PASS** |
| | | **B** | **PASS** |

**Purpose**: To verify that a successful UDP exchange can be achieved, in both directions, between IPv6 implementations from various vendors.

**Comments on Test Procedure**

A. A TFTP session was initiated between H1 (Client) and H2 (Server). A TFTP session was initiated between H2 (Client) and H1 (Server). H1 and H2 were ensured to be able to communicate properly off-link. TFTP sessions were terminated.
B. A TFTP session was initiated between H1 (Client) and H2 (Server). A TFTP session was initiated between H2 (Client) and H1 (Server). H1 and H2 were ensured to be able to communicate properly on-link. TFTP sessions were terminated.

**Comments on Test Results**

A. DR1 forwarded all frames destined for a host on Network1 or Network2 to the appropriate link. H2 and H1 were able to communicate via TFTP without interruption.
B. H2 and H1 were able to communicate via TFTP without interruption.

## Group 2: Extended Interoperability

The following tests verify that the NUT is able to engage in various aspects of the base IPv6 protocol.

| Test # | | Result | |
|---|---|---|---|
| IP6.2.2.1 | **Address Autoconfiguration and Duplicate Address Detection** | **A** | **PASS** |
| **Purpose**: To verify that an arbitrary number of hosts can properly initialize on a network and communicate with other on-link partners. | | | |
| **Comments on Test Procedure** | | | |
| A. Host Hn was configured on Network 1 to have the same link-local address as the NUT. All devices on Network 1 were initialized, powering up Hn before the NUT. Time was allowed for all devices on Network1 to perform stateless address autoconfiguration and Duplicate Address Detection. An ICMP Echo Requests were transmitted from H1 to the link-local address of the NUT. Steps 1 through 4 were repeated for every other address of the NUT. | | | |
| **Comments on Test Results** | | | |
| A. The NUT performed Duplicate Address Detection on its address for Network1. It determined that another device on Network1 already had its tentative address and prompted for administrative configuration. Hn, and not the NUT, responded to the ICMP Echo Requests transmitted from H1. | | | |

| Test # | | Result | |
|---|---|---|---|
| IP6.2.2.2 | **Path MTU and Fragmentation** | **A** | **PASS** |
| **Purpose**: To verify that the NUT can participate in path MTU discovery and handle fragmentation in an IPv6 network. | | | |
| **Comments on Test Procedure** | | | |
| A. The Network1 interface on DR1 was configured with a path MTU of 1280 bytes. The Network2 interface on DR1 was configured with a path MTU of 1500 bytes. 1500 byte ICMP Echo Requests were transmitted from the global address of H1 to the global address of H2. 1500 byte ICMP Echo Requests were transmitted from the global address of H2 to the global address of H1. The path MTU for Network 1 was increased to 1500 bytes. Steps 3 and 4 were repeated until the NUT detected that the path MTU had increased. | | | |
| **Comments on Test Results** | | | |
| A. In Steps 3 and 4, H1 and H2 fragmented its ICMP Echo Requests and Echo Replies to fit within the minimum path MTU of Network1 of 1280 bytes. In Step 5, H1 and H2 eventually detected that the path MTU for Network1 had increased and no longer fragmented its ICMP Echo Requests and Replies. | | | |

| Test # | | Result | |
|---|---|---|---|
| IP6.2.2.3 | **Multiple Prefixes and Network Renumbering** | **A** | **PASS** |

**Purpose**: To verify that a host configured with multiple prefixes can communicate with another host on a different network when its site has been renumbered.

**Comments on Test Procedure**

A. Network1 was configured with a new prefix, Prefix2. The old prefix, Prefix1, was configured to time out such that the old and new prefix lifetimes overlapped. Time was allowed for H1 to be configured with the new prefix and for Duplicate Address Detection to be performed. ICMP Echo Requests were transmitted from a global address of H1 to the global address of H2. An ICMP Echo Request was transmitted from the global address of H2 to the global address of H1 associated with Prefix1. An ICMP Echo Request was transmitted from the global address of H2 to the global address of H1 associated with Prefix2. Enough time was allowed so that prefix 1 timed out. ICMP Echo Requests were transmitted from a global address of H1 to the global address of H2. An ICMP Echo Request was transmitted from the global address of H2 to the global address of H1 associated with Prefix1. An ICMP Echo Request was transmitted from the global address of H2 to the global address of H1 associated with Prefix2.

**Comments on Test Results**

A. H1 should configure the new prefix Prefix1. H2 should respond to ICMP Echo Requests from H1 with Echo Replies sent to the appropriate global address of H1. H1 should respond to ICMP Echo Requests from H2 with Echo Replies sent from the appropriate global address. H2 should respond to ICMP Echo Requests from H1 with Echo Replies sent to the appropriate global address of H1. H1 should only respond to ICMP Echo Requests sent to the global address associated with Prefix2.

| Test # | | Result | |
|---|---|---|---|
| IP6.2.2.4 | **Redirect** | **A** | **PASS** |

**Purpose**: To verify the correct interoperability between the NUT's redirect handling with that of various IPv6 router implementations.

**Comments on Test Procedure**

A. A static route was configured on DR1 indicating DR2 as the next hop for network Network2. An ICMP Echo Request was transmitted from the global address of H1 to the global address of H2. Time was allowed for DR1 to send an ICMP Redirect message to H1 specifying DR2 as a better first hop. An ICMP Echo Request was transmitted from the global address of H1 to the global address of H2. the static route configured in on DR1 was removed.

**Comments on Test Results**

A. H2 responded to the ICMP Echo Request with an ICMP Echo Reply. DR1 sent an ICMP Redirect message to H1 indicating DR2 as a better first hop to network Network2. H2 responded to the ICMP Echo Request with an ICMP Echo Reply. H1 used DR2 as its first hop.

| Test # | | Result | |
|---|---|---|---|
| IP6.2.2.5 | **Neighbor Unreachability Detection: Loss of Default Router** | **A** | **PASS** |
| **Purpose**: To verify that a host can determine that its default router is no longer reachable, so that it may switch to another default router. | | | |
| **Comments on Test Procedure** | | | |
| A. An ICMP Echo Request was trnamitted from the global address of H1 to the global address of H2. The link was disconnected between Network1 and the router that H1 originally uses as a first hop. An ICMP Echo Request was transmitted from the global address of H1 to the global address of H2. Time was allowed for H1 to determine that its first hop in Step 3 was unreachable and switch to the other router as its default. An ICMP Echo Request was tansmitted from the global address of H1 to the global address of H2. | | | |
| **Comments on Test Results** | | | |
| A. H1 performed Neighbor Unreachability Detection and determined that its first hop was no longer available. The ICMP Echo Request was received and replied to by H2. | | | |