

Agilent N2X

High Availability Productivity Application

N5571A

Technical Data Sheet



The N2X High Availability Productivity Application provides rapid and easy verification of scaled multi-protocol High Availability scenarios, thereby reducing the overall test-bed investment and time-to-deployment



Agilent Technologies

Key Features

- Easy to use wizard-style application
- Includes complex 'canned' scenarios for BGP4, OSPFv2, IS-IS, LDP and RSVP Graceful Restart
- Includes 'canned' scenario for RSVP Fast Reroute
- Highly-scaled performance tests
- Clear verdict assignment for each test case

Product Overview

Agilent N2X is the industry's most comprehensive test solution for testing the development and deployment of network services for converging network infrastructures.

N2X Productivity Advantage delivers a rich set of automated applications designed to maximize testing productivity. Service providers and network equipment manufacturers will save months of engineering effort by eliminating the need for developing and supporting custom applications of their own.

The N5571A High Availability Productivity Application is one of the N2X Productivity Advantage automated applications designed to accelerate testing.

The N5571A High Availability Productivity Application simplifies and accelerates testing of scaled multi-protocol router and network resiliency scenarios, because:

- Customers don't have to study and interpret multiple IETF documents to then develop commonly used test scenarios
- Customers don't have to invest time writing scripts for commonly used test scenarios
- Provides rapid test execution and dynamic graphical reporting for quick analysis on highly scaled scenarios

The Productivity Application significantly reduces the overall test-bed investment, because there is no need for actual routers to be used as co-operating neighbors - N2X simulates that behavior which is a key benefit for anyone who doesn't have ready access to large amounts of equipment.

The N5571A High Availability Productivity Application test scenarios are written in an easily extensible framework that enables Agilent engineers to rapidly add test scenarios as the high availability testing landscape evolves.

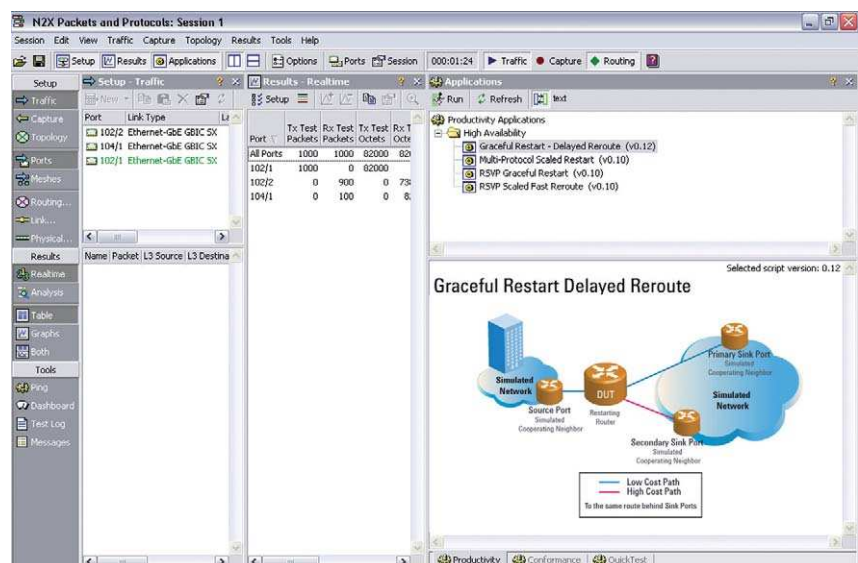


Figure 1: The N5571A integrates seamlessly into the N2X main application

Relevant Specifications Test Scenarios

The N5571A leverages Graceful Restart and RSVP Fast Reroute emulation capability implemented in the N2X solution according to the following documents:

- IS-IS GR: RFC3847
- OSPF GR: RFC3623
- BGP4 GR: draft-ietf-idr-restart-10
- RSVP GR: RFC3473 and RFC3209
- RSVP FRR: RFC4090

This release of N5571A implements four main-stream high availability test scenarios. These are:

1. Multi-Protocol Scaled Restart

Under highly scaled scenarios, verifies forwarding plane continuity and control plane recovery during fully redundant control plane switchover (ie no Graceful Restart capability) as well as for the duration of Graceful Restart (BGP, OSPF, IS-IS, RSVP, LDP)

2. Graceful Restart with Delayed Reroute

Confirms database resync after proper removal of routes marked as stale (due to topology change) during restart (BGP, OSPF, IS-IS, RSVP, LDP)

3. Scaled RSVP Fast Reroute Time

Measures duration of switchover to backup LSP's and then verifies recovery once the original LSP's are restored.

4. RSVP Scaled Restart

Measures packet loss and tunnel recovery during a high-scale RSVP Graceful Restart

The above tests implement Graceful Restart from a SUT restarting perspective only. (i.e. No tester restarting tests are currently implemented).

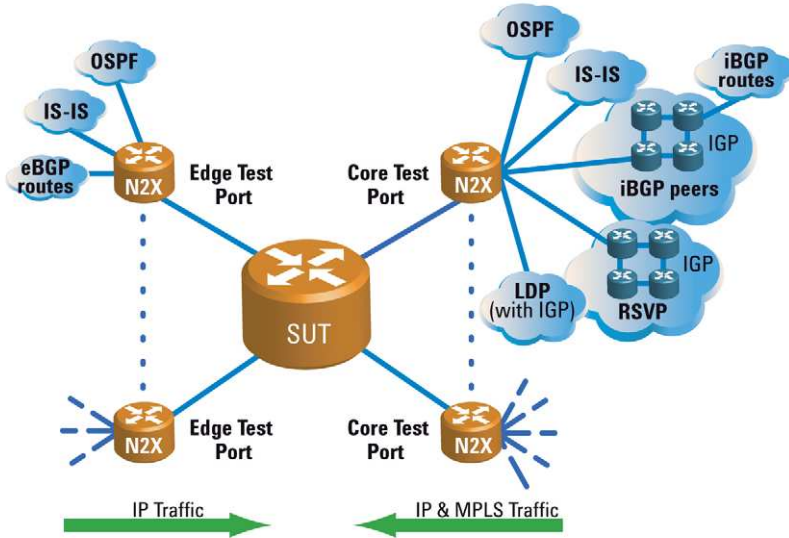
Two of these test cases are described in detail overleaf. For detail on the remaining tests, please contact your Agilent Field representative.

Detailed Test Scenarios

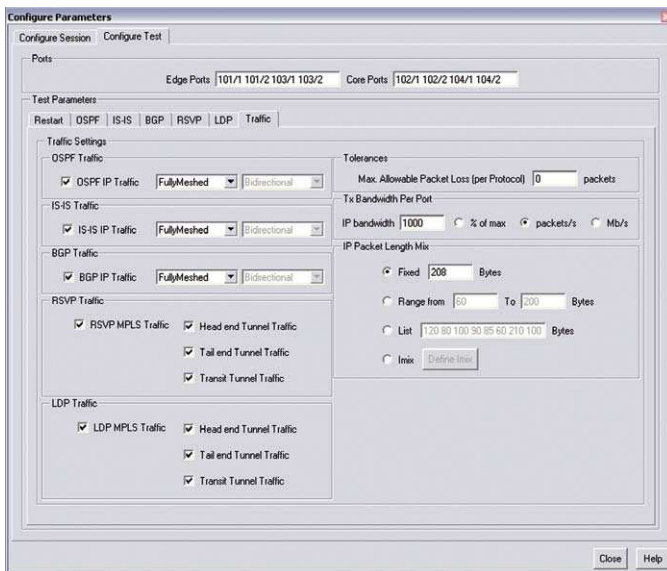
(1) Multi-Protocol Scaled Restart

The Multi-Protocol Non-stop Forwarding is a highly scaled and automated test to verify a router's ability to maintain packet forwarding during restart.

- 1 Advertise simulated edge and core networks
- 2 Setup MPLS LSPs between core ports and DUT
- 3 Generate Traffic to all routes



- 4 Establish baseline performance
- 5 Force route processor to restart or software upgrade
- 6 Validate that traffic continues to flow without loss



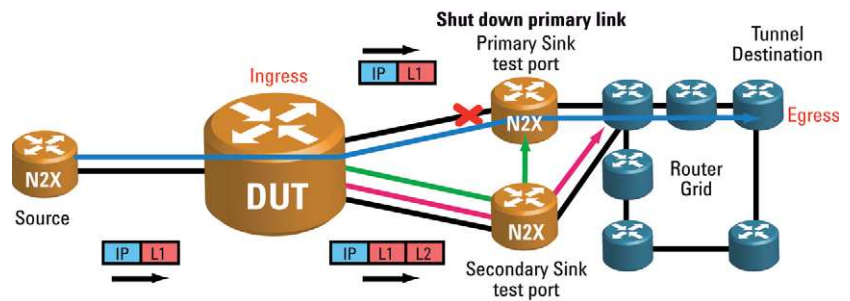
Typical test parameter configuration for Multi-Protocol Scaled Restart

(3) Scaled RSVP Fast Reroute Time

Testing MPLS Fast Reroute is a complex procedure requiring a test instrument that tightly integrates simulation of network topologies (using OSPF or IS-IS), emulation of MPLS signaling protocols, and generation and performance measurement of labeled test traffic.

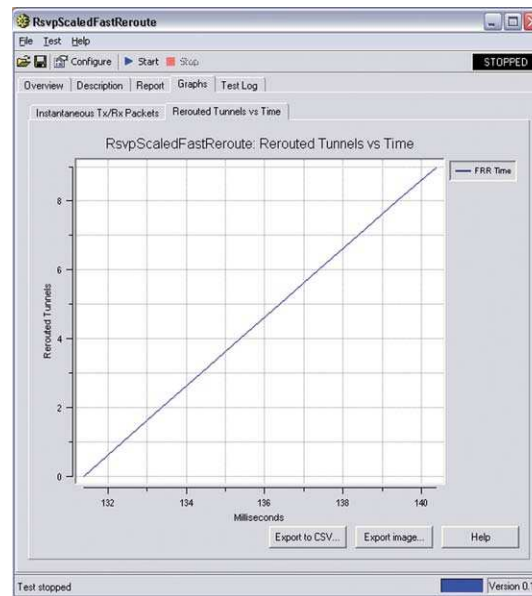
Scaled RSVP Fast Reroute Time is an automated test to measure the duration of switchover to backup LSP, also includes make-before-break options.

- 1 Simulate a common topology using OSPF or IS-IS
- 2 Establish multiple primary backup LSP tunnels
- 3 Generate MPLS packets on each tunnel



- 4 Sever primary link to force failover
- 5 Measure packet loss and time taken to reroute traffic to backup LSP

—	Primary LSP(s)
—	Backup LSP(s) (node protection)
—	Backup LSP(s) (link protection)



Typical RSVP FRR Test result

Sample test results

Test Journal

```
=====
0.00 - Test Started
0.00 - Establishing Baseline performance (wait Time: 10000 msecs)
11.30 - Baseline performance established
11.40 - User presented with router failure confirmation prompt
11.40 - Waiting for router to fail (timeout: 60000 msec)
21.40 - Router failure detected, via OSPF protocol.
21.40 - Waiting for Router to complete restart (Timeout: 60000 msec)
24.70 - RSVP entered RESTART state.
25.50 - LDP converged.
40.70 - RSVP entered RECOVERY state.
81.70 - OSPF Restart period timeout. OSPF session(s) did not enter
ready/recovery state within restart time.
82.00 - Entering Recovery Period (wait Time: 60000 msec)
140.79 - RSVP entered ENABLED state (recovery complete).
142.70 - Entering Post Dwell Period (wait Time: 360000 msec)
132.60 - RSVP Protocol has un-acceptable packet loss (1000 packets lost so far)
134.40 - RSVP Protocol has un-recovered Tunnels (2 Tunnels with new labels).
502.70 - Test Complete.
=====
```

SUMMARY OSPF

```
=====
Total Source Tx Packets      : 271468
Total Sink Rx Packets       : 271468
Sequence Errors              : 0
Lost Packets                 : 0
```

81.70 - Restart period timeout. OSPF session(s) did not enter ready/recovery state within restart time.

Test Result

```
=====
FAIL. Failure to converge.
=====
```

SUMMARY LDP

```
=====
Total Source Tx Packets      : 373264
Total Sink Rx Packets       : 373263
Sequence Errors              : 1
Lost Packets                 : 1
Ingress Tunnels (head-end)
  Recovered                  : 10
  Re-opened:                 : 0
  Closed:                    : 0
Egress Tunnels (tail-end)
  Open:                      : 8
  Closed:                    : 0
=====
```

Test Result

```
=====
PASS.
=====
```

SUMMARY RSVP

```
=====
Total Source Tx Packets      : 373268
Total Sink Rx Packets       : 371267
Sequence Errors              : 1
Lost Packets                 : 2000
Ingress Tunnels (head-end)
  Recovered                  : 6
  Re-opened:                 : 2
  Closed:                    : 0
Egress Tunnels (tail-end)
  Open:                      : 8
  Closed:                    : 0
132.60 - RSVP Protocol has un-acceptable packet loss (1000 packets lost so far)
134.40 - RSVP Protocol has un-recovered Tunnels (2 Tunnels with new labels).
=====
```

Test Result

```
=====
FAIL. RSVP Protocol has un-acceptable packet loss.
=====
```

```
=====
Run Ended: Wed Sep 07 20:41:15 2005 (duration = 00:09:25)
=====
```

Software Requirements

- N5571A - High Availability Productivity Application Software and Support Agreement contract options:
 - PS-S12-001 - 1 year contract included with initial purchase
 - PS-S12-102 - 1 year contract extended to 2 years
 - PS-S12-103 - 1 year contract extended to 3 years

The following N2X software licenses are a pre-requisite to supporting N5571A:

- E7881B - Packets and Protocols Application
- E7882A - IPv4 Routing Emulation Software
- E7883A - MPLS Signaling Emulation Software

Hardware Requirements

All N2X routing cards (XR, XS, XR-2 and XS-2) including the E7320B OC768c XS Test Card support the N5571A High Availability Productivity Application.

N2X XP packet test cards do not support the High Availability Productivity Application

Minimum Ordering Configuration

Given the minimum 3-port nature of the N5571A scenarios, two 2-port routing cards or one 4-port routing card is required to execute all the scenarios in the Productivity Application.

Agilent N2X

Agilent's N2X multi-service tester combines leading-edge services with carrier grade infrastructure testing and emulation. The N2X solution set allows network equipment manufacturers and service providers to more comprehensively test new services end-to-end, resulting in higher quality of service and lower network operating costs.

Warranty and Support

Hardware Warranty

All N2X hardware is warranted against defects in materials and workmanship for a period of 1 year from the date of shipment.

Software Warranty

All N2X software is warranted for a period of 90 days. The applications are warranted to execute and install properly from the media provided.

This warranty only covers physical defects in the media, whereby the media is replaced at no charge during the warranty period.

Software Updates

With the purchase of any new system controller Agilent will provide 1 year of complimentary software updates. At the end of the first year you can enroll into the Software and Support Agreement (SSA) contract for continuing software product enhancements.

Support

Technical support is available throughout the support life of the product. Support is available to verify that the equipment works properly, to help with product operation, and to provide basic measurement assistance for the use of the specified capabilities, at no extra cost, upon request.

Ordering Information

To order and configure the test system consult your local Agilent field engineer.

Sales, Service and Support

United States:

Agilent Technologies
Test and Measurement Call Center
P.O. Box 4026
Englewood, CO 80155-4026
1-800-452-4844

Canada:

Agilent Technologies Canada Inc.
2660 Matheson Blvd. E
Mississauga, Ontario
L4W 5M2
1-877-894-4414

Europe:

Agilent Technologies
European Marketing Organisation
P.O. Box 999
1180 AZ Amstelveen
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(31 20) 547-2323

United Kingdom

07004 666666

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9-1, Takakura-Cho, Hachioji-Shi,
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Forest Hill, Victoria 3131
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Fax: (61-3) 9272-0749
Tel: 0-800-738-378 (New Zealand)
Fax: (64-4) 802-6881

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