

Agilent N2X
**HTTP/TCP Protocol
Emulation Software**

N5577A
Technical Data Sheet



The most comprehensive tool for realistically emulating thousands of HTTP clients and servers for real-world service-aware testing.

Key Features

- **Ability to test service-aware platforms where 100% realism of HTTP is required**
- **Demonstrate HTTP services when simulated clients are connected (through a SUT) to a real server**
- **Performance test of HTTP and L4 re-direct**
- **Simultaneously test HTTP with other services, access protocols, routing protocols, MPLS, or background traffic on the same port(s)**
- **Can be used on a variety of ethernet interfaces**

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. Service providers, network equipment manufacturers (NEMs), and component manufacturers can verify service attributes of entire networks end-to-end, while also isolating problems down to individual networking devices and subsystems.

Agilent N2X delivers unparalleled test realism to verify the ultimate performance, scalability and resilience of carrier grade services and infrastructure.

HTTP is the base protocol and fundamental part of Data services on the Internet. Likewise, Data services are a basic part of Multiplay, a service offering that typically includes Voice and Video.

The N2X N5577A HTTP/TCP protocol emulation software allows you to simulate many hundreds-of-thousands of HTTP clients and/or servers simultaneously on the same N2X test port.

The ability to generate HTTP transactions such as PUT, GET, HEAD, POST, and DELETE, provides you with the power to realistically test the service-aware nature of a router, switch, or other forwarding device. A common test scenario often implemented by service providers and network equipment manufactures is depicted in Figure 1 below, where N2X is used to simulate real-world HTTP client and servers on either side of the device under test.

This realistic HTTP traffic in conjunction with the ability to also simulate VoIP and IPTV clients and/or servers on the same N2X port*, equips you with a truly realistic Multiplay simulation environment.

* Extra licensing required – please see the "Complementary Products" section on page 8

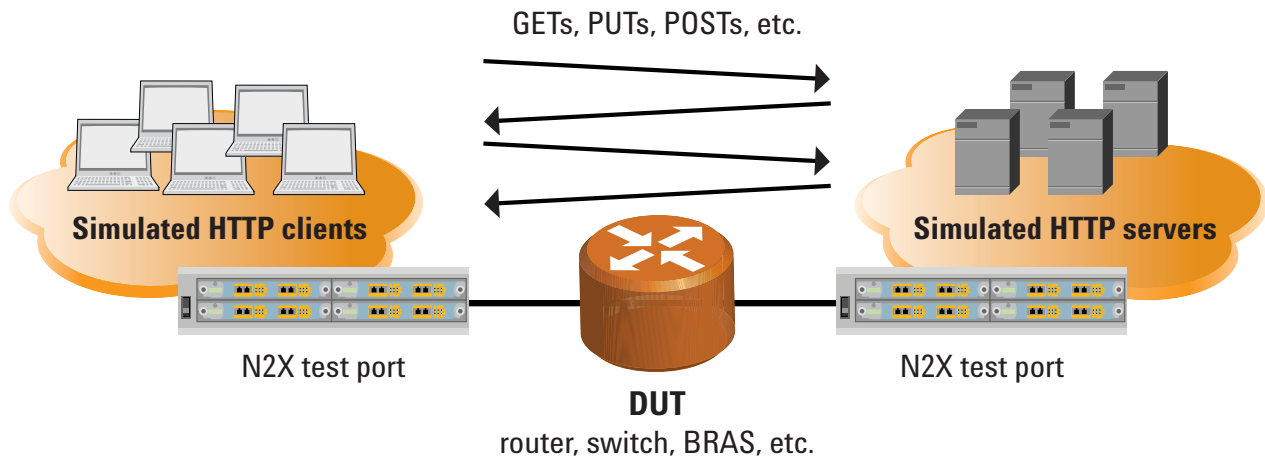


Figure 1 - Simulated HTTP servers and clients

N2X test ports simulating HTTP may also be used in conjunction with real HTTP devices such as real HTTP servers or real HTTP clients. (See figures 2 and 3)

A unique feature of the N2X HTTP solution is the ability to test the re-direct functionality and performance of forwarding devices. (See figure 4)

HTTP clients may be simulated over PPP sessions, or in association with IP addresses provided via DHCP. Emulation of HTTP clients and servers is provided over both IPv4 and IPv6. In addition, HTTP 1.0 and 1.1 are both supported.

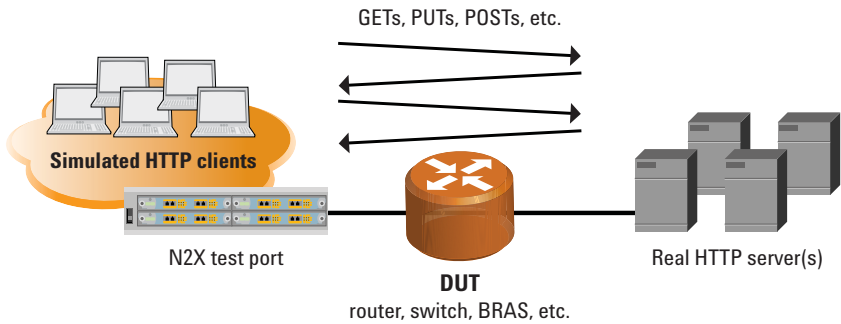


Figure 2 - Simulated HTTP clients, real servers

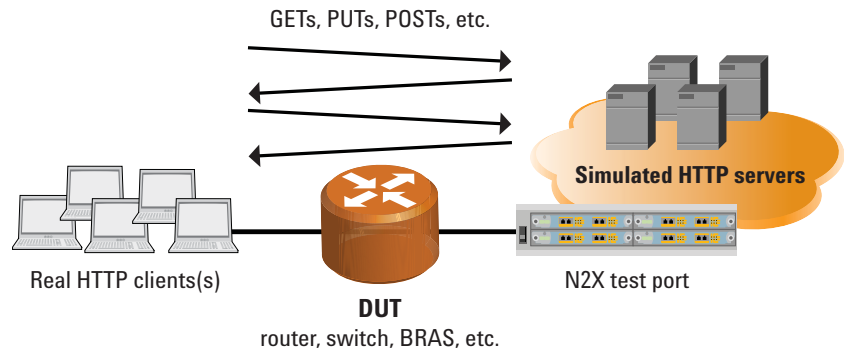


Figure 3 - Simulated servers, real clients

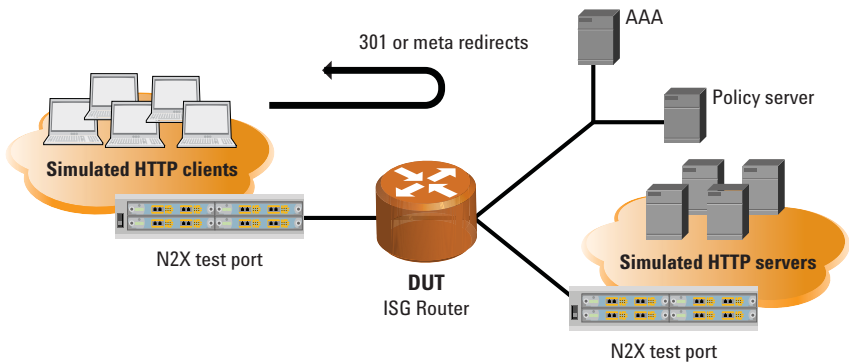


Figure 4 - Re-direct network diagram

Test Scenarios

1. Multiplay service-aware performance test
2. Multiplay demonstration test
3. Re-direct (HTTP & Meta) test

HTTP Re-direct

HTTP re-direct is commonly employed when users log on to a network for the first time and must submit payment or enter an access code before accessing other Internet services such as e-mail, VoIP, Internet video or web-browsing. The HTTP emulation allows the user to test the basic HTTP re-direct scenario.

N2X N5577A HTTP/TCP protocol emulation software includes solutions to test the HTTP (301) and meta re-direct performance of re-directing devices such as BRASs (Broadband Remote Access Servers) and ISGs (Intelligence Service Gateways).

Integration with DHCP and PPP

Because Multiplay services are frequently tested in over access networks, integration with key access protocols is critical. The N2X HTTP protocol emulations for HTTP clients are fully integrated with the N2X PPP and DHCP emulations, including DHCPv6*.

* Extra licensing required – please see the “Complementary Products” section on page 8

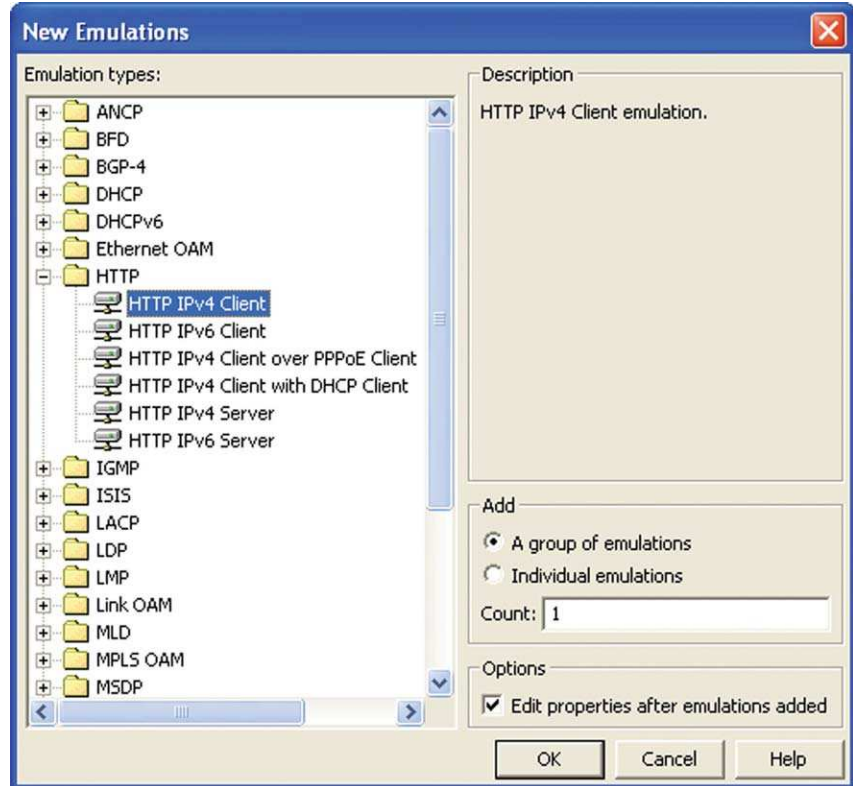


Figure 5 – Creating HTTP Emulations

Integration with N2X's VoIP and IPTV Test Solutions

Data services are a part of the N2X Multiplay test solution. Along with VoIP and IPTV, the ability to simulate data services is critical for POC labs and service providers to evaluate Multiplay enabling routers and networks. Credible Multiplay testing means being able to emulate data, VoIP and IPTV clients simultaneously on the same test ports. Simultaneous emulation of Multiplay clients on the same test port(s) is made possible through the Agilent N2X HTTP solution in conjunction with existing VoIP and IPTV emulation solutions.

User Interface

A complete GUI is provided for all emulations and statistical results. (See Figures 6 and 7) In addition, a complete API (application programming interface) is available for all functionality to drive the emulation from Tcl scripts.

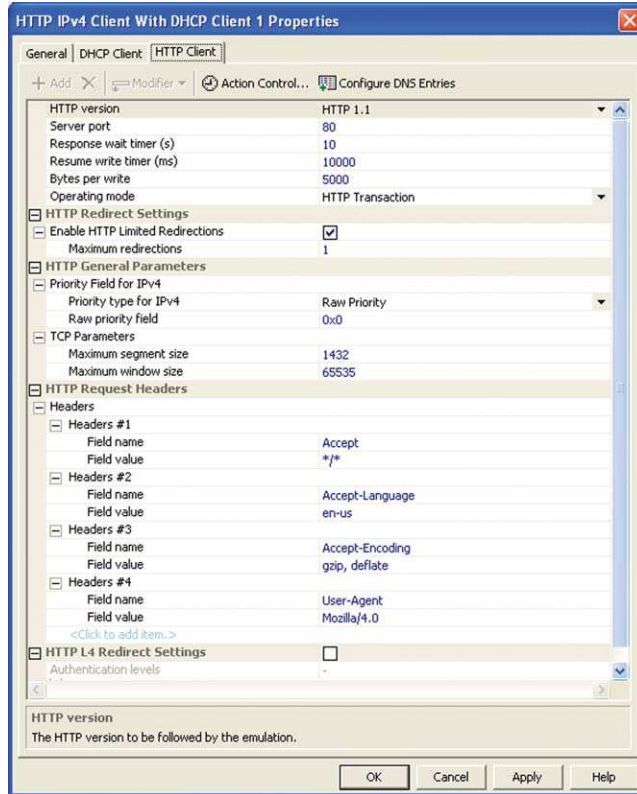


Figure 6 - HTTP Client Dialog GUI

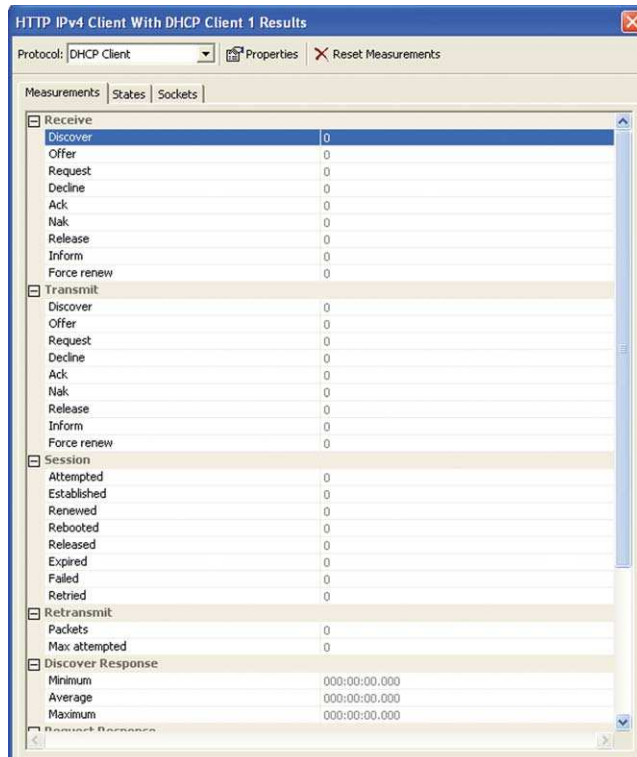


Figure 7 - Statistical results GUI

Technical Specifications

This section contains the protocol-specific parameters that are configurable through the GUI or the TCL scripting environment.

Performance

Here are some key performance and scalability characteristics for the N5577A HTTP/TCP emulation software when used with XS-2 high-performance N2X test cards.

- Simultaneous connections: 225,000
- HTTP Throughput: 114Mb/second
- HTTP transaction rate: 2500/second

Hardware

The HTTP/TCP emulation solution works on the most popular N2X Ethernet test cards – please contact an Agilent sales representative for details.

Software

Emulations

- HTTP IPv4 Clients
- HTTP IPv6 Clients
- HTTP IPv4 Clients over PPPoE
- HTTP IPv4 Clients with DHCP
- HTTP IPv4 Server
- HTTP IPv6 Server

Transaction Types

- HTTP GET
- HTTP PUT
- HTTP POST
- HTTP HEAD
- HTTP DELETE
- Null transaction (i.e. raw TCP)

Measurements

HTTP

HTTP Requests Transmitted

- GET
- PUT
- POST
- DELETE
- HEAD

HTTP Responses Received

- Redirect
- GET
- PUT
- POST
- DELETE
- HEAD

HTTP Timeout Responses Received

- Timeout Responses
- Response Wait Timeouts

HTTP Malformed Responses Received

- Malformed Responses

HTTP Failed Responses Received

- Total
- GET
- PUT
- POST
- DELETE
- HEAD

HTTP Informational Responses Received

- Informational (1xx)
- Continue (100)
- Switching protocols (101)

HTTP Success Responses Received

- Success (2xx)
- OK (200)
- Created (201)
- Accepted (202)
- Non-authoritative information (203)
- No content (204)
- Reset content (205)
- Partial content (206)

HTTP Redirection Responses Received

- Redirection (3xx)
- Multiple choices (300)
- Moved permanently (301)
- Found (302)
- See other (303)
- Not modified (304)
- Use proxy (305)
- Temporary redirect (307)

HTTP Client Error Responses Received

- Client error (4xx)
- Bad request (400)
- Unauthorized (401)
- Payment required (402)
- Forbidden (403)
- Not found (404)
- Method not allowed (405)
- Not acceptable (406)
- Proxy authentication required (407)
- Request timeout (408)
- Conflict (409)
- Gone (410)
- Length required (411)
- Precondition failed (412)
- Request entity too large (413)
- Request URI too large (414)
- Unsupported media type (415)
- Request range not satisfiable (416)
- Expectation failed (417)

- HTTP Server Responses Received**
- Server error (5xx)
 - Internal server error (500)
 - Not implemented (501)
 - Bad gateway (502)
 - Service unavailable (503)
 - Gateway timeout (504)
 - HTTP version not supported (505)

TCP

- TCP Transient Connections**
- OPEN
 - OPENING
 - CLOSING
 - ACTIVE

- TCP Aggregated Connections**
- SUCCESSFUL
 - FAILED
 - TOTAL

- TCP Octets Transmitted**
- Total
 - Goodput

- TCP Octets Received**
- Total
 - Goodput

PPP

- PPPoE Receive**
- PADI
 - PADO
 - PADR
 - PADS
 - PADT

- Receive**
- LCP configure request
 - LCP configure ack
 - LCP configure nak
 - LCP configure reject
 - LCP configure request
 - LCP configure

DHCP

- Receive & Transmit**
- Discover
 - Offer
 - Request
 - Decline
 - Ack
 - Nak
 - Release
 - Inform
 - Force renew

- Session**
- Attempted
 - Established
 - Renewed
 - Rebooted
 - Released
 - Expired
 - Failed
 - Retried

- Retransmit**
- Packets
 - Max attempted

- Discover Response**
- Minimum
 - Average
 - Maximum

- Request Response**
- Minimum
 - Average
 - Maximum

DHCPv6

- Receive & Transmit**
- Solicit
 - Advertise
 - Request
 - Confirm
 - Renew
 - Rebind
 - Reply
 - Release
 - Decline
 - Reconfigure
 - Information-request
 - Replay forward
 - Relay reply

- Session**
- Attempted
 - Established
 - Renewed
 - Rebooted
 - Released
 - Expired
 - Failed
 - Retried

- Retransmit**
- Packets
 - Max attempted

- Discover Response**
- Minimum
 - Average
 - Maximum

- Request Response**
- Minimum
 - Average
 - Maximum

Applicable Standards

- RFC 791 - Internet Protocol
- RFC 793/STD 07: Transmission Control Protocol
- RFC 894 - A Standard for the Transmission of IP Datagrams over Ethernet Networks
- RFC 1042 - Standard for the transmission of IP datagrams over IEEE 802 Networks
- RFC 1122 - Requirements for Internet Hosts - Communication Layers
- RFC 2001 - TCP slow Start, congestion avoidance, fast re-transmit and fast recovery algorithms
- RFC 2581 - TCP congestion control, slow start, fast re-transmit
- RFC 2988 - Computing TCP's Retransmission Timer
- RFC 3782 - NewReno Modification to TCP's Fast Recovery Algorithm, Apr 2004
- RFC 1945 - Hypertext Transfer Protocol - HTTP/1.0
- RFC 2616 - Hypertext Transfer Protocol - HTTP/1.1

Configuration

To use the N5577A HTTP/TCP emulation software, the following Agilent N2X hardware and software are required.

Hardware

A N2X system is required with:

- System controller
- Chassis
- One or more Ethernet test cards

The N5577A HTTP/TCP emulation software is supported on the majority of N2X Ethernet interfaces. For a complete list of supported test cards, please contact your local Agilent N2X sales representative.

Software

The following N2X software licenses are a pre-requisite to supporting the HTTP emulation:

- E7881A or E7881B - Packets and Protocols Application Software

Although not required, the following software licenses are complementary to the HTTP test solution:

- E7877A – IPTV Video Generation and Analysis Software
- E7887A – DHCP Protocol Emulation Software
- E7888A – Access Protocol Emulation Software (PPPoX)
- E7896A – DHCPv6 Protocol Emulation Software
- N5588A – SIP Emulation Software

Support

The N5577A HTTP/TCP emulation software license has a Software and Support Agreement (SSA) contract options associated with it

- 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

Please ensure that you have a current SSA in order to automatically receive future releases and technical product support.

Online Help

An extensive online help system provides complete descriptions and detailed usage instructions for every component of N2X. Dialog-level, context-sensitive help provides rapid access to the relevant sections of the online help.

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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.

Software and Support Agreement

To protect your investment in the Agilent N2X, every new system includes an initial 12-month comprehensive system-based warranty and Software and Support Agreement (SSA).

Renewing Agilent support services ensures uninterrupted technical support and software upgrades, giving you confidence in N2X throughout the life of your system.

The N2X technical support portion of your SSA includes assistance with product operation and measurements, and verification that the N2X equipment is in correct working order.

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.

Ordering Information

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

Sales, Service and Support

N2X must be serviced by an approved Agilent Technologies service centre, please contact us for more information.

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Englewood, CO 80155-4026

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