Agilent
N2X Carrier Ethernet Testing

The industry's most comprehensive solution for verifying Carrier Ethernet infrastructure & services

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

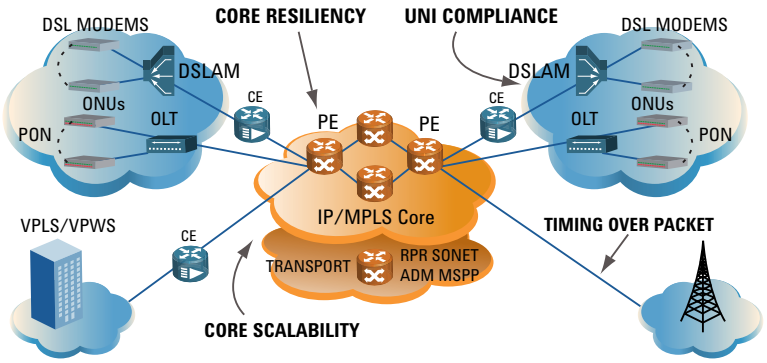
The N2X Carrier Ethernet test solution offers service providers and equipment manufacturers a powerful toolset to verify the interoperability, scalability, resiliency and synchronization aspects of emerging Carrier Ethernet services under real-world conditions.

The networking industry is making considerable efforts to ensure that Ethernet infrastructure and services are 'Carrier Class' including:

- The Metro Ethernet Forum (MEF) has defined a certification process to accelerate Carrier Ethernet deployment.
- Key service delivery concerns such as quality of service (QoS), resiliency, scalability, and timing are being addressed. As this evolves, testing is recognized as essential to ensuring the efficient and reliable delivery of carrier-class Ethernet services to subscribers.

Agilent N2X offers a comprehensive test solution to meet Carrier Ethernet test needs including:

- Industry's first performance verification of Timing-over-Packet technologies including IEEE 1588v2 PTP and Synchronous Ethernet.
- Proven MEF 9 and MEF 14 conformance test suites to verify adherence to the Metro Ethernet Forum's UNI specification.
- UNI-C and UNI-N conformance test suites to verify all 371 test cases defined in the Iometrix MEF 21 test plan.
- Emulation of real-world network conditions including highly scalable support for MPLS, VPLS, VPWS, Ethernet Operations and Maintenance (E-OAM) including IEEE 802.1ag ITU-T Y1731 (Connectivity Fault Management) and IEEE 802.3ah (Link OAM) and VLAN tag stacking.
- Powerful traffic generation capable of simulating up to 32,000 Ethernet Virtual Circuits (EVCs).
- QoS measurements across 32,000 streams per port to accurately verify MEF-defined traffic management parameters such as CIR and EIR.
- Industry's first LACP emulation to verify traffic prioritization and performance across aggregated Ethernet links and characterize the impact of oversubscribed and failed links on services. It's the only test device to do this while still simultaneously emulating other protocols over these links.



Carrier Ethernet delivery chain

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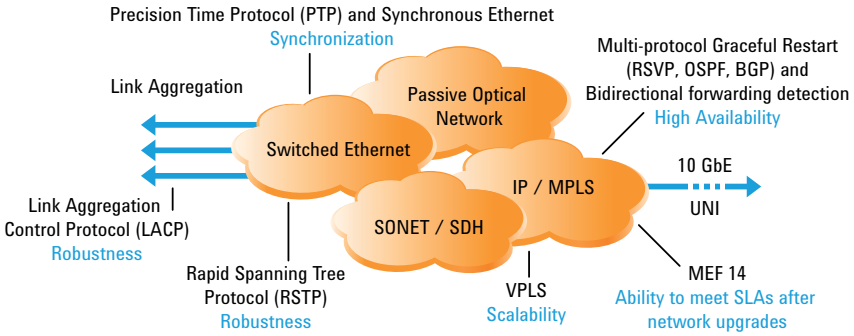
Interoperability & Conformance

Carrier Ethernet is being delivered within multi-vendor network environments. As a founding member of the Metro Ethernet Forum, Agilent was first to market three times, with complete MEF 9 and MEF 14 conformance test suites and then again with the MEF 21 UNI-C and UNI-N suites. N2X suites also cover layer-2 protocols such as CFM IEEE 802.1ag (E-OAM), Link OAM (IEEE 802.3ah), BFD, LACP, STP, RSTP and MSTP, as well as MPLS, routing and Graceful Restart to enable you to verify the IP/MPLS infrastructure that commonly transports Ethernet services. The easy-to-use, test-plan-oriented N2X solution accurately follows MEF, IETF and IEEE specifications, ensuring device interoperability and accelerating the deployment of Carrier Ethernet services.

Resiliency

Carrier Ethernet is driving the addition of carrier-class reliability mechanisms to deliver emerging services. Validating network reliability requires the simulation of a realistic network environment while accurately measuring QoS parameters and service disruption. Technologies supported by the Agilent N2X such as LCAP and BFD provide different ways to manage these failover and service disruption events. The powerful and flexible traffic generation and multi-protocol emulation capabilities of N2X deliver unparalleled test realism and measurement accuracy. Features including the VPLS topology builder and per-stream QoS measurements allow service providers and equipment manufacturers to quantify the robustness of Ethernet services.



Ensure Service Quality with thousands of users, over a variety of technologies

Scalability

With industry-leading protocol performance, breadth and depth, the N2X Carrier Ethernet test solution offers the most comprehensive solution for verifying the interoperability, resiliency and scalability of next-generation Carrier Ethernet infrastructure and services.

The scalability and performance of the underlying network infrastructure is critical to the profitable delivery of Carrier Ethernet services. The N2X Packets and Protocols test solution simplifies scalability testing by enabling users to easily set up sophisticated test scenarios in a couple of minutes. Powered by the industry's most scalable multi-protocol emulation hardware, N2X can validate the ability of devices to deliver many thousands of E-LAN and E-Line services.

Synchronization

Because Ethernet has no native clock transfer mechanism like SONET/SDH, network operators are evaluating and deploying Timing-over-Packet technologies such as IEEE 1588v2 Precision Time Protocol (PTP) and Synchronous Ethernet for applications such as wireless backhaul.

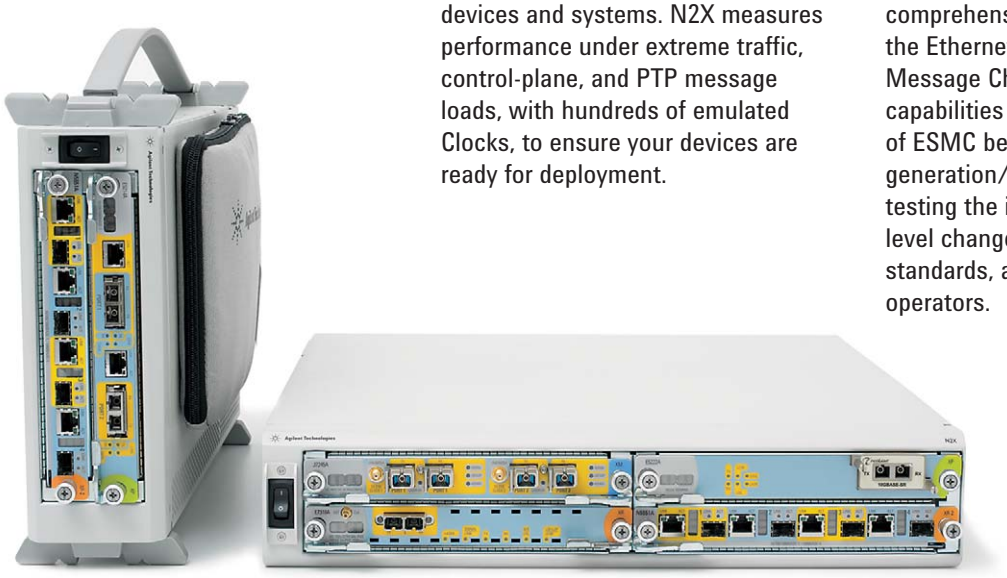
The success of PTP for clock transfer depends upon the introduction of high performance Transparent Clock (TC) and Boundary Clock (BC) capabilities, Slave Clocks (SC) that can survive upstream Master flapping during failures, and scalable Master Clocks (MC) that support hundreds of slaves in mixed modes.

The Precision Time Protocol itself was spawned in the renowned Agilent Labs and developed through an IEEE collaboration of leading vendors and operators. Building upon this solid foundation, Agilent introduced the first IEEE 1588v2 test solution that verifies the functionality, performance, scalability, and resilience of PTP devices and systems. N2X measures performance under extreme traffic, control-plane, and PTP message loads, with hundreds of emulated Clocks, to ensure your devices are ready for deployment.

Complementing the IEEE 1588v2 emulation software, the N2X G.8261 Traffic QuickTool accurately generates the complex time-varying loads specified in ITU-T G.8261 Appendix VI for testing complete Timing-over-Packet systems.

Synchronous Ethernet, an alternative or complement to PTP, distributes a clock signal for frequency synchronization across the network. Every switch/router in the path must support both Synchronous Ethernet and (SSM) Synchronization Status Messages for clock selection and traceability. Ethernet Synchronization Messaging Channel (ESMC) is the protocol used for communicating the current reference clock quality using SSM. It is vital to test ESMC performance under load and clock failover because the network depends on ESMC for clock management, selection, quality, traceability and failover.

Agilent N2X provides the most comprehensive solution for verifying the Ethernet Synchronization Message Channel Protocol. Its unique capabilities include full emulation of ESMC beyond simple SSM PDU generation/analysis, and interactively testing the impact of clock quality level changes to ITU-T and IEEE standards, as demanded by network operators.



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