

Novus mini

Compact Network Tester

Multi-Rate Ethernet Testing — Anywhere, Anytime

Introduction

The Keysight Novus mini is the industry's most compact and portable network tester, offering complete Layer 2-3 conformance and performance testing in an affordable form-factor.

Novus mini supports high-performance routing / bridging protocol emulation, line-rate L2-3 traffic generation with flow level traffic statistics and analysis, and both control and data packet capture.

Designed as a platform for **Time-Sensitive Networking (TSN)**, Novus Mini offers advanced time-synchronization capabilities, including support for synchronization with an external clock reference.

The platform also provides a complete **MACsec test solution**, enabling validation from hardware design and software-stack implementation through full system integration. It covers the full range of MACsec functions, allowing customers to benchmark performance under realistic traffic loads, verify service continuity during key rotation, and ensure robustness under adverse or negative test conditions.

Ensure compatibility with an  Avnu Certification Test Tool (CTT).



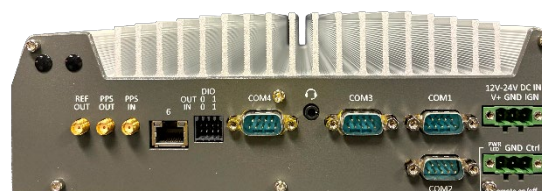
Novus mini - 3 port



Novus mini Pro - 6 port



Novus mini - 4 port



Novus mini Pro - 6 port



Novus mini Automotive



Novus mini Pro Automotive

Highlights

- Meet test requirements with full-featured portable compact tester.
- **Support automotive testing needs** with native **100/1000BASE-T1** and **10BASE-T1S** interfaces.
- Optimize budgets and lab space with affordable compact tester.
- Enable broad test functions across L2-3 with a unified architecture that supports the Keysight IxNetwork application.
- **Validate enterprise and service-provider environments** with an appliance purpose-built for high-performance, low-latency device testing.
- Validate automotive and industrial IoT (IIoT) networks.
- Test with a platform that is TSN-aware with precise time synchronization measurement capabilities.
- **MACsec 802.1AE testing**, enabling comprehensive **MACsec validation** across hardware, software, and system integration
- **AVQU** Avnu Certification Test Tool (CTT) — Component 802.1AS,

Featuring IxNetwork Web Edition

The IxNetwork web application offers a new simple, lightweight way to connect easily from anywhere to run tests. Now you can avoid heavy client application installation, keep tests running in the background, and share and collaborate with peers across the globe with inherent session sharing. Migrate to a platform independent environment with IxNetwork Web Edition.

Web Edition includes a feature-rich GUI to configure IxNetwork tests, and REST API browser. The ability to switch between GUI and REST API browsers empowers easy automation.

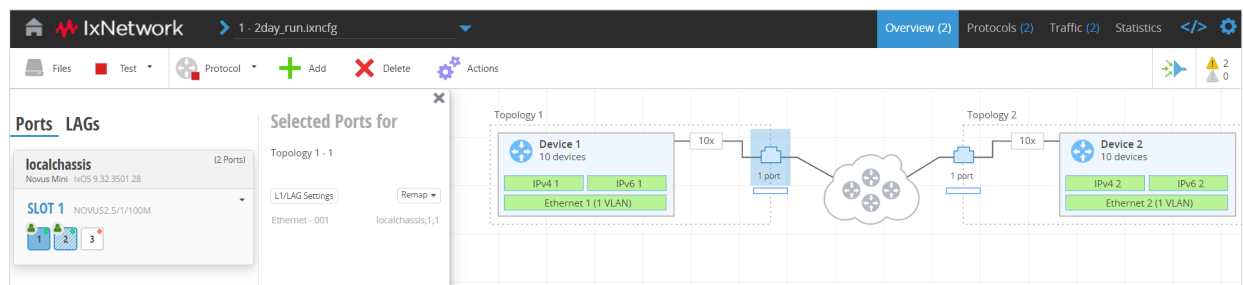


Figure 1. IxNetwork web edition

IxNetwork web application supports traffic generation and measurements that can ensure highest precision and performance. The sophisticated traffic generator is also integrated with the control plane protocols.

#	Traffic Item	State	Enabled	Src/Dst Mesh	Route Mesh	Bi-Directional	Statistics Tracking	Sources	Destinations	Stack	Frame Size	Frame Rate	Frame Rate Dis...	Payload	Protocol
1	TrafficItem 1	UNAPPLIED	☒	One - One	One - One	☐	Traffic Item, Flow Gro...	IPv4 1	IPv4 2	Ethernet II VLAN L...	Fixed: 64	10% Line Rate	Port: Apply to All;	Increment Byte	TrafficItem 1
2	TrafficItem 2	UNAPPLIED	☒	One - One	One - One	☐	Traffic Item, Flow ...	IPv6 1	IPv6 2	Ethernet II VLAN L...	Fixed: 64	10% Line Rate	Port: Apply to ...	Increment Byte	TrafficItem 2

Figure 2. IxNetwork traffic view

IxNetwork web houses a powerful statistics viewer for viewing and analyzing real time results along with comprehensive report generation.

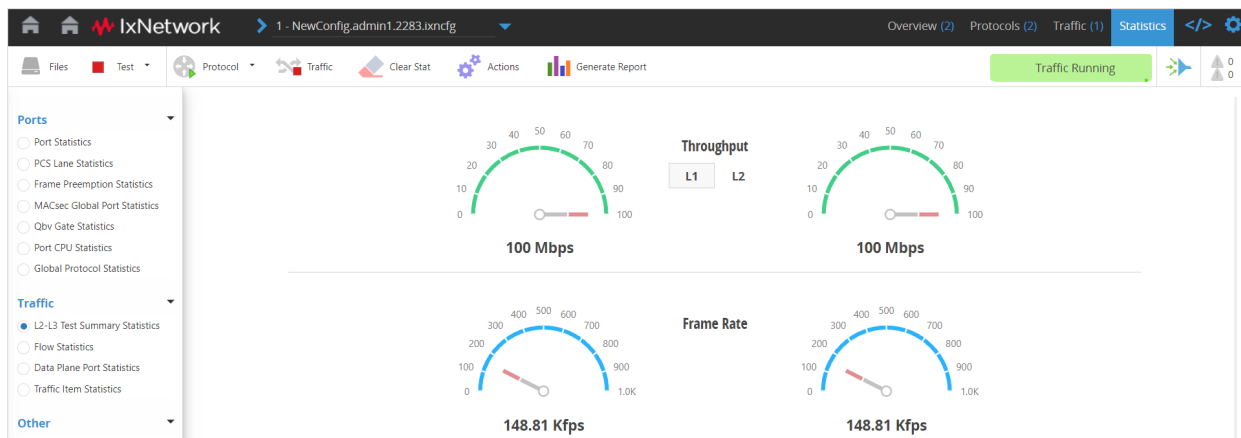


Figure 3. IxNetwork statistics viewer

IxNetwork web's built-in capture tool allows capturing of both control plane and data plane traffic. The integrated analyzer module is a sophisticated network analyzer that allows triggering and filtering of control and data plane packet captures based on user-defined packet fields. Captured packets can be saved and later accessed using Novus mini's integrated wireshark module.

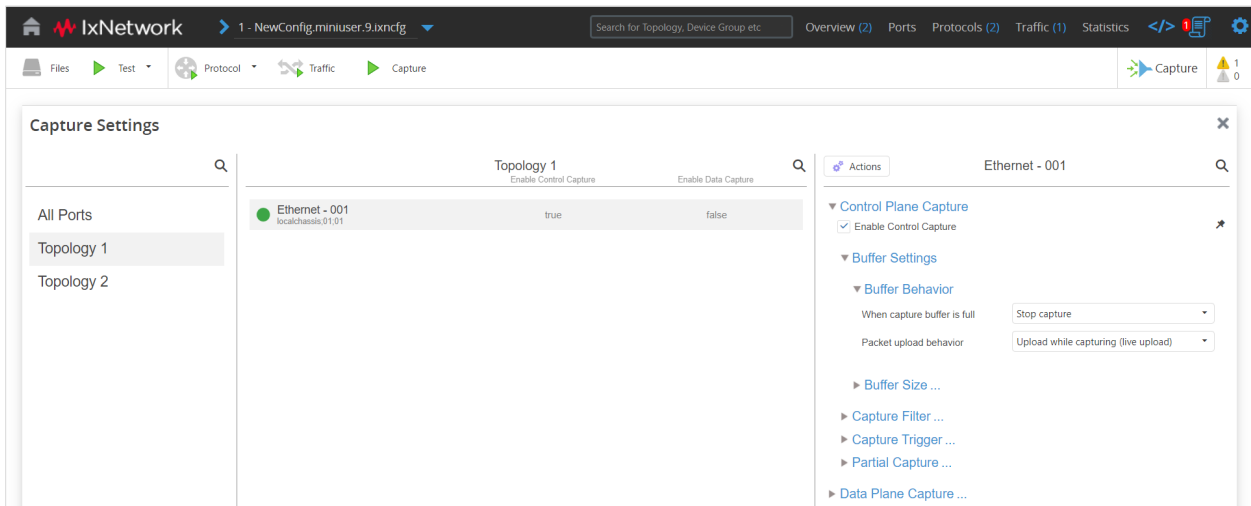


Figure 4. IxNetwork analyzer setting

No.	Time	Source	Destination	Protocol	Length	subdomainNumber	Info
28	2.695355	MoxaTech_9f:17:fb	LLDP_Multicast	PTPv2	90		@ Follow-Up Message
29	2.828322	MoxaTech_9f:17:fb	LLDP_Multicast	PTPv2	60		@ Sync Message
30	2.828372	MoxaTech_9f:17:fb	LLDP_Multicast	PTPv2	90		@ Follow-Up Message
31	2.881511	CETTechn_00:00:01	LLDP_Multicast	PTPv2	68		@ Peer_Delay_Req Message
32	2.881630	MoxaTech_9f:17:fb	LLDP_Multicast	PTPv2	68		@ Peer_Delay_Resp Message
33	2.881664	MoxaTech_9f:17:fb	LLDP_Multicast	PTPv2	68		@ Peer_Delay_Resp_Follow-Up Message
34	2.945347	MoxaTech_9f:17:fb	LLDP_Multicast	PTPv2	60		@ Sync Message
35	2.945398	MoxaTech_9f:17:fb	LLDP_Multicast	PTPv2	90		@ Follow-Up Message
36	3.078371	MoxaTech_9f:17:fb	LLDP_Multicast	PTPv2	60		@ Sync Message
37	3.078423	MoxaTech_9f:17:fb	LLDP_Multicast	PTPv2	90		@ Follow-Up Message
38	3.195395	MoxaTech_9f:17:fb	LLDP_Multicast	PTPv2	60		@ Sync Message
39	3.195450	MoxaTech_9f:17:fb	LLDP_Multicast	PTPv2	90		@ Follow-Up Message
40	3.260771	MoxaTech_9f:17:fb	LLDP_Multicast	PTPv2	68		@ Peer_Delay_Req Message

< Frame 1: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface unknown, id 0
> Ethernet II, Src: CETTechn_00:00:01 (00:11:01:00:00:01), Dst: LLDP_Multicast (01:80:c2:00:00:0e)
> Precision Time Protocol (IEEE1588)
 > 0001 = transportSpecific: 0x1
 1100 = messageId: Signalling Message (0xc)
 0010 = versionPTP: 2
 messageLength: 60
 subdomainNumber: 0
 > flags: 0x0000
 > correction: 0.000000 nanoseconds
 > ClockIdentity: 0x001101ffffe00001
 SourcePortID: 1
 sequenceId: 0
 control: Other Message (5)
 logMessagePeriod: 127
 targetPortIdentity: 0xffffffffffffffff
 targetPortId: 65535
 > Message Interval Request TLV

Figure 5. IxNetwork capture decode

Benchmarking Devices using Quick Test

Quick Test allows users to run RFC benchmarking tests suites like RFC2544 and RFC2889 with a simplified user interface. It enables complex test executions with just two or three clicks and helps assess performance of a variety of network infrastructure devices.

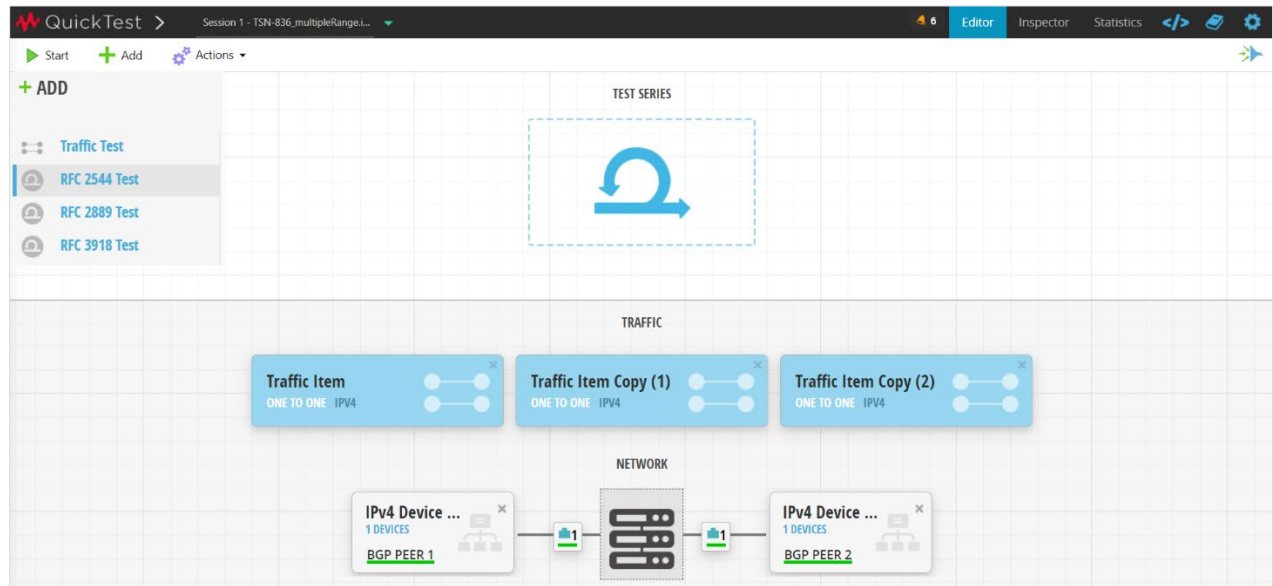


Figure 6. IxNetwork editor

MACsec Test Solution

MACsec 802.1AE is an industry-standard security technology that secures a point-to-point link between directly connected nodes. It operates at the link layer and protects layer 2 and above content.

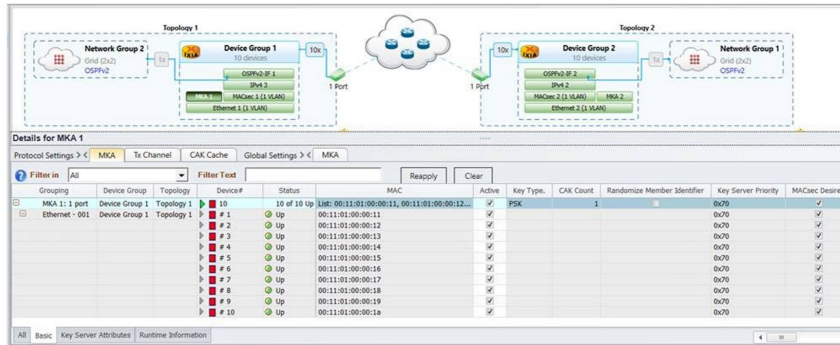


Figure 7. IxNetwork MACsec Emulation

- MACsec traffic encryption at line rate with a range of incrementing PN (packet number) and fixed payload
- Static Secure Association Key (SAK) provision or dynamic key negotiation with MACsec Key Agreement (MKA) protocol
- Frame sizes from 64 bytes to 14K bytes, vary per stream
- Integrity (ICV) only or integrity + encryption
- 128/256 bits Cipher Suites with Extended Packet Number (XPN) support
- Timer-based periodic re-key with fixed count or continuous
- Timer based roll over of PSK (key chain functionality).
- VLAN in clear text or in encrypted payload
- Confidentiality Offset 0/30/50 (non-zero offset is supported only for stateless traffic)
- MACsec frame decryption and ICV validation in Wireshark capture
- Negative test with mal-configured TCI flags, bad ICV, erroneous SL, out of window PN
- Full automation support with Python, REST, TCL, and HLAPI for continuous validation

Ensuring Interoperability with Keysight Network Conformance (KNC)

Keysight Network Conformance is a web-based tool powered by IxNetwork engine that provides a common platform for all conformance test solutions. With KNC, you can quickly and easily view all the available conformance tests, create playlists of selected test cases, configure, and execute tests, and generate reports. Because it is a web-based tool, KNC offers the flexibility of using a web browser with no OS dependencies. KNC provides a simple, easy to use UI, with live logs, consolidated reports and history running. It also supports the option to download execution logs and packet captures for collecting diagnostics and debugging. KNC supports manual mode with the tool pausing the execution at steps where DUT configurations are required. KNC offers REST API based automation support enabling users to seamlessly integrate the tool with their automation and CI/CD environments.

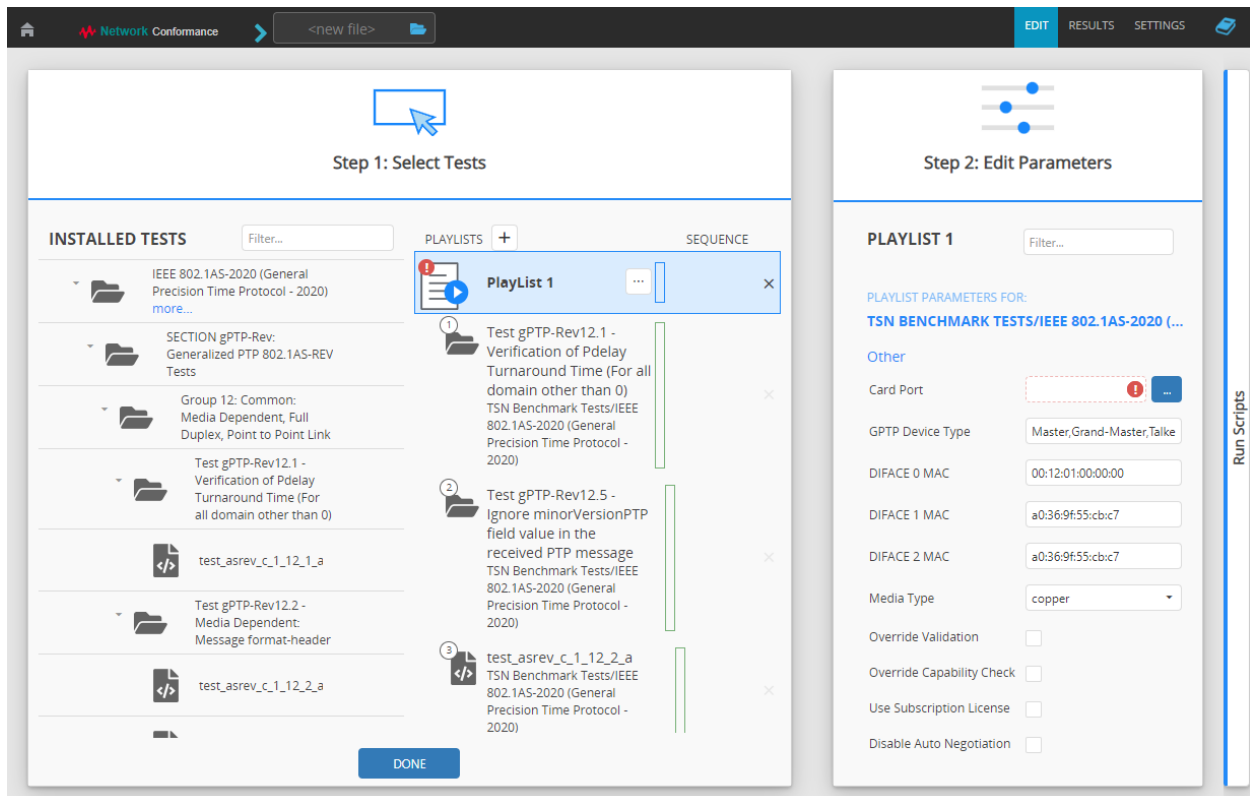


Figure 7. KNC edit view

Portability, Power, and Performance

Equipped with powerful multi-core, multi-threaded network processors, Novus mini uses Keysight's next-generation architecture designed to meet highly precise testing needs. Because of its compact and highly affordable form-factor and reduced power requirements, the Novus mini is a great option for customers who need high-performance testing yet are constrained by space, power, and affordability. A single Novus mini fixed chassis allows emulation of multiple time sensitive traffic endpoints. The system provides enhanced accuracy pertaining to latency measurements, with a resolution of up to 3.2 ns to deliver line-rate performance, including small 64-byte packets.

Key Features

- Full line-rate traffic generation to evaluate ASIC designs, FPGAs, and hardware switch fabrics.
- Scale and performance for emulating L2/3 protocols by using the Keysight IxNetwork application.
- Extensive port and traffic flow statistics.
- Support for extensive TSN capabilities includes 802.1AS-2011, 802.1AS-2020, 802.1Qav, 802.1Qbv, 802.1Qat, 802.1CB, and 1722.
- Support for Avnu conformance test plans, includes Avnu Automotive, Avnu Industrial, and Avnu Component test packages.
- Support for Keysight defined TSN Conformance test package, includes conformance for 802.1AS-2011, 2020, 802.1Qbv, 802.1Qci, and 802.1CB.
- Industry-standard RFC tests, including RFC2544, RFC2889, RFC3918 (requires four ports), and protocol emulation on 2.5G, 1G, 100M or 10M ports.
- Support for MACsec 802.1AE.
- 4-Speed 2.5G, 1G, 100M, and 10M line-rate packet capture and decode tools to detect and debug data transmission errors.
- Native 100/1000 BASE-T1 and 10BASE-T1S interfaces on Novus Mini and Novus Mini Pro automotive variants.
- Full automation support with Python, REST, and other APIs for continuous validation
-  Avnu Certification Test Tool (CTT) — Component 802.1AS, 802.1Qbv, 802.1Qbu and Switch 802.1BA

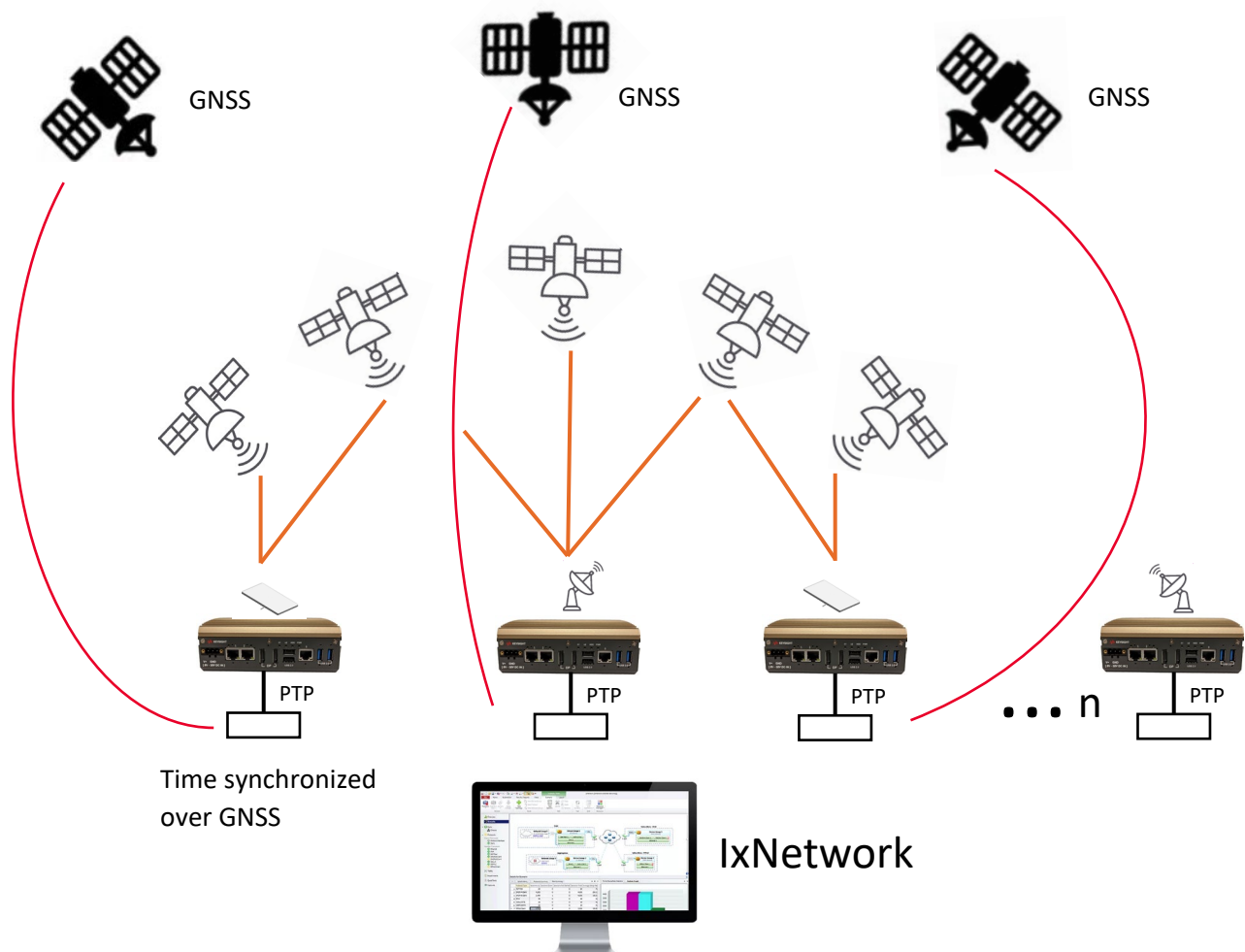
Novus mini Synchronization

Synchronize multiple Novus mini compact testers with Precision Time Protocol (PTP) to allow for distributed testing or increased channel count.

Non-Terrestrial networks can be tested by using PTP synchronization using the Global Navigation Satellite System (GNSS). GNSS provides a highly accurate, UTC-traceable time source, providing nanosecond-level accuracy for distributed networks.

Non-Terrestrial Networks

Measure Latency and Throughput



Specifications

Novus Mini

Number of ports	3-Port	4-Port	Automotive – 6 port
Port speeds	2.5/1000/100/10BASE-T	2.5/1000/100/10BASE-T	2.5/1000/100/10BASE-T 1000/100BASE-T1 10BASE-T1S
Part number	NTNM00100A option 003	NTNM00100A option 004	NTNM00100A option AUT
Hardware Specifications			
Physical interfaces	RJ-45	RJ-45	RJ-45, H-MTD, Terminal block
CPU and memory	Multicore processor with 16 GB of CPU memory per appliance		
Cable media	CAT5e, CAT6, CAT6A	CAT5e, CAT6, CAT6A	CAT5e, CAT6, CAT6A SPE(Single-Pair Ethernet, on automotive only)
Appliance dimensions	2.2" (H) x 6.02" (W) x 4.25" (D) 56 mm (H) x 153 mm (W) x 108 mm (D)		
Appliance weights	Appliance only: 2.11 lbs. (0.96 kg)		
Temperature (Ambient air)	Operating: 32 °F to 104 °F (0 °C to 40 °C) Storage: -13 °F to 185 °F (-25 °C to 85 °C)		
Power	Input: 100 – 240 VAC, 50-60 Hz, 1.4 A Output: 20 VDC, 6 A, Max power: 120 W		
Humidity (Ambient air)	Operating: 10% to 90%, non-condensing Storage: 0% to 85%, non-condensing		

Novus mini Pro

Number of ports	6-Port	Automotive – 10-Port
Port speeds	2.5/1000/100/10BASE-T	2.5/1000/100/10BASE-T 1000/100BASE-T1 10BASE-T1S
Part number	NTNM01000A option 006	NTNM01000A Option AUT
Hardware Specifications		
Physical interfaces	RJ-45	RJ-45, H-MTD, Terminal block
CPU and memory	Multicore processor with 32 GB of CPU memory per appliance	
Cable media	CAT5e, CAT6, CAT6A	CAT5e, CAT6, CAT6A SPE(Single-Pair Ethernet, on automotive only)
Appliance dimensions	3.11" (H) x 9.44" (W) x 8.85" (D) 79 mm (H) x 240 mm (W) x 225 mm (D)	
Appliance weights	Appliance only: 9.7 lbs. (4.4 kg)	
Temperature (Ambient air)	Operating: 32 °F to 104 °F (0 °C to 40 °C) Storage: -13 °F to 185 °F (-25 °C to 85 °C)	
Power	Input: 100 – 240 VAC, 50-60 Hz, 1.4 A Output: 20 VDC, 6 A, Max power: 120 W	
Humidity (Ambient air)	Operating: 10 % to 90 %, non-condensing Storage: 0 % to 85 %, non-condensing	

Novus mini and Novus mini Pro

Transmit Feature Specifications

Transmit engine	Wire-speed packet generation with timestamps, sequence numbers, data integrity signature, and packet group signatures
Max. Streams per port	64
Stream controls	Rate and frame size change on the fly, sequential and advanced stream scheduler
Minimum frame size	64 bytes at
Maximum frame size	1518 bytes
Maximum jumbo frame size	9728 bytes BASE-T 2000 bytes BASE-T1S 1522 bytes BASE-T1
Frame length controls	Fixed, increment by user-defined step, weighted pairs, uniform, repeatable random, IMIX, and Quad Gaussian
User-Defined Fields (UDF)	Fixed, increment or decrement by user-defined step, sequence, value list, and random configurations.
Error generation	Bad checksum generation
Hardware checksum generation	Checksum generation and verification for IPv4
Latency measurement resolution	3.2 nanoseconds BASE-T 8.0 nanoseconds BASE-T1/BASE-T1S 50 nanoseconds when synchronized with PTP 150 nanoseconds when synchronized with PTP over GNSS

Receive Feature Specifications

Receive engine	Wire-speed packet filtering, capturing, real-time latency, and inter-arrival time for each packet group, with data integrity, sequence and advanced sequence checking capability
Trackable receive flows per port	4096 trackable flows per port 4096 flow groups per port
Minimum frame size	64 bytes at full line rate into the capture buffer
Capture buffer	512 MB per port
Statistics and rates	Link state, line speed, frames sent, valid frames received, bytes sent/received, fragments, undersize, oversize, CRC errors, VLAN tagged frames, 6 user-defined stats, data integrity frames, data integrity errors, sequence and advanced sequence checking frames, sequence checking errors, Qbv Gate Statistics
Latency measurements	Cut-through, store and forward

Quantity of Ports

	RJ45 port (2.5G/1G/100M/10M)	100/1000BASE-T1	10BASE-T1S	Timing Ports
Novus mini				
3 ports	3	0	0	None
4 ports	4	0	0	1pps in/out, 10 Mhz reference
Automotive	3	2	1	1pps in/out
Novus mini Pro				
6 ports	6	0	0	1pps in/out, 10 Mhz reference
Automotive	6	3	1	1pps in/out

Novus mini and Novus mini Pro

Layer 2-3 Protocol Support

0	0	0	1	1		NTXNM0100A: Basic
1	1	2	0	1		NTXNM0150A: Timing: Basic + Timing
0	5	0	0	0		NTXNM0200A: TSN: Basic + Timing + TSN
0	0	0	0	0		NTXNM1000A: Advance: Basic + Timing + TSN + Routing
A	A	A	A	A		NTXNM1100A: Professional: Basic + Timing + TSN + Routing + SDN + 5G
●	●	●	●	●	Basic	Ethernet, IPv4, IPv6, Traffic Emulation, RFC2544/2889/3918 Quicktest
	●	●	●	●	Timing	IEEE 1588v2, IEEE 802.1AS, IEEE 802.1AS-2020, IEEE 802.1AS-HDE, SMPTE ST 2059-2, AES-67, IEEE C37-238-Power
	●	●	●	●	Industrial Ethernet	CFM IEEE 802.1ag Service OAM ITU-T Y.1731, IEEE 1588v2 (PTP)
		●	●	●	Time sensitive networking	IEEE 802.1AS-2011 and IEEE 802.1AS-2020 (General Precision Time Protocol), IEEE 802.1Qav (Forwarding & Queuing of Time Sensitive Streams), IEEE 802.1Qbv (Enhancements for Scheduled Traffic), IEEE 802.1Qat (Stream Reservation Protocol), IEEE 802.1CB (Frame Replication and Elimination), IEEE 802.1Qci (Per Stream Filtering & Policing), IEEE 1722 (AVTP), Netconf
			●	●	MPLS	RSVP-TE P2P / RSVP-TE P2MP LDP / LDPv6 / mLDP L3 MPLS VPN / 6VPE / 6PE L2 LDP VPN / PWE / VPLS BGP VPLS / VPWS BGP RFC3107 EVPN / PBB-EVPN Multicast VPN NG MPLS OAM MPLS over GRE MPLS over UDP
			●	●	Broadband and authentication	PPPoE / L2TPv2 DHCPv4 / DHCPv6 DHCPv4 / DHCPv6 over EoGRE IPv6 Autoconfiguration (SLAAC) Bonded GRE IGMP / MLD 802.1x ANCP
			●	●	Routing and switching	BGPv4 / BGPv6 ISISv4 / ISISv6 OSPFv2 / OSPFv3 PIM-SM / PIM-SSM BFD STP / RSTP / MSTP LACP / Static LAG / Protocols over LACP (PoLACP)
			●	●	Data center Ethernet	DCBX / LLDP FCoE Forwarder FabricPath TRILL
				●	TSN over 5G	TSN protocols for 5G Networks, includes NW-TT and DS-TT emulation. (Only available on Novus mini Pro)
				●	Software defined network	Segment Routing BGP Prefix SID, Segment Routing ISIS, Segment Routing OSPF, Segment Routing v6 / G-SRv6, Segment Routing v6 / G-SRv6 OAM, BGP FlowSpec, BGP Link State (BGP-LS), BGP SR TE Policy, BIER, OpenFlow, OVSD, PCEP, S-BFD, GENEVE, VXLAN, VXLAN EVPN, ISIS / OSPFv2 Flex-Algo, gRIBI (Only available on Novus mini Pro)
○	○	○	○	○	MACsec	MACsec Test Solution is an optional feature available with all IxNetwork levels

Ordering Information

Novus mini (Required)

Part Number	Options	Description
NTNM00100A	003 – 3 ports	Includes Novus mini chassis with 3 ports and a management port with the included USB to Ethernet adapter
NTNM00100A	004 – 4 ports	Includes Novus mini chassis with 4 ports and a management port with the included USB to Ethernet adapter. Also includes 1pps (input), 1pps (output) and 10 MHz (output)
NTNM00100A	AUT – 6 ports, including automotive interface	Includes Novus mini chassis with 3 RJ45 ports, 2 100/1000 BASE-T1, 1 10BASE-T1S and a management port with the included USB to Ethernet adapter. Also includes 1pps (input), 1pps (output)

Novus mini Pro (Required)

Part Number	Options	Description
NTNM01000A	006 – 6 ports	Includes Novus mini Pro chassis with 6 ports and a management port. Also includes 1pps (input), 1pps (output) and 10 MHz (output)
NTNM01000A	AUT – 10 ports, including automotive interface	Includes Novus mini Pro chassis with 6 RJ45 ports, 3 100/1000 BASE-T1, 1 10BASE-T1S ports and a management port. Also includes 1pps (input), 1pps (output)

IxNetwork

Part Number	Options	Description
NTXNM0100A	SW-LIC-01 Perpetual license SW-SUB-01 Subscription	IxNetwork Basic package for Novus mini and Novus mini Pro. Includes Ethernet, IPv4, IPv6, Traffic Emulation, RFC2544/2889/3918 Quicktest
NTXNM0150A	SW-LIC-01 Perpetual license SW-SUB-01 Subscription	IxNetwork Basic plus timing for Novus mini and Novus mini Pro. Includes gPTP (802.1AS-2011 and 802.1AS-2020), IEEE 1588v2, IEEE 802.1AS-HDE, SMPTE ST 2059-2, AES-67, IEEE C37-238-Power
NTXNM0200A	SW-LIC-01 Perpetual license SW-SUB-01 Subscription	IxNetwork Basic plus timing and TSN for Novus mini and Novus mini Pro. Includes TSN – gPTP (802.1AS-2011 and 802.1AS-2020), Qbv Scheduled Traffic, 1CB Redundancy, Qav CBS, MSRP, 1722 and 1733 protocol and Netconf
NTXNM1000A	SW-LIC-01 Perpetual license SW-SUB-01 Subscription	IxNetwork Advanced package for Novus mini and Novus mini Pro. Includes TSN and routing protocols
NTXNM1100A	SW-LIC-01 Perpetual license SW-SUB-01 Subscription	IxNetwork Professional package for Novus mini Pro. Includes TSN, 5G protocols for TSN (NW-TT and DS-TT emulation), Routing protocols, SDN protocols
NTXNM2000A	SW-LIC-01 Perpetual license SW-SUB-01 Subscription	IxNetwork MACsec encryption test package

MACsec Encryption

Part Number	Options	Description
NTXNM2000A	SW-LIC-01 Perpetual license SW-SUB-01 Subscription	IxNetwork MACsec encryption test package

Keysight Network Conformance (KNC)

Part Number	Options	Description
NTNCM0100A	SW-LIC-01 Perpetual license SW-SUB-01 Subscription	Avnu Conformance Bundle for Novus mini. Includes automated test for Avnu Automotive, Industrial, Component and Switch test plans
NTNCM0200A	SW-LIC-01 Perpetual license SW-SUB-01 Subscription	Keysight TSN Conformance for Novus mini. Includes automated test for 802.1AS, 802.1Qbv, 802.1Qci, 802.1CB
NTNCM0300A	SW-LIC-01 Perpetual license SW-SUB-01 Subscription	Bundle of Avnu Conformance Bundle (NTNCM0100A) and Keysight TSN Conformance (NTNCM0200A)
NTNCM1700A	SW-LIC-01 Perpetual license SW-SUB-01 Subscription	MACsec protocol conformance - includes OPEN Alliance-TC17
NTNCM1400A	SW-LIC-01 Perpetual license SW-SUB-01 Subscription	Automotive protocol conformance OPEN Alliance Ethernet ECU-TC8

More Information

For more information, see the following URL:

<https://www.keysight.com/us/en/products/network-test/network-test-hardware/novus-mini.html>

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