ATxTel

ATX-BENCHMARK-XP SERIES NETWORK TESTERS

HIGH-PERFORMANCE L2-7 TEST PLATFORM

INTRODUCTION

ATX-BENCHMARK-XP Series network test platform was specifically created to verify the performance of core routers, switches, data center switches, and application-layer devices, designed to meet the high-port density and scalability required by the increasing demand of the network.

With its modular design, ATX-BENCHMARK-XP Series chassis is the next generation in chassis architecture equipped with 3 or 12 slots and support line-rate Ethernet interfaces from 1GbE to 800GbE and are 1.6TB ready to enable on-demand scalability and help companies deal with increasing test demands and future development.

The supported ATX-RENIX and ATX-ALPS software applications and our X-Series test modules provided comprehensive Layer 2-7 traffic tests and complex multiprotocol emulation for various network devices and systems. As a full-featured testing solution in functionality, performance, and security, the ATX-BENCHMARK-XP Series meets the complex requirements of network equipment testing for hardware and software development, system testing for the chip/component, telecommunications equipment, and pre-production verification.

CHASSIS

ATX-BENCHMARK-XP 3000

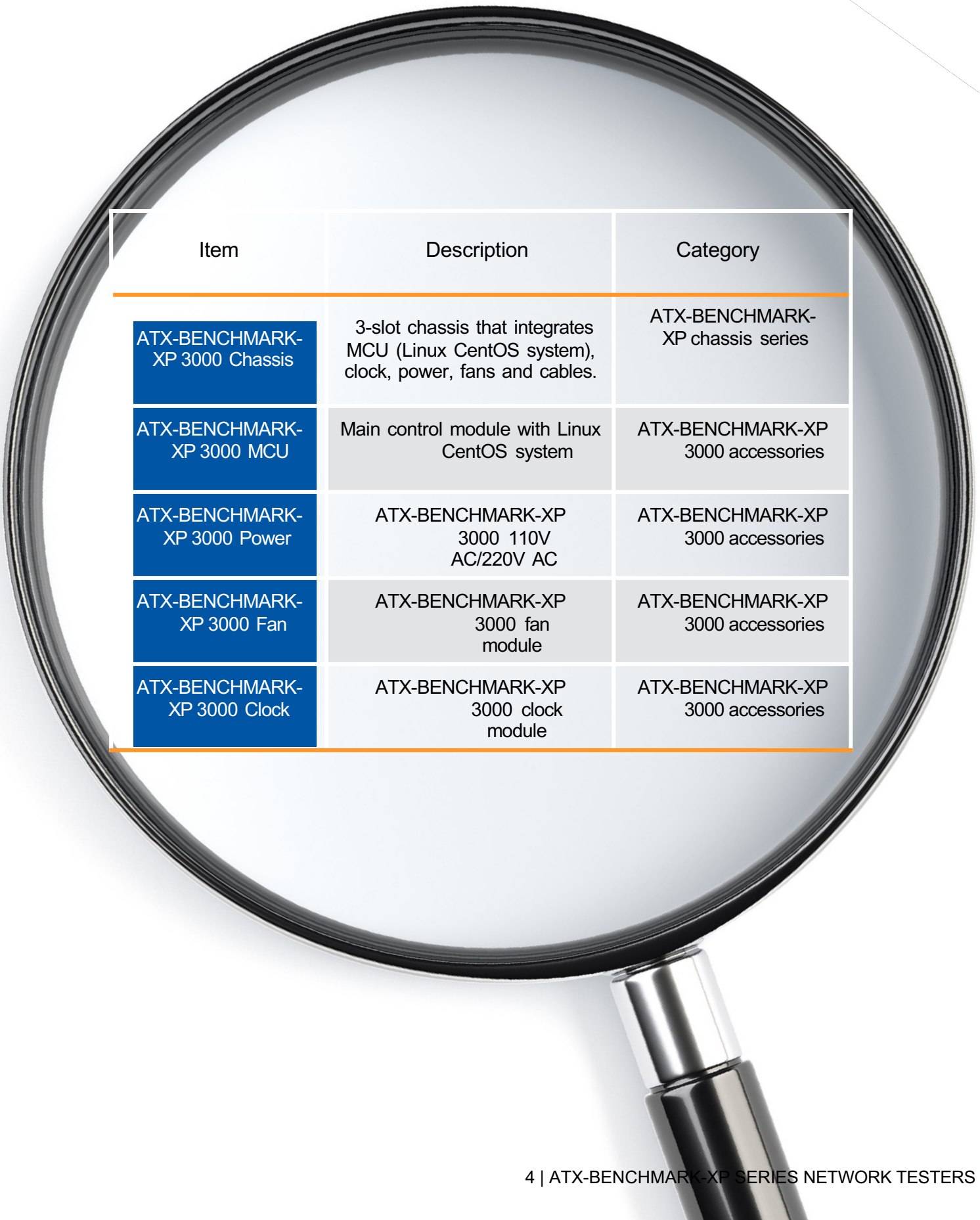
ATX-BENCHMARK-XP 3000 chassis supports ATxTel's next generation of X-Series multi-rate test modules from 1GbE to 400GbE in a portable form factor. The ATX-BENCHMARK provides a built-in dashboard, intelligent power supply, fan control, and lighting-fast firmware upgrades.

With ATX-RENIX, new PCT-based test software, and X-Series test modules, the ATX-BENCHMARK-XP 3000 enables Layer 2-7 traffic tests and protocol emulation of various network devices and systems. As a full-featured testing solution in functions, performance and security, it meets multiple test requirements from R&D, experiments, and quality control validation.

Key Features

- Single test platform covering Layer 2-7 traffic emulation, suitable for large-scale core-router stress testing, testing highest scale multi-chassis switch fabric with deep functionality protocol emulation
- Ultrahigh-performance chassis with 3 slots, allowing up to 12 x 400GbE ports
- Support for various port speeds, including 400GbE/100GbE/40GbE/25GbE/10 GbE/5GbE/2.5GbE/GbE ports
- Modular design with field-replaceable power and fans, allowing easier maintenance
- Daisy chain multiple chassis for large-scale testing
- Hot-swappable modules
- Multiple users per test module for greater efficiency of resources
- Download local software with web browser
- ATX-RenixAPI interface to support TCL and Python automated testing

Product Information



Item	Description	Category
ATX-BENCHMARK-XP 3000 Chassis	3-slot chassis that integrates MCU (Linux CentOS system), clock, power, fans and cables.	ATX-BENCHMARK-XP chassis series
ATX-BENCHMARK-XP 3000 MCU	Main control module with Linux CentOS system	ATX-BENCHMARK-XP 3000 accessories
ATX-BENCHMARK-XP 3000 Power	ATX-BENCHMARK-XP 3000 110V AC/220V AC	ATX-BENCHMARK-XP 3000 accessories
ATX-BENCHMARK-XP 3000 Fan	ATX-BENCHMARK-XP 3000 fan module	ATX-BENCHMARK-XP 3000 accessories
ATX-BENCHMARK-XP 3000 Clock	ATX-BENCHMARK-XP 3000 clock module	ATX-BENCHMARK-XP 3000 accessories

ATX-BENCHMARK-XP 3000 Chassis System Specification	
Slots	3
Size（W×H×D）	482.6mm×178mm×686mm (19ins×7ins×27ins)
Weight	Empty chassis with panels: about 25 kg (55.1lbs) With all board cards: about 46 kg (101.4lbs)
Maximum power supply	No-load power: 300W Maximum power: 3300W
Indicators and controls	Rear AC power Power, Fan, Temp, Link LED indicator and LCD Reset control of MCU LCD button
Connectors	1 DB15 display interface 1 RJ45 10/100/1000M management interface 1 RJ45 10/100/1000M 1588 clock interface (reserved) 1 RJ45 RS232 serial interface 1 SYNC-OUT and 1 SYNC-IN chassis cascade interface 1 DB9 GPS RS232 serial interface 1 1PPS and 1 10MHz input BNC 2 USB Type-A interfaces
Temperature	Work: 32°F to 95°F (0°C to 35°C) Storage: -40°F to 158°F (-40°C to 70°C)
Humidity	Work: 20%-85% RH, condensation Free Storage: 20%-85% RH
Power supply	4-channel 110V AC/220V AC 50/60Hz@10A single-phase power input
Operating system	CentOS7.X, 64bit
Administration and operation	IPv4 network management IP address modification and status inquiry through the dashboard IP address modification and status inquiry at SSH terminals IP address modification and status inquiry through connected display and keyboard Client downloading, IP address modification and status inquiry from webpage License and hardware management through client software
Client software	ATX-RENIX test platform: L2-3 traffic test and protocol emulation ALPS software platform: L4-7 application protocol emulation
Client system requirements	System: Microsoft Windows 7/ Windows 10/Windows Server 2012 R2 standard CPU: i3-6100 CPU @ 3.70GHz and above Memory: 4 GbE and above
Board card support	X2-10G-16F-HD Series 10GbE functional test modules (1GbE/10GbE) X2-10G-16C-HQ Series 5-rate copper (100M/1GbE/2.5GbE/5GbE/10GbE) X2-100G-4QSFP28 Series 4-port 100GbE multi-rate functional test modules (10GbE/25GbE/40GbE/100GbE)

CHASSIS

ATX-BENCHMARK-XP 12000

The ATX-BENCHMARK-XP 12000 chassis supports ATxTel's next generation of X-Series multi-rate test modules from 1GbE to 400GbE. ATX-BENCHMARK provides a built-in dashboard, intelligent power supply, fan control and fast firmware upgrades, significantly reducing testing costs of network devices and environment.

Combined with ATX-RENIX, new PCT-based test software and X-Series test modules, the ATX-BENCHMARK-XP 12000 enables Layer 2-7 traffic tests and protocol emulation of a range of network devices and systems. As a full-featured testing solution in functions, performance, and security, it can meet various test requirements from R&D, experiments, and quality control validation.

Key Features

- Single test platform covering Layer 2-7 traffic emulation, suitable for large scale core-router stress testing, testing highest scale multi-chassis switch fabric with deep functionality protocol emulation
- Ultra high-performance chassis with 12 slots, allowing up to 48 x 400GbE ports
- Support for various port speed, including 400GbE/200GbE/100GbE/50GbE/40GbE/25 GbE/10GbE/5GbE/2.5GbE/GbE ports
- Modular design with field-replaceable power and fans, allowing easier maintenance
- Daisy chain multiple chassis for large-scale testing
- Hot swappable modules
- Multiple users per test module for greater efficiency of resources
- Familiar user interface and API
- Downloading of local software with web browser
- ATX-RENIXAPI interface to support TCL and Python automated testing

Product Information

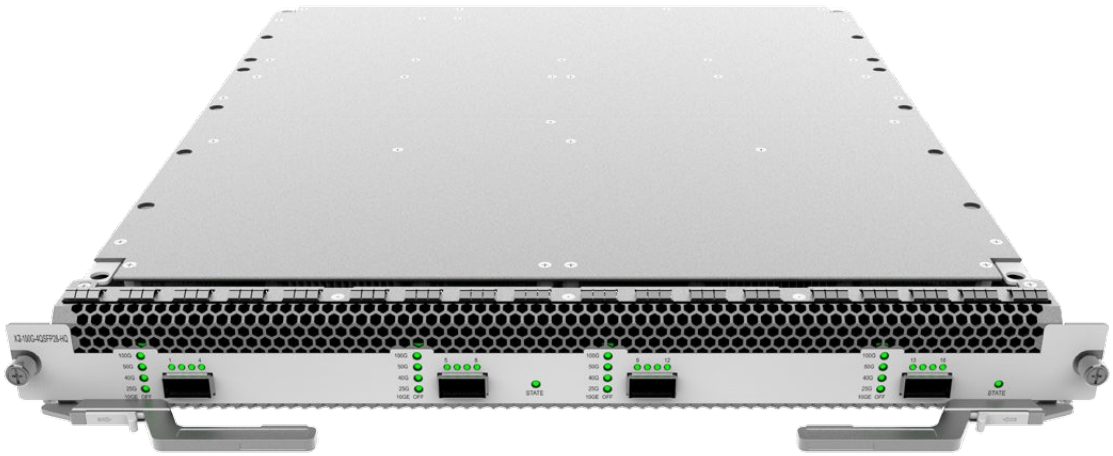
Item	Description	Category
ATX-BENCHMARK-XP 12000 Chassis	12-slot chassis that integrates MCU (Linux CentOS system), clock, power, fans and cables.	ATX-BENCHMARK-XP chassis series
ATX-BENCHMARK-XP 12000 MCU	Main control module with Linux CentOS system	ATX-BENCHMARK-XP 12000 chassis accessories
ATX-BENCHMARK-XP 12000 Power	ATX-BENCHMARK-XP 12000 110V AC/220V AC power module	ATX-BENCHMARK-XP 12000 chassis accessories
ATX-BENCHMARK-XP 12000 Fan	ATX-BENCHMARK-XP 12000 fan module	ATX-BENCHMARK-XP 12000 chassis accessories
ATX-BENCHMARK-XP 12000 Clock	ATX-BENCHMARK-XP 12000 clock module	ATX-BENCHMARK-XP 12000 chassis accessories

ATX-BENCHMARK-XP 12000 Chassis System Specification	
Slots	12
Size(W×H×D)	442mm×622.3mm×815mm (17.4ins×24.5ins×32.1ins)
Weight	Empty chassis with panels: about 108kg(238.1lbs) With all board cards: about 209kg(460.8lbs)
Maximum power supply capacity of the system	No-load power: 650W Maximum power: 12,000W (4 power modules) or 24,000W (8 power modules)
Indicators and controls	Rear AC power Power, Fan, Temp, Link LED indicator and LCD Reset control of MCU LCD button
Connectors	1 DB15 display interface 1 RJ45 10/100/1000M management interface 1 RJ45 10/100/1000M 1588 clock interface (reserved) 1 RJ45 RS232 serial interface 5 SYNC-OUT and 1 SYNC-IN chassis cascade interfaces 1 DB9 GPS RS232 serial interface 1 1PPS and 1 10MHz input BNC 4 USB Type-A interfaces
Temperature	Work: 32°F to 95°F (0°C to 35°C) Storage: -40°F to 158°F (-40°C to 70°C)
Humidity	Work: 20%-85% RH, condensation Free Storage: 20%-85% RH
Power	8-channel 110V AC/220V AC 50/60Hz@16A single-phase power input
Operating system	CentOS7.X, 64bit
Administration and operation	IPv4 network management IP address modification and status inquiry through the dashboard IP address modification and status inquiry at SSH terminals IP address modification and status inquiry through connected display and keyboard Client downloading, IP address modification and status inquiry from webpage License and hardware management through client software
Client software	ATX-RENIX test platform: L2-3 traffic test and protocol emulation ALPS software platform: L4-7 application protocol emulation
Client system requirements	System: Microsoft Windows 7/ Windows 10/Windows Server 2012 R2 standard CPU: i3-6100 CPU @ 3.70GHz and above Memory: 4 GbE and above
Board card support	ATX-X2-10G-16F-HD Series 10GbE functional test modules (1GbE/10GbE) ATX-X2-10G-16C-HQ Series 5-rate copper (100M/1GbE/2.5GbE/5GbE/10GbE) ATX-X2-100G-4QSFP28 Series 4-port 100GbE multi-rate functional test modules (10GbE/25GbE/40GbE/100GbE)

BOARD CARDS

ATX-X2-100G SERIES BOARD CARDS

With cutting-edge L2-7 traffic generation and analysis, ATxTel's ATX-X2-100G multi-rate test module supports large-scale router protocols and traffic emulation and enables ATX-BENCHMARK standard tests (e.g. RFC2544, RFC2889 and RFC3918), function tests, performance tests, and long-term stability & reliability tests on ultrahigh-density network devices covering 100GbE/40GbE/25GbE/10GbE.



Key Features

- Native QSFP28 100GbE interface, compatible for 100GbE/40GbE/25GbE/10GbE
- Emulation support for large-scale L2-3 traffic and router protocols
- Single-port statistics of up to 64K standalone messaging and 128K traffic
- Single-port support for 2 million discrete router tables added
- Ultimate performance tests of routers, multicast, access, MPLS, VXLAN and SR protocols
- 100% line rate traffic generation, statistics and capture based on FPGA
- Support for ATX-BENCHMARK test suites like RFC2544, RFC2889 and RFC3918
- L4-7 traffic test and protocol emulation

Product Information

Item	Description	Category
ATX-X2-100G-4QSFP28-HQ test module	4-port and 4-rate 100GbE /40GbE/25GbE/10GbE performance test module	ATX-BENCHMARK-XP test module
ATX-X2-100G-4QSFP28-HT test module	4 -port and 3-rate 10GbE/40GbE/100GbE performance test module	ATX-BENCHMARK-XP test module
ATX-X2-100G-4QSFP28-HD test module	4-port and 2-rate 25GbE/100GbE performance test module	ATX-BENCHMARK-XP test module
ATX-X2-100G-4QSFP28-HS test module	4-port and single-rate 100GbE performance test module	ATX-BENCHMARK-XP test module
ATX-X2-40G-4QSFP28-HS test module	4-port and single-rate 40GbE performance test module	ATX-BENCHMARK-XP test module
ATX-X2-100G-2QSFP28-HQ test module	2-port and 4-rate 100GbE performance test module	ATX-BENCHMARK-XP test module
ATX-X2-100G-2QSFP28-HT test module	2-port and 3-rate 10GbE/40GbE/100GbE performance test module	ATX-BENCHMARK-XP test module
ATX-X2-100G-2QSFP28-HD test module	2-port and 2-rate 25GbE/100GbE performance test module	ATX-BENCHMARK-XP test module
ATX-X2-100G-2QSFP28-HS test module	2-port and single-rate 100GbE performance test module	ATX-BENCHMARK-XP test module
ATX-X2-40G-2QSFP28-HS test module	2-port and single-rate 40G performance test module	ATX-BENCHMARK-XP test module

ATX-X2-100G SERIES BOARD CARDS Specification	
Hardware and Electrical Characteristics	
Port rate	Optical port: 100GbE/40GbE/25GbE/10GbE
Port density	Up to 4 interfaces per slot
Interface standard	100GbE: 100GBASE-SR4, 100GBASE-LR4; 40GbE: 40GBASE-SR4, 40GBASE-LR4; 25GbE: 25GBASE-SR; 10GbE: 10GBASESR; QSFP28 to SFP28 breakout cable options; Clause 74 BASE-R FEC, Clause 91 RS-FEC and Clause 108 RS-FEC
Port occupancy	Occupied by single port
Rate switching	Rate switch by group that includes two ports
Module weight (kg)	8KG (17.6lbs)
Module size (W×H×D)	437mm×45.32mm×468.746mm (17.2ins×1.8ins×18.5ins)
Working temperature	32°F to 95°F (0°C to 35°C)
Relative working humidity	20% to 85%
Maximum power consumption (W)	400W
Traffic Generation	
Stream per port	100GbE/40GbE: 64K; 25GbE/10GbE: 32K
Frame length (byte)	64-16383
Frame length type	Fixed, increment, decrement, random, automated, IMIX, etc.
VFDs per stream	6 VFD fields for each traffic flow; Support for fixed, increment, decrement, list and random and other VFD modes.
Entries of router table added	100GbE/40GbE port: 2 million entries; 25GbE/10GbE port: 500,000 entries
Generation model	Port-based: Continuous, Burst and Time Traffic-based: Continuous and Burst
Speed regulation mode	Port-based and traffic-based modulation
Delay and jitter settings	Four latency test modes: LIFO, FIFO, LILO and FILO
Frame timestamp resolution	2.5 nanoseconds
Stream Template	A range of built-in message templates, such as VLAN, ICMP, PPPoE, GRE, DHCP, L2TP, IPv6, MPLS, GTP, GOOSE, VXLAN, OSPF, TCP and UDP.
Custom packet	Support customization with edited message templates; Apply checksum to user defined fields.
User-defined data	Support 16K-byte user-defined data, in which the first 256 bytes support VFD
Flow Control	Full duplex traffic control
Error Generation	CRC error or oversize frame
Traffic Statistics	
Stream per port	100GbE/40GbE: 128K； 25GbE/10GbE: 64K
Statistical mode	Tables, charts and autosaved Excel files

ATX-X2-100G SERIES BOARD CARDS Specification	
Statistics item (port)	Tx/Rx frames, Tx/Rx frame rate, Rx bandwidth, error frame statistics, filtering statistics and custom statistics, FCS error statistics, TCP / UDP Checksum error, pause frame statistics and average latency, etc.
Statistics item(stream)	Tx/Rx frames, Tx/Rx stream rate, Rx bandwidth, error frame statistics, real-time packet loss statistics, out-of-order statistics, delay jitter and custom statistics, etc.
Statistical operation	Support the sequencing of statistical results, mathematical operations like addition, subtraction, division and multiplication, and user-defined quantity statistics by pages, etc.
Traffic Capture	
Capture Buffer/port (byte)	1MB per 100GbE or 40GbE port 256K per 25GbE or 10GbE port
Capture type	Capture the Rx frame of data and control plane Capture Tx and Rx frame of control plane Capture frame based on filter template Capture frame based on error message Support loopback capture Support downloading a specified number of captured messages
Protocol Emulation	
Routing and MPLS	RIPv1v2, RIPng, OSPFv2, OSPFv3, ISISv4, ISISv6, BGP, BGP4+, LDP, MPLS L3VPN, VPLS, VLL, 6VPE and 6PE
Access	PPPoE Client/Server, DHCPv4 Client/Server, DHCPv6 Client/Server, DHCPv6 PD Client/Server, L2TPv2 and 802.1x
Multicast	IGMPv1/v2/v3, MLDv1/v2, IGMP/MLD Querier and PIM-SM
Data center	VXLAN, OpenFlow, OVSDB, EVPN and LACP
Others	Automatic configuration of BFD, 802.1ag, 802.3ah and IPv6
Test suites	RFC2544, RFC2889, RFC3918, asymmetrical test and Smart Scripter
L4-7 protocol	HTTP, HTTPS, TCP, FTP, DNS, Mail (SMTP/POP3/IMAP), SSH, TFTP, Telnet, UDP, Application-Replay, etc.
Software Platform	
Client software	ATX-RENIX test platform: L2-3 traffic test and protocol emulation ALPS software platform: L4-7 application protocol emulation
API secondary development	TCL, Python3.x, GUIToTCL and GUIToPython
Interface language	English
Hardware Platform	
Adapter chassis	ATX-BENCHMARK-XP 3000 and ATX-BENCHMARK-XP 12000
Chassis operating system	Linux CentOS7.X

BOARD CARDS

X2-10G SERIES BOARD CARDS (COPPER)

With cutting-edge L2-7 traffic generation and analysis, ATxTel's ATX-X2-10GbE multi-rate test module supports large-scale router protocols and traffic emulation. It enables ATX-BENCHMARK standard tests (e.g., RFC2544, RFC2889, and RFC3918), function tests, performance tests, and long-term stability & reliability tests on ultrahigh-density 10GbE network devices.

Key Features

- RJ45 interface, compatible for 100M/1GbE/2.5GbE/5GbE/10GbE
- Emulation support for large-scale L2-3 traffic and router protocols
- Single-port statistics of up to 64K standalone messaging and 32K traffic
- Single-port support for 500,000 discrete router tables added
- Ultimate performance tests of routers, multicast, access, MPLS, VXLAN and SR protocols
- 100% linear rate traffic generation, statistics and capture based on FPGA
- Support for ATX-BENCHMARK test suites like RFC2544, RFC2889 and RFC3918
- L4-7 HTTP/TCP tests

Product Information

Item	Description	Category
X2-10G-16C-HQ test module	16-port RJ45 and 5-rate 100M/1GbE/2.5GbE/5GbE/10GbE	ATX-BENCHMARK-XP test module performance test module
X2-10G-8C-HQ test module	8-port RJ45 and 5-rate 100M/1GbE/2.5GbE/5GbE/10GbE performance test module	ATX-BENCHMARK-XP test module

ATX-X2-10G Series Board Cards (Copper) Specification	
Hardware and Electrical Characteristics	
Port rate	Copper: 100M/1GbE/2.5GbE/5GbE/10GbE
Port density	Up to 16 interfaces per slot
Interface standard	100BASE-T, 1000BASE-T, 2.5GBASE-T, 5GBASE-T and 10GBASE-T
Port occupancy	Occupied by single port
Rate switching	Rate switch by group that includes 8 ports
Module size (W×H×D)	437mm×45.32mm×468.746mm (17.2ins×1.8ins×18.5ins)
Operating temperature range	32°F to 95°F (0°C to 35°C)
Working relative humidity	20% to 85%
Maximum power consumption (W)	400W
Traffic Transmission	
Stream per port	32K
Frame length (bytes)	58-16383

ATX-X2-10G Series Board Cards (Copper) Specification	
Frame length type	Fixed, increment, decrement, random, automated, IMIX, etc.
VFDs per stream	6 jump fields for each traffic flow; Support for fixed, increment, decrement, list and random and other jump modes.
Entries of router table added	500,000 entries
Generation model	Port-based: Continuous, Burst and Time Traffic-based: Continuous and Burst
Speed regulation mode	Port-based and traffic-based modulation
Delay and jitter settings	Four latency test modes: LIFO, FIFO, LILO and FILO
Frame timestamp resolution	2.5 nanoseconds
Built-in message template	A range of built-in message templates, such as VLAN, ICMP, PPPoE, GRE, DHCP, L2TP, IPv6, MPLS, GTP, GOOSE, VXLAN, OSPF, TCP and UDP.
Custom data	Support customization with edited message templates; Apply checksum to user defined fields.
User defined data	Support 16K-byte user-defined data, in which the first 256 bytes support VDF
Flow Control	Full duplex traffic control
Error frame	CRC error or oversize frame
Traffic Statistics	
Stream per port	64K
Statistical mode	Tables, charts and autosaved Excel files
Statistics item (port)	Tx/Rx frames, Tx/Rx frame rate, Rx bandwidth, error frame statistics, filtering statistics and custom statistics, FCS error statistics, TCP / UDP Checksum error, pause frame statistics and average latency, etc.
Statistics item (stream)	Tx/Rx frames, Tx/Rx stream rate, Rx bandwidth, error frame statistics, real-time packet loss statistics, out-of-order statistics, delay jitter and custom statistics, etc.
Statistical operation	Support the sequencing of statistical results, mathematical operations like addition, subtraction, division and multiplication, and user-defined quantity statistics by pages, etc.

ATX-X2-10G Series Board Cards (Copper) Specification	
Traffic Capture	
Capture Buffer/port (byte)	256K
Capture type	Capture the Rx frame of data and control plane Capture Tx and Rx frame of control plane Capture frame based on filter template Capture frame based on error message Support loopback capture Support downloading a specified number of captured messages
Protocol Emulation	
Routing and MPLS	RIPv1v2, RIPng, OSPFv2, OSPFv3, ISISv4, ISISv6, BGP, BGP4+, LDP, MPLS L3VPN, VPLS, VLL, 6VPE and 6PE
Access	PPPoE Client/Server, DHCPv4 Client/Server, DHCPv6 Client/Server, DHCPv6 PD Client/Server, L2TPv2 and 802.1x
Multicast	IGMPv1/v2/v3, MLDv1/v2, IGMP/MLD Querier and PIM-SM
Data center	VXLAN, OpenFlow, OVSDB, EVPN and LACP
Others	Automatic configuration of BFD, 802.1ag, 802.3ah and IPv6
Test suites	RFC2544, RFC2889, RFC3918, asymmetrical test and Smart Scripter
L4-7 protocol	HTTP, HTTPS, TCP, FTP, DNS, Mail (SMTP/POP3/IMAP), SSH, TFTP, Telnet, UDP, Application-Replay, etc.
Software Platform	
Client software	ATX-RENIX software platform: L2-3 traffic test and protocol emulation ALPS software platform: L4-7 application protocol emulation
API secondary development	TCL, Python3.x, GUIToTCL and GUIToPython
Interface language	English
Hardware Platform	
Adapter chassis	ATX-BENCHMARK-XP 3000 and ATX-BENCHMARK-XP 12000
Chassis operating system	Linux CentOS7.X

BOARD CARDS

ATX-X2-10G SERIES BOARD CARDS (OPTICAL)

With cutting-edge L2-7 traffic generation and analysis features, ATxTel's ATX-X2-10G multi-rate test module supports large-scale router protocol and traffic emulation. It enables ATX-BENCHMARK tests (such as RFC2544, RFC2889, and RFC3918), function tests, performance tests, and long-term stability and reliability tests on ultrahigh-density 10GbE network devices.

Key Features

- SFP/SFP+ interface, compatible for 1GbE/10GbE
- Emulation support for large-scale L2-3 traffic and router protocols
- Single-port statistics of up to 64K standalone messaging and 32K traffic
- Single-port support for 500,000 discrete router tables added
- Ultimate performance tests of routers, multicast, access, MPLS, VXLAN and SR protocols
- 100% linear rate traffic generation, statistics and capture based on FPGA
- Support for ATX-BENCHMARK test suites like RFC2544, RFC2889 and RFC3918
- L4-7 HTTP/TCP tests

Product Information

Item	Description	Category
ATX-X2-10G-16F-HD test module	16-port SFP/SFP+ 1GbE/10GbE performance test module	ATX-BENCHMARK-XP test module
ATX-X2-10G-8F-HD test module	8-port SFP/SFP+ 1GbE/10GbE performance test module	ATX-BENCHMARK-XP test module

ATX-X2-10G Series Board Cards (Optical) Specification	
Hardware and Electrical Characteristics	
Port rate	Optical: 10GbE/1GbE
Port density	Up to 16 interfaces per slot
Interface standard	1000MBASE-SX/LX, 10GBASE-SR/SW and 10GBASE-LR/LW
Port occupancy	Occupied by single port
Module size (W×H×D)	437mm×45.32mm×468.746mm (17.2ins×1.8ins×18.5ins)
Operating temperature range	32°F to 95°F (0°C to 35°C)
Working relative humidity	20% to 85%
Maximum power consumption (W)	400W
Traffic Transmission	
Stream per port	32K
Frame length (bytes)	58-16383
Frame length type	Fixed, increment, decrement, random, automated, IMIX, etc.

ATX-X2-10G Series Board Cards (Optical) Specification	
VFDs Per Stream	6 VFD fields for each traffic flow; Support for fixed, increment, decrement, list and random and other VFD modes.
Entries of router table added	500,000 entries
Generation model	Port-based: Continuous, Burst and Time Traffic-based: Continuous and Burst
Speed regulation mode	Port-based and traffic-based modulation
Delay and jitter settings	Four latency test modes: LIFO, FIFO, LILO and FILO
Frame timestamp resolution	2.5 nanoseconds
Built-in message template	A range of built-in message templates, such as VLAN, ICMP, PPPoE, GRE, DHCP, L2TP, IPv6, MPLS, GTP, GOOSE, VXLAN, OSPF, TCP and UDP.
Custom data	Support customization with edited message templates; Apply checksum to user defined fields.
User defined data	Support 16K-byte user-defined data, in which the first 256 bytes support VFD
Flow Control	Full duplex traffic control
Error frame	CRC error or oversize frame
Traffic Statistics	
Stream per port	64K
Statistical mode	Tables, charts, autosaved excel files
Statistics item (port)	Tx/Rx frames, Tx/Rx frame rate, Rx bandwidth, error frame statistics, filtering statistics and custom statistics, FCS error statistics, TCP / UDP Checksum error, pause frame statistics and average latency, etc.
Statistics item (stream)	Tx/Rx frames, Tx/Rx stream rate, Rx bandwidth, error frame statistics, real-time packet loss statistics, out-of-order statistics, delay jitter and custom statistics, etc.
Statistical operation	Support the sequencing of statistical results, mathematical operations like addition, subtraction, division and multiplication, and user-defined quantity statistics by pages, etc.
Traffic Capture	
Capture Buffer/port (bytes)	256K

ATX-X2-10G Series Board Cards (Optical) Specification	
Capture type	Capture the Rx frame of data and control plane Capture Tx and Rx frame of control plane Capture frame based on filter template Capture frame based on error message Support loopback capture Support downloading a specified number of captured messages
Protocol Emulation	
Routing and MPLS	RIPv1v2, RIPng, OSPFv2, OSPFv3, ISISv4, ISISv6, BGP, BGP4+, LDP, MPLS L3VPN, VPLS, VLL, 6VPE and 6PE
Access	PPPoE Client/Server, DHCPv4 Client/Server, DHCPv6 Client/Server, DHCPv6 PD Client/Server, L2TPv2 and 802.1x
Multicast	IGMPv1/v2/v3, MLDv1/v2, IGMP/MLD Querier and PIM-SM
Data center	VXLAN, OpenFlow, OVSDB, EVPN and LACP
Others	Automatic configuration of BFD, 802.1ag, 802.3ah and IPv6
Test suites	RFC2544, RFC2889, RFC3918, asymmetrical test and Smart Scripter
Stateful L47 protocol	HTTP, HTTPS, TCP, FTP, DNS, Mail (SMTP/POP3/IMAP), SSH, TFTP, Telnet, UDP, Application-Replay, etc.
Software Platform	
Client software	ATX-RENIX software platform: L2-3 traffic test and protocol emulation ALPS software platform: L4-7 application protocol emulation
API secondary development	TCL, Python3.x, GUIToTCL and GUIToPython
Interface language	English
Hardware Platform	
Adapter chassis	ATX-BENCHMARK-XP 3000 and ATX-BENCHMARK-XP 12000
Chassis operating system	Linux CentOS7.X

SOFTWARE

ATX-RENIX TEST SOFTWARE

ATX-RENIX is an integrative datacom test software targeting diverse R&D tests of complicated network devices, such as switches, routers, and firewalls. Combined with ATxTel's chassis and interface cards, it ideally enables traffic tests, protocol emulation, and performance tests of DUTs.

In the era of evolving communication networks, network testers are confronted with tons of challenges, including complex software & hardware structure of network devices, various emerging protocols and rapid traffic explosion, as well as 5G-related features in ultrahigh bandwidth, massive connections, low latency and super reliability.

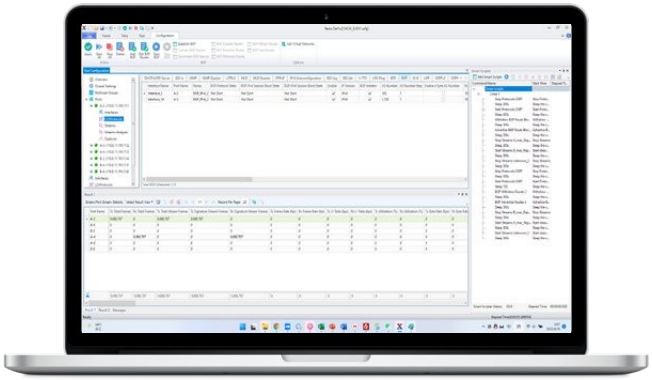
As an L2-3 test solutions leader, ATxTel has launched the new ATX-RENIX, the PCT-based test software platform to meet the testing requirements of large-scale NEMs, telecom operators, and data centers in complex test scenarios. This comprehensively improved platform highlights ease of use, functionality and scalability.

Key Features

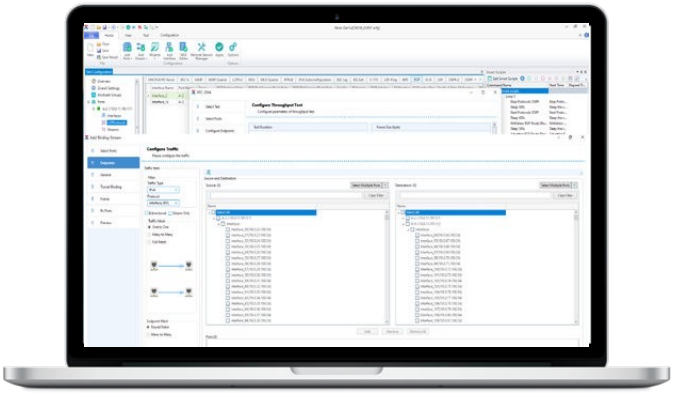
- A single test platform covering L2-7
- Intuitive and simple GUI in English
- 100M-400GbE port rate
- Powerful traffic configuration
- Efficient and easy-to-use configuration wizard
- Nestable packet capture and analysis
- Diverse and professional statistic views
- Convenient Smartscript
- Tailored test reports and result analysis system
- Support for Tcl and Python API secondary development

SOFTWARE HIGHLIGHTS

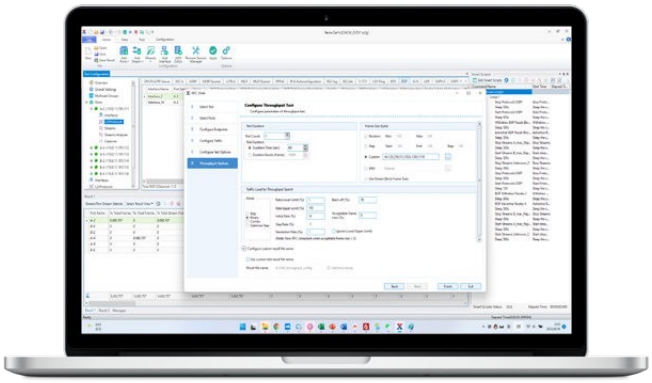
Easy-to-use GUI



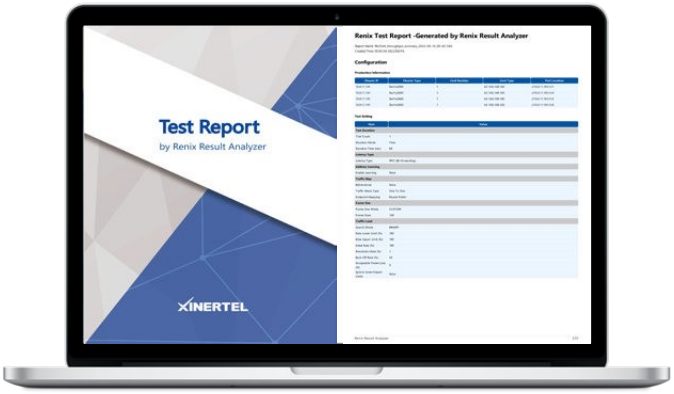
Full-featured module design



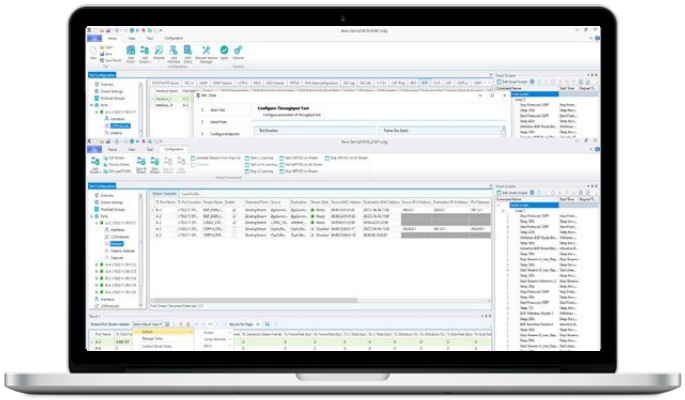
End-to-end test creation



Efficient and convenient configuration wizard



Test report and result analysis tool



Diverse statistic views

ATX-RENIX Test Software Specification	
Machine frame management	
Adapting machine frame	ATX-BENCHMARK-DVT 220, ATX-BENCHMARK-DVT 6200, ATX-BENCHMARK-XP3000 and ATX-BENCHMARK- XP12000
Frame operating system	Linux CentOS 7.6
Machine frame management	Add, delete, connect and disconnect chassis
Machine frame operation	Reset, shut and upgrade chassis, and check status
Port Management	
Port management	Migrate, online/offline and delete
License Management	
License management and operation	Install, clean, merge, delete and download
Multi-users/multi-processes	
Multi-users	Supported (up to 32 users)
Multi-processes	Supported
Send	
Frame length type	Fixed, increment (step setting supported), decrement (step setting supported), random (random seeds supported) and iMIX
Sending mode	Port-based: Continuous, Burst and Time Traffic-based: Continuous and Burst Sending mode: synchronous and asynchronous
Speed regulation mode	Port speed regulation and flow speed regulation
Stream template	Layer2, IPv4, IPv6, TCP, UDP, ARP, Pause, Goose, PPPoE, VLAN, MPLS, ICMP, IGMP, GRE, GTP, L2TPv2, L2TPv3, IPv6, OSPF, STP, MLD, IS-IS, etc.
Delay mode	LILO, FIFO, LIFO, FILO Latency mode configuration supported
Error Frame	CRC error, undersize frame and oversize frame
Statistics	
Statistical form	Tables (by pages) and charts
Statistical sampling	Real-time statistics
Functional support	Filter statistics
Statistical items	Tx/Rx frames, Tx/Rx rates, Rx bandwidth, error packet statistics, frame latency, latency jitter, real-time packet loss, filtering statistics, etc.
Capture	

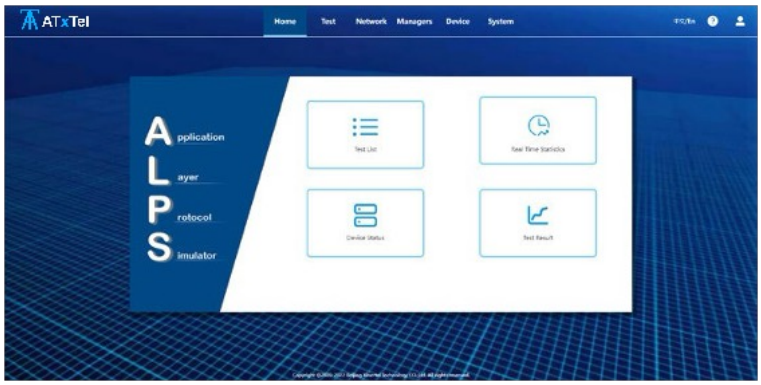
ATX-RENIX Test Software Specification	
Capture type	Rx/Tx capture of control plane Rx capture of data and control plane (linear rate) Rx messages including CRC Loopback capture
Capture filtering	User-defined capture: Eight traffic templates and user-defined byte Error frame capture: FCS Error, PRBS Error, IPv4 Checksum Error, TCP Checksum Error, UDP Checksum Error, IGMP Checksum Error and ICMP Checksum Error Length and ID capture: Undersize, oversize and jumbo frame, specific-size frame and Signature Present ID Frame type capture: IPv4, TCP, UDP, IPv6 and IGMP Event capture: Qualify Event, Start Event and Stop Event
Real-time capture	Support Real-time capture of the control plane
Protocol Emulation	
Routing	RIPv2, RIPng, OSPFv2, OSPFv3, BGP4, BGP4+ and IS-IS
Access	PPPoE Client/Server, DHCPv4 Client/Server, DHCPv6 Client/Server, L2TPv2, 802.1X and SAA
Multicast	IGMPv1/v2/v3, IGMP/MLD querier, MLDv1/v2, PIM-SMv4/v6 and PPPoE over Multicast
Carrier Ethernet	Link OAM 802.3ah and Service OAM 802.1ag
MPLS	LDP, MPLS IP VPN, 6VPE/6PE, BGP VPLS, LDP VPLS, PWE and LSP Ping
SP-SDN	BGP-LS, PCEP, SR for BGP/OSPF/ISIS, SRv6 for ISISv6/BGP, BGP SR TE Policy, SRv6 VPN and SRv6 EVPN
Data Center	VXLAN, VXLAN EVPN, OVSDB, OpenFlow 1.3 Controller, BGP/EVPN for VxLAN and LACP
High Availability	BFD, OSPFv2 BFD, OSPFv4 BFD, IS-IS BFD and BGP BFD
Protocol wizard and protocol binding traffic support	OSPFv2/v3, BGP4/BGP4+, IS-ISv4/v6, PPPoE Client/Server, DHCPv4/v6 Client/Server, IGMPv1/v2/v3, MLDv1/v2, and PCEP and IGP Topology/SR Anycast/SR TE Convergency/SRv6 VPN/SRv6 IP/SRv6 EVPN
Test suites	RFC2544, RFC2889, RFC3918, and Asymmetric Performance
Automation	
API	TCL, Python3.x, GUIToTCL and GUIToPython
Others	
Smart Scripter	Supported

SOFTWARE

ALPS TEST SOFTWARE

L4-7 TEST PLATFORM FOR APPLICATION PROTOCOL EMULATION AND NETWORK SECURITY

As an L4-7 test solutions leader, ATxTel has launched a new ALPS, the Web-based test software platform to meet the requirements of large-scale NEMs (covering firewalls, IPS/IDS, WAF, SLB, and DPI), telecom operators, and data centers in application and safety test scenarios. This comprehensively improved platform highlights ease of use, functionality and scalability.



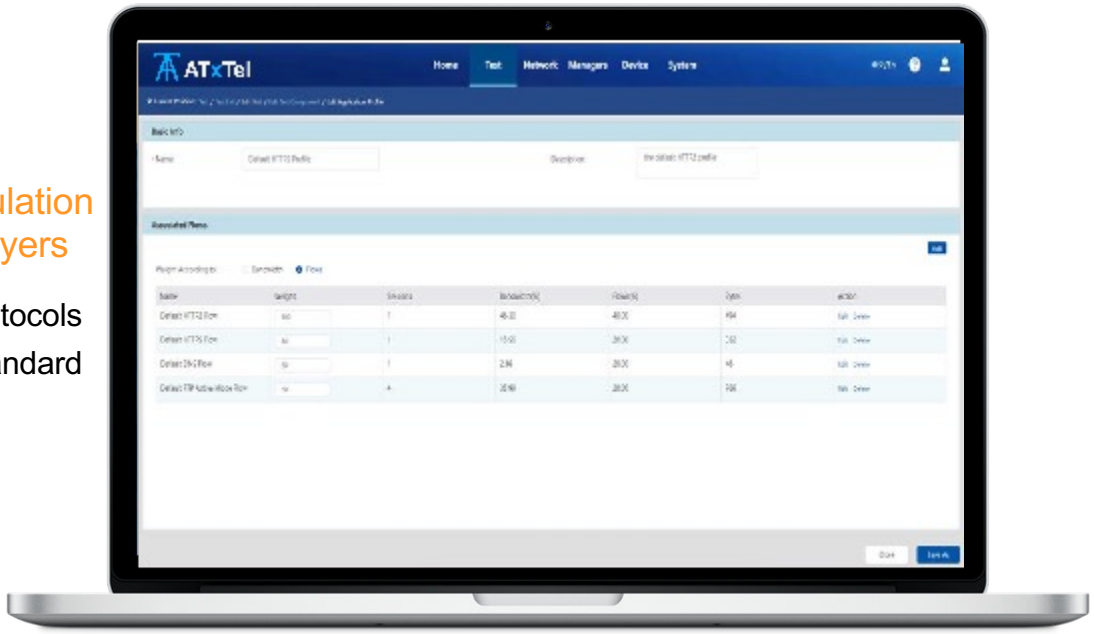
ALPS presents strong capacities in data and invoice emulation of millions of end users and network behaviors to support sensing device stress and performance tests on a single application layer (e.g., Firewall, IPS, IDS, WAF, and DPI) or the whole system. Furthermore, it can emulate massive real-world attacks and malicious traffic (e.g., Fuzzing test) to validate and test 5G network security devices and systems in detecting and defending against attacks and malware and fully evaluate the performance and effectiveness of 5G safety testing.

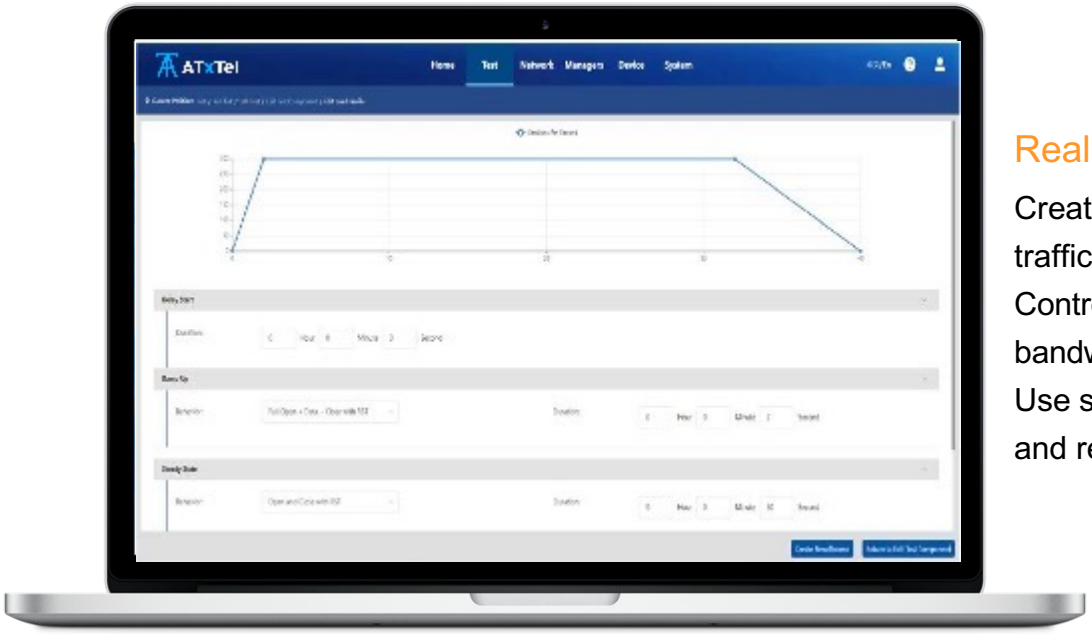
Key Features

- Performance and capacity tests of network security devices, such as firewall, application firewall, load balancer, WAF, URL filter, anti-virus, anti-spyware, HTTP/HTTPS accelerator, WAN accelerator, IDS/IPS and IPSec VPN gateway, etc.
- Performance tests of application servers, covering Web, mails, DHCP, FTP, DNS, RTSP/RTP QuickTime, multicast, etc.
- Network security tests, including emulation of thousands of attack traffic, Fuzzing tests, virus traffic emulation, cyber range emulation, etc.

Support for protocol emulation at different application layers

HTTP/HTTPS/DNS/FTP protocols
Massive private and non-standard protocols (record & replay)





Real user modeling

Create real and multiple-protocol traffic modes
Control APP hybrid and bandwidth
Use stateful L7 application traffic and real TCP stack

ATxTel

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