Product Catalog

Veryx ATTEST™



Introduction

With widespread adoption of IP and Ethernet based networking technologies, Network Equipment Manufacturers (NEMs) face the daunting task of continuing to enhance network device functionalities and support newer protocol standards across multiple product lines in shorter timeframes. Accordingly, Network Service Providers (NSPs) have to ensure that these newer network devices can meet the current and future requirements of technologies and services, before deploying them.

Veryx ATTEST range of testing solutions enable NEMs and NSPs to reduce the time taken to test with **automated test suites** in an **integrated testing framework,** providing many **tester-friendly** features such as flexible DUT control, GUI or CLI-based access, easy debugging and detailed reporting.

Veryx ATTEST-CATS (Comprehensive Automated Test Solution) consists of **ATTEST-XP** and **ATTEST-CTS** ready-to-run automated test suites for a wide range of Ethernet and IP applications:

- **Veryx ATTEST-XP** test suites provide tests covering functionality, deployment scenarios in multi-protocol topologies, scalability, performance measurement, Interoperability and so on.
- **Veryx ATTEST-CTS** test suites verify conformance to protocol standards.

Veryx ATTEST test suites are licensed as binary or source.

ATTEST test suites are based on the Veryx ATTEST Framework – a powerful environment that makes testing and debugging faster and easier. Test scripts are written in industry standard Tcl/Tk.

Veryx ATTEST Test Platforms

ATTEST supports the following hardware :

- Veryx compact custom hardware: Veryx VT-400 (figure 1) is a compact platform with support for 4x1G test ports (non wire-speed).
- Xena platform : Veryx offers a selection of ATTEST test suites in partnership with Xena. For more information on Veryx-Xena joint solution, visit www.veryxtech.com.
- LINUX based COTS server.

Figure 1 : VT - 400

Table 1: ATTEST Product list

Test Suites

Carrier Ethernet

Bridging
- PB (802.1ad)

OAM
- Link OAM (802.3ah)
- CFM (802.1ag)
- SOAM (Y.1731)

Backhaul
- ERPS (G.8032)

MPLS

- BFD-MPLS
- LDP
- MPLS-TP Data Plane
- MPLS-TP Data Plane M2M
- MPLS-TP DCN
- MPLS-TP OAM (G.8113.1)
- MPLS-TP LPS (G.8131)
- MPLS-TP G.8032

MEF

- CE2.0

SDN

- OpenFlow Controller

Data Center

- VxLAN

Layer 2

Timing & Sync
- PTP

Bridging
- STP
- VLAN
- RSTP
- MSTP
- IGMP Snooping
- LACP
- LLDP
- MRP-MVRP
- MRP-MMRP

Security
- 802.1x

Industrial
- MRP
- PRP

IPv6

Multicast
- MLD - Router
- MLD - Listener
- PIM-SMv6
- PIM-DMv6

Unicast
- IPv6 Ready Logo
- Host
- Router
- IPv6 Tunnel
- BGP4+
- IS-ISv6
- OSPFv3
- RIPng

IPv4

Multicast
- IGMPv1/v2
- IGMPv3
- PIM-DM
- PIM-SM

Unicast
- BFD
- BGP4
- DHCP - Server/Relay
- IPv4
- IS-IS
- OSPFv2
- RIP

Security
- NAT
- IPSec
- IKEv1, IKEv2

Framework

ATTEST 6.x

- Multi-user
- Web-based Reports
- Windows Clients
- Dashboard
- Zero Touch Execution
- Device Management – CLI/ SNMP/ Manual
- Results Baseline Comparison
- Archival and Retrieval

ATTEST-XP Functional Test Suites

Veryx ATTEST-XP test suites provide functional verification for multiple IP and Ethernet based protocols and contain pre-defined topologies of typical deployment scenarios. The ready-to-run **Veryx ATTEST-XP** test suites provide Ethernet-based device manufacturers and service providers with significant cost savings in their test development and automation efforts.

ATTEST-XP test cases verify device functionalities for**:**

Simultaneous Protocol Operation: Verification for simultaneous operations of different protocols and their active features.

Protocol Performance, Boundary Verification: With the support of configuration controls, the tests provide verification for protocol performance and boundary conditions such as maximum database entries, VLANs, etc.

Data handling: Verification of the data forwarding and behavior of the switch for data flows with valid and malformed data packets.

Robustness: Verification of device behavior in handling valid and invalid protocol messages.

Wire-speed behavior: Verification of device capability in handling data on selected interfaces at wire-speed using special hardware platforms.

ATTEST-XP test suites currently support 1 to 4 Ethernet test interfaces.

ATTEST-CTS Conformance Test Suites

Veryx ATTEST-CTS protocol conformance test suites verify compliance to IP and Ethernet-based protocols defined by standards bodies such as **IETF, IEEE, IEC, ITU-T, and MEF**.

NEMs typically perform conformance testing during protocol module development phase and at the final QA testing phase. NSPs need to perform conformance testing on equipment before network deployment to ensure better interoperability between vendors' equipment. **ATTEST-CTS** test suites support 1 to 4 Ethernet test interfaces.

Table 2: ATTEST Carrier Ethernet Test Solutions

Category	Test Suite	Standards / RFC reference	Test-case	Interfaces	
			Count	Min.	Max.
Carrier Ethernet	**EFMOAM – CATS**	**Ethernet in First Mile – Link OAM**	**125**		
	EFMOAM - XP	IEEE 802.3ah - 802.3 2005 Clause 57	14	1	2
	EFMOAM - CTS	IEEE 802.3ah - 802.3 2005 Clause 57	111	1	4
	CFM – CATS	**Connectivity Fault Management**	**235**		
	CFM – XP	IEEE 802.1ag draft 8	36	1	4
	CFM – CTS	IEEE 802.1ag 2007	198	1	4
	Y.1731 – CATS	**Service OAM**	**186**		
	Y.1731 – CTS	ITU-T Y.1731 07/2011	180	1	2
	Y.1731 – XP**	ITU-T Y.1731 02/2008	21	2	2
	PB – CTS	**Provider Bridges**	**65**		
	PB – CTS	IEEE 802.1ad-2005	65	2	4
	ERPS – CATS	**Ethernet Ring Protection Switching**	**105**		
	ERPS – CTS	ITU-T G.8032/Y.1344	70	3	4
	ERPS – XP**	ITU-T G.8032/Y.1344	35	3	4

Table 3: ATTEST MPLS Test Solutions

Category	Test Suite	Standards / RFC reference	Test-case	Interfaces	
			Count	Min.	Max.
MPLS	**BFD-MPLS – CTS**	**Bi-directional Forwarding Detection for MPLS**	**83**		
	BFD-MPLS - CTS	IETF RFC 5884 (draft-ietf-bfd-mpls-07.txt), IETF RFC 5880 (draft-ietf-bfd-base-11.txt)	83	1	3
	MPLS-LDP – CTS	**MPLS Label Distribution Protocol**	**468**		
	LDP – CTS	IETF RFC 5036, RFC 3478, RFC 3815, RFC 5283	468	1	3
	MPLS-TP – CTS	**MPLS Traffic Profile**	**432**		
	MPLS-TP Data Plane	IETF RFC 5654, 5960	62	2	4
	MPLS-TP Data Plane M2M	RFC 5654, 4665	44	3	4
	MPLS-TP OAM (G.8113.1)	RFC 5860, RFC 6371, ITU-T G.8113.1/Y.1372	229	2	2
	MPLS-TP G.8131 (LPS)	ITU-T G.8131/Y.1382	47	3	3
	MPLS-TP DCN	RFC 5718	7	2	2
	MPLS-TP-G.8032	ITU-T G.8032/Y.1344 (2012)	63	3	4

** Requires Xena test platform

Table 4: ATTEST MEF Test Solutions

Category	Test Suite	Standards / RFC reference	Test-case	Interfaces	
			Count	Min.	Max.
MEF	**CE 2.0**	**Carrier Ethernet 2.0**	**709**		
	CE 2.0-E-Line**	MEF 6.1, MEF 10.2, MEF 13, MEF 20, MEF 23.1, MEF 26.1, MEF 30, MEF 33	152	2	4
	CE 2.0-E-LAN**		175	3	6
	CE 2.0-E-Tree**		176	3	6
	CE 2.0-E-Access**		206	2	4

Table 5: ATTEST Layer 2 Test Solutions

Category	Test Suite	Standards / RFC reference	Test-case	Interfaces	
			Count	Min.	Max.
Layer 2	**STP – CTS**	**Spanning Tree Protocol**	**70**		
	STP – CTS	IEEE 802.1D-1998	70	1	3
	MSTP – CTS	**Multiple Spanning Tree Protocol**	**249**		
	MSTP – CTS	IEEE 802.1s-2002, 802.1Q-2003, 802.1Q-2005	249	1	3
	RSTP – CTS	**Rapid Spanning Tree Protocol**	**144**		
	RSTP – CTS	802.1w-2001,802.1d-2004	144	1	3
	VLAN – CTS	**Virtual Local Area Network**	**115**		
	VLAN - CTS	IEEE 802.1d-1998, 802.1d-2004, 802.1Q-2003 and 802.1Q-2005	115	1	3
	IGS – CTS	**IGMP Snooping**	**90**		
	IGS - CTS	draft-ieft-magma-snoop-12/RFC 4541, RFC 1112, RFC 2236 and RFC 3376	90	2	3
	LACP – CTS	**Link Aggregation Control Protocol**	**87**		
	LACP - CTS	IEEE 802.3-2002, 802.3 - 2005 Clause 43	87	2	4
	802.1X-CTS	**Port-based Network Access Control Protocol**	**104**		
	802.1X - CTS	IEEE 802.1x -2001, IEEE 802.1x -2004	104	2	2
	LLDP – CTS	**Link Layer Discovery Protocol**	**196**		
	LLDP - CTS	IEEE 802.1AB-2005, IEEE 802.1AB-2009	196	1	2
	MRP-MVRP – CTS	**Multiple VLAN Registration Protocol**	**91**		
	MRP-MVRP - CTS	IEEE 802.1ak – 2007	91	1	3
	MRP-MMRP – CTS	**Multiple MAC Registration Protocol**	**96**		
	MRP-MMRP - CTS	IEEE 802.1Q – 2011	96	1	3

** Requires Xena test platform

Table 6: ATTEST Industrial Ethernet Test Solutions

Category	Test Suite	Standards / RFC reference	Test-case Count	Interfaces	
				Min.	Max.
Industrial Ethernet	**MRP - CTS**	**Media Redundancy Protocol**	**111**		
	MRP - CTS	IEC 62439/Ed 1.0	111	4	24
	PRP - CATS	**Parallel Redundancy Protocol**	**86**		
	PRP - CTS	IEC 62439-3:2011/FDIS	32	2	4
	PRP - XP		54	3	3

Table 7: ATTEST IPv6 Test Solutions

Category	Test Suite	Standards / RFC reference	Test-case	Interfaces	
			Count	Min.	Max.
IPv6 Unicast	**IPv6 – CTS**	**Internet Protocol version 6**	**801**		
	IPv6 Host - CTS	IETF 2460, 4861, 4862, 4443, 1981	384	1	3
	IPv6 Router - CTS	IETF 2460, 4861, 4862, 4443, 1981	329	1	3
	IPv6 Tunnel - CTS	IETF RFC 2529, 2893, 3056, 3068	88	1	3
	OSPFv3 - CTS	**Open Shortest Path First for IPv6**	**375**		
	OSPFv3 - CTS	IETF RFC 2328, 2740	375	1	3
	BGP4+ - CTS	**Border Gateway Protocol for IPv6**	**210**		
	BGP4+ - CTS	IETF RFC 4271, 2545, 4760	210	2	3
	ISISv6 - CTS	**Intermediate System to Intermediate System for IPv6**	**201**		
	ISISv6 - CTS	IETF 1195, 3719, 3847, 5308, ISO-10589:2002(E)	201	1	3
	RIPng – CTS	**Routing Information Protocol next generation**	**65**		
	RIPng - CTS	IETF RFC 2080	65	1	3
IPv6 Multicast	**MLD - CTS**	**Multicast Listener Discovery Protocol**	**180**		
	MLDL - CTS	IETF RFC 2710, 3810	77	1	1
	MLDR - CTS	IETF RFC 2710, 3810	103	2	2
	PIM-DMv6 - CTS	**Protocol Independent Multicast for IPv6– Dense Mode**	**139**		
	PIM-DMv6 - CTS	IETF RFC 3973	139	2	3
	PIM-SMv6 - CTS	**Protocol Independent Multicast for IPv6– Sparse Mode**	**269**		
	PIM-SMv6- CTS	IETF RFC 4601, draft-ietf-pim-sm-bsr-09	269	2	3

Table 8: ATTEST IPv4 Test Solutions

Category	Test Suite	Standards / RFC reference	Test-case Count	Interfaces	
				Min.	Max.
IPv4 Unicast	**IPv4 - CTS**	**Internet Protocol Version 4**	**120**		
	IPv4 - CTS	IETF RFC 791, 792, 950, 1122, 1812	120	1	3
	OSPFv2 - CTS	**Open Shortest Path First**	**384**		
	OSPFv2 - CTS	IETF RFC 1850, 2328	384	1	3
	RIP - CTS	**Routing Information Protocol**	**78**		
	RIP - CTS	IETF RFC 1058, 1724, 1812, 2082, 2453	78	1	3
	DHCP - CATS	**Dynamic Host Control Protocol**	**303**		
	DRA - CTS	IETF RFC 3046, 1542, 2132, 2131	129	2	3
	DHCP Server - XP	IETF RFC 2131, 2132	174	1	2
	BFD - CTS	**Bi-directional Forwarding Detection**	**148**		
	BFD - CTS	IETF RFC 5880 (draft-ietf-bfd-base-11.txt), IETF RFC 5881 (draft-ietf-bfd-v4v6-1hop-11.txt), draft-ietf-bfd-mib-07.txt	148	1	2
	BGP4 – CTS	**Border Gateway Protocol version 4**	**200**		
	BGP4 - CTS	IETF RFC 4271	200	1	3
	ISIS – CTS	**Intermediate System to Intermediate System**	**201**		
	ISIS - CTS	IETF RFC 1195, 3719, 3847, 3787, ISO-10589:2002(E)	201	1	3
IPv4 Multicast	**IGMP - CTS**	**Internet Gateway Management Protocol**	**137**		
	IGMPv1v2 - CTS	IETF RFC 2236, 1112	65	1	2
	IGMPv3 - CTS	IETF RFC 3376	72	1	2
	PIM - CTS	**Protocol Independent Multicast**	**369**		
	PIM-DM - CTS	IETF RFC 3973	89	1	3
	PIM-SM - CTS	IETF RFC 4601, 5059	280	1	3

Table 9: ATTEST IPv4 Security Test Solutions

Category	Test Suite	Standards / RFC reference	Test-case Count	Interfaces	
				Min.	Max.
IPv4 Security	**NAT - XP**	**Network Address Translation**	**175**		
	NAT - XP	IETF RFC 2663	175	2	2
	IPSec - CTS	**Internet Protocol Security**	**124**		
	IPSec - CTS	IETF RFC 4301, 4302, 4303, 4835, 2403, 2404, 2410, 2451, 3602, 4306, 4307, 2409, 4109	124	1	2
	IKE - CATS	**Internet Key Exchange**	**272**		
	IKEv1 - CTS	IETF RFC 2407, 2408, 2409, 4109	182	1	2
	IKEv2 - CTS	IETF RFC 4306, 4307	90	1	2

Table 10: ATTEST Data Center and Virtualization Test Solution

Category	Test Suite	Standards / RFC reference	Test-case Count	Interfaces	
				Min.	Max.
Data Center /Virtualization	**VXLAN - CTS**	**Virtual Extensible LAN**	**42**		
	VXLAN - CTS	draft-mahalingam-dutt-dcops-vxlan-03, draft-ietf-nvo3-framework-02	42	1	3

Table 11: ATTEST SDN Test Solution

Category	Test Suite	Standards / RFC reference	Test-case Count	Interfaces	
				Min.	Max.
SDN	**SDN Open Flow - CTS**	**Software Defined Networking – Open Flow**	**91**		
	SDN OFC - CTS	ONF OpenFlow Specifications – 1.0.0, 1.3.1, 1.3.2, 1.3.3	91	1	1

Table 12: ATTEST Timing and Synchronization Test Solution

Category	Test Suite	Standards / RFC reference	Test-case Count	Interfaces	
				Min.	Max.
PTP	**PTP - CTS**	**Precision Time Protocol**	**182**		
	Boundary clock - CTS	IEEE 1588™-2008	90	1	2
	Ordinary clock - CTS		92	1	2

Veryx ATTEST Test Framework

Veryx ATTEST Test Framework version 6 supports a flexible and distributed environment catering to diverse test lab requirements for today's dynamic conditions.

ATTEST significantly speeds up the testing cycles and accelerates product development. Its unique design results in minimal time for integration and enables efficient use of time and resources.

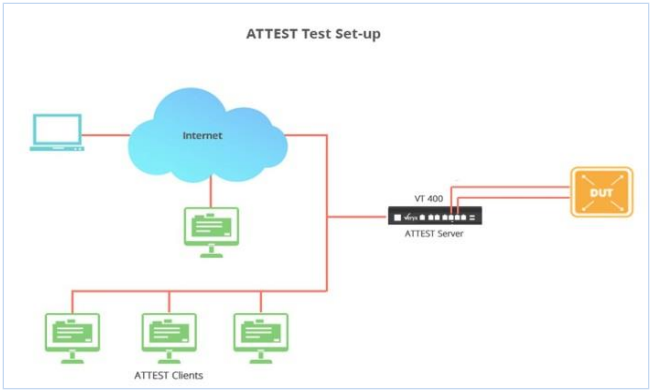


Figure 2: ATTEST Test Set-up

ATTEST provides centralized management of user access, test results and reports, while facilitating a flexible distributed test environment. Using the web based access, testers can have any-time, any-where access to highly informative test reports and test result information.

Figure 3: Testing Dashboard

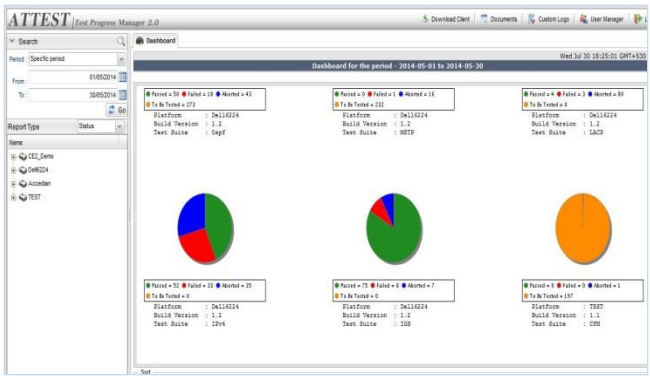
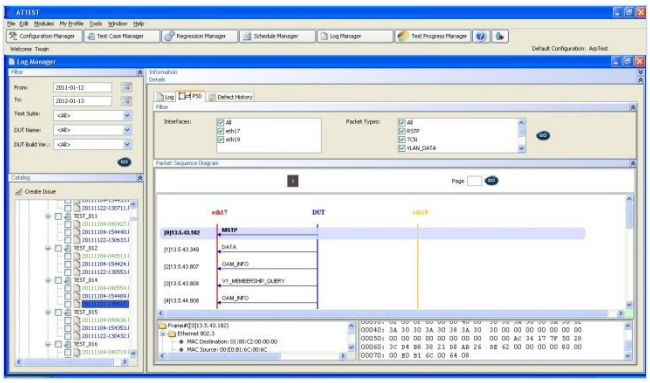


Figure 4: Packet Sequences



ATTEST provides excellent graphical textual reports to enable QA managers track the overall progress of testing. The testing progress for different devices under test with corresponding software image versions can be tracked from the ATTEST client systems.

Multiple testers can access and execute tests on ATTEST-based test servers, from remote ATTEST clients on Windows or Linux desktops. ATTEST also provides remote web-based access for test reports.

Veryx Professional Services

Delivering quality products “ready-to-market” is always a challenge. Tight release schedules and resource shortages are the common challenges in product development. There is often little that can be done to relieve schedule pressure and many organizations find it difficult to maintain a dedicated, trained test team equipped with the best tools to accomplish the testing mission.

Veryx’s professional services while effectively complementing and supplementing the customer testing teams’ efforts, also delivers higher efficiency and flexibility with the following execution models.

Test-for-Hire

- End-to-end testing
- Feature testing
- Performance testing

Quick-Testing

- Sanity testing
- Test audit
- Regression testing

Test consultancy

- Test strategy
- Test development
- Test automation

Test–for-Hire

Test-for-Hire enhances customers’ SQA team capabilities. This is done by leveraging the established Veryx ATTEST test infrastructure, ready-to-use exhaustive library of tests, well-equipped test lab and an expert testing team. Thus it enables better management of the testing lifecycle of products on an ongoing basis, while delivering greater ROI and flexibility, without compromising on quality.

Quick-Testing

Veryx Quick-Testing services provide fast turnaround times for “single cycle” test verification requirements. By utilizing ready-to-use library of test cases, customers are assured of quick results at lower budgets.

Test Consulting

Veryx’s expertise in developing efficient test solutions for its customers can be utilized to bring Test Consulting services to manufacturers as well as solution providers and large enterprises that need to perform pre-deployment verification of their networks.

Veryx can enhance existing test suites to address new test requirements, increase test coverage and take up the responsibility of testing and maintaining customer baseline(s) on a turnkey basis. Veryx can actively work with customers on enhancing their existing test suites/frames to include additional features. Veryx can also help integrate third party products into its Test automation framework or build custom automation.

About Veryx Technologies

Veryx Technologies (www.veryxtech.com) is an innovative enterprise providing solutions that enhance product quality and testing efficiency. Veryx offers flexible, cost-effective SAMTEST range of products that enhance the Service Assurance and diagnostic capabilities of Ethernet Service Providers. Leading equipment vendors, rely on the ATTEST range of products for testing applications in Access, Carrier Ethernet, Data Center, Edge, Enterprise, Industrial Networking and Security domains for over a decade. The unique offerings from Veryx enable customers to reduce the "time-required-to-test" and enhance their "time-to-market"

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