

IxVM: Validating Virtualized Assets and Environments



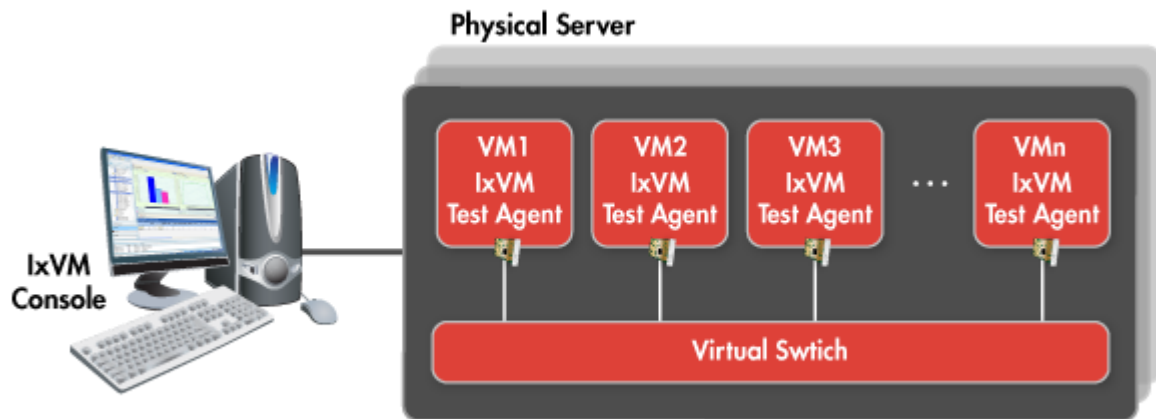
Cloud computing is creating a new paradigm of user experience with the online applications users employ. Users expect immediate access to a wide range of media-rich applications and services, instantly, from any location. Virtualization makes more efficient and flexible use of data center resources, but in doing so, it also increases the workload and complexity of server architecture and network infrastructure, and puts new and significant demands on both resources.

Integrating virtualization within a host and across the servers within a data center is key to creating a functional and adaptable cloud network, and requires careful planning and thorough testing to ensure functionality, performance, security, and reliability of applications and devices.

Network functions virtualization (NFV) is another trend that is driven by multiple service providers around the world. To accelerate the deployment of new network services, reduce capital and operating expenses by leveraging cost effective COTS (Commercial Off-The-Shelf) hardware, and make more efficient use of network resources, service providers are looking at integrating NFV in their network. NFV is a paradigm shift in networking to move network functions like switching, routing, firewall, BRAS, and many other devices from hardware appliances to running on virtualized x86 based server platforms.

Integrating NFV within a network is key to increasing competitiveness in a very dynamic market, where service providers are constantly trying to satisfy their customers' needs. Just like in the case of server virtualization, a successful NFV deployment requires thorough testing and end-to-end network validation to deliver on the touted advantages.

Ixia's virtualization test solution accelerates time-to-market, improves confidence and maximizes ROI by providing the only unified product portfolio with the flexibility and breadth of applications required to assess the impact of server and network virtualization across the Data Center.



IxVM Test Scenario

Ixia's IxVM product family is specifically designed to test virtualized assets and environments while leveraging trusted tools that have been used for testing hardware-based network equipment for over a decade. IxVM virtual ports provide a software-based version of a traditional Ixia hardware port that can be deployed in a virtualized environment. Virtual ports support Ixia software applications and can be combined with hardware ports to thoroughly test all aspects of virtualized servers or network devices, and the impact of virtualization on the broader data center performance.

Key Features

- Test the most critical components of virtual switches, including functionality, conformance to standards, and performance
- Compare how different hypervisors, virtual appliances, and configurations impact server performance
- Validate functionality of application-ware devices such as virtual firewalls, ADCs, storage servers, and other application servers
- Validate CNA throughput and I/O performance
- Measure intra-server and inter-server virtual machine (VM) traffic exchange performance
- Validate critical functionality including VLAN, IGMP, policy enforcement, and security
- Assess how VM mobility impacts application reliability and performance
- Evaluate performance from different server suppliers
- Accelerate time to market by conducting functional test early in the development lifecycle
- Compare performance of different blade servers, hypervisors, virtual switches, and appliances using Ixia's test wizards, industry-leading automation, and performance benchmarking test suites

- Improve confidence by testing in the context of the intended data center deployment and isolate performance issues:
 - IxVM cards are deployed as complete virtual appliances to test customized VMs and applications, and specific operating environments
 - Unified data center solution emulates real-world end-to-end data center conditions so you can assess the overall impact of data center virtualization, including how VM scale and mobility affects application performance
 - Multi-level statistics correlate measurements from the virtual infrastructure with measurements from physical and virtual NICs (on both sides of the hypervisors) so you can quickly identify and address sources of errors and performance degradation
- Maximize return on your test investment using a scalable, unified test platform for complete device and data center characterization
- Compatible with Ixia hardware ports and streams
- Flexible floating licensing allows IxVM cards to be dynamically used anywhere in the lab
- Automatic asset discovery facilitates testing across both private and public cloud infrastructure

IxNetwork

IxNetwork is designed to test network infrastructure, capacity, scalability, and convergence using scaled protocol emulation. IxNetwork running over IxVM provides a flexible deployment of Ixia traffic generator and protocol emulation to perform wide-scale functional testing of L2/3 devices.

Using virtual load modules, IxNetwork running over IxVM offers the unique ability to benchmark the performance of virtualized servers by simulating data center traffic between VMs, for data center/cloud computing environments. Also, IxNetwork running over IxVM enables the ability to deploy virtual test ports inside virtualized network devices, for end-to-end testing of NFV implementations.

IxLoad

IxLoad performs L4-7 application testing for a wide variety of virtualized application architectures.

Using virtual load modules, IxLoad running over IxVM allows complete functional and performance testing of virtualized servers and 10GE converged network adapters (CNAs) for data center/cloud computing environments. Also, IxLoad running over IxVM has enables the ability to test virtual firewalls, virtual deep packet inspection (DPI) devices, virtual load balancers, or other virtualized network devices, for functional and performance testing of NFV implementations.

Specifications

Feature	Description
Number of IxVM ports per load module	Depends on IxVM module type ⁱ and host system ⁱⁱ
Number of IxVM load modules per vChassis	32
Number of IxVM ports per vChassis	128
Line speed	Up to 10Gbps per VM (IxNetwork and IxLoad) ⁱⁱⁱ
Interface protocols	MAC, VLAN, IPv4 (ARP, PING), IPv6 (NDP, SLAAC, PING)
Host protocols	DHCPv4/v6 (Client, Relay Agent and Server), PPPoE/L2TP ^{iv} (Client and Server), IGMP/MLD (Host and Querier)
Data center bridging (DCB) protocols	DCBX, FIP/FCoE ^v , FCF, VXLAN, TRILL, SPBM, FabricPath, OpenFlow
Routing/bridging protocols	BFD, BGPv4/v6, EIGRPv4/v6, ISISv4/v6, LDP, OSPF/OSPFv3, PIMv4/v6, RIP/RIPng, RSVP-TE, xSTP
Carrier Ethernet protocols	CFM, Y.1731, PBB-TE, Link OAM, TWAMP
Application traffic protocols	HTTP, SSL, FTP, TFTP, DNS, DHCP, LDAP, RADIUS, SMTP, POP3, IMAP, SMB, NFS, iSCSI, Storage I/O
Application traffic flows	Hundreds of AppLibrary flows inside IxNetwork-AppLibrary and IxLoad-AppLibrary
Security testing	IxLoad-Attack (PVM/DDoS)
Stream definitions per port	256
Number of transmit flows per port (sequential)	Billions

ⁱ IxVM supports a single-port load module and a multi-port load module. A single-port load module is a VM that has one virtual NIC (vNIC). A multi-port load module is a VM that has more than one virtual NIC (vNIC).

ⁱⁱ IxVM supports a multi-port load module that supports a maximum number of 32 virtual NICs. However, the actual number of virtual NICs supported depends on the host system configuration and specification.

ⁱⁱⁱ The generated traffic throughput depends on the host system and on the VM provisioning.

^{iv} L2TP traffic is not supported.

^v FCoE traffic is not supported.

Feature	Description
Number of transmit flows per port (non-sequential values)	4,096
User defined fields (UDF)	Counter, Nested Counter, Value List, Range List, Random
Transmit engine	Packet generation with timestamps, sequence numbers, and packet group signatures
Data pattern per stream	Increment Byte, Increment Word, Decrement Byte, Decrement Word, Repeat, Random, Custom
Frame length controls	Fixed, Increment, Decrement, Random (Uniform Distribution, Weight Paris, IMIX), Auto
Error generation	Invalid IP checksum
Receive engine	Packet filtering, capturing, real-time latency, latency bin and sequence checking for each packet group
Trackable receive flows	4,096
UDS filters	Destination MAC, Source MAC, Frame Size, Pattern
Flow control	N/A
Latency measurements	Based on NTP
IxVM Controller OS support (IxVM vChassis)	Windows 7 Professional (32-bit and 64-bit)
Host OS support/hypervisor support	<ul style="list-style-type: none"> • IxNetwork <ul style="list-style-type: none"> ○ VMware vSphere 5.5 ○ KVM over RHEL/CentOS 6.4 ○ KVM over Ubuntu 12.04 LTS ○ XEN over RHEL/CentOS 5.6 • IxLoad <ul style="list-style-type: none"> ○ VMware vSphere 5.5 ○ KVM over RHEL/CentOS 6.4 ○ KVM over Ubuntu 12.04 LTS

Feature	Description
Guest OS support/IxVM load modules	<ul style="list-style-type: none"> • IxNetwork <ul style="list-style-type: none"> ○ Ixia-enhanced kernel (based on RHEL/CentOS 6.3) ○ Ixia-enhanced kernel (based on SuSE 11) • IxLoad <ul style="list-style-type: none"> ○ Ixia-enhanced kernel (based on RHEL/CentOS 6.3)
Distribution formats	<ul style="list-style-type: none"> • VMware: <ul style="list-style-type: none"> ○ OVA ○ RPM • KVM: <ul style="list-style-type: none"> ○ IxVM self-extracting installer ○ QCOW2 ○ RPM

Product Ordering Information

IxVM virtual ports provide high performance (in terms of control plane scalability and data plane throughput), having the capability to test the performance of many physical or virtual network devices. The performance can be further increased by stacking multiple license units on the same port.

One license unit entitles the user to emulate a comprehensive set of protocols from a control plane point of view, and to generate 1 Gbps of traffic from a data plane point of view. Each license includes all the capabilities required to run end-to-end functional IxVM tests, and multiple units of the same license can be used to increase the performance and scalability to the required levels.

939-9501

IxVM, IxNetwork Tier-1 FLOATING Subscription license. Includes all IxNetwork protocols supported on IxVM for a duration of 1-Year.

Supports low scale control plane and 1Gig throughput per unit.

INCLUDES 939-0002 IxVM Subscription IxServer License FLOATING, 939-1902 IxVM Endpoint Discovery Server, 939-1501 IxVM/IxNetwork Tier-1 Subscription License

939-9502

IxVM, IxNetwork Tier-2 FLOATING Subscription license. Includes all IxNetwork protocols supported on IxVM, all IxNetwork QuickTests, all Test Automation (Macro Recorder, Test Composer licenses) features and IxReporter for a duration of 1-Year.

Supports medium scale control plane and 1Gig throughput per unit.

INCLUDES 939-0002 IxVM Subscription IxServer License FLOATING, 939-1902 IxVM Endpoint Discovery Server, 939-1502 IxVM/IxNetwork Tier-2 Subscription License

939-9503

IxVM, IxNetwork Tier-3 FLOATING Subscription license. Includes all IxNetwork protocols supported on IxVM, all IxNetwork QuickTests, all Test Automation (Macro Recorder, Test Composer licenses) features, IxReporter, IxExplorer/IxNetwork-FT and AppLibrary for a duration of 1-Year.

Supports high scale control plane and 1Gig throughput per unit.

INCLUDES 939-0002 IxVM Subscription IxServer License FLOATING, 939-1902 IxVM Endpoint Discovery Server, 939-1503 IxVM/IxNetwork Tier-3 Subscription License

939-9511

IxVM, IxLoad Tier-1 FLOATING Subscription license. Includes the following IxLoad protocols supported on IxVM for a duration of 1-Year: HTTP, HTTPS, FTP, TFTP, DNS, DHCP, LDAP, RADIUS, Mail (IMAP, POP3, SMTP).

Enables 1Gig throughput per unit.

INCLUDES 939-0002 IxVM Subscription IxServer License FLOATING, 939-1511 IxVM/IxLoad Tier-1 Subscription License

939-9512

IxVM, IxLoad Tier-2 FLOATING Subscription license. Includes the following IxLoad protocols supported on IxVM for a duration of 1-Year: HTTP, HTTPS, FTP, TFTP, DNS, DHCP, LDAP, RADIUS, Mail (IMAP, POP3, SMTP), Storage (SMB, NFS, iSCSI, Storage I/O).

Enables 1Gig throughput per unit.

INCLUDES 939-0002 IxVM Subscription IxServer License FLOATING, 939-1512 IxVM/IxLoad Tier-2 Subscription License

939-9513

IxVM, IxLoad Tier-3 FLOATING Subscription license. Includes the following IxLoad protocols supported on IxVM for a duration of 1-Year: HTTP, HTTPS, FTP, TFTP, DNS, DHCP, LDAP, RADIUS, Mail (IMAP, POP3, SMTP), Storage (SMB, NFS, iSCSI, Storage I/O), IxLoad-Attack and IxLoad-AppLibrary.

Enables 1Gig throughput per unit.

INCLUDES 939-0002 IxVM Subscription IxServer License FLOATING, 939-1513 IxVM/IxLoad Tier-3 Subscription License