

## Network Performance and Analytics Platform

### Advanced Network Visibility and Service Assurance

The interactive network topology of LiveNX displays traffic flows and the network devices that communicate those flows across your network: routers, switches, wireless devices, firewalls, WAN Optimization Controllers, Application Delivery Controllers, etc. The topology allows network managers to drill down to individual devices or interfaces for detailed analysis of hop-by-hop performance metrics. Additionally, historical flows can be examined from any date and time in the past with the flow playback feature.

### Application Visibility and Troubleshooting

Gain a deep understanding of application traffic with full visibility of protocol and application type including video, voice, instant messaging, file-transfer, etc. Troubleshoot applications deployed in the data center, public cloud or SaaS. Understand how your network is being used, how applications are performing, and which sanctioned or unsanctioned applications are being used.

### Quality of Service (QoS) Management and Control

With multimedia applications, Unified Communications and work collaboration services all demanding better user experiences, LiveNX delivers the capability to manage QoS end to end. Create, edit and apply QoS polices for Cisco routers and Layer 3 switches on live networks consistently and confidently. QoS wizard and built-in templates are available to apply policies based on Cisco best practices or use the QoS GUI editor to build custom policies. LiveNX generates a QoS audit report to show QoS policies in detail including configuration settings, performance issues, drops, and policy errors.

### Software-Defined WAN (SD-WAN) Management

Utilize application and path visualizations to effectively validate WAN Return-on-Investment (ROI) for traditional MPLS, hybrid, or SD-WAN. When a network element makes a path change to protect the applications due to an Out-Of-Policy (OOP) condition, LiveNX renders the end-to-end path changes graphically. Visualize the path from the branch-office, through the service provider(s) to the data center where the applications reside, for meaningful and actionable information.

### Capacity Planning

Identify the most changed and most heavily used resources such as bandwidth, CPU utilization and memory usage. Drill-down views provide details such as interface statistics and errors. Additionally, pivot to other reports to view pertinent data like top applications and top conversations to identify heavy bandwidth usage to align bandwidth consumption with business policies.

### Stories with Built-in Best Practices

Guided Workflows with embedded best practices to simplify your network management tasks, such as: Capacity Planning, Device Inventory, Security Flow Analysis, and Site-to-Site Traffic Analysis.

## What's New in LiveNX

### Cisco APIC-EM EasyQoS Integration

Cisco Application Policy Infrastructure Controller – Enterprise Module (APIC-EM) is an integral element of the Cisco Digital Network Architecture (DNA) to automate configuration and setup of software defined networking to the enterprise branch, campus and WAN. LiveNX 6.2.0 enhances APIC-EM with auto-semantic discovery using the integrated API to monitor and report on favorite apps, traffic and performance at near real-time polling intervals.

### Auto-Semantic Discovery and Device Recording

Simplify the user experience with auto discovery across IP ranges with applied semantic settings such as: site, interface line rate capacity, Service Provider description and default Application Group by DSCP for rapid population in new (greenfield) LiveNX environments.

### Preview of LiveNX Insight

New LiveNX licensed module for predictive insights based on machine learning.

### LiveNX Monitor of Monitors

Single pane of glass dashboard aggregating LiveNX server settings, system health, sites and configuration.

### Configuration of New Alerts and Notification

New alerts can be configured for email or assigned through 3rd party integration with PagerDuty.

### Report Templates

Improved granularity of time series report data and new pre-built report templates for quick display, in addition to new flow reports for site to site applications and jitter/loss.

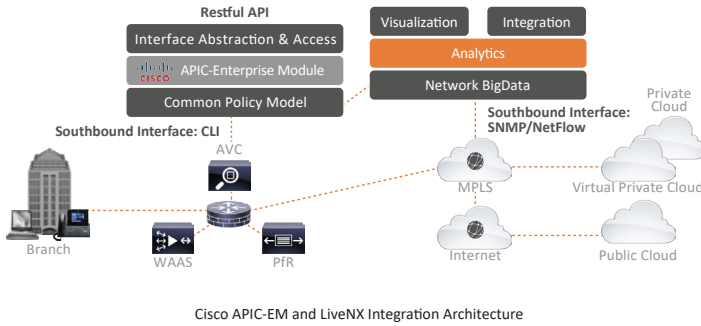
### Guided Navigation

Faster onboarding and Time to Value with embedded tutorials and step by step actions.

# LiveNX 6.2.0 Key Features

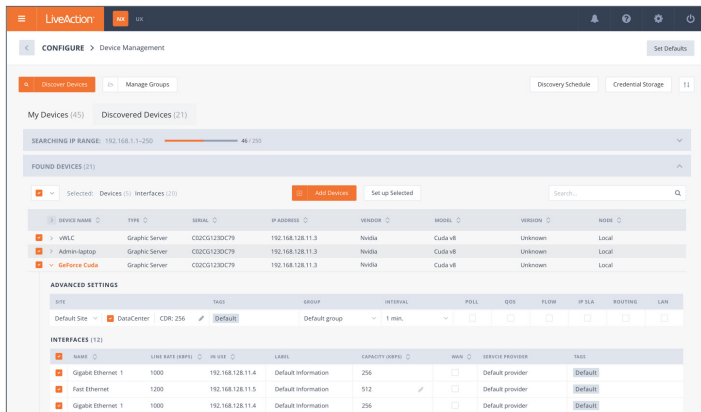
## Cisco APIC-EM EasyQoS Integration

Learn inventory and view voice or favorite app information via Cisco APIC-EM APIs from LiveNX. LiveNX repopulates the favorite applications to report on quantitative elements like application bandwidth, traffic class and business-relevance breakdowns. It also provides qualitative data for the customer's favorite applications like voice and video performance and critical application response time metrics.



## Auto-Semantic Device Discovery and Management

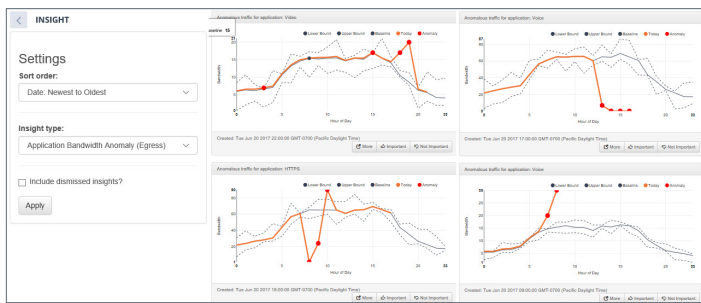
Through device discovery LiveNX will retrieve IP address information and perform a lookup of existing sites in LiveNX and attempt to match the IP address with each site CIDR (Classless Inter-Domain Routing) for the best match possible. Suggested site tags are returned with the device information (name, link capacity, WAN tag, Service Provider, default Application Group by DSCP).



The Auto Discovery will learn 107 vendors' products. Please reference the User Guide for a complete list.

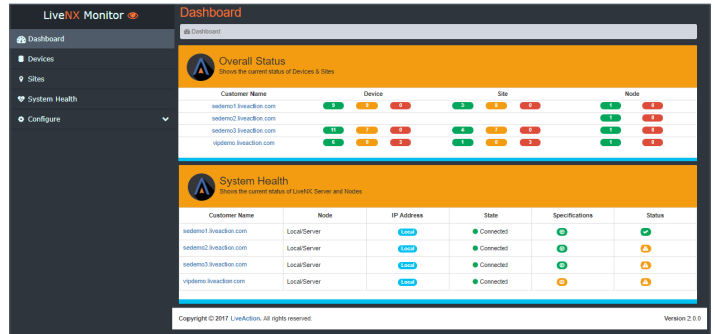
## Preview of LiveNX Insight

LiveNX Insight is a new addition to LiveNX. As an additionally licensed module for predictive insights based on machine learning, LiveNX Insight is available in preview in 6.2, with General Availability coming later.



## LiveNX Monitor of Monitors

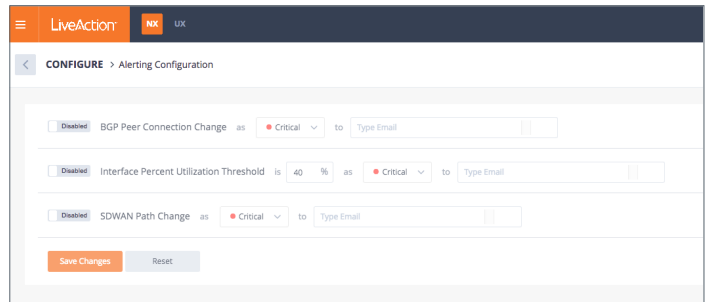
Single pane of glass dashboard aggregating LiveNX server settings, system health, sites and configuration. This reference design is particularly helpful for Managed Service Provider (MSP) environments with separated management responsibilities. The LiveNX Monitor of Monitors maintains the administrative separation between LiveNX domains providing provisioning of LiveNX users, discovery and scheduling reports for each LiveNX domain.



## Configuration of New Alerts and Notification

New Alert Configurations Component on LiveNX Web UI and added REST APIs for:

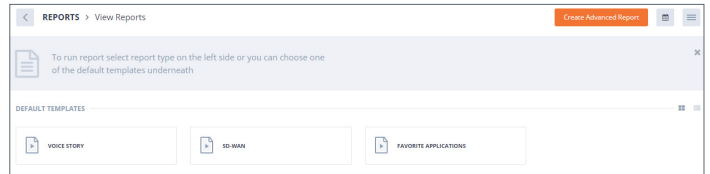
- BGP Peer Connection Change
- Interface Percent Utilization
- Path or Routing Change



LiveNX Administrators can set the tagging of the severity levels for alerts and a list of email addresses to receive the Alert. For streamlined alert notification PagerDuty escalation policies and email integrations can be easily defined as a new service.

## Report Templates

Improved granularity of time series report data and new pre-built report templates for quick display, in addition to new flow reports for site to site applications and jitter/loss.



## Guided Navigation

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# LiveNX 6.2.0 Key Solutions

## QoS Monitoring

Track QoS performance on a per-class basis. Monitoring and alerting of priority queue drops provides proactive notification of potential voice quality issues.

- NBAR2 application visualization
- Custom NBAR definitions
- Pre- and post-QoS graphs
- Detailed graphical display of interface and CBQoS statistics
- 95th/99th percentile, quarterly, yearly and collated reports

## QoS Configuration

Create, edit, and apply QoS policies for Cisco routers and Layer 3 switches on live networks. Use the QoS wizard and built-in templates to apply policies across multiple devices based on Cisco best practices or use the QoS GUI editor to build policies.

- Full MQC QoS configuration support including WRED, CBWFQ, and Priority Queuing
- Custom NBAR2 based matches including high-level attributes, HTTP URL, MIME, HOST and RTP protocols
- Built-in ACL editor
- Built-in rules for QoS settings that highlight violations
- Configuration audit trail
- System-wide QoS audit
- LAN Service Policy

## Flow Visualization for Network Troubleshooting

Visualize trouble spots on the network for a better understanding of traffic patterns.

- Application and Flow path analysis
- Multi-vendor Support – NetFlow v5/v9, IPFIX, sFlow, Z-Flow and J-Flow
- Jitter, delay, packet loss metrics for voice and video
- Application Response times, Round Trip time, server delay and client delay metrics
- NetFlow Secure Event Logging (NSEL)
- Wireless information including user identity
- Firewall High-Speed Logging
- End system (device type, OS) and end-user information
- Integration with Network Packet Brokers
- Flow DVR for playback of historical data
- Built-in Domain Name System (DNS) name resolution
- Topology export to Visio

## LAN

Visualize Spanning Tree Protocol. Provide real-time Layer 2 visualizations for networks, including trunk interface, port channels, VLAN associations and bandwidth percentages.

## Routing

Real-time routing visualizations for Cisco networks that can identify reachability problems, routing loops and asymmetric paths affecting traffic quality. In addition, the policy-based routing viewer/editor provides a high degree of control over traffic policy to route traffic easily and predictably over user-specified paths.

## Open APIs for Application and System Integration

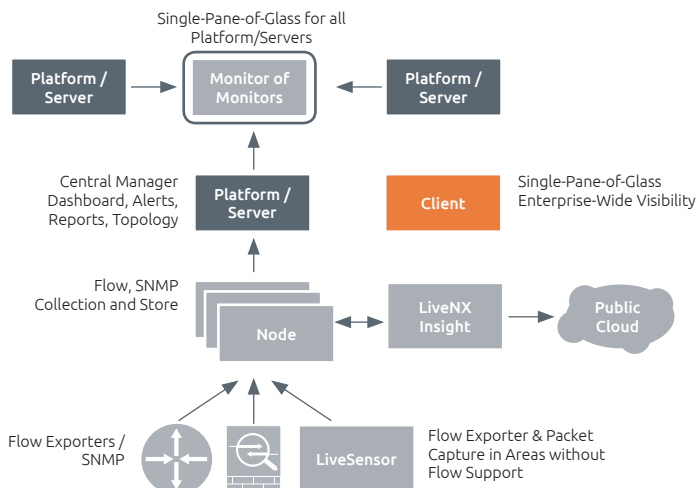
LiveNX Server makes most visible capabilities accessible through REST APIs for integration to IT operational applications and systems.

- REST API
  - OAuth2 based authentication
  - API Key generated by user
- Documentation
  - Quick start guide
  - Live Swagger documentation built into LiveNX Server
- Device and status
  - Device, interface, site, status
- Reports
  - Flow, QoS, Scheduling, Grouping
- Workflows
  - Capacity and inventory set of reports
- Topology
  - Site, path, application information

## Admin

- LDAP and WMIC polling
- License
- Mailer
- OAuth
- API state
- SSL cert
- Time, Time zones, Business hours
- User management

# LiveNX 6.2.0 Architecture



## Deployment Models:

- Single Server/Node deployed as single system
- Multi-Server with nodes deployed anywhere there is IP connectivity

## LiveSensor Integration (optional purchasable module)

NetFlow generation to provide application visibility and application recognition in the absence of flow-exporting devices.

- Software-based packet analysis
- Deep Packet Inspection
- Application layer visibility (e.g. Skype, BitTorrent, Citrix)
- Supports multivendor environments

## LiveUX Integration (optional purchasable module)

LiveUX monitors end-user experience of web applications. By combining the end-user experience metrics with the network performance monitoring information, you can quickly triage performance issues.

- Integrated LiveNX and LiveUX dashboard for instant visibility of site health, network devices, application usage and application performance.
- Quickly identify the sites that are experiencing performance degradation and the applications impacted.
- From the site, drill down to examine network conditions including bandwidth utilization, link errors, QoS metrics and applications that are competing for the bandwidth.

## Deployment Options

LiveNX components can be deployed via two options:

Component	Virtual Appliances (preferred)	Installers (EOL 7/1/2017)
Client	Installer: MacOS, Win 32/64	Installer: MacOS, Win 32/64
Server	All-in-one	Installer: Win64/Linux
Platform	Server & Platform OVA	All-in-one Server & Platform OVA
Node (optional)	Node OVA	Installer: Win64/Linux
LiveSensor (optional)	LiveSensor OVA	LiveSensor OVA
LiveNX Insight (optional)	LiveNX Insight OVA	LiveNX Insight OVA

### Client

- Windows 7, 8, 10 or Mac OSX 64 bit OS
- 4 Cores, 8 GB RAM
- Web browser: IE (> Version 8), Firefox, Chrome and Safari

### Server/Node Installers

The sizing of your LiveNX Server is critical to its overall stability and performance. These are minimum recommendations.

- Windows 64-bit Operating System – Server 2008 or 2012 R2, Windows 7 (Professional or Ultimate) with .NET framework v3.5.1+
- Linux RHEL 7.1 or 7.2 /CENTOS 6.7 or 6.8 with GNOME UI installed
- For less than 100 devices or less than 100K flows/sec:
  - 8 Core 2+ GHz CPU, 8 GB RAM, 2-6 TB 7,200 RPM HD<sup>1</sup>
- For 100-500 devices or less than 200K flows/sec
  - 12 Core, 2+ GHz CPU, 16 GB RAM, 3-10 TB 7,200 RPM HD<sup>1</sup>
- For 500-1,000 devices
  - 2x12 Core, 2+GHz CPU, 16 GB RAM, 5-10 TB, 7,200+ RPM HD<sup>1</sup>
- Virtual Machine
  - Adequate core and storage allocation
  - Store: local store preferred, virtual thick disk setting
  - VMware ESXi 5.1 or later, recommended for production environments
    - o vMotion Supported
  - Compatible with most VM systems
    - o VMware products, Oracle VirtualBox, Microsoft Hyper-V 6.0+, Citrix Xen

<sup>1</sup> Disk usage depends on network traffic pattern. For higher performance use RAID 10 or RAID 0 if redundancy is not required.

### All-in-One Server & Platform, Node Virtual Appliances

- Custom—Less than 25 devices or less than 25k flows/sec; targeted at small laptop deployments or starter platform (size not available for Node OVA)
  - 2 vCPU Xeon or i7, 4 GB RAM, 250 GB data disk
- Small—Less than 100 devices or less than 100k flows/sec
  - 8 vCPU Xeon or i7, 16 GB RAM, 2 TB data disk
- Medium—100 to 500 devices or less than 200k flows/sec
  - 16 vCPU Xeon or i7, 32 GB RAM, 4 TB data disk
- Large—500 to 1,000 devices or greater than 200k flows/sec
  - 32 vCPU Xeon or i7, 32 GB RAM, 8 TB data disk

### LiveNX Insight (Optional)

- 2 vCPU Xeon or i7, 4 GB RAM, 30 GB data disk

### LiveSensor (Optional)

- Monitor 1Gbps
- Virtual Hardware
  - 4 vCPU, 8GB of RAM, 50GB Disk
- Virtual Platform
  - VMware ESXi v5.0+
  - VMware Hardware Version 8 (vmx-8)
- Network Hardware
  - At least 2 Physical NICs on ESXi
    - o Support up to 10Gbps

NOTE: Virtual NICs on OVA are utilizing VMXNET

## LiveNX Flow

LiveNX Flow provides advanced end-to-end system level flow visualizations for multivendor networks. The following devices have gone through flow-analysis testing with LiveNX.

- Adtran NetVanta Series Routers
- Alcatel-Lucent Routers
- Brocade Series Routers
- Cisco Series Routers (ISR Series, CRS-1, ASR 1000 & ASR 9000 Series Routers)
- Cisco Catalyst Switches
- Cisco Nexus Switches (Nexus 3000, 7000 & 9000 Series)
- Cisco ASA 5500 Series Firewalls
- Cisco AnyConnect Network Visibility Module on Windows and Mac OS X Platforms
- Cisco Meraki MX Security Appliance
- Cisco NetFlow Generation Appliance
- Extreme Network Switches
- F5 BIG-IP Application Delivery Controller Platforms
- Gigamon GigaSMART
- Hewlett-Packard Enterprise Procurve Series Switches
- Ixia's Network Visibility Solution
- Juniper MX Series Routers
- nTop nProbe
- Palo Alto Networks Firewalls
- Riverbed SteelHead WAN Optimization Controllers
- Silver Peak WAN Optimization Controllers
- Viptela vEdge Routers
- Ziften ZFlow

## LiveNX QoS Configure

LiveNX QoS Configure provides for configuring and troubleshooting Quality of Service for Cisco routers and switches.

- Cisco Series Routers: 800, 1700, 1800, 1900, 2600, 2600XM, 2800, 2900, 3600, 3700, 3800, 3900, 4300, 4400, 7200, 7600, ASR1000, CSR 1000V
  - Recommend IOS versions 12.3 or higher or 15.0 or higher for use with the software (IOS XE 2.6.0 or higher for ASR 1000 series). Earlier IOS versions may also work but are not officially supported. General-release IOS versions are recommended, although early- and limited-release versions will also work with LiveNX.
- Cisco Catalyst Series Switches: 3850 & 4500-X
  - Limited LiveNX QoS Monitor support on Layer 3-routable interfaces and VLANs depending upon Cisco hardware capabilities.
- Cisco Nexus Series Switches: 7000 Series are partially supported

## LiveNX QoS Monitor

LiveNX QoS Monitor provides quality of service monitoring and troubleshooting for Cisco router and switches.

- Cisco Series Routers: 800, 1700, 1800, 1900, 2600, 2600XM, 2800, 2900, 3600, 3700, 3800, 3900, 4300, 4400, 7200, 7600, ASR1000, CSR 1000V
- Cisco ASR 9000
  - Recommend IOS versions 12.3 or higher or 15.0 or higher for use with the software (IOS XE 2.6.0 or higher for ASR 1000 series). Earlier IOS versions may also work but are not officially supported. General-release IOS versions are recommended, although early- and limited-release versions will also work with LiveNX.
- Cisco Catalyst Series Switches: 3650, 3850 & 4500-X
  - Limited LiveNX QoS Monitor support on Layer 3-routable interfaces and VLANs depending upon Cisco hardware capabilities.
- Cisco Nexus Series Switches: 7000

## LiveNX IP SLA

Cisco Series Routers: 800, 1700, 1800, 1900, 2600, 2600XM, 2800, 2900, 3600, 3700, 3800, 3900, 4300, 4400, 7200, 7600, ASR1000, CSR 1000V are supported.

## LiveNX LAN

Cisco Catalyst Series Switches: 2960, 2960-X, 3560, 3650, 3750, 3850, 4500, and 6500 are supported.

## LiveNX Routing

Cisco Series Routers: 800, 1700, 1800, 1900, 2600, 2600XM, 2800, 2900, 3600, 3700, 3800, 3900, 4300, 4400, 7200, 7600, ASR1000, CSR 1000V are supported.



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