

Pluribus Networks UNUM™ Insight Analytics™

Network Performance Monitoring and Analytics

Insight Analytics

Insight Analytics is a powerful integrated analytics module within the Pluribus UNUM platform that provides the IT operations team with proactive insight into network and application performance to assure peak operating performance and meet user experience expectations. Insight Analytics leverages Netvisor® ONE's embedded monitoring telemetry and packet flow data sources to enable pervasive visibility across the network, eliminating the need for expensive probes or complex monitoring overlay networks.

Integrated Netvisor telemetry monitors every TCP connection, including traffic within a VXLAN tunnel, across the entire fabric at the speed of the network to track east/west and north/south traffic flows, as well as virtualized workloads to expose important network and application performance characteristics.

Insight Analytics leverages the collected network intelligence from the UNUM database, which stores up to 2.5 billion flows, to build knowledge of the network, and enables contextual drill-down from dashboards and analysis views. The UNUM analytics engine constantly monitors and analyzes all traffic and transactions to identify network and application performance characteristics, allowing IT operations to quickly identify performance trends and interrelationships in real time. User-defined alert notifications can be generated when anomalies are discovered, such as volumetric changes, performance deviations or threshold-based violations, enabling rapid triage to precisely pinpoint root cause and speed resolution.

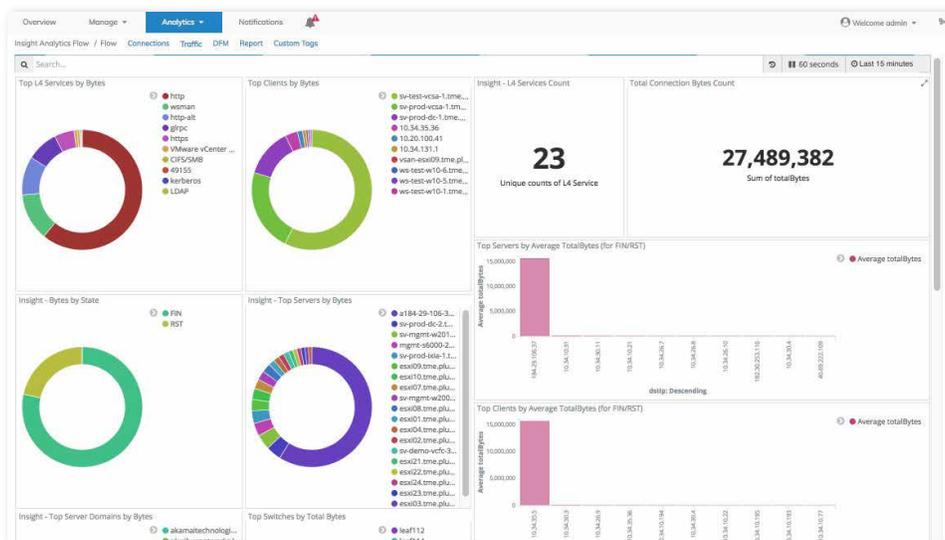
Insight Analytics provides extensive operational intelligence that supports many performance management use cases, allowing operators to quickly pinpoint performance issues, accelerate troubleshooting, improve operational intelligence, identify security risks and speed remediation.

Network Intelligence in a White Box Environment

Insight Analytics tracks network and endpoint service state and performance across the Adaptive Cloud Fabric to understand how the users and services are consuming the infrastructure, and conversely, how the infrastructure is supporting the users and services.

The intelligence garnered from across the fabric enables operators to analyze and compare actual versus desired performance and implement corrective actions such as changes to policy, rerouting traffic to implement on-demand changes to the infrastructure. Since all visualization is done within the same platform, changes can be implemented from a single pane of glass, simplifying operations and speeding change implementation.

UNUM Insight Analytics (IA) provides a suite of tools designed to analyze data with search capabilities on information collected from UNUM collectors (a designated switch UNUM uses to collect fabric information), packet capture analytics and monitoring capabilities.

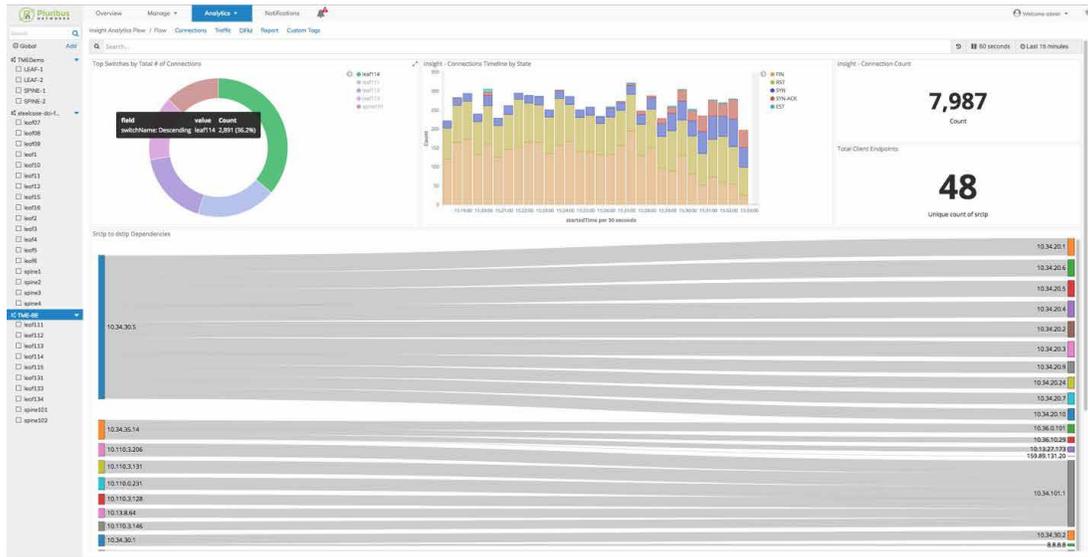


UNUM - Insight Analytics Flow Traffic Dashboard.

Flow Analytics

IA - Flow Analytics collects fabric and network flow data over time, and graphically displays the information via a variety of tools.

- The **Connections** dashboard allows network admins to measure, sort and analyze TCP connection states (SYN, SYN-ACK, EST, FIN, etc.) by service, client, domains and many other options over time.
- The **Traffic** dashboard breaks flows down into busiest services, servers, domains and switches.
- **Dynamic Flow Mapping (DFM)** dashboard illustrates the total connections based on server, state and endpoints.
- **Custom Tagging** enables customers to choose up to 100 different options to tag IP addresses, VLANs, MAC addresses and switch ports with metadata/contextual tags, and then aggregate or filter their flows based on their custom tags.
- **Report** dashboard displays a standardized view of high-level flow statistics over the past seven days.
- **VMware vSphere integration** - The Netvisor vCenter Connection Service provides UNUM Insight Analytics with virtual machine and virtual network configuration data, allowing any recorded communication to be identified and indexed. This enables insight into the virtualization layer.

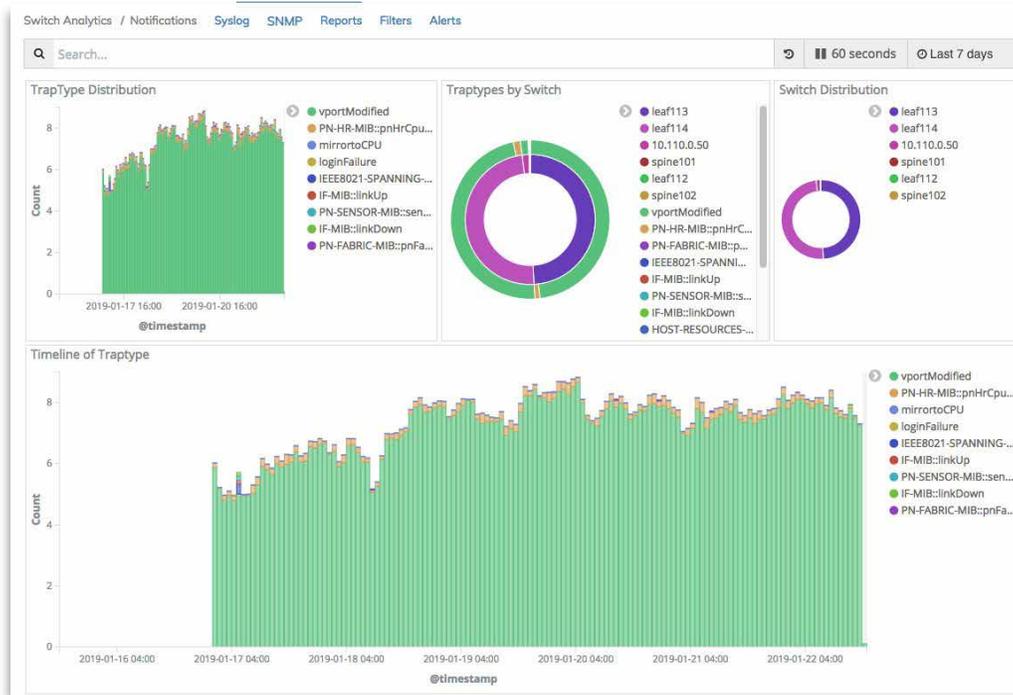


UNUM Insight Analytics Dynamic Flow Mapping Dashboard.

Switch Analytics

UNUM IA Switch Analytics enables port telemetry and device diagnostics via a selection of searchable options such as fabric node, switch port, vport (virtual port) and state, including a dashboard of all ports in the fabric.

- **Switch Analytics Notifications** allow users to sort and analyze syslog and SNMP data, as well as schedule reports and configure alerts.
- The **Schedule Reports** module provides a method of creating customized reports, which are then sent by email to the user. Schedule Reports notifies the user of useful monitoring information, such as the information in the standardized view reporting high-level flow statistics over the past seven days. *Use of the scheduler is an option that requires an additional license.*
- The **Alerts** module provides a method of creating alerts notifying the user of critical monitored events. Alert Details, Alert Conditions, Schedule Details and Alert Action parameters can all be adjusted depending on the monitoring and alerting requirements. *Use of the Alerts module is an option that requires an additional license.*
- **Port stats** – View port utilization and plot traffic across multiple ports over an adjustable period of time.
- **Policy stats (vFlow)** – Administrators can now see the impact of the traffic policies set with the Pluribus Policy (vFlow) dashboard.
- **Tunnel stats** – The Tunnel Stats dashboard displays information on VXLAN tunnels, such as top input/output traffic and top i/o packet errors.



UNUM Switch Analytics SNMP Notifications Dashboard.

Search

UNUM Insight Analytics utilizes a powerful, distributed engine to store, filter, correlate and visualize vast amounts of data in real time, while isolating and filtering specific flows from millions, all in a fraction of a second.

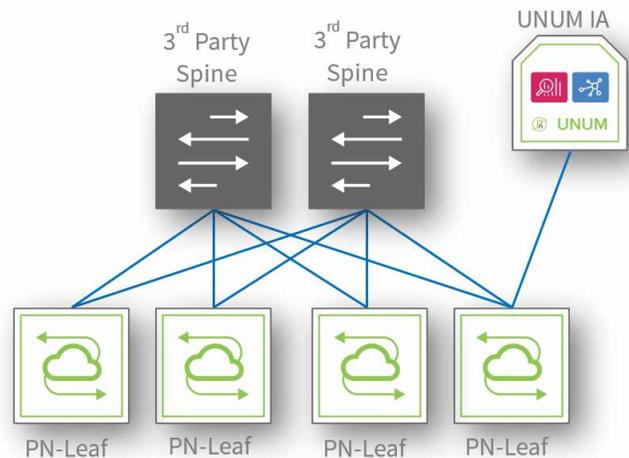
Features of the search engine include:

- Powerful query syntax to filter flow metadata information based on field-based exact matches, regular expressions, ranges and Boolean operators.
- Selected views from the Connection Dashboard.
- Aggregated flow stats: duration, latency, total bytes per connection.
- Extensive “time machine” functionality with absolute or relative year/month/day/hour/minute/second granularity.
- IP geolocation for client and servers.
- Detailed flow table consisting of over 30 metadata fields associated with each flow.

Potential use cases for Pluribus Insight Analytics Alerts and programmable tagging include the detection of unauthorized access attempts, DDOS attacks or fabric node failure.

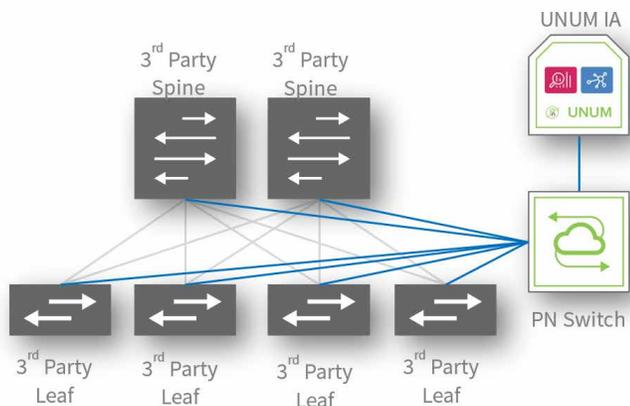
Deployment Options

Pluribus UNUM Insight Analytics is deployed in one of two scenarios. The first is with in-line Pluribus Netvisor switches to maximize the capture switch telemetry for analysis, providing a comprehensive view of the fabric, including syslog and SNMP. Netvisor Flow or nvFlow is the technology used by Netvisor One to collect metadata and telemetry for the Insight Analytics database.



Deployment Option #1 - UNUM Insight Analytics with In-line Pluribus Netvisor OS Switches.

The second scenario is when a customer has an already-deployed network and would like to use IA as a collection and analysis tool for SNMP traps and syslog data.



Deployment Option #2 - UNUM Insight Analytics with Pluribus Netvisor OS Mirror Switch.

Licensing

The Pluribus UNUM platform is simple to deploy and can manage and support any sized network with multiple fabrics distributed across multiple locations. Licensing is elastic, enabling pay-as-you-grow flexibility. Insight Analytics is a fully integrated module of UNUM that is optionally activated through a license key. Insight Analytics is available in two versions depending on the monitoring capacity required. The standard version supports up to 100 million flows and the high-capacity version supports up to 2.5 billion flows.

Support and Professional Services

Pluribus Networks offers a wide range of advanced services spanning the entire network lifecycle to protect investments and help accelerate success from initial deployment to ongoing optimization. Multiple extended support options are available, including on-demand global support, on-site support, advanced hardware replacements and customized technical training. Professional implementation services can help design, deploy and optimize the operating environment tailored to your organization's specific requirements. Maintenance options include direct access to a team of expert network engineers with deep networking experience and our self-service online Customer Portal. For more information about Pluribus support options, visit <http://www.pluribusnetworks.com/support> or contact a Pluribus Networks authorized reseller.

Pluribus UNUM and Netvisor ONE Compatibility

Pluribus UNUM supports the equivalent release of Netvisor ONE, plus the prior version. For example, UNUM 5.1.x supports Netvisor versions 5.1.x and 5.0.x. For other combinations, please contact Pluribus Networks customer service before deploying.

Please Note: early field trial (EFT) features are not fully tested and are annotated in the Pluribus UNUM release notes. Before implementing an EFT feature in production, please consult your local partner or Pluribus Networks account team.

Now on the Dell Virtual Edge Platform 4600!

UNUM 5.2.x extends syslog data collection up to 30 days and analytics data storage up to 500 million flows exclusively on the Dell VEP 4600. Included are two virtual Netvisor ONE machines to help manage larger, busier fabrics. The Dell VEP4600 can be ordered directly from Dell in the configuration provided in the UNUM Hardware Requirements and Specifications table.

Virtual Netvisor is a virtual machine running Pluribus Networks' Netvisor ONE operating system. Once deployed and joined to a fabric as a node, vNV offloads resource-intensive services from switches and is most commonly deployed with UNUM in high-traffic fabrics.

For more information please refer to the [Virtual Netvisor](#) data sheet.

Ordering Information

Pluribus UNUM software can be deployed as an OVA/virtual appliance on customer-provided hardware or delivered preconfigured on a server appliance for turnkey deployment. Ordering information is below for Pluribus UNUM, Insight Analytics, server appliances and add-on reports/alerts. Support must be ordered separately. Subscription options are available.

Pluribus UNUM Software

- UNUM-LIC — Pluribus UNUM Unified Management, Automation and Analytics Platform.

Insight Analytics Module License

Insight Analytics is optionally licensed in addition to the Pluribus UNUM software.

- IA-MOD-LIC — Pluribus Insight Analytics module license. Supports up to 100 million flows.
- IA-HC-MOD-LIC — Pluribus Insight Analytics High-Capacity (HC) module license. Supports up to 2.5 Billion flows. Cannot be deployed on customer hardware – HC server appliance required.

Dell VEP4600 Appliance with UNUM

- **IA-MOD-VEP-LIC** – Pluribus Insight Analytics license for the Dell VEP4600 platform. Requires base UNUM software license. Supports up to 500 million flows and up to 30 days syslog.
 - Includes two virtual Netvisor ([vNV](#)) machines.
 - The Dell VEP4600 can be ordered directly from Dell.
 - Refer to the Pluribus UNUM hardware requirements and specifications table for configuration details.

Pluribus UNUM Server Appliance

- AP-BASE-HW — Standard hardware server appliance for UNUM software or UNUM plus Insight Analytics, supporting up to 100M flows. Hardware only – requires software licenses.
- AP-HC-HW — HC hardware server appliance for UNUM + Insight Analytics, supporting 100M+ flows. Hardware only – requires software licenses.

Pluribus UNUM Reporting and Alerts

Add-on reporting and alerts are optionally licensed in addition to the Pluribus UNUM software.

- UNUM-RPRT-LIC — Pluribus UNUM add-on reporting license.
- UNUM-ALRT-LIC — Pluribus UNUM add-on alert license.

Specifications

The following are highlights of features provided by the Pluribus UNUM platform. Many automation capabilities are integrated as part of the Netvisor ONE OS and are not included in this summary.

Operational

- Runs in a VM as a virtual appliance
- Single-node deployment
- High-performance cluster supported for analytics
- Device inventory
- Manual device discovery
- Automatic device discovery via LLDP
- Day-0 automation/zero-touch provisioning (ZTP)
- Per-device logs of all actions taken by the portal
- Device connectivity status (up/down)
- Network provisioning - configuration
- Switch configuration management
- Change history tracking
- Device configuration validation

- View devices through network provisioning
- Filter view of network provisioning based on devices
- Topology mapping for Netvisor-enabled devices
- Third-party device topology mapping and visualization requires LLDP
- CLI tracking via the syslog dashboard

Configuration

- Automated ongoing device configuration change management
- Automated detection and rollback of invalid configuration changes
- Network-wide rollback supported from Netvisor OS

Telemetry Supported

- nvFlow for real-time analytics stream from Netvisor devices
- Syslog

Pluribus UNUM Hardware Requirements and Specifications

	UNUM Virtual Machine ¹	UNUM Appliance ²	UNUM on the Dell VEP4600	UNUM High-Capacity Appliance ^{2,3}
CPU	8 vCPU (4-core)	8 vCPU (4-core)	16 vCPU (8-core)	32 vCPU (16-core)
Memory	64 GB	128 GB	128 GB	4 x 64 GB
Solid State Storage	480 GB	480 GB	960 GB	Dual 960 GB
VMware ESXi Hypervisor	6.5 or 6.7	6.5 or 6.7	6.5 or 6.7	6.5 or 6.7
Client Requirements	Google Chrome (Version 44+), Mozilla Firefox (version 39+)	Google Chrome (Version 44+), Mozilla Firefox (version 39+)	Google Chrome (Version 44+), Mozilla Firefox (version 39+)	Google Chrome (Version 44+), Mozilla Firefox (version 39+)
NIC	N/A	Dual 1G Base-T NIC, dual 10G Base-T NIC	Dual 1G Base-T NIC, dual 10G Base-T NIC	Dual 10G Base-T NIC
IPMI	N/A	IPMI 2.0 + KVM with dedicated LAN	IPMI 2.0 + KVM with dedicated LAN	IPMI 2.0 + KVM with dedicated LAN
Power	N/A	Dual power supplies	Dual power supplies	Dual power supplies

¹ Specifications provided are operational requirements to use the UNUM virtual machine.

² The UNUM Appliance and the UNUM High-Capacity Appliance come with the hardware preconfigured. These specifications are provided for reference only.

³ The UNUM High-Capacity Appliance is a quad-server chassis. Numbers provided are per server.

UNUM Platform Scalability Matrix

	UNUM Virtual Machine	UNUM Appliance	UNUM on the Dell VEP4600	UNUM High-Capacity Appliance
Netvisor ONE Switches	50	50	50	100
Adaptive Cloud Fabrics	5	5	5	10
Syslog¹	Up to 7 days	Up to 7 days	Up to 30 days	Up to 60 days
IA Analytics records²	Up to 30 days	Up to 30 days	Up to 30 days	Up to 30 days
IA Stored Flows³	100 million	100 million	500 million	2.5 billion
IA Ingestion Rate⁴	1000 flows/sec	1000 flows/sec	1000 flows/sec	10,000 flows/sec
Fabric Ports stats	512	512	768	1536
Tunnel stats⁵	256	256	384	768
vFlow stats⁶	2560	2560	3520	7040

¹ Syslog storage is a rolling window (FIFO).

² 30-day rolling window (FIFO) of nvFlow and sFlow records combined.

³ Long-term retention of up to 100 million nvFlow and sFlow records

⁴ nvFlow or sFlow connection records per second combined.

⁵ A **tunnel** is a virtual connection between two fabric end points.

⁶ Local (switch) vFlows. Divide by number of switches to get fabric-level vFlows. For example, in an 8-node fabric, 2560 divided by 8 would be 320 fabric-wide vFlows.

Please refer to the [UNUM supported feature table](#) for more information.