Pluribus UNUM Fabric Manager
Unified Management, Automation and Analytics for the Unified Cloud Fabric

Highlights

- Advanced management platform that enhances the intrinsic automation of the Unified Cloud Fabric
- Simplifies provisioning and operating a complex network, or groups of networks
- Workflow automation with pre-built templates for zero-touch provisioning
- Dynamic topology mapping with multi-vendor network visualization
- Advanced diagnostics and analytics
- Intuitive and consistent user interface for seamless navigation across management and analysis modules
- Optional Insight Analytics supports extensive performance management and analytics

New with UNUM 6.3.0

- Fabric Resource Groups - Manage groups of resources as a single logical entity
- User Groups - Enable admin roles with definable permissions to access dashboards and menus for VirtualWire
- VirtualWire Enhancements - Time limits, point-to-multi-point connections, roles, and more

Pluribus UNUM Platform

Pluribus UNUM™ is a unified management platform that integrates a comprehensive range of advanced management, automation and analytics capabilities. At the highest level it consists of two main modules: UNUM Fabric Manager and UNUM Insight Analytics. UNUM Fabric Manager enhances the intrinsic automation of the Unified Cloud Fabric™ architecture with graphical workflow automation, topology visualization and switch diagnostics. UNUM Insight Analytics, which requires an add-on license, provides integrated performance analytics for every flow across the fabric with rich graphical dashboards, a time machine function and a powerful search capability. Together, these two Pluribus UNUM solutions liberate network operators from the complexity of provisioning and operating a complex network, or groups of networks, by automating the complete network lifecycle from implementation to operation and optimization, enabling intent-based network operations with vastly reduced deployment times. It simplifies management interactions, eliminates the command line function (CLI) learning curve and allows a broader range of users to operate the network while minimizing the potential for errors by minimizing direct human interactions with individual devices.

Pluribus UNUM is an agile, multi-functional web management portal that front-ends the distributed peer-to-peer Unified Cloud Fabric architecture. It combines an elastic big data database and intelligent analytics engine with an intuitive and consistent user interface that allows seamless navigation across fully integrated management and analysis modules. The UNUM platform combines deep intelligence with powerful real-time and historical visualization to provide a unified tool set to provision, manage, troubleshoot and proactively manage the fabric environment. Key capabilities include:

- Device and fabric management and provisioning
- Workflow automation with zero-touch provisioning
- Dynamic multi-vendor topology mapping
- Real-time network-wide monitoring with diagnostics and advanced analytics

The UNUM architecture consists of a multi-function web portal with a big data database and intelligent analytics engine that unifies automation, management and analytics.
UNUM Fabric Manager

Automation Speeds Time to Deployment

UNUM Fabric Manager permits operators to automate common deployment and configuration tasks from a single visual touch-point so one click can equal 1000 actions. The combination of fabric and workflow automation dramatically reduces operational complexity and significantly speeds deployments for large-scale networks by up to 95 percent faster over box-by-box manual configurations. UNUM Fabric Manager leverages the fabric APIs to distribute configurations across the topology, enabling rapid execution with accuracy and consistency.

Workflow Automation

UNUM Fabric Manager workflow automation simplifies the process of building and provisioning next-generation software-defined networks. Pre-built customizable playbooks leverage deployment-proven best practice designs, allowing network operators to quickly define, provision and deploy network configurations for an entire fabric topology at scale in minutes. This significantly speeds time to deployment and helps to prevent inconsistencies and misconfigurations.

UNUM Fabric Manager workflow automation enables precise zero-touch provisioning for any sized network – scaling from single-switch and two-switch clusters to more advanced leaf and spine topologies. UNUM Fabric Manager automatically discovers eligible devices and allows the network operator to select which devices to include in the fabric configuration. Once the devices are selected, UNUM Fabric Manager automates the topology build-out in minutes with only a few clicks without touching a single device.

15 pre-defined automated playbooks are available for multi-vendor brownfield environments where Netvisor® ONE-powered switches are only deployed in either a leaf or spine placement, or greenfield environments where the Unified Cloud Fabric will be used in both the leaf and spine placements.

Playbooks include automated designs for Layer 2 or Layer 3 implementations, such as BGP and OSPF, as well as various high-availability options. Operators can quickly modify the pre-built playbooks to meet unique operational needs and can create customized playbooks to automate and consistently replicate configurations.

Fabric Commit Process

To help eliminate the risk of inconsistent network configurations, UNUM Fabric Manager leverages the advanced transactional model of the Unified Cloud Fabric to validate that all provisioning and policy has been consistently implemented across every member network device.

As UNUM Fabric Manager begins to implement the desired configuration, the Netvisor ONE OS validates that all targeted switch devices have the capacity to physically support the requested configuration. To assure operational consistency, Netvisor ONE OS verifies that all devices have received the configuration and simultaneously executes the configuration across all devices.

Network Diagnostics and Fault Management

UNUM Fabric Manager continuously monitors the fabric and collects extensive physical link layer and device-level data from Netvisor embedded telemetry. Metrics are stored in the common database and leveraged across UNUM Fabric Manager to proactively identify emerging anomalies that can affect network availability and performance.

Real-time and historical diagnostic views enable contextual analysis, with event-driven insights into network and device health enabling operators to rapidly identify, troubleshoot and resolve network fault, availability and performance issues. Device statistics provide a picture of device health with CPU, memory and table utilization statistics, and link-level metrics identify congestion, traffic errors, interface flapping, and packet drops.

Flexible filtering allows operators to fine-tune an investigation to focus on specific time periods, devices or activities to speed root cause isolation. Historical diagnostic data is maintained for a rolling seven-day window, allowing the network operator to analyze previous performance levels with five-second granularity.

Flexible Alerting

The optional alerting module enables flexible, user-defined alerting notifications to quickly identify emerging operational issues based upon network status changes, error state or individual device issues. The UNUM Fabric Manager big data engine continuously monitors key performance indicators (KPI) to identify anomalies and generates real-time alert notifications when measured data crosses specific thresholds. Operators can leverage predefined KPIs or build customize alerting for user-definable KPI triggers and thresholds.

Real-time alert notifications can be delivered to any number of people or defined groups. Different classes of alerts can be targeted to specific IT staff based upon a specific incident type or affected portion of the network. UNUM Fabric Manager alert notifications can contain a unique link with one-click access to alert detail and the analysis workflow, permitting operators to quickly drill down for rapid triage, targeted troubleshooting and remediation.
Real-Time Topology Visualization

UNUM Fabric Manager provides an interactive live network topology map to visualize an Unified Cloud Fabric network. UNUM Fabric Manager automatically discovers all connected devices and builds a dynamic view of the network topology, including compatible adjacent third-party networked devices and endpoints that support the Link Layer Discovery Protocol (LLDP). Netvisor vPort intelligence allows the visualization of servers and services correlated to endpoints.

The topology view delivers an accurate representation of the fabric topology, with real-time traffic and state information overlaid on the topology. A single instance of UNUM Fabric Manager can seamlessly scale to visualize very large distributed fabrics and multiple interconnected fabrics in a single unified topology view.

Interactive Real-time Visualization

The interactive topology map provides a real-time holistic view of the active network topology and is an ideal primary dashboard for managing network operations. Operators easily and quickly create customized physical network topology views for a specific fabric, or multiple fabrics, with simple drag-and-click operation to meet diverse operational needs.

The topology dashboard provides a comprehensive at-a-glance view of the current state and health of network operations. Granular flow-on-flow traffic path visualization superimposes traffic flows across the topology to expose traffic volume and applications traversing the network.

Unified cross-platform workflows speed analysis and simplify troubleshooting, allowing operators to quickly isolate flows between any two endpoints and drill down to launch debugging tools or Insight Analytics for deeper analysis and troubleshooting.

Device Auto Discovery

Leveraging the automated intelligence of the Unified Cloud Fabric, UNUM Fabric Manager performs autonomous multi-level network discovery to scan the network and auto-detect changes to network topology and state as devices or endpoints are moved, added or removed.

The discovery process is an automated background task that is non-disruptive to network operations and does not create an unnecessary load on the network. The topology view is automatically updated in real time, notifications are indicated on the live topology dashboard and alerts can be generated based upon user-defined criteria.

Device-level diagnostics and configuration updates can also be initiated from the interactive topology view with a single click from any connected Netvisor device icon. Operators can view a device health snapshot or health over time for metrics such as CPU, memory and table utilization, link layer utilization and device state.

Netvisor ONE Backup & Restore

Backup your fabrics automatically and restore switch nodes directly from the UNUM Fabric Manager Topology Dashboard. Backup files are stored in a network file share and can be exported for storage elsewhere.

The real-time Topology Dashboard provides a comprehensive and interactive view of the Unified Cloud Fabric topology along with connected networked devices, endpoints and services with drill-down access to diagnostic and analytics data.
Endpoint Intelligence

UNUM Fabric Manager leverages Netvisor ONE OS vPort intelligence to identify fabric-connected endpoints. Operators can click and view all active endpoints connected to each switch directly from the network topology dashboard. When the Insight Analytics module is activated, operators can drill down to view real-time and historical endpoint performance metrics for an entire switch, a specific switch port or a specific endpoint.

Netvisor ONE Upgrades

Admins can upgrade their switch software directly from the Fabric Manager topology dashboard. Upgrades can be performed with or without Internet connectivity.

Latest Features in UNUM 6.3

- The latest iteration of Pluribus UNUM incorporates several new features: Fabric Resource Groups – Administrators can conduct operations on a defined group of fabrics, switches, and/or ports as one logical entity, with a single action.
- User Groups - Enable admin roles with limited permissions to access dashboards and menus for Virtual Wire.
- Virtual Wire and Packet Broker Enhancements - Improved Dashboard, time limits, point-to-multipoint connections, roles, permissions, and port status.
- Background Fabric Upgrades – Pre-stage your upgrade and trigger during downtime windows.
- Introductory Insight Analytics License – A new low-cost, one million flow license is now available allowing customers to kick the tires on Insight Analytics.
- Notifications – E-mail notifications for Fabric events.

UNUM Super Fabric Highlight

UNUM Super Fabric enables the management of up to four pods as one, allowing a single command to propagate across all of the fabrics. A pod is simply a fabric being managed as part of a Super Fabric.

Customers requiring maximum uptime can use the VMware vSphere High Availability solution in conjunction with the UNUM Super Fabric for cost-effective failover protection against hardware and operating system outages.

Super Fabric deployments currently require a Professional Services engagement.

VirtualWire

UNUM Fabric Manager incorporates Pluribus VirtualWire Technology in an easy-to-use, graphical dashboard, allowing administrators to create virtual links between ports. With Pluribus VirtualWire, you can quickly build new topologies in software in a matter of minutes with visibility and troubleshooting built in, all at a fraction of the cost of traditional Layer 1 matrix switches. VirtualWire was formerly known as virtual link extension or vLE.

- VirtualWire enables the creation of point-to-point and point-to-multi-point virtual links across a fabric
- Facilitates the efficient sharing of expensive test tools (e.g., traffic generators), which can be dynamically moved across test environments
- Transparency to Ethernet frames and control plane protocols
- Distributed architecture enables flexible and geographically distributed deployments
- Creation by port description for simpler management
- Now includes an interactive dashboard of connected devices

Please refer to the Pluribus VirtualWire solutions webpage for more information on IP VirtualWire and other VirtualWire Solutions.

Packet Broker

Pluribus’ packet broker architecture provides pervasive and deep visibility across geographically distributed data centers leveraging open networking Ethernet switches. Now admins are able to manage the Packet Broker directly from Fabric Manager via the new Packet Broker Dashboard. Please refer to the Network Packet Broker solution brief for more information.
UNUM Archiver

Flow metadata and switch analytics can now be stored beyond the 30-day limit onto a user defined NFS solid state repository. The add-on IUNUM-ARCHIVER-LIC license comes with a read-only viewer UNUM that can load and display the saved metadata files, so there will be no impact to live operations. Admins can copy the archived files to other long-term storage for historical analysis and compliance purposes.

Switch Analytics

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

- Switch Notifications - Allow users to sort and analyze syslog and SNMP data, as well as schedule reports and configure alerts.
- 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 packet errors.
- 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.

Insight Analytics

Insight Analytics is a powerful optional 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 embedded Netvisor 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.

Insight Analytics is an add-on license for UNUM. For more information, please refer to the Insight Analytics datasheet on the UNUM Product Page.
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, Boolean operators.
- Selected views from the Connection Dashboard.
- Aggregated flow statistics: 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.

Alerts

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 Pluribus Netvisor switches in-line to maximize the capture of 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.

UNUM - Insight Analytics Flow Traffic Dashboard

Deployment Option #1

UNUM Insight Analytics with Pluribus Netvisor OS switches in-line.
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 syslog data.

Insight Analytics is available in two versions depending on the monitoring capacity required. The BASE version supports up to 100 million flows, the medium capacity up to 500 million flows, and the high-capacity version up to 2 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 OS Compatibility

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

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.

Ordering Information

Pluribus UNUM software is available in three flavors: a BASE virtual machine, a medium capacity virtual machine, and a high-capacity option which can be ordered on an appliance or installed on four Dell RX740 servers. Refer to the Hardware Requirements and Scalability tables for more information on the different UNUM options. See the ordering information below for Pluribus UNUM, Insight Analytics, server appliances, and add-on reports/alerts. Support is ordered separately, and subscription options are available.

Pluribus UNUM Software is available in three options.

- UNUM-LIC — Pluribus UNUM BASE license.
- UNUM-MC-LIC — Pluribus medium-capacity license.
- UNUM-HC-LIC — Pluribus high-capacity license. Requires either the appliance option below or four Dell RX740 servers ordered directly from Dell, as well as professional services for deployment.

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

- IA-MOD-LIC — Pluribus Insight Analytics module BASE license. Supports up to 100 million flows.
- IA-MC-MOD-LIC — Pluribus Insight Analytics Medium-Capacity (MC) module license. Supports up to 500 million flows.
- IA-HC-MOD-LIC — Pluribus Insight Analytics High-Capacity (HC) module license. Supports up to 2 billion flows. Cannot be deployed on existing customer hardware – HC server appliance or four Dell RX740 are required.
- IA-SC-MOD-LIC — Introductory, low-cost license for Insight Analytics that will enable the storage of 1 million flows.

UNUM Appliance Hardware

- AP-HC-HW — UNUM high capacity hardware server appliance. Hardware only (software licenses are required) – add to order when a high-capacity appliance is needed. Requires professional services deployment.

Other Optional, add-on UNUM Licenses

- UNUM-RPRT-LIC — Pluribus UNUM add-on reporting license.
- UNUM-ALRT-LIC — Pluribus UNUM add-on e-mail alert license.
- UNUM-ARCHIVER-LIC — Archive daily snapshots capturing Insight & Switch Analytics meta data to an NFS repository (network folder) for long term storage. Includes a second UNUM “viewer” virtual machine so that archived data can be loaded and analyzed.
## Software Requirements & Specifications

Specifications provided are operational requirements to use UNUM virtual machines. Values do not include ESXi resource requirements.

### UNUM Appliance

<table>
<thead>
<tr>
<th>UNUM Appliance</th>
<th>vCPU (cores)</th>
<th>RAM</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNUM Base Capacity VM</td>
<td>8vCPU (4-core)</td>
<td>64 GB</td>
<td>480 GB SSD</td>
</tr>
<tr>
<td>UNUM Base Capacity VM - Archive Viewer 1,3,4</td>
<td>8vCPU (4-core)</td>
<td>64 GB</td>
<td>480 GB SSD</td>
</tr>
<tr>
<td>UNUM Medium Capacity VM</td>
<td>8vCPU (4-core)</td>
<td>64 GB</td>
<td>960 GB SSD</td>
</tr>
<tr>
<td>UNUM Medium Capacity VM - Archive Viewer 1,3,4</td>
<td>8vCPU (4-core)</td>
<td>64 GB</td>
<td>960 GB SSD</td>
</tr>
<tr>
<td>UNUM High Capacity VM Cluster 2,4</td>
<td>Special</td>
<td>Special</td>
<td>Special</td>
</tr>
<tr>
<td>UNUM High Capacity VM Cluster - Archive Viewer 1,3,4</td>
<td>Special</td>
<td>Special</td>
<td>Special</td>
</tr>
</tbody>
</table>

1. UNUM Archiver requires the Archiver license and a shared NFS SSD storage to store daily analytics snapshots.
2. The High Capacity VM cluster runs on four servers. Direct software download for existing servers is not supported, dedicated hardware needs to be purchased. See the Hardware Requirements and Specifications table.
3. Customers wishing to use UNUM Archiver will require resources for a second VM (provided with the license).
4. All UNUM virtual machines require ESXi 6.7.

## Server Hardware Specifications for UNUM Virtual Machines

Specifications provided are the minimum necessary server resources to run the UNUM virtual machine on dedicated hardware. This includes ESXi hardware requirements and resources for planned future expansions of UNUM.

### Bring Your Own Server

<table>
<thead>
<tr>
<th>UNUM Base Capacity Virtual Machine 5</th>
<th>UNUM Medium Capacity Virtual Machine 6</th>
<th>UNUM High Capacity VM Cluster 1,5</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU 16 vCPU (8-core) 2</td>
<td>CPU 16 vCPU (8-core) 2</td>
<td>CPU 32 vCPU (8-core) 2 per server</td>
</tr>
<tr>
<td>Memory 96 GB</td>
<td>Memory 96 GB</td>
<td>Memory 256 GB per server</td>
</tr>
<tr>
<td>Local SSD 480 GB</td>
<td>Local SSD 960 GB</td>
<td>Local SSD 1920 GB per server</td>
</tr>
<tr>
<td>Shared NFS SSD 480 GB required for HA 1,4</td>
<td>Shared NFS SSD 960 GB required for HA 1,4</td>
<td>Shared NFS SSD 960 GB required for HA 1,4</td>
</tr>
<tr>
<td>VMWare ESXi Hypervisor 6.7, 7.0</td>
<td>VMWare ESXi Hypervisor 6.7, 7.0</td>
<td>VMWare ESXi Hypervisor 6.7, 7.0</td>
</tr>
<tr>
<td>NIC Dual 10G Base-T NIC 6</td>
<td>NIC Dual 10G Base-T NIC 6</td>
<td>NIC Dual 10G Base-T NIC 8</td>
</tr>
<tr>
<td>High Availability (HA) Yes 3,7</td>
<td>High Availability (HA) Yes 3,7</td>
<td>High Availability (HA) Yes 3,7</td>
</tr>
</tbody>
</table>

1. The High Capacity VM cluster can be installed as a cluster on four dedicated DELL RX740 servers. Direct software download for existing servers is not supported, dedicated hardware or the appliance needs to be purchased. The Dell configuration requires professional services installation as well as an external 10 Gbps switch is needed to enable internal cluster communication.
2. All versions of UNUM require CPU clock speeds of 2.4 GHz CPUs or higher.
3. All High Availability configurations require the following: UNUM 6.0+, the VMware vSphere 6 Enterprise Plus License, the UNUM base license + any optional UNUM licenses, and a shared NFS SSD storage. Redundant (RAID-1) storage is recommended for the shared storage, as is a minimum of a 10 Gbps connection between the NFS storage and the servers.
4. Solid State Drives are required on all UNUM platforms.
5. No specific VMware license requirements for non-HA environments (ESXi free is OK).
6. In HA deployments, the local storage for the Base VM and Medium Capacity VM must meet recommended VMware hardware requirements. Pluribus recommends a minimum of 480 GB. 960 GB of shared NFS storage is still required.
7. In HA deployments, the local storage for two of the four servers in the High Capacity VM cluster can be reduced to 960 GB. 960 GB of shared NFS storage is still required.
8. UNUM can only support one direct in-band fabric connection via the eth2 interface. Management of multiple in-band fabrics requires the addition of an external switch.
Specifications for the UNUM High Capacity Appliance

Customers without an ESXi infrastructure or limited compute resources can purchase a Pluribus Networks tested and validated, turnkey appliance with UNUM pre-installed. Simply rack, stack, and power on. UNUM is ready to go.

### UNUM High Capacity Appliance

<table>
<thead>
<tr>
<th></th>
<th>UNUM High Capacity Appliance 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU</strong></td>
<td>32 vCPU (16-core) per server</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>256 GB per server</td>
</tr>
<tr>
<td><strong>Local SSD</strong></td>
<td>1920 GB per server</td>
</tr>
<tr>
<td><strong>Shared NFS SSD</strong></td>
<td>960 GB required for HA</td>
</tr>
<tr>
<td><strong>VMware ESXi Hypervisor</strong></td>
<td>6.7, 7.0</td>
</tr>
<tr>
<td><strong>Client Requirements</strong></td>
<td>Google Chrome (Version 44+)</td>
</tr>
<tr>
<td></td>
<td>Mozilla Firefox (Version 39+)</td>
</tr>
<tr>
<td><strong>NIC</strong></td>
<td>Dual 10G Base-T NIC</td>
</tr>
<tr>
<td><strong>High Availability (HA)</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Rack Dimensions</strong></td>
<td>1RU Base/Medium, 2RU High Capacity</td>
</tr>
</tbody>
</table>

1 The High Capacity appliance is four dedicated nodes of the listed specifications.

### UNUM Fabric Manager Scalability Matrix

<table>
<thead>
<tr>
<th></th>
<th>UNUM Base Capacity VM/Appliance</th>
<th>UNUM Medium Capacity VM/Appliance</th>
<th>UNUM High Capacity VM Cluster/Appliance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximum Netvisor One Switches</strong></td>
<td>55</td>
<td>55</td>
<td>140</td>
</tr>
<tr>
<td><strong>Maximum Unified Cloud Fabrics</strong></td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td><strong>Maximum Netvisor ONE Switches per Fabric</strong></td>
<td>32</td>
<td>32</td>
<td>128 Leafs per Super Fabric 5</td>
</tr>
<tr>
<td><strong>Syslog Records</strong> 1</td>
<td>Up to 7 Days</td>
<td>Up to 30 Days</td>
<td>Up to 60 Days</td>
</tr>
<tr>
<td><strong>Port Stats</strong> 2,6</td>
<td>512</td>
<td>768</td>
<td>1536</td>
</tr>
<tr>
<td><strong>Tunnel Stats</strong> 3,6,7</td>
<td>246</td>
<td>384</td>
<td>768</td>
</tr>
<tr>
<td><strong>vFlow Stats</strong> 2,3,6</td>
<td>2560</td>
<td>3520</td>
<td>7040</td>
</tr>
</tbody>
</table>

1 Records storage is a rolling first-in first-out window of both flow (nvFlow) and switch analytics records.
2 Numbers provided are aggregate values of active stats captured. To get a per switch value of active stats captured, divide the value provided by the total number of switches being managed by UNUM. For example, if the UNUM Base Capacity VM is managing 24 switches total, then 512 / 24 = 21 port stats per switch (rounding down).
3 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.
4 Maximum fabric size of 32 switches is a Netvisor ONE limitation but is listed here for convenience. UNUM supports a number of fabrics and switches, up to the maximum amount of either switches or fabrics. For example, one fabric of 32 nodes, two fabrics of 24 and 26 nodes, three fabrics of 12, 18, and 20 nodes or five fabrics of 11 nodes each for the UNUM Base Capacity virtual machine.
5 Super Fabric can manage up to four pods, up to 128 leafs and up to 12 spines. Without super fabric any combination of leafs and spines are supported up to 140 total, 32 nodes maximum per fabric.
6 Number of simultaneous stats collected every ten seconds.
7 A Tunnel is a virtual connection between two fabric end points.

### UNUM Insight Analytics Scalability Matrix

<table>
<thead>
<tr>
<th></th>
<th>UNUM Base Capacity VM/Appliance</th>
<th>UNUM Medium Capacity VM/Appliance</th>
<th>UNUM High Capacity VM Cluster/Appliance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IA Maximum Records Stored</strong> 1,2,3</td>
<td>100 Million</td>
<td>500 Million</td>
<td>2 Billion</td>
</tr>
<tr>
<td><strong>IA Analytics Records, Maximum Days</strong> 1,3</td>
<td>Up to 30 Days</td>
<td>Up to 30 Days</td>
<td>Up to 30 Days 4</td>
</tr>
<tr>
<td><strong>IA Peak Ingestion Rate</strong> 3</td>
<td>1000 flows/sec</td>
<td>10000 flows/sec</td>
<td>10,000 flows/sec</td>
</tr>
</tbody>
</table>

1 Records storage is a rolling first-in first-out window of both flow (nvFlow) and switch analytics records.
2 Long-term retention of records, up to the value stated (100M, 500M, 2B). Variations based on network traffic can occur.
3 Ingestion rate will affect the number of days of records are stored. This can vary based on fabric size and traffic patterns.
4 Busy environments generating more than 1000 flows per second impact the number of days records are stored. If sustained 10,000 flows per second occur; the maximum days of records stored will be reduced to approximately one week. This environment can be mitigated using the UNUM Archiver license and external SSD storage.

*Note:* All UNUM fabrics are required to have a minimum of one switch with 16 GB of RAM to act as a communication node. Two 16 GB switches will be required if seed switch redundancy is implemented.
Specifications

The following are highlights of features provided by the Pluribus UNUM platform. Many automation capabilities are integrated as part of the Netvisor ONE network 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/API command tracking via syslog dashboard
- vCenter Connection Service

Configuration

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