Pluribus UNUM Platform

Unified Management, Automation and Analytics for the Adaptive Cloud Fabric

**Highlights**

- Advanced management platform that enhances the intrinsic automation of the Adaptive 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 6.0.0**

- Super Fabric High Availability Cluster – UNUM now manages fabrics with up to 64 leafs and can be configured with VMware high availability
- UNUM Archiver – stores metadata beyond the 30-day limit in a separate NFS repository
- IP Virtual Wire – New and simplified dashboard of connected devices

Pluribus UNUM™ is a unified management platform that integrates a comprehensive range of advanced management, automation and analytics capabilities. It enhances the intrinsic automation of the Adaptive Cloud Fabric™ architecture with workflow automation, topology visualization, network diagnostics and integrated performance analytics. Pluribus UNUM liberates 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 interface (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 Adaptive 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 toolset 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.
Insight Analytics is an add-on license for UNUM. For more information, please refer to the Insight Analytics datasheet on the UNUM Product Page.

Automation Speeds Time to Deployment
Pluribus UNUM 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 leverages the fabric APIs to distribute configurations across the topology, enabling rapid execution with accuracy and consistency.

Workflow Automation
Pluribus UNUM 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 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. The UNUM platform 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 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 Adaptive 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, Pluribus UNUM leverages the advanced transactional model of the Adaptive Cloud Fabric to validate that all provisioning and policy has been consistently implemented across every member network device.

As UNUM 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
The UNUM platform 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 the UNUM platform 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 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. Alerting can be delivered via email; through popular collaboration platforms, such as Slack; through third-party IT Service Management platforms, such as ServiceNow; or through IT alerting platforms such as xMatters using Webhooks APIs. UNUM 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

Pluribus UNUM provides an interactive live network topology map to visualize an Adaptive Cloud Fabric network. UNUM 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 Pluribus UNUM can seamlessly scale to visualize very large distributed fabrics and multiple interconnected fabrics in a single unified topology view.

Device Auto Discovery

Leveraging the automated intelligence of the Adaptive Cloud Fabric, UNUM 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.

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-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.

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

UNUM 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.

**IP VirtualWire**

UNUM incorporates Pluribus IP VirtualWire Technology in an easy-to-use, graphical dashboard, allowing administration 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. IP VirtualWire is also known as virtual link extension or vLE.

- IP VirtualWire enables the creation of point-to-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
- vLE creation by port description for simpler management
- Now includes a dashboard of connected devices

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

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**Latest Features in UNUM 6.0**

The latest iteration of Pluribus UNUM incorporates several new features:

- **Super Fabric with HA Cluster** – UNUM now enables the creation of 64 leaves and six spines fabrics, including support for VMware High Availability.

- **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 UNUM-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.

- **Lab automation enhancements** – IP Virtual Wire now includes a new dashboard displaying connected devices.

- **QoS configurations for: CoS settings, rate limiting, DSCP mapping and CPU control plane protection.**

- **Seed Switch High Availability** – UNUM can now connect to two fabric seed switches via a single VRRP virtual IP address, providing redundant access to the fabric.

- **Fabric over Layer-3 via Ansible Scripts** – Customers can now deploy fabrics over L3 in a Leaf-spine topology via an imbedded Ansible script. Fabric over Layer-3 deployments require a Pluribus professional services engagement.
UNUM Super Fabric with HA Cluster Highlight

UNUM now manages 64 leaf fabrics, with four to six spines using a “pod” architecture of two fabrics, managed by the administrator as if they were a single fabric.

Customers requiring maximum uptime can now 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.

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 embedded Netvisor monitoring telemetry, sFlow and packet flow data sources to enable pervasive visibility across the network – eliminating the need for expensive probes or complex monitoring overlay networks.

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.*
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.

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.
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.

**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, the Dell EMC VEP4600 supports 500 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](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.

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**Ordering Information**

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

**Pluribus UNUM Software**

- **UNUM-LIC** — Pluribus UNUM Unified Management, Automation and Analytics Platform.
- **Insight Analytics Module License** 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.
- **UNUM Archiver**
  - **UNUM-ARCHIVER-LIC** — Add on license that enables the archiving of Insight & Switch Analytics metadata to an NFS repository. Includes a second UNUM “viewer” so that archived data can be loaded and analyzed.

**The Dell EMC VEP4600 Appliance with UNUM**

- **IA-MOD-VEP-LIC** — Pluribus Insight Analytics license for the 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 VEP4600 can be ordered directly from Dell Technologies.
  - 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 + 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.
# Pluribus UNUM Hardware Requirements & Specifications

<table>
<thead>
<tr>
<th></th>
<th>UNUM Virtual Machine¹</th>
<th>UNUM Appliance²</th>
<th>UNUM on the Dell EMC VEP4600</th>
<th>UNUM High Availability Cluster⁴,⁵</th>
<th>UNUM High Capacity Appliance²,³,⁸</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU</strong></td>
<td>8 vCPU (4-core)</td>
<td>8 vCPU (4-core)</td>
<td>16 vCPU (8-core)</td>
<td>32 vCPU (16-core) per server¹</td>
<td>32 vCPU (16-core) per server</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>64 GB</td>
<td>128 GB</td>
<td>128 GB</td>
<td>192 GB per server</td>
<td>256 GB per server</td>
</tr>
<tr>
<td><strong>ESXi SSD</strong></td>
<td>480 GB</td>
<td>480 GB</td>
<td>960 GB</td>
<td>960 GB per server</td>
<td>1920 GB per server</td>
</tr>
<tr>
<td><strong>NFS SSD</strong></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>960 GB per server</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>VMware ESXi Hypervisor</strong></td>
<td>6.7</td>
<td>6.7</td>
<td>6.7</td>
<td>6.7</td>
<td>6.7</td>
</tr>
<tr>
<td><strong>Client Requirements</strong></td>
<td>Google Chrome (Version 44+), Mozilla Firefox (version 39+)</td>
<td>Google Chrome (Version 44+), Mozilla Firefox (version 39+)</td>
<td>Google Chrome (Version 44+), Mozilla Firefox (version 39+)</td>
<td>Google Chrome (Version 44+), Mozilla Firefox (version 39+)</td>
<td>Google Chrome (Version 44+), Mozilla Firefox (version 39+)</td>
</tr>
<tr>
<td><strong>NIC</strong></td>
<td>N/A</td>
<td>Dual 1G Base-T NIC, dual 10G Base-T NIC</td>
<td>Dual 10G Base-T NIC</td>
<td>Quad 10G Base-T NIC¹</td>
<td>Dual 10G Base-T NIC</td>
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<tr>
<td><strong>IPMI</strong></td>
<td>N/A</td>
<td>IPMI 2.0 + KVM with dedicated LAN</td>
<td>IPMI 2.0 + KVM with dedicated LAN</td>
<td>IPMI 2.0 + KVM with dedicated LAN</td>
<td>IPMI 2.0 + KVM with dedicated LAN</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>N/A</td>
<td>Dual power supplies</td>
<td>Dual power supplies</td>
<td>Dual power supplies</td>
<td>Dual power supplies</td>
</tr>
<tr>
<td><strong>High Availability</strong></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes*</td>
<td>No</td>
</tr>
</tbody>
</table>

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 pre-configured. These specifications are provided for reference only.

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

⁴ The UNUM HA cluster requires: UNUM 6.0+, two physical ESXi servers, the VMware vSphere 6 Enterprise Plus License, and 480 GB per server of shared NFS storage. Customers wishing to deploy a super-fabric without high availability will only need one server.

⁵ Required for fault tolerance logging and vMotion in In-Band management Fabrics. Out-of-band management fabrics require two fewer 10G Base-T NIC’s.

⁶ The High Availability cluster requires clock speeds of 2.4 Ghz CPU’s or higher.

⁷ The high availability and high capacity clusters require dedicated servers.

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## UNUM Platform Scalability Matrix

<table>
<thead>
<tr>
<th>UNUM Platform Scalability Matrix</th>
<th>UNUM Virtual Machine</th>
<th>UNUM Appliance</th>
<th>UNUM on the Dell EMC VEP4600</th>
<th>UNUM High Availability Cluster⁴</th>
<th>UNUM High Capacity Appliance²,³,⁸</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netvisor ONE Switches¹</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>70¹</td>
<td>100</td>
</tr>
<tr>
<td>Adaptive Cloud Fabrics²</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Syslog¹</td>
<td>Up to 7 days</td>
<td>Up to 7 days</td>
<td>Up to 30 days</td>
<td>Up to 30 days</td>
<td>Up to 30 days</td>
</tr>
<tr>
<td>IA Analytics records²</td>
<td>Up to 30 days</td>
<td>Up to 30 days</td>
<td>Up to 30 days</td>
<td>Up to 30 days</td>
<td>Up to 30 days</td>
</tr>
<tr>
<td>IA Stored Flows²</td>
<td>100 million</td>
<td>100 million</td>
<td>500 million</td>
<td>100 million</td>
<td>2.5 Billion</td>
</tr>
<tr>
<td>IA Ingestion Rate⁴</td>
<td>1000 flows/sec</td>
<td>1000 flows/sec</td>
<td>10000 flows/sec</td>
<td>10000 flows/sec</td>
<td>10,000 flows/sec</td>
</tr>
<tr>
<td>Fabric Ports Stats¹</td>
<td>512</td>
<td>512</td>
<td>768</td>
<td>768</td>
<td>1536</td>
</tr>
<tr>
<td>Tunnels Stats⁴</td>
<td>256</td>
<td>256</td>
<td>384</td>
<td>384</td>
<td>768</td>
</tr>
<tr>
<td>vFlows Stats⁴</td>
<td>2560</td>
<td>2560</td>
<td>3520</td>
<td>3520</td>
<td>7040</td>
</tr>
</tbody>
</table>

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.

⁷ 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.

⁸ Up to 64 leafs and 6 spines total deployed in a super-fabric, containing two “pods” of a maximum 32 leafs each.

Note: All UNUM fabrics require one switch with 8GB of RAM to act as a communication node.

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

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