

# OpenNMS Release Notes

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OpenNMS Horizon v26.2.2-SNAPSHOT, Last updated 2020-10-29 19:39:03 UTC

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# What's New in OpenNMS Horizon 26

## System Requirements

- **Java 8 through 11:** OpenNMS Horizon 26 runs on JDK 8 through 11. We recommend the most recent version of OpenJDK 11.
- **PostgreSQL 10 or higher:** Horizon 26 requires any supported version of PostgreSQL 10 or higher.

## Breaking Changes

### Flow Classification

In versions before Horizon 26, the Flow Classification UI accepted invalid IP address values, e.g., `10,192.1,168.1,5.1-160`. When upgrading OpenNMS Horizon, existing Flow Classification Rules may be considered invalid. In this case they are silently ignored by the Flow Classification Engine.

In order to assure no invalid Flow Classification Rules exist, please run the OSGi shell command `opennms-classification:list-invalid-rules` to list all invalid rules. If there are any invalid rules, you must manually fix them using the Flow Classification UI. For more details, refer to issue [NMS-12422](#).

### Events and Kafka

Events forwarded to Kafka are now keyed by `id` rather than `uei`.

### Karaf Shell Command Changes

All of the custom Karaf shell commands have now been updated to use a common scope of `opennms`. This makes it easier to find and enumerate the commands.

Mapping from previous to new commands is as follows:

Previous Command	New Command
<code>opennms-provision:detect</code>	<code>opennms:detect</code>
<code>opennms-provision:list-detectors</code>	<code>opennms:list-detectors</code>
<code>opennms-provision:show-import</code>	<code>opennms:show-import</code>
<code>opennms-provision:import-requisition</code>	<code>opennms:import-requisition</code>
<code>opennms-dns:lookup</code>	<code>opennms:dns-lookup</code>
<code>opennms-dns:reverse-lookup</code>	<code>opennms:dns-reverse-lookup</code>
<code>opennms-ping:sweep</code>	<code>opennms:ping-sweep</code>
<code>opennms-ping:ping</code>	<code>opennms:ping</code>
<code>opennms-jira:list-projects</code>	<code>opennms:jira-list-projects</code>

Previous Command	New Command
opennms-jira:verify	opennms:jira-verify
opennms-jira:show-config	opennms:jira-show-config
opennms-jira:list-priorities	opennms:jira-list-priorities
opennms-jira:list-fields	opennms:jira-list-fields
opennms-jira:list-versions	opennms:jira-list-versions
opennms-jira:list-issue-types	opennms:jist-list-issue-types
opennms-jira:list-components	opennms:jira-list-components
opennms-scv:set	opennms:scv-set
opennms-scv:get	opennms:scv-get
opennms-datachoices:reset-system-id	opennms:datachoices-reset-system-id
opennms-datachoices:display-usage-report	opennms:datachoices-display-usage-report
opennms-datachoices:send-usage-report	opennms:datachoies-send-usage-report
opennms-poller:test	opennms:poll-test
opennms-poller:list-monitors	opennms:list-monitors
opennms-poller:poll	opennms:poll
opennms-filters:filter	opennms:filter
opennms-measurements:show-newts-samples	opennms:show-newts-samples
opennms-measurements:delete-resource	opennms:delete-measurement-resources
opennms-measurements:show-measurements	opennms:show-measurements
opennms-measurements:show-resources	opennms:show-measurement-resources
opennms-enlinkd:delete-topology	opennms:delete-topology
opennms-enlinkd:generate-topology	opennms:generate-topology
opennms-provision:list-detectors	opennms:list-detectors
opennms-collection:list-collectors	opennms:list-collectors
opennms-minion:id	opennms:minion-id
opennms-minion:ping	*Removed in favor of opennms:health-check
opennms-dns:stress	opennms:stress-dns
opennms-kafka-producer:sync-alarms	opennms:kafka-sync-alarms
opennms-kafka-producer:push-topology-edges	opennms:kafka-push-topology-edges
opennms-kafka-producer:evaluate-filter	opennms:kafka-evaluate-filter
opennms-kafka-producer:list-alarms	opennms:kafka-list-alarms
opennms-nodecache:sync	opennms:sync-node-cache
opennms-coordination:join-election-domain	opennms:join-election-domain

<b>Previous Command</b>	<b>New Command</b>
<code>opennms-kv-blob:put</code>	<code>opennms:kv-put-blob</code>
<code>opennms-kv-blob:get</code>	<code>opennms:kv-get-blob</code>
<code>opennms-kv-blob:benchmark</code>	<code>opennms:kv-benchmark-blob</code>
<code>opennms-kv-json:get</code>	<code>opennms:kv-get-json</code>
<code>opennms-kv-json:put</code>	<code>opennms:kv-put-json</code>
<code>opennms-classification:list-rules</code>	<code>opennms:list-classification-rules</code>
<code>opennms-classification:reload-engine</code>	<code>opennms:reload-classification-engine</code>
<code>opennms-classification:list-groups</code>	<code>opennms:list-classification-groups</code>
<code>opennms-classification:list-invalid-rules</code>	<code>opennms:list-classification-invalid-rules</code>
<code>opennms-classification:classify</code>	<code>opennms:classify-flow</code>
<code>opennms-elasticsearch:send-historic-events</code>	<code>opennms:send-events-to-elasticsearch</code>
<code>opennms-events:show-event-config</code>	<code>opennms:show-event-config</code>
<code>opennms-reload:daemon</code>	<code>opennms:reload-daemon</code>
<code>opennms-events:stress</code>	<code>opennms:stress-events</code>
<code>opennms-events:send</code>	<code>opennms:send-event</code>
<code>opennms-bsm:generate-hierarchies</code>	<code>opennms:bsm-generate-hierarchies</code>
<code>opennms-bsm:delete-generated-hierarchies</code>	<code>opennms:bsm-delete-generated-hierarchies</code>
<code>opennms-bsm:render-graph</code>	<code>opennms:bsm-render-graph</code>
<code>opennms-asset-topology:regenerate</code>	<code>opennms:asset-topo-regenerate</code>
<code>opennms-asset-topology:remove</code>	<code>opennms:asset-topo-remove</code>
<code>opennms-asset-topology:list</code>	<code>opennms:asset-topo-list</code>
<code>opennms-asset-topology:create</code>	<code>opennms:asset-topo-create</code>
<code>opennms-asset-topology:regenerateall</code>	<code>opennms:asset-topo-regenerate-all</code>
<code>opennms-topo:show-history</code>	<code>opennms:topo-show-history</code>
<code>opennms-topo:delete-history</code>	<code>opennms:topo-delete-history</code>
<code>opennms-onms:listnamespaces</code>	<code>opennms:list-namespaces</code>
<code>opennms-topo:listoperations</code>	<code>opennms:topo-list-operations</code>
<code>opennms-activemq:stats</code>	<code>opennms:activemq-stats</code>
<code>opennms-activemq:purge-queue</code>	<code>opennms:activemq-purge-queue</code>
<code>opennms-sentinel:id</code>	<code>opennms:id</code>
<code>opennms-collection:list-collectors</code>	<code>opennms:list-collectors</code>
<code>opennms-collection:collect</code>	<code>opennms:collect</code>
<code>opennms-metrics:stress</code>	<code>opennms:stress-metrics</code>

<b>Previous Command</b>	<b>New Command</b>
<code>opennms-threshold-states:details</code>	<code>opennms:threshold-details</code>
<code>opennms-threshold-states:enumerate</code>	<code>opennms:threshold-enumerate</code>
<code>opennms-threshold-states:clear-all</code>	<code>opennms:threshold-clear-all</code>
<code>opennms-threshold-states:clear</code>	<code>opennms:threshold-clear</code>
<code>opennms-meta:test</code>	<code>opennms:metadata-test</code>
<code>opennms-rpc:stress</code>	<code>opennms:stress-rpc</code>
<code>opennms-kafka-sink:topics</code>	<code>opennms:kafka-sink-topics</code>
<code>opennms-kafka-rpc:topics</code>	<code>opennms:kafka-rpc-topics</code>
<code>opennms-snmp:fit</code>	<code>opennms:snmp-fit</code>
<code>opennms-snmp:show-config</code>	<code>opennms:snmp-show-config</code>
<code>opennms-snmp:remove-from-definition</code>	<code>opennms:snmp-remove-from-definition</code>
<code>opennms-snmp:walk</code>	<code>opennms:snmp-walk</code>
<code>snmp:local-engine-id</code>	<code>opennms:snmp-local-engine-id</code>
<code>opennms-health:metrics-list</code>	<code>opennms:metrics-list</code>
<code>opennms-health:metrics-display</code>	<code>opennms:metrics-display</code>
<code>opennms-health:check</code>	<code>opennms:health-check</code>
<code>opennms-graph:get</code>	<code>opennms:graph-get</code>
<code>opennms-graph:list</code>	<code>opennms:graph-list</code>
<code>opennms-graph:force-reload</code>	<code>opennms:graph-force-reload</code>
<code>opennms-graph:search</code>	<code>opennms:graph-search</code>

# New Features and Improvements

## Documentation Updates

Documentation improvements have been made in a number of areas:

- Docker
- Grafana PDF Reports
- Graph Service API
- Minion
- Telemetry/flows
- Thresholding
- Timeseries Integration

## Graph API

A new API has been added for querying graph data, inspired by [GraphML](#). This API consolidates a number of internal APIs for accessing topology, application, BSM, link, and other data.

## Kafka and RPC

The RPC APIs for communicating between the OpenNMS core, Minion, and Sentinel have been improved, including adding support for GRPC communication.

It is now possible to configure Kafka to use a single topic for communication rather than one-per-module.

Flow data can now be configured to be enriched with node metadata before being forwarded to Kafka.

## Minion and Sentinel

- The Minion can now be configured using `confd` by creating a `minion-config.yaml` file. For details, see [the README in the Minion source](#).
- The Minion Docker container has a number of enhancements:
  - Minion container sizes have been halved.
  - Native ICMP support has been added to improve performance.
  - Dockerized Minion now supports ARM.
- The Jolokia HTTP-JMX bridge has been added to the Minion and Sentinel.



## Polling and Monitoring

- The HTTP POST monitor has been updated to support injecting headers into the request.
- The poller now does a better job of validating configs on startup/reload.

## Provisioning

- Provisiond has been enhanced to improve performance of scans.
- Nodes provisioned through new suspect events now get assigned a foreign source.

## Telemetry and BMP

- The flow classification editor now supports CIDR notation for IP address expressions.
- Support has been added for the BGP Monitoring Protocol (BMP).

## Time-Series API

A new experimental internal API has been added for supporting persisting time-series data in a way that doesn't carry the baggage of the existing persistence APIs which are still heavily influenced by RRDTOOL.

## Web UI Improvements

- The navbar notification alert now shows everywhere, not just the front page.
- The "user" menu has been reorganized and cleaned up.
- The requisitions UI now supports deleting a node from its node page in the editor.

# Important Internal Changes

- Kafka has been updated to version 2.4.0.
- Protobuf has been updated to version 3.11.4.
- The OpenNMS Integration API is now version 0.4.
- Internally, events are, in most cases, immutable. For the most part, you should see no changes in the external and code places that events are interacted with. They are converted to mutable versions in places where they are often manipulated (like Drools).

## Changelog

### Release 26.2.2

Release 26.2.2 is the ninth release in the Horizon 26 series.

It contains a number of bug fixes and enhancements, including doc improvements, time series updates, and a fix for UEI processing.

The codename for 26.2.2 is *Vader*.

#### Bug

- HTTP Detector does not accept a response without a reason as valid (Issue [NMS-10351](#))
- Eventconf with same UEI but differing masks does not follow first-found-wins rule when some events have alarm-data elements and some do not (Issue [NMS-12755](#))
- make allowing legacy MD5 passwords configurable (Issue [NMS-12817](#))
- Install guide RHEL instructions are invalid on RHEL 7 (Issue [NMS-12891](#))
- Nullpointer in Time Series Integration Layer when query leads to no data. (Issue [NMS-12914](#))
- Integration API: Alarm.type is unset (Issue [NMS-12923](#))

#### Enhancement

- SNMP special configs are missing in the docs (Issue [NMS-10382](#))
- Update collectors chapter (Issue [NMS-12682](#))
- Include XML schema for wsman-datacollection-config.xml in assemblies (Issue [NMS-12813](#))
- Update Minion installation documentation (Issue [NMS-12917](#))
- Improvements to Timescale Plugin (Issue [NMS-12929](#))
- sort custom reports (Issue [NMS-12931](#))
- TSS: TimescalePlugin: Create KAR (Issue [NMS-12932](#))

## Release 26.2.1

Release 26.2.1 is the eighth release in the Horizon 26 series.

It is a re-roll of 26.2.0 with some missing merges fixed. The bugs and enhancements that were reported as part of 26.2.0 are now actually all there. ;)

The codename for 26.2.1 is *Maskne*.

## Release 26.2.0

Release 26.2.0 is the seventh release in the Horizon 26 series.

It contains a bunch of bug fixes and improvements, including adding support for a new telemetry adapter supporting collection from OpenConfig over the gRPC Juniper Telemetry Interface.

The codename for 26.2.0 is *Kabuki*.

### Bug

- importing a provisioning group erases path outages (Issue [NMS-3608](#))
- Slack-compatible notification strategies expect "url" for switch name, should be "-url" (Issue [NMS-10552](#))
- Can't install Horizon on Ubuntu 20.04 LTS (Issue [NMS-12693](#))
- opennms.pid missing when started by Systemd (Issue [NMS-12769](#))
- Wildcard certificate rejected after upgrade from OpenNMS version 26.1.1 to 26.1.2 (Issue [NMS-12805](#))
- Syslogd is sending new suspect events with null IP Address (Issue [NMS-12824](#))
- NPE while running AlarmLifecycleListenerManager (Issue [NMS-12825](#))
- Response Time Summary database report missing latency calculation (Issue [NMS-12837](#))
- SslContextFactory needs to be changed to SslContextFactory.Server in jetty.xml (Issue [NMS-12847](#))
- Wrong startup command for Minion running with Docker and health check issues (Issue [NMS-12872](#))

### Enhancement

- Create OpenConfig Client to collect/digest Telemetry data (Issue [NMS-12729](#))
- Support encryption for SNMP V3 credentials (Issue [NMS-12753](#))
- snmpv3 need support for SHA256 and SHA512 Authentication Protocol (Issue [NMS-12782](#))
- Resource Graph properties throws exception if label starts with a number (Issue [NMS-12793](#))
- AbstractXmlCollectionHandler.parseString() doesn't handle json content (Issue [NMS-12812](#))
- Fix CollectdTest mock'ing errors (Issue [NMS-12828](#))
- Fix JMX datacollection config generator test (Issue [NMS-12829](#))

- Remove unused import in BsonUtils (Issue [NMS-12830](#))
- Update mockito/powermock dependencies (Issue [NMS-12831](#))
- Add documentation for OpenConfig feature (Issue [NMS-12857](#))
- Backport OpenConfig to release-26.x (Issue [NMS-12867](#))

## Release 26.1.3

Release 26.1.3 is the sixth release in the Horizon 26 series.

It contains a bunch of bug fixes and improvements, including big optimizations to the new time-series layer, some UI fixes, and more.

The codename for 26.1.3 is *Bit*.

### Bug

- Using Netflow aggregations results in NPE when no results returned from ES (Issue [NMS-12761](#))
- Fix docs warnings for resource-types, time series config and thresholding (Issue [NMS-12770](#))
- interfaceSnmplibByIfIndex fails if SNMP interface has no physical address (Issue [NMS-12775](#))
- Searching for alarms in the v2 API with a reductionKey that includes a comma or semicolon results in a 500 error (Issue [NMS-12777](#))
- Update log4j2 to 2.13.2 (Issue [NMS-12787](#))
- Support for optional snmpTrapAddress varbind needs documenting (Issue [NMS-12795](#))
- Broken link to "Standalone HTTPS with Jetty" in documentation. (Issue [NMS-12804](#))
- Rendering problems with complex custom Flow Classification Rules (Issue [NMS-12806](#))
- RRD-to-Newts Converter doesn't handle fully-overlapping RRAs (Issue [NMS-12835](#))

### Enhancement

- Encrypt the password in REST API POST endpoint /opennms/rest/users (Issue [NMS-6470](#))
- Optimize Performance of Timeseries Integration Layer (Issue [NMS-12731](#))
- Limit number of calls to find metrics (Issue [NMS-12744](#))
- Limit calls to the timeseries\_metatable (Issue [NMS-12745](#))
- Remove (if possible) the conversion from Opennms → Newts → TS (Issue [NMS-12746](#))
- Add JMX Meters to measure and export performance (Issue [NMS-12747](#))
- Remove unnecessary writes to meta\_data table (Issue [NMS-12748](#))
- Remove conversion to Newts objects in read operation (Issue [NMS-12749](#))
- Clean up package structure (Issue [NMS-12751](#))
- Review documentation (Issue [NMS-12758](#))
- Remove necessity to retrieve Metric when reading Samples (Issue [NMS-12786](#))

- Update OpenNMS DB functions and tests to handle Postgres 12 (Issue [NMS-12819](#))

## Release 26.1.2

Release 26.1.2 is the fifth release in the Horizon 26 series.

It contains a bunch of bug fixes and improvements, including docker container optimizations, Netflow changes, documentation updates, time-series enhancements, and more.

The codename for 26.1.2 is *Plague*.

### Bug

- AbstractSnmpValue.allBytesDisplayable() IndexOutOfBoundsException (Issue [NMS-7547](#))
- Unable to collect SNMP through minions on a large scale (Issue [NMS-10389](#))
- Update examples/opennms.conf to be JDK11-compatible (Issue [NMS-12468](#))
- RRD-to-Newts converter only handles AVERAGE RRAs (Issue [NMS-12722](#))
- Parameters with dots handled incorrectly in BMP feature config (Issue [NMS-12738](#))
- The ReST end-point for the Flow Exporter details is returning invalid content (Issue [NMS-12740](#))
- Netflow 5 records in ES do not contain value for delta\_switched (Issue [NMS-12750](#))
- dependency commons-beanutils 1.8.3 vulnerability (Issue [NMS-12757](#))
- Template field 'APPLICATION TAG' has illegal size (Issue [NMS-12783](#))
- Kafka Producer puts all events on the same partition when using `donotpersist` (Issue [NMS-12784](#))

### Enhancement

- Reduce Docker container image size (Issue [NMS-12284](#))
- Document how to use meta-data with thresholding (Issue [NMS-12735](#))
- Add documentation for TcpListener (Issue [NMS-12736](#))
- upgrade to latest Jetty security/bug fixes (Issue [NMS-12743](#))
- Run a comparison: implementation before changes and after (Issue [NMS-12752](#))
- Optimize Performance of InfluxDb Plugin (Issue [NMS-12759](#))
- Be able to ignore certificate validation on all Karaf features that push data to Elasticsearch (Issue [NMS-12768](#))
- Evaluate and improve opennms-cortex-tss-plugin (Issue [NMS-12771](#))
- Provide a test harness for time series plugins (Issue [NMS-12772](#))

## Release 26.1.1

Release 26.1.1 is the fourth release in the Horizon 26 series.

It contains a number of documentation and bug fixes including improvements to Kafka event and

alarm publishing.

The codename for 26.1.1 is *Hydrating*.

## Bug

- SSLCertMonitor server-name parameter results in NPE (Issue [NMS-12332](#))
- Provisiond accepts multiple primary SNMP interfaces (Issue [NMS-12605](#))
- Fix warnings during documentation build (Issue [NMS-12702](#))
- Cleanup removed Elasticsearch REST plugin and hint to Plugin Manager (Issue [NMS-12716](#))
- The Alarm History feature is not working (Issue [NMS-12718](#))
- Events forwarded by Kafka Producer doesn't have any parameters set (Issue [NMS-12723](#))
- Netflow ingress performance regression (Issue [NMS-12724](#))

## Enhancement

- Bump Docker base dependencies in build-env and OCI artifacts (Issue [NMS-12699](#))
- Send trouble ticket id to kafka alarm topic (Issue [NMS-12725](#))

## Release 26.1.0

Release 26.1.0 is the third release in the Horizon 26 series.

It is an enhancement release with a number of bug fixes and improvements, including updates to telemetry, provisioning, and more.

The codename for 26.1.0 is *Surgical*.

## Bug

- Security vulnerability in io.netty:netty-handler < 4.1.45 (need upgrade) (Issue [NMS-12541](#))
- NPE in KafkaFlowForwarder (Issue [NMS-12660](#))
- Add more context to Response Time resources (Kafka Producer) (Issue [NMS-12661](#))
- BMP parse error for path attribute MP\_UNREACH\_NLRI (Issue [NMS-12671](#))
- Reloading the Pollerd daemon causes multiple nodeDown messages (Issue [NMS-12681](#))
- Streaming Telemetry is broken when using OpenJDK 11 and minion (Issue [NMS-12688](#))

## Enhancement

- Document JDBCQueryMonitor "compare\_string" Action (Issue [NMS-9581](#))
- Add opentracing support for Provisiond (Issue [NMS-12374](#))
- SystemExecuteMonitor fails with exit code 6 (Issue [NMS-12564](#))
- Add an example for SystemExecuteMonitor into the docs (Issue [NMS-12568](#))
- Prometheus collector (Issue [NMS-12577](#))

- Timeseries Plugin Influx 1.x (Issue [NMS-12633](#))
- Update smoketests to support various Kafka compression codecs (Issue [NMS-12647](#))
- Bump ES version used in Smoke Tests (Issue [NMS-12648](#))
- Provide written procedures on the proper way to restart (Issue [NMS-12650](#))
- Aggregate flow metrics w/ stream processing (Issue [NMS-12656](#))
- Provisiond: Add NodeScanStarted event for scheduled scans (Issue [NMS-12658](#))
- Flow aggregation - alternate indices based on duration of time range filter (Issue [NMS-12663](#))
- Flow aggregation - Identify minimal set of fields required for current queries (Issue [NMS-12664](#))
- Enable node enrichment for Topology providers coming from the Integration Api (Issue [NMS-12674](#))
- Add tooltip support to the LegacyGraphProvider (Issue [NMS-12694](#))
- add a telemetry adapter for the Graphite plaintext protocol (Issue [NMS-12695](#))

## Release 26.0.1

Release 26.0.1 is the second release in the Horizon 26 series.

It is an off-schedule release to fix a vulnerability in ActiveMQ and the Minion. Thanks to Florian Hauser of Code White for catching this one.

The codename for 26.0.1 is *Luchador*.

### Bug

- Authenticated RCE vulnerability via ActiveMQ Minion payload deserialization (Issue [NMS-12673](#))

## Release 26.0.0

Release 26.0.0 is the first release in the Horizon 26 series.

It contains a large number of bug fixes and new features, most notably initial support for handling the BGP Monitoring Protocol in Telemetryd. It also contains a few security fixes for issues reported by Johannes Moritz.

For a high-level overview of what has changed in Horizon 26, see [What's New in OpenNMS Horizon 26](#).

The codename for 26.0.0 is *Balaclava*.

### Bug

- RTC subscription events should not be persisted to DB (Issue [NMS-9754](#))
- Make Events immutable (avoid CMEs and fix non-deterministic behavior) (Issue [NMS-10720](#))
- Invalid poller filter rules can break service web UI page (Issue [NMS-12400](#))

- Discovery and foreignSource service detection get in the way (Issue [NMS-12411](#))
- SNMP Remove from definitions fails for definitions with profile label (Issue [NMS-12413](#))
- persisted defaultCalendarReport database reports are broken (Issue [NMS-12438](#))
- Filter related errors in karaf.log when using new search (Issue [NMS-12502](#))
- Security issue disclosures, 31 Jan 2020 (Issue [NMS-12513](#))
- Selecting an Icon on Topology Map breaks the map (Issue [NMS-12532](#))
- BMP parser is too strict for unknown elements / types (Issue [NMS-12552](#))
- "No future found for message" warnings in telemetryd log (Issue [NMS-12565](#))
- The health check script for Minion and Sentinel on Docker Images stopped working (Issue [NMS-12600](#))
- Open Redirect security issues (Issue [NMS-12612](#))
- PR's fail circleci RPM build steps due to missing GPG setup (Issue [NMS-12615](#))
- XSS security issues (Issue [NMS-12617](#))
- sentinel-coordination-zookeeper doesn't start due to missing dependency (Issue [NMS-12619](#))
- Description: Cannot create monitored-service with JSON via ReST (Issue [NMS-12625](#))
- Minion Docker image for develop is tagged as 27.0.0-SNAPSHOT instead of bleeding (Issue [NMS-12627](#))
- Push Minion OCI to DockerHub for release branches (Issue [NMS-12630](#))
- Restore CAP\_NET\_RAW capabilities in Minion when running as non-root (Issue [NMS-12635](#))
- Can't change password using the user self service (Issue [NMS-12636](#))
- GraphService is throwing Error with an NPE Karaf startup (Issue [NMS-12637](#))
- Telemetryd with BMP adapter throws java.util.ConcurrentModificationException (Issue [NMS-12638](#))
- Confd download fails silently on Docker install (Issue [NMS-12642](#))
- Error parsing MP\_UNREACH\_NLRI attribute (Issue [NMS-12643](#))
- BMP Parser Bulkhead Config does not work (Issue [NMS-12644](#))
- Error parsing label information from BGP MP\_REACH\_NLRI attribute (Issue [NMS-12649](#))

## Enhancement

- Add more information into BSM alarms (Issue [NMS-9352](#))
- Prefix all shell commands with "opennms" (Issue [NMS-10413](#))
- Shorten log message in SNMP trap event definitions (Issue [NMS-10564](#))
- Clarify Basic Installation scenario (Issue [NMS-11812](#))
- Provide DefaultFocus capabilities (Issue [NMS-11979](#))
- Provide a better graph service with an actual API/Model and better import/export/integration capabilities (Issue [NMS-12086](#))



- Rework the current navbar (Issue [NMS-12128](#))
- Event documentation is missing tokens (Issue [NMS-12228](#))
- Add a "Delete" button on the Node page of the Requisition UI (Issue [NMS-12292](#))
- Discovery enhancements (Issue [NMS-12314](#))
- Update discoveryd to support detectors (Issue [NMS-12315](#))
- Provide criteria for determining the "management IP" in provisiond (Issue [NMS-12316](#))
- Process newSuspect events in a single threaded fashion (Issue [NMS-12318](#))
- Provide Central Search Function (Issue [NMS-12347](#))
- Create BMP listener and parser for telemetryd (Issue [NMS-12358](#))
- Add gRPC support for IPC between Minion & OpenNMS (Issue [NMS-12372](#))
- Allow querying a graph using vertices in focus and a szl (Issue [NMS-12376](#))
- Implement Enrichment of vertices (Issue [NMS-12382](#))
- Develop Timeseries Integration Layer (Issue [NMS-12383](#))
- Allow persisting edges with references to at least one vertex which is not in the edge's namespace (Issue [NMS-12388](#))
- Implement caching strategies for graphs (Issue [NMS-12389](#))
- Add HTTP header injection in HTTP Monitors (Issue [NMS-12393](#))
- Add possibility to listen for graph changes (Issue [NMS-12408](#))
- Create BMP Adapter for Telemetry (Issue [NMS-12414](#))
- Create BMP Adapter for Peer Up / Down Events (Issue [NMS-12415](#))
- Allow CIDR notation in our IP filter implementation (Issue [NMS-12423](#))
- Create BMP Adapter forwarding to OpenBMP (Issue [NMS-12424](#))
- Create graph definitions for BMP statistics (Issue [NMS-12425](#))
- Add BMP config example and documentation (Issue [NMS-12426](#))
- Use Router Id (and maybe AS) to associate node with exporting router's data (Issue [NMS-12436](#))
- Provide basic development documentation (Issue [NMS-12441](#))
- Integrate the new Graph Service API with the OpenNMS Integration API (Issue [NMS-12445](#))
- Remove getVertexType() on GraphInfo (Issue [NMS-12447](#))
- Avoid rebuilding the graph view when enriching (Issue [NMS-12448](#))
- Expose status information when fetching a graph view (Issue [NMS-12453](#))
- DatacollectionFailed event definitions are located in wrong file (Issue [NMS-12471](#))
- dataCollectionSucceeded does event auto-clean (Issue [NMS-12474](#))
- Remove obsolete entry in log4j2.xml (Issue [NMS-12475](#))
- Make Kafka RPC topics configurable to use module in topic names (Issue [NMS-12479](#))
- Docker Image Improvements (Issue [NMS-12481](#))

- Reduce Minion docker image size (Issue [NMS-12482](#))
- Publish arm64 and armhf Docker images for Minion (Issue [NMS-12483](#))
- Use jicmp (and jicmp6) by default in Minion Docker images (Issue [NMS-12484](#))
- Implement GRPC Server that can route all RPC/Sink messages from OpenNMS to Minion and vice versa (Issue [NMS-12486](#))
- Use protobuf instead of bson for encoding/decoding Netflow payloads (Issue [NMS-12521](#))
- Enrich content of nodeAdded event (Issue [NMS-12526](#))
- Migrate config-tester wiki to the docs (Issue [NMS-12527](#))
- Splitting Docker documentation in Horizon, Minion and Sentinel (Issue [NMS-12529](#))
- Add Jolokia features to Minion & Sentinel (Issue [NMS-12533](#))
- Expose OnmsIpInterface, OnmsSnmpInterface, others as top-level resources in REST API (Issue [NMS-12538](#))
- Use ProtoBuf to transport parsed BMP messages (Issue [NMS-12547](#))
- Add support for per AFI/SAFI statistics (Issue [NMS-12553](#))
- Add basic system test for BMP processing (Issue [NMS-12554](#))
- Improve parsing of BGP extended communities attribute (Issue [NMS-12559](#))
- Populate path id and labels attributes in unicast prefix messages (OpenBMP integration) (Issue [NMS-12560](#))
- Async DNS resolution for Hostnames in BMP (Issue [NMS-12569](#))
- Add support for Local RIB (Issue [NMS-12570](#))
- Parse BGP Capabilities (Issue [NMS-12571](#))
- Refine parameter handling in Adapters (Issue [NMS-12573](#))
- Apply more sensible defaults to OpenBMP kafka producer (Issue [NMS-12574](#))
- Confd templates for Minion configuration (Issue [NMS-12578](#))
- Improve node cache in flow document enrichment (Issue [NMS-12580](#))
- Improve OIA performance when mapping alarms (Issue [NMS-12581](#))
- Upgrade Kafka components to 2.4.0 (Issue [NMS-12582](#))
- Write enriched flows to Kafka (Issue [NMS-12583](#))
- Create threshold documentation (Issue [NMS-12588](#))
- Document how to generate PDFs from dashboards using OpenNMS (Issue [NMS-12599](#))
- Minion should bind to 0.0.0.0 by default for SNMP traps (Issue [NMS-12626](#))
- Minion confd template should disable JMS when using Kafka (Issue [NMS-12631](#))
- Add required dependencies to use ZSTD inside Kafka to features.xml (Issue [NMS-12639](#))
- Set RPM compression type and level inside RPM Spec Files (Issue [NMS-12640](#))
- Support for more extended community types in BMP (Issue [NMS-12641](#))