

OpenNMS Meridian Release Notes

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OpenNMS Meridian Development Team

Tarus Balog < tarus@opennms.org >
David Hustace < david@opennms.org >
Benjamin Reed < ranger@opennms.org >

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OpenNMS Meridian 2019

System Requirements

- **Java 8 through 11:** OpenNMS Meridian 2019 runs on JDK 8 through 11. We recommend the most recent version of OpenJDK 11.
- **Default Heap Size:** The default heap size is now 2GB.
- **PostgreSQL 10 or higher:** Meridian 2019 requires any supported version of PostgreSQL 10 or higher.

What's New in Meridian 2019

Since Meridian 2018, we have introduced a large number of features, most notably Telemetryd (for processing streaming telemetry like NetFlow and sFlow), the Sentinel (for horizontal scaling of telemetry and other processing), and ALEC (for alarm correlation).

On top of that, there have been many other improvements and bug fixes since Meridian 2018.

Meridian 2019 roughly matches the feature set available in Horizon 25.

Architecture for Learning Enabled Correlation

Horizon 23 introduced support for correlation of alarms into meta-alarms called "situations" using an engine called the [Architecture for Learning Enabled Correlation](#).

Situations are OpenNMS alarms that contain one or more triggering alarms, which allows them to be browsed, acknowledged, and unacknowledged just like any other alarm.

A high-level overview of the goal and implementation of correlation can be seen [on the ALEC web site](#).

Changes to the Alarm Lifecycle

Alarm Clearing

Traditionally, OpenNMS has created and resolved alarms in pairs, with one alarm representing the triggering event (or events), and then a second alarm representing the resolution. Horizon 23 changes this default behavior to use a single alarm to track the problem state, incrementing the alarm count when it occurs while in a problem state, or when moving from resolved *back* into a problem state. Additionally, you can configure OpenNMS to create a new alarm if a problem happens again.

These behaviors are controlled by the introduction of 2 new settings in the `opennms.properties` file:

```
org.opennms.alarmd.legacyAlarmState
```

This setting reverts to the old (pre-23) behavior of creating separate alarms for a problem and its resolution.

`org.opennms.alarmd.newIfClearedAlarmExists`

This setting forces Alarmd to create a new alarm if a problem reoccurs, rather than incrementing an existing alarm. (Note: this is ignored if `LegacyAlarmState` is set to `true`.)

These improvements are covered in a [lunch and learn video](#) we published recently, if you would like to learn more.

Alarmd Architecture

To facilitate the implementation of ALEC, alarmd has been rearchitected to use Drools to manage the alarm lifecycle, rather than Vacuumd automations, triggers, and actions.

If are migrating changes to `vacuumd-configuration.xml` from an earlier Meridian release, it is strongly recommended you port them to the new Alarmd Drools context. The Drools rules are in the `$OPENNMS_HOME/etc/alarmd/drools-rules.d/` directory.

Additionally, we no longer generate `alarmCreated`, `alarmEscalated`, `alarmCleared`, `alarmUncleared`, `alarmUpdatedWithReducedEvent`, and `alarmDeleted` events. Instead, it is recommended that you add Drools rules to react to alarm changes.

For more complicated integrations, we also have a new API—`AlarmLifecycleListener`—for reacting to alarm changes.

Kafka Data Collection Sync

In addition to publishing events, alarms, and node inventory to Kafka, we now [publish collected time-series data to the Kafka bus](#) as well.

Sentinel

In addition to the Minion, we have added a new container-based subsystem called "Sentinel." The Sentinel is a Karaf container that can be configured to run a subset of OpenNMS daemons as a standalone tool, to aid in horizontal scaling and/or high availability.

Sentinel is designed to run our Karaf/Camel/SQS-based messaging bus, syslog listener, telemetry receiver, and Newts and Elasticsearch persistence.

Node and Interface Metadata

There is now support for associating arbitrary metadata with nodes and interfaces, including configuring arbitrary metadata in the requisition UI.

For details on using the metadata APIs, see [the Admin Guide](#) and [the Developer Guide](#).

Breaking Changes

PostgreSQL 10

OpenNMS Meridian 2019 is supported on PostgreSQL 10 or later.

If you are upgrading from an OpenNMS using an older PostgreSQL version, you can use the `pg_upgrade` tool to migrate. For details on the migration process, see [the PostgreSQL `pg_upgrade` documentation](#).

If you are running on a distribution that does not provide PostgreSQL 10 packages by default, you can [download packages provided by PostgreSQL instead](#).

Minion Packages Combined

The Minion RPM and Debian/Ubuntu packages have been combined into a single package. Previously it was possible to just install the core container and optionally a set of features on top, but in the real world no one used this, and it's still possible to choose what features are used with the configuration.



If you were previously *only* installing the sub-packages and not installing the wrapper `opennms-minion` RPM package, you may need to run this command to upgrade cleanly:

```
$ yum swap 'opennms-minion*' -- install opennms-minion
```

Elasticsearch 7.x Support

Version Compatibility

All of the features that leverage integrations with Elasticsearch (i.e., event & alarm history, flows & situation feedback) have been updated to support Elasticsearch 7.x. Elasticsearch versions before 7.x are no longer supported.

Given the pace of change and the number of breaking changes between major versions of Elasticsearch, we will focus on supporting a single major version of Elasticsearch per release moving forward.

ReST Plugin Configuration

The configuration of the *Elasticsearch ReST plugin* has changed.

Some properties have new defaults and have been renamed. It is now also possible to define index settings and provide an index strategy to have more control over the index creation.

Some properties of the plugin have changed. The following table shows the old (no longer supported) and the new property name, as well as the new default, which is used if the configuration is not updated manually. Please update the configuration file `etc/org.opennms.plugin.elasticsearch.rest.forwarder.cfg` accordingly. For more details on how to configure the plugin to use Elasticsearch refer to [Configure Elasticsearch](#).

Old parameter	New parameter	Default Value
<code>elasticsearchUrl</code>	<code>elasticUrl</code>	<code>http://localhost:9200</code>

Old parameter	New parameter	Default Value
esusername	globalElasticUser	-
espassword	globalElasticPassword	-
timeout	connTimeout	5000
socketTimeout	readTimeout	30000

In addition the following default values have changed:

Parameter	Old default	New default
batchSize	1	200
batchInterval	0	500
connTimeout	3000	5000
readTimeout	3000	30000

Index Properties

It is now possible to define index-related properties, e.g. the number of shards and replicas. It is also possible to define a property `elasticIndexStrategy` to determine if a `hourly`, `daily`, `monthly` or `yearly` index should be created. It defaults to `monthly`.

For more details please refer to [Configure Elasticsearch](#).

Karaf Container

The embedded Karaf has been upgraded to 4.2.

This changes the default `users.properties` file. Ensure that the `admingroup` in `${OPENNMS_HOME}/etc/users.properties` contains the role `ssh`. You can use the [new default users.properties file](#) for comparison.

Other notable Karaf and OSGi-related changes include:

- We now support [adding OSGi-capable code at runtime](#) by putting a `.kar` file in the `deploy/` directory and adding relevant features to boot files in `etc/featuresBoot.d/`.
- The usage of `config:edit` has changed in some cases. This affects all configuration edits, where the configuration contains a `-`, e.g. `org.opennms.features.telemetry.listeners-udp-50003`. If you are using Minion, you may be affected (e.g. for Telemetry Listeners/Adapters).

For example, this set of configuration commands:

```
config:edit org.opennms.features.telemetry.listeners-udp-50003
config:property-set key value
config:update
```

...should now be written as:

```
config:edit --alias udp-50003 --factory org.opennms.features.telemetry.listeners
config:property-set key value
config:update
```

Polling, Collection, Plugins, Parsers, and Services

- **Cassandra JMX:** The `cassandra30x.xml` datacollection config for thread pool metrics has been modified to be of type `counter` rather than type `gauge`. If you are using RRD or JRobin storage, you will need to delete any `.jrb` or `.rrd` files with both `path_request` and `CurrentlyBlockedTasks` in their filename (eg, `org_apache_cassandra_metrics_type_ThreadPools_path_request_scope_MutationStage_name_CurrentlyBlockedTasks.jrb`).
- **Pollerd and Collectd:** Additional attributes for thread pool graphs have been added to the Pollerd and Collectd mbeans. If you are using `storeByGroup=true` with RRD or JRobin, you will need to delete the `OpenNMS_Name_Pollerd` and `OpenNMS_Name_Collectd` `.jrb` or `.rrd` files and let them be reinitialized. Newts and `storeByGroup=false` should be unaffected.
- **Dhcpd:** The `Dhcpd` plugin (and its configuration) was removed in favor of a Minion-capable implementation. The new `DhcpMonitor` options can be set in the `poller-configuration.xml` file.
- **Syslog:** The default parser used for `Syslog` messages has been switched from the `CustomSyslogParser` to the `RadixTreeSyslogParser`.
- **Plugins:** The `Plugin Manager` is no longer distributed with OpenNMS. Features or bundles should be installed via the Karaf Shell.



If you have legacy SNMP agents which only support 32bit interface counters, the data collection for this interfaces will stop after you upgraded to 22.0.0. To get them enabled, you have to create a data collection package and add the `mib2-interfaces` data collection group manually for this devices with the example below.

Example to collect 32bit MIB-2 Interface counter from nodes in a category configured in `collectd-configuration.xml`

```
<package name="Legacy-MIB2-Interfaces" remote="false">
  <filter>categoryName == 'Legacy-MIB2-Interfaces'</filter>
  <include-range begin="1.1.1.1" end="254.254.254.254"/>
  <include-range begin="::1" end="ffff:ffff:ffff:ffff:ffff:ffff:ffff:ffff"/>

  <service name="SNMP" interval="300000" user-defined="false" status="on">
    <parameter key="collection" value="legacy-32bit-mib2"/>
    <parameter key="thresholding-enabled" value="true"/>
  </service>
</package>
```


Load the Legacy MIB-2 Interfaces metrics configured in the `datacollection-config.xml`

```
<snmp-collection name="legacy-32bit-mib2" snmpStorageFlag="select">
  <rrd step="300">
    <rra>RRA:AVERAGE:0.5:1:2016</rra>
    <rra>RRA:AVERAGE:0.5:12:1488</rra>
    <rra>RRA:AVERAGE:0.5:288:366</rra>
    <rra>RRA:MAX:0.5:288:366</rra>
    <rra>RRA:MIN:0.5:288:366</rra>
  </rrd>
  <include-collection dataCollectionGroup="Legacy_MIB2-Interfaces"/>
  <include-collection dataCollectionGroup="REF_MIB2-Interfaces"/>
</snmp-collection>
```

Removed from Meridian 2019

- The Centric Trouble Ticker plugin has been removed.
- The NCS-Alarm page and the NCS-Topology-Plugin have been removed. See issue [NMS-11493](#).
- The remote poller map has been removed.
- The Alarm Change Notifier plugin has been removed due to performance problems. Use the Alarm History function instead.
- The `resourcecli` tool has been removed in favor of [Karaf shell commands](#) to perform the same operations.

Vacuumd Alarm Handling

In previous OpenNMS releases, a large portion of the alarm workflow was handled by Vacuumd automations, triggers, and actions. As part of the work to implement alarm correlation, this logic has been moved to Drools, running inside Alarmd.

If you made any changes to `vacuumd-configuration.xml` related to alarms, it is strongly recommended you port them to the new Alarmd Drools context. The Drools rules are in the `$OPENNMS_HOME/etc/alarmd/drools-rules.d/` directory.

Also, we no longer generate `alarmCreated`, `alarmEscalated`, `alarmCleared`, `alarmUncleared`, `alarmUpdatedWithReducedEvent`, and `alarmDeleted` events. Instead, we recommend that you add Drools rules to react to alarm changes. For more complicated integrations, we also have a new API — `AlarmLifecycleListener` — for reacting to alarm changes.

Event (and Alarm) Date/Time Formats

Events and alarms previously used the current locale for formatting timestamps. As of Meridian 2019, we now format dates as ISO-8601 date-time with offsets (e.g., `2011-12-03T10:15:30+01:00`) and we expect dates in incoming events to be the same. This reduces the amount of code we run through trying to figure out date formats while parsing events, and simplifies things to work no matter what locale you are using.

Developer Considerations

- The `HttpService` can no longer be consumed. This will only affect custom implementations of HTTP Servlets and Resources, but only if they are exposed via `httpServices.register(...)`. If you need those, please expose the according services via the OSGi Service Registration. Refer to the [OSGi Http Whiteboard Specification](#) for more details.
- Exposing Servlets now follow the OSGi Specification. Refer to the [OSGi Http Whiteboard Specification](#) for more details.
- Properties to expose Vaadin Applications have changed:
 - `init.widgetset` becomes `servlet.init.widgetset`
 - `alias` becomes `osgi.http.whiteboard.servlet.pattern`

Helm 4/5

Technically not a part of OpenNMS, but it's important to note that as of Helm 4, we have replaced the "Faults" datasource with a new "Entities" datasource. Migration of existing dashboards requires a few manual steps; documentation on how to do so are available in [the latest Helm documentation](#).

Other Improvements

Since Meridian 2019 is based on Horizon 25, it contains all the fixes and updates that have occurred since Meridian 2018 was created from the Horizon 21 codebase.

For a more complete list of changes included in this release, see the "What's New" documentation for the following Horizon releases:

- [Horizon 22](#)
- [Horizon 23](#)
- [Horizon 24](#)
- [Horizon 25](#)

Release Meridian-2019.1.10

Release 2019.1.10 contains a few enhancements and a number of bugfixes.

The codename for 2019.1.10 is [Ceres](#)

Bug

- `interfaceSnmplibIndex` 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](#))
- Backport log4j version update to older release(s) (Issue [NMS-12791](#))
- 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](#))
- Update OpenNMS DB functions and tests to handle Postgres 12 (Issue [NMS-12819](#))

Release Meridian-2019.1.9

Release 2019.1.9 is a small update to 2019.1.8 that fixes a few bugs and makes some Docker-related improvements.



This release changes the Systemd service name back from `meridian` to `opennms` to match previous releases. You may need to run `systemctl disable meridian` and/or `systemctl enable opennms` to make sure OpenNMS starts on reboot.

The codename for 2019.1.9 is *Pluto*

Bug

- `AbstractSnmpValue.allBytesDisplayable()` `IndexOutOfBoundsException` (Issue [NMS-7547](#))
- Update `examples/opennms.conf` to be JDK11-compatible (Issue [NMS-12468](#))
- RRD-to-Newts converter only handles AVERAGE RRAs (Issue [NMS-12722](#))
- dependency `commons-beanutils 1.8.3` vulnerability (Issue [NMS-12757](#))
- Kafka Producer puts all events on the same partition when using `donotpersist` (Issue [NMS-12784](#))
- The Systemd service definition is called `meridian` not `opennms` (Issue [LTS-239](#))

Enhancement

- Reduce Docker container image size (Issue [NMS-12284](#))
- upgrade to latest Jetty security/bug fixes (Issue [NMS-12743](#))

Release Meridian-2019.1.8

Release 2019.1.8 is the ninth release in the Meridian 2019 series.

It contains a number of bug and documentation fixes as well as a few small enhancements.

The codename for 2019.1.8 is *Neptune*

Bug

- `SSLCertMonitor` `server-name` parameter results in NPE (Issue [NMS-12332](#))

- Fix warnings during documentation build (Issue [NMS-12702](#))
- Images are broken in admin guide (Issue [NMS-12713](#))
- Cleanup removed Elasticsearch REST plugin and hint to Plugin Manager (Issue [NMS-12716](#))
- Events forwarded by Kafka Producer doesn't have any parameters set (Issue [NMS-12723](#))

New Feature

- 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 Meridian-2019.1.7

Release 2019.1.7 is the eighth release in the Meridian 2019 series.

It contains a few bug fixes as well as a number of enhancements to the documentation.

The codename for 2019.1.7 is *Uranus*

Bug

- Prevent multiple node scans from being scheduled for a single node (Issue [NMS-12504](#))
- Add more context to Response Time resources (Kafka Producer) (Issue [NMS-12661](#))
- 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](#))
- SystemExecuteMonitor fails with exit code 6 (Issue [NMS-12564](#))
- Add an example for SystemExecuteMonitor into the docs (Issue [NMS-12568](#))
- Provide written procedures on the proper way to restart (Issue [NMS-12650](#))

Release Meridian-2019.1.6

Release 2019.1.6 is the seventh release in the Meridian 2019 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 2019.1.6 is *Europa*

Bug

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

Release Meridian-2019.1.5

Release 2019.1.5 is the sixth release in the Meridian 2019 series.

It fixes a few more security issues, as well as a number of other bugs and a couple of enhancements. Hat tip to Johannes Moritz for the security report.

The codename for 2019.1.5 is *Saturn*

Bug

- SNMP Remove from definitions fails for definitions with profile label (Issue [NMS-12413](#))
- persisted defaultCalendarReport database reports are broken (Issue [NMS-12438](#))
- Security issue disclosures, 31 Jan 2020 (Issue [NMS-12513](#))
- Selecting an Icon on Topology Map breaks the map (Issue [NMS-12532](#))
- Description: Cannot create monitored-service with JSON via ReST (Issue [NMS-12625](#))
- Confd download fails silently on Docker install (Issue [NMS-12642](#))

Enhancement

- Event documentation is missing tokens (Issue [NMS-12228](#))
- Splitting Docker documentation in Horizon, Minion and Sentinel (Issue [NMS-12529](#))
- Improve OIA performance when mapping alarms (Issue [NMS-12581](#))
- Events not balanced across partitions when using opennms-kafka-producer (Issue [NMS-12616](#))

Release Meridian-2019.1.4

Release 2019.1.4 is the fifth release in the Meridian 2019 series.

It fixes an HQL injection bug, as well as a few other issues. Hat tip to Johannes Moritz for the security report.

The codename for 2019.1.4 is *Jupiter*

Bug

- Cannot process SNMPv3 Informs due to random Engine ID associated with users (Issue [NMS-12473](#))
- Downtime model change was not updated in the docs (Issue [NMS-12520](#))
- HQL Injection (Issue [NMS-12572](#))

Enhancement

- Support signing code in CircleCI (Issue [NMS-12557](#))

Release Meridian-2019.1.3

Release 2019.1.3 is the fourth release in the Meridian 2019 series.

It contains a few bug fixes, most notably a fix for some NPEs as well as a performance issue in topology processing.

The codename for 2019.1.3 is *Mars*

Bug

- changing GUI date/timeformat breaks requisition update/import date/time display (Issue [NMS-12428](#))
- Inefficient locking in the TopologyUpdater class (Issue [NMS-12443](#))
- MIB Compiler fails with Null Pointer Exception (Issue [NMS-12459](#))
- The Karaf poller:test command is not location aware (Issue [NMS-12460](#))
- NPE while compiling a MIB (Issue [NMS-12472](#))

Release Meridian-2019.1.2

Release 2019.1.2 is the third release in the Meridian 2019 series.

It contains a number of alarm classification bug fixes and performance improvements, flow enhancements, and more.

The codename for 2019.1.2 is *Earth*

Bug

- possible issue in JCIFS Monitor - continuously increase of threads - finally heap dump (Issue [NMS-12407](#))
- Wrong links in the Help/Support page (Issue [NMS-12418](#))
- Classification Engine reload causes OOM when defining a bunch of rules (Issue [NMS-12429](#))
- Cannot define a specific layer in topology app URL (Issue [NMS-12431](#))
- Classification UI: Error responses are not shown properly (Issue [NMS-12432](#))
- Classification Engine: The end of the range is excluded, which is not intuitive (Issue [NMS-12433](#))
- Ticket-creating automations are incorrectly enabled by default (Issue [NMS-12439](#))
- Enable downtime model-based node deletion to happen when unmanaged interfaces exist (Issue [NMS-12442](#))
- Improve alarmd Drools engine performance by using STREAM mode (Issue [NMS-12455](#))

Enhancement

- Refactoring of the Cassandra installation instructions (Issue [NMS-12397](#))
- Allow telemetry flows to balance across Kafka partitions (Issue [NMS-12427](#))

- Add system test for IpfixTcpParser (Issue [NMS-12434](#))
- Associate exporter node using Observation Domain Id (Issue [NMS-12435](#))

Release Meridian-2019.1.1

Release 2019.1.1 is the second release in the Meridian 2019 series.

It contains a number of bug fixes mostly related to alarm and event processing and potential resource leaks, as well as provisioning enhancements to SNMP profiles.

The codename for 2019.1.1 is *Venus*

Bug

- Readiness probe with Minion in Kubernetes with health:check does not work (Issue [NMS-12120](#))
- Cannot use poller:poll karaf command with WsManMonitor through Minions (Issue [NMS-12365](#))
- Strange behavior on used threads and file descriptors on Minion (Issue [NMS-12366](#))
- Upstream Drools Bug: From with modify fires unexpected rule (Issue [NMS-12367](#))
- "Page Not Found" in alarm-list when choosing number of alarms in dropdown-list (Issue [NMS-12379](#))
- Build failure during release for 25.1.0 in CircleCI (Issue [NMS-12380](#))
- backport missing patches from 25.1.0 to foundation-2019 (Issue [NMS-12384](#))
- Discovery does not honor exclude-range inside a definition (Issue [NMS-12385](#))
- Discovery exclude-range is not location-aware (Issue [NMS-12386](#))
- Update OpenJDK 11.0.4 to 11.0.5 (Issue [NMS-12387](#))
- Elasticsearch event forwarder manipulates in-flight event (Issue [NMS-12390](#))
- send-event.pl is broken after OpenNMS 25.1.0 update (Issue [NMS-12392](#))
- SNMP profile fitting is not triggered in some cases when MINION is involved (Issue [NMS-12399](#))
- Alarmd fails intermittently and OOMs (Issue [NMS-12412](#))
- SNMP Remove from definitions fails for definitions with profile label (Issue [NMS-12413](#))

Enhancement

- Create a step-by-step guide how to setup Kafka for Minions (Issue [NMS-12368](#))
- Enhance new snmp profiles to allow fitting to nodes inside requisitions without SNMP service associated to any IPs configured (Issue [NMS-12396](#))

Release Meridian-2019.1.0

Release 2019.1.0 is the first release in the Meridian 2019 series.

The codename for 2019.1.0 is *Mercury*

Bug

- removed service will break BSM web ui (Issue [NMS-9322](#))
- Event parameters no longer preserve ordering (Issue [NMS-9827](#))
- The JMX-Cassandra service goes down for all the cluster when a single instance is down. (Issue [NMS-10027](#))
- deleting a BSM monitor while an alarm is active doesn't clear the alarm (Issue [NMS-10184](#))
- default event description is incorrect (Issue [NMS-10346](#))
- Config tester doesn't detect missing xml datacollection file (Issue [NMS-10396](#))
- BSM alarm severity is not being updated (Issue [NMS-10578](#))
- snmp authentication error traps with Enhanced Linkd / bridge discovery (Issue [NMS-10582](#))
- Zooming with Backshift is broken (Issue [NMS-10635](#))
- Karaf shell history thrown out with bathwater on upgrade (Issue [NMS-10664](#))
- Node detail page renders with no content when invalid node ID specified (Issue [NMS-10679](#))
- Apparent memory leak in JMX collector, possibly restricted to "weird" JMX transports (Issue [NMS-10684](#))
- Elasticsearch forwarding fails to recover after outage (Issue [NMS-10697](#))
- Flow rest results for top N queries are not returned in the correct order (Issue [NMS-12104](#))
- karaf.log appears on the root file system when running Minion/Sentinel on Ubuntu/Debian. (Issue [NMS-12125](#))
- WS-MAN doesn't work with JDK 11 (Issue [NMS-12235](#))
- ReST API for meta-data doesn't support JSON (Issue [NMS-12272](#))
- UI for meta-data is only present when using the horizontal layout (Issue [NMS-12273](#))
- Groups disappear in classification UI (Issue [NMS-12291](#))
- BSM simulation mode does not reset the last state (Issue [NMS-12302](#))
- Web Assets Dependency Rollup 2019-09-24 (Issue [NMS-12320](#))
- Memory leak in Drools engine for alarmd (Issue [NMS-12322](#))
- Threshold state keys do not incorporate the collected resource's instance label (Issue [NMS-12329](#))
- Reportd generated reports cause: "No bean named " is defined" in Persisted Reports (Issue [NMS-12337](#))
- InterfaceNodeCache doesn't remove deleted nodes immediately (Issue [NMS-12338](#))
- Delivering a report with "-" in local part of email address is not working (Issue [NMS-12342](#))
- Install guide for R-core is broken for CentOS 8 (Issue [NMS-12352](#))
- Karaf feature install issue with opennms-core-tracing-jaeger (Issue [NMS-12359](#))
- Fix requisition cache when accessing the Requisitions UI via "Edit in Requisition" (Issue [NMS-12360](#))

Enhancement

- Refactor the compatibility matrix in the documentation (Issue [NMS-9684](#))
- Be able to change the number of rows for the pagination control on the Requisitions UI (Issue [NMS-9793](#))
- Documentation typo for /rest/ifservices on the developers guide (Issue [NMS-9842](#))
- Remove alarm-change-notifier plugin (Issue [NMS-10658](#))
- Add OpenTracing support for Camel (JMS) RPC (Issue [NMS-10961](#))
- Support large buffer sizes in Kafka Sink Layer (Issue [NMS-11126](#))
- Investigate OpenTracing for our RPC communications (Issue [NMS-11177](#))
- RPC Metrics (Issue [NMS-11517](#))
- Sink Metrics (Issue [NMS-11540](#))
- Add a command to show configuration diffs (Issue [NMS-12129](#))
- Add Web-Hook as delivery option (Issue [NMS-12153](#))
- Add reply-to field to notification emails (Issue [NMS-12224](#))
- Refactor Event Timestamps to ISO-8601 Format (Breaking Change) (Issue [NMS-12263](#))
- Improve robustness of CassandraBlobStore for async operations (Issue [NMS-12274](#))
- Clearing threshold states via shell should take effect immediately and not require restart (Issue [NMS-12277](#))
- BSM configuration breaks without being notified (Issue [NMS-12288](#))
- List Kafka RPC/Sink topics, Expose Metrics on Karaf shell (Issue [NMS-12294](#))
- Create proper systemd files for OpenNMS, Minion and Sentinel (Issue [NMS-12299](#))
- Add ability to update definitions when SNMP profile changes (Issue [NMS-12307](#))
- Fix security vulnerability with jackson-databind (Issue [NMS-12308](#))
- Availability boxes on node pages including sub pages differ (Issue [NMS-12321](#))
- OpenNMS 25 Dependency Still Allows Old PostgreSQL Versions (Issue [NMS-12341](#))
- Update base container image to use CentOS 8 (Issue [NMS-12353](#))
- Remove floating OpenJDK dependencies in OCI build (Issue [NMS-12354](#))
- Detect and help resolve Karaf bootstrap issues (Issue [NMS-12356](#))
- Update CISCO-ENTITY-SENSOR-MIB threshold trap events to include alarm-data (Issue [NMS-12362](#))
- switch core/web-assets from yarn to npm (Issue [NMS-12363](#))
- Collect and display file descriptor statistics via JMX for OpenNMS and Minion (Issue [NMS-12364](#))