



CPS vDRA SNMP and Alarms Guide, Release 21.1.0

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About This Guide

This document is a part of the Cisco Policy Suite documentation set.

For information about available documentation, see the *CPS Documentation Map* for this release at [Cisco.com](https://www.cisco.com).



Note

The PATS/ATS, ANDSF, and MOG products have reached end of life and are not supported in this release. Any references to these products (specific or implied), their components or functions in this document are coincidental and are not supported. Full details on the end of life for these products are available at: <https://www.cisco.com/c/en/us/products/wireless/policy-suite-mobile/eos-eol-notice-listing.html>.

Audience

This guide is best used by these readers:

- Network administrators
- Network engineers
- Network operators
- System administrators

This document assumes a general understanding of network architecture, configuration, and operations.

Additional Support

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Conventions (all documentation)

This document uses the following conventions.

| Conventions | Indication |
|--------------------|---|
| bold font | Commands and keywords and user-entered text appear in bold font. |
| <i>italic font</i> | Document titles, new or emphasized terms, and arguments for which you supply values are in <i>italic</i> font. |
| [] | Elements in square brackets are optional. |
| {x y z } | Required alternative keywords are grouped in braces and separated by vertical bars. |
| [x y z] | Optional alternative keywords are grouped in brackets and separated by vertical bars. |
| string | A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks. |
| courier font | Terminal sessions and information the system displays appear in courier font. |
| <> | Nonprinting characters such as passwords are in angle brackets. |
| [] | Default responses to system prompts are in square brackets. |
| !, # | An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line. |



Note Means reader take note. Notes contain helpful suggestions or references to material not covered in the manual.



Caution Means reader be careful. In this situation, you might perform an action that could result in equipment damage or loss of data.



Warning IMPORTANT SAFETY INSTRUCTIONS.

Means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

SAVE THESE INSTRUCTIONS



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Important Notes



Important

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CHAPTER 1

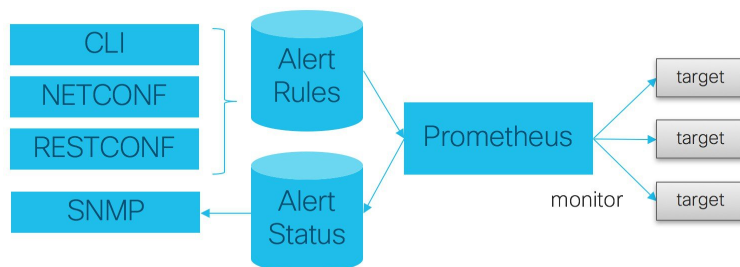
Notification and Alert

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Architectural Overview

A Cisco Policy Suite (CPS) vDRA deployment comprises multiple virtual machines (VMs) with multiple running containers deployed for scaling and high availability (HA) purposes. The monitoring and alerting system of the CPS vDRA deployment is centered around alert definition, metric gathering, and SNMP trap forwarding. The high-level architecture is shown below:

Figure 1: High-Level Architecture



Major Components

Alert Definition

Alert definition occurs when an end user (or external system) configures the system via CLI, NETCONF, or RESTCONF interfaces with Alert rules. The system takes these alert rules and pushes the definitions into the Prometheus processes running within the cluster. The system does not provide a fixed set of alerts but provides a sample list of common alerts an operator may want to configure.

Metric Gathering

At the core of the alerting framework, the system runs multiple Prometheus processes (<http://prometheus.io>) which monitors the system and track metrics which can be used for triggering alerts. The default Prometheus instance that monitors the system tracks metrics at a 5 second interval for 24 hours.

SNMP Trap Forwarding

Once an alert is triggered the Prometheus server forwards that alert to the active control/Cluster Manager node. These alerts are forwarded based on configuration to external NMS systems using either SNMPv2 or SNMPv3.

Technical Architecture

Cisco Policy Suite is deployed as a distributed virtual appliance. The standard architecture uses Hypervisor virtualization. Multiple hardware host components run Hypervisors and each host runs several virtual machines. Within each virtual machine, one-to-many internal CPS components can run. CPS monitoring and alert notification infrastructure simplifies the virtual physical and redundant aspects of the architecture.

Protocols

The CPS monitoring and alert notification infrastructure provides a simple standards-based interface for network administrators and NMS (Network Management System). SNMP is the underlying protocol for all alert notifications. Standard SNMP notifications (traps) are used throughout the infrastructure.

Alerts are triggered from either the Cluster Manager or Control virtual machines if the Cluster Manager is not active.

SNMP Object Identifier and Management Information Base

Cisco has a registered private enterprise Object Identifier (OID) of 26878. This OID is the base from which all the aggregated CPS metrics are exposed at the SNMP endpoint. The Cisco OID is fully specified and made human-readable through a set of Cisco Management Information Base (MIB-II) files.

The current MIBs are defined as follows:

Table 1: MIBs

| MIB Filename | Purpose |
|-------------------------------|--|
| BROADHOP-MIB.mib | Defines the main structure include structures and codes. |
| BORADHOP-NOTIFICATION-MIB.mib | Defines Notifications/Traps available. |

SNMP Notifications

SNMP Notifications in the form of traps (one-way) are provided by the infrastructure. CPS notifications do not require acknowledgments. The traps provide both:

- Proactive alerts that the predetermined thresholds have been passed. For example, a disk is nearing capacity or CPU load is too high.
- Reactive alerting when system components fail or are in a degraded state. For example, a process died or network connectivity outage has occurred.

Notifications and traps are categorized by a methodology similar to UNIX System Logging (syslog) with both Severity and Facility markers. All event notifications (traps) contain these markers.

- Facility
- Severity
- Source (device name)
- Device time

These objects can be used to identify where the issue lies and the Facility (system layer) and the Severity (importance) of the reported issue.

Facility

The generic syslog facility has the following definitions:



Note Facility defines a system layer starting with physical hardware and progressing to a process running in a particular application.

Table 2: Syslog Facility

| Number | Facility | Description |
|--------|----------------|--|
| 0 | Hardware | Physical Hardware - Servers SAN NIC Switch and so on |
| 1 | Networking | Connectivity in the OSI (TCP/IP) model |
| 2 | Virtualization | VMware ESXi (or other) virtualization |

| Number | Facility | Description |
|--------|------------------|--|
| 3 | Operating System | Linux OS |
| 4 | Application | Application (CPS Session Manager, CPS Binding Database, and so on) |
| 5 | Process | Specific process |

There may be overlaps in the Facility value as well as gaps if a particular SNMP agent does not have full view into an issue. The Facility reported is always shown as viewed from the reporting SNMP agent.

Severity

In addition to Facility each notification has a Severity measure. The defined severities are directly from UNIX syslog and defined as follows:

Table 3: Severity Levels

| Number | Severity | Description |
|--------|-----------|--|
| 0 | Emergency | System is unusable. |
| 1 | Alert | Action must be taken immediately. |
| 2 | Critical | Critical conditions. |
| 3 | Error | Error conditions. |
| 4 | Warning | Warning conditions. |
| 5 | Notice | Normal but significant condition. |
| 6 | Info | Informational message. |
| 7 | Debug | Lower level debug message. |
| 8 | None | Indicates no severity. |
| 9 | Clear | The occurred condition has been cleared. |

For the purposes of the CPS Monitoring and Alert Notifications system, Severity levels of Notice Info and Debug are usually not used.

Warning conditions are often used for proactive threshold monitoring (for example, Disk usage or CPU Load) which requires some action on the part of administrators but not immediately.

Conversely, Emergency severity indicates that some major component of the system has failed and that either core policy processing session management or major system functionality is impacted.

Categorization

Combinations of Facility and Severity create many possibilities of notifications (traps) that might be sent. However, some combinations are more likely than others. The following table lists some Facility and Severity categorizations:

Table 4: Severity Categorization

| Facility.Severity | Categorization | Possibility |
|------------------------|--|--|
| Process.Emergency | A single part of an application has failed. | Possible but in an HA configuration very unlikely. |
| Hardware.Debug | A hardware component has sent a NA debug message. | NA |
| Operating System.Alert | An Operating System (kernel or resource level) fault has occurred. | Possible as a recoverable kernel fault (on a vNIC for instance). |
| Application.Emergency | An entire application component has failed. | Unlikely but possible (load balancers failing for instance). |

It is not possible to quantify every Facility and Severity combination. This is primarily driven by the fact that the alert rules can be configured to meet each operator's environment. However, greater experience with CPS leads to better diagnostics. The CPS Monitoring and Alert Notification infrastructure provides a baseline for event definition and notification by an experienced engineer.

Emergency Severity Note

Caution Emergency severities are very important! As a general principle, alerts should only be defined with an Emergency-severity trap if the system becomes inaccessible or unusable in some way. An unusable system is rare but might occur if multiple failures occur in the operating system virtualization networking or hardware facilities.

Notifications and Alerting

The CPS Monitoring and Alert Notification framework provides the following SNMP notification traps (one-way). Traps are either proactive or reactive. Proactive traps are alerts based on system events or changes that require attention (for example, Disk is filling up). Reactive traps are alerts that an event has already occurred (for example, an application process failed).

Component Notifications

Components are devices that make up the CPS system. These are systems level traps. They are generated when some predefined thresholds is crossed and are defined in the alerting configuration of the system. User can modify and change these using the alert definition commands.

Component notifications are defined in the BROADHOP-NOTIFICATION-MIB as follows:

```

broadhopQNSComponentNotification NOTIFICATION-TYPE OBJECTS {
    broadhopComponentName,
    broadhopComponentTime,
    broadhopComponentNotificationName,
    broadhopNotificationFacility,
    broadhopNotificationSeverity,
    broadhopComponentAdditionalInfo }
STATUS current
DESCRIPTION "
Trap from any QNS component - i.e. device.

"
::= { broadhopProductsQNSNotifications 1 }

```

Each Component Notification contains:

- Name of the Notification being thrown (broadhopComponentNotificationName)
- Name of the device throwing the notification (broadhopComponentName)
- Time the notification was generated (broadhopComponentTime)
- Facility or which layer the notification came from (broadhopNotificationFacility)
- Severity of the notification (broadhopNotificationSeverity)
- Additional information about the notification, which might be a bit of log or other information.

The following table provides the list of supported alarms:

Table 5: Component Notifications

| Notification Name | Severity | Message Text | Description |
|-------------------|----------|---|--|
| DISK_FULL | Critical | Disk filesystem / usage is more than the 90% | Disk usage is monitored. |
| | Clear | Disk filesystem / usage is greater than 10% | |
| HIGH_LOAD | Major | load average value for 5 min is greater than 3 current value is {{ \$value }} | Load on the CPU is measured as per the linux operating system load. |
| | Clear | load average value for 5 min is lower than 3 | |
| LINK_STATE | Critical | {{ \$labels.interface }} is down on {{ \$labels.instance }} | Indicates if any interface (ens**) has gone down. |
| | Clear | {{ \$labels.interface }} is up on {{ \$labels.instance }} | |
| LOW_MEMORY | Critical | Available RAM is less than 20% current value is {{ \$value }} | Monitors memory usage on the VMs. When free memory goes down, the threshold alarm is raised. |
| | Clear | Available RAM is more than 20% | |

| Notification Name | Severity | Message Text | Description |
|-----------------------|----------|---|--|
| PROCESS_STATE | Critical | {{ \$labels.service_name }} instance {{ \$labels.module_instance }} of module {{ \$labels.module }} is in Aborted state. | Monitors process restarts. |
| | Clear | {{ \$labels.service_name }} instance {{ \$labels.module_instance }} of module {{ \$labels.module }} is moved from Aborted state | |
| HIGH_CPU_USAGE | Critical | CPU usage in last 10 sec is more than 30% current value {{ \$value }} | Monitors CPU usage. |
| | Clear | CPU usage in last 10 sec is lower than 30% | |
| QNS_JAVA_STARTED | Error | {{ \$labels.service_name }} instance {{ \$labels.module_instance }} of module {{ \$labels.module }} is in Started state. | Indicates Java process restart. |
| | Clear | {{ \$labels.service_name }} instance {{ \$labels.module_instance }} of module {{ \$labels.module }} is moved from started state | |
| IP_NOT_REACHABLE | Critical | VM/VIP IP {{ \$labels.instance }} is not reachable | When IP is not reachable, this alarm is raised. For more information, see IP Not Reachable, on page 8 |
| | Clear | VM/VIP IP {{ \$labels.instance }} is reachable | |
| DIAMETER_PEER_DOWN | Error | Diameter peer is down. | Any peer connected to PAS is monitored. |
| | Clear | Diameter peer is up | |
| DRA_PROCESS_UNHEALTHY | Critical | {{ \$labels.service_name }} instance {{ \$labels.module_instance }} of module {{ \$labels.module }} is not healthy | Process state is monitored. |
| | Clear | {{ \$labels.service_name }} instance {{ \$labels.module_instance }} of module {{ \$labels.module }} is healthy | |
| DB_SHARD_DOWN | Critical | All DB Members of a replica set {{ \$labels.shard_name }} are down | Alarm raised when both primary and secondary replica set members are down. |
| | Clear | All DB Members of a replica set {{ \$labels.shard_name }} are not down | |

| Notification Name | Severity | Message Text | Description |
|--------------------|----------|---|---|
| NO_PRIMARY_DB | Critical | Primary DB member not found for replica set {{ \$labels.shard_name }} | Alarm raised when primary database is not up. |
| | Clear | Primary DB member found for replica set {{ \$labels.shard_name }} | |
| SECONDARY_DB_DOWN | Critical | Secondary Member {{ \$labels.name }} of replica set {{ \$labels.shard_name }} is down | Alarm raised when secondary database is not up. |
| | Clear | Secondary Member {{ \$labels.name }} of replica set {{ \$labels.shard_name }} is up | |
| LOW_SWAP | Critical | {{ \$labels.instance }} has less than 80% swap memory . | Monitors the swap memory. |
| | Clear | {{ \$labels.instance }} has greater than 80% swap memory . | |
| DOCKER_ENGINE_DOWN | Critical | Docker Engine {{ \$labels.engine_id }} is down. | Monitors the docker engine status/state. |
| | Clear | Docker Engine {{ \$labels.engine_id }} is up. | |
| SVN_BACKUP_ALERT | Alert | svn backup in mongo is out of sync, please check svn_audit.log | Alarm raised when SVN repos are not in sync with SVN backup stored in mongo-admin containers. |
| | Clear | svn backup in mongo is in sync now | |



Note By default, no alert rules are configured in the system.

IP Not Reachable

Two things impact the generation of an IP_NOT_REACHABLE alert if a VIP fails over.

1. VIP switchover time
2. Prometheus polling interval

VIP switchover time can vary depending on the load of the VM and traffic on the network. Metrics are polled every 5 seconds. If a VIP fails over quickly, then an IP_NOT_REACHABLE alert is not generated.

Example: IP_NOT_REACHABLE alert not generated

1. T0 Prometheus polls the Orchestrator for the probe_icmp_target metric which is set to 1 (ip reachable).
2. T1 VIP fails
3. T2

4. T3
5. T4 VIP moves to the backup VM
6. T5 Prometheus polls the Orchestrator for the probe_icmp_target metric which is set to 1 (ip reachable)

Example: IP_NOT_REACHABLE alert generated

1. T0 Prometheus polls the Orchestrator for the probe_icmp_target metric which is set to 1 (ip reachable).
2. T1
3. T2
4. T3
5. T4 VIP fails
6. T5 Prometheus polls the Orchestrator for the probe_icmp_target metric which is set to 0 (ip not reachable)
7. T6 IP_NOT_REACHABLE alert is generated.

Application Notifications

The following table describes the application notifications:

Table 6: Application Notifications

| Notification Name | Severity | Message Text | Description |
|---|----------|---|---|
| DRA_MESSAGE_PROCESSING_FAILURE_TPS_EXCEEDED | Critical | Message Processing Failure TPS exceeded, current value is {{ \$value }}. | TPS of rejected messages from DRA Director (Any messages with Result code !=2001) |
| | Clear | Message Processing Failure TPS in control. | |
| DRA_DIRECTOR_TPS_EXCEEDED | Critical | {{ \$labels.instance }} Director TPS exceeded, current value is {{ \$value }}. | Success TPS of Total DRA Director (ResultCode=2001) |
| | Clear | {{ \$labels.instance }} Director TPS in control . | |
| DRA_WORKER_TPS_EXCEEDED | Critical | {{ \$labels.instance }} Worker TPS exceeded, current value is {{ \$value }}. | TPS of Total Worker |
| | Clear | {{ \$labels.instance }} Worker TPS in control. | |
| DRA_DB_TPS_EXCEEDED | Critical | {{ \$labels.instance }} Persistence DB TPS exceeded , current value is {{ \$value }}. | TPS of DB TPS (Query and Update) |
| | Clear | {{ \$labels.instance }} Persistence DB TPS in control. | |

| Notification Name | Severity | Message Text | Description |
|---|----------|---|--|
| DIAMETER_UNABLE_TO_DELIVER_TPS_EXCEEDED | Critical | UNABLE_TO_DELIVER TPS exceeded, current value is {{ \$value }}. | TPS of Diameter 3002 |
| | Clear | UNABLE_TO_DELIVER in control. | |
| DIAMETER_TRANSIENT_FAILURE_TPS_EXCEEDED | Critical | TRANSIENT_FAILURE TPS exceeded, current value is {{ \$value }}. | TPS of Diameter 4xxx |
| | Clear | TRANSIENT_FAILURE in control. | |
| DIAMETER_UNKNOWN_SESSIONS_TPS_EXCEEDED | Critical | UNKNOWN_SESSIONS TPS exceeded, current value is {{ \$value }}. | TPS of Diameter 5002 |
| | Clear | UNKNOWN_SESSIONS in control. | |
| MISMATCH_REQUEST_RESPONSE | Critical | {{ \$labels.remote_peer }} MISMATCH_REQUEST_RESPONSE exceeded, current value is {{ \$value }}. | Mismatch in Rate of Request and Response (Discrepancy in ingress and egress) |
| | Clear | {{ \$labels.remote_peer }} MISMATCH_REQUEST_RESPONSE in control. | |
| KEEP_ALIVE_RAR_ROUTING_FAILURE_TPS_EXCEEDED | Critical | Keep Alive RAR TPS exceeded, current value is {{ \$value }}. | TPS of Keep Alive RAR Routing (Stale RAR) |
| | Clear | Keep Alive RAR TPS in control. | |
| EGRESS_RATE_LIMITED_SESSION_ERR_RESP_TPS_EXCEEDED | Critical | {{ \$labels.local_peer }} {{ \$labels.remote_peer }} Egress rate limited messages with error response TPS exceeded, current value is {{ \$value }}. | TPS of Rate Limited Response for Error |
| | Clear | {{ \$labels.local_peer }} {{ \$labels.remote_peer }} Egress rate limited messages with error response TPS in control. | |
| EGRESS_RATE_LIMITED_SESSION_REJECT_TPS_EXCEEDED | Critical | {{ \$labels.local_peer }} {{ \$labels.remote_peer }} Egress rate limited messages dropped without error TPS exceeded, current value is {{ \$value }}. | TPS of Rate Limited Response Rejected |
| | Clear | {{ \$labels.local_peer }} {{ \$labels.remote_peer }} Egress rate limited messages dropped without error TPS in control. | |

| Notification Name | Severity | Message Text | Description |
|--|----------|---|---|
| INGRESS_RATE_LIMITED_SESSION_ERR_RESP_TPS_EXCEEDED | Critical | {{ \$labels.local_peer }} {{ \$labels.remote_peer }} Ingress rate limited messages with error response TPS exceeded, current value is {{ \$value }}. | TPS of Rate Limited Response Error - Ingress |
| | Clear | {{ \$labels.local_peer }} {{ \$labels.remote_peer }} Ingress rate limited messages with error response TPS in control. | |
| INGRESS_RATE_LIMITED_SESSION_REJECT_TPS_EXCEEDED | Critical | {{ \$labels.local_peer }} {{ \$labels.remote_peer }} Ingress rate limited messages dropped without error response TPS exceeded, current value is {{ \$value }}. | TPS of Rate Limited Response Rejected - Ingress |
| | Clear | {{ \$labels.local_peer }} {{ \$labels.remote_peer }} Ingress rate limited messages dropped without error response TPS in control. | |
| BINDING_STORAGE_ERRORS_TPS_EXCEEDED | Critical | Binding Store Error TPS exceeded, current value is {{ \$value }}. | TPS Binding Storage Errors (Binding storage failed because of high load/any other database error) |
| | Clear | Binding Store Error TPS in control. | |
| BINDING_LOOKUP_ERROR_TPS_EXCEEDED | Critical | Binding Lookup Error TPS exceeded, current value is {{ \$value }}. | TPS Binding Lookup Errors (Binding retrieval failure because of internal error) |
| | Clear | Binding Lookup Error TPS in control. | |
| DB_ERR_TPS_EXCEEDED | Critical | All DB Errors TPS exceeded, current value is {{ \$value }}. | TPS All database errors |
| | Clear | All DB Errors TPS in control. | |
| DB_RESPONSE_TIME_EXCEEDED | Critical | {{ \$labels.instance }} DB Response Time exceeded, current value is {{ \$value }}. | Response Time Exceeds (Database Query/Update operation time exceeds) |
| | Clear | {{ \$labels.instance }} DB Response Time in control, current value is {{ \$value }}. | |
| BINDING_KEY_NOT_FOUND_IN_AAR_TPS_EXCEEDED | Critical | {{ labels.origin_host }} Binding Key not found in AAR TPS exceeded, current value is {{ \$value }}. | TPS Binding Key Not Found in AAR (When AAR received with no "imsi+apn/msisdn/ipv6") |
| | Clear | {{ labels.origin_host }} Binding Key not found in AAR TPS in control. | |

| Notification Name | Severity | Message Text | Description |
|---|----------|--|--|
| BINDING_KEY_NOT_FOUND_IN_CCR_I_TPS_EXCEEDED | Critical | {{ labels.origin_host }} Binding Key not found in CCR(I) TPS exceeded, current value is {{ \$value }}. | TPS Binding Key Not Found in CCR-I(When CCR-I received with no "imsi+apn/msisd/ipv6" |
| | Clear | {{ labels.origin_host }} Binding Key not found in CCR(I) TPS in control. | |
| BINDING_NOT_FOUND_TPS_EXCEEDED | Critical | {{ labels.origin_host }} Binding not found TPS exceeded, current value is {{ \$value }}. | TPS Binding Not Found |
| | Clear | {{ labels.origin_host }} Binding not found TPS in control,. | |
| BINDING_DB_INCONSISTENT_TPS_EXCEEDED | Critical | TPS AAR with Result Code 5065 exceeded, current value is {{ \$value }}. | TPS AAR with Result Code 5065 |
| | Clear | TPS AAR with Result Code 5065 in control. | |
| BINDING_SESSION_DB_SIZE_EXCEEDED | Critical | {{ \$labels.db }} size exceeded, current value is {{ \$value }}. | Total Size of Session DB Exceeded |
| | Clear | {{ \$labels.db }} size in control. | |
| BINDING_IMSI_APN_DB_SIZE_EXCEEDED | Critical | {{ \$labels.db }} size exceeded, current value is {{ \$value }}. | Total Size of IMSI / APN DB Exceeded |
| | Clear | {{ \$labels.db }} size in control. | |
| BINDING_MSISDN_APN_DB_SIZE_EXCEEDED | Critical | {{ \$labels.db }} size exceeded, current value is {{ \$value }}. | Total Size of MSISDN / APN DB Exceeded |
| | Clear | {{ \$labels.db }} size in control | |
| BINDING_IPV6_DB_SIZE_EXCEEDED | Critical | {{ \$labels.db }} size exceeded, current value is {{ \$value }}. | Total Size of IPv6 DB Exceeded |
| | Clear | {{ \$labels.db }} size in control | |
| PEER_TPS_EXCEEDED | Critical | {{ \$labels.instance }} Peer Connection {{ \$labels.local_peer }} {{ \$labels.remote_peer }} TPS exceeded, current value is {{ \$value }}. | Peer TPS Exceeded (Per peer TPS thresholds) |
| | Clear | {{ \$labels.instance }} Peer Connection {{ \$labels.local_peer }} {{ \$labels.remote_peer }} TPS in control. | |

| Notification Name | Severity | Message Text | Description |
|--|----------|---|---|
| NO_RESPONSE_PEER_FOR_ANSWER_TPS_EXCEEDED | Critical | {{ \$labels.instance }} No Response From Peer Connection TPS exceeded for {{ \$labels.message_type }} , current value is {{ \$value }}. | TPS No Response From Peer (timeouts from PCRf/any peer) |
| | Clear | {{ \$labels.instance }} No Response From Peer Connection TPS in control for {{ \$labels.message_type }} . | |
| PEER_RESPONSE_TIME_EXCEEDED | Critical | message_duration_seconds {type=~"peer_*"} [labels: type] | Peer Response Time Exceeded (Response time of peer exceeds) |
| | Clear | Response time in control. | |
| NO_PEER_GROUP_MEMBER_AVAILABLE | Critical | {{ \$labels.peer_group }} not available. | Peer Group is not Available (All peers in peer_group down) |
| | Clear | {{ \$labels.peer_group }} available. | |
| PCRf_NOT_CREATING_SESSIONS_TPS_EXCEEDED | Critical | Failed CCR-I TPS exceeded, current value is {{ \$value }}. | TPS Rate of Failed CCR-I(ResultCode !=2001) |
| | Clear | Failed CCR-I TPS in control. | |
| FORWARDING_LOOP_FOUND_TPS_EXCEEDED | Critical | {{ \$labels.remote_peer }} Loop Detected TPS exceeded , current value is {{ \$value }}. | TPS Rate of Diameter Message Loop |
| | Clear | {{ \$labels.remote_peer }} Loop Detected TPS in control. | |
| RELAY_LINK_TPS_GT_0 | Critical | {{ \$labels.remote_peer }} Relay Started, current value is {{ \$value }}. | TPS Rate of Relay Peer > 0 (When relay peers start exchanging control plane messages) |
| | Clear | {{ \$labels.remote_peer }} Relay Stated. | |
| RELAY_LINK_TPS_EXCEEDED | Critical | {{ \$labels.remote_peer }} Relay Link TPS exceeded, current value is {{ \$value }}. | TPS Rate of Relay Peer (TPS of relay messages) |
| | Clear | {{ \$labels.remote_peer }} Relay Link TPS in control. | |
| RELAY_LINK_STATUS | Critical | {{ \$labels.remote_peer }} Relay Link is Down. | Relay Link is Down (Relay link status is monitored) |
| | Clear | {{ \$labels.remote_peer }} Relay Link is UP. | |

| Notification Name | Severity | Message Text | Description |
|----------------------------|----------|---|---|
| NO_RELAY_PEER_TPS_EXCEEDED | Critical | {{ \$labels.remote_peer }} Relay Peer TPS exceeded, current value is {{ \$value }}. | TPS Rate of Relay Peer Failure |
| | Clear | {{ \$labels.remote_peer }} Relay Peer TPS in control. | |
| SESSION_DB_LIMIT_EXCEEDED | Alert | Session max DB limit reached | This alarm is generated when session database count crosses maximum limit configured using CLI for db-max-record-limit. |
| | Clear | Session max DB limit reached alarm cleared | This alarm is cleared when session database count drops below maximum limit configured using CLI for db-max-record-limit. |
| IPV6_DB_LIMIT_EXCEEDED | Alert | IPv6 max DB limit reached | This alarm is generated when IPv6 database count crosses maximum limit configured using CLI for db-max-record-limit. |
| | Clear | IPv6 max DB limit reached alarm cleared | This alarm is cleared when IPv6 database count drops below maximum limit configured using CLI for db-max-record-limit. |
| IPV4_DB_LIMIT_EXCEEDED | Alert | IPv4 max DB limit reached | This alarm is generated when IPv4 database count crosses maximum limit configured using CLI for db-max-record-limit. |
| | Clear | IPv4 max DB limit reached alarm cleared | This alarm is cleared when IPv4 database count drops below maximum limit configured using CLI for db-max-record-limit. |

| Notification Name | Severity | Message Text | Description |
|-----------------------------|----------|--|---|
| IMSIAPN_DB_LIMIT_EXCEEDED | Alert | ImsiApn max DB limit reached | This alarm is generated when ImsiApn database count crosses maximum limit configured using CLI for db-max-record-limit. |
| | Clear | ImsiApn max DB limit reached alarm cleared | This alarm is cleared when ImsiApn database count drops below maximum limit configured using CLI for db-max-record-limit. |
| MSISDNAPN_DB_LIMIT_EXCEEDED | Alert | MsisdnApn max DB limit reached | This alarm is generated when MsisdnApn database count crosses maximum limit configured using CLI for db-max-record-limit. |
| | Clear | MsisdnApn max DB limit reached alarm cleared | This alarm is cleared when MsisdnApn database count drops below maximum limit configured using CLI for db-max-record-limit. |
| CRD_CACHE_LOAD_ERROR | Critical | Error when loading CRD cache | This alarm is generated when CRD is not loaded properly or CRD is loaded with an error value as "1". |
| | Clear | CRD cache loaded successfully | This alarm is cleared when CRD cache is updated properly with value as "0". |

Alert Rules

Alert Rules Configuration

The following commands are used to configure alert rules:

```
scheduler#config
```

```
scheduler(config)# alert rule <rule_name>
```

where, <rule_name> is the name of the alert rule. For example, test

```
Value for 'expression' (<string>): <expression based on the stats>
```

where, <expression based on the stats> is the expression. For example, test>1

```
Value for 'message' (<string>): <message string to be sent in the alarm message>
```

where, *<message string to be sent in the alarm message>* is the message to be sent in the alarm. For example, testing

```
Value for 'snmp-clear-message' (<string>): <message string for clear alarm>
```

where, *<message string for clear alarm>* is the string for the clear message. For example. test clear

```
scheduler(config-rule-test)#
scheduler(config-rule-test)# snmp-facility
Possible completions:
  application hardware networking os proc virtualization

scheduler(config-rule-test)# snmp-facility <SNMP facility to be provided for this alert>
```

where, *<SNMP facility to be provided for this alert>* is the facility to be provided for this alert. For example, application

```
scheduler(config-rule-test)# event-host-label <provide the node details>
```

where, *<provide the node details>* is used to provide node details. For example, instance

```
scheduler(config-rule-test)# snmp-severity
Possible completions:
  alert critical debug emergency error info none notice warning

scheduler(config-rule-test)# snmp-severity <SNMP severity to be send for this alert>
```

where, *<SNMP severity to be send for this alert>* is the severity level to be used for alert rule. For example, critical

```
scheduler(config-rule-test)# duration <time>
```

where, *<time>* causes Prometheus to wait for a certain duration between first encountering a new expression output vector element (like, an instance with a high HTTP error rate) and counting an alert as firing for this element. Elements that are active, but not firing yet, are in pending state.

```
scheduler(config-rule-test)# commit
Commit complete.
scheduler(config-rule-test)# end
```

Sample Configuration

The alert rules configuration are for reference only. Here is the configuration with sample values:

You can configure your alert rules based on your requirements.

```
scheduler#config
scheduler(config)# alert rule test
Value for 'expression' (<string>): test>1
Value for 'message' (<string>): testing
Value for 'snmp-clear-message' (<string>): test clear
scheduler(config-rule-test)#
scheduler(config-rule-test)# snmp-facility
Possible completions:
  application hardware networking os proc virtualization
scheduler(config-rule-test)# snmp-facility application
scheduler(config-rule-test)# event-host-label instance
scheduler(config-rule-test)# snmp-severity
Possible completions:
  alert critical debug emergency error info none notice warning
scheduler(config-rule-test)# snmp-severity critical
scheduler(config-rule-test)# duration 30s
scheduler(config-rule-test)# commit
Commit complete.
```



```
scheduler(config-rule-test)# end
```

To display all the configured alert rules use the following command:

```
scheduler# show running-config alert | tab
```

| NAME | EXPRESSION | DURATION | EVENT | MESSAGE | SNMP | SNMP | SNMP CLEAR |
|------|------------|----------|----------|---------|-------------|----------|---------------|
| | | | HOST | | FACILITY | SEVERITY | MESSAGE |
| test | test > 1 | - | instance | testing | application | critical | testing clear |

Sample Alert Rules

You can configure alert rules based on your requirements. For sample configuration, refer to Sample Alert Rule Configuration.



Note *event-host-label* value is used as a key in the alarm map. So, configure the correct value based on your requirements while configuring alert rules.



Note Grafana can be used to see all the statistics generated by the system and based on these statistics alerting rules can be configured.



Note Alert SNMP command includes an optional parameter named *add-vm-info* that you can use to specify whether or not the VM name is prepended in the SNMP alarm in *broadhopComponentName*. For example, *broadhopComponentName: VMName/containerName*. By default, the parameter is set to true. If set to false, *broadhopComponentName* does not prepend VM name. For example, *broadhopComponentName: containerName*. The following table includes sample alert rules when *add-vm-info* is set to false. For more information about this parameter and the command, see the *vDRA Operations Guide*.

Table 7: Sample Alert Rules

| Alarm Name | Configuration |
|----------------|--|
| DiskFull | <p>broadhopComponentName: Linux host name</p> <p>broadhopComponentNotificationName: DISK_FULL</p> <p>broadhopNotificationFacility: hardware</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Disk Filesystem/usage is more than 90%</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Disk filesystem/usage is greater than 10%</p> <p>Expression: (round((node_filesystem_size_bytes{job='node_exporter'}-node_filesystem_avail_bytes{job='node_exporter'})/node_filesystem_size_bytes{job='node_exporter'}*100)) >= 70</p> |
| HighLoad | <p>broadhopComponentName: Linux host name</p> <p>broadhopComponentNotificationName: HIGH_LOAD</p> <p>broadhopNotificationFacility: hardware</p> <p>Alert broadhopNotificationSeverity: major</p> <p>Alert broadhopComponentAdditionalInfo: load average value for 5 minutes is greater than 3 current value is {{ \$value }}</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: load average value for 5 minutes is lower than 3</p> <p>Expression: node_load5 > 3</p> |
| LowMemoryAlert | <p>broadhopComponentName: Linux host name</p> <p>broadhopComponentNotificationName: LOW_MEMORY</p> <p>broadhopNotificationFacility: hardware</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Available RAM is less than 20% current value is {{ \$value }}</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Available RAM is more than 20%</p> <p>Expression: round((node_memory_MemAvailable_bytes/node_memory_MemTotal_bytes)*100) < 20</p> |

| Alarm Name | Configuration |
|----------------------|--|
| High CPU Usage Alert | <p>broadhopComponentName: Linux host name</p> <p>broadhopComponentNotificationName: HIGH_CPU_USAGE</p> <p>broadhopNotificationFacility: hardware</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: CPU usage in last 10 sec is more than 30% current value {{ \$value }}</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: CPU usage in last 10 sec is lower than 30%</p> <p>Expression: rate(node_cpu_seconds_total{mode="system"} [10s])*100 > 40</p> |
| Link down Alert | <p>broadhopComponentName: Linux host name</p> <p>broadhopComponentNotificationName: LINK_STATE</p> <p>broadhopNotificationFacility: networking</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: {{ \$labels.interface }} is down on {{ \$labels.instance }}</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: {{ \$labels.interface }} is up on {{ \$labels.instance }}</p> <p>Expression: link_state == 0</p> |
| Process down Alert | <p>Container Name: Linux host name</p> <p>broadhopComponentNotificationName: PROCESS_STATE</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: {{ \$labels.service_name }} instance {{ \$labels.module_instance }} of module {{ \$labels.module }} is in Aborted state.</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: {{ \$labels.service_name }} instance {{ \$labels.module_instance }} of module {{ \$labels.module }} is moved from Aborted state</p> <p>Expression: docker_service_up==1 or docker_service_up==3</p> |

| Alarm Name | Configuration |
|----------------------------------|---|
| VM/Node Down Alert | <p>broadhopComponentName: IP Address</p> <p>broadhopComponentNotificationName: IP_NOT_REACHABLE</p> <p>broadhopNotificationFacility: networking</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: VM/VIP IP {{ \$labels.instance }} is not reachable</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: VM/VIP IP {{ \$labels.instance }} is reachable</p> <p>Expression: probe_icmp_target==0</p> |
| DiameterPeer Status | <p>broadhopComponentName: Peer FQDN</p> <p>broadhopComponentNotificationName: DIAMETER_PEER_DOWN</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: error</p> <p>Alert broadhopComponentAdditionalInfo: Diameter peer is down</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Diameter peer is up.</p> <p>Expression: alert rule DIAMETER_PEER_DOWN expression "(sum(peer_connection_status{remote_peer!=\"\"}) by (local_peer,remote_peer)) == 0)"</p> |
| DRA Process Down (healthy) Alert | <p>broadhopComponentName: Container Name</p> <p>broadhopComponentNotificationName: DRA_PROCESS_UNHEALTHY</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: {{ \$labels.service_name }} instance {{ \$labels.module_instance }} of module {{ \$labels.module }} is not healthy</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: {{ \$labels.service_name }} instance {{ \$labels.module_instance }} of module {{ \$labels.module }} is healthy</p> <p>Expression: docker_service_up==4</p> |

| Alarm Name | Configuration |
|---|---|
| All DB Member of Replica Set Down Alert | <p>broadhopComponentName: Shard Name</p> <p>broadhopComponentNotificationName: DB_SHARD_DOWN</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: All DB Members of replica set {{ \$labels.shard_name }} are down</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Some DB Members of replica set {{ \$labels.shard_name }} are up</p> <p>Expression: absent(mongoddb_mongod_replset_member_state{shard_name="shard-1"})==1</p> |
| No primary DB Member found Alert | <p>broadhopComponentName: Shard Name</p> <p>broadhopComponentNotificationName: NO_PRIMARY_DB</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Primary DB member not found for replica set {{ \$labels.shard_name }}</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Primary DB member found for replica set {{ \$labels.shard_name }}</p> <p>Expression: absent(mongoddb_mongod_replset_member_health{shard_name="shard-1",state="PRIMARY"})==1</p> |
| Secondary DB Member Down Alert | <p>broadhopComponentName: Shard Name</p> <p>broadhopComponentNotificationName: SECONDARY_DB_DOWN</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Secondary Member {{ \$labels.name }} of replica set {{ \$labels.shard_name }} is down</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Secondary Member {{ \$labels.name }} of replica set {{ \$labels.shard_name }} is down</p> <p>Expression: (mongoddb_mongod_replset_member_state != 2) and ((mongoddb_mongod_replset_member_state==8) or (mongoddb_mongod_replset_member_state==6))</p> |

| Alarm Name | Configuration |
|---|--|
| DRA message processing failure TPS exceeded | <p>broadhopComponentName: System</p> <p>broadhopComponentNotificationName: DRA_MESSAGE_PROCESSING_FAILURE_TPS_EXCEEDED</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Message Processing Failure TPS exceeded.</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo Message Processing Failure TPS in control.</p> <p>Expression: rate(rejected_messages_total[5m]) > 5</p> |
| Keepalive RAR routing failure - TPS exceeded | <p>broadhopComponentName: System</p> <p>broadhopComponentNotificationName: KEEP_ALIVE_RAR_ROUTING_FAILURE_TPS_EXCEEDED</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Keep Alive RAR TPS exceeded.</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Keep Alive RAR TPS in control.</p> <p>Expression: rate(keep_alive_rar_failure[5m]) > 5</p> |
| Egress rate limited session error response TPS exceeded | <p>broadhopComponentName: Peer FQDN</p> <p>broadhopComponentNotificationName: EGRESS_RATE_LIMITED_SESSION_ERR_RESP_TPS_EXCEEDED</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Egress rate limited messages with error response TPS exceeded.</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Egress rate limited messages with error response TPS in control.</p> <p>Expression: rate(diameter_peer_egress_rate_limited_with_err_response[5m]) > 5</p> |

| Alarm Name | Configuration |
|--|---|
| Egress rate limited session reject TPS exceeded | <p>broadhopComponentName: Peer FQDN</p> <p>broadhopComponentNotificationName: EGRESS_RATE_LIMITED_SESSION_REJECT_TPS_EXCEEDED</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Egress rate limited messages dropped without error TPS exceeded.</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Egress rate limited messages dropped without error TPS in control.</p> <p>Expression: rate(diameter_peer_egress_rate_limited_without_err_response[5m]) > 5</p> |
| Ingress rate limited session error response TPS exceeded | <p>broadhopComponentName: Peer FQDN</p> <p>broadhopComponentNotificationName: INGRESS_RATE_LIMITED_SESSION_ERR_RESP_TPS_EXCEEDED</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Ingress rate limited messages with error response TPS exceeded.</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Ingress rate limited messages with error response TPS in control.</p> <p>Expression: rate(diameter_peer_ingress_rate_limited_with_err_response[5m]) > 5</p> |
| Ingress rate limited session reject TPS exceeded | <p>broadhopComponentName: Peer FQDN</p> <p>broadhopComponentNotificationName: INGRESS_RATE_LIMITED_SESSION_REJECT_TPS_EXCEEDED</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Ingress rate limited messages dropped without error response TPS exceeded.</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Ingress rate limited messages dropped without error response TPS in control.</p> <p>Expression: rate(diameter_peer_ingress_rate_limited_without_err_response[5m]) > 5</p> |

| Alarm Name | Configuration |
|---|---|
| Binding key not found in AAR TPS exceeded | <p>broadhopComponentName: System</p> <p>broadhopComponentNotificationName: BINDING_KEY_NOT_FOUND_IN_AAR_TPS_EXCEEDED</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Binding Key not found in AAR TPS exceeded.</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Binding Key not found in AAR TPS in control.</p> <p>Expression: rate(aar_bind_key_not_found_total[5m]) > 5</p> |
| Binding key not found in CCR-I TPS exceeded | <p>broadhopComponentName: System</p> <p>broadhopComponentNotificationName: BINDING_KEY_NOT_FOUND_IN_CCR_I_TPS_EXCEEDED</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Binding Key not found in CCR(I) TPS exceeded.</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Binding Key not found in CCR(I) TPS in control.</p> <p>Expression: rate(ccri_bind_key_not_found_total[5m]) > 5</p> |
| Peer response time exceeded | <p>broadhopComponentName: Peer FQDN</p> <p>broadhopComponentNotificationName: PEER_RESPONSE_TIME_EXCEEDED</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Peer response time exceeded.</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Peer response time in control.</p> <p>Expression: rate(message_duration_seconds{type=~\"peer_.*\"}[5m]) > 5</p> |

| Alarm Name | Configuration |
|---------------------------------------|---|
| No peer group member available | broadhopComponentName: Container Name broadhopComponentNotificationName: NO_PEER_GROUP_MEMBER_AVAILABLE broadhopNotificationFacility: application Alert broadhopNotificationSeverity: critical Alert broadhopComponentAdditionalInfo: Peer group not available. Clear broadhopNotificationSeverity: clear Clear broadhopComponentAdditionalInfo: Peer group available. Expression: no_active_peer_in_peer_group ==1 |
| Forwarding loop found TPS exceeded | broadhopComponentName: System broadhopComponentNotificationName: FORWARDING_LOOP_FOUND_TPS_EXCEEDED broadhopNotificationFacility: application Alert broadhopNotificationSeverity: critical Alert broadhopComponentAdditionalInfo: Loop Detected TPS exceeded. Clear broadhopNotificationSeverity: clear Clear broadhopComponentAdditionalInfo: Loop Detected TPS in control. Expression: rate(diameter_loop_detected [5m]) > 5 |
| No relay peer TPS exceeded | broadhopComponentName: Container Name broadhopComponentNotificationName: NO_RELAY_PEER_TPS_EXCEEDED broadhopNotificationFacility: application Alert broadhopNotificationSeverity: critical Alert broadhopComponentAdditionalInfo: Relay Peer TPS exceeded. Clear broadhopNotificationSeverity: clear Clear broadhopComponentAdditionalInfo: Relay Peer TPS in control. Expression: rate(relay_send_nopeer[5m]) > 5 |

| Alarm Name | Configuration |
|--------------------------------|---|
| Relay link status | <p>broadhopComponentName: Peer FQDN</p> <p>broadhopComponentNotificationName: RELAY_LINK_STATUS</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Relay Link is down.</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Relay Link is up</p> <p>Expression: relay_peer_status == 0</p> |
| Binding not found TPS exceeded | <p>broadhopComponentName: System</p> <p>broadhopComponentNotificationName: BINDING_NOT_FOUND_TPS_EXCEEDED</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Binding not found TPS exceeded.</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Binding not found TPS in control</p> <p>Expression: rate(binding_not_found_total[5m]) > 5</p> |
| Relay link TPS GT 0 | <p>broadhopComponentName: Peer FQDN</p> <p>broadhopComponentNotificationName: RELAY_LINK_TPS_GT_0</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Relay started.</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Relay not started.</p> <p>Expression: rate(relay_peer_messages_total[5m]) > 0</p> |
| Relay link TPS exceeded | <p>broadhopComponentName: Peer FQDN</p> <p>broadhopComponentNotificationName: RELAY_LINK_TPS_EXCEEDED</p> <p>broadhopNotificationFacility: application</p> <p>Alert broadhopNotificationSeverity: critical</p> <p>Alert broadhopComponentAdditionalInfo: Relay Link TPS exceeded.</p> <p>Clear broadhopNotificationSeverity: clear</p> <p>Clear broadhopComponentAdditionalInfo: Relay Link TPS in control.</p> <p>Expression: rate(relay_peer_messages_total[5m]) > 5</p> |

| Alarm Name | Configuration |
|----------------------|---|
| SVN_BACKUP_ALERT | broadhopComponentName: Linux host name broadhopComponentNotificationName: SVN_BACKUP_ALERT broadhopNotificationFacility: application Alert broadhopNotificationSeverity: warning Alert broadhopComponentAdditionalInfo: svn backup in mongo is out of sync Clear broadhopNotificationSeverity: clear Clear broadhopComponentAdditionalInfo: svn backup in mongo is in sync now Expression: svn_alert==1 |
| CRD_CACHE_LOAD_ERROR | broadhopComponentName: Container Name broadhopComponentNotificationName: CRD_CACHE_LOAD_ERROR broadhopNotificationFacility: application Alert broadhopNotificationSeverity: critical Alert broadhopComponentAdditionalInfo: CRD cache not loaded / loaded with error Clear broadhopNotificationSeverity: clear Clear broadhopComponentAdditionalInfo: CRD cache loaded successfully Expression: crd_cache_load_error==1 |

Health Status of Service

On getting the Qns Java Process State alert, the user has to access the system and check the diagnostics logs of the service to get the exact issue with the service. To access the system and check the diagnostics log, run the following command:

```
show system diagnostics | include <service_name>
```

For example:

```
scheduler# show system diagnostics | include diameter-endpoint-s1
system diagnostics diameter-endpoint-s1 serfHealth 1
system diagnostics diameter-endpoint-s1 service:cisco-policy-app 1
system diagnostics diameter-endpoint-s1 service:cisco-policy-app 2
system diagnostics diameter-endpoint-s1 service:cisco-policy-app 3
system diagnostics diameter-endpoint-s1 service:cisco-policy-app 4
message "CLEARED: InterfaceID=diameter-endpoint-s1.weave.local;msg=\"Memcached server is operational\""
```

```
system diagnostics diameter-endpoint-s1 service:cisco-policy-app 5
message "CLEARED: InterfaceID=com.broadhop.server:diameter-endpoint-s1.weave.local;msg=\"before Feature com.broadhop.server is Running\""
```

```
system diagnostics diameter-endpoint-s1 service:cisco-policy-app 6
message "CLEARED: InterfaceID=com.broadhop.dra.service:diameter-endpoint-s1.weave.local;msg=\" before Feature com.broadhop.dra.service is Running\""
```

```
system diagnostics diameter-endpoint-s1 service:cisco-policy-app 7
message "CLEARED: InterfaceID=com.broadhop.common.service:diameter-endpoint-s1.weave.local;msg=\" before
```

```

Feature com.broadhop.common.service is Running\\""
system diagnostics diameter-endpoint-s1 service:cisco-policy-app 8
message "CLEARED:
InterfaceID=com.broadhop.resourcemonitor:diameter-endpoint-s1.weave.local;msg=\" before
Feature com.broadhop.resourcemonitor is Running\\""
system diagnostics diameter-endpoint-s1 service:cisco-policy-app 9
message "CLEARED:
InterfaceID=com.broadhop.microservices.control:diameter-endpoint-s1.weave.local;msg=\"
before Feature com.broadhop.microservices.control is Running\\""
system diagnostics diameter-endpoint-s1 service:cisco-policy-app 10
message "CLEARED:
InterfaceID=com.broadhop.custrefdata.service:diameter-endpoint-s1.weave.local;msg=\" before
Feature com.broadhop.custrefdata.service is Running\\""
system diagnostics diameter-endpoint-s1 service:cisco-policy-app 11
system diagnostics diameter-endpoint-s1 service:cisco-policy-jmx 1
scheduler#

```

Delete Alert Rules

The following section describes the procedure to delete an alert rule and are for reference only:

```

scheduler# config
Entering configuration mode terminal
scheduler(config)# no alert rule node_down
scheduler(config)# commit
Commit complete.
scheduler(config)# end
scheduler#

```

Alert Status

Use the following command to display the current alerts status:

```
show alert status
```

For example:

```

scheduler# show alert status
NAME                               EVENT HOST      STATUS    MESSAGE
                                UPDATE TIME
-----
high_cpu_alert                     system          firing    CPU usage is more than 30% current_value
is 37.055555555555597              2017-05-22T10:59:37.945+00:00
high_cpu_alert_1                   control-0       resolved  CPU usage is more than 30% current_value
is 33.625000000000637              2017-05-22T17:17:38.184+00:00
high_cpu_alert_1                   control-1       resolved  CPU usage is more than 30% current_value
is 35.6666666666667076             2017-05-22T11:29:37.899+00:00
high_cpu_usage_alert               localhost:9090  resolved  CPU Usage for last 1 min is more than
configured threshold               2017-05-22T09:55:37.902+00:00
2017-05-22T15:39:37.811+00:00

scheduler#

```

Database Alert Expression

IMSI_MSISDN Cluster

Alert Threshold for IMSI/MSISDN:

- Capacity per Primary Shard = $145000/48 = 3020$ TPS
- Alert Threshold per Shard Primary (85%) = 2500 TPS

```
alert rule DRA_IMSI_MSISDN_DB_TPS_EXCEEDED
```

```
expression
```

```
"sum(rate(mongo_operation_total{state='primary',type='mongo',op=~'update|query|delete',cluster='IMSI_MSISDN'}[5m]))
> (2500 * sum(mongo_node_state_primary{cluster='IMSI_MSISDN',type='mongo'}))"
```

```
event-host-label instance
```

```
message "{{ $Labels.instance }}" Persistence DB TPS exceeded , current value is {{ $value }} !"
```

```
snmp-severity critical
```

```
snmp-clear-message "{{ $Labels.instance }}" Persistence DB TPS in control, current value is {{ $value }} !"
```

Session_IPv6 Cluster

Alert Threshold for Session:

- Capacity per Primary Shard = $180000/48 = 3750$ TPS
- Alert Threshold per Shard Primary (85%) = 3200 TPS

```
alert rule DRA_SESS_IPV6_DB_TPS_EXCEEDED
```

```
expression
```

```
"sum(rate(mongo_operation_total{state='primary',type='mongo',op=~'update|query|delete',cluster=~'SES_IPV6_*'}[5m]))
> (3200 * sum(mongo_node_state_primary{cluster=~'SES_IPV6_*',type='mongo'}))"
```

```
event-host-label instance
```

```
message "{{ $Labels.instance }}" Persistence DB TPS exceeded , current value is {{ $value }} !"
```

```
snmp-severity critical
```

```
snmp-clear-message "{{ $Labels.instance }}" Persistence DB TPS in control, current value is {{ $value }} !"
```

NMS Destination Configuration

The following configuration is for reference only:

You can configure the NMS destination based on your requirements.

Example: SNMPv2

```
scheduler#config
scheduler(config)# alert snmp-v2-destination "10.1.1.1"
Value for 'community' (<string>): "cisco"
scheduler(config-snmp-v2-destination-10.1.1.1)# commit
Commit complete.
scheduler(config-snmp-v2-destination-10.1.1.1)# end
```

where, "10.1.1.1" is the SNMPv2 NMS destination address.

Example: SNMPv3

```

scheduler# config
scheduler(config)# alert snmp-v3-destination <nms_ip> e.g. 10.1.1.2
Value for 'user' (<string>): <username> e.g. cis_user
Value for 'auth-password' (<string>): <password string > e.g. cisco-123
Value for 'privacy-password' (<string>): <password string> e.g. cisco-123
scheduler(config-snmp-v3-destination-10.1.1.2)# auth-proto
[MD5,SHA] (SHA): SHA
scheduler(config-snmp-v3-destination-10.1.1.2)# privacy-p
Possible completions:
  privacy-password  privacy-protocol
scheduler(config-snmp-v3-destination-10.1.1.2)# privacy-protocol
[AES,DES] (AES): AES
scheduler(config-snmp-v3-destination-10.1.1.2)# engine-id
(<string>) (0x0102030405060708): 0x0102030405060708
scheduler(config-snmp-v3-destination-10.1.1.2)# commit
Commit complete.
scheduler(config-snmp-v3-destination-10.1.1.2)# end
scheduler#

```

where, "10.1.1.2" is the SNMPv3 NMS destination address.

All the configured NMS destinations in the system can be displayed using the following command:

```

scheduler# show running-config alert | tab
NMS
ADDRESS  COMMUNITY
-----
10.1.1.1  cisco

alert snmp-v3-destination 10.142.148.160
engine-id      0x0102030405060708
user           cis_user
auth-proto     SHA
auth-password  cisco-123
privacy-protocol AES
privacy-password cisco-123
!

```



APPENDIX A

MIBs

- [BROADHOP-MIB.mib](#), on page 31
- [BROADHOP-NOTIFICATION-MIB.mib](#), on page 37
- [Sample Alert Rule Configuration](#), on page 38

BROADHOP-MIB.mib

```
BROADHOP-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    NOTIFICATION-TYPE,
    enterprises,
    Integer32                FROM SNMPv2-SMI
    DisplayString            FROM SNMPv2-TC;

broadhop MODULE-IDENTITY
    LAST-UPDATED "201201270000Z"
    ORGANIZATION "Broadhop, Inc."
    CONTACT-INFO "Technical Support
                  Web: www.broadhop.com
                  E-mail: support@broadhop.com
                  "
    DESCRIPTION "Top Level MIB-II for BroadHop Enterprise and Common Elements"
    REVISION "201207050000Z"
    DESCRIPTION
        "Add notification clear value to broadhopNotificationSeverity
        to support extended notifications.
        "
    REVISION "201201270000Z"
    DESCRIPTION
        "Smilint validation and cleanup. Preparation for expansion.
        Break out BroadHop enterprise. Redo categories.
        "
    REVISION "200906210000Z"
    DESCRIPTION
        "Initial version of this MIB module."
    ::= { enterprises 26878 }

broadhopCommon OBJECT IDENTIFIER ::= { broadhop 100 }

broadhopProducts OBJECT IDENTIFIER ::= { broadhop 200 }
```

```

broadhopCommonNotificationsGroup OBJECT IDENTIFIER ::= { broadhopCommon 1 }

broadhopNotificationParameters OBJECT IDENTIFIER ::= { broadhopCommonNotificationsGroup 1
}

broadhopAlarmDeviceName OBJECT-TYPE
    SYNTAX DisplayString
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The broadhopAlarmDeviceName object is used to provide the
        name of the device being trapped and may represent the
        Network Element as a whole or may represent a subsystem
        contained in the Network Element.

        Please note, this value is used for trapping purposes only.
        If you try to read this value, the results are undefined
        and can not be relied upon."

    ::= { broadhopNotificationParameters 1 }

broadhopAlarmErrorNumber OBJECT-TYPE
    SYNTAX Integer32 (1..32767)
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The broadhopAlarmErrorNumber object is used to provide the
        error number associated with the problem being trapped.

        Please note, this value is used for trapping purposes only.
        If you try to read this value, the results are undefined
        and can not be relied upon."

    ::= { broadhopNotificationParameters 2 }

broadhopAlarmErrorText OBJECT-TYPE
    SYNTAX DisplayString
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The broadhopAlarmErrorText object is used to provide the
        error text associated with the problem being trapped.

        Please note, this value is used for trapping purposes only.
        If you try to read this value, the results are undefined
        and can not be relied upon."

    ::= { broadhopNotificationParameters 3 }

broadhopAlarmDateAndTime OBJECT-TYPE
    SYNTAX DisplayString
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The broadhopAlarmDateAndTime object is used to provide the
        date and time associated with the occurrence of the problem
        being trapped. Format for this field is:
        YYYY-MM-DD at HH:MM:SS GMT-Offset

        Please note, this value is used for trapping purposes only.
        If you try to read this value, the results are undefined
        and can not be relied upon."

    ::= { broadhopNotificationParameters 4 }

```



```

broadhopAlarmProbableCause OBJECT-TYPE
    SYNTAX DisplayString
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The broadhopAlarmProbableCause object is used to provide a
        cause for the problem being trapped.

        Please note, this value is used for trapping purposes only.
        If you try to read this value, the results are undefined
        and can not be relied upon."

    ::= { broadhopNotificationParameters 5 }

broadhopAlarmAdditionalInfo OBJECT-TYPE
    SYNTAX DisplayString
    MAX-ACCESS read-only
    STATUS deprecated
    DESCRIPTION
        "The broadhopAlarmAdditionalInfo object is used to provide
        any additional information about the problem being trapped
        that can be determined at run time.

        Please note, this value is used for trapping purposes only.
        If you try to read this value, the results are undefined
        and can not be relied upon."

    ::= { broadhopNotificationParameters 6 }

broadhopComponentName OBJECT-TYPE
    SYNTAX DisplayString
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The broadhopComponentName object is used to provide the
        name of the individual system device being trapped.
        Example of value from field mimics HOST-RESOURCE-MIB sysName.

        sessionmgr01

        Please note, this value is used for trapping purposes only.
        If you try to read this value, the results are undefined
        and can not be relied upon."
    ::= { broadhopNotificationParameters 7 }

broadhopComponentTime OBJECT-TYPE
    SYNTAX DisplayString
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The broadhopComponentTime object is used to provide the
        date and time associated with the occurrence of the problem
        being trapped from the system component perspective.
        Example of value from this field mimics hrSystemDate like:

        2012-2-10,13:9:41.0,-7:0

        Please note, this value is used for trapping purposes only.
        If you try to read this value, the results are undefined
        and can not be relied upon."

    ::= { broadhopNotificationParameters 8 }

```

```

broadhopComponentNotificationName OBJECT-TYPE
    SYNTAX DisplayString
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The broadhopComponentNotificatoinName object is used to provide
        the name of the notification. These names are outlined in the
        BroadHop QNS Monitoring and Alert Notification Guide.

        Please note, this value is used for trapping purposes only.
        If you try to read this value, the results are undefined
        and can not be relied upon."

    ::= { broadhopNotificationParameters 9 }

broadhopComponentAdditionalInfo OBJECT-TYPE
    SYNTAX DisplayString
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The broadhopAdditionalInfo object is used to provide
        any additional information about the problem being trapped
        that can be determined at run time.

        Please note, this value is used for trapping purposes only.
        If you try to read this value, the results are undefined
        and can not be relied upon."

    ::= { broadhopNotificationParameters 10 }

broadhopNotificationPrefix OBJECT IDENTIFIER ::= { broadhopCommonNotificationsGroup 2 }
broadhopNotifications OBJECT IDENTIFIER ::= { broadhopNotificationPrefix 0 }

broadhopCriticalAlarm NOTIFICATION-TYPE
    OBJECTS
    {
        broadhopAlarmDeviceName,
        broadhopAlarmErrorNumber,
        broadhopAlarmErrorText,
        broadhopAlarmDateAndTime,
        broadhopAlarmProbableCause,
        broadhopAlarmAdditionalInfo
    }
    STATUS deprecated
    DESCRIPTION
        "This object is used to report all Critical severity problems
        that may occur with in the system."

    ::= { broadhopNotifications 1 }

broadhopMajorAlarm NOTIFICATION-TYPE
    OBJECTS
    {
        broadhopAlarmDeviceName,
        broadhopAlarmErrorNumber,
        broadhopAlarmErrorText,
        broadhopAlarmDateAndTime,
        broadhopAlarmProbableCause,
        broadhopAlarmAdditionalInfo
    }
    STATUS deprecated
    DESCRIPTION
        "This object is used to report all Major severity problems
        that may occur with in the system."

```

```

 ::= { broadhopNotifications 2 }

broadhopMinorAlarm NOTIFICATION-TYPE
OBJECTS
{
    broadhopAlarmDeviceName,
    broadhopAlarmErrorNumber,
    broadhopAlarmErrorText,
    broadhopAlarmDateAndTime,
    broadhopAlarmProbableCause,
    broadhopAlarmAdditionalInfo
}
STATUS deprecated
DESCRIPTION
    "This object is used to report all Minor severity problems
    that may occur with in the system."

 ::= { broadhopNotifications 3 }

broadhopWarningAlarm NOTIFICATION-TYPE
OBJECTS
{
    broadhopAlarmDeviceName,
    broadhopAlarmErrorNumber,
    broadhopAlarmErrorText,
    broadhopAlarmDateAndTime,
    broadhopAlarmProbableCause,
    broadhopAlarmAdditionalInfo
}
STATUS deprecated
DESCRIPTION
    "This object is used to report all Warning severity problems
    that may occur with in the system."

 ::= { broadhopNotifications 4 }

broadhopIndeterminateAlarm NOTIFICATION-TYPE
OBJECTS
{
    broadhopAlarmDeviceName,
    broadhopAlarmErrorNumber,
    broadhopAlarmErrorText,
    broadhopAlarmDateAndTime,
    broadhopAlarmProbableCause,
    broadhopAlarmAdditionalInfo
}
STATUS deprecated
DESCRIPTION
    "This object is used to report all Indeterminate severity problems
    that may occur with in the system."

 ::= { broadhopNotifications 5 }

broadhopNormalAlarm NOTIFICATION-TYPE
OBJECTS
{
    broadhopAlarmDeviceName,
    broadhopAlarmErrorNumber,
    broadhopAlarmErrorText,
    broadhopAlarmDateAndTime,
    broadhopAlarmProbableCause,
    broadhopAlarmAdditionalInfo
}

```

```

STATUS deprecated
DESCRIPTION
    "This object is used to report all Normal severity problems
    that may occur with in the system."

 ::= { broadhopNotifications 6 }

broadhopClearAlarm NOTIFICATION-TYPE
OBJECTS
{
    broadhopAlarmDeviceName,
    broadhopAlarmErrorNumber,
    broadhopAlarmErrorText,
    broadhopAlarmDateAndTime,
    broadhopAlarmProbableCause,
    broadhopAlarmAdditionalInfo
}
STATUS deprecated
DESCRIPTION
    "This object is used to report all alarm clearing problems
    that may occur with in the system."

 ::= { broadhopNotifications 7 }

broadhopNotificationFacility OBJECT-TYPE
SYNTAX      INTEGER {
                hardware(0),
                network(1),
                virtualization(2),
                operatingsystem(3),
                application(4),
                process(5),
                none(6)
            }
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "This object determines the facility or layer which
    notifications are sourced.  Except for none, all
    facilities are sourced by size - hardware is a bigger
    size than process.  This roughly mimics the Unix
    syslog facility.  Used with severity, facility
    fully categorizes an alert notification.
    "
DEFVAL { none }
 ::= { broadhopCommonNotificationsGroup 3 }

broadhopNotificationSeverity OBJECT-TYPE
SYNTAX      INTEGER {
                emergency(0),
                alert(1),
                critical(2),
                error(3),
                warning(4),
                notice(5),
                info(6),
                debug(7),
                none(8),
                clear(9)
            }
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "This object determines the severity or level of sourced

```

```

        notifications. All severities are facilities are sourced
        by size - emergency is a worse than debug. This roughly
        mimics the Unix syslog facility. Used with facility,
        severity categorizes an alert notification.
    "
    DEFVAL { none }
    ::= { broadhopCommonNotificationsGroup 4 }

END

```

BROADHOP-NOTIFICATION-MIB.mib

```

BROADHOP-NOTIFICATION-MIB DEFINITIONS ::=BEGIN

IMPORTS
    MODULE-IDENTITY,
    NOTIFICATION-TYPE                      FROM SNMPv2-SMI
    broadhopComponentName,
    broadhopComponentTime,
    broadhopComponentNotificationName,
    broadhopComponentAdditionalInfo,
    broadhopNotificationFacility,
    broadhopNotificationSeverity          FROM BROADHOP-MIB
    broadhopProductsQNS                  FROM BROADHOP-QNS-MIB;

broadhopProductsQNSNotification MODULE-IDENTITY
    LAST-UPDATED "201202100000Z"
    ORGANIZATION "Broadhop, Inc."
    CONTACT-INFO
        "Technical Support
        Web: www.broadhop.com
        E-mail: support@broadhop.com
        "
    DESCRIPTION "Top Level MIB-II Definitions for BroadHop QNS
        Notifications and Traps
        "
    REVISION "201202100000Z"
    DESCRIPTION "Top Level MIB-II Definitions for BroadHop QNS Product"
    ::= { broadhopProductsQNS 2 }

--
-- Ensure SMIV1 and SMIV2 convertability with reverse mappability (ie.
broadhopProductQNSNotifications(0))
--
broadhopProductsQNSNotifications OBJECT IDENTIFIER ::= { broadhopProductsQNS 0 }

broadhopQNSComponentNotification NOTIFICATION-TYPE
    OBJECTS { broadhopComponentName,
        broadhopComponentTime,
        broadhopComponentNotificationName,
        broadhopNotificationFacility,
        broadhopNotificationSeverity,
        broadhopComponentAdditionalInfo }
    STATUS current
    DESCRIPTION "
        Trap from any QNS component - ie. device.
        "
    ::= { broadhopProductsQNSNotifications 1 }

broadhopQNSApplicationNotification NOTIFICATION-TYPE

```

```

OBJECTS { broadhopComponentName,
          broadhopComponentTime,
          broadhopComponentNotificationName,
          broadhopNotificationFacility,
          broadhopNotificationSeverity,
          broadhopComponentAdditionalInfo }
STATUS current
DESCRIPTION "
    Notification Trap from any QNS application - ie. runtime.
    "
 ::= { broadhopProductsQNSNotifications 2 }

END

```

Sample Alert Rule Configuration



Note The following alert rule configuration is for reference only. You should configure your alert rules as per your requirement.

```

alert rule DISK_FULL
  expression      "(round((node_filesystem_size_bytes{job='node_exporter'}-
node_filesystem_avail_bytes{job='node_exporter'})/node_filesystem_size_bytes
{job='node_exporter'}*100)) >= 70"
  event-host-label instance
  message         "Disk Filesystem/usage is more than 90%"
  snmp-facility   hardware
  snmp-severity   critical
  snmp-clear-message "Disk filesystem/usage is greater than 10%"
!

alert rule HIGH_LOAD
  expression      "node_load5 > 3"
  event-host-label instance
  message         "load average value for 5 minutes is greater than 3 current value is
{{ $value }}"
  snmp-facility   hardware
  snmp-severity   major
  snmp-clear-message "load average value for 5 minutes is lower than 3"
!

alert rule LOW_MEMORY
  expression      "round((node_memory_MemAvailable_bytes/node_memory_MemTotal_bytes)*100)
< 20"
  event-host-label instance
  message         "Available RAM is less than 80% current value is {{ $value }}"
  snmp-facility   hardware
  snmp-severity   critical
  snmp-clear-message "Available RAM is more than 80%"
!

alert rule PROCESS_STATE
  expression      "docker_service_up==3"
  event-host-label container_name
  message         "{{ $labels.service_name }} instance {{ $labels.module_instance }} of
module {{ $labels.module }} is in Aborted state"
  snmp-facility   application

```

```

    snmp-severity      critical
    snmp-clear-message "{{ $labels.service_name }} instance {{ $labels.module_instance }} of
module {{ $labels.module }} is moved from Aborted state"
!

alert rule LINK_STATE
expression            "link_state == 0"
event-host-label     instance
message              "{{ $labels.interface }} is down on {{ $labels.instance }}"
snmp-facility        hardware
snmp-severity        critical
snmp-clear-message  "{{ $labels.interface }} is up on {{ $labels.instance }}"
!

alert rule HIGH_CPU_USAGE
expression            "rate(node_cpu_seconds_total{mode=\"system\"} [10s])*100 > 40 "
event-host-label     instance
message              "CPU usage in last 10 sec is more than 30% current value {{ $value }}"
snmp-facility        hardware
snmp-severity        critical
snmp-clear-message  "CPU usage in last 10 sec is lower than 30%"
!

alert rule IP_NOT_REACHABLE
expression            "probe_icmp_target==0"
event-host-label     instance
message              "VM/VIP IP {{ $labels.instance }} is not reachable."
snmp-facility        networking
snmp-severity        critical
snmp-clear-message  "VM/VIP IP {{ $labels.instance }} is reachable"
!

alert rule DIAMETER_PEER_DOWN
expression            "peer_status==0"
event-host-label     remote_peer
message              "Diameter peer is down."
snmp-facility        application
snmp-severity        error
snmp-clear-message  "VM/Diameter peer is up."
!

alert rule DRA_PROCESS_UNHEALTHY
expression            "docker_service_up!=2"
event-host-label     container_name
message              "{{ $labels.service_name }} instance {{ $labels.module_instance }} of
module {{ $labels.module }} is not healthy"
snmp-facility        application
snmp-severity        critical
snmp-clear-message  "{{ $labels.service_name }} instance {{ $labels.module_instance }} of
module {{ $labels.module }} is healthy"
!

# REPEAT for each shard - replace shard-1 with the shard that is configured
alert rule DB_SHARD_DOWN
expression            "absent(mongodb_mongod_replset_member_state{shard_name='shard-1'})==1"
event-host-label     shard_name
message              "All DB Members of a replica set {{ $labels.shard_name }} are down"
snmp-facility        application
snmp-severity        critical
snmp-clear-message  "All DB Members of a replica set {{ $labels.shard_name }} are not down"
!

# REPEAT for each shard - replace shard-1 with the shard that is configured
alert rule NO_PRIMARY_DB

```

```

expression          "absent(mongodb_mongod_replset_member_health
{shard_name="shard-1",state="PRIMARY"})==1"
event-host-label    shard_name
message             "Primary DB member not found for replica set {{ $labels.shard_name }}"
snmp-facility       application
snmp-severity       critical
snmp-clear-message  "Primary DB member found for replica set {{ $labels.shard_name }}"
!

alert rule SECONDARY_DB_DOWN
expression          "(mongodb_mongod_replset_member_state != 2) and
((mongodb_mongod_replset_member_state==8) or (mongodb_mongod_replset_member_state==6))"
event-host-label    shard_name
message             "Secondary Member {{ $labels.name }} of replica set {{ $labels.shard_name
}} is down"
snmp-facility       application
snmp-severity       critical
snmp-clear-message  "Secondary Member {{ $labels.name }} of replica set {{ $labels.shard_name
}} is up"
!

alert rule DOCKER_ENGINE_DOWN
expression          "docker_engine_up!=2"
event-host-label    engine_id
message             "Docker Engine {{ $labels.engine_id }} is down."
snmp-facility       application
snmp-severity       critical
snmp-clear-message  "Docker Engine {{ $labels.engine_id }} is up.
!"

alert rule SVN_BACKUP_ALERT
expression          "svn_alert==1"
event-host-label    "instance"
message             "svn backup in mongo is out of sync, please check svn_audit.log"
snmp-severity       alert
snmp-clear-message  "svn backup in mongo is in sync now"
!
```