

Smart Monitoring and Alerting

18 August 2023

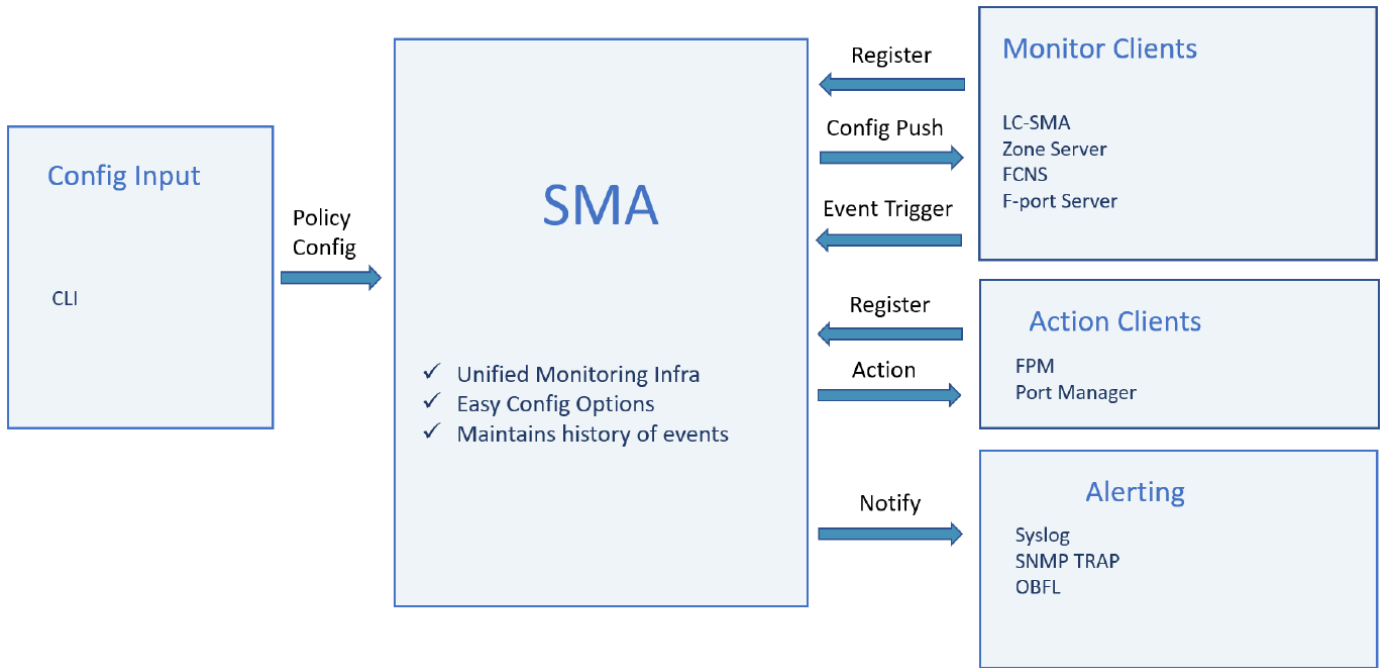
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Smart Monitoring and Alerting (SMA) is a beta feature that helps monitor and detect important events or conditions in real-time. SMA provides notifications and help perform the required actions.

Benefits

Benefit	Description
Unified Monitoring	<ul style="list-style-type: none">• Single feature that enables monitoring of all aspects of the switch.
Timely Detection	<ul style="list-style-type: none">• Real time continuous monitoring of data streams and system attributes for errors and anomalies in counters.• Only port counters and protocol counters are monitored for unexpected patterns.
Proactive Notification	<ul style="list-style-type: none">• Notifications or alerts are sent by SMA whenever an event of interest is detected.• Alerts such as snmp-notification, system logs or OBFL logs.
Ease of Configuration	<ul style="list-style-type: none">• Easy to configure the SMA feature by using the building blocks such as the default policy or entity groups.
Maintain System Health	<ul style="list-style-type: none">• SMA helps in maintainin the system health by constantly monitoring the switch that enable in timely actions
History of Events	<ul style="list-style-type: none">• SMA maintains a history of events and aims to provide an overall system health report.
Customization of priorities and thresholds	<ul style="list-style-type: none">• SMA provides flexibility to set custom thresholds, priorities or conditions based on specific requirements.• Define thresholds based on understanding of the system,• Enables tailored monitoring and alerting such as configuring the monitoring for per port.



Architecture

The following image describes the architecture of SMA.

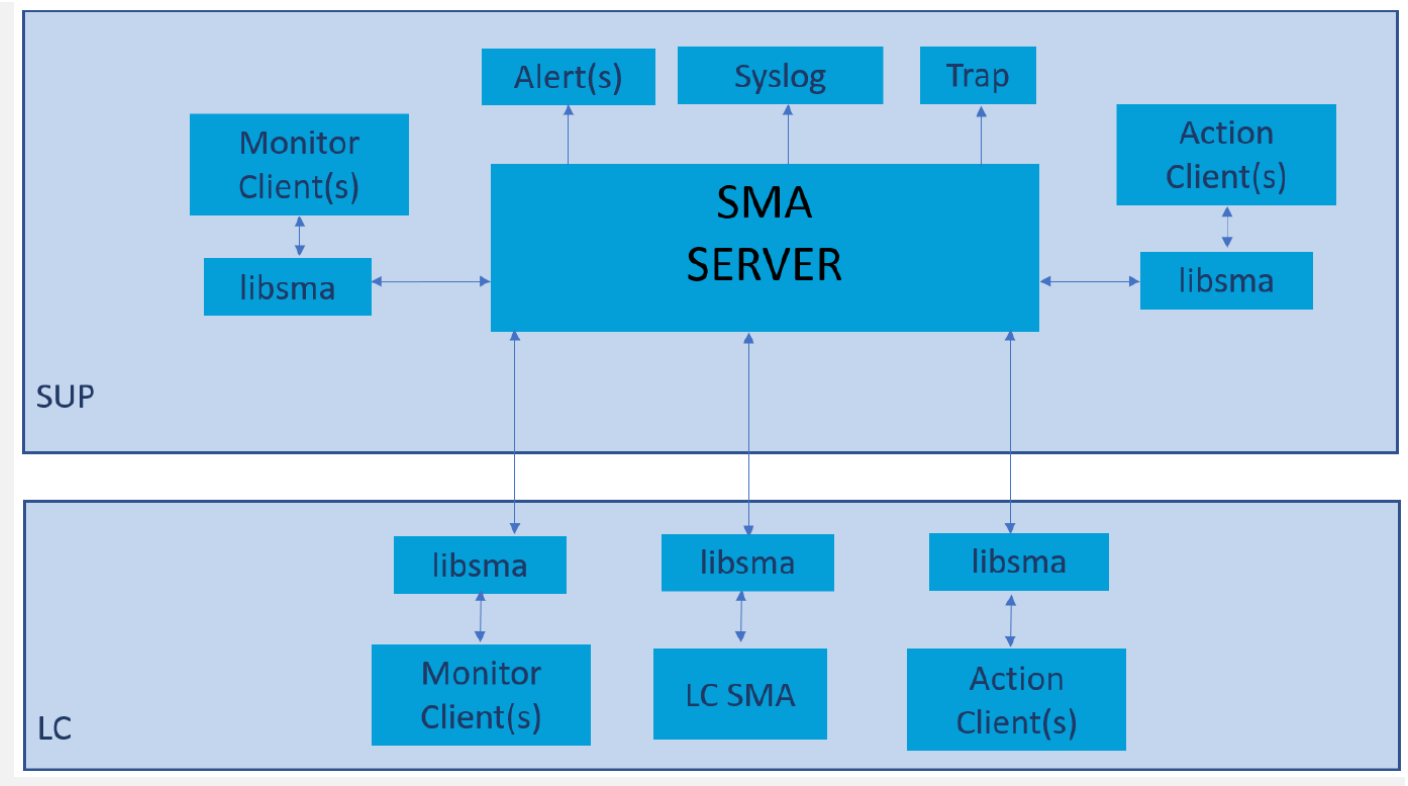


Figure 1.
SMA Architecture

Prerequisites

Table 1. Building blocks of SMA

Building Block	Description	Additional Information
Policy	Two types of policy are available. <ul style="list-style-type: none"> • Default policy • User-defined policy 	Cloning of a policy is supported. Only one user-defined policy can exist at a time
Entity-Type	Two types of entities are supported <ul style="list-style-type: none"> • Switch • FC-port 	
Entity-group	Group of entity-type and filters, which are optional, form an entity group. Entity groups have priority based on the placement of the entity-group in the policy. When the same counter for certain entities is present in multiple entity-groups, then the configuration from the highest priority entity-group is applied. For an entity-type, the entity-groups at the top of policy have the highest priority with the priority decreasing we progress down the policy.	Pre-defined entity-groups are available. Custom entity-groups can be created.
Monitor-level	Defines the threshold values, sampling period for various threshold levels, warning, alarm and falling.	Each counter has a default monitor-level Custom monitor levels are accepted.
Action-group	Defines action and alerts for various threshold levels. An action-group is associated with a counter of the counter-group. A created action-group is re-used by the relevant counters or counter-groups multiple times in the same policy or across policies.	Pre-defined action-groups are available Custom action-groups can be created.
Counter-group	Defines a common behaviour for a set of counters.	Pre-defined counter-groups are available Custom counter-groups can not be created.

Supported Hardware and Software

Hardware

- Cisco MDS 9700 48-Port 64-Gbps Fibre Channel Switches
- Cisco MDS 9700 48-Port 32-Gbps Fibre Channel Switches
- Cisco MDS 9396T 32-Gbps 96-Port Fibre Channel Switches
- Cisco MDS 9132T 32-Gbps 32-Port Fibre Channel Switches

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- Cisco MDS 9148T 32-Gbps 48-Port Fibre Channel Switches
 - Cisco MDS 9124V 64-Gbps 24-Port Fibre Channel Switches
 - Cisco MDS 9148V 64-Gbps 48-Port Fibre Channel Switches
 - Cisco MDS 9396V 64-Gbps 96-Port Fibre Channel Switches
 - Cisco MDS 9220i
 - Cisco MDS 9000 24/10-Port SAN Extension Module for Cisco MDS 9700 Series Multilayer Directors

Software

Cisco MDS 9000 NX-OS Release 9.4(1)

Guidelines and Restrictions

- SMA active policy and PMON active policy cannot co-exists.
- SMA is not supported in NPV mode
- ISSU/D and high availability is not supported.
- Editing of active user-defined policy is not supported
- Implicit deactivation of a policy is not supported.
- Migration from PMON to SMA not supported.
- SMA to handle all alerts instead of LCSMA
- The global recovery-interval configuration is not supported.
 - The interval for DURL is 60 seconds
 - The interval for congestion Isolation and congestion isolation recovery is 900 seconds
- FPM and FSM events are not displayed in SMA as FSM events and reason codes are available in PMON as the codes are reused.

Configuring SMA

Enabling SMA

1. Enter configuration mode: switch# **configure terminal**
2. Enable SMA switch(config)# **no debug sma disable**

Note: SMA is disabled by default.

Disabling SMA

1. Enter configuration mode:
switch# **configure terminal**
2. Disable SMA
switch(config)# **debug sma disable**

Creating or deleting entity group

1. Enter configuration mode: switch# **configure terminal**

2. Create an entity-group for using in the SMA policy.
switch(config)# **[no] sma entity-group name <entity-group-name>**

3. Add the entity-type to the entity-group.
switch(config-sma-entity-group)# **[no] entity-type fc-port {all | core | edge | interface}**
switch(config-sma-entity-group)# **[no] entity-type switch {all | core | edge | interface}**

Note: The following conditions are applicable:

- More than one filter can be added to the entity-type.
- Entity-type or sub-entity cannot be added or deleted when the entity-group is present in an active policy.
- The last filter cannot be deleted when the entity-group is part of an inactive policy.

Creating or deleting Action-group

1. Enter configuration mode: switch# configure terminal
2. Create an action-group for using in the SMA policy.
switch(config)# **[no] sma action-group name <action-group-name> counter-group {cg-all | cg-congestion | cg-datarate | cg-fcport-all | cg-link-integrity | cg-protocol-all | cg-slowdrain }**
switch(config)# **[no] sma action-group name <action-group-name> counter {cg-all | cg-congestion | cg-datarate | cg-fcport-all | cg-link-integrity | cg-protocol-all | cg-slowdrain }**

Adding or deleting actions to action-group

1. Enter configuration mode:
switch# **configure terminal**
2. Create an action-group to add actions to an action-group.
switch(config)# **[no] sma action-group name <action-group-name> counter-group {cg-all | cg-congestion | cg-datarate | cg-fcport-all | cg-link-integrity | cg-protocol-all | cg-slowdrain }**
3. Add the counter or counter-group specific actions and/or alerts to any of the threshold levels of an action-group.
switch(config-sma-entity-group)# **[no] threshold-level {alarm | warning | falling} {actions <action-name> | alerts}**

Note: The following conditions are applicable:

- Only one action and/or one or more alerts for each threshold-level in an action-group.
- For all counters, alarm threshold-level is mandatory and for many counters falling threshold-level is mandatory.
- Actions and alerts are editable if the action-group is part of an inactive policy.
- Actions and alerts are not editable if the action-group is part of an active policy.

Configuring the SMA Policy

1. Enter configuration mode:
switch# **configure terminal**

-
2. Configure the policy.
switch(config)# **[no] sma policy name <policy_name>**
 3. Configure the entity-group
switch(config)# **[no] entity-group name <entity-group-name> [{before|after} name <ref-entity-group-name>]**
 4. Configure the counter-group containing the monitor-levels, intervals and action groups.
switch(config)# **[no] {counter <counter-name>|counter-group <countergrp-name>} monitor-level {default| period <period> alarm <alarm-threshold> [warning <warn-threshold>] falling <fall-threshold>} action-group {ag-default|ag-none|<action-group-name>}**

Creating or deleting a user defined SMA Policy

1. Enter configuration mode:
switch# **configure terminal**
2. Create a user defined policy.
switch(config)# **[no] sma policy name <policy_name>**

Note: When the no form of the command is used, all the configuration details are to be provided.

Cloning or copying a user defined SMA Policy

1. Enter configuration mode:
switch# **configure terminal**
2. Copy a user defined SMA policy.
switch(config)# **sma policy name copy default <policy_name>**

Note: Ensure that the policy to be copied does not exist before copying.

Activating or deactivating SMA Policy

1. Enter configuration mode:
switch# **configure terminal**
2. Activate or deactivate SMA policy.
switch(config)# **[no] sma policy activate name {default | <policy_name>}**

Note: The following conditions are applicable:

- No active policy must exist in order to activate a policy.
- When the no form of the command is used, all the configuration details are to be provided.
- Policy must be active for the policy to be deactivated.

Verification

Viewing the Active Policy

Displays the active policy.

```
switch(config)# show sma policy active
```

View a policy with a given name

Displays the policy with the given name.

switch(config)# **show sma policy name <policy-name>**

View a action-group with a given name

Displays the action-group with the given name.

switch(config)# **show sma action-group name <action-group-name>**

View default and user-defined action-group

Displays the action-group of class as system or user. Class system refers to system-defined and user refers to user-defined.

switch(config)# **show sma action-group class {system | user }**

View an entity-group with a given name

Displays the entity-group with the given name.

switch(config)# **show sma entity-group name <entity-group-name>**

View the SMA History

Displays the SMA history. 1MB of memory is reserved for history and contains an average of 11,000 entries of threshold events.

switch(config)# **show sma history**

Examples

SMA default policy

```
sma policy name default
  entity-group name eg-switch
    counter-group cg-protocol-all monitor-level default action-group ag-default
  entity-group name eg-fcport-edge
    counter credit-loss-recovery monitor-level default action-group ag-error-disable
  entity-group name eg-fcport-all
    counter-group cg-fcport-all monitor-level default action-group ag-default
```

SMA custom policy

```
sma entity-group name eg-interface-range
  entity-type fc-port interface fc1/1-10,fc1/13-20
sma policy name custom
  entity-group name eg-switch
    counter-group cg-protocol-all monitor-level default action-group ag-default
  entity-group name eg-interface-range
    counter tx-wait monitor-level default action-group ag-fpin-congestion
    counter-group cg-link-integrity monitor-level default action-group ag-fpin-link-
    integrity
  entity-group name eg-fcport-edge
    counter credit-loss-recovery monitor-level default action-group ag-error-disable
```

```
entity-group name eg-fcport-all
```

```
counter-group cg-fcport-all monitor-level default action-group ag-default
```

Creating an entity-group for fc-port with filters edge and interface range

```
switch(config)# sma entity-group name egl
```

```
switch(config)# entity-type fc-port edge
```

```
switch(config-sma-entity-group)# entity-type fc-port interface fc1/1-20
```

Support

Contact Cisco Support to provide feedback or if you require additional support.

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