



SNMP Support in Avi Vantage

Avi Technical Reference (v17.1)

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Avi Vantage supports SNMP v2c. The MIB file name is AVI-NETWORKS-MIB.my and is available for download at the following location: <https://github.com/avinetworks/sdk/tree/master/mibs>

The MIB file contains a description of the Avi Vantage SNMP configuration objects and notifications.

This article shows the MIB definitions for the Avi Vantage objects and the definitions for the notifications (traps). An example of how to configure a [custom alert based on an SNMP notification](#) also is provided.

Responding to SNMP Queries

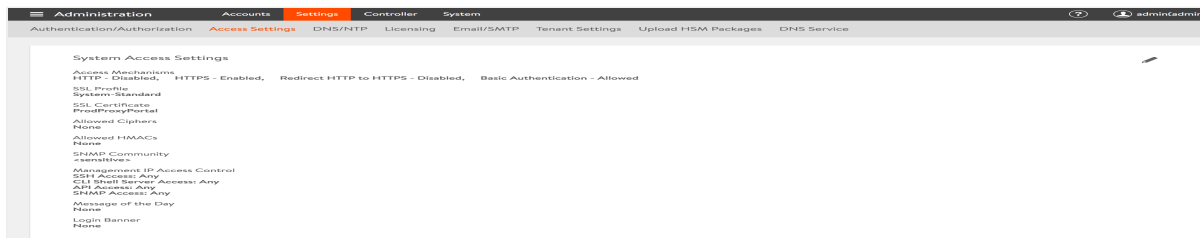
To fetch SNMP objects from Avi Vantage, an external host needs to query the SNMP daemon, which only runs on the Controller cluster leader. It is therefore best to configure the external host to direct queries to the cluster IP of the Avi Controller cluster. Absent a cluster IP, the external host must know the IP addresses of *each* Controller, and try as many as three times before it finds the current leader’s SNMP daemon.

Firewall rules should be configured to give that external host access to port 161 on the cluster IP or each of the Controller IPs.

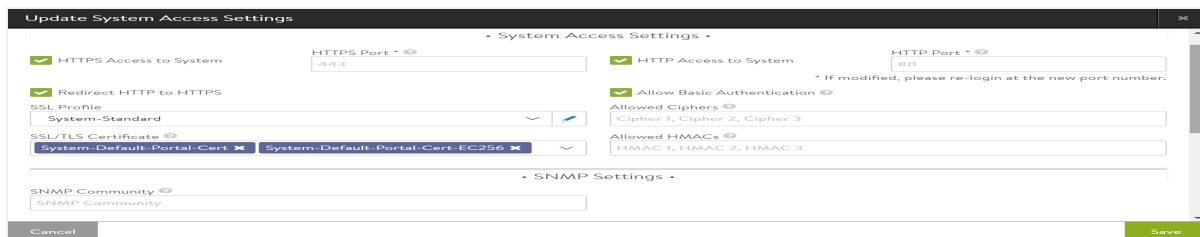
During the brief period of time (1-4 minutes) that a Controller cluster is recovering from the failure of its leader, queries to the cluster IP will fail, which the external host may interpret as "Vantage is down." That is only true in the narrow sense that the control plane is down; the data plane (i.e., the SEs) are likely up and delivering virtual services to clients.

SNMP Polling Configuration

To configure the community string for SNMP polling, log into the UI and navigate to Administration > Settings > Access Settings.



Click on the edit icon. Enter the relevant community string under SNMP Community in the SNMP Settings section.



SNMP System Configuration

You can configure the common system parameters - sysName, sysLocation and sysContact in the Avi Vantage Platform. In a Controller Cluster, sysName is configured for each controller node as node name in the Cluster object. sysLocation and sysContact are specified in SystemConfiguration object.

API to configure the SNMP system parameters

```
PUT api/systemconfiguration
{
  "email_configuration": {
    "mail_server_name": "localhost",
    "mail_server_port": 25,
    "smtp_type": "SMTP_LOCAL_HOST",
    "from_email": "admin@avicontroller.net"
  },
  "global_tenant_config": {
    "se_in_provider_context": true,
    "tenant_access_to_provider_se": true,
    "tenant_vrf": false
  },
  "uuid": "default",
  "dns_configuration": {
    "search_domain": ""
  },
  "url": "https://localhost/api/systemconfiguration",
  "tech_support_uploader_configuration": {
    "auto_upload": false
  },
  "docker_mode": false,
  "snmp_configuration": {
    "sys_contact": "support@avinetworks.com",
    "sys_location": "San Jose, CA"
  },
  "portal_configuration": {
    "use_uuid_from_input": false,
    "redirect_to_https": true,
    "sslprofile_ref": "https://localhost/api/sslprofile/sslprofile-788831a0-1ef6-4a65-b0e3-e55c26796e1b",
    "disable_remote_cli_shell": false,
    "enable_clickjacking_protection": true,
    "enable_https": true,
    "sslkeyandcertificate_refs": [
      "https://localhost/api/sslkeyandcertificate/sslkeyandcertificate-cd610fa3-71b5-4c42-b6bd-b6697dda9933",
      "https://localhost/api/sslkeyandcertificate/sslkeyandcertificate-705d3ebd-0a26-447b-84ea-b876508a5319"
    ],
    "password_strength_check": true,
    "enable_http": true,
    "allow_basic_authentication": false
  },
  "ntp_configuration": {
```

```
"ntp_server_list": [
  {
    "type": "DNS",
    "addr": "0.us.pool.ntp.org"
  },
  {
    "type": "DNS",
    "addr": "1.us.pool.ntp.org"
  },
  {
    "type": "DNS",
    "addr": "2.us.pool.ntp.org"
  },
  {
    "type": "DNS",
    "addr": "3.us.pool.ntp.org"
  }
]
},
}

PUT api/cluster
{
  "nodes": [
    {
      "ip": {
        "type": "V4",
        "addr": "10.10.25.44"
      },
      "vm_hostname": "node1.controller.local",
      "vm_uuid": "005056b09a67",
      "name": "node1",
      "vm_mor": "vm-102996"
    },
    {
      "ip": {
        "type": "V4",
        "addr": "10.10.25.45"
      },
      "name": "node2",
    },
    {
      "ip": {
        "type": "V4",
        "addr": "10.10.25.46"
      },
      "name": "node3",
    }
  ],
  "uuid": "cluster-005056b09a67",
  "name": "cluster-0-1"
}
```

```
}

```

CLI to configure the SNMP system parameters

```
[admin:node1]: > configure systemconfiguration
[admin:node1]: systemconfiguration> snmp_configuration
[admin:node1]: systemconfiguration:snmp_configuration> sys_location "San Jose, CA"
[admin:node1]: systemconfiguration:snmp_configuration> sys_contact support@avinetworks.com
[admin:node1]: systemconfiguration:snmp_configuration> exit
[admin:node1]: systemconfiguration> exit

+-----+-----+
| Field                               | Value                               |
+-----+-----+
| uuid                                 | default                             |
| dns_configuration                    |                                     |
|   search_domain                      |                                     |
| ntp_configuration                    |                                     |
|   ntp_server_list[1]                 | 0.us.pool.ntp.org                  |
|   ntp_server_list[2]                 | 1.us.pool.ntp.org                  |
|   ntp_server_list[3]                 | 2.us.pool.ntp.org                  |
|   ntp_server_list[4]                 | 3.us.pool.ntp.org                  |
| tech_support_uploader_configuration |                                     |
|   auto_upload                        | False                              |
| portal_configuration                 |                                     |
|   enable_https                       | True                               |
|   redirect_to_https                  | True                               |
|   enable_http                        | True                               |
|   sslkeyandcertificate_refs[1]       | System-Default-Portal-Cert        |
|   sslkeyandcertificate_refs[2]       | System-Default-Portal-Cert-EC256  |
|   use_uuid_from_input                | False                              |
|   sslprofile_ref                     | System-Standard                    |
|   enable_clickjacking_protection     | True                               |
|   allow_basic_authentication         | False                              |
|   password_strength_check            | True                               |
|   disable_remote_cli_shell           | False                              |
| global_tenant_config                 |                                     |
|   tenant_vrf                         | False                              |
|   se_in_provider_context              | True                               |
|   tenant_access_to_provider_se       | True                               |
| email_configuration                  |                                     |
|   smtp_type                          | SMTP_LOCAL_HOST                    |
|   from_email                         | admin@avicontroller.net           |
|   mail_server_name                   | localhost                          |
|   mail_server_port                   | 25                                  |
| docker_mode                          | False                              |
| snmp_configuration                   |                                     |
|   sys_location                       | San Jose, CA                      |
|   sys_contact                        | support@avinetworks.com           |
+-----+-----+

[admin:node1]: > configure cluster
```

```

[admin:node1]: cluster> nodes name node2 ip 10.10.25.45
[admin:node1]: cluster:nodes> exit
[admin:node1]: cluster> nodes name node3 ip 10.10.25.46
[admin:node1]: cluster:nodes> exit
[admin:node1]: cluster> exit
+-----+-----+
| Field      | Value      |
+-----+-----+
| uuid       | cluster-005056b09a67 |
| name       | cluster-0-1 |
| nodes[1]   |             |
|   name     | node1      |
|   ip       | 10.10.25.44 |
|   vm_uuid  | 005056b09a67 |
|   vm_mor   | vm-102996  |
|   vm_hostname | node1.controller.local |
| nodes[2]   |             |
|   name     | node2      |
|   ip       | 10.10.25.45 |
|   vm_uuid  | 005056b0c4c4 |
|   vm_mor   | vm-102995  |
|   vm_hostname | node3.controller.local |
| nodes[3]   |             |
|   name     | node3      |
|   ip       | 10.10.25.46 |
|   vm_uuid  | 005056b0cd6a |
|   vm_mor   | vm-102997  |
|   vm_hostname | node2.controller.local |
+-----+-----+

```

MIB Objects

The following are the Avi Vantage configuration objects exposed through the AVI-NETWORKS-MIB.my:

- Avi Controller
- Service Engine
- Virtual Service

Avi Controller

```

AviControllerEntry ::=
    SEQUENCE {
        aviControllerIndex      Integer32,
        aviControllerUUID       SnmpAdminString,
        aviControllerName       DisplayString,
        aviControllerAddrType   InetAddressType,
        aviControllerAddr       InetAddress,
        aviControllerStatus     INTEGER
    }
aviControllerUUID          : Unique UUID of the Avi Controller VM

```

```

aviControllerName      : Name assigned to the Avi Controller (defaults
                        to the IP address of the Avi Controller)
aviControllerAddr     : Management v4 IP address of the Avi
                        Controller
aviControllerStatus   : Runtime status of the Avi Controller

```

Service Engine

```

AviServiceEngineEntry ::=
    SEQUENCE {
        aviServiceEngineIndex      Integer32,
        aviServiceEngineUUID       SnmpAdminString,
        aviServiceEngineName       DisplayString,
        aviServiceEngineAddrType   InetAddressType,
        aviServiceEngineAddr       InetAddress,
        aviServiceEngineStatus     INTEGER
    }
aviServiceEngineUUID   : Unique UUID of the Avi Service Engine VM
aviServiceEngineName   : Name of the Service Engine VM
                        assigned in the Virtual Infrastructure
aviServiceEngineAddr   : Management v4 IP address of the Avi Service
                        Engine VM
aviServiceEngineStatus : Runtime status of the Avi Service Engine

```

Virtual Service

```

AviVirtualServiceEntry ::=
    SEQUENCE {
        aviVirtualServiceIndex      Integer32,
        aviVirtualServiceUUID       SnmpAdminString,
        aviVirtualServiceName       DisplayString,
        aviVirtualServiceAddrType   InetAddressType,
        aviVirtualServiceAddr       InetAddress,
        aviVirtualServiceStatus     INTEGER
    }
aviVirtualService UUID : Unique UUID of the virtual service
aviVirtualServiceName  : Name assigned to the virtual service
aviVirtualServiceAddr  : Virtual IP (v4) address of the virtual service
aviVirtualServiceStatus : Runtime status of the virtual service

```

Notifications (traps)

The Controller cluster leader can issue SNMP trap notifications based on system events. For SNMP trap notifications to reach an external SNMP server:

- Since the leadership role can change from time to time, the external SNMP server should be configured to allow traffic from any one of the three Controllers in the cluster, i.e., all three addresses should be in the SNMP server's allowed-access list.

- The firewall rules should be configured to allow UDP traffic destined to port 162 on the SNMP trap server from any of the three cluster member's IP addresses.

System events related to the Avi Controller cluster, Avi Service Engines, virtual services and SSL certification expiry can be classified into their respective SNMP traps. Other system events use the generic SNMP trap notification to generate traps.

Only the alerts generated for the following events are fed into the specific SNMP traps.

Events	SNMP trap
VS_DOWN, VS_UP	aviVirtualServiceStatusChanged
SE_DOWN, SE_UP	aviServiceEngineStatusChanged
CONTROLLER_NODE_JOINED, CONTROLLER_NODE_LEFT	aviControllerStatusChanged
SSL_CERT_EXPIRE	aviSSLCertificateExpired
All other alerts	aviSystemAlert

Note: aviSystemAlert is a generic trap notification and can be associated with any of the system events generated by the Avi Controller.

aviControllerStatusChanged

```
aviControllerStatusChanged NOTIFICATION-TYPE
  OBJECTS {
    aviControllerStatus,
    aviOperStatusReason
  }
  STATUS      current
  DESCRIPTION
  "This alert is generated when controller status
  Changes."
  ::= { aviNotificationsObjects 1 }
```

This trap is generated when the Avi Controller status changes.

The following Controller-state-change system events can initiate the aviControllerStatusChange trap:

- Controller-Node-Left
- Controller-Node-Joined

For each of the above Avi Controller status-change events, there is a default system alert configuration and for it a default alert action.

aviServiceEngineStatusChanged

```
aviServiceEngineStatusChanged NOTIFICATION-TYPE
  OBJECTS {
    aviObjectURL,
    aviServiceEngineStatus,
    aviOperStatusReason
  }
```



```

STATUS      current
DESCRIPTION
"This alert is generated when Service Engine status
Changes."
::= { aviNotificationsObjects 2 }

```

This trap is generated when the Avi SE status changes.

The following Avi SE status-change events can initiate the aviServiceEngineStatusChanged trap:

- Se-Up
- Se-Down

For each of the above Avi SE status-change events, there is a default system alert configuration.

aviVirtualServiceStatusChanged

```

aviVirtualServiceStatusChanged NOTIFICATION-TYPE
OBJECTS {
  aviObjectURL,
  aviVirtualServiceStatus,
  aviVirtualServiceStatusReason
}
STATUS      current
DESCRIPTION
"This alert is generated when virtual service status
changes."
::= { aviNotificationsObjects 3 }

```

This trap is generated when the virtual service status changes.

The following virtual service status-change events can initiate the aviVirtualServiceStatusChanged trap:

- Vs-Down
- Vs-Up

To configure SNMP traps for the Avi Controller status-change events, [click here](#).

aviSSLCertificateExpired

```

aviSSLCertificateExpired NOTIFICATION-TYPE
OBJECTS {
  aviObjectURL,
  aviSSLCertificateInfo
}
STATUS      current
DESCRIPTION
"This alert is generated when SSL Certificate
Expires."
::= { aviNotificationsObjects 4 }

```

This trap is generated when an SSL certificate expires. The virtual service `Ssl-Cert-Expire` event can initiate the `aviVirtualServiceStatusChanged` trap.

To configure SNMP traps for the Avi Controller status-change events, [click here](#).

aviSystemAlert

```
aviSystemAlert NOTIFICATION-TYPE
  OBJECTS {
    aviSystemAlertInfoDesc
  }
  STATUS      current
  DESCRIPTION
    "This is a generic system alert"
    ::= { aviNotificationsObjects 5 }
```

This is a generic trap notification. It can be associated with any of the system events generated by the Avi Controller.

Configuration for SNMP Event-based Trap

This section shows the configuration for generating an SNMP trap when a Vs-Down event occurs. The workflow is described here, and also shown here:



In the following example from the Avi Controller web interface, the Vs-Down event is shown associated with a new alert action named "my-SNMP-alert-action." The default alert action System-Alert-Level-High could be modified instead. However, it is best practice to leave the system default alert action unchanged, and instead create a new, custom alert action.

Name	Alert Action	Type	Alert Group	Enabled
Vca-Image-Upload-Failure	System-Alert-Level-High	Real Time	Event Logs	True
Vcenter-Bad-Credentials	System-Alert-Level-High	Real Time	Event Logs	True
Vs-Down	my-SNMP-alert-action	Real Time	Event Logs	True

In the Alert Configuration editor, the alert action is configured:



Edit Alert Configuration: Vs-Down

my-SNMP-alert-action

Alert Expiry Time: 86400 sec

Throttle Alert: 0 sec

Description

Rules

Source: **EVENT** METRIC

Object: Virtual Service Service Engine Pool

Instance: None

Number of Occurrences: 1

Rolling Window

Event Occurs: VS Down

Event Does Not Occur: Select an Event

In the Alert Action editor, the named action is associated with just *one* type of notification, an SNMP trap. The notification is given the name ?my-SNMP-trap-notification.?

New Alert Action: my-SNMP-alert-action

• General Information •

Name

The screenshot shows a configuration form for an alert action. At the top, there is a text input field containing 'my-SNMP-alert-action'. Below this are two unchecked checkboxes: 'Only Generate External Alerts' and 'AutoScale Trigger'. The 'Alert Level' is set to 'Low' in a dropdown menu. The 'Email' field is set to 'Select Email Notification', 'Syslog' to 'Select Syslog Notification', and 'SNMP Trap' to 'my-SNMP-trap-notification'. The 'ControlScript' field is set to 'Select ControlScript Profile'. At the bottom, there are 'Cancel' and 'Save' buttons.

The named notification is defined in the notification editor.

Note: Multiple SNMP servers are supported. (Click on the green + box to add.)

The screenshot shows the 'New SNMP Trap Notifications' editor for a notification named 'my-SNMP-trap-notification'. The 'Name' field contains 'my-SNMP-trap-notification'. Below, there is a section for 'SNMP Trap Servers' with two input fields: 'Trap Server IP Address' (containing '10.1.1.1') and 'SNMP Community' (containing 'public'). A green '+' button is next to the community field. At the bottom, there are 'Cancel' and 'Save' buttons.

To confirm that the SNMP trap notification is defined:

The screenshot shows the main configuration page with the 'Notifications' tab selected. The page title is 'SNMP Trap Notifications' with a '+ Create' button. Below the title, there are tabs for 'Syslog', 'Email', and 'SNMP Trap'. A 'Delete' button is visible on the left, and a search box is on the right. The text 'Displaying 2 of 2 item(s)' is shown at the bottom left.



Name	Server
<input type="checkbox"/> my_snmp	RO: 10.130.1.1
<input type="checkbox"/> my-SNMP-trap-notification	public: 10.1.1.1

Alternate Download Location for MIBs

- [AVI-NETWORKS-MIB.my](#)
- [INET-ADDRESS-MIB.my](#)
- [SNMP-FRAMEWORK-MIB](#)
- [SNMP-VIEW-BASED-ACM-MIB](#)
- [SNMPv2-CONF.my](#)
- [SNMPv2-SMI.my](#)
- [SNMPv2-TC.my](#)