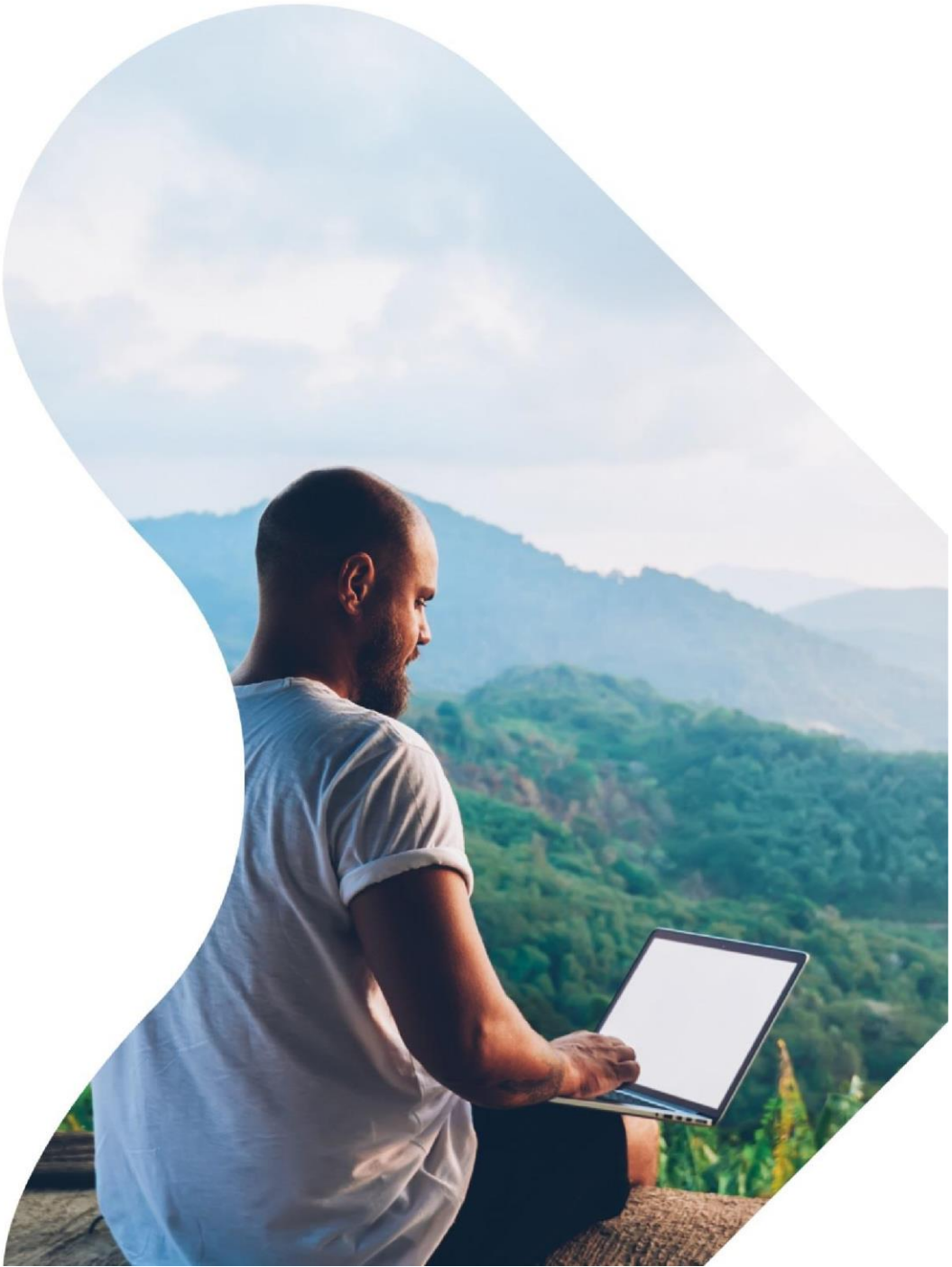
Configuration of SNMP Traps



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Revision History

Version	Description	Name	Function	Date
1.1	SNMP Trap Mechanism	Ami Shah	Associate Manager	08/08/2022

1. SNMP Introduction

The first thing you might be asking is “What is SNMP?”

SNMP stands for Simple Network Management Protocol. SNMP is an application layer protocol that uses UDP port number 161/162. SNMP is used to monitor the network, detect network faults, and sometimes even used to configure remote devices.

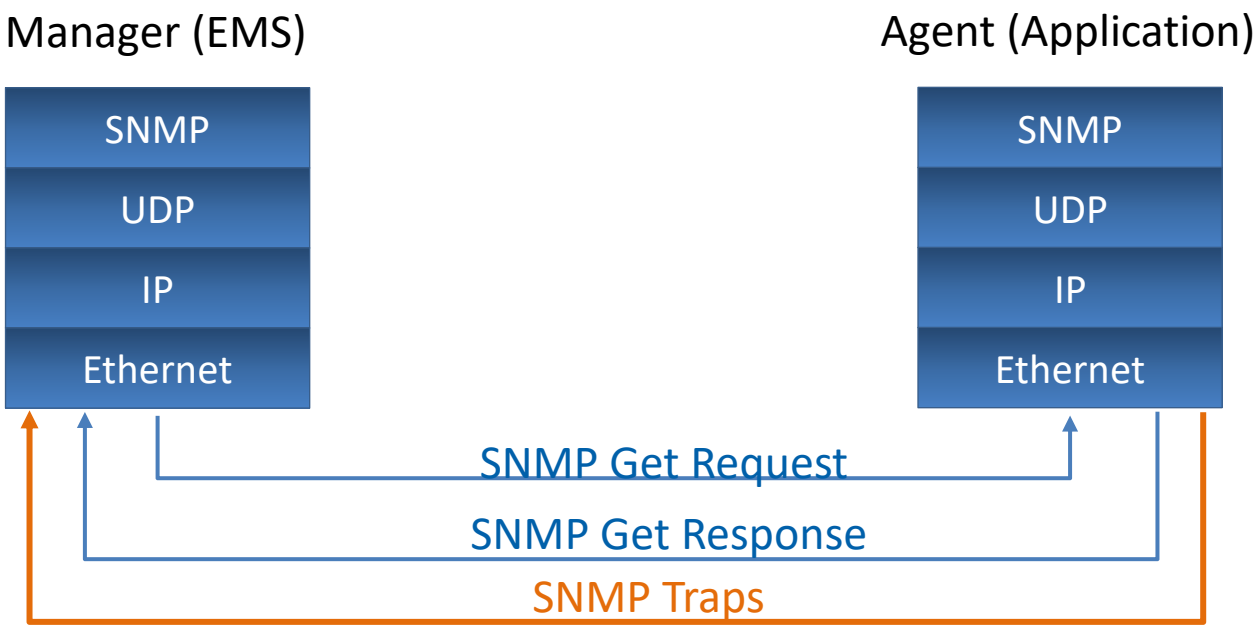
There are three parts of SNMP allowing it to function:

1) **SNMP Manager**
   It is a centralized system used to monitor network. It is also known as Network Management Station (NMS)

2) **SNMP Agent**
   It is a software management software module installed on a managed device. Managed devices can be network devices like PC, routers, switches, servers, etc.

3) **Management Information Base (MIB)**
   MIB consists of information on resources that are to be managed. This information is organized hierarchically. It consists of objects instances which are essentially variables.

Protocol Stack of SNMP



Variables of SNMP Messages

1) GetRequest
   SNMP manager sends this message to request data from the SNMP agent. It is simply used to retrieve data from SNMP agents. In response to this, the SNMP agent responds with the requested value through a response message.

2) GetNextRequest
   This message can be sent to discover what data is available on an SNMP agent. The SNMP manager can request data continuously until no more data is left. In this way, the SNMP manager can take knowledge of all the available data on SNMP agents.

3) GetBulkRequest
   This message is used to retrieve large data at once by the SNMP manager from the SNMP agent. It is introduced in SNMPv2c.

4) SetRequest
   It is used by the SNMP manager to set the value of an object instance on the SNMP agent.

5) Response
   It is a message sent from the agent upon a request from the manager. When sent in response to Get messages, it will contain the data requested. When sent in response to the Set message, it will contain the newly set value as confirmation that the value has been set.

6) Trap
   These are the message sent by the agent without being requested by the manager. It is sent when a fault has occurred.

7) InformRequest
   It was introduced in SNMPv2c, used to identify if the trap message has been received by the manager or not. The agents can be configured to send trap message continuously until it receives an Inform message. It is the same as a trap but adds an acknowledgement that the trap doesn't provide.

Version of SNMP

There are 3 versions of SNMP:

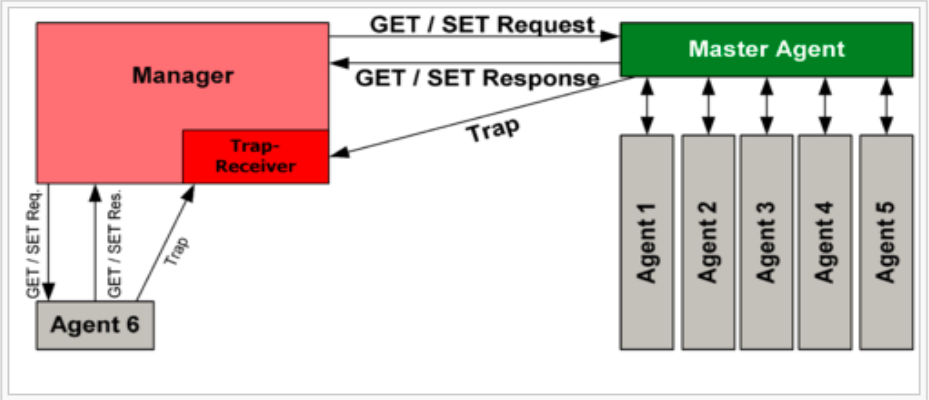
1) SNMPv1
   It uses community strings for authentication and uses UDP only.

2) SNMPv2c
   It uses community strings for authentication. It uses UDP but can be configured to use TCP.

3) SNMPv3
   It uses Hash-based MAC with MD5 or SHA for authentication and DES-56 for privacy. This version uses TCP. Therefore, the conclusion is the higher the version of SNMP, the more secure it will be.

2. SNMP Traps

An SNMP trap is any event generated and sent by the SNMP agent in a device and received by a network management system (NMS) whenever a change of state or anomaly is detected. These event messages generated by devices are received by an NMS like Site24x7, which is the trap receiver. Traps are generated instantaneously and are raw messages which an NMS has to process for network admins to understand easily.



An SNMP trap port is the port at which the manager receives the traps. This port is typically set as port number 162. However, you can change this port if necessary, and it may also differ depending on the SNMP manager you're using.

One of the complicated things about SNMP traps is they're not always effective at alerting you when major errors have occurred. For example, sometimes the device agent will send out an SNMP trap for a minor issue and miss a major problem capable of bringing your entire network down. For instance, if the device experiences a fatal issue shutting down the entire device, the SNMP agent can no longer work either (and no SNMP trap will be sent out).

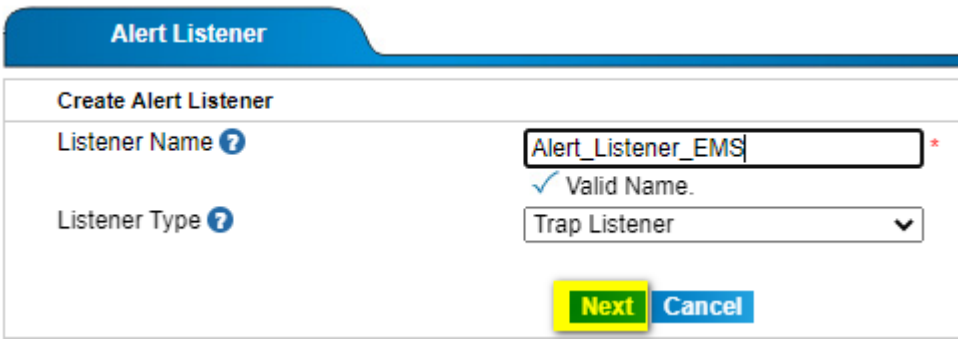
SNMP traps are sent out in a particular format, showing a time, an identifier, and a value. The time shows when the error occurred. The identifier is from the MIB and is called an "OID," also known as an Object Identifier. The OID represents an element of the device being monitored, such as temperature, CPU function, or memory (or even whether the printer ink is running low). These OIDs can help you to pinpoint the problem. This information is critical when you're monitoring a large network where a single device failure can cause a cascade of issues.

3. SNMP Configuration on AAA

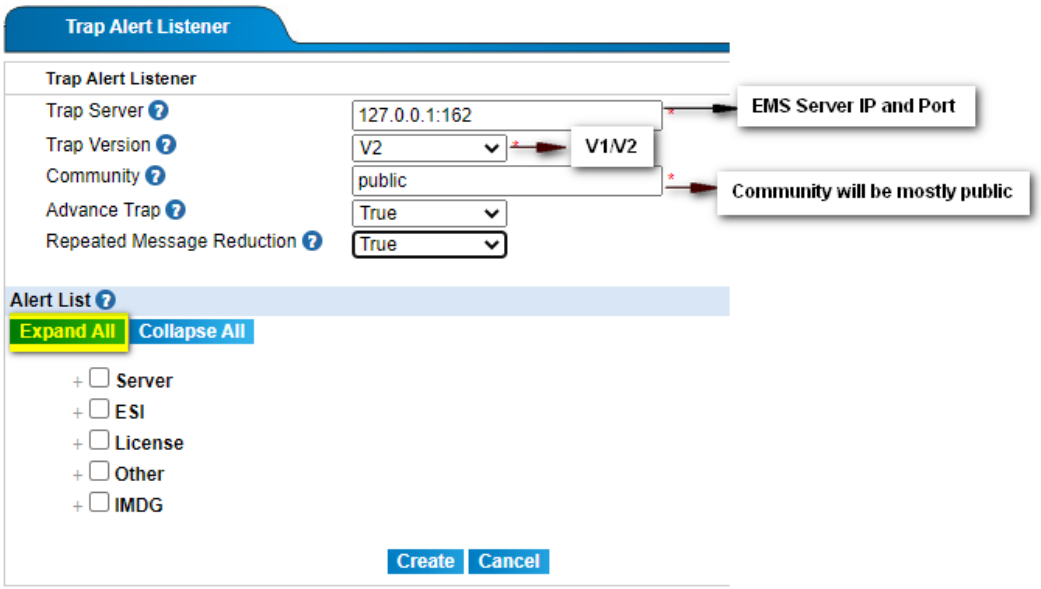
For Alerts to get generate, we need to change some configuration in AAA

1) We will configure Alert Listener in AAA as per below screenshot.
   Go To Servers/Configuration and then select Alert Configuration

2) After clicking on Alert Listener, click on Create New and select Listener Type as TRAP LISTENER. Listener Name you can give anything and then click on Next

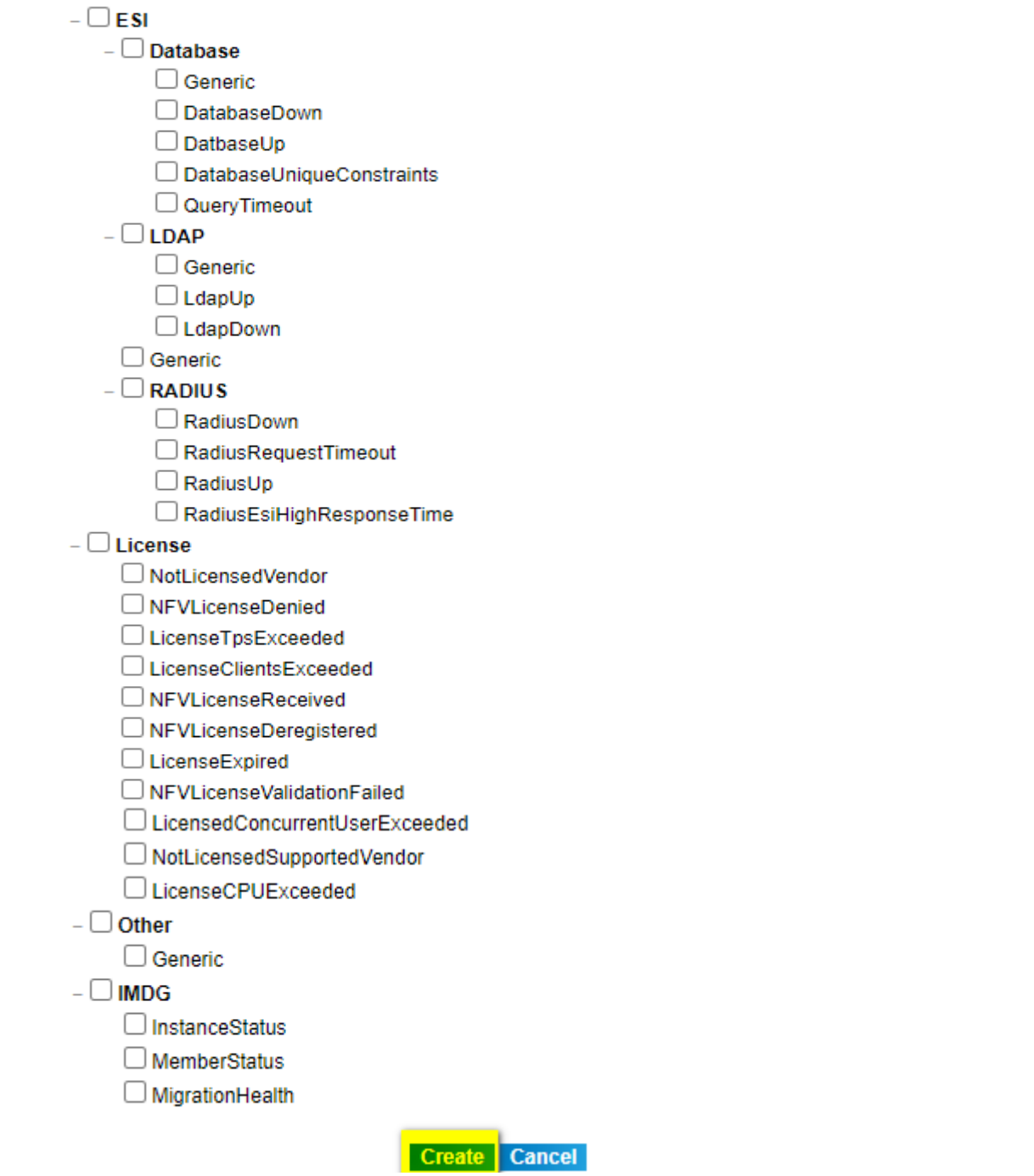


3) Then you need to mention the EMS server IP and Port on which EMS listens the Trap, Trap Version as V1/V2/V2c and community which is generally public in all case but it may differ from vendor to vendor and rest parameters you can keep as it is and then click on Expand All menu as shown below.



4) When you click on Expand All menu, you can see all the TRAPS which AAA can send to NMS system. By default no traps would be selected, you need to select the Trap according to your project requirements. Generally we select all the Traps and then click on Create.

- Server
  - ServerUp
  - RM
    - Prepaid
      - Generic
    - IPPool
      - Generic
    - Concurrency
      - Generic
  - ServerDown
  - RADIUS
    - DynaAuth
      - Generic
    - WebService
      - Generic
    - RadiusServicePolicyNotSatisfied
    - Acct
      - Generic
      - CDRStorageProblem
    - Auth
      - UnknownUser
      - Generic
      - InvalidClient
- Thread Not Available
- High AAA Response Time
- IDLE Communication
- Diameter
  - Diameter Stack Up
  - NAS
    - Generic
  - EAP
    - Generic
  - Diameter Peer Down
  - Diameter Stack Down
  - Diameter Peer High Response Time
  - Diameter Stack High Response Time
  - CreditControl
    - Generic
  - WebService
    - Generic
  - Diameter Peer Up
  - MIP
    - Generic
  - Diameter Peer Connection Rejected



5) So any of the above event occurs on AAA, then AAA will PUSH the Trap to NMS that following event has occurred in AAA and NMS will need to show as a TRAP and you can select Email/SMS event for monitoring purpose.