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**Welcome  
To  
Network for you  
SNMP**



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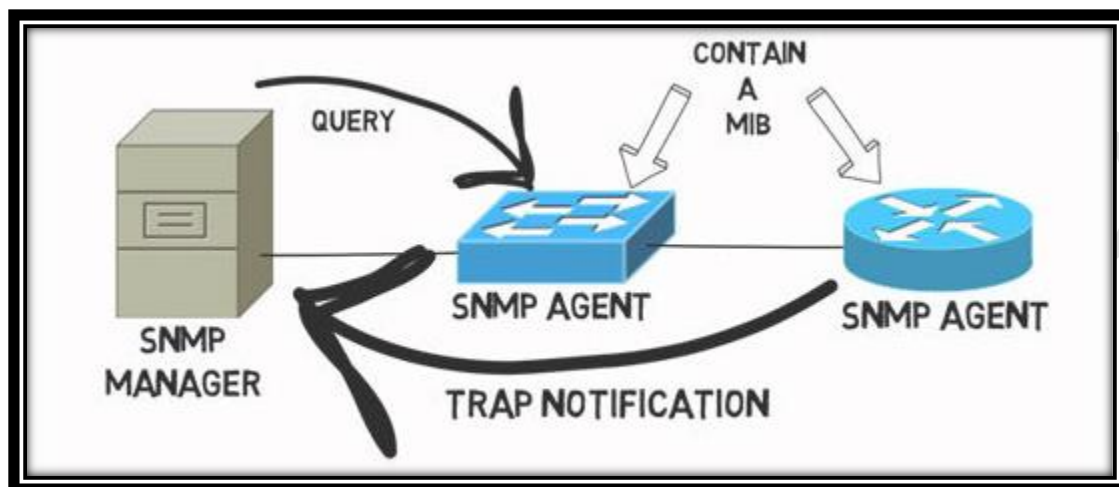
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## SNMP (Simple Network Management Protocol):

- SNMP Stand for Simple Network Management Protocol.
- It is Monitoring Protocol.
- It is application Protocol that is used for network management.
- It is used to monitor and manage devices on your whole networks.
- With the help of SNMP Protocol we can retrieve information from network devices.
- And also we can configure network devices with SNMP.
- We have read only and Read write mode with this we can retrieve only information from device and retrieve or configure the network devices respectively.
- All SNMP Message are transported via User Datagram Protocol (UDP).
- SNMP agent receives requests on User Datagram Protocol (UDP) port 161.
- SNMP Traps, information to the manager over Port User Datagram Protocol UDP 162.



## SNMP Manger:

- SNMP Manager is the software that is running on a pc or server that will monitor the network devises.

## SNMP Agent:

- SNMP Agent runs on the network device like routers, Switches, Server etc.

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## SNMP Monitoring Tools Example:

- Solar Winds Network Performance Monitor
- Manage Engine OP Manager
- Paessler PRTG Network Monitor
- MRTG

## Management Information Base (MIB):

- It is collection of Managed objects
- It contain set of question that the SNMP Manager can ask the Agent
- It commonly shared between the Agent and SNMP Manager.

## SNMP Messages:

- SNMP Manager and Agents used SNMP Messages to communicate between them.
- GET Message are sent by the SNMP Manger to retrieve information from SNMP Agents
- SET Message are used by SNMP Manger to assign the value to SNMP Agents.
- GET-NEXT retrieves the value of the next object present in MIB.
- GET-Response Message is used by SNMP Agents to reply to GET and GET-Next messages.
- TRAP Messages are initiated from the SNMP Agents to inform the SNMP Manager on event.
- GETbulk operation efficiently retrieves large blocks of data, such as multiple rows in a table.
- Inform Message is used by SNMP Manager to acknowledge that the message has been received.

## We have SNMP Version:

- SNMP Version1 ----- Limited
- SNMP Version2 ----- Limited Authentication
- SNMP Version3 -----Increase Security (Encryption)

## SNMPv1:

- SNMP version 1 uses **plain text authentication** between the manager and agent using matching community strings.
- SNMP version 1 security is based on community strings.
- An SNMP community string can be considered as password.

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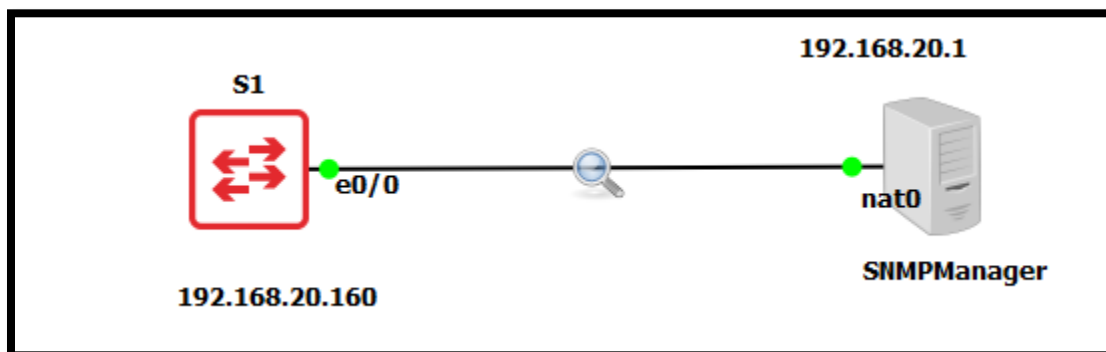
## SNMPv2c:

- SNMPv2c is an update SNMPv2.
- SNMPv2c also uses plain text community strings.
- It supports bulk retrieval.

## SNMPv3:

- SNMPv3 is the most secure version among other SNMP versions.
- SNMPv3 provides secure access to devices using authentication & encryption.
- SNMPv3 supports strong authentication and encryption. It is the preferred version but it not supported on all devices.
- Authentication security feature makes sure that the message is from a valid source.
- Integrity security feature makes sure that the message has not been tampered.
- Encryption security feature provides confidentiality by encrypting the contents.
- SNMPv3 will never send the user password in the clear text.
- SNMP offers three security levels: noAuthNoPriv, AuthNoPriv and AuthPriv.
- Auth stands for Authentication and Priv for Privacy.
- NoAuthNoPriv = no authentication and no encryption.
- AuthNoPriv = authentication but no encryption.
- AuthPriv = authentication AND encryption.

## Lab Time:



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SW1 Basic Configuration:	SNMP V2 Configuration:
<pre>en Configuration hostname SW1  int vlan 1 ip add 192.168.20.162 255.255.255.0 no sh</pre>	<pre>snmp-server community abc snmp-server community abc rw snmp-server location DataCenter snmp-server contact Networkforyou snmp-server host 192.168.20.1 version 2c abc snmp-server enable traps show snmp group show snmp user show snmp engine ID</pre>

No.	Time	Source	Destination	Protocol	Length	Info
1800	835.216953	192.168.20.162	192.168.20.1	SNMP	343	get-response 1.3.6.1.2.1.1.1
1801	835.443107	192.168.20.1	192.168.20.162	SNMP	79	get-request 1.3.6.1.2.1.1.1
1802	835.665494	192.168.20.162	192.168.20.1	SNMP	343	get-response 1.3.6.1.2.1.1.1
1803	835.722897	192.168.20.1	192.168.20.162	SNMP	79	get-request 1.3.6.1.2.1.1.1
1804	835.877800	192.168.20.162	192.168.20.1	SNMP	343	get-response 1.3.6.1.2.1.1.1
1805	835.962976	192.168.20.1	192.168.20.162	SNMP	79	get-request 1.3.6.1.2.1.1.1
1806	836.096186	192.168.20.162	192.168.20.1	SNMP	343	get-response 1.3.6.1.2.1.1.1
1807	836.819159	192.168.20.1	192.168.20.162	SNMP	79	get-request 1.3.6.1.2.1.1.1
1808	836.998215	192.168.20.162	192.168.20.1	SNMP	343	get-response 1.3.6.1.2.1.1.1
1825	849.618887	192.168.20.1	192.168.20.162	SNMP	79	get-request 1.3.6.1.2.1.1.5
1826	849.732515	192.168.20.162	192.168.20.1	SNMP	81	get-response 1.3.6.1.2.1.1.5
1840	858.442743	192.168.20.1	192.168.20.162	SNMP	79	get-request 1.3.6.1.2.1.1.5
1842	858.652279	192.168.20.162	192.168.20.1	SNMP	81	get-response 1.3.6.1.2.1.1.5
1873	899.692038	192.168.20.1	192.168.20.162	SNMP	79	get-request 1.3.6.1.2.1.1.4
1874	899.863024	192.168.20.162	192.168.20.1	SNMP	92	get-response 1.3.6.1.2.1.1.4
1928	925.282699	192.168.20.1	192.168.20.162	SNMP	79	get-request 1.3.6.1.2.1.1.4
1929	925.414149	192.168.20.162	192.168.20.1	SNMP	92	get-response 1.3.6.1.2.1.1.4
1939	931.371252	192.168.20.1	192.168.20.162	SNMP	79	get-request 1.3.6.1.2.1.1.4
1942	931.524579	192.168.20.162	192.168.20.1	SNMP	92	get-response 1.3.6.1.2.1.1.4
1944	932.187123	192.168.20.1	192.168.20.162	SNMP	79	get-request 1.3.6.1.2.1.1.4
1945	932.415236	192.168.20.162	192.168.20.1	SNMP	92	get-response 1.3.6.1.2.1.1.4
1954	936.939171	192.168.20.1	192.168.20.162	SNMP	79	get-request 1.3.6.1.2.1.1.4
1955	937.097762	192.168.20.162	192.168.20.1	SNMP	92	get-response 1.3.6.1.2.1.1.4
1959	942.283031	192.168.20.1	192.168.20.162	SNMP	79	get-request 1.3.6.1.2.1.1.6
1960	942.486109	192.168.20.162	192.168.20.1	SNMP	89	get-response 1.3.6.1.2.1.1.6
2001	975.771326	192.168.20.1	192.168.20.162	SNMP	79	get-request 1.3.6.1.2.1.1.6
2002	975.966542	192.168.20.162	192.168.20.1	SNMP	89	get-response 1.3.6.1.2.1.1.6

> Frame 2055: 288 bytes on wire (2304 bits), 288 bytes captured (2304 bits) on interface -, id 0  
 > Ethernet II, Src: aa:bb:cc:80:01:00 (aa:bb:cc:80:01:00), Dst: VMware\_c0:00:08 (00:50:56:c0:00:08)  
 > Internet Protocol Version 4, Src: 192.168.20.162, Dst: 192.168.20.1  
 v User Datagram Protocol, Src Port: 59272, Dst Port: 162  
 Source Port: 59272  
 Destination Port: 162  
 Length: 254  
 Checksum: 0x013c [unverified]  
 [Checksum Status: Unverified]

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```
[Stream index: 121]
> [Timestamps]
Simple Network Management Protocol
  version: v2c (1)
  community: abc
  data: snmpV2-trap (7)
    snmpV2-trap
      request-id: 8
      error-status: noError (0)
```

**PowerSNMP Free Manager**

Discovered Devices

- Network Nodes
- SNMP Agents
  - SNMPv1
  - SNMPv2
  - 192.168.20.162
  - SNMPv3

Agent Address	Variable (OID)	Value

Traps Log

Time	Sender	Originator	Enterprise/OID	Generic Trap	Spe
12/18/2020 8:04:14 PM		192.168.20.162:59272	1.3.6.1.4.1.9.0.1		
12/18/2020 8:04:15 PM		192.168.20.162:59272	1.3.6.1.4.1.9.0.1		
12/18/2020 8:10:06 PM		192.168.20.162:59272	1.3.6.1.2.1.17.0.2		
12/18/2020 8:13:39 PM		192.168.20.162:59272	1.3.6.1.4.1.9.0.1		

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The screenshot shows the SnmpB application window. The 'Remote SNMP Agent' is set to 'SW1'. The 'MIB Tree' view shows a hierarchical structure with 'system' expanded to show 'sysName'. The 'Node Info' section provides details for 'sysName'.

Node Info	
<b>Name:</b>	sysName
<b>Oid:</b>	1.3.6.1.2.1.1.5
<b>Composed Type:</b>	DisplayString
<b>Base Type:</b>	OCTET STRING
<b>Status:</b>	current
<b>Access:</b>	read-write
<b>Kind:</b>	Scalar
<b>SMI Type:</b>	OBJECT-TYPE
<b>Size:</b>	0 .. 255
<b>Module:</b>	SNMPv2-MIB
<b>Description:</b>	An administratively-assigned name for this managed node. By convention, this is the node's fully-qualified domain name. If the name is unknown, the value is the zero-length string.

**Query Results**

```
-----SNMP set started-----  
1: sysName.0 S1  
-----SNMP set finished-----
```

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<b>sysName</b>
1.3.6.1.2.1.1.5
<b>Type:</b> DisplayString
OCTET STRING

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