Contents

Preface.........................................................................................................................................................5

Guide Audience...............................................................................................................................................5

Accessing Command Line Console................................................................................................................5

Network Configuration.....................................................................................................................................6
  Interface Configuration.................................................................................................................................6
  DNS Configuration.........................................................................................................................................8
  Exit...............................................................................................................................................................8

System Settings.............................................................................................................................................9
  Set Password for User Admin.........................................................................................................................9
  Set System Date............................................................................................................................................9
  Set Email ID for system notification...............................................................................................................10
  Reset Default Web Admin Certificate........................................................................................................10
  Exit............................................................................................................................................................11

Route Configuration.....................................................................................................................................11
  Configure Unicast Routing............................................................................................................................11
  Configure RIP..............................................................................................................................................12
  Configure OSPF.........................................................................................................................................14
  Configure BGP.........................................................................................................................................15
  Exit............................................................................................................................................................17
  Configure Multicast Routing.......................................................................................................................17
  Enable/Disable Multicast forwarding.........................................................................................................18
  Configure Static multicast routes...............................................................................................................18
  Exit............................................................................................................................................................21
  Exit............................................................................................................................................................21

Device Console...........................................................................................................................................22
  Clear............................................................................................................................................................22
  disableremote.........................................................................................................................................22
  dnslookup..............................................................................................................................................23
  dnslookup6............................................................................................................................................23
  drop-packet-capture.................................................................................................................................23
  enableremote.......................................................................................................................................24
  ping..........................................................................................................................................................24
  ping6.......................................................................................................................................................25
  set.............................................................................................................................................................25
  advanced_firewall.................................................................................................................................26
  arp-flux.................................................................................................................................................28
  business-policy.................................................................................................................................28
Device Management

Reset to Factory Defaults................................................................. 51
Show Firmware......................................................................................... 51
Advanced Shell......................................................................................... 51
Flush Device Reports.............................................................................. 51
Exit........................................................................................................... 51
**Preface**

Welcome to Sophos Firewall OS Command Line Console (CLI) guide. This guide helps you configure and manage your Sophos XG Firewall command line interface. It also provides list of CLI commands that you can use from the command line interface.

The default password to access the Command Line Console is **admin**. It is recommended to change the default password immediately post deployment.

**Guide Audience**

This Guide describes CLI commands used to configure and manage a Sophos XG Firewall device from the Command Line Console (CLI). The Guide is written to serve as a technical reference and describes features that are specific to the Command Line Console.

This guide is primary intended for the Network Administrators and Support personnel who perform the following tasks:

- Configure System & Network
- Manage and maintain Network
- Manage various services
- Troubleshooting

This guide is intended for reference purpose and readers are expected to possess basic-to-advanced knowledge of systems networking.

*Note:* The Corporate and individual names, data and images in this guide are for demonstration purpose only and do not reflect the real data.

**Accessing Command Line Console**

There are two ways to access Sophos XG Firewall CLI:

- **Connection over Serial Console** - Physically connecting one end of a serial cable -RJ45 connector to the Console port of the device and the other end to a PC’s serial port.

  For more information, refer to the KB article titled “Setup Serial Console Connection using PuTTY”.

- **Remote connection using SSH or TELNET** - Access Sophos XG Firewall CLI using a SSH client, e.g. PuTTY. IP Address of the Sophos XG Firewall is required. Start SSH client and create new connection with the following parameters:

  - **Hostname** - <Sophos XG Firewall IP Address>
  - **Username** – admin
  - **Password** – admin

  On successful login, following **Main Menu** screen is displayed:
To access any of the menu items, type the number corresponding to the menu item against **Select Menu Number** and press **Enter** key.

For Example, to access **Network Configuration** – press 1; to access **Device Management** – press 5.

## Network Configuration

Use this menu for:

- Configure and manage Interfaces
- Configure and manage DNS

### Interface Configuration

Following screen displays the current Network settings like IPv4 Address/Netmask and/or IPv6 Address/Prefix for all the Ports. In addition, it displays IPv4 Address/Netmask and/or IPv6 Address/Prefix of Aliases, if configured.
Note: VLAN and WLAN Interfaces are not displayed here.

Set Interface IP Address

This section allows setting or modifying the Interface Configuration for any port. Following screen allows setting or modifying the IPv4 Address for any port. Type y and press Enter to set IP Address.

Displays the IP Address, Netmask and Zone and prompts for the new IP Address and Netmask for each Port.

Press Enter if you do not want to change any details. For example, we are skipping changing the network schema for Port A and B while updating the IP Address and Netmask for Port C, as shown in the image below:
Network Configuration settings described above are applicable to Gateway mode deployment.

• Aliases, VLAN, DHCP, PPPoE, WLAN and WWAN settings cannot be configured through the CLI.

• The steps described above are for setting or modifying IPv4 Address only. The screen elements differ slightly for IPv6 configuration.

DNS Configuration
Configure and manage DNS

Following screen displays list of all the IPv4 and IPv6 DNS configured in the device:

Set DNS IP Address
This section allows setting or modifying the existing DNS configuration. Following screen allows setting or modifying the DNS configuration. Type y and press Enter to set DNS IP Address. Press just Enter to skip changing current DNS configuration.

Press Enter to return to the Main menu.

Exit
Type 0 to exit from Network Configuration menu and return to the Main Menu.

System Settings

Use this menu to configure and manage various system settings.

![System Settings Menu](image)

**Figure 1: System Settings**

**Set Password for User Admin**

Use to change the password of the user “admin”.

Type new password, retype for confirmation, and press Enter

![Password for User Admin](image)

**Figure 2: Password for User Admin**

Displays successful completion message

Press Enter to return to the System Settings Menu.

**Set System Date**

Use to change time zone and system date.

Type y to set new time and press Enter.

![System Date](image)

**Figure 3: System Date**
If NTP server is configured for synchronizing date and time, screen with the warning message as given below will be displayed. If you set date manually, NTP server will be disabled automatically.

**Figure 4: NTP Configuration**

Current Date :Mon Aug 24 15:47:07 IST 2015

WARNING: NTP is configured. Setting date manually will disable NTP.

Set Date (y/n) : No (Enter) >

Type Month, Day, Year, Hour, Minute.

**Figure 5: Setting new Date**

Press Enter to return to the System Settings Menu.

**Set Email ID for system notification**

Use to set the Email ID for system notifications. Sophos XG Firewall sends system alert mails on the specified Email ID.

Type Email ID and press Enter. It displays the new Email ID.

**Figure 6: System Notification**

Press Enter to return to the System Settings Menu.

**Reset Default Web Admin Certificate**

Use to reset the Web Admin certificate back to default.
Type `y` to reset the Web Admin certificate back to default.

![Certificate Reset Message]

**Exit**

Type `0` to exit from **System Settings** menu and return to the **Main Menu**.

**Route Configuration**

Use this menu to configure:

- Static routes
- RIP
- OSPF
- Enable/Disable multicast forwarding.

Sophos XG Firewall adheres to Cisco terminology for routing configuration and provides Cisco-compliant CLI to configure static routes and dynamic routing protocols.

Traditionally, IP packets are transmitted in one of either two ways – Unicast (1 sender –1 receiver) or Broadcast (1 sender –everybody on the network). Multicast delivers IP packets simultaneously to a group of hosts on the network and not everybody and not just 1.

![Router Management Menu]

**Configure Unicast Routing**

Use this page for configuring RIP, OSPF and BGP.
Configure RIP

This option is available only when Sophos XG Firewall is deployed in Gateway mode.

Routing Information Protocol (RIP) is a distance-vector routing protocol documented in RFC1058. RIP uses broadcast User Datagram Protocol (UDP) data packets to exchange routing information.

The Sophos XG Firewall implementation of RIP supports

- RIP version 1 (as described in RFC 1058)
- RIP version 2 (as described in RFC 2453)
- Plain text and Message Digest 5 (MD5) authentication for RIP Version

This section covers the following topics:

- Configure RIP
- Removing Routes
- Disabling RIP

Removing routes

To remove route configuration, execute the `no network` command from the command prompt as below:

```plaintext
rip(config-router)#no network ip address
```

Disabling RIP

To disable RIP routing configuration, execute the `no router` command from the command prompt as below:

```plaintext
rip(config)#no network rip
```

Execute `exit` command to return to the previous mode.

RIP Configuration Task List

RIP must be enabled before carrying out any of the RIP commands.

To configure RIP, perform the steps described below:

1. Navigate to Option 3 (Route Configuration) > Option 1 (Configure Unicast Routing) > Option 1 (Configure RIP)
2. Enable RIP
   ```plaintext
   rip>enable
   ```
   Enables RIP routing process and places you in Global Configuration mode.
3. Specify a list of networks for the RIP routing process
   ```plaintext
   rip#configure terminal
   ```
   Enables the RIP configuration mode which places you in the Router Configuration mode and allows you to configure from the terminal.
rip(config)#router rip
   Allows to configure and start RIP routing process.

rip(config-router)#network ip-address/subnet mask
   Specify ip-address with the subnet information
   For example, if the network for 10.0.0.0/24 is RIP enabled, this would result in all the addresses from 10.0.0.0 to 10.0.0.255 being enabled for RIP.
   Enables RIP interfaces between specified network address. RIP routing updates will be sent and received only through interfaces on this network.
   Also, if the network of an interface is not specified, the interface will not be advertised in any RIP update. The interfaces which have addresses matching with network are enabled.

rip(config-router)#end
   Exits from the Router Configuration mode and places you into the Enable mode.

4. Configure Authentication

   rip#configure terminal
   Enables the RIP configuration mode which places you in the Router Configuration mode and allows you to configure from the terminal.

   rip(config)#interface ifname

   rip(config-if)#ip rip authentication mode{text|string}
   To set authentication mode as text and set the authentication string. Defines authentication mode for each interface. By default, authentication is on for all the interfaces. If authentication is not required for any of the interface, it is to be explicitly disabled.
   RIP Version 1 does not support authentication. RIP Version 2 supports Clear Text (simple password) or Keyed Message Digest 5 (MD5) authentication.
   To enable authentication for RIP Version 2 packets and to specify the set of keys that can be used on an interface, use the ip rip authentication key-chain command in interface configuration mode. If authentication is not required for any of the interface, use the no form of this command.
   For example,
   rip(config)#interface A
   rip(config-if)#ip rip authentication mode{text}
   rip(config-if)#ip rip authentication string {teststring}

   rip(config-if)#interface ifname

   rip(config-if)#ip rip authentication mode {md5[Key-chain name of key-chain]}
   To set authentication mode as MD5 and set the authentication string.
   For example,
   rip(config)#interface A
   rip(config-if)#ip rip authentication mode md5 key-chain testkeychain

   rip(config)#interface ifname

   rip(config-if)#no ip rip authentication mode
   To disable authentication
   For example, disable authentication for interface A
   rip(config)#interface A
   rip(config-if)#no ip rip authentication mode

rip(config-if)#end
Exits from the Router Configuration mode and places you into the Enable mode.

5. Exit to Router Management Menu

```bash
rip(config-if)#exit
```

Exits to the Router Management Menu.

**Configure OSPF**

This option is available only when Sophos XG Firewall is deployed in Gateway mode.

OSPF is one of IGPs (Interior Gateway Protocols). Compared with RIP, OSPF can serve much more networks and period of convergence is very short. OSPF is widely used in large networks such as ISP backbone and enterprise networks.

The Sophos XG Firewall implementation of OSPF supports:

- OSPF version 2 (as described in RFC 2328)
- Plain text and Message Digest 5 (MD5) authentication

**How OSPF works**

OSPF keeps track of a complete topological database of all connections in the local network. It is typically divided into logical areas linked by area border routers. An area comprises a group of contiguous networks. An area border router links one or more areas to the OSPF network backbone.

Sophos XG Firewall participates in OSPF communications, when it has an interface to an OSPF area. Sophos XG Firewall uses the OSPF Hello protocol to acquire neighbors in an area. A neighbor is any router that has an interface to the same area as the Sophos XG Firewall. After initial contact, the Sophos XG Firewall exchanges Hello packets with its OSPF neighbors at regular intervals to confirm that the neighbors can be reached.

OSPF-enabled routers generate link-state advertisements and send them to their neighbors whenever the status of a neighbor changes or a new neighbor comes online. If OSPF network is stable, link-state advertisements between OSPF neighbors does not occur. A Link-State Advertisement (LSA) identifies the interfaces of all OSPF-enabled routers in an area, and provides information that enables OSPF-enabled routers to select the shortest path to a destination. All LSA exchanges between OSPF-enabled routers are authenticated. The Sophos Firewall maintains a database of link-state information based on the advertisements that it receives from OSPF-enabled routers. To calculate the shortest path to a destination, the Sophos Firewall applies the Shortest Path First (SPF) algorithm to the accumulated link-state information.

The Sophos XG Firewall updates its routing table dynamically based on the results of the SPF calculation to ensure that an OSPF packet will be routed using the shortest path to its destination.

This section covers the following topics:

- Configure OSPF
- Removing Routes
- Disabling OSPF

**Removing routes**

To remove route configuration, execute the `no network` command from the command prompt as below:

```bash
ospf(config-router)#no network ip address area area-id
```

**Disabling OSPF**

To disable OSPF routing configuration, execute the `no router` command from the command prompt as below:

```bash
ospf(config)#no network ospf
```

**OSPF Configuration Task List**

OSPF must be enabled before carrying out any of the OSPF commands.
To configure OSPF, perform the steps described below:

1. Navigate to **Option 3 (Route Configuration)** > **Option 1 (Configure Unicast Routing)** > **Option 2 (Configure OSPF)**
2. Enable OSPF
   ```
   OSPF>enable
   ```
   Enables OSPF routing process and places you in Global Configuration mode.
3. Specify a list of networks for the OSPF routing process
   ```
   ospf#configure terminal
   ```
   Enables the OSPF configuration mode which places you in the Router Configuration mode and allows you to configure from the terminal.
   ```
   ospf(config)#router ospf
   ```
   Allows to configure and start OSPF routing process.
   ```
   ospf(config-router)#network ip-address area area-id
   ```
   Specify ip-address with the subnet information
   Assigns an interface to an area. The area-id is the area number we want the interface to be in. The area-id can be an integer between 0 and 4294967295 or can take a form similar to an IP Address A.B.C.D. Interfaces that are part of the network are advertised in OSPF link-state advertisements.
   ```
   ospf(config-router)# show running-config
   ```
   View configuration.
   ```
   ospf(config-router)#end
   ```
   Exits from the Router Configuration mode and places you into the Enable mode.
   ```
   ospf(config-if)#exit
   ```
   Exits to the Router Management Menu.

**Configure BGP**

This option is available only when Sophos XG Firewall is deployed in Gateway mode.

Border Gateway Protocol (BGP) is a path vector protocol that is used to carry routing between routers that are in the different administrative domains (Autonomous Systems) e.g. BGP is typically used by ISPs to exchange routing information between different ISP networks.

The Sophos XG Firewall implementation of BGP supports:

- Version 4 (RFC 1771)
- Communities Attribute (RFC 1997)
- Route Reflection (RFC 2796)
- Multiprotocol extensions (RFC 2858)
- Capabilities Advertisement (RFC 2842)

Additionally, a firewall rule is to be configured for the zone for which the BGP traffic is to be allowed i.e. LAN to LOCAL or WAN to LOCAL.

**How BGP works**

When BGP is enabled, the Sophos XG Firewall advertises routing table updates to neighboring autonomous systems whenever any part of the Sophos XG Firewall routing table changes. Each AS, including the local AS of which the Sophos XG Firewall device is a member, is associated with an AS number. The AS number references a particular destination network.
BGP updates advertise the best path to a destination network. When the Sophos XG Firewall unit receives a BGP update, the Sophos XG Firewall examines potential routes to determine the best path to a destination network before recording the path in the Sophos XG Firewall routing table.

This section covers the following topics:

- **Configure BGP**
- **Removing Routes**
- **Disabling BGP**

**Removing routes**

To remove route configuration, execute the `no network` command from the command prompt as below:

```
bgp(config-router)#no network ip address
```

**Disabling BGP**

To disable BGP routing configuration, execute the `no router bgp AS number` command from the command prompt as below:

```
bgp(config)#no network bgp AS number
```

**BGP Configuration Task List**

BGP must be enabled before carrying out any of the OSPF commands.

To configure BGP, perform the steps described below:

1. **Navigate to Option 3 (Route Configuration) > Option 1 (Configure Unicast Routing) > Option 3 (Configure BGP)**
2. **Enable BGP**
   
   ```
   bgp>enable
   ```
   Enables BGP routing process and places you in Global Configuration mode.
3. **Specify a list of networks for the BGP routing process**
   
   ```
   bgp#configure terminal
   ```
   Enables the BGP configuration mode which places you in the Router Configuration mode and allows you to configure from the terminal.

   ```
   bgp(config)#router bgp AS number
   ```
   Allows to configure and start OSPF routing process. AS number is the number of the local AS that Sophos Firewall unit is a member of.

   ```
   bgp(config-router)#network ip-address
   ```
   Specify ip-address with the subnet information of the network to be advertised.
   
   The IP Addresses and network masks/prefixes of networks to advertise to BGP peers. The Sophos Firewall may have a physical or VLAN interface connected to those networks.

   ```
   bgp(config-router)# show running - config
   ```
   View configuration. By default, router ID is Sophos Firewall IP Address. Router ID is used to identify the Sophos Firewall to other BGP routers. The router - id can be an integer or can take a form similar to an IP Address A.B.C.D.

   ```
   bgp(config-router)#end
   ```
   Exits from the Router Configuration mode and places you into the Enable mode.

   ```
   bgp#exit
   ```
   Exits to the Router Management Menu.
Exit

Type 0 to exit from **Unicast Routing configuration** menu and return to **Router Management**.

Configure Multicast Routing

This section covers the following topics:

- Enable/Disable Multicast forwarding
- Configure Static multicast routes
- Viewing routes
- Removing Routes

![Multicast Routing Configuration]

**Multicast Routing Configuration**

1. Enable/Disable Multicast forwarding
2. Configure Staticroutes
0. Exit

Select Menu Number: [ ]

IP Multicast

Internet Protocol (IP) multicast is a bandwidth-conserving technology that reduces traffic by simultaneously delivering a single stream of information to thousands of recipients and homes. IP Multicast delivers source traffic to multiple receivers without adding any additional burden on the source or the receivers.

Applications like videoconferencing, corporate communications, distance learning, and distribution of software, stock quotes, and news use IP multicasting.

If IP multicast is not used, source is required to send more than one copy of a packet or individual copy to each receiver. In such case, high-bandwidth applications like Video or Stock where data is to be send more frequently and simultaneously, uses large portion of the available bandwidth. In these applications, the only efficient way of sending information to more than one receiver simultaneously is by using IP Multicast.

Multicast Group

Multicast is based on the concept of a group. An arbitrary group of receivers express an interest in receiving a particular data stream. This group does not have any physical or geographical boundaries—the hosts can be located anywhere on the Internet. Hosts that are interested in receiving data flowing to a particular group must join the group. Hosts must be a member of the group to receive the data stream.

IP Multicast Addresses

Multicast addresses specify an arbitrary group of IP hosts that have joined the group and want to receive traffic sent to this group.

IP Class D Addresses

The Internet Assigned Numbers Authority (IANA) controls the assignment of IP multicast addresses. Multicast addresses fall in Class D address space ranging from 224.0.0.0 to 239.255.255.255.

This address range is only for the group address or destination address of IP multicast traffic. The source address for multicast datagrams is always the unicast source address.
**Multicast forwarding**

In multicast routing, the source is sending traffic to a group of hosts represented by a multicast group address. The multicast router must determine which direction is upstream (toward the source) and which direction (or directions) is downstream. If there are multiple downstream paths, the router replicates the packet and forwards the traffic down the appropriate downstream paths—which is not necessarily all paths.

**Enable/Disable Multicast forwarding**

With multicast forwarding, a router forwards multicast traffic to networks where other multicast devices are listening. Multicast forwarding prevents the forwarding of multicast traffic to networks where there are no nodes listening.

For multicast forwarding to work across inter-networks, nodes and routers must be multicast-capable.

A multicast-capable node must be able to:

- Send and receive multicast packets.
- Register the multicast addresses being listened to by the node with local routers, so that multicast packets can be forwarded to the network of the node.

IP multicasting applications that send multicast traffic must construct IP packets with the appropriate IP multicast address as the destination IP Address. IP multicasting applications that receive multicast traffic must inform the TCP/IP protocol that they are listening for all traffic to a specified IP multicast address.

**Setting up IP Multicast forwarding**

Configuring multicast forwarding is two-step process:

- Enable multicast forwarding (both the modes)
- Configure multicast routes (only in Gateway mode)

To enable multicast forwarding, navigate to Option 3 (Route Configuration) > Option 2 (Configure Multicast Routing) > Option 1 (Enable/Disable Multicast forwarding) and execute the following command:

```console`
console> enable multicast-forwarding
```

**Configure Static multicast routes**

Multicast routes cannot be added before enabling multicast forwarding.

Navigate to Option 3 (Route Configuration) > Option 2 (Configure Multicast Routing) > Option 2 (Configure Static-routes) and execute following command:

```console`
console>mroute add input-interface Port port number source-ip-source-ip-address dest-ip-destination-ip-address output-interface Port port number
```

where,

- **input-interface** - interface from which the multicast traffic is supposed to arrive (interface that leads to the source of multicast traffic). This is the port through which traffic arrives.
• **source-ip** - unicast IP Address of source transmitting multicast traffic
• **destination-ip** - class D IP Address (224.0.0.0 to 239.255.255)
• **output-interface** - interface on which you want to forward the multicast traffic (interface that leads to destination of multicast traffic). This is the port through which traffic goes.

For example,
```
console>mroute add input-interface PortA source-ip 1.1.1.1 dest-ip 230.1.1.2 output-interface PortB
```
Sophos XG Firewall will forward multicast traffic received on interface PortA from IP Address 1.1.1.1 to 230.1.1.2 through interface PortB.

If you want to inject multicast traffic to more than one interface, you have to add routes for each destination interface. For example,
```
console>mroute add input-interface PortA source-ip 1.1.1.1 dest-ip 230.1.1.2 output-interface PortB
console>mroute add input-interface PortA source-ip 1.1.1.1 dest-ip 230.1.1.2 output-interface PortC
```

**Viewing routes**
Navigate to **Option 3 (Route Configuration) > Option 2 (Configure Multicast Routing)** and execute following command:
```
console>mroute show
```

**Removing route**
Navigate to **Option 3 (Route Configuration) > Option 2 (Configure Multicast Routing)** and execute following command:
```
console>mroute del source-ip source-ip-address dest-ip destination-ip-address
```

Note:
Source and destination interfaces cannot be same for multicast route.
Multiple destination interfaces cannot be defined. Route manipulation per interface is required to add/delete such routes.
Non-Ethernet interfaces like - IPsec0, etc. are not supported.

**Multicast routes over IPsec VPN tunnel**

Sophos XG Firewall supports secure transport of multicast traffic over un-trusted network using IPsec/VPN connection.

It is possible to send/receive both unicast and multicast traffic between two or more VPN sites connected through public Internet. This removes the dependency of multicast aware routers between the sites connecting via IPsec/VPN.

Any unicast host wanting to access a multicast host shall require to be configured as a explicit host (with netmask /32) in VPN configuration.

Navigate to **Option 3 (Route Configuration) > Option 2 (Configure Multicast Routing) > Option 2 (Configure Static-routes)** and execute following command:

- **Command:** `console>mroute add input-interface Port port number source-ip ipaddress dest-ip ipaddress output-interface Port port number`
  
  **Description:** To forward multicast traffic coming from a given interface to another interface

  For example:
  
  `mroute add input-interface Port A source-ip 192.168.1.2 dest-ip 239.0.0.55 output-interface Port B`

- **Command:** `mroute add input-interface Port port number source-ip ipaddress dest-ip ipaddress output-tunnel gre name gre tunnel name`
  
  **Description:** To forward multicast traffic coming from a given interface to GRE tunnel.

  For example:
  
  `mroute add input-interface Port A source-ip 192.168.1.2 dest-ip 239.0.0.55 output-tunnel gre name Elitecore`

- **Command:** `mroute add input-interface Port port number source-ip ipaddress dest-ip ipaddress output-tunnel IPsec`
  
  **Description:** To forward multicast traffic coming from a given interface to IPsec tunnels. Sophos XG Firewall automatically selects the appropriate tunnel to be used depending upon the Local Network and Remote Network configuration.

  For example:
  
  `console>mroute add input-interface Port A source-ip 192.168.1.2 dest-ip 239.0.0.55 output-tunnel IPsec`

- **Command:** `mroute add input-tunnel IPsec name IPsec connection name source-ip ipaddress dest-ip ipaddress output-interface Port port number`
  
  **Description:** To forward multicast traffic coming from IPsec tunnel to an interface.

  For example:
  
  `console>mroute add input-tunnel IPsec name Net2Net source-ip 192.168.1.2 dest-ip 239.0.0.55 output-interface Port B`

- **Command:** `mroute add input-tunnel IPsec name IPsec connection name source-ip ipaddress dest-ip ipaddress output-tunnel IPsec`
  
  **Description:** To forward multicast traffic coming from a given IPsec tunnel to other IPsec tunnels. Sophos XG Firewall automatically selects the appropriate tunnel to be used depending upon the Local Network and Remote Network configuration.

  For example:
console>mroute add input-tunnel IPsec nameNet2Net source-ip 192.168.1.2 dest-ip 239.0.0.55 output-tunnel IPsec

- **Command:** mroute add input-tunnel IPsec name `Net2Net` source-ip `192.168.1.2` dest-ip `239.0.0.55` output-tunnel IPsec `name` `Net2Net`

**Description:** To forward multicast traffic coming from a given IPsec tunnel to GRE tunnel.

For example:

```bash
console>mroute add input-tunnel IPsec nameNet2Net source-ip 192.168.1.2 dest-ip 239.0.0.55 output-tunnel IPsec Elitecore
```

- **Command:** mroute add input-tunnel gre name `Elitecore` source-ip `192.168.1.2` dest-ip `239.0.0.55` output-tunnel gre `Elitecore`

**Description:** To forward multicast traffic coming from a GRE tunnel to an interface.

For example:

```bash
console>mroute add input-tunnel gre nameElitecore source-ip 192.168.1.2 dest-ip 239.0.0.55 output-interface Port `B`
```

- **Command:** mroute add input-tunnel gre name `Elitecore` source-ip `192.168.1.2` dest-ip `239.0.0.55` output-tunnel gre `Terminal1`

**Description:** To forward multicast traffic coming from a GRE tunnel to another GRE tunnel.

For example:

```bash
console>mroute add input-tunnel gre nameElitecore source-ip 192.168.1.2 dest-ip 239.0.0.55 output-tunnel IPsec
```

**Description:** To forward multicast traffic coming from a given GRE tunnel to IPsec tunnels. Sophos XG Firewall automatically selects the appropriate tunnel to be used depending upon the Local Network and Remote Network configuration.

For example:

```bash
console>mroute add input-tunnel gre nameElitecore source-ip 192.168.1.2 dest-ip 239.0.0.55 output-tunnel IPsec
```

- **Command:** mroute del source-ip `192.168.1.2` dest-ip `239.0.0.55`

**Description:** To delete multicast route.

For example:

```bash
console>mroute del source-ip 192.168.1.2 dest-ip 239.0.0.55
```

**Note:** CLI shows only static interfaces as input and output interface whereas Web Admin Console shows both, static as well as dynamic interfaces (PPPoE, DHCP).

---

**Exit**

Type 0 to exit from Multicast Routing Configuration menu and return to Router Management.

---

**Exit**

Type 0 to exit from Router Management menu and return to Main Menu.
Device Console

Use to perform various checks and view logs for troubleshooting.

Generally, when using command line help, one has to remember parameters/arguments of the command and has to go to the help and check for the parameters. Users using command line for the first time face difficulty in such situations.

To remove the above difficulty, Sophos XG Firewall has inbuilt help at the command prompt itself.

Navigate to **Option 4 (Device Console)** and Press **Tab** or ? to view the list of commands supported.

```
Device Console

clear
disable remote
DNS lookup
DNS lookup6
Drop packet capture
Enabler remote
tcpdump

Device Console
```

Type command and then press tab to view the list of argument(s) supported or required. For example after typing ping press tab, it shows what all parameters are required or allowed.

```
<ipaddress> count quiet source ip
<string> interface size timeout
```

Type command and then press ? to view the list of argument(s) supported with its description. For example after typing ping , press ?, it shows what all parameters are required or allowed, along with description.

```
clear
disable remote
DNS lookup
DNS lookup6
Drop packet capture
Enabler remote
tcpdump
```

Type **Exit** to return to the **Main menu**.

---

Clear

Clears the screen

**Syntax**

clear

**disableremote**
Disables the remote (SSH) connection, if enabled. By default, it is not allowed. Refer to enable remote to allow to establish the remote connection.

**Syntax**

disableremote

dnslookup

Query Internet domain name servers for hostname resolving.

**Syntax**
dnslookup [host {ipaddress | string}]

**Parameter list & description**

<table>
<thead>
<tr>
<th>Keywords &amp; Variables</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host [ipaddress</td>
<td>String]</td>
</tr>
<tr>
<td>Server [ipaddress [host]]</td>
<td>Internet name or address of the name server</td>
</tr>
</tbody>
</table>

dnslookup6

Query Internet domain name servers for IPv6 hostname resolving.

**Syntax**
dnslookup6 [host {ipaddress | string}]

**Parameter list & description**

<table>
<thead>
<tr>
<th>Keywords &amp; Variables</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host [ipaddress6</td>
<td>String]</td>
</tr>
<tr>
<td>Server [ipaddress6 [host]]</td>
<td>Internet name or address of the name server</td>
</tr>
</tbody>
</table>

drop-packet-capture

Displays the packets dropped by firewall rules. It will provide connection details and details of the packets processed by the device. This will help administrators to troubleshoot errant firewall rules. You can also filter the dropped packets.

**Syntax**
drop-packet-capture [text | interface {Port Port number} | snaplen {20-65535}]

**Keywords & Variables**

<table>
<thead>
<tr>
<th>Keywords &amp; Variables</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>text</td>
<td>BPF (Berkeley Packet Filter) Compatible Packet Filter Expression.</td>
</tr>
<tr>
<td>interface port Port number</td>
<td>Listen on interface</td>
</tr>
<tr>
<td>snaplen 20-68835</td>
<td>Number of bytes to capture</td>
</tr>
</tbody>
</table>

**BPF String Parameters**
### How to check packets of the specific host

<table>
<thead>
<tr>
<th>How to check packets of the specific host</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>specific host</td>
<td>host 10.10.1</td>
</tr>
<tr>
<td>specific source host</td>
<td>src host 10.10.1</td>
</tr>
<tr>
<td>specific destination host</td>
<td>dst host 10.10.1</td>
</tr>
<tr>
<td>specific network</td>
<td>net 10.10.0</td>
</tr>
<tr>
<td>specific source network</td>
<td>src net 10.10.0</td>
</tr>
<tr>
<td>specific destination network</td>
<td>dst net 10.10.0</td>
</tr>
<tr>
<td>specific port</td>
<td>Port 20 or port 21</td>
</tr>
<tr>
<td>specific source port</td>
<td>src port 21</td>
</tr>
<tr>
<td>specific destination port</td>
<td>dst port 21</td>
</tr>
<tr>
<td>specific host for the particular port</td>
<td>host 10.10.1 and port 21</td>
</tr>
<tr>
<td>the specific host for all the ports except SSH</td>
<td>host 10.10.1 and port not 22</td>
</tr>
<tr>
<td>specific protocol</td>
<td>proto ICMP, proto UDP, proto TCP</td>
</tr>
</tbody>
</table>

### enableremote

Allows to connect to the Sophos XG Firewall remotely i.e. allows to establish remote (SSH) connection. By default, remote connection is not allowed.

**Syntax**

enableremote [port number | serverip | ipaddress]

<table>
<thead>
<tr>
<th>Keywords &amp; Variables</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>port number</td>
<td>Port through which the remote SSH connection can be established</td>
</tr>
<tr>
<td>serverip</td>
<td>ipaddress</td>
</tr>
</tbody>
</table>

### ping

Sends ICMP ECHO_REQUEST packets to network hosts.

**Syntax**

ping [ipaddress | string | count | interface | quiet | size | sourceip | timeout]

<table>
<thead>
<tr>
<th>Keywords &amp; Variables</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipaddress</td>
<td>IP Address to be pinged</td>
</tr>
<tr>
<td>string</td>
<td>Domain to be pinged</td>
</tr>
<tr>
<td>count</td>
<td>number</td>
</tr>
<tr>
<td>interface</td>
<td>Port</td>
</tr>
<tr>
<td>quiet</td>
<td>Display the summary at startup and end</td>
</tr>
<tr>
<td>size</td>
<td>number</td>
</tr>
</tbody>
</table>
### Keywords & Variables

<table>
<thead>
<tr>
<th>Keywords &amp; Variables</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sourceip</td>
<td>ipaddress</td>
</tr>
<tr>
<td>timeout</td>
<td>number</td>
</tr>
</tbody>
</table>

### ping6

Sends ICMPv6 ECHO_REQUEST packets to network hosts.

**Syntax**

```
ping [ipaddress6] | count | interface | quiet | size
```

<table>
<thead>
<tr>
<th>Keywords &amp; Variables</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipaddress6</td>
<td>IPv6 Address to be pinged</td>
</tr>
<tr>
<td>count</td>
<td>number</td>
</tr>
<tr>
<td>interface</td>
<td>[Port</td>
</tr>
<tr>
<td>quiet</td>
<td></td>
</tr>
<tr>
<td>size</td>
<td>number</td>
</tr>
</tbody>
</table>

### set

Navigate to **Option 4 (Device Console)** and Press Tab or ? to view the list of commands supported.

Type `set` command and then press tab to view the list of argument(s) supported or required. Use `set` command to set entities.

For example after typing `set` press tab, it shows what all parameters are required or allowed.

```
console> set
advanced-firewall  http_proxy  network  report-disk-usage
arp-flux  ips  on-box-reports  service-param
business-policy  ips_conf  port-affinity  vpn
fqdn-host  lanbypass  proxy-arp
```

Type command and then press ? to view the list of argument(s) supported with its description. For example after typing `set`, press ?, it shows what all parameters are required or allowed, along with description.
advanced_firewall


- **bypass-stateful-firewall-config**
  Add host or network when the outbound and return traffic does not always traverse through Sophos XG Firewall.

  `bypass-stateful-firewall-config [ add | dest_host ipaddress | dest_network ipaddress | source_host ipaddress | source_network ipaddress ] | del | dest_host ipaddress | dest_network ipaddress | source_host ipaddress | source_network ipaddress ]`

- **icmp-error-message**
  Allow or deny ICMP error packets describing problems such as network/host/port unreachable, destination network/host unknown and so on.

- **tcp-appropriate-byte-count**
  Controls Appropriate Byte Count (ABC) settings. ABC is a way of increasing congestion window (cwnd) more slowly in response to partial acknowledgments.

  `tcp-appropriate-byte-count [ on | off ]`

- **fragmented-traffic**
  Allow or deny fragmented traffic. IP Fragmentation is the process of breaking down an IP datagram into smaller packets to be transmitted over different types of network media and then reassembling them at the other end. While Fragmentation is an integral part of the IP protocol, there are numerous ways in which attackers have used fragmentation to infiltrate and cause a denial of service to networks.

  `fragmented-traffic [ allow | deny ]`

- **tcp-est-idle-timeout**
  Set Idle Timeout between 2700 - 432000 seconds for TCP connections in the established state

  `tcp-est-idle-timeout [ 2700 - 432000 ]`

- **ftpbounce-prevention**
  Prevent FTP Bounce attack on FTP control and data connection. An FTP Bounce attack is when an attacker sends a PORT command to an FTP server, specifying the IP Address of a third party instead of the attacker's own IP Address. The FTP server then sends data to the victim machine.
ftpbounce-prevention [ control | data ]

- **tcp-frto**
  tcp-frto Off – Disables Forward RTO-Recovery (F-RTO). F-RTO is an enhanced recovery algorithm for TCP retransmission timeouts and it is particularly beneficial in wireless environments where packet loss is typically due to random radio interference rather than intermediate router congestion. F-RTO is sender-side only modification. Therefore it does not require any support from the peer.

  
tcp-frto [ on | off ]

- **midstream-connection-pickup**
  Configure midstream connection pickup settings. Enabling midstream pickup of TCP connections will help while plugging in the Sophos XG Firewall as a bridge in a live network without any loss of service. It can also be used for handling network behavior due to peculiar network design and configuration. E.g. atypical routing configurations leading to ICMP redirect messages. By default, XG Firewall is configured to drop all untracked (mid-stream session) TCP connections in both the deployment modes.

  midstream-connection-pickup [ on | off ]

- **tcp-selective-acknowledgement**
  tcp-selective-acknowledgement Off – Disables selective acknowledgement. Using selective acknowledgments, the data receiver can inform the sender about all segments that have arrived successfully, so the sender need retransmit only the segments that have actually been lost.

  tcp-selective-acknowledgement [ on | off ]

- **strict-icmp-tracking**
  Allow or Drop ICMP reply packets. Setting this option ‘on’ drops all ICMP reply packets.

  strict-icmp-tracking [ on | off ]

- **tcp-seq-checking**
  Every TCP packet contains a Sequence Number (SYN) and an Acknowledgement Number (ACK). Sophos XG Firewall monitors SYN and ACK numbers within a certain window to ensure that the packet is indeed part of the session. However, certain application and third party vendors use non-RFC methods to verify a packet's validity or for some other reason a server may send packets in invalid sequence numbers and expect an acknowledgement. For this reason, Sophos Firewall offers the ability to disable this feature. Default – ON

  tcp-seq-checking [ on | off ]

- **strict-policy**
  When strict policy is off, strict firewall policy is disabled.

  strict-policy [ on | off ]

- **tcp-timestamp**
  tcp-timestamp Off – Disables timestamps. Timestamp is an TCP option used to calculate the Round Trip Measurement in a better way than the retransmission timeout method.

  tcp-timestamp [ on | off ]

- **sys-traffic-nat**
  sys-traffic-nat [ add { destination ipaddress } | delete { destination ipaddress } | fragmentedtraffic { allow | deny } ]

- **tcp-window-scaling**
  tcp-window-scaling Off – Disables window scaling. The TCP window scaling increase the TCP receiving window size above its maximum value of 65,535 bytes.

  tcp-window-scaling [ on | off ]

- **udp-timeout-stream**
  Set up UDP timeout value between 30 - 3600 seconds for established UDP connections.
udp-timeout-stream [ 30 - 3600 ]
Default - 60 Seconds

• ipv6-unknown-extension-header
  Allow or drop IPv6 packets with unknown extension headers.
  ipv6-unknown-extension-header [ on | off ]

arp-flux
ARP flux occurs when multiple ethernet adaptors, often on a single machine, respond to an ARP query. Due to this, problem with the link layer address to IP Address mapping can occur. Sophos XG Firewall may respond to ARP requests from both Ethernet interfaces. On the machine creating the ARP request, these multiple answers can cause confusion. ARP flux affects only when Sophos XG Firewall has multiple physical connections to the same medium or broadcast domain.
  arp-flux [ on | off ]

  On
  Sophos XG Firewall may respond to ARP requests from both Ethernet interfaces when Sophos XG Firewall has multiple physical connections to the same medium or broadcast domain.

  Off
  Sophos XG Firewall responds to ARP requests from respective Ethernet interface when Sophos XG Firewall has multiple physical connections to the same medium or broadcast domain.

business-policy
Enable/disable mail notification for Fail-over of your application server.
  business-policy application-server [ failover { mail-notification (enable | disable) } ]

fqdn-host

  Cache TTL
  Set cache-ttl value for FQDN Host. The cache-ttl value represents the time (in seconds) after which the cached FQDN Host to IP Address binding will be updated.
  Range: 1 – 86400 seconds
  Default – 3600 seconds
  fqdn-host [ cache-ttl number | dns-reply-ttl ]
  dns-reply-ttl – use the ttl value in DNS reply packet as cache-ttl

  Idle Timeout
  The idle-timeout value represents the time (in seconds) after which the cached FQDN Host to IP Address binding is removed.
  Range: 60 – 86400 seconds
  Default – 3600 seconds
  fqdn-host [ idle-timeout ( number | default ) ]

http_proxy
Set proxy parameters

http_proxy [ add_via_header {on|off} | relay_invalid_http_traffic {on|off} | core_dump {on|off} ]

**ips**

Configure IPS settings.

**Syntax**


**Options**

- `enable_appsignatures[ on | off ]`
- `http_response_scan_limit<number>`
  
  Specify maximum file size (in KB) for scanning. Files exceeding this size received through HTTP will not be scanned.
  
  Default: 64 KB
- `ips-instance[ add | apply | clear ]`
  
  Manipulate number of IPS process instances created by init process
  
  `add` – Add IPS instance to the init list
  
  `apply` – Start IPS processes as given in the list
  
  `clear` – Clear IPS list for init process
- `ips_mmap[ on | off ]`
  
  Enable mmap to optimize RAM usage, especially in low-end devices.
  
  `on` – enable ips mmap
  
  `off` – disable ips mmap
  
  Default - on
- `lowmem-settings[ on | off ]`
  
  Set whether low memory settings to be applied or not.
  
  Low memory settings are applied in case of system having memory issues.
  
  `on` – enable low memory settings
  
  `off` – disable low memory settings
- `maxpkts[ <number>| all | default ]`
  
  Set number of packets to be sent for Application Classification
  
  `number` – any number above 8
  
  `all` - pass all of the session packets for application classification
  
  default - pass first 8 packets of the session of each direction for application classification (total 16)
- `maxsesbytes-settings[ update <number> ]`
  
  maxsesbytes-settings allows you to set the maximum allowed size. Any file beyond the configured size is bypassed and not scanned.
  
  Update – set the value for maximum bytes allowed per session
- `packet-streaming[ on | off ]`
  
  Set whether packet streaming is to be allowed or not.
packet-streaming is used to restrict streaming of packets in situations where system is experiencing memory issues.

  on - Enables packet streaming.
  off - disable packet streaming.

- **sip_preproc [ enable | disable ]**
  Set whether SIP preprocessor should be enabled or not. Enabling this will scan all the SIP sessions to prevent any network attacks.
  Default - enable

- **search_method [ ac-bnfa | ac-q | hyperscan ]**
  Set the search method for IPS signature pattern matching.
  - ac-bnfa (low memory, high performance)
  - ac-q (high memory, best performance)
  - hyperscan (low memory, best-performance)
  Default:
  - Hardware devices - hyperscan
  - Virtual and Software Appliances - ac-q

- **sip_ignore_call_channel [ enable | disable ]**
  Set whether the audio/video data channels should be ignored or not. Enable this to ignore such channels.
  Default - enable

**ips_conf**

Use this to add, delete or edit an existing IPS configuration entry.

- **on-box-reports [ add { key text value text } | del { key text } | update { key text value text } ]**

**lanbypass**

Enable/disable LAN Bypass

- **lanbypass [ off | on ]**

**network**

- **network [ interface-speed <port> | interfaces | macaddr <port> | mtu-mss <port> | lag-interface | static-route | static-route6 ]**

  interface-speed – Shows current interface speed settings.
  interfaces – Shows all network interfaces configuration

**Note:**

One or more LAG interface must be configured in the device to be able to view its configuration using the SHOW command from CLI.

macaddr – Shows original and overridden mac address of interface.

**on-box-reports**

Generate on-box reports.

Default – ON
on-box-reports [ off | on ]

port-affinity

Configure Port Affinity settings. Administrator can manually assign/unassign a CPU Core to a particular Interface. Once configured, all the network traffic for the Interfaces is handled by the assigned CPU Cores.

```
port-affinity [ add { port Port Name ( bind-with cpu | start-with cpu | cpu CPU Core ) } | defsetup | del { port Port Name } | fwnonlysetup ]
```

By default, your device is shipped with the factory-default Port Affinity settings.

**Note:**
- CPU Cores can be assigned to the binded Interfaces only.
- Port-affinity is not supported with ‘Legacy Network Adaptors’, when Virtual Security appliance is deployed in Microsoft Hyper-V.

proxy-arp

Add or delete proxy ARP

```
proxy-arp [ add { interface Port port name ( dst_ip ipaddress | dst_iprange < from_ip ipaddress | to_ip ipaddress > ) } | del { interface Port port name ( dst_ip ipaddress | dst_iprange < from_ip ipaddress | to_ip ipaddress > ) } ]
```

report-disk-usage

Set Watermark in percentage for the Report Disk usage. Watermark represents the allowed level up to which data can be written to the Report Disk.

Watermark range: 60 – 85
Default – 80%

```
report-disk-usage [ watermark { number | default } ]
```

In case the Report Disk usage increases more than the set Watermark level, administrator is shown a warning message saying the Report Disk usage is more than the set Watermark level.

In case the Report Disk usage increases more than 90%, no additional data will be allowed to be written to the Report Disk until the Report Disk usage is reduced to the set Watermark level.

routing

multicast-group-limit [ 20 - 4096 ]

Set the maximum number of Multicast Groups that can be configured. Valid range: 20-4096

source-base-route-for-alias [ Enable | Disable ]

Set the status of source base route for WAN alias. By default, it is disabled.

service-param

By default, Sophos XG Firewall inspects all inbound HTTP, HTTPS, FTP, SMTP/S, POP and IMAP traffic on the standard ports. “service-param” enables inspection of HTTP, HTTPS, FTP, SMTP/S, POP, IMAP, IM – MSN and Yahoo traffic on nonstandard ports also.

```
service-param [ FTP { add port number | delete port number } | HTTP { add | delete } | HTTPS ( deny_unknown_proto { on | off } ) | IMAP { add | delete } | IM_MSN { add | delete } | IM_YAHOO { add | delete } | POP { add | delete } | SMTP { add | delete | failiure_notification { on | off } | notification-port (]
```
add < port port_value > | strict-portal-check ( on | off ) | SMTPS ( add ( port port_value ) | delete ( port port_value ) | invalid-certificate ( allow | block ) )

- add Port < port name > – enable inspection for a specified port number.
- delete Port < port name > - disable inspection for a specified port number.
- deny_unknown_proto - Allow/deny traffic not following HTTPS protocol i.e. invalid traffic through HTTPS port
- Default – ON
- invalid_certificate - If you enable HTTPS or SMTPS scanning, you need to import SecurityAppliance_SSL_CA certificate in your browser for decryption of SSL traffic, otherwise your browser will always give a warning page when you try to access any secure site. “Invalid Certificate error” warning appears when the site is using an invalid SSL certificate. Sophos XG Firewall blocks all such sites. Use this command, if you want to allow access to such sites.

Note: For SMTPS Scanning - CA certificate used by Sophos XG Firewall to sign certificate should be added in the certificate store of your Email client.

**vpn**

Set authentication protocol for l2tp and pptp connections. For l2tp, Maximum Transmission Unit (MTU) can be configured.

MTU range: 576 – 1460

Default: 1410

```
vpn [ l2tp { authentication ( ANY | CHAP | MS_CHAPv2 | PAP ) | mtu ( number ) } | pptp { authentication ( ANY | CHAP | MS_CHAPv2 encryption < NONE | SOME | STRONG | WEAK | PAP ) } ]
```

**Partition Reset support**

File System Integrity check verifies all the partitions for corruption. Check is enabled automatically when the device goes in failsafe mode.

It is required to flush the partitions if device comes up in failsafe mode even after the integrity check. RESET command is extended to include commands to flush partitions. With these commands, administrator can reset the config, signature and report partition. Entire data will be lost, as the partition will be flushed.

Integrity check repairs the partition while resetting partition removes entire data from the partition.

Command Usage:

When you type RESET at the Serial Console Password prompt, menu with 3 options is provided:

- Reset configuration.
- Reset configuration and signatures.
- Reset configuration, signatures and reports.

**show**

Displays various parameters configured for firewall.

```
advance_firewall [ arp-flux | business-policy | country-host | date | fqdn-host | http_proxy | ips-settings | ips-config | lan-bypass | lcd | network | on-box-reports | port-affinity | pppoe | proxy-arp | report-disk-usage | routing multicast-group-limit | service-param | vpn ]
```

- **advanced-firewall**
  Shows firewall configuration.

1. Strict policy
2. FtpBounce Prevention
3. TCP Conn. Establishment Idle Timeout
4. UDP Timeout Stream
5. Fragmented Traffic Policy
6. Midstream Connection Pickup
7. TCP Seq Checking
8. TCP Window Scaling
9. TCP Appropriate Byte Count
10. TCP Selective Acknowledgements
11. TCP Forward RTO-Recovery [F-RTO]
12. TCP TIMESTAMPPS
13. Strict ICMP Tracking
14. ICMP error message

• routing multicast-group-limit
  Displays the maximum number of Multicast Groups that can be configured.

**system**

You can perform following SF system configurations using system command:
- Allow access to SF services
- Application classification/categorization
- Enable authentication
- Configure VLAN tags
- Configure wireless protection and WWAN
- Bridge management
- DHCP and DHCPv6 management
- Device diagnostics
- Firewall acceleration configuration
- HA
- Manage static IPsec routes, link failover over VPN, route precedence, system modules

**appliance_access**

To override or bypass the configured Device Access settings and allow access to all the Sophos Firewall services. Default – Disabled.

Enable and disable event will be logged in Admin Logs.

**Syntax**

appliance_access [disable | enable | show]

**Options / Keywords & Variables**

Disable - Disable to re-apply Device Access.
Enable - Enable Device Access.
Show - Show Device Access Status.

**application_classification**

application_classification [ microapp-discovery { on | off | show } | on | off | show ]

If application classification is enabled, traffic is categorized on the basis of application, and traffic discovery live connections that is displayed on Admin Console, is displayed based on the application.
Once application_classification is enabled, you can enable microapp_discovery, which identifies and classifies microapps used within web browsers.

If application_classification is disabled, traffic is categorized on port-based applications, and traffic discovery based on applications does not display any signature-based application.

Default – ON

Note: application_classification must be ON to enable Micro App_Discovery.

auth

auth[ctathin-client]

Manage cta options

auth[cta{collector|enable|unauth-traffic|disable|show|vpnzonenetwork}]  
Enable authentication: transparent authentication, thin client authentication for AD users

• Manage collector options  
  cta - Add and remove CTA collector IP Address for clientless Single Sign On configuration.  
  • To add a collector in new group
    auth cta[collector{addcollector-ip collector-port port create-new-collector-group}]
  • To add a collector in an existing collector group
    auth cta[collector{addcollector-ip collector-port port collector-groupgroup-number}]
  • To delete a collector IP
    dhcp[dhcp-options {binding show {dhcpname dhcp server name}]

• To enable cta
  auth cta[enable]

• Manage drop period for unauthenticate traffic options
  auth cta[unauth-trafficdrop-period]
  • To configure the default drop period for unauthenticated traffic
    auth cta[unauth-trafficdrop-perioddefault]
  • To manually configure the drop period for unauthenticated traffic
    auth cta[unauth-trafficdrop-period0-120]

• To disable cta
  auth cta[disable]

• To display all cta configurations
  auth cta[show]

• Manage VPN zone Network options
  auth cta[vpnzonenetwork]
  • To add source-network IP address
    auth cta[vpnzonenetwork{add source networkipaddress}]
  • To delete source-network IP Address
    auth cta[vpnzonenetwork{delete source networkipaddress}]
**Manage thin-client options**

thin-client – add and remove citrix server IP Address for thinclient support.

auth[thin-client{add|delete|show}]

- **To add a thin-client IP Address**
  auth[thin-client{addcitrix-ip|ipaddress}]

- **To delete a thin-client IP Address**
  auth[thin-client{deletecitrix-ip|ipaddress}]

- **To add a thin-client IP Address**
  auth[thin-client{show}]

**bridge**

Use the bypass - firewall - policy command to configure policy for unknown network traffic (non - routable traffic) on which no Security Policy is applied.

bridge[bypass-firewall-policy{unknown-network-traffic} | static-entry]

**Manage bypass-firewall-policy options**

bypass-firewall-policy[unknown-network traffic{allow | drop | show}]

- **To allow unknown network traffic**
  allow - allow unknown network traffic to pass through system
  bypass-firewall-policy[unknown-network traffic{allow}]

- **To drop unknown network traffic**
  drop - do not allow unknown network traffic to pass through system
  bypass-firewall-policy[unknown-network traffic{drop}]

- **To view bypass status for unknown network traffic**
  show - display unknown traffic bypass status
  bypass-firewall-policy[unknown-network traffic{show}]

**Manage static-entry options**

Use static - entry for Static MAC configuration in Bridge Mode. Bridge forwarding table stores all the MAC addresses learned by the Bridge and is used to determine where to forward the packets.

static-entry[add|delete|show]

add - add a new static entry in bridge MAC table.

delete - delete an existing static entry from bridge MAC table

show - show all static entries in bridge table

- **To add a static entry**
  staticentry[add{interface (bridge name : Port) macaddrMAC address|priority (dynamic | static)}]

**dhcp**

Sophos XG Firewall supports configuration of DHCP options, as defined in RFC 2132. DHCP options allow users to specify additional DHCP parameters in the form of pre-defined, vendor-specific information that is stored in the options field of a DHCP message. When the DHCP message is sent to clients on the network, it provides vendor-
specific configuration and service information. Appendix A provides a list of DHCP options by RFC-assigned option number.

dhcp [ dhcp-options | lease-over-IPsec | one-lease-per-client | static-entry-scope ]

Manage DHCP options

dhcp [ dhcp-options { add | binding | delete | list } ]

• To add a custom DHCP option
  dhcp [ dhcp-options { add optioncode 1-255 optionname String optiontype { array-of | one-byte | two-byte | four-byte | ipaddress | string | boolean } } ]

• To delete a custom DHCP option
  dhcp [ dhcp-options { delete optionname optionname } ]

• To display all configurable DHCP option
  dhcp [ dhcp-options { list } ]

• To manage additional options for DHCP Server
  • Add option to DHCP Server
    dhcp [ dhcp-options { binding add (dhcpname DHCP Server name optionname DHCP options value text ) } ]
  • Delete option from DHCP Server
    dhcp [ dhcp-options { binding delete { dhcpname dhcp server name } } ]
  • Show options assigned to DHCP Server
    dhcp [ dhcp-options { binding show { dhcpname dhcp server name } } ]

Manage IP Lease over IPsec

• To disable IP Lease over IPsec for all DHCP Servers (Default Value)
  dhcp [ lease-over-IPsec { disable } ]

• To enable IP Lease over IPsec for all DHCP Servers
  dhcp [ lease-over-IPsec { enable } ]

• To display all IP Lease over IPsec configuration
  dhcp [ lease-over-IPsec { enable } ]

Manage IP lease for Client

dhcp [ one-lease-per-client { enable | disable | show } ]

• To enable one lease per client for all DHCP servers
  dhcp [ one-lease-per-client { enable } ]

• To disable one lease per client for all DHCP servers
  dhcp [ one-lease-per-client { disable } ]

• To view one lease per client configuration
  dhcp [ one-lease-per-client { show } ]

Manage scope of Static lease

dhcp [ static-entry-scope { global | network | show } ]

dhcppv6
Sophos XG Firewall supports configuration of DHCPv6 options, as defined in RFC 3315. DHCPv6 options allow users to specify additional DHCPv6 parameters in the form of pre-defined, vendor-specific information that is stored in the options field of a DHCPv6 message. When the DHCPv6 message is sent to clients on the network, it provides vendor-specific configuration and service information. Appendix B provides a list of DHCPv6 options by RFC-assigned option number.

```bash
dhcpv6[ dhcpv6-options]
```

### Manage DHCPv6 options

```bash
dhcpv6[ dhcpv6-options { add | binding | delete | list } ]
```

- **To add a custom DHCPv6 option**
  ```bash
dhcpv6[ dhcpv6-options { add optioncode 1-65535 optionname String optiontype { array-of | one-byte | two-byte | four-byte | ipv6address | string | boolean } }]
```

- **To delete a custom DHCPv6 option**
  ```bash
dhcpv6[ dhcpv6-options { delete optionname }]
```

- **To display all configurable DHCPv6 option**
  ```bash
dhcpv6[ dhcpv6-options { list }]
```

- **To manage additional options for DHCPv6 Server**
  ```bash
dhcpv6[ dhcpv6-options { binding add { dhcpname DHCPv6 Server name optionname DHCP options value text } }]
```

- **Delete option from DHCPv6 Server**
  ```bash
dhcpv6[ dhcpv6-options { binding delete { dhcpname dhcpv6 server name } }]
```

- **Show options assigned to DHCPv6 Server**
  ```bash
dhcpv6[ dhcpv6-options { binding show { dhcpname dhcpv6 server name } }]
```

### diagnostics

Various tools to check device health.

#### Syntax

```bash
diagnostics[ ctr-log-lines | purge-old-logs | subsystems | purge-all-logs | show | utilities]
```

1. **To take last n lines for Consolidated Troubleshooting Report (CTR)**
   ```bash
diagnostics[ ctr-log-lines <250-10000>]
```
   - **ctr-log-lines** – set number of lines to display in Consolidated Troubleshooting Report (CTR) log file.
   - Default = 1000.

2. **To truncate all rotated logs**
   ```bash
diagnostics[ purge-old-logs ]
```
   - **purge-old-logs** – purge all rotated log files

3. **To configure Subsystems**
   ```bash
diagnostics[ subsystems { Access-Server | Bwm | CSC | IM | IPSEngine | LoggingDaemon | Msyncd | POPIMAPDaemon | Pktcapd | SMTPD | SSLVPN | SSLVPN-RPD | WebProxy | Wifiauthd }]
```
   - **subsystems** – configure each subsystem individually.

Configuration options include: debug, purge-logs and purge-oldlogs

#### Manage Access Server options
diagnostics[ subsystems { Access-Server ( debug | purge-log | purge-old-log ) }]

Enable/Disable Access Server debug
diagnostics[ subsystems { Access-Server ( debug <on | off> ) }]

To truncate all logs
diagnostics[ purge-log ]

To truncate all rotated logs
diagnostics[ purge-old-log ]

Manage CSC options
diagnostics[ subsystems { CSC ( debug | purge-log | purge-old-log ) }]

Enable/Disable CSC debug mode
diagnostics[ subsystems { CSC ( debug <on | off> ) }]

To truncate all logs
diagnostics[ purge-log ]

To truncate all rotated logs
diagnostics[ purge-old-log ]

Note:

• Here we are showing management options for two subsystems only since all except CSC offers same three configuration options i.e. to enable/disable debug mode, to truncate all logs and to purge old logs.
• In case of CSC, the debug mode differs a little. In all the subsystems administrator has an option to enable/disable debug mode, while in CSC the debug mode can only be toggled.

4. To truncate all logs
diagnostics[ purge-all-logs ]

5. To view diagnostic statistics
diagnostics[ show { cpu | interrupts | syslog | version-info | ctr-log-lines | memory | syslog | disk | subsystem-info | uptime } ]

6. To view utilities statistics
diagnostics[ utilities{ arp | dnslookup6 | route | bandwidthmonitor | drop-packet-capture | route6 | connections | ping | traceroute | dnslookup | ping6 | traceroute6 } ]

Note:

• SSLVPN option will be visible in all the models except CR15i and CR15wi models.
• Wifiauthd option will be visible in Local Wi-Fi Devices only.
• Msynsd option will be visible in all the models except CR15i, CR10iNG, CR10wiNG, CR 15iNG, CR15wi, CR 15wiNG, CR25wi, CR25wiNG/6P CR35wi and CR35wiNG models.

discover-mode

Use to configure one of more interfaces of Sophos XG Firewall in Discover Mode.
discover-mode[tap{ (addPort_Name|deletePort_Name) | show}]
• add - configure an interface in Discover mode
  
  For Example: discover-mode [tap {addPort-D}]

• delete - remove an interface from Discover mode

  For example: discover-mode [tap {deletePort-D}]

• show - use to view ports configured in Discover mode, if any

firewall-acceleration

Use to enable Firewall Acceleration that uses advanced data-path architecture that enables Sophos XG Firewall with faster processing of data packets for known traffic.

Firewall-acceleration (enable | disable | show)

  • enable - use to enable firewall acceleration. This is the default option.
  • disable - use to disable firewall acceleration.
  • show - use to view status of firewall acceleration configuration.

fsck-on-nextboot

Check file system integrity of all the partitions. Turning ON this option forcefully checks the file system integrity on next device reboot. By default, check is OFF but whenever device goes in failsafe due to following reasons, this check is automatically turned ON:

  • Unable to start Config/Report/Signature Database
  • Unable to Apply migration
  • Unable to find the deployment mode

fsck-on-nextboot [ off | on | show ]

Once the check is turned ON, on the boot, all the partitions will be checked. The check will be turned OFF again on the next boot.

If the option is ON and the device boots up due following reasons, then file system check will not be enforced and option will be disabled after boot:

  • Factory reset
  • Flush Device Report

gre

gre [ route | tunnel ]

Configure, delete, set TTL and status of gre tunnel, view route details like tunnel name, local gateway network and netmask, remote gateway network and netmask.

For GRE Tunnel

gre [ tunnel { add | del | set | show } ]

1. To add a GRE Tunnel

   gre [ tunnel { add ( name tunnel-name local-gw WAN_Interface remote-gw Remote_WAN_IP local-ip LocalIP remote-remote-ip RemoteIP ) } ]

2. To list GRE Tunnel

   gre [ tunnel { show ( local-gw | name ) } ]

3. To set TTL for GRE Tunnel

   gre [ tunnel { set ( name tunnel-name ttl ttlvalue ) } ]

4. To set state of GRE Tunnel
5. To delete GRE Tunnel
   a. `gre tunnel { del ( name tunnel-name local-gw WAN_Interface remote-gw Remote_WAN_IP ) }`
   b. `gre [ tunnel { del ( name tunnel-name ) } ]`
   c. `gre [ tunnel { del ( All ) } ]`

6. To check status of GRE Tunnel
   `gre [ tunnel { show ( name tunnel-name local-gw WAN_Interface remote-gw Remote_WAN_IP ) } ]`

**Unicast Routing Support in GRE**

`gre [ route { add | del | show } ]`

1. To add an Unicast Route for Network
   `gre [ route { add ( net network tunnelname tunnel-name ) } ]`

2. To add an Unicast Route for Host
   `gre [ route { add ( host IP tunnelname tunnel-name ) } ]`

3. To delete an Unicast Route for Network
   `gre [ route { del ( net network tunnelname tunnel-name ) } ]`

4. To delete an Unicast Route for Host
   `gre [ route { del ( host IP tunnelname tunnel-name ) } ]`

5. To see all the networks and hosts with respective GRE Tunnels
   `gre [ route { show } ]`

**ha**

High Availability Options

`ha [ disable | load-balancing ( off | on ) | show { details | logs ( lines number ) } ]`

- `disable` - Option to disable HA. One can enable HA from Admin Console – System > HA.
- `load-balancing` – Option to disable traffic load balancing between the cluster device. By default, as soon as Active-Active is configured, traffic load balancing is enabled.
- `show` – Displays HA configuration details like HA status and state, current and peer device key, dedicated port and IP Address, load balancing and Auxiliary Administrative port and IP Address. It also displays HA logs if HA is configured.

**hardware_acceleration**

This command is available only for XG 125, XG 135 and XG 750 appliances.

Use to enable hardware acceleration for IPsec VPN traffic to increase throughput of Sophos XG Firewall.

`hardware_acceleration ( disable | enable | statistics | status )`

- `disable` - use to disable hardware acceleration.
- `enable` - use to enable hardware acceleration. This is the default option.
- `statistics` - reserved for future use.
- `status` - use to view current configuration status.

**ipsec_route**

Configure IPSec routes and view route details like tunnel name, host/network and netmask.

`IPsec_route [ add | delete | show ]`

- To add an IPSec Route for Host
IPsec_route[add {hostIP tunnelname Tunnel name }]

• To add an IPsecRoute for Network
IPsec_route[add {netNetwork address/Mask tunnelname Tunnel name }]

• To delete an IPsecRoute for Host
IPsec_route[del {hostIP tunnelname Tunnel name }]

• To delete an IPsecRoute for Network
IPsec_route[del {netNetwork address/Mask tunnelname Tunnel name }]

• To see all the networks and hosts with respective IPsecTunnels
IPsec_route[show]

link_failover

VPN can be configured as a Backup link. With this, whenever primary link fails, traffic will be tunneled through VPN connection and traffic will be routed again through the primary link once it is UP again.

Syntax
link_failover[ add | del | show ]

1. Manage Add Link Fail-over options
link_failover[ add { primarylink Port<Port Name> backuplink ( gre | vpn )}]

To configure GRE Tunnel as a Backup link using PING
link_failover[ add { primarylink Port<Port Name> backuplink gre tunnel <gre tunnel name> monitor PING host <ip address>}]

To configure GRE Tunnel as a Backup link using TCP
link_failover[ add { primarylink Port<Port Name> backuplink gre tunnel <gre tunnel name> monitor TCP host <ip address> port <Port Number>}]

To configure an IPsec/VPN connection as a Backup link using PING

link_failover[ add { primarylink Port<Port Name> backuplink vpn tunnel <IPSec Connection Name> monitor PING host <ip address>}]

To configure an IPsec/VPN connection as a Backup link using TCP

link_failover[ add { primarylink Port<Port Name> backuplink vpn tunnel <IPSec Connection Name> monitor TCP host <ip address> port <Port Number>}]}

2. To delete link failover configuration
link_failover del primarylink <port name>

3. To display all link failover configuration
link_failover show

restart

Restart Sophos XG Firewall.
restart[all]
route_precedence

Set the route precedence.

route_precedence [set | show]

Default route lookup order is as follows:

1. Policy Route
2. VPN Route
3. Static Route
4. Default Route

Manage Set Route Precedence options

route_precedence [set {policyroute | vpn | static}]

• To configure higher precedence for Static Routes
  route_precedence [set {staticvpn | policyroute}]

• To configure higher precedence for VPN Routes
  route_precedence [set {vpn | static | policyroute}]

To display Route Precedence configuration

route_precedence [show]

shutdown

Shutdown Sophos XG Firewall.

shutdown

system_modules

Load or unload the system modules like h23, irc, sip, tftp.

By default, all the modules are loaded.

Load/unload modules to enhance the network performance and reduce the potential security risk.

system_modules [h23 {load | unload} | irc {load (port <string | default >) | unload} |pptp {load | unload} | sip {load (port <string | default >) | unload} |tftp {load (port <string | default >) | unload} | show]

H323 - The H.323 standard provides a foundation for audio, video, and data communications across IP-based networks, including the Internet. H.323 is an umbrella recommendation from the International Telecommunications Union (ITU) that sets standards for multimedia communications over Local Area Networks (LANs) that do not provide a guaranteed Quality of Service (QoS). It enables users to participate in the same conference even though they are using different videoconferencing applications.

PPTP - PPTP (Point to Point Tunneling Protocol) is a network protocol that enables secure transfer of data from a remote client to a private server, creating a Point to Point VPN tunnel using a TCP/IP based network.

IRC - IRC (Internet Relay Chat) is a multi-user, multi-channel chatting system based on a client-server model. Single Server links with many other servers to make up an IRC network, which transport messages from one user (client) to another. In this manner, people from all over the world can talk to each other live and simultaneously. DoS attacks are very common as it is an open network and with no control on file sharing, performance is affected.

SIP – SIP (Session Initiation Protocol) is a signaling protocol which enables the controlling of media communications such as VOIP. The protocol is generally used for maintaining unicast and multicast sessions consisting of several media systems. SIP is a text based and TCP/IP supported Application layer protocol.
**TFTP** - Trivial File Transfer Protocol (TFTP) is a simple form of the File Transfer Protocol (FTP). TFTP uses the User Datagram Protocol (UDP) and provides no security features.

**dos-config**

Use to configure Denial of Service (DoS) policies and rules. You can enable flood protection for ICMP/TCP/UDP/IP flood types by configuring maximum packets per second to be allowed per source/destination. If the traffic exceeds the limit then device considers it an attack.

**Add DoS policy/rule**

- To add a DoS policy.

  dos-config [add|delete|flush|show]

  ```
  dos-config [add {dos-policy policy_name policy_name \{ICMP-Flood|IP-Flood|SYN-Flood|UDP-Flood\} 1-10000 pps \{global | per-dst | per-src\} ]
  
  per-src: Configure packets per second (pps) allowed from a single source, above which device will drop the packets. The limit is applicable to individual source requests per user/IP address.
  
  per-dst: Configure packets per second (pps) allowed to a single destination. The limit is applicable to individual destination requests per user/IP address.
  
  global: Apply the limit on the entire network traffic regardless of source/destination requests.
  
  With per-src option configured, if the source rate is 2500 packets/second and the network consists of 100 users then each user is allowed a packet rate of 2500 packets per second.
  
  With global option selected, if limit configured is 2500 packets/second and the network consists of 100 users then only 2500 packets/second are allowed to the entire traffic coming from all the users.
  
- Add a DoS rule, specify the criteria to match the traffic in the DoS rule and attach it to a DoS policy.

  dos-config [add {dos-rule rule_name rule_name \{srcip sourceip | dstip destinationip netmask netmask\} protocol \{icmp | ip | tcp | udp\} \{rule-position number \{src-interface Physical Interface Name src-zone \{DMZ | LAN | VPN | WAN | WiFi | custom zone\} \} dos-policy policy_name ]

  Specify the source/destination IP address for which you want to enable flood protection.

  dos-config [add {dos-rule rule_name rule_name \{srcip sourceip | dstip destinationip netmask netmask\} dos-policy policy_name ]

  Enable flood protection for the protocol.

  dos-config [add dos-rule rule_name rule_name \{icmp | ip | tcp | udp\} dos-policy policy_name ]

  Enable flood protection for ICMP protocol.

  dos-config [add dos-rule rule_name rule_name \{icmp icmptype 0-40 icmptype 0-15\} dos-policy policy_name ]

  Enable flood protection for IP protocol.

  dos-config [add dos-rule rule_name rule_name \{ip protonumber 0-142\} dos-policy policy_name ]

  Enable flood protection for TCP protocol.

  dos-config [add dos-rule rule_name rule_name \{tcp dport 1-65535\} dos-policy policy_name ]

  Enable flood protection UDP protocol.

  dos-config [add dos-rule rule_name rule_name \{udp dport 1-65535\} dos-policy policy_name ]

  Specify the zone/interface you want to protect.

  dos-config [add dos-rule rule_name rule_name \{src-interface Physical Interface Name src-zone \{DMZ | LAN | VPN | WAN | WiFi | custom zone\} \} dos-policy policy_name ]
Delete DoS policy/rule

- To delete a DoS policy
  ```
  dos-config{delete{dos-policy policy-name policy_name }}
  ```
- To delete a DoS rule
  ```
  dos-config{delete{dos-rule rule-name rule_name }}
  ```

Flush Dos rules

```dos-config{flush{dos-rules}}
```

View configured DoS rules/policies

- `dos-config[show {dos-rules | dos-policies}]`
- To view a DoS rule
  ```
  dos-config[show {dos-rules rule-name rule_name}]
  ```
- To view a DoS policy
  ```
  dos-config[show {dos-policies policy-name policy_name}]
  ```
- To view all configured DoS policies
  ```
  dos-config[show {dos-policies }]
  ```
- To view all configured DoS rules
  ```
  dos-config[show {dos-rules }]
  ```

In terms of precedence, DoS policies are applied in the following order:

- **DoS Bypass rules**: They have the highest precedence and traffic will be matched first with configured bypass rules.
- **Policies/rules configured using CLI commands**: If traffic does not match any configured bypass rule, then policies configured through CLI will be applied.
- **Global DoS Settings**: DoS Settings are applied last if traffic doesn't match either of DoS bypass rule or policies.

For e.g., If a DoS policy is configured with 500 maximum packets per second for a source and the traffic hitting the DoS policy exceeds the limit, device will ignore flooding, as bypass rule for the same source is configured. If no bypass rule is configured and traffic hitting the DoS policy exceeds the limit, then device will consider it an DoS attack.

**vlan-tag**

Set vlan tag on traffic which is originated by Sophos XG Firewall and do not fall in any Security Policy.

- **VLAN tag**
  ```
  vlan-tag[reset|set|show]
  ```
- To reset vlanid
  ```
  reset-reset or remove vlanid on bridge-interface
  ```
  ```
  vlan-tag[reset{interface interface-bridge}]
  ```
- To set vlanid
  ```
  set --set vlanid 0-4094 on bridge interface.
  ```
  ```
  vlan-tag[set{interface test vlanid number}]
  ```
- To display the configured vlanid
  ```
  show --show configured vlan tags on bridge interface(s).
  ```
  ```
  vlan-tag[show]
wireless-controller

The debuglevel parameter configures the debugging level the device will use when logging. The level parameter must be between 0 (lowest) and 15 (highest).

The log_level parameter configures the logging level the device will use. When an event is logged, it is printed into the corresponding log if the log level of the message is equal or higher than the configured log level. The level parameter must be between 0 (lowest) and 7 (highest).

Packets bound for devices within the WLAN need to go to the correct destination. The SSID keeps the packets within the correct WLAN, even when overlapping WLANs are present. However, there are usually multiple Aps within each WLAN, and here has to be a way to identify those Aps and their associated clients. This identifier is called a basic service set identifier (BSSID) and is included in all wireless packets. Put simply, each AP Has its own BSS, which helps identify clients associated with each AP.

The tunnel_id_offset parameter value must be between 0 (lowest) and 65535 (highest).

Syntax

wireless-controller global[ ap_autoaccept | ap_debuglevel | log_level | show | store_bss_stats | tunnel_id_offset ]

To enable auto-accept of Access Points (APs)

wireless-controller global[ ap_autoaccept {1}]

To disable auto-accept of Access Points (APs)

wireless-controller global[ ap_autoaccept {0}]

Set the debugging output level

wireless-controller global[ ap_debuglevel <number>]

Set the log level value

wireless-controller global[ log_level <number>]

To enable storing of basic service set (BSS) identifier

wireless-controller global[ store_bss_stats {1}]

To disable storing of basic service set (BSS) identifier

wireless-controller global[ store_bss_stats {0}]

To set tunnel ID offset value

wireless-controller global[ tunnel_id_offset <number>]

To view the configured Wireless Protection settings

wireless-controller global show

cellular_wan

Enable or disable Cellular WAN and view information of the Wi-Fi modem information (if plugged-in). Cellular WAN menu will be available on Admin Console only when cellular wan is enabled from CLI.

cellular_wan [ disable | enable | query | set | show ]
To disable Cellular WAN
cellular_wan[disable]

To enable Cellular WAN
cellular_wan[enable]

Manage Cellular WAN Query options
cellular_wan[ {serialport serial port number} AT command command string ]

Manage Cellular WAN Set options
cellular_wan[ set { disconnect-on-systemdown (off | on) } | { modem-setup-delay number } ]

To display Cellular WAN configuration
cellular_wan[show]

Serial dial-in
This command is available only in CR15i, CR10iNG, CR10wiNG, CR15iNG, CR15wi and CR 15wiNG devices.
serial_dialin[ enable | disable | modem-nvram { reset | save-init-string } ]
Enable/Disable serial dial-in or DB9.
enable – Enables serial dial-in feature. Modem can be connected to Sophos XG Firewall’s serial (COM) port.
disable – Disable serial dial-in feature.
modem-nvram to save/reset init string in modem.
reset – Reset init string in modem to factory default value.
save – Save pre-configured init string in modem's memory.

tcpdump
tcpdump prints out the headers of packets on a network interface that match the boolean expression. Only packets that match expression will be processed by tcpdump.

Syntax
tcpdump [<text> | count | filedump | hex | interface | llh | no_time | quite | verbose ]

Parameter list & description

<text>
Packet filter expression. Based on the specified filter, packets are dumped. If no expression is given, all packets are dumped else only packets for which expression is 'true' are dumped. The expression consists of one or more primitives. Primitives usually consist of an id (name or number) proceeded by one or more qualifiers. Refer to the below given table on writing filtering expressions.

count
Exit after receiving count packets.

filedump
Tcpdump output can be generated based on criteria required.

hex
Print each packet (minus its link level header) in hexadecimal notation.

**interface**

Listen on `<interface>`.

**llh**

View packet contents with Ethernet or other layer 2 header information.

**no_time**

Do not print a timestamp on each dump line.

**quite**

Print less protocol information so output lines are shorter.

**verbose**

Verbose output. For example, the time to live, identification, total length and options in an IP packet are printed. Also enables additional packet integrity checks such as verifying the IP and ICMP header checksum.

### How to view traffic of the

<table>
<thead>
<tr>
<th>How to view traffic of the</th>
<th>tcpdump command</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>specific host</td>
<td><code>tcpdump 'host &lt;ipaddress&gt;'</code></td>
<td><code>tcpdump 'host 10.10.1.1'</code></td>
</tr>
<tr>
<td>specific network</td>
<td><code>tcpdump 'net &lt;network address&gt;'</code></td>
<td><code>tcpdump 'net 10.10.0.0'</code></td>
</tr>
<tr>
<td>specific source network</td>
<td><code>tcpdump 'src net &lt;network address&gt;'</code></td>
<td><code>tcpdump 'src net 10.10.0.0'</code></td>
</tr>
<tr>
<td>specific destination network</td>
<td><code>tcpdump 'dst net &lt;network address&gt;'</code></td>
<td><code>tcpdump 'dst net 10.10.0.0'</code></td>
</tr>
<tr>
<td>specific port</td>
<td><code>tcpdump 'port &lt;port-number&gt;'</code></td>
<td><code>tcpdump 'port 21'</code></td>
</tr>
<tr>
<td>specific source port</td>
<td><code>tcpdump 'src port &lt;port-number&gt;'</code></td>
<td><code>tcpdump 'src port 21'</code></td>
</tr>
<tr>
<td>specific destination port</td>
<td><code>tcpdump 'dst port &lt;port-number&gt;'</code></td>
<td><code>tcpdump 'dst port 21'</code></td>
</tr>
<tr>
<td>specific host for the particular port</td>
<td><code>tcpdump 'host &lt;ipaddress&gt; and port &lt;port-number&gt;'</code></td>
<td><code>tcpdump 'host 10.10.1.1 and port 21'</code></td>
</tr>
<tr>
<td>the specific host for all the ports except SSH</td>
<td><code>tcpdump 'host &lt;ipaddress&gt; and port not &lt;port-number&gt;'</code></td>
<td><code>tcpdump 'host 10.10.1.1 and port not 22'</code></td>
</tr>
<tr>
<td>specific protocol</td>
<td><code>tcpdump 'proto ICMP'</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>tcpdump 'proto UDP'</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>tcpdump 'proto TCP'</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>tcpdump 'arp'</code></td>
<td></td>
</tr>
<tr>
<td>particular interface</td>
<td><code>tcpdump interface &lt;interface&gt;</code></td>
<td><code>tcpdump interface PortA</code></td>
</tr>
<tr>
<td>specific port of a particular interface</td>
<td><code>tcpdump interface &lt;interface&gt; 'Port &lt;port-number&gt;'</code></td>
<td><code>tcpdump interface PortA 'port 21'</code></td>
</tr>
</tbody>
</table>

**Note:** Expressions can be combined using logical operators AND or OR and with NOT also. Make sure to use different combinations within single quotes.

**telnet**

Use telnet protocol to connect to another remote computer.
Syntax
telnet\[<ipaddress>\]

Parameter list & description
ipaddress \{<port number>\}

official name, an alias, or the Internet address of a remote host

Port - indicates a port number (address of an application). If a number is not specified, the default
telnet port is used.

telnet6

Use telnet protocol to connect to another remote computer.

Syntax
telnet6\[<ipaddress6>\]

Parameter list & description
ipaddress6 \{<port number>\}

official name, an alias, or the Internet address of a remote host

Port - indicates a port number (address of an application). If a number is not specified, the default
telnet port is used.

traceroute

Use to trace the path taken by a packet from the source system to the destination system, over the Internet.

The Internet is a large and complex aggregation of network hardware, connected together by gateways. Tracking
the route one's packets follow (or finding the miscreant gateway that is discarding your packets) can be difficult.
Traceroute utilizes the IP protocol 'time to live (TTL)' field and attempts to elicit an ICMP TIME_EXCEEDED
response from each gateway along the path to some host.

Syntax
traceroute \[<ipaddress>|<string>|first-ttl|icmp|max-ttl|no-frag|probes|source|timeout|tos]\n
Parameter list & descriptions

\<ipaddress> \[size \<number>\]

Set the IP Address to be traced.

\<string> \[size \<number>\]

Set the domain to be traced.

first-ttl

Set the initial time-to-live used in the first outgoing probe packet.

icmp

Use ICMP ECHO instead of UDP datagrams.

max-ttl

Set the max time-to-live.

no-frag
Set the 'don't fragment' bit.

**probes**
Probes are sent at each ttl.
Default - 3

**source**
Use given IP Address as source address.

**timeout**
Set the timeout - in seconds for a response to a probe.
Default 5

**tos**
Set the type-of-service.

---

**traceroute6**

Use to trace the path taken by a packet from the source system to the destination system, over the Internet.

The Internet is a large and complex aggregation of network hardware, connected together by gateways. Tracking the route one's packets follow (or finding the miscreant gateway that is discarding your packets) can be difficult. Traceroute utilizes the IP protocol 'time to live (TTL)' field and attempts to elicit an ICMP TIME_EXCEEDED response from each gateway along the path to some host.

**Syntax**

```
traceroute6 [<ipaddress6>|<string>| first-ttl | icmp | max-ttl | no-frag | probes | source | timeout | tos]
```

**Parameter list & descriptions**

- `<ipaddress6>` [size `<number>`]
  Set the IP Address to be traced.

- `<string>` [size `<number>`]
  Set the domain to be traced.

- **first-ttl**
  Set the initial time-to-live used in the first outgoing probe packet.

- **icmp**
  Use ICMP ECHO instead of UDP datagrams.

- **max-ttl**
  Set the max time-to-live.

- **no-frag**
  Set the 'don't fragment' bit.

- **probes**
  Probes are sent at each ttl.
  Default - 3

- **source**
  Use given IP Address as source address.

- **timeout**
Set the timeout -in seconds for a response to a probe.

Default 5

tos
Set the type-of-service.

route

Use to view / manipulate the IP routing table. Route manipulates the kernel’s IP routing tables. Its primary use is to set up temporary routes to specific hosts or networks via an interface. When the add or del options are used, route modifies the routing tables. Without these options, route displays the current contents of the routing tables.

Syntax
```plaintext
diagnostics [ utilities { route ( flush-cache | lookup ) ]
```

Parameter list & description
- **flush-cache**: Flush entire route cache.
- **lookup**: Route lookup.

route6

Use to view / manipulate the IP routing table. Route manipulates the kernel’s IP routing tables. Its primary use is to set up temporary routes to specific hosts or networks via an interface. When the add or del options are used, route modifies the routing tables. Without these options, route displays the current contents of the routing tables.

Syntax
```plaintext
diagnostics [ utilities { route6 ( flush-cache | lookup ) ]
```

Parameter list & description
- **flush-cache**: Flush entire route cache.
- **lookup**: Route lookup.

Connections

Allows to view and delete connections to the Sophos XG Firewall device.

Syntax
```plaintext
connections [ count | v4 | v6 ]
```

Parameter list & description
- **count <number>**
  Count of current connections.
- **v4 [delete | show]**
Device Management

Use this menu to:

- Reset to Factory Defaults
- Show Firmware(s)
- Advanced Shell
- Flush Device Reports

Reset to Factory Defaults

This option resets all the customized configurations to their original state. All customization done after the initial deployment will be deleted including network configuration, HTTP proxy cache, passwords, groups, users and policies.

Show Firmware

This option displays all the firmware installed on the device. Moreover, the firmware currently active on the device is also mentioned.

Advanced Shell

This option directs you to the Advanced Shell.

Flush Device Reports

This option flushes all the On-box reports. This makes device inaccessible for a few minutes as flushing reports takes time.

Exit
Type 0 to exit from Device Management menu and return to Main Menu.

VPN Management

Below given menu will be displayed only when Sophos XG Firewall is deployed in Gateway mode.

```
VPN Management Menu
---------------------
Main Menu
  1. Regenerate RSA Key
  2. Restart VPN Service
  0. Exit

Select Menu Number [0-2]:
```

Regenerate RSA Key

RSA is used as one of the authentication methods to authenticate IPsec end-points in Site-to-Site and Host-to-Host VPN connections.

Use this option to regenerate the RSA Key i.e. New Public-Private Key pair, on the Sophos Firewall device.

```
VPN Management Menu
---------------------
Main Menu
  1. Regenerate RSA Key
  2. Restart VPN Service
  0. Exit

Select Menu Number [0-2]: 1
Do you want to continue (y/n) : No (Enter) > y
This may take few mins....Please wait....
Regenerating RSA Key.........Done
RSA Key generated Successfully.....
You need to change your RSA Key at each remote location
```

Restart VPN Service

Use to restart VPN Service:
Exit

Type 0 to exit from VPN menu and return to the Main Menu.

Shutdown/Reboot Device

Use to shut down or reboot Sophos XG Firewall.

Type ‘s’ to shut down the device, ‘r’ to soft reboot the device, “R” to hard reboot the device; else press “Enter” key to exit.

![Figure 9: Shutdown Device](image)

Exit

Type 0 to exit from Device Command Line Console (CLI) Management.

Appendix A – DHCP Options (RFC 2132)

A DHCP server can provide optional configurations to the client. Sophos XG Firewall provides support to configure following DHCP Options as defined in RFC 2132. To set the options, refer to DHCP Management section.

<table>
<thead>
<tr>
<th>Option Number</th>
<th>Name</th>
<th>Description</th>
<th>Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Time Offset</td>
<td>Time offset in seconds from</td>
<td>Four Byte Numeric Value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>UTC</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Time Servers</td>
<td>N/4 time server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>5</td>
<td>Name Servers</td>
<td>N/4 IEN-116 server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>Option Number</td>
<td>Name</td>
<td>Description</td>
<td>Data Type</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------</td>
<td>-------------------------------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>7</td>
<td>Log Servers</td>
<td>N/4 logging server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>8</td>
<td>Cookie Servers</td>
<td>N/4 quote server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>9</td>
<td>LPR Servers</td>
<td>N/4 printer server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>10</td>
<td>Impress Servers</td>
<td>N/4 impress server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>11</td>
<td>RLP Servers</td>
<td>N/4 RLP server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>12</td>
<td>Host Name</td>
<td>Hostname string</td>
<td>String</td>
</tr>
<tr>
<td>13</td>
<td>Boot File Size</td>
<td>Size of boot file in 512 byte chunks</td>
<td>Two Byte Numeric Value</td>
</tr>
<tr>
<td>14</td>
<td>Merit Dump File</td>
<td>Client to dump and name of file to dump to</td>
<td>String</td>
</tr>
<tr>
<td>16</td>
<td>Swap Server</td>
<td>Swap server addresses</td>
<td>IP-Address</td>
</tr>
<tr>
<td>17</td>
<td>Root Path</td>
<td>Path name for root disk</td>
<td>String</td>
</tr>
<tr>
<td>18</td>
<td>Extension File</td>
<td>Patch name for more BOOTP info</td>
<td>String</td>
</tr>
<tr>
<td>19</td>
<td>IP Layer Forwarding</td>
<td>Enable or disable IP forwarding</td>
<td>Boolean</td>
</tr>
<tr>
<td>20</td>
<td>Src route enabler</td>
<td>Enable or disable source routing</td>
<td>Boolean</td>
</tr>
<tr>
<td>22</td>
<td>Maximum DG Reassembly Size</td>
<td>Maximum datagram reassembly size</td>
<td>Two Byte Numeric Value</td>
</tr>
<tr>
<td>23</td>
<td>Default IP TTL</td>
<td>Default IP time-to-live</td>
<td>One Byte Numeric Value</td>
</tr>
<tr>
<td>24</td>
<td>Path MTU Aging Timeout</td>
<td>Path MTU aging timeout</td>
<td>Four Byte Numeric Value</td>
</tr>
<tr>
<td>25</td>
<td>MTU Plateau</td>
<td>Path MTU plateau table</td>
<td>Array of Two Byte Numeric Values</td>
</tr>
<tr>
<td>26</td>
<td>Interface MTU Size</td>
<td>Interface MTU size</td>
<td>Two Byte Numeric Value</td>
</tr>
<tr>
<td>27</td>
<td>All Subnets Are Local</td>
<td>All subnets are local</td>
<td>Boolean</td>
</tr>
<tr>
<td>28</td>
<td>Broadcast Address</td>
<td>Broadcast address</td>
<td>IP-Address</td>
</tr>
<tr>
<td>29</td>
<td>Perform Mask Discovery</td>
<td>Perform mask discovery</td>
<td>Boolean</td>
</tr>
<tr>
<td>30</td>
<td>Provide Mask to Others</td>
<td>Provide mask to others</td>
<td>Boolean</td>
</tr>
<tr>
<td>31</td>
<td>Perform Router Discovery</td>
<td>Perform router discovery</td>
<td>Boolean</td>
</tr>
<tr>
<td>32</td>
<td>Router Solicitation Address</td>
<td>Router solicitation address</td>
<td>IP-Address</td>
</tr>
<tr>
<td>34</td>
<td>Trailer Encapsulation</td>
<td>Trailer encapsulation</td>
<td>Boolean</td>
</tr>
<tr>
<td>35</td>
<td>ARP Cache Timeout</td>
<td>ARP cache timeout</td>
<td>Four Byte Numeric Value</td>
</tr>
<tr>
<td>36</td>
<td>Ethernet Encapsulation</td>
<td>Ethernet encapsulation</td>
<td>Boolean</td>
</tr>
<tr>
<td>37</td>
<td>Default TCP Time to Live</td>
<td>Default TCP time to live</td>
<td>One Byte Numeric Value</td>
</tr>
<tr>
<td>38</td>
<td>TCP Keepalive Interval</td>
<td>TCP keepalive interval</td>
<td>Four Byte Numeric Value</td>
</tr>
<tr>
<td>Option Number</td>
<td>Name</td>
<td>Description</td>
<td>Data Type</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------</td>
<td>------------------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>39</td>
<td>TCP Keepalive Garbage</td>
<td>TCP keepalive garbage</td>
<td>Boolean</td>
</tr>
<tr>
<td>40</td>
<td>NIS Domain Name</td>
<td>NIS domain name</td>
<td>String</td>
</tr>
<tr>
<td>41</td>
<td>NIS Server Addresses</td>
<td>NIS server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>42</td>
<td>NTP Servers Addresses</td>
<td>NTP servers addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>43</td>
<td>Vendor Specific Information</td>
<td>Vendor specific information</td>
<td>String</td>
</tr>
<tr>
<td>45</td>
<td>NetBIOS Datagram Distribution</td>
<td>NetBIOS datagram distribution</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>46</td>
<td>NetBIOS Node Type</td>
<td>NetBIOS node type</td>
<td>One Byte Numeric Value</td>
</tr>
<tr>
<td>47</td>
<td>NetBIOS Scope</td>
<td>NetBIOS scope</td>
<td>String</td>
</tr>
<tr>
<td>48</td>
<td>X Window Font Server</td>
<td>X window font server</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>49</td>
<td>X Window Display Manager</td>
<td>X window display manager</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>50</td>
<td>Requested IP Address</td>
<td>Requested IP Address</td>
<td>IP-Address</td>
</tr>
<tr>
<td>51</td>
<td>IP Address Lease Time</td>
<td>IP Address lease time</td>
<td>Four Byte Numeric Value</td>
</tr>
<tr>
<td>52</td>
<td>Option Overload</td>
<td>Overload “sname” or “file”</td>
<td>One Byte Numeric Value</td>
</tr>
<tr>
<td>53</td>
<td>DHCP Message Type</td>
<td>DHCP message type</td>
<td>One Byte Numeric Value</td>
</tr>
<tr>
<td>55</td>
<td>Parameter Request List</td>
<td>Parameter request list</td>
<td>Array of One Byte Numeric Values</td>
</tr>
<tr>
<td>56</td>
<td>Message</td>
<td>DHCP error message</td>
<td>String</td>
</tr>
<tr>
<td>57</td>
<td>DHCP Maximum Message Size</td>
<td>DHCP maximum message size</td>
<td>Two Byte Numeric Value</td>
</tr>
<tr>
<td>58</td>
<td>Renew Time Value</td>
<td>DHCP renewal (T1) time</td>
<td>Four Byte Numeric Value</td>
</tr>
<tr>
<td>59</td>
<td>Rebinding Time Value</td>
<td>DHCP rebinding (T2) time</td>
<td>Four Byte Numeric Value</td>
</tr>
<tr>
<td>60</td>
<td>Client Identifier</td>
<td>Client identifier</td>
<td>String</td>
</tr>
<tr>
<td>61</td>
<td>Client Identifier</td>
<td>Client identifier</td>
<td>String</td>
</tr>
<tr>
<td>62</td>
<td>Netware/IP Domain Name</td>
<td>Netware/IP domain name</td>
<td>String</td>
</tr>
<tr>
<td>64</td>
<td>NIS+ V3 Client Domain Name</td>
<td>NIS+ V3 client domain name</td>
<td>String</td>
</tr>
<tr>
<td>65</td>
<td>NIS+ V3 Server Address</td>
<td>NIS+ V3 server address</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>66</td>
<td>TFTP Server Name</td>
<td>TFTP server name</td>
<td>String</td>
</tr>
<tr>
<td>67</td>
<td>Boot File Name</td>
<td>Boot file name</td>
<td>String</td>
</tr>
<tr>
<td>68</td>
<td>Home Agent Addresses</td>
<td>Home agent addresses</td>
<td>Array of IP-Address</td>
</tr>
</tbody>
</table>
## Appendix B – DHCPv6 Options (RFC 3315)

A DHCP server can provide optional configurations to the client. Sophos XG Firewall provides support to configure following DHCPv6 Options as defined in RFC 3315. To set the options, refer to DHCPv6 Management section.

<table>
<thead>
<tr>
<th>Option Number</th>
<th>Name</th>
<th>Description</th>
<th>Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
<td>Simple Mail Server Addresses</td>
<td>Simple mail server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>70</td>
<td>Post Office Server Addresses</td>
<td>Post office server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>71</td>
<td>Network News Server Addresses</td>
<td>Network news server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>72</td>
<td>WWW Server Addresses</td>
<td>WWW server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>73</td>
<td>Finger Server Addresses</td>
<td>Finger server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>74</td>
<td>Chat Server Addresses</td>
<td>Chat server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>75</td>
<td>StreetTalk Server Addresses</td>
<td>StreetTalk server addresses</td>
<td>Array of IP-Address</td>
</tr>
<tr>
<td>76</td>
<td>StreetTalk Directory Assistance Addresses</td>
<td>StreetTalk directory assistance addresses</td>
<td>Array of IP-Address</td>
</tr>
</tbody>
</table>

### Option Number 21 – SIP-Servers-Names
- **Description**: The domain names of the SIP outbound proxy servers for the client to use
- **Data Type**: Alpha-Numeric TEXT with/without quotes

### Option Number 22 – SIP-Servers-Addresses
- **Description**: Specifies a list of IPv6 addresses indicating SIP outbound proxy servers available to the client
- **Data Type**: Alpha-Numeric TEXT with/without quotes

### Option Number 24 – Domain-Search
- **Description**: Specifies the domain search list the client is to use when resolving hostnames with DNS
- **Data Type**: Alpha-Numeric TEXT with/without quotes

### Option Number 27 – NIS-Servers
- **Description**: Provides a list of one or more IPv6 addresses of NIS servers available to the client
- **Data Type**: Alpha-Numeric TEXT with/without quotes
<table>
<thead>
<tr>
<th>Option Number</th>
<th>Name</th>
<th>Description</th>
<th>Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>NISP-Servers</td>
<td>Provides a list of one or more IPv6 addresses of NIS + servers available to the client</td>
<td>Alpha-Numeric TEXT with/without quotes</td>
</tr>
<tr>
<td>29</td>
<td>NIS-Domain-Name</td>
<td>Used by the server to convey client's NIS Domain Name info to the client</td>
<td>Alpha-Numeric TEXT with/without quotes</td>
</tr>
<tr>
<td>30</td>
<td>NISP-Domain-Name</td>
<td>Used by the server to convey client's NIS+ Domain Name info to the client</td>
<td>Alpha-Numeric TEXT with/without quotes</td>
</tr>
<tr>
<td>31</td>
<td>SNTP-Servers</td>
<td>Provides a list of one or more IPv6 addresses of SNTP servers available to the client for synchronization</td>
<td>Alpha-Numeric TEXT with/without quotes</td>
</tr>
<tr>
<td>32</td>
<td>INFO-Refresh-Time</td>
<td>Specifies an upper bound for how long a client should wait before refreshing information retrieved from DHCPv6</td>
<td>Alpha-Numeric TEXT with/without quotes</td>
</tr>
<tr>
<td>33</td>
<td>BCMS-Server-D</td>
<td>Broadcast and Multicast Service Controller Domain Name List Option for DHCPv6</td>
<td>Alpha-Numeric TEXT with/without quotes</td>
</tr>
<tr>
<td>34</td>
<td>BCMS-Server-A</td>
<td>Broadcast and Multicast Service Controller IPv6 Address Option for DHCPv6</td>
<td>Alpha-Numeric TEXT with/without quotes</td>
</tr>
</tbody>
</table>