

# Moxa Managed Switch Next-generation OS (v4.x) Layer 3 User Manual

---

Version 1.0, June 2023

[www.moxa.com/products](http://www.moxa.com/products)

**Models covered by this manual:**

MDS-G4000-L3-4XGS Series Managed Ethernet Switches

MDS-G4000-L3 Series Managed Ethernet Switches

RKS-G4000 Series Managed Ethernet Switches (L3 Models)



© 2023 Moxa Inc. All rights reserved.

# Moxa Managed Switch Next-generation OS (v4.x) Layer 3 User Manual

The software described in this manual is furnished under a license agreement and may be used only in accordance with the terms of that agreement.

## Copyright Notice

© 2023 Moxa Inc. All rights reserved.

## Trademarks

The MOXA logo is a registered trademark of Moxa Inc.  
All other trademarks or registered marks in this manual belong to their respective manufacturers.

## Disclaimer

- Information in this document is subject to change without notice and does not represent a commitment on the part of Moxa.
- Moxa provides this document as is, without warranty of any kind, either expressed or implied, including, but not limited to, its particular purpose. Moxa reserves the right to make improvements and/or changes to this manual, or to the products and/or the programs described in this manual, at any time.
- Information provided in this manual is intended to be accurate and reliable. However, Moxa assumes no responsibility for its use, or for any infringements on the rights of third parties that may result from its use.
- This product might include unintentional technical or typographical errors. Changes are periodically made to the information herein to correct such errors, and these changes are incorporated into new editions of the publication.

## Technical Support Contact Information

[www.moxa.com/support](http://www.moxa.com/support)

# Table of Contents

<b>1. Introduction to Layer 3 Switches.....</b>	<b>4</b>
The Layer 3 Switching Concept.....	4
Static Routing and Dynamic Routing .....	4
Static Routing .....	4
Dynamic Routing with OSPF (Open Shortest Path First).....	4
<b>2. Getting Started .....</b>	<b>5</b>
Log in by Web Interface.....	5
Connecting to the Switch.....	6
Log in by RS-232 Console .....	7
Log in by Telnet.....	9
<b>3. Layer 3 Function Configurations .....</b>	<b>12</b>
System.....	12
Network .....	12
Layer 3 Routing .....	22
Unicast Route .....	22
Network Redundancy .....	36
Layer 3 Redundancy .....	36

# 1. Introduction to Layer 3 Switches

---

Moxa's Layer-3 switches perform data switching on the Network Layer (Layer 3) of the ISO OSI layer model. Unlike Layer-2 switching, which uses the MAC address for exchanging data, a Layer-3 switch uses the IP address to represent the destination of a data packet.

## The Layer 3 Switching Concept

IP (Internet Protocol) is a protocol defined on layer 3 of the 7-layer OSI model. The IP address is used to address data packets on the Network Layer, and is not tied to the hardware of a device or PC. The IP address can be assigned by the system operator or network administrator.

Since Layer 2 switches use the MAC address to determine the destination of transmitted data packets, and Layer 3 switches use the IP address, some mechanism is needed to associate MAC addresses with IP addresses. This is done by ARP (Address Resolution Protocol), which creates a table that matches MAC addresses to IP addresses.

When a PC sends out an ARP request, which is just a broadcast packet requiring the IP address owner to send back his MAC address, two situations could occur:

- If your PC and the IP address owner are on the same subnet, the IP address owner will use a unicast packet, which contains his MAC address, to reply to your PC. Thereafter, your PC will use this MAC address to transmit to the IP address owner directly.
- If your PC and the IP address owner are not on the same subnet, your PC will not receive a reply, so it will ask for the MAC address of the Layer-3 switch (gateway/router). To transmit data packets to the IP address owner, your PC packs the data packet with the IP address, and sends the packet to the Layer-3 switch (gateway/router) using its MAC address. The Layer-3 switch (gateway/router) receives the data packet, re-packs it, and then forwards it to the next hop according to the routing rules.

## Static Routing and Dynamic Routing

The Moxa Layer 3 switch supports two routing methods: static routing and dynamic routing. Dynamic routing makes use of OSPF.

A routing entry includes the following items: the destination address, the next hop address (which is the next router along the path to the destination address), and a metric that represents the cost we need to pay to access a different network.

### Static Routing

You can define the routes yourself by specifying the next hop (or router) that the Layer 3 switch forwards data to for a specific subnet. The settings of the Static Route will be added to the routing table and stored in the Layer 3 switch.

### Dynamic Routing with OSPF (Open Shortest Path First)

The Moxa Layer 3 switch also supports OSPF (open shortest path first), which uses "Link State" instead of "hop count" to determine the network route. OSPF is more complicated than RIP. However, compared to RIP, OSPF has faster network convergence and results in less network traffic. Both RIP and OSPF are usually referred to as Interior Gateway Protocols (IGPs).

## 2. Getting Started

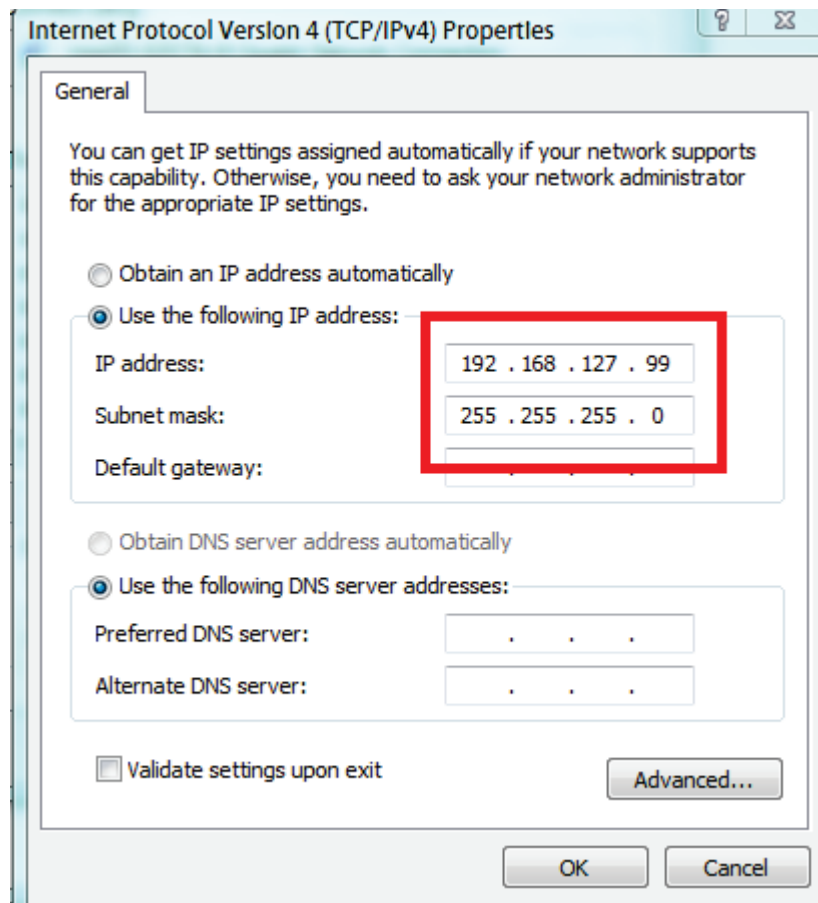
In this chapter, we explain how to log in to a Moxa switch for the first time. There are three ways to access the Moxa switch's configuration settings: RS-232 console, web-based interface, and telnet.

### Log in by Web Interface

You can directly connect a Moxa switch to your computer with a standard network cable or install your computer on the same intranet as your switch. You will then need to configure your computer's network settings. The default IP address for a Moxa switch is:

**192.168.127.253**

For example, you can configure the computer's IP setting as **192.168.127.99**, and the subnet mask as 255.255.255.0.



Click **OK** when finished.

## Connecting to the Switch

Open a browser, such as Google Chrome, Internet Explorer 11, or Firefox, and connect to the following IP address:

**http://192.168.127.253**

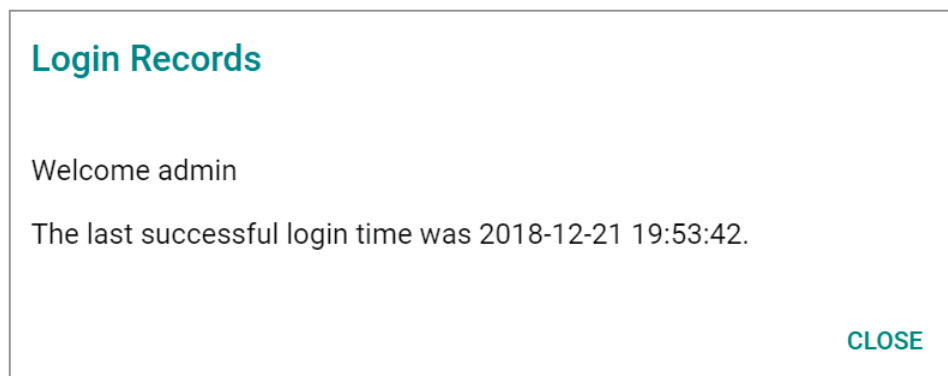


The default username and password are:

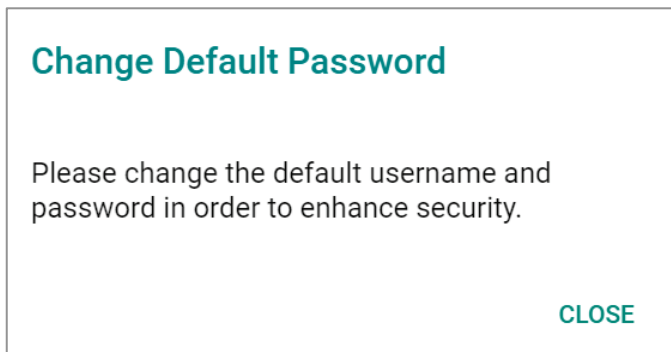
Username: **admin**

Password: **moxa**

**Click LOG IN to continue.** If you have logged in before, you will see a screen indicating the previous login information. Click **CLOSE**.



Another system message will appear, reminding you to change the default password. We recommend that you change your password, or a message will appear whenever you log in telling you to change your password. You can change the password in the **Account Management** section. Click **CLOSE** to continue.



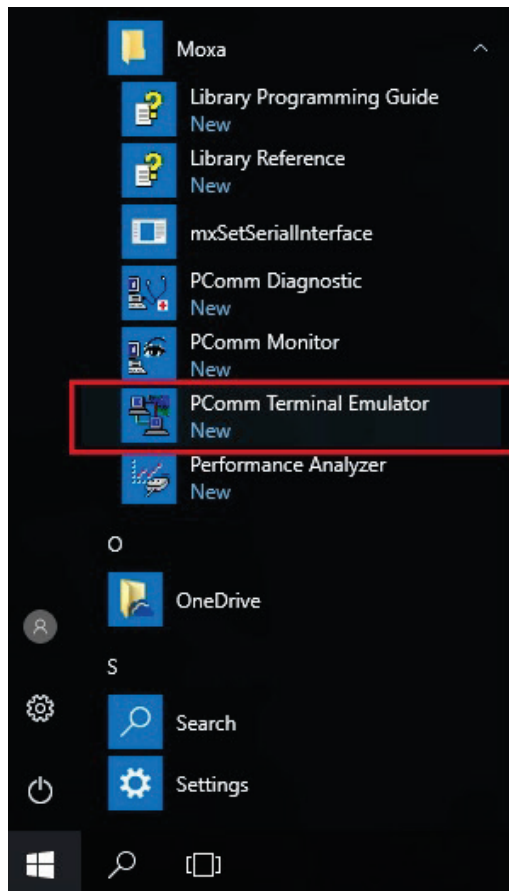
## Log in by RS-232 Console

Moxa's managed switch has a serial console port that can be used to connect to the switch and configure the settings. Take the following steps:

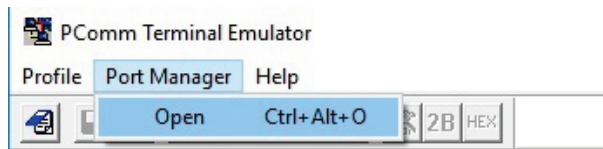
1. Prepare an RS-232 serial cable with an RJ45 interface.
2. Connect the RJ45 interface end to the console port on the switch, and the other end to the computer.
3. We recommend that you use **PComm Terminal Emulator** for serial communication. The software can be downloaded free of charge from Moxa's website.

After installing PComm Terminal Emulator, access the Moxa switch's console as follows:

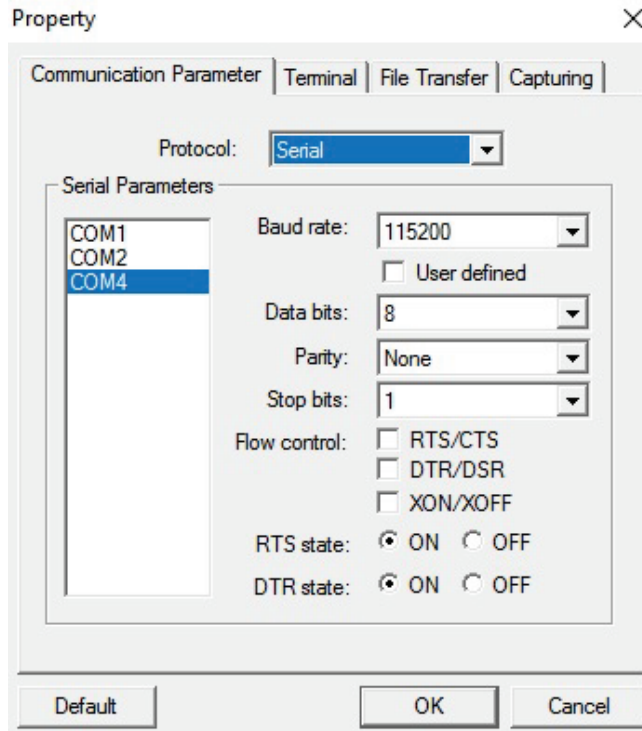
1. From the Windows desktop, click **Start > Moxa > PComm Terminal Emulator**.



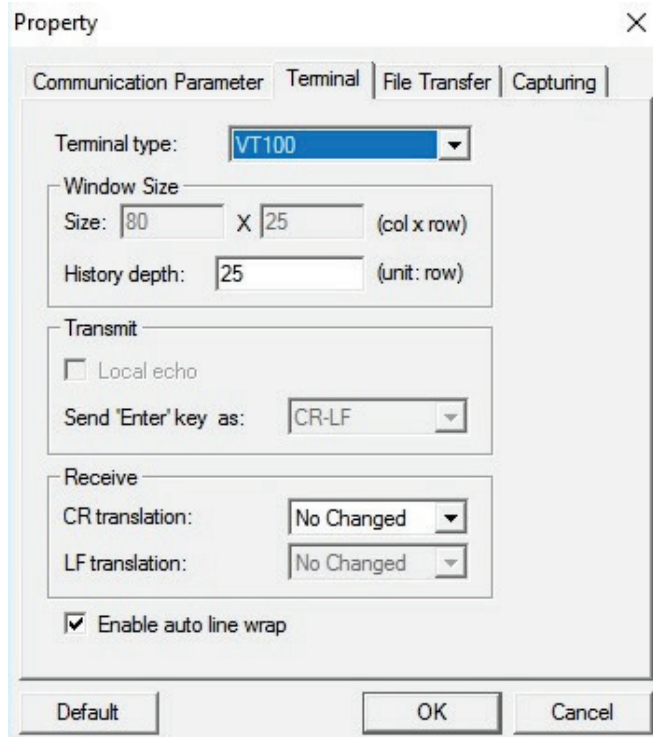
2. Select **Open** under the **Port Manager** menu to open a new connection.



3. The **Property** window should open. On the **Communication Parameter** tab for **Ports**, select the COM port that is being used for the console connection. Set the other fields as follows: **115200** for **Baud Rate**, **8** for **Data Bits**, **None** for **Parity**, and **1** for **Stop Bits**.

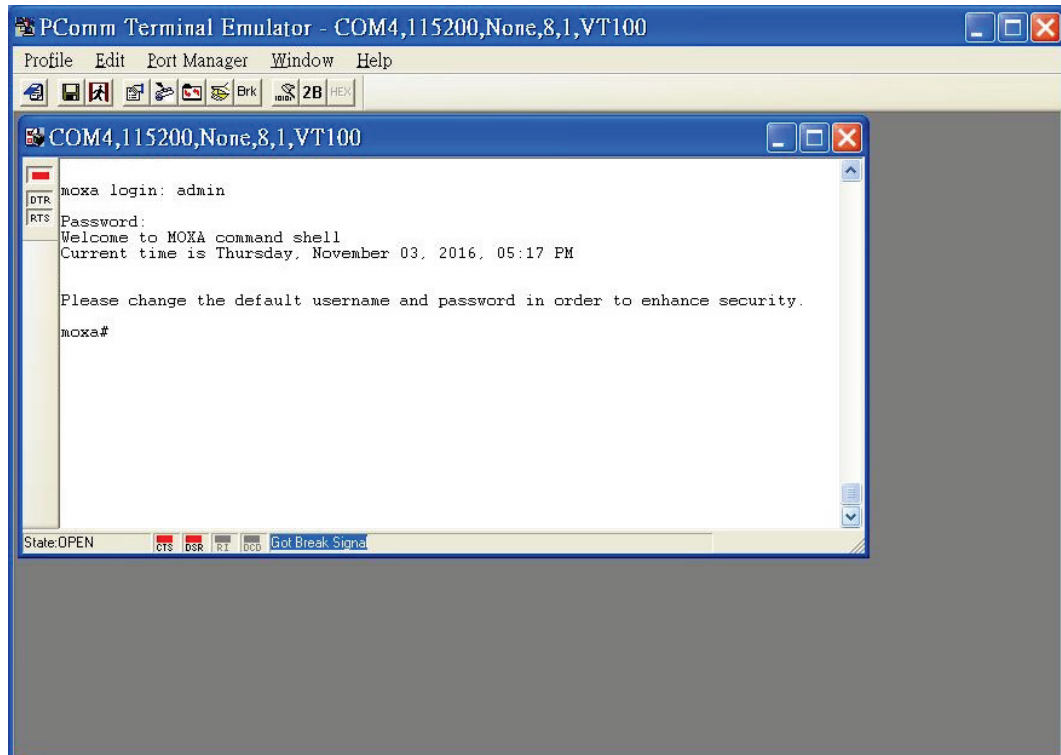


4. On the **Terminal** tab, select **VT100** for **Terminal Type**, and then click **OK** to continue.





- The console will prompt you to log in. The default login name is **admin**, and the default password is **moxa**. This password will be required to access any of the consoles (web, serial, Telnet).



- After successfully connecting to the switch by serial console, you can start configuring the switch's parameters by using command line instructions. Refer to the **Moxa Command Line Interface Manual** for details.



## NOTE

By default, the password assigned to the Moxa switch is **moxa**. Be sure to change the default password after you first log in to help keep your system secure.

## Log in by Telnet

Opening the Moxa switch's Telnet or web console over a network requires that the PC host and Moxa switch are on the same logical subnet. You might need to adjust your PC host's IP address and subnet mask. By default, the Moxa switch's IP address is 192.168.127.253 and the Moxa switch's subnet mask is 255.255.255.0. Your PC's IP address must be set to 192.168.xxx.xxx if the subnet mask is 255.255.0.0, or to 192.168.127.xxx if the subnet mask is 255.255.255.0.



## NOTE

When connecting to the Moxa switch's Telnet or web console, first connect one of the Moxa switch's Ethernet ports to your Ethernet LAN, or directly to your PC's Ethernet port. You can use either a straight-through or cross-over Ethernet cable.

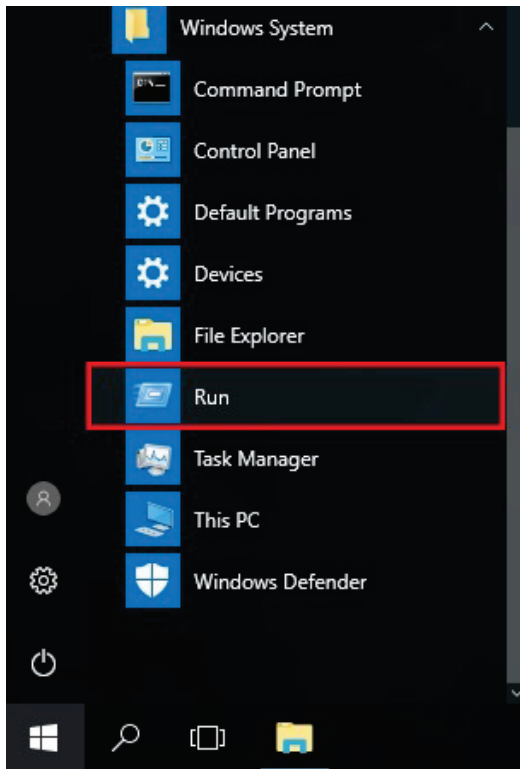


## NOTE

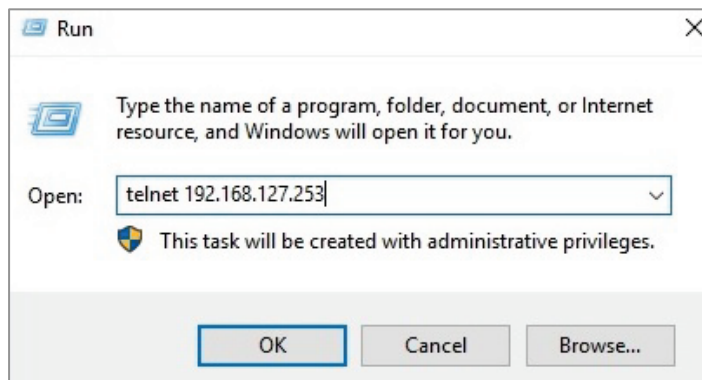
The Moxa switch's default IP address is 192.168.127.253.

After making sure that the Moxa switch is connected to the same LAN and logical subnet as your PC, open the Moxa switch's Telnet console as follows:


1. Click **Start > Run** from the Windows Start menu and then Telnet to the Moxa switch's IP address from the Windows **Run** window. You can also issue the Telnet command from a DOS prompt.

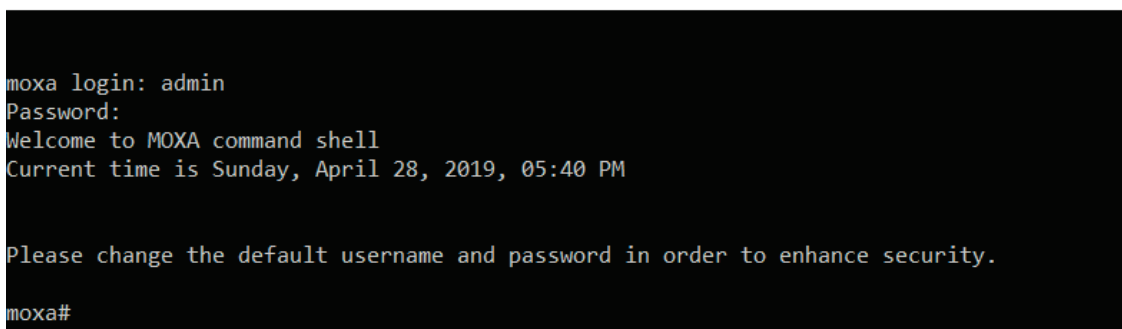


2. Next, use Telnet to connect the Moxa switch's IP address (192.168.127.253) from the Windows **Run** window. You can also issue the Telnet command from a DOS prompt.



3. The Telnet console will prompt you to log in. The default login name is **admin**, and the password is **moxa**. This password will be required to access any of the consoles (web, serial, Telnet).

 Telnet 192.168.127.253



4. After successfully connecting to the switch by Telnet, users can start configuring the switch parameters by using command line instructions. Refer to the **Moxa Command Line Interface Manual**.



## **NOTE**

By default, the password assigned to the Moxa switch is moxa. Be sure to change the default password after you first log in to help keep your system secure.

# 3. Layer 3 Function Configurations

This chapter describes how to configure the layer 3 functions on Moxa’s managed switches.

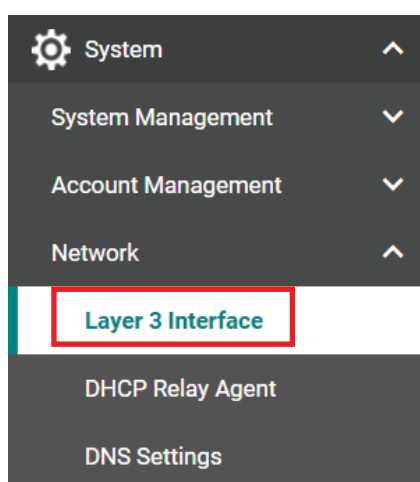
## System

### Network

This section describes the configurations for **Layer 3 Interfaces**, **DHCP Relay Agent**, and **DNS Settings**.

#### Layer 3 Interfaces

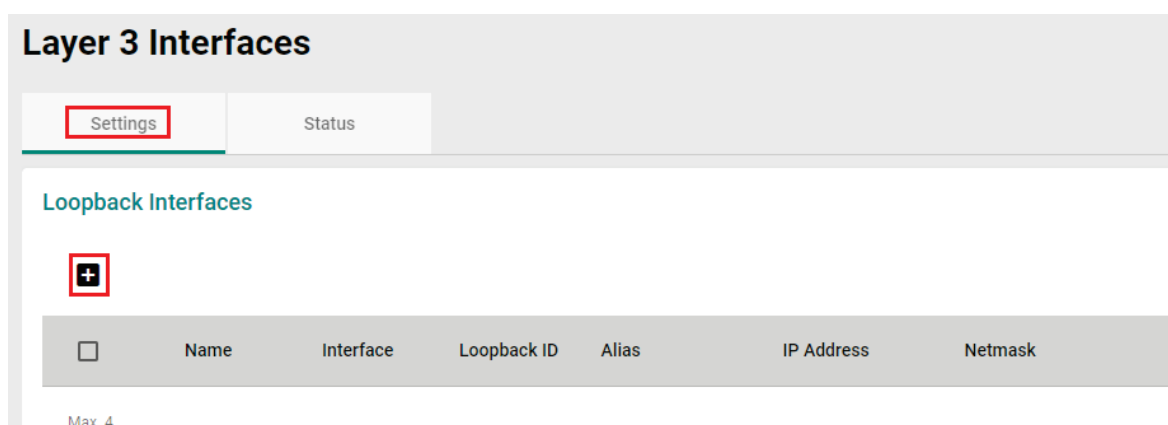
Click **Layer 3 Interfaces** from **System** > **Network** on the function menu.



#### Layer 3 Interfaces Settings

The loopback interface is a special, virtual network interface that is used to identify and manage devices. It is used mainly for diagnostics and troubleshooting.

Click the **Settings** tab first, and then click the **+** icon under **Loopback Interfaces** to configure the settings.



Configure the following settings.

### Create Loopback Interface Settings

Loopback Interface  
Enabled ▼

---

Loopback ID \*  
1 - 10

---

Alias  
0 / 64

---

IP Address \*      Netmask  
255.255.255.255

---

CANCEL
CREATE

#### **Loopback Interface**

Setting	Description	Factory Default
Enable/Disable	Enable/disable the loopback interface.	Enabled

#### **Loopback ID**

Setting	Description	Factory Default
1 to 10	Specify the loopback ID.	None



### **NOTE**

A user may see interface 407 to 410 displayed via the network management tool based on SNMP. Interface 407 to 410 can be mapped to the 1st Loopback interface the user sets to the 4th Loopback interface the user sets based on the standard MIB design. A user can set a maximum of 4 loopback interfaces.

#### **Alias**

Setting	Description	Factory Default
0 to 64 characters	Specify the alias for the loopback interface.	None

#### **IP Address**

Setting	Description	Factory Default
IP address	Specify the IP address for the loopback interface.	None

#### **Netmask**

Setting	Description	Factory Default
Netmask	Show the default netmask for the loopback interface.	255.255.255.255

Click **CREATE** to finish.

## Creating VLAN Interfaces

Next, click  under **VLAN Interfaces** to create the interface.


VLAN Interfaces								
	Name	Interface	VLAN ID	Alias	IP Address	Netmask	MTU (byte)	Proxy Arp
<input type="checkbox"/>	vlan1	Enabled	1		192.168.127.253	255.255.255.0	1500	Disabled

Max. 256

Configure the following settings.

### Create VLAN Interface Settings

VLAN Interface  
Enabled

VLAN ID \*   
1 - 4094

Alias  
0 / 64

IP Address \*      Netmask \*

MTU \*  
1500  
1400 - 3000      byte

Proxy Arp  
Disabled

CANCEL CREATE

### VLAN Interface

Setting	Description	Factory Default
Enable/Disable	Enable/disable the VLAN interface.	Enabled

### VLAN ID

Setting	Description	Factory Default
1 to 4094	Display all available VLAN IDs that you have set in the Virtual LAN. To establish an interface, you must first assign an available ID to this interface. If a VLAN ID is assigned twice, a warning message will appear.	None (if no VLAN ID is available)



## NOTE

A user may see interface 130 to 386 displayed via the network management tool based on SNMP. Interface 130 to 386 can be mapped to the 1st VLAN interface the user sets to the 256th VLAN interface the user sets based on the standard MIB design. A user can set a maximum of 256 VLANs.

### Alias

Setting	Description	Factory Default
0 to 64 characters	Specify the alias for the VLAN interface.	None

### IP Address

Setting	Description	Factory Default
IP address	Specify the IP address for the VLAN interface.	None

### Netmask

Setting	Description	Factory Default
Netmask	Specify the netmask for the VLAN interface.	None

### MTU (byte)

Setting	Description	Factory Default
1400 to 3000	Specify the MTU (Maximum Transmission Unit) for the VLAN interface.	1500

### Proxy Arp

Setting	Description	Factory Default
Enable/Disable	Enable/disable the Proxy ARP for the VLAN interface.	None

Click **CREATE** to finish.



## Viewing Layer 3 Interfaces Status

Click the **Status** tab to view the current configurations.

### Layer 3 Interfaces

Settings **Status**



#### Loopback Interfaces

Name	Admin Status	Operation Status	Loopback ID	Alias	IP Address	Netmask
loopback1	Enabled	Up	1	Test	192.168.227.120	255.255.255.255

---

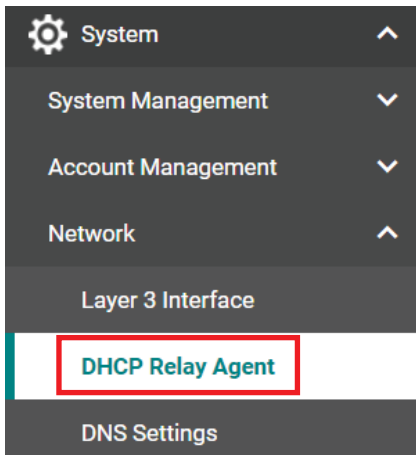
#### VLAN Interfaces

Name	Admin Status	Operation Status	VLAN ID	Alias	IP Address	Netmask	MTU (byte)	Proxy Arp
vlan1	Enabled	Up	1		192.168.127.253	255.255.255.0	1500	Disabled

# DHCP Relay Agent

Click **DHCP Relay Agent** from **System > Network**.



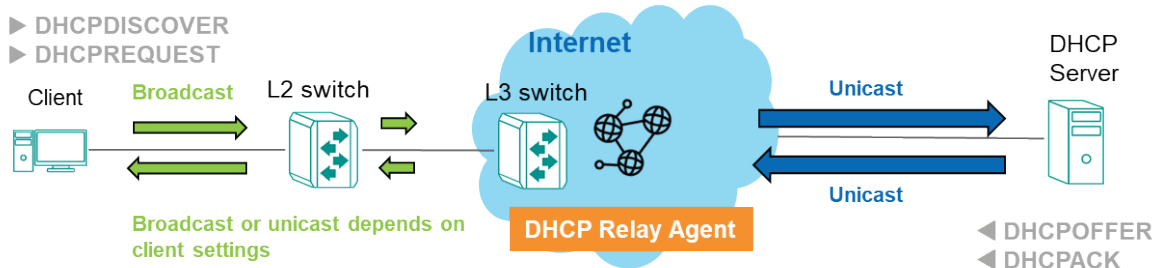
## Overview

**DHCP Relay agent** is used when the host and the DHCP server are in different subnets. Normally, the DHCP packets cannot be forwarded through different subnets and a **DHCP Relay agent** is required to convert the DHCP broadcast packet from the client to a unicast packet to the DHCP server. If there is not a DHCP relay agent, the L3 switch will discard the DHCP broadcast packet from the client since it does not forward broadcast packets from different network segments.

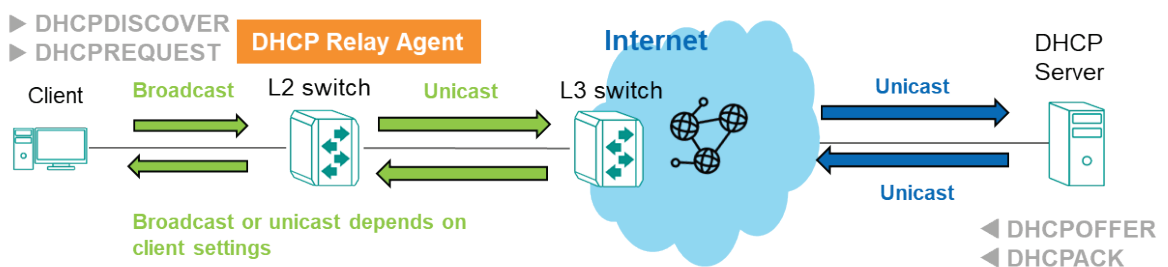
**Option 82** information can be inserted into a client's DHCP packets when a DHCP Relay Agent forwards client-originated DHCP packets to a DHCP server. This information serves as a reference for the DHCP server to identify the DHCP Relay Agent that the DHCP packets were sent from. When **Option 82** is applied, the closer the DHCP Relay Agent is to the client, the more precisely the client's position can be determined.

## How Does DHCP Relay Agent Work?

When the DHCP Relay Agent is set on an L3 switch, the L3 switch would convert the broadcast packets to unicast packet and routes them to the DHCP server.



When the DHCP Relay Agent is set on an L2 switch, the switch would convert the broadcast packets to unicast packets and forward them to the L3 switch to route to the DHCP server.





## How Does Option 82 Work?

When **Option 82** is enabled, the DHCP relay agent inserts Option 82 information into client-originated DHCP packets before forwarding them to the DHCP server. This information contains two sub-options: Circuit ID and Remote ID. The Circuit ID is generated by the switch, while the Remote ID can be configured by the user. By including this information in the DHCP packets, the DHCP server is able to identify the location from where the DHCP packets were sent from.

## DHCP Relay Agent/Option 82 Settings

The steps to configure a DHCP Relay Agent on an L2 switch or an L3 switch are the same. However, users may encounter two scenarios:

DHCP Relay Agent is set up on an L2 switch:

If users set up a DHCP Relay Agent on an L2 switch, an L3 switch capable of routing the frame to another subnet is still required. However, the L3 switch does not need to enable the DHCP Relay Agent function.

DHCP Relay Agent is set up on an L3 switch:

If users set up a DHCP Relay Agent on an L3 switch, and any L2 switch is connected to the L3 switch, then the L2 switch does not need to enable the DHCP Relay Agent function.


The following are the steps to configure a **DHCP Relay Agent**:

1. Click **General**.
2. **Enable** DHCP Relay Agent.
3. Enter the **Server IP Address**. Please note, users can enter a maximum of 4 server IP addresses.
4. Click **APPLY** to save the configurations.



### NOTE

If users do not enter any server IP address, even with DHCP Relay Agent enabled, no DHCP server will reply to the packets from the clients.


5. Scroll down the page and click  to edit the port connected to the server.
6. Select **Enabled** under Relay.
7. Select **Trusted** under Status.
8. (Specify the Status as **Untrusted** if the user expects the switch to be the first relay agent to prevent the DHCP packet being maliciously revised.)
9. Select the port connected to the client from the drop-down list of **Copy Configuration to Ports**.
10. Click **APPLY** to save the configurations.



### NOTE

Both the port connected to the client and the port connected to the server should have the DHCP Relay Agent function enabled.

The following are the steps to configure **Option 82**:

1. Click **Option 82**.
2. Choose **Remote ID Type**.  
(If you select **Other**, please enter the Remote ID Value that is less than 64 characters.)
3. Click **APPLY** to save the configurations.
4. Scroll down the page and click  to edit the port connected to the client.
5. Select **Enabled** of Option 82.
6. Click **APPLY** to save the configurations.



## NOTE

Only the port connected to the client should have **Option 82** enabled when applying the **Option 82** function.

Click **DHCP Relay Agent** on the function menu.

### DHCP Relay Agent

General

Option 82

DHCP Relay Agent \*

Disabled ▼

1st Server IP Address

2nd Server IP Address

3rd Server IP Address

4th Server IP Address

APPLY

Select the **General** tab and configure the following settings.

#### **DHCP Relay Agent**

Setting	Description	Factory Default
Enabled	Enable the DHCP Relay Agent.	Disabled
Disabled	Disable the DHCP Relay Agent.	

#### **1st/2nd/3rd/4th Server IP Address**

Setting	Description	Factory Default
Server IP address	Specify the 1st, 2nd, 3rd, and 4th server IP address	None

When finished, click **APPLY** to save your settings.

Next, click the icon to configure the setting for the port.

	Port	Relay	Status
	1/1	Disabled	Trusted
	1/2	Disabled	Trusted
	1/3	Disabled	Trusted
	1/4	Disabled	Trusted

Configure the following settings.

**Relay**

Setting	Description	Factory Default
Enabled	Enable the Relay function on the port.	Disabled
Disabled	Disable the Relay function on the port.	

**Status**

Setting	Description	Factory Default
Trusted	The relay on the port is trusted, and DHCP packets with Option 82 or with non-zero giaddr will be accepted.	Trusted
Untrusted	The relay on the port is untrusted, and DHCP packets with Option 82 or with non-zero giaddr will be discarded.	

**Copy Configurations to Ports**

Setting	Description	Factory Default
Select the port(s) from the drop-down list	Select the port(s) you want to copy the same configurations to.	None

When finished, click **APPLY** to save your changes.

Next, select **Option 82 tab**.

Configure the following settings.

#### Remote ID Type

Setting	Description	Factory Default
IP	Specify IP address as the remote ID type.	IP
MAC	Specify MAC address as the remote ID type.	
Client ID	Specify Client ID as the remote ID type.	
Other	Specify other option as the remote ID type.	

#### Remote ID Value (read only except selecting Other as the remote ID type)

Setting	Description	Factory Default
Show the remote ID value	Show the remote ID value with the remote ID type selected.	Varies depending on different options

#### Remote ID Value (When selecting Other as the remote ID type)





Setting	Description	Factory Default
0 to 64 characters	Specify the remote ID value if you select Other as the remote ID type.	moxa-dhcp-relay

#### Remote ID Display (read only)

Setting	Description	Factory Default
Remote ID	Show the remote ID.	Remote ID

When finished, click APPLY to save your changes.

Next, click the  icon to configure the settings for the port.

Port	Option 82
 1/1	Disabled
 1/2	Disabled
 1/3	Disabled
 1/4	Disabled

Configure the following settings.

#### Option 82

Setting	Description	Factory Default
Enabled	Enable Option 82 on the port.	Disabled
Disabled	Disable Option 82 on the port.	

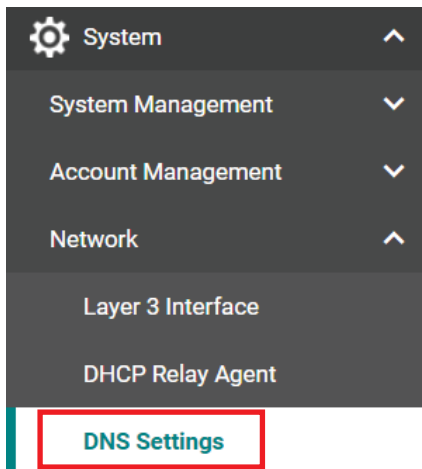
#### Copy Configurations to Ports

Setting	Description	Factory Default
Select the port(s) from the drop-down list	Select the port(s) you want to copy the same configurations to.	None

When finished, click **APPLY** to save your changes.

## DNS Settings

Click **DNS Settings** from **System > Network**.



The screenshot shows a navigation menu with the following items: System (with a gear icon and an upward arrow), System Management (with a downward arrow), Account Management (with a downward arrow), Network (with an upward arrow), Layer 3 Interface, and DHCP Relay Agent. The 'DNS Settings' option is highlighted with a red rectangular box.

### DNS Settings

Primary DNS Server

Secondary DNS Server

**APPLY**

#### **Primary DNS Server**

Setting	Description	Factory Default
1st DNS server IP address	Specify the IP address of the 1st DNS server used by your network. The server will transfer your domain name to the IP address.	None

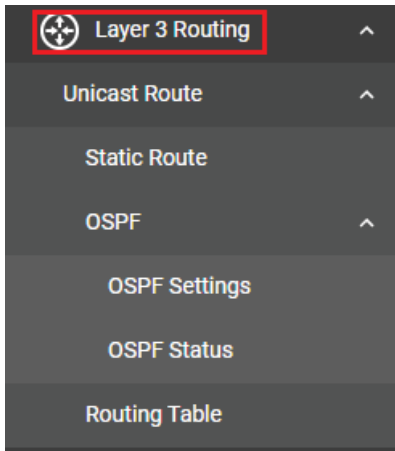
#### **Secondary DNS Server**

Setting	Description	Factory Default
2nd DNS server IP address	Specify the IP address of the 2nd DNS server used by your network. The switch will use the second DNS server if the first DNS server fails to connect.	None

When finished, click **APPLY** to save your changes.

# Layer 3 Routing

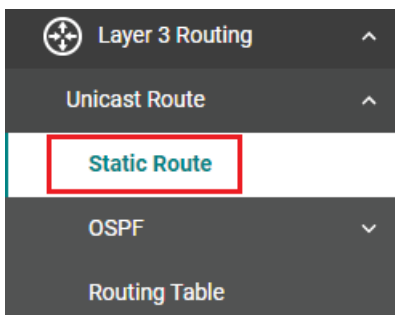
This section describes how to configure the layer 3 routing settings for the switch. Click **Layer 3 Routing** on the function menu on the left of the page.




## Unicast Route

Click **Unicast Route** to configure **Static Route** and **OSPF**.

### Static Route



Click **Static Route** on the function menu and then click the  icon on the page.



Configure the following settings.

### Create Static Route Settings

Destination \*  
\_\_\_\_\_

Netmask \*  
\_\_\_\_\_

Next Hop Type \* i

Next Hop IP \_\_\_\_\_ Next Hop Interface \_\_\_\_\_ ▾

Distance \*  
1 - 255

CANCEL
CREATE

#### **Destination**

Setting	Description	Factory Default
Input IP address	Specify the IP address of the destination.	None

#### **Netmask**

Setting	Description	Factory Default
Input Netmask	Specify the subnet mask of the destination subnet.	None

**Next Hop:** The next router along the path to the destination. You can choose a VLAN interface which has already been created or choose **Unselect** to ignore this setting.

#### **Next Hop IP**

Setting	Description	Factory Default
Input IP address	Specify the IP address of the next hop IP address.	None

#### **Next Hop Interface**

Setting	Description	Factory Default
Unselect	Unselect to ignore this setting; if selected, you will need to specify the next hop IP address.	Unselect
VLAN1	Specify VLAN1 as the next hop interface	

#### **Distance**

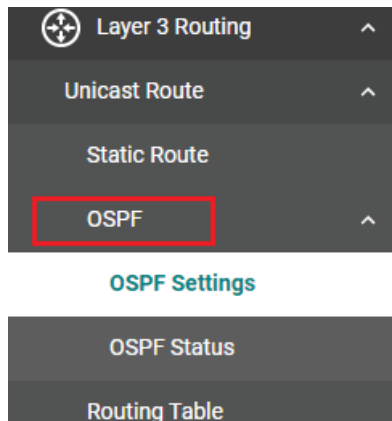
Setting	Description	Factory Default
1 to 255	Shorter distances have a higher priority; if set to 255, the router will not trust the source of that route and will not install the route in the routing table.	None

When finished, click **CREATE** to save your changes.

## OSPF

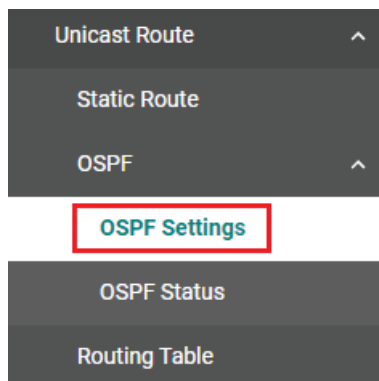
Open Shortest Path First (OSPF) is a dynamic routing protocol for use on Internet Protocol (IP) networks. Specifically, it is a link-state routing protocol in the group of interior gateway protocols, operating within a single autonomous system. As a link-state routing protocol, OSPF establishes and maintains neighbor relationships in order to exchange routing updates with other routers. The neighbor relationship table is called an adjacency database in OSPF. OSPF forms neighbor relationships only with the routers directly connected to it. In order to form a neighbor relationship between two routers, the interfaces used to form the relationship must be in the same area. An interface can only belong to a single area. With OSPF enabled, the Moxa Layer 3 switch is able to exchange routing information with other L3 switches or routers more efficiently in a large system.

Click **OSPF** to configure the settings, including **OSPF Settings** and **OSPF Status**.



## OSPF Settings

Click **OSPF Settings** on the function menu.





## General Settings

Click the General tab. Each L3 switch/router has an OSPF router ID, customarily written in the dotted decimal format (e.g., 1.2.3.4) of an IP address. This ID must be established in every OSPF instance. If not explicitly configured, the default ID (0.0.0.0) will be regarded as the router ID. Since the router ID is an IP address, it does not need to be a part of any routable subnet on the network.

### OSPF Settings

General
Area
Interface
Neighbor
Aggregation
Virtual Link

OSPF  
Disabled ▼

Router ID Current Router ID  
0.0.0.0
192.168.227.120
i

Compatible RFC 1583  
Disabled ▼

SPF Hold Time  
5000  
0 - 65535 ms

**APPLY**

### OSPF

Setting	Description	Factory Default
Enable/Disable	This option is used to enable or disable the OSPF function globally.	Disable

### Router ID

Setting	Description	Factory Default
Input the router IP	Specify the IP address of the router.	0.0.0.0

### Current Router ID

Setting	Description	Factory Default
None	A router ID identifies a router in the OSPF domain. You can manually assign an IP address, or use "0.0.0.0" to force the switch to auto assign a router ID. When selecting 0.0.0.0, the switch will set the Router ID to the lowest interface IP address.	None



## Note

The Router ID is just used to recognize the device in the OSPF protocol; it does not need to be ICMP reachable.

### Compatible RFC 1583 (Available in Advanced Mode only)

Setting	Description	Factory Default
Enable/Disable	Enable/disable to be compatible with RFC 1583	Disabled

### SPF Hold Time (ms) (Available in Advanced Mode only)



Setting	Description	Factory Default
0 to 65535	Specify the SPF hold time.	5000

When finished, click **APPLY** to save your changes.

## Redistribute Static Settings

The "Redistribute Static" function allows you to share your internal routing settings (e.g., Static and Connected) with other devices.

Click the  icon to edit the **Redistribute Static** settings.

	Protocol	Redistribute
	Static	Disabled
	Connected	Disabled

### Edit Redistribute Static

Redistribute  
Disabled ▼

CANCEL
APPLY

### Redistribute Static

Setting	Description	Factory Default
Enable/disable	Enable/disable the redistribute static function.	Enabled

### Type (Available in the Advanced Mode only)

Setting	Description	Factory Default
E1/E2	Configure the metric type applied to the routes to be redistributed.	E2



### Metric (Available in the Advanced Mode only)

Setting	Description	Factory Default
1 to 16777214	Configure the metric values for the routes to be redistributed into OSPF.	20

When finished, click **APPLY** to save your changes.

## Redistribute Connected Settings

Click the  icon to edit the **Redistribute Connected** settings.

	Protocol	Redistribute
	Static	Disabled
	Connected	Disabled

### Edit Redistribute Connected

Redistribute  
Disabled ▼

CANCEL
APPLY

### **Redistribute Connected**

Setting	Description	Factory Default
Enable/disable	Enable/disable the redistribute connected function.	Enabled

### **Type (Available in Advanced Mode only)**

Setting	Description	Factory Default
E1/E2	Configure the metric type applied to the routes to be redistributed.	E2

### **Metric (Available in Advanced Mode only)**

Setting	Description	Factory Default
1 to 16777214	Configure the metric values for the routes to be redistributed into OSPF.	20

When finished, click **APPLY** to save your changes.

## Area Settings

An OSPF domain is divided into areas that are labeled with 32-bit area identifiers, commonly written in the dot-decimal notation of an IPv4 address. Areas are used to divide a large network into smaller network areas. They are logical groupings of hosts and networks, including the routers connected to a particular area. Each area maintains a separate link state database whose information may be summarized towards the rest of the network by the connecting router. Thus, the topology of an area is unknown outside of the area. This reduces the amount of routing traffic between parts of an autonomous system.

Follow the contents below to configure the settings.

### Creating a New Area ID

Click the **Area** tab.

Click the **+** icon to create the new area settings.

#### **Area ID**

Setting	Description	Factory Default
Area ID	Defines the areas that this L3 switch/router connects to.	0.0.0.0

#### **Area Type**


Setting	Description	Factory Default
Normal	Defines the area type as Normal.	None
Stub	Defines the area type as Stub.	
NSSA	Defines the area type as NSSA.	

#### **Summary**

Setting	Description	Factory Default
Summary/ No Summary	Displays the summary of the Area type	None

When finished, click **CREATE** to finish.

### **Editing the Existing Area ID**

Click the  icon and configure the following settings.

<input type="checkbox"/>	Area ID	Area Type	Summary
<input type="checkbox"/>	0.0.0.0	Normal	No Summary

Max. 64

### **Area Type**

Setting	Description	Factory Default
Normal	Defines the area type as Normal.	None
Stub	Defines the area type as Stub.	
NSSA	Defines the area type as NSSA.	

### **Summary**

Setting	Description	Factory Default
Summary/ No Summary	Displays the summary of the Area type	None

When finished, click **APPLY**.


### **Interface Settings**

Before using OSPF, you need to assign an interface for each area. Detailed information related to the interface can be defined in this section.

Click the **Interface** tab and then click the  icon on the interface you want to configure.

**OSPF Settings**

General   Area   **Interface**   Neighbor   Aggregation   Virtual Link

Items per page: 50   1 - 1 of 1   < >

Configure the following settings.

### Edit Interface vlan1

OSPF  
Disabled ▼

Area ID  
0.0.0.0 ▼

Hello Interval Dead Interval  
10 40

1 - 65535 sec. 1 - 65535 sec.

Priority  
1

0 - 255

Cost  
1

1 - 65535

Network Type  
Broadcast ▼

Auth Type  
None ▼

Passive interface  
Disabled ▼

CANCEL
APPLY

#### OSPF

Setting	Description	Factory Default
Enable/Disable	This option is used to enable or disable the OSPF function globally.	Disable

#### Area ID

Setting	Description	Factory Default
Area ID	Defines the Area ID.	0.0.0.0

#### Hello Interval (sec)

Setting	Description	Factory Default
1 to 65535	Hello packets are packets that an OSPF process sends to its OSPF neighbors to maintain connectivity with those neighbors. The hello packets are sent at a configurable interval (in seconds). The value of all hello intervals must be the same within a network.	10

#### Dead Interval (sec)

Setting	Description	Factory Default
1 to 65535	The dead interval is also a configurable interval (in seconds), and defaults to four times the value of the hello interval.	40

#### Priority

Setting	Description	Factory Default
0 to 255	Defines the L3 switch/router's priority.	1

### Cost (sec)

Setting	Description	Factory Default
1 to 65535	The cost for each interface; a lower cost means the interface has higher priority.	1

### Network Type (Available in Advanced Mode only)

Setting	Description	Factory Default
Broadcast Non-Broadcast Point-to-Multipoint Point-to-Point	Select the network type from the drop-down list to determine how the Hello message will be sent. For Non-Broadcast or Point-to-Multipoint settings, you will need to add a neighbor manually.	Broadcast

### Auth Type


Setting	Description	Factory Default
None/Simple/MD5/ SHA1/SHA-224/ SHA-256/ SHA-385/SHA-512	OSPF authentication provides the flexibility of authenticating OSPF neighbors. Users can enable authentication to exchange routing update information in a secure manner. OSPF authentication can either be none, simple, or MD5. However, authentication does not need to be configured. If it is configured, all L3 switches/routers on the same segment must have the same password and authentication method.	None

### Passive Interface (Available in Advanced Mode only)

Setting	Description	Factory Default
Enable/Disable	Enable/Disable the settings to allow all interfaces to be configured as passive as the default value. For the Passive Interface, the OSPF related operation will not execute, but this passive interface's route information can still be learned by other non-passive interfaces.	Disabled

When finished, click **APPLY** to save your changes.

## Neighbor Settings

Click the **Neighbor** tab and then click the  icon for proceed with the configuration.





### NOTE

This function is available in **Advanced Mode** only.

### OSPF Settings

- General
- Area
- Interface
- Neighbor**
- Aggregation
- Virtual Link

<input type="checkbox"/>	Neighbor Ip Address	Priority
--------------------------	---------------------	----------

Max. 64

Configure the following settings.

### Create Neighbor

Neighbor Ip Address

---

Priority

0 - 255

CANCEL
CREATE

#### Neighbor IP Address

Setting	Description	Factory Default
Neighbor IP address	Specify the IP address for the neighbor.	None

#### Priority

Setting	Description	Factory Default
0 to 255	Specify the priority for the neighbor.	None


### Aggregation Settings


Each OSPF area, which consists of a set of interconnected subnets and traffic, is handled by routers attached to two or more areas, known as Area Border Routers (ABRs). The OSPF aggregation function allows you to combine groups of routing table entries that represent the same route with a single entry in the routing table. The function will automatically update references to the old table entry IDs. The function is used to reduce the size of routing tables.

Click the Aggregation tab and then the  icon to proceed with the configuration.

### OSPF Settings

General
Area
Interface
Neighbor
Aggregation
Virtual Link





<input type="checkbox"/>	Area ID	IP Address	Subnet Mask	LSA Type
Max. 192				

Configure the following settings.

### Create Aggregation

Area ID ▼

---

IP Address

Subnet Mask ▼

---

LSA Type ▼

---

CANCEL
CREATE



### Area ID

Setting	Description	Factory Default
Area ID	Select the Area ID that you want to configure.	0.0.0.0

### IP Address

Setting	Description	Factory Default
Aggregation IP address	Specify the IP address for the aggregation.	None

When finished, click **CREATE** to save your changes.

## Virtual Link Settings

All areas in an OSPF autonomous system must be physically connected to the backbone area (Area 0.0.0.0). However, this is impossible in some cases. For those cases, users can create a virtual link to connect to the backbone through a non-backbone area and also use virtual links to connect two parts of a partitioned backbone through a non-backbone area.

Click **Virtual Link**, and then click the **+** icon to proceed with the configuration.

OSPF Settings

General Area Interface Neighbor Aggregation **Virtual Link**

**+**

<input type="checkbox"/>	Area ID	Router ID	Hello Interval (sec.)	Dead Interval (sec.)	Auth Type	Key ID
--------------------------	---------	-----------	-----------------------	----------------------	-----------	--------

Max. 128

Configure the following settings.

Create Virtual Link

Area ID

Router ID

Hello Interval  sec. Dead Interval  sec.

Auth Type

None

CANCEL CREATE

### Area ID

Setting	Description	Factory Default
Area ID	Define the areas that this L3 switch/router can connect to.	None

### Router ID

Setting	Description	Factory Default
Router ID	Define the L3 switch/route's ID.	None

### Hello Interval (sec)

Setting	Description	Factory Default
1 to 65535	Hello packets are packets that an OSPF process sends to its OSPF neighbors to maintain connectivity with those neighbors. The hello packets are sent at a configurable interval (in seconds). The value of all hello intervals must be the same within a network.	None

### Dead Interval (sec)

Setting	Description	Factory Default
1 to 65535	The dead interval is also a configurable interval (in seconds), and defaults to four times the value of the hello interval.	None

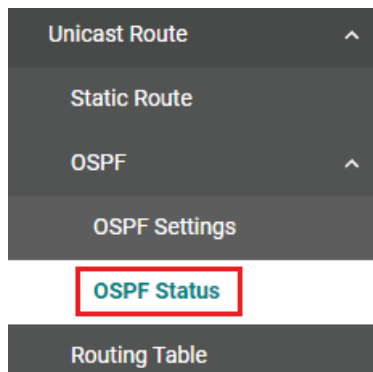
### Auth Type

Setting	Description	Factory Default
None/Simple/MD5/ SHA1/SHA-224/ SHA-256/ SHA-385/SHA-512	OSPF authentication provides the flexibility of authenticating OSPF neighbors. Users can enable authentication to exchange routing update information in a secure manner. OSPF authentication can either be none, simple, or MD5. However, authentication does not need to be configured. If it is configured, all L3 switches/routers on the same segment must have the same password and authentication method.	None

When finished, click **CREATE** to save your changes.

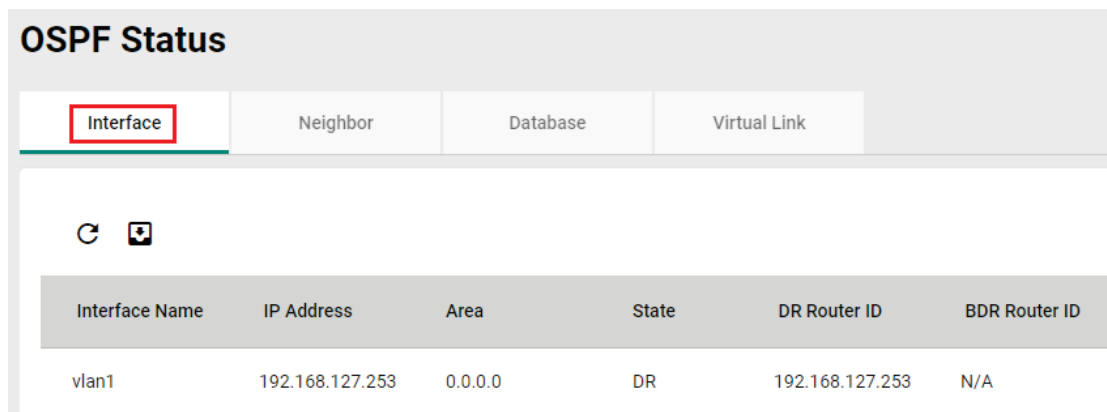
## OSPF Status

Click **OSPF Status** to may view the current OSPF configuration status.



## Interface Status

Click the **Interface** tab to view the current OSPF interface status.



## Neighbor Status

Click the **Neighbor** tab to view the current neighbor configuration status.

### OSPF Status

Interface **Neighbor** Database Virtual Link

🔄 📄

Neighbor ID	Priority	State	IP Address	Interface Name	Dead Interval (sec.)
10.30.1.2	1	Full	10.30.1.2	vlan10	35
20.60.2.3	1	Full	20.60.2.3	vlan20	31

Items per page: 50 1 - 2 of 2 |< < > >|

## Database Status

Click the **Database** tab to view the current database status.

### OSPF Status

Interface Neighbor **Database** Virtual Link

🔄 📄

LSA Type	Area	Link ID	ADV Router	Age (sec.)
Router	0.0.0.0	192.168.127.253	192.168.127.253	70

## Virtual Link Status

Click the **Virtual Link** tab to view the current virtual link status.

### OSPF Status

Interface Neighbor Database **Virtual Link**

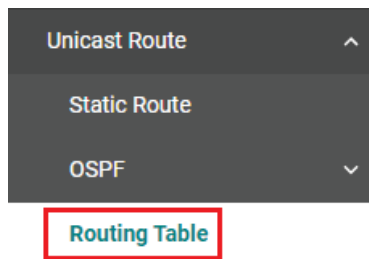
🔄 📄

Area	Router ID	Neighbor State	Events	LSA Retransmission Queue Length	Hello Suppressed
0.0.0.1	20.60.2.3	Full	5	0	No

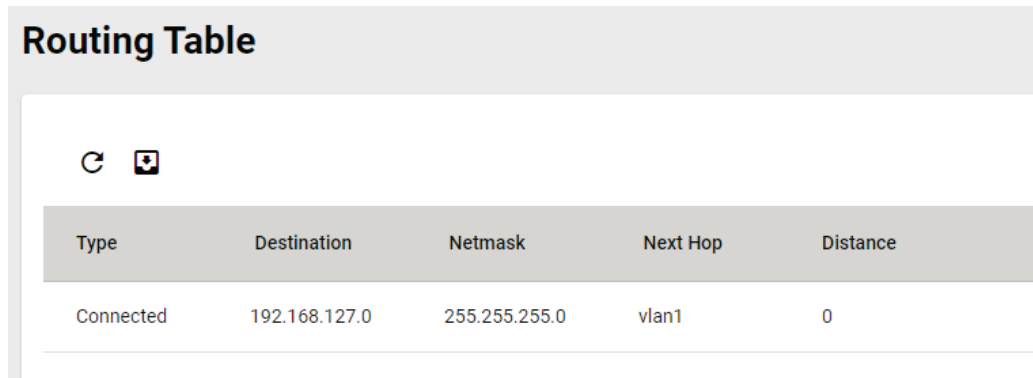
Items per page: 50 1 - 1 of 1 |< < > >|

## Routing Table

This function allows users to view the current routing table.



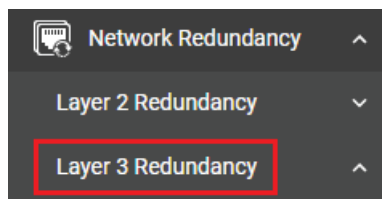
Click **Routing Table** on the function menu to view the routing table.



## Network Redundancy

### Layer 3 Redundancy

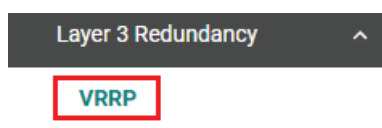
The MDS-4000 Layer 3 switch provides a layer 3 redundancy function. Click Layer 3 Redundancy under Network Redundancy on the function menu.



### VRRP

The **Virtual Router Redundancy Protocol (VRRP)** enables a group of routers to form a single virtual router with a virtual IP address. The LAN clients can then be configured with the virtual router's virtual IP address as their default gateway. The virtual router is the combination of a group of routers, also known as a VRRP group.

Click **VRRP** under Layer 3 Redundancy on the function menu.



## VRRP Settings

Click the **Settings** tab on the page.

Configure the following settings.


### VRRP

Setting	Description	Factory Default
Enable/Disable	Enable or disable VRRP	Disabled

### Version

Setting	Description	Factory Default
V2/V3	Select version 2 or version 3 for the VRRP.	V2

When finished click **APPLY** to save your changes.

Click the  icon to create a virtual router.

Configure the following settings.

### Create a Virtual Router

Virtual Router \* ▼

---

Interface \* ▼    VRID \* \_\_\_\_\_  
1 - 255

Priority \* \_\_\_\_\_  
1 - 254

Virtual Router IP Addre... \_\_\_\_\_

Advertisement Interval \* \_\_\_\_\_  
30 - 40000    ms

Preempt Mode ▼    Preempt Delay \* \_\_\_\_\_  
Enabled    0 - 3600    sec.

Auth Type \* ▼    Authentication Key \* \_\_\_\_\_   
0 / 8

Accept Mode \* ▼

CANCEL
CREATE

#### Virtual Router

Setting	Description	Factory Default
Enable/Disable	Enable or disable virtual router.	None

#### Interface

Setting	Description	Factory Default
VLAN	Select which VLAN to be the interface.	None

#### VRID

Setting	Description	Factory Default
1 to 255	Specify the virtual router ID. Virtual Router ID is used to assign a VRRP group. The L3 switch/router, which operate as master/backup, should have the same ID. The Moxa L3 switch/router supports one virtual router ID for each interface. IDs can range from 1 to 255.	None

**Priority**

Setting	Description	Factory Default
1 to 254	Determines priority in a VRRP group. The priority value range is 1 to 254, with 254 the highest priority. If several L3 switches/routers have the same priority, the router with higher IP address will have the higher priority. The usable range is "1 to 254".	None

**Virtual Router Address**

Setting	Description	Factory Default
IP Address of the virtual router	L3 switches/routers in the same VRRP group must have the identical virtual IP address. This virtual IP address must belong to the same address range as the real IP address of the interface.	None

**Advertisement Interval (ms)**

Setting	Description	Factory Default
30 to 40000	Define the VRRP advertisement interval.	None

**Preempt Mode**

Setting	Description	Factory Default
Enable/Disable	Determine whether or not a backup L3 switch/router will take over the authority of the master. If enabled, VRRP will compare the priority of the switch/router with the backup switch/router. The higher priority switch/router will take over as the Master.	None

**Preempt Delay(sec.)**

Setting	Description	Factory Default
0 to 3600	If Preempt Mode is enabled, specify the delay (in seconds) before the backup L3 switch/router will take over the authority of the master.	None

**Accept Mode**

Setting	Description	Factory Default
Enable/Disable	Enable or disable the accept mode. When enabled, VRRP IP can be accessed.	None

**Auth Type (available in V2 only)**

Setting	Description	Factory Default
None/Simple	Determines whether to activate the authentication (Simple Type), or not to activate the authentication (None).	None

**Auth Key (available in V2 only)**

Setting	Description	Factory Default
Authentication key	Provides an authentication key when simple type for authentication is set.	None

When finished, click **CREATE** to complete the configuration.

## VRRP Status

Click the **Status** tab to view the current VRRP setting status.


**VRRP**

Settings **Status**

🔄 🏠 🔍 Search

Interface	VRID	Priority	State	Master Address
vlan1	1	1	Backup	0.0.0.0

1 - 1 of 1

To edit the existing VRRP setting, click the  icon.

**VRRP**


Settings **Status**

VRRP \*  
Enabled ▾

Version \*  
V2 ▾

**APPLY**

🛠️ 🔍 Search

<input type="checkbox"/>	Enable	Interface	VRID	Priority	Virtual Router IP Address	Advertisement Interval	Preempt Mode	Preempt Delay	Accept Mode	Auth Type
<input type="checkbox"/>		vlan1	1	1	192.168.127.3	30	Enabled	30	Enabled	None

Max. 40 1 - 1 of 1