

Networking Solutions for VoIP

Application Notes



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INTRODUCTION

Voice over IP (VoIP) has become a mainstream technology with quality of service (QoS) as the most important factor underlying this change. Businesses that previously held back because of the early reputation for poor VoIP quality need no longer be concerned about quality. Today, excellent quality of service can be achieved with VoIP, though it is not guaranteed. QoS ultimately depends on the switches that control the VoIP traffic, and of course, the network over which that traffic travels.

Regardless of the size of a VoIP network, it will always include one or more of the following components:

- **User agents.** These may be commercial IP phones, or “soft phones” residing in a desktop or laptop PC.
- **Voice gateway.** The gateway acts as the bridge between a VoIP network and the PSTN network of the “outside world.”
- **IPBX.** The IPBX (sometimes referred to as an IP PBX) replaces the conventional PBX of the past, and performs all its functions (voice mail, call forwarding, conference calling and many, many more). It connects to the PSTN network via the voice gateway. The IPBX is available in three deployment options:
 - Dedicated, on-site hardware device
 - Software that runs on a standard on-site server
 - Managed service via the cloud
- **Switches to manage network traffic.** The switches are crucial, because if they lack the appropriate capabilities or bandwidth capacity, QoS will suffer, leading to user complaints, poor customer service and problems with external telephone communication in general.
- **Cabling.** For adequate performance, Cat5E or better cabling is recommended.

HOW TO USE THIS DOCUMENT

The *Networking Solutions for VoIP Solution Guide* provides technical guidance and details about reference designs for installations with 20, 200 and 1000 phones. Use the Solution Guide to plan your solution architecture and determine the needed equipment.

This Application Note is a companion document to the Solution Guide. After you have planned and have the equipment for your network, use this guide to configure your VoIP solution. Example configurations are provided for 20-phone, 200-phone, and 1000-phone deployments.

REFERENCE CONFIGURATIONS AND ASSUMPTIONS

The following figures show reference configurations for 20-phone, 200-phone, and 1000-phone solutions.

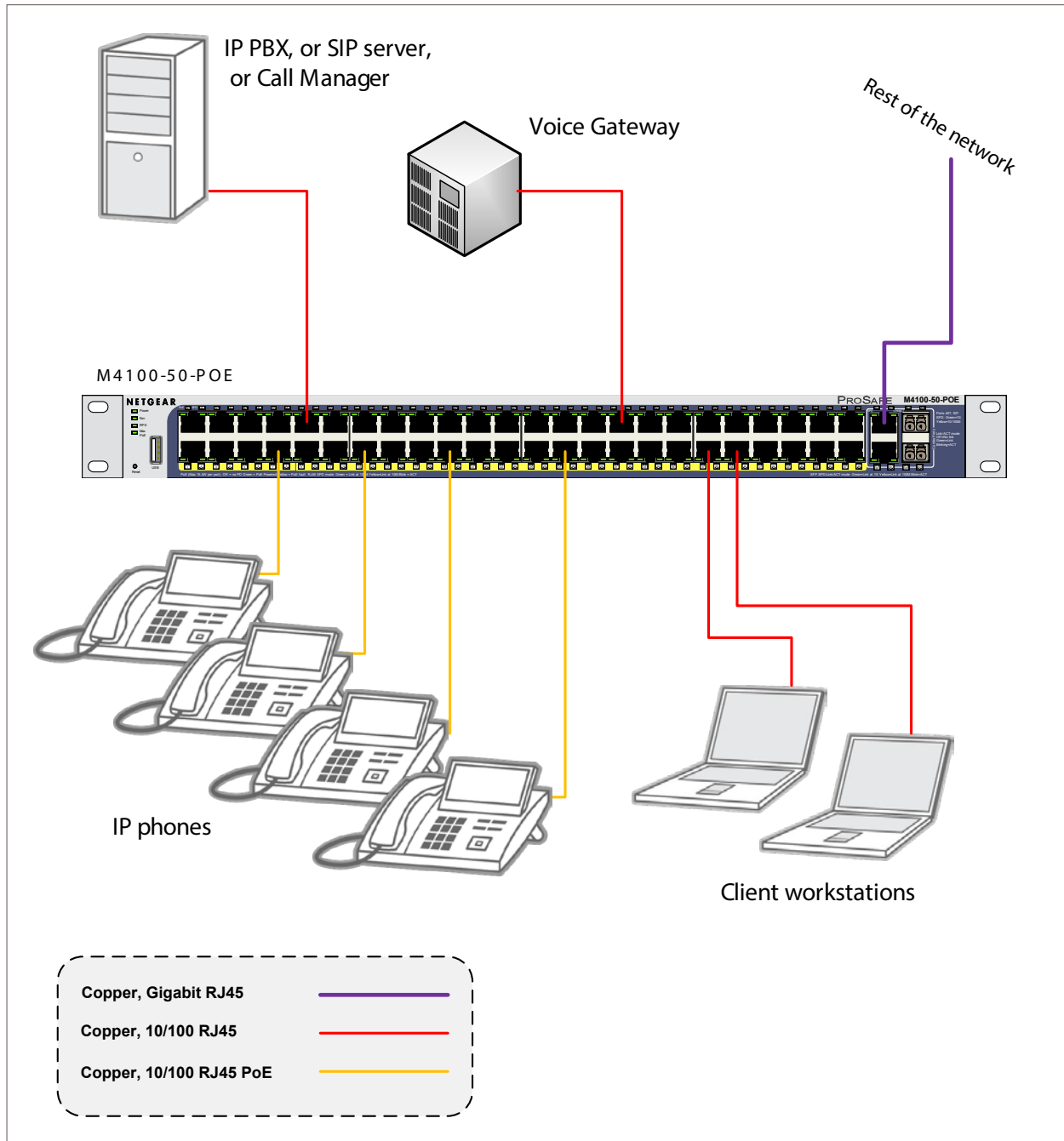


Figure 1. Sample Solution – 20 Phones

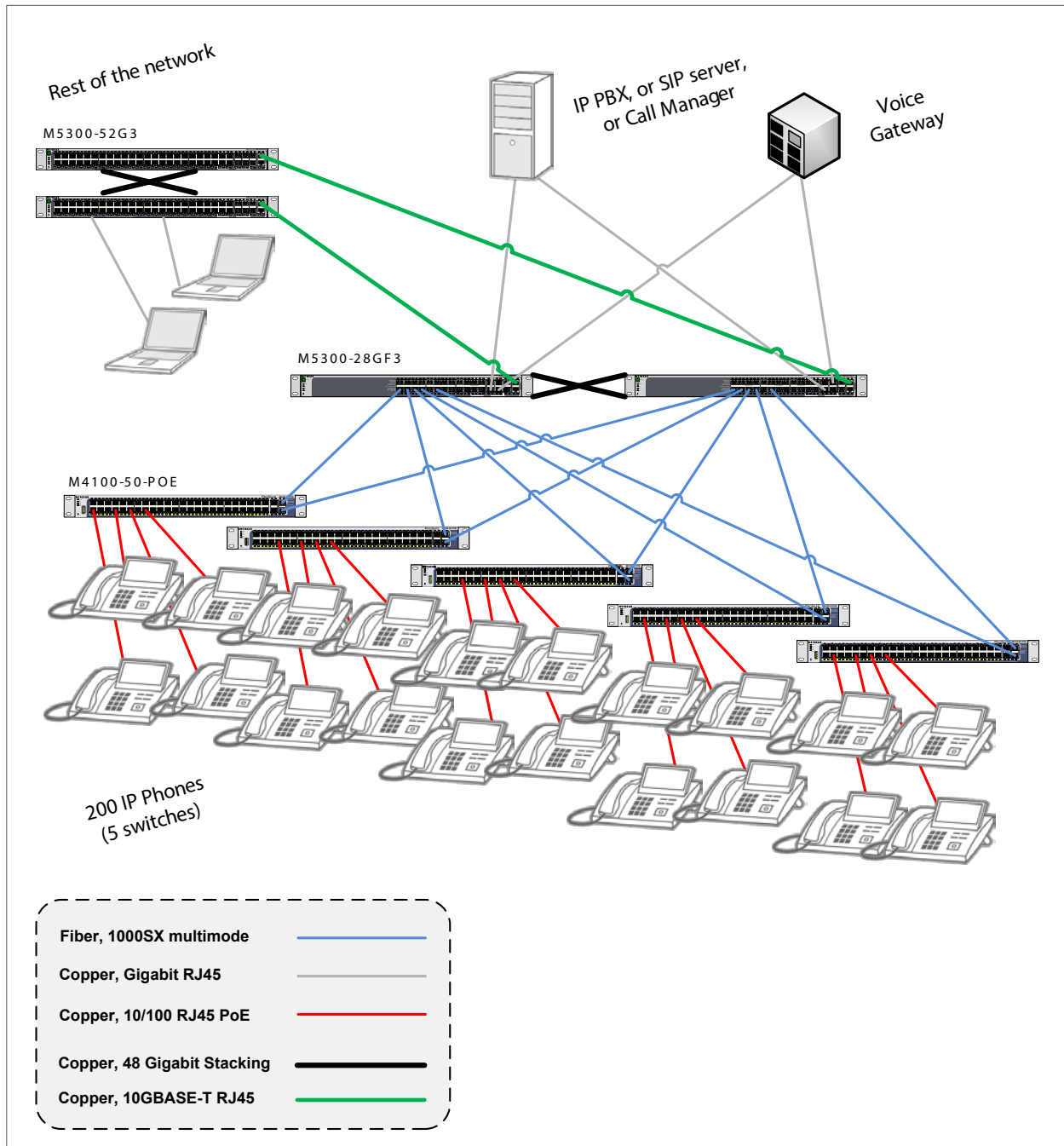


Figure 2. Sample Solution – 200 Phones

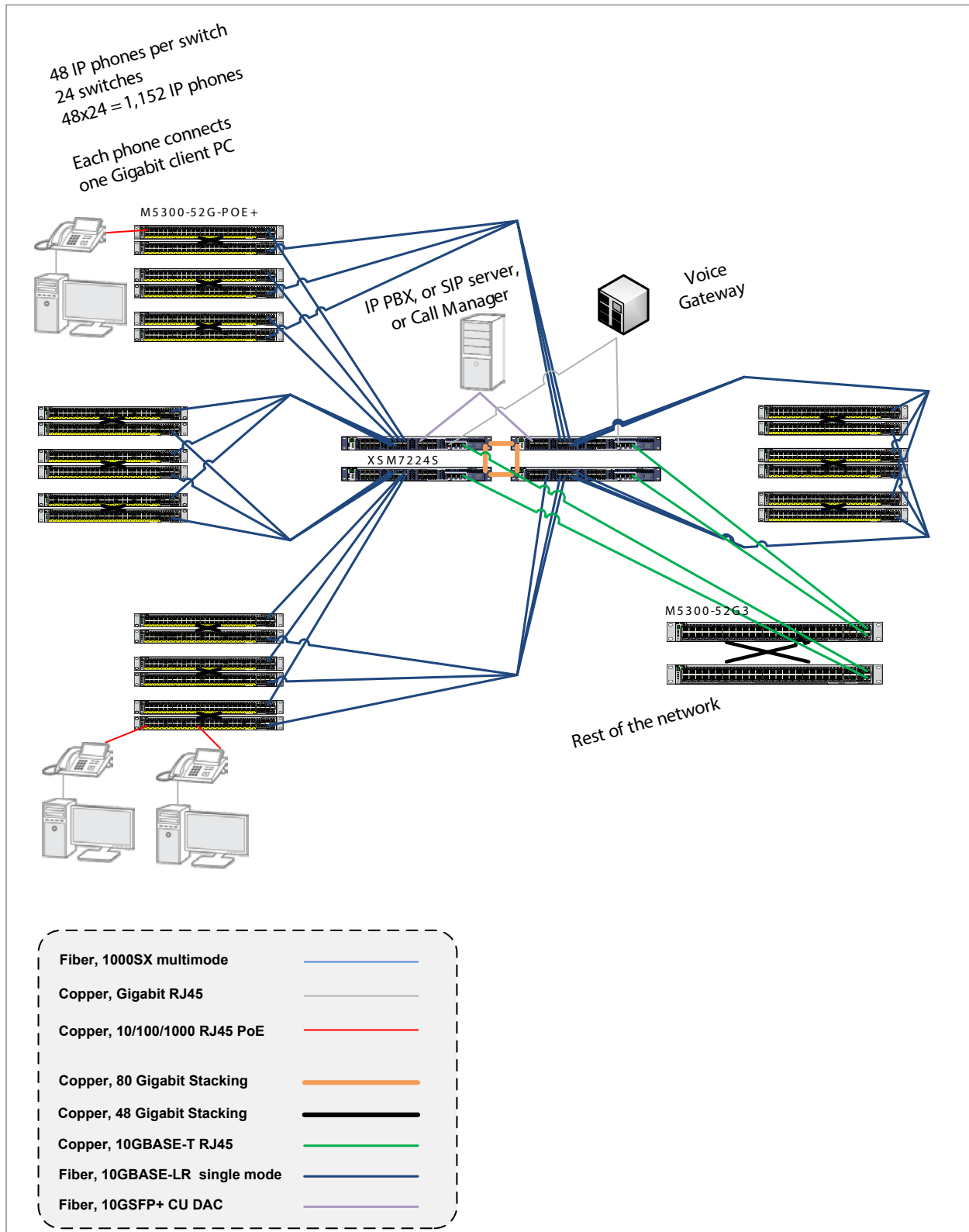


Figure 3. Sample Solution – 1000 Phones

CONFIGURATION FOR THE 20-PHONE SOLUTION

Refer to Figure 1 for a diagram of the solution. You can use the CLI or Web GUI for configuration.

Assumptions for the 20-Phone Solution

- A DHCP server on the switch will be used. If a third-party DHCP solution is used, refer to the vendor's documentation and the documentation for the phone backend to configure DHCP options.
- The VoIP network is a dedicated, isolated network with a single uplink to the customer's enterprise network.
- VoIP backend systems will be protected by security measures local to the individual systems. ACLs can be used to further restrict access but are not configured in this application note. Visit support.netgear.com for further information.
- The tested VoIP phones have an internal switch to support a second device connected to a secondary port on the phone, allowing a voice and data VLAN to be configured on the switch port.
- Tested phones are SIP-enabled Cisco 79x5 series phones, and the tested PBX system is an AsteriskNOW VM installation. Refer to vendor documentation for further configuration guidance on these platforms.
- Best practices are used to implement switch stacking and failover/redundancy.

Global Configuration Notes

- Be sure to save your configuration using the **save** or **write memory** CLI command. Alternatively, choose **Maintenance > Save Config** in the GUI. Select the box, and click **APPLY**.
- Physical interfaces are referred to interfaces and ports interchangeably throughout this document.

Sample Configuration Values

The following values are used in the sample configuration:

- Voice VLAN: 100
- Voice VLAN subnet: 192.168.100.0/24
- Data VLAN: 200
- Data VLAN subnet: 192.168.200.0/24

CLI Configuration Steps: 20-Phone Solution

These steps provide an example CLI configuration for the 20-phone solution. To use the Web GUI for configuration, see [Web GUI Configuration Steps: 20-Phone Solution](#) on page 12.

1. Create voice VLAN 100 and data VLAN 200 and their respective interfaces using subnet 192.168.100.0/24 for VLAN 100 and 192.168.200.0/24 for VLAN 200.

```
(M4100-50-POE) #vlan database
(M4100-50-POE) (Vlan)#vlan 100
(M4100-50-POE) (Vlan)#vlan 200
(M4100-50-POE) (Vlan)#vlan routing 100
(M4100-50-POE) (Vlan)#vlan routing 200
(M4100-50-POE) (Vlan)#exit
(M4100-50-POE) #configure
(M4100-50-POE) (Config)#interface vlan 100
(M4100-50-POE) (Interface vlan 100)#routing
(M4100-50-POE) (Interface vlan 100)#ip address 192.168.100.1 255.255.255.0
(M4100-50-POE) (Interface vlan 100)#exit
(M4100-50-POE) (Config)#interface vlan 200
(M4100-50-POE) (Interface vlan 200)#routing
(M4100-50-POE) (Interface vlan 200)#ip address 192.168.200.1 255.255.255.0
(M4100-50-POE) (Interface vlan 200)#exit
```

2. Enable the DHCP server and configure DHCP pools for each VLAN. Add DHCP option 66 for the TFTP server on VLAN 100 to allow the phones to download their images and configuration files. In this example, the TFTP server has an address of 192.168.100.100.

```
(M4100-50-POE) (Config)#service dhcp
(M4100-50-POE) (Config)#ip dhcp pool pool100
(M4100-50-POE) (Config-dhcp-pool)#network 192.168.100.0 255.255.255.0
(M4100-50-POE) (Config-dhcp-pool)#default-router 192.168.100.1
(M4100-50-POE) (Config-dhcp-pool)#option 66 ascii 192.168.100.100
(M4100-50-POE) (Config-dhcp-pool)#exit
(M4100-50-POE) (Config)#ip dhcp pool pool200
(M4100-50-POE) (Config-dhcp-pool)#network 192.168.200.0 255.255.255.0
(M4100-50-POE) (Config-dhcp-pool)#default-router 192.168.200.1
(M4100-50-POE) (Config-dhcp-pool)#exit
```

3. Enable auto-VoIP on VLAN 100.

```
(M4100-50-POE) (Config) #auto-voip vlan 100
```

4. By default, the auto-voip feature prioritizes voice traffic in queue 6. This step raises the priority to class 3.

```
(M4100-50-POE) (Config) # auto-voip protocol-based traffic-class 3
```

5. Enable the Voice VLAN feature globally.

```
(M4100-50-POE) (Config) #voice vlan
```

6. Configure the phone ports for voice VLAN 100 and data VLAN 200. Select all the desired interfaces to support VoIP devices. Tag the traffic on phone interfaces, but leave the data VLAN 200 traffic untagged on these ports. For all VoIP device interfaces, set the configured PVID to data VLAN 200.

```
(M4100-50-POE) (Config) #interface 0/1-0/20
(M4100-50-POE) (Interface 0/1-0/20) #vlan participation exclude 1
(M4100-50-POE) (Interface 0/1-0/20) #vlan participation include 100,200
(M4100-50-POE) (Interface 0/1-0/20) #vlan tagging 100
(M4100-50-POE) (Interface 0/1-0/20) #voice vlan 100
(M4100-50-POE) (Interface 0/1-0/20) #vlan pvid 200
(M4100-50-POE) (Interface 0/1-0/20) #exit
```

7. Configure infrastructure ports on VLAN 100. For each interface on each unit that will support a VoIP phone, include voice VLAN 100.

```
(M4100-50-POE) (Config) #interface 0/23
(M4100-50-POE) (Interface 0/23) #vlan participation exclude 1
(M4100-50-POE) (Interface 0/23) #vlan participation include 100
(M4100-50-POE) (Interface 0/23) #vlan pvid 100
(M4100-50-POE) (Interface 0/23) #exit
```


Web GUI Configuration Steps: 20-Phone Solution

These steps provide an example Web GUI configuration for the 20-phone solution. To use the CLI for configuration, see CLI Configuration Steps: 20-Phone Solution on page 8.

1. Specify voice VLAN 100 and data VLAN 200. Choose **Switching > VLAN > Advanced > VLAN Configuration**. Enter each VLAN ID and name, and click **ADD** to add the VLAN.

The screenshot displays the Netgear Web GUI for an M4100-50-POE switch. The main navigation bar includes tabs for System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The Switching tab is active, and the VLAN Configuration page is shown. The page includes a sidebar menu with options for Basic, VLAN Configuration, and Advanced. The main content area is titled 'VLAN Configuration' and contains the following sections:

- Reset:** A section with a 'Reset Configuration' button.
- Internal VLAN Configuration:** A section with 'Internal VLAN Allocation Base' set to 4093 and 'Internal VLAN Allocation Policy' set to Ascending.
- VLAN Configuration Table:** A table listing existing VLANs with columns for VLAN ID, VLAN Name, VLAN Type, and Make Static.

VLAN ID	VLAN Name	VLAN Type	Make Static
<input type="checkbox"/>	<input type="text"/>		Disable
<input type="checkbox"/>	1 default	Default	Disable
<input type="checkbox"/>	2 Auto VoIP	AUTO VoIP	Disable
<input type="checkbox"/>	100 VLAN0100	Static	Disable
<input type="checkbox"/>	200 VLAN0200	Static	Disable

At the bottom of the page, there are buttons for ADD, DELETE, CANCEL, and APPLY.

2. Enable routing on the VLAN interfaces and configure their respective subnets (192.168.100.0/24 for VLAN 100 and 192.168.200.0/24 for VLAN 200). Choose **Routing > VLAN > VLAN Routing**. For each VLAN, enter the VLAN ID and the first available IP address (also the gateway) for the subnet with the correct subnet mask. Click **ADD** after each full entry.

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System Switching **Routing** QoS Security Monitoring Maintenance Help Index

Routing Table | IP | **VLAN** | ARP | Router Discovery

VLAN Routing Wizard
VLAN Routing

VLAN Routing Configuration

VLAN Routing Configuration

VLAN ID	Port	MAC Address	IP Address	Subnet Mask
<input type="checkbox"/>				
<input type="checkbox"/> 100	4/1	28:C6:8E:15:E7:52	192.168.100.1	255.255.255.0
<input type="checkbox"/> 200	4/2	28:C6:8E:15:E7:52	192.168.200.1	255.255.255.0

ADD DELETE CANCEL

3. Enable the DHCP server. Choose **System > Services > DHCP Server > DHCP Server Configuration**. Enable Admin Mode and click **APPLY**.

The screenshot shows the Netgear web interface for an M4100-50-POE switch. The navigation menu includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The current page is DHCP Server Configuration, which is part of the Services > DHCP Server path. The configuration page has a left sidebar with a tree view showing DHCP Server Configuration selected. The main content area has a title 'DHCP Server Configuration' and a sub-section 'DHCP Server Configuration' with the following settings:

- Admin Mode: Disable Enable
- Ping Packet Count: (0, 2 to 10)
- Conflict Logging Mode: Disable Enable
- Bootp Automatic Mode: Disable Enable

Below these settings is an 'Excluded Address' section with a table for IP ranges:

IP Range From	IP Range To
<input type="text"/>	<input type="text"/>

At the bottom right of the interface, there are buttons for ADD, DELETE, CANCEL, and APPLY.

4. Choose **System > Services > DHCP Server > DHCP Pool Configuration**. Select Create for Pool Name and specify “pool<VLANID>” as the name for each VLAN. Enter the network address for each VLAN and the network mask. Under Default Router Addresses, enter the gateway you configured for each VLAN interface. You can also optionally change the least time value. Click **ADD** to create the pool.

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System | Switching | Routing | QoS | Security | Monitoring | Maintenance | Help | Index

Management | Device View | **Services** | PoE | SNMP | LLDP | ISDP | Timer Schedule

LOGOUT

DHCP Server

- » DHCP Server Configuration
- » **DHCP Pool Configuration**
- » DHCP Pool Options
- » DHCP Server Statistics
- » DHCP bindings Information
- » DHCP Conflicts Information
- » DHCP Relay
- » DHCP I2 Relay
- » UDP Relay

DHCP Pool Configuration

DHCP Pool Configuration

Pool Name: pool100

Type of Binding: Dynamic

Network Address: 192.168.100.0

Network Mask: 255.255.255.0

Network Prefix Length: (0 to 32)

Client Name:

Hardware Address:

Hardware Address Type: Ethernet

Client ID:

Host Number:

Host Mask:

Host Prefix Length: (1-22)

Lease Time: Specified Duration

Days: 1 (0 to 39)

Hours: 0 (0 to 23)

Minutes: 0 (0 to 59)

Default Router Addresses

192.168.100.1

0.0.0.0

0.0.0.0

0.0.0.0

0.0.0.0

0.0.0.0

0.0.0.0

0.0.0.0

DNS Server Addresses

NetBIOS Name Server Addresses

NetBIOS Node Type: b node Broadcast

Next Server Address: 0.0.0.0

Domain Name: (0 to 255 characters)

Bootfile: (0 to 128 characters)

ADD DELETE CANCEL APPLY

5. Configure the DHCP option to allow the phones to reach the TFTP server containing the phones' necessary firmware images and configuration files. Choose **System > Services > DHCP Server > DHCP Pool Options**. Select the VLAN 100 pool and enter Option Code 66 with Option Type Ascii and Option Value 192.168.100.100 (your TFTP server's IP address). Click **ADD**.

The screenshot shows the Netgear web interface for an M4100-50-POE switch. The top navigation bar includes tabs for System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. Below this is a secondary navigation bar with links for Management, Device View, Services, PoE, SNMP, LLDP, ISDP, and Timer Schedule. The main content area is titled "DHCP Pool Options" and features a table with the following data:

Pool Name	Option Code	Option Type	Option Value
pool100	66	Ascii	192.168.100.100

At the bottom right of the interface, there are buttons for ADD, DELETE, and APPLY.

6. Choose **Switching > Auto-VoIP > Protocol based > Port Settings**. Set the Prioritization Type to Traffic Class and Class Value to 3. Select all the interfaces and select Enable for Auto VoIP Mode. Click **APPLY**.

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VLAN | **Auto-VoIP** | STP | Multicast | MVR | Address Table | Ports | LAG

Protocol based
 > Port Settings
 > OUI-based

Protocol Based Port Settings

Protocol Based Global Settings

Prioritization Type: Traffic Class
 Class Value: 7

Protocol Based Port Settings

LAGS: All | Go To Interface: [] | GO

Interface	Auto VoIP Mode	Operational Status
<input type="checkbox"/> 0/1	Enable	UP
<input type="checkbox"/> 0/2	Enable	UP
<input type="checkbox"/> 0/3	enable	UP
<input type="checkbox"/> 0/4	Enable	UP
<input type="checkbox"/> 0/5	Enable	UP
<input type="checkbox"/> 0/6	Enable	UP
<input type="checkbox"/> 0/7	Enable	UP
<input type="checkbox"/> 0/8	enable	UP
<input type="checkbox"/> 0/9	Enable	UP
<input type="checkbox"/> 0/10	Enable	UP
<input type="checkbox"/> 0/11	Enable	UP
<input type="checkbox"/> 0/12	Enable	UP
<input type="checkbox"/> 0/13	enable	UP
<input type="checkbox"/> 0/14	Enable	UP
<input type="checkbox"/> 0/15	Enable	UP
<input type="checkbox"/> 0/16	Enable	UP
<input type="checkbox"/> 0/17	enable	UP
<input type="checkbox"/> 0/18	enable	UP
<input type="checkbox"/> 0/19	Enable	UP
<input type="checkbox"/> 0/20	Enable	UP
<input type="checkbox"/> 0/21	Enable	UP
<input type="checkbox"/> 0/22	enable	UP
<input type="checkbox"/> 0/23	Enable	UP
<input type="checkbox"/> 0/24	Enable	UP
<input type="checkbox"/> 0/25	Enable	UP
<input type="checkbox"/> 0/26	Enable	UP

CANCEL APPLY

- Set up the voice VLAN feature on the phone ports. Choose **Switching > VLAN > Advanced > Voice VLAN Configuration**. Enable Admin Mode. Select all the desired interfaces to support VoIP devices. Set the Interface Mode to VLAN ID and enter 100 as the Value. Click **APPLY**.

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VLAN | Auto-VoIP | STP | Multicast | MVR | Address Table | Ports | LAG

Voice VLAN Configuration

Voice VLAN Global Admin
Admin Mode: Disable Enable

Voice VLAN Configuration
Go To Interface: GO

	Interface	Interface Mode	Value	CoS Override Mode	Operational State
<input type="checkbox"/>	0/1	VLAN ID	100	Disable	Enable
<input type="checkbox"/>	0/2	VLAN ID	100	Disable	Enable
<input type="checkbox"/>	0/3	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/4	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/5	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/6	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/7	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/8	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/9	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/10	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/11	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/12	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/13	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/14	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/15	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/16	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/17	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/18	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/19	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/20	VLAN ID	100	Disable	Disable
<input type="checkbox"/>	0/21	Disable	0	Disable	Disable
<input type="checkbox"/>	0/22	Disable	0	Disable	Disable
<input type="checkbox"/>	0/23	Disable	0	Disable	Disable
<input type="checkbox"/>	0/24	Disable	0	Disable	Disable
<input type="checkbox"/>	0/25	Disable	0	Disable	Disable
<input type="checkbox"/>	0/26	Disable	0	Disable	Disable

REFRESH CANCEL APPLY

- Finish setting up the phone interfaces to support the voice and data VLANs. Choose **Switching > VLAN > VLAN Membership**. For voice VLAN 100, tag the traffic on phone interfaces, but leave the data VLAN 200 traffic untagged on these ports. For each interface on each unit that will support a VoIP phone, select the VLAN from the drop-down menu and cycle through clickable options on each interface until the correct option is reached. All non-VoIP device interfaces will have only 1 VLAN untagged and no tagged VLANs. Click **APPLY** after each VLAN is completed.

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VLAN | Auto-VoIP | STP | Multicast | MVR | Address Table | Ports | LAG

VLAN Membership

VLAN ID: 100 | Group Operation: Untag All

VLAN Name: VLAN0100 | UNTAGGED PORT MEMBERS

VLAN Type: Static | TAGGED PORT MEMBERS

Unit 1

Port	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U

49 50

LAG

CANCEL APPLY

- Choose **Switching > VLAN > Port PVID Configuration**. For all VoIP device interfaces, set the Configured PVID to data VLAN 200. All infrastructure ports must be set to Configured PVID 100. Click **APPLY**.

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VLAN | Auto-VoIP | STP | Multicast | MVR | Address Table | Ports | LAG

Basic
 Advanced
 VLAN Configuration
 VLAN Membership
 VLAN Status
Port PVID Configuration
 Configuration
 MAC Based VLAN
 Protocol Based VLAN Group Configuration
 Protocol Based VLAN Group Membership
 IP Subnet Based VLAN
 Port DVLAN Configuration
 Voice VLAN Configuration
 GARP Switch Configuration
 GARP Port Configuration

Port PVID Configuration

PVID Configuration

1 LAGS All Go To Interface GO

Interface	Configured PVID	Current PVID	Acceptable Frame Types	Configured Ingress Filtering	Current Ingress Filtering	Port Priority
<input type="checkbox"/> 0/1	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/2	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/3	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/4	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/5	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/6	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/7	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/8	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/9	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/10	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/11	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/12	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/13	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/14	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/15	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/16	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/17	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/18	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/19	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/20	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/21	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/22	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/23	100	100	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/24	100	100	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/25	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/26	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/27	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/28	1	1	Admit All	Disable	Disable	0

CANCEL APPLY

CONFIGURATION FOR THE 200-PHONE SOLUTION

Refer to Figure 2 for a diagram of the solution. You can use the CLI or Web GUI for configuration.

Assumptions for the 200-Phone Solution

- A DHCP server on the switch will be used. If a third-party DHCP solution is used, refer to the vendor's documentation and the documentation for the phone backend to configure DHCP options.
- The VoIP network is a dedicated, isolated network with a single uplink to the customer's enterprise network.
- VoIP backend systems will be protected by security measures local to the individual systems. ACLs can be used to further restrict access but are not configured in this application note. Visit support.netgear.com for further information.
- The tested VoIP phones have an internal switch to support a second device connected to a secondary port on the phone, allowing a voice and data VLAN to be configured on the switch port.
- Tested phones are SIP-enabled Cisco 79x5 series phones, and the tested PBX system is an AsteriskNOW VM installation. Refer to vendor documentation for further configuration guidance on these platforms.
- Best practices are used to implement switch stacking and failover/redundancy.

Global Configuration Notes

- Be sure to save your configuration using the **save** or **write** memory CLI command. Alternatively, choose **Maintenance > Save Config** in the GUI. Select the box, and click **APPLY**.
- Physical interfaces are referred to interfaces and ports interchangeably throughout this document.

Sample Configuration Values

The following values are used in the sample configuration:

- Infrastructure VLAN: 10
- Infrastructure VLAN subnet: 192.168.1.0/24
- Voice VLAN: 200
- Voice VLAN subnet: 192.168.100.0/24

CLI Configuration Steps: 200-Phone Solution

These steps provide an example CLI configuration for the 200-phone solution. For the Web GUI configuration, see Web GUI Configuration Steps: 200-Phone Solution on page 24.

1. Configure the M5300-28GF3 stack. Create VLAN interfaces on this stack and trunk them out to neighboring stacks as necessary. Allocate VLAN and subnets as follows: infrastructure VLAN 10 (192.168.1.0/24), voice VLAN 100 (192.168.100.0/24), and data VLAN 200 (192.168.200.0/24).

```
(M5300-28GF3) #vlan data
(M5300-28GF3) (Vlan)#vlan 10,100,200
(M5300-28GF3) (Vlan)#vlan routing 10
(M5300-28GF3) (Vlan)#vlan routing 100
(M5300-28GF3) (Vlan)#vlan routing 200
(M5300-28GF3) (Vlan)#exit
(M5300-28GF3) #configure
(M5300-28GF3) (Config)#interface vlan 10
(M5300-28GF3) (Interface vlan 10)#ip address 192.168.1.1 255.255.255.0
(M5300-28GF3) (Interface vlan 10)#routing
(M5300-28GF3) (Interface vlan 10)#exit
(M5300-28GF3) (Config)#interface vlan 100
(M5300-28GF3) (Interface vlan 100)#ip address 192.168.100.1 255.255.255.0
(M5300-28GF3) (Interface vlan 100)#routing
(M5300-28GF3) (Interface vlan 100)#exit
(M5300-28GF3) (Config)#interface vlan 200
(M5300-28GF3) (Interface vlan 200)#routing
(M5300-28GF3) (Interface vlan 200)#ip address 192.168.200.1 255.255.255.0
(M5300-28GF3) (Interface vlan 200)#exit
```

2. Enable the built-in DHCP server and set up DHCP pools for subnets.

```
(M5300-28GF3) (Config)#ip dhcp pool pool10
(M5300-28GF3) (Config-dhcp-pool)#default-router 192.168.1.1
(M5300-28GF3) (Config-dhcp-pool)#network 192.168.1.0 255.255.255.0
(M5300-28GF3) (Config-dhcp-pool)#exit
(M5300-28GF3) (Config)#ip dhcp pool pool100
(M5300-28GF3) (Config-dhcp-pool)#default-router 192.168.100.1
(M5300-28GF3) (Config-dhcp-pool)#network 192.168.100.0 255.255.255.0
(M5300-28GF3) (Config-dhcp-pool)#exit
(M5300-28GF3) (Config)#ip dhcp pool pool200
(M5300-28GF3) (Config-dhcp-pool)#default-router 192.168.200.1
(M5300-28GF3) (Config-dhcp-pool)#network 192.168.200.0 255.255.255.0
(M5300-28GF3) (Config-dhcp-pool)#exit
```

3. Add DHCP option 66 to the voice VLAN DHCP pool so that the phones can reach the TFTP server to download necessary firmware and configuration files upon boot-up. In this case, the TFTP server has an IP address of 192.168.1.100.

```
(M5300-28GF3) (Config)#ip dhcp pool pool100
(M5300-28GF3) (Config-dhcp-pool)#option 66 ascii 192.168.100.100
(M5300-28GF3) (Config-dhcp-pool)#exit
```

4. Enable IP routing globally.

```
(M5300-28GF3) (Config)#ip routing
```

5. Configure uplink ports to the neighboring switches. Configurations will be the same on both sides of the uplink. Add or remove VLANs as needed. All transported VLANs must be tagged to create the trunk.

```
(M5300-28GF3) (Config)#interface 1/0/25
(M5300-28GF3) (Interface 1/0/25)#vlan participation exclude 1
(M5300-28GF3) (Interface 1/0/25)#vlan participation include 10,100,200
(M5300-28GF3) (Interface 1/0/25)#vlan tagging 10,100,200
(M5300-28GF3) (Interface 1/0/25)#exit
```

6. Configure the infrastructure ports. For each interface on each unit that will support a VoIP phone, include infrastructure VLAN 10.

```
(M5300-28GF3) (Config)#interface 1/0/21
(M5300-28GF3) (Interface 1/0/25)#vlan participation exclude 1
(M5300-28GF3) (Interface 1/0/25)#vlan participation include 10
(M5300-28GF3) (Interface 1/0/25)#vlan pvid 10
(M5300-28GF3) (Interface 1/0/25)#exit
```

7. Move to the M4100-50-POE stacks to replicate the configuration on each one. Start by declaring the VLANs 10, 100, and 200.

```
(M4100-50-POE) #vlan database
(M4100-50-POE) (Vlan)#vlan 10,100,200
(M4100-50-POE) (Vlan)#exit
```

8. Enable IP routing on each M4100-50-POE stack.

```
(M4100-50-POE) #configure
(M4100-50-POE) (Config)#ip routing
```

9. Configure each uplink to the M5300-28GF3 stack. Both sides of the uplink must have the same configuration. All transported VLANs must be tagged to create the trunk.

```
(M4100-50-POE) (Config) #interface 0/49
(M4100-50-POE) (Interface 0/49) #vlan participation exclude 1
(M4100-50-POE) (Interface 0/49) #vlan participation include 10,100,200
(M4100-50-POE) (Interface 0/49) #vlan tagging 10,100,200
(M4100-50-POE) (Interface 0/49) #exit
```

10. Raise the VoIP traffic priority and enable the voice VLAN feature. Send VoIP traffic with a dot1p priority of 5 and map priority 5 to queue 5.

```
(M4100-50-POE) (Config) # classofservice dot1p-mapping 5 5
(M4100-50-POE) (Config) #cos-queue strict 5
(M4100-50-POE) (Config) #voice vlan
```

11. Create a DiffServ class map policy to provide QoS for voice traffic on the phone ports. This policy will be copied onto all stacks in the LAN network supporting VoIP devices.

```
(M4100-50-POE) (Config) #diffserv
(M4100-50-POE) (Config) #class-map match-all class_voip
(M4100-50-POE) (Config-classmap) #match protocol udp
(M4100-50-POE) (Config-classmap) #match ip dscp ef
(M4100-50-POE) (Config-classmap) #exit
(M4100-50-POE) (Config) #policy-map pol_voip in
(M4100-50-POE) (Config-policy-map) #class class_voip
(M4100-50-POE) (Config-policy-classmap) #assign-queue 5
(M4100-50-POE) (Config-policy-classmap) #exit
(M4100-50-POE) (Config-policy-map) #exit
```

12. Configure the phone ports with voice VLAN 100 and data VLAN 200 and apply the VoIP policy to the phone ports.

```
(M4100-50-POE) (Config) #interface 0/1
(M4100-50-POE) (Interface 0/1) #vlan participation exclude 1
(M4100-50-POE) (Interface 0/1) #vlan participation include 100,200
(M4100-50-POE) (Interface 0/1) #vlan tagging 100
(M4100-50-POE) (Interface 0/1) #voice vlan 100
(M4100-50-POE) (Interface 0/1) #vlan pvid 200
(M4100-50-POE) (Interface 0/1) #service-policy in pol_voip
(M4100-50-POE) (Interface 0/1) #exit
```

13. Move to the M5300-52G3 stack to replicate the configuration. Declare the VLANs, enable IP routing, and enable the voice VLAN features globally.

```
(M5300-52G3) #vlan database
(M5300-52G3) (Vlan)#vlan 10,100,200
(M5300-52G3) (Vlan)#exit
(M5300-52G3) #configure
(M5300-52G3) (Config)#ip routing
(M5300-52G3) (Config)#voice vlan
```

14. Configure the uplink to the M5300-28GF3 stack. Both sides of the uplink must have the same configuration. All transported VLANs must be tagged to create the trunk.

```
(M5300-52G3) (Config)#interface 1/0/25
(M5300-52G3) (Interface 1/0/25)#vlan participation exclude 1
(M5300-52G3) (Interface 1/0/25)#vlan participation include 10,100,200
(M5300-52G3) (Interface 1/0/25)#vlan tagging 10,100,200
(M5300-52G3) (Interface 1/0/25)#exit
```

15. Finish the configuration by setting up ports on the other endpoints with the appropriate VLAN, in this case, data VLAN 200.

```
(M5300-52G3) (Config)#interface 1/0/1
(M5300-52G3) (Interface 1/0/1)#vlan participation exclude 1
(M5300-52G3) (Interface 1/0/1)#vlan participation include 200
(M5300-52G3) (Interface 1/0/1)#vlan pvid 200
(M5300-52G3) (Interface 1/0/1)#exit
(M5300-52G3) (Config)#exit
```

Web GUI Configuration Steps: 200-Phone Solution

These steps provide an example Web GUI configuration for the 200-phone solution. For the CLI configuration, see CLI Configuration Steps: 200-Phone Solution on page 20.

1. Create the VLAN interfaces for the three subnets. Choose **Switching > VLAN > Advanced > VLAN Configuration**. Enter each VLAN ID, its name, and click ADD to add the VLAN to the configuration.

The screenshot shows the Netgear Web GUI for an M5300-28GF3 switch. The main navigation bar includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The current page is VLAN Configuration, with sub-menus for VLAN, Auto-VoIP, ISCSI, STP, Multicast, MVR, Address Table, Ports, and LAG. The left sidebar shows a tree view of configuration options under Basic and Advanced, with VLAN Configuration selected. The main content area is titled 'VLAN Configuration' and contains three sections:

- Reset:** A 'Reset Configuration' button.
- Internal VLAN Configuration:** 'Internal VLAN Allocation Base' set to 4093 and 'Internal VLAN Allocation Policy' set to Descending.
- VLAN Configuration Table:** A table with columns for VLAN ID, VLAN Name, VLAN Type, and Make Static. The table lists several VLANs, including the default and three custom VLANs (2, 5, 10, 100, 200).

At the bottom of the page, there are buttons for ADD, DELETE, CANCEL, and APPLY.

VLAN ID	VLAN Name	VLAN Type	Make Static
<input type="checkbox"/> 1	default	Default	Disable
<input type="checkbox"/> 2	Auto VoIP	AUTO VoIP	Disable
<input type="checkbox"/> 5	VLAN0005	Static	Disable
<input type="checkbox"/> 10	VLAN0010	Static	Disable
<input type="checkbox"/> 100	VLAN0100	Static	Disable
<input type="checkbox"/> 200	VLAN0200	Static	Disable

2. Choose **Routing > VLAN > VLAN Routing**. Configure each VLAN interface and enable routing on it. Allocate VLANs and subnets as follows: infrastructure VLAN 10 (192.168.1.0/24), voice VLAN 100 (192.168.100.0/24), and data VLAN 200 (192.168.200.0/24). Select the VLAN ID and enter the corresponding gateway IP address and subnet mask for each. Click **ADD** after completing each entry.

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M5300-28GF3
ProSafe 24-port L3
Stackable fiber GE Switch with L3 Routing

System Switching **Routing** QoS Security Monitoring Maintenance Help Index

Routing Table | IP | IPv6 | **VLAN** | ARP | RIP | OSPF | OSPFv3 | Router Discovery | VRRP | Multicast | IPv6 Multicast

VLAN Routing Wizard
VLAN Routing

VLAN Routing Configuration

<input type="checkbox"/>	VLAN ID	Port	MAC Address	IP Address	Subnet Mask
<input type="checkbox"/>	5	0/4/4	28:C6:8E:17:6C:37	10.10.10.1	255.255.255.0
<input type="checkbox"/>	10	0/4/1	28:C6:8E:17:6C:37	192.168.1.1	255.255.255.0
<input type="checkbox"/>	100	0/4/3	28:C6:8E:17:6C:37	192.168.100.1	255.255.255.0
<input type="checkbox"/>	200	0/4/2	28:C6:8E:17:6C:37	192.168.200.1	255.255.255.0

ADD DELETE CANCEL

- Choose **System > Services > DHCP Server > DHCP Server Configuration**. Enable Admin Mode and click **APPLY**. Set up any IP address ranges you want to exclude from the DHCP pools. Click **ADD** after configuring any excluded ranges for static IP addresses.

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M5300-28GF3
ProSafe 24 port L3
Stackable fiber GE Switch with L3 Routing

System | Switching | Routing | QoS | Security | Monitoring | Maintenance | Help | Index

Management | Device View | **Services** | Stacking | SNMP | LLDP | ISDP | Timer Schedule

DHCP Server Configuration

DHCP Server Configuration

Admin Mode Disable Enable

Ping Packet Count (0, 2 to 10)

Conflict Logging Mode Disable Enable

Bootp Automatic Mode Disable Enable

Excluded Address

	IP Range From	IP Range To
<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	10.10.10.0	10.10.10.223
<input type="checkbox"/>	192.168.100.0	192.168.100.223
<input type="checkbox"/>	192.168.1.0	192.168.1.15
<input type="checkbox"/>	192.168.200.0	192.168.200.15

ADD DELETE CANCEL APPLY

4. Choose **System > Services > DHCP Server > DHCP Pool Configuration**. Create a pool for each subnet associated with the VLANs. Set Type of Binding to Dynamic and enter the address and gateway for each. Set Default Router Address to the IP address of the subnet gateway. You can optionally change the lease time. Click **ADD**.

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M5300-28GF3
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Stackable fiber GE Switch with L3 Routing

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LOGOUT

DHCP Server

- DHCP Server Configuration
- DHCP Pool Configuration
- DHCP Pool Options
- DHCP Server Statistics
- DHCP Bindings Information
- DHCP Conflicts Information
- DHCP Relay
- DHCP L2 Relay
- UDP Relay
- DHCPv6 Server
- DHCPv6 Relay

DHCP Pool Configuration

DHCP Pool Configuration

Pool Name: pool100

Type of Binding: Dynamic

Network Address: 192.168.100.0

Network Mask: 255.255.255.0

Network Prefix Length: (0 to 32)

Client Name:

Hardware Address:

Hardware Address Type: Ethernet

Client ID:

Host Number:

Host Mask:

Host Prefix Length: (8 to 32)

Lease Time: Specified Duration

Days: 1 (0 to 99)

Hours: 0 (0 to 23)

Minutes: 0 (0 to 59)

Default Router Addresses

192.168.100.1

0.0.0.0

0.0.0.0

0.0.0.0

0.0.0.0

0.0.0.0

0.0.0.0

0.0.0.0

DNS Server Addresses

NetBIOS Name Server Addresses

NetBIOS Node Type: b-node Broadcast

Next Server Address: 0.0.0.0

Domain Name: (0 to 255 characters)

Bootfile: (0 to 120 characters)

ADD DELETE CANCEL APPLY

5. Set DHCP option 66 on the voice VLAN 100 so that the phones can download firmware and configuration files from a TFTP server. Choose **System > Services > DHCP Server > DHCP Pool Options**. Select the pool name for the VLAN 100 DHCP pool. Enter 66 for Option Code, select Ascii as Option Type, and enter the TFTP server IP address as Option Value. In this example, the TFTP server's address is 192.168.1.10. Click **ADD**.

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M5300-28CF3
ProSafe 24 port L3
Stackable Fiber GE Switch with L3 Routing

System | Switching | Routing | QoS | Security | Monitoring | Maintenance | Help | Index

Management | Device View | **Services** | Stacking | SNMP | LLDP | ISDP | Timer Schedule

DHCP Server

- DHCP Server Configuration
- DHCP Pool Configuration
- DHCP Pool Options**
- DHCP Server Statistics
- DHCP Bindings Information
- DHCP Conflicts Information
- DHCP Relay
- DHCP L2 Relay
- UDP Relay
- DHCPv6 Server
- DHCPv6 Relay

DHCP Pool Options

Pool Name	Option Code	Option Type	Option Value
pool100	66	Ascii	192.168.1.10

ADD DELETE APPLY

6. Choose **Routing > IP > Basic > IP Configuration** to enable routing globally. Enable Routing Mode and click **APPLY**.

The screenshot displays the Netgear web interface for the M5300-28GF3 device. The top navigation bar includes tabs for System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The Routing tab is active, and the sub-menu shows IP, IPv6, VLAN, ARP, RIP, OSPF, OSPFv3, Router Discovery, VRRP, Multicast, and IPv6 Multicast. The left sidebar shows a tree view with Basic, IP, Configuration, Statistics, and Advanced. The main content area is titled "IP Configuration" and contains a form with the following settings:

Parameter	Value
Default time to live	64
Routing Mode	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Echo Replies	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Redirects	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
ICMP Rate Limit Interval	1000 (0 to 2147483647 ms)
ICMP Rate Limit Burst Size	100 (1 to 200)
Maximum Next Hops	4
Maximum Routes	6112
Select to configure Global Default Gateway	<input type="checkbox"/>
Global Default Gateway	0.0.0.0

At the bottom right of the page, there are "CANCEL" and "APPLY" buttons.

7. Enable the voice VLAN feature globally. Choose **Switching > VLAN > Advanced > Voice VLAN Configuration**. Enable Admin Mode and click **APPLY**.

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M5300-28GF3
 ProSafe 24-port L3
 Stackable fiber GE Switch with L3 Routing

System | **Switching** | Routing | QoS | Security | Monitoring | Maintenance | Help | Index

VLAN | Auto-VoIP | iSCSI | STP | Multicast | MVR | Address Table | Ports | LAG

LOGOUT

Voice VLAN Configuration

Voice VLAN Global Admin
 Admin Mode: Disable Enable

Voice VLAN Configuration
 Go To Interface:

	Interface	Interface Mode	Value	CoS Override Mode	Operational State
<input type="checkbox"/>	1/0/1	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/2	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/3	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/4	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/5	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/6	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/7	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/8	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/9	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/10	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/11	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/12	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/13	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/14	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/15	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/16	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/17	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/18	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/19	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/20	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/21	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/22	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/23	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/24	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/25	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/26	Disable	0	Disable	Disable

REFRESH CANCEL APPLY

- For infrastructure ports, configure the port PVID. Choose **Switching > VLAN > Advanced > Port PVID Configuration**. Enter infrastructure VLAN ID 10 as Configured PVID for all infrastructure ports. Click **APPLY**.

NETGEAR
 M5300-28GF3
 ProSafe 24-port L3 Stackable fiber GE Switch with L3 Routing

System | **Switching** | Routing | QoS | Security | Monitoring | Maintenance | Help | Index

VLAN | Auto-VoIP | iSCSI | STP | Multicast | MVR | Address Table | Ports | LAG

Basic
 > **Advanced**
 > VLAN Configuration
 > VLAN Membership
 > VLAN Status
 > **Port PVID Configuration**
 > MAC Based VLAN
 > Protocol Based VLAN Group Configuration
 > Protocol Based VLAN Group Membership
 > IP Subnet Based VLAN
 > Port DVLAN Configuration
 > Voice VLAN Configuration
 > GARP Switch Configuration
 > GARP Port Configuration

Port PVID Configuration

PVID Configuration
 Go To Interface [] GO

Interface	Configured PVID	Current PVID	Acceptable Frame Types	Configured Ingress Filtering	Current Ingress Filtering	Port Priority
<input type="checkbox"/> 1/0/1	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/2	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/3	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/4	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/5	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/6	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/7	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/8	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/9	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/10	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/11	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/12	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/13	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/14	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/15	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/16	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/17	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/18	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/19	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/20	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/21	10	10	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/22	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/23	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/24	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/25	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/26	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/27	1	0	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/28	1	0	Admit All	Disable	Disable	0

CANCEL APPLY

Switch – M4100-50-POE

1. Create the VLAN interfaces for the three subnets. Choose **Switching > VLAN > Advanced > VLAN Configuration**. Declare each VLAN ID and click **ADD** after each one.

The screenshot shows the Netgear M4100-50-POE web interface. The top navigation bar includes tabs for System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The current page is titled "VLAN Configuration" under the "Switching" tab. The sidebar on the left lists various configuration options, with "VLAN Configuration" selected. The main content area is divided into three sections:

- Reset:** A section with a "Reset Configuration" button and a "Reset" link.
- Internal VLAN Configuration:** A section with a text input field for "Internal VLAN Allocation Base" (containing "4093") and radio buttons for "Internal VLAN Allocation Policy" (set to "Ascending").
- VLAN Configuration Table:** A table listing existing VLANs with columns for VLAN ID, VLAN Name, VLAN Type, and Make Static.

	VLAN ID	VLAN Name	VLAN Type	Make Static
<input type="checkbox"/>				Disable
<input type="checkbox"/>	1	default	Default	Disable
<input type="checkbox"/>	2	Auto VoIP	AUTO VoIP	Disable
<input type="checkbox"/>	5	VLAN0005	Static	Disable
<input type="checkbox"/>	10	VLAN0010	Static	Disable
<input type="checkbox"/>	100	VLAN0100	Static	Disable
<input type="checkbox"/>	200	VLAN0200	Static	Disable

At the bottom of the page, there are buttons for "ADD", "DELETE", "CANCEL", and "APPLY".

2. Choose **Routing > IP > Basic > IP Configuration** to enable routing globally. Enable Routing Mode and click **APPLY**.

The screenshot displays the Netgear M4100-50-POE web management interface. The top navigation bar includes tabs for System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The Routing tab is active, and the breadcrumb trail shows Routing Table > IP > VLAN > ARP > Router Discovery. The main content area is titled "IP Configuration" and contains a configuration window for "IP Configuration".

Parameter	Value
Default time to live	64
Routing Mode	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Echo Replies	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Redirects	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
ICMP Rate Limit Interval	1000 (0 to 2147483647 ms)
ICMP Rate Limit Burst Size	100 (1 to 200)
Maximum Next Hops	1
Maximum Routes	64
Select to configure Global Default Gateway	<input type="checkbox"/>
Global Default Gateway	0.0.0.0

At the bottom right of the interface, there are "CANCEL" and "APPLY" buttons.

- Configure the switch ports. Choose **Switching > VLAN > Advanced > VLAN Membership**. For each of the three VLANs, set all uplink ports to neighboring stacks as T for tagged. For the phone ports, set VLAN 100 as T for tagged and VLAN 200 as U for untagged. Click **APPLY** after configuring the ports for each VLAN.

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M4100-50-POE
ProSafe 48 port FastEthernet L2+ Intelligent Edge PoE Managed Switch

System | **Switching** | Routing | QoS | Security | Monitoring | Maintenance | Help | Index

VLAN | Auto-VoIP | STP | Multicast | MVR | Address Table | Ports | LAG

Basic
 > **Advanced**
 > VLAN Configuration
 > **VLAN Membership**
 > VLAN Status
 > Port PVID Configuration
 > MAC Based VLAN Configuration
 > Protocol Based VLAN Group Configuration
 > Protocol Based VLAN Group Membership
 > IP Subnet Based VLAN
 > Port DVLAN Configuration
 > Voice VLAN Configuration
 > GARP Switch Configuration
 > GARP Port Configuration

VLAN Membership

VLAN ID: 100 Group Operation: Untag All

VLAN Name: VLAN0100

VLAN Type: Static

Port	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
25	T	T																						
26																								
27																								
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49																								
50																								

LAG

CANCEL APPLY

- Configure the PVID for the data VLAN to pass through the phone's internal switch. Choose **Switching > VLAN > Advanced > Port PVID Configuration**. For all of the phone ports, set Configured PVID to 200 for the data VLAN. Click **APPLY**.

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ProSafe 48-port FastEthernet L2+ Intelligent Edge PoE Managed Switch

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 Protocol Based VLAN Group Membership
 IP Subnet Based VLAN
 Port DVLAN Configuration
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 GARP Port Configuration

Port PVID Configuration

PVID Configuration

Go To Interface GO

Interface	Configured PVID	Current PVID	Acceptable Frame Types	Configured Ingress Filtering	Current Ingress Filtering	Port Priority
<input type="checkbox"/> 0/1	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/2	200	100	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/3	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/4	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/5	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/6	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/7	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/8	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/9	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/10	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/11	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/12	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/13	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/14	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/15	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/16	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/17	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/18	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/19	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/20	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/21	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/22	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/23	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/24	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/25	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/26	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/27	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/28	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 0/29	1	1	Admit All	Disable	Disable	0

CANCEL APPLY

5. Enable the voice VLAN feature globally. Choose **Switching > VLAN > Advanced > Voice VLAN Configuration**. Enable Admin Mode and select all interfaces to support phones. Change the Interface Mode to VLAN ID and set Value to voice VLAN 100. Click **APPLY** to commit the changes.

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LOGOUT

Voice VLAN Configuration

Voice VLAN Global Admin
Admin Mode: Disable Enable

Voice VLAN Configuration
Go To Interface: [] GO

	Interface	Interface Mode	Value	CoS Override Mode	Operational State
<input checked="" type="checkbox"/>	0/1	VLAN ID	100	Disable	Enable
<input type="checkbox"/>	0/2	Disable	0	Disable	Disable
<input type="checkbox"/>	0/3	Disable	0	Disable	Disable
<input type="checkbox"/>	0/4	Disable	0	Disable	Disable
<input type="checkbox"/>	0/5	Disable	0	Disable	Disable
<input type="checkbox"/>	0/6	Disable	0	Disable	Disable
<input type="checkbox"/>	0/7	Disable	0	Disable	Disable
<input type="checkbox"/>	0/8	Disable	0	Disable	Disable
<input type="checkbox"/>	0/9	Disable	0	Disable	Disable
<input type="checkbox"/>	0/10	Disable	0	Disable	Disable
<input type="checkbox"/>	0/11	Disable	0	Disable	Disable
<input type="checkbox"/>	0/12	Disable	0	Disable	Disable
<input type="checkbox"/>	0/13	Disable	0	Disable	Disable
<input type="checkbox"/>	0/14	Disable	0	Disable	Disable
<input type="checkbox"/>	0/15	Disable	0	Disable	Disable
<input type="checkbox"/>	0/16	Disable	0	Disable	Disable
<input type="checkbox"/>	0/17	Disable	0	Disable	Disable
<input type="checkbox"/>	0/18	Disable	0	Disable	Disable
<input type="checkbox"/>	0/19	Disable	0	Disable	Disable
<input type="checkbox"/>	0/20	Disable	0	Disable	Disable
<input type="checkbox"/>	0/21	Disable	0	Disable	Disable
<input type="checkbox"/>	0/22	Disable	0	Disable	Disable
<input type="checkbox"/>	0/23	Disable	0	Disable	Disable
<input type="checkbox"/>	0/24	Disable	0	Disable	Disable
<input type="checkbox"/>	0/25	Disable	0	Disable	Disable
<input type="checkbox"/>	0/26	Disable	0	Disable	Disable

REFRESH CANCEL APPLY

6. To queue and prioritize VoIP traffic properly, change the 802.1p queue mapping. Choose **QoS > CoS > Advanced > 802.1p to Queue Mapping**. Select All from the Interface Selection drop-down menu and change the Queue value to 5 for 802.1p Priority 5. Click **APPLY**.

The screenshot shows the Netgear web interface for the M4100-50-POE switch. The navigation menu includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The QoS section is expanded to show CoS and DiffServ. The 802.1p to Queue Mapping page is displayed, featuring an Interface Selection dropdown set to 0/1 and a table for mapping 802.1p priorities to queues. The table has 8 columns for priorities 0-7 and a Queue column. The Queue value for priority 5 is set to 5. The interface also includes a LOGOUT button and CANCEL/APPLY buttons at the bottom.

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CoS | DiffServ

LOGOUT

> Basic
> Advanced
» CoS Configuration
» 802.1p to Queue Mapping
» IP DSCP Queue Mapping
» CoS Interface Configuration
» Interface Queue Configuration

802.1p to Queue Mapping

Interface Selection 0

Interface 0/1

802.1p to Queue Mapping 0

802.1p Priority	0	1	2	3	4	5	6	7
Queue	1	0	0	1	2	5	3	3

CANCEL APPLY

- Assign queue priority to the phone ports. Choose **QoS > CoS > Advanced > Interface Queue Configuration**. Select all phone ports, change the Queue ID to 5, and change the Scheduler Type to Strict. Click **APPLY**.

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Interface Queue Configuration
 CoS Configuration

Interface Queue Configuration

LAGS All Go To Interface GO

	Interface	Queue ID	Minimum Bandwidth	Scheduler Type	Queue Management Type
<input checked="" type="checkbox"/>	0/1	5	0	Strict	TailDrop
<input checked="" type="checkbox"/>	0/2	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/3	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/4	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/5	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/6	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/7	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/8	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/9	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/10	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/11	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/12	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/13	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/14	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/15	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/16	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/17	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/18	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/19	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/20	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/21	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/22	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/23	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/24	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/25	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/26	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/27	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/28	5	0	Weighted	TailDrop
<input checked="" type="checkbox"/>	0/29	5	0	Weighted	TailDrop

CANCEL APPLY

8. Enable the DiffServ feature. Choose **QoS > DiffServ > Advanced > DiffServ Configuration**. Enable DiffServ Admin Mode and click **APPLY**.

The screenshot displays the Netgear M4100-50-POE web interface. The top navigation bar includes tabs for System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The QoS tab is selected, and the breadcrumb path is CoS > DiffServ. The left sidebar shows a tree view with DiffServ Wizard, Basic, Advanced, and DiffServ Configuration selected. The main content area is titled "DiffServ Configuration" and contains two sections: "DiffServ Configuration" with a radio button for "Enable" selected, and "Status" which is a table showing the current and maximum sizes of various tables.

MTB Table	Current Size	Max Size
Class Table	0	32
Class Rule table	0	192
Policy table	0	64
Policy Instance table	0	768
Policy Attributes table	0	2304
Service table	0	64

9. Create a DiffServ class for the DiffServ policy and queue VoIP traffic on the protocol level. Choose **QoS > DiffServ > Advanced > Class Configuration**. Enter the VoIP class name, change the Class Type to All, and click **ADD**. When the class is created, click at the class to open the VoIP class configuration page.

The screenshot shows the Netgear web interface for the M4100-50-POE switch. The top navigation bar includes tabs for System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The QoS tab is active, and the breadcrumb path is CoS > DiffServ. The left sidebar shows a tree view with DiffServ Wizard, Basic, Advanced, and various configuration options. The main content area is titled 'Class Name' and contains a table with the following data:

Class Name	Class Type
class_void	All

At the bottom of the page, there are buttons for ADD, DELETE, CANCEL, and APPLY.

- On the VoIP class configuration page, notice the various settings that can be applied to the class. Click Protocol Type and select UDP from the drop-down menu. Click **APPLY**. Then click IP DSCP and select EF from the drop-down menu. Click **APPLY**. Next, click Class of Service and select 5 from the drop-down menu. Click **APPLY**.

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 ProSafe 48-port FastEthernet L2+ Intelligent Edge PoE-Managed Switch

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CoS | DiffServ

Diffserv Wizard
 Basic
 Advanced
 DiffServ Configuration
 Class Configuration
 IPv6 Class Configuration
 Policy Configuration
 Service Interface Configuration
 Service Statistics

Class Configuration

Class Information

Class Name: class_voip
 Class Type: All

DiffServ Class Configuration

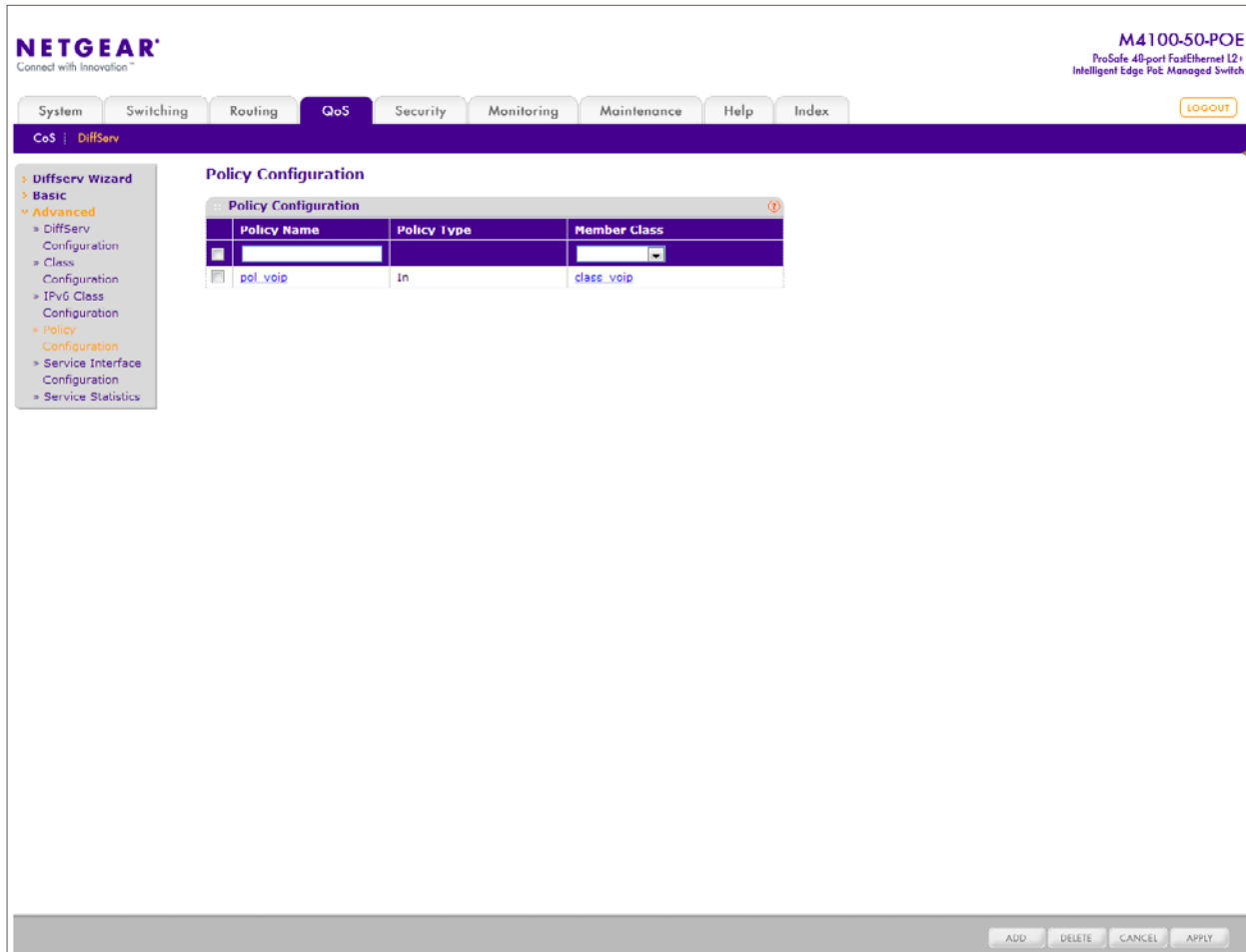
Match Every: Any
 Reference Class:
 Class Of Service: 0
 VLAN: (1 to 4093)
 Secondary Class of Service: 0
 Secondary VLAN: (1 to 4093)
 Ethernet Type: Appletalk (G00 to ffff hex)
 Source MAC: Address Mask
 Destination MAC: Address Mask
 Protocol Type: ICMP (0 to 255)
 Source IP: Address Mask
 Source L4 Port: domain (0 to 65535)
 Destination IP: Address Mask
 Destination L4 Port: domain (0 to 65535)
 IP DSCP: af11 (0 to 62)
 Precedence Value: 0 (0 to 7)
 IP ToS: Bit Value Bit Mask

Class Summary

Match Criteria	Values
Protocol	17(udp)
IP DSCP	46(ef)

CANCEL APPLY

11. Apply the class to a policy map. To create the policy map, choose **QoS > DiffServ > Advanced > Policy Configuration**. Enter the VoIP policy name, change the Policy Type to In, and change the Member Class to the VoIP class you created. Click **ADD**. When the policy is created, click the VoIP policy to enter its configuration page.



The screenshot displays the Netgear web interface for a switch. The top navigation bar includes tabs for System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The QoS tab is active. The breadcrumb trail shows CoS > DiffServ. The sidebar on the left contains a tree view with categories like DiffServ Wizard, Basic, Advanced, and Policy Configuration. The main content area is titled "Policy Configuration" and features a table with the following data:

Policy Name	Policy Type	Member Class
pol_voip	In	class_voip

At the bottom of the page, there are buttons for ADD, DELETE, CANCEL, and APPLY.

12. On the VoIP policy configuration page, change the Assign Queue value to 5 and click **APPLY**.

The screenshot shows the Netgear M4100-50-POE web interface. The top navigation bar includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The QoS tab is active, and the CoS | DiffServ menu is open. The left sidebar shows the Diffserv Wizard with options for Basic, Advanced, and Policy Configuration. The main content area is titled "Policy Class Configuration" and is divided into two sections: "Class Information" and "Policy Attribute".

Class Information:

- Policy Name: pol_voip
- Policy Type: In
- Member Class Name: class_voip

Policy Attribute:

- Policy Attribute: Assign Queue (5)
- Drop:
- Mark VLAN CoS: 0
- Mark CoS As Secondary CoS:
- Mark IP Precedence: 0
- Mark IP DSCP: af11
- Simple Policy:
- Two Rate:

Conform Action:

- Color Mode: Color Blind
- Comitted Rate: [text box]
- Comitted Burst Size: [text box]
- Conform Action: Send, Drop
- Mark CoS: 0
- Mark CoS As Secondary CoS:
- Mark IP Precedence: 0
- Mark IP DSCP: af11, 10

Violate Action:

- Color Mode: Color Blind
- Comitted Rate: [text box]
- Comitted Burst Size: [text box]
- Peak Rate: [text box]
- Peak Burst Size: [text box]
- Conform Action: Send, Drop
- Mark CoS: 0
- Mark CoS As Secondary CoS:
- Mark IP Precedence: 0
- Mark IP DSCP: af11, 10

Buttons: CANCEL, APPLY

13. Apply the policy to all the phone ports. Choose **QoS > DiffServ > Advanced > Service Interface Configuration**. Select all phone ports and change the Policy In Name to the VoIP policy created. Click **APPLY**.

The screenshot shows the Netgear M4100-50-POE web interface. The top navigation bar includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The QoS menu is expanded to show DiffServ, and the Service Interface Configuration page is active. The page title is "Service Interface Configuration" and it shows a table of interfaces with checkboxes for selection and a dropdown menu for the Policy In Name. The "pol.voip" policy is selected for all interfaces.

Interface	Policy In Name	Direction	Operational Status
<input checked="" type="checkbox"/> 0/1	pol.voip		
<input checked="" type="checkbox"/> 0/2	pol.voip		
<input checked="" type="checkbox"/> 0/3	pol.voip		
<input checked="" type="checkbox"/> 0/4	pol.voip		
<input checked="" type="checkbox"/> 0/5	pol.voip		
<input checked="" type="checkbox"/> 0/6	pol.voip		
<input checked="" type="checkbox"/> 0/7	pol.voip		
<input checked="" type="checkbox"/> 0/8	pol.voip		
<input checked="" type="checkbox"/> 0/9	pol.voip		
<input checked="" type="checkbox"/> 0/10	pol.voip		
<input checked="" type="checkbox"/> 0/11	pol.voip		
<input checked="" type="checkbox"/> 0/12	pol.voip		
<input checked="" type="checkbox"/> 0/13	pol.voip		
<input checked="" type="checkbox"/> 0/14	pol.voip		
<input checked="" type="checkbox"/> 0/15	pol.voip		
<input checked="" type="checkbox"/> 0/16	pol.voip		
<input checked="" type="checkbox"/> 0/17	pol.voip		
<input checked="" type="checkbox"/> 0/18	pol.voip		
<input checked="" type="checkbox"/> 0/19	pol.voip		
<input checked="" type="checkbox"/> 0/20	pol.voip		
<input checked="" type="checkbox"/> 0/21	pol.voip		
<input checked="" type="checkbox"/> 0/22	pol.voip		
<input checked="" type="checkbox"/> 0/23	pol.voip		
<input checked="" type="checkbox"/> 0/24	pol.voip		
<input checked="" type="checkbox"/> 0/25	pol.voip		
<input checked="" type="checkbox"/> 0/26	pol.voip		
<input checked="" type="checkbox"/> 0/27	pol.voip		
<input checked="" type="checkbox"/> 0/28	pol.voip		
<input checked="" type="checkbox"/> 0/29	pol.voip		

Switch – M5300-52G3

1. Create VLAN interfaces for the three subnets. Choose **Switching > VLAN > Advanced > VLAN Configuration**. Declare each VLAN ID and click **ADD** after each one.

The screenshot shows the Netgear M5300-28G3 switch configuration interface. The top navigation bar includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The left sidebar shows a tree view with Basic and Advanced sections, where Advanced > VLAN > Configuration is selected. The main content area is titled "VLAN Configuration" and contains three sections: "Reset", "Internal VLAN Configuration", and "VLAN Configuration".

Internal VLAN Configuration

Internal VLAN Allocation Base: 4093
 Internal VLAN Allocation Policy: Ascending Descending

VLAN Configuration

	VLAN ID	VLAN Name	VLAN Type	Make Static
<input type="checkbox"/>				Disable
<input type="checkbox"/>	1	default	Default	Disable
<input type="checkbox"/>	2	Auto VoIP	AUTO VoIP	Disable
<input type="checkbox"/>	5	VLAN0005	Static	Disable
<input type="checkbox"/>	10	VLAN0010	Static	Disable
<input type="checkbox"/>	100	VLAN0100	Static	Disable
<input type="checkbox"/>	200	VLAN0200	Static	Disable

At the bottom of the page, there are buttons for ADD, DELETE, CANCEL, and APPLY.

2. Choose **Routing > IP > Basic > IP Configuration** to enable routing globally. Enable Routing Mode and click **APPLY**.

The screenshot displays the Netgear M5300-28G3 web interface. The top navigation bar includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The Routing section is expanded to show IP, IPv6, VLAN, ARP, RIP, OSPF, OSPFv3, Router Discovery, VRRP, Multicast, and IPv6 Multicast. The IP Configuration page is open, showing the following settings:

Parameter	Value
Default Time to Live	64
Routing Mode	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Echo Replies	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Redirects	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
ICMP Rate Limit Interval	1000 (0 to 2147483647 ms)
ICMP Rate Limit Burst Size	100 (1 to 200)
Maximum Next Hops	4
Maximum Routes	6112
Select to configure Global Default Gateway	<input type="checkbox"/>
Global Default Gateway	0.0.0.0

At the bottom right of the page, there are CANCEL and APPLY buttons.

3. Enable the voice VLAN feature globally. Choose **Switching > VLAN > Advanced > Voice VLAN Configuration**. Enable Admin Mode and click **APPLY**.

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M5300-28G3
ProSafe 24 port L3
Stackable GE Switch with L3 Routing

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 > MAC Based VLAN
 > Protocol Based VLAN Group Configuration
 > Protocol Based VLAN Group Membership
 > IP Subnet Based VLAN
 > Port DVLAN Configuration
 > **Voice VLAN Configuration**
 > GARP Switch Configuration
 > GARP Port Configuration

Voice VLAN Configuration

Voice VLAN Global Admin

Admin Mode: Disable Enable

Voice VLAN Configuration

All | Go To Interface: [] GO

	Interface	Interface Mode	Value	CoS Override Mode	Operational State
<input type="checkbox"/>	1/0/1	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/2	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/3	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/4	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/5	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/6	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/7	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/8	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/9	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/10	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/11	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/12	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/13	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/14	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/15	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/16	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/17	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/18	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/19	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/20	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/21	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/22	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/23	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/24	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/25	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/26	Disable	0	Disable	Disable

REFRESH CANCEL APPLY

4. Configure the switch ports. Choose **Switching > VLAN > Advanced > VLAN Membership**. For each of the three VLANs, set all uplink ports to neighboring stacks as T for tagged. For the other endpoints, set all ports to U for untagged on VLAN 200. Click **APPLY** after configuring the ports for each VLAN.

The screenshot shows the Netgear M5300-28G3 switch configuration interface. The page title is "VLAN Membership" and the device model is "M5300-28G3 ProSafe 24-port L3 Stackable GE Switch with L3 Routing". The navigation menu includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The current page is "VLAN Membership" under the "Switching" tab.

The configuration page shows the following settings:

- VLAN ID:** 200
- VLAN Name:** VLAN0200
- VLAN Type:** Static
- Group Operation:** Untag All

The port configuration table is as follows:

Port	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	U																							
	25	26	27	28																				
	T																							
	LAG																							

The "LAG" row is highlighted in orange. At the bottom of the page, there are "CANCEL" and "APPLY" buttons.

- Configure the PVID for the endpoints on the data VLAN. Choose **Switching > VLAN > Advanced > Port PVID Configuration**. For all of the phone ports, set Configured PVID to 200 and click **APPLY**.

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M5300-28G3
ProSafe 24-port L3
Stackable GE Switch with L3 Routing

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LOGOUT

Port PVID Configuration

PVID Configuration

LAGS All

Go To Interface GO

	Interface	Configured PVID	Current PVID	Acceptable Frame Types	Configured Ingress Filtering	Current Ingress Filtering	Port Priority
<input type="checkbox"/>	1/0/1	200	200	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/2	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/3	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/4	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/5	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/6	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/7	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/8	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/9	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/10	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/11	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/12	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/13	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/14	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/15	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/16	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/17	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/18	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/19	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/20	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/21	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/22	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/23	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/24	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/25	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/26	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/27	1	0	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/28	1	0	Admit All	Disable	Disable	0

CANCEL APPLY

CONFIGURATION FOR THE 1000-PHONE SOLUTION

Refer to Figure 3 for a diagram of the solution. You can use the CLI or Web GUI for configuration.

Assumptions for the 1000-Phone Solution

- A DHCP server on the switch will be used. If a third-party DHCP solution is used, refer to the vendor's documentation and the documentation for the phone backend to configure DHCP options.
- The VoIP network is a dedicated, isolated network with a single uplink to the customer's enterprise network.
- VoIP backend systems will be protected by security measures local to the individual systems. ACLs can be used to further restrict access but are not configured in this application note. Visit support.netgear.com for further information.
- The tested VoIP phones have an internal switch to support a second device connected to a secondary port on the phone, allowing a voice and data VLAN to be configured on the switch port.
- Tested phones are SIP-enabled Cisco 79x5 series phones, and the tested PBX system is an AsteriskNOW VM installation. Refer to vendor documentation for further configuration guidance on these platforms.
- Best practices are used to implement switch stacking and failover/redundancy.
- Layer 3 licenses have been installed on switches when necessary.

Global Configuration Notes

- Be sure to save your configuration using the **save** or **write** memory CLI command. Alternatively, choose **Maintenance > Save Config** in the GUI. Select the box, and click **APPLY**.
- Physical interfaces are referred to interfaces and ports interchangeably throughout this document.
- While the LLDP MED discovery protocol utilizes network policies, there is only one network policy available on these switches already assigned to the voice Vlan.
- While the management VLAN is used as the Layer 3 route between the switches in this application note, a separate VLAN can be used to further isolate communication.
- VoIP backend systems will be protected by security measures local to the individual systems. ACLs can be used to further restrict access but are not configured in this application note. Please visit support.netgear.com for further information.
- The default OSPF area ID is 0.0.0.0 but is stressed for technical purposes in this application note for more complex environments.
- While M5300-28G3 switches are used for illustrative purposes instead of the M5300-52G3 switches in the design, all configuration and features apply.

Sample Configuration Values

The following values are used in the sample configuration:

- Management VLAN: 5
- Management VLAN subnet: 192.168.10.0/24
- Infrastructure VLAN: 10
- Infrastructure VLAN subnet: 192.168.1.0/24
- Voice VLAN: 100
- Voice VLAN subnet: 192.168.100.0/24
- Data VLAN: 200
- Data VLAN subnet: 192.168.200.0/24

CLI Configuration Steps: 1000-Phone Solution

These steps provide an example CLI configuration for the 1000-phone solution. For the Web GUI configuration, see Web GUI Configuration Steps: 1000-Phone Solution on page 59.

Switch – XSM7224S

1. Create all of the VLAN interfaces on the XSM7224S stack and trunk them out to the neighboring stacks as necessary. Allocate VLANs and subnets as follows: management VLAN 5 (10.10.10.0/24) infrastructure VLAN 10 (192.168.1.0/24), voice VLAN 100 (192.168.100.0/22), and data VLAN 200 (192.168.200.0/21).

```
(XSM7224S) #vlan data
(XSM7224S) (Vlan)#vlan 5,10,100,20
(XSM7224S) (Vlan)#vlan routing
(XSM7224S) (Vlan)#vlan routing 1
(XSM7224S) (Vlan)#vlan routing 10
(XSM7224S) (Vlan)#vlan routing 20
(XSM7224S) (Vlan)#exit
(XSM7224S) #configure
(XSM7224S) (Config)#interface vlan 5
(XSM7224S) (Interface vlan 5)#ip address 10.10.10.1 255.255.255.0
(XSM7224S) (Interface vlan 5)#routing
(XSM7224S) (Interface vlan 5)#exit
(XSM7224S) (Config)#interface vlan 10
(XSM7224S) (Interface vlan 10)#ip address 192.168.1.1 255.255.255.0
(XSM7224S) (Interface vlan 10)#routing
(XSM7224S) (Interface vlan 10)#exit
(XSM7224S) (Config)#interface vlan 100
(XSM7224S) (Interface vlan 100)#ip address 192.168.100.1 255.255.252.0
(XSM7224S) (Interface vlan 100)#routing
(XSM7224S) (Interface vlan 100)#exit
(XSM7224S) (Config)#interface vlan 200
(XSM7224S) (Interface vlan 200)#routing
(XSM7224S) (Interface vlan 200)#ip address 192.168.200.1 255.255.248.0
(XSM7224S) (Interface vlan 200)#exit
```

2. Enable the built-in DHCP server and set up DHCP pools for the non-management subnets.

```
(XSM7224S) (Config) #service dhcp
(XSM7224S) (Config) #ip dhcp pool pool10
(XSM7224S) (Config-dhcp-pool) #default-router 192.168.1.1
(XSM7224S) (Config-dhcp-pool) #network 192.168.1.0 255.255.255.0
(XSM7224S) (Config-dhcp-pool) #exit
(XSM7224S) (Config) #ip dhcp pool pool100
(XSM7224S) (Config-dhcp-pool) #default-router 192.168.100.1
(XSM7224S) (Config-dhcp-pool) #network 192.168.100.0 255.255.255.0
(XSM7224S) (Config-dhcp-pool) #exit
(XSM7224S) (Config) #ip dhcp pool pool200
(XSM7224S) (Config-dhcp-pool) #default-router 192.168.200.1
(XSM7224S) (Config-dhcp-pool) #network 192.168.200.0 255.255.255.0
(XSM7224S) (Config-dhcp-pool) #exit
```

3. Add DHCP option 66 to the voice VLAN DHCP pool so that the phones can reach the TFTP server to download necessary firmware and configuration files upon boot-up. In this case, the TFTP server has an IP address of 192.168.1.100.

```
(XSM7224S) (Config) #ip dhcp pool pool100
(XSM7224S) (Config-dhcp-pool) #option 66 ascii 192.168.1.100
(XSM7224S) (Config-dhcp-pool) #exit
```

4. Enable IP routing globally.

```
(XSM7224S) (Config) #ip routing
```

5. Configure uplink ports to the neighboring switches. Configurations will be the same on both sides of the uplink. Add or remove VLANs as needed. All transported VLANs must be tagged to create the trunk.

```
(XSM7224S) (Config) #interface 1/0/25
(XSM7224S) (Interface 1/0/25) #vlan participation exclude 1
(XSM7224S) (Interface 1/0/25) #vlan participation include 5,10,100,200
(XSM7224S) (Interface 1/0/25) #vlan tagging 5,10,100,200
(XSM7224S) (Interface 1/0/25) #exit
```

6. After trunking the VLANs on the uplinks, configure the stack for OSPF routing. Enable OSPF and configure a router ID that is unique to each stack in the LAN. Configure OSPF to redistribute any connected routes.

```
(XSM7224S) (Config) #router ospf
(XSM7224S) (Config-router) #enable
(XSM7224S) (Config-router) #router-id 10.10.10.1
(XSM7224S) (Config-router) #redistribute connected
(XSM7224S) (Config-router) #exit
```

7. Configure the routable VLAN interfaces for the same OSPF area ID.

```
(XSM7224S) (Config)#interface vlan 5
(XSM7224S) (Interface vlan 5)#ip ospf area 0.0.0.0
(XSM7224S) (Interface vlan 5)#exit
(XSM7224S) (Config)#interface vlan 10
(XSM7224S) (Interface vlan 10)#ip ospf area 0.0.0.0
(XSM7224S) (Interface vlan 10)#exit
(XSM7224S) (Config)#interface vlan 100
(XSM7224S) (Interface vlan 100)#ip ospf area 0.0.0.0
(XSM7224S) (Interface vlan 100)#exit
(XSM7224S) (Config)#interface vlan 200
(XSM7224S) (Interface vlan 200)#ip ospf area 0.0.0.0
(XSM7224S) (Interface vlan 200)#exit
```

8. Configure infrastructure ports. For all VoIP device interfaces, set the configured PVID to infrastructure VLAN 10.

```
(XSM7224S) (Config)#interface 1/0/21
(XSM7224S) (Interface 1/0/21)#vlan participation exclude 1
(XSM7224S) (Interface 1/0/21)#vlan participation include 10
(XSM7224S) (Interface 1/0/21)#vlan pvid 10
(XSM7224S) (Interface 1/0/21)#exit
(XSM7224S) (Config)#exit
```

Switch – M5300-52G-POE+

1. Move to the M5300-52G-POE+ stacks to replicate the configuration on each one. Start by declaring VLANs 5, 10, 100, and 200.

```
(M5300-52G-POE+) #vlan database
(M5300-52G-POE+) (Vlan)#vlan 5,10,100,200
(M5300-52G-POE+) (Vlan)#exit
```

2. Enable routing and configure the management VLAN interface to be able to participate in OSPF routing. In this example, the switch has IP address 10.10.10.5.

```
(M5300-52G-POE+) #vlan database
(M5300-52G-POE+) (Vlan)#vlan routing 5
(M5300-52G-POE+) (Vlan)#exit
(M5300-52G-POE+) #configure
(M5300-52G-POE+) (Config)#vlan interface 5
(M5300-52G-POE+) (Interface vlan 5)#routing
(M5300-52G-POE+) (Interface vlan 5)#ip address 10.10.10.5 255.255.255.0
(M5300-52G-POE+) (Interface vlan 5)#exit
```

3. Enable IP routing.

```
(M5300-52G-POE+) #configure
(M5300-52G-POE+) (Config)#ip routing
```

4. Configure the uplink to the XSM7224S stack. Remember both sides of the uplink must have the same configuration. All transported VLANs must be tagged to create the trunk.

```
(M5300-52G-POE+) (Config)#interface 1/0/49
(M5300-52G-POE+) (Interface 1/0/49)#vlan participation exclude 1
(M5300-52G-POE+) (Interface 1/0/49)#vlan participation include 5,10,100,200
(M5300-52G-POE+) (Interface 1/0/49)#vlan tagging 5,10,100,200
(M5300-52G-POE+) (Interface 1/0/49)#exit
```

5. After trunking the VLANs on the uplinks, configure the stack for OSPF routing. Enable OSPF and configure a router ID that is unique to each stack in the LAN. Configure OSPF to redistribute any connected routes.

```
(M5300-52G-POE+) (Config)#router ospf
(M5300-52G-POE+) (Config-router)#enable
(M5300-52G-POE+) (Config-router)#router-id 10.10.10.5
(M5300-52G-POE+) (Config-router)#redistribute connected
(M5300-52G-POE+) (Config-router)#exit
```

6. Configure the correct OSPF area ID for the management VLAN interface.

```
(M5300-52G-POE+) (Config)#interface vlan 5
(M5300-52G-POE+) (Interface vlan 5)#ip ospf area 0.0.0.0
(M5300-52G-POE+) (Interface vlan 5)#exit
```

7. Raise the VoIP traffic priority and enable the voice VLAN feature as on the XSM7224S stack. Send VoIP traffic with a dot1p priority of 5 and map priority 5 to queue 5.

```
(M5300-52G-POE+) (Config)# classofservice dot1p-mapping 5 5
(M5300-52G-POE+) (Config)#cos-queue strict 5
(M5300-52G-POE+) (Config)#voice vlan
```

8. Enable the LLDP-MED discovery protocol, which works in conjunction with the voice VLAN feature to auto-detect a phone on a port and apply the appropriate QoS and voice VLAN.

```
(M5300-52G-POE+) (Config)#lldp med all
```


9. Create a Diffserv class map policy to provide QoS for voice traffic on on the phone ports. This policy will be copied onto all stacks in the LAN that support VoIP devices.

```
(M5300-52G-POE+) (Config) #diffserv
(M5300-52G-POE+) (Config) #class-map match-all class_voip
(M5300-52G-POE+) (Config-classmap) #match protocol udp
(M5300-52G-POE+) (Config-classmap) #match ip dscp ef
(M5300-52G-POE+) (Config-classmap) #exit
(M5300-52G-POE+) (Config) #policy-map pol_voip in
(M5300-52G-POE+) (Config-policy-map) #class class_voip
(M5300-52G-POE+) (Config-policy-classmap) #assign-queue 5
(M5300-52G-POE+) (Config-policy-classmap) #exit
(M5300-52G-POE+) (Config-policy-map) #exit
```

10. Configure the phone ports to auto-register on voice VLAN 100 and pass data VLAN 200 to the phone's secondary port. If there is no phone detected on the port, the connected device will use the data VLAN. Make sure to place them in the correct OSPF area. Assign the DiffServ voice policy to the phone ports.

```
(M5300-52G-POE+) (Config) #interface 0/1
(M5300-52G-POE+) (Interface 0/1) #voice vlan 100
(M5300-52G-POE+) (Interface 0/1) #vlan participation exclude 200
(M5300-52G-POE+) (Interface 0/1) #vlan participation include 100,200
(M5300-52G-POE+) (Interface 0/1) #vlan pvid 200
(M5300-52G-POE+) (Interface 0/1) #service-policy in pol_voip
(M5300-52G-POE+) (Interface 0/1) #exit
```

Switch - M5300-52G3

1. Declare the VLANs and enable IP routing and the voice VLAN features globally.

```
(M5300-52G3) #vlan database
(M5300-52G3) (Vlan) #vlan 5,10,100,200
(M5300-52G3) (Vlan) #exit
(M5300-52G3) #configure
(M5300-52G3) (Config) #ip routing
(M5300-52G3) (Config) #voice vlan
```

2. Enable routing and configure the management VLAN interface to be able participate in OSPF routing. In this example, the management IP address is 10.10.10.10.

```
(M5300-52G3) #vlan database
(M5300-52G3) (Vlan)#vlan routing 5
(M5300-52G3) (Vlan)#exit
(M5300-52G3) #configure
(M5300-52G3) (Config)#vlan interface 5
(M5300-52G3) (Interface vlan 5)#routing
(M5300-52G3) (Interface vlan 5)#ip address 10.10.10.10 255.255.255.0
(M5300-52G3) (Interface vlan 5)#exit
```

3. Configure the uplink to the XSM7224S stack. Both sides of the uplink must have the same configuration. All transported VLANs must be tagged to create the trunk.

```
(M5300-52G3) (Config)#interface 1/0/49
(M5300-52G3) (Interface 1/0/49)#vlan participation exclude 1
(M5300-52G3) (Interface 1/0/49)#vlan participation include 5,10,100,200
(M5300-52G3) (Interface 1/0/49)#vlan tagging 5,10,100,200
(M5300-52G3) (Interface 1/0/49)#exit
```

4. After trunking the VLANs on the uplinks, configure the stack for OSPF routing. Enable OSPF and configure a router ID that is unique to each stack in our LAN. Configure OSPF to redistribute any connected routes.

```
(M5300-52G3) (Config)#router ospf
(M5300-52G3) (Config-router)#enable
(M5300-52G3) (Config-router)#router-id 10.10.10.10
(M5300-52G3) (Config-router)#redistribute connected
```

5. Configure the management VLAN interface with the correct OSPF area ID.

```
(M5300-52G3) (Config)#interface vlan 5
(M5300-52G3) (Interface vlan 5)#ip ospf area 0.0.0.0
(M5300-52G3) (Interface vlan 5)#exit
```

6. Finish the configuration by configuring any ports with the necessary VLAN (data VLAN 200).

```
(M5300-52G3) (Config)#interface 1/0/1
(M5300-52G3) (Interface 1/0/1)#vlan participation exclude 1
(M5300-52G3) (Interface 1/0/1)#vlan participation include 200
(M5300-52G3) (Interface 1/0/1)#vlan pvid 200
(M5300-52G3) (Interface 1/0/1)#exit
(M5300-52G3) (Config)#exit
```

Web GUI Configuration Steps: 1000-Phone Solution

These steps provide an example Web GUI configuration for the 1000-phone solution. For the CLI configuration, see CLI Configuration Steps: 1000-Phone Solution on page 53.

Switch – XSM7224S

1. Create VLAN interfaces for the subnets: management (VLAN ID 5), infrastructure (VLAN ID 10), voice (VLAN ID 100), and data (VLAN ID 200). Choose **Switching > VLAN > Advanced > VLAN Configuration**. Declare each VLAN ID and click **ADD** after each one.

The screenshot shows the Netgear Web GUI for switch XSM7224S. The main navigation bar includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The current page is VLAN Configuration, with sub-menus for VLAN, STP, Multicast, Address Table, Ports, LAG, and PFC. The sidebar on the left shows a tree view with 'Advanced' expanded to 'VLAN Configuration'. The main content area is titled 'VLAN Configuration' and contains three sections:

- Reset:** A checkbox for 'Reset Configuration'.
- Internal VLAN Configuration:** A text input for 'Internal VLAN Allocation Base' set to '4093' and radio buttons for 'Internal VLAN Allocation Policy' set to 'Descending'.
- VLAN Configuration:** A table with columns: VLAN ID, VLAN Name, VLAN Type, and Make Static.

VLAN ID	VLAN Name	VLAN Type	Make Static
<input type="checkbox"/>	<input type="text"/>		Disable
<input type="checkbox"/>	1	default	Default
<input type="checkbox"/>	5	VLAN0005	Static
<input type="checkbox"/>	10	VLAN0010	Static
<input type="checkbox"/>	100	VLAN0100	Static
<input type="checkbox"/>	200	VLAN0200	Static

At the bottom of the page, there are buttons for ADD, DELETE, CANCEL, and APPLY.

- Choose **Routing > VLAN > VLAN Routing**. Configure each VLAN interface and enable routing on it. Allocate VLANs and subnets as follows: management VLAN 5 (10.10.10.0/24), infrastructure VLAN 10 (192.168.1.0/24), voice VLAN 100 (192.168.100.0/24), and data VLAN 200 (192.168.200.0/24). Select the VLAN ID and enter the corresponding gateway IP address and subnet mask for each. Click **ADD** after completing each entry.

NETGEAR
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XSM7224S
24-Port 10G SFP+ Ports
Managed L2+ Stackable Switch

System | Switching | **Routing** | QoS | Security | Monitoring | Maintenance | Help | Index

Routing Table | IP | IPv6 | **VLAN** | ARP | RIP | OSPF | OSPFv3 | Router Discovery | VRRP | Multicast | IPv6 Multicast

> VLAN Routing Wizard
v VLAN Routing

VLAN Routing Configuration

VLAN Routing Configuration

VLAN ID	Port	MAC Address	IP Address	Subnet Mask
<input type="checkbox"/> 5	0/4/4	00:8E:F2:59:67:36	10.10.10.1	255.255.255.0
<input type="checkbox"/> 10	0/4/1	00:8E:F2:59:67:36	192.168.1.1	255.255.255.0
<input type="checkbox"/> 100	0/4/2	00:8E:F2:59:67:36	192.168.100.1	255.255.252.0
<input type="checkbox"/> 200	0/4/3	00:8E:F2:59:67:36	192.168.200.1	255.255.248.0

ADD DELETE CANCEL

3. Choose **System > Services > DHCP Server > DHCP Server Configuration**. Enable Admin Mode and click **APPLY**. You can also configure any IP address ranges to exclude from the DHCP pools. Click **ADD** after configuring any excluded ranges for static IP addresses.

The screenshot displays the Netgear web interface for the DHCP Server Configuration page. The top navigation bar includes tabs for System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The breadcrumb trail shows Management > Device View > License > Services > Stacking > SNMP > LLDP > ISDP. The sidebar on the left contains a tree view of DHCP settings, with 'DHCP Server Configuration' selected. The main content area is titled 'DHCP Server Configuration' and contains two sections:

- DHCP Server Configuration:** This section includes four configuration items:
 - Admin Mode:** Radio buttons for 'Disable' and 'Enable', with 'Enable' selected.
 - Ping Packet Count:** A text input field containing the value '2', with a range '(0, 2 to 10)' indicated to the right.
 - Conflict Logging Mode:** Radio buttons for 'Disable' and 'Enable', with 'Enable' selected.
 - Bootp Automatic Mode:** Radio buttons for 'Disable' and 'Enable', with 'Disable' selected.
- Excluded Address:** This section contains a table with two columns: 'IP Range From' and 'IP Range To'. The table has one row with the values '192.168.1.0' and '192.168.1.223'.

At the bottom right of the page, there are buttons for 'ADD', 'DELETE', 'CANCEL', and 'APPLY'.

4. Choose **System > Services > DHCP Server > DHCP Pool Configuration**. Create a pool for each subnet associated with the VLANs. Set Type of Binding to Dynamic and enter the address and gateway for each. Set Default Router Address to the IP of the subnet gateway. Optionally change the lease time. Click **ADD**.

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System | Switching | Routing | QoS | Security | Monitoring | Maintenance | Help | Index

Management | Device View | License | Services | Stacking | SNMP | LLDP | ISDP

LOGOUT

DHCP Server

- > DHCP Server Configuration
- > DHCP Pool Configuration
- > DHCP Pool Options
- > DHCP Server Statistics
- > DHCP Bindings Information
- > DHCP Conflicts Information
- > DHCP Relay
- > DHCP L2 Relay
- > UDP Relay
- > DHCPv6 Server
- > DHCPv6 Relay

DHCP Pool Configuration

DHCP Pool Configuration

Pool Name: pool100

Type of Binding: Dynamic

Network Address: 192.168.100.0

Network Mask: 255.255.252.0

Network Prefix Length: (0 to 32)

Client Name:

Hardware Address:

Hardware Address Type: Ethernet

Client ID:

Host Number:

Host Mask:

Host Prefix Length: (8 to 32)

Lease Time: Specified Duration

Days: 1 (0 to 59)

Hours: 0 (0 to 23)

Minutes: 0 (0 to 59)

Default Router Addresses

192.168.100.1

0.0.0.0

0.0.0.0

0.0.0.0

0.0.0.0

0.0.0.0

0.0.0.0

0.0.0.0

DNS Server Addresses

NetBIOS Name Server Addresses

NetBIOS Node Type: b-node Broadcast

Next Server Address: 0.0.0.0

Domain Name: (0 to 255 characters)

Rootfile: (0 to 128 characters)

ADD DELETE CANCEL APPLY

- Set DHCP option 66 on voice VLAN 100 so that the phones can download firmware and configuration files from a TFTP server. Choose **System > Services > DHCP Server > DHCP Pool Options**. Select the pool name for the VLAN 100 DHCP pool. Enter 66 for Option Code, select Ascii as the Option Type, and enter the TFTP server IP address as Option Value. In this example, the TFTP server's address is 192.168.1.100. Click **ADD** to save changes.

The screenshot shows the Netgear web interface for configuring DHCP Pool Options. The top header includes the Netgear logo, the slogan "Connect with innovation™", and the device model "XSM7224S" with specifications "24-Port 10G SFP+ Ports" and "Managed L2+ Stackable Switch". The navigation menu includes "System", "Switching", "Routing", "QoS", "Security", "Monitoring", "Maintenance", "Help", and "Index". The "System" menu is expanded to show "Management", "Device View", "License", "Services", "Stacking", "SNMP", "LLDP", and "ISDP". The "Services" menu is further expanded to show "DHCP Server", "DHCP Pool Configuration", "DHCP Pool Configuration", "DHCP Pool Options", "DHCP Server Statistics", "DHCP Bindings Information", "DHCP Conflicts Information", "DHCP Relay", "DHCP L2 Relay", "UDP Relay", "DHCPv6 Server", and "DHCPv6 Relay". The "DHCP Pool Options" page displays a table with the following data:

Pool Name	Option Code	Option Type	Option Value
pool100	66	Ascii	192.168.1.100

At the bottom of the page, there are buttons for "ADD", "DELETE", and "APPLY".

6. Choose **Routing > IP > Basic > IP Configuration** to enable routing globally. Enable Routing Mode and click **APPLY**.

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XSM7224S
24-Port 10G SFP+ Ports
Managed L2+ Stackable Switch

Logout

System Switching **Routing** QoS Security Monitoring Maintenance Help Index

Routing Table | IP | IPv6 | VLAN | ARP | RIP | OSPF | OSPFv3 | Router Discovery | VRRP | Multicast | IPv6 Multicast

Basic
= IP
= Configuration
= Statistics
> Advanced

IP Configuration

Default Time to Live	64
Routing Mode	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Echo Replies	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Redirects	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
ICMP Rate Limit Interval	<input type="text" value="1000"/> (0 to 2147483647 ms)
ICMP Rate Limit Burst Size	<input type="text" value="100"/> (1 to 200)
Maximum Next Hops	4
Maximum Routes	5112
Select to configure Global Default Gateway	<input type="checkbox"/>
Global Default Gateway	<input type="text" value="0.0.0.0"/>

CANCEL APPLY

7. Configure the switch ports. Choose **Switching > VLAN > Advanced > VLAN Membership**. For each of the four VLANs, set all uplink ports to neighboring stacks as T for tagged. For the infrastructure ports, set all ports to U for untagged on the infrastructure VLAN. Click **APPLY** after configuring the ports for each VLAN.

NETGEAR
Connect with Innovation™

XSM7224S
24-Port 10G SFP+ Ports
Managed L2+ Stackable Switch

System | **Switching** | Routing | QoS | Security | Monitoring | Maintenance | Help | Index

VLAN | STP | Multicast | Address Table | Ports | LAG | PFC

Basic
 > Advanced
 > VLAN
 > Configuration
 > VLAN Membership
 > VLAN Status
 > Port PVID
 > Configuration
 > MAC Based VLAN
 > IP Subnet Based VLAN
 > Port DVLAN
 > Configuration
 > Protocol Based VLAN Group
 > Configuration
 > Protocol Based VLAN Group
 > Membership
 > Voice VLAN
 > Configuration
 > GARP Switch
 > Configuration
 > GARP Port
 > Configuration

VLAN Membership

VLAN Membership

VLAN ID: 5 Group Operation: Untag All

VLAN Name: VLAN0005 UNTAGGED PORT MEMBERS

VLAN Type: Static TAGGED PORT MEMBERS

Unit 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
T																							

LAG

CANCEL APPLY

8. For infrastructure ports, configure the port PVID. Choose **Switching > VLAN > Advanced > Port PVID Configuration**. Enter infrastructure VLAN ID 10 as the Configured PVID for all infrastructure ports and click **APPLY**.

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XSM7224S
24-Port 10G SFP+ Ports
Managed L2+ Stackable Switch

System | **Switching** | Routing | QoS | Security | Monitoring | Maintenance | Help | Index

VLAN | STP | Multicast | Address Table | Ports | LAG | PFC

LOGOUT

> Basic
> **Advanced**
 > VLAN Configuration
 > VLAN Membership
 > VLAN Status
 > **Port PVID Configuration**
 > MAC Based VLAN Configuration
 > IP Subnet Based VLAN
 > Port DVLAN Configuration
 > Protocol Based VLAN Group Configuration
 > Protocol Based VLAN Group Membership
 > Voice VLAN Configuration
 > GARP Switch Configuration
 > GARP Port Configuration

Port PVID Configuration

PVID Configuration

LAGs: All Go To Interface: GO

	Interface	Configured PVID	Current PVID	Acceptable Frame Types	Configured Ingress Filtering	Current Ingress Filtering	Port Priority
<input type="checkbox"/>	1/0/1	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/2	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/3	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/4	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/5	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/6	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/7	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/8	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/9	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/10	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/11	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/12	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/13	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/14	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/15	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/16	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/17	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/18	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/19	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/20	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/21	10	10	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/22	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/23	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/24	1	1	Admit All	Disable	Disable	0

LAGs: All Go To Interface: GO

CANCEL APPLY

9. Choose **Routing > OSPF > Basic > OSPF Configuration**. Select **Enable** and set the router ID to 10.10.10.1. Click **APPLY**. The router ID must be unique to each stack in the LAN.

The screenshot displays the Netgear web interface for an XSM7224S switch. The top navigation bar includes tabs for System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The Routing tab is active, and the OSPF sub-tab is selected. The main content area shows the OSPF Configuration page with the following settings:

- Admin Mode:** Disable Enable
- Router ID:** 10.10.10.1

At the bottom right of the page, there are buttons for CANCEL and APPLY.

- Choose **Routing > OSPF > Advanced > Route Redistribution**. Select the box for Connected and set Redistribution Option to Enable. Click **APPLY**.

The screenshot shows the Netgear web interface for a switch (XSM7224S). The navigation menu includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The Routing menu is expanded to show OSPF, OSPFv3, Router Discovery, VRRP, Multicast, and IPv6 Multicast. The OSPF menu is further expanded to show Basic, Advanced, and Route Redistribution. The Route Redistribution page is titled 'OSPF Route Redistribution' and contains a table with the following data:

	Source	Redistribute Option	Metric	Metric Type	Tag	Subnets	Distribute List
<input checked="" type="checkbox"/>	Connected	Enable	0	External Type 2	0	Disable	
<input type="checkbox"/>	Static	Disable	0	External Type 2	0	Disable	
<input type="checkbox"/>	RIP	Disable	0	External Type 2	0	Disable	

At the bottom right of the page, there are 'CANCEL' and 'APPLY' buttons.

11. Choose **Routing > OSPF > Advanced > Interface Configuration**. Click All above the column headings to list all physical and VLAN interfaces. By default, all interfaces are set to the OSPF area ID 0.0.0.0. Select the box above the first interface's check box to select all interfaces. Enable Admin Mode and click **APPLY**.

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XSM7224S
24-Port 10G SFP+ Ports
Managed L2+ Stackable Switch

System | Switching | **Routing** | QoS | Security | Monitoring | Maintenance | Help | Index

Routing Table | IP | IPv6 | VLAN | ARP | RIP | **OSPF** | OSPFv3 | Router Discovery | VRRP | Multicast | IPv6 Multicast

Interface Configuration

OSPF Interface Configuration

1 VLANs All

	Interface	IP Address	Subnet Mask	Area ID	Admin Mode	Router Priority	Retransmit Interval	Hello Interval	De In
<input type="checkbox"/>	1/0/1	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/2	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/3	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/4	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/5	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/6	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/7	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/8	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/9	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/10	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/11	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/12	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/13	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/14	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/15	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/16	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/17	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/18	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/19	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/20	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/21	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/22	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/23	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/24	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	vlan 10	192.168.1.1	255.255.255.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	vlan 100	192.168.100.1	255.255.252.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	vlan 200	192.168.200.1	255.255.248.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	vlan 5	10.10.10.1	255.255.255.0	0.0.0.0	Enable	1	5	10	40

CANCEL APPLY

Switch – M5300-52G-POE+

1. Move over to configure the M5300-52G-POE+ switch. Configuration for the M5300-52G-POE+ stacks will be replicated on each one. Create VLAN interfaces for the subnets: management (VLAN ID 5), infrastructure (VLAN ID 10), voice (VLAN ID 100), and data (VLAN ID 200). Choose **Switching > VLAN > Advanced > VLAN Configuration**. Declare each VLAN ID and click **ADD** after each one.

The screenshot shows the Netgear web interface for an M5300-28G-POE+ switch. The navigation menu includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The Switching menu is expanded to show VLAN, Auto-VoIP, iSCSI, STP, Multicast, MVR, Address Table, Ports, and LAG. The VLAN Configuration page is displayed, featuring a left-hand navigation tree with options like Basic, Advanced, VLAN, VLAN Membership, and VLAN Status. The main content area is titled 'VLAN Configuration' and includes sections for Reset, Internal VLAN Configuration, and a table for VLAN Configuration. The table lists VLANs 1, 2, 5, 10, 100, and 200 with their respective names and types. At the bottom of the page, there are buttons for ADD, DELETE, CANCEL, and APPLY.

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M5300-28G-POE+
ProSafe 24 port L2 Stackable
GigE PoE Switch with Static Routing

System | **Switching** | Routing | QoS | Security | Monitoring | Maintenance | Help | Index

VLAN | Auto-VoIP | iSCSI | STP | Multicast | MVR | Address Table | Ports | LAG

VLAN Configuration

Reset

Reset Configuration

Internal VLAN Configuration

Internal VLAN Allocation Base: 4093

Internal VLAN Allocation Policy: Ascending Descending

VLAN Configuration

VLAN ID	VLAN Name	VLAN Type	Make Static
<input type="checkbox"/> 1	default	Default	<input type="button" value="Disable"/>
<input type="checkbox"/> 2	Auto VoIP	AUTO VoIP	<input type="button" value="Disable"/>
<input type="checkbox"/> 5	VLAN0005	Static	<input type="button" value="Disable"/>
<input type="checkbox"/> 10	VLAN0010	Static	<input type="button" value="Disable"/>
<input type="checkbox"/> 100	VLAN0100	Static	<input type="button" value="Disable"/>
<input type="checkbox"/> 200	VLAN0200	Static	<input type="button" value="Disable"/>

ADD DELETE CANCEL APPLY

- Choose **Routing > VLAN > VLAN Routing**. Configure the management VLAN 5 (10.10.10.0/24). Select the VLAN ID and enter the corresponding gateway IP address and subnet mask. The management gateway address will be unique to each switch stack. In this case, it is 10.10.10.5. Click **ADD**.

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M5300-28G-POE+
ProSafe 24-port L2 Stackable
GE PoE Switch with Static Routing

System Switching **Routing** QoS Security Monitoring Maintenance Help Index

Routing Table | IP | IPv6 | **VLAN** | ARP | RIP | OSPF | OSPFv3 | Router Discovery | VRRP | Multicast | IPv6 Multicast

VLAN Routing Wizard
VLAN Routing

VLAN Routing Configuration

	VLAN ID	Port	MAC Address	IP Address	Subnet Mask
<input type="checkbox"/>	5	0/4/2	10-0D-7F-5F-65-E8	10.10.10.5	255.255.255.0

ADD DELETE CANCEL

3. Choose **Routing > IP > Basic > IP Configuration** to enable routing globally. Enable Routing Mode and click **APPLY**.

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M5300-28G-POE+
ProSafe 24-port L2 Stackable
GE PoE Switch with Static Routing

System | Switching | **Routing** | QoS | Security | Monitoring | Maintenance | Help | Index

Routing Table | **IP** | IPv6 | VLAN | ARP | RIP | OSPF | OSPFv3 | Router Discovery | VRRP | Multicast | IPv6 Multicast

Basic
 > IP
 > Configuration
 > Statistics
 > Advanced

IP Configuration

Default Time to Live	64
Routing Mode	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Echo Replies	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Redirects	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Rate Limit Interval	<input type="text" value="1000"/> (0 to 2147483647 ms)
ICMP Rate Limit Burst Size	<input type="text" value="100"/> (1 to 200)
Maximum Next Hops	4
Maximum Routes	6112
Select to configure Global Default Gateway	<input type="checkbox"/>
Global Default Gateway	<input type="text" value="0.0.0.0"/>

CANCEL APPLY

- Enable auto-VoIP on all interfaces and increase voice traffic priority. Choose **Switching > Auto-VoIP > Protocol based > Port Settings**. Select Traffic Class as the Prioritization Type and set Class Value to 5. Select all interfaces by checking the box above the first interface and change Auto VoIP Mode to Enable. Click **APPLY**.

The screenshot shows the Netgear web interface for an M5300-28G-POE+ switch. The navigation menu includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. Under Switching, there are sub-menus for VLAN, Auto-VoIP, iSCSI, STP, Multicast, MVR, Address Table, Ports, and LAG. The 'Auto-VoIP' sub-menu is expanded to show 'Protocol-based', 'Port Settings', and 'QoS-based'. The 'Protocol-based' sub-menu is further expanded to show 'Protocol Based Port Settings'.

The 'Protocol Based Port Settings' page has two main sections:

- Protocol Based Global Settings:** This section allows for global configuration. The 'Prioritization Type' is set to 'Traffic Class' and the 'Class Value' is set to '5'.
- Protocol Based Port Settings:** This section contains a table of interfaces. A checkbox at the top left of the table is checked, indicating that all interfaces are selected. The 'Auto VoIP Mode' is set to 'Enable'.

Interface	Auto VoIP Mode	Operational Status
<input checked="" type="checkbox"/> 1/0/1	Enable	UP
<input checked="" type="checkbox"/> 1/0/2	Enable	UP
<input checked="" type="checkbox"/> 1/0/3	Enable	UP
<input checked="" type="checkbox"/> 1/0/4	Enable	UP
<input checked="" type="checkbox"/> 1/0/5	Enable	UP
<input checked="" type="checkbox"/> 1/0/6	Enable	UP
<input checked="" type="checkbox"/> 1/0/7	Enable	UP
<input checked="" type="checkbox"/> 1/0/8	Enable	UP
<input checked="" type="checkbox"/> 1/0/9	Enable	UP
<input checked="" type="checkbox"/> 1/0/10	Enable	UP
<input checked="" type="checkbox"/> 1/0/11	Enable	UP
<input checked="" type="checkbox"/> 1/0/12	Enable	UP
<input checked="" type="checkbox"/> 1/0/13	Enable	UP
<input checked="" type="checkbox"/> 1/0/14	Enable	UP
<input checked="" type="checkbox"/> 1/0/15	Enable	UP
<input checked="" type="checkbox"/> 1/0/16	Enable	UP
<input checked="" type="checkbox"/> 1/0/17	Enable	UP
<input checked="" type="checkbox"/> 1/0/18	Enable	UP
<input checked="" type="checkbox"/> 1/0/19	Enable	UP
<input checked="" type="checkbox"/> 1/0/20	Enable	UP
<input checked="" type="checkbox"/> 1/0/21	Enable	UP
<input checked="" type="checkbox"/> 1/0/22	Enable	UP
<input checked="" type="checkbox"/> 1/0/23	Enable	UP
<input checked="" type="checkbox"/> 1/0/24	Enable	UP
<input checked="" type="checkbox"/> 1/0/25	Enable	UP
<input checked="" type="checkbox"/> 1/0/26	Enable	UP

At the bottom of the page, there are 'CANCEL' and 'APPLY' buttons.

- Enable the voice VLAN feature globally. Choose **Switching > VLAN > Advanced > Voice VLAN Configuration**. Select the box above the first port to select all ports. Change Interface Mode to VLAN ID and Value to 100. Enable Admin Mode and click **APPLY**.

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M5300-28G-POE+
ProSafe 24-port 12 Stackable
GE PoE Switch with Static Routing

System | **Switching** | Routing | QoS | Security | Monitoring | Maintenance | Help | Index

VLAN | Auto-VoIP | iSCSI | STP | Multicast | MVR | Address Table | Ports | LAG

LOGOUT

Basic

- Advanced
 - VLAN Configuration
 - VLAN Membership
 - VLAN Status
 - Port PVID Configuration
 - MAC Based VLAN
 - Protocol Based VLAN Group Configuration
 - Protocol Based VLAN Group Membership
 - IP Subnet Based VLAN
 - Port DVLAN Configuration
 - 1/0/6
 - Voice VLAN Configuration**
 - GARP Switch Configuration
 - GARP Port Configuration

Voice VLAN Configuration

Voice VLAN Global Admin
Admin Mode Disable Enable

Voice VLAN Configuration

1 All

	Interface	Interface Mode	Value	CoS Override Mode	Operational State
<input checked="" type="checkbox"/>	1/0/1	VLAN ID	100	Disable	Enable
<input checked="" type="checkbox"/>	1/0/2	VLAN ID	100	Disable	Enable
<input type="checkbox"/>	1/0/3	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/4	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/5	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/6	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/7	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/8	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/9	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/10	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/11	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/12	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/13	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/14	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/15	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/16	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/17	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/18	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/19	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/20	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/21	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/22	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/23	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/24	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/25	Disable	0	Disable	Disable
<input type="checkbox"/>	1/0/26	Disable	0	Disable	Disable

REFRESH CANCEL APPLY

8. Choose **Routing > OSPF > Basic > OSPF Configuration**. Select **Enable** and set the router ID to 10.10.10.5. Click **APPLY**. Remember that the router ID must be unique to each stack in your LAN network.

The screenshot displays the Netgear web management interface for an M5300-28G-POE+ switch. The top navigation bar includes tabs for System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The Routing tab is active, and the OSPF menu item is highlighted. The main content area shows the OSPF Configuration page with the following settings:

- Admin Mode:** Disable Enable
- Router ID:** 10.10.10.5

At the bottom right of the page, there are buttons for CANCEL and APPLY.

- Choose **Routing > OSPF > Advanced > Route Redistribution**. Check the box next to the source Connected and set the Redistribution Option to Enable. Click **APPLY**.

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M5300-28G-POE+
ProSafe 24 port L2 Stackable
GE PoE Switch with Static Routing

System Switching **Routing** QoS Security Monitoring Maintenance Help Index

Routing Table | IP | IPv6 | VLAN | ARP | RIP | **OSPF** | OSPFv3 | Router Discovery | VRRP | Multicast | IPv6 Multicast

Basic
Advanced
 » OSPF Configuration
 » Common Area Configuration
 » Stub Area Configuration
 » NSSA Area Configuration
 » Area Range Configuration
 » Interface Configuration
 » Interface Statistic
 » Neighbor Table
 » Link State Database
 » Virtual Link Configuration
 » **Route Redistribution**
 » NSF OSPF Summary

Route Redistribution

OSPF Route Redistribution

	Source	Redistribute Option	Metric	Metric Type	Tag	Subnets	Distribute List
<input checked="" type="checkbox"/>	Connected	Enable	0	External Type 2	0	Disable	
<input type="checkbox"/>	Static	Disable	0	External Type 2	0	Disable	
<input type="checkbox"/>	RIP	Disable	0	External Type 2	0	Disable	

CANCEL APPLY

- Choose **Routing > OSPF > Advanced > Interface Configuration**. Click All above the column headings to list all physical and VLAN interfaces. By default, all interfaces are set to the OSPF area ID 0.0.0.0. Select the box above the first interface's check box to select all interfaces. Enable Admin Mode and click **APPLY**.

NETGEAR M5300-28G-POE
ProSafe 24-port L2 Stackable Gb PoE Switch with Static Routing

System Switching **Routing** QoS Security Monitoring Maintenance Help Index

Routing Table IP IPv6 VLAN ARP RIP OSPF OSPFv3 Router Discovery VRRP Multicast IPv6 Multicast

Basic
Advanced
OSPF
Configuration
Common Area
Configuration
Stub Area
Configuration
NSSA Area
Configuration
Area Range
Configuration
Interface
Configuration
Interface Statistics
Neighbor Table
Link State
Database
Virtual Link
Configuration
Route
Redistribution
NSF OSPF
Summary

Interface Configuration

OSPF Interface Configuration

1 VLANs All

	Interface	IP Address	Subnet Mask	Area ID	Admin Mode	Router Priority	Retransmit Interval	Hello Interval	Dead Interval
<input checked="" type="checkbox"/>									
<input checked="" type="checkbox"/>	1/0/1	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/2	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/3	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/4	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/5	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/6	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/7	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/8	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/9	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/10	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/11	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/12	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/13	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/14	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/15	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/16	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/17	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/18	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/19	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/20	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/21	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/22	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/23	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/24	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/25	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/26	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/27	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40
<input checked="" type="checkbox"/>	1/0/28	0.0.0.0	0.0.0.0	0.0.0.0	Disable	1	5	10	40

CANCEL APPLY

11. To queue and prioritize VoIP traffic properly, change the 802.1p queue mapping. Choose **QoS > CoS > Advanced > 802.1p to Queue Mapping**. Select All from the Interface Selection drop-down menu and change the Queue value to 5 for 802.1p Priority 5. Click **APPLY**.

The screenshot shows the Netgear web interface for configuring 802.1p to Queue Mapping. The page title is "802.1p to Queue Mapping" and the interface is for a "M5300-28G-POE" device. The navigation menu includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The breadcrumb trail is "CoS > DiffServ".

The configuration page is divided into two sections:

- Interface Selection:** A dropdown menu labeled "Interface" is set to "1/0/1".
- 802.1p to Queue Mapping:** A table with 8 columns representing 802.1p priorities (0-7) and one row for Queue mapping. The Queue value for priority 5 is set to 5.

802.1p Priority	0	1	2	3	4	5	6	7
Queue	1	0	0	1	2	5	3	3

At the bottom right of the page, there are "CANCEL" and "APPLY" buttons.

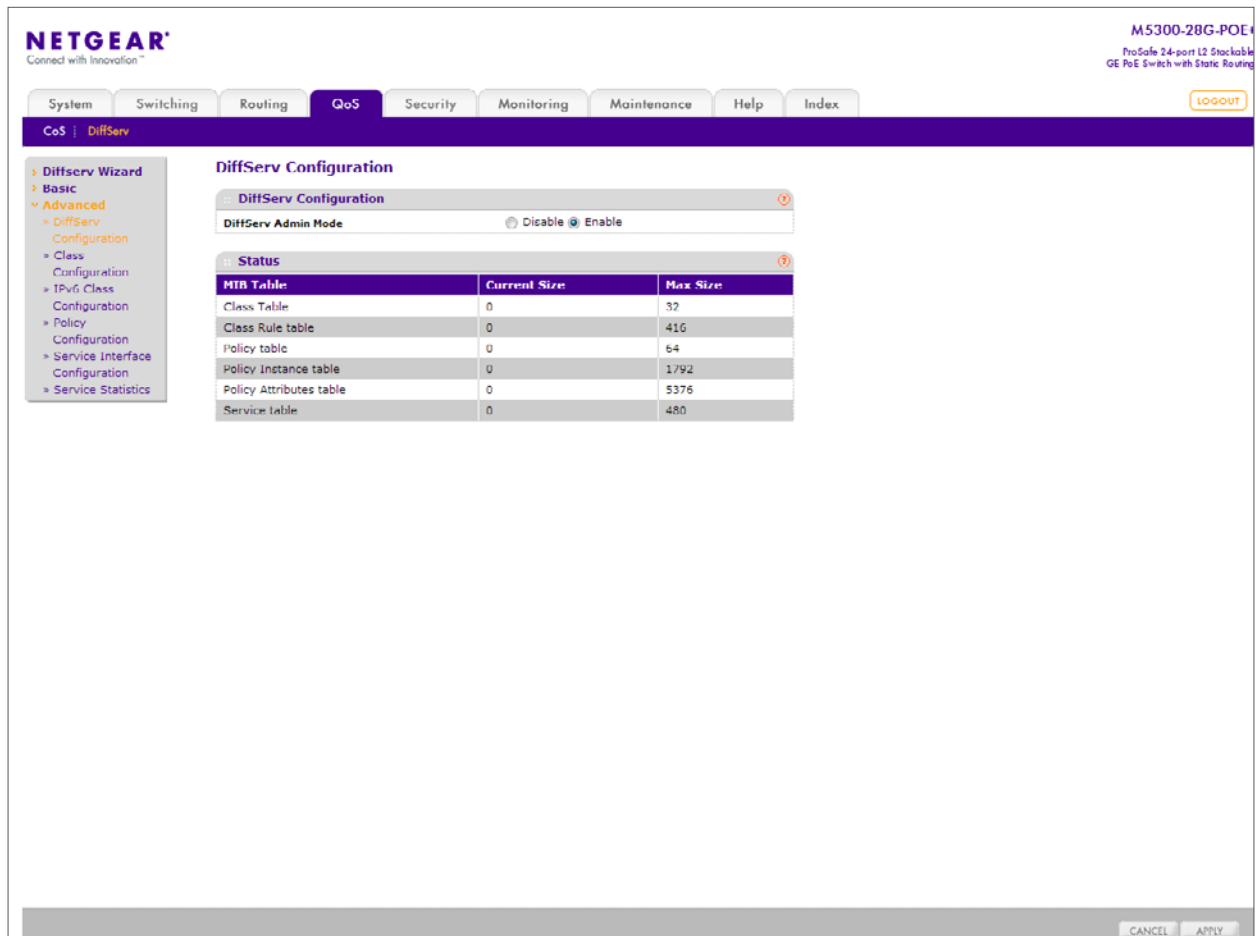
- Assign queue priority to our phone ports. Choose **QoS > CoS > Advanced > Interface Queue Configuration**. Select all phone ports, change the Queue ID to 5, and change the Scheduler Type to Strict. Click **APPLY**.

The screenshot shows the Netgear web interface for the 'Interface Queue Configuration' page. The page title is 'Interface Queue Configuration' and it includes a 'Go To Interface' search bar. The table below lists the configuration for various interfaces, with the Queue ID set to 5 and the Scheduler Type set to Strict for all entries.

Interface	Queue ID	Minimum Bandwidth	Scheduler Type	Queue Management Type
<input checked="" type="checkbox"/>	5		Strict	
<input checked="" type="checkbox"/> 1/0/1	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/2	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/3	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/4	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/5	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/6	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/7	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/8	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/9	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/10	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/11	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/12	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/13	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/14	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/15	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/16	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/17	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/18	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/19	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/20	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/21	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/22	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/23	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/24	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/25	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/26	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/27	0	0	Weighted	TailDrop
<input checked="" type="checkbox"/> 1/0/28	0	0	Weighted	TailDrop

At the bottom of the page, there are 'CANCEL' and 'APPLY' buttons.

13. Enable the DiffServ feature. Choose **QoS > DiffServ > Advanced > DiffServ Configuration**. Enable DiffServ Admin Mode and click **APPLY**.



The screenshot displays the Netgear web interface for the M5300-28G-POE switch. The navigation menu includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The QoS menu is expanded to show CoS and DiffServ. The DiffServ Configuration page is active, showing the DiffServ Admin Mode set to Enable. A table titled 'Status' provides details on the size of various DiffServ tables.

MTB Table	Current Size	Max Size
Class Table	0	32
Class Rule table	0	416
Policy table	0	64
Policy Instance table	0	1792
Policy Attributes table	0	5376
Service Table	0	480

14. Create a DiffServ class for our DiffServ policy. In this class, we will specifically queue VoIP traffic on the protocol level. Go to **QoS > DiffServ > Advanced > Class Configuration**. Enter the VoIP class name, change the Class Type to All, and Click **ADD**. Once the class is created, click on the class to open the VoIP class' configuration page.

The screenshot displays the Netgear web interface for a ProSafe 24-port L2 Stackable GE PoE Switch with Static Routing (M5300-28G-POE). The navigation menu includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The current page is titled "Class Name" and is part of the "DiffServ" configuration section. A sidebar on the left shows a tree view with "DiffServ Wizard" expanded to "Advanced" > "Class Configuration". The main content area features a table with the following data:

Class Name	Class Type
class_voip	All

At the bottom of the page, there are buttons for "ADD", "DELETE", "CANCEL", and "APPLY".

15. On the VoIP class' configuration page, notice the settings that can be applied to the class. Click Protocol Type and select UDP from the drop-down menu. Click **APPLY**. Then click IP DSCP and select EF from the drop-down menu. Click **APPLY**. Next, click Class of Service and select 5 from the drop-down menu. Click **APPLY**.

The screenshot shows the Netgear M5300-28G-POE+ web interface. The top navigation bar includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The QoS section is active, and the DiffServ configuration page is displayed. The left sidebar shows the DiffServ Wizard with Basic and Advanced sections. The main content area is titled "Class Configuration" and contains the following sections:

- Class Information:** Class Name: class_voip, Class Type: All
- DiffServ Class Configuration:**
 - Match Every: Any
 - Reference Class: []
 - Class Of Service: 0
 - VLAN: [] (0 to 4095)
 - Secondary Class of Service: 0
 - Secondary VLAN: [] (0 to 4095)
 - Ethernet Type: Appletalk (600 to ffff hex)
 - Source MAC: Address [] Mask []
 - Destination MAC: Address [] Mask []
 - Protocol Type: ICMP (0 to 255)
 - Source IP: Address [] Mask []
 - Source L4 Port: domain (0 to 65535)
 - Destination IP: Address [] Mask []
 - Destination L4 Port: domain (0 to 65535)
 - IP DSCP: af11 (0 to 63)
 - Precedence Value: 0 (0 to 7)
 - IP ToS: Bit Value [] Bit Mask []
- Class Summary:**

Match Criteria	Values
Protocol	17(udp)
IP DSCP	46(ef)

At the bottom right, there are CANCEL and APPLY buttons.

16. Apply the class to a policy map. To create the policy map, choose **QoS > DiffServ > Advanced > Policy Configuration**. Enter the VoIP policy name, change the Policy Type to In, and change the Member Class to the VoIP class you created. Click **ADD**. When the policy is created, click the VoIP policy to enter its configuration page.

The screenshot shows the Netgear web interface for a ProSwitch 24-port 17 Slot switch. The navigation menu includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The sidebar on the left contains a tree view with categories like DiffServ Wizard, Basic, and Advanced. The main content area is titled 'Policy Configuration' and features a table with the following data:

Policy Name	Policy Type	Member Class
<input type="text"/>	<input type="text"/>	<input type="text"/>
pol_voice	In	class_voice

At the bottom of the page, there are buttons for ADD, DELETE, CANCEL, and APPLY.

17. On the VoIP policy configuration page, change the Assign Queue value to 5 and click **APPLY**.

The screenshot shows the Netgear web interface for configuring a Policy Class. The page title is "Policy Class Configuration" and it is for a device model "M5300-28G-POE+". The navigation menu includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The left sidebar shows a tree view with "DiffServ Wizard" expanded to "Advanced" and "Policy Configuration".

The main configuration area is divided into two sections:

- Class Information:**
 - Policy Name: pol_voip
 - Policy Type: In
 - Member Class Name: class_voip
- Policy Attribute:**
 - Policy Attribute: Assign Queue (set to 5)
 - Drop:
 - Mark VLAN CoS: 0
 - Mark CoS As Secondary CoS:
 - Mark IP Precedence: 0
 - Mark IP DSCP: af11
 - Simple Policy:
 - Two Rate:
 - Color Mode: Color Blind
 - Committed Rate: [input field]
 - Committed Burst Size: [input field]
 - Conform Action: Send, Drop, Mark CoS (0), Mark CoS As Secondary CoS, Mark IP Precedence (0), Mark IP DSCP (af11, 10)
 - Violate Action: Send, Drop, Mark CoS (0), Mark CoS As Secondary CoS, Mark IP Precedence (0), Mark IP DSCP (af11, 10)
 - Color Mode: Color Blind
 - Committed Rate: [input field]
 - Committed Burst Size: [input field]
 - Peak Rate: [input field]
 - Peak Burst Size: [input field]
 - Conform Action: Send

Buttons for "CANCEL" and "APPLY" are located at the bottom right of the configuration area.

18. Apply the policy to all the phone ports. Choose **QoS > DiffServ > Advanced > Service Interface Configuration**. Select all phone ports and change the Policy In Name to the VoIP policy created. Click **APPLY**.

The screenshot shows the Netgear web interface for the M5300-28G-POE+ switch. The navigation menu includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The current page is 'Service Interface Configuration' under the 'QoS' tab. The left sidebar shows a tree view with 'DiffServ Wizard' expanded to 'Advanced' > 'Service Interface Configuration'. The main content area shows a table with the following columns: Interface, Policy In Name, Policy Out Name, Direction, and Operational Status. All 28 interfaces (1/0/1 to 1/0/28) are selected with checkboxes. The 'Policy In Name' for all selected interfaces is 'pol. voip'. The 'Operational Status' column is empty for all interfaces. At the bottom of the table, there is a 'LAGS All' section with a 'Go To Interface' field and a 'GO' button. The 'APPLY' button is visible at the bottom right of the page.

Interface	Policy In Name	Policy Out Name	Direction	Operational Status
<input checked="" type="checkbox"/>	pol. voip			
<input checked="" type="checkbox"/> 1/0/1				
<input checked="" type="checkbox"/> 1/0/2				
<input checked="" type="checkbox"/> 1/0/3				
<input checked="" type="checkbox"/> 1/0/4				
<input checked="" type="checkbox"/> 1/0/5				
<input checked="" type="checkbox"/> 1/0/6				
<input checked="" type="checkbox"/> 1/0/7				
<input checked="" type="checkbox"/> 1/0/8				
<input checked="" type="checkbox"/> 1/0/9				
<input checked="" type="checkbox"/> 1/0/10				
<input checked="" type="checkbox"/> 1/0/11				
<input checked="" type="checkbox"/> 1/0/12				
<input checked="" type="checkbox"/> 1/0/13				
<input checked="" type="checkbox"/> 1/0/14				
<input checked="" type="checkbox"/> 1/0/15				
<input checked="" type="checkbox"/> 1/0/16				
<input checked="" type="checkbox"/> 1/0/17				
<input checked="" type="checkbox"/> 1/0/18				
<input checked="" type="checkbox"/> 1/0/19				
<input checked="" type="checkbox"/> 1/0/20				
<input checked="" type="checkbox"/> 1/0/21				
<input checked="" type="checkbox"/> 1/0/22				
<input checked="" type="checkbox"/> 1/0/23				
<input checked="" type="checkbox"/> 1/0/24				
<input checked="" type="checkbox"/> 1/0/25				
<input checked="" type="checkbox"/> 1/0/26				
<input checked="" type="checkbox"/> 1/0/27				
<input checked="" type="checkbox"/> 1/0/28				
LAGS All				

Switch – M5300-52G3

- We now move over to the M5300-52G3 stacks. The configuration will be replicated on each one. Create VLAN interfaces for the subnets: management (VLAN ID 5), infrastructure (VLAN ID 10), voice (VLAN ID 100), and data (VLAN ID 200). Choose **Switching > VLAN > Advanced > VLAN Configuration**. Declare each VLAN ID and click **ADD** after each one.

The screenshot shows the Netgear M5300-28G3 switch configuration interface. The page title is "VLAN Configuration". The navigation menu includes System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The "Switching" menu is expanded to show VLAN, Auto-VoIP, iSCSI, STP, Multicast, MVR, Address Table, Ports, and LAG. The "VLAN" menu is further expanded to show Basic, Advanced, and VLAN sub-menus. The "Advanced" menu is selected, and the "VLAN Configuration" page is displayed.

The "VLAN Configuration" page has a "Reset" button and a "Reset Configuration" checkbox. Below this is the "Internal VLAN Configuration" section, which includes an "Internal VLAN Allocation Base" field set to 4093 and an "Internal VLAN Allocation Policy" dropdown set to Ascending. The main section is a table titled "VLAN Configuration" with the following data:

VLAN ID	VLAN Name	VLAN Type	Make Static
1	default	Default	Disable
2	Auto VoIP	AUTO VoIP	Disable
5	VLAN0005	Static	Disable
10	VLAN0010	Static	Disable
100	VLAN0100	Static	Disable
200	VLAN0200	Static	Disable

At the bottom of the page, there are buttons for ADD, DELETE, CANCEL, and APPLY.

- Choose **Routing > VLAN > VLAN Routing**. Configure management VLAN 5 (10.10.10.0/24). Select the VLAN ID and enter the corresponding gateway IP address and subnet mask. The management gateway address will be unique to each switch stack. In this case, it is 10.10.10.10. Click **ADD**.

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M5300-28G3
ProSAFE 24-port L3
Stackable GS Switch with L3 Routing

System Switching **Routing** QoS Security Monitoring Maintenance Help Index

Routing Table IP IPv6 **VLAN** ARP RIP OSPF OSPFv3 Router Discovery VRRP Multicast IPv6 Multicast

VLAN Routing Wizard
VLAN Routing

VLAN Routing Configuration

VLAN ID	Port	MAC Address	IP Address	Subnet Mask
5	0/4/1	10:0D:7F:4C:18:E0	10.10.10.10	255.255.255.0

ADD DELETE CANCEL

3. Choose **Routing > IP > Basic > IP Configuration**. Enable Routing Mode and click **APPLY**.

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M5300-28G3
PoE Safe 24-port L3
Stackable GigE Switch with L3 Routing

System | Switching | **Routing** | QoS | Security | Monitoring | Maintenance | Help | Index

Routing Table | IP | IPv6 | VLAN | ARP | RIP | OSPF | OSPFv3 | Router Discovery | VRRP | Multicast | IPv6 Multicast

Basic
IP
Configuration
Statistics
Advanced

IP Configuration

Default Time to Live	64
Routing Mode	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Echo Replies	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Redirects	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
ICMP Rate Limit Interval	<input type="text" value="1000"/> (0 to 2147483647 ms)
ICMP Rate Limit Burst Size	<input type="text" value="100"/> (1 to 200)
Maximum Next Hops	4
Maximum Routes	6112
Select to configure Global Default Gateway	<input type="checkbox"/>
Global Default Gateway	<input type="text" value="0.0.0.0"/>

CANCEL APPLY

- Configure the switch ports. Select **Switching > VLAN > Advanced > VLAN Membership**. For each of the four VLANs, set all uplink ports to neighboring stacks as T for tagged. For all other ports, set ports to U for untagged on the necessary VLAN. Click **APPLY** after configuring the ports for each VLAN.

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M5300-28G3
ProSafe 24-port L3
Stackable GE Switch with L3 Routing

System | **Switching** | Routing | QoS | Security | Monitoring | Maintenance | Help | Index

VLAN | Auto-VoIP | iSCSI | STP | Multicast | MVR | Address Table | Ports | LAG

LOGOUT

VLAN Membership

VLAN ID: 200 | Group Operation: Untag All

VLAN Name: VLAN0200 | UNTAGGED PORT MEMBERS

VLAN Type: Static | TAGGED PORT MEMBERS

Unit 1

Port	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	U	U	U	U																				
	25	26	27	28																				
	T																							

LAG

CANCEL APPLY

- For untagged ports, configure the port PVID to support the data VLAN. Choose **Switching > VLAN > Advanced > Port PVID Configuration**. Enter the corresponding VLAN ID as the Configured PVID for all non-trunk ports in that VLAN and click **APPLY**.

NETGEAR
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M5300-28G3
ProSafe 24 port L3 Stackable Gb Switch with L3 Routing

System | **Switching** | Routing | GoS | Security | Monitoring | Maintenance | Help | Index

VLAN | Auto-VoIP | iSCSI | STP | Multicast | MVR | Address Table | Ports | LAG

LOGOUT

Port PVID Configuration

1 LAGS All Go to Interface: GO

	Interface	Configured PVID	Current PVID	Acceptable Frame Types	Configured Ingress Filtering	Current Ingress Filtering	Port Priority
<input type="checkbox"/>	1/0/1	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/2	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/3	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/4	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/5	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/6	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/7	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/8	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/9	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/10	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/11	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/12	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/13	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/14	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/15	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/16	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/17	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/18	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/19	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/20	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/21	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/22	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/23	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/24	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/25	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/26	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/27	1	0	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/28	1	0	Admit All	Disable	Disable	0

CANCEL APPLY

- Choose **Routing > OSPF > Basic > OSPF Configuration**. Select Enable and set the router ID to 10.10.10.10. Click **APPLY**. The router ID must be unique to each stack in the LAN network.

The screenshot displays the Netgear web interface for an M5300-28G3 switch. The top navigation bar includes tabs for System, Switching, Routing, QoS, Security, Monitoring, Maintenance, Help, and Index. The Routing tab is active, and the sub-menu shows OSPF selected. The main content area is titled "OSPF Configuration" and contains a configuration card for "OSPF Configuration". The "Admin Mode" is set to "Enable" (indicated by a selected radio button), and the "Router ID" is set to "10.10.10.10". A "LOGOUT" button is visible in the top right corner. At the bottom right, there are "CANCEL" and "APPLY" buttons.

- Choose **Routing > OSPF > Advanced > Route Redistribution**. Check the box next to the source Connected and set the Redistribution Option to Enable. Click **APPLY**.

NETGEAR
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M5300-28G3
ProSafe 24-port L3
Stackable GE Switch with L3 Routing

System | Switching | **Routing** | QoS | Security | Monitoring | Maintenance | Help | Index

Routing Table | IP | IPv6 | VLAN | ARP | RIP | **OSPF** | OSPFv3 | Router Discovery | VRRP | Multicast | IPv6 Multicast

Route Redistribution

OSPF Route Redistribution

	Source	Redistribute Option	Metric	Metric Type	Tag	Subnets	Distribute List
<input checked="" type="checkbox"/>	Connected	Enable	0	External Type 2	0	Disable	
<input type="checkbox"/>	Static	Disable	0	External Type 2	0	Disable	
<input type="checkbox"/>	RIP	Disable	0	External Type 2	0	Disable	

CANCEL APPLY

8. Choose **Routing > OSPF > Advanced > Interface Configuration**. Click All above the column headings to list all physical and VLAN interfaces. By default, all interfaces are set to the OSPF area ID 10.10.10.10. Check the box above the first interface's check box to select all interfaces. Enable Admin Mode and click **APPLY**.

NETGEAR M5300-28G3
 ProSafe 24-port L3 Stackable GE Switch with L3 Routing

System Switching **Routing** QoS Security Monitoring Maintenance Help Index

Routing Table IP IPv6 VLAN ARP RIP **OSPF** OSPFv3 Router Discovery VRRP Multicast IPv6 Multicast

Basic
 Advanced
 OSPF
 Configuration
 Common Area Configuration
 Stub Area Configuration
 NSSA Area Configuration
 Area Range Configuration
 Interface Configuration
 Interface Statistics
 Neighbor Table
 Link State Database
 Virtual Link Configuration
 Route Redistribution
 NSF OSPF Summary

OSPF Interface Configuration

1 VLANs All

	Interface	IP Address	Subnet Mask	Area ID	Admin Mode	Router Priority	Retransmit Interval	Hello Interval	Dead Interval
<input checked="" type="checkbox"/>	1/0/1	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/2	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/3	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/4	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/5	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/6	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/7	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/8	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/9	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/10	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/11	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/12	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/13	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/14	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/15	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/16	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/17	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/18	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/19	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/20	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/21	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/22	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/23	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/24	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/25	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/26	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/27	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
<input type="checkbox"/>	1/0/28	0.0.0.0	0.0.0.0	0.0.0.0	Enable	1	5	10	40
	vlan 5	10.10.10.10	255.255.255.0	0.0.0.0	Enable	1	5	10	40

CANCEL APPLY