

Networking Solutions for Storage

Application Notes

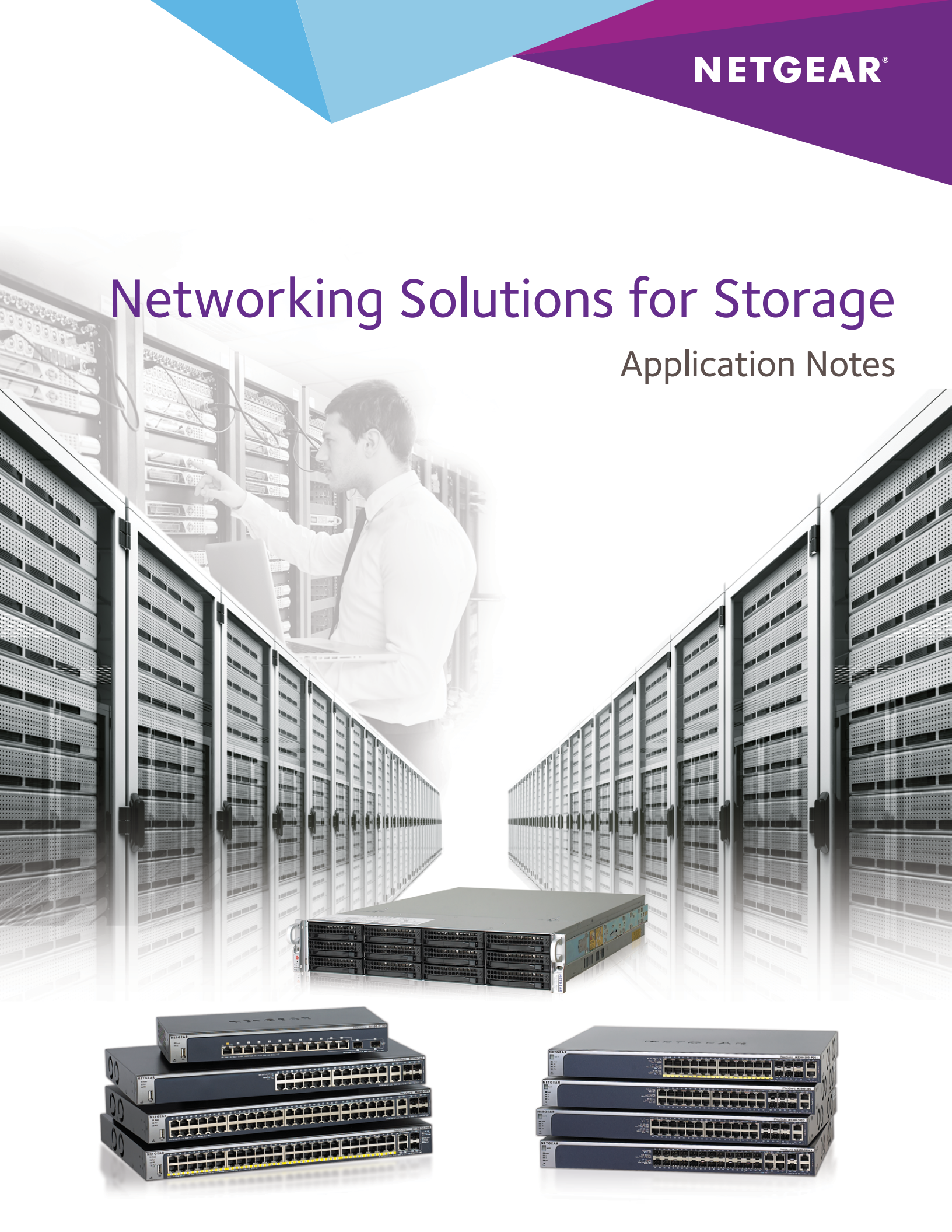


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INTRODUCTION

Unified storage that supports IP-based SAN (iSCSi) and Network-Attached Storage (NAS) protocols on 10G Ethernet fabric, has emerged as an attractive storage option for mid-sized companies seeking an efficient, reasonably-priced solution to handle the flood of data generated by twenty-first century businesses. Mid-sized companies can now take the same fundamental approach to storage as large enterprises, using a storage area network (SAN) to store data, but in a smaller scale than enterprises and without the expense and complexity of enterprise-scale fiber channel SANs.

Several factors are driving the trend towards NAS/SAN solutions for these companies.:

- **Data volume.** More data is being generated than ever before for operating systems, applications, and user data.
- **Regulatory requirements.** Government regulations are compelling businesses to maintain and back up data that previously would have been deleted.
- **Virtualization.** With multiple virtual machines (VMs) running on the same server, centralized storage becomes a necessity. NAS devices or dedicated SAN storage devices are needed to meet the VM storage demands.

Enterprise-scale companies have met storage challenges with fiber channel SANs, which can manage huge quantities of data. However, they are not appropriate for mid-sized businesses, as they are complex, expensive to install and maintain, and must be managed by experts with specialized training and skills.

The iSCSi protocol offers an alternative to fiber channel SANs that is appropriate for mid-sized businesses. iSCSi is an extension of the ScSi protocol used for block transfers in most storage devices and in fiber channel architectures. The Internet extension (the “i” in iSCSi) defines protocols for extending block transfers over IP, allowing standard Ethernet infrastructure to be used as a SAN interconnect fabric. Basic iSCSi is supported in most operating systems today, and its capabilities allow 10G Ethernet to compare favorably to fiber channel as a SAN interconnection fabric.

HOW TO USE THIS DOCUMENT

The *Networking Solutions for Storage Solution Guide* provides technical guidance and details for the NETGEAR storage solution. 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 storage solution.

REFERENCE CONFIGURATIONS

The following figure shows a reference configuration. You can use the CLI or Web GUI for configuration.

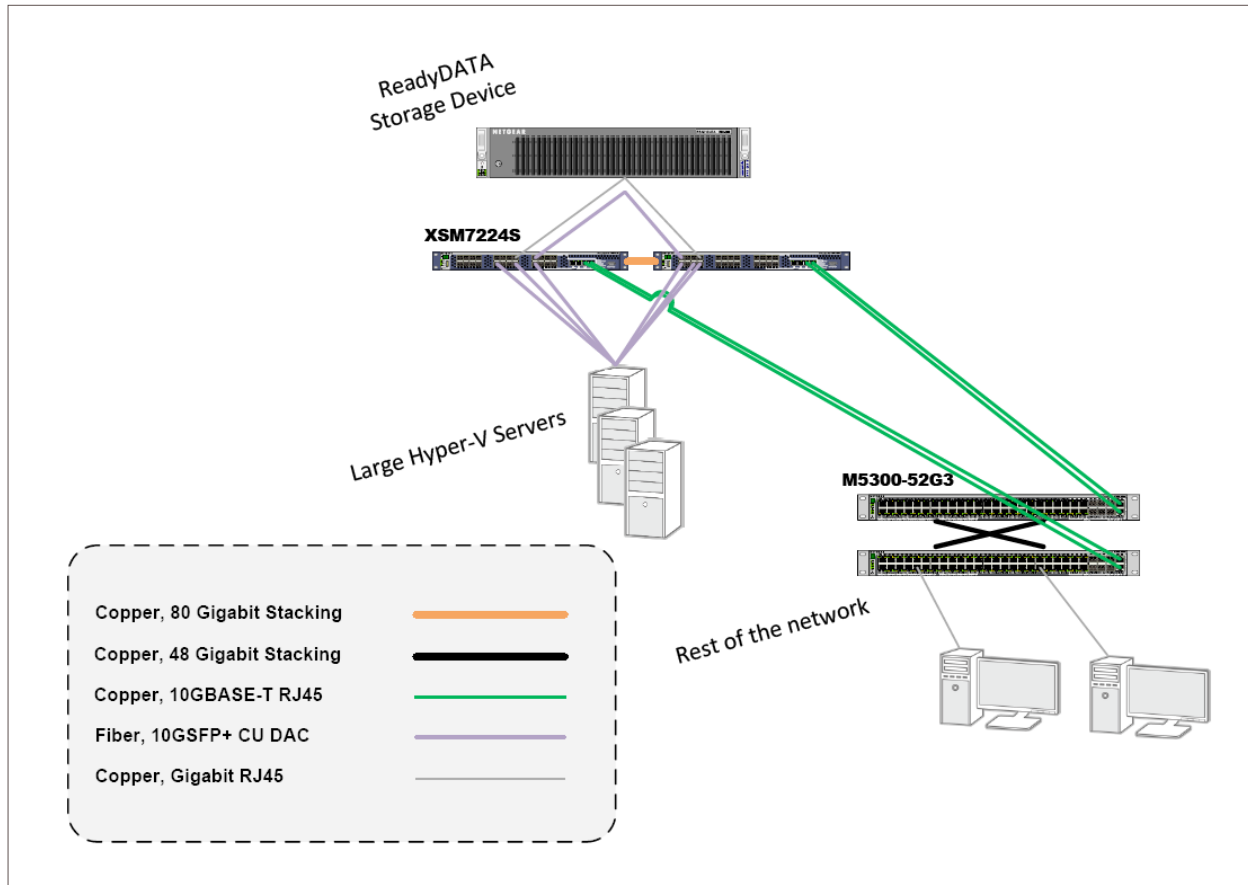


Figure 1. Sample Solution

Assumptions

- Layer 3 licenses have been installed on XSM7224S switches as they are native Layer 2+ switches. No additional license is needed for the M5300-52G3 switches, as they are native Layer 3 switches.
- An existing DHCP server is used to manage dynamic and static DHCP pools.
- Best practices are used to design and implement switch stacking and redundancy/failover.
- A NETGEAR ReadyData 5200 storage server is used with the recommended bonded gigabit interfaces using passive LACP mode, Layer 3 /Layer 4 hash type, and short LACP Timer. By default, NETGEAR Layer 3 switches have LACP enabled globally, LACP mode set to active, and LACP Timer set to short. For LACP to operate, only one side of the link needs to be in the active mode. Refer to the storage vendor documentation for information on selecting optimal settings, and modify LACP-related commands in this application note as 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**.
- When using link aggregation groups (LAGs), do not connect any ports in the LAG until both ends of all links are configured.
- Amend routes on the M5300-52G3 stack to reflect the correct static routes, particularly the next-hop address to the rest of the network.
- Screens in the GUI section of this application note were taken from an M5300-28G3 stack. However, all of the configuration and features also apply to a M5300-52G3 stack.

Sample Configuration Values

The following values are used in the sample configuration. Modify the configuration as needed for your environment.

- Management VLAN: VLAN 5
- VLANs for the storage server's 10G links: VLAN 80 (192.168.88.1/24) and VLAN 90 (192.168.89.1/24).
- VLAN for the storage server's bonded 1G links: VLAN 10 (192.168.1.1/24)
- Load balance type: 6

CLI Configuration Steps

These steps provide an example CLI configuration. To use the Web GUI for configuration, see Web GUI Configuration Steps on page 9.

XSM7224S

1. Use one VLAN for each of the storage server's 10G links – VLAN 80 (192.168.88.1/24) and VLAN 90 (192.168.89.1/24). Use one VLAN for the storage server's bonded 1G links – VLAN 10 (192.168.1.1/24). Declare the VLANs with routing.

```
XSM7224S) #vlan database
(XSM7224S) (Vlan)#vlan 5,10,80,90
(XSM7224S) (Vlan)#vlan routing 5
(XSM7224S) (Vlan)#vlan routing 10
(XSM7224S) (Vlan)#vlan routing 80
(XSM7224S) (Vlan)#vlan routing 90
```

2. Configure the VLAN interfaces.

```
(XSM7224S) #configure
(XSM7224S) (Config)#interface vlan 10
(XSM7224S) (Interface-vlan 10)#routing
(XSM7224S) (Interface-vlan 10)#ip address 192.168.1.1 255.255.255.0
(XSM7224S) (Interface-vlan 10)#exit
(XSM7224S) (Config)#interface vlan 80
(XSM7224S) (Interface-vlan 80)#routing
(XSM7224S) (Interface-vlan 80)#ip address 192.168.88.1 255.255.255.0
(XSM7224S) (Interface-vlan 80)#exit
(XSM7224S) (Config)#interface vlan 90
(XSM7224S) (Interface-vlan 90)#routing
(XSM7224S) (Interface-vlan 90)#ip address 192.168.89.1 255.255.255.0
(XSM7224S) (Interface-vlan 90)#exit
```

3. Enable routing globally.

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

4. Configure the storage server's 10G links. Match the correct VLAN interface with the storage server's port configuration.

```
(XSM7224S) (Config)#interface 1/0/22
(XSM7224S) (Interface 1/0/22)#vlan participation exclude 1
(XSM7224S) (Interface 1/0/22)#vlan participation include 80
(XSM7224S) (Interface 1/0/22)#vlan pvid 80
(XSM7224S) (Interface 1/0/22)#exit
(XSM7224S) (Config)#interface 2/0/22
(XSM7224S) (Interface 2/0/22)#vlan participation exclude 1
(XSM7224S) (Interface 2/0/22)#vlan participation include 90
(XSM7224S) (Interface 2/0/22)#vlan pvid 90
(XSM7224S) (Interface 2/0/22)#exit
```

5. Enable LAG globally. LAG is used to satisfy the bonding requirements of the storage server.

```
(XSM7224S) (Config)#port-channel adminmode all
```

6. Set the load balance type on the ports. This must match with the hash type configured on the storage server. In this case, the storage server's ports are configured for Layer 3 and Layer 4. Set the load balance type to 6 (Src/Dest IP and TCP/UDP Port fields) and apply it to all interfaces.

```
(XSM7224S) (Config)#port-channel load-balance 6 all
```

7. Configure the LAG interface for the storage server's 1G links. When using LAGs, configuration is done on the LAG interface much like it is done on a physical interface. Configuration of the LAG interface is done prior to configuring the port, as the port inherits its configuration from the LAG interface.

```
(XSM7224S) (Config) #interface lag 1
(XSM7224S) (Interface-lag 1) #vlan participation exclude 1
(XSM7224S) (Interface-lag 1) #vlan participation include 10
(XSM7224S) (Interface-lag 1) #vlan pvid 10
(XSM7224S) (Interface-lag 1) #exit
```

8. Add the ports to be part of the LAG.

```
(XSM7224S) (Config) #interface 1/0/21
(XSM7224S) (Interface 1/0/21) #addport lag 1
(XSM7224S) (Interface 1/0/21) #exit
(XSM7224S) (Config) #interface 2/0/21
(XSM7224S) (Interface 2/0/21) #addport lag 1
(XSM7224S) (Interface 2/0/21) #exit
```

9. For distributed link aggregation between the XSM7224S stack and M5300-52G3 stack, configure the second LAG interface with all VLAN needed to pass between the stacks like a normal trunk port.

```
(XSM7224S) (Config) #interface lag 2
(XSM7224S) (Interface-lag 2) #vlan participation exclude 1
(XSM7224S) (Interface-lag 2) #vlan participation include 5,10,80,90
(XSM7224S) (Interface-lag 2) #vlan tagging 5,10,80,90
(XSM7224S) (Interface-lag 2) #exit
```

10. Add uplink interfaces as members of the LAG.

```
(XSM7224S) (Config) #interface range 1/0/19-1/0/20
(XSM7224S) (conf-if-range-1/0/19-1/0/20) #addport lag 2
(XSM7224S) (conf-if-range-1/0/19-1/0/20) #exit
(XSM7224S) (Config) #interface range 2/0/19-2/0/20
(XSM7224S) (conf-if-range-2/0/19-2/0/20) #addport lag 2
(XSM7224S) (conf-if-range-2/0/19-2/0/20) #exit
(XSM7224S) (Config) #exit
```

M5300-52G3

1. Declare the VLANs.

```
(M5300-52G3) #vlan database
(M5300-52G3) (Vlan)#vlan 5,10,80,90
(M5300-52G3) (Vlan)#exit
```

2. Enable IP routing globally and set a default route. Configure static routes as appropriate for your environment.

```
(M5300-52G3) #configure
(M5300-52G3) (Config)#ip routing
(M5300-52G3) (Config)#ip route 0.0.0.0 0.0.0.0 10.10.10.1
```

3. Enable LAG globally.

```
(M5300-52G3) (Config)#port-channel adminmode all
```

4. Set the load balance type on the ports. This must match the LAG interface configurations on the XSM7224S stack. Set the load balance type to 6 (Src/Dest IP and TCP/UDP Port fields) and apply it to all interfaces.

```
(M5300-52G3) (Config)#port-channel load-balance 6 all
```

5. For distributed link aggregation between the XSM7224S stack and M5300-52G3 stack, configure the second LAG interface with all VLANs needed to pass between the stacks like a normal trunk port. Both sides of the LAG interfaces must match.

```
(M5300-52G3) (Config)#interface lag 2
(M5300-52G3) (Interface-lag 2)#no spanning-tree port mode
(M5300-52G3) (Interface-lag 2)#vlan participation exclude 1
(M5300-52G3) (Interface-lag 2)#vlan participation include 5,10,80,90
(M5300-52G3) (Interface-lag 2)#vlan tagging 5,10,80,90
(M5300-52G3) (Interface-lag 2)#exit
```

6. Add the uplink interfaces as members of the LAG.

```
(M5300-52G3) (Config)#interface 1/0/23-1/0/24
(M5300-52G3) (Interface 1/0/23-1/0/24)#addport lag 2
(M5300-52G3) (Interface 1/0/23-1/0/24)#exit
(M5300-52G3) (Config)#interface 2/0/23-2/0/24
(M5300-52G3) (Interface 2/0/23-2/0/24)#addport lag 2
(M5300-52G3) (Interface 2/0/23-2/0/24)#exit
(M5300-52G3) (Config)#exit
```


Web GUI Configuration Steps

These steps provide an example Web GUI configuration. For the CLI configuration, see CLI Configuration Steps on page 5.

XSM7224S

1. Declare the VLANs. The configuration uses one VLAN for each of the storage server's 10G links – VLAN 80 (192.168.88.1/24) and VLAN 90 (192.168.89.1/24). Use one VLAN for the storage server's bonded 1G links – VLAN 10 (192.168.1.1/24). Choose **Switching > VLAN > Advanced > VLAN Configuration**. For each VLAN, enter the correct VLAN ID and click **ADD**.

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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
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 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"/>				Disable
<input type="checkbox"/>	1	default	Default	Disable
<input type="checkbox"/>	5	VLAN0005	Static	Disable
<input type="checkbox"/>	10	VLAN0010	Static	Disable
<input type="checkbox"/>	80	VLAN0080	Static	Disable
<input type="checkbox"/>	90	VLAN0090	Static	Disable

ADD DELETED CANCEL APPLY

2. Choose **Routing > VLAN > VLAN Routing**. Select each VLAN ID from the drop-down menu and enter its IP address and subnet mask. Click **ADD** after configuring each VLAN.

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

> 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="text" value="5"/>	0/4/4	00:8E:F2:59:67:36	10.10.10.1	255.255.255.0
<input type="checkbox"/>	<input type="text" value="10"/>	0/4/1	00:8E:F2:59:67:36	192.168.1.1	255.255.255.0
<input type="checkbox"/>	<input type="text" value="80"/>	0/4/2	00:8E:F2:59:67:36	192.168.88.1	255.255.255.0
<input type="checkbox"/>	<input type="text" value="90"/>	0/4/3	00:8E:F2:59:67:36	192.168.89.1	255.255.255.0

ADD DELETE CANCEL

3. Choose Routing > IP > Basic > IP Configuration and enable Routing Mode. Click APPLY.

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 'Routing' tab is active, and a sub-menu shows 'IP' selected. The left sidebar has a tree view with 'Basic' expanded to 'IP', which is further expanded to 'Configuration'. The main content area is titled 'IP Configuration' and contains a configuration window 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 configuration window, there are 'CANCEL' and 'APPLY' buttons.

- Configure ports for the storage server's 10G links. Choose **Switching > VLAN > Advanced > VLAN Membership**. For each port, select the corresponding VLAN ID from the drop-down menu and click the box under the port until you see U for untagged. 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 current page is VLAN Membership for VLAN ID 80. The configuration area shows the following details:

- VLAN ID: 80
- VLAN Name: VLAN0080
- VLAN Type: Static
- Group Operation: Untag All

Below these details is a table for port membership:

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

The 'U' under Port 22 indicates it is untagged. At the bottom right, there are CANCEL and APPLY buttons.

- Configure the VLAN PVID for each of the ports. Choose **Switching > VLAN > Advanced > Port PVID Configuration**. For each port, select it and enter the correct Configured PVID value. Click **APPLY**.

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24-Port 10G SFP+ Ports
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Port PVID Configuration

1 2 LAGS All

Interface	Configured PVID	Current PVID	Acceptable Frame Types	Configured Ingress Filtering	Current Ingress Filtering	Port Priority
<input checked="" type="checkbox"/> 1/0/22	80	80	Admit All	Disable	Disable	0
<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"/> 1/0/23	1	0	Admit All	Disable	Disable	0
<input type="checkbox"/> 1/0/24	1	0	Admit All	Disable	Disable	0
<input type="checkbox"/> 2/0/1	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 2/0/2	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 2/0/3	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 2/0/4	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/> 2/0/5	1	1	Admit All	Disable	Disable	0

CANCEL APPLY

- Configure the LAG interfaces for the 1G bonded uplink to the storage server (LAG 1) and the 10G uplinks to the M5300-52G3 stack (LAG 2). Choose **Switching > LAG > LAG Configuration**. Select the first LAG interface and enable Admin Mode. Set the Hash Mode to "6 Src/Dest IP and TCP/UDP Port fields." This setting is dictated by the hash type set on the storage server. Click **APPLY**. Do the same for the second LAG interface using the same Hash Mode.

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

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

LAG Configuration
LAG Membership

LAG Configuration

LAG Name	Description	LAG ID	Admin Mode	Hash Mode	STP Mode	Static Mode	Link Trap	Config Ports
<input type="checkbox"/> lag_nas		lag 1	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Disable	Disable	Disable	1/0/21,
<input type="checkbox"/> lag_uplink		lag 2	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Disable	Disable	Disable	1/0/19,
<input type="checkbox"/> ch3		lag 3	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch4		lag 4	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch5		lag 5	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch6		lag 6	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch7		lag 7	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch8		lag 8	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch9		lag 9	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch10		lag 10	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch11		lag 11	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch12		lag 12	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch13		lag 13	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch14		lag 14	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch15		lag 15	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch16		lag 16	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch17		lag 17	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch18		lag 18	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch19		lag 19	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch20		lag 20	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch21		lag 21	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch22		lag 22	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch23		lag 23	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch24		lag 24	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch25		lag 25	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch26		lag 26	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch27		lag 27	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch28		lag 28	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch29		lag 29	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/> ch30		lag 30	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	

CANCEL APPLY

- Configure the LAG interfaces in the same way as physical ports. Choose **Switching > VLAN > Advanced > VLAN Membership**. For LAG 1 (for 1G bonded ports), select VLAN 10 from the drop-down menu and set LAG 1 U for untagged under the LAG port list. Click **APPLY**. For LAG 2 (for uplink ports to the M5300-53G3 stack), select each VLAN that needs to be transported across stacks from the drop-down menu and set LAG 2 to T for tagged under the LAG port list. 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 current page is VLAN Membership for VLAN 80. The configuration fields are as follows:

VLAN ID	80	Group Operation	Untag All
VLAN Name	VLAN0080	UNTAGGED PORT MEMBERS	
VLAN Type	Static	TAGGED PORT MEMBERS	

Below the configuration fields is a table for port membership:

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

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

- Set the correct PVID for the 1G storage server ports. Choose **Switching > VLAN > Advanced > Port PVID Configuration**. Click the LAGS option above the column headings to list the LAG interfaces. Select LAG 1 and set the Configured PVID to 10. Click **APPLY**.

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XSM7224S
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Managed L2+ Stackable Switch

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Port PVID Configuration

PVID Configuration

1 2 LAGS All Go To Interface GO

	Interface	Configured PVID	Current PVID	Acceptable Frame Types	Configured Ingress Filtering	Current Ingress Filtering	Port Priority
<input checked="" type="checkbox"/>	1/0/22	80	80	Admit All	Disable	Disable	0
<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 checked="" type="checkbox"/>	1/0/22	80	80	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/23	1	0	Admit All	Disable	Disable	0
<input type="checkbox"/>	1/0/24	1	0	Admit All	Disable	Disable	0
<input type="checkbox"/>	2/0/1	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	2/0/2	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	2/0/3	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	2/0/4	1	1	Admit All	Disable	Disable	0
<input type="checkbox"/>	2/0/5	1	1	Admit All	Disable	Disable	0

CANCEL APPLY

9. Add ports to the LAG groups. Choose **Switching > LAG > LAG Membership**. Select LAG 1 from the drop-down list and select the box for the ports for the 1G links to the storage server. Click **APPLY**. Do the same for LAG 2 with our uplink ports to the M5300-52G3 stack.

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> LAG Configuration
v LAG Membership

LAG Membership

LAG ID: Lag 2 | LAG Name: lag_uplink

LAG Description:

Admin Mode: Enable | Link Trap: Disable

STP Mode: Disable | Static Mode: Disable

Hash Mode: Src/Dest MAC, VLAN, EType, incoming port

Port Selection Table

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
																			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				

Unit 2																								
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
																			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				

CANCEL APPLY

M5300-52G3

1. Declare VLANs as was done for the XSM7224S stack. Choose **Switching > VLAN > Advanced > VLAN Configuration**. For each VLAN, enter the correct VLAN ID and click **ADD**.

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ProSafe 24-port L3
Stackable GE Switch with L3 Routing

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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"/>				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"/>	80	VLAN0080	Static	Disable
<input type="checkbox"/>	90	VLAN0090	Static	Disable

ADD DELETE CANCEL APPLY

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

The screenshot displays the Netgear web management interface for an M5300-28G3 switch. The navigation menu 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 buttons for CANCEL and APPLY.

3. Choose **Routing > Routing Table > Basic > Route Configuration**. Configure the appropriate static routes for the environment between stacks and to the rest of the network. Click **ADD** after each complete entry.

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

Basic
Route Configuration
Advanced

Route Configuration

Configure Routes

Route Type	Network Address	Subnet Mask	Next Hop IP Address	Preference	Description
<input type="checkbox"/> Default	0.0.0.0	0.0.0.0	10.10.10.1	1	

Learned Routes

Network Address	Subnet Mask	Protocol	Route Type	Next Hop Interface	Next Hop IP Address	Preference	Metric
0.0.0.0	0.0.0.0	Default	Static	vlan 5	10.10.10.1	1	0
10.10.10.0	255.255.255.0	Local	Connected	vlan 5	10.10.10.5	0	1

CLEAR REFRESH ADD DELETE CANCEL APPLY

- Configure the LAG interface for the uplinks to the CSM7224S stack. Choose **Switching > LAG > LAG Configuration**. Select LAG 2, enable Admin Mode, and set the Hash Mode to "6 Src/Dest IP and TCP/UDP Port fields" Click **APPLY**. The Hash Mode must be the same on both sides of the uplinks.

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LAG Configuration
LAG Membership

LAG Configuration

LAG Configuration

	LAG Name	Description	LAG ID	Admin Mode	Hash Mode	STP Mode	Static Mode	Link Trap	Config Ports
<input type="checkbox"/>	ch1		lag 1	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	lag_uplink		lag 2	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Disable	Disable	Disable	1/0/23
<input type="checkbox"/>	ch3		lag 3	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch4		lag 4	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch5		lag 5	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch6		lag 6	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch7		lag 7	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch8		lag 8	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch9		lag 9	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch10		lag 10	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch11		lag 11	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch12		lag 12	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch13		lag 13	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch14		lag 14	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch15		lag 15	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch16		lag 16	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch17		lag 17	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch18		lag 18	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch19		lag 19	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch20		lag 20	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch21		lag 21	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch22		lag 22	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch23		lag 23	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch24		lag 24	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch25		lag 25	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch26		lag 26	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch27		lag 27	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch28		lag 28	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch29		lag 29	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
<input type="checkbox"/>	ch30		lag 30	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	

CANCEL APPLY

5. Configure LAG interfaces as for a physical port. Choose **Switching > VLAN > Advanced > VLAN Membership**. For LAG 2 (for the uplink ports to the XSM7224S stack), select each VLAN that needs to be transported across stacks from the drop-down menu, and set LAG 2 to T for tagged under the LAG port list. Click **APPLY** after each.

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Port DVLAN
Configuration
Voice VLAN
Configuration
GARP Switch
Configuration
GARP Port
Configuration

VLAN Membership

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
	25 26 27 28
	T
	LAG

CANCEL APPLY

- Add ports to the LAGs. Choose **Switching > LAG > LAG Membership**. Select LAG 2 from the drop-down list and check the box for the ports for the uplinks to the XSM7224S stack. Click **APPLY**.

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LAG Configuration
LAG Membership

LAG Configuration

LAG Name	Description	LAG ID	Admin Mode	Hash Mode	STP Mode	Static Mode	Link Trap	Config Ports
lag_nas		lag 1	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Disable	Disable	Disable	1/0/21,
lag_uplink		lag 2	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Disable	Disable	Disable	1/0/19,
ch3		lag 3	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch4		lag 4	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch5		lag 5	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch6		lag 6	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch7		lag 7	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch8		lag 8	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch9		lag 9	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch10		lag 10	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch11		lag 11	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch12		lag 12	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch13		lag 13	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch14		lag 14	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch15		lag 15	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch16		lag 16	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch17		lag 17	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch18		lag 18	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch19		lag 19	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch20		lag 20	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch21		lag 21	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch22		lag 22	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch23		lag 23	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch24		lag 24	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch25		lag 25	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch26		lag 26	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch27		lag 27	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch28		lag 28	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch29		lag 29	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	
ch30		lag 30	Enable	3 Src/Dest MAC, VLAN, EType, incoming port	Enable	Disable	Disable	

CANCEL APPLY