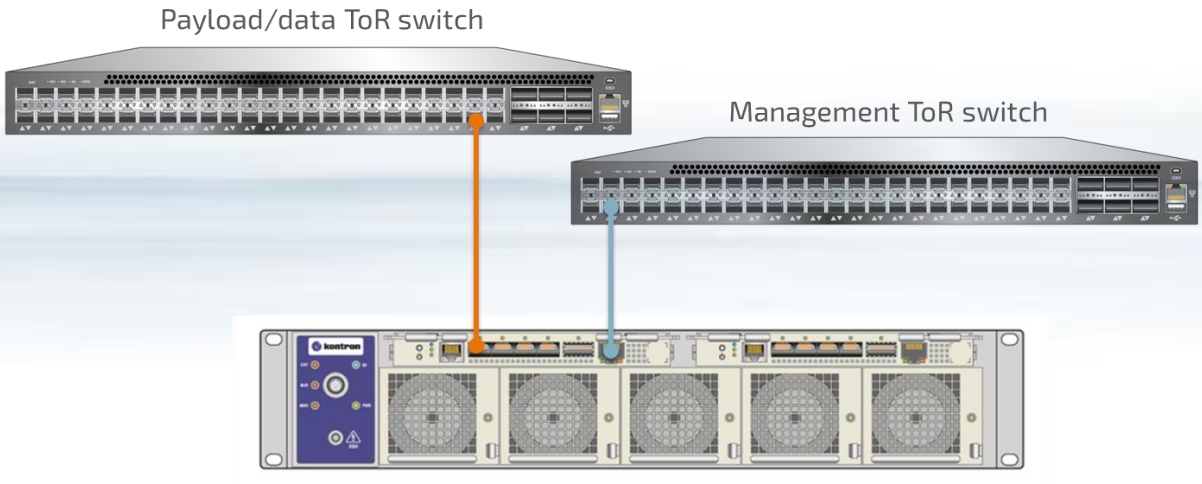
APPLICATION NOTE



MS2910 – Getting Started | Physically Isolated Management and Payload Networks

AN17003 - Doc. Rev. 1.0

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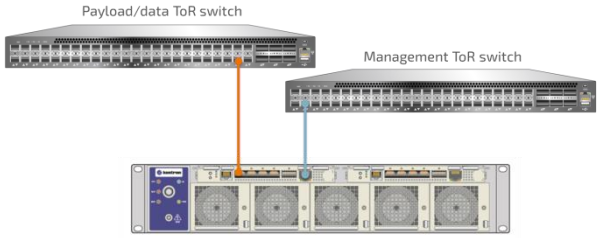
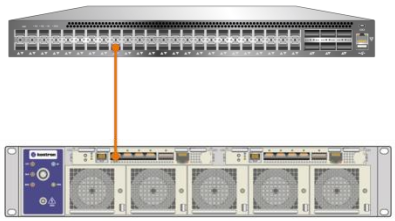
1/ Introduction

This use case describes the network integration steps to get started with the MS2910 platform where the traffic (management and payload data) passes over **two network links from two different switches that are physically isolated**.



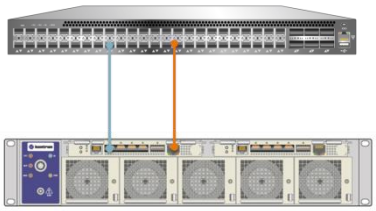
Kontron created other use cases. You may refer to them if you want to:

- Create a common network for management and payload traffic



That use case describes the network integration steps to get started with the MS2910 platform where all traffic (management and payload data) passes over the same network link.

- Create VLAN-segregated management and payload networks



That use case describes the network integration steps to get started with the MS2910 platform where the traffic (management and payload data) passes over two different network links that are segregated either by VLAN from a single switch or from two different switches that are physically interconnected.

Note that each MS2910 platform—like most rack-mounted deployments—contains redundant switches.

It is recommended that you identify the appropriate upstream topology with the help of the IT/network personnel managing the upstream network hardware and configuration. This will facilitate the process down the road.

Each section in this application note contains an introduction with general information, followed by steps to perform platform configuration. The sections covered are as shown in black on the flow diagram below.

1.1. Platform Architecture

The architecture and components of an MS2910 platform are similar to those of a rack in a data center. The platform contains the equivalent of 2 top-of-rack (ToR) switches and up to 18 servers internally interconnected within the platform, all in a 2U chassis.

Figure 1: Platform architecture

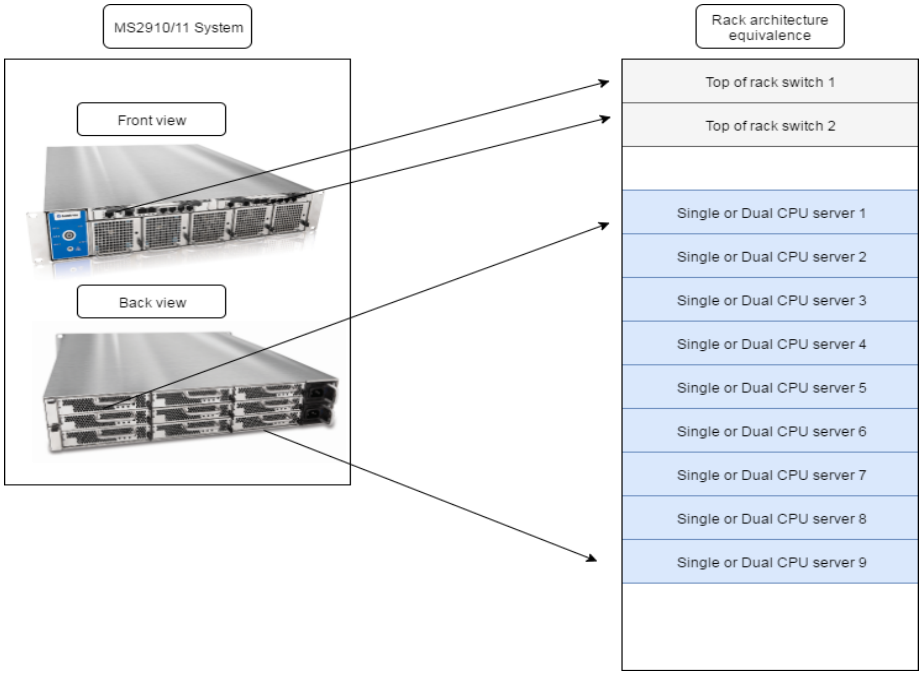


Figure 2: Faceplate connectors and LEDs

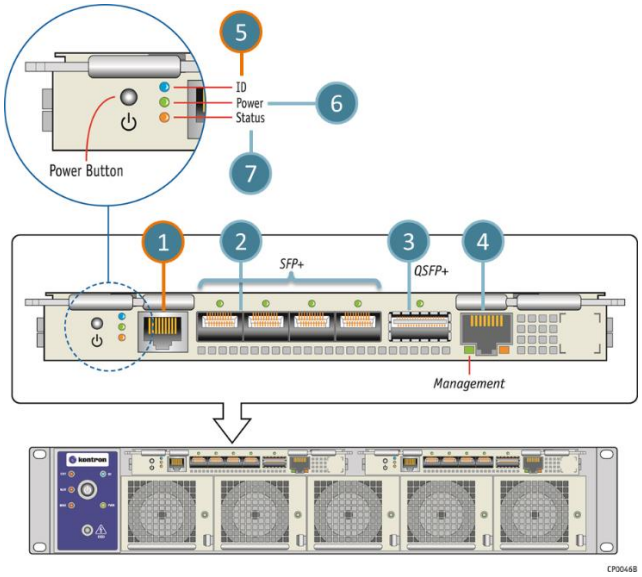
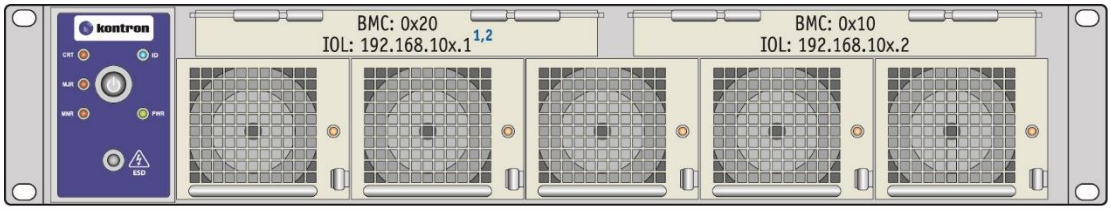


Table 1: Faceplate connectors and LEDs

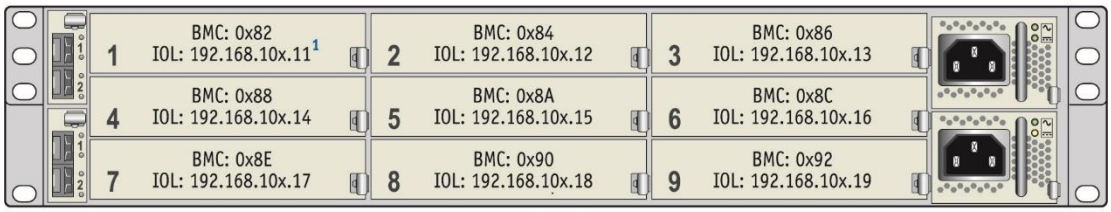
Label	Description	Faceplate marking
1	Console RJ-45 port	1010
2	4x 10GbE SFP+ uplink ports	1, 2, 3, 4
3	40GbE QSFP+ uplink port	5
4	Management 1GbE RJ-45 port	MNGT
5	ID LED (Blue): ▶ Management power is present = On ▶ Active hub = Blinking ▶ Payload power removed = Off	None
6	Power LED (Green): ▶ Payload power is on = On ▶ Hub hosts the active ShMC = On ▶ Hub hosts the standby ShMC = Blinking ▶ Payload power removed = Off	None
7	Status LED (Amber): ▶ Hub "not healthy", needs attention = On ▶ Hub transitioning when power button pressed (clean shutdown request) = Blinking ▶ Hub operating under normal conditions = Off	None

The switch with shelf management controller (ShMC) is referred to as hub in this document.

Figure 3: Factory default IP addresses



Front View



Back View

[1] 'x' in IOL addresses can be replaced by the chassis ID (1-6). Default is '1'.
[2] Master Switch IP: 192.168.10x.10

CP0011

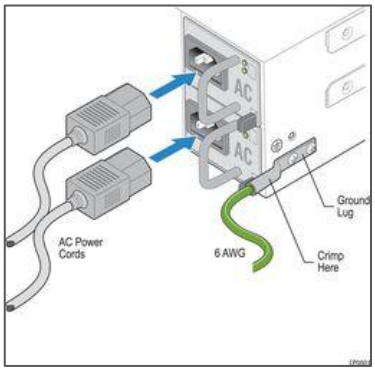
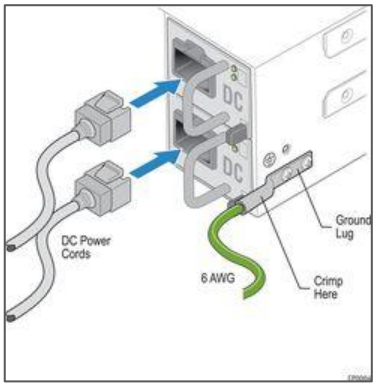
2/ Initial Platform Connections

2.1. Introduction

By completing the steps described in this section, you will have access to:

- The platform serial console used to access and configure management and payload components.

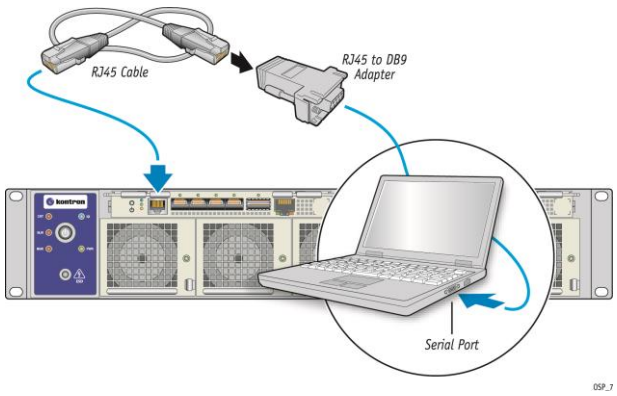
2.2. Power Supply Connection

Connect appropriately rated cables from an external power source to each power supply on the rear of the unit. The unit will power on as soon as external power is applied.	AC Power Supply  DC Power Supply 

2.3. Serial Console Connection and Configuration

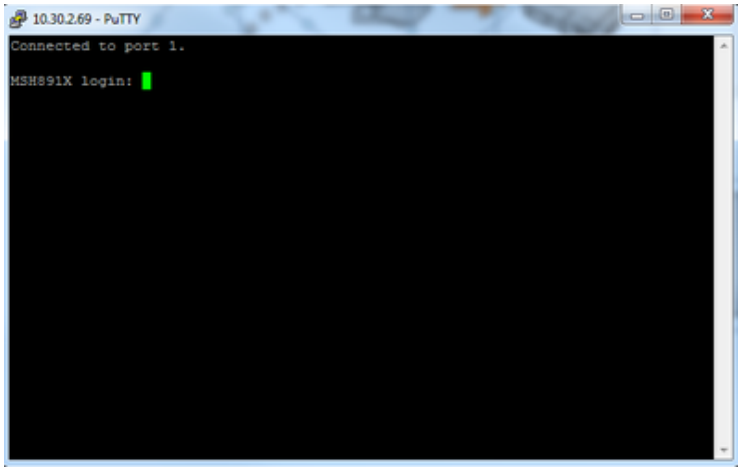
Use the RJ45 to DB9 adapter provided with the platform to connect a (non-crossover) Ethernet cable to establish a serial connection between the technician's PC and the RJ45 console port of the **hub with the active ShMC** (faceplate marking "10101"; see label 1 in Figure 2) of the MS2910.

The **hub with the active ShMC** is the one with the solid green Power LED (see label 6 in Figure 2). The hub with the standby ShMC has the blinking green Power LED.



Configure a serial console tool (e.g.: PuTTY) with the correct COM-port for your system using the following parameters:

Parameters	Value
Speed (Baud)	115200
Data bits	8
Stop bits	1
Parity	none
Flow Control	none



You have now completed section Initial Platform Connections.

You should now have access to:

- The platform serial console used to access and configure management and payload components.

You can now proceed to section Switch Configuration.

3/ Switch Configuration

3.1. Introduction

By completing the steps described in this section, you will configure your switch in order to be ready to connect the MS2910 platform to your network infrastructure. Once the network cable is connected to the platform, you will have the ability to access the switch management interface.

NOTICE

Kontron strongly recommends working with facility IT/network personnel because this platform contains redundant switches.

As with any switching appliance, undesired behaviours may occur within the network as a result of incomplete or inadequate configurations.

Prior to performing the steps described in Section 3/, speak with the IT/network personnel responsible for the hardware and configuration of the network into which the MS2910 platform will be deployed and share the following details:

1. This platform contains redundant switches
2. Spanning Tree Protocol (STP) is enabled (by default on management ports)
3. Per VLAN Spanning Tree (PVST) and Multiple Spanning Tree Protocol (MSTP) compatibility are available
4. Management and payload networks are segregated by VLAN

NOTICE

It is important to complete the switch configuration before plugging in the network cables. The physical connection of the network is described starting at Section 3.2.8. Follow the steps in the order in which they are presented for proper network configuration.

Here is an example of a configuration that might be required on your network switch prior to connecting the MS2910 platform. The example is for a Cisco C3560X-24T-S switch. The dot1q encapsulation command is essential for PVST or MSTP interoperability support, two important protocols that will be required when you scale up your network infrastructure to a complete multi-link redundant architecture.

Management ToR switch configuration

Command	Purpose
switch#	
switch#**configure terminal**	From privileged EXEC mode, enter global configuration mode.
switch(config)#**spanning-tree mode pvst**	Configure spanning-tree mode to PVST.
switch(config)#**spanning-tree extend system-id**	Enable extend system-id.
Switch(config)#**vtp mode transparent**	Enable VTP mode transparent.
switch(config)#**vlan 4093**	Add VLAN 4093 to database
Switch(config-vlan)#**exit**	Exit VLAN database
switch(config)#**interface vlan 4093**	Enter interface VLAN configuration mode.
switch(config-if)# **ip address 192.168.101.254 255.255.255.0**	Define VLAN 4093 IP address and subnet.
switch(config-if)#**exit**	Exit interface configuration mode.
Switch(config)#**spanning-tree vlan 4093 priority 24576**	Increase VLAN 4093 STP priority.
switch(config)# **interface gigabitEthernet 0/1**	Enter interface 0/1 configuration mode.
switch(config-if)#**switchport trunk encapsulation dot1q**	Configure dot1q encapsulation (IEEE 802.1Q is a standard protocol for interconnecting multiple switches and routers and for defining VLAN topologies).
switch(config-if)#**switchport mode trunk**	Configure interface mode to trunking layer 2 VLAN port.
switch(config-if)#**switchport trunk native vlan 4093**	Define the native VLAN for a trunk interface.
switch(config-if)#**switchport trunk allowed vlan 4093**	Add VLAN 4093 to the allowed VLAN list.
switch(config-if)#**speed 1000**	Configure the speed of a given Ethernet interface to 1Gbps.
switch(config-if)#**duplex full**	Force full-duplex operation.
switch(config-if)#**end**	Return to privileged EXEC mode.
switch#	

Data network ToR switch configuration

Command	Purpose
switch#	
switch#**configure terminal**	From privileged EXEC mode, enter global configuration mode.
switch(config)#**spanning-tree mode pvst**	Configure spanning-tree mode to PVST.
switch(config)#**spanning-tree extend system-id**	Enable extend system-id.
Switch(config)#**vtp mode transparent**	Enable VTP mode transparent.
switch(config)#**interface vlan 1**	Enter interface VLAN configuration mode.
switch(config-if)# **ip address 192.168.10.254 255.255.255.0**	Define VLAN 1 IP address and subnet.
switch(config-if)#**exit**	Exit interface configuration mode.
Switch(config)#**spanning-tree vlan 1 priority 24576**	Increase VLAN 1 STP priority.
switch(config)# **interface gigabitEthernet 0/1**	Enter interface 0/1 configuration mode.
switch(config-if)#**switchport trunk encapsulation dot1q**	Configure dot1q encapsulation (IEEE 802.1Q is a standard protocol for interconnecting multiple switches and routers and for defining VLAN topologies).
switch(config-if)#**switchport mode trunk**	Configure interface mode to trunking layer 2 VLAN port.
switch(config-if)#**switchport trunk native vlan 1**	Define the native VLAN for a trunk interface.
switch(config-if)#**switchport trunk allowed vlan 1**	Add VLAN 1 to the allowed VLAN list.
switch(config-if)#**speed 1000**	Configure the speed of a given Ethernet interface to 1Gbps.
switch(config-if)#**duplex full**	Force full-duplex operation.
switch(config-if)#**end**	Return to privileged EXEC mode.
switch#	

The components used in the sample setup described in this application note are:

- Cisco C3560X-24T-S
- Kontron MS2910 platform (including MSH8910/11 hubs and modular server processing nodes running default configurations)

NOTICE

The instructions included below are provided as a reference for demonstration purposes only. Instructions may need to be adapted based on the network configuration and/or the hardware used.

3.2. Step-by-Step MSH8910/11 Switch Configuration

NOTICE

Once you have fully understood the steps described in Section 3/, you could paste multiple configuration commands all at once into the CLI to perform them all in one step. If you wish to proceed this way, refer to the instructions provided in Section 3.3 and adapt the command list example provided based on your network requirements.

3.2.1. Log In the Switch CLI

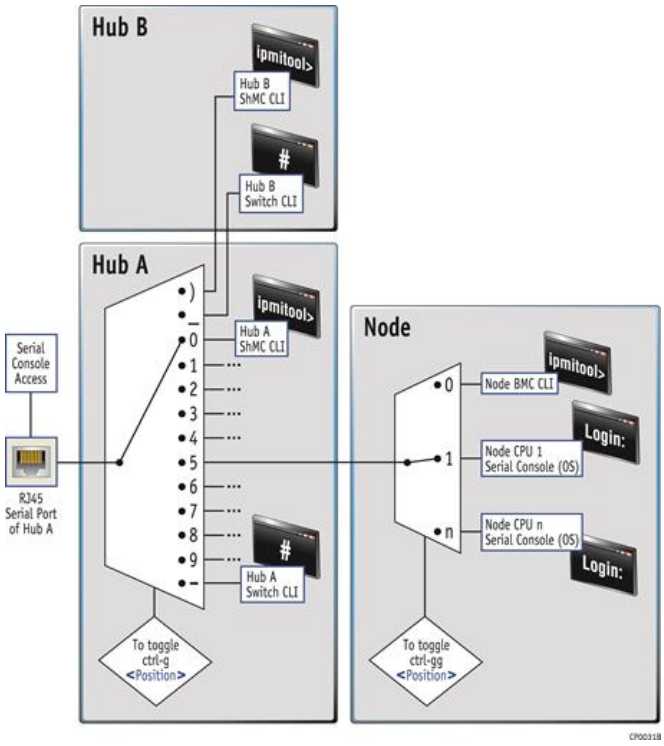
Log in using the default credentials—user: admin and password: admin.

Command	Purpose
MSH891X Login: **Ctrl+g -** User: **admin** Password: **admin** (MSH8910 Ethernet P1:H1) > **enable**	Use HOTKEY to redirect serial console multiplexer to the switch CLI. Enable privileged EXEC mode.

The "Ctrl+g -" command is performed by pressing the Ctrl and g keys simultaneously, then pressing on the Minus key, followed by the Enter key.

The serial interface of the hubs includes a multiplexing functionality that can establish a link with each component of the platform through a series of hotkeys (Figure 4).

Figure 4: Interface paths with a serial console connection



The ASCII control code for "Ctrl-g" is 7. To type "Ctrl-gg", use the "Ctrl-g" ASCII control code twice in a row.

3.2.2. Configure Spanning-Tree

Enable per VLAN spanning-tree (PVST).

Command	Purpose
(MSH8910 Ethernet P1:H1) # (MSH8910 Ethernet P1:H1) #**configure** (MSH8910 Ethernet P1:H1) (Config)# (MSH8910 Ethernet P1:H1) (Config)#**spanning-tree mode pvst** (MSH8910 Ethernet P1:H1) (Config)#**spanning-tree port mode all** (MSH8910 Ethernet P1:H1) (Config)#**end** (MSH8910 Ethernet P1:H1) #	From privileged EXEC mode, enter global configuration mode. Configure spanning-tree mode to PVST. Enable spanning-tree on all ports. End the current configuration session and return to privileged EXEC mode.

3.2.3. Configure Switch Management IP Source (DHCP or Static)

Configure the switch management IP source. Choose Option 1 for a static IP and Option 2 for a DHCP IP.

Option1 – Static IP

Command	Purpose
(MSH8910 Ethernet P1:H1)#network protocol none Changing protocol mode will reset ip configuration. Are you sure you want to continue? (y/n) **y** (MSH8910 Ethernet P1:H1) #**network parms 192.168.101.10 255.255.255.0**	Configure Management interface to disable DHCP/Auto-IP. Confirm you want to proceed with static IP configuration. Configure Management interface with static IP and subnet.

Option 2 – DHCP IP

Command	Purpose
(MSH8910 Ethernet P1:H1) #**network protocol dhcp** Changing protocol mode will reset ip configuration. Are you sure you want to continue? (y/n) **y**	Configure Management interface to use DHCP. Confirm you want to proceed with DHCP IP configuration.

3.2.4. Configure Management Ports

Configure the management ports to use trunk mode and VLAN 4093 (platform default management VLAN).

Command	Purpose
(MSH8910 Ethernet P1:H1) #**configure** (MSH8910 Ethernet P1:H1) (Config)# **interface 1/0/31,2/0/31** (MSH8910 Ethernet P1:H1) Interface 1/0/31,2/0/31)#**switchport mode trunk** (MSH8910 Ethernet P1:H1) (Interface 1/0/31,2/0/31)#**switchport trunk native vlan 4093** (MSH8910 Ethernet P1:H1) (Interface 1/0/31,2/0/31)#**switchport trunk allowed vlan 4093** (MSH8910 Ethernet P1:H1) (Interface 1/0/31,2/0/31)#**no vlan pvid** (MSH8910 Ethernet P1:H1) (Interface 1/0/31,2/0/31)#**end** (MSH8910 Ethernet P1:H1) #	From privileged EXEC mode, enter global configuration mode. Specify the interface to be configured. 1/0/31 and 2/0/31 are the front management interfaces. Configure interface mode to trunking layer 2 VLAN port. Define the native VLAN for a trunk interface. Add VLAN 4093 to the allowed VLAN list. Disable PVID. End the current configuration session and return to privileged EXEC mode.

3.2.5. Force Payload/Data Network Uplink Speed to 1Gbps (Optional)

By default, ports have a speed of 10Gbps. To connect the platform to a switch with a speed of 1Gbps and use Copper SFP transceivers, force uplink port to a speed of 1Gbps, full duplex.

Command	Purpose
(MSH8910 Ethernet P1:H1) #**configure** (MSH8910 Ethernet P1:H1) (Config)#**interface 1/0/1** (MSH8910 Ethernet P1:H1) (Interface 1/0/1)#**no sfp auto-configure** (MSH8910 Ethernet P1:H1) (Interface 1/0/1)#**speed 1000 full-duplex** (MSH8910 Ethernet P1:H1) (Interface 1/0/1)#**end** (MSH8910 Ethernet P1:H1) #	From privileged EXEC mode, enter global configuration mode. Specify the interface to be configured. Interface 1/0/1 is used as our data uplink. Disable the auto-configure feature. Configure port speed to 1Gbps full-duplex. End the current configuration session and return to privileged EXEC mode.

3.2.6. Configure Payload/Data Network Uplink

Configure the payload/data uplink to use trunk mode and VLAN 1 (platform default payload/data VLAN).

Command	Purpose
(MSH8910 Ethernet P1:H1) #**configure** (MSH8910 Ethernet P1:H1) (Config)#**interface 1/0/1** (MSH8910 Ethernet P1:H1) (Interface 1/0/1)#**switchport mode trunk** (MSH8910 Ethernet P1:H1) (Interface 1/0/1)#**switchport trunk native vlan 1** (MSH8910 Ethernet P1:H1) (Interface 1/0/1)#**switchport trunk allowed vlan 1** (MSH8910 Ethernet P1:H1) (Interface 1/0/1)#**end** (MSH8910 Ethernet P1:H1) #	From privileged EXEC mode, enter global configuration mode. Specify the interface to be configured. Interface 1/0/1 is used as our data uplink. Configure interface mode to trunking layer 2 VLAN port. Define the native VLAN for a trunk interface. Add VLAN 1 to the allowed VLAN list. End the current configuration session and return to privileged EXEC mode.

3.2.7. Save Running-Config to Startup-Config

NOTICE

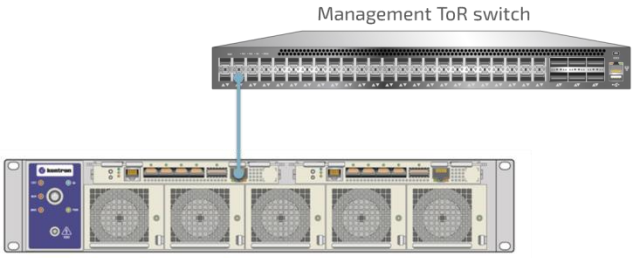
If this step is skipped or forgotten, the configuration will be lost at the next switch reboot and/or power cycle! Make sure you perform this step each time you change the configuration.

Command	Purpose
(MSH8910 Ethernet P1:H1) #**write memory** This operation may take a few minutes. Management interfaces will not be available during this time. Are you sure you want to save? (y/n) **y** Config file 'startup-config' created successfully. Configuration Saved!	Save the running-config to startup-config. Confirm you want to proceed with saving the running-config to the startup-config.

3.2.8. Connect the MS2910 Platform to the Network (Management Uplink)

NOTICE

The ShMC and BMC are preconfigured with addresses within the 192.168.101.xxx range. If your network uses that specific range, plugging in the system could cause some IP address conflicts with undesired side effects. If this is the case, complete the steps in Section 4/ Management Configuration before plugging in the cables as described in Sections 3.2.8 and 3.2.11 and performing the verification steps (Sections 3.2.9, 3.2.10, 3.2.12 and 3.2.13) of Section 3/ Switch Configuration.

Connect your management network to the Management 1GbE RJ-45 port (see label 4 on Figure 2).	

3.2.9. Verify Management IP Details and VLANs

Verify various management IP details such as those for DHCP addresses and VLANs. Note that it may take several seconds to obtain an IP from your DHCP server. The example below is for a static IP configuration.

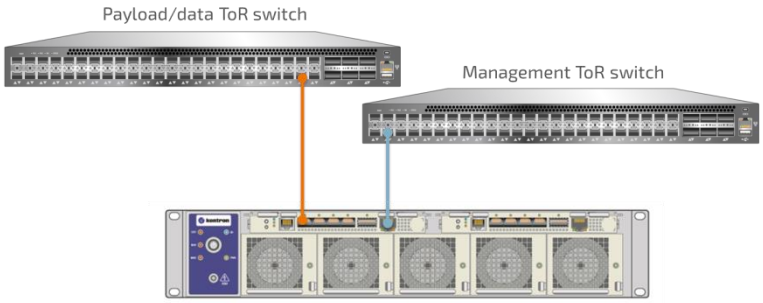
Command	Purpose
(MSH8910 Ethernet P1:H1) #**show network** Interface Status.............................. Up IP Address.....................................192.168.101.10 Subnet Mask.................................. 255.255.255.0 Default Gateway.............................. 0.0.0.0 IPv6 Administrative Mode....................... Enabled IPv6 Prefix is .... fe80::2a0:a5ff:fe75:d5d6/64 Burned In MAC Address.................. 00:A0:A5:75:D5:D6 Locally Administered MAC address....... 00:00:00:00:00:00 MAC Address Type.............................. Burned In Configured IPv4 Protocol...................... None Configured IPv6 Protocol...................... None IPv6 AutoConfig Mode.....................................Disabled Management VLAN ID............................ 4093	Display configuration settings associated with the switch's network interface.

3.2.10. Confirm Proper Networking Configuration (Management Network)

Confirm the validity of the networking configuration by testing network connectivity to an external network via the management IP of the ToR switch.

Command	Purpose
(MSH8910 Ethernet P1:H1) #**ping 192.168.101.254** Pinging 192.168.101.254 with 0 bytes of data: Reply From 192.168.101.254: icmp_seq = 0. time= 4 msec. Reply From 192.168.101.254: icmp_seq = 1. time= 1 msec. Reply From 192.168.101.254: icmp_seq = 2. time= 1 msec. ----192.168.101.254 PING statistics---- 3 packets transmitted, 3 packets received, 0% packet loss round-trip (msec) min/avg/max = 1/2/4	Ping external network using the management IP of the ToR switch.

3.2.11. Connect the MS2910 Platform to the Network (Payload/Data Network)

Connect your payload/data network to SFP+ port 1 (see label 2 on Figure 2).	

3.2.12. Confirm Proper Networking Configuration (Spanning-Tree)

Confirm that the spanning-tree configuration works properly by looking at the forwarding states of the interfaces. Data/payload uplink 1/0/1 should be on forwarding state on VLAN 1 and Management uplink 1/0/31 should be on forwarding state on VLAN 4093. You should also look at the forwarding states of the interfaces on the ToR switches (use "show spanning-tree" command for a Cisco switch).

Command	Purpose
(MSH8910 Ethernet P1:H1) #**show spanning-tree vlan 1** VLAN 1 Spanning-tree enabled protocol pvst RootID Priority 24577 Address F0:7F:06:FA:D5:00 Cost 20000 Port 1(1/0/1) Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec BridgeID Priority 32769 (priority 32768 sys-id-ext 1) Address 00:A0:A5:75:D5:D6 Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec Aging Time 300 sec Interface Role Sts Cost Prio.Nbr --- --- --- --- --- 1/0/1 Root Forwarding 20000 128.1	Display spanning-tree interface forwarding states for VLAN 1.
(MSH8910 Ethernet P1:H1) #**show spanning-tree vlan 4093** VLAN 4093 Spanning-tree enabled protocol pvst RootID Priority 28669 Address F0:7F:06:FA:D5:00 Cost 20000 Port 31(1/0/31) Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec BridgeID Priority 36861 (priority 32768 sys-id-ext 4093) Address 00:A0:A5:75:D5:D6 Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec ng Time 300 sec Interface Role Sts Cost Prio.Nbr --- --- --- --- --- 1/0/31 Root Forwarding 20000 128.31	Display spanning-tree interface forwarding states for VLAN 4093.

3.2.13. Confirm Proper Networking Configuration (Management and Payload/Data Network)

Confirm the validity of the networking configuration by testing network connectivity to an external payload/data network via the payload/data IP of the ToR switch. To do so, we will temporarily enable VLAN routing on VLAN 1 and define an IP for VLAN 1 to confirm the switch has access to the external payload/data network.

Command	Purpose
(MSH8910 Ethernet P1:H1) # (MSH8910 Ethernet P1:H1) #**vlan database**	From privileged EXEC mode, enter VLAN database.
(MSH8910 Ethernet P1:H1) (Vlan)#**vlan routing 1**	Enable VLAN routing for VLAN 1.
(MSH8910 Ethernet P1:H1) (Vlan)#**end** (MSH8910 Ethernet P1:H1) #**configure**	Exit VLAN database. From privileged EXEC mode, enter global configuration mode.
(MSH8910 Ethernet P1:H1) (Config)#**interface vlan 1**	Specify the interface to be configured (VLAN 1).
(MSH8910 Ethernet P1:H1) (Interface vlan 1)#**ip address 192.168.10.10 255.255.255.0**	Define an IP address and netmask for VLAN 1.
(MSH8910 Ethernet P1:H1) (Interface vlan 1)#**end** (MSH8910 Ethernet P1:H1) #	Exit interface VLAN configuration mode.
(MSH8910 Ethernet P1:H1) #**ping 192.168.101.254** Pinging 192.168.101.254 with 0 bytes of data: Reply From 192.168.101.254: icmp_seq = 0. time= 4 msec. Reply From 192.168.101.254: icmp_seq = 1. time= 1 msec. Reply From 192.168.101.254: icmp_seq = 2. time= 1 msec. ----192.168.101.254 PING statistics---- 3 packets transmitted, 3 packets received, 0% packet loss round-trip (msec) min/avg/max = 1/2/4	Ping external network using the management IP of the ToR switch.
(MSH8910 Ethernet P1:H1) #**ping 192.168.10.254** Pinging 192.168.10.254 with 0 bytes of data: Reply From 192.168.10.254: icmp_seq = 0. time= 4 msec. Reply From 192.168.10.254: icmp_seq = 1. time= 1 msec. Reply From 192.168.10.254: icmp_seq = 2. time= 1 msec. ----192.168.10.254 PING statistics---- 3 packets transmitted, 3 packets received, 0% packet loss round-trip (msec) min/avg/max = 1/2/4	Ping external payload/data network via the management IP of the ToR switch.
(MSH8910 Ethernet P1:H1) # (MSH8910 Ethernet P1:H1) #**vlan database**	Remove VLAN routing configuration on VLAN 1 (optional).
(MSH8910 Ethernet P1:H1) (Vlan)#**no vlan routing 1** (MSH8910 Ethernet P1:H1) (Vlan)#**end** (MSH8910 Ethernet P1:H1) #	

3.3. Paste Multiple Commands for MSH8910/11 Switch Configuration

NOTICE

Do not perform this step if you have done all the configurations required in Section 3.2. Section 3.3 describes an option to perform all the steps described in Section 3.2 by pasting multiple commands at once.

3.3.1. Log In the Switch CLI

Log in using the default credentials—user: admin and password: admin.

Command	Purpose
MSH891X Login: **Ctrl+g -** User: **admin** Password: **admin** (MSH8910 Ethernet P1:H1) > **enable**	Use HOTKEY to redirect serial console multiplexer to the switch CLI. Enable privileged EXEC mode.

The "Ctrl+g –" command is performed by pressing the Ctrl and g keys simultaneously, then pressing on the Minus key, followed by the Enter key.

3.3.2. Paste the Configuration Commands

When multiple platforms must be configured, several commands can be pasted in the console as a block to save time. The commands shown below form a typical command list for a static IP and VLAN 1. Adapt this list based on your network requirements.

Command	Purpose
(MSH8910 Ethernet P1:H1) # **configure**	From privileged EXEC mode, enter global configuration mode.
spanning-tree mode pvst	Configure spanning-tree mode to PVST.
spanning-tree port mode all	Enable spanning-tree on all ports.
end	End the current configuration session and return to privileged EXEC mode.
network protocol none	Configure Management interface to disable DHCP/Auto-IP.
y	
network parms 192.168.101.10 255.255.255.0	Configure Management interface with static IP and subnet.
configure	From privileged EXEC mode, enter global configuration mode.
interface 1/0/31,2/0/31	Specify the interfaces to be configured. 1/0/31 and 2/0/31 are the management uplink interfaces.
switchport mode trunk	Configure interface mode to trunking layer 2 VLAN port.
switchport trunk native vlan 4093	Define the native VLAN for a trunk interface.
switchport trunk allowed vlan 4093	Define the allowed VLAN for a trunk interface.
no vlan pvid	Disable PVID.
exit	Exit interface configuration mode.
interface 1/0/1	Specify the interface to be configured. Interface 1/0/1 is used as our data uplink.
no sfp auto-configure	Disable the auto-configure feature.
speed 1000 full-duplex	Configure port speed to 1Gbps full-duplex.
switchport mode trunk	Configure interface mode to trunking layer 2 VLAN port.
switchport trunk native vlan 1	Define the native VLAN for a trunk interface.
switchport trunk allowed vlan 1	Define the allowed VLAN for a trunk interface.
end	End the current configuration session and return to privileged EXEC mode.
write memory	Save the running-config to startup-config.
y	Confirm you want to proceed with saving the running-config to the startup-config.

3.3.3. Confirm Configurations

Once this is done, manually confirm that each configuration was applied properly.

Command	Purpose
(MSH8910 Ethernet P1:H1)#**show running-config**	Display or capture the current setting of different protocol packages configured on the switch.
(MSH8910 Ethernet P1:H1)#**show network**	Display configuration settings associated with the switch's network interface.

You have now completed section Switch Configuration.

You should now have configured your switch and should have access to the switch management web interface of the MS2910 platform switches using the IP provided in Section 3.2.9.

You can now proceed to section Management Configuration.

4/ Management Configuration

4.1. Introduction

By completing the steps described in this section, you will set up the management IP addresses, i.e. the addresses required to access the platform management features.

After completing this stage, you will be able to access the following interfaces:

1. System Monitor RESTFUL API interface
2. System Monitor web interface
3. ShMCs and BMCs IPMI Over LAN interface (IOL)

These interfaces (or any combination thereof) can be used to manage the MS2910 platform, perform firmware upgrades, monitor system health and configure the platform more in depth.

4.1.1. Management Architecture Overview

Each individual modular server processing node (MSP node) has a network connection to each switch. Both switches are stacked together (acting as a single switch) for redundancy purposes.

Figure 5: MS2910 management interconnections

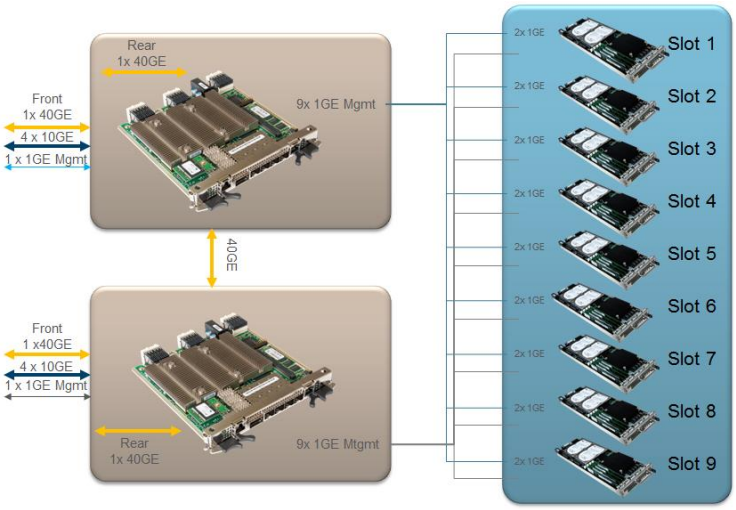
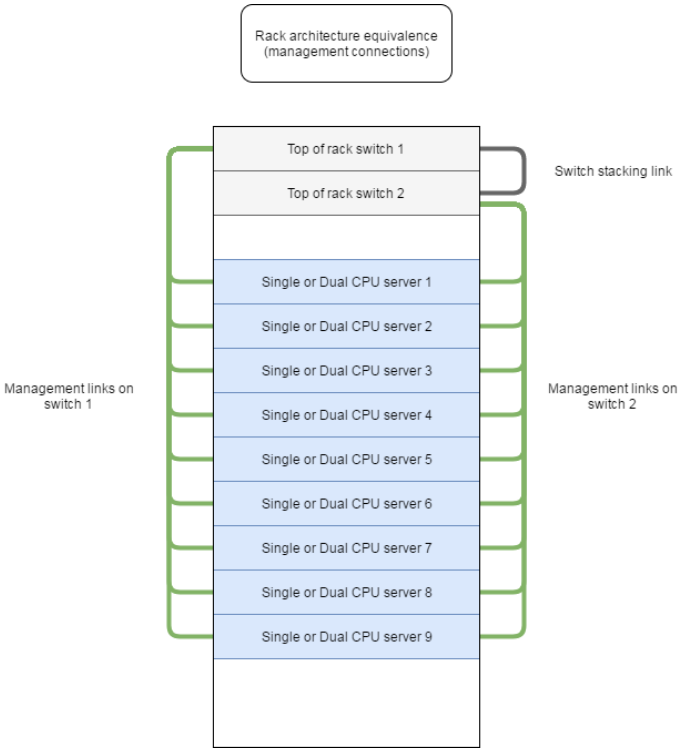


Figure 6: Rack architecture equivalence



4.2. Configure the IP Address of the Active ShMC

NOTICE

Once you have fully understood the steps described in Sections 4.2, 4.3 and 4.4, you could paste multiple configuration commands all at once into the CLI to perform them all in one step. If you wish to proceed this way, refer to the instructions provided in Section 4.5 and adapt the command list examples provided based on your network requirements.

4.2.1. Set Up the Access to the Active ShMC

Access the active ShMC CLI via the muxed serial connection.

Command	Purpose

`(MSH8910 Ethernet P1:H1)# **Ctrl+g 0**`
`MSH891X Login: **admin**`
`Password: **admin**`
`ipmitool>`
	`Use HOTKEY to redirect serial console multiplexer to the ShMC CLI.`

The "Ctrl+g 0" command is performed by pressing the Ctrl and g keys simultaneously, then pressing on the 0 key, followed by the Enter key.

4.2.2. Configure and Set the IP Address (Static or DHCP)

Configure and set the IP address, the netmask and the gateway (optional for a static IP). Choose Option 1 for a static IP or Option 2 for a DHCP IP.

Option 1 – Static IP

Command	Purpose
ipmitool> **lan set 1 ipsrc static** ipmitool> **lan set 1 ip addr 192.168.101.1** ipmitool> **lan set 1 netmask 255.255.255.0** ipmitool> **lan set 1 defgw ipaddr 192.168.101.254**	Configure IP source to static. Define static IP address. Define netmask. Define default gateway IP address.

Option 2 – DHCP IP

Command	Purpose
ipmitool> **lan set 1 ipsrc dhcp**	Configure IP source to DHCP.

4.2.3. Verify Active ShMC Network Configuration

Check the following configurations: IP address source (Static or DHCP), IP address, subnet mask, default gateway IP and 802.1q VLAN ID. It may take several seconds to gather an IP from the DHCP server. The results shown in the table below are for a static IP.

Command	Purpose
ipmitool> **lan print** Access Mode : Enable IP Address Source : Static IP Address : 192.168.101.1 Subnet Mask : 255.255.255.0 MAC Address : 00:a0:a5:96:e9:ea IP Header : TTL=0x40 Flags=0x40 Precedence=0x00 TOS=0x10 Default Gateway IP : 192.168.101.254 Default Gateway MAC : 00:00:00:00:00:00 802.1q VLAN ID : 4093 802.1q VLAN Priority : 0 HPM.2 Draft Capabilities: Supported Hostname (OEM) :	Display the current network configuration.

4.3. Configure the IP Address of the Standby ShMC

4.3.1. Set Up the Access to the Standby ShMC

There are 2 access methods available, based on preference. Once you have chosen a method and accessed the component, the commands to type are identical, regardless of your choice.

Option 1: Toggle the serial console connection to the Standby ShMC (see Figure 4).

Option 2: Stay in the serial console of the active ShMC, but change the target address of the commands (IPMI bridging).

Option 1: Set up the access by directing the serial connection to the standby ShMC

Command	Purpose
ipmitool> **Ctrl+g)** MSH8910 login: **admin** Password: **admin** ipmitool>	Use HOTKEY to redirect serial console multiplexer to the standby ShMC CLI.

The "Ctrl+g)" command is performed by pressing the Ctrl and g keys simultaneously, then entering the closing parentheses character, followed by the Enter key.

Option 2: Set up the access by using IPMI bridging

Command	Purpose
ipmitool> **set targetaddr 0x10**	Set the remote target address of the standby ShMC. The following commands will be redirected to the targeted address.

This redirects all ipmitool shell commands to the standby ShMC until the end of the session (type Exit or press Ctrl+c) or a manual change to another component using their respective target addresses.

4.3.2. Configure and Set the IP Address (DHCP or Static)

Configure and set the IP address, the netmask and the gateway (optional for a static IP). Choose Option 1 for a static IP or Option 2 for a DHCP IP.

Option 1 – Static IP

Command	Purpose
ipmitool> **lan set 1 ipsrc static** ipmitool> **lan set 1 ip addr 192.168.101.2** ipmitool> **lan set 1 netmask 255.255.255.0** ipmitool> **lan set 1 defgw ipaddr 192.168.101.254**	Configure IP source to static. Define static IP address. Define netmask. Define default gateway IP address.

Option 2 – DHCP IP

Command	Purpose
ipmitool> **lan set 1 ipsrc dhcp**	Configure IP source to DHCP.

Note that it may take several seconds to gather an IP from the DHCP server.

4.3.3. Verify Standby ShMC Network Configuration

Check the following configurations: IP address source (Static or DHCP), IP address, subnet mask, default gateway IP and 802.1q VLAN ID (disabled in the example below). The results shown in the table below are for a static IP.

Command	Purpose
ipmitool> **lan print** Access Mode : Enable IP Address Source : Static IP Address : 192.168.101.2 Subnet Mask : 255.255.255.0 MAC Address : 00:a0:a5:96:e9:ea IP Header : TTL=0x40 Flags=0x40 Precedence=0x00 TOS=0x10 Default Gateway IP : 192.168.101.254 Default Gateway MAC : 00:00:00:00:00:00 802.1q VLAN ID : 4093 802.1q VLAN Priority : 0 HPM.2 Draft Capabilities: Supported Hostname (OEM) :	Display the current network configuration.

4.4. Configure the IP Address of the BMC on Each Modular Server Processing Node

All the steps in this section have to be done for each available MSP node in your platform (up to 9). It is advisable to note when an MSP node configuration is completed. If at any point while cycling through the list of MSP nodes in your system you are not sure to which component you are connected, just go back to the Set Up step (Section 4.4.1) and redo it for the targeted MSP node.

4.4.1. Set Up the Access to the BMC on a Specific Modular Server Processing Node

As for the standby ShMC, there are 2 access methods available, based on preference. Once you have chosen a method and accessed the component, the commands to type are identical, regardless of your choice.

Option 1: Toggle the serial console connection to the desired BMC (see Figure 4).

Option 2: Stay in the serial console of the active ShMC, but change the target address of the commands (IPMI bridging).

Option 1 – Set up the access by directing the serial connection to the BMC (example provided for node 1)

Command	Purpose
ipmitool> **Ctrl+g 1** CentOS Linux 7 (Core) Kernel 3.10.0-229.el7.x86_64 on an x86_64 sk9013075860 login: **Ctrl+gg 0** MSP803X login: admin Password: ipmitool>	Use HOTKEY to redirect serial console multiplexer to MSP node 1 components. Use HOTKEY to redirect serial console multiplexer to the BMC of MSP node 1.

The "Ctrl+g 1" command is performed by pressing the Ctrl and g keys simultaneously, then pressing on 1 (the MSP node number), followed by the Enter key. By default, this sets the serial multiplexer mechanism to the payload of the targeted MSP node (for an MSP node with dual CPUs, the redirection will be on payload #1).

If there is an OS installed on the MSP node, you should get something similar to the example above. Otherwise, the console may not show anything at this point.

The "Ctrl+gg 0" command is performed by pressing the Ctrl and g keys simultaneously, then pressing on the g key again, followed by the 0 key and the Enter key. This will toggle the multiplexer to target the BMC instead of the payload (see Figure 4).

Option 2 – Set up the access by using IPMI bridging

Command	Purpose
ipmitool> **set targetaddr 0x82**	Set remote target address of the BMC of MSP node 1. The following commands will be redirected to the targeted address.

This command redirects the ipmi commands to the BMC of MSP node 1 (see Figure 3 for the addresses of the other BMCs).

4.4.2. Configure and Set the IP Address (Static or DHCP)

Configure and set the IP address, the netmask and the gateway (optional for a static IP). Choose Option 1 for a static IP or Option 2 for a DHCP IP.

Option 1 – Static IP

Command	Purpose
ipmitool> **lan set 1 ipsrc static** ipmitool> **lan set 1 ip addr 192.168.101.11** ipmitool> **lan set 1 netmask 255.255.255.0** ipmitool> **lan set 1 defgw ipaddr 192.168.101.254**	Configure IP source to static. Define static IP address. Define netmask. Define default gateway IP address.

Option 2 – Network using DHCP IP

Command	Purpose
ipmitool> **lan set 1 ipsrc dhcp**	Configure IP source to DHCP.

Note that it may take several seconds to gather an IP from the DHCP server.

4.4.3. Verify BMC Network Configuration

Check the following configurations: IP address source (Static or DHCP), IP address, subnet mask, default gateway IP and 802.1q VLAN ID. The results shown in the table below are for a static IP.

Command	Purpose
ipmitool> **lan print** Access Mode : Enable IP Address Source : Static IP Address : 192.168.101.11 Subnet Mask : 255.255.255.0 MAC Address : 00:a0:a5:90:ac:d0 IP Header : TTL=0x40 Flags=0x40 Precedence=0x00 TOS=0x10 Default Gateway IP : 192.168.101.254 Default Gateway MAC : 00:00:00:00:00:00 802.1q VLAN ID : 4093 802.1q VLAN Priority : 0 HPM.2 Draft Capabilities: Supported Hostname (OEM) :	Display the current network configuration.

4.4.4. Configure the BMC of the Next Modular Server Processing Node

Configure the BMC of the next MSP node by going back to Section 4.4.1 and performing the required steps. You will have to perform this configuration sequence for all the MSP nodes in the platform.

NOTICE

Once the BMCs of all the MSP nodes are configured, if you have not physically connected the MS2910 platform to the network as described in Sections 3.2.8 and 3.2.11 because of possible IP address conflicts, do so now. Also perform the switch configuration verification steps that were omitted (Sections 3.2.9, 3.2.10, 3.2.12 and 3.2.13).

4.5. Paste Multiple Commands in the Console to Perform Management Configuration

NOTICE

Do not perform this step for a platform if you have done all the configurations required in Sections 4.2, 4.3 and 4.4 for it. Section 4.5 describes an option to perform all the steps described in Section 4.2, 4.3 and 4.4 by pasting multiple commands at once.

4.5.1. Set Up the Access to the Active ShMC

Access the active ShMC CLI via the muxed serial connection.

Command	Purpose

`(MSH8910 Ethernet P1:H1)# Ctrl+g 0`
`MSH891X Login: admin`
`Password: admin`
`ipmitool>`
	`Use HOTKEY to redirect serial console multiplexer to the ShMC CLI.`

The "Ctrl+g 0" command is performed by pressing the Ctrl and g keys simultaneously, then pressing on the 0 key, followed by the Enter key.

4.5.2. Paste the Configuration Commands

When multiple platforms must be configured, several commands can be pasted into the console as a block to save time. Two command lists are provided below. They are typical command lists for static IP and DHCP IP. Adapt these commands based on your network requirements.

Option 1 – Set both ShMCs and all BMCs to use a static IP

Command	Purpose

`ipmitool> # set targetaddr 0x20`
`lan set 1 ipsrc static`
`lan set 1 ipaddr 192.168.101.1`
`lan set 1 netmask 255.255.255.0`
`lan set 1 defgw ipaddr 192.168.101.254`
 	
`set targetaddr 0x10`
`lan set 1 ipsrc static`
`lan set 1 ipaddr 192.168.101.2`
`lan set 1 netmask 255.255.255.0`
`lan set 1 defgw ipaddr 192.168.101.254`
 	
`set targetaddr 0x82`
`lan set 1 ipsrc static`
`lan set 1 ipaddr 192.168.101.11`
`lan set 1 netmask 255.255.255.0`
`lan set 1 defgw ipaddr 192.168.101.254`
 	
`set targetaddr 0x84`
	`Target active ShMC IPMI address.`
	`Configure IP source to static.`
	`Define static IP address.`
	`Define netmask.`
	`Define default gateway IP address.`
	
	`Target standby ShMC IPMI address.`
	`Configure IP source to static.`
	`Define static IP address.`
	`Define netmask.`
	`Define default gateway IP address.`
	
	`Target BMC of MSP node 1.`
	`Configure IP source to static.`
	`Define static IP address.`
	`Define netmask.`
	`Define default gateway IP address.`
	
	`Target BMC of MSP node 2.`

Command	Purpose
lan set 1 ipsrc static	Configure IP source to static.
lan set 1 ipaddr 192.168.101.12	Define static IP address.
lan set 1 netmask 255.255.255.0	Define netmask.
lan set 1 defgw ipaddr 192.168.101.254	Define default gateway IP address.
set targetaddr 0x86	Target BMC of MSP node 3.
lan set 1 ipsrc static	Configure IP source to static.
lan set 1 ipaddr 192.168.101.13	Define static IP address.
lan set 1 netmask 255.255.255.0	Define netmask.
lan set 1 defgw ipaddr 192.168.101.254	Define default gateway IP address.
set targetaddr 0x88	Target BMC of MSP node 4.
lan set 1 ipsrc static	Configure IP source to static.
lan set 1 ipaddr 192.168.101.14	Define static IP address.
lan set 1 netmask 255.255.255.0	Define netmask.
lan set 1 defgw ipaddr 192.168.101.254	Define default gateway IP address.
set targetaddr 0x8a	Target BMC of MSP node 5.
lan set 1 ipsrc static	Configure IP source to static.
lan set 1 ipaddr 192.168.101.15	Define static IP address.
lan set 1 netmask 255.255.255.0	Define netmask.
lan set 1 defgw ipaddr 192.168.101.254	Define default gateway IP address.
set targetaddr 0x8c	Target BMC of MSP node 6.
lan set 1 ipsrc static	Configure IP source to static.
lan set 1 ipaddr 192.168.101.16	Define static IP address.
lan set 1 netmask 255.255.255.0	Define netmask.
lan set 1 defgw ipaddr 192.168.101.254	Define default gateway IP address.
set targetaddr 0x8e	Target BMC of MSP node 7.
lan set 1 ipsrc static	Configure IP source to static.
lan set 1 ipaddr 192.168.101.17	Define static IP address.
lan set 1 netmask 255.255.255.0	Define netmask.
lan set 1 defgw ipaddr 192.168.101.254	Define default gateway IP address.
set targetaddr 0x90	Target BMC of MSP node 8.
lan set 1 ipsrc static	Configure IP source to static.
lan set 1 ipaddr 192.168.101.18	Define static IP address.
lan set 1 netmask 255.255.255.0	Define netmask.
lan set 1 defgw ipaddr 192.168.101.254	Define default gateway IP address.
set targetaddr 0x92	Target BMC of MSP node 9.
lan set 1 ipsrc static	Configure IP source to static.
lan set 1 ipaddr 192.168.101.19	Define static IP address.
lan set 1 netmask 255.255.255.0	Define netmask.
lan set 1 defgw ipaddr 192.168.101.254	Define default gateway IP address.
set targetaddr 0x20	Target active ShMC IPMI address.

Option 2 – Set both ShMCs and all BMCs to use a DHCP IP

Command	Purpose
ipmitool> # **set targetaddr 0x20**	
lan set 1 ipsrc dhcp	Target active ShMC IPMI address. Configure IP source to DHCP.
set targetaddr 0x10	
lan set 1 ipsrc dhcp	Target standby ShMC IPMI address. Configure IP source to DHCP.
set targetaddr 0x82	
lan set 1 ipsrc dhcp	Target BMC of MSP node 1. Configure IP source to DHCP.
set targetaddr 0x84	
lan set 1 ipsrc dhcp	Target BMC of MSP node 2. Configure IP source to DHCP.
set targetaddr 0x86	
lan set 1 ipsrc dhcp	Target BMC of MSP node 3. Configure IP source to DHCP.
set targetaddr 0x88	
lan set 1 ipsrc dhcp	Target BMC of MSP node 4. Configure IP source to DHCP.

Command	Purpose
set targetaddr 0x8a **lan set 1 ipsrc dhcp** **set targetaddr 0x8c** **lan set 1 ipsrc dhcp** **set targetaddr 0x8e** **lan set 1 ipsrc dhcp** **set targetaddr 0x90** **lan set 1 ipsrc dhcp** **set targetaddr 0x92** **lan set 1 ipsrc dhcp** **set targetaddr 0x20**	Target BMC of MSP node 5. Configure IP source to DHCP. Target BMC of MSP node 6. Configure IP source to DHCP. Target BMC of MSP node 7. Configure IP source to DHCP. Target BMC of MSP node 8. Configure IP source to DHCP. Target BMC of MSP node 9. Configure IP source to DHCP. Target active ShMC IPMI address.

4.5.3. Confirm Configurations

Once this is done, manually confirm that each configuration was applied properly.

Command	Purpose
ipmitool> #**set targetaddr 0x20** **lan print** **set targetaddr 0x10** **lan print** **set targetaddr 0x82** **lan print** **set targetaddr 0x84** **lan print** **set targetaddr 0x86** **lan print** **set targetaddr 0x88** **lan print** **set targetaddr 0x8a** **lan print** **set targetaddr 0x8c** **lan print** **set targetaddr 0x8e** **lan print** **set targetaddr 0x90** **lan print** **set targetaddr 0x92** **lan print** **set targetaddr 0x20**	Confirm configuration of the active ShMC. Confirm configuration of the standby ShMC. Confirm configuration of the BMC of MSP node 1. Confirm configuration of the BMC of MSP node 2. Confirm configuration of the BMC of MSP node 3. Confirm configuration of the BMC of MSP node 4. Confirm configuration of the BMC of MSP node 5. Confirm configuration of the BMC of MSP node 6. Confirm configuration of the BMC of MSP node 7. Confirm configuration of the BMC of MSP node 8. Confirm configuration of the BMC of MSP node 9. Redirect bridging to the active ShMC.

You have now completed section Management Configuration.

You should now be able to start managing your platform and have access to the System Monitor web interface using the IP configured at step 4.2.

To properly and fully complete the configuration, please refer to the platform documentation at kontron.com.

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