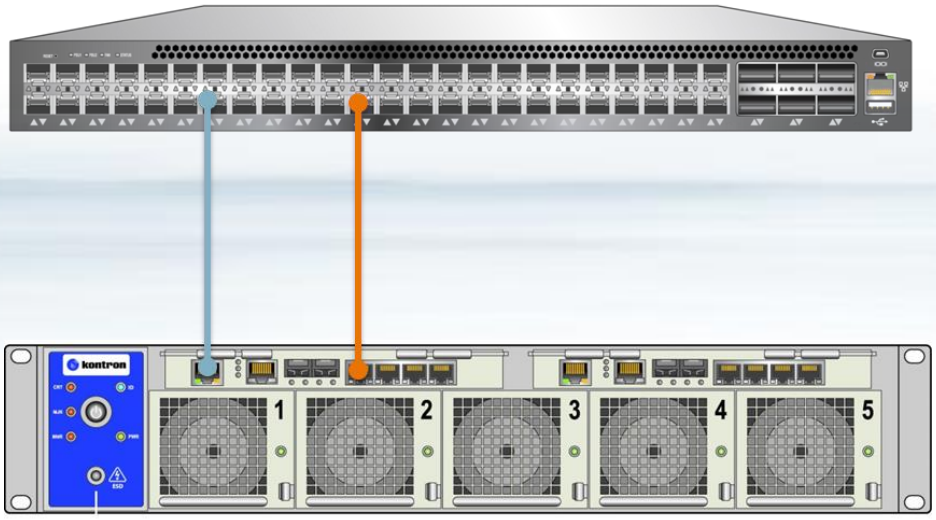
APPLICATION NOTE



MS2900 – Getting Started | VLAN-segregated Management and Payload Networks

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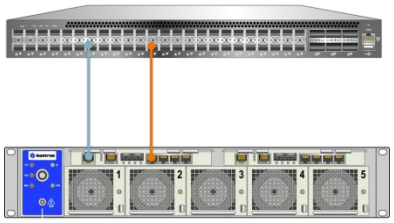
1/ Introduction

The factory default network configuration of the MS2900 platform assigns the Management traffic to VLAN4093 and the Payload data traffic to VLAN1. Both traffic flows are received and sent untagged (without 802.1Q VLAN tags) on the corresponding external ports (the management ports and the uplink ports of each hub).

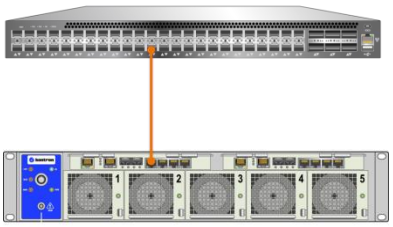
- This use case describes the network integration steps to get started with the MS2900 platform where the traffic (management and payload data) passes over two different network links that are segregated either by VLAN from a single switch or from two different switches that are physically interconnected. The target configuration is rather similar to the default configuration but is different in that it requires mandatory spanning-tree configurations in order to guarantee a loop-free topology. Additionally, in order to be closer to real cases, the Payload data traffic is changed to a different VLAN. The ports corresponding to the management link and the Payload data uplink are both configured as 802.1Q trunk interfaces.



The steps described in this use case assume that the MS2900 has default configurations loaded in all its elements (factory default).

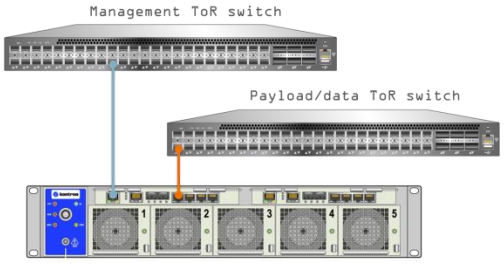
Kontron created other use cases related to the MS2900 network configuration. You may refer to them if you want to:

- Create a common network for management and payload traffic (MS2900)



That use case describes the network integration steps to get started with the MS2900 platform when the factory default network settings need to be changed to have all traffic (Management and Payload data) passing over the same network uplink on a given VLAN. This network uplink is configured as 802.1Q trunk interface.

- Create physically isolated management and payload networks (MS2900)



That use case describes the network integration steps to get started with the MS2900 platform where the traffic (management and payload data) passes over two network links from two different switches that are physically isolated. This is similar to the default configuration of the MS2900 when the Payload data traffic is kept on VLAN 1. For this use case, in order to be closer to real cases, the Payload data traffic is changed to a different VLAN and the corresponding uplink is configured as 802.1Q trunk interface. The traffic on the management link is kept untagged.

Note that each MS2900 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 MS2900 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

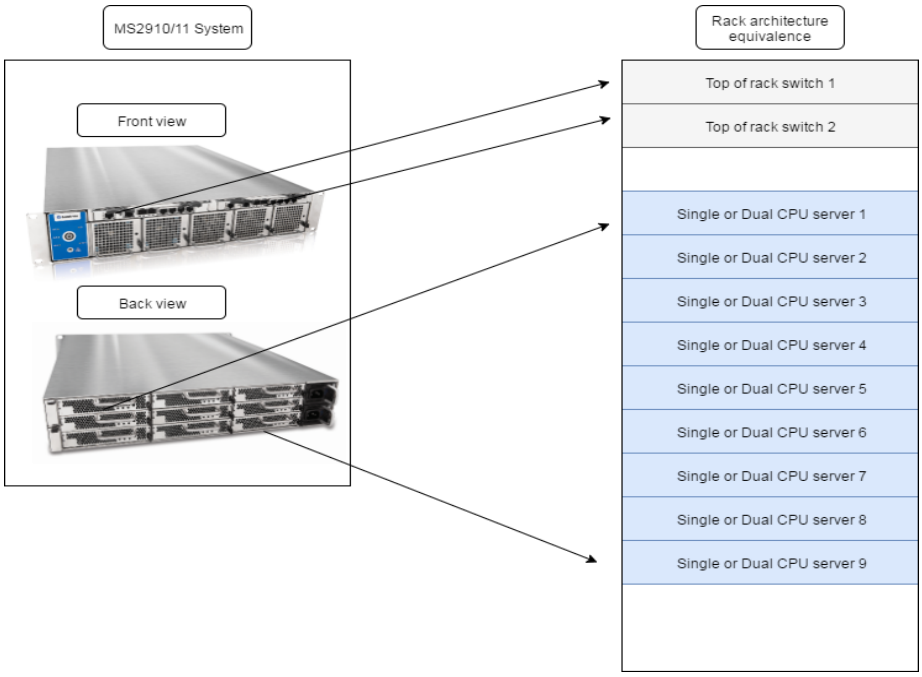


Figure 2: Faceplate connectors and LEDs

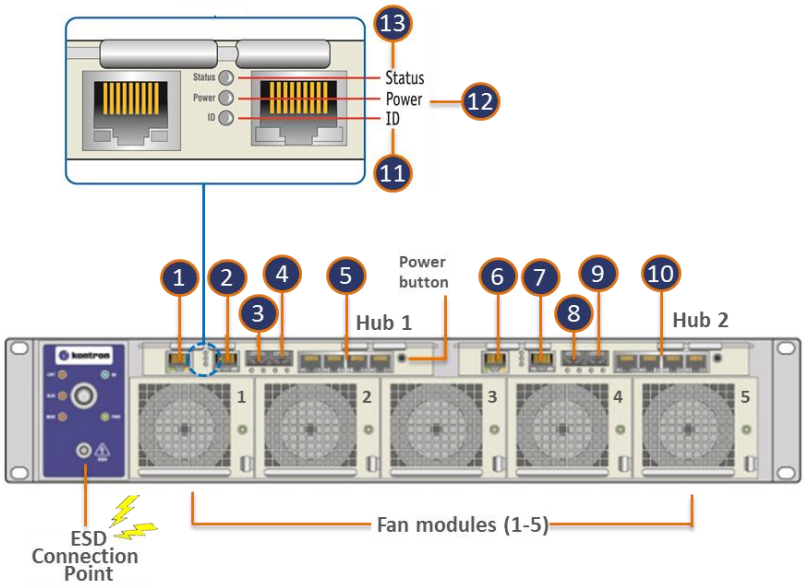
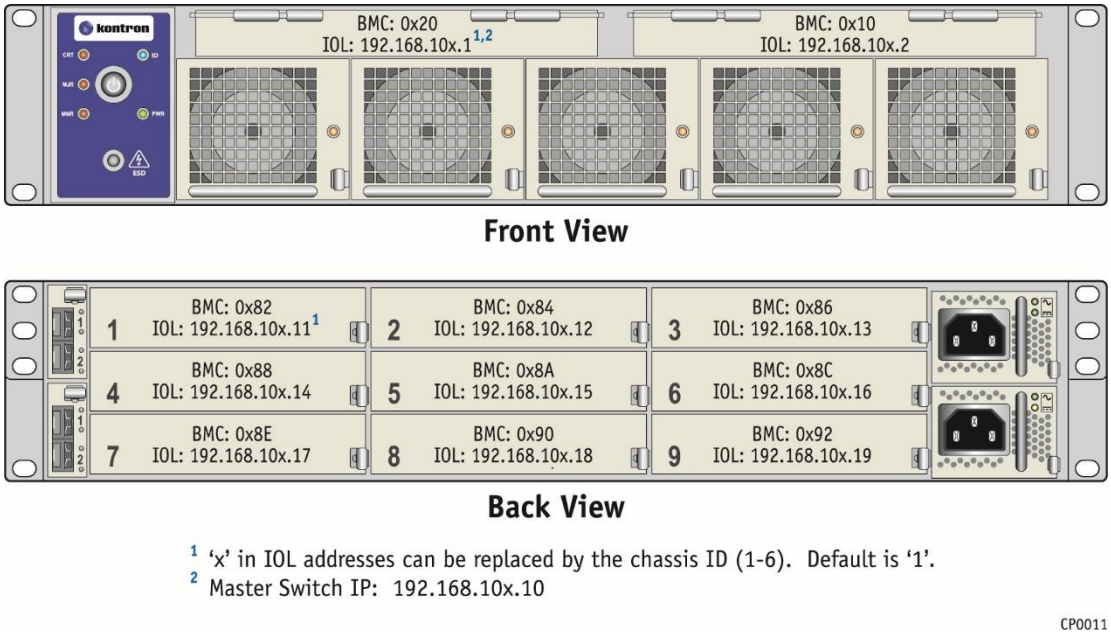


Table 1: Faceplate connectors and LEDs

Label	Description	Faceplate marking
1 & 6	Management 1GbE RJ-45 port (Switch/ShMC 1&2)	MNGT
2 & 7	Serial Console RJ-45 port (Switch/ShMC 1&2)	1010
3 & 8	SFP+ stacking port (Switch/ShMC 1&2)	1
4 & 9	10GbE SFP+ uplink port (Switch/ShMC 1&2)	2
5 & 10	Quad GbE RJ-45 uplink ports (Switch/ShMC 1&2)	3,4,5,6
11	ID LED (Blue): ▶ Payload power removed = On ▶ Identify command in progress = Blinking ▶ Payload power is on = Off	None
12	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
13	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) are refered to as hubs in this document.

Figure 3: Factory default IP addresses



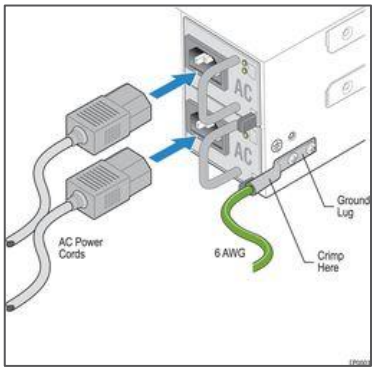
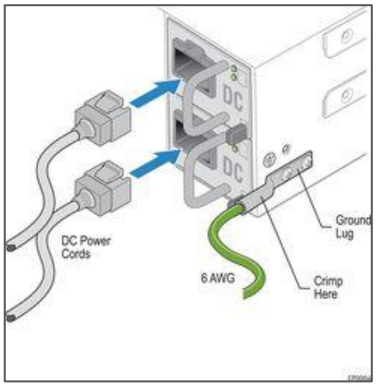
2/ Initial Platform Connections

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.

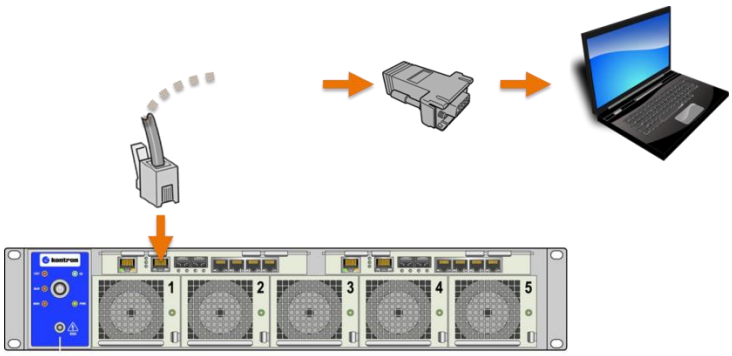
2.2. Power Supply Connection

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

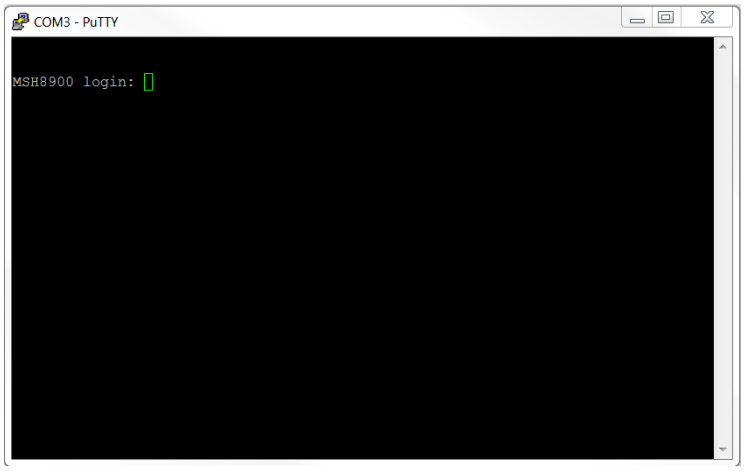
Use the RJ45 to DB9 adapter provided with the platform to connect a (non-crossover) Ethernet cable to establish a serial connection between the technician's PC and the RJ45 console port of the **hub with the active ShMC** (faceplate marking "1010"; see label 2 in Figure 2) of the MS2900.

The **hub with the active ShMC** is the one with the solid green Power LED (see label 12 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 MS2900 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 behaviors may occur within the network as a result of incomplete or inadequate configurations.

NOTICE

Note about Spanning Tree:

The Spanning Tree Protocol is a network protocol that builds loop-free logical topologies for Ethernet networks. While not mandatory in some simple topologies where logical (VLAN) or physical (Ethernet segments) do not introduce loops (i.e. point-to-point connections), it is often essential to scale up networks with complete multi-link redundant architecture.

The MS2900 platform does not support PVST (Per-VLAN Spanning Tree). If the network infrastructure you are connecting the MS2900 to is running PVST, a proper interoperability between PVST and MSTP (or STP/RSTP) will require the building of a common Spanning Tree. On Cisco, or other vendors that have implemented PVST, this common Spanning Tree will be built from the untagged VLAN1. It is therefore mandatory to configure VLAN1 as the native VLAN for the PVST switches on the interfaces that will interconnect to the MS2900.

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 MS2900 platform will be deployed and share the following details:

1. This platform contains redundant switches.
2. Multiple Spanning Tree Protocol (MSTP) is enabled.
3. STP and RSTP (Spanning Tree and Rapid Spanning Tree Protocols) are also available.
4. Management and payload networks are segregated by VLANs.

This use case will implement Spanning Tree best practices on both side of the interconnection.

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 **3.2.7**. 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 ToR switch prior to connecting the MS2900 platform. The example is for a Cisco C3560X-24T-S switch.

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)#**vlan 1**	Enter VLAN 1 to database
switch(config-vlan)#**exit**	Exit VLAN database
switch(config)#**vlan 10**	Enter VLAN 10 to database
switch(config-vlan)#**exit**	Exit VLAN database
switch(config)#**vlan 4093**	Enter VLAN 4093 to database
switch(config-vlan)#**exit**	Exit VLAN database
switch(config)#**interface vlan 10**	Enter interface VLAN 10 configuration mode.
switch(config-if)# **ip address 192.168.10.254 255.255.255.0**	Define VLAN 10 IP address and subnet.
switch(config-if)#**exit**	Exit interface configuration mode.
switch(config)#**interface vlan 4093**	Enter interface VLAN 4093 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)# **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 1 for a trunk interface.
switch(config-if)#**switchport trunk allowed vlan add 1,10**	Add VLAN 1 and 10 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)#**exit**	Exit interface configuration mode.
switch(config)# **interface gigabitEthernet 0/2**	Enter interface 0/2 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 1 for a trunk interface.
switch(config-if)#**switchport trunk allowed vlan add 1,4093**	Add VLAN 1 and 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#	

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

- Cisco C3560X-24T-S
- Kontron MS2900 platform (including MSH8900 hubs and modular server processing nodes running factory default configurations)

NOTICE

The instructions included above 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 MSH8900 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.

3.2.1. Log In the Switch CLI

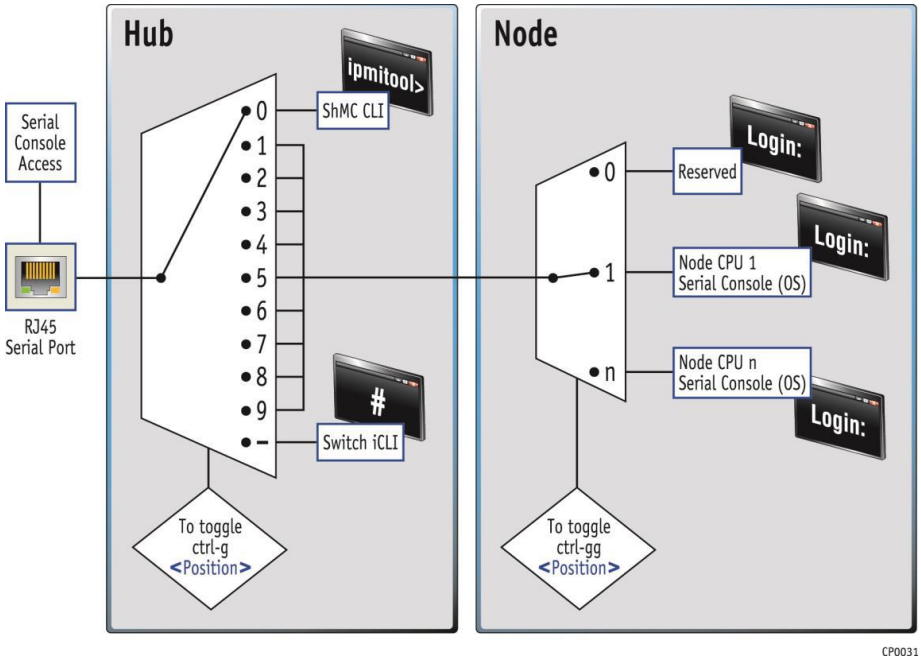
Log in using the default credentials—user: admin and password: admin.

Command	Purpose
MSH8900 Login: **Ctrl+g -** Username:**admin** Password:**admin** #	Use HOTKEY to redirect serial console multiplexer to the switch CLI.

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 (MSH8900) includes a multiplexing functionality that can establish a serial console 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 Switch Management and Payload/Traffic IP Source (DHCP or Static), Address and VLAN

Configure a new VLAN for the payload Data traffic. The example here is VLAN 10.

Command	Purpose
# **configure terminal** (config)# **vlan 10** (config-vlan)# **name DATA** (config-vlan)# **end** #	Enter configuration mode Create VLAN 10 in the VLAN database Enter a name for VLAN 10 Exit configuration mode

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

Option1 – Static IP

Command	Purpose
# **configure terminal** (config)# **interface vlan 4093** (config-if-vlan)# **ip address 192.168.101.10 255.255.255.0** (config-if-vlan)# **end** #	Enter configuration mode Enter VLAN 4093 interface configuration mode Configure VLAN 4093 IP address and subnet Exit Interface configuration mode

Option 2 – DHCP IP

Command	Purpose
# **configure terminal** (config)# **interface vlan 4093** (config-if-vlan)# **ip address dhcp** (config-if-vlan)# **end** #	Enter configuration mode Enter VLAN 4093 interface configuration mode Configure VLAN 4093 IP to use DHCP Exit Interface configuration mode

3.2.3. Assign the payload Data traffic VLAN to the interfaces

The payload Data traffic VLAN needs to be added to the chosen uplink towards your network infrastructure and to all interfaces towards the MS2900 modular server processing nodes. The chosen uplink interface for this example is 1/3 and the chosen VLAN for Payload Data traffic is 10.

Command	Purpose
# **configure terminal** (config)# **interface Ethernet 1/3** (config-if)# **switchport hybrid allowed vlan add 10** (config-if)# **exit** (config)# **interface Ethernet 1-2/7-24** (config-if)# **switchport hybrid allowed vlan add 10** (config-if)# **switchport hybrid native vlan 10** (config-if)# **end** #	Enter configuration mode Enter 1/3 uplink interface configuration mode. Add VLAN 10 to the allowed hybrid mode VLAN list Exit the interface configuration mode Enter 1/7-24 and 2/7-24 interfaces (MSP nodes) configuration mode. Add VLAN 10 to the allowed hybrid mode VLAN list Configure VLAN 10 as the native VLAN for 1/7-24 and 2/7-24 interfaces (**optional / the Payload Data flow can also be sent with a VLAN tag value of 10. In this case, the MSP's OS needs to be configured accordingly and this command line is not necessary**). Exit configuration mode

3.2.4. Configure the management port

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

Command	Purpose
# **configure terminal** (config)# **interface Ethernet 1-2/25** (config-if)# **switchport hybrid allowed vlan add 4093** (config-if)# **no switchport hybrid native vlan 4093** (config-if)# **exit**	Enter configuration mode Enter 1/25 and 2/25 management interfaces configuration mode. Add VLAN 4093 to the allowed hybrid mode VLAN list Deconfigure VLAN 4093 as being the native VLAN. Exit the interface configuration mode

3.2.5. Configure MSTP

This use case will implement Spanning Tree best practices on both side of the interconnection.

MSTP is activated by default on the MS2900 platform. Configure the name and revision of the MS2900 MSTP region and create separate instances for the Payload Data traffic VLAN 10 and the Management traffic VLAN 4093.

Command	Purpose
# **configure terminal** (config)# **spanning-tree mst name SYMKLOUD revision 0** (config)# **spanning-tree mst 1 vlan 10** (config)# **spanning-tree mst 2 vlan 4093** (config# **end** #	Enter configuration mode Enter the region name and revision Create MSTP instance 1 and assign VLAN10 to it Create MSTP instance 2 and assign VLAN4093 to it Exit configuration mode

If the network infrastructure you are connecting the MS2900 to is configured with PVST, it is recommanded that the root of the CST (Common Spanning Tree built between the MSTP and the PVST regions) be the MS2900 itself in order to have all ports of the MS2900 forwarding traffic. If the root of the CST is located in the PVST region, there is a high chance that the traffic on some ports of the MS2900 be discarded because of the spanning-tree blocking mechanism, hence impacting VLAN-segregated traffic when VLANs are assigned to different physical ports.

Configure the mst 0 instance with the lower spanning-tree root priority.

Command	Purpose
# **configure terminal** (config)# **spanning-tree mst 0 priority 0** (config# **end** #	Enter configuration mode Configure mst 0 with priority 0 Exit configuration mode

3.2.6. Save Running-Config to Startup-Config

NOTICE

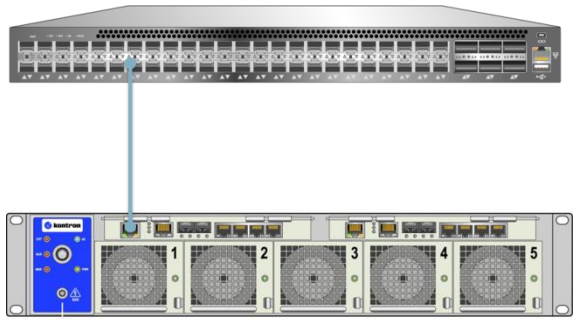
If this step is skipped or forgotten, the configuration will be lost at the next switch reboot and/or power cycle! Make sure you perform this step each time you change the configuration.

Command	Purpose
# **copy running-config startup-config** Building configuration... % Saving 3930 bytes to flash:startup-config #	Save the running-config to startup-config.

3.2.7. Connect the MS2900 Platform to the Network (management Uplink)

NOTICE

The ShMCs and BMCs 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 cable as described in Section 3.2.77 and performing the verification steps (Sections 3.2.88, 3.2.9, 3.2.11 and 3.2.12) of Section 3/ Switch Configuration.

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

3.2.8. Verify Management IP Details and VLANs

Verify various management IP details. Note that it may take several seconds to obtain an IP from your DHCP server.

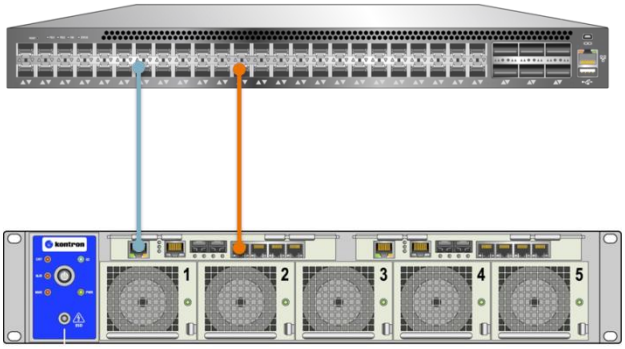
Command	Purpose
#show interface vlan 4093 VLAN1 LINK: 00-a0-a5-a6-8c-fa Mtu:1500 <UP BROADCAST RUNNING MULTICAST> IPv6: fe80::2a0:a5ff:fea6:8cfa/64 <ANYCAST TENTATIVE AUTOCONF> IPv4: 192.168.101.10/24 192.168.101.255	Display configuration settings associated with the switch's network interface.

3.2.9. Confirm Proper Networking Configuration (Management network)

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

Command	Purpose
# ping ip 192.168.101.254 PING server 192.168.101.254, 56 bytes of data. 64 bytes from 192.168.101.254: icmp_seq=0, time=0ms 64 bytes from 192.168.101.254: icmp_seq=1, time=0ms 64 bytes from 192.168.101.254: icmp_seq=2, time=0ms 64 bytes from 192.168.101.254: icmp_seq=3, time=0ms 64 bytes from 192.168.101.254: icmp_seq=4, time=0ms Sent 5 packets, received 5 OK, 0 bad	Ping external management network using the management IP of the ToR switch.

3.2.10. Connect the MS2900 Platform to the Network (Payload/Data Network)

Connect your payload/data network to port 3 (see item 5 on Figure 2).	

3.2.11. Confirm Proper Networking Configuration (Spanning-Tree)

Confirm that the spanning-Tree configuration works properly by looking at the forwarding states of the uplinks connected to your networks: Ethernet 1/3 (Payload/Data network) and Ethernet 1/25 (Management network). Both interfaces should be in forwarding state on mst instance 0. You should also look at the forwarding states of the interfaces on the ToR switch (use "show spanning-tree" command for a Cisco switch).

Command	Purpose
# sh spanning-tree mst 0 CIST Bridge STP Status Bridge ID : 32768.00-A0-A5-80-52-9C Root ID : 32768.00-A0-A5-80-52-9C Root Port : - Root PathCost: 0 Regional Root: 32768.00-A0-A5-80-52-9C Int. PathCost: 0 Max Hops : 20 TC Flag : Steady TC Count : 148 TC Last : 0d 00:02:59 Mst Port Port Role State Pri PathCost Edge P2P Uptime ----- --------- -------------- ---------- --- -------- ---- --- ------------- CIST Eth 1/3 DesignatedPort Forwarding 128 20000 No Yes 0d 00:26:02 CIST Eth 1/7 DesignatedPort Forwarding 128 20000 Yes Yes 0d 00:26:20 CIST Eth 1/8 DesignatedPort Forwarding 128 20000 Yes Yes 0d 00:26:20 ====== [truncated] ===== CIST Eth 1/25 DesignatedPort Forwarding 128 20000 No Yes 0d 00:26:27 ====== [truncated] =====	Display spanning-tree mst 0 status

3.2.12. Confirm Proper Networking Configuration (Payload/Data Network)

Confirm the validity of the networking configuration by retesting the connectivity on the management network, and by testing network connectivity to an external payload/data network. To do so, we will temporarily enable VLAN routing on VLAN 10 and define an IP for it.

Command	Purpose
# ping ip 192.168.101.254 PING server 192.168.101.254, 56 bytes of data. 64 bytes from 192.168.101.254: icmp_seq=0, time=0ms 64 bytes from 192.168.101.254: icmp_seq=1, time=0ms 64 bytes from 192.168.101.254: icmp_seq=2, time=0ms 64 bytes from 192.168.101.254: icmp_seq=3, time=0ms	Ping external management network using the management IP of the ToR switch.

64 bytes from 192.168.101.254: icmp_seq=4, time=0ms Sent 5 packets, received 5 OK, 0 bad # # **configure terminal** (config)# **interface vlan 10** (config-if-vlan)# **ip address 192.168.10.10 255.255.255.0** (config-if-vlan)# **end** # # **ping ip 192.168.10.254** PING server 192.168.10.254, 56 bytes of data. 64 bytes from 192.168.10.254: icmp_seq=0, time=0ms 64 bytes from 192.168.10.254: icmp_seq=1, time=0ms 64 bytes from 192.168.10.254: icmp_seq=2, time=0ms 64 bytes from 192.168.10.254: icmp_seq=3, time=0ms 64 bytes from 192.168.10.254: icmp_seq=4, time=0ms Sent 5 packets, received 5 OK, 0 bad	 Enter configuration mode Enter VLAN 10 interface configuration mode Define an IP address and netmask for VLAN 10. Exit Interface configuration mode Ping external payload/data network using the IP configured on the ToR switch.

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 MS2900 platform switches using the IP provided in Section 3.2.88.

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 Manager RESTFUL API interface
2. System Manager web interface
3. ShMCs and BMCs IPMI Over LAN interface (IOL) and Serial Over LAN (SOL) interface

These interfaces (or any combination thereof) can be used to manage the MS2900 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: MS2900 management interconnections

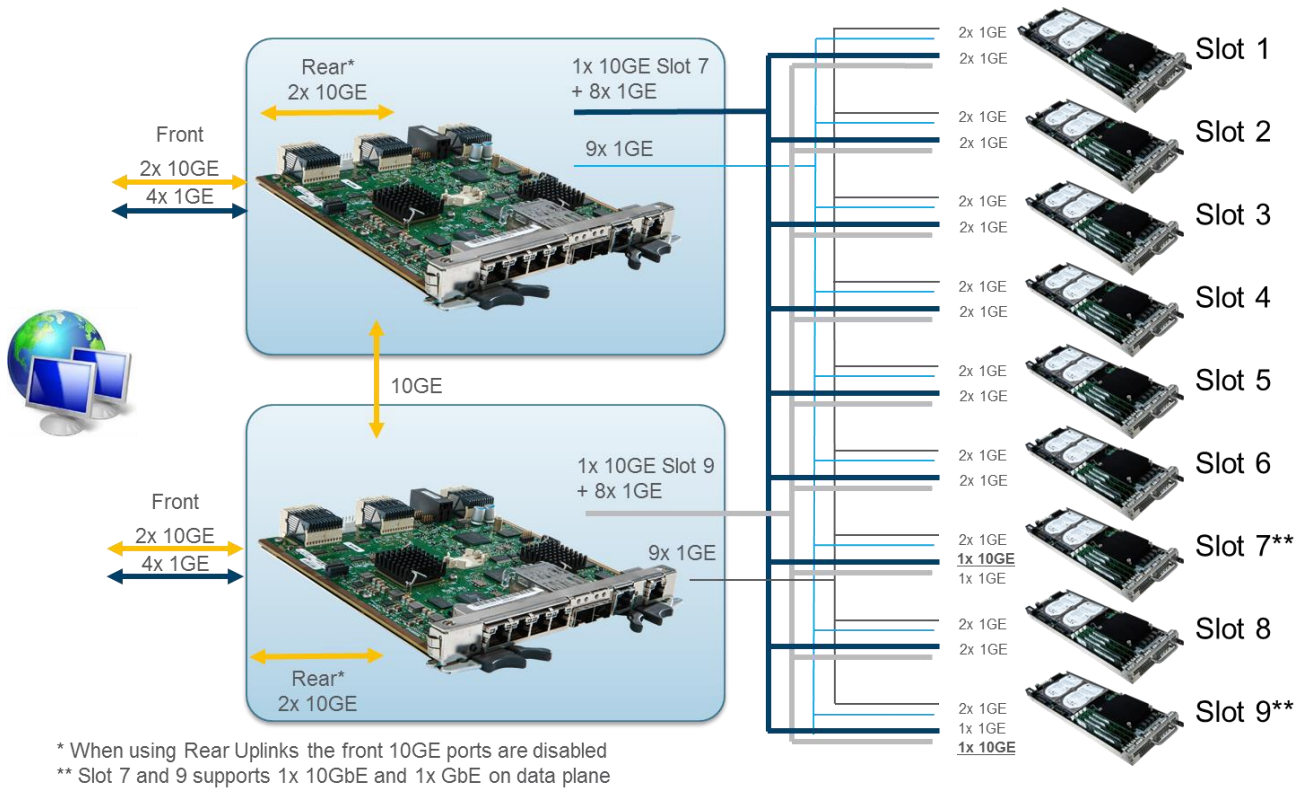
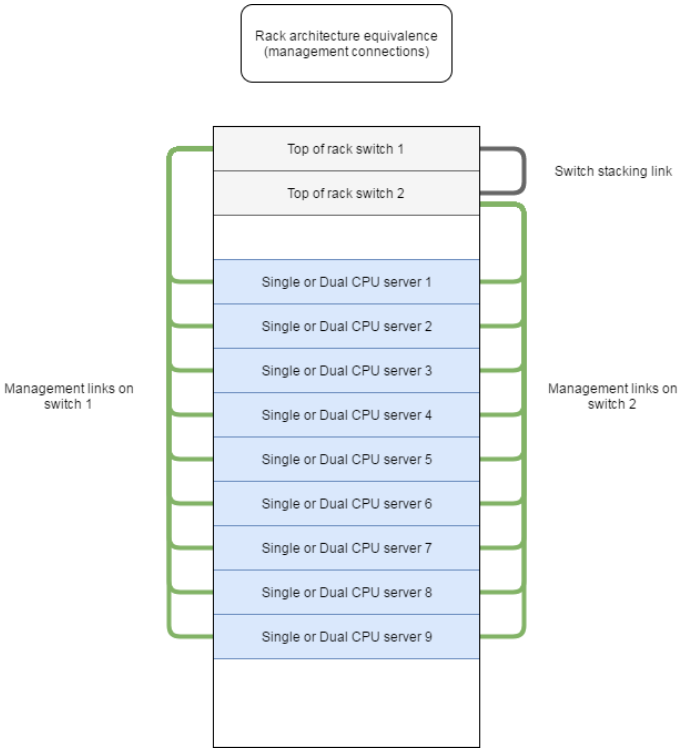


Figure 6: Rack architecture equivalence



4.2. Configure the IP Address and VLAN ID of the Active ShMC

NOTICE

Once you have fully understood the steps described in Sections 4.2, 0 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
Ctrl+g 0 MSH8900 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 ipaddr 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.

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

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: Connect the serial cable to the Standby ShMC serial port (see label 7 in Figure 2).

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 directly connecting the serial cable to the standby ShMC

After connecting the serial cable: log in using the default credentials—user: admin and password: admin.

Command	Purpose

`MSH8900 Login: admin`
`Password:`**`admin`**
`ipmitool>`
	`Enter the default credential to access the standby ShMC.`

Option 2: Set up the access by using IPMI bridging

Command	Purpose
`ipmitool>` **`set targetaddr 0x10`**	`Set remote target address of the standby ShMC. The following command 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 address.

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 ipaddr 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

If you have used option 1 in 4.3.1, reconnect the serial cable to the serial port of the active ShMC (see label 2 in Figure 2) and log-in again.

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 MSP 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** MSP80XX login: admin Password: ipmitool>	Use HOTKEY to redirect serial console multiplexer to the 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 modular server processing node number) followed by the Enter key. This sets the serial multiplexer mechanism to the latest targeted component of the modular server processing node (for a modular server processing node with dual CPUs, the default 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 to the BMC of MSP node 1. The following commands will be redirected to the targeted address.

This command redirects the ipmi command 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 ipaddr 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 BMC's of all MSP nodes are configured, if you have not physically connected the MS2900 platform to the network as described in Section 3.2.77 because of possible IP address conflicts, do so now. Also perform the switch configuration verification steps that were omitted (Sections 3.2.88 to 3.2.912).

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. 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
# **Ctrl+g 0** MSH8900 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. Choose Option 1 for a static IP or Option 2 for a 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
set targetaddr 0x20 **lan set 1 ipsrc static**	Target active ShMC IPMI address. Configure IP source to static.

Command	Purpose
lan set 1 ipaddr 192.168.101.1	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 0x10	Target standby ShMC IPMI address.
lan set 1 ipsrc static	Configure IP source to static.
lan set 1 ipaddr 192.168.101.2	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 0x82	Target BMC of MSP node 1.
lan set 1 ipsrc static	Configure IP source to static.
lan set 1 ipaddr 192.168.101.11	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 0x84	Target BMC of MSP node 2.
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
set targetaddr 0x20	Target active ShMC IPMI address.

Command	Purpose
lan set 1 ipsrc dhcp	Configure IP source to DHCP.
set targetaddr 0x10	Target standby ShMC IPMI address.
lan set 1 ipsrc dhcp	Configure IP source to DHCP.
set targetaddr 0x82	Target BMC of MSP node 1.
lan set 1 ipsrc dhcp	Configure IP source to DHCP.
set targetaddr 0x84	Target BMC of MSP node 2.
lan set 1 ipsrc dhcp	Configure IP source to DHCP.
set targetaddr 0x86	Target BMC of MSP node 3.
lan set 1 ipsrc dhcp	Configure IP source to DHCP.
set targetaddr 0x88	Target BMC of MSP node 4.
lan set 1 ipsrc dhcp	Configure IP source to DHCP.
set targetaddr 0x8a	Target BMC of MSP node 5.
lan set 1 ipsrc dhcp	Configure IP source to DHCP.
set targetaddr 0x8c	Target BMC of MSP node 6.
lan set 1 ipsrc dhcp	Configure IP source to DHCP.
set targetaddr 0x8e	Target BMC of MSP node 7.
lan set 1 ipsrc dhcp	Configure IP source to DHCP.
set targetaddr 0x90	Target BMC of MSP node 8.
lan set 1 ipsrc dhcp	Configure IP source to DHCP.
set targetaddr 0x92	Target BMC of MSP node 9.
lan set 1 ipsrc dhcp	Configure IP source to DHCP.
set targetaddr 0x20	Target active ShMC IPMI address.

4.5.3. Confirm Configurations

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

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