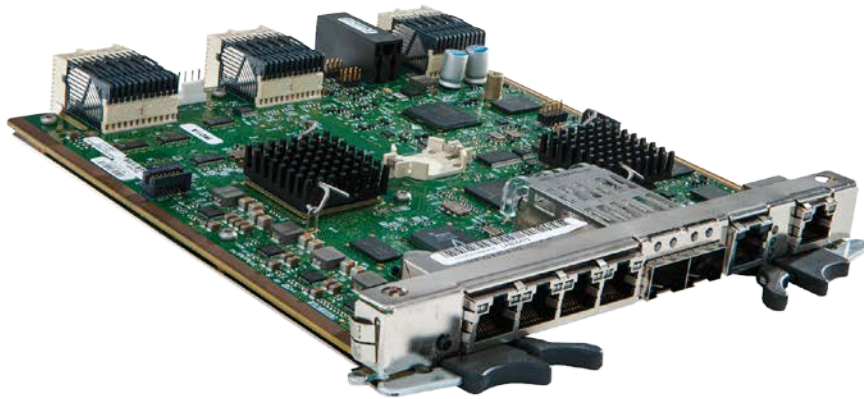


# » Kontron User`s Guide «



**MSH8900**

Document Revision 1.2

## Revision History

Revision	Brief description of changes	Date of issue
1.0	First release	April 2014
1.2	Added Port Mapping for all the available nodes.	April 2017

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## Customer Comments

If you have any difficulties using this user's guide, discover an error, or just want to provide some feedback, please send a message to Kontron. Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised user's guide on our website. Thank you.

## Acronyms

API	Application Programming Interface
BMC	Base Management Controller
CLI	Command-Line Interface
DHCP	Dynamic Host Configuration Protocol
FRU	Field Replaceable Unit
HPM	PICMG Hardware Platform Management specification family
ICLI	Industrial Command-Line Interface
IOL	IPMI-Over-LAN
IPMI	Intelligent Platform Management Interface
KVM	Keyboard Video Mouse
NCSI	Network Communications Services Interface
RTC	Real Time Clock
SEL	System Event Log
SFP	Small Form-factor Pluggable
SFP+	Small Form-factor Pluggable that supports data rates up to 10.0 Gbps
SGMII	Serial Gigabit Media Independent Interface
ShMC	Shelf Management Controller
SMWI	System Monitor Web Interface
SNMP	Simple Network Management Protocol
SOL	Serial Over LAN
SSH	Secure Shell
STP	Spanning Tree Protocol
THOL	Tested Hardware and Operating System List
XAU1	X (meaning ten) Attachment Unit Interface

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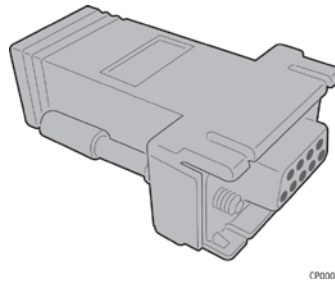
## Electrostatic Discharge

**CAUTION!** The MSH8900 hub is sensitive to electrostatic discharge (ESD). Users must observe the appropriate precautions when handling ESD-sensitive devices.

## Adapter Cable

To establish a serial connection through the RJ45 console port located on the front plate (Figure 3), use the RJ45 to DB9 adapter provided with the system to connect a straight-through Ethernet cable.

Figure 1: RJ45 to DB9 adapter



CP0007

Pinouts are provided in the *SYMKLOUD MS2900 Platform Installation and Maintenance Guide*.

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If the customer's eligibility for warranty has not been voided, in the event of any claim, he may return the product at the earliest possible convenience to the original place of purchase, together with a copy of the original document of purchase, a full description of the application the product is used on and a description of the defect. Pack the product in such a way as to ensure safe transportation (see our safety instructions).

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## 1 Product Description

### 1.1 Product Overview

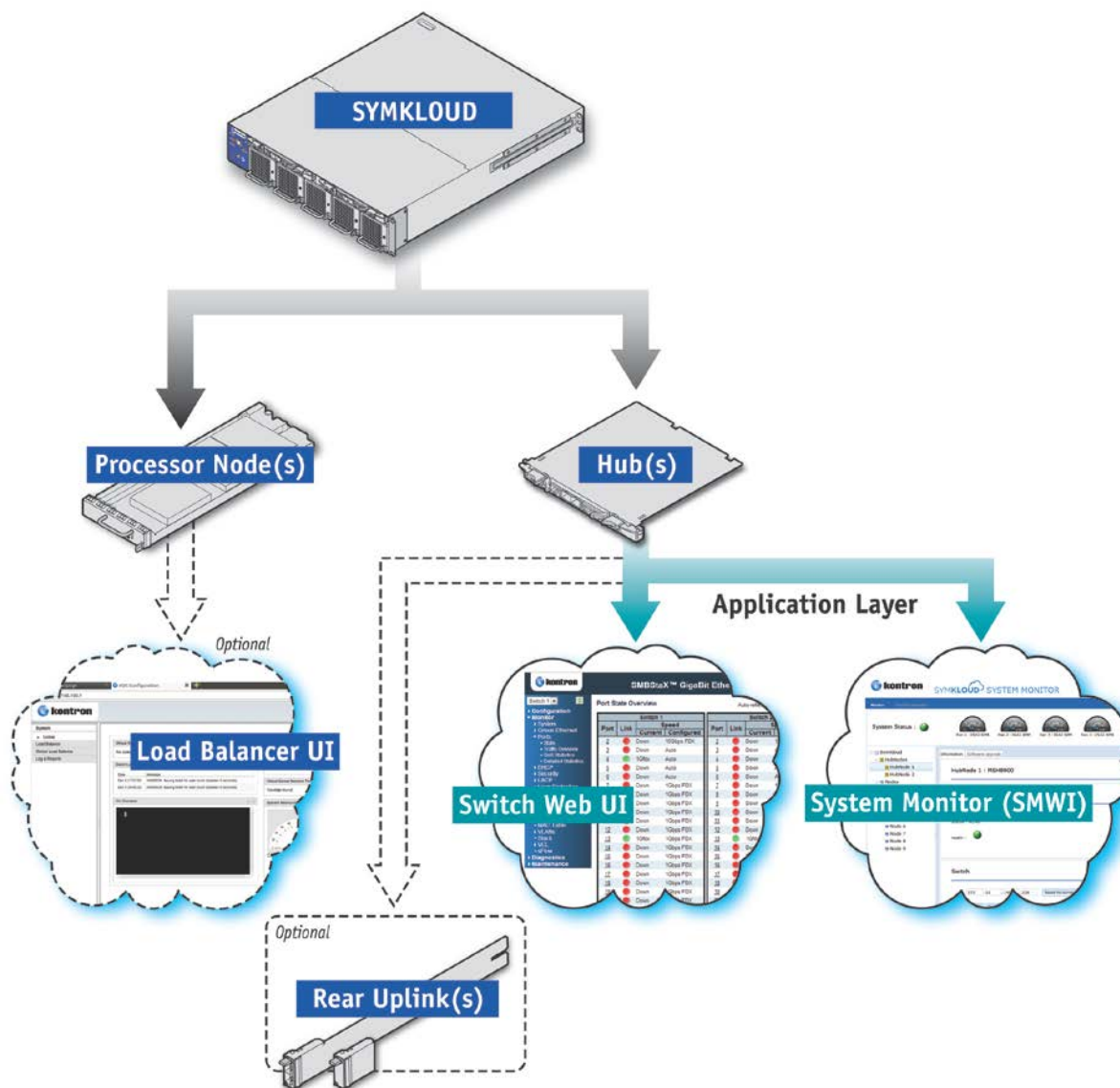
The MSH8900 is a hub module for the SYMKLOUD MS2900 platform. Two hubs can be installed in each MS2900.

Up to 2 optional MSU8700 uplink modules can be installed per MS2900. Each MSU8700 connects to a single MSH8900. For a list of approved SFP+ modules, refer to the product's THOL.



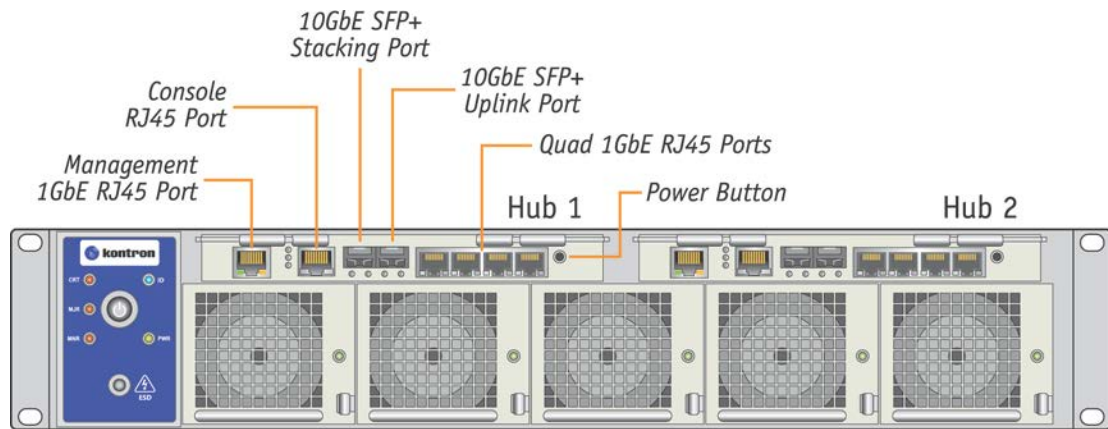
The staking port can only be used to stack the switches of MS2900 systems (see section 4.8).

Figure 2: SYMKLOUD layers



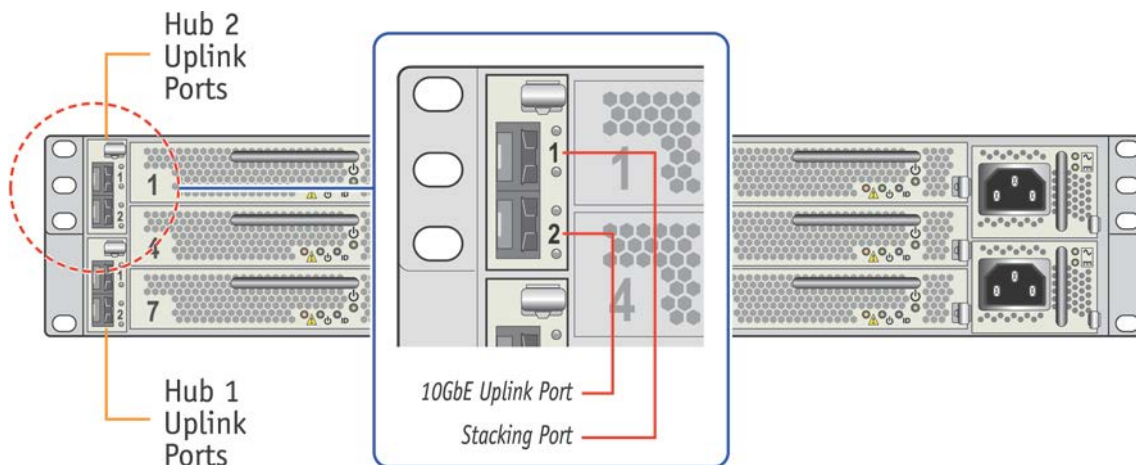
CP0035

Figure 3: MSH8900 in front of chassis



CP0027

Figure 4: MSU8700 in back of chassis



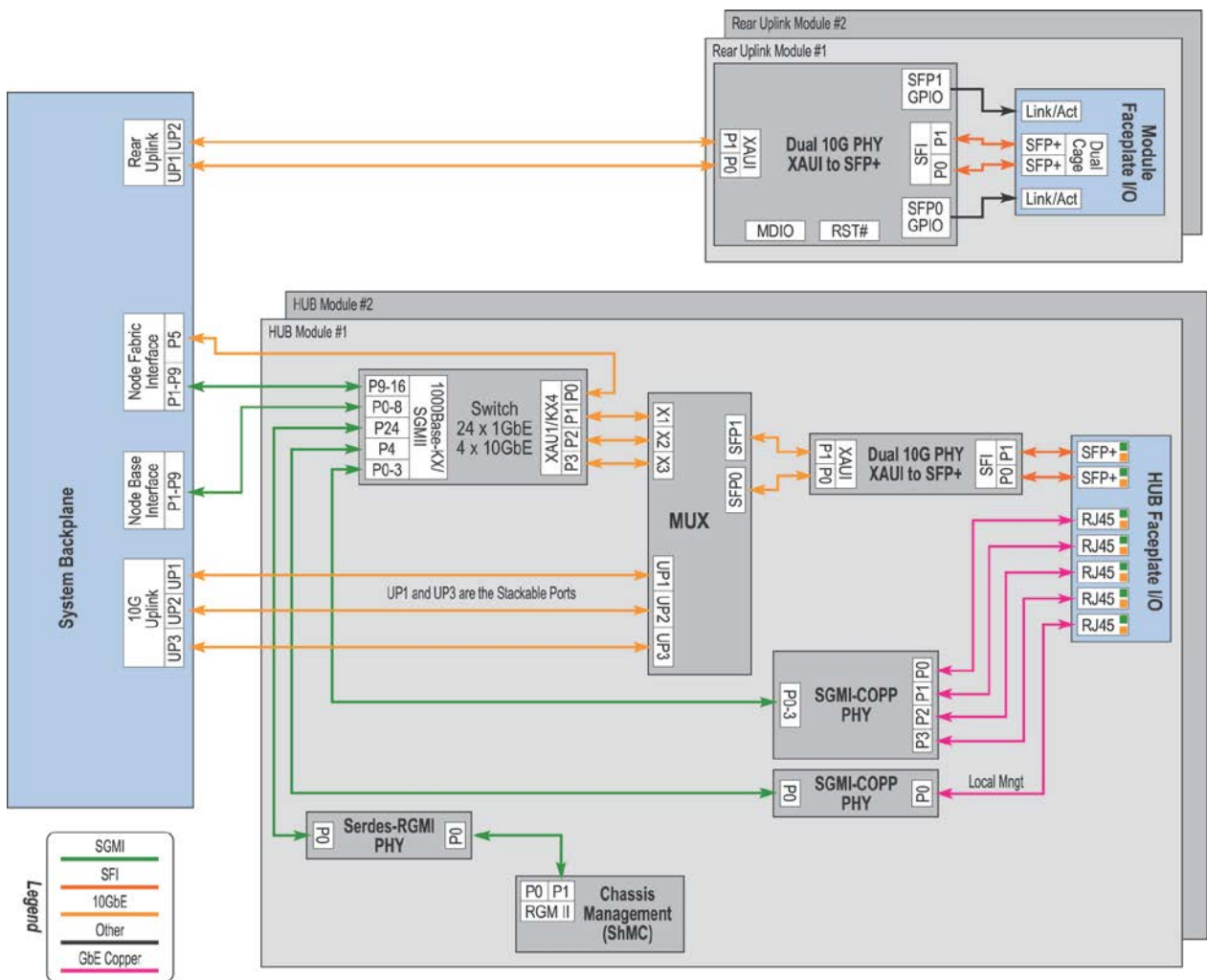
CP0008A

For information on other SYMKLOUD MS2900 components, refer to the specific component's user manual.

To ensure you have the latest document version or to consult other SYMKLOUD documents, visit the Kontron portal at <http://cbu.kontron.ca/>.

## 1.2 Block Diagram

Figure 5: MSH8900 and MSU8700 block diagram

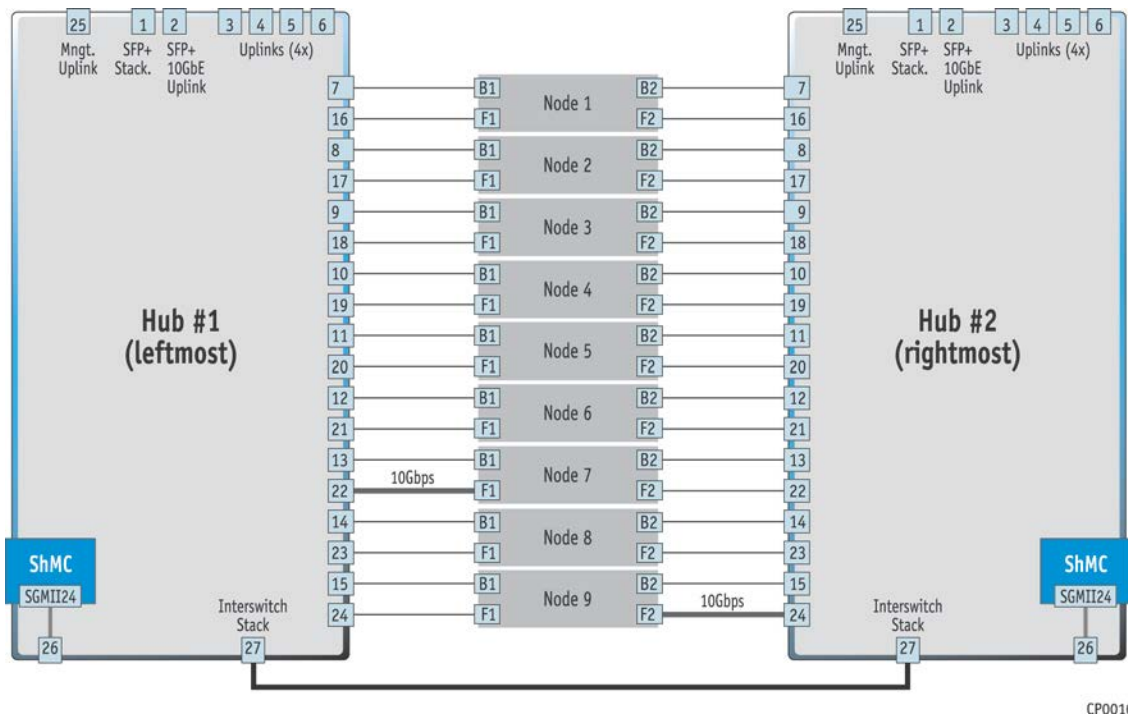


CP0041

For a block diagram of the entire MS2900 system, refer to the *SYMKLOUD MS2900 Platform User's Guide*.

## 1.3 Port Mapping

Figure 6: Port mapping



CP001C

Table 1: MSP8001 nodes in an MS2900 chassis with MSH8900 hubs

	CPU 1			
Node Port	Fabric 1	Base 1	Fabric 2	Base 2
PCI Device	0000:09:00.0	0000:02:00.0	0000:09:00.1	0000:03:00.0
Speed	1Gbps 10Gbps (Slot 7 only)	1Gbps	1Gbps 10Gbps (Slot 9 only)	1Gbps
Node #	Switch Port Number	Switch Port Number	Switch Port Number	Switch Port Number
1	1/16	1/7	2/16	2/7
2	1/17	1/8	2/17	2/8
3	1/18	1/9	2/18	2/9
4	1/19	1/10	2/19	2/10
5	1/20	1/11	2/20	2/11
6	1/21	1/12	2/21	2/12
7	1/22	1/13	2/22	2/13
8	1/23	1/14	2/23	2/14
9	1/24	1/15	2/24	2/15

Table 2: MSP802x series nodes in an MS2900 chassis with MSH8900 hubs

Node Port	CPU 1		CPU 2	
	Fabric 1	Base 2	Fabric 2	Base 1
PCI Device	0000:00:19.0	0000:01:00.0	0000:00:19.0	0000:01:00.0
Speed	1Gbps	1Gbps	1Gbps	1Gbps
Node #	Switch Port Number	Switch Port Number	Switch Port Number	Switch Port Number
1	1/0/16	2/0/7	2/0/16	1/0/7
2	1/0/17	2/0/8	2/0/17	1/0/8
3	1/0/18	2/0/9	2/0/18	1/0/9
4	1/0/19	2/0/10	2/0/19	1/0/10
5	1/0/20	2/0/11	2/0/20	1/0/11
6	1/0/21	2/0/12	2/0/21	1/0/12
7	1/0/22	2/0/13	2/0/22	1/0/13
8	1/0/23	2/0/14	2/0/23	1/0/14
9	1/0/24	2/0/15	2/0/24	1/0/15

Table 3: MSP803x series nodes in an MS2900 chassis with MSH8900 hubs

Node Port	CPU 1			
	Fabric 1	Base 1	Fabric 2	Base 2
PCI Device	0000:02:00.0	0000:04:00.0	0000:02:00.1	0000:05:00.0
Speed	1Gbps 10Gbps (Slot 7 only)	1Gbps	1Gbps 10Gbps (Slot 9 only)	1Gbps
Node #	Switch Port Number	Switch Port Number	Switch Port Number	Switch Port Number
1	1/16	1/7	2/16	2/7
2	1/17	1/8	2/17	2/8
3	1/18	1/9	2/18	2/9
4	1/19	1/10	2/19	2/10
5	1/20	1/11	2/20	2/11
6	1/21	1/12	2/21	2/12
7	1/22	1/13	2/22	2/13
8	1/23	1/14	2/23	2/14
9	1/24	1/15	2/24	2/15

Table 4: MSP804x series nodes in an MS2900 chassis with MSH8900 hubs

	CPU 1			
Node Port	Fabric 1	Base 1	Fabric 2	Base 2
PCI Device	0000:03:00.0	0000:0b:00.0	0000:03:00.1	0000:0c:00.0
Speed	1Gbps	1Gbps	1Gbps	1Gbps
Node #	Switch Port Number	Switch Port Number	Switch Port Number	Switch Port Number
1	1/16	1/7	2/16	2/7
2	1/17	1/8	2/17	2/8
3	1/18	1/9	2/18	2/9
4	1/19	1/10	2/19	2/10
5	1/20	1/11	2/20	2/11
6	1/21	1/12	2/21	2/12
7	1/22	1/13	2/22	2/13
8	1/23	1/14	2/23	2/14
9	1/24	1/15	2/24	2/15

Table 5: MSP805x series nodes in an MS2900 chassis with MSH8900 hubs

	CPU 1			CPU 2		
Node Port	Fabric 1	Fabric 2_p2	Base 2	Fabric 1_p2	Fabric 2	Base 1
PCI Device	0000:01:00.0	0000:01:00.1	0000:04:00.0	0000:01:00.0	0000:01:00.1	0000:04:00.0
Speed	1Gbps	No connection	1Gbps	No Connection	1Gbps	1Gbps
Node #	Switch Port Number	Switch Port Number	Switch Port Number	Switch Port Number	Switch Port Number	Switch Port Number
1	1/16	No connection	2/7	No connection	2/16	1/7
2	1/17	No connection	2/8	No connection	2/17	1/8
3	1/18	No connection	2/9	No connection	2/18	1/9
4	1/19	No connection	2/10	No connection	2/19	1/10
5	1/20	No connection	2/11	No connection	2/20	1/11
6	1/21	No connection	2/12	No connection	2/21	1/12
7	1/22	No connection	2/13	No connection	2/22	1/13
8	1/23	No connection	2/14	No connection	2/23	1/14
9	1/24	No connection	2/15	No connection	2/24	1/15

The port numbers for the Web interface and for the switch CLI (ICLI) are not the same.

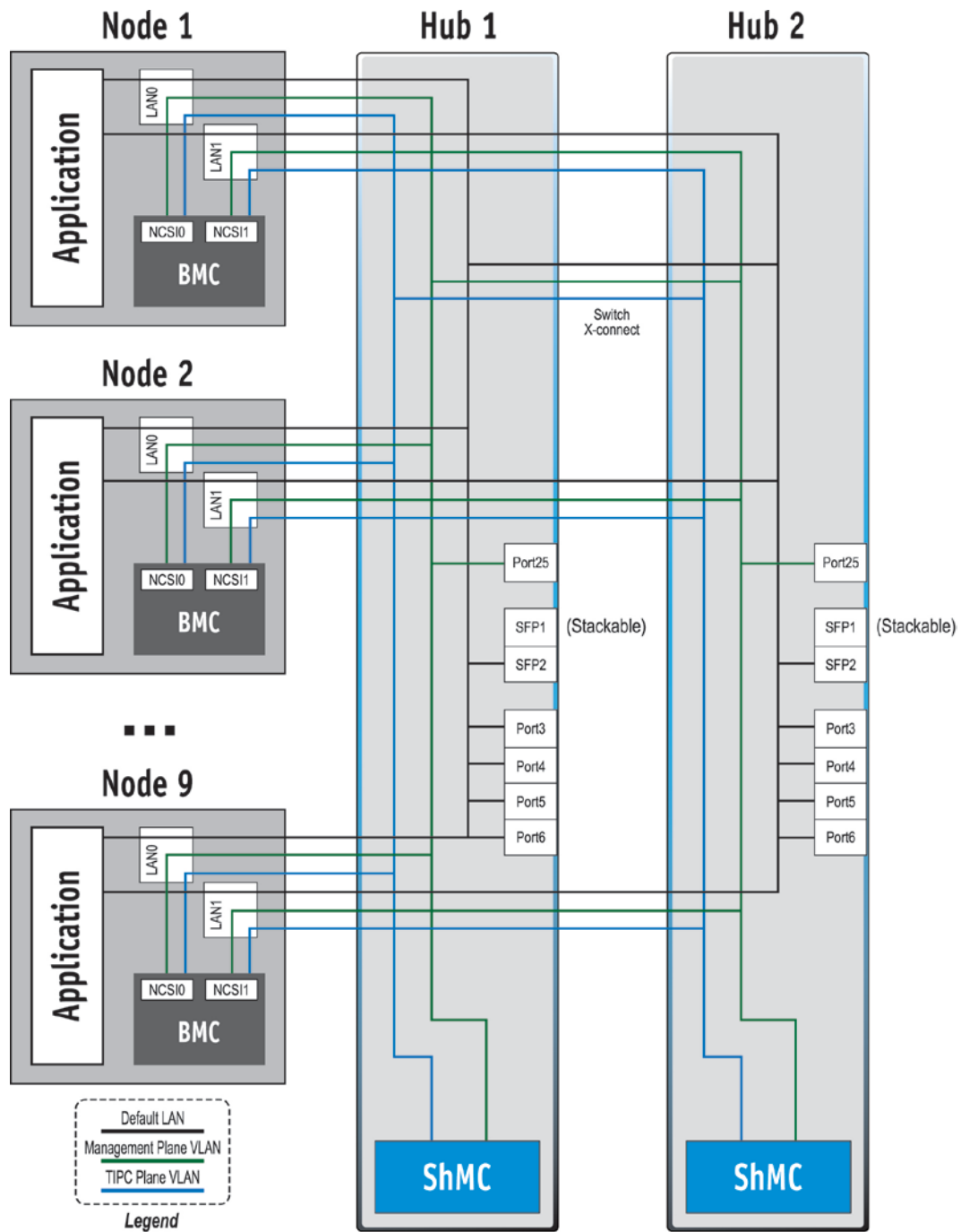
Table 6: Switch ICLI port mapping

Web port	Hub slot 1 switch ICLI port		Hub slot 2 switch ICLI port	
	10GbE or 1GbE	10GbE      1GbE	10GbE      1GbE	
1		1/1	2/1	
2		1/2	2/2	
3			1/3	2/3
4			1/4	2/4
5			1/5	2/5
6			1/6	2/6
7			1/7	2/7
8			1/8	2/8
9			1/9	2/9
10			1/10	2/10
11			1/11	2/11
12			1/12	2/12
13			1/13	2/13
14			1/14	2/14
15			1/15	2/15
16			1/16	2/16
17			1/17	2/17
18			1/18	2/18
19			1/19	2/19
20			1/20	2/20
21			1/21	2/21
22		1/22	1/22	2/22
23			1/23	2/23
24			1/24      2/24	2/24
25			1/25	2/25
26			1/26	2/26
27		1/27	2/27	

**NOTE:** In the ICLI, the \* sign refers to all switches within a stack or all ports within a switch, e.g. \*/4-9 means ports 4 to 9 of all switches and 2/\* means all ports of switch 2.

## 1.4 Network Topology

Figure 7: Network topology



CP003C



## 1.5 Hub Features

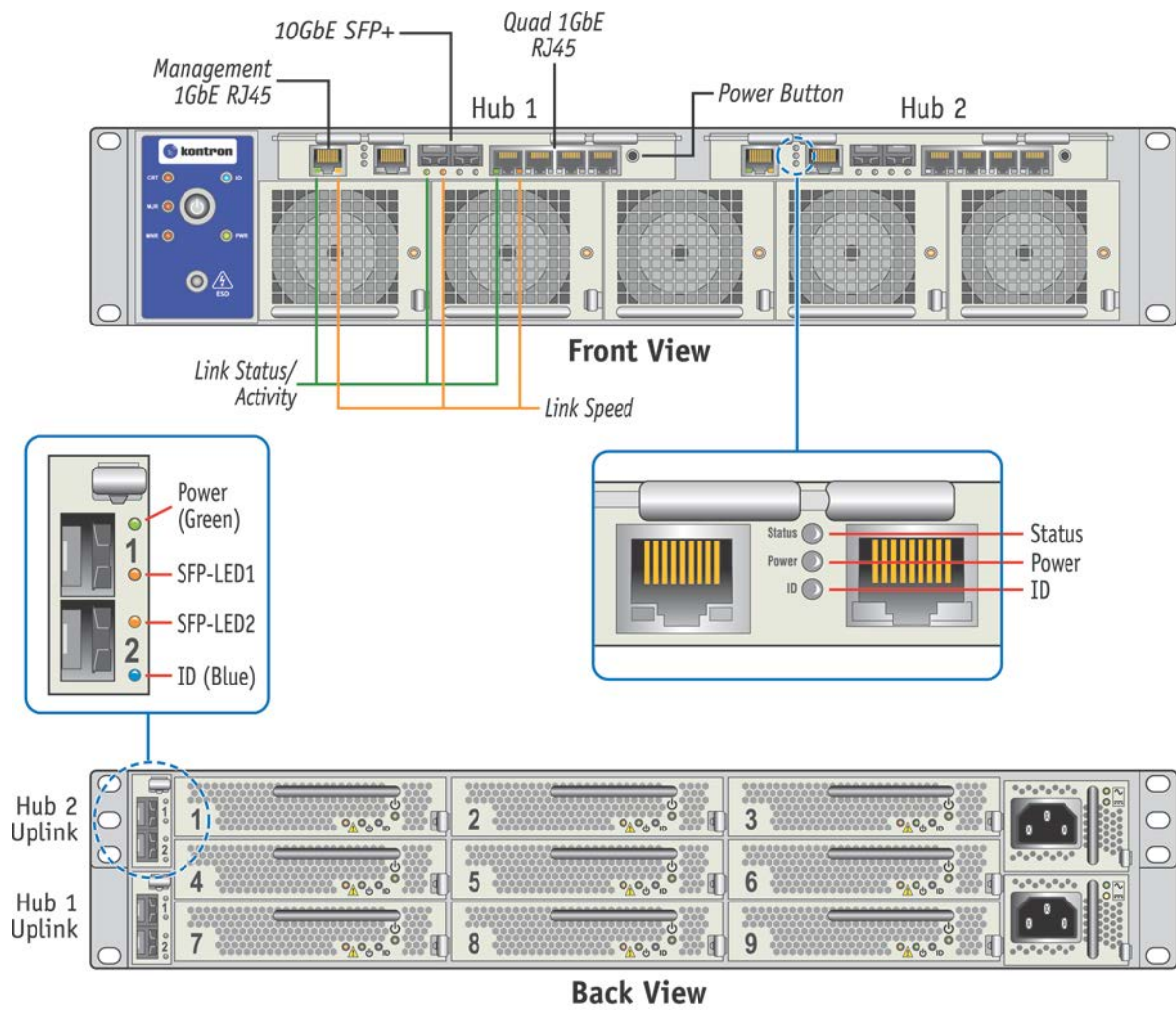
Table 7: Hub features

Feature	Description
Switching capabilities	22x 1 Gbps and 4x 10 Gbps managed switches Stacking up to 16 MSH8900 Multicast technologies supported (IPv4, IPv6, IGMP and MLD)
Shelf Manager (ShMC) capabilities	Central time source for MS2900 platform Fan management Power management LED control Platform monitoring MSU8700 configuration Gigabit switch configuration
Remote management	IPMI 2.0 Power and cooling management for hubs and nodes Sensor and event monitoring for hubs and nodes Hot swap monitoring for hubs and nodes Comprehensive sensor network and event monitoring
Hot swap	Refer to the <i>MSH8900 Sensor List</i> for a complete list of sensors Supported
Power consumption	Refer to section 2.5 for a description of hub behavior during a hot swap procedure MSH8900 (with 2 optical SFP+ modules): 15.6 W typical MSU8700 (with 2 optical SFP+ modules): 5.3 W typical
Power management	Support of IEEE 802.3az Energy Efficient Ethernet idle link standards
Green features	Ability to control fan speed and LED brightness

For a complete list of system features, refer to the *SYMKLOUD MS2900 Platform User's Guide*.

## 1.6 Switch and Uplink Module LEDs and Buttons

Figure 8: MSH8900 and MSU8700 LEDs and buttons



CP0026A

Table 8: LED status description and button behavior

MSH8900			
State	ID (blue)	Power (green)	Status (amber)
Identify command in progress	Blinking <sup>1</sup>	Not affected	Not affected
Switch power ON on active ShMC	OFF	ON	ON: not healthy OFF: healthy
Switch power OFF	ON	OFF	ON: not healthy OFF: healthy
Switch power ON on standby ShMC	OFF	Blinking <sup>2</sup>	ON: not healthy OFF: healthy

MSH8900		
State	Link Status/Activity (green)	Link Speed (amber or green)
Link established, no activity	ON	Green ON: speed 1 Gbps Amber ON: speed 10 Mbps or 100 Mbps
Activity	Blinking	Green ON: speed 1 Gbps Amber ON: speed 10 Mbps or 100 Mbps
No link	OFF	OFF

MSU8700			
State	Power (green)	SFP-LED1 / SFP-LED2 (amber or green)	ID (blue)
Payload power ON	ON	Not affected	OFF
Payload power OFF	OFF	OFF	ON
SFP+ not healthy or rear/front SFP+ configuration error	Not affected	Amber ON	Not affected
Link established, no activity	Not affected	Green ON	Not affected
Activity	Not affected	Green blinking	Not affected
No link, no error	Not affected	OFF	Not affected
Identify command in progress	Not affected	Not affected	Blinking

<sup>1</sup> Fast blink, 1 Hz, 50%<sup>2</sup> Slow blink, 0.5 Hz, 20%

Power button of hub with a standby ShMC		
State	Short press	Long press
Power OFF	Powers the hub	Nothing happens
Power ON	Performs a clean shutdown of the hub	Turns hub off immediately
Power button of hub with an active ShMC		
State	Short press	Long press
Power OFF	Powers the hub	Nothing happens
Power ON	Switches over to the standby ShMC	Turns hub off immediately (the system will automatically attempt a switch over to the standby ShMC)
	» Successful switchover: performs a clean shutdown of the hub	
	<input type="checkbox"/> » Unsuccessful switchover: nothing happens	

**NOTE:** In a single hub system, nothing will happen when the power button is quickly pressed (short press). The power button must be pressed for several seconds (long press) for the hub to power OFF. This will result in complete loss of network access and management capabilities.

For information on all system LEDs, refer to the *SYMKLOUD MS2900 Platform User's Guide*.

## 1.7 Interfacing

Two types of connections can be established with MSH8900 components: a management networking connection or a serial console connection.

The SYMKLOUD platform comes with a System Monitor Web Interface (SMWI). The SMWI is the Web interface of the ShMC and can be used to access the Web interfaces of some hub components (e.g. switch, load balancer). Refer to the *SYMKLOUD MS2900 Platform Quick Start Guide* for an overview of the SMWI and for information on how to access it.

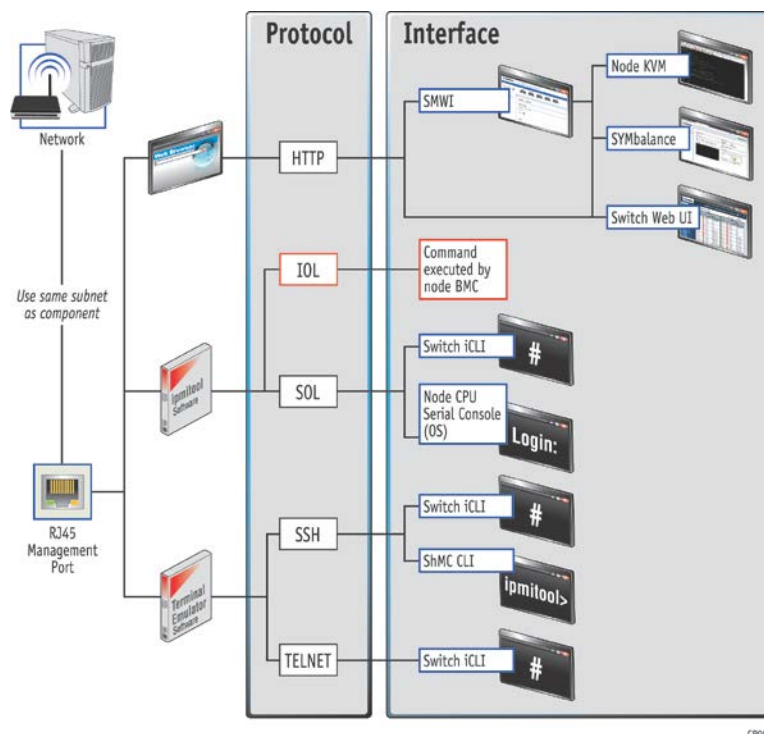
The serial interface of the MSH8900 hub includes a multiplexing functionality that establishes a link with a component through a series of commands (Figure 10).

The IP address of the component you want to connect to might be required when using certain paths. For a list of the default IP addresses of components, refer to the *SYMKLOUD MS2900 Platform Quick Start Guide*.

In addition, the management port (Figure 3) can be used to create a dedicated management network.

Figure 9 and Figure 10 show the steps required to access the system's various interfaces.

Figure 9: Diagram of interface paths with a management networking connection



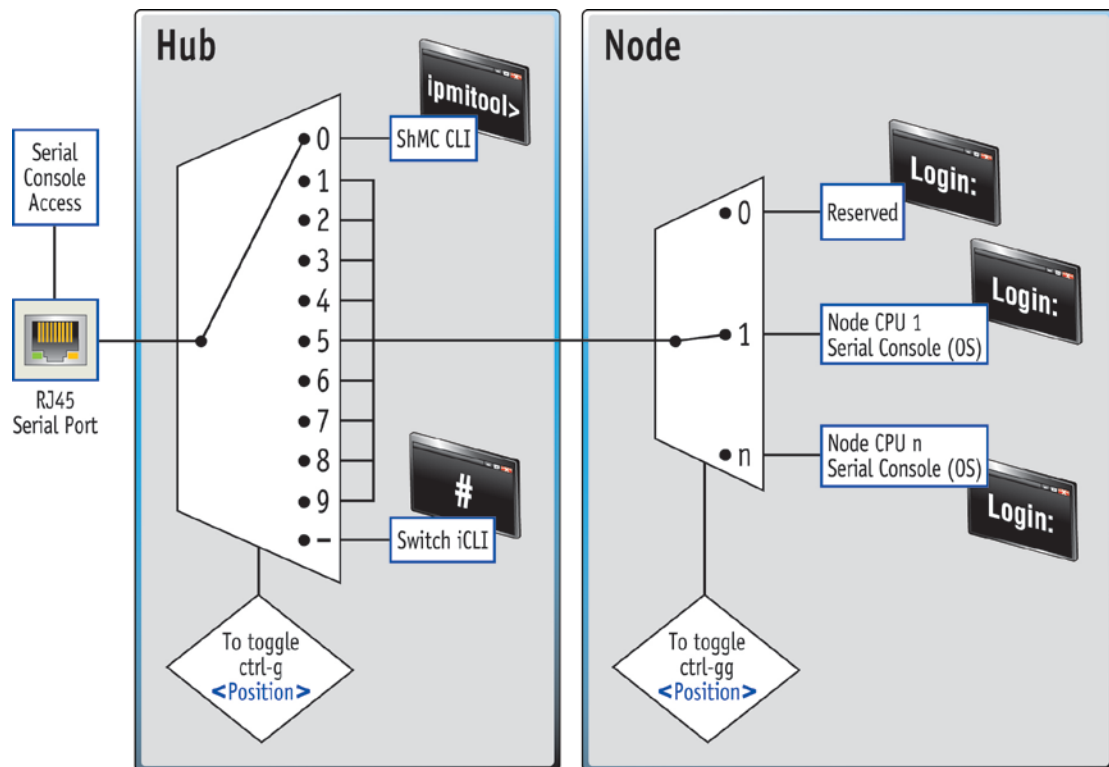
### Example of SSH connection to the switch ICLI:

1. Connect to the management port (Figure 3) with a cable or via a network.
2. Establish an SSH connection through a terminal emulator using the switch IP address.
3. Login using the appropriate user name and password (Table 4).
4. Type **enable** to enter Privileged Exec mode.
5. Prompt **#** is displayed.

### NOTES:

- » Terminal emulator software such as PuTTY can be used.
- » The Kontron ipmitool package can be downloaded from site <http://cbu.kontron.ca/>, under Software Tools.
- » Ensure the protocol is enabled for the interface you want to access (Section 4).
- » An IOL connection allows users to send ipmitool commands that will immediately be executed by the node BMC.

Figure 10: Diagram of interface paths with a serial console connection



CP0031

The serial port communication parameters are 115200 baud, no parity, 8 data bits and backspace key set to "Ctrl-h". BIOS POST and configuration menu redirection is VT100+.

**NOTE:** The ASCII control code for "Ctrl-g" is 7 (decimal) or 0x07 (hex). To type "Ctrl-gg", use the "Ctrl-g" ASCII control code 2 times in a row.

Example of serial connection to the switch ICLI:

1. Connect to the console port (Figure 3) using the RJ45 to DB9 adaptor (Figure 1) or via a device such as a terminal server.
2. Establish a connection through a terminal emulator using the serial port communication parameters.
3. Access a component by toggling the MUX, e.g. to access the ICLI, type **Ctrl-g** and then -.

Table 9: Default usernames and passwords

Configuration interface	Username and password
SMWI	admin
	admin
Switch UI	admin
	admin
Switch ICLI	admin
	admin
ShMC CLI	admin
	admin

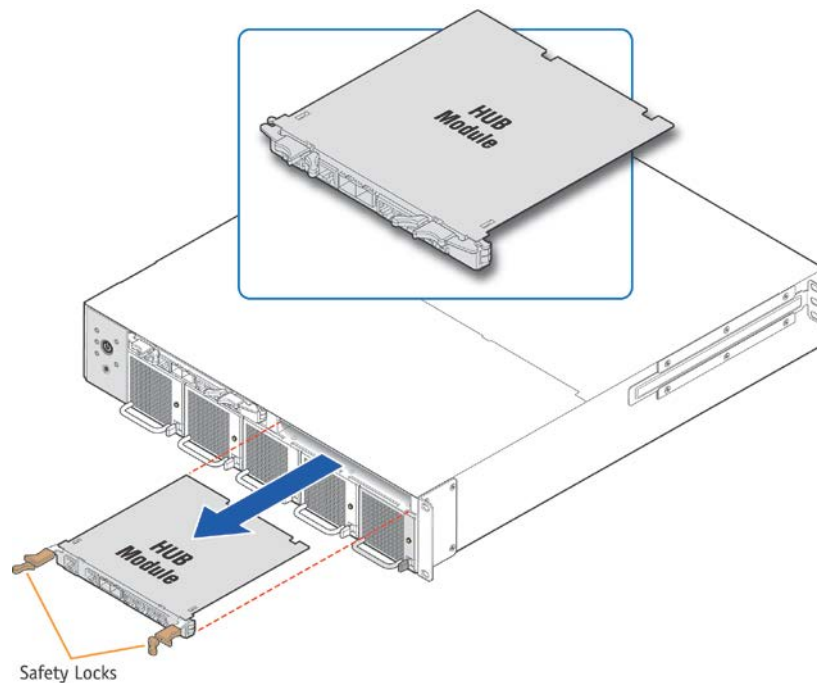
## 2 Extracting and Inserting a Module

### 2.1 Extracting a Hub Module

**NOTE:** Steps in blue apply only to hot swap procedures.

1. Take all necessary ESD protection measures.
2. Press the power button of the hub to be extracted.
3. The ID LED of the hub becomes steady blue: the hub is ready to be extracted.
4. To release the safety locks, simultaneously squeeze the black moving parts against the black fixed parts and move the safety locks to a 90-degree position to unhook the hub from the frame of the MS2900 (Figure 11).
5. Hold the safety locks and extract the module by pulling it from the slot.

Figure 11: Hub module safety lock location



CP0024

### 2.2 Inserting a Hub Module

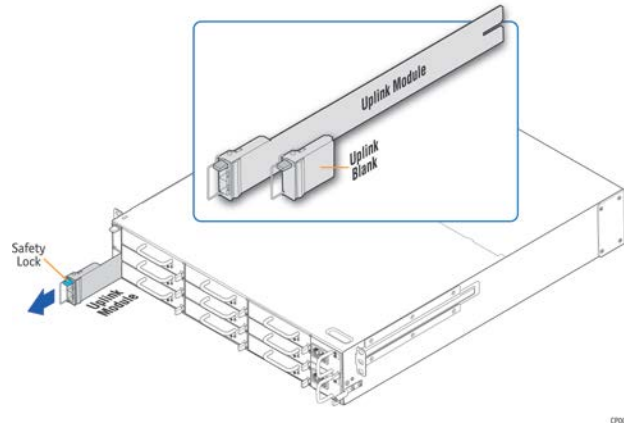
1. Holding the safety locks, insert a hub module in the appropriate slot until the safety locks rest against the faceplate.
2. Gently push the safety locks against the frame of the hub until you hear a click.
3. The power LED of the hub then becomes steady or blinking green: the hub is powered on and ready to use.

### 2.3 Extracting an Optional Uplink Module (MSU8700)

Uplink module MSU8700 cannot be hot swapped.

1. Take all necessary ESD protection measures.
2. Press the power button of the hub connected to the uplink module to be extracted (uplink 1 is connected to hub 1 and uplink 2 to hub 2).
3. The ID LED of the hub and the ID LED of the uplink module become steady blue: the rear uplink module is ready to be extracted.
4. Release the wire handle to a 90-degree position.
5. Pull on the wire handle while pressing down on the safety lock located at the top of the module (Figure 12).

Figure 12: Uplink module safety lock and wire handle locations



**NOTE:** When using optical SFP+ modules in the uplink module, the chassis alignment bracket may prevent easily pulling or activating the SFP+ release clamp. It is suggested to extract the entire uplink module to release the SFP+ module. Once the new SFP+ module is inserted in the uplink module, follow the steps in section 2.4 to insert the uplink module and activate the SFP+ module.

### 2.4 Inserting an Optional Uplink Module (MSU8700)

1. Holding the wire handle, insert an uplink module.
2. Push it in until the safety lock locks in place.
3. Press the power button of the hub connected to the uplink that was inserted. The power LED of the hub becomes steady or blinking green and the power LED of the uplink module becomes steady green: the hub and its uplink module are powered on and ready to use.

### 2.5 System Behavior upon Hot Swap

**NOTE:** The system is electrically designed to support a surprise extraction. However, this type of extraction is not recommended and could affect system performance and functionalities.

When a hot swap procedure is performed on the MSH8900 hub, the following systems and functionalities could be affected:

- » The rear uplink module linked to the removed hub loses connection.
- » Access to the extracted ShMC SEL data and SMWI could be interrupted.
- » The nodes lose half of their fabric and base connections.
- » A SYMBalance node connected to the removed hub could stop functioning properly because a 10GbE link could be lost. (Hub 1 is connected to node 7 and hub 2 to node 9.)
- » If a ring topology (recommended) is used for the system stack, the system topology changes to a chain topology until the ring is rebuilt.
- » If a chain topology is used for the system stack, removing a hub could break the chain and affect system performance.

## 3 Software Configurations and Conventions

To use the system, you must perform the configurations described in section 4.1 Configuring Switch Management Interfaces.



**Conventions:**

- » Elements between **< >** in **blue** are variables. The value shown is an example or an instruction of what to enter. Items between **()** show a value range for the variable spelled out, e.g. **<Switch No. (1-5)>** means you must enter the switch number and that this number can be between 1 and 5.
- » The **|** symbol indicates a choice between two or more alternatives, e.g. **x|y|z** reads "x or y or z".
- » Elements in **black bold** are selectable menu items or button names.
- » Elements in **blue italics** are configuration options or types.
- » The **>** symbol separates a series of operations required to access a specific element.

**Configuration command tables:**

Sections 4, 5, 6 and 7 contain 2-column tables. The first column describes steps that can be performed in the Web interface named in the header. The second column describes steps that can be performed in the CLI specified in the header. See Figure 9 and Figure 10 to find out how to access the specified Web interface or CLI.

**Switch Web User Interface help:**

- » The Help menu of the Switch Web User Interface is comprehensive. It should be used to configure the system.

**Switch ICLI help:**

- » The switch ICLI contains a context-sensitive help feature.
- » Use the **?** symbol to display the next possible commands and their descriptions.
- » To perform the configurations described in this guide, you need to access the ICLI in Privileged Exec mode. Use the "enable" command to access this mode. (The command prompt will display the **#** sign when you are in Privileged Exec mode.)
- » Almost all configuration commands have a corresponding 'no' form. The 'no' form is syntactically similar (but not necessarily identical) to the configuration command; however, it either resets the parameters to default values for the configurable item or disables the item altogether.

## 4 Configuring Switches and Uplink Modules

Figure 13: Switch Web User Interface

**Port State Overview**

Switch 1				Switch 2			
Port	Link	Speed		Port	Link	Speed	
		Current	Configured			Current	Configured
2	Down		10Gbps FDX	2	Down		10Gbps FDX
3	Down		Auto	3	Down		Auto
4	1Gfdx		Auto	4	Down		Auto
5	Down		Auto	5	Down		Auto
6	Down		Auto	6	Down		Auto
7	Down		1Gbps FDX	7	Down		1Gbps FDX
8	Down		1Gbps FDX	8	Down		1Gbps FDX
9	Down		1Gbps FDX	9	Down		1Gbps FDX
10	Down		1Gbps FDX	10	Down		1Gbps FDX
11	Down		1Gbps FDX	11	Down		1Gbps FDX
12	Down		1Gbps FDX	12	Down		1Gbps FDX
13	1Gfdx		1Gbps FDX	13	1Gfdx		1Gbps FDX
14	Down		1Gbps FDX	14	Down		1Gbps FDX
15	Down		1Gbps FDX	15	Down		1Gbps FDX
16	Down		1Gbps FDX	16	Down		1Gbps FDX
17	Down		1Gbps FDX	17	Down		1Gbps FDX
18	Down		1Gbps FDX	18	Down		1Gbps FDX
19	Down		1Gbps FDX	19	Down		1Gbps FDX
20	Down		1Gbps FDX	20	Down		1Gbps FDX
21	Down		1Gbps FDX	21	Down		1Gbps FDX
22	Down		10Gbps FDX	22	1Gfdx		1Gbps FDX
23	Down		1Gbps FDX	23	Down		1Gbps FDX
24	Down		1Gbps FDX	24	Down		10Gbps FDX
25	Down		Auto	25	Down		Auto
26	1Gfdx		Auto	26	1Gfdx		Auto

All switches within a stack can be managed through the stack master switch in the Web interfaces and ICLIs.

### 4.1 Configuring Switch Management Interfaces

#### 4.1.1 IP Address Configuration

To assign an IP address to an existing VLAN:

Switch Web User Interface	ICLI (serial, SSH, Telnet, SOL)
Configuration > System > IP	#
Click <b>Add Interface</b>	# configure terminal
Proceed with configuration	(config)# interface vlan <VLAN number>
Click <b>Save</b>	(config-if-vlan)#
	<i>For a static IP address, use:</i>
	(config-if-vlan)# ip address <ip address> <netmask>
	<i>For a DHCP address, use:</i>
	(config-if-vlan)# ip address dhcp

#### 4.1.2 SSH Configuration

To enable SSH access:

Switch Web User Interface	ICLI (serial, SSH, Telnet, SOL)
Configuration > Security > Switch > SSH	#
Select <b>Enabled</b>	# configure terminal
Click <b>Save</b>	(config)# ip ssh

#### 4.1.3 SNMP Configuration

To enable and configure SNMP:

Switch Web User Interface	ICLI (serial, SSH, Telnet, SOL)
Configuration > Security > SNMP > System	#
Proceed with configuration	# configure terminal
Click <b>Save</b>	(config)# snmp-server
	(config)# ?
	A list of possible configuration commands appears
	Proceed with configuration

#### 4.2 Date and Time Configuration

Switch date and time must be configured using the NTP, as the default system date and time is not populated in the switch. To configure the switch date and time:

Switch Web User Interface	ICLI (serial, SSH, Telnet, SOL)
Configuration > System > NTP	#
Select <b>Enabled</b>	# config terminal
Enter the server IP or server host name	(config)# ntp server <Server No. (1-5)> ip-address <ip address>   <host name>
Click <b>Save</b>	
Notes	
To enter a server host name, DNS service must be configured.	

### 4.3 User Account Configuration

To create a user account and password, set a privilege level (value between 0 and 15, where 15 has all privileges) and define the type of password:

Switch Web User Interface	ICLI (serial, SSH, Telnet, SOL)
Configuration > Security > Switch > Users	#
Click <b>Add New User</b>	# configure terminal
Proceed with configuration	(config)# username <username> privilege <privilege level (0-15)>
Click <b>Save</b>	password <unencrypted   none   encrypted> <password>

### 4.4 Port Configuration

To enable or disable ports and uplinks and to configure port and uplink status, speed, flow control, MTU and other advanced features:

Switch Web User Interface	ICLI (serial, SSH, Telnet, SOL)
Configuration > Ports	#
Proceed with configuration	# config terminal
Click <b>Save</b>	(config)# interface <*   Ethernet> <switch No.   switch group> / <port   port group>
	(config-if)# ?
	A list of possible configuration commands appears
	Proceed with configuration
Notes	
This operation must be done for all switches in the stack.	<p>In hub slot 1, the 10GbE ports are 1, 2, 22 and 27. In hub slot 2, the 10GbE ports are 1, 2, 24 and 27. (Refer to Table 1.)</p> <p>A single command line can involve one or multiple switches and one or multiple ports. Standard range writing conventions apply.</p> <p>Examples:</p> <p>(config)# interface Ethernet 1,2/3-9 This command involves switches 1 and 2 and ports 3 to 9.</p> <p>(config)# interface Ethernet */1-2 This command involves all switches within the stack and ports 1 and 2.</p>

## 4.5 Rear and Front Uplink Configuration

By default, the SYMKLOUD platform uses the hub's front 10GbE SFP+ uplinks.

When the front uplinks of a hub are used, the rear SFP+ uplinks of an optional MSU8700 uplink module attached to it cannot be used and vice versa.

### 4.5.1 Front Uplinks

To toggle uplinks from rear to front:

Not possible through a Web interface	ShMC CLI
	<pre>ipmitool&gt; ipmitool&gt; raw 0x3e 0x20 0xC0 0x00</pre> <p><i>To perform a power cycle for the change to take effect, the hub must be in standby mode (blinking green LED on hub). Refer to Table 3 for ShMC redundancy characteristics.</i></p> <pre>ipmitool&gt; power cycle</pre>
Notes	
	<p>If the configuration is still not in effect after a power cycle, reset the switch to factory default. Refer to the <i>SYMKLOUD MS2900 Platform Installation and Maintenance Guide</i>.</p>

### 4.5.2 Rear Uplinks

When 1 or 2 rear uplink modules (MSU8700) are installed, 10GbE connections can be established from the back of the system.

To toggle uplinks from front to rear:

Not possible through a Web interface	ShMC CLI
	<pre>ipmitool&gt; ipmitool&gt; raw 0x3e 0x20 0xC0 0x01</pre> <p><i>To perform a power cycle for the change to take effect, the hub must be in standby mode (blinking green LED on hub). Refer to Table 3 for ShMC redundancy characteristics.</i></p> <pre>ipmitool&gt; power cycle</pre>
Notes	
	<p>If the configuration is still not in effect after a power cycle, reset the switch to factory default. Refer to the <i>SYMKLOUD MS2900 Platform Installation and Maintenance Guide</i>.</p>

#### 4.6 Loop Protection Configuration

To protect the system against network loops:

Switch Web User Interface	ICLI (serial, SSH, Telnet, SOL)
Configuration > Loop Protection Proceed with configuration Click <b>Save</b>	# # configure terminal (config)# loop-protect
Notes	
This operation enables loop protection on all switches in the stack.	

#### 4.7 Spanning Tree Protocol Configuration

To enable and configure the STP for all switches in the stack:

Switch Web User Interface	ICLI (serial, SSH, Telnet, SOL)
Configuration > Spanning Tree > CIST Ports Proceed with configuration Click <b>Save</b>	<i>To perform global switch configuration</i> # # configure terminal (config)# spanning-tree mode <b>mstp   rstp   stp</b>
Configuration > Spanning Tree > CIST Ports Configuration > Spanning Tree > MSTI Mapping Configuration > Spanning Tree > MSTI Priorities Configuration > Spanning Tree > MSTI Ports For each page, proceed with configuration Click <b>Save</b>	<i>To perform interface specific configurations</i> # #configure terminal (config)# interface <*> <b>Ethernet   vlan</b> (config-if)# spanning-tree

4.8 Stacking Configuration

Stacking is a method used to create a switch cluster for the functionalities of all switches. By default, stacking is enabled, all switches have the same priority level, a master switch is selected by the system, and switch IDs are assigned based on order of detection.

Up to 16 switches (maximum of 8 MS2900) can be stacked using the dedicated 10GbE stacking ports on the front plate and the dedicated interswitch stacking ports. The master switch selected by the system manages the switch cluster.

Two types of topology are supported: ring topology (closed loop) and chain topology (open loop). A ring topology is recommended for redundancy and performance purposes.

Figure 14: Stacking example using 4 MS2900



The blue cable in Figure 14 closes the loop. If this cable (or any cable involved in the stacking) is removed, the ring topology becomes a chain topology. Removing a cable between 2 MS2900 will disable their external stacking capabilities; however, their internal (hub 1 to hub 2) stacking capabilities will be maintained.

To configure a specific stack:

Switch Web User Interface	ICLI (serial, SSH, Telnet, SOL)
Configuration > Stack Proceed with configuration Click <b>Save</b>	# # switch stack ?  A list of possible configuration commands appears Proceed with configuration
Notes	
Column <b>Priority</b> lets you set priority levels for switches. Priority levels are from 1 to 4. The switch with a priority level of 1 will be the one elected master upon system power up or when you use the <b>Start Master Election</b> option.	

4.9 Basic VLAN Configuration

Three VLANs are preconfigured on the switch, i.e. VLANs 1 (default), 4093 (management) and 4094 (TIPC) (see Figure 7). VLAN 1 cannot be deleted. To configure a VLAN:

Switch Web User Interface	ICLI (serial, SSH, Telnet, SOL)
Configuration > VLANs > VLAN Membership Click <b>Add New VLAN</b> Configure the new VLAN Include or forbid ports Click on <b>Save</b>	<i>To create a VLAN</i> # # configure terminal (config)# vlan <vlan list> (config-vlan)# ?  A list of possible configuration commands appears Proceed with configuration  <i>To include ports in a VLAN</i> # # configure terminal (config)# interface <*   Ethernet> <switch No.   switch group/port No.   port group> (config-if)# switchport ?  A list of possible configuration commands appears Proceed with configuration
Configuration > VLANs > Ports Proceed with configuration Click on <b>Save</b>	# # configure terminal (config)# interface <*   Ethernet> <switch No.   switch group/port No.   port group> (config-if)# switchport mode ?  A list of possible configuration commands appears Proceed with configuration
Notes	
These 2 configurations must be done for each switch in the stack.	VLAN configuration will be propagated to all switches in the stack if the symbol for "all switches in the stack", i.e. "*", is used as a parameter in the interface command.

#### 4.10 Static Routing Configuration

To configure routing between VLANs within a stack:

Switch Web User Interface	ICLI (serial, SSH, Telnet, SOL)
Configuration > System > IP Click on <b>Add Route</b> Proceed with configuration Click on <b>Save</b>	# # configure terminal (config)# ip route <network address> <network mask> <gateway>
Notes	
Perform this configuration on the stack master switch.	



#### 4.11 Node Connection Speed Configuration (Chassis Slots 7 and 9)

To reconfigure hub connection speeds for a node installed in chassis slot 7 or 9:

SMWI	ShMC CLI
Click on <b>Chassis</b> Change the speed of the slot Click on <b>Apply Settings</b> Click on <b>OK</b>  Perform a switch reboot.	<i>Read</i> ipmitool> raw 0x3e 0x21 <ShMC No.>  <i>Write</i> ipmitool> raw 0x3e 0x20 <ShMC No.> <ShMC fabric link speed> ipmitool> power reset
Notes	
This configuration is required only if you replace an existing node installed in slot 7 or 9 by another node that does not have the same speed configuration, e.g. a node with a 10GbE connection is installed in lieu and place of a node supporting only 1GbE connections. When no card is installed, the default configuration applies.	ShMC No.: "0xc3" for ShMC slot 1 "0xc4" for ShMC slot 2  ShMC fabric link speed: "0x01" for 1Gbps link speed "0x02" for 10Gbps link speed

#### 4.12 Switch Log

To view system log information:

Switch Web User Interface	ICLI (serial, SSH, Telnet, SOL)
Monitor > System > Log View log Click on the ID number of the entry to access its Detailed log	# # show logging ?  A list of possible logs to view is displayed

## 5 Configuring and Monitoring Shelf Managers

### 5.1 ShMC Management Interface Configuration

To configure the ShMC IP interface:

Not possible through a Web interface	ShMC CLI (serial)
	<pre>ipmitool&gt; lan print</pre> <p>Existing configuration is displayed</p> <pre>ipmitool&gt; lan set 1</pre> <p>Command syntax and possible configurations are displayed Proceed with configuration</p>
Notes	
	<b>WARNING:</b> Do not attempt to configure the IP interface of the ShMC through an SSH connection. This will interrupt the SSH session.

### 5.2 Date and Time Configuration

At power up, the ShMC gets the date and time from the onboard RTC. The ShMC then uses it to set the date and time of the SEL and the nodes.

Not possible through a Web interface	ShMC CLI (serial, SSH)
	<pre>ipmitool&gt;</pre> <pre>ipmitool&gt; sel time set "&lt;dd/mm/yyyy hh:mm:ss&gt;"</pre>
Notes	
	Quotation marks (") must surround your configured time.

### 5.3 User Account Configuration

To configure user accounts (user ID and associated username, password and privilege level):

Not possible through a Web interface	ShMC CLI (serial, SSH)
	<pre>ipmitool&gt;</pre> <pre>ipmitool&gt; user list 1</pre> <p>A list of all users is displayed</p> <p><i>To add a user</i></p> <pre>ipmitool&gt; enable &lt;user ID&gt;</pre> <p><i>To configure user parameters</i></p> <pre>ipmitool&gt; user set name &lt;user ID&gt; &lt;username&gt;</pre> <pre>ipmitool&gt; user set password &lt;user ID&gt; &lt;password&gt;</pre> <pre>ipmitool&gt; user priv &lt;user ID&gt; &lt;privilege level (1-4)&gt; 1</pre>
Notes	
	Privilege levels are from 1 to 4 (1: CALLBACK; 2: USER; 3: OPERATOR; 4: ADMINISTRATOR).

### 5.4 Chassis ID Configuration

A stack can contain up to 8 MS2900 systems. To configure the chassis ID of an MS2900 before including it in a stack:

Not possible through a Web interface	ShMC CLI (serial, SSH)
	<p><i>To configure the chassis ID</i></p> <pre>ipmitool&gt; raw 0x3e 0x0F 0xB4 0x90 0x91 0x8B 0xE0 &lt;Chassis No. (1-8)&gt;</pre> <p><i>To display the chassis ID</i></p> <pre>ipmitool&gt; raw 0x3e 0x10 0xB4 0x90 0x91 0x8B 0xE0</pre>
Notes	
	When you are done, disconnect all the power cords of the unit for which you just changed the chassis ID. Then reconnect the power cords.

## 5.5 System Event Log Access

To access the SEL:

Not possible through a Web interface	ShMC CLI (serial, SSH)
	<p><i>To view SEL status</i></p> <pre>ipmitool&gt; sel</pre> <p><i>To view the SEL</i></p> <pre>ipmitool&gt; sel list</pre> <p>A list of event logs sent to the ShMC is displayed</p> <p><i>To delete the SEL</i></p> <pre>ipmitool&gt; sel clear</pre>

## 5.6 System Sensors Access

Refer to the *MSH8900 Sensor List* for a complete list of sensors.

To view system sensor information:

Not possible through a Web interface	ShMC CLI (serial, SSH)
	<pre>ipmitool&gt; sensor list</pre>
Notes	
	<p>System information is displayed in the following order:</p> <ul style="list-style-type: none"> <li>» Sensor name</li> <li>» Analog reading—reading for analog sensor and 0x0 for discrete sensor</li> <li>» Type—unit for analog sensor and discrete for discrete sensor</li> <li>» Sensor status—ok or not ok for analog sensor and bites for discrete sensor</li> <li>» Threshold values (last 6 columns): lower non-recoverable, lower critical, lower non-critical, upper non-critical, upper critical, upper non-recoverable</li> </ul>

# 6 Using Ipmitool

## 6.1 IPMI Mapping

From the ipmitool interface, you can access MS2900 components using their IPMI addresses.

Table 10: IPMI mapping

Component	IPMI address
Active ShMC 1	0x20
Standby ShMC 2	0x10
Node 1	0x82
Node 2	0x84
Node 3	0x86
Node 4	0x88
Node 5	0x8a
Node 6	0x8c
Node 7	0x8e
Node 8	0x90
Node 9	0x92

To establish a connection with another MS2900 component and direct the commands to this component:

SMWI	ShMC CLI (serial, SSH)
Click on <b>HubNode</b> <n> or <b>Node</b> <n>	ipmitool> set targetaddr <ipmi address>
Notes	
IPMI mapping is not required in the SMWI. You can connect to a component by clicking on it.	To break the connection and go back to the initial component, reestablish a connection with the initial component.

## 6.2 IPMI Node Parameter Configuration

To configure node IOL/SOL and users:

Not possible through a Web interface	ShMC CLI (serial, SSH)
	<p>Use IPMI mapping to connect to the node you want to configure (section 6.1)</p> <p><i>To configure IOL IP</i>  ipmitool&gt; lan print  Existing configuration is displayed</p> <p>ipmitool&gt; lan set 1  Command syntax and possible configurations are displayed  Proceed with configuration</p>
	<p>Use IPMI mapping to connect to the node you want to configure (section 6.1)</p> <p><i>To configure SOL</i>  ipmitool&gt; sol info 1  Existing configuration is displayed</p> <p>ipmitool&gt; sol set  Command syntax and possible configurations are displayed  Proceed with configuration</p>
	<p>Use IPMI mapping to connect to the node you want to configure (section 6.1)</p> <p><i>To view users</i>  ipmitool&gt;  ipmitool&gt; user list 1  A list of all users is displayed</p> <p><i>To add a user</i>  ipmitool&gt; enable &lt;user ID&gt;</p> <p><i>To configure user parameters</i>  ipmitool&gt; user set name &lt;user ID&gt; &lt;username&gt;  ipmitool&gt; user set password &lt;user ID&gt; &lt;password&gt;  ipmitool&gt; user priv &lt;user ID&gt; &lt;privilege level (1-4)&gt; 1</p>
Notes	
	IOL IP must be configured before SOL can be enabled.

### 6.3 Node Information Access

To access SEL information:

Not possible through a Web interface	ShMC CLI (serial, SSH)
	<p>Use IPMI mapping to connect to the node you want to configure (section 6.1)</p> <p><i>To view SEL status</i></p> <pre>ipmitool&gt; sel</pre> <p><i>To view the SEL</i></p> <pre>ipmitool&gt; sel list</pre> <p>A list of event logs sent to the ShMC is displayed</p> <p><i>To delete the SEL</i></p> <pre>ipmitool&gt; sel clear</pre>

Refer to the *MSH8900 Sensor List* for a complete list of sensors. To access sensor information:

Not possible through a Web interface	ShMC CLI (serial, SSH)
	<p>Use IPMI mapping to connect to the node you want to configure (section 6.1)</p> <pre>ipmitool&gt; sensor list</pre>
Notes	
	<p>System information is displayed in the following order:</p> <ul style="list-style-type: none"> <li>» Sensor name</li> <li>» Analog reading—reading for analog sensor and 0x0 for discrete sensor</li> <li>» Type—unit for analog sensor and discrete for discrete sensor</li> <li>» Sensor status—ok or not ok for analog sensor and bites for discrete sensor</li> <li>» Threshold values (last 6 columns): lower non-recoverable, lower critical, lower non-critical, upper non-critical, upper critical, upper non-recoverable</li> </ul>

To access FRU data information:

Not possible through a Web interface	ShMC CLI (serial, SSH)
	<p>Use IPMI mapping to connect to the node you want to configure (section 6.1)</p> <pre>ipmitool&gt; fru print</pre>

## 7 Performing Updates

### 7.1 Switch Update

To update the firmware of all switches in a stack:

Switch Web User Interface	ICLI (serial, SSH, Telnet, SOL)
Maintenance > Software Upload Click on <b>Browse...</b> Select the proper *.dat file Click on <b>Upload</b>	# # firmware upgrade tftp://<TFTP Server IP>/<path>/<*.dat filename>
Notes	
A TFTP server is required to perform the upgrade.	

### 7.2 ShMC Update

To update a ShMC:

SMWI	Computer command prompt
Select <b>HubNode1</b> or <b>HubNode2</b> Click on the <b>Software Upgrade</b> tab Click on <b>Select HPM file to upload</b> Select the HPM file from its location in your network Click on <b>Open</b> Click on <b>Upload to BMC</b> Click on <b>Start upgrade</b> once available	API under construction
Notes	
This operation must be done for each ShMC.	

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