» Kontron User's Guide «

MSP8000/8001
Document Revision 1.0

Revision History

Revision	Brief description of changes	Date of issue
1.0	First release	July 2014

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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
BP	Backplane
CLI	Command-Line Interface
DMI	Desktop Management Interface
ECC	Error Checking and Correction
HPM	PICMG Hardware Platform Management specification family
IOL	IPMI-Over-LAN
IPMI	Intelligent Platform Management Interface
KCS	Keyboard Controller Style
KVM	Keyboard Video Mouse
NCSI	Network Communications Services Interface
PCIe	PCI-Express
RAM	Random Access Memory
ShMC	Shelf Management Controller
SMWI	System Monitor Web Interface
SOL	Serial Over LAN
SSD	Solid-State Drive
VLP	Very Low Profile

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Electrostatic Discharge

CAUTION! The MSP8000 and MSP8001 nodes are sensitive to electrostatic discharge (ESD). Users must observe the appropriate precautions when handling ESD-sensitive devices.

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Kontron grants the original purchaser of Kontron's products a TWO YEAR LIMITED HARDWARE WARRANTY as described in the following. However, no other warranties that may be granted or implied by anyone on behalf of Kontron are valid unless the consumer has the express written consent of Kontron.

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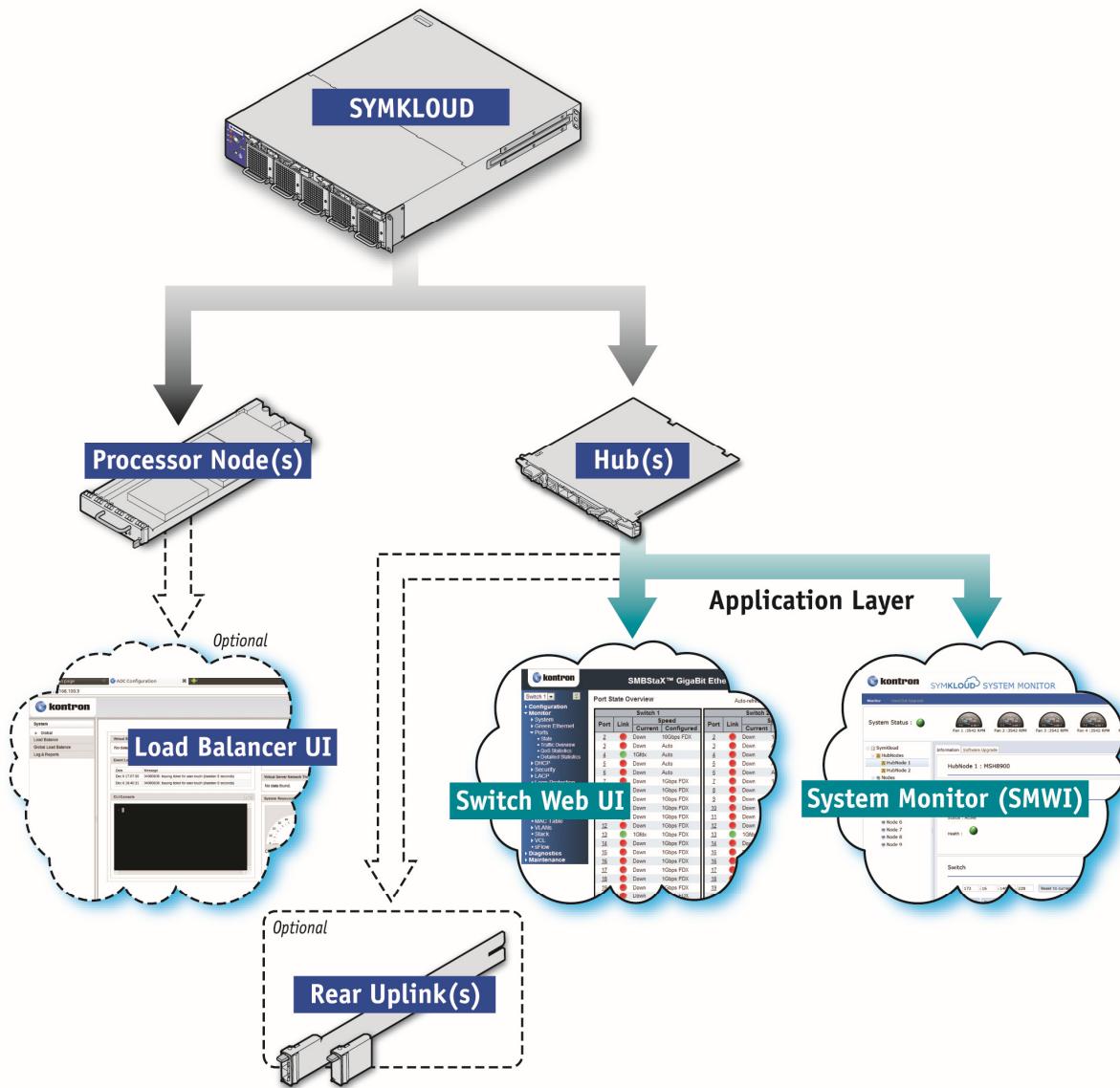
1   Product Description

1.1   Product Overview

The MSP8000 and MSP8001 are processor nodes for the SYMKLOUD MS2900 platform. Nine nodes can be installed in each MS2900. When used with the MSH8900 hub, the MSP8000 node supports two 1GbE ports and the MSP8001 node supports four 1GbE ports with the exception of nodes 7 and 9 that support three 1GbE ports and one 10GbE port.

An OS must be loaded on the processor nodes for the system to be operational.

Figure 1: SYMKLOUD layers

Figure 2: MSP8000 or MSP8001 in rear of chassis
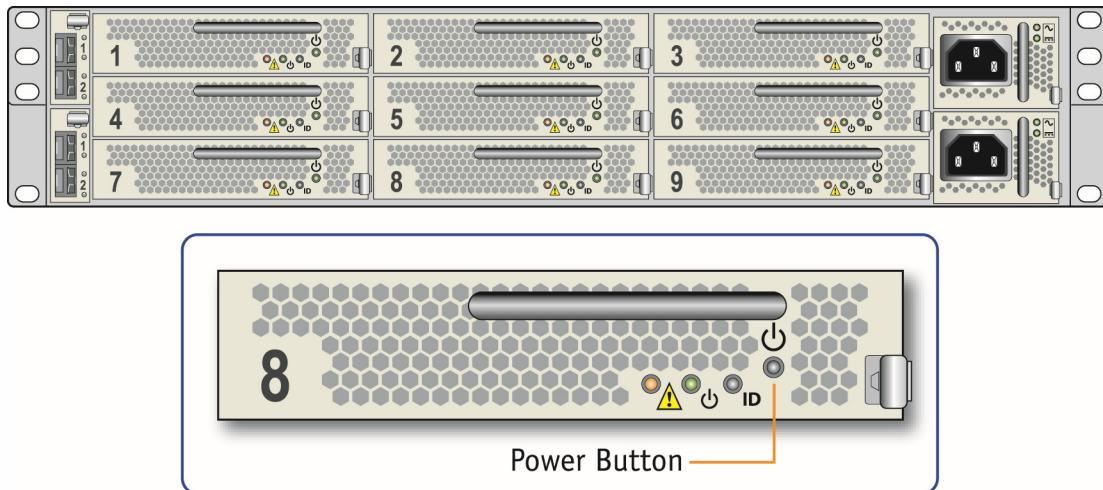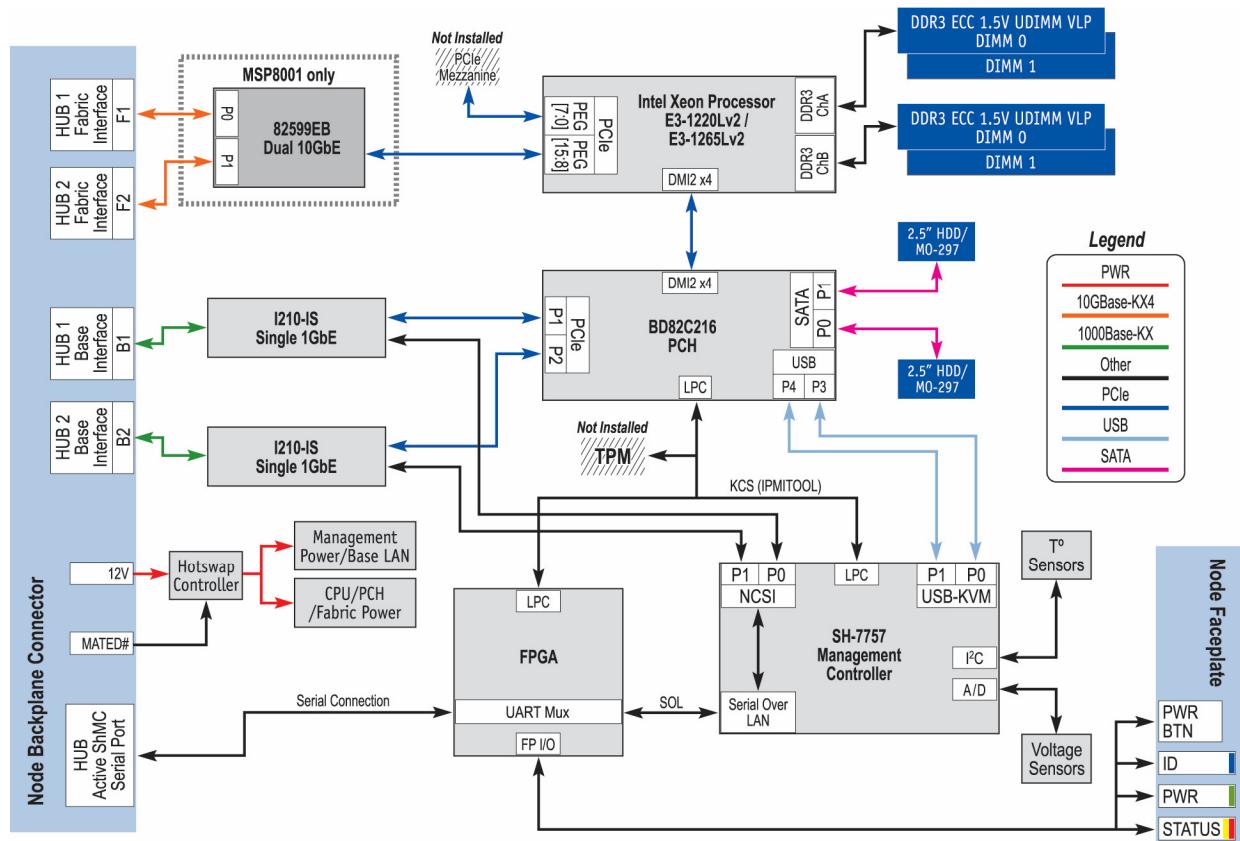
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For information on other SYMKLOUD MS2900 components, refer to the specific component's user manual.

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 3: MSP8000 and MSP8001 block diagram

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

1.3   PCI Mapping

Table 1: PCI Mapping

| Bus:Device: Function	Device ID	Component	Description	Note
CPU				
00:00.0	0158	Host bridge	Intel Corporation Ivy Bridge DRAM Controller (rev. 09)	Intel E3-1265LV2 processor
00:01.0	0151	PCI bridge	Intel Corporation 3rd Gen Core processor PCI Express Root Port (rev. 09)	MSP8001 only
Chipset				
00:14.0	1e31	USB controller	Intel Corporation 7 Series Chipset Family USB xHCI Host Controller (rev. 04)	Intel C216 chipset
00:16.0	1e3a	Communication controller	Intel Corporation 7 Series Chipset Family MEI Controller No. 1 (rev. 04)	
00:1c.0	1e10	PCI bridge	Intel Corporation 7 Series Chipset Family PCI Express Root Port 1 (rev. c4)	
00:1c.1	1e12	PCI bridge	Intel Corporation 7 Series Chipset Family PCI Express Root Port 2 (rev. c4)	
00:1c.2	1e14	PCI bridge	Intel Corporation 7 Series Chipset Family PCI Express Root Port 3 (rev. c4)	
00:1d.0	1e26	USB controller	Intel Corporation 7 Series Chipset Family USB Enhanced Host Controller No. 1 (rev. 04)	
00:1e.0	244e	PCI bridge	Intel Corporation 82801 PCI Bridge (rev. a4)	
00:1f.0	1e53	ISA bridge	Intel Corporation Panther Point LPC Controller (rev. 04)	
00:1f.2	1e02	SATA controller	Intel Corporation 7 Series Chipset Family 6-port SATA AHCI Controller (rev. 04)	
00:1f.3	1e22	SMBus	Intel Corporation 7 Series Chipset Family SMBus Controller (rev. 04)	
Network devices				
02:00.0	1537	Ethernet controller	Intel Corporation (rev. 03)	Intel I210-IS 1Gb Ethernet to Hub 1
03:00.0	1537	Ethernet controller	Intel Corporation (rev. 03)	Intel I210-IS 1Gb Ethernet to Hub 2
BMC				
04:00.0	0013	PCI bridge	Renesas Technology Corp. SH7757 PCIe Switch [PS]	Renesas SH7757 BMC
05:00.0	0013	PCI bridge	Renesas Technology Corp. SH7757 PCIe Switch [PS]	
05:01.0	0013	PCI bridge	Renesas Technology Corp. SH7757 PCIe Switch [PS]	
07:00.0	0012	PCI bridge	Renesas Technology Corp. SH7757 PCIe-PCI Bridge [PPB]	
08:00.0	0534	VGA compatible controller	Matrox Electronics Systems Ltd. G200eR2	
Network devices				
09:00.0	10f8	Ethernet controller	Intel Corporation 82599EB 10 Gigabit Dual Port Backplane Connection (rev. 01)	Intel 82599EB 1Gb/10Gb to hub 1, MSP8001 only
09:00.1	10f8	Ethernet controller	Intel Corporation 82599EB 10 Gigabit Dual Port Backplane Connection (rev. 01)	Intel 82599EB 1Gb/10Gb to hub 2, MSP8001 only

1.4   Node Key Components

Table 2: Node key components

Component*	Description
CPU	1 Intel® Xeon® E3-1220L v2, 3 MB cache, 2.3 GHz, 17 W, dual-core **OR** 1 Intel® Xeon® E3-1265L v2, 8 MB cache, 2.5 GHz, 45 W, quad-core
Chipset	1 Intel® C216 PCH
System memory	4 DIMM slots for up to 32 GB DDR3, supports ULP unbuffered 1.5V DDR3 with ECC, up to 1600 MHz
Network connections	2 Intel® I210-IS 1GbE controllers 1 Intel® 82599EB dual 10GbE controller (MSP8001 only)
Storage	1 or 2 2.5-inch SATA SSD/HDD depending on CPU/heatsink option
I/O devices	2 6-Gbps SATA ports 1 serial port through backplane and MSH8900 hub 1 serial port through SOL via the integrated BMC 1 KVM (Keyboard, Video, Mouse) accessible over LAN 1 USB storage via virtual media over LAN 1 optional OEM mezzanine (for PCIe x8 Gen 2)
BIOS	8 MB SPI AMI UEFI BIOS

* Some of the components are optional.

Refer to the Intel website ark.intel.com for more information on Intel components.

1.5   Node Features
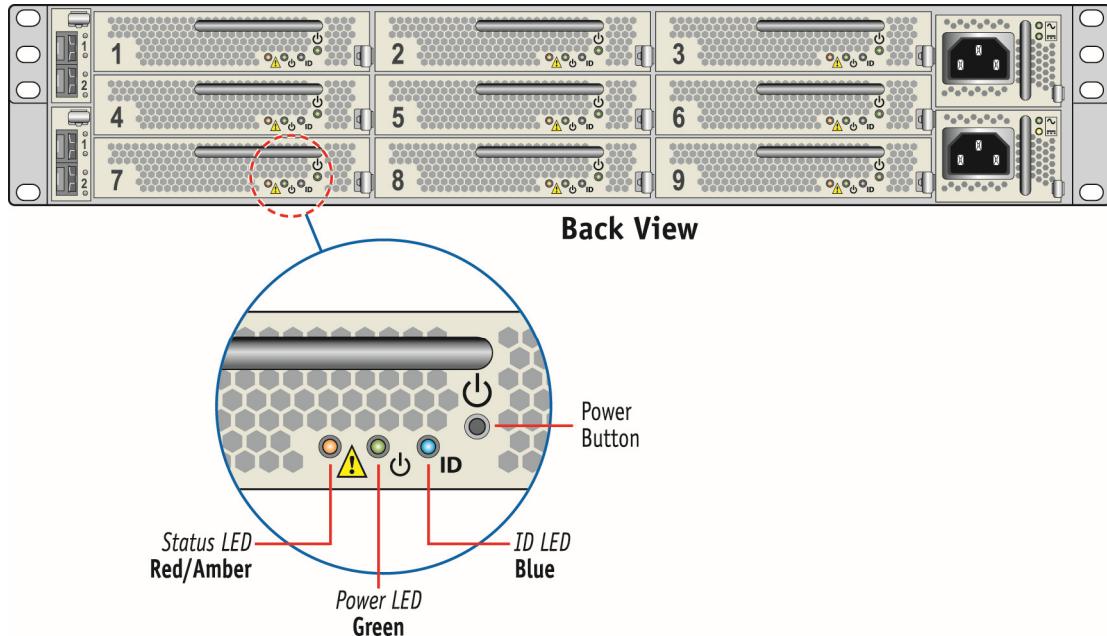
Table 3: Node features

Feature	Description
Remote management	IPMI 2.0 IOL SOL KVM/virtual media Remote firmware update Comprehensive sensor network and event monitoring Refer to the *MSP8000/8001 Sensor List* for a list of sensors
Validated OS	Ubuntu Server, 64-bit, long-term support release 12.04 Red Hat Enterprise Linux Server, 64-bit, release 6.3 SUSE Linux Enterprise Server 11, 64-bit, SP2 Windows Server 2008 R2, 64-bit, SP1 For a list of current validated OS, refer to the product's THOL.
Hot swap	Supported Refer to the *MSH8900 User's Guide* for information on system behavior upon hot swap
Power consumption	May vary depending on SSD/HDD model MSP8000: 43 W max (E3-1220L v2) 67 W max (E3-1265L v2) MSP8001: 73 W max (E3-1265L v2) The maximums are typical. Tests were conducted with 32 GB of 1600 MHz DDR3 and 2 SSDs, running a combination of CPU, memory, storage and network stress test applications.
Power management	Support for suspend-to-RAM and suspend-to-disk

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

1.6 Node Module LEDs and Buttons

Figure 4: MSP8000 and MSP8001 LEDs and buttons

CP0036

Table 4: LED status description and button behavior

MSP8000/8001			
State	ID (blue)	Power (green)	Status (amber)
Identify command in progress	Blinking[1]	Not affected	Not affected
Payload power ON	OFF	ON	ON: not healthy OFF: healthy
Payload power OFF or suspend-to-disk	ON	OFF	ON: not healthy OFF: healthy
Suspend-to-RAM	ON	Blinking[2]	ON: not healthy OFF: healthy

[1] Fast blink, 1 Hz, 50%
[2] Slow blink, 0.5 Hz, 20%

Power button		
State	Short press	Long press
Power OFF OR Suspend-to-RAM	Powers the node	Nothing happens
Power ON	Performs a clean shutdown of the node or enables suspend-to-RAM (OS configuration dependant)	Turns node off immediately

1.7   Network Interfacing

The MSP8001 node supports four 1GbE ports when installed in chassis slots 1-6 or 8. However, when installed in chassis slots 7 or 9, it supports three 1GbE ports and one 10GbE port.

In slot 7, the 10GbE link is on the F1 port and goes to hub 1. In slot 9, the 10GbE link is on the F2 port and goes to hub 2. For a complete port mapping and network topology of the system, refer to the *MSH8900 User's Guide.*

1.8   Management Interfacing

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

The SYMKLOUD platform comes with a System Monitor Web Interface (SMWI). The SMWI can be used to update node components.

Refer to the *SYMKLOUD MS2900 Platform Quick Start Guide* for an overview of the SMWI and for information on how to access it as well as for the locations of the management and console ports.

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.*

The MSP8000 and MSP8001 nodes have a KVM functionality that gives users remote access to the CPU engine. The remote console is the redirected screen, keyboard and mouse of the remote host system. Through media redirection, this functionality allows users to mount a device, e.g. a USB drive or ISO image, as a remote device to the CPU engine. Once mounted, the device appears as a local device.

Figure 5 and Figure 6 show the steps required to access the system's various interfaces.

Figure 5: Diagram of interface paths with a management networking connection
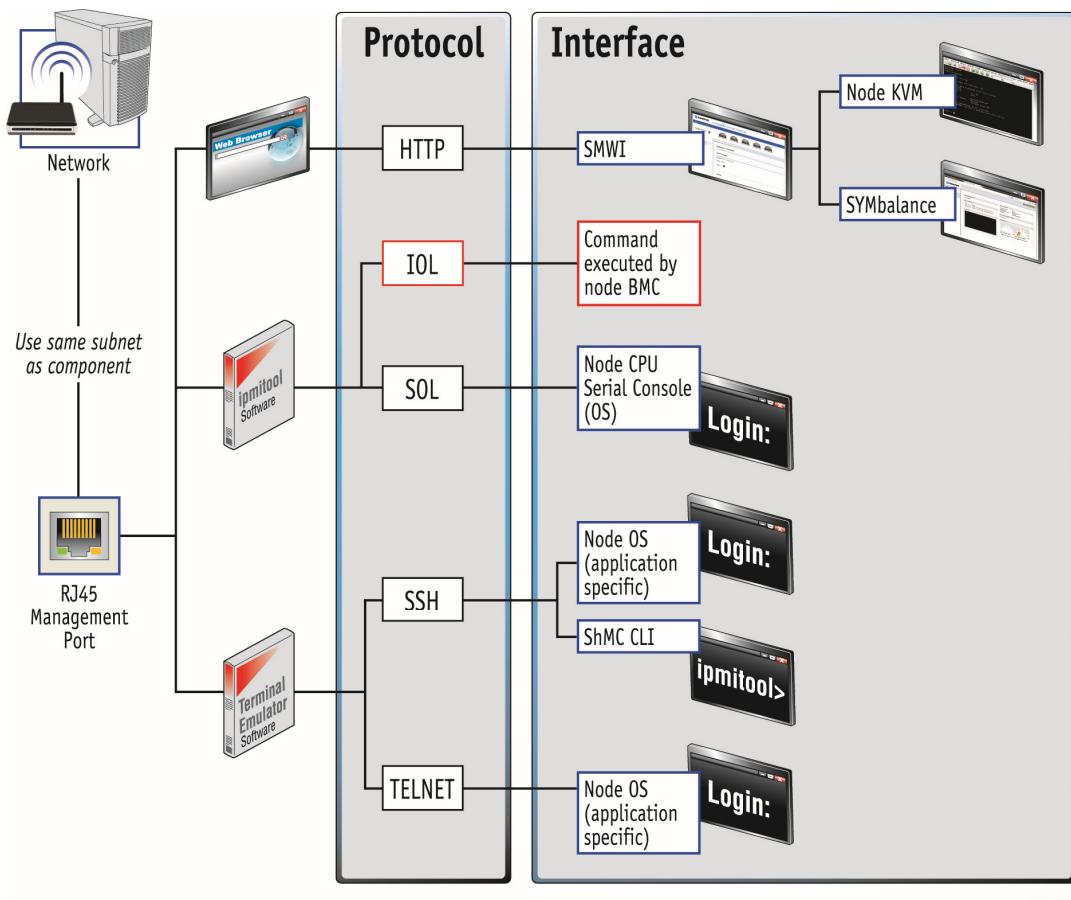
NOTES:
- » Terminal emulator software such as PuTTY can be used.
- » The Kontron ipmitool package can be downloaded from site http://cbu.kontron.ca/, under Software Tools.
- » Ensure the protocol is enabled for the interface you want to access.
- » An IOL connection allows users to send ipmitool commands that will immediately be executed by the node BMC.
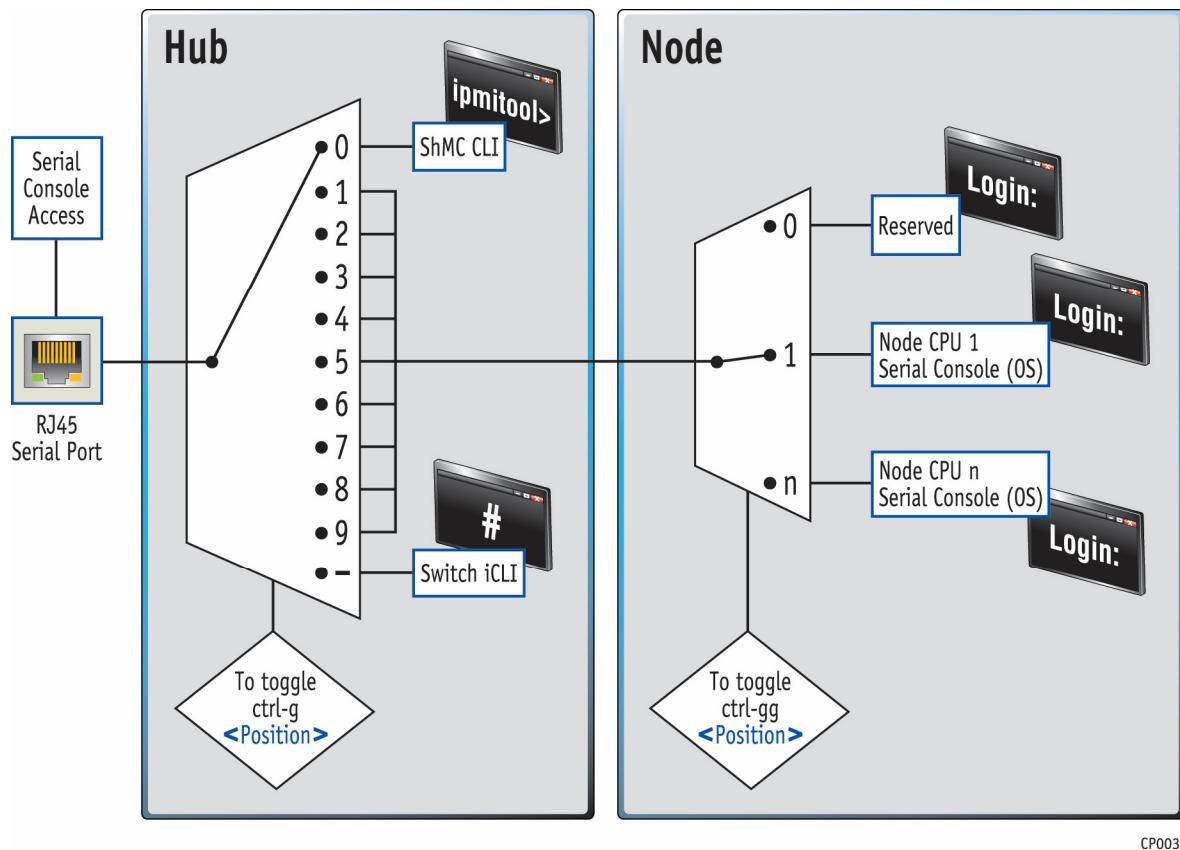
Example of SOL connection to the node CPU serial console (OS):
1. Connect to the management port with a cable or via a network.
2. Establish an SOL connection using ipmitool:
   a. From a PC: ipmitool –H <node ip address> -U admin –P admin –I lanplus sol activate
   b. From the ShMC CLI: under construction
3. The OS specific prompt is displayed, e.g. Login.
Example of an HTTP connection to the node KVM:
1. Connect to the management port with a cable or via a network.
2. Open a Web browser and enter the IP address of the hub to access the SMWI.
3. Click on **Node n** and then on **Create Session** under section Remote access.

Figure 6: Diagram of interface paths with a serial console connection

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. To type "Ctrl-gg", use the "Ctrl-g" ASCII control code 2 times in a row.

Example of a serial connection to the node CPU serial console (OS):
1. Connect a PC to the active hub's console port
2. Establish a connection using the PC terminal emulator with parameters 115200 baud, no parity, one stop bit
3. To configure the hub console port MUX, type Ctrl-g <Node No. (1-9)>, then Ctrl-gg 1.

Table 5: Default usernames and passwords of management interfaces

| Configuration interface	Username and password
MS2900 SMWI	admin
	admin
ShMC CLI	admin
	admin
Node CPU serial console (OS)	Customer specific

2   Extracting and Inserting a Node Module

2.1   Extracting a Node 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 node to be extracted. (The power button should be configured in the operating system so as to perform a clean shutdown when pressed.)
3.   The ID LED of the node becomes steady blue: the node is ready to be extracted.
4.   To extract the node module from the slot, pull on the handle while pressing the safety lock (Figure 7) towards the left.

Figure 7: Processor node module safety lock location
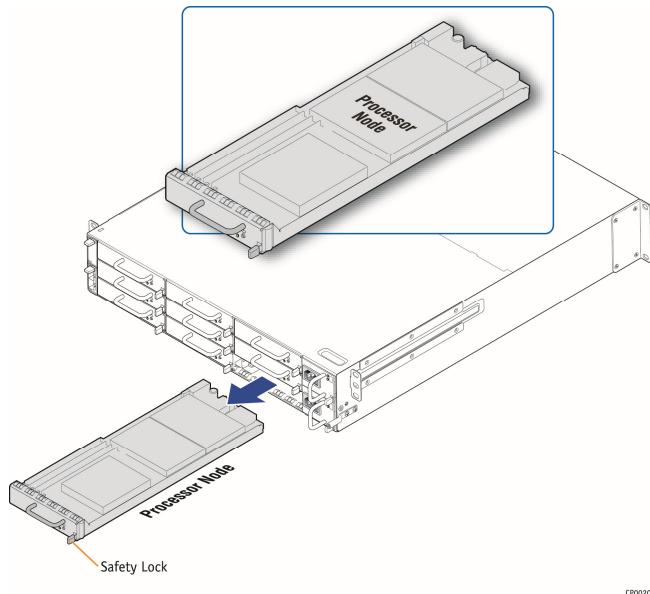
2.2   Inserting a Node Module

1.   Holding the handle, insert a node module.
2.   Push it in until the safety lock locks in place.
3.   Press the power button of the node module that was inserted. The power LED of the processor node module becomes steady green: the node is powered on and ready to use.

2.3   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 nodes MSP8000 or MSP8001, the following systems and functionalities could be affected:

» All nodes: Node dedicated applications could be affected.
» Node 7 or 9: A SYMbalance connection could be lost.

3   Software Configurations and Conventions

Before you start configuring node modules, read the following list of mandatory tasks. You can refer to that list to ensure you have performed the basic tasks required for proper system operation. Note that some of these tasks can already have been done.

Mandatory tasks:
» Booting from LAN, from virtual media or from disk onboard
» Installing an OS

The following conventions are used in this guide:

Conventions:

- » Elements between < > in blue are variables. The value shown is an example or an instruction on 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.
- » Refer to the _MSH8900 User's Guide_ for the IPMI mapping of the system.
- » Refer to the _SYMKLOUD MS2900 Platform Quick Start Guide_ for a list of default IP addresses.

Configuration command tables:

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

4 Configuring Node Modules

4.1 Node Reset

To reset the CPU of a node:

SMWI, KVM, Node Web UI	Node CPU serial console, ShMC CLI, IOL remote PC
From the SWMI Under construction	*From the Node CUP serial console* Send a break sequence *From the ShMC CLI* ipmitool> ipmitool> set targetaddr <node ipmi address> ipmitool> power reset *From an IOL remote PC* > ipmitool –H <node BMC ip address> -U admin –P admin power reset *OR* > ipmitool –H <ShMC ip address > -U admin –P admin –t <node ipmi address> power reset
Notes	
	For the node CPU serial console connection, the method is terminal emulator specific, e.g. with putty type Ctrl-break or use menu **Special command** and select **Break.**

4.2 Boot Order

To choose the boot order of a processor node:

KVM	Node CPU serial console
Perform a node reset (section 4.1) Press **F2** when prompted to enter the bios setup menu Select the **Boot** tab to display the current boot order *To choose the Boot Option Priority* Use the up or down arrow key to select a boot device Use the **+** or **–** key to move the boot device up or down Select the **Save & Exit** tab Select **Save Changes and Reset**	Perform a node reset (section 4.1) Press **F2** when prompted to enter the bios setup menu Select the **Boot** tab to display the current boot order *To choose the Boot Option Priority* Use the up or down arrow key to select a boot device Use the **+** or **–** key to move the boot device up or down Select the **Save & Exit** tab Select **Save Changes and Reset**
Notes	
You could boot from LAN, from virtual media or from disk on board. The default Boot Priority Order is: virtual media (if open), hard drive (if installed), Base Interface LAN, Fabric Interface LAN.	

To change the boot order of a processor node temporarily:

KVM	Node CPU serial console
Perform a node reset (section 4.1) Press **F7** when prompted to enter the boot menu Detected boot devices are displayed Use the up or down arrow key to select a boot device Press **Enter**	Perform a node reset (section 4.1) Press **F7** when prompted to enter the boot menu Detected boot devices are displayed Use the up or down arrow key to select a boot device Press **Enter**
Notes	
You could boot from LAN, from virtual media or from disk on board.	

4.3   Boot from Virtual Media

To boot a processor node from a virtual media:

KVM	Not possible from a CLI-type interface
Select the **Media** tab Connect the media device and select the appropriate option Click on **Close** Perform a node reset (section 4.1) Set the boot priority of your media device (section 4.2)	
Notes	
The possible options are virtual floppy, virtual CD and virtual hard disk.	

4.4   OS Installation

To install an OS:

KVM	Not possible from a CLI-type interface
Boot from LAN or from virtual media (section 4.3) Select the **CD/DVD** option Proceed with installation	

5   Performing Updates

An HPM file provided by Kontron contains firmware updates for node components.

5.1   Processor Node Update

To update the firmware of the node BMC, BIOS and FPGA:

SMWI	Computer command prompt
Select **Node n** Click on tab **Software Upgrade** Click on **Select HPM file to upload** Select the HPM file from its location in your network Click on **Open** Click on **Upload to BMC** **Click on** Start upgrade once available	API under construction
Notes	
This operation must be done for all nodes.	

5.2   One Click Upgrade to Update all Nodes

To update the firmware of the node BMC, BIOS and FPGA of all nodes sequentially:

SMWI	Computer command prompt
Click on tab **OneClick Upgrade** Select **All** to update all nodes and the 2 ShMC *OR* Select **MSP8000** to update all nodes *OR* Select **MSP8001** to update all nodes Select the HPM file from its location in your network Click on **Open** Click on **Upload to BMC** Click on **Start process**	API under construction
Notes	
The update will be performed only on the components for which files are included in the HPM file bundle.	

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