



**SGI® UV™ System Management Node
Administrator Guide**

007-5694-011

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About This Manual

This manual describes how to use the system management node (SMN), which is an administrative computer for SGI® UV™ 2000, SGI® UV™ 1000, and SGI® UV™ 100 systems.

An SMN is required for SGI UV 1000 systems. An SMN is optional for SGI UV 2000 systems and SGI UV 100 systems.

Related Publications

The release notes for the SGI Foundation Suite and the SGI Performance Suite list SGI publications that pertain to the specific software packages in those products. The release notes reside in a text file in the `/docs` directory on the product media. For example, `SGI-MPI-1.x-readme.txt`. After installation, the release notes and other product documentation reside in the `/usr/share/doc/packages/product` directory.

All SGI publications are available on the Technical Publications Library at <http://docs.sgi.com>.

The following additional publications might be useful to you:

- The *SGI UV System Software Installation and Configuration Guide* describes how to install operating system software, SMN software, and SGI Foundation Software on SGI UV 2000, SGI UV 1000, and SGI UV 100 systems.
- For information about the optional SGI Management Center (SMC) software, see the following:
 - *SGI Management Center (SMC) Installation and Configuration*
 - *SGI Management Center (SMC) System Administrator Guide*
- The SGI Knowledgebase has been updated to include advanced information that pertains to the SMN. Your SGI representative can assist you in obtaining information from the SGI Knowledgebase about the following:
 - How to flash the BMC and CMC firmware.
 - How to flash the LG-E or Edge-corE switch firmware.
 - How to boot using the iSCSI protocol or how to boot from a Fibre Channel disk.

You can access the Knowledgebase at the following URL:

<https://support.sgi.com/Knowledgebase>

SGI creates hardware manuals that are specific to each product line. The hardware documentation typically includes a system architecture overview and describes the major components. It also provides the standard procedures for powering on and powering off the system, basic troubleshooting information, and important safety and regulatory specifications.

The following procedure explains how to retrieve a list of hardware manuals for your system.

Procedure 0-1 To retrieve hardware documentation

1. Type the following URL into the address bar of your browser:

`docs.sgi.com`

2. In the search box on the Techpubs Library, narrow your search as follows:

- In the **search** field, type the model of your SGI system.

For example, type one of the following: "UV 2000", "ICE X", Rackable.

Remember to enclose hardware model names in quotation marks (" ") if the hardware model name includes a space character.

- Check **Search only titles**.
- Check **Show only 1 hit/book**.
- Click **search**.

Obtaining Publications

You can obtain SGI documentation in the following ways:

- You can access user guides and reference manuals from the SGI Technical Publications Library at the following website:

<http://docs.sgi.com>.

Various formats are available. This library contains the most recent and most comprehensive set of online books, release notes, man(1) pages, and other information.

- You can log into an SGI system and retrieve Linux man(1) pages for a particular topic title. Type `man title` on a command line.

Conventions

The following conventions are used throughout this document:

Convention	Meaning
<code>command</code>	This fixed-space font denotes literal items such as commands, files, routines, path names, signals, messages, and programming language structures.
<code>manpage(x)</code>	Man page section identifiers appear in parentheses after man page names.
<i>variable</i>	Italic typeface denotes variable entries and words or concepts being defined.
user input	This bold, fixed-space font denotes literal items that the user enters in interactive sessions. (Output is shown in nonbold, fixed-space font.)
[]	Brackets enclose optional portions of a command or directive line.
...	Ellipses indicate that a preceding element can be repeated.

Reader Comments

If you have comments about the technical accuracy, content, or organization of this publication, contact SGI. Be sure to include the title and document number of the publication with your comments. (Online, the document number is located in the front matter of the publication. In printed publications, the document number is located at the bottom of each page.)

You can contact SGI in either of the following ways:

- Send e-mail to the following address:
techpubs@sgi.com
- Contact your customer service representative and ask that an incident be filed in the SGI incident tracking system:
<http://www.sgi.com/support/supportcenters.html>

SGI values your comments and will respond to them promptly.

Introduction

This chapter includes the following topics:

- "System Management Node Software and Documentation" on page 1
- "Logging in to the System Management Node" on page 2
- "System Management Node (SMN) Commands" on page 3
- "SMN RPMs for Single System Images (SSIs)" on page 7

System Management Node Software and Documentation

The SMN requires the following software:

- Operating system software, which can be either SUSE Linux Enterprise Server 11 or Red Hat Enterprise Linux 6
- SGI Foundation Software
- SGI System Management Node Software

In addition to the preceding list of required software, you might want to install the SGI Management Center (SMC) software. SMC provides a graphical user interface tool that enables you to initiate management actions and monitor essential system metrics.

To verify the software on your SMN, type the following command:

```
smn:~ # cat /etc/*release
```

SGI provides documentation on the documentation website at <http://docs.sgi.com>. In addition, documentation is included in the SMN software packages. You can access the SMN documentation on your SMN in one of the following ways:

- To retrieve the location of the SMN release notes, type the following command:

```
smn:~ # rpm -qld sgi-smn-release
```

- To retrieve the locations for the PDF and HTML versions of this manual, the *SGI UV System Management Node Administrator Guide*, type the following command:

```
smn:~ # rpm -qld sgi-smn-docs
```

- To retrieve a menu that lists additional documentation, type the following `relnotes(8)` command:

```
smn:~ # relnotes -b smn
```

After you make a selection from the menu, the system starts the appropriate viewing tool and presents your selection. The `relnotes(8)` command displays PDFs or other graphical documentation when X11 forwarding is enabled. To enable X11 forwarding, log into the SMN with a command similar to the following:

```
smn:~ # ssh -X root@my-smn
```

For example:

```
smn:~ # relnotes -b smn
NOTICE: Found only one(1) PDF viewer : /usr/bin/evince
NOTICE: Found multiple HTML viewers  : /usr/bin/firefox /usr/bin/lynx,no
  1 sgi-smn-1          SGI-SMN-1.7-readme.txt
  2 sgi-smn-1          SGI-SMN-1.7-rpms.txt
  3 sgi-smn-1          UV_mannode_AG/pdf/UV_mannode_AG.pdf
  4 sgi-smn-1          UV_mannode_AG/cgi_html/index.html
File number (h or ? for help) [1] : 3
... Using /usr/bin/evince
                                     # NOTE: At this point, the PDF viewer starts on the desktop.

  4 sgi-smn-1          UV_mannode_AG/cgi_html/index.html
File number (h or ? for help) [4] : 4
  1 /usr/bin/firefox
  2 /usr/bin/lynx
Choose viewer (h or ? for help) [Default=1] :
                                     # NOTE: At this point, select the browser.
```

Logging in to the System Management Node

The following procedure explains how to log into the SMN.

Procedure 1-1 To log into the SMN

1. Type the following command to log into the SMN:

```
# ssh -X sysco@uv-system-smn
```

2. Type the password for the SMN.

By default, the password is `sysco`.

3. (Optional) Type the following to list the SMN commands:

```
# /sysco/bin/help
```

System Management Node (SMN) Commands

The SGI UV system includes some commands that are available only on the SMN and others that are available on both the SMN and the chassis management controller (CMC). For information about how to log into the CMC and enter commands from the CMC, see the *SGI UV CMC Software User Guide*.

The following topics describe the SMN commands:

- "Chassis Management Controller (CMC) and System Management Node (SMN) Commands" on page 3
- "Managing Multiple, Individual SGI UV Systems or Single System Images (SSIs) From a Single SMN" on page 5
- "Specifying Unique SGI UV System Targets" on page 6

Chassis Management Controller (CMC) and System Management Node (SMN) Commands

Table 1-1 on page 3 lists the CMC commands, lists the SMN commands, and shows platform availability. To obtain more information about any of these commands, type the following:

```
command_name --help
```

Table 1-1 CMC and SMN Commands

Command	Availability	Action
auth	CMC, SMN	Authenticates system serial number (SSN) changes and sets the average peak performance in weighted teraflops (APPWT) limit for export compliance. You can obtain this key and reset the limit if needed.
autopower	CMC, SMN	Allows your system to power up automatically when power is applied after a power outage. Issuing the <code>autopower</code> command without an argument acts as a query, with the results displaying the current state (enabled/disabled) and (if enabled) the current delay time and the results of the last attempted automatic power on.
baseiolist	SMN	For each Base I/O BMC, lists the IP addresses, system serial number (SSN), Base I/O hostname, CMC hostname, and CMC IP address for the SGI UV systems attached to the SMN. This command requires the <code>smnd</code> daemon to be running.
bios	CMC, SMN	Displays BIOS information for the system after it is powered on.
bmc	CMC, SMN	Sends a command to one or more BMCs. It is a shell command similar in behavior to the <code>ssh</code> command.
cmc	CMC, SMN	Sends a command to one or more CMCs. It is a shell command similar in behavior to the <code>ssh</code> command.
config	CMC, SMN	Displays the system configuration.
console	CMC, SMN	Opens a console window on the CMC, BMC, or compute blade. Type <code>CTRL -] q</code> to exit the console.
help	CMC, SMN	Displays the hardware error logs.
hel	CMC, SMN	Displays the hardware error logs.
hwcfg	CMC, SMN	Displays and sets hardware override variables.
leds	SMN	Displays system LED values.
log	CMC, SMN	Provides a log of various operations performed on the CMC.

Command	Availability	Action
<code>power</code>	CMC, SMN	Accesses power control/status. The <code>power</code> command is also available on the chassis management controller (CMC). When a <code>power</code> command is issued, it checks to see if the individual rack units (IRUs) are powered on. If not on, the <code>power</code> command powers up the IRUs and then powers up the blades in the IRUs.
<code>/smnbackup</code>	SMN	Creates a <code>tar(1)</code> file and, optionally, other system files for the SMN. For more information, type the following command: <code># /smnbackup --help</code>
<code>uv_con</code>	SMN	Collects all SMN UV Base I/O UV consoles locally for consultation purposes.

Managing Multiple, Individual SGI UV Systems or Single System Images (SSIs) From a Single SMN

You can configure one SMN to manage multiple SGI UV systems. If you need to run SMN commands on only one system that is managed, type the `config` command first to retrieve the system serial numbers (SSNs) of the machines that your SMN manages. For example:

```
# config

SSN: UV2-00000050

CMCs:          20
BMCs:          160
Partitions:    1
Accessories:   0

SSN: UV2-00000051

CMCs:          20
BMCs:          160
Partitions:    1
Accessories:   0
```

If an SGI UV system is partitioned into multiple single system images (SSIs), the `config` command returns the number of SSIs and notes the BMCs and CMCs that are associated with each SSI.

Alternatively, you can use the `cmcfind` or the `cmclist` commands on the chassis management controller (CMC) to retrieve the SSN of a machine.

Specifying Unique SGI UV System Targets

Each of the SMN commands accepts a *target* argument. The *target* argument is optional. You can use the *target* argument if your SMN manages multiple SGI UV systems and you want the command to operate on only one system. You can also use the *target* argument if you want the command to operate on a specific rack, IRU, or blade. You can also specify multiple targets or only one single system image (SSI) of a system.

In the SMN command help output, the *target* argument is `[TARGET]`, as follows:

```
usage: leds [-sv] [-c <index>] [-d <value>] [--help] [TARGET]...
```

If you specify the *target* argument, use the following format:

```
[system_serial_number:] rrack_num [iiru_num [blade_num]]
```

The variables are as follows:

- For *system_serial_number*, specify the system serial number (SSN) of the SGI UV system, followed by a colon character (:). To retrieve the SSN of a particular SGI UV system, type the `config` command.
- For *rack_num*, specify the rack number upon which the command needs to operate. If you specify the *target* argument to a command, this rack number is the only required argument.
- For *iru_num*, specify the individual rack unit (IRU) upon which the command needs to operate.
- For *blade_num*, specify the blade number upon which the command needs to operate.

Example 1: To retrieve the power status of `r1i1b0` on the SGI UV 2000 system with SSN UV2-00000050, type the following command:

```
# power status UV2-00000050:r001i01b00
==== r001i01b00 ====
power is on
```

Example 2: `r1i02` specifies rack 1, slot 2.

Example 3: `r2i1b4` specifies rack 2, slot 1, blade 4.

SMN RPMs for Single System Images (SSIs)

The following RPM is installed on each SSI:

- SLES platforms:

```
rpm -i sysco-uv-smnconfig-1.1-sgi707r1.sles11sp2.x86_64.rpm
```

- RHEL platforms:

```
rpm -i sysco-uv-smnconfig-1.1-sgi707r1.rhel6.x86_64.rpm
```


System Network Addressing

This chapter describes the internal system management network addressing scheme for SGI UV 2000, SGI UV 1000, or SGI UV 100 systems.

It covers the following topics:

- "System Network Addressing Overview" on page 9
- "System Management Node Ethernet Ports" on page 10
- "SGI UV CMC IP Address Assignment" on page 12
- "Multiple SGI UV Partitions or Systems on a Single SMN" on page 12
- "Non SGI UV Systems on the SMN" on page 13
- "SMN Firewall Capabilities" on page 13

System Network Addressing Overview

The SGI UV hostname assignment is based on the rack and upos position of the blade or other component. The rack/upos position must be uniform across all SGI UV systems that are attached to a system management node (SMN). In other words, a single SGI UV 2000 system or SGI UV 1000 system that encompasses multiple racks has racks numbered 1 to N in increments of 1, and upos positions within each rack that range from 1 to 42, with an increment of 3 (there is an exception where upos 2 is also present). In the case of multiple SGI UV 100 systems, each SGI UV 100 is assigned a unique rack/upos in the same manner, so all SGI UV 100 systems are identifiable in this way.

The system management node (SMN) has three dedicated Ethernet ports to connect to the SGI UV systems, specifically, for the system control network and the primary Base I/O of each partition. There is one Ethernet port on the SMN that is to be attached to the customer network. The connections described in this manual are very specific. Sites are not allowed to also attach other unrelated customer equipment to these dedicated networks because this would interfere with SGI UV system management network.

The SMN detects and then assigns hostnames, IP addresses, and name binding for the SGI UV systems and any additional systems that have a dedicated BMC port

connection to the single system image (SSI) segment. For more information, see "eth1smn" on page 10 and "Multiple SGI UV Partitions or Systems on a Single SMN" on page 12. Because the SGI UV rack/upos convention for identification is used and the network connections are very specific, guidelines must be adhered to carefully.

System Management Node Ethernet Ports

The SGI UV 2000 SMN is a SuperMicro SuperServer 6017R-N3RF4+ server. The SGI UV 1000 SMN is a SuperMicro SuperServer 6016T-URF 1U server.

The four ports on the SMN are designated eth0 through eth3. The eth0 port is attached to the customer network. Its address is not assigned by the SMN software stack. Customers assign the IP address of the eth0 port. The ports eth1 through eth3 are dedicated to the system management network. To distinguish the SMN Ethernet ports from other ports on Base I/O blades or CMCs, the port is suffixed with smn, for example eth0smn.

You can get product specification information and other documentation for the SuperMicro servers at <http://www.supermicro.com/> or at <http://docs.sgi.com/>. Search on the following:

- *SuperServer 6016T-URF User's Manual*, part number 860-0498-001.
- *SuperServer 6017R-N3RF4+ User's Manual*, part number 007-5849-001

eth1smn

eth1smn is the port for the private network known as the SSI network. This is a dedicated, known path between the SGI Management Center (SMC) application and each kernel instance, or single system image (SSI). If an SGI UV system is partitioned, each partition requires at least one Base I/O blade, and the primary Base I/O of each partition is connected to the SMN. The eth1smn network connects the Base I/O baseboard management controller (BMC) to the SMN. This network can also connect systems other than SGI UV systems to an SMN. For example, you can attach the BMC from an SGI Rackable series system to the SMN, thus enabling administration through the SMN for these systems.

The IP address range for eth1smn is 172.21.0.0/16 with starting address 172.21.1.1. Within this range, the convention is to designate 172.21.1-128.x for Base I/O Ethernet and 172.21.129-254.x for BMCs on systems other than SGI UV systems.

eth2smn

`eth2smn` is the port for the private network known as the primary CMC network. The SGI UV 2000, SGI UV 1000, or SGI UV 100 systems with multiple CMCs are very specifically configured into a small network, and the SMN is a peer on this network.

The range of IP addresses for devices attached to `eth2smn` is 172.19.0.0/16 with starting address 172.19.1.1.

eth3smn

You can configure the `eth3smn` interface to operate in one of three different modes. To configure different modes for `eth3smn`, open file `/etc/sysconfig/smnconfig`, and search for the `ETH3_MODE` parameter. The `ETH3_MODE` parameter accepts one of the following arguments:

Argument	Effect
<code>sysco</code>	Configures <code>eth3smn</code> to operate in the same way as <code>eth2smn</code> , except that this argument sets the IP address range from 172.20.1.0 through 172.20.255.254 for DHCP known clients. For unknown clients, an anonymous pool is available in the range 172.20.0.2 through 172.20.0.63. The range 172.20.0.64 through 172.20.0.255 is reserved for static IP addresses and is not managed by the SMN's DHCP server.
<code>dhclient</code>	Configures <code>eth2smn</code> as a standard DHCP client, so no DHCP configuration is generated for the <code>eth2</code> interface. The IP range of 172.20.0.0/16 segment should not be used.
<code>dhserver</code>	The effect of the <code>dhserver</code> argument is similar to the effect of the <code>sysco</code> argument. IP addresses ranging from 172.20.0.2 through 170.20.0.63 and IP addresses ranging from 172.20.1.0 through 172.20.255.254 are available for unknown clients. Like the <code>sysco</code> argument, the range 172.20.0.64 through 172.20.0.255 is

reserved for static IP addresses and is not managed by the SMN's DHCP server.

SGI UV CMC IP Address Assignment

The chassis management controllers (CMCs) are given IP addresses based on their location in the racks. The address is determined, as follows:

`172.{19|20}.rh.ruuuuuuu`

Where:

- 'rh' is the lower 8 bits of the rack number.
- 'rr' is the upper two bits of the rack number, shifted down 2. Rarely used.
- 'uuuuuu' is the upos (6 bits)

`eth0` is the WAN interface (see Figure A-6 on page 33 and Figure A-6 on page 33). By default, SGI UV systems are shipped with dynamic host configuration protocol (DHCP).

`eth2` is `172.19.0.1` on the SMN. `172.19.XX.YY` is the IP address when the SMN assigns the IP address to the CMC.

`eth3` is same as `eth2` except it is `172.20`.

`eth1` is the same but `172.21.X.Y`. This is the link to the single-system image (SSI) SGI UV Base I/O. The SGI UV SSI Base I/O will get IP address either from system management node (SMN) or the SGI Management Center (SMC), when installed. For this segment, the SMN do not use rack/upos since it is not relevant for SSI Base I/O.

Multiple SGI UV Partitions or Systems on a Single SMN

A single SGI UV system may be partitioned and have multiple kernels running. The Base I/O blade from each partition must have its `eth1` and BMC ports attached to the system management node (SMN). To accommodate the additional cabling, a GigE switch is needed.

In a similar way, a single SMN can be configured to manage multiple SGI UV 2000, SGI UV 1000, or SGI UV 100 systems. One GigE switch is used for the SSI network, another switch for the CMC network.

The `smnconfig` tool performs discovery and address assignment in both of these configurations, if the cabling is connected per the guideline and the multiple SGI UV 2000, SGI UV 1000, or SGI UV 100 systems have their CMCs uniquely designated with the rack/upos method.

Non SGI UV Systems on the SMN

In addition to managing SGI UV 2000, SGI UV 1000, or SGI UV 100 systems, the SMN can also provide system management for other systems, such as an SGI UV 10 system, an SGI Rackable system, and so on. For these classes of systems, the only connection to the SMN required is the BMC port from the motherboard to the SSI network. The SSI network 172.21.0.0/16 connects the SGI UV Base I/O `eth0` ports and the Base I/O BMC ports. Systems other than SGI UV systems connect their BMC ports to this network and are assigned addresses from the 172.21.129-254.x range.

SMN Firewall Capabilities

Because of system addressing requirements for the system management node (SMN), see "System Network Addressing Overview" on page 9, firewall capabilities should **only** be applied to the SMN wide area network (WAN) interface `eth0smn`. SGI recommends that you do not firewall the `eth1smn`, `eth2smn`, and `eth3smn` interfaces, with the exception of a remote client. If you use a remote client, in which you install the client-only installation of SMC on a different server, then TCP ports 7620, 4672, and 7673 need to be opened up in the firewall. This is the only requirement for the WAN interface. For more information, see "System Management Node Ethernet Ports" on page 10.

Simple Network Management Protocol

The Simple Network Management Protocol (SNMP) is part of the Internet protocol suite, as defined by the Internet Engineering Task Force (IETF). SNMP monitors and manages network-attached devices. For information about SNMP, see the following website:

<http://www.snmplink.org/>

This section describes the `snmpd-uv(8)` agent which is the SGI SNMP agent for SGI UV 2000, UV 1000, and UV 100 series systems. The `snmpd-uv(8)` agent is available only on the System Management Node (SMN) node.

SNMP Agent Overview

The `snmpd-uv(8)` agent fetches configuration information from the System Controller (SYSCO) network attached to the System Management Node (SMN). The SYSCO network contains all the Chassis Management Controller (CMC) and Base Management Controller (BMC) and accessories, such as, the I/O expansion chassis.

The `snmpd-uv(8)` agent supports multiple SGI UV systems attached to the SMN.

The `snmpd-uv(8)` retrieves information stored in a MySQL database by translating SNMP `pass_persist GET` and `GETNEXT` OID requests into equivalent MySQL `SELECT` queries on appropriate tables corresponding to those defined in the SGI UV SNMP.

The `snmpd-uv(8)` agent does not perform data gathering or MySQL tables update operations. Instead, two additional services are used in tandem to perform the following:

- Data gathering

A system daemon, called `uv_gather`, collects information from the SYSCO network attached to the SMN. After parsing the data in a readable format, it pushes the data to another system daemon, `uv_db`, to perform MySQL updates.

- MySQL Tables updates

A system daemon, `uv_db`, is responsible for receiving data from `uv_gather` and performs appropriate MySQL tables update.

Since the `snmpd-uv(8)` agent does not perform data gathering, it is important to make sure the `uv_gather` and `uv_db` services are enabled in order to get up-to-date information from the periodically updated MySQL SGI UV database (see "Verifying the SMN Software Stack" on page 16). The `uv_gather` and `uv_db` services are normally setup to start at boot time.

The SNMP Agent companion services maintain information of all the SGI UV nodes attached to the SMN. They also fetch environmental information, such as, fan speed and voltage margins. For further details, please consult the management information base (MIB) file that comes with the package.

The `snmpd-uv(8)` agent can also send trap if the configuration file contains `trapsink` or `trapsink2` directives.

Note: The agent does not support sending traps. Typically, the `snmpd-uv(8)` agent is not invoked manually. It is invoked by the `snmpd(8)` daemon via a configuration file. See "SNMP Configuration" on page 20.

Verifying the SMN Software Stack

The `smn_info_gather` script is the most complete and preferred method of verifying the SMN software stack. The `system_info_gather` script is included in the `sgi-support-tools` package in the SGI Foundation Software product. When you run the `system_info_gather` script, it automatically calls the `smn_info_gather` script on SMN nodes, too. For more information about the `system_info_gather` script, type the following command:

```
smn:~ # /usr/sbin/smn_info_gather -h
```

There are several ways to verify that the system management node (SMN) software stack is operating properly, as follows:

- To perform a sanity test on the various SMN software components, type the following:

```
uv44-smn:~ # smn_info_gather running
check_sysco          :
  sysco              user exist          : Pass
  /sysco             home exist         : Pass
check_sysco_mount    :
  /sysco/hw/.fuse    mount exist         : Pass
```

```

check_console          :

      /sysco/bin/uv_con      exist          : Pass      1 /sysco/uv_con/old/UV-00000
014:partition000.log-20110608.bz2      21324 2011-06-08 14:00
  2 /sysco/uv_con/old/UV-00000044:partition000.log-20110608.bz2      18994 2011-06-08 14:00
  3 /sysco/uv_con/old/UV-00000014:partition000.log-20110607.bz2      21324 2011-06-07 14:00
  4 /sysco/uv_con/old/UV-00000044:partition000.log-20110607.bz2      18994 2011-06-07 14:00
  5 /sysco/uv_con/old/UV-00000044:partition000.log-20110606.bz2      18994 2011-06-06 14:00
  6 /sysco/uv_con/UV-00000014:partition000.log      117527 2011-06-05 23:23
  7 /sysco/uv_con/UV-00000014:partition000.log.1      117527 2011-06-05 23:20
  8 /sysco/uv_con/old/UV-00000044:partition000.log-20110605.bz2      18994 2011-06-05 14:00
  9 /sysco/uv_con/old/UV-00000044:partition000.log-20110604.bz2      18994 2011-06-04 14:00
 10 /sysco/uv_con/old/UV-00000044:partition000.log-20110603.bz2      18994 2011-06-03 14:00
 11 /sysco/uv_con/old/UV-00000044:partition000.log-20110511.bz2      18994 2011-05-11 14:00
 12 /sysco/uv_con/old/UV-00000044:partition000.log-20110510.bz2      18994 2011-05-10 14:00
 13 /sysco/uv_con/old/UV-00000044:partition000.log-20110509.bz2      18994 2011-05-09 14:00
 14 /sysco/uv_con/old/UV-00000044:partition000.log-20110508.bz2      18994 2011-05-08 14:00
 15 /sysco/uv_con/old/UV-00000044:partition000.log-20110507.bz2      18994 2011-05-07 14:00
 16 /sysco/uv_con/old/UV-00000044:partition000.log-20110506.bz2      18994 2011-05-06 14:00
 17 /sysco/uv_con/old/UV-00000044:partition000.log-20110505.bz2      18994 2011-05-05 14:00
 18 /sysco/uv_con/old/UV-00000044:partition000.log-20110504.bz2      18994 2011-05-04 14:00
 19 /sysco/uv_con/old/UV-00000044:partition000.log-20110428.bz2      18994 2011-04-28 14:00
 20 /sysco/uv_con/old/UV-00000044:partition000.log-20110427.bz2      18994 2011-04-27 14:00
 21 /sysco/uv_con/old/UV-00000044:partition000.log-20110426.bz2      18994 2011-04-26 14:00
 22 /sysco/uv_con/old/UV-00000044:partition000.log-20110425.bz2      18994 2011-04-25 14:00
 23 /sysco/uv_con/old/UV-00000044:partition000.log-20110424.bz2      18994 2011-04-24 14:00
 24 /sysco/uv_con/old/UV-00000044:partition000.log-20110423.bz2      18994 2011-04-23 14:00
 25 /sysco/uv_con/old/UV-00000044:partition000.log-20110422.bz2      18994 2011-04-22 14:00
 26 /sysco/uv_con/old/UV-00000044:partition000.log-20110421.bz2      18994 2011-04-21 14:00
 27 /sysco/uv_con/old/UV-00000044:partition000.log-20110420.bz2      18994 2011-04-20 14:00
 28 /sysco/uv_con/old/UV-00000044:partition000.log-20110419.bz2      18994 2011-04-19 14:00
 29 /sysco/uv_con/old/UV-00000044:partition000.log-20110418.bz2      18994 2011-04-18 14:00
 30 /sysco/uv_con/old/UV-00000044:partition000.log-20110417.bz2      18994 2011-04-17 14:00
 31 /sysco/uv_con/old/UV-00000044:partition000.log-20110416.bz2      18994 2011-04-16 14:00
 32 /sysco/uv_con/old/UV-00000044:partition000.log-20110415.bz2      18994 2011-04-15 14:00
 33 /sysco/uv_con/old/UV-00000044:partition000.log-20110414.bz2      18994 2011-04-14 14:00
 34 /sysco/uv_con/old/UV-00000044:partition000.log-20110413.bz2      18994 2011-04-13 14:00
 35 /sysco/uv_con/UV-00000044:partition000.log      92108 2011-04-01 16:33
 36 /sysco/uv_con/old/UV-00000044:partition000.log-20110401.gz      19728 2011-04-01 16:33
 37 /sysco/uv_con/old/UV-00000044:partition000.log-20110328.gz      19771 2011-03-28 11:55

Pass

```

```
check_running      :
    status         monit           : Pass
    status         named           : Pass
    status         dhcpd           : Pass
    status         smnd            : Pass
    status         syscofs         : Pass
    status         mysql           : Pass
    status         smn_uv_db       : Pass
    status         smn_uv_gather   : Pass
    daemons        named           : Pass
    daemons        dhcpd           : Pass
    daemons        smnd            : Pass
    daemons        syscofs         : Pass
    daemons        mysqld         : Pass
    daemons        uv_db          : Pass
    daemons        uv_gather      : Pass
    daemons        logman         : Pass
    monit          smnd            : Pass
    monit          syscofs         : Pass
    monit          syscofs_mount   : Pass
    monit          uv_db          : Pass
    monit          uv_gather      : Pass
    /usr/bin/pmdate exist          : Pass
    logs exist     /var/log/smnd.log : Pass
    ...
```

- To display the status of the various SMN daemons running on the SMN, perform the following:

```
uv44-smn:~ # monit status
The Monit daemon 5.0.3 uptime: 61d 16h 59m
```

```
Process 'syscofs'
  status         running
  monitoring status monitored
  pid            21262
  parent pid     1
  uptime         47d 16h 55m
  children       0
  memory kilobytes 1388
  memory kilobytes total 1388
```

```
memory percent          0.0%
memory percent total    0.0%
cpu percent             0.0%
cpu percent total       0.0%
data collected          Tue Apr 26 12:37:24 2011

File 'syscofs_mount'
status                  accessible
monitoring status      monitored
permission             444
uid                    0
gid                    0
timestamp              Tue Mar 15 11:20:28 2011
size                   0 B
data collected         Tue Apr 26 12:37:24 2011

Process 'smnd'
status                  running
monitoring status      monitored
pid                    21351
parent pid             1
uptime                47d 16h 55m
children               0
memory kilobytes       2115648
memory kilobytes total 2115648
memory percent         35.3%
memory percent total   35.3%
cpu percent            0.0%
cpu percent total      0.0%
data collected         Tue Apr 26 12:37:24 2011

Process 'uv_gather'
status                  not monitored
monitoring status      not monitored
data collected         Tue Apr 26 12:37:24 2011

Process 'uv_db'
status                  not monitored
monitoring status      not monitored
data collected         Tue Apr 26 12:37:24 2011
```

```
System 'localhost'
  status           running
  monitoring status monitored
  load average     [0.04] [0.05] [0.01]
  cpu              0.3%us 0.3%sy 0.0%wa
  memory usage     3406740 kB [56.9%]
  data collected   Tue Apr 26 12:37:24 2011
```

- You can access the monit status at a web browser interface at <http://admin:11110>.

SNMP Configuration

In order to integrate the `snmpd-uv` agent into `snmpd`, two configuration methods are available, as follows:

- "Automatic Configuration Using `uv_snmpconfig`" on page 20
- "Manual Configuration " on page 21

Automatic Configuration Using `uv_snmpconfig`

This is the easiest and recommended method. The `uv_snmpconfig` command performs all the configuration steps explained in the manual configuration section below. It also offers an option to test the configuration consisting in verifying:

- MIB translation of Object Identifiers (OIDs) using `snmptranslate`.
- The SNMP agent can `snmpwalk` the entire `uv` SNMP agent SQL database
- Basic and configured (if relevant) traps are captured.

To view the `uv_snmpconfig(8)` man page, type the following command:

```
uv41-smn:~ # man uv_snmpconfig
```

Note: The utility does not overwrite already installed SNMP configuration files unless the command line option `-f` (force) is used. However, in most cases, although the utility backs up files before overwriting them (when `-f` is used), it is recommended to make a copy of the configuration files before proceeding. Use the `--r` option to save a backup. `uv_snmpconfig` is a generic script for all the agents supported by SGI.

Manual Configuration

To manually configure the SNMP agent, three steps are required, as follows:

1. Integrate the agent MIB.

On RHEL, modify or create the `snmpd /etc/snmp/snmpd.options` file. The easiest is to make sure the following start-up parameters are defined:

```
# Original option
OPTIONS="-Lsd -Lf /dev/null -p /var/run/snmpd.pid -a"

# Adding SGI agent
OPTIONS="${OPTIONS} -M +/opt/sgi/snmpagents/mibs -m ALL"
```

On SLES, the `/opt/sgi/snmpagents/mibs/sgi-uv-smi.mib` should be copied to `/usr/share/snmp/mibs/` directory. Also, if not already done, the remaining `/opt/sgi/snmpagents/mibs/` files should also be copied.

Optionally, apply the same changes in the global `/etc/snmp/snmp.conf` file by adding the following two lines:

```
mibs          ALL
mibdirs       +/opt/sgi/snmpagents/mibs
```

2. Configure agent configuration file.

3. This is where the agent is actually called by `snmpd(8)` using the `pass_persist` protocol. Also, this is where various monitored events are defined. The file itself contains configuration instructions.

Copy or append `/opt/sgi/snmpagents/etc/snmpd.uv.conf` to `/opt/sgi/snmpagents/etc/snmpd.local.conf`. Do NOT edit the file directly as it can be replaced later by an RPM package update.

Finally, if NET-SNMP DISMAN facilities are used and you want to change monitoring intervals, the `monitor -r 300` lines should be changed.

You also have to specify the `-c /opt/sgi/snmpagents/etc/uv.conf` file for use by agent itself. A template file `/opt/sgi/snmpagents/etc/uv.conf.template` contains instructions on how to configure this file.

4. Integrate agent configuration file.

On RHEL, modify or create `snmpd /etc/snmp/snmpd.options` file and set the following environment variable:

```
# Add SGI agent configurations
OPTIONS="${OPTIONS} -c /opt/sgi/snmpagents/etc/snmpd.local.conf"
```

On SLES, a properly substituted `/opt/sgi/snmpagents/etc/snmpd.uv.conf` file should be appended to the `/etc/snmp/snmpd.local.conf` file.

Network Topology

This appendix section includes the following topics:

- "About the System Control Network on SGI UV 2000 Systems and SGI UV 1000 Systems" on page 23
- "SGI UV 2000 Network Topology" on page 24
- "SGI UV 1000 Network Topology" on page 32

About the System Control Network on SGI UV 2000 Systems and SGI UV 1000 Systems

The system control network on an SGI UV system includes the following components:

- The system management node (SMN)
- One or more chassis management controllers (CMCs)
- One or more baseboard management controller (BMCs)

The components communicate with each other in the following ways:

- The SMN and CMCs use a private, dedicated Gigabit Ethernet network to pass system control commands and other communication. The CMCs communicate directly with the BMC in each installed blade by way of the IRU's internal backplane.
- All the CMCs communicate with each other via a private, dedicated Ethernet network.
- In larger configurations, the system control communication path includes a private, dedicated Ethernet switch.

Each of the four ports on the SMN, `eth0` through `eth3`, connect to one of the private, dedicated Ethernet system control networks. The ports and their associated LANs are as follows:

LAN	Port
LAN1	<code>eth0</code>

LAN2	eth1
LAN3	eth2
LAN4	eth3

SGI UV 2000 Network Topology

The following topics describe the SGI UV 2000 network topology:

- "Single IRU System Control Cabling" on page 24
- "One Single System Image (SSI) System Management Node (SMN) Network" on page 26
- "Multiple Single System Image (SSI) System Management Node (SMN) Network" on page 28
- "Two Systems, One Single System Image (SSI) System Management Node (SMN) Network" on page 30

Single IRU System Control Cabling

A single IRU system that is not partitioned does not require GigE switches.

Figure A-1 on page 25 illustrates the cabling for a single IRU system.

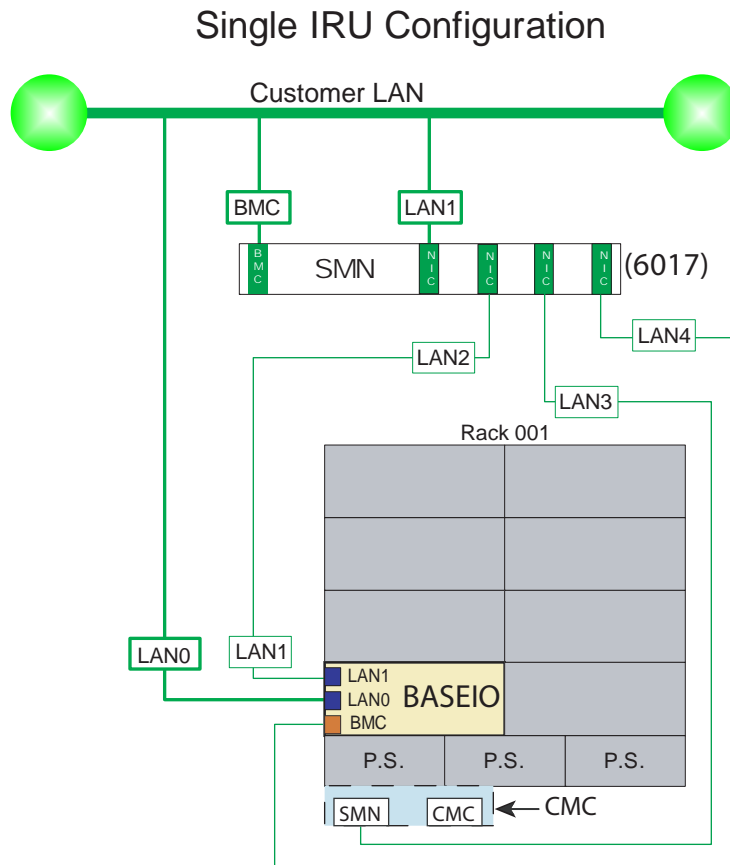


Figure A-1 Single IRU System Connections

The cable connections for a single IRU system without a GigE switch are as follows:

- Connect LAN1 of the SMN to the customer LAN.
- Connect LAN2 of the SMN to LAN1 of the Base I/O.
- Connect LAN3 of the SMN to the SMN port of the CMC.
- Connect LAN4 of the SMN to the BMC port of the Base I/O.
- Connect the BMC port of the SMN to the customer LAN.

- Connect LAN0 of the Base I/O to the customer LAN.

One Single System Image (SSI) System Management Node (SMN) Network

Figure A-2 on page 27 illustrates one SSI SGI UV 2000 system management network.

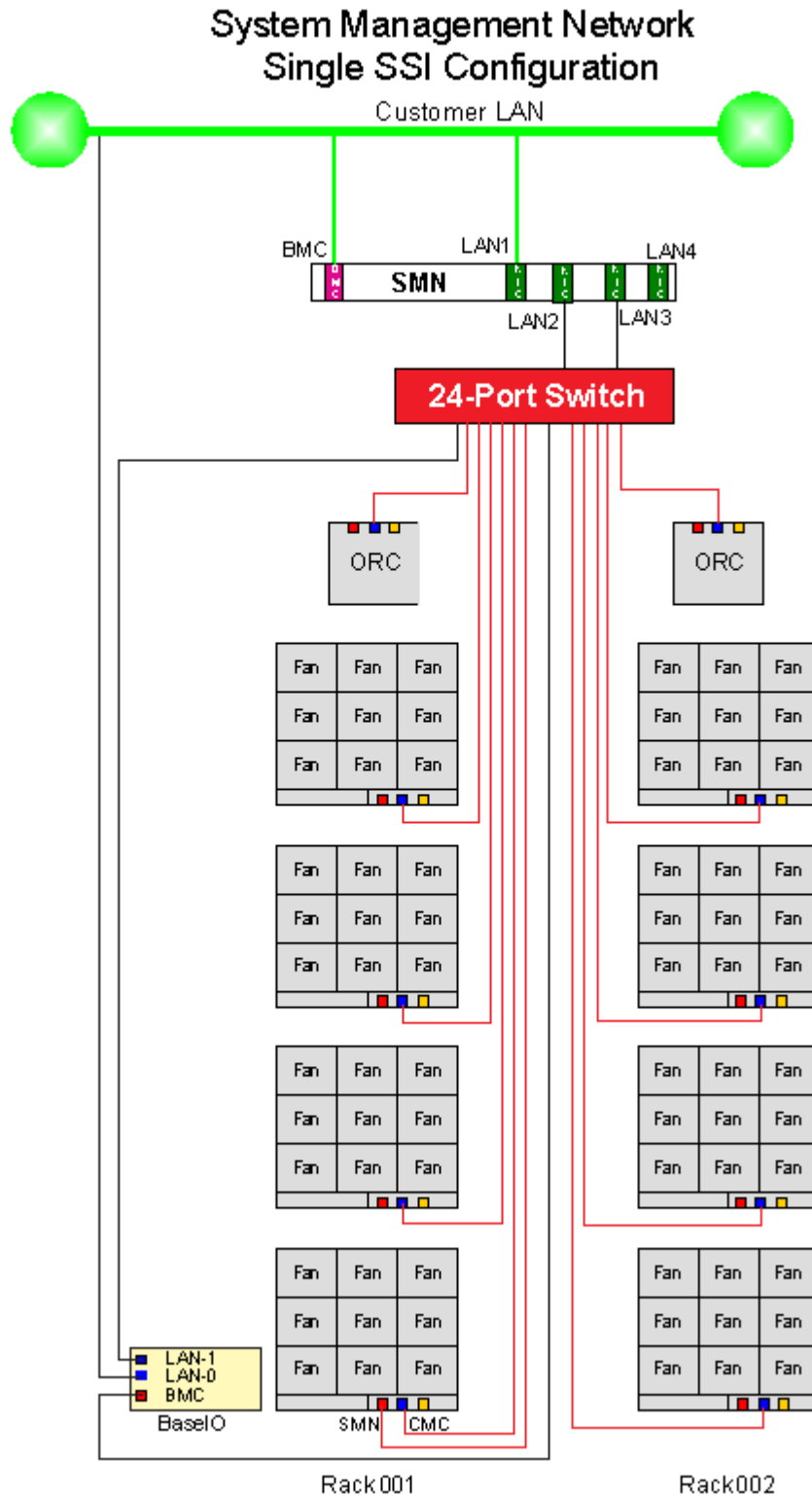


Figure A-2 System Control Single SSI Configuration

The cable connections for a single-partition, multiple-IRU system with a GigE switch are as follows:

- Connect LAN1 of the SMN to the customer LAN.
- Connect LAN2 of the SMN to the GigE switch.
- Connect LAN3 of the SMN to the GigE switch.
- Connect the BMC port of the SMN to the customer LAN.
- Connect the SMN port of the CMC in the lowest position of the lowest rack number to the GigE switch.
- Connect the LAN0 port of the Base I/O to the customer LAN.
- Connect the LAN1 port of the Base I/O to the GigE switch.
- Connect the BMC port of the Base I/O to the GigE switch.
- Connect the CMC port of all CMCs located in the IRUs to the GigE switch.
- Connect the CMC port of all CMCs located in the ORCs to the GigE switch.

Multiple Single System Image (SSI) System Management Node (SMN) Network

Figure A-3 on page 29 illustrates a multiple-SSI, or multiple partition, SGI UV 2000 system management network.



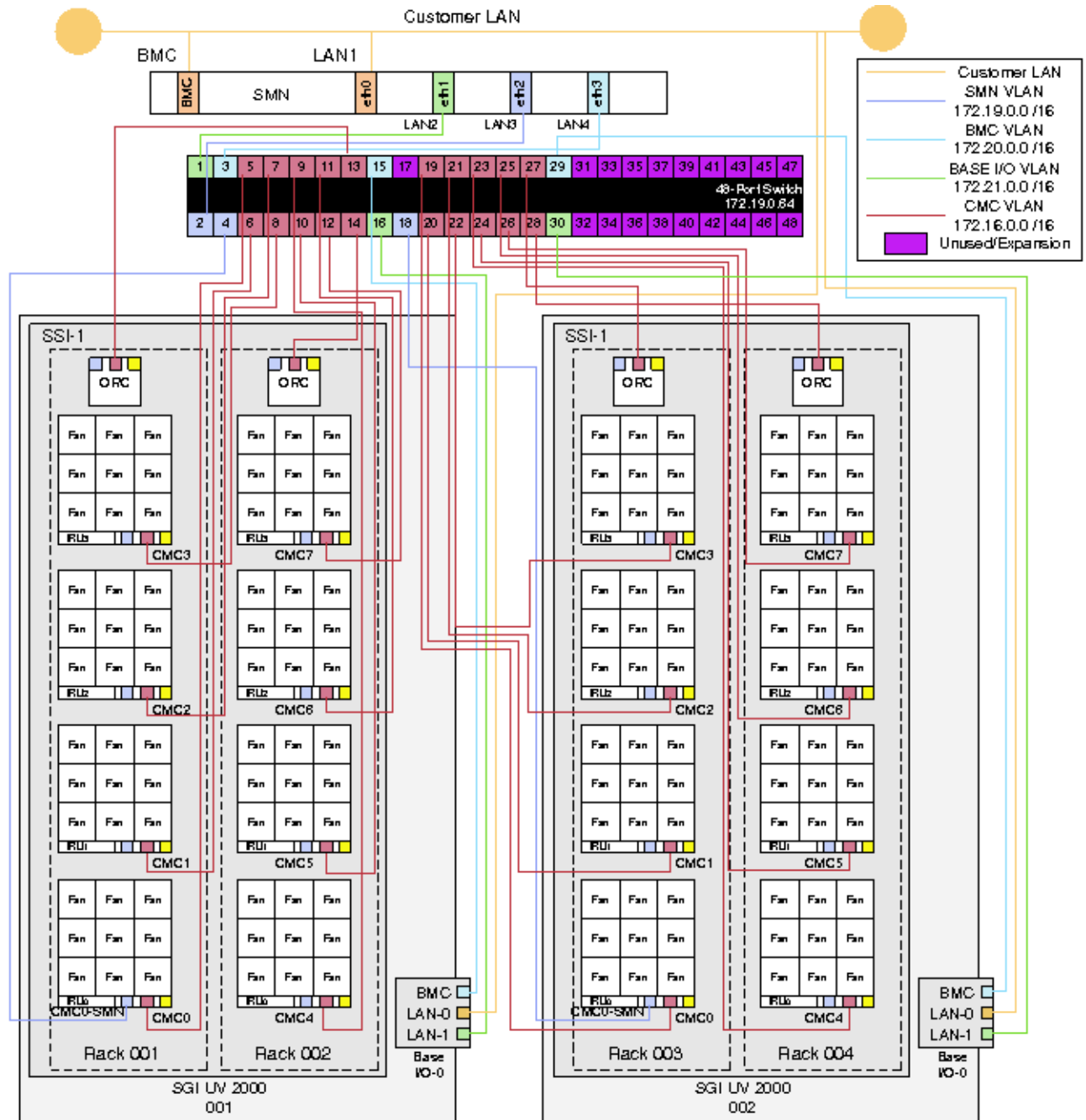
Figure A-3 System Control Network for a Multiple SSI Configuration

The cable connections for a multiple-SSI, multiple-IRU system with a GigE switch are as follows:

- Connect LAN1 of the SMN to the customer LAN.
- Connect LAN2 of the SMN to the GigE switch.
- Connect LAN3 of the SMN to the GigE switch.
- Connect the BMC port of the SMN to the customer LAN.
- Connect the SMN port of the CMC in the lowest position of the lowest rack number for each partition or SSI to the GigE switch.
- Connect the LAN0 port of each Base I/O to the customer LAN.
- Connect the LAN1 port of each Base I/O to the GigE switch.
- Connect the BMC port of each Base I/O to the GigE switch.
- Connect the CMC port of all CMCs located in IRUs to the GigE switch.
- Connect the CMC port of all CMCs located in ORCs to the GigE switch.

Two Systems, One Single System Image (SSI) System Management Node (SMN) Network

Figure A-4 on page 31 shows the SMN network for two SGI UV 2000 systems configured into one SSI.



SGI UV 1000 Network Topology

The following topics describe the SGI UV 1000 network topology:

- "Physical Connections" on page 32
- "VLANs" on page 34
- "Discovery and Failover" on page 35

Physical Connections

Each IRU contains one CMC. The CMC jacks are used to connect all the CMCs in a private network. Specific connections between CMCs ensure redundancy.

The SBK jack is used to interconnect building blocks into another private network. Up to four building blocks may be interconnected, creating a superblock (SBK). Using only the SBK jacks on the primary CMCs for these connections, connect a cable from a CMC in the first building block to a CMC in the second building block. Then, select another CMC in the second building block and connect it to a CMC in the third building block (or back to a CMC in the first building block in the case of only two building blocks). To minimize network hops, it is recommended that the two connections within a building block be in different racks (for redundancy) and that the two racks be adjacently cabled with respect to the CMC network.

One SMN is required for each system. Systems with more than one partition or more than one building block require a GigE switch. Systems with more than one superblock require two GigE switches.

The SMN should be connected to the SMN jack in a CMC that also has an SBK connection. The SMN requires a GigE switch to support connections to two different superblocks.

The EXT[0,1,2] jacks are used for connections from the smart door controller, etc. The SMN jack can be used for other in-rack devices if it is available and all SMNs in the configuration are already connected.

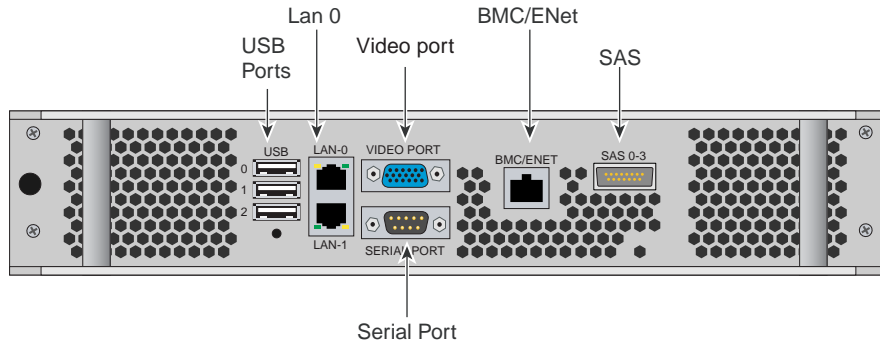


Figure A-5 SGI UV 1000 Base I/O Riser

Figure A-6 on page 33 shows the an SMN Ethernet cabling example for a single SGI UV rack.

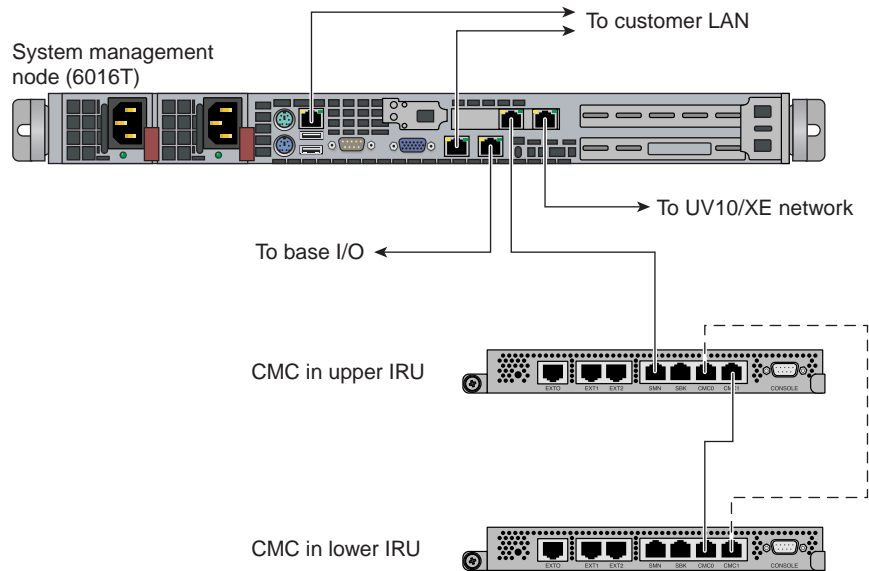


Figure A-6 SMN Ethernet Cabling for a Single SGI UV 1000 Rack

Figure A-7 on page 34 shows an example layout.

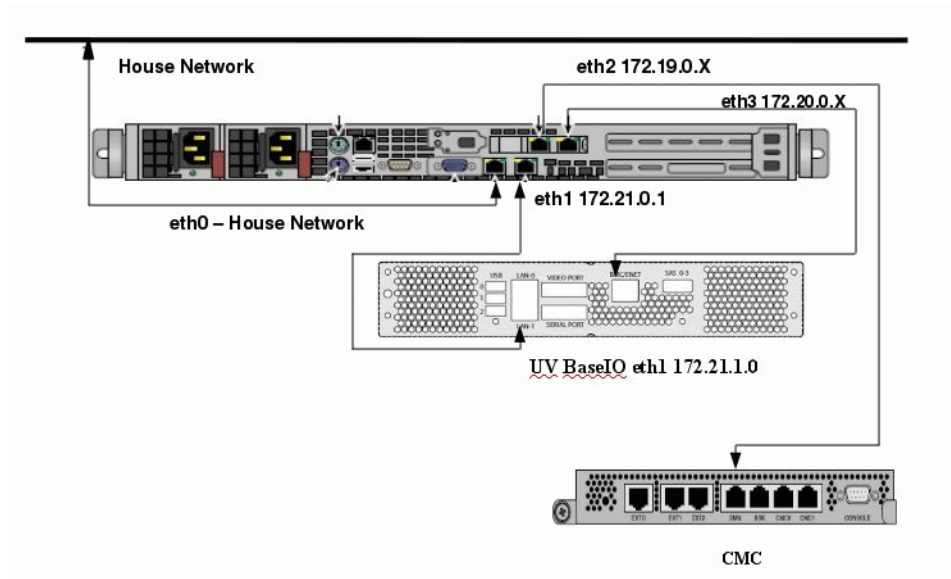


Figure A-7 SMN Ethernet Cabling Layout for a Single SGI UV 1000 Rack

VLANS

The following VLANs are possible within the system controller network:

- Vbmc0 - VLAN between the primary CMC and the blades
- Vcmc0 - VLAN between the primary CMCs within a building block
- Vsbk - VLAN between building blocks within an superblock
- Vacc - VLAN between external devices and the CMC
- VSmw - Vlan between SMN and CMCs

Each CMC processor has a single physical connection to the local 48-port Ethernet switch ASIC within the CMC. This physical connection carries the following VLANs (x matches the local CMC's position):

- Vbmcx
- Vcmc_x

- Vsbk
- Vacc
- Vsmn

Additionally, each CMC processor has a physical connection to the 48-port Ethernet switch ASIC on the redundant CMC in the same IRU. This physical connection carries the following VLANs:

- Vbmc
- Vcmc

Discovery and Failover

Within the building block, each CMC is connected to the CMC VLANs. Each CMC broadcasts a UDP packet containing an identification string at 5 second intervals.

Given two CMCs, each receiving the other broadcast packet, only one initiates a connection to other. The decision is based on the contents of the broadcast string. The CMC with the lesser broadcast string initiates the connection.

Once the building block discovery is complete, a given CMC has a connection to every CMC in the building block on VLAN_PRI_CMC.

Each CMC now has two connections to each IRU in the building block. By default, the CMC routes requests first to the CMC in the same position as itself - that is, a CMC tries to send the request to another CMC first.

The two CMCs in each building block with a physical connection on the SBK jacks is used to establish a SBK VLAN between building blocks. These CMCs are considered building block controllers (BBCs). When the CMC detects a connection on the SBK jack, it broadcasts a similar identification string on the SBK VLAN. These BBCs connect to each other in the same fashion as the CMCs did within the building block. There are two BBCs in each building block, but neither is designated as primary or secondary explicitly. Since each BBC is connected to two other BBCs in each of the other building blocks, losing a connection to one still allows access to that building block through the second connection.

Each CMC collects configuration information from each of its BMCs. A CMC functioning as a BBC collects configuration information from each of the CMCs in the local building block and shares that information with other BBCs. By collecting configuration information from each BBC, a complete SBK configuration is created.

Figure A-8 on page 37 illustrates the system control connections for a single rack system.

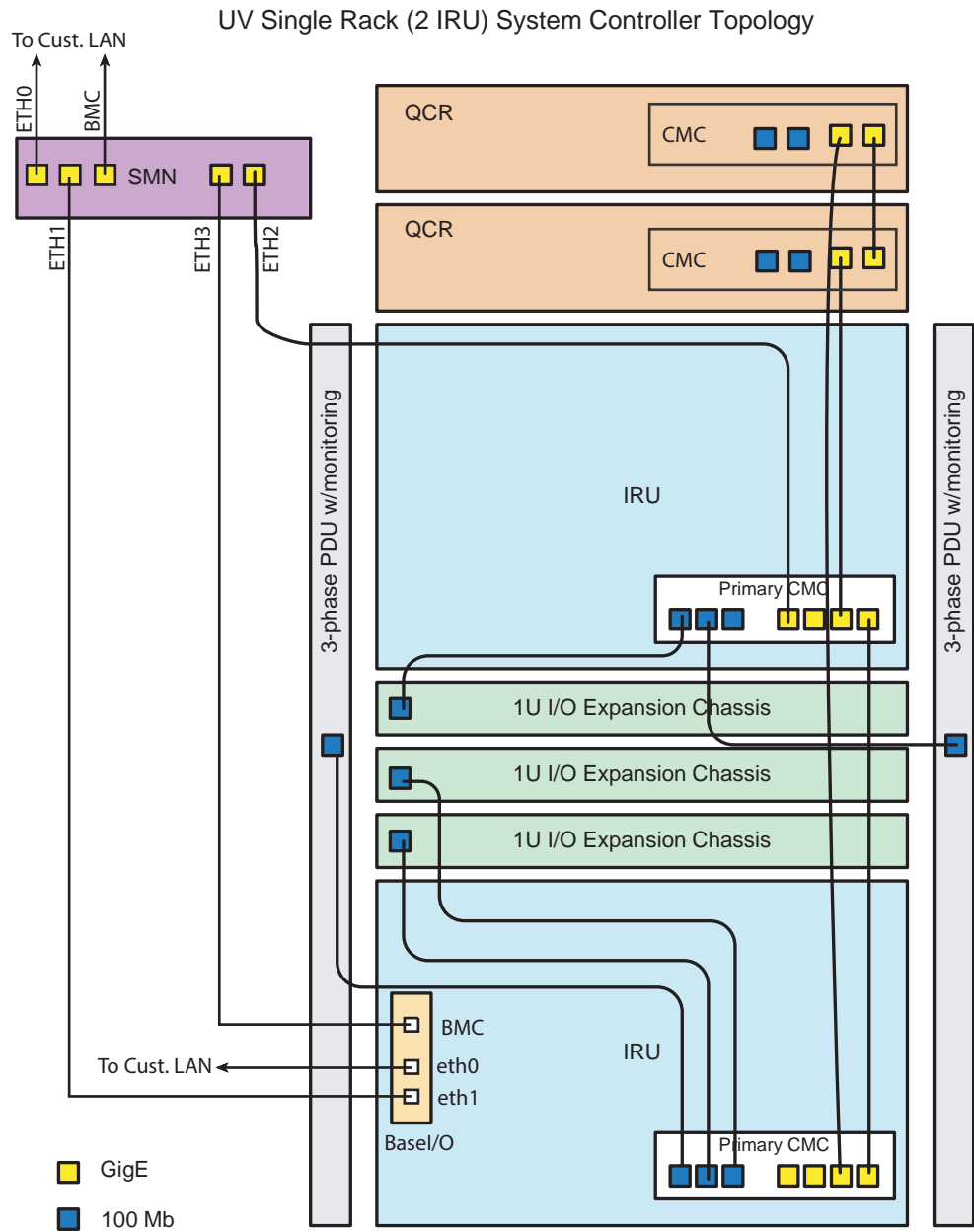


Figure A-8 System Control connection — Single Rack

Figure A-9 on page 38 illustrates the system control cabling for a four rack group (a building block).

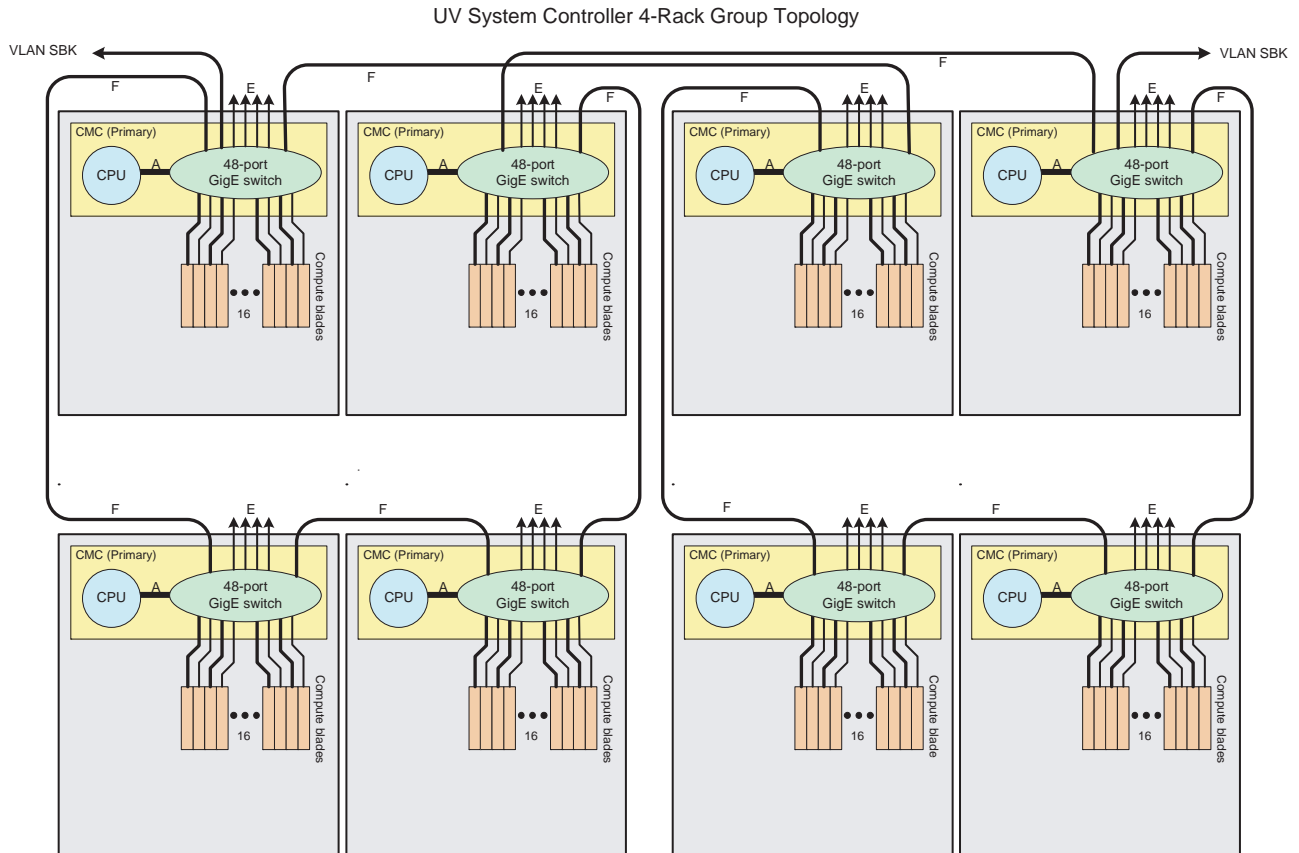


Figure A-9 System Control — Four Rack Group

Link references on Figure A-9 on page 38 are as follows:

- A links - support VLANs [SBK, Primary BMC, Primary CMC and External]
- D links - support VLANs [Primary BMC and Primary CMC]
- E links = support VLAN [External]

- F links - support VLANs [Primary CMC and SBK]

Figure A-10 on page 39 illustrates the complete system control topology for a very large (48 rack) system.

Top Level UV System Management Node and System Controller Topology

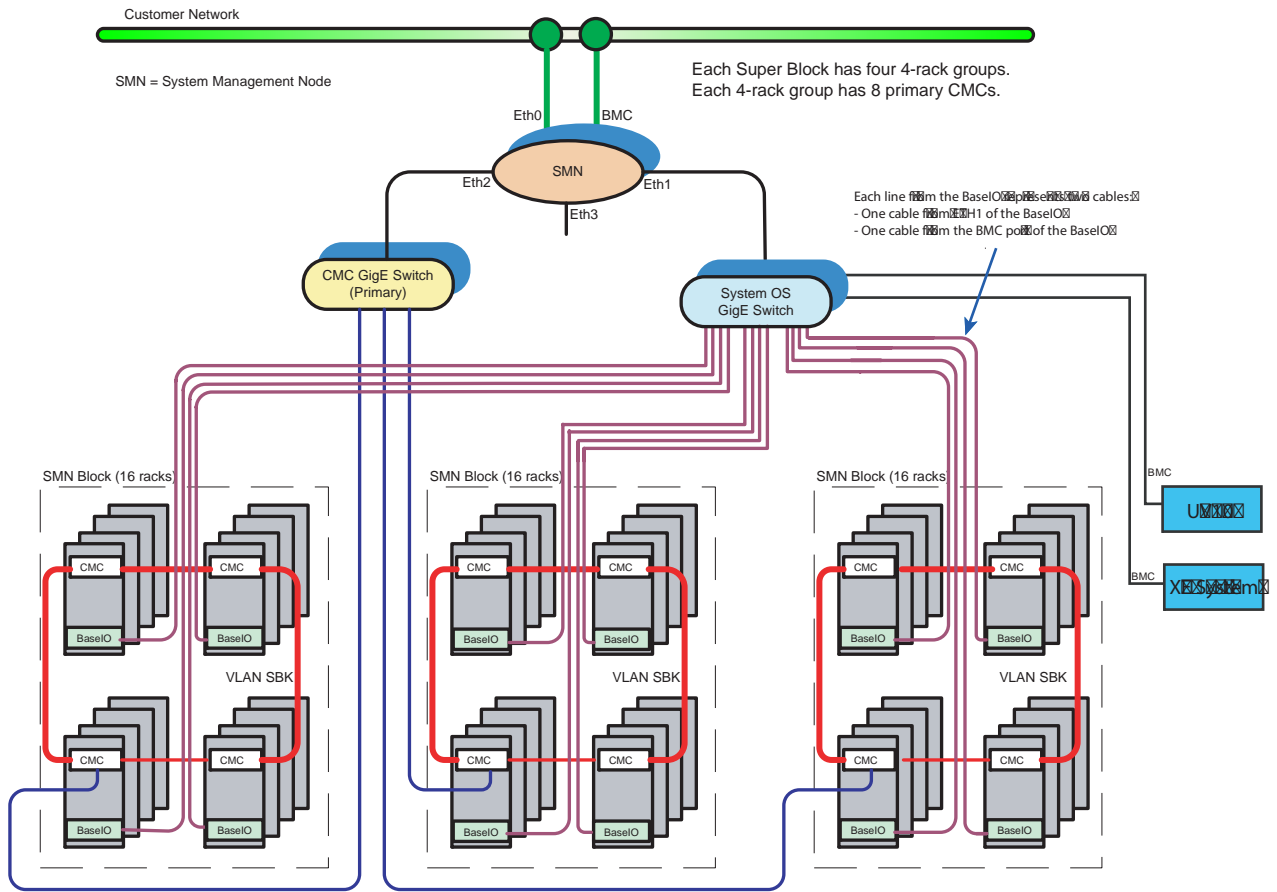


Figure A-10 System Control Diagram for a 48-rack System

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