COMPUTING

MaxCore™ MC3000 Platform Software

Installation and Use

P/N: 6806800U97A

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ARTESYN™
EMBEDDED TECHNOLOGIES

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Overview of Contents

This manual provides information on how to install MaxCore MC3000 Platform software on Artesyn MaxCore PCIE cards. This manual contains following chapters and appendices.

- Chapter 1, *Introduction, on page 15* provides an overview of this manual.
- Chapter 2, *Software Installation, on page 17* provides procedures on how to create a MaxCore MC3000 ISO, different types of booting options, and how to install the software on MaxCore PCIE cards.
- Chapter 3, *Accessing MaxCore MC3000 Platform, on page 29* provides brief information about various types of interfaces to access MaxCore MC3000 Platform.
- Chapter 4, *Managing and Configuring MaxCore Platform, on page 35* provides additional information that you need to know while working with MaxCore MC3000 Platform.
- Chapter 5, *Linux Command-line Utilities, on page 57* provides additional information about Linux command line utilities.
- Appendix A, *Troubleshooting and FAQ* provides a set of troubleshooting tips and frequently asked questions that are useful while working with MaxCore MC3000 Platform.
- Appendix B, *Related Documentation* provides the list of the relevant manuals that you may need to access while working with MaxCore MC3000 Platform.

Abbreviations

These are the abbreviations used in this manual.

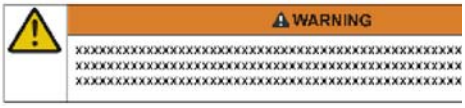
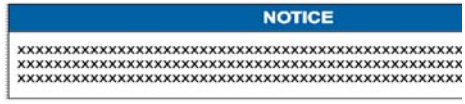
Abbreviation	Definition
BCSIM	Blade Common System Information Model
BMC	Baseboard Management Controller
CLI	Command Line Interface
CSIM	Common System Information Model
DB	Database
FRU	Field Replaceable Unit
GUI	Graphical User Interface

Abbreviation	Definition
LCU	Log Collection Utility
mCPU	Management CPU
PF	Primary Function
RADIUS	Remote Authentication Dial-In User Service
SMAN	Service Manager
SSF	System Services Framework
SMC	System Management Controller
SNMP	Simple Network Management Interface
TCP	Transmission Control Protocol
TL-Server	Transport Layer Server
MIB	Management Information Base
MO	Managed Objects
PCIe	Peripheral Component Interconnect Express
UDP	User Datagram Protocol
UDS	Unix Domain Socket
VF	Virtual Function
XML	Extensible Markup Language

Conventions

The table below describes the conventions used throughout this manual.

Notation	Description
0x00000000	Typical notation for hexadecimal numbers (digits are 0 through F) used for addresses, offsets, and so on.
0b0000	Same for binary numbers (digits are 0 and 1).
bold	Used to emphasize a word.
`Screen`	Used for on-screen output and code related elements or commands in body text.

Notation	Description
`Courier + Bold`	Used to characterize user input and to separate it from system output.
Reference	Used for references and for table and figure descriptions.
File > Exit	Notation for selecting a sub-menu.
<text>	Notation for variables and keys.
[text]	Notation for software buttons to click on the screen and parameter description
...	Repeated item for example node 1, node 2, ..., node 12.
. . .	Omission of information from example/command that is not necessary at the time being.
..	Ranges. For example: 0..4 means one of the integers 0,1,2,3, and 4 (used in registers).
|	Logical OR
	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
	Indicates a property damage message.
	No danger encountered. Pay attention to important information.

Summary of Changes

This manual has been revised and replaces all prior editions.

Part Number	Date	Description
6806800U97A	February 2018	Initial version.

Chapter 1
Introduction

This manual describes installation and use of MaxCore™ MC3000 Platform software on Artesyn MaxCore PCIE cards. This software contains board utilities and platform management interface (SSF).

SSF is the primary interface to configure and manage MaxCore platform. However, certain command line utilities are also documented in this manual, which may be useful to prepare the platform before SSF comes up. These details are provided in *Linux Command Line Utilities* on page 73.

This chapter describes different installation methods to install the MaxCore MC3000 software on MaxCore PCIE cards.

2.1 Terminology

This section provides explanation of commonly used terminology in a MaxCore system.

shelfHost

shelfHost is a central management entity in a MaxCore with many CPUs. It manages the MaxCore infrastructure, such as power supplies, fans, and USB/SATA/PF/VF assignments. Alternatively, the term mCPU is also used across the manual.

applicationHost

An applicationHost processes the data it receives through the network functions assigned to it by a shelfHost. Alternatively, the term applicationCPU is also used across the manual.

networkCPU

This is the CPU on a PCIE-9205 card. It runs the switch management software with a user interface provided by the SSF core software on the shelfHost. The networkCPU may also run user applications of any kind. Alternatively, the term networkHost is also used across the manual.

2.2 Software Content

This software is delivered as an ISO image `MC3K-COMPLETE-ISO_<Version number>.iso`. This ISO image contains Linux Operating System, Linux command line utilities, SSF, and other necessary files to create a bootable USB or PXE boot to boot PCIE cards and perform disk installation.

This software can be installed on shelfHost, applicationHost, and networkHost. On shelfHost, this software is highly functional context with lots of internal dependencies. The purpose is to manage the MaxCore infrastructure and to provide sophisticated user interfaces. You can add packages of your choice to the installed OS, but you should never remove or update the pre-installed packages.

NOTICE

Do not run yum update on the shelfHost.

applicationCPUs are primarily bare metal devices and the user can install any kind of OS. The Artesyn package is also designed to be installed on applicationCPUs and contains the following additional services:

1. A daemon which reports the CPU temperature to the MaxCore fan controller. The controller will adjust the fan speed accordingly.
2. An agent which connects SSF to the OS of the applicationCPU. Based on this, SSF agent offers various services.
3. A method to exchange parameters between shelfHost and applicationCPU.

Some of these optional services require a proprietary kernel module. So, the use of these services is tight to the Artesyn OS distribution. Contrary to the shelfHost, users can update installed packages and install new packages with the OS package manager (`yum` for CentOS).

NOTICE

The following packages are excluded from upgrade.
`postgresql`, **`freeradius`**, **`libpqxx`**, **`mod_ssl`**, **`syslog`**, **`telnet`**, **`vsftpd`**, **`ftp`**, **`httpd`**, **`expect`**, **`eventlog`**, **`daemonize`**, and **`ivykis`**

In addition to this, Artesyn also provides software images `mc3ksw_update_centos-7.3_<Version number>.iso` and `SSFMAXCORE-R_<Version number>.iso`. These software images are released based on the need. Contact your local sales representative to obtain the latest software images.

The following table provides the directory structure of `MC3K-COMPLETE-ISO_<Version number>.iso`.

Table 2-1 ISO Directory Structure

Directory	Files	Description
EFI	`BOOT`	To boot into UEFI mode.
isolinux		To boot into legacy mode.
images	`kernel`	Kernel image file used for USB, PXEboot or Disk booting.
	`ramfs.xz`	`initramfs` based root file system.
	`files.sha1sum`	Sha1sum of `vmlinuz` and `ramfs.xz` are used during the installation on to the disk.
utils	`mkinitramfs`	Utility to create `ramfs.xz` image.
	`unpackinitramfs`	Utility to unpack `ramfs.xz` image.
	`create_bootusb.sh`	Utility to install `kernel` and `ramfs` onto disk and create it bootable.

2.2.1 Linux Distribution

The distribution is based on CentOS 7.3. The Kernel version provided is 3.10.0-514.26.2.

The default runlevel is **3**. The root file system does not contain any graphical interface packages. The following table shows the default login credentials.

Table 2-2 Login Credentials

Username	Password
root	root

2.2.1.1 Ethernet Interfaces

This section provides information on Ethernet device (s) interfaces.

- Backplane Ethernet devices assigned to aCPU have the following naming convention. **e_s**<physical_slot_id>**d**<device_id>**f**<function>

- aCPU (onboard Ethernet devices) mCPU (all Ethernet devices) have the following naming convention.
  enp<pci_bus_num>**s**<pci_device_num>**f**<pci_func_num>

2.3 Console Access (BIOS and OS)

This section provides information about various methods for console access.

2.3.1 VGA over LAN to Access shelfHost Console

Start VGA console session to access shelfHost (JViewer). This gives you guaranteed console access and you can also run software with graphical output.

1. Install Java from www.java.com to your PC (if it is not already installed).
2. Go to **Java Control Panel** > **Security > Exception Site List** and add **172.26.0.1** to the list.
3. In MegaRAC GUI, go to **Remote Control** > **Console Redirection** and click **Launch** to view JViewer window.
   If any security warning messages pop-up, accept them to view JViewer window.

Only shelfHost console can be accessed using this method.

2.3.2 Serial over LAN

Open an SSH session on the BMC using the same IP address and login credentials as MegaRAC.

```
/opt/fru/bin/sol <slotID> <cpuID>
```

The slotID ranges from 1 to 15 and the cpuID is either 1 or 2. Press <ESC + t> key, if you want to terminate the session and open a new one for another CPU. Be aware that the session terminates automatically after 1800 seconds. Re-open it when you see the BMC prompt.

To use SOL console, use the second option during the bootup in the GRUB prompt.

console=ttyS2,38400n8

You can use this method to access any of the hosts (shelfHost, applicationHost, networkHost).

2.3.3 Serial Over Card Bracket

CPU1 and/or CPU2 serial consoles are exposed via faceplate through Silicon labs (CP2105) single-chip USB to Dual UART bridge. Connect a microUSB to USB cable with mircoUSB end to the CONSOLE on the faceplate and the other end to the PC or laptop.

For Windows 7 or Later: Teraterm
Drivers are automatically installed up to connecting the cable.

For Linux (any recent distribution): minicom
Serial USB driver *cp210x* should be available.

2.3.3.1 Serial Console Options

The following table provides serial port configuration information.

Table 2-3 Serial Port Configuration Parameters

Parameter	Default Settings
Baud Rate	38400
Data Bits	8
Parity	No
Stop Bit (s)	1
Flow Control	Off
Terminal Type	Teraterm

The output from the card can be viewed over serial console. The default Kernel command line uses the following console options.

console=tty0 console=ttyS1,38400n8

You can use this method to access any of the hosts (shelfHost, applicationHost, networkHost).

2.4 Installation

2.4.1 Installation Source and Target Media

This section provides information about different types of installation source media and types of target media for installation.

- Source image media for installation
  - CD or HDD over LAN
  - External TFTP server
  - USB drive at chassis front
  - USB drive at card bracket
- Target media for installation
  - SSD or HDD in drive bay
  - SSD on PCIE-600x card
  - SD on card
  - SSD on card (PCIE-721x only)
  - iSCSI drive on shelfHost (PCIE-9205 recommended)

2.4.2 Remote Installation of shelfHost

You can install shelfHost either remotely or locally. This section explains remote installation of shelfHost from your notebook/PC using CD or HDD over LAN as source image media for installation.

For this you need to download the Complete ISO on to your notebook/PC and follow the below procedure:

1. Access MegaRAC GUI by providing the BMC IP address in a browser. The default IP address is 192.168.201.9 and use the credentials admin/admin to log in.
2. In MegaRAC GUI, launch Remote Console by going to **Remote Control > Console Redirection** and then clicking **Java Console**.

This will load a Java application from the BMC and will also launch the JRE to run this application.The JRE will not run an application from an unknown source. In such case, use the **Java Control Panel** to change the security settings add the BMC's IP address to the **Java Site List**.
A new **JViewer** window pops up with set of pull-down menus and the remote console. Select the **JViewer** window and press <Enter> to see the text or graphical message of your OS.

3. In the **JViewer** window, go to **Media** > **Virtual Media Wizard** to display **Virtual Media** window.
4. In **CD/DVD** Media, select **CD image**.
5. Click **Browse** and select the downloaded Complete ISO. Click the **Connect CD/DVD** button and click **Close**.
6. In MegaRAC GUI, go to **Remote Control > Chassis Power & Reset**, select **shelfHost Reset** and click **Perform Action**.
7. Observe the JViewer session and press <F4> to enter the **Boot** menu. It takes a while to enter the **Boot** menu.
8. In **Boot** menu, select **Virtual CD ROM** and press <Enter> to boot.
9. After boot up, log in with root/root.
10. Identify the storage device name for the microSD card using `parted -l`
    Note: We are currently shipping a **Model: Generic Ultra HS-COMBO** microSD card, but that may change. The assumption in this procedure is `/dev/sda.`
11. Execute the following command.
    ```
    $disk_install.sh -d disk:sda -i bootcd -t
    ```
    The above command is preferred, because along with installing Complete ISO it also sets up TFTP server to enable PXEboot for applicationHost CPUs. It takes a while to install.
12. Disconnect remote storage.
    In **JViewer** menu, go to **Media > Virtual Media Wizard,** click **Disconnect CD/DVD** and close the window.
13. Reboot the shelfHost.
14. Enter BIOS and select the installed media as the new boot device.

For local installation procedure, refer to section *Local Installation of shelfHost, applicationHost, and networkCPU (using bootable USB device)* on page 25.

2.4.3 Remote Installation of applicationCPU

You can install applicationCPU either remotely or locally. This section explains remote installation procedure.

The shelfHost must be up and running, before you install any other CPU in MaxCore. Before you proceed with the next chapter make yourself familiar with the SSF methods to power and reset the individual CPUs in MaxCore. Login to SSF and select the CPU of your choice from the Navigation pane at the left. The GUI will then display power and reset buttons of this specific CPU. For more information about options to power on/off a CPU, refer to section *Powering On/Off of a CPU* on page 40.

For local installation, refer to section *Local Installation of shelfHost, applicationHost, and networkCPU (using bootable USB device)* on page 25.

2.4.3.1 PXEBoot the applicationHost CPU from shelfHost

To PXEBoot the applicationCPU from shelfHost:

1. Open TTY session to any applicationCPU. The following commands assume CPU2 in slot 1:
   `/opt/fru/bin/sol 1 2`
2. Execute the following commands on the shelfHost to power off and power on the applicationCPU.
   ```
   mccs_tool.py --method=set-cpu-power --cpu=1,2 --power=off
   mccs_tool.py --method=set-cpu-power --cpu=1,2 --power=on
   ```
3. Enter the BIOS boot console with <F4> key.
4. Boot from network interface with MAC address 02:01:00:10:02:xx (xx is the number of the assigned VF).
5. Login with root/root. Now, we need to install the Complete ISO on to the disk.

2.4.3.2 Installing to an applicationCPU Disk

This installation procedure is similar for SATA disk, onboard SSD, SSD on PCIE-600x cards, and third-party NVMe cards.

To install to an applicationCPU disk:

1. Identify the storage device name for the microSD card. It is /dev/sda for this example.
   `parted -l`
2. Install Complete ISO to disk. The below command is framed with an assumption that shelf Id is 1 and disk is mounted on `/dev/sda`.
   `disk_install.sh -d disk:sda -i 172.27.1.2:/default/common/images`
3. Reboot the applicationCPU.
4. Enter BIOS with <F2> key and modify the following parameters.
   `BIOS: BOOT > EFI Device First [Disabled]`
   `BIOS: BOOT > Legacy > Boot Type Order`
   Note: Move the USB (BIOS sees the microSD card as a USB device) to the top of the list, save with <F10> and let the shelfHost boot from its microSD card.
   Note: Above suggested BIOS configuration changes would disable SSF support for network boot.
   Revert the changes, if you want to network boot the CPU using SSF. For more information about Network Boot Configuration, refer to *SSF for MaxCore MC3000 Platform GUI Help*.

2.4.4 Installation of networkCPU

You can install networkCPU only locally. Refer to the section *Local Installation of shelfHost, applicationHost, and networkCPU (using bootable USB device)* on page 25 for local installation.

2.4.5 Local Installation of shelfHost, applicationHost, and networkCPU (using bootable USB device)

This is a common procedure that can be used to install on shelfHost, applicationHost, and networkCPU.

Prerequisites

- 1 GB USB drive
- microUSB OTG adapter cable

- A PC with CentOS7.3 with extlinux, syslinux, sgdisk, and parted installed. The installation script will verify these utilities and abort, if not available. Alternatively, you can use shelfHost with USB connector at the front.
- Make sure the shelfHost must be up and running, before you install applicationHosts and networkCPUs.

2.4.5.1 Creating a Bootable USB on a Linux Machine

To create a bootable USB on Linux machine, use the shelfHost with a USB connector at the front:

1. Connect the USB drive.
2. Mount the `MC3K-COMPLETE-ISO_<Version number>.iso` to a directory.
   ```
   $ mkdir -p /mnt
   $ mount -o loop MC3K-COMPLETE-ISO_<Version number>.iso /mnt
   ```
3. Run the `create_bootusb.sh` script available in the `utlis` directory under mount point and then follow on-screen instructions.
   ```
   $ cd /mnt/utils
   $ sh create_bootusb.sh
   ```

Now, you can install the software using this bootable USB.

2.4.5.2 Install using Bootable USB

To install software using bootable USB drive:

1. Access the console. (For access methods, refer to section *Console Access (BIOS and OS)* on page 20).
2. Connect the bootable USB drive with an OTG cable to the microUSB connector at the card bracket and reboot the CPU using SSF.
3. Change the BIOS mode to UEFI. Refer to BIOS sections in the installation and use manuals of respective PCIE cards.
4. Boot the card with bootable USB drive.
5. Login using default credentials root/root.

6. Identify the name of the target storage device. The target storage device could be microSD, onboard SSD, 2.5" SATA, or NVMe or iSCSI.
   `parted -l`
7. Execute `disk_install.sh -d disk:<storage-device> -i bootusb`

   If you want to install Complete ISO on shelfHost using a bootable USB and also want to setup TFTP server to enable PXEboot for applicationCPUs, use the following command.

   ```
   disk_install.sh -d disk:<storage-device> -i bootusb -t
   ```

   For example, if /dev/sda is the storage device, the command will be
   `disk_install.sh -d disk:sda -i bootusb -t`

You can access MaxCore MC3000 platform using following interfaces:

- Web interface
- XML interface
- CLI
- Simple Network Management Protocol (SNMP)

3.1 Accessing MaxCore MC3000 Platform using SSF Web Interface

You can access MaxCore MC3000 Platform using the web interface for configuring, managing, and monitoring the platform equipped with multiple resources. You can use any of the following browsers to log on to SSF and access the MaxCore MC3000 Platform:

- Internet Explorer version 10.0 and later.
- Mozilla Firefox 12.0 and later.
- Google Chrome version 23 and later.

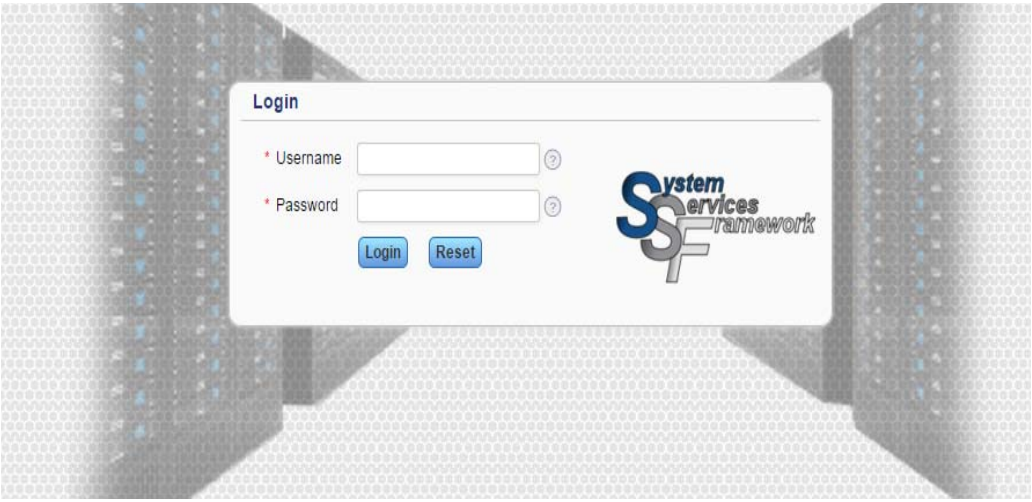
Note: Sometimes after installation or due to some timeout, you may get a blank screen. Cleanup browser cache (CTRL + SHFT+ DEL) and reconnect the SSF using web interface. This is a onetime activity.

To access MaxCore MC3000 Platform using SSF Web interface

1. Type the SSF web application URL in the address bar of the web browser and then press **<Enter>**. You can obtain the SSF URL from your administrator. The **SSF Login** dialog box opens, as shown in Figure 3-1.

For example, `https://<IP Address>:<PortNumber>`

Figure 3-1 Login Page



2. In the **Login** dialog box, type your *User name* and *password*.

The default user name and password is “Admin”.

3. Click **Login** for logging into **SSF**. The SSF Home page opens.

For more information on Web interface, refer to Online Help integrated with the SSF application. Click the **Help** icon to access the Online help.

NOTICE

Make sure that the SSF Web Interface is initiated before accessing it. In order to access SSF GUI, the SSF discovery/initialization should be completed.

3.2 Accessing MaxCore MC3000 Platform using SSF XML Interface

The XML interface of SSF passes management requests to the SSF framework for processing. It also handles responses and notifications/events from the SSF framework.

The XML interface facilitates access to SSF using an XML-based request protocol. The XML interface is intended for remote configuration of software and scripts. It can also be used via a remote GUI configuration tool. The XML-based requests are sent over a persistent connection to the XML agent, which processes the requests and returns XML-based responses. SSF also sends asynchronous responses/events over the XML interface such as alarm notifications, etc. By default, these events are disabled.

For more information about the XML commands, refer to the *System Services Framework for MaxCore™ Platform XML Interface Guide*.

3.3 Accessing MaxCore MC3000 Platform using SSF CLI

You can access MaxCore MC3000 Platform using the SSF CLI. SSF provides a fully functional CLI.

To access MaxCore MC3000 Platform using CLI

1. Establish a secure shell connection to SSF host using SSH.
2. Start the **telnet** connection from an already established secure shell.

```
root@localhost ~]# telnet localhost 11001
Trying ::1...
telnet: connect to address ::1: Connection refused
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
Welcome to Maxcore CLI
```

3. Type your *user name* and *password*.

```
Username: Admin
Password:
Access granted

>enable
#configure terminal
Maxcore(config)#
```

NOTICE

By default, the administrator user name and password are “Admin”. To change the existing password, see *Managing and Configuring MaxCore Platform* on page 35.

3.4 Accessing MaxCore MC3000 Platform using SNMP

The SNMP is designed to provide a means of managing and monitoring diverse network devices. It has client-server architecture and uses unencrypted text known as community strings for authentication. Communication between the client and server is accomplished using a command. There are four commonly used commands: `snmpget`, `snmpset`, `snmpwalk`, and `snmptrapd` for receiving trap message.

You can access SSF on PCIE card using port number `10165`, private enterprise number `26061` and text file `MAX-CORE-MIB` which will be available in `/usr/share/snmp/mibs` directory.

Example for SNMPget

```
#snmpget -v2c -cprivate -m /usr/share/snmp/mibs/MAX-CORE-MIB
snmp_agent_Ip_address:10165 systemName.1

MAX-CORE-MIB::systemName.1 = STRING: "MaxCore System Framework"
```

Example for SNMP walk,

```
#snmpwalk -m /usr/share/snmp/mibs/MAX-CORE-MIB  -v2c -c private
snmp_agent_Ip_address:10165 1.3.6.1.4.1.26061
```

```
MAX-CORE-MIB::systemInfo.1 = STRING: "System Services Framework for
Configuring MaxCore shelves"

MAX-CORE-MIB::systemName.1 = STRING: "MaxCore System Framework"

MAX-CORE-MIB::maxNoEvents.1 = Gauge32: 1000000

MAX-CORE-MIB::eventFilterSeverity.1 = Gauge32: 1

MAX-CORE-MIB::eventFilterType.1 = Gauge32: 32

MAX-CORE-MIB::userConfig.1 = Gauge32: 0

MAX-CORE-MIB::shelfName.1.1 = STRING: "Maxcore (r1.s1.a1.b1)"

MAX-CORE-MIB::shelfAddr.1.1 = STRING: "r1.s1.a1.b1"

MAX-CORE-MIB::shelfInventoryInfo.1.1 = STRING: "Vendor: ARTESYN,
Product: MAXCore"

...
```

Example for SNMP set

```
#snmpset -m /usr/share/snmp/mibs/MAX-CORE-MIB  -v2c  -   cprivate
snmp_agent_Ip_address :10165 systemName.1 s "MAXCORE"

MAX-CORE-MIB::systemName.1 = STRING: "MAXCORE"
```

Example for SNMP trap

You can configure the PCIE card using the CLI to send notifications to SNMP managers as traps.

```
#snmp-server host snmp_traphost_Ip_address trap version 2c SSF udp-
port 162 Admin
```

To receive traps, start `snmptrapd` application on configured manager that listen at port 162 and notifies the traps.

```
#snmptrapd  -f -Lo  -m MAX-CORE-MIB
```

System Services Framework (SSF) provides a management and configuration interface to Artesyn's hardware and software products. It facilitates system level configuration and management access to SSF managed hardware and software components through Web, XML, and CLI protocol interfaces.

SSF represents all the managed hardware and software components in a simple and easily manageable hierarchal model. It also supports persistency and playback of MaxCore configuration.

The following are the key features supported by SSF:

- Access, Authentication, and Authorization
- Configuration Management
- Hierarchal representation of System model
- Dynamic population of System model
- Remote system Configuration Management
- Application Management of Remote systems
- Event and Alarm management
- Graphical Monitoring of Sensors

4.1 PEX Modes and Network Configuration

MaxCore has two different architecture modes:

- Single-Host Mode
- Multi-Host Mode

4.1.1 Single-Host Mode

In this mode, it is a single PCIe domain. Where only one slot (slot1 or slot15) is populated with one Host card and other slots are populated with PCIe endpoint cards. This mode can be compared with any other PCIe rack server with a host processor and multiple PCIe Slots (14 slots).

4.1.2 Multi-Host Mode

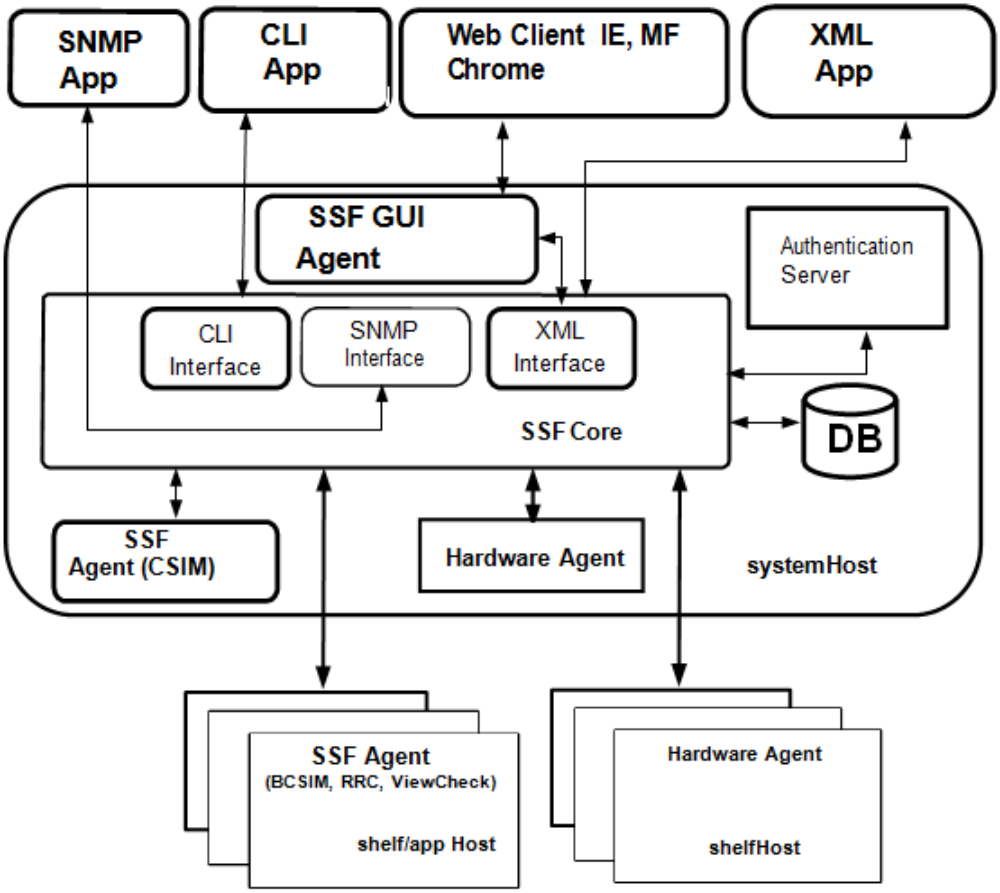
In Multi-Host mode, multiple slots are configured as Host Ports. There can be multiple PCIe Hosts, that contains PCIe endpoints associated with them. The shelfHost can either assign the primary function (PF) of a device or a virtual function (VF) of a device to an App Host CPU root port.

By default, MaxCore is configured in Base mode. You can switch MaxCore to Express fabric mode using SSF. This will result in the power cycle of the shelf host and bring-up MaxCore with the multi-host configuration, now set as default. You can decide on the default fabric mode configuration set separately.

4.2 SSF Components

The following figure illustrates various components of SSF.

Figure 4-1 SSF Components



SSF has the following components:

- **SSF Agent** - SSF Agent is the software component that models and represents underlying hardware or application to be managed. There is one SSF Agent that models the shelf hardware and runs on shelfHost, which is the called CSIM. Apart from CSIM, each applicationHost can run more than one SSF Agent, each modeling a particular software or hardware specific to the host. For example, an applicationHost can run one SSF Agent to configure and manage Linux Applications and another agent for diagnosing the hardware. Similarly, a networkHost can run an agent to manage the underlying RRC switch.
- **Hardware Agent** - This is a software component that runs on each shelfHost. This component understands the lower level languages like IPMI to communicate and discover complete hardware. The above mentioned CSIM models the hardware based on discovery of hardware agent.
- **SSF Core** - It is the central component of SSF. It provides single point access to the complete system. It uses north-bound external interface agents to communicate with the user. It receives requests from different external interfaces and forwards them to the one or many targeted SSF Agents. SSF Agents are the actual work horse that gets the job done for the user. SSF Agents in reply sends the response to SSF Core which in turn sends it to the user. It also receives asynchronous events from the SSF Agents and forwards them to the applications registered for the events.
- **SSF GUI Agent** - It is an application that interacts with the SSF Core to provide web interface for accessing SSF managed system. Similar to SSF core, SSF GUI Agent has to be installed on shelf host.

4.3 Resetting Administrator Password

To reset the administrator password:

1. Log on to the card on which SSF and PostgreSQL are installed.
2. Log on as a PostgreSQL user with the `# su -l postgres` command.
3. Connect to the PostgreSQL database using the below command.
   `#/usr/local/postgres/bin/psql SSF`
   The following output is displayed.
   ```
   psql (9.1.3)
   Type "help" for help.
   SSF=#
   ```

4. List the available users, using the SSF=# `select * from "user";` command. The list of available users along with the passwords are displayed as shown below.

```
user | password | hash
-------+----------+------
Admin | Admin    |
(1 row)

SSF=#
```

5. Reset the administrator password using the following command.

```
SSF=# update "user" set password = 'test' where "user" = 'Admin';
UPDATE 1
SSF=#
```

After changing the password of the administrator, you can check whether the new password is reflected or not by listing the available users using the SSF=# `select * from "user";` command. The following output is displayed.

```
SSF=#
SSF=# select * from "user";
user | password | hash
-------+----------+------
Admin | test     |
(1 row)

SSF=#
```

4.4 Powering On/Off of a CPU

SSF provides following options to power on/off a CPU.

- **Graceful Power Off** - Allows you to gracefully power off of the selected CPU. (The host can be a shelfHost CPU, or an application CPU or a network CPU). If you want to gracefully power off shelfHost, it is strongly recommended to gracefully power off all applicationHosts gracefully. You can gracefully power off all the applicationHosts by clicking the **Power Off All App Hosts** button on **System > Shelf > Overview** screen.
- **Power Off** - It is a toggle button. It instantaneously powers off the selected CPU. This is nota graceful power off. It is suggested to use this option only when graceful power off operation fails. If you want to power off shelfHost, it is strongly recommended to graceful power off all applicationHosts. You can gracefully power off all the applicationHosts by clicking the **Power Off All App Hosts** button on **System > Shelf > Overview** screen.
- **Reboot** - Allows you to gracefully reboot the selected CPU. The rebooting of shelfHost results in power reset of applicationHosts. it is strongly recommended to gracefully power off all applicationHosts gracefully before rebooting shelfHost. You can gracefully power off all the applicationHosts by clicking the **Power Off All App Hosts** button on **System > Shelf > Overview** screen.
- **Reset** - It instantaneously resets selected CPU. This is not a graceful reboot. It is suggested to use this option only when graceful reboot operation fails. If you want to perform shelfHost reset, it is strongly recommended to gracefully power off all applicationHosts gracefully. You can gracefully power off all the applicationHosts by clicking the **Power Off All App Hosts** button on **System > Shelf > Overview** screen. If SSF is running on the shelfHost, resetting the shelfHost will make SSF not accessible.

For more information, refer to *SSF for MaxCore MC3000 Platform GUI Online Help*.

4.5 Configuring a Non-Artesyn card for SSF

If a non-Artesyn card is inserted into the MaxCore chassis, the card information will be shown as **Unknown** in the SSF GUI. Let us assume that a non Artesyn card is inserted in slot 3.

To view the card information in the SSF GUI, you need to perform the following steps:

1. Obtain the vendor and device details of the card using **mccs_tool.py** tool. For this you need to run the following command on shelfHost.
   `#mccs_tool.py --method=list-devices`

Note: Only the output of the card in slot 3 is shown below for quick reference.

```
slot: 5 device: 1
  func: 1
      vendor          : 0x8086
      device          : 0x15a4
      class           : 0x20000
   pci location@mcpu  : 0f:00.0
   plx switch         : 0
   plx station        : 1
   plx port           : 4
```

2. Use the bus device function `0f:00.0` shown at `pci location@mcpu` in the above step to get device details as shown below.

```
[root@pcie7410-s1-c1 ~]# lspci -s 0f:00.0 -vnn

0f:00.0 Ethernet controller [0200]: Intel Corporation Ethernet
Switch FM10000 Host Interface [8086:15a4]
        Subsystem: Artesyn Communication Products Device
[1223:2020]
```

3. Add the retrieved device details in `/opt/ssf/etc/config/main/pcidb.csv` file in the following format.

```
<vendor, vendor desc, device, device desc <,sub vendor, sub
vendor desc, sub device, sub device desc -- card name, device
num, device name>
```

For example,

```
0x8086,"Intel Corporation",0x15a4,"Ethernet Switch FM10000 Host
Interface",0x1223,"Artesyn Communication
Products",0x2020,"PCIE-9205","--","PCIE-9205"
```

The above example shows the following details.

Vendor id - 0x8086, Vendor description - Intel Corporation, Device id - 0x15a4,device description - Ethernet Switch FM10000 Host Interface
sub-vendor id - 0x1223
sub-vendor description - Artesyn Communication Products
sub-device id - 0x2020
sub-device description - PCIE-9205
SSF delimiter, for providing human readable strings for card and devices – "—"
Card name - PCIE-9205

Note: SSF delimiter and elements following delimiter are optional. This is the interface for user to give a human readable name to card for any third-party card that does not provide FRU information. These names are read and used in SSF GUI.
If either the entry is not available in `pcidb.csv` or if human readable text is not provided, then the names would default to unknown.

4. Restart the SSF hardware agent.
   #**`/opt/ssf/etc/config/S99mcagent.sh restart`**

After completion of the procedure, the name of the card with its details are shown in SSF GUI.

4.6 Updating Shelf Address

SSF allows you update the MaxCore shelf address through GUI. The shelf ID is used to configure the internal default network. Several MAC and IP addresses will incorporate this number. So, be cautious when you are going to change the Shelf ID of an already running system. Shelf IDs must be unique within the same SSF system stack. The shelf name is a reference for management layers above SSF.

SSF itself does not use this parameter. You can update the shelf ID and the name of a Shelf here. For more information on how to update shelf address, refer to *SSF for MaxCore MC3000 Platform GUI Online Help*.

4.7 Network Boot Configuration

SSF allows you to enable or disable network boot configuration of applicationHost (s). The Network Boot Configuration dialog box in SSF GUI shows the status of availability of images (Ramdisk and Kernel) of CPU for PCIE card (PCIE-7410, PCIE-9205, and PCIE-7210). If any of these images are not available or you want to replace the available image with a new image, you need to upload the required image.

For more details about *Network Boot Configuration*, refer to *SSF for MaxCore MC3000 Platform GUI Help*.

4.8 Setting Default Configuration

It allows you to set the default assignments, ETH3 and ETH4 virtual functions, to applicationHosts. The pre-defined virtual functions are automatically assigned to the available applicationHosts and thus bringing applicationHosts into internal networking.

NOTICE

You do not need to assign these virtual functions to applicationHost manually. This operation will not disturb any other assignments made from other endpoint devices.

For more details on how to set default configuration, refer to *SSF for MaxCore MC3000 Platform GUI Help*.

4.9 Configuration Management

Configuration Editor is for editing a file with the baseboard configuration of MaxCore. When this editor is active the SSF GUI no longer displays the connected hardware. The GUI shows the content of the configuration file and is used to edit its content. A red frame below System Alarms is visible when the GUI displays the editable file content. The content of the currently opened file can be applied to the connected system.

Be aware that the applied changes may result in a reboot of most CPUs in all shelves of the system. You can exit editor to gain back access to the connected system.

Make note that editing the saved file with a text editor is possible, but may result in an inconsistent configuration file.

For more information, refer to *SSF for MaxCore MC3000 Platform GUI Online Help*.

4.10 Enabling Network Time Protocol

Using this feature you can enable or disable SSF Configured NTP (Network Time Protocol) Service. SSF provides this feature at the CPU level of a MaxCore system. This feature allows you to synchronize the date and time of application hosts with the shelfHost.

To enable or disable this feature, click Off/On control button in line with SSF Configured NTP Service label. This is a toggle button. When this service is enabled (ON), the time stamp of all the application hosts running in the MaxCore gets aligned with shelfHost running time and when this service is disabled (OFF), the respective application hosts will be running independently irrespective of shelfHost running time.

NOTICE

Disable *SSF Configured NTP Service*, if you want to synchronize any of the applicationHosts date and time with an external source other than shelfHost.

4.11 Configuring Multiple Shelves on MaxCore

To configure multiple shelves on MaxCore, follow the procedure below.

NOTICE

Assuming shelf Ids/chassis numbers for the shelf are already configured as mentioned in Appendix 4, *Updating Shelf Address, on page 42*.

On System Host (that hosts all the MaxCore shelves)

1. Check the current shelf's configuration using CLI or XML Command.
   `MaxCore(config-HardwarePlatformManager)#listShelves`

```
Shelf: Shelf
      rackID: 1
      ShelfId: 1
      Name: Shelf
      shelfHostIpAddr: 127.0.0.1
      isMaster: true;
```

Here, the shelfHost IP address is localhost (127.0.0.1) and the shelf id is 1.

2. Add a new Shelf using CLI or XML command.
   The Shelf's ID and shelfHost IP Address should be different from that of earlier configured shelves, and shelfHost IP Address should be reachable to SSF core.

   Syntax

   ```
   MaxCore(config-HardwarePlatformManager)#addShelf shelfID
   <Shelf_Id> shelfHostIpAddr <Shelf_IP_Address> master false
   shelfName <Shelf_Name>
   ```

   Example

   ```
   MaxCore(config-HardwarePlatformManager)#addShelf shelfID 2
   shelfHostIpAddr 172.27.2.2 master false shelfName Shelf2
   ```

   For more information about add shelf command, refer to *SSF for MaxCore MC3000 Platform XML Interface Guide* and *SSF for MaxCore MC3000 Platform Command Line Interface Guide*.

On Shelf Hosts (other than System Host)

1. Disable loop-back for ETH3 while connecting multiple shelves to a hub to be on default base network.

   ```
   # mccs_tool.py --method=set-loopback --mode=off --func=16,2
   ```

2. Start and Stop following services.

   ```
   #systemctl stop ssfCore.service
   #systemctl disable ssfCore.service
   #systemctl start mcagent.service
   #systemctl enable mcagent.service
   ```

On both System Hosts and Shelf Hosts

1. Restart all SSF services.
   For more information on restarting SSF services, see sections *Starting SSF* on page 43 and *Managing SSF MaxCore Agent* on page 43.

4.12 Configuring firewalld to Allow SSF Communication

NOTICE

Assuming that the following configurations are present:

- **`firewalld`** is running both on SSF-Core and App-host.
- **`firewalld`** is already started while executing the commands. (Command: **`systemctl start firewalld`**)

Follow the below procedure to configure `firewalld` to allow SSF internal communication:

On App-host

1. Identify the ports for which firewall rule needs to be added. Run the below command.
   ```
   # cat /opt/ssf/etc/config/bcsim/ssfApi.conf
   ```
   Output:
   ```
   # Transport type (one of: tcp, uds)
   #transport=tcp
    #listening address
   LocalTcpAddress=0.0.0.0:21215  <-  firewall rule to be added for
   this on App Host side
    # embeddedMIND process location
   emindTcpAddress=192.168.201.100:21212  <- firewall rule to be
   added for this on SSF Core side
   #emindUdsPath=/tmp/emind-tl-uds
    # Link health-check period (in seconds)
   healthcheckPeriod=10.0
   ```

```
 # Log settings
#logEnabled=yes
#logLevel=error # one of: error, info, debug
#logFile=eMindApi.log
[root@localhost ~]#
```

2. Add firewall rule on App Host. (port 21215 in this case). It allows traffic from SSF-Core to App-host.
   `#firewall-cmd --zone=public --add-port=21215/tcp`
   Change the port number in the above command as per your `ssfApi.conf` file.

On SSF Core-host

- Add firewall rule on the SSF Core host. All app hosts usually connect to port 21212. So, this needs to be added for firewall exception.
  `#firewall-cmd --zone=public --add-port=21212/tcp`

4.13 Verifying SSF and BBS Versions Installed on the System

For verifying SSF version, execute below command.

```
#cat /etc/ssf-release
```

For verifying BBS version, execute below command.

```
#cat /etc/pcie-release
```

4.14 Changing Logging Configuration

By default, the log level configured is "info".

To change it to lower levels in order to avoid excessive logging, perform the following steps:

1. Login to SSF CLI and enter the config mode.

```
# telnet localhost 11001
Trying::1...
Trying 127.0.0.1...
Connected to localhost.
```

```
Escape character is '^]'.
Welcome to SSF CLI
Username: Admin
Password:
Access granted
>enable
#configure terminal
MaxCore(config)#
```

2. Go to `logfilter` class and select "syslog " instance and then enter show to get the current logging configuration.

```
MaxCore(config)#logfilter syslog
MaxCore(logfilter-syslog)#show
logfilter, syslog
type                 = priority
priority             = info
modules              =
```

3. Enter priority from one of the following.

```
MaxCore(logfilter-syslog)#priority ?
  critical  Filter priority (applicable for priority log filter)
[debug]
  debug     Filter priority (applicable for priority log filter)
[debug]
  error     Filter priority (applicable for priority log filter)
[debug]
  info      Filter priority (applicable for priority log filter)
[debug]
  warning   Filter priority (applicable for priority log filter)
[debug]
```

4.15 SSF Core Configuration

SSF core is a management and configuration interface between hardware and software. SSF core consists of two sets of configuration files. One for SSF-Core (`ssfMxcd`) and other for SSF-CSIM (`ssfcsimd`). All SSF-Core (`ssfMxcd`) executable configuration files are stored in `/opt/ssf/etc/config/main/`.

You can edit the `ssf.ini, maxcore.conf, and tl.ini` files stored at this location to configure the required parameters.

All CSIM (`ssfcsimd`) executable configuration files are stored in `/opt/ssf/etc/config/csim/`. You can edit the `ssfApi.conf` file stored at this location to configure the required parameters. Table 4-1 describes the configuration options.

⚠ CAUTION

Misconfiguring any of the following may lead to an unusable system.

Table 4-1 SSF Core Configuration Files

File Name	Configuration Options	Description

`ssf.ini`
Directory:
`/opt/ssf/etc/config/main`
	`MaxSessions`	The default value for `MaxSessions` is 100. You can edit it to any required value.

	`SessionTimeOut`	The default value for `SessionTimeOut` is 1800 seconds. You can edit it to any required value.

Table 4-1 SSF Core Configuration Files (continued)

File Name	Configuration Options	Description

`maxcore.conf`
Directory:
`/opt/ssf/etc/config/main`
	`log_level`	Log level
		INFO - Notifications and important information.
		DEBUG - Verbose
		Default is INFO.

	`domain`	MaxCore ID in the system. This may become obsolete.
	`rack`	Rack ID in the system.
	`shelf`	Shelf ID or chassis number to uniquely identify the MaxCore.
	`name`	Name of the MaxCore. This is optional.
	`mcpu_ipaddr`	Shelf Host IP address. The default IP is `127.0.0.1`. You can edit it to any Shelf Host IP reachable by the system host.
	`mcpu_port`	TCP/IP port. The default value is 8888.
	`mcpu_evt_port`	TCP/IP port for events. The default value is 8890.
	Note: To access multiple MaxCores simultaneously, you can configure more than one domain in the same file.	

`tl.ini`
Directory:
`/opt/ssf/etc/config/main`
	`transport`	The default `Transport` is set as TCP. You can also change it to Unix Domain Sockets (UDS), if needed. SSF Server (SSF Host) listens on both TCP and UDS sockets for connection from the SSF agent.

	`emindTcpAddress`	By default, the `emindTcpAddress` is set to localhost. You can replace with the IP address of the SSF Core.

Table 4-1 SSF Core Configuration Files (continued)

File Name	Configuration Options	Description

`ssfApi.conf`
Directory:
`/opt/ssf/etc/config/csim/`
	`transport`	The default `Transport` is set as TCP. You can also change it to UDS, if required. SSF Server (SSF Host) listens on both TCP and UDS sockets for connection from the SSF agent.

	`emindTcpAddress`	By default, the `emindTcpAddress` is set to localhost. You can edit with the IP address of the SSF Core.
	`healthcheckPeriod`	By default, the `healthcheckPeriod` is set to 1.0 seconds. In every 1.0 second the system checks the health link between CSIM core and SSF. You can modify this value to required duration.
	`logEnabled`	By default, the `logEnabled` field is enabled for log collection. You can modify it to disable log collection.
	`logLevel`	By default, the `logLevel` is set to error. You can modify to either error, info or debug.
	`logFile`	By default, `logFile` name is `eMindApi.log` file.

4.16 SSF Agent Configuration

Server SSF core consists of SSF-BCSIM (`ssfbcsimd`) executable configuration files. These files are stored in `/opt/ssf/etc/config/bcsim/.` You can edit the `ssfApi.conf` file stored at this location to configure the required parameters.The following table provides the list of configuration options of `ssfApi.conf` file.

Table 4-2 SSF Server Configuration Files

File Name	Configuration Options	Description
`ssfApi.conf`	`transport`	The default `transport` is set as TCP. You can also change it to UDP, if needed.
	`emindTcpAddress`	By default, the `emindTcpAddress` is `172.27.1.2`. You can edit with the IP address of SSF Core.
	`healthcheckPeriod`	By default, the `healthcheckPeriod` is to 1.0 second. In every 1.0 second, the system checks the health link between CSIM core and SSF. You can edit this value to required duration.
	`logEnabled`	By default, the `logEnabled` field is enabled for log collection. You can edit it to disable log collection.
	`logLevel`	By default, the `logLevel` is set to error. You can edit to either error, info or debug.
	`logFile`	By default, the `logFile` name is `eMindApi.log` file.
	`ShelfHostIPAddress`	By default, the `ShelfHostIPAddress` is set to `172.27.1.2`. You can edit with the IP address of the shelf host of the shelf in which the SSF agent is to be considered. Note: This option is only applicable to SSF Agent and no other TL servers.
	`localTcpAddress`	By default, the `localTcpAddress` is set to `0.0.0.0:21215`. You can edit with the IP address and port on which the SSF agent needs to be configured to listen to incoming request from SSF Core.

4.16.1 Service Manager Configuration

In the Service Manager (SMAN) configuration file `SMAN.conf`, you can add additional user defined services. The `SMAN.conf` file is stored in `/opt/ssf/etc/config/bcsim/`.

Use the following guidelines to add a service:

- Service name should be less than 20 characters.
- Service name should be the same as that of Linux daemon service, if there exists a Linux daemon.
- Description of the service should be equal to or less than 128 characters.
- Binary file path should be equal to or less than 128 characters.
- Tabs should be given before the file list and space should be used between path and filename.

Syntax

```
## SYSLOG-NG configuration ####

#service syslog-ng

{
        enable=y;
        desc="syslog-ng system logger application";
       binFilePath=/opt/ssf/etc/config/bcsim/etc/init.d/syslog-ng;
        numberOfConfigFiles=2;
        filename
        {
                /etc/syslog-ng/ syslog-ng.conf;
                /etc/syslog-ng/ scl.conf;
        }
```

```
}
```

NOTICE

To disable a particular service parsing, add '#' before the service.

4.16.2 Service Manager Configuration INI File

Service Manager (SMAN) configuration INI file (`SMAN.ini`) supports two modes:

- ConfigMode: Supports commit-config of configured applications. The services under SSF control should be separated by comma (,). For example, `[ConfigMode]:pcieBsnet,dhcpd,tftp,ntpd,syslog-ng,syslcu`
- NonConfigMode: Does not support commit-config of configured applications. For example, `[NonConfigMode]:syslog-ng,tftp`

NOTICE

Add an application under "configMode" in case you choose to perform 'Commit Config' for the application. Otherwise add it to "NonConfigMode".

4.17 Hardware Agent Configuration

Hardware Agent RPM consists of MaxCore Agent executable configuration files (`mxcagent.conf`). Configuration files are stored in `/opt/ssf/etc/config/agent`. You can edit the `mxcagent.conf` file stored at this location to configure the required parameters.The following table provides the list of configuration options of `mxcagent.conf` file.

Table 4-3 Hardware Agent Configuration

File Name	Configuration Options	Description

`mxcagent.conf`
Directory:
`/opt/ssf/etc/config/agent`
	`log_level`	Log level
		INFO - Notifications and important information.
		DEBUG - Verbose
		Default is INFO.

	`domain`	MaxCore ID in the system. This may become obsolete.
	`master`	Identifies whether SSF core runs on this Shelf Host. The default type is true.
	`rack`	Rack ID in the system.
	`shelf`	Shelf ID or chassis number to uniquely identify the MaxCore.
	`name`	Name of the MaxCore. This is optional.
	`mcpu_ipaddr`	Shelf Host IP address. The default IP is `127.0.0.1`. You can edit it to any Shelf Host IP reachable by the system host.
	`agent_listening_port`	This is listening TCP/IP port to make a connection for SSF core. The default value is 8888.
	`agent_evt_listening_port`	This is listening TCP/IP port for event. The default value is 8890.
	`con_type`	Connection type to BMC. The default value is smi.
	`ipmi_con_tmout`	IPMI connection timeout. The default value is 5000 msecs.
	Note: The below commands is not applicable if the connection type is (`con_type`) smi. But, it is applicable only if it is LAN type.	
	`bmc_ipaddr`	BMC IP address. The default IP is `192.168.201.9`. You can edit it to any BMC IP reachable by the shelf host.
	`port`	RMCP port. The default value is 623.
	`auth_type`	RMCP authentication type. The default type is md5.

Table 4-3 Hardware Agent Configuration (continued)

File Name	Configuration Options	Description
	`privilege`	RMCP privilege. The default privilege is admin.
	`username`	RMCP username. The default username is admin.
	`password`	RMCP password. The default password is admin.

5.1 Firmware Upgrade

The PCIE card has two firmware devices that need to be upgraded, when required. The first device is the CPU with the BIOS firmware and the second is the CPLD. The root file system includes the latest firmware images for both the devices and a firmware command line utility (FCU) to execute the upgrade procedure. FCU provides the following operations:

- Query the device to return the current firmware version
- Show the version of a firmware image
- Validate the firmware image
- Verify whether the image is applicable on the target device
- Upgrade the device with the given firmware image

When you call FCU with the help option `fcu –help` or `fcu –h`, a list of supported operations are displayed on the screen.

This section explains the firmware upgrade using the FCU tool, bundled as part of BBS.

Applicable: For mCPU and aCPU

Related packages: `fcu` and `pcie-firmware`

`pcie-firmware` images are available in the `/opt/bladeservices/rom/<PCIE Card Number>` directory and it contains BIOS and CPLD firmware.

`fcu` utility is available in `/opt/bladeservices/bin` directory. It provides functionality to query and upgrade the BIOS and CPLD firmware.The following sections provide information about the commands used to query, upgrade, and verify the firmware.

5.1.1 BIOS Upgrade

5.1.1.1 Query Operation

Using the query operation, FCU returns firmware information for a specific device (if used with -d) or information about all firmware devices.

If you want to know the current BIOS version before upgrading it with a new version, use the following command.

```
$ fcu -q
```

The following screen shows a typical output when the above command is executed.

```
[root@pcie7410-s1-c1 bin]# fcu -q
********************[[[[[REPORT BEGIN]]]]]********************
Operation: Query
Product Name: PCIE-7410

 #00 Device    : pcie7410-cpld
  Bank #0 -       Active Version: 01.00.00

 #01 Device    : pcie7410-cpu
  Bank #0 -       Active Version: 1.4.00000002

********************[[[[[ REPORT END ]]]]]********************
[root@pcie7410-s1-c1 bin]#
```

The above screen depicts the following information.

- Device #00 represents the CPLD and the firmware version is 01.00.00.
- Device #01 represents BIOS and the firmware version is 1.4.00000002.

The following screen show the typical output of `fcu -q` command on a PCIE -721x card.

```
[root@pcie7210-s15-c2 ~]# fcu -q
********************[[[[[REPORT BEGIN]]]]]********************
Operation: Query
Product Name: PCIE-7210

 #00 Device    : pcie721X-cpld
  Bank #0 -       Active Version: 01.06.01

 #01 Device    : pcie721X-cpu
  Bank #0 -       Active Version: 2.2.00000004

********************[[[[[ REPORT END ]]]]]********************
[root@pcie7210-s15-c2 ~]#
```

5.1.1.2 Show Operation

Show operation does not access any device. It only operates with the firmware image and it shows the metadata, which is part of the image. Furthermore, it validates the firmware image to compare the checksum part of the metadata against the checksum of the raw image. The output of the show operation is similar to the output of the query operation. A sample output of the BIOS image is shown below.

Verification of BIOS image

```
[root@pcie7210-s15-c2 bios]# fcu -vf pcie_721x-2_bios_2.2.4.fri
********************[[[[[REPORT BEGIN]]]]]********************
Operation: Verify
Result    : Success
********************[[[[[ REPORT END ]]]]]********************
[root@pcie7210-s15-c2 bios]#
```

Show contents of BIOS firmware image

```
[root@pcie7210-s15-c2 bios]# fcu -sf pcie_721x-2_bios_2.2.4.fri
********************[[[[[REPORT BEGIN]]]]]*********************
Operation: Show
 Manufacturer : ARTESYN
 Board        : pcie721X
 #00 Device   : pcie721X-cpu
  Bank #0 -              Version: 2.2.00000004

 #01 Device   : pcie721X-cpu
  Bank #0 -              Version: 2.2.00000004

*********************[[[[[ REPORT END ]]]]]*********************
[root@pcie7210-s15-c2 bios]#
```

5.1.1.3 Upgrade Operation

Upgrade operation uploads the firmware image to the device. Before the upload process, the firmware image is validated first and the FCU verifies if the image is applicable to the firmware device.

To upgrade BIOS, use the following command.

```
$ fcu -uf <BIOS image>.fri
```

Here, <*BIOS image*>.*fri* is the firmware file to which BIOS will be upgraded. The following screen shows a typical output when the above command is executed.

```
[root@pcie7210-s15-c2 bios]# fcu -uf pcie_721x-2_bios_2.2.4.fri
********************[[[[[REPORT BEGIN]]]]]*********************
Operation: Upgrade
Current BIOS version is 02.02.04

                     Please do not remove the AC power


        Insyde H2OFFT (Flash Firmware Tool) Version (SEG) 100.00.08.05
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Result    : Success
*********************[[[[[ REPORT END ]]]]]*********************
[root@pcie7210-s15-c2 bios]#
```
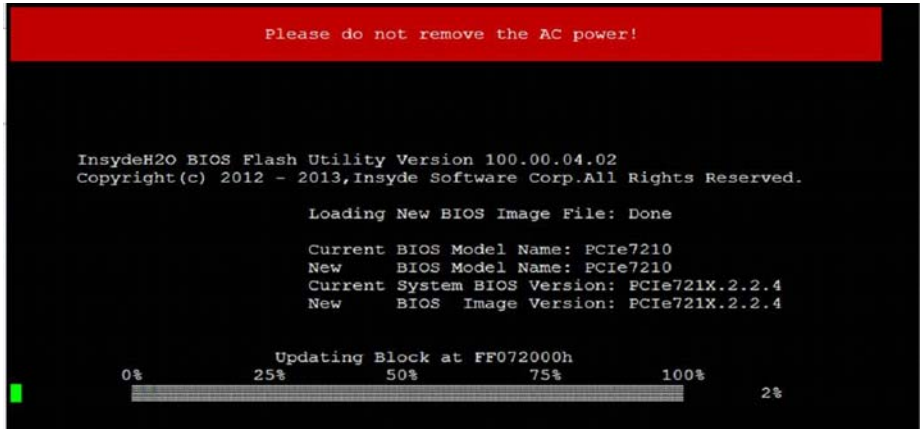

After completion of this procedure the image is copied to the flash temporary location. Once the upgrade procedure shows the result as **Success** (as notified in the above screen), the upgrade procedure would complete with the rebooting of the card. After the reboot, the following screen is displayed.



Wait until the above procedure is successful.

NOTICE

Do not reset or reboot the card at this point of time. This may corrupt the BIOS. Once the upgrade is successful, card will go for automatic reset and then boots with the upgraded BIOS.

After the card boots to Linux, to confirm whether the BIOS is upgraded, execute the `fcu -q` command.

This section contains screen shots of PCIE-7410 and PCIE-7210 cards as an example; same command is applicable for PCIE-9205 card.

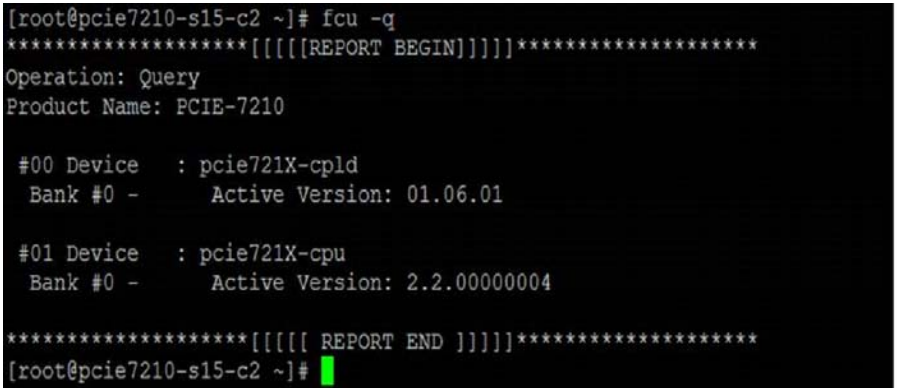
5.1.2 CPLD Upgrade

5.1.2.1 Query Operation

If you want know the current CPLD version before upgrading it with a new version, use the following command.

```
$ fcu -q
```

The following screen shows a typical output when the above command is executed.



5.1.2.2 Show Operation

Verification of CPLD Firmware Image

`fcu-vf<Fri file image>` is the command used for verifying a CPLD firmware.

The following screen shows the typical output of the command when executed on PCIE-721x card.

```
**********[[[[[ REPORT END ]]]]]**********
[root@pcie7210-s15-c2 ~]# cd /opt/bladeservices/rom/7210/cpld/
[root@pcie7210-s15-c2 cpld]# fcu -vf PCIe_721x-2_CPLD_1_6_0.fri
**********[[[[[REPORT BEGIN]]]]]**********
Operation: Verify
Result   : Success
**********[[[[[ REPORT END ]]]]]**********
[root@pcie7210-s15-c2 cpld]#
```

Show contents of CPLD firmware image

```
[root@pcie7210-s15-c2 cpld]# fcu -sf PCIe_721x-2_CPLD_1_6_0.fri
**********[[[[[REPORT BEGIN]]]]]**********
Operation: Show
 Manufacturer : ARTESYN
 Board        : pcie721X
 #00 Device   : pcie721X-cpld
  Bank #0 -             Version: 01.06.00

**********[[[[[ REPORT END ]]]]]**********
[root@pcie7210-s15-c2 cpld]#
```

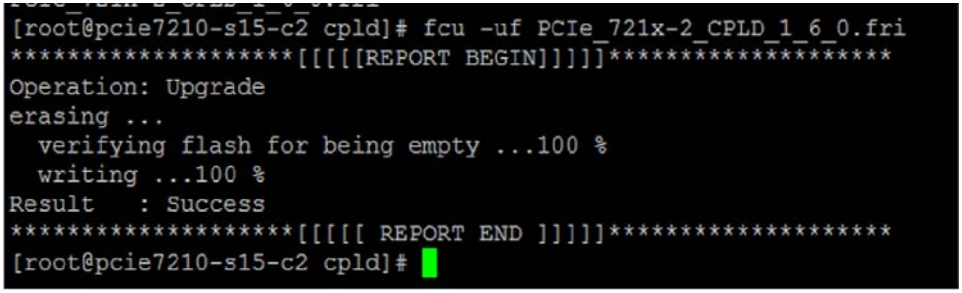
5.1.2.3 Upgrade Operation

To upgrade CPLD, use the following command.

$ fcu –uf <CPLD image>.fri

Here, *<CPLD image>.fri* is the firmware file to which CPLD will be upgraded.

The following screen shows a typical output when the above command is executed.



For the newly upgraded CPLD image to be active, you need to PowerCycle the card.

After the card boots to Linux, to confirm whether the CPLD is upgraded, execute the `fcu -q` command.

Troubleshooting and FAQ

This section provides troubleshooting and frequently asked questions (FAQs) and their usual solutions on SSF for MaxCore MC3000 Platform.

A.1 Starting SSF

SSF starts automatically once you restart the system after its installation and configuration. If you want to start manually, then the following sections describe how to start SSF Core, SSF Agent, Application agent individually, and SSF web interface.

A.1.1 Starting SSF Core

You can stop and start the SSF Services using the systemd scripts.

After you start the SSF Core, you can stop, restart, and check the status of the SSF using the following command.

```
#systemctl {stop|restart|status|enable|disable} ssfCore.service
```

A.1.2 Starting SSF Agent

You can stop, restart, and check the status of the SSF Agent using the following command.

```
#systemctl {stop|restart|status|enable|disable} ssfAgent.service
```

A.2 SSF Core Failure

Problem Description

Why SSF core fails to start.

Root Cause and Solution

- PAM-postgres-SSF communication error. If so, wait for a while and retry starting SSF core.
- `Radiusd` service is not running.
- User table in SSF got corrupted

- Insufficient persistence memory - Make sure sufficient physical disk space available for database transactions being done by SSF.
- Meta.txt not is sync with the compiled SSF binaries - Make sure that `/opt/ssf/etc/config/main/meta.txt` is proper and not corrupted.

A.3 Host OS Not Displayed

Problem Description

Why is host OS not seen under CPU in navigation pane.

Root Cause and Solution

- The CPU is not in the internal (base) network. May because virtual functions from ETH3 (default base network) are not assigned to the CPU. At least one VF from ETH3 should be assigned to the CPU.
- ssfAgent on that specific CPU is not running.
- ssfAgent did not get shelf host IP address through mcparams.
  - Verify `/opt/boardinfo/params` on that specific CPU to see if shelfhost IP address is populated.
- If firewall is enabled on shelf host and or application host, then proper IP table rules should be added.
- SSF discovery is in progress

A.4 Login Failure

Problem Description

Why do login fail.

Root Cause and Solution

- Login fails if wrong credentials are provided as input.
- SSF failed to start or User table in SSF got corrupted.

A.5 Switch Management Tab is Hidden

Problem Description

Why is switch management tab not seen.

Root Cause and Solution

See the reasons in Appendix A, *Host OS Not Displayed*.

A.6 Configuration Editor - Apply Failure

Problem Description

What are various reasons for Configuration Editor - Apply Failure.

Root Cause and Solution

- If shelf ID of the shelf is different to what is present in the configuration.
- If any of the IPMI or PEX commands fails.
- Configuration file is corrupted.
- If the PCIE card is PCIE-9205, then if any of RRC configurations set is failed.
- If configuration is captured on a shelf which has different hardware configuration to the one on which it is applied.

A.7 GUI Access and Logging Issues

Problem Description

User logged in after a long interval; Tree not getting loaded or not able to access GUI. It returns Error 500 or any http error.

Root Cause and Solution

- Linux may be responding slowly.
- File system is corrupted.

A.8 PCIE-9205 Switch Management is Not Populated in GUI

Problem Description

In case PCIE-9205 is placed as network CPU and PCIE-9205 Switch Management is not populated in GUI.

Root Cause and Solution

Perform the following steps:

1. Check if `172.27.<SHELF ID>.2` is reachable from PCIE-9205.
2. Check if PEP4 (ex. enp6s0) of PCIE-9205 is having DHCP IP on network `172.27.x.x`. To find device name of PEP4, use the below commands. In this case, enp6s0 is the PEP4 interface.

```
# lspci -vv | grep "FM10000\|VP"
06:00.0 Ethernet controller: Intel Corporation Ethernet Switch
FM10000 Host Interface
Product Name: FM10000
[VP] Vendor specific: 4
0a:00.0 Ethernet controller: Intel Corporation Ethernet Switch
FM10000 Host Interface
Product Name: FM10000
[VP] Vendor specific: 8
# systool -c net
Class = "net"
Class Device = "enp0s20u2"
Device = "3-2:1.0"
Class Device = "enp10s0"
Device = "0000:0a:00.0"
Class Device = "enp4s0f0"
Device = "0000:04:00.0"
Class Device = "enp4s0f1"
Device = "0000:04:00.1"
Class Device = "enp6s0"
Device = "0000:06:00.0"
```

3. Check if DHCP client is running on PEP4 interface. `emindTcpAddress` and `ShelfHostIPAddress` in configuration file(s) of SSF BCSIM and SSF RRC TLS need to be set with the IP address of br0 on System Host. It would be of the format `172.27.<SHELFID>.2`.
   For example,
   emindTcpAddress =`172.27.44.2:21212` => This is to be modified in both `rrc/ssfApi.conf and bcsim/ssfApi.conf`
   ShelfHostIPAddress =`172.27.44.2` => This is to be modified in `bcsim/ssfApi.conf`

   Note: Reboot PCIE-9205, if you have performed any changes on these files.

4. If an old configuration file is not loaded properly, ensure the following mentioned below:
   - Size of Port, VLAN, and Pool descriptions is less than 24 characters.
   - In the old configuration file, replace the trailing spaces at the end of each line using the below command in vim:
     `%s/\s\+$//`

A.9 Incorrect Device Id to RRC PEP Port Mapping

Problem Description

If the listed VF ports in the configuration interface are not matching as per the mapping listed by`/opt/switch_sw/etc/pcie9205_getpep.sh` script. This script lists the mapping between PEP devices and RRC port, then there is a correction required in the mapping configuration file.

Root Cause and Solution

By default, all the four PEP devices are mapped in reverse to sw1p2* ports of RRC with EEPROM v10. However, if there is any change in the mapping or to confirm the mapping, copy "`/opt/switch_sw/etc/pcie9205_getpep.sh`" from PCIE-9205 to management CPU and run the script. This script will be listing the mapping between PEP devices and RRC ports.

If there is a different mapping between PEP devices and RRC ports, the correct mapping need to be updated in "`/opt/switch_sw/etc/pep_info.conf`" as below:

```
<DEVICE ID> <RRC PORT>
```

For example,

1. sw1p20
2. sw1p21
3. sw1p22
4. sw1p23

A.10 How to check whether SSF Services are running fine

To confirm whether SSF is running properly, run the following services in the specified order as mentioned below:

1. `pciemgmt.service` – On shelfHost of SSF configured shelves.
2. `mcagent.service` – On shelfHost of SSF configured shelves.
3. `ssfCore.service` – On systemHost.
4. `ssfAgent.service` – On all SSF configured hosts.
5. `dhcpd.service` – On shelfHost of SSF configured shelves.
6. `network.service` – On all SSF configured hosts.
7. `ssfRRCAgent.service` – On all SSF configured network hosts.
8. `zend-server.service` – On systemHost.
9. `vsftpd.service` – On systemHost.

B.1 Artesyn Embedded Technologies - Embedded Computing Documentation

The publications listed below are referenced in this manual. You can obtain electronic copies of Artesyn Embedded Technologies - Embedded Computing publications by contacting your local Artesyn sales office. For released products, you can also visit our Web site for the latest copies of our product documentation.

1. Go to www.artesyn.com/computing/search/documents.
2. Under **FILTER OPTIONS**, click the **Document types** drop-down list box to select the type of document you are looking for.
3. In the **Search** text box, type the product name or manual name and click **Filter**.

Table B-1 Artesyn Embedded Technologies - Embedded Computing Publications

Document Title	Publication Number
SSF for MaxCore™ MC3000 Platform XML Interface Guide	6806800T71
SSF for MaxCore™ MC3000 Platform Command Line Interface Guide	6806800T87
MaxCore™ MC3000 Platform Installation and Use	6806800T88
MaxCore™ MC3000 Platform Quick Start Guide	6806800T89
MaxCore™ MC3000 Platform Safety Notes Summary	6806800T90
Getting Started with MaxCore™ MC3000 Application Note	6806800T98

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