

Platform Guide: Enterprise Manager 4000

MAN-0315-03



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Legal Notices

Publication Date

This document was published on October 25, 2013.

Publication Number

MAN-0315-03

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Chapter

1

The Enterprise Manager (EM) 4000 Platform

- *About the EM 4000 Platform*
- *Components provided with the platform*
- *Peripheral hardware requirements*
- *LCD panel*
- *Indicator LEDs*
- *Platform interfaces*
- *Always-On Management*

About the EM 4000 Platform

The Enterprise Manager (EM) 4000 management appliance platform is a powerful system capable of managing F5 devices for any size of enterprise.

Before you install the Enterprise Manager (EM) 4000 platform, review helpful information about the controls and ports located on both the front and the back of the platform.

On the front of the platform, you can reset the unit using the LCD control buttons. You can also use the front-panel LEDs to assess the condition of the unit. On the back, you can power off the unit.



1. Management port
2. USB ports
3. Console port
4. Serial (hard-wired) failover port
5. 10/100/1000 interfaces
6. SFP ports
7. Indicator LEDs
8. LCD display
9. LCD control buttons

Figure 1: Front view of the platform

The back of the platform includes one or two power supplies.



1. Power input panel (power switch and power receptacle)
2. Unused power supply bay
3. Chassis ground lug (with cover)

Figure 2: Back view of the platform

Components provided with the platform

When you unpack the platform, verify that the following components are included.

Quantity	Hardware
1	Power cable (black)
2	DC terminal blocks, DC power option only
1	Serial failover cable (blue)

Quantity	Hardware
1	Console cable (beige)
1	Front-mounting kit
1	Rail-mounting kit

Peripheral hardware requirements

For each platform, you might need to provide additional peripheral hardware. If you plan to remotely administer the system, it would be helpful to have a workstation already connected to the same subnet as the management interface.

Type of hardware	Description
Network hubs, switches, or connectors to connect to the platform network interfaces	You must provide networking devices that are compatible with the network interface cards installed in the platform. You can use either 10/100/1000 Ethernet or 10 Gigabit Ethernet switches.
External USB CD/DVD drive or USB flash drive	You can use any USB-certified CD or DVD mass storage device for installing upgrades and for system recovery. <i>Note: External CD/DVD drives must be externally powered.</i>
Serial terminal console	You can remotely manage the platform by connecting to a serial terminal console through the console port.
Management workstation on the same IP network as the platform	You can use the default platform configuration if you have a management workstation set up.

LCD panel

The LCD panel provides the ability to manage the unit without attaching a console or network cable.



Figure 3: The LCD panel and control buttons

About LCD menus

LCD config menu

You can use the LCD config menu to adjust the display properties of the LCD panel.

Option	Description
Backlight	Specifies an LCD screen backlighting option. Select from the following options: <ul style="list-style-type: none"> • ON enables the backlight. • GRAY enables the software to specify when the backlight is illuminated. • OFF disables the backlight.
Contrast	Sets the contrast of the LCD.
On Brightness	Adjusts LCD backlight brightness.
Off Brightness	Controls the brightness of the LCD when the backlight is off.

Screens menu

You can use the Screens menu to specify the information that is displayed on the default screens.

Option	Description
DateScreen	Displays the date and time.
InfoScreen	Displays the information screen menu.
MACscreen	Displays the MAC addresses on the unit.
SysinfoScreen	Displays system information.
TMMAuthScreen	Displays the number of authentication requests being processed.
TMMCPUScreen	Displays the CPU usage percentage.
TMMMemoryScreen	Displays the memory usage.
TMMStatScreen	Displays simple statistics, such as bytes and packets in and out of the system.
VersionScreen	Displays product version information.

System menu

You can use the System menu to view options for rebooting, halting, and netbooting the hardware. This menu also provides options for configuring the management interface.

Option	Description
Management	Changes the management interface information. Select from the following options: <ul style="list-style-type: none"> • Mgmt IP sets the management interface IP address. You can use only an IPv4 address. • Mgmt Mask sets the netmask for the management interface IP address. • Mgmt Gateway sets the default route for the management interface. This route is necessary if you plan to manage the unit from a different subnetwork. • Commit saves your changes.
Serial Speed	Changes the baud rate of the serial port. Select from the following options: <ul style="list-style-type: none"> • 9600 • 19200 (default) • 57600 • 115200
Reboot	Reboots the unit.
Halt	Halts the unit.
Netboot	Boots the unit over an IP network. Select this option if you are installing software from a PXE server.

Using LCD menus

Press the X button to put the LCD in Menu mode.

The Left Arrow, Right Arrow, Up Arrow, and Down Arrow buttons are functional only when the LCD is in Menu mode.

Pausing on a screen

Normally, the screens cycle on the LCD panel at a constant rate, but you can pause on a specific screen.

Push the Check button to toggle the LCD screen between Hold and Rotate modes.

In Hold mode, a single screen is displayed. The Rotate mode changes the screen displayed on the LCD every four seconds.

Powering on the unit

Press the Check button to power on a unit that is shut down.

When you initially power on the unit, use the power switch located on the power supply at the back of the unit.

Halting the unit

We recommend that you halt the unit before you power it down or reboot it using the LCD menu options.

1. Press the X button, then use the arrow keys to navigate to the System menu.
2. Press the Check button.
3. Navigate to the Halt menu.
4. Press the Check button.
5. Press the Check button again at the confirmation screen.

Wait 30 seconds before powering the machine off or rebooting it.

Putting the unit into standby mode

Hold the X button for four seconds to put the unit in standby mode and power off the host subsystem. F5 Networks recommends that you halt the system before you power off the system in this manner.

Rebooting the unit

Hold the Check button for four seconds to reset the unit.

You should only use this option after you halt the unit.

Clearing alerts

Press the Check button to clear any alerts on the LCD screen.

You must clear any alerts on the screen before you can use the LCD panel.

Indicator LEDs

The behavior of each LED indicates the status of the system.

Indicator LED behavior

The indicator LEDs behave in a specific manner to indicate system or component status.

Behavior	Description
Off (none)	LED is not lit and does not display any color.
Solid	LED is lit and does not blink.
Blinking	LED turns on and off at a regular frequency.
Intermittent	LED turns on and off with an irregular frequency and might sometimes appear solid.

Status LED

When the unit is in a standard operating state, the Status LED behaves in a defined manner.

State	Description
off/none	System is halted and powered down.
green solid	System is running in normal mode. Also indicates that the system is in an Active state of a device group.
yellow solid	System is running in an impaired mode. The condition is not considered to be significant enough to be considered an alarm condition. Also indicates that the system is the Standby member of a device group.
yellow blinking	The system is not under host computer control. This might be due to the host being halted or due to a software or hardware problem that interferes with the host's control of the LED.

Power supply LEDs

The power supply LEDs indicate the operating state of the power supplies.

Power 1 state	Power 2 state	Description
green solid	green solid	Power supply is present and operating properly. Also indicates when the system is in power standby mode.
yellow solid	yellow solid	Power supply is present, but not operating properly.
off/none	off/none	No power supply present.

LED alert conditions

When there is an alert condition on the unit, the Alarm LED behaves in a specific manner.

Note: The Alarm LED might continue to display until alerts are cleared using the LCD panel.

Action	Description
System situation	Alarm LED behavior
Emergency	Red blinking
Alert or Critical	Red solid
Error	Yellow blinking

Defining custom alerts

The `/etc/alertd/alert.conf` and the `/config/user_alert.conf` files on the Enterprise Manager system define alerts that cause the indicators to change. The `/etc/alertd/alert.conf` file defines standard system alerts, and the `/config/user_alert.conf` file defines custom settings.

Note: You should edit only the `/config/user_alert.conf` file.

1. Open a command prompt on the system.
2. Change to the `/config` directory.

```
cd /config
```
3. Using a text editor, such as `vi` or `Pico`, open the `/config/user_alert.conf` file.
4. Add the following lines to the end of the file:

```
alert BIGIP_MCPD_MCPDERR_POOL_MEMBER_MON_DOWN "Pool member (.*?):(.*?) monitor
status down."
{
  snmptrap OID=".1.3.6.1.4.1.3375.2.4.0.10";
  lcdwarn description="Node down" priority="1"
}
alert BIGIP_MCPD_MCPDERR_NODE_ADDRESS_MON_DOWN "Node (.*?) monitor status
down." {
  snmptrap OID=".1.3.6.1.4.1.3375.2.4.0.12";
  lcdwarn description="Node address down" priority="1"
}
alert BIGIP_MCPD_MCPDERR_POOL_MEMBER_MON_UP "Pool member (.*?):(.*?) monitor
status up."
{
  snmptrap OID=".1.3.6.1.4.1.3375.2.4.0.11"
}
alert BIGIP_MCPD_MCPDERR_NODE_ADDRESS_MON_UP "Node (.*?) monitor status up."
{
  snmptrap OID=".1.3.6.1.4.1.3375.2.4.0.13"
}
```

5. Save the file and exit the text editor.
The front panel LEDs now indicate when a node is down.

Additional indicator LED status conditions

A few LED status conditions are not covered in the definition tables in the `/etc/alertd/alert.conf` file.

Yellow intermittent Status LED indicator

A yellow intermittent Status LED indicates that the unit is not under host computer control. This might be due to the host being halted or due to a software or hardware problem that interferes with the host's control of the LED.

Green/Yellow solid Status LED indicator

When the Status LED indicator is solid yellow or green, it indicates that the system is in a Standby state (yellow) or an Active state (green). It displays solid green if the unit is Standalone or if it is the Active unit of a redundant system configuration. It displays yellow if the unit is the Standby member of a redundant system configuration.

Platform interfaces

Every platform includes multiple interfaces. The exact number of interfaces that are on the system depends on the platform type.

Each interface on the platform has a set of properties that you can configure, such as enabling or disabling the interface, setting the requested media type and duplex mode, and configuring flow control.

About managing interfaces

You can use `tmsh` or the Configuration utility to configure platform interfaces.

Viewing the status of a specific interface using `tmsh`

You can use `tmsh` to view the status of a specific interface on a platform.

1. Open the Traffic Management Shell (`tmsh`).

```
tmsh
```

2. Change to the network module.

```
net
```

The system prompt updates with the module name: `user@bigip01 (Active) (/Common) (tmsh.net) #`.

3. Display the current status of a specific interface.

```
show interface <interface_key>
```

The following is an example of the output you might see when you issue this command on interface 1.2:

```
-----
Net::Interface
Name  Status  Bits   Bits  Errs  Errs  Drops  Drops  Colli
      In    Out   In    Out   In    Out   Out  sions
-----
1.2   up     191.4K  0     0     0     374   0     0
```

Viewing the status of all interfaces using `tmsh`

You can use `tmsh` to view the status of all interfaces on the platform.

1. Open the Traffic Management Shell (`tmsh`).

```
tmsb
```

2. Change to the network module.

```
net
```

The system prompt updates with the module name: user@bigip01 (Active) (/Common) (tmos.net) #.

3. Display the current status of all interfaces.

```
show interface
```

The following is an example of the output you might see when you issue this command:

```
-----
Net::Interface
Name  Status  Bits      Bits  Errs  Errs  Drops  Drops  Colli
      In    Out      In    Out   In    Out   sions
-----
1.1   down    0         0     0     0     0     0     0
1.2   up      191.4K    0     0     0     374   0     0
1.3   down    0         0     0     0     0     0     0
1.4   up      22.5K    0     0     0     44    0     0
2.1   miss    0         0     0     0     0     0     0
2.2   miss    0         0     0     0     0     0     0
mgmt  up      43.2G    160.0G  0     0     0     0     0
-----
```

Viewing the status of all interfaces using the Configuration utility

You can use the Configuration utility to view the status of all interfaces on the platform.

1. On the Main tab, expand **Network**, and click **Interfaces**.
This displays the list of available interfaces.
2. Click **Statistics**.
The Statistics screen for all interfaces opens.

About interface media type and duplex mode

All interfaces on the system default to auto-negotiate speed and duplex settings. We recommend that you also configure any network equipment that you plan to use with the system to auto-negotiate speed and duplex settings. If you connect the system to network devices with forced speed and duplex settings, you must force the speed and duplex settings of the system to match the settings of the other network device.

Important: *If the system is attempting to auto-negotiate interface settings with an interface that has the speed and duplex settings forced (that is, auto-negotiation is disabled), you will experience severe performance degradation. This applies to 10GbE and 40GbE interfaces.*

By default, the media type on interfaces is set to automatically detect speed and duplex settings, but you can specify a media type as well. Use the following syntax to set the media type:

```
tmsb modify net interface <interface_key> media <media_type> | auto
```

If the media type does not accept the duplex mode setting, a message appears. If media type is set to `auto`, or if the interface does not accept the duplex mode setting, the duplex setting is not saved to the `/config/bigip_base.conf` file.

Important: If you manually configure the platform to use specific speed and duplex settings on interfaces, Auto-MDI/MDIX functionality is disabled by default. When an interface is set manually, it functions as a data terminal equipment (DTE) port. This means that crossover cables are required to connect to other DTE devices (such as servers), and straight-through cables are required for connecting to data communications equipment (DCE) devices (for example, switches or routers). Be sure to use the correct cable type (straight-through or crossover) if you manually set interface speed and duplex settings.

Viewing valid media types for an interface using tmsh

You can use `tmsh` to view the valid media types for an interface.

Note: This platform might not support all of the media type options that are available in `tmsh`.

1. Open the Traffic Management Shell (tmsh).

```
tmsh
```

2. Change to the network module.

```
net
```

The system prompt updates with the module name: `user@bigip01 (Active) (/Common) (tmsh.net) #`.

3. Display the valid media types for a specific interface.

```
show running-config interface <interface_key> media-capabilities
```

Important: In all Gigabit Ethernet modes, the only valid duplex mode is full duplex.

The following is an example of the output you might see when you issue this command on interface 1.3:

```
net interface 1.3 {
  media-capabilities {
    none
    auto
    10T-FD
    10T-HD
    100TX-FD
    100TX-HD
    1000T-FD
    1000T-HD
  }
}
```

Valid media types

The following table lists the valid media types for the `tmsh interface` command.

Note: This platform might not support all of the media type options that are available in `tmsh`.

10BaseT half	100BaseTX full
10BaseT full	1000BaseLX full
10GBaseER full	1000BaseCX full

10GBaseLR full	1000BaseT half
10GBaseSR full	1000BaseT full
10GBaseT full	1000BaseSX full
10SFP+Cu full	auto
40GBaseSR4 full	none
40GBaseLR4 full	no-phy
100BaseTX half	

Network interface LED behavior

The appearance and behavior of the network interface LEDs on the platform indicate network traffic activity, interface speed, and interface duplexity.

RJ45 Copper interface LED behavior

The appearance and behavior of the RJ45 network interface LEDs indicate network traffic activity, interface speed, and interface duplexity.

Link	Speed LED	Activity LED
No Link	Not lit	Not lit
10Mbit/s, half duplex	Yellow blinking	Yellow solid
10Mbit/s, full duplex	Yellow blinking	Green blinking
100Mbit/s, half duplex	Yellow solid	Yellow blinking
100Mbit/s, full duplex	Yellow solid	Green blinking
1Gbit/s, half duplex	Green solid	Yellow blinking
1Gbit/s, full duplex	Green solid	Green blinking

SFP port LED behavior

The appearance and behavior of the SFP optic interface LEDs indicate network traffic activity, interface speed, and interface duplexity.

Link	Speed LED	Activity LED
No link	Not lit	Not lit
10 Mbit/s, half duplex	Yellow blinking	Yellow solid
10 Mbit/s, full duplex	Yellow blinking	Green blinking
100 Mbit/s, half duplex	Yellow solid	Yellow blinking
100 Mbit/s, full duplex	Yellow solid	Green blinking
1 Gbit/s, half duplex	Green solid	Yellow blinking
1 Gbit/s, full duplex	Green solid	Green blinking

Optical transceiver specifications

The following tables list specifications for optical transceivers that are supported by this platform.

Specifications for copper SFP modules

This table lists specifications for the available copper Gigabit Ethernet SFP transceiver modules.

Important: 1000Base-T network segments have a maximum length of 328 feet (100 meters) and must use Category 5 cable minimum. F5 recommends Category 5e or Category 6.

Note: F5 Gigabit Ethernet 1000Base-T Copper SFP modules comply with IEEE standards 802.3ab (1000BASE-T).

Module	Connector type	Maximum operating distance	Cable specifications	Supported Platforms
1000Base-T Copper Ethernet Transceiver	RJ45	328 feet (100 meters)	Minimum Category 5 (Cat5), Cat5e or Cat6 recommended	1600, 3600, 3900, 6900, 8900, 8950, 11000, 11050

Important: Specifications are subject to change without notification.

Specifications for fiber SFP modules

This table lists specifications for the available fiber Gigabit Ethernet SFP (or Mini-GBIC) transceiver modules.

Important: You must ensure suitability of both the optical fiber and the laser transceiver on the other end.

Important: Fiber cables must be a minimum of two meters, according to IEEE Std 802.3ae.

Note: F5 Gigabit Ethernet modules comply with IEEE standards 802.3ab (1000BASE-T) and 802.3z (1000BASE-SX, 1000BASE-LX).

Module	Laser emitter	Connector type	Operating distance/cable specifications	Supported platforms
1000Base-SX (Short Range) Ethernet Transceiver	850 nm (multi-mode)	LC	<ul style="list-style-type: none"> 220 meters maximum of 62.5um MMF that meets type A1a defined in IEC 60793-2:1992 500 meters maximum of 50.0um MMF that meets type A1b defined in IEC 60793-2:1992 	1500, 1600, 3400, 3600, 3900, 6400, 6800, 6900, 8400, 8800, 8900, 8950, 11050, VIPRION [®] 4400 Series, B4100, B4200, VIPRION [®] 2400, B2100

Module	Laser emitter	Connector type	Operating distance/cable specifications	Supported platforms
1000Base-LX (Long Range) Ethernet Transceiver	1310 nm (single-mode)	LC	<ul style="list-style-type: none"> 5 kilometers maximum using 10um SMF that meets type B1 in IEC 60793-2:1992 550 meters maximum using 50um MMF that meets type A1b defined in IEC 60793-2:1992 550 meters maximum using 62.5um MMF that meets type A1a defined in IEC 60793-2:1992 <p><i>Note: When using MMF, single-mode, fiber offset-launch mode-conditioning patch cords are required in both ends of the link, as specified in IEEE 802.3-2005 section 38.11.4.</i></p>	1500, 1600, 3400, 3600, 3900, 6400, 6800, 6900, 8400, 8800, 8900, 8950, 11050, VIPRION 4400 Series, B4100, B4200, VIPRION 2400, B2100

Important: Specifications are subject to change without notification.

Cable pinout specifications

The following pinouts describe how specified connectors are wired. Pinouts are helpful when building and testing connectors, cables, and adapters.

RJ-45 connector pinouts for the console port

This table lists the pinouts for the RJ-45 console (upper) port.

Pin number	Name
1	RTS
2	DTR
3	TX
4	GND
5	GND
6	RX
7	DSR (no connect)
8	CTS

RJ-45 connector pinouts for the failover port

This table lists the pinouts for the RJ-45 failover (lower) port.

Pin number	Name
1	RTS
2	DTR
3	CTS
4	GND
5	GND
6	DSR
7	TX
8	RX

Always-On Management

The Always-On Management (AOM) subsystem enables you to manage the Enterprise Manager system remotely using SSH or serial console, even if the host is powered down. The AOM Command Menu operates independently of the Traffic Management Operating System® (TMOS).

You can use the command menu to reset the unit if TMOS® has locked up, or get access to TMOS directly, so that you can configure it from the command line interface.

AOM consists of the host console shell (hostconsh) and the AOM Command Menu, which contains the options for AOM.

Note: The available functionality and options in AOM vary depending on the platform type.

AOM Command Menu options

The AOM Command Menu provides Always-On Management options for the Enterprise Manager system.

Number/Letter	Option	Description
1	Connect to Host subsystem console	Exits the AOM Command Menu and returns to terminal emulation mode.
2	Reboot Host subsystem (sends reboot command)	Reboots the host subsystem. In this case, the Traffic Management Operating System (TMOS) is rebooted.
3	Reset Host subsystem (issues hardware reset--USE WITH CARE!)	Resets the host subsystem. In this case, TMOS is halted. Important: We do not recommend using this option under normal circumstances. It does not allow for graceful shutdown of the system.
4	Reset AOM subsystem (issues hardware reset--USE WITH CARE!)	Resets the AOM subsystem. In this case, the system is reset with a hardware reset. Important: We do not recommend using this option under normal circumstances. It does not allow for graceful shutdown of the system.

Number/Letter	Option	Description
5	Power off/on Host subsystem (issues hardware shutdown--USE WITH CARE!)	Powers off the Host subsystem. In this case, TMOS is powered off. If the Host subsystem is already powered off, this option powers on the Host subsystem.
B	AOM baud rate configurator	Configures the baud speed for connecting to AOM using the serial console.
L	AOM subsystem login	Presents a logon prompt for the AOM subsystem. This subsystem cannot be configured by end users.
N	AOM network configurator	Runs the AOM network configuration utility. This utility enables you to reconfigure the IP address, netmask, and default gateway used by AOM. If you use this option while connected using SSH, your session will be disconnected as a part of the network configuration operation.
P	AOM platform information	Displays information about the platform, including serial number and MAC address.

Accessing the AOM Command Menu from the serial console

You can access the AOM Command Menu through the host console shell (hostconsh) using the front panel serial console.

1. Connect to the system using the serial console.
2. Open the AOM Command Menu.

`Esc (`

Setting up Always-On Management SSH access

You can use the AOM Command Menu to set up remote SSH access to the system and then connect remotely using an SSH client.

1. Connect to the system using the serial console.
2. Open the AOM Command Menu.
`Esc (`
3. Type `n` to open the AOM network configuration utility.
4. Configure an IP address and gateway for the AOM subsystem.

Accessing the AOM Command Menu using SSH

You can access the AOM Command Menu through the host console shell (hostconsh) remotely through SSH, provided you have configured an IP address for AOM.

1. Open an SSH session, where `<ip addr>` is the IP address that you configured for AOM:

```
ssh root@<ip addr>
```

2. Type the root password.

3. Open the hostconsh shell.

hostconsh

4. Open the AOM Command Menu.

Esc (

Chapter 2

Platform Installation

- *About platform installation*
- *Determining which rack mounting kit to use*
- *About general recommendations for rack mounting*
- *Unpacking the platform*
- *About the front-mounting kit*
- *About the rail-mounting kit*
- *About grounding the platform*
- *Connecting the cables and other hardware*
- *Configuring a management IP address*
- *Licensing the platform*

About platform installation

After you have reviewed the hardware requirements and become familiar with the EM 4000 platform, you can install the unit.

Determining which rack mounting kit to use

The EM 4000 platform comes with two types of rack mounting kits: stationary front-mounting and sliding rail-mounting. An advantage of installing the sliding rail-mounting kit is that you can then slide the unit in and out of the rack as needed.

The tasks required to install the platform differ depending on the type of rack mount you decide to use or which type of cabinet unit you are installing into (single two-post cabinet or four-post cabinet).

About general recommendations for rack mounting

Although not required, a 1U space between units makes it easier for you to remove the unit from the rack if that the unit requires service. A 1U space between units also provides additional cable routing options.

Leaving at least 100 mm spacing from the front panel of the unit to the rack front or rack door provides enough room for you to route the cables without excessive bending or insulation damage.

A shelf or similar device is required to support the unit if only one person is installing the unit.

Caution: To prevent personal injury or damage to the unit, F5 Networks strongly recommends that at least two people perform the installation.

Important: This product is sensitive to electrostatic discharge (ESD). F5 Networks recommends that you use proper ESD grounding procedures and equipment when you install or maintain the unit.

Unpacking the platform

The platform ships in a custom-designed package that protects the product during shipment.

Caution: To ensure your safety and to prevent damage to the platform, F5[®] Networks recommends that you have at least two people remove the platform from the shipping box.

1. If you have not already done so, open the top of the shipping box.



2. Remove the rail-mounting kit and accessory boxes from the foam inserts.



3. Remove the platform from the box and remove the foam inserts.



4. Remove the platform from the plastic bag.
5. Place the platform on a flat surface until you are ready to install the platform into a rack.

About the front-mounting kit

You can use the front-mounting kit if you are installing into a two-post rack.

Front-mounting kit hardware

The front-mounting kit includes these parts.

Quantity	Hardware
2	front-mounting brackets
4	#6-32 pan head screws

Installing using a front-mounting kit

Before you install this platform, review the environmental guidelines to make sure that you are installing and using the platform in the appropriate environment.

This platform includes front-mounting brackets, which you can use to attach the unit directly to the rack.

1. Align the bracket's keyhole slots with the PEM fasteners on the side of the unit.
2. Slide the bracket toward the back of the unit to lock the bracket into place.

Important: You must secure the bracket to the unit using four of the #6-32 inch screws provided with the platform.



3. Repeat steps 1 and 2 for the other bracket.
4. Secure the front-mounting brackets to the rack using four rack manufacturer-provided screws.
The unit must be securely fastened to the rack to provide adequate stability and to prevent the unit from falling out of the rack.



If the rack you have does not provide adequate support for the unit, you might need a shelf kit. We recommend that you use a shelf kit created by the rack manufacturer, if available.

About the rail-mounting kit

Use the rail-mounting kit if you want to be able to slide the unit in or out of the rack for maintenance activities.

Rail-mounting kit hardware

The rail-mounting kit includes these parts.

Quantity	Hardware
1	pair of rails (left and right)
4	mounting brackets (two front and two rear)
1	pair of rail lock brackets
8	#8-32 thumb screws
8	#8-32 Keps nuts or wing nuts
4	#6-32 pan head screws
2	#8-32 pan head screws (for rail locks)

Installing the rail-mounting kit hardware

Before you install this platform, review the environmental guidelines to make sure that you are installing and using the platform in the appropriate environment.

1. Separate the inner rails from the outer rails by fully extending the rails outward and pressing the lever located on the inner rail.
2. Align the large holes in the inner rails with the PEM fasteners on the unit and then push toward the back of the unit to lock the PEM fasteners to the inner rails.

You can secure the inner rails to each side of the chassis using two of the pan head screws that are included with the kit.

Note: If you need to remove an inner rail from the side of the unit, press the spring clip located on the first PEM fastener, pull the inner rail away from the PEM fastener, and then remove the inner rail from the unit.



3. Attach the rail lock brackets to each side of the unit using the rail lock screws that are included in the kit.

Use 6 to 7 inch-pounds (0.7 to 0.8 Newton-meters) of torque on these screws.



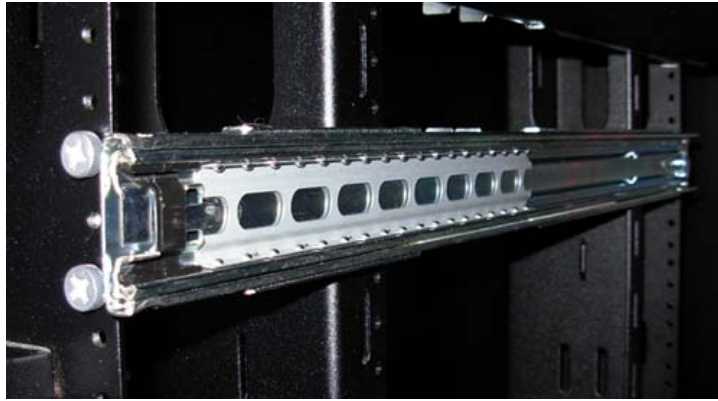
4. Slide the outer rails onto the inner rails on the unit.



5. Attach the front mounting brackets to the outer rails, and then slide the front mounting brackets up to the rail locks.

Note: The front brackets are shorter than the rear brackets.

6. Secure the front mounting brackets to the outer rails by attaching and hand-tightening the included Keps (or wing) nuts.
7. Attach the rear mounting brackets to the outer rails.
8. Secure the rear mounting brackets to the outer rails by attaching and hand-tightening the included Keps (or wing) nuts.
9. Remove the outer rails and attached mounting brackets from the unit.
10. Hold the rails and brackets up to the rack, place the front bracket either in front of or behind the cabinet rail (as appropriate for the rack type), and secure it to the rack using at least two thumb screws.

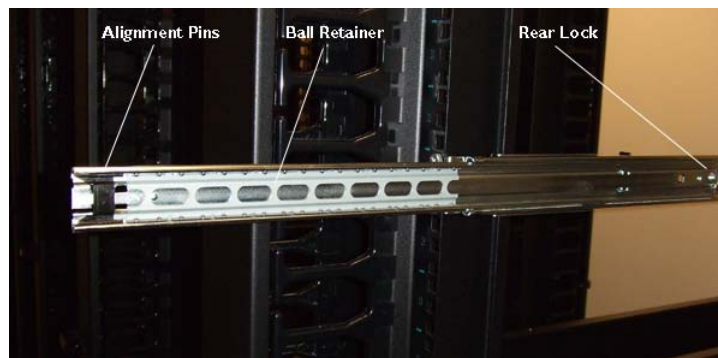


11. Adjust the rear bracket until it fits either in front of or behind the cabinet rail (as appropriate for the rack type), and secure it to the rack using at least two thumb screws.

Installing the unit into a rail-mount rack

Once the outer rails are installed into the rack, you can slide the inner rails mounted on the unit into the rack.

1. Extend the outer rails to the fully-locked position.
2. Slide the ball retainer on each rail to the front of the rail.



3. Align the rear portion of the inner rails to the black plastic alignment pins.
4. Slide the unit into the rack, fitting the inner rails attached to the unit to the outer rails attached to the rack, and continue sliding the rail to the fully-closed position.

Note: If the rail stops suddenly or locks, press the levers on the inner rail to enable the rails to slide into the fully-closed position.

5. Move the unit in and out of the rack to settle the slide operation.
6. Ensure that all screws and Keps (or wing) nuts are properly tightened.

After installing the platform, secure it to the rack with the rail lock brackets that are provided.

About grounding the platform

You should ground the platform after you install it in a rack. The chassis ground lug is located on the back of the platform.

Do not secure multiple bonding or grounding connectors with the same bolt. The grounding connectors do not need to be removed to perform service or installation procedures. You can connect other bonding or grounding conductors to a grounding connector provided a reliable bond between the connector and the equipment is not disturbed during installation, service, or maintenance of the platform.

Important: All copper grounding cable compression-type terminal lugs used for grounding must meet all appropriate UL standards.

Note: The platform must be grounded to a common bonding network (CBN).



Figure 4: Chassis ground lug

Connecting the ground lug to the ground terminal

After the unit is installed in the rack and before you provide power to the system, you need to connect the grounding hardware.

1. Attach a two-hole grounding terminal lug to 12 AWG copper ground wire.
2. Install the M6 Keps nuts on the ground terminal lugs.
Use 60 to 70 inch-pounds (6.8 to 8.0 Newton-meters) of torque on these Keps nuts.
3. Connect the ground wire to a common bonding network (CBN).

Connecting the cables and other hardware

After you have installed the unit into the rack, connect the cables and other hardware.

1. Connect an Ethernet cable to the MGMT port if you are using the default network configured on the management interface.

Note: For EMI compliance, shielded cables are required for the MGMT port.

2. Connect the serial console cable supplied by F5[®] Networks to the CONSOLE port.

Important: In the event that network access is impaired or not yet configured, the serial console might be the only way to access the unit. F5 Networks recommends that you perform all installations and upgrades using the serial console, as these procedures require reboots, in which network connectivity is lost temporarily.

Note: The default baud rate is 19200,n,8,1.

3. For AC-powered systems, connect the power cable to the power input panel, and then connect the cable to the power source. For DC-powered systems, wire the DC power terminal block and connect the power supply to a DC power source.
4. Connect the serial failover cable to the failover port on each unit if you plan to set up device service clustering (DSC™) with hard-wired failover capacity.
For more information about configuring failover, see *BIG-IP® Device Service Clustering: Administration*.
5. If you have not already done so, power on the unit.

You can now assign a management IP address to the system, and then license and provision the software.

Optionally, you should run the latest version of the qkview utility. This utility collects configuration and diagnostic information about your system into a single file that you can provide to F5 Technical Support to aid in troubleshooting. For more information, see

<http://support.f5.com/kb/en-us/solutions/public/1000/800/sol11858.html>.

Configuring a management IP address

You can use the LCD panel to configure the management IP address. The management IP address enables you to access the Configuration utility to configure other aspects of the product, such as the product license, VLANs, and trunks. The options are located in the System menu.

Note: When using the LCD panel to configure the unit, be sure to use the Commit option to save all settings.

1. Press the X button to activate Menu mode for the LCD.
2. Use the arrow keys to select **System**, and then press the Check button.
3. Press the Check button to select **Management**.
4. Press the Check button to select **Mgmt IP**.
5. Enter your management IP address using the up and down arrow keys, and then press the Check button.
6. Use the arrow keys to select **Mgmt Mask**, and then press the Check button.
7. Enter the netmask using the up and down arrow keys, and then press the Check button.
8. Use the arrow keys to select **Mgmt Gateway**, and then press the Check button.
9. Enter your default route using the up and down arrow keys, and then press the Check button. If you do not have a default route, enter 0.0.0.0.
10. Use the arrow keys to select **Commit**, and then press the Check button.
11. Press the Check button to select **OK**.

Licensing the platform

After the management IP address is configured for the platform, you can use the browser-based Configuration utility to license the appropriate Enterprise Manager software.

1. Using a Web browser, navigate to the management IP address that you assigned to the platform.

Use the following format where `<mgmt_ip_address>` is the management IP address you assigned:

`https://<mgmt_ip_address>`

2. Type `admin` as the user name and `admin` as the password.

If this is the first time you have accessed the Configuration utility, the first screen you see is the License screen.

3. Follow the instructions in the Configuration utility to license the platform.

For more information about licensing the system, click the Help tab.

Chapter

3

Platform Maintenance

- *About platform maintenance*
 - *About AC power supplies*
 - *About DC power supplies*
-

About platform maintenance

The EM 4000 platform contains several components that can be replaced individually without exchanging the entire system. This platform contains the following replaceable components:

- AC power supply
- DC power supply

About AC power supplies

Enterprise Manager™ platforms can support up to two AC power supplies. Some platforms come with only one power supply by default. You can hot swap power supplies if there are two installed in your system.



Figure 5: A power supply partially removed from the platform

The platform supports power redundancy, which ensures that the system is unaffected if a single power supply fails in a system containing more than one power supply.

Caution: Running without power supplies installed in all available bays in the platform can affect cooling and electromagnetic interference (EMI). If you need to run the unit with fewer power supplies, you must install a blank supply bracket into any empty power supply bays. The blank supply bracket is required to maintain proper airflow in the system. If you do not have a blank supply bracket, leave all supplies installed and unplug any unused power supplies.

Caution: As a safety precaution, the socket outlet must be installed near the equipment and be easily accessible.

Important: This product is sensitive to electrostatic discharge (ESD). F5 Networks recommends that you use proper ESD grounding procedures and equipment when you install or maintain the unit.

Important: F5 Networks strongly recommends that you use only one power supply type (AC or DC) in a platform.

Note: Depending on the model and revision of the power supply, you might need either a Phillips or a slotted screwdriver to replace the power supply.

Installing an AC power supply

In the event of a power supply failure, you can install a replacement AC power supply without powering down the system, provided that there is at least one power supply operating during the replacement process.

Important: *If the power supply is installed when the power switch is on, the power supply might not function (for safety reasons) until you shut off the power switch and power it on again.*

1. Make sure that the power switch on the new power supply is powered off.
2. Ensure that the AC power cord is not connected to the new power supply before adding it to the unit.
3. Remove the cover plate from the power supply bay, if one is installed.
4. Slide the new power supply into the power supply bay.
5. Tighten the screw into place.

The power supply is connected to the system when you tighten the screw completely.

6. Attach the power cord to the new power supply.
7. Attach the power cord to the power source.
8. Turn the power switch on.

If the AC power supply does not function after installation:

- Make sure that the power switch on the power supply is off. If you install the power supply while the power switch is on, you will need to shut off the power switch and power it on again before the power supply will function properly.
- Check the LCD panel to see if the system is in power standby mode. If the system is in power standby mode, press the Check button on the LCD to begin booting the system.

About DC power supplies

The Enterprise Manager platforms support DC power supplies. You can hot swap power supplies if there are two installed in your system. The DC power supply does not have an on/off switch. You can control the power from the rack switch or the DC power source.

The DC power supply includes a DC terminal block that connects the power supply to the DC power source.

The platform supports power redundancy, which ensures that the system is unaffected if a single power supply fails in a system containing more than one power supply.



Figure 6: The 300W DC power supply and terminal block

Caution: *Before installing a DC power supply, be sure that the DC power source for the rack is powered off.*

Caution: Running without power supplies installed in all available bays in the platform can affect cooling and electromagnetic interference (EMI). If you need to run the unit with fewer power supplies, you must install a blank supply bracket into any empty power supply bays. The blank supply bracket is required to maintain proper airflow in the system. If you do not have a blank supply bracket, leave all supplies installed and unplug any unused power supplies.

Caution: Before you begin to work with one of these platforms, refer to the DC-powered equipment environmental warnings for this platform and review any safety requirements for the facilities where the DC-powered platforms will be installed.

Important: This product is sensitive to electrostatic discharge (ESD). F5 Networks recommends that you use proper ESD grounding procedures and equipment when you install or maintain the unit.

Important: The platform must be installed in a RESTRICTED ACCESS LOCATION, such as a central office or customer premises environment.

Note: All copper grounding cable used for grounding must meet all appropriate UL standards.

Note: You should coat bare conductors with an appropriate antioxidant compound before you make crimp connections. You should bring all unplated connectors, braided strap, and bus bars to a bright finish and then coat them with an antioxidant before you connect them.

Note: The platform must be grounded to a common bonding network (CBN).

Note: The battery return terminals on the platform are in an isolated DC return (DC-I) configuration.

Installing a DC power supply

You will need the following tools to install the DC power supply:

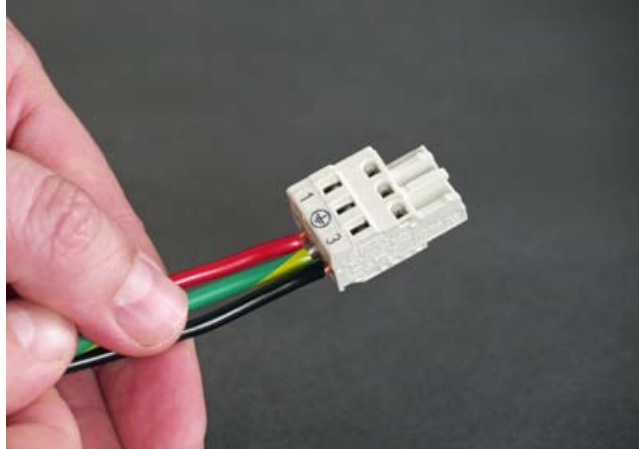
- Wire stripping tool
- Small slotted screwdriver
- Two 14-16 AWG copper wires long enough to reach from the platform to the DC power source

In the event of a power supply failure, you can replace a DC power supply in the system.

1. Review the DC power supply label and determine the correct wire size for your installation.
2. Use the wire stripping tool to remove 3/8 inch (0.95 cm) of insulation.

Important: Be sure to remove the appropriate amount of insulation from each wire. If you remove too much insulation, exposed wire protruding from the terminal block can create an electrical hazard. If you do not remove enough insulation, the wire might not make proper contact with the terminal.

3. Using a small slotted screwdriver, press the spring-loaded mechanism above the openings in the terminal block to open the terminal connectors and then insert each exposed wire into the appropriate opening.
 - a) Connect the chassis ground wire to the middle terminal in the terminal block.
This step might be optional with some DC power sources.
 - b) Connect the negative DC power wire to the 3 terminal on the terminal block.
 - c) Connect the positive DC wire to the 1 terminal on the terminal block.



4. Make sure that the power from the DC power source is off.
5. Ensure that the terminal block is not connected to the power supply before adding it to the unit.
6. Remove the AC power supply, if it is installed.
7. Slide the DC power supply into the power supply slot.



8. Tighten the screw completely, using 4 to 5 inch-pounds (0.45 to 0.56 Newton-meters) of torque on the screw.



9. Connect the terminal block into the DC power supply.



10. Power on the DC power source.

If the system does not boot after you power on the DC power source, press the Check button on the LCD to begin booting the system.

Appendix

A

Environmental Guidelines

- *General environmental and installation guidelines*
 - *Guidelines for DC-powered equipment*
 - *Platform airflow diagram*
-

General environmental and installation guidelines

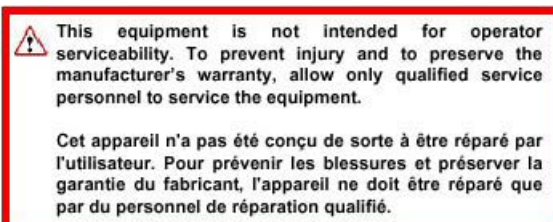
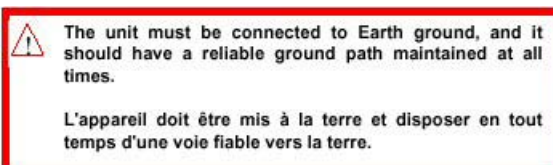
The EM 4000 platform is an industrial network appliance that is designed to be mounted in a standard 19-inch EIA rack. Follow these guidelines to adhere to safety precautions:

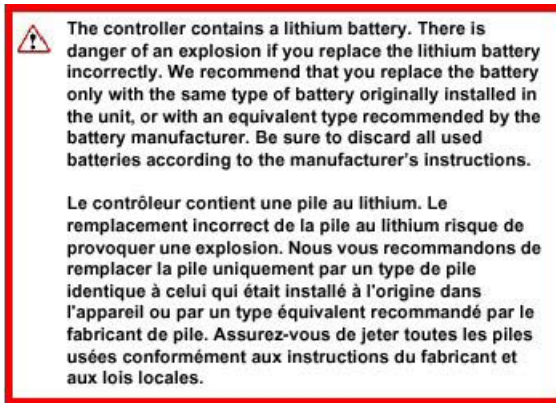
- Install the rack according to the manufacturer's instructions and check the rack for stability before placing equipment in it.
- Build and position the rack so that once you install the platform, the power supply and the vents on both the front and back of the unit remain unobstructed. The platform must have adequate ventilation around the unit at all times.
- Although not required, a 1U space between units makes it easier for you to remove the unit from the rack in the event that the unit requires service. A 1U space between units also provides additional cable routing options.
- Leaving at least 100 mm of space from the front panel of the unit to the rack front or rack door provides enough room for you to route the cables without excessive bending or insulation damage.
- Do not allow the air temperature in the room to exceed 104°F (40°C).
- Do not plug the unit into a branch circuit shared by more electronic equipment than the circuit is designed to manage safely at one time.

Important: *This product is sensitive to electrostatic discharge (ESD). F5 Networks recommends that you use proper ESD grounding procedures and equipment when you install or maintain the unit.*

Caution: *Customers should not attempt to replace batteries. There is a risk of explosion if a battery is replaced with an incorrect type. Field technicians should dispose of used batteries according to the instructions.*

Attention: *Il y a risque d'explosion si la batterie est remplacée par une batterie de type incorrect. Mettre au rebut les batteries usagées conformément aux instructions.*





Guidelines for DC-powered equipment

A DC-powered installation must meet the following requirements:

- Use a 25 amp external branch circuit protection device to install the unit.
- For permanently connected equipment, incorporate a readily accessible disconnect in the fixed wiring.
- Use only copper conductors.
- Ground the cabling for the system on both sides.
- Use one power feed for each individual power supply.



Platform airflow diagram

The platform employs a negative pressure fan system, which draws cold air in from the front of the chassis and exhausts hot air out the back of the chassis.

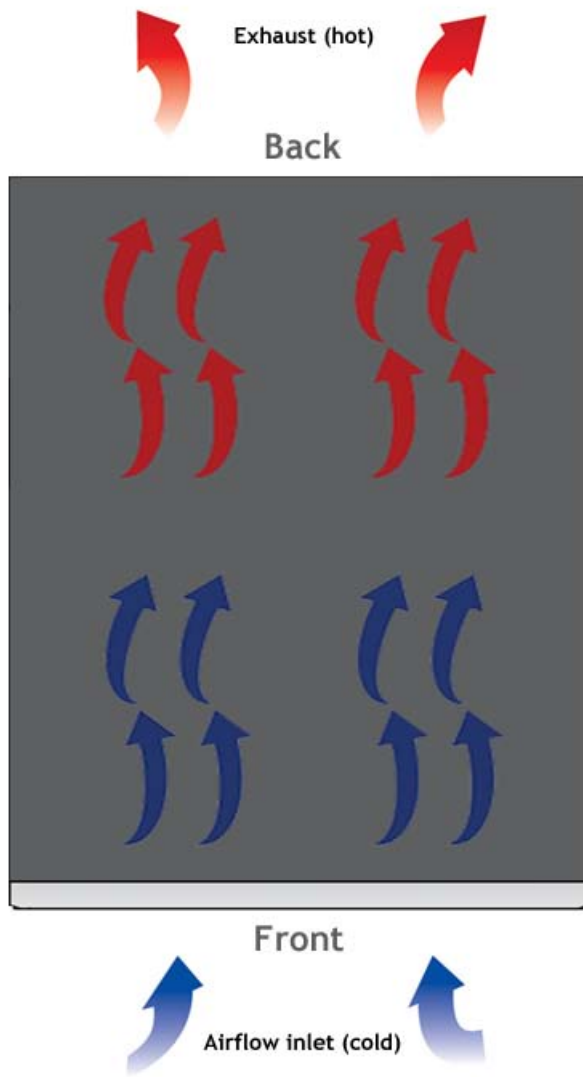


Figure 7: Airflow in the EM 4000 platform

Appendix

B

Platform Specifications

- *General specifications for system features*
- *Platform hardware specifications*
- *Platform environmental operating specifications*
- *Platform power specifications*
- *Safety requirements*
- *Acoustic, airflow, and altitude specifications*

General specifications for system features

This table lists general specifications for system features for the Enterprise Manager 4000 platform.

Item	Specification
Server/Node operating system compatibility	Load balancing of any TCP/IP operating system: 32- and 64-bit Windows® operating systems; all UNIX® platforms; and Mac OS
Internet/Intranet protocol support	All TCP services, UDP, SIP, and SSL; nearly all IP-based protocols
Administrative environment support	DNS proxy, SMTP, SSH, SNMP, dynamic/static network monitoring, scheduled batch job processing, system status reports, and alarms event notification
Network management and monitoring	Secure SSL browser-based interface, remote encrypted logon and file transfer using SSH monitor, Enterprise Manager system network monitoring utilities and additional contributed software; SNMP gets and traps; iControl API using CORBA and SOAP/XML
Dynamic content support	ASP, VB, ActiveX, Java, VRML, CGI, Cool Talk, Net Meeting, Real Audio, Real Video, Netshow, QuickTime, PointCast, or any HTTP-encapsulated data
Device redundancy	Watchdog timer, failsafe cable (primary and secondary)
SFP hot swap	Support for hot swap of the SFP modules
Web server application compatibility	Any IP-based web or application server
Routing protocols	RIP, OSPF, and BGP with optional ZebOS Advanced Routing Modules

Important: Specifications are subject to change without notification.

Platform hardware specifications

This table lists hardware specifications for the EM 4000 platform.

Item	Specification
Dimensions	H: 1.75 inches (4.45 cm) x W: 17 inches (43.18 cm) x D: 21 inches (53.34 cm) (per unit) 1U industry standard rack-mount chassis
Weight	<p>20 pounds (9.07 kg) with one power supply (per unit) 22 pounds (9.98 kg) with two power supplies (per unit)</p> <ul style="list-style-type: none"> • Front mount brackets add 1 pound (0.45 kg). • Rail kit adds 5 pounds (2.27 kg). • Optional quick install rail kit adds 5.5 pounds (2.27 kg).

Item	Specification
Processor	1 x Intel® Core™2 Quad processor
Communication interfaces	8 x 10/100/1000 copper ports 4 x 1000Base-X SFP fiber ports 1 x 10/100/1000 Ethernet Management port 1 x serial console port 1 x serial failover port 2 x USB interfaces
Hard drive capacity	300 GB
RAM	8 GB
AC power supply	1-2 x 300 W 90/240 +/- 10% VAC AUTO Switching
DC power supply	1-2 x 300 W DC Operating range: 36 to 72 VDC

Important: Specifications are subject to change without notification.

Important: F5 Networks only provides support for F5-branded optical modules.

Platform environmental operating specifications

This table lists platform environmental operating specifications.

Item	Specification
Operational temperature	32 to 104°F (0 to 40°C)
Operational relative humidity	10 to 90% (40°C)
Non-operational temperature	-40 to 158°F (-40 to 70°C)
Non-operational relative humidity	5 to 95% (40°C) non-condensing

Important: Specifications are subject to change without notification.

Platform power specifications

This table lists power specifications for the EM 4000 platform.

Item	Specification
Typical power draw (dual AC power supplies; 50% load; temp 25°C)	110VAC input: 175W 220VAC input: 215W
Typical power draw (dual DC power supplies; 50% load; temp 25°C)	48VDC input: 179W
Maximum power draw (AC power)	220VAC input: 240W

Item	Specification
Maximum power draw (DC power)	48VDC input: 235W
Typical heat generated (AC power)	110VAC input: 598 BTU/hour 220VAC input: 734 BTU/hour
Typical heat generated (DC power)	48VDC input: 610 BTU/hour
Maximum heat generated (AC power)	Single power supply: 973 BTU/hour Dual power supplies: 819 BTU/hour
Maximum heat generated (DC power)	Single power supply: 783 BTU/hour Dual power supplies: 802 BTU/hour

Important: Specifications are subject to change without notification.

Safety requirements

This equipment complies with the following requirements of the Low Voltage Directive 2006/95/EC.

EC Type Examination Certificates:

EN 6090-1:2006+A11:2009

IEC 60950-1:2005, 2nd Edition

CB Scheme

UL 60950-1 2nd Edition, CSA C22.2 No. Master Contract 252302
60950-1-07

Important: Specifications are subject to change without notification.

Acoustic, airflow, and altitude specifications

This table lists acoustic levels, airflow movement, and operational altitude specifications for the Enterprise Manager (EM) 4000 platform.

Specification type	Detail	Units	Value
Acoustic ¹	Front	dBA	70
	Left	dBA	67
	Right	dBA	69
	Rear	dBA	76
Altitude ²	Operational	Feet (Meters)	6,000 (1,829)
	Non-operational	Feet (Meters)	40,000 (12,192)

¹ All measurements taken at 0.6 meter with one power supply operational and fans at 75% duty cycle. Measurements recorded in Decibels A-weighting.

² Per BELCORE GR-63-CORE, section 4.1.3: This unit is functional when installed at elevations between 60m (197 feet) below sea level and 1800m (6000 feet) above sea level at the aisle ambient temperatures of 40°C.

Specification type	Detail	Units	Value
Airflow ³	Open air	CFM	94.8

Important: Specifications are subject to change without notification.

³ Fan Tray airflow measurements taken at 100% duty cycle and in open air.

Appendix

C

China RoHS Requirements

- *Hazardous substance levels for China* |

Hazardous substance levels for China

This table shows how the F5 Networks® EM 4000 platform components conform to the Restriction of Hazardous Substances Directive (RoHS) standards for China.

EM4000 平台有害物质表
EM4000 Platform Hazardous Substance Table

部件名称 Part Name	有毒有害物质 Hazardous Substance					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	铬 6+ (Cr ⁶⁺)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
金属部件 Metal Parts	X	o	o	o	o	o
电源 Power Supplies	X	o	X	o	o	o
主板 Motherboard	X	o	o	o	o	o
排热器部件 Heatsink Assemblies	o	o	o	o	o	o
闪存卡 Compact Flash Card	X	o	o	o	o	o
硬盘 Hard Drives	X	o	o	o	o	o
风扇装置 Fan Assembly	X	o	o	o	o	o

o: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T 11363-2006标准规定的限量要求以下
Expresses that this hazardous substance is below the specified limits as described in SJ/T 11363-2006.
x: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T 11363-2006标准规定的限量要求
(企业可在此处,根据实际情况对上表中打“x”的技术原因进行进一步说明)
Expresses that this hazardous substance is above the specified limits as described in SJ/T 11363-2006.

除非另外特别的标注,此标志为针对所涉及产品的环保使用期标志. 某些零部件会有一个不同的环保使用期(例如,电池单元模块)贴在其产品上.

此环保使用期限只适用于产品是在产品手册中所规定的条件下工作.

The Environmentally Friendly Use Period (EFUP) for all enclosed products and their parts are per the symbol shown here, unless otherwise marked. Certain parts may have a different EFUP (for example, battery modules) and so are marked to reflect such. The Environmentally Friendly Use Period is valid only when the product is operated under the conditions defined in the product manual.



Appendix

D

Repackaging Guidelines

- *About repackaging the platform*
 - *Repackaging the platform*
-

About repackaging the platform

If it becomes necessary to transport the platform to another location or return it to F5® Networks, the following guidelines will help ensure that you repackage the platform properly.

Important: Before returning any equipment, contact F5 Networks to obtain a Return Material Authorization (RMA) case number.

Important: You must use shipping materials and packaging provided by F5 Networks when repackaging the platform.

Note: Be sure that you keep a record of the tracking number and ship date. These will be needed to track lost shipments.

Note: Do not include any cables, removable XFP/SFP modules, GBICs, or other peripheral items if you are returning the platform to F5 Networks.

Repackaging the platform

The EM 4000 platform must be shipped in packaging provided by F5® Networks.

1. Disconnect the network cables and other cables from the platform, and then remove any optical modules.
2. Remove the platform from the rack.
3. Place the platform in the plastic bag, if available.



4. Place the foam inserts on the front and back sides of the platform.
5. Place the platform into the shipping box.



6. Place the accessory boxes in the foam inserts.



7. Close and seal the shipping box.



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