

# EMS and Predictive Support

**Scott Kaneko**

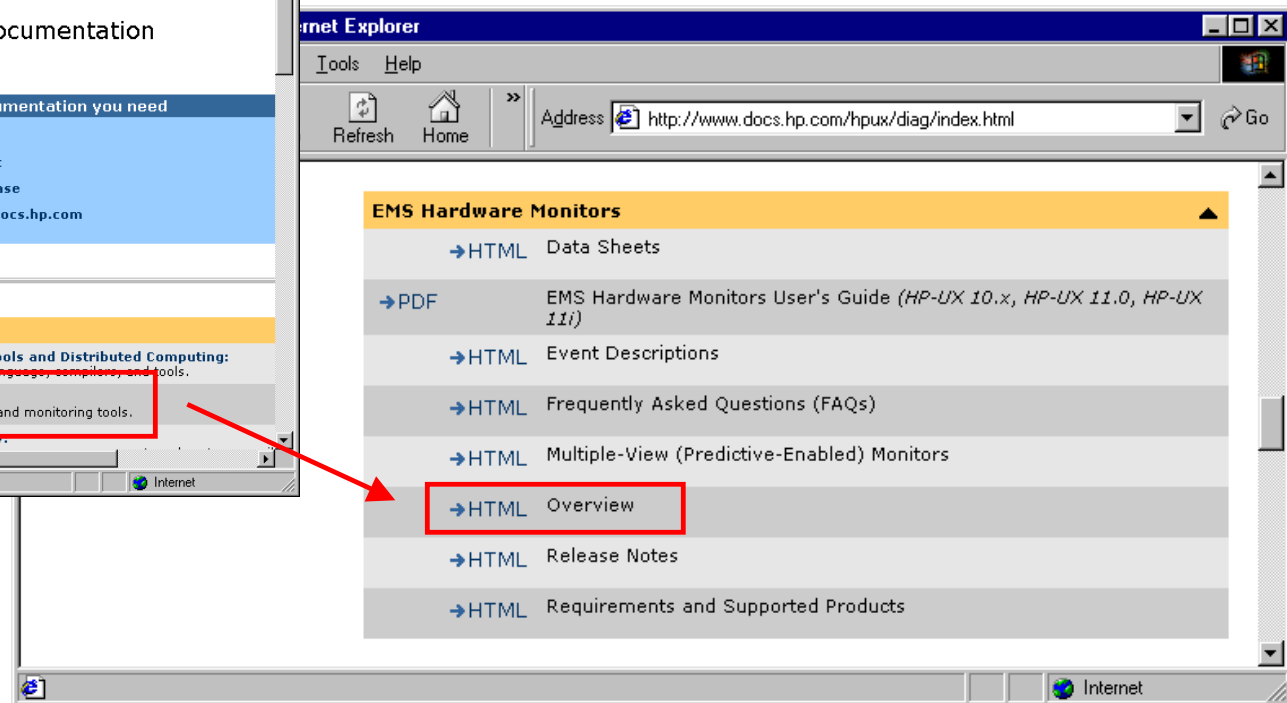
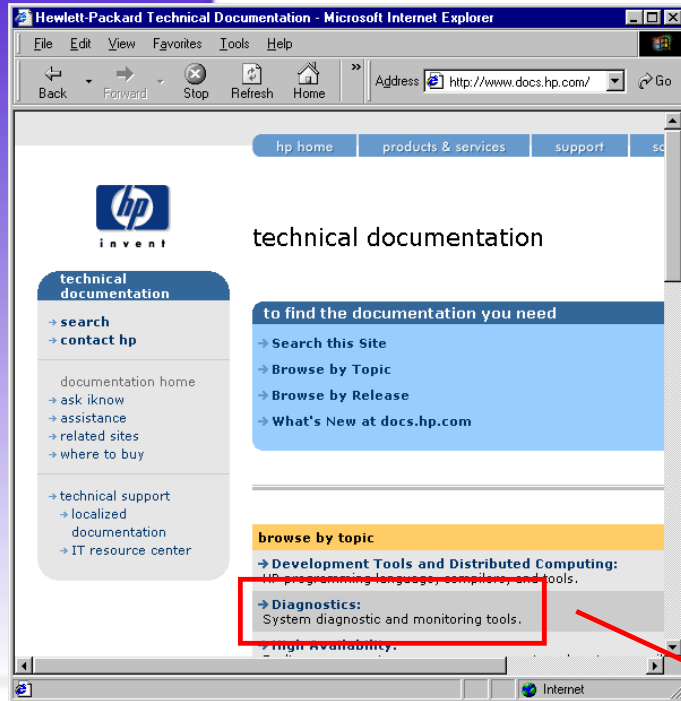
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# EMS Overview

- **Event Monitoring Service (EMS)**
- **Protection against undetected hardware failures**
- **Provides hardware monitoring**
- **Integrate with other applications**

# EMS Overview



# EMS Overview



[http://docs.hp.com/hpux/onlinedocs/diag/ems/emo\\_summ.htm](http://docs.hp.com/hpux/onlinedocs/diag/ems/emo_summ.htm)

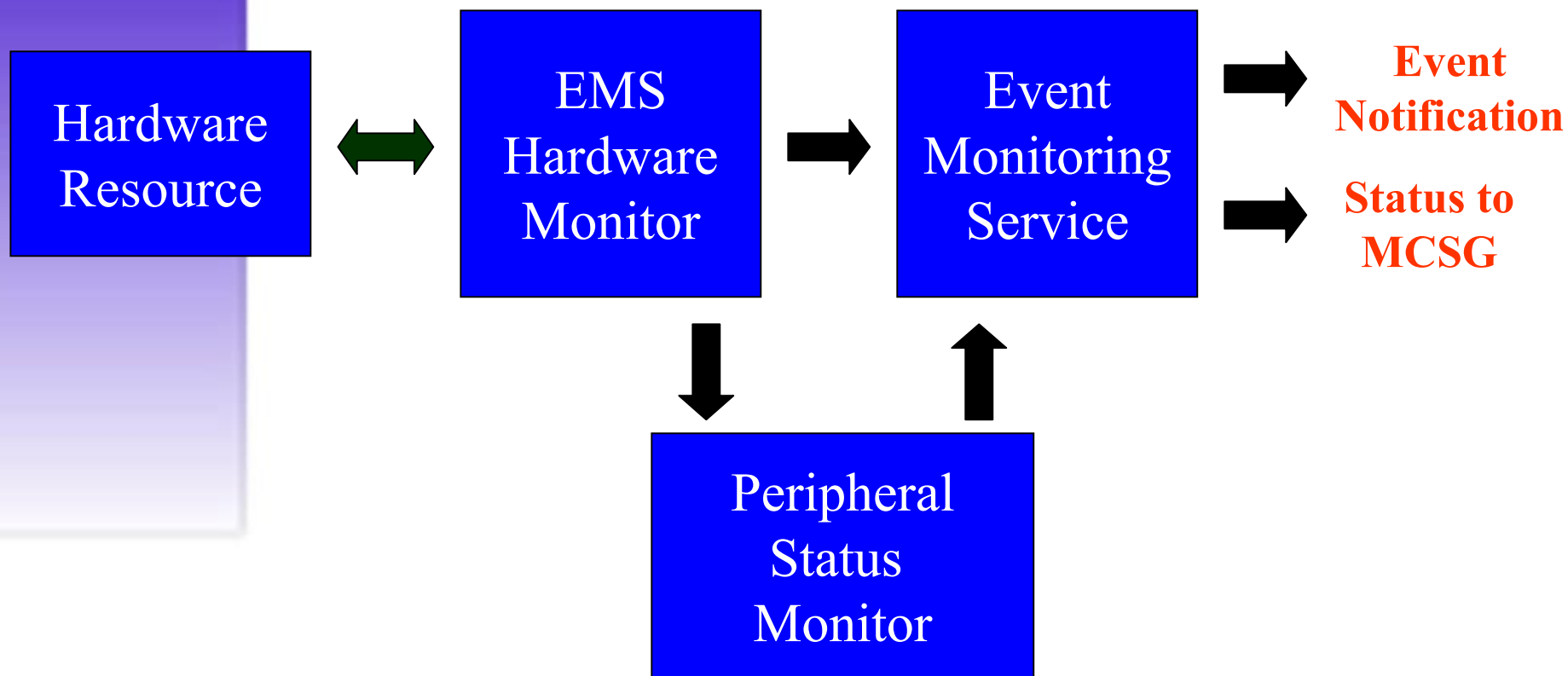
## EMS Benefits

- **Reduce system downtime**
- **Common tool for hardware resource monitoring**
- **Variety of notification methods**
- **Minimal maintenance**
- **Integration into MC ServiceGuard & other applications**

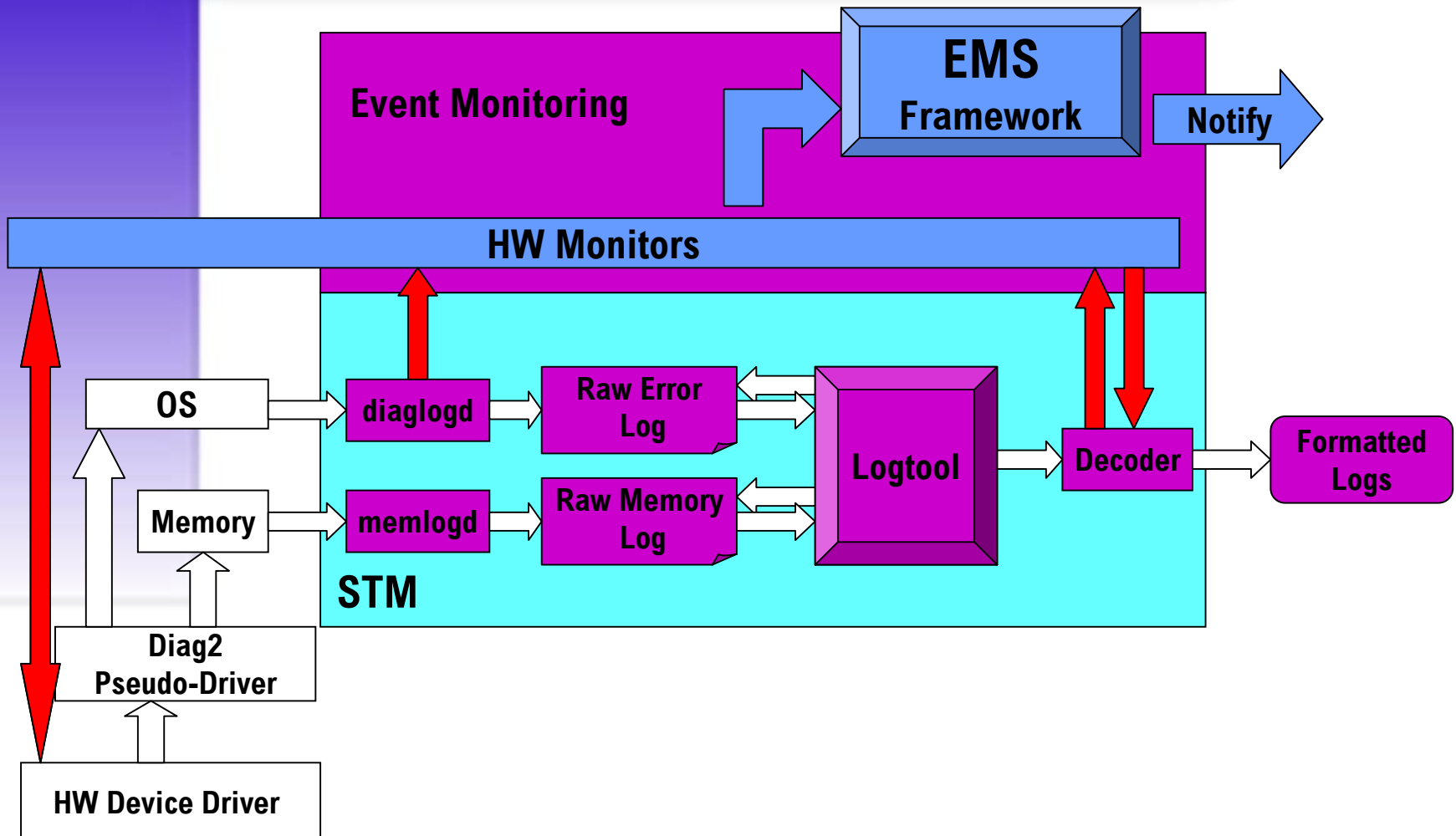
# EMS Components

- **Hardware (H/W) Monitors**
  - **Monitors hardware resources: I/O devices (disk arrays, tape drives, etc.), interface cards, and memory**
  - ◆ **Peripheral Status Monitor**
    - **Free**
- **High Availability (HA) Monitors**
  - **Monitors system resources: disk, cluster, network, system, and database**
  - **Additional cost**

## EMS Hardware Monitor Process



# EMS STM Integration





## EMS Event Message Standard Information

- **Notification time**
- **Value that triggered event**
- **Event data from monitor:**
  - event time, hostname, event number,**
  - severity, IP address, etc**
- **Description of error**
- **Probable Cause**
- **Recommended Action**

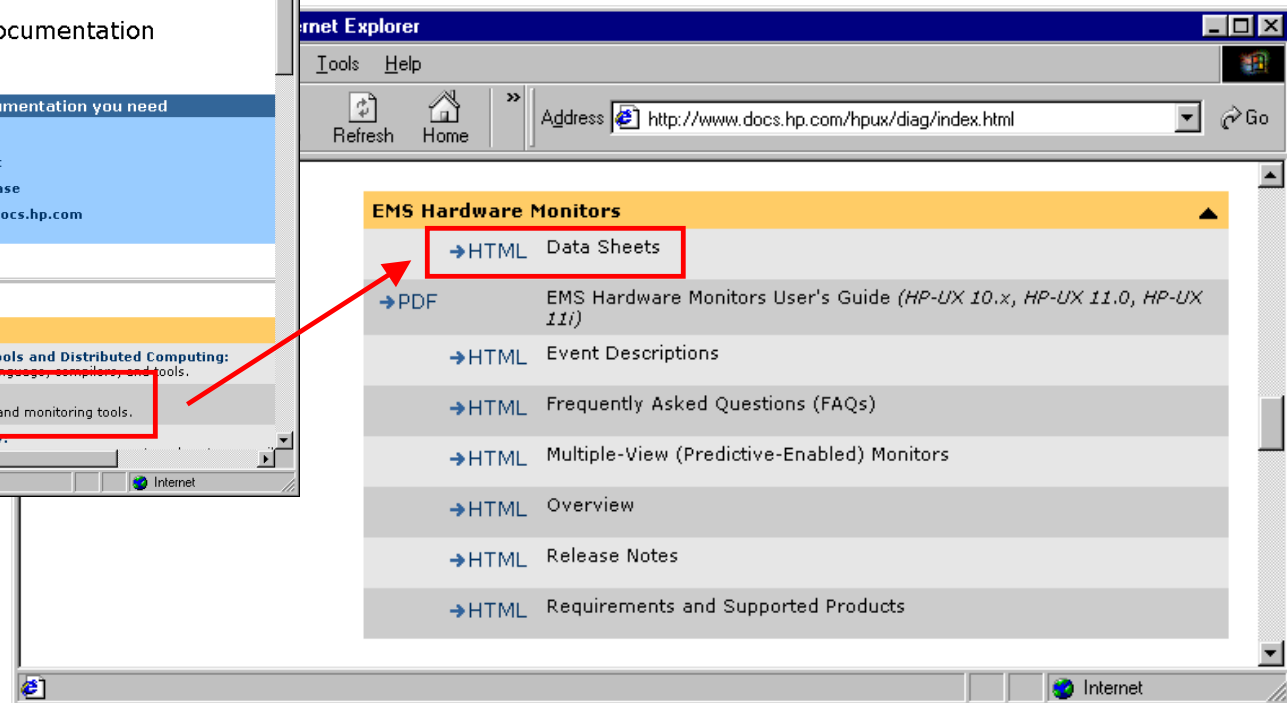
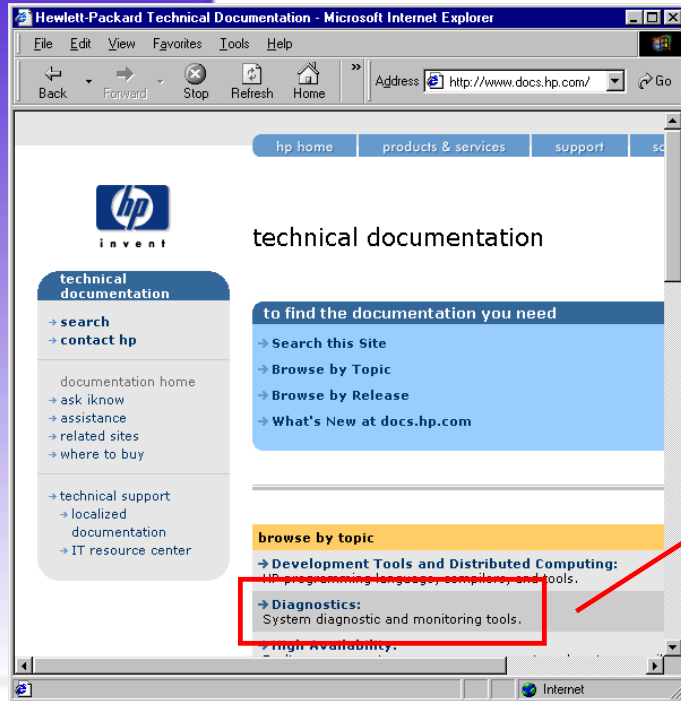
# EMS Event Message Example

```
Untitled - Notepad
File Edit Search Help
>----- Event Monitoring Service Event Notification -----<
Notification Time: Tue Mar 12 11:54:07 2002
up_mrp2 sent Event Monitor notification information:
/storage/events/disks/default/8_4.10.0 is >= 1.
Its current value is CRITICAL(5).
Event data from monitor:
Event Time : Tue Mar 12 11:54:05 2002
Hostname : up_mrp2          IP Address : 123.13.12.10
Event Id : 0x003c8e5cd00000000 Monitor : disk_em
Event # : 100091          Event Class : I/O
Severity : CRITICAL
Disk at hardware path 8/4.10.0 : Software configuration error
Associated OS error log entry id(s):
0x3c8e5cd800000000
Latest information on this event:
http://docs.hp.com/hpux/content/hardware/ems/scsi.htm#100091
Description of Error:
The device is in a condition where it requires action on the part of the
device driver or a human operator.
Probable Cause / Recommended Action:
The device has been reset by a Bus Device Reset message, a hard reset
condition, or a power-on reset.
```

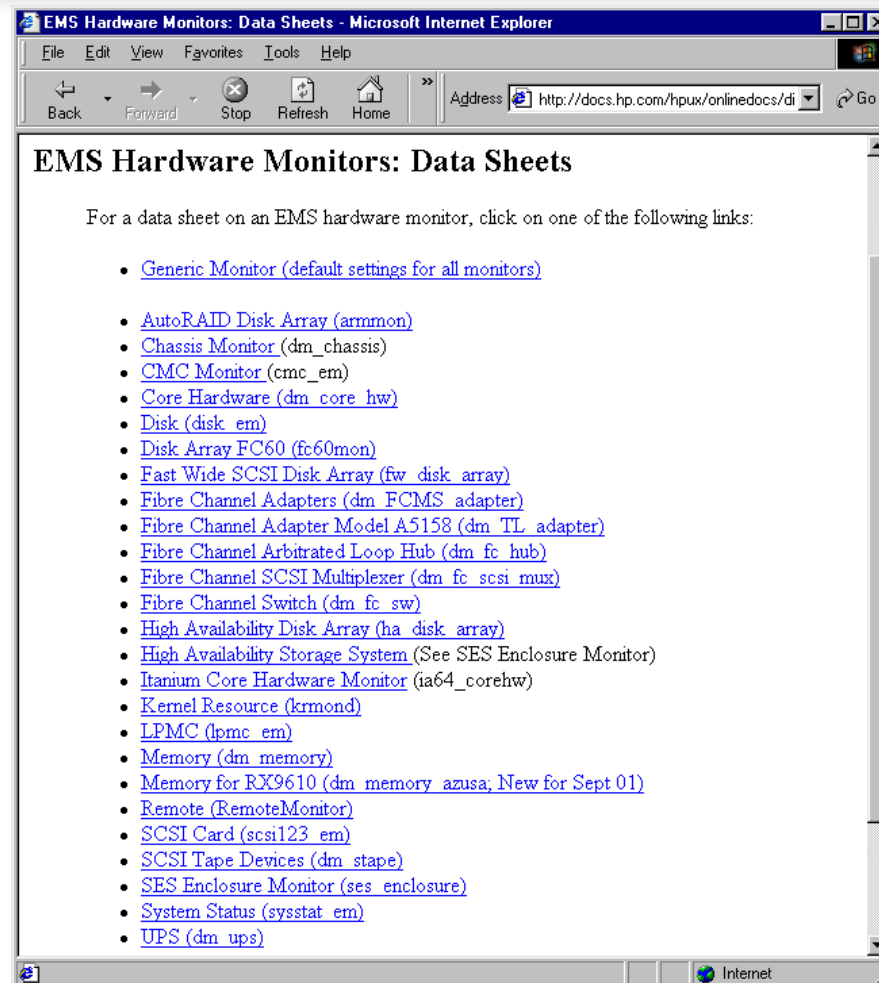
```
Untitled - Notepad
File Edit Search Help
Probable Cause / Recommended Action:
The device has been reset by a Bus Device Reset message, a hard reset
condition, or a power-on reset.
If this is the case, no action is necessary.
Alternatively, a removable medium has been loaded or replaced.
If this is the case, no action is necessary.
Alternatively, the mode parameters, microcode, or inquiry data for the
device have been changed.
If this is the case, no action is necessary.
Alternatively, the installed version of the device driver does not match
that of the installed version of HP-UX. Install the correct version of the
driver.
v-v-v-v-v-v-v-v-v-v-v-v-v-v-v-v D E T A I L S v-v-v-v-v-v-v-v-v-v-v-v-v-v-v-v
Product/Device Identification Information:
Logger ID.....: sdisk
Product Identifier: SCSI Disk
Product Qualifier.: SEAGATEST39175LC
SCSI Target ID.....: 0x0A
SCSILUN.....: 0x00
I/O Log Event Information:
```

```
Untitled - Notepad
File Edit Search Help
I/O Log Event Information:
Driver Status Code.....: 0x0000000B
Length of Logged Hardware Status....: 22 bytes.
Offset to Logged Manager Information: 24 bytes.
Length of Logged Manager Information: 44 bytes.
Hardware Status:
Raw H/W Status:
0x0000: 00 00 00 02 70 00 06 00 00 00 00 0A 00 00 00 00
0x0010: 29 02 02 00 00 00
SCSI Status....: CHECK CONDITION (0x02)
Indicates that a contingent allegiance condition has occurred. Any
error, exception, or abnormal condition that causes sense data to be
set will produce the CHECK CONDITION status.
SCSI Sense Data:
Undecoded Sense Data:
0x0000: 70 00 06 00 00 00 00 0A 00 00 00 00 29 02 02 00
0x0010: 00 00
SCSI Sense Data Fields:
Error Code          : 0x70
Segment Number      : 0x00
Bit Fields:
Filemark            : 0
End-of-Medium       : 0
Incorrect Length Indicator : 0
Sense Key           : 0x06
Information Field Valid : FALSE
```

# EMS Hardware Monitor Data Sheets

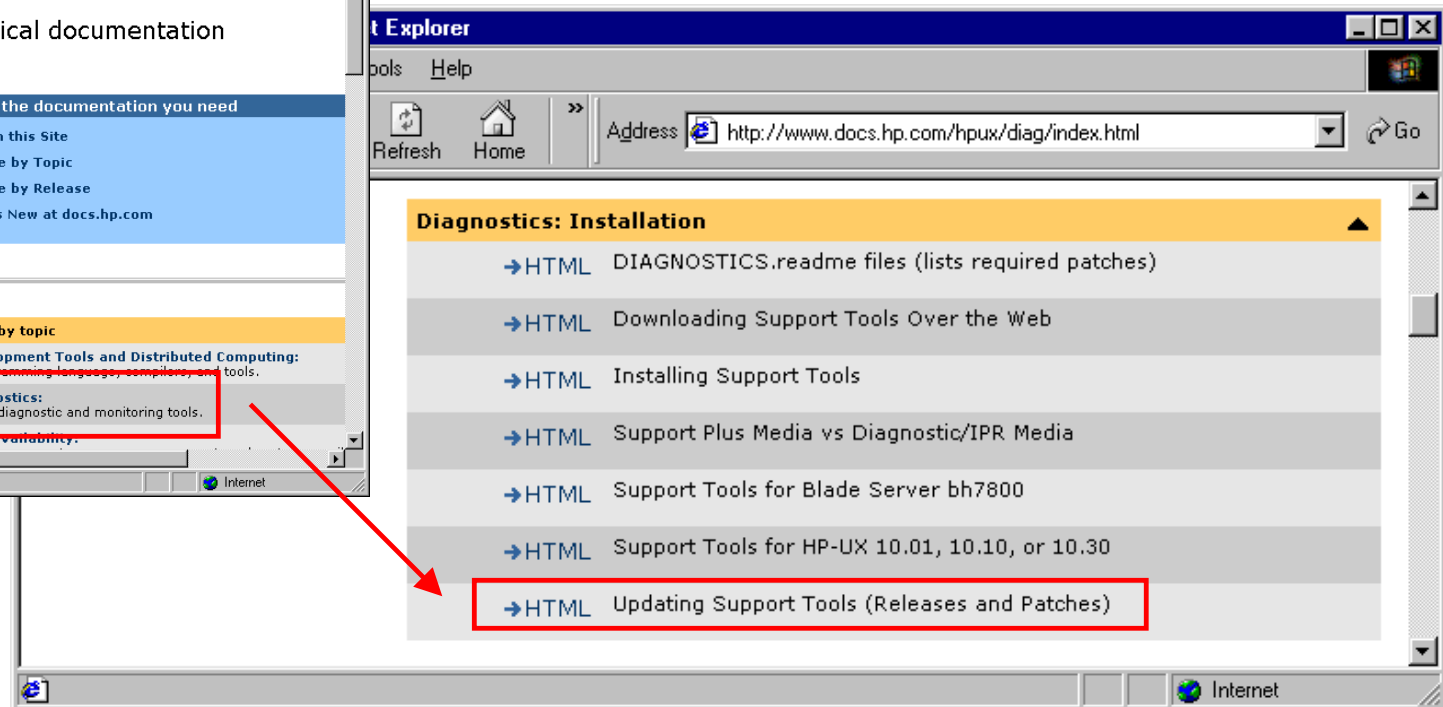
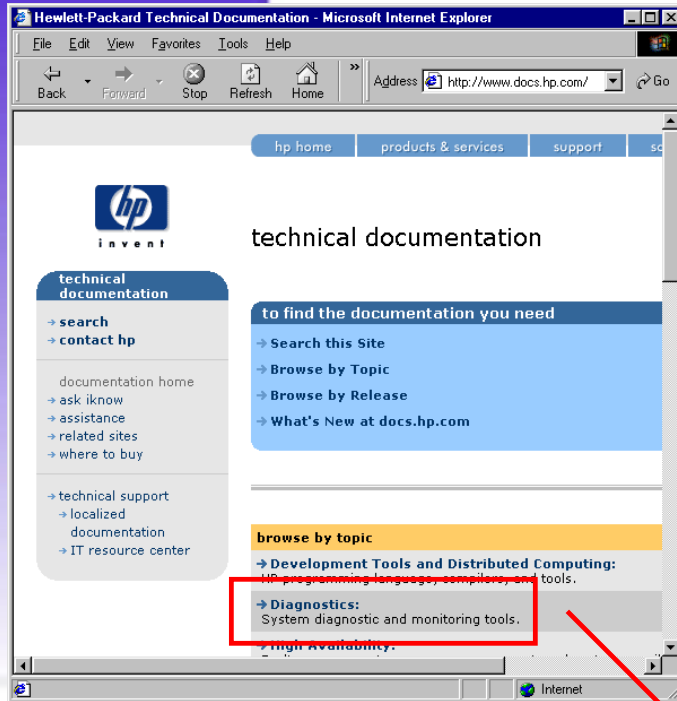


# EMS Hardware Monitor Data Sheets



[http://docs.hp.com/hpux/onlinedocs/diag/ems/emd\\_summ.htm](http://docs.hp.com/hpux/onlinedocs/diag/ems/emd_summ.htm)

# EMS Hardware Monitor Version Number Information



# EMS Hardware Monitor Version Number Information

Updating Support Tools (Releases and Patches) - Microsoft Internet Explorer

Address: [http://www.docs.hp.com/hpux/onlinedocs/diag/stm/stm\\_upd.htm](http://www.docs.hp.com/hpux/onlinedocs/diag/stm/stm_upd.htm)

### Finding your version number

You can locate the release number for your version of Support Tools in three ways:

- As STM (the online diagnostics program) loads, look for the version number in the second or third line of text (depending on your version). Entering `csfm` at the HP-UX prompt is a fast way to get the version number.
- Look at the "On Version" item when you call up online help from within STM.
- Use the 'swlist' command at the HP-UX prompt. Get the SW Depot ID and look it up in the table below. The SW Depot ID has the format:

```

Minor revision (for HP internal use only)
||
OS release ||
|----| ||
B.11.00.12.06
||
Revision (incremented for each SP (IPR)
on which a version of the
Support Tools appears)
  
```



hpterm [m2426s2k.nsr.hp.com via TELNET]

```

# swlist -l bundle
# Initializing...
# Contacting target "m2426s2k.nsr.hp.com"...
#
# Target: m2426s2k.nsr.hp.com:/
#
B2491BA      B.11.00      MirrorDisk/UX
B3929BA      B.11.00      HP OnLineJFS (Advanced VxFS)
B5736DA      A.03.20      HA Monitors
B7609BA      A.03.20      Event Monitoring Service
HPUXEng32RT  B.11.00.01  English HP-UX 32-bit Runtime Environment
HME1100      B.11.00.0112.7 Hardware Enablement Patches for HP-UX 11.00, December 2001
OnlineDiag   B.11.00.19.10 HPLUX 11.0 Support Tools Bundle, Dec 2001
UnlimUserLic B.11.00.02   HP-UX Unlimited-User License
XSNGR1100    B.11.00.47.08 General Release Patches, November 1999 (ACE)
  
```

Updating Support Tools (Releases and Patches) - Microsoft Internet Explorer

Address: [http://www.docs.hp.com/hpux/onlinedocs/diag/stm/stm\\_upd.htm](http://www.docs.hp.com/hpux/onlinedocs/diag/stm/stm_upd.htm)

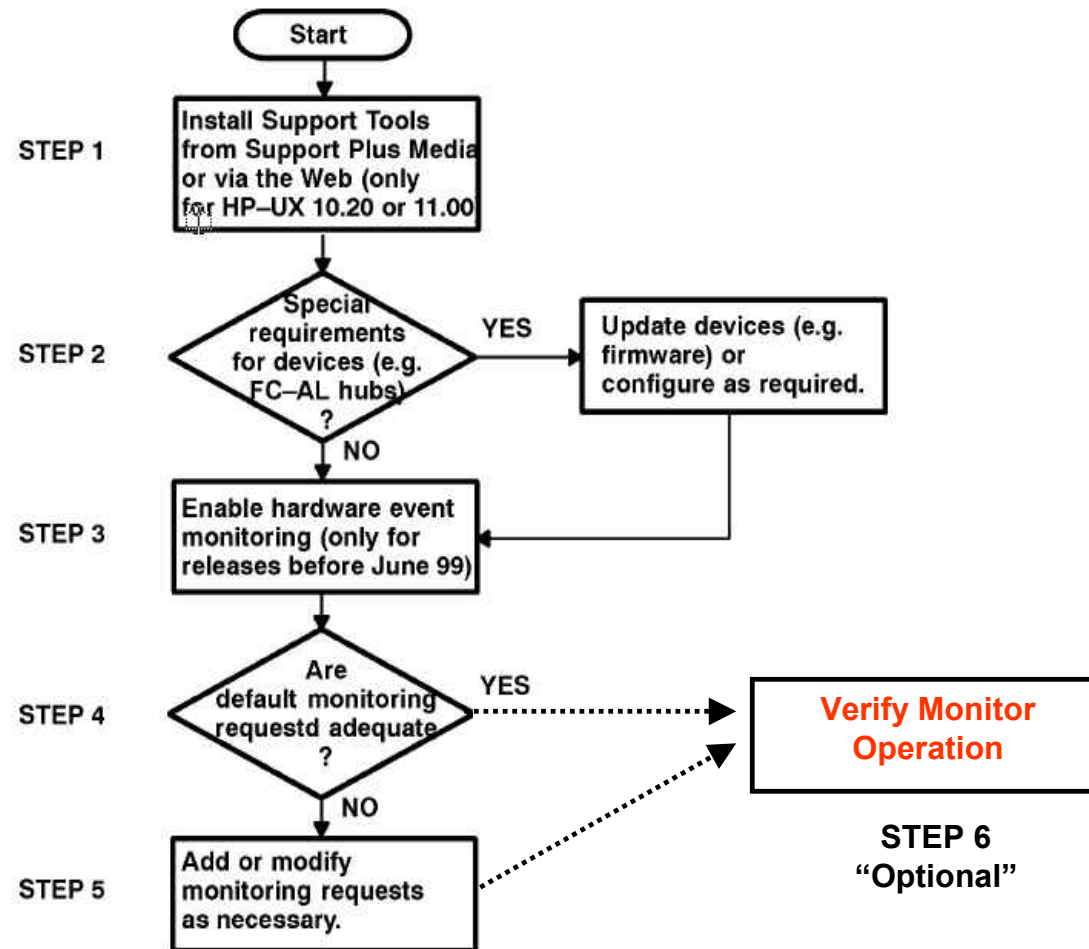
STM Version	Distribution	Release Date	SW Depot IDs (swlist)	EMS Version	More information
B.30.00	HWE 0203	Mar 02	B.11.00.20.xxx B.11.11.06.xxx	A.03.20 (11.0) A.03.20.01 (11)	Release notes for <a href="#">11i / 11.0 / EMS</a> <a href="#">DIAGNOSTICS.readme</a> <a href="#">Summary of features.</a>
A.29.00	HWE 0112 (IPR 0112)	Dec 01	B.10.20.24.xxx B.11.00.19.xxx B.11.11.05.xxx	A.03.20 (10.20, 11.0) A.03.20.01 (11)	Release notes for <a href="#">11i / 11.0 / 10.20 / EMS</a> <a href="#">DIAGNOSTICS.readme</a> <a href="#">Summary of features.</a>
A.28.00	HWE 0109 (IPR 0109)	Sep 01	B.10.20.23.xxx B.11.00.18.xxx B.11.11.04.xxx	A.03.20 (10.20, 11.0) A.03.20.01 (11)	Release notes for <a href="#">11i / 11.0 / 10.20 / EMS</a> <a href="#">DIAGNOSTICS.readme</a> <a href="#">Summary of features.</a>
B.27.00	HP-UX 11i Version 1.5 (B.11.20)  (minor fixes and support added for RX9610)	Sep 01	B.11.20.02.xxx	A.03.30	Release notes for <a href="#">STM / EMS</a> <a href="#">DIAGNOSTICS.readme</a> <a href="#">Summary of features.</a>
B.26.00	HP-UX 11i Version 1.5 (B.11.20)  (for RX 4610, 1st release)	Jun 01	B.11.20.01.xxx	A.03.30	Release notes for <a href="#">STM / EMS</a> <a href="#">DIAGNOSTICS.readme</a> <a href="#">Summary of features.</a>

[http://www.docs.hp.com/hpux/onlinedocs/diag/stm/stm\\_upd.htm](http://www.docs.hp.com/hpux/onlinedocs/diag/stm/stm_upd.htm)

## **EMS Hardware Monitor Software Requirements**

- **HP 9000 Series 700 or 800 Systems**
- **HP-UX 10.20 and ongoing versions**
- **Installation of Online Diagnostic Products from the Support Plus Media**
- **Applicable patches**

# EMS Configuration Steps





# EMS H/W Monitor Install

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help
# pwd
/cdrom/DIAGNOSTICS
# ll
total 61416
-r-xr-xr-x  1 4294967295 4294967295 28631040 Oct 25 20:18 B.11.00
-r-xr-xr-x  1 4294967295 4294967295  19873 Oct 17 09:48 DIAGNOSTICS.readme
-r-xr-xr-x  1 4294967295 4294967295 1112217 Oct 17 09:48 DIAG_USR.PDF
-r-xr-xr-x  1 4294967295 4294967295 1677585 Oct 17 09:48 EMS_USR.PDF
#
```

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help

      Readme for Diagnostics (Support Tools)
      Support Plus
      December 2001

      CONTENTS

      Overview
      Required and Recommended Patches
      Loading Patches
      Known Problems
      Removing Diagnostics
      Getting More Information
      EMS Hardware Monitors

This DIAGNOSTICS.readme document covers the December 2001 release
of Support Plus for S800/S700 systems (HP-UX 11i, 11.00, and 10.20).

NOTE:
  As of the September 1999 release, the name of the
  Diagnostic/IPR Media has been changed to Support Plus.
  In addition, the format has changed so that there is
  a separate CD-ROM for each version of the operating system:
  HP-UX 11i (11.11), HP-UX 11.00, and HP-UX 10.20.
```

# EMS H/W Monitor Install

```
Telnet - m2426stk.nsr.hp.com
Connect Edit Terminal Help
# pwd
/cdrom/DIAGNOSTICS
# ls
B.11.00          DIAGNOSTICS.readme  DIAG_USR.PDF      EMS_USR.PDF
# swinstall -s /cdrom/DIAGNOSTICS/B.11.00
```

SD Install - Software Selection (m2426s2k.nsr.hp.com)

File View Options Actions Help

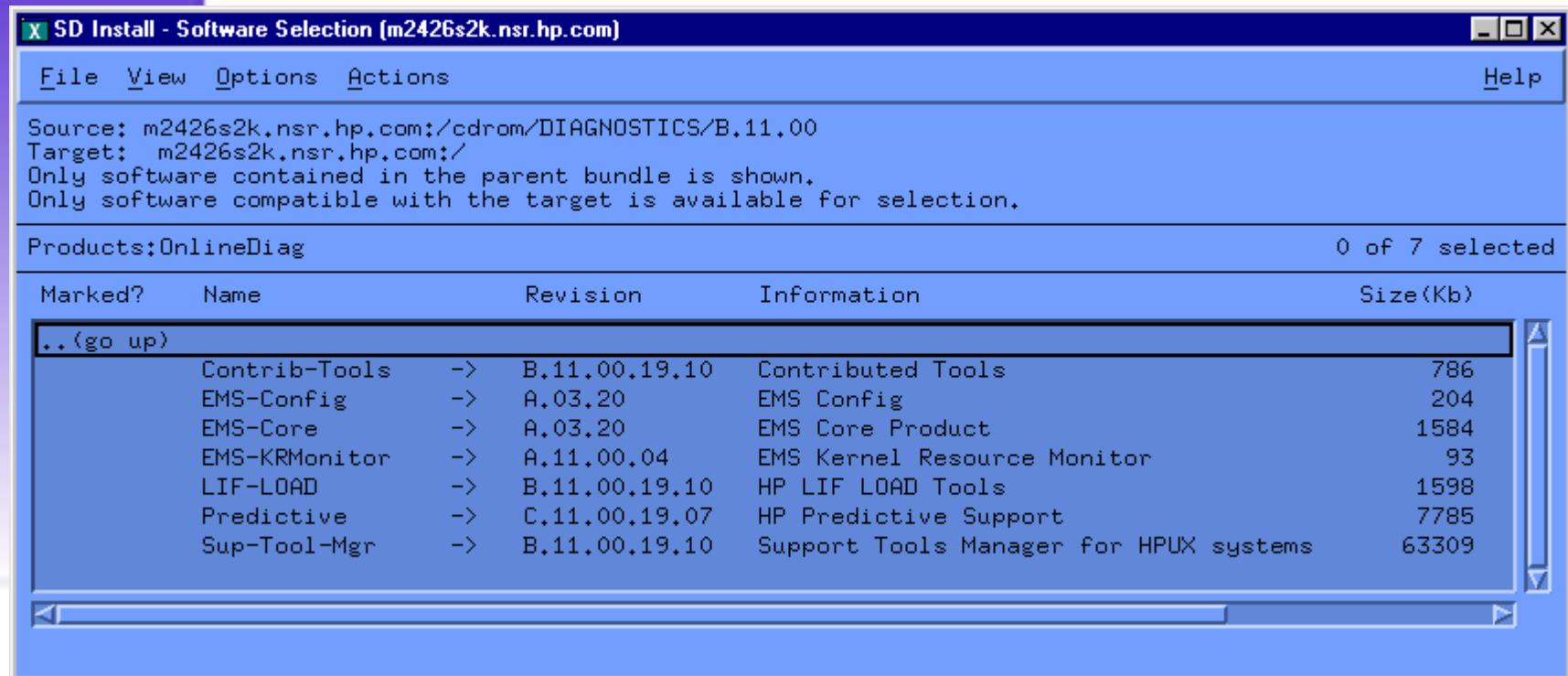
Source: m2426s2k.nsr.hp.com:/cdrom/DIAGNOSTICS/B.11.00  
Target: m2426s2k.nsr.hp.com:/

Only software compatible with the target is available for selection.

Top (Bundles and Products) 1 of 3 selected

Marked?	Name	Revision	Information
	B9073AA	-> B.04.01	HP-UX iCOD-purchase (Instant Capacity on Demand - purchase)
	OnlineDiag	-> B.11.00,19,10	HPUX 11.0 Support Tools Bundle, Dec 2001
	T1322AA	-> B.04.01	HP-UX iCOD-utility (Instant Capacity on Demand - utility)

# EMS H/W Monitor Install



The screenshot shows a window titled "SD Install - Software Selection (m2426s2k.nsr.hp.com)". The window has a menu bar with "File", "View", "Options", "Actions", and "Help". Below the menu bar, there is a text area with the following information:

Source: m2426s2k.nsr.hp.com:/cdrom/DIAGNOSTICS/B,11,00  
Target: m2426s2k.nsr.hp.com:/  
Only software contained in the parent bundle is shown.  
Only software compatible with the target is available for selection.

Below the text area, there is a section labeled "Products:OnlineDiag" with "0 of 7 selected" on the right. A table lists the available software products:

Marked?	Name	Revision	Information	Size(Kb)
	.. (go up)			
	Contrib-Tools	-> B,11,00,19,10	Contributed Tools	786
	EMS-Config	-> A,03,20	EMS Config	204
	EMS-Core	-> A,03,20	EMS Core Product	1584
	EMS-KRMonitor	-> A,11,00,04	EMS Kernel Resource Monitor	93
	LIF-LOAD	-> B,11,00,19,10	HP LIF LOAD Tools	1598
	Predictive	-> C,11,00,19,07	HP Predictive Support	7785
	Sup-Tool-Mgr	-> B,11,00,19,10	Support Tools Manager for HPUX systems	63309

# EMS H/W Monitor Install

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help
Message 1/16 root                               Mar 4, 2002 04:56:30 pm -0800

Date: Mon, 4 Mar 2002 16:56:30 -0800 (PST)
To: root
Subject: Introduction to HP's Hardware Monitoring

Introducing Hewlett-Packard's Hardware Monitoring!

EMS Hardware Monitors were installed along with the Support Tools
Manager. Hardware monitoring gives you the ability to detect problems
with many of your system hardware resources. By providing immediate
detection and notification, hardware monitoring allows you to
quickly identify and correct problems - often before they impact
system operation.

EMS HW Monitoring has been enabled on your system. By default,
messages regarding major warnings, serious and critical events that
occur on hardware being monitored will be:
- Written to /var/adm/syslog/syslog.log
- E-mailed to root
All events will be stored in /var/opt/resmon/log/event.log.

EMS HW Monitoring can be reconfigured using the Monitoring Request
MORE (you've seen 61%):
```

# EMS H/W Monitor Configuration

- Examine the list of supported products for special requirements

The image displays two overlapping screenshots of a Microsoft Internet Explorer browser window. The left window shows the HP technical documentation homepage at <http://www.docs.hp.com/>. The page features the HP logo and navigation links. A section titled "browse by topic" is visible, with a red box highlighting the link "→ Diagnostics: System diagnostic and monitoring tools.". A red arrow points from this box to the right window. The right window shows the "EMS Hardware Monitors" page at <http://www.docs.hp.com/hpux/diag/index.html>. This page lists various resources, with a red box highlighting the link "→HTML Requirements and Supported Products".

EMS Hardware Monitors	
→HTML	Data Sheets
→PDF	EMS Hardware Monitors User's Guide (HP-UX 10.x, HP-UX 11.0, HP-UX 11i)
→HTML	Event Descriptions
→HTML	Frequently Asked Questions (FAQs)
→HTML	Multiple-View (Predictive-Enabled) Monitors
→HTML	Overview
→HTML	Release Notes
→HTML	Requirements and Supported Products

# EMS H/W Monitor Configuration

The image shows two overlapping Microsoft Internet Explorer browser windows. The left window displays the main 'Requirements and Supported Products' page for EMS Hardware Monitors. The right window displays a detailed data sheet for 'Fibre Channel Arbitrated Loop Hubs'.

**Left Window: Requirements and Supported Products**

Address: <http://www.docs.hp.com/hpu>

## EMS Hardware Monitors

### Requirements and Supported Products

This page lists the Hewlett-Packard products currently supported by EMS hardware monitors. The page also identifies any patches or software required for using the EMS hardware monitor with the product.

- [Disk Arrays](#)
- [Disk Products](#)
- [Tape Products](#)
- [High Availability Storage Systems](#)
- [Fibre Channel SCSI Multiplexers](#)
- [Fibre Channel Adapters](#)
- **[Fibre Channel Arbitrated Loop Hubs](#)**
- [Fibre Channel Switches](#)
- [Memory](#)
- [System](#)
- [Interface Cards](#)
- [Other](#)

**Right Window: Fibre Channel Arbitrated Loop Hubs**

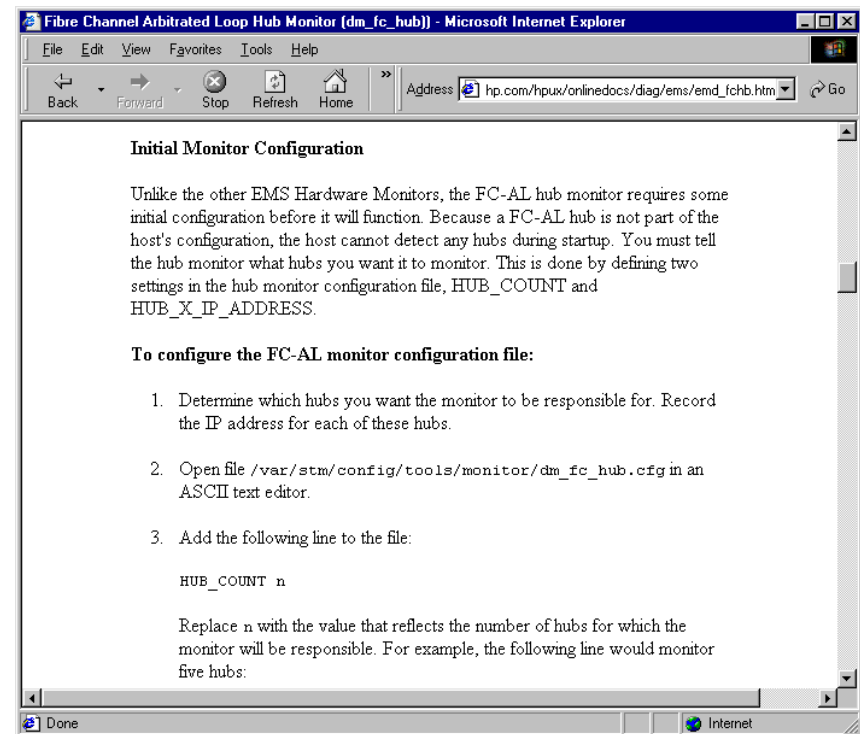
Address: <http://www.docs.hp.com/hpu/online/docs/diag/e>

Product	Model/Product Number	Special Requirements
HP Fibre Channel Arbitrated Loop Hubs	A3724A A4839A	The FC-AL Hub monitor requires:  Device Firmware revisions <ul style="list-style-type: none"><li>• Device Agent Firmware revision 2.14 or greater</li><li>• Hub Controller Firmware revision 3.06 or greater</li></ul> Firmware and installation instructions are available at <a href="http://www.software.hp.com">http://www.software.hp.com</a>  C++ runtime support patches <ul style="list-style-type: none"><li>• 10.20 PHSS_16585 (supersedes PHSS_14262)</li><li>• 11.00 PHSS_16587 (supersedes PHSS_14577)</li></ul> Before using the hub monitor, edit the monitor configuration file ( <code>/var/stm/config/tools/monitor/dm_fc_hub.cfg</code> ) to indicate what hubs will be monitored.

Supported by:  
[Fibre Channel Arbitrated Loop Hub Monitor](#)

Displays the Fibre Channel Arbitrated Loop Hub Monitor Data Sheet

# EMS H/W Monitor Configuration



## Information from the Fibre Channel Arbitrated Loop Hub Monitor (dm\_fc\_hub) Data Sheet

## EMS H/W Monitor Configuration

- **For Releases earlier than June 1999, enable hardware monitoring**
- **Determine whether default monitoring requests are adequate**
- **Add or modify monitoring requests as necessary**
- **If desired, verify monitor operation**



## EMS H/W Monitor Configuration

### Enable H/W Monitoring

#### H/W Monitoring Request Manager

- Used to create and manage Hardware Event Monitoring requests: TUI
- Requires root user id
- Opening screen indicates if monitoring is currently enabled or disabled

***/etc/opt/resmon/lbin/monconfig***

## EMS H/W Monitor Configuration

### Enable H/W Monitoring

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help
=====
Event Monitoring Service
Monitoring Request Manager
=====

EVENT MONITORING IS CURRENTLY ENABLED.
EMS Version : A.03.20
STM Version : A.29.00

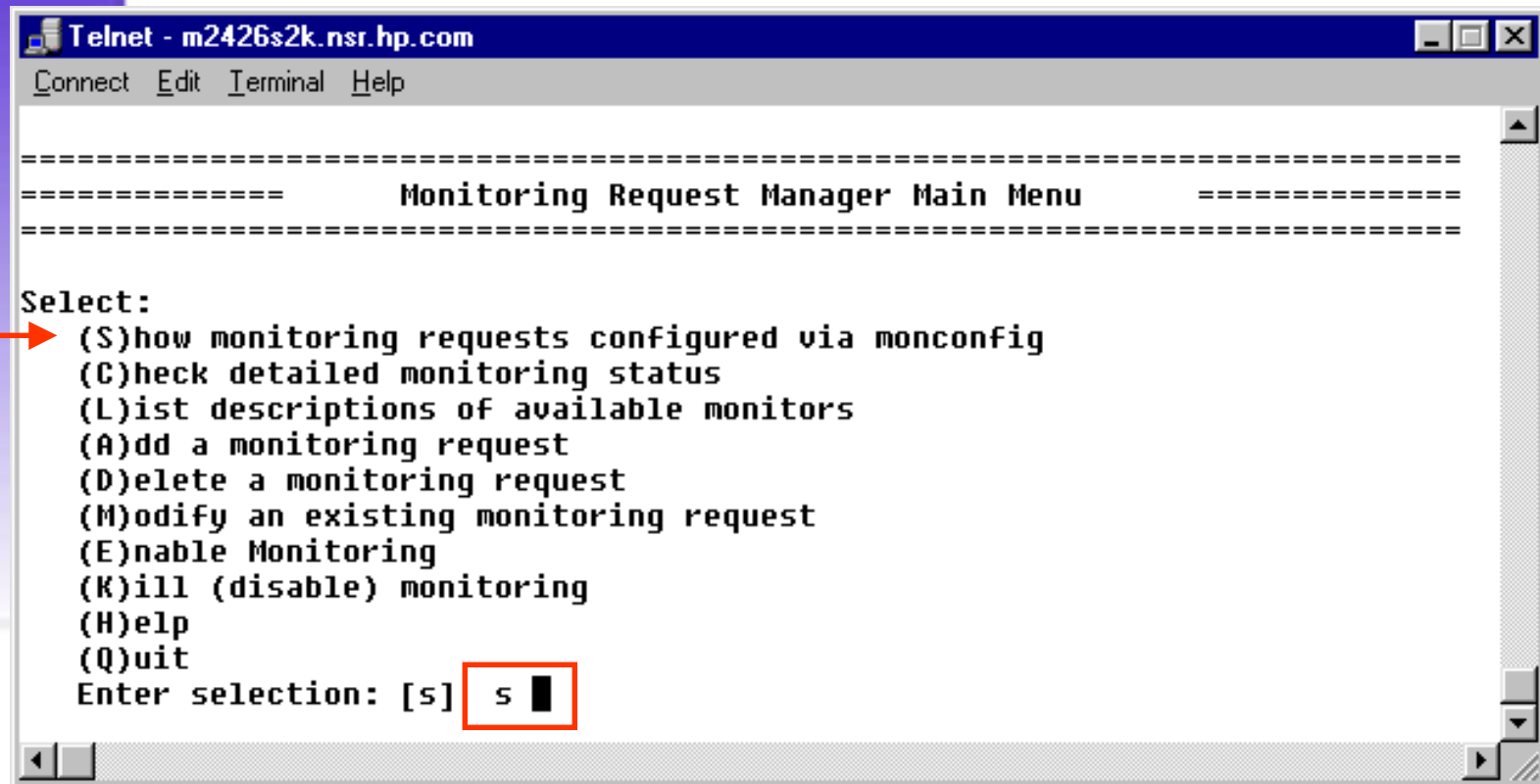
=====
Monitoring Request Manager Main Menu
=====

Select:
(S)how monitoring requests configured via monconfig
(C)heck detailed monitoring status
(L)ist descriptions of available monitors
(A)dd a monitoring request
(D)elete a monitoring request
(M)odify an existing monitoring request
(E)nable Monitoring
(K)ill (disable) monitoring
(H)elp
(Q)uit
Enter selection: [s]
```

What is STM  
Version A.29.00?

## EMS H/W Monitor Configuration

### Show Monitoring Requests



```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help

=====
Monitoring Request Manager Main Menu
=====

Select:
(S)how monitoring requests configured via monconfig
(C)heck detailed monitoring status
(L)ist descriptions of available monitors
(A)dd a monitoring request
(D)elete a monitoring request
(M)odify an existing monitoring request
(E)nable Monitoring
(K)ill (disable) monitoring
(H)elp
(Q)uit
Enter selection: [s] s █
```

## EMS H/W Monitor Configuration

### Show Monitoring Requests

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help

=====
Current Monitoring Requests
=====

EVENT MONITORING IS CURRENTLY ENABLED.

NOTE: Predictive / Instant Support Enterprise Edition monitor requests are
not managed by this application, and are displayed only by the "C" command.
Refer to Predictive's release notes (/opt/pred/bin/Rel_NOTES.PRED)
for further details on Predictive.

The current monitor configuration is:
  1) Send events generated by monitors
      /StorageAreaNetwork/events/SAN_Monitor
      with severity >= MAJOR WARNING to SYSLOG
      with client configuration file:
          /var/stm/config/tools/monitor/default_RemoteMonitor.clcfg
Standard input
```

## EMS H/W Monitor Configuration List Monitor Descriptions

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help
=====
Monitoring Request Manager Main Menu
=====

Select:
(S)how monitoring requests configured via monconfig
(C)heck detailed monitoring status
(L)ist descriptions of available monitors
(A)dd a monitoring request
(D)elete a monitoring request
(M)odify an existing monitoring request
(E)nable Monitoring
(K)ill (disable) monitoring
(H)elp
(Q)uit
Enter selection: [s] 1 █
```

# EMS H/W Monitor Configuration

## List Monitor Descriptions

```
x hpterm (m2426s2k.nsr.hp.com via TELNET)
===== Monitor Descriptions =====
The following lists information about the monitors which are available.
Individual monitors will only be active if:
- There is hardware on the system that they are designed to monitor.
- There are monitoring requests configured for them. (Use the monconfig
"s" command to check the currently configured monitoring requests)
- Monitoring is enabled. (Use the monconfig "s" command to check whether
monitoring is enabled or disabled.)

*** MONITOR /StorageAreaNetwork/events/SAN_Monitor:
Remote Event Monitor

This resource monitors events for SAN connected products.
This resource can be configured to report events directly using the
Standard input
```

```
x hpterm (m2426s2k.nsr.hp.com via TELNET)
g requests to detect changes in device status are created using the Peripheral Status
Monitor ( psmmon (1m) ) and Event Monitoring Service (EMS).
For more information see the monitor man page, dm_TL_adapter (1m).

*** MONITOR /system/events/core_hw:
Core Hardware Monitor

This resource monitors events for system core hardware, including the processor and
memory buses. Event monitoring requests are created using the Monitoring Request
Manager (monconfig(1m)). Monitoring requests to detect changes in core hardware st
atus are created using the Peripheral Status Monitor (psmmon(1m)) and Event Monitor
ing Service (EMS).
For more information see the monitor man page, dm_core_hw(1m).

*** MONITOR /connectivity/events/hubs/FC_hub:
FC-AL Hub Monitor
Standard input
```

# EMS H/W Monitor Configuration

## List Monitor Descriptions

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help

dm core hw(1m) dm core hw(1m)

NAME
dm core hw - monitors system processing unit

SYNOPSIS
dm core hw

DESCRIPTION
dm core hw is the monitor for hardware which is part of the System
Processing Unit (SPU.) This includes the cabinet power supplies and
fans, system bus, circuits which connect the I/O system to the main
processor, and intake temperature.

dm core hw event monitoring requests are created using the Hardware
Event Monitoring Request Manager (monconfig). Monitoring requests for
status changes caused by events are created using the Event Monitoring
Service (EMS). Both types of monitoring requests are handled by the
EMS.

Supported Systems
Standard input
```

*dm\_core\_hw  
Man Page*

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help

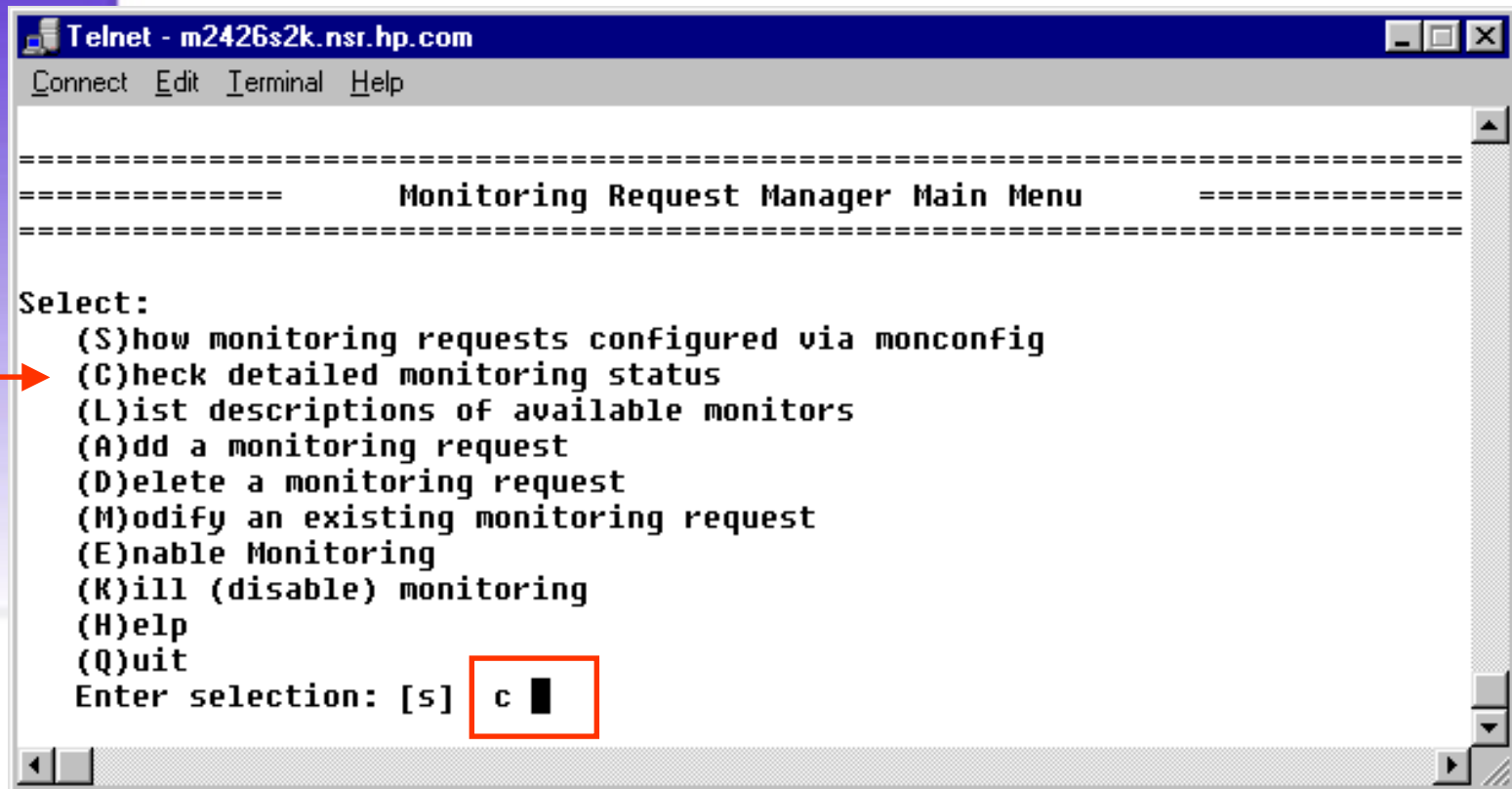
/etc/opt/resmon/EMS/dm core hw.sapcfg
Startup configuration file containing entries for
all dm core hw monitoring requests.
```

*This path is incorrect.  
The correct path is  
displayed below.*

`/var/stm/config/tools/monitor`

## EMS H/W Monitor Configuration

### Check Monitoring Requests



```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help

=====
Monitoring Request Manager Main Menu
=====

Select:
(S)how monitoring requests configured via monconfig
(C)heck detailed monitoring status
(L)ist descriptions of available monitors
(A)dd a monitoring request
(D)elete a monitoring request
(M)odify an existing monitoring request
(E)nable Monitoring
(K)ill (disable) monitoring
(H)elp
(Q)uit
Enter selection: [s] c █
```



## EMS H/W Monitor Configuration

### Check Monitoring Requests

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help
Events >= 1 (INFORMATION) Goto TEXTLOG; file=/var/opt/resmon/log/event.log
Events >= 3 (MAJOR WARNING) Goto EMAIL; addr=root
Events >= 1 (INFORMATION) Goto TEXTLOG; file=/var/opt/pred/emslog
Comment: Predictive Monitor Request
Events = 5 (CRITICAL) Goto TCP; host=m2426s2k.nsr.hp.com port=55382

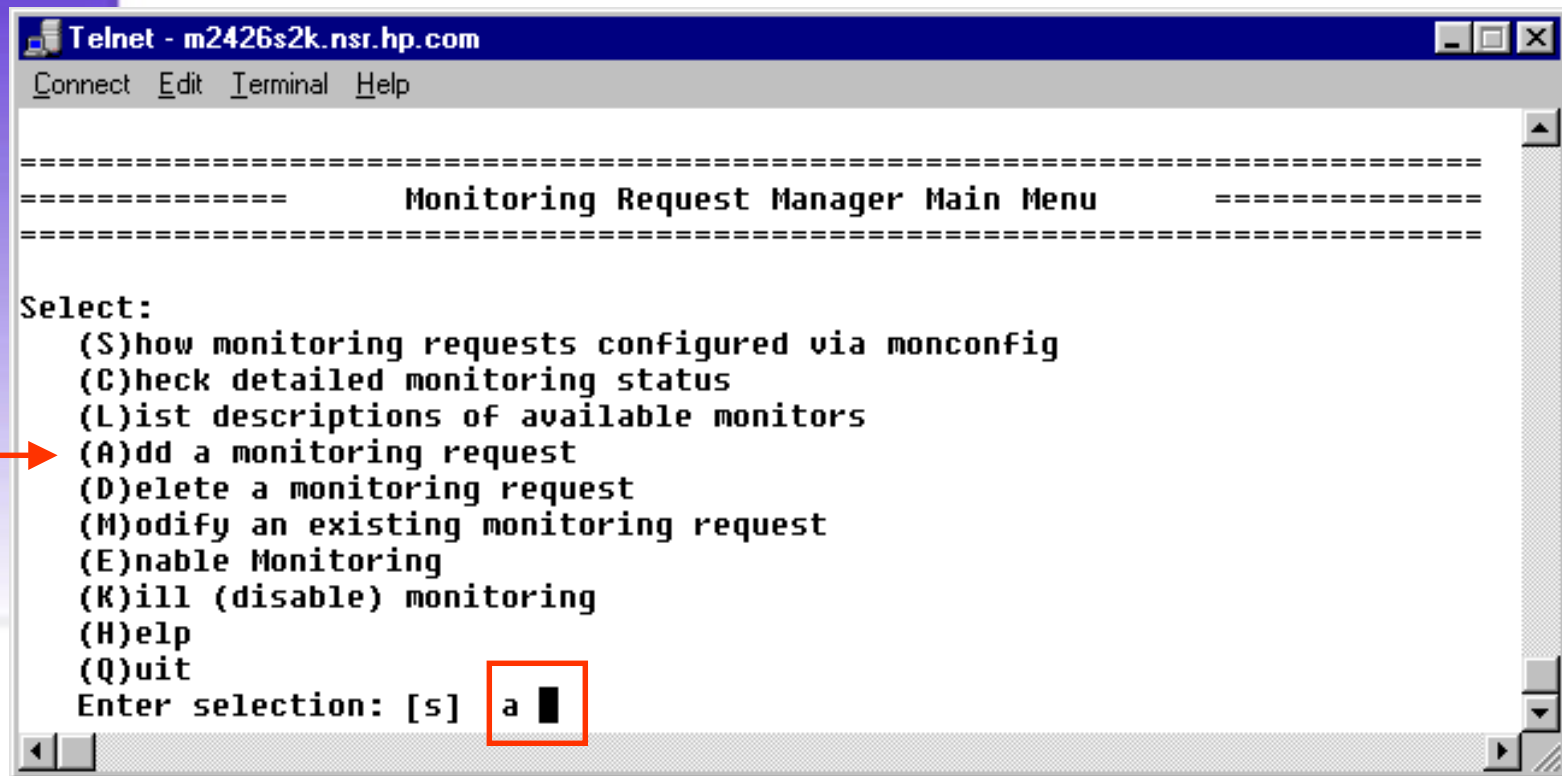
>/adapters/events/FC_adapter ... NOT MONITORING.
(Possibly there is no hardware to monitor.)

>/adapters/events/TL_adapter ... NOT MONITORING.
(Possibly there is no hardware to monitor.)

>/system/events/core_hw ... OK.
For /system/events/core_hw/core_hw:
Events >= 1 (INFORMATION) Goto TEXTLOG; file=/var/opt/resmon/log/event.log
Events >= 3 (MAJOR WARNING) Goto SYSLOG
Events >= 3 (MAJOR WARNING) Goto EMAIL; addr=root
Events >= 4 (SERIOUS) Goto TCP; host=m2426s2k.nsr.hp.com port=55382
Events >= 1 (INFORMATION) Goto TEXTLOG; file=/var/opt/pred/emslog
Comment: Predictive Monitor Request

>/connectivity/events/hubs/FC_hub ... NOT MONITORING.
(Possibly there is no hardware to monitor.)
Standard input
```

## EMS H/W Monitor Configuration Add Monitoring Requests



```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help

=====
Monitoring Request Manager Main Menu
=====

Select:
(S)how monitoring requests configured via monconfig
(C)heck detailed monitoring status
(L)ist descriptions of available monitors
(A)dd a monitoring request
(D)elete a monitoring request
(M)odify an existing monitoring request
(E)nable Monitoring
(K)ill (disable) monitoring
(H)elp
(Q)uit
Enter selection: [s] a |
```

## EMS H/W Monitor Configuration Add Monitoring Requests

### Attributes Required For Adding or Modifying A Monitor Request

**Criteria Threshold: Severity Level**

**Criteria Operator: Desired Operator**

**Notification Method: Notification Method**

*Adding a monitor request is  
synonymous with adding an  
additional notification message.*

## EMS H/W Monitor Configuration

### Add Monitoring Requests

**Hardware  
Event  
Monitor**

This setting identifies what hardware you want to monitor. You can select multiple monitors for each request.

**Severity Level:**

**Critical = 5**

**Serious = 4**

**Major Warning = 3**

**Minor Warning = 2**

**Information = 1**

+

**Operator**

=

>

<

>=

<=

!

Together, these settings identify what events you want reported. You can select one pair of settings for each request.

**Notification Method**

This setting identifies the notification method to use when an event occurs. You can select only one notification method for each request.

## EMS H/W Monitor Configuration

### Add Monitoring Requests: Severity Levels ( 1 - 5 )

- **Critical (5)** - Immediate action is required to avoid or recover from critical data loss, system down time or other loss of service. The text event will indicate exactly that loss of data has occurred or a critical warning has been issued to avoid loss of data. Normal use of the hardware cannot, or should not, continue.
- **Serious (4)** - Action is required very soon to avoid data loss, system down time or other loss of service. May escalate to critical. Normal use of the hardware may be impeded and repair should occur as soon as possible.

## EMS H/W Monitor Configuration

### Add Monitoring Requests: Severity Levels ( 1 - 5 )

- **Major Warning (3)** - A potential problem has been detected that could escalate to a serious problem. Normal use of the hardware is not likely to be impeded, and repair can be scheduled for a convenient time.
- **Minor Warning (2)** - A minor problem has been detected that should be corrected. Normal use of the hardware is not affected, and escalation to a more severe condition is not likely to occur.
- **Information (1)** - An unusual event has occurred that is part of the normal operation of the hardware. Events in this category should be used very sparingly and will not typically be monitored.

## EMS H/W Monitor Configuration

### Add Monitoring Requests: Notification Method

METHOD	NOTIFICATION TARGET	END USER ACTION
Write to syslog	<b><code>/var/adm/syslog/syslog.log</code></b>	System Administrator reads system log
Write to console	System Console	System Administrator views console message on display
Write to text log	User defined text log <b>or</b> <b><code>/var/opt/resmon/logevent.log</code></b>	System Administrator reads text log
Write to Predictive log	<b><code>/var/opt/pred/emslog</code></b>	RCE reads Predictive Message and takes appropriate action

## EMS H/W Monitor Configuration

### Add Monitoring Requests: Notification Method

METHOD	NOTIFICATION TARGET	END USER ACTION
Send via EMail	EMail address	Addressee invokes EMail application and reads message
Send via TCP	User written socket program – host and port	Application dependent System Administrator runs receiving application.
Send via UDP	User written socket program – host and port	Application dependent System Administrator runs receiving application
Send via SNMP	Any application configured to receive SNMP messages Templates provided for integration with HP NNM	Application dependent System Administrator runs Network Node Manager and receives message. Visual change in HW icon
Send OPC format	Templates provided for integration with ITO	System Administrator receives notification via ITO.



## EMS H/W Monitor Configuration

### Add Monitoring Request

```
X hpterm (m2426s2k.nsr.hp.com via TELNET)
=====
===== Add Monitoring Request =====
=====
Start of edit configuration:

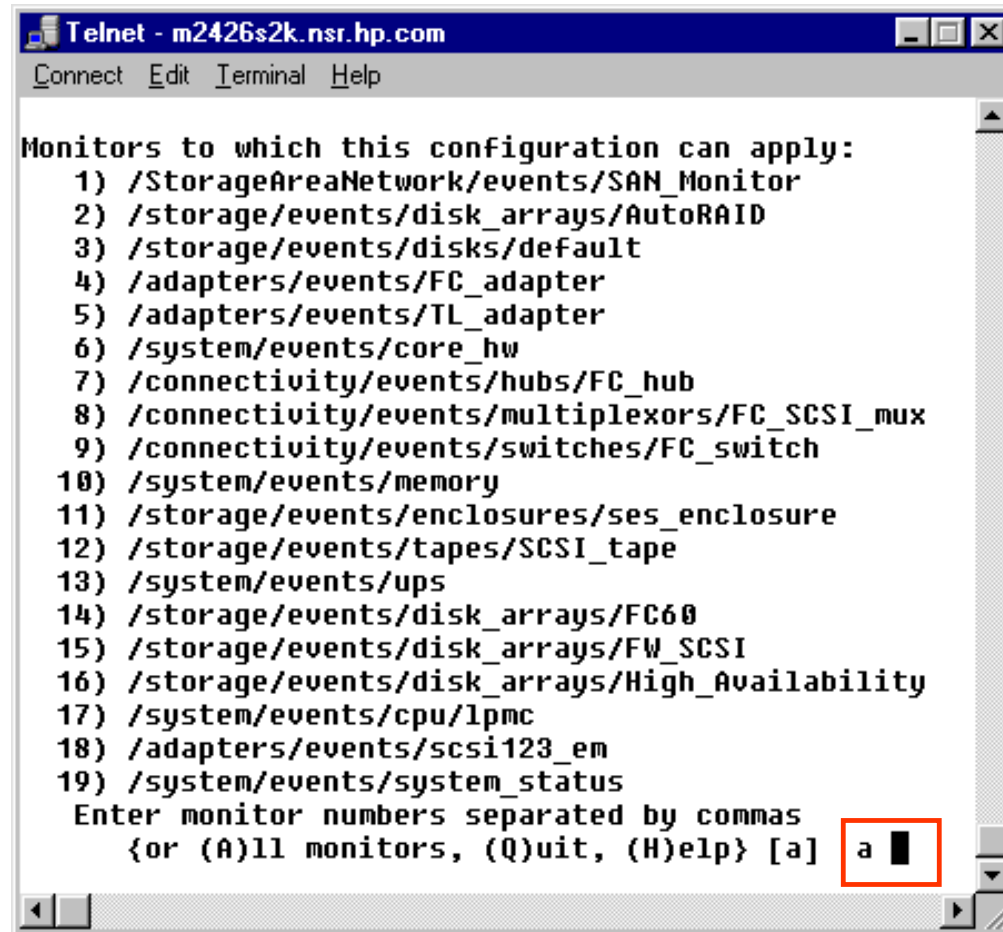
A monitoring request consists of:
- A list of monitors to which it applies
- A severity range (A relational expression and a severity. For example,
  < "MAJOR WARNING" means events with severity "INFORMATION" and
  "MINOR WARNING")
- A notification mechanism.
Please answer the following questions to specify a monitoring request. █
```

```
X hpterm (m2426s2k.nsr.hp.com via TELNET)
Please answer the following questions to specify a monitoring request.

Monitors to which this configuration can apply:
1) /StorageAreaNetwork/events/SAN_Monitor
2) /storage/events/disk_arrays/AutoRAID
3) /storage/events/disks/default
4) /adapters/events/FC_adapter
5) /adapters/events/TL_adapter
6) /system/events/core_hw
7) /connectivity/events/hubs/FC_hub
8) /connectivity/events/multiplexors/FC_SCSI_mux
9) /connectivity/events/switches/FC_switch
10) /system/events/memory
11) /storage/events/enclosures/ses_enclosure
12) /storage/events/tapes/SCSI_tape
13) /system/events/ups
14) /storage/events/disk_arrays/FC60
15) /storage/events/disk_arrays/FW_SCSI
16) /storage/events/disk_arrays/High_Availability
17) /system/events/cpu/lpmc
18) /adapters/events/scsi123_em
19) /system/events/system_status
Enter monitor numbers separated by commas
(or (A)ll monitors, (Q)uit, (H)elp} [a] █
```

**EMS can apply the monitor request to all monitors or a specific monitor**

## EMS H/W Monitor Configuration Add Monitoring Request



```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help

Monitors to which this configuration can apply:
 1) /StorageAreaNetwork/events/SAN_Monitor
 2) /storage/events/disk_arrays/AutoRAID
 3) /storage/events/disks/default
 4) /adapters/events/FC_adapter
 5) /adapters/events/TL_adapter
 6) /system/events/core_hw
 7) /connectivity/events/hubs/FC_hub
 8) /connectivity/events/multiplexors/FC_SCSI_mux
 9) /connectivity/events/switches/FC_switch
10) /system/events/memory
11) /storage/events/enclosures/ses_enclosure
12) /storage/events/tapes/SCSI_tape
13) /system/events/ups
14) /storage/events/disk_arrays/FC60
15) /storage/events/disk_arrays/FW_SCSI
16) /storage/events/disk_arrays/High_Availability
17) /system/events/cpu/lpmc
18) /adapters/events/scsi123_em
19) /system/events/system_status
Enter monitor numbers separated by commas
  {or (A)ll monitors, (Q)uit, (H)elp} [a] a █
```

# EMS H/W Monitor Configuration

## Add Monitoring Request

*OPC option only available on systems with OpenView installed*

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help
{or (A)ll monitors, (Q)uit, (H)elp} [a] a

Criteria Thresholds:
 1) INFORMATION  2) MINOR WARNING  3) MAJOR WARNING
 4) SERIOUS      5) CRITICAL
Enter selection {or (Q)uit,(H)elp} [4] 3

Criteria Operator:
 1) <  2) <=  3) >  4) >=  5) =  6) !=
Enter selection {or (Q)uit,(H)elp} [4] 4

Notification Method:
 1) UDP  2) TCP  3) SNMP  4) TEXTLOG
 5) SYSLOG  6) EMAIL  7) CONSOLE
Enter selection {or (Q)uit,(H)elp} [6] 6

Enter email address: [root] scott_kaneko@hp.com

User Comment:
(C)lear (A)dd
Enter selection {or (Q)uit,(H)elp} [c] a

Enter comment: [ ] Scott Kaneko EMS Notification
```

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help

Notification Method:
 1) UDP  2) TCP  3) SNMP  4) TEXTLOG
 5) SYSLOG  6) EMAIL  7) CONSOLE  8) OPC
Enter selection {or (Q)uit,(H)elp} [6] 6
```

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help

Client Configuration File:
(C)lear
Use Clear to use the default file
Enter selection {or (Q)uit,(H)elp} [c] c

New entry:
Send events generated by all monitors
with severity >= MAJOR WARNING to EMAIL scott_kaneko@hp.com
with comment:
  Scott Kaneko EMS Notification

Are you sure you want to keep these changes?
{(Y)es,(N)o,(H)elp} [n] y
```

```
Telnet - m2426stk.nsr.hp.com
Connect Edit Terminal Help

Changes will take effect when the diagmond(1M) daemon discovers that
monitoring requests have been modified. Use the 'c' command to wait for
changes to take effect.
```

# EMS H/W Monitor Configuration

## Add Monitoring Request

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help

=====
Monitoring Request Manager Main Menu
=====

Select:
(S)how monitoring requests configured via monconfig
(C)heck detailed monitoring status
(L)ist descriptions of available monitors
(A)dd a monitoring request
(D)elete a monitoring request
(M)odify an existing monitoring request
(E)nable Monitoring
(K)ill (disable) monitoring
(H)elp
(Q)uit
Enter selection: [s] c
```

Check Modification

The TCP Notification  
Will Only Appear If The  
EMS High Availability  
Monitor Product Is  
Installed

```
m2426s2k.nsr.hp.com
Connect Edit Terminal Help

>/storageAreaNetwork/events/SAN_Monitor/DiskArray ... NOT MONITORING.
(Possibly there is no hardware to monitor.)

>/system/events/core_hw/core_hw ... OK.
For /system/events/core_hw/core_hw:
Events >= 1 (INFORMATION) Goto TEXTLOG; file=/var/opt/resmon/log/event.log
Events >= 3 (MAJOR WARNING) Goto SYSLOG
Events >= 3 (MAJOR WARNING) Goto EMAIL; addr=root
Events >= 4 (SERIOUS) Goto TCP; host=m2426s2k.nsr.hp.com port=55382
Events >= 1 (INFORMATION) Goto TEXTLOG; file=/var/opt/pred/emslog
Comment: Predictive Monitor Request
Events >= 3 (MAJOR WARNING) Goto EMAIL; addr=scott_kaneko@hp.com
Comment: Scott Kaneko EMS Notification

>/adapters/events/scsi123_em ... OK.
For /adapters/events/scsi123_em/52:
Events >= 4 (SERIOUS) Goto TCP; host=m2426s2k.nsr.hp.com port=55382
```

# EMS H/W Monitor Configuration

## Verify Monitoring Requests

`/opt/resmon/bin/send_test_event` command

```
Telnet - m2426stk.nsr.hp.com
Connect Edit Terminal Help

NAME
  send_test_event- Test event tool

SYNOPSIS
  send_test_event [-v] [-a] monitor_name

DESCRIPTION
  The send_test_event command is used to cause a monitor to generate one
  or more test events.

  Only those monitors which support the functionality of sending test
  events will respond to this command. Monitors that support this
  functionality should be revision B.01.00 or higher.

NOTE: The event will only be generated out of EMS if a monitoring
request is active for that monitor. To use this mechanism to test the
caller must ensure that the appropriate monitoring request is active
via the monconfig (Check monitor calls).

Standard input
```

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help
# pwd
/var/stm/config/tools/monitor
# ls *.clcfg
default_RemoteMonitor.clcfg      default_dm_ses_enclosure.clcfg
default_disk_em.clcfg           default_dm_stape.clcfg
default_dm_FCMS_adapter.clcfg    default_dm_ups.clcfg
default_dm_TL_adapter.clcfg     default_ha_disk_array.clcfg
default_dm_core_hw.clcfg        default_lpmc_em.clcfg
default_dm_fc_scsi_mux.clcfg     default_scsi123_em.clcfg
default_dm_memory.clcfg         default_sysstat_em.clcfg
#
```

## EMS H/W Monitor Configuration

### Verify Monitoring Requests

`/opt/resmon/bin/send_test_event` command

```
x hpterm [m2426s2k.nsr.hp.com via TELNET]
# send_test_event -av dm_core_hw

Finding resource name associated with monitor dm_core_hw.

Found resource name /system/events/core_hw
associated with monitor dm_core_hw.

Creating test file /var/stm/config/tools/monitor/dm_core_hw.test
for monitor dm_core_hw.

Making test file /var/stm/config/tools/monitor/dm_core_hw.test
for monitor dm_core_hw
indicate send test event for all resources.

Performing resls on resource name /system/events/core_hw
for monitor dm_core_hw to cause generation of test event.
Contacting Registrar on m2426s2k.nsr.hp.com

NAME: /system/events/core_hw
DESCRIPTION: Core Hardware Monitor

This resource monitors events for system core hardware, including the processor
and memory buses. Event monitoring requests are created using the Monitoring Re
quest Manager (monconfig(1m)). Monitoring requests to detect changes in core ha
rdware status are created using the Peripheral Status Monitor (psmmon(1m)) and E
vent Monitoring Service (EMS).

For more information see the monitor man page, dm_core_hw(1m).
TYPE: /system/events/core_hw is a Resource Class.

There is one resource configured below /system/events/core_hw:
Resource Class
    /system/events/core_hw/core_hw
#
```

**Verify  
Modification**

## EMS H/W Monitor Configuration

### Verify Monitoring Requests

`/opt/resmon/bin/send_test_event` command

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help
>/StorageAreaNetwork/events/SAN_Monitor/DiskArray ... NOT MONITORING.
(Possibly there is no hardware to monitor.)

>/system/events/core_hw/core_hw ... OK.
For /system/events/core_hw/core_hw:
Events >= 1 (INFORMATION) Goto TEXTLOG; file=/var/opt/resmon/log/event.log
Events >= 3 (MAJOR WARNING) Goto SYSLOG
Events >= 3 (MAJOR WARNING) Goto EMAIL; addr=root
Events >= 4 (SERIOUS) Goto TCP; host=m2426s2k.nsr.hp.com port=55382
Events >= 1 (INFORMATION) Goto TEXTLOG; file=/var/opt/pred/emslog
Comment: Predictive Monitor Request
Events >= 3 (MAJOR WARNING) Goto EMAIL; addr=scott_kaneko@hp.com
Comment: Scott Kaneko EMS Notification

>/adapters/events/scsi123_em ... OK.
For /adapters/events/scsi123_em/52:
Events >= 4 (SERIOUS) Goto TCP; host=m2426s2k.nsr.hp.com port=55382
```

**Check all of these  
notification methods**





## EMS H/W Monitor Configuration

### Verify Monitoring Requests

`/opt/resmon/bin/send_test_event` command

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help
>/StorageAreaNetwork/events/SAN_Monitor/DiskArray ... NOT MONITORING.
(Possibly there is no hardware to monitor.)

>/system/events/core_hw/core_hw ... OK.
For /system/events/core_hw/core_hw:
Events >= 1 (INFORMATION) Goto TEXTLOG; file=/var/opt/resmon/log/event_log
Events >= 3 (MAJOR WARNING) Goto SYSLOG
Events >= 3 (MAJOR WARNING) Goto EMAIL; addr=root
Events >= 4 (SERIOUS) Goto TCP; host=m2426s2k.nsr.hp.com port=55382
Events >= 1 (INFORMATION) Goto TEXTLOG; file=/var/opt/pred/emslog
Comment: Predictive Monitor Request
Events >= 3 (MAJOR WARNING) Goto EMAIL; addr=scott_kaneko@hp.com
Comment: Scott Kaneko EMS Notification

>/adapters/events/scsi123_em ... OK.
For /adapters/events/scsi123_em/52:
Events >= 4 (SERIOUS) Goto TCP; host=m2426s2k.nsr.hp.com port=55382
```



*Only notifications of serverity  
one were successful -  
all others failed*

# EMS H/W Monitor Configuration

## Verify Monitoring Requests

/opt/resmon/bin/send\_test\_event command

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help
# pwd
/var/stm/config/tools/monitor
# vi default_dm_core_hw.clcfg
```

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help
# -----
EQ:100 :INFORMATION :TRUE :NOT_USED :ANY :1 :NONE :NO_OP:NO_OP:NONE
EQ:101 :CRITICAL :TRUE :NOT_USED :ANY :1 :NONE :NO_OP:NO_OP:NONE
EQ:103 :INFORMATION :TRUE :NOT_USED :ANY :1 :NONE :NO_OP:NO_OP:NONE
#
```

Change To

```
Telnet - m2426s2k.nsr.hp.com
Connect Edit Terminal Help
# -----
EQ:100 :INFORMATION :TRUE :NOT_USED :ANY :1 :NONE :NO_OP:NO_OP:NONE
EQ:101 :CRITICAL :TRUE :NOT_USED :ANY :1 :NONE :NO_OP:NO_OP:NONE
EQ:103 :CRITICAL :TRUE :NOT_USED :ANY :1 :NONE :NO_OP:NO_OP:NONE
#
```

## EMS H/W Monitor Configuration

### Verify Monitoring Requests

`/opt/resmon/bin/send_test_event` command

```
x hpterm (m2426s2k.nsr.hp.com via TELNET)
# send_test_event -av dm_core_hw

Finding resource name associated with monitor dm_core_hw.

Found resource name /system/events/core_hw
associated with monitor dm_core_hw.

Creating test file /var/stm/config/tools/monitor/dm_core_hw.test
for monitor dm_core_hw.

Making test file /var/stm/config/tools/monitor/dm_core_hw.test
for monitor dm_core_hw
indicate send test event for all resources.

Performing resls on resource name /system/events/core_hw
for monitor dm_core_hw to cause generation of test event.
Contacting Registrar on m2426s2k.nsr.hp.com

NAME: /system/events/core_hw
DESCRIPTION: Core Hardware Monitor

This resource monitors events for system core hardware, including the processor a
d memory buses. Event monitoring requests are created using the Monitoring Reque
t Manager (monconfig(1m)). Monitoring requests to detect changes in core hardwar
status are created using the Peripheral Status Monitor (psmmon(1m)) and Event Mo
itoring Service (EMS).

For more information see the monitor man page, dm_core_hw(1m).
TYPE: /system/events/core_hw is a Resource Class.

There is one resource configured below /system/events/core_hw:
Resource Class
/system/events/core_hw/core_hw
#
```

**Verify  
Modification  
Again**

# EMS H/W Monitor Configuration

## Verify Monitoring Requests

`/opt/resmon/bin/send_test_event` command

```
x hpterm (m2426s2k.nsr.hp.com via TELNET)
m2426s2k.nsr.hp.com sent Event Monitor notification information:

/system/events/core_hw/core_hw is >= 3.
Its current value is CRITICAL(5).

Event data from monitor:

Event Time.....: Tue Mar  5 11:24:27 2002
Severity.....: CRITICAL
Monitor.....: dm_core_hw
Event #.....: 103
System.....: m2426s2k.nsr.hp.com

Summary:
  Test event

Description of Error:

  This is a test message from the monitor to test the communication path
  from the monitor to the notification mechanism.

MORE (you've seen 38%):
```

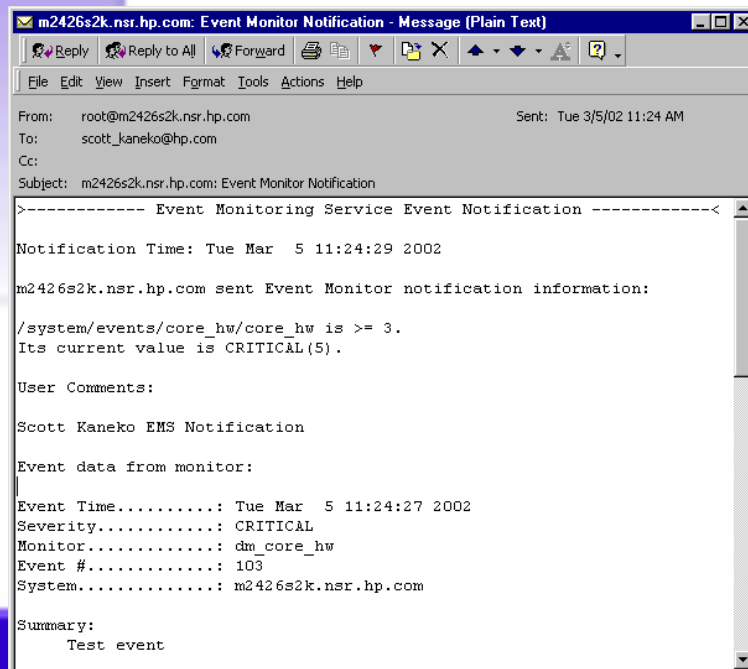
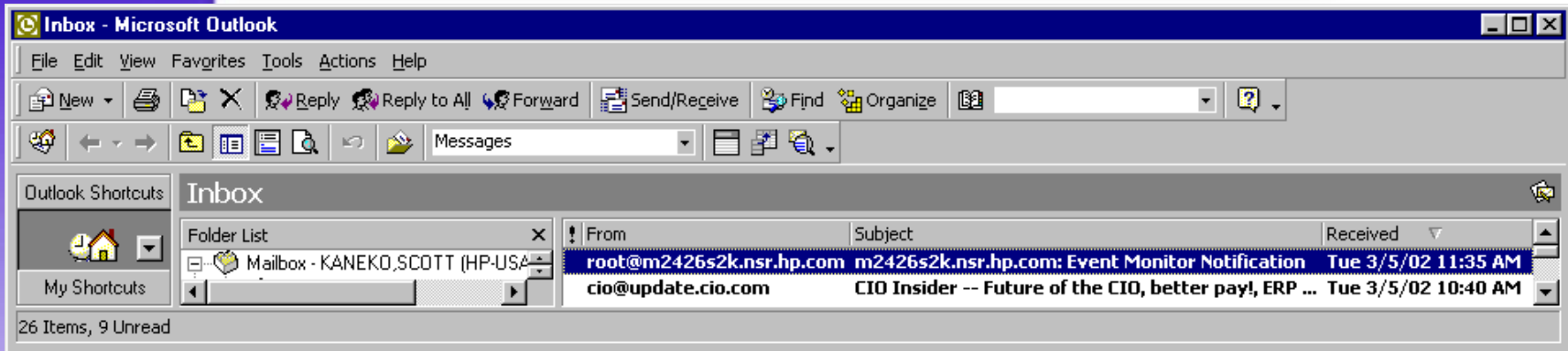
Next Page	Next Msg	Prev Msg	hpterm (m242	Reply to Msg	Delete Msg	Send Msg	Return to ELM
-----------	----------	----------	--------------	--------------	------------	----------	---------------

**Email To Root Account Was Successful**

# EMS H/W Monitor Configuration

## Verify Monitoring Requests

/opt/resmon/bin/send\_test\_event command



**Email To  
scott\_kaneko@hp.com  
Was Successful**

## EMS Configuration Files

- **Global Specific file**  
`/var/stm/config/tools/monitor/Global.cfg`
- **Monitor Specific files**  
`/var/stm/config/tools/monitor/monitor_name.cfg`
- **Monitor Start Up Specific files**  
`/var/stm/config/tools/monitor/monitor_name.sapcfg`

## EMS Configuration Files Upcoming Revision & Other Notes

- **All values in the `global.cfg` and `monitor_name.cfg` files will be moving into the new configuration file: `monitor_name.clcfg`**
- **Changes to a monitor-specific configuration file are invoked at the next polling interval or when an event occurs, whichever comes first.**

## EMS Configuration Files

### Operating Parameters: Polling Interval

- **Frequency to which monitor polls HW for status**
- **Select a value which provides current device status without seriously impacting system performance**
- **Default in Global.cfg :**  
**POLL\_INTERVAL 60 # in minutes (one hour)**
- **Timed from when monitor was enabled**
- **This is the only parameter that will not be overwritten by the .clcfg files**



## EMS Configuration Files

### Operating Parameters: Repeat Frequency

- **How often the same event should be reported**
- **Prevents system from being overburdened with continuous streams of messages**
- **Default in Global.cfg :**  
**REPEAT\_FREQUENCY 1440 # in minutes (one day)**
- **This is overwritten by the suppression\_time parameter in the .clcfg files**

## EMS Configuration Files

### Operating Parameters: Severity Actions

- **Determines whether events of a particular severity are reported or ignored**
- **Defaults in Global.cfg:**

```
SEVERITY_ACTION CRITICAL          NOTIFY
SEVERITY_ACTION SERIOUS           NOTIFY
SEVERITY_ACTION MAJOR_WARNING     NOTIFY
SEVERITY_ACTION MINOR_WARNING     NOTIFY
SEVERITY_ACTION INFORMATION       NOTIFY
```

- **This is overwritten by the enable\_flag in the .clcfg files**

## EMS Configuration Files

### Operating Parameters: Events

- Identifies events handled by the monitor
- Defines severity level
- Action monitor will take when event occurs

- **Format:**

<b>config--verb</b>	<b>event no.</b>	<b>severity</b>	<b>action</b>
<b>DEFINE_EVENT</b>	<b>10001</b>	<b>CRITICAL</b>	<b>DEFAULT</b>

- **This is overwritten by the severity and enable\_flag fields in the .clcfg files**

## EMS Startup Configuration File Operating Parameters: Events

- **Used To Customize Monitor Requests**
- **Hardware Monitoring Request Manager ([monconfig](#)) modifies the contents of the .sapcfg file**
- **Startup process is managed by the startup client: [startcfg\\_client](#)**