EMS and Predictive Support

Scott Kaneko
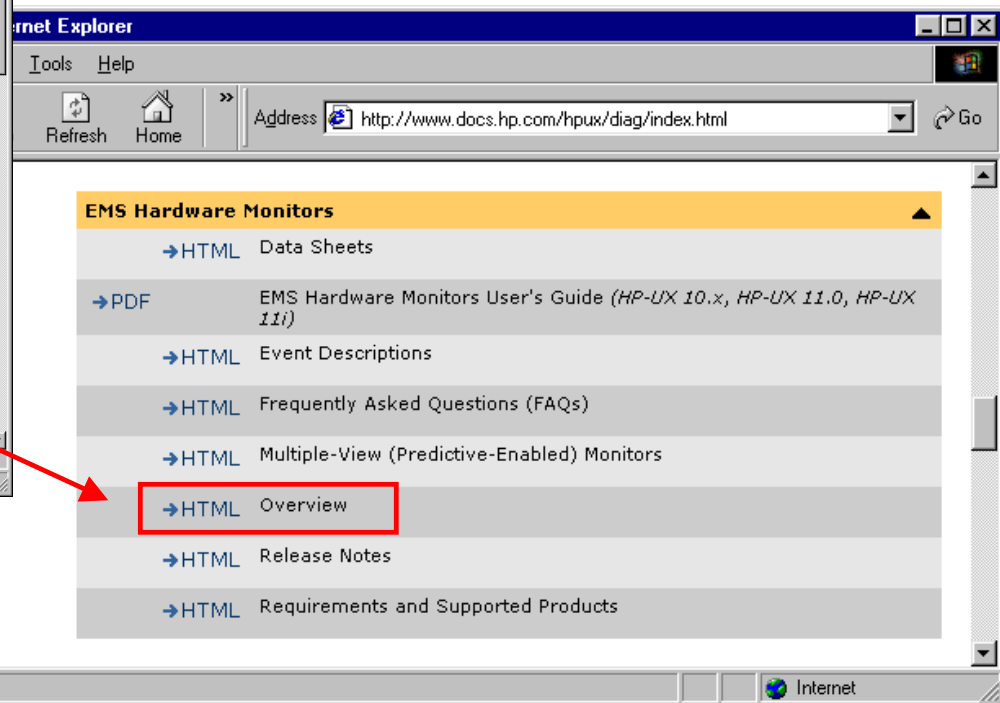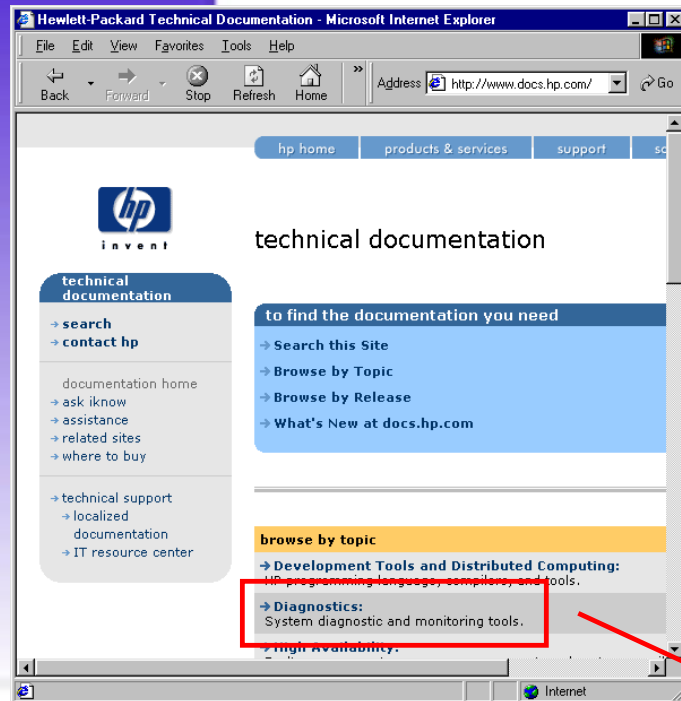
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InterWorks 2002

THE HP TECHNICAL TRAINING CONFERENCE

EMS Overview

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

# EMS Overview

EMS Overview

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

Hardware Resource ⟷ **EMS Hardware Monitor** → **Event Monitoring Service** → **Event Notification**

→ **Status to MCSG**

Peripheral Status Monitor
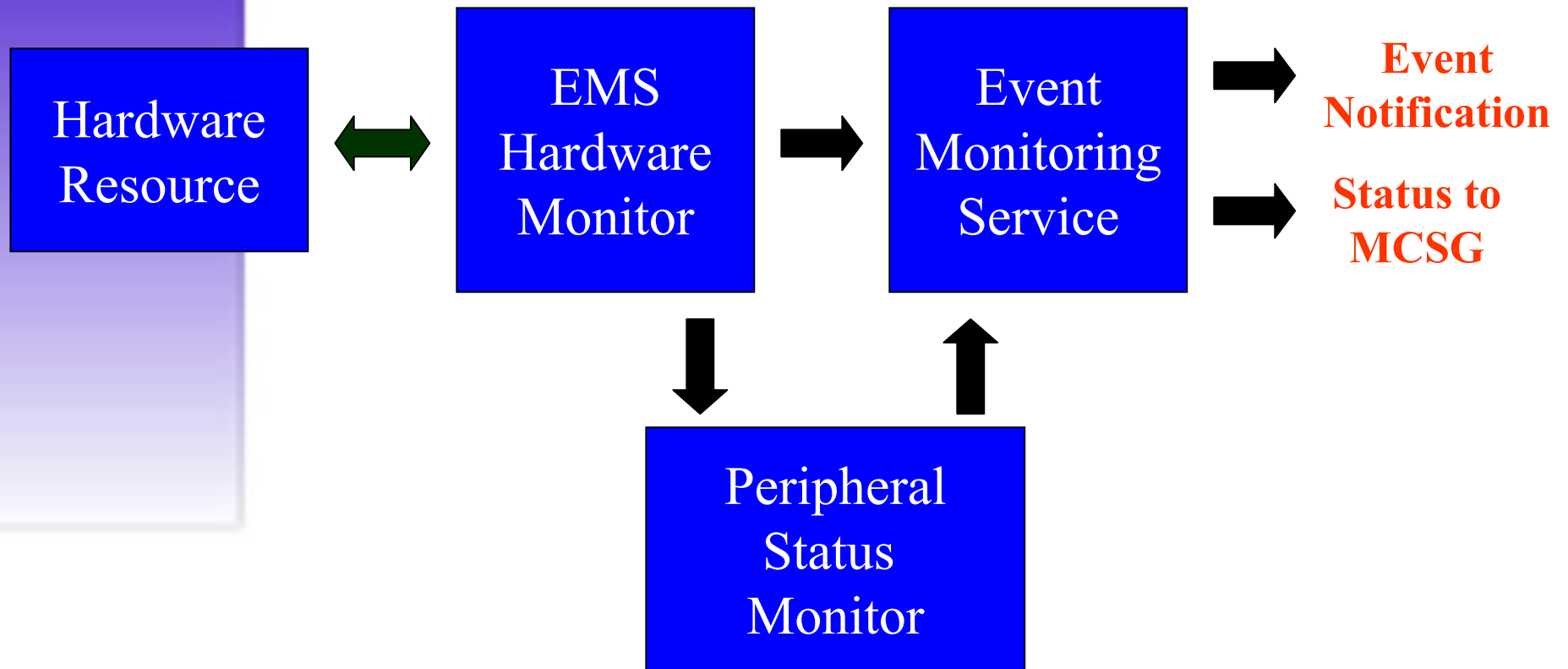
EMS STM Integration
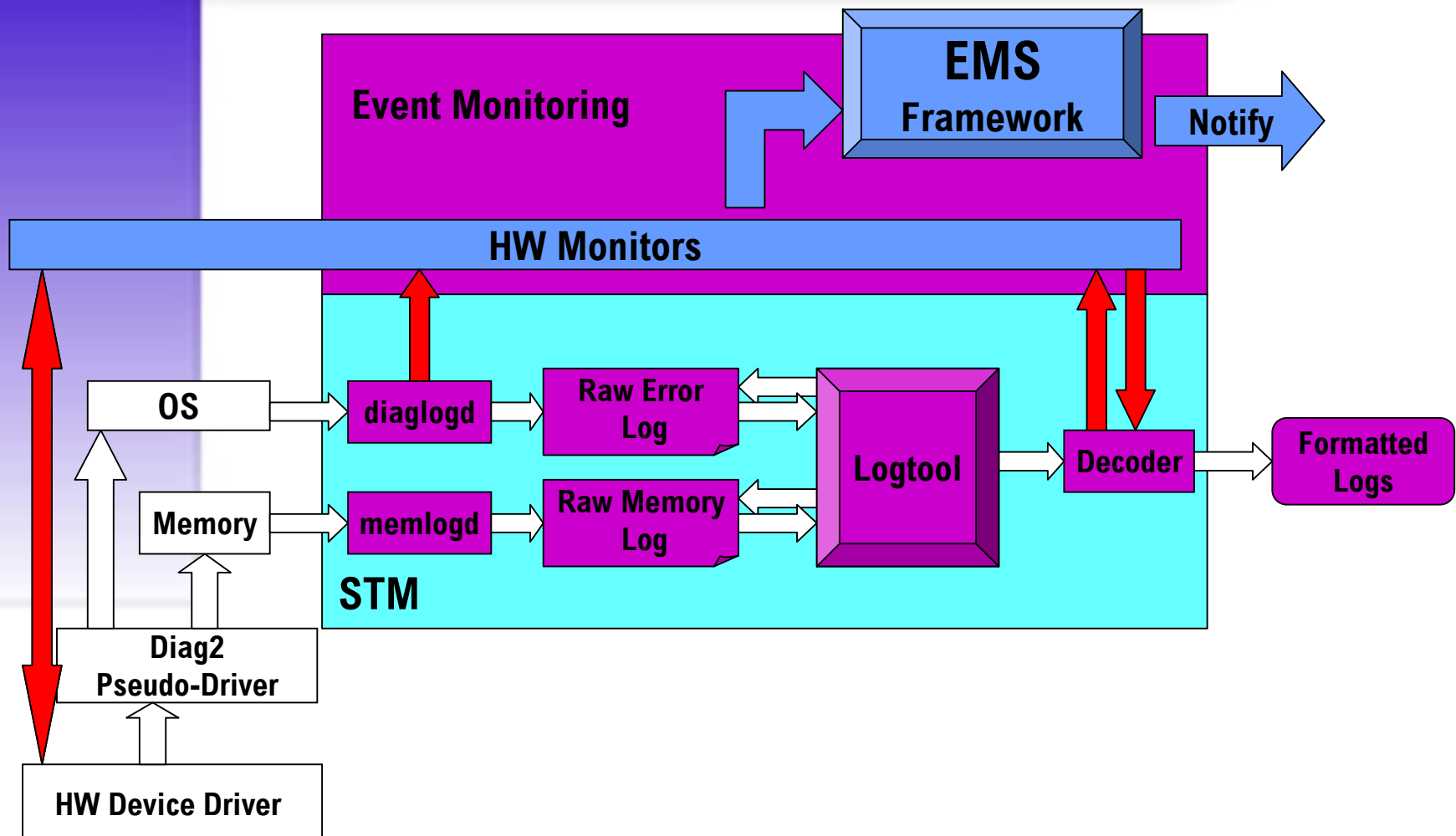
EMS Event Message
Standard Information

- **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

Window 1 (Untitled - Notepad):

```
>------------ 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 : 0x003c8e5cdd00000000    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.
```

Window 2 (Untitled - Notepad):

```
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   D E T A I L S   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
    SCSI LUN..........: 0x00

I/O Log Event Information:
```

Window 3 (Untitled - Notepad):

```
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
```
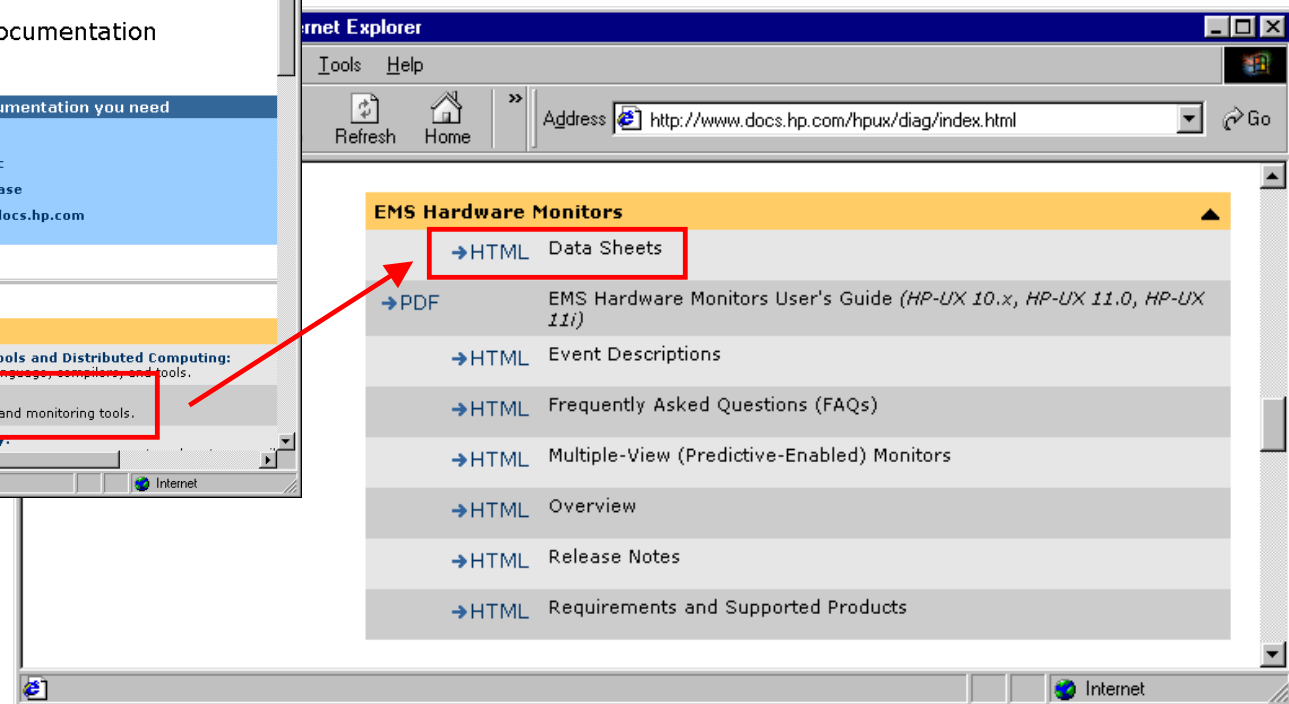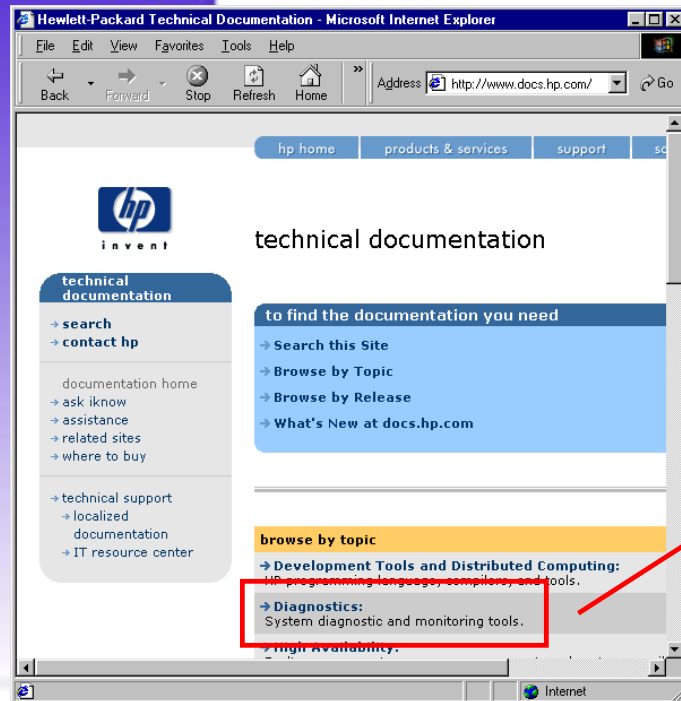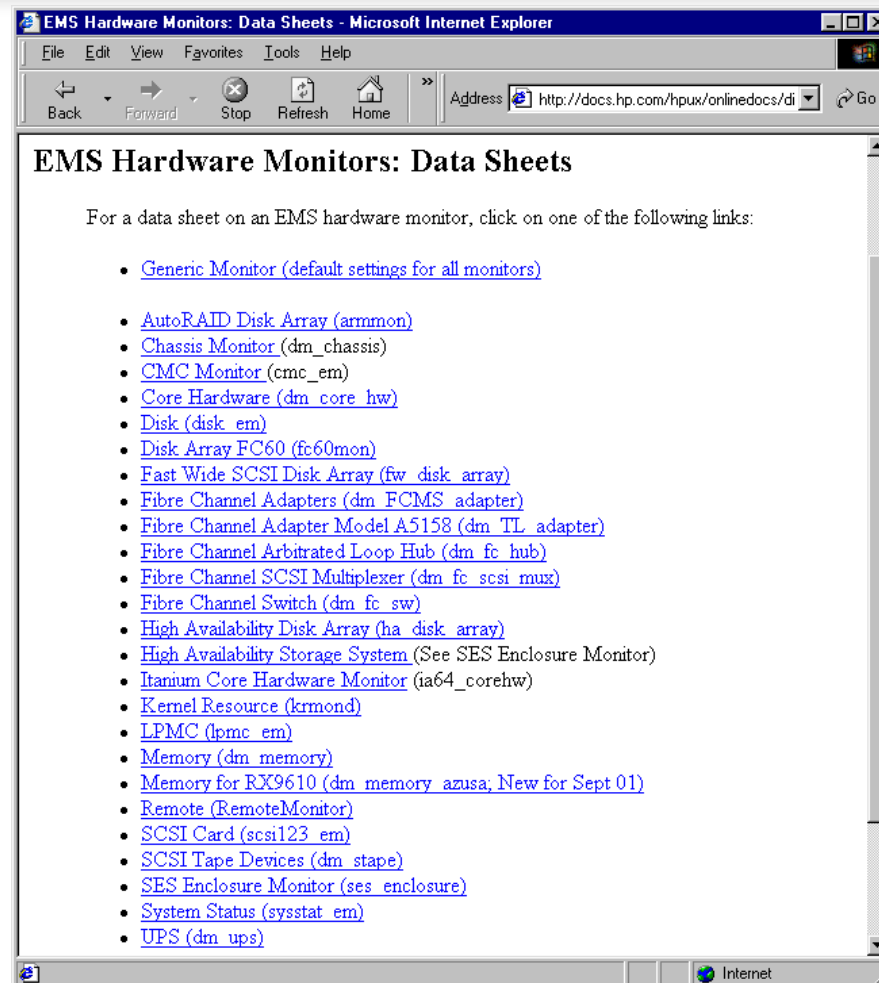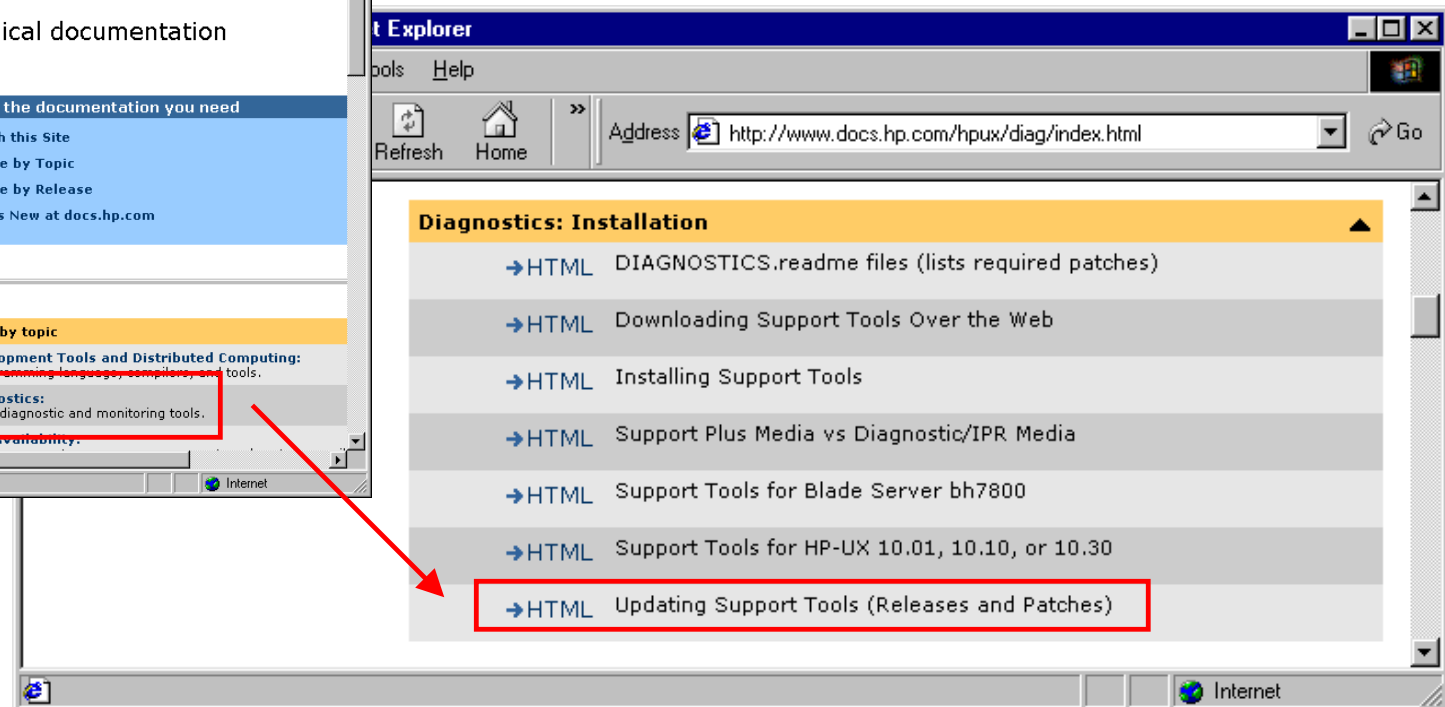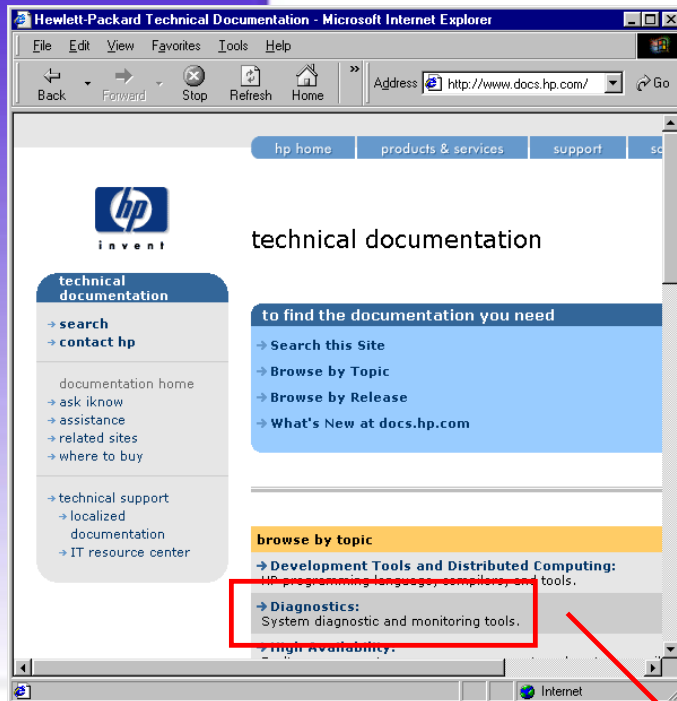
EMS Hardware Monitor
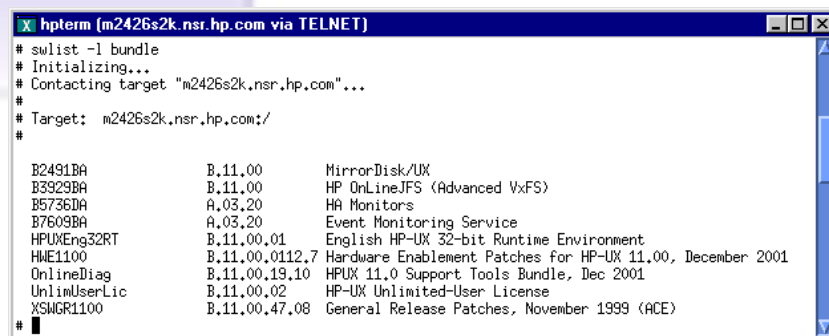# Data Sheets

EMS Hardware Monitor
Data Sheets

EMS Hardware Monitors: Data Sheets - Microsoft Internet Explorer

File   Edit   View   Favorites   Tools   Help

Back   Forward   Stop   Refresh   Home   Address http://docs.hp.com/hpux/onlinedocs/di   Go

EMS Hardware Monitors: Data Sheets

For a data sheet on an EMS hardware monitor, click on one of the following links:

- Generic Monitor (default settings for all monitors)

- AutoRAID Disk Array (armmon)
- Chassis Monitor (dm_chassis)
- CMC Monitor (cmc_em)
- Core Hardware (dm_core_hw)
- Disk (disk_em)
- Disk Array FC60 (fc60mon)
- Fast Wide SCSI Disk Array (fw_disk_array)
- Fibre Channel Adapters (dm_FCMS_adapter)
- Fibre Channel Adapter Model A5158 (dm_TL_adapter)
- Fibre Channel Arbitrated Loop Hub (dm_fc_hub)
- Fibre Channel SCSI Multiplexer (dm_fc_scsi_mux)
- Fibre Channel Switch (dm_fc_sw)
- High Availability Disk Array (ha_disk_array)
- High Availability Storage System (See SES Enclosure Monitor)
- Itanium Core Hardware Monitor (ia64_corehw)
- Kernel Resource (krmond)
- LPMC (lpmc_em)
- Memory (dm_memory)
- Memory for RX9610 (dm_memory_azusa; New for Sept 01)
- Remote (RemoteMonitor)
- SCSI Card (scsi123_em)
- SCSI Tape Devices (dm_stape)
- SES Enclosure Monitor (ses_enclosure)
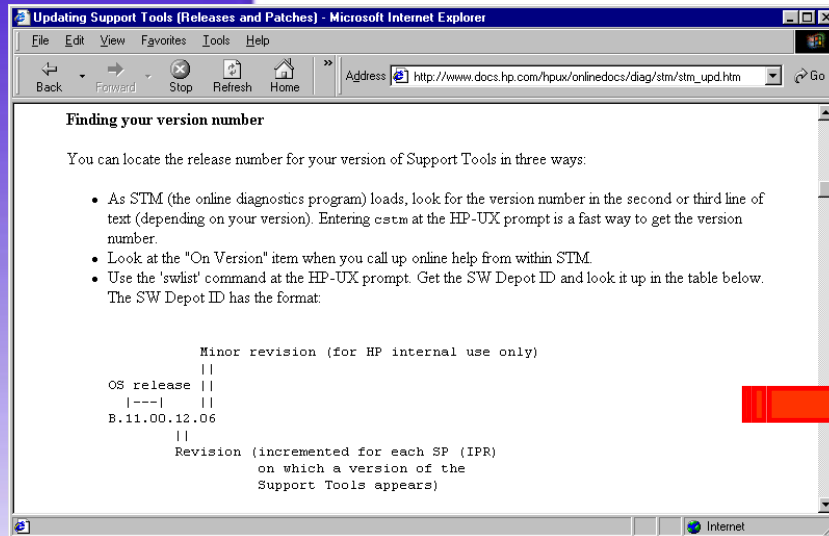- System Status (sysstat_em)
- UPS (dm_ups)

Internet

http://docs.hp.com/hpux/onlinedocs/diag/ems/emd_summ.htm

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EMS Hardware Monitor
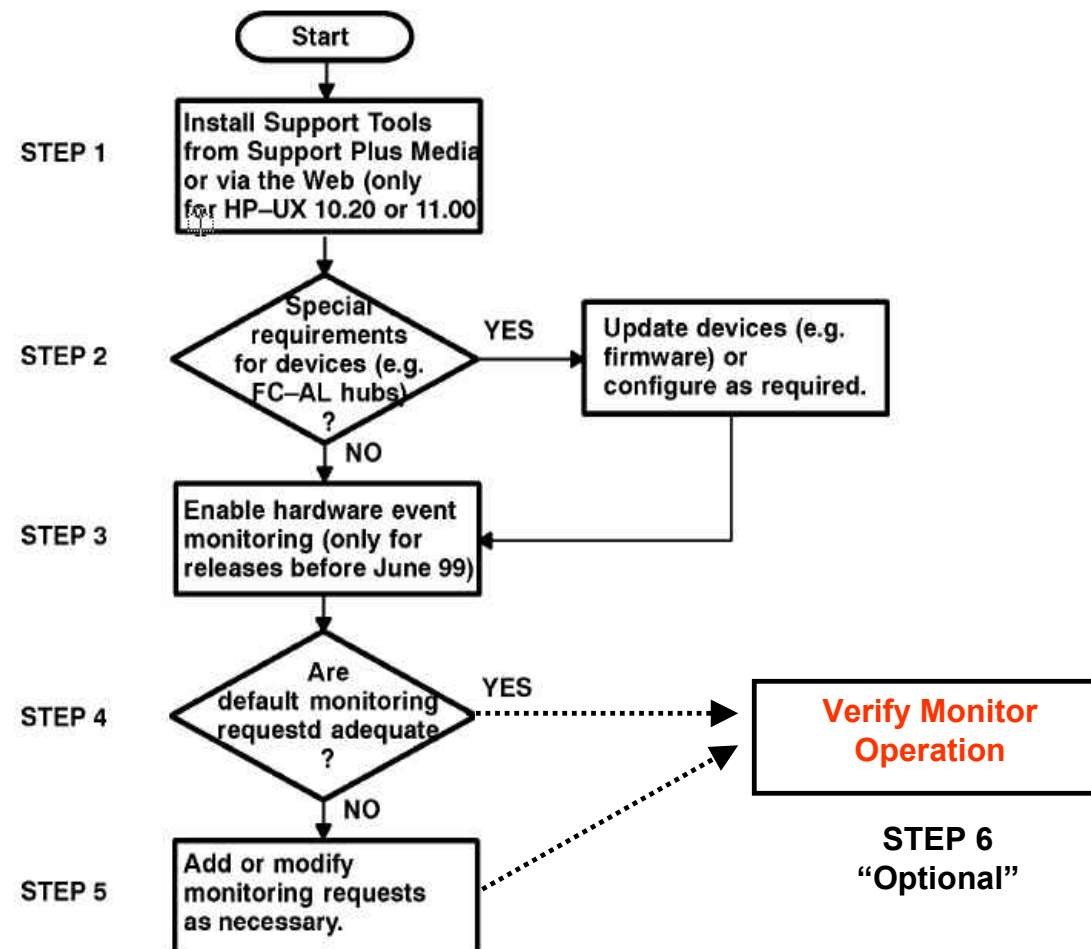# Version Number Information

EMS Hardware Monitor
Version Number Information

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**

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EMS Configuration Steps

Start

STEP 1 — Install Support Tools from Support Plus Media or via the Web (only for HP–UX 10.20 or 11.00)

STEP 2 — Special requirements for devices (e.g. FC–AL hubs)? — YES → Update devices (e.g. firmware) or configure as required. — NO ↓

STEP 3 — Enable hardware event monitoring (only for releases before June 99)

STEP 4 — Are default monitoring requestd adequate? — YES → **Verify Monitor Operation** — NO ↓

STEP 5 — Add or modify monitoring requests as necessary.

STEP 6 "Optional"

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 █
```

```
X 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)
```
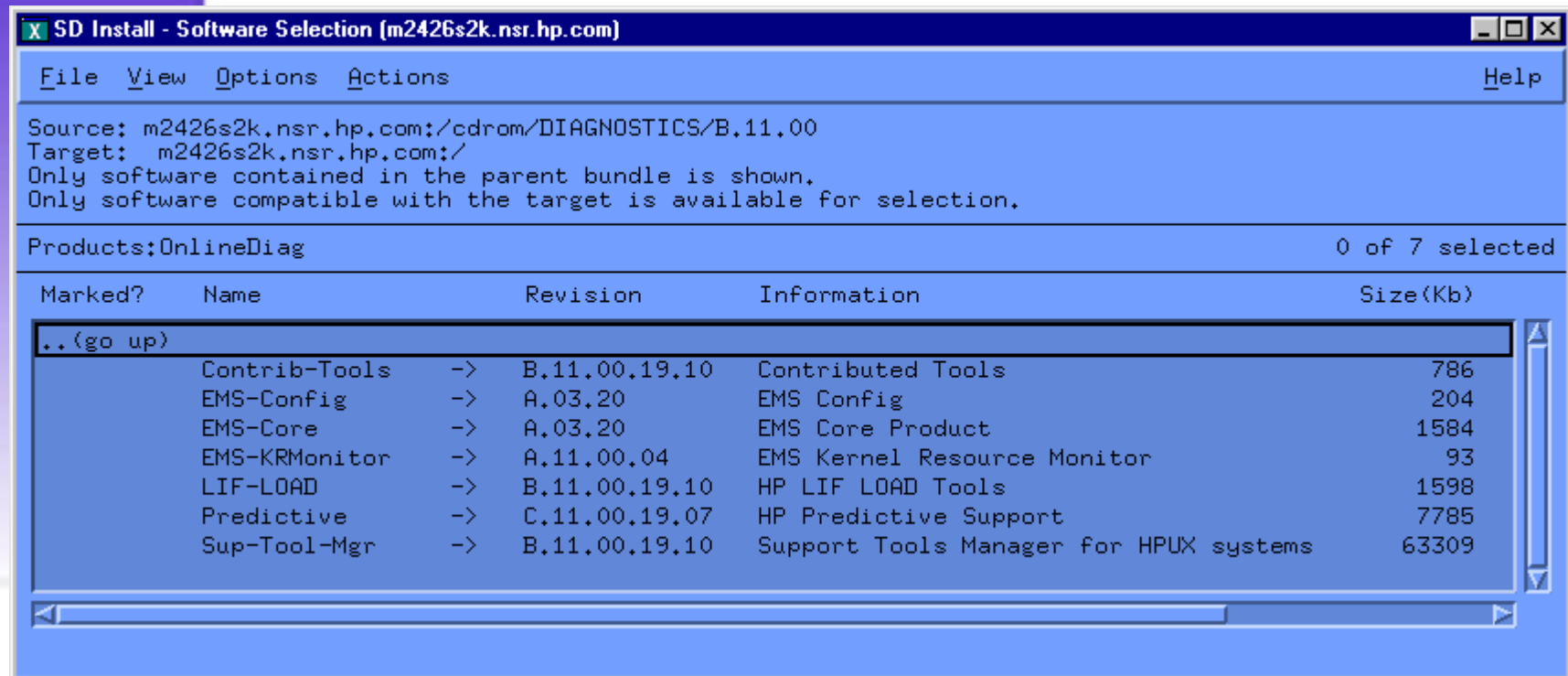
EMS H/W Monitor Install

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%):
```
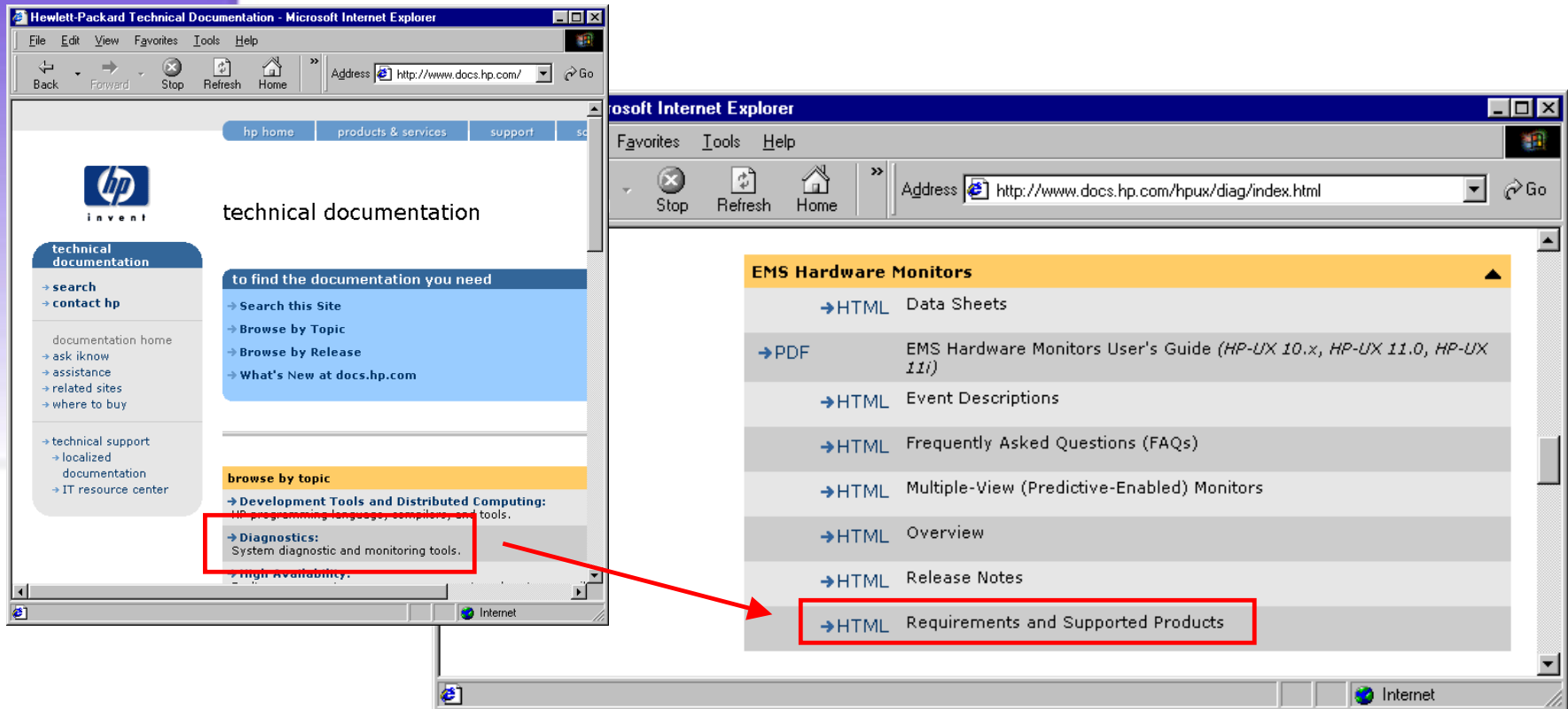
EMS H/W Monitor Configuration

- **Examine the list of supported products for special requirements**

EMS H/W Monitor Configuration

Displays the Fibre Channel Arbitrated Loop Hub Monitor Data Sheet

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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

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

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
```
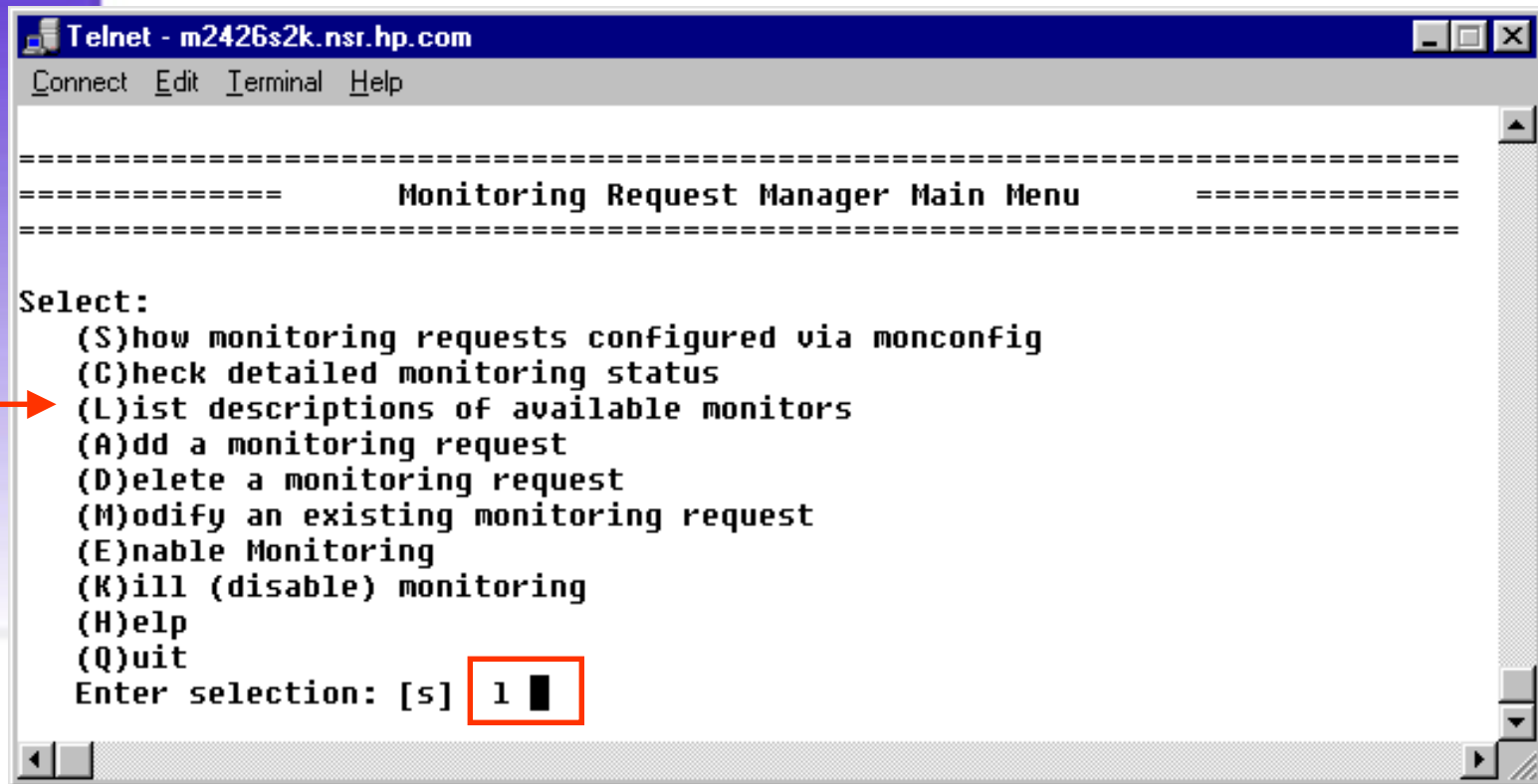
EMS H/W Monitor Configuration
List Monitor Descriptions

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]  l █
```

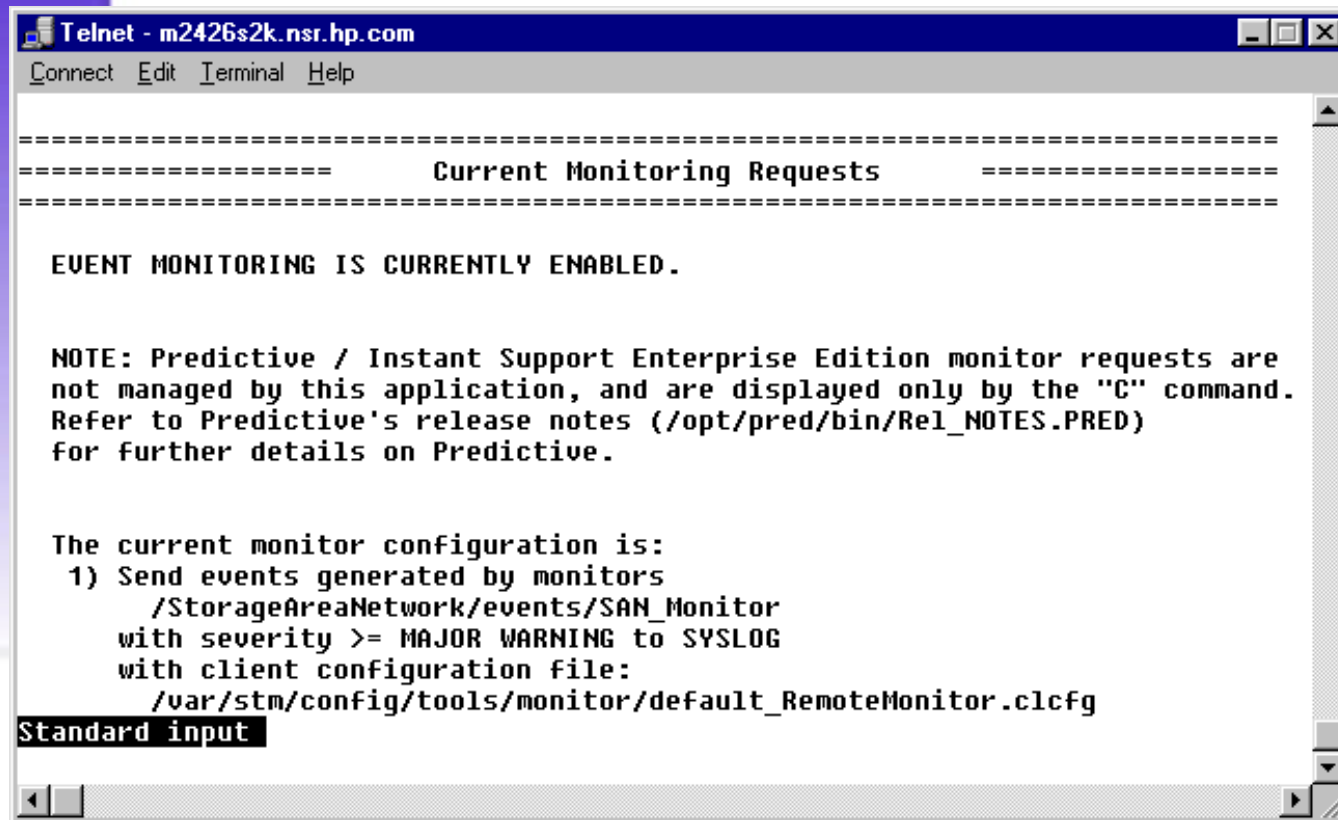# EMS H/W Monitor Configuration
List Monitor Descriptions

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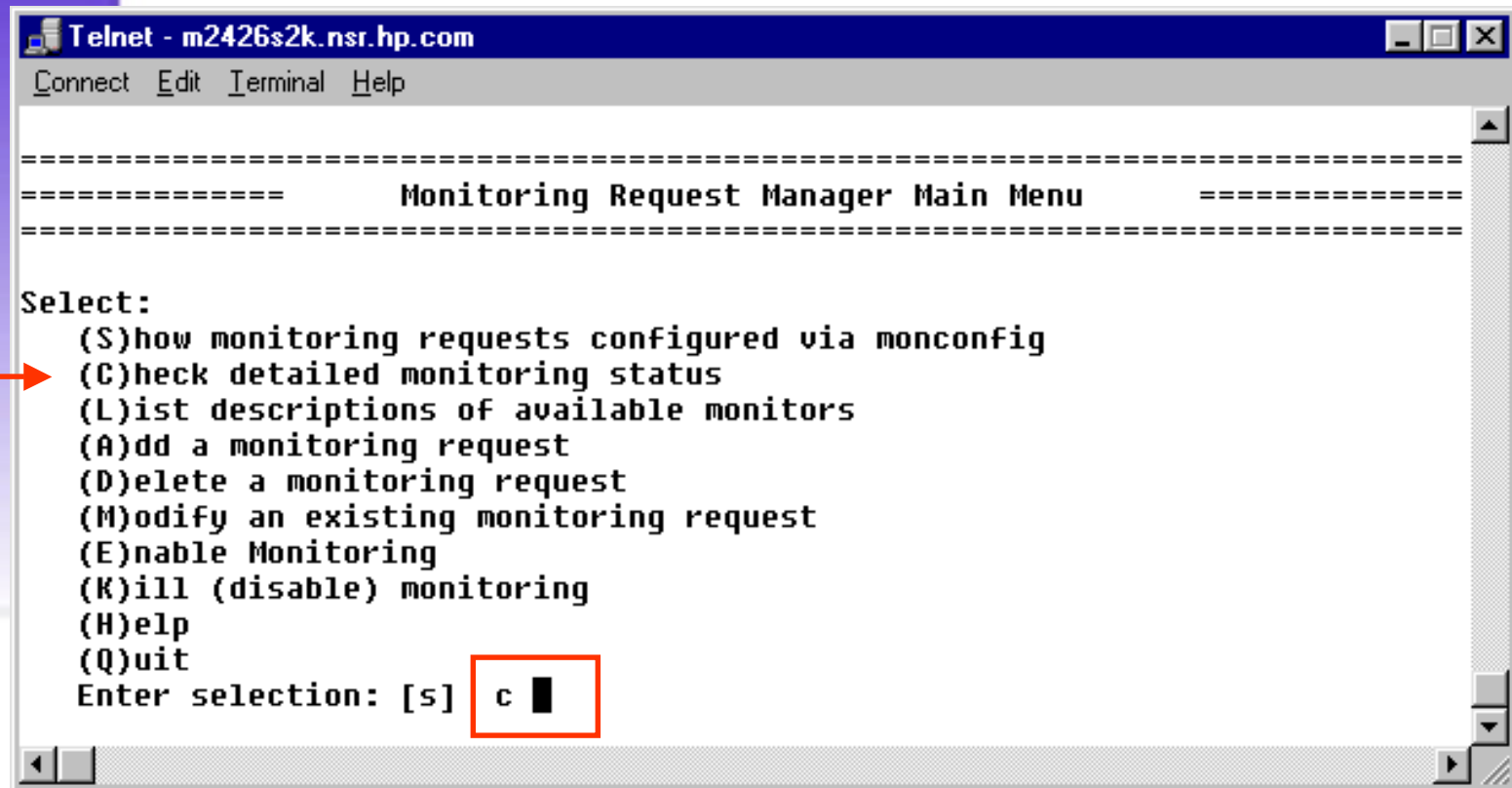
```
/etc/opt/resmon/EMS/dm_core_hw.sapcfg
                    Startup configuration file containing entries for
                    all dm_core_hw monitoring requests.
```

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

/var/stm/config/tools/monitor

EMS H/W Monitor Configuration
Check Monitoring Requests

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
```
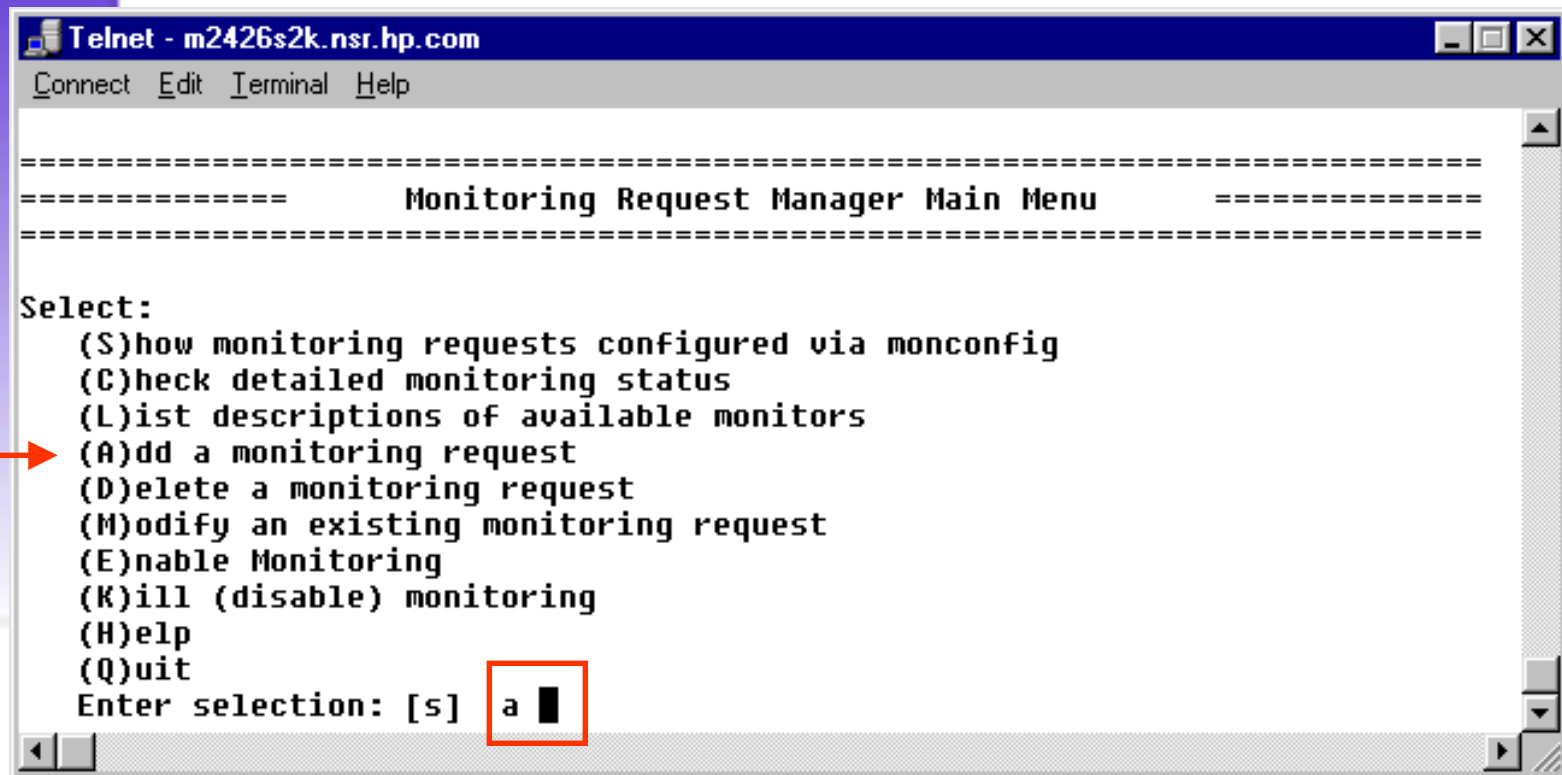
EMS H/W Monitor Configuration
Add Monitoring Requests

```
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 ▮
```

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.**

- **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.

- **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	**/var/adm/syslog/syslog.log**	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 **or** **/var/opt/resmon/logevent.log**	System Administrator reads text log
Write to Predictive log	**/var/opt/pred/emslog**	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. ▮
```
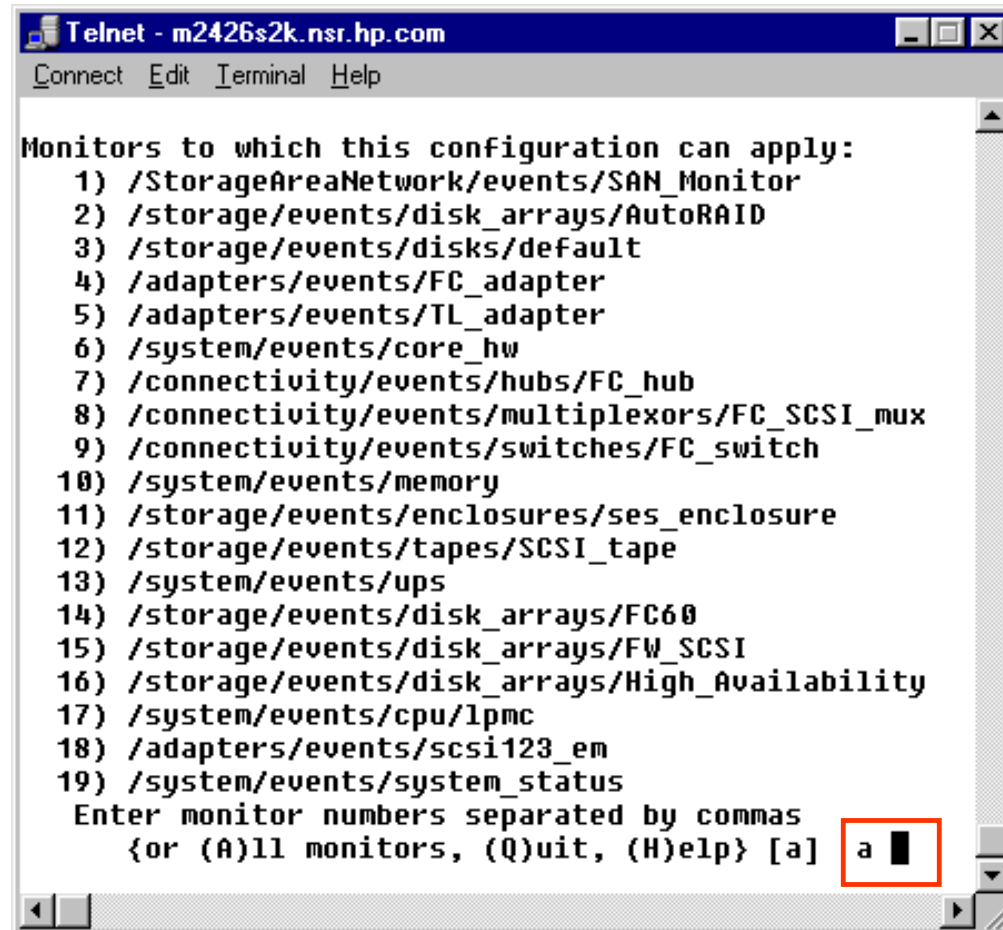
```
X hpterm (m2426s2k.nsr.hp.com via TELNET)                    _ □ ✕
Please answer the following questions to specify a monitoring request.

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

```
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 █
```

OPC option only available on systems with OpenView installed

```
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.
```

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EMS H/W Monitor Configuration
Add Monitoring Request

Check Modification

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

```
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
```

```
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
```

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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 mo
        use this mechanism to test th
        the caller must ensure that i
        the appropriate monitoring re
        via the monconfig (Check moni
        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
#
```

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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

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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=
```

Check all of these
notification methods

EMS H/W Monitor Configuration
Verify Monitoring Requests
/opt/resmon/bin/send_test_event command

```
X hpterm (m2426s2k.nsr.hp.com via TELNET)                    _ □ ×
# more /var/opt/resmon/log/event.log ▮
```

```
X hpterm (m2426s2k.nsr.hp.com via TELNET)                    _ □ ×
>----------- Event Monitoring Service Event Notification -----------<

Notification Time: Tue Mar  5 10:56:34 2002

m2426s2k.nsr.hp.com sent Event Monitor notification information:

/system/events/core_hw/core_hw is >= 1.
Its current value is INFORMATION(1).


Event data from monitor:

Event Time..........: Tue Mar  5 10:56:34 2002
Severity............: INFORMATION
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.

Probable Cause / Recommended Action:

      No action required.

Additional Event Data:
      System IP Address...: 15.17.39.116
      Event Id............: 0x3c8514e200000000
      Monitor Version.....: B.01.00
      Event Class.........: System
      Client Configuration File...........:
      /var/stm/config/tools/monitor/default_dm_core_hw.clcfg
      Client Configuration File Version...: A.01.00
          Qualification criteria met.
          Number of events..: 1
event.log (64%)▮
```

```
X hpterm (m2426s2k.nsr.hp.com via TELNET)                    _ □ ×
      Associated OS error log entry id(s):
          None
      Additional System Data:
          System Model Number.............: 9000/887
          OS Version......................: B.11.00
          STM Version.....................: A.29.00
          EMS Version.....................: A.03.20
      Latest information on this event:
          http://docs.hp.com/hpux/content/hardware/ems/dm_core_hw.htm#103

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




>---------- End Event Monitoring Service Event Notification ----------<
# ▮
```

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

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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
# █
```
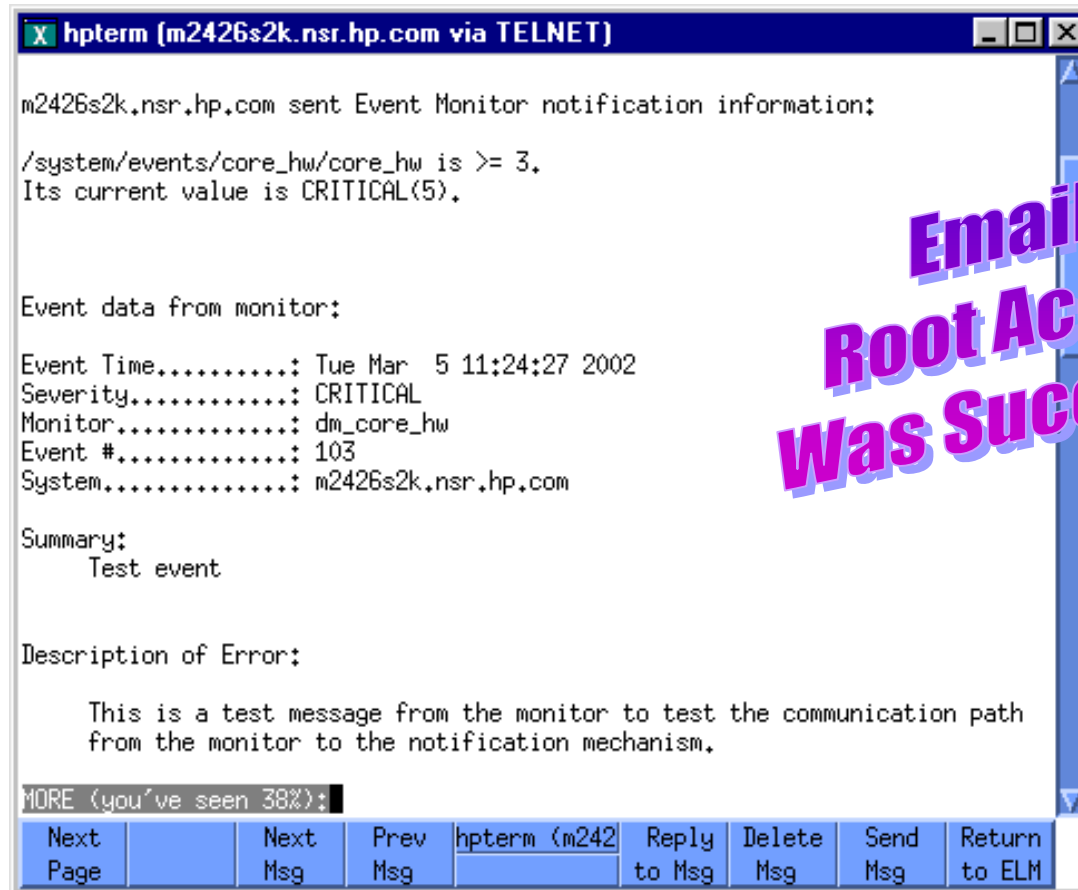
Verify
Modification
Again

```
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%):
```
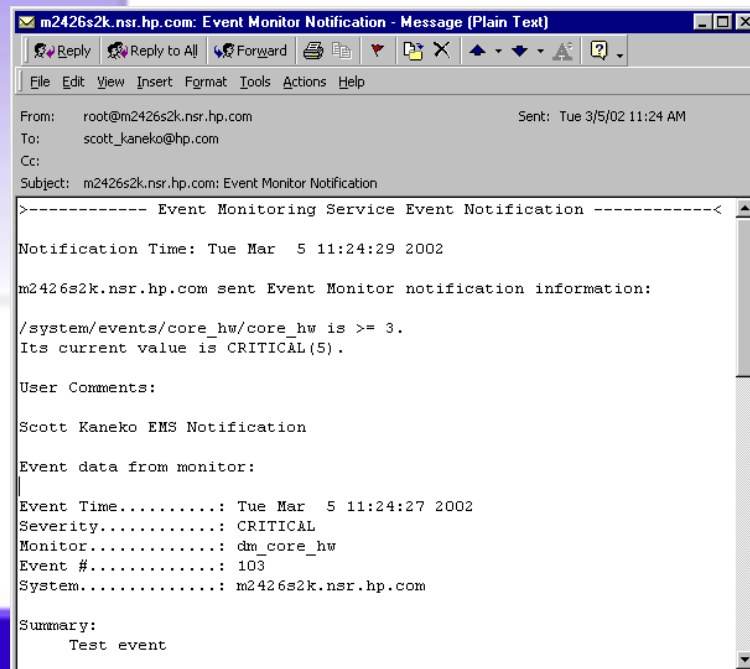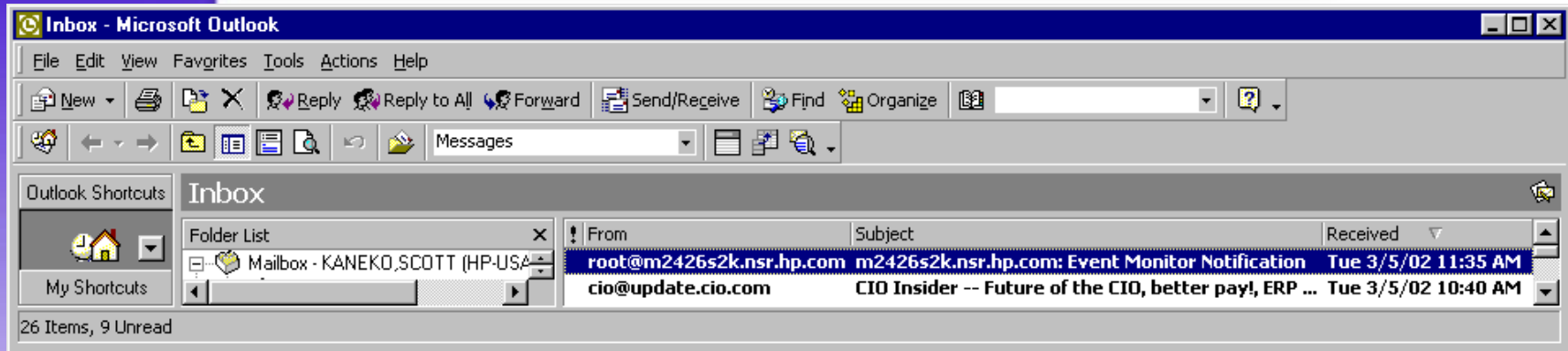
| Next Page | | Next Msg | Prev Msg | hpterm (m242 | Reply to Msg | Delete Msg | Send Msg | Return to ELM |

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

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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.**

- **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**

- **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**

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EMS Configuration Files
Operating Parameters: Events

- **Identifies events handled by the monitor**

- **Defines severity level**

- **Action monitor will take when event occurs**

- **Format:**
  config--verb   event no.   severity   action
  DEFINE_EVENT   10001   CRITICAL   DEFAULT

- **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**