connect OpenVMS Bootcamp 2011

Understanding and maintaining the Integrity Console

Presented by

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http://www.parsec.com/public/Integrity_console.pdf

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Outline

- Introduction
- Console overview
- EFI
- BMC
- MP
- iLo
- Booting
- Updating Firmware
- Backing up the system board configuration

Introduction

- The RX2600 will serve as our example
  - One of many I64 Integrity servers supported by OpenVMS version 8.3
- The Integrity console consists of three components
  - Extensible Firmware Interface (EFI)
  - Maintenance Processor (MP)
  - Baseboard Management Controller (BMC)

Note: The MP is optional and does not exist on every system

Console Overview

Management Processor Card

1000Mb connection

MP Card 10/100 connection

10/100 connection

Three Headed Cable Connection

Serial Console connection

Console Overview

- There are two ways to communicate with the various components of the Integrity console:
  - Connecting to Console/Remote/UPS connector, which you will have to have the associated three headed cable (called a dongle) shown in the next slide.
  - Via a network cable plugged into the LAN 10/100 Management Card Ethernet connection.

Console Overview

Three Headed Cable (dongle)

Console Overview

- Console
- Remote
- UPS

Console Overview

USB to serial

Null Modem cable

Understanding the I64 console

- The I64 console is quite different from the Alpha console. There are a number of additional components that you have to understand before you can understand the console. The following components are part of the I64 console:
  - Extensible Firmware Interface (EFI), a standard Integrity interface
  - Baseboard Management Controller (BMC), an HP value added interface.
  - Management Processor (MP) (optional on some I64 models), an HP value added interface.

Understanding the I64 console

Feature/Function	Extensible Firmware Interface	Maintenance Processor	Baseboard Management Card
Configuration Functions	Boot environment System date/time Security passwords Processors Devices and drivers SCSI parameters Memory	Power restore policy Default configuration Diagnostics Upgrade firmware Security options Inactivity timeout User configuration Serial, LAN, and remote/modem access	Power restore policy Security options BMC password
Remote Capabilities	Yes, depending on MP or BMC connectivity	Yes	Yes, through modem or remote serial connection
Access type	Depends on MP or BMC connectivity (EFI behavior is **independent** of the connection type)	Local EIA-232 serial with terminal emulation software, remote (modem) EIA-232 serial, LAN/Telnet (also allows access through web browser)	Local EIA-232 serial only, with terminal emulation software

Extensible Firmware Interface

- The Extensible Firmware Interface (EFI) is an interface that allows you to configure the I64 firmware. Compared to Alpha, this is the closest thing to a console device. The EFI is basically a mini-OS that supports a FAT file system and it's own executables and command procedures. The EFI menu includes the following options:
  - The **EFI Shell** is a command line interface that allows you to operate the EFI commands or create and run automated scripts. The EFI shell can be used to set boot flags, show devices and other console related functions.
  - **Boot Option Maintenance Menu** allows you to select the order of the devices from which you want the firmware to attempt to boot the OS. You can also configure the system to boot from a configuration file.
  - The **System Configuration Menu** lets you view the system configuration and change or delete administrator and user passwords.

EFI Shell

- The EFI Shell is equivalent to DCI
  - Executables for the Shell have a file type of .efi
  - Command procedures have a file type of .nsh

Baseboard Management Controller

- The Baseboard Management Controller (BMC) supports the industry-standard Intelligent Platform Management Interface (IPMI) specification. This specification describes the management features that have been built into the system board. These features include:
  - Local and remote diagnostics
  - Console support
  - Configuration management
  - Hardware management
  - Troubleshooting

Baseboard Management Controller

- The BMC has a command line interface with commands that will allow you to do low level system operations such as power on and off the system. **To use BMC you must be connected to "SERIAL A" on the rear panel of the system**.
- You will be prompted for a password if it has been set up.
- To enter the BMC from the EFI, type <esc>(
  - The BMC prompt is: cli>
- To exit the BMC, type <esc>)
- The following are some of the more commonly used BMC CLI commands:

H	- Help (this text)
INFO	- Display BMC FW Revision
LOC [0,1]	- Locator LED Control
P [0,1]	- Power Control
Q	- Quit/Logout
RS [s]	- Reset System [and switch to sys console]
SE	- Read System Event Log
TOC	- Crash the system

Management processor (MP)

- Standard on rx2600-2, rx4640-8, rx7620-16, rx86-32, and Superdome
- Optional on rx1600-2, rx1620-2, and rx2620-2
  - Can be ordered – part number is A9803A
- Username and password protected
- Always on
- Can connect via
  - The serial line through a dongle cable
  - TCP/IP: telnet, web server, and ssh
- Both interfaces lead to the Extensible Firmware Interface (EFI). The EFI allows you to boot.
- Supports multiple simultaneous user access (multiple viewers but one user with control)

Management processor (MP)

- Once connected to the MP, a username and password must be entered
- To reenter the MP (from the EFI for instance) enter ctrl/b
- To erase characters, enter ctrl/h. Some terminal emulators will allow you to assign the delete key to a ctrl/h
- Exit the MP with an “x”
- The MP prompt is MP>
- **Important!** Set your terminal emulator to be 24*80 for your viewing pleasure!!

MP Example

```
MP login: Admin
MP password: ***********

       Hewlett-Packard Integrated Lights-Out HP Integrity and HP 9000

    (c) Copyright Hewlett-Packard Company 1999-2006.  All Rights Reserved.

                          MP Host Name: ia64
                             Revision E.03.30

 ************************************************************************
                         MP ACCESS IS NOT SECURE
  Default MP users are currently configured and remote access is enabled.
  Modify default users passwords or delete default users (see UC command)
                                    OR
            Disable all types of remote access (see SA command)
 ************************************************************************

MP MAIN MENU:

         CO: Console
        VFP: Virtual Front Panel
         CM: Command Menu
         CL: Console Log
         SL: Show Event Logs
         HE: Main Help Menu
          X: Exit Connection

[ia64] MP>
```

MP Virtual Front Panel Example

```
[ia64] MP> vfp
              .
        Welcome to the Virtual Front Panel (VFP).
        Use Ctrl-B to exit.

     System state                  Activity                  # of logs since boot
     ---------------               --------                  --------------------
     Boot complete                                           137


E indicates error since last boot


LEDs     | LOCATOR       | SYSTEM        | POWER
-------------------------------------------------------------------------------
         | OFF           | ON GREEN      | ON GREEN
-------------------------------------------------------------------------------
Status   |  System running normally.
-------------------------------------------------------------------------------



[ia64] MP:VFP(Use '?' to display VFP terminal info or Ctrl-B to Quit)> <^B>
```

MP Command menu Example

```
MP MAIN MENU:

         CO: Console
        VFP: Virtual Front Panel
         CM: Command Menu
         CL: Console Log
         SL: Show Event Logs
         HE: Main Help Menu
          X: Exit Connection

[ia64] MP> cm



        (Use Ctrl-B to return to MP main menu.)



[ia64] MP:CM>
```

MP Help Command Menu Example (Continued)

```
[ia64] MP:CM> help

HE
==== MP Help: Main Menu ============================================

Hardware Revision a5  Firmware Revision E.03.30 Oct 27 2006,13:43:15

Integrated Lights-Out for HP Integrity and HP 9000 - Management Processor (MP)

                        MP Help System

    Use Ctrl-B to exit MP command interface and return to the main MP menu.

    Enter a command at the help prompt:
           OVerview  : Launch the help overview
           LIst      : Show the list of MP Command Menu commands
           <COMMAND> : Enter the command name for help on individual command
           TOPics    : Show all MP Help topics and commands
           HElp      : Display this screen
           Q         : Quit help
====
MP:HE>
```

MP Help Command Menu Example (Continued)

```
MP:HE> li
li
==== MP Help: Command Menu List ============================================

BP  : Reset BMC Passwords                MS  : Modem Status
CA  : Configure asynch/serial ports      PC  : Remote Power Control
DATE: Display Date                       PG  : PaGing parameters setup
DC  : Default Configuration              PR  : Power Restore Policy Config.
DF  : Display FRU Information            PS  : Power management module Status
DI  : DIsconnect users                   RB  : Reset BMC
DNS : Configure DHCP and DNS             RS  : Reset System through RST signal
FW  : Upgrade MP firmware                SA  : Set MP Access
HE  : Display Help                       SNMP: Configure SNMP parameters
ID  : System Information                 SO  : Security Options
IT  : Modify MP inactivity timeouts      SS  : System processors Status
LC  : Configure LAN, SSH and Web ports   SYSREV: Display System firmware Revs.
LDAP: Configure Directory parameters     TC  : Reset system via INIT
LM  : License Management                 TE  : TEll- send a msg. to other users
LOC : Locator LED display                UC  : User Configuration
LS  : LAN Status                         WHO : Display connected MP users
MR  : Modem Reset                        XD  : Diagnostics and reset of MP

====
(HE for main help, enter command name, or Q to quit)
MP:HE>
```

MP Help Command Menu Example (Continued)

```
MP:HE> lc
lc

==== MP Help: Port Configuration ============================================

  LC  : LAN Configuration usage (IP address, etc.)

Command access level: MP Configuration access.

This command modifies the LAN Configuration.  Configurable parameters: DHCP
enable/disable, MP IP Address, MP host name, subnet mask, gateway, web
access port number, SSH access port number, LAN speed, and autonegotiation.

If DHCP is enabled, the IP address, subnet mask and gateway address for the
system are obtained from the DHCP server. A user cannot set the IP Address,
Subnet Mask and Gateway Address if DHCP is enabled. In order to configure
these parameters, disable DHCP and set appropriate values.

MP Host Name set in this command is displayed at the MP command
interface prompt.  Typically the DNS name for the LAN IP is entered.
This field can be programmed to any useful name or phrase.  For clarity,
it is useful to enter: "MPNAME-on-SYSTEM" as the MP Host name, so
both names show up in the prompt (limit 19 chars, no spaces allowed.)

MORE Help (Q to go back to main, enter command name, or <CR> for more):
```

MP Help Command Menu Example (Continued)

```
==== MP Help: Port Configuration ============================================

  LC  : LAN Configuration usage (Continued)

Command line usage:
  LC [ -ip <ipaddr> ] [ -subnet <subnet> ] [ -gateway <ipaddr> ]
     [ -host <text> ] [ -web <n> ] [ -link <auto|T(10baseT)> ]
     [ -ssh <n> ] [ -dhcp <e|d> ] [ -nc ]

SEE ALSO:  DNS, LS, SA  (DNS Configuration, LAN Status, Set Access)




====
(HE for main help, enter command name, or Q to quit)
MP:HE>
```

At the help prompt (MP:HE>) either a Q or a <cr> will get you back to the MP

Configuring the MP LAN

- To remotely access the MP, you must configure the MP LAN port. To configure the MP LAN port, the following steps must be taken:
  1. Log in to the MP via the serial console line
  2. Select the command menu (cm)
  3. Select the LAN configuration option (lc)
  4. Specify the appropriate network parameters
     - IP address
     - Network mask
     - Gateway address
  5. Connect a network cable to the MP LAN port
  6. Hide the Dongle somewhere (you may never use it again)

Configuring the MP LAN example

```
[sys6console] MP:CM> lc
LC
Current LAN Configuration:
     - - MAC Address                    : 0x00306e397db2
     D - DHCP Status                    : Disabled
     I - IP Address                     : 192.168.0.216
     M - MP Host Name                   : sys6console
     S - Subnet Mask                    : 255.255.255.0
     G - Gateway Address                : 192.168.0.1
     L - Link State                     : Auto Negotiate
     W - Remote Serial Console Port     : 2023
     H - SSH Access Port                : 2123
     - - IPMI / LAN Port                : 623

Enter parameter(s) to change, A to modify All, or [Q] to Quit: A <CR>
A
```

Configuring the MP LAN example

```
For each parameter, enter:
     New value, or
     <CR> to retain the current value, or
     DEFAULT to set the default value, or
     Q to Quit


IP Address:
   Current -> 192.168.0.216
              127.0.0.1 (default)
   Modifying this parameter will cause all present LAN and Web
   connections to be dropped.

Enter new value, or Q to Quit: <CR>

-> Current IP Address has been retained
```

Configuring the MP LAN example

```
Host Name:
   Current -> sys6console
              mp00306e397db2 (default)

Enter new value, or Q to Quit: sys226console
sys226console

   -> Host Name will be updated


Subnet Mask:
   Current -> 255.255.255.0 (default)
   Modifying this parameter will cause all present LAN and
   Web
   connections to be dropped.

Enter new value, or Q to Quit: <CR>

   -> Current Subnet Mask has been retained
```

Configuring the MP LAN example

```
Gateway Address:
   Current -> 192.168.0.1
              127.0.0.1 (default)

Enter new value, or Q to Quit: <CR>

   -> Current Gateway Address has been retained


Remote Serial Console Port:
   Current -> 2023 (default)
              Options: 2000 to 2400
   Modifying RSC Port number will cause all present
   connections to be dropped.

Enter new value, or Q to Quit: <CR>

   -> Current Remote Serial Console Port has been retained
```

Configuring the MP LAN example

```
SSH Console Port Number:
   Current -> 2123
              22 (default)
              Options:  22, 2000 to 2400
Enter new value, or Q to Quit: 22
22
   -> SSH Console Port Number will be updated

DHCP Status:
   Current -> D - Disabled
              E - Enabled  (default)
   Modifying this parameter will cause all present LAN and Web
   connections to be dropped.
Enter new value, or Q to Quit: D
D
   -> Current DHCP Status has been retained
```

Configuring the MP LAN example

```
Link State:
   Current -> A - Auto Negotiate (default)
              T - 10BaseT
   Modifying this parameter will cause all present LAN and
Web
   connections to be dropped.

Enter new value, or Q to Quit:


   -> Current Link State has been retained
```

Configuring the MP LAN example

```
New LAN Configuration (* modified values):
     - - MAC Address                    : 0x00306e397db2
     D - DHCP Status                    : Disabled
     I - IP Address                     : 192.168.0.216
   * M - MP Host Name                   : sys226console
     S - Subnet Mask                    : 255.255.255.0
     G - Gateway Address                : 192.168.0.1
     L - Link State                     : Auto Negotiate
     W - Remote Serial Console Port     : 2023
   * H - SSH Access Port                : 22
     - - IPMI / LAN Port                : 623

Enter Parameter(s) to revise, Y to confirm, or [Q] to Quit: Y
Y

   -> LAN Configuration has been updated.
   -> Reset MP (XD command option 'R') for configuration to
take effect.
[sys226console] MP:CM>
```

Configuring the MP LAN example

```
[sys226console] MP:CM> xd

XD

Diagnostics Menu:
Non destructive tests:
     P - Parameter checksum
     I - I2C access (get BMC Device ID record)
     L - LAN access (PING)
     M - Modem selftests
Destructive tests:
     R - Restart MP

Enter menu item or [Q] to Quit: R
R

** Invalid entry specified! **

 <CR> to continue...
```

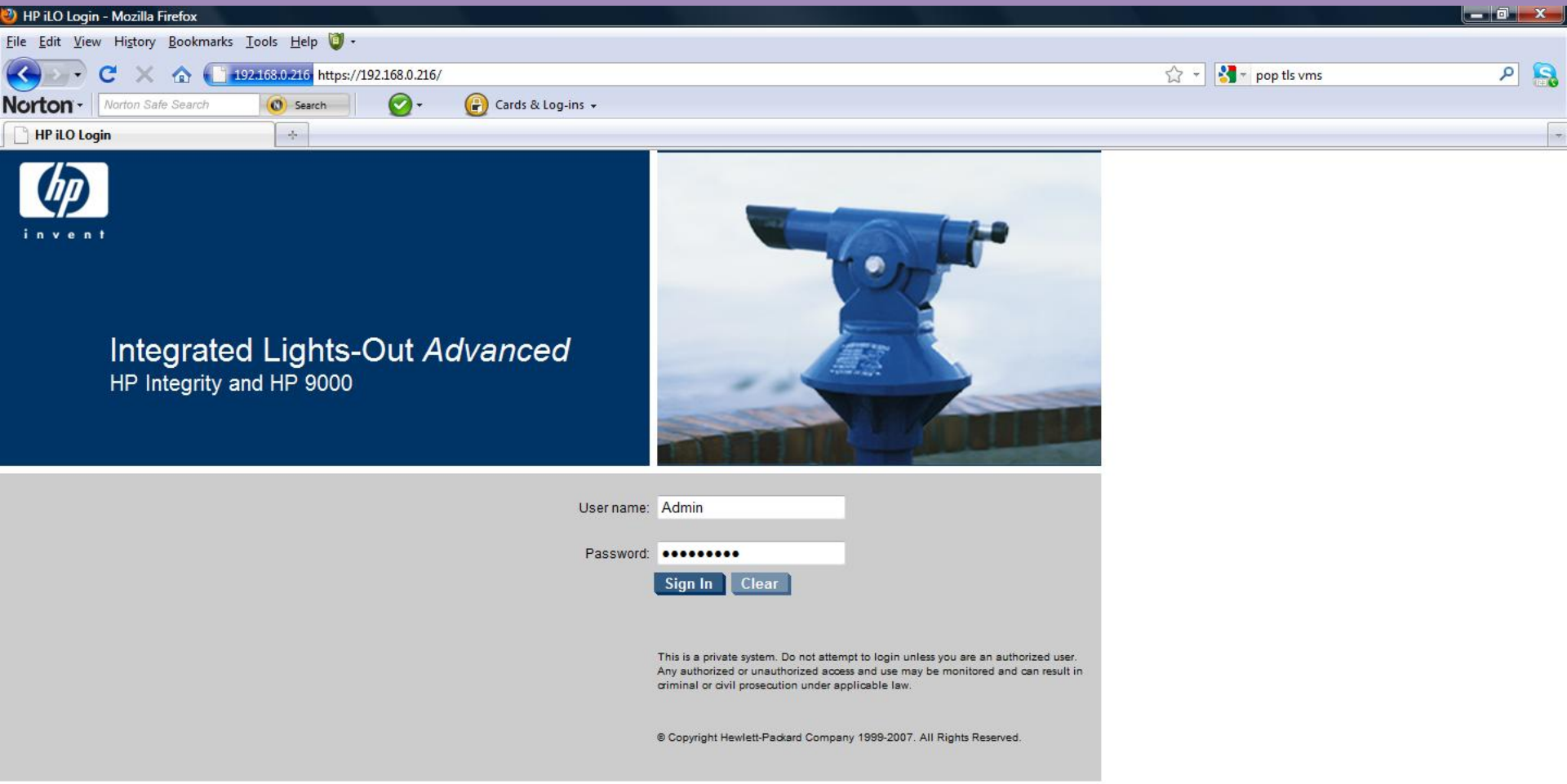
- Sometimes it is case sensitive and not even with the case shown!

Configuring the MP LAN example

```
<CR> to continue...



Diagnostics Menu:
Non destructive tests:
     P - Parameter checksum
     I - I2C access (get BMC Device ID record)
     L - LAN access (PING)
     M - Modem selftests
Destructive tests:
     R - Restart MP

Enter menu item or [Q] to Quit: r
r

   Confirm? (Y/[N]): y
y

MP is now being reset...
```

- At this point lost connectivity

Accessing the iLo WEB interface

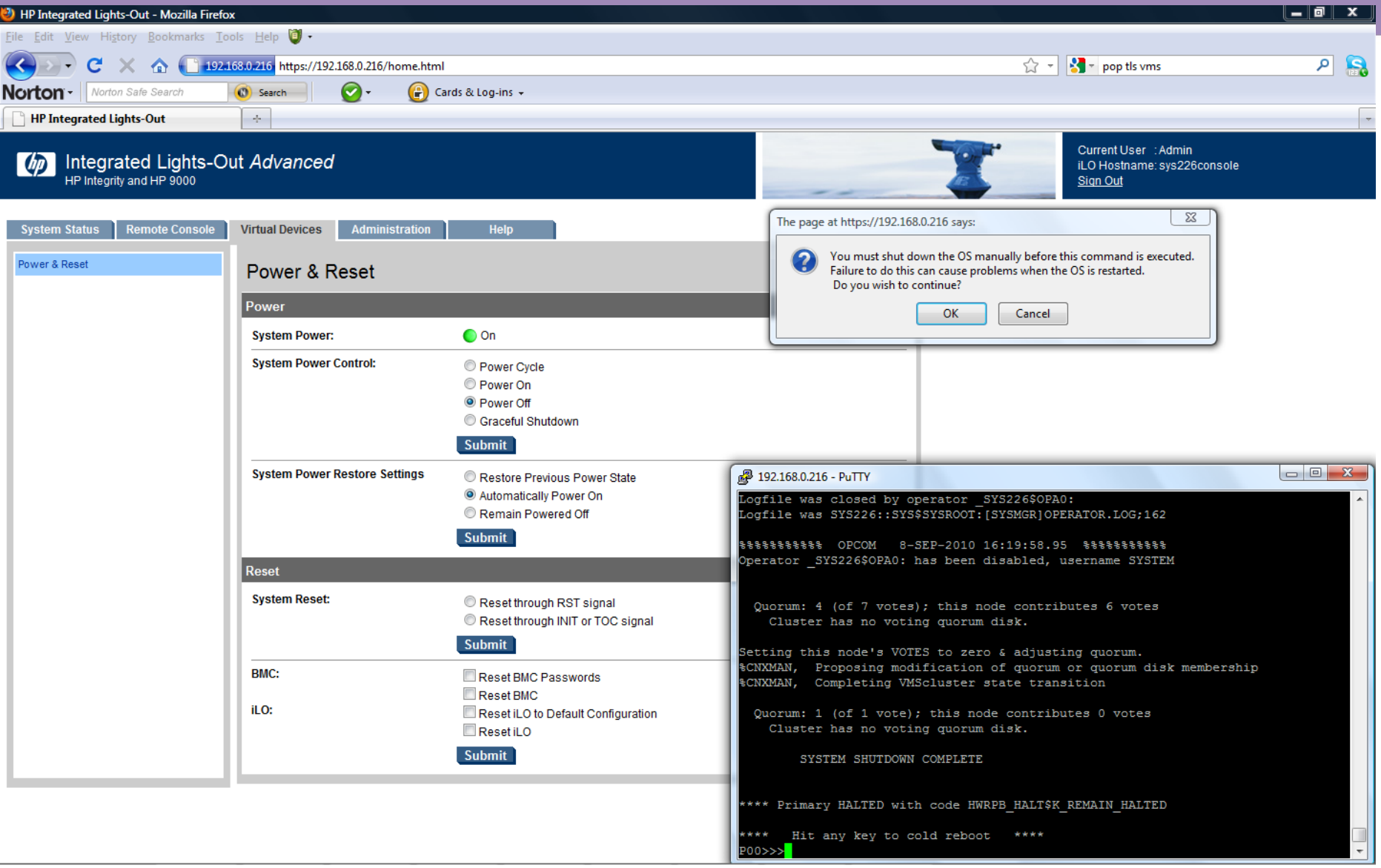


MP Power off Example

- There are multiple ways to execute most functions. First we will look at powering the system on/off.
- This can be done via telnet from here forward, simply referred to as the MP, and via the Web interface referred to as iLo (iLo2/iLo3 based on system). First via the MP:

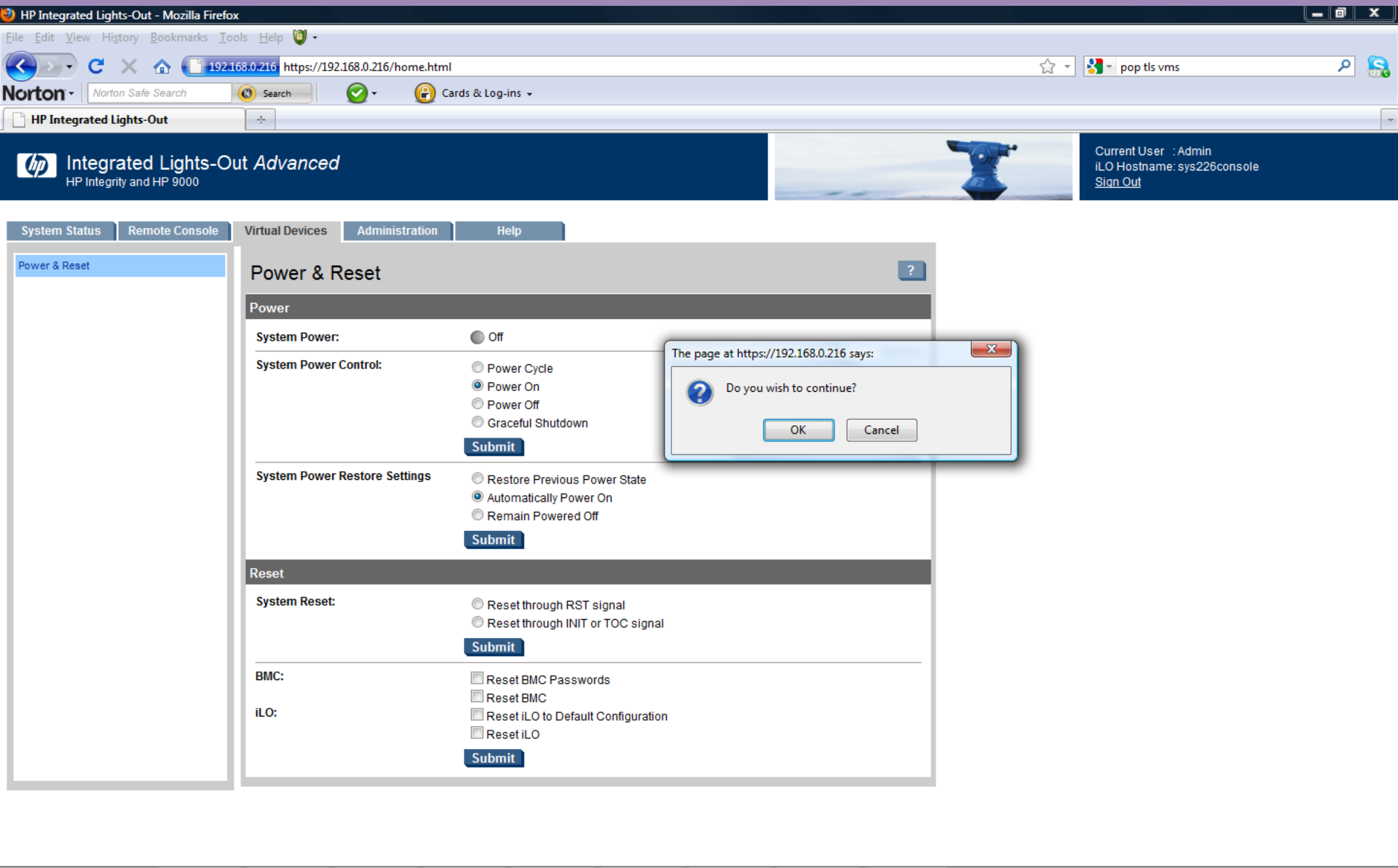
```
ia64] MP> cm

        (Use Ctrl-B to return to MP main menu.)

[sys226console] MP:CM> pc


PC


Current System Power State: On


Power Control Menu:
     C   - Power Cycle
     ON  - Power On
     OFF - Power Off
     G   - Graceful Shutdown

Enter menu item or [Q] to Quit: off
off

System will be powered off.y
y

 -> System is being powered off.


[sys226console] MP:CM>
```

iLo Power off Example



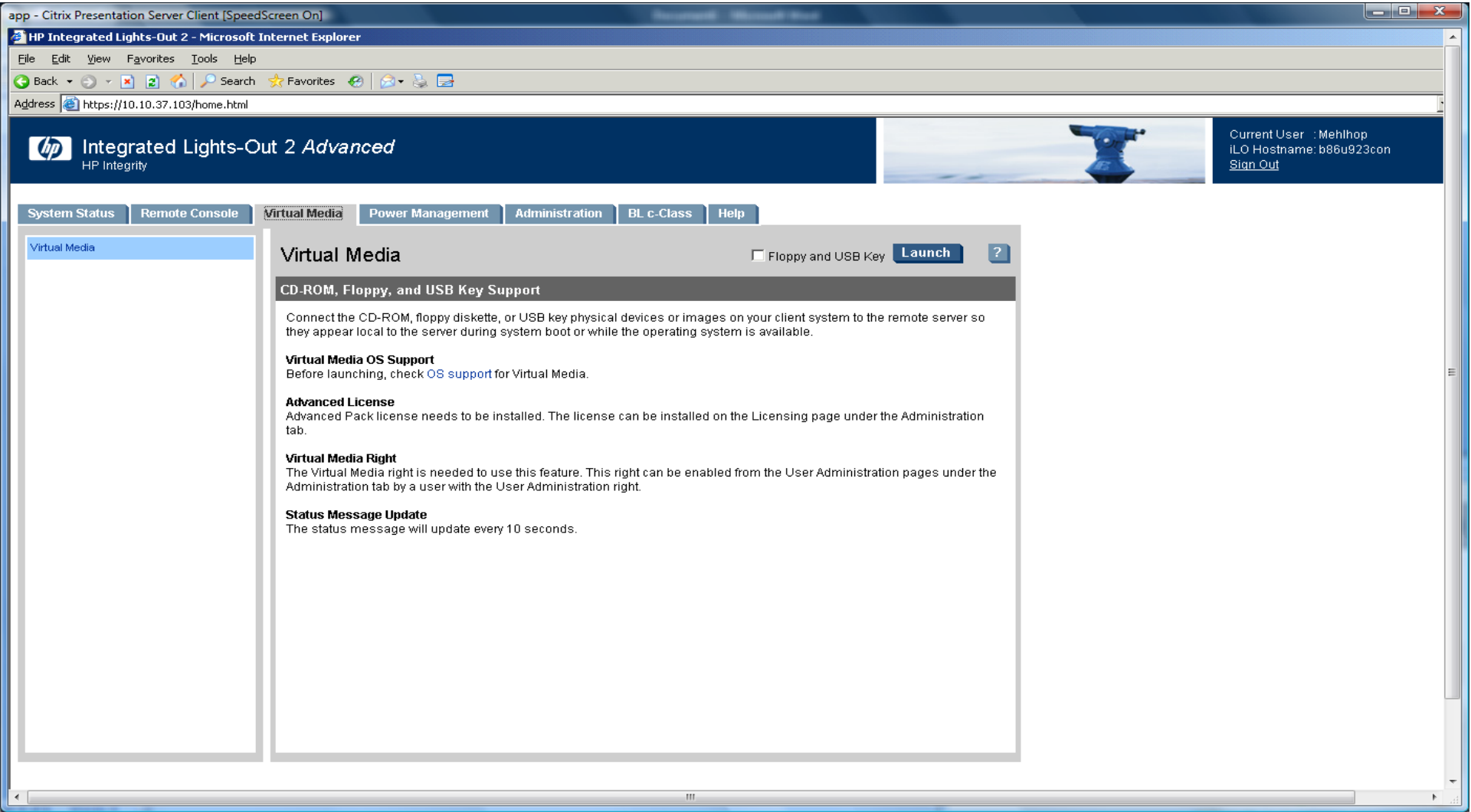
connect OpenVMS Bootcamp 2011

iLo Power On

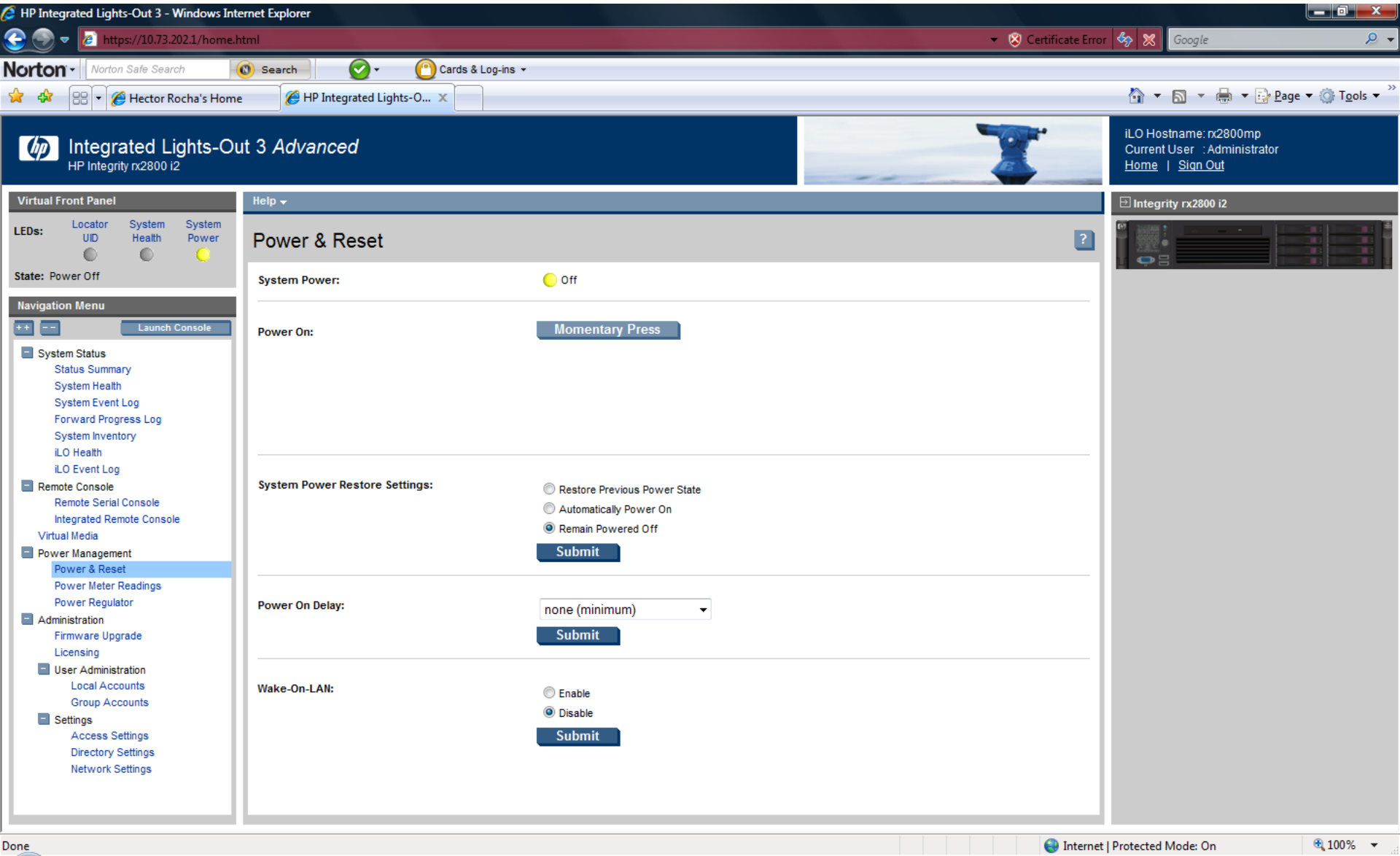


iLo2

- On the iLo2 systems there is a separate tab for Power Management (force crash, etc) and the Virtual Media tab is for exactly that. The Blades have yet another tab (BL c-Class)



iLo3


HP Integrated Lights-Out 3 - Windows Internet Explorer
https://10.73.202.1/home.html
Certificate Error
Google
Norton
Norton Safe Search
Search
Cards & Log-ins
Hector Rocha's Home
HP Integrated Lights-O...
Page
Tools
Integrated Lights-Out 3 Advanced
HP Integrity rx2800 i2
iLO Hostname: rx2800mp
Current User : Administrator
Home | Sign Out
Virtual Front Panel
LEDs:
Locator UID
System Health
System Power
State: Power Off
Navigation Menu
Launch Console
System Status
Status Summary
System Health
System Event Log
Forward Progress Log
System Inventory
iLO Health
iLO Event Log
Remote Console
Remote Serial Console
Integrated Remote Console
Virtual Media
Power Management
Power & Reset
Power Meter Readings
Power Regulator
Administration
Firmware Upgrade
Licensing
User Administration
Local Accounts
Group Accounts
Settings
Access Settings
Directory Settings
Network Settings
Help
Power & Reset
System Power:
Off
Power On:
Momentary Press
System Power Restore Settings:
Restore Previous Power State
Automatically Power On
Remain Powered Off
Submit
Power On Delay:
none (minimum)
Submit
Wake-On-LAN:
Enable
Disable
Submit
Integrity rx2800 i2
Done
Internet | Protected Mode: On
100%

MP Power on Example

```
[sys226console] MP:CM> pc


PC


Current System Power State: Off


Power Control Menu:
     C   - Power Cycle
     ON  - Power On
     OFF - Power Off
     G   - Graceful Shutdown

Enter menu item or [Q] to Quit: on
on

System will be powered on.
   Confirm? (Y/[N]): y
y

   -> System is being powered on.

[sys226console] MP:CM>
```

MP Power on Example

```
[sys226console] MP:CM> <^B>

   MP MAIN MENU:

         CO: Console
        VFP: Virtual Front Panel
         CM: Command Menu
         CL: Console Log
         SL: Show Event Logs
         HE: Main Help Menu
          X: Exit Connection

[sys226console] MP> co

        (Use Ctrl-B to return to MP main menu.)


- - - - - - - - - - Prior Console Output - - - - - - - - - -
  Quorum: 1 (of 1 vote); this node contributes 0 votes
    Cluster has no voting quorum disk.

        SYSTEM SHUTDOWN COMPLETE


**** Primary HALTED with code HWRPB_HALT$K_REMAIN_HALTED

****   Hit any key to cold reboot   ****
P00>>>
- - - - - - - - - - - - - Live Console - - - - - - - - - - - - -
************************************************************
.
.
.
```

Extensible Firmware Interface (EFI)

- The console interface for the Integrity Servers is provided by the EFI
  - EFI is a new interface provided by Intel to replace the BIOS
  - The EFI user interface is called the “shell”
  - EFI provides an interface to the hardware
  - EFI runs applications from an EFI partition
  - EFI partitions contain FAT file systems
    - Seeing “fs*n*” devices in the device mapping table indicated that that device has an EFI partition
    - If the device does not have an EFI partition, it will show up as “blk*n*” device
    - OpenVMS bootable devices will normally have a mixture of FAT partitions and Block partitions (blk#’s from the EFI viewpoint)

EFI Device Mapping

```
 MP MAIN MENU:
    V8.3 conversational PKA0.0
- - OpenVMS - DKA100:
    Conversational boot from dka100 PKA0.1
    DVD
    EFI Shell [Built-in]
    test
         HE: Main Help Menu
          X: Exit Connection
Loading.: EFI Shell [Built-in]
EFI Shell version 1.10 [14.61]
Device mapping table to return to MP main menu.)
  fs0   : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,SigEC04A681-C93F-11
  fs1   : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,Sig2044175C)
  blk0  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)- - - - -
  blk1  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,SigEC04A681-C93F-11
  blk2  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part2,SigEC04A680-C93F-11
  blk3  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part3,SigEC04A680-C93F-11
  blk4  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)
  blk5  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,Sig2044175C)
Shell>
```

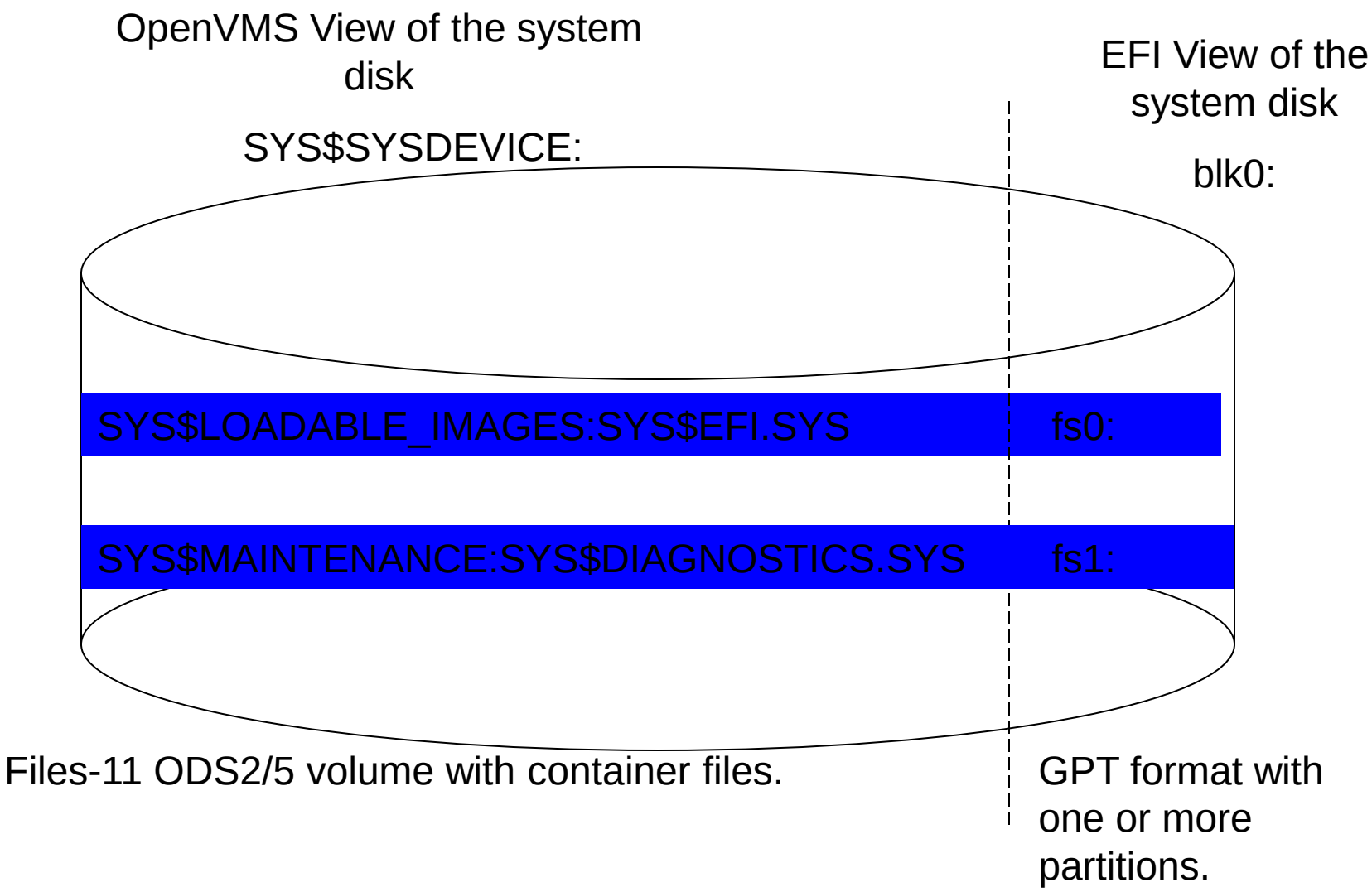
EFI Components

- The EFI is made up of the following major components:
  - EFI Firmware core
  - EFI system partition (ESP)
    - Created by the operating system
    - Operating system loader
    - Contains value added software utilities and tools
  - EFI Boot manager
    - Supports the operating system boot loader menu

EFI and OpenVMS

- EFI requires a GUID (Global Unique IDentifier) Partition Table (GPT) disk format with at least one FAT32 partition
  - The FAT32 partition contains the EFI support files
  - OpenVMS supports ODS2/ODS5, but doesn't support FAT32
  - To make this work, both formats exist independently on the same disk
  - VMS sees the GPT as gpt.sys in the MFD
  - GUID gets updated with VMS update, thus boot options must be fixed/validated
  - The GPT is in the boot block(s) and points to any FAT partitions contained on that device

EFI and OpenVMS (Continued)



OpenVMS View of the GPT and EFI Partition

```
$ dump/header/block=count:0 sys$sysdevice:[000000]gpt.sys

Dump of file SYS$SYSDEVICE:[000000]GPT.SYS;1 on 16-MAY-2008 12:59:04.77
File ID (11,11,0)   End of file block 80 / Allocated 80

                            File Header

Header area
    Identification area offset:           40
...
File identification:                   (11,11,0)
    Extension file identification:        (0,0,0)
...
Identification area
    File name:                            GPT.SYS;1
...
Map area
    Retrieval pointers
        Count:          40        LBN:           0
        Count:          40        LBN:    71132920

Checksum:                                 16326
$
```

OpenVMS View of the GPT and EFI

```
$ dump/header/block=count:0 sys$common:[sys$ldr]sys$efi.sys

Dump of file SYS$COMMON:[SYS$LDR]SYS$EFI.SYS;1 on 16-MAY-2008 13:02:24.86
File ID (439,4,0)   End of file block 256000 / Allocated 256000

                            File Header
Header area
...
    File identification:                    (439,4,0)
    Extension file identification:          (0,0,0)
    VAX-11 RMS attributes
File name length:                       13
    File name:                              SYS$EFI.SYS;1
...
Map area
    Retrieval pointers
        Count:      256000          LBN:      425072


Checksum:                                   8829
$
```

EFI View of the System Disk

```
Please select a boot option

    OpenVMS V8.3 PKA0.0
    V8.3 conversational PKA0.0
    OpenVMS - DKA100:
    Conversational boot from dka100 PKA0.1
    DVD
    EFI Shell[Built-in]
    DVD new
    Boot Option Maintenance Menu
    System Configuration Menu

    Use ^ and v to change option(s). Use Enter to select an option
Loading.: EFI Shell[Built-in]
EFI Shell version 1.10 [14.61]
Device mapping table
  fs0  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,SigEC04A681-C93F-11
D8-B246-414243202020)
  fs1  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,Sig2044175C)
  blk0 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)
  blk1 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,SigEC04A681-C93F-11
Shell>
```

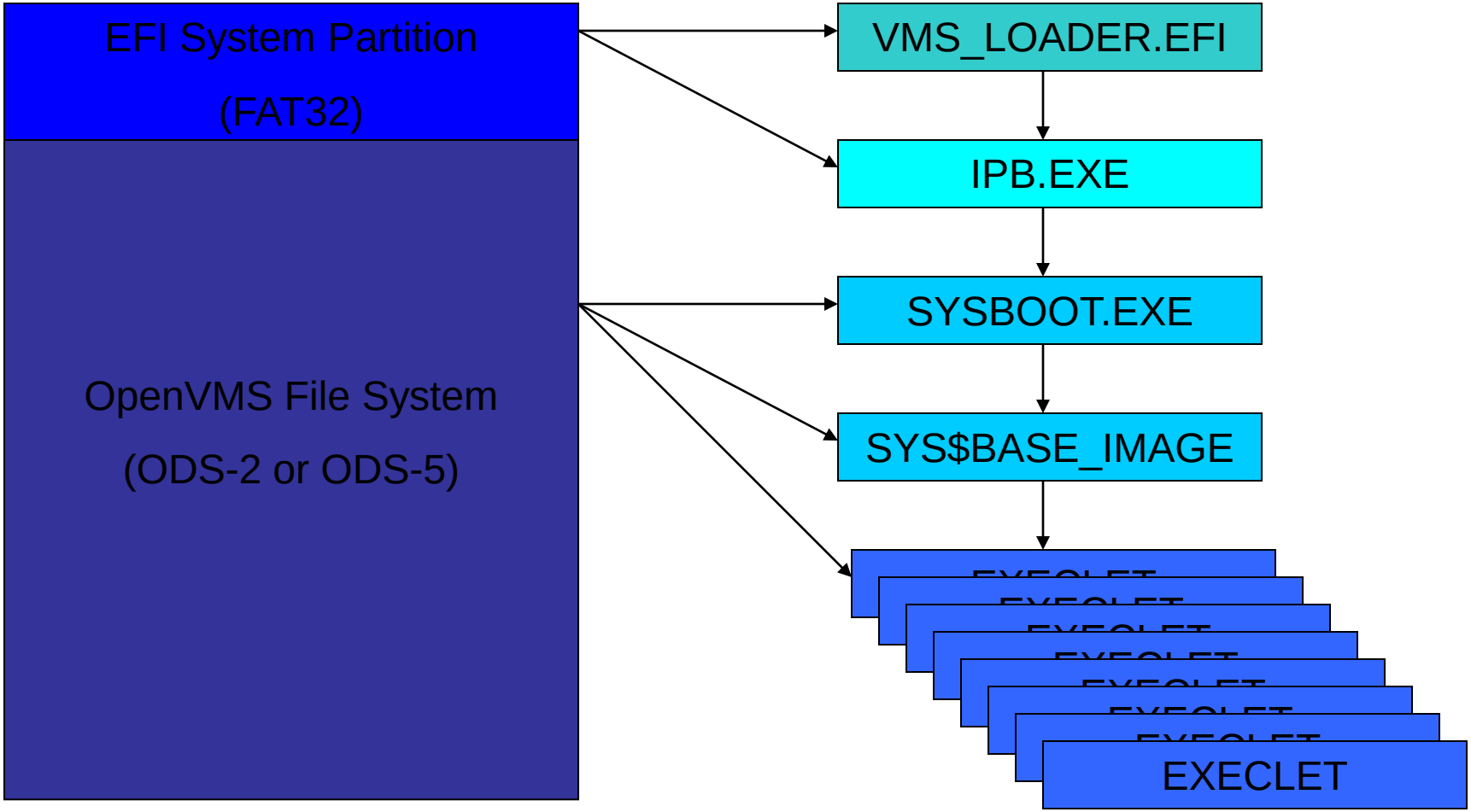
EFI View of the System Disk

```
Shell> fs0: <CR>
fs0:\> dir <CR>
Directory of: fs0:\

  04/03/06  02:16p <DIR>          2,048  EFI
         0 File(s)           0 bytes
         1 Dir(s)


fs0:\> cd efi

fs0:\EFI> dir
Directory of: fs0:\EFI

  04/03/06  02:16p <DIR>          2,048  .
  04/03/06  02:16p <DIR>              0  ..
  04/03/06  02:16p <DIR>          2,048  VMS
         0 File(s)           0 bytes
         3 Dir(s)

fs0:\EFI>
```

EFI View of the System Disk

```
fs0:\EFI> cd vms

fs0:\EFI\VMS> ls
Directory of: fs0:\EFI\VMS

  04/03/06  02:16p <DIR>          2,048  .
  04/03/06  02:16p <DIR>          2,048  ..
  04/03/06  02:16p <DIR>          2,048  UPDATE
  04/03/06  02:16p <DIR>          2,048  TOOLS
  03/28/08  03:38p            3,948,544  IPB.EXE
  04/30/07  02:18p            1,173,504  VMS_LOADER.EFI
  03/28/08  03:39p              329,216  VMS_BCFG.EFI
  04/30/07  02:18p              887,296  VMS_SPCFG.EFI
  03/28/08  03:38p              300,032  VMS_SHOW.EFI
  03/28/08  03:39p              302,592  VMS_SET.EFI
          6 File(s)    6,941,184 bytes
          4 Dir(s)


fs0:\EFI\VMS>
```

OpenVMS I64 Boot Sequence



Booting OpenVMS

- There are a number of ways to boot OpenVMS once it has been installed:
  - Set up a boot option using the “Boot Option Maintenance Menu” option in the EFI menu, using the vms_bcfg or bcfg utility, or the BOOT_OPTIONS.COM command procedure. Once created, you can select it and make it the default.
  - Navigate the FAT32 directory structure to find the VMS_LOADER.EFI file and invoke it.
  - Create an alias to point to the VMS_LOADER and invoke that. This option is the closest thing to the SRM that you are probably familiar with. However the addition or removal of a bootable device can change the fs#.
  - Execute the SYS$MANAGER:BOOT_OPTIONS command procedure from DVD or OpenVMS.
- Note: When booting from the DVD, you may need to execute the following command and the EFI shell prompt:

```
shell> map -r
```

Setting up a Boot Option Using the "Boot Option Maintenance Menu"

```
EFI Boot Manager ver 1.10 [14.61]  Firmware ver 2.31 [4411]

Please select a boot option

    DVD
    EFI Shell[Built-in]
    Boot Option Maintenance Menu
    System Configuration Menu


    Use ^ and v to change option(s). Use Enter to select an option
```

Setting up a Boot Option Using the "Boot Option Maintenance Menu"

```
EFI Boot Maintenance Manager ver 1.10 [14.61]

Main Menu. Select an Operation


        Boot from a File
        Add a Boot Option
        Delete Boot Option(s)
        Change Boot Order

        Manage BootNext setting
        Set Auto Boot TimeOut

        Select Active Console Output Devices
        Select Active Console Input Devices
        Select Active Standard Error Devices

        Cold Reset
        Exit


    Timeout-->[20] sec SystemGuid-->[62F272DE-E457-11D8-A9CA-B753D35CBA26]
    SerialNumber-->[US42779094          ]
```

Setting up a Boot Option Using the "Boot Option Maintenance Menu"

```
EFI Boot Maintenance Manager ver 1.10 [14.61]

Add a Boot Option.  Select a Volume


    F8_3 [Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,SigEC0
    V8_3 [Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,Sig204
    Load File [EFI Shell [Built-in]]
    Load File [Acpi(HWP0002,0)/Pci(3|0)/Mac(00306EF3AB09)]
    Load File [Acpi(HWP0002,100)/Pci(2|0)/Mac(00306EF30B4F)]
    Exit
```

Note: The first line correspondes to FS0 (SCSI(Pun0,Lun0) Partition 1

Setting up a Boot Option Using the "Boot Option Maintenance Menu"

```
EFI Boot Maintenance Manager ver 1.10 [14.61]

Select file or change to new directory:

       07/14/06  02:00p <DIR>       1,024 EFI
       [Treat like Removable Media Boot]
    Exit
```

<Next Screen>

```
EFI Boot Maintenance Manager ver 1.10 [14.61]

Select file or change to new directory:

       07/14/06  02:00p <DIR>       1,024 .
       07/14/06  02:00p <DIR>           0 ..
       07/14/06  02:00p <DIR>       1,024 VMS
    Exit
```

Setting up a Boot Option Using the "Boot Option Maintenance Menu"

```
EFI Boot Maintenance Manager ver 1.10 [14.61]
Select file or change to new directory:

      04/03/06  02:16p <DIR>       2,048 .
      04/03/06  02:16p <DIR>       2,048 ..
      04/03/06  02:16p <DIR>       2,048 UPDATE
      04/03/06  02:16p <DIR>       2,048 TOOLS
      04/30/07  02:18p         1,173,504 VMS_LOADER.EFI
      03/28/08  03:39p           329,216 VMS_BCFG.EFI
      04/30/07  02:18p           887,296 VMS_SPCFG.EFI
      03/28/08  03:38p           300,032 VMS_SHOW.EFI
      03/28/08  03:39p           302,592 VMS_SET.EFI
    Exit
```

Setting up a Boot Option Using the "Boot Option Maintenance Menu"

```
 Filename: \EFI\VMS\VMS_LOADER.EFI
  DevicePath:
   [Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,SigEC04A681-C
93F-11D8-B246-414243202020)/\EFI\VMS\VMS_LOADER.EFI]
    IA-64 EFI Application 04/30/07  02:18p   1,173,504 bytes

    Enter New Description:  OpenVMS Primary Boot Option
 Enter BootOption Data Type [A-Ascii U-Unicode N-No BootOption] :
   Unicode
    Enter BootOption Data [Data will be stored as Unicode string]:




    Save changes to NVRAM [Y-Yes N-No]:Y
```

Setting up a Boot Option Using the "Boot Option Maintenance Menu"

```
EFI Boot Manager ver 1.10 [14.61]  Firmware ver 2.31 [4411]

Please select a boot option

DVD
    EFI Shell[Built-in]
    OpenVMS Primary Boot Option
    Boot Option Maintenance Menu
    System Configuration Menu


    Use ^ and v to change option(s). Use Enter to select an option
```

- Now that the option exists, we need to make it the first one on the list because when the system is powered up, or rebooted, the first entry on the list is what is selected by default

Setting up a Boot Option Using the "Boot Option Maintenance Menu"

```
EFI Boot Maintenance Manager ver 1.10 [14.61]

Main Menu. Select an Operation


        Boot from a File
        Add a Boot Option
        Delete Boot Option(s)
        Change Boot Order

        Manage BootNext setting
        Set Auto Boot TimeOut

        Select Active Console Output Devices
        Select Active Console Input Devices
        Select Active Standard Error Devices

        Cold Reset
        Exit


    Timeout-->[20] sec SystemGuid-->[62F272DE-E457-11D8-A9CA-B753D35CBA26]
    SerialNumber-->[US42779094          ]
```

Setting up a Boot Option Using the "Boot Option Maintenance Menu"

```
EFI Boot Maintenance Manager ver 1.10 [14.61]

Change boot order.  Select an Operation


    OpenVMS Primary Boot Option
    DVD
    EFI Shell[Built-in]
    Save Settings to NVRAM
    Help
    Exit

    NVRAM Not updated. Save NVRAM? [Y to save, N to ignore]Y
```

- Use the up and down arrows to select the option you want to move
- To move it up on the list type the "u" key for up. To move the selected operation down on the list, type "d" for down
- Our newly created option is now first on the list
- Select exit to save the changes

Setting up a Boot Option Using the "Boot Option Maintenance Menu"

```
EFI Boot Manager ver 1.10 [14.61]  Firmware ver 2.31 [4411]

Please select a boot option

    OpenVMS Primary Boot Option
    DVD
    EFI Shell[Built-in]
    OpenVMS xyz
    Boot Option Maintenance Menu
    System Configuration Menu


    Use ^ and v to change option(s). Use Enter to select an option
Loading.: OpenVMS Primary Boot Option
Starting: OpenVMS Primary Boot Option

    HP OpenVMS Industry Standard 64 Operating System, Version V8.3
    © Copyright 1976-2007 Hewlett-Packard Development Company, L.P.

%PKA0, Copyright (c) 2001 LSI Logic, PKM V1.1.01
...
```

Setting up a Boot Option Using the EFI bcfg Utility

```
Shell> bcfg boot add 1 fs0:\efi\vms\vms_loader.efi "hp OpenVMS"
Target = 8
bcfg: Add boot option as 1
Shell>exit
EFI Boot Manager ver 1.10 [14.61]  Firmware ver 2.31 [4411]

Please select a boot option
    hp OpenVMS
    OpenVMS Primary Boot Option
    DVD
    EFI Shell[Built-in]
    Boot Option Maintenance Menu
    System Configuration Menu

    Use ^ and v to change option(s). Use Enter to select an option
Loading.: hp OpenVMS
Starting: hp OpenVMS

    HP OpenVMS Industry Standard 64 Operating System, Version V8.3
    © Copyright 1976-2007 Hewlett-Packard Development Company, L.P.
    ...
```

Setting up a Boot Option using the BOOT_OPTIONS.COM Procedure

- Instead of messing with all of the above, if you have OpenVMS V8.3 or later you can use a command procedure to manage your boot options. This did not work on the i2 machines and the initial release of 8.4. For example:

```
$ @sys$manager:boot_options

    OpenVMS I64 Boot Manager Boot Options List Management Utility

    (1) ADD an entry to the Boot Options list
    (2) DISPLAY the Boot Options list
    (3) REMOVE an entry from the Boot Options list
    (4) MOVE the position of an entry in the Boot Options list
    (5) VALIDATE boot options and fix them as necessary
    (6) Modify Boot Options TIMEOUT setting

    (B)  Set to operate on the Boot Device Options list
    (D)  Set to operate on the Dump Device Options list
    (G)  Set to operate on the Debug Device Options list

    (E) EXIT from Boot Manager utility

    You can also enter Ctrl-Y at any time to abort this utility.

Enter your choice: 2
```

BOOT_OPTIONS.COM Procedure – Displaying Boot Options

```
To display all entries in the Boot Options list, press Return.
To display specific entries, enter the entry number or device name.
(Enter "?" for a list of devices):


EFI Boot Options list:   Timeout = 7 secs.

Entry  Description                                                  Options
-----  ------------------------------------------------------------ ------------
   1   $32$dka0: PKA0.0                                             -fl 0,0
         $32$DKA0 PCI(0|20|1|0) Scsi(Pun0,Lun0)
   2   dka0 conversational PKA0.0 PKA0.0                            -fl 0,1
         $32$DKA0 PCI(0|20|1|0) Scsi(Pun0,Lun0)
   3   OpenVMS on DKA100: PKA0.1
         $32$DKA100 PCI(0|20|1|0) Scsi(Pun1,Lun0)
   4   dka100 conversational PKA0.1                                 -fl 0,1
         $32$DKA100 PCI(0|20|1|0) Scsi(Pun1,Lun0)
   5   Boot DVD
         $32$DQA0 PCI(0|0|2|0) ATA(Primary,Master)
   6   EFI Shell [Built-in]
         VenHw(d65a6b8c-71e5-4df0-d2f009a9)
-------------------------------------------------------------------------------
6 entries found.


Enter your choice:
```

BOOT_OPTIONS.COM Procedure – Adding Boot Options

```
Enter your choice: 1
Enter the device name (Enter "?" for a list of devices): ?

Device                  Device           Error    Volume         Free  Trans Mnt
 Name                   Status           Count     Label        Blocks Count Cnt
$27$DKA0:      (CLASS8)  Online               0
$32$DKA0:      (CLASS8)  Mounted              0  I64SYS        17405496   655   2
$32$DKA100:    (CLASS8)  Mounted alloc        0  IVMS83        49404112     1   1
$32$DQA0:      (CLASS8)  Online               0
...
EFI     Built-in EFI Shell

Enter the device name (Enter "?" for a list of devices): $32$dka100:

Enter the desired position number (1,2,3,,,) of the entry.
To display the Boot Options list, enter "?" and press Return.
Position [1]: 3

Enter the value for VMS_FLAGS in the form n,n.
VMS_FLAGS [NONE]: 0,1

Enter a short description (do not include quotation marks).
Description ["$32$DKA100:"]: v8.3 conversational

efi$bcfg: $32$dka100: (Boot0004) Option successfully added
```

BOOT_OPTIONS.COM Procedure – Adding Boot Options

```
Enter your choice: 2

To display all entries in the Boot Options list, press Return.
To display specific entries, enter the entry number or device name.
(Enter "?" for a list of devices):

EFI Boot Options list:   Timeout = 7 secs.

Entry  Description                                                  Options
-----  ------------------------------------------------------------ ------------
   1   $32$dka0: PKA0.0                                             -fl 0,0
         $32$DKA0 PCI(0|20|1|0) Scsi(Pun0,Lun0)
   2   dka0 conversational PKA0.0 PKA0.0                            -fl 0,1
         $32$DKA0 PCI(0|20|1|0) Scsi(Pun0,Lun0)
   3   v8.3 conversational PKA0.1                                   -fl 0,1
         $32$DKA100 PCI(0|20|1|0) Scsi(Pun1,Lun0)
   4   OpenVMS on DKA100: PKA0.1
         $32$DKA100 PCI(0|20|1|0) Scsi(Pun1,Lun0)
   5   dka100 conversational PKA0.1                                 -fl 0,1
         $32$DKA100 PCI(0|20|1|0) Scsi(Pun1,Lun0)
   6   Boot DVD
         $32$DQA0 PCI(0|0|2|0) ATA(Primary,Master)
   7   EFI Shell [Built-in]
         VenHw(d65a6b8c-71e5-4df0-d2f009a9)
-------------------------------------------------------------------------------
7 entries found.


Enter your choice:
```

BOOT_OPTIONS.COM Procedure – Changing the Timeout Value

```
Enter your choice:

    OpenVMS I64 Boot Manager Boot Options List Management Utility

    (1) ADD an entry to the Boot Options list
    (2) DISPLAY the Boot Options list
    (3) REMOVE an entry from the Boot Options list
    (4) MOVE the position of an entry in the Boot Options list
    (5) VALIDATE boot options and fix them as necessary
    (6) Modify Boot Options TIMEOUT setting
...
    (E) EXIT from Boot Manager utility

    You can also enter Ctrl-Y at any time to abort this utility.

Enter your choice: 6
efi$bcfg: Boot Timeout period is 20 secs

Would you like to modify the Timeout value? (Yes/No) [NO] y

Please enter the Timeout value in seconds: 15

efi$bcfg: Boot Timeout period is 15 secs

Enter your choice:
```

EFI Variables – Boot Flags

- On an Alpha, boot flags is an SRM variable. On the Integrity server, boot flags is an EFI variable.
  - Alpha
    - `P00> set boot_osflags 0,1`
  - Integrity
    - `Shell> set vms_flags 0,1`
- The boot command or menu entry overrides the default.
- The following example shows how to set and show boot flags:

```
fs0:\EFI\VMS> set vms_flags 0,1

fs0:\EFI\VMS> set
    vms_flag   : 0,0
    bcfg       : 0,0
    path       :
   .;fs0:\efi\tools;fs0:\efi\boot;fs0:\;fs1:\efi\tools;fs1:\efi\boo
t;fs1:\
    vms_flags : 0,1

fs0:\EFI\VMS>
```

EFI Alias

- You can create EFI Alias commands, similar to DCL command synonyms with the EFI Alias command. Be CAREFUL as inserting the installation DVD may change the FS# designeation. To view an Alias, perform the following:

```
fs0:\EFI\VMS> alias
     setv : fs1:\efi\vms\vms_set
     sdev : fs0:\efi\vms\vms_show device
     show : fs0:\efi\vms\vms_show.efi
     myse : fs0:\efi\vms\vms_set.efi
     dir  : ls
     md   : mkdir
     rd   : rm
     del  : rm
     copy : cp
     find : ls -r
     ll   : ls
     cat  : type
fs0:\EFI\VMS>
```

EFI Alias (Continued)

- To create and alias:

```
fs0:\EFI\VMS> alias b fs0:\efi\vms\vms_loader
fs0:\EFI\VMS> alias sysboot "fs0:\efi\vms\vms_loader.efi -fl 0,1"
fs0:\EFI\VMS> b
fs0:\EFI\VMS> b -fl 0,1

        HP OpenVMS Industry Standard 64 Operating System, Version V8.3
        © Copyright 1976-2007 Hewlett-Packard Development Company, L.P.
        ...
```

OpenVMS EFI Utilities

- There are a few utilities that were designed for OpenVMS:
  - vms_show
  - vms_set
  - vms_bcfg

OpenVMS EFI Utilities – vms_show

- Translated between EFI and OpenVMS device names
- Display (selected) device mapping
  - vms_show device [device-name]
- Display (selected) dump device
  - vms_show dump_dev [device-name]
- Display (selected) debug device
  - vms_show debug_dev [device-name]

OpenVMS EFI Utilities – vms_show

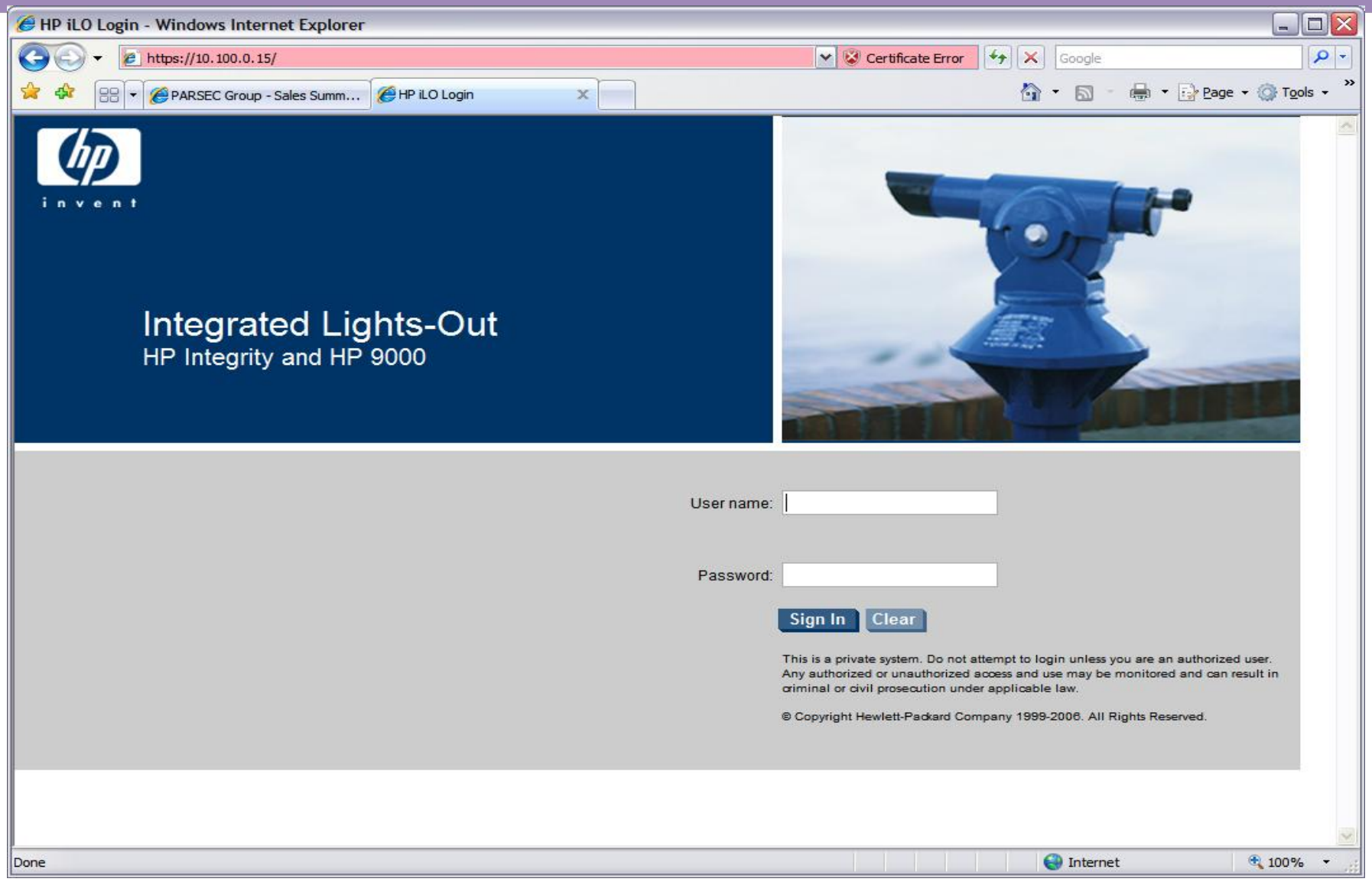
```
fs0:\EFI\VMS> alias show
  show : fs0:\efi\vms\vms_show.efi

fs0:\EFI\VMS> show device
VMS: EIA0                00-30-6E-F3-AB-09
EFI: Acpi(HWP0002,0)/Pci(3|0)/Mac(00306EF3AB09)

VMS: DKA100              HP 36.4GMAS3367NC       HPC3    V8_3
EFI: fs1: Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)

VMS: DKA0                HP 36.4GMAS3367NC       HPC3    F8_3
EFI: fs0: Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)

VMS: EWA0                00-30-6E-F3-0B-4F
EFI: Acpi(HWP0002,100)/Pci(2|0)/Mac(00306EF30B4F)
```

OpenVMS EFI Utilities – vms_set

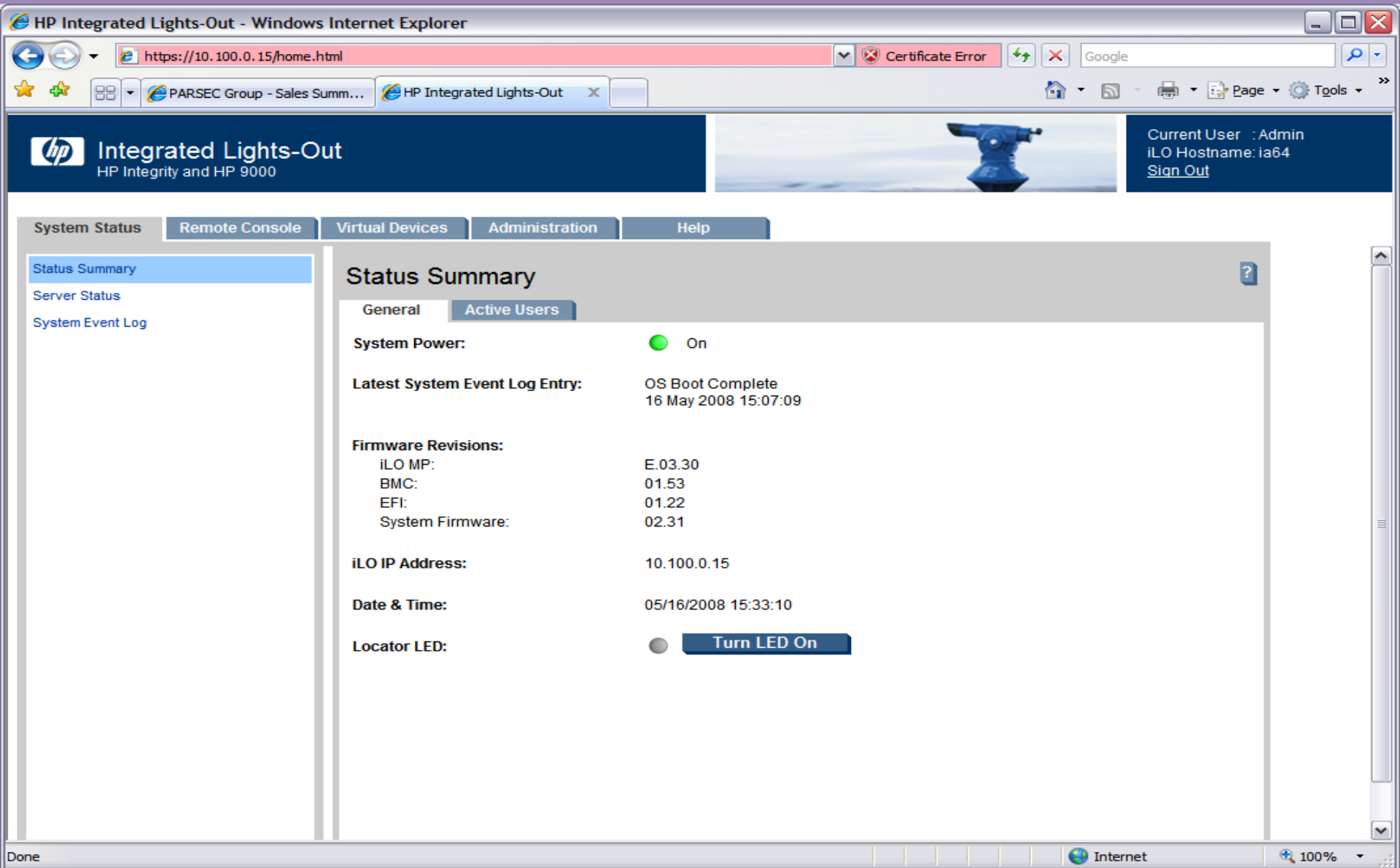
- Set dump device only accepts OpenVMS style names
  - vms_set dump_dev dev [,dev…]

```
fs0:\EFI\VMS> vms_show dump_dev

fs0:\EFI\VMS> vms_set dump_dev dka100
VMS: DKA100                HP 36.4GMAS3367NC        HPC3     V8_3
EFI: fs1: Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)


fs0:\EFI\VMS> vms_show dump_dev
VMS: DKA100                HP 36.4GMAS3367NC        HPC3     V8_3
EFI: fs1: Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)


fs0:\EFI\VMS>
```

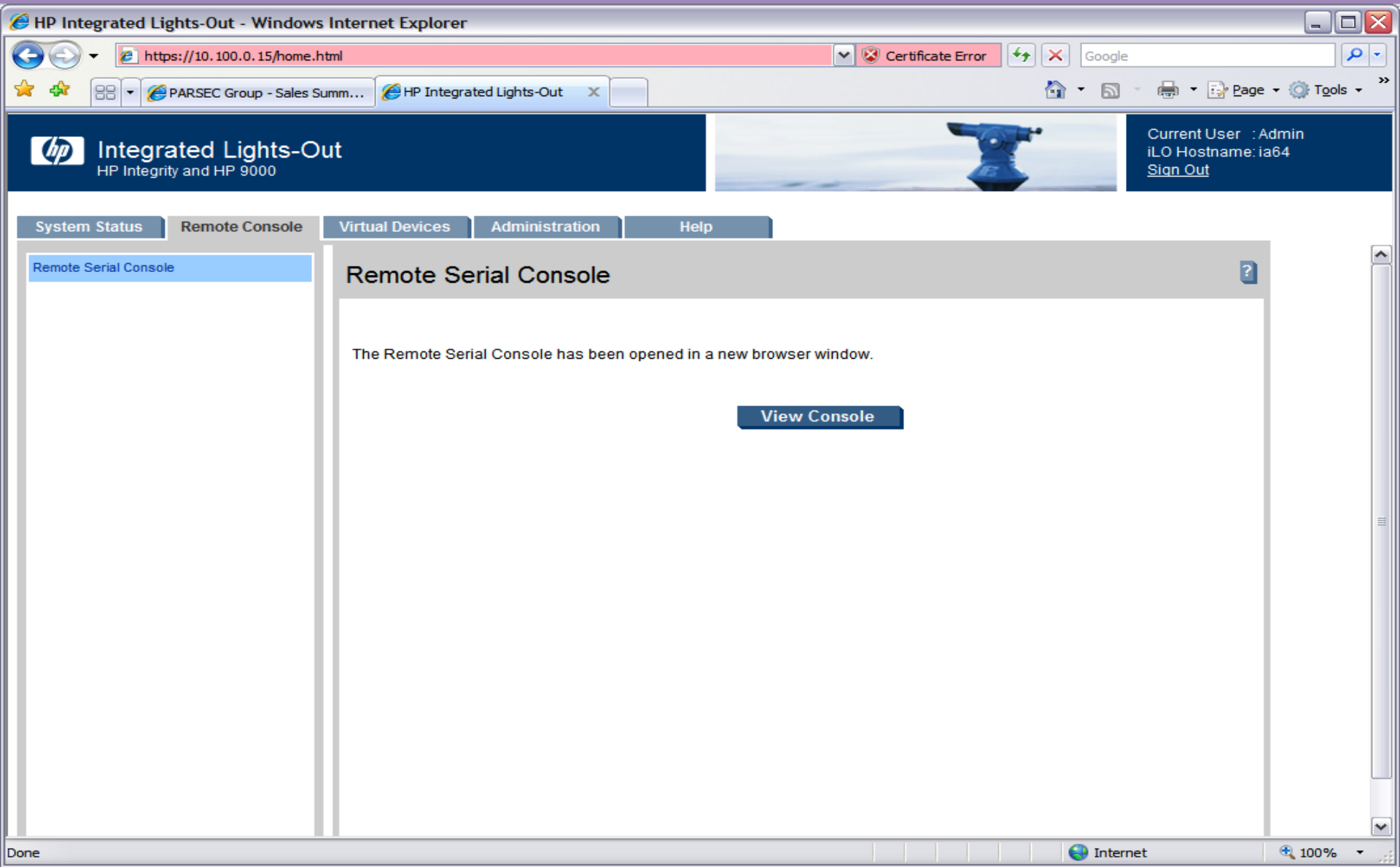
iLo


HP iLO Login - Windows Internet Explorer
https://10.100.0.15/
Certificate Error
Google
PARSEC Group - Sales Summ...
HP iLO Login
Page
Tools
invent
Integrated Lights-Out
HP Integrity and HP 9000
User name:
Password:
Sign In
Clear
This is a private system. Do not attempt to login unless you are an authorized user. Any authorized or unauthorized access and use may be monitored and can result in criminal or civil prosecution under applicable law.
© Copyright Hewlett-Packard Company 1999-2006. All Rights Reserved.
Done
Internet
100%

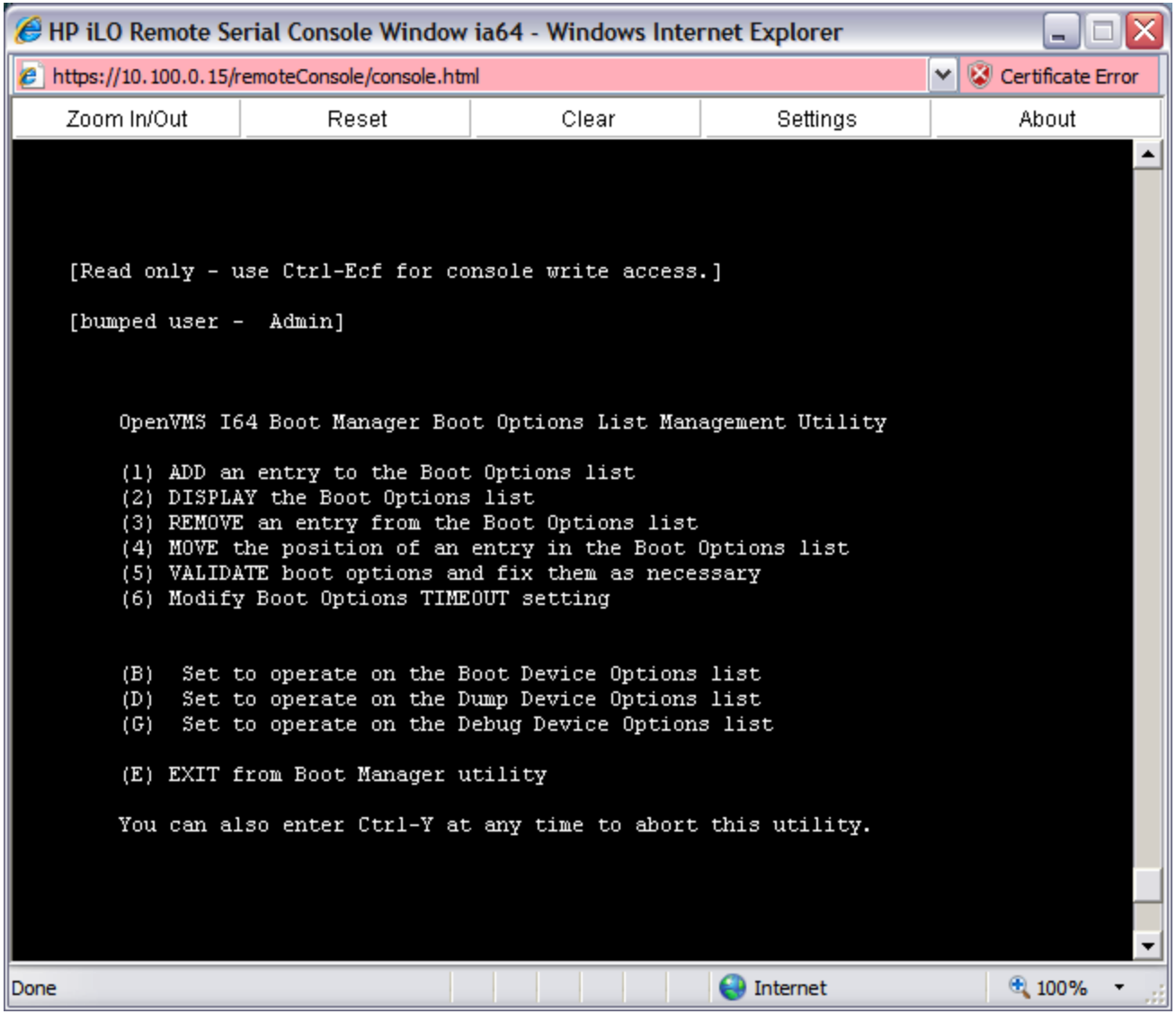
iLo


HP Integrated Lights-Out - Windows Internet Explorer
https://10.100.0.15/home.html
Certificate Error
Google
PARSEC Group - Sales Summ...
HP Integrated Lights-Out
Page
Tools
Integrated Lights-Out
HP Integrity and HP 9000
Current User : Admin
iLO Hostname: ia64
Sign Out
System Status
Remote Console
Virtual Devices
Administration
Help
Status Summary
Server Status
System Event Log
Status Summary
General
Active Users
System Power: On
Latest System Event Log Entry: OS Boot Complete
16 May 2008 15:07:09
Firmware Revisions:
iLO MP: E.03.30
BMC: 01.53
EFI: 01.22
System Firmware: 02.31
iLO IP Address: 10.100.0.15
Date & Time: 05/16/2008 15:33:10
Locator LED:
Turn LED On
Done
Internet
100%

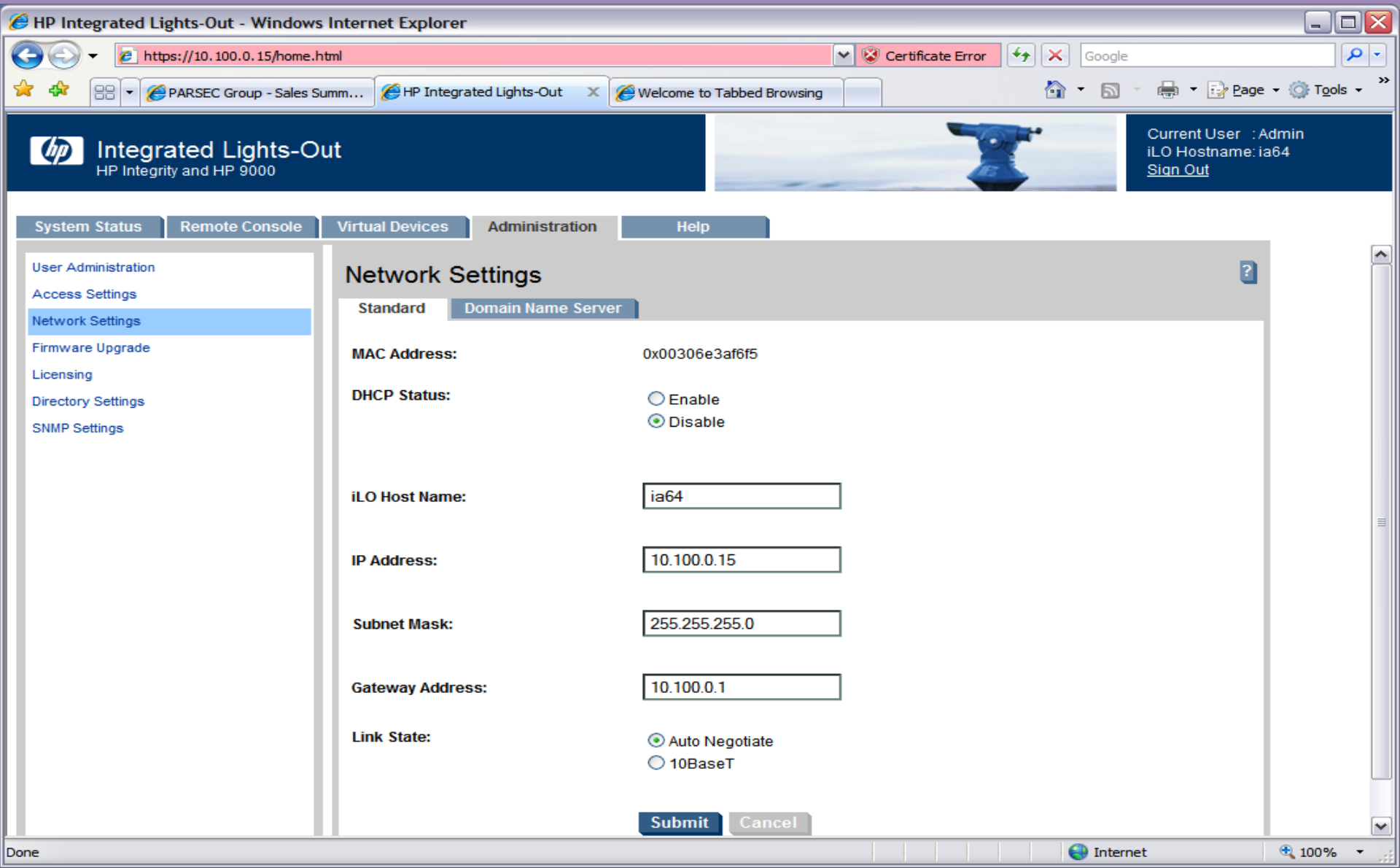
iLo


HP Integrated Lights-Out - Windows Internet Explorer
https://10.100.0.15/home.html
Certificate Error
Google
PARSEC Group - Sales Summ...
HP Integrated Lights-Out
Page
Tools
Integrated Lights-Out
HP Integrity and HP 9000
Current User : Admin
iLO Hostname: ia64
Sign Out
System Status
Remote Console
Virtual Devices
Administration
Help
Remote Serial Console
Remote Serial Console
The Remote Serial Console has been opened in a new browser window.
View Console
Done
Internet
100%

iLo


HP iLO Remote Serial Console Window ia64 - Windows Internet Explorer
https://10.100.0.15/remoteConsole/console.html
Certificate Error
Zoom In/Out
Reset
Clear
Settings
About
[Read only - use Ctrl-Ecf for console write access.]
[bumped user - Admin]
OpenVMS I64 Boot Manager Boot Options List Management Utility
(1) ADD an entry to the Boot Options list
(2) DISPLAY the Boot Options list
(3) REMOVE an entry from the Boot Options list
(4) MOVE the position of an entry in the Boot Options list
(5) VALIDATE boot options and fix them as necessary
(6) Modify Boot Options TIMEOUT setting
(B) Set to operate on the Boot Device Options list
(D) Set to operate on the Dump Device Options list
(G) Set to operate on the Debug Device Options list
(E) EXIT from Boot Manager utility
You can also enter Ctrl-Y at any time to abort this utility.
Done
Internet
100%

iLo


HP Integrated Lights-Out - Windows Internet Explorer
https://10.100.0.15/home.html
Certificate Error
Google
PARSEC Group - Sales Summ...
HP Integrated Lights-Out
Welcome to Tabbed Browsing
Page
Tools
Integrated Lights-Out
HP Integrity and HP 9000
Current User : Admin
iLO Hostname: ia64
Sign Out
System Status
Remote Console
Virtual Devices
Administration
Help
User Administration
Access Settings
Network Settings
Firmware Upgrade
Licensing
Directory Settings
SNMP Settings
Network Settings
Standard
Domain Name Server
MAC Address:
0x00306e3af6f5
DHCP Status:
Enable
Disable
iLO Host Name:
ia64
IP Address:
10.100.0.15
Subnet Mask:
255.255.255.0
Gateway Address:
10.100.0.1
Link State:
Auto Negotiate
10BaseT
Submit
Cancel
Done
Internet
100%

Forcing a crash

- There are a number of ways to force a crash on an Integrity:
  - MP:CO ^P/^P/Yes
  - MP:CM> TC
  - iLo Virtual Devices/Power & Reset/System Reset/Reset System through INIT or TOC Signal
  - Availability Manager
- The console ^P mechanism it the most common (similar to an alpha) but not as reliable as the others.

Forcing a crash (^P)

```
*****************************************************************************
  This is a private system.
  Do not attempt to login unless you are an authorized user.
  Any authorized or unauthorized access or use may be monitored and can
  result in criminal or civil prosecution under applicable law.
 *****************************************************************************

MP login: Admin
MP password: *********
<^P>
Interrupt Priority C

Commands:
  C device   Cancel Mount Verification
  Q          Adjust Quorum
  CTRL-P     Prompt for Crash
  CTRL-Z     Exit IPC

IPC> ^P

Crash (y/n): y
Starting Crash...


**** OpenVMS I64 Operating System V8.3-1H1 - BUGCHECK ****

** Bugcheck code = 0000064C: OPERCRASH, Operator forced system crash
** Crash CPU: 00000000    Primary CPU: 00000000    Node Name: SYS226
** Highest CPU number:    00000001
```

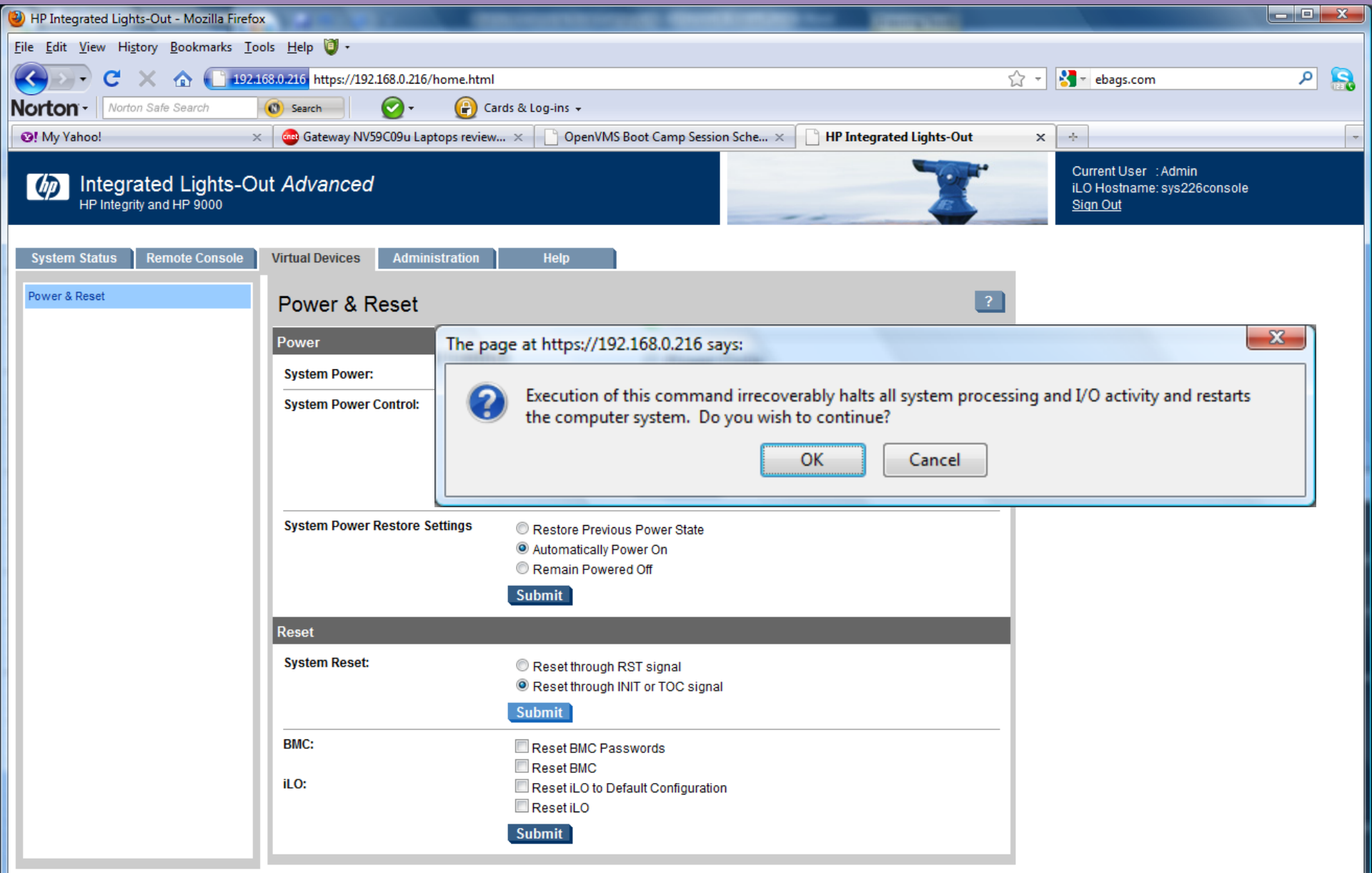
Forcing a crash MP:CM>TC

```
 MP MAIN MENU:

         CO: Console
        VFP: Virtual Front Panel
         CM: Command Menu
         CL: Console Log
         SL: Show Event Logs
         HE: Main Help Menu
          X: Exit Connection

[sys226console] MP> cm



        (Use Ctrl-B to return to MP main menu.)



[sys226console] MP:CM> tc


TC

Execution of this command irrecoverably halts all system processing and
I/O activity and restarts the computer system.

Type Y to confirm your intention to restart the system: (Y/[N]) y
y
   -> SPU hardware was successfully issued a TOC.




[sys226console] MP:CM>
```

Forcing a crash MP:CM>TC

```
[sys226console] MP:CM> <^B>

   MP MAIN MENU:

         CO: Console
        VFP: Virtual Front Panel
         CM: Command Menu
         CL: Console Log
         SL: Show Event Logs
         HE: Main Help Menu
          X: Exit Connection

[sys226console] MP> co



        (Use Ctrl-B to return to MP main menu.)



- - - - - - - - - - Prior Console Output - - - - - - - - - -
      Data (read only)                  FFFFFFFF.88901600 FFFFFFFF.8890181F 77712A00
      Code                              FFFFFFFF.815E6B00 FFFFFFFF.815FB99F 7EA31500
      Data (read only)                  FFFFFFFF.88901A00 FFFFFFFF.88906397 7772E600
      Data (read/write)                 FFFFFFFF.88906400 FFFFFFFF.889069EF 77731C00
      Short data (read/write)           FFFFFFFF.88906A00 FFFFFFFF.8890706F 7773D600
      Linked  5-FEB-2009 19:09
```

Forcing a crash iLo



Forcing a crash iLo

On the console terminal

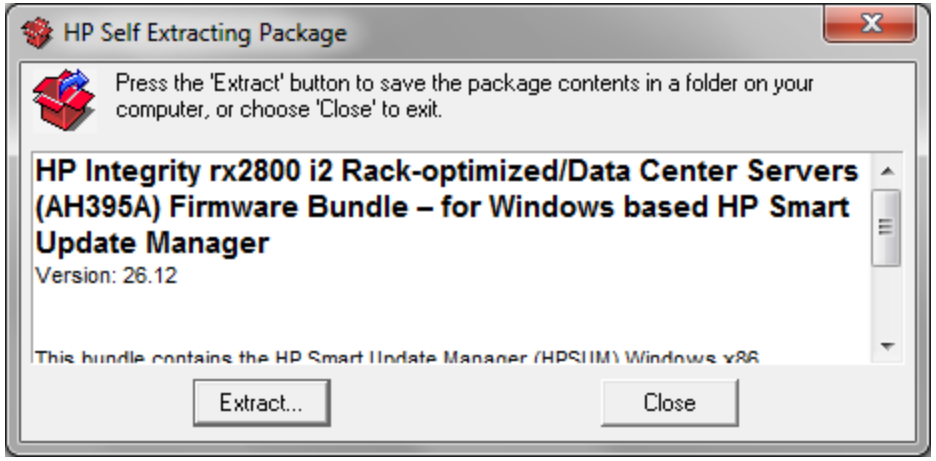
```
**** OpenVMS I64 Operating System V8.3-1H1 - BUGCHECK ****

** Bugcheck code = 00000AFC: CPUINT_INIT, Hardware INIT interrupt received
** Crash CPU: 00000000    Primary CPU: 00000000    Node Name: SYS226
** Highest CPU number:    00000001
** Active CPUs:           00000000.00000003
** Available CPUs:        00000000.00000003
** Current Process:       NULL
** Current PSB ID:        00000001
** Register Dump:
TRAP_TYPE       =          00000066
IIP             = FFFFFFFF.8058FA40
RSC             = 00000000.00000000
BSP             = FFFFF802.8D932450
BSPSTORE        = FFFFF802.8D932300
RNAT            = 00000000.00000000
BSPBASE         = 00000040.FFF6A000
PFS             = 00000000.000010A9
AST_F12         = 00000000.00000000.00000000.00000000
AST_F13         = 00000000.00000000.00000000.00000000
AST_F14         = 00000000.00000000.00000000.00000000
AST_F15         = 00000000.00000000.00000000.00000000
PREDS           = 00000000.00056AE3
IPSR            = 00001010.08426030
```

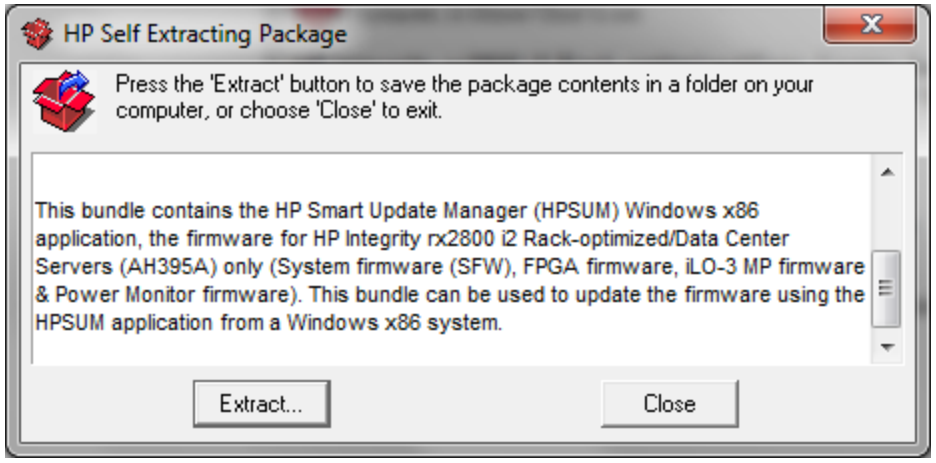
Updating Firmware

- Updating the Integrity firmware steps:

1. Go to the following Web site
2. http://h20000.www2.hp.com/bizsupport/TechSupport/Product.jsp?lang=en&cc=us&taskId=135&prodTypeId=15351&prodCatId=321933
3. Find your server type on the list provided and following the links.
4. Click on the “Cross operating system (BIOS, Firmware, Diagnostics, etc)” link
5. Locate the appropriate ISO-image firmware file, and download the ISO-image firmware (zip-compressed) file to your system.
6. Unzip the firmware file, it will have an .ISO extension
7. Run a windows CD write program like Roxio
8. Record the data on the CD, specifying the .ISO file as the source for the CD.
9. Boot the CD on your Integrity
10. If i2 machine there is no ISO file. Only Tarballs and a Windows installation package for HPSUM (Smart Update Manager)

Update firmware





Updating Firmware

```
Loading.: DVD

HPOFM located on removable media device at 'fs0:\EFI\BOOT\'

     /-------------------------------------------------------------------\
     |   (i) INFORMATION:  The option "Internal Bootable DVD" has been   |
     |   added to the EFI Boot Manager.  It is required for HPOFM, but   |
     |   could allow any user to bypass the EFI Shell password and gain  |
     |    system access.  The option can be removed by using the Boot    |
     |                      Option Maintenance Menu.                     |
     |                                                                   |
     |                              OK                                   |
     \-------------------------------------------------------------------/

HPOFM located on removable media device at 'fs0:\EFI\BOOT\'
HP Offline Firmware Manager Version v2.6.53
Copyright (c) 2003 Hewlett-Packard Development Company, L.P.
Portions Copyright (c) 2000-2003 LSI Logic Corporation.  All rights reserved.

HPOFM will start in 4 second(s)...<cr>
```

Updating Firmware

```
HP Offline Firmware Manager   v2.6.53                hp integrity server rx2600

 /-------------------------------------------------------------------------\
 |  Welcome to the HP Offline Firmware Manager (HPOFM)!  HPOFM reduces the  |
 | complexity of managing your computer's firmware.  More information about |
 |   firmware updates is available in installation manuals, and online at   |
 |                       http://www.hp.com/go/support                       |
 |                                                                          |
 |                 Thank you for choosing Hewlett-Packard!                  |
 |                                                                          |
 |                                  OK                                      |
 \-------------------------------------------------------------------------/

HP Offline Firmware Manager   v2.6.53                hp integrity server rx2600
                                Welcome to HPOFM


 /---------- Main Menu -----------\
 | Welcome                       |
 | Manage Firmware               |
 | Help                          |
 | Exit                          |
 \-------------------------------/

 arrows move | ENTER selects | F1, ? for Help
 ENTER selects
```

Updating Firmware

```
HP Offline Firmware Manager   v2.6.53              hp integrity server rx2600
                                  Manage Firmware
 Devices with updateable firmware appear in the list below, if included in
 the package and detected in the system. Devices of identical types, and any
 indented devices shown below, are all updated together. Devices prefixed by
 '---' cannot be updated from HPOFM, but help is shown upon selection.

 Press SPACE to display the firmware update release notes for the highlighted
 device.

 Select all    : everything will be updated
 Deselect all  : clear all selections
     Device                        Local Version  Version on Disk   Date on Disk

 [X] Management Processor            E.02.29         E.03.15          05/11/2005

                                  Back       Begin update

 arrows move | TAB changes section | ENTER selects | F1, ? for Help
```

Updating Firmware

```
/-------------------------------------------------------------------\
|    (i) INFORMATION:  After updating, the MP will reset, and the MP     |
|  console will be disconnected.  You will need to reconnect to the MP   |
|                              manually.                                 |
|                                                                        |
|                                 OK                                     |
\-------------------------------------------------------------------/

   /-----------------------------------------------------------------\
   |  (?) QUESTION:  This update process may require a reboot and the   |
   |     DVD must be kept in the drive until this program returns.      |
   |                                                                    |
   |                    Do you want to continue?                        |
   |                                                                    |
   |                Cancel                  Continue                    |
   \-----------------------------------------------------------------/

Executing: "Management Processor"
```

Updating Firmware

```
HP Offline Firmware Manager   v2.6.53                hp integrity server rx2600
                            Firmware Update Results

 The following firmware updates were performed:


   [OK]         Management Processor



   [OK]         means that the update was successful.
   [FAILED]     means that the update failed. Press '?' for more help.
   [EXECUTED]   means that the update program ran. To verify this update,
                           compare versions in the Manage Firmware screen.
```

OK

```
HP Offline Firmware Manager   v2.6.53                hp integrity server rx2600
```

Exit this program

Updating Controller Firmware

- Updating the Integrity Controller firmware steps:

1. Go to the following Web site
2. http://h20000.www2.hp.com/bizsupport/TechSupport/Product.jsp?lang=en&cc=us&taskId=135&prodTypeId=15351&prodCatId=321933
3. Find your server type on the list provided and following the links.
4. Click on the “Cross operating system (BIOS, Firmware, Diagnostics, etc)” link
5. Select and download the **IPF Offline Diagnostics and Utilities** ISO-image firmware (zip-compressed) file to your system.
6. Unzip the firmware file, it will have an .ISO extension
7. Run a windows CD write program like Roxio
8. Record the data on the CD, specifying the .ISO file as the source for the CD.
9. Boot the CD on your Integrity
10. If i2 machine there is no ISO file. Only Tarballs and a Windows installation package for HPSUM (Smart Update Manager)

Updating Controller Firmware Example

```
This CD provides diagnostic applications and tools to support and maintain
  HP systems based on the Intel IPF platform.
  Type the key which corresponds to your selection below:

  a. View CD Overview

  b. Run the Off-line Diagnostic Environment (ODE)

  c. Run CD Installer to install/update CD content to HPSP

  d. View Release Notes and Documentation Menu

  e. View I/O Cards FW Update and Configuration Utilities, MCA, and ICM Menu

  f. View License and Warranty Agreements Notice



  x. exit and reboot          q. exit menu without reboot
                                                  Time Remaining =  0
```

Updating Controller Firmware Example

```
ATTENTION NOTICE

ATTENTION:  USE OF THE SOFTWARE IS SUBJECT TO THE HP SOFTWARE LICENSE
TERMS CONTAINED IN THE "LICENSES.TXT" FILE AND THE "IPF OFFLINE
DIAGNOSTICS AND UTILITIES AS-IS WARRANTY STATEMENT" CONTAINED IN THE
"WARRANTY.TXT" FILE INCLUDED IN THE "\EFI\HP\DIAG\DOCUMENTATION\"
DIRECTORY OF THE PHYSICAL MEDIA ON WHICH THE SOFTWARE HAS BEEN
PROVIDED. USING THE SOFTWARE INDICATES YOUR ACCEPTANCE OF THESE
LICENSE TERMS. IF YOU DO NOT ACCEPT THESE LICENSE TERMS, YOU MAY RETURN
THE SOFTWARE FOR A FULL REFUND.



<End of file> press any key to quit:
```

Updating Controller Firmware Example

```
HP Itanium Processor Family Diagnostics and Utilities CD        Version A.01.23

  This CD provides diagnostic applications and tools to support and maintain
  HP systems based on the Intel IPF platform.
  Type the key which corresponds to your selection below:

  a. View CD Overview

  b. Run the Off-line Diagnostic Environment (ODE)

  c. Run CD Installer to install/update CD content to HPSP

  d. View Release Notes and Documentation Menu

  e. View I/O Cards FW Update and Configuration Utilities, MCA, and ICM Menu

  f. View License and Warranty Agreements Notice


  x. exit and reboot          q. exit menu without reboot <b>
```

Updating Controller Firmware Example

```
< (c) Hewlett-Packard Company, 2003-2009

**************************************************************************
******                                                              ******
******             Offline Diagnostic Environment                   ******
******                                                              ******
******  (C) Copyright Hewlett-Packard Co 1993-2008                  ******
******                    All Rights Reserved                       ******
******                                                              ******
******  HP shall not be liable for any damages resulting from the   ******
******  use of this program.                                        ******
******                                                              ******
******                TC  Version B.00.24                           ******
******                SysLib Version B.00.11                        ******
******                Mapfile Version B.01.37                       ******
******                                                              ******
**************************************************************************

Type HELP for command information.
ODE>
```

Updating Controller Firmware Example

```
ODE> ls

          Modules on this boot media are:

filename      type   size     created   description
-------------------------------------------------------------------------
CIODIAG2.EFI  TM     798720   11/13/2009  Core IO diagnostic
COPYUTIL.EFI  TM     1126400  11/13/2009  Disk-to-tape copy utility
CPUDIAG.EFI   TM     1454080  11/13/2009  Processor diagnostic
DFDUTIL.EFI   TM     942592   11/13/2009  Disk firmware download utility
FCFUPDATE.EFI TM     418816   11/13/2009  FW Update Utility for Fibre Channel
IODIAG.EFI    TM     262656   11/13/2009  Runs selftests on I/O modules
MAPPER.EFI    TM     1113600  11/13/2009  System mapping utility
MEMDIAG.EFI   TM     328192   11/13/2009  Memory diagnostic
PERFVER.EFI   TM     939520   11/13/2009  Runs ROM-based selftests on peripherals
PLUTODIAG.EFI TM     610816   11/13/2009  SBA/LBA diagnostic

ODE>
```

Updating Controller Firmware Example

```
ODE> fcfupdate

**************************************************************************
******                                                              ******
******                          FCFUPDATE                           ******
******                                                              ******
******          Copyright (C) 2009 by Hewlett-Packard Company       ******
******                       All Rights Reserved                    ******
******                                                              ******
******   HP shall not be liable for any damages resulting from the  ******
******   use of this program.                                       ******
******                                                              ******
******                         Version B.00.44                      ******
******                                                              ******
**************************************************************************


Scanning the system for supported cards ... No FC Cards found
Done


Searching for F/W files... Done
Update Protocol not found.  Aborting.

Type HELP for command information.
No supported IO Cards Found in the system
```

Updating Controller Firmware Example

```
*******************************************************************************
*                          List of Firmware Files found                       *
*******************************************************************************
File Name                    Version    Size       Vend ID & Dev ID Supported
-------------------------- ---------- ---------- --------------------------
fc_1_37.frm                  137        89088      0x103C    0x1029
a9782a_bc.frm                230        11288      0x14e4    0x16c7
brcm_efi.frm                 7000b      79360      0x14e4    0x16c7
i_03004800_193.frm           3004800    108032     0x8086    0x1026
i_03004800_194.frm           3004800    108032     0x8086    0x1079
i_03004800_331.frm           3004800    108032     0x8086    0x1026
i_03004800_332.frm           3004800    108032     0x8086    0x1027
i_03004800_7011.frm          3004800    108032     0x8086    0x107a
i_03004800_7012.frm          3004800    108032     0x8086    0x1079
i_3003_290.frm               3000030    123392     0x8086    0x1079
i_3003_545.frm               3000030    123392     0x8086    0x1079
c_03081400_221.frm           3081400    173056     0x8086    0x10a7
c_03081400_222.frm           3081400    173056     0x8086    0x10a7
c_03081400_339.frm           3081400    173056     0x8086    0x10bc
c_03081400_360m.frm          3081400    183808     0x8086    0x10d9
c_03081400_364m.frm          3081400    183808     0x8086    0x10da
c_03081400_393.frm           3081400    173056     0x8086    0x10a9

Continue ([y]/n)? n

FCFUPDATE> exit
```

Running Diagnostics

```
ODE> cpudiag

**********************************************************************
******                                                          ******
******                          CPUDIAG                         ******
******                                                          ******
******          Copyright (C) 2008 by Hewlett-Packard Company   ******
******                     All Rights Reserved                  ******
******                                                          ******
******   HP shall not be liable for any damages resulting from the   ******
******   use of this program.                                   ******
******                                                          ******
******                        Version B.00.71                   ******
******                                                          ******
**********************************************************************

CPUDIAG:ImageStart 0x00000040fdb68000 Size 0x000000000118e000

Type HELP for command information.
```

Running Diagnostics

```
Please wait, detecting if a MP system....
MP.EFI loaded at 0x40ffcc0000 size 0xaa000
Initializing MP Protocol Interface....
Done
Number of Processors = 2

Sent AP(1) Start Message

CPUDIAG> help

CPUDIAG Help

     Commands
     --------
     SECTION  -- Displays/Sets current test sections to execute
     DIAGINFO -- Displays the test sections covered by cpudiag
     UP       -- Test only one processor (the BSP)
     MP       -- Test all processors in the system
     SEED     -- Sets the default seed value to be used
     PROC     -- Selects which processors to test
     PSTAT    -- Displays information on processors to test
     BREAK    -- Sets breakpoints in diagnostic
     MASTER   -- Selects which cpu will play the master role in the Multi-processor tests
     GREG     -- Displays the static general registers
     CREG     -- Displays selected control and application registers
     FREG     -- Displays the static floating point registers registers
     CPUFREQ  -- Displays selected processor's actual frequency
     THREADS  -- Displays all the processors and their sibling threads


Continue ([y]/n)? y
```

Running Diagnostics

```
CPUDIAG> mp

2 processors are used in testing
CPUDIAG> run


STARTING EXECUTION OF CPUDIAG


SECTION 001
General register Test Section

Started Date : 9/11/2010  Time : 10:38:32

Sent AP(1) Start Message

Finished Date : 09/11/2010  Time : 10:38:32


SECTION 002
Bank register Test Section
.
.
.
Skipping Multi-Threaded Section:25.

RUN COMPLETED.
CPUDIAG>
```

Updating Firmware Example From EFI Shell

- You can use the EFI SHELL to manually find the command procedures to accomplish tasks as well:
  - **Set your default to the correct location**
  - **Execute the command procedure** (.nsh file)

Updating Firmware Example From EFI Shell

```
EFI Shell version 1.10 [14.61]
Device mapping table
  fs0  : Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)
  fs1  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,SigAFC31241-054A-11DF-9C6E-
AA000400FEFF)
  blk0 : Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)
  blk1 : Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)
  blk2 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)
  blk3 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,SigAFC31241-054A-11DF-9C6E-
AA000400FEFF)
  blk4 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part3,SigEDA77411-0D76-11DE-8901-
00306E3947DE)

Shell> fs0:

fs0:\> dir
Directory of: fs0:\

  11/13/09  02:24p <DIR>          1,024  EFI
         0 File(s)           0 bytes
         1 Dir(s)


fs0:\> cd efi

fs0:\EFI>
```

Updating Firmware Example From EFI Shell

```
fs0:\EFI> cd hp

fs0:\EFI\HP> dir
Directory of: fs0:\EFI\HP

  11/13/09  02:24p <DIR>          1,024  .
  11/13/09  02:24p <DIR>          1,024  ..
  11/13/09  02:24p <DIR>          1,024  DIAG
  11/13/09  02:27p <DIR>          1,024  TOOLS
          0 File(s)           0 bytes
          4 Dir(s)


fs0:\EFI\HP> cd tools

fs0:\EFI\HP\TOOLS> dir
Directory of: fs0:\EFI\HP\TOOLS

  11/13/09  02:27p <DIR>          1,024  .
  11/13/09  02:27p <DIR>          1,024  ..
  11/13/09  02:27p <DIR>          1,024  MCA_Utilities
  11/13/09  02:27p <DIR>          1,024  ilosetup
  11/13/09  02:27p <DIR>          1,024  icm_Utility
  11/13/09  02:27p <DIR>          1,024  IO_CARDS
  11/13/09  02:29p <DIR>          1,024  NetWork
  11/13/09  02:29p <DIR>          2,048  CD_Installer
  11/13/09  02:30p <DIR>          1,024  LaunchMenu
          0 File(s)           0 bytes
          9 Dir(s)


fs0:\EFI\HP\TOOLS>
```

Updating Firmware Example From EFI Shell

```
fs0:\EFI\HP\TOOLS> cd io_cards

fs0:\EFI\HP\TOOLS\IO_CARDS> dir
Directory of: fs0:\EFI\HP\TOOLS\IO_CARDS

  11/13/09  02:27p <DIR>          1,024  .
  11/13/09  02:27p <DIR>          1,024  ..
  11/13/09  02:27p <DIR>          1,024  Gigabit_PCIe
  11/13/09  02:27p <DIR>          1,024  SmartArray
  11/13/09  02:27p <DIR>          2,048  SAS
  11/13/09  02:28p <DIR>          1,024  U320_Scsi
  11/13/09  02:28p <DIR>          1,024  U160_Scsi
  11/13/09  02:28p <DIR>          1,024  ixgbe
  11/13/09  02:28p <DIR>          1,024  iexgbe
  11/13/09  02:28p <DIR>          1,024  icxgbe
  11/13/09  02:28p <DIR>          1,024  Ibautil64
  11/13/09  02:28p <DIR>          2,048  Gigabit
  11/13/09  02:29p <DIR>          1,024  FC4
  11/13/09  02:29p <DIR>          1,024  FC2
  11/13/09  02:29p <DIR>          1,024  FC
         0 File(s)           0 bytes
        15 Dir(s)


fs0:\EFI\HP\TOOLS\IO_CARDS> > cd fc2

fs0:\EFI\HP\TOOLS\IO_CARDS\FC2>
```

Updating Firmware Example From EFI Shell

```
fs0:\EFI\HP\TOOLS\IO_CARDS\FC2> dir
Directory of: fs0:\EFI\HP\TOOLS\IO_CARDS\FC2

  11/13/09  02:29p <DIR>          1,024  .
  11/13/09  02:29p <DIR>          1,024  ..
  03/29/07  06:45p              236,291  EfiUtil.pdf
  10/14/05  01:46p                  655  fcd_update2.nsh
  10/14/05  09:32p                  669  fcd_vpd.nsh
  03/30/07  02:39p               50,176  ql2312ef.bin
  03/30/07  02:39p               75,264  ql2312fw.bin
  06/26/07  05:31p                2,142  Readme.txt
  06/26/07  05:42p               26,401  ReleaseNotes.txt
  03/30/07  02:31p              122,368  efiaux.drv
  03/29/07  06:45p              304,068  EfiCfg.pdf
  03/28/07  06:07p       r      386,048  efiutil.efi
         10 File(s)   1,204,082 bytes
          2 Dir(s)


fs0:\EFI\HP\TOOLS\IO_CARDS\FC2>
```

Updating Firmware Example From EFI Shell

```
fs0:\EFI\HP\TOOLS\IO_CARDS\FC2> fcd_update2.nsh
fcd_update2.nsh> echo -off
Update the EFI driver and RISC firmware on all the fibre
channel adapters based on QLogic ISP23xx

Wait...

 Fibre Channel Card Efi Utility  2.30  (3/28/2007)
 No adapters found.
 No adapters connected to driver, exiting...
Exit status code: Not Found

If the screen does not indicate that every fibre channel
adapters is updated, you may need to execute search all
command from EFI shell, then repeat the procedure. Note that
search all command may take a long time. On some systems,
this command may fail because it is implemented only on some
HP Integrity servers.

When the operation is complete, enter EFI shell command RESET.

fs0:\EFI\HP\TOOLS\IO_CARDS\FC2> exit
```

Backing up the NVRAM

- The **NVRAMBKP Utility** allows you to backup all of your site customizations.
- Fills a common gap in backup strategies where the system console settings are not recorded.
- The alternative is documenting the console settings on paper and typing them in again when needed.
- There are two packages available:
  - nvrambkp_010301.zip Bootable CD-ROM ISO Image
  - nvrambkp_010301EFI.tar EFI package

Backing up the NVRAM

- These packages can be downloaded through http and the World Wide Web using the following method:

1. Connect to the Hewlett-Packard Support & Drivers home pages at: http://www.hp.com/go/bizsupport
2. Select Download drivers and software.
3. Enter the server model number (for example, BL870c) and then click >> to begin the search
4. Select the appropriate product from the Product search result
5. Select the Cross operating system (BIOS, Firmware, Diagnostics, etc.) section
6. Select Utility
7. Locate the appropriate utility package and click Download. (example IPF Offline Diagnostics and Utilities). These come out quarterly.

Backing up the NVRAM

- The packages include instructions how to use the utility. These steps are (assuming you download the ISO image).

1. Burn the ISO image to CD using a pc CD burning application
2. Insert the CD into the Integrity DVD drive.
3. Boot the Integrity into the EFI
4. Copy the utility to an EFI partition on one or more of the VMS disks
5. Run the application off of one of the read/write FS#'s to save the configuration.

- To recover the configuration you simply run the application from the EFI partition and use the restore qualifier..

Backing up the NVRAM Example

- **Example** Utility CD is mounted and therefore shows up as FS0:

```
Shell>
Map to the cd:

Shell> fs0:

fs0:\>
fs0:\> ls
Directory of: fs0:\

  10/10/08  12:20p <DIR>             512  EFI
          0 File(s)           0 bytes
          1 Dir(s)


fs0:\> cd EFI

fs0:\EFI> ls
Directory of: fs0:\EFI

  10/10/08  12:20p <DIR>             512  .
  10/10/08  12:20p <DIR>               0  ..
  10/10/08  12:20p <DIR>             512  HP
          0 File(s)           0 bytes
          3 Dir(s)


fs0:\EFI>
```

Backing up the NVRAM Example

```
fs0:\EFI> cd HP

fs0:\EFI\HP> ls
Directory of: fs0:\EFI\HP

  10/10/08  12:20p <DIR>            512  .
  10/10/08  12:20p <DIR>            512  ..
  10/10/08  12:20p <DIR>            512  FIRMWARE
         0 File(s)           0 bytes
         3 Dir(s)


fs0:\EFI\HP> cd FIRMWARE

fs0:\EFI\HP\FIRMWARE> LS
Directory of: fs0:\EFI\HP\FIRMWARE

  10/10/08  12:20p <DIR>            512  .
  10/10/08  12:20p <DIR>            512  ..
  10/03/08  03:55p                1,609  notice.txt
  10/03/08  12:12p              386,560  nvrambkp.efi
  10/03/08  12:35p                6,938  nvrambkp_readme.txt
  10/06/06  01:21a              590,336  TextViewer.efi
         4 File(s)     985,443 bytes
         2 Dir(s)
```

Backing up the NVRAM Example

- Copy the Utility to File System 1 (system disk EFI partition)

```
fs0:\EFI\HP\FIRMWARE> cp nvrambkp.efi fs1:
copying fs0:\EFI\HP\FIRMWARE\nvrambkp.efi -> fs1:\nvrambkp.efi
 - [ok]

fs0:\EFI\HP\FIRMWARE> fs1:

fs1:\>
fs1:\> ls
Directory of: fs1:\

  04/03/06  02:16p <DIR>          2,048  EFI
  10/03/08  12:12p              386,560  nvrambkp.efi
          1 File(s)     386,560 bytes
          1 Dir(s)

fs1:\>
```

Backing up the NVRAM Example

- Run utility –a (archive all) Archive name –l (log) Logfile name

```
fs1:\> nvrambkp.efi -a testconfig -l test.log

Hewlett-Packard (R) IPF Non-Volatile Configuration Back-up Utility
Version 01.03.01

Copyright (C) Hewlett-Packard.  All rights reserved.

Operation: Archive to testconfig
Archive Operation: Initiated

        Time-Stamp (local): Tue Dec 16 05:01:12 2008

Please provide creator's name [upto 24 char]:
> Jim Mehlhop

Is [Jim Mehlhop] ok? [y/n] > y

Add Comments? [y/n] > n
Archive: System Information
Archive: System ID Information
Archive: EFI NVRAM Information
Archive: ROM NVRAM Information
Operation: Archive to testconfig Completed
```

Backing up the NVRAM Example

```
fs1:\> dir
Directory of: fs1:\

  04/03/06  02:16p <DIR>          2,048  EFI
  10/03/08  12:12p              386,560  nvrambkp.efi
  12/16/08  12:01p                6,044  test.log
  12/16/08  12:01p                2,489  testconfig
          6 File(s)     406,664 bytes
          1 Dir(s)
 fs1:\>
```

Backing up the NVRAM Example

- Run utility to restore setting –r (restore) Archive file name –l (log) Log file name

```
fs1:\>  nvrambkp.efi -r testconfig -l testrestore.log

Hewlett-Packard (R) IPF Non-Volatile Configuration Back-up Utility
Version 01.03.01

Copyright (C) Hewlett-Packard.  All rights reserved.

Operation: Restore from testconfig
Restore Operation: Initiated
Restore: ROM NVRAM Information
Restore: System ID Information
Restore: EFI NVRAM Information
Operation: Restore from testconfig Completed
System Reset: Issued!
```

Backing up the NVRAM Example

```
MP MAIN MENU:

         CO: Console
        VFP: Virtual Front Panel
         CM: Command Menu
         CL: Console Log
         SL: Show Event Logs
         HE: Main Help Menu
          X: Exit Connection

 [ia64] MP> co


        (Use Ctrl-B to return to MP main menu.)


- - - - - - - - - - Prior Console Output - - - - - - - - - -
Copyright (C) Hewlett-Packard.  All rights reserved.
.
.
.
System Reset: Issued!

- - - - - - - - - - - - - Live Console - - - - - - - - - - - - -
************************************************************
* ROM Version : 02.31
```

Question & Answer

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