Oracle® x86 Server Diagnostics, Applications, and Utilities Guide

for Servers with Oracle ILOM 3.1 and Oracle ILOM 3.2.x

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Oracle x86 Server Diagnostics, Applications, and Utilities Guide

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Using This Documentation

This manual provides instructions for performing diagnostics for your server. It is intended for technicians, system administrators, and authorized Oracle service providers, and users who have experience managing system hardware, and includes information on other applications or utilities that you might find useful, such as NIC Teaming.

- "Getting the Latest Firmware and Software" on page 11
- "Documentation and Feedback" on page 11
- "About This Documentation" on page 12
- "Change History" on page 12

Getting the Latest Firmware and Software

Firmware, drivers, and other hardware-related software for each Oracle x86 server, server module (blade), and blade chassis are updated periodically.

You can obtain the latest version in one of three ways:

- Oracle System Assistant – This is a factory-installed option for Sun Oracle x86 servers. It has all the tools and drivers you need and resides on a USB drive installed in most servers.
- My Oracle Support – `https://support.oracle.com`

For more information, see "Getting Server Module Firmware and Software" on page 133.

Documentation and Feedback

Documentation	Link
All Oracle products	`http://www.oracle.com/technology/documentation/index.html`
Oracle ILOM	`http://www.oracle.com/goto/ILOM/docs`

Provide feedback on this documentation at: http://www.oracle.com/goto/docfeedback.

About This Documentation

This documentation set is available in both PDF and HTML. The information is presented in topic-based format (similar to online help) and therefore does not include chapters, appendixes, or section numbering.

Change History

The following lists the release history of this documentation set:

- December 2011. Initial publication.
- May 2012. Added NIC Teaming and HWdiag.
- April 2014. Added UEFI diagnostic tests and updates to support ILOM 3.2.x
- October 2014. Added new option to UEFI diagnostic tests.
- April 2015. Technical corrections and editorial improvements.
- January 2016. Technical updates.
- June 2016. Updated information for UEFI Diagnostics Tests.

About the Diagnostics Guide

This document describes the diagnostics tools available for Oracle x86 servers equipped with Oracle Integrated Lights Out Manager (ILOM) 3.1 and Oracle ILOM 3.2.x, and provides information about other applications and utilities, such as NIC Teaming.

For information about Oracle ILOM, refer to the *Oracle ILOM Documentation Library* at:

`http://www.oracle.com/goto/ILOM/docs`

This document includes the following sections.

Description	Link
See descriptions of the diagnostic tools for your server.	“Introduction to System Diagnostics” on page 15
Learn how to systematically troubleshoot your server.	“Diagnostic Strategies” on page 17
Perform preliminary checks on your server.	“Preliminary Troubleshooting Procedures” on page 21
Use the U-Boot diagnostics to check Oracle ILOM.	“U-Boot Diagnostic Start-Up Tests” on page 25
Use the preboot diagnostics to diagnose and repair problems with Oracle ILOM.	“Fixing Problems with Oracle ILOM Using the Preboot Menu” on page 35
Learn what is tested during BIOS POST.	“BIOS POST” on page 45
Use Oracle ILOM to monitor the host and to create a snapshot of the system state.	“Using Oracle ILOM to Monitor Server Components” on page 49
Use SunVTS to diagnose problems with the functionality and connectivity of server hardware components.	“Using SunVTS Diagnostics Software” on page 57
Use Pc-Check to diagnose server hardware problems. Use this test for servers that are **older** than Sun Server X4-4.	“Performing Pc-Check Diagnostic Tests” on page 61
Use UEFIdiag to diagnose server problems. Use this test for Sun Server X4-4 and **newer** systems.	“Performing UEFI Diagnostics Tests” on page 75
Configure NIC teaming on Windows.	“Configuring NIC Teaming” on page 117
Use the HWdiag utility to check the status of system components.	“Checking System Components with HWdiag” on page 127
Instructions for getting server module firmware and software.	“Getting Server Module Firmware and Software” on page 133

Introduction to System Diagnostics

This section lists and describes the Oracle diagnostic tools for x86 servers equipped with Oracle ILOM 3.1 and Oracle ILOM 3.2.x. It includes the following topics:

Description	Link
Lists the diagnostic tools available	“Diagnostic Tools” on page 15
Shows the diagnostic tools' coverage	“Diagnostic Test Coverage” on page 16

Diagnostic Tools

The following diagnostic tools are available for your server.

Tool	Description	Link
U-Boot Diagnostics	U-Boot automatically tests basic hardware functions to ensure that there is enough functionality to boot the SP.	“U-Boot Diagnostic Start-Up Tests” on page 25
Oracle ILOM Preboot Menu	The Oracle ILOM preboot menu can be used to fix problems with Oracle ILOM that cannot be fixed while it is running. It allows you to interrupt the Oracle ILOM boot process, configure settings, then continue booting. Among other things, it allows you to reset the Oracle ILOM root password to factory defaults, restore Oracle ILOM access to the serial port, and update the SP firmware.	“Fixing Problems with Oracle ILOM Using the Preboot Menu” on page 35.
BIOS POST	At system startup, the BIOS performs a power-on self-test (POST) that checks the hardware on your server to ensure that all components are present and functioning properly. It displays the results of these tests on the system console.	“BIOS POST” on page 45
Service processor (Oracle ILOM)	Oracle ILOM displays the status of system components. You can then replace a failed component, which often clears the problem.	“Using Oracle ILOM to Monitor Server Components” on page 49
SunVTS	SunVTS provides a comprehensive diagnostic tool that verifies the connectivity and functionality of most hardware controllers	“Using SunVTS Diagnostics Software” on page 57

Tool	Description	Link
	and devices. SunVTS is the preferred test for diagnosing I/O and SBA problems.	
Pc-Check	The Pc-Check diagnostics can test and detect problems on all motherboard components, drives, ports, and slots. It is used on systems that are **older** than Sun Server X3-2.	"Performing Pc-Check Diagnostic Tests" on page 61.
UEFIdiag	The UEFI diagnostics can test and detect problems on all CPU, memory, disk drives, and network ports. It is used on Sun Server X4-4 and newer systems.	"Performing UEFI Diagnostics Tests" on page 75

Diagnostic Test Coverage

The following table lists the system components and shows which utility can be used to either test them or get status information about them.

Server Component	U-Boot	Preboot Menus	BIOS POST	Oracle ILOM	Oracle VTS	PC-Check or UEFIdiag	HWdiag
Service processor	Yes	Yes	No	Yes	Partial	No	Yes
CPU and memory	No	No	Yes	Yes	Yes	Yes	Yes
I/O hub	No	No	No	Yes	Yes	Yes	Yes
I/O controller hub	No	No	No	Yes	Yes	Yes	Yes
Fans	No	No	No	Yes	No	No	Yes
Power supplies	No	No	No	Yes	No	No	Yes
Storage devices	No	No	No	Yes	Yes	Yes	No
Storage drive backplane	No	No	No	Yes	Yes	Yes	No
Network interface	No	No	No	Yes	Yes	Yes	Yes

Diagnostic Strategies

This section provides strategies for using the diagnostic tools to troubleshoot your Oracle x86 server. It includes the following sections:

Description	Link
Suggested diagnostic order	“Suggested Diagnostic Order” on page 17
Scenarios for verifying server operation and troubleshooting problems	“Server Verification and Troubleshooting Scenarios” on page 18

Suggested Diagnostic Order

The following table lists the suggested order of troubleshooting procedures when you have an issue with the server.

Step	Troubleshooting Task	Link
1	Gather initial service visit information.	“Gather Service Visit Information” on page 22
2	Investigate any power-on problems.	“Troubleshoot Power Problems” on page 22
3	Perform *external* visual inspection.	“Externally Inspect the Server” on page 23
4	Perform *internal* visual inspection.	“Internally Inspect the Server” on page 23
5	If Oracle ILOM is not working correctly, test it with the U-Boot diagnostic and the preboot menus.	“U-Boot Diagnostic Start-Up Tests” on page 25 “Fixing Problems with Oracle ILOM Using the Preboot Menu” on page 35
6	Look at the Oracle ILOM Summary view and the Open Problems view. Replace any failed components.	“Check Component Status Using the Oracle ILOM Web Interface” on page 49
7	View BIOS event logs and POST messages.	“BIOS POST” on page 45

Step	Troubleshooting Task	Link
8	Use HWdiag commands for failing subsystem.	"Checking System Components with HWdiag" on page 127
9	Run SunVTS, or run either Pc-Check or UEFIdiag. ■ Pc-Check and UEFIdiag run when the system boots. ■ SunVTS can be booted from a CD/DVD or ISO image, or can be started by a command line on the Oracle Solaris operating system.	"Using SunVTS Diagnostics Software" on page 57 "Performing Pc-Check Diagnostic Tests" on page 61 (for older systems) "Performing UEFI Diagnostics Tests" on page 75 (for Sun Server X4-4 or newer)
10	Collect diagnostics data for Oracle Service.	"Creating a Data Collector Snapshot" on page 53

Server Verification and Troubleshooting Scenarios

Diagnostic tests can be used to verify the operation of a server when it is newly installed, when it is upgraded or modified, and when it fails. The following sections list the common testing scenarios:

New Server

Run the following diagnostic tests before installing any options:

- U-Boot
- Pc-Check or UEFIdiag
- HWdiag

Tests failed: If the tests identify a server failure:

- Check the product notes or release notes for the product or option for any known conditions that might cause a diagnostic test to fail.
- If you do not solve the problem by looking in the product notes or release notes, assume that the server was damaged in shipment. Terminate the installation process, and notify Oracle Service. This ensures that the server is covered under warranty.

If you experience a network connectivity problem when placing a server into service for the first time, ensure that the network access point for the server is activated.

Note - Not all U-Boot and Pc-Check/UEFIdiag tests are applicable to all servers.

Tests passed: If the server passes the tests and has no options to install, you can place it into service.

If the server passes the test and has options to install, install the options and re-run the tests.

- If it passes the test with the options installed, you can place it into service.
- If the diagnostic tests reveal that an installed option is faulty, remove the option and return it for replacement.

Upgrading a Server That Has Been In Service

Before installing a server upgrade (memory, hard disk drives, I/O cards, or power supply), take the server out of service and run the diagnostic tests:

1. Take the server out of service.
2. Run the U-Boot diagnostic tests.
3. Run the Pc-Check, UEFIdiag., or HWdiag diagnostic tests.
4. Install the server upgrade.
5. Run the U-Boot, HWdiag, and Pc-Check or UEFIdiag diagnostic tests again.

Tests failed: If the diagnostic tests fail, one of the installed options was faulty or the server was damaged when you installed the options. In either case, remove and replace the faulty component, run the diagnostic tests again to confirm that the problem has been corrected, and place the server into service.

Tests passed: Place the server into service.

Note - If the failed component is a non-replaceable component on the server's motherboard, return the motherboard to Oracle for repair, or order a replacement motherboard and have it replaced in the field by authorized service personnel.

New Problem on Existing Server

The server has been operating problem free for a long time, and the Service Action Required LED on the server's front panel illuminates.

Do the following:

1. Before opening the server's cover, inspect the server and Oracle ILOM service processor (SP) log files for obvious fault messages and any fault LEDs. Refer to your service documentation for details.

2. Inspect the server's internal components for obvious problems, such as burnt components, or anything that might inhibit proper cooling of a server component.
3. If the visual inspection does not identify a failed component, run the U-Boot tests and then the Pc-Check or UEFIdiag diagnostic tests to identify the failed component.
4. If the tests do not identify the failed component, run SunVTS.
5. If the failed component is a customer-replaceable unit (CRU), replace it. For each model, CRUs are defined in the service manual, the System Handbook, and My Oracle Support.
6. If the failed component is a field-replaceable unit (FRU), initiate a service request with Oracle Service. FRUs are defined in the service manual for the particular server model.

Note - If the failed component is a non-replaceable component on the server's motherboard, return the motherboard to Oracle for repair, or order a replacement motherboard and have it replaced in the field by authorized service personnel.

Preliminary Troubleshooting Procedures

This section describes the troubleshooting actions that might help you identify problems quickly and prepare for the more extensive troubleshooting procedures described later.

These sections describe the preliminary procedures:

Description	Link
How to check for known issues	“Check for Known Issues” on page 21
How to gather service visit information	“Gather Service Visit Information” on page 22
How to troubleshoot power problems	“Troubleshoot Power Problems” on page 22
How to externally inspect the server	“Externally Inspect the Server” on page 23
How to internally inspect the server	“Internally Inspect the Server” on page 23

▼ Check for Known Issues

Product notes and release notes provide information about late-breaking problems. They include a description of each problem and methods to repair the problem or work around it.

1. **Check the server product notes or software release notes for known issues related to the problem you are trying to fix.**

   You can often find the problem and the solution to the problem in the product notes and the release notes.

   Product notes and release notes sometimes contain information about the diagnostic tools themselves. For example, they might say that under certain circumstances, a specific diagnostic test failure can be ignored.

2. **If you find your problem listed, follow the instructions to repair it or work around it.**

   Often, following the instructions in the product notes or release notes is the first and last step in troubleshooting a problem with your server.

Gather Service Visit Information

The first step in determining the cause of the problem with the server is to gather whatever information you can from the service-call paperwork or the on-site personnel. Use the following general guidelines when you begin troubleshooting.

1. **Collect information about the following items:**
   - Events that occurred prior to the failure
   - Whether any hardware or software was modified or installed
   - Whether the server was recently installed or moved
   - How long the server exhibited symptoms
   - The duration or frequency of the problem
2. **Document the server settings before you make any changes.**

   If possible, make one change at a time to isolate potential problems. In this way, you can maintain a controlled environment and reduce the scope of troubleshooting.
3. **Take note of the results of any change you make. Include any errors or informational messages.**
4. **Check for potential device conflicts, especially if you have added a new device.**
5. **Check for version dependencies, especially with third-party software.**

Troubleshoot Power Problems

- **If the server does not power on:**
  - **Check that AC power cords are attached firmly to the server's power supplies and to the AC sources.**
  - **Check the PSU Fault LED on the power supplies. If any of them are on, that power supply is in a faulted state.**
  - **Check that the Power/OK LED on the server front panel is steady on. If it is blinking, the server is in standby power mode. For instructions to bring it to full power mode, refer to your server's installation or administration documentation.**

- **Run the HWdiag `cpld vrcheck` test and inspect the output for errors.**

Externally Inspect the Server

1. **Inspect the external status indicator LEDs, which can indicate component malfunction.**

   For the LED locations and descriptions of their behavior, refer to your server's installation or administration documentation.

2. **Verify that nothing in the server environment is blocking air flow or making a contact that could short out power.**

3. **If the problem is not evident, continue with "Internally Inspect the Server" on page 23.**

Internally Inspect the Server

1. **Choose a method for shutting down the server from main power mode to standby power mode.**

   - **Graceful shutdown**: Press and release the Power button on the front panel. This causes Advanced Configuration and Power Interface (ACPI)-enabled operating systems to perform an orderly shutdown of the operating system. Servers not running ACPI-enabled operating systems shut down to standby power mode immediately.
   - **Emergency shutdown**: Press and hold the Power button for four seconds to force main power off and enter standby power mode.

     When main power is off, the Power/OK LED flashes.

Caution - When the server is in standby power mode, power is still directed to the service processor board and the power supply fans. To remove power completely, disconnect the AC power cords from the server back panel.

2. **Access your server's internal components.**

   Refer to your installation guide or service manual for details.

3. **Inspect the internal status indicator LEDs as described in your installation guide or service manual.**

4. **Verify that there are no loose or improperly seated components.**

5. **Verify that all cable connectors inside the system are firmly and correctly attached to their appropriate connectors.**

6. **Verify that any after-factory components are qualified and supported.**

   For a list of supported PCI cards and DIMMs, refer to your service manual.

7. **Check that the installed DIMMs comply with the supported DIMM population rules and configurations as described in your service manual.**

8. **Reassemble your server.**

   Refer to your installation guide or service manual for details.

9. **To restore full power mode to the server, (all components powered on), press and release the Power button on the server front panel.**

   When main power is applied to the full server, the Power/OK LED next to the Power button blinks intermittently until BIOS POST finishes.

10. **If the problem with the server is not evident, you can try viewing the power-on self-test (POST) messages and BIOS event logs during system startup.**

    See "BIOS POST" on page 45 or refer to the your service manual for more information about POST and BIOS event logs.

U-Boot Diagnostic Start-Up Tests

This section describes how to configure the U-Boot diagnostic test mode and how to read the results.

The U-Boot diagnostic tests the hardware to ensure that enough functionality is present to allow the SP to boot. It runs automatically when the server is started or rebooted.

The following table lists the topics in this section:

Description	Link
Lists the options for U-Boot testing	"U-Boot Test Options" on page 25
Describes how to run the U-Boot diagnostic tests and view the results	"Running the U-Boot Diagnostic Tests and Viewing the Results" on page 26
Describes the U-Boot test output	"U-Boot Diagnostic Test Output" on page 27

Note - If any test fails, the SP does not boot.

The tested hardware includes:

- SP memory
- Network devices
- I/O devices
- I2C devices
- USB connections

U-Boot Test Options

U-Boot diagnostic tests run in one of three modes: normal, quick, or extended. Normal mode is the default; quick or extended modes can be selected as described in "Running the U-Boot Diagnostic Tests and Viewing the Results" on page 26.

The tests in each mode include:

U-Boot Component Test	Quick	Normal	Extended	Description
Memory Data Bus Test	X	X	X	Checks for opens and shorts on the SP memory data bus.
Memory Address Bus Test	X	X	X	Checks for opens and shorts on the SP memory address bus.
Memory Data Integrity Test			X	Checks for data integrity on the SP memory.
Flash Test			X	Checks access to flash memory.
WatchDog Test		X	X	Checks the watchdog functionality on the SP.
I2C Probe Tests		X	X	Checks the connectivity to I2C devices on standby power.
Ethernet Test	X	X	X	Verifies ability to read from the specified Ethernet port.
Ethernet Link Test	X	X	X	Verifies link on the specified PHY.
Ethernet Internal Loopback Test		X	X	Verifies Ethernet functionality by sending and receiving packets.
Real Time Clock Test		X	X	Checks functionality of the real-time clock on the SP.
BIOS Flash ID Test		X	X	Verifies ability to read from the BIOS flash.
Serial Presence Detect (SPD) Access Test			X	Verifies DIMM SPD access along with checksum, and prints SPD information.
NAND Controller and Chip Test	X	X	X	Tests the NAND flash chip.

Running the U-Boot Diagnostic Tests and Viewing the Results

U-Boot diagnostic tests run automatically when the server is started or booted. However:

- You must connect a serial terminal to the serial port on the SP to see the output.

  You can tell whether the tests passed or failed by looking command output. See "U-Boot Diagnostic Test Output" on page 27 for details.

  When Oracle ILOM is running, you can see additional information about the test results in the environmental variables. Refer to your Oracle ILOM documentation for more information.
- Before the tests start you can select quick or extended mode.

  If you do nothing the tests run in normal mode.

For information about running the tests, see "Run the U-Boot Diagnostic Tests" on page 27.

▼ Run the U-Boot Diagnostic Tests

1. **Attach a serial terminal to the SER MGT port on the SP.**

   Refer to your server's documentation for details.

2. **Power on or restart the server.**

   Refer to your server's installation or administration guide for details.

3. **Watch for the following prompt and do one of the following:**

   ```
   Enter Diagnostics Mode {'q'uick/'n'ormal (default)/e'x'tended]...
   ```

   - To run in normal mode, type `n` or let the countdown continue to run.
   - To enable Quick U-Boot tests, type `q`.
   - To enable Extended U-Boot component tests, type `x`.

4. **Read the output, as described in "U-Boot Diagnostic Test Output" on page 27.**

   If any test fails, the test stops at that test and displays a FAILED message, and the SP does not boot. Further actions might include:

   - **If you were running in normal mode, consider running the tests in extended mode.**
   - **Contact Oracle support.**

See Also "U-Boot Diagnostic Test Output" on page 27

U-Boot Diagnostic Test Output

This section shows examples of the U-Boot diagnostic tests in normal, quick, and extended mode.

If a test fails, the following message should appear:

Test `... FAILED`

For instructions to run the U-Boot diagnostic tests, see "Running the U-Boot Diagnostic Tests and Viewing the Results" on page 26.

U-Boot Output in Normal Test Mode

```
U-Boot 1.1.4

Custom AST2100 U-Boot 2.0 (Jan 26 2009 - 10:29:26) r41480
DRAM:  119 MB

Flash bank 0 at 10000000 has 0x2000000 bytes in 256 sectors (chipSize 1--25,
size_ratio 1).

Flash: 32 MB

readonly: ethaddr=00:14:4F:CA:B5:10
readonly: eth1addr=00:14:4F:CA:B5:11

VUART1 already enabled at port 0x03f8, SerIRQ[4] rise

Protecting U-Boot flash sectors; monitor_base=100a0000.
Negating BIOS_TOP_BLOCK_LOCK signal.

H/W: Sun Fire X4800 M2 Service Processor; SOC: AST2100 Rev. 02 ('A3')
PWC_SP_Broken_OD = 0;  ARM restart caused by: watch-dog ExtRst# pin
The host is OFF(S5) (hostWantsPwr=0, powerGood=0,
allowPwrOn=0|0, outOfReset=0, fatalError=0).
Reset straps=0x88819180, def. H-PLL=264 MHz, CPU/AHB=2:1, boot CS0# normal speed
PCI w/VGA noVBIOS;  DRAM clock is M-PLL: 264 MHz (DDR2-528)
DRAM: 128MB data - 8MB VGA, 32-bit noECC, 2 BA 10 CA, CL=4 BL=4 ap=1, 61440 us refr

Board Revision - cc
Net:   faradaynic#0, faradaynic#1
Enter Diagnostics Mode ['q'uick/'n'ormal(default)/e'x'tended(manufacturing mode)].....0

Diagnostics Mode - QUICK

DIAGS Memory Data Bus Test ... PASSED
DIAGS Memory Address Bus Test ... PASSED
DIAGS PHY #0 R/W Test ... PASSED
DIAGS PHY #0 Link Status ... PASSED
Booting linux in 3 seconds...
```

Sample U-Boot Output in Quick Test Mode

```
U-Boot 1.1.4

Custom AST2100 U-Boot 2.0 (Jan 26 2009 - 10:29:26) r41480
```

```
DRAM:  119 MB

Flash bank 0 at 10000000 has 0x2000000 bytes in 256 sectors
(chipSize 1--25, size_ratio 1).

Flash: 32 MB

readonly: ethaddr=00:14:4F:CA:B5:10
readonly: eth1addr=00:14:4F:CA:B5:11

VUART1 already enabled at port 0x03f8, SerIRQ[4] rise

Protecting U-Boot flash sectors; monitor_base=100a0000.
Negating BIOS_TOP_BLOCK_LOCK signal.

H/W: Sun Fire X4800 M2 Service Processor; SOC: AST2100 Rev. 02 ('A3')
PWC_SP_Broken_OD = 0;  ARM restart caused by: watch-dog ExtRst# pin
The host is OFF(S5) (hostWantsPwr=0, powerGood=0,
allowPwrOn=0|0, outOfReset=0, fatalError=0).
Reset straps=0x88819180, def. H-PLL=264 MHz, CPU/AHB=2:1, boot CS0# normal speed
PCI w/VGA noVBIOS;  DRAM clock is M-PLL: 264 MHz (DDR2-528)
DRAM: 128MB data - 8MB VGA, 32-bit noECC, 2 BA 10 CA, CL=4 BL=4 ap=1, 61440 us refr

Board Revision - cc
Net:   faradaynic#0, faradaynic#1
Enter Diagnostics Mode ['q'uick/'n'ormal(default)/e'x'tended(manufacturing mode)].....0

Diagnostics Mode - QUICK

DIAGS Memory Data Bus Test ... PASSED
DIAGS Memory Address Bus Test ... PASSED
DIAGS PHY #0 R/W Test ... PASSED
DIAGS PHY #0 Link Status ... PASSED
Booting linux in 3 seconds...
```

Sample U-Boot Output in Extended Test Mode

```
U-Boot 1.1.4

Custom AST2100 U-Boot 2.0 (Jan 26 2009 - 10:29:26) r41480

DRAM:  119 MB
Flash bank 0 at 10000000 has 0x2000000 bytes in 256 sectors(chipSize 1-25,
size_ratio 1).
Flash: 32 MB
```

```
readonly: ethaddr=00:14:4F:CA:B5:10
readonly: eth1addr=00:14:4F:CA:B5:11

VUART1 already enabled at port 0x03f8, SerIRQ[4] rise

Protecting U-Boot flash sectors; monitor_base=100a0000.

Negating BIOS_TOP_BLOCK_LOCK signal.

H/W: Sun Fire X4800 M2 Service Processor; SOC: AST2100 Rev. 02 ('A3')
PWC_SP_Broken_OD = 0;  ARM restart caused by: watch-dog ExtRst# pin
The host is OFF(S5) (hostWantsPwr=0, powerGood=0,
allowPwrOn=0|0, outOfReset=0, fatalError=0).
Reset straps=0x88819180, def. H-PLL=264 MHz, CPU/AHB=2:1, boot CS0#
normal speed
PCI w/VGA noVBIOS;  DRAM clock is M-PLL: 264 MHz (DDR2-528)
DRAM: 128MB data - 8MB VGA, 32-bit noECC, 2 BA 10 CA, CL=4 BL=4 ap=1,
61440 us refr

Board Revision - cc

Net:   faradaynic#0, faradaynic#1
Enter Diagnostics Mode
['q'uick/'n'ormal(default)/e'x'tended(manufacturing mode)] 0

Diagnostics Mode - EXTENDED(Manufacturing Mode)

DIAGS Memory Data Bus Test ... PASSED
DIAGS Memory Address Bus Test ... PASSED
DIAGS Testing 0MB to 24MB (TEXT_BASE - 7 MB) ... PASSED
DIAGS Testing 32MB (TEXT_BASE + 1MB) to 128MB ... PASSED
DIAGS Flash ID Test - Flash Bank 1 ... PASSED
DIAGS Testing Watchdog ... PASSED

I2C Probe Test - Motherboard

Bus  Device  Address  Results
========================================

1  Temp. Sensor(LM75) (U3006)    0x90   PASSED
2  Sys FRUID (U3003)    0xA0  PASSED
2  CPU0 Fault LED's (U3001)    0x40  PASSED
2  CPU1 Fault LED's (U3002)     0x42  PASSED
2  PCA9555 (Misc) (U3005)    0x44  PASSED
2  DIMM IMAX (U3102)     0x12   PASSED
6  Bank Panel Led's (U2701)    0xC6 PASSED
6  DS1338(RTC) ( U803)    0xD0  PASSED
```

```
I2C Probe Test - Chassis (2U)

Bus  Device  Address  Results
========================================
PDB Board

1  PCA9548 Mux (U0202)    0xE0   PASSED
1  PDB FRUID (U0203)    0xAA   PASSED
1  MAX7313 (U0201)    0x40  PASSED

Power Supply 0

Bus  Device  Address  Results
========================================

1  0   PS 0 FRUID   ( - )    0xAC  PASSED
1  0   PS 0 CTRL    ( - )    0x7C   PASSED

Power Supply 1

Bus  Device  Address  Results
========================================

1  1   PS 1 FRUID   ( - )   0xAC   PASSED
1  1   PS 1 CTRL    ( - )   0x7C   PASSED

Fan Module  1

Bus  Device  Address  Results
========================================

1  2   FM 1 FRUID   (U0203)     0xAC   PASSED
1  2   FM 1 PCA9555 (U0201)    0x42   PASSED
1  2   FM 1 ADT7462 (U0202)    0xB8   PASSED

Fan Module  0

Bus  Device  Address  Results
========================================

1  3   FM 0 FRUID   (U0203)     0xAC   PASSED
1  3   FM 0 PCA9555 (U0201)     0x42   PASSED
1  3   FM 0 ADT7462 (U0202)     0xB8  PASSED

16 Disk Backplane

Bus  Device  Address  Results
========================================
```

```
1   4   BP MAX7313 (U1801) 0x44   PASSED
1   4   BP FRUID (U2102)    0xAC   PASSED

Paddle Card
Bus  Device  Address  Results
========================================

1   4   EXP FRUID (U0401)    0xAE   PASSED

DIAGS PHY #0 R/W Test ... PASSED
DIAGS PHY #0 Link Status ... PASSED
DIAGS ETHERNET PHY #0, Internal Loopback Test ... PASSED
DIAGSTesting RTC ... PASSED
DIAGS USB 1.1 Register Test ... PASSED
DIAGS USB2.0 Register Test ... PASSED
DIAGS USB 1.1 Test ... PASSED
DIAGSAccess to BIOS Flash ... PASSED

CPU0 D0 ... Not Present
CPU0 D1 ... Not Present
CPU0 D2 ... Present

DIAGS > Verifying DIMM SPD Checksum on CPU0 D2 ... PASSED
SDRAM DEVICE      DDR3 SDRAM
MODULE TYPE       RDIMM
SDRAM SIZE       2 GB
NUMBER OF ROWS & COLUMNS       14 Row x 11 Column
CYCLE TIME      DDR3 533Mhz clock(1066data rate)
MANUFACTURER_JEDEC_ID_CODE       Micron
MANUFACTURED DATE       Week 18 of '08
MODULE SERIAL NUMBER      EA09445A
MODULE_PART_NUMBER       18JSF25672PY-1G1D

CPU0 D3 ... Not Present
CPU0 D4 ... Not Present
CPU0 D5 ... Not Present
CPU0 D6 ... Not Present
CPU0 D7 ... Not Present
CPU0 D8 ... Not Present
CPU1 D0 ... Not Present
CPU1 D1 ... Not Present
PU1 D2 ... Present

DIAGSVerifying DIMM SPD Checksum on CPU1 D2 ... PASSED
SDRAM DEVICE      DDR3 SDRAM
MODULE TYPE      RDIMM
SDRAM SIZE      2 GB
```

```
NUMBER OF ROWS & COLUMNS       14 Row x 11 Column
CYCLE TIME      DDR3 533Mhz clock(1066data rate)
MANUFACTURER_JEDEC_ID_CODE     Micron
MANUFACTURED DATE       Week 18 of '08
MODULE SERIAL NUMBER       EA09445B
MODULE_PART_NUMBER       18JSF25672PY-1G1D

CPU1 D3 ... Not Present
CPU1 D4 ... Not Present
CPU1 D5 ... Not Present
CPU1 D6 ... Not Present
CPU1 D7 ... Not Present
CPU1 D8 ... Not Present

Booting linux in 3 seconds...
```

Fixing Problems with Oracle ILOM Using the Preboot Menu

The Oracle ILOM Preboot menu is a utility that can be used to fix problems with Oracle ILOM that cannot be fixed while it is running. It allows you to interrupt the Oracle ILOM boot process, configure settings, then continue booting Oracle ILOM.

Caution - Security Hazard. Depending on the configuration, use of the Preboot menu might cause security vulnerabilities for your hardware and software. For maximum security, restrict use of the Preboot menu to the physical location of the server. The check_physical_presence setting in Oracle ILOM should remain enabled (true). For more information about possible security vulnerabilities when using the Preboot menu, refer to your platform Security Guide.

This section includes the following subjects:

Description	Link
Describes how to access the Preboot menu.	"Accessing the Preboot Menu" on page 35
Provides a summary of Preboot menu commands.	"Preboot Menu Command Summary" on page 38
Describes how to use the `edit` command to configure the Preboot menu.	"Use the `edit` Command to Configure the Preboot Menu" on page 39
Describes how to use the Preboot menu to restore Oracle ILOM access to the serial console.	"Restoring Oracle ILOM Access to the Serial Console" on page 41
Describes how to recover the SP firmware image using the Preboot menu.	"Recover the SP Firmware Image Using the Preboot Menu" on page 42

Accessing the Preboot Menu

To access the Preboot menu, you must boot the SP and interrupt the SP boot process.

Caution - Security Hazard. Depending on the configuration, use of the Preboot menu might cause security vulnerabilities for your hardware and software. For maximum security, restrict use of the Preboot menu to the physical location of the server. The check_physical_presence setting in Oracle ILOM should remain enabled (true). For more information about possible security vulnerabilities when using the Preboot menu, refer to your platform Security Guide.

There are two ways to interrupt the SP boot process:

- Manually by holding the Locate button while booting the SP.
- By typing **xyzzy** during a pause in the SP bootstrap process.

The first method requires you to have physical access to the server. The second method can be done remotely. The following procedure includes both methods.

For procedures, see "Access the Preboot Menu" on page 36.

Access the Preboot Menu

Before You Begin

The Preboot menu runs at 9600 baud only. This cannot be changed.

You must use a terminal or a terminal emulator. You cannot use an SSH, or an RKVMS session.

Before using the Preboot menu, set the terminal or terminal emulator to communicate at 9600 baud.

Caution - Security Hazard. Connecting a terminal or terminal server to the serial port potentially exposes the server to unauthorized access.

1. **Connect a terminal or a computer running terminal emulation software to the server's serial management port using an RJ45 serial cable.**
   Refer to the *Oracle ILOM Documentation Library* for additional details.
2. **Ensure that the terminal or computer running terminal emulation software is set for 9600 baud.**
3. **Use one of the following methods to boot the SP and interrupt the boot process:**
   - **Recommended - Maximizes security**
     a. **Enable check_physical_presence. In the Oracle ILOM CLI, type:**
        `set /SP check_physical_presence=true.`

b. Boot the SP.

Remove AC power from the system then restore it, or in the Oracle ILOM CLI, type **`reset /SP`**.

c. Press and hold the Locate button on the server front panel until the Preboot menu appears.

- **Not Recommended - Increases security risks**

a. Disable check_physical_presence. In the Oracle ILOM CLI, type:

```
set /SP check_physical_presence=false
```

b. Boot the SP.

Remove AC power from the system then restore it, or in the Oracle ILOM CLI, type **`reset /SP`**.

c. When you see the following message, type `xyzzy`:

```
Booting linux in n seconds...
```

If this message does not appear, or appears and passes too quickly to enter the command, use the Locate button to access the Preboot menu.

The Oracle ILOM Preboot menu appears as shown here.

```
Booting linux in 10 seconds...

ILOM Pre-boot Menu
------------------
Type "h" and [Enter] for a list of commands, or "?" [Enter] for
command-line key bindings.  Type "h cmd" for summary of 'cmd' command.

Warning: SP will warm-reset after 300 seconds of idle time.
Set 'bootretry' to -1 to disable the time-out.

Preboot>
```

4. When you have finished, enter the boot command to exit the Preboot menu and start Oracle ILOM. Type: `boot`

Caution - Security Hazard. You must enable check_physical_presence to maintain system security.

5. **Once Oracle ILOM has booted, enable check_physical_presence. In the Oracle ILOM CLI, type:**

   ```
   check_physical_presence=true
   ```

Note - You can also enable and disable check_physical_presence in the Preboot menu. For details, see "Use the `edit` Command to Configure the Preboot Menu" on page 39.

Next Steps

- "Preboot Menu Command Summary" on page 38
- "Use the `edit` Command to Configure the Preboot Menu" on page 39

Preboot Menu Command Summary

Command	Description and Options
`boot`	Boots the SP. The Preboot menu closes and the SP boots. **Note -** This command executes a modified boot sequence that does not offer the choice to select the diagnostic level, or to interrupt the boot sequence and return to the Preboot menu. To execute the normal boot sequence, use the `reset warm` command instead.
`vers`	Displays version information including the hardware type, board revision, Oracle ILOM revision, revisions of PBSW and recovery U-Boot. Shows the checksum integrity of the images, and the preference between redundant images.
`help`	Displays a list of commands and parameters.
`show`	Displays a list of SP settings.
`edit`	Starts an interactive dialog that prompts and changes settings one by one. See "Use the `edit` Command to Configure the Preboot Menu" on page 39 for details.
`diag`	Runs the U-Boot diagnostic tests in manual mode. For more on U-Boot diagnostic tests, see "U-Boot Diagnostic Start-Up Tests" on page 25.
`net`	`{ config | dhcp | ping | flash }` ■ `config` - Starts a dialog that allows you to change the Oracle ILOM network settings. ■ `dhcp` - Changes the network addressing from static to DHCP. **Note -** You must set `ipdiscovery=dhcp` using the `net config` command first. ■ `ping` - Sends a ping. ■ `flash` - Downloads an Oracle ILOM firmware image. See "Recover the SP Firmware Image Using the Preboot Menu" on page 42. Type **`help net`** *command* for more details on these commands.
`reset`	{[`warm ]| cold` }. Resets the SP and the host. ■ `warm` - Resets the SP without affecting a running host.

Command	Description and Options
	■ cold - Resets the SP and the host. Powers off the server.
unconfig	{ ilom_conf | most | all } Causes the specified values to return to defaults the next time Oracle ILOM boots. **Note -** Oracle ILOM operates as it was until it is rebooted. None of these options erases the dynamic FRU PROMs. ■ ilom_conf - Resets configuration settings but preserves SP network and baudrate, preferred, and check_physical_presence. ■ most - Resets the SP data storage, but preserves network settings and baudrate, preferred, and check_physical_presence settings. **Note -** The most option is not available on ILOM 3.2.2 or newer. ■ all - Resets all SP data storage and settings.

Related Information

- "Use the edit Command to Configure the Preboot Menu" on page 39

▼ Use the edit Command to Configure the Preboot Menu

1. **Access the Preboot menu.**

   For more information, see "Accessing the Preboot Menu" on page 35.

   Note - Until check_physical_presence is disabled, the only way to interrupt the SP boot process is to hold the Locate button down while the SP is booting.

2. **At the Preboot prompt, type:**

   ```
   Preboot> edit
   ```

   The Preboot menu enters edit mode. In edit mode, the Preboot menu displays its selections one-by-one, offering you a chance to change each one.

   - To change a setting, type the new value, and then press Enter.
   - To skip to the next setting, press Enter.

3. **Press Enter to move through the settings until you reach the settings you wish to change.**

   The menu displays the settings and values one by one:

   ```
   Values for setting are {list of values }.
   ```

```
Set setting?            [value]
```

4. **To change a setting, type the new value.**

   The new value must be from the displayed list of values.

5. **Press Enter.**

   The Preboot menu asks you to confirm your changes:

```
Enter 'y[es]' to commit changes: [no]
```

6. **Type `y` to exit the edit session and save your changes.**

   To exit without saving your changes, type **`n`**.

   The following display shows an edit session where the `bootdelay` and `check_physical_presence` settings are changed. See the table that follows for a description of `edit` command settings:

```
Preboot> edit

Press Enter by itself to reach the next question.
Press control-C to discard changes and quit.

Values for baudrate are {[ 9600 ]| 19200 | 38400 | 57600 | 115200 }.
Set baudrate?               [9600]
Values for serial_is_host are {[ 0 ]| 1 }.
Set serial_is_host?         [0]
Values for bootdelay are { -1 | 3 | 10 | 30 }.
Set bootdelay?              [30] 10
Values for bootretry are { -1 | 30 | 300 | 3000 }.
Set bootretry?              [-1]
Values for diags_mode are {[ Normal ]| Quick | Extended | Skip }.
Set diags_mode?             [Normal]
Values for preferred are {[ 0 ]| 1 }.
Set preferred?              [<not set>]
Values for preserve_conf are {[ yes ]| no }.
Set preserve_conf?          [yes]
Values for check_physical_presence are {[ yes ]| no }.
Set check_physical_presence? [no] no
Enter 'y[es]' to commit changes: [no] y
Summary: Changed 2 settings.
Preboot>
```

Setting	Description
`baudrate`	Sets the baud rate of the serial port. Selections include 9600,19200, 38400, 57600, and 115200.

Setting	Description
	Note - This setting remains at 9600 (baud). Do not change it.
`serial_is_host`	If this is set to 0, the serial port connects to Oracle ILOM. If this is set to 1, the serial port connects to the host.
`bootdelay`	The number of seconds the bootstrap process waits for the user to type **`xyzzy`** before booting the SP.
`bootretry`	The number of seconds the Preboot menu waits for user input before timing out and starting the SP. Set to –1 to disable the timeout.
`diags_mode`	Normal, quick, extended, skip.
`preferred`	Not used.
`preserve_conf`	Setting this to `no` duplicates the function of the `unconfig ilom_conf` command, which resets many Oracle ILOM configuration settings, but preserves SP network, `baudrate`, and `check_physical_presence` settings the next time the SP is booted.
`check_physical_presence`	If this is set to `Yes`, you must press and hold the Locate button to interrupt the SP boot process. If it is set to `No`, the boot process prompts you to interrupt it. For details, see "Use the `edit` Command to Configure the Preboot Menu" on page 39.

Next Steps

- "Use the Preboot Menu to Restore Oracle ILOM Access to the Serial Console" on page 41
- "Recover the SP Firmware Image Using the Preboot Menu" on page 42

Restoring Oracle ILOM Access to the Serial Console

The serial port can be configured to connect to the server's Oracle ILOM service processor (SP) or to the host console.

- The serial port is configured to go to the SP by default.
- If the serial port is configured to connect to the host, and you cannot access Oracle ILOM over the network, you can use this procedure to reconfigure it to connect to Oracle ILOM.

▼ Use the Preboot Menu to Restore Oracle ILOM Access to the Serial Console

1. **Access the Preboot menu.**

   For more information, see "Accessing the Preboot Menu" on page 35.

2. **At the Preboot prompt, type:**

```
Preboot> edit
```

The Preboot menu enters edit mode.

In edit mode, the Preboot menu displays its selections one by one, offering you a chance to change each one.

- To change a setting, type the new value, and then press Enter.
- To skip to the next setting, press Enter.

3. **Press Enter to move through the settings until the `serial_is_host` setting appears.**

   To change the `serial_is_host` setting, type **`0`**, and then press Enter.

   The Preboot menu redisplays the `serial_is_host` setting with the value **`0`**.

4. **Press Enter.**

   The next setting appears.

5. **Press Enter to scroll through the settings until the Preboot menu asks you to confirm your changes.**

   ```
   Enter 'y[es]' to commit changes: [no]
   ```

6. **Type `y` to confirm your change.**

   The Preboot menu displays this message:

   ```
   Summary: Changed 1 settings.
   Preboot>
   ```

▼ Recover the SP Firmware Image Using the Preboot Menu

The Preboot menu provides the ability to recover the Oracle ILOM firmware image by updating (flashing) the SP firmware.

Normally, if the host is running, you can update the SP using the Oracle ILOM CLI or the web interface.

If the host is powered off and the SP firmware image becomes corrupted (making the server SP inaccessible using Oracle ILOM), you can use the following procedure to update it using the Preboot menu.

Note - This feature is not supported on Sun Server X4-4, Sun Server X4-8, or newer.

Before You Begin

To update the SP firmware, you must have the correct `.pkg` file, and a TFTP server that your server's SP can access over a network connection.

The `.pkg` file is part of the firmware package. For information about getting firmware packages, see "Getting Server Module Firmware and Software" on page 133.

1. **Access the Preboot menu.**
   For more information, refer to "Accessing the Preboot Menu" on page 35.

2. **At the Preboot prompt, type:**
   `Preboot>` **`net config`**
   `Preboot>` **`net dhcp`**
   This configures a DHCP network.
   You need to be connected to a network that has access to the TFTP server.

3. **Type:**
   `Preboot>` **`net ping`** *tftpIPaddress*
   where *tftpIPaddress* is the IP address of a TFTP server.
   This checks to see if the TFTP server is accessible over the network.

4. **Enter the command:**
   `Preboot>` **`net flash`** *tftpIPaddress path/* **`ILOM-`***version***`-`***server***`.pkg`**
   where:

   - *tftpIPaddress* is the IP address of a TFTP server
   - *path* is the path to the file relative to `/tftpboot`
   - *version* is the version of SP firmware
   - *server* is the name of your server

   For example:

   ```
   Preboot> net flash 192.12.173.25 images/ILOM-3_0_x_x_rxxxx-Sun_Fire_X4800M2.pkg
   ```

   This downloads and flashes the firmware image. After a series of messages, the Preboot prompt appears.

5. **Restart the SP. Type:**

```
Preboot> reset
```

The Preboot menu exits and service processor reboots.

BIOS POST

This section provides information about BIOS POST diagnostics. It includes:

Description	Link
Lists and describes the default BIOS power-on self test (POST) events	“Default BIOS POST Events” on page 45
Lists and describes the BIOS POST errors	“BIOS POST Errors” on page 46

Default BIOS POST Events

At system startup, the BIOS performs a power-on self-test (POST) that checks the hardware on your server to ensure that all components are present and functioning properly. It displays the results of these tests on the system console.

The following table identifies the events that can occur during BIOS POST, and specifies whether these event can prevent the host from powering on.

Event	Cause	Boot continues on host?
User password violation	Attempt to enter password fails three times.	No
Setup password violation	Attempt to enter password fails three times.	No
Correctable ECC	Correctable ECC (error correction code) error detected.	Yes
Uncorrectable ECC	Uncorrectable ECC error detected.	Yes
No system memory	No physical memory detected in the system.	No
No usable system memory	All installed memory has experienced an unrecoverable failure.	No
Boot media failure	No removable boot media is found.	Yes
CMOS set to optimal defaults	Load optimal defaults.	Yes
CMOS time and data error	RTC is invalid.	Yes

Event	Cause	Boot continues on host?
IOH errors reported	IOH errors.	Yes
CMOS battery low	CMOS battery is low.	Yes
System restart	System boot initiated.	Yes
Initiated by hard reset	Boot process started by hard reset.	Yes
Memory initialization	Memory sizing is occurring. System firmware progress.	Does not apply
Motherboard initialization	Primary CPU initialization.	Does not apply
Secondary processor initialization	Secondary CPU initialization. System firmware progress.	Does not apply
Initiated by warm reset	Boot process started by warm reset.	Does not apply
Embedded controller management	Management controller initialization.	Does not apply
PCI resource initialization	BIOS initializes PCI resources.	Does not apply
Video initialization	BIOS initializes video.	Does not apply
USB resource configuration	BIOS configures USB resources.	Does not apply
Option ROM initialization	BIOS initializes Option ROMs. System firmware progress.	Does not apply
Not enough option ROM space allocated for device	BIOS cannot copy an option to the memory. This is likely due to a large number of PCIe EMs attached to the system.	Maybe booting over an EM not possible.
User initiated system set up	End user initiated access to BIOS Setup Utility. System firmware progress.	Does not apply
User initiated boot to OS	System boot initiated. System firmware progress.	Does not apply
No bootable media	Nothing to boot from.	No
PXE server not found	Boot error - PXE server not found.	No
ACPI power state	Soft-off power on (S0) or off (S5).	Does not apply
Not enough IO address space allocated for device	Cannot allocate resources to an on-board device (PCIe EM, REM, FEM), and slot is disabled.	Yes

BIOS POST Errors

Each power-on self-test (POST) diagnostic is a low-level test designed to pinpoint faults in a specific hardware component. If a POST diagnostic discloses an error, it typically reports the following information about the error:

- Type of error detected
- When or where the error occurred

The following table lists some of the error messages that might appear during the POST diagnostics, and provides instructions for resolving the errors.

Note - Contact Oracle Service for information about interpreting and applying the Oracle ILOM log information that you receive on these errors.

BIOS POST Error Message	Error Type	Resolution
Uncorrectable Error Detected on Last Boot:IOH(0) Protocol Error (Please Check SP Log for more Details)	IOH error	Check the fault management function and the SP event log in Oracle ILOM for more details.
Uncorrectable Error Detected on Last Boot:IOH(0) QPI [*x*] Error (Please Check SP Log for more Details) **Note -** Where QPI [*x*] equals 0 for QPI Link 0 or 1 for QPI Link 1.	IOH error	Check the fault management function and the SP event log in Oracle ILOM for more details.
Uncorrectable Error Detected on Last Boot:IOH(0) PCI-E [*x*] Error (Please Check SP Log for more Details) **Note -** Where PCI-E [*x*] port number can range from 1 to 10 depending on the PCI root port on IOH.	IOH error	Check the fault management function and the SP event log in Oracle ILOM for more details.
Uncorrectable Error Detected on Last Boot:IOH(0) ESI Error (Please Check SP Log for more Details)	IOH error	Check the fault management function and the SP event log in Oracle ILOM for more details.
Uncorrectable Error Detected on Last Boot:IOH(0) Thermal Error (Please Check SP Log for more Details)	IOH error	Check the fault management function and the SP event log in Oracle ILOM for more details.
Uncorrectable Error Detected on Last Boot:IOH(0) Miscellaneous Error (Please Check SP Log for more Details)	IOH error	Check the fault management function and the SP event log in Oracle ILOM for more details.
Uncorrectable Error Detected on Last Boot:IOH(0) VT-d Error (Please Check SP Log for more Details)	IOH error	Check the SP event log in Oracle ILOM for more details. Check the fault management function and the SP event log in Oracle ILOM for more details.
BMC Not Responding	Oracle ILOM error	This error message might appear if an internal error occurs during the SP-BIOS communication. This error might require you to restart the SP.
Hard disk error	SAS error	Check the SP event log in Oracle ILOM for more details. **Note -** These error messages appear when the BIOS is attempting to configure SAS devices in POST.
Bad PBR sig	Hard disk error	This is caused by a corrupted or nonexistent partition table on the disk drive. A disk utility (Oracle Solaris format or Linux fdisk) must be used to format the tables again.
RAM R/W test failed	Memory test failure	Check the SP event log in Oracle ILOM for more details.

BIOS POST Error Message	Error Type	Resolution
		Note - This type of error typically indicates that the RAM read/write test failed.
CMOS Battery Low	CMOS battery error	■ Check the SP event log in Oracle ILOM for more details. ■ If necessary, replace the CMOS battery.
■ CMOS Checksum Bad ■ CMOS Date/Time Not Set	CMOS error	Check the SP event log in Oracle ILOM for more details.
Password check failed	Password check error	Check the SP event log in Oracle ILOM for more details. **Note -** This type of error indicates that the password entered does not match the password specified in the BIOS Setup Utility. This condition might occur for both Supervisor and User password verification.

Using Oracle ILOM to Monitor Server Components

This section includes the following procedures:

Description	Link
Provides instructions for checking component status using the Oracle ILOM web interface.	"Check Component Status Using the Oracle ILOM Web Interface" on page 49
Provides instructions for checking component status using the Oracle ILOM command line interface.	"Check Component Status Using the Oracle ILOM Command-Line Interface" on page 51
Provides instructions for creating a data collector snapshot.	"Creating a Data Collector Snapshot" on page 53

Note - Your Oracle ILOM screen might look slightly different from what is shown in these procedures. However it should work the same.

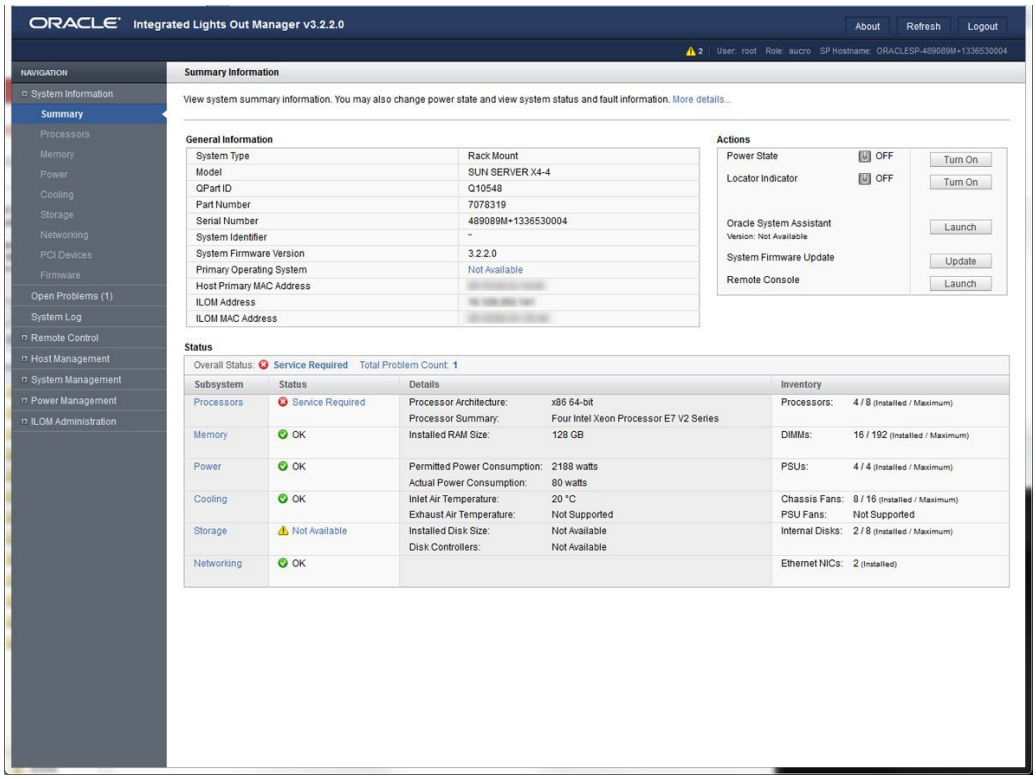
For information about Oracle ILOM, refer to the *Oracle ILOM Documentation Library* at:

`http://www.oracle.com/goto/ILOM/docs`

▼ Check Component Status Using the Oracle ILOM Web Interface

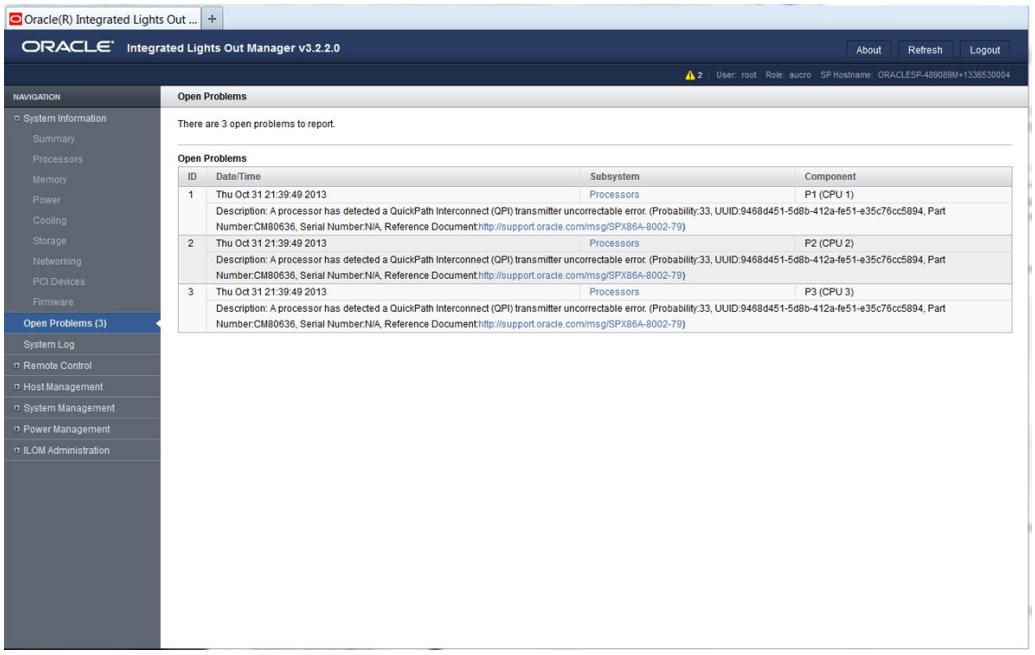
1. **Log in to the ILOM Web interface.**

The Oracle ILOM Summary page appears.



2. **Click Open Problems.**

The Open Problems page displays a list of open problems.



3. **To fix problems, repair or replace any failed devices.**

   Oracle ILOM normally clears open problems after the indicated device is repaired or replaced. On some devices, it does not do this. For these, see the *Oracle ILOM Documentation Library* at:

   `http://www.oracle.com/goto/ILOM/docs`

▼ Check Component Status Using the Oracle ILOM Command-Line Interface

The Oracle ILOM CLI allows you to list, display, and clear faults.

Before You Begin Viewing faults requires Read Only (o) permission. Clearing them requires Administration (a) permission.

1. **Log in to the Oracle ILOM CLI.**

2. **There are two ways to view faults through the CLI:**

   - **Type:** **`show /System/Open_Problems`**

     A display like the following appears:

```
-> show /System/Open_Problems

Open Problems (3)
Date/Time                Subsystems          Component
-----------------------  ------------------  ------------
Thu Oct 31 21:39:49 2013  Processors          P1 (CPU 1)
        A processor has detected a QuickPath Interconnect (QPI) transmitter
        uncorrectable error. (Probability:33,
        UUID:9468d451-5d8b-412a-fe51-e35c76cc5894, Part Number:CM80636, Serial
        Number:N/A, Reference
        Document:http://support.oracle.com/msg/SPX86A-8002-79)
Thu Oct 31 21:39:49 2013  Processors          P2 (CPU 2)
        A processor has detected a QuickPath Interconnect (QPI) transmitter
        uncorrectable error. (Probability:33,
        UUID:9468d451-5d8b-412a-fe51-e35c76cc5894, Part Number:CM80636, Serial
        Number:N/A, Reference
        Document:http://support.oracle.com/msg/SPX86A-8002-79)
Thu Oct 31 21:39:49 2013  Processors          P3 (CPU 3)
        A processor has detected a QuickPath Interconnect (QPI) transmitter
        uncorrectable error. (Probability:33,
        UUID:9468d451-5d8b-412a-fe51-e35c76cc5894, Part Number:CM80636, Serial
        Number:N/A, Reference
        Document:http://support.oracle.com/msg/SPX86A-8002-79)
```

   - **Type:** **`show faulty`**

Note - The `show faulty` command is a shortcut for the following Oracle ILOM CLI command string: -> `show -o table -level all /SP/faultmgmt`. The alias produces the same output as the previous command. This enables you to view all active faults in the system in a concise, tabular form. For example, it produces output similar to the following:

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+---------------------------------
/SP/faultmgmt/0     | fru                    | /SYS
/SP/faultmgmt/0/    | class                  | fault.chassis.device.missing
faults/0            |                        |
/SP/faultmgmt/0/    | sunw-msg-id            | SPX86-8000-4S
faults/0            |                        |
/SP/faultmgmt/0/    | uuid                   | 8acb45f9-fb70-e5d0-b73c-f8e5ea32
faults/0            |                        | c52a
```

```
/SP/faultmgmt/0/    | timestamp              | 2010-02-19/02:58:20
faults/0            |                        |
/SP/faultmgmt/0/    | product_serial_number  | 12345678-abcdefghi
faults/0            |                        |
/SP/faultmgmt/0/    | chassis_serial_number  | 12345678-abcdefghi
faults/0            |                        |
/SP/faultmgmt/0/    | power_supply           | 2
faults/0            |                        |
/SP/faultmgmt/0/    | event_key              | 2
faults/0            |                        |
```

3. **To clear a fault, repair or replace the faulted component.**

   The system clears the fault when the new component is installed.

   Oracle ILOM clears most faults when the indicated component is repaired or replaced. If Oracle ILOM does not clear the fault, see the *Oracle ILOM Documentation Library* at:

   http://www.oracle.com/goto/ILOM/docs

Creating a Data Collector Snapshot

The Oracle ILOM Service Snapshot utility is used to collect data for use by Oracle Services personnel, who use the data to diagnose system problems. You should not run this utility unless requested to do so by Oracle Services.

This section includes:

- "Create a Snapshot With the Oracle ILOM Web Interface" on page 53
- "Create a Snapshot With the Oracle ILOM Command-Line Interface" on page 55

▼ Create a Snapshot With the Oracle ILOM Web Interface

Before You Begin To perform this procedure, you need the Admin (a) role enabled.

Caution - You should not run this utility unless requested to do so by Oracle Services.

1. **Log in to the Oracle ILOM web interface.**

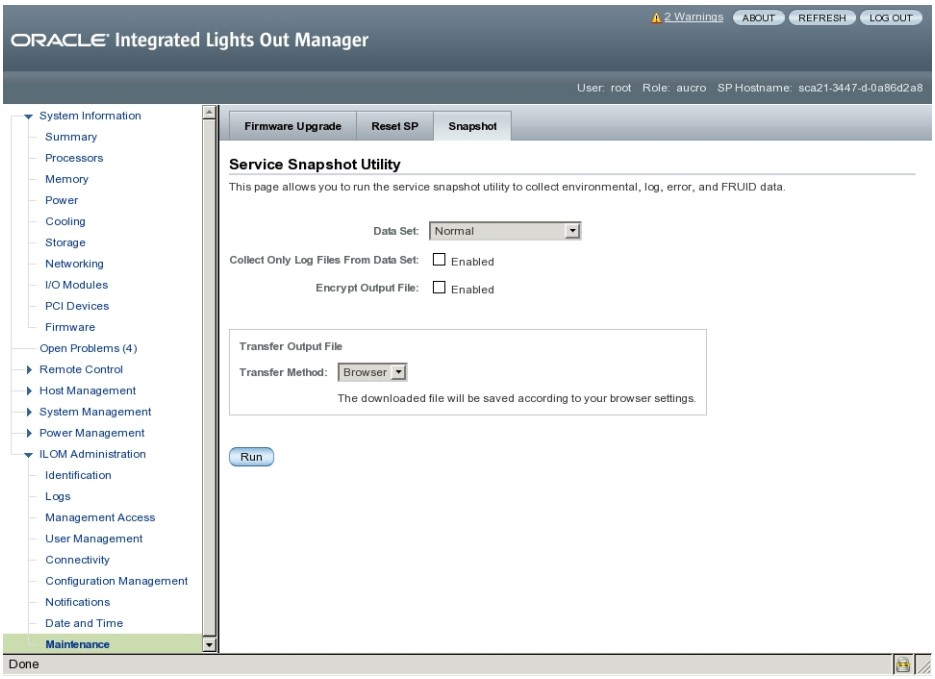
2. **In the navigation pane, click ILOM Administration —> Maintenance.**

   The Firmware Upgrade page appears.

3. **Click the Snapshot tab.**

   The Service Snapshot Utility page appears.

Note - Some Oracle ILOM windows might look slightly different.



4. **Click the data set you want:**

   - **Normal – Specifies that Oracle ILOM, operating system and hardware information is collected.**
   - **FRU ID – Provides FRU ID information.**
   - **Full – Specifies that all data is collected. Clicking Full might reset the system.**

- **Custom – Allows you to select one or more of the following data sets:**
  - ILOM data
  - Hardware data
  - Diagnostic data
  - Basic OS data
  - FRUID data

5. **Click the Enabled check box if you want to collect only log files from the data set.**
6. **Click the Enabled check box if you want to encrypt the output file.**
7. **Select one of the following methods to transfer the output file:**
   - Browser
   - SFTP
   - FTP
8. **Click Run.**
   A Save As dialog box appears.
9. **In the dialog box, specify the directory to which to save the file and the file name.**
10. **Click OK.**
    The utility places a zip file in the specified directory.
11. **Unzip the file to access the data produced by the snapshot.**

Note - Use `openssl` to decrypt an encrypted file.

▼ Create a Snapshot With the Oracle ILOM Command-Line Interface

Before You Begin To collect SP data using the Service Snapshot utility, you need the Admin (a) role enabled.

Caution - You should not run this utility unless requested to do so by Oracle Services.

1. **Log in to the Oracle ILOM CLI.**

2. **To configure the type of data that the snapshot collects, type:**

   ->**set /SP/diag/snapshot dataset=***value*

   where *value* is one of the following:

   - **normal** – Collect information about Oracle ILOM, host operating system, and hardware configuration.
   - **normal-logonly** – Collect only log files
   - **FRUID** – Collect information about installed FRUs, in addition to the data set collected for Normal.
   - **fruid-logonly** – Collect only log files.
   - **full** – Collect the maximum information about the server. This option could cause the server to reset.
   - **full-logonly** – Collect only log files.

3. **To encrypt the output, type:**

   -> **set /SP/diag/snapshot encrypt_output=***[true|false]*

4. **To create the snapshot, type:**

   ->**set /SP/diag/snapshot dump_uri=***URI*

   URI takes the form: *protocol://username:password@host/directory* where *protocol* is sftp or ftp.

   If you set **encrypt_output=true**, the system prompts for a password that is used later to decrypt the output.

   The snapshot places a zip file in the specified URI.

5. **Unzip the file to access the data produced by the snapshot.**

Using SunVTS Diagnostics Software

The Sun Validation Test Suite (SunVTS) provides a comprehensive suite of diagnostic tools that test and validate Oracle hardware by verifying the connectivity and functionality of most hardware controllers and devices on Oracle platforms.

This section includes the following topics:

Description	Link
Introduces and describes the SunVTS diagnostic test suite	"SunVTS Diagnostic Test Suite Overview" on page 57
Describes the different types of SunVTS log files	"SunVTS Log Files" on page 58
Describes how to access the SunVTS documentation	"SunVTS Documentation" on page 58
Describes how to diagnose server problems using the bootable diagnostics CD	"Diagnose Server Problems With the Bootable Diagnostics CD" on page 59

SunVTS Diagnostic Test Suite Overview

SunVTS is provided with the Oracle Solaris operating system and can be downloaded for other systems. It can be started from an Oracle Solaris command line, or booted from an ISO image or CD/DVD using Oracle ILOM redirection.

SunVTS provides a comprehensive diagnostic tool that tests and validates Oracle hardware by verifying the connectivity and functionality of most hardware controllers and devices on Oracle platforms.

SunVTS software has a graphical user interface (GUI) that provides test configuration and status monitoring. The user interface can be run on one system to display the SunVTS testing of another system on the network. SunVTS software also provides a TTY-mode interface for situations in which running a GUI is not possible.

The following tests are available in SunVTS:

- Processor

- Memory
- Disk
- Graphics
- Media
- IO ports
- Interconnects
- Network
- Environment
- HBA

SunVTS Log Files

SunVTS software provides access to four different log files:

- **SunVTS test error log** – Contains time-stamped SunVTS test error messages.

  The log file path name is `/var/sunvts/logs/sunvts.err`. This file is not created until a SunVTS test failure occurs.
- **SunVTS kernel error log** – Contains time-stamped SunVTS kernel and SunVTS probe error messages. SunVTS kernel errors are errors that relate to running SunVTS, and not to testing of devices.

  The log file path name is `/var/sunvts/logs/vtsk.err`. This file is not created until SunVTS reports a SunVTS kernel error.
- **SunVTS information log** – Contains informative messages that are generated when you start and stop the SunVTS test sessions.

  The log file path name is `/var/sunvts/logs/sunvts.info`. This file is not created until a SunVTS test session runs.
- **Solaris system message log** – A log of all the general Solaris events logged by `syslogd`.

  The path name of this log file is `/var/adm/messages`.

SunVTS Documentation

For the most up-to-date information about SunVTS, go to:

`http://docs.oracle.com/cd/E19719-01/index.html`

Diagnose Server Problems With the Bootable Diagnostics CD

1. **Use one of the following methods to start SunVTS:**

   - On a Solaris system, type `/usr/sunvts/bin/startsunvts`.

     Note - SunVTS is resource-intensive. When running it from the command line, it is advisable to close any non-essential applications on your system.

   - On any system:

     1. Download the SunVTS ISO file. Refer to your server download page for details.
     2. After downloading the ISO image, copy it to a local drive or a to a CD/DVD.
     3. Use Oracle ILOM redirection to boot the ISO image. Refer to your Oracle ILOM documentation for information about redirection.

     Note - SunVTS can take as long as nine minutes to boot.

2. **Press Enter or click the Start button when you are prompted to start the tests.**

   The test suite runs until it encounters an error or the test is completed.

3. **When the test stops, review the log files generated during the test.**

   For a description of the log files, see "SunVTS Log Files" on page 58.

   a. **Click the Log button.**

      The log file window appears.

   b. **Specify the log file that you want to view by selecting it.**

      The content of the selected log file appears in the window.

   c. **Use the three lower buttons to perform the following actions:**

      - **Print the log file.**

        A dialog box appears for you to specify your printer options and printer name.

      - **Delete the log file.**

        The file remains displayed, but it is gone the next time you try to display it.

- **Close the log file window.**

  The window closes.

Performing Pc-Check Diagnostic Tests

This section describes how to use the Pc-Check diagnostic tests provided through the Oracle Integrated Lights Out Manager (ILOM). The Pc-Check diagnostics can test and detect problems on all motherboard components, drives, ports, and slots.

The diagnostic tests in this section are for Sun servers that are **older than** Sun Server X4-4. For Sun Server X4-4 or newer, use the UEFIdiag tests provided in “Performing UEFI Diagnostics Tests” on page 75.

This section includes the following topics:

Description	Link
Provides an overview of Pc-Check	“Pc-Check Diagnostics Overview” on page 61
Describes how to run Pc-Check diagnostics	“Run Pc-Check Diagnostics” on page 62
Describes the contents of the Pc-Check main menu	“Pc-Check Main Menu” on page 65
Describes the contents of the Pc-Check system information menu	“System Information Menu” on page 65
Describes how to use advanced diagnostics	“Advanced Diagnostics” on page 66
Describes how to use burn-in testing	“Burn-In Testing” on page 68
Describes how to view the Pc-Check results	“Viewing the Pc-Check Results” on page 71

Pc-Check Diagnostics Overview

If you are having a problem with your system, you can use the Pc-Check diagnostic tests to diagnose and possibly solve the problem.

To run Pc-Check, use Oracle ILOM to select testing options, and then boot the server.

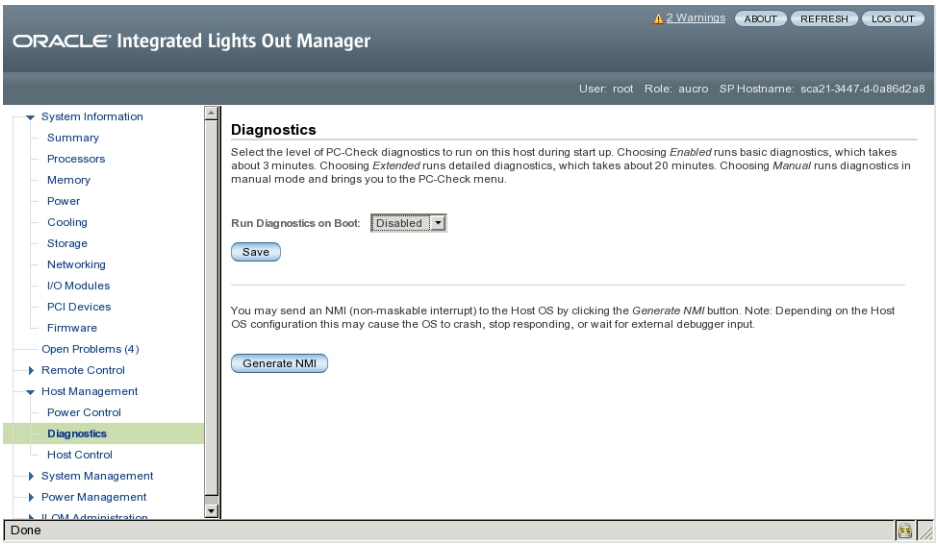
The only way you can see the results of Pc-Check diagnosis is to run Pc-Check in manual mode. The output is displayed on a monitor or serial console connected to the system. See “Viewing the Pc-Check Results” on page 71.

Note - On some systems with eight Combo GbE/8Gb FC Express Module HBA cards and four Sun Dual 10GbE 12 SFP+ PCIe 2.0 cards, Pc-Check incorrectly reports network card test failures. If this occurs, turn off SR-IOV in BIOS by setting Advanced > I/O Virtualization > SR-IOV > **Disabled**. Be sure to re-enable SR-IOV when you have finished.

▼ Run Pc-Check Diagnostics

1. **Ensure that the host is in standby power mode.**
   - **The Power/OK LED on the front panel should be flashing.**
   - **The Oracle ILOM System Information page should indicate that the host power is off.**
2. **Log in to the Oracle ILOM web interface.**
3. **Click Host Management —> Diagnostics.**

   The Diagnostics page appears.



4. **From the Run Diagnostics on Boot list, select the level of Pc-Check diagnostics to be run.**

   - **Manual** – Runs Pc-Check in manual mode and brings you to a Pc-Check menu.
   - **Disabled** – Pc-Check does not run. Use this selection for normal system operation.
   - **Enabled** – Runs basic diagnostics and takes about 3 minutes.

     This selection is reserved for Oracle Service personnel.
   - **Extended** – Runs detailed diagnostics and takes about 30 minutes.

     This selection is reserved for Oracle Service personnel.

5. **Click Host Control.**

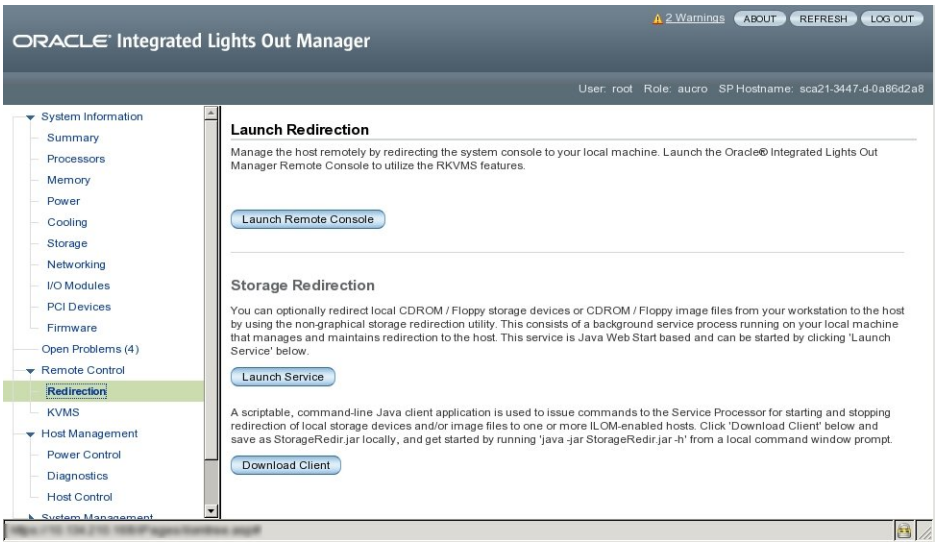
6. **Click Diagnostic partition from the Next Boot Device menu.**

7. **Click the Save button.**

8. **Start redirection:**

   a. **In the navigation pane, click Remote Control —> Redirection.**

   The Launch Redirection page appears:



   b. **Click the Launch Remote Control button.**

The redirection is established. Because the host is in standby power mode, the view should be empty.

9. **Power on the host.**

   a. **In the navigation pane, click Power Control.**

   The Server Power Control page appears.

   b. **In the Select Action drop-down list, click Power On.**

   c. **Click Save.**

   The host begins its startup sequence.

10. **Return to the Redirection page.**

    If the redirection page is not open, click Remote Control —> Redirection in the navigation pane.

    The host startup messages appear. After POST, the Pc-Check menu appears.

11. **If a license agreement display appears, type Enter to continue.**

12. **Follow the prompts to open the Pc-Check main menu.**

See Also “Pc-Check Main Menu” on page 65

Pc-Check Main Menu

In manual mode, the main Pc-Check menu provides the options shown in the following graphic:

The following sections describe how to use the Pc-Check options:

- “System Information Menu” on page 65
- “Advanced Diagnostics” on page 66
- “Burn-In Testing” on page 68
- “Viewing the Pc-Check Results” on page 71

System Information Menu

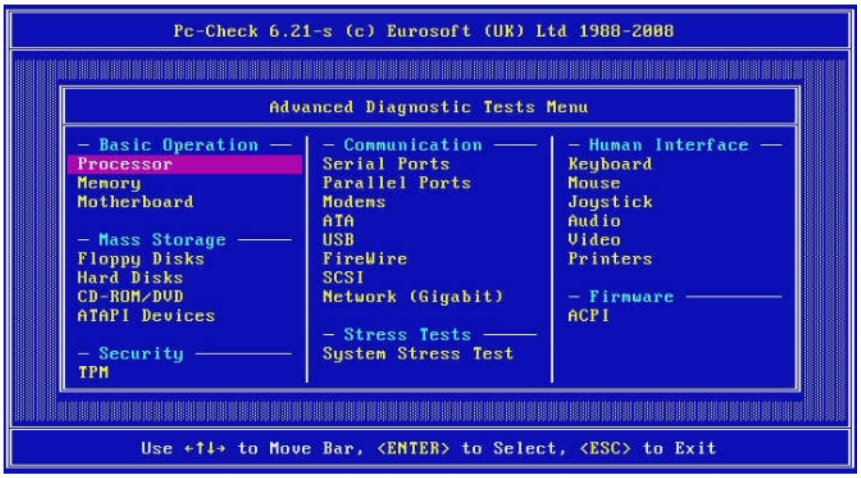
Select System Information in the Pc-Check main menu to view the System Information menu. Select items in this menu to see detailed information.

The following table describes the System Information menu options.

Option	Description
System Overview Menu	Displays basic information about your system, motherboard, BIOS, processor, memory cache, drives, video, modem, network, buses, and ports.
Component Audit Menu	Creates a text document describing your system for Oracle Service personnel.
System Management Info	Displays information about the BIOS type, system, motherboard, enclosure, processors, memory modules, cache, slots, system event log, memory array, memory devices, memory device mapped addresses, and system boot.
PCI Bus Info	Displays details about specific devices from `pci-config` space within the system, similar to the System Management Information section.
PCMCIA/ CardBus Info	Displays information about PCMCIA/CardBus devices.
IDE Bus Info	Displays information about the IDE bus.
Interrupt Vectors	Displays a list of interrupt vectors.
IRQ Routing Info	Shows hardware interrupt assignments.
Device Drivers	Shows device drivers loaded under Open DOS.
APM Info	Enables you to test and configure the Advanced Power Management (APM) capabilities of the system. You can choose to change the power state, view the power status, indicate CPU usage, get a power management event, or change the interface mode.
I/O Port Browser	Shows the I/O port assignment for the hardware devices on the system.
Memory Browser	Enables you to view the mapped memory for the entire system.
Sector Browser	Reads sector information from the hard disks sector by sector.
CPU Freq. Monitor	Tests the processor speed.
CMOS RAM Utilities	Shows the CMOS settings of the system.
SCSI Utils	Provides SCSI device options.
Text File Editor	Opens a file editor.
Start-Up Options	Enables you to set up startup options for diagnostics testing.

Advanced Diagnostics

Advanced diagnostics are used to test an individual device on the system. Most of the selections on this menu display information about the corresponding devices, and then offer a menu of testing options. For example, to test CPU 0, you can select Advanced Diagnostics Tests, select Processor, and then select CPU0.



Note - If you do not know which device to test, see "Burn-In Testing" on page 68.

The following table gives the name and a brief description of many of the selections in the Advanced Diagnostics Tests menu.

Note - Some of the tests in the table might not be applicable for your server.

Option	Description
Processor	Displays information about the processors and includes a Processor Tests menu.
Memory	Displays information about the memory, and includes tests for the different types of system memory.
Motherboard	Displays information about the motherboard, and includes a Motherboard Tests menu.
Floppy Disks	Not applicable.
Hard Disks	Displays information about the hard disk, and includes a Hard Disk Tests menu.
CD-ROM/DVD	Provides menus to test CD-ROM/DVD devices, if the server is so equipped.
ATAPI Devices	Displays information about devices attached to the IDE controllers (other than DVD or hard disks).
TPM	Verifies the operation of the security chip.
Serial Ports	Displays information about the serial ports and includes a Serial Port Tests menu.
Parallel Ports	Not applicable.
Modems	Not applicable.
ATA	Includes an ATA Test menu. Select the serial ATA driver to test.

Option	Description
USB	Displays information about the USB devices on the system and includes a USB Tests menu.
Firewire	Not applicable.
SCSI	Displays information about SCSI devices and includes a SCSI Test menu.
Network	Performs network register controller tests.
System Stress Test	Exercises and checks the CPU, memory, and hard drive.
Keyboard	Includes a Keyboard Test menu with options for performing different tests on the keyboard.
Mouse	Displays information about the mouse and includes a menu to test the mouse on the system.
Joystick	Not applicable.
Audio	Not applicable.
Video	Displays information about the video card. Initially, the monitor might flicker, but then the system brings up a Video Test Options menu that enables you to perform various video tests.
Printers	Not applicable.
Firmware– ACPI	Displays information about Advanced Configurable Power Interface (ACPI) and includes an ACPI Tests menu.

Burn-In Testing

Burn-in testing enables you to run test scripts and to create new scripts.

The main menu provides two burn-in selections, Immediate Burn-In Testing and Deferred Burn-In Testing.

- **Immediate Burn-In Testing** allows you to run a test script, which you can modify, or run as is.
- **Deferred Burn-In Testing** allows you to modify existing test scripts or create new ones. To actually run the new or modified scripts, you must use Immediate Burn-In Testing.

This section covers the following topics:

- “Perform Immediate Burn-In Testing” on page 69
- “Create and Save Scripts (Deferred Burn-in Testing)” on page 70

▼ Perform Immediate Burn-In Testing

Oracle provides three ready-made scripts designed to test the general health of the devices on your system.

These scripts include:

- `quick.tst`

  This script performs a series of tests that require you to interact with the test software. When they require a user interaction, they stop and do not time out. These tests are faster than `full.tst`, but they are less thorough. For example, they do not run all the tests associated with a DIMM.

- `noinput.tst`

  This script performs a non-detailed test of most hardware components, excluding those components that require user input (keyboard, mouse, sound, and video). This test does not require user input. It is normally the first test performed for hardware-related problems.

- `full.tst`

  This script performs a detailed and comprehensive test on all hardware components, including those that require user input. It includes external port tests and requires loopback connectors on COM ports, parallel ports, and USB ports. You must interact with the test utility to progress through these interactive tests.

You can also modify and create scripts, which you can then run using immediate burn-in testing. For details, see “Create and Save Scripts (Deferred Burn-in Testing)” on page 70.

1. **From the main menu, click Immediate Burn-In Testing.**

   The page displays a list of settings and a Burn-In menu.

2. **From the menu, click Load Burn-In Script.**

   A text field appears.

3. **Type the name of the script you want to run, for example: `quick.tst`, `noinput.tst`, or `full.tst`.**

4. **To change any of the options, at the bottom of the page, click Change Options.**

   This opens the Burn-In Options menu, which enables you to modify the options listed in the following table for the currently loaded test script.

Option	Default General	Default Using `quick.tst`, `noinput.tst`, or `full.tst` Script	All Possible Choices
Pass Control	Overall Time	Overall Passes	Individual Passes, Overall Passes, or Overall Time
Duration	01:00	1	Enter any number to choose the time duration of the test
Script File	N/A	`quick.tst`, `noinput.tst`, or `full.tst`	quick.tst, noiniput.tst, or full.tst
Report File	None	None	User defined
Journal File	None	`D:\noinput.jrl`, `D:\quick.jrl`, or `D:\full.jrl`	User defined
Journal Options	Failed Tests	All Tests, Absent Devices, and Test Summary	Failed Tests, All Tests, Absent Devices, and Test Summary
Pause on Fail	N	N	Y or N
Screen Display	Control Panel	Control Panel	Control Panel or Running Tests
POST Card	N	N	Y or N
Beep Codes	N	N	Y or N
Maximum Fails	Disabled	Disabled	1–9999

5. **Click Perform Burn-In Tests.**

   The diagnostics software executes the test script as configured.

▼ Create and Save Scripts (Deferred Burn-in Testing)

1. **From the Pc-Check main menu, select Deferred Burn-in Testing.**

   The top portion of the window lists the options described in the table shown in Step 4 of "Perform Immediate Burn-In Testing" on page 69, and the bottom portion of the window lists the Deferred Burn-in menu options.

2. **To modify the list of tests and the options, select one or both of the following:**

   - **Change Options**

     Opens the Burn-in Options menu, which enables you to modify the various options listed in the table in "Perform Immediate Burn-In Testing" on page 69 for the currently loaded test script.

- **Select Tests**

  Opens a listing of all the possible types of tests available for you to run for the currently loaded test script.

3. **When you have finished, select Save Burn-in Script and type the name for the new script.**

   Type `d:\`*testname*`.tst` where *testname* is the name of the script that you have created.

4. **To run the newly created script, see Immediate Burn-in Testing and run the script.**

   See "Perform Immediate Burn-In Testing" on page 69.

Viewing the Pc-Check Results

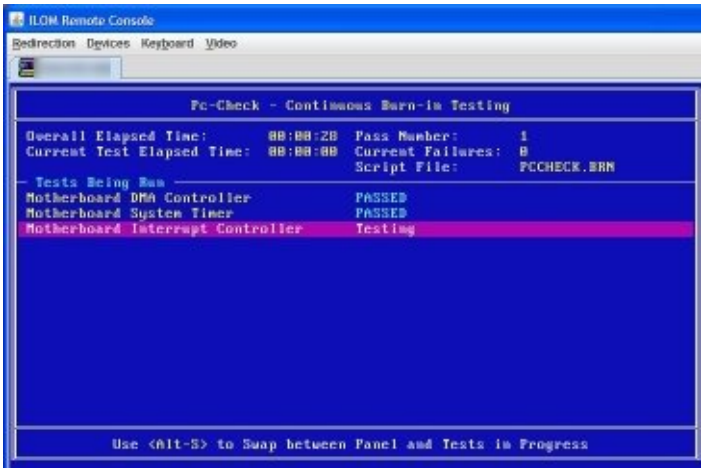
Pc-Check provides two ways to check results when you run it in manual mode. These are described in the following sections:

- "View Pc-Check Files With the Text File Editor" on page 71
- "View Test Results Using Show Results Summary" on page 73

▼ View Pc-Check Files With the Text File Editor

Before You Begin

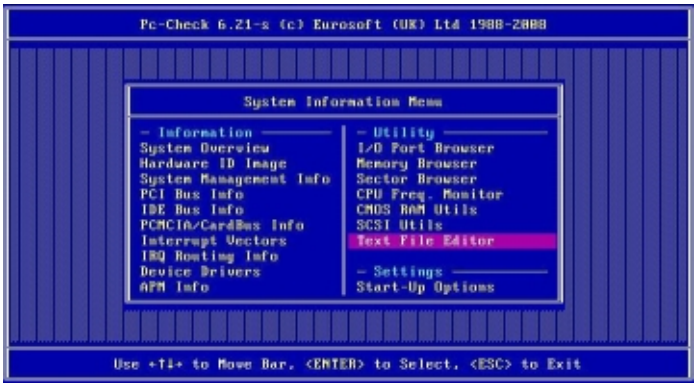
View the header of the page where you invoke the test to determine the name of the output file. For example, when you run the continuous burn-in test, the name of the output file is `PCCHECK.BRN`, as shown in the following figure.



Other files include `PCCHECK.JNL` and `PCCHECK.HII`. The `.HII` file is especially important because it shows the entire host configuration at the time of failure.

1. **On the Pc-Check main menu, select System Information Menu, and press Enter.**

   The System Information Menu appears:

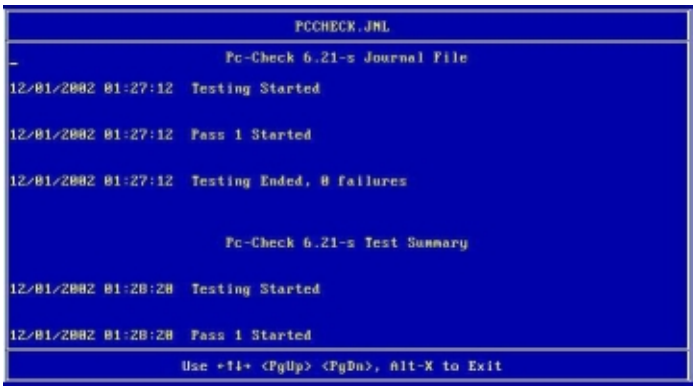


2. **Select Text File Editor, and press Enter.**

   Pc-Check prompts for a file name.

3. **Type the file name (for example, `PCCHECK.JNL`), and press Enter.**

   The editor opens with the file displayed:



▼ View Test Results Using Show Results Summary

- **From the main menu, select Show Results Summary to display the tests that have been run and the test results.**

  Test results can be Pass, Fail, or N/A (not applicable).

  - Processor

    This section shows the following tests conducted against the processor: Core Processor Tests, AMD 64-Bit Core Tests, Math Co-Processor Tests – Pentium Class FDIV and Pentium Class FIST, MMX Operation, 3DNow! Operation, SSE Instruction Set, SSE2 Instruction Set, and MP Symmetry.

  - Motherboard

    This section shows the following tests conducted against the motherboard: DMA Controller Tests, System Timer Tests, Interrupt Test, Keyboard Controller Tests, PCI Bus Tests, and CMOS RAM/Clock Tests.

  - Memory, Cache Memory, and Video Memory

    This section shows the following tests conducted against the various types of memory: Inversion Test Tree, Progressive Inversion Test, Chaotic Addressing Test, and Block Rotation Test.

  - Input Device

This section shows the following tests conducted against the input device: Verify Device, Keyboard Repeat, and Keyboard LEDs.

- Mouse

  This section shows the following tests conducted against the mouse: Buttons, Ballistics, Text Mode Positioning, Text Mode Area Redefine, Graphics Mode Positions, Graphics Area Redefine, and Graphics Cursor Redefine.

- Video

  This section shows the following tests conducted against the video: Color Purity Test, True Color Test, Alignment Test, LCD Test, and Test Cord Test.

- Multimedia

  This section shows the following tests conducted against the multimedia components: Internal Speaker Test, FM Synthesizer Test, PCM Sample Test, CD/DVD Drive Read Test, CD/DVD Transfer (KB/Sec), CD/DVD Transfer Rating, CD/DVD Drive Seek Test, CD/DVD Seek Time (ms), CD/DVD Test Disk Read, and CD/DVD Tray Test.

- ATAPI Devices

  This section shows the following tests conducted against ATAPI devices: Linear Read Test, Non-Destructive Write, and Random Read/Write Test.

- Hard Disk

  This section shows the following tests conducted against the hard disk: Read Test, Read Verify Test, Non-Destructive Write Test, Destructive Write Test, Mechanics Stress Test, and Internal Cache Test.

- USB

  This section shows the following tests conducted against the USB: Controller Tests and Functional Tests.

- Hardware ID

  The compare test is used to determine the machine ID for the system. This test is not available for x86 servers.

Performing UEFI Diagnostics Tests

This section describes how to use the Unified Extensible Firmware Interface (UEFI) diagnostics tests provided through Oracle Integrated Lights Out Manager (ILOM). Use UEFI diagnostics to test and detect problems on motherboard components, drives, ports, and slots.

The diagnostic tests in this section are for Sun Server X4-4 or newer systems. For older systems, use the Pc-Check diagnostic tests provided in "Performing Pc-Check Diagnostic Tests" on page 61.

This section includes the following topics:

Description	Link
Overview of UEFI diagnostics	"UEFI Diagnostics Overview" on page 75
Start UEFI diagnostics from the Oracle ILOM web interface	"Run UEFI Diagnostics Using the Oracle ILOM Web Interface" on page 76
Start UEFI diagnostics from the Oracle ILOM CLI	"Run UEFI Diagnostics Using the Oracle ILOM CLI" on page 78
Use UEFI diagnostics in Enabled or Extended mode	"UEFI Diagnostics in Enabled or Extended Mode" on page 79
Use UEFI diagnostics in Manual mode	"UEFI Diagnostics in Manual Mode" on page 81
Use UEFI diagnostics CLI commands	"UEFI Diagnostics CLI Commands" on page 91

UEFI Diagnostics Overview

Use UEFI diagnostics tests to diagnose server problems and determine root causes of system problems.

You can use either the Oracle ILOM web interface or the command-line interface (CLI) to run UEFI diagnostics. From within Oracle ILOM, you select the level of test that you want to perform.

You can run UEFI diagnostics in one of the following modes:

- **Disabled** – UEFI diagnostics do not run. Use this selection for normal system operation. You must select Disabled after running UEFI diagnostics tests in Manual mode. Selecting Disabled recovers the original system status prior to running UEFI diagnostics.
- **Enabled** – Runs UEFI diagnostics tests automatically. The server boots and executes a predefined set of basic UEFI diagnostics tests that takes several minutes to a few hours to complete, depending on system configuration, including memory size and the number of PCIe cards. Enabled mode diagnostics tests output is written to log files in your service processor system directory.

  The Enabled mode diagnostics test minimum system functionality.

  For more information, see "UEFI Diagnostics in Enabled or Extended Mode" on page 79.
- **Extended** – Runs UEFI diagnostics tests automatically. The server boots and executes a predefined set of detailed UEFI diagnostics tests that takes longer than Enabled mode to complete, depending on system configuration, including memory size and the number of PCIe cards. Extended mode diagnostics output is written to log files in your service processor system directory.

  Use the Extended mode diagnostics to guarantee system performance parameters.

  For more information, see "UEFI Diagnostics in Enabled or Extended Mode" on page 79.
- **Manual** – Runs UEFI diagnostics tests in Manual mode and displays the UEFI graphic user interface (GUI) or the UEFI shell environment. Either interface allows you to run individual tests. The diagnostics test output is viewed from either a monitor (keyboard and mouse) or a remote console (video or serial redirection). For more information, see "UEFI Diagnostics in Manual Mode" on page 81.

Note - The UEFI diagnostics GUI is only available on Oracle Server X4-4, X4-8, X5-4, and X5-8 systems equipped with Oracle ILOM 3.2.4 or newer.

▼ Run UEFI Diagnostics Using the Oracle ILOM Web Interface

Before You Begin Access the Oracle ILOM web interface.

1. **Verify that the host is in Standby power mode.**

   - **The Power/OK LED on the front panel is flashing.**

- **The Oracle ILOM System Information page indicates that the host power is off.**

2. **(Test-level dependent) To run Manual mode tests or to monitor the progress of Enabled or Extended level testing, start a remote system console session:**

   a. **In the navigation pane, click Remote Control → Redirection.**

      The Launch Redirection page appears.

   b. **Select Use video redirection, then click the Launch Remote Console button.**

      A number of dialog windows might appear. Click to accept them as necessary.

      A redirection window appears when the redirection is established.

3. **Click Host Management → Diagnostics.**

   The Diagnostics page appears.

4. **From the Run Diagnostics on Boot list box, select the UEFI diagnostics mode that you want to start.**

   For information on UEFI diagnostics levels, see "UEFI Diagnostics Overview" on page 75.

5. **Click the Save button.**

   - **If the host server is an Oracle Server X4-4, X4-8, X5-4, or X5-8 equipped with Oracle ILOM 3.2.4 or newer, select Start Diagnostics.**

     This causes the host server to boot and starts the UEFI diagnostic tests.

     For these systems, you can stop the tests by selecting Stop Diagnostics.

   - **On other systems, the server automatically boots and starts the UEFI diagnostics tests.**

6. **If you run UEFI Diagnostics in Manual mode:**

   - **For Oracle Server X4-4, X4-8, X5-4, and X5-8 systems equipped with Oracle ILOM 3.2.4 or newer, select Stop, and then change the diagnostic mode to Enabled, Extended, or Disabled.**

   - **For other systems, power off the system before switching the diagnostic mode to Disabled.**

For these systems, you must return the server to Disabled diagnostics mode before you can set the diagnostics mode to Enabled or Extended.

See Also

- "Run UEFI Diagnostics Using the Oracle ILOM CLI" on page 78
- "UEFI Diagnostics in Enabled or Extended Mode" on page 79
- "UEFI Diagnostics in Manual Mode" on page 81
- "Using the UEFI Diagnostics GUI" on page 81

▼ Run UEFI Diagnostics Using the Oracle ILOM CLI

Before You Begin Log on to the Oracle ILOM CLI as root.

1. **Verify that the host is in Standby power mode.**
   - **The Power/OK LED on the front panel is flashing.**
   - **The `show /System` command displays `power_state = Off`.**
2. **Change the directory to `/HOST/diag`.**

   ```
   -> cd /HOST/diag
   ```
3. **From the prompt, enter the `set mode=<`*level*`>` command to choose one of the following UEFI diagnostic modes:**

   Note - Oracle ILOM 3.2.1 or 3.2.2 refer to it as the "state" instead of the "mode". For example, on these systems, use the command `set state=enabled` instead.

   - **Disabled**
   - **Enabled**
   - **Extended**
   - **Manual**

   For example, to run UEFI diagnostics tests in **Enabled** mode, enter:

   ```
   -> set mode=enabled
   ```
4. **To start the UEFI diagnostics, enter:**

   ```
   start /HOST/diag
   ```

   The server automatically boots and starts UEFI diagnostics tests. No more action is necessary.

What happens now depends on what test you are running.

- **If you are running Enabled or Extended diagnostics, the tests run automatically. See "UEFI Diagnostics in Enabled or Extended Mode" on page 79.**

- **If you are running Manual mode diagnostics, the system displays boot messages, then it displays the following startup messages:**

```
startup.nsh> echo -off
Moving to drive fs2:
Oracle Enterprise UEFI Diagnostics
type: fs2:\version.txt, Size 100
Revision: 862
Last Changed Rev: 862
Last Changed Date: 2014-08-22 16:39:56 -0400 (Fri, 22 Aug 2014)
```

Note - The boot process can take several minutes, and might include an extra power cycle.

  - On systems with Oracle Server X4-4, X4-8, X5-4 and X5-8 equipped with Oracle ILOM 3.2.4 or newer, the UEFI GUI starts.

    To exit the UEFI GUI and start the UEFI shell, use the escape key (ESC).

    See "UEFI Diagnostics in Manual Mode" on page 81.
  - For other systems, after the messages, the UEFI shell opens. This shell is accessible from both the video interface (a monitor or an Oracle ILOM remote console session) and the serial interface.

5. **If you ran UEFI diagnostics in Manual mode, return the mode to Disabled after the tests have concluded. Enter:**

```
set /host/diag/ mode=disabled
```

See Also

- "Run UEFI Diagnostics Using the Oracle ILOM Web Interface" on page 76
- "UEFI Diagnostics in Enabled or Extended Mode" on page 79
- "UEFI Diagnostics in Manual Mode" on page 81

UEFI Diagnostics in Enabled or Extended Mode

If you chose the Enabled or Extended diagnostics tests level, the server boots and runs UEFI diagnostics automatically. These modes execute a predefined set of tests and write the test

output to log files in the log directory. At the end of the test, UEFI diagnostics returns the system status to disabled.

To view UEFI diagnostics output log files:

1. Log in to Oracle ILOM as root.
2. Access the Oracle ILOM restricted shell. From the Oracle ILOM prompt, type:

   ```
   set SESSION mode=restricted
   ```
3. View the output files.
   - On Oracle Server X4-4, X4-8, X5-4, and X5-8 systems equipped with Oracle ILOM 3.2.4 or newer, the file is in `diag/uefidiag/`.
   - On other systems, the file is in `log/uefidiag/`.

   The UEFI diagnostics preserve the output from the previously-run test by appending a .1 to a file instead of overwriting it. For example, if UEFIdiag finds an existing `test.log` file, it saves that file as `test.log.1` instead of overwriting it.

The following table provides the name and description of each output log file.

Filename	Description
`uefi_started`	Displays the time and date when the test started.
`system.inv`	Lists the system inventory.
`test.log`	Displays results of commands executed in the test scripts.
`done`	Displays the time and date when the test ended.
`uefidiag.log`	Displays the logs related to the UEFIdiag activities from when it is started until the original settings are restored.
`parseresults.txt`	This file is created if any errors occur. It contains a summary of the pass/fail counts for every command executed.

In addition to the above files, the directory contains one of the following files:

Filename	Description
ABORTED. configuration_phase	Indicates that UEFIdiag was aborted because of a configuration error. This applies only to systems equipped with Oracle ILOM 3.2.4 or newer.
`FAILED.stress_test`	Indicates that one or more tests failed.
`PASSED.stress_test`	Indicates that all tests passed.

For information about viewing UEFI diagnostics output, see "UEFI Diagnostics Output" on page 90.

UEFI Diagnostics in Manual Mode

In Manual mode, you can run individual diagnostic tests and see the results as the tests finish.

Manual-mode diagnostics provides both a graphical user interface (GUI) and a command line interface (CLI). The GUI requires either a monitor, or an Oracle ILOM remote system console session.

You can access the CLI through a video monitor (or remote KVM), or the serial console. Access to the GUI requires a video monitor attached directly to the server, or a remote KVM session.

- To use the UEFI diagnostics GUI, see "Using the UEFI Diagnostics GUI" on page 81.
- For a list of UEFI command options, see "UEFI Diagnostics CLI Commands" on page 91.
- For information about viewing UEFI diagnostics output, see "UEFI Diagnostics Output" on page 90.

▼ Using the UEFI Diagnostics GUI

This task provides instructions for using UEFI diagnostics graphic user interface (GUI).

The UEFI GUI is available in Manual mode on Oracle Server X4-4, X4-8, X5-4, and X5-8 systems equipped with Oracle ILOM 3.2.4 or newer.

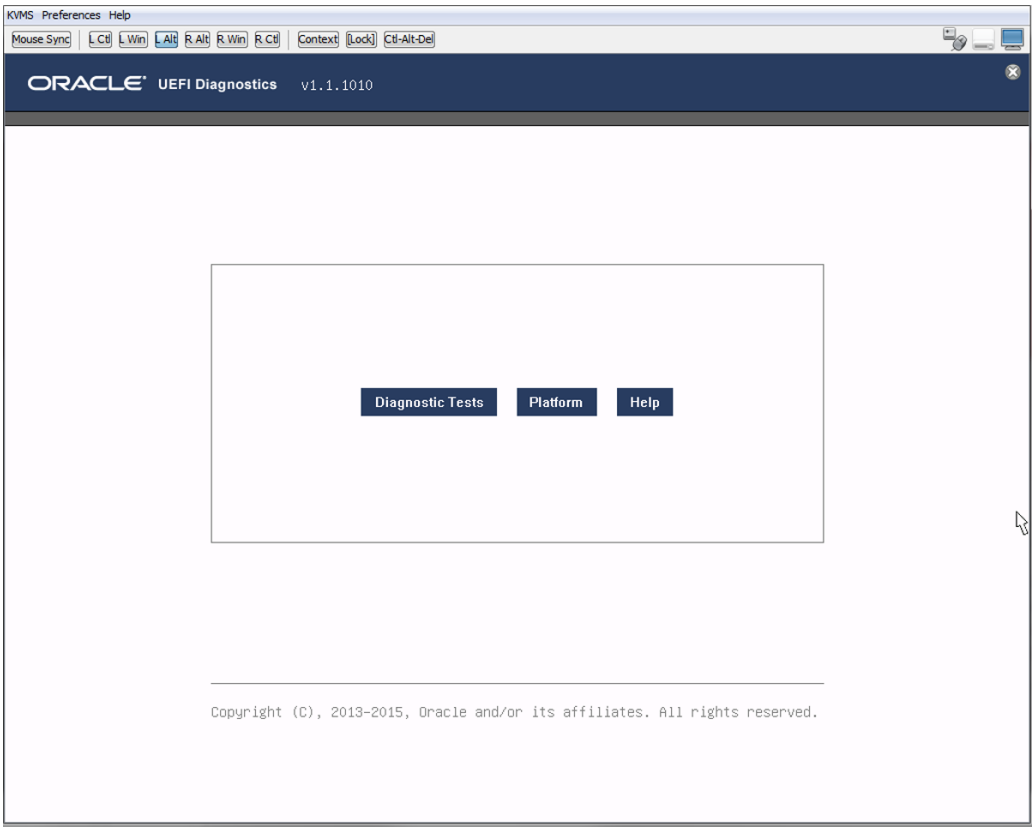
Before You Begin Start UEFI diagnostics as described in "Run UEFI Diagnostics Using the Oracle ILOM Web Interface" on page 76.

1. **From the Oracle ILOM diagnostics page, select Manual from the pull down menu, then click Save.**
2. **If the Status buttons says Stop Diagnostics, click it to stop any currently-running diagnostics.**
3. **If you do not have an active remote system console session, start one as described in "Run UEFI Diagnostics Using the Oracle ILOM Web Interface" on page 76.**
   If a message asks you to start a KVM session, select OK.
4. **Click Start Diagnostics.**
   Boot messages appear in the KVM screen, then the UEFI diagnostics GUI appears.

The boot process can take several minutes, and might include a power cycle.

Note - As UEFI diagnostics boot, you might see messages stating that you can use function keys to interrupt the boot process. These messages do not apply to UEFI diagnostics. Do not press any function keys when starting the UEFI diagnostics.

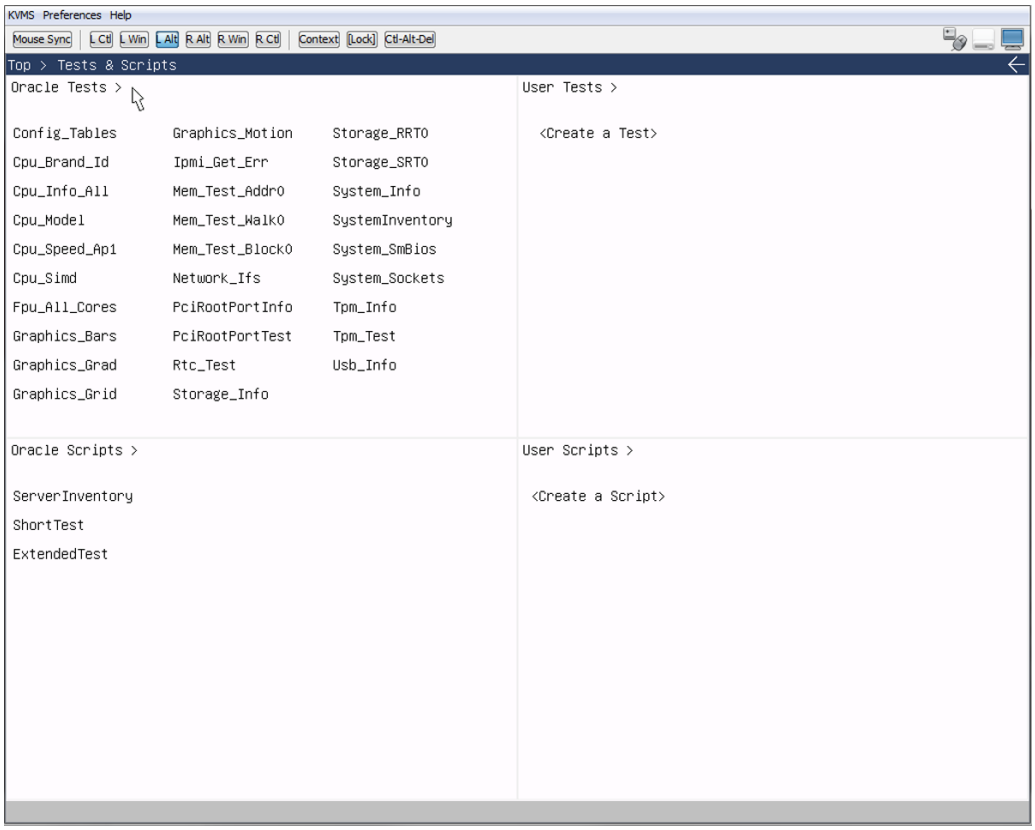
The Manual mode initial screen appears.



Note - To exit the GUI and run the CLI, press the Escape (ESC) key. To return to the GUI, type the command `udiag`.

5. **Click Diagnostic Tests.**

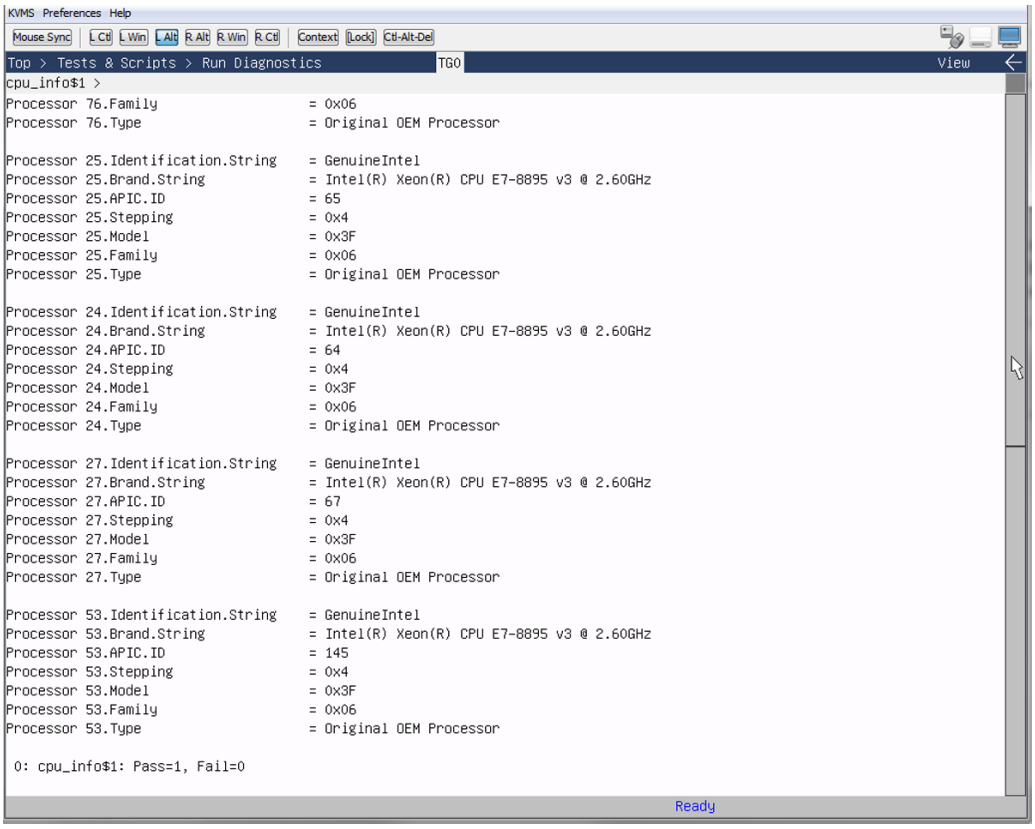
The test window appears.



- **Oracle Tests**: These are Oracle-defined tests with default parameters to a single command. Right-click a test and select View to see parameters related to the command and Copy to create a new User Test with different parameters.
- **User Tests**: Users can change test parameters and save the changes. See Step 9 for more details.
- **Oracle Scripts**: Predefined scripts that run multiple tests.
- **User Scripts**: Users can select multiple tests and save their selections as a script. See Step 11 for more details.

6. **To run a test, select it on the test page.**

The test runs and the results appear in a test results page. The following picture shows the results after selecting Cpu_Info_All.



The line at the bottom indicates how many times the test ran, and how many times it passed or failed. For example:

```
0: cpu_info$1: Pass=1, Fail=0
```

This indicates that the test ran once, and it passed. For example, if a test runs 10 times and fails once, the bottom line reads:

```
0: cpu_info$1: Pass=9, Fail=1
```

For more information about reading the test output, see “UEFI Diagnostics Output” on page 90.

7. **To navigate through the GUI, use the white arrows in the upper right-hand corner of the screen.**

8. **To see test details, right click the test and select View.**

   The test details view appears in write-only mode.

9. **To modify a test:**

   a. **Right-click the test, then select Copy.**

      The test details view appears in copy mode.

   b. **Select subcommands and parameters as desired.**

   c. **To run a test with your modifications, click the Run button.**

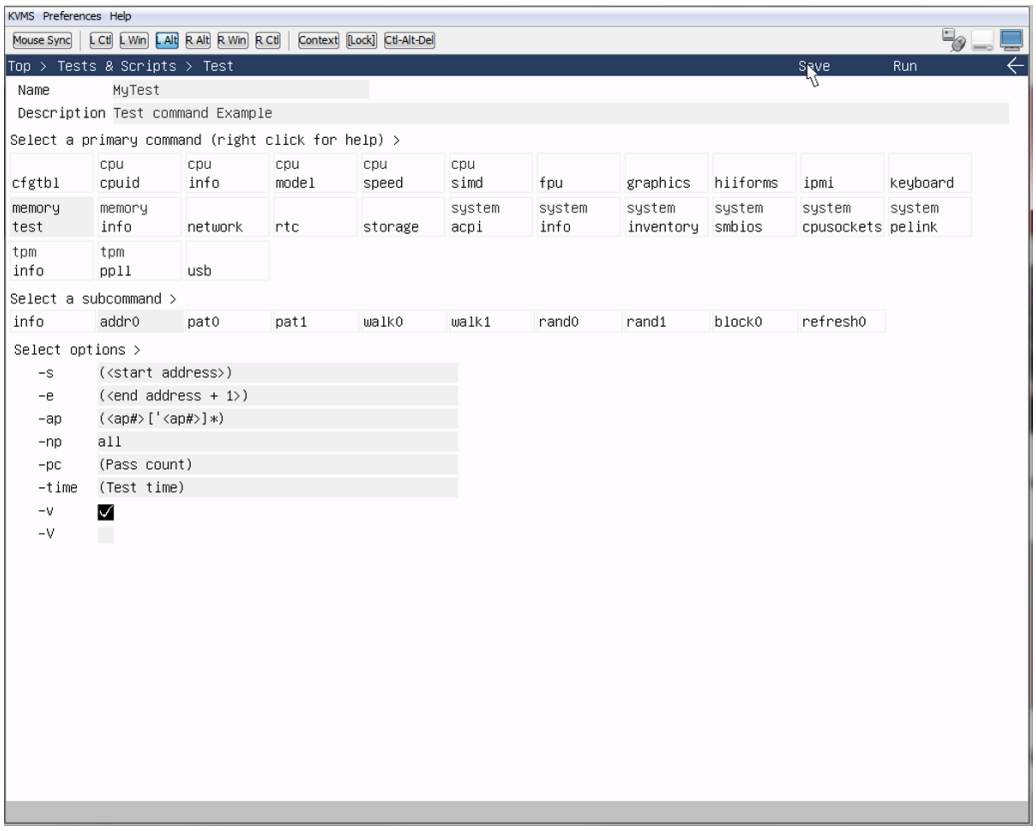
      UEFI diagnostics displays the test results. Use the white up-arrow to return to the details screen.

   d. **Type in a test name, and then click Save.**

      The new test is added to the User Test list.

Note - You cannot save a test that is identical to an existing test.

The following figure shows the Copy view of the addr0 memory test.



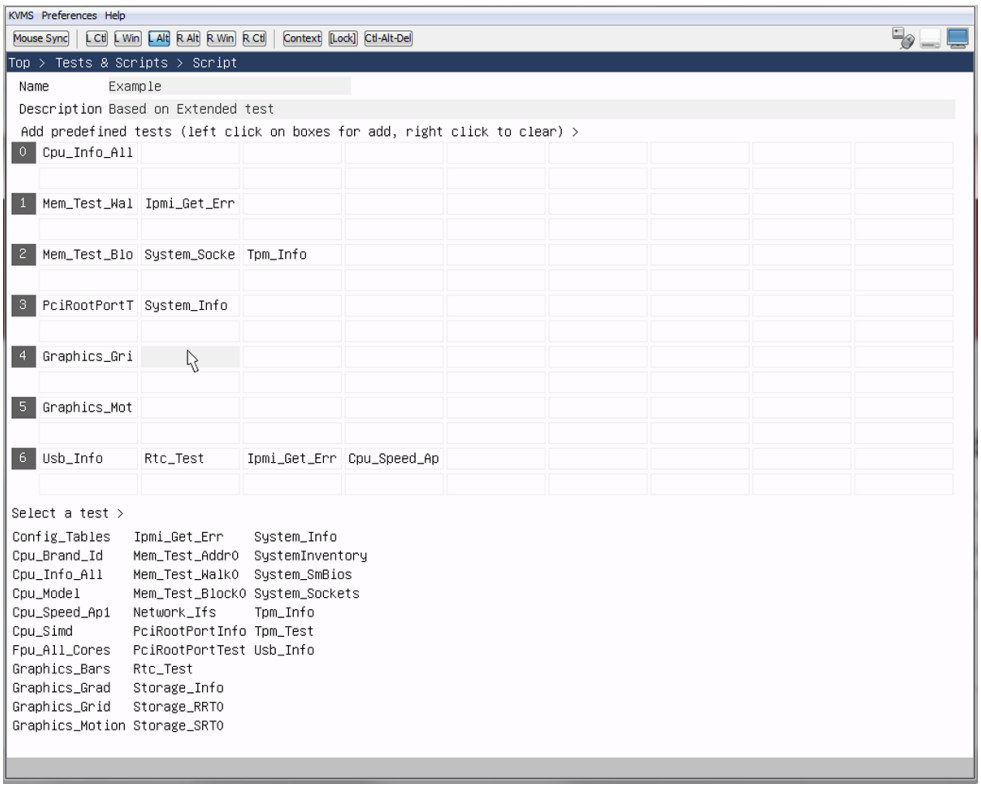
10. **To see script details, right click it, then select View.**

    The script details screen appears.

11. **To modify a script:**

    a. **Right-click the script, then select Copy.**

The script details screen appears in copy mode.



b. Select a cell in the table, then select a test from the list that appears.

The test you selected is inserted into the cell. If the cell already contained a test, that test is replaced by the test you selected.

Tests in columns are executed sequentially. Steps in rows are executed in parallel.

c. When you are done, type in a name for your script, then select Save.

Your script is added to the User Scripts list.

See Also

- "UEFI Diagnostics Output" on page 90
- "Run UEFI Diagnostics Using the Oracle ILOM Web Interface" on page 76

Basic Command Syntax

This section describes basic CLI syntax conventions that are used in this guide.

Within this document, CLI commands appear in `monospace` font. The `fs0:/>` characters represent an example of the UEFI shell command prompt and should not be entered as part of the command.

Convention	Description
`{ }`	Braces indicate required items.
`[ ]`	Brackets indicate optional items.
<*italics*>	Italic type indicates a variable. Substitute a value for the variable.
|	A vertical line indicates a required choice within braces or an optional choice within brackets.

For example, in the following command syntax:

`udiag storage mst { all | <`*device_name*`> } [ -time <`*n*`> ]`

- **`udiag storage mst`** – Indicates the UEFI diagnostics test to start.
- **`all | <`***device_name*`>`** – Indicates a required choice between testing all storage devices, or a specific storage device that is entered in place of the *device_name* variable.
- **`-time <`***n*`>`** – Indicates an optional choice to test the storage device(s) for a specific amount of time, entered in place of the *n* variable.

Command Flags

This section describes command flags that are used with UEFI diagnostics.

UEFI diagnostics processes flags in two steps. In the first step, the flags that appear before any command (but after `udiag`) are parsed and treated as the setting flags for the command that follows. In the second step, the flags that follow a command are used to override the setting for the command only.

Note - The `-l` (log file) flag must be used as a default setting flag only. Other flags should be used as command-specific flags only. Use them as default settings only when it is appropriate to do so.

Flags	Parameters	Description
`-h`, `-?`, `-help`		Displays command help information.
`-n`, `-v`, `-V`		Mutually exclusive flags that specify the amount of information commands may output. `-n` is the default. `-v` is verbose and `-V` is very verbose.
`-w`	<*byte_size*>	Specifies access size in bytes to register and memory locations. <*byte_size*> must be one of **1**, **2**, **4**, or **8**. The default size is **8**.
`-pc`	<*n*>	Repeats a command until <*n*> passes are reached. The default is **1**.
`-ec`	<*n*>	Repeats a command until <*n*> errors are reached. The default is **1**.
`-time`	<*n*>	Limits run to <*n*> seconds. The default is **0**, which indicates no limit.
`-l`	<*log_file*>	Copies all console outputs to <*log_file*>. *log_file* must be in the format of: <*volume*>:<*hierarchical_file_name*> Where: *hierarchical_file_name* = [\<*file_or_folder_name*>]+ For example: **`-l fs0:\test1.log`**
`-s`	<*begin*>	Specifies a generic 64-bit hexadecimal number which is command-specific. For example, memory tests use it as the lowest address of a memory range to test.
`-e`	<*end*>	Specifies a generic 64-bit hexadecimal number which is command-specific. For example, memory tests use it as the highest address of a memory range to test *plus* one byte.
`-np`	<*n*> | all	Specifies the number of application processors (APs) to use. The literal **`all`** specifies to use all enabled processors.
`-ap`	<*n*>[|<*n*>]*	Specifies one or more specific APs to use. The processor number **0** is reserved for the boot strap processor (BSP) and it should not be used with this flag. **Note -** For Oracle ILOM 3.2.1 or 3.2.2, use a slash character instead of a pipe character (**`"/"`** instead of **`"|"`**. All APs are numbered from 1 through the maximum enabled processors reported by the SMBIOS table. To find the relationship between the AP number with the socket number, type: `udiag system acpi -v` For example, **`-ap 5f|1|10`** allocates processors `5f`, `1` and `10` to a command. Memory tests, for example, allocate the APs in the listed order to the sub-blocks within a test range sequentially starting with the lowest addressed sub-block. A typical application is to generate as much cross traffic on socket interconnects by assigning processors far from their sub-blocks.
`-pc`	<*n*>	*n* indicates how many times to test the storage device(s).

When entering CLI commands, note the following rules:

- Most commands support the `-hv`, `-n`, `-v`, `-V`, `-pc`, and `-ec` flags.
- AP-capable commands support the `-np` and `-ap` flags.
- Long running tests such as `memory` and `storage` support the `-time` flag.
- The suffix * (for example, [<*n*>]*) after the right bracket indicates 0 or more repeated options.
- The suffix + (for example, [\<*file_or_folder_name*>]+) after the right bracket indicates 1 or more repeated options.

Command Resource Requirements

This section describes processor resource requirements and instance limitations that are documented for each UEFI diagnostics command. The following table provides a description of processor attributes and instance attributes.

Type `udiag main-command [sub-command] -hv` to see a detailed command description.

Resource Requirement	Description
BSP_ONLY	A command runs on the boot strap processor (BSP) only. It should not be run on application processors (APs).
ONE_AP_OR_BSP	A command can run on the BSP or any one of the APs at a time.
ANY_PROC	A command can run on any APs or the BSP.
ONE_INSTANCE_ONLY	Only one instance of a command can be run at a time.
MULTIPLE_INSTANCES	Two or more copies of a command can run simultaneously.

UEFI Diagnostics Output

This section describes UEFI diagnostics output. The diagnostic output format is the same, regardless whether the output is displayed in a console (Manual mode) or in an output log file (Automatic mode).

If you experience any diagnostics test failures, contact Oracle Customer Support for assistance with interpreting diagnostics tests output.

Note - Information-only commands do not display a test result unless an error such as an invalid parameter has been detected.

At the completion of the test, UEFI diagnostics displays test results in one of two formats:

```
COMMAND_ID: COMMAND_NAME$INSTANCE_ID : PASS, FAIL

COMMAND_ID: COMMAND_NAME$INSTANCE_ID : ERROR_STATUS
```

Where:

- `COMMAND_ID` – Indicates all command instances that run in parallel, sequentially starting at 0.
- `COMMAND_NAME$INSTANCE_ID` – Specifies the hierarchical command name of the command, and the instances of the command as a decimal number, starting at 1.
- `PASS` or `FAIL`, displayed as `Pass=<`*pass_count*`>`, or `Fail=<`*error_count*`>` – Indicates that the test has either passed or failed, and should be consistent with the `-pc` and `-ec` flag settings. For example, if a test is invoked with **`-pc 10`**, then the execution status should display as `Pass=10` if no error was detected.
- `ERROR_STATUS`, displayed as `Time Out`, `Aborted`, `Killed`, `Unknown Error`, or `UEFI_ERROR` – Indicates that the command either failed to start a test or encountered a serious error that prevented it from completing the test.

Note - The `Time Out` status typically indicates a failure for the boot strap processor portion of the command to communicate with the application processor portion of the command. This status should not be confused with the `-time` flag, which simply places a limit on the amount of test time.

An example of UEFI diagnostics tests output is shown below.

```
MEMORY test:
- Use walking 0's
0: test$1 : Pass=1, Fail=0
- Use walking 1's
0: test$1 : Pass=1, Fail=0
- Move blocks of data around
0: test$1 : Pass=1, Fail=0

TPM PPLL test:
- Physical Presence Life time Lock is not set
0: tpm : Pass=0, Fail=1
```

UEFI Diagnostics CLI Commands

In Manual mode, UEFI diagnostics provides the CLI command options shown in the following table:

Commands	Descriptions
`cfgtbl`	Displays installed UEFI tables.
`cpu { cpuid | info | model | speed | simd }`	Runs tests and displays results about host CPUs (processors).
`fpu`	Runs tests on floating-point units (FPU) in x64 processors.
`graphics`	Displays available graphics modes or tests graphics modes.
`hiiforms { list | <`*form_no*`> }`	Shows available HII forms.
`ipmi { on off state diagver getval problems }`	Use IPMI functionality to share information with Oracle ILOM.
`keyboard`	Checks keyboard functionality.
`memory { test | info }`	Runs tests and displays results about the host memory subsystem.
`mouse`	Checks mouse pointer operations.
`network`	Displays Ethernet interfaces or runs external loop-back tests.
`rtc`	Displays the date and time in 24-hour format.
`storage { info | mst | rrt | srt | rwv }`	Runs tests and displays information about system storage devices.
`system { acpi | info | inventory | smbios | cpusockets | pelink }`	Runs tests and displays information about the system.
`tpm { info | ppll }`	Display basic TPM information and Evaluates TPM PPLL flag. Available on systems equipped with Oracle ILOM 3.2.4 or newer.
`usb`	Displays information on USB root hubs and devices.

cfgtbl

The `cfgtbl` command displays tables attached to EFI_CONFIGURATION_TABLE pointer of EFI_SYSTEM_TABLE instance passed to this program.

Command Syntax

udiag cfgtbl

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

cpu cpuid

The `cpu cpuid` command executes the x86 CPU Identification (CPUID) instruction given EAX and optional ECX. EAX and ECX are x86 general purpose execution registers. See the *Intel 64 and IA-32 Architectures Software Developer's Manual* or any x86 assembly language manual for information on how to use the CPU Identification instruction.

Without EAX, this command displays Brand String embedded in CPUID EAX of `80000002h-80000005h`.

Command Syntax

udiag cpu cpuid <*EAX***> [<***ECX***>]**

udiag cpu cpuid

Options

Options	Descriptions
<*EAX***>**	Specifies the value for EAX before CPUID is executed.
<*ECX***>**	Specifies the optional value for ECX before CPUID is executed.

Resource Requirements

ONE_AP_OR_BSP; ONE_INSTANCE_ONLY

Examples

To display Brand string, type:

```
fs0:/> udiag cpu cpuid
```

To execute CPUID with EAX=4 and ECX=2 (level 2 cache information), type:

```
fs0:> udiag cpu cpuid 4 2
```

cpu info

The `cpu info` command displays CPU (processor) information using the CPUID instruction. If the requested information is displayed for the respective logical processor, it means that the processor is in a working state. This command is differentiated from System Inventory or System Info where processor information is coming from SMBIOS. This command executes the x86 CPUID instructions to collect and display respective CPU type, family, mode, stepping, and strings. Boot strap processor (BSP) CPU information is displayed without options.

Command Syntax

udiag cpu info

udiag cpu info -ap <*n*> [/<*n*>]*

udiag cpu info -np <*n*>

udiag cpu info -np all

Resource Requirements

ANY_PROC; MULTIPLE_INSTANCES

Examples

To run the test on a specific processor, type:

```
fs0:/> udiag cpu info -ap 1a
```

To run the test on <*n*> number of processors, type:

```
fs0:/> udiag cpu info -ap 1a/34/2
```

To run the test on all processors, type:

```
fs0:/> udiag cpu info -np all
```

cpu model

The `cpu model` command executes the x86 CPUID instruction with EAX = 1. The returned values are decoded from CPU type, family, model, stepping, and processor features.

A numeral 1 in the output indicates the feature is implemented.

Command Syntax

udiag cpu model

Resource Requirements

ONE_AP_OR_BSP; ONE_INSTANCE_ONLY

Example

To display Brand string, type:

```
fs0:/> udiag cpu model
```

cpu speed

The `cpu speed` command measures each processor speed using a chip set high precision timer clock. Measurement takes approximately five seconds.

Command Syntax

udiag cpu speed

Resource Requirements

ONE_AP_OR_BSP; ONE_INSTANCE_ONLY

Examples

To measure the speed of the boot strap processor (BSP), type:

```
fs0:/> udiag cpu speed
```

To measure the speed of an application processor (AP). For example, to test AP 3, type:

```
fs0:/> udiag cpu speed -ap 3
```

cpu simd

The `cpu simd` command tests multimedia extensions. For every logical processor, next multimedia extensions are tested. For example: MMX, SSE, SSE3, SSSE3, SSE4.1, SSE4.2, and AVX. This command tests the Simple Input Multiple Data (SIMD) Intel Instruction set. Small algorithms are executed using respective instructions. Without options, testing is executed on the boot strap processor.

Command Syntax

udiag cpu simd

udiag cpu simd -ap <*n*> | -np <*n*>

Resource Requirements

ONE_AP_OR_BSP; MULTIPLE_INSTANCES

Examples

To run the test on a specific application processor, type:

```
fs0:/> udiag cpu simd -ap 3a
```

To run the test on <*n*> number of randomly assigned application processors, type:

```
fs0:/> udiag cpu simd -np 5
```

fpu

The `fpu` command tests one or more floating-point units (FPUs) in x64 processors.

Command Syntax

udiag fpu { -ap <*n*> [/<*n*>]* | -np <*n*> | -np all }

Resource Requirements

ANY_PROC; MULTIPLE_INSTANCES

Examples

To run the test on the boot strap processor (BSP), type:

```
fs0:/> udiag fpu
```

To run the test on all application processors 10 (hex) times, type:

```
fs0:/> udiag fpu -np all -pc 10
```

graphics

The `graphics` command displays available graphics modes in terms of pixel resolution and color depth. This command also provides various tests for testing graphics using different patterns displayed on screen generated using the Block Transfer (Blt) service of EFI_GRAPHICS_OUTPUT_PROTOCOL.

Command Syntax

For Oracle Servers X4-4, X4-8, X5-4, and X5-8 equipped with Oracle ILOM 3.2.4 or newer:

- **udiag graphics info**
- **udiag graphics bars -x -W 10 -C white -C blue**
- **udiag graphics gradient -m 0 -C cyan -A horizontal**

- **udiag graphics grid -W 20 -L 10 -C cyan -time 10**
- **udiag graphics motion -S 300 -T 30 -C green**
- **udiag graphics memory zeros**
- **udiag graphics text**

For other systems:

- **udiag graphics modes**
- **udiag graphics test**

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

hiiforms

Lists available HII forms or invokes an HII form.

This command displays HII forms registered in the HII database and allows the user to activate a form and navigate through it.

This command allows you to change parameters on any form-based driver configuration menu; however changing form parameters is highly discouraged.

If you modify the value on any form and save your changes, the server reboots. If no save occurs, control returns to the Shell.

Command Syntax

hiiforms list

hiiforms <*form_no***>**

Options

Options	Descriptions
list	Displays forms registered in the BIOS HII database.
<*form_no***>**	Specifies the form number, shown in 'hiiforms list', and activates the form navigator.

Resource Requirements

BSP_ONLY ONE_INSTANCE_ONLY

Examples

To list avaiable forms, type:

```
fs0:\> mp hiiforms list
```

This might display:

```
    1: iSCSI Configuration
    2: LSI MegaRAID <LSI MegaRAID SAS 9261-8i> Configuration Utility
    3: Server Mgmt
    4: Setup
    5: Intel(R) I350 Gigabit Network Connection - 00:10:E0:22:88:6C
    6: Intel(R) I350 Gigabit Network Connection - 00:10:E0:22:88:6D
```

The numbers in the first column are the valid <form_no> values.

To activate a form (for example Setup):

```
fs0:\> mp hiiforms 4
```

This activates the BIOS setup menu.

ipmi

Uses IPMI functionalities to share information with Oracle ILOM. It has three objectives:

1. Test IPMI communication with ILOM
2. Provide information to ILOM related to diagnostics activity in the Host
3. Get information from ILOM that the Host is not able to access

Options

Options	Descriptions
on	Turns IPMI on if it was off.

Options	Descriptions
off	Turns IPMI off.
state	Reports diagnostics tool version.
diagver	Reports diagnostics tool info to ILOM including binary version, detected platform name and release type.
getval	Gets property values from ILOM including processor description, memory size, BIOS/ ILOM FW version, installed power supplies and chassis fans.
problems	Gets all open problems from ILOM. Displays all ILOM known open problems.

Resource Requirements

ONE_SINGLE_INSTANCE BSP_ONLY

keyboard

This command displays a keyboard layout and indicates keys depressed on a keyboard or serial terminal.

Command Syntax

keyboard

To exit the command, type **QA** or **QP** for pass, or **QF** for fail.

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

memory test

The `memory test` command tests main memory. The command tests a range of main DRAM using the test algorithm, as defined by command options, and for a time duration that is defined by the time option, on one or more processors.

Command Syntax

udiag memory test { ALGORITHM } [RANGE] [TIME] [MP]

Options

Options	Descriptions
ALGORITHM = **addr0 | pat0 | pat1 | walk1 | walk0 | rand0 | rand1 | block0 | refresh0**	
addr0	Tests the uniqueness of each address location.
pat0	Fills memory with all 0's and verifies (for stuck-at-1).
pat1	Fills memory with all 1's and verifies (for stuck-at-0).
walk1	Fills memory with 0x01 shifted left 8 times and verifies data.
walk0	Fills memory with 0xFE shifted left 8 times and verifies data.
rand0	Fills memory with random data, verifies, inverts and verifies data again.
rand1	Writes random data at random locations, verifies, inverts and verifies data again.
block0	Divides memory range into two blocks with random data. Data are swapped between the blocks (copied reversed top-down or bottom-up). Data are swapped again and the memory contents are verified.
refresh0	Fills memory with all 0's, waits for 5 minutes and verifies. Then it fills memory with all 1's, waits for 5 minutes and verifies data.
RANGE = **-s <***start_address***> [-e <***end_address_plus_one***>]**	
-s	Specifies the starting address of a memory block to test. The address is entered in hexadecimal format and must be aligned at 4KB boundary.
-e	Specifies the end address of a memory block to test plus 1 byte. If the flag is not given, the test uses the end of the contiguous block selected by the UEFI memory allocation service. If RANGE is not given, the test uses the biggest available memory block. Note that <*start_address*> must be lower than <*end_address*>.
TIME = **-time <***test_time_in_seconds***>**	
-time	Specifies maximum test time in seconds in hexadecimal. The default is 0, which indicates that there is no time limit.

Resource Requirements

ANY_PROC; MULTIPLE_INSTANCES

Examples

To run the `addr0` test between a specific address range, type:

```
fs0:/> udiag memory test addr0 -s 100000000 -e 110000000
```

To run the `walk1` test between a specific address range, type:

```
fs0:/> udiag memory test walk1 -s 100000000 -e 110000000
```

To run the `rand0` test on all processors, type:

```
fs0:/> udiag memory test rand0 -np all
```

To run the `rand1` test on specific processors for a specified amount of time (in seconds), type:

```
fs0:/> udiag memory test rand1 5f/5e/5d/1/2/3 -time 258
```

`memory info`

The `memory info` command displays basic information on various aspects of the host memory system, as described in the command options.

Command Syntax

udiag memory info { freespace | maxblock | dimms | dimm <*address***> }**

Options

Options	Descriptions
freespace	Displays available memory for UEFI applications as reported by BIOS.
maxblock	Displays the starting address and size for the largest contiguous block available for UEFI applications.
dimms	Displays installed DIMM information at each CPU socket. This is not available on systems equipped with Oracle ILOM 3.2.4 or newer.

Options	Descriptions
dimm [x] <*address***>**	Translates the system <*address*> into a physical location in terms socket, channel, DIMM, rank, and chip numbers. If x is present, then it uses the MP translator (if available) instead of the default BIOS-provided translator..
addr DRAM_INFO	DRAM_INFO := <socket> <mc> <channel> <dimm> [<rank> [<bank> [<row> [<col>]]]] Translates the DRAM information to the physical address ■ <*socket*> is the CPU socket number (base 0). ■ <*mc*> is the memory controller. For example on a two-socket system it is 0 or 1. ■ <*channel*> is the channel on the memory controller. For example, it is 0 for processor 0, CH 0, and it is 3 for processor 1, CH 1. ■ <*dimm*> is the DIMM slot number. ■ Optional DRAM <*rank*>, <*bank*>, <*row*>, and <*col*> all default to 0.
map [<*address*> | RANK]	Displays system address mapping using DIMM ranks and address ranges. ■ <*address*> displays the address range info that <*address*> belongs to. ■ RANK = <*socket*> <*mc*> <*channel*> <*dimm*> [<rank>] ■ <*rank*> is optional and if absent, ranks are enumerated for display.

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

mouse

This command enables the user to see the mouse pointer movement and to check mouse button click operations. It displays a cursor, and it displays a message when the user clicks a mouse button.

Command Syntax

mouse [-time <*timeout***>]**

Options

Options	Descriptions
-time <*timeout***>**	<*timeout*> specifies maximum test time in seconds in hexadecimal. The default is 180 seconds.

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

network

The `network` command displays Ethernet interfaces or runs external loop-back tests. If the **`ifs`** option is used, the command displays a list of Ethernet ports that are available for external loop-back tests.

Note - Ports need to be configured with IP addresses prior to running this command. You can use the EFI Shell application `ifconfig` to configure IP addresses. Enter the `udiag network ifs` command to verify that all Ethernet ports are configured correctly.

With two interface numbers specified, this command tests the ports by sending packets from the first port and by receiving and verifying the packets from the second port.

Command Syntax

`udiag network ifs`

`udiag network <`*`tx_if`***`> <`***`rx_if`***`> [-ps <`***`size`***`>]`**

Options

Options	Descriptions
`ifs`	Lists the available Ethernet ports, including interface numbers.
<*tx_if***>**	Specifies the interface number of the port from which external loop-back test packets are sent out.
<*rx_if***>**	Specifies the interface number of the port from which external loop-back test packets are received.
`-ps <`*`size`***`>`**	Specifies the packet size used by the test when requesting data transfer at TCP4 interface. The size option should be [**`10`**, **`10000`**] (inclusive).

Resource Requirements

BSP_ONLY; MULTIPLE_INSTANCES

Examples

To display recognized ports, type:

```
fs0:/> udiag network ifs
```

To run an external loop-back test from interface 2 to interface 4, type:

```
fs0:/> udiag network 2 4
```

rtc

The `rtc` command displays the current date and time in the 24-hour format by directly accessing the legacy real-time clock (RTC) function.

Command Syntax

udiag rtc

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

storage info

The `storage info` command displays storage information retrieved from SCSI commands. Storage devices include USB, SATA, and SAS devices. Information from all storage devices include product name, serial number, and capacity. If the device is a hard disk, it also includes ECC errors, temperature, in-service data, total and maximum starts/stops, and total and maximum loads/unloads.

The LSI RAID host bus adapters (HBAs) use two separate devices to describe attached SAS devices. One is the physical SCSI device and the other is the virtual block device. To view disk statistics, and other information, use the physical SCSI device (HDDx). For information on the RAID partition, use the virtual block device (VHDx).

The non-RAID HBAs use only one device to describe attached SAS devices.

Command Syntax

udiag storage info [<*device_name***>]**

Options

Options	Descriptions
<*device_name***>**	Must be entered as **HDDx**, **SATAx**, **USBx**, **VHDx**, **NVMEx**, or **VFD**, where **x** represents the index of the device. The index of the device can be found by running the `udiag storage info` command. This command lists all devices.

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

Examples

To get information on all devices, type:

```
fs0:/> udiag storage info
```

To get information on HDD02, type:

```
fs0:/> udiag storage info HDD02
```

storage mst

The `storage mst` command runs the Mechanical Stress Test (`mst`) for the time duration specified by the **`-time`** flag and for the **`-pc`** (count) iterations. The test reads the blocks sequentially from the device. The default is to run the test once, until all blocks have been tested.

If both **`-time`** and **`-pc`** flags are specified, the test runs until either the time interval has lapsed, or the count has been reached.

Command Syntax

udiag storage mst { all | <*device_name***> } [-time <***n***>] [-pc <***n***>]**

Options

Options	Descriptions
all	Runs the test on all block storage devices.
<*device_name***>**	Must be entered as **HDDx**, **SATAx**, **USBx**, **VHDx**, or **NVMEx**, where **x** represents the index of the device. The index of the device can be found by running the `udiag storage info` command. This command lists all devices and identifies block devices. Tests run only on block devices.
-time <*n***>**	Specifies the maximum test time in seconds in hexadecimal. The default is 0, which indicates no time limit. The test runs to completion.
-pc <*n***>**	Specifies the maximum number of times to run the test. The default is 1.

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

Examples

To run the test on HDD02, type:

```
fs0:/> udiag storage mst HDD02
```

To run the test on all devices for a total of 4 hours, type:

```
fs0:/> udiag storage mst all -time 3840
```

storage rrt

The `storage rrt` command runs the Random Read Test (`rrt`) on a single device (if specified), or on all storage devices. The command runs the test for the time specified by the **-time** flag duration. The test reads block-size blocks randomly from the device. The default is to run the test once for the total number of blocks on the device.

Command Syntax

udiag storage rrt { all | <*device_name***> } [-time <***n***>]**

Options

Options	Descriptions
all	Runs the test on all block storage devices.
<*device_name***>**	Must be entered as **HDDx**, **SATAx**, **USBx**, **VHDx**, or **NVMEx**, where **x** represents the index of the device. The index of the device can be found by running the `udiag storage info` command. This command lists all devices and identifies block devices. Tests run only on block devices.
-time <*n***>**	Specifies the maximum test time in seconds in hexadecimal. The default is 0, which indicates no time limit. The test runs to completion.

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

Examples

To run the test on all devices until they are complete, type:

```
fs0:/> udiag storage rrt all
```

To run the test on NVME until completion, type:

```
fs0:/> udiag storage rrt NVME1
```

To run the test on HDD03 for 1 hour, type:

```
fs0:/> udiag storage rrt HDD3 -time E10
```

`storage srt`

The `storage srt` command runs the Sequential Read Test (`srt`) on a single device (if specified), or all storage devices. The command runs the test for the time specified by the **-**

time flag. The test reads blocks sequentially from the device, starting at block 0 or the block specified by the **-s** flag. The default is to run the test once, until all blocks have been tested.

Command Syntax

udiag storage srt { all | <*device_name***> } [-s <***start_address***> [-e <***end_address***>] [-time <***n***>]**

Options

Options	Descriptions
all	Runs the test on all block storage devices.
<*device_name***>**	Must be entered as **HDDx**, **SATAx**, **USBx**, **VHDx**, or **NVMEx**, where **x** represents the index of the device. The index of the device can be found by running the `udiag storage info` command. This command lists all devices and identifies block devices. Tests run only on block devices.
-s <*start_address***>**	Specifies the starting Logical Block Address (LBA) and is entered in hexadecimal format.
-e <*end_address***>**	Specifies the ending LBA and is entered in hexadecimal format. The default is the last LBA on the device.
-time <*n***>**	Specifies the maximum test time in seconds in hexadecimal. The default is 0, which indicates that there is no time limit. The test runs to completion.

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

Examples

To run the test on all devices until they are completed, type:

```
fs0:/> udiag storage srt all
```

To run the test on HDD starting at block 100, type:

```
fs0:/> udiag storage srt HDD1 -s 64
```

To run the test on HDD02 for 2 hours from block 16 to block 4096, type:

```
fs0:/> udiag storage srt HDD2 -time 1c20 -s 10 -e 1000
```

storage rwv

The `storage rwv` command runs the Read-Write-Verify-Restore (`rwv`) test on a single device (if specified), or all block devices. If specified, the test runs for the time specified by the **`-time`** flag. The test reads blocks sequentially from the device. The default is to run the test once, until all blocks have been tested.

The test reads a block and stores it; then it writes a known pattern to the disk and reads it back, verifying that it wrote the contents correctly. Finally, the original contents of the block are restored.

Command Syntax

`udiag storage rwv { all | <`*device_name***`> } [ -time <`***n***`> ]`**

Options

Options	Descriptions
`all`	Runs the test on all block storage devices.
<*device_name***>**	Must be entered as **`HDDx`**, **`SATAx`**, **`USBx`**, **`VHDx`**, or **`NVMEx`**, where **`x`** represents the index of the device. The index of the device can be found by running the `udiag storage info` command. This command lists all block devices.
`-time <`*n***`>`**	Specifies the maximum test time in seconds in hexadecimal. The default is 0, which indicates no time limit. The test runs to completion.

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

Examples

To run the test on all devices until they are completed, type:

```
fs0:/> udiag storage rwv all
```

To run the test on HDD, type:

```
fs0:/> udiag storage rwv HDD
```

To run the test on VHD for 1 hour, type:

```
fs0:/> udiag storage rwv VHD -time E10
```

system acpi

The `system acpi` command finds all of the Advanced Configuration and Power Interface (ACPI) tables that are defined by BIOS and displays their associated information. This command can be used to view ACPI signature tables, to dump all table data, and to determine how many logical processors and cores are enabled. Without options, this command displays only defined ACPI tables.

Command Syntax

udiag system acpi [-v]

udiag system acpi <*name***> [offset_length]**

Options

Options	Descriptions
<*name***>**	Specifies the name of the ACPI table.
offset	Specifies the offset to start the data dump.
length	Specifies the number of bytes to be displayed.
-v	Displays more information, such as the ACPI processor ID, CPU ID, APIC ID, core ID, thread number, and if the logical processor is a boot strap processor or an application processor.

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

Examples

To display system ACPI tables, type:

```
fs0:/> udiag system acpi
```

To display a specific ACPI table, type:

```
fs0:/> udiag system acpi XSDT
```

To display a specific ACPI table and the offset length, type:

```
fs0:/> udiag system acpi SSDT 0x40 0x20
```

system info

The `system info` command displays general information about the server as a system. Information includes:

- BIOS provider and version
- Oracle Integrated Lights Out Manager (ILOM) version
- System baseboard and chassis manufacturer
- Processors, cache, memory, port connectors, and PCI slots

Command Syntax

udiag system info

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

Example

To display general information about the system, type:

```
fs0:/> udiag system info
```

system inventory

The `system inventory` command displays the inventory information about the server in a text format. Information includes the system motherboard, enclosure, BIOS, processors, memory, cache, and PCI slots. Information is according to SMBIOS tables.

Command Syntax

udiag system inventory

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

Example

To display system inventory information about the system in text format, type:

```
fs0:/> udiag system inventory
```

system smbios

The `system smbios` command displays information from the SMBIOS tables defined by BIOS. The supported range is from 0 to 255. Number 255 is used to display information for the Entry Point Table. Without options, the command displays all available tables and their respective table type number.

Command Syntax

udiag system smbios [<*table_type***>]**

Options

Options	Descriptions
<*table_type***>**	Specifies the table type number. Add this number to the command to display information for the related table. To display information for the Entry Point Table, enter **255** for this option

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

Examples

To display information for all SMBIOS tables, type:

```
fs0:/> udiag system smbios
```

To display information for SMBIOS table 17, type:

```
fs0:/> udiag system smbios 17
```

To display information for the Entry Point Table, type:

```
fs0:/> udiag system smbios 255
```

system cpusockets

The `system cpusockets` command displays information on CPU sockets and QuickPath Interconnect (QPI) links. Information includes QPI links to sockets, bus numbers (BUS0, BUS1) and QPI speed and link lane status (UP=1).

Note - BUS0 equates to CPU Bus Number 0. BUS1 equates to CPU Bus Number 1.

Command Syntax

udiag system cpusockets

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

system pelink

The `system pelink` command displays or verifies PCIExpress (PCIe) link settings or resets a port. The command lists the PCIe root ports in the host system. The list displays the actual and maximum link widths and speeds.

The test option compares the maximum width and possible speed, and the actual width and speed for each root port. If a mismatch is detected, the test fails.

Command Syntax

udiag system pelink [test | train <*port_number***> | -v]**

Options

Options	Descriptions
test	Verifies the width and speed settings for the root ports.
-v	Displays more information on PCIe links.

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

tpm

The `tpm` command displays vendor IDs, device IDs, and the contents of access status registers in all security levels of the Trusted Platform Module (TPM) chip.

Command Syntax

udiag tpm

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

usb

The `usb` command displays information extracted from UEFI USB protocols for USB root hubs, ports, and devices.

Command Syntax

udiag usb { hubs | <*hub_id***> | device | <***device_id***> }**

Options

Options	Descriptions
hubs	Displays USB root hubs. Each hub is identified by a hub ID in the list.
<*hub_id***>**	Specifies a USB hub to display. Entered as **h<***hex_number***>**.
devices	Displays USB devices that have a driver attached. Each device is identified by a device ID in the list.
<*device_id***>**	Specifies a USB device to display. Entered as **d<***hex_number***>**.

Resource Requirements

BSP_ONLY; ONE_INSTANCE_ONLY

Examples

To list USB controllers, type:

```
fs0:/> udiag usb hubs
```

To display information for the second USB hub in the list, type:

```
fs0:/> udiag usb h1
```

To list active USB devices, type:

```
fs0:/> udiag usb devices
```

To display information for the fourth device in the list, type:

```
fs0:/> udiag usb d3
```

Configuring NIC Teaming

This chapter describes network adapter teaming using the Windows operating system.

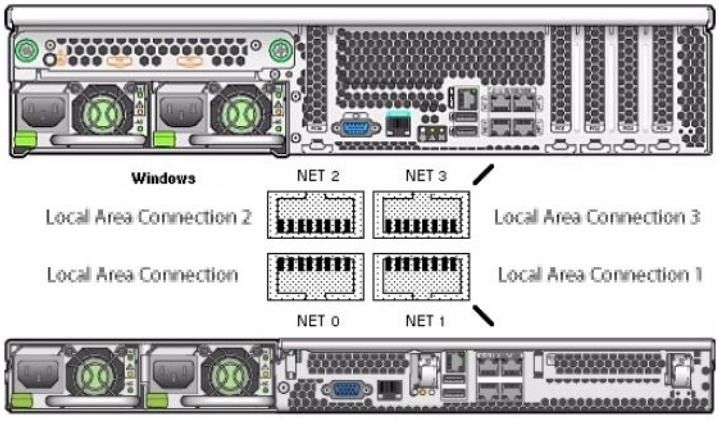
Teaming is the ability to configure two or more network adapters (team) to a single network interface for fault tolerance or load balancing.

Intel PROSet is network connection software that provides advanced networking features like teaming. Intel PROSet can be installed from the Oracle Server Assistance (Supplemental Software) on your server.

Adapter Teaming

Network adapter teaming aggregates two or more network adapters into a single network adapter. Inter PROSet teaming software supports Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, and Windows Server 2016.

The following picture illustrates the Windows Server naming conventions for network adapters:



Note - To determine which network interface ports are active on your system, use the Windows `ipconfig /all` command, or the Windows Network Connections manager. For more information, see your Service Manual.

A team can include two or more network adapters that appear in the teaming wizard.

▼ Install the Intel Network Connections Manager

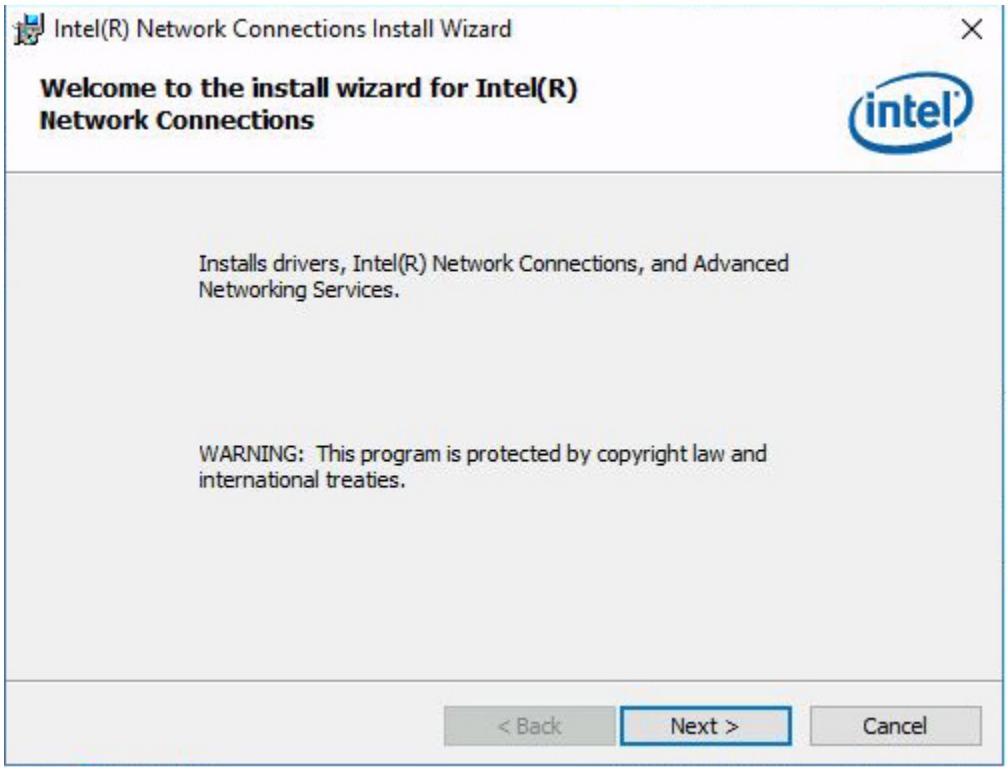
1. **Navigate to the Intel PROSet network connection software on the Oracle System Assistant.**

   DRIVE`:\Windows\Common\Windows_2012\2012R2\Tools\Intel-Nic-PROSet`.

   Note - If your system does not include Oracle System Assistant, download and install the tool according to the instructions from Intel.

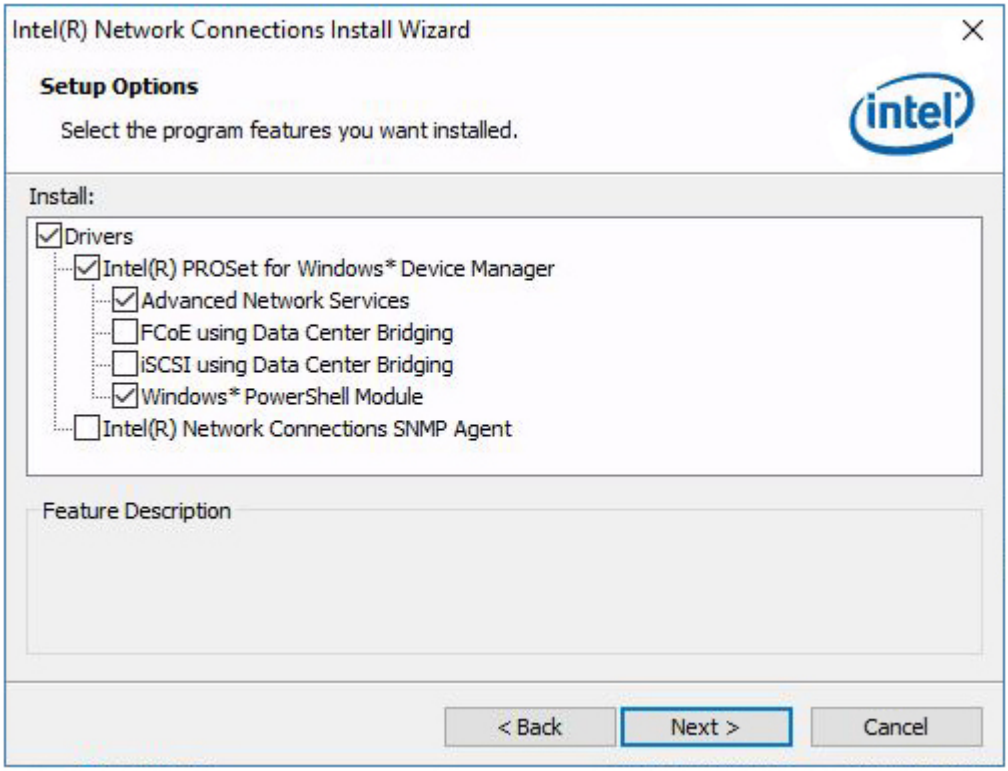
2. **Change Directory to `APPS\PROSETDX\Winx64` and then double-click `DxSetup`.**

The installation wizard starts.



3. **Click Next.**

The setup options dialog appears.

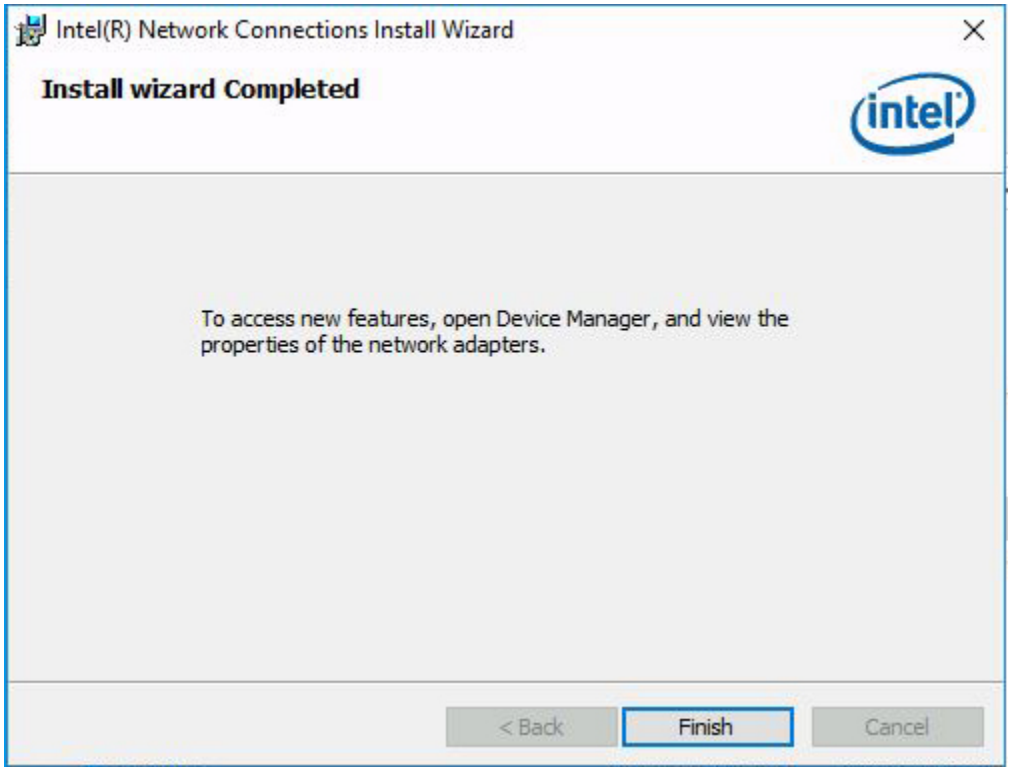


4. **Enter your selections and then select Next.**

   For network adapter teaming, make sure, make sure Advanced Network Services is selected.

5. **In the following dialogs, click Install and then Finish.**

The installation is complete.



▼ To Configure Network Adapter Teaming

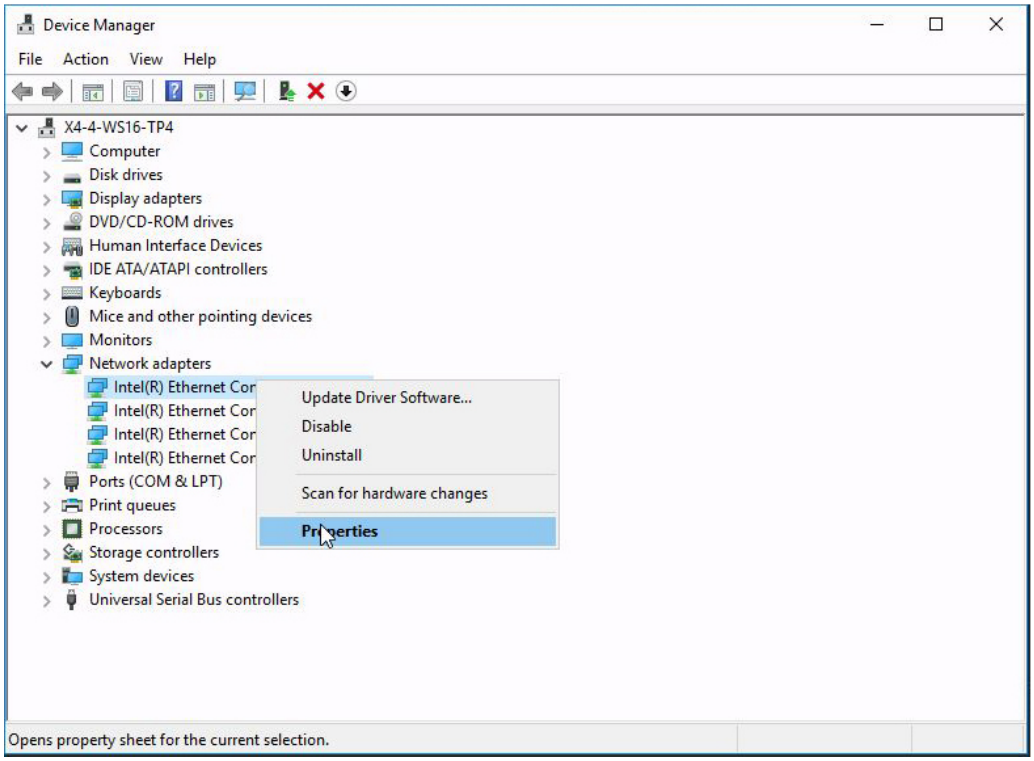
1. **Open the Windows Device Manager.**

   a. **Right-click the Windows Start icon and then select `run`.**

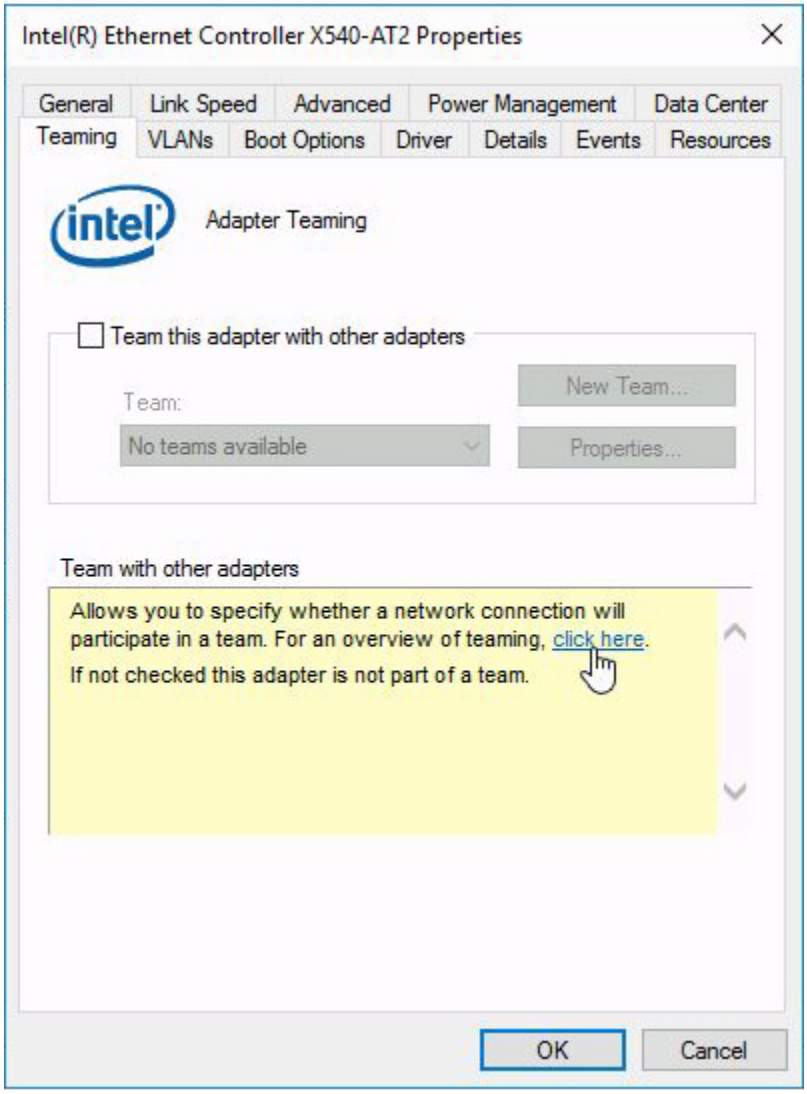
   b. **Type `devmgmt.msc` in the text box and then click OK.**
   The Device Manager screen appears.

2. **Expand the Network adapters group.**
   A list of network adapters appears.

3. **Right click one of the Intel network adapters and click Properties.**



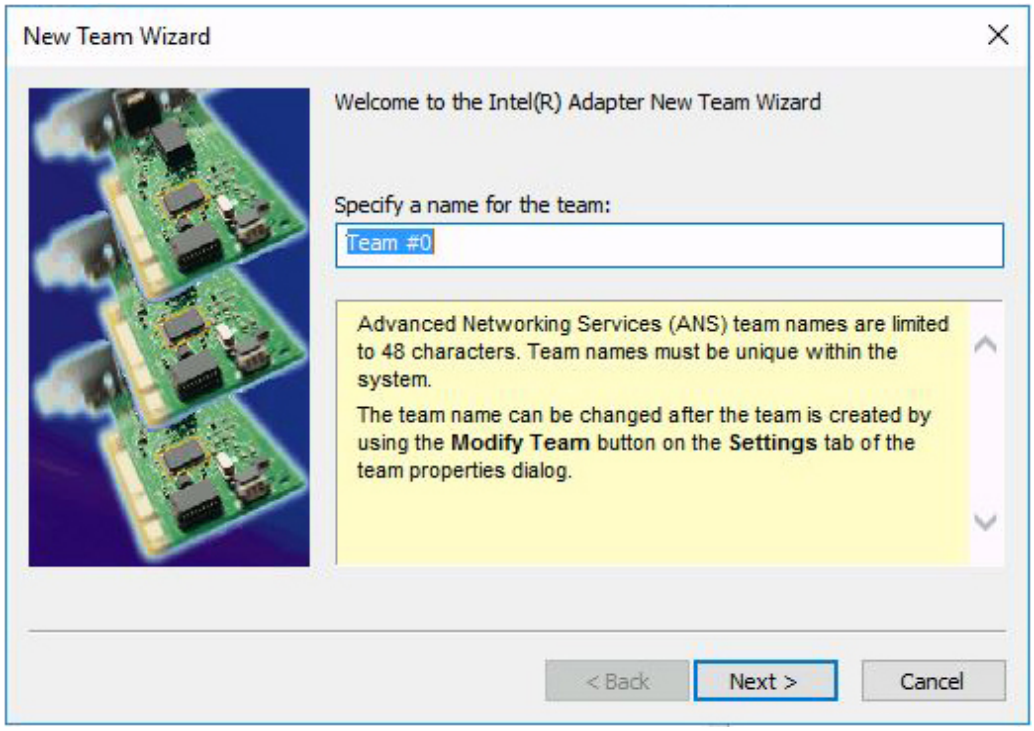
The adapter properties screen appears.



Note - Many of these dialogs include links that you can click to display online documentation.

4. **Select Team this adapter with other adapters, and select New Team or an existing team, and then select OK.**

   A team wizard appears.

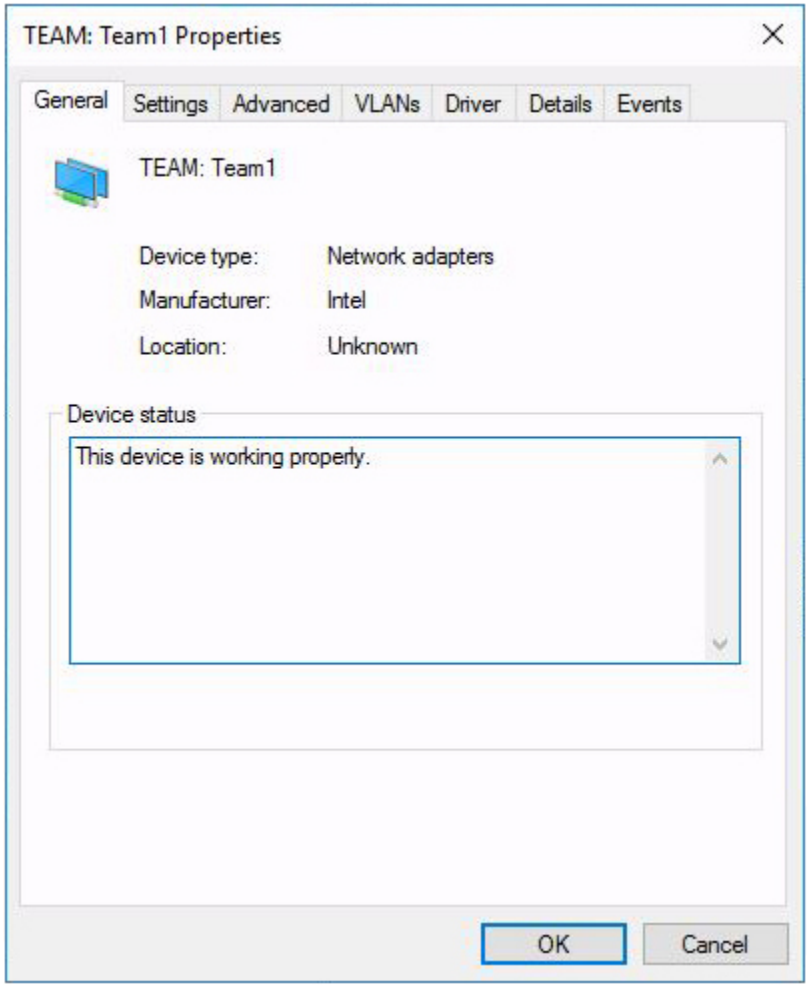


5. **Follow the wizard screens to configure the team.**

   The selections include naming the team, selecting the adapters, selecting the team type, and selecting a team profile.

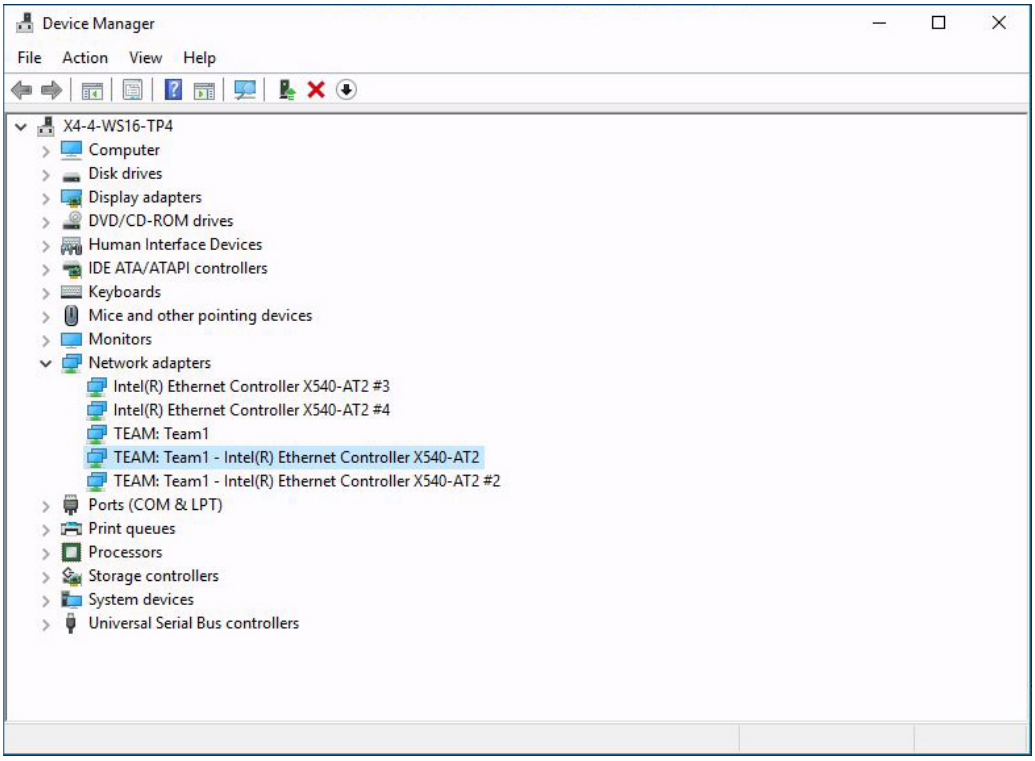
6. **When you have completed the selections, select Finish.**

The team properties view appears.



7. **Click OK.**

The team you added appears in the Device Manager.



Checking System Components with HWdiag

HWdiag is a command-line utility that can be used to check the status of system components. It is run in restricted mode, from the Oracle ILOM command line interface (CLI).

Note - Check in your product notes to see if this functionality is supported on your platform.

This section contains the following topics:

- "Run HWdiag" on page 127
- "HWdiag Commands" on page 128

For information about Oracle ILOM, refer to the *Oracle ILOM Documentation Library* at:

`http://www.oracle.com/goto/ILOM/docs`

Run HWdiag

Access HWdiag from Oracle ILOM in restricted shell mode.

1. **Logon to the Oracle ILOM CLI.**
   The Oracle ILOM prompt appears.
   For details refer to `http://docs.oracle.com/cd/E24707_01/index.html`.

2. **Enter restricted mode. Type:**

```
->set SESSION mode=restricted
Warning: The "Restricted Shell" account is provided solely
to allow Services to perform diagnostic tasks.

[(restricted_shell) ssg15-2243-0a8181e4:~]#
```

3. **Enter the command.**
   HWdiag commands use the form **`hwdiag`** *main command [subcommand ...]*.
   See "HWdiag Commands" on page 128 for details.

4. **To display HWdiag help, type:**

   - **hwdiag** to get a list of options and main commands.
   - **hwdiag –h** to get a list of main commands and their sub commands.
   - **hwdiag –h** *main command* to get a list of all the subcommands associated with *main command*.

HWdiag Commands

This section describes how to use the HWdiag command line.

Using the HWdiag Command Line

HWdiag commands use the form **hwdiag** *main-command [subcommand ...]*.

For example:

```
[(restricted_shell) ORACLESP-XXxxXXxxXXxx:~]# hwdiag led get /SYS/MB/P1/MR0/D1/SERVICE
HWdiag (Restricted Mode) - Build Number 81018 (May 12 2013 at 00:42:14)
  LED                             VALUE
  ----------------------------------------
  /SYS/MB/P1/MR0/D1/SERVICE     : off

[(restricted_shell) ORACLESP-XXxxXXxxXXxx:~]#
```

Many subcommands require an additional subcommand to identify the actual device or devices being acted on. This *target* can be an individual device or **all**, which represents all the valid targets for the subcommand. In the above example, **hwdiag led get /SYS/MB/P1/MR0/D1/SERVICE** returns the state of a single LED. If you enter **hwdiag led get all**, it displays the state of all the system LEDs.

Note - Main commands and subcommands are case insensitive. However **hwdiag** is not. For example, **hwdiag led get all** is the same as **hwdiag LED GET ALL**.

If you enter an incomplete command line, HWdiag displays the syntax for the command and a list of valid subcommands. Use this information to re-enter the command with a complete and valid set of parameters and subcommands.

The following display shows an example.

```
[(flash)root@ORACLESP-XXxxXXxxXXxx:~]# hwdiag temp
```

```
HWdiag - Build Number 81018 (May 12 2013 at 00:42:14)

Syntax: hwdiag temp ...

   get [all|<sensor>]
               - Display Temperature Sensor Reading
   info [all|<sensor>]
               - Display Temperature Sensor Information
[(flash)root@ORACLESP-XXxxXXxxXXxx:~]# hwdiag temp get
HWdiag - Build Number 81018 (May 12 2013 at 00:42:14)

Syntax: hwdiag temp get all|<sensor>

Valid Options for Temperature :
  ALL                             /SYS/MB/T_IN_PS
  /SYS/MB/P0                      /SYS/MB/T_IN_ZONE1
  /SYS/MB/P1                      /SYS/MB/T_IN_ZONE2
  /SYS/MB/P2                      /SYS/MB/T_IN_ZONE3
  /SYS/MB/P3                      /SYS/MB/T_IN_ZONE4
  /SYS/MB/T_CORE_NET01            /SYS/MB/T_OUT_SLOT1
  /SYS/MB/T_CORE_NET23            /SYS/T_FRONT
[(flash)root@ORACLESP-XXxxXXxxXXxx:~]# hwdiag temp get all
HWdiag - Build Number 81018 (May 12 2013 at 00:42:14)
  DEVICE                          TEMP
  ----------------------------------------
  /SYS/MB/P0                    : 64.00 margin
  /SYS/MB/P1                    : 64.00 margin
  /SYS/MB/P2                    : 63.00 margin
  /SYS/MB/P3                    : 64.00 margin
  /SYS/MB/T_CORE_NET01          : 38.75 deg C
  /SYS/MB/T_CORE_NET23          : 38.00 deg C
  /SYS/MB/T_IN_PS               : 26.75 deg C
  /SYS/MB/T_IN_ZONE1            : 30.75 deg C
  /SYS/MB/T_IN_ZONE2            : 30.75 deg C
  /SYS/MB/T_IN_ZONE3            : 29.50 deg C
  /SYS/MB/T_IN_ZONE4            : 28.25 deg C
  /SYS/MB/T_OUT_SLOT1           : 29.75 deg C
  /SYS/T_FRONT                  : 24.50 deg C
```

Command Descriptions

The following table lists the HWdiag commands.

Note - Not all commands are available on all platforms. To find out which commands are available on your system, enter **`hwdiag –h`**.

TABLE 1 HWdiag Commands

Component	Action	Options	Description and Options
cpld			Power and CPLD commands.
	reg		Dump CPLD registers.
	vr_check		Print voltage regulator status.
	log		Read and clear FPGA event log and trigger an event in log.
cpu			Display CPU information.
	info all|*cpu*	-r	Dump CPU devices.
fan			Fan test/utilities.
	get	-m	Display fan RPM.
	info		Displays fan presence information.
	testpsu		Check PSU (power supply) fans.
	test chassis fans		Check chassis fans.
gpio			SP GPIO.
	get *gpio_pin*	-r	Get information about specific pins.
i2c			Test the sideband i2c topology.
	scan all|*bus*		Display all accessible i2c devices.
	test all|*bus*		Test connectivity of all platform i2c devices. This test returns a pass or fail.
led			Get information about LEDs.
	get all|*led*		Display the state of LEDs.
	info all|*led*		Display information about LED registers.
mem			Display memory (DIMM) information.
	info all|*dimm name*		Display memory configuration.
	spd all|*dimm name*	-r	Display DIMM SPD information, which includes things like size, speed, and voltage. The information displayed varies according to manufacturer.
pci			PCIe tests and utilities.
	dump		Read PCIe registers. dump <socket> <bus> <dev> <func> [std|ext]|[<offset> <count>] ■ std reads the entire space ■ ext reads the extended space ■ <offset><count> specifies a single register
	info all|*device*	-r	Display PCIe link information for all, or for a single device.
	lspci		Display all PCIe devices, Linux style.
	read		Read the specified PCIe register. read <socket> <bus> <dev> <func> <offset>
power			Display power information.

Component	Action	Options	Description and Options
	get		Display sensor readings. get amps|volts|watts all|*sensor*. *sensor* identifies an individual sensor.
	info all|*sensor*		Display information about sensors.
system			
	summary		Display system summary.
	fabric test *all*		Test the system fabric, including QPI bus speed, PCIe link speed, and memory frequency.
	info		Display system configuration information.
	port80	-m	Display host boot progress by monitoring port 80. The default interval is 5ms.
	rtc		Display the real time clock (RTC).
	thermal	-m, –r	Display system thermal information, including temperatures, fan speeds, and power.
	version		Display the version of system components.
temp			Display temperatures.
	get all|*sensor*		Display temperature sensor readings.
	info all|*sensor*		Display information about system sensors.

TABLE 2 Options

Option	Long	Description
– h	help	Display help.
– l	log <filename>	Enable HWdiag to start logging to *filename*. **Note -** Use – t to add time stamp to logging.
– t	timestamp	Add timestamp to logging. Use with – l option.
– m	monitor <.1 sec>	Set monitoring interval in increments of tenths of a second (.1 second). Overrides current monitoring interval.
– r	raw	Modify HWdiag output for easier parsing.
– i	interactive	Prompts when used with a main command.

Getting Server Module Firmware and Software

This section explains the options for accessing server firmware and software.

Description	Links
Learn about server firmware and software updates.	“Firmware and Software Updates” on page 133
Learn about the options for accessing firmware and software.	“Firmware and Software Access Options” on page 134
View the available firmware and software packages.	“Available Software Release Packages” on page 134
Access the firmware and software packages through Oracle System Assistant or My Oracle Support.	“Accessing Firmware and Software” on page 135
Install firmware and software updates.	“Installing Updates” on page 136

Firmware and Software Updates

Firmware and software, such as hardware drivers and tools for the server, are updated periodically. Updates are made available as a software release. The software release is a set of downloads (patches) that include all available firmware, hardware drivers, and utilities for the server. All these have been tested together. The Read Me document that is included with the download explains what has changed and what has not changed from the prior software release.

You should update your server firmware and software as soon as possible after the software release becomes available. Software releases often include bug fixes, and updating ensures that your server module software is compatible with the latest chassis firmware and other chassis component firmware and software.

A Read Me file in the download package and your server's product notes should contain information about the updated files in the download package, as well as bugs that are fixed with the current release. The product notes also provide information about which server module software versions are supported with the latest chassis firmware.

Firmware and Software Access Options

Use one of the following options to obtain the latest set of firmware and software for your server:

- **Oracle System Assistant** – Oracle System Assistant is a new factory-installed option for Oracle servers that allows you to easily download and install server firmware and software.

  For more information about using Oracle System Assistant, refer to your server's administration guide.
- **My Oracle Support** – All system firmware and software are available from My Oracle Support at `https://support.oracle.com`.

  For more information about what is available on the My Oracle Support, see "Available Software Release Packages" on page 134.

  For instructions on how to download software releases from My Oracle Support, see: "Download Firmware and Software Using My Oracle Support" on page 135.

Available Software Release Packages

Downloads on My Oracle Support are grouped by product family, then product, then version. The version contains one or more downloads (patches).

For servers and blades, the pattern is similar. The product is the server. Each server contains a set of releases. These releases are not true software product releases, but releases of updates for the server. These updates are called software releases and comprise several downloads, all tested together. Each download contains firmware, drivers, or utilities.

My Oracle Support has the same set of download types for this server family as shown in the following table. The same firmware and software can also be downloaded using Oracle System Assistant.

Package Name	Description	When to Download This Package
server name SW*version* – Firmware Pack	All the system firmware, including Oracle ILOM, BIOS, and option card firmware.	You need the latest firmware.
server name SW*version* – OS Pack	An OS pack is available for each supported operating system version. Each OS pack includes a package of all tools, drivers, and utilities for that version of the OS.	You need to update OS-specific drivers, tools, or utilities.

Package Name	Description	When to Download This Package
	Software includes Oracle Hardware Management Pack and LSI MegaRAID software.	
server name SW*version* – All packs	Includes the Firmware Pack, all OS Packs, and all documents. This pack does not include SunVTS or the Oracle System Assistant image.	You need to update a combination of system firmware and OS-specific software.
server name SW*version* – Diagnostics	SunVTS diagnostics image.	You need the SunVTS diagnostics image.
server name SW*version* – Oracle System Assistant Updater	Oracle System Assistant updater and ISO update image.	You need to manually recover or update Oracle System Assistant.

Each of the downloads is a zip file that contains a Read Me and a set of subdirectories containing firmware or software files. The Read Me file contains details on the components that have changed since the prior software release and the bugs that have been fixed. For more details on the directory structure of these downloads, refer to the your server's administration guide.

Accessing Firmware and Software

This section covers instructions for downloading or requesting software release files.

Note - You can also use Oracle System Assistant to easily download and use the latest software release. For further information, refer to the your server's administration guide.

To obtain updated firmware and software, see: “Download Firmware and Software Using My Oracle Support” on page 135

▼ Download Firmware and Software Using My Oracle Support

1. **Go to: `https://support.oracle.com`**
2. **Sign in to My Oracle Support.**

3. **At the top of the page, click the Patches and Updates tab.**
   The Patches and Updates screen appears.

4. **In the Search screen, click Product or Family (Advanced Search).**
   The screen appears with search fields.

5. **In the Product field, select the product from the drop-down list.**
   Alternatively, type a full or partial product name (for example, Sun Blade X6270 M3) until a match appears.

6. **In the Release field, select a software release from the drop-down list.**
   Expand the folders to see all available software releases.

7. **Click Search.**
   The software release comprises a set of downloads (patches) .
   See "Available Software Release Packages" on page 134 for a description of the available downloads.

8. **To select a patch, click the check box next to the patch name (you can select more than one patch).**
   A pop-up action panel appears. The panel contains several action options.

9. **To download the update, click Download in the pop-up panel.**
   The download begins automatically.

Installing Updates

The following topics provide information about installing firmware and software updates:

- "Installing Firmware" on page 136
- "Installing Hardware Drivers and OS Tools" on page 137

Installing Firmware

Updated firmware can be installed using one of the following:

- **Oracle Enterprise Manager Ops Center** – Ops Center Enterprise Controller can automatically download the latest firmware from Oracle, or firmware can be loaded

manually into the Enterprise Controller. In either case, Ops Center can install the firmware onto one or more servers, blades, or blade chassis.

For more information, go to:

http://docs.oracle.com/cd/E27363_01/index.htm.

- **Oracle System Assistant** – Oracle System Assistant can download and install the latest firmware from Oracle. The server must be booted to Oracle System Assistant. The GUI displays a list of installed firmware and available updates, and then lets you choose what updates to install.

  For more information, refer to your server's administration guide.
- **Oracle Hardware Management Pack** – The Oracle Hardware Management Pack `fwupdate` CLI tool allows you to update system firmware without shutting down the OS. It runs from the OS command line, and provides command options to reset individual devices as required.

  For more information, go to: http://www.oracle.com/goto/OHMP/docs.
- **Oracle ILOM** – The Oracle ILOM web interface or CLI can be used to update the Oracle ILOM and BIOS firmware bundle. An option allows you to leave the OS running and postpone the BIOS update until the next server reset. Otherwise Oracle ILOM shuts down the OS and resets the server.

  For more information, go to: http://www.oracle.com/goto/ILOM/docs.

Installing Hardware Drivers and OS Tools

Updated hardware drivers and operating system (OS)-related tools, such as the Oracle Hardware Management Pack, can be installed using one of the following:

- **Oracle Enterprise Manager Ops Center** – For more information, go to:

  http://docs.oracle.com/cd/E27363_01/index.htm
- **Oracle System Assistant** – For more information, refer to your server's administration guide.
- Other deployment mechanisms such as JumpStart, Kickstart or third-party tools.

  For more information, refer to your OS documentation.

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