Oracle® x86 Servers Diagnostics and Troubleshooting Guide

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Using This Documentation

- **Overview** – Describes diagnostic and troubleshooting information for x86 servers with Oracle ILOM Firmware Releases 4.x and 5.x
- **Audience** – Technicians, system administrators, and authorized service providers
- **Required knowledge** – Advanced experience troubleshooting and replacing hardware

Product Documentation Library

Documentation and resources for this product and related products are available at `https://www.oracle.com/goto/x86admindiag/docs`.

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Introduction to System Diagnostics and Troubleshooting

Oracle provides a wide spectrum of diagnostic and troubleshooting tools for use with Oracle x86 servers. These tools include integrated log file information, operating system diagnostics, standalone software packages such as Oracle VTS software, and hardware LED indicators, all of which contain clues helpful in narrowing down the possible sources of a problem.

Some diagnostic tools stress the system by running tests in parallel, while other tools run sequential tests, enabling the system to continue its normal functions. Some diagnostic tools function on Standby power or when the system is offline, while others require the operating system to be up and running.

This section describes the Oracle diagnostic tools for x86 servers equipped with Oracle ILOM Firmware Releases 4.x and 5.x. It includes the following topics:

- "Diagnostic and Troubleshooting Tools" on page 11
- "Troubleshooting System Components" on page 12

Diagnostic and Troubleshooting Tools

Why are there so many different diagnostic and troubleshooting tools? There are a number of reasons for the lack of a single all-in-one diagnostic test, starting with the complexity of the server. Consider also that some diagnostics must function even when the system fails to boot. Any diagnostic capable of isolating problems when the system fails to boot must be independent of the operating system. But any diagnostic that is independent of the operating system is also unable to make use of the operating system's considerable resources for getting at the more complex causes of faults or failures. Consider the different tasks you expect to perform with your diagnostic and troubleshooting tools:

- Isolating faults to a specific replaceable hardware component
- Exercising the system to disclose more subtle problems that might or might not be hardware related

- Monitoring the system to catch problems before they become serious enough to cause unplanned downtime

You cannot optimize every diagnostic tool for all these varied tasks. Instead of one unified diagnostic tool, Oracle provides a palette of tools each of which has its own strengths and applications.

The following diagnostic and troubleshooting tools are available for your server.

Tool	Description	Link
Status indicators	Status indicators (LEDs) located on the chassis and on selected system components can serve as front-line indicators of a limited set of hardware failures.	"System LEDs and Diagnostics" on page 86
Oracle ILOM Diagnostics	Oracle ILOM displays the status of system components. You can then replace a failed component, which often clears the problem.	"Oracle ILOM Diagnostics" on page 23
HWdiag (Oracle ILOM Diag shell)	Oracle ILOM allows you to run HWdiag, a command-line utility that checks the status of system components. Access the `hwdiag` command from the Oracle ILOM Diag shell.	"Using the Oracle ILOM Diag Shell" on page 40
Snapshot Utility (Oracle ILOM)	Oracle ILOM collects information about the current state of the Oracle ILOM SP, including environmental data, logs, and information about field-replaceable units installed on the server. You also can use Snapshot to run diagnostics on the host and capture the diagnostics log files.	"Using the Snapshot Utility" on page 48
UEFIdiag (Oracle ILOM/UEFI shell)	Oracle ILOM allows you to run diagnostics in a UEFI environment to evaluate system components, such as the CPU, memory, disk drives, and I/O cards.	"Using UEFI Diagnostics" on page 53
Oracle VTS Software	Oracle VTS software provides comprehensive diagnostics that verify the connectivity and functionality of most hardware controllers and devices. Oracle VTS can exercise all servers, adding stress to the main components. You can use Oracle VTS on a system running Oracle Linux or Oracle Solaris.	"Oracle VTS Software" on page 67
Oracle Solaris Diagnostics	Use Oracle Solaris diagnostics to diagnose component problems and interpret the log files.	"Core Dump File" on page 79
Oracle Linux FMA	Oracle Linux Fault Management Architecture (FMA) software is an add-on service that receives data related to hardware errors detected by the host OS (CPU and memory) and automatically diagnoses the underlying problem.	"Core Dump File" on page 79

Troubleshooting System Components

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

Server Component	Oracle ILOM	UEFIdiag	HWdiag	Oracle VTS
Service processor	Yes	No	Yes	Partial
CPU and memory	Yes	Yes	Yes	Yes
Fans	Yes	No	Yes	No
Power supplies	Yes	No	Yes	No
Storage devices	Yes (limited)	Yes	Yes (limited)	Yes
Network interface	Yes	Yes (limited)	Yes (limited)	Yes

System Diagnostics and Troubleshooting Strategies

This section provides strategies for using the diagnostic tools to troubleshoot your Oracle x86 server.

- "When to Run the Tools" on page 15
- "System Diagnostics and Troubleshooting Scenarios" on page 16
- "Preliminary Troubleshooting Procedures" on page 18

When to Run the Tools

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 Information for Service" on page 19 "Information to Gather for Troubleshooting" on page 86
2	Investigate any power-on problems.	"Troubleshoot Power Problems" on page 20
3	Perform *external* visual inspection.	"Inspect the External System" on page 20
4	Perform *internal* visual inspection.	"Inspect the Internal System" on page 20
5	Look at the Oracle ILOM Summary Information page and the Open Problems page in the web interface. Replace any failed components.	"View Open Problems on a System (Web)" on page 29
6	Run HWdiag commands to test system components.	"Using the Oracle ILOM Diag Shell" on page 40

Step	Troubleshooting Task	Link
7	Run UEFIdiag to execute a quick diagnostic and detect problems on all CPU, memory, disk drives, and I/O devices.	"Using UEFI Diagnostics" on page 53
8	Run Oracle VTS to verify the connectivity and functionality of most hardware controllers and devices.	"Oracle VTS Software" on page 67

System Diagnostics and Troubleshooting Scenarios

Run diagnostic tests 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 System" on page 16
- "Upgraded System" on page 17
- "Production System" on page 17

▼ New System

- **Before installing options into a new system, run these diagnostic tests in the following order:**

  - HWdiag
  - UEFIdiag

  Tests failed: If the tests identify a server failure:

  - Check the server Product Notes or Release Notes for the product or option for any known conditions that might cause a diagnostic test to fail.
  - If the solution to the problem is not in the Product Notes or Release Notes, assume that the server was damaged in shipment. Terminate the installation process, and notify Oracle Service personnel. 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.

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

  If the server passes the test and you have optional components to install, install the options and re-run the tests.

- If the server passes the test with the new components installed, you can place the server into service.
- If the diagnostic tests reveal that a newly installed component is faulty, remove the component and return the component for replacement.

▼ Upgraded System

1. **Before installing a server upgrade (memory, hard disk drives, I/O cards, or power supply) to an in-service server, take the server out of service and run these diagnostic tests in the following order:**

   - HWdiag
   - UEFIdiag

2. **Install the server upgrade.**

3. **Run the HWdiag and 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 option. 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 installed in the field by authorized Oracle Service personnel.

▼ Production System

If the server has been operating problem-free for a long time, and then the Fault-Service Required indicator LED on the server illuminates, do the following:

1. **Check Oracle ILOM for Open Problems. See "Administering Open Problems" on page 29.**

2. **If you find an open problem, take the appropriate action to repair or replace the faulty component.**

Oracle ILOM typically clears open problems after you repair or replace the faulty component.

3. **If the problem is not resolved, remove the AC power cords from the server and press the Fault Remind button on the motherboard, which illuminates any internal Fault LEDs and indicates which CRU or FRU is faulty.**

4. **If the failed component is a customer-replaceable unit (CRU), replace it. For x86 servers, CRUs are defined in the server Service Manual and the Oracle System Handbook. You must have an account to access the handbook.**

   You can access the Oracle System Handbook from the My Oracle Support web site at `https://support.oracle.com`.

5. **If the failed component is a field-replaceable unit (FRU), initiate a service request with Oracle Service. FRUs are defined in the server Service Manual and Oracle System Handbook.**

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

- "Check for Known Issues" on page 18
- "Gather Information for Service" on page 19
- "Troubleshoot Power Problems" on page 20
- "Inspect the External System" on page 20
- "Inspect the Internal System" on page 20

▼ Check for Known Issues

Product Notes and Release Notes documents provide information about late-breaking issues or problems. They include a description of each issue or problem and methods to repair 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 its solution in the Product Notes or 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 the problem described in the document, follow the instructions to repair it or work around it.**

    Often, following the instructions in the Product Notes or the Release Notes is the first and last step in troubleshooting a problem with your server.

▼ Gather Information for Service

Next, gather information from the service call or the on-site personnel.

1. **Collect information about the following items:**

    - Events that occurred before 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. **Record the results of any change you make. Include any errors or informational messages.**

4. **Check for potential device conflicts, especially if you added a new device.**

5. **Check for version dependencies, especially with third-party software.**

    For more information, see .

▼ Troubleshoot Power Problems

If the server does not power on:

1. **Check that AC power cords are attached firmly to the server power supplies and to the AC sources.**

2. **Check the power supply (PS) Fault LED on the power supplies. If the PS LED is lit, that power supply is in a faulted state.**

3. **Check that the System OK LED on the server front panel is steady on, which indicates the server is in Main power mode. If it is blinking, the server is in Standby power mode.**

   For instructions to bring the server to Main power mode, refer to the server Installation Guide.

4. **Check the system for faults using Oracle ILOM.**

5. **Run the `hwdiag cpld vr_check` test and inspect the output for errors.**

   This test checks the complex programmable logic device (CPLD). For information about the HWdiag utility, see "Using the Oracle ILOM Diag Shell" on page 40.

▼ Inspect the External System

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

   For the LED locations and descriptions of their behavior, refer to the server Service Manual.

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

3. **If the problem is not evident, continue with "Inspect the Internal System" on page 20.**

▼ Inspect the Internal System

1. **Choose a method for shutting down the server from Main power mode to Standby power mode.**

- **Graceful shutdown**: Press and release the On/Standby 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 On/Standby button for five seconds to force Main power off and enter Standby power mode.

  When the system is in Standby power mode, the System OK LED blinks.

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. **Remove the chassis top cover to view the server internal components.**
   Refer to the server Service Manual for details.

3. **Inspect the internal status indicator LEDs, as described in the 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 PCIe cards and memory modules (DIMMs), refer to the server Service Manual and Product Notes.

7. **Check that the installed DIMMs comply with the supported DIMM population rules and configurations.**
   Refer to the server Service Manual for information about DIMMs.

8. **Replace any faulty component.**
   Refer to the server Service Manual for component remove and replace procedures.

9. **To restore Main power mode to the server, that is, all components powered on, press and release the On/Standby button on the server front panel.**
   When Main power is applied to the full server, the System OK LED next to the On/Standby button blinks intermittently until BIOS POST finishes, then the LED is steady on.

10. **If the problem with the server is not evident, view the BIOS event logs during system startup.**

Oracle ILOM Diagnostics

This section includes the following topics about Oracle ILOM diagnostics:

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

https://www.oracle.com/goto/ilom/docs

Using Oracle ILOM to Monitor a System and Diagnose Components

When something goes wrong with a system, diagnostic tools can help you to determine what caused the problem. However, this approach is inherently reactive. It means waiting until a component fails. Oracle ILOM provides diagnostic tools that allow you to be more proactive by monitoring the system while it is still "healthy." Monitoring tools give you early warning of imminent failure, thereby allowing planned maintenance and better system availability. Remote monitoring is also a convenient way to check the status of many machines from one centralized location.

Using Oracle ILOM, you can view detailed information about the overall health of a system and the status of system components. In addition, you can monitor open problems and close fault status. Oracle ILOM also provides access to informational system management log files.

To monitor a system or diagnose components, see:

▼ View System-Level Information and Health Status (Web)

The system-level health status properties for a server are viewable from the Summary Information page in the web interface.

1.   To view system-level health status details, click System Information → Summary.

The Summary Information page appears.

2.   To collect system information about the system, review the entries in the General Information table.

Information in the General Information table includes the model number, serial number, system type, firmware currently installed, primary operating system installed, host MAC address, IP address for the SP, and MAC address for the SP.

Note - The property value for the Primary Operating System installed on the server is shown only when the Oracle ILOM Hardware Management Pack is installed on the server.

3.   To identify problems detected on the system or to view the total problem count, review the entries in the Status table.

The overall health status and total problem count appear at the top of the table.

To view additional information about a component category reported in the Status table, click the link in the Subsystem column.

4.   To view the current firmware on the system, click System Information → Firmware.

▼ View System-Level Information and Health Status (CLI)

You can view the host system-level health status properties from the command-line interface (CLI) under the /System target.

● **To collect system-level information or to verify the system health status, type `show /System`.**

For example:

```
    Properties:
        health = OK
        health_details = -
        open_problems_count = 0
        type = Rack Mount
        model = ORACLE SERVER X8-2
        qpart_id = Q13015
        part_number = 7336847-B2
        serial_number = 1715XC4010A
        rfid_serial_number = changeme
        system_identifier = (none)
        system_fw_version = 5.0.0.21
        primary_operating_system = Not Available
        primary_operating_system_detail = Comprehensive System monitoring is not
 available. Ensure the host is running with the Hardware Management
                                        Pack. For details go to http://www.oracle.com/
goto/ilom-redirect/hmp
        host_primary_mac_address = 00:10:e0:b5:df:ba
        ilom_address = 10.129.129.183
        ilom_mac_address = 00:10:E0:B5:DF:BE
        locator_indicator = Off
        power_state = Off
        actual_power_consumption = 66 watts
        action = (Cannot show property)
```

Note - The property value for the primary operating system installed on the managed device is shown only when the Oracle ILOM Hardware Management Pack is installed on the managed device.

▼ View Subsystem and Component Information and Health Status (Web)

The subsystem and component health status properties for a server are viewable from the Summary Information page in the web interface.

Installation of Oracle Hardware Management Pack is required for the following:

- To view health and inventory status properties on the Networking page for InfiniBand network controllers.
- To view the majority of the health and inventory status properties on the Storage page and to view the controller Type property or the controller Details properties (such as, Location; World Wide Name (WWN) for FC Controllers; and, Number Of Ports).

1. **To view subsystem and component health status properties, click System Information** → *category-name*.

   For example, the navigation pane shows a list of subsystems such as Processors, Memory, Power, Cooling, and Storage. To view server component health status details for Processors, click System Information → Processors.

2. **On the component category page, you can:**

   - Determine the overall health for the subsystem category and the number of components installed for each category.
   - Determine the health details and the installed location for each component currently installed on the server.

     On some servers, you can also enable and disable components from the component category page. For further information about enabling or disabling subcomponents on your Oracle server, refer to the Oracle ILOM documentation.

   - View further information about the installed component by clicking the Details link in the table.

▼ View Subsystem and Component Information and Health Status (CLI)

You can view the health status properties for subsystems and components from the comand-line interface (CLI) under the `/System` target.

● **To access subsystem and component health details from the CLI, type**
  `show /System/`*category-name***.**

  Where *category-name* equals one of the subsystem target names under `show /System`.

  For example:

  ■ **To view the subsystem health status for memory modules (DIMMs) on a server, type** `show /System/Memory`

```
/System/Memory
   Targets:
      DIMMs

   Properties:
      health = OK
      health_details = -
      installed_memory = 16 GB
      installed_dimms = 2
      max_dimms = 16

   Commands:
      cd
      show
```

  ■ **To view the subsystem health status for a specific DIMM on a server, type** `show /System/Memory/DIMMs/DIMM_`*0***.**

```
/System/Memory/DIMMs/DIMM_0
   Targets:

   Properties:
      health = OK
      health_details = -
      part_number = 07075400,M393A4K40CB2-CTD
      serial_number = 00CE0117490324CDF0
      location = P0/D0 (CPU 0 DIMM 0)
      manufacturer = Samsung
      memory_size = 32 GB
      type = DDR4 SDRAM

   Commands:
      cd
      show
```

Health State Definitions

The following status descriptions reported by Oracle ILOM pertain to the health state of the system or components.

Health Status State	Description
Not Available	Oracle ILOM is unable to provide a health status for this component. Oracle ILOM might require Oracle Hardware Management Pack to be installed. For more information, refer to the Oracle Hardware Management documentation library at: `http://www.oracle.com/goto/ohmp/docs`
OK	The system or component is in good working order.
Offline	Applies to the Prepare to Remove action state of a subcomponent. This status appears when the action property is set to Prepare to Remove and the physical subcomponent is not physically removed from the chassis. **Note -** Not all subsystems managed by Oracle ILOM support properties for service actions (Prepare to Remove or Return to Service).
Warning	Oracle ILOM presents informational warning messages to indicate that a minor problem has been detected on system. Despite any warning messages, the system is functioning as expected and the informational message can be safely ignored.
Degraded	Oracle ILOM indicates a Degraded state for a parent component if one or more of its subcomponents are disabled. The parent component continues to participate in the operation of the system in a limited capacity.
Disabled	Oracle ILOM presents a Disabled state when one of the following conditions occurs: ■ A fault was not detected on the component; however, Oracle ILOM has determined that the component should not participate in the operation of the system. ■ An end-user has manually disabled the component. If a Disabled health state appears, view the Health Details property for the component.
Disabled (Service Required)	Oracle ILOM has detected a fault on the component and disabled it. A service action is required to enable the disabled component. If a Disabled (Service Required) health state appears, view the Health Details property provided for the component.
Service Required	Oracle ILOM has detected a problem on the system that will require a service action to resolve the issue. If this status appears at the system level, view the open problems detected on the system in the Oracle ILOM web interface or CLI. If this status appears in the Open Problems table, refer to the URL provided in the table for further details.

Related Information

-

Administering Open Problems

Oracle ILOM automatically detects system hardware faults and environmental conditions on a system. If a problem occurs on a system, Oracle ILOM automatically:

- Illuminates the Fault-Service Action Required LED on the physical server.
- Identifies the faulted condition in an easy-to-read Open Problems table.
- Records system information about the fault condition in the event log.

Upon the repair (or the replacement) of a faulty field-replaceable unit (FRU) or customer-replaceable unit (CRU), Oracle ILOM typically clears the fault state from the Open Problems table. On some devices, it does not do this. For these devices, refer to the server Service Manual.

For further information about administering open problems that are detected and reported in Oracle ILOM interfaces, see:

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▼ View Open Problems on a System (Web)

Open problems detected on a host server are viewable from the Open Problems web page.

1. **To view the server Open Problems web page, click Open Problems.**

The Open Problems page displays a list of open problems.

2. **Review the Open Problems web page for the following information:**

   - The total number of problems detected
   - The time stamp, subsystem, and location for each faulted component
   - The URL for troubleshooting a faulted component

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

   Oracle ILOM typically clears open problems after the indicated device is repaired or replaced. On some devices, it does not do this. For these devices, refer to the server Service Manual.

▼ View Open Problems on a System (CLI)

Open problems detected on a server are viewable under the /System/Open_Problems CLI target.

1. **To view server open problems, type** show /System/Open_Problems.

   A display similar to the following appears.

   ```
   -> show /System/Open_Problems
   ```

```
Open Problems (3)
Date/Time                 Subsystems        Component
-----------------------   ----------------- ------------
Thu Oct 31 21:39:49 2018  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 2018  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 2018  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)
```

2. **Review the Open Problems properties for the following information:**

   - The total number of problems detected
   - The time stamp, subsystem, and location for each faulted component
   - The URL for troubleshooting a faulted component

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

   Oracle ILOM typically clears open problems after the indicated device is repaired or replaced. On some devices, it does not do this. For these devices, refer to the server Service Manual.

Using the Fault Management Shell

You can use the Oracle ILOM Fault Management Shell to view faults and determine the components affected by the faults.

The Oracle ILOM `fmadm faulty` command is the preferred method to display fault or defect information and determine the FRUs involved.

▼ View Faults Using the Fault Management Shell

1. **From the Oracle ILOM CLI, to launch the Oracle ILOM Fault Management Shell, type `start /SP/faultmgmt/shell.`**

2. **To display the commands available in the Fault Management Shell, type `help`.**

3. **To display information about the components, type `fmadm faulty`.**

    In the following example, the output shows one faulty CPU.

    The `Affects` and `Status` lines identify the component affected by the fault and its relative state. In this example, a single CPU is affected. It is marked "faulted".

    Beneath the `Status` information, the data for the impacted FRU (field-replaceable unit) displayed. The location string (also called the FRU label) is "/SYS/MB/P0." It should match the label on the physical hardware or the value displayed by Oracle ILOM.

    The `Status` of the FRU displays as `faulty`.

    The Action section might also include other specific actions instead of, or in addition to, the usual reference to the `fmadm` command.

    ```
    -> start /SP/faultmgmt/shell
    Are you sure you want to start /SP/faultmgmt/shell (y/n)? y

    faultmgmtsp> help

    Built-in commands:
        echo - Display information to user.
               Typical use: echo $?
        help - Produces this help.
               Use 'help <command>' for more information about an external command.
        exit - Exit this shell.

    External commands:
        fmadm - Administers the fault management service
        fmdump - Displays contents of the fault and ereport/error logs
        fmstat - Displays statistics on fault management operations

    faultmgmtsp> fmadm faulty
    ------------------ ------------------------------------ -------------- --------
    Time               UUID                                 msgid          Severity
    ------------------ ------------------------------------ -------------- --------
    2000-06-18/22:39:23 00cbca46-d34d-6938-ba47-d9f69e8ccceb SPX86A-8007-Q1 Critical

    Problem Status          : open
    Diag Engine             : fdd 1.0
    ```

```
System
   Manufacturer        : Oracle Corporation
   Name                : ORACLE SERVER X8-8
   Part_Number         : 7336847-B2
   Serial_Number       : 1715XC4010A

System Component
   Firmware_Manufacturer : Oracle Corporation
   Firmware_Version      : (ILOM)4.1.0.0
   Firmware_Release      : (ILOM)2018.03.16

----------------------------------------
Suspect 1 of 1
   Problem class  : fault.chassis.fw.platform-info.invalid
   Certainty      : 100%
   Affects        : /SYS/SMOD0/MB
   Status         : faulted

   FRU
      Status          : faulty
      Location        : /SYS/SMOD0/MB
      Manufacturer    : HON HAI PRECISION INDUSTRY CO LTD
      Name            : SMOD TOP LEVEL ASSY
      Part_Number     : 7339666
      Revision        : 07
      Serial_Number   : 465136N+1743PJ001J
      Chassis
         Manufacturer  : Oracle Corporation
         Name          : ORACLE SERVER X8-8
         Part_Number   : 7336847-B2
         Serial_Number : 1715XC4010A

Description : The BIOS has detected that the platform information structure
              (SPI flash) is invalid.

Response    : The chassis wide service-required LED is illuminated.

Impact      : The system is unable to power on. BIOS does not have valid
              platform information to boot properly.

Action      : Please refer to the associated reference document at
              http://support.oracle.com/msg/SPX86A-8007-Q1 for the latest
              service procedures and policies regarding this diagnosis.
```

Repairing Faults or Defects

After Oracle ILOM Fault Management identifies a faulted component in your system, you must repair it. A repair can happen in one of two ways: implicitly or explicitly.

- An *implicit repair* can occur when the faulty component is replaced or removed, provided the component has serial number information that the Fault Manager daemon can track. The system's serial number information is included so that the Fault Manager daemon can determine when components have been removed from operation, either through replacement or other means (for example, *blacklisting*). When such detections occur, the Fault Manager daemon no longer displays the affected resource in `fmadm faulty` output.
- An *explicit repair* is required if no FRU serial number is available. For example, CPUs have no serial numbers. In these cases, the Fault Manager daemon cannot detect a FRU replacement.

  Use the `fmadm` command to explicitly mark a fault as repaired. The options include:

  - `fmadm replaced` *label*
  - `fmadm repaired` *label*
  - `fmadm acquit` *label*
  - `fmadm acquit` *uuid* [*label*]

  Although these four commands can take UUIDs or labels as arguments, it is better to use the label. For example, the label `/SYS/MB/P0` represents the CPU labeled "P0" on the motherboard.

  If a FRU has multiple faults against it and you want to replace the FRU only one time, use the `fmadm replaced` command against the FRU.

`fmadm replaced` Command

You can use the Oracle ILOM `fmadm replaced` command to indicate that the suspect FRU has been replaced or removed.

If the system automatically discovers that a FRU has been replaced (the serial number has changed), then this discovery is treated in the same way as if `fmadm replaced` had been typed on the command line. The `fmadm replaced` command is not allowed if `fmadm` can automatically confirm that the FRU has not been replaced (the serial number has not changed).

If the system automatically discovers that a FRU has been removed but not replaced, then the current behavior is unchanged: The suspect is displayed as `not present`, but is not considered to be permanently removed until the fault event is 30 days old, at which point it is purged.

`fmadm repaired` Command

You can use the Oracle ILOM `fmadm repaired` command when some physical repair has been carried out to resolve the problem, other than replacing a FRU. Examples of such repairs include reseating a component or straightening a bent pin.

`fmadm acquit` Command

Often you use the Oracle ILOM `fmadm acquit` option when you determine that the resource was not the cause. Acquittal can also happen implicitly when additional error events occur, and the diagnosis gets refined.

Replacement takes precedence over repair, and both replacement and repair take precedence over acquittal. Thus, you can acquit a component and then subsequently repair it, but you cannot acquit a component that has already been repaired.

A case is considered repaired (moves into the `FMD_CASE_REPAIRED` state and a `list.repaired` event is generated) when either its UUID is acquitted, or all suspects have been either repaired, replaced, removed, or acquitted.

Usually `fmadm` automatically acquits a suspect in a multi-element suspect list, or Oracle Support Services gives you instructions to perform a manual acquittal. You would only want to acquit by label if you determined that the resource was not guilty in all current cases in which it is a suspect. However, you can allow a FRU to be manually acquitted in one case while remaining a suspect in all others, using the following option, which enables you to specify both UUID and label:

`fmadm acquit` *uuid*   [*label*]

Managing Oracle ILOM Log Entries

Oracle ILOM maintains four system management logs: system log, event log, and audit log. For further details about these logs, see the following topics:

-
-

Log Descriptions

Log	Description
System	The top-level *system log* presents a subset of relevant operational event log entries. Specifically, this log reports subsystem-level diagnostic events pertaining to system inventory actions and component health. These events can include power on and off, FRU insertion and removal, as well as health status events, such as service required, warning, or OK.
Event	The *event log* tracks informational, warning, or error messages about a system such as the addition or removal of a component or the failure of a component. The event properties recorded in the event log can include: the severity of the event, the event provider (class), and the date and time the event was logged. The event log is helpful for troubleshooting the system when problems occur. It is also helpful for monitoring the performance of the system.
Audit	The *audit log* tracks all interface-related user actions, such as user logins, user logouts, configuration changes, and password changes. The user interfaces monitored for user actions include the Oracle ILOM web interface, CLI, Fault Management Shell, Restricted Shell, Diagnostics Shell, and SNMP and IPMI client interfaces. The audit log is helpful for auditing user activity to ensure that no privilege violations have occurred.

Log Properties

Property	Description	Applicable to:
Event ID	Unique number used to identify the encountered event.	■ System Log ■ Event Log ■ Audit Log
Date and Time	Day and time the event occurred. If the Network Time Protocol (NTP) server is enabled to set the Oracle ILOM time, the Oracle ILOM clock uses Universal Coordinated Time (UTC). For more information about time stamps, see "Log Time Stamps" on page 38.	■ System Log ■ Event Log ■ Audit Log
Event Type or Type	Hardware-dependent event property. **Event type examples**: ■ IPMI	■ System Log ■ Event Log ■ Audit Log

Property	Description	Applicable to:
	■ UI ■ Upgrade ■ Persistence ■ Action or Service Required ■ Warning ■ OK	
Subsystem	Hardware-dependent property that identifies the subsystem where the event was encountered. **Subsystem examples**: ■ System ■ Power ■ Cooling ■ Memory ■ Storage ■ I/O module ■ Processor ■ Firmware	■ System Log
Component	Hardware-dependent property that identifies the component where the event was encountered. **Component examples**: ■ Host*n* ■ /SYS (Host System) ■ PS*n* (Power Supply *n*) ■ Fan*n* (Fan *n*) ■ Disk*n* (Disk *n*) ■ Oracle ILOM	■ System Log
Class	Hardware-dependent property that identifies the event class. **Class examples:** ■ **Audit/Log** – For commands that result in a configuration change. Description includes user, command, command parameters, and success/failure. ■ **IPMI/Log** – For any event that is placed in the IPMI System Event Log is also put in the management log. ■ **Chassis/State** – For changes to the inventory and general system state. ■ **Chassis/Action** – For shutdown events for a server, hot insert/removal of FRU components. ■ **Fault/Fault** – Description gives the time fault was detected and the suspect component name. ■ **Fault/Repair** – For Fault Management repairs. Description gives component name.	■ Event Log ■ Audit Log
Severity	Severity level of the event.	■ Event Log

Property	Description	Applicable to:
	Severity examples: ■ Debug ■ Down ■ Critical ■ Major ■ Minor	■ Audit Log

Log Time Stamps

Local system time stamps, by default, are captured in the Oracle ILOM log files by using the host server system clock UTC/GMT time zone. However, if a log file is viewed from a remote client that is located in a different time zone, Oracle ILOM automatically adjusts the time stamps in the log files to reflect the local time zone of the remote client and the host system. In this case, two time stamps appear in the log for each listed event entry. In addition to supporting local system time stamps, Oracle ILOM enables you to capture remote router time stamps using a Network Time Protocol (NTP) server. For information about the way to modify how Oracle ILOM captures time stamps for logged entries, refer to the *Oracle ILOM Administrator's Guide for Configuration and Maintenance.*

▼ View and Clear Log Entries (Web)

Oracle ILOM log entries for a server are viewable from the Oracle ILOM web interface.

1. **Verify that you have Admin (a) role privileges, which are required to clear log entries.**

2. **To view the log entries, perform one of the following:**

   ■ To view the system log entries, click System Information → System Log.

   ■ To view the event or audit log entries, click ILOM Administration → Logs, and then click the Event or Audit tab.

   The selected Oracle ILOM log page appears.

3. **To clear all log entries shown, click the Clear Log button in the log table, and then click OK in the message box that appears.**

   Oracle ILOM removes all entries in log file.

▼ View and Clear Log Entries (CLI)

1. **Verify that you have Admin (`a`) role privileges, which are required to clear log entries.**

2. **To view a tabular list of log entries, do one of the following:**

   - **For the system log, type `show /System/Log/list`.**

   - **For the event log, type `show /SP/Logs/event/list`.**

   - **For the audit log, type `show /SP/Logs/audit/list`.**

     To scroll through a list, press any key except the q key.

3. **To clear log entries shown, type `set` *target* `clear=true`, and then type `y` at the prompt.**

   For example:

   - `set /System/Log clear=true`
   - `set /SP/logs/event/ clear=true`
   - `set /SP/logs/audit clear=true`

▼ Filter Log Entries (Web)

1. **Select System Information → Logs.**

2. **Select either a standard filter or a custom filter from the Filter list box.**

   For further details about filtering log entries shown in the web interface, click the More Details link on the web page.

▼ Filter Log Entries (CLI)

- **From the CLI, issue the `show` command followed by one or more supported log filter properties.**

  For example:

- **To filter the system log entries by subsystem or Event Type, type one of the following:**

  `show /System/Log/list Subsystem==`*subsystem*

  `show /System/Log/list Type==`*type*

- **To filter the event or audit log entries by Class, type** `show / SP/ logs/`*|event|audit*`/list Class==`*class*`.`

- **To filter the event or audit log entries by Class and Type, type** `show /SP/ logs`*|event|audit*`/list Class==`*class* `Type==`*type*`.`

- **To filter the event or audit log entries using all the filter properties, type** `show /SP/logs`*event|audit*`/list Class==`*class* `Type==`*type* `Severity==`*value*`.`

Where:

- *subsystem* is the subsystem component name, for example: `System`, `Cooling`, or `Processor`.
- *type* is the event name or the component name where the event occurred, for example: `OK`, `Warning`, `Service Required`, `Fan`*n*, `Processor`*n*, `DIMM`*n*, `UI`, `Product`, `Log`, `Update`, or `Action`.
- *class* is the class event name, for example: `System`, `Fault`, `Chassis`, `Software`, `Audit`, `BIOS`, or `Sensor`.
- *severity* is the event severity, for example: `Debug`, `Down`, `Critical`, `Major`, or `Minor`.
- *event|audit* indicates a choice between the event and audit log. Type `event` to filter the event log, or type `audit` to filter the audit log.

For other examples of log filter properties, see "Log Properties" on page 36.

Related Information

- "Log Properties" on page 36
- "View and Clear Log Entries (Web)" on page 38
- "View and Clear Log Entries (CLI)" on page 39

Using the Oracle ILOM Diag Shell

The Oracle ILOM Diag shell allows you to run HWdiag commands to check the status of a system and its components, and access HWdiag and UEFIdiag logs.

> **Note -** The Oracle ILOM Diag shell is available only in Oracle ILOM 4.0.x and later releases. Check the *Oracle x86 Critical Patch Update Guide* and server Product Notes to see if this functionality is supported on your platform.

This section contains the following topics:

- "Run HWdiag (CLI)" on page 41
- "Using HWdiag Commands" on page 42
- "HWdiag Commands and Options" on page 43
- "HWdiag Logs" on page 46

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

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

▼ Run HWdiag (CLI)

> **Note -** The Oracle ILOM Diag shell is available only in Oracle ILOM 4.0.x and later releases. Check the *Oracle x86 Critical Patch Update Guide* and server Product Notes to see if this functionality is supported on your platform.

1. **At the Oracle ILOM CLI prompt, access the Diag shell, type:**

   ```
   -> start /SP/diag/shell
   Are you sure you want to start /SP/diag/shell (y/n)? y
   ```

2. **At the `diag>` prompt, type `diag> hwdiag` *parameters***

   HWdiag commands use the form `hwdiag` *main_command [subcommand ...]*.

   For details, see "HWdiag Commands and Options" on page 43.

3. **Choose any of the following ways to display help for HWdiag options and commands:**

   - To display an overview of HWdiag options and main commands, type `help hwdiag`.
   - To display all HWdiag main commands and their subcommands, type `help hwdiag -h`.
   - To display the command structure with all options available by command, type `help hwdiag -h -v`.
   - To display help specific to a main-command, type `help hwdiag -h` *main command*.

4. **In the Diag shell, type any of the following commands:**

- To display the external commands available in the Diag shell, type **help**.
- To display information, type **echo**, for example, **echo $?**.
- To exit the Diag shell, type **exit**.
- To run hardware diagnostics, type **hwdiag**.
- To list the diagnostics log directories and files, type **ls**.
- To print the content of the diagnostics log files, type **cat**.

Using HWdiag Commands

This section describes how to use the HWdiag command line.

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

For example:

```
[(flash)root@ORACLESP-1234567:~]# hwdiag led get /SYS/MB/P1/D8/SERVICE
HWdiag - Build Number 117435 (May 01 2019, 17:05:36)
        Current Date/Time: January 04 2019, 10:52:31
  LED                            VALUE
  ------------------------------------------
  /SYS/MB/P1/D8/SERVICE       : off
```

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/D8/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, the HWdiag utility 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.

```
diag> hwdiag temp
HWdiag - Build Number 81018 (January 12 2019 at 00:42:14)

Syntax: hwdiag temp ...
```

```
   get [all|<sensor>]
             - Display Temperature Sensor Reading
   info [all|<sensor>]
             - Display Temperature Sensor Information

diag> hwdiag temp get
HWdiag - Build Number 81018 (January 12 2019 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

diag> hwdiag temp get all
HWdiag - Build Number 81018 (January 12 2019 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
```

HWdiag Commands and Options

The following tables list the HWdiag utility commands and options.

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

HWdiag Commands

Component	Action	Options	Description and Options
cpld			CPLD, FPGA tests, and utilities.
	reg	all|*fgpa*	Dump CPLD registers.
	vr_check		Print voltage regulator status.
	log read *number_of_ last_entries*		Read the last three entries from the cpld log file.
	mbus		(X8-8 only) Check MBUS status.
cpu			Display CPU information.
	capid all|*cpu*		Decode CAPID values for CPU.
	info all|*cpu*	-v	Dump CPU devices and display coding for all registers.
	pirom_info all|*cpu*		Dump PIROM CPU information.
fan			Fan test and utilities.
	get	-m	Display fan RPM.
	info	-r	Display fan presence information.
gpio			GPIO utilities.
	get all|*gpio_pin*		Get information about GPIO pin.
i2c			Test the sideband i2c topology.
	scan all|*bus*		Display accessible i2c devices.
	test all|*bus*		Test connectivity of platform i2c devices. This test returns a pass or fail.
io			IO tests and utilities.
	nvme_info	-v	Display information from VPD and MI for NVMe devices.
	nvme_test	-v	Check for PCIe link width and speed of NVMe drives and NVMe add-in-cards.
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, such as 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

Component	Action	Options	Description and Options
			■ 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.
	read		Read the specified PCIe register. read \<socket> \<bus> \<dev> \<func> \<offset>
	scan		Scan all PCIe devices.
	status all|*pci-target(s)*		Print status of pci-target(s)
power			Display power information.
	get		Display sensor readings. get amps|volts|watts all|*sensor*.
	info all|*sensor*		Display information about voltage reduction devices (VRD). *sensor* identifies an individual sensor.
system			Display system information.
	summary		Display system summary.
	fabric test all| *cpu*		Test the system fabric, including QPI bus speed, PCIe link speed, and memory frequency.
	info		Display system configuration information.
	port80 *number_of_last_codes*	-m	Display host boot progress. Optionally, enter the number of last codes to show the last codes for port80.
	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 temperature sensors.

HWdiag Command Options

The following table lists the HWdiag command options.

Option	Long	Description
– f	force	Force execution of a command regardless of prerequisites.*

Option	Long	Description
– h	help	Display help test.
– i	interactive	Prompts when you use it with a main command.*
– l	log *<filename>*	Enable HWdiag to start logging to *<filename>*. **Note -** Use -t to add time stamp to logging.
– m	monitor <.1 sec>	Set monitoring interval in increments of tenths of a second (.1 second). Overrides current monitoring interval.*
– n	numberloop	Set the number of loops to run a command continually.
– p	persist	Use persistent hardware presence data for all invocations of any HWdiag command.
– q	quiterr	Exit HWdiag utility immediately after an error occurs.
– r	raw	Modify HWdiag output for easier parsing.*
– s	sampleint	Sample interval in seconds to set the number of seconds of sleep between collecting data samples. Use only with -n option.
– t	timestamp	Add time stamp to logging. Use with -l option.
– u	unit [1,2,4]	Control the output format of dump subcommands. Options are 1 byte (default), 2 byte, or 4 byte format.*
– v	verbose	Enhance the verbosity of output.*
– x	exclude	Exclude a feature.*

Note - *Implement the HWdiag command option only on subcommands. For details on the syntax, refer to the subcommand documentation or display the help by typing `help hwdiag -hv`.

HWdiag Logs

In addition to running the HWdiag utility commands, you can access and display the content of the HWdiag log files. The commands `ls` and `cat` are available in the Oracle ILOM Diag shell.

To read the content of the logs use the `cat` command. For example, type **cat hwdiag/ hwdiag_i2c_test.log**.

Using a Non-Maskable Interrupt

Sending a non-maskable interrupt (NMI) to the host operating system can cause the host to stop responding and wait for input from an external debugger. Use this feature only when requested to do so by Oracle Service personnel.

⚠ **Caution -** Do not send an NMI to the host operating system unless requested to do so by Oracle Service personnel.

To generate an NMI, see:

▼ Generate a Non-Maskable Interrupt (Web)

Note - The setting for generating a non-maskable interrupt from Oracle ILOM might not be supported on all Oracle servers.

⚠ **Caution -** Depending on the host OS configuration, generating an NMI might cause the OS to crash, stop responding, or wait for external debugger input.

1. **Obtain permission from Oracle Service prior to performing this procedure.**

2. **To generate an NMI from the Oracle ILOM interfaces, verify that you have `Reset and Host Control (r)` privileges.**

3. **From the Oracle ILOM web interface, click Host Management → Diagnostics.**

4. **On the Diagnostics page, to send an NMI to the host, click the Generate NMI button.**

▼ Generate a Non-Maskable Interrupt (CLI)

Note - The setting for generating a non-maskable interrupt from Oracle ILOM might not be supported on all Oracle servers.

⚠ **Caution -** Depending on the host OS configuration, generating a non-maskable interrupt (NMI) might cause the OS to crash, stop responding, or wait for external debugger input.

1. **Obtain permission from Oracle Service personnel before performing this procedure.**

2. **To generate an NMI from the Oracle ILOM interfaces, verify that you have `Reset and Host Control (r)` privileges.**

3. **To send an NMI to the host, from the Oracle ILOM CLI, type `set /HOST/ generate_host_nmi=true.`**

Using the Snapshot Utility

⚠ **Caution -** The purpose of the Oracle ILOM Snapshot feature is to collect data for use by Oracle Service personnel to diagnose system problems. Customers must not run this utility unless requested to do so by Oracle Service personnel.

The Snapshot feature in Oracle ILOM enables you to collect information about the current state of the service processor (SP). This information can include environmental data, logs, and information about field-replaceable units installed on the server. In addition, you can use Snapshot to run diagnostics on the host and capture the diagnostics log files.

The output from Snapshot is saved as a standard zip file or an encrypted zip file to a location you specify.

To use the Snapshot feature, see the following procedures:

- "Take a System Snapshot (Web)" on page 48
- "Take a System Snapshot (CLI)" on page 50
- "Decrypt an Encrypted Snapshot File" on page 51

▼ Take a System Snapshot (Web)

⚠ **Caution -** The purpose of the Oracle ILOM Snapshot utility is to collect data for use by Oracle Service personnel to diagnose system problems. Customers must not run this utility unless requested to do so by Oracle Service personnel.

1. **Obtain permission from Oracle Service personnel before performing this procedure.**

2. **Verify that you have Admin`(a)` role privileges, which are required to collect SP data using the Snapshot utility.**

3. **From the Oracle ILOM web interface, click ILOM Administration → Maintenance → Snapshot.**

4. **On the Snapshot page, in the Data Set list box, select one of the following options:**

   - **Normal** – Collect information about Oracle ILOM, the host operating system, and the hardware configuration.
   - **FRUID** – Collect information about installed FRUs, in addition to the data set collected for Normal. The FRUID option enables Oracle Service personnel to analyze data in a binary format about FRUs.
   - **Full** (might reset the host) – Collect the maximum amount of data from the host, and initiate diagnostics on the host. This option could cause the server to reset.
   - **Custom** – Specify which of the following data sets to capture:
     - Oracle ILOM data
     - Hardware data
     - Diagnostic data (This option might require a host reset.)
     - Basic OS data
     - FRUID data

5. **Configure the following output properties:**

   - **Collect Only Log Files From Data Set** – Enable (select) this option to collect only log files. Disable (deselect) this option to capture log files and additional information about the SP state.
   - **Encrypt Output File** – Enable (select) this option to encrypt the output file. When encryption is enabled, you are prompted for an encryption passphrase. To decrypt an encrypted output file, you will need to know the passphrase.

     Deselect this option to produce a non-encrypted output file. To decrypt an encrypted output file, see "Decrypt an Encrypted Snapshot File" on page 51.

6. **In the Transfer Method list box, select one of the following options:**

   - **Browser** – Specify the output destination in a browser window.
   - **SFTP** – Specify the SFTP host, your user name and password on the host, and the output file destination.
   - **FTP** – Specify the FTP host, your user name and password on the host, and the output file destination.
   - **FTPS**– Specify the FTPS host, your user name and password on the host, and the output file destination
   - **TFTP** – Specify the TFTP host and the output file destination.

- **HTTP** – Specify the HTTP host, your user name and password on the host, and the output file destination.
- **HTTPS** – Specify the HTTPS host, your user name and password on the host, and the output file destination.

7. Click Run.

When the Snapshot is complete, the Save As dialog box appears prompting you to save the output file.

8. Specify the output directory in the Save As dialog box, and then click OK.

▼ Take a System Snapshot (CLI)

⚠️ **Caution -** The purpose of the Oracle ILOM Service Snapshot utility is to collect data for use by Oracle Service personnel to diagnose system problems. Customers must not run this utility unless requested to do so by Oracle Service personnel.

1. Obtain permission from Oracle Service personnel before performing this procedure.

2. Verity that you have Admin(a) role privileges, which are required to collect SP data using the Snapshot utility.

3. Issue the following command to specify what kind of data the Snapshot utility should collect:

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

Where *value* can be 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.

4. **To specify whether the Snapshot data should be encrypted, type:**

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

   Note - When the `encrypt_output` property is set to `true`, you must type an encryption password at the prompt in order to start the data collection. Later, you must type an encryption password at the prompt in order to decrypt the output file. To decrypt an encrypted output file, see "Decrypt an Encrypted Snapshot File" on page 51.

   ---

5. **To start the data collection, type** `set /SP/diag/snapshot dump_uri=`*protocol*`://`*username*`:`*password*`@`*host*`/`*directory*.

   The transfer `protocol` can be `sftp`, `ftp`, `ftps`, `tftp`, `http`, or `https`.

   For example, to store the Snapshot information through FTP in a directory named `data` on the host, type **`set /SP/diag/snapshot dump_uri=ftp://`***username:mypasswd***`@`***host-ip-address***`/data`**.

   Note - The *directory* is relative to the user's login; therefore, in the previous example, the full path to `data` is probably `/home/`*username*`/data`.

▼ Decrypt an Encrypted Snapshot File

1. **Using a terminal window that supports `openssl` commands, navigate to the directory that contains the Snapshot output file.**

2. **Issue the decryption command, type `openssl aes-128-cbc -d -md sha1 -in` *encryptedSnapshotFilename*`.zip.e -out` *snapshotFilename*`.zip`.**

3. **When prompted, type the encryption passphrase.**

Using UEFI Diagnostics

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

Note - The UEFI diagnostics information in this section is intended for only servers supporting UEFI.

This section includes the following topics:

UEFI Diagnostics Test Modes

Use UEFI diagnostic 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 Oracle ILOM, you select the level of test that you want to perform.

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

UEFI Diagnostics Test Mode	Description
Disabled	UEFI diagnostics do not run. Use this selection for normal system operation. After you run UEFI diagnostics tests in Manual mode, stop UEFI Diagnostics, and select Disabled mode to recover the original system status.

UEFI Diagnostics Test Mode	Description
Enabled	The server boots automatically and executes a predefined test suite without user intervention. Test output is logged to the uefidiag directory, which you can view in the Oracle ILOM Diag shell. After the diagnostic tests complete, the system automatically shuts down and returns to Disabled diagnostics mode. Use Enabled mode as a quick test for first-time field installation and prior to installing mission-critical applications to verify system quality. These basic tests typically take between 10 minutes and 1.5 hours, depending on the system configuration.
Extended	The server boots automatically and executes a comprehensive test suite without user intervention. Test output is logged to the uefidiag directory, which you can view in the Oracle ILOM Diag shell. After the diagnostic tests complete, the system automatically shuts down and returns to Disabled diagnostics mode. Use Extended mode for first-time system installation, after physically transporting the system, any time you add components, and prior to installing production operating systems and mission-critical applications. These extended tests typically take between 15 minutes and 3 hours, depending on the system configuration.
Manual	The server boots to the UEFI shell. Type `udiag -hv` to display the UEFI Diagnostics commands. View the test output using a remote console or a serial console. After the tests are complete, manually return the diagnostics mode to `Disabled`.

▼ Run UEFI Diagnostics Automatically (Web)

1. **Verify that you have Reset and Host Control (r) role privileges, which you need to diagnose system hardware issues.**

2. **If you want to monitor the progress of diagnostic tests in Enabled or Extended mode, see "UEFI Diagnostics Test Modes" on page 53.**

3. **Power the server to Standby power mode:**

   a. **In the Oracle ILOM web interface, click Host Management → Power Control.**

   b. **In the Select Action list box select a Power Off option, and then click Save.**
   The System OK LED on the front panel is blinking.

4. **Start a video or serial console redirection:**

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

   b. **Select a redirection: Video or Serial.**

   c. **Click Launch Remote Console.**
   Several dialog boxes might appear. Click to accept them, as necessary.

A redirection window appears when the redirection is established. For video redirection, ensure that (Full Control) appears in the title bar of the remote console window.

5. **Click Host Management → Diagnostics.**

6. **On the Diagnostics page, perform the following steps:**

   a. **In the Mode list box, select Enabled or Extended mode.**

      For details about the diagnostic levels, see "UEFI Diagnostics Test Modes" on page 53.

   b. **Click Save.**

      The Start Diagnostics button is enabled.

   c. **Click Start Diagnostics.**

      An informational message about controlling diagnostics through the remote console application appears.

      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.

      ---

   d. **Click OK to clear the message and proceed with the diagnostic tests.**

      The Diagnostics Status field indicates the progress of the diagnostic tests.

      If you are running Enabled or Extended diagnostics, the tests run automatically. If there is an internal error, you can abort the test (see Step 6e) or wait for ILOM to detect the error and restore the system to Disabled mode, which could take more than one hour. The Status field is updated accordingly.

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

      Note - To check the history of the test using Oracle ILOM event log, select ILOM Administration → Logs → Event → Filter → Custom Filter → Event Type → Diags.

      Caution - Do not disrupt the test progress by changing the server power state. If there is an unexpected AC power cycle and a test is in progress, configure Diagnostics mode again starting from Step 3. Internal variables could be corrupted and setting a new mode or resetting the same mode fixes any potential issue.

      ---

e. To safely disrupt the diagnostic tests, click Stop Diagnostics.

Note - When you stop running the diagnostic tests, wait approximately 40 seconds while Oracle ILOM is searching for CPU errors, before you enter another command. Because the host power status is off, you can change the Diagnostics mode or resume the same mode.

f. View the UEFI Diagnostics logs. See "UEFI Diagnostic Logs" on page 65.

▼ Run UEFI Diagnostics Automatically (CLI)

1. **Verify that you have Reset and Host Control (r) role privileges, which you need to diagnose system hardware issues.**

2. **If you want to monitor the progress of diagnostic tests in Enabled or Extended mode, see "UEFI Diagnostics Test Modes" on page 53.**

3. **Power off the server.**

   a. **Type `stop /System`.**

   b. **To stop the system, type `y`.**

   The System OK LED on the front panel is blinking.

4. **To access the Host (UEFI shell), start a serial console redirection:**

   a. **Log in to the Oracle ILOM command-line interface (CLI) as root.**

   b. **Type `start /HOST/console`.**

   c. **To start the host console, type `y`.**

   d. **To open another ILOM CLI session to manage the power state and start UEFIdiag tests, type `y`.**

5. **To verify that the host is in Standby power mode, type `show /System/ power_state`.**

   The System OK LED on the front panel is blinking.

   The power state displays as Off.

6. **To change the directory to `/HOST/diag`, type `cd /HOST/diag.`**

7. **Enter the `set mode=<`*mode*`>` command to choose one of the following UEFI diagnostic modes:**

   - Enabled
   - Extended

   For example, to run UEFI diagnostics tests in Enabled mode, type: `set mode=enabled`.

8. **Start the UEFI diagnostics.**

   a. **Type `start /HOST/diag.`**

   b. **To start the UEFI diagnostics, type `y`.**

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

   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.

   If you are running Enabled or Extended diagnostics, the tests run automatically. If there is an internal error, abort the test (see Step 10) or wait for ILOM to detect the error and restore the system to Disabled mode, which could take more than one hour. The Status field is updated accordingly.

9. **To view the progress of the diagnostic tests, type `show /HOST/diag status.`**

   ⚠️ **Caution -** Do not disrupt the test progress by changing the server power state. If there is an unexpected AC power cycle and a test is in progress, configure Diagnostics mode again starting from Step 3. Internal variables could be corrupted and setting a new mode or resetting the same mode fixes any potential issue.

   ---

10. **Stop the diagnostic tests.**

    a. **Type `stop /HOST/diag.`**

    b. **To stop the UEFI diagnostics, type `y`.**

> **Note -** When you stop running the diagnostic tests, wait approximately 40 seconds while Oracle ILOM is searching for CPU errors, before you enter another command. You can change the Diagnostics mode or resume the same mode.

11. **To resume running the diagnostic tests:**

    a. **Type `start /HOST/diag.`**

    b. **To start the UEFI diagnostics, type `y`.**

    > **Note -** To check the history of the test using ILOM Event logs, type: `show /SP/logs/event/list/type==diags`.

12. **View the UEFI Diagnostics logs. See "UEFI Diagnostic Logs" on page 65.**

▼ Run UEFI Diagnostics Manually (Web)

This task provides instructions for running UEFI diagnostics manually from the web interface through a video or serial redirection.

1. **Power off the server to Standby power mode:**

    a. **In the Oracle ILOM web interface, click Host Management → Power Control.**

    b. **In the Select Action list box select a Power Off option, and then click Save.**
    The System OK LED on the front panel is blinking.

2. **Start a video or serial console redirection:**

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

    b. **Select a redirection:**

        ■ **Select `Use video redirection.`**

        ■ **Select `Use serial redirection.`**

c. Click Launch Remote Console.

Several dialog boxes might appear. Click to accept them, as necessary.

A redirection window appears when the redirection is established. For video redirection, ensure that (Full Control) appears in the title bar of the remote console window.

3. Click Host Management → Diagnostics.

4. On the Diagnostics page, select the mode and start the diagnostics:

For details about the diagnostic levels, see "UEFI Diagnostics Test Modes" on page 53.

a. In the Mode list box, select Manual.

b. Click Save.

The Start Diagnostics button is enabled.

c. Click Start Diagnostics.

An informational message about controlling diagnostics through the remote console application appears.

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.

---

d. Click OK to clear the message and proceed with the diagnostic tests.

The Diagnostics Status field indicates the progress of the diagnostic tests. The system displays boot messages, and displays the following startup messages:

```
FS0:\> echo -off

Oracle Enterprise UEFI Diagnostics

Diagnostics tool found at drive FS0:
UEFI Diagnostics x8_8A v1.2.1332
Production Rel.

Last Changed Rev: 1332
Last Changed Date: 2019-03-14 11:40:28 -0700 (Thu, 14 March 2019)

03/21/2019
05:24:36 (LOCAL)
```

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

> **Note -** To check the history of the test using ILOM Event logs, select ILOM Administration → Logs → Event → Filter → Custom Filter → Diags.

   e. To safely disrupt the diagnostic tests, click Stop Diagnostics.

⚠ **Caution -** If there is an unexpected AC power cycle and a test is in progress, configure Diagnostics mode again starting from Step 1. Internal variables could be corrupted and setting a new mode or resetting the same mode fixes any potential issue.

5. To finish the Diagnostics activities, select Disabled.

▼ Run UEFI Diagnostics Manually (CLI)

This task provides instructions for running UEFI diagnostics manually from the CLI through the host console.

1. Power off the server:

   a. Type `stop -f /SYS`.

   b. To stop the system, type `y`.

   The System OK LED on the front panel is blinking.

2. Start a serial console redirection:

   a. Log in to the Oracle ILOM command-line interface (CLI) as root.

   b. Type `start /HOST/console`.

   c. To start the host console, type `y`.

3. To change the directory to `/HOST/diag`, type `cd /HOST/diag`.

4. To set manual mode, type `set mode=manual`.

5. **Start the UEFI diagnostics.**

    a. **Type** `start /HOST/diag.`

    b. **To start the UEFI diagnostic, type** `y.`

    The server automatically boots the UEFI shell. No more action is necessary.

    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 system displays boot messages, and displays the following startup messages.

    ```
    FS0:\> echo -off

    Oracle Enterprise UEFI Diagnostics

    Diagnostics tool found at drive FS0:
    UEFI Diagnostics x8_8A v1.2.1332
    Production Rel.

    Last Changed Rev: 1332
    Last Changed Date: 2018-04-26 11:40:28 -0700 (Tue, 26 February 2019)

    02/26/2019
    05:24:36 (LOCAL)
    ```

6. **To view the progress of the diagnostic tests in Manual mode, type** `show /HOST/diag status.`

    The Diagnostics Status field indicates the progress of the diagnostic tests.

7. **To display the available commands, type** `udiag -hv.`

8. **Stop the diagnostic tests.**

    a. **Type** `stop /HOST/diag.`

    b. **To stop the UEFI diagnostics, type** `y.`

⚠️ **Caution -** If there is an unexpected AC power cycle and a test is in progress, configure Diagnostics mode again starting from Step 1. Internal variables could be corrupted and setting a new mode or resetting the same mode fixes any potential issue.

---

9. **To resume running the diagnostic tests, type** `start /HOST/diag.`

Note - To check the history of the test using Oracle ILOM Event logs, type: `show /SP/logs/ event/list/ type==diags`.

---

10. **To finish the Diagnostics activities, type** `set /HOST/diag/ mode=disabled.`

UEFI Commands

This section includes the following topics that describe UEFI commands:

UEFI Command Options

In Manual mode, UEFI Diagnostics provides the command-line options shown in the following table.

Command	Description
`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.
`network`	Displays Ethernet interfaces or runs external loopback tests.
`rtc`	Displays the date and time in 24-hour format.

Command	Description
`nvdimm`	Decodes NFIT and PCAT ACPI tables provide information about NVDIMMs.
`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 }`	Display basic Trusted Platform Module (TPM) information.
`usb`	Displays information on USB root hubs and devices.

UEFI Command Flags

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 - Use the `-l` (log file) flag only as a default setting flag. Use other flags only as command-specific flags. Use them as default settings only when it is appropriate to do so.

Flag	Parameter	Description
`-h`, `-help`		Displays command help information.
`-v`, `-V`		Mutually exclusive flags that specify the amount of information commands may output. `-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: **FS0:\>udiag system info -l fs0:\system.info**
`-s`	*<begin>*	Specifies a generic 64-bit hexadecimal number that is command-specific. For example, memory tests use it as the lowest address of a memory range to test.

Flag	Parameter	Description
-e	*<end>*	Specifies a generic 64-bit hexadecimal number that 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 must not be used with this flag. All APs are numbered from 1 through the maximum enabled processors. To find the relationship between the AP number with the socket number, type: `udiag system acpi` 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 in 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.

When entering CLI commands, note the following rules:

- Most commands support the -hv, -n, -v, -V, -pc, and -ec flags.

- Application processors-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.

UEFI 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.

To see a detailed command description of a UEFI command resource requirement, on the Oracle ILOM serial link or KVM screen, at the prompt, type udiag main-command [*subcommand*] -hv.

Resource Requirement	Description
BSP_ONLY	A command runs on the boot strap processor (BSP) only. It must 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 Diagnostic Logs

Enabled and Extended mode generate test results and log files that provide details about what occurred during the test time.

To access and display the content of the UEFI diagnostic log files, use the Oracle ILOM Diag shell. See "Run HWdiag (CLI)" on page 41.

For example:

```
diag> ls -l uefidiag
-rw-r--r--    1 root     root            0 May 10 23:50 PASSED.stress_test
-rw-r--r--    1 root     root           28 May 10 23:50 done
-rw-r--r--    1 root     root         2831 May 10 23:50 system.info
-rw-r--r--    1 root     root         2864 May 10 23:23 system.info.1
-rw-r--r--    1 root     root        21790 May 10 23:50 system.inv
-rw-r--r--    1 root     root        21365 May 10 23:23 system.inv.1
-rw-r--r--    1 root     root         8316 May 10 23:50 test.log
-rw-r--r--    1 root     root         8649 May 10 23:23 test.log.1
-rw-r--r--    1 root     root           28 May 10 23:50 uefi_started
-rw-r--r--    1 root     root         5505 May 10 23:50 uefidiag.log
-rw-r--r--    1 root     root         6023 May 10 23:24 uefidiag.log.1
```

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 (Enabled or Extended mode).

If you experience any diagnostic test failures, contact Oracle Service personnel for assistance with interpreting diagnostic 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 must be consistent with the `-pc` and `-ec` flag settings. For example, if a test is invoked with **`-pc 10`**, then the execution status displays 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 must not be confused with the `-time` flag, which 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
```

Oracle VTS Software

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

For comprehensive information about Oracle VTS, refer to the Oracle VTS 8.2.0 Documentation Library at: `https://docs.oracle.com/cd/E83848_01/`.

This section includes the following topics:

Note - Oracle VTS was previously referred to as Sun VTS. The Sun VTS nomenclature is still used in certain Oracle VTS commands.

Oracle VTS Software

Oracle VTS is an Oracle hardware validation test that is provided with the Oracle Solaris operating system. The Oracle x86 servers require Oracle VTS 8.2.0 or later. For instructions on running the Oracle VTS software to exercise an Oracle x86 server, see "Running Oracle VTS Software" on page 74.

Oracle VTS provides the following features:

- Oracle VTS starts from an Oracle Solaris or Oracle Linux command line, or boots from an ISO image or CD/DVD using Oracle ILOM redirection.
- Provides multiple hardware tests to verify the functionality of most hardware controllers and devices for systems based on the Oracle x86 architectures.
- Provides an infrastructure for developers to develop their own tests and integrate into it.
- Has a graphical user interface (GUI) that provides test configuration and status monitoring. You can run the user interface on one system to display the Oracle VTS testing of another system on the network. Oracle VTS software also provides a TTY-mode interface for situations in which running a GUI is not possible.

For comprehensive information about Oracle VTS, go to the Oracle VTS 8.2.0 Documentation Library at: https://docs.oracle.com/cd/E83848_01/.

Test Modes

You an tailor tests for different testing needs through a set of modes and test options. These modes and options determine how the tests are run on the system. You have the option of running the tests in three different modes:

- Online Stress Test Mode
- System Exerciser Test Mode
- Component Stress Test Mode

Online Stress Test Mode

Use this mode for testing if you want to simultaneously run other applications in addition to Oracle VTS software on the system. The goal of this mode is to validate the hardware without having significant impact on other applications running on the system. In this mode, the tests would not stress the system, and to provide coverage they might have to run for longer periods of time. If there are any latent faults in the system hardware, the tests in this level try to stimulate those faults before the application is impacted by the fault. When the test stimulates the fault, the OS detects the fault and takes appropriate action.

The test characteristics in this mode are as follows:

- **Nonintrusive** – The tests running in this mode do not intrude on the applications that are running on the system. Nonintrusive mode does not change any system configuration that can have an effect on the applications.
- **Data Safe** – The tests running in this mode do not cause any kind of data corruption.

- **Test Time** – The time of completion for these tests could vary from milliseconds to days. There is no restriction on the amount of time.
- **Resource Usage** – The resource usage is designed so that the test does not have any distinguishable effect on the applications that are running on the system. The goal is to use as few resources as possible for a given instance of time.

System Exerciser Test Mode

This mode provides system exercising capability. It tests the system with all its components. All tests are run in parallel. In this mode, no other application except Oracle VTS software should be running on the system. The characteristics of the tests in this mode are as follows:

- **Intrusive** – The tests can be intrusive in nature. No other application should run on the system while these tests are running.
- **Data Safe** – The tests are data safe by default.
- **Resource Usage** – The tests are aware that there could be other tests running. Accordingly, the tests would then allocate and lock resources.

Component Stress Test Mode

This mode performs targeted testing of system components and modules. In this mode, the test puts the maximum stress on the component or module under test. The tests are not run simultaneously with other tests: all tests are run sequentially. No other user application can be running on the system. The characteristics of the tests in this mode are as follows:

- **Intrusive** – The tests can be intrusive in nature. The tests might need specific system configuration settings to run efficiently.
- **Data Safe** – The tests are data safe by default. The tests assume that the complete system resources are at their disposal and can use resources according to its needs.

User Interface Options

Oracle VTS provides three user interfaces that handle different usage needs of the software. Testing session controls are available through all interfaces. The VTS harness, which handles the commands that are coming from the user interfaces, does not distinguish between which interface is sending the command.

The user interfaces and their usages are described in the following table.

User Interface	Description
GUI	Oracle Java technology-based standalone user interface. Start the Java GUI on the same machine under test that has the Oracle VTS kernel running. The GUI does not allow remote connection. The GUI provides the following features: ■ Displays the host machine name and the tests registered to that host on the Test Group tab. ■ Displays the tests registered with the host in the Test Group pane, and allows you to set the testing modes, schedule the tests, and monitor the testing status of each test. ■ Displays the host configuration and runs the test with AutoMode Sequencer. Allows you to apply options to all tests, such as schedule the total time of the testing session, start the tests, and enable, disable, and stop the tests. Also allows you to reset the results such as reset the status counters (pass, elapsed time, and error count of a test is reset to zero), and reset the progress bar to an idle state. You also can reprobe the system for devices currently available. ■ Describes the parameters available in setting up a test and displays the system name. You can enable or disable the selected tests, set the stress level, set and view the schedule policy (time-based or in terms of test passes) and error limit, view the state of the test at a given time (enabled or disabled), view the test progress and the status of a test, and the test results.
TTY	An ASCII-based, screen-oriented interface that does not need a graphical window environment. You can use this interface to run the software from a serial terminal or a graphical window tool, such as a shell tool or a terminal window.
CLI	The most lightweight user interface. Its main advantage is that it can be used in scripts for tool automation. The CLI is provided through the interface called `vts_cmd`. It is a UNIX shell application that enables you to send a single command to the kernel (`vtsk`), and receive a reply back.

Installation Requirements

Your system must meet the following requirements to run the software:

■ Oracle Solaris 11 or Oracle Linux 7.x
■ Booted to run level 3 (multiuser level)
■ Java Enterprise Edition, version 1.7 or later
■ Logged in as a superuser

Obtaining and Installing Oracle VTS Software

You can download the latest Oracle VTS software packages from My Oracle Support at: `https://support.oracle.com` and install Oracle VTS.

To find and upgrade to the latest version of the software, refer to the Oracle VTS documentation at: http://docs.oracle.com/cd/E83848_01/.

▼ Install Oracle VTS Software for Oracle Solaris 11.x

1. **Ensure that the Oracle Solaris Publisher is pointing to a repository containing the Solaris version currently installed on the machine.**

2. **To install the Image Packaging System (IPS) sunvts package FMRI, type # `pkg install SunVTS-incorporation sunvts.`**

▼ Install Oracle VTS Software for Oracle Linux 7.x/8.x

- **To install the Image Packaging System (IPS) sunvts package, type `#rpm -ivh sunvts-8.2.2-build8.x86_64.rpm.`**

Runtime Considerations

Before you run the Oracle VTS software, consider the following runtime issues.

Issue	Consideration
System load	Before you run the software on your system, consider the added system activity created by the software and its effect on users. Depending on the mode you select, testing can add a significant load to your system, or it can be quite minimal.
Other applications	Some tests stress the system resources (such as virtual memory) to the point that other applications might not run.
System functionality	The software runs only when your system is fully booted to run level 3 (multiuser level). The software does not run from single-user (maintenance mode) nor from run level 0 (monitor mode).
Superuser access	For security reasons, you must be a superuser to run the software.
Graphics tests	When running tests on frame buffers, do not run any other application or screen saver program that uses the frame buffer. Frame buffer graphic tests print test patterns on the display. This situation temporarily prevents you from working in your window environment.

Issue	Consideration
Swap space	The amount of swap space required for testing varies widely with individual hardware and software configurations. If an adequate amount of swap space is not available on your system, the status column on the graphical user interface displays the message "waiting for swap space."
Processor sets	The software is not supported on systems where processor sets have been created. Oracle Solaris OS enables the creation and management of processor sets, which allows you to bind processes to a group of processors, rather than just a single processor [prset (1M)]. In the presence of processor sets, the tests can have undeterministic behavior.
Zones	The software is supported only in the Oracle Solaris global zone environment. It is not supported in local zones. The zones facility in Oracle Solaris OS provides an isolated environment for running applications [zones(5)]. If the software is started on a local zone, it aborts with an appropriate message.
Systems in a clustered configuration	When systems are configured in a cluster, do not run Oracle VTS, as system resources for testing needs might be exhausted. This could impact the ability of a system node in the cluster to respond to heartbeat communication from the other node. If you want to test the hardware for systems in a cluster, take the systems out of the cluster mode and then test them.
Production system	Because Oracle VTS software can run many tests in parallel and can consume many system resources, be cautious when using it on a production system. If you are stress-testing a system using the Oracle VTS software Comprehensive test mode, do not run anything else on that system at the same time.

Starting Oracle VTS Software

You can start the Oracle VTS application with the script startsunvts. The script has a set of options that caters to different choices on how the application needs to be started. There are options to start the application and bring up a user interface that needs user intervention to select and start the tests. Also, there are options that do not bring up any user interface and start the testing without any user intervention.

The startsunvts script gets installed under the /usr/sunvts/bin directory. You can type startsunvts in the terminal to view all the options. If you select any one the options from the menu (d,l,s,m, or A), it prompts you to select yes or no to display the time taken for each logical test (LT) in each pass.

```
# cd /usr/sunvts/bin
# ./startsunvts
Which VTS 8.2.0 User Interface (UI) or Testing option would you like to use?
a) Command Line Interface
b) Terminal User Interface
c) Graphical User Interface
d) Default Testing
l) Comprehensive Testing
s) Short Testing
```

```
m) Memory Testing
A) All level Testing
s
Do you want time information of each LT in each pass 'y/n'
y
Starting VTS Short Testing....
```

You can start Oracle VTS in GUI mode, as explained in "Start Oracle VTS Software (GUI)" on page 73. For details on how to start Oracle VTS in TTY or CLI mode, refer to the *Oracle VTS 8.2.0 Software User's Guide* at: `https://docs.oracle.com/cd/E83848_01/`.

▼ Start Oracle VTS Software (GUI)

The graphical user interface is a standalone user interface. Start the Java GUI on the same machine under test that has the Oracle VTS kernel running. The GUI does not allow remote connection.

1. **Review important information and perform any necessary steps before starting the software.**

    For details, refer to the *Oracle VTS 8.2.0 Software User's Guide* at: `https://docs.oracle.com/cd/E83848_01/`.

2. **To start the graphical user interface, type:**

    ```
    # cd /usr/sunvts/bin
    ```

    ```
    # ./startsunvts -g
    ```

3. **Press c to select Graphic User Interface.**

The Oracle VTS main window appears.
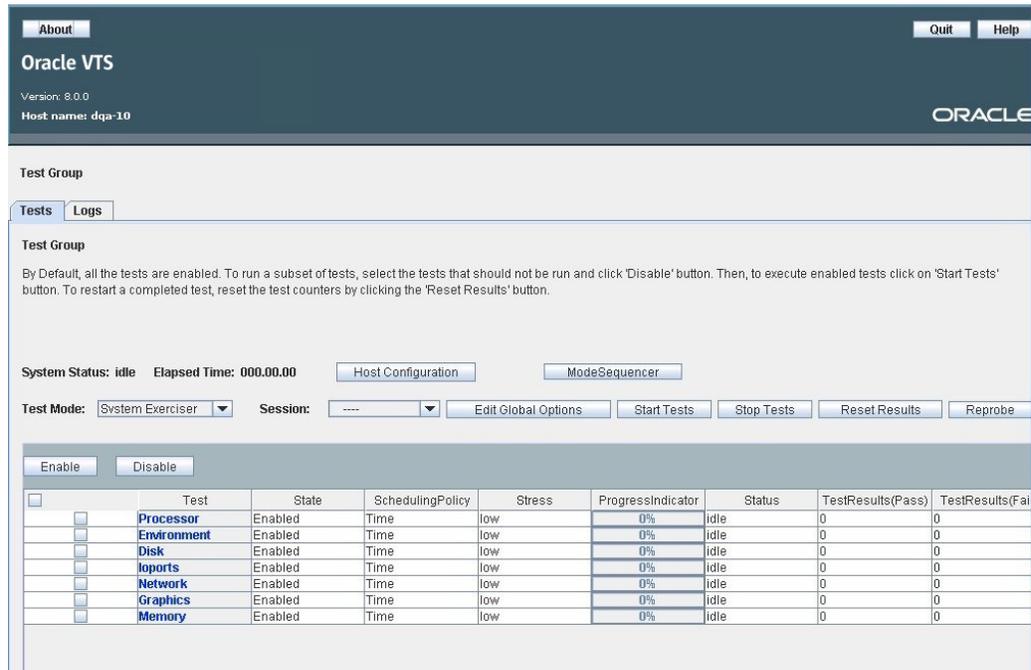
4.   **To begin testing, see .**

Running Oracle VTS Software

If you want to use Oracle VTS software, the x86 server must be up and running because it relies on the Oracle Solaris or Linux operating environment. Because Oracle VTS software packages are optional, they might not be installed on your system. It is important to use the most up-to-date version of Oracle VTS available, to ensure that you have the latest suite of tests. To download the most recent Oracle VTS software, go to the My Oracle Support web site at: https://support.oracle.com.

▼ Run Oracle VTS Software (GUI)

You can run Oracle VTS from the GUI, as described in this procedure. If you want to run it from the command-line interface (CLI), or TTY mode, refer to the *Oracle VTS 8.2.0 Software User's Guide* at: `https://docs.oracle.com/cd/E83848_01/`.

1. **To view the host configuration, on the main page of the GUI, click Host Configuration.**

   The Host Configuration page appears, and shows the machine details such as hostname, IP address, platform, operating system, number of CPUs, machine type, and architecture of the machine under test.

2. **Click the Back button or use the navigation link at the top of the page to return to the main page.**

3. **To select a test mode, on the Test Group page, from the Test Mode menu, select the test you want to run.**

   By default, the System Exerciser mode is selected.

4. **To select a device to test, on the Test Group page, choose the device you want to test from the test table, and click Enable.**

5. **To begin the test session, perform these steps:**

   a. **On the Test Group page, select the test you want to run from the test table.**

   b. **Click Enable.**

   c. **Click Start Tests.**

      All tests that are enabled start.

   d. **To run a particular test, disable the other tests by clicking the check box for each test, and click Disable.**

   e. **To start a particular test when other tests are running, select the check box for the test, and click Enable.**

6. **To stop the test session, on the Test Group page, click Stop Tests to stop all the running tests.**

   The test session is stopped and the Status field changes to stopping. After all tests are stopped, the status is changed to idle.

Oracle VTS Logs

In most cases, faults in the hardware are detected and managed by the system (the hardware plus operating system) and not by the test. The software and its tests are all user-level applications, running on top of the operating system. Any error or failure that is detected and managed by the system might not be visible to the tests. But the occurrence of such errors or failures are logged by the system. Therefore, you must always check the following log files after a run of the testing session. These log files identify any error or failure that might have occurred.

Oracle VTS software supports the following logs.

Log	Description
Test Information log	Contains informative messages that are generated when you start and stop the Oracle VTS test sessions. The log file path name is `/var/sunvts/logs/sunvts.info`. This file is not created until an Oracle VTS test session runs.
Test Error log	Contains time-stamped Oracle VTS test error messages. The log file path name is `/var/sunvts/logs/sunvts.err`. This file is not created until an Oracle VTS test failure occurs.
VTSK Error log	Contains time-stamped Oracle VTS kernel and Oracle VTS probe error messages. Oracle VTS kernel errors relate to running Oracle VTS, and not to testing of devices. The log file path name is `/var/sunvts/logs/vtsk.err`. This file is not created until Oracle VTS reports an Oracle VTS kernel error.
Test Verbose log	Verbose messages are the test progression informative messages. The log file path name is `/var/sunvts/logs/sunvts.verbose`. These messages are logged only when the verbose mode is enabled and help you continuously monitor what is happening during the testing.
Report log	A report of the Oracle VTS test session logged using the `vtsreportgenerate` utility. The log file path name is `/var/sunvts/logs/sunvts.rpt`.
Test Event log	Contains test start messages. Every test started by Oracle VTS infrastructure logs its start message in the `sunvts.event` file, which has the start time and version of the test binary. The log path name is `/var/sunvts/logs/sunvts.event`.

▼ Review Oracle VTS Log Files

1. **On the Test Group screen, click the Logs tab.**
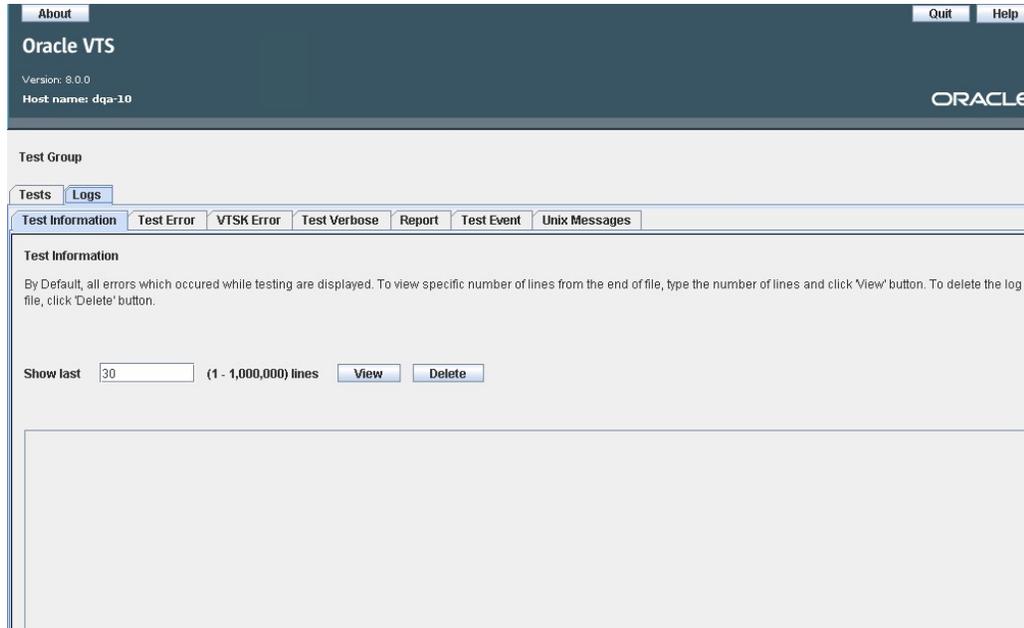
2. **On the Logs screen, click a tab to view the logging information.**

3. **In the Show Last field, type the number of lines you want to view from the end of the log file, and click View.**

Operating System Diagnostics

If a system passes the power-on self-test (POST), it attempts to boot its operating system (OS) environment. If you are running the Oracle Solaris or Oracle Linux operating system, you can use diagnostic commands and access log files from the operating system environment.

After the server is running the OS, you have recourse to run software-based diagnostic tools, such as Oracle VTS. The software-based diagnostic tools can help you with more advanced monitoring, exercising, and fault isolating capabilities.

To use the operating system diagnostics, see the following procedures:

-
-

For more information about Oracle Linux and Oracle Solaris operating system diagnostics, refer to the following documentation:

- Installing Oracle Linux FMA – *Oracle Hardware Management Pack 2.4 Installation Guide* at `https://www.oracle.com/goto/ohmp/docs`
- Troubleshooting System Administration Issues in Oracle Solaris 11.4 – *Troubleshooting System Administration Issues in Oracle Solaris 11.4* at `https://docs.oracle.com/cd/E37838_01/`
- Managing Faults, Defects, and Alerts in Oracle Solaris 11.4 – *Managing Faults, Defects, and Alerts in Oracle Solaris 11.4* at `https://docs.oracle.com/cd/E37838_01/`

Core Dump File

In some failure situations, an Oracle engineer might need to analyze a system core dump file to determine the root cause of a system failure. Although the core dump process is enabled by default, configure your system so that the core dump file is saved in a location with adequate space. You also might want to change the default core dump directory to another locally mounted location so that you can better manage any system core dumps. In certain testing and

pre-production environments, this is recommended because core dump files can take up a large amount of file system space.

During a system core dump, the system saves the content of kernel core memory to the dump device. The dump content is compressed during the dump process at a 3:1 ratio; that is, if the system were using 6 Gbytes of kernel memory, the dump file is about 2 Gbytes. For a typical system, the dump device must be at least one third the size of the total system memory.

Swap space is used to save the dump of system memory. By default, Oracle Solaris software uses the first swap device that is defined. This first swap device is known as the dump device.

For Oracle Solaris software, use `dumpadm` to enable the core dump process. For details, refer to *Troubleshooting System Administration Issues in Oracle® Solaris 11.4* at `https://docs.oracle.com/cd/E37838_01/`.

For instructions on how to configure and initiate forced crash dumps (kernel core dumps) in x86 Oracle Solaris and collect information for troubleshooting system hangs, go to My Oracle Support at `https://support.oracle.com`, and refer to the Knowledge Article Doc ID 1003085.1.

For Oracle Linux software, use `kdump` to enable the core dump process. For details, refer to the *Oracle Linux Administrator's Guide for Release 7* at `https://docs.oracle.com/cd/E52668_01/`.

Responding to a Hung System

Troubleshooting a hung x86 Oracle Solaris system can be a difficult process because the root cause of the problem might be masked by false error indications from another part of the system. Therefore, it is important that you carefully examine all the information sources available to you before you attempt any remedy. Also, it is helpful to know the type of hang the system is experiencing. This hang state information is especially important to Oracle Service personnel, when you contact them.

A system "soft hang" can be characterized by any of the following symptoms:

- Usability or performance of the system gradually decreases.
- New attempts to access the system fail.
- Some parts of the system appear to stop responding.

Some soft hangs might dissipate on their own, while others will require that the system be interrupted to gather information. A soft hang responds to a break signal that is sent through the system console.

A system "hard hang" leaves the system unresponsive to a system break sequence. You know that a system is in a hard hang state when you attempt all the soft hang remedies with no success.

See "Troubleshoot a Hung System" on page 81.

A system might not actually be hung due to another condition causing the system to appear to be hung. For example, a network or network share problem, or a power or boot issue could be the cause. For information on how to eliminate conditions that may give the appearance of a system hang, go to My Oracle Support at `https://support.oracle.com`, and refer to the Knowledge Article Doc ID 1012991.1.

▼ Troubleshoot a Hung System

This procedure describes how to troubleshoot a hung system by using the Oracle Solaris serial console.

1. Verify that the system is hanging.

a. Type the `ping` command to determine whether there is any network activity.

b. Type the `ps -ef` command to determine whether any other user sessions are active or responding.

If another user session is active, use it to review the contents of the `/var/adm/messages` file for any indications of the system problem.

c. Try to access the system console through Oracle ILOM.

If you can establish a working system console connection, the problem might not be a true hang but might instead be a network-related problem. For suspected network problems, use the `ping` or `ssh` commands to reach another system that is on the same sub-network, hub, or router. If NFS services are served by the affected system, determine whether NFS activity is present on other systems.

2. If there are no responding user sessions, record the state of the system LEDs.

The system LEDs might indicate a hardware failure in the system. You can use Oracle ILOM to check the state of the system LEDs. For more information about how to interpret system LEDs, refer to the server Service Manual.

3. To force a kernel core dump on an x86 system, go to My Oracle Support at `https://support.oracle.com`, and refer to the Knowledge Article Doc ID 1003085.1.

4. **Review the contents of the `/var/adm/messages` file.**

Look for the following information about the system state:

- Any large gaps in the time stamp of operating system software or application messages
- Warning messages about any hardware or software components
- Information from last root logins to determine whether any system administrators might be able to provide any information about the system state at the time of the hang

5. **If possible, verify whether the system saved a core dump file.**

Core dump files provide invaluable information to your support provider to aid in diagnosing any system problems. For further information about saving core dump files, see "Core Dump File" on page 79.

Troubleshooting Information

There are several troubleshooting options that you can implement when you set up and configure an Oracle x86 server. By setting up your system with troubleshooting in mind, you can save time and minimize disruptions if the system encounters any problems.

This section contains the following troubleshooting options:

- "Updated Product Information" on page 83
- "Firmware and Software Patches" on page 85
- "Information to Gather for Troubleshooting" on page 86
- "System LEDs and Diagnostics" on page 86
- "Oracle Service Tools Bundle " on page 87
- "Auto Service Requests" on page 87

Updated Product Information

Oracle gathers and publishes information about the Oracle x86 servers long after the initial system is shipped. You can obtain the most current server troubleshooting information in the Product Notes or Release Notes and at Oracle web sites. These resources can help you understand and diagnose problems that you might encounter.

Product Notes and Release Notes

Oracle x86 server Product Notes and Release Notes documents contain late-breaking information about the systems, including the following:

- Updated hardware and driver compatibility information
- Known issues and bug descriptions, including solutions and workarounds

The latest Product Notes and Release Notes are available as part of the documentation library for the server platform, or operating system.

Oracle x86 Critical Patch Update Guide

Oracle x86 Critical Patch Update Guide contains the latest software release information for Oracle x86 servers, including the following:

- Current recommended and required software patches
- Updated operating system support information
- Fixed/Known issues

Oracle x86 Critical Patch Update Guide is available as part of the documentation library for the server platform, or in the *Systems Management and Diagnostics Documentation Library* at `https://www.oracle.com/goto/x86admindiag/docs`.

Information about the latest firmware and Software Release, including tools, drivers, component firmware versions, and bug fixes is available in the ReadMe file for each Software Release.

My Oracle Support

My Oracle Support web site presents a collection of resources for Oracle technical and support information. Access to some of the information on this site depends on the level of your service contract with Oracle. To access My Oracle Support, go to `https://support.oracle.com`.

This site lets you do the following:

- **Search for solutions** – Knowledge articles and alerts about your product and other Oracle products.
- **Download patches and updates** – Everything you need to download and install patches, including tools, product patches, security patches, signed patches, and x86 drivers.
- **Access proactive support tools** – Tools that help you solve problems without having to log a service request, streamline and simplify your daily operations, reduce risks, maximize up-time, and lower your organizations costs through preventative maintenance.
- **Collaborate in the My Oracle Support Community** – Oracle Support Blogs provide product news, technical insight, and how-to information.
- **Learn about Oracle products** – Education resources include how-to training videos, Oracle Support accreditation, live Oracle Adviser webcasts, learning library, training on demand from Oracle University, and Transfer of Information (TOI) online training.
- **Create a service request** – A dashboard where you create, view, and manage service requests, and track the status of bugs associated with a service request.

Firmware and Software Patches

Oracle makes every attempt to ensure that each system is shipped with the latest firmware and software. However, in complex systems, bugs and problems are discovered in the field after systems leave the factory. Often, these problems are fixed with patches to the system firmware. Keeping your system firmware and operating environment current with the latest recommended and required patches can help you avoid problems that others already discovered and solved. Firmware and operating environment updates are often required to diagnose or fix a problem. Schedule regular updates of your system firmware and software so that you do not have to update the firmware or software at an inconvenient time.

You can find the latest patches and updates for Oracle x86 servers at the My Oracle Support web site at `https://support.oracle.com`.

Server Security, Software Releases, and Critical Patch Updates

To ensure continued security of your system, Oracle strongly recommends that you apply the latest Software Releases. Server Software Releases include Oracle ILOM, BIOS, and other firmware updates, often referred to as "patches." Oracle publishes these patches regularly on the My Oracle Support site. Applying these patches helps ensure optimal system performance, security, and stability. You can identify the latest Software Release for your system at `http://www.oracle.com/technetwork/systems/patches/firmware/release-history-jsp-138416.html`.

To download a Software Release, go to My Oracle Support at `https://support.oracle.com`.

Oracle notifies customers about security vulnerability fixes for all its products four times a year through the Critical Patch Update (CPU) program. Customers must review the CPU advisories to ensure that the latest software release updates are applied to their Oracle products. Note that updates for Engineered Systems are specifically published for a specific Engineered Systems product (that is, you need not look at specific updates for individual software components included in your Engineered System). For more information about the Oracle CPU program, go to `http://www.oracle.com/technetwork/topics/security/alerts-086861.html`.

Oracle also recommends that you update to the latest operating system release when it becomes available. Although a minimum operating system release is supported, updating to the latest OS release ensures that you have the most up-to-date software and security patches. To confirm that you have the latest OS release, refer to the Oracle Hardware Compatibility Lists. For information on how to access the Oracle Hardware Compatibility Lists, refer to "Supported Operating Systems" in the Product Notes for your platform.

Oracle x86 Critical Patch Update Guide contains the latest software release information for Oracle x86 servers.

For details about the latest system software update, refer to information about getting firmware and software updates in the Product Notes for your platform.

Information to Gather for Troubleshooting

Oracle x86 servers indicate and log events and errors in various ways. Depending on the system configuration and software, certain types of errors are captured only temporarily. Therefore, you must observe and record all available information immediately before you attempt any corrective action. Power-on self-test (POST), for instance, accumulates a list of failed components across resets. However, failed component information is cleared after a system reset. Similarly, the state of LEDs in a hung system is lost when the system reboots or resets.

If you encounter any system problems that are not familiar to you, gather as much information as you can before you attempt any remedial actions. The following tasks provide a basic approach to information gathering.

- Gather as much error indications and messages as possible from the system.
- Review and verify the system operating environment, firmware, and hardware configuration. To accurately analyze error indications and messages, you or an Oracle Service engineer must know the system operating environment and patch revision levels and the specific hardware configuration.
- Compare the specifics of your situation to the latest published information about your system. Often, unfamiliar problems you encounter have been seen, diagnosed, and fixed by others. This information might help you avoid the unnecessary expense of replacing parts that are not actually failing.

System LEDs and Diagnostics

While not a comprehensive diagnostic tool, status indicators (LEDs) located on the chassis and on selected system components can serve as front-line indicators of a limited set of hardware failures.

You can view LED status by direct inspection of the system front and back panels and on some components and ports. You also can view the status of certain LEDs from the Oracle ILOM web interface or command-line interface. The Oracle ILOM Fault Management Shell allows you

and Oracle Service personnel to view and manage fault activity on servers and other types of devices.

The green System OK LED indicator and the green SP OK indicator remain lit (no blinking) when the server is in a normal operating state. For any LED color other than green or if the LED is blinking, refer to the Troubleshooting chapter in the Service Manual for your platform.

Note - Most LEDs available on the front panel are duplicated on the back panel.

Oracle Service Tools Bundle

You can use the Oracle Service Tools Bundle (STB) to expedite problem diagnosis and resolution and for proactive prevention of problems. STB is a self-extracting installer bundle that supports all Oracle Solaris standard operating systems and architectures, enabling you to get the most from your Oracle Premier Support plans. For details on the component parts of STB and where to download the latest version for your Oracle Solaris platform, go to My Oracle Support at `https://support.oracle.com`, and refer to the Knowledge Article Doc ID 1153444.1.

Auto Service Requests

Oracle Auto Service Requests (ASR) is a feature available to customers having Oracle Premier Support and is provided to those customers at no additional cost. Oracle ASR is the fastest way to restore system availability if a hardware fault occurs. Oracle ASR software is secure and customer installable, with the software and documentation downloadable from My Oracle Support at `https://support.oracle.com`. When you log in to My Oracle Support, refer to the "Oracle Auto Service Request" knowledge article document (ID 1185493.1) for instructions on downloading the Oracle ASR software.

When a hardware fault is detected, Oracle ASR opens a service request with Oracle and transfers electronic fault telemetry data to help expedite the diagnostic process. Oracle diagnostic capabilities then analyze the telemetry data for known issues and delivers immediate corrective actions. For security, the electronic diagnostic data sent to Oracle includes only what is needed to solve the problem. The software does not use any incoming Internet connections and does not include any remote access mechanisms.

For more information about Oracle ASR, go to: `https://www.oracle.com/support/premier/auto-service-request.html`.

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