Insight Diagnostics User Guide

Abstract

This guide provides information about the Hewlett-Packard Insight Diagnostics software, including the usage, managing, and troubleshooting.

HP Insight Diagnostics is a proactive server management tool, available in both Online and Offline Editions. Insight Diagnostics provides diagnostics and troubleshooting capabilities to assist IT administrators who verify server installations, troubleshoot problems, and perform repair validation.

This guide is intended is for the person who installs, administers, and troubleshoots servers and storage systems. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.



HP Part Number: 390374-008
Published: February 2012
Edition: 1.0

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Printed in the US

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1 HP Insight Diagnostics overview

HP Insight Diagnostics editions

HP Insight Diagnostics Online Edition is a web-based application that captures hardware and operating system configuration information, records critical information for documentation and disaster recovery, and compares historical configurations on the same server or a baseline server. Available in Microsoft® Windows® and Linux versions, Insight Diagnostics helps to ensure proper system operation. Online diagnosis of hard drives and assessment of power supplies for potential issues under the following conditions:

- Hard drives attached to an HP Smart Array Controller
- Power supplies that are HP common slot power supplies and are deemed "diagnosable" by Power Supply Diagnosis software using specific HP part numbers and HP servers

HP Insight Diagnostics Offline Edition captures system configuration information and provides detailed diagnostic testing capabilities. The Offline Edition provides a comprehensive suite of offline system and component tests, providing in-depth testing of critical hardware components for devices such as processors, memory, and hard drives. During offline testing, the user-installed OS is not running. Therefore, software information from the system is not reported. Insight Diagnostics Offline Edition runs when the computer is started by running the on-board Intelligent Provisioning software embedded on the servers.

IMPORTANT: Third-party devices not supported by HP might not be detected by HP Insight Diagnostics.

Key features and benefits

HP Insight Diagnostics simplifies the process of effectively identifying, diagnosing, and isolating hardware issues.

System availability is maintained through the following key features:

- Testing and diagnosing apparent hardware failures
- Documenting system configurations for upgrade planning, standardization, inventory tracking, disaster recovery, and maintenance
- Sending or printing configuration information to another location for more in-depth analysis
- Managing the Integrated Management Log (IML)

In addition to system management tools, service tools can resolve system problems quickly. To streamline the service process and resolve problems quickly, you must have the right information available at the time that a service call is placed. This combination of features simplifies the service process and minimizes downtime.

Theory of operation

HP Insight Diagnostics is a useful step in troubleshooting procedures. If a system problem occurs, do the following:

- Check the computer health and status LEDs.
- Use the HP Insight Diagnostics Survey Utility feature to verify the hardware configuration and firmware versions.
- Use the HP Insight Diagnostics Offline Edition Test feature to help validate the hardware.
- Use the Integrated Management Log (if supported) to identify system errors.

System requirements

HP Insight Diagnostics Online Edition for Windows® requires the following:

- HP Advanced System Management Driver
- HP System Management Homepage
- HP Server Management Application and Agents
- Memory: 512 MB
- Graphics controller support: 1024x768

HP Insight Diagnostics Online Edition for Linux requires the following:

- HP System Management Homepage
- HP Server Management Application and Agents
- HP ProLiant Linux Deployment Utility
- Memory: 512 MB
- Graphics controller support: 1024x768

HP Insight Diagnostics Offline Edition requires the following:

- System support for a bootable CD-ROM
- Memory: 512 MB
- Graphics controller support: 1024x768

NOTE: If the system has less than 1 GB of memory, some tests may be unavailable. Also, a memory of 1 GB or more is required while testing offline for time periods longer than 12 hours.

2 Getting started

Installing the Online Edition

Use the appropriate procedures for your OS environment.

Removing the HP Survey utility

Before installing the HP Insight Diagnostics Online Edition, HP recommends removing the HP Survey Utility. Use the procedures in this section to remove the software.

Removing the HP Survey utility for Windows operating systems

If installed, remove the HP Survey Utility for Windows® before installing HP Insight Diagnostics Online Edition.

1. Go to **Add or Remove Programs**.
2. Select **Hewlett-Packard Survey Utility**.
3. Click **Remove**.

Removing the HP Survey utility for Linux operating systems

If installed, remove the HP Survey Utility for Linux before installing HP Insight Diagnostics Online Edition.

1. Identify which version of the HP Survey Utility is installed. Enter the following command: `rpm -qa|grep survey`.
2. Remove the HP Survey Utility. Enter the following command: `rpm -e survey`.

Installing HP Insight Diagnostics for Windows Online Edition

Installing from the HP ProLiant Support Pack

Install the HP ProLiant Support Pack (PSP). HP Insight Diagnostics for Windows® installs during the PSP installation.

For more information on the PSP, see the *HP ProLiant Support Pack and Deployment Utilities User Guide*.

Installing from the Smart Component

1. Log on to the Windows® server with administrator access rights.
2. Download the Smart Component executable file.
3. Copy the executable file to a temporary directory on the target server.
4. Run the Smart Component executable file to start the HP Diagnostics interactive installation program.

During the installation, the Insight Diagnostics files are copied to the `\hp\hpdiags` directory on the same drive in which Windows is installed, usually the C: drive.

Installing HP Insight Diagnostics for Linux Online Edition

Installing from the HP ProLiant Linux Support Pack

Install the HP ProLiant Linux Support Pack (LSP). . HP Insight Diagnostics for Linux and all the dependent packages required for successful operation are installed during the LSP installation.

For more information on the LSP, see the *HP ProLiant Support Pack and Deployment Utilities User Guide*.

Installing from the Linux RPM Package Manager (RPM)

HP Insight Diagnostics for Linux is available for use with the Linux RPM utility. The following RPM options are available:

- Install
- Query
- Refresh
- Uninstall

To install the Insight Diagnostics for Linux RPM file:

1. Obtain the Insight Diagnostics RPM file.
2. Log in to the target server as root.
3. Enter the following command:

   ```
   rpm -Uvh <rpmFilename>
   ```

   For example:

   ```
   rpm -Uvh hpdiags-8.6.0-12.linux.x86_64.rpm
   ```

Locating files

During the installation, the HP Insight Diagnostics files are copied to the following directories:

- The HP Insight Diagnostics executable file is copied to the `/opt/hp/hpdiags` directory.
- The files for the web-based user interface, provided as a webapp, in the HP System Management Homepage are copied to the `/opt/hp/hpsmh/data/htdocs/hpdiags` directory.

Starting the Online Edition

Starting HP Insight Diagnostics for Windows Online Edition

Starting from the Windows Start menu

1. Go to **Start > All Programs > HP Insight Diagnostics Online Edition for Windows**.
2. Select **HP Insight Diagnostics Online Edition for Windows**.

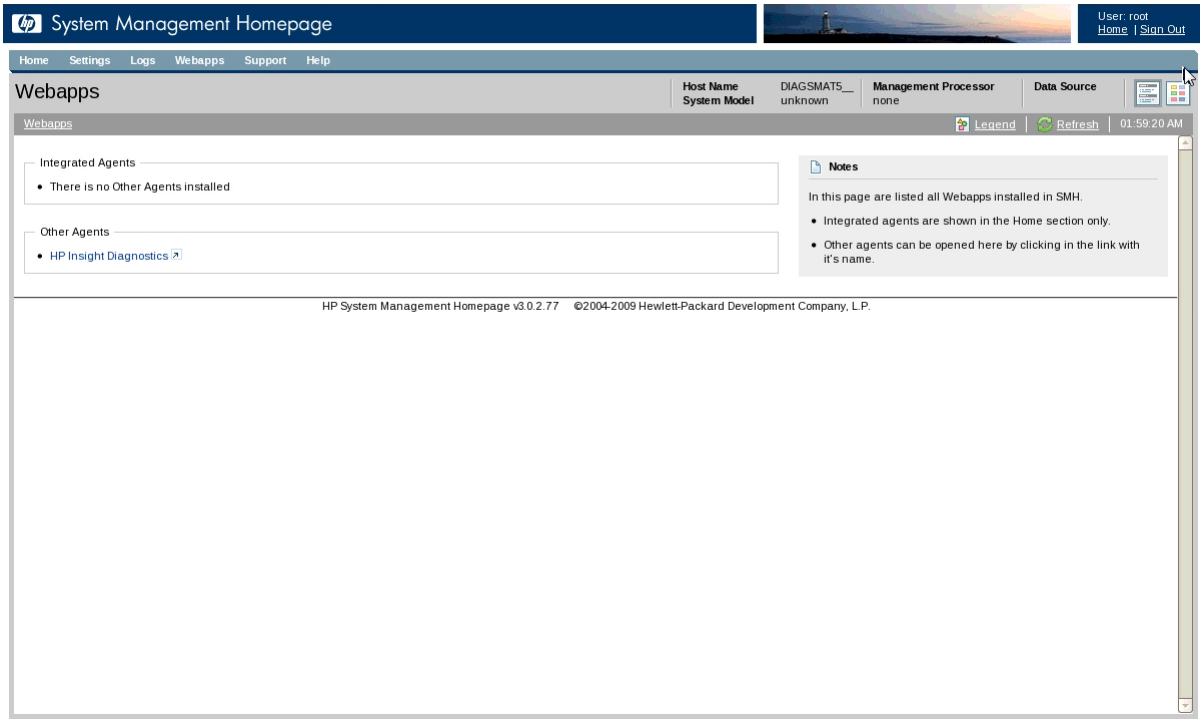
Starting from the HP Systems Insight Manager

1. In HP Systems Insight Manager, go to the Device page.
2. Select **HP Insight Diagnostics** from the Device Links box.

Starting from the HP System Management Homepage

1. Click **HP System Management Homepage** on the Windows desktop.
2. Click **Webapps**.
3. Click **HP Insight Diagnostics** in **Other Agents**.

Figure 1 The Webapps tab



Starting HP Insight Diagnostics for Linux Online Edition from the HP System Management Homepage

1. Open the browser.
2. In the address field, enter the following:

   ```
   https://localhost:2381
   ```

3. Press **Enter**. The System Management Homepage appears.
4. Click **Webapps**.
5. Click **HP Insight Diagnostics** in **Other Agents**.

Starting the Online Edition from a browser

HP Insight Diagnostics Online Edition enables you to view information from a browser meeting the following requirements:

- Microsoft Internet Explorer 6.0 or later
- Firefox 1.5 or later
- Support for TCP/IP
- Support enabled for the following:
  - Accept all cookies
  - Java™
  - JavaScript
  - CSS
  - Tables and frames

To start HP Insight Diagnostics from the browser:

1. Open the browser.
2. In the address field, enter the following:

```
https://localhost:2381/hpdiags/frontend2/frontend.php
```

3. Press **Enter**.

Modifying browser settings on a Linux server

Both the browser menu bar that displays the address and the menu bar directly below it must be minimized so that the HP Insight Diagnostics screens fit in the browser window correctly.

To minimize the menu bars:

1. Click the down arrow located between the Back and Forward buttons and the address field to minimize the menu bar that displays the address.
2. To minimize the bottom menu bar:
   1. Right-click an open space in the menu bar.
   2. Select **Properties**.
   3. Select **Auto hide**.
   4. Click **Apply**.

Starting the Online Edition from Microsoft Internet Explorer

To log on to the System Management Homepage from Microsoft Internet Explorer:

1. Open the browser.
2. In the address field, enter the following:

   ```
   https://devicename:2381
   ```

3. Press **Enter**.

   The Security Alert dialog box appears the first time you navigate to a system without a Certificate Authority Root Certificate.

   The Security Alert dialog box does not display if a Certificate Authority Root Certificate is installed on the browsers to be used for management. If it does display after this is implemented, you might have browsed to the wrong system. For more information about installing the Certificate Authority Root Certificate, refer to the online help in your browser.

4. Click **Yes**. The Login page appears.

   If **Anonymous access** is enabled, the System Management Homepage appears.

5. Enter your user name and password.
6. Click **Login**. The System Management Homepage appears.

Starting the Online Edition from Firefox

To log in to the System Management Homepage with Firefox:

1. Open the browser.
2. In the address field, enter the following:

   ```
   https://devicename:2381
   ```

   The first time you navigate to this link, the **Website Certified by an Unknown Authority** dialog box appears.

3. Click **OK**. The Login page appears.

   If **Anonymous access** is enabled, the System Management Homepage appears.

4. Enter your user name and password.
5. Click **Login**. The System Management Homepage appears.

Using the Online Edition from a command line

The optional command line parameters are listed in Table 1 (page 11).

Table 1 Optional command line parameters

Parameter	Description
`-1<LanguageCode>`	Language Code options: • `en` (for English, the default language) • `de` (for German) • `es` (for Spanish) • `fr` (for French) • `it` (for Italian) • `ja` (for Japanese)
`-v <Level>`	Verbosity of output where Level is an integer between 1 and 5. Level 1 is the most filtered and Level 5 is the most verbose. The default is Level 3.
`-s "mmhhddMMDD"`	Schedule automatic execution. mm=minute (0-59), hh=hour (0-23), dd=day (1-31), MM=month (1-12), DD=day of week (0-6). All fields must be two digits (for example, 02 instead of 2). Use a single asterisk (*) for any value. If you use an asterisk, you must quote the date/time value (`-s "0023***"`). If no asterisk is used, the quotes are optional. This command adds an entry to your crontab for Linux-based systems, or to the Windows Scheduled Tasks list for Windows-based systems. For more information on crontab, enter `man crontab` at a Linux command prompt.
`-u`	Unschedule of HP Insight Diagnostics running. This command removes all entries that refer to HP Insight Diagnostics in your crontab. For a Windows system, this command removes the entries in the Windows Scheduled Tasks list.
`-c <File1><File2>`	Compare a file to the current output, or if two files are specified, compare the files without generating a new report.
`-t`	Run a new HP Survey Utility snapshot and output to the terminal. This option is ignored if `-o` is not specified.
`-p`	HP Survey Utility captures and comparisons can be to a file as plain text. The default is XML format.
`-o <File1>`	Run a new HP Survey Utility snapshot and output to a file. The default is formed using the current date in this format: surveyCCYY-MM-DD-HH-mm-ss.xml (CC=century, YY=year, MM=month, DD=day, HH=hour, mm=minute, and ss=second). `-t` and `-o` cannot be used together.
`-f`	Overwrite the output file if it already exists. If the `-o` parameter is not specified this option is ignored.
`-a`	Append the output to an existing output file. If no `-o` option is specified, this option is ignored. To avoid XML parsing errors, use this option with the plain text (`-p`).
`-rd`	Run a diagnosis of all diagnosable devices. The test results are posted to the Diagnosis Log (*diagnosislog.xml*).
`-? , -h`	Display help.

Using HP Insight Diagnostics commands in Linux

To use the command line switches in Linux:

1. Open a terminal window if necessary.
2. Change to the `/opt/hp/hpdiags` directory.
3. Enter the command with the preferred switch.

See the following examples:

- To capture Survey configuration information for your system, and then send the XML file to a terminal, enter either of the following commands:
  - `# ./hpdiags -t`
  - `# /opt/hp/hpdiags/hpdiags -t`
- For example, if, every Monday at 5:00 AM, you want Insight Diagnostics to compare the original HP Survey Utility configuration file to the current HP Survey Utility configuration, and then save the result to a remote file in plain-text format, enter the following command:
  ```
  # ./hpdiags -s "0005**01" -c surveybase.xml -p -o
  /mnt/remoteserver/surveycompare.txt
  ```
- To verify the System Management Homepage status on a Linux server, enter the following command:
  ```
  /etc/init.d/hpsmhd status
  ```

Using HP Insight Diagnostics commands in Windows

To use the command line switches in Windows:

1. Open a console window if necessary.
2. Change to the `C:\hp\hpdiags` directory.
3. Enter the command with the preferred switch.

See the following examples:

- To capture HP Survey Utility configuration information, and then send the XML file to a terminal, enter either of the following commands:
  - `C:\hp\hpdiags> hpdiags.exe -t`
  - Or from any directory, run `C:\hp\hpdiags\hpdiags.exe -t`
- For example, if, every Monday at 5:00 AM, you want Insight Diagnostics to compare the original HP Survey Utility configuration file to the current HP Survey Utility configuration, and then save the result to a remote file in plain-text format, and enter the following command:
  ```
  C:\hp\hpdiags> hpdiags.exe -s "0005**01" -c surveybase.xml -p -o
  \\server\share\surveycompare.txt
  ```

Starting the Offline Edition

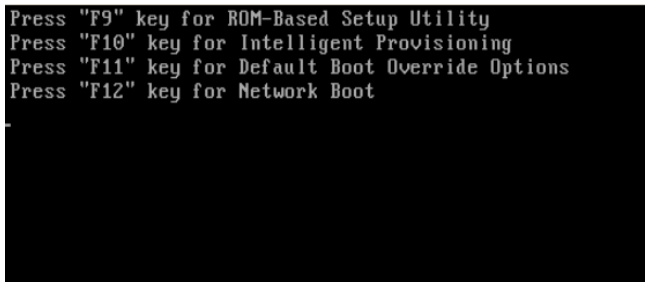
Starting from the HP ProLiant servers

On an HP ProLiant server, start the HP Insight Diagnostics Offline Edition through the on-board Intelligent Provisioning software embedded on the servers.

To start the HP Insight Diagnostics Offline Edition, complete the following steps:

1. Shut down the operating system, and then reboot the server.
2. When prompted during the booting up process, press **F10** to start the Intelligent Provisioning.

Figure 2 Press F10 key for Intelligent Provisioning



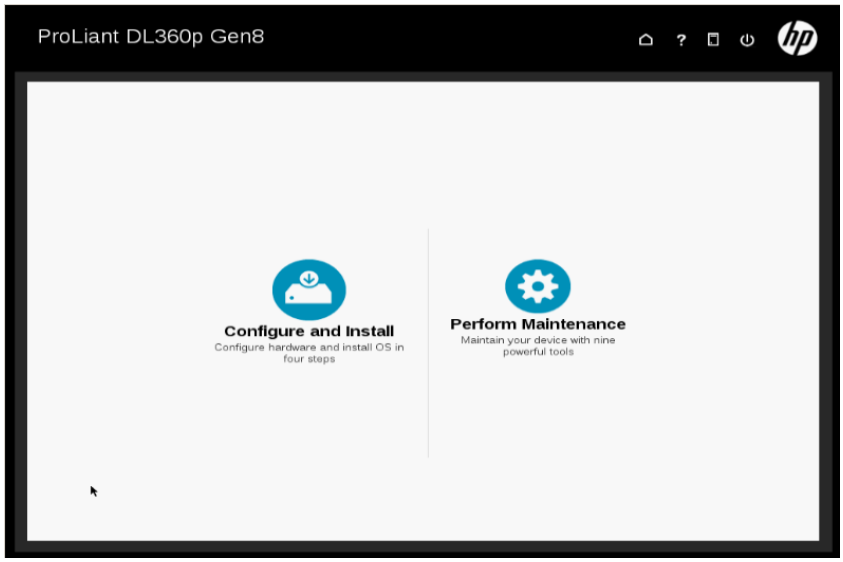
3. On the blue menu screen, press **Enter**.

NOTE: If HP Insight Diagnostics is listed in this menu, you can skip Step 4 through Step 5 as well you can use the down arrow key to select that option, then press **Enter**.

If you are using Intelligent Provisioning for the first time, you see screens prompting you to configure the keyboard, networking, etc. After you have completed the configuration, these screens are skipped the next time you use Intelligent Provisioning, and you are taken directly to the Home screen.

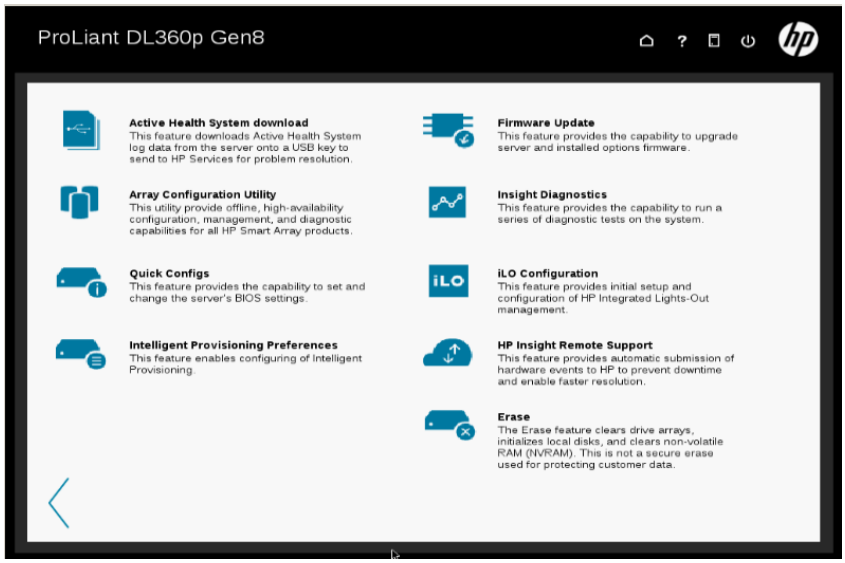
4. On the Home screen, click on the **Perform Maintenance** con.

Figure 3 Select Perform Maintenance



5. On the Maintenance screen, click on the **Insight Diagnostics** icon.

Figure 4 Select Insight Diagnostics



When you exit HP Insight Diagnostics, you will return to the maintenance menu, where you can run another tool or reboot the server back to your operating system.

3 Using HP Insight Diagnostics

HP Insight Diagnostics contains the following primary tabs:

- Survey
- Diagnose
- Test (available only in Offline Edition)
- Status
- Log
- Help

Using the Survey tab

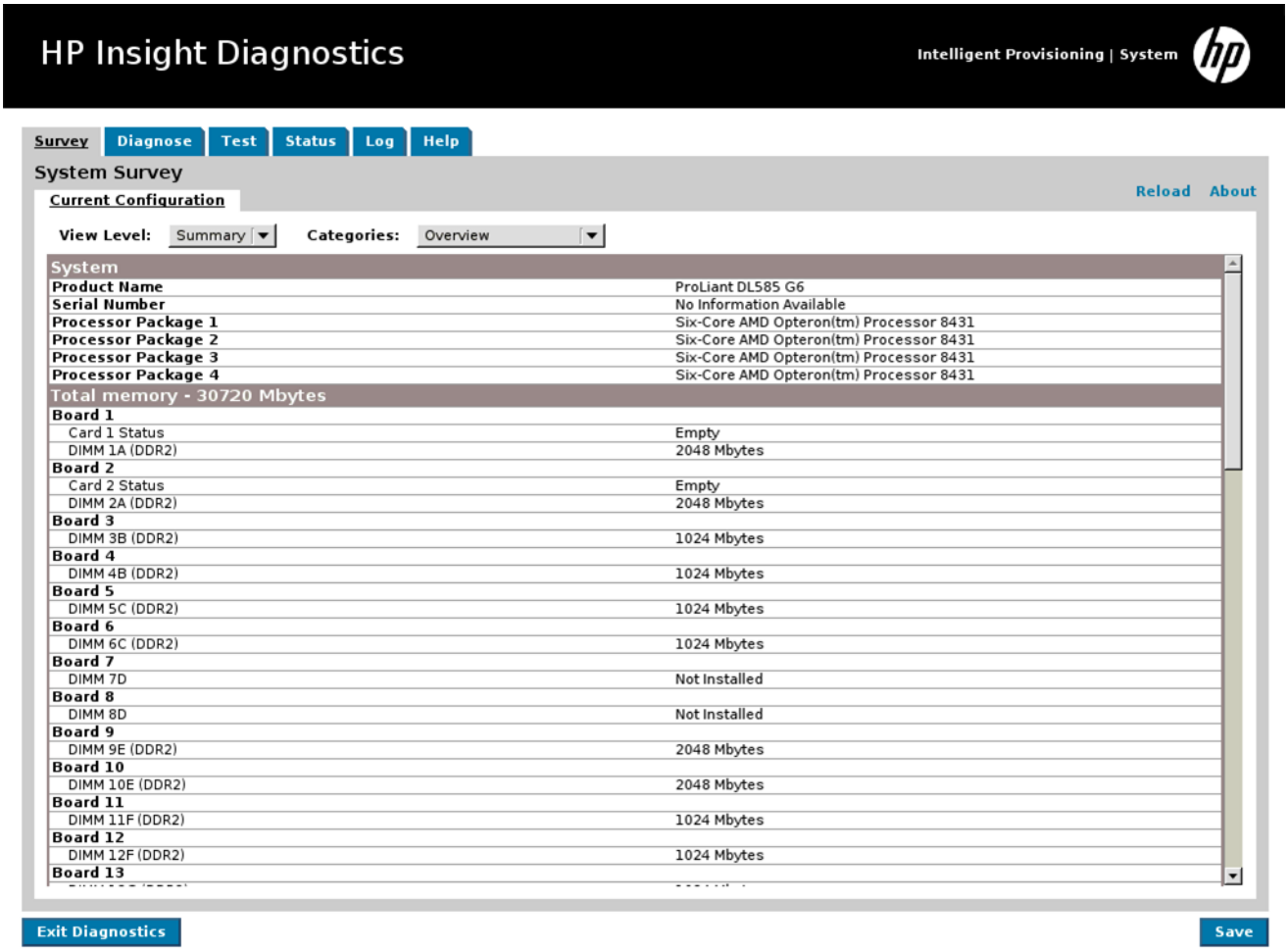
The HP Insight Diagnostics Survey feature displays system configuration information on the Survey tab.

When Insight Diagnostics starts, summary information for the Overview category appears. To view configuration details for a different subject:

1. Select the configuration details to view from the **View Level** list:
   - Select **Summary** to view summary configuration information.
   - Select **Advanced** to view detailed configuration information.

2. Select the subject to view from the **Categories** list:
   - **All** displays all information about the system and subsystems.
   - **Overview** displays general information about the system.
   - **Architecture** displays the type of bus the system uses, the BIOS, and PCI-related information.
   - **Asset Control** displays the product name, serial number, asset tag, and processor information (system identification number).
   - **Communication** displays information about the system parallel (LPT) port, serial (COM) port, USB, and network interface controller.
   - **Graphics** displays information about the graphics subsystem, including the graphics card, graphics mode, ROM, and video memory.
   - **Input Devices** displays information about the type of keyboard, mouse, and other input devices connected to the computer.
   - **Internal Conditions** (if supported on system) displays information about the health of the computer, including the fan, temperature, power supply, and health LED information.
   - **Memory** displays detailed information about system memory.
   - **Remote Management** (if supported on system) displays information about iLO.
   - **Miscellaneous** displays information obtained from CMOS, BIOS data area, Interrupt Vector table, TPM, and diagnostics component information.
   - **Resources** displays information about the system resources, real-time clock, and operating system settings for certain settings, such as I/O and IRQs.
   - **Operating System** displays information on the OS, when run in online mode.
   - **Storage** displays information about the storage controllers and storage media connected to the system, including hard drives, diskette drives, and optical drives. It also shows logical volume information for all connected hard drives.
   - **System** displays information about the system ROM, product type, processor type and speed, and coprocessor.

Figure 5 Survey tab – Current configuration



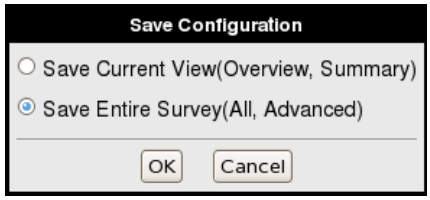
Scheduling a survey

1. Click **Schedule Captures**.
2. Select either **Weekly** or **Monthly** for the capture frequency.
3. Select the day of the week/day of the month for the capture.
4. Select the time for the capture.
5. Click **OK**.

Saving the survey configuration information

1. Click **Save** to save the configuration information.
2. The **Save Configuration** pop up allows you to save the configuration as either **Save Current View (Overview, Summary)** or as **Save Entire Survey (All, Advanced)**. Select one of them, and click **OK** to save or **Cancel** to exit.

Figure 6 Save Configuration pop up



NOTE: The saved information is for the current view and category on the Survey tab.

3. The survey file is saved with table of contents.

Save the configuration file to a USB storage device

1. Click **USB flash drive** to save the file to the USB device. If a USB storage device is not attached to the system, the USB flash drive radio button does not appear.
2. If you attach a USB storage device after clicking **Save**, click **Rescan for devices** to detect the attached USB storage device.
3. Enter the file name in the **File Name** box.
4. Click **Save**.

The file is saved in HTML format and can be viewed by any standard Web browser.

To get an XML formatted Survey report, copy the session file from the `\hpdiags` directory. Survey session files are named using the format: *SurveyDATE.xml*, where *DATE* is the date and time the sessions were captured. A **Save** button, under **Manage System Configurations**, saves a copy of the Survey XML file.

Deleting a survey session

1. Select **Manage Configurations**.
2. Check the sessions to delete.
3. Click **Delete**.

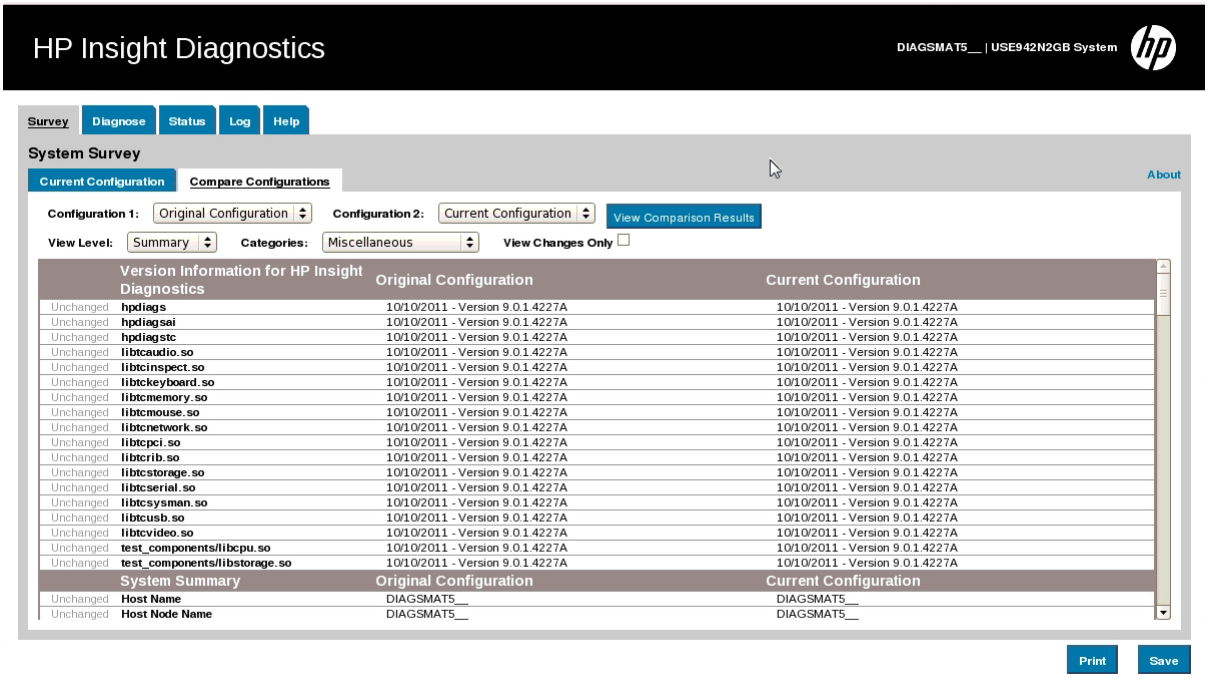
Comparing configurations

1. Click **Compare System Configuration**.
2. Select a survey session from the Configuration 1 list.
3. Select a survey session from the Configuration 2 list.
4. Select **View Changes Only** to display only the differences.
5. Select the configuration details to view from the View Level list:
   - Select **Summary** to view summary configuration information.
   - Select **Advanced** to view detailed configuration information.
6. Select the subject to view from the **Categories** list:
   - **All** displays all information about the system and subsystems.
   - **Overview** displays general information about the system.
   - **Architecture** displays the type of bus the system uses, the BIOS, and PCI-related information.
   - **Asset Control** displays the product name, serial number, asset tag, and processor information (system identification number).
   - **Communication** displays information about the system parallel (LPT) port, serial (COM) port, USB, and network interface controller.
   - **Graphics** displays information about the graphics subsystem, including the graphics card, graphics mode, ROM, and video memory.
   - **Input Devices** displays information about the type of keyboard, mouse, and other input devices connected to the computer.
   - **Internal Conditions** (if supported on system) displays information about the health of the computer, including the fan, temperature, power supply, and health LED information.
   - **Memory** displays detailed information about system memory.
   - **Remote Management** (if supported on system) displays information about iLO and RILOE II cards.
   - **Miscellaneous** displays information obtained from CMOS, BIOS data area, Interrupt Vector table, TPM, and diagnostics component information.

- **Resources** displays information about the system resources, real-time clock, and operating system settings for certain settings, such as I/O and IRQs.
- **Operating System** displays information on the OS.
- **Storage** displays information about the storage controllers and storage media connected to the system, including hard drives, diskette drives, and optical drives. It also shows logical volume information for all connected hard drives.
- **System** displays information about the system ROM, product type, processor type and speed, and coprocessor.

7. Click **View Comparison Results**.
8. Click **Current Configuration** to return to the current configuration information.
9. Click **Print** to print the configuration comparison details.
10. Click **Save** to save the configuration comparison details to a file.

Figure 7 Survey tab – Compare configurations



Using the Diagnose tab

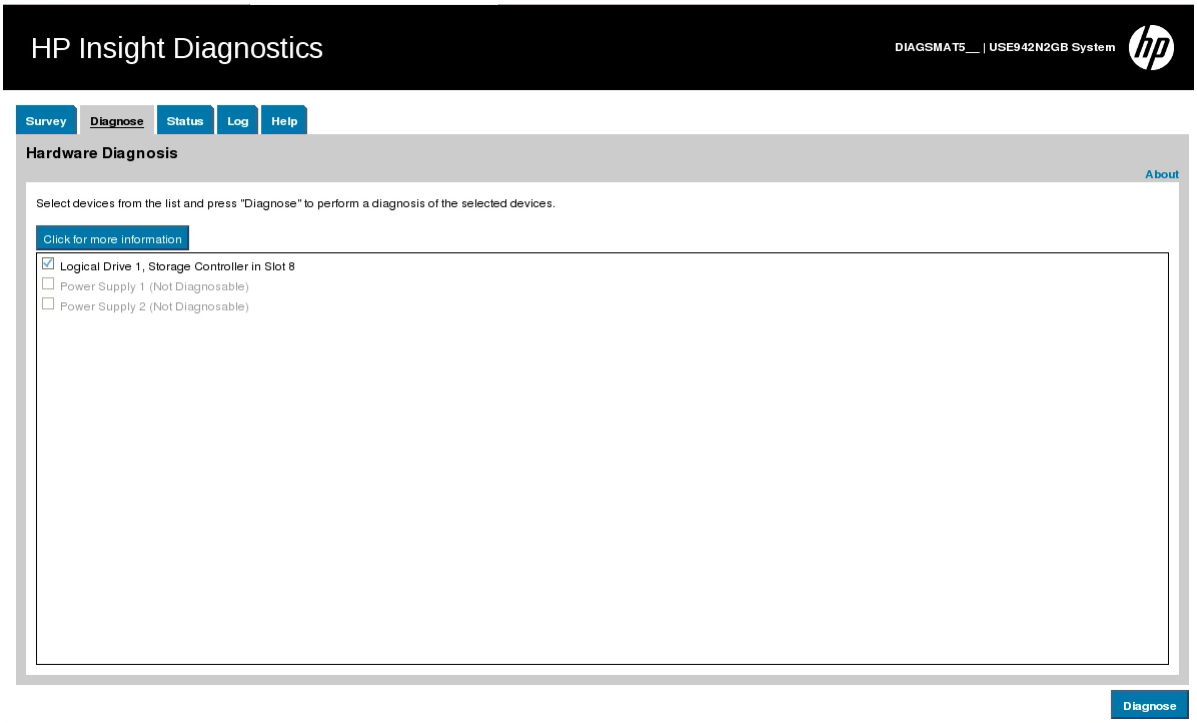
The HP Insight Diagnostics Diagnose feature performs diagnosis on the following devices:

- Hard drives attached to an HP Smart Array Controller
- Power supplies that are deemed diagnosable

To start a diagnostic test:

1. Click **Diagnose** tab.
2. Select the device to diagnose:
   - Select **All Devices** to assess the health of all logical volumes and power supplies.
   - Select one or more specific logical volumes or power supplies to assess the health of the selected devices.
3. Click **Diagnose** button.

Figure 8 Diagnose tab



If the computer does not have any logical volumes or power supplies that are diagnosable, the following message appears:

```
System does not have any diagnosable devices installed.
```

Using the Test tab (HP Insight Diagnostics Offline Edition only)

IMPORTANT: This feature is available only in HP Insight Diagnostics Offline Edition.

The offline HP Insight Diagnostics Test feature provides options for diagnostic testing of all major hardware components in the system. Three tests are available on the Test tab:

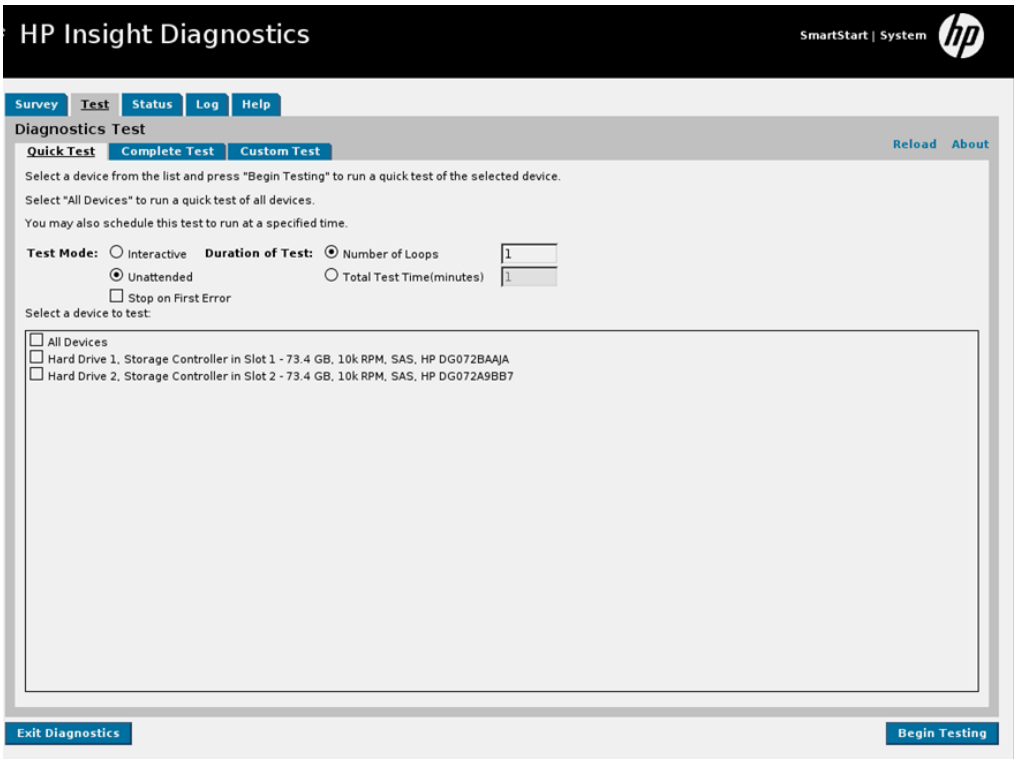
- **Quick Test** runs a predetermined test script for which a sample of each hardware component is exercised and requires no user intervention.
- **Complete Test** runs a predetermined script for which each hardware component is tested fully.
- **Custom Test** runs only the tests selected. This test is the most flexible option, with selections for specifying devices, tests, and test parameters.

Running a Quick Test

1. Click **Quick Test**.
2. Select the test mode:
   - **Interactive** runs all tests, some of which require user input.
   - **Unattended** runs the tests that do not require user input.
3. Select the test duration:
   - **Loops** runs the test for the specified number of test cycles.
   - **Total Test Time (minutes)** runs the test for the specified length of time.
4. Select **Stop on First Error** to stop all tests if an error occurs.

5. Select the device to test:
   - Select the **All Devices** check box to test all devices.
   - Select the check box for one or more devices to test specific devices.
6. Click **Begin Testing**.

Figure 9 Test tab – Quick Test

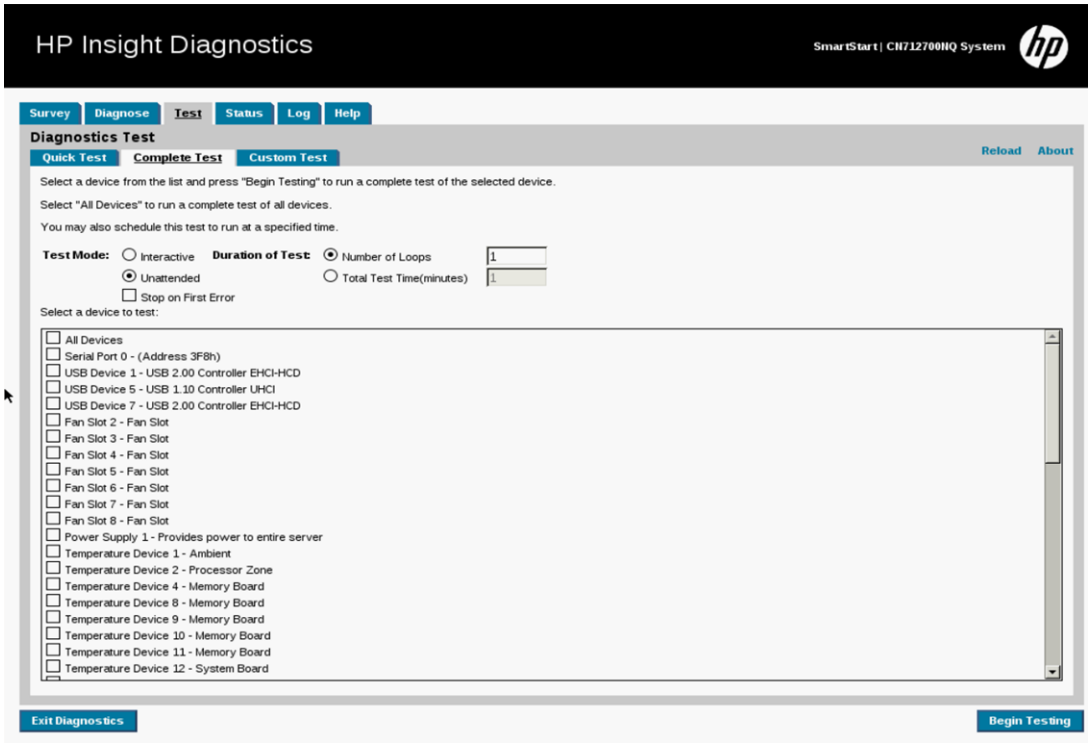


The Status tab displays test progress. The logs, on the Log tab, display detailed test results.

Running a Complete Test

1. Click **Complete Test**.
2. Select the test mode:
   - **Interactive** runs all tests, some of which require user input.
   - **Unattended** runs the tests that do not require user input.
3. Select the test duration:
   - **Loops** runs the test for the specified number of test cycles.
   - **Total Test Time (minutes)** runs the test for the specified length of time.
4. Click **Stop on First Error** to stop all tests if an error occurs.
5. Select the device to test:
   - Select **All Devices** to test all devices.
   - Select the check box for one or more devices to test specific devices.
6. Click **Begin Testing**.

Figure 10 Test tab – Complete Test

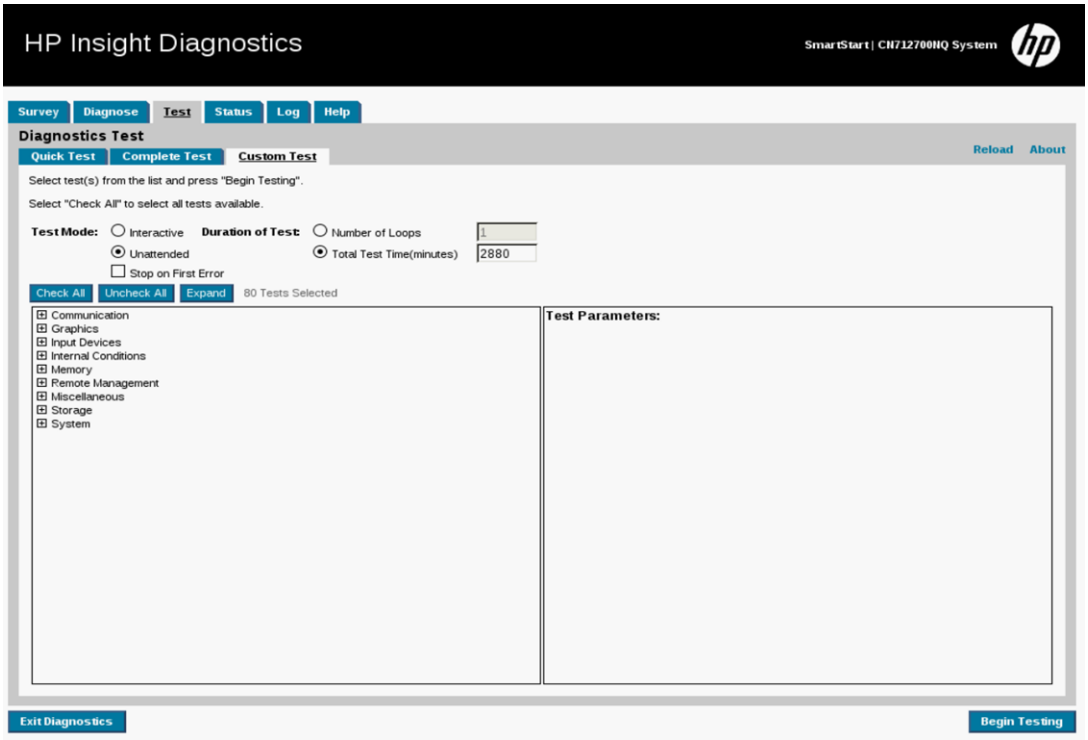


The Status tab displays test progress. The logs, on the Log tab, display detailed test results.

Running a Custom Test

1. Click **Custom Test**.
2. Select the test mode:
   - **Interactive** runs all tests, some of which require user input.
   - **Unattended** runs the tests that do not require user input.
3. Select the test duration:
   - **Loops** runs the test for the specified number of test cycles.
   - **Total Test Time (minutes)** runs the test for the specified length of time.
4. Click **Stop on First Error** to stop all tests if an error occurs.
5. Select the device and tests:
   - Click **Check All** to run all device-specific tests.
   - Click **Uncheck All** to clear any check boxes that are selected.
   - Click **Expand** to view the available device-specific tests, and then select the check box for tests to run. Click on the test to enable any parameter updates/changes. Edits to the parameters can be made in the window on the right of the screen.
6. Click **Begin Testing**.

Figure 11 Test tab – Custom Test



The Status tab displays test progress. The logs, on the Log tab, display detailed test results.

Using the Status tab

The Status tab displays testing progress and results

Viewing Diagnose test status

The progress and status of the Diagnose process appears on the Status tab when Diagnose completes

The progress bar shows the test progress. During tests of longer duration, the Status screen refresh rate varies.

To cancel the test in progress, click **Cancel**.

To repeat the test, click **Retest**.

The Device Diagnosis sections display device-specific details and test results and details for each device.

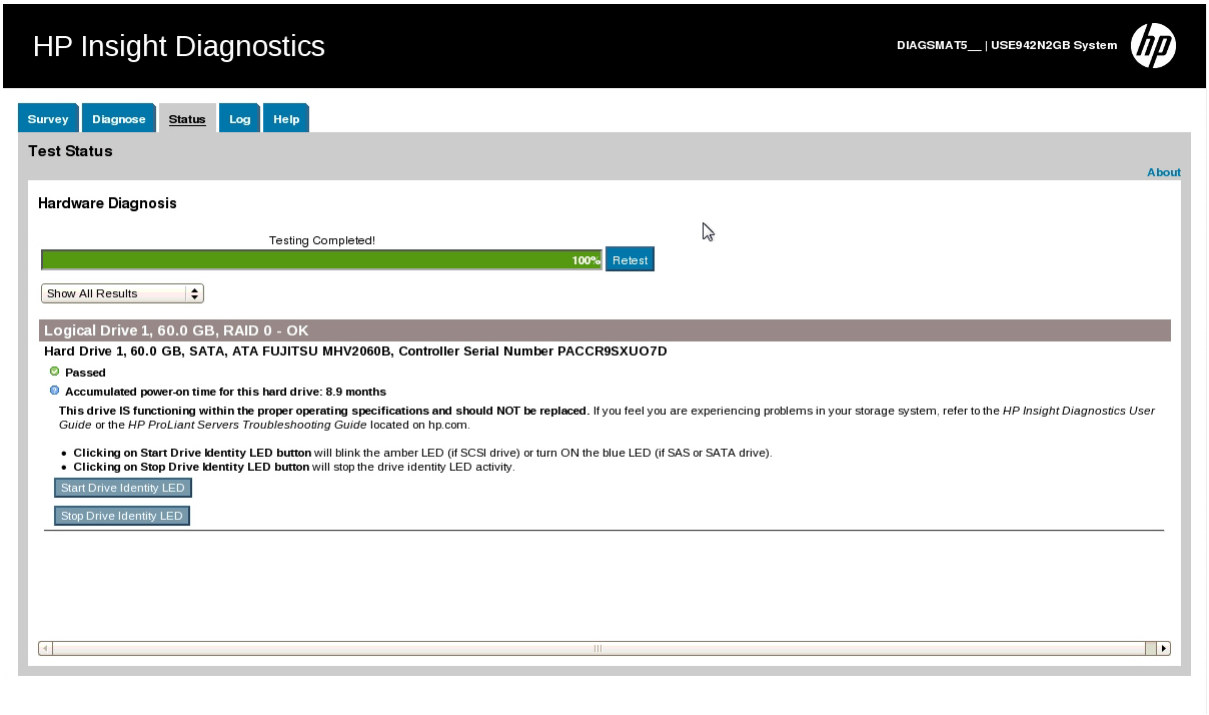
Test results are indicated as follows:

- **Canceled**: The test did not complete or was canceled.
- **Passed**: The test passed and the device is operating within specifications.
- **Failed**: The device failed the test, or the test itself failed. A failure indicates that additional testing should be performed on the device.
- **Further Troubleshooting Required**: A communication problem exists that could be related to the health of the device. Perform additional troubleshooting procedures to determine the problem or use the Custom Test option on the Test tab to retest the device. Custom testing can be performed only with HP Insight Diagnostics Offline Edition.
- **Abnormal termination**: The test terminated abnormally.

Click **Identify Drive** to identify the specific hard drive in the computer that may contain the volume. The hard drive LED indicates the location of the volume as follows:

- A SCSI hard drive containing the logical volume flashes the hard drive LED.
- A SATA or SAS hard drive containing the logical volume illuminates a blue hard drive LED.

Figure 12 Test status



Viewing offline test status

The progress and status of offline quick, complete, or custom testing appears on the Status tab as follows:

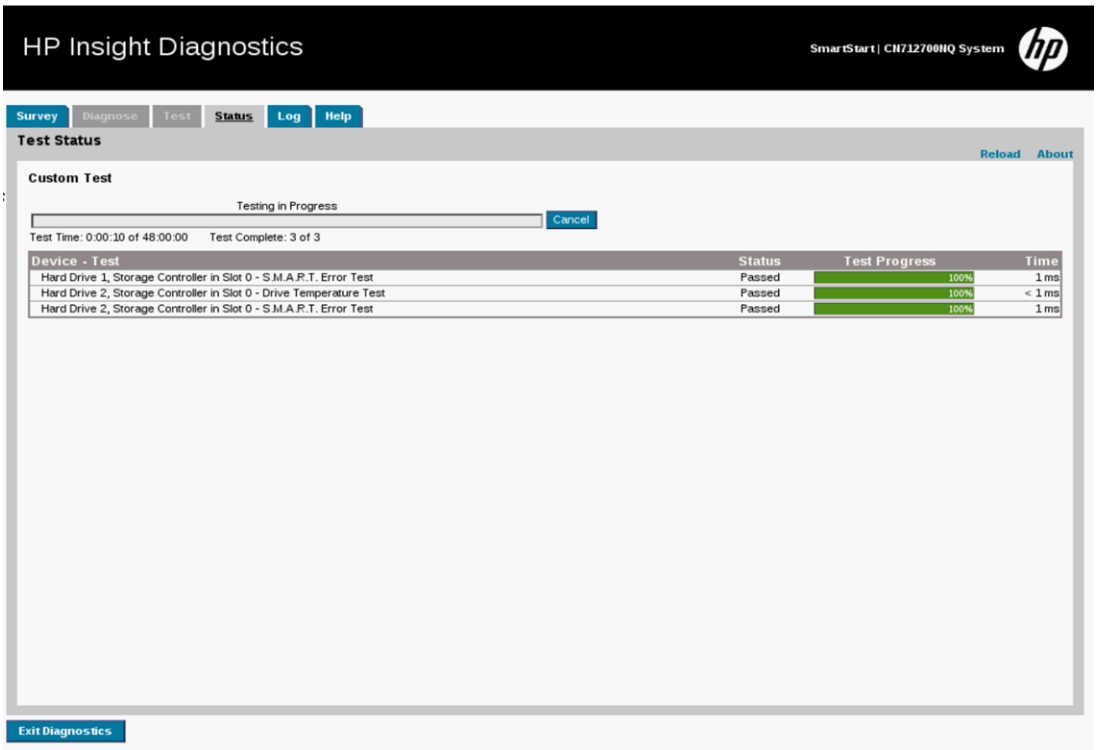
- **Device** displays the specific device being tested.
- **Test** displays the specific test running.
- **Status** displays the test results as follows:
  - **Canceled**: The test did not complete or was canceled.
  - **Passed**: The test passed, and the device is operating within specifications.
  - **Failed**: The device failed the test, or the test itself failed. A failure indicates that additional testing should be performed on the device.
  - **Further Troubleshooting Required**: A communication problem exists that could be related to the health of the device. Perform additional troubleshooting procedures to determine the problem or use the Custom test option on the Test tab to retest the device.
  - **Abnormal termination**: The test terminated abnormally.
- **Test Progress** displays the progress of the testing.
- **Time** displays the time elapsed for the specific test.

To cancel the test in progress, click **Cancel**.

To repeat the testing, click **Retest**.

To view all test failure information, view the Error Log on the Log tab.

Figure 13 Custom test results



The Log tab

The Log tab includes four logs containing historical testing and diagnosis information:

- Diagnosis Log displays the following details on the tested devices after Diagnose completes.
  - The pass/fail status
  - The list of devices diagnosed
  - The number of times Diagnose ran
  - The number of times the test failed
  - The number of times the test passed
  - The time it took to run Diagnose on each device during the last execution
- **Test Log** (available only in HP Insight Diagnostics Offline Edition) displays detailed offline test details.
- **Error Log** displays the tests that have failed during the diagnostic testing.
- **Integrated Management Log** displays POST errors and diagnostic errors. The IML records system events, critical errors, power-on messages, memory errors, and any catastrophic hardware or software errors that typically cause a system to fail. The IML enables the manipulation of this data.

Diagnosis Log tab

Detailed results of Diagnose appear in the Diagnosis Log on the Log tab.

The Diagnosis Log displays the following information:

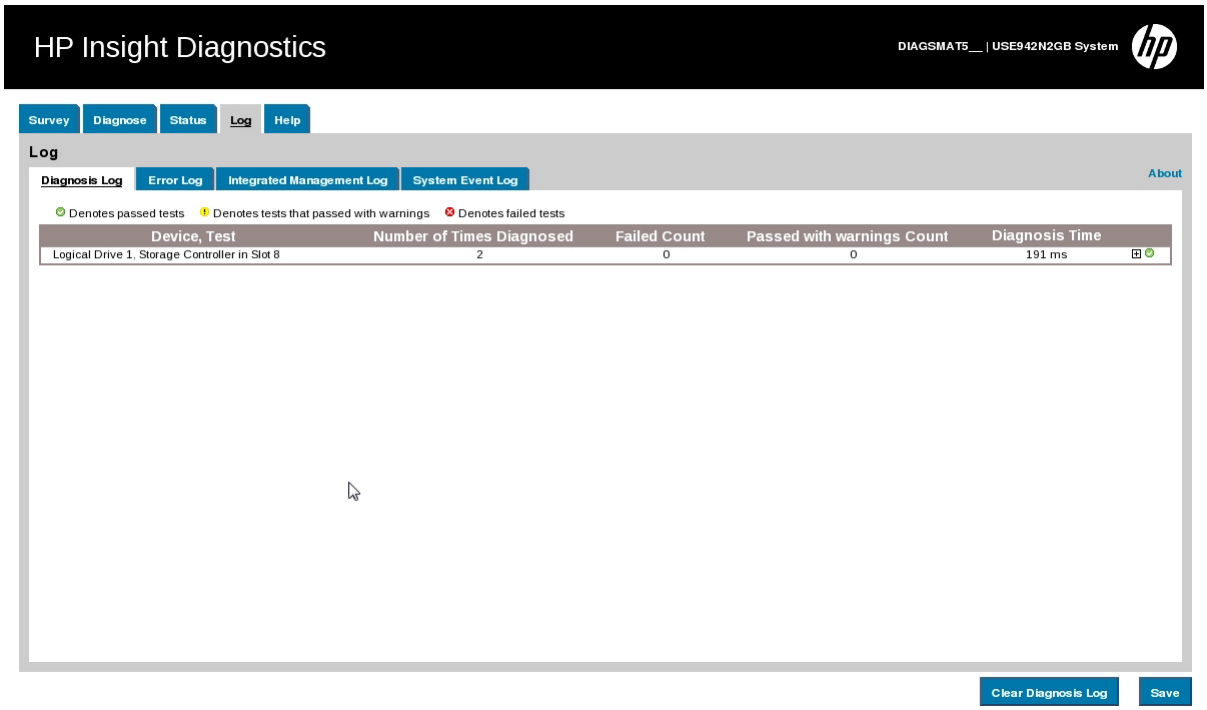
- The status indicator for each power supply or logical volume diagnosed
- The specific power supply or logical volume diagnosed
- The number of times the diagnostic test was run

- The number of times the diagnostic test failed
- The time required to complete the diagnostic test

To clear the contents of the Diagnose Log, click **Clear Diagnosis Log**.

To save the Diagnose Log to an HTML file onto a storage device such as a USB disk or diskette, click **Save**.

Figure 14 Diagnosis Log



Test Log (HP Insight Diagnostics Offline Edition only)

IMPORTANT: This feature is available only in HP Insight Diagnostics Offline Edition.

Detailed test results of offline testing appear in the Test Log on the Log tab.

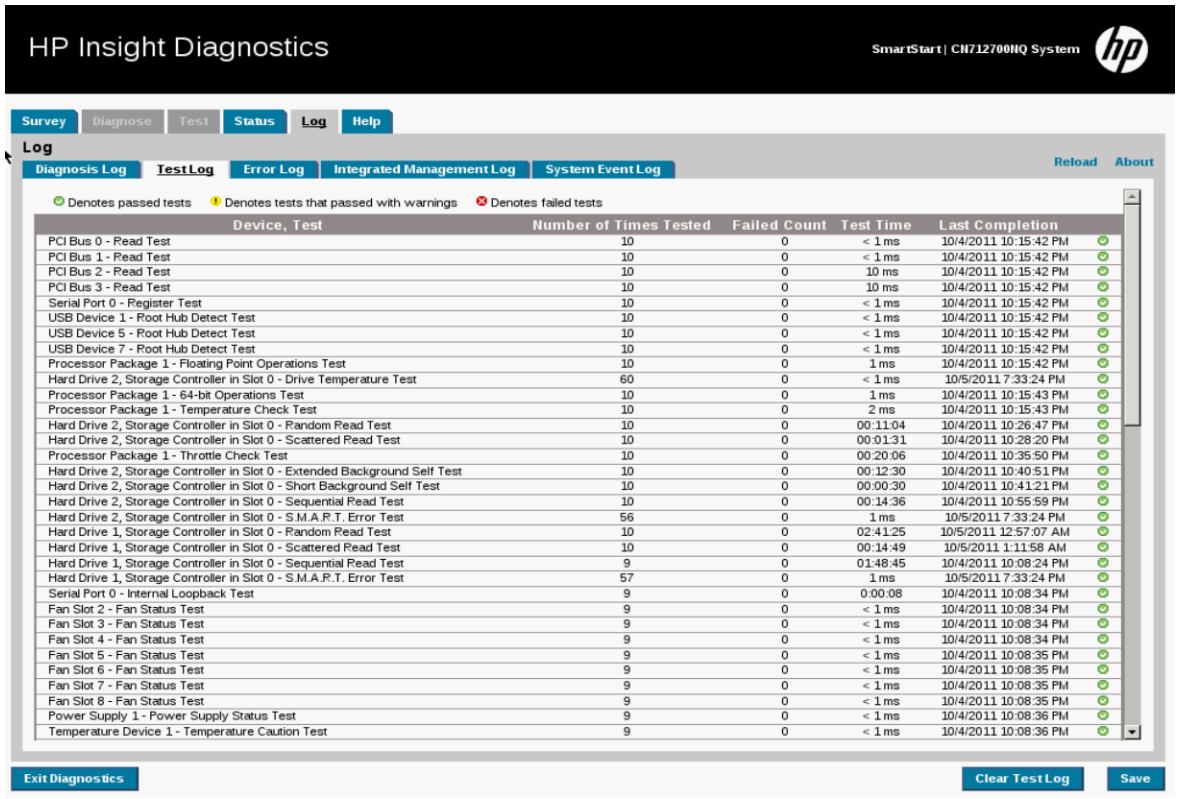
The Test Log displays the following information:

- The status indicator for each test
- The completed tests
- The number of times the test was run
- The number of times the test failed
- The time it took to complete the test
- The date that this same test was last completed

To clear the contents of the Test Log, click **Clear Test Log**.

To save the Test Log to an HTML file onto a storage device such as a USB disk or diskette, click **Save**.

Figure 15 Test Log



Device, Test	Number of Times Tested	Failed Count	Test Time	Last Completion
PCI Bus 0 - Read Test	10	0	< 1 ms	10/4/2011 10:15:42 PM
PCI Bus 1 - Read Test	10	0	< 1 ms	10/4/2011 10:15:42 PM
PCI Bus 2 - Read Test	10	0	10 ms	10/4/2011 10:15:42 PM
PCI Bus 3 - Read Test	10	0	10 ms	10/4/2011 10:15:42 PM
Serial Port 0 - Register Test	10	0	< 1 ms	10/4/2011 10:15:42 PM
USB Device 1 - Root Hub Detect Test	10	0	< 1 ms	10/4/2011 10:15:42 PM
USB Device 5 - Root Hub Detect Test	10	0	< 1 ms	10/4/2011 10:15:42 PM
USB Device 7 - Root Hub Detect Test	10	0	< 1 ms	10/4/2011 10:15:42 PM
Processor Package 1 - Floating Point Operations Test	10	0	1 ms	10/4/2011 10:15:42 PM
Hard Drive 2, Storage Controller in Slot 0 - Drive Temperature Test	60	0	< 1 ms	10/5/2011 7:33:24 PM
Processor Package 1 - 64-bit Operations Test	10	0	1 ms	10/4/2011 10:15:43 PM
Processor Package 1 - Temperature Check Test	10	0	2 ms	10/4/2011 10:15:43 PM
Hard Drive 2, Storage Controller in Slot 0 - Random Read Test	10	0	00:11:04	10/4/2011 10:26:47 PM
Hard Drive 2, Storage Controller in Slot 0 - Scattered Read Test	10	0	00:01:31	10/4/2011 10:28:20 PM
Processor Package 1 - Throttle Check Test	10	0	00:20:06	10/4/2011 10:35:50 PM
Hard Drive 2, Storage Controller in Slot 0 - Extended Background Self Test	10	0	00:12:30	10/4/2011 10:40:51 PM
Hard Drive 2, Storage Controller in Slot 0 - Short Background Self Test	10	0	00:00:30	10/4/2011 10:41:21 PM
Hard Drive 2, Storage Controller in Slot 0 - Sequential Read Test	10	0	00:14:36	10/4/2011 10:55:59 PM
Hard Drive 2, Storage Controller in Slot 0 - S.M.A.R.T. Error Test	56	0	1 ms	10/5/2011 7:33:24 PM
Hard Drive 1, Storage Controller in Slot 0 - Random Read Test	10	0	02:41:25	10/5/2011 12:57:07 AM
Hard Drive 1, Storage Controller in Slot 0 - Scattered Read Test	10	0	00:14:49	10/5/2011 1:11:58 AM
Hard Drive 1, Storage Controller in Slot 0 - Sequential Read Test	9	0	01:48:45	10/4/2011 10:08:24 PM
Hard Drive 1, Storage Controller in Slot 0 - S.M.A.R.T. Error Test	57	0	1 ms	10/5/2011 7:33:24 PM
Serial Port 0 - Internal Loopback Test	9	0	0:00:08	10/4/2011 10:08:34 PM
Fan Slot 2 - Fan Status Test	9	0	< 1 ms	10/4/2011 10:08:34 PM
Fan Slot 3 - Fan Status Test	9	0	< 1 ms	10/4/2011 10:08:34 PM
Fan Slot 4 - Fan Status Test	9	0	< 1 ms	10/4/2011 10:08:34 PM
Fan Slot 5 - Fan Status Test	9	0	< 1 ms	10/4/2011 10:08:35 PM
Fan Slot 6 - Fan Status Test	9	0	< 1 ms	10/4/2011 10:08:35 PM
Fan Slot 7 - Fan Status Test	9	0	< 1 ms	10/4/2011 10:08:35 PM
Fan Slot 8 - Fan Status Test	9	0	< 1 ms	10/4/2011 10:08:35 PM
Power Supply 1 - Power Supply Status Test	9	0	< 1 ms	10/4/2011 10:08:36 PM
Temperature Device 1 - Temperature Caution Test	9	0	< 1 ms	10/4/2011 10:08:36 PM

Error Log tab

The Error Log tab displays the following diagnostic information for failed devices:

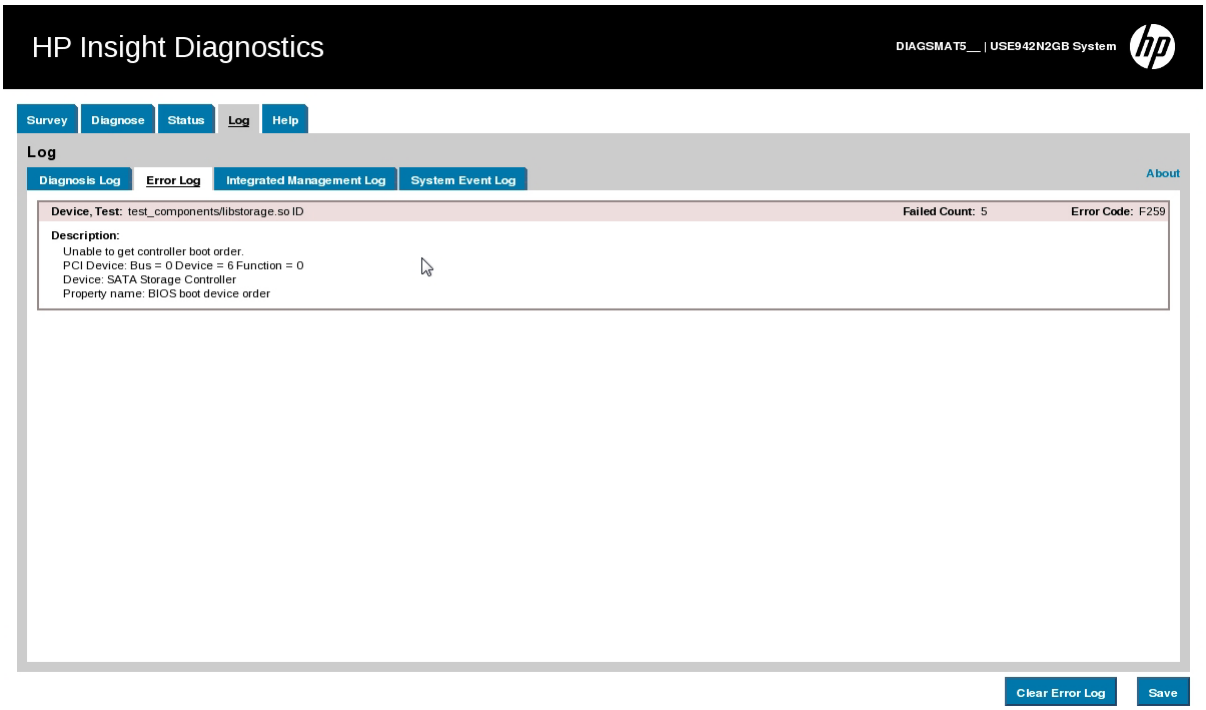
- The device and test that failed
- A description of and details about the error
- The recommended repair action for the failed hardware issue
- The failed count, the number of times the test has failed

To remove the Error Log entries, click **Clear Error Log**.

To save the Error Log to an HTML file onto a storage device such as a USB disk or diskette, click **Save**.

To find detailed information about specific error codes, see (page 31).

Figure 16 Error Log



Integrated Management Log tab

The Integrated Management Log (IML) tab contains system errors discovered during POST and by the System Management driver during normal operations. IML entries are dated and have severity levels and error counts that can be used to help isolate a problem. The Integrated Management Log on the Log tab displays the current entries in the IML.

Each IML entry displays the following information about a failed device

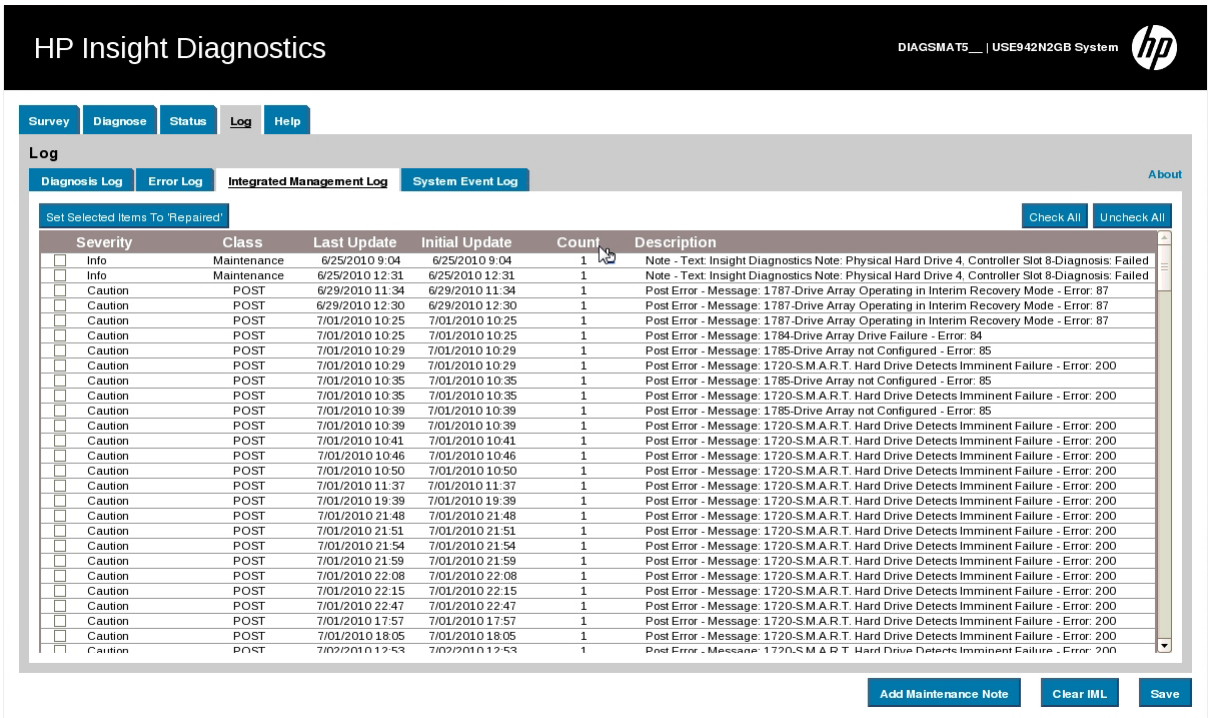
- One of the following severity levels:
  - **Information** indiciates general information about a system event
  - **Repaired** indicates this entry has been repaired
  - **Caution** indicates a non-fatal error condition has occurred
  - **Critical/Failed** indicates a device failure
- Class
- Last Update
- Initial Update
- Count
- Description

From this tab, the following actions are available:

- To change the severity level to **Repaired**, click **Set Selected Items to Repaired**.
- To select all IML entries, click **Check All**.
- To deselect any selected IML entries, click **Uncheck All**.
- To enter any text or note into the IML, click **Add Maintenance Note**.

- To remove all IML entries, click **Clear IML**. HP recommends saving the current contents in a file before clearing the log.
- To save the IML Log to an HTML file onto a storage device such as a USB disk or diskette, click **Save**. This operation does not affect the current contents of the IML, but it does archive IML data for use when working with HP to diagnose issues.

Figure 17 Integrated Management Log



System Event Log tab

The System Event Log (SEL) records events relating to system sensors. A System Event Log entry displays the following information:

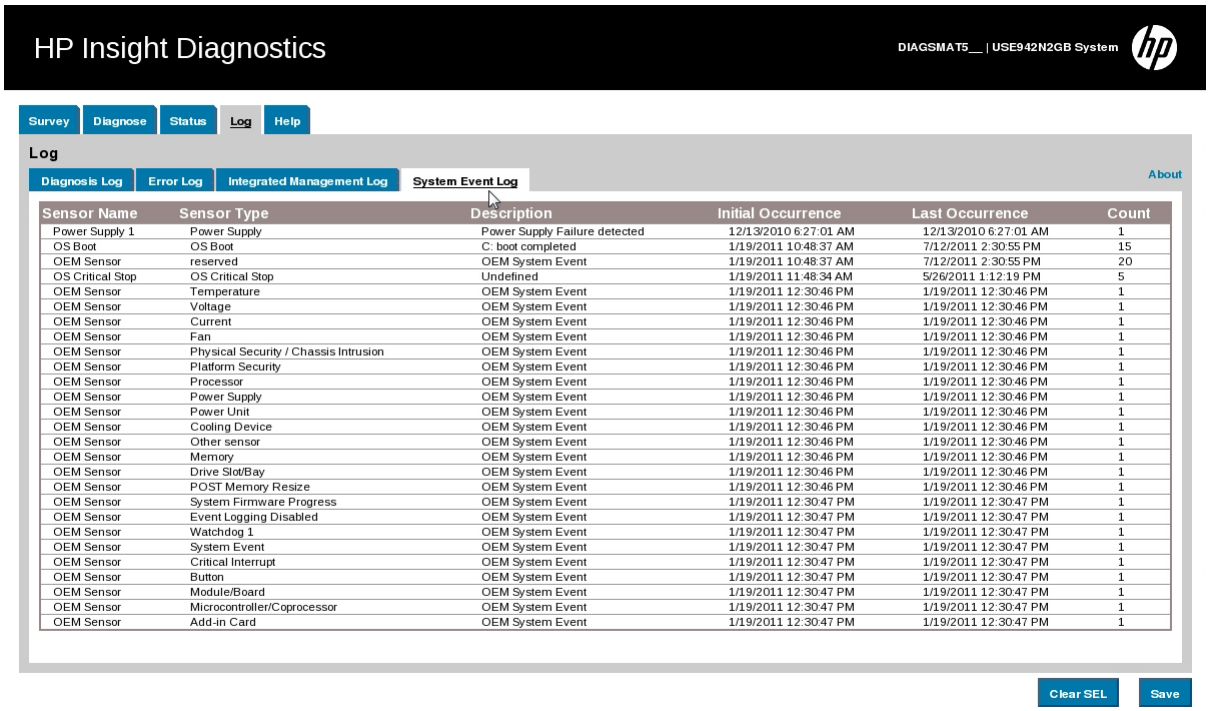
- **Sensor Name**—The name of the sensor.
- **Sensor Type**—The type of the sensor.
- **Description**—The description of the event.
- **Initial Occurrence**—The date and time that the event was initially added to the SEL.
- **Last Occurrence**—The date and time that the event was last added to the SEL.
- **Count** —The count of the event.

The **Clear SEL** button clears the contents of the Error Log.

The **Save** button allows the user to save the SEL file in HTML format.

NOTE: HP Insight Diagnostics only reports the SEL when the corresponding IPMI driver is loaded for the online environment.

Figure 18 System Event Log



Sensor Name	Sensor Type	Description	Initial Occurrence	Last Occurrence	Count
Power Supply 1	Power Supply	Power Supply Failure detected	12/13/2010 6:27:01 AM	12/13/2010 6:27:01 AM	1
OS Boot	OS Boot	C: boot completed	1/19/2011 10:48:37 AM	7/12/2011 2:30:55 PM	15
OEM Sensor	reserved	OEM System Event	1/19/2011 10:48:37 AM	7/12/2011 2:30:55 PM	20
OS Critical Stop	OS Critical Stop	Undefined	1/19/2011 11:48:34 AM	5/26/2011 1:12:19 PM	5
OEM Sensor	Temperature	OEM System Event	1/19/2011 12:30:46 PM	1/19/2011 12:30:46 PM	1
OEM Sensor	Voltage	OEM System Event	1/19/2011 12:30:46 PM	1/19/2011 12:30:46 PM	1
OEM Sensor	Current	OEM System Event	1/19/2011 12:30:46 PM	1/19/2011 12:30:46 PM	1
OEM Sensor	Fan	OEM System Event	1/19/2011 12:30:46 PM	1/19/2011 12:30:46 PM	1
OEM Sensor	Physical Security / Chassis Intrusion	OEM System Event	1/19/2011 12:30:46 PM	1/19/2011 12:30:46 PM	1
OEM Sensor	Platform Security	OEM System Event	1/19/2011 12:30:46 PM	1/19/2011 12:30:46 PM	1
OEM Sensor	Processor	OEM System Event	1/19/2011 12:30:46 PM	1/19/2011 12:30:46 PM	1
OEM Sensor	Power Supply	OEM System Event	1/19/2011 12:30:46 PM	1/19/2011 12:30:46 PM	1
OEM Sensor	Power Unit	OEM System Event	1/19/2011 12:30:46 PM	1/19/2011 12:30:46 PM	1
OEM Sensor	Cooling Device	OEM System Event	1/19/2011 12:30:46 PM	1/19/2011 12:30:46 PM	1
OEM Sensor	Other sensor	OEM System Event	1/19/2011 12:30:46 PM	1/19/2011 12:30:46 PM	1
OEM Sensor	Memory	OEM System Event	1/19/2011 12:30:46 PM	1/19/2011 12:30:46 PM	1
OEM Sensor	Drive Slot/Bay	OEM System Event	1/19/2011 12:30:46 PM	1/19/2011 12:30:46 PM	1
OEM Sensor	POST Memory Resize	OEM System Event	1/19/2011 12:30:46 PM	1/19/2011 12:30:46 PM	1
OEM Sensor	System Firmware Progress	OEM System Event	1/19/2011 12:30:47 PM	1/19/2011 12:30:47 PM	1
OEM Sensor	Event Logging Disabled	OEM System Event	1/19/2011 12:30:47 PM	1/19/2011 12:30:47 PM	1
OEM Sensor	Watchdog 1	OEM System Event	1/19/2011 12:30:47 PM	1/19/2011 12:30:47 PM	1
OEM Sensor	System Event	OEM System Event	1/19/2011 12:30:47 PM	1/19/2011 12:30:47 PM	1
OEM Sensor	Critical Interrupt	OEM System Event	1/19/2011 12:30:47 PM	1/19/2011 12:30:47 PM	1
OEM Sensor	Button	OEM System Event	1/19/2011 12:30:47 PM	1/19/2011 12:30:47 PM	1
OEM Sensor	Module/Board	OEM System Event	1/19/2011 12:30:47 PM	1/19/2011 12:30:47 PM	1
OEM Sensor	Microcontroller/Coprocessor	OEM System Event	1/19/2011 12:30:47 PM	1/19/2011 12:30:47 PM	1
OEM Sensor	Add-in Card	OEM System Event	1/19/2011 12:30:47 PM	1/19/2011 12:30:47 PM	1

Help tab

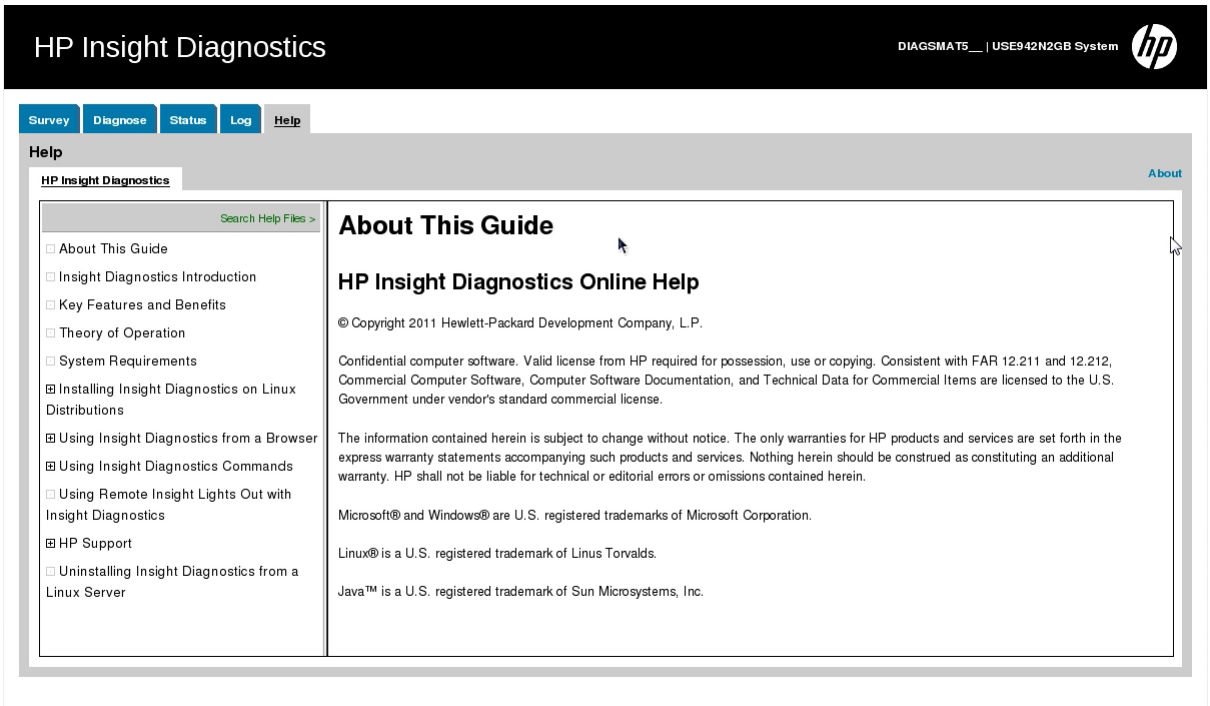
The Help tab provides information on using HP Insight Diagnostics, such as the tab interface, overview categories, test mode descriptions, device test descriptions, error codes and descriptions, logging capabilities, and failure information.

About HP Insight Diagnostics

The HP Insight Diagnostics tab provides the details of the Insight Diagnostics software and searchable help information about operating Insight Diagnostics.

To search the help files, click **Search Help Files**.

Figure 19 HP Insight Diagnostics Help tab



Error codes

IMPORTANT: This feature is available only in HP Insight Diagnostics Offline Edition.

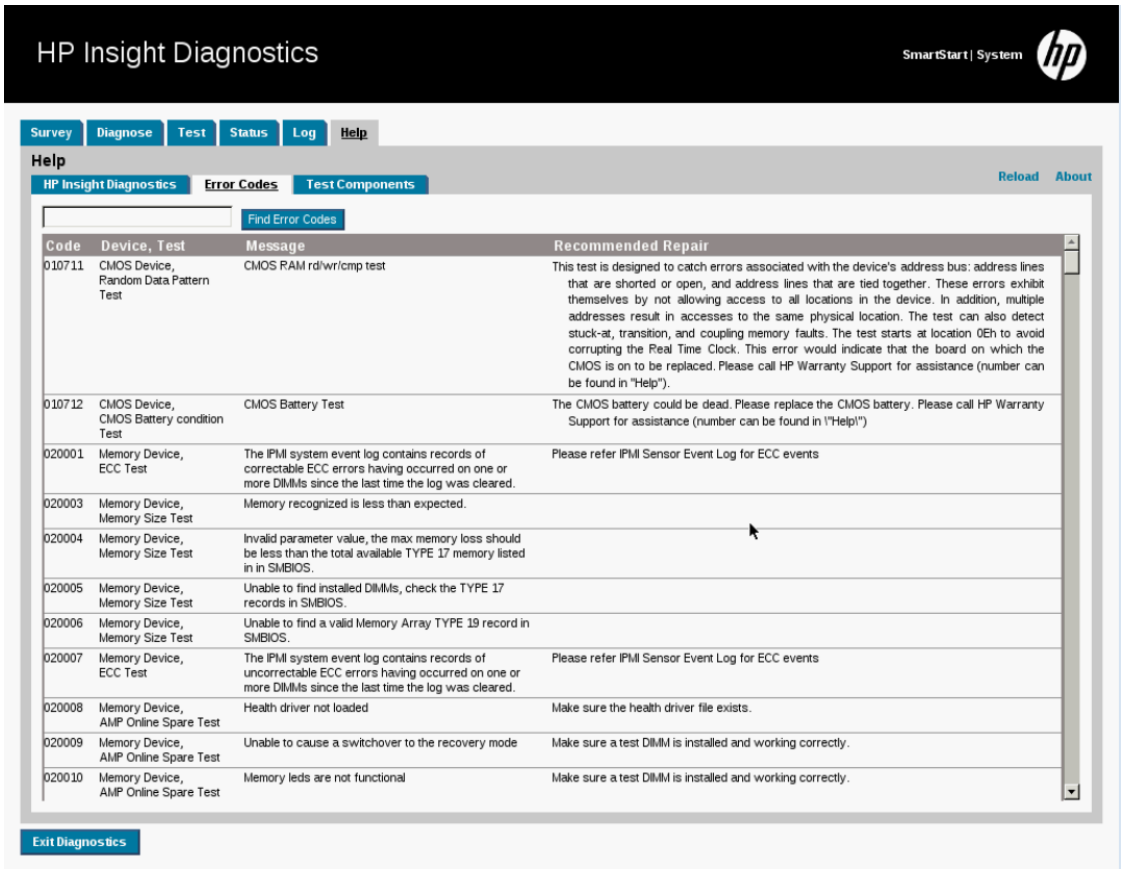
The Error Codes tab describes each numerical error code and the recommended actions for each error.

To find a specific error code description:

1. Enter the error code into the text box.
2. Click **Find Error Codes**.

To find general error code information, use the scroll bar to browse the list of the Insight Diagnostics error codes and a description of each.

Figure 20 Find Error Codes

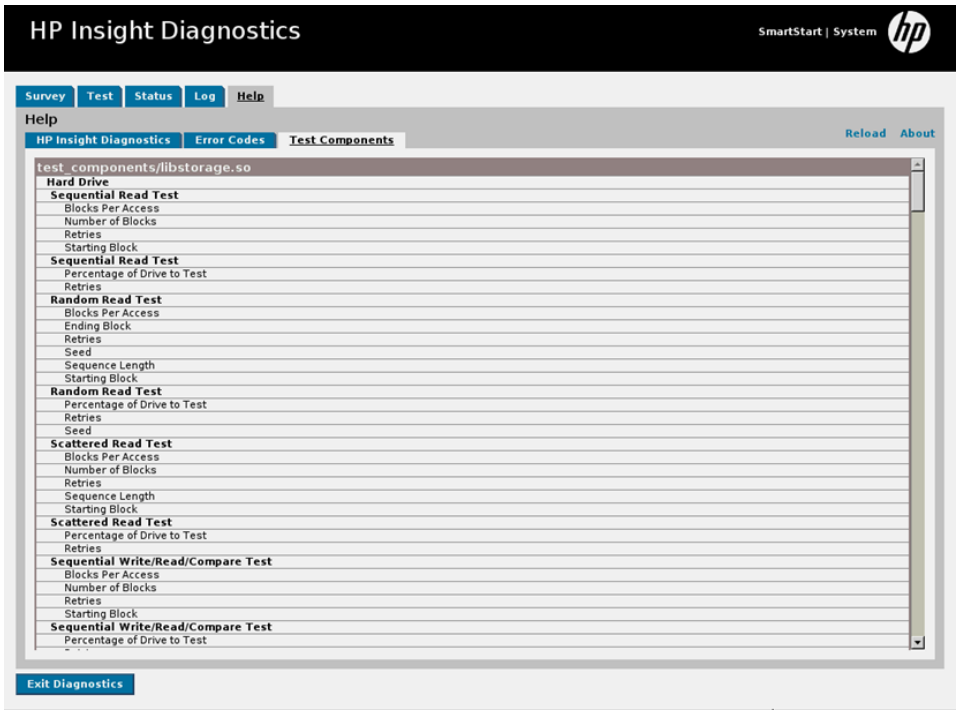


Test components

IMPORTANT: This feature is available only in HP Insight Diagnostics Offline Edition.

The Test Components tab provides a detailed description of the test that was run.

Figure 21 Test Components



Saving and printing information in HP Insight Diagnostics

You can save the information displayed in the HP Insight Diagnostics Survey and Log tabs to a diskette or a USB HP Drive Key. You cannot save to the hard drive if you are using HP Insight Diagnostics Offline Edition. The system automatically creates an HTML file that has the same appearance as the information displayed on the screen.

To save and print:

1. Insert a diskette or USB HP Drive Key:
   - If you insert an HP Drive Key, click **Reload** for the system to recognize the new device.
   - If you inserted an HP Drive Key before booting to the CD, you do not need to click **Refresh**.
2. Click **Save**.
3. Select **Save to the floppy** or **Save to USB key**. For supported USB devices, see the system documentation.
4. Enter a file name in the File Name field, and then click **Save**. An HTML file is saved to the diskette or USB HP Drive Key.
5. Print the information from the storage device, when using Offline Edition.

Exiting HP Insight Diagnostics

To exit HP Insight Diagnostics Online Edition, close the browser window. Click **Exit Diagnostics**.

To exit HP Insight Diagnostics Offline Edition:

1. Click **Exit Diagnostics**.
2. Remove the CD from the optical drive.

Uninstalling HP Insight Diagnostics Online Edition

Uninstalling HP Insight Diagnostics on a Windows server

1. Go to **Add/Remove Programs**, and then select **HP Insight Diagnostics Online Edition for Windows**.
2. Click **Uninstall**. HP Insight Diagnostics program files and Insight Diagnostics registry data are deleted.
3. Manually remove the `\hp\hpdiags` directory and any of the following files that remain on the computer:
   - Survey session files
   - Test log files
   - Error log files

Uninstalling HP Insight Diagnostics on a Linux server

1. Enter the following RPM command:

   ```
   rpm -e hpdiags
   ```

2. Manually remove the `\hp\hpdiags` directory and any of the following files that remain on the computer:
   - Survey session files
   - Test log files
   - Error log files

4 Troubleshooting

Troubleshooting memory

The memory test component can perform the following tests:

- **Address test**–This test verifies the integrity of the address buses connecting the processors to the memory modules. Verification is done by writing data to all possible addresses that have only 1 bit either set (1) or reset (0), having alternate bits set, having all bits high, and having all bits low. The purpose of this test is to check for address lines that are either shorted to ground, shorted to a highvoltage signal, shorted to other address lines, or floating (disconnected). This test alone might not indicate a hard failure.
- **Walk test**–This test verifies the integrity of the data buses connecting the processors to the memory modules. Verification is done by writing data to all possible addresses that have only 1 bit either set (1) or reset (0), having alternate bits set, having all bits high, and having all bits low. The purpose of this test is to check for data lines that are either shorted to ground, shorted to a high-voltage signal, shorted to other address lines, or floating (disconnected). This test alone might not indicate a hard failure.
- **Noise test**–This test verifies memory integrity by writing the inverse of the current test address to the current test address. The current test address alternates between the start and the end of the current test block, incrementing or decrementing the address until the entire block has been accessed. The purpose of this test is to check for address and data bus transition problems when these lines are forced high and low as rapidly as possible. A failure of this test indicates a failure of the DIMM.
- **March test**–This test is similar to a true walk bit test and is able to detect the following: address faults, stuck-at faults, transition faults, coupling faults, and linked coupling faults. These types of faults occur when memory cells within a bit cell array affect the operation of nearby memory cells. In many cases, static type tests do not detect these failures. A failure of this test indicates a failure of the DIMM.
- **Random address test**–This test verifies memory integrity by running a random pattern across a given test range. The addresses used to store the patterns are selected randomly and normalized to fit within the current test block. The purpose of this test is to detect intermittent memory problems that can be caused by temperature, variable clock speeds, variable voltages, signal timing, manufacturing faults, variable refresh rates, and decay. This test is also useful in detecting memory faults that might not be detected by other static tests. A failure of this test indicates a failure of the DIMM.

Not all the memory in a system can be tested because of the operating system and applications that are installed. As a best practice, use the default setting for each test. The default settings help ensure the maximum amount of memory that is available is tested.

To test memory thoroughly, run as many loops as possible in the time allowed. If time is critical, and all memory tests cannot be run, then HP recommends running the Random Address test and the Noise test. These two tests can catch the most errors.

Troubleshooting disk drives and storage systems

To further troubleshoot a disk drive, or if you continue experiencing storage-related issues after running Diagnose, perform the following tasks:

- Search for known storage-related issues on the HP website at http://www.hp.com. To search for customer advisories related to ProLiant servers configured with Smart Array controllers, use the following search string: +ProLiant +Advisory +"Smart Array".
- Update the controller driver and firmware revision and any drive-related software components such as firmware updates, management agents, and storage utilities.

- Re-seat physical drives and controllers.
- Check drive cables and connectors for any signs of damage or bent pins.

IMPORTANT: To minimize downtime, HP recommends that steps involving the reseating of drives and controllers be performed simultaneously. Perform steps involving multiple drive reseating, controller reseating, and cable inspection with the server powered off.

TIP: When powering down a system using external storage, power down the server before powering down the external storage. When powering up the system, power on the external storage before powering on the server. This action prevents the possibility of drives being failed erroneously by the controller.

A server power failure before the test, can also cause erroneous failures.

For more troubleshooting procedures, see the *HP ProLiant Servers Troubleshooting Guide* located on the HP website at http://www.hp.com.

To troubleshoot the backplane, controller, and cables, do the following:

- Check drive cables for any signs of damage or bent pins. Try another drive cable from another server, if possible.
- If you are able to identify a bad bay, replace the hard drive backplane.

  If the backplane and drive cables have already been replaced, the problem may be a bad controller.
- Determine if the controller is good by moving it to another server. Boot the server, and watch for any POST errors. If the controller has already been replaced, the problem is likely to be a bad backplane or cable.

Support and other resources

Information to collect before contacting HP

Be sure to have the following information available before you contact HP:

- Software product name
- Hardware product model number
- Operating system type and version
- Applicable error message
- Third-party hardware and software
- Technical support registration number (if applicable)

How to contact HP

Use the following methods to contact HP technical support:

- In the United States, see the Customer Service / Contact HP United States website for contact options:

  http://welcome.hp.com/country/us/en/contact_us.html

- In the United States, call 1-800-HP-INVENT (1-800-474-6836) to contact HP by telephone. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, conversations might be recorded or monitored.
- In other locations, see the Contact HP Worldwide website for contact options:

  http://welcome.hp.com/country/us/en/wwcontact.html

Registering for software technical support and update service

HP Insight Management includes one year of 24 x 7 HP Software Technical Support and Update Service. This service provides access to HP technical resources for assistance in resolving software implementation or operations problems.

The service also provides access to software updates and reference manuals in electronic form as they are made available from HP. Customers who purchase an electronic license are eligible for electronic updates only.

With this service, Insight Management customers benefit from expedited problem resolution as well as proactive notification and delivery of software updates. For more information about this service, see the following website:

http://www.hp.com/services/insight

Registration for this service takes place following online redemption of the license certificate.

How to use your software technical support and update service

After you have registered, you will receive a service contract in the mail containing the Customer Service phone number and your Service Agreement Identifier (SAID). You need your SAID when you contact technical support. Using your SAID, you can also go to the Software Update Manager (SUM) web page at to view your contract online.

Warranty information

HP will replace defective media for a period of 90 days from the date of purchase. This warranty applies to all Insight Management products.

HP authorized resellers

For the name of the nearest HP authorized reseller, see the following sources:

- In the United States, see the HP U.S. service location website:
  http://www.hp.com/service_locator
- In other locations, see the Contact HP worldwide website:
  http://welcome.hp.com/country/us/en/wwcontact.html

Documentation feedback

HP welcomes your feedback. To make comments and suggestions about product documentation, send a message to:

mailto:docsfeedback@hp.com

Include the document title and manufacturing part number in your message. All submissions become the property of HP.

New and changed information in this edition

- A new tab **System Event Log** tab introduced under the **Log** tab which provides information of all the system sensors.
- Support for the new HP ProLiant Gen8 servers.
- The on-board Intelligent Provisioning software embedded on the servers replaces the previously available SmartStart CD, Insight Diagnostics offline edition can be run directly from the ProLiant servers.
- An option to save the Survey Configuration file either in the Current View or the Entire Survey is provided.

Related information

HP ProLiant Servers:

- BL BladeSystem servers:
  http://www.hp.com/go/blades
- DL series servers:
  http://www.hp.com/servers/dl
- ML series servers:
  http://www.hp.com/servers/ml

Related documentation

The following documents [and websites] provide related information:

- *HP ProLiant Support Pack and Deployment Utilities User Guide*
- *HP ProLiant Servers Troubleshooting Guide*

You can find these documents from the Manuals page of the HP Business Support Center website:

http://www.hp.com/support/manuals

In the server section, click **link label** and then select your product.

HP websites

For additional information, see the following HP websites:

- http://www.hp.com
- http://www.hp.com/service_locator
- http://www.hp.com/support/manuals

HP Support Center

The HP Support Center contains software and drivers, user guides, part information, technical forums, and information on training and education. For more information, see http://www.hp.com/go/hpsc.

Support and drivers

For support software, driver updates, ROM updates, product bulletins, warranty information, manuals, and email-based support, see http://www.hp.com/go/support.

Typographic conventions

This document uses the following typographical conventions:

Book title	The title of a book. On the web, this can be a hyperlink to the book itself.
`Command`	A command name or command phrase, for example `ls -a`.
`Computer output`	Information displayed by the computer.
Ctrl+x or **Ctrl-x**	A key sequence that indicates you must hold down the keyboard key labeled **Ctrl** while you press the letter `x`.
`ENVIRONMENT VARIABLE`	The name of an environment variable, for example, `PATH`.
Key	The name of a keyboard key. **Return** and **Enter** both see the same key.
Term	A term or phrase that is defined in the body text of the document, not in a glossary.
`User input`	Indicates commands and text that you type exactly as shown.
`Replaceable`	The name of a placeholder that you replace with an actual value.
[ ]	In command syntax statements, these characters enclose optional content.
{ }	In command syntax statements, these characters enclose required content.
|	The character that separates items in a linear list of choices.
...	Indicates that the preceding element can be repeated one or more times.
WARNING	An alert that calls attention to important information that, if not understood or followed, results in personal injury.
CAUTION	An alert that calls attention to important information that, if not understood or followed, results in data loss, data corruption, or damage to hardware or software.
IMPORTANT	An alert that calls attention to essential information.
NOTE	An alert that contains additional or supplementary information.
TIP	An alert that provides helpful information.

A Acronyms and abbreviations

BIOS	Basic Input/Output System
CMOS	Complementary Metal-Oxide Semiconductor
COM	Serial port interface
CSR	Customer Self Repair
CSS	Cascading Style Sheets
HTML	HyperText Markup Language
iLO	Integrated Lights-Out
IML	Integrated Management Log
IRQ	Interrupt ReQuest
LED	Light-Emitting Diode
LPT	Line Print Terminal
LSP	Linux Support Pack
OS	Operating System
PCI	Peripheral Component Interconnect
POST	Power-On Self Test
PSP	ProLiant Support Pack
ROM	Read-Only Memory
RPM	Red Hat Package Manager
SAS	Serial Attached SCSI
SATA	Serial ATA
SCSI	Small Computer System Interface
TCP/IP	Transmission Control Protocol/Internet Protocol
TPM	Trusted Platform Module
USB	Universal Serial Bus
XML	EXtensible Markup Language

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