Oracle Hardware Certification Test Suite 5.2

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Contents

Preface

Oracle Hardware Certification Test Suite (Oracle HCTS) is an application that can be downloaded freely from the Oracle HCTS web site to certify your system for the Oracle Solaris Operating System (OS) compatibility. To use Oracle HCTS, your system should be installed with the Oracle Solaris OS and must be ready for use.

This book describes how to certify that your system hardware is compatible with the Oracle Solaris OS by using the Oracle HCTS application.

Who Should Use This Book

The *Oracle Hardware Certification Test Suite 5.2 User Guide* is for the independent hardware vendors (IHVs), system manufacturers, system integrators, system administrators, and end users who want to perform the following operations with their system devices:

- Certify system hardware as Oracle Solaris platform compatible.
- Certify network-related components such as Ethernet NIC and WiFi card.
- Certify serial I/O devices.
- Certify storage devices such as SATA, SAS, SCSI, Fiber Channel, iSCSI, and FCoE card.
- Certify the InfiniBand Host Channel Adapter (HCA).
- Certify audio and video devices.
- Certify the CD/DVD reader and writer.
- Certify USB devices such as the USB CD/DVD reader and writer, USB keyboard, USB web cam, USB hard disk, solid-state storage device, and multimedia card reader.
- Test CPU, memory, Suspend/Resume, Network performance feature, Storage performance feature and USB audio device.
- Certify systems and components for the Oracle Solaris 11 OS.
- Certify virtual platforms.
- Certify tape drive devices.

The guide assumes that developers have sufficient knowledge about the Oracle Solaris OS.

Before You Read This Book

Before reading this book, you must be familiar with the following documents to get the release information of the Oracle Hardware Certification Test Suite (Oracle HCTS) application that you have downloaded.

- Oracle HCTS 5.2 README
- Oracle HCTS 5.2 Release Notes

If the Oracle Solaris operating environment is not installed on your system, see the installation manual specific to your system before you read this book.

How This Book Is Organized

Here is a list of topics that are covered by the Oracle HCTS User Guide.

- Chapter 1, "Getting Started With Oracle HCTS," describes the general overview of the Oracle HCTS application and its benefits. It also explains how to configure test machines to create the Oracle HCTS environment.
- Chapter 2, "System Requirements," describes requirements for installing and running Oracle HCTS and certifying the devices and systems for the Oracle Solaris OS compatibility based on the type of certification. It also includes the individual description of the certification type and the hardware and software requirements for the corresponding certification type.
- Chapter 3, "Installing Oracle HCTS," discusses the procedure for installing Oracle HCTS and the other necessary configurations. It also includes the procedure to uninstall Oracle HCTS after the testing is complete.
- Chapter 4, "Working With Oracle HCTS," provides information about accessing Oracle HCTS in the GUI mode and the CLI mode.
- Chapter 5, "WiFi Test Environment Setup," describes the software requirements and environment setup procedure for WiFi certification.
- Chapter 6, "Certifying the Virtual Platform," describes the software requirements and the environment setup procedure for virtual platform certification.
- Chapter 7, "Manual Tests," explains mandatory manual tests that are a part of certification tests. Although these manual tests are not included in an automated Oracle HCTS program, you must carry them out to certify your system component. Report test results to HCL auditing team, if necessary.
- Appendix A, "Tools in `/opt/SUNWhcts/bin`," provides a quick reference to the tools that exist in the `/opt/SUNWhcts/bin` directory.
- Appendix B, "Suspend/Resume Checklist," provides a checklist for user to record the Oracle HCTS Suspend/Resume test results.

Related Documentation

Refer to the online help if you are using the graphical user interface (GUI) of Oracle HCTS for certification.

Refer to the man pages for the commands `hctscli` and `hctsclid` if you want to use the command line interface (CLI) of Oracle HCTS.

Typographic Conventions

The following table describes the typographic conventions that are used in this book.

TABLE P–1 Typographic Conventions

Typeface	Meaning	Example
`AaBbCc123`	The names of commands, files, and directories, and onscreen computer output	Edit your `.login` file. Use `ls -a` to list all files. `machine_name% you have mail.`
`AaBbCc123`	What you type, contrasted with onscreen computer output	`machine_name%` **`su`** `Password:`
aabbcc123	Placeholder: replace with a real name or value	The command to remove a file is `rm` *filename*.
AaBbCc123	Book titles, new terms, and terms to be emphasized	Read Chapter 6 in the *User's Guide*. A *cache* is a copy that is stored locally. Do *not* save the file. **Note:** Some emphasized items appear bold online.

Shell Prompts in Command Examples

The following table shows the default UNIX system prompt and superuser prompt for shells that are included in the Oracle Solaris OS. Note that the default system prompt that is displayed in command examples varies, depending on the Oracle Solaris release.

TABLE P–2 Shell Prompts

Shell	Prompt
Bash shell, Korn shell, and Bourne shell	`$`
Bash shell, Korn shell, and Bourne shell for superuser	`#`
C shell	`machine_name%`
C shell for superuser	`machine_name#`

◆ ◆ ◆ CHAPTER 1

Getting Started With Oracle HCTS

Oracle Hardware Certification Test Suite (Oracle HCTS) is an application that includes several tests for the Oracle Solaris Operating System (OS) Hardware Certification Program. Oracle HCTS enables you to certify your systems, components, and virtual platforms for the Oracle Solaris OS x86, x64, and SPARC platforms. This tool is useful for independent hardware vendors (IHVs), system manufacturers, and system integrators.

Be sure to download the most updated version of Oracle HCTS. Check the Oracle HCTS web site frequently to see whether a newer version is available. Before installing Oracle HCTS, back up your test systems and install the most updated version of the Oracle Solaris OS x86 and SPARC platforms. See the Oracle Solaris web site to check for a newer version of the Oracle Solaris OS.

This chapter contains the following information:

Benefits of Oracle HCTS

By participating in the Oracle Solaris OS Hardware Certification Program and successfully completing the test by using Oracle HCTS, system vendors, original equipment manufacturers (OEMs), and IHVs have the following benefits:

- Systems and components are listed in the Oracle Solaris OS Hardware Compatibility List (HCL).
- Customers get a choice of platforms for the hardware components that they purchase. The device drivers and the certified components that they support gain increased exposure to customers whose purchasing policy requires them to select certified peripherals.
- Compete in new markets and help your products stay competitive in current markets thereby increasing the product sales.

- Establish a link to the HCL entry of the Oracle Solaris system certified product on your product web site. HCL entries can also point to your driver download page.
- The certification process can be completed quickly and is free of charge.

If hardware passes all the tests after running the Oracle HCTS application at the first pass, that hardware is listed under the Certified category of the HCL.

The hardware that fails to clear one or more tests at the first round after running the Oracle HCTS application, is listed under the Reported to Work category of HCL. The hardware under the Reported to Work category can be later updated to the Certified category once the hardware passes all the tests of Oracle HCTS.

Note – Before you use Oracle HCTS, be sure to check whether the system that you want to test is already listed on the Oracle Solaris OS HCL as Certified.

Configuring Test Machines to Run Oracle HCTS

To test systems, InfiniBand, network components, Network performance, WiFi, Suspend/Resume feature, and serial I/O components, you need two test machines with the following details:

- System Under Test (SUT) - System to certify or the system that has the device that you want to certify.
- Test Manager system (TM) - System that is used by the SUT to test system, network, InfiniBand, WiFi, Suspend/Resume feature, network performance feature, and serial I/O devices. The TM should be a system that is already listed on the HCL as Certified.

Storage, Storage performance, CD or DVD reader and writer, video, audio, CPU memory, USB devices, Tape Drive devices, and virtual platforms certifications require only SUT to be configured.

Table 2–1 lists the types of tests and indicates the number of machines required for each test. The entry Required indicates that the particular type of certification requires the respective number of test machines. For example, to do system certification, you might need two test systems.

TABLE 1–1 Machine Requirements

Type of Test	Requires SUT and TM	Requires Only SUT
	The Oracle Solaris 10 OS or the Oracle Solaris 11 and Oracle HCTS must be installed on both SUT and TM.	The Oracle Solaris 10 OS or the Oracle Solaris 11 and Oracle HCTS must be installed only on SUT.

TABLE 1–1 Machine Requirements *(Continued)*

Type of Test	Requires SUT and TM	Requires Only SUT
System Certification	Required	
Network Component Certification ■ 10 GB Ethernet ■ GB Ethernet ■ Fast Ethernet	Required	
Serial I/O Component Certification ■ Serial Asynchronous Interface/PCI (SAI/P)	Required	
Storage Component Certification ■ SATA, SCSI, iSCSI, RAID, Fibre Channel, FCoE, and SAS		Required
CD-ROM or DVD-ROM, CD-RW or DVD-RW, CPU or Memory, Audio, Video, and Component Testing		Required
USB Device Certification ■ Keyboard, CD-DVD ROM, CD-DVD RW, web cam, and storage devices ■ USB Audio device test		Required
WiFi Card Certification	Required	
InfiniBand Component Certification - InfiniBand Host Channel Adapter (HCA)	Required	
Suspend/Resume Test	Required	
Virtual Platform Certification	Required	
Tape Drive Certification		Required
Network Performance Test	Required	
Storage Performance Test		Required

Creating the Oracle HCTS Test Environment

Create the Oracle HCTS environment based on the type of hardware or system that needs to be certified. Based on the method of creating test environment, the hardware or systems can be categorized in the following two groups:

- System, Network, InfiniBand, WiFi, Suspend/Resume feature, Network performance feature, and Serial I/O Testing that requires TM and SUT.
- USB, Storage, Storage performance, CD/DVD, CPU/Memory, Audio, Tape Drive and Video Testing that requires only the SUT.

◆ ◆ ◆ CHAPTER 2

System Requirements

The system requirements for certification by using Oracle HCTS depends on the hardware or the system to be tested. This chapter explains in detail the hardware and software requirements for each type of system and hardware certification.

This chapter contains the following information:

Certifying System, Network, InfiniBand, Suspend/Resume, Network performance and Serial I/O Devices

To certify system, network, InfiniBand, Suspend/Resume, Network performance and serial I/O devices, configure two test machines, TM and SUT. This section explains the hardware and software requirements to certify system, network, InfiniBand, and serial I/O devices.

Hardware Requirements

TM and SUT systems must meet the following hardware requirements:

- Network - Both systems must be nonproductive systems on an isolated network segment. Network certification might generate a flood of traffic on other systems in the network.
- Free space - Each system must have at least (*number-of-network-ports*) x (1.5 GB) free space in the `/export/home` directory.

  Type the following command to verify this requirement:

  ```
  % df -h
  ```

- Serial cable - For serial I/O testing only. A serial cable must connect the serial port of the TM with that of the SUT.
- InfiniBand switch - For InfiniBand testing only. An InfiniBand cable must connect the InfiniBand HCA ports of the TM and SUT systems to the InfiniBand switch.

SUT should satisfy the following hardware requirements:

- Floating point - The SUT must have hardware floating point support. To check whether the SUT processor has floating point support, type `psrinfo -v` in the terminal. If the output sentence contains the phrase: `and has an i387 compatible floating point processor`, the processor has the floating point support.
- Free space - With the free space requirement for both systems, the SUT must have the following free space:
  - Swap space of at least 1/8 the physical memory size (a minimum 512 Mbytes).
  - At least 4 Gbytes of free space in any single Oracle Solaris slice or a non reserved hard disk larger than 16 GBytes.

    Type the following command to check free space:

    ```
    $ df -h
    ```

  A non reserved disk does not contain any slice mounted to the following directories: `/`, `/usr`, `/var`, or `/export/home*`.
- Network - The SUT must have at least one port. Each port on the SUT must be connected to the TM system. For InfiniBand HCA certification, at least one port on the SUT must be connected to the TM system.
- Network Performance - The SUT must have meet the `Uperf` tool requirement.
- At least one USB storage disk, an audio play and record device, and one USB or built-in web camera attached to the SUT machine.

Caution – For system certification, if the SUT contains more than one disk drive, any disk that does not have any slice mounted to`/`, `/usr`, `/var`, or `/export/home*` is formatted. All data on such a disk is lost. During the test initialization process, any disk that is scheduled to be formatted is listed. The initialization process waits for 60 seconds and prompts you to stop the certification if you do not want the disk to be formatted.

TM should satisfy the following hardware requirements:

- Network - The TM system must have one functional network port for each network port on the SUT. The TM system must have at least as many network ports as that of the SUT. Each port on the SUT must be connected to the TM system. The TM system must not have more than five ports than that of the SUT. For InfiniBand HCA certification, at least one port on the SUT must be connected to the TM system.
- Network Performance - The TM system must have meet the `Uperf` tool requirement.

You also require an InfiniBand switch for testing InfiniBand. The Infiniband switch is required to connect the InfiniBand HCA port of the TM to that of the SUT.

Software Requirements

For certifying the system, network, InfiniBand, Suspend/Resume, Network performance and serial I/O devices, configure TM and SUT.

You can choose any of the following configurations:

- The test environment must consist of only one TM system and a SUT in an isolated network segment. Additional systems must be tested separately.
- If your TM system or your SUT matches the following description, you must disable NIS:
  - The Oracle Solaris OS is installed on the machine and you do not reinstall the Oracle Solaris OS before running Oracle HCTS.
  - NIS is set up and enabled on the machine.
  - You disconnect the machine from another network and reconnect it to the isolated network segment of the test environment.

  In the above mentioned conditions, if you do not disable NIS, the system behaves abnormally due to inconsistent network settings.

  Type the following command to disable NIS:

  ```
  /usr/lib/netsvc/yp/ypstop
  ```

  This command disables NIS until the next reboot.

  To permanently disable NIS, type the following command:

  ```
  svcadm disable svc:/network/nis/client:default
  ```
- Ensure that `Xwindows` is running on the SUT.
- If you are certifying either your system, network, Suspend/Resume, Network performance, or serial I/O, ensure that the TM system is correctly connected to the SUT in the following manner:
  - All the ports in the SUT must be correctly connected to the TM system. No port should be left unconnected on the SUT. For the network component certification, all the ports of the network component must be connected to the TM System. For serial I/O certification, at least one port must be connected to the TM System.
  - Connect TM and SUT back-to-back by using a crossover cable or a private switch. Oracle HCTS assigns a particular range of IP addresses to the TM system and a different range of IP addresses to the SUT system. Network devices on the TM system must allow their IP addresses to be temporarily changed to `10.10.n.11/24`, where `n` is 10, 11, 12...

for multiple ports. Network devices on the SUT must allow their IP addresses to be temporarily changed to `10.10.n.10/24`, where `n` is 10, 11, 12... for multiple ports. All the network devices between the TM system and the SUT must allow these IP addresses.

If you have routers, intelligent switches, gateways, or VLAN between the TM system and the SUT, configure them to enable the IP addresses that are specified above.

- For serial I/O certification, set up the serial ports. Ensure that at least one pair of serial ports is connected between the TM system and the SUT.

Note – For the tests that require TM, make sure the following services are available on both SUT and TM.

```
svc:/network/physical:default
svc:/network/shell:default
svc:/network/ftp:default
svc:/network/rpc/spray:default
svc:/network/nfs/client:default
svc:/network/nfs/mapid:default
```

Use `svcs` command to check the service availability, use `pkg` command to install the missing services. For the package names of the missing services, refer to the following mapping table:

svc name	Package name
`svc:/network/physical:default`	`system/network`
`svc:/network/shell:default`	`service/network/legacy-remote-utilities`
`svc:/network/ftp:default`	`service/network/ftp`
`svc:/network/rpc/spray:default`	`service/network/spray`
`svc:/network/nfs/client:default`	`system/file-system/nfs`
`svc:/network/nfs/mapid:default`	`system/file-system/nfs`

- Make sure that the TM system is correctly connected to the SUT. If you are doing InfiniBand HCA certification, TM is connected to SUT through the network and InfiniBand switch.

  Make sure that the TM system is correctly connected to the SUT in the following manner:

  - Each port of the InfiniBand HCA to be certified must have one dedicated InfiniBand switch to connect. Each InfiniBand switch involved in the test process must connect to one port of the TM system.
  - At least one network port on the SUT must be connected to a port on the TM system.

Note – In this release of Oracle HCTS, InfiniBand HCA certification can certify only one InfiniBand HCA at a time. If more than one InfiniBand HCA has a driver in Oracle Solaris, none of them can be certified.

- The Oracle Solaris 11 OS is required for the Suspend/Resume test. You need to perform both manual and the automatic tests and fill the test results in the Suspend/Resume check list in the Appendix B.
- If you are testing Network performance, please make sure `uperf` is installed on the System Under Test (SUT) and the Test Manager system (TM).

  Also, a configuration file must be generated to show where the `uperf` is installed on SUT and TM. The expected format of the file is as follows:

  ```
  sut_uperf_install_path tm_uperf_install_path
  ```

  For example: `/opt/uperf /opt/uperf`

  The configuration file must be saved as `/opt/SUNWhcts/etc/uperf_path.conf`

  Make sure the system configuration meet `uperf` requirement. For detailed description for `uperf`, refer `uperf` website.

Certifying USB, Storage, Storage performance, CD/DVD, CPU or Memory, Audio, Tape Drive and Video Devices

For certifying USB, storage, CD/DVD, CPU or Memory, audio, Tape Drive and video devices, only the SUT is required. This section explains the hardware and the software requirements for certifying USB, storage, CD/DVD, CPU/Memory, audio, and video devices.

Hardware Requirements

SUT should satisfy the following hardware requirements:

- Hardware floating point support.
- The SUT must have at least the following amount of free space:
  - Swap space is at least 1/8 of the physical memory size, minimum 512 Mbyte.
  - At least four Gbyte of free space on any Oracle Solaris system slice or a non reserved hard disk that is greater than 16 Gbyte.

    Type the following command to check free space:

    ```
    $ df -h
    ```

  A non reserved disk does not contain any slice mounted to the `/`, `/usr`, `/var`, or `/export/home*` directory.

For USB device certification, the SUT must meet the following hardware requirements:

- For USB hard disk, solid state storage device, and multimedia card reader certification, the device to be certified must have at least 128 Mbyte of free space.
- For USB CD/DVD reader certification, a mixed-mode CD must be used. You can use the `make_mixed_mode_cd` utility under the `/opt/SUNWhcts/bin` directory to create one mixed-mode CD that could be used for the certification. See the Oracle HCTS man page for more information.
- For USB CD writer certification, a re writable CD should be inserted in the drive under test. For USB DVD writer certification, any supported rewritable media should be inserted.
- For USB CD/DVD writer certification, a minimum of 600 Mbyte of free space is needed in the `/export/home` directory for each device to be certified.

Caution – To certify storage devices, USB hard disk, and solid state storage, if the SUT contains more than one disk drive, any disk that does not have a slice mounted to `/`, `/usr`, `/opt`, `/var`, or `/export/home*` is formatted. All the data on such a disk is lost. During the test initialization process, any disk that is scheduled to be formatted is listed. The initialization process pauses for 60 seconds and prompts you to stop the certification if you do not want the disk to be formatted.

Caution – For CD/DVD writer certification and USB CD/DVD writer certification, the disk that is inserted in the writer is erased during testing and all the data on the disk is lost. Ensure that you use a disk that does not contain any data for this certification.

Caution – The USB web cam functional test takes pictures during testing. These pictures are packed in the Oracle HCTS result package for auditing. Adjust the web cam for moderate brightness and visibility.

Software Requirements

SUT must have the following OS installed and running:

- "Oracle Solaris OS or Oracle Solaris 11 OS" on page 20
- "Oracle HCTS" on page 21

Oracle Solaris OS or Oracle Solaris 11 OS

Any Oracle Solaris 10 release or Oracle Solaris 11 release can be used to run the Oracle HCTS 5.2 application. You need at least Oracle Solaris 10 version 6/06 to certify CD-RW or DVD-RW devices.

If your system is already running the Oracle Solaris 10 OS or the Oracle Solaris 11 OS, you might want to perform a fresh reinstall before you install Oracle HCTS.

For USB CD/DVD reader certification and USB CD/DVD writer certification, at least Oracle Solaris OS version 6/06 must be installed on the SUT. Use the latest Oracle Solaris release.

For the USB web cam certification, the latest release of the Oracle Solaris 11 OS must be installed on SUT.

Oracle HCTS

Before you download the Oracle HCTS 5.2 archive file, create a download directory on the test system. When you are prompted for the download location, provide the name of this directory that you created.

You can download Oracle HCTS from the Downloads web page.

Note – Before invoking Oracle HCTS, ensure that `Xwindows` is running on the test system.

If you are testing Storage Performance, please make sure the SUT must have installed `vdbench` and meet the `vdbench` tool requirement.

Note – A configuration file for starting `vdbench` in Oracle HCTS must be generated. The expected format of the file is as follows:

`vdbench_install_path`

For example: `/opt/vdbench`

The configuration file must be saved as `/opt/SUNWhcts/etc/vdbench_path.conf`.

For detailed description for `vdbench`, refer `vdbench` website.

◆ ◆ ◆ CHAPTER 3

Installing Oracle HCTS

Before installing Oracle HCTS, ensure that the Oracle Solaris 10 OS or Oracle Solaris 11 OS is installed and running. You might need to do a few configurations when installing Oracle Solaris 10 OS or the Oracle Solaris 11 OS. This chapter explains the installation and configuration of OS and Oracle HCTS for certifying various types of devices.

This chapter covers the following sections:

Configuring the Oracle Solaris 10 OS Installation

For Oracle Solaris 10 installation details, see the Oracle Solaris 10 Release and Installation Collection web page.

While installing the Oracle Solaris 10 OS, partition the disk to satisfy the requirements mentioned in Chapter 2, "System Requirements."

Use the following command to verify whether you are running the Oracle Solaris 10 OS or the Oracle Solaris 11 OS:

```
% cat /etc/release
```

While installing the Oracle Solaris 10 OS, you must make the following customization in the GUI prompt:

- Select None for Name Service.
- Select Initial Install for Upgrade or Initial Install.

- Select Custom Install and then select Developer group or above. You must perform at least a Developer group installation. See the Oracle Solaris 10 Package List for a list of what you get with different types of installations.

You might have to backup your test systems and reinstall the Oracle Solaris OS before you install and run Oracle HCTS.

Configuring the Oracle Solaris 11 OS Installation

While installing the Oracle Solaris 11 OS, partition the disk to satisfy the requirements mentioned in Chapter 2, "System Requirements."

For the Oracle Solaris 11 OS installation details, see the Oracle Solaris 11 OS Installation Guide.

Installing the Oracle HCTS Application

For certifying system, network, InfiniBand, WiFi, Network performance and serial I/O devices, install Oracle HCTS on both TM and SUT.

For certifying USB, storage, CD/DVD, audio, and video devices or testing CPU/Memory, Storage performance, Suspend/Resume, install Oracle HCTS on SUT.

The Oracle HCTS 5.2 archive is a tar file from which you need to extract the contents.

This section describes the following topics.

▼ To Extract the Oracle HCTS File Content

1 **Type the following command to extract the Oracle HCTS contents:**

```
$ gzip -cd hcts.5.2.tar.gz | tar xvf -
```

2 **If you are working on the SPARC platform the package is `hcts.5.2-sparc.tar.gz`. Type the following command to extract the contents of the package:**

```
$ gzip -cd hcts.5.2-sparc.tar.gz | tar xvf -
```

The contents are extracted to a directory called `hcts.5.2` or `hcts.5.2-sparc`, which is placed in the directory where you downloaded Oracle HCTS. This `hcts.5.2` or `hcts.5.2-sparc` directory contains the following files:

- Oracle HCTS 5.2 README

- Oracle HCTS 5.2 Release notes
- Oracle HCTS 5.2 ThirdPartyLicenseReadMe
- `SUNWhcts` package

Note – Be sure to read the Oracle HCTS 5.2 README and Oracle HCTS 5.2 Release notes in the `/hcts_extract_dir/hcts.5.2` directory before you install Oracle HCTS.

Installation verifies that no previous version of Oracle HCTS exists on your system. If Oracle HCTS is already installed on the system, "Uninstall Oracle HCTS" on page 27 the existing version.

▼ To Install Oracle HCTS

1 **Type the following commands to get the superuser privilege and add the Oracle HCTS package.**

```
% su
# /usr/sbin/pkgadd -d . SUNWhcts
```

Watch for any questions or error messages and respond accordingly.

2 **The Oracle HCTS installation performs the following functions:**

- Verifies that no version of Oracle HCTS is already installed on the system.
- Installs the package `SUNWhcts` in the `/opt` directory.
- Installs the `x11perf` binary file in the `/usr/X11/demo/` directory.
- Installs the `x11perf.1x` man page file in the `/usr/X11/share/man/man1` directory for the video test case.
- Creates a `/docs` directory in the `/opt/SUNWhcts` directory.

Installing the Oracle HCTS InfiniBand HCA Application

This section describes the following topics.

To certify an InfiniBand Host Channel Adapter (HCA), you must install the Oracle HCTS InfiniBand HCA application and the Oracle HCTS application on the TM and SUT systems.

Extracting the Oracle HCTS InfiniBand HCA File Content

The Oracle HCTS 5.2 IB HCA archive is a tar file from which you need to extract the contents. The name of the downloaded file is `hcts.5.2.ib-${ARCH}.tar.gz`. The `${ARCH}` value represents the processor type, that is `i386` or SPARC. For example, the IB HCA package for x64 platform is named as `hcts.5.2.ib-i386.tar.gz`.

On each machine, type the following command to extract the Oracle HCTS InfiniBand HCA file content:

```
$gzip -cd hcts.5.2.ib-$(ARCH).tar.gz | tar xvf -
```

The contents are extracted to a directory called `hcts.5.2.ib-${ARCH}`, which is placed in the directory where you have downloaded the Oracle HCTS InfiniBand HCA.

The `hcts.5.2.ib-${ARCH}` directory contains the following files:

- `hcts.5.2.ib.README`
- `SUNWhcts-ibtf` package
- `SUNWstc-dtet` package

Installing the `SUNWhcts-ibtf` Package

Be sure to read the `hcts.5.2.ib.README` in the `/hcts_extract_dir/hcts.5.2.ib-${ARCH}` directory before you install the `SUNWhcts-ibtf` package. Installation verifies that no previous version of the `SUNWhcts-ibtf` exists on your system. If `SUNWhcts-ibtf` is already installed on the system, uninstall the existing version.

On each system, perform the following steps to install the `SUNWhcts-ibtf` package.

1. Type the following commands to get the superuser privilege and add the `SUNWhcts-ibtf` package.

   ```
   % su

   # /usr/sbin/pkgadd -d . SUNWhcts-ibtf
   ```

2. Watch for any questions or error messages from the installation and respond accordingly. The `SUNWhcts-ibtf` installation performs the following actions:
   - Verifies that no version of the `SUNWhcts-ibtf` is already installed on the system.
   - Installs the package `SUNWhcts-ibtf` into the `/opt` directory.

Installing the SUNWstc-dtet Package

Be sure to read hcts.5.2.ib.README in the /hcts_extract_dir/hcts.5.2.ib-${ARCH} directory before you install the SUNWstc-dtet package. Installation verifies that no previous version of the SUNWstc-dtet is on your system. If SUNWstc-dtet is already installed on this system, uninstall the existing version manually.

On each system, perform the following steps to install the SUNWstc-dtet package.

1. Type the following commands to get the superuser privilege and add the SUNWstc-dtet package.

   ```
   % su

   # /usr/sbin/pkgadd -d . SUNWstc-dtet
   ```

2. Watch for any questions or error messages from the installation and respond accordingly. The SUNWstc-dtet installation performs the following actions:
   - Verifies that no version of the SUNWstc-dtet is already installed on the system.
   - Installs the package SUNWstc-dtet into the /opt directory.

Uninstall Oracle HCTS

Before you put the test systems back into production use, you might want to reconfigure your test system to its original configuration.

If you choose not to reinstall your test systems, you must uninstall Oracle HCTS.

Perform the following steps to uninstall Oracle HCTS from your system:

1. Log in as root.

- Remove the SUNWhcts package by typing the following command:

  ```
  # /usr/sbin/pkgrm SUNWhcts
  ```

◆ ◆ ◆ CHAPTER 4

Working With Oracle HCTS

For certifying your systems and hardware, you can use the Oracle HCTS graphical user interface (GUI) or the Oracle HCTS command line interface (CLI). This chapter describes working with the Oracle HCTS GUI and CLI.

Note – There is a slight difference in the GUI while you are certifying the virtual platforms. Refer Chapter 6, "Certifying the Virtual Platform," to learn about the Oracle HCTS GUI changes for the virtual platform certification.

This chapter discusses the following topics:

Running the Oracle HCTS Application

Caution – For the system certification, if the SUT contains more than one disk drive, any disk that does not have any slice mounted to `/`, `/usr`, `/opt`, `/var`, or `/export/home*` is formatted. All data on such a disk is lost. During the test initialization process, any disk that is scheduled to be formatted is listed. The initialization process pauses for 60 seconds and prompts you to stop the certification if you do not want the disk to be formatted.

To system certify the SUT, if the SUT has a CD or DVD drive, insert a CD or DVD in the drive.

If you are certifying a CD-ROM or DVD-ROM drive for compatibility with the Oracle Solaris OS, insert a mixed-mode CD in the test system. Use the `make_mixed_mode_cd` utility to create a mixed-mode CD.

If you are testing a CD-RW or DVD-RW drive for compatibility with the Oracle Solaris OS, insert a CD-RW, DVD-RW, DVD-RW, or DVD-RAM disk in the drive of the test system.

If you are certifying or testing a USB device, make sure you connect the device to the SUT and power it on according to the instructions provided in the device's user guide.

If you are certifying the USB CD/DVD reader, insert a mixed-mode CD before you start certification. You can use the `make_mixed_mode_cd` utility to create a mixed-mode CD. See the Oracle HCTS 5.2 man page for more information.

If you are certifying the USB CD/DVD writer, prepare all types of re writable media supported by the device, certify each of them and then submit your results.

Using the Oracle HCTS GUI

To start the Oracle HCTS GUI, type the following Oracle HCTS command:

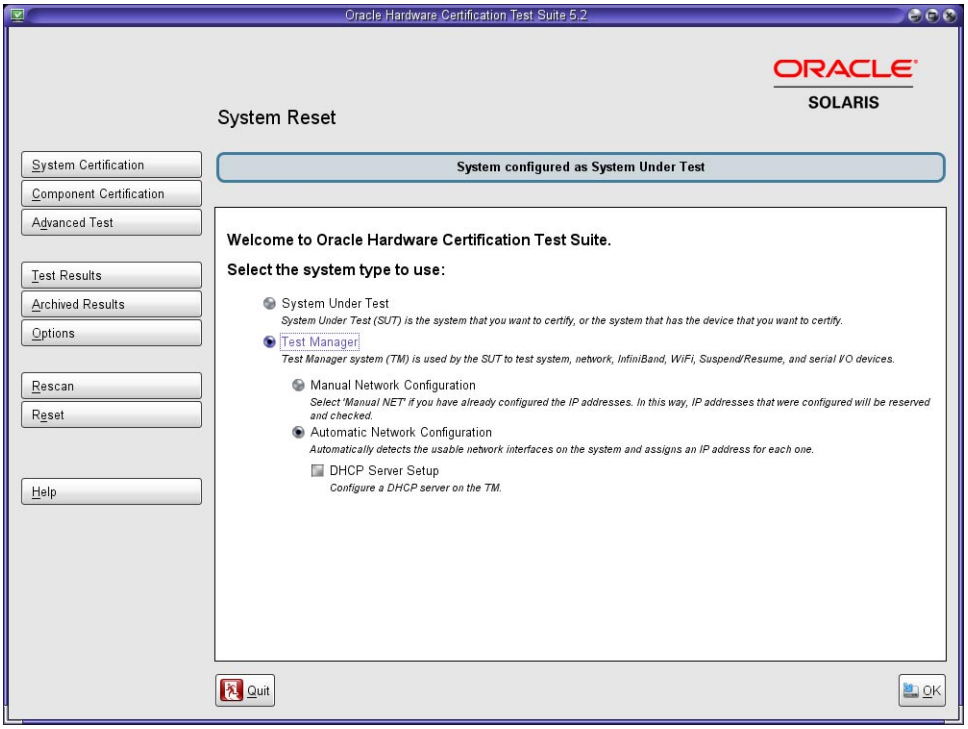
```
$ /usr/bin/hcts
```

On the TM system, if you are prompted to select a mode for the machine, click the Test Manager button. If you want Oracle HCTS to automatically prepare the TM network environment, click the Automatic Network Configuration. Otherwise click the Manual Network Configuration.

If you want the TM machine to behave as a DHCP server when doing certification, click DHCP Server Setup checkbox after selecting the Automatic Network Configuration. Click the OK button.

On the SUT system, if you are prompted to select a mode for the machine, click System Under Test then click the OK button.

FIGURE 4–1 Reset Oracle HCTS

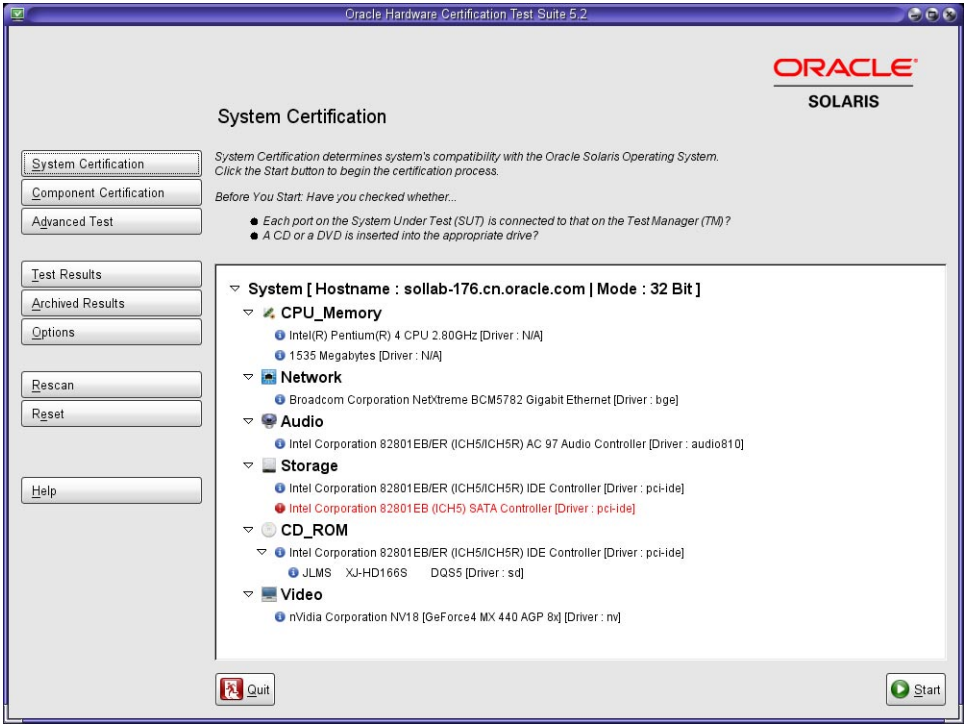


System Certification

To certify a system, click the System Certification button and then click the Start button. By performing this operation, your system will get certified as a whole.

The System Certification page is shown in the following figure.

FIGURE 4–2 System Certification

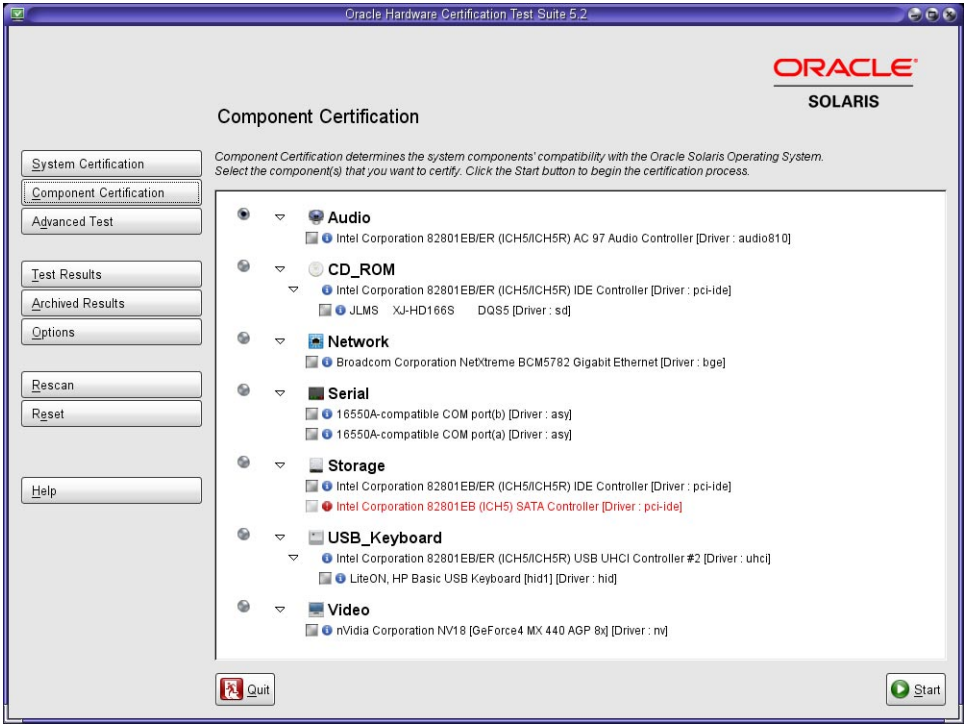


Component Certification

To run the Component Certification test for components such as audio, CD/DVD RW, CD/DVD ROM, network, serial, storage, InfiniBand, WiFi, USB CD/DVD ROM, USB CD/DVD RW, USB hard disk and solid-state storage device, USB keyboard Tape Drive and video, click the Component Certification button. Select the component and click the Start button. The component that you select gets certified.

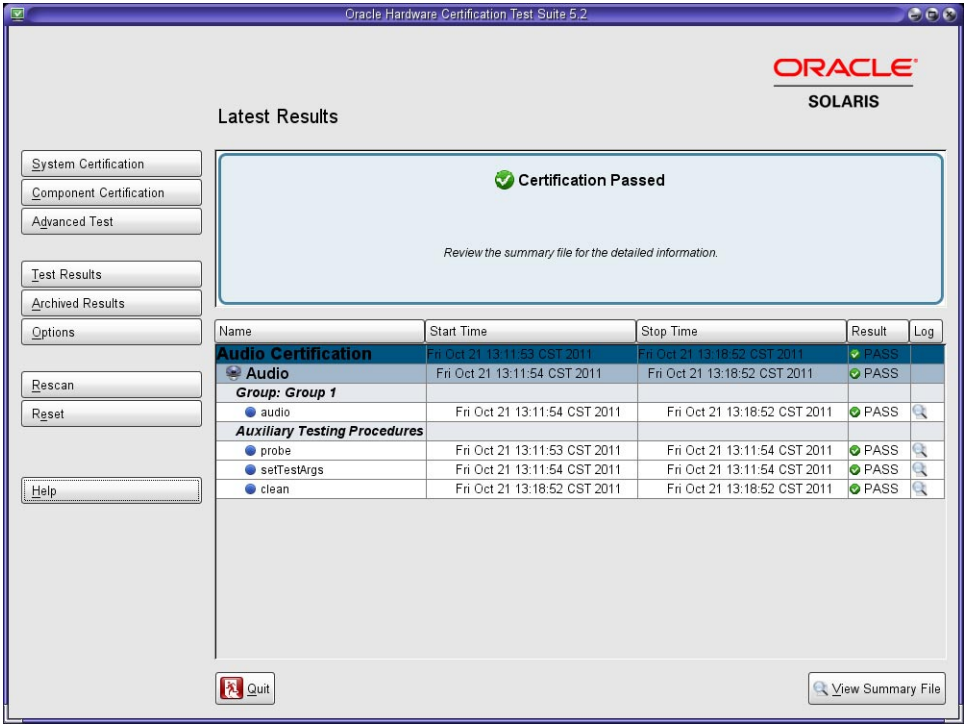
The Component Certification page is shown in the following figure.

FIGURE 4–3 Component Certification



When testing is complete, click the Test Results button.

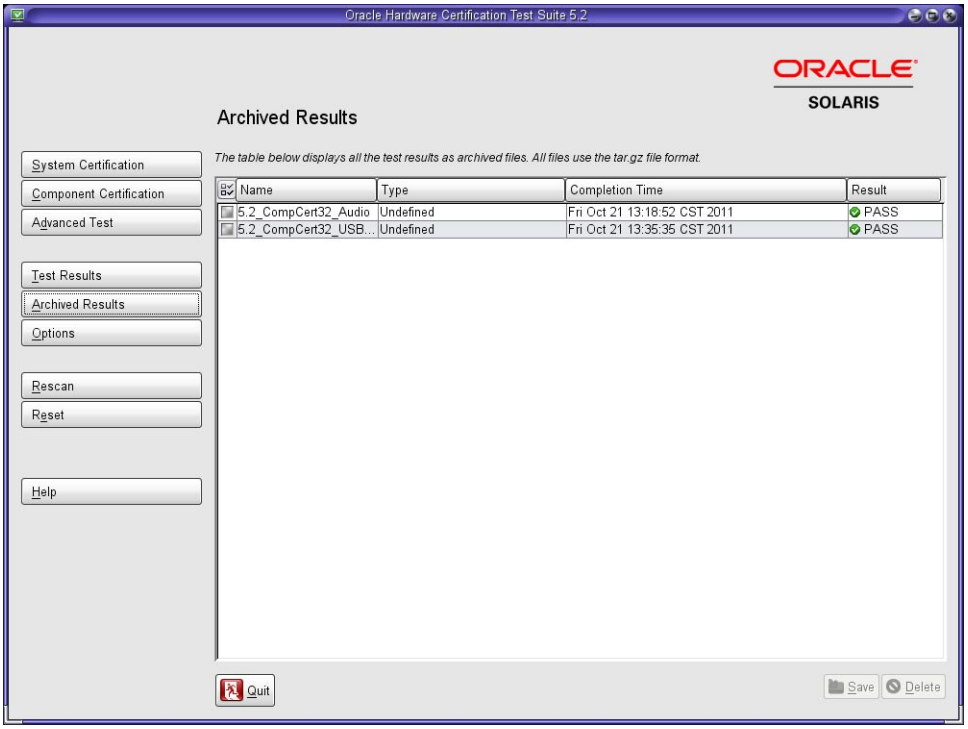
FIGURE 4–4 Test Results



Click the icon in the Log column to view the detailed results for a test. Click the View Summary File button to view the summary of the results of all the tests listed in the table.

To access the results archive file that you need to submit to the HCL if your certification testing passed, click the Archived Results button.

FIGURE 4–5 Certification Logs



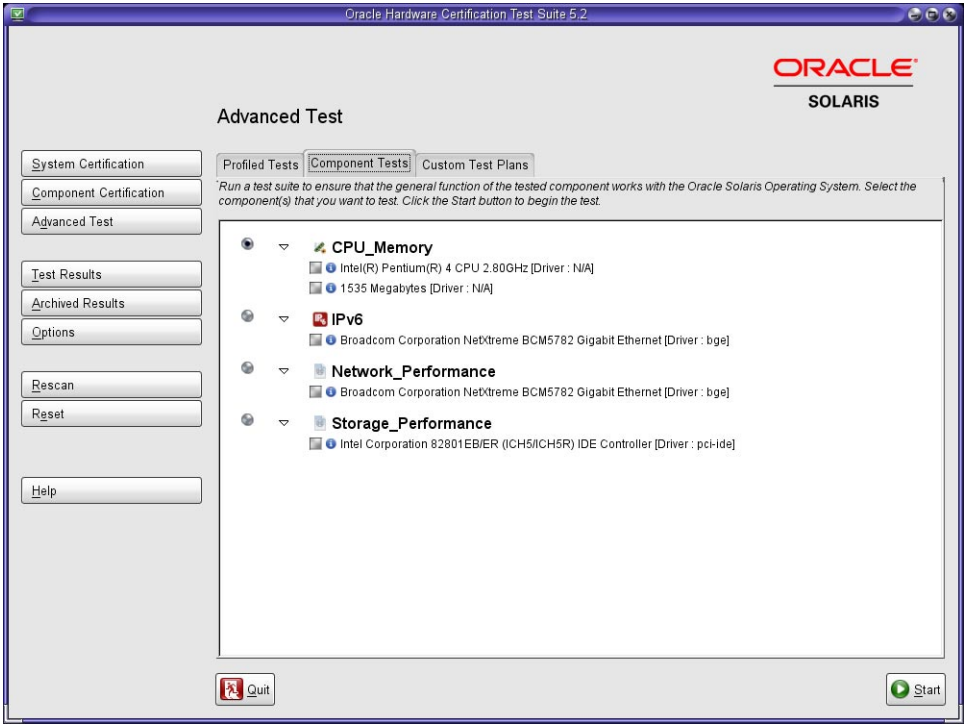
Select the files that you want to operate on by selecting the checkboxes at the left-most column, then click Save to save the files to another location or Delete to remove the files.

To select all the files, click the left button displaying two check marks in the header row. To de-select all files, click the left button displaying no check marks in the header row.

Component Tests

To test a component but not certify the component, click the Advanced Test button and then click the Component Tests tab. Select the component test that you want to run and then click the Start button.

FIGURE 4–6 Component Tests



Custom Test Plan

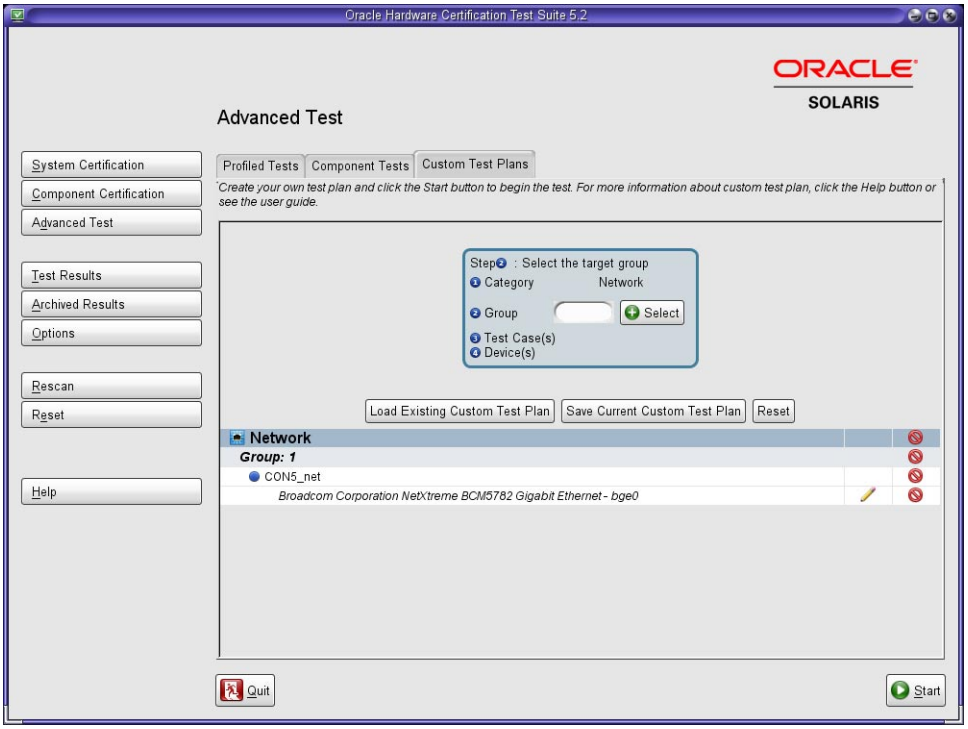
To run the other tests, click the Advanced Test button and then click the Custom Test Plan tab. Select the test that you want to run from the drop-down list . Click the Start button.

The Custom Test Plan feature provides an interface for creating test plans which may provide additional failure diagnostics information. Custom Test Plan results are not valid for HCL submission.

Tunable Options permit the customization of various predefined test arguments. By modifying the values of these options, you can control the exposed runtime attributes for the Test Case operating on the associated device.

For more information, see the Custom Test Plan online help page under Certification Center > Custom Test Plan.

FIGURE 4–7 Custom Test Plan

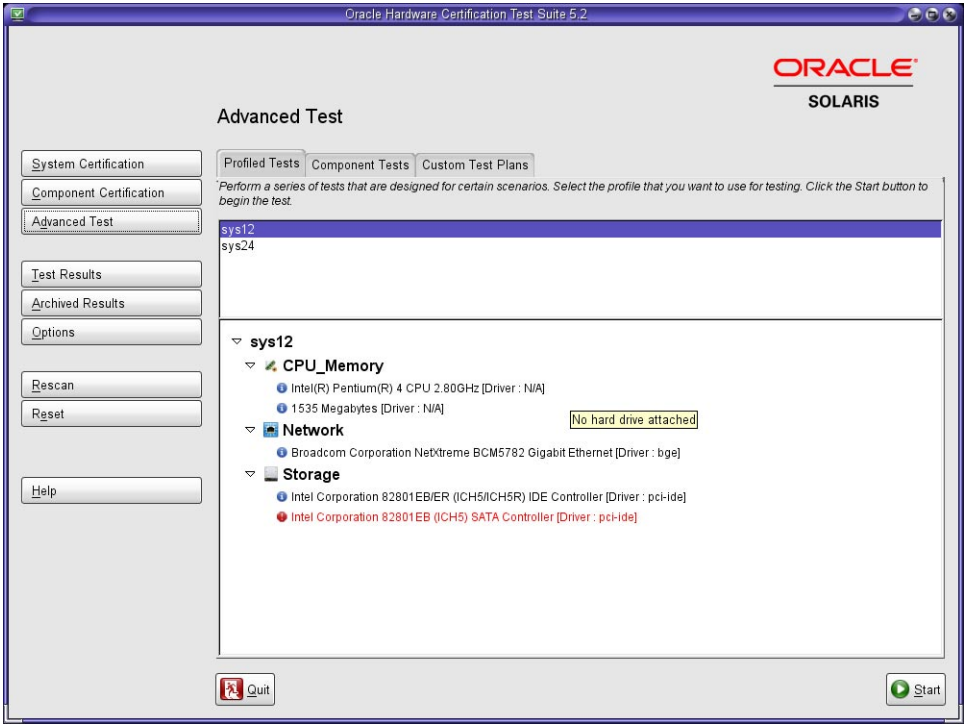


Profile Testing

Starting from version 5.2, the Oracle HCTS application enables you to perform testing based on the profiles having different test coverage and stress. There are currently two profiles that are previously implemented in the system. You can select any of the following system profiles:

- `sys12`: A system test that runs for about 12 hours.
- `sys24`: A system test that runs for 24 hours.

FIGURE 4–8 Profile Tests



▼ Procedure to Perform the Profile Tests

Before You Begin Before performing the profile tests, you must ensure that the following system requirements are satisfied:

- Hardware Requirements: Two systems are needed.
  - System Under Test (SUT): The SUT is the system that is to be certified or that has the component that needs to be certified.
  - Test Manager (TM): The TM is the system that is already certified as Oracle Solaris OS compatible.

  To learn more about the SUT and TM, click the Help button in the GUI or see "Configuring Test Machines to Run Oracle HCTS" on page 12.
- Software Requirements: Oracle Solaris 10 OS or the Oracle Solaris 11 OS.

- **Configure the network and storage environment as required for the system certification.**

  See "System Certification" on page 31 to know how to configure your system for the Oracle HCTS system certification.

  - **GUI Mode:**

    If you are using the GUI mode, perform the following steps:

    - Click the Advanced Test button in the main window.
    - Click the Profile Test tab.
    - Select the profile that you want to execute.
    - Click the Start button.

  - **CLI Mode:**

    In the CLI mode, type the following command in the terminal:

    ```
    hctscli test-profile sys12 | sys24
    ```

Using Oracle HCTS CLI

There are two commands in the Oracle HCTS CLI environment listed as follows:

- `hctscli`: This command is used to certify the system and component in the CLI mode.
- `hctsclid`: This command is used to create and run the custom test plan in the CLI mode.

Certifying Systems and Components Using CLI

For certifying systems and components, you need to use the `hctscli` command. As described in the previous chapters, you need to use TM and SUT for certifying the system, network, InfiniBand, WiFi, and serial I/O devices.

To start the Oracle HCTS for setting up the systems, certifying systems, and components, use the `hctscli` command. See the `hctscli(1M)` man page for more information.

Type the following command to set up the TM system:

```
# /usr/bin/hctscli setup-tm
```

Type the following command to certify the SUT as a system:

```
# /usr/bin/hctscli certify System
```

Type the following command to list certifiable network devices of the SUT:

```
# /usr/bin/hctscli list-device Network
```

Type the following command to certify the network of the SUT using the IPv4 protocol:

```
# /usr/bin/hctscli certify [ -d device_id_from_the_list-device_output ] Network
```

If no device is specified for the certify network command, then all network devices are tested at the same time.

Type the following command to list the serial devices of the SUT:

```
# /usr/bin/hctscli list-device Serial
```

Type the following command to certify the serial I/O component of the SUT:

```
# /usr/bin/hctscli certify Serial
```

If no device is specified for the `certify Serial` command, then all serial devices are tested one by one.

Note – After you complete all testing, uninstall Oracle HCTS. Before you put the test systems back into production use, you might want to reinstall your test system to it's original configuration.

Type the following command to run the storage certification test suite:

```
# /usr/bin/hctscli certify Storage
```

If no device is specified for the certify storage command, then all storage devices are certified at the same time.

See the man page for the names of component certification test suites that you can run and more examples.

Note – After you complete all testing, uninstall Oracle HCTS. Before you put the test systems back into production use, you might want to reinstall your test system to its original configuration.

Creating the Custom Test Plan Using CLI

For creating and running the custom test plan in the Oracle HCTS CLI, use the `hctsclid` command. Refer `hctsclid.1m` man page for more information.

EXAMPLE 4–1 Creating a Custom Test Plan

The following command lists all the available test categories under the Custom Test Plan.

```
sut# hctsclid list-category
```

EXAMPLE 4–1 Creating a Custom Test Plan *(Continued)*

```
1: USB_Keyboard
2: CPU
3: Video
4: IPv6
5: Memory
6: Audio
7: CD-RW_DVD-RW
8: Storage
9: Network
```

The following command will set the test category.

```
sut# hctsclid set-category Storage
```

```
Category Storage is added.
```

The following command adds a new group.

```
sut# hctsclid add-group 1
```

```
Group 1 added to Custom Test Plan.
```

The following command lists all the available test cases for the selected category.

```
sut# hctsclid list-testcase Storage
```

```
1: bonnie
2: misabuf
3: fs_stress
4: dd
5: mode_sense
6: mpflip
```

The following command will list all the devices supported by the bonnie test.

```
sut# hctsclid list-device bonnie
```

```
Test Case Device List for bonnie
1: c1d0         Driver : N/A
```

The following command will add the test case to the created group.

```
sut# hctsclid add-testcase -g 1 -d 1 bonnie
```

```
Test Case bonnie   id=1 executed on "c1d0" added to group 1.
```

The following command will create another group.

```
sut# hctsclid add-group 2
```

```
Group 2 added to Custom Test Plan.
```

EXAMPLE 4–1 Creating a Custom Test Plan *(Continued)*

The following command will list all the devices supported by the `Fs_Stress` test.

```
sut# hctsclid list-device Fs_stress

Test Case Device List for Fs_stress:
       1 : c1d0      Driver : N/A
```

The following command will add the test case to the created group.

```
sut# hctsclid add-testcase -g 2 -d 1 Fs_stress

Test case Fs_stress  id=2 executed on  "c1d0" added to group 2.
```

The following command will list the available tunable options for the `Fs_stress` test.

```
sut# hctsclid list-option Fs_stress

 Option Description : Enter runtime in seconds(minimum is 600, default is 3600):
        Option Type : TextArgument
        Option Name  : run_time
        Option Value : value
```

The following command will set the tunable option.

```
sut# hctsclid set -p run_time=610 -g 2 2

Set tunable options into TestcaseId2 Fs_stress successfully.
```

The following command will enable you to view the custom test plan.

```
sut# hctsclid show-testplan

  Category : Storage
         Group : 1
         Test Case Id : 1
         Test Case Name: bonnie
         Device: c1d0
         Group : 2
         Test Case Id : 2
         Test Case Name: Fs_stress
         Device: c1d0
         Option Name : run_time    Value : 610
```

The following command enables you to run the test plan.

```
sut# hctsclid run-testplan

Test is active!(Press Ctrl+C to stop the test!)
       System Under Test: 32Bit Mode!
       System configuration in progress...
```

EXAMPLE 4–1 Creating a Custom Test Plan *(Continued)*

```
Progress: 0%...1%...11%...21%...31%...41%...100%
Result: Pass!
Review report: /var/hcts/reports
Review test logs: /var/hcts/logs
Note: Customization test is invalid for submission.
```

Global Options

In Oracle HCTS 5.2, there are five global options that can be used in GUI and CLI. These global options are:

- **Exit On Error** - When this option is set, Oracle HCTS exits immediately when any test case fails without cleaning up the test environment.
- **Manual Network Setup** - When this option is set, user should configure the IP addresses for the network interfaces to be tested before starting the Oracle HCTS test. See the Oracle HCTS 5.2 online help or man page for more information.
- **Diagnosis** - When this option is set, a few `DTrace` scripts run in parallel with test cases to collect information for debugging. This option should only be used for failure analysis. Certification with this option set is not qualified for HCL submission.
- **DHCP Network** - When this option is set, the SUT uses Dynamic Host Configuration Protocol (DHCP), to get the IP address for one or more interfaces to be tested in an automatic network setup mode. Make sure to configure your TM system with DHCP server capability if you are testing system, network or serial I/O, or enable DHCP server capability of your Access Points (AP) if you are testing WiFi card.
- **Automatically Add Swap Space** - When this option is set, Oracle HCTS automatically adds the required swap space during the test. Setting up this option is useful when Oracle HCTS requires more swap space for the test initiation.
- **Enable VLAN test case** - When this option is set, VLAN test case will be enabled in Network Certification Test. Make sure the SUT and the TM are connected back-to-back before starting the Network Certification test.

Caution – If you are certifying a WiFi card, make sure that you re-scan after you switched the Manual Network Setup global option after modifying the Manual Network.

◆ ◆ ◆ CHAPTER 5

WiFi Test Environment Setup

To certify WiFi devices, you need to configure SUT and Test Manager systems. The requirements and configurations needed to certify the WiFi devices are different from that of certifying other components with Oracle HCTS. Hence, this chapter is dedicated only to the WiFi devices and the procedure to certify them using Oracle HCTS.

This chapter covers the following sections:

Requirements for Certifying WiFi Devices

WiFi certification has certain hardware and software requirements.

Hardware Requirements

To certify WiFi devices, you need the following hardware:

- Latest version of the Oracle Solaris 11 OS installed on SUT.
- Access Point (AP) - The TM System must have one or more APs to certify the WiFi cards. Ensure that the APs support all the transfer modes and encryption protocols needed to complete a certification. Refer to the respective WiFi card manual for supported transfer modes and encryption protocols that are being tested. Refer to the manual of APs for transfer modes and encryption protocols that are supported by the APs. Refer to WiFi card certification manual test guidelines to know how to set up the WiFi testing environment.

  The TM System must have one functional network port for each wireless network port on the SUT. The TM system must have at least the same number of network ports as the number of wireless network ports as that of the SUT. Each port on the TM system must

connect to an AP that a wireless network port in SUT can connect to. The TM system cannot have more than five ports than the number of SUT wireless network ports.

Note – Disable the NWAM service before starting the WiFi test particularly, in the case of a manual wireless network setup.

To disable the NWAM service, type the following commands in the terminal:

```
netadm enable -p ncp defaultfixed
svcadm enable svc:/network/physical:default
```

Software Requirements

Ensure that the TM system is correctly connected to the SUT.

Each wireless network port of the WiFi card to be certified must be connected to one dedicated AP. Each AP involved in the testing must be connected to one network port in the TM system.

Refer to the manual of the particular AP to know about configuring different transfer modes and encryption protocols of the AP. From the manual, you can also check how to enable or disable DHCP of the AP.

In the automatic network setup mode, Oracle HCTS assigns a particular range of IP addresses to the TM system and a different range of IP addresses to the SUT.

Network devices on the TM system must allow their IP addresses to be temporarily changed to `10.10.n.11/24`, where `n` is 10, 11, or 12 for multiple ports.

Network devices on the SUT must allow their IP addresses to be temporarily changed to `10.10.n.10/24`, where `n` is 10, 11, or 12 for multiple ports.

All the network devices between the TM system and the SUT must allow the specified IP addresses. If you are testing the DHCP capability of a wireless network port, be sure to enable DHCP on AP and change the IP address pool of the AP to have the IP address `10.10.n.10/24`, where `n` is 10, 11, and 12, for the multiple ports. The AP must be in the same network segment of the network port on the connected TM system.

Configuring AP

Before you begin to set up WiFi certification testing environment, you need to know how to configure your AP for the following changes:

- Modify SSID (name of the wireless network)
- Change transfer mode (802.11a/802.11b/802.11g/802.11n)
- Change encryption protocol (none or WEP or WPA)
- Change the pass phrase when encryption protocol is set to WEP or WPA
- Enable or disable the DHCP server function
- Change the DHCP IP address pool
- Configure the wireless MAC filter (optional)
- Change the IP address of AP (optional)

If your AP is capable of being a router, you also need to know the physical RJ45 port for WAN/Internet connection and the port for LAN connection. Refer to the user's manual of your AP to make the changes or consult your vendor for technical support.

WiFi Test Environment Setup

This section describes how to set up the WiFi testing environment to certify your WiFi devices by using the Oracle HCTS application.

Set up Test Manager (TM) System

To use the automatic network setup mode for testing that includes the DHCP, set up TM in the automatic network setup mode. To use the manual network setup mode for testing, for example, for verifying target support WEP and WPA encryption protocols, set up the TM in the manual network setup mode.

Configure the TM as mentioned in "Configuring Test Machines to Run Oracle HCTS" on page 12.

Placing the AP

Pick a good location for the APs that are involved in the testing process. The stability and actual transfer speed during testing depends on the physical placement of the APs and the antenna of the target card. For the optimal testing environment, use the following tips to place your APs:

- Place the APs close to the antenna of the target card.
- Antennas of the APs and the target card should be inline to one another. Put your face next to one antenna to find whether the other is visible.

- Antennas transmit weakly at the base where they connect. Hence, do not expect a good reception from the bottom of an AP.
- Keep the antennas at least 0.6 meters from the metal fixtures such as sprinklers, pipes, metal ceiling, reinforced concrete, and metal partitions.
- Keep the AP away from large amounts of water such as fish tanks and water coolers.
- Place the antennas away from various electromagnetic noise sources, especially those in the 2400 to 2500 MHz frequency band.

  The following sources create noise:

  - Computers and fax machines - should not be closer than 0.3 meters
  - Copying machines, elevators, and cell phones - should not be closer than 2 meters
  - Microwave ovens - should not be closer than 3 meters

Connecting AP to TM

Use the standard Ethernet cable to connect the AP involved in testing to the TM machine. If your AP has multiple Ethernet ports, connect the TM to one of the LAN ports. Refer to the user manual of your AP regarding the Ethernet ports for LAN connection.

Setting Up AP

You need to set up the following parameters for WiFi certification:

- **Provide the name or Service Set Identifier (SSID) of the AP**:

  Provide the name or SSID of the AP to a string that is easy to remember and one that clearly indicates that the AP is involved in testing, for example `HCTS_test`. Write the existing name (SSID) so that you can select the correct wireless network from the Oracle HCTS UI in the automatic network setup mode or execute the `connect` commands in the manual network setup mode.

  Some special characters such as, `:`, `?`, and `\` have certain meanings in the Oracle Solaris OS and are handled differently. If these characters appear in the name of a wireless network, Oracle HCTS might behave abnormally. Although some special characters might be valid in your AP, use an alphanumeric string as the name of the wireless network for the Oracle HCTS test.

- **Provide the IP address of the AP**:

  The IP address of the AP should be in the same subnet as the TM, SUT, and the target card. Provide an IP address that does not conflict with the existing IP address of the TM and the IP address that the target card uses. Set the AP to use the IP address you provided. Alternatively, you can change the TM's IP address and the IP address that the target card uses.

- **Enable the DHCP server function and set up a proper IP address pool**:

  To verify that the target card can get the IP address from the AP and works correctly in the subsequent data transfer job, the DHCP server function of the AP needs to be enabled. Simultaneously, set up a proper IP address pool to ensure that the target card gets an IP address valid for Oracle HCTS testing. Refer to"Software Requirements" on page 17 and the man pages to learn the valid IP address for Oracle HCTS testing in the automatic and manual network setup mode.

  If your AP supports IP address reservation, that is, always offers the assigned IP to a certain MAC address, set the valid IP address for Oracle HCTS testing for the target card into the IP address reservation table.

  If your AP supports MAC filter, which means that only the wireless client adapters with registered MAC addresses can connect to the AP, enable the DHCP function and add the MAC address of the target card to the allowed MAC address list of the AP.

- **Change the transfer mode to the mode to test**:

  Your AP might have advanced options for transfer modes. Keep the default value unless you have to change them.

  For channel setting, unless you must use a specific channel, retain the setting to let the AP automatically choose a channel.

  If your AP has a region setting that enables you choose the country or area that the AP is working, ensure that you select the correct place. It might not be legal to operate the AP in a region other than the specified region. If your country or region is not listed, check with your local government agency or check the web site of the AP vendor for more information about the channels.

- **Change the encryption protocol to the protocol to test**:

  Your AP might have advanced options for encryption protocols. Leave the default option in place unless you have to change them.

  To test encrypted transfer, set the key or pass phrase for the wireless network. Note the key or pass phrase that you set for reference.

  If you plan to test WPA (TKIP) or WPA2 (AES), ensure that you do not set a very short key renewal period. If the specified key renewal period is short, the network load for key renewal becomes very high and communication becomes unstable. Set the key renewal period to one hour or more.

WiFi Certification by Using the Automatic Network Setup (DHCP)

After setting up the parameters as described in the previous section, perform the following procedure to start the WiFi certification by using the automatic network setup.

▼ To Start a WiFi Certification using DHCP

1. **Start the Oracle HCTS UI.**
2. **If the current network setup mode is manual, set it to automatic as shown below:**

   ```
   manual network setup=false
   ```

3. **Re scan the system.**
4. **Enable the DHCP network setup option.**
5. **Select the wireless network with the name you set and start the certification.**

WiFi Certification Using the Manual Network Setup

Perform the following steps to start the WiFi certification by using a manual network setup.

▼ To Start a WiFi Certification Manually

1. **Create a security object.**

   To run the test under an encryption protocol, type the following command to create a security object:

   `dladm create-secobj -c` *wep|wpa security object name*

   When prompted for the value of the object, type the key or pass phrase that you have set.

   You can use the following command to check whether the security object is created successfully:

   ```
   dladm show-secobj
   ```

2. **Plumb the target interface by using the following command.**

   `ifconfig` *interface name* `plumb`

   Note – Type the `dladm show-wifi` command to get a list of the existing interface names.

   ---

3. **Check the availability of the wireless network.**

   Type the following command to check the availability of the wireless network with the name that you have set:

   `dladm scan-wifi` *interface name*

If the wireless network that you set up does not appear in the output of the above command, check the settings and setup of your AP. Retype the above command until the wireless network appears in the output.

4 Check the connection status of the target interface.

Type the following command to check the connection status of the target interface:

`dladm show-wifi` *interface name*

If the status of the interface is connected, type the following command to disconnect the interface:

`dladm disconnect-wifi` *interface name*

Wait for a few minutes and type `dladm show-wifi` *interface name* to re check until the status changes to disconnected.

5 Connect to the wireless network.

Connect to the wireless network with the name that you have set. Perform any one of the following steps:

- If the wireless network is not encrypted, type the following command to connect:

  `dladm connect-wifi -e <wireless network name>` *interface name*

- If the wireless network is encrypted, type the following command to connect:

  `dladm connect-wifi -e` *wireless network name* `-k` *security object name* `-s` *wep|wpa interface name*

Type the following command to check the wireless connection status:

`dladm show-wifi` *interface name*

6 Get the IP address from the AP for this interface by typing the following command:

`ifconfig` *interface name* `dhcp`

Type the following command to verify the connection

`TM: ping <TM's IP address>`

7 Start the Oracle HCTS UI.

8 Set up the network.

If the current network setup mode is automatic, set it to manual by changing the following value:

`manual network setup=true`

9 Re scan the system.

10 Select the card that you want to certify, and start the certification.

Example

To test the `ath0` interface in the SUT machine, with the wireless network name `HCTS_WiFi`, which is not encrypted.

Type the following command to prepare WiFi certification testing environment:

```
ifconfig ath0 plumb
dladm scan-wifi ath0 (-- Ensure wireless network "HCTS_WiFi" appears in the output.)
dladm show-wifi ath0 (-- Ensure status of "ath0" is "disconnected".)
dladm connect-wifi -e "HCTS_WiFi" ath0
dladm show-wifi ath0 (-- Ensure ath0 is connected to "HCTS_WiFi".)
ifconfig ath0 dhcp
ping <TM's IP address>
```

◆ ◆ ◆ CHAPTER 6

Certifying the Virtual Platform

Virtual platform refers to the virtual machine instance created by a hypervisor software. This feature of Oracle HCTS 5.2 enables the hypervisor software provider companies to certify virtual platforms for the Oracle Solaris OS on x86 and x64 systems. Oracle Solaris OS that is running as a guest in the virtual platform implementation can be tested by using the Oracle HCTS application. Hence the virtual platform can be certified for Oracle Solaris OS compatibility.

Note – In the current release, the virtual platform certification feature of Oracle HCTS is the evaluation version. You can only test this feature and provide us the feedback. The certified virtual platforms are not included in the HCL.

This chapter includes the following sections:

Implementations of Hypervisor

The hypervisor software has the following implementations:

- In the first implementation, the hypervisor software runs directly on a hardware platform, as an OS control program. A guest operating system runs at the second level above the hardware. For example, the Oracle VM server software runs directly on the hardware.

- In the second implementation, the hypervisor software runs within the host OS environment. A guest operating system runs at the third level above the hardware. For example, the Oracle VM VirtualBox software runs on the Oracle Solaris OS, the Microsoft Windows OS, and the Linux OS.

System Requirements for Testing Virtual Platforms

To certify a virtual platform, you need to configure the following test machines:

- Reference Hardware System (RHS) — System in which you must install the host OS and the hypervisor software. Virtual machines are then created on this hardware with the hypervisor software. To align with the Oracle HCTS product terminology, virtual machines created on the RHS are called Virtual System Under Test (VSUT).
- Test Manager System (TM) — System used by the VSUT to perform tests related to the network. The TM should be a system that is already listed on HCL as Certified.

Hardware Requirements

RHS and TM must be non productive systems on an isolated network segment. Network testing might generate a flood of traffic on other systems in the network.

RHS has the following requirements:

- Number of CPU Cores — The RHS must have enough CPU cores to ensure that the VSUT has the maximum virtual CPUs that the hypervisor product supports. Each virtual CPU in the VSUT should map to one CPU core of the RHS.
- Memory — The RHS must have enough memory to ensure that the VSUT has the maximum virtual memory that the hypervisor product supports. Refer to the hypervisor manual to determine the minimum and the maximum amount of memory that the respective hypervisor can have.
- Disk space — The RHS should have enough disk space to run the host OS, the hypervisor product, and the VSUT. Each VSUT should occupy at least 20 Gbyte disk space.
- Network — The RHS should have enough network ports to ensure that each port on the VSUT is able to connect to a network port on the TM. The VSUT should be configured with the maximum virtual network ports that the hypervisor product supports.
- Hardware compatibility with host OS - If a host OS is required, the RHS system must be a certified system for the host OS. Check the Hardware Compatibility List of the host OS provider.

TM has the following hardware and networking requirements:

The TM system must have one functional network port for each network port on the VSUT. The TM system must have at least as many network ports as that of the VSUT. Each port on the VSUT must be connected to the TM system. The TM system can have no more than five more ports than the VSUT.

Software Requirements

To certify a virtual platform, you should have the following software.

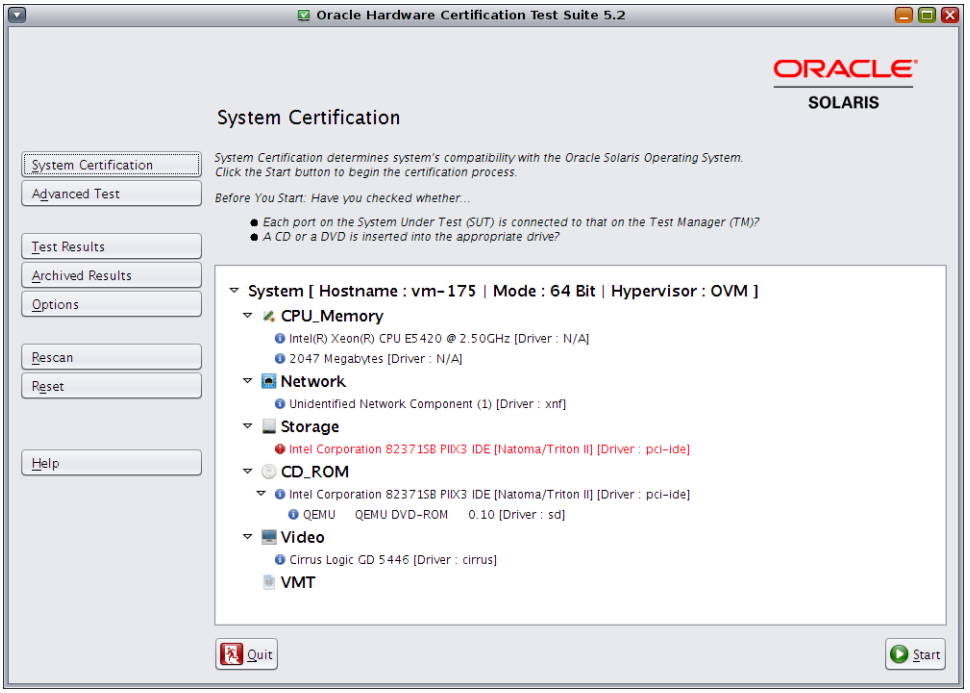
- Host OS
- Hypervisor software
- Oracle Solaris OS
- Oracle HCTS Application

Oracle HCTS on Virtual Platform

If you have installed the Oracle HCTS application on the Oracle Solaris OS or the Oracle Solaris 11 OS that is running as a guest on the virtual platform, you can only certify the whole system, but not an individual component. Hence, the Component Certification button is not be seen on the Oracle HCTS screen. An individual component in the virtual platform might not be valid for the Oracle Solaris OS HCL submission. The Oracle HCTS window in the virtual platform shows the hypervisor name on which the guest OS is being installed.

The following figure shows the Oracle HCTS application window on the virtual platform.

FIGURE 6–1 Virtual System Certification



The result packages are generated after the testing is complete. The term VM is appended to the filename indicating that the package was generated from the virtual platform.

The system setup and the other test procedures remain the same as that of the hardware platform. The procedure for testing the components and creating the custom test plan remains the same as that on the hardware platform which is described in Chapter 4, "Working With Oracle HCTS."

Certifying a Virtual Platform

Depending on the implementation of the hypervisor software, obtain the system requirements as described in the "System Requirements for Testing Virtual Platforms" on page 54 section. This section describes the procedure to certify the virtual platforms.

▼ Steps to Create Oracle HCTS Environment

1 Install the host OS.

If a host OS is required, follow the user guide of the OS to install the host OS on the RHS.

2 Install the hypervisor.

Follow the user guide of the hypervisor product to install it on the host OS or on the RHS.

3 Create a Virtual Machine.

Follow the user guide of the hypervisor product to create a virtual machine. Ensure that the virtual machine has the maximum of virtual CPUs, virtual memory and network ports that the hypervisor product supports. Allocate more than 20 Gbyte disk space for this virtual machine.

4 Customize the Oracle Solaris OS installation.

See "Configuring the Oracle Solaris 10 OS Installation" on page 23 for the customization that needs to be done while installing the Oracle Solaris OS.

See "Configuring the Oracle Solaris 11 OS Installation" on page 24 for the customization that needs to be done while installing the Oracle Solaris 11 OS.

5 Install the Oracle HCTS application.

Perform the following steps to install the Oracle HCTS application on your virtual machine:

- On the VSUT and TM terminals, type the following command to extract the `hcts.5.2.tar.gz` file.

  ```
  $ gzip -cd hcts.5.2.tar.gz | tar xvf -
  ```

  The contents are extracted in the newly created `hcts4.3` directory that is placed in the path where you have downloaded Oracle HCTS 5.2.
- On the VSUT and TM terminals, type the following command to install Oracle HCTS:

  ```
  % su

  #/usr/sbin/pkgadd -d . SUNWhcts
  ```

6 Configure the VSUT.

- On the VSUT, type the following command:

  ```
  /opt/SUNWhcts/bin/reconfigure
  ```

  The command line messages are displayed.
- Type `y` for : `Do you want to set up HCTS executing environment (y/n) ?`
- Type `y` for : `Is Solaris running on a virtual machine (y/n) ?`
- Type the hypervisor name and the version number.

  Follow the prompt message and reboot VSUT.

7 **Run the Oracle HCTS application.**

Use the same procedure as described in the Chapter 4, "Working With Oracle HCTS," to set up the TM. Refer to the software requirements described in Chapter 2, "System Requirements," to set up the network on the VSUT and connect the RHS and TM properly. Then start the Oracle HCTS test on the VSUT.

Submitting a Virtual Platform to the Oracle Solaris HCL

Run the Oracle HCTS system certification test to certify the virtual platform.

If the hypervisor supports several options for network configuration or storage configuration when creating a virtual machine, each option should be tested at least once. This test might result in the execution of the Oracle HCTS system certification test several times.

If the hypervisor supports both the Hardware Virtual Machine (HVM) guest and the para virtual guest, then each type of guest should be tested.

If the hypervisor can run on multiple host OS, test the virtual platforms on each host OS separately. You need not certify the virtual platforms on all the host OS' that the hypervisor supports. Only those host OS that are tested on the virtual machines are listed in the Oracle Solaris OS HCL.

To list a virtual platform as Certified on the Oracle Solaris OS HCL, submit the following information to the Oracle HCTS team for auditing and publishing purposes:

1. Information about the hypervisor product. Include the company name of the hypervisor provider, name of the hypervisor, and the version of the hypervisor.
2. Information of the RHS, manufacturer name, model name, and BIOS version.
3. Information of the host OS if applicable, manufacturer name, OS name, and version number.
4. Oracle HCTS test result packages. If there are multiple test result packages, explain them in the note.
5. Submitter information. Submitter's name, email address, and company name.
6. Any nonstandard configuration of the RHS, host OS, hypervisor product, and the Oracle Solaris OS.

Note – Virtual platforms cannot be submitted to the HCL for this release. However, you can send your feedback.

◆ ◆ ◆ CHAPTER 7

Manual Tests

USB and WiFi devices can be further tested since a few of these tests are not automated. Manual tests ensure that the devices are in the working condition to work with the Oracle Solaris OS.

This chapter includes the following sections:

USB Manual Tests

In Oracle HCTS 5.2, the following sample component certifications require manual configuration.

USB Keyboard Tests

You need to perform the following USB Keyboard manual tests:

- Plug or unplug test
- Usability test
- Internationalization test

▼ To Perform the Plug or Unplug Test

Before You Begin Before starting the automated USB keyboard certification, unplug the keyboard to be certified from the SUT then plug it back. Repeat this test 10 times.

- **Start the Oracle HCTS 5.2 user interface.**

More Information

Expected Result

After this step, Oracle HCTS can detect the keyboard to be certified.

▼ To Perform the Usability Test

1. **Open a few applications in the Oracle Solaris OS.**

   Log in to the Oracle Solaris OS and open applications such as `gnome-terminal (JDS)`, `gedit (JDS)` or `firefox (JDS)`.

2. **Verify the functionality of each key in the keyboard.**

   Ensure that every key and key combination on the keyboard are operating as expected. Also, make sure that the right key events are received when you press the keys.

   Note – Pay attention to any keys that do not exist in the US keyboard layout or those mapped differently than the US keyboard layout.

More Information

Expected Result

Each key generates the correct character onscreen or correct key event.

▼ To Perform the Internationalization Test

1. **Switch as the root user.**

2. **Set the keyboard type and layout.**

   Type `/usr/X11R6/bin/xorgconfig` and set the correct keyboard type and layout.

3. **Restart Xserver.**

4. **Open a few applications in the Oracle Solaris OS.**

   Log in to the Oracle Solaris OS and open some applications such as `gnome-terminal(JDS)`, `gedit(JDS)` or `firefox(JDS)`.

5. **Verify the functionality of each key in the keyboard.**

   Ensure that every key and key combination on the keyboard is operating as expected. Also, make sure that the right key events are received when you press the keys.

More Information

Expected Result

In step 3, when you restart Xserver, no layout error is reported. Characters specific to the keyboard layout are shown correctly in `dtlogin`.

Note – Ensure that the language selected in `dtlogin` corresponds with your keyboard layout.

In step 5, each key generates the correct character on screen or correct key event.

USB Web cam Test

To certify a stand alone USB web cam that is not built into the system, you need to perform the plug or unplug test before starting the automated USB web cam certification.

▼ To Perform the Plug or Unplug Test

Before You Begin Before starting the automated USB web cam certification, unplug the web cam to be certified from the SUT then plug it back. Repeat this test 10 times.

- **Start the Oracle HCTS 5.2 UI.**

More Information

Expected Result

After this step, Oracle HCTS can detect the USB web cam to be certified.

USB Hard Disk, Solid-State Storage Device, and Multimedia Card Reader Test

To certify a stand alone USB hard disk, solid-state storage device, or multimedia card reader, that is not built-in with the system, you need to perform the plug or unplug test before starting the automated USB storage certification.

▼ To Perform the Plug or Unplug Test

Before You Begin Before starting the automated USB storage certification, unplug the storage device to be certified from the SUT then plug it back. Repeat this test 10 times.

- **Start the Oracle HCTS 5.2 UI.**

More Information

Expected Result

After this step, Oracle HCTS can detect the USB storage device to be certified.

USB CD/DVD Reader Tests

You need to perform the following CD/DVD reader manual tests:

- Plug or unplug test
- Boot computer test

▼ To Perform the Plug or Unplug Test

Before You Begin Before starting the automated USB CD/DVD reader certification, unplug the CD/DVD reader to be certified from the SUT then plug it back. Repeat this test 10 times.

● **Start the Oracle HCTS 5.2 UI.**

More Information Expected Result

After this step, Oracle HCTS can detect the CD/DVD reader to be certified.

▼ To Perform the Boot Computer Test

1. **Insert a bootable Oracle Solaris OS installation disk in the CD/DVD reader to be certified.**
2. **Reboot the SUT machine.**
3. **Change the SUT settings to boot from the USB CD/DVD drive.**
4. **Save this change and start the SUT.**

More Information Expected Result

After step 2, SUT boots from the CD/DVD reader and the Oracle Solaris OS installation process begins.

USB CD/DVD Writer

You need to perform the following CD/DVD writer manual tests:

- Plug or unplug test
- Boot computer test
- Media support test

To Perform the Plug or Unplug Test

Before You Begin Before starting the automated USB CD/DVD writer certification, plug and unplug the CD/DVD writer to be certified from the SUT. Repeat this test 10 times.

- **Start the Oracle HCTS 5.2 UI.**

More Information Expected Result

After this step, Oracle HCTS can detect the CD/DVD writer to be certified.

To Perform the Boot Computer Test

1. **Insert a bootable Oracle Solaris OS installation disk into the CD/DVD writer to be certified.**
2. **Reboot SUT machine.**
3. **Change the SUT settings to boot from the USB CD/DVD drive.**
4. **Save this change and start the SUT.**

More Information Expected Result

After step 2, SUT boots from the CD/DVD writer and the Oracle Solaris OS installation process begins.

To perform the Media Support Test

1. **Check the Re-writable Media**

   For each supported re-writable media such as CD-RW, DVD+RW, DVD-RW, and DVD-RAM, insert a disk in the drive that is under test.
2. **Perform the automated USB CD/DVD writer certification test.**

More Information Expected Result

For all the supported re-writable media, the automated USB CD/DVD writer certification is passed.

WiFi Card Manual Tests

The WiFi cards support the following manual tests:

- Transfer mode test
- Encryption protocols test

▼ To Perform the Transfer Mode Test

Before You Begin To test whether the WiFi card supports various transfer modes, you must have the following prerequisites:

- One or more APs that support all the transfer modes. The `802.11b`, `802.11g`, `802.11a`, and `802.11n` standards are commonly supported by the target card and the Oracle Solaris OS.
- One machine that is set up as a TM.
- AP must be correctly connected to the TM machine.

1. **Set up the AP.**

   Set up the AP to work in one of the transfer modes commonly supported by the target card and the Oracle Solaris OS.

2. **Enable the DHCP server capability of the AP.**

3. **Reboot the Oracle Solaris OS on the SUT and start the Oracle HCTS UI.**

4. **Enable the DHCP Network global option.**

5. **Perform the WiFi certification test.**

6. **Change the transfer mode of the AP.**

   Change the transfer mode of the AP to the next one that is commonly supported by the target card and the Oracle Solaris OS. Alternately, change to another AP that supports a different transfer mode.

7. **Repeat step 3 to 5 until all the transfer modes commonly supported by the target card and the Oracle Solaris OS are tested.**

More Information

Expected Result

WiFi certification test passes on all the transfer modes tested.

▼ To Perform the Encryption Protocol Test

Before You Begin

To test whether the WiFi card supports various encryption protocols, you must have the following prerequisites:

- One or more APs that can support the encryption protocols: none, WEP, and WPA which are commonly supported by the target card and the Oracle Solaris OS.
- One machine that is set up as a TM.
- AP must be correctly connected to the TM machine.

1 **Set up the AP**

Set up the AP to work with one of the encryption protocols that are commonly supported by the target card and the Oracle Solaris OS.

2 **Reboot**

Reboot the Oracle Solaris OS on SUT and start the Oracle HCTS UI.

3 **Run the transfer modes tests described in the procedure "To Perform the Transfer Mode Test" on page 64.**

4 **Change the encryption protocol.**

Change the encryption protocol of the AP to the next one that is commonly supported by the target card and the Oracle Solaris OS. Alternately, change to another AP that supports a different encryption protocol.

5 **Repeat step 2 and 3 until all the encryption protocols that are commonly supported by the target card and the Oracle Solaris OS are tested on the card.**

More Information

Expected Result

WiFi certification test passes on all the encryption protocols tested.

Note – For the WEP (Wired Equivalent Privacy) and WPA (Wi-Fi Protected Access) modes of test, you must use the manual network setup to set up the wireless connection for testing.

Suspend/Resume Manual Tests

You need to perform the following manual tests for the Suspend/Resume feature:

- Pre setup
- Pre test
- Simple suspend and wake up tests
- Device tests

▼ To Perform Pre Setup

1. **Add the following line in the `/etc/power.conf` file.**

   ```
   S3-support enable
   ```

2. **Type the following command in the terminal.**

   ```
   pmconfig
   ```

▼ To Perform Pre Test

- **Type the following command in the terminal.**

  ```
  pfexec uadmin 3 22
  ```

Note – Failure of these tests is an automatic failure of the Suspend/Resume manual test. No further testing should be performed until you pass this test.

▼ To Perform Simple Suspend and Wake Up Tests

1. **Type the following command in the terminal.**

   ```
   pfexec uadmin 3 20
   ```

   The system suspends after performing this step.

2. **Wake up the system**

   - Wake up the system by pressing the power button.

     System resumes after pressing the power button.
   - Wake up the system by pressing any key on the keyboard.

     System resumes after pressing any key on the keyboard.

- Wake up the system by setting an alarm.
  - To set an alarm, type the following command in the terminal before performing the suspend operation.

    ```
    echo "rtc_wake/W5" | mdb -kw
    ```

    `W5` indicates that the system will be awakened after 5 seconds
  - Type the following command in the terminal to cancel the alarm that is set:

    ```
    echo "rtc_wake/W0" | mdb -kw"
    ```

  System resumes automatically after the time you set earlier.
- Wake up the system through the Wake on LAN method.

  System resumes after receiving Wake on the LAN magic packet.

▼ To Perform Device Tests

Perform the following actions between suspend and resume.

- Remove and apply power while the system is suspended.
- Add or remove the USB stick.
- Add or remove the SD card, if applicable.
- Add or remove the PCMCIA card, if applicable.
- Turn on/off WiFi if possible while the system is suspended.
- Unplug and plug in the projector.
- Add or remove the firewire device, if applicable.

Each of these tests have two distinct steps:

1. **Suspend the system, add the device, and resume the system.**
2. **Suspend the system, remove the device, and resume the system.**

◆ ◆ ◆ APPENDIX A

Tools in /opt/SUNWhcts/bin

The following table provides a quick reference to the tools and utilities available under /opt/SUNWhcts/bin/ directory:

TABLE A–1 Tools Reference

Tool	Usage	Description
ftp_setup	ftp_setup [path_name]	Sets up an FTP anonymous access for using Oracle HCTS.
ftp_clean	ftp_clean	Disables Oracle HCTS FTP anonymous access.
nfs_config	nfs_config -e	Enables Oracle HCTS NFS environment.
		The /export/home/nfs directory is shared.
	nfs_config -r	Restores the NFS modified by Oracle HCTS to the original state.
ssh_config	ssh_config -e	Enables the SSH access for using Oracle HCTS.
	ssh_config -r	Restores the SSH environment modified by Oracle HCTS to the original state.

TABLE A–1 Tools Reference *(Continued)*

Tool	Usage	Description
net_svcs	net_svcs -c | -e | -r | -t	Enables or restores the network services for Oracle HCTS network testing. **Note –** To run the Oracle HCTS network test cases correctly, the following services should be in the online status: ■ svc:/network/physical:default ■ svc:/network/shell:default ■ svc:/network/ftp:default ■ svc:/network/rpc/spray:default ■ svc:/network/nfs/client:default ■ svc:/network/nfs/mapid:default The Oracle HCTS framework invokes this command automatically before starting the network test cases. In case the above services listed above are still not in the desired state, run this command to put these services in the correct state for Oracle HCTS network testing.
	net_svcs -c	Displays the current state of the network services.
	net_svcs -e	Enables services required for Oracle HCTS network testing.
	net_svcs -r	Restores network services modified by Oracle HCTS to the original state.
	net_svcs -t	Temporarily enables the Oracle HCTS network services, which are active until reboot.
make_mixed_mode_cd	make_mixed_mode_cd	Creates a mixed-mode CD for the CD/DVD reader certification and USB CD/DVD reader certification.
reconfigure	reconfigure	Checks and sets up the Oracle HCTS running environment. Restarts the machine and reconfigures devices.
ibgen_config	ibgen_config -i	This command installs ibgen driver on the system.
	ibgen_config -r	This command removes ibgen driver from the system.

TABLE A–1 Tools Reference *(Continued)*

Tool	Usage	Description
nwam_config	nwam_config -d | -r	Disables or restores the nwam service for Oracle HCTS network testing. For Oracle Solaris 11 OS, the svc:/network/physical:nwam service should be in the disabled state before starting the Oracle HCTS network test. The Oracle HCTS framework automatically invokes this command.
	nwam_config -d	Disables the nwam service.
	nwam_config -r	Restores the nwam service modified by Oracle HCTS to the original state.

◆ ◆ ◆ APPENDIX B

Suspend/Resume Checklist

Machine Information					Date	
No	Case Type	Case Name			Result	Note
1	Manual	Verification Test	`pfexec uadmin 3 22`			
2	Manual	Functional Test	Suspend	`pfexec uadmin 3 20`		
				Power Button		
				Key Press		
				Network		
				Alarm		
3	Manual	Simple Cyclic Test	Key press 10 cycles			
			Power button 10 cycles			
			Alarm 10 cycles			

4	Manual	Device Test	Power		
			USB stick		
			SD card		
			PCMCIA card		
			WIFI		
			Plugin projector/external display		
			Fire wire		
5	Automate	Cyclic and Stress Test	Suspend resume with storage stress		
			Suspend resume with network stress		
			Suspend resume with USB storage stress		
			Suspend resume with USB web camera work		
			Suspend resume with audio play and record		
			Suspend resume with interrupt stress		

Note – The recorded value in the table should be one of the following: Pass, Fail, or Not tested.