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Oracle Solaris 11 Fault Analysis and Troubleshooting

Activity Guide
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Practices for Lesson 1: Course Introduction

Chapter 1

Practices for Lesson 1

Practices Overview

There is no practice for Lesson 1.

Practices for Lesson 2: Analyzing System Failures and Troubleshooting Techniques

Chapter 2

Practices for Lesson 2

Practices Overview

In these practices, you will answer questions and perform steps from the material presented in this lesson. Solutions for each task in this practice are provided after the practice exercises are introduced.

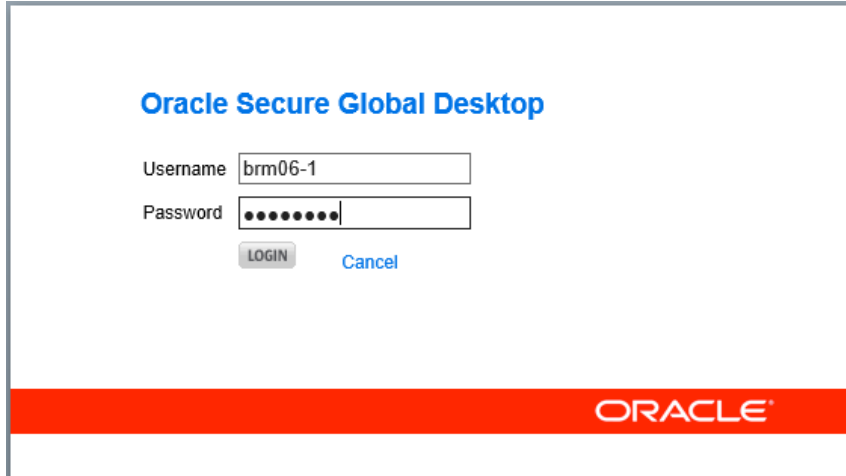
- Using Relevant Log Files and Core Files
- Using an Application's Debug Mode
- Applying the Troubleshooting Technique

Note: The command responses output in this guide are examples only. The command output on your host might be different.

Pre-Tasks for all Practices:

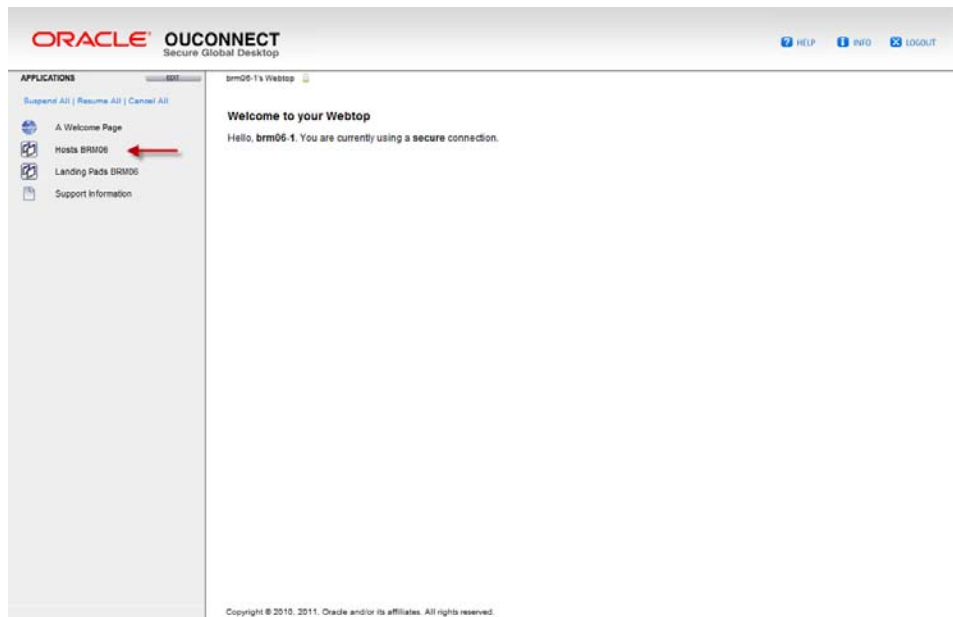
Perform the following steps to prepare for the practices:

1. In a web browser, go to the OU Connect website by typing in this URL:
<https://ouconnect.oracle.com>
2. Click the LOGIN button and log in to your lab environment. See your instructor for login credentials and assigned host.



The image shows the Oracle Secure Global Desktop login interface. At the top, the text "Oracle Secure Global Desktop" is displayed in blue. Below this, there are two input fields: "Username" with the value "brm06-1" and "Password" with masked characters. To the right of the password field is a "Cancel" link. Below the input fields are two buttons: "LOGIN" and "Cancel". At the bottom of the page, there is a red horizontal bar with the "ORACLE" logo in white.

3. Open a Gnome desktop session on your assigned server by selecting your assigned host from the Oracle OUCONNECT Secure Global Desktop.



4. Select your assigned host and click Start:

Server	Description
<input checked="" type="radio"/> host01	host01 - 192.168.106.11
<input type="radio"/> host02	host02 - 192.168.106.21
<input type="radio"/> host03	host03 - 192.168.106.31
<input type="radio"/> host04	host04 - 192.168.106.41
<input type="radio"/> host05	host05 - 192.168.106.51
<input type="radio"/> host06	host06 - 192.168.106.61
<input type="radio"/> host07	host07 - 192.168.106.71
<input type="radio"/> host08	host08 - 192.168.106.81
<input type="radio"/> host09	host09 - 192.168.106.91
<input type="radio"/> host10	host10 - 192.168.106.101
<input type="radio"/> host11	host11 - 192.168.106.111
<input type="radio"/> host12	host12 - 192.168.106.121
<input type="radio"/> host13	host13 - 192.168.106.131
<input type="radio"/> host14	host14 - 192.168.106.141
<input type="radio"/> host15	host15 - 192.168.106.151
<input type="radio"/> host16	host16 - 192.168.106.161
<input type="radio"/> instructor01	instructor01 - 192.168.106.181

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5. You may log in as the user `oracle` with the password `oracle`, or log in directly as `root`, depending on the task at hand. If you log in as the user, run the `su` command to assume primary administrator privileges as needed.

```
root@host01:~$ su -
```

```
Password: cangetin
```

Note: Passwords are site-specific and are subject to change. If the password shown in the example does not work, check with your instructor for the latest password.

Practice 2-1: Using Relevant Log Files and Core Files

Overview

In Task1, you gather information about the system—in the form of log files and system messages—and interpret them. In Task 2, you also display the crash dump configuration and examine a core file to gather general information about a system panic.

Task 1

Perform the following steps:

1. For system errors, use the `tail` command to display the last lines of the console messages file:

```
# tail /var/adm/messages
```

Note: If there are no error messages to look at in that file, you can use this file that is created for the purposes of this practice: `/var/adm/messages.example`

Are there any messages on this system? How would you address them?

2. Next, use the `svcs -xv` command to display detailed information about a service that has been disabled on your system, such as `ldoms/agents`:

```
# svcs -xv ldoms/agents
```

What action(s) would you take to correct the problem(s)?

3. Find the corresponding log file for this service on your system and display it for more information about why the service is disabled:

```
# more /var/svc/log/ldoms-agents:default.log
```

Is there any added information as to why the service is not running?

Now, what action(s) would you take to correct the problem(s)?

4. Next, use the `tail` command again to display the last lines of the installation log:

```
# tail /var/sadm/system/logs/install_log
```

What does the log file state at the end? Was the installation successful?

5. Last, use the `pkg history` command to check a history log of all package operations performed on your system:

```
# pkg history
```

List some of the operations that were performed: Were all of them successful?

Task 2

Perform the following steps:

1. Assume that a system has just crashed with a panic. In order to analyze the system panic, first use the `dumpadm` command to display the current crash dump configuration:

```
# dumpadm
```

In which directory are dump files saved after a `savecore` operation?

2. For this next step, a dump file has been created for you and it exists in the `/opt/ora/course_files` directory. Copy this file to your `savecore` directory:

```
# cp /opt/ora/course_files/vmdump.0 /var/crash
```

Note: Normally, you would change directories to the directory specified in `dumpadm` such as `/var/crash` and the dump file is written there if you have `savecore` enabled.

3. Change to that directory and list the directory to identify the crash file and its number:

```
# cd /var/crash
# ls
```

4. Use the `savecore` command to convert the dump file to files that can be analyzed with `mdb`:

```
# savecore -f vmdump.0
```

5. List the directory to verify that the files now exist:

```
# ls
```

6. Use the `mdb` utility to analyze the crash dump:

```
# mdb 0
>
```

7. Get `mdb` help to list the general usage syntax:

```
> ::help
```

8. Examine the general status information by using the `status` command:

```
> ::status
```

Based on the error message, what kind of panic is this?

9. As shown in the case study, display the console error messages with the following command:

```
> ::msgbuf
```

On which CPU did this panic occur?

What is the thread number?

Note: To continue this analysis, you might take a deeper look at the thread that had the panic or the CPU where it occurred. This will be the subject of a subsequent practice in module 9 where you will go deeper into this kind of fault analysis.

10. Exit the `mdb` tool:

```
> $q
```

Practice 2-2: Using an Application's Debug Mode

Overview

In this practice, you use a program in debug mode to get verbose message output to the screen. Most applications and programs have a verbose or debug mode. This is often very useful and is part of the troubleshooting technique.

Task 1

Perform the following steps:

1. For this task, use the `ssh` program in verbose (debug) mode to get verbose output. First `ssh` to your own machine by using the `-v` option and note the messages on the screen, which could be used to debug a problem:

```
# ssh -v <yourhost>
```

What types of routines did verbose mode show as the `ssh` command was executing that are not normally output to the screen?

2. Now use the same command and `ssh` to a machine that does not exist:

```
# ssh -v host100
```

How many routines did the `ssh` command get to this time as opposed to last time? At which function did the command fail?

Practice 2-3: Applying the Troubleshooting Techniques

Overview

In this practice, you are given a fault and you will apply the assumptive troubleshooting strategy to:

- Clarify the problem statement
- Prioritize the most probable cause of failure
- Gather all the pertinent information
- Quantify a solution for the fault
- Apply the solution
- Verify that solution solves the problem, or else try the next most probable cause of failure

Fault Analysis Task

A new service is created called `mysvc` and then identified as the source for automated install with the command below:

```
# installadm create-service -n mysvc -s /export/aiimages/s11ai.iso \
-d /export/auto_install/mysvc
```

This produces the following error message when booting:

```
{0} ok boot net:dhcp - install
Boot device: /pci@400/pci@2/pci@0/pci@6/network@0:dhcp File and args:
- install
install1000 Mbps full duplex Link up
Timed out waiting for BOOTP/DHCP reply
HTTP: Bad Response: 500 Internal Server Error
(wanboot.conf error: Can't open configuration file)
ERROR: boot-read fail
Boot load failed.
{0} ok
```

- What is the problem statement?

- List your best guesses as the most probable causes of failure and prioritize them:
 1. _____
 2. _____
 3. _____
- What pertinent information would you gather?

- What is your solution to this problem and how would you apply it?

- How would you verify that the solution solves the problem?

- What would you do if your first solution did not solve the problem?

Solution 2-1: Using Relevant Log Files and Core Files

Task 1

Perform the following steps:

1. For system errors, use the `tail` command to display the last lines of the console messages file:

```
# tail /var/adm/messages
Feb 14 03:49:25 host03 last message repeated 1 time
Feb 14 05:49:29 host03 SC Alert: [ID 628137 daemon.alert] BATTERY at
SC/BAT/V_BAT has exceeded low warning threshold.
```

Note: If there are no error messages to look at in that file, you can use this file that is created for the purposes of this practice: `/var/adm/messages.example`

Are there any messages on this system? How would you address them?

In this case, the log file shows that a battery needs to be replaced.

2. Next, use the `svcs -xv` command to display detailed information about a service that has been disabled on your system such as `ldoms/agents`:

```
# svcs -xv ldoms/agents
svc:/ldoms/agents:default (Logical Domains agents service)
State: disabled since June 18, 2013 04:05:42 PM MDT
Reason: Temporarily disabled by an administrator.
See: http://support.oracle.com/msg/SMF-8000-1S
See: man -M /usr/share/man -s 1M ldmad
See: /var/svc/log/ldoms-agents:default.log
Impact: This service is not running.
```

What action(s) would you take to correct the problem(s)?

Try enabling the service, look for any dependent services that may need to start first, and look at the corresponding log file for more information.

3. Find the corresponding log file for this service on your system and display it for more information about why the service is disabled:

```
# more /var/svc/log/ldoms-agents:default.log
Jun  4 20:18:19 Enabled. ]
[ Jun  4 20:18:19 Rereading configuration. ]
[ Jun  4 20:18:19 Executing start method ("/lib/svc/method/ldoms-
agents"). ]
The Logical Domains agents service has been disabled because the
system has no virtual domain service (vlds) device.
[ Jun  4 20:18:20 Method "start" exited with status 0. ]
[ Jun  4 20:18:20 Stopping because service disabled. ]
[ Jun  4 20:18:20 Executing stop method (:kill). ]
[ Jun 18 22:05:42 Enabled. ]
[ Jun 18 22:05:42 Executing start method ("/lib/svc/method/ldoms-
agents"). ]
The Logical Domains agents service has been disabled because the
system has no virtual domain service (vlds) device.
```



```
[ Jun 18 22:05:42 Method "start" exited with status 0. ]
[ Jun 18 22:05:42 Stopping because service disabled. ]
[ Jun 18 22:05:42 Executing stop method (:kill). ]
```

Is there any added information as to why the service is not running?

Yes, the agent service was disabled because there is no virtual domain service device.

Now, what action(s) would you take to correct the problem(s)?

In this case, none, because it was disabled for a good reason.

4. Next, use the `tail` command again to display the last lines of the installation log:

```
# tail /var/sadm/system/logs/install_log
2013-02-28 04:14:00,883   InstallationLogger INFO    Automated Installation
succeeded.
2013-02-28 04:14:00,936   InstallationLogger DEBUG   Transferring log to
/a/var/log/install/
2013-02-28 04:14:00,978   InstallationLogger INFO    System will be rebooted
now
2013-02-28 04:14:01,030   InstallationLogger DEBUG   Shutting down Progress
Handler
```

What does the log file state at the end? Was the installation successful?

The AI installation succeeded, the log file was transferred, and the system rebooted.

5. Last, use the `pkg history` command to check a history log of all package operations performed on your system:

```
# pkg history
```

START	OPERATION	CLIENT	OUTCOME
2013-02-27T20:01:4	set-property	transfer module	Succeeded
2013-02-27T20:01:47	add-publisher	transfer module	Succeeded
2013-02-27T20:01:47	refresh-publishers	transfer module	Succeeded
2013-02-27T20:01:47	image-create	transfer module	Succeeded
2013-02-27T20:01:57	rebuild-image-catalogs	transfer module	Succeeded
2013-02-27T20:02:05	add-publisher	transfer module	Succeeded
2013-02-27T20:02:06	rebuild-image-catalogs	transfer module	Succeeded
2013-02-27T20:02:06	refresh-publishers	transfer module	Succeeded
2013-02-27T20:02:15	install	transfer module	Succeeded
2013-02-27T21:59:03	uninstall	pkg	Succeeded

List some of the operations that were performed: Were all of them successful?

The operations are listed above such as set-property, add-publisher, and so on.

In this example, all of them were successful but your system may be different.

Task 2

Perform the following steps:

1. Assume that a system has just crashed with a panic. In order to analyze the system panic, first use the `dumpadm` command to display the current crash dump configuration:

```
# dumpadm
Dump content: kernel pages
Dump device: /dev/zvol/dsk/rpool/dump (dedicated)
Savecore directory: /var/crash
Savecore enabled: yes
Save compressed: on
```

In which directory are dump files saved after a `savecore` operation?

`/var/crash`

2. For this next step, a dump file has been created for you and it exists in the `/opt/ora/course_files` directory. Copy this file to your `savecore` directory:

```
# cp /opt/ora/course_files/vmdump.0 /var/crash
```

Note: Normally, you would change directories to the directory specified in `dumpadm` such as `/var/crash` and the dump file is written there if you have `savecore` enabled.

3. Change to the directory and list the directory to identify the crash file and its number:

```
# cd /var/crash
# ls
vmdump.0
```

4. Use the `savecore` command to convert the dump file to files that can be analyzed with `mdb`:

```
# savecore -f vmdump.0
```

5. List the directory to verify that the files now exist:

```
# ls
unix.0    vmcore.0  vmdump.0
```

6. Use the `mdb` utility to analyze the crash dump:

```
# mdb 0
>
```

7. Get `mdb` help to list the general usage syntax:

```
# tail /var/adm/messages> ::help
Each debugger command in mdb
is structured as follows:
      [ address  [, count]] verb [ arguments ... ]
      ^          ^          ^          ^
the start ---+  |          |          +-- arguments are strings which can
be address can be an |          |          quoted using " " or ' ' or
expression           |          |          expressions enclosed in $[ ]
                     |          |
the repeat count    ---+      +----- the verb is a name which begins
is also an expression                                with either $, :, or ::. it can also
                                                        be a format specifier (/ \ ? or =)
```

```

For information on debugger commands (dcmds) and walkers, type:
::help cmdname ... for more detailed information on a command
::dcmds         ... for a list of dcmds and their descriptions
::walkers       ... for a list of walkers and their descriptions
::dmods -l      ... for a list of modules and their dcmds and walkers
::formats       ... for a list of format characters for / \ ? and =
For information on command-line options, type:
$ mdb -?        ... in your shell for a complete list of options

```

8. Examine the general status information by using the status command:

```

> ::status
debugging crash dump vmcore.0 (64-bit) from host01
operating system: 5.11 11.1 (sun4v)
usr/src version: 18828:5d68fa7861ea:0.175.1.7.0.2.0:S11.1SRU7.2+1
usr/closed version:
1755:cf15b5df45b4:0.175.1.7.0.2.0:S11.1SRU7.2+1
image uuid: dc120d6f-f6e8-c496-b4af-c2ee4f6e64fe
panic message:
BAD TRAP: type=31 rp=2a1027ff050 addr=a8 mmu_fsr=0 occurred in
module "genunix"
due to a NULL pointer dereference
dump content: kernel pages only
WARNING: /dev/kmem written to, use ::kmemstatus to view log.

```

Based on the error message, what kind of panic is this?

BAD TRAP

9. As shown in the case study, display the console error messages with the following command:

```

> ::msgbuf
MESSAGE
/pci@7c0/pci@0/pci@1/pci@0,2/LSILogic,sas@2/sd@2,0 (sd4) online
pseudo-device: llc10
llc10 is /pseudo/llc1@0
pseudo-device: lockstat0
lockstat0 is /pseudo/lockstat@0
. . . . . (output truncated) . . . . .
pseudo/zconsnex@1/zcons@0 (zcons0) online
/pseudo/zconsnex@1/zcons@1 (zcons1) online
/pseudo/zconsnex@1/zcons@1 (zcons1) online
/pseudo/zconsnex@1/zcons@2 (zcons2) online
/pseudo/zconsnex@1/zcons@2 (zcons2) online
panic[cpu11]/thread=40325fc2380:
BAD TRAP: type=31 rp=2a1027ff050 addr=a8 mmu_fsr=0 occurred in module
"genunix"
due to a NULL pointer dereference
nscd:
trap type = 0x31addr=0xa8
pid=1588, pc=0x12add70, sp=0x2a1027fe8f1, tstate=0x4480001606,
context=0x7

```

```

g1-g7: 64dd6, 14, 2e, 64dd5, 0, 0, 40325fc2380

000002a1027feda0 unix:die+7c (31, 2a1027ff050, a8, 0, 0, 10c3400)
%10-3: 00000000000000031 0000000001000000 00000000000002000
00000000010c34c8
%14-7: 00000000010c3400 00000000000000005 00000000000000000
000002a1027fee60
000002a1027fee80 unix:trap+a3c (2a1027ff050, fa5f60a8, 1fff, 0, 1c00,
0)
%10-3: 00000000000000000 00000000000000031 00000000c1680000
00000000000000001
%14-7: 0000040327e44240 00000000000000005 00000000000000000
00000000000000001
000002a1027fefaf0 unix:ktl0+64 (2a1027ff618, 0, 14, 0, 0, 21745b40)
%10-3: 0000030000014000 00000000000000058 0000004480001606
000000000101e4a8
%14-7: 0000040327e44240 0000040321745b40 00000000000000000
000002a1027ff0f0 genunix:lookupnpnatcred+118 (21745b40, 40327e44240, 0,
4000, 1,
0)
%10-3: 00000000000000000 00000000000000000 00000000000000000
00000000000000001
%14-7: 0000040327e44240 0000040321745b40 0000000021745b40
00000000000000000
000002a1027ff1a0 genunix:lookupnpvp+b5c (2a1027ff618, 0, 14, 0, 0,
21745b40)
%10-3: 00000000000000000 00000000000000000 00000000000000000
00000000000000001
%14-7: 0000040327e44240 0000040321745b40 0000000021745b40
000002a1027ff618
000002a1027ff440 genunix:lookupnpnatcred+118 (21745b40, 0, 70, 0,
2a1027ff910, 40
327e44240)
%10-3: 0000000000000002f 00000000000000001 00000000000000001
0000000021745b40
%14-7: 00000000000000000 00000000000000010 0000040328387008
000002a1027ff618
000002a1027ff510 genunix:lookupnameatcred+4c (f49dbaf0, 0, 2a1027ff618,
0, 2a102
7ff910, 0)
%10-3: 00000000000000000 00000000000000001 00000000000000001
00000000000000100
%14-7: 00000000000000000 00000000000000001 00000000000000000
0000040327e44240
000002a1027ff640 genunix:lookupnameat+20 (f49dbaf0, 0, 1, 0,
2a1027ff910, 40327e
44240)
%10-3: 00000000000000000 00000000000000001 00000000000000001
00000000000000100

```

```

%l4-7: 0000000000000000 0000000000000000 0000000000000000
0000000000000000
000002a1027ff700 genunix:vn_openat+e8 (f49dbaf0, 40000, 1, 2a1027ff910,
0, 0)
%l0-3: 0000000000000000 0000000000000001 0000000000000001
0000000000000000
%l4-7: 0000000000000000 0000000000000000 0000000000000000
0000000000000000
000002a1027ff930 genunix:copen+434 (f49dbaf0, 600000, 1, 379a0, 0, 0)
%l0-3: 0000000000000000 000000000000009a0 000000000000000a
000000000000000a
%l4-7: 0000000000000012 0000040328387008 0000000000000000
00000000000004000

syncing file systems...
done
dumping to /dev/zvol/dsk/rpool/dump, offset 65536, content: kernel
>

```

On which CPU did this panic occur?

In this example, cpu11

What is the thread number?

In this example, 40325fc2380

Note: To continue this analysis, you might take a deeper look at the thread that had the panic or the CPU where it occurred. This will be the subject of a subsequent practice in module 9 where you will go deeper into this kind of fault analysis.

10. Exit the `mdb` tool:

```
> $q
```

Solution 2-2: Using an Application's Debug Mode

Task 1

Perform the following steps:

1. For this task, use the `ssh` program in verbose (debug) mode to get verbose output. First `ssh` to your own machine by using the `-v` option and note the messages on the screen, which could be used to debug a problem:

```
# ssh -v host05
Sun_SSH_2.0, SSH protocols 1.5/2.0, OpenSSL 0x100000af
debug1: Reading configuration data /etc/ssh/ssh_config
debug1: Rhosts Authentication disabled, originating port will not
be trusted.
debug1: ssh_connect: needpriv 0
debug1: Connecting to host05 [192.168.124.51] port 22.
debug1: Connection established.
debug1: ssh_kmf_check_uri: /root/.ssh/identity
debug1: Identity file/URI '/root/.ssh/identity' pubkey type
UNKNOWN
debug1: ssh_kmf_check_uri: /root/.ssh/id_rsa
debug1: Identity file/URI '/root/.ssh/id_rsa' pubkey type UNKNOWN
debug1: ssh_kmf_check_uri: /root/.ssh/id_dsa
debug1: Identity file/URI '/root/.ssh/id_dsa' pubkey type UNKNOWN
debug1: Logging to host: host05
debug1: Local user: root Remote user: root
debug1: Remote protocol version 2.0, remote software version
Sun_SSH_2.0
debug1: match: Sun_SSH_2.0 pat Sun_SSH_2.*
debug1: Enabling compatibility mode for protocol 2.0
debug1: Local version string SSH-2.0-Sun_SSH_2.0
debug1: use_engine is 'yes'
debug1: pkcs11 engine initialized, now setting it as default for
RSA, DSA, and symmetric ciphers
debug1: pkcs11 engine initialization complete
debug1: Creating a global KMF session.
debug1: My KEX proposal before adding the GSS KEX algorithm:
debug1: Failed to acquire GSS-API credentials for any mechanisms
(No credentials were supplied, or the credentials were
unavailable or inaccessible
)
debug1: SSH2_MSG_KEXINIT sent
debug1: SSH2_MSG_KEXINIT received
debug1: My KEX proposal I sent to the peer:
debug1: KEX proposal I received from the peer:
debug1: kex: server->client aes128-ctr hmac-sha2-256 none
```

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```

debug1: kex: client->server aes128-ctr hmac-sha2-256 none
debug1: Host key algorithm 'ssh-rsa' chosen for the KEX.
debug1: Peer sent proposed langtags, ctos: de-DE,en-US,es-ES,fr-FR,it-IT,ja-JP,ko-KR,pt-BR,zh-CN,zh-TW,i-default
debug1: Peer sent proposed langtags, stoc: de-DE,en-US,es-ES,fr-FR,it-IT,ja-JP,ko-KR,pt-BR,zh-CN,zh-TW,i-default
debug1: We proposed langtags, ctos: en-US
debug1: We proposed langtags, stoc: en-US
debug1: Negotiated lang: en-US
debug1: SSH2_MSG_KEX_DH_GEX_REQUEST sent
debug1: expecting SSH2_MSG_KEX_DH_GEX_GROUP
debug1: Remote: Negotiated main locale: en_US.UTF-8
debug1: Remote: Negotiated messages locale: en_US.UTF-8
debug1: dh_gen_key: priv key bits set: 245/512
debug1: bits set: 2085/4095
debug1: SSH2_MSG_KEX_DH_GEX_INIT sent
debug1: expecting SSH2_MSG_KEX_DH_GEX_REPLY
debug1: ssh_kmf_key_from_blob: blob length is 277.
The authenticity of host 'host05 (192.168.124.51)' can't be
established.
RSA key fingerprint is
5a:cb:87:8c:8e:a3:3b:fd:0e:9d:5e:86:05:e3:17:de.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'host05,192.168.124.51' (RSA) to the
list of known hosts.
debug1: bits set: 2042/4095
debug1: ssh_rsa_verify: signature correct
debug1: set_newkeys: setting new keys for 'out' mode
debug1: SSH2_MSG_NEWKEYS sent
debug1: expecting SSH2_MSG_NEWKEYS
debug1: set_newkeys: setting new keys for 'in' mode
debug1: SSH2_MSG_NEWKEYS received
debug1: done: ssh_kex2.
debug1: send SSH2_MSG_SERVICE_REQUEST
debug1: got SSH2_MSG_SERVICE_ACCEPT
debug1: Authentications that can continue: gssapi-keyex,gssapi-
with-mic,publickey,password,keyboard-interactive
debug1: Next authentication method: gssapi-keyex
debug1: Next authentication method: gssapi-with-mic
debug1: Failed to acquire GSS-API credentials for any mechanisms
(No credentials were supplied, or the credentials were
unavailable or inaccessible
)
debug1: Next authentication method: publickey

```

```

debug1: Trying private key: /root/.ssh/identity
debug1: ssh_kmf_check_uri: /root/.ssh/identity
debug1: Trying private key: /root/.ssh/id_rsa
debug1: ssh_kmf_check_uri: /root/.ssh/id_rsa
debug1: Trying private key: /root/.ssh/id_dsa
debug1: ssh_kmf_check_uri: /root/.ssh/id_dsa
debug1: Next authentication method: keyboard-interactive
Password:xxxxxxx
debug1: Authentication succeeded (keyboard-interactive)
debug1: SSH receive window size: 515488 B
debug1: channel 0: new [client-session]
debug1: send channel open 0
debug1: Entering interactive session.
debug1: ssh_session2_setup: id 0
debug1: channel request 0: env
debug1: channel request 0: env
debug1: channel request 0: env
debug1: channel request 0: env
debug1: channel request 0: env
debug1: channel request 0: env
debug1: channel request 0: env
debug1: channel request 0: env
debug1: channel request 0: env
debug1: channel request 0: pty-req
debug1: channel request 0: shell
debug1: fd 4 setting TCP_NODELAY
debug1: channel 0: open confirm rwindow 0 rmax 32768
debug1: Remote: Channel 0 set: LANG=en_US.UTF-8
debug1: Remote: Channel 0 set: LC_CTYPE=
debug1: Remote: Channel 0 set: LC_COLLATE=
debug1: Remote: Channel 0 set: LC_TIME=
debug1: Remote: Channel 0 set: LC_NUMERIC=
debug1: Remote: Channel 0 set: LC_MONETARY=
debug1: Remote: Channel 0 set: LC_MESSAGES=
debug1: Remote: Channel 0 set: LC_ALL=
Last login: Sat Feb  5 16:24:43 2000 from host05
Oracle Corporation      SunOS 5.11      11.1      September 2012
Welcome to D78767GC10_Lab on host05

```

What types of routines did verbose mode show as the ssh command was executing that are not normally output to the screen?

List some of the routines above such as checking the configuration, privileges, and identity.

2. Now use the same command and `ssh` to a machine that does not exist:

```
# ssh -v host100
Sun_SSH_2.1, SSH protocols 1.5/2.0, OpenSSL 0x100000af
debug1: Reading configuration data /etc/ssh/ssh_config
debug1: Rhosts Authentication disabled, originating port will not
be trusted.
debug1: ssh_connect: needpriv 0
ssh: host100: temporary name resolution failure
```

How many routines did the `ssh` command get to this time as opposed to last time? At which function did the command fail?

In this case, the command opened and read the configuration data, read that authentication for hosts was disabled, and then passed that information to a privilege variable, and then failed upon name resolution.

Solution 2-3: Applying the Troubleshooting Techniques

Fault Analysis Task

A new service was created called `mysvc` and identified as the source for automated install with the command below:

```
# installadm create-service -n mysvc -s /export/aiimages/s11ai.iso \
-d /export/auto_install/mysvc
```

This produced the following error message when booting:

```
{0} ok boot net:dhcp - install
Boot device: /pci@400/pci@2/pci@0/pci@6/network@0:dhcp File and args:
- install
install1000 Mbps full duplex Link up
Timed out waiting for BOOTP/DHCP reply
HTTP: Bad Response: 500 Internal Server Error
(wanboot.conf error: Can't open configuration file)
ERROR: boot-read fail
Boot load failed.
{0} ok
```

- What is the problem statement?
A new service causes the system to not boot.
- List your best guesses as the most probable causes of failure and prioritize them:
Based on the error message above, the best guess is that there is a permissions problem on the AI configuration files, or they do not exist in the expected location. But other possibilities are that there is a problem with the `mysvc` file itself such as permissions or corruption, a problem in the boot loader, and so on.
- What pertinent information would you gather?
Because the system does not boot, there may not be any relevant log files to check, but you can check the permissions in the `wanboot.conf` (and `system.conf`) files and verify that they can be opened by the install routine and that they exist in the expected locations. You could also check that the system will still boot from the previous install service to verify that the problem lies somewhere with the new service.
- What is your solution to this problem and how would you apply it?
The simplest solution is to change the permissions of the configuration files and try to boot again:

```
# chmod 644 /var/ai/services/mysvc/system.conf
# chmod 644 /export/auto_install_mysvc/wanboot.conf
Another solution is to set the umask to 022 before creating the service:
# umask 022
# installadm create-service -n mysvc -s \
/export/aiimages/s11ai.iso -d /export/auto_install/mysvc
```

- How would you verify that the solution solves the problem?
For this problem, the solution is apparent if the system boots successfully from the new service.
- What would you do if your first solution didn't solve the problem?
You can proceed down the prioritized list in Step 2 until a solution does solve the problem.

Practices for Lesson 3: Troubleshooting SPARC- based Systems

Chapter 3

Practices for Lesson 3

Practices Overview

In these practices, you will answer questions and perform steps from the material presented in this lesson. Solutions for each task in this practice are provided after the practice exercises are introduced.

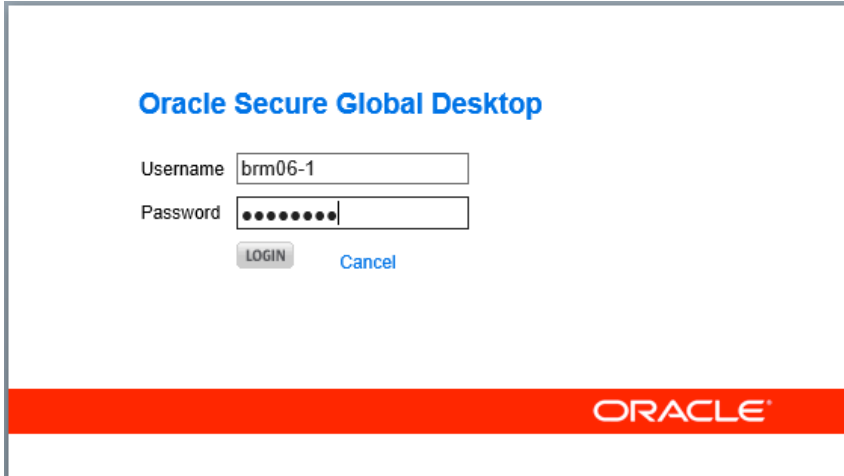
- Using the OBP Commands to Display System Information
- Modifying OBP Variables

Note: The command responses output in this guide are examples only. The command output on your host might be different.

Pre-Tasks for all Practices:

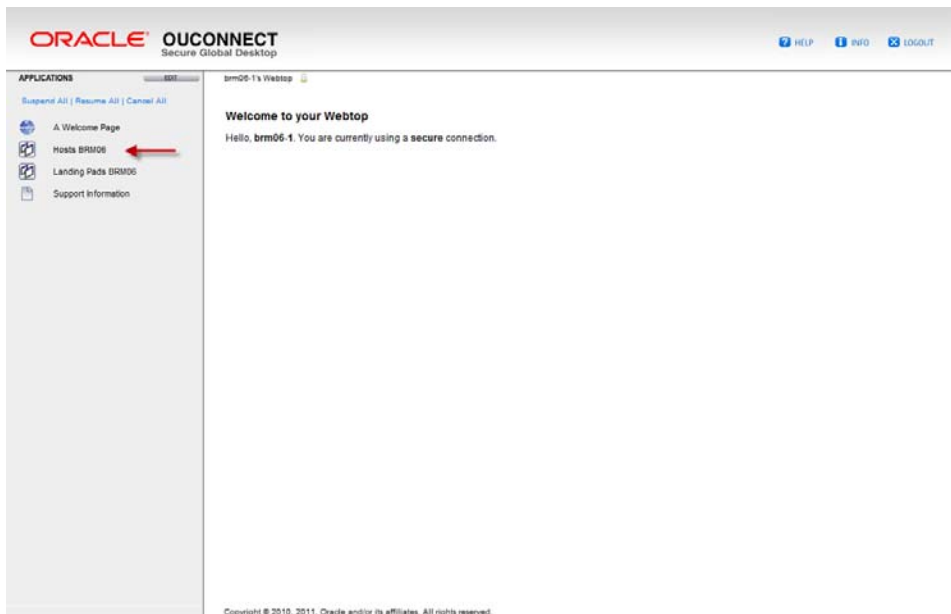
Perform the following steps to prepare for the practices:

1. In a web browser, go to the OU Connect website by typing this URL:
<https://ouconnect.oracle.com>
2. Click the LOGIN button and log in to your lab environment. See your instructor for login credentials and assigned host.

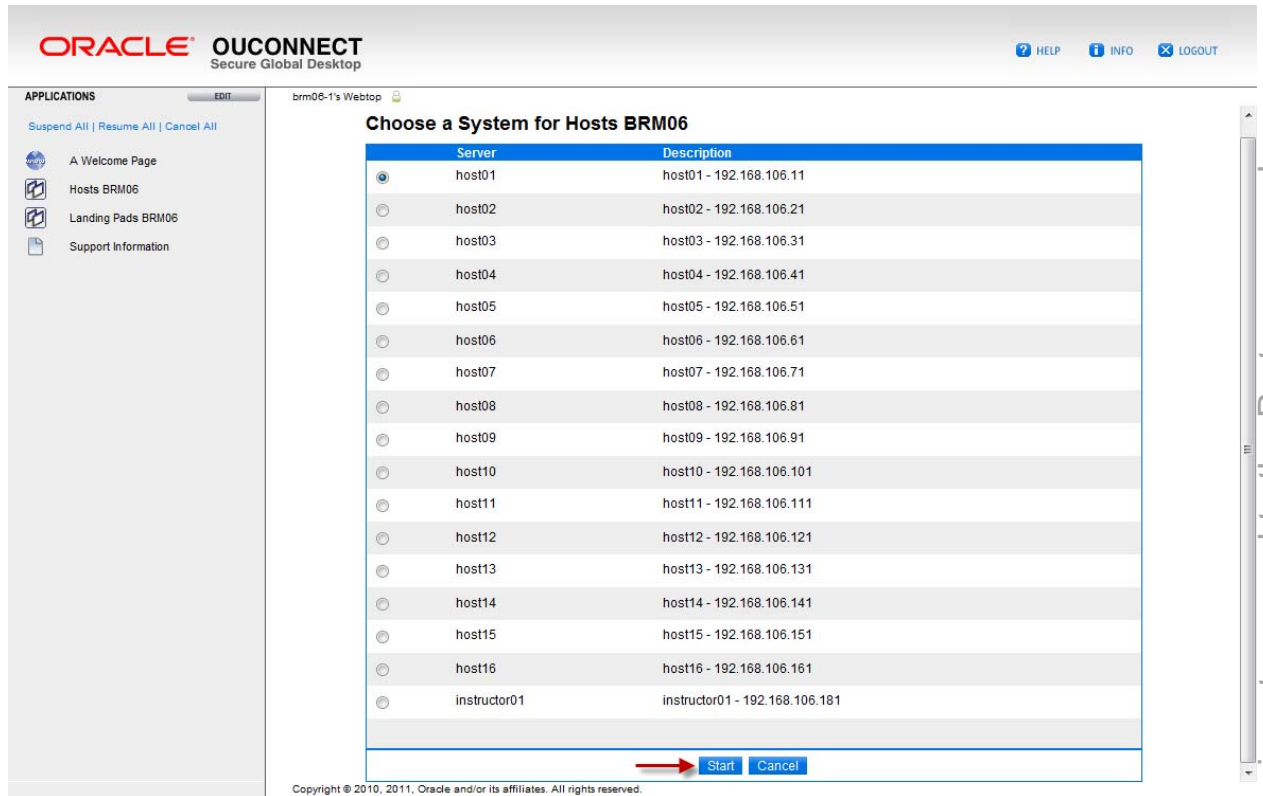


The image shows the Oracle Secure Global Desktop login interface. At the top, the text "Oracle Secure Global Desktop" is displayed in blue. Below this, there are two input fields: "Username" with the value "brm06-1" and "Password" with masked characters. To the right of the password field is a "Cancel" link. Below the input fields are two buttons: "LOGIN" and "Cancel". At the bottom of the page, there is a red horizontal bar with the "ORACLE" logo in white.

3. Open a Gnome desktop session on your assigned server by selecting your assigned host from the Oracle OUCONNECT Secure Global Desktop.



- Select your assigned host and click Start.



- You may log in as the user `oracle` with the password `oracle`, or log in directly as `root`, depending on the task at hand. If you log in as the user, run the `su` command to assume primary administrator privileges as needed.

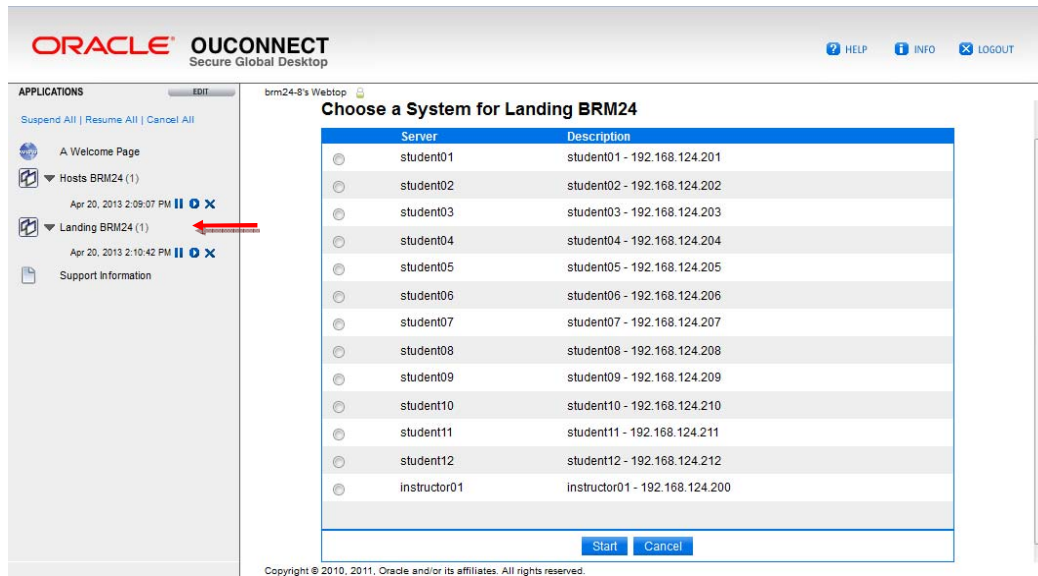
```
root@host01:~$ su -
```

```
Password: cangetin
```

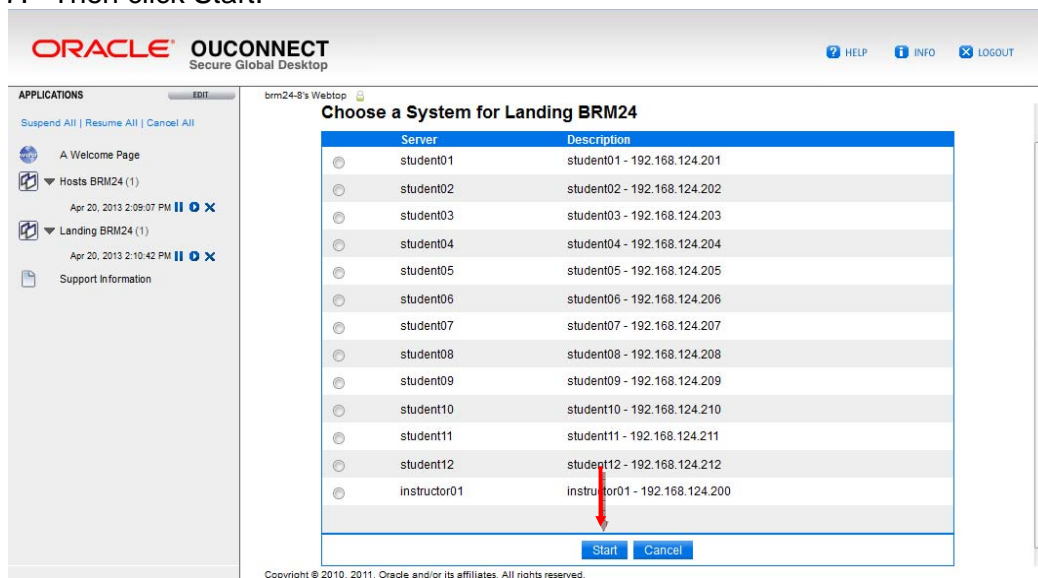
Note: Passwords are site-specific and are subject to change. If the password shown in the example does not work, check with your instructor for the latest password.

For these practices you will also need access to the Service Controller (SC) and OpenBoot PROM (OBP) prompt. To get to the `ok` prompt on a physical system, type L1-A (Stop-A) keys or the Break key. This depends on the specific system.

- To get to the OBP prompt in the LVC classroom, select the landing pad that corresponds with your assigned host, such as `student03` if you are on `host03`:



- Then click Start:



- When the CDE desktop is loaded, open a terminal window and then `telnet` to the service controller for your host, all of which are listed in the `/etc/hosts` file. Here is an example using `host03`:

```
# telnet 192.168.106.30
Trying 192.168.106.30...
Connected to 192.168.106.30.
Escape character is '^]'.
Copyright (c) 2010, Oracle and/or its affiliates. All rights reserved.
```

Copyright © 2010, 2011, Oracle and/or its affiliates. All rights reserved.

```
Oracle Advanced Lights Out Manager CMT v1.7.1
Please login: admin
Please Enter password: cangetin
```

Note:

- You are now at the SC, signified by the `-sc` prompt. From here, you can enter ALOM commands. To get to the OBP, continue by sending a break to the system, followed by forcing a console session:

```
host03-sc>break
Are you sure you want to send a break to the system [y/n]? y
host03-sc>
SC Alert: SC Request to send Break to host.
host03-sc>console -f
Warning: User <> currently has write permission to this console
and forcibly removing them will terminate any current write
actions and all work will be lost. Would you like to continue?
[y/n] y
Enter #. to return to ALOM.
{12} ok
```

- As the instructions say, enter `#.` to return to ALOM from the `ok` prompt.
- Whenever you boot to the net by using DHCP, the default root password is `solaris`.

Practice 3-1: Using OBP Commands to Display System Information

Overview

In this practice, you use the OpenBoot PROM (OBP) commands to display relevant system information, and display the same information using different commands at the regular prompt.

Task 1

Perform the following steps:

1. Navigate to the OBP prompt as described in the Pre-Task section of this practice. Use the `banner` command to display the current OBP version and other pertinent information:

```
ok banner
```

What is the OBP version on your system?

What is the Ethernet address?

What is the Host ID?

2. Use the `printenv` command to display the OBP variables on this system:

```
ok printenv
```

What is the default setting for `auto-boot`?

What is the current setting for `auto-boot`?

3. Use the `printenv` command to display information about a certain variable such as the `boot-device`:

```
ok printenv boot-device
```

What is the current `boot-device` setting?

What is the default `boot-device` setting?

4. Use the `help` command to display a list of help items:

```
ok help
```

What are some of the main `help` categories?

5. Use the `help` command in conjunction with an OBP command such as `reset-all` to display more information about the command:

```
ok help reset-all
```

What command powers-off the machine?

6. Use the `help` command in conjunction with a category such as `diag` to display more information about all the diagnostic tests:

```
ok help diag
```

What command monitors network broadcast packets on all net interfaces?

7. Use the `probe-scsi-all` command to show attached SCSI devices for all host adapters:

```
ok probe-scsi-all
```

```
This command may hang the system if a Stop-A or halt command has  
been executed. Please type reset-all to reset the system before  
executing this command. Do you wish to continue? (y/n) y
```

How many attached SCSI devices are there?

8. Type `go` to return to ALOM:

```
ok go
```

Task 2

Perform the following steps:

1. Navigate back to your host and use the `prtconf -v` command to display the platform-dependent PROM version:

```
# prtconf -v
```

Is it the same version as shown when using the `banner` command?

2. Display the OBP variables by entering the `eeeprom` command:

```
# eeeprom
```

Are these settings the same as shown with the `printenv` command?

3. Display a single OBP variable by entering the `eeeprom` command and the parameter:

```
# eeeprom auto-boot?
```

Is this the same setting as before?

Practice 3-2: Modifying OBP Variables

Overview

In this practice, you learn how to modify the OBP variables and their default values by using the OBP commands and the equivalent using Solaris commands, and then reset them back to the NVRAM parameter default values.

Task 1

Perform the following steps:

1. Navigate to the OBP prompt as described in the Pre-Task section of this practice. Use the `setenv` command to change the `auto-boot?` parameter to `false`:

```
ok setenv auto-boot? false
```

2. Use the `printenv` command to look at the new settings:

```
ok printenv
```

What is the current setting for `auto-boot`?

What is the factory default setting for `auto-boot`?

3. Use the `set-defaults` command to set all NVRAM parameters back to their default:

```
ok set-defaults
```

4. Verify these values by using the `printenv` command:

```
ok printenv
```

5. Now, what is the current (default) setting for `auto-boot`?

Task 2

Perform the following steps:

1. Navigate back to your host and use the `eeeprom` command to change the `auto-boot?` parameter again to `false`:

```
# eeeprom auto-boot?=false
```

2. List three ways in which you can set the `auto-boot?` parameter back to the default value of `true` and perform one of them so that your system is set to automatically boot.

- a) _____
- b) _____
- c) _____

Solution 3-1: Using OBP Commands to Display System Information

Task 1

Perform the following steps:

1. Navigate to the OBP as described in the Pre-Task section of this practice. Use the banner command to display the current OBP version and other pertinent information:

```
ok banner
Sun Fire T200, No Keyboard
Copyright (c) 1998, 2011, Oracle and/or its affiliates. All rights reserved.
OpenBoot 4.30.4.d, 16256 MB memory available, Serial #67263974.
Ethernet address 0:14:4f:2:5d:e6, Host ID: 84025de6.
```

What is the OBP version on your system?

OpenBoot 4.30.4.d

What is the Ethernet address?

0:14:4f:2:5d:e6

What is the Host ID?

84025de6

2. Use the printenv command to display the OBP variables on this system:

```
ok printenv
```

Variable Name	Value	Default Value
ttya-rts-dtr-off	false	false
ttya-ignore-cd	true	true
keyboard-layout		
reboot-command		
security-mode	none	No default
security-password		No default
security-#badlogins	0	No default
verbosity	min	min
pci-mem64?	false	false
diag-switch?	false	false
local-mac-address?	true	true
fcode-debug?	false	false
scsi-initiator-id	7	7
oem-logo		No default
oem-logo?	false	false
oem-banner		No default
oem-banner?	false	false
ansi-terminal?	true	true
screen-#columns	80	80
screen-#rows	34	34
ttya-mode	9600,8,n,1,-	9600,8,n,1,-
output-device	virtual-console	virtual-console

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input-device	virtual-console	virtual-console
auto-boot-on-error?	false	false
load-base	16384	16384
auto-boot?	true	true
network-boot-arguments		
boot-command	boot	boot
boot-file		
boot-device	disk net	disk net
multipath-boot?	false	false
boot-device-index	0	0
use-nvramrc?	false	false
nvramrc		
error-reset-recovery	boot	boot

What is the default setting for auto-boot?

true

What is the current setting for auto-boot?

true

- Use the `printenv` command to display information about a certain variable such as the boot-device:

```
ok printenv boot-device
boot-device =          disk net
```

What is the current boot-device setting?

disk net

What is the default boot-device setting?

disk net

- Use the `help` command to display a list of help items:

```
ok help
Enter 'help command-name' or 'help category-name' for more help
(Use ONLY the first word of a category description)
Examples:  help select    -or-   help line
    Main categories are:
Breakpoints (debugging)
Repeated loops
Defining new commands
Numeric output
Radix (number base conversions)
Arithmetic
Memory access
Line editor
System and boot configuration parameters
Select I/O devices
eject devices
Power on reset
```

```

Diag (diagnostic routines)
Resume execution
File download and boot
nvramrc (making new commands permanent)

```

What are some of the main help categories?

Breakpoints, Repeated loops, Defining new commands, and so on.

5. Use the help command in conjunction with an OBP command such as reset-all to display more information about the command:

```

ok help reset-all
reset-all    reset machine, ( simulates power cycling )
power-off    Power Off

```

What command powers-off the machine?

power-off

6. Use the help command in conjunction with a category such as diag to display more information about all the diagnostic tests:

```

ok help diag
test <device-specifier>    Run selftest method for specified device
Examples:
test floppy                - test floppy disk drive
test net                   - test net
testscsi                   - test scsi
test-all                   Execute test for all devices with selftest method
watch-clock                Show ticks of real-time clock
watch-net                  Monitor network broadcast packets
watch-net-all              Monitor broadcast packets on all net interfaces
probe-scsi                 Show attached SCSI devices
probe-scsi-all             Show attached SCSI devices for all host adapters

```

What command monitors network broadcast packets on all net interfaces?

watch-net-all

7. Use the probe-scsi-all command to show attached SCSI devices for all host adapters:

```

ok probe-scsi-all
This command may hang the system if a Stop-A or halt command
has been executed. Please type reset-all to reset the system
before executing this command.
Do you wish to continue? (y/n) y
/pci@7c0/pci@0/pci@1/pci@0,2/LSILogic,sas@2

MPT Version 1.05, Firmware Version 1.06.00.00

Target 0
Unit 0    Disk      FUJITSU MAV2073RCSUN72G 0301    143374738 Blocks,
73 GB
SASAddress5000000e011710132  PhyNum 0

```

```

Target 1
  Unit 0   Disk      FUJITSU MAY2073RCSUN72G 0501      143374738 Blocks,
73 GB
SASAddress500000e0166d07d2  PhyNum 1
Target 2
  Unit 0   Disk      FUJITSU MAY2073RCSUN72G 0501      143374738 Blocks,
73 GB
SASAddress500000e01642e552  PhyNum 2

```

How many attached SCSI devices are there?

On this system, three: Target 0, Target 1, and Target 2

8. Type `go` to return to ALOM:

```
ok go
```

Task 2

Perform the following steps:

1. Navigate back to your host and use the `prtconf -v` command to display the platform-dependent PROM version:

```
# prtconf -v
OBP 4.30.4.d 2011/07/06 14:29
```

Is it the same version as shown when using the `banner` command?

Yes.

2. Display the OBP variables by entering the `eeeprom` command:

```
# eeeprom
ttya-rts-dtr-off=false
ttya-ignore-cd=true
keyboard-layout: data not available.
reboot-command: data not available.
security-mode=none
security-password: data not available.
security-#badlogins=0
verbosity=min
pci-mem64?=false
diag-switch?=false
local-mac-address?=true
fcode-debug?=false
scsi-initiator-id=7
oem-logo: data not available.
oem-logo?=false
oem-banner: data not available.
oem-banner?=false
ansi-terminal?=true
screen-#columns=80

```

```
screen-#rows=34
ttya-mode=9600,8,n,1,-
output-device=virtual-console
input-device=virtual-console
auto-boot-on-error?=false
load-base=16384
auto-boot?=true
network-boot-arguments: data not available.
boot-command=boot
boot-file: data not available.
boot-device=disk net
multipath-boot?=false
boot-device-index=0
use-nvramrc?=false
nvramrc: data not available.
error-reset-recovery=boot
```

Are these settings the same as shown with the `printenv` command?

Yes.

3. Display a single OBP variable by entering the `eeeprom` command and the parameter:

```
# eeeprom auto-boot?
auto-boot?=true
```

Is this the same setting as before?

Yes.

Solution 3-2: Modifying OBP Variables

Task 1

Perform the following steps:

1. Use the `setenv` command to change the `auto-boot?` parameter to `false`:

```
ok setenv auto-boot? false
auto-boot? = false
```

2. Use the `printenv` command to look at the new settings:

```
ok printenv
```

Variable Name	Value	Default Value
ttya-rts-dtr-off	false	false
ttya-ignore-cd	true	true
keyboard-layout		
reboot-command		
security-mode	none	No default
security-password		No default
security-#badlogins	0	No default
verbosity	min	min
pci-mem64?	false	false
diag-switch?	false	false
local-mac-address?	true	true
fcode-debug?	false	false
scsi-initiator-id	7	7
oem-logo		No default
oem-logo?	false	false
oem-banner		No default
oem-banner?	false	false
ansi-terminal?	true	true
screen-#columns	80	80
screen-#rows	34	34
ttya-mode	9600,8,n,1,-	9600,8,n,1,-
output-device	virtual-console	virtual-console
input-device	virtual-console	virtual-console
auto-boot-on-error?	false	false
load-base	16384	16384
auto-boot?	false	true
network-boot-arguments		
boot-command	boot	boot
boot-file		
boot-device	disk net	disk net
multipath-boot?	false	false

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boot-device-index	0	0
use-nvramrc?	false	false
nvramrc		
error-reset-recovery	boot	boot

What is the current setting for auto-boot?

false

What is the factory default setting for auto-boot?

true

3. Use the `set-defaults` command to set all NVRAM parameters back to their defaults:

```
ok set-defaults
```

Setting NVRAM parameters to default values.

4. Verify these values using the `printenv` command:

```
ok printenv
```

Variable Name	Value	Default Value
ttya-rts-dtr-off	false	false
ttya-ignore-cd	true	true
keyboard-layout		
reboot-command		
security-mode	none	No default
security-password		No default
security-#badlogins	0	No default
verbosity	min	min
pci-mem64?	false	false
diag-switch?	false	false
local-mac-address?	true	true
fcode-debug?	false	false
scsi-initiator-id	7	7
oem-logo		No default
oem-logo?	false	false
oem-banner		No default
oem-banner?	false	false
ansi-terminal?	true	true
screen-#columns	80	80
screen-#rows	34	34
ttya-mode	9600,8,n,1,-	9600,8,n,1,-
output-device	virtual-console	virtual-console
input-device	virtual-console	virtual-consol
auto-boot-on-error?	false	false
load-base	16384	16384
auto-boot?	true	true
network-boot-arguments		

boot-command	boot	boot
boot-file		
boot-device	disk net	disk net
multipath-boot?	false	false
boot-device-index	0	0
use-nvramrc?	false	false
nvramrc		
error-reset-recovery	boot	boot

5. Now, what is the current (default) setting for auto-boot?
`true`

Task 2

Perform the following steps:

1. Navigate back to your host and use the `eeeprom` command to change the `auto-boot?` parameter again to false:

```
# eeeprom auto-boot?=false
auto-boot?=false
```

2. List three ways in which you can set the `auto-boot?` parameter back to the default value of `true` and perform one of them so that your system is set to automatically boot.

- a) `# eeeprom auto-boot?=true`
- b) `ok setenv auto-boot? true`
- c) `ok set-defaults`

Note: The `set-defaults` command will set ALL the settings back to the default and should not be used if other modifications have been made.

Practices for Lesson 4: Utilizing Useful Troubleshooting Tools in Oracle Solaris 11

Chapter 4

Practices for Lesson 4

Practices Overview

In these practices, you will answer questions and perform steps from the material presented in this lesson. Solutions for each task in this practice are provided after the practice exercises are introduced.

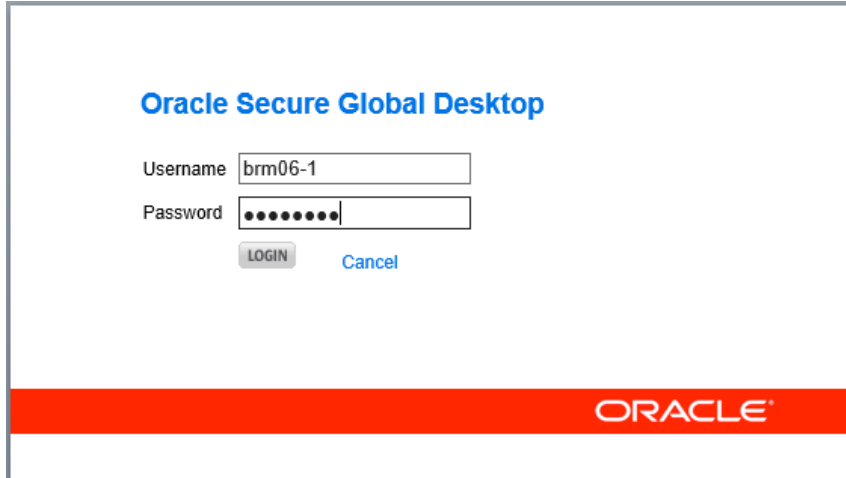
- Restoring from a Backup System File
- Restoring Corrupt Boot Program Files
- Restoring from an Alternate Boot Device
- Debugging an SMF Service that is in Maintenance State

Note: The command responses output in this guide are examples only. The command output on your host might be different.

Pre-Tasks for all Practices:

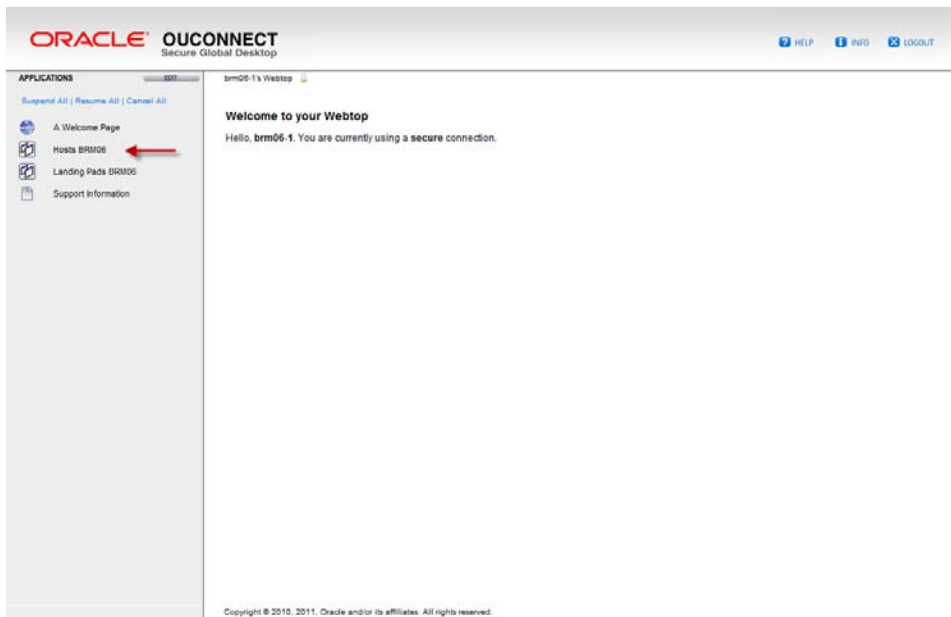
Perform the following steps to prepare for the practices:

1. In a web browser, go to the OU Connect website by typing in this URL:
<https://ouconnect.oracle.com>
2. Click the LOGIN button and log in to your lab environment. See your instructor for login credentials and assigned host.

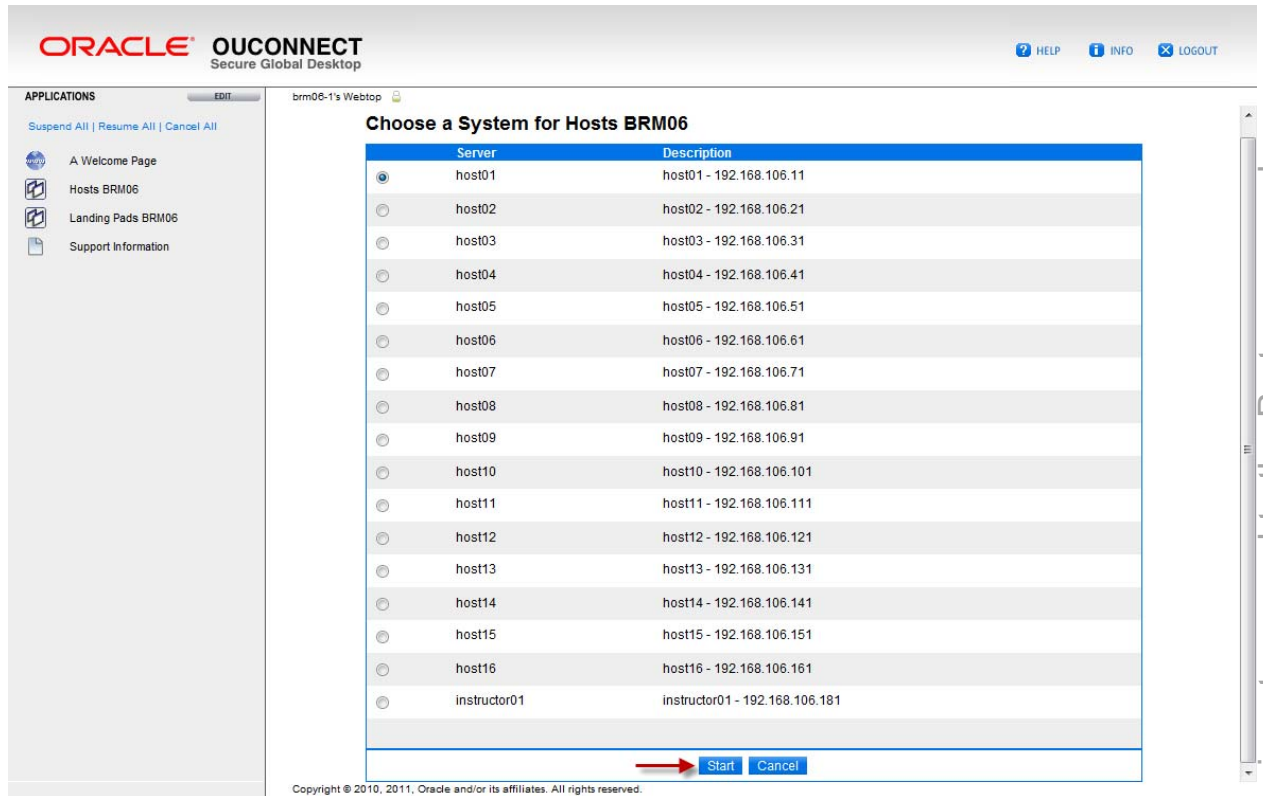


The image shows the Oracle Secure Global Desktop login interface. At the top, the text "Oracle Secure Global Desktop" is displayed in blue. Below this, there are two input fields: "Username" with the value "brm06-1" and "Password" with masked characters. To the right of the password field are two buttons: "LOGIN" (a grey button) and "Cancel" (a blue text link). At the bottom of the interface is a red horizontal bar with the "ORACLE" logo in white.

3. Open a Gnome desktop session on your assigned server by selecting your assigned server from the Oracle OUCONNECT Secure Global Desktop.



4. Select your assigned host and click Start.



5. You may log in as the user `oracle` with the password `oracle`, or log in directly as `root`, depending on the task at hand. If you log in as the user, run the `su` command to assume primary administrator privileges as needed.

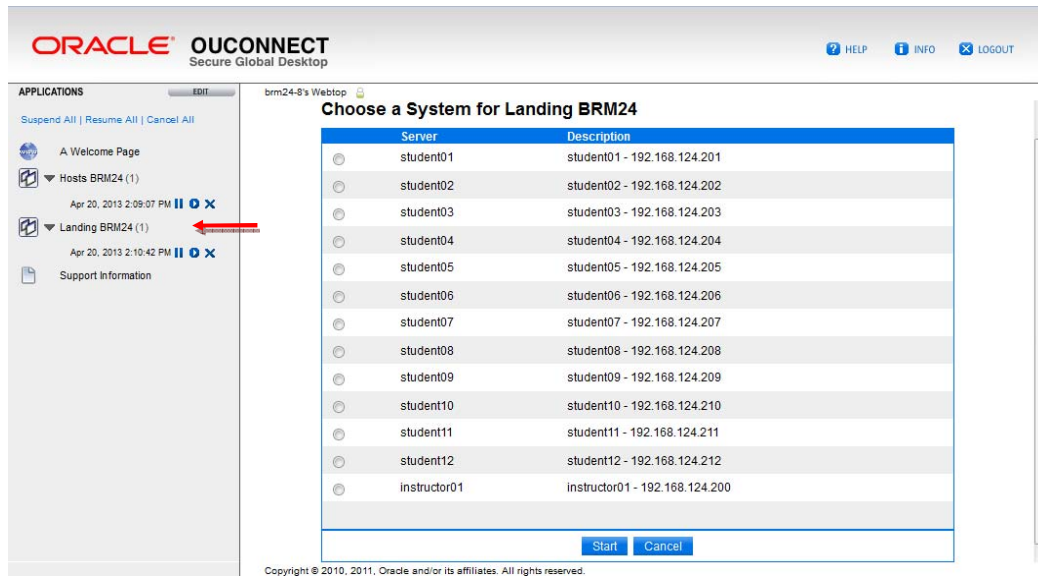
```
root@host01:~$ su -
```

```
Password: cangetin
```

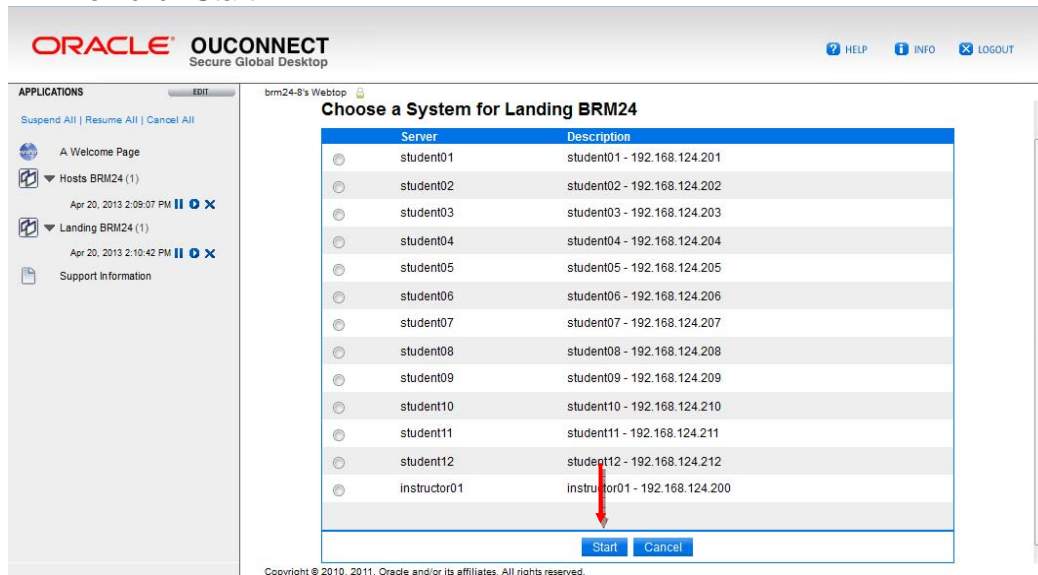
Note: Passwords are site-specific and are subject to change. If the password shown in the example does not work, check with your instructor for the latest password.

For these practices you will also need access to the Service Controller (SC) and OpenBoot PROM (OBP) prompt. To get to the `ok` prompt on a physical system, type L1-A (Stop-A) keys or the Break key. This depends on the specific system.

- To get to the OBP prompt in the LVC classroom, select the landing pad that corresponds with your assigned host, such as `student03` if you are on `host03`:



- Then click Start:



- When the CDE desktop is loaded, open a terminal window and then `telnet` to the service controller for your host, all of which are listed in the `/etc/hosts` file. Here is an example using `host03`:

```
# telnet 192.168.106.30
Trying 192.168.106.30...
Connected to 192.168.106.30.
Escape character is '^]'.
Copyright (c) 2010, Oracle and/or its affiliates. All rights reserved.
```

Copyright © 2014, Oracle and/or its affiliates. All rights reserved.

```
Oracle Advanced Lights Out Manager CMT v1.7.1
Please login: admin
Please Enter password: cangetin
```

Note:

- You are now at the SC, signified by the `-sc` prompt. From here, you can enter ALOM commands. To get to the OBP, continue by sending a break to the system, followed by forcing a console session:

```
host03-sc> break
Are you sure you want to send a break to the system [y/n]? y
host03-sc>
SC Alert: SC Request to send Break to host.
host03-sc> console -f
Warning: User <> currently has write permission to this console
and forcibly removing them will terminate any current write
actions and all work will be lost. Would you like to continue?
[y/n]y
Enter #. to return to ALOM.
{12} ok
```

- As the instructions say, enter `#.` to return to ALOM from the `ok` prompt.
- Whenever you boot to the net by using DHCP, the default root password is `solaris`.

Practice 4-1: Restoring From a Backup System File

Overview

In this practice, you will make a copy of your `/etc/system` file for safekeeping and then boot from the backup file in interactive mode when a problem occurs with the current system file.

Task 1

Perform the following steps:

1. Log in to your service controller without sending a break so that you have the `sc>` prompt on your landing pad. Then navigate to a terminal window on your host, copy the `/etc/system` file for safekeeping, and name it `/etc/system.bak`:

```
# cp /etc/system /etc/system.bak
```

2. Edit the `/etc/system` file and uncomment out the following line:

```
# vi /etc/system
moddir:
...
# reboot
```

3. On the landing pad, notice the console errors in the window. What are they?
4. To fix the problem, boot the machine in interactive mode and use the backup system file you created in the first step to restore your system:

```
ok boot -a
. . .
Boot device: /pci@7c0/pci@0/pci@1/pci@0,2/LSILogic,sas@2/disk@0,0:a
File and args: -a
Name of system file [/etc/system]: /etc/system.bak
SunOS Release 5.11 Version 11.1 64-bit
Copyright © 1983, 2012, Oracle and/or its affiliates. All rights
reserved.
Retire store [/etc/devices/retire_store] (/dev/null to bypass):
<return>
root filesystem type [zfs]:<return>
Enter physical name of root device
[/pci@7c0/pci@0/pci@1/pci@0,2/LSILogic,sas@2/disk@0,0:a]:<return>
Hostname: host03
host03 console login:
```

5. Log in and comment out the bad entry in the `/etc/system` file:

```
# vi /etc/system
* moddir:
```

6. Reboot the system and verify that the system will now boot without errors by using the default `/etc/system` file:

```
# reboot
```

Practice 4-2: Restoring Corrupt Boot Program Files

Overview

In this practice, you install `aufsbootblk` onto your ZFS system, which causes the machine to not boot, to simulate a corrupt boot program. You then boot the machine onto the network by using DHCP in order to get to a shell so that you can replace the `bootblk` with a known good ZFS boot block and successfully restore the system.

Task 1

Perform the following steps:

1. Navigate to your host system and find the disk that has the root file system on it by using the `zpool status` command:

```
# zpool status rpool
```

2. Use the `installboot` command to install a `ufs` boot block on `c3t0d0s0`, or whatever your disk may be:

```
# installboot /usr/platform/`uname -i`/lib/fs/ufs/bootblk \
/dev/rdsk/c3t0d0s0
```

3. Navigate to the OBP prompt from your landing pad and reboot your machine:

```
ok boot
Did the machine boot? Note any error messages during the boot
process:
```

What is the error message?

4. At the `ok` prompt, boot to the network instead by using DHCP:

```
ok boot net:dhcp
```

5. When you see the installation menu, type 3 for Shell:

```
Welcome to the Oracle Solaris installation menu
1  Install Oracle Solaris
2  Install Additional Drivers
3  Shell
4  Terminal type (currently xterm)
5  Reboot
Please enter a number [1]:3
```

6. In the shell, replace the `bootblk` with a known good ZFS `bootblk`:

```
# installboot -F zfs /usr/platform/`uname -i`/lib/fs/zfs/bootblk \
/dev/rdsk/c3t0d0s0
```

7. Reboot the machine:

```
# reboot
```

8. Make sure you have corrected the fault before continuing onto the next practice and that you have a console login.

Practice 4-3: Restoring from an Alternate Boot Device

Overview

In this practice, you create an alternate boot environment (BE) and use that environment as a test environment. When you are in the test environment, you insert a fault that causes the BE to not boot. You then boot to the original boot environment at the `ok` prompt to restore the system.

Task 1

Perform the following steps:

1. Navigate to your host and create a new boot environment with the `beadm` command and call it `test_be`. You may add a description if you like:

```
# beadm create -d "test environment" test_be
```

2. Verify the creation:

```
# beadm list
```

3. Activate the new boot environment:

```
# beadm activate test_be
```

4. Verify the activation. Notice the `R` next to `test_be`, which means it is set to activate at the next reboot:

```
# beadm list
```

5. Reboot to the new boot environment:

```
# reboot
```

6. After the system reboots, log in and verify that you are now using the test boot environment:

```
# beadm list
```

7. In this test environment, use the `svcadm` command to disable a service critical for booting:

```
# svcadm disable svc:/system/filesystem/minimal:default
```

8. Now navigate to your landing pad and the OBP prompt to boot the system, and watch for errors:

```
ok boot
```

Did the system boot? What is the error message?

9. Because the test environment now has faults, you can restore the system by using the previous BE. Navigate to the OBP prompt and boot to the previous BE called `solaris`:

```
ok boot -Z rpool/ROOT/solaris
```

10. Log in and then verify that you are using the non-test environment called `solaris`:

```
# beadm list
```

11. Activate the non-test boot environment for the next reboot:

```
# beadm activate solaris
```

12. Verify the activation:

```
# beadm list
```

13. Destroy the test environment:

```
# beadm destroy test_be
```

```
Are you sure you want to destroy test_be? This action cannot be  
undone(y/[n]): y
```

Note: The test environment cannot be destroyed if it is either active or set for the next reboot. Make sure you have completed the previous step.

14. Verify that the test environment has been removed:

```
# beadm list
```

Practice 4-4: Debugging an SMF Service That Is in Maintenance State

Overview

In this practice, you disable and then enable a service, which leaves a different service in maintenance state. Clearing services and learning the dependencies of services is vital to keeping a healthy system. You will clear the service that is in maintenance state and confirm that it is back online.

Task 1

Perform the following steps:

1. First, use the `svcs -xv` command to see what services are enabled but not online, if any:

```
# svcs -xv
```

2. Next, use the `svcs` command with the `-x` option and examine the `rpc/bind` service:

```
# svcs -xv rpc/bind
```

3. Disable the `rpc/bind` service:

```
# svcadm disable rpc/bind
```

4. Confirm that the `rpc/bind` service is disabled and note the dependency impact:

```
# svcs -xv rpc/bind
```

5. List the services that have dependencies on `rpc/bind` with the `-D` option. Note that `inetd` is one of them:

```
# svcs -D rpc/bind
```

6. Enable the `rpc/bind` service and confirm that it is back online:

```
# svcadm enable rpc/bind
# svcs -xv rpc/bind
```

7. Now that `rpc/bind` is back online, use the `svcs -xv` command to look for any services that may not be healthy. Note that one service that issues Kerberos warning tickets (`ktkt_warn`) is not online:

```
# svcs -xv
```

8. Try to enable this service and then check whether it is running or not:

```
# svcadm enable ktkt_warn
# svcs -xv ktkt_warn
```

9. This service is in maintenance state and cannot be enabled. This happened because `inetd` is responsible for running `ktkt_warn` and `inetd` is dependent on `rpc/bind`. To clear a service that is in maintenance state, first confirm that all processes associated with that instance have stopped. Normally, they would have already stopped but you should make sure before you proceed:

```
# svcs -p security/ktkt_warn
```

Note: If any process were still active it would appear after this line with the process ID number (PID) and you would use the `pkill -9` command to kill the process.

10. Because there are no running processes, proceed to clear the service by using the `clear` subcommand and confirm that the service is restored:

```
# svcadm clear security/ktkt_warn
# svcs -xv ktkt_warn
```

Solution 4-1: Restoring from a Backup System File

Task 1

Perform the following steps:

1. Log in to your service controller without sending a break so that you have the `sc>` prompt on your landing pad. Then navigate to a terminal window on your host and copy the `/etc/system` file for safekeeping, and name it `/etc/system.bak`:

```
# cp /etc/system /etc/system.bak
```

2. Edit the `/etc/system` file and uncomment out the following line:

```
# vi /etc/system
moddir:
...
# reboot
```

3. On the landing pad, notice the console errors in the window. What are they?
Copyright (c) 1983, 2012, Oracle and/or its affiliates. All rights reserved.
Can't open misc/forthdebug
(Can't load specfs) Program terminated
4. To fix the problem, boot the machine in interactive mode and use the backup system file you created in the first step to restore your system:

```
ok boot -a
. . .
Boot device: /pci@7c0/pci@0/pci@1/pci@0,2/LSILogic,sas@2/disk@0,0:a
File and args: -a
Name of system file [/etc/system]: /etc/system.bak
SunOS Release 5.11 Version 11.1 64-bit
Copyright © 1983, 2012, Oracle and/or its affiliates. All rights reserved.
Retire store [/etc/devices/retire_store] (/dev/null to bypass):
<return>
root filesystem type [zfs]:<return>
Enter physical name of root device
[/pci@7c0/pci@0/pci@1/pci@0,2/LSILogic,sas@2/disk@0,0:a]:<return>
Hostname: host03
host03 console login:
```

5. Log in, comment out the bad entry in the `/etc/system` file:

```
# vi /etc/system
* moddir:
```

6. Reboot the system and verify that the system now boots without errors by using the default `/etc/system` file:

```
# reboot
```


Solution 4-2: Restoring Corrupt Boot Program Files

Task 1

Perform the following steps:

1. Navigate to your host system and find the disk that has the root file system on it by using the `zpool status` command:

```
# zpool status rpool
pool: rpool
state: ONLINE
scan: none requested
config:
NAME          STATE      READ WRITE CKSUM
rpool         ONLINE    0     0    0
c3t0d0s0      ONLINE    0     0    0
errors: No known data errors
```

Note: The disk special file (`c3t0d0s0`) shown in this example might vary depending on which machine you are assigned.

2. Use the `installboot` command to install a UFS boot block on `c3t0d0s0`, or whatever your disk may be:

```
# installboot /usr/platform/`uname -i`/lib/fs/ufs/bootblk \
/dev/rdisk/c3t0d0s0
```

3. Navigate to the OBP prompt from your landing pad and reboot your machine:

```
ok boot
Sun Fire T200, No Keyboard
Copyright (c) 1998, 2011, Oracle and/or its affiliates. All rights
reserved.
OpenBoot 4.30.4.d, 16256 MB memory available, Serial #67263734.
Ethernet address 0:14:4f:2:5c:f6, Host ID: 84025cf6.
Boot device: /pci@7c0/pci@0/pci@1/pci@0,2/LSILogic,sas@2/disk@0,0:a
File and args:
ERROR: /packages/ufs-file-system: Last Trap: Division by Zero
ok
```

4. Did the machine boot? Note any error messages during the boot process:
What is the error message?
No. ERROR: /packages/ufs-file-system: Last Trap: Division by Zero
5. At the `ok` prompt, boot to the network instead by using DHCP:

```
ok boot net:dhcp
```

6. When you see the installation menu, type 3 for Shell:

```
Welcome to the Oracle Solaris installation menu
1  Install Oracle Solaris
2  Install Additional Drivers
3  Shell
4  Terminal type (currently xterm)
```

```
5 Reboot
```

```
Please enter a number [1]:3
```

7. In the shell, replace the `bootblk` with a known good ZFS `bootblk`:

```
# installboot -F zfs /usr/platform/`uname -i`/lib/fs/zfs/bootblk \  
/dev/rdisk/c3t0d0s0
```

8. Reboot the machine:

```
# reboot
```

9. Make sure you have corrected the fault before continuing on to the next practice, and that you have a console login.

Solution 4-3: Restoring from an Alternate Boot Device

Task 1

Perform the following steps:

1. Navigate to your host and create a new boot environment with the `beadm` command and call it `test_be`. You may add a description if you like:

```
# beadm create -d "test environment" test_be
```

2. Verify the creation:

```
# beadm list
BE           Active Mountpoint Space  Policy Created
--           -
test_be      -           9.89G static 2013-02-24 13:06
solaris      NR          /       51.64M static 2013-02-08 15:17
solaris.orig -           -       1.17M static 2013-02-08 17:23
```

3. Activate the new boot environment:

```
# beadm activate test_be
```

4. Verify the activation. Notice the `R` next to `test_be`, which means it is set to activate at the next reboot:

```
# beadm list
BE           Active Mountpoint Space  Policy Created
--           -
test_be      R           9.89G static 2013-02-24 13:06
solaris      N           /       51.64M static 2013-02-08 15:17
solaris.orig -           -       1.17M static 2013-02-08 17:23
```

5. Reboot to the new boot environment:

```
# reboot
```

6. After the system reboots, log in and verify that you are now using the test boot environment:

```
# beadm list
BE           Active Mountpoint Space  Policy Created
--           -
test_be      NR          -       9.89G static 2013-02-24 13:06
solaris      /       51.64M static 2013-02-08 15:17
solaris.orig -           -       1.17M static 2013-02-08 17:23
```

7. In this test environment, use the `svcadm` command to disable a service critical for booting:

```
# svcadm disable svc:/system/filesystem/minimal:default
```

8. Now navigate to your landing pad and the OBP prompt to boot the system and watch for errors:

```
ok boot
```

Did the system boot? What is the error message?

No.

. . . .

Requesting System Maintenance Mode

(See /lib/svc/share/README for more information.)

Console login service(s) cannot run

Enter user name for system maintenance (control-d to bypass):

9. Because the test environment now has faults, you can restore the system by using the previous BE. Navigate to the OBP prompt and boot to the previous BE called `solaris`:

```
ok boot -Z rpool/ROOT/solaris
```

10. Log in and then verify that you are using the non-test environment called `solaris`:

```
# beadm list
```

BE	Active	Mountpoint	Space	Policy	Created
--	----	-----	-----	-----	-----
test_be	R	-	9.89G	static	2013-02-24 13:06
solaris	N	/	51.64M	static	2013-02-08 15:17
solaris.orig	-	-	1.17M	static	2013-02-08 17:23

11. Activate the non-test boot environment for the next reboot:

```
# beadm activate solaris
```

12. Verify the activation:

```
# beadm list
```

BE	Active	Mountpoint	Space	Policy	Created
--	----	-----	-----	-----	-----
test_be		-	9.89G	static	2013-02-24 13:06
solaris	NR	/	51.64M	static	2013-02-08 15:17
solaris.orig	-	-	1.17M	static	2013-02-08 17:23

13. Destroy the test environment:

```
# beadm destroy test_be
```

Are you sure you want to destroy test_be? This action cannot be undone (y/[n]): **y**

Note: The test environment cannot be destroyed if it is either active or set for the next reboot. Make sure you have done the previous step.

14. Verify the test environment has been removed:

```
# beadm list
```

BE	Active	Mountpoint	Space	Policy	Created
--	----	-----	-----	-----	-----
solaris	NR	/	51.64M	static	2013-02-08 15:17
solaris.orig	-	-	1.17M	static	2013-02-08 17:23

Solution 4-4: Debugging an SMF Service That Is in Maintenance State

Task 1

Perform the following steps:

1. First, use the `svcs -xv` command to see what services are enabled but not online, if any:

```
# svcs -xv
```

2. Next, use the `svcs` command with the `-x` option and examine the `rpc/bind` service:

```
# svcs -xv rpc/bind
svc:/network/rpc/bind:default (RPC bindings)
State: online since February 12, 2013 02:47:34 PM MST
See: rpcbind(1M)
See: /var/svc/log/network-rpc-bind:default.log
Impact: None.
```

3. Disable the `rpc/bind` service:

```
# svcadm disable rpc/bind
Console messages:
Jun 20 15:58:47 host08 rpcbind: rpcbind terminating on signal.
Jun 20 15:58:48 host08 inetd[6517]: Failed to register version 1 of
RPC service instance svc:/network/security/ktkt_warn:default,
netidticotsord
Jun 20 15:58:48 host08 inetd[6517]: Too many bind failures for
instance svc:/network/security/ktkt_warn:default, transitioning to
maintenance
```

4. Confirm the `rpc/bind` service is disabled and note the dependency impact:

```
# svcs -xv rpc/bind
svc:/network/rpc/bind:default (RPC bindings)
State: disabled since February 12, 2013 03:27:39 PM MST
Reason: Disabled by an administrator.
See: http://support.oracle.com/msg/SMF-8000-05
See: man -M /usr/share/man -s 1M rpcbind
See: /var/svc/log/network-rpc-bind:default.log
Impact: 9 dependent services are not running:
svc:/network/rpc/gss:default
svc:/network/nfs/client:default
svc:/system/filesystem/autofs:default
svc:/network/nfs/nlockmgr:default
svc:/network/nfs/status:default
svc:/network/nfs/cbd:defaultsvc:/network/nfs/mapid:default
svc:/network/rpc/smsserver:default
svc:/network/nfs/rquota:default
```

5. List the services that have dependencies on `rpc/bind` with the `-D` option. Note that `inetd` is one of them:

```
# svcs -D rpc/bind
STATE          STIME          FMRI
disabled       Feb_04         svc:/network/nis/client:default
disabled       Feb_04         svc:/system/idmap:default
disabled       Feb_04         svc:/network/rpc/keyserve:default
disabled       Feb_04         svc:/network/rpc/rstat:default
disabled       Feb_04         svc:/network/rpc/rusers:default
disabled       Feb_04         svc:/network/rpc/rex:default
disabled       Feb_04         svc:/network/rpc/wall:default
disabled       Feb_04         svc:/network/rpc/spray:default
disabled       Feb_04         svc:/network/nfs/server:default
online         Feb_04         svc:/milestone/multi-user:default
online         Feb_04         svc:/system/fmd:default
online         15:27:39      svc:/network/inetd:default
online         15:28:27      svc:/network/nfs/mapid:default
online         15:28:27      svc:/network/nfs/cbd:default
online         15:28:27      svc:/network/rpc/gss:default
online         15:28:27      svc:/network/nfs/status:default
online         15:28:27      svc:/network/nfs/nlockmgr:default
online         15:28:27      svc:/network/rpc/smserver:default
online         15:28:27      svc:/network/nfs/client:default
online         15:28:27      svc:/network/nfs/rquota:default
online         15:28:28      svc:/system/filesystem/autofs:default
```

6. Enable the `rpc/bind` service and confirm that it is back online:

```
# svcadm enable rpc/bind
# svcs -xv rpc/bind
svc:/network/rpc/bind:default (RPC bindings)
State: online since February 12, 2013 03:28:26 PM MST
See: man -M /usr/share/man -s 1M rpcbind
See: /var/svc/log/network-rpc-bind:default.log
Impact: None.
```

7. Now that `rpc/bind` is back online, use the `svcs -xv` command to look for any services that may not be healthy. Note that one service that issues Kerberos warning tickets (`ktkt_warn`) is not online:

```
# svcs -xv
svc:/network/security/ktkt_warn:default (Kerberos V5 warning
messages daemon)
State: maintenance since February 12, 2013 03:27:40 PM MST
Reason: Maintenance requested by an administrator.
See: http://support.oracle.com/msg/SMF-8000-63
See: ktkt_warnd(1M)
Impact: This service is not running.
```

8. Try to enable this service and then confirm whether it is running or not:

```
# svcadm enable ktkt_warn
# svcs -xv ktkt_warn
svc:/network/security/ktkt_warn:default (Kerberos V5 warning
messages daemon)
State: maintenance since February 12, 2013 03:27:40 PM MST
Reason: Maintenance requested by an administrator.
See: http://support.oracle.com/msg/SMF-8000-63
See: ktkt_warnd(1M)
Impact: This service is not running.
```

9. This service is in maintenance state and cannot be enabled. This happened because `inetd` is responsible for running `ktk_warn` and `inetd` is dependent on `rpc/bind`. To clear a service that is in maintenance state, first confirm that all processes associated with that instance have stopped. Normally, they would have already stopped but you should make sure before you proceed:

```
# svcs -p security/ktkt_warn
STATE          STIME          FMRI
maintenance    15:27:40      svc:/network/security/ktkt_warn:default
```

Note: If any process were still active, it would appear after this line with the process ID number (PID) and you would use the `kill -9` command to kill the process.

10. Because there are no running processing, proceed to clear the service by using the `clear` subcommand and confirm that the service is restored:

```
# svcadm clear security/ktkt_warn
# svcs -xv ktkt_warn
svc:/network/security/ktkt_warn:default (Kerberos V5 warning
messages daemon)
State: online since February 12, 2013 03:47:40 PM MST
See: man -M /usr/share/man -s 1M ktkt_warnd
Impact: None.
```


Practices for Lesson 5: Troubleshooting SPARC- based Systems

Chapter 5

Practices for Lesson 5

Practices Overview

In these practices, you will answer questions and perform steps from the material presented in this lesson. Solutions for each task in this practice are provided after the practice exercises are introduced.

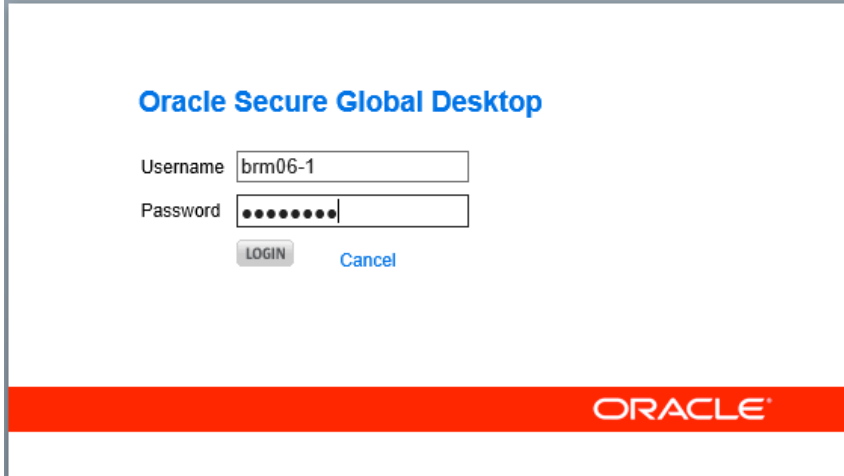
- Fixing an IPS Client Problem
- Fixing an IPS Service Problem
- Fixing an IPS Package Problem

Note: The command responses output in this guide are examples only. The command output on your host might be different.

Pre-Tasks for all Practices:

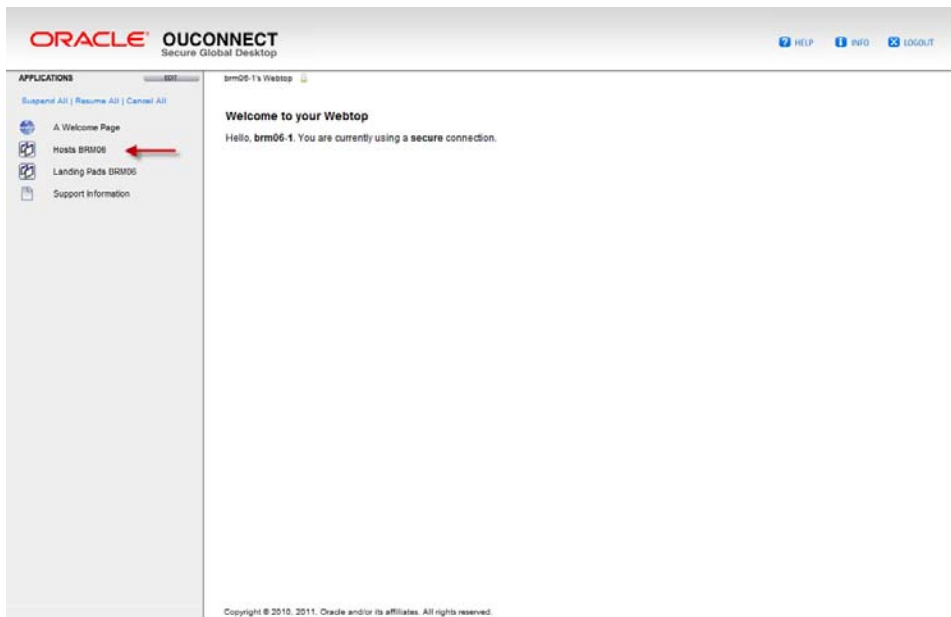
Perform the following steps to prepare for the practices:

1. In a web browser, go to the OU Connect website by typing in this URL:
<https://ouconnect.oracle.com>
2. Click the LOGIN button and log in to your lab environment. See your instructor for login credentials and assigned host.

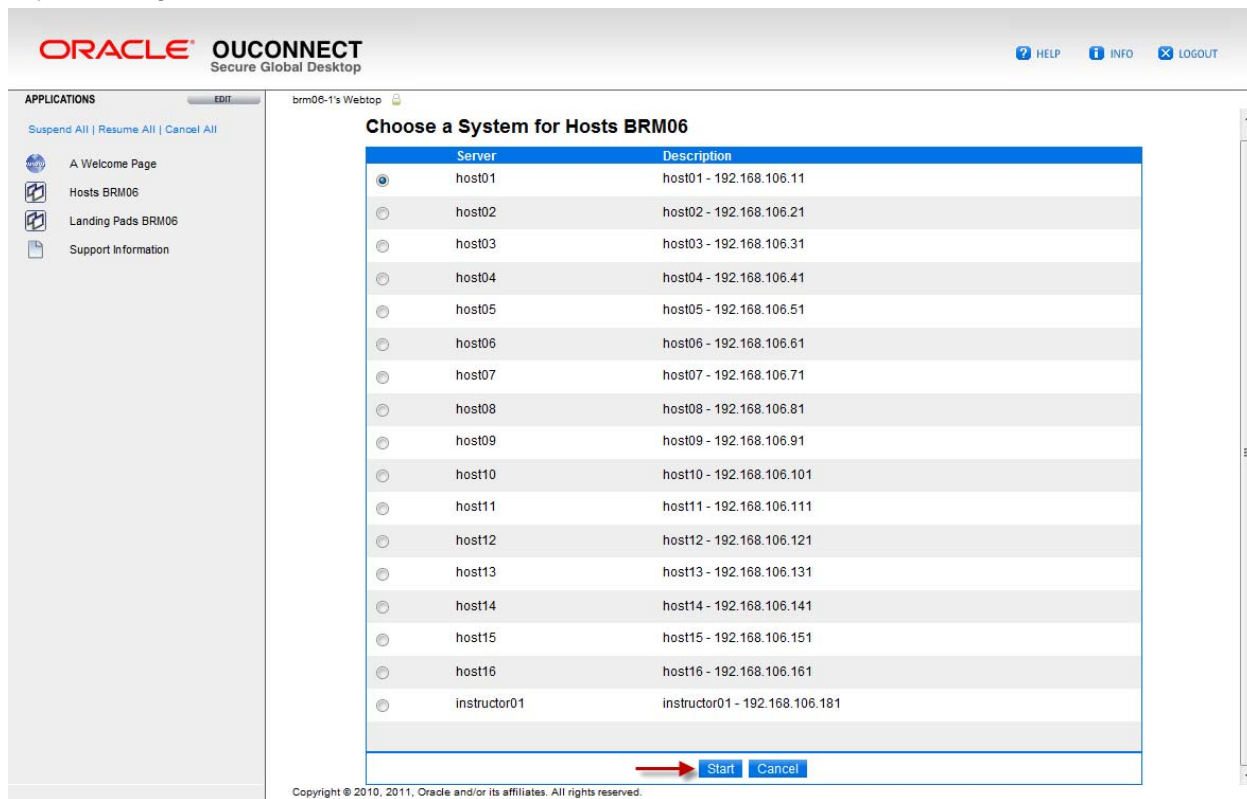


The image shows the Oracle Secure Global Desktop login interface. At the top, the text "Oracle Secure Global Desktop" is displayed in blue. Below this, there are two input fields: "Username" with the value "brm06-1" and "Password" with masked characters. To the right of the password field is a "Cancel" link. Below the input fields are two buttons: "LOGIN" and "Cancel". At the bottom of the interface is a red horizontal bar with the "ORACLE" logo in white.

3. Open a Gnome desktop session on your assigned server by selecting your assigned host from the Oracle OUCONNECT Secure Global Desktop.



4. Select your assigned host and click Start.



5. You may log in as the user `oracle` with the password `oracle`, or log in directly as `root`, depending on the task at hand. If you log in as the user, run the `su` command to assume primary administrator privileges as needed.

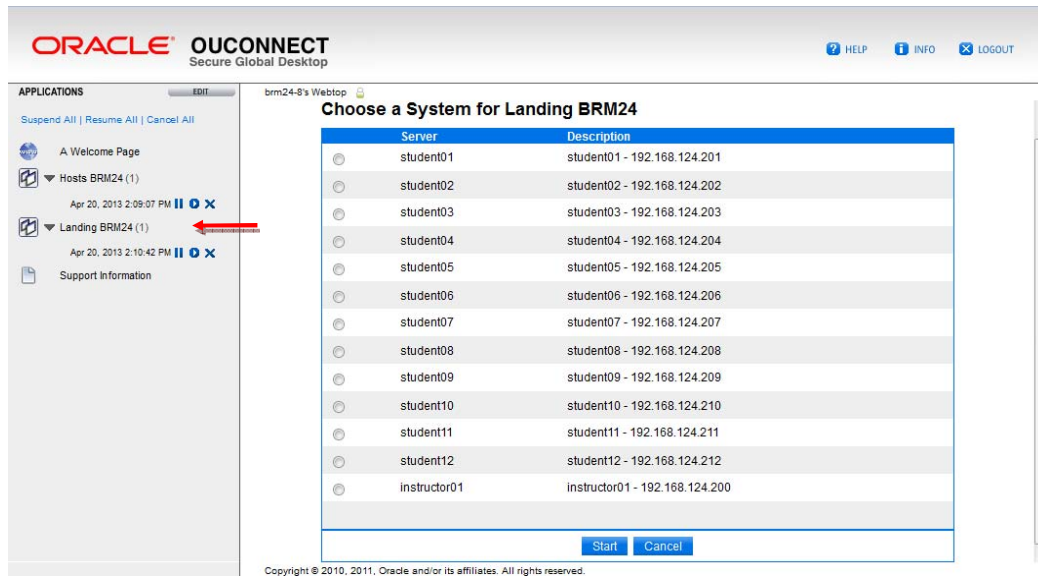
```
root@host01:~$ su -
```

```
Password: cangetin
```

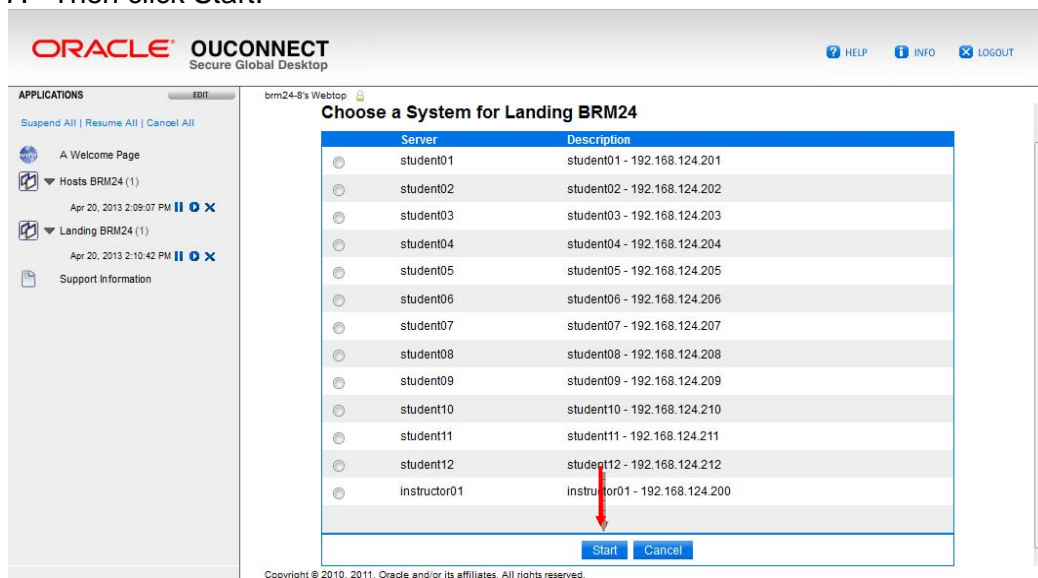
Note: Passwords are site-specific and are subject to change. If the password shown in the example does not work, check with your instructor for the latest password.

For these practices you will also need access to the Service Controller (SC) and OpenBoot PROM (OBP) prompt. To get to the `ok` prompt on a physical system, type L1-A (Stop-A) keys or the Break key. This depends on the specific system.

- To get to the OBP prompt in the LVC classroom, select the landing pad that corresponds with your assigned host, such as `student03` if you are on `host03`:



- Then click Start:



- When the CDE desktop is loaded, open a terminal window and then `telnet` to the service controller for your host, all of which are listed in the `/etc/hosts` file. Here is an example using `host03`:

```
# telnet 192.168.106.30
Trying 192.168.106.30...
Connected to 192.168.106.30.
Escape character is '^]'.
Copyright (c) 2010, Oracle and/or its affiliates. All rights reserved.
```

Copyright © 2014, Oracle and/or its affiliates. All rights reserved.

```
Oracle Advanced Lights Out Manager CMT v1.7.1
Please login: admin
Please Enter password: cangetin
```

Note:

- You are now at the SC, signified by the `-sc` prompt. From here, you can enter ALOM commands. To get to the OBP, continue by sending a break to the system, followed by forcing a console session:

```
host03-sc> break
Are you sure you want to send a break to the system [y/n]? y
host03-sc>
SC Alert: SC Request to send Break to host.
host03-sc> console -f
Warning: User <> currently has write permission to this console
and forcibly removing them will terminate any current write
actions and all work will be lost. Would you like to continue?
[y/n]y
Enter #. to return to ALOM.
{12} ok
```

- As the instructions say, enter `#.` to return to ALOM from the `ok` prompt.
- Whenever you boot to the net by using DHCP, the default root password is `solaris`.

Practice 5-1: Fixing an IPS Client Problem

Overview

In this practice, you rename the current package publisher to simulate the publisher being broken or invalid and then deduce, based on the error message, how to fix the problem. You then apply this fix and verify that the publisher is back in working order.

Task 1

Perform the following steps:

1. Identify the current publisher by typing the `pkg publisher` command:

```
# pkg publisher
```

2. Find out more details about the specific publisher by appending the `solaris` publisher name to the command:

```
# pkg publisher solaris
```

3. Change the directory to the source of the repository:

```
# cd /opt/ora
```

4. List the directory:

```
# ls
```

5. Change the name of the repository in order to make it unreachable and verify it is changed:

```
# mv s11_u1-sru7.2_repo s11_u1_repo
# ls
```

6. Notice that the package publisher repository is still identified by the previous path name:

```
# pkg publisher solaris
```

7. Now try to refresh the publisher with the `pkg refresh` command:

```
# pkg refresh solaris
```

Was the command successful? If not, what is the error message?

8. Try to install a new package, such as `appttrace`:

```
# pkg install appttrace
```

Was the command successful? If not, what is the error message?

9. Change the name of the repository back to the original and verify its name change:

```
# mv s11_u1_repo s11_u1-sru7.2_repo
# ls
```

10. Now refresh the publisher again:

```
# pkg refresh solaris
```

Was the command successful? If not, what is the error message?

11. Try installing a package such as `apptrace` again:

```
# pkg install apptrace
```

Was the command successful? If not, what is the error message?

12. Change back to the top directory:

```
# cd /
```


Practice 5-2: Fixing an IPS Service Problem

Overview

In this practice, you configure the server's application package service by changing the property that resolves the directory for the publisher's repository, thus creating a fault in the system that causes the service to fail. Based on the log file, you formulate a solution, apply the solution, and verify that the solution works by bringing the service back online.

Task 1

Perform the following steps:

1. Configure the application package server service by entering the `svccfg -s` command:

```
# svccfg -s pkg/server
```

2. List the package properties by using the `listprop` subcommand:

```
svc:/application/pkg/server > listprop pkg
...
```

3. Change the location of where the package server looks for the repository by changing the `inst_root` service property, thus causing the service to fail:

```
svc:/application/pkg/server> setprop
pkg/inst_root=/opt/ora/s11_u1_repo
```

Note: This can be done all in one command by entering the following:

```
# svccfg -s pkg/server setproppkg/inst_root=/opt/ora/s11_u1_repo
```

4. Verify that you have changed the location:

```
svc:/application/pkg/server>listprop pkg
...
```

5. Exit the service configuration utility:

```
svc:/application/pkg/server> exit
```

6. Check the state of the `pkg/server` service:

```
# svcs -xv pkg/server
```

What state is this service in?

7. Disable the `pkg/server` service:

```
# svcadm disable pkg/server
```

8. Confirm that the service is disabled:

```
# svcs -xv pkg/server
```

What state is this service in?

9. Enable the `pkg/server` service:

```
# svcadm enable pkg/server
```

10. Check the health of the `pkg/server` service again:

```
# svcs -xv pkg/server
```

What state is this service in? Why?

11. If you had not created this fault yourself, the next logical step would be to look at the last lines of the log file for this service to find out why the service is not running:

```
# tail /var/svc/log/application-pkg-server:default.log
```

What is the error message in the log file?

12. Set the `inst_root` property back to the original directory for the application package server:

```
# svccfg -s pkg/server setprop \  
pkg/inst_root=/opt/ora/s11_u1-sru7.2_repo
```

13. Now try to enable the `pkg/server` service:

```
# svcadm enable pkg/server
```

14. Check that the service is now running:

```
# svcs -xv pkg/server
```

Why is this service not running?

15. Use the `svcadm clear` command to clear the service:

```
# svcadm clear pkg/server
```

16. Refresh the `pkg/server` service:

```
# svcadm refresh pkg/server
```

17. Check that the `pkg/server` service is now healthy:

```
# svcs -xv pkg/server
```

Is this service back online?

Practice 5-3: Fixing an IPS Package Problem

Overview

In this practice, you remove a needed file from a package, thus causing it to have verification and execution errors. Based on the verification output, you fix the package and confirm that the solution repairs the problem.

Task 1

Perform the following steps:

1. Verify the status of the package you previously installed such as `apptrace`:

```
# pkg verify -v apptrace
```

2. Use the `pkg info` command on the package and note its publisher and version:

```
# pkg info apptrace
```

3. Use the `pkg contents` command to view the contents of this package:

```
# pkg contents apptrace
```

4. Remove a file such as the library file, thus causing the package to have verification and execution errors:

```
# rm /usr/lib/abi/apptrace.so.1
```

5. Try to use the `apptrace` command on a command such as `date`:

```
# apptrace date
```

6. For this failure, you can use the `pkg verify` command in verbose mode to find out the root cause of the problem:

```
# pkg verify -v apptrace
```

What is the error message?

The error message states that a library file in the package is missing.

7. Verify that the file is missing:

```
# ls /usr/lib/abi/apptrace.so.1
```

8. If a file in a package is missing or corrupt, you can run the `pkg fix` command to repair it:

Note: The `--accept` flag accepts any licensing agreements automatically.

```
# pkg fix --accept apptrace
```

9. Verify that the package has been fixed:

```
# pkg verify -v apptrace
```

10. Try to use the `apptrace` command again on a command such as `date`:

```
# apptrace date
```

Solution 5-1: Fixing an IPS Client Problem

Task 1

Perform the following steps:

1. Identify the current publisher by entering the `pkg publisher` command:

```
# pkg publisher
PUBLISHER TYPE      STATUS P LOCATION
solaris    origin  online F file:///opt/ora/s11_u1-sru7.2_repo/
```

2. Find out more details about the specific publisher by appending the `solaris` publisher name to the command:

```
# pkg publisher solaris
Publisher: solaris
Alias:
Origin URI: file:///opt/ora/s11_u1-sru7.2_repo/
SSL Key: None
SSL Cert: None
Client UUID: 3b68ac92-d2cf-11e2-99dc-80144f82abc2
Catalog Updated: April 18, 2013 02:12:09 AM
Enabled: Yes
```

3. Change the directory to the source of the repository:

```
# cd /opt/ora
```

4. List the directory.

```
# ls
course_files  info      s11_u1-sru7.2_repo  setup  software
```

5. Change the name of the repository in order to make it unreachable and verify that it is changed:

```
# ls
course_files  info      s11_u1_repo setup  software
```

6. Notice that the package publisher repository is still identified by the previous path name:

```
# pkg publisher solaris
Publisher: solaris
Alias:
Origin URI: file:///opt/ora/s11_u1-sru7.2_repo/
SSL Key: None
SSL Cert: None
Client UUID: 3b68ac92-d2cf-11e2-99dc-80144f82abc2
Catalog Updated: April 18, 2013 02:12:09 AM
Enabled: Yes
```

7. Now try to refresh the publisher with the `pkg refresh` command:

```
# pkg refresh solaris
pkg: 0/1 catalogs successfully updated:
Unable to contact valid package repository
Encountered the following error(s):
Unable to contact any configured publishers.
This is likely a network configuration problem.
file protocol error: code: 22 reason: The path '/opt/ora/s11_u1-
sru7.2_repo' does not contain a valid package repository.
Repository URL: 'file:///opt/ora/s11_u1-sru7.2_repo'. (happened 2
times)
```

Was the command successful? If not, what is the error message?

No. The error message states that the repository cannot be found in the current path.

8. Try to install a new package, such as `appttrace`:

```
# pkg install appttrace
pkg: 1/2 catalogs successfully updated:
Unable to contact valid package repository
Encountered the following error(s):
Unable to contact any configured publishers.
This is likely a network configuration problem.
file protocol error: code: 22 reason: The path '/opt/ora/s11_u1-
sru7.2_repo' does not contain a valid package repository.
Repository URL: 'file:///opt/ora/s11_u1-sru7.2_repo'. (happened 2
times)
```

Was the command successful? If not, what is the error message?

No. The error message states that the repository cannot be found in the current path.

9. Change the name of the repository back to the original and verify its name change:

```
# mv s11_u1_repo s11_u1-sru7.2_repo
# ls
course_files  info          s11_u1-sru7.2_repo  setup  software
```

10. Now refresh the publisher again:

```
# pkg refresh solaris
```

Was the command successful? If not, what is the error message?

Yes.

11. Try installing a package such as `appttrace` again:

```
# pkg install appttrace
      Packages to install:  1
      Create boot environment: No
      Create backup boot environment: No
      Planning linked: 0/3 done; 1 working: zone:database
      Planning linked: 1/3 done; 1 working: zone:web
      Planning linked: 2/3 done; 1 working: zone:storage
```

```
Planning linked: 3/3 done
DOWNLOAD                                PKGS      FILES
XFER (MB)    SPEED
Completed                                1/1       10/10
0.1/0.1      0B/s
Downloading linked: 0/3 done; 1 working: zone:database
Downloading linked: 1/3 done; 1 working: zone:web
Downloading linked: 2/3 done; 1 working: zone:storage
Downloading linked: 3/3 done
PHASE                                ITEMS
Installing new actions                29/29
Updating package state database        Done
Updating image state                   Done
Creating fast lookup database          Done
Executing linked: 0/3 done; 1 working: zone:database
Executing linked: 1/3 done; 1 working: zone:web
Executing linked: 2/3 done; 1 working: zone:storage
Executing linked: 3/3 done
```

Was the command successful? If not, what is the error message?

Yes.

12. Change back to the top directory:

```
# cd /
```

Solution 5-2: Fixing an IPS Service Problem

Task 1

Perform the following steps:

1. Configure the application package server service by entering the `svccfg -s` command:

```
# svccfg -s pkg/server
```

2. List the package properties by using the `listprop` subcommand:

```
svc:/application/pkg/server> listprop pkg
pkg                                application
pkg/address                       net_address
pkg/cfg_fileastring
pkg/content_rootastringusr/share/lib/pkg
pkg/debug                         astring
pkg/file_rootastring
pkg/log_accessastring            none
pkg/log_errorsastringstderr
pkg/mirror                       boolean        false
pkg/pkg_rootastring              /
pkg/port                         count         80
pkg/proxy_baseastring
pkg/socket_timeout              count         60
pkg/sort_file_max_sizeastring
pkg/ssl_cert_fileastring
pkg/ssl_dialogastringsmf
pkg/ssl_key_fileastring
pkg/threads                      count         60
pkg/writable_rootastring
pkg/readonlyboolean              true
pkg/inst_rootastring             /opt/ora/s11_u1-sru7.2_repo/
```

3. Change the location of where the package server looks for the repository by changing the `inst_root` service property, thus causing the service to fail:

```
svc:/application/pkg/server> setprop pkg/inst_root=/opt/ora/s11_u1_repo
```

Note: This can be done all in one command by entering the following:

```
# svccfg -s pkg/server setprop pkg/inst_root=/opt/ora/s11_u1_repo
```

4. Verify that you have changed the location:

```
svc:/application/pkg/server> listprop pkg
pkg                                application
pkg/address                       net_address
pkg/cfg_fileastring
pkg/content_rootastringusr/share/lib/pkg
pkg/debug                         astring
```

```

pkg/file_rootastring
pkg/log_accessastring      none
pkg/log_errorsastringstderr
pkg/mirror                  boolean    false
pkg/pkg_rootastring        /
pkg/port                    count      80
pkg/proxy_baseastring
pkg/socket_timeout         count      60
pkg/sort_file_max_sizeastring
pkg/ssl_cert_fileastring
pkg/ssl_dialogastringsmf
pkg/ssl_key_fileastring
pkg/threads                 count      60
pkg/writable_rootastring
pkg/readonlyboolean        true
pkg/inst_rootastring       /opt/ora/s11_u1_repo

```

5. Exit the service configuration utility:

```
svc:/application/pkg/server> exit
```

6. Check the state of the pkg/server service:

```

# svcs -xv pkg/server
svc:/application/pkg/server:default (image packaging repository)
State: online since June 13, 2013 11:29:42 AM MDT
See: /var/svc/log/application-pkg-server:default.log
Impact: None.

```

What state is this service in?

It is online.

7. Disable the pkg/server service:

```
# svcadm disable pkg/server
```

8. Confirm that the service is disabled:

```

# svcs -xv pkg/server
svc:/application/pkg/server:default (image packaging repository)
State: disabled since June 13, 2013 11:33:21 AM MDT
Reason: Disabled by an administrator.
See: http://support.oracle.com/msg/SMF-8000-05
See: /var/svc/log/application-pkg-server:default.log
Impact: This service is not running.

```

What state is this service in?

It is disabled.

9. Enable the pkg/server service:

```
# svcadm enable pkg/server
```


10. Check the health of the pkg/server service again:

```
# svcs -xv pkg/server
svc:/application/pkg/server:default (image packaging repository)
State: maintenance since June 13, 2013 11:33:59 AM MDT
Reason: Start method failed repeatedly, last exited with status
1.
See: http://support.oracle.com/msg/SMF-8000-KS
See: /var/svc/log/application-pkg-server:default.log
Impact: This service is not running.
```

What state is this service in? Why?

It is in maintenance state because it is not just disabled anymore. It is enabled, but with errors.

11. If you had not created this fault yourself, the next logical step would be to look at the last lines of the log file for this service to find out why the service is not running:

```
# tail /var/svc/log/application-pkg-server:default.log
[ Jun 13 17:33:55 Executing start method ("//lib/svc/method/svc-
pkg-depot start"). ]
Dropping net_privaddr privilege.
ppriv -s A=basic,-file_link_any,-proc_info,-
proc_session,net_privaddr -e /usr/lib/pkg.depotd --cfg
svc:/application/pkg/server:default
pkg.depotd: The path '/opt/ora/s11_ul_repo' does not contain a
valid package repository.
[ Jun 13 17:33:57 Method "start" exited with status 1. ]
[ Jun 13 17:33:57 Executing start method ("//lib/svc/method/svc-
pkg-depot start"). ]
Dropping net_privaddr privilege.
ppriv -s A=basic,-file_link_any,-proc_info,-
proc_session,net_privaddr -e /usr/lib/pkg.depotd --cfg
svc:/application/pkg/server:default
pkg.depotd: The path '/opt/ora/s11_ul_repo' does not contain a
valid package repository.
[ Jun 13 17:33:59 Method "start" exited with status 1. ]
```

What is the error message in the log file?

The error message states that there is no valid package repository in the path specified for the service.

12. Set the inst_root property back to the original directory for the application package server:

```
# svccfg -s pkg/server setprop \
pkg/inst_root=/opt/ora/s11_ul-sru7.2_repo
```

13. Now try to enable the pkg/server service:

```
# svcadm enable pkg/server
```

14. Check that the service is now running:

```
# svcs -xv pkg/server
svc:/application/pkg/server:default (image packaging repository)
State: maintenance since June 13, 2013 11:33:59 AM MDT
Reason: Start method failed repeatedly, last exited with status
1.
See: http://support.oracle.com/msg/SMF-8000-KS
See: /var/svc/log/application-pkg-server:default.log
Impact: This service is not running.
```

Why is this service not running?

When a service is in maintenance state, it must be cleared first to signal the restarter that it has been repaired.

15. Use the `svcadm clear` command to clear the service:

```
# svcadm clear pkg/server
```

16. Refresh the `pkg/server` service:

```
# svcadm refresh pkg/server
```

17. Check that the `pkg/server` service is now healthy:

```
# svcs -xv pkg/server
svc:/application/pkg/server:default (image packaging repository)
State: online since June 13, 2013 01:00:11 PM MDT
See: /var/svc/log/application-pkg-server:default.log
Impact: None.
```

Is this service back online?

Yes.

Solution 5-3: Fixing an IPS Package Problem

Task 1

Perform the following steps:

1. Verify the status of the package you previously installed such as `apptrace`:

```
# pkg verify -v apptrace
PACKAGE STATUS
pkg://solaris/developer/apptrace      OK
```

2. Use the `pkg info` command on the package and note its publisher and version:

```
# pkg info apptrace
      Name: developer/apptrace
      Summary: Apptrace Utility
      Description: Apptrace utility for application tracing,
including shared
objects
      Category: Development/System
      State: Installed
      Publisher: solaris
      Version: 0.5.11
Build Release: 5.11
      Branch: 0.175.1.0.0.24.2
Packaging Date: September 19, 2012 06:42:08 PM
      Size: 173.09 kB
      FMRI:
pkg://solaris/developer/apptrace@0.5.11,5.11-
0.175.1.0.0.24.2:20120919T184208Zroot@host07:~
```

3. Use the `pkg contents` command to view the contents of this package:

```
# pkg contents apptrace
PATH
usr
usr/bin
usr/bin/apptrace
usr/lib
usr/lib/abi
usr/lib/abi/apptrace.so.1
usr/lib/abi/sparcv9
usr/lib/abi/sparcv9/apptrace.so.1
usr/share/man/ja_JP.UTF-8/man1
usr/share/man/ja_JP.UTF-8/man1/apptrace.1
usr/share/man/man1
usr/share/man/man1/apptrace.1
usr/share/man/zh_CN.UTF-8/man1
usr/share/man/zh_CN.UTF-8/man1/apptrace.1
```

- Remove a file such as the library file, thus causing the package to have verification and execution errors:

```
# rm /usr/lib/abi/appttrace.so.1
```

- Try to use the `appttrace` command on a command such as `date`:

```
# appttrace date
ld.so.1: date: warning: /usr/lib/abi/appttrace.so.1: open failed:
No such file or directory
ld.so.1: date: warning: /usr/lib/abi/appttrace.so.1: audit
initialization failure: disabled
Tuesday, February 1, 2000 05:53:33 PM MST
```

- For this failure, you can use the `pkg verify` command in verbose mode to find out the root cause of the problem:

```
# pkg verify -v appttrace
PACKAGE STATUS
pkg://solaris/developer/appttrace ERROR
file: usr/lib/abi/appttrace.so.1
Missing: regular file does not exist
```

What is the error message?

The error message states that a library file in the package is missing.

- Verify that the file is missing:

```
# ls /usr/lib/abi/appttrace.so.1
appttrace.so.1: no such file or directory
```

- If a file in a package is missing or corrupt, you can run the `pkg fix` command to repair it:

Note: The `--accept` flag accepts any licensing agreements automatically.

```
# pkg fix --accept appttrace
Verifying: pkg://solaris/developer/appttrace
ERROR
    file: usr/lib/abi/appttrace.so.1
        Missing: regular file does not exist
Created ZFS snapshot: 2000-02-02-00:54:39
Repairing: pkg://solaris/developer/appttrace
Creating Plan (Evaluating mediators): /

DOWNLOAD                                PKGS            FILES
XFER (MB)    SPEED
Completed    1/1            1/1
0.0/0.0      0B/s

PHASE                                ITEMS
Updating modified actions            1/1
Updating image state                  Done
Creating fast lookup database         Done
```

9. Verify that the package has been fixed:

```
# pkg verify -v appttrace
PACKAGE STATUS
pkg://solaris/developer/appttrace      OK
```

10. Try to use the appttrace command again on a command such as date:

```
# appttrace date
->date      -> libc.so.1:int atexit(int (*)() = 0xf1679d2c)
<- date     -> libc.so.1:atexit()
->date      -> libc.so.1:int atexit(int (*)() = 0x1243c)
<- date     -> libc.so.1:atexit()
->date      -> libc.so.1:char * setlocale(int = 0x6, const char *
= 0x124a0 "")
<- date     -> libc.so.1:setlocale() = 0x1f94a0
->date      -> libc.so.1:char * textdomain(const char * = 0x124a4
"SUNW_OST_OSCMD")
<- date     -> libc.so.1:textdomain() = 0x1f94d0
->date      -> libc.so.1:int getopt(int = 0x1, char *const * =
0xf950f6d4, const char * = 0x124b4 "a:u")
<- date     -> libc.so.1:getopt() = 0xffffffff
->date      -> libc.so.1:int clock_gettime(clockid_t = 0x3,
timespec_t * = 0x26004)
<- date     -> libc.so.1:clock_gettime()
->date      -> libc.so.1:char * nl_langinfo(nl_item = 0x3a)
<- date     -> libc.so.1:nl_langinfo() = 0xf0a96480
->date      -> libc.so.1:struct tm * localtime(consttime_t * =
0x26000)
<- date     -> libc.so.1:localtime() = 0xf1290280
->date      -> libc.so.1:strchr(0xf0a96480, 0x25, 0xf1290280) **
NR
->date      -> libc.so.1:strchr(0xf0a96481, 0x25, 0xff630804) **
NR
->date      -> libc.so.1:strchr(0xf0a96485, 0x25, 0xff6603ff) **
NR
->date      -> libc.so.1:strchr(0xf0a96488, 0x25, 0x25) ** NR
->date      -> libc.so.1:strchr(0xf0a9648c, 0x25, 0x3f0803ff) **
NR
->date      -> libc.so.1:strchr(0xf0a9648f, 0x25, 0x7b03ff6b) **
NR
->date      -> libc.so.1:strchr(0xf0a96492, 0x25, 0x1dfff671e) **
NR
->date      -> libc.so.1:strchr(0xf0a96495, 0x25, 0xff7503ff) **
NR
->date      -> libc.so.1:strchr(0xf0a96498, 0x25, 0x25) ** NR
->date      -> libc.so.1:strchr(0xf0a9649b, 0x25, 0x5403ff7e) **
NR
```

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```
->date      -> libc.so.1:memcpy%sun4v-hwcap1(0xf950f644,  
0xf1290280, 0x24) ** NR  
->date      -> libc.so.1:size_t strftime(char * = 0x2640c "",  
size_t = 0x400, const char * = 0x2600c "%A, %B %e, %Y %I:%M:%S %p  
%Z", conststruct tm * = 0xf950f644)  
<- date     -> libc.so.1:strftime() = 0x29  
->date      -> libc.so.1:int puts(const char * = 0x2640c "Friday,  
February  4, 2000 09:24:57 PM MST")  
Friday, February  4, 2000 09:24:57 PM MST  
<- date     -> libc.so.1:puts() = 0x2a  
->date      -> libc.so.1:exit(0x0, 0xf950f6d4, 0xf1290280) ** NR
```

Practices for Lesson 6: Troubleshooting Automated Install (AI) Problems

Chapter 6

Practices for Lesson 6: Overview

Practices Overview

In this practice, you troubleshoot faults related to the AI technology. The AI service provides the ability to remotely deploy Oracle Solaris 11 systems. AI utilizes additional technologies such as DHCP, IPS, Oracle Solaris Zones, and so on. Each AI service is created by administrators.

These services include numerous components, including:

- Oracle Solaris images
- AI manifests
- Client criteria
- System configuration profiles

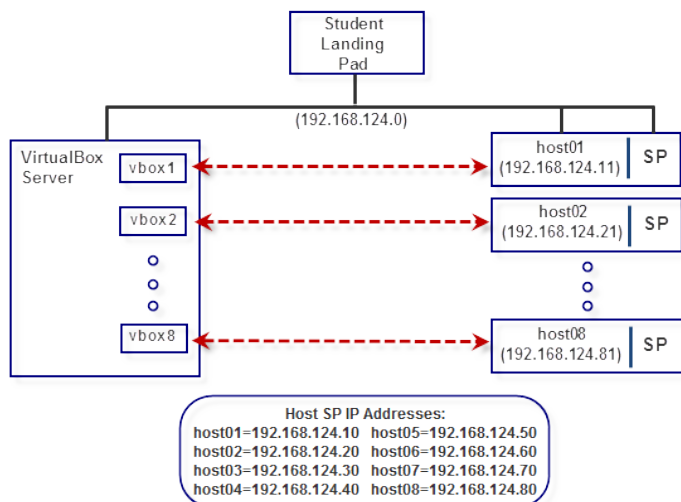
When you deploy a Solaris 11 system by using AI, the following basic steps must be performed correctly for the deployment to be successful:

- Make sure that the installation server has a static IP address and default route.
- Make sure that the clients can access a DHCP server.
- Make sure that the necessary information is available in the DHCP configuration to boot the service.
- Make sure that the clients can access an IPS software package repository. To use the default IPS package repository, the clients must be able to access the Internet.
- Configure the AI service.
 - Run the `installadm create-service` command to create the AI service.
 - Identify the client machines that are to use the service.
 - Create the AI manifest files associated with the AI service.
 - Define the client criteria associated with each AI manifest.
 - Create an SC profile for each client.

Before You Begin

This section provides information about the lab environment for this practice. Familiarize yourself with this information before you begin the practice.

Lab Topology



The practice environment that you use in this course is based on the I386 T2000 server hardware that is running Oracle Solaris 11.1 and an x4170 that is running VirtualBox, which is configured with eight virtual machines (vboxes). Your instructor will assign you a host/vbox pair to use during this course. The host/vbox pairing is shown in this illustration. For example: host01 is paired with vbox1, host02 is paired with vbox2, and so on. Make sure that you are assigned a host/vbox pair before you begin this practice.

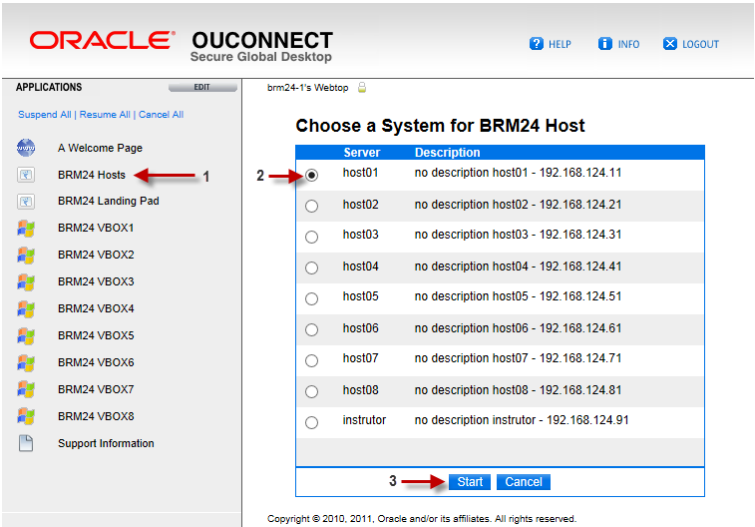
Note

- The vbox takes on the client role when performing client/server troubleshooting.
- Each T2000 server is configured with 8 CPU cores, 16 GB of memory, two 72-GB disk drives, one physical NIC, and one console connection. Each server is configured with zones and VNICS.
- In the practice environment, each host contains a service processor (SP). When you are required to access the system console, you open a terminal window and `telnet` into your assigned host's SP. From the SP, you open a console session on the server. Additional instructions are provided in your Activity Guide.

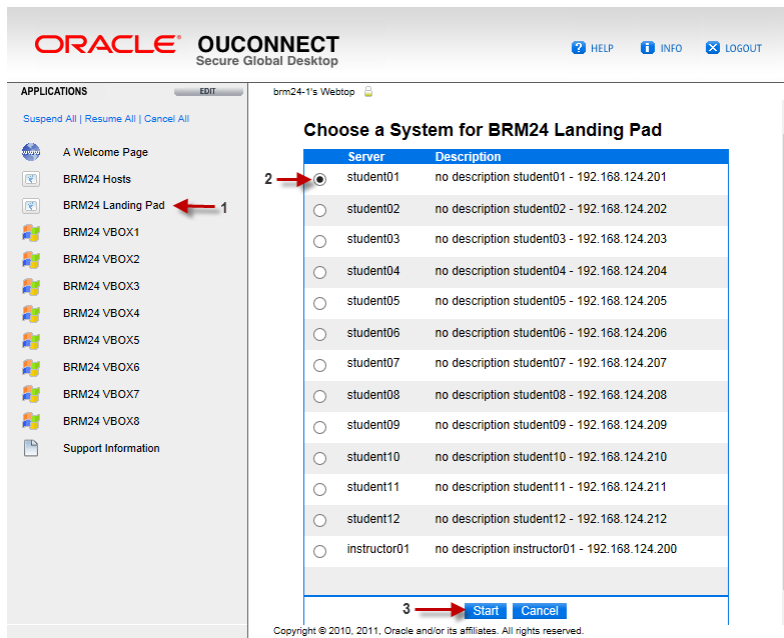
Working with Your Lab Environment

Your lab environment consists of your assigned host (server) and a VirtualBox (VBox) virtual machine. In this practice, the host has the role of the AI server and the Oracle VirtualBox virtual machines to use as the AI client. This section covers some of the basic essentials when you work with your lab environment.

- To assess your assigned server:



- To access your server's Service Processor (SP):

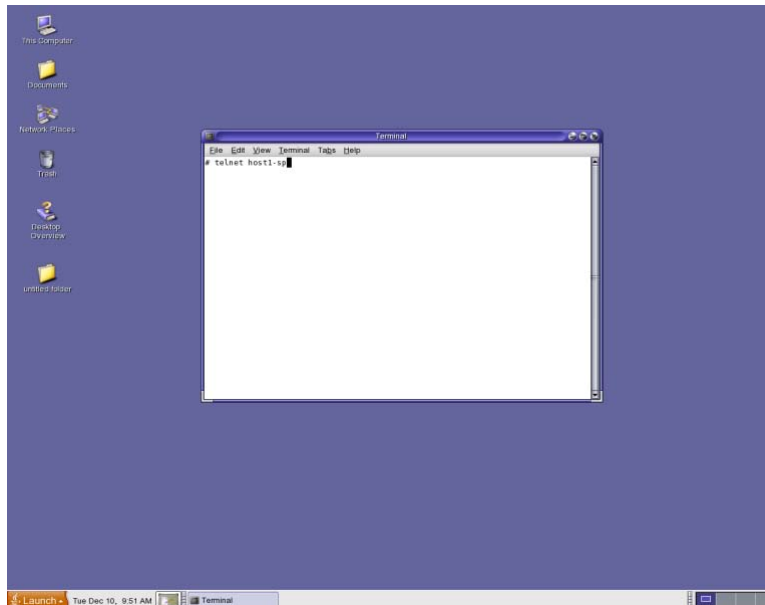


- Select the Landing Pad application.
- Select your assigned server SP.

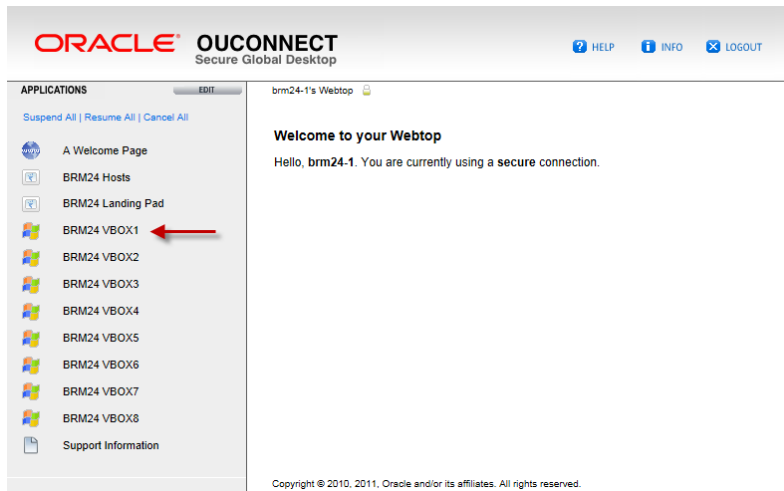
Note: The server `studentxx` is the same machine as `hostxx`.

- Click the Start icon.

Open a terminal window in the landing pad desktop and `telnet` to your assigned server's SP.



- To access the VirtualBox virtual machine console from the Oracle OUCONNECT Secure Global Desktop:



Note: The Secure Global Desktop virtual machine console link works only when the virtual machine is running. If the virtual machine is shut down, the virtual console does not respond to connection requests. Also, the console connection automatically disconnects if the virtual machine is powered off. To regain access to the virtual machine, you must power the virtual machine back on. See the following section for information about powering virtual machines on and off.

Managing Virtual Machines from the Command Line

You can manage your assigned virtual machine from the command line on the VirtualBox server:

- To start (power on) your virtual machine, open a terminal window on your assigned host and `ssh` to the VirtualBox server as the user `oracle` with the password `oracle`. Then run the `VBoxManage startvm` command.

```
# ssh -l oracle 192.168.124.231
Password: oracle
Last login: Mon Dec  9 17:58:12 2013 from 192.168.124.31
Oracle Corporation      SunOS 5.11      11.1      July 2013
Welcome to Sol11-ul-sru10.5_Generic on vbox-svr
oracle@vbox-svr:~$ VBoxManage startvm <vmname> --type headless
```

Note: To view the virtual machine console, quickly return the OUCONNECT Secure Global Desktop and select your assigned virtual machine (vbox1, vbox2, and so on) from the applications panel. *Perform the VM start and VM console open in quick succession.*

- To reset your virtual machine, open a terminal window on your assigned host and `ssh` to the VirtualBox server as the user `oracle` with the password `oracle`. Then run the `VBoxManage controlvm reset` command.

```
# ssh -l oracle 192.168.124.231
Password: oracle
Last login: Mon Dec  9 17:58:12 2013 from 192.168.124.31
Oracle Corporation      SunOS 5.11      11.1      July 2013
Welcome to Sol11-ul-sru10.5_Generic on vbox-svr
oracle@vbox-svr:~$ VBoxManage controlvm <vmname> reset
```

- To shut down (power off) your virtual machine, open a terminal window on your assigned host and `ssh` to the VirtualBox server as the user `oracle` with the password `oracle`. Then run the `VBoxManage controlvm poweroff` command.

```
# ssh -l oracle 192.168.124.231
Password: oracle
Last login: Mon Dec  9 17:58:12 2013 from 192.168.124.31
Oracle Corporation      SunOS 5.11      11.1      July 2013
Welcome to Sol11-ul-sru10.5_Generic on vbox-svr
oracle@vbox-svr:~$ VBoxManage controlvm <vmname> poweroff
```

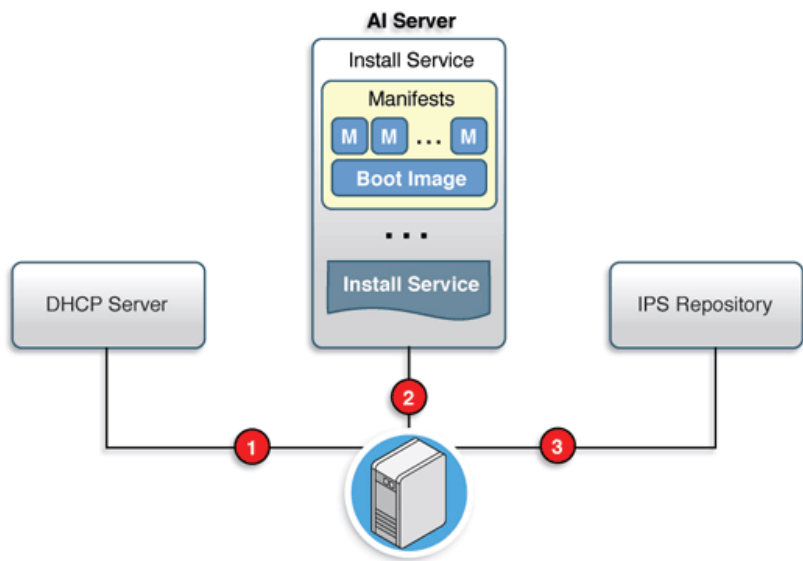
Practice 6-1: Troubleshooting a Failed AI Zone Installation

Overview

In this practice, you troubleshoot a failed AI deployment of an Oracle Solaris Zone. The name of the zone that failed to deploy is `engineering`.

Before You Begin

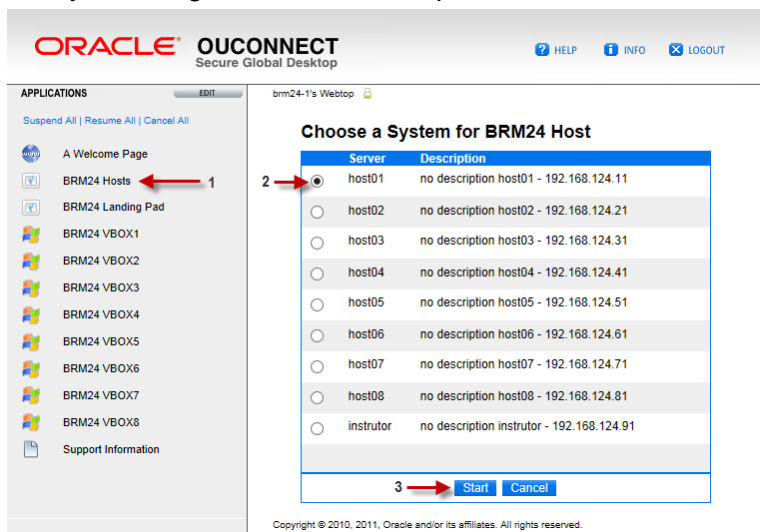
Before you begin this practice, familiarize yourself with the following illustration that shows the AI service infrastructure:



Tasks

Perform the following steps:

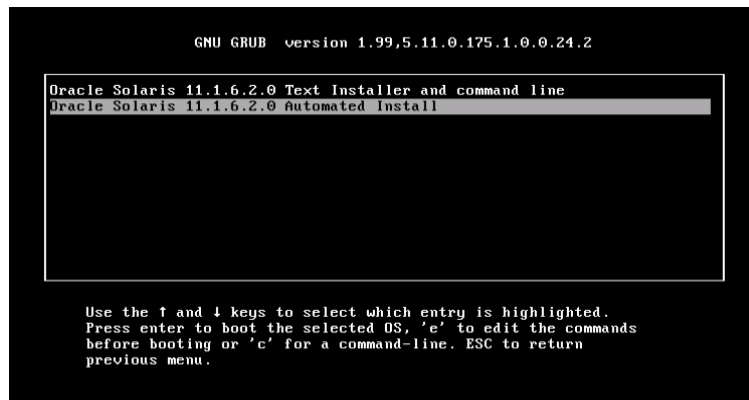
1. Verify that the AI installation fails due to an unresolved host.
 - a. Launch your assigned server desktop.



- b. Open a terminal window, `ssh` to the VirtualBox server, and restart your assigned virtual machine. Then, quickly perform step c.

```
# ssh -l oracle 192.168.124.231
Password: oracle
Last login: Mon Dec  9 17:58:12 2013 from 192.168.124.31
Oracle Corporation      SunOS 5.11      11.1      July 2013
Welcome to Sol11-ul-sru10.5_Generic on vbox-svr
oracle@vbox-svr:~$ VBoxManage controlvm <vmname> poweroff
Note: If your VM is already powered off, the command returns an Invalid machine state error message.
oracle@vbox-svr:~$ VBoxManage startvm <vmname> --type headless
```

- c. Quickly return the OUCONNECT Secure Global Desktop and launch your assigned virtual machine console window from the applications panel.
- d. Select the Oracle Solaris 11.1.6.2.0 Automated Install image from the GNU GRUB menu.



2. Check the AI installation log on the client for error indications.

Using the AI Server Infrastructure illustration shown at the beginning of this practice, which part of the AI infrastructure is associated with which type of failure?

- 1 ____
- 2 ____
- 3 ____

List the problems that might cause this type of AI installation failure.

Using the list created in the preceding step as a guide, verify that each item is configured correctly.

Did you find any problems?

If so, what is the problem?

3. Repair the fault and test your solution.

Note: The valid location for the zone configuration file is:

`http://your_AI_svr_IP_addr:8080/engineering.cfg`

Note: If you repaired the fault correctly, you will see the second fault in the lab appear when you try to install the Solaris 11 OS by using AI.

Practice 6-2: Troubleshooting a Failed AI Installation

Overview

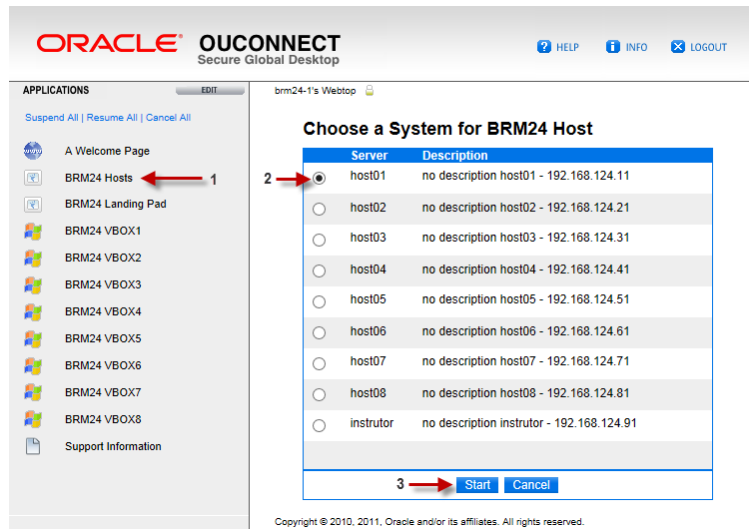
In this practice, you troubleshoot a failed Solaris 11 installation by using AI.

Note: To perform this practice, you must have successfully completed Practice 6-1.

Tasks

Perform the following steps:

1. Verify that the AI installation fails due to an unresolved host.
 - a. Launch your assigned server desktop.

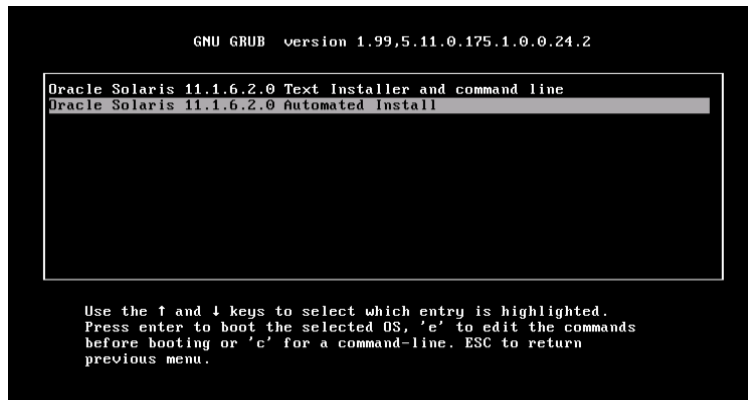


- b. Open a terminal window, `ssh` to the VirtualBox server, and restart your assigned virtual machine. Then, quickly perform step c.

```
# ssh -l oracle 192.168.124.231
Password: oracle
Last login: Mon Dec  9 17:58:12 2013 from 192.168.124.31
Oracle Corporation      SunOS 5.11      11.1      July 2013
Welcome to Sol11-11-sru10.5_Generic on vbox-svr
oracle@vbox-svr:~$ VBoxManage controlvm <vmname> poweroff
Note: If your VM is already powered off, the command will return an Invalid machine state error message.
oracle@vbox-svr:~$ VBoxManage startvm <vmname> --type headless
```

- c. Quickly return the OUCONNECT Secure Global Desktop and launch your assigned virtual machine console window from the applications panel.

- d. Select the Oracle Solaris 11.1.6.2.0 Automated Install image from the GNU GRUB menu.



2. Check the AI installation log on the client for error indications.

Using the AI Server Infrastructure illustration shown at the beginning of the first practice, which part of the AI infrastructure is associated with which type of failure?

- 1 ____
2 ____
3 ____

List the problems that might cause this type of AI installation failure.

Using the list that is created in the preceding step as a guide, verify that each item is configured correctly.

Did you find any problems?

If so, what is the problem?

3. Repair the fault and test your solution.

Solution 6-1: Troubleshooting a Failed AI Zone Installation

Overview

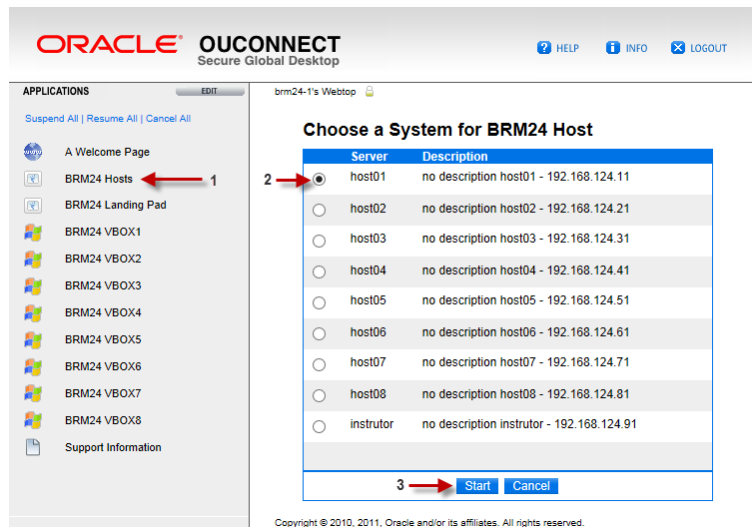
In this practice, you troubleshoot a failed AI deployment that fails to complete.

Note: The following examples assume that the student was assigned `host01` and `vbox1`.

Tasks

Perform the following:

1. Verify that the AI installation fails due to an unresolved host.
 - a. Launch your assigned server desktop.

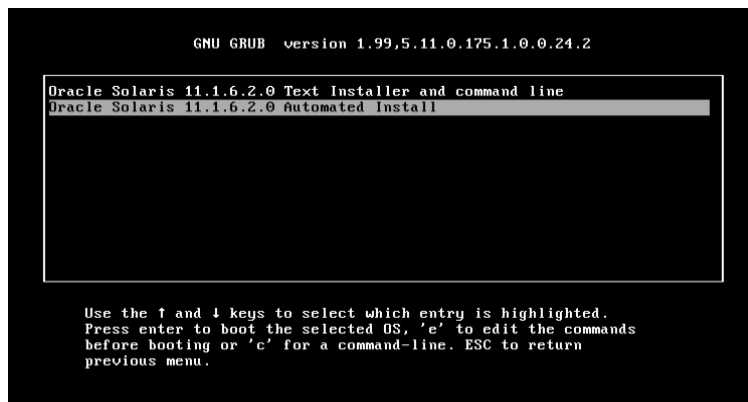


- b. Open a terminal window, `ssh` to the VirtualBox server, and restart your assigned virtual machine. Then, quickly perform step c.

```
# ssh -l oracle 192.168.124.231
Password: oracle
Last login: Mon Dec 9 17:58:12 2013 from 192.168.124.31
Oracle Corporation      SunOS 5.11      11.1      July 2013
Welcome to Sol11-ul-sru10.5_Generic on vbox-svr
oracle@vbox-svr:~$ VBoxManage controlvm <vmname> poweroff
Note: If your VM is already powered off, the command returns an Invalid machine state error message.
oracle@vbox-svr:~$ VBoxManage startvm <vmname> --type headless
```

- c. Quickly return the OUCONNECT Secure Global Desktop and launch your assigned virtual machine console window from the applications panel.

- d. Select the Oracle Solaris 11.1.6.2.0 Automated Install image from the GNU GRUB menu.



2. Check the AI installation log on the client for error indications.

```
solaris console login: root
Password: solaris
Jun 19 19:39:27 solaris login: ROOT LOGIN /dev/console
Oracle Corporation      SunOS 5.11      11.1      March 2013
# more /system/volatile/install_log
....
2013-06-25 20:15:27,462  InstallationLogger Error Unable to
import manifest. Unable to open source
(http://192.168.124.199/engineering.cfg):
[Errno socket error] [Errno 145] Connection timed out
....
```

- a. Check the zone configuration in the AI manifest on your assigned server.

```
# installadm export -n default-i386 -m i386-manifest |grep zone
<configuration type="zone" name="en" <configuration type="zone"
name="engineering"
source="http://192.168.124.199/engineering.cfg"/>
```

- b. Open a terminal window on the HTTP server (192.168.124.199) and verify the local zone configuration file.

```
# ssh 192.168.124.199
<no response from server>
^C
```

Did you find any problems? Yes

If so, what is the problem?

The zone configuration file location (source) in the AI manifest is incorrect. Or, the system containing the zone configuration file is down.

3. Repair the fault and test your solution.

Note: The valid location for the zone configuration file is:

`http://your_AI_svr_IP_addr:8080/engineering.cfg`

- a. Repair the fault.

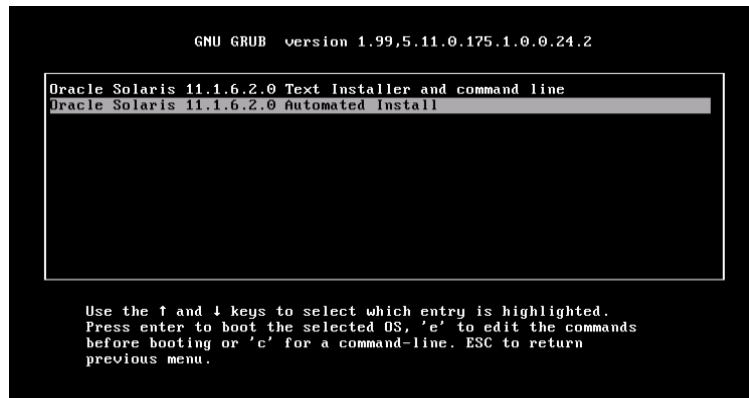
```
# installadm list -m
Service/Manifest Name      Status      Criteria
-----
default-i386
  i386-manifest              platform = i86pc
  orig_default               Default     None

solaris11_1_6_2_0-i386
  orig_default               Default     None
# installadm export -n default-i386 -m i386-manifest > \
  /var/tmp/manifest_tmpl.xml
# vi /var/tmp/manifest_tmpl.xml
...
<configuration type="zone" name="engineering" source="
http://192.168.124.11:8080/engineering.cfg "/>
...
:wq!
# installadm delete-manifest -m i386-manifest -n default-i386
# installadm list -m -n default-i386
Service/Manifest Name      Status      Criteria
-----
default-i386
  orig_default               Default     None
# installadm create-manifest -f /var/tmp/manifest_tmpl.xml \
  -m i386-manifest -c platform=i86pc \
  -n default-i386
# installadm list -m -n default-i386
Service/Manifest Name      Status      Criteria
-----
default-i386
  i386-manifest              platform = i86pc
  orig_default               Default     None
# installadm export -m i386-manifest \
  -n default-i386 | grep zone
      <configuration type="zone" name="engineering" source="
http://192.168.124.11:8080/engineering.cfg "/> >
```

- b. Test your solution.
- Move to the VirtualBox server and restart your assigned virtual machine. Then, quickly perform step b.

```
# ssh -l oracle 192.168.124.231
Password: oracle
Last login: Mon Dec  9 17:58:12 2013 from 192.168.124.31
Oracle Corporation      SunOS 5.11      11.1      July 2013
Welcome to Sol11-ul-sru10.5_Generic on vbox-svr
oracle@vbox-svr:~$ VBoxManage controlvm <vmname> poweroff
Note: If your VM is already powered off, the command returns an Invalid machine state error message.
oracle@vbox-svr:~$ VBoxManage startvm <vmname> --type headless
```

- Quickly return the OUCONNECT Secure Global Desktop and launch your assigned virtual machine console window from the applications panel.
- Select the Oracle Solaris 11.1.6.2.0 Automated Install image from the GNU GRUB menu.



Note: If you repaired the fault correctly, you will see the second fault in the lab appear when you try to install the Solaris 11 OS by using AI.

Solution 6-2: Troubleshooting a Failed AI Installation

Overview

In this practice, you troubleshoot a failed Solaris 11 installation by using AI.

Note: To perform this practice, you must have successfully completed Practice 6-1.

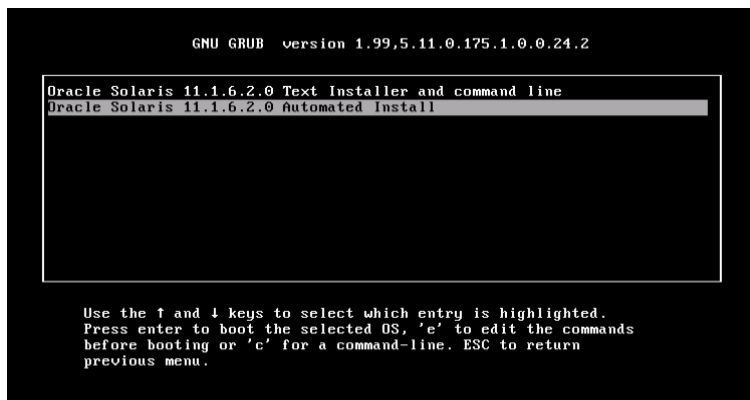
Tasks

Perform the following steps:

1. Verify that the AI installation fails due to an unresolved host.
 - a. Open a terminal window, `ssh` to the VirtualBox server, and restart your assigned virtual machine. Then, quickly perform step b.

```
# ssh -l oracle 192.168.124.231
Password: oracle
Last login: Mon Dec  9 17:58:12 2013 from 192.168.124.31
Oracle Corporation      SunOS 5.11      11.1      July 2013
Welcome to Sol11-ul-sru10.5_Generic on vbox-svr
oracle@vbox-svr:~$ VBoxManage controlvm <vmname> poweroff
Note: If your VM is already powered off, the command returns an Invalid machine state
error message.
oracle@vbox-svr:~$ VBoxManage startvm <vmname> --type headless
```

- b. Quickly return the OUCONNECT Secure Global Desktop and launch your assigned virtual machine console window from the applications panel.
 - c. Select the Oracle Solaris 11.1.6.2.0 Automated Install image from the GNU GRUB menu.



2. Check the AI installation log on the client for error indications.

```
solaris console login: root
Password: solaris
Jun 19 19:39:27 solaris login: ROOT LOGIN /dev/console
Oracle Corporation      SunOS 5.11      11.1      March 2013
# more /system/volatile/install_log
....
Framework error: code: 6 reason: Couldn't resolve host
'pkg.oracle.com'
```

```
2013-06-25 21:33:10,117    InstallationLogger ERROR
URL: 'http://pkg.oracle.com/solaris/release/versions/0/'
....
```

- a. Compare the IPS publisher URI value stated in the error messages on the AI client with the AI server current IPS publisher property value and the IPS publisher origin name in the AI service manifests.

On the AI client:

```
# cat /system/volatile/install_log |egrep '(error)|(URL)'
TransportFailures: Framework error: code: 6 reason: Couldn't
resolve host 'pkg.oracle.com'
URL: 'http://pkg.oracle.com/solaris/release/versions/0/'
2013-06-19 17:29:42,188    InstallationLogger ERROR
Checkpoint execution error:
2013-06-19 17:29:42,289    InstallationLogger ERROR
Framework error: code: 6 reason: Couldn't resolve host
'pkg.oracle.com'
2013-06-19 17:29:42,340    InstallationLogger ERROR
URL: 'http://pkg.oracle.com/solaris/release/versions/0/'
```

On the AI server:

```
# pkg publisher
PUBLISHER                                TYPE      STATUS P LOCATION
solaris                                  origin    online F
file:///opt/ora/s11_u1-sru7.2_repo/
```

- b. Check the IPS entry in the AI manifest.

```
# installadm list -m -n default-i386
Service/Manifest Name  Status  Criteria
-----
default-i386
  i386-manifest                platform = i86pc
  orig_default                Default  None
# installadm export -n default-i386 -m i386-manifest \
|grep origin
<origin name="http://pkg.oracle.com/solaris/release/">
```

Using the AI Server Infrastructure illustration shown at the beginning of the first practice, which part of the AI infrastructure is associated with which type of failure?

1. *The AI service configuration*
2. *The IPS service*
3. ____

List the problems that might cause this type of AI installation failure.

1. *Cannot resolve IPS URI*
2. *Faulty AI manifest configuration*
3. *Invalid manifest criteria*

Did you find any problems? Yes

If so, what is the problem?

The IPS service entry in the AI manifest does not match the IPS configuration in the AI server.

3. Repair the fault and test your solution.

Note: The valid IPS entry in the AI manifest should be:

`http://your_AI_svr_IP_addr/`

- a. Repair the fault.

```
# installadm list -m
Service/Manifest Name      Status      Criteria
-----
default-i386
  i386-manifest              platform = i86pc
  orig_default               Default     None

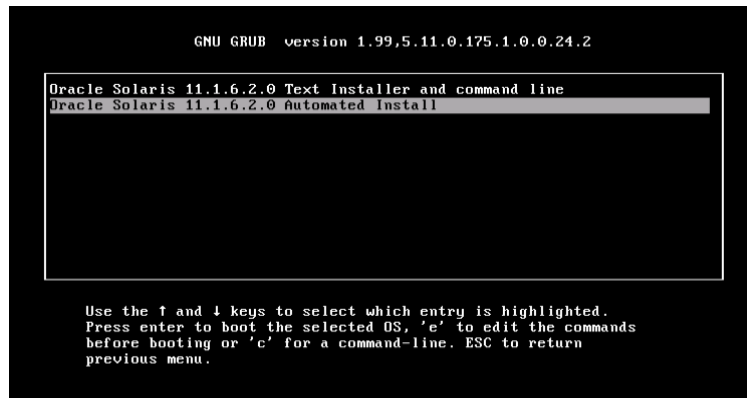
solaris11_1_6_2_0-i386
  orig_default               Default     None
# installadm export -n default-i386 -m i386-manifest > \
/var/tmp/manifest_tmp2.xml
# vi /var/tmp/manifest_tmp2.xml
...
<origin name="your_AI_svr_IP_addr"/>
...
:wq!
# installadm delete-manifest -m i386-manifest -n default-i386
# installadm list -m -n default-i386
Service/Manifest Name      Status      Criteria
-----
default-i386
  orig_default               Default     None
# installadm create-manifest -f /var/tmp/manifest_tmp2.xml \
-m i386-manifest -c platform=i86pc \
-n default-i386
# installadm list -m -n default-i386
Service/Manifest Name      Status      Criteria
-----
default-i386
  i386-manifest              platform = i86pc
  orig_default               Default     None
# installadm export -m i386-manifest \
-n default-i386 | grep origin
<origin name="your_AI_svr_IP_addr"/>
```


b. Test your solution.

- Restart your assigned virtual machine. Then, quickly perform step 2.

```
# ssh -l oracle 192.168.124.231
Password: oracle
Last login: Mon Dec  9 17:58:12 2013 from 192.168.124.31
Oracle Corporation      SunOS 5.11      11.1      July 2013
Welcome to Sol11-ul-sru10.5_Generic on vbox-svr
oracle@vbox-svr:~$ VBoxManage controlvm <vmname> poweroff
Note: If your VM is already powered off, the command will return an Invalid machine state error message.
oracle@vbox-svr:~$ VBoxManage startvm <vmname> --type headless
```

- Quickly return the OUCONNECT Secure Global Desktop and launch your assigned virtual machine console window from the applications panel.
- Select the Oracle Solaris 11.1.6.2.0 Automated Install image from the GNU GRUB menu.



Note: The initial OS installation will take several minutes to complete. Upon completion of the AI installation, the system will need to be rebooted. **Do not reboot the VM until you complete the next step.**

To avoid the system attempting to perform another AI installation, change the boot order of the VM so the system boots to the newly installed OS. From the VirtualBox server, change the VM boot order to disk first, then restart the virtual machine.

- Move to the VirtualBox server and change the VM boot order to disk first. Restart the virtual machine.

```
# ssh -l oracle 192.168.124.231
Password: oracle
Last login: Mon Dec  9 17:58:12 2013 from 192.168.124.31
Oracle Corporation      SunOS 5.11      11.1      July 2013
Welcome to Sol11-ul-sru10.5_Generic on vbox-svr
oracle@vbox-svr:~$ VBoxManage controlvm <vmname> poweroff
Note: If your VM is already powered off, the command will return an Invalid machine state error message.
oracle@vbox-svr:~$ VBoxManage modifyvm <vmname> --boot1 disk
oracle@vbox-svr:~$ VBoxManage startvm <vmname> --type headless
```

Note: The zone is installed on first reboot of the new OS. This normally takes several minutes to complete.

Practices for Lesson 7: Troubleshooting Problems with Zones

Chapter 7

Practices for Lesson 7

Practices Overview

In this practice, you troubleshoot problems related to Oracle Solaris Zones.

Practice 7-1: Troubleshooting an Oracle Solaris Zone Startup Failure

Overview

In this practice, the `database` zone boots to maintenance mode.

Tasks

Perform the following steps to troubleshoot the `database` zone:

1. Verify that the `database` zone boots to maintenance mode.
List the problems that might cause this type of failure in a zone.
2. Using the list created in the previous step as a guide, verify that each item is configured correctly.
Did you find any problems?
If so, what is the problem?
3. Repair the fault and test your solution.

Practice 7-2: Troubleshooting a Zone Permissions Issue

Overview

In this practice, a second disk drive (c2t2d0) has been added to the `storage` zone. This disk is to be used for UFS file systems required by a legacy application. The administrator wants to use the "all free hog" feature to create a single partition spanning the entire disk. But when the second disk drive is accessed (by using the `format` command), a `Permission denied` message is returned.

Tasks

Perform the following steps:

1. Verify that the `storage` zone has a disk permissions problem.
List the problems that might cause this type of storage failure in a zone.
2. Using the list created in the previous step as a guide, verify that each item is configured correctly.
Did you find any problems?
If so, what is the problem?
3. Repair the fault and test your solution.
4. Use the `format` command to create a partition that spans the entire disk. Then create a UFS file system on that partition.

```
# format
AVAILABLE DISK SELECTIONS:
    0. c3t2d0 <FUJITSU-MAY2073RCSUN72G-0501-68.37GB>
       sd4 at pci1000,500 slave 16
Specify disk (enter its number): 0
selecting c3t2d0
[disk formatted]
...
format> partition
...
partition> modify
Select partitioning base:
    0. Current partition table (original)
    1. All Free Hog
Choose base (enter number) [0]? 1
...
Do you wish to continue creating a new partition
table based on above table[yes]? yes
Free Hog partition[6]?
Enter size of partition 0 [0b, 33e, 0mb, 0gb, 0tb]:
Enter size of partition 1 [0b, 33e, 0mb, 0gb, 0tb]:
```

```

Enter size of partition 2 [0b, 33e, 0mb, 0gb, 0tb]:
Enter size of partition 3 [0b, 33e, 0mb, 0gb, 0tb]:
Enter size of partition 4 [0b, 33e, 0mb, 0gb, 0tb]:
Enter size of partition 5 [0b, 33e, 0mb, 0gb, 0tb]:
Enter size of partition 7 [0b, 33e, 0mb, 0gb, 0tb]:
...
Ready to label disk, continue? yes
partition> quit
...
format> quit
# newfs /dev/rdisk/c3t2d0s6
newfs: construct a new file system /dev/rdisk/c3t2d0s6: (y/n)? y
Warning: 5810 sector(s) in last cylinder unallocated
/dev/rdisk/c3t2d0s6: 143358286 sectors in 23334 cylinders of 48
tracks, 128 sectors
        69999.2MB in 1459 cyl groups (16 c/g, 48.00MB/g, 5824 i/g)
super-block backups (for fsck -F ufs -o b=#) at:
    32, 98464, 196896, 295328, 393760, 492192, 590624, 689056,
    787488, 885920,
Initializing cylinder groups:
.....
super-block backups for last 10 cylinder groups at:
    142447776, 142546208, 142644640, 142743072, 142841504,
    142939936, 143038368,
    143136800, 143235232, 143333664
142447776, 142546208, 142644640, 142743072, 142841504, 142939936,
143038368,
    143136800, 143235232, 143333664
#

```

Practice 7-3: Troubleshooting a Zone Restore Failure

Overview

In this practice, an administrator has identified a problem where a backed up zone cannot be reattached to the system. The administrator has provided you with the following tasks that were performed when the zone attachment failed. Run each of these tasks to verify that the zone fails to attach, and then fix the problem.

Task 1: Back Up the Zone Configuration

In this task, you create a backup on the `web` zone configuration.

Perform the following steps to back up the zone configuration:

1. Log in to your assigned server.
2. Create a repository for your zone configuration files.

```
# mkdir -p /var/backups/zone_configs
```

3. Export the `web` zone configuration to the zone configuration repository.

```
# zonecfg -z web export \  
-f /var/backups/zone_configs/web.cfg
```

Task 2: Back Up the Non-Global Zone Operating System Environment

Perform the following steps to create a backup of the entire `web` zone operating system environment:

1. Create a repository for your zone backups.

```
# mkdir -p /var/backups/zones
```

2. Determine the `web` zone `zonepath`.

```
# zonecfg -z web info zonepath  
/zones/web
```

3. Determine the `zonepath` data set for the `web` zone.

```
# zfs list -H -o name /zones/web  
rpool/zones/web
```

4. Create an archive of the `web` zone.

```
# zfs snapshot -r rpool/zones/web@snap  
# zfs send -rc rpool/zones/web@snap > \  
/var/backups/zones/web  
# zfs destroy -r rpool/zones/web@snap
```

Task 3: Completely Remove the Non-Global Zone

Perform the following steps to completely remove the `web` zone:

1. Place the `web` zone in installed state.

```
# zoneadm -z web halt  
# zoneadm list -cv | grep web  
- web          installed  /zones/web          solaris  shared
```


- Uninstall the web zone.

```
# zoneadm -z web uninstall
Are you sure you want to uninstall zone web (y/[n])? y
Progress being logged to
/var/log/zones/zoneadm.20120417T225149Z.web.uninstall
promoting 'rpool/zones/web/rpool/ROOT/solaris-1/var'.
promoting 'rpool/zones/web/rpool/ROOT/solaris-1'.
# zoneadm list -cv | grep web
- web          configured /zones/web          solaris exclusive
```

- Delete the web zone configuration.

```
# zonecfg -z web delete
Are you sure you want to delete zone web (y/[n])? y
# zoneadm list -cv
```

ID	NAME	STATUS	PATH	BRAND	IP
0	global	running	/	solaris	shared
4	storage	running	/zones/storage	solaris	shared
6	database	running	/zones/database	solaris	shared

Task 4: Restore the Non-Global Zone

Perform the following steps to recover the web zone after a catastrophic failure:

- Restore the web zone configuration.

```
# zonecfg -z web -f /var/backups/zone_configs/web.cfg
```

- Attach the web zone archive.

```
# zoneadm -z web attach -a /var/backups/zones/web
Progress being logged to
/var/log/zones/zoneadm.20120418T000740Z.web.attach
Attaching...
    Installing: This may take several minutes...
Received dataset ROOT/solaris-1 collides with existing dataset
rpool/zones/web/rpool/ROOT/solaris-1.
Received dataset ROOT/solaris-1/var collides with existing
dataset rpool/zones/web/rpool/ROOT/solaris-1/var.
Received dataset VARSHARE collides with existing dataset
rpool/zones/web/rpool/VARSHARE.
Received dataset export collides with existing dataset
rpool/zones/web/rpool/export.
Received dataset export/home collides with existing dataset
rpool/zones/web/rpool/export/home.
Received dataset export/home/oracle collides with existing
dataset rpool/zones/web/rpool/export/home/oracle.
ERROR: Error: Command <zfs destroy rpool/zones/web/installtmp>
exited with status 1
ERROR: Error: cannot destroy dataset rpool/zones/web/installtmp
ERROR: Invalid data received
Result: Attach Failed.
```

Describe the problems that could cause this type of failure.

3. Using the list created in the previous step as a guide, verify that each item is configured correctly.

Did you find any problems?

If so, what is the problem?

4. Try restoring the `web` zone again.

Did the `web` zone restore correctly?

If the answer is yes, boot the web zone.

If the answer is no, go back to step 3 and try another solution for the problem.

Practice 7-4: Troubleshooting an Oracle Solaris Zone Startup Failure

Overview

In this practice, the database zone boots to maintenance mode.

Tasks

Perform the following steps to troubleshoot the database zone:

1. Verify that the database zone boots to maintenance mode.

```
# zoneadm list -cv
ID NAME          STATUS  PATH                      BRAND  IP
 0 global        running /                          solaris shared
10 web           running /zones/web                solaris excl
11 storage       running /zones/storage            solaris excl
14 database      running /zones/database            solaris excl

# zoneadm -z database halt
# zoneadm -z database boot
# zlogin -C database
[Connected to zone 'database' console]

...
Enter user name for system maintenance (control-d to bypass):root
Enter root password (control-d to bypass): solaris
single-user privilege assigned to root on /dev/console.
Entering System Maintenance Mode

Jul 10 23:03:56 su: 'su root' succeeded for root on /dev/console
Oracle Corporation      SunOS 5.11 11.1 April 2013
root@database:~#
```

List the problems that might cause this type of failure in a zone.

Incorrect or defective zone resource

Incorrect zone configuration

2. Using the list created in the previous step as a guide, verify that each item is configured correctly.
 - a) In the global zone, check the `/var/adm/messages` file for problem indications.

```
# egrep 'ERROR|WARNING' /var/adm/messages
...
Jul 10 11:32:21 host01 tmpfs: [ID 518458 kern.warning] WARNING:
/zones/database/root/system/volatile: File system full, swap
space limit exceeded
Jul 10 11:57:51 host01 gnome-session[6402]: [ID 702911
daemon.warning] WARNING: Unable to determine session: Unable to
lookup session information for process '6402'
```

```
Jul 10 11:58:38 host01 gnome-session[6565]: [ID 702911
daemon.warning] WARNING: Unable to determine session: Unable to
lookup session information for process '6565'
Jul 10 16:11:47 host01 gnome-session[6891]: [ID 702911
daemon.warning] WARNING: Unable to determine session: Unable to
lookup session information for process '6891'
Jul 10 16:58:09 host01 zoneadmd[2282]: [ID 702911 daemon.error]
[zone 'database'] WARNING: console
/devices//pseudo/zconsnex@1/zcons@1 found, but it could not be
removed.: I/O error
Jul 10 16:58:53 host01 tmpfs: [ID 518458 kern.warning] WARNING:
/zones/database/root/system/volatile: File system full, swap
space limit exceeded
```

- b) In the global zone, determine how much physical memory is available.

```
# prtconf | grep Memory
prtconf: devinfo facility not available
Memory size: 16256 Megabytes
```

- c) In the database zone, determine how much physical memory is assigned to the database zone.

```
# prtconf | grep Memory
prtconf: devinfo facility not available
Memory size: 1 Megabytes
```

- d) In the database zone, determine how much virtual memory is available.

```
# vmstat 3 5
kthr      memory          page        disk        faults        cpu
 r  b  w   swap  free  re  mf  pi  po  fr  de  sr  s2  s3  s4  s5   in   sy   cs  us  sy  id
 0  0  0 13412288 13557800 15 48 98  0  0  0  0 28  0  0  0 1057 1179 943  0  0 99
 0  0  0 12754400 12903528  2 13 132  0  0  0  0 285  0  0  0 1214  896 902  0  4 96
 0  0  0 12754400 12902312  0  9 121  0  0  0  0  2  0  0  0  966  332 645  0  0 100
 1  0  0 12754400 12902312  0  0  0  0  0  0  0  0  0  0  0  947  326 618  0  0 100
 0  1  0 12754400 12902512  1 24 490  0  0  0  0 191  0  0  0 1427 1438 1489  0  1 99
```

- e) In the global zone, determine the database zone configuration. Look for a memory cap.

```
# zonecfg -z database info
...
capped-memory:
    physical: 1M
    [swap: 50M]
    [locked: 1M]
...
```

Did you find any problems? Yes

If so, what is the problem?

The capped memory allocation in the database zone configuration is too conservative.

3. Repair the fault and test your solution.

- a) Repair the fault by increasing the database zone memory cap to: physical=1 GB, swap=1 GB, and locked=500 MB.

```
# zonecfg -z database
zonecfg:database> select capped-memory
zonecfg:database:capped-memory> set physical=1G
zonecfg:database:capped-memory> set swap=1G
zonecfg:database:capped-memory> set locked=500M
zonecfg:database:capped-memory> info
capped-memory:
    physical: 1G
    [swap: 1G]
    [locked: 500M]
zonecfg:database:capped-memory> end
zonecfg:database> verify
zonecfg:database> commit
zonecfg:database> exit
```

- b) Verify your solution.

```
# zoneadm -z database halt
# zoneadm -z database boot
# zlogin -C database
...
database console login: oracle
Password: oracle1
Oracle Corporation      SunOS 5.11      11.1      April 2013
oracle@database:~$ su -
Password: oracle1
Feb 13 20:03:41 database su: 'su root' succeeded for oracle on
/dev/console
Oracle Corporation      SunOS 5.11      11.1      April 2013
root@database:~# prtconf | grep Memory
prtconf: devinfo facility not available
Memory size: 1024 Megabytes
root@database:~#
```

- c) Return to the global zone.

Practice 7-5: Troubleshooting a Zone Permissions Issue

Overview

In this practice, a second disk drive (c3t2d0) has been added to the `storage` zone. This disk is to be used for UFS file systems required by a legacy application. The administrator wants to use the "all free hog" feature to create a single partition spanning the entire disk. But when the second disk drive is accessed (by using the `format` command), a `Permission denied.` message is returned.

Tasks

Perform the following steps:

1. Verify that the `storage` zone has a disk permissions problem. From the global zone, log in to the `storage` zone and run the `format` command.

```
# zlogin storage
[Connected to zone 'storage' pts/3]
Oracle Corporation      SunOS 5.11 11.1  September 2012
# format
Searching for disks...
Permission denied.
```

List the problems that might cause this type of storage failure in a zone.

Incorrect zone configuration

Faulty disk

2. Using the list created in the previous step as a guide, verify that each item is configured correctly.
 - a) In the global zone, identify the installed disk drives and determine if any are faulty.

```
# iostat -eE
      ---- errors ----
device  s/w h/w trn tot
sd2      0  0  0  0
sd3      0  0  0  0
sd4      0  0  0  0
sd5      0  8  0  8
sd2      Soft Errors: 0 Hard Errors: 0 Transport Errors: 0
Vendor: FUJITSU  Product: MAV2073RCSUN72G  Revision: 0301 Serial
No: 0543S00H13
Size: 73.41GB <73407865856 bytes>
Media Error: 0 Device Not Ready: 0 No Device: 0 Recoverable: 0
Illegal Request: 2 Predictive Failure Analysis: 0
sd3      Soft Errors: 0 Hard Errors: 0 Transport Errors: 0
Vendor: FUJITSU  Product: MAY2073RCSUN72G  Revision: 0501 Serial
No: 0728S0C0W2
Size: 73.41GB <73407865856 bytes>
```

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```
Media Error: 0 Device Not Ready: 0 No Device: 0 Recoverable: 0
Illegal Request: 1 Predictive Failure Analysis: 0
sd4          Soft Errors: 0 Hard Errors: 0 Transport Errors: 0
Vendor: FUJITSU Product: MAY2073RCSUN72G Revision: 0501 Serial
No: 0726S0BSSR
Size: 73.41GB <73407865856 bytes>
Media Error: 0 Device Not Ready: 0 No Device: 0 Recoverable: 0
Illegal Request: 2 Predictive Failure Analysis: 0
```

- b) Determine which disk devices are being used by the storage zone.

```
# zonecfg -z storage info
zonename: storage
zonepath: /zones/storage
brand: solaris
autoboot: true
bootargs:
file-mac-profile:
pool:
limitpriv:
scheduling-class:
ip-type: exclusive
hostid:
fs-allowed:
net:
    address not specified
    allowed-address not specified
    configure-allowed-address: true
    physical: vnic1
    defrouter not specified
device:
    match: /dev/*dsk/c2t2d0*
    allow-partition not specified
    allow-raw-io not specified
```

- c) In the storage zone, verify that the special files for disk c2t2d0 have been created.

```
root@storage:~# ls -l /dev/rdisk/c2t2d0*
crw-r----- 1 root sys 214, 39 Jul 10 17:15 /dev/rdisk/c2t2d0
crw-r----- 1 root sys 214, 32 Jul 10 17:15 /dev/rdisk/c2t2d0s0
crw-r----- 1 root sys 214, 33 Jul 10 17:15 /dev/rdisk/c2t2d0s1
crw-r----- 1 root sys 214, 34 Jul 10 17:15 /dev/rdisk/c2t2d0s2
crw-r----- 1 root sys 214, 35 Jul 10 17:15 /dev/rdisk/c2t2d0s3
crw-r----- 1 root sys 214, 36 Jul 10 17:15 /dev/rdisk/c2t2d0s4
crw-r----- 1 root sys 214, 37 Jul 10 17:15 /dev/rdisk/c2t2d0s5
crw-r----- 1 root sys 214, 38 Jul 10 17:15 /dev/rdisk/c2t2d0s6
```

Did you find any problems? Yes

If so, what is the problem? The `format` command is a partition management tool. The zone configuration for disk `c2t2d0` currently does not have partition management enabled.

3. Repair the fault and test your solution.

a) Repair the fault.

```
# zonecfg -z storage
zonecfg:storage> select device match=/dev/*dsk/c2t2d0*
zonecfg:storage:device> info
device:
    match: /dev/*dsk/c2t2d0*
    allow-partition not specified
    allow-raw-io not specified
zonecfg:storage:device> set allow-partition=true
zonecfg:storage:device> info
device:
    match: /dev/*dsk/c2t2d0*
    allow-partition: true
    allow-raw-io not specified
zonecfg:storage:device> end
zonecfg:storage> verify
zonecfg:storage> commit
zonecfg:storage> exit
# zoneadm -z storage halt
# zoneadm -z storage boot
```

b) Verify your solution. Use the `format` command in the storage zone to create a partition that spans the entire disk (`c2t2d0`). Then create a UFS file system on that partition.

```
# zlogin storage
[Connected to zone 'storage' pts/5]
Oracle Corporation    SunOS 5.11 11.1 April 2013
# format
AVAILABLE DISK SELECTIONS:
    0. c2t2d0 <FUJITSU-MAY2073RCSUN72G-0501-68.37GB>
        sd4 at pci1000,500 slave 16
Specify disk (enter its number): 0
selecting c2t2d0
[disk formatted]
...
format> partition
...
partition> modify
Select partitioning base:
    0. Current partition table (original)
    1. All Free Hog
```



```

Choose base (enter number) [0]? 1
...
Do you wish to continue creating a new partition
table based on above table[yes]? yes
Free Hog partition[6]?
Enter size of partition 0 [0b, 33e, 0mb, 0gb, 0tb]:
Enter size of partition 1 [0b, 33e, 0mb, 0gb, 0tb]:
Enter size of partition 2 [0b, 33e, 0mb, 0gb, 0tb]:
Enter size of partition 3 [0b, 33e, 0mb, 0gb, 0tb]:
Enter size of partition 4 [0b, 33e, 0mb, 0gb, 0tb]:
Enter size of partition 5 [0b, 33e, 0mb, 0gb, 0tb]:
Enter size of partition 7 [0b, 33e, 0mb, 0gb, 0tb]:
...
Ready to label disk, continue? yes
partition> quit
...
format> quit
# newfs /dev/rdisk/c2t2d0s6
newfs: construct a new file system /dev/rdisk/c2t2d0s6: (y/n)? y
Warning: 5810 sector(s) in last cylinder unallocated
/dev/rdisk/c2t2d0s6: 143358286 sectors in 23334 cylinders of 48
tracks, 128 sectors
        69999.2MB in 1459 cyl groups (16 c/g, 48.00MB/g, 5824 i/g)
super-block backups (for fsck -F ufs -o b=#) at:
    32, 98464, 196896, 295328, 393760, 492192, 590624, 689056,
    787488, 885920,
Initializing cylinder groups:
.....
super-block backups for last 10 cylinder groups at:
    142447776, 142546208, 142644640, 142743072, 142841504,
    142939936, 143038368,
    143136800, 143235232, 143333664
142447776, 142546208, 142644640, 142743072, 142841504, 142939936,
143038368,
    143136800, 143235232, 143333664
#

```

c) Return to the global zone.

Practice 7-6: Troubleshooting a Zone Restore Failure

Overview

In this practice, an administrator has identified a problem where a backed up zone cannot be reattached to the system. The administrator has provided you with the following tasks that were performed when the zone attachment failed. Run each of these tasks to verify that the zone fails to attach, and then fix the problem.

Task 1: Back Up the Zone Configuration

In this task, you create a backup on the `web` zone configuration.

Perform the following steps to back up the zone configuration:

1. Log in to your assigned server.
2. Create a repository for your zone configuration files.

```
# mkdir -p /var/backups/zone_configs
```

3. Export the `web` zone configuration to the zone configuration repository.

```
# zonecfg -z web export \
-f /var/backups/zone_configs/web.cfg
```

Task 2: Back Up the Non-Global Zone Operating System Environment

Perform the following steps to create a backup of the entire `web` zone operating system environment:

1. Create a repository for your zone backups.

```
# mkdir -p /var/backups/zones
```

2. Determine the `web` zone zonepath.

```
# zonecfg -z web info zonepath
/zones/web
```

3. Determine the zonepath data set for `web` zone.

```
# zfs list -H -o name /zones/web
rpool/zones/web
```

4. Create an archive of the `web` zone.

```
# zfs snapshot -r rpool/zones/web@snap
# zfs send -rc rpool/zones/web@snap > \
/var/backups/zones/web
# zfs destroy -r rpool/zones/web@snap
```

Task 3: Completely Remove the Non-Global Zone

Perform the following steps to completely remove the `web` zone:

1. Place the `web` zone in installed state.

```
# zoneadm -z web halt
# zoneadm list -cv | grep web
- web          installed  /zones/web          solaris  shared
```

2. Uninstall the `web` zone.

```
# zoneadm -z web uninstall
```

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```
Are you sure you want to uninstall zone web (y/[n])? y
Progress being logged to
/var/log/zones/zoneadm.20120417T225149Z.web.uninstall
promoting 'rpool/zones/web/rpool/ROOT/solaris-1/var'.
promoting 'rpool/zones/web/rpool/ROOT/solaris-1'.
# zoneadm list -cv | grep web
- web          configured  /zones/web          solaris  exclusive
```

3. Delete the web zone configuration.

```
# zonecfg -z web delete
Are you sure you want to delete zone web (y/[n])? y
# zoneadm list -cv
```

ID	NAME	STATUS	PATH	BRAND	IP
0	global	running	/	solaris	shared
4	storage	running	/zones/storage	solaris	shared
6	database	running	/zones/database	solaris	shared

Task 4: Restore the Non-Global Zone

Perform the following steps to recover the web zone after a catastrophic failure:

1. Restore the web zone configuration.

```
# zonecfg -z web -f /var/backups/zone_configs/web.cfg
```

2. Attach the web zone archive.

```
# zoneadm -z web attach -a /var/backups/zones/web
Progress being logged to
/var/log/zones/zoneadm.20120418T000740Z.web.attach
Attaching...
    Installing: This may take several minutes...
Received dataset ROOT/solaris-1 collides with existing dataset
rpool/zones/web/rpool/ROOT/solaris-1.
Received dataset ROOT/solaris-1/var collides with existing
dataset rpool/zones/web/rpool/ROOT/solaris-1/var.
Received dataset VARSHARE collides with existing dataset
rpool/zones/web/rpool/VARSHARE.
Received dataset export collides with existing dataset
rpool/zones/web/rpool/export.
Received dataset export/home collides with existing dataset
rpool/zones/web/rpool/export/home.
Received dataset export/home/oracle collides with existing
dataset rpool/zones/web/rpool/export/home/oracle.
ERROR: Error: Command <zfs destroy rpool/zones/web/installtmp>
exited with status 1
ERROR: Error: cannot destroy dataset rpool/zones/web/installtmp
ERROR: Invalid data received
Result: Attach Failed.
```

Describe the problems that could cause this type of failure?

Data set collisions in the zone install path.

3. Using the list created in the previous step as a guide, verify that each item is configured correctly.

a) Look for errors in the zone attach log.

```
# more /var/log/zones/zoneadm.20130328T232100Z.web.attach
[Thursday, March 28, 2013 05:21:00 PM MDT] ==== Starting:
/usr/lib/brand/solaris
/attach web /zones/web -a /var/backups/zones/web ====
...
[Thursday, March 28, 2013 05:22:31 PM MDT] Mounting
rpool/zones/web/rpool/ROOT/s
olaris-1 at /tmp/tmp.rRa4Pu with ZFS temporary mount
[Thursday, March 28, 2013 05:22:32 PM MDT] Received dataset ROOT/solaris-1
colli
des with existing dataset rpool/zones/web/rpool/ROOT/solaris-1.
[Thursday, March 28, 2013 05:22:32 PM MDT] Mounting
rpool/zones/web/rpool/ROOT/s
olaris-1/var at /tmp/tmp.wbaqRu with ZFS temporary mount
[Thursday, March 28, 2013 05:22:33 PM MDT] Received dataset ROOT/solaris-
1/var c
ollides with existing dataset rpool/zones/web/rpool/ROOT/solaris-1/var.
[Thursday, March 28, 2013 05:22:33 PM MDT] Mounting
rpool/zones/web/rpool/VARSHA
RE at /tmp/tmp.FyaWSu with ZFS temporary mount
[Thursday, March 28, 2013 05:22:35 PM MDT] Received dataset VARSHARE
collides wi
th existing dataset rpool/zones/web/rpool/VARSHARE.
[Thursday, March 28, 2013 05:22:35 PM MDT] Mounting
rpool/zones/web/rpool/export
at /tmp/tmp.KVaiUu with ZFS temporary mount
[Thursday, March 28, 2013 05:22:36 PM MDT] Received dataset export
collides with
existing dataset rpool/zones/web/rpool/export.
[Thursday, March 28, 2013 05:22:36 PM MDT] Mounting
rpool/zones/web/rpool/export
/home at /tmp/tmp.ZcaGVu with ZFS temporary mount
[Thursday, March 28, 2013 05:22:37 PM MDT] Received dataset export/home
collides
with existing dataset rpool/zones/web/rpool/export/home.
[Thursday, March 28, 2013 05:22:37 PM MDT] Mounting
rpool/zones/web/rpool/export
/home/oracle at /tmp/tmp.2va4Wu with ZFS temporary mount
[Thursday, March 28, 2013 05:22:38 PM MDT] Received dataset
export/home/oracle c
ollides with existing dataset rpool/zones/web/rpool/export/home/oracle.
cannot destroy 'rpool/zones/web/installtmp': filesystem has children.
```

```

use '-r' to destroy the following datasets:
rpool/zones/web/installtmp/ds@snap
rpool/zones/web/installtmp/ds/rpool@snap
rpool/zones/web/installtmp/ds/rpool/export@snap
rpool/zones/web/installtmp/ds/rpool/export/home@snap
rpool/zones/web/installtmp/ds/rpool/export/home/oracle@snap
rpool/zones/web/installtmp/ds/rpool/export/home/oracle
rpool/zones/web/installtmp/ds/rpool/export/home
rpool/zones/web/installtmp/ds/rpool/export
rpool/zones/web/installtmp/ds/rpool/ROOT@snap
rpool/zones/web/installtmp/ds/rpool/ROOT/solaris-1@snap
rpool/zones/web/installtmp/ds/rpool/ROOT/solaris-1/var@snap
rpool/zones/web/installtmp/ds/rpool/ROOT/solaris-1/var
rpool/zones/web/installtmp/ds/rpool/ROOT/solaris-1
rpool/zones/web/installtmp/ds/rpool/ROOT/solaris@2013-03-20-03:28:31
rpool/zones/web/installtmp/ds/rpool/ROOT/solaris@snap
rpool/zones/web/installtmp/ds/rpool/ROOT/solaris/var@2013-03-20-03:28:31
rpool/zones/web/installtmp/ds/rpool/ROOT/solaris/var@snap
rpool/zones/web/installtmp/ds/rpool/ROOT/solaris/var
rpool/zones/web/installtmp/ds/rpool/ROOT/solaris
rpool/zones/web/installtmp/ds/rpool/ROOT
rpool/zones/web/installtmp/ds/rpool/VARSHARE@snap
rpool/zones/web/installtmp/ds/rpool/VARSHARE
rpool/zones/web/installtmp/ds/rpool
rpool/zones/web/installtmp/ds

```

b) Determine whether alternate BE(s) exist.

```

# beadm list
BE           Active Mountpoint Space Policy Created
--           -
solaris      NR      /           11.18G static 2013-03-19 19:07
solaris.orig -      -           96.75M static 2013-03-19 21:28

```

c) Determine whether data sets exist in the web zone zonepath.

```

# zfs list |grep web
rpool/zones/web           479M  42.7G  35K /zones/web
rpool/zones/web/rpool     479M  42.7G  31K /rpool
rpool/zones/web/rpool/ROOT 478M  42.7G  31K legacy
rpool/zones/web/rpool/ROOT/solaris-1 478M  42.7G  453M /
rpool/zones/web/rpool/ROOT/solaris-1/var 24.9M 42.7G  24.9M /var
rpool/zones/web/rpool/VARSHARE 58K  42.7G  39K /var/share
rpool/zones/web/rpool/export 138K 42.7G  32K /export
rpool/zones/web/rpool/export/home 85.5K 42.7G  32K /export/home
rpool/zones/web/rpool/export/home/oracle 33.5K 42.7G  33.5K

```

Did you find any problems? Yes

If so, what is the problem?

Data sets exist is the zone restore path.

4. Repair the fault and test your solution.

a) Repair the fault by removing the existing data sets from the zone restore path.

```
# zfs destroy -r rpool/zones/web
# zfs list |grep web
#
```

b) Verify your solution.

```
# zoneadm -z web attach -a /var/backups/zones/web
```

The following ZFS file system(s) have been created:

rpool/zones/web

Warning: The -a and -d options to the attach subcommand may be removed in a future release of Solaris. Use of the install subcommand is recommended.

Progress being logged to

/var/log/zones/zoneadm.20130328T235102Z.web.attach

Installing: This may take several minutes...

Zone BE root dataset: rpool/zones/web/rpool/ROOT/solaris-0

Cache: Using /var/pkg/publisher.

Updating non-global zone: Linking to image /.

Processing linked: 1/1 done

Updating non-global zone: Auditing packages.

No updates necessary for this image.

Updating non-global zone: Zone updated.

Result: Attach Succeeded.

Log saved in non-global zone as

/zones/web/root/var/log/zones/zoneadm.20130328T235102Z.web.attach

```
# zoneadm list -cv
```

ID	NAME	STATUS	PATH	BRAND	IP
0	global	running	/	solaris	shared
1	engineering	running	/zones/engineering	solaris	excl
3	storage	running	/zones/storage	solaris	shared
4	database	running	/zones/database	solaris	shared
-	web	installed	/zones/web	solaris	shared

Practices for Lesson 8: Troubleshooting Physical and Virtual Network Problems

Chapter 8

Practices for Lesson 8: Overview

Practices Overview

In this practice, you troubleshoot faults associated with physical and virtual networks.

Practice 8-1: Troubleshooting a Network Performance Issue

Overview

In this practice, assume that system users complain that network performance is very slow when they exchange files with users on other systems. The method used for transferring files is `scp`. The problem started occurring after a system tuning event. Testing before the tuning event showed an average of 21 seconds to transfer a 100 MB test file. After the tuning event, the transfer time increased to three minutes. The maximum time requirement to copy a 100 MB file is 60 seconds.

Tasks

Perform the following steps to troubleshoot the network performance issue:

1. Verify that the `scp` file fails to meet minimum time requirements.
List the problems that might cause this type of performance degradation.
 1. ____
 2. ____
 3. ____
2. Using the list created in the preceding step as a guide, verify that each item is configured correctly.
Did you find any problems?
If so, what is the problem?
3. Repair the fault and test your solution.
Note: The maximum time required to copy a 100 MB file between systems must be less than 60 seconds.

Practice 8-2: Troubleshooting Host Access Failure

Overview

In this practice, following a system update event, the host is no longer accessible.

Before You Begin

Log in to your assigned system. Note the IP addresses assigned to your host system controller in the `/etc/hosts` file. For example, if you are assigned `host01`:

```
# cat /etc/hosts | grep host01-sc
192.168.124.10 host01-sc          # system controller machine 1
```

Back up the current system by creating a new boot environment (BE):

```
# beadm create solaris.bak
```

Run the `/opt/ora/course_files/lesson8-fault2` program.

Note: Your system reboots and is no longer accessible.

Tasks

Perform the following steps to troubleshoot the host accessibility failure:

1. Use the Hosts link from the Oracle OUCONNECT desktop to verify that your system is no longer accessible.

List the problems that might cause this type of storage failure in a zone.

1. ____
2. ____
3. ____

2. Using the list created in the preceding step as a guide, verify that each item is configured correctly.

Did you find any problems?

If so, what is the problem?

3. Repair the fault and test your solution.

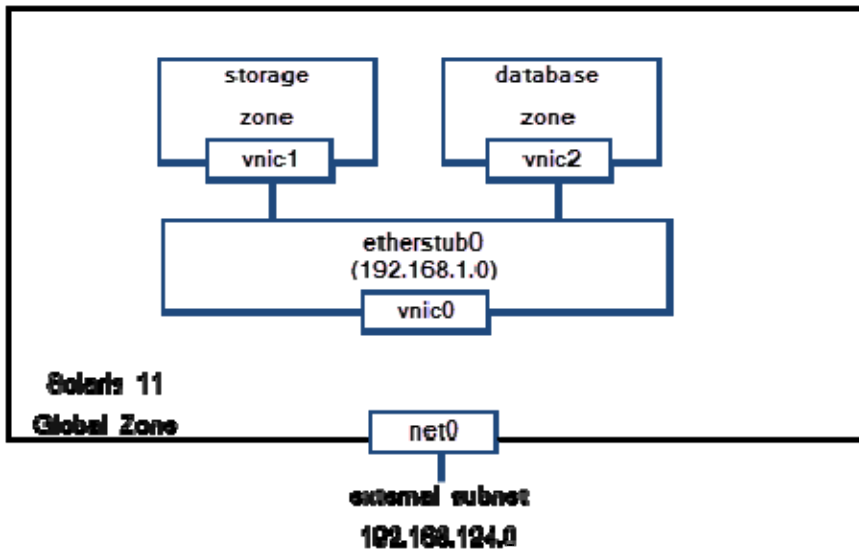
Practice 8-3: Troubleshooting a Virtual Network

Overview

In this practice, users in the `storage` and `database` zones cannot send packets to or receive packets from the global zone.

Before You Begin

Use the following illustration to familiarize yourself with the planned virtual network topology:



Tasks

Perform the following steps to troubleshoot virtual networking:

1. Verify that users in the `storage` and `database` zones cannot communicate over the network with the global zone.

List the problems that might cause this type of failure.

- a) ____
- b) ____
- c) ____

2. Using the list created in the preceding step as a guide, verify that each item is configured correctly.

Did you find any problems?

If so, what is the problem?

3. Repair the fault and test your solution.

Solution 8-1: Troubleshooting a Network Performance Issue

Overview

In this practice, assume that system users complain that network performance is very slow when they exchange files with users on other systems. The method used for transferring files is `scp`. The problem started occurring after a system tuning event. Testing before the tuning event showed an average of 21 seconds (which is the requirement) to transfer a 100 MB test file. After the tuning event, the transfer time increased to over 14 minutes. The maximum time requirement to copy a 100 MB file is 60 seconds.

Tasks

Perform the following steps to troubleshoot the network performance issue:

1. Verify that the `scp` file fails to meet minimum time requirements.
 - a. Open a terminal window and `ssh` to the VirtualBox server.

```
# ssh -l oracle 192.168.124.231
Password: oracle
Last login: Mon Dec  9 17:58:12 2013 from 192.168.124.31
Oracle Corporation      SunOS 5.11      11.1      July 2013
Welcome to Sol11-u1-sru10.5_Generic on vbox-svr
```

- b. Verify the network communication between your VM and your server.

```
oracle@vbox-svr:~$ ping 192.168.124.11
192.168.124.11 is alive
```

- c. On the VM system, create a 100 MB test file.

```
oracle@vbox-svr:~$ cd /var/tmp
oracle@vbox-svr:~$ dd if=/dev/zero of=your-host-name_100MB.bin \
bs=104857600 count=1
```

- d. Determine the time it takes to copy the test file to your system.

```
oracle@vbox-svr:~$ time scp your-host-name _100MB.bin \
root@192.168.124.11:/var/tmp
Password: cangetin
testfile_100MB.bin 100% |*****| 100 MB 2:55

real    3m2.635s
user    0m15.547s
sys     0m1.018s
```

List the problems that might cause this type performance degradation.

1. *Incorrect networking properties*
2. *Faulty network infrastructure*

2. Using the list created in the preceding step as a guide, verify that each item is configured correctly.
 - a. In the global zone terminal window, check the `net0` data link properties for values that might cause the performance problem. Look for property values that are not default.

```
root@host01:~# dladm show-linkprop net0
```

LINK	PROPERTY	PERM	VALUE	DEFAULT	POSSIBLE
net0	speed	r-	100	100	--
net0	autopush	rw	--	--	--
net0	zone	rw	--	--	--
net0	duplex	r-	full	full	half, full
net0	state	r-	up	up	up, down
net0	adv_autoneg_cap	rw	1	1	1, 0
net0	mtu	rw	1500	1500	1500-9216
net0	flowctrl	rw	bi	bi	no, tx, rx, bi, pfc, auto
net0	flowctrl-effective	r-	--	--	--
net0	adv_10gfdx_cap	r-	--	0	1, 0
net0	en_10gfdx_cap	--	--	0	1, 0
net0	adv_1000fdx_cap	r-	1	0	1, 0
net0	en_1000fdx_cap	rw	1	1	1, 0
net0	adv_1000hdx_cap	r-	0	0	1, 0
net0	en_1000hdx_cap	r-	0	0	1, 0
net0	adv_100fdx_cap	r-	1	0	1, 0
net0	en_100fdx_cap	rw	1	1	1, 0
net0	adv_100hdx_cap	r-	1	0	1, 0
net0	en_100hdx_cap	rw	1	1	1, 0
net0	adv_10fdx_cap	r-	1	0	1, 0
net0	en_10fdx_cap	rw	1	1	1, 0
net0	adv_10hdx_cap	r-	1	0	1, 0
net0	en_10hdx_cap	rw	1	1	1, 0
LINK	PROPERTY	PERM	VALUE	DEFAULT	POSSIBLE
net0	maxbw	rw	--	--	--
net0	cpus	rw	--	--	--
net0	cpus-effective	r-	0-9	--	--
net0	rxfanout	rw	--	8	--
net0	rxfanout-effective	r-	8	--	--
net0	pool	rw	--	--	--
net0	pool-effective	r-	--	--	--
net0	priority	rw	high	high	low, medium, high
net0	tagmode	rw	vlanonly	vlanonly	normal, vlanonly
net0	forward	rw	1	1	1, 0
net0	default_tag	rw	1	1	--
net0	vlan-announce	rw	off	off	off, gvrp
net0	gvrp-timeout	rw	250	250	100-100000
net0	learn_limit	rw	1000	1000	--
net0	learn_decay	rw	200	200	--
net0	stp	rw	1	1	1, 0
net0	stp_priority	rw	128	128	--
net0	stp_cost	rw	auto	auto	--

```

net0      stp_edge          rw    1          1          1,0
net0      stp_p2p           rw    auto         auto        true,false,auto
net0      stp_mcheck        rw    0           0           1,0
net0      protection        rw    --          --          mac-nospoof,
                                         restricted,
                                         ip-nospoof,
                                         dhcp-nospoof

net0      mac-address       rw    0:3:ba:d8:c0:82 0:3:ba:d8:c0:82 --
LINK      PROPERTY         PERM  VALUE          DEFAULT    POSSIBLE
net0      allow-autoconf    rw    1           1           1,0
net0      allowed-ips       rw    --          --          --
net0      allowed-dhcp-cids rw    --          --          --
net0      rxrings           rw    --          --          --
net0      rxrings-effective r-    --          --          --
net0      txrings           rw    --          --          sw,hw
net0      txrings-effective r-    --          --          --
net0      txrings-available r-    0           --          --
net0      rxrings-available r-    0           --          --
net0      rxhwcInt-available r-    0           --          --
net0      txhwcInt-available r-    1           --          --
net0      pfcmap            rw    --          11111111  00000000-11111111
net0      pfcmap-lcl-effective r-    --          --          --
net0      pfcmap-rmt-effective r-    --          --          --
net0      ntcs              r-    0           0           --
net0      vsi-mgrid         rw    --          ::         --
net0      vsi-mgrid-enc     rw    --          oracle_v1  none,oracle_v1
net0      lro               rw    off         auto        on,off,auto
net0      lro-effective     r-    off         off         on,off
net0      etsbw-lcl         rw    --          0           --
net0      etsbw-lcl-effective r-    --          --          --
net0      etsbw-rmt-effective r-    --          --          --
net0      etsbw-lcl-advice  r-    --          --          --
LINK      PROPERTY         PERM  VALUE          DEFAULT    POSSIBLE
net0      cos               rw    --          0           --

root@host01:~# ipadm show-ifprop net0
IFNAME  PROPERTY          PROTO PERM  CURRENT  PERSISTENT  DEFAULT  POSSIBLE
net0    arp          ipv4   rw   on      --          on       on,off
net0    forwarding  ipv4   rw   on      off         off       on,off
net0    metric       ipv4   rw   0       --          0        --
net0    mtu          ipv4   rw   1500    --          1500     68-1500
net0    exchange_routes ipv4   rw   on      --          on       on,off
net0    usesrc       ipv4   rw   none    --          none     --
net0    forwarding  ipv6   rw   off     --          off       on,off
net0    metric       ipv6   rw   0       --          0        --
net0    mtu          ipv6   rw   1500    --          1500     1280-1500
net0    nud          ipv6   rw   on      --          on       on,off
net0    exchange_routes ipv6   rw   on      --          on       on,off
net0    usesrc       ipv6   rw   none    --          none     --
net0    group        ip     rw   --      --          --       --
net0    standby      ip     rw   off     --          off      on,off

```

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- b. Check if any bandwidth constraints have been placed on the `net0` network interface.

```

root@host01:~# flowadm
FLOW          LINK      IPADDR          PROTO  LPORT  RPORT  DSFLD
throttle-ssh  net0      --              tcp    22     --     --
root@host01:~# flowadm show-flowprop throttle-ssh
FLOW          PROPERTY    VALUE          DEFAULT      POSSIBLE
throttle-ssh  maxbw      5              --           --

```

Did you find any problems? Yes

If so, what is the problem?

The flow control bandwidth for the `net0` interface is set too low.

3. Repair the fault and test your solution.

- a. Try to repair the performance problem by increasing the flow control bandwidth to 10 MB.

```

root@host01:~# flowadm set-flowprop -p maxbw=10M throttle-ssh
root@host01:~# flowadm show-flowprop throttle-ssh
FLOW          PROPERTY    VALUE          DEFAULT      POSSIBLE
throttle-ssh  maxbw      10             --           --

```

- b. Verify your solution by copying the 100 MB test file from your VM system to your server. The file transfer time must be below the required maximum (60 seconds). Try to target approximately 50 seconds as your performance goal. Adjust the flow control bandwidth if necessary.

```

# time scp testfile_100MB.bin \
    root@192.168.124.51:/var/tmp
...

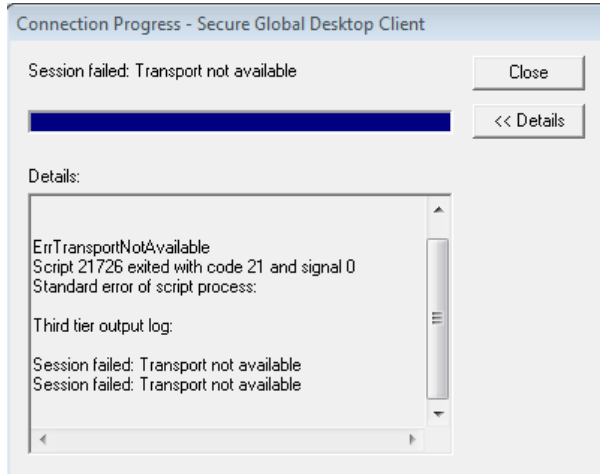
```

Solution 8-2: Troubleshooting a Host Access Failure

Tasks

Perform the following steps to troubleshoot the host accessibility failure:

1. Use the Hosts link from the Oracle OUCONNECT desktop to verify that your system is no longer accessible.



List the problems that might cause this type of storage failure in a zone.

1. *Faulty network configuration*
 2. *Faulty system hardware*
2. Using the list created in the preceding step as a guide, verify that each item is configured correctly.
 - a. Click the Landing Pad link from the Oracle OUCONNECT desktop to the landing pad desktop.
 - b. From the landing pad desktop, open a terminal window.
 - c. Using the terminal window, log in to the system controller on your host.

```
# telnet 192.168.124.10
Trying 192.168.124.10...
Connected to 192.168.124.10.
Escape character is '^]'.
Copyright (c) 2010, Oracle and/or its affiliates. All rights
reserved.

Oracle Advanced Lights Out Manager CMT v1.7.11
Please login: admin
Please Enter password: cangetin
host01-sc>
```


- d. Open a console window to your system and log in to your system.

```
host01-sc> console -f
Warning: User < > currently has write permission to this console
and forcibly removing them will terminate any current write
actions and all work will be lost. Would you like to continue?
[y/n]y
Enter #. to return to ALOM.
host01 console login: root
Password: cangetin
Apr 13 14:01:37 host01 login: ROOT LOGIN /dev/console
Last login: Tue Mar 19 23:04:20 on console
Oracle Corporation      SunOS 5.11      11.1      April 2013
Welcome to D80397GC10_Lab on host01
root@host01:~#
```

- e. Test network functionality.

```
root@host01:~# ping 192.168.124.10
ping: sendto No route to host
```

- f. Query the fault manager for faulty components.

```
root@host01:~# fmadm faulty
root@host01:~#
```

- g. Check the /var/adm/messages file for error indications.

```
root@host01:~# cat /var/adm/messages | grep error
root@host01:~#
```

- h. Verify network configuration.

```
root@host01:~# ipadm show-addr | grep net
net0/v4          static   disabled  192.168.124.51/24
net0/v6          addrconf disabled  ::
root@host01:~# ipadm show-if
IFNAME      CLASS    STATE    ACTIVE  OVER
lo0         loopback ok      yes     --
net0        ip       disabled no      --
root@host01:~# dladm show-link
root@host01:~#
root@host01:~# dladm show-phys
root@host01:~#
```

- i. Bring the system to OpenBoot PROM (OBP).

```
root@host01:~# init 0
svc.startd: The system is coming down. Please wait.
svc.startd: 145 system services are now being stopped.
syncing file systems... done
Program terminated
{13} ok
```

- j. Run firmware-based diagnostics to check for network-related faulty components.

```
{13} ok setenv diag-switch? true
diag-switch? = true
{13} ok setenv auto-boot? false
auto-boot? = false
{13} ok ok reset-all
SC Alert: Host System has Reset
...
Device: pci
/pci@780: Device 0 pci
/pci@780/pci@0: Device 1 pci
/pci@780/pci@0/pci@1: Device 0 network network
/pci@7c0/pci@0: Device 2 pci
/pci@7c0/pci@0/pci@2: Device 0 network network
...
```

- k. Boot the system and log back in to the system.

```
{13} ok setenv diag-switch? false
diag-switch? = false
{13} ok setenv auto-boot? true
auto-boot? = true
{13} ok boot
...
host01 console login: root
Password: cangetin
Apr 13 14:01:37 host01 login: ROOT LOGIN /dev/console
Last login: Tue Mar 19 23:04:20 on console
Oracle Corporation      SunOS 5.11      11.1      April 2013
Welcome to D80397GC10_Lab on host01
root@host01:~#
```

- l. Verify that the network interface has been enumerated in the path_to_inst file.

```
root@host01:~# cat /etc/path_to_inst | grep network
"/pci@780/pci@0/pci@1/network@0" 0 "e1000g"
"/pci@780/pci@0/pci@1/network@0,1" 1 "e1000g"
"/pci@7c0/pci@0/pci@2/network@0" 2 "e1000g"
"/pci@7c0/pci@0/pci@2/network@0,1" 3 "e1000g"
```

- m. Verify the network device driver.

```
root@host01:~# pkg contents e1000g
PATH
kernel
kernel/drv
kernel/drv/e1000g.conf
kernel/drv/sparcv9
```

```

kernel/drv/sparcv9/e1000g
usr/share/man/man7d
usr/share/man/man7d/e1000.7d
usr/share/man/man7d/e1000g.7d
root@host01:~# pkg verify -v e1000g
PACKAGE
STATUS
pkg://solaris/driver/network/ethernet/e1000g
ERROR
    file: kernel/drv/sparcv9/e1000g
    Missing: regular file does not exist

```

Did you find any problems? Yes

If so, what is the problem?

Missing or corrupted network device driver

3. Repair the fault and test your solution.
 - a. Repair the network device driver.

```

root@host01:~# pkg fix e1000g
Verifying: pkg://solaris/driver/network/ethernet/e1000g
ERROR
file: kernel/drv/sparcv9/e1000g
    Missing: regular file does not exist
Created ZFS snapshot: 2013-03-20-04:50:01
Repairing: pkg://solaris/driver/network/ethernet/e1000g
Creating Plan (Evaluating mediators): \pkg: Requested "fix"
operation would affect files that cannot be modified in live
image.
Please retry this operation on an alternate boot environment.
root@host01:~# beadm list
BE           Active Mountpoint Space  Policy Created
--           -
solaris      NR      /           9.85G  static 2013-03-19 19:07
solaris.bak  -        -           1.17M  static 2013-03-19 20:02
solaris.orig -        -           1.12M  static 2013-03-19 21:28
root@host01:~# beadm activate solaris.bak
root@host01:~# reboot
...
host01 console login: root
Password: cangetin
Apr 13 23:32:03 host01 login: ROOT LOGIN /dev/console
Last login: Tue Mar 19 23:04:20 on console
Oracle Corporation      SunOS 5.11      11.1      April 2013
root@host01:~# beadm mount solaris /mnt

```

```

root@host01:~# pkg -R /mnt fix e1000g
Verifying: pkg://solaris/driver/network/ethernet/e1000g
ERROR
  file: kernel/drv/sparcv9/e1000g
           Missing: regular file does not exist
Created ZFS snapshot: 2013-03-20-05:04:11
Repairing: pkg://solaris/driver/network/ethernet/e1000g
Creating Plan (Evaluating mediators): \
DOWNLOAD                                PKGS                                FILES
XFER (MB)    SPEED
Completed                                1/1                                1/1
0.1/0.1      0B/s
PHASE                                           ITEMS
Updating modified actions                      1/1
Updating image state                          Done
Creating fast lookup database                  Done
root@host01:~# beadm unmount solaris
root@host01:~# beadm activate solaris
root@host01:~# reboot
...
Note: Close (disconnect) the Landing Pad link to your host system controller before
performing the next step.

```

- b. Verify your solution.

Use the Hosts link from the Oracle OUCONNECT desktop to verify that your system is accessible.

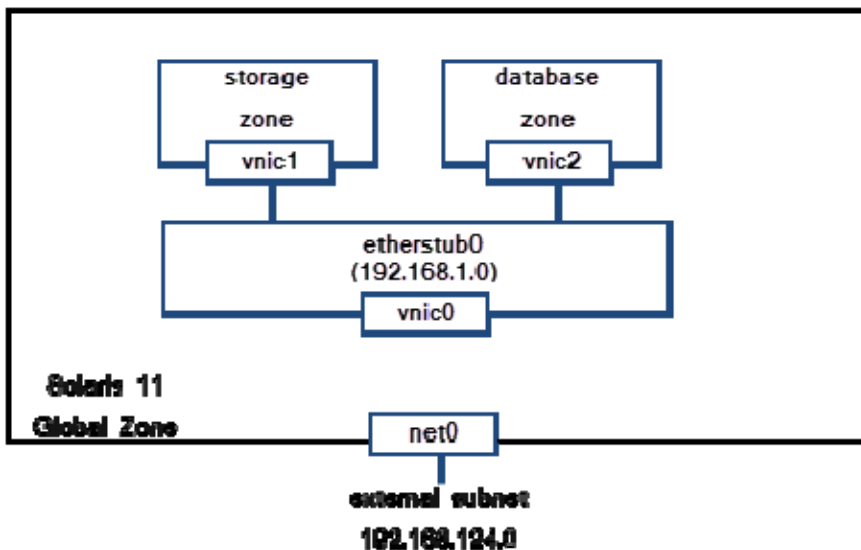
Solution 8-3: Troubleshooting a Virtual Network

Overview

In this practice, users in the `storage` and `database` zones cannot send packets to or receive packets from the global zone.

Before You Begin

Use the following illustration to familiarize yourself with the planned virtual network topology:



Tasks

Perform the following steps to troubleshoot virtual networking:

1. Verify that users in the `storage` and `database` zones cannot communicate over the network with the global zone.

Open two terminal windows on your server desktop. In one terminal window, use `zlogin` to log in to the `storage` zone. In the other terminal window, use `zlogin` to log in to the `database` zone. Use the `ping` command to verify the fault.

```
# zlogin storage
[Connected to zone 'storage' pts/5]
Oracle Corporation SunOS 5.11 11.1 April 2013
root@storage:~# ping 192.168.124.11
ping: sendto No route to host
```

```
# zlogin database
[Connected to zone 'storage' pts/5]
Oracle Corporation SunOS 5.11 11.1 April 2013
root@database:~# ping 192.168.124.11
ping: sendto No route to host
```

List the problems that might cause this type of network failure.

1. *Incorrect network configuration in the non-global zones*
2. *Incorrect network configuration in the global zones*

2. Using the list created in the previous step as a guide, verify that each item is configured correctly.

Note: For the sake of brevity, only the storage zone is shown in this example.

- a. Verify the network configuration in each non-global zone.

```

root@storage:~# dladm show-link
LINK           CLASS      MTU      STATE    OVER
vnic1          vnic       9000     up       ?
root@storage:~# ipadm show-if
IFNAME        CLASS      STATE     ACTIVE  OVER
lo0           loopback  ok        yes     --
vnic1         ip        ok        yes     --
root@storage:~# ipadm show-addr
ADDROBJ       TYPE       STATE      ADDR
lo0/v4        static    ok         127.0.0.1/8
vnic1/v4      static    ok         192.168.1.100/24
lo0/v6        static    ok         ::1/128
vnic1/v6      addrconf  ok         fe80::8:20ff:feeb:36b8/10
root@storage:~# netstat -r

Routing Table: IPv4
  Destination      Gateway      Flags  Ref    Use  Interface
  -----
localhost          localhost    UH      2      36    lo0
192.168.1.0        storage      U        3       1    vnic1

Routing Table: IPv6
Destination/Mask    Gateway      Flags  Ref    Use  If
-----
localhost          localhost    UH      2       0    lo0
fe80::/10          fe80::8:20ff:feeb:36b8  U      2       0    vnic1

```

- b. Verify that the storage and database zones can communicate over the network with each other.

```

root@storage:~# ping 192.168.1.102
192.168.1.102 is alive

```

- c. Open a third terminal window on your server desktop.

d. Verify the network configuration of the global zone.

```
# dladm show-phys
LINK          MEDIA          STATE      SPEED    DUPLEX    DEVICE
net1          Ethernet        unknown    0        unknown   e1000g1
net0          Ethernet        up         100     full      e1000g0
net2          Ethernet        unknown    0        unknown   e1000g2
net3          Ethernet        unknown    0        unknown   e1000g3

# dladm show-link
LINK          CLASS      MTU      STATE    OVER
net1          phys      1500     unknown  --
net0          phys      1500     up       --
net2          phys      1500     unknown  --
net3          phys      1500     unknown  --
etherstub0    etherstub 9000     unknown  --
vnic1         vnic      9000     up       etherstub0
storage/vnic1 vnic      9000     up       etherstub0
vnic2         vnic      9000     up       etherstub0
database/vnic2 vnic      9000     up       etherstub0
web/net0      vnic      1500     up       net0

#
# ipadm show-if
IFNAME      CLASS    STATE    ACTIVE  OVER
lo0         loopback ok       yes     --
net0        ip       ok       yes     --

# ipadm show-addr
ADDROBJ     TYPE     STATE    ADDR
lo0/v4      static   ok       127.0.0.1/8
net0/v4     static   ok       192.168.124.51/24
lo0/v6      static   ok       ::1/128
net0/v6     addrconf ok       fe80::203:baff:fed8:c082/10

# netstat -r
Routing Table: IPv4
Destination      Gateway          Flags    Ref      Use      Interface
-----
default          session         UG        2         0 net0
host05-local     host05-local    UH        2        266 lo0
192.168.124.0    host05          U         6       34181 net0

Routing Table: IPv6
Destination/Mask  Gateway          Flags    Ref      Use      If
-----
host05-local     host05-local    UH        2        140 lo0
fe80::/10        host05.local.   U         2         0 net0
```

Did you find any problems? Yes

If so, what is the problem?

There are two problems with this configuration. First, the global zone is missing a virtual network interface to the etherstub-based subnet. Second, the non-global zones are missing the default route to the global zone.

3. Repair the fault and test your solution.

a. Repair the network configuration in the global zone.

```
# dladm show-vnic
LINK          OVER          SPEED  MACADDRESS          MACADDRTYPE  VID
vnic1         etherstub0  40000  2:8:20:eb:36:b8     random       0
storage/vnic1 etherstub0  40000  2:8:20:eb:36:b8     random       0
vnic2         etherstub0  40000  2:8:20:c2:c9:5e     random       0
database/vnic2 etherstub0  40000  2:8:20:c2:c9:5e     random       0
web/net0      net0        100    2:8:20:d4:d:ca      random       0
vnic0         etherstub0  40000  2:8:20:30:56:46     random       0

# ipadm create-ip vnic0
# ipadm show-if
IFNAME      CLASS    STATE    ACTIVE OVER
lo0         loopback ok       yes   --
net0        ip       ok       yes   --
vnic0       ip       down    no    --

# ipadm create-addr -a 192.168.1.102/24 vnic0
vnic0/v4
# ipadm show-addr
ADDROBJ     TYPE     STATE      ADDR
lo0/v4      static   ok         127.0.0.1/8
net0/v4     static   ok         192.168.124.51/24
vnic0/v4    static   ok         192.168.1.102/24
lo0/v6      static   ok         ::1/128
net0/v6     addrconf ok         fe80::203:baff:fed8:c082/10
```

– Repair the network configuration in each non-global zone.

Note: For the sake of brevity, only the storage zone is shown in this example.

```
root@storage:~# route add default 192.168.1.102
root@storage:~# netstat -r | grep default
default      192.168.1.102      UG          1          0
```

– Verify your solution.

```
root@storage:~# ping 192.168.124.11
192.168.124.11 is alive
```


Practices for Lesson 9: Fault Analysis and Troubleshooting Workshop

Chapter 9

Fault Analysis and Troubleshooting Workshop

Workshop Overview

Welcome to the Oracle Solaris 11 Troubleshooting Workshop. This lab provides you with practical experience in troubleshooting a wide variety of challenging faults. Use the skills and knowledge you gained from the lessons provided earlier in the course to identify the cause of each fault. To assist you in managing the faults, the `bugadm` utility is provided in the `/opt/ora/course_files` directory. This utility will assist you in managing the lab faults. Using the `bugadm` utility, you can:

- List the available lab faults.
- View information about a specific fault.
- Install the lab faults.
- Remove the lab faults.
- Track your progress.

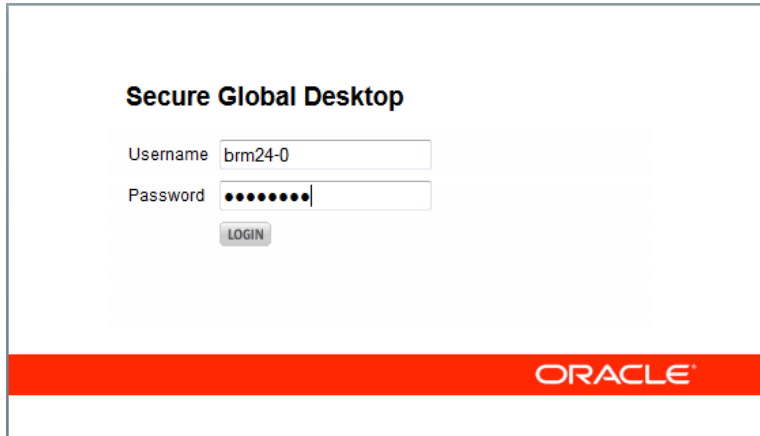
Here is a list of faults supported by the `bugadm` utility:

- Fault # 1: The user can't login.
- Fault # 2: Can't partition disk in the storage zone.
- Fault # 3: Unable to retrieve root entry in password file.
- Fault # 4: Can't locate boot device.
- Fault # 5: System doesn't finish booting.
- Fault # 6: System won't boot after apparent power failure.
- Fault # 7: System hangs during boot with MMU error.
- Fault # 8: System boots System Maintenance Mode.
- Fault # 9: Package will not update/install.
- Fault # 10: System will not boot.
- Fault # 11: Can't edit crontab.
- Fault # 12: User can not install a package in a zone.
- Fault # 13: Zone won't boot.
- Fault # 14: System fails to boot.
- Fault # 15: Applications hang when launched by members of `eng_team1` project.
- Fault # 16: Applications run slowly in the `eng_team2` project.
- Fault # 17: Can't write to file system.
- Fault # 18: Corrupt or missing file in package.
- Fault # 19: Applications won't start in the `eng_team1` project.
- Fault # 20: Can't communicate over the network.
- Fault # 21: Slow traffic on network interface `net0`.
- Fault # 22: System can't access the local network.
- Fault # 23: Zone fails to restore.
- Fault # 24: AI client loads wrong payload.
- Fault # 25: Problem with IPS service.
- Fault # 26: Network traffic seems slow or unresponsive.
- Fault # 27: NFS server doesn't work.
- Fault # 28: Systems in network cannot access iSCSI drives.
- Fault # 29: Problem with IPS.
- Fault # 30: DNS client fails to find DNS server after reboot.

Task

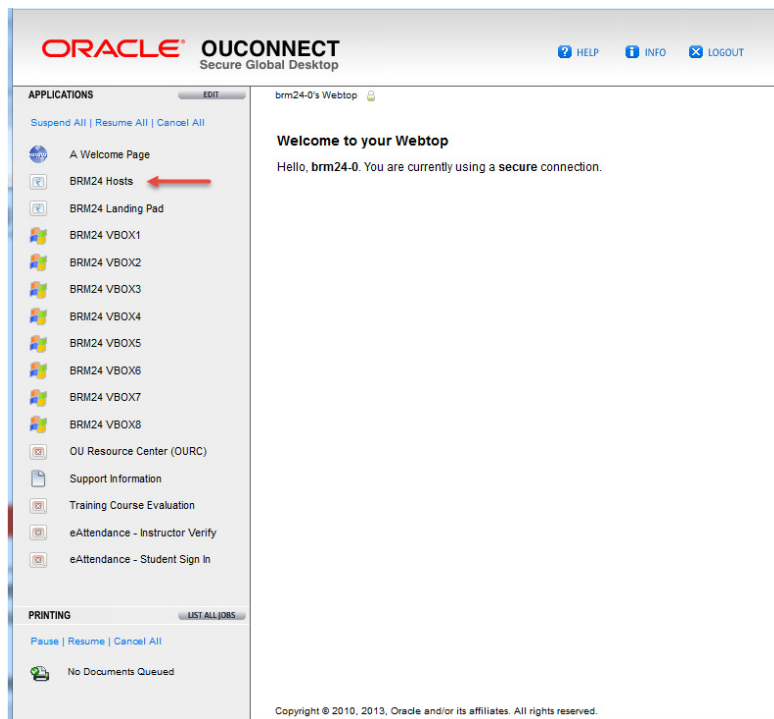
Perform the following steps to assess system configuration:

1. Log in to your lab environment. See your instructor for login credentials.

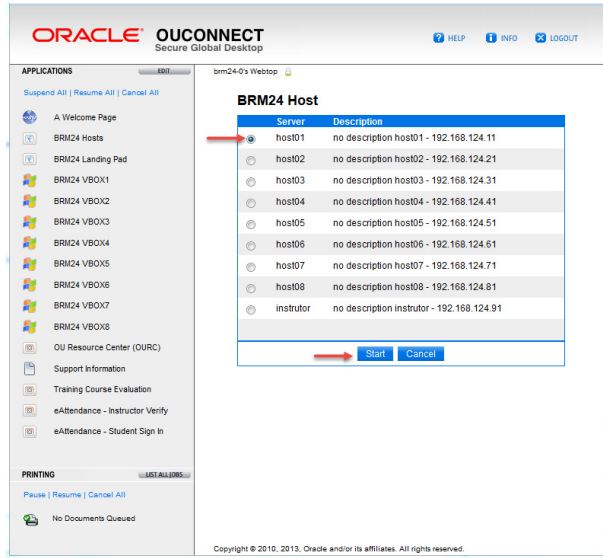


The image shows the 'Secure Global Desktop' login interface. It features a title 'Secure Global Desktop' at the top. Below the title, there are two input fields: 'Username' with the value 'brm24-0' and 'Password' with masked characters. A 'LOGIN' button is positioned below the password field. At the bottom of the interface, there is a red horizontal bar with the 'ORACLE' logo in white.

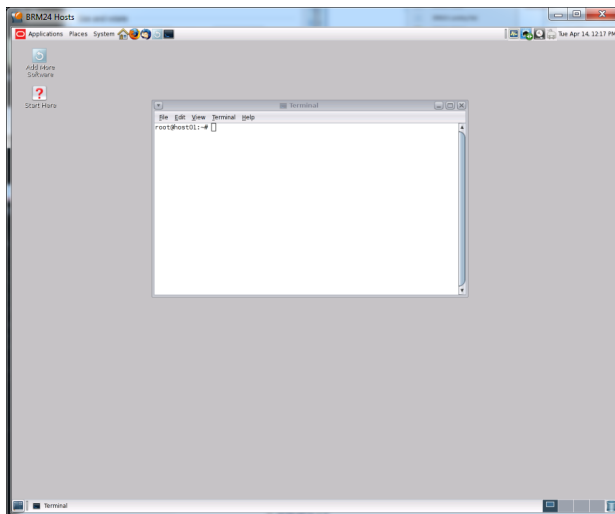
2. From Oracle OUCONNECT Secure Global Desktop, select the Hosts link.



3. Select your assigned host and click Start.



4. Open a terminal window on your assigned host.



5. Run the bugadm utility to begin the troubleshooting practice.

```

root@host01:~# cd /opt/ora/course_files
root@host01:/opt/ora/course_files# ./bugadm

```

6. Run the Help option from the bugadm main menu. Follow the directions provided on the screen to get started.

When you have completed troubleshooting all the workshop faults, contact your instructor.