



TBMR

Cristie Bare Machine Recovery

Quick Start Guide

For HP-UX

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Version 6.1

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1 Introduction

TBMR for HP-UX Itanium

1.1 Context

This document describes the essential elements of TBMR and Disaster Recovery based upon a tailored Cristie Recovery module. Please review this Quick Start Guide before using TBMR (Bare Machine Recovery for TSM) Version 6.1 in your HP-UX Itanium environment for the first time.

Before installation, you must check the availability of certain services and protocols which TBMR will require during the setup of servers and clients and during the restore of a downed machine. Some system administration experience is required to perform these one time tasks.

1.2 Requirements

TBMR for HP-UX Itanium can be installed on any HP-UX 11.23 or 11.31 Itanium machine (64-bit only). TBMR requires a minimum TSM client version of 5.3.x.x and a maximum of 6.1. This must be installed and correctly configured prior to the installation of TBMR.

Please consult the table below for compatibility regarding operating system:

Version of TBMR	Operating System
6.1.23	11.23
6.1.31	11.31

Ensure you are using the correct version for your operating system.

To create bootable DR ISOs, the third party product **DVD+RW-Tools** is required to be installed - otherwise the ISO can be burnt to a CD from a PC.

Note: recovery requires at least 64MB RAM

1.3 Licencing

Production use of TBMR requires a licence to be purchased from Cristie. The fully working product is provided for free evaluation for a period of up to 30 days. Use beyond that trial period requires a TBMR for HP-UX licence to be purchased from Cristie or its partners.

1.4 The Disaster Recovery Process

Bare Machine Recovery for TSM (TBMR) allows you to perform a bare machine recovery of your system directly from an IBM Tivoli Storage Manager (TSM) BA Backup Client backup.

To do this, you must first prepare your system using the steps outlined below:

1. Installation

Install the TBMR configuration software.

Licence the TBMR software. A trail licence is created automatically as part of the installation.

2. Configuration

Save the configuration parameters. Update when significant hardware changes are made.
Create bootable media (ie. the TBMR Disaster Recovery CD).

3. Backup system and user data

Perform regular standard TSM backups as required

You will then be ready to restore the system from the TSM BA Client backup.

Note: this version of TBMR does NOT require use of an HP Ignite™ server for disaster recovery purposes. It also does not require the use of a special TSM backup

2 Installation

The installation depot can be downloaded from the Cristie website at <http://www.cristie.com> or can be found in the install directory on the TBMR for HP-UX Itanium CD.

TBMR installation requires the standard HP-UX installation utility **swinstall**. This is required in order to install the TBMR depot. Use the following command to install TBMR:

```
swinstall -s/tmp/tbmr-6.1.31IA_HP-UX_11.31.depot \* (for HP-UX 11.31)
```

```
xander> swinstall -s /tmp/tbmr-6.1.31IA.depot \*
----- 03/03/10 13:03:52 GMT BEGIN swinstall SESSION
(non-interactive) (jobid=xander-0055)

* Session started for user "root@xander".

* Beginning Selection
* Target connection succeeded for "xander:/".
* Source: /tmp/tbmr-6.1.31IA.depot
* Targets: xander:/
* Software selections:
    TBMR.TBMR_commands,r=6.1.31IA,a=HP-UX_B.11.11_64,y=CRISTIE
    TBMR.man,r=6.1.31IA,a=HP-UX_B.11.11_64,y=CRISTIE
* Selection succeeded.

* Beginning Analysis and Execution
* Session selections have been saved in the file
"/.sw/sessions/swinstall.last".
* The analysis phase succeeded for "xander:/".
* The execution phase succeeded for "xander:/".
* Analysis and Execution succeeded.

NOTE: More information may be found in the agent logfile using the
command "swjob -a log xander-0055 @ xander:/".

----- 03/03/10 13:03:54 GMT END swinstall SESSION (non-interactive)
(jobid=xander-0055)

xander> █
```

To uninstall TBMR, use:

```
swremove TBMR
```

The installation process will install the following programs/utilities:

Program/Utility	User/System Component	Description
tbmrcfg	User/Prep	Write configuration prior to DR make_tbmr
make_tbmr	User/Prep	Create TBMR recovery media
showdevs	User/Prep/DR	List currently installed CD/DVD/Tape/ Floppy drives

In addition, a detailed discussion of each component is provided by installed `man` pages. A `readme.txt` file containing the latest news and user guides (including this guide) can be found in the directory `/etc/cristie`.

2.1 Check TSM Client

It is important to check the version of the TSM Client installed on your machine. TSM Client compatibility is

HP-UX version 11.23 - client version 5.3.x through to 6.1 x (64-bit only)

HP-UX version 11.31 - client versions 5.3.x through to 6.1 x (64 bit only)

Only clients with a compatible TSM Server are supported by TBMR. To check, use the HP-UX command:

```
swlist TIVsm64
```

This will produce output like the example shown below:

```
xander> swlist TIVsm64
# Initializing...
# Contacting target "xander"...
#
# Target: xander:/
#
# TIVsm64          5,3,5      IBM Tivoli Storage Manager Client
TIVsm64.CLIENT    5.3.5.0    TSM Base Client Files
TIVsm64.CLIENT_API64 5,3,5,0    TSM API64 Client Files
TIVsm64.CLIENT_DOC 5,3,5,0    TSM Documentation Files
```

3 The TBMR Configuration Tool

Configuration information is saved by default to the `TBMRCFG/<hostname>` folder on the root partition. This can be changed but is not recommended. The Cristie tool that provides this function is called `tbmrcfg`, which is located in the `/usr/bin` directory. This is a command line only tool which is licenced for use initially for a 30 day trial period. A full licence is required to use the program beyond the trial period.

As part of this process, details about the hard disks, operating system, storage controller(s), network adapter(s) and network settings will be queried and stored.

Note: a valid licence must be installed for TBMR

3.1 Creating the Configuration Information

To create the configuration manually, run the `tbmrcfg` tool. The syntax of the command is as follows:

```
tbmrcfg [-l log_file] [-o out_file] [-r] [-v] [-x] [-?]
```

Refer to the `tbmrcfg man` pages for a discussion of the switches.

With TBMR 6.1 the only supported location for the configuration is within the backup itself. To generate this, simply enter:

```
tbmrcfg
```

```
Buffy> tbmrcfg
Obtaining TBMR configuration information ...
Finished updating configuration file
```

This will create the files in the `/TBMRCFG/<hostname>` folder. This folder will then get backed up as part of the normal regular TSM BA Client backup.

Typically, the configuration consists of the following files:

```
Xander> ls -l /TBMRCFG/xander
total 16
-r-xr-xr-x  1 root      sys      7788 Nov 12 13:50 disrec.ini
```

Note: it is important to remember that the TBMR configuration must be created before the BA Client backup is made. Cristie suggests that this is done by creating a job to run on the TSM Scheduler containing a script that calls the `tbmrcfg` program

3.2 Create Disaster Recovery bootable media

This is performed using the command line utility `make_tbmr`, eg.

```
Buffy> make_tbmr /cristie_nfs
make_tbmr v6.1 (c) Cristie Software Ltd. 2009
Found space for temporary RAM Filesystem
Created temporary RAM Filesystem
Mounted temporary RAM Filesystem
Populating temporary RAM Filesystem ...
Copying system files (this may take a few minutes) ...
Copied system files OK
Populated temporary RAM Filesystem
Unmounted temporary RAM Filesystem
Building temporary install kernel ...
Built temporary install kernel
Creating temporary install LIF ...
Created temporary install LIF
Copied LIF to output media OK
Bootable image has been copied to /var/tmp/cristie
Creating configuration ISO
Merging boot file and configuration ISO
make_tbmr finished OK
Buffy>
```

This example creates and saves the bootable TBMR image to a network share. The final DR ISO can be found on the share called `Tbmr.<hostname>.iso` ie. `Tbmr.xander.iso` in this example.

This ISO should be burnt to a suitable CD, perhaps on a PC if CD burning software is not available on the HP-UX server.

3.3 Testing the Disaster Recovery media

Note: before finally storing your Disaster Recovery Boot CD and the DR Configuration, it is important to check that the Disaster Recovery process works and that the Disaster Recovery configuration and Backup device are accessible from the booted image. The tests described here follow the standard DR sequence, but will not attempt to actually perform a full Disaster Recovery - only up to the point of testing access to the backup device.

Insert the prepared **Disaster Recovery CD** in the appropriate boot device and reboot your computer from this CD.

The figure below shows a typical boot sequence from CD:

```

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HP-UX Boot Loader for IPF -- Revision 2,028

Press Any Key to interrupt Autoboot
\EFI\BOOT\AUTO ==> boot :IINSTALL
Seconds left till autoboot = 0
AUTOBOOTING...> System Memory = 4075 MB
loading section 0
..... (complete)
loading section 1
..... (complete)
loading symbol table
loading ram disk file (;IINSTALLFS),
.....
..... (complete)
Launching :IINSTALL
SIZE: Text:30019K + Data:7031K + BSS:5287K = Total:42338K

Console is on a Serial Device
Booting kernel...

```

When the DR system boots, follow the onscreen instructions to first select the appropriate keyboard layout for your system. By default, the terminal type configured is 'hp'. If this is not suitable for your terminal type, this may be changed to 'vt100' if required. Do this by editing the 'TERM =hp' line manually before proceeding with the keyboard selection and pressing [Enter](#).

```

A USB interface has been detected on this system.
In order to use a keyboard on this interface, you must specify
a language mapping which will be used by X windows and
the Internal Terminal Emulator (ITE).
The characters '1234567890' will appear as "1@#%&*()"
on keyboards that use the shift key to type a number.
Your choice will be stored in the file /etc/kbdlang

1) USB_PS2_DIN_Belgian          2) USB_PS2_IIN_Belgian_Euro
3) USB_PS2_DIN_Danish          4) USB_PS2_IIN_Danish_Euro
5) USB_PS2_DIN_Euro_Spanish    6) USB_PS2_IIN_Euro_Spanish_Euro
7) USB_PS2_DIN_French          8) USB_PS2_IIN_French_Euro
9) USB_PS2_DIN_German          10) USB_PS2_IIN_German_Euro
11) USB_PS2_DIN_Italian        12) USB_PS2_IIN_Italian_Euro
13) USB_PS2_DIN_JIS_109       14) USB_PS2_IIN_Korean
15) USB_PS2_DIN_Norwegian      16) USB_PS2_IIN_Norwegian_Euro
17) USB_PS2_DIN_S_Chinese      18) USB_PS2_IIN_Swedish
19) USB_PS2_DIN_Swedish_Euro   20) USB_PS2_IIN_Swiss_French2_Euro
21) USB_PS2_DIN_Swiss_German2  22) USB_PS2_IIN_Swiss_German2_Euro
23) USB_PS2_DIN_T_Chinese      24) USB_PS2_IIN_UK_English
25) USB_PS2_DIN_UK_English_Euro 26) USB_PS2_IIN_US_English
27) USB_PS2_DIN_US_English_Euro

Enter the number of the language you want: 24

You have selected the keyboard language USB_PS2_IIN_UK_English.
Please confirm your choice by pressing RETURN or enter a new number: █

```

At this point, the main [TBMR Recovery Console](#) menu will be displayed:

```

Welcome to the Cristie Recovery Console (v6.1)
-----
|
| Main Menu
|-----|
| 1. Automatic recovery |
| 2. Manual recovery   |
| 3. Tools              |
| 4. View log files    |
| 5. Copy log files    |
| 6. Exit and Reboot   |
|-----|
|
| Redraw: ^L
|
|-----|
| Copyright (C) Cristie Software Ltd. 2003-2009
|-----|

```

TBMR requires access to the system configuration before it can perform a recovery from the backup. This test therefore confirms both access to the TSM server and the integrity of the configuration.

The following discussion describes tests for the only supported scenario - the configuration held within a TSM BA Client backup itself.

3.3.1 Configuration data stored in a TSM BA Client backup

In this example we show how to test access to a configuration held in a TSM BA Client backup.

Select option four - **Test access to backup device** - on the Tools menu. You will then be provided with the following Access Configuration menu:

```

Welcome to the Cristie Recovery Console (v6.1)
-----
|
| Access Configuration
|-----|
| 1. From a CBMR backup |
| 2. From a TSM BA Client backup |
| 3. From an NFS share  |
| 4. From a CD          |
| 5. Return to previous menu |
|-----|
|
| Redraw: ^L
|
|-----|
| Copyright (C) Cristie Software Ltd. 2003-2009
|-----|

```

Select option two - **From a TSM BA Client backup**. You will then be prompted with the server network details so that the network can be started:

```

Welcome to the Cristie Recovery Console (v6.1)
-----
| Enter Network Details
|-----
| Hostname                buffy
| IPv4 address of this server 10,2,8,2
| Netmask (e.g. 255.0.0.0)  255.0.0.0
| Default Gateway         10.0.1.100
| Nameserver IPv4 address  10,1,1,1
| NIC device to activate   lan0
|
|                        OK          Cancel
|-----
R+
-----
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```

Successful start of the network is indicated by:

```

Network started OK
Press <Enter> key to continue +++

```

You will then be required to setup details of the TSM server:

```

Welcome to the Cristie Recovery Console (v6.1)
-----
| Enter TSM Server Details
|-----
| TSM Server IP address 10,2,1,20
| TSM Port              1500
| Node name             XANDER.1131
| Password              ****
|
|                        OK          Cancel
|-----
Redraw: ^L
-----
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```

Select **OK** and TBMR will attempt to recover the configuration.

```

Retrieving TBMR configuration from TSM server +++

```

Successful recovery is indicated with this message:

```
Successfully restored TBMR configuration from TSM server
Press <Enter> key to continue ...
```

At this point, TBMR will examine the configuration files to determine where the TSM BA Client backup is held (ie. the TSM server details) and proceed to access the backup. Each TSM Filespace within the Node will be listed:

```
IBM Tivoli Storage Manager
Command Line Backup/Archive Client Interface
Client Version 5, Release 3, Level 5.0
Client date/time: 11/12/08 15:19:04
(c) Copyright by IBM Corporation and other(s) 1990, 2007, All Rights Reserved.

Node Name: XANDER.1131
Session established with server DEV_SERVER1; Windows
Server Version 5, Release 3, Level 0.0
Server date/time: 11/12/08 15:23:25 Last access: 11/12/08 15:22:52

#      Last Incr Date      Type      File Space Name
-----
1      11/12/08 14:51:49      VxFS      /
2      11/12/08 15:08:54      VxFS      /home
3      11/12/08 15:08:51      VxFS      /opt
4      11/12/08 14:59:22      VxFS      /patches
5      11/12/08 14:52:41      VxFS      /stand
6      11/12/08 14:59:04      VxFS      /usr
7      11/12/08 14:53:37      VxFS      /var

Backup is accessible
```

If it is possible to access the configuration, this message will be displayed:

```
Test access to backup device OK
Press <Enter> key to continue ...
```

If this process is successful, you can select [Exit](#) and [Reboot](#) from the main menu to boot the machine back to the normal HP-UX operating system.

Store the DR System CD and the DR backup tape (if used) in a safe location. It is a good idea to keep more than one copy and store them in different locations.

4 Do regular system backups

In order to perform a DR full backup (to TSM) straight away, enter this on the command line:

```
dsmc backup or dsmc inc for incremental backup.
```

Ensure that the DR backup is created regularly. In an enterprise environment, it is likely the regular backups are already configured via cron or the TSM scheduler.

As long as the TBMR configuration has been created ([The TBMR Configuration Tool](#)) and a TSM BA Client backup performed afterwards, then it will be possible to recover the system using the DR environment.

Note: this document does not describe how to create or schedule TSM BA Client backups. Please consult your TSM Administrator

5 Performing a Disaster Recovery

In the event of a disaster, having previously taken TSM BA Client backups of the system, TBMR enables you to restore your system. You will need your **TBMR Disaster Recovery** boot CD. This was created earlier.

Boot the machine (or replacement machine) using the prepared TBMR boot CD to display the TBMR Recovery Console main menu.

5.1 Recovering the System

The TBMR Disaster Recovery system will be booted.

```
All rights reserved
HP-UX Boot Loader for IPF -- Revision 2,028

Press Any Key to interrupt Autoboot
\EFI\BOOT\AUTO ==> boot :IINSTALL
Seconds left till autoboot - 0
AUTOBOOTING...> System Memory = 4075 MB
loading section 0
..... (complete)
loading section 1
..... (complete)
loading symbol table
loading ram disk file (:IINSTALLFS).
.....
..... (complete)
Launching :IINSTALL
SIZE; Text;30019K + Data;7031K + BSS;5287K = Total;42338K

Console is on a Serial Device
Booting kernel...
```

At the end of the boot process, select the appropriate keyboard layout for your system and then choose the location of your DR configuration media. You may modify the 'TERM = hp' setting as the **TBMR Recovery Console** boots to something more appropriate (eg. 'TERM = vt100').

```

A USB interface has been detected on this system,
In order to use a keyboard on this interface, you must specify
a language mapping which will be used by X windows and
the Internal Terminal Emulator (ITE),
The characters '1234567890' will appear as "!"@#%&'*()
on keyboards that use the shift key to type a number,
Your choice will be stored in the file /etc/kbdlang

1) USB_PS2_DIN_Belgian          2) USB_PS2_DIN_Belgian_Euro
3) USB_PS2_DIN_Danish          4) USB_PS2_DIN_Danish_Euro
5) USB_PS2_DIN_Euro_Spanish    6) USB_PS2_DIN_Euro_Spanish
7) USB_PS2_DIN_French          8) USB_PS2_DIN_French_Euro
9) USB_PS2_DIN_German          10) USB_PS2_DIN_German_Euro
11) USB_PS2_DIN_Italian        12) USB_PS2_DIN_Italian_Euro
13) USB_PS2_DIN_JIS_109       14) USB_PS2_DIN_Korean
15) USB_PS2_DIN_Norwegian      16) USB_PS2_DIN_Norwegian_Euro
17) USB_PS2_DIN_S_Chinese      18) USB_PS2_DIN_Swedish
19) USB_PS2_DIN_Swedish_Euro   20) USB_PS2_DIN_Swiss_French2
21) USB_PS2_DIN_Swiss_German2  22) USB_PS2_DIN_Swiss_German3
23) USB_PS2_DIN_T_Chinese      24) USB_PS2_DIN_UK_English
25) USB_PS2_DIN_UK_English_Euro 26) USB_PS2_DIN_US_English
27) USB_PS2_DIN_US_English_Euro

Enter the number of the language you want: 24

You have selected the keyboard language USB_PS2_DIN_UK_English,
Please confirm your choice by pressing RETURN or enter a new number:

```

The TBMR Recovery Console main menu will then be displayed.

It is recommended to test access to the TSM BA Client backup device first using option four on the **Tools** menu. This procedure will also setup the network and TSM Server details.

```

Welcome to the Cristie Recovery Console (v6.1)

Main Menu
1. Automatic recovery
2. Manual recovery
3. Tools
4. View log files
5. Copy log files
6. Exit and Reboot

Redraw: ^L

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```

If you are confident that the configuration data and backup device are correct and accessible, select option one - **Automatic Recovery** - from the main menu.

You will be prompted with a caution before proceeding with the recovery because the next process will write to the hard drive and overwrite all the current data.

Select **Yes** to proceed with the disaster recovery. The recovery actions are summarised below:



- any bootable hard disks identified in the configuration data will be made bootable
- any physical volumes will be created
- any volume groups will be created
- any logical volumes will be created
- any file systems will be created and mounted as necessary
- any mount points will be recreated
- swap and dump will be configured
- networks and routes will be configured

The TSM BA Client will then be used to restore the files in each filespace in turn.

At the end of the file restore step (this could take some time), a message such as this will be displayed:

```

Configuring Volume Group(s) ...
Volume Group(s) configured OK
Configuring Logical Volume(s) ...
Logical Volume(s) configured OK
Configuring File System(s) ...
File System(s) configured OK
Configuring Mount Point(s) ...
Mount Point(s) configured OK
Configuring Swap ...
Swap configured OK
Configuring Network(s) ...
Network(s) configured OK
Configuring Route(s) ...
Route(s) configured OK
Recovering files using TSM BA Client ...
/usr/bin/dsmc restore -password="hpux" -replace=all -subdir=yes /* /tmp_mnt//
IBM Tivoli Storage Manager
Command Line Backup/Archive Client Interface
  Client Version 5. Release 3, Level 5.0
  Client date/time: 11/12/08 16:51:48
(c) Copyright by IBM Corporation and other(s) 1990, 2007, All Rights Reserved.

```

Press **Enter** to display:

```

Restoring          660 /home/stevek/src/cristie/utls/isopatch/readme.txt --> /tmp_
p_mnt/home/stevek/src/cristie/utls/isopatch/readme.txt [Done]
Restoring          713 /home/stevek/src/cristie/utls/showdisk/makefile --> /tmp_
mnt/home/stevek/src/cristie/utls/showdisk/makefile [Done]
Restoring          5,009 /home/stevek/src/cristie/utls/showdisk/showdisk.c --> /tm
p_mnt/home/stevek/src/cristie/utls/showdisk/showdisk.c [Done]
Restoring          473 /home/stevek/src/cristie/utls/ubaxpasswd/makefile --> /tm
p_mnt/home/stevek/src/cristie/utls/ubaxpasswd/makefile [Done]
Restoring          1,275 /home/stevek/src/cristie/utls/ubaxpasswd/makefile.nmake -
-> /tmp_mnt/home/stevek/src/cristie/utls/ubaxpasswd/makefile.nmake [Done]
Restoring          2,138 /home/stevek/src/cristie/utls/ubaxpasswd/ubaxpasswd.c -->
/tmp_mnt/home/stevek/src/cristie/utls/ubaxpasswd/ubaxpasswd.c [Done]

Restore processing finished.

Total number of objects restored:          863
Total number of objects failed:            0
Total number of bytes transferred:        16.71 MB
Data transfer time:                        1.47 sec
Network data transfer rate:                11.613.14 KB/sec
Aggregate data transfer rate:              2.917.05 KB/sec
Elapsed processing time:                   00:00:05

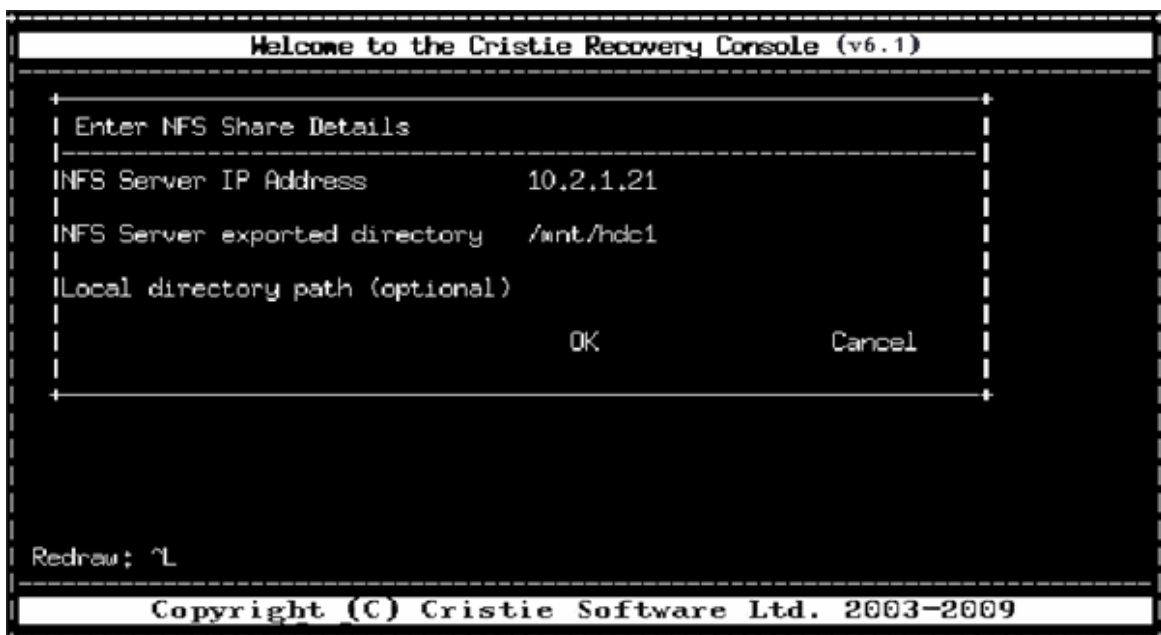
Press <Enter> key to continue ...

```

Press **Enter** to return to the Recovery Console main menu. At this point, you should be able to select option six - Exit and Reboot. However, Cristie advises that you save the recovery log files before doing so, in case there are any boot problems. These log files will be required by Cristie Support when assisting you. Select option five - **Copy Log Files** - to do this.



You will be required to set up the NFS share, if it is not already setup.



Enter the share details and the log files will be copied to the share:

```
Copying log files to NFS share ...
Copying /usr/local/log/devfs.log to file store /cristie_nfs
Copying /usr/local/log/disrec.log to file store /cristie_nfs
Copying /usr/local/log/dr.log to file store /cristie_nfs
Copying /usr/local/log/dsmerror.log to file store /cristie_nfs
Copying /usr/local/log/insf.log to file store /cristie_nfs
Copying /usr/local/log/ioint,log to file store /cristie_nfs
Copying /usr/local/log/ioscan.log to file store /cristie_nfs
Copying /usr/local/log/itemap.log to file store /cristie_nfs
Copying /usr/local/log/lanadmin.log to file store /cristie_nfs
Copying /usr/local/log/mkfs_ramfs.log to file store /cristie_nfs
Copying /usr/local/log/mount_ramfs.log to file store /cristie_nfs
Copying /usr/local/log/unpack.log to file store /cristie_nfs
Copying /etc/mnttab to file store /cristie_nfs

Press <Enter> key to continue ...
```

Return to the main menu and select option six - **Exit and Reboot**. The machine will boot and run from the hard disk.

When the computer is operational, you will be in a state prior to the disaster, to the state when the last TSM BA Client was taken.