Bare Machine Recovery for TSM

User Guide

For Windows

April 2016

Version 7.3.2

Cristie Software Ltd.
New Mill
Chestnut Lane
Stroud GL5 3EH
United Kingdom
Tel:+44(0)1453 847000
Fax:+44(0)1453 847001
support@cristie.com

Cristie Data Products GmbH
Nordring 53-55

63843 Niedernberg
Germany
Tel: +49 (0) 60 28/97 95-0
Fax: +49 (0) 60 28/97 95 7-99
cbmr@cristie.de

Cristie Nordic AB
Knarrarnäsgatan 7
164 40 Kista
Sweden
Tel:+46(0)8 718 43 30
cbmr@cristie.se

Cristie Software Ltd
New Mill
Chestnut Lane
Stroud
GL5 3EH
UK

Tel: +44 (0) 1453 847000
Email: support@cristie.com
Website: http://www.cristie.com

Contents

1 Document Conventions

The following typographical conventions are used throughout this guide:

`/etc/passwd`	represents command-line commands, options, parameters, directory names and filenames
Next >	used to signify clickable buttons on a GUI dialogue
Note:	describes something of importance related to the current topic

2 Overview

This document describes the essential elements of **Bare Machine Recovery for TSM** (**TBMR**) and **Disaster Recovery** based upon a tailored WinPE 2 or WinPE 5 recovery module. It is based upon version 7.3.2 of the software.

This document describes the steps required to install, configure and use the Bare Machine Recovery for TSM (TBMR) product. Refer to the product Readme for installation requirements and late breaking information associated with this release.

2.1 Prerequisites

> *Note: Please refer to the product Readme for the supported operating systems, RAM and free disk space required. A full list of supported TSM clients and servers is included in the Readme.*

Ensure that the IBM BA Client **Open File Support** is installed and configured correctly. Select either **LVSA** or **VSS** as appropriate. This allows important OS files that are normally held open by the OS to be successfully backed up by TSM. TBMR will not successfully recover the OS without these files.

2.2 Backup Process

TBMR allows you to perform a bare machine recovery of your system direct from a TSM backup.

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

Installation (refer to the TBMR Installation and Licensing Guide)

- *Install the TBMR configuration software on the client system to be protected*
- *License the software (using a Trial or Full license)*

Configuration

- *Save the configuration parameters.*
- *Install and run the Cristie Recovery ISO Producer (CRISP) tool on a suitable system to create the TBMR WinPE 2 or WinPE 5 based DR environment. This only needs to be done once.*

Backup system and user data

- *Perform regular standard TSM backups as required*

You will then be ready to Restore the system from the Disaster Recovery Backup.

2.3 Recovery Process

In the event of a disaster, having previously taken a TSM backup of the system and stored the configuration information, Windows WinPE 2 or WinPE 5 mode DR enables you to restore your system to the state at the last TSM backup.

The TBMR recovery console must be created first by using the Cristie Recovery ISO Producer (CRISP) tool. The output from this tool is a bootable WinPE 2 or WinPE 5 ISO which can be either burnt to physical CD/DVD media or used directly in a virtual environment.

If your machine supports bootable CDs, this is the most convenient way to boot the DR module. If the system does not support bootable CDs, you can boot from the network. Contact Cristie for details on how to set this up.

Windows WinPE 2 or WinPE 5 offers several advantages, namely:

- *a familiar Windows GUI*
- *the ability to inject new mass storage drivers during the boot process*
- *all variations of Windows dynamic disks are supported (ie. mirrored, spanned, striped and RAID-5)*
- *NTFS volumes/partitions are created natively*
- *support for NTFS mounted folders (junctions) and hard links*
- *the restored backup contains the original file security information*
- *UEFI (GPT) to BIOS (MBR) conversion on recovery*

The WinPE 2 or WinPE 5 recovery process has five main steps:

1. *Load Configuration data*
2. *Rebuild storage devices (hard disks)*
3. *Restore OS files from a TSM backup*
4. *Dissimilar Hardware and inject new drivers (if necessary)*
5. *Boot into Windows*

3 Create The Bootable Recovery Environment

The supplied CRISP tool is used to create the TBMR recovery environment. This environment is based upon a customised version of Microsoft's WinPE version 2 (WinPE2) or 5 (WinPE5).

The WinPE2 version is 32-bit based and the WinPE5 is 64-bit based. Cristie Software Ltd. recommend using the WinPE5 based environment if possible. This is based upon Windows 8.1/2012R2 and is more likely to be compatible with most modern hardware. Use the WinPE5 version for Windows 2008R2 and later. Use the WinPE2 version for Windows 2008 and legacy hardware.

Once created the recovery environment is booted on the target system and then manages the restore process.

The CRISP tool should be run in conjunction with the supplied CRISP WinPE2 and WinPE5 Filesets for TBMR 7.3.2. The fileset should be installed alongside the CRISP on the same host.
A full discussion of how to install and run CRISP is contained in the separate **CRISP User Guide**.
Note that the CRISP does not need to be installed on the system to be backed up; any suitable host machine will do.

Output from the CRISP tool is a bootable WinPE 2 or WinPE 5 ISO file which can then be burnt to physical media (CD or DVD) or mounted directly in a VM environment. This media is then booted on the target machine to manage the recovery operation.

4 The TBMR Create Configuration Tool

Configuration information is saved by default to the **TBMRCFG** folder on the Windows system partition. This cannot be changed.

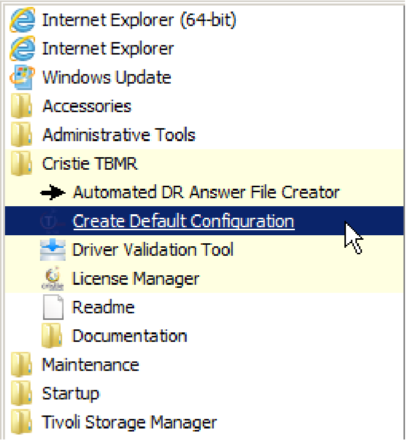
The Cristie tool that provides this function is called **TBMRCfg.exe** which is located in the TBMR installation folder (normally **Program Files\Cristie\TBMR**). This is a command line only tool which is licensed for use for a 30 initial day trial period. A full license is required to use the program 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. You can override some of these details if you wish. The result of the configuration creation (success or failure) is recorded in the Windows Application Event Log.

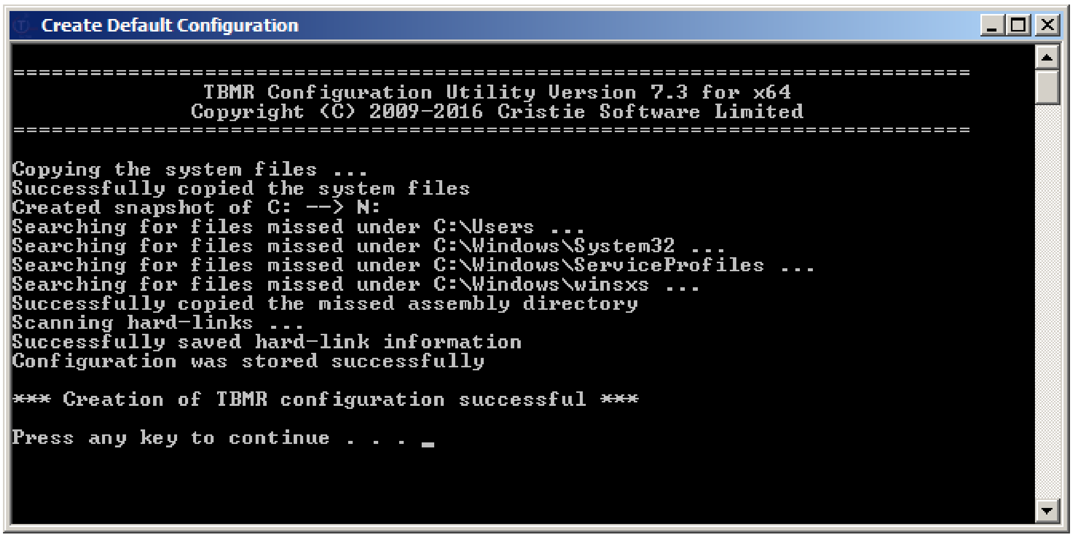
The next sections discuss this process in more detail.

4.1 Creating the Configuration Information

The easiest way to create the configuration manually is to select the Create Default Configuration shortcut provided on the Start menu for TBMR. Note however that an initial configuration is created during the TBMR installation process.



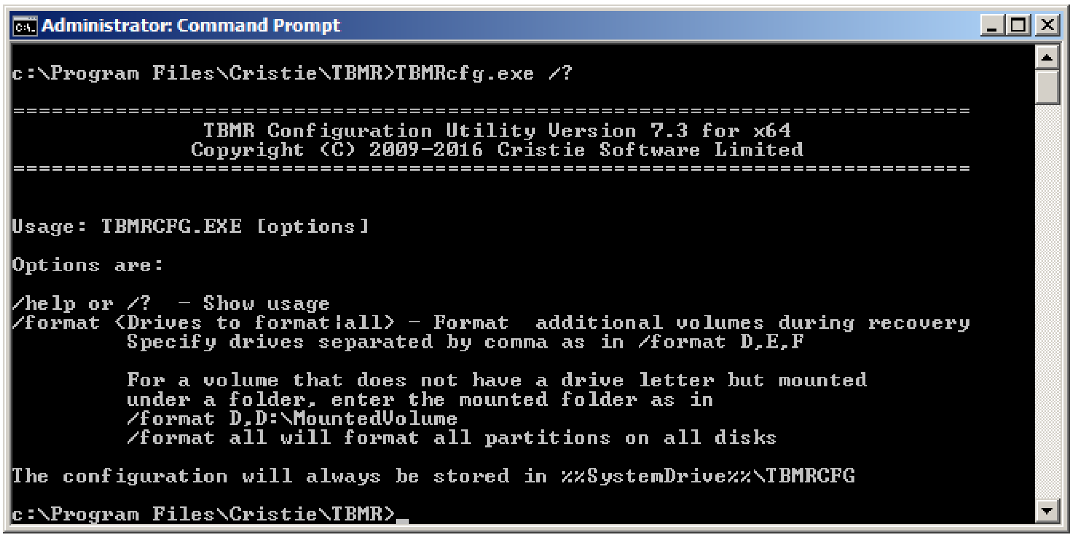
This will create a new configuration using the default settings.



```
===========================================================================
               TBMR Configuration Utility Version 7.3 for x64
              Copyright (C) 2009-2016 Cristie Software Limited
===========================================================================

Copying the system files ...
Successfully copied the system files
Created snapshot of C: --> N:
Searching for files missed under C:\Users ...
Searching for files missed under C:\Windows\System32 ...
Searching for files missed under C:\Windows\ServiceProfiles ...
Searching for files missed under C:\Windows\winsxs ...
Successfully copied the missed assembly directory
Scanning hard-links ...
Successfully saved hard-link information
Configuration was stored successfully

*** Creation of TBMR configuration successful ***

Press any key to continue . . . _
```

If you need to select non-default settings, then you will need to create the configuration manually. Run a command window and navigate to the folder where TBMR is installed.

The TBMR configuration program is called **TBMRCfg.exe**. Enter the command `TBMRCfg.exe /?`, this will display the command line options available.



```
c:\Program Files\Cristie\TBMR>TBMRcfg.exe /?

===========================================================================
              TBMR Configuration Utility Version 7.3 for x64
             Copyright (C) 2009-2016 Cristie Software Limited
===========================================================================


Usage: TBMRCFG.EXE [options]

Options are:

/help or /?   - Show usage
/format <Drives to format|all> - Format  additional volumes during recovery
         Specify drives separated by comma as in /format D,E,F

         For a volume that does not have a drive letter but mounted
         under a folder, enter the mounted folder as in
         /format D,D:\MountedVolume
         /format all will format all partitions on all disks

The configuration will always be stored in %%SystemDrive%%\TBMRCFG

c:\Program Files\Cristie\TBMR>_
```

The command line options are very simple:

/help or **/?**

shows **TBMRCfg** usage. This displays the command option summary.

/format <Drives to format | all>

The /format option allows disk volumes other than the Windows drive to be formatted during the recovery. By default, only the Windows volume will be formatted. There is an exception to this if Windows is not contained within the first partition of the disk. In that case, both the Boot partition and the Windows partition will be configured for formatting. However, regardless of this setting, the WinPE 2 or WinPE 5 based recovery environment will allow any or all partitions to be formatted.

So, for example, if volumes D:, E: and F: are to be additionally formatted during recovery, enter:

`TBMRCfg.exe /format D,E,F` (separate the drive letters using a comma)

Enter the following to back up all partitions on all drives on the system:

```
TBMRCfg.exe /format all
```

Volumes mounted on local folders not having a drive letter can be specified like this:

```
TBMRCfg.exe /format D:\MountedVolume
```

where `D:\MountedVolume` is the folder mount point. An example using both normal partitions and a mounted volume is:

```
TBMRCfg.exe /format D,D:\MountedVolume
```

TBMRCfg stores the configuration in `%SystemDrive%\TBMRCFG folder` (`%SystemDrive%` is the drive associated with the Windows folder, usually `C:\`). This location cannot be changed.

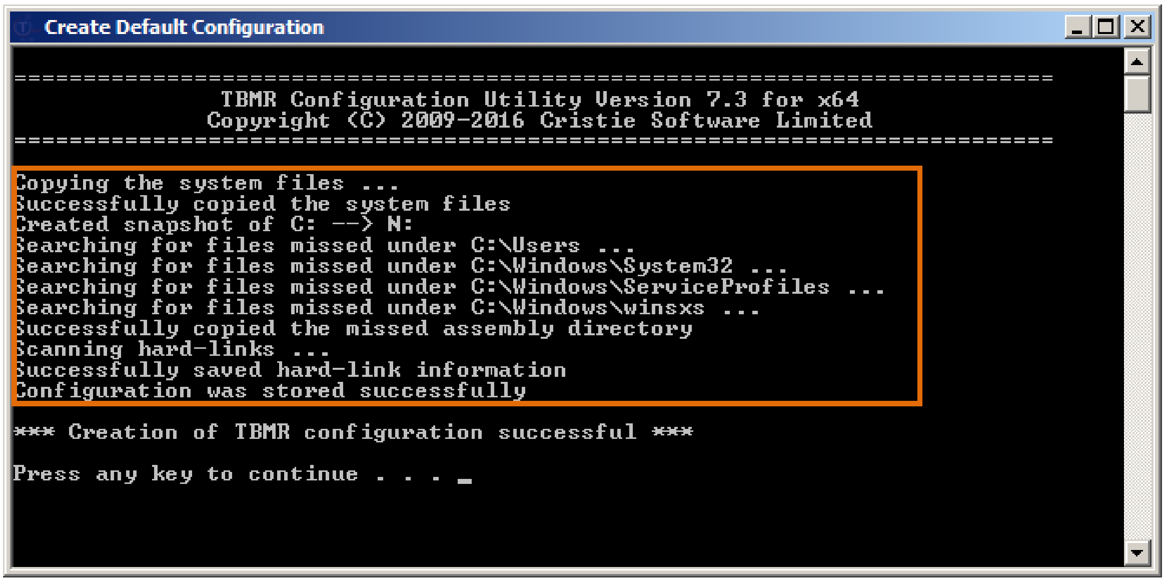
Note: it is important to remember that the TBMR configuration must be created before the BA

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 TBMR Cfg.exe program installed in the TBMR installation folder.

4.2 Backup of Boot and SystemState Files

On all Windows OS's, files additional to the standard TSM backup dataset must be copied and saved. These include boot files and SystemState objects which are not normally backed up by the IBM BA Client on these OS's.

Some of the additional files backed up are also locked at the time of backup and must be backed up using the Windows Open File Manager **VSS**. So when TBMRCfg runs, it invokes VSS to take a snapshot copy of these extra files:



```
===========================================================================
              TBMR Configuration Utility Version 7.3 for x64
             Copyright (C) 2009-2016 Cristie Software Limited
===========================================================================

Copying the system files ...
Successfully copied the system files
Created snapshot of C: --> N:
Searching for files missed under C:\Users ...
Searching for files missed under C:\Windows\System32 ...
Searching for files missed under C:\Windows\ServiceProfiles ...
Searching for files missed under C:\Windows\winsxs ...
Successfully copied the missed assembly directory
Scanning hard-links ...
Successfully saved hard-link information
Configuration was stored successfully

*** Creation of TBMR configuration successful ***

Press any key to continue . . . _
```

5 Using a TSM Backup for Disaster Recovery

TBMR allows a previously created TSM backup or backupset to be used as a DR backup.

As long as the TBMR configuration has been created (see previous section) and a TSM backup is performed afterwards, then it will be possible to recover the system using the DR environment.

> *Note: this document does not describe how to create TSM backups. Please refer to your TSM Administrator's Guide for details.*

5.1 Encrypted Backups

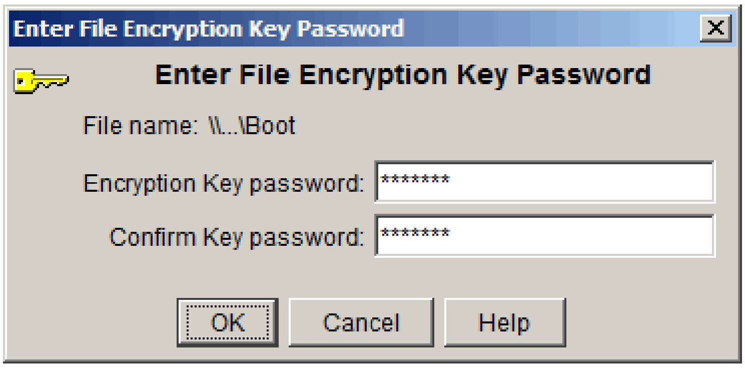
TBMR supports encrypted TSM backups. This can be enabled in TSM by adding the line:

```
INCLUDE.ENCRYPT "*:\...\*"
```

to the dsm.opt file. TBMR works by creating the system configuration into the folder TBMRCFG. So the line above would mean that when the TSM backup is created, the TBMRCFG folder is also encrypted. This is not a problem, but would mean that you will be prompted for the password during the recovery. If you wish to avoid this prompt, add this additional line to dsm.opt after the line above:

```
EXCLUDE.ENCRYPT "*:\TBMRCFG\*"
```

You can also choose to always prompt for the encryption key password, or have it stored locally. You will be prompted for the encryption key as follows:



Enter File Encryption Key Password

Enter File Encryption Key Password

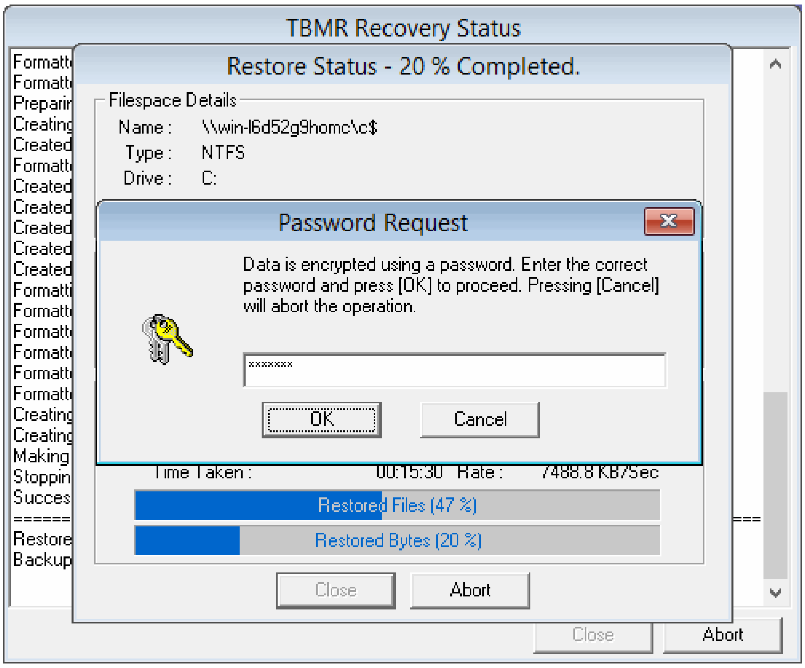
File name: \\...\Boot

Encryption Key password: *******

Confirm Key password: *******

You should also select the appropriate encryption algorithm for your backup.

If the folder containing the TBMR configuration has been encrypted, then during the recovery you will be prompted for the password:



TBMR Recovery Status

Restore Status - 20 % Completed.

Filespace Details

Name : \\win-l6d52g9homc\c$

Type : NTFS

Drive : C:

Password Request

Data is encrypted using a password. Enter the correct password and press [OK] to proceed. Pressing [Cancel] will abort the operation.

****

Time Taken : 00:15:30 Rate : 7488.8 KB/Sec

Restored Files (47 %)

Restored Bytes (20 %)

If the configuration folder has been excluded from the encryption (as described above), you will be prompted for the password during the Restore Files phase of the DR.

Please enter the same password you entered during the backup.

Note 1: if you have elected to have the password stored locally (via the BA Client Preferences menu) and the TBMR configuration has been created post this change, then you will not be prompted for the password during the recovery. You may also need to perform a 'dummy' backup first to get the password stored locally before generating the TBMR configuration.

Note 2: Cristie recommends using a single password for the entire encrypted backup. With TSM it is possible to backup parts of the system with a different password. This could lead to confusion during the recovery and is discouraged.

5.2 Image Backups

TBMR supports TSM backups of the form incremental, image and backupsets. However, for image backups, it is essential that in addition to the image backup, an incremental backup of the TBMRCFG folder is made to the same Node.

This is because it is not possible to retrieve the configuration details from an image backup.

Note: if this extra incremental backup is not made, then it will not be possible to perform a DR. It is also not possible to restore an image backup to a smaller disk partition.

5.3 Backupsets

TBMR now supports DR recovery from TSM backupsets. At the moment, TBMR only supports **online** backupsets (ie. those maintained in a Node on a TSM server). Typically a backupset is created with a **dsmadmc** command such as:

```
Generate Backupset <Nodename> <Prefix> Description="This is a backupset test"
Retention=Nolimit Wait=Yes Datatype=File TOC=Yes DevClass=File
```

Where <Nodename> is the name of the node on the TSM server, <Prefix> is a short prefix to add to the backupset name.

Note that a backupset is created from a backup already present in the specified node. If this backup does not already contain a backup of the TBMRCFG folder generated by the TBMRCfg program, it will not be possible to recover the system from the backupset.

It is essential to specify TOC=Yes. **TBMR cannot recover a backupset created without a TOC (Table of Contents).**

6 Restoring your System

This section discusses the steps required to run a recover sequence using the TBMR Recovery Environment. This is booted from the media created by CRISP in conjunction with the CRISP WinPE2 and WinPE5 Filesets for TBMR 7.3.2 (see Create the bootable cloning environment for further details).

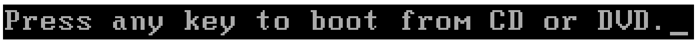
The WinPE 2 or WinPE 5 based recovery environment is booted on the ***target*** system. This could be the original or a dissimilar system.

A typical TBMR recovery sequence consists of the following steps.

1. *Install and run the **Cristie Recovery ISO Producer** (**CRISP**) tool on a suitable system to create the TBMR WinPE 2 or WinPE 5 based recovery environment. This only needs to be done once.*
2. *Boot the TBMR WinPE 2 or WinPE 5 recovery environment on the **target** system.*
3. *Run a restore sequence from the recovery environment on the **target** system using the TSM backup.*
4. *When the restore operation is complete and, before booting the system, you may change the hostname and IP address as required. If the target system uses different hardware from the source system inject additional drivers into the system using the hardware wizard tool. This tool will detect any new devices in the target system and prompt for the drivers.*
5. *Boot the recovered system.*

6.1 Booting the WinPE 2 or WinPE 5 DR Console from CD

Insert the bootable TBMR WinPE 2 or WinPE 5 DR CD/DVD-ROM and reboot the machine. By default you will be prompted to **Press any key to boot from the CD or DVD** unless you have disabled this feature when creating the ISO in CRISP.



```
Press any key to boot from CD or DVD._
```

This prompt is only made for a few seconds before the system will attempt to boot the underlying OS, so you will need to react quickly.

> ***Note: It is possible to suppress this prompt completely during the ISO creation stage. If the prompt is disabled then the DR ISO image will always booted by default. Please refer to CRISP documentation which describes how to do this.***

To support devices (for example a new mass storage controller) not supported in the current DR environment, WinPE 2 or WinPE 5 allows drivers for any device to be injected at any time *post boot*. Refer to the section titled Load a Driver for information on how to do this. Ensure you add the correct driver version; 32-bit for WinPE2 and 64-bit for WinPE5.

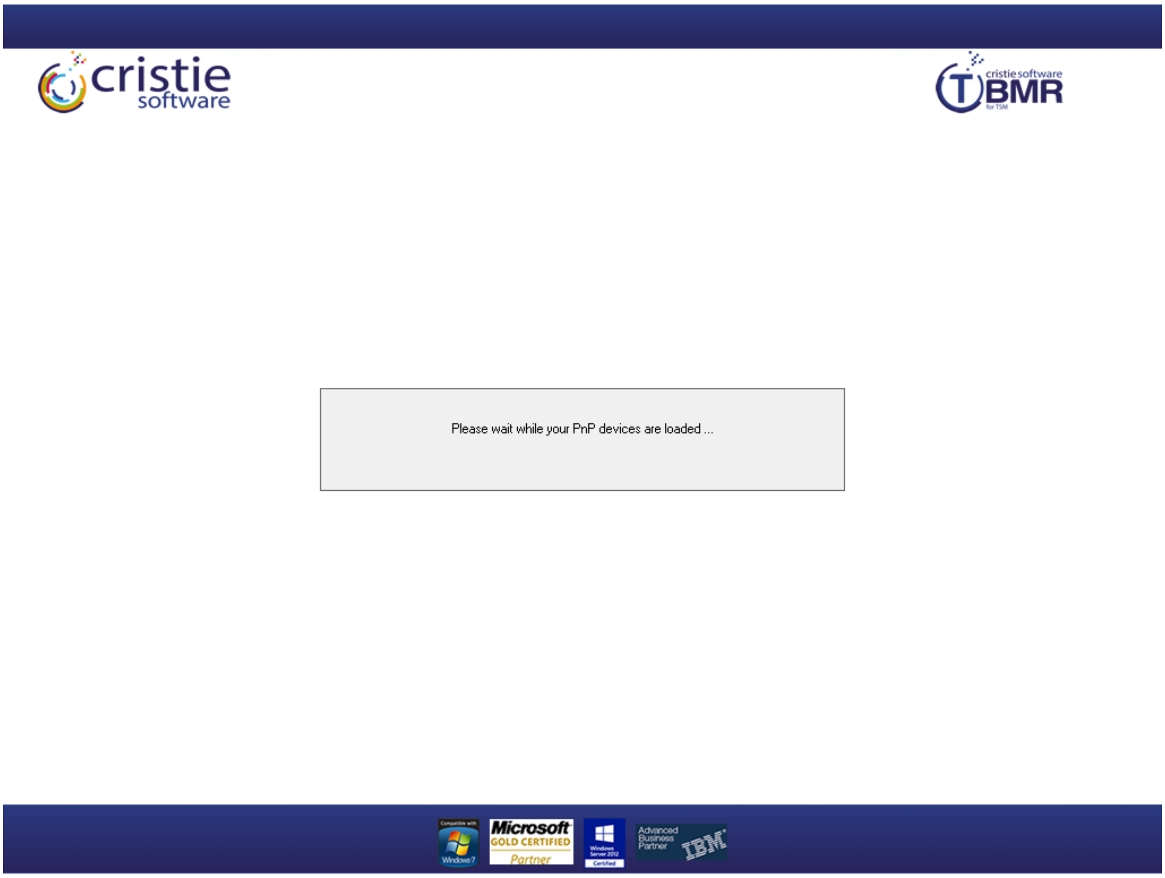
6.2 WinPE 2 or WinPE 5 Based TBMR Recovery Console

When the **WinPE 2 or WinPE 5 TBMR Console** is booted, a Windows installation-like boot procedure is started.

During the boot process, WinPE 2 or WinPE 5 drivers for your **Plug and Play** devices will be loaded - in particular the **Mass Storage** devices and **Network Adapters**.

When the WinPE 2 or WinPE 5 system has fully booted, it is possible to remove the CD/DVD if you wish.

Note: the DR Console will automatically reboot 72 hours after starting. This is an operating limitation of the Microsoft Windows WinPE 2 or WinPE 5 environment.

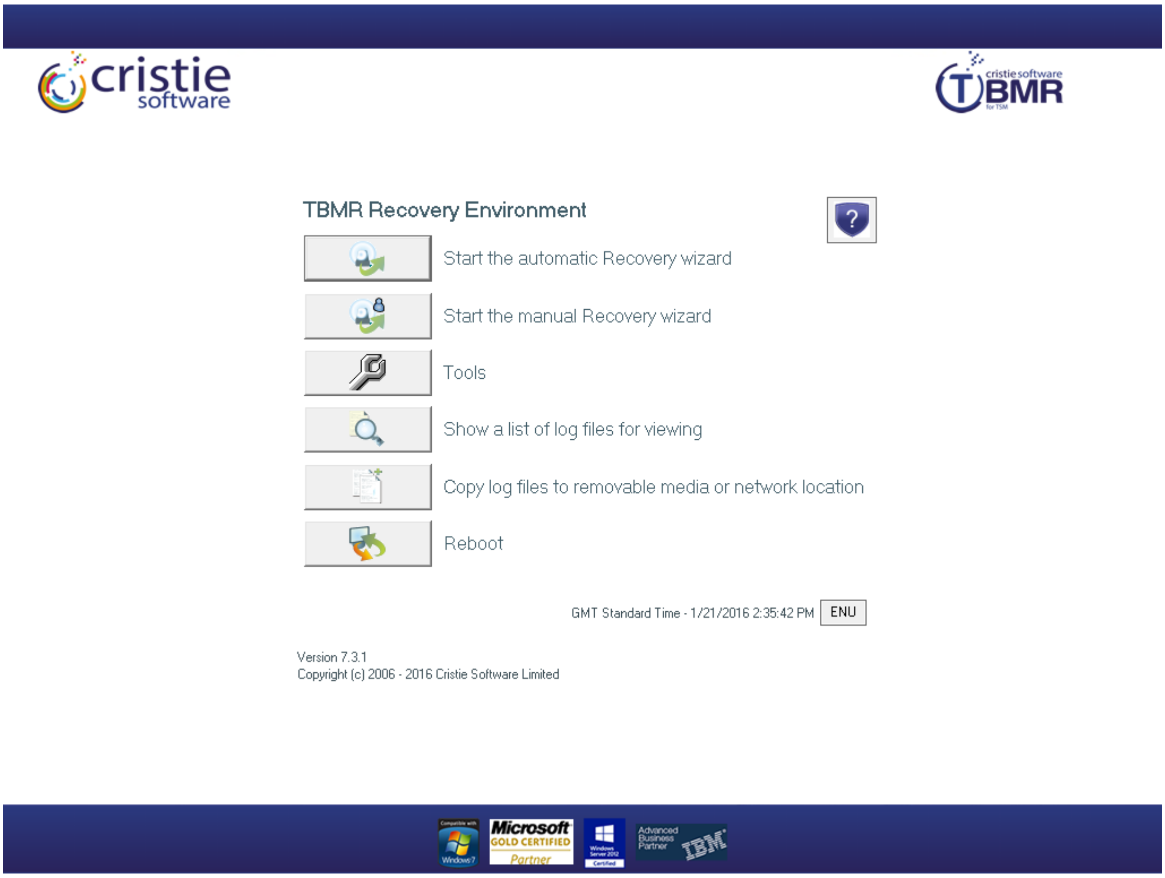


Please wait while your PnP devices are loaded ...

When this sequence completes, the **TBMR Recovery Console** will be shown.

6.2.1 TBMR Recovery Environment Main Menu

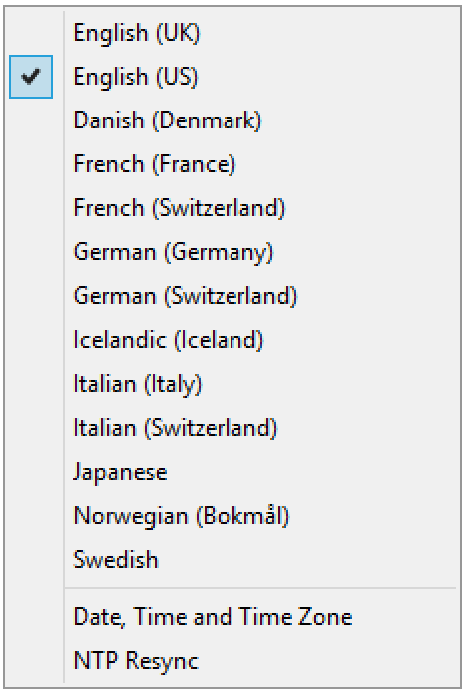
When you boot the **WinPE 2 or WinPE 5** DR environment (the WinPE2 and WinPE5 versions are very similar), you will see the **TBMR Recovery Environment** Main Menu as below:


cristie software
cristie software TBMR for TSM
TBMR Recovery Environment
?
Start the automatic Recovery wizard
Start the manual Recovery wizard
Tools
Show a list of log files for viewing
Copy log files to removable media or network location
Reboot
ENU

GMT Standard Time - 1/21/2016 2:35:42 PM

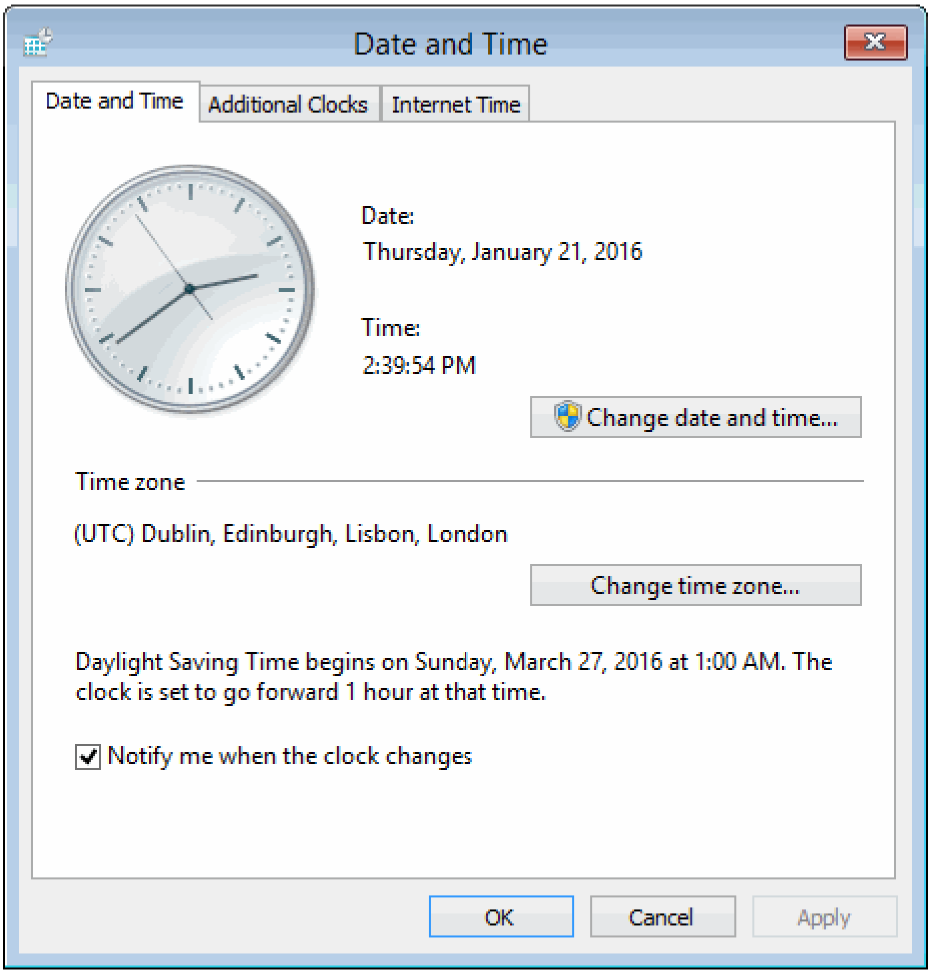
Version 7.3.1
Copyright (c) 2006 - 2016 Cristie Software Limited

You may configure the format of the displayed date/time and the keyboard layout, by pressing the locale ENU icon. Note this icon will be shown according to the locale of the host system used to create the ISO using the CRISP utility so it may not match the version shown here. So if, for example, the ISO was built on a machine configured with a UK locale it will be displayed as ENG .



By default the standard display uses a keyboard layout to match the default locale as discussed above. However, this may be changed to one of the listed alternatives. Note that this does not change the display language which is always English.

Select **Date, Time and Time Zone** to configure the time zone for the recovery.



Date:
Thursday, January 21, 2016

Time:
2:39:54 PM

Time zone

(UTC) Dublin, Edinburgh, Lisbon, London

Daylight Saving Time begins on Sunday, March 27, 2016 at 1:00 AM. The clock is set to go forward 1 hour at that time.

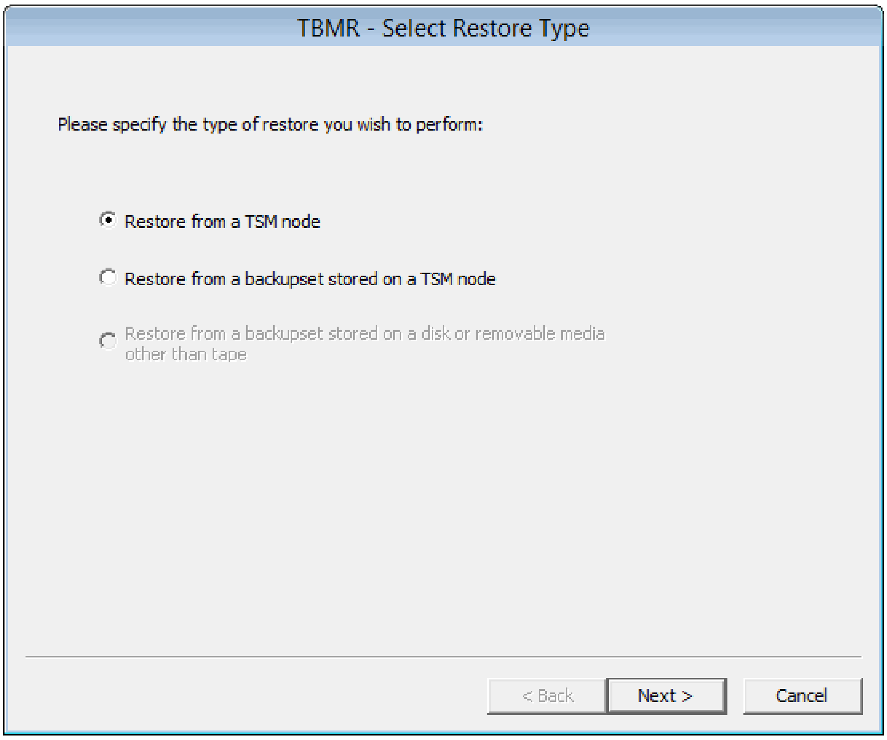
☑ Notify me when the clock changes

Note: the Additional Clocks and Internet Time tabs are operational. In fact it is possible to synchronise the system time with an NTP time server if required.

Select the Help button ? to show online help for the recovery environment.

6.2.2 Start the automatic Recovery wizard

Select the **Start the automatic Recovery wizard** option to commence an automatic DR sequence.



TBMR - Select Restore Type

Please specify the type of restore you wish to perform:

● Restore from a TSM node

○ Restore from a backupset stored on a TSM node

○ Restore from a backupset stored on a disk or removable media other than tape

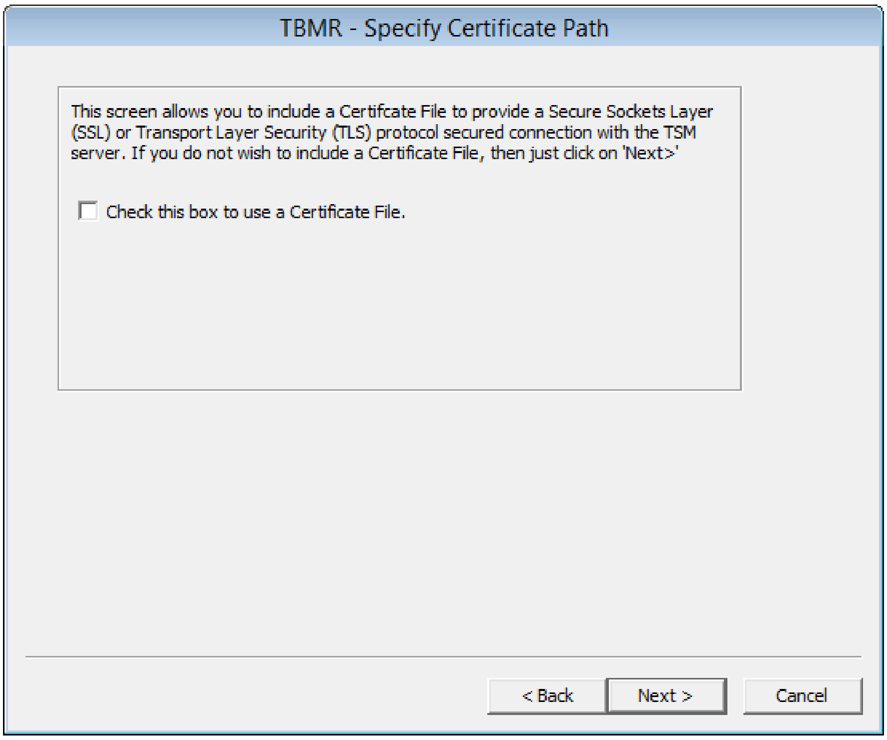
At the moment only restoring from a TSM node or an online backupset is supported. A future release will support restoring from a backupset stored on a disk or removable media. Make your choice and press Next> to continue.

6.2.2.1 Restore from Node

If you selected **Restore from a Node,** select Next>. This will then display the **Enter TSM server details** as shown in the next section.

Specify Certificate File

The first step of the automatic Node restore allows a **Secure Sockets Layer** (**SSL**) or **Transport Layer Security** (**TLS**) certificate to be provided to the TSM server. If you do not require to add an SSL or TLS certificate click Next > to continue directly to the next step.

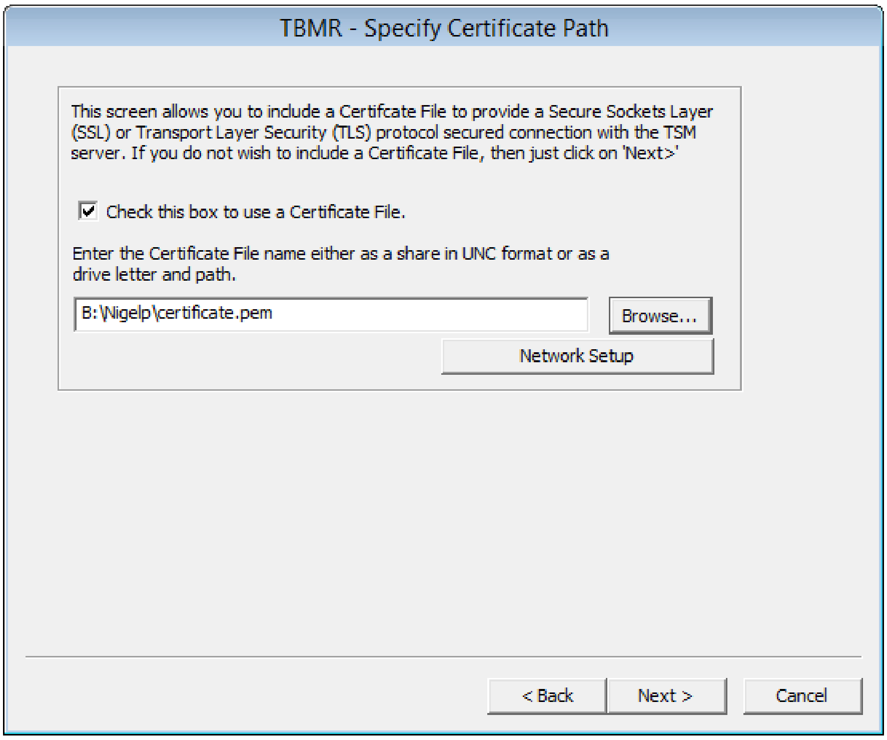


TBMR - Specify Certificate Path

This screen allows you to include a Certifcate File to provide a Secure Sockets Layer (SSL) or Transport Layer Security (TLS) protocol secured connection with the TSM server. If you do not wish to include a Certificate File, then just click on 'Next>'

□ Check this box to use a Certificate File.

To add a certificate, click the check box to open up a browser window. Then enter the full path or browse to the location of the certificate file.



TBMR - Specify Certificate Path

This screen allows you to include a Certifcate File to provide a Secure Sockets Layer (SSL) or Transport Layer Security (TLS) protocol secured connection with the TSM server. If you do not wish to include a Certificate File, then just click on 'Next>'

☑ Check this box to use a Certificate File.

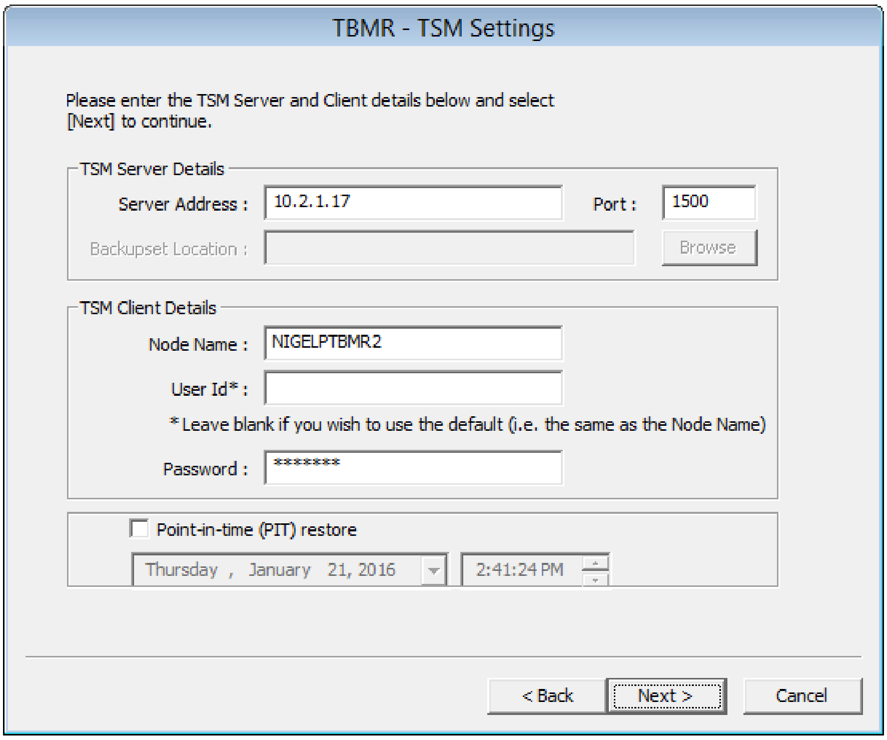
Enter the Certificate File name either as a share in UNC format or as a drive letter and path.

B:\Nigelp\certificate.pem

Use the Network Setup button to connect a network share if required (as in the example). Click Next > to continue to the next step.

Specify TSM Details and Recovery Date/Time

The next step of the automatic recovery identifies the location of the **TSM Server** and **Node** used to back up the Client. The TSM server IP address may be expressed in either IPv4 or IPv6 format.



TBMR - TSM Settings

Please enter the TSM Server and Client details below and select [Next] to continue.

TSM Server Details

Server Address : 10.2.1.17 Port : 1500

Backupset Location :

TSM Client Details

Node Name : NIGELPTBMR2

User Id* :

*Leave blank if you wish to use the default (i.e. the same as the Node Name)

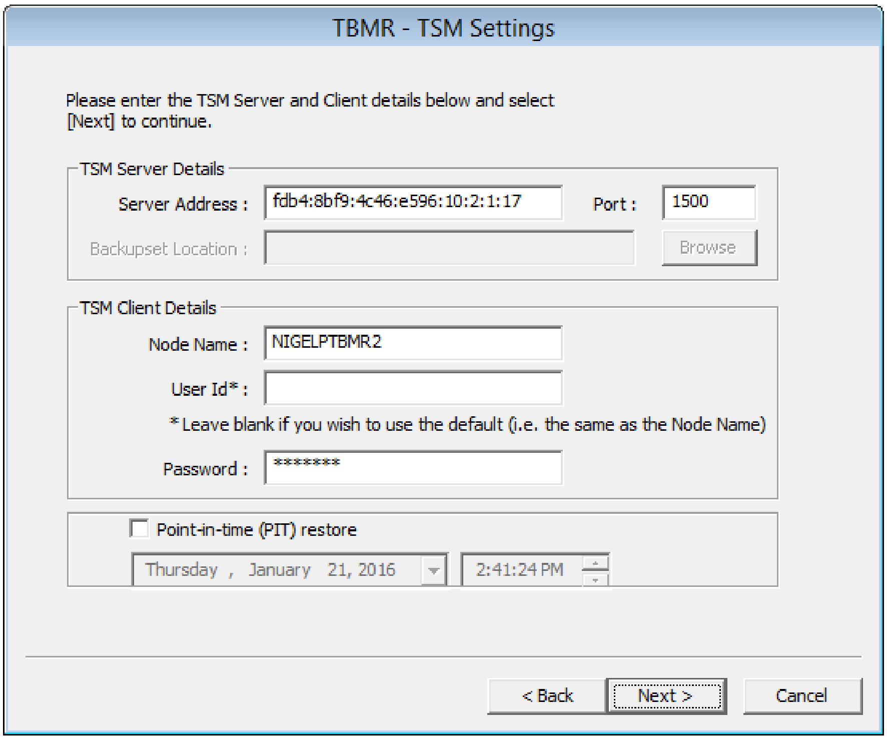
Password : ********

□ Point-in-time (PIT) restore

Thursday , January 21, 2016 2:41:24 PM

Identify TSM server using an IPv4 IP address

Or,



TBMR - TSM Settings

Please enter the TSM Server and Client details below and select [Next] to continue.

TSM Server Details

Server Address : fdb4:8bf9:4c46:e596:10:2:1:17 Port : 1500

Backupset Location :

TSM Client Details

Node Name : NIGELPTBMR2

User Id* :

*Leave blank if you wish to use the default (i.e. the same as the Node Name)

Password : ********

□ Point-in-time (PIT) restore

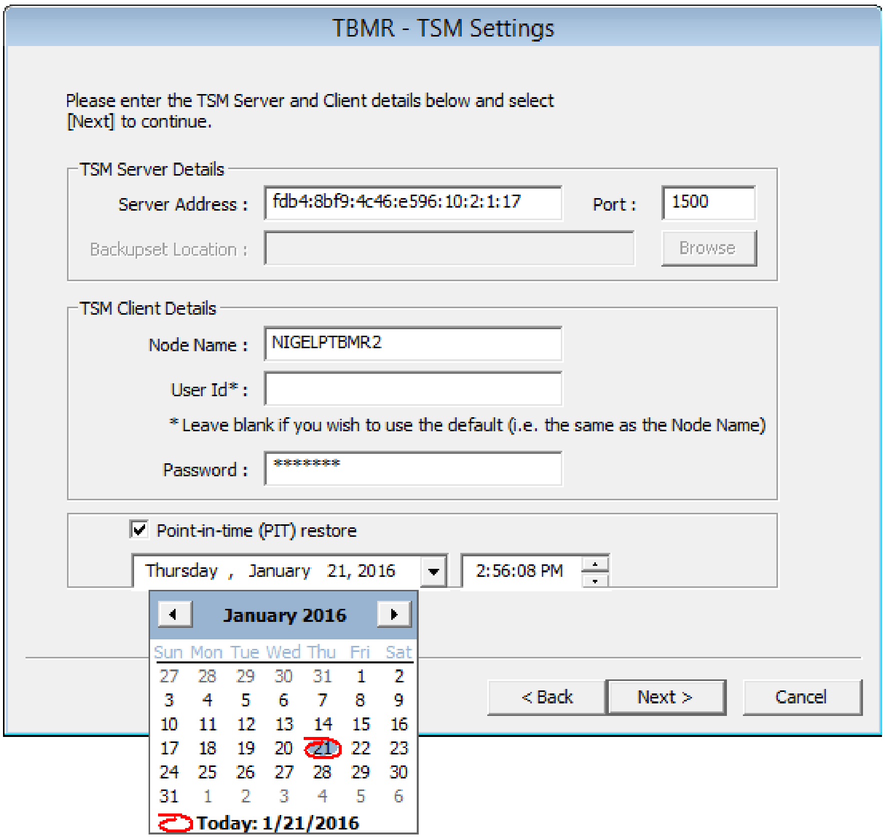
Thursday , January 21, 2016 2:41:24 PM

Identify TSM server using an IPv6 IP address

Note: You may use an alternative to the normal Node credentials (such as the Administrator account) to access the account. In this case enter the username of the alternative in the User

Id field and the corresponding password.

Selecting the **Point-in-time** (PIT) restore mode will allow the system to be recovered from the most recent backup before the specified date and time. This means the version of any file restored will be earlier than the specified date and time. Selecting the down-arrow in the calendar control will bring up a calendar:



TBMR - TSM Settings

Please enter the TSM Server and Client details below and select [Next] to continue.

TSM Server Details

Server Address : fdb4:8bf9:4c46:e596:10:2:1:17 Port : 1500

Backupset Location :

TSM Client Details

Node Name : NIGELPTBMR2

User Id* :

* Leave blank if you wish to use the default (i.e. the same as the Node Name)

Password : ********

☑ Point-in-time (PIT) restore

Thursday , January 21, 2016 2:56:08 PM

January 2016

Sun	Mon	Tue	Wed	Thu	Fri	Sat
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

Today: 1/21/2016

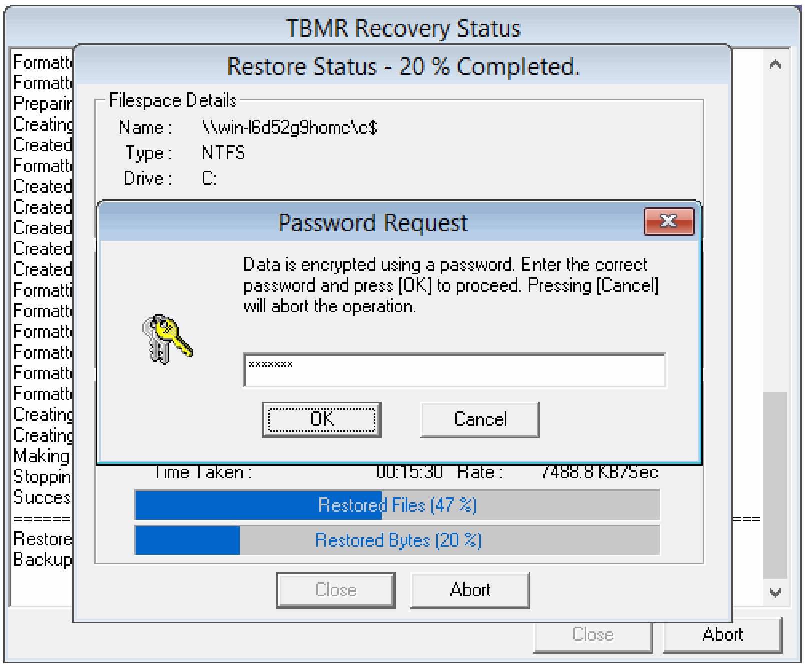
This can be used to scroll the months/years backwards and forwards as necessary.

Note: a future date will result in the latest backup being recovered.

If PIT mode is not selected then, by default, the latest file versions will be restored.

Select Next> to continue.

If the backup including the TBMR configuration folder **TBMRCFG** is encrypted, a prompt for the encryption password will be displayed if not held locally:



TBMR Recovery Status

Restore Status - 20 % Completed.

Filespace Details
Name : \\win-l6d52g9homc\c$
Type : NTFS
Drive : C:

Password Request

Data is encrypted using a password. Enter the correct password and press [OK] to proceed. Pressing [Cancel] will abort the operation.

****

Time Taken : 00:15:30 Rate : 7488.8 KB/Sec

Restored Files (47 %)

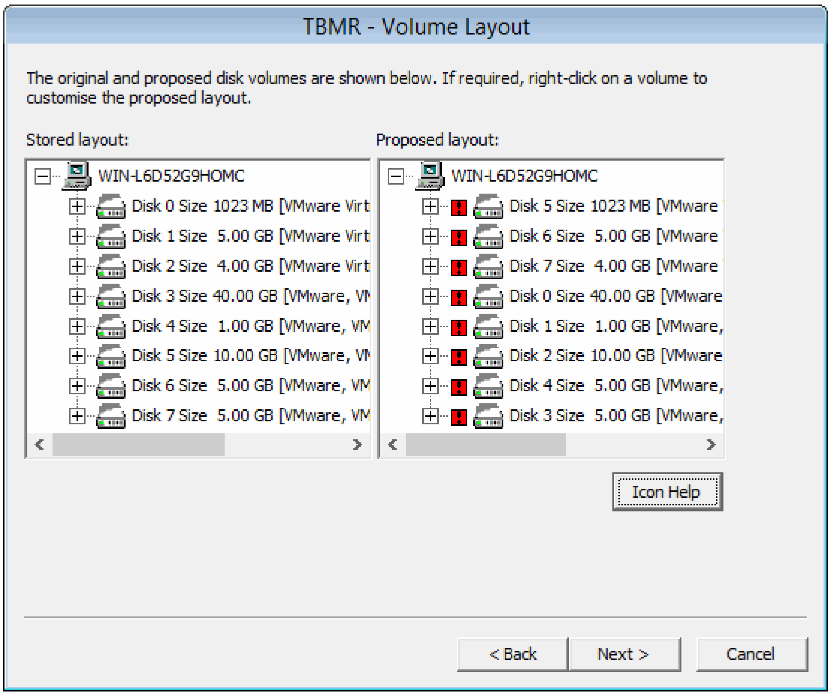
Restored Bytes (20 %)

Enter the password used during the backup. Press OK> to proceed. At this point the Node will be accessed on the specified server and the machine configuration extracted.

> *Note: TBMR assumes that TCP/IP is the communication method used between the Client and the Server. Other TSM communication methods are not supported.*

Confirm Volume Layout

The next step in the **Automatic recovery** shows a list of the disks and partitions to be recovered.



TBMR - Volume Layout

The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.

Stored layout:	Proposed layout:
WIN-L6D52G9HOMC	WIN-L6D52G9HOMC
Disk 0 Size 1023 MB [VMware Virt	Disk 5 Size 1023 MB [VMware
Disk 1 Size 5.00 GB [VMware Virt	Disk 6 Size 5.00 GB [VMware
Disk 2 Size 4.00 GB [VMware Virt	Disk 7 Size 4.00 GB [VMware
Disk 3 Size 40.00 GB [VMware, VI	Disk 0 Size 40.00 GB [VMware
Disk 4 Size 1.00 GB [VMware, VM	Disk 1 Size 1.00 GB [VMware,
Disk 5 Size 10.00 GB [VMware, VI	Disk 2 Size 10.00 GB [VMware
Disk 6 Size 5.00 GB [VMware, VM	Disk 4 Size 5.00 GB [VMware,
Disk 7 Size 5.00 GB [VMware, VM	Disk 3 Size 5.00 GB [VMware,

The left-hand panel of the dialogue shows the original disk layout and partitions. The right-hand panel shows how the recovered disks will be partitioned after the recovery.

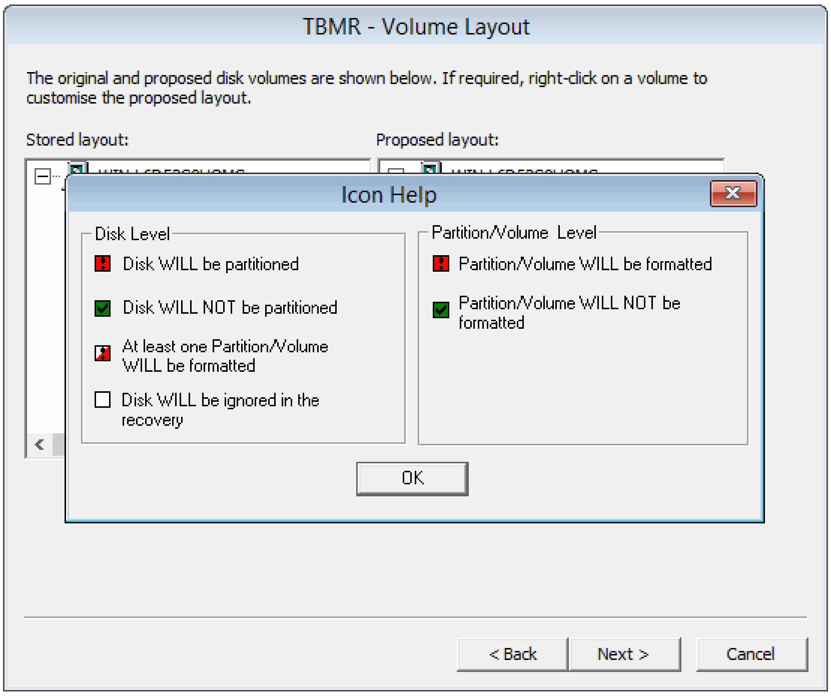
A green tick box ☑ next to a disk signifies that the disk and its underlying partitions will be left intact. Placed next to a partition/volume means that the corresponding partition/volume **WILL NOT** be partitioned.

A red exclamation mark ❗ placed next to a disk means it **WILL** be partitioned during recovery. Placed next to a partition or volume means that the corresponding partition/volume **WILL** be partitioned.

A red/white exclamation mark ❕ placed next to a disk means at least one partition/volume **WILL** be partitioned.

A white box □ indicates that the disk will be completely ignored during the recovery.

Click on the Icon Help button to display a summary of this:



TBMR - Volume Layout

The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.

Stored layout:

Proposed layout:

Icon Help

Disk Level

- ❗ Disk WILL be partitioned
- ☑ Disk WILL NOT be partitioned
- ❕ At least one Partition/Volume WILL be formatted
- □ Disk WILL be ignored in the recovery

Partition/Volume Level

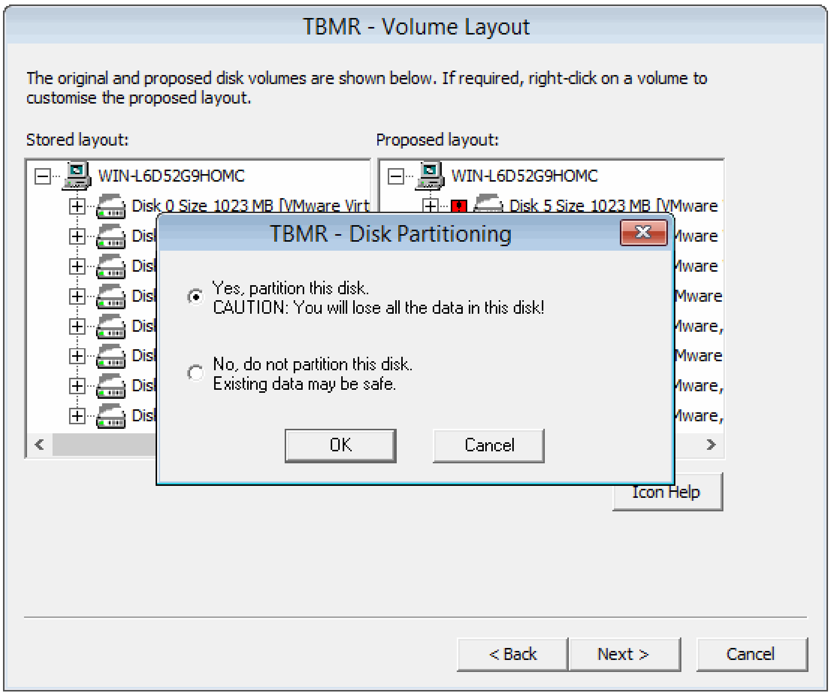
- ❗ Partition/Volume WILL be formatted
- ☑ Partition/Volume WILL NOT be formatted

When the recovery is to the original system, the contents of both panels will look similar if the number of disks is the same. Possibly the disk sizes will be different.

When performing a recovery to a dissimilar system, the disk mapping can be much more complex. Some of the criteria used to judge the disk mapping are:

- disk geometry
- disk capacity
- if currently formatted, the disk signature

You may right-click on any disk shown in the right-hand panel to select whether the disk will be partitioned or not.



TBMR - Volume Layout

The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.

Stored layout:

WIN-L6D52G9HOMC
Disk 0 Size 1023 MB [VMware Virt

Proposed layout:

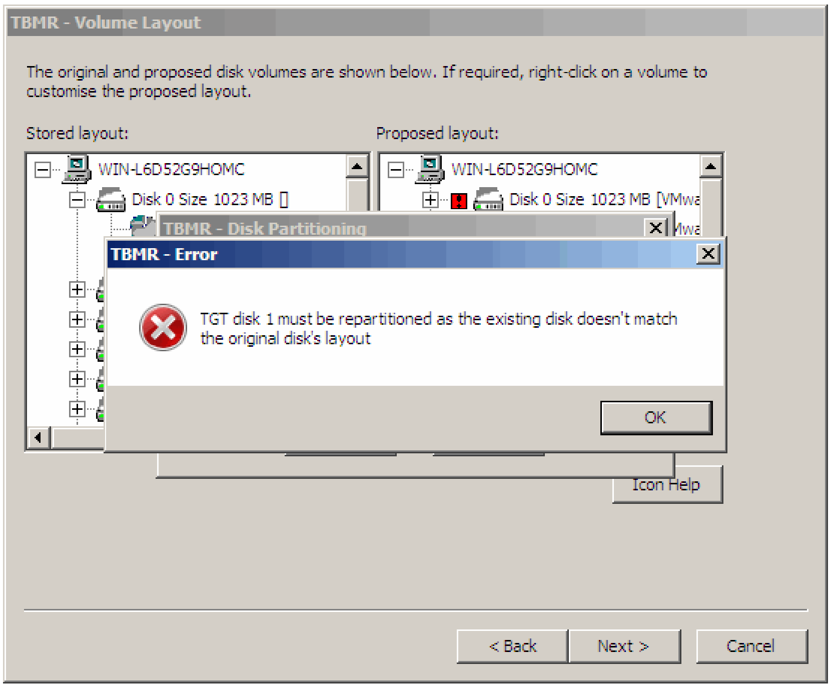
WIN-L6D52G9HOMC
Disk 5 Size 1023 MB [VMware

TBMR - Disk Partitioning

● Yes, partition this disk.
CAUTION: You will lose all the data in this disk!

○ No, do not partition this disk.
Existing data may be safe.

Any attempt to incorrectly turn off formatting will result in this error:



TBMR - Volume Layout

The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.

Stored layout:

WIN-L6D52G9HOMC
Disk 0 Size 1023 MB []

Proposed layout:

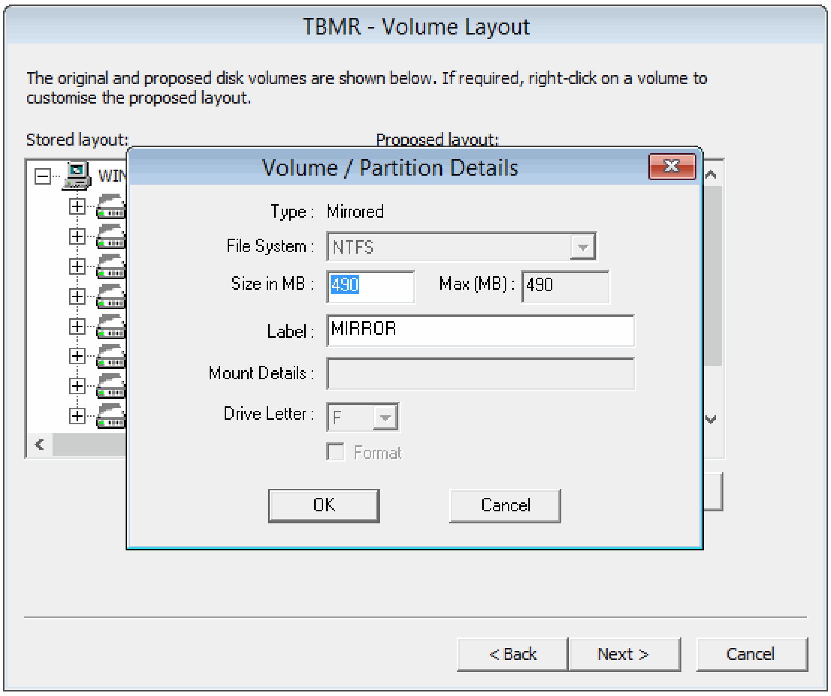
WIN-L6D52G9HOMC
Disk 0 Size 1023 MB [VMwa

TBMR - Disk Partitioning

TBMR - Error

TGT disk 1 must be repartitioned as the existing disk doesn't match the original disk's layout

You may also right-click on a partition to allow you to selectively modify the partition parameters or remove it altogether.



TBMR - Volume Layout

The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.

Stored layout:

Proposed layout:

Volume / Partition Details

Type : Mirrored

File System : NTFS

Size in MB : 490 Max (MB) : 490

Label : MIRROR

Mount Details :

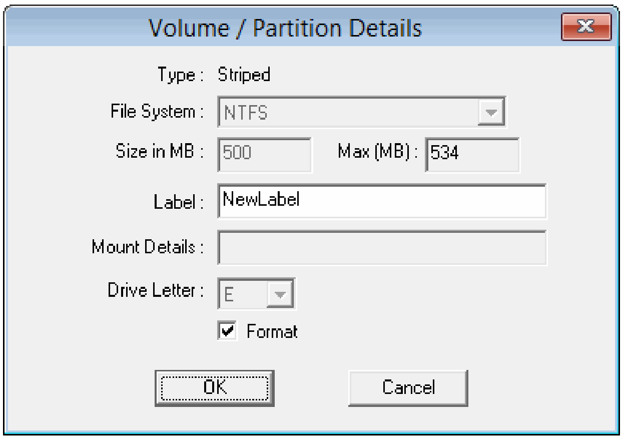
Drive Letter : F

□ Format

You may **Modify** the following partition parameters:

- size in MB (only if disk is shown with a ❗)
- label
- format (yes/no)

The screenshot below shows an example:



Volume / Partition Details

Type : Striped

File System : NTFS

Size in MB : 500 Max (MB) : 534

Label : NewLabel

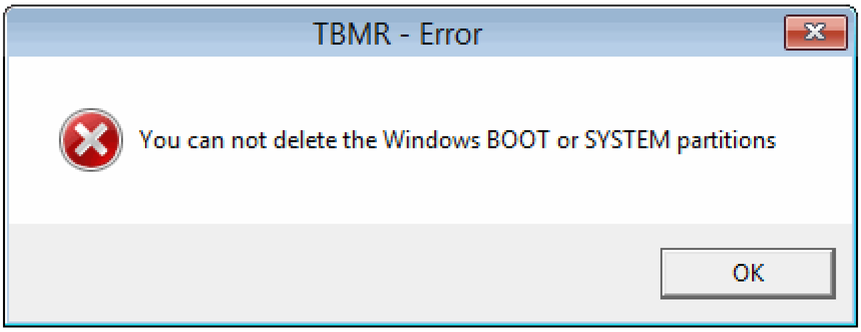
Mount Details :

Drive Letter : E

☑ Format

Select **Delete** to remove the partition completely (only if disk is shown with a ❗).

If you attempt to either not format or delete a Windows system partition, an error such as this will be displayed:



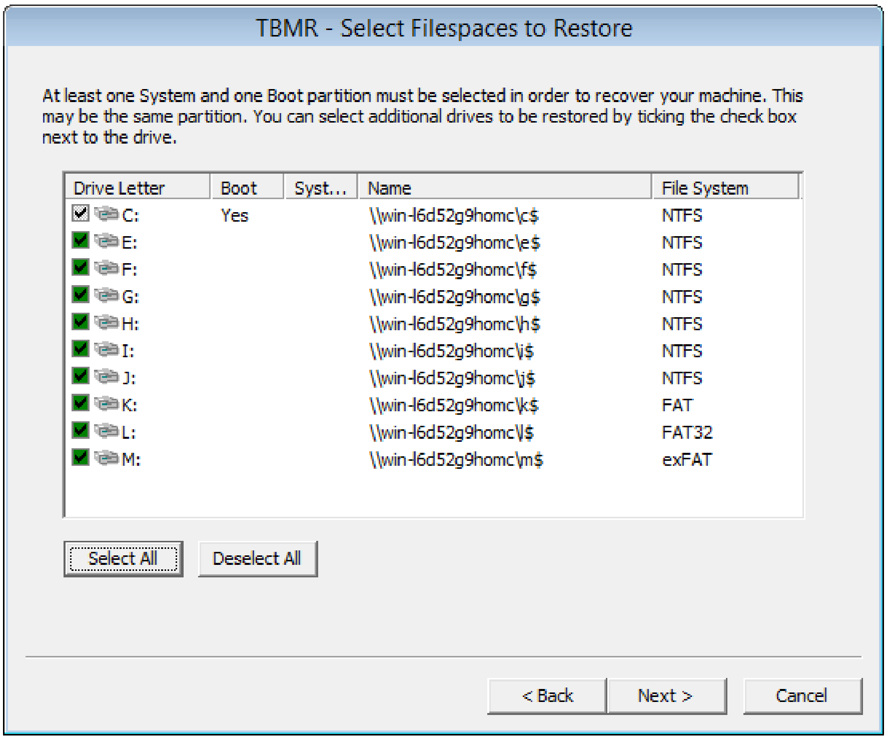
TBMR - Error

You can not delete the Windows BOOT or SYSTEM partitions

At this stage, nothing has happened to the disks. Press Next> to continue with the recovery.

Select Filespaces To Restore

The next step prompts for the filespaces to restore. Generally, each filespace represents a disk partition or volume. Put a tick against each filespace that should be restored or **Select All**:



TBMR - Select Filespaces to Restore

At least one System and one Boot partition must be selected in order to recover your machine. This may be the same partition. You can select additional drives to be restored by ticking the check box next to the drive.

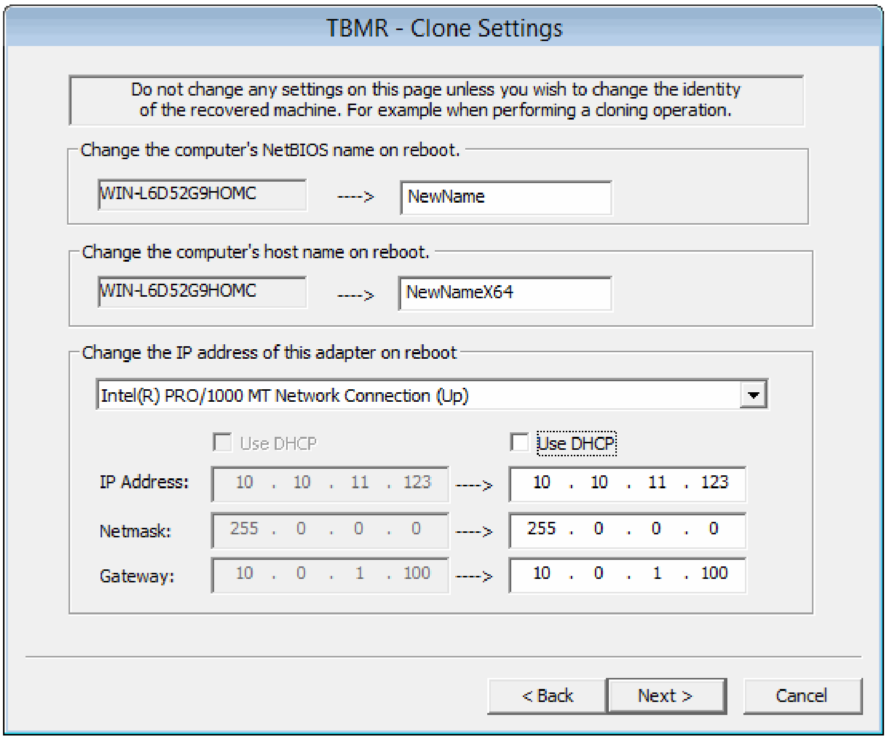
Drive Letter	Boot	Syst...	Name	File System
☑ C:	Yes		\\win-l6d52g9homc\c$	NTFS
☑ E:			\\win-l6d52g9homc\e$	NTFS
☑ F:			\\win-l6d52g9homc\f$	NTFS
☑ G:			\\win-l6d52g9homc\g$	NTFS
☑ H:			\\win-l6d52g9homc\h$	NTFS
☑ I:			\\win-l6d52g9homc\i$	NTFS
☑ J:			\\win-l6d52g9homc\j$	NTFS
☑ K:			\\win-l6d52g9homc\k$	FAT
☑ L:			\\win-l6d52g9homc\l$	FAT32
☑ M:			\\win-l6d52g9homc\m$	exFAT

Note: the system and boot partitions (even if on different partitions) will always be restored by default.

Click Next> to continue to the next step.

Clone Settings

Use this dialogue to change the recovered system's **hostname** and **IP addresses** if required. Select to use either DHCP or enter a valid static IP address.



TBMR - Clone Settings

Do not change any settings on this page unless you wish to change the identity of the recovered machine. For example when performing a cloning operation.

Change the computer's NetBIOS name on reboot.

WIN-L6D52G9HOMC ----> NewName

Change the computer's host name on reboot.

WIN-L6D52G9HOMC ----> NewNameX64

Change the IP address of this adapter on reboot

Intel(R) PRO/1000 MT Network Connection (Up)

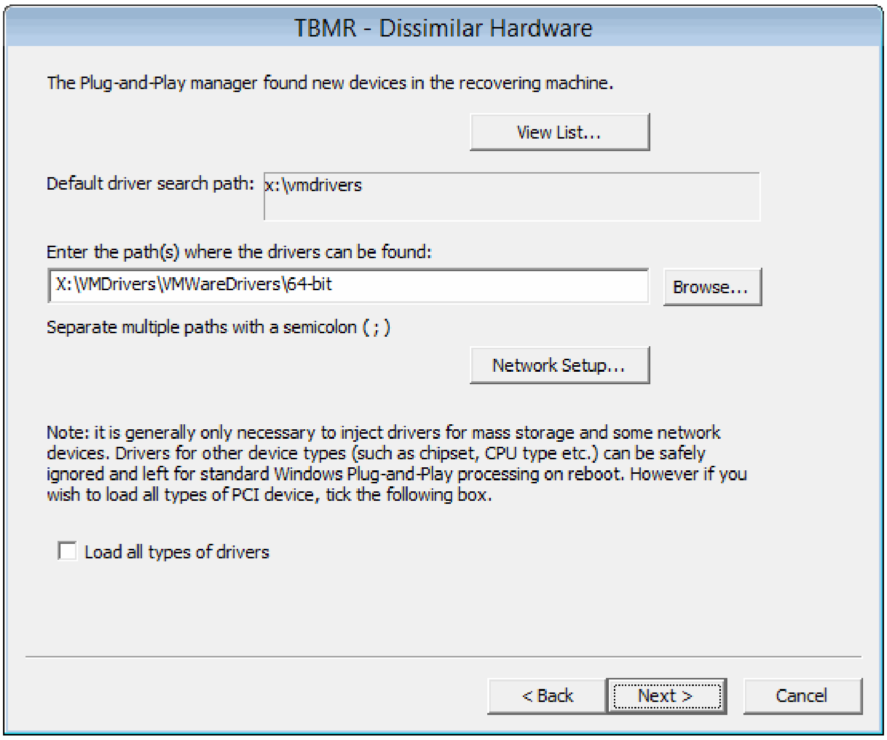
	□ Use DHCP		□ Use DHCP
IP Address:	10 . 10 . 11 . 123	---->	10 . 10 . 11 . 123
Netmask:	255 . 0 . 0 . 0	---->	255 . 0 . 0 . 0
Gateway:	10 . 0 . 1 . 100	---->	10 . 0 . 1 . 100

You may change the IP address for each NIC interface independently. NICs that are currently connected to a network are tagged with **(Operational)**.

If you wish to retain the current hostname and IP addresses leave the fields at their default values and select Next> to continue to the next section.

Dissimilar Hardware

Next, the DR process performs a check to determine if there are new devices in the recovering machine that were not present in the original system. If this is true, then this is a 'dissimilar' DR and the following dialogue will be shown to allow the user to specify the location of the new driver files for these devices.



TBMR - Dissimilar Hardware

The Plug-and-Play manager found new devices in the recovering machine.

Default driver search path: x:\vmdrivers

Enter the path(s) where the drivers can be found:

X:\VMDrivers\VMWareDrivers\64-bit

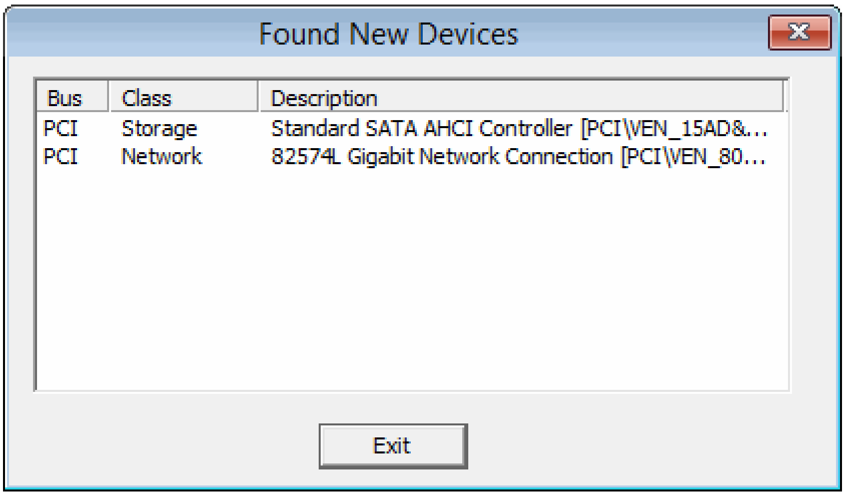
Separate multiple paths with a semicolon (;)

Note: it is generally only necessary to inject drivers for mass storage and some network devices. Drivers for other device types (such as chipset, CPU type etc.) can be safely ignored and left for standard Windows Plug-and-Play processing on reboot. However if you wish to load all types of PCI device, tick the following box.

□ Load all types of drivers

Specify the default path or paths to be searched for the missing driver files. The paths may be on a local device (eg. a USB disk) or a network share. Use the Network Setup... button if you need to map a network share. In either case, the paths must be accessible to the WinPE 2 or WinPE 5 environment.

Select View List... to see a list of the new devices.



Found New Devices

Bus	Class	Description
PCI	Storage	Standard SATA AHCI Controller [PCI\VEN_15AD&...
PCI	Network	82574L Gigabit Network Connection [PCI\VEN_80...

Ensure the specified path or paths contain the correct drivers for the dissimilar machine (ie. correct 32 or 64-bit version as appropriate for the OS). At the end of the DR sequence, the specified paths will be searched for the missing drivers and automatically injected into the recovered system.

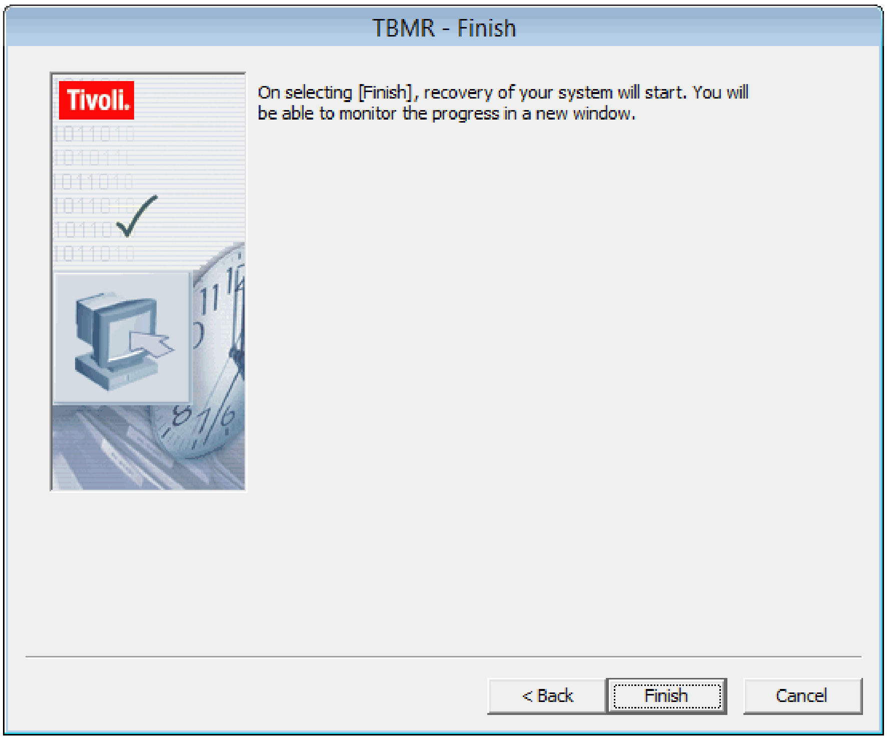
By default, it is only necessary to inject drivers for mass storage devices and, in some some cases, network devices. The 'Load all types of drivers' tick box will force the DR to look for all drivers in addition to mass storage and network devices. For example, this could include graphics cards, USB and chipset devices, but these are rarely required and not recommended.

Note that if drivers are not found for the new boot disk then, although WinPE 2 or WinPE 5 will be able to recover the files to the disk, there is a good chance that it will not boot correctly.

Press Next> to proceed with the recovery.

Proceed With The Recovery

Before continuing with the actual file recovery, a final warning screen is displayed.



TBMR - Finish

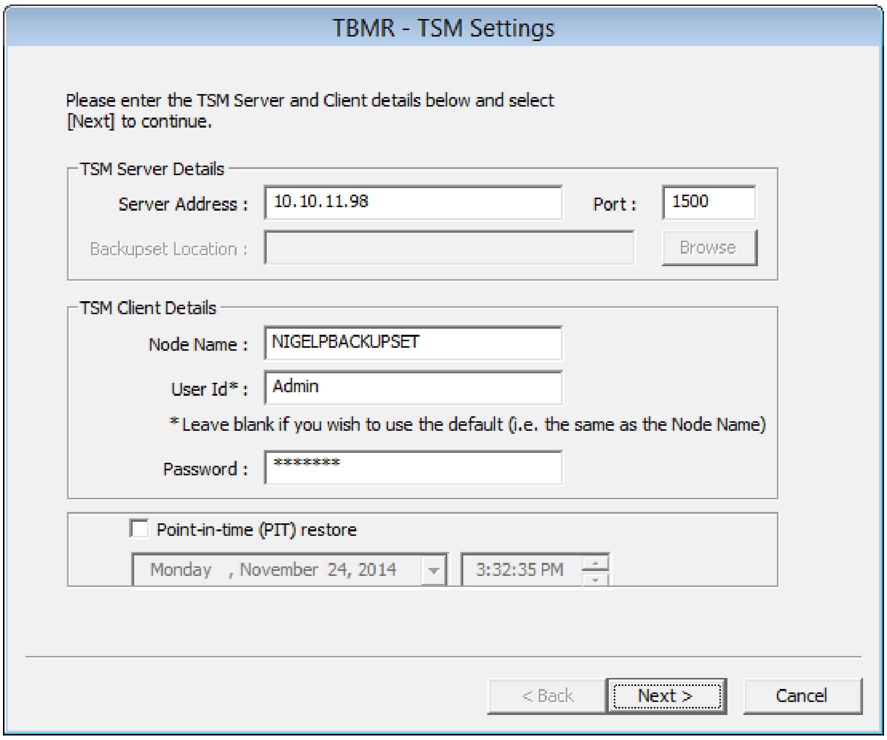
On selecting [Finish], recovery of your system will start. You will be able to monitor the progress in a new window.

If you are happy with the specified recovery configuration, press Finish. This will commence the **actual** file recovery.

> *Note: this procedure will COMPLETELY DESTROY any existing data on those disks selected for format (ie. shown with a !). Disks or partitions tagged as no format (ie. shown with a ✓) will remain intact.*

6.2.2.2 Restore from Backupset

If you selected **Restore from a Backupset**, select Next>. This will then display the **Enter TSM** server details:



TBMR - TSM Settings

Please enter the TSM Server and Client details below and select [Next] to continue.

TSM Server Details

Server Address : 10.10.11.98 Port : 1500

Backupset Location :

TSM Client Details

Node Name : NIGELPBACKUPSET

User Id* : Admin

*Leave blank if you wish to use the default (i.e. the same as the Node Name)

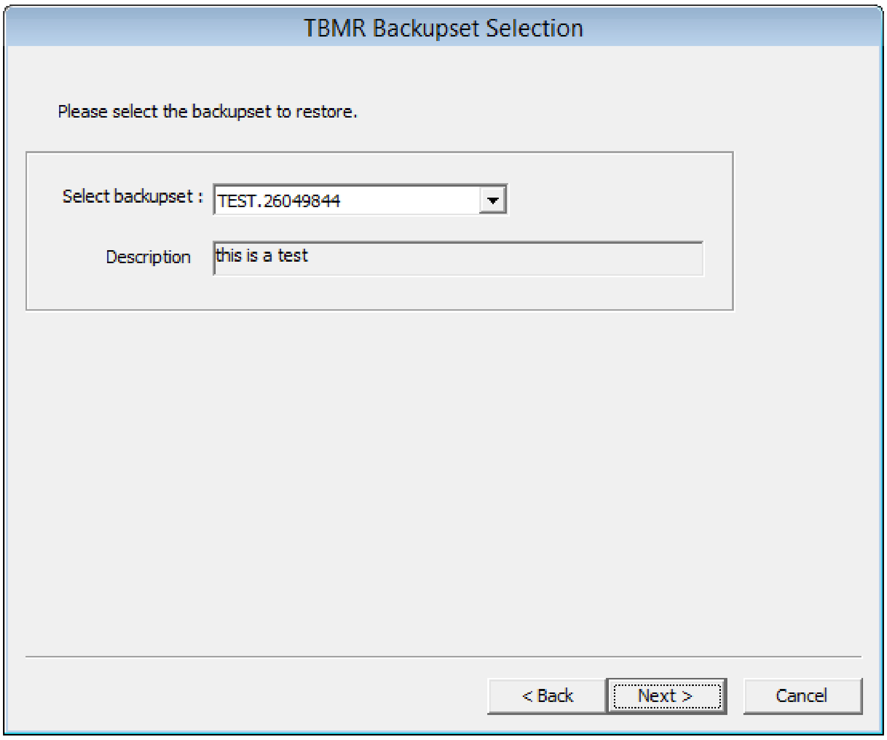
Password : ********

□ Point-in-time (PIT) restore

Monday , November 24, 2014 3:32:35 PM

> *Note: Example above shows the server Admin credentials being used to recover the backupset instead of the standard Node credentials.*

The system configuration will then be restored from the appropriate backupset, which is selected from the next dialogue:



TBMR Backupset Selection

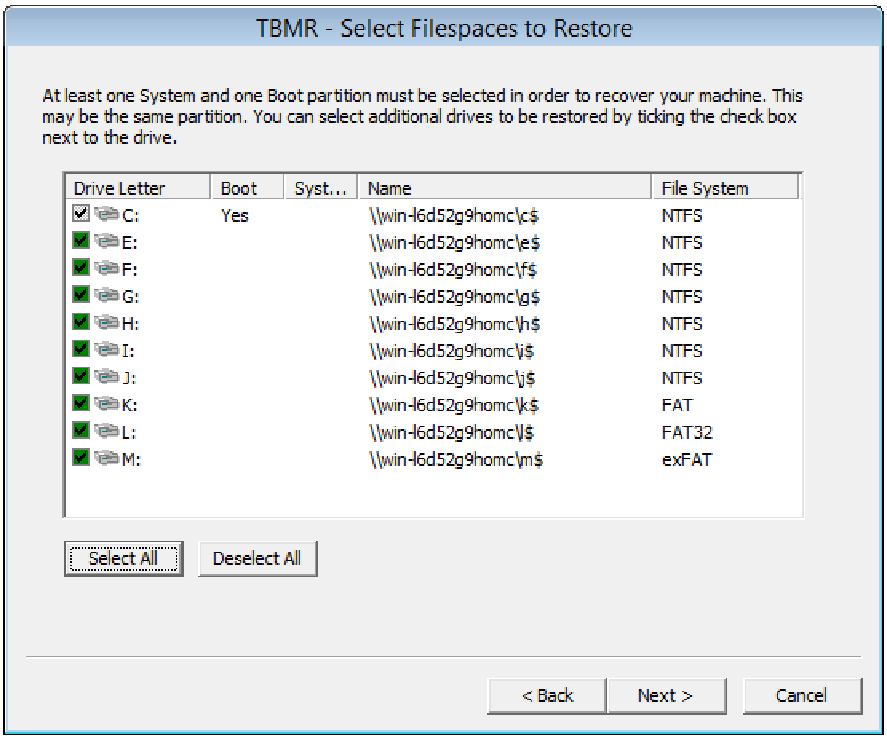
Please select the backupset to restore.

Select backupset : TEST.26049844

Description this is a test

If only 1 backupset is detected in the TSM node then the dialogue is not displayed.

The configuration will then be retrieved from the selected backupset. The DR process continues from the **Select Filespaces to Restore** dialogue:

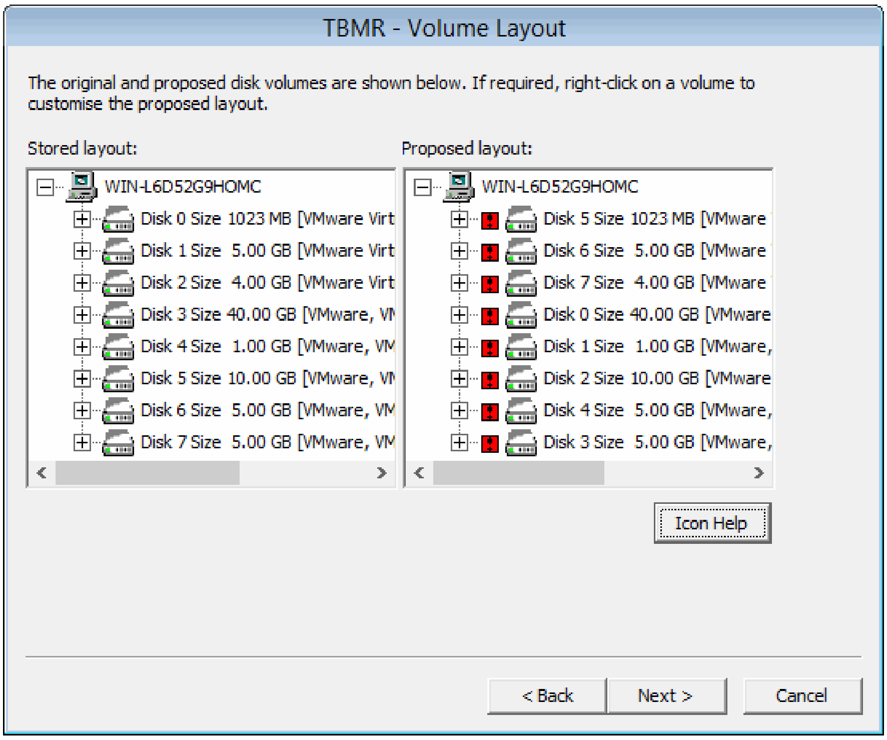


TBMR - Select Filespaces to Restore

At least one System and one Boot partition must be selected in order to recover your machine. This may be the same partition. You can select additional drives to be restored by ticking the check box next to the drive.

Drive Letter	Boot	Syst...	Name	File System
☑ C:	Yes		\\win-l6d52g9homc\c$	NTFS
☑ E:			\\win-l6d52g9homc\e$	NTFS
☑ F:			\\win-l6d52g9homc\f$	NTFS
☑ G:			\\win-l6d52g9homc\g$	NTFS
☑ H:			\\win-l6d52g9homc\h$	NTFS
☑ I:			\\win-l6d52g9homc\i$	NTFS
☑ J:			\\win-l6d52g9homc\j$	NTFS
☑ K:			\\win-l6d52g9homc\k$	FAT
☑ L:			\\win-l6d52g9homc\l$	FAT32
☑ M:			\\win-l6d52g9homc\m$	exFAT

Select the filespaces to restore and then the partition layout for the recovering system:



TBMR - Volume Layout

The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.

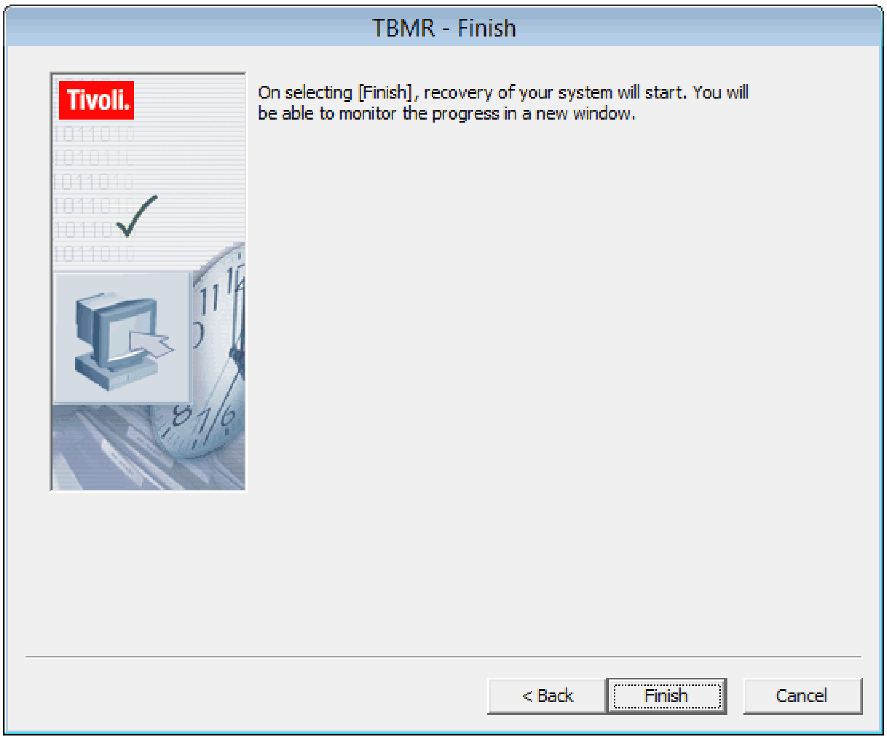
Stored layout:

```
WIN-L6D52G9HOMC
  Disk 0 Size 1023 MB [VMware Virt
  Disk 1 Size  5.00 GB [VMware Virt
  Disk 2 Size  4.00 GB [VMware Virt
  Disk 3 Size 40.00 GB [VMware, VI
  Disk 4 Size  1.00 GB [VMware, VM
  Disk 5 Size 10.00 GB [VMware, VI
  Disk 6 Size  5.00 GB [VMware, VM
  Disk 7 Size  5.00 GB [VMware, VM
```

Proposed layout:

```
WIN-L6D52G9HOMC
  Disk 5 Size 1023 MB [VMware
  Disk 6 Size  5.00 GB [VMware
  Disk 7 Size  4.00 GB [VMware
  Disk 0 Size 40.00 GB [VMware
  Disk 1 Size  1.00 GB [VMware,
  Disk 2 Size 10.00 GB [VMware
  Disk 4 Size  5.00 GB [VMware,
  Disk 3 Size  5.00 GB [VMware,
```

Finally, select Finish and the recovery will then proceed.

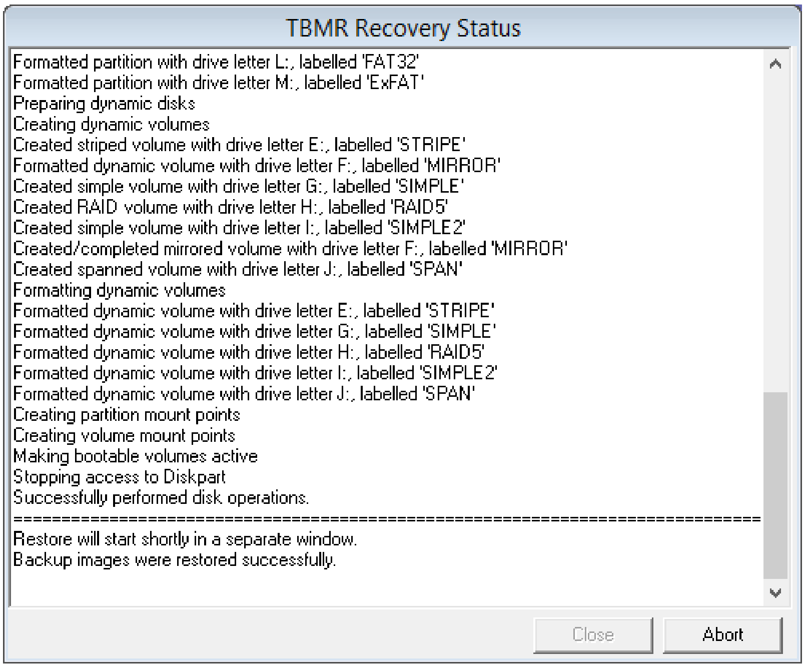


On selecting [Finish], recovery of your system will start. You will be able to monitor the progress in a new window.

The subsequent recovery continues as described in section Disk Recovery Sequence.

6.2.2.3 Disk Recovery Sequence

The **Recovery Sequence** begins by preparing the disks selected for the recovery.



```
Formatted partition with drive letter L:, labelled 'FAT32'
Formatted partition with drive letter M:, labelled 'ExFAT'
Preparing dynamic disks
Creating dynamic volumes
Created striped volume with drive letter E:, labelled 'STRIPE'
Formatted dynamic volume with drive letter F:, labelled 'MIRROR'
Created simple volume with drive letter G:, labelled 'SIMPLE'
Created RAID volume with drive letter H:, labelled 'RAID5'
Created simple volume with drive letter I:, labelled 'SIMPLE2'
Created/completed mirrored volume with drive letter F:, labelled 'MIRROR'
Created spanned volume with drive letter J:, labelled 'SPAN'
Formatting dynamic volumes
Formatted dynamic volume with drive letter E:, labelled 'STRIPE'
Formatted dynamic volume with drive letter G:, labelled 'SIMPLE'
Formatted dynamic volume with drive letter H:, labelled 'RAID5'
Formatted dynamic volume with drive letter I:, labelled 'SIMPLE2'
Formatted dynamic volume with drive letter J:, labelled 'SPAN'
Creating partition mount points
Creating volume mount points
Making bootable volumes active
Stopping access to Diskpart
Successfully performed disk operations.
==============================================================================
Restore will start shortly in a separate window.
Backup images were restored successfully.
```

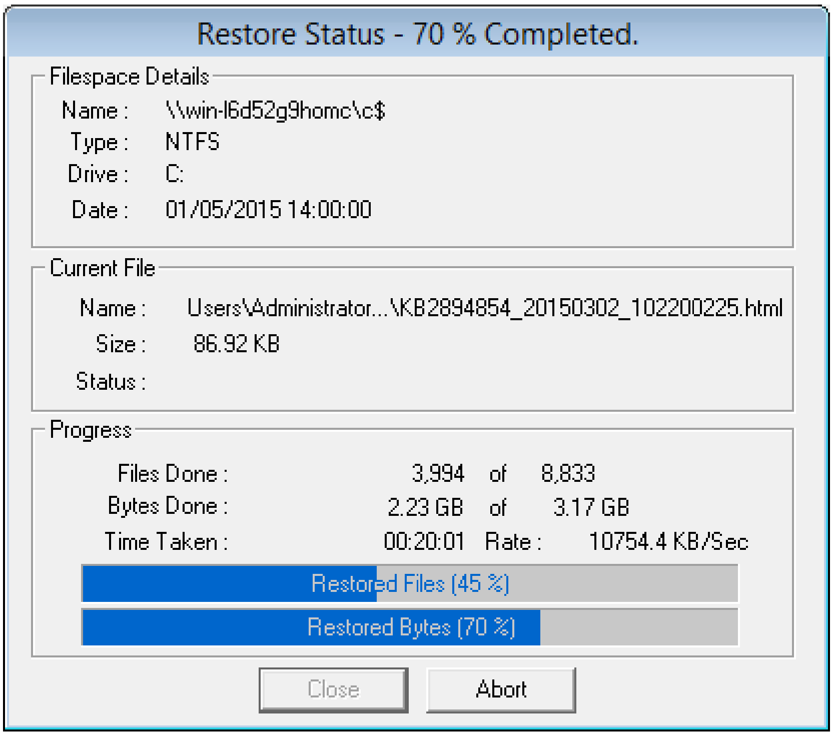
This involves:

- disk mapping original layout to new
- cleaning (removing any existing disk partitions)
- removing any existing dynamic volume databases
- re-creating the partitions

- converting to dynamic volumes if required
- formatting to the required partition type
- create partition/volume mount points
- make bootable volumes active

The next step is to recover the filespaces to the selected target disks/partitions. A new window appears containing the restore status of recovered files, with progress bars indicating how much of the backup has been restored. This display also shows the recovery statistics in terms of time, size and throughput.

The recovery is divided into different phases: first the recovery of each ***volume filespace*** selected,



Restore Status - 70 % Completed.

Filespace Details

Name : \\win-l6d52g9homc\c$
Type : NTFS
Drive : C:
Date : 01/05/2015 14:00:00

Current File

Name : Users\Administrator...\KB2894854_20150302_102200225.html
Size : 86.92 KB
Status :

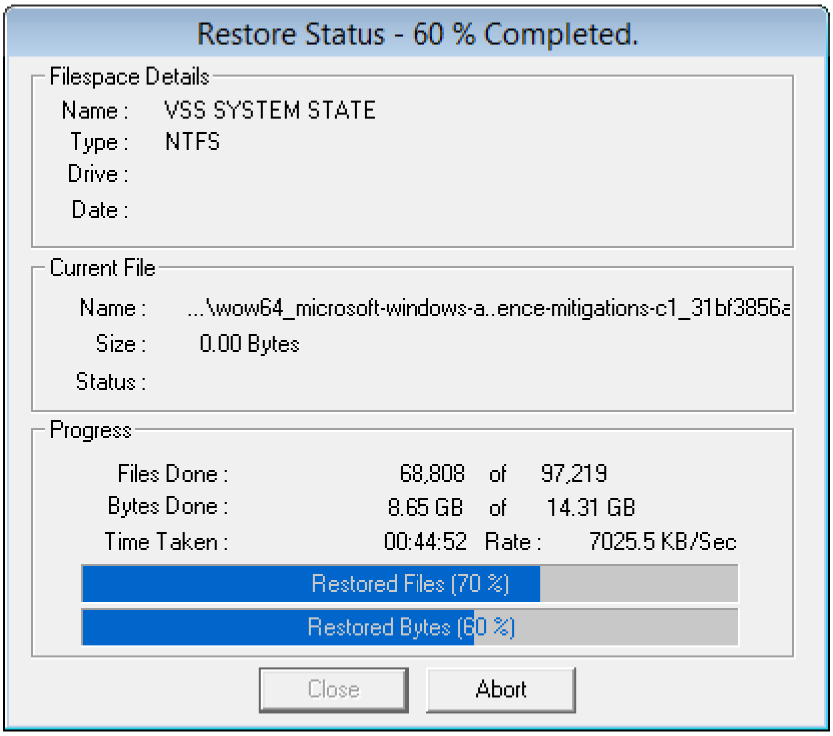
Progress

Files Done : 3,994 of 8,833
Bytes Done : 2.23 GB of 3.17 GB
Time Taken : 00:20:01 Rate : 10754.4 KB/Sec

Restored Files (45 %)

Restored Bytes (70 %)

followed by ***SystemState***:



Name : VSS SYSTEM STATE
Type : NTFS
Drive :
Date :

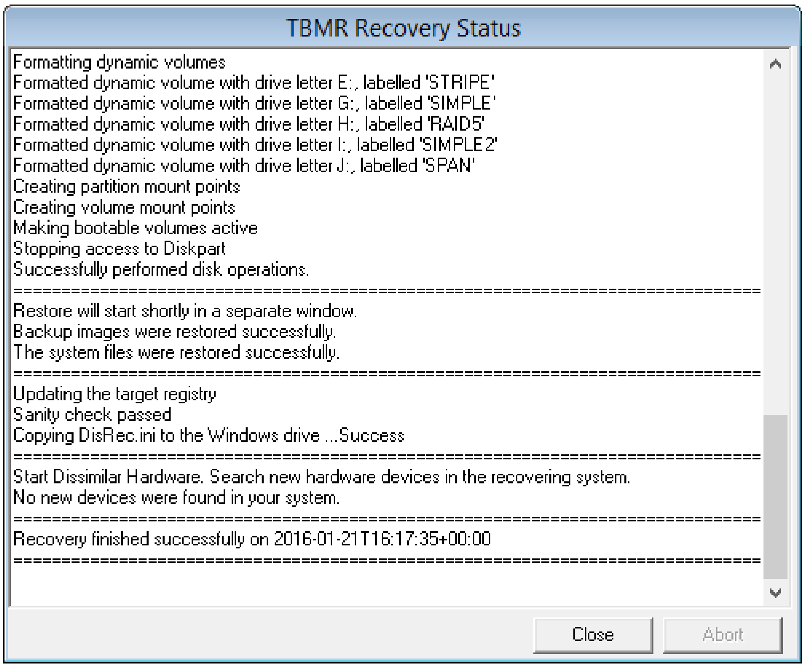
Name : ...\wow64_microsoft-windows-a..ence-mitigations-c1_31bf3856a
Size : 0.00 Bytes
Status :

Files Done :	68,808	of	97,219
Bytes Done :	8.65 GB	of	14.31 GB
Time Taken :	00:44:52	Rate :	7025.5 KB/Sec

This process may take some minutes if the backups are large. You may select the Abort button to terminate the file recovery process, but this may leave a disk or partition in an unpredictable state, which may render it unusable.

If any errors occur during the recovery, an error message will be shown in the window. Refer to the logs post recovery to establish the cause of any error. The final steps of the recovery are to:

- run a sanity check to determine if all the expected boot files are present on the boot volume
- run a dissimilar hardware check to determine if new drivers are required for new boot devices



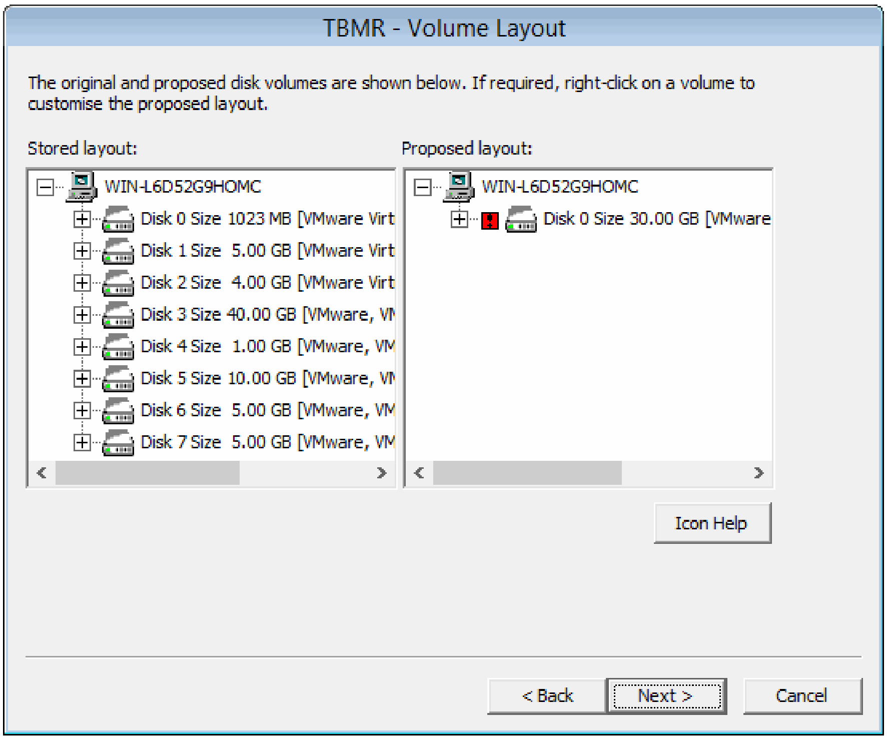
```
Formatting dynamic volumes
Formatted dynamic volume with drive letter E:, labelled 'STRIPE'
Formatted dynamic volume with drive letter G:, labelled 'SIMPLE'
Formatted dynamic volume with drive letter H:, labelled 'RAID5'
Formatted dynamic volume with drive letter I:, labelled 'SIMPLE2'
Formatted dynamic volume with drive letter J:, labelled 'SPAN'
Creating partition mount points
Creating volume mount points
Making bootable volumes active
Stopping access to Diskpart
Successfully performed disk operations.
================================================================================
Restore will start shortly in a separate window.
Backup images were restored successfully.
The system files were restored successfully.
================================================================================
Updating the target registry
Sanity check passed
Copying DisRec.ini to the Windows drive ...Success
================================================================================
Start Dissimilar Hardware. Search new hardware devices in the recovering system.
No new devices were found in your system.
================================================================================
Recovery finished successfully on 2016-01-21T16:17:35+00:00
================================================================================
```

Finally, press Close to return to the **Recovery Environment** main menu. At this point, you may want to view the recovery logs and perhaps copy the logs to a local device or remote share before selecting to reboot.

> *Note:recovery logs are also saved to the recovered system to the TBMR installation sub-folder 'Temp' (e.g. "C:\Program Files\Cristie\TBMR\Temp")*

6.2.2.4 Disk Scaling

In situations where the target system has fewer or smaller disks than the original system, *Disk Scaling* will come into effect.



TBMR - Volume Layout

The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.

Stored layout:

- WIN-L6D52G9HOMC
  - Disk 0 Size 1023 MB [VMware Virt
  - Disk 1 Size 5.00 GB [VMware Virt
  - Disk 2 Size 4.00 GB [VMware Virt
  - Disk 3 Size 40.00 GB [VMware, VI
  - Disk 4 Size 1.00 GB [VMware, VM
  - Disk 5 Size 10.00 GB [VMware, VI
  - Disk 6 Size 5.00 GB [VMware, VM
  - Disk 7 Size 5.00 GB [VMware, VM

Proposed layout:

- WIN-L6D52G9HOMC
  - Disk 0 Size 30.00 GB [VMware

The above example shows a recovery from an original system with 8 physical disks, to a target system with only one disk. The target disk is also much smaller than the original system disk.

In this scenario, TBMR will select as many disks to recover as possible (in this case only one disk - the boot disk). In addition, it will scale the partitions down in proportion to their original size and occupancy. This can be complicated by having, say, mirrored dynamic volumes when the mirror will need to be broken - if only one disk exists on the target (or it has been tagged as not to modify).

> *Note 1: the Volume Layout dialogue will only show disks in the left hand panel that can be removed.*

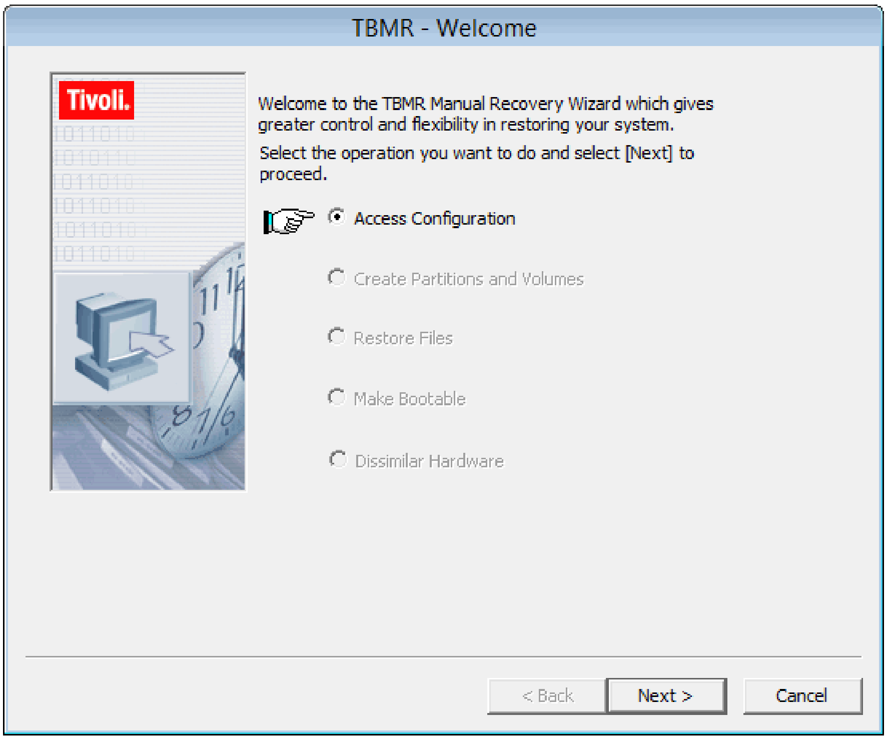
> *Note 2: during a recovery to a system with larger disks, the partition sizes will remain the same as the original by default. However, in this case, it is possible to increase partition size manually during the recovery by right-clicking on the partition icon and selecting* Modify.

6.2.3 Start the manual Recovery wizard

Select the **Start the manual Recovery wizard** to commence a manual DR sequence. This option will stop after each step in the DR sequence allowing the DR to be aborted or the step to be repeated with different parameters.

6.2.3.1 Locate Configuration

The first step of the manual DR sequence is to provide the location of the DR configuration.



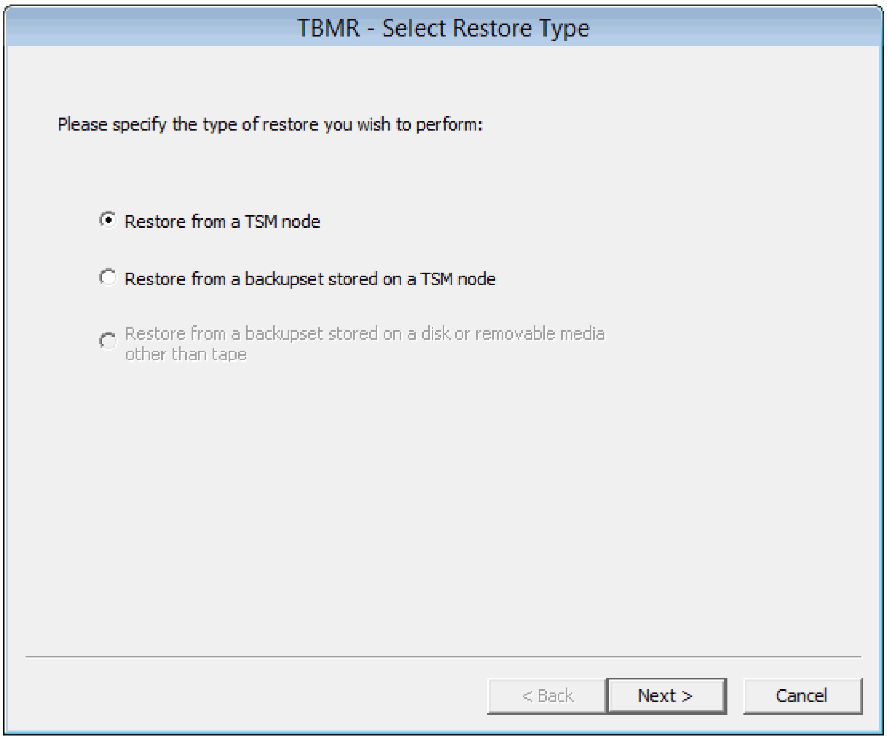
TBMR - Welcome

Welcome to the TBMR Manual Recovery Wizard which gives greater control and flexibility in restoring your system.

Select the operation you want to do and select [Next] to proceed.

- ● Access Configuration
- ○ Create Partitions and Volumes
- ○ Restore Files
- ○ Make Bootable
- ○ Dissimilar Hardware

Press Next> to proceed to the first step of the sequence. Press Cancel to abort the recovery sequence at this point. You will then be presented with a dialogue prompting you to select the type of the TSM restore.


TBMR - Select Restore Type

Please specify the type of restore you wish to perform:

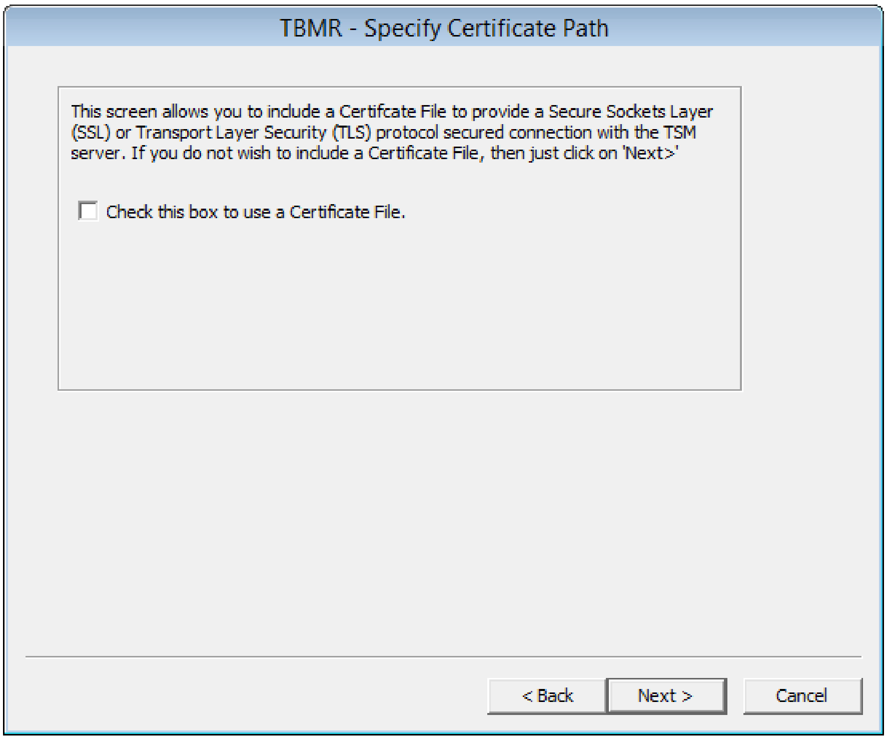
● Restore from a TSM node

○ Restore from a backupset stored on a TSM node

○ Restore from a backupset stored on a disk or removable media other than tape

Restoring from a TSM node or an online backupset is supported.

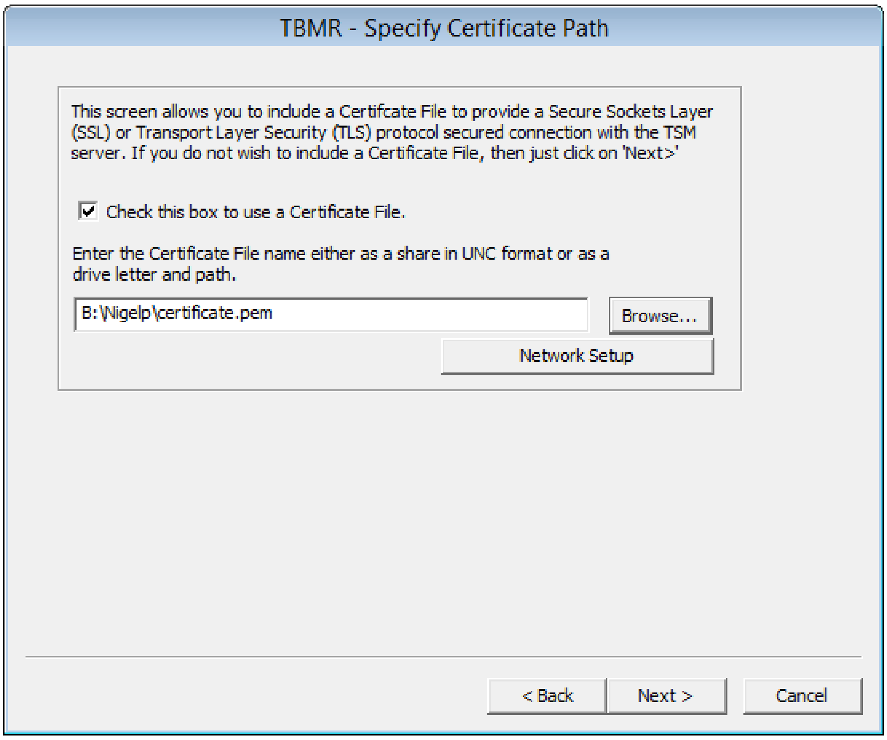
Press Next> to continue to:


TBMR - Specify Certificate Path

This screen allows you to include a Certifcate File to provide a Secure Sockets Layer (SSL) or Transport Layer Security (TLS) protocol secured connection with the TSM server. If you do not wish to include a Certificate File, then just click on 'Next>'

□ Check this box to use a Certificate File.

This dialogue allows an SSL or TLS security certificate to be provided to the TSM server. To add a certificate click the check box to open up a browse window.



TBMR - Specify Certificate Path

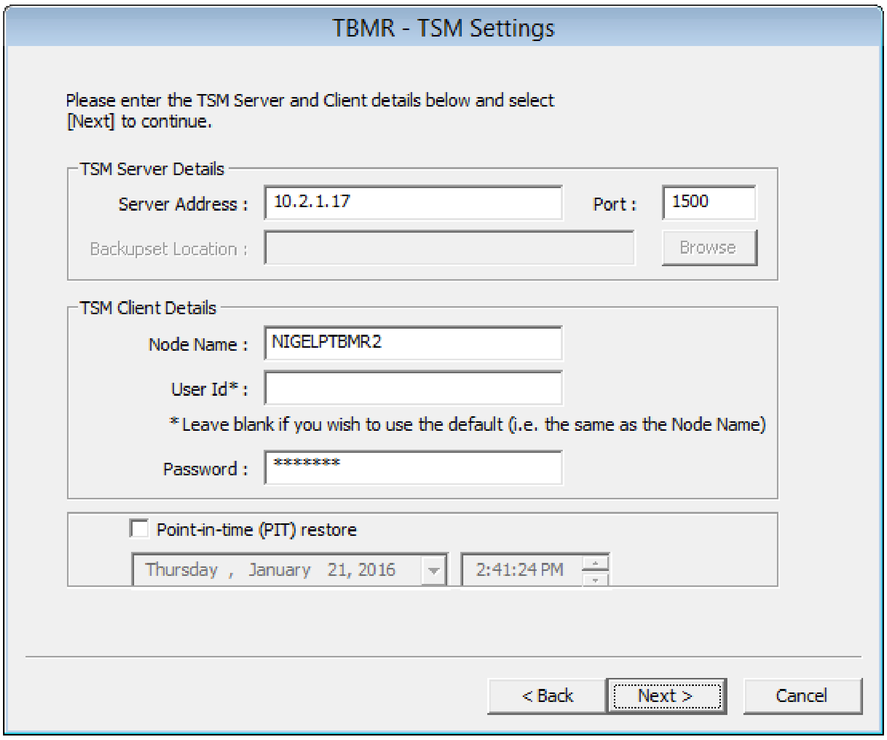
This screen allows you to include a Certifcate File to provide a Secure Sockets Layer (SSL) or Transport Layer Security (TLS) protocol secured connection with the TSM server. If you do not wish to include a Certificate File, then just click on 'Next>'

☑ Check this box to use a Certificate File.

Enter the Certificate File name either as a share in UNC format or as a drive letter and path.

B:\Nigelp\certificate.pem

Add a path to the certificate file or use the Browse button to navigate to the location of the certificate. You will be prompted to add any network access credentials or use the Network Setup button to add them in advance. Click Next > to continue to the **TSM Server Settings** dialogue. The TSM server IP address may be expressed in either IPv4 or IPv6 format.



TBMR - TSM Settings

Please enter the TSM Server and Client details below and select [Next] to continue.

TSM Server Details

Server Address : 10.2.1.17

Port : 1500

Backupset Location :

TSM Client Details

Node Name : NIGELPTBMR2

User Id* :

*Leave blank if you wish to use the default (i.e. the same as the Node Name)

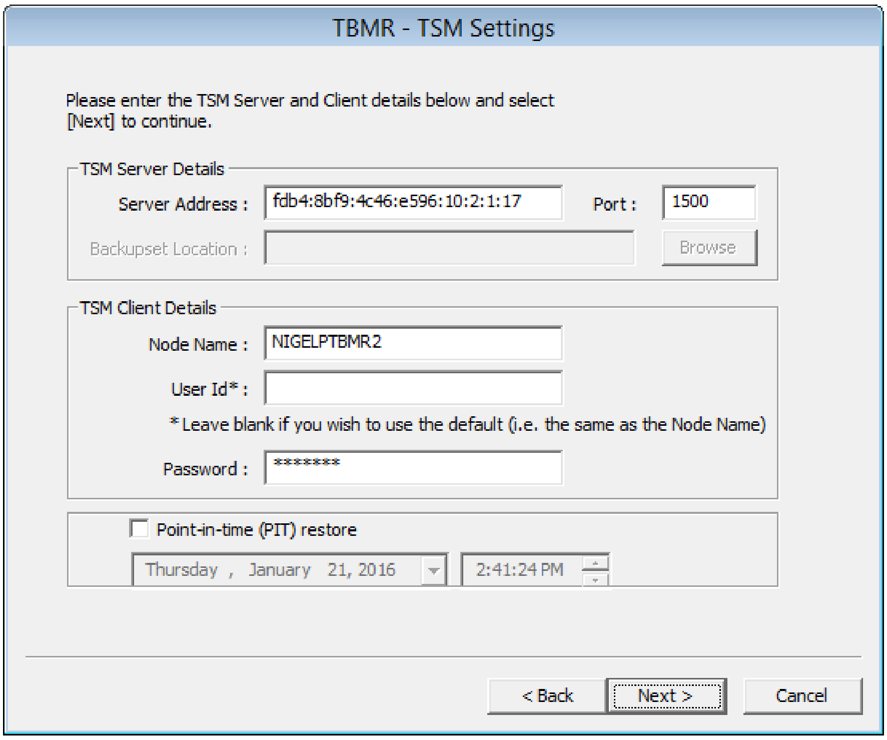
Password : ********

☐ Point-in-time (PIT) restore

Thursday , January 21, 2016 2:41:24 PM

Identify TSM server using an IPv4 IP address

Or,



TBMR - TSM Settings

Please enter the TSM Server and Client details below and select [Next] to continue.

TSM Server Details

Server Address : fdb4:8bf9:4c46:e596:10:2:1:17

Port : 1500

Backupset Location :

TSM Client Details

Node Name : NIGELPTBMR2

User Id* :

* Leave blank if you wish to use the default (i.e. the same as the Node Name)

Password : ********

□ Point-in-time (PIT) restore

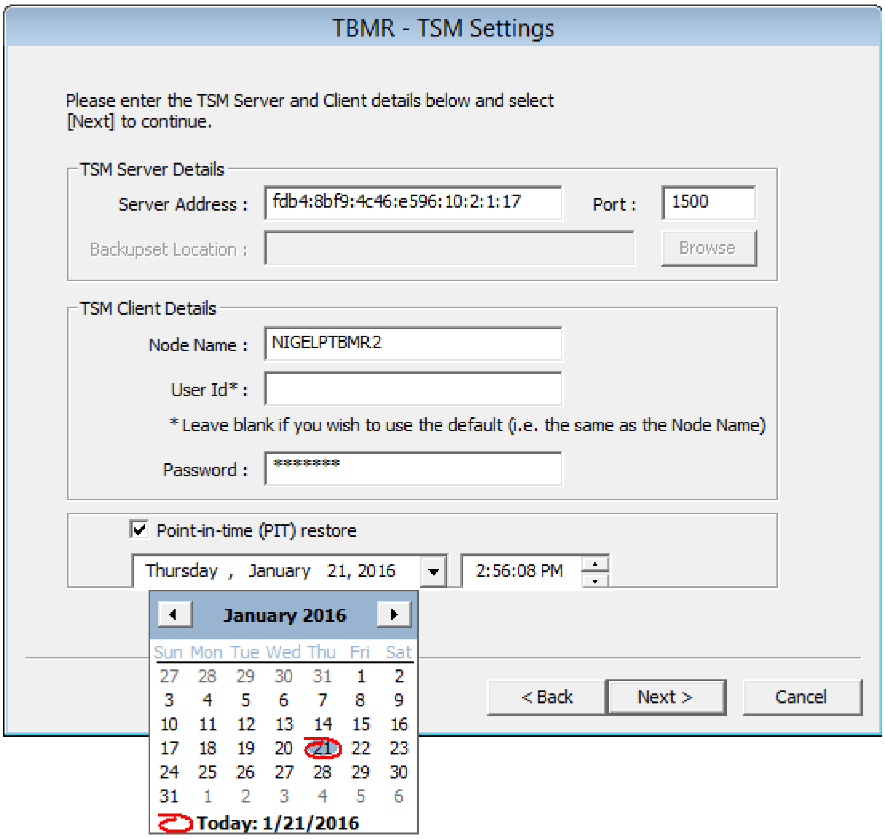
Thursday , January 21, 2016

2:41:24 PM

Identify TSM server using an IPv6 IP address

Specify the location of the **TSM Server** and **Node** used to back up the Client.

Selecting the **Point-in-time** (PIT) restore mode will allow the system to be recovered from the most recent backup before the specified date and time. This means the version of any file restored will be earlier than the specified date and time. Selecting the down-arrow in the calendar control will bring up a calendar:



TBMR - TSM Settings

Please enter the TSM Server and Client details below and select [Next] to continue.

TSM Server Details

Server Address : fdb4:8bf9:4c46:e596:10:2:1:17

Port : 1500

Backupset Location :

TSM Client Details

Node Name : NIGELPTBMR2

User Id* :

* Leave blank if you wish to use the default (i.e. the same as the Node Name)

Password : ********

☑ Point-in-time (PIT) restore

Thursday , January 21, 2016

2:56:08 PM

January 2016

Sun	Mon	Tue	Wed	Thu	Fri	Sat
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

Today: 1/21/2016

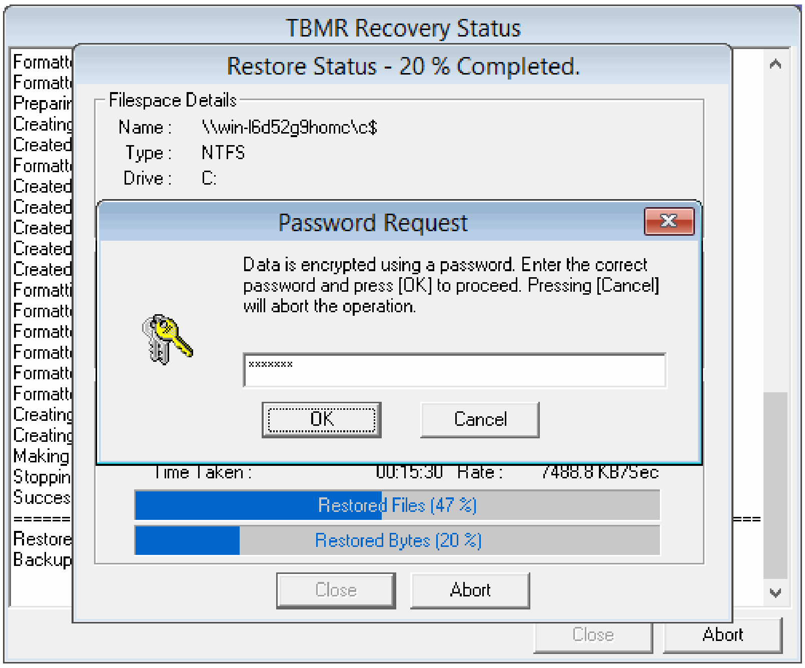
This can be used to scroll the months/years backwards and forwards as necessary.

> *Note: a future date will result in the latest backup being recovered.*

The next dialogue displayed depends upon whether you selected **Restore from Node** or **Restore from Backupset**.

Restore From Node

Select Next> to continue. If the backup including the TBMR configuration folder **TBMRCFG** is encrypted, a prompt for the encryption password will be displayed if not held locally:



TBMR Recovery Status

Restore Status - 20 % Completed.

Filespace Details

Name : \\win-l6d52g9homc\c$

Type : NTFS

Drive : C:

Password Request

Data is encrypted using a password. Enter the correct password and press [OK] to proceed. Pressing [Cancel] will abort the operation.

****

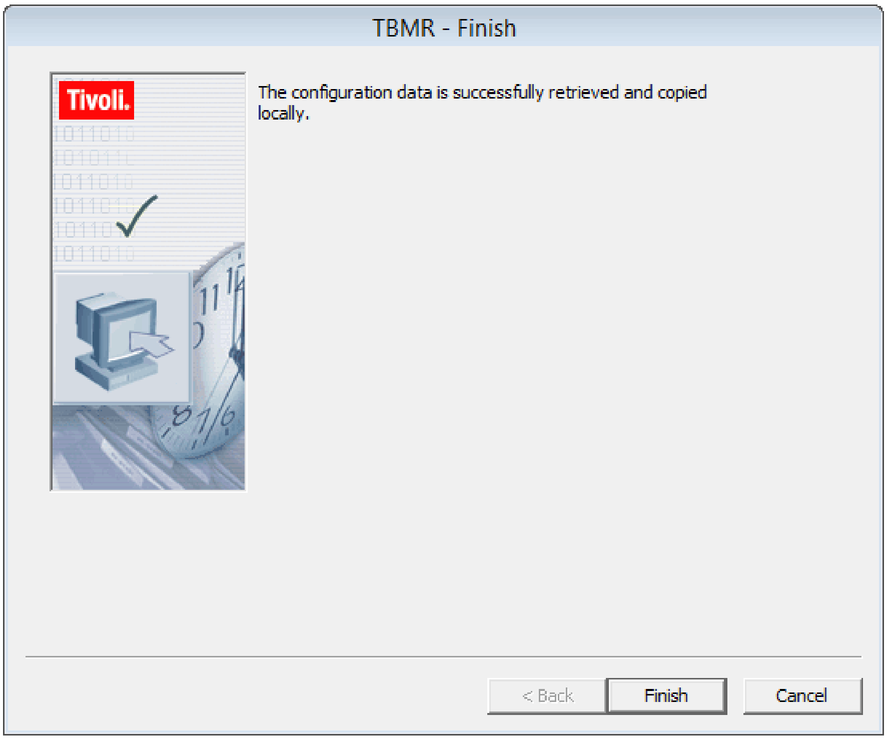
Time Taken : 00:15:30 Rate : 7488.8 KB/Sec

Restored Files (47 %)

Restored Bytes (20 %)

Enter the password used during the backup and press OK.

Successful extraction of the configuration from the server is confirmed with the following dialogue:

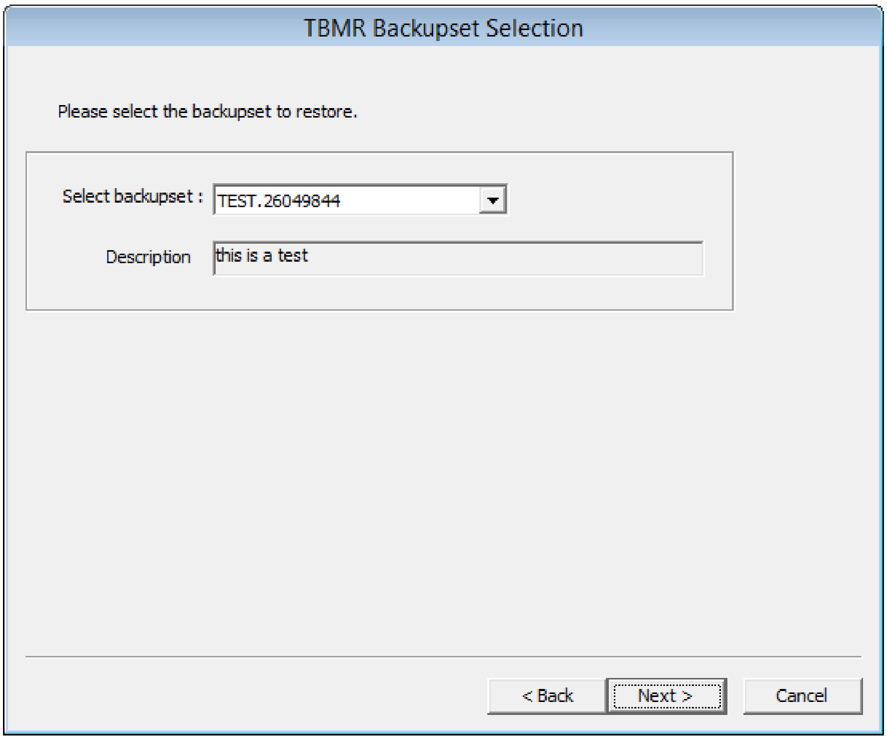


TBMR - Finish

The configuration data is successfully retrieved and copied locally.

Restore From Backupset

The system configuration will be restored from the appropriate backupset, which is selected from the next dialogue:



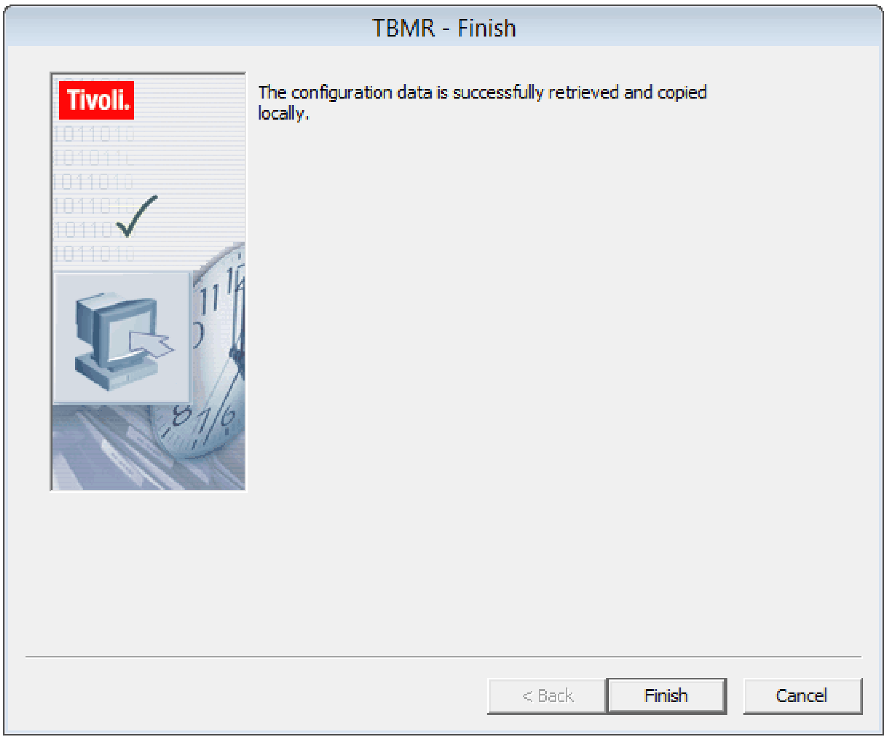
TBMR Backupset Selection

Please select the backupset to restore.

Select backupset : TEST.26049844

Description this is a test

Successful extraction of the configuration from the server is confirmed with the following dialogue:

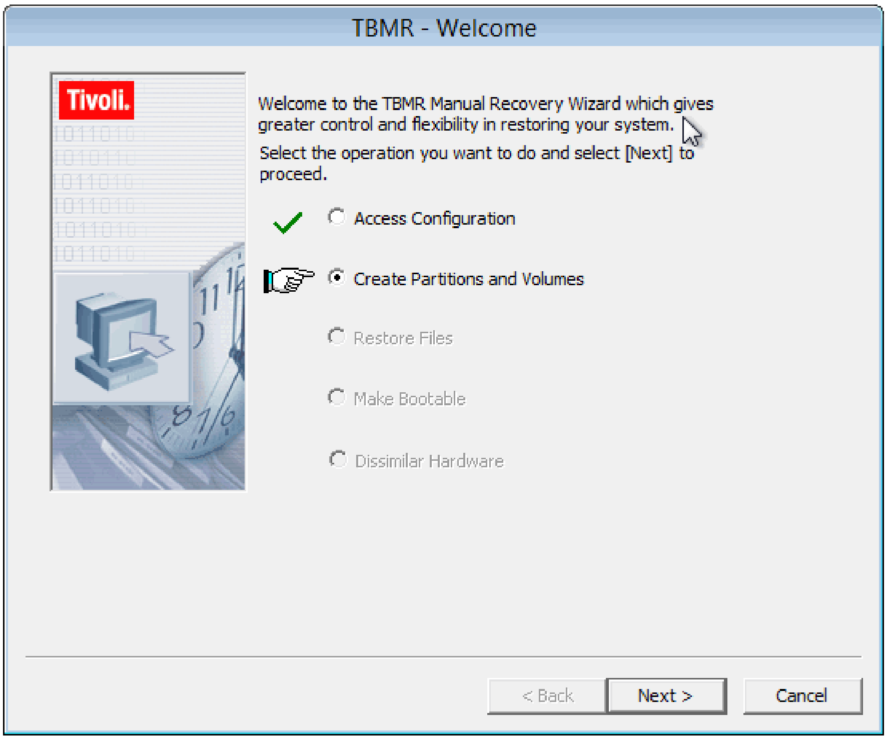


The configuration data is successfully retrieved and copied locally.

Select Finish and control returns to the next step in the **Manual Recovery** sequence.

6.2.3.2 Create Partition and Volumes

The next step of the manual recovery process is to configure the target disk **partitions** and **volumes**



Welcome to the TBMR Manual Recovery Wizard which gives greater control and flexibility in restoring your system.

Select the operation you want to do and select [Next] to proceed.

✓ ○ Access Configuration

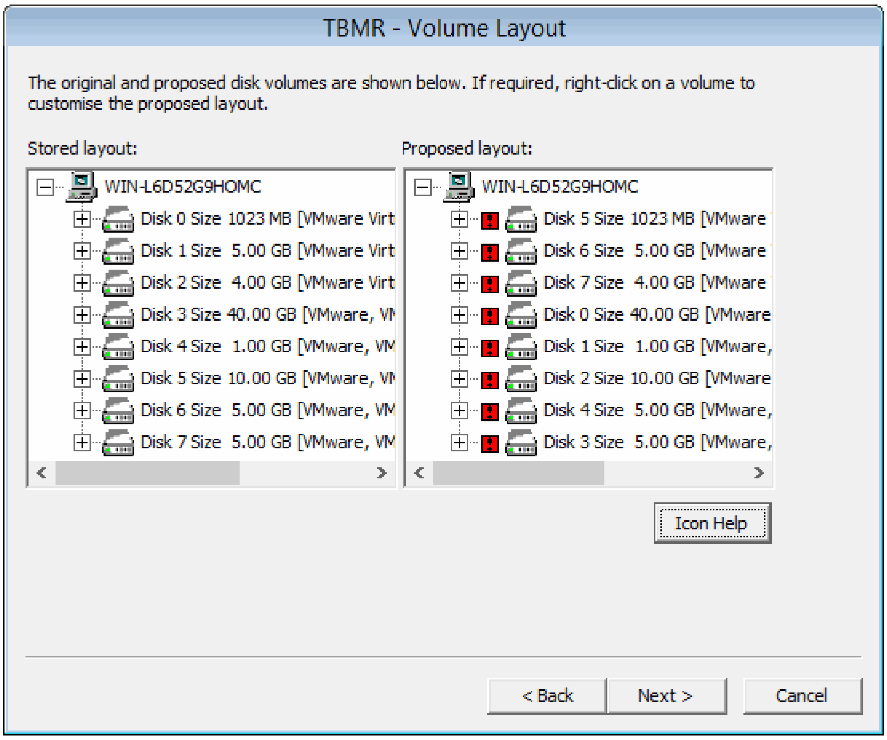
☞ ● Create Partitions and Volumes

○ Restore Files

○ Make Bootable

○ Dissimilar Hardware

Select Next> to display the Volume Layout dialogue:



The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.

Stored layout:

```
WIN-L6D52G9HOMC
  Disk 0 Size 1023 MB [VMware Virt
  Disk 1 Size  5.00 GB [VMware Virt
  Disk 2 Size  4.00 GB [VMware Virt
  Disk 3 Size 40.00 GB [VMware, VI
  Disk 4 Size  1.00 GB [VMware, VM
  Disk 5 Size 10.00 GB [VMware, VI
  Disk 6 Size  5.00 GB [VMware, VM
  Disk 7 Size  5.00 GB [VMware, VM
```

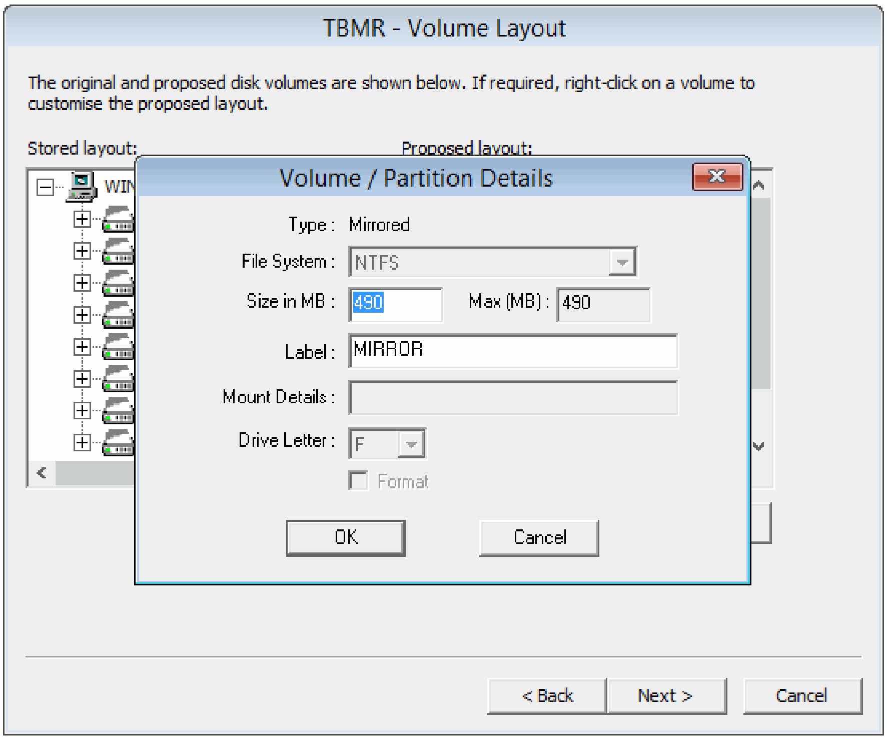
Proposed layout:

```
WIN-L6D52G9HOMC
  Disk 5 Size 1023 MB [VMware
  Disk 6 Size  5.00 GB [VMware
  Disk 7 Size  4.00 GB [VMware
  Disk 0 Size 40.00 GB [VMware
  Disk 1 Size  1.00 GB [VMware,
  Disk 2 Size 10.00 GB [VMware
  Disk 4 Size  5.00 GB [VMware,
  Disk 3 Size  5.00 GB [VMware,
```

This screen shows the original disk layout against that of the target system. The target disk layout could be very different to the original. TBMR will attempt to match the disks using its own in-built criteria. Some of the criteria used to judge the match are:

- disk geometry (tracks, cylinders and sectors)
- disk capacity
- if currently formatted, the disk signature

However, it is possible to change the partition size, or opt to tag/untag whether or not a partition should be formatted. To do this, right click on the the disk icon and the following configuration dialogue is displayed:



TBMR - Volume Layout

The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.

Stored layout:

Proposed layout:

Volume / Partition Details

Type : Mirrored

File System : NTFS

Size in MB : 490

Max (MB) : 490

Label : MIRROR

Mount Details :

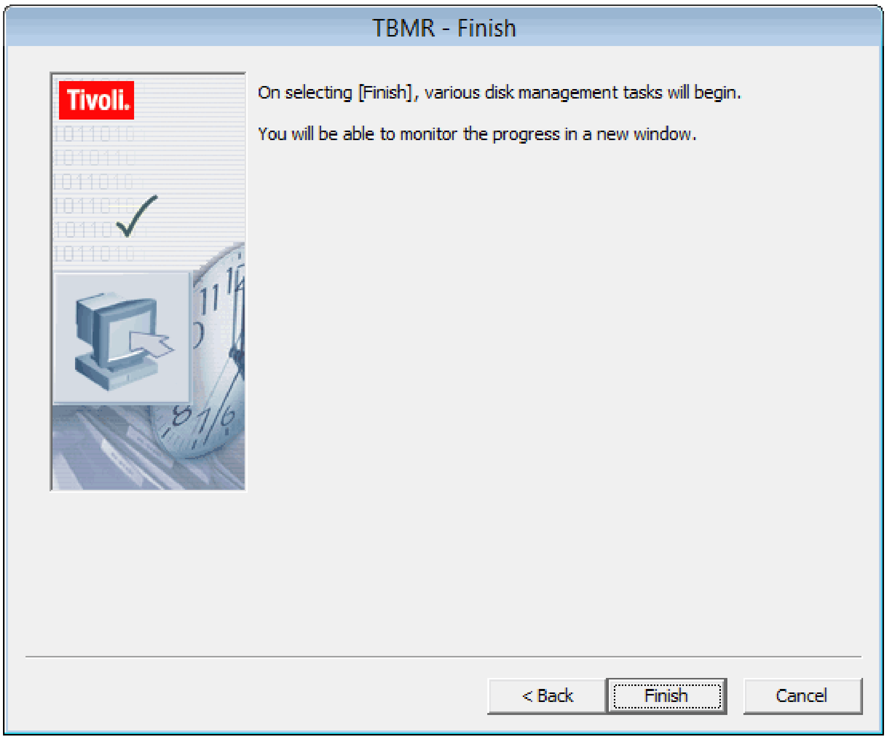
Drive Letter : F

□ Format

The indicator shown next to the disk icon indicates whether that disk will be left intact or not. A red exclamation mark indicates that the disk will be re-partitioned and/or formatted. A green tick indicates that the disk will be left intact.

Disks and partitions are discussed in more detail in the Volume Layout section.

Press <Back to return to the previous step, Finish to commence the active part of this step, or Cancel to abort.



TBMR - Finish

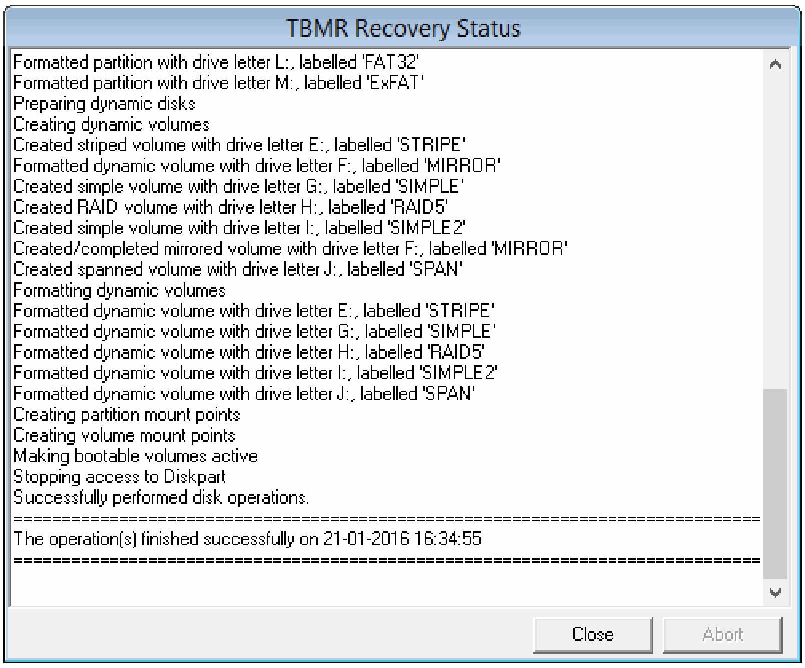
On selecting [Finish], various disk management tasks will begin.

You will be able to monitor the progress in a new window.

If you are happy with the recovery configuration, press Finish. This will commence the actual recovery.

Note: this procedure will completely destroy any existing data on the disks selected for recovery. Disks or partitions tagged as 'no format' will be retained.

The **Create Partitions and Volumes** step begins by preparing the disk selected for the recovery.



```
Formatted partition with drive letter L:, labelled 'FAT32'
Formatted partition with drive letter M:, labelled 'ExFAT'
Preparing dynamic disks
Creating dynamic volumes
Created striped volume with drive letter E:, labelled 'STRIPE'
Formatted dynamic volume with drive letter F:, labelled 'MIRROR'
Created simple volume with drive letter G:, labelled 'SIMPLE'
Created RAID volume with drive letter H:, labelled 'RAID5'
Created simple volume with drive letter I:, labelled 'SIMPLE2'
Created/completed mirrored volume with drive letter F:, labelled 'MIRROR'
Created spanned volume with drive letter J:, labelled 'SPAN'
Formatting dynamic volumes
Formatted dynamic volume with drive letter E:, labelled 'STRIPE'
Formatted dynamic volume with drive letter G:, labelled 'SIMPLE'
Formatted dynamic volume with drive letter H:, labelled 'RAID5'
Formatted dynamic volume with drive letter I:, labelled 'SIMPLE2'
Formatted dynamic volume with drive letter J:, labelled 'SPAN'
Creating partition mount points
Creating volume mount points
Making bootable volumes active
Stopping access to Diskpart
Successfully performed disk operations.
================================================================================
The operation(s) finished successfully on 21-01-2016 16:34:55
================================================================================
```

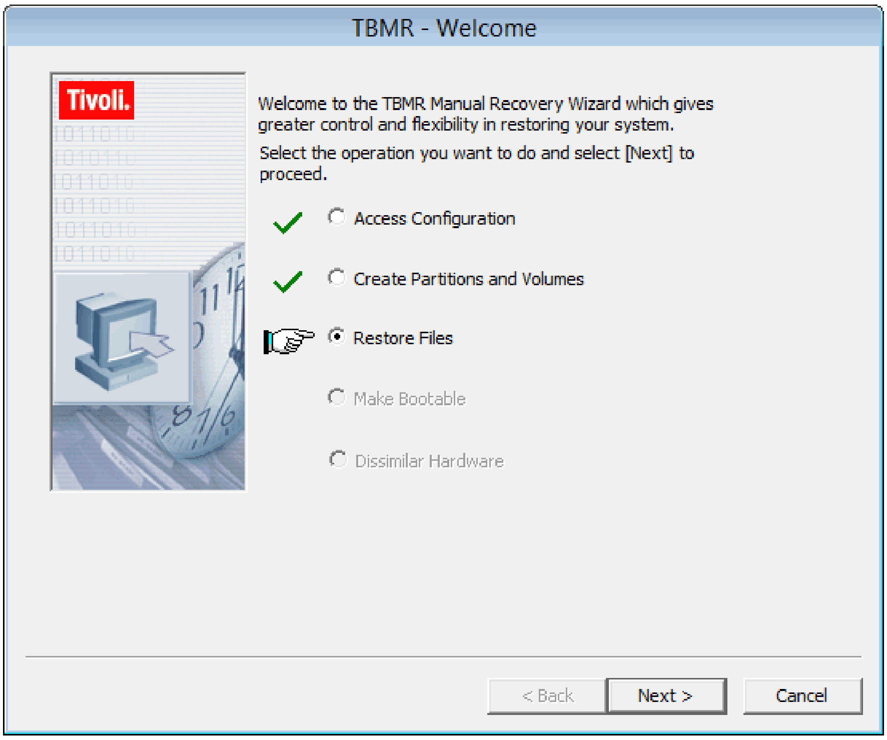
This involves:

- disk mapping original layout to new
- cleaning (removing any existing disk partitions)
- removing any existing dynamic volume databases
- re-creating the partitions
- converting to dynamic volumes if required
- formatting to the required partition type
- create partition/volume mount points
- make bootable volumes active
- waiting for any mirrored volumes to resync

Press Close> to continue with the recovery.

6.2.3.3 Restore Files

The next step of the manual recovery process is to restore the DR backup files.



TBMR - Welcome

Welcome to the TBMR Manual Recovery Wizard which gives greater control and flexibility in restoring your system.

Select the operation you want to do and select [Next] to proceed.

✓ ○ Access Configuration

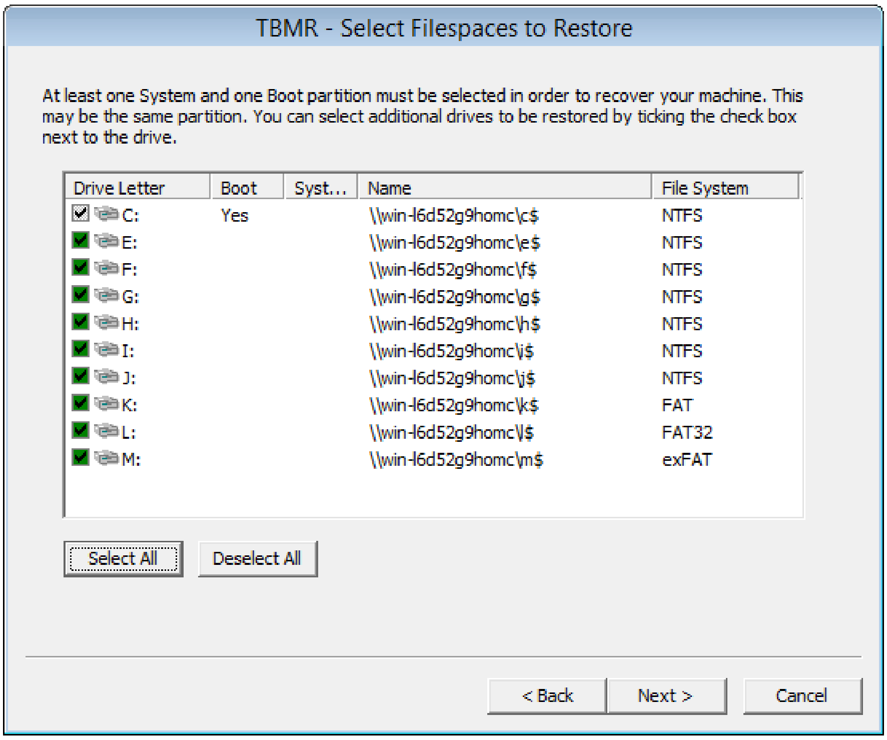
✓ ○ Create Partitions and Volumes

☞ ● Restore Files

○ Make Bootable

○ Dissimilar Hardware

Press Next> to identify the TSM filespaces that should be recovered. Note that the *SystemState* filespace will always be recovered by default.



TBMR - Select Filespaces to Restore

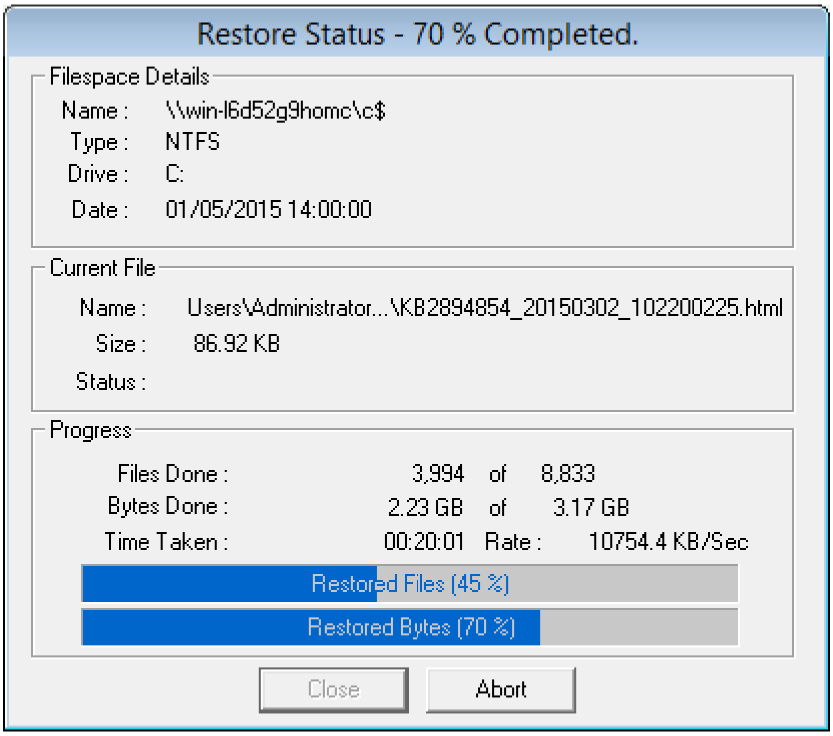
At least one System and one Boot partition must be selected in order to recover your machine. This may be the same partition. You can select additional drives to be restored by ticking the check box next to the drive.

Drive Letter	Boot	Syst...	Name	File System
☑ C:	Yes		\\win-l6d52g9homc\c$	NTFS
☑ E:			\\win-l6d52g9homc\e$	NTFS
☑ F:			\\win-l6d52g9homc\f$	NTFS
☑ G:			\\win-l6d52g9homc\g$	NTFS
☑ H:			\\win-l6d52g9homc\h$	NTFS
☑ I:			\\win-l6d52g9homc\i$	NTFS
☑ J:			\\win-l6d52g9homc\j$	NTFS
☑ K:			\\win-l6d52g9homc\k$	FAT
☑ L:			\\win-l6d52g9homc\l$	FAT32
☑ M:			\\win-l6d52g9homc\m$	exFAT

Press Next> to commence the restore of the TSM filespaces to their target disks/partitions.

Finally, a new window appears containing the restore status of recovered files, with progress bars indicating how much of the backup has been restored. This display also shows the recovery statistics in terms of time, size and throughput.

Note that the recovery is divided into different phases: firstly each ***volume filespace*** selected is restored with the ***SystemState*** filespace restored last.



Restore Status - 70 % Completed.

Filespace Details

Name : \\win-l6d52g9homc\c$
Type : NTFS
Drive : C:
Date : 01/05/2015 14:00:00

Current File

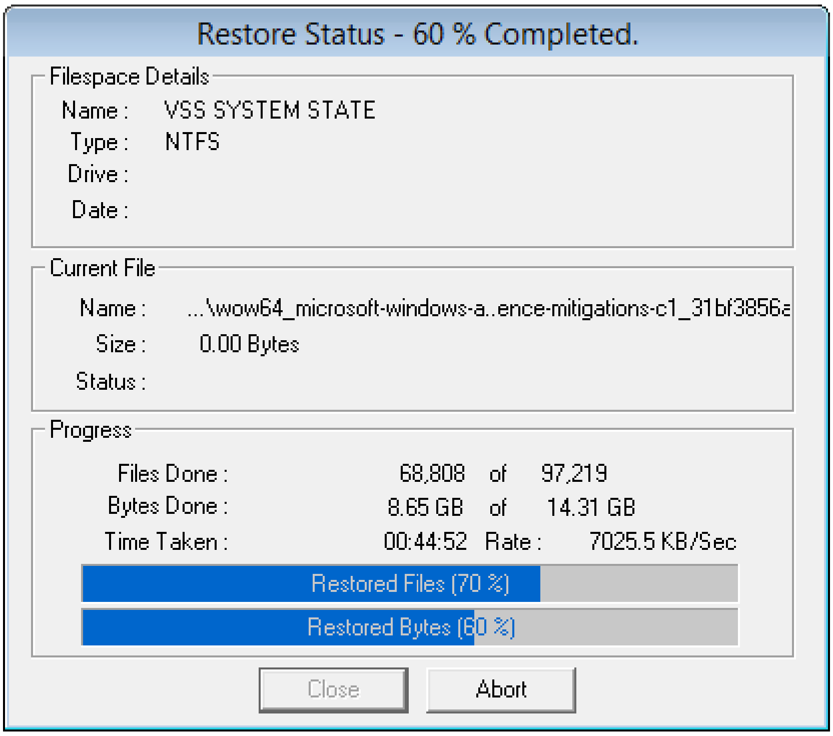
Name : Users\Administrator...\KB2894854_20150302_102200225.html
Size : 86.92 KB
Status :

Progress

Files Done : 3,994 of 8,833
Bytes Done : 2.23 GB of 3.17 GB
Time Taken : 00:20:01 Rate : 10754.4 KB/Sec

Restored Files (45 %)
Restored Bytes (70 %)

This process may take some minutes if the backups are large. You may select the Abort button to terminate the file recovery process, but this may leave the disk or partition in an unpredictable state, which may render it unusable.



Restore Status - 60 % Completed.

Filespace Details

Name : VSS SYSTEM STATE
Type : NTFS
Drive :
Date :

Current File

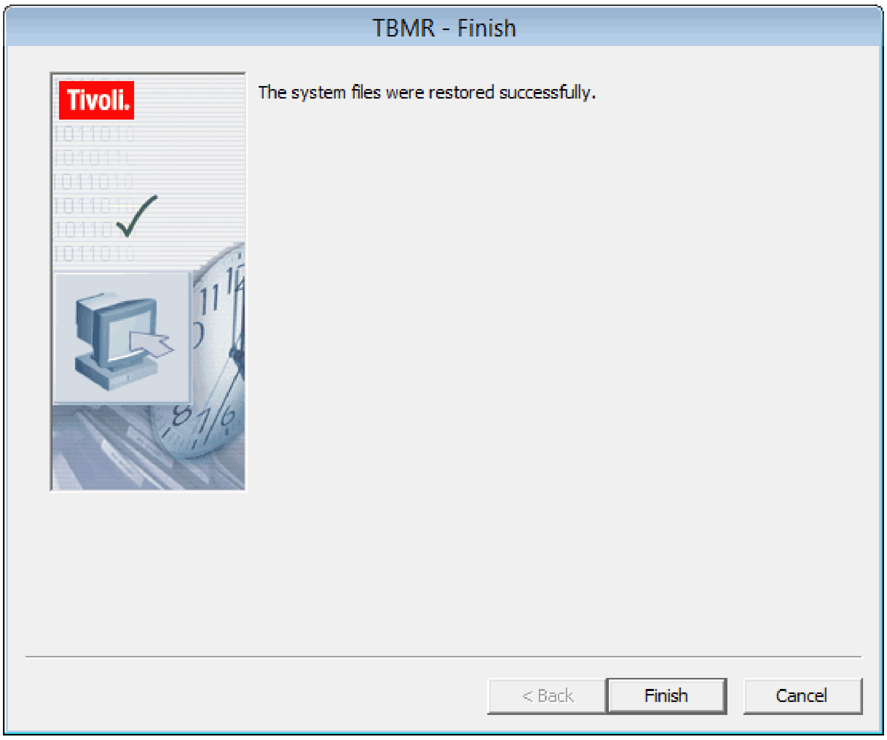
Name : ...\wow64_microsoft-windows-a..ence-mitigations-c1_31bf3856a
Size : 0.00 Bytes
Status :

Progress

Files Done : 68,808 of 97,219
Bytes Done : 8.65 GB of 14.31 GB
Time Taken : 00:44:52 Rate : 7025.5 KB/Sec

Restored Files (70 %)
Restored Bytes (60 %)

If any errors occur during the recovery, an error message will be shown in the window. Refer to the logs post recovery to establish the cause of any error. When the restore files step completes the following dialogue is displayed:



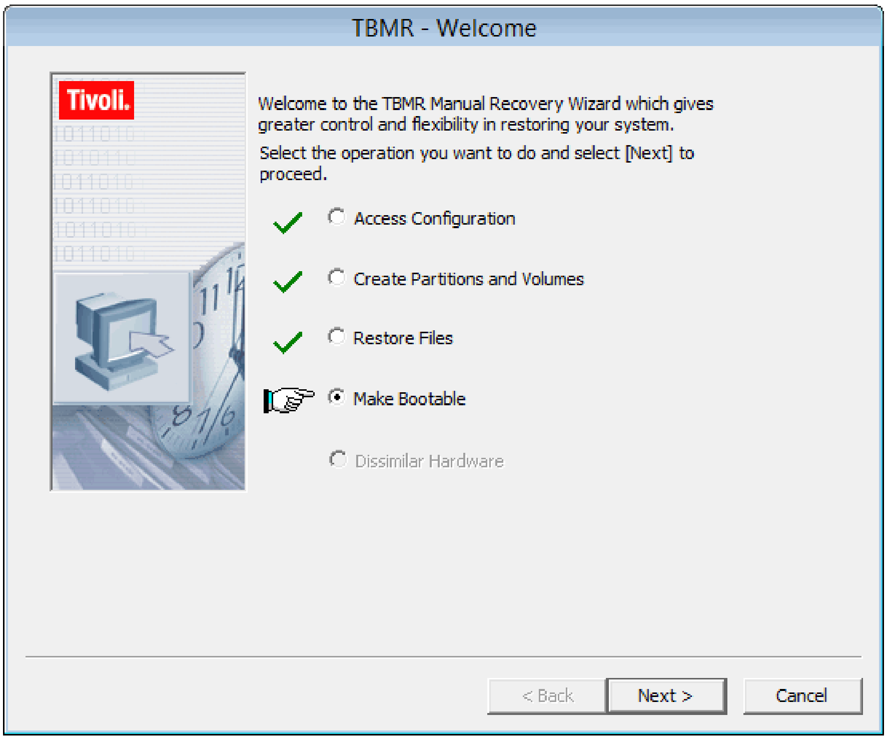
TBMR - Finish

The system files were restored successfully.

Select Finish and control returns to the next step in the **Manual Recovery** sequence.

6.2.3.4 Make Bootable

The next step in the manual recovery sequence is to make the original disk 'bootable'. This involves re-creating the MBR of the boot disk and modifying the registry with the new disk GUID.



TBMR - Welcome

Welcome to the TBMR Manual Recovery Wizard which gives greater control and flexibility in restoring your system.

Select the operation you want to do and select [Next] to proceed.

✓ ○ Access Configuration

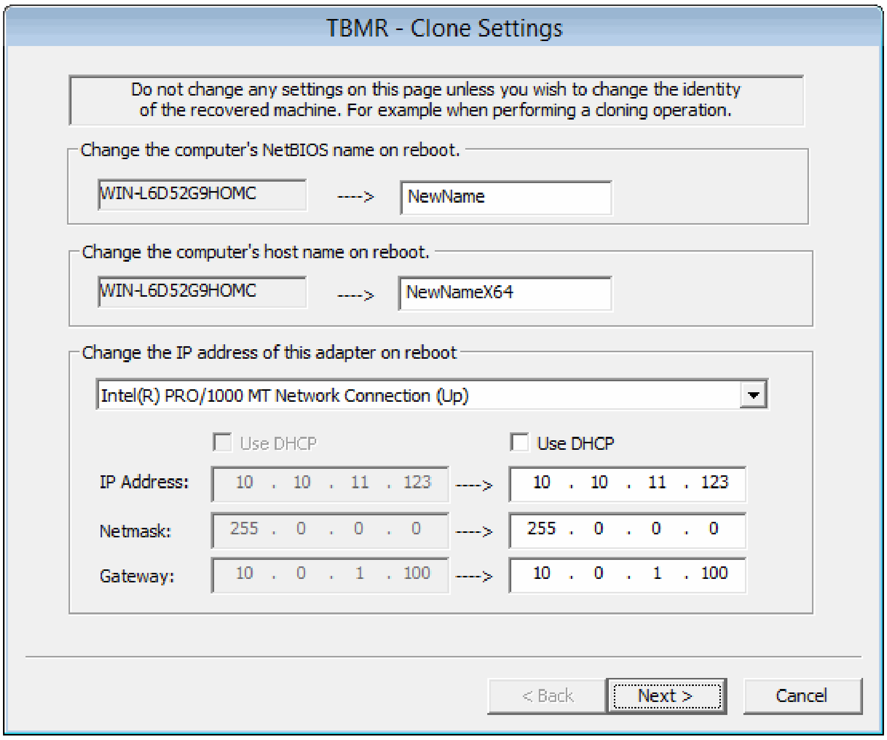
✓ ○ Create Partitions and Volumes

✓ ○ Restore Files

☞ ● Make Bootable

○ Dissimilar Hardware

Press Next> to commence the **Make Bootable** step. You will now be able to change the hostname and/or the machine's IP addresses on reboot.



TBMR - Clone Settings

Do not change any settings on this page unless you wish to change the identity of the recovered machine. For example when performing a cloning operation.

Change the computer's NetBIOS name on reboot.

WIN-L6D52G9HOMC ----> NewName

Change the computer's host name on reboot.

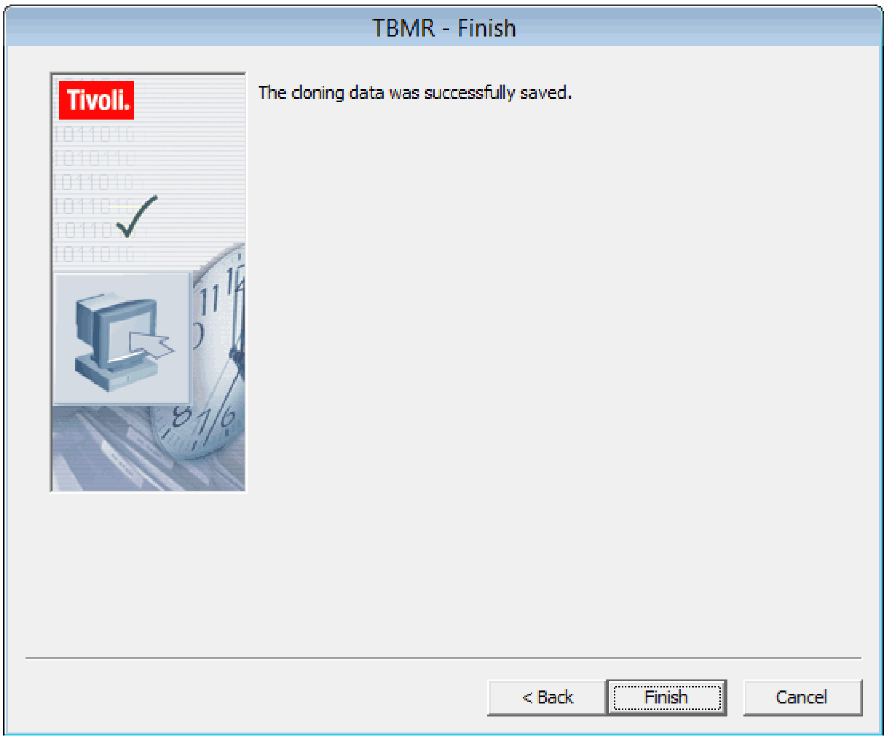
WIN-L6D52G9HOMC ----> NewNameX64

Change the IP address of this adapter on reboot

Intel(R) PRO/1000 MT Network Connection (Up)

	□ Use DHCP		□ Use DHCP
IP Address:	10 . 10 . 11 . 123	---->	10 . 10 . 11 . 123
Netmask:	255 . 0 . 0 . 0	---->	255 . 0 . 0 . 0
Gateway:	10 . 0 . 1 . 100	---->	10 . 0 . 1 . 100

If no hostname or IP change is required, click Next> to continue. The cloning data is confirmed with the following dialogue.

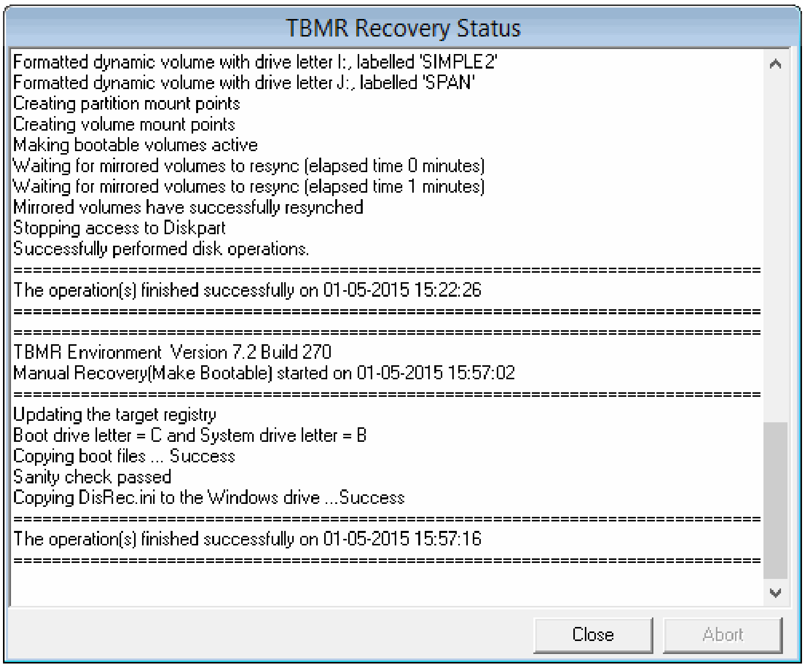


TBMR - Finish

The cloning data was successfully saved.

Click Finish to complete the Make Bootable step.

A new dialogue window opens summarising the success or failure of the operation:

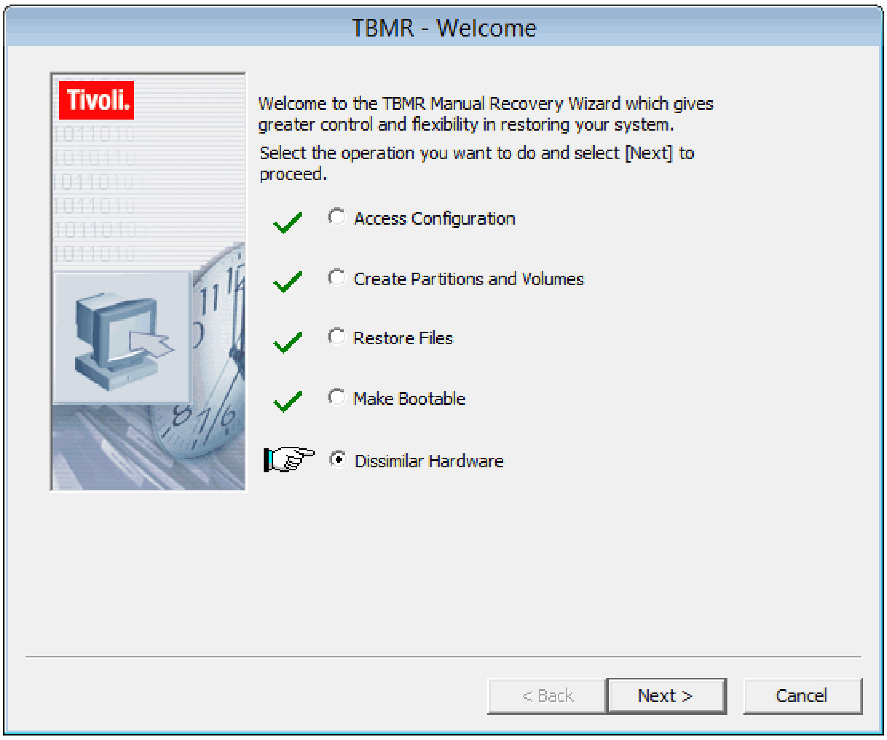


```
Formatted dynamic volume with drive letter I:, labelled 'SIMPLE2'
Formatted dynamic volume with drive letter J:, labelled 'SPAN'
Creating partition mount points
Creating volume mount points
Making bootable volumes active
Waiting for mirrored volumes to resync (elapsed time 0 minutes)
Waiting for mirrored volumes to resync (elapsed time 1 minutes)
Mirrored volumes have successfully resynched
Stopping access to Diskpart
Successfully performed disk operations.
================================================================================
The operation(s) finished successfully on 01-05-2015 15:22:26
================================================================================
================================================================================
TBMR Environment  Version 7.2 Build 270
Manual Recovery(Make Bootable) started on 01-05-2015 15:57:02
================================================================================
Updating the target registry
Boot drive letter = C and System drive letter = B
Copying boot files ... Success
Sanity check passed
Copying DisRec.ini to the Windows drive ...Success
================================================================================
The operation(s) finished successfully on 01-05-2015 15:57:16
================================================================================
```

Press Close to complete the step and return to the **Manual Recovery Wizard**.

6.2.3.5 Dissimilar Hardware

The final step in the manual DR sequence is to check if the recovery is to **Dissimilar Hardware**.



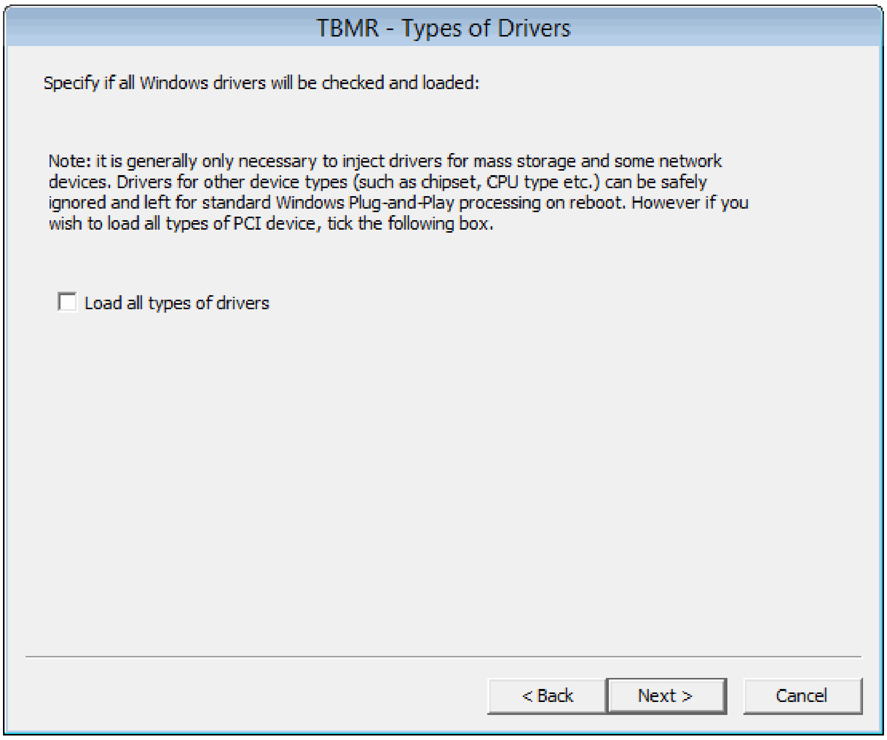
Welcome to the TBMR Manual Recovery Wizard which gives greater control and flexibility in restoring your system.

Select the operation you want to do and select [Next] to proceed.

- ✓ ○ Access Configuration
- ✓ ○ Create Partitions and Volumes
- ✓ ○ Restore Files
- ✓ ○ Make Bootable
- ● Dissimilar Hardware

This is determined by comparing the drivers currently in use by Windows WinPE 2 or WinPE 5 and the drivers listed in the recovered machine's registry.

The step first prompts for what driver types should be checked. By default, only **Mass Storage** (disk) and **network devices** are checked.



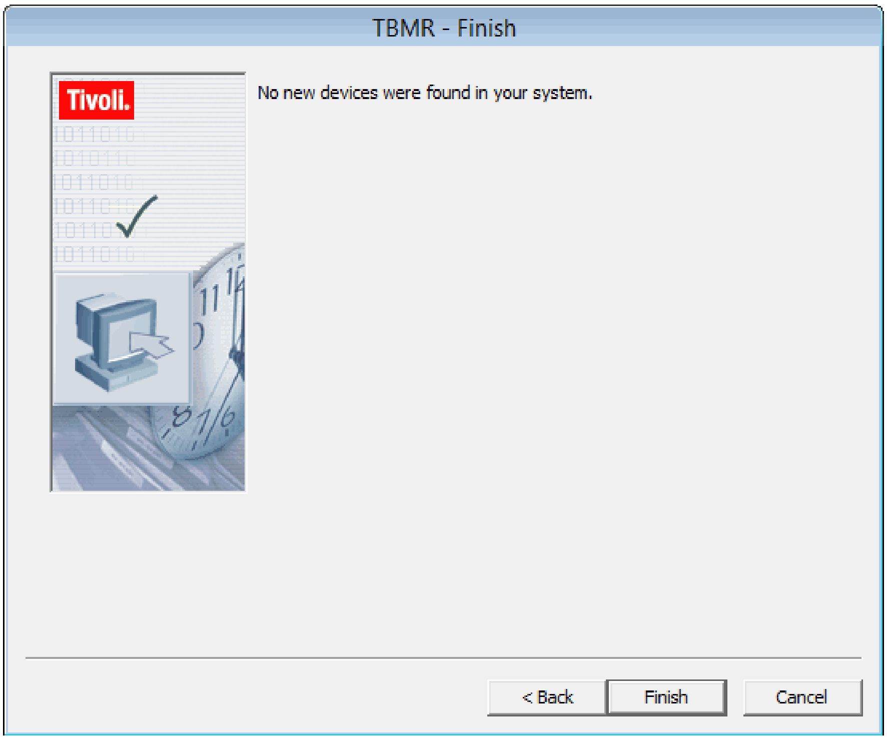
TBMR - Types of Drivers

Specify if all Windows drivers will be checked and loaded:

Note: it is generally only necessary to inject drivers for mass storage and some network devices. Drivers for other device types (such as chipset, CPU type etc.) can be safely ignored and left for standard Windows Plug-and-Play processing on reboot. However if you wish to load all types of PCI device, tick the following box.

□ Load all types of drivers

Press Next> to continue. For recovery to similar hardware, no new devices will be found and this will be confirmed by this dialogue:



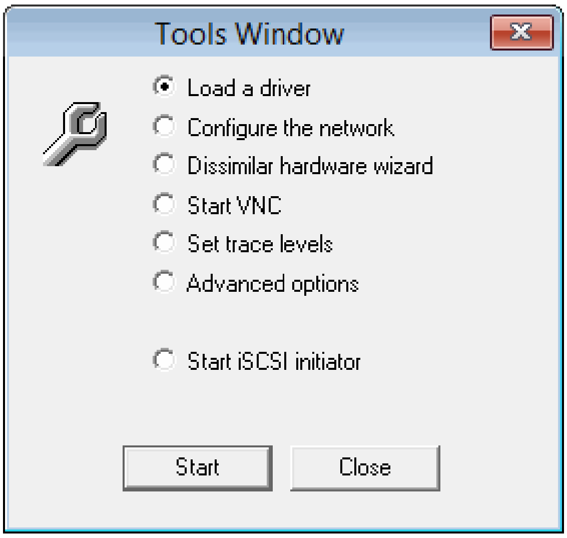
TBMR - Finish

No new devices were found in your system.

Press Finish to complete the manual recovery sequence.

6.2.4 Tools

There are a number of tools that can assist with the recovery process. They are all collected under this command button:



The options available are:

- Load a driver
- Configure the network
- Dissimilar Hardware Wizard
- Start VNC
- Set trace levels
- Advanced options
- Start iSCSI initiator

Load a driver allows a new mass storage or NIC driver to be injected into the running booted WinPE 2 or WinPE 5 DR environment. This would be used, for example, to support a mass-storage (disk) device not currently supported out-of-box. This should be done prior to starting the DR sequence.

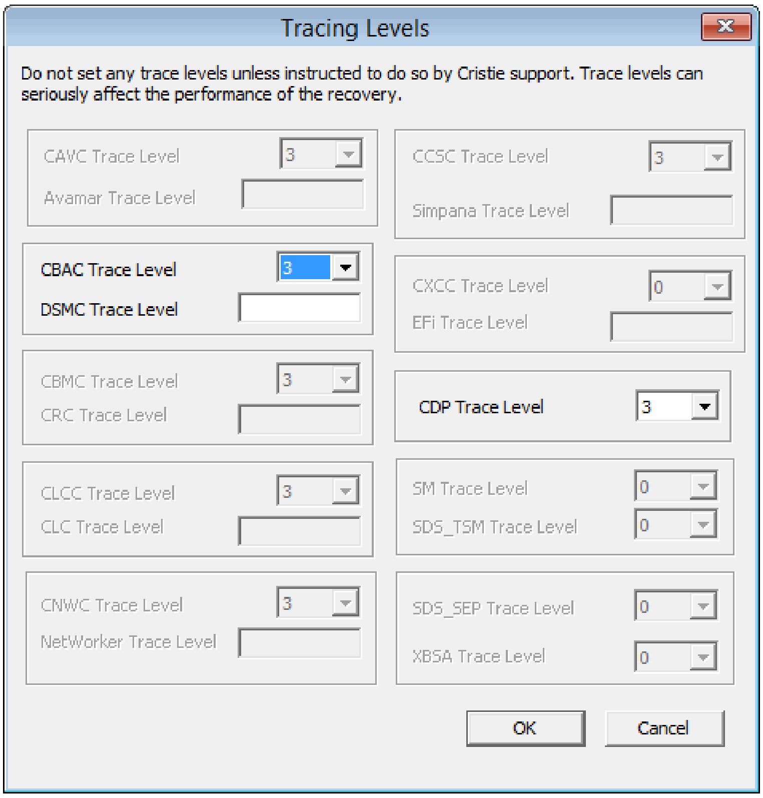
Selecting **Configure the network** will start the **Cristie Network Configurator** tool. This provides extensive facilities to configure networks during the DR process.

The **Dissimilar Hardware Wizard** will allow drivers to be injected into the recovered system when the target hardware has different devices from the original (eg. RAID controllers). Normally, this will be done automatically as part of the DR sequence and will not need to be run manually.

Start VNC will run a VNC server within the WinPE 2 or WinPE 5 environment, allowing external VNC clients to remotely connect during the DR session. The start process will provide you with the current IP address of the WinPE 2 or WinPE 5 environment, which you will need to specify in the VNC client.

> *Note: the VNC connection is also password protected. The VNC feature is intended for diagnosing DR problems under the guidance of Cristie Support, who will provide the password upon request.*

Set trace levels allows the DR log file trace to be increased or decreased as required:



Tracing Levels

Do not set any trace levels unless instructed to do so by Cristie support. Trace levels can seriously affect the performance of the recovery.

CAVC Trace Level: 3

Avamar Trace Level:

CCSC Trace Level: 3

Simpana Trace Level:

CBAC Trace Level: 3

DSMC Trace Level:

CXCC Trace Level: 0

EFi Trace Level:

CBMC Trace Level: 3

CRC Trace Level:

CDP Trace Level: 3

CLCC Trace Level: 3

CLC Trace Level:

SM Trace Level: 0

SDS_TSM Trace Level: 0

CNWC Trace Level: 3

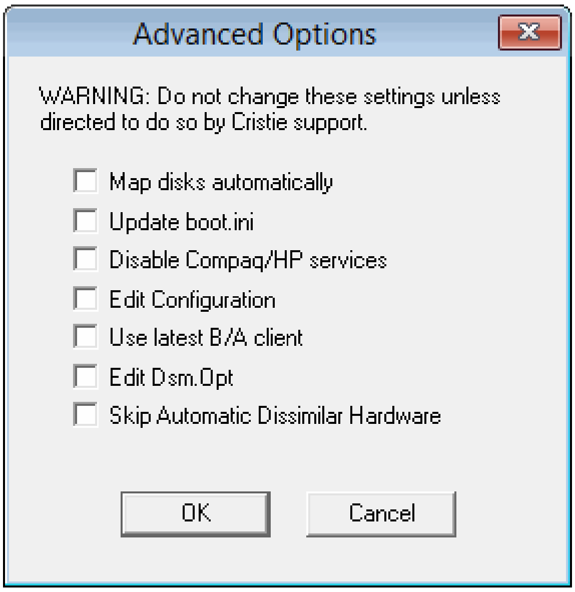
NetWorker Trace Level:

SDS_SEP Trace Level: 0

XBSA Trace Level: 0

It is recommended that the trace levels are only changed when advised to do so by Cristie Support staff. This is because they could have a severe impact upon the performance of the backup restore process.

Advanced Options should only be selected when advised to do so by Cristie Support staff.



Advanced Options

WARNING: Do not change these settings unless directed to do so by Cristie support.

☐ Map disks automatically

☐ Update boot.ini

☐ Disable Compaq/HP services

☐ Edit Configuration

☐ Use latest B/A client

☐ Edit Dsm.Opt

☐ Skip Automatic Dissimilar Hardware

Start iSCSI initiator - please contact Cristie Support if you wish to use this feature.

6.2.4.1 Cristie Network Configurator Tool

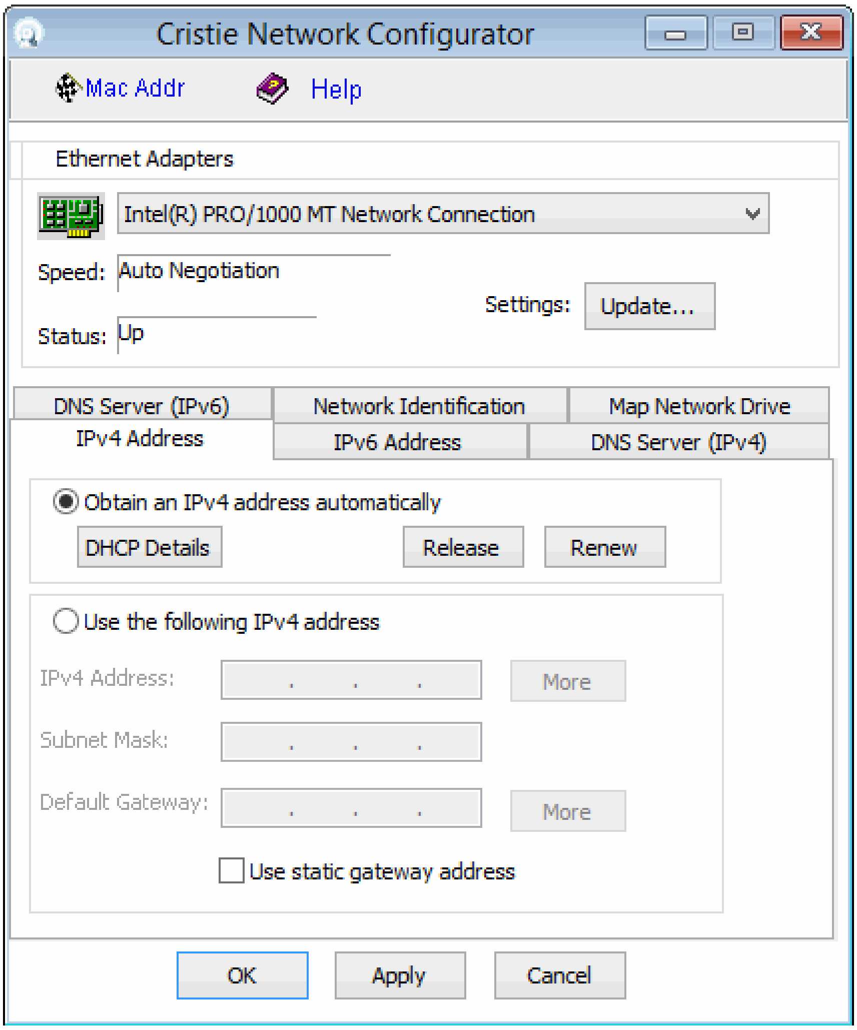
The **Cristie Network Configurator** tool provides extensive facilities to configure the network during the recovery process. It offers the following features:

- supports multiple NICs
- configure individual NIC parameters for duplex mode and link speed
- the ability to select DHCP allocated or static IPv4 and IPv6 IP addresses
- the ability to setup DNS server IPv4 and IPv6 IP addresses
- the ability to setup the Network Identification of the recovering system
- allow file shares to be set on the recovering system (using IPv4 and IPv6 IP addresses)
- map/unmap network drives

Select the Help button at the top of the dialogue to show Network Configurator online help.

Configure NIC Parameters

It is possible to change both the link speed and duplex mode for any NIC detected on the recovering target system. Select the desired NIC (there could be more than one) from the drop down box and then select Update....



Cristie Network Configurator

Ethernet Adapters

Intel(R) PRO/1000 MT Network Connection

Speed: Auto Negotiation

Status: Up

● Obtain an IPv4 address automatically

○ Use the following IPv4 address

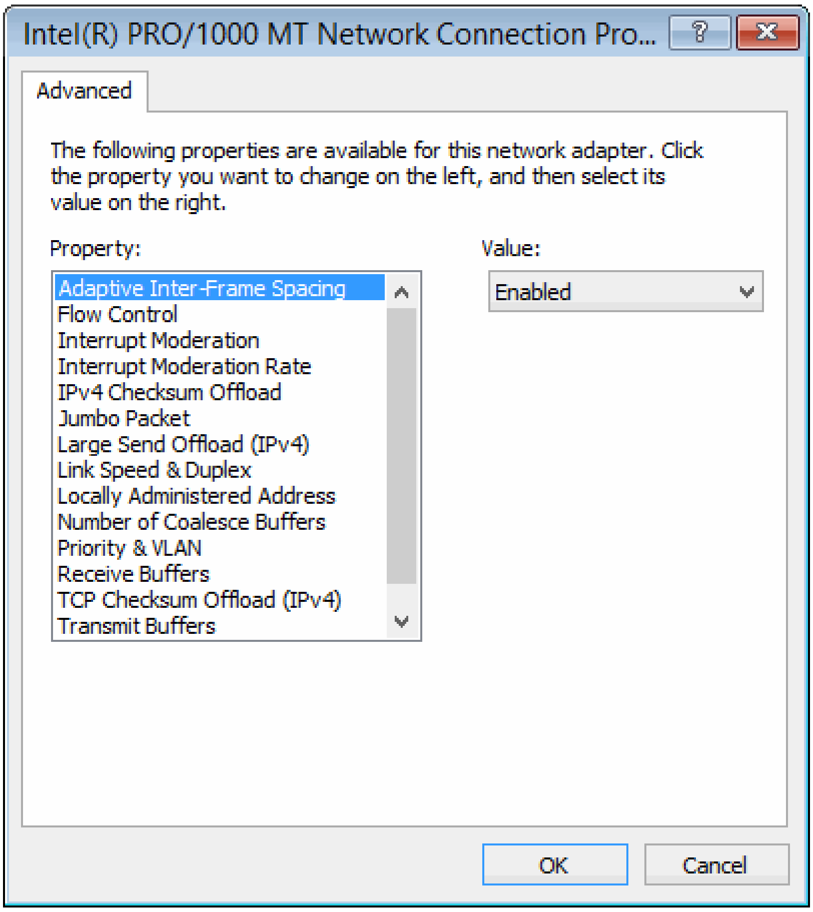
IPv4 Address: . . .

Subnet Mask: . . .

Default Gateway: . . .

□ Use static gateway address

The resulting display offers numerous NIC properties that can be changed. This property list is dependent upon the NIC - ie. not all properties will be available for all NICs.



Intel(R) PRO/1000 MT Network Connection Pro...

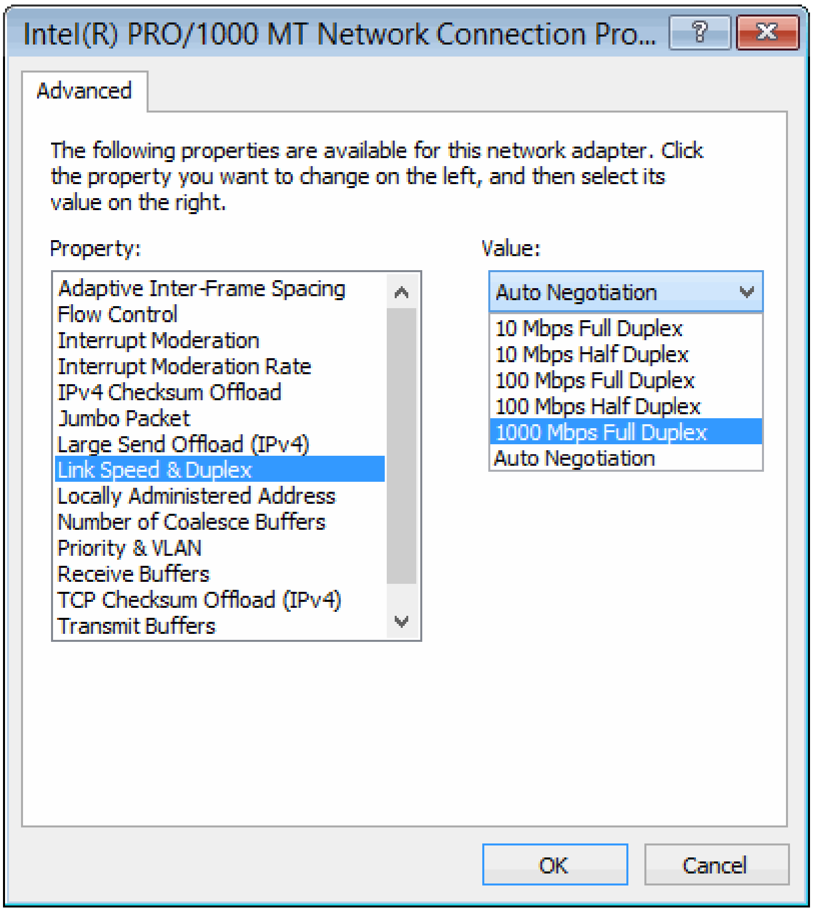
The following properties are available for this network adapter. Click the property you want to change on the left, and then select its value on the right.

Property:

- Adaptive Inter-Frame Spacing
- Flow Control
- Interrupt Moderation
- Interrupt Moderation Rate
- IPv4 Checksum Offload
- Jumbo Packet
- Large Send Offload (IPv4)
- Link Speed & Duplex
- Locally Administered Address
- Number of Coalesce Buffers
- Priority & VLAN
- Receive Buffers
- TCP Checksum Offload (IPv4)
- Transmit Buffers

Value: Enabled

To change the NIC speed or duplex setting, select the corresponding *Property* from the dialogue and then select the required value from the *Value* drop down box as shown below:



Intel(R) PRO/1000 MT Network Connection Pro...

Advanced

The following properties are available for this network adapter. Click the property you want to change on the left, and then select its value on the right.

Property:

- Adaptive Inter-Frame Spacing
- Flow Control
- Interrupt Moderation
- Interrupt Moderation Rate
- IPv4 Checksum Offload
- Jumbo Packet
- Large Send Offload (IPv4)
- Link Speed & Duplex
- Locally Administered Address
- Number of Coalesce Buffers
- Priority & VLAN
- Receive Buffers
- TCP Checksum Offload (IPv4)
- Transmit Buffers

Value:

Auto Negotiation

- 10 Mbps Full Duplex
- 10 Mbps Half Duplex
- 100 Mbps Full Duplex
- 100 Mbps Half Duplex
- 1000 Mbps Full Duplex
- Auto Negotiation

Again, note that the speed/duplex settings available are NIC dependent. *Auto Negotiation* is generally the NIC default setting. Other NIC properties may be changed as required.

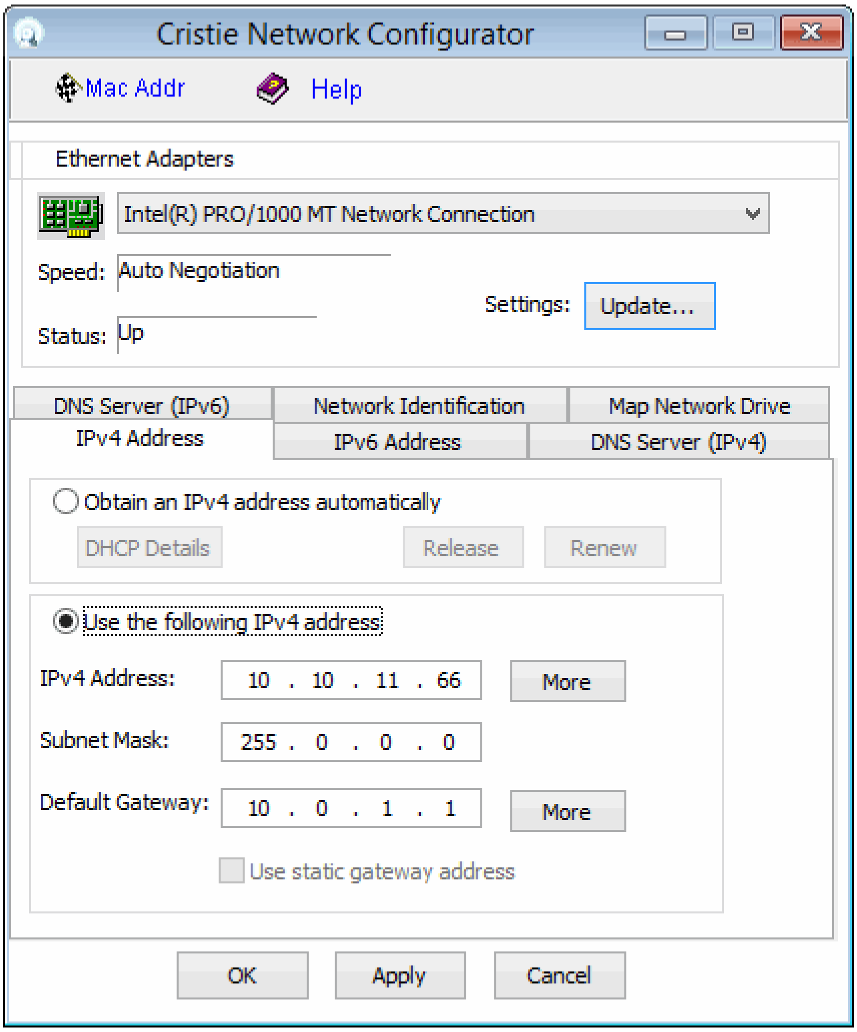
If the NIC is currently connected to the network then the *Status* will be shown as **Operational**. Otherwise the NIC is considered to be **Non-Operational**.

Assign Static or DHCP IP Settings

Normally the WinPE 2 or WinPE 5 DR environment will start with DHCP enabled and active. However, if a static IP is required, use the 'Use the following IP address' option to manually configure.

First ensure the desired network adapter is selected from the drop down list. If a static IP address is to be applied, select the 'Use the following IP address' button. This will automatically deselect the default DHCP option and allow the static IP parameters to be defined.

Different tabs are provided for configuring IPv4 or IPv6 IP addresses.



Cristie Network Configurator

Ethernet Adapters

Intel(R) PRO/1000 MT Network Connection

Speed: Auto Negotiation

Status: Up

○ Obtain an IPv4 address automatically

● Use the following IPv4 address

IPv4 Address: 10 . 10 . 11 . 66

Subnet Mask: 255 . 0 . 0 . 0

Default Gateway: 10 . 0 . 1 . 1

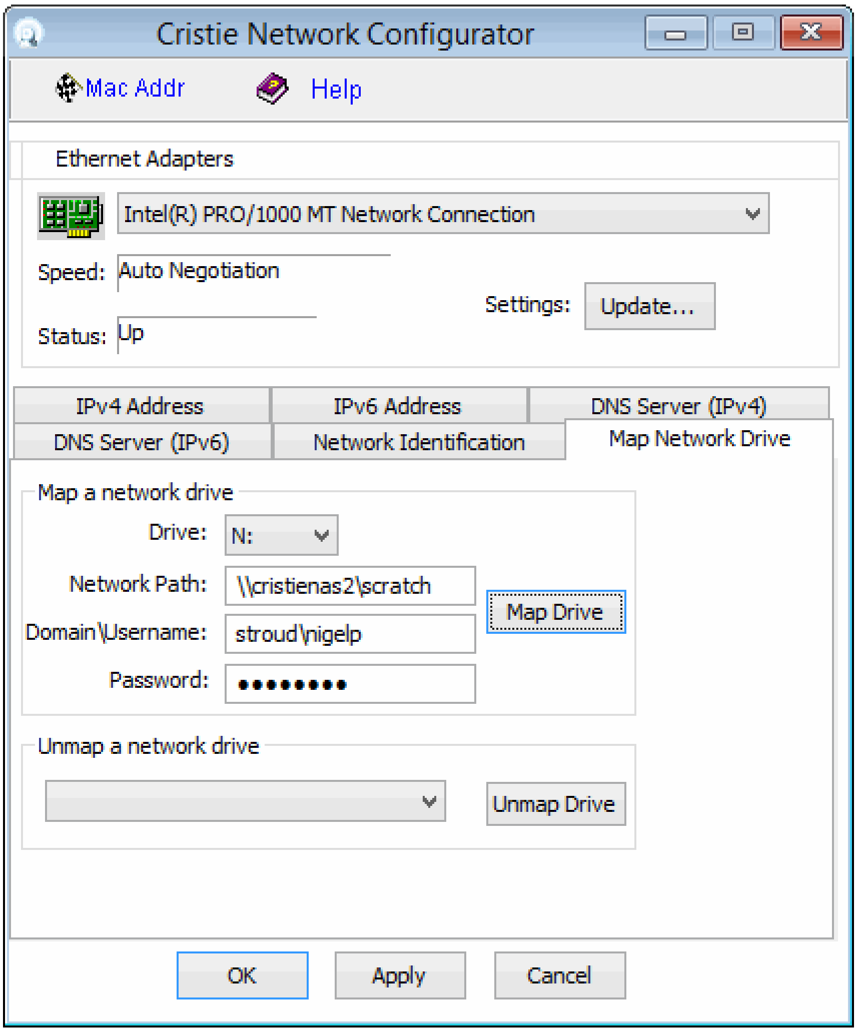
□ Use static gateway address

Set the new IP address, subnet mask and gateway IP address. The More button will allow the system to have more than one static IP address. Click on Apply to confirm the settings for the selected adapter.

This feature will also allow the DHCP lease to be released or renewed, as required.

Map a Network Drive

In order to simplify access to network resources, the Network Configurator allows you to map a network drive to a network share. Start the Cristie Network Configurator from the **Tools** menu and select the **Map Network Drive** tab.



Intel(R) PRO/1000 MT Network Connection

Speed: Auto Negotiation

Status: Up

Drive: N:

Network Path: \\cristienas2\scratch

Domain\Username: stroud\nigelp

Password: ●●●●●●●●●

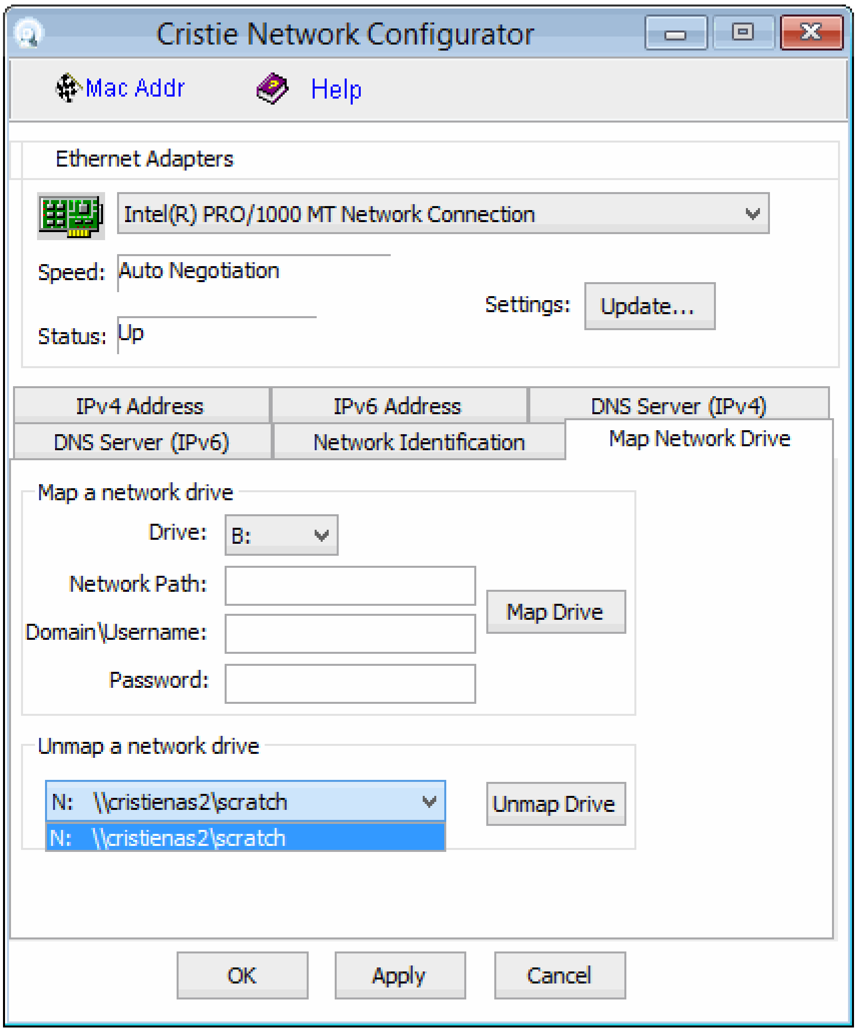
Select the drive letter that you wish to allocate from the **Drive** drop-down box and type in the share name that you wish to associate with it. Also specify the network credentials to be used to access the share.

> *Note: The network path may be specified either by hostname, IPv4 or IPv6 address.*

Press Map Drive to confirm the share operation. If successful, the share will be added to the **Unmap a network drive** drop down list.

Unmap a Network Drive

If you need to disconnect a mapped drive for any reason, this option allows you to do this. Just select the drive that you wish to disconnect from the Unmap a network drive drop down list and then click Unmap Drive.



Intel(R) PRO/1000 MT Network Connection

Speed: Auto Negotiation

Status: Up

Drive: B:

N: \\cristienas2\scratch

N: \\cristienas2\scratch

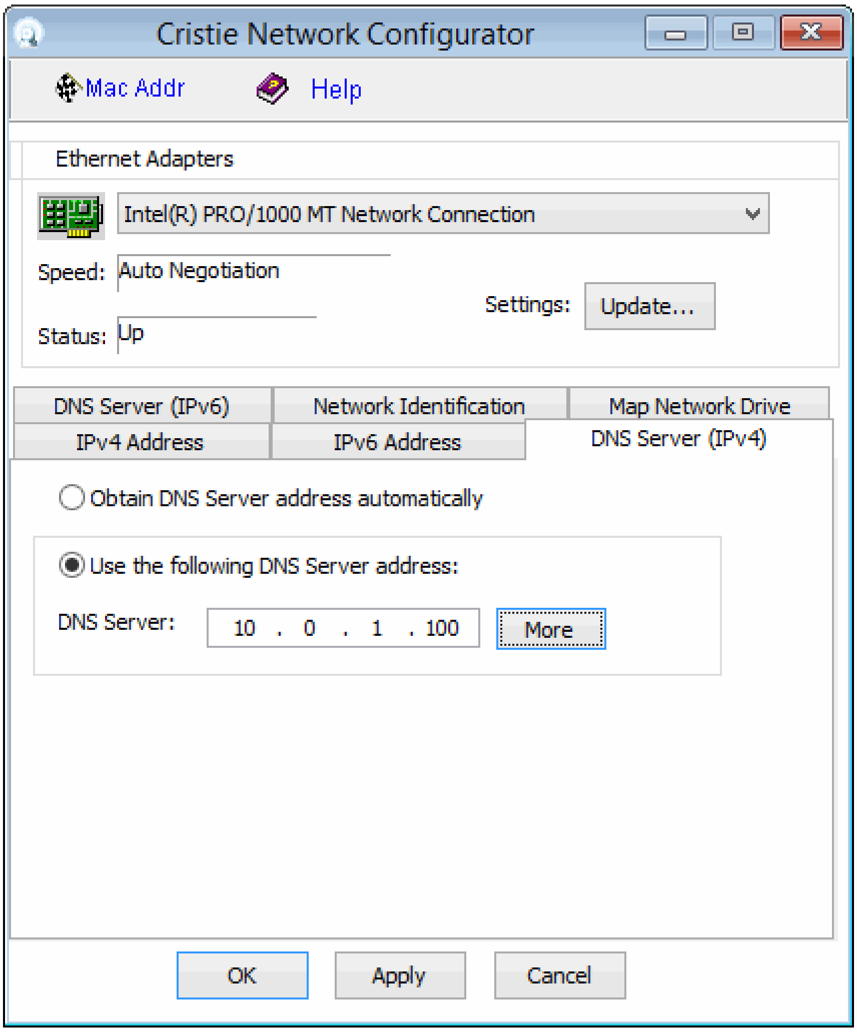
The mapped drive is removed from the list to confirm the operation.

Setup DNS Servers

DNS server IP addresses are automatically set when the WinPE 2 or WinPE 5 DR environment boots. However, options are provided to allow DNS server IP addresses to be manually set if required.

Different tabs are provided for configuring IPv4 or IPv6 IP addresses.

Note: WINS servers are not currently supported by this tool.



Ethernet Adapters

Intel(R) PRO/1000 MT Network Connection

Speed: Auto Negotiation

Status: Up

Settings:

○ Obtain DNS Server address automatically

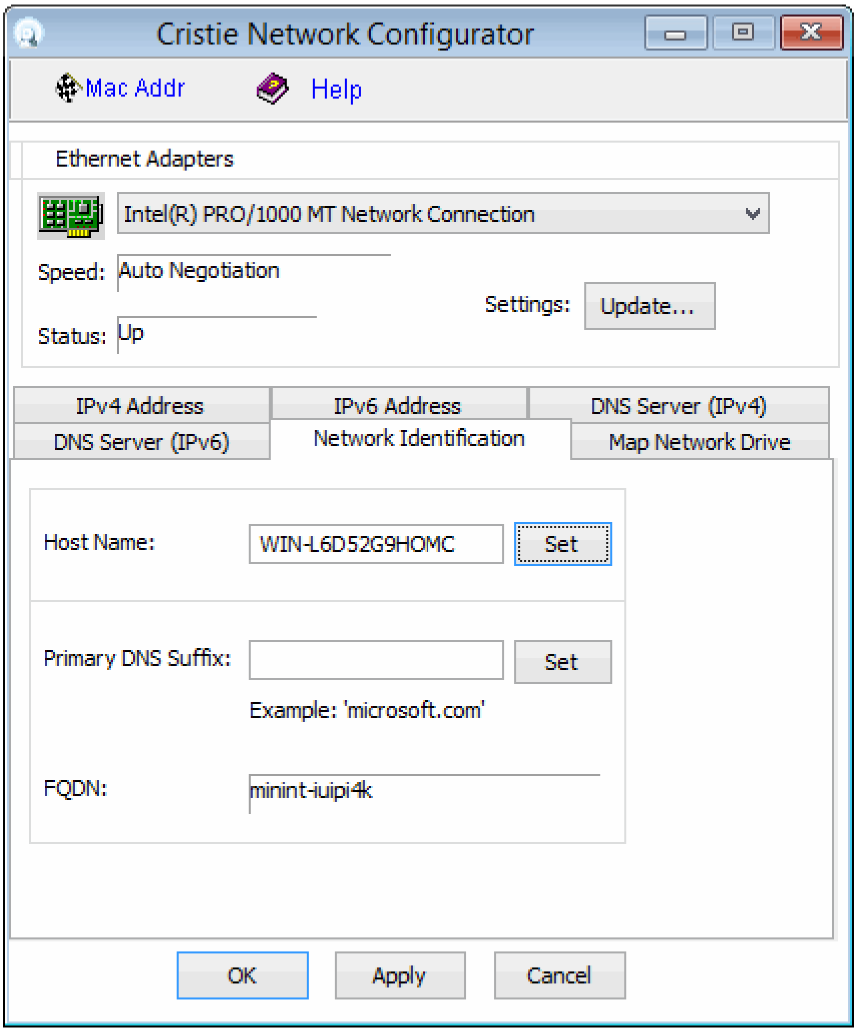
● Use the following DNS Server address:

DNS Server: 10 . 0 . 1 . 100

Select the **'Use the following DNS Server address'** radio button and enter the new DNS IP server address. If required, select the More button to add several DNS IP addresses. Press Apply to activate the new address.

Setup Network Identification

Click the **Network Identification** tab to setup a new hostname for the recovering system. This allows the WinPE 2 or WinPE 5 hostname and Primary DNS suffix to be changed during a DR session if required. These details are transient and only apply only while theWinPE 2 or WinPE 5 DR session is running. They are not applied to the recovered system when it reboots after the DR session.



Ethernet Adapters

Intel(R) PRO/1000 MT Network Connection

Speed: Auto Negotiation

Status: Up

Host Name: WIN-L6D52G9HOMC

Primary DNS Suffix:

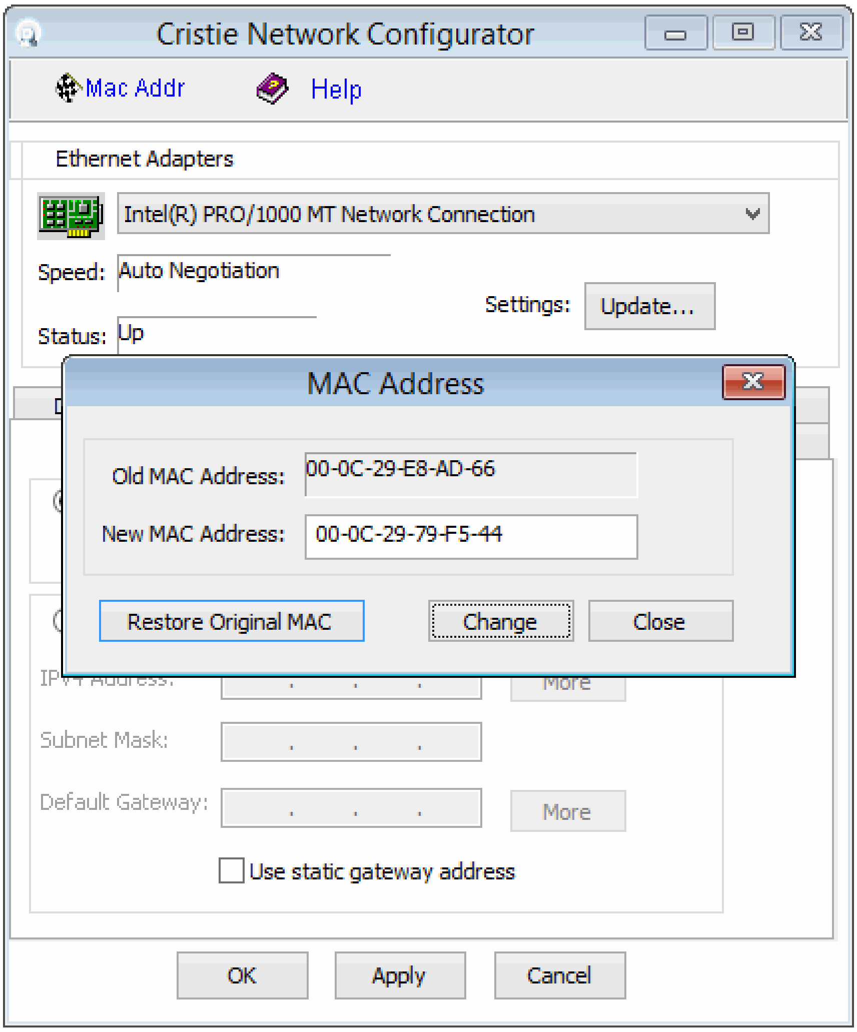
Example: 'microsoft.com'

FQDN: minint-iuipi4k

Enter the new Computer Name and press Set to confirm the change.

Display/Change MAC Address

It is possible to display and change the local MAC address of the recovering system. Select the MAC Address Mac Addr button at the top of the Main menu dialogue:



Intel(R) PRO/1000 MT Network Connection

Speed: Auto Negotiation

Status: Up

Old MAC Address: 00-0C-29-E8-AD-66

New MAC Address: 00-0C-29-79-F5-44

☐ Use static gateway address

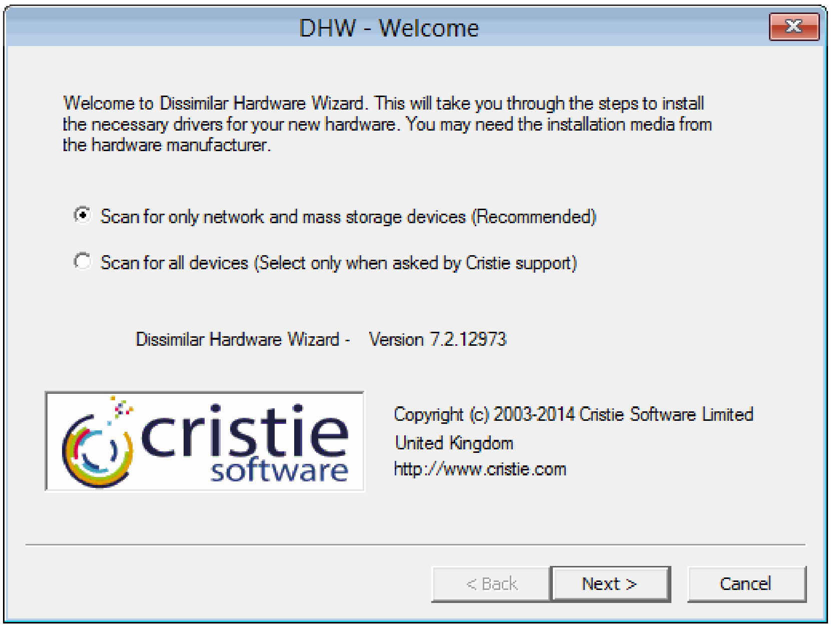
Change the MAC address by entering a new value in the form xx-xx-xx-xx-xx-xx and selecting Change. The original MAC address will be preserved and can be restored using the Restore Original MAC button.

6.2.4.2 Dissimilar Hardware Wizard

A restore to dissimilar hardware is normally detected during the Automatic or Manual DR sequence. Drivers will be injected automatically at the end of the restore sequence if a source location has been provided. However, if this process has failed for some reason, or additional drivers are required to be injected into the recovering machine, then this **Dissimilar Hardware Wizard** (DHW) tool is provided.

> *Note: it is only necessary to load the drivers for the hard disk, NIC and, rarely, the HAL. Drivers for the hard disks and NIC can be determined by Plug-and-Play (PnP) and may be readily identified. However, changes required in the CPU model via a change in HAL cannot yet be determined by PnP - these need to be loaded manually.*

If you wish to scan for just Mass Storage and Network devices (the minimum required to boot a dissimilar system), select Next> to continue to the next step of the Wizard. This is the recommended option. Under the guidance of **Cristie Support**, you may be asked to scan for all devices. In this case, tick the **'Scan for all devices'** box before selecting Next>.



DHW - Welcome

Welcome to Dissimilar Hardware Wizard. This will take you through the steps to install the necessary drivers for your new hardware. You may need the installation media from the hardware manufacturer.

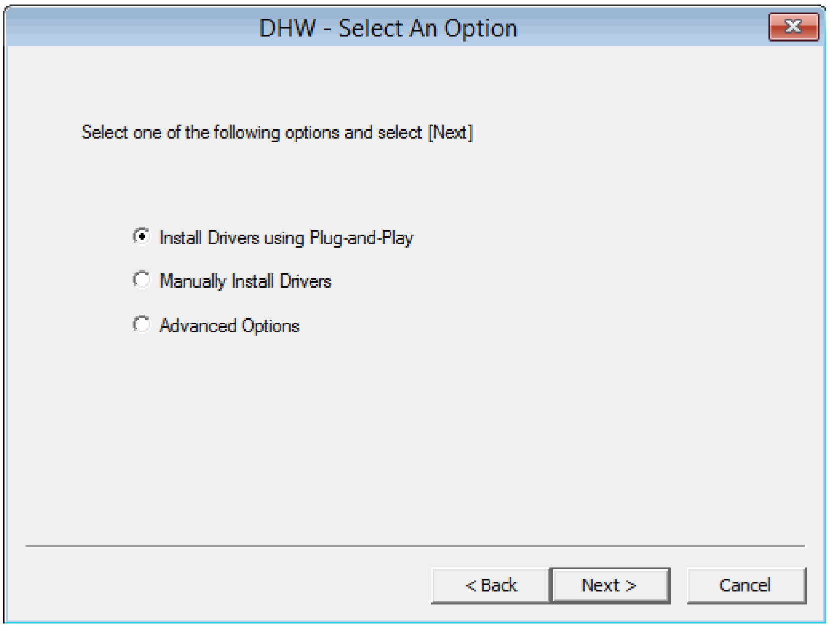
● Scan for only network and mass storage devices (Recommended)

○ Scan for all devices (Select only when asked by Cristie support)

Dissimilar Hardware Wizard - Version 7.2.12973

Copyright (c) 2003-2014 Cristie Software Limited
United Kingdom
http://www.cristie.com

Select the **'Install Drivers using Plug-and-Play'** option:



DHW - Select An Option

Select one of the following options and select [Next]

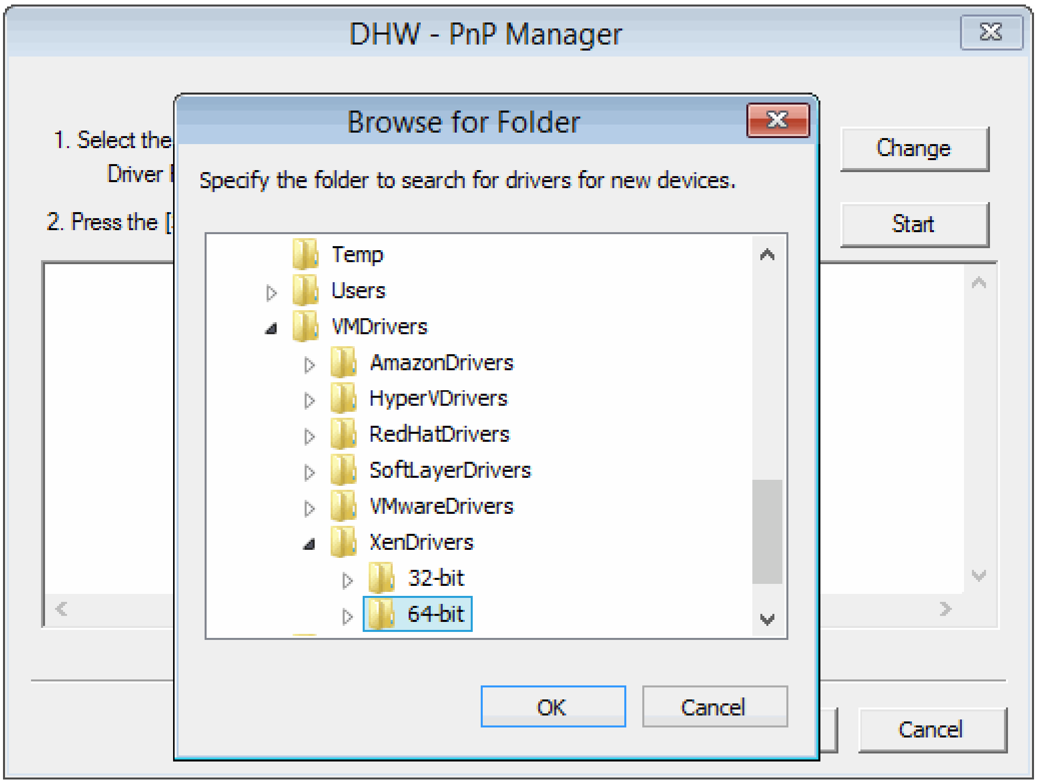
● Install Drivers using Plug-and-Play

○ Manually Install Drivers

○ Advanced Options

Install Drivers using Plug-and-Play

The window appears empty to start with. The set of drivers located on the recovery CD is the default choice, but in practice they should not be used. Instead, change the driver search path to where you have actually located your drivers (for example, to a network share or another CD) with the **Change** command button.



DHW - PnP Manager

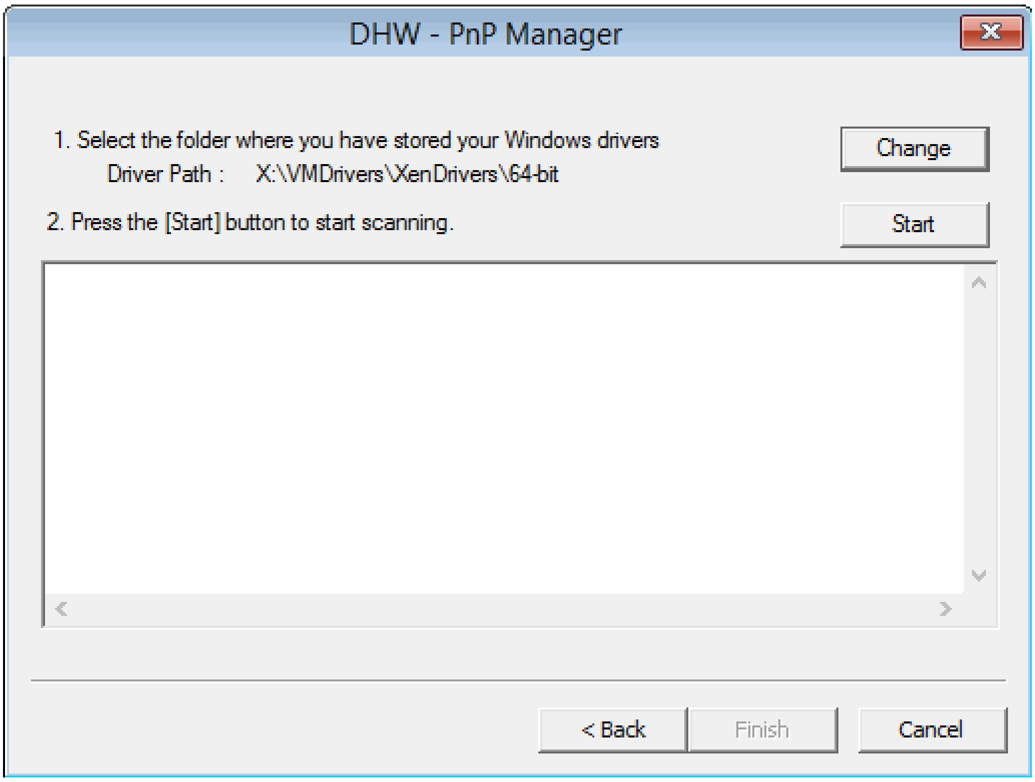
1. Select the
Driver

2. Press the [

Browse for Folder

Specify the folder to search for drivers for new devices.

In the example above, the driver search path is changed to the VMware drivers on the WinPE boot CD. Begin the PnP driver detection by clicking Start.

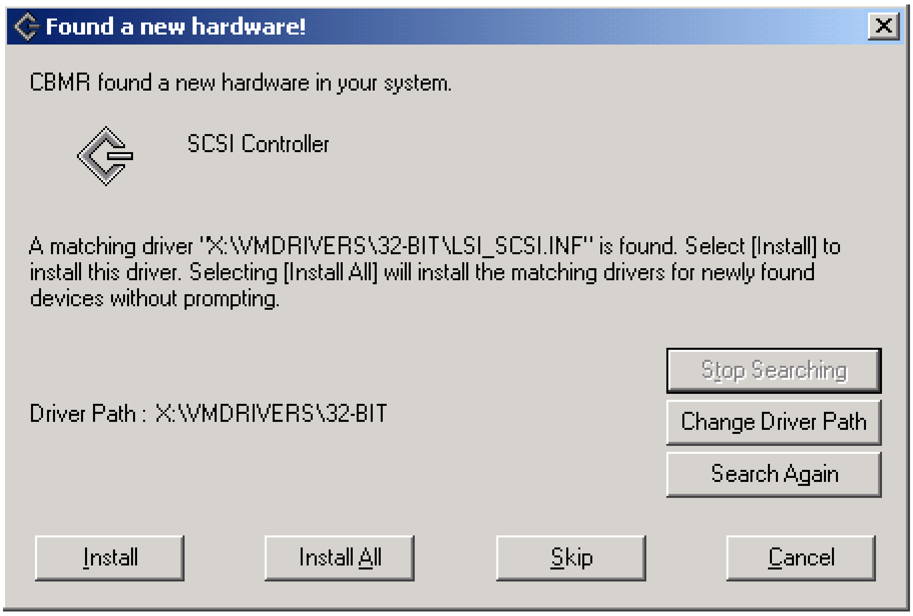


DHW - PnP Manager

1. Select the folder where you have stored your Windows drivers
   Driver Path : X:\VMDrivers\XenDrivers\64-bit

2. Press the [Start] button to start scanning.

The process checks the devices that it can detect and when it finds one that does not have a driver loaded, it will offer to install it. The example below shows an LSI SCSI device being detected:



Found a new hardware!

CBMR found a new hardware in your system.

SCSI Controller

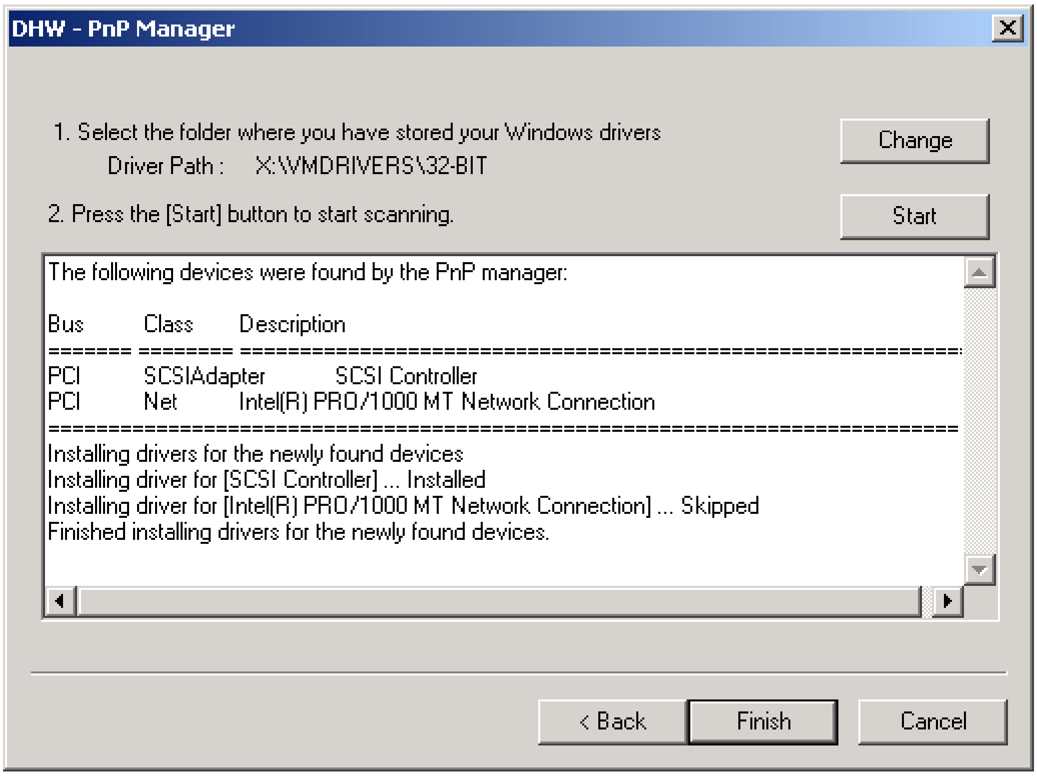
A matching driver "X:\VMDRIVERS\32-BIT\LSI_SCSI.INF" is found. Select [Install] to install this driver. Selecting [Install All] will install the matching drivers for newly found devices without prompting.

Driver Path : X:\VMDRIVERS\32-BIT

If you are satisfied that the found driver path is correct, click on Install and the driver will be installed. The device scan will continue and may find, for example, other mass storage or network devices. Follow the steps above to install.

Drivers are usually .sys files. The .inf files define which driver files need to be loaded for a given device. You may need to confirm the location of the driver files for each device, or possibly find the path where they are stored. When you have the correct path, click on OK and the Wizard will look for more.

Once all of the drivers of the detected devices have been processed, the Wizard will indicate that the installation has finished. Click on Finish to proceed.



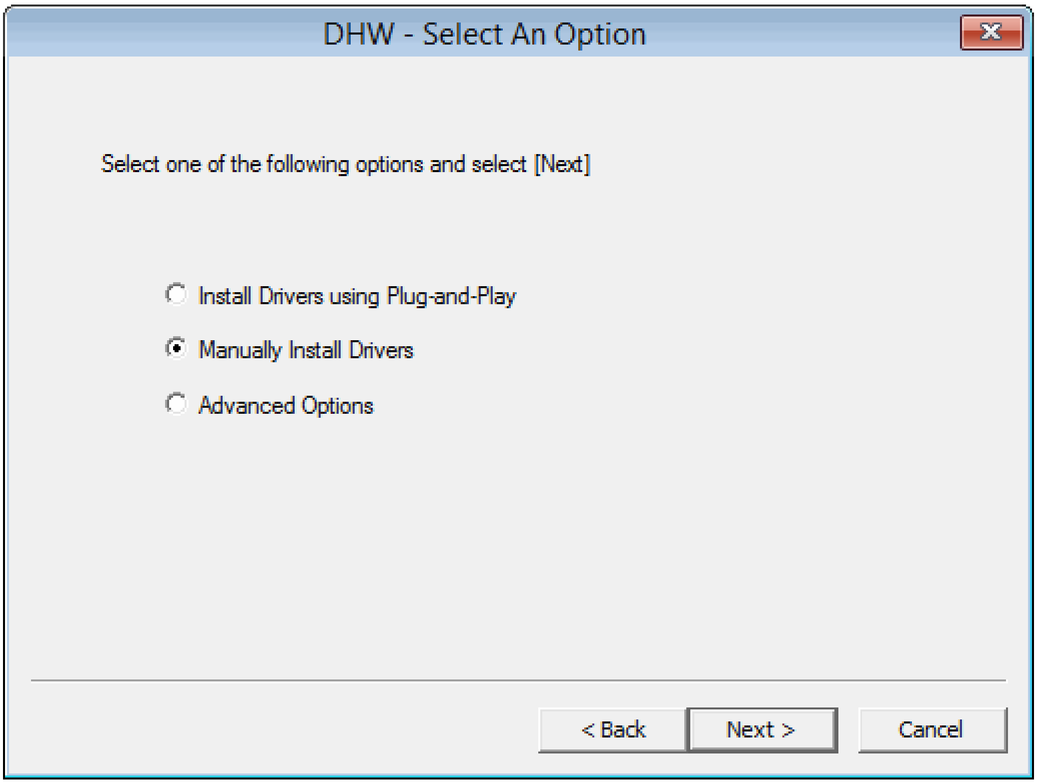
1. Select the folder where you have stored your Windows drivers
Driver Path : X:\VMDRIVERS\32-BIT

2. Press the [Start] button to start scanning.

```
The following devices were found by the PnP manager:

Bus      Class      Description
======= ======== ================================================================
PCI      SCSIAdapter      SCSI Controller
PCI      Net      Intel(R) PRO/1000 MT Network Connection
================================================================================
Installing drivers for the newly found devices
Installing driver for [SCSI Controller] ... Installed
Installing driver for [Intel(R) PRO/1000 MT Network Connection] ... Skipped
Finished installing drivers for the newly found devices.
```

Manual Installation

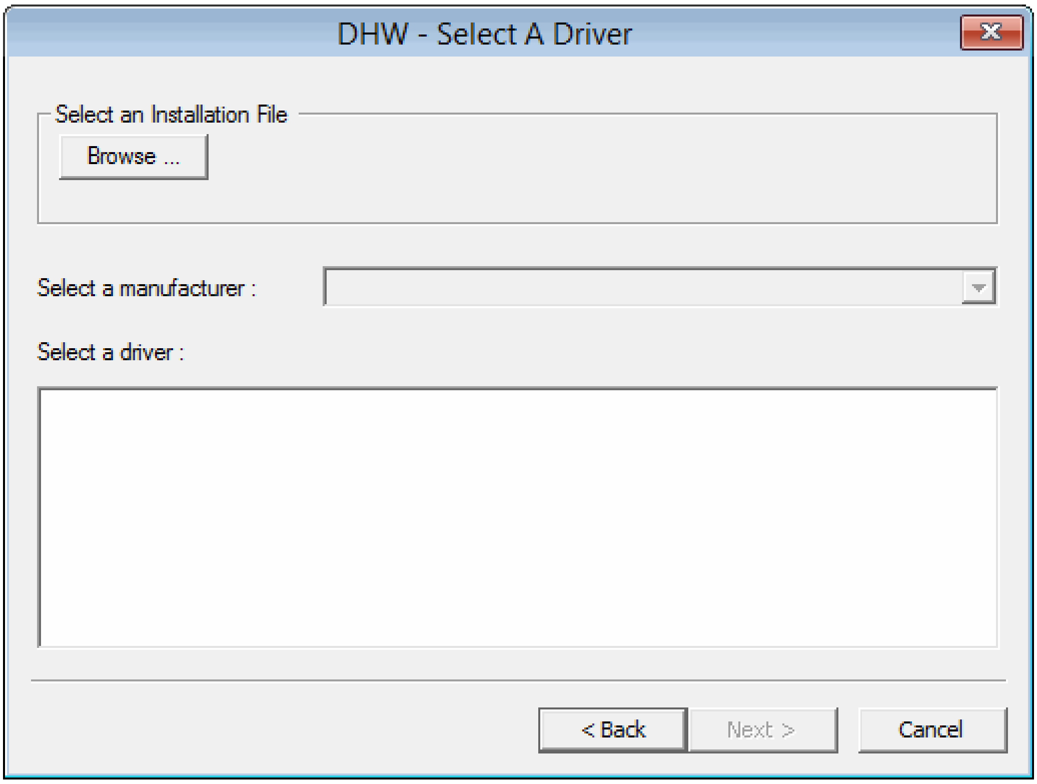
Typically, you would only manually install a driver for a CPU/HAL change. Select **'Manually Install Drivers'** from the option menu:



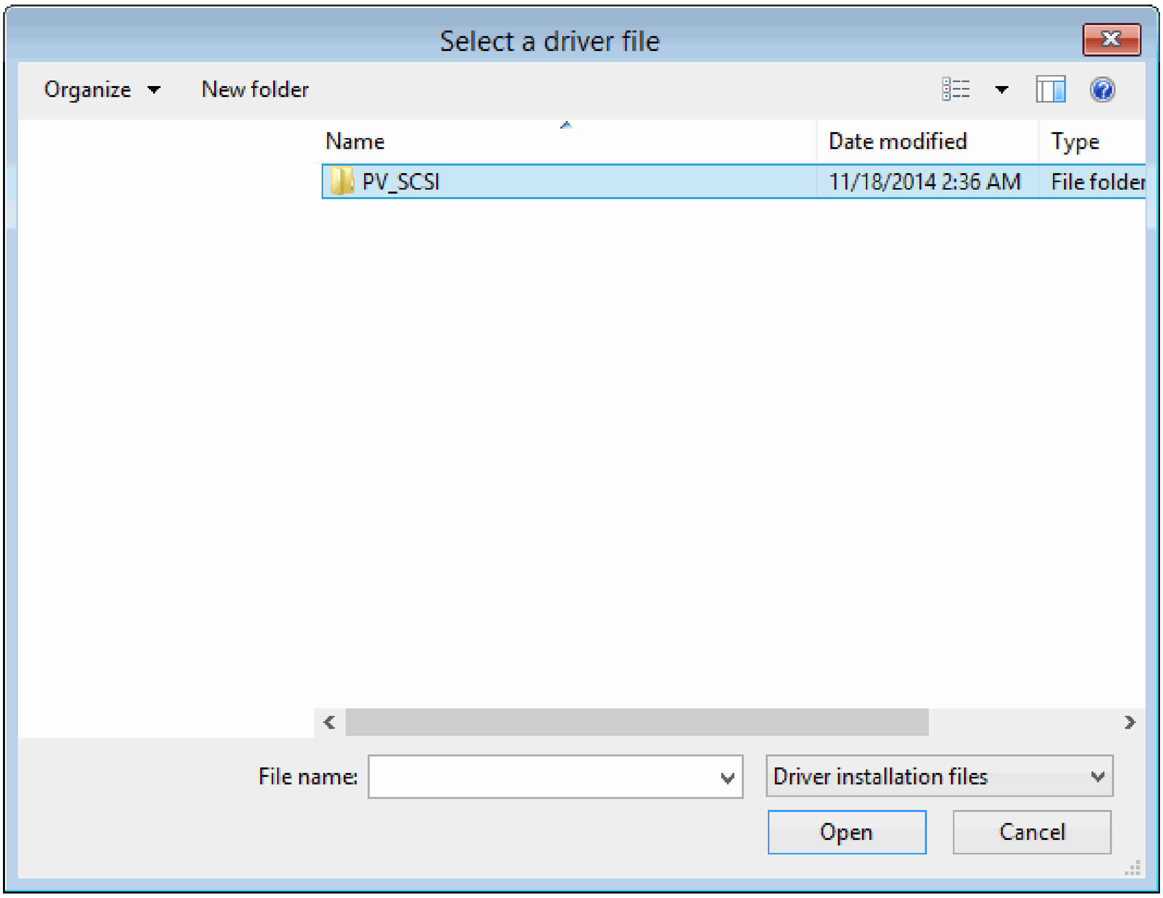
Select one of the following options and select [Next]

○ Install Drivers using Plug-and-Play
● Manually Install Drivers
○ Advanced Options

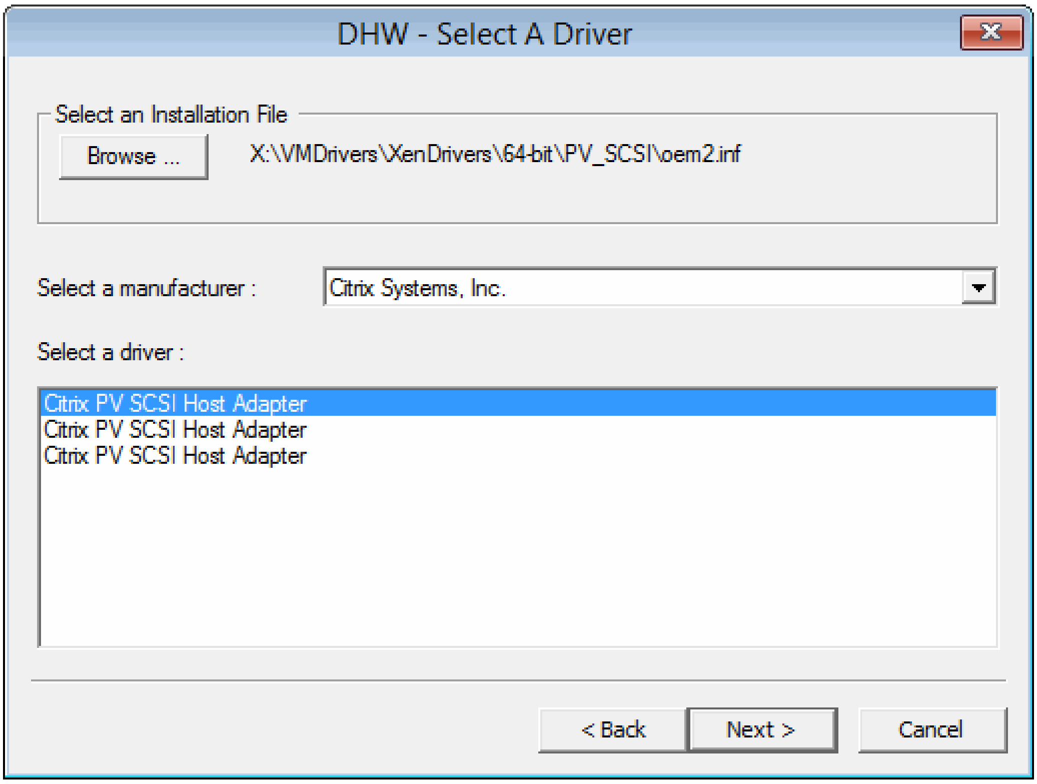
Then select Next>.



Select Browse... to locate the driver or HAL file you need by browsing to the appropriate folder that holds the .inf file. If you need to load the driver from another machine, then you can browse to a share on that machine and then to the appropriate folder.



Here we are selecting the Citrix PV SCSI controller driver:



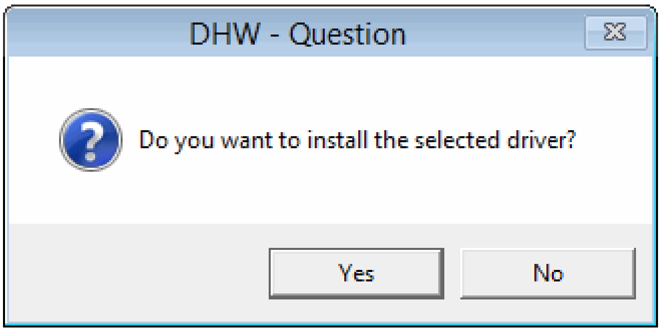
X:\VMDrivers\XenDrivers\64-bit\PV_SCSI\oem2.inf

Select a manufacturer : Citrix Systems, Inc.

Select a driver :

Citrix PV SCSI Host Adapter
Citrix PV SCSI Host Adapter
Citrix PV SCSI Host Adapter

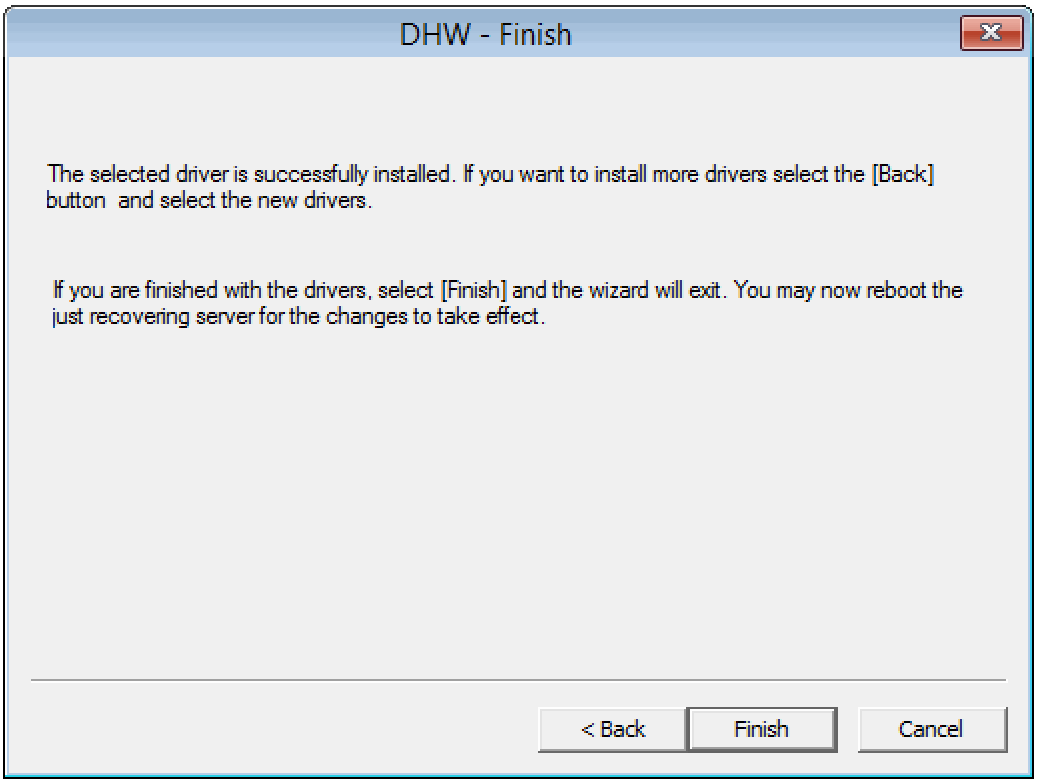
The Wizard allows you to select drivers that are grouped by manufacturer. Select the actual driver that you wish to install and click Next>.



Do you want to install the selected driver?

After you confirm the selection, the Wizard determines which files need to be installed. You are given the opportunity to change the location from which they are loaded if required..

When the drivers have been installed, the Wizard allows you to go back to install another device driver or Finish the process.



The selected driver is successfully installed. If you want to install more drivers select the [Back] button and select the new drivers.

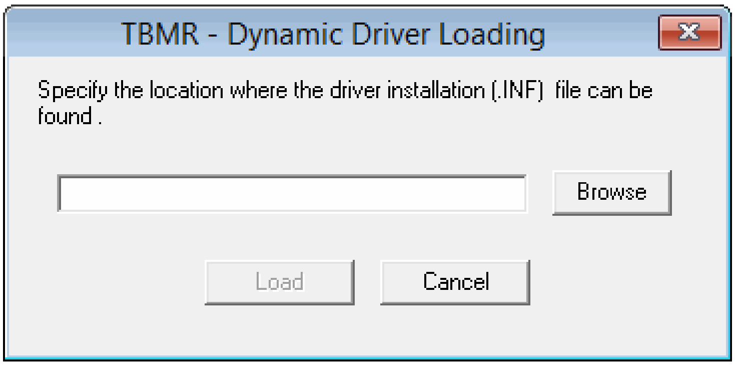
If you are finished with the drivers, select [Finish] and the wizard will exit. You may now reboot the just recovering server for the changes to take effect.

6.2.4.3 Load a Driver

This option allows a **new mass storage** or **Network card driver** to be loaded into the WinPE 2 or WinPE 5 environment. Use this when WinPE 2 or WinPE 5 does not have a built-in driver for your hardware.

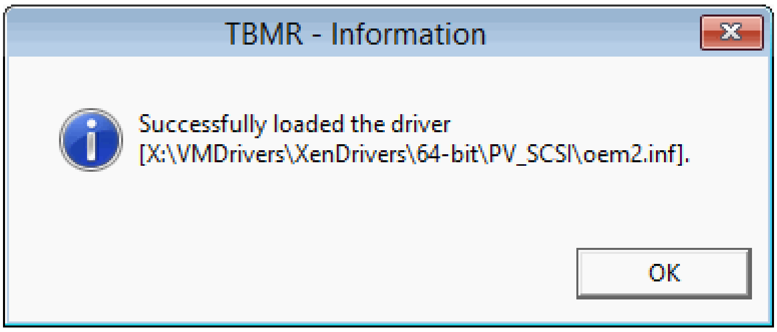
For example, if the DR environment does not show any disks to be recovered, you can inject a new mass storage device driver for the device and retry the DR Wizard.

You will be prompted for the location of the driver INF file:



Specify the location where the driver installation (.INF) file can be found .

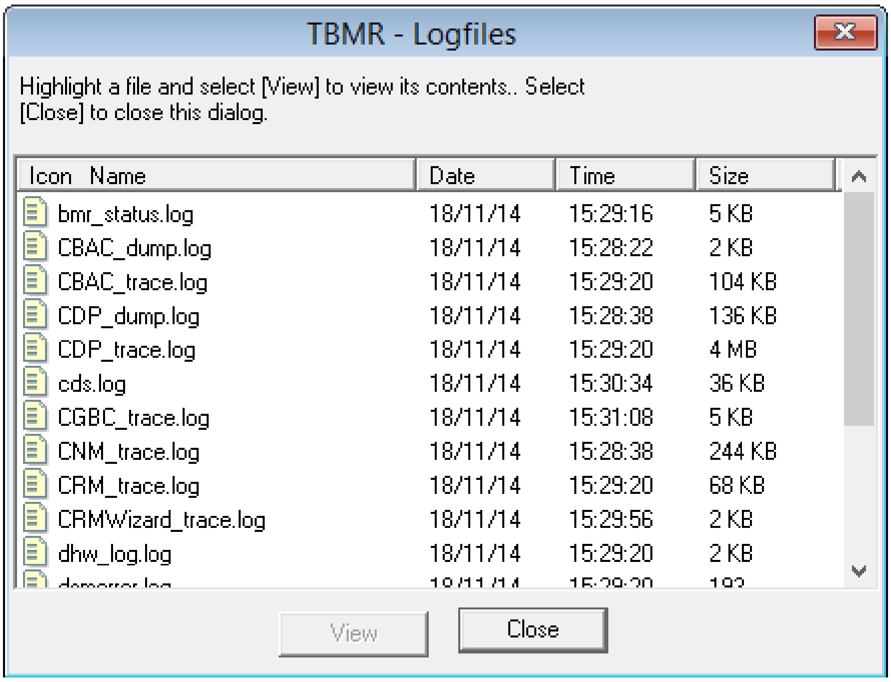
The INF file and other associated driver files (such as the .SYS file) can be located on a CD, USB device or a network share. The following confirmation dialogue is displayed if the driver is loaded successfully:



Successfully loaded the driver [X:\VMDrivers\XenDrivers\64-bit\PV_SCSI\oem2.inf].

6.2.5 Show a list of log files for viewing

This main menu option allows the log files produced during the recovery to be viewed using Notepad. Normally, viewing this information is only required to diagnose a problem with the recovery.



Highlight a file and select [View] to view its contents.. Select [Close] to close this dialog.

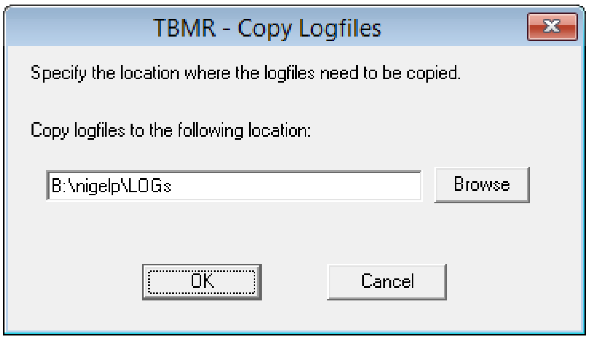
Icon Name	Date	Time	Size
bmr_status.log	18/11/14	15:29:16	5 KB
CBAC_dump.log	18/11/14	15:28:22	2 KB
CBAC_trace.log	18/11/14	15:29:20	104 KB
CDP_dump.log	18/11/14	15:28:38	136 KB
CDP_trace.log	18/11/14	15:29:20	4 MB
cds.log	18/11/14	15:30:34	36 KB
CGBC_trace.log	18/11/14	15:31:08	5 KB
CNM_trace.log	18/11/14	15:28:38	244 KB
CRM_trace.log	18/11/14	15:29:20	68 KB
CRMWizard_trace.log	18/11/14	15:29:56	2 KB
dhw_log.log	18/11/14	15:29:20	2 KB
demerror.log	18/11/14	15:29:20	193

The important files are (this is not an exhaustive list):

6.2.6 Copy log files to removable media or network location

Since all log and error files generated during the recovery are only transitory (ie. they are lost as soon as the Windows WinPE 2 or WinPE 5 environment exits), this option allows you to copy the files to a local device or remote network share for permanent record before booting the recovered system.

Use the **Cristie Network Configurator** utility to setup a network share first. All the files are compressed into a single ZIP file so that they can be easily sent to Cristie Support when required.



TBMR - Copy Logfiles

Specify the location where the logfiles need to be copied.

Copy logfiles to the following location:

B:\nigelp\LOGs

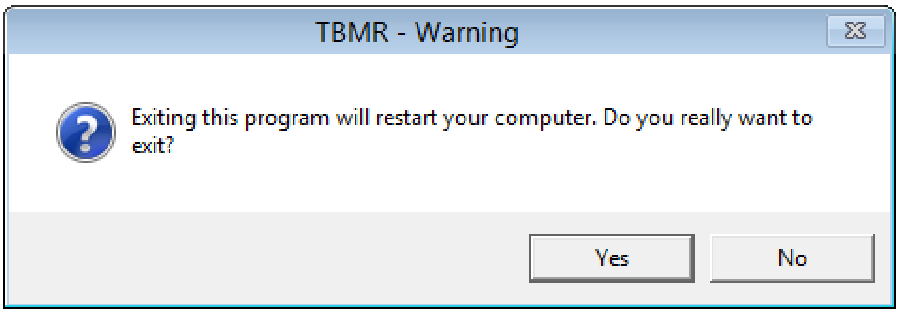
The example shows files being copied to a network share **A:**.

Note: the logs are automatically written back to the recovered system after a successful recovery. They are saved to the TBMR installation sub-folder 'Temp'.

6.2.7 Reboot

After a successful recovery, select **Reboot** to exit the Windows WinPE 2 or WinPE 5 environment and boot the recovered system.

Press Yes on the confirmation warning to restart or No to continue running the DR console. If you choose to reboot, the recovered Windows system will boot into the OS:



TBMR - Warning

Exiting this program will restart your computer. Do you really want to exit?

7 Appendicies

7.1 Windows 8.1/10 Storage Space and 2012/2012R2 Storage Pool Support

On Windows 2012, Windows 2012 R2, Windows 8.1 and Windows 10 based systems that are utilising the Storage Pool/Space feature, TBMR will support the backup of the Storage Pool/Space in a passive manner.

This is achieved by storing all the data contained on the Storage Pool/Space as a single volume, that will then be stored in the backup location, during the process of performing your backup. The actual physical construction of the storage pool/space will not be retained in this process.

The process required to protect the data contained on a Storage Pool/Space will typically consist of the following steps:

1. Create a TBMR backup of the system. (This consists of the local partitions, storage pools and the System State)

2. Recover the backup using the TBMR recovery media, choosing just to recover just the Operating System and associated System State.

3. Reboot the recovered system.

> ***Note: When recovering to the original machine, the Storage Pool/Space should still be available. This enables step 4 below to be skipped.***

4. Open Server Manager (Windows 2012/2012 R2) or Control Panel (Windows 8.1/10) and create a Storage Pool/Space. (This does not need to be a replica of the original Storage Pool/Space).

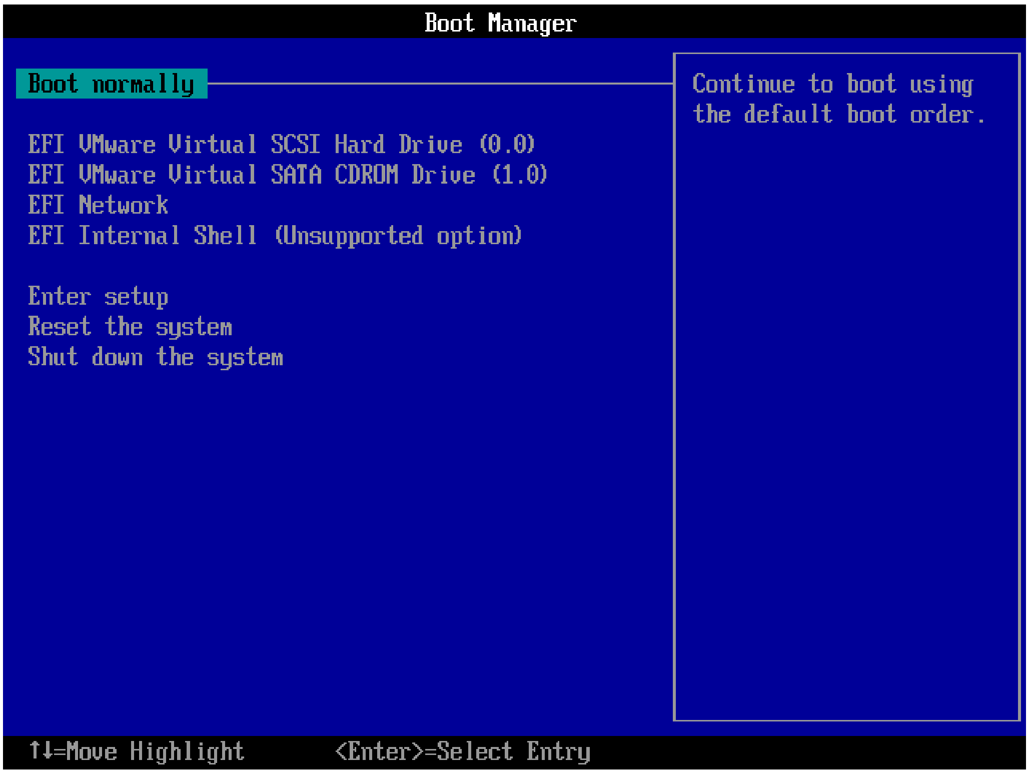
5. Launch TSM and recover the data from the backup location to an available Storage Pool/Space.

7.2 UEFI and MBR BIOS support

TBMR has the ability to convert a legacy BIOS boot configuration to a more modern EFI based boot configuration during a Windows clone operation. It does this automatically by creating an extra EFI partition on the detected boot disk and adding the requisite boot files to this partition. Regardless of the original boot disk type it will be converted to GPT format in the clone target system.

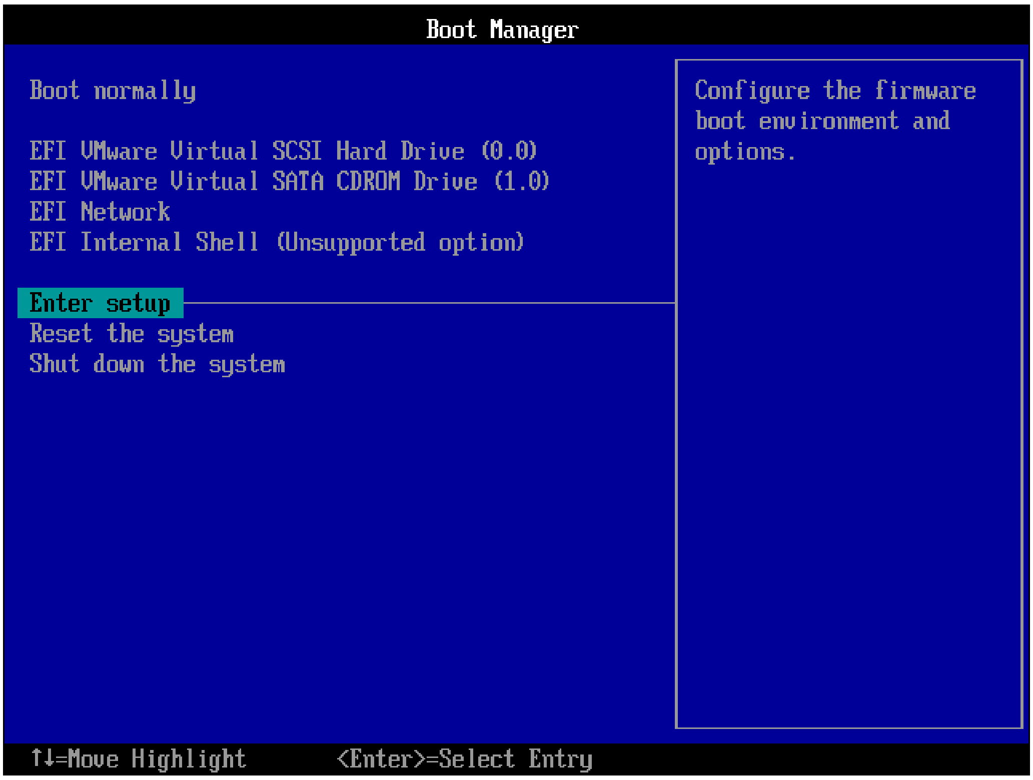
> ***Note: This EFI BIOS conversion feature is only supported on compatible target environments such as physical machines, VMware Workstation™ and VMware vSphere™.***

Prior to booting the new EFI clone target manual intervention will be required to configure a new boot option. An example of this obtained from a VMware Workstation™ clone target is shown below. Other virtual environments will be similar.



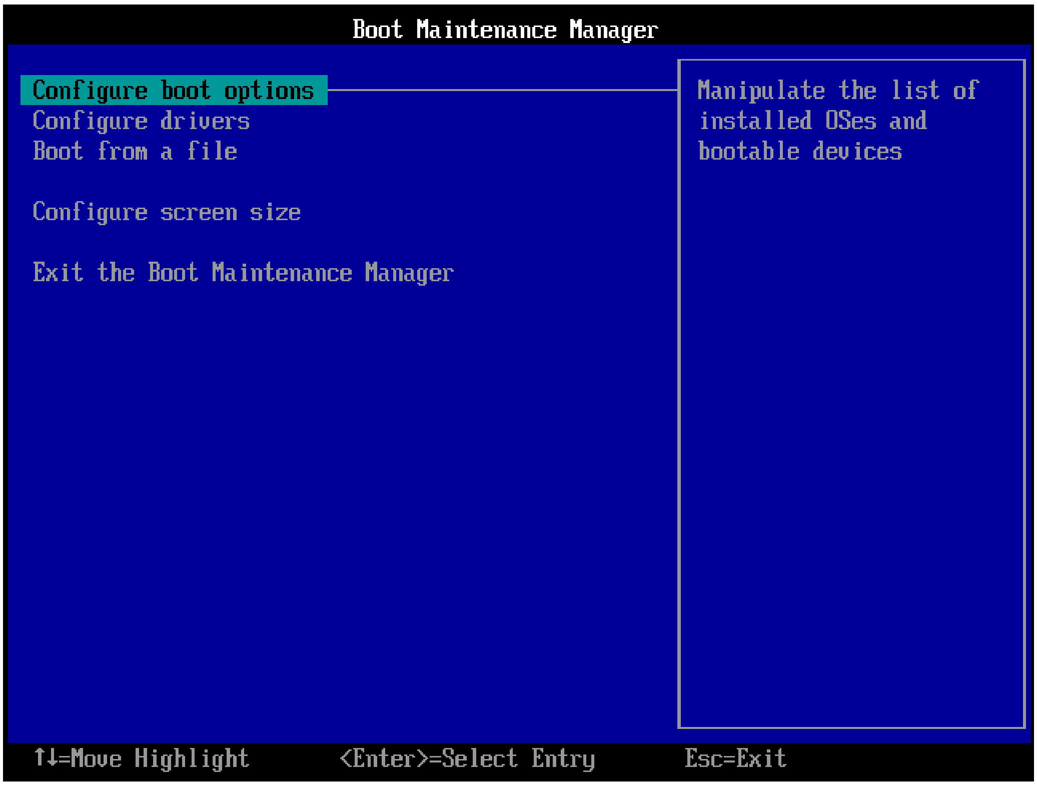
```
                          Boot Manager

Boot normally                                   Continue to boot using
                                                the default boot order.
EFI VMware Virtual SCSI Hard Drive (0.0)
EFI VMware Virtual SATA CDROM Drive (1.0)
EFI Network
EFI Internal Shell (Unsupported option)

Enter setup
Reset the system
Shut down the system

↑↓=Move Highlight       <Enter>=Select Entry
```

Default EFI bios



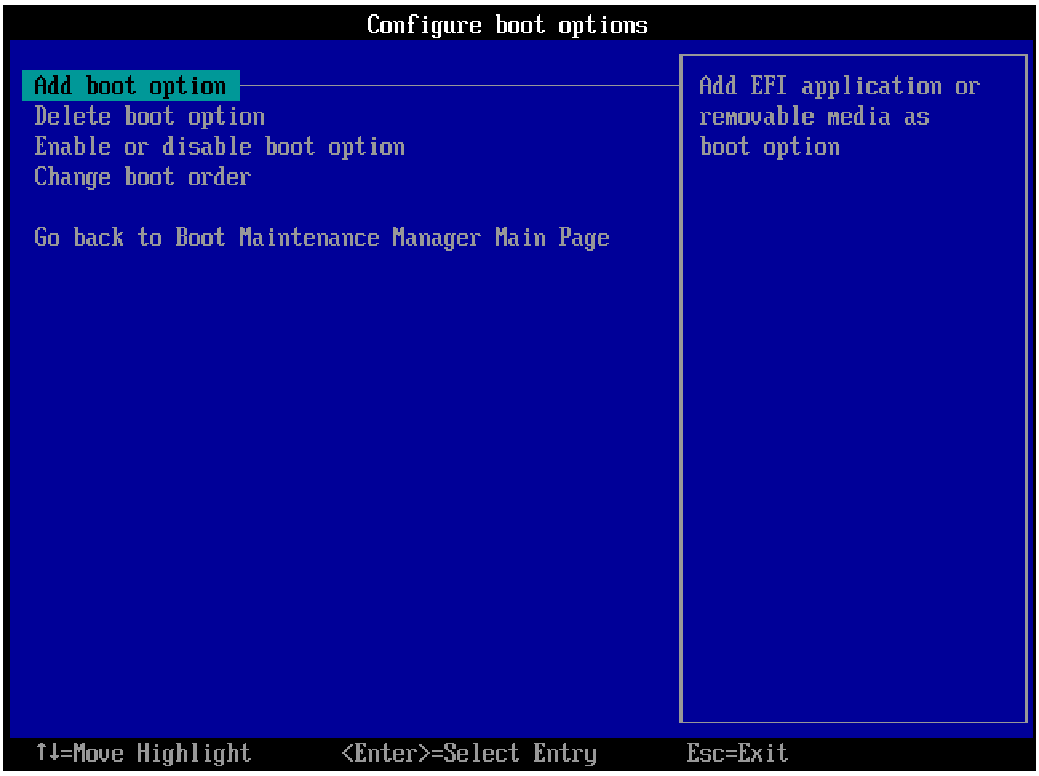
```
                          Boot Manager

Boot normally                                   Configure the firmware
                                                boot environment and
EFI VMware Virtual SCSI Hard Drive (0.0)        options.
EFI VMware Virtual SATA CDROM Drive (1.0)
EFI Network
EFI Internal Shell (Unsupported option)

Enter setup
Reset the system
Shut down the system

↑↓=Move Highlight       <Enter>=Select Entry
```

Select Enter Setup option



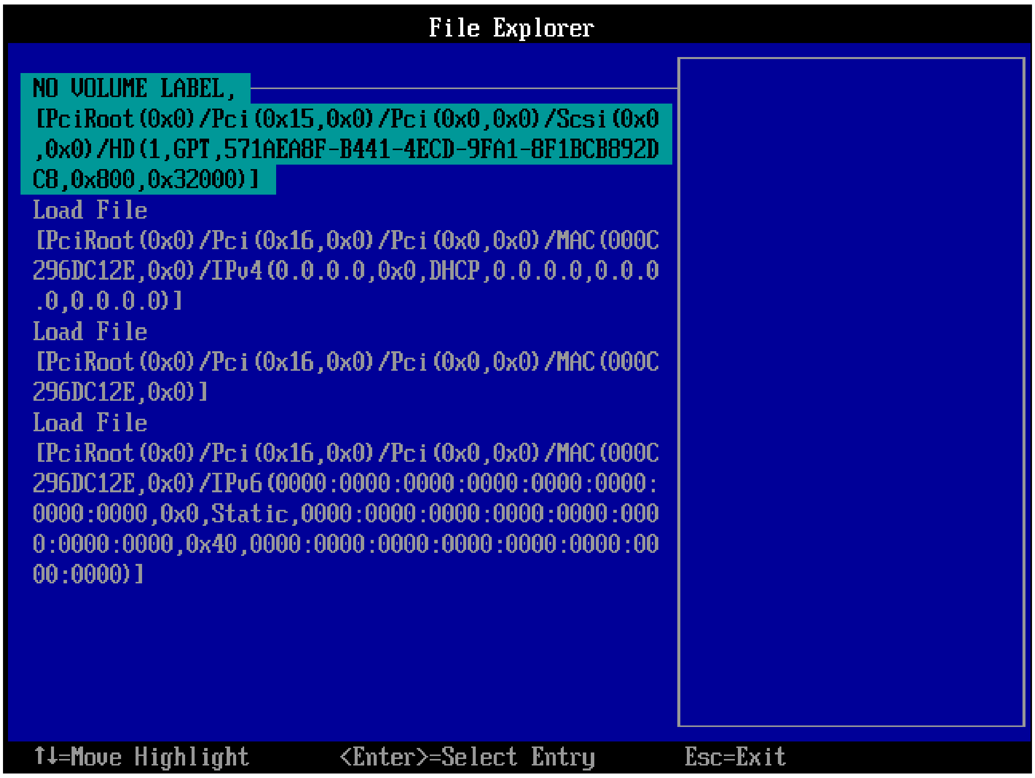
```
                    Boot Maintenance Manager

 Configure boot options                       Manipulate the list of
 Configure drivers                            installed OSes and
 Boot from a file                             bootable devices

 Configure screen size

 Exit the Boot Maintenance Manager

 ↑↓=Move Highlight      <Enter>=Select Entry      Esc=Exit
```

Select Configure boot options



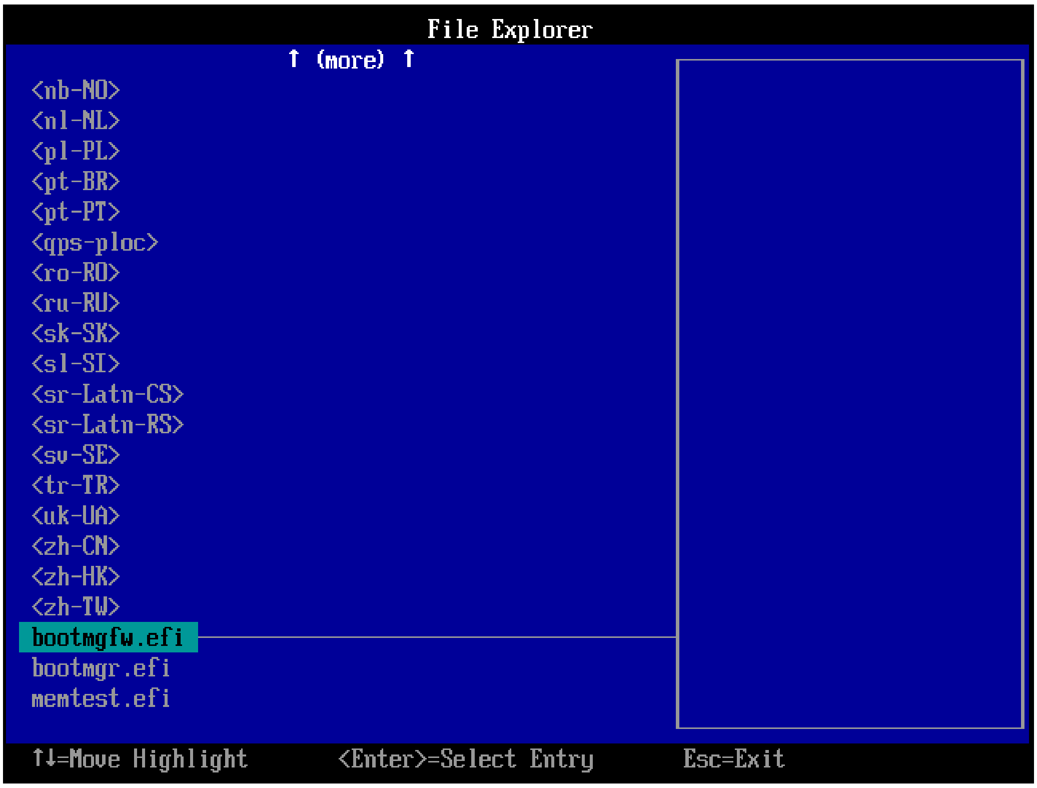
```
                      Configure boot options

 Add boot option                              Add EFI application or
 Delete boot option                           removable media as
 Enable or disable boot option                boot option
 Change boot order

 Go back to Boot Maintenance Manager Main Page

 ↑↓=Move Highlight      <Enter>=Select Entry      Esc=Exit
```

Select add boot option



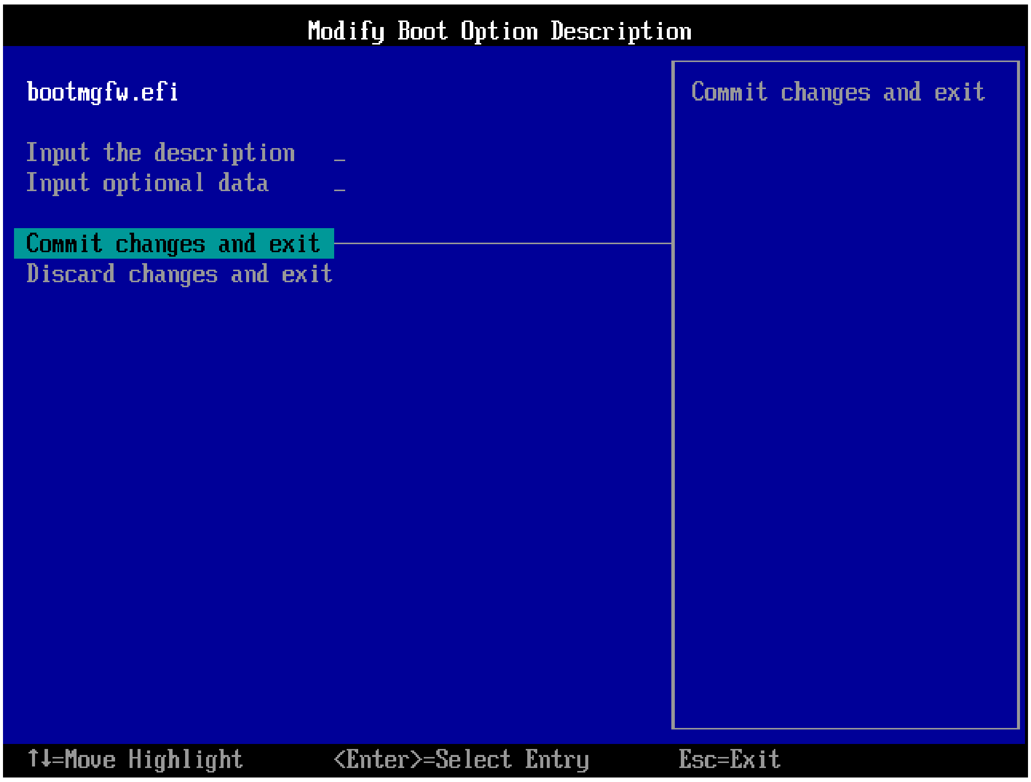
```
                         File Explorer

NO VOLUME LABEL,
[PciRoot(0x0)/Pci(0x15,0x0)/Pci(0x0,0x0)/Scsi(0x0
,0x0)/HD(1,GPT,571AEA8F-B441-4ECD-9FA1-8F1BCB892D
C8,0x800,0x32000)]
Load File
[PciRoot(0x0)/Pci(0x16,0x0)/Pci(0x0,0x0)/MAC(000C
296DC12E,0x0)/IPv4(0.0.0.0,0x0,DHCP,0.0.0.0,0.0.0
.0,0.0.0.0)]
Load File
[PciRoot(0x0)/Pci(0x16,0x0)/Pci(0x0,0x0)/MAC(000C
296DC12E,0x0)]
Load File
[PciRoot(0x0)/Pci(0x16,0x0)/Pci(0x0,0x0)/MAC(000C
296DC12E,0x0)/IPv6(0000:0000:0000:0000:0000:0000:
0000:0000,0x0,Static,0000:0000:0000:0000:0000:000
0:0000:0000,0x40,0000:0000:0000:0000:0000:0000:00
00:0000)]

↑↓=Move Highlight      <Enter>=Select Entry      Esc=Exit
```

Select boot partition in File Explorer



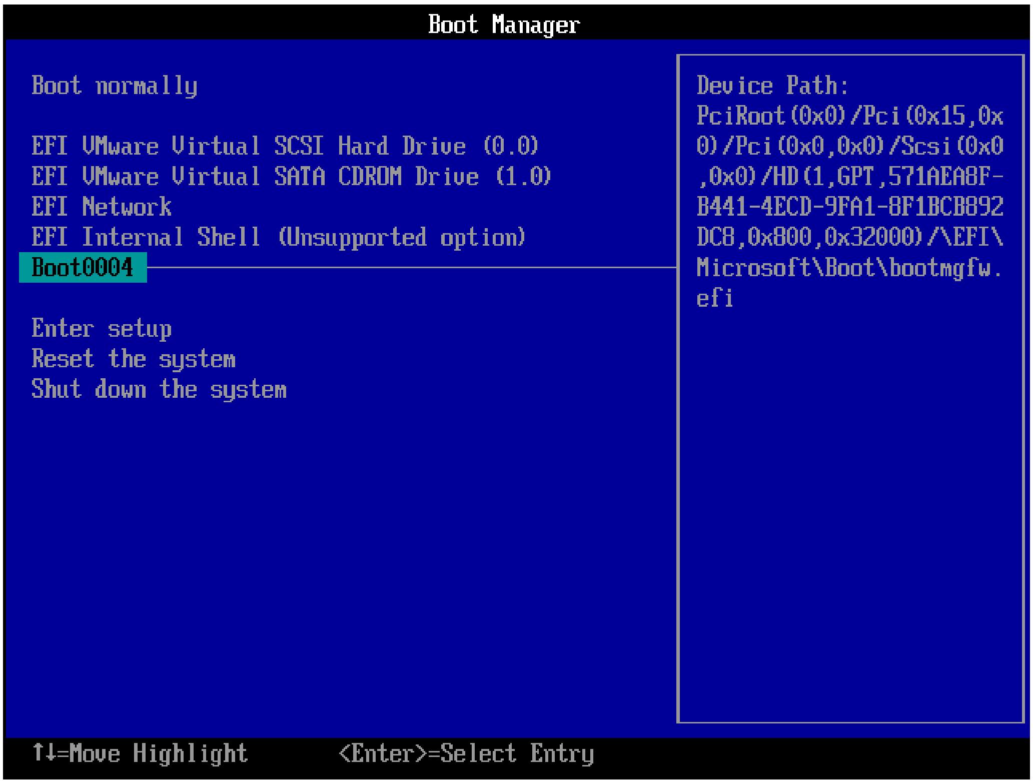
```
                         File Explorer
                 ↑ (more) ↑
<nb-NO>
<nl-NL>
<pl-PL>
<pt-BR>
<pt-PT>
<qps-ploc>
<ro-RO>
<ru-RU>
<sk-SK>
<sl-SI>
<sr-Latn-CS>
<sr-Latn-RS>
<sv-SE>
<tr-TR>
<uk-UA>
<zh-CN>
<zh-HK>
<zh-TW>
bootmgfw.efi
bootmgr.efi
memtest.efi

↑↓=Move Highlight      <Enter>=Select Entry      Esc=Exit
```

Select EFI boot image



```
                    Modify Boot Option Description

 bootmgfw.efi                                      Commit changes and exit

 Input the description   _
 Input optional data     _

 Commit changes and exit
 Discard changes and exit

 ↑↓=Move Highlight       <Enter>=Select Entry       Esc=Exit
```

Modify boot option description and commit



```
                             Boot Manager

 Boot normally                                     Device Path:
                                                   PciRoot(0x0)/Pci(0x15,0x
 EFI VMware Virtual SCSI Hard Drive (0.0)          0)/Pci(0x0,0x0)/Scsi(0x0
 EFI VMware Virtual SATA CDROM Drive (1.0)         ,0x0)/HD(1,GPT,571AEA8F-
 EFI Network                                       B441-4ECD-9FA1-8F1BCB892
 EFI Internal Shell (Unsupported option)           DC8,0x800,0x32000)/\EFI\
 Boot0004                                          Microsoft\Boot\bootmgfw.
                                                   efi
 Enter setup
 Reset the system
 Shut down the system

 ↑↓=Move Highlight       <Enter>=Select Entry
```

New boot option configured

This feature supports clone source systems with a split boot configuration (i.e. *Boot* and *System* partitions on different disks or different *Boot/System* partitions on the same disk). The split boot configuration will be replicated on the clone target subject to the GPT conversion mentioned above.

This feature also supports source systems configured with a Windows dynamic boot volume (e.g. a dynamic mirror).

It is also possible to clone an EFI based source system to a target configured with a legacy BIOS. In this case any GPT based boot disks will be converted to legacy MBR disks and the EFI partition removed.

8 Cristie Technical Support

If you have any queries or problems concerning your Bare Machine Recovery for TSM product, please contact **Cristie Technical Support**. To assist us in helping with your enquiry, make sure you have the following information available for the person dealing with your call:

- TBMR Version Number
- Installed OS type and version
- Any error message information (if appropriate)
- Description of when the error occurs
- All Cristie log files relating to the source or recovery machine. This is very important to help us provide a quick diagnosis of your problem

Contact Numbers - Cristie Software (UK) Limited

Technical Support	+44 (0) 1453 847 009
Toll-Free US Number	1-866-TEC-CBMR (1-866-832-2267)
Knowledgebase	kb.cristie.com
Sales Enquiries	sales@cristie.com
Email	support@cristie.com
Web	www.cristie.com

Support Hours

05:00 to 17:00 Eastern Standard Time (EST) Monday to Friday

Out-of-Hours support available to customers with a valid Support Agreement - Severity 1 issues* only

UK Bank Holidays** classed as Out-of-Hours - Severity 1 issues only.

*Severity 1 issues are defined as: a production server failure, cannot perform recovery or actual loss of data occurring.
**For details on dates of UK Bank Holidays, please see www.cristie.com/support/

Cristie Software Limited are continually expanding their product range in line with the latest technologies. Please contact the Cristie Sales Office for the latest product range. Should you have specific requirements for data storage and backup devices, then Cristie's product specialists can provide expert advice for a solution to suit your needs.