ABMR

Bare Machine Recovery for Dell EMC Avamar

Quick Start Guide

For Solaris

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Version 8.5

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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   About ABMR

ABMR for Solaris provides a file-based backup and disaster recovery (DR) system for Solaris 9, 10 and 11 on Sparc and Solaris 10 and 11 (excluding 11.4) on Intel (64-bit only).

The process of backing up and recovering a Solaris machine comprises three steps:

1. **Create a bootable recovery environment from the running machine**

2. **Perform the Disaster Recovery (DR) backup**

3. **Perform the recovery**

Step 1 of the above actions may be performed using the Graphical User Interface run from the command `abmr`. Step 2 is performed using the Dell EMC Avamar product. Please consult manuafactuer's documentation on how to set up scheduled and scripted backups in this case. Step 3 is performed using the DR environment created from step1.

Use the command `man abmr` to get an overview of ABMR functionality and the command line tools available.

Note: ABMR must be installed and run by a user that has root access

3 System Requirements

ABMR for Solaris supports Solaris 9, 10 and 11 on Sparc hardware and Solaris 10 and 11 only on Intel hardware.

> *Note: Solaris 11.4 Intel is not supported by ABMR.*

ABMR requires the following minimum hardware requirements:

Disk Space	16MB
Memory	256MB

ABMR for Solaris supports the following:

Platform	Sparc			Intel (64-bit)	
Solaris Version	9	10	11	10	11 (excluding 11.4)
Dell EMC Avamar Client Version	6.1 - 7.5	6.1 - 18.2	6.1 - 18.2	6.1 - 18.2	6.1 - 18.2
Dell EMC Avamar Server Version	6.1.1-87 7.0.0-396 7.1.0-370 7.3.0-211 7.5.0-183 18.1.0-33 18.2.100-134 19.1.100-38			6.1.1-87 7.0.0-396 7.1.0-370 7.3.0-211 7.5.0-183 18.1.0-33 18.2.100-134 19.1.100-38	6.1.1-87 7.0.0-396 7.1.0-370 7.3.0-211 7.5.0-183 18.1.0-33 18.2.100-134 19.1.100-38
Veritas Storage Foundation	5.0 - 6.1				

Prerequisites

Name	Version	Sun Package	Open Source Package
GCC Libraries	3.4	SUNWgccruntime	SMClgcc
Libxml2	2.4.23	SUNWlxml	SMClxml2
Mkisofs	2.01	SUNWmkcd	SMCcdrt
Programming Tools	Any	SUNWtoo	-

These tools are included in modern Solaris distributions and, for the open source packages, on the installation media. In this case, package installations are independent so both may be installed simultaneously.

4   Installation

On default installations of Solaris 9, 10 and 11, all of the necessary prerequisites should be available.

However, if a minimal installation was performed or if an earlier operating system is in use, then the prerequisites must be checked.

4.1   Checking Prerequisites

The `pkginfo` tool may be used to determine whether a package is installed and the `pkgchk` tool can verify the files for the given package are correct. For example:

```
> pkginfo SUNWmkcd
> pkgchk SUNWmkcd
```

Additionally, the ABMR installation media contains a **'checkpackages.sh'** script, which will attempt to determine whether the necessary files are installed:

```
> cd ./abmr-8.5.2020/
> ./checkpackages.sh
```

Finally, it is recommended that the core system files are also checked, as these are required to build the recovery environment. This can be performed by checking the core Solaris package:

```
> pkgchk -n SUNWcsr
```

4.2   Installing Files

ABMR can be installed using the Solaris packaging system. After unpacking the archive or mounting the CD to a directory, change to this directory using `'cd'` then the following command will install ABMR 8.5 for Solaris:

```
> pkgadd -G -d ./CSTEabmr-8.5.2020-i86pc.pkg
```
for Intel machines

and

```
> pkgadd -G -d ./CSTEabmr-8.5.2020-sparc.pkg
```
in the case of Sparc hardware

This release of ABMR is not able to **upgrade** an existing installation (say version 7.5.1). You must first uninstall the existing version and then install this latest version. If you wish to preserve your current settings during this process (e.g. Backup Location definitions), you should first save these settings and then re-instate after the new installation is complete.

4.3   License

Following the instructions in this section will result in a standard 30-day trial license being installed. **Cristie** provide a 30 day trial license so that the product can be fully evaluated before purchase.

If you have purchased a full licencs, you will have been sent an activation code, these can be used to activate the product with the `licmgr` tool as follows:

```
> licmgr -p abmr --act YU5ZQCSR-C962R6YD-PYKKTSA5-ZFHJ7FKN
```

More information about the `licmgr` tool can be found by typing `'man licmgr'`.

4.4 Uninstall

The package may be uninstalled by running the following command:

```
>pkgrm CSTEabmr
```

4.5 Zones

As Solaris **Zones** are not bootable from installation media, ABMR is not applicable to Zone backup *inside* a zone. However, all Zones may be fully backed up and restored with the host operating system.

5   Product Licensing

When first installed, ABMR may be used for a trial period of 30 days. During that period ABMR is fully functional. If the software is subsequently un-installed and later re-installed on the same system, the 30 day period continues from the date of the first installation.

If you wish to use the software beyond the trial period, you must register and purchase a license from Cristie Software Ltd.. Alternatively, and in special circumstances, Cristie Software Ltd. may extend the license period if you wish to trial the software beyond that period.

If you purchase the product, then contract and license activation codes will be available on the Cristie Licensing Portal. Together these codes will enable you to fully activate the product.

The following sections discuss this in more detail.

5.1   Trial License

A 30-day trial license commences from the date of installation. The ABMR configuration file generator (**abmrcfg**) will not run after this period expires.

You may use the **Cristie License Manager** to add or inspect license details at any time. This is achieved by opening up a terminal and entering:

```
#
# licmgr -p abmr
```

Entering this command, will display the **Cristie License Manager**, that shows Machine attributes, Contract ID, the installed host System signature, the current Cristie product (ABMR in this case), the product version, the trial end date and the license Status.

```
==============================================================================
                        Cristie License Manager Version
                                       X.X
                    Copyright (C) 2012-2019 Cristie Software Limited
==============================================================================
    Machine attributes : {virtual, server}
            Contract ID : 0
              Signature : EKSEWPSC-L3AF7EWW-DFY9GH69-5Z48W7PJ
                Product : Bare Machine Recovery for XXXXXXXX (XBMR)
                Version : X.X
           Trial ends on : 2019-03-24

                 Status : Trial licence
```

The ABMR configuration file generator will become active again as soon as a full license has been purchased from Cristie Software Ltd. and the new contract and activation codes entered via the Cristie License Manager.

5.2 Full License

A Full license entitles the Customer to product support and upgrades for the duration of the license period.

To upgrade from the trial license to a full license, you need to apply for a full license activation code either via the Cristie Licensing Portal website or via the product Cristie License Manager. In either case you will need to first register an account on the Cristie Licensing Portal (located at https://portal.cristie.com/login). A Contract ID will be created and provided to you when you purchase a license.

These are the various codes used in the Cristie licensing process:

Contract ID: A 4-digit number supplied by Cristie Software Ltd. Sales during the license purchase process.
Agreement Number: Same as *Contract ID* at the moment.
Contract Code: 35-character contract code obtained from the Cristie Licensing Portal
Activation Code: 35-character support activation code obtained from the Cristie Licensing Portal

In special circumstances a 'bulk license' may be issued by Cristie Software Ltd. for customers that order a significant number of product licenses. Please contact your Cristie sales representative if you wish to discuss this service.

> *Note this discussion assumes that ABMR is already installed on a Customer production machine.*

5.2.1 Setting up a Cristie Licensing Portal account

To setup a new account on the Cristie Licensing Portal follow the following steps. To do this you will need your 4-digit Contract ID and contract setup password. These will be provided by email from Cristie Software Ltd. when you purchase a product license.

> *Note: Your Contract ID may have been supplied to you as your contract Agreement Number. In that case please use your Agreement number in place of the Contract ID throughout.*

1. On a suitable machine that has Internet access run a browser (e.g. Microsoft Internet Explorer on Windows or say Firefox on UNIX) and navigate to the Cristie Licensing Portal web page at https://portal.cristie.com/login. If accessing the internet on a Solaris machine use the the available installed browser.

Cristie Licensing Portal (Version 1.5)

cristie
software

Log in

User E-mail:	
Password:	

Log in   **Register**

Forgot Password?

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2. Select Register to create a new account. Enter your new account details (note this is an example):

Cristie Licensing Portal (Version 1.5)

cristie
software

Register a new user

E-mail ID:	test@cristie.com	*
User Name:	Nigel Poole	*
Password:	•••••••	*
Confirm password:	•••••••	*
Password reset question:	Mother's maiden name	* ⓘ
Password reset answer:	•••••••	* ⓘ
Contract/Agreement No.:	4	* ⓘ
Contract Password:	••••	* ⓘ
Address:	New Mill	*
	Chestnut Lane	
City:	Stroud	*
Zip or Postal Code:	GL5 3EH	*
State or County:	Gloucestershire	*
Country:	U.K	*

Fields with a * are mandatory

Create   **Cancel**

Microsoft GOLD CERTIFIED Partner | Advanced Business Partner | IBM. Tivoli. | GODADDY VERIFIED & SECURED VERIFY SECURITY

3. Then click Create. If successful the following is shown.
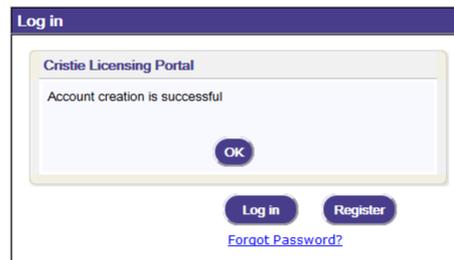
At this point you may now log in to the Cristie Licensing Portal using the E-mail ID and

password setup in the previous steps.

5.2.2   Manual Activation

The steps involved in manual activation using the Cristie Licensing Portal are as follows.
This discussion assumes your contract is already setup on the Cristie Licensing Portal.

1. Licence ABMR by entering the command:

```
#
# licmgr -p abmr --act xxxxxxxx-xxxxxxxx-xxxxxxxx-xxxxxxxx
```

(where xxxxxxxx-xxxxxxxx-xxxxxxxx-xxxxxxxx is your Activation code, which can be obtained
by signing into the Cristie Licensing Portal) and activating a license for this server. You will
require the machine IP address, hostname and machine signature to do this. Use the
command `licmgr -p abmr` to get the signature.

After activation, the Cristie License Manager will be refreshed showing your full Contract
ID, the new activation code and your contract support end date.

```
================================================================================
                    Cristie License Manager Version
                                  X.X
              Copyright (C) 2012-2019 Cristie Software Limited
================================================================================
Successfully applied the activation code.
  Machine attributes : {virtual, server}
          Contract ID : 1
            Signature : EKSEWPSC-L3AF7EWW-DFY9GH69-5Z48W7PJ
              Product : Bare Machine Recovery for XXXXXXXX (XBMR)
              Version : X.X
  Maintenance ends on : 2019-12-31

       Activation code : XXXXXXXX-Z94ABKH9-UFWKN2BD-R3CCJB53
       Activation type : Product activation
   Maintenance ends on : 2019-12-31
            Attributes : {virtual, server}

                Status : Full licence
```

5.2.3   Online Activation

The steps involved in activating the product automatically using the Cristie License Manager are summarised below. This discussion assumes your contract is already setup on the Cristie Licensing Portal and you have access to both Contract and Activation codes.

1. Assign your Contract code on the ABMR host machine, by opening up a terminal and entering:

```
# licmgr -p abmr --cid xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
```

   (where xxxxxxxx-xxxxxxxx-xxxxxxxx-xxxxxxxx is your Contract code)

```
================================================================================
                    Cristie License Manager Version
                                  X.X
              Copyright (C) 2012-2019 Cristie Software Limited
================================================================================
Successfully set the contract ID.
  Machine attributes : {virtual, server}
          Contract ID : 1
            Signature : EKSEWPSC-L3AF7EWW-DFY9GH69-5Z48W7PJ
              Product : Bare Machine Recovery for XXXXXXXX (XBMR)
              Version : X.X
         Trial ends on : 2019-03-24

                Status : Trial licence
```

2. Then activate the license online ABMR by entering the command:

```
# licmgr -p abmr --cred user@example,password
```

   (The required email and password are the ones you use to sign into the Cristie Licensing Portal)

The Cristie License Manager will be refreshed showing your Contract ID, the new activation code and your contract support end date.

```
================================================================================
                        Cristie License Manager Version
                                      X.X
                Copyright (C) 2012-2019 Cristie Software Limited
================================================================================
Connecting with: 'xxxxxxxxxxxxxxxxxxx@xxxxxxxxx.com' and 'xxxxxxxxxxxxxx'
Licensing machine: 'EKSEWPSC-L3AF7EWW-DFY9GH69-5Z48W7PJ'
Details: 'jn-source' on '10.1.4.197' (Virtual)
Activating using code: XXXXXXXX-XXXXXXXX-UFWKN2BD-R3CCJB53
Success


    Machine attributes : {virtual, server}
            Contract ID : 1
              Signature : EKSEWPSC-L3AF7EWW-DFY9GH69-5Z48W7PJ
                Product : Bare Machine Recovery for XXXXXXXX (XBMR)
                Version : X.X
     Maintenance ends on : 2019-12-31

        Activation code : XXXXXXXX-XXXXXXXX-UFWKN2BD-R3CCJB53
        Activation type : Product activation
     Maintenance ends on : 2019-12-31
             Attributes : {virtual, server}

                 Status : Full licence
```

Note: Internet access on the host machine is required to run the online activation process from the Cristie License Manager directly.

If you see the error "Failed to initialise SSL" with the reason "unable to get local issuer certificate" then this means that a bundle of Certificate Authority root certificates is missing. This is a frequent problem with Solaris installations and is easily solved.

Linux machines contain a copy of the Mozilla CA root certificate bundle. It is therefore possible to copy "**/etc/pki/tls/cert.pem**" from any Linux machine into **/etc/cristie/cacert. pem** on the Solaris machine. Alternatively, this file is made available for download as part of the "CURL" project here: http://curl.haxx.se/ca/cacert.pem.

More information can be found about the Certificate Authorities trusted in this file on the Mozilla website here:

```
https://www.mozilla.org/en-US/about/governance/policies/security-group/
certs/included/
```

6   Creating a Recovery Image

All functionality can be accessed through the **ABMR Graphical User Interface.** After entering the command `'abmr'`, select Recovery Environment from the **ABMR Backup Console** main menu:
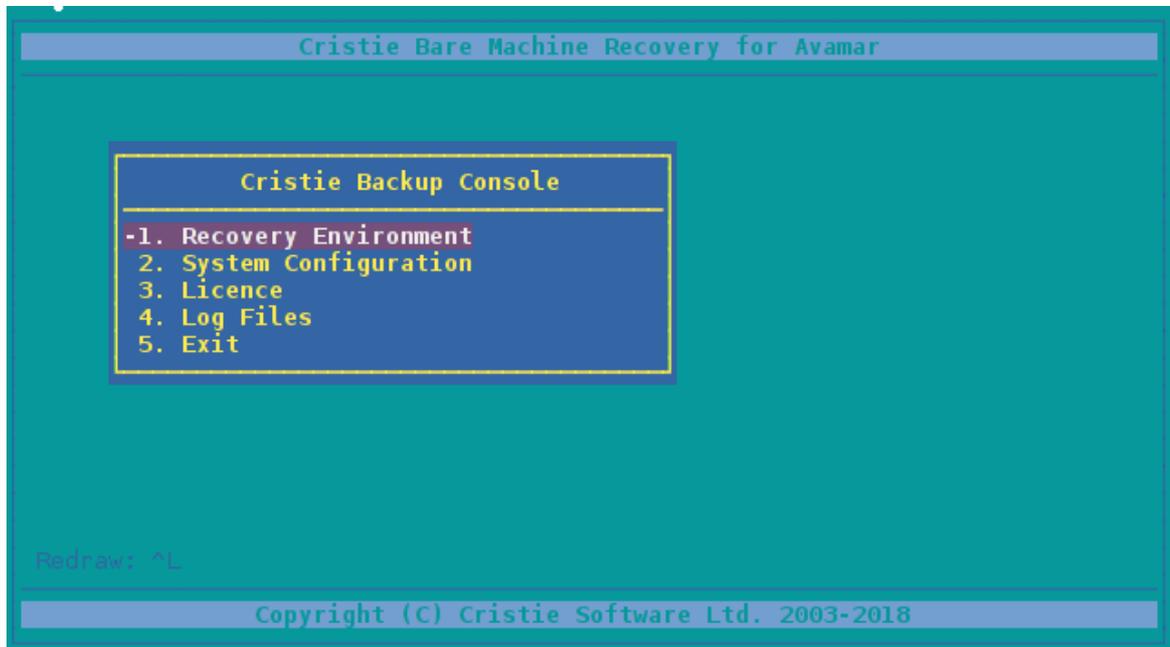
Then select **Make Recovery CD**:

The first step is to create a recovery CD or PXE/Jumpstart bootable image. This is an image that can either be burned to CD to boot the recovery environment, or extracted to create a network boot environment.

The creation of recovery media is performed by opening the **Make Recovery CD** menu.

```
Cristie Bare Machine Recovery for Avamar

  Make Recovery CD

  The CD ISO will be approximately 200Mb in size.
  Temporary Storage requires at least 200Mb free space.

  ISO Location:                         /mnt/Nigelp/Solaris/sol11.iso

  Temporary Storage:                    /tmp/cbmrrcd

  Include configuration on CD:          no

  Use DHCP to find interfaces:          yes

  Include additional support (Veritas)  yes

                              OK    Cancel

        Copyright (C) Cristie Software Ltd. 2003-2018
```

This menu presents various options for creating the recovery environment:

- **Make Recovery CD** - create an ISO image that can be burned to a CD

- **Make Recovery Miniroot** - create a miniroot file for PXE or Jumpstart booting

- **Add driver to image** - add an extra driver to support hardware not on the CD

- **Create CD from Miniroot** - create a bootable ISO from a miniroot file

Note: the recovery image uses only files from the running system and only uses files required for recovering that system. Therefore, a new ISO shoud be created for each processor architecture and Solaris version

Additionally, this means that if the hardware to be restored to contains a storage controller or network card requiring additional drivers not present on the previous machine, these drivers will have to be added to the image.

6.1   Creating a Recovery CD

The **'Make Recovery CD'** option creates an ISO image that can be burned to a CD using a tool such as `cdrecord`:

```
> cdrw -i /tmp/dr.iso
```

This also provides the option to include the configuration information on the CD. This will allow the recovery process for this machine to begin immediately once the backup has been located

Note: the output log for CD creation is saved in '/var/log/cristie/mkdrcd.log'

6.2   Creating a Recovery Miniroot

The **'Make Recovery Miniroot'** option performs the same function as 'Make Recovery CD', except it creates a `x86.miniroot` or `sparc.miniroot` file, depending on the machine architecture.

This file can be used to network boot the machine over jumpstart or PXE.

Detailed instructions on how to setup PXE and jumpstart booting are available in additional documentation.

```
          Cristie Bare Machine Recovery for Avamar

   Make Recovery Miniroot

   The image will be approximately 100Mb in size.
   Temporary Storage requires at least 100Mb free space.

   Miniroot Location:              /tmp/sparc.miniroot

   Temporary Storage:              /tmp/cbmrrcd

   Include configuration on CD:    no

   Use DHCP to find interfaces:    yes

   Include additional support (Veritas) yes

                                   OK    Cancel


          Copyright (C) Cristie Software Ltd. 2003-2018
```

The miniroot dialogue presents the same options as the CD dialogue.

6.3   Adding Additional Drivers

The recovery environment created provides only those drivers present on the machine upon which it was created.

Therefore, if the machine is being restored to different hardware with storage controllers or network cards requiring drivers not present on the original machine, then additional drivers must be installed.

```
                 Cristie Bare Machine Recovery for Avamar

     Inject Drivers

     This tool should be used to modify an existing recovery environment to
     include extra drivers to support new hardware.

     The list of drivers is space separated and may contain driver files (eg.
     cpqary3) or paths of packages (eg. /export/home/CPQary3.pkg)

     Input Image:   /mnt/Nigelp/Solaris/abmr-sol11

     Output Image:  /mnt/Nigelp/Solaris/abmr-sol11

     Drivers:       ...

                    OK    Cancel

                 Copyright (C) Cristie Software Ltd. 2003-2018
```

The drivers can be injected either from the running system (eg. `cpqary3`) or may be a
path to a package file (eg. `/export/home/CPQary3.pkg`). It is recommended that the
latter form is used wherever possible, as packages may install additional files or modify
system files that cannot be picked up by examining the system driver database.

*Note: the machine used to inject the driver does not have to match the machine the CD
was built on. It is only required that the driver will function on the intended hardware*

6.4   Create CD from Miniroot

This option provides a method to create a CD ISO file from a miniroot file

```
                 Cristie Bare Machine Recovery for Avamar

     Make Recovery CD from Miniroot

     The image will be approximately 100Mb in size.
        Temporary Storage requires at least 100Mb free space.

     Input miniroot:   /tmp/sparc.miniroot

     Output ISO File: /mnt/Nigelp/Solaris/abmr-sol11

                    OK    Cancel

     Redraw: ^L

                 Copyright (C) Cristie Software Ltd. 2003-2018
```
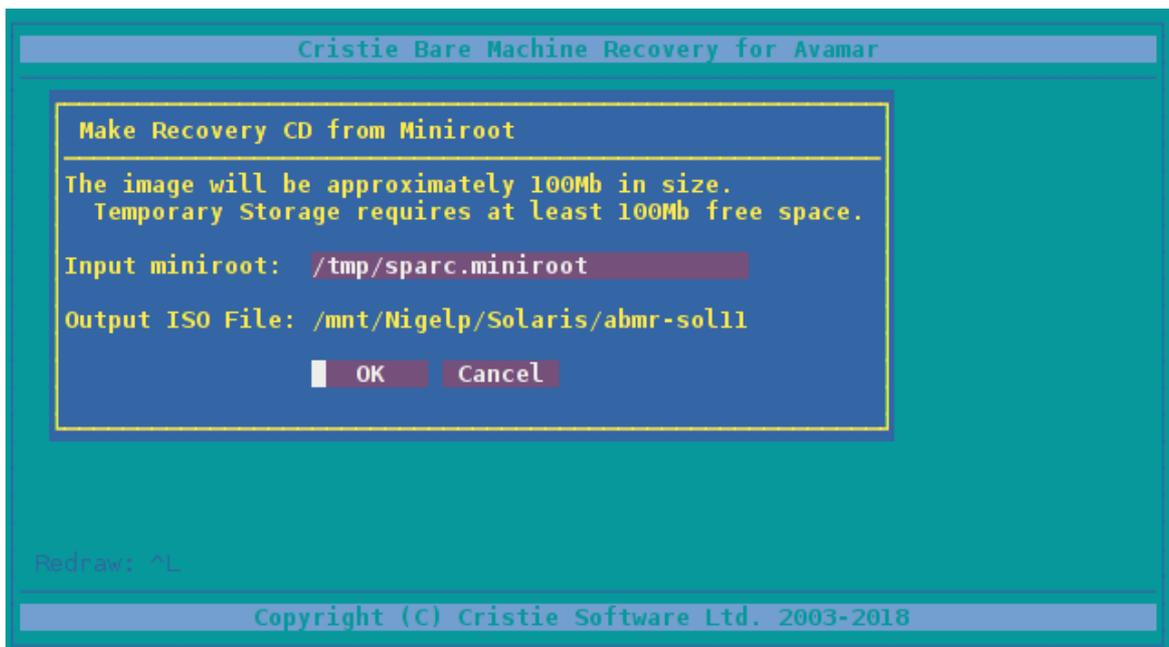
7   Performing a DR backup

Performing a DR backup is split into two stages:

1. Record system information

2. Perform the backup using Dell EMC Avamar

The system information is recorded to allow the recovery environment to recreate the original system environment. This will include the network configuration, the disk volume and file-system configuration, as well as information about essential packages for rebuilding the system.

7.1   Recording System Information

The system information must be recorded and stored so that the system can be rebuilt at recovery time. This is performed using the `abmrcfg` tool, available through the **System Configuration** option of the abmr **Backup Console**.

Selecting **System Configuration** from the main menu will open a sub-menu containing options for creating the configuration:
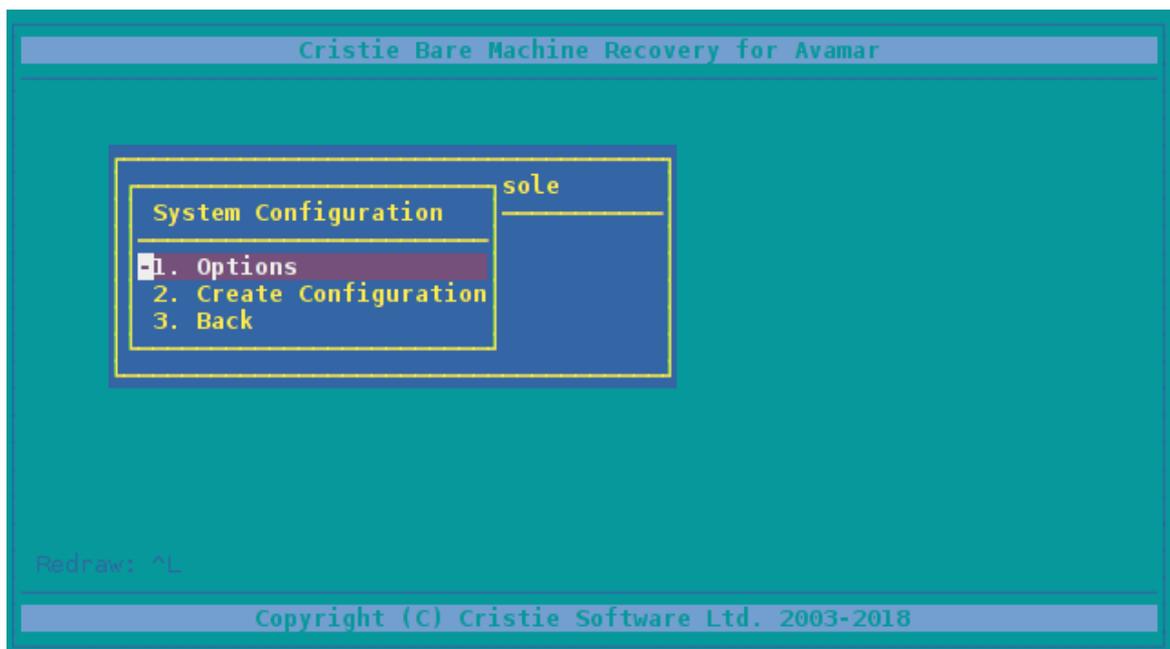
The default location of the configuration information is `/ABMRCFG/disrec.xml`. However, the **Set Location** option will allow you to select a different location if desired.
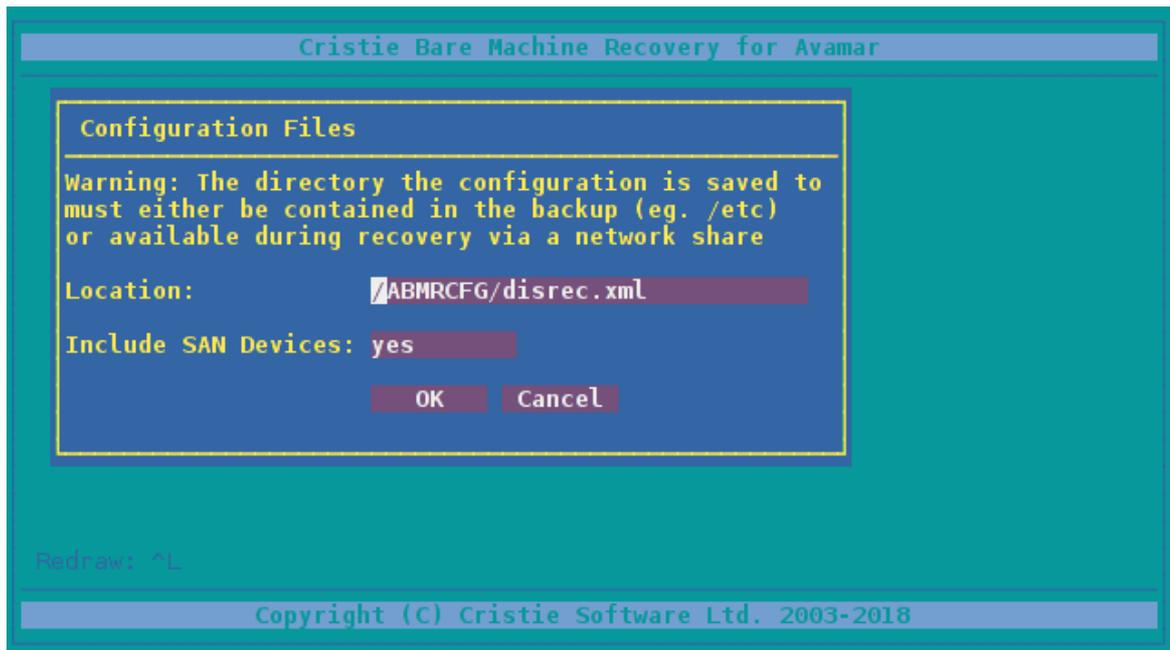
Note: the location chosen MUST be included in the file paths specified to be included in the backup. If you change the location of the configuration information, ensure this is included in the backup.

When running the configuration tool information, the current operations will be displayed:
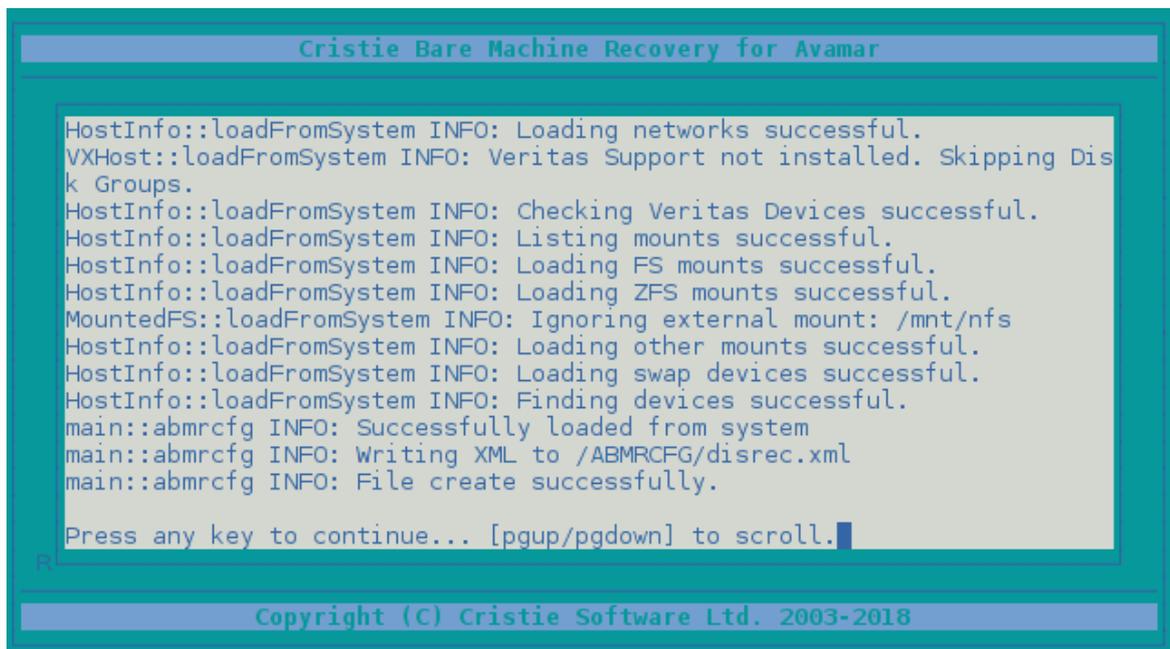
Once this operation is complete, the log fine can be found in `/var/log/cristie/` `abmrcfg.log`. This may also be viewed using the **Log Files** submenu.

8   Performing a Recovery

The final stage will test the backup location supplied, then perform the recovery.
Recovery is divided into a number of stages dependent upon the system configuration:

1. **FDisk** - make the disks recognisable to Solaris
2. **Partition** - partition disks to match configuration

Veritas Volume Manager installed:

3. **VXDisks** - set disks to be managed by VxM
4. **VXGroups** - create Veritas disk groups
5. **VXVolumes** - create Veritas volumes

Solaris Volume Manager installed:

6. **MetaVolumes** - create SVM meta-devices

ZFS support installed:

7. **ZPools** - create FS Zpools
8. **FileSystems** - create file-systems on the volumes created in steps 5, 6 and 7
9. **Mounting** - mount the file-systems
10. **Recovery** - recover files from the backup
11. **PostRecover** - perform modifications to recovered files to match new
    configuration
12. **Make bootable** - make the system bootable

All stages are run through in order - consequently this can take a long time, dependent
on the speed of disks and network interfaces. Once the recovery is complete, the system
can be rebooted into its original state.

Before reboot, it is recommended that a copy of the log files generated during the
recovery is made, as shown in Copying Log Files.

8.1   Starting the Recovery Environment

A recovery may be performed by booting into the recovery console from the recovery CD
created earlier. The environment will initialise by attempting to acquire a network address
via DHCP or RARP and starting an SSH server if available.

> *Note: the password for the SSH server will be identical to the password of the machine
> on which it was created*

Once boot-up is complete, a dialogue will be presented to change the hostname or
network setup.

```
+----------------------------------------------------------------+
|           Cristie Bare Machine Recovery for EMC Avamar         |
+----------------------------------------------------------------+
 +-----------------------------------------------------------+
 |         CBMR Recovery Environment                         |
 |-----------------------------------------------------------|
 |ABMR Recovery has determined the following information for |
 |this system.                                               |
 |Select OK to change the values                             |
 |                                                           |
 |Hostname      Cristieunknown      Interface  net0          |
 |                                                           |
 |IP Address    10.1.5.2 (DHCP)     Subnet     255.0.0.0     |
 |                                                           |
 |Default Gateway 10.0.1.100        DNS        10.0.1.110    |
 |                                                           |
 |Domain                                                     |
 |                                                           |
 |              OK                           Cancel          |
 |                                                           |
 +-----------------------------------------------------------+




 Redraw: ^L
+----------------------------------------------------------------+
|           Copyright (C) Cristie Software Ltd. 2003-2018        |
+----------------------------------------------------------------+
```
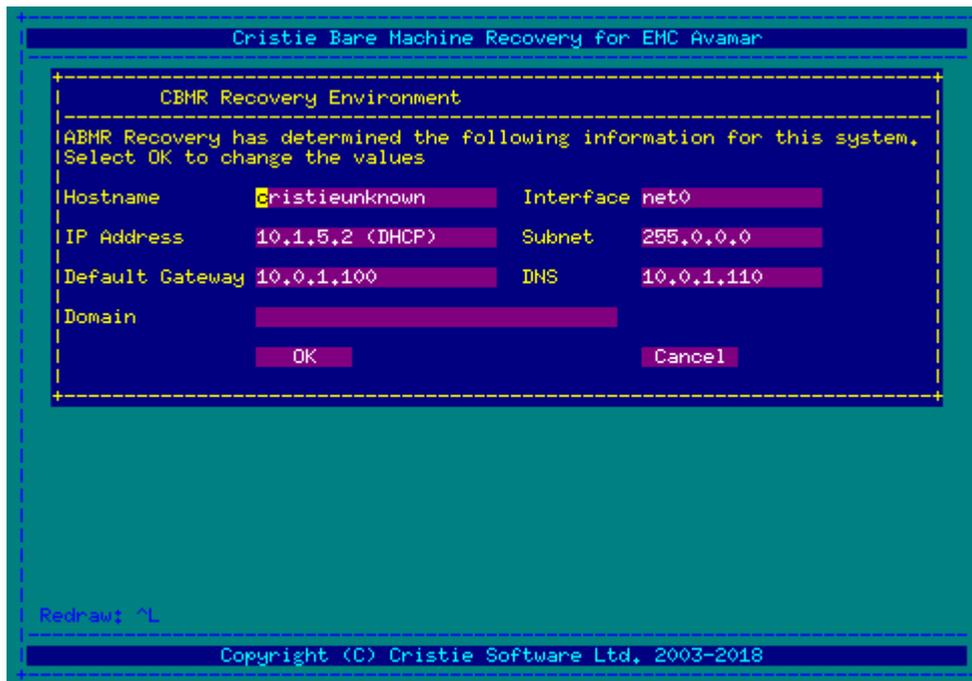
Selecting Cancel at this stage will leave these values as they are.

> *Note: if no DNS entry is given, then all subsequent addresses MUST be given in dotted decimal form*

Once the network is setup, the **Recovery Main Menu** will be presented:

```
+----------------------------------------------------------------+
|           Cristie Bare Machine Recovery for EMC Avamar         |
+----------------------------------------------------------------+

    +------------------------------------------------+
    |         CBMR Recovery Environment              |
    |------------------------------------------------|
    | 1. Set VA Address                              |
    | 2. Automatic Recovery                          |
    | 3. Manual Recovery                             |
    | 4. Tools                                       |
    | 5. Log Files                                   |
    | 6. Exit And Reboot                             |
    | 7. Exit to Shell                               |
    +------------------------------------------------+








 Redraw: ^L
+----------------------------------------------------------------+
|           Copyright (C) Cristie Software Ltd. 2003-2018        |
+----------------------------------------------------------------+
```
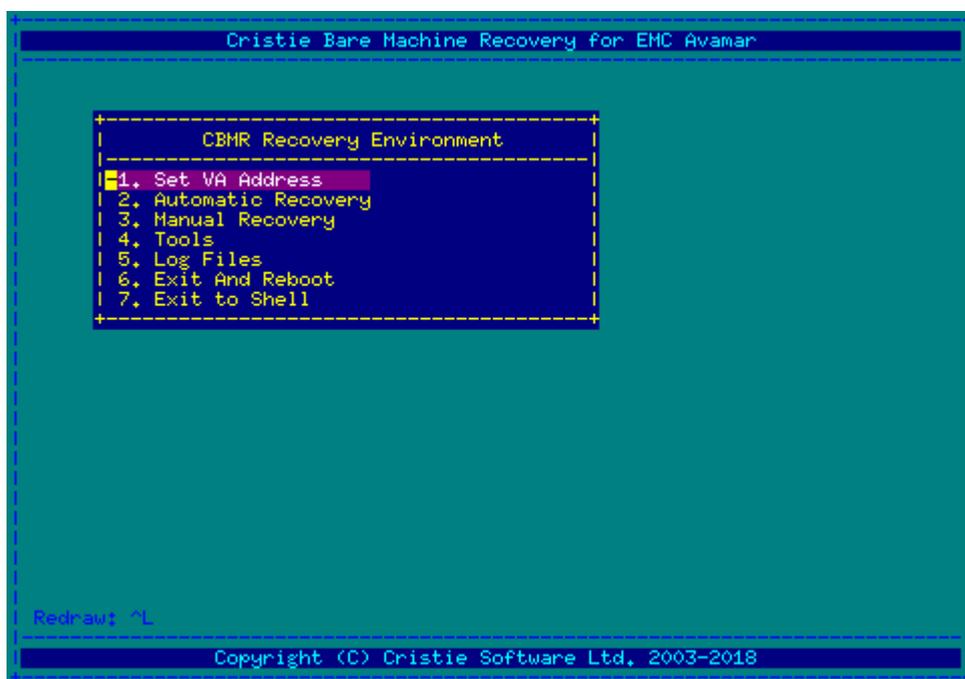
If you wish to monitor the recovery operation in the Cristie VA Console product use the **Set VA Address** option to set the IP address of the VA. If this is not set or set incorrectly the recovery will not be shown on the VA console.

Two recovery modes are available - **Automatic** and **Manual** - as well as tools for

managing the recovery environment and log files.

- The automatic recovery runs through all stages of the recovery

- The manual recovery provides the ability to run through selected phases of the recovery individually

> *Note: if the graphical environment is unusable at this stage, for example if the currently selected item, appears to change unexpectedly, then the terminal type should be changed. This can be performed by exiting to the shell and restarting the GUI using:* `>`
> `TERM=vt102 dr`

8.2   Automatic Recovery Wizard

The **Automatic Recovery Wizard** takes you through the following steps in order:

1. **Setup Network** - if initial setup was unsatisfactory

2. **Backup Location** - specify the attributes of the server holding the backup

3. **Configuration** - read machine configuration information and set applicable options

4. **Perform Recovery** - start the recovery procedure

5. **Copy Log Files** - copy the log files generated by the recovery

Setup Network
The network can be setup for any interfaces found using either DHCP (Dynamic Host Configuration Protocol) or manual configuration.

The manual configuration step is exactly the same as the initial network setup in section Starting the Recovery Environment. The DHCP setup will attempt to start a DHCP client (if one is not already started) and check for an IP address.

> *Note: it is common to see warning messages during DHCP setup as interfaces may be polled whilst they are in uncertain states. The DHCP setup will fail if an IP address is not received in ten seconds. Therefore, if DHCP fails initially, it may succeed on subsequent attempts.*

Backup Location
The Backup Location menu allows the user to setup the Dell EMC Avamar client for access to the server.
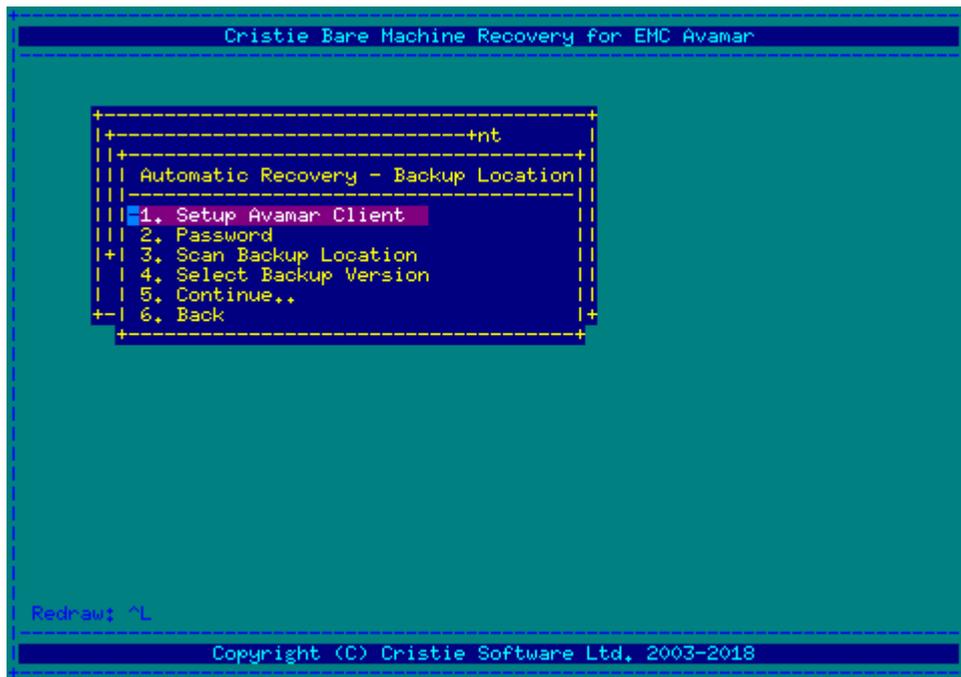
Note: if the server is specified by name, then a DNS server must be chosen when setting up the network

Ensure you prefix the system name with a domain name if relevant (see example below):
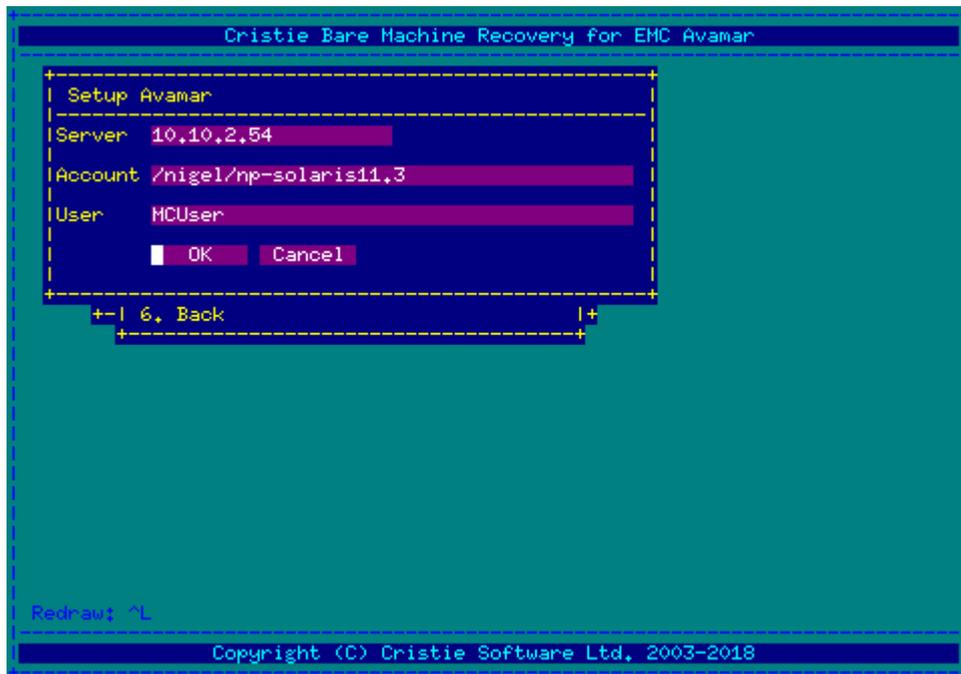
You must then specify the corresponding account password:
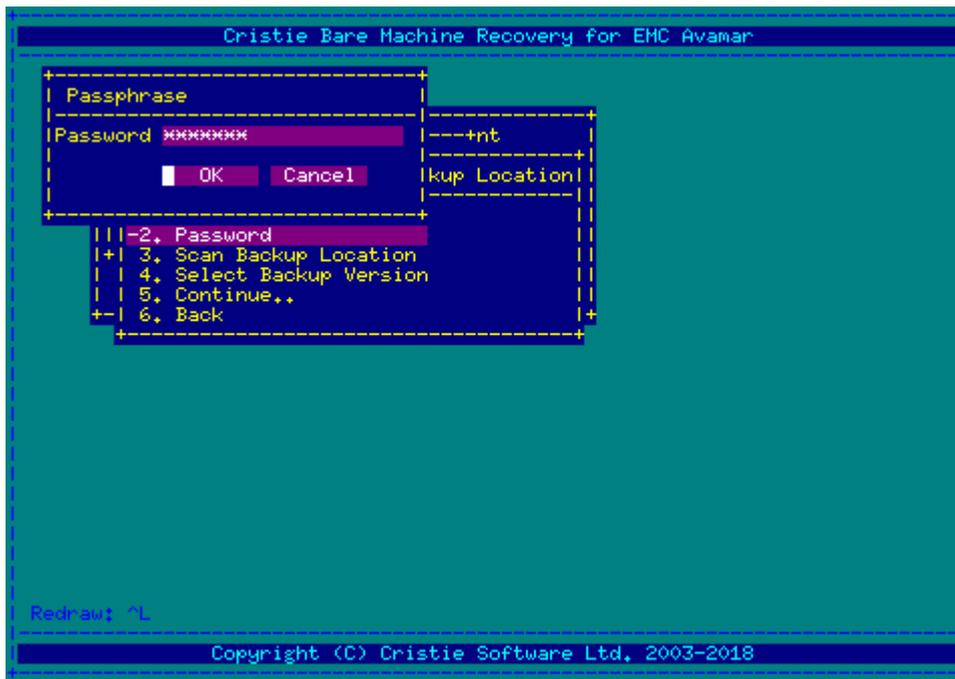
It is also possible to select the version to be restored:
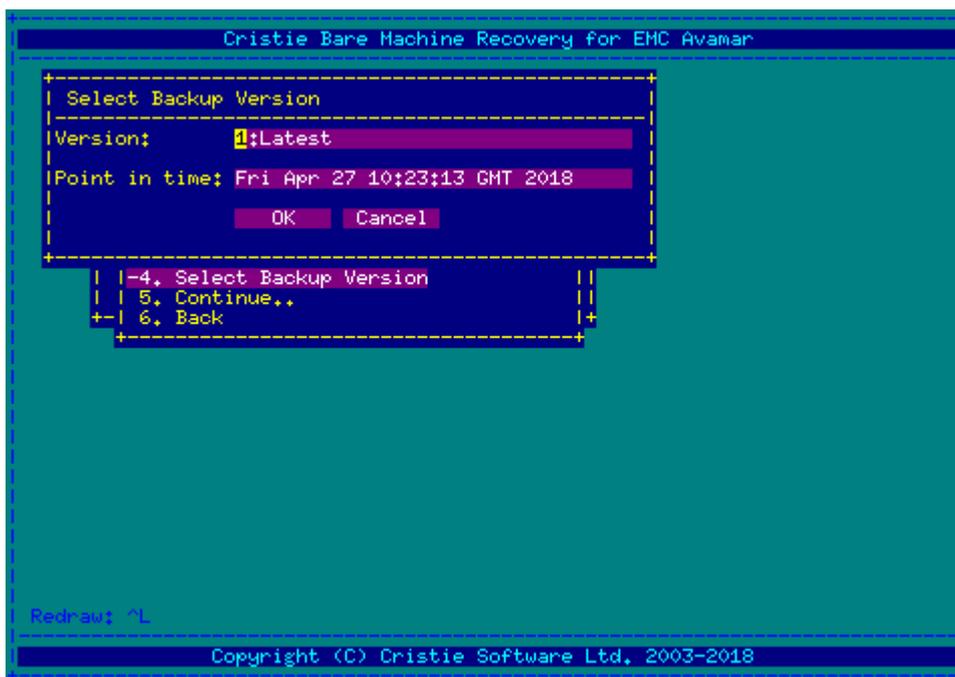
Instead of a particular version, the backup may be recovered from a particular point in time. Note use the up-arrow or down-arrow keys to selected a different point-in-time or the latest as required.
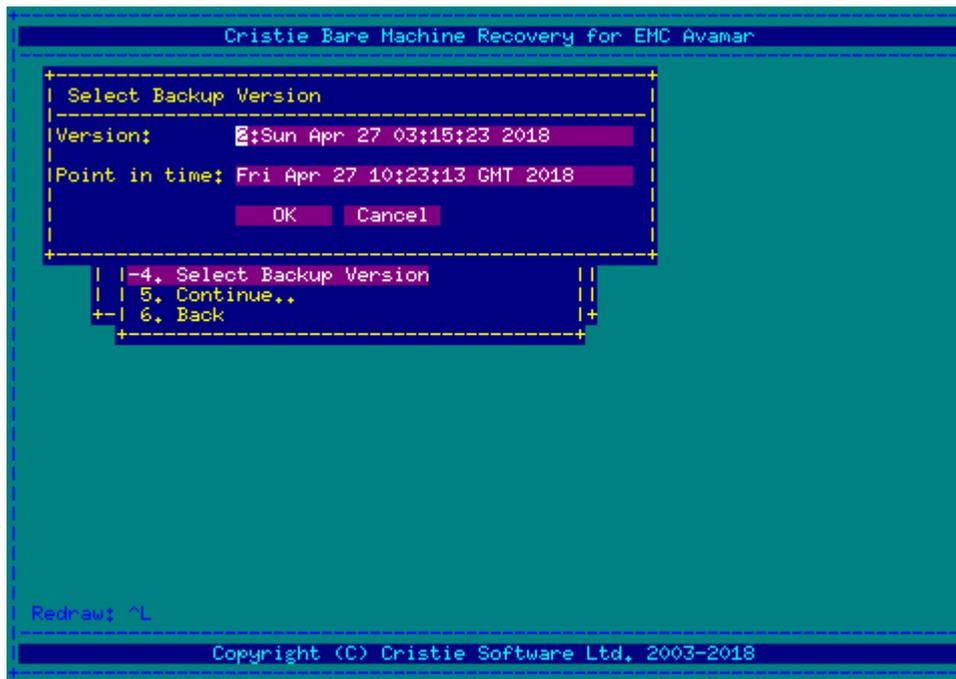
Once the backup has been successfully setup, you can move to the next stage to setup the configuration.

Configuration
Before recovery can begin, the machine configuration information created earlier must be loaded into the recovery environment from the backup. This is performed by selecting the **Restore Configuration From Backup** option.
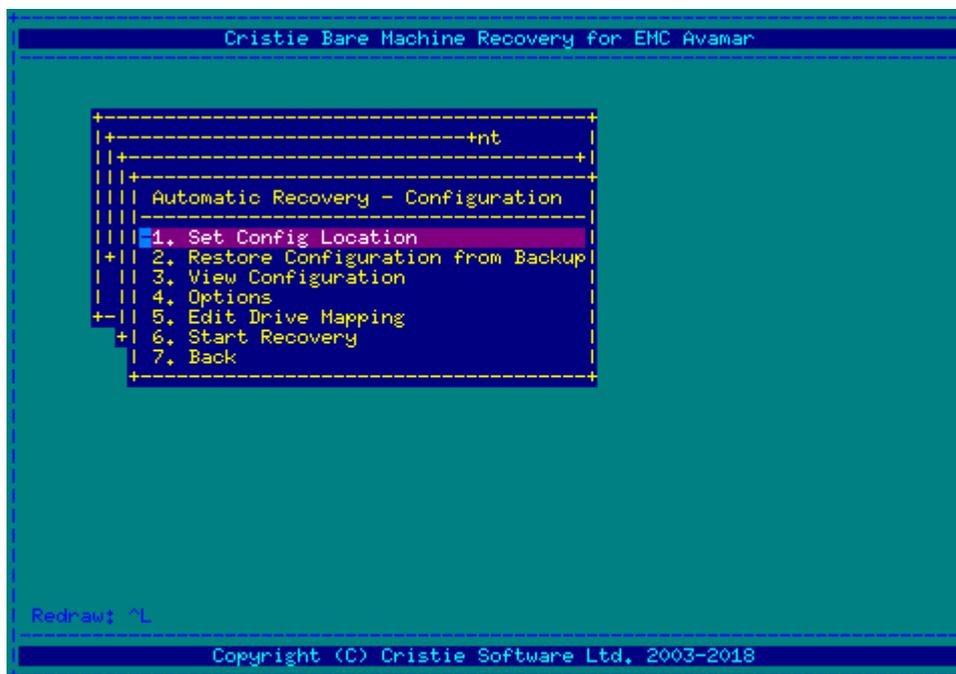
Note1: if the location was saved with the recovery CD, as outlined in Creating a Recovery Image, then this step may be skipped

Note2: if the location of the configuration was changed in Recording System Information, you will need to enter the location chosen here

Selecting the **Options** item will display any additional options that can be applied at this point.

```
          Cristie Bare Machine Recovery for EMC Avamar
   +---------------------------------------------------+
   | Configuration Options                             |
   |---------------------------------------------------|
   |Only recover drive with / on?   No                 |
   |                                                   |
   |Automatically install drivers? no                  |
   |                                                   |
   |Map network devices?            no                 |
   |                                                   |
   |                                OK     Cancel      |
   |                                                   |
   +---------------------------------------------------+
      +-|| 5. Edit Drive Mapping          |
      +-| 6. Start Recovery               |
      |  7. Back                          |
      +-----------------------------------+




   Redraw: ^L
          Copyright (C) Cristie Software Ltd. 2003-2018
```
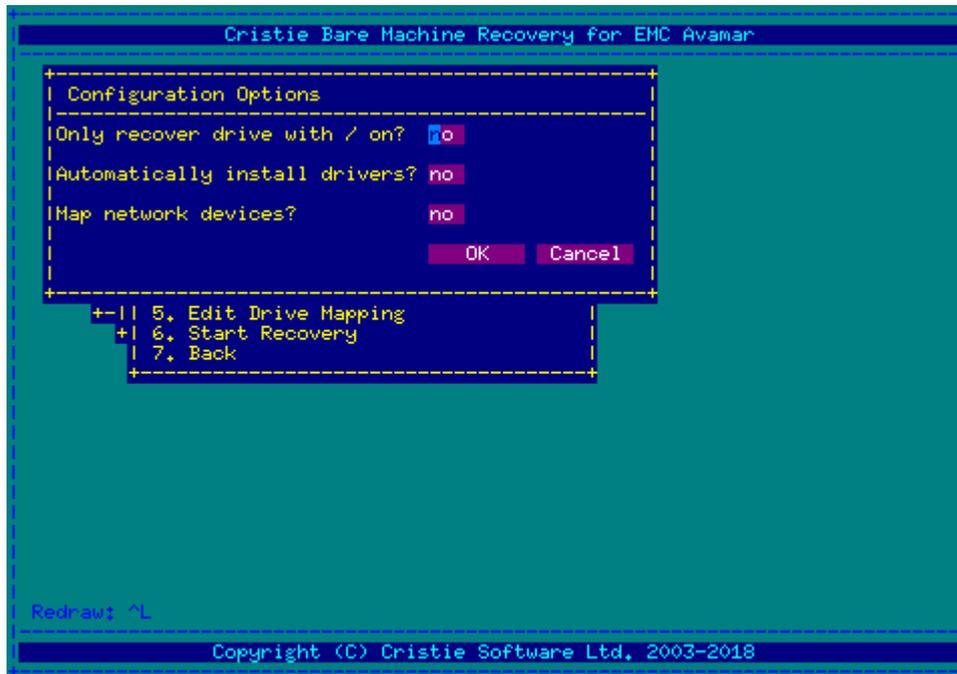
The **Configuration Options** control what is to be recovered and which steps are to be performed upon completion.

Your first option defines whether you intend to recover only the drive that the root filesystem (/) is mounted on. This will work in addition to drive mapping by removing all drives from the mapping that are not required. This option is useful if the system has a number of drives, many of which are data drives that do not need to be recovered.

> *Note: this can also be achieved by setting all but the root drives to 'Unmapped' in the drive mapping*

The second option enables you to instruct the recovery environment to automatically install drivers. It is rare that this is required, as Solaris systems usually install with drivers necessary for all supported hardware. However, if additional drivers were added to the CD to support the disk controller or network cards, then this option will automatically add them to the recovered environment.

The third option will instruct the recovery environment to map network devices from the backup to those present on the current machine. This will ensure that any interfaces previously in use are available on the restored machine.

> *Note: if fewer interfaces are present on the new machine, then mapping can only work on a best effort basis*
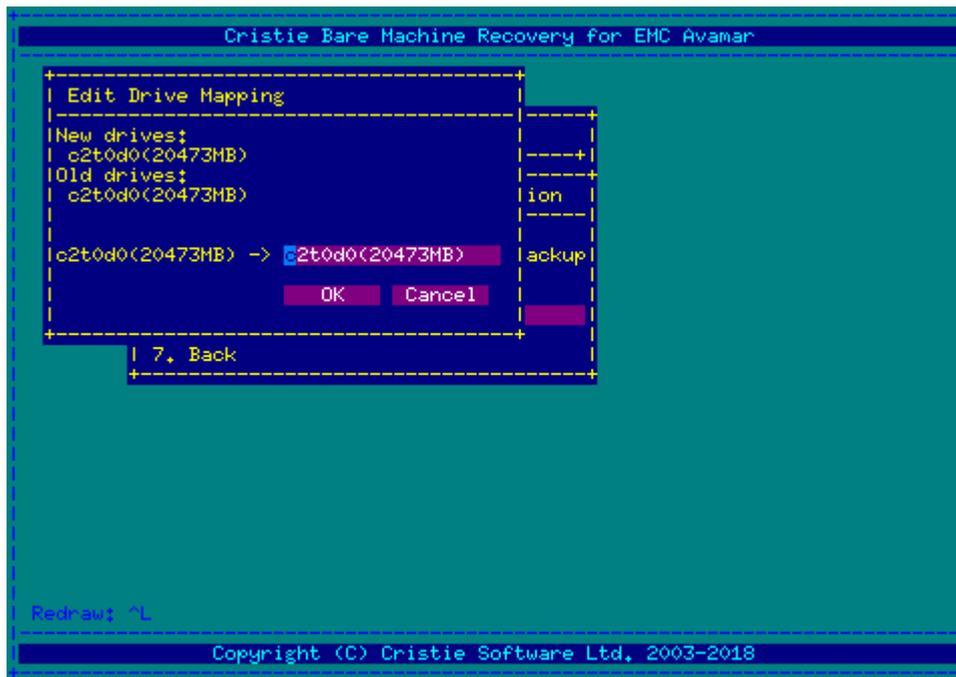
The **Edit Drive Mapping** item is used to modify the disks that the backup is restored to. In the example given, a system disk is mapped to a disk during recovery.

When recovering to fewer disks, any volume groups other than rootvg which cannot be re-created will be dropped. However, a volume group spanning more than one physical volume can be restored to a single volume provided that volume has enough capacity. In the case of mirrored volume groups the mirroring will be split if the mapping indicates this.

8.2.1 Drive Mapping

Selecting the **Drive Mapping** option will display a form matching drives in the configuration to drives on the system.

```
     Cristie Bare Machine Recovery for EMC Avamar
+------------------------------------------------+
| Edit Drive Mapping                             |
|------------------------------------------------|
|New drives:                                |----+
| c2t0d0(20473MB)                           |----+
|Old drives:                                |
| c2t0d0(20473MB)                           |ion |
|                                                |
|c2t0d0(20473MB) -> c2t0d0(20473MB)    |ackup|
|                 OK     Cancel                  |
|                                                |
+------------------------------------------------+
         | 7. Back                     |

 Redraw: ^L
    Copyright (C) Cristie Software Ltd. 2003-2018
```
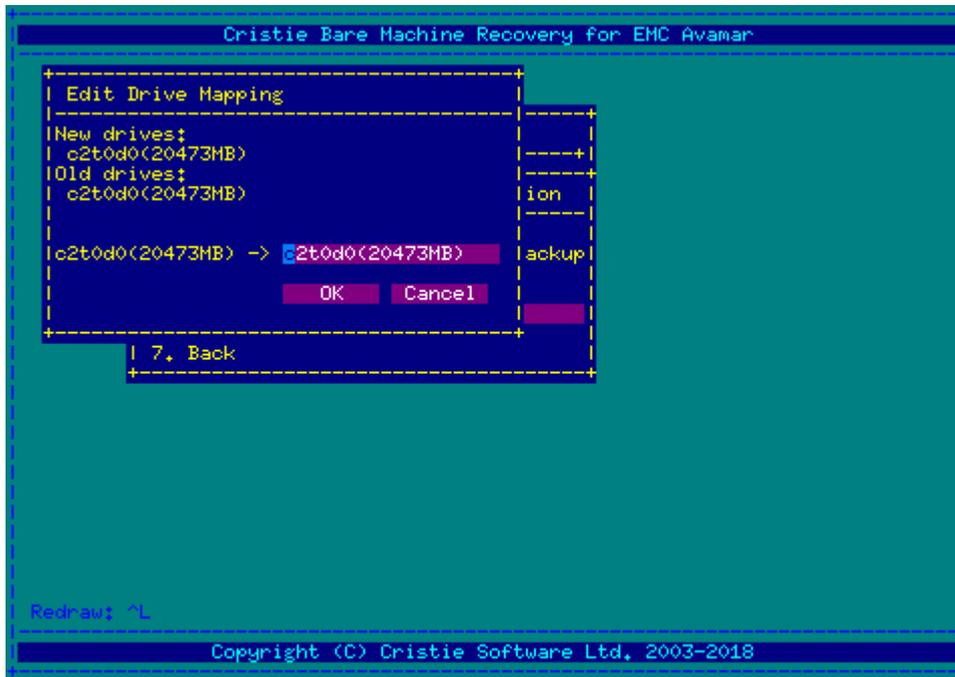
It is also possible to remove drives from being recovered here. If you do not wish the data on a particular drive to be recovered, then select '**Unmapped**' (use the down-arrow or up-arrow key to change the setting):

```
     Cristie Bare Machine Recovery for EMC Avamar
+------------------------------------------------+
| Edit Drive Mapping                             |
|------------------------------------------------|
|New drives:                                |----+
| c2t0d0(20473MB)                           |----+
|Old drives:                                |
| c2t0d0(20473MB)                           |ion |
|                                           |----|
|c2t0d0(20473MB) -> Unmapped           |ackup|
|                 OK     Cancel                  |
|                                                |
+------------------------------------------------+
         | 7. Back                     |

 Redraw: ^L
    Copyright (C) Cristie Software Ltd. 2003-2018
```
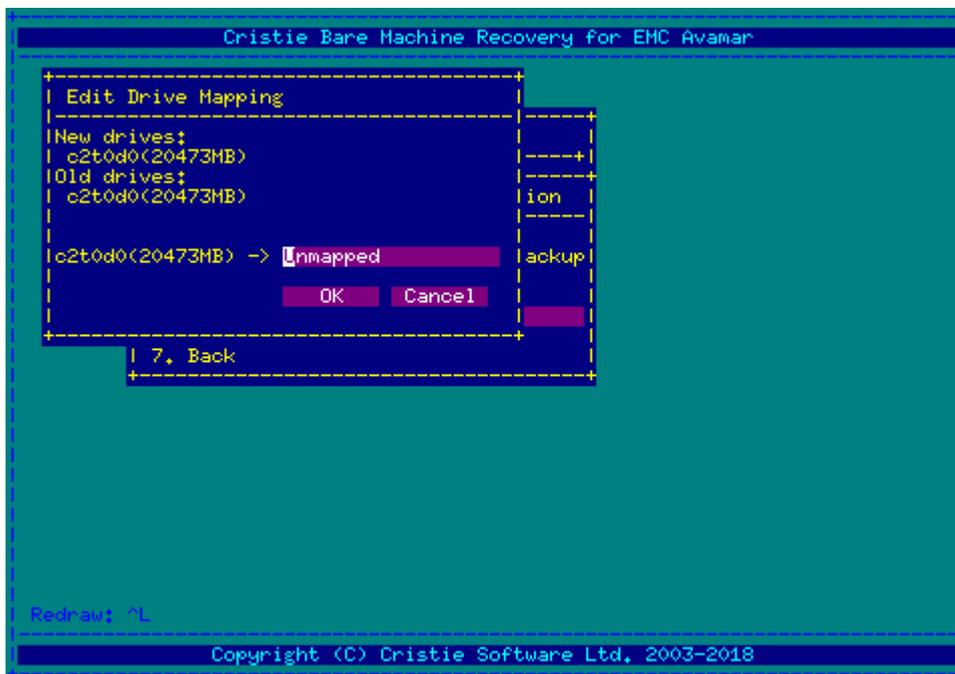
Note 1: if a disk is set to 'Unmapped', then the restore procedure will remove ALL devices that rely on that disk. In particular, if the disk is part of a mirror, then the mirror will not be recovered

> *Note 2: in some circumstances where there are a large number of disks, the 'OK' and 'Cancel' buttons may not be visible. You can scroll the Drive Mapping window up or down by pressing the short-cut keys CTRL-N or CTRL-P to bring them into view.*

If critical devices are removed by a mapping, it will result in the error 'Mapping removes the root filesystem' and the recovery will not proceed.

8.2.2 Start Recovery

Once the configuration has been restored, it will be possible to start the recovery. When this option is selected, the backup location will be tested and a confirmation dialogue presented:
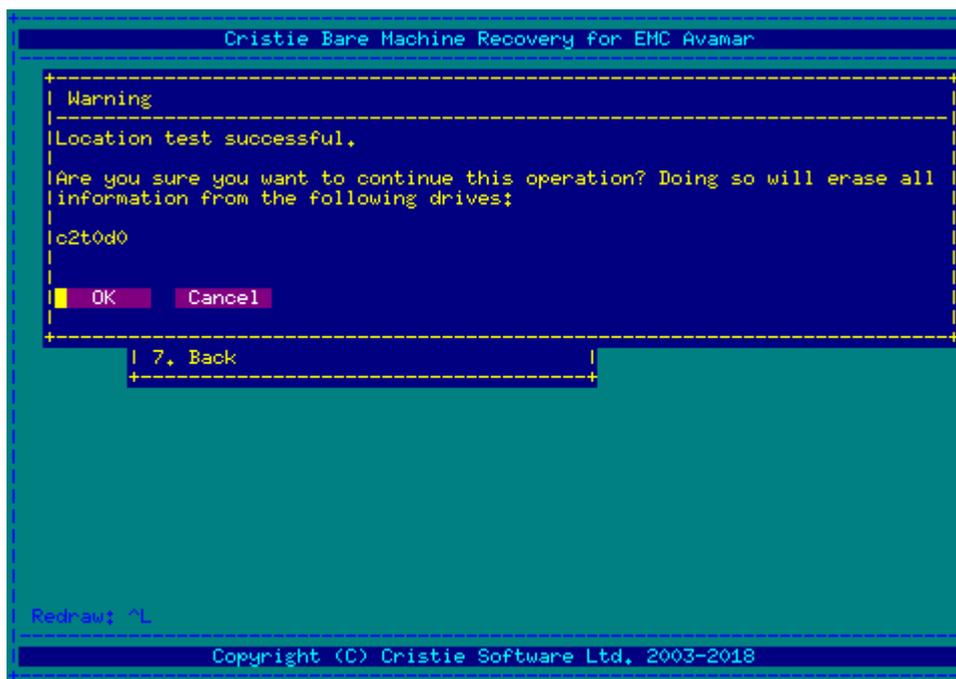
> *Note: as soon as the recovery is started, ALL data will be destroyed on the drives listed*

Once the recovery is complete, you will be presented with a dialogue indicating that the machine can be rebooted.

```
main::shelloutput INFO: ..ZPOOL identifier:  cb5eac79fc24dbdc was 7becdc2b2c7127
e9
main::shelloutput INFO: ..installing GRUB2 to c2t0d0p0
main::shelloutput INFO: >>-n Installation finished. No error reported.
main::shelloutput INFO: >>
main::shelloutput INFO: >>
main::shelloutput INFO: ..installing GRUB2 to c2t0d0p0
main::shelloutput INFO: >>-n Installation finished. No error reported.
main::shelloutput INFO: >>
main::shelloutput INFO: >>
main::runCommands INFO: Setting bootpath in bootenv.rc
main::runCommands INFO: Rebuilding kernel md database
main::runCommands INFO: Rebuilding archive
main::shelloutput INFO: updating /platform/i86pc/amd64/boot_archive
main::shelloutput INFO: updating /platform/i86pc/boot_archive
main::runCommands INFO: Syncing
main::runCommands INFO: Syncing
main::shelloutput INFO: Processing ZPool: rpool
main::shelloutput INFO: GRUB2 in use. Editing grub.cfg but not re-creating
main::shelloutput INFO: ..ZPOOL identifier:  cb5eac79fc24dbdc was cb5eac79fc24db
dc
main::shelloutput INFO: ..installing GRUB2 to c2t0d0p0
main::shelloutput INFO: >>-n Installation finished. No error reported.
main::shelloutput INFO: >>
main::shelloutput INFO: >>
main::shelloutput INFO: ..installing GRUB2 to c2t0d0p0
main::shelloutput INFO: >>-n Installation finished. No error reported.
main::shelloutput INFO: >>
main::shelloutput INFO: >>
main::runCommands INFO: Recovery complete. System can now be rebooted.
main::delete_pid_file INFO: will unlink pid file in disrec::delete_pid_file
Press ENTER to continue...
```

```
+--------------------------------------------------------------------+
| Cristie Bare Machine Recovery for EMC Avamar                       |
|--------------------------------------------------------------------|
|                                                                    |
|    +------------------------------------------------+              |
|    |Recovery                                        |              |
|    |------------------------------------------------|              |
|    |Recovery Successful. Machine can be rebooted.   |              |
|    |Press any key to continue...█                   |              |
|    |                                                |              |
|    +------------------------------------------------+              |
|    |||| 1. Set Config Location                      |              |
|    |+|| 2. Restore Configuration from Backup|       |              |
|    | || 3. View Configuration               |       |              |
|    | || 4. Options                          |       |              |
|    +-|| 5. Edit Drive Mapping               |       |              |
|      +|-6. Start Recovery                   |       |              |
|       | 7. Back                             |       |              |
|       +-------------------------------------+       |              |
|                                                                    |
|                                                                    |
|                                                                    |
|                                                                    |
|                                                                    |
|                                                                    |
| Redraw: ^L                                                         |
|--------------------------------------------------------------------|
| Copyright (C) Cristie Software Ltd. 2003-2018                      |
+--------------------------------------------------------------------+
```
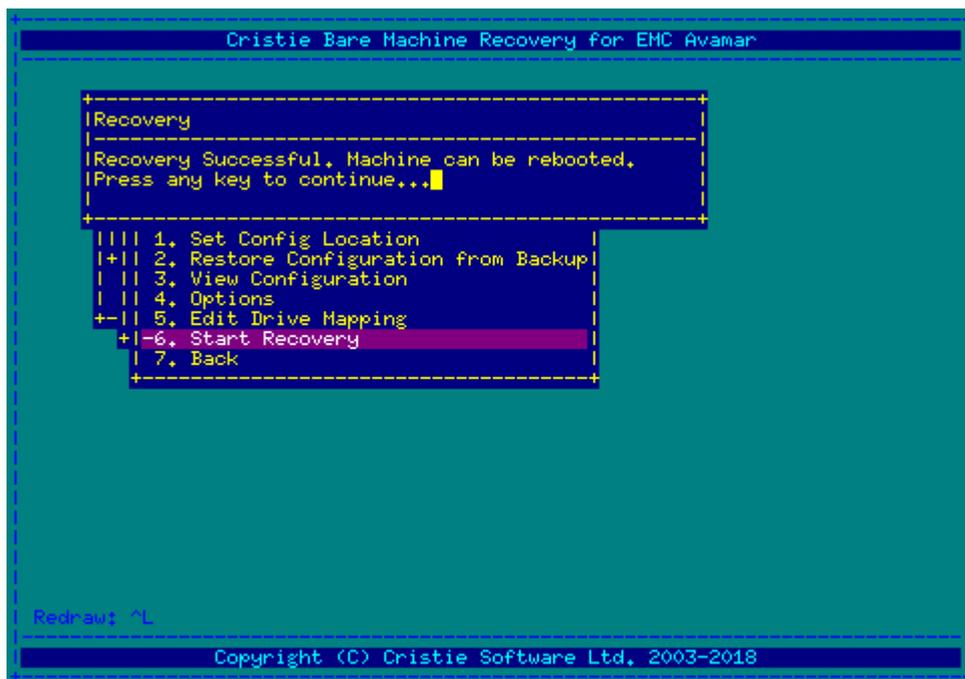
8.3   Manual Recovery

Manual recovery presents the stages performed during automatic recovery to be applied individually. This may be required if a particular stage fails and you wish to continue the recovery from that point onwards, rather than restart.

The options in the manual recovery menu are:
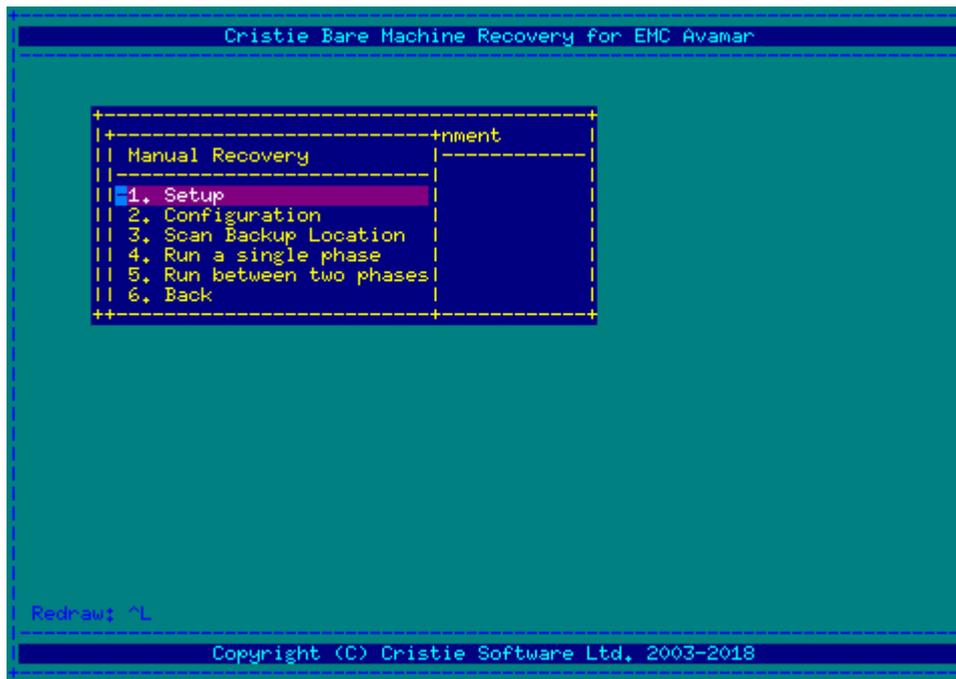
Setup

The setup menu allows you to setup networking (exactly as the first stage of the automatic recovery), setup the Avamar Client and mount an NFS Volume.
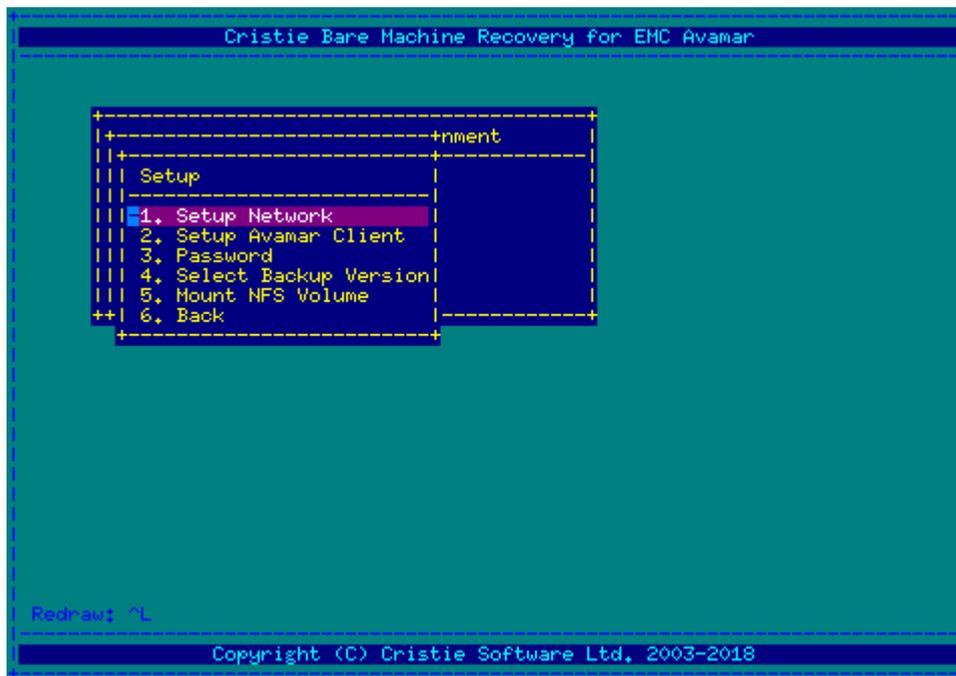
Configuration

The configuration menu allows you to restore the configuration from the backup, select which disks should be restored and modify configuration options.
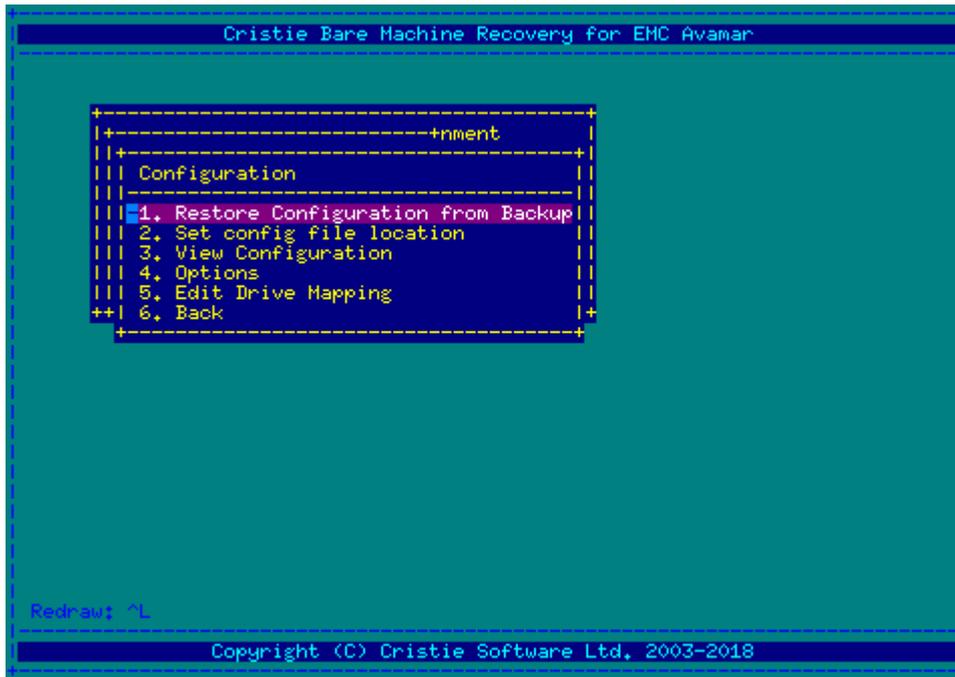
This menu presents the same options as the configuration menu for the automatic recovery.

Test Backup Location

This option allows you to test the backup location for connectivity before performing a restore. It is recommended that this step is always performed before recovering a system.

Running a single recovery phase

If a problem occurs during recovery, it may be desirable to attempt to run a single recovery phase. This option allows you to select a single phase and run it on its own.
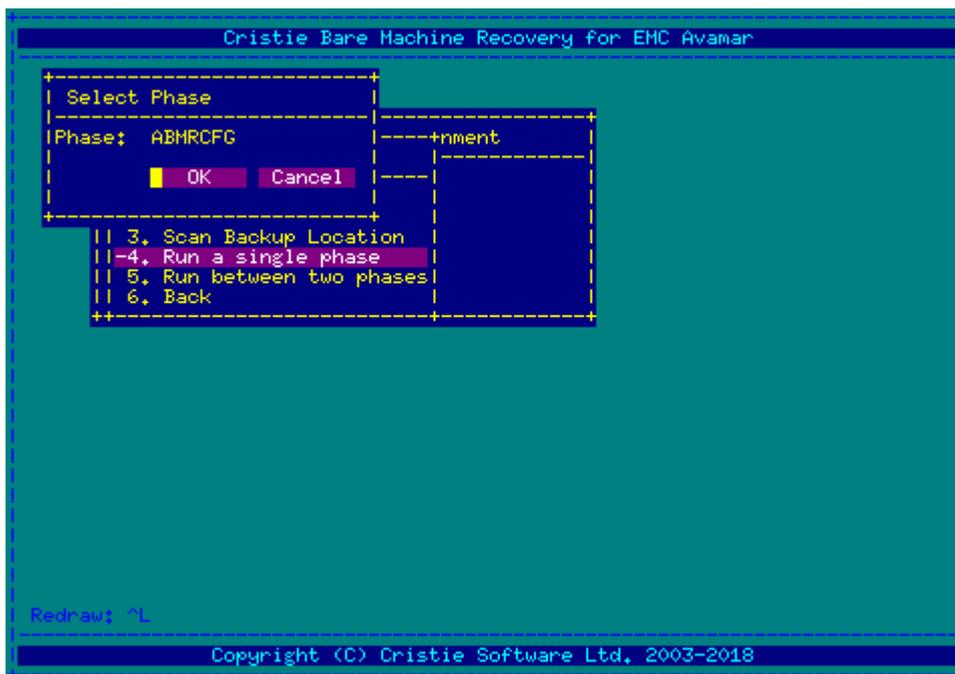
> *Note: running an earlier phase after a later phase, such as running Partitions after Restore, will RESET ANY WORK DONE BY A LATER PHASE. You will therefore have to run the remaining phases as well to complete the restore*

Running between two recovery phases

The **'Run between two phases'** menu option allows you to run **all** phases, inclusively, between two sections. In the following example, the restore is being run from creation of the two pools to the mounting of file-systems:
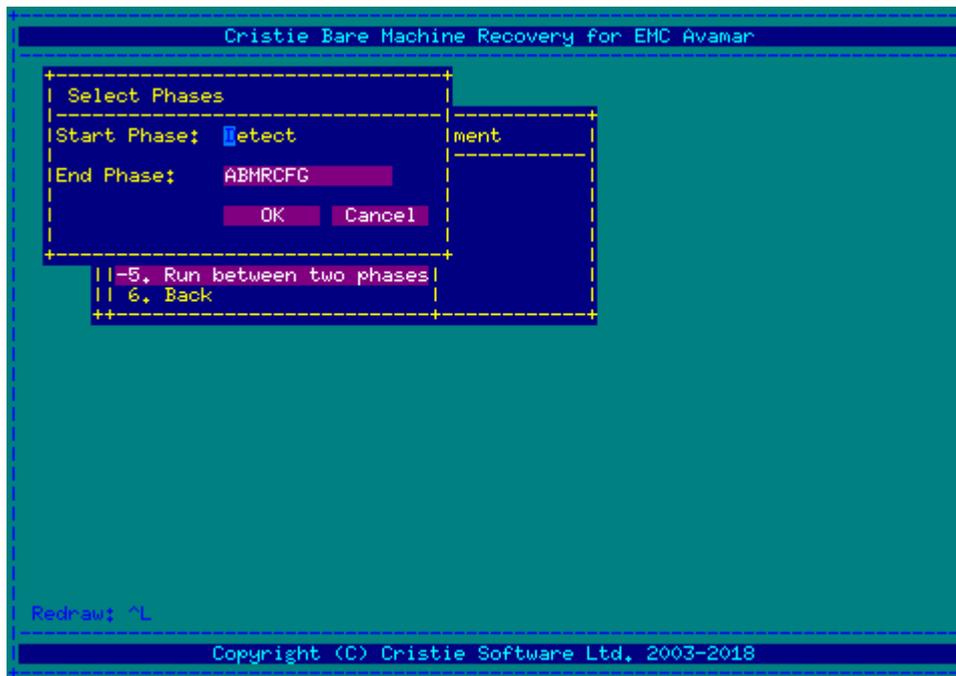
This option may be used to restart a stalled recovery from the next phase to run until completion. For example, if the recovery stopped at the FileSystems stage, then running from Mounting to MakeBootable should result in a fully restored system.

Additionally, there is a special option which will attempt to work out the last known phase:

```
+-------------------------------------------------------------+
|        Cristie Bare Machine Recovery for EMC Avamar          |
|+------------------------------------+                        |
|| Select Phases                      |                        |
||------------------------------------|-------------+          |
||Start Phase:  Detect                |ment         |          |
||                                    |-------------|          |
||End Phase:    BMRCFG                 |             |          |
||               OK    Cancel         |             |          |
|+------------------------------------+             |          |
|||-5. Run between two phases|                      |          |
||| 6. Back                  |                      |          |
|+--+------------------------+----------------------+          |
|                                                              |
|                                                              |
|                                                              |
|                                                              |
|                                                              |
|                                                              |
|                                                              |
|                                                              |
| Redraw: ^L                                                   |
|                                                              |
|         Copyright (C) Cristie Software Ltd. 2003-2018        |
+-------------------------------------------------------------+
```
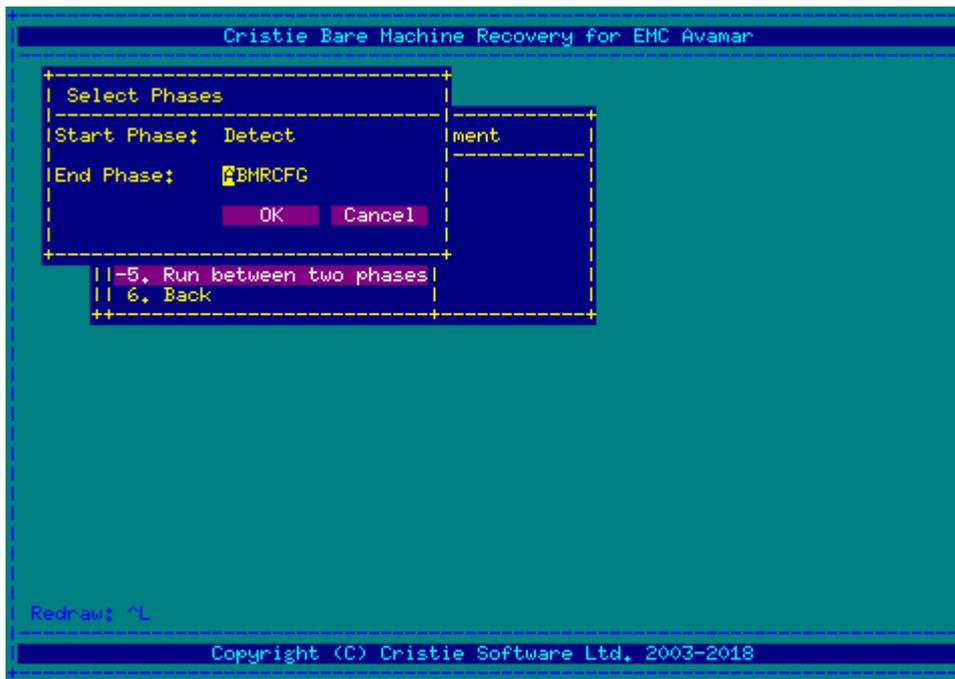
This option is useful if it is not clear why the recovery stopped.

8.4 Post Recovery Steps

There are a number of steps that can be performed once the recovery is complete to help ensure that the recovered system does not need additional configuration before it is usable. Select **Tools** from the main menu to display these options.

```
+-------------------------------------------------------------+
|        Cristie Bare Machine Recovery for EMC Avamar          |
|                                                              |
|  +--------------------------------+onment       |            |
|  |+------------------------------+-------+       |           |
|  || Post Recovery Setup          |       |       |           |
|  ||------------------------------|       |       |           |
|  ||1. Copy current network setup |       |       |           |
|  || 2. Install Missing Drivers   |       |       |           |
|  || 3. Install Package           |       |       |           |
|  || 4. Back                      |       |       |           |
|  |+------------------------------+-------+       |           |
|  +| 7. Back      |-------------------------------+           |
|                                                              |
|                                                              |
|                                                              |
|                                                              |
|                                                              |
| Redraw: ^L                                                   |
|                                                              |
|         Copyright (C) Cristie Software Ltd. 2003-2018        |
+-------------------------------------------------------------+
```
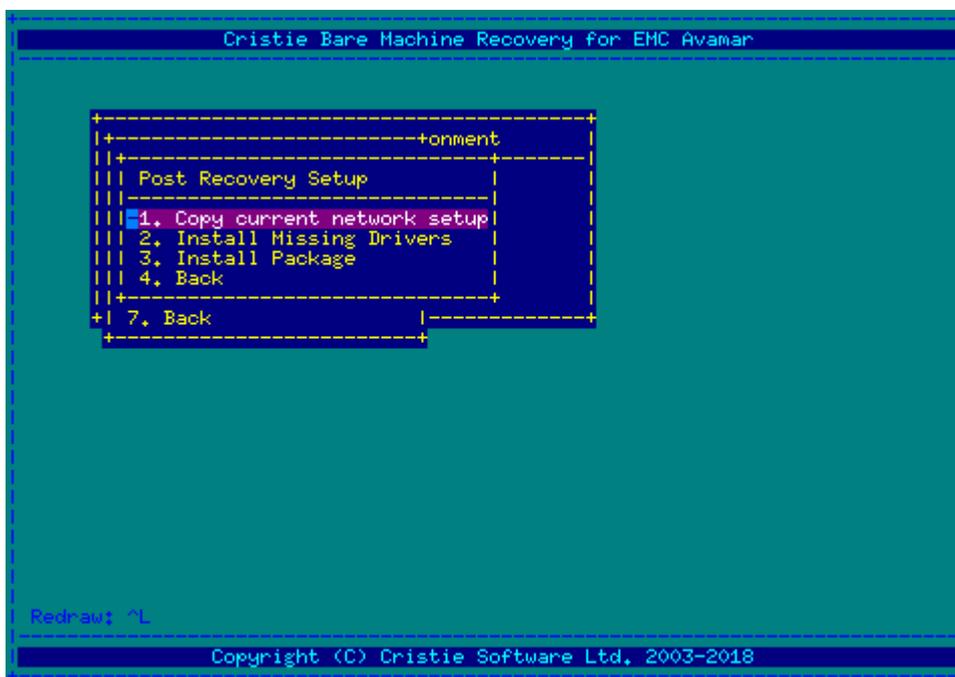
Copy current network setup
The network settings used by the recovery environment can be copied to the recovered system so that it uses those settings on boot up. If DHCP was used to obtain an IP

address, then the recovered system will use DHCP on boot up.

Install Missing Drivers
This option examines the current setup to determine which drivers were used to access the disks and the network adapters. It then examines the recovered system to determine whether these drivers were installed. Once complete, it will present a list of drivers that can be pushed from the recovery CD to the recovered system.

Install Package
Some driver packages (in particular RAID controllers, such as HP smart-array) install a set of tools alongside the driver. This often means that installing the driver by itself is not sufficient to get a working system. In these cases, it is recommended the driver package is installed instead.
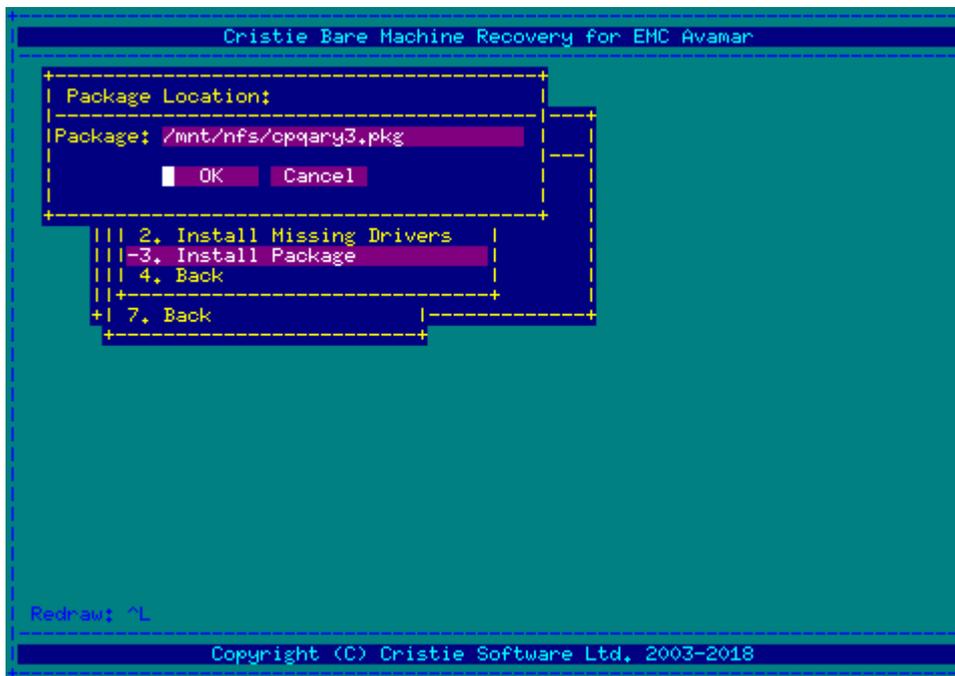
The simplest method to perform this operation is to mount an NFS drive that contains packages and install from there.

8.5   Copying Log Files

Once the recovery is complete, a menu will be opened containing options for copying log files:

```
+----------------------------------------------------------+
|              Cristie Bare Machine Recovery for EMC Avamar |
+----------------------------------------------------------+
    +-------------------------------+nt
    |+------------------------------+
    ||+-----------------------------+
    |||+---------------------------+onfiguration  |
    ||||| Log Files          |---------------|
    |||||---------------------|
    |+||| 1. Summary Log Files|on from Backup|
    | ||| 2. Display Log Files|
    | |||■3. Copy Log Files   |
    +-||| 4. Mount NFS Volume |
      +|| 5. Exit And Reboot  |
      || 6. Back
      ++

| Redraw: ^L

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```

The **Summary Log Files** entry allows you to view the most important informational, warning and error messages generated during the recovery.

Use the **Copy Log Files** feature to copy the log files to an NFS share. This will allow any problems encountered during recovery and subsequent reboot to be diagnosed more quickly.

*Note: You will need to configure the NFS mount using the **Mount NFS Volume** option.*

8.6   Trouble-shooting

Recovery

If the automatic recovery fails at any point, then it may be possible to continue to recover the system by continuing the recovery at the next phase.

For example, if the recovery fails with the following error:

```
> Disrec::ERROR "The following operations failed in the last phase run"
> ...
> Disrec:: ERROR "Review the logs and correct any errors before
proceeding
> Disrec:: ERROR "to the next phase  (Mounting)"
```

then it *may* be possible to get a working system by running the phases from Mounting until the final phase, MakeBootable.

All phases between Mounting and MakeBootable may be run by selecting **'Run Between**

Two Phases' and selecting the Mounting and MakeBootable phases. If preferred the phases may be run individually by selecting **Run Single Phase**.

Once the final phase, Make Bootable, has been run, then it will be possible to reboot the machine. However, it is recommended to copy log files to an accessible location (an NFS server, for example) before performing the reboot.

9   Cristie Technical Support

If you have any queries or problems concerning your Bare Machine Recovery for Dell EMC Avamar 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:

- ABMR 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
Forum	forum.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/

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