



TECHNICAL HowTo

Imaging Linux systems with hardware changes using Mondo Rescue



ABSTRACT

This document describes the process to create and deploy system images from HP Proliant equipped with a Smart Array Controller to some other hardware controller using mondorescue software.

Table of contents

.....	2
General remarks.....	4
Copyright and confidentiality.....	4
Version history.....	4
References.....	4
Prerequisites.....	5
Requirements.....	5
Backup the source server.....	5
Backup onto the local server.....	5
Backup onto NFS share.....	6
Deployment on target server.....	8
Restoring from Media.....	8
Restoring from network.....	8
Mondorestore part.....	9
Manual part.....	12



General remarks

Copyright and confidentiality

The information contained in this document is subject to change without notice. Hewlett-Packard makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Use, duplication, or disclosure is subject to restrictions as set forth in contract subdivision (c)(1)(ii) of the Rights in Technical Data and Computer Software clause 52.227-FAR14.

Hewlett-Packard Company
3000 Hanover Street
Palo Alto, CA 94304, USA

© Copyright 2003 Hewlett-Packard Company.

Version history

Version	Date	Comments
1.0	06.07.2005	First draft / FX. Horel
2.01	05.10.2005	Review, add mkinitrd process / FX. Horel
2.02	07. 10. 05	Review / B. Cornec
2.1	21.05.07	Addition for ATCA / E. Montaut
2.2	8.06.2007	Complete review + adding P2V / G. Renaud

References

Persons or documents	Description

Prerequisites

Requirements

The following steps must be done on the source system (HP Proliant with a SCSI Raid controller – cciss driver) :

- Mondo Rescue must be installed (mondo + mindi RPMs/debs) (Latest version available at <http://www.mondorescue.org>). This has been tested with mondo 2.2.3/mindi 1.2.3.
- Stop all the processes on the server for whose the online backup could cause problems (for example: Databases)

Backup the source server

... Backup onto the local server

Enter the following lines in a new file called mondo-bck (with execute rights):

```
# cat > /usr/local/bin/mondo-bck << EOF
# Our data are on a separated XFS FS
umount -at xfs
# You need room under /usr/mondo
rm -fr /usr/mondo/*
mkdir -p /usr/mondo/images /usr/mondo/tmp /usr/mondo/scratch
/usr/sbin/mondoarchive -O -i -H -N -g -d /usr/mondo/images -T
/usr/mondo/tmp -S /usr/mondo/scratch -E /video -s 4300m
EOF
```

- Add the following line to `/etc/modules.conf` file (if your target system uses e.g. a SATA controller managed by the `ata_piix` module) :

```
# echo 'alias scsi_hostadapter ata_piix' >> /etc/modules.conf
```

Or use the method below with the `FORCE_MODS` variable in `mindi`.

Ensure that you'll have enough space to store the mondo images and temporary files generated and launch the script:

```
# /usr/local/bin/mondo-bck
```

Then, when mondo has finished the backup, burn the images on DVD (in the script above, the image size is configured for 4.3GB).

...

... Backup onto NFS share

If you want to do a P2V (Physical to virtual migration), Virtual being a VMWare Virtual Machine, you will need to modify `mindy` (located in `/usr/sbin/mindy`) to specify the modules that will be required by the new hardware on boot. Change the `FORCE_MODS` line to match:

```
FORCE_MODS="diskdumplib diskdump mptbase mptscsi mptspi mptsas mptscsih ata_piix crc32 mii  
pcnet32 sunrpc nfs nfs_acl lockd loop"
```

Modify the path and run the script `mondoscript.sh` (you can find it in the folder `/d2/apps/i386/mondo/scripts` on deploy server):

```
#!/bin/sh

# better to got those locally
TEMP_PATH=/tmp/backupmondo/temp
SCRATCH_PATH=/tmp/backupmondo/scratch

NFS_HOST=10.a.b.c
NFS_MOUNT=/dploy/mondo
MOUNT_PATH=/mnt/backupmondo

# Relative path that will be used locally and remotely on the NFS server
BCKUP_PATH=images/ims

if (! test `mount | grep $MOUNT_PATH | wc -l` -eq 0);
then umount $MOUNT_PATH;
fi

if (! test -d $TEMP_PATH);
then mkdir -p $TEMP_PATH;
fi
echo "Temp directory $TEMP_PATH created"

if (! test -d $SCRATCH_PATH);
then mkdir -p $SCRATCH_PATH;
fi
echo "Scratch directory $SCRATCH_PATH created"

if (! test -d $MOUNT_PATH);
then mkdir -p $MOUNT_PATH;
fi
echo "Mount directory $MOUNT_PATH created"

echo "Try to mount NFS point $NFS_HOST:$NFS_MOUNT on $MOUNT_PATH..."

mount $NFSSHOST:$NFS_MOUNT $MOUNT_PATH
echo "NFS point $NFS_HOST:$NFS_MOUNT mounted on $MOUNT_PATH"

if (! test -d $MOUNT_PATH/$BCKUP_PATH);
then mkdir -p $MOUNT_PATH/$BCKUP_PATH;
fi
echo "Backup directory $MOUNT_PATH/$BCKUP_PATH created"

BCKUP_NAME=`hostname -s`-"-"`date +%Y%m%d%H%M`
echo "Backup name: "$BCKUP_NAME

CMD_LINE="mondoarchive -O -n $NFS_HOST:$NFS_MOUNT -p $BCKUP_NAME -N -d $BCKUP_PATH -s 4380m  
-F -S $SCRATCH_PATH -T $TEMP_PATH -E /tmp/rhel40u1"
echo "Will run command: $CMD_LINE"

$CMD_LINE
echo "Mondorescue terminated"

umount $MOUNT_PATH
echo "Backup directory $MOUNT_PATH unmounted"

rm -rf $TEMP_PATH
echo "Temp directory $TEMP_PATH removed"

rm -rf $SCRATCH_PATH
```



```
echo "Scratch directory $SCRATCH_PATH removed"  
echo "Backup over"
```

Copy the initrd and the kernel needed to boot using PXE onto deploy server in the correct folder:

```
# mount -o loop /var/cache/mindi/mindi.iso /mnt/cdrom  
# scp /mnt/cdrom/isolinux/initrd.img 10.a.b.c:/d2/v1/mondo/i-3pf.img  
# scp /mnt/cdrom/isolinux/vmlinuz 10.a.b.c:/d2/v1/mondo/k-3pf  
# umount /mnt/cdrom
```

Deployment on target server

... Restoring from Media

Insert the first media created by mondo rescue and start the server. It will boot automatically on the linux image (-H option of `mondoarchive`).

... Restoring from network

To restore from the network, you need to use some services provided by the deployment server (10.a.b.c).

Update the DHCP config file (for instance `/etc/dhcpd.d/10.x.y`) by adding some line corresponding to your hardware:

```
host yourhostname {
    hardware ethernet 00:50:56:AD:11:11 # your server mac address
    fixed-address 10.x.y.z             # IP address for your server
}
```

Then, reload the DHCP configuration files:

```
# service dhcpd reload
```

You now have to modify the PXE configuration. In the folder `/d2/v1/pxelinux.cfg`, create a file using the following naming:

```
01-<your mac address in lower case>
for instance: 01-00-50-56-ad-11-11
```

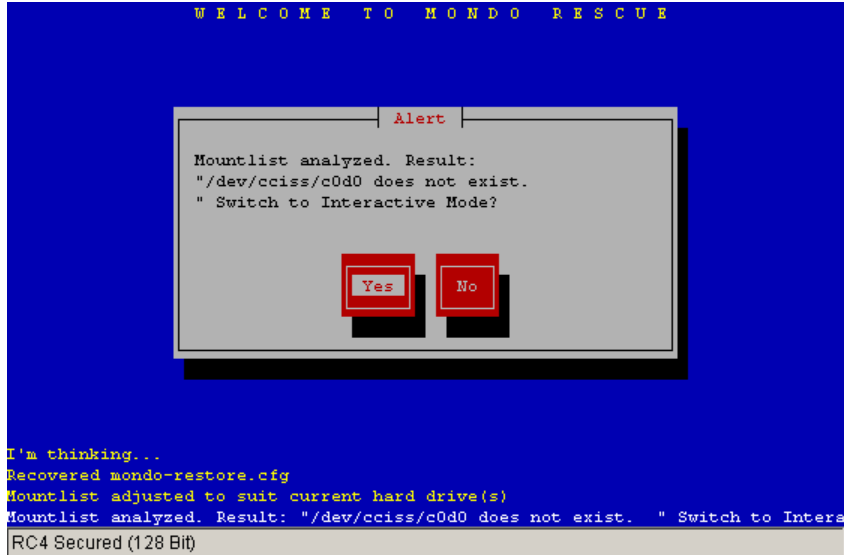
In that file, copy the following:

```
default local
prompt 20
timeout 600
label local
    localboot 0
label ims-3pf
    kernel mondo/k-3pf
    append initrd=mondo/i-3pf.img load_rmdisk=1 prompt_ramdisk=0
    ramdisk_size=36864 rw root=/dev/ram iso_mode nuke devfs=nomount
    exec-shield=0 pxe prefix=3pf-2007060610
    nfsmount=10.a.b.c:/dploy/mondo/images/ims ipconf=eth0:dhcp
```

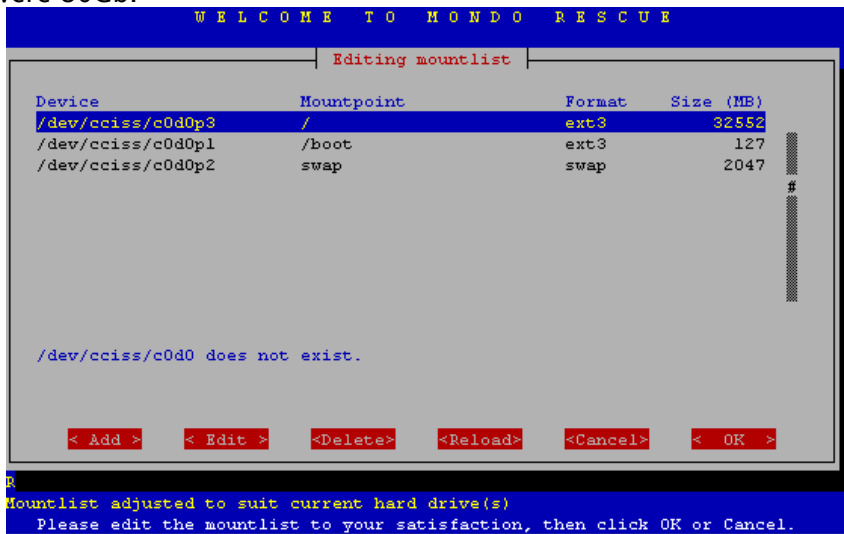
Boot your target system on the network (press F12 at boot or change boot order in Bios).

... **Mondorestore part**

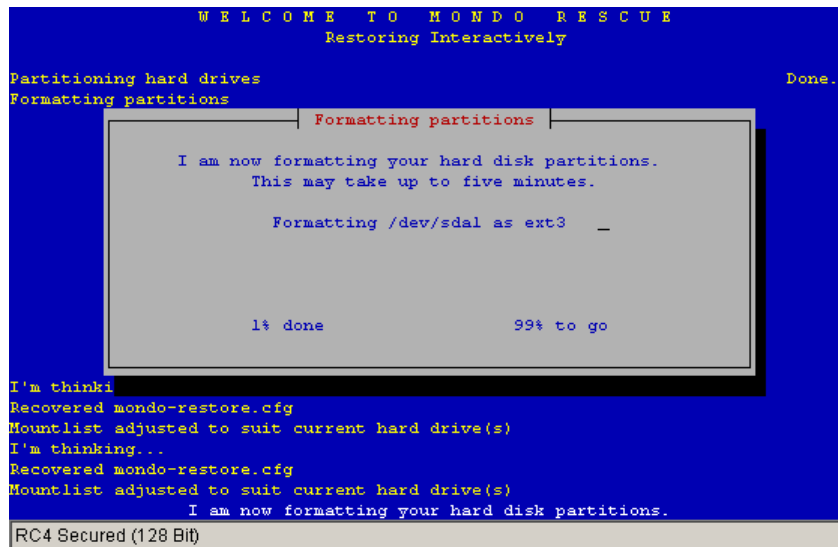
After few minutes, the software detects that the SCSI hardware is not present and that it can not mount the correct devices. It proposes to switch to interactive mode (answer Yes).



Edit the mountlist and change the devices to reflect the current hardware (going from /dev/c0d0 to /dev/sda or /dev/sdb for the SATA controller). In this example, the source disks were 36Gb and the target ones were 80Gb.



Press OK and answer Yes twice. It will repartitioned the disks and format them.

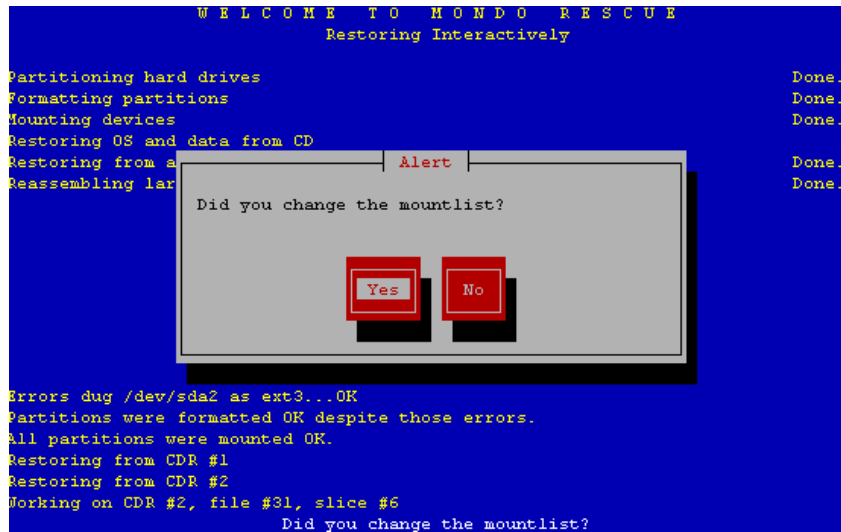


Mondo rescue will ask you for restoring the data on the new system. Answer Yes. At the end, it asks you to initialize the boot loader:

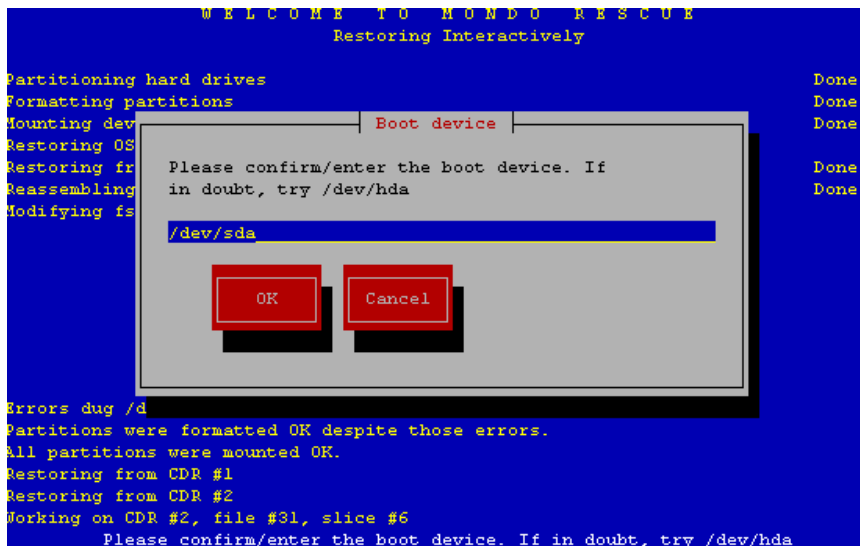


Answer Yes.

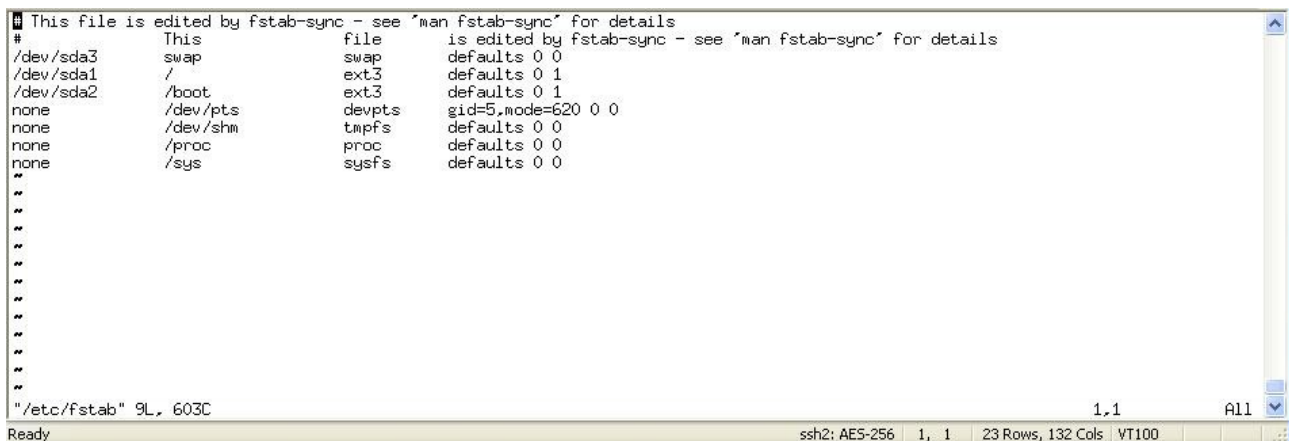
Then you'll have to change the mountlist. Answer again Yes:



Change the mountlist and point it to /dev/sda (in case you have restored the image on /dev/sda):



Then it will ask to review the /etc/fstab, /etc/grub.conf files before rebooting the server. For fstab, you should change the file to reflect the change of hard drive reference (in our case from /dev/cciss/c0d0p? To /dev/sda?) as in the lines below. If you are using Label on drives, you can stay with it, Mondo will handle it properly.



For `/etc/grub.conf`, you'll have to change it the same way to obtain:

```
# grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE: You have a /boot partition. This means that
#           all kernel and initrd paths are relative to /boot/, eg.
#           root (hd0,0)
#           kernel /vmlinuz-version ro root=/dev/cciss/c0d0p3
#           initrd /initrd-version.img
#boot=/dev/sda
default=0
timeout=5
#splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
title Red Hat Enterprise Linux AS (2.6.9-42.ELsmp) ATCA
    root (hd0,1)
    kernel /vmlinuz-2.6.9-42.ELsmp ro root=/dev/sda1 rhgb quiet console=ttyS0,115200
    initrd /initrd-2.6.9-42.ELsmp.img
title Red Hat Enterprise Linux AS-up (2.6.9-42.EL) ATCA
    root (hd0,1)
    kernel /vmlinuz-2.6.9-42.EL ro root=/dev/sda1 rhgb quiet console=ttyS0,115200
    initrd /initrd-2.6.9-42.EL.img
..
"/etc/grub.conf" 21L, 812C
1,1 All
Ready ssh2: AES-256 1, 1 23 Rows, 132 Cols VT100
```

Above is a configuration file that is specific to ATCA. The splashimage has been deactivated and the `console=ttyS0,115200` option has been put as ATCA blades are controlled through the serial port.

... Manual part

After mondorescue job is finish, you have some manual steps to perform. You have to recreate your `initrd` so that it contains the right drivers needed for your new configuration (the current one references `cciss`), edit some configuration files and make a `grub-install`.

To recreate your `initrd`, launch the following commands:

```
# mkdir -p /mnt/sysimage          # Create a folder as mounting point
# mount /dev/sda3 /mnt/sysimage   # mount the /
# mount /dev/sda1 /mnt/sysimage/boot # mount /boot (partition number
may change)
# cp /dev/sda* /mnt/sysimage/dev  # copy disk devices into the chroot
environment (usefull only for distro using devfs such as RHAS4)
# chroot /mnt/sysimage           # chroot onto the new disk
```

If you want to do some P2V to vmware, you have to make some modification to the modules you want to load. On RHAS3, change `/etc/modules.conf` and on RHAS4, change `/etc/modprobe.conf` to match the following:

```
alias eth0 pcnet32
alias scsi_hostadapter mptbase
alias scsi_hostadapter1 mptscsih
```

On SLES9, modify the file `/etc/sysconfig/kernel`. Change the `INITRD_MODULES` section on top:
`INITRD_MODULES="scsi_mod sd_mod ext3 mptbase mptscsih pcnet32"`

Then, run the following command to recreate a valid `initrd` for the new system (kernel version may be different)

```
# mkinitrd /boot/initrd-2.4.21-27.ELsmp.img 2.4.21-27.ELsmp -f -v
# mkinitrd /boot/initrd-2.4.21-27.EL.img 2.4.21-27.EL -f -v
```

Then you have to edit your mtab file to change /dev/cciss entry by /dev/sda.

```
# vi /etc/mtab  
/dev/sda1 / ext3 rw 0 0  
none /proc proc rw 0 0  
none /sys sysfs rw 0 0  
none /dev/pts devpts rw,gid=5,mode=620 0 0  
usbfs /proc/bus/usb usbfs rw 0 0  
/dev/sda2 /boot ext3 rw 0 0  
none /dev/shm tmpfs rw 0 0  
none /proc/sys/fs/binfmt_misc binfmt_misc rw 0 0  
sunrpc /var/lib/nfs/rpc_pipefs rpc_pipefs rw 0 0  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"/etc/mtab" 9L, 299C  
1,1 All
```

To update the bootloader, you have to change /boot/grub/device.map file (/dev/cciss/c0d0 become /dev/sda).
It should be like this:

```
# this device map was generated by anaconda  
(fd0) /dev/fd0  
(hd0) /dev/sda  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"  
"/boot/grub/device.map" 3L, 82C  
1,1 All
```

Install grub onto the boot disk (/dev/sda):

```
# grub-install /dev/sda
```

After that, if your restore is not on ATCA, you should be able to reboot your system successfully with the new hardware configuration and the previous content restored by mondo.

Otherwise, for restore on ATCA hardware, few more configurations are needed for the connexion of the console on the serial port.

You have to modify the /etc/inittab file and add the following line at the end:

```
#S0:2345:respawn:/sbin/mingetty ttyS0
```

Then, in the /etc/securetty file, add at the end of the file a line with ttyS0. Finally, enter the following command:

```
# /sbin/mingetty ttyS0
```

You can now exit the chroot environment and reboot:

```
# exit  
# reboot
```



After the reboot of the server, you might have to go into some reconfiguration process (such as kudzu on redhat).