

Operating System Version Migration

Instructions and advice for migrating from RedHat Linux version 8.0 to Red-Hat Enterprise Linux Version 3 are given.

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Introduction

RedHat Enterprise Linux, Version 3 (RHEL3), is closely related to RedHat Linux 8.0 (RH8), but the differences are great enough that a simple update is not possible. In the future, when we go from one version of RHEL to the next, an update function that preserves data and applications while upgrading the operating system will be available. No such update function is offered for the migration from RH8 to RHEL3.

Even when such an update function is available, it is dangerous to use. If the update process fails after having made irreversible changes to a hard disk, the recovery process is likely to be very difficult and only partially successful.

Our strategy to reduce risk and to simplify the migration process is to utilize two hard disks. One disk contains the current operating system and all of the software and data that needs to be preserved. During the migration it will be untouched. After the migration, it will be placed on-line in a read-only state, so that its contents will be fully accessible. The other disk contains nothing that requires preservation. Its contents will be completely wiped out. It is the disk on which the new version will be installed.

There is always some risk that the first disk will not be readable after the new system is installed. In such a case we have to fall back onto the backups which were copied to the whitechuck server. Part of the preparation described in the next section is concerned with making sure that these backups would be available if needed.

Preparation

It is imperative that we collect information about the current system and store it in forms that will not be over-written when the new version is installed. Some of the data has already been provided by the automatic nightly backups to whitechuck.

We must verify that these backups are usable. Some additional data not included in the nightly backups must be copied to whitechuck. Finally, the contents of some key configuration files must be printed out.

Get a Hard Copy of this Document

If you have not already done so, print out a copy of this document from its .pdf file.

Verify the Backup of your Home Directory

Each weekday night, your system should be copying your home directory to whitechuck. You should verify that this is working correctly. Here is one way to do that:

1. In a terminal window, go to the directory on whitechuck which contains your backup copies:

```
ssh whitechuck
cd backup
```

2. If you run **ls -l**, you should see a list of directory names, each starting with the date on which the backup was taken. Go **cd** to the most recent backup, and then take a directory listing:

```
cd most-recent-backup
ls -lR $USER > /tmp/backup_listing
```

3. Open a terminal window on your workstation, and make a similar directory listing there, retrieve the listing made on whitechuck, and use **diff** to compare the two:

```
cd ..
ls -lR $USER > /tmp/current_listing
cd /tmp
scp whitechuck:/tmp/backup_listing .
diff current_listing backup_listing
```

4. If the backup is recent, the output from the **diff** command should be short. Check into any differences that come as a surprise. At the end of this process, you must be confident that your backup is good.

Make a Copy of /etc

Most of the configuration files on your workstation reside in the **/etc** directory. If certain functions no longer work after the migration, it will be useful to be able to consult previous versions of the configuration files. From a terminal window, here is a convenient way to make a copy:

```
su -
cd /
tar cvzf /tmp/etc.tgz etc
chown $USER /tmp/etc.tgz
exit
scp /tmp/etc.tgz whitechuck:
```

Upon completing the command sequence listed above, a new tar ball named `etc.tgz` should appear in your home directory on whitechuck.

Plan the Migration of Non-RPM Packages

The overwhelming majority of software packages on your workstation were installed by the Redhat Package Manager (RPM). When you install RHEL, later versions of these packages will be installed automatically. You may, however, have several packages that were not installed by RPM. These are most likely located in `/usr/local`, although they may be elsewhere. Only you know what these packages are.

There are two basic ways to handle the migration of your non-RPM packages:

1. Reinstall them from scratch.
2. Similar to the way that you placed a copy of `/etc` on whitechuck place a copy of the tar ball for each package somewhere safe, so that you can copy it back and expand it after the migration. Note, however, that this might not work, because the package might depend in some way on RedHat 8.0 that is not compatible with RHEL.

Just to be on the safe side, it might be best to make a copy of any non-RPM package that you are really depending on, even though your intention is to reinstall from scratch.

Print Out Configuration Files and Reports

We need to list some key network configuration files and reports describing the layout of the filesystem:

```
pr /etc/resolv.conf | lpr
pr /etc/hosts | lpr
pr /etc/sysconfig/network | lpr
pr /etc/sysconfig/network-scripts/ifcfg-eth0 | lpr
pr /etc/fstab | lpr
df | lpr
```

Commit your CVS Changes

Be sure to commit any changes that you have made to your CVS work space.

Install RHEL from Cdrom

There are five RHEL3 installation cdroms. Of these, you will probably only need the first three. Important steps in the installation process are listed below. Not all interactions with the installation GUI are covered, because many items are either obvious or you have simply to agree with something that the software has already figured out. When in doubt, accept the value that the software suggests.

1. Automatic Partitioning. Your machine contains two hard drives. We *do not* want to remove anything on the drive that you are currently using for linux. Instead, RHEL will be installed on the drive that currently contains Windows. Be certain that you select the Windows drive for RHEL installation.

2. Network Configuration. In the **hostname** section of this screen, select the **manually** radio button, then type in your complete Internet host name. It will be a name of the form `name.rfpk.washington.edu`.
3. Firewall. We definitely want the firewall to be enabled. Check only the **SSH** box in the list of services to allow through the firewall.
4. Time Zone. Check the **System Clock Uses UTC** box, and a Pacific Timezone city, such as **America/Los_Angeles**.
5. Root Password. You can use the same root password that you are using now.
6. Package Installation Defaults. Check the **Customize ...** box.
7. Package Group Selection.

In addition to the boxes already check-marked by default select the following package groups:

- Engineering and Scientific.
- Authoring and Publishing.
- Web Server.
- MySQL Database.
- KDE Software Development.
- Legacy Software Development.
- System Tools.

If all goes well, you should reach the end of the installation process. Press the **Exit** button, and the machine will boot up on RHEL3.

Once you have booted, a post-configuration GUI starts automatically. Here are some additional steps:

1. Date and Time. Check the **Enable Network Time Protocol** box and select either of the servers listed in the **Server** box.
2. User account. Enter the same username and password that you were using for your ordinary user login before the migration. *You do not need to do a network login.*
3. At this point, the installation is complete. Reboot your system, to ensure that any updates will go into effect.

Start Mozilla to Access this Document

Start Mozilla. A RedHat registration page will appear. Ignore it, and type the following URL into the field at the top of the page:

```
whitechuck.rfpk.washington.edu/soft/index.html
```

This should bring up the Software Team web page, from which you can bring up a copy of this document.. In the steps that follow, having a copy on the screen will facilitate entering commands into shell windows, because you can cut and paste.

Make Old Disk Accessible

Your old disk, with your RH8 installation, should now be made accessible. We mount the partitions of the old disk on a directory called `/old` which we will create on the new disk.

List all the disk partitions known to RHEL:

```
su -
fdisk -l
```

You will get a list of the partitions of both your disks. Compare this with the output of the **df** that you printed before the migration. This latter list shows what mount points the partitions had before migration.

By comparing the two lists, determine whether the disk device changed. This might have happened if you changed the physical connections of your hard drives as might occur, for example, if you added a second drive.

As root, create an empty directory on which the old partitions will be mounted:

```
mkdir /old
```

Make a backup copy of `/etc/fstab`:

```
cd /etc
cp fstab fstab.bak
```

With **emacs**, edit `/etc/fstab`, adding one line for each of the old partitions that you want to mount.

For example, assume that a comparison of the old **df** listing with the current output of **fdisk -l** shows that the contents of the current `/dev/hdb1` was mounted previously on `/`. In this case you would add the following line:

```
/dev/hdb1      /old          ext3      ro,suid,dev,exec,auto,nouser,async 1 2
```

With the above definition, paths relative to `/` on the old system will now be relative to `/old` on the new one. For example, the old `/home` is now `/old/home`.

Further suppose that the contents of the current `/dev/hdb3` used to be mounted on `/home`. We add the following line to `/etc/fstab`:

```
/dev/hdb3      /old/home     ext3      ro,suid,dev,exec,auto,nouser,async 1 2
```

Suppose that the contents of the current `/dev/hdb5` was mounted previously on `/usr`. We add this line:

```
/dev/hdb5      /old/usr      ext3      ro,suid,dev,exec,auto,nouser,async 1 2
```

Continue until all of the "Linux" file systems (not including the "Linux swap" file system) shown on the **fdisk -l** listing have been accounted for with lines added to `/etc/fstab`. You may need fewer than three lines. You may need more. It all depends on how many ordinary linux filesystem partitions your old system had.

Save `/etc/fstab`, then reboot your system. When you now do **df**, you should see that the old partitions are mounted.

Restore Your Home Directory

After establishing access to your old home directory, you are ready to restore most of its contents. To do this, we will use the **rsync** command, which gives us a convenient means of copying a directory tree while excluding a few things we do not want copied. In particular, we do not want to overwrite the **gnome**, **rhnc**, **nautilus** and **metacity** settings that have just been set up by the RHEL installation.

From a terminal window:

```
cd
H=/old/home/$USER
export H
su
rsync -a --exclude '.g*' --exclude '.rhnc*' --exclude '.nautilus*' --exclude '.metacity*
```

To complete this process, go to the **Main** menu and select **Log Out**.

Finally, log in again.

Restore Static IP

After the migration, RHEL communicated with a DHCP server in the UW network to get information to set up Internet access. This works fine, but at this point your machine is not accessible by name from the outside, because the IP that DHCP assigns can change every time you restart your network interface. For the time being, at least, the Software Team workstations are accessible by host name from the Internet, because they have had static IP addresses assigned.

Do the following to restore your static IP address (note that **su** is not followed by the - option symbol):

```
su
cd /etc/sysconfig/network-scripts
cp ifcfg-eth0 ifcfg-eth0.bak
cp /old/etc/sysconfig/network-scripts/ifcfg-eth0 .
/etc/rc.d/init.d/network restart
```

Register with the RedHat Network

Now that you have restored your static IP address, you can register with RedHat Network. RFPK purchases a set of annual subscriptions that entitle our RHEL machines to receive automatic updates, via the **up2date** program. In this section, you register your machine with RedHat so that this function is enabled.

Notice the small red-colored circle at the lower right-hand corner of the screen, just to the left of the date and time. Double click this to start **up2date**.

Follow the dialog. At some point you will be asked to register with RedHat Network and presented with a window that allows you to either **Create a New Account** or **Use Existing Account**.

Click the **Use Existing Account** radio button and supply this information:

Username: alanwesthagen
Password: (get this from the Software Team manager)
Email address: afw@u.washington.edu

This should link you up to use one of the RedHat Network Management Entitlements that RFPK has purchased. The **up2date** wizard will start automatically. Allow it to install any updates to RHEL Version 3 that have been created since the cdroms were made, including updates to the kernel.

Set Up Printers

There are two Hewlett Packard laser printers located in the lab:

1. HP LaserJet 4200 dtn, located near the front door to the lab. This printer has its own interface to the network, and its own domain name, which is *arunta*.
2. HP LaserJet 5000 dtn, located near the back door to the lab. At present, this printer's network interface is broken. The firewall on whitechuck prevents us from accessing this printer, at the present time.

Configuring lj4200

To configure access to the LaserJet 4200: Bring up the **Printer Configuration** window:

Main => System Settings => Printing

Press the **New** button to bring up the **Add a new print queue** window. Provide this "wizard" with the following answers:

- *Name:* lj4200
- *Short description:* HP LaserJet 4200 near front door
- **Select a queue type:** Networked JetDirect
- *Printer:* arunta
- *Select the printer manufacturer and model:* PostScript Printer

Let the wizard **apply** this definition and print a test page.

Configuring lj5000

As explained above, the firewall on whitechuck inhibits us from accessing this printer until the JetDirect interface is repaired.

Restore Password-Free SSH Connections

If you have previously followed the instructions in the *SSH Configuration Howto* to enable your workstation to create secure connections to remote hosts without requiring a password except when your desktop manager starts up, you will want to follow the steps in this section.

Configure the Gnome desktop manager.

Main => Preferences => More Preferences => Sessions => left-click

This will open the Sessions window. Press the **Startup Programs** button followed by the **Add** button. Then set the following variables:

```
Startup Command: /usr/bin/ssh-add
Priority: 70
```

Close the window by pressing the **OK** button.

To complete this process, go to the **Main** menu and select **Log Out**.

Finally, log in again.

Update CVS

During the migration, other developers may have committed changes to the cvs repository. This would be a good time to update your cvs work space.

Assume that R2 contains the path of the root of your workspace:

```
cd $R2
cvs update -dP
```

Restore Clock Synchronization

If your workstation was previously configured to use the network time protocol to automatically synchronize its internal clock that of whitechuck, you can easily restore this function by executing the following commands from a shell window.

Note: **su** is not followed by the - option symbol.

```
su
cd /etc
mv ntp.conf ntp.conf.bak
mv ntp/step-tickers ntp/step-tickers.bak
cp /old/etc/ntp.conf .
cp /old/etc/ntp/step-tickers ntp
/etc/rc.d/init.d/ntpd restart
/sbin/chkconfig --level 2345 ntpd on
```


Restore the Backup Function

Perform the following menu sequence:

Main => Preferences => More Preferences => Sessions => left-click

This will open the Sessions window. Press the **Startup Programs** button followed by the **Add** button. Then set the following variables:

Startup Command: `/home/username/bin/shell/get-agent-data`
Priority: 75

where *username* is your username. Close the window by pressing the **OK** button.

As an ordinary user, from a terminal window, execute the following command:

```
crontab -e
```

and an **emacs** window should appear, displaying the `crontab` file, ready for editing (the file might be empty at this point).

Add the following line:

```
30 2 * * 2-6 ~/bin/shell/backup-home-full
```

Close the file, and your home directory will be backed up to whitechuck 2:30 AM, each morning that follows a work day.

Reinstall Acrobat Reader

If you prefer the Adobe Acrobat Reader to the default reader provided with RHEL, you will need to reinstall **acroread**. This is easily accomplished by following the steps in the *Acrobat Reader Installation* ¹ howto.

Install Dia

Dia, the Gnu Office diagramming tool, is not included in the RHEL distribution. It can be easily installed, following the instructions in the *Authoring RFPK Software Documents* ² howto, in the *Installing Dia* sub-section.

Notes

1. <http://whitechuck.rfpk.washington.edu/soft/howto/rhel3/acroread/acroread.html>
2. <http://whitechuck.rfpk.washington.edu/soft/howto/rhel3/authoring/authoring.html>

