Bare metal DR and Linux Migration with Relax and Recover (rear)

INTRODUCTION

In short, Relax and Recover (rear) is a tool that creates .tar.gz images of the running server and creates bootable rescue media as .iso images

Relax and Recover (ReaR) generates an appropriate rescue image from a running system and also acts as a migration tool for Physical to Virtual or Virtual to Virtual migrations of running linux hosts.

It is not per se, a file level backup tool. It is akin to Clonezilla – another popular bare metal backup tool also used to migrate Linux into virtual environments.

There are two main commands, **rear mkbackuponly** and **rear mkrescue** to create the backup archive and the bootable image respectively. They can be combined in the single command **rear mkbackup**.

The bootable iso provides a configured bootable rescue environment that, provided your backup is configured correctly in **/etc/rear/local.conf**, will make recovery as simple as typing **rear recover** from the recovery prompt.

You can back up to NFS or CIFS Share or to a USB block storage device pre-formatted by running **rear format /dev/sdX**

A LITTLE MORE DETAIL

A professional recovery system is much more than a simple backup tool.
Experienced admins know they must control and test the entire

workflow for the recovery process in advance, so they are certain all the pieces will fall into place in case of an emergency.

Versatile replacement hardware must be readily available, and you might not have the luxury of using a replacement system that exactly matches the original.

The partition layout or the configuration of a RAID system must correspond.

If the crashed system’s patch level was not up to date, or if the system contained an abundance of manually installed software, problems are likely to occur with drivers, configuration settings, and other compatibility issues.

Relax and Recover (ReaR) is a true disaster recovery solution that creates recovery media from a running Linux system.

If a hardware component fails, an administrator can boot the standby system with the ReaR rescue media and put the system back to its previous state.

ReaR preserves the partitioning and formatting of the hard disk, the restoration of all data, and the boot loader configuration.

ReaR is well suited as a migration tool, because the restoration does not have to take place on the same hardware as the original.

ReaR builds the rescue medium with all existing drivers, and the restored system adjusts automatically to the changed hardware.

ReaR even detects changed network cards, as well as different storage scenarios with their respective drivers (migrating IDE to SATA or SATA to CCISS) and modified disk layouts.

The ReaR documentation provides a number of mapping files and examples.

An initial full backup of the protected system is the foundation.

ReaR works in collaboration with many backup solutions, including Bacula/Bareos SEP SESAM, Tivoli Storage Manager, HP Data Protector, Symantec NetBackup, CommVault Galaxy, and EMC

Legato/Networker.

WORKING EXAMPLE

Below is a working example of rear in action, performed on fresh Centos VM’s running on VirtualBox in my own lab environment.

Note: This example uses a Centos 7 server and a NFS Server on the same network subnet.

INSTALLATION

Add EPEL repository

```
yum install wget
wget http://dl.fedoraproject.org/pub/epel/beta/7/x86_64/epel-release-7-0.2.noarch.rpm
rpm -ivh epel-release-7-0.2.noarch.rpm
yum install rear
```

START A BACKUP

On the CentOS machine

Add the following lines to */etc/rear/local.conf:*

```
OUTPUT=iso
BACKUP=NETFS
BACKUP_TYPE=incremental
BACKUP_PROG=tar
FULLBACKUPDAY=”Mon”
BACKUP_URL=”nfs://NFSSERVER/path/to/nfs/export/servername”
BACKUP_PROG_COMPRESS_OPTIONS=”–gzip”
BACKUP_PROG_COMPRESS_SUFFIX=”.gz”
BACKUP_PROG_EXCLUDE=( ‘/tmp/*’ ‘/dev/shm/*’ )
BACKUP_OPTIONS=”nfsvers=3,nolock”
```

Now make a backup

```
[root@centos7 ~]# rear mkbackup -v
Relax-and-Recover 1.16.1 / Git
Using log file: /var/log/rear/rear-centos7.log
mkdir: created directory ‘/var/lib/rear/output’
```

```
Creating disk layout
Creating root filesystem layout
TIP: To login as root via ssh you need to set up /root/.ssh/authorized_keys or SSH_ROOT_PASSWORD in your configuration file
Copying files and directories
Copying binaries and libraries
Copying kernel modules
Creating initramfs
Making ISO image
Wrote ISO image: /var/lib/rear/output/rear-centos7.iso (90M)
Copying resulting files to nfs location
Encrypting disabled
Creating tar archive ‘/tmp/rear.QnDt1Ehk25Vqurp/outputfs/centos7/2014-08-21-1548-F.tar.gz’
Archived 406 MiB [avg 3753 KiB/sec]OK
Archived 406 MiB in 112 seconds [avg 3720 KiB/sec]
```

Now look on your NFS server
You’ll see all the files you’ll need to perform the disaster recovery.

```
total 499M
drwxr-x— 2 root root 4.0K Aug 21 23:51 .
drwxr-xr-x 3 root root 4.0K Aug 21 23:48 ..
-rw——- 1 root root 407M Aug 21 23:51 2014-08-21-1548-F.tar.gz
-rw——- 1 root root 2.2M Aug 21 23:51 backup.log
-rw——- 1 root root 202 Aug 21 23:49 README
-rw——- 1 root root 90M Aug 21 23:49 rear-centos7.iso
-rw——- 1 root root 161K Aug 21 23:49 rear.log
-rw——- 1 root root 0 Aug 21 23:51 selinux.autorelabel
-rw——- 1 root root 277 Aug 21 23:49 VERSION
```

INCREMENTAL BACKUPS

ReaR is not a file level Recovery tool (Look at fwbackups) however, you can perform incremental backups, in fact, in the “BACKUP_TYPE=incremental” parameter which takes care of that.

As you can see from the file list above, it shows the letter “F” before the .tar.gz extension which is an indication that this is a full backup.
Actually it’s better to make the rescue ISO seperately from the backup.
The command “rear mkbackup -v” makes both the bootstrap ISO and the backup itself, but running “rear mkbackup -v” twice won’t create incremental backups for some reason.

So first:

```
[root@centos7 ~]# time rear mkrescue -v
Relax-and-Recover 1.16.1 / Git
Using log file: /var/log/rear/rear-centos7.log
Creating disk layout
Creating root filesystem layout
TIP: To login as root via ssh you need to set up /root/.ssh/authorized_keys or SSH_ROOT_PASSWORD in your configuration file
Copying files and directories
Copying binaries and libraries
Copying kernel modules
Creating initramfs
Making ISO image
Wrote ISO image: /var/lib/rear/output/rear-centos7.iso (90M)
Copying resulting files to nfs location

real 0m49.055s
user 0m15.669s
sys 0m10.043s
```

And then:

```
[root@centos7 ~]# time rear mkbackuponly -v
Relax-and-Recover 1.16.1 / Git
Using log file: /var/log/rear/rear-centos7.log
Creating disk layout
Encrypting disabled
Creating tar archive ‘/tmp/rear.fXJJ3VYpHJa9Za9/outputfs/centos7/2014-08-21-1605-
```

```
F.tar.gz’
Archived 406 MiB [avg 4166 KiB/sec]OK
Archived 406 MiB in 101 seconds [avg 4125 KiB/sec]

real 1m44.455s
user 0m56.089s
sys 0m16.967s
```

Run again (for incrementals)

```
[root@centos7 ~]# time rear mkbackuponly -v
Relax-and-Recover 1.16.1 / Git
Using log file: /var/log/rear/rear-centos7.log
Creating disk layout
Encrypting disabled
Creating tar archive ‘/tmp/rear.Tk9tiafmLyTvKFm/outputfs/centos7/2014-08-21-1608-I.tar.gz’
Archived 85 MiB [avg 2085 KiB/sec]OK
Archived 85 MiB in 43 seconds [avg 2036 KiB/sec]

real 0m49.106s
user 0m10.852s
sys 0m3.822s
```

Now look again at those backup files: -F.tar.gz is the Full Backup, -I.tar.gz is the Incremental. There’s also basebackup.txt and timestamp.txt files.

```
total 585M
drwxr-x— 2 root root 4.0K Aug 22 00:09 .
drwxr-xr-x 3 root root 4.0K Aug 22 00:04 ..
-rw-r—r— 1 root root 407M Aug 22 00:07 2014-08-21-1605-F.tar.gz
-rw-r—r— 1 root root 86M Aug 22 00:09 2014-08-21-1608-I.tar.gz
-rw-r—r— 1 root root 2.6M Aug 22 00:09 backup.log
-rw-r—r— 1 root root 25 Aug 22 00:05 basebackup.txt
-rw——- 1 root root 202 Aug 22 00:05 README
-rw——- 1 root root 90M Aug 22 00:05 rear-centos7.iso
-rw——- 1 root root 161K Aug 22 00:05 rear.log
```

```
-rw-r—r— 1 root root 0 Aug 22 00:09 selinux.autorelabel
-rw-r—r— 1 root root 11 Aug 22 00:05 timestamp.txt
-rw——- 1 root root 277 Aug 22 00:05 VERSION
```

RECOVERY

ReaR is designed to create bootable .iso, making recovery very easy and flexible in terms of options. .iso files can be booted from CD/DVD optical media, USB Block Storage Devices & Hard disks and also in VMWare & Virtual Box.

To recover a system, you first need to boot to the .ISO that was created with the backup.

You may use your favorite method for booting to the .ISO whether it’s creating a bootable USB sick, burning it to a CD, mounting it in iDRAC, etc.

Just boot to it on the server in which you want to restore to.

When the recovery screen loads, select the top option to recover.

Type root to log in.

To start recovery, type

```
rear -v recover
```

TROUBLESHOOTING RECOVERY

```
# Create missing directory:
mkdir /run/rpcbind
```

```
# Manually start networking:
chmod a+x /etc/scripts/system-setup.d/60-network-devices.sh
/etc/scripts/system-setup.d/60-network-devices.sh
```

```
# Navigate to and list files in /var/lib/rear/layout/xfs
# Edit each file ending in .xfs with vi and remove “sunit=0 blks” from the “log” section.
# In my case, the following files, then save them:
vi /var/lib/rear/layout/xfs/fedora_serv—build-root.xfs
vi /var/lib/rear/layout/xfs/sda1.xfs
vi /var/lib/rear/layout/xfs/sdb2.xfs
```

```
# Run the following commands to get a list of LVs and VGs:
```

lvdisplay
vgdisplay

# Run the following commands to remove the above listed LVs and VGs:
lvremove
vgremove

# Now run recovery again:
rear recover

USEFUL URLs / FURTHER READING
ReaR Project Page:
ReaR on Github:
ReaR in OpenSuse:
YaST Module for Suse:
ReaR User Guide:
SEP-SESAM Support:
ReaR1.15 Release Notes: