

v2p Recovery for Oracle Support Cases

PREPARED FOR - Volkswagen IT Group Cloud

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1. History and Revisions

Version	Date	Authors	Changes
0.0.1	04/11/2015	Ben Haubeck bhaubeck@redhat.com	Initial Draft
0.0.2	05/11/2015	Ben Haubeck bhaubeck@redhat.com	adding images, little adjustments
0.0.3	06/11/2015	Ben Haubeck bhaubeck@redhat.com	adding hint for identifying the direct attached LUN
0.0.4	06/11/2015	Ben Haubeck bhaubeck@redhat.com	added description for the VLAN module
0.9.0	11/11/2015	Ben Haubeck bhaubeck@redhat.com	added the feedback from Frank Kapsch from the first recovery
1.0.0	18/11/2015	Ben Haubeck bhaubeck@redhat.com	added the feedback from Gunnar Thielebein
1.0.1	19/11/2015	Ben Haubeck bhaubeck@redhat.com	minor changes, typos, etc.

2. Preface

2.1. Confidentiality, Copyright, and Disclaimer

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2.2. About This Document

The purpose of the document is to describe the procedure of the recovery of virtual machine to a physical machine with Relax-and-Recover if the Oracle support is demanding to reproduce a support case on bare metal.

2.3. Audience

The document is intended for those team members on site at Volkswagen, who will be responsible for Linux server support.

2.4. Additional Background and Related Documents

Numerous other documents have also been provided by Red Hat Consulting, explaining tasks such as installation of RHEV, backup etc.

2.5. Terminology

Some of the acronyms using in this document are included in the table below

Table 1. Terminology Table

Term	Definition
RHEV	Red Hat Enterprise Virtualisation
RHEV-M	Red Hat Enterprise Virtualisation Manager
RHEL-H	Red Hat Enterprise Linux Hypervisor
v2p	virtual to physical

3. Important Remarks



To prevent any accidental access to the LUN while it is mounted on the standalone recovery system, the LUN should be completely unzoned from the RHEV environment and should be zoned to the recovery standalone system **exclusively**.



The original VM should be **shut down** to prevent IP address conflicts, that might prevent the TSM restore.



If the recovery is being done on a original hypervisor have in mind, that this machine might have still access to all LUNs in the complete RHEV environment. So do **NOT** use the automatic recovery option of ReaR as it might overwrite a LUN with the recovery instead of a local disk. (ReaR has added some extra safety to prevent this but it is not recommended to test this out.)

4. Prerequisites

1. The ISO image of every VM must contain the kernel module *8021q* so that you can configure the VLAN interface for the TSM file recovery. Therefore this lines

```
# kernel modules to include in the rescue media in addition to the ones
# present at that time mkrescue is being executed
MODULES=(8021q)
```

must be placed in the file `/etc/rear/local.conf` After that the cronjob for creating the ReaR iso images must renew the ISO image at least once. In the new RHEV environment at Volkswagen cfengine is taking care about this line in `/etc/rear/local.conf`.

2. The physical box need at least 2 physical disks as the VMs are using 2 virtual disks according to Volkswagen standard.

5. Recovery Preparations

1. Turn of the original VM to avoid IP address conflicts.
2. Make sure, that you have a local user for login after the recovery as the network of the VM will not work on the physical box.
3. Note the WWN of the LUN that is direct attached to the VM, notify the SAN-Team to zone that (and only that) LUN to target machine for the recovery.
4. Note the name and the IP address of the TSM server that is holding the backup for the VM (look it up in `/opt/tivoli/tsm/client/ba/bin/dsm.sys`) on the original VM or in the file in the ReaR recovery shell:

```
grep TCPServeraddress /opt/Tivoli/tsm/client/ba/bin/dsm.sys
```

5. Obtain the ISO that is being creating on a daily basis individually for every VM and place it on the boot server according to the environment in which the VM, that should be recovered, is placed.
 - a. recent ISO image for ReaR saved locally on every VM. If the VM is not existing anymore and / or the file system is not accessible anymore, the ISO image can be retrieved from TSM via the TSM client on a different node.
 - b. local path to the ReaR image: `/opt/tivoli/tsm/rear/rear-<hostname>.iso`
 - i. for example: `/opt/tivoli/tsm/rear/rear-lxf102p001.iso`
 - c. change the permission of the ISO file to 644 if necessary.
6. Boot via iRMC the machine with the ReaR iso image. If the restore is happening on a Fujitsu server, login into the iRMC, navigate to the "Remote Console in Power" and set the onetime boot option:

Remote CD/DVD Image Options

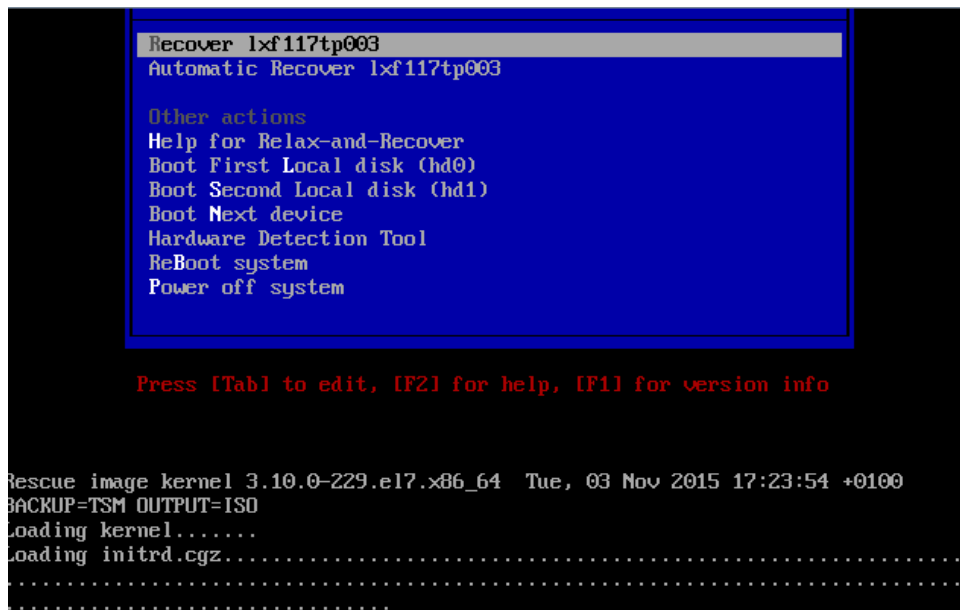
Share Type:

Server:

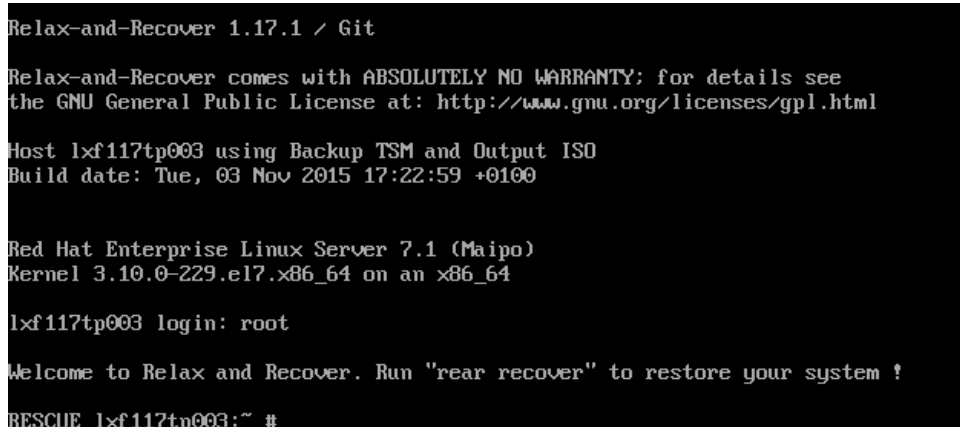
Share Name:

Image Name:

7. Choose "Recover <hostname>". Do **NOT** use the automatic recovery option.



8. after ReaR has booted the machine you can login by typing "root" at the prompt and hit return (no password) and you have reached the ReaR recovery shell.



9. unload the fiber channel module

```
modprobe -r lpfc
```

10. load the module for the SAS controller to get access to the local disks

```
modprobe megaraid_sas
```

11. if it is not clear, which interfaces have a link you can determine this by using

```
ip link set up <interface>
```

on the interfaces and check with


```
ip a s <interface>
```

if the state of the interface is "up"

12. create the ifcfg-files for ens3f0, ens4f0 and bond0 (or the corresponding devices for the interface(s) to get the interface(s) up, that you need for reaching the TSM server)

```
# cat /etc/sysconfig/network-scripts/ifcfg-bond0
DEVICE=bond0
ONBOOT=yes
BOOTPROTO=none
USERCTL=no
```

check, if the physical interfaces in this example (ens3f0 and ens4f0) are matching your recovery target box physics.

```
# cat /etc/sysconfig/network-scripts/ifcfg-ens3f0
DEVICE=ens3f0
USERCTL=no
ONBOOT=yes
MASTER=bond0
SLAVE=yes
BOOTPROTO=none
```

```
# cat /etc/sysconfig/network-scripts/ifcfg-ens4f0
DEVICE=ens4f0
USERCTL=no
ONBOOT=yes
MASTER=bond0
SLAVE=yes
BOOTPROTO=none
```

13. load the modules for the bonded interface with a VLAN trunk

```
modprobe 8021q
modprobe bonding mode=4 miimon=100
```

14. set up the vlan interface on top of the bond interface (in this example it is VLAN 27)

```
ip link add link bond0 name bond0.27 type vlan id 27
```

15. set an IP address on the VLAN interface (in this example it is 10.252.185.45/22)

```
ip addr add 10.252.185.45/22 dev bond0.27
```

16. activate the VLAN interface

```
ip link set up bond0
```

17. put the network ports into the bond

```
ifenslave bond0 ens3f0 ens4f0
```

18. check if the interfaces (bond0 and bond0.<VLANID>) are up, if not:

```
ip link set up bond0.27
```

19. add the default route:

```
ip route add default gw 10.252.184.4
```

20. in B2X add the TSM server to the /etc/hosts, for instance:

```
10.252.40.54    tsm74-10g.wob.sec.vw.vwg
```

6. Recovery Procedure with ReaR

1. Start the Recovery process by typing

```
rear recover
```

```
RESCUE lxf117tp003:/etc/sysconfig/network-scripts # rear recover
```

2. using the defaults until you got asked for file systems that should be recovered and for the disk mapping.

```
RESCUE lxf117tp003:/etc/sysconfig/network-scripts # rear recover
Relax-and-Recover 1.17.1 / Git
Using log file: /var/log/rear/rear-lxf117tp003.log
NOTICE: Will do driver migration

TSM restores by default the latest backup data. Alternatively you can specify
a different date and time to enable Point-In-Time Restore. Press ENTER to
use the most recent available backup
Enter date/time (YYYY-MM-DD HH:mm:ss) or press ENTER [30 secs]: _
```

```
The TSM Server reports the following for this node:
-----
#      Last Incr Date      Type      File Space Name
-----
1      02-11-2015 12:30:53  XFS       /
2      02-11-2015 12:30:55  XFS       /appl/opc
3      02-11-2015 12:30:55  XFS       /boot
4      02-11-2015 12:30:53  XFS       /home
5      02-11-2015 12:30:55  XFS       /opt
6      02-11-2015 12:30:51  XFS       /oracle
7      02-11-2015 12:30:55  XFS       /u00
8      02-11-2015 12:30:55  XFS       /u01/oradata/lxf117tp003
01
9      02-11-2015 12:30:55  XFS       /u02/oradata/lxf117tp003
01
10     02-11-2015 12:30:55  XFS       /u03/oradata/lxf117tp003
01
11     02-11-2015 12:30:55  XFS       /u04/oradata/lxf117tp003
01
12     02-11-2015 12:30:55  XFS       /u05/fra/lxf117tp003_01
13     02-11-2015 12:30:55  XFS       /var

Please enter the numbers of the filesystems we should restore.
Pay attention to enter the filesystems in the correct order
(like restore / before /var/log) !
(default: 1 2 3 4 5 7 8 9 10 11 12 13): [30 secs]
```



Do not use the defaults as we do not want to restore the database files. So skip every file system that is starting with u0[1-5]. We are using the re-attached LUN after the recovery directly again.

If you chose to recover also the database files but skip the direct attached LUN later on as described, you end up with an overfilled root file system and therefore failing recovery.

So in this specific case, type

```
1 2 3 4 5 6 7 13
```

hit <Enter> and check the selection in the next step:

```

We will now restore the following filesystems:
/
# /appl/opc
/boot
/home
/opt
/u00
/var
Is this selection correct ? (Y/n) [30 secs] _

```

3. Disk mappings

- a. skip the recovery of /dev/sda as this is the direct attached LUN, that is direct attached after the recovery again, so there is no need to recover that. Skip also /dev/sda of the physical box as it seems that /dev/sda is some virtual disk / floppy provided by the Fujitsu iRMC with a capacity of 8 MB, so ignore that.

```

Comparing disks.
Device sda has size 8388608, 322122547200 expected
Device vda does not exist.
Device vdb does not exist.
Switching to manual disk layout configuration.
Original disk /dev/sda does not exist in the target system. Please choose an appropriate replacement.
1) /dev/nullb0      3) /dev/sda      5) /dev/sdc
2) /dev/nullb1      4) /dev/sdb      6) Do not map disk.
#? 6_

```

- b. use /dev/sdb for original /dev/vda (we are moving from virtual to physical AND we have to skip the first sd-device which is temporarily created by the iRMC for us):

```

Original disk /dev/vda does not exist in the target system. Please choose an appropriate replacement.
1) /dev/nullb0      3) /dev/sda      5) /dev/sdc
2) /dev/nullb1      4) /dev/sdb      6) Do not map disk.
#? 4_

```

- c. use /dev/sdc for original /dev/vdb (same procedure):

```

Original disk /dev/vdb does not exist in the target system. Please choose an appropriate replacement.
1) /dev/nullb0      3) /dev/sda      5) Do not map disk.
2) /dev/nullb1      4) /dev/sdc
#? 4_

```

4. Choose to continue

```

2015-11-04 14:04:09 Disk /dev/sdc chosen as replacement for /dev/vdb.
Disk /dev/sdc chosen as replacement for /dev/vdb.
This is the disk mapping table:
    /dev/vda /dev/sdb
    /dev/vdb /dev/sdc
Please confirm that '/var/lib/rear/layout/disklayout.conf' is as you expect.
1) View disk layout (disklayout.conf)  4) Go to Relax-and-Recover shell
2) Edit disk layout (disklayout.conf)  5) Continue recovery
3) View original disk space usage      6) Abort Relax-and-Recover
#? 5

```

5. Partitions, PVs, VGs, LVs and file systems are getting rebuild:

```

Start system layout restoration.
Creating partitions for disk /dev/sdb (msdos)
Creating partitions for disk /dev/sdc (gpt)

```

```

Creating LVM VG vg00
Creating LVM VG vg01
Creating LVM volume vg00/swapvol
  Wiping swap signature on /dev/vg00/swapvol.
  Logical volume "swapvol" created.
Creating LVM volume vg00/lvol5
  Wiping xfs signature on /dev/vg00/lvol5.
  Logical volume "lvol5" created.
Creating LVM volume vg00/lvol4
  Wiping xfs signature on /dev/vg00/lvol4.
  Logical volume "lvol4" created.
Creating LVM volume vg00/lvol3
  Wiping xfs signature on /dev/vg00/lvol3.
  Logical volume "lvol3" created.
Creating LVM volume vg00/lvol2
  Wiping xfs signature on /dev/vg00/lvol2.
  Logical volume "lvol2" created.
Creating LVM volume vg00/lvol1
  Wiping xfs signature on /dev/vg00/lvol1.
  Logical volume "lvol1" created.
Creating LVM volume vg01/lvol1
  Wiping xfs signature on /dev/vg01/lvol1.
  Logical volume "lvol1" created.
Creating LVM volume vg01/lvol2

```

```

=                sectsz=512    sunit=0 blks, lazy-count=1
realtime =none      extsz=4096    blocks=0, rtextents=0
Mounting filesystem /u00
Creating xfs-filesystem /boot on /dev/sdb1
meta-data=/dev/sdb1    isize=256    agcount=4, agsize=65536 blks
=                sectsz=512    attr=2, projid32bit=1
=                crc=0          finobt=0
data      =                bsize=4096    blocks=262144, imaxpct=25
=                sunit=0        swidth=0 blks
naming    =version 2        bsize=4096    ascii-ci=0 ftype=0
log       =internal log    bsize=4096    blocks=2560, version=2
=                sectsz=512    sunit=0 blks, lazy-count=1
realtime =none      extsz=4096    blocks=0, rtextents=0
Mounting filesystem /boot
Creating swap on /dev/mapper/vg00-swapvol
Disk layout created.
Restoring /
IBM Tivoli Storage Manager
Command Line Backup-Archive Client Interface
Client Version 7, Release 1, Level 2.0
Client date/time: 2015-11-04 14:06:32
(c) Copyright by IBM Corporation and other(s) 1990, 2015. All Rights Reserved.

Node Name: LXF117TP003

```

6. after it finished the file recovery from the TSM server you can either investigate the chrooted environment or just sync and reboot:

```
Restore function invoked.

ANS1247I Waiting for files from the server...
** Interrupted **
ANS1114I Waiting for mount of offline media.
* Processed      7,000 files * -
Restore processing finished.

Total number of objects restored:      7,201
Total number of objects failed:        0
Total number of bytes transferred:    257.42 MB
Data transfer time:                   23.77 sec
Network data transfer rate:           11,088.07 KB/sec
Aggregate data transfer rate:         2,829.56 KB/sec
Elapsed processing time:               00:01:33
Patching '/etc/default/grub' instead of 'etc/sysconfig/grub'
Patching '/proc/9210/mounts' instead of 'etc/mtab'
Updated initramfs with new drivers for Kernel 3.10.0-229.el7.x86_64.
Installing GRUB2 boot loader

Finished recovering your system. You can explore it under '/mnt/local'.

RESCUE lxf117tp003:/etc/sysconfig/network-scripts #
```

- a. sync
- b. reboot

7. Final Steps

- a. Network: After the machine has rebooted, you have to configure the network interfaces once more as the network configuration is now recovered as formerly used inside the VM.
- b. Attach the LUN with the database on it (if already zoned to the physical box).
- c. DB-Settings: Depending on the size of the new physical box it might necessary to increase the SGA size as the number of CPUs are increased compared to the original VM
See also:
ORA-00821 ORA-01034 ORA-27101, SGA_target need to be increased (Doc ID 815426.1)
ORA-12853 / ORA-4031 or ORA-4030 on Instance Startup With increased SGA size (Doc ID 839789.1)