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Can't Boot Break-fix

RHEL 7 Practice 3

BREAK-FIX TRAINING
This training requires solving a problem that's simulated in a hands-on lab environment.

Course: pnt-support-102
Version: July 2021
Description: This break-fix course simulates a problem booting a system running Red Hat Enterprise Linux 7. You'll investigate and solve the problem in a hands-on lab environment to complete the course.

How to use this module:

- Look for gray < and > marks on either the bottom or the left and right sides of this pane, depending on the size of the window. Select those to navigate to the previous or next page, respectively.
- Jump to a specific page using the navigation links at the left.
- Play audio for a page using the player at the top of that page. Audio often provides more complete information than the text and graphics alone. A transcript may be available from a link on the same page.

In this break-fix:

Type of issue: Red Hat Enterprise Linux 7 is booting into the dracut emergency shell.

What you should already know:
This training assumes that you are a Red Hat Certified System Administrator (RHCSA) or have equivalent experience administrating RHEL 7.

How break-fix training works:

1. Challenge yourself in the **break-fix activity**. It describes a problem scenario that's simulated in the lab environment where you can investigate and solve the problem.
2. Follow up with the **guided solution**:
    - If you couldn't solve the problem on your own, read and follow the instructions in the Guided Solution to complete this training.
    - If you were successful solving the problem, read the solution for useful tips you can apply when solving similar problems.

Lab environment

Successful completion for this training includes hands-on lab activities hosted in a cloud-based lab environment.

LAUNCH THE LAB ENVIRONMENT

The lab environment is labeled by the course code: **tech-breakfix-cantboot-001**

Use this code when following instructions to launch this lab environment:

- Instructions for Red Hat internal users using OpenTLC
- Instructions for Partner users using OpenTLC

SYSTEM INFO

System	IP	Credentials	Description
classroom	172.25.250.254	root/redhat	Central SSH access point

SSH ACCESS

(1) Use the SSH command shown here to access your environment, modifying the command based on the information you received by email:

```
$ ssh flastname-redhat.com@classroom-guid.red.osp.opentlc.com
```

NOTE: The user ID to use in this *ssh* line is based on your login credentials for OpenTLC, so modify that as appropriate for your account.

(2) When prompted, log in to your lab environment using one of these options:

- A password set by OpenTLC and provided in the information email.
- An SSH key pair configured as described here: http://www.opentlc.com/ssh.html

```
$ ssh flastname-redhat.com@classroom-guid.red.osp.opentlc.com
The authenticity of host 'classroom-guid.red.osp.opentlc.com (169.47.191.199)' can't be established.
ECDSA key fingerprint is SHA256:v01n4XWXr0lphfGpBiSSvbasmrlQZul2ntS8g0Kbmdk.
Are you sure you want to continue connecting (yes/no)? yes

flastname-redhat.com@classroom-guid.red.osp.opentlc.com's password: <PASSWORD>

[flastname-redhat.com@classroom-guid ~]$ sudo su -
Last login: Thu Oct 24 14:19:41 EDT 2019 from 61.0.147.106 on pts/0
[root@classroom-guid ~]#
```

CONSOLE ACCESS

If you need console access to any of the machines in this environment, follow these steps:

(1) Retrieve the **Master Console** URL from the information email you received on provisioning your lab environment. Look for a line that's similar to this one:

```
Master Console: https://console-redvnc.apps.shared.na.openshift.opentlc.com
```

(2) Open this console URL in your web browser, and select **Log in with OpenShift**.

(3) Enter your OpenTLC username and password at the OpenShift login prompt.

(4) If a dialog appears requiring you to *Authorize Access* for a service account, choose to allow the selected permissions to continue.

(5) Select **Access Console** for a given virtual machine to open a VNC console session with that system.

LOCAL WEB BROWSER ACCESS (HOSTED WEB UI)

(1) Use the same *ssh* command from your local system as for command line access, but add the argument **-CfND 8080**

```
[user1@laptop ~]$ ssh flastname-redhat.com@classroom-guid.red.osp.opentlc.com -CfnND 8080
```

(2) Configure your local web browser to send all web traffic through **localhost:8080**.

```
[user1@laptop ~]$ google-chrome --proxy-server="socks5://127.0.0.1:8080" --host-resolver-rules="MAP * 0.0.0.0 , EXCLUDE localh
ost" &
```

Break-fix activity

This section presents a scenario based on a real customer issue.

1. Read the scenario and success criteria.
2. Follow any instructions provided for setting up your lab environment.
3. Resolve the issue as simulated in your lab environment.
4. After resolving the issue, run the grading script and submit the completion code as prompted.

You must successfully complete this section to receive a passing grade for this module.

If you exhaust your experience and resources, and you're unable to solve the issue on your own, use the guided solution to step through one possible solution, with tips for addressing similar issues.

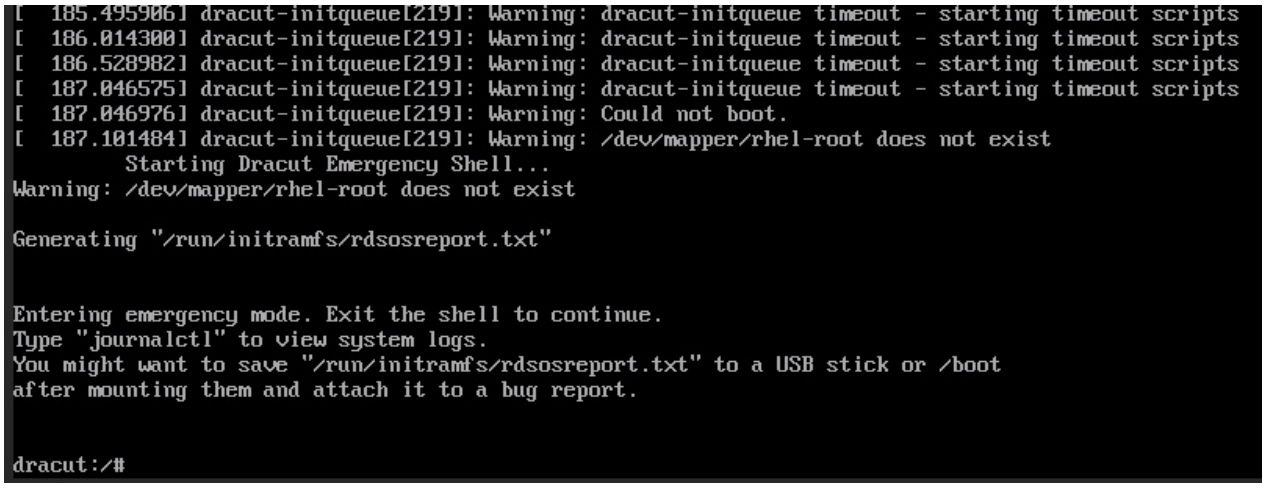
Break-fix scenario

SCENARIO

Your team handles a Red Hat Enterprise Linux 7.9 server. As part of monthly maintenance, your team members reboot the server.

After the reboot, the system is no longer booting. You noticed that the system is failing with the error "**dracut-initqueue timeouts**" and eventually drops into a dracut emergency shell.

The system boot is hanging with error logs as shown in this screen capture (select image to view at full size):



To address the issue, you've decided to boot the system in rescue mode and investigate further.

SUCCESS CRITERIA

After you investigate and solve the issue, the system should boot and run without errors at the *graphical.target* runlevel, and the root user should be able to connect to the system using SSH.

Setup instructions

After you launch your lab environment, follow these setup instructions for the break-fix scenario:

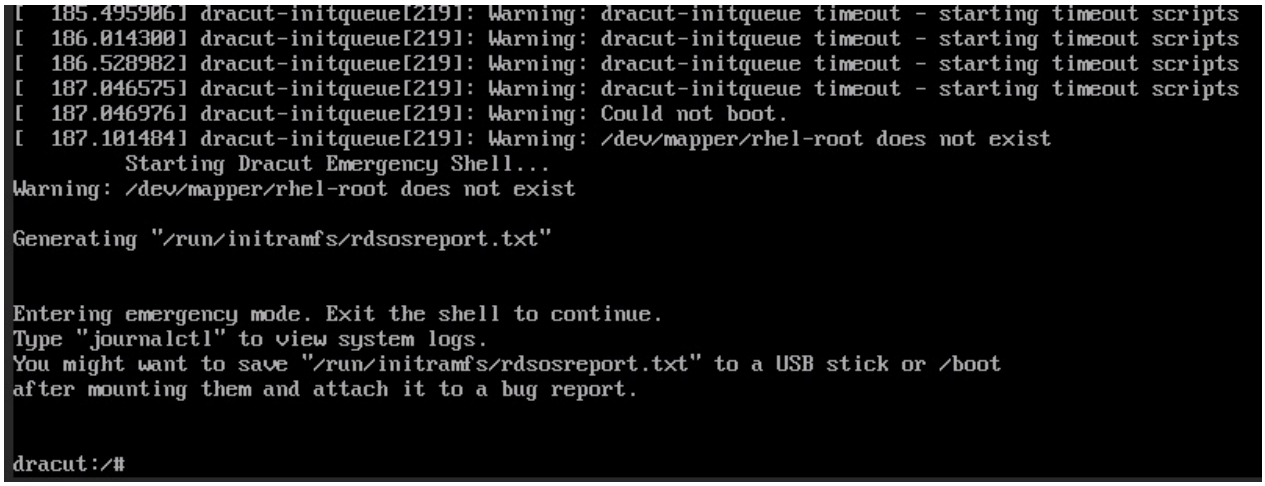
(1) Modify the environment by executing break and reboot the system as shown:

```
[root@0classroom ~]# tech-breakfix-cantboot-001 break
Applying break....
Your system has been modified.

[root@0classroom ~]# reboot
```

Get VNC console access to the ***0classroom*** system using the *Console Access* instructions on the Lab Environment page.

(2) Confirm that the system boots to maintenance mode, and that the screen looks like the image here:



(3) With these logs available to work with, proceed with investigating and solving the issue to meet the given success criteria.

Check your work

After you have resolved the issue and met the success criteria, run the grading script as shown here to receive a completion code:

```
[root@0classroom ~]# tech-breakfix-cantboot-001 grade
Initiating break-fix-script with option grade
Grading.  Please wait.
Success.
COMPLETION CODE: <check your output for this value>
Completed break-fix-script with option grade successfully
```

Submit that completion code here to receive a grade for this training:

> COMPLETION CODE: _____
>
> ans: OMIT

Guided solution

This section presents a guided solution to the break-fix activity.

Use this section to:

- Learn one possible path to resolving the customer issue.
- Get some tips for investigating and resolving similar issues.

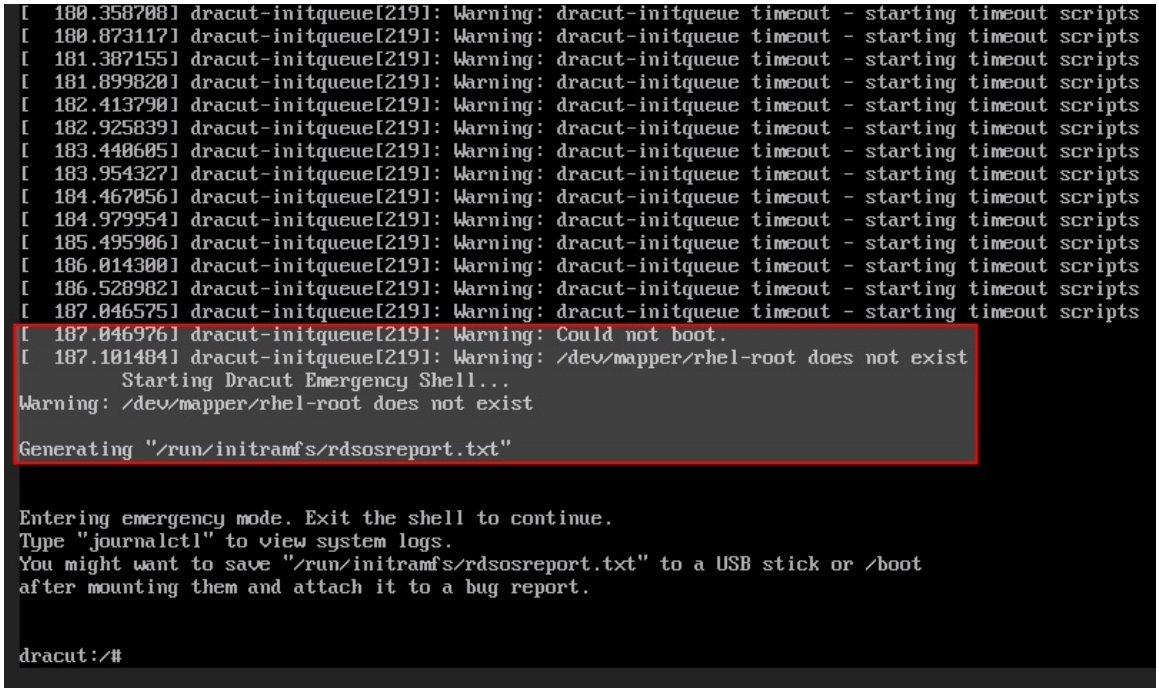
If you're still stuck after exhausting your expertise and resources on the break-fix activity:

- Use this solution to complete the activity.
- Check your work when you finish to receive a grade for this activity.

Our solution approach

The steps detailed in these solution pages are optional. They provide additional guidance for those struggling with the Break-fix Activity. **We encourage you to only use these pages if you are completely stuck in solving the issue.**

(1) Here's a look at the screen capture mentioned in the problem statement. Take a close look at the message *"dracut Warning: /dev/mapper/rhel-root does not exist"* before dropping into a dracut emergency shell.

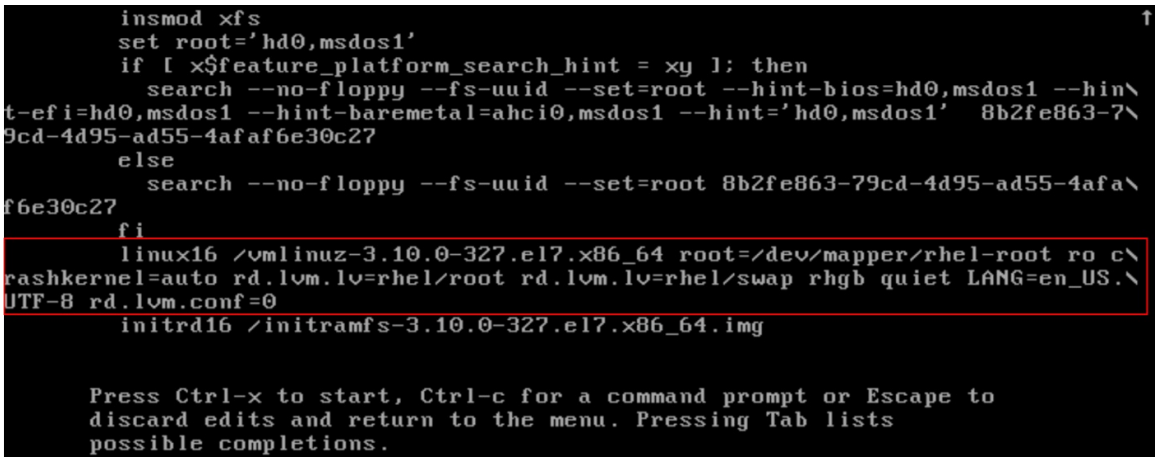


Solution (2 of 4)

(2) It seems there's some issue with the */dev/mapper/rhel-root* LVM partition. The knowledge base article mentions a similar issue. Append **rd.lvm.conf=0** to the kernel command line as mentioned in the resolution section of the article.

Here's what you'll do:

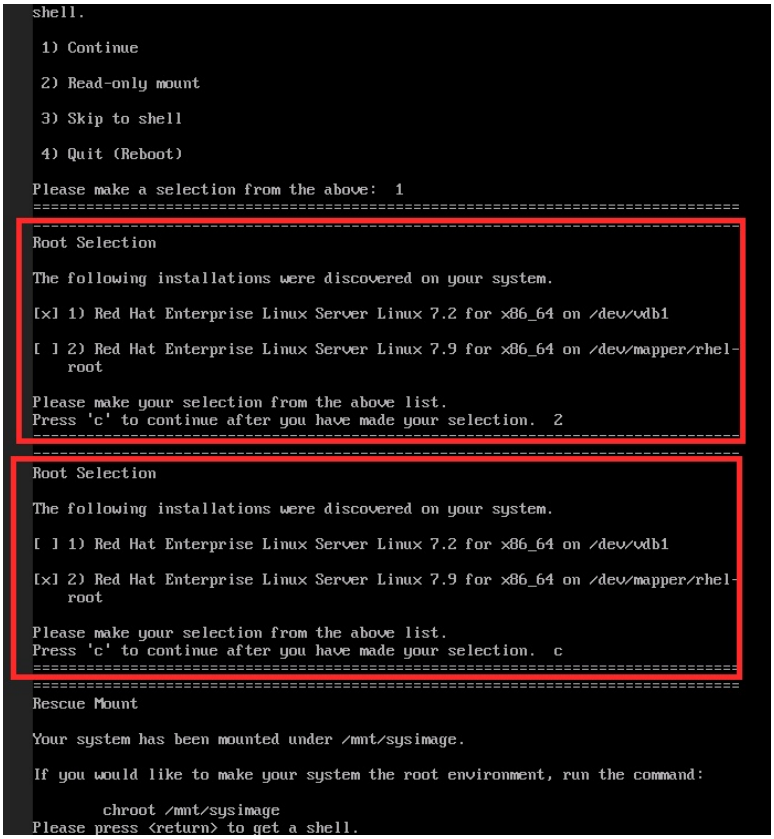
- Interrupt grub sequence at the GRUB splash menu.
- Use the up and down arrow keys to select the kernel you wish to boot.
- Press "e" to edit the entry.
- Scroll down to the line starting with the word "linux" (RHEL 7).
- Press "End" or use your arrow keys to move your cursor to the end of the line.
- Type this at the end of the line: **rd.lvm.conf=0**
- Press Control+X to accept the changes made and boot the kernel with modified command line options.



(3) Boot the system to rescue mode where you can troubleshoot further.

Recall: How to boot a system into rescue mode

In this lab, you will get an option to select correct disk in rescue mode. Select option "2" to proceed with selecting the root disk of the server and press "c" to continue further.



(4) In rescue mode, use *chroot* to change to the root partition of your file system:

```
# chroot /mnt/sysimage
```

Solution (3 of 4)

(5) Examine the devices available in rescue mode using **lsblk**, and look for the root LVM partition:

```
# lsblk
```

In this lab, */dev/vdb3* is the device with the root LVM partition.

(6) Inspect the physical device for that LVM partition device using the "pvs" command:

```
bash-4.2# pvs
  WARNING: Device for PV xG5DDX-RnTQ-CsrI-40PO-HPyf-PDmP-uTRDow not found or rejected by a filter.
  WARNING: Device for PV xG5DDX-RnTQ-CsrI-40PO-HPyf-PDmP-uTRDow not found or rejected by a filter.
  WARNING: Device for PV xG5DDX-RnTQ-CsrI-40PO-HPyf-PDmP-uTRDow not found or rejected by a filter.
  Couldn't find device with uuid xG5DDX-RnTQ-CsrI-40PO-HPyf-PDmP-uTRDow.
  WARNING: Couldn't find all devices for LV rhel/swap while checking used and assumed devices.
  WARNING: Couldn't find all devices for LV rhel/home while checking used and assumed devices.
  WARNING: Couldn't find all devices for LV rhel/root while checking used and assumed devices.
  PV         VG   Fmt  Attr PSize   PFree
  [unknown]  rhel lvm2 a-m  <73.00g    0
```

Notice the warning "Device for PV not found or rejected by a filter".

(7) There are 2 things that the warning suggests:

- If the problem was with the *device*, then the *pvs* command would have not displayed any output.
- This *pvs* output, though, suggests that **there's some issue with the LVM filter**.

(8) Inspect the **/etc/lvm/lvm.conf** file for any filter that might be the cause of problem. You can use grep to search for the word "filter":

```
# grep filter /etc/lvm/lvm.conf | grep -v "#"
filter = ["r|.*/|"]
```

This filter setting rejects the reading and scanning of LVM metadata from all system devices during system boot. This looks to be the main problem here.

(9) Solution to this is to:

Edit the filter in */etc/lvm/lvm.conf* to no longer reject the root PV while still rejecting other devices. Change the filter to what's shown here (using the root LVM partition that you found with *lsblk*), and save the file:

```
filter = [ "a|/dev/sda|", "r|.*/|" ]
```

OR

Edit the filter in */etc/lvm/lvm.conf* to no reject any device. Change the filter to what's shown here, and save the file:

```
filter = [ "a|.*/|" ]
```

For this lab, you will need to edit the filter to no longer reject any device. This is due to the fact that this lab would rename root disk device as /dev/vdb in rescue mode.

Caution

In complicated environments with multipath for multiple physical devices, setting the filter incorrectly could further break a system or cause extremely slow boots. In an extreme situations, it can hang a system during boot and result in a catastrophic, unrepairable failure. In multipath situations, work with a storage specialist to verify that the filter is the cause of failure and to assist with proper LVM filter configuration.

Solution (4 of 4)

(10) Verify the filter is correct by running another **pvs** command.

```
# pvs
```

The resulting output should no longer show any device rejection warnings.

(11) Rebuild the initramfs for the kernel you want to boot the system with. In this case there is only one kernel, and you can determine the version like this:

```
# rpm -qa | grep kernel
```

The correct command syntax for rebuilding the initramfs is:

```
# dracut -fv /boot/initramfs-<kernelVersion>.img <kernelVersion>
```

In this lab, the command would be:

```
# dracut -fv /boot/initramfs-3.10.0-957.el7.x86_64.img 3.10.0-957.el7.x86_64
```

(12) Verify the new initramfs contains the LVM module. This command should print "lvm":

```
# lsinitrd /boot/initramfs-<kernelVersion>.img | grep ^lvm
```

Also verify that the new filter is included in the initramfs file. This command should print your updated filter line from *lvm.conf*:

```
# lsinitrd /boot/initramfs-<kernelVersion>.img -f /etc/lvm/lvm.conf | grep -i filter
```

(13) Exit from rescue mode, and use *Boot with local disk* from the boot disk.

(14) **Check whether you've met the success criteria** to confirm that no other action is required to resolve this issue:

- The system appears to boot normally to the *graphical.target* runlevel.
- The root user can sign in using SSH.

(15) Return to Check your work, and follow the instructions there to run the grading script and submit the completion code.

BREAK-FIX SUMMARY

DIAGNOSIS	WAYS TO FIX
System booting into dracut mode with error "dracut Warning: /dev/mapper/rhel-root does not exist"	Correct the LVM filter setting in /etc/lvm/lvm.conf and rebuild initramfs.

Resources

This list includes content referenced during research for this training plus links you can use for ongoing reference or additional learning:

How to boot a system without applying LVM filters

How to boot a system into rescue mode

Thanks for your feedback!

Did you like it? Have suggestions?
Let us know so we can continue enhancing our training courses.

Provide Feedback