

RHEL: Crash kernel dumps configuration and analysis on RHEL 7

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```
# The memory reserved for the kdump kernel is always reserved during
system boot. That
# means that the amount of memory is specified in the system's boot
loader configuration.

# To enable the dump of the vmcore file, edit /etc/default/grub
configuration file and
# set the "crashkernel=auto" option, in GRUB_CMDLINE_LINUX variable
according to the
# amount of memory you want to reserve. For example:

GRUB_CMDLINE_LINUX="crashkernel=256M rd.lvm.lv=rootvg/lv_root [...]"

# Minimum amount of reserved memory required for kdump
# -----
#
# Architecture                Available Memory          Minimum
Reserved Memory
# AMD64 and Intel 64 (x86_64)    2 GB and more            160 MB + 2
bits
#
#                               for every
```

```

4 KB of RAM.
#
# IBM POWER (ppc64)          2 GB to 4 GB          256 MB of
RAM.
#                            4 GB to 32 GB          512 MB of
RAM.
#                            32 GB to 64 GB          1 GB of
RAM.
#                            64 GB to 128 GB         2 GB or
RAM.
#                            128 GB and more         4 GB of
RAM.
#
# IBM System z (s390x)       2 GB and more         160 MB + 2
bits
#                            for every
4 KB of RAM.
#
# On some systems, it is possible to allocate memory for kdump
automatically, either by
# using the "crashkernel=auto" parameter in the bootloader's
configuration file, or by
# enabling this option in the graphical configuration utility.
Nevertheless, for this to
# work a certain amount of total memory needs to be available in the
system:
#
# Architecture                Required Memory
# AMD64 and Intel 64 (x86_64)  2 GB
# IBM POWER (ppc64)           2 GB
# IBM System z (s390x)         4 GB

# Finally, regenerate the GRUB2 configuration:

grub2-mkconfig -o /boot/grub2/grub.cfg

```

```
# When capturing a kernel crash, the core dump can be stored in a
local filesystem or
# directly on a device, or sent via NFS or SSH. The default option is
to store the core
# file in the /var/crash/ directory of the local file system. To
change this, as root,
# modify following line in /etc/kdump.conf configuration file:
```

```
path /var/crash
```

```
# You can choose to write the core file to a different device.
Following syntaxes/devices
# are accepted (among others):
```

```
# Filesystem name: ext2 /dev/vg/lv_kdump
# Filesystem label: ext3 LABEL=/crash_dump
# Filesystem UUID: ext4 UUID=03138356-5eh1-4ab3-b58e-29a07ac41x37
# Raw device: raw /dev/vg/lv_kdump
# NFS location: nfs my.server.com:/export/kdump
# SSH connection: ssh user@my.server.com line
# (if a SSH key is required, add "sshkey /root/.ssh/kdump_id_rsa"
line too)
```

```
# We can configure the action to perform in case dumping to intended
targer fails.
```

```
# If no default action is specified, "reboot" is assumed default.
```

```
default <reboot | halt | poweroff | shell | dump_to_rootfs>
```

```
# To reduce the size of the vmcore dump file, kdump allows to specify
a program to compress
```

```
# the data, and optionally leave out all irrelevant information.
```

```
Currently, the only fully
```

```
# supported core collector is "makedumpfile", by default configured like this:
```

```
core_collector makedumpfile -l --message-level 1 -d 31
```

```
# Generating a vmcore file (test purposes)
```

```
# -----  
-----
```

```
# Before testing, make sure that the service is running:
```

```
systemctl is-active kdump
```

```
active
```

```
# If needed, enable and start kdump daemon:
```

```
systemctl enable kdump.service
```

```
systemctl start kdump.service
```

```
# With kdump daemon running, execute following commands:
```

```
echo 1 > /proc/sys/kernel/sysrq
```

```
echo c > /proc/sysrq-trigger
```

```
# That will force the kernel to crash. * Ensure that you have enough disk space to store
```

```
# the core dump.
```

```
# Analyzing a core file
```

```
# -----  
-----
```

```
# First of all, install crash utility and kernel-debuginfo package
which provides the
# data necessary for dump analysis:

yum install crash

rpm -ihv <kernel-debuginfo-common-x86_64-3.10.0-327.el7.x86_64.rpm>
rpm -ihv <kernel-debuginfo-3.10.0-327.el7.x86_64.rpm>

# Once necessary tools have been installed, you can analyze the core
file:

crash /usr/lib/debug/lib/modules/3.10.0-327.el7.x86_64/vmlinux
    /var/crash/127.0.0.1-2016-01-26-22:30:26/vmcore

crash 7.1.2-2.el7
Copyright (C) 2002-2014 Red Hat, Inc.
[...]
GNU gdb (GDB) 7.6
Copyright (C) 2013 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later
<http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law. Type "show
copying"
and "show warranty" for details.
This GDB was configured as "x86_64-unknown-linux-gnu"...

    KERNEL:
/usr/lib/debug/lib/modules/3.10.0-327.el7.x86_64/vmlinux
    DUMPFILE: /var/crash/127.0.0.1-2016-01-26-22:30:26/vmcore
[PARTIAL DUMP]
    CPUS: 1
    DATE: Tue Jan 26 22:30:15 2016
    UPTIME: 00:09:55
LOAD AVERAGE: 0.02, 0.10, 0.11
    TASKS: 139
```

```
NODENAME: myserver.localdomain
RELEASE: 3.10.0-327.el7.x86_64
VERSION: #1 SMP Thu Nov 19 22:10:57 UTC 2015
MACHINE: x86_64 (2009 Mhz)
MEMORY: 2.5 GB
PANIC: "SysRq : Trigger a crash"
PID: 3433
COMMAND: "bash"
TASK: ffff8800994d2280 [THREAD_INFO: ffff88009b044000]
CPU: 0
STATE: TASK_RUNNING (SYSRQ)
```

```
crash>
```

```
# To display the kernel message buffer, type the "log" command at the
crash prompt:
```

```
crash> log
```

```
# To show the kernel stack trace; "bt <pid>" to display the backtrace
of a single process:
```

```
crash> bt
```

```
# Status of processes:
```

```
crash> ps
```

```
# Virtual memory information of the current context:
```

```
crash> vm
```

```
# Information about open files of the current context:
```

```
crash> files
```

```
crash> exit
```

```
# -----  
-----
```

```
# For more information about memory requirements, supported kdump  
targets, filtering
```

```
# levels, dump analysis, etc, refer to Red Hat official  
documentation.
```

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