

RHEL: Crash kernel dumps configuration and analysis on RHEL 6

Article Number: 122 | Rating: Unrated | Last Updated: Sat, Jun 2, 2018 8:37 AM

RHEL: Crash kernel dumps configuration and analysis on RHEL 6

Kernel dumps may provide invaluable insights when debugging serious issues.

1.- Install following RPMs:

```
kexec-tools
crash
```

To be able to analyze crash dumps, following packages should be also installed:

```
kernel-debuginfo-common
kernel-debuginfo
```

2.- Append "**crashkernel=128M@16M**" to the kernel parameters in `/boot/grub/grub.conf`

(see next points to adjust the size of crashkernel):

```
kernel /vmlinuz-2.6.18-238.el5 ro root=/dev/rvg/rootlv nodmraid
rhgb quiet crashkernel=128M@16M
```

3.- Reboot the system

4.- Check that the crash kernel has been loaded:

```
# cat /proc/iomem | grep Crash kernel
01000000-08ffffff : Crash kernel
```

5.- Configure kdump to dump to:

- Either locally; add following lines to **/etc/kdump.conf**:

```
path /var/crash
core_collector makedumpfile -d 31 -c
```

*** Note: This config can be done also by running:

```
# system-config-kdump
```

Please check the option box "Enable kdump" at the top of the Dialog.

Next, you have to define the memory to reserve for Kdump In the dialog you see the memory information for your system and the usable memory for Kdump. On most systems a value of "128MB" Kdump memory should be enough.

Finally, you need to define a location where to store the dump file. You have the choice between 'file', 'nfs', 'ssh', 'raw', 'ext2', and 'ext3'. This setup is straight forward, please configure the kdump as it fit's best into your environment. The simplest configuration for the location is "file:///var/crash".

- Or to a remote server; add following lines to **/etc/kdump.conf**:

```
net root@<kdump_remote_server>  
core_collector makedumpfile -d 31 -c
```

6.- Propagate SSH keys so that the vmcore could be sent via scp without the need to enter any password

(Take this point into account only if dumping to a remote server):

```
# service kdump propagate
```

7.- Configure kdump to start automatically

```
# chkconfig kdump on  
# service kdump start
```

8.- Sync all filesystems:

```
# sync
```

9.- Provoke a kernel panic with:

```
# echo "1" > /proc/sys/kernel/sysrq  
# echo "c" > /proc/sysrq-trigger
```

10.- Now the crash kernel should get booted and on the remote system a vmcore should get created

under /var/crash:

```
# tree /var/crash  
/var/crash  
|-- 192.168.12.227-2010-01-21-20:16:16  
`-- vmcore.flat
```

11.- The vmcore.flat needs to be processed in order to analyze the core dump via the crash utility:

```
# cat "vmcore.flat" | makedumpfile -R "/tmp/vmcore"
The dumpfile is saved to /tmp/vmcore.
makedumpfile Completed.
```

12.- Now you may analyze the vmcore with the crash utility:

```
# crash
/usr/lib/debug/lib/modules/2.6.18-128.1.10.el5/vmlinux /tmp/vmcore

crash 4.0-8.9.1.el5
Copyright (C) 2002, 2003, 2004, 2005, 2006, 2007, 2008,
2009 Red Hat, Inc.
Copyright (C) 2004, 2005, 2006 IBM Corporation
Copyright (C) 1999-2006 Hewlett-Packard Co
Copyright (C) 2005, 2006 Fujitsu Limited
Copyright (C) 2006, 2007 VA Linux Systems Japan K.K.
Copyright (C) 2005 NEC Corporation
Copyright (C) 1999, 2002, 2007 Silicon Graphics, Inc.
Copyright (C) 1999, 2000, 2001, 2002 Mission Critical
Linux, Inc.

This program is free software, covered by the GNU General
Public License,
and you are welcome to change it and/or distribute copies of
it under
certain conditions. Enter "help copying" to see the
conditions.

This program has absolutely no warranty. Enter "help
warranty" for details.

GNU gdb 6.1
Copyright 2004 Free Software Foundation, Inc.
GDB is free software, covered by the GNU General Public
License, and you are
```

welcome to change it and/or distribute copies of it under certain conditions.

Type "show copying" to see the conditions.

There is absolutely no warranty for GDB. Type "show warranty" for details.

This GDB was configured as "x86_64-unknown-linux-gnu"...

KERNEL:

/usr/lib/debug/lib/modules/2.6.18-128.1.10.el5/vmlinux

DUMPFILE: /tmp/vmcore [PARTIAL DUMP]

CPUS: 1

DATE: Thu Jan 21 20:21:20 2010

UPTIME: 00:03:10

LOAD AVERAGE: 1.09, 0.46, 0.17

TASKS: 445

NODENAME: vrhel03

RELEASE: 2.6.18-128.1.10.el5

VERSION: #1 SMP Wed Apr 29 13:53:08 EDT 2009

MACHINE: x86_64 (2666 Mhz)

MEMORY: 1 GB

PANIC: "SysRq : Trigger a crashdump"

PID: 7835

COMMAND: "bash"

TASK: ffff81040699d0c0 [THREAD_INFO: ffff8103fed24000]

CPU: 1

STATE: TASK_RUNNING (SYSRQ)

crash>

The kdump procedure

1.- The normal kernel is booted with crashkernel=... as a kernel option, reserving some memory for

the kdump kernel. The memory reserved by the crashkernel parameter is not available to the normal kernel during regular operation. It is reserved for later use by the kdump kernel.

2.- The system panics.

3.- The kdump kernel is booted using kexec, it uses the memory area that was reserved via the crashkernel parameter.

4.- The normal kernel's memory is captured into a vmcore.

*** Note: Not reserving enough memory for the kdump kernel can lead to the kdump operation failing.

*** Warning: Unless the system has enough memory, the Kernel Dump Configuration utility will not start and you will be presented with an error message.

Configuring crashkernel on RHEL6.0 and RHEL6.1 kernels

Some mappings of ram and appropriate crashkernel values:

ram size	crashkernel parameter	ram / crashkernel factor
>0GB	128MB	15
>2GB	256MB	23
>6GB	512MB	15
>8GB	768MB	31

The last column contains a ram/crashkernel factor.

The table is covered by the following crashkernel configuration:

crashkernel=0M-2G:128M,2G-6G:256M,6G-8G:512M,8G-:768M

For servers with more RAM it is recommended to compute the crashkernel parameter using the factors that have been observed so far: 15 to stay on a safe side (maybe wasting memory), using a factor of 20 should also work. Please also note that the maximum size of RAM that should be reserved here is 896M.

Configuring crashkernel on RHEL6.2 (and later) kernels

Starting with RHEL6.2 kernels crashkernel=auto should be used. The kernel will automatically reserve an appropriate amount of memory for the kdump kernel.

Additionally some improvements have been made in the RHEL6.2 kernel which have reduced the overall memory requirements of kdump.

The amount of memory reserved for the kdump kernel can be estimated with the following scheme:

base memory to be reserved = 128MB
an additional 64MB added for each TB of physical RAM present in the system. So
for example if a system has 1TB of memory 192MB (128MB + 64MB) will be reserved.

*** Note: It is recommended to verify that kdump is working on all systems after installation of all applications. The memory reserved by crashkernel=auto takes only typical RHEL configurations into account. If 3rd party modules are used more memory might have to be reserved. Thus, if a testdump fails it is a good strategy

```
to verify if it works with
    crashkernel=768M@0M and if it does do further debugging of
the memory requirements
    using the debug_mem_level option in /etc/kdump.conf.
```

```
*** Note: crashkernel=auto will only reserve memory on systems with
4GB or more physical memory.
```

```
    If the system has less than 4GB of memory the memory must
be reserved in explicitly
```

```
    configuring crashkernel=128M. Since RHEL6.3GA
(kernel-2.6.32-279.el6) this limit has
    been lowered to 2GB.
```

```
*** Warning: You need to take care that you have enough disk space on
the configured location.
```

Posted - Sat, Jun 2, 2018 8:37 AM. This article has been viewed 4634 times.

Online URL: <http://kb.ictbanking.net/article.php?id=122>