IOS and Mainframe Dump [H]

If your CRAY J90 series system experiences an IOS assertion panic, IOS processor panic, or a UNICOS system panic, you should perform an IOS and mainframe dump so that the data in your system's memory is saved into a file. These dumps are very important and useful for determining probable causes for software or hardware problems. This chapter explains the procedures for capturing memory dumps on CRAY J90 systems, both from the IOS and from the mainframe (UNICOS).

H.1 Send dump results to Cray Research

Place dumps on digital audio tapes (DAT) media in `tar`(1) or `cpio`(1) format and send them to Software Product Support at Cray Research corporate headquarters in Eagan, Minnesota, USA for analysis. For tracking purposes, include the CRUISE ticket number and/or the SPR number for the incident. The `unicos` and crash files that are created at the same time as the dump file become the core file system and also should be forwarded for analysis.

H.2 IOS dump for IOS-V

When either an IOS assertion panic or an IOS processor fault panic occurs, the firmware on the IOS automatically captures a dump of that IOS and saves it to the system console disk in the IOS file `/adm/dumpx/D` *mmddyy.n*. IOS dumps are usually 9 Mbytes for each IOP. In cases where an apparent hang or unusual system behavior has occurred, you must manually perform an IOS dump.

The `iosdump` command saves all of the memory from the IOP and selected areas from the I/O buffer board (IOBB) memory to the system console disk.

> **Note:** You can invoke the `iosdump` command at the `BOOT>` prompt or the `sn` *xxxx* `-ios0>` prompt.

The format of the `iosdump` command is as follows:

```
iosdump [-n filename] [-s iobbsize]
```

The arguments are optional. The default area dumped during an IOS dump is not a complete dump of IOBB memory; however, it usually contains enough

information for problem analysis. To obtain a complete dump, use the -s option and enter the memory size in Kbytes of the IOBB. For example, for an I/O subsystem configured with an IOBB-64, you would enter -s 16384. Dumps that are automatically initiated by the IOS will be of the default size, and you cannot control this. However, if an automatic dump is captured and the IOS stops at the BOOT> prompt, you can then initiate another valid dump if you must capture the entire IOBB contents. If the IOS kernel has reloaded, the IOBB and IOP contents will have been overwritten, so dumps performed after a reload are not valid.

By default, the IOS generates a file name for the contents of the dump. The following example displays the output of the iosdump command:

```
sn9xxx-ios0> iosdump -s 16384

Saving IOS dump to /adm/dump0/D011895.0...
Dump file size, 1MB, 2MB, 3MB, 4MB, 5MB, 6MB, 7MB, 8MB
IOS0 dump completed
sn9xxx-ios0>
```

H.2.1 Dumping a slave IOS

To capture a dump of a slave IOS, use the jcon system console command. Perform the iosdump procedures as previously described, then enter the following command (*xxxx* is the serial number of your system; *n* is the IOS number of slave IOS):

IOS> jcon sn*xxxx*-ios*n*

H.3 UNICOS dump

Before you capture a UNICOS dump for the first time, make sure that you allocated enough disk space for the dump on the dump partition (sometimes called the dump device); if not enough space is allocated, the dump will be truncated. Space is allocated in the IOS /sys/param file. The minimum size of the dump device should be a little larger than the amount of memory you actually want to examine in order to provide an additional 512 words for the dump header plus additional space for ublocks, which vary by system. You should start with a minimum of 50,000 blocks (sectors) for the dump size. An example of a dump partition entry in the physical and logical device portion of the UNICOS file system section of the IOS /sys/param file is shown in Figure 5, page 345. The dump partition usually is named /dev/dsk/dump.

Also, before you capture a UNICOS dump for the first time, make sure that the dump partition was initialized. If not initialized, the dump will fail. Usually, the dump partition is initialized during installation. If the dump partition was not initialized when the UNICOS system was installed, use the mkdmp(8) command to initialize the dump partition.

To perform a UNICOS system dump, do the following:

1. If the IOS is not running, reset the VME.

2. If a dump has not already been done, perform an IOS dump using the iosdump command.

3. After the IOS dump has completed, reload the IOS.

4. Perform the mainframe dump using mfdump. (Refer to the following sections for more information about performing a dump using the mfdump command.)

See *CRAY IOS-V Messages*, Cray Research publication SQ–2172, for message explanations.

See the *CRAY IOS-V Commands Reference Manual*, Cray Research publication SR–2170, or the online man pages for descriptions of IOS commands.

Figure 5. Dump entry example from IOS /sys/param file

H.4 Tips on configuring `mfdump`

When you initiate multiuser mode, the `/etc/coredd` start-up script creates a subdirectory and copies into it a file containing the dump, the version of the UNICOS operating system that was running at the time of the crash, and the version of `crash`(8) to be used with the dump. The following are tips for configuring `mfdump` correctly.

- The `mfdump`(8) command is not supported from the `BOOT>` prompt. You must have the IOS loaded before running `mfdump`.

- When you run `mfdump` for the first time, check the `/sys/mfdumpa.arg` (ASCII version) argument file. Its contents are described on the `mfdump`(8) man page. An example follows. During installation, the `/sys/mfdumpa.arg` argument file is configured for the system. You can use the `mfdump -c` command line option to display the current settings for the dump configuration file.

```
CPUS=4
MEM=64
range1=0-8000000
range2=0-0
range3=0-0
range4=0-0
regdump=yes
sysreg=yes
ublocks=yes
IOS#=0
channel#=16
disktype=DD5S
controller=20
unit=0
start=540000
length=65536
```

- If there is a system dump in the dump partition that has not been copied, use the `-f` command line option to force the dump. This will overwrite the previously uncopied dump.

H.4.1 Running `mfdump`(8)

The following example shows how to specify a reason for the dump by using the `mfdump` command with the `-r` option.

```
snxxxx-ios0> mfdump -f -v -r System panic on an ORE in user code
```

H.5 Verifying that you have captured a UNICOS dump

After a UNICOS dump is captured using mfdump, it is copied off the dump device and into a file system when multiuser mode is initiated. See Section H.5, page 347 for sample console output generated when the UNICOS system is booted in multiuser mode. For more information about this process, see the /etc/brc script and refer to the UNICOS mkdmp(8) man page.

```
/core: file system opened
/core: super block fname core, fpack core_000
/core: clean exit for clean file system
/etc/mount: warning <core> mounted as </mnt>
01446 blocks - NOT copied
coredd: Copying system dump into /mnt/08230838.
Sysdump copy completed
/etc/umount: /mnt unmounted successfully
```

Example 11: Sample console output when the UNICOS system is booted in multiuser mode

Note: Many systems use the /tmp file system to store dumps instead of the /core file system as shown in the previous example.