

Amount of Disk Space

The total size of the dataset needed for checkpointing was determined for four applications. In addition, the time needed to write the files was measured. The checkpoint dataset is written to the directory `/work/PBS/cpr/<jobid>.pbs.CK`. The command “`du -sm *`” was used to determine the dataset size. During early tests it was noted that execution does not pause if the time needed for writing the checkpoint dataset exceeds five minutes. Though attempts were made by the ERDC Cray Support Staff to solve this problem, during the final week of testing the problem remained. In Table 1 the dataset size is shown in parathesis when the write time was greater than five minutes, since it is not known whether the size would be the same if CPR worked correctly. The table entry “> 300” denotes CPR failure because the job continued to run rather than going into the “hold” state. For jobs that were successfully put into the “hold” state (`qhold <jobid>`) then released (`qrls <jobid>`), and also for jobs that continued to run despite use of the `qhold` command, the program results were correct when the run finished. Moreover, for every test, whether successful or not, the directory containing the checkpoint dataset was automatically deleted when the job finished. Table 1 is correct in showing that the case of CTH with 64 processes required more time for writing the checkpoint dataset than CTH with 288 processes.

Application	Num. Procs.	Checkpoint Write Time (secs)	Checkpoint Dataset Size (MB)
CTH	64	> 300	(26663)
CTH	288	167	55041
OOCORE	64	125	43351
OOCORE	288	122	34955
HYCOM	59	80	26239
HYCOM	256	283	93783
WRF	256	75	24205

Table 1: **Checkpointing Time and Dataset Size.** This table can be used for projecting the amount of disk space needed for a large job on a machine such as jade. On jade each node has 8 GBytes of memory and 4 cores per node, so for a program that fully utilizes memory, if it runs on 1000 cores, then 2 TeraBytes of memory would be needed for the checkpoint dataset. In practice, the worst case for these tests was HYCOM for which the total size of the checkpoint files for a run with 1000 cores can be projected to be 0.37 TeraBytes.