Chapter 4

Executing a C* Program

Once a C* program has been compiled and linked, you can execute the output file on a CM-5. This chapter gives an overview of how to execute a program on a CM-5. Section 4.1 describes how to execute the program directly. Section 4.2 describes how to execute the program in batch mode. Section 4.3 describes how to execute a C* program on a Sun-4.

Note that you can execute C* programs within Prism, the CM's programming environment. See Chapter 5 for information on Prism.

NOTE: Your site may be using DJM (Distributed Job Manager), a batch system/job manager. If so, see your local documentation for DJM to learn how to execute programs on the CM.

4.1 Executing the Program Directly

To execute a program directly on a CM-5, you must gain access to it first. To do this, you must know the name of one of its partition managers. You can find out the names of partition managers from your system administrator; the system administrator can also tell you if you have permission to use a particular partition manager.

From your terminal or workstation on the network, you can gain access to the partition manager via the UNIX command **rlogin** or **rsh**. For example, to log in to the partition manager Mars, issue the command:

```
% rlogin mars
```

You can then execute your program on the partition just as you would any UNIX command or program. For example:

```
% a.out
```

Use the **rsh** command to execute the program without logging in to the partition manager. Simply specify the name of the partition manager, followed by the name of the executable program, on the **rsh** command line. For example:

```
% rsh mars a.out
```

You are then returned to your local UNIX shell.

4.2 Obtaining Batch Access

You can use NQS, a standard batch system, to obtain batch access to the CM-5. For complete information on NQS, see the manual *NQS for the CM-5*.

In NQS, you submit your program as a request to a queue. The queue may be associated with a partition, in which case the request is generally executed when it reaches the head of the queue. Or, the queue could send the request to another queue for execution.

NQS is configured differently at different sites. To find out what queues exist at your site and when they are active, ask your system administrator, or issue this command:

```
% qstat -x
```

4.2.1 Submitting a Batch Request

Use the **qsub** command to submit a batch request for execution via a queue in NQS. You can submit multiple programs as one batch request. There are two ways of specifying the programs to be executed:

- Put their names in a script file, and specify the name of the script file on the **qsub** command line. For example, the file **myprogram_script** could contain these names of executable C* programs:

```
myprogram1
myprogram2
myprogram3
```

You can then submit these programs for execution by issuing this command:

```
% qsub myprogram_script
```

- Enter the names of the files from standard input. Put the names of the programs on separate lines, and type Ctrl-d at the end to signal that there is no more input. For example:

```
% qsub
  myprogram1
  myprogram2
  myprogram3
  Ctrl–d
```

You can also issue other commands as part of the request.

4.2.2 Options for qsub

This section describes several of the most commonly used options for **qsub**. See its on-line man page for a discussion of all its options.

Specifying a Queue

Use the **-q** option to specify the name of the queue to which the request is to be submitted. If you omit this, the request is sent to the default queue (if one has been set up).

Receiving Mail

Use the **-mb** option to specify that mail is to be sent to you when the request begins execution. Use **-me** to have mail sent to you when the request ends execution.

Setting the Priority

Use the **-p** option, followed by an integer from 0 through 63, to set a priority for this request in its queue. 63 is the highest priority, and 0 is the lowest priority. The priority determines the request's position in the queue. If you don't set a priority, the request is assigned a default priority.

Specifying Output Files

Use the **-o** option, followed by a pathname, to specify the file to which output of the batch request is to be sent. Use the **-e** option to specify the pathname for the standard error output. If you omit these options, the output is sent to default files based on an ID number assigned to the request by the batch system.

4.2.3 Other Commands

There are other commands you can use in working with NQS:

- Use the **qdel** command to delete a batch request from a queue.
- Use the **qstat** command to obtain information about batch requests in a queue.

4.2.4 UNIX Batch Commands

The CM-5 also supports the standard UNIX batch commands **at** and **batch**. For example:

```
% at 0815am Jan 24
  primes
  Ctrl-d
```

This causes the program **primes** to be executed at 8:15 a.m. on January 24th.

4.3 Executing a C* Program on a Sun-4

If you compiled your program with the **`-cmsim`** option, you can run your program on a Sun-4. You run the program just as you would any other program on a Sun-4. Performance, of course, will be much worse than on a CM-5.