

Introduction [1]

This chapter discusses your role as a UNICOS system administrator, lists the log books you need to administer the system smoothly, and describes the major features of UNICOS. It also provides a brief overview of the contents of this document with cross references to related information and documentation.

1.1 The UNICOS system administrator

The UNICOS system administrator maintains the Cray Research UNICOS computing environment for its users. He or she is responsible for the following:

- Getting the system up and running and available for job submissions.
- Making site-specific configuration changes.
- Resolving hardware and software problems.
- Performing administrative duties necessary to maintain a system for all users.

Administrative duties may consist of the following functions:

- Section 10.1, page 195, Configuring and maintaining system accounting
- Chapter 6, page 105, Backing up and restoring file systems (dumps and restores)
- Chapter 7, page 129, Adding and deleting users
- Chapter 5, page 35, Maintaining file systems and structures
- Chapter 9, page 179, Tracking, analyzing, and resolving problems
- Chapter 11, page 269, Configuring and administering the network
- , Tuning the system and monitoring performance
- Upgrading and modifying the system

1.2 Create and maintain a log book

You must create and maintain a system administration log book that includes the following information:

- An incident report log to record problems, how they occur, and how they are resolved.
- Logs of scripts used to perform backups, the location(s) of backup tapes, and all pertinent backup-related information.
- A system crash log with procedures for crash recovery.
- Local documentation, detailing site-specific procedures, such as operator procedures, backup procedures, and so on.
- Path names of essential scripts or files (especially the current configuration and parameter files).
- Emergency names and phone numbers, as well as any emergency procedures relevant for your site.

Note: You should keep your log book current. It is invaluable for troubleshooting purposes.

1.3 Major features of UNICOS

The Cray UNICOS operation system is based on the UNIX System V operating system with Berkeley extensions. It is an interactive and batch operating system that offers many features for performance, functionality, application portability, and I/O connectivity.

UNICOS combines all of the strengths inherent in UNIX, such as its familiar user interface, with production-oriented features. These including high-performance I/O, multiprocessing support, ANSI/IBM tape support, resource allocation and control, and enhanced process scheduling.

The following subsections describe the major UNICOS characteristics.

1.3.1 Cray Scalable I/O (SIO)

The Cray Scalable I/O (SIO) architecture consists of an array of I/O nodes (IONs) connected by a new high-speed channel called the *GigaRing channel*. The GigaRing channel is a scalable input/output (I/O) and networking channel that supports upcoming I/O peripherals for the CRAY J90se system.

1.3.2 File systems

UNICOS modifies the regular UNIX System V file system with an improved disk block allocation scheme, and the ability to create file systems that can span multiple physical disk devices.

1.3.3 Disk devices

UNICOS permits disk striping and banding techniques to improve file system performance and reliability. A unique language, the *configuration specification language* (CSL), defines the physical and logical characteristics of your UNICOS disk devices.

1.3.4 File system quotas

File system quotas have been implemented under UNICOS to control the amount of disk space that you use for files. Two different types of quotas, file and inode, are already supported. Additionally, you may set quotas for three ID classes, user, group, and/or account IDs.

1.3.5 User database (UDB)

UNICOS uses a data file, called the *user database* (`/etc/udb`) that holds comprehensive resource allocation and control information about users. The UNIX equivalent of this data file, the `/etc/passwd` file, is maintained for compatibility.

1.3.6 Resource control

UNICOS resource control allows you to set limits on CPU, memory, tapes, and file allocation. Limits are applied to processes or jobs to establish the maximum amount system resources that they can use. You can specify per-process and / or per-job limits for interactive and batch workloads. This lets a system provide restricted resources for interactive use without limiting a user's batch resources to the same degree.

1.3.7 Unified Resource Manager (URM)

The Unified Resource Manager (URM) is a job scheduler that balances the demands of batch and interactive sessions. URM provides high-level allocation

control of system resources to run jobs that originated either in batch mode or in an interactive session.

1.3.8 Fair-share scheduler

The fair-share scheduler is a process scheduler that works with the standard System V scheduler to equitably distribute system CPU resources. The fair-share scheduler regularly adjusts the scheduling priorities of all running processes based on users' usage history and their "share" of available CPU resource.

1.3.9 System accounting

UNICOS supports two methods of system accounting: standard System V system accounting, and Cray system accounting (CSA). CSA meets the unique accounting requirements of Cray Research customers. Like the standard System V accounting package, CSA provides a method to collect per-process resource usage data, record connect sessions, monitor disk usage, and charge fees to users. In addition, it permits sites to perform per-job and device accounting, along with daemon accounting. Individual sites can select either accounting system by launching the appropriate shell scripts and programs.

1.3.10 TCP/IP

The Transmission Control Protocol/Internet Protocol (TCP/IP) suite provides network communications that use the TCP/IP family of protocols and applications. It allows Cray Research systems to become a peer node of any established TCP/IP network and permits other users and networks to access the UNICOS environment.

1.3.11 Menu system

UNICOS contains a set of shell scripts, parameter files, and a user interface written in menu specification language (MSL). You may use this menu system to perform system configuration changes. For more information, see Appendix A, page 309.

1.3.12 Data migration

The optional UNICOS Data Migration Facility (DMF) provides on-line file system space by moving selected files off-line to a designated storage device(s). These files remain cataloged in their original directories and behave as if they

are still disk resident. Likewise, an on-line disk can be considered a cached copy of a larger virtual disk space.

UNICOS DMF is not part of the standard UNICOS software package. It is available as an optional software package.

1.3.13 System activity monitor (SAM)

The Cray Research system activity monitor, *sam*, collects and displays system activity data from selected Cray Research computer systems. It consists of a data acquisition daemon, *samdaemon*, and two display clients, *xsam* and *csam*.

For more information see *UNICOS Resource Administration*, Cray Research publication SG-2302.

1.3.14 Network Queuing Environment (NQE)

The optional Cray Research Network Queuing Environment (NQE) feature for the UNICOS consists of the Network Queuing Extensions (NQX), Network Queuing System (NQS), and the File Transfer Agent (FTA). NQE is a software product that consists of a set of servers and clients that allows batch requests to be executed across a load-balanced network of hosts known as a batch complex. The NQX component of NQE provides a Network Load Balancer (NLB) that supports destination selection and load balancing. The NQS component of NQE lets users submit, monitor, and control batch jobs for execution on a local or remote system running the UNICOS system. The FTA component of NQE queues synchronous or asynchronous outbound and inbound file transfers over the network.

For more information, see *UNICOS NQS and NQE Administrator's Guide*, Cray Research publication SG-2305.

1.4 How this guide will help you

Note: Before you consult any of the procedures in this document, you must first boot your SIO and UNICOS software in multiuser mode. See the *UNICOS Installation Guide for CRAY J90se GigaRing based Systems*, Cray Research publication SG-5296, and the *Open Me First* document for more information.

This guide provides you with information to perform the following tasks:

- Establish and maintain basic system security; see Chapter 3, page 17.

- Start up and shut down the SIO and UNICOS; see Chapter 4, page 25.
- Verify and change date and time of UNICOS; see Chapter 4, page 25.
- Determine existing file systems; see Chapter 5, page 35.
- Plan and configure file systems; see Chapter 5, page 35.
- Create, label, mount, and check the integrity of a file system; see Chapter 5, page 35.
- Monitor disk usage; see Chapter 5, page 35.
- Back up and restore a file system; see Chapter 6, page 105.
- Create and maintain user accounts; see Chapter 7, page 129.
- Communicate with your system users; see Chapter 8, page 173.
- Interpret system logs and determine when to "clean up" logs; see Chapter 9, page 179.
- Set up Cray system accounting (CSA) and monitor accounting functions; see Chapter 10, page 195.
- Add your CRAY J90se system to an existing network; see Chapter 11, page 269.
- Configure NIS; see Chapter 12, page 287.
- Configure NFS; see Chapter 13, page 297.

Although topics described in this guide list publications you can read to get a greater understanding of the topic, the following list identifies topics not covered in this guide that you may wish to pursue to best administer your CRAY J90sesystem.

<u>For information about</u>	<u>Read</u>
File system space monitoring	<i>UNICOS Resource Administration</i> , Cray Research publication SG-2302; <code>df(1)</code> and <code>du(1)</code> man pages
File system quotas	<i>UNICOS Resource Administration</i> , Cray Research publication SG-2302
System activity monitoring	<i>UNICOS Resource Administration</i> , Cray Research publication SG-2302; <code>sag(1)</code> , <code>sar(8)</code> , <code>sd(8)</code> , <code>tsar(8)</code> , and <code>timex(1)</code> man pages

Automated incident reporting (AIR)	<i>UNICOS Resource Administration</i> , Cray Research publication SG-2302; <code>aird(8)</code> , <code>airdet(8)</code> , <code>airprconf(8)</code> , <code>airsum(8)</code> , and <code>airtsum(8)</code> man pages
Job and process recovery	<i>General UNICOS System Administration</i> , Cray Research publication SG-2301; <code>chkpnt(1)</code> , <code>chkpnt(2)</code> , and <code>crash(8)</code> man pages
Reinstalling your system software	<i>UNICOS Installation Guide for CRAY J90se GigaRing based Systems</i> , Cray Research publication SG-5296
Updating your system software	<i>UNICOS Installation Guide for CRAY J90se GigaRing based Systems</i> , Cray Research publication SG-5296
Using the <code>cron(8)</code> and <code>at(8)</code> utilities	<i>General UNICOS System Administration</i> , Cray Research publication SG-2301; <code>at(1)</code> and <code>cron(8)</code> man pages
Configuring network interfaces	<i>UNICOS Networking Facilities Administrator's Guide</i> , Cray Research publication SG-2304
Monitoring networks	<i>UNICOS Networking Facilities Administrator's Guide</i> , Cray Research publication SG-2304
Unified Resource Manager (URM) centralizes resource allocation with a formal method of communication	<i>UNICOS Resource Administration</i> , Cray Research publication SG-2302
Fair-share scheduler	<i>UNICOS Resource Administration</i> , Cray Research publication SG-2302; <code>shradmin(8)</code> and <code>shrdist(8)</code> man pages
Memory scheduling	<i>UNICOS Resource Administration</i> , Cray Research publication SG-2302
Multilevel security (MLS)	<i>General UNICOS System Administration</i> , Cray Research publication SG-2301
UNICOS message system	<code>explain(1)</code> man page
Data migration facility (DMF)	<code>dmmode(2)</code> , <code>dmofrq(2)</code> , <code>dm(4)</code> and <code>dmf_offline(3C)</code> man pages

Tape subsystem

Tape Subsystem Administration, Cray Research
publication SG-2307

1.5 UNICOS on-line glossary

The `define(1)` command allows quick, on-line retrieval of Cray Research technical terms and their definitions, and terms added by your site that match a specified search term. See the following example for definitions retrieved for the word *stripe*:

```
$ define stripe
striped disk slice
  A logical disk device composed of two or more
  physical disk slices (also known as members).

striped group

  The set of disk devices that are written to
  as a single group with data blocks
  interleaved among the members for maximum
  throughput at very high bandwidth.
```

For more information, see the `define(1)` man page. For information on how to add your own terms and definitions to the glossary, see the `builddefs(1)` man page.