

Contents

	<i>Page</i>
Preface	xv
UNICOS system administration publications	xv
Related publications	xvi
Ordering Cray Research publications	xviii
Conventions	xviii
Reader comments	xx
Introduction [1]	1
The role of a system administrator	1
Create and maintain a log book	2
Major characteristics of the UNICOS operating system	2
High-performance I/O	3
File systems	3
Disk devices	3
File system quotas	3
User database (UDB)	3
Resource control	3
Unified Resource Manager (URM)	4
Fair-share scheduler	4
System accounting	4
TCP/IP	4
Network Queuing Environment (NQE)	5
Network Queuing System (NQS)	5
Menu system	5
Data migration	5
SG-2416 10.0	iii

	<i>Page</i>
System activity monitor (SAM)	6
How this guide will help you	6
UNICOS online glossary	8
Basic System Security [2]	11
Related basic system security documentation	11
Super-user privileges	11
Password security for super-user	12
Physical security	12
setuid programs	13
root PATH	14
User security	15
umask command	15
Default PATH variable	15
User groups	16
File-owner fraud	16
Login attempts	16
Partition security	17
Tape device access	17
Startup and Shutdown [3]	19
Related startup and shutdown documentation	19
Procedure 1: Starting up the system	19
Procedure 2: Shutting down the UNICOS system and the IOS	23
Shutdown information	25
User exits	25
shutdown.pre	25
shutdown.mid	25
shutdown.pst	26

	<i>Page</i>
Shutdown process	26
Startup, shutdown, and configuration files and scripts for IOS and the UNICOS system	28
Start-up scripts	29
The /etc/init command	30
The /etc/inittab file	30
Interaction between /etc/init and /etc/inittab	33
/etc/bcheckrc script	34
/etc/brc script	34
The multiuser start-up script /etc/rc	35
Using rcoptions to modify the actions of /etc/bcheckrc, /etc/brc, and /etc/rc	35
To add site-specific code to the start-up process	36
Run-level configuration	36
Changing run level	37
Strategies for using run levels	37
Single-user mode	37
Multiuser mode	38
Typical tasks you can perform while in multiuser mode	39
Dedicated system	40
IOS prompts, and permissible actions	40
IOS boot prompt	41
IOS prompt	42
UNICOS System Daemons [4]	45
Related UNICOS system daemons documentation	45
Procedure 3: Starting and stopping UNICOS system daemons	45
File Systems [5]	51
UNICOS file systems	51
Related file systems documentation	51
SG-2416 10.0	v

	<i>Page</i>
An overview of file systems	52
Terminology	53
UNICOS file system structure	54
Commands for examining files and file systems	56
File system planning	57
The root (/) file system	58
The /usr file system	58
The /usr/src file system	59
The /tmp file system	59
The swap device	59
The dump device	60
The back-up root (/) and back-up /usr file systems	60
The /home file system	60
Disk device characteristics	60
Disk striping	61
Disk banding	61
Configuring your devices and their file system allocation	61
Network disk array configuration	62
CSL syntax	62
Placement of CSL statements	63
Revision section	64
ios_v section	64
Mainframe section	65
UNICOS section	66
File system section	66
Checking your disk configuration parameter file	70
Procedure 4: Identifying devices defined on your system and their file system allocation	104
Procedure 5: Modifying your configuration file	106

	<i>Page</i>
File system quotas	108
File system quota overview	108
Quota control structure	109
Commands	110
Quotas and the user	110
Quota header file	111
Soft quotas	111
Procedure 6: Setting up a quota control file	111
Current usage information	114
Warning windows	114
Sharing quota controls files between multiple file systems	115
Monitoring quotas	115
Planning file system change	116
Configuration objectives	116
Plan preparation	116
New disks	117
Implementation	118
Apply changes	118
As you proceed	119
Helpful hints for implementing plan	119
Creating file systems	120
Procedure 7: Create the file system	121
Example 1: round-robin, first-level	123
Example 2: round-robin, all-directory	123
Example 3: round-robin, all-files	123
Example 4: assign file system name and volume name to umounted file system	124
Example 5: labelit output	125
/etc/mnttab and /etc/fstab files	129

	<i>Page</i>
/etc/mnttab	129
/etc/fstab	130
Procedure 8: Configuring a file system to be mounted automatically at the initialization of multiuser mode	131
Procedure 9: Unmounting file systems	132
 Backing Up and Restoring File Systems [6]	 133
Related backup and restore documentation	133
Tape devices referenced in /dev/tape	134
Backup and restore utilities	134
dump and restore utilities	134
rdump and rrestore utilities	135
dd utility	135
tar and cpio utilities	135
root and usr file systems	135
Procedure 10: Creating bkroot and bkusr file systems	136
Procedure 11: Booting bkroot and bkusr into production	137
Procedure 12: Backing up the IOS	140
/etc/dump utility	141
Routine backup (dump) strategy	142
Restoring file systems	143
Increasing and decreasing file system space	144
Procedures included in this section	144
Procedure 13: Backing up (dumping) a file system without tpdaemon	144
Procedure 14: Restoring a file system without tpdaemon	147
Procedure 15: Backing up (dumping) a file system by using tpdaemon	152
Procedure 16: Restoring a full file system by using tpdaemon	158
Procedure 16.a:	159
Procedure 17: Restoring a partial file system by using tpdaemon	165

	<i>Page</i>
Procedure 17.a:	166
Maintaining Users [7]	171
Related user accounts documentation	171
The user database (UDB)	172
Adding user records to the UDB	173
UDB files and commands	173
Procedure 18: Determining settings for UDB fields	176
Procedure 19: Adding a group to /etc/group	181
Procedure 20: Adding an accounting group to /etc/acid	182
Using the /etc/nu utility	183
Procedure 21: Changing /etc/nu configuration parameters	184
Procedure 22: Creating a file system to use with /etc/nu	186
Procedure 23: Adding a user record to /etc/udb by using /etc/nu	188
Procedure 24: Modifying user records by using /etc/nu	193
Procedure 25: Deleting a user record by using /etc/nu	196
Using /etc/udbgen	199
Procedure 26: Adding users to /etc/udb by using /etc/udbgen	201
Procedure 27: Transferring initial files to the login directory when using /etc/udbgen	208
Procedure 28: Updating user logins in the UDB by using /etc/udbgen	208
Example 6: Adding a new group ID	209
Example 7: Changing the user's shell	209
Example 8: Changing the user's login directory	209
Example 9: Using the udbsee command as a filter to add an account ID (acid)	210
Example 10: Changing the user's password	210
Procedure 29: Deleting a user from the UDB by using /etc/udbgen	211
Maintaining user environment files	212
Procedure 30: Setting up an /etc/profile file	212

	<i>Page</i>
Procedure 31: Setting up an <code>/etc/cshrc</code> file	214
Procedure 32: Transferring user accounts to another file system	215
Communicating with Users [8]	217
Related user communication documentation	217
Issuing emergency messages only	217
Issuing critical messages	218
Issuing special messages (message of the day)	219
Issuing noncritical communication to all users	220
Using the <code>write</code> command	221
Using the <code>mail</code> command	223
Log Files [9]	225
Related log files documentation	225
<code>/etc/boot.log</code> file	226
<code>/etc/rc.log</code> file	226
<code>/etc/syslog.conf</code> file	226
System logs	227
Message sources	228
Priority levels	228
syslog daemon startup	229
<code>/usr/adm/sulog</code>	231
<code>/etc/dump.log</code>	231
<code>/usr/adm/nu.log</code>	232
<code>/usr/adm/sa/saDD</code>	233
<code>/usr/adm/sl/slogfile</code>	233
<code>/usr/spool/msg/msglog.log</code>	234
<code>/usr/lib/cron/cronlog</code>	234
<code>/usr/tmp/nqs.log</code>	235

	<i>Page</i>
/usr/adm/errfile	236
/usr/spool/dm/*	237
Cleaning up system logs	238
Log files recycled during each reboot	238
Small accumulative log files	238
Large accumulative log files	239
Accounting [10]	241
Related accounting documentation	241
Concepts and terminology	242
Unique features of CSA	243
Accounting directories and files	244
Daily operation overview of CSA	247
Customizing your system billing procedure	251
The csarun command	251
CSA accounting states	252
Fixing wtmp errors	254
Verifying data files	255
Editing data files	255
Data recycling	256
Procedure 33: Setting up CSA	257
Daily CSA reports	262
Adding Your Cray Research System to Your Network [11]	275
Related network information	275
Procedure 34: Adding a CRAY J90 system to an existing TCP/IP network	276
Domain name service (DNS)	281
Procedure 35: Configuring a caching-only server by using the menu system	282
Procedure 36: Configuring a caching-only server without using the menu system	285

	<i>Page</i>
Common TCP/IP configuration files	287
Configuring NIS [12]	289
Related NIS documentation	289
What is NIS?	289
Procedure 37: Using the menu system to configure your CRAY J90 system as an NIS slave server	292
Procedure 38: Configuring your CRAY J90 system as an NIS slave server without using the menu system	294
Procedure 39: Configuring user accounts to use NIS	296
Configuring NFS [13]	299
Related NFS documentation	299
What is NFS?	299
ID mapping and when it is used	300
Procedure 40: Configuring a CRAY J90 system as an NFS client	301
Procedure 41: Configuring a CRAY J90 system as an NFS server	306
Appendix A Frequently Used Commands	311
Commands available from the IOS console	311
Commands available from the UNICOS console	313
Appendix B File Version Numbers	319
Appendix C Cleaning Tape Units	321
Cleaning the digital audio tape (DAT)	321
Cleaning the 3480 (StorageTek 4220)	322
Cleaning the 9-track tape (StorageTek 9914)	322
Appendix D Disk Capacities and Transfer Rates	323
DD-5I disk drives	323
DD-5S disk drives	324

	<i>Page</i>
DD-6S disk drives	325
DD-314 disk drives	325
DD-318 disk drives	326
Appendix E Logical Device Cache Process	329
Setting up ldcache by using /etc/ldcache	329
Assigning ldcache	330
Flushing data by using /etc/ldsync	333
Appendix F Power Up and Down Procedures	335
Powering up/down a CRAY J90 system	335
Powering up a CRAY J90 system	335
Powering down a CRAY J90 system	338
Appendix G Memory Configuration Parameters	341
Appendix H IOS and Mainframe Dump	343
Send dump results to Cray Research	343
IOS dump for IOS-V	343
Dumping a slave IOS	344
UNICOS dump	344
Tips on configuring mfdump	346
Running mfdump(8)	346
Verifying that you have captured a UNICOS dump	347
Example 11: Sample console output when the UNICOS system is booted in multiuser mode	347
Index	349
Figures	
Figure 1. ddstat output	106

	<i>Page</i>
Figure 2. Daily operation overview of CSA	250
Figure 3. AC circuit breakers	337
Figure 4. CCU	338
Figure 5. Dump entry example from IOS /sys/param file	345
 Tables	
Table 1. CRAY J90 IOS Channel Values	65
Table 2. Disk device types and their values	67
Table 3. TCP/IP configuration files	288
Table 4. DD-5I specifications	323
Table 5. DD-5S	324
Table 6. DD-6S specifications	325
Table 7. DD-314 specifications	326
Table 8. DD-318 specifications	326
Table 9. NBANKS values for CRAY J916 2x2 backplane	341
Table 10. NBANKS values for CRAY J916 4x4 backplane	341
Table 11. NBANKS values for CRAY J932 8x8 backplane	342