

IBM Academic Operating System 4.3
Release 2
for the
IBM RT System

Program Directory

September 1988

PRPQ Number 5799-WZQ

IBM Technical Computing Systems Development
1510 Page Mill Road, MS 35A
Palo Alto, CA 94304

This directory describes the contents of IBM Academic Operating System 4.3 for the IBM RT System (PRPQ 5799-WZQ). It also directs you to the information you need to install the product. Please review the entire program directory before you begin installation. Keep this document for future reference.

Copyright International Business Machines Corporation, 1988.

Permission to copy this document or any portion thereof as necessary for licensed use of the software is granted to licensees of this software, provided this copyright notice and statement are included.

Ethernet is a registered trademark of Xerox Corporation.

UNIX is a registered trademark of AT&T Laboratories.

AIX, Andrew RT, and RT PC are trademarks of International Business Machines Corporation.

Network File System, NFS, and Sun Microsystems are trademarks of Sun Microsystems, Inc.

Introduction

IBM Academic Operating System 4.3 (IBM/4.3) is an operating system designed for selected models of the IBM RT System and the IBM 6152 Academic System. It is functionally equivalent to and compatible with the 4.3 Berkeley Software Distribution (4.3BSD) and includes all the IBM extensions available in IBM Academic Information Systems 4.3 for the IBM RT System (4.3/RT).

For a comprehensive list of the hardware supported by this release, see "Installing and Operating Academic Operating System 4.3" in the *IBM Academic Operating System 4.3* manual.

Note: *Using an upgrade kit available from IBM, you can upgrade an RT model 010, 015, 020, or 025 to be equivalent to a model 115 or 125. If you are an IBM Academic Operating System 4.3 user, you must follow the upgrade installation instructions in the "IBM RT PC New Model Series Upgrade Instructions" article included in the IBM Academic Operating System 4.3 manual. Do not use the instructions shipped with the upgrade kit. The disk backup instructions in the upgrade kit are for a different operating system. Using the wrong instructions could cause data to be lost.*

The four-volume *IBM Academic Operating System 4.3* manual shipped with the system contains only machine specific changes and additions to the 4.3BSD documentation set. You must also have the 4.3BSD documentation to gain maximum benefit from IBM/4.3.

Technical Highlights

Release 2 of the IBM Academic Operating System 4.3 (IBM/4.3) includes the following changes and new functions:

- The Network File System (NFS), version 3.2, server and client functions are part of the operating system.
- The IBM Andrew File System (AFS) server and client functions are shipped with the operating system.
- Network File System and IBM Andrew File System servers and clients can coexist on the same IBM RT System or IBM 6152 workstation. The kernel, as shipped, is configured for the Network File System, the IBM Andrew File System, and the Remote Virtual Disk system.
- The MetaWare High C Compiler, version 2.1, with global optimization has replaced version 1.4. Version 2.1 supports the language level defined in the proposed ANSI standard for C. This entire release was compiled with the new version. Both `/bin/cc` and `/bin/hc` invoke version 2.1. The version 1.4 compiler, at the August 1988 maintenance level, is available as `/bin/hc1.4`. Version 2.1:
 - Decreases execution time and program size.
 - Is compatible with version 1.4 in source language and object code. With few exceptions, users and programs will be unaffected by this change in compilers.
 - Eliminates the version 1.4 capacity limitations. Array sizes are no longer limited to 2^{**24} bytes. There is no effective limit to source program size.
 - Generally compiles in less time than did version 1.4, although compile times increase more than proportionally with file size. Compile times with the `-O` option can be longer.
 - Normally compiles at the ANSI C level but can also accept nearly all constructs acceptable to `pcc` that `pcc` does not label "old-fashioned." The `-Hppcc` option inhibits non-`pcc` keywords, enables anonymous structure references, and reduces type-matching

- checks to the *pcc* level.
- Lets you, with the *-Hnocpp* option, enable an ANSI level preprocessor instead of the default preprocessor */lib/cpp*. The symbols *__STDC__* and *__HIGHC__* are predefined in either case.
 - Generates assembler source files (.s) and invokes the assembler to produce object files (.o) unlike version 1.4, which generates object files directly.
 - Recognizes the *setjmp* and *alloc* libc function names as having their usual meaning. *_abs*, *_max*, and *_min* are also recognized and generate inline code. The *-Hoff=recognize_library* option disables this recognition.
 - Exploits hardware loop mode for short loops.
 - Permits only constant expressions in initializers for auto arrays and structures. Non-constant expressions must be assigned with assignment statements.
 - Increases the chance of malfunctions due to missing volatile declarations for interface variables such as I/O ports because auto variables and common subexpressions, particularly pointer values, are more likely to be resident in registers. The *-Hvolatile* option, which suppresses optimization of pointer dereferences, may be helpful in diagnosing problems. A volatile declaration assures a storage reference for each mention of the object.
- An Optimizing FORTRAN Compiler--*bf77(1)*--is available and is shipped as the default FORTRAN compiler, *f77(1)*. The 4.3BSD FORTRAN compiler is still available as *bf77(1)*
 - The X11 Window System has been upgraded to Release 2.
 - The advanced floating point accelerator (AFPA) performance has been improved.
 - *Dosread(1)* now works with 16-bit FATs. It also works better with subdirectories.
 - There is a significant increase in the number of utilities shipped with the system. Because of this increase, you cannot put all of the optional system components on a single disk. The installation Miniroot diskette no longer installs kernel source and documentation source by default. If you have 114Mbyte or larger disks you can install all of the optional system components by overriding the defaults during the tape installation procedure.
 - New and changed device support for the IBM RT System:
 - The IBM 5081 Display is supported for use as the system console.
 - The RT System internal 310MB high-capacity fixed-disk drive is supported.
 - The IBM 1356 Buffered 4-Port asynchronous adapter card is supported providing improved performance over the unbuffered adapter. The performance of either adapter depends on system configuration and load.

Recommendations, Suggestions, and Hints

The following are actions users may take to get the best possible performance from this release of the operating system:

- To avoid any problems users should recompile their programs that:
 - execute a read on a directory.
 - look at /etc/fstab.
 - use the following kernel structures: cmap, buf, mbuf, namidata, file, text, unpcb,user, and inode.

This page intentionally left blank.

Distribution Contents

The IBM Academic Operating System 4.3 Release 2 package contains the following materials:

- Documentation (new customers):
 - One copy of the “IBM Academic Operating System 4.3 Program Directory” (this document)
 - One copy of the “IBM Academic Operating System 4.3 - Support Procedures” article.
 - One copy of the *IBM Academic Operating System 4.3* manual (4 volumes)
 - One copy of the *IBM Academic Operating System 4.3 TNL*.
 - One copy of *The IBM Andrew Toolkit Applications User's Guide*
 - One copy of *The IBM Andrew Toolkit Applications User's Guide TNL*
 - One copy of the *IBM Academic Operating System User's Guide*
 - One copy of the *IBM Academic Operating System Administration Guide*
 - One copy of the *IBM Andrew File System* manual
 - Five binders for the IBM/4.3 manual and the Andrew manuals with binder cover and spine inserts
 - One set of tabs for the IBM/4.3 manual
- Documentation (existing customers):
 - One copy of the “IBM Academic Operating System 4.3 Program Directory” (this document)
 - One copy of the *IBM Academic Operating System 4.3 TNL*.
 - One copy of *The IBM Andrew Toolkit Applications User's Guide TNL*
 - One copy of the *IBM Academic Operating System User's Guide*
 - One copy of the *IBM Academic Operating System Administration Guide*
 - One copy of the *IBM Andrew File System* manual
 - One new binder for the expanded IBM/4.3 manual plus one binder for the Andrew manuals with binder cover and spine inserts
- Diskettes:
 - IBM Academic Operating System 4.3 Installation MINIROOT
 - IBM Academic Operating System 4.3 Installation SAUTIL.
- Streaming tapes:
 - IBM Academic Operating System 4.3 ROOT/USER
 - IBM Academic Operating System 4.3 SOURCE
 - IBM Academic Operating System 4.3 X, Version 11
 - IBM Academic Operating System 4.3 IBM Andrew Toolkit
 - IBM Andrew File System

This page intentionally left blank.

Installation Instructions

To install IBM/4.3, you need the following articles:

- "Installing and Operating Academic Operating System 4.3" (a part of the *IBM Academic Operating System 4.3* manual)
- *IBM Andrew File System* manual
- "IBM Academic Operating System 4.3 - Support Procedures"

If you are upgrading a model 010, 015, 020, or 025, you also need the "IBM RT PC New Model Series Upgrade Instructions" article included in the *IBM Academic Operating System 4.3* manual.

Note: *Even if you are currently running 4.3/RT, follow each step in the installation instructions. There are differences between this procedure and the one you used to install previous releases.*

- (1) Before starting the installation, read the articles listed above.
- (2) Check the "Installation Instructions Errata" section of this document. If there are any last minute corrections in this section, mark them in your copies of the appropriate articles.
- (3) If you are upgrading a model 010, 015, 020, or 025 to be equivalent to a model 115 or 125, follow the instructions in the "IBM RT PC New Model Series Upgrade Instructions" article. Ignore this step if you have a model 115 or 125 or are not upgrading your older model.
- (4) Follow the instructions in the "Installing and Operating Academic Operating System 4.3" article.
- (5) Connect a Customer Central Support Site work station to the IBM Academic Information Systems uucp network according to the instructions in the "IBM Academic Operating System 4.3 - Support Procedures" article.
- (6) Optionally, install an Andrew File System server according to the instructions in the *IBM Andrew File System* manual.

Useful Documentation

The Customer Central Support Site should have copies of the following manuals.

Note: The RT System manuals in the list may have different order numbers than manuals of the same you received with your RT System. Only the ordering numbers have changed; it is not necessary to replace your existing manuals.

- *IBM RT System User Setup Guide and Options Installation*, SBOF-1829
- *IBM RT System Guide to Operations*, SBOF-1828
- *IBM RT System Problem Determination Guide*, SBOF-1825, which contains the diagnostics diskette.
- *IBM 6152 Academic System Quick Reference*, S68X-2326
- *IBM RT System Hardware Technical Reference*, SBOF-1830
- *IBM RT System Site Preparation Guide*, GA23-1058
- *IBM PS/2 Hardware Interface Technical Reference*, S68X-2330

The following manuals are useful for maintenance purposes.

- *IBM RT System 6150 System Unit Hardware Maintenance and Service*, SA23-2605
- *IBM RT System 6151 System Unit Hardware Maintenance and Service*, SA23-2606

- *IBM 6152 Academic System Hardware Maintenance Reference*, S68X-2329
- *IBM 6152 Academic System Hardware Maintenance Service*, S68X-2327, which contains the diagnostic diskette.
- *IBM PS/2 Hardware Maintenance Reference*, S68X-2221
- *IBM PS/2 Maintenance Service*, S68X-2222

It is the customer's responsibility to obtain copies of all volumes of the 4.3BSD Documentation.

If you need additional copies of manuals, order them from your IBM representative.

Installation Instructions Errata

Installing and Operating IBM/4.3 Errata

Page 24 of the Installing and Operating article in the IBM/4.3 manual was inadvertently omitted during printing. Before attempting to install your Release 2 system, replace pages 23 and 25 with the pages 23, 24, and 25 in *Installation and Operating Replacement Pages*.

Pages 21 and 25: Change the time estimates (two on each page) from:

(about 30 minutes)...

to:

(about 50 minutes)...

Page 41: Change the section reference near the bottom of the page from:

See Section 3.1.2.5,...

to:

See Section 3.1.1.5,...

Andrew File System Errata

Make the following changes to Andrew File System Installation section in the *IBM Andrew File System* manual before installing the Andrew File System.

Page 2: Following:

```
# /usr/ibm/ftc /dev/rst0...
```

add:

If you intend to install server and/or client binaries via the network, replace the preceding command with:

```
# /usr/ibm/ftc /dev/rst0 - | tar xvfp - server/src fserver fsclient < Enter >
```

Page 2: Replace the ten lines at the bottom of the page beginning with:

If the Andrew File System source tape...

with:

To load the AFS server binaries from a network machine (with the AFS source, including fserver, loaded) issue the following commands. In these commands re-

place *srcmach* with the name of the machine that contains the AFS sources and replace *username* with any non-root user name that both the source and target machines share.

```
# cd /
# su username -c 'rsh srcmach " cd /usr/andrew/fsserver;
tar cvf - . " '| (cd /; tar xvfp -) <Enter >
```

To load the server binaries on a machine that has the entire AFS tape (on a local disk) issue these commands:

Page 3: In the seventh line from the top of the page, change:

```
/.scm, /.rhosts and /vice/db/hosts
```

to:

```
/.scm, /.rhosts, /vice/db/hosts, and /vice/db/servers
```

Page 4: Change:

```
# cat /etc/passd.adm > > /etc/passwd <Enter >
```

to:

```
# cat /etc/passwd.adm > > /etc/passwd <Enter >
```

Page 4: Change:

```
# /vice/bin/pwd2pdb -p /etc/passwd -g /usr/admin/groups > vice.pdb <Enter >
```

to:

```
# /vice/bin/pwd2pdb -p /etc/passwd -g /usr/admin/groups >! vice.pdb <Enter >
```

Page 6: Change:

An updated */etc/host* that contains...

to:

An updated */etc/hosts* that contains...

Page 6: Delete the 16 lines beginning with:

To load the binaries needed to run...

and ending with:

```
# rep srcmach:/andrew/fsclient...
```

Replace the deleted lines with the following page (suggest you make a copy of the next two pages for each of your manuals):

The binaries needed to run the AFS client can be loaded from tape or from another machine on the network on which the AFS sources have been loaded as described in the preceding section.

To load the AFS binaries from tape, do the following:

- (1) Reboot the machine by typing:

```
# reboot
```

When the boot prompt appears, type:

```
hd(0,0)vmunix <Enter>
```

If a "root device?" prompt appears, type:

```
hd0 <Enter>
```

- (2) Issue the following to mount all file systems:

```
# cp /dev/null /etc/mtab
# mount -vf /
# mount -atv ufs
```

- (3) Put the ROOT/USER tape into the streaming tape drive. Issue the following to extract the client binaries from the tape:

```
# cd /
# mt -f /dev/nrst0 rew
# mt -f /dev/nrst0 fsf 2
# /usr/ibm/ftc /dev/rst0 - | restore rvf -
# rm restoresymtable
```

To load the AFS client binaries from a network machine (with the AFS source, including *fsclient*, loaded), issue the following commands. In these commands replace *srcmach* with the name of the machine that contains the AFS sources and replace *username* with any non-root user name that both the source and target machines share.

- (1) The AFS client binaries will be copied from the source machine and placed in tape-archive format in a file named */tmp/AFS.bin.tar* on the target machine:

```
# cd /
# su username -c 'rsh srcmach "cd /usr/andrew/fsclient;
tar cvf - ." ' | dd of=/tmp/AFS.bin.tar
```

- (2) Next the file will be unpacked on the target machine. This must be done in single user mode to avoid "text file busy" errors. To reboot the machine and bring it to single user mode:

```
# reboot
```

When the boot prompt appears, type:

```
hd(0,0)vmunix <Enter>
```

If a "root device?" prompt appears, type:

```
hd0 <Enter>
```

- (3) Issue the following commands to mount all of the file systems:

```
# cp /dev/null /etc/mtab  
# mount -vf /  
# mount -atv ufs
```

- (4) Issue the following to unpack and remove the file:

```
# tar xvp /tmp/AFS.bin.tar  
# rm /tmp/AFS.bin.tar
```

Pages 7 and 8: Remove the references to `serverd` and `client`. The `/usr/andrew/etc` directory is empty. These files are not included on the client tape.

Page 9: In the paragraph that begins, "If the parameters are different...", change:

/etc/viced

to:

/etc/viced and/or *rc.config*

This page intentionally left blank.

List of APAR Fixes Supplied on the System Update

This release incorporates all fixes to previous releases; therefore no system update is supplied with this release. All known APARs to this release appear in the `ibm.apars` notesfile.

This page intentionally left blank.

List of Files Supplied on the System Update

This release incorporates all fixes to previous releases; therefore no system update is supplied with this release. All known APARs appear in the `ibm.apars` notesfile.

This page intentionally left blank.