

**IBM Advanced Interactive Executive
for the Personal System/2
(AIX PS/2)
General Information
Version 1.2.1**

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**IBM Advanced Interactive Executive
for the Personal System/2
(AIX PS/2)**

General Information

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AIX PS/2 General Information
Edition Notice

Edition Notice

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Trademarks and Acknowledgements

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<p>AIX PS/2 Features General Description</p>	<p>5.0</p>	<p>AIX PS/2 offers UNIX System V upward compatibility as well as 4.3BSD functions and other enhancements.</p>
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<p>Operating System User Interfaces Connectivity and Communications Application Development Distributed Processing</p>	<p>7.0 8.0 9.0 10. 11.</p>	<p>Descriptions of individual AIX PS/2 base, Extensions DOS Merge, X-Windows, Usability Services, AIXwindows INmail/INed/INnet/INfp, TCP/IP, Workstation Host Interface Program, AIX Access for DOS Users, X-Windows for IBM DOS, X.25. Application Development Toolkit, VS FORTRAN, VS Pascal, C Language, Text Formatting System, VS COBOL, graPHIGS Transparent Computing Facility, Network File System.</p>
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AIX PS/2 General Information

Publications	13.	AIX PS/2's task-oriented library contains user information, system support information, and reference material.
Hardware requirements	14.	Minimum configuration needed for AIX PS/2; supported displays, printers, adapters, terminals, and other hardware.
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AIX PS/2 General Information
Introducing AIX PS/2

2.0

Introducing AIX PS/2

Subtopics

2.1 Multi-user, multi-tasking environment for the Personal System/2

2.2 Runs DOS and UNIX operating system applications

2.3 An AIX Family member

2.4

AIX PS/2 General Information

Multi-user, multi-tasking environment for the Personal System/2

2.1 *Multi-user, multi-tasking environment for the Personal System/2*

AIX PS/2 General Information

Runs DOS and UNIX operating system applications

2.2

Runs DOS and UNIX operating system applications

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An AIX Family member
An AIX Family member

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AIX PS/2 General Information

2.4

Subtopics

2.4.1 IBM Advanced Interactive Executive for the Personal System/2 (AIX PS/2)

2.4.2 Some Reasons to Choose AIX PS/2

2.4.3 Highlights

AIX PS/2 General Information

IBM Advanced Interactive Executive for the Personal System/2 (AIX PS/2)

2.4.1 IBM Advanced Interactive Executive for the Personal System/2 (AIX PS/2)

is an enhanced UNIX operating system implementation for the IBM Personal System/2 (80386- and 80486-based models, Industrial Computers, and PS/55).

AIX PS/2 is an adaptation of IBM's AIX/RT, the Advanced Interactive Executive for the RT system. It is part of the AIX Family of products that provide a compatible operating system environment on hardware ranging from the IBM PS/2 Model 55 SX to the IBM System/390.

AIX PS/2 General Information

Some Reasons to Choose AIX PS/2

2.4.2

Some Reasons to Choose AIX PS/2

You want a multiuser, interactive operating system for the PS/2.

You want to combine the power of AIX with the capabilities of IBM's 386 or 486-based Personal System/2.

You want a multi-tasking environment that supports multiple users, including multiple users running your existing DOS applications.

You want to connect ASCII terminals to your AIX/370 system.

You want to interact with and manipulate data in the Japanese language.

You want a low-cost, high function UNIX operating system for which you may purchase and install just those related programs that you need.

You want consistent user and application interfaces as your hardware requirements expand.

AIX PS/2 General Information

Highlights

Highlights

2.4.3

Multi-user, multi-tasking environmen

32-bit, 386 or 486 implementatio

AIX Family membe

Individually packaged program

DOS Merge, for running DOS application

Multiple concurrent DOS and AIX session

Based on UNIX System V Release

Selected Berkeley 4.3 extension

POSIX complianc

Multiple languages and character set

AIX PS/2 General Information
AIX Structure

3.0

AIX Structure

Subtopics

3.1 Based on UNIX operating system

3.2

AIX PS/2 General Information

Based on UNIX operating system

3.1

Based on UNIX operating system

AIX PS/2 General Information

3.2

IBM's AIX Operating System offerings are based on the UNIX System V operating system, and include selected enhancements from the 4.3 Berkeley Software Distribution (4.3BSD) operating system. These systems are among the numerous UNIX operating systems available today on a wide variety of computers.

UNIX operating systems are used in many installations, including universities and businesses. Numerous software houses write application programs for these systems, often in the C language, which is easily ported from one such system to another.

The figure below shows the major software components of a UNIX operating system, such as AIX, and how these components interrelate.

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- 3.2.1 Multi-User systems
- 3.2.2 Kernel
- 3.2.3 Shell
- 3.2.4 Programs
- 3.2.5 File System

AIX PS/2 General Information

Multi-User systems

3.2.1

Multi-User systems

AIX and other UNIX operating systems are designed to be interactive and to handle multiple users. Several users can work with the system concurrently and independently, and each of them can run several processes (programs or parts of programs) at the same time. Users can share files depending on the permissions that are set by the file's owner.

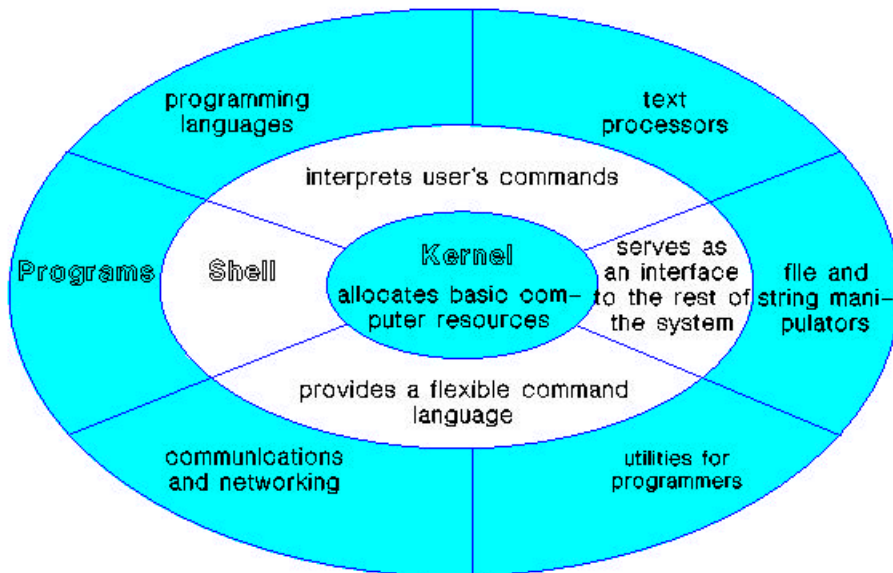
AIX PS/2 General Information

Kernel

3.2.2

Kernel

The kernel is the part of the operating system that interfaces with the hardware and provides services for the other system layers.



AIX PS/2 General Information

Shell

3.2.3

Shell

Interfacing with the kernel are various programs, including the shell. A shell provides a flexible interface between the users and the rest of the system. It is a command interpreter with programming facilities. (The two most widely used shells are the Bourne shell and the C shell.)

When you enter a command, the shell interprets it and calls the appropriate program to perform the work. The program the shell invokes may be a simple command, a chain of commands, or an application program such as an editor or a debugging tool.

You can put several commands and control statements into a file (*shell script*) that can then be executed by the shell as a new command. This is similar in concept to batch (.BAT) files in DOS.

The shell treats I/O devices the same way as it treats files. For example, normally the input from a program or command comes from the keyboard, and the output goes to the display. But with the shell, input can come from any file or device, and output can go to any file or device. This is called *I/O redirection*.

The shell also makes it easy to use the output of one command as the input to another command. This is called *piping*.

AIX PS/2 General Information

Programs

3.2.4

Programs

AIX and other UNIX operating systems contain many commands and a wide variety of programs and functions. They are especially equipped with tools for software development like high-level languages (the C language in particular), a symbolic debugger, a source code control system, a compiler, and a lexical analyzer. There are also tools for text processing, file and string manipulation, document production, networking functions, and other uses.

AIX PS/2 General Information

File System

3.2.5

File System

Like other UNIX operating systems, AIX has a simple yet powerful file system that consists of directories and files.

Files are considered to be strings of characters without any further structure. Any information structure is assumed only by the processing programs.

Files are accessed via directories. The directories are structured in a hierarchical tree-like way, starting with the "root" directory. You can access files relative to the "current" directory or by absolute path name.

You can define access permissions for each file or directory for reading, writing, and executing. These rights can be different for you (the owner), for the group that you are a member of, and for all other users. For example, you could define a file that you can read, write, and execute; members of your group can only read and write; and everyone else can only read.

AIX PS/2 General Information

AIX Family

4.0

AIX Family

Subtopics

4.1 Systems for various machines

4.2 High similarity

4.3

AIX PS/2 General Information
Systems for various machines

4.1

Systems for various machines

AIX PS/2 General Information

High similarity

High similarity

4.2

AIX PS/2 General Information

4.3

IBM's AIX Family gives you common operating systems, applications, communications features, and documentation on IBM processors ranging from the Personal System/2 Model 55 through the RISC System/6000 and the 9370 Information System to the 4381 and System/390 systems.

These AIX offerings provide a range of function, performance, capacity, and price. This enables you to select and implement the most appropriate solution for your current requirements, and provides a framework that will allow you to build on your investments as your needs change.

Subtopics

4.3.1 Family Members

4.3.2 AIX Family Features

AIX PS/2 General Information
Family Members

4.3.1

Family Members

AIX PS/2

AIX PS/2 is the entry-level AIX offering. This is appropriate if you require a small single- or multi-user AIX system or workstation, migrations from XENIX, or a high degree of affinity with IBM PC-DOS.

AIX Version 3 for RISC System/6000

AIX Version 3 for RISC System/6000 is a multi-tasking, demand-paged virtual memory operating system that can operate as a single-user or multi-user system. It is POSIX compatible, and offers significant IBM enhancements. For further information, see *IBM RISC System/6000 Software Offerings Overview*, GC23-2189.

AIX/370

AIX/370 is an AIX offering for the mid-range to high-end processors (IBM 9370, 4381, 3090, and ES/9000). It is appropriate when a System/370 operating environment is required. The large System/370 processors provide the most extensive AIX disk storage capacity, memory, and CPU processing capability, with 3090 vector facility support for large-scale numeric-intensive computing.

AIX/370 is well suited for a centralized processing and administrative environment. It is also appropriate when accessibility to VM function and application is desired.

AIX PS/2 General Information

AIX Family Features

AIX Family Features

4.3.2

Based on UNIX System

Selected Berkeley 4.3 extension

Berkeley C shell, Bourne shell

POSIX complianc

Etherne

IBM Token-Rin

Transmission Control Protocol/Internet Protocol (TCP/IP

X-Window

Network File System (NFS

Programming languages (C and VS FORTRAN

National Language suppor

Multibyte Character Set (MBCS) suppor

Licensed program product (LPP) suppor

AIX PS/2 General Information

AIX PS/2 Features

AIX PS/2 Features

5.0

Subtopics

5.1

AIX PS/2 General Information

5.1

In addition to the AIX Family features, AIX PS/2 also offers:

32-bit addressin

Multiple virtual terminal suppor

DOS Merge, for running DOS application

Individually packaged program

Workstation Host Interface Program (WHIP

Graphic Support Librar

80387 math co-processor suppor

Transparent Computing Facility (TCF

VS Pascal and VS COBO

Usability Services shel

X.2

AIXwindow

Xstation Manage

Personal graPHIG

Subtopics

5.1.1 Standards Compliance

5.1.2 Berkeley Functions Added

5.1.3 Other Enhancements

5.1.4 General Description

AIX PS/2 General Information
Standards Compliance

5.1.1

Standards Compliance

AIX PS/2 has been tested to comply with the following industry UNIX standards:

IEEE POSIX 1003.1-1988 with Common Usage C Language binding

FIPS 151-

System V Interface Definition, Issue 2

AIX PS/2 General Information
Berkeley Functions Added

5.1.2

Berkeley Functions Added

AIX PS/2 includes selected functions of Berkeley Software Distribution 4.3 (4.3BSD), such as:

C Shel

TCP/I

dbx debugger

mail and **sendmail**

Enhanced signal

Multiple concurrent group acces

File enhancements, including file synchronization and truncatio

Select(

Socket

Pseudo tty's (teletypewriter devices

BSD job contro

AIX PS/2 General Information

Other Enhancements

5.1.3

Other Enhancements

AIX PS/2 also provides you with these enhancements to the UNIX operating system environment:

Multiple virtual terminal support

- Toggle between virtual AIX PS/2 and DOS terminal sessions

Users can run different applications in different full-screen windows, and toggle between them. Applications continue running in background even if they aren't displayed on the screen.

- AIX PS/2 support for High Function Terminal console operation.

Configuration Service

- Software configuration of I/O devices; hardware configuration information is taken from non-volatile memory
- The **devices** command, which uses menus to show the current configuration and lets users change, add, or delete devices
- The **minidisks** command, used to define virtual disks
- Application interface to **devices** and **minidisks** commands
- System configuration automatically updated, with file systems and queues created and the kernel rebuilt if necessary
- System dynamically configured at IPL time

Generalized spooling support for private or public queue

80387 support, or software emulation of the hardware floating-point feature

Kernel demand-page fault handling, to improve overall performance of the operating system

DOS Serve

Virtual memory paging support

Improved application installation and system-configuration procedure

File system enhancements for an improved backup/restore facility

Generalized queueing system for improved management of job queues and print queues

Full-screen editor for data creation and manipulation

Kernel support for shared libraries

Asynchronous Terminal Emulation (ATE)

Japanese language support

AIX PS/2 General Information

General Description

5.1.4

General Description

The AIX PS/2 Operating System provides you with a 32-bit implementation of the IBM AIX Operating System -- a multi-user, multi-tasking virtual memory operating system. AIX PS/2 supports up to 16 concurrent users.

AIX PS/2 provides a POSIX-compliant operating system environment. In addition to UNIX System V functions, AIX PS/2 includes selected Berkeley Software Distribution extensions, plus IBM enhancements.

In conjunction with the Intel 80386 and 80486 hardware, AIX PS/2 provides virtual-memory support. Virtual memory allows the operating system and application programs to be written without being limited to the size of the actual physical memory installed. The "flat demand-paged" memory model of the 80386 is used, giving 4 gigabytes of logical address space to each process.

AIX PS/2 contains a number of functions for display and console support; these functions are supported via the High Function Terminal (HFT) driver. Character model provides a device-independent interface. Monitor mode provides direct access to the display. A pointing device (mouse) and sound are supported. Window-management routines allow a user to open multiple full-screen windows and to toggle between them. Additional features support color functions and extended graphics.

AIX PS/2 includes support for device-independent I/O. In addition, users may add or replace the drivers distributed with the system with driver routines developed in 80386 assembly language or C.

Installation and Configuration:

The installation of the AIX PS/2 Operating System is accomplished through a menu-driven user interface that assists in setting system parameters at installation time. Most system defaults are modified automatically to conform to the hardware configuration of the system. In addition, the user may specify other parameters to tailor the system for unique requirements. Devices and adapters can be added by using AIX commands that prompt the user for any required input.

Most of the information required for application installation is provided in the AIX PS/2 Operating System's installation tools. Configuration files are automatically updated and file systems are automatically created.

Also included in AIX PS/2 are the **installp** and **updatep** commands, which provide a uniform method of installing IBM licensed programs and other application programs. All AIX PS/2 licensed programs are installed and maintained through the use of **installp** and **updatep**, respectively.

User Interfaces:

The Bourne shell is a command interpreter that serves as an interface between the user and the operating system. It reads the user's command, calls the corresponding program, and executes it. The command may be a single AIX command, multiple commands (a shell procedure), or a program. This shell will be familiar to users of the UNIX operating system.

In addition to the Bourne shell, AIX PS/2 provides an implementation of the C shell that will be familiar to users of Berkeley Software Distribution systems.

AIX PS/2 General Information

General Description

Additional user interfaces are provided by other AIX PS/2 licensed programs.

Communications Support:

AIX PS/2 communications support includes:

Asynchronous Terminal Emulation (ATE), which allows the AIX PS/2-supported terminal to emulate an ASCII display terminal connected to a host computer. It provides a convenient means for establishing a connection through automatic dialing. After connection, the operator can interact with the remote system, and can send and receive files using the XMODEM protocol. ATE may be used to connect with remote private data bases and other systems that support asynchronous terminals.

Ethernet and IBM Token-Ring via the following AIX PS/2 license programs:

- Transmission Control Protocol/Internet Protocol (TCP/IP)
- DOS Server component of AIX PS/2
- Transparent Computing Facility
- Network File System
- X.25

Standard UNIX networking functions such as **uucp** and **uux**, and the **connect** function for establishing a connection to a remote host.

Terminal Support:

Terminal support includes most members of the IBM 32xx family of display stations, members of the IBM PC family using emulation, and other ASCII terminals that adhere to ANSI 3.64 protocol as implemented by DEC VT100 and VT220, or the equivalent. Programmers can consult AIX PS/2 documentation for information on supporting other kinds of ASCII terminals.

Printer Support:

Printers are supported via an extended Personal Computer ASCII print data stream. In addition, pass-through mode may be used by applications that need to use a particular printer's unique features. The AIX PS/2 Operating System provides a common application interface to the supported printers.

Graphics Support:

AIX PS/2 includes the Advanced Display Graphics Support Library (GSL), which provides a program interface for graphics applications to the displays:

8503 12" Monochrome Displa

8512 14" Color Displa

8513 12" Color Displa

8514 16" Color Display in any of the VGA modes, up to 640x480

AIX PS/2 General Information

General Description

GSL includes a set of graphics primitives designed to provide access to the display hardware with a minimum of system overhead.

Functions provided by the Advanced Display Graphics Support Library include:

- Adapter initialization and terminatio
- Line, multiline, and polyline drawin
- Line-drawing logical operation
- Solid rectangle and polygon fil
- Fixed-pitch text paintin
- User-definable character fonts and cursor function
- Keyboard and mouse suppor
- Query for display type, active font, pointing devic

The AIX PS/2 Personal graPHIGS Programming Interface supports applications written to the Graphical Kernel System (GKS) International Standard (ISO 7942).

National Language Support (NLS):

NLS support is provided for 8-bit ASCII. It provides National Language Character Set support for IBM console displays, selected World Trade ASCII terminals, and IBM printers with National Language capability.

Multi-Byte Character Support (MBCS):

MBCS provides international character support for both European languages and the Japanese language. MBCS uses a set of codes (rather than a single code) to represent ASCII and extended characters in files and on networks.

Other Support:

The AIX PS/2 Operating System contains a software emulation of the floating-point functions defined by ANSI/IEEE Standard 754-1985. The optional 80387 co-processor may be installed for improved performance of programs that use floating-point routines.

AIX PS/2 includes an enhanced print command to facilitate spool-queue handling, and a command to facilitate adding new users to the system.

AIX PS/2 General Information
Packaging

6.0

Packaging

Subtopics

6.1 Customizing your AIX PS/2 system

6.2

AIX PS/2 General Information

Customizing your AIX PS/2 system

6.1

Customizing your AIX PS/2 system

AIX PS/2 General Information

6.2

IBM offers the AIX PS/2 Operating System base and a wide range of related programs to meet a wide range of needs. Each of these programs is individually packaged and available separately.

You pay only for the programs your users need, which eliminates unused programs and unneeded documentation -- and saves you money.

Subtopics

6.2.1 Select Just the Ones You Need

AIX PS/2 General Information

Select Just the Ones You Need

6.2.1

Select Just the Ones You Need

AIX PS/2 Operating System

The AIX PS/2 Operating System is designed as a run-time (1) environment that supports these licensed programs:

Operating System Extensions

DOS Merge

X-Windows

AIXwindows

Usability Services

INmail/INed/INnet/INftp

AIX PS/2 General Information
Select Just the Ones You Need

TCP/IP

Workstation Host Interface Program

AIX Access for DOS Users

X-Windows for IBM DOS

X.25

Application Development Toolkit

VS FORTRAN

AIX PS/2 General Information

Select Just the Ones You Need

VS COBOL

VS Pascal

C Language

Extended C Language

Text Formatting System

Transparent Computing Facility

Network File System

Personal graPHIGS

AIX PS/2 General Information
Select Just the Ones You Need

+-----+

(1) Allows program execution only. To create code, other licensed programs are required.

AIX PS/2 General Information
Operating System
Operating System

7.0

Subtopics

7.1 The Foundation

7.2 Additional Tools

7.3

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Additional Tools
Additional Tools

7.2

AIX PS/2 General Information

7.3

Subtopics

7.3.1 Base System

7.3.2 Extensions

AIX PS/2 General Information

Base System

7.3.1

Base System

AIX PS/2 Operating System

The AIX PS/2 Operating System licensed program is a run-time AIX environment for application execution only, and is the foundation upon which all other AIX PS/2 packages are installed.

See "AIX PS/2 Commands" in topic 12.0 for a list of the commands included in this base package.

AIX PS/2 General Information
Extensions

7.3.2

Extensions

Operating System Extensions

The Operating System Extensions licensed program provides additional facilities for the experienced AIX user, such as:

Commands for

- shell programming
- text and information processing
- file and directory management

The UNIX-to-UNIX copy program **uucp**)

Electronic mail

Online documentation

See "AIX PS/2 Commands" in topic 12.0 for a list of the commands included in the Operating System Extensions package.

AIX PS/2 General Information
User Interfaces

8.0

User Interfaces

Subtopics

8.1 DOS Merge

8.2 Windowing Capabilities

8.3 Usability Services

8.4

AIX PS/2 General Information
Windowing Capabilities

8.2

Windowing Capabilities

AIX PS/2 General Information

8.4

Subtopics

8.4.1 Using DOS Applications

8.4.2 Windowing Capabilities

8.4.3 Assistance for AIX Novices

AIX PS/2 General Information
Using DOS Applications

8.4.1

Using DOS Applications



With the installation of **DOS Merge**, AIX PS/2 supports the execution of IBM Personal Computer DOS Version 3.3 and DOS applications concurrently with AIX PS/2. DOS Merge provides multiple users with access to DOS, while maintaining the powerful features and applications of AIX:

Password security and file protection are extended to DOS users

Record-level access to the same files is provided to both operating systems.

DOS programs can be invoked from AIX, and AIX programs can be invoked from DOS.

Pipes support interprocess communication between AIX and DOS programs

DOS Merge facilities include:

Virtual 8086 mode IBM Personal Computer DOS Version 3.3 for the execution of DOS programs

Ability to execute multiple DOS sessions concurrently with one or more AIX sessions

Ability to access DOS files (on fixed disk or diskette) from an AIX PS/2 shell, by invoking DOS commands, applications, and batch files

Ability to access the AIX PS/2 file system by using DOS commands, applications, and batch files, or by using AIX commands or shell procedures

Ability to convert ASCII files between DOS and AIX PS/2 format

Ability to transfer data between DOS and AIX PS/2 programs via pipe

Support for the execution of graphics-based DOS applications under AIX PS/2 X-Windows

DOS files under control of the AIX PS/2 Operating System are maintained transparently as AIX PS/2 files. Native DOS files that are on diskettes or in physical or virtual DOS partitions may be accessed only from AIX PS/2 using DOS commands.

Note: Running DOS applications under DOS Merge requires the prior installation of IBM DOS 3.3.

See "AIX PS/2 Commands" in topic 12.0 for a list of the commands included in the DOS Merge package.

DOS Software Compatibility:

AIX PS/2 General Information

Using DOS Applications

To demonstrate the compatibility of AIX PS/2 DOS Merge with DOS 3.3, IBM has tested both IBM licensed programs and non-IBM offerings.

The following are examples of application programs that IBM has tested using AIX PS/2 DOS Merge with DOS 3.3:

Word processin

- Wordstar Professional (2)
- MultiMate Advantage (3)
- Webster's New World Spelling Checker (4)
- IBM DisplayWrite 4

Business and accountin

- dBase III Plus (3)
- Chart Master (3)
- Lotus 1-2-3 (5) Version 2.01
- Multiplan (6)
- VP Planner (7)

Programmin

- Turbo Pascal with 8087 and BCD (8)
- Turbo Prolog (8)
- Turbo Graphix Toolbox (8)
- The Print-Shop Graphics Library Disk (8)
- BASICA (9)
- Microsoft Macro Assembler Package (6)
- Microsoft Quick C (6)
- Microsoft Quick Basic (6)

Utilitie

- Sidekick (8)
- The Print Shop (10)
- Fastback 3.1 (11)
- Sideways (12)

Operating Environment/Application

- GEM Draw Plus (13)
- GEM Collection (13)
- Microsoft Windows Version 1.03 (6)
- EZ-VU (9)

Communication

- Smartcom II (14)
- Crosstalk (15)

Othe

- Flight Simulator (6)

(2) Trademark of MicroPro International Corporation Inc.

(3) Trademark of Ashton-Tate

AIX PS/2 General Information
Using DOS Applications

- (4) Trademark of Simon & Schuster, Inc.
- (5) Trademark of Lotus Development Corporation
- (6) Trademark of Microsoft Corporation
- (7) Trademark of CYMA/McGraw-Hill
- (8) Trademark of BORLAND INTERNATIONAL, INC.
- (9) Trademark of International Business Machines Corporation
- (10) Trademark of Broderbund Software
- (11) Trademark of Fifth Generation Systems
- (12) Trademark of Funk Software Inc.
- (13) Trademark of Digital Research Inc.
- (14) Trademark of Hayes Microcomputer Products Inc.
- (15) Trademark of DCA/Crosstalk Communications

AIX PS/2 General Information
Windowing Capabilities

8.4.2

Windowing Capabilities



AIX PS/2 **X-Windows** provides a popular windowing environment to users on all-points-addressable displays. Based on the X-Windows Version 11 protocol, it provides a powerful end-user interface into whatever environment the user is operating.

Whether users are viewing multiple tasks running on a PS/2 or interfacing to tasks running in a network environment, X-Windows provides a consistent single interface. Processes or tasks can each have their own window.

X-Windows includes support for:

Up to 16 concurrent window

Multiple concurrent processors per window

Overlapped and hidden window

Cut-and-paste buffers for use by applications when transferring data

Sharing the display with other virtual terminal

Window management by the user or by application program

Graphics and text-based application

Generic terminal emulator

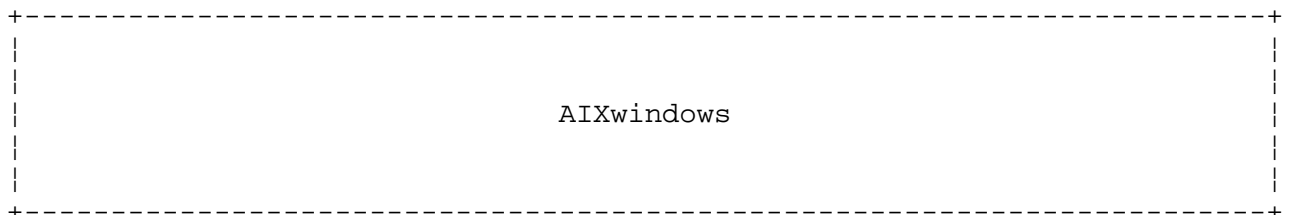
Mouse support

On-screen analog or digital clock

Programming tool

A network (Ethernet or IBM Token-Ring) is required for communications between X-Windows clients and servers on separate hosts; TCP/IP is required for network use.

X-Windows provides tools and libraries for programmers to develop X-Windows client applications. These tools include the X library, the X-Windows Toolkit of higher-level functions, and utilities for developing specialized fonts and cursors.



AIX PS/2 General Information

Windowing Capabilities

AIXwindows is a graphical user interface that is based on the Open Software Foundation's OSF/Motif user interface offering and on the OS/2 Presentation Manager (PM) user environment. AIXwindows runs in the AIX PS/2 X-Windows Version 1.2.1 environment. The AIXwindows user interface is comprised of the AIXwindows run time environment and the AIXwindows application development environment.

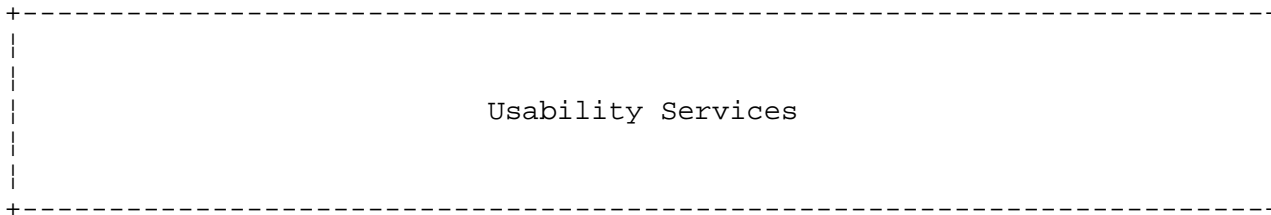
The AIXwindows run-time environment consists of the OSF/Motif window manager and a graphical OSF/Motif-based desktop that provides an iconic view of the file system and allows the user to browse the file system. Simple file maintenance functions can be performed on the files via direct manipulation of the icons. Applications can be started by selecting the application itself and/or the application's data file.

The AIXwindows application development environment provides the application developer with a high-level toolkit based on OSF/Motif. The AIXwindows application development environment consists of the following tools:

- OSF/Motif user interface toolkit bindings (C Language

- OSF/Motif Xm library containing user interface widgets and gadget (windowless widgets)

- Enhanced Xt intrinsics and Xlib support for OSF/Motif



AIX PS/2 **Usability Services** provides a point-and-select interface to many AIX PS/2 functions. Users can access a subset of the AIX commands by selecting items from a command bar and pop-up menus.

Usability Services functions are invoked through full-screen windows on the display. For example:

A tools window provides access to AIX system functions such as the compiler.

Files windows allow users to get the AIX directory structure and its associated commands.

A shell window provides access to other AIX System interfaces (DO Merge, Bourne shell, C shell).

In the *Windows* window, users can list existing windows and create new windows.

In addition, a user at the console display can create multiple concurrent windows, allowing easy switching among multiple active tasks. The console also supports the use of a mouse to point to items on menus and the command bar.

AIX PS/2 General Information
Connectivity and Communications

9.0

Connectivity and Communications

Subtopics

9.1 INmail/INed/INnet/INftp

9.2 TCP/IP

9.3 Workstation Host Interface Program

9.4 AIX Access for DOS Users

9.5 X-Windows for IBM DOS

9.6 X.25

9.7

AIX PS/2 General Information
INmail/INed/INnet/INftp

9.1

INmail/INed/INnet/INftp

AIX PS/2 General Information

Workstation Host Interface Program

9.3

Workstation Host Interface Program

AIX PS/2 General Information

AIX Access for DOS Users

9.4

AIX Access for DOS Users

AIX PS/2 General Information

X-Windows for IBM DOS

X-Windows for IBM DOS

9.5

AIX PS/2 General Information

9.7

Subtopics

9.7.1 Message Handling/Processing

9.7.2 Communication Protocols

9.7.3 Communicating with a Host

9.7.4 PC Support

9.7.5 X.25 Support

AIX PS/2 General Information
Message Handling/Processing

9.7.1

Message Handling/Processing

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| INmail/INed/INnet/INftp |
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Developed by INTERACTIVE Systems Corporation, the **INmail/INed/INnet/INftp** program allows the creation and queued transfer of files and electronic messages. It allows users to send, receive, update, print, delete, restore, search, move, and copy messages. Other features include a reminder facility, auto-forwarding, and execution of AIX PS/2 commands and applications from within the message system.

The program uses asynchronous communications facilities to send and receive electronic mail between:

Two or more users on the same PS/2 system
Two or more PS/2s with the INmail program installed
A PS/2 system with the INmail program installed and another suitable equipped system (such as an RT) with the INmail program installed.

See "AIX PS/2 Commands" in topic 12.0 for a list of the commands included in the INmail/INed/INnet/INftp package.

INmail:

The **INmail** program extends the capabilities of AIX PS/2 to allow the sending and reading of electronic mail. Each user on the system has a private electronic mailbox for receiving mail from other users, who may exist on other systems using INmail/INed/INnet/INftp.

The INmail program also has a reminder facility that provides the user with the ability to send reminders at specified times, process messages on delivery, start a program at a specified time, or cancel unsent reminders.

The INmail program allows you to select one of several editors for message composition. This includes **INed**, the AIX PS/2 editor (**ed**), or no editor (when sending brief messages).

INed:

The **INed** editor is a high-function full-screen text editor that allows users to edit more than one file at a time, and to execute AIX commands without leaving the editor. It also supports multiple windowing of files.

The INed editor can scroll horizontally and vertically; handle word wrapping; cut and paste blocks of text; and move and copy blocks of text.

INnet:

The **INnet** program provides the communications facilities when two or more AIX PS/2 systems running INmail/INed/INnet/INftp are connected. It permits users on separate, interconnected AIX PS/2 systems to print locally generated output on remote printers.

AIX PS/2 General Information
Message Handling/Processing

The INnet program can route output from one system through one or more different systems, so that there is no need for direct communication links between each of the connected systems.

File Transfer Program (INftp):

The **INftp** component enables you to transfer files interactively between systems, and to enter commands interactively to be executed on remote systems.

Once the communication link with another system has been established, you may send, receive, rename, and delete files on the remote system.

AIX PS/2 General Information
Communication Protocols

9.7.2

Communication Protocols

TCP/IP

AIX PS/2 **TCP/IP** incorporates several communication protocols that permit information exchange between personal computer workstations in peer-to-peer or peer-to-host modes. TCP/IP (Transmission Control Protocol/Internet Protocol) is a host-to-host communications protocol familiar to users of UNIX and other operating systems.

End users can request the following tasks:

Transferring a file between the user and a server, or between two hosts

Relaying mail within or across networks or a subset of a network

Displaying information about problem determination and the network status

Reporting the status of a remote host or user

Connecting and logging in to a remote host

Synchronizing the time across all the hosts in a network

Printing at a remote printer

Executing commands on a remote host

With the appropriate communications adapter hardware, the TCP/IP program can support direct attachment to an Internet Network such as Ethernet or to an IBM Token-Ring network.

See "AIX PS/2 Commands" in topic 12.0 for a list of the commands included in the TCP/IP package.

AIX PS/2 General Information
Communicating with a Host

9.7.3

Communicating with a Host

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|
| Workstation Host Interface Program |
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The AIX PS/2 **Workstation Host Interface Program (WHIP)**, using the PS/2 3270 Connection Adapter in DFT mode, allows you to communicate with a System/370 host system and provides:

3278/79 emulation (**E789**)

High-speed file transfer (**fxfer**)

Application Program Interface (**API**)

E789 Highlights:

Operates as a virtual terminal application, allowing users to switch between AIX PS/2 and host tasks

Up to five concurrent emulation sessions per adapter

Emulation of the following 3270-family workstations

- 3278 model 2
- 3279 model 2A or 2B
- 3279 model S2A or S2B

Character attributes, highlighting, seven-color support

National Language support

Cursor movement extensions such as word delete, word tab, end of line

AIX PS/2 command execution from an emulation session

Screen copy/print capability

3270 printer support

ASCII terminal support

Supports all displays supported by AIX PS/2

Keyboard layout and color redefinition utilities

Distributed emulation via TCP/IP, if TCP/IP is installed

fxfer Highlights:

File transfer between AIX PS/2 and VM/CMS or MVS/TSO host

Queued or immediate transfer

AIX PS/2 General Information
Communicating with a Host

Automatic logon and recover

Character and binary transfer

Optional character translation, for handling file transfers between systems with different national languages

National Language support

Programming interface to file transfer, allowing transfers to be initiated by programs

API Highlights:

Support for AIX PS/2, VM/CMS, and MVS/TS

Pascal, C, and FORTRAN support for AIX PS/2

Message-level S/370 host support (VM/CMS and MVS/TSO)

Optional translation, for systems with different national languages

High-function Application to Application Interface

Access to emulator presentation space (3270 to application mode)

AIX Access for DOS Users

IBM **AIX Access for DOS Users** allows DOS users connected to PCs and PS/2s to take advantage of the AIX PS/2 storage facilities and to access data and programs that are maintained under AIX PS/2. (AIX Access for DOS Users is installed on the attached PCs and PS/2s.)

Files may be transferred transparently between the disk drivers of the DOS-based workstation and the AIX file system. The AIX file system appears to DOS and to applications or users running DOS as an additional virtual disk drive.

In addition to supporting data sharing, AIX Access for DOS Users provides AIX printer access, terminal emulation, and a PC-based **vi** editor for use under DOS. AIX file security and locking is extended to DOS users connected via AIX Access to DOS Users.

A PC or PS/2 user running DOS 3.3 can access the AIX PS/2 host via Ethernet, IBM Token-Ring, or asynchronous connections.

Note: TCP/IP is a prerequisite for network attachment.

X-Windows for IBM DOS

IBM **X-Windows for IBM DOS** allows a PC AT or PS/2 user running DOS 3.3 to create and manage windows running AIX X-Windows applications at a remote host.

Note: On an AIX PS/2 host system, X-Windows for IBM DOS requires AIX PS/2 X-Windows and AIX PS/2 TCP/IP.

AIX PS/2 General Information

X.25 Support

9.7.5

X.25 Support

X.25

AIX PS/2 **x.25** allows a properly configured PS/2 to attach as Data Terminal Equipment (DTE) to an X.25 packet-switched data network. X.25 is supported on a single port or on two ports simultaneously.

AIX PS/2 X.25 supports Recommendation X.25 International Telegraph and Telephone Consultative Committee (CCITT) 1980 and Recommendation X.25 CCITT 1984. CCITT X.25 defines three levels of the DTE interface: physical, link, and packet. The physical interface supported include RS-232-C, X.21bis, and V.24. Line speeds up to 19.2 Kilobits per second will be supported. The link-level access procedure supported is HDLC LAPB protocol. Packet-level functions include support for 64 virtual circuits and connection to X.25 networks through either TCP/IP or Transparent Computing Facility (TCF).

This product is designed to meet Department of Defense Network (DDN) certification for X.25 and X.25 to TCP/IP.

ASCII terminals attached to an X.25 packet-switched data network can send ASCII data to the PS/2. The ASCII data is available to other AIX systems via TCF or TCP/IP. When the PS/2 is part of a TCF cluster, any node in the TCF cluster can establish a connection over an IBM Token-Ring or Ethernet LAN through the PS/2 to the X.25 network. Using TCP/IP Telnet support, users on other systems can log in to the PS/2 for access to the X.25 network.

An application program interface is provided so that programmers can write code to support private protocols.

AIX PS/2 General Information
Application Development

10.0

Application Development

Subtopics

10.1 Application Development Toolkit

10.2 VS FORTRAN, VS Pascal, C Language

10.3 Text Formatting System

10.4

AIX PS/2 General Information
Application Development Toolkit

10.1

Application Development Toolkit

AIX PS/2 General Information
VS FORTRAN, VS Pascal, C Language
VS FORTRAN, VS Pascal, C Language

10.2

AIX PS/2 General Information

10.4

Subtopics

- 10.4.1 Programming Tools
- 10.4.2 FORTRAN
- 10.4.3 Pascal
- 10.4.4 C Languages
- 10.4.5 Creating Documents

AIX PS/2 General Information

Programming Tools

VS Pascal, and C Language compilers. The DBX debugger provides the following functions:

Breakpoints on subroutines, lines, variables, and addresses

Trace support

Argument passing and standard I/O redirection

Source file manipulation with user's choice of editor

A customized environment with alias facilities

The Application Development Toolkit **assembler** provides:

Compatibility with the UNIX System V assembly language for the Intel 80386

Macro assembly, repeat block, and conditional assembly directives

High-speed assembly

The Application Development Toolkit also provides a symbolic disassembler with the following features:

Disassembles compiled VS FORTRAN, VS Pascal, and C Language programs into UNIX-style assembler mnemonics

Annotation with source line information

Disassembled code can be reassembled

Shared-library support in AIX PS/2, in conjunction with the Application Development Toolkit **shlib2** command, allows application developers to place common routines in a shared object library. Object modules from this library are referenced, but not included, when a program's load module is link-edited. The object modules are only loaded when the program is executed.

This facility can be used to reduce the size of the load modules in an application or to ensure that the most current version of a routine is used by all programs.

See "AIX PS/2 Commands" in topic 12.0 for a list of commands included in the Application Development Toolkit package.

AIX PS/2 General Information
FORTRAN

10.4.2

FORTRAN

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| VS FORTRAN |
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AIX PS/2 **VS FORTRAN** is a high-level programming language that provides a high-performance, optimizing VS FORTRAN compiler. It accepts source code in the following FORTRAN languages:

S/370 VS FORTRAN Version 2, Release (17)
RT VS FORTRAN Version
ANSI-77 standard for FORTRAN (16)
VAX FORTRAN Version (17)

AIX PS/2 VS FORTRAN compiles programs that comply with Systems Application Architecture (SAA) Level 2.

Additional highlights include:

Optimized object code
Fast compilation
AIX system call interface library
Supports VS Pascal and C interface
Supports **dbx** symbolic debugger
Intel 80387 floating-point and floating-point emulation support
Supports the bit-string manipulation functions described in
ANSI/ISA-S61.1

AIX PS/2 VS FORTRAN performs the following optimizations (when selected at compile time) to improve performance:

Efficient register usage
Dead code elimination
Common sub-expression elimination
Constant folding
Code motion for loop invariant
Strength reduction
Subscript optimization
Copy propagation
Algebraic simplification
Flow of control optimization
Elimination of redundant load/store sequence

Note: AIX PS/2 VS FORTRAN requires the AIX PS/2 Application Development Toolkit.

(16) ANSI X3.9-1978, American National Standard FORTRAN Computer Programming Language

AIX PS/2 General Information

Pascal

10.4.3

Pascal

VS Pascal

AIX PS/2 **VS Pascal** is a high-level programming language that provides a high-performance, optimizing VS Pascal compiler. It accepts source code in the following Pascal languages:

S/370 VS Pascal Version 1, Release (17)
RT VS Pascal Version
ANSI-83 standard for Pascal (18)

Additional highlights include:

Optimized object code
Fast compilation
AIX system call interface library
Supports VS FORTRAN and C interface
Supports **dbx** symbolic debugger
Intel 80387 floating-point and floating-point emulation support

AIX PS/2 VS Pascal performs the following optimizations (when selected at compile time) to improve performance:

Efficient register usage
Dead code elimination
Common sub-expression elimination
Constant folding
Code motion for loop invariant
Strength reduction
Subscript optimization
Copy propagation
Algebraic simplification
Flow of control optimization
Elimination of redundant load/store sequence

Note: AIX PS/2 VS Pascal requires the AIX PS/2 Application Development Toolkit.

(17) With minor restrictions

(18) ANSI/IEEE 770 X3.97-1983, American National Standard
FORTRAN Computer Programming Language

AIX PS/2 General Information
C Languages

10.4.4

C Languages

C Language

AIX **C Language** is a high-level programming language that provides a high-performance, optimizing C compiler. It accepts source code in the following C languages:

RT Portable (19)
RT AIX
UNIX System V, Release 2 (19)

AIX C Language compiles programs that comply with Systems Application Architecture (SAA) Level 1, and includes additional tools commonly used in the development of C language applications, such as **lint**.

Additional highlights include:

Optimized object code
Fast compilation
Supports VS FORTRAN and VS Pascal interface
Supports **dbx** symbolic debugger
Intel 80387 floating-point and floating-point emulation support

AIX C language performs the following optimizations (when selected at compile time) to improve performance:

Efficient register usage
Dead code elimination
Common sub-expression elimination
Constant folding
Code motion for loop invariant
Strength reduction
Subscript optimization
Copy propagation
Algebraic simplification
Flow of control optimization
Elimination of redundant load/store sequence

Note: AIX PS/2 C language requires the AIX PS/2 Application Development Toolkit.

Extended C Language

The IBM AIX PS/2 **Extended C Language** is a high-performance optimizing compiler that produces object code for execution on certain IBM PS/2

AIX PS/2 General Information
C Languages

Models under the AIX PS/2 Operating System Version 1.2.1. It supports the ANSI Standard for the C Language. It supports double-byte characters in C strings.

(19) With minor restrictions

AIX PS/2 General Information
Distributed Processing

11.0

Distributed Processing

Subtopics

11.1 Transparent Computing Facility

11.2 Network File System

11.3

AIX PS/2 General Information
Transparent Computing Facility
Transparent Computing Facility

11.1

AIX PS/2 General Information
Network File System
Network File System

11.2

AIX PS/2 General Information

11.3

Subtopics

11.3.1 Single System Image

11.3.2 Attaching Other UNIX Systems

AIX PS/2 General Information
Single System Image

11.3.1

Single System Image

Transparent Computing Facility

AIX PS/2 **Transparent Computing Facility (TCF)** allows AIX PS/2 in a multiple-node networked environment to appear to users as a single host system. Up to 31 AIX systems can be connected (*clustered*) via Ethernet or IBM Token-Ring into a single system image. TCF clusters can be connected via TCP/IP or NFS to allow additional sharing of data. Highlights of TCF include:

Automatic dynamic reconfiguratio

TCF allows networked processors to be added or removed without disturbing overall network function.

File transparenc

Users and programs don't have to know where files are stored.

Single file system hierarch

In a networked TCF environment, there is a single root directory.

Single user name spac

In a networked TCF environment, there is a single **passwd** file.

Distributed tasking, signals, and pipe

TCF allows the initiation of processes across machine boundaries, and allows communication across machine boundaries through both signals and pipes.

Remote device

TCF allows processes on one networked processor to access devices on a different networked processor.

Replicated and synchronized file system

TCF allows for one primary copy plus one or more replicated copies of any file system. Networked processors can access any such file system, even if those processors do not have a copy of the file system. Update synchronization is maintained automatically.

Host systems that return to online status and that maintain replicated copies of one or more file systems receive updated files automatically. If the primary copy of a file system exists on a host that becomes unavailable, read-only access to any replicated copies is maintained until the primary copy is again available.

Mixed machine type

AIX PS/2 General Information

Single System Image

TCF supports connection of AIX PS/2 and AIX/370 machines within a network.

Automatic load module selectio

Commands and application programs may reside in the system in more than one binary format. Selection of the required format is done automatically at execution time, and is transparent to the user or the invoking application. Load modules need not exist in all formats; commands are executed automatically on the appropriate host processor if no binary image exists on the processor on which the command was issued.

Explicit load module selectio

Command and application program execution on a given processor or processor type may be requested explicitly, allowing users to match tasks with available resources or data.

AIX PS/2 General Information
Attaching Other UNIX Systems

11.3.2

Attaching Other UNIX Systems

Network File System

AIX PS/2 **Network File System (NFS)** allows a properly configured AIX PS/2 to participate in an NFS local area network. With NFS, non-IBM mainframes and workstations can be integrated with AIX systems or clusters. This integration ability allows resource sharing while still supporting the specific needs of each user.

Highlights of AIX Network File System include:

- Support for Sun Microsystems, Inc. NFS 3.2 protocol

- Transparent access to remote file

- Support for

- Remote Procedures Calls (RPC)
- External data representation
- NIS (network information service)
- Remote execution

- NFS client and server support

AIX systems and non-IBM mainframes and workstations can also be networked using TCP/IP (see page 18).

Note: AIX PS/2 Network File System requires AIX PS/2 TCP/IP.

AIX PS/2 General Information

AIX PS/2 Commands

12.0

AIX PS/2 Commands

Subtopics

12.1 Listed by package

12.2

AIX PS/2 General Information

Listed by package

12.1

Listed by package

AIX PS/2 General Information

12.2

AIX PS/2 Operating System

The base package includes the following commands:

adduser
apply
apropos
ar
awk
axeb
backup
banner
basename
bellmail
bj
cancel
cat
catman
cd
chfn
chgrp
chmod
chown
chparm
chsh
ckprereq
cleanloc
cleanup
clear
clri
config
copy
cp
cpio
cron
crontab
csch
ctab
date
dcopy
defkey
del
delete
devices
devnm
df
dfsch

AIX PS/2 General Information

di
diff
dirname
display
dmesg
dosdel
dosdir
dosread
doswrite
dspcat
dspmsg
du
ebxa
echo
edit
egrep
env
errdead
errdemon
errpd
errpt
errstop
errupdate
ex
expr
expreserve
exrecover
false
fastboot
fasthalt
fdformat
fgrep
fmt
format
fsck
fsdb
gencat
getopt
getty
grep
groups
halt
head
help
hftinit
hftsmproc
hostname
i370
i386
icaload
icareset
id
ifconfig
init
installp
insvl
inuconfig
inudocm
inurecv
inurest

AIX PS/2 General Information

inusave
inuupdt
inuvlid
ipcrm
ipcs
keyboard
kill
killall
last
lconfig
ld
learn
li
line
link
ln
locator
logger
login
logname
look
lp
lp(backend)
lpq
lpr
lprm
lpstat
ls
Mail
mail
mailq
mailstats
maint
make
makemotd
man
MasterInstall
mbsdump
mbsgen
mdrc
mesg
minidisks
mkcatdefs
mkdir
mkfs
mknod
mkpasswd
mount
move
mt
mv
mmdir
ncheck
newaliases
newgfs
newgrp
newkernel
nohup
od
open

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osconfig
passwd
pdelay
pdisable
penable
pf
pg
phold
piobe
print
printenv
printlocal
printspath
printxvers
proto
ps
pshare
pstart
pstat
pwck
pwd
qapp
qdaemon
qinvoke
qproc
rc
rdrdaemon
reboot
red
restore
rev
rm
rmail
rmdir
rscsmail
rscssrvr
Rsh
runcat
runcat
sed
sendbug
setmaps
setmnt
sh
shutdown
skulker
sleep
sort
sound
STTY
stty
su
sum
sushell
swapoff
swapon
sync
syncfsmmap
syslogd
tab

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tapechk
tar
tctl
telinit
termdef
test
tlog
tlogger
touch
tput
tr
trace
trcrpt
trcstop
trcupdate
true
tty
u370
umask
umount
uname
uninst
unlink
unmount
untab
updatep
uptime
users
users (BSD)
uvcp
vedit
vi
view
vipw
vrm2rtfont
vucp
w
wall
wc
whatis
whereis
which
who
whoami
write
wump
xa370
xargs

Operating System Extensions

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The Operating System Extensions package includes the following commands:

300
300s
4014
450
ac
acctcms
acctcom
acctcon1
acctcon2
acctdisk
acctdusg
acctmerg
accton
acctprc1
acctprc2
acctwtmp
actman
ali
anno
ap
arithmetic
at
atq
atrm
back
batch
bc
bdiff
bfs
biff
bugfiller
burst
cal
calendar
chargefree
chroot
ckpacct
cmp
colrm
comm
comp
compress
comsat
conflict
craps
crash
crypt
csplit
ct
cu
cut
dc
diff3
dircmp
diskusg

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dist
dodisk
dp
dumpbsd
dumpfs
ed
edconfig
edquota
enroll
expand
factor
ff
file
find
fish
flcopy
fold
folder
folders
fortune
forw
from
fsplit
fuser
fwtmp
gettext
graph
greek
grpck
hangman
inc
install
install (BSD)
install-mh
istat
join
lastcomm
lastlogin
leave
lock
lptest
makekey
mark
mhl
mhmail
mhpath
mklost+found
monacct
moo
more
msgchk
msgs
msh
newform
news
next
nice
nl
nulladm
number

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Nutry
pack
packf
page
pagesize
paste
pcat
pick
plot
post
pprint
pr
prctmp
prdaily
prev
prompter
prtacct
puttext
quiz
quot
quota
quotacheck
quotaoff
quotaon
rcvdist
rcvpack
rcvstore
rcvtty
rdump
refile
remove
renice
repl
repquota
reset
restorebsd
rmf
rmm
rmt
rrestore
runacct
sa
sa1
sa2
sadc
sag
sar
savecore
scan
script
sdiff
send
sendmail
show
shutacct
slocal
sortm
spline
split
splp

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spost
startup
strings
sysline
tabs
tail
tcopy
tee
tic
time
timex
tip
tr (BSD)
tset
tsort
ttt
turnacct
uncompress
unexpand
uniq
units
unpack
update
uuccheck
uucico
uucleanup
uucp
uucpd
uudecode
uuencode
uukick
uulog
uuname
uupick
uusched
uustat
uuto
Uutry
uutry
uux
uuxqt
vacation
vgrind
vmh
whatnow
whom
window
wtmpfix
xget
xsend
yes
zcat
ext

-----+
| |

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DOS Merge

The DOS Merge package includes the following commands:

aix2dos
copy(merg)
dos
dos2aix
dosadmin
dosboot
dosexec
dosinstall
dosopt
dossvr
homedir
lnfile
lp(merge)
on(merge)
printer
quit
syscopy
udir
mrg

INmail/INed/INnet/INftp

The INmail/INed/INnet/INftp package includes the following commands:

atalk
bellpost
connect
delrem
ftp
ftpmail
ftpsrvr
ftpuser
mkalias

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mksalias
mkssites
qdisable
qenable
qftp
qhold
qstart
qstat
readmail
remind
rftpsrvr
rmtcp
rmtprint
rwaxsrvr
sendmail
spost
to
uumail
uumove
waxsrvr

-----+
|
| TCP/IP |
|
|-----+
|

The TCP/IP package includes the following commands:

arp
finger
fingerd
ftp
host
hostid
inetd
lpd
lprbe
named
netconfig
netstat
ping
rcp
rdist
remsh
rexec
rexecd
rlogin
rlogind
route

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routed
rsh
rshd
ruptime
rwho
rwhod
talk
talkd
telnet
telnetd
tftp
tftpd
timed
timedc
tn
tn3270
whois
xftp

Application Development Toolkit

The Application Development Toolkit package includes the following commands:

adb (00)
admin
as
bs
cb
cc
cdc
cflow
comb
cpp
ctags
cxref
dbx
delta
dis
dump
fpr
gcore
genxlt
get
gprof
indent
lex
lint

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eqn
explain
hashcheck
hashmake
hp
hunt
hyphen
indxbib
inv
invert
listrefs
lookbib
lookup
mant
mm
mmt
mvt
neqn
nroff
prfl
proff
ptroff
ptx
refer
roffbib
soelim
sortbib
spell
spellin
spellout
style
tbl
tc
troff
ul

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Publications

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Manuals are packaged with the separate AIX PS/2 products, thereby providing you with only the information you need for successful implementation of the programs you purchase.

The following documents make up the AIX PS/2 library. Use the numbers listed here when ordering documentation only.

AIX Library Guide, Glossary, and Master Index, SC23-2324, describes the publications in the AIX Operating System library and contains a glossary of terms used throughout the library. This book also includes a master index to the contents of each of the publications in the library.

Installing and Customizing the AIX PS/2 Operating System, SC23-2290, provides step-by-step instructions for installing the AIX PS/2 Operating System and related programs. This book also shows how to customize the operating system to suit the user's specific needs and work environment.

AIX Access for DOS Users Administrator's Guide, SC23-2042, explains how to install and administer the AIX Access for DOS Users program on the IBM PS/2, RT, and System/370 computers running the AIX Operating System with the AIX DOS Server. It covers the responsibilities for installation, daily operation, and maintenance of the AIX Access program.

AIX Access for DOS Users User's Guide, SC23-2041, describes the AIX Access for DOS Users program and shows how to use the file services of an AIX host while running DOS applications.

AIX C Language Reference, SC23-2058, describes the C programming language and contains reference information for writing programs in C language that run on the AIX Operating System.

AIX C Language User's Guide, SC23-2057, describes how to develop, link, and execute C language programs. This book also describes the operating dependencies of C language and shows how to use C language-related software utilities and other program development tools.

AIX Commands Reference, SC23-2292 (Vol. 1) and SC23-2184 (Vol. 2), lists and describes the AIX/370 and AIX PS/2 Operating System commands.

AIX Guide to Multibyte Character Set (MBCS) Support, GC23-2333, explains the basic concepts of AIX multibyte character set support and refers to other AIX books that contain more detailed information.

AIX Messages Reference, SC23-2294, lists messages displayed by the AIX Operating System and explains how to respond to them.

AIX Programming Tools and Interfaces, SC23-2304, describes the programming environment of the AIX Operating System and includes information about operating system tools that are used to develop, compile, and debug programs.

AIX TCP/IP User's Guide, SC23-2309, describes the features of TCP/IP

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and shows how to install and customize the program. It includes reference information on TCP/IP commands that are used to transfer files, manage the network, and log into remote systems.

AIX Technical Reference, SC23-2300 (Vol. 1) and SC23-2301 (Vol. 2), describes the system calls and subroutines a programmer uses to write application programs. This book also provides information about the AIX Operating System file system, special files, miscellaneous files, and the writing of device drivers.

AIX VS FORTRAN Reference, SC23-2050, describes the FORTRAN programming language as implemented on AIX RT, AIX PS/2, and AIX/370. This book describes all of the standard features of VS FORTRAN as well as the enhanced functions and capabilities incorporated into IBM AIX VS FORTRAN.

AIX VS FORTRAN User's Guide, SC23-2049, shows how to develop and execute FORTRAN programs on AIX RT, AIX PS/2, and AIX/370. This book also explains how to compile and execute programs that contain sections of code written in the VS Pascal and C programming languages.

AIX VS Pascal Reference, SC23-2054, describes the VS Pascal programming language as implemented on the IBM PS/2 or RT with the AIX Operating System installed. This book describes all of the standard features of Pascal as well as the enhanced functions and capabilities incorporated into IBM AIX VS Pascal.

AIX VS Pascal User's Guide, SC23-2053, shows how to develop and execute Pascal programs on the IBM PS/2 and RT using the AIX Operating System. This book also explains how to compile and execute programs that contain sections of code written in the VS FORTRAN and C programming languages.

The following publications describe the use of the X-Windows license program:

- *AIXwindows Style Guide*, SC23-2250
- *AIXwindows User's Guide*, SC23-2251
- *AIXwindows Configuration Guide*, SC23-2280
- *AIXwindows Programming Guide*, SC23-2233
- *AIXwindows Programming Reference*, SC23-2263

AIX PS/2 DOS Merge User's and Administrator's Guide, SC23-2045, shows how to use DOS in the AIX environment, including running DOS and AIX programs simultaneously and running AIX commands from the DOS environment. It also shows how to install the DOS Merge software and how to perform essential system maintenance activities, such as adding user accounts, backing up the file system, and setting up terminals.

AIX PS/2 INed, SC23-2001, shows how to use the INed editor to create, access, and store files. This book also includes reference information on INed commands and a listing of INed error messages.

AIX PS/2 INmail/INnet/INftp User's Guide, SC23-2076, describes the INmail/INnet/INftp/Connect programs and shows how to use these programs to send mail to and receive mail from local and remote

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computer systems. This book also shows how to transfer files to and from other computer systems installed on the network.

AIX PS/2 Interface Library Reference, SC23-2051, contains information about the library of system calls available with IBM AIX VS Pascal and IBM AIX VS FORTRAN as implemented for use with the IBM AIX PS/2 Operating System.

AIX PS/2 Keyboard Description and Character Reference, SC23-2037, describes the characters and keyboards supported by the AIX PS/2 Operating System. This book also provides information on keyboard position codes, keyboard states, control code points, code-sequence processing, and non-spacing character sequences.

AIX PS/2 Text Formatting Guide, SC23-2044, describes the text formatting utilities available on the PS/2 and shows how to format text with NROFF and TROFF. This book also shows how to use the **vi** editor to create, revise, and store files.

AIX PS/2 Usability Services Reference, SC23-2039, lists and describes Usability Services commands.

AIX PS/2 Usability Services User's Guide, SC23-2038, shows how to create and print text files, work with directories, start application programs, and do other basic tasks with Usability Services.

Managing the AIX Operating System, SC23-2293, describes such system-management tasks as adding and deleting user IDs, creating and mounting file systems, backing up the system, repairing file system damage, and setting up an electronic mail system and other networking facilities.

Using the AIX Operating System, SC23-2291, shows the beginning user how to use AIX Operating System commands to do such basic tasks as log in and out of the system, display and print files, and set and change passwords. It includes information for intermediate to advanced users about how to use communication and networking facilities and write shell procedures.

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Hardware Requirements

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Subtopics

14.1.1 Minimum Configuration

14.1.2 Supported Hardware

AIX PS/2 General Information
Minimum Configuration

14.1.1

Minimum Configuration

To run the AIX PS/2 Operating System base offering, you need an IBM PS/2 with at least the following requirements:

44 MB fixed dis

2 MB memor

Refer to *Installing and Customizing the AIX PS/2 Operating System*, SC23-2290, for information on the maximum supported configuration and the system resources required for the various packages. Japanese language users need a PS/2 Model 55 with X-Windows software to enter Japanese characters to the system. Model 5550 (a terminal) functions without X-Windows.

AIX PS/2 General Information
Supported Hardware

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Supported Hardware

Note: As new PS/2 hardware becomes available, its compatibility with the AIX PS/2 Operating System will be defined in the hardware's product release announcements.

The AIX PS/2 Operating System supports the following:

IBM PS/5

- IBM 5502-TFB
- IBM 5551-VOB
- IBM 5571-TOA
- IBM 5571-TOB
- IBM 5571-TOC
- IBM 5571-VOB
- IBM 5571-ZOC

IBM PS/2 Model 55 SX (IBM 8555-061

IBM PS/2 Model 65 5

- IBM 8565-061
- IBM 8565-121
- IBM 8565-321

IBM PS/2 Model P70 38

- IBM 8573-061
- IBM 8573-121

IBM PS/2 Model 7

- IBM 8570-A21
- IBM 8570-A61
- IBM 8570 B21
- IBM 8570-B61
- IBM 8570-E61
- IBM 8570-061
- IBM 8570-121
- PS/2 486/25 Power Platform

IBM PS/2 Model P75 48

- IBM 8573-161
- IBM 8573-401

IBM PS/2 Model 8

- IBM 8580-A16
- IBM 8580-A21
- IBM 8580-A31
- IBM 8580-041
- IBM 8580-071
- IBM 8580-081
- IBM 8580-111
- IBM 8580-121
- IBM 8580-161
- IBM 8580-311
- IBM 8580-321

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Supported Hardware

IBM PS/2 Model 90-X

- IBM 8590-AJ5
- IBM 8590-AJ9
- IBM 8590-AK9
- IBM 8590-AKD

IBM PS/2 Model 90 XP-48

- IBM 8590-0J5
- IBM 8590-0J9
- IBM 8590-0KD

IBM PS/2 Model 95-X

- IBM 8595-AJ9
- IBM 8595-AJD
- IBM 8595-AK9
- IBM 8595-AKD

IBM PS/2 Model 95-XP XP-48

- IBM 8595-0J9
- IBM 8595-0JD
- IBM 8595-0KD

IBM 7561 Industrial Computer Model 11

IBM 7562 Industrial Computer Model 11

IBM 7568 Industrial Computer Model 15

Fixed storage, up to the maximum supported by hardware

Diskette (3.5", 1.44 MB)

Keyboard (except Hebrew and Arabic)

Standard planar attachment

- Serial port
- Parallel port
- Pointing device port

Display

- 6091 19" Color Display
- 7544 Industrial Graphics Display
- 7554 19" Color Display
- 8503 12" Monochrome Display
- 8507 Monochrome Display
- 8512 14" Color Display
- 8513 12" Color Display
- 8514 16" Color Display in any of the VGA modes, up to 1024x768
- 8515 14" Color Display

Printer

- 3812 Page Printer, Models 1 and 2

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Supported Hardware

- 3816 Page Printer, Models 01D and 01S
- 3852 Color Jet Printer, Model 2
- 4019 Laser Printer
- 4072 Exec Jet
- 4201 Proprinter. Models 1, 2, and 3
- 4202 Proprinter XL, Models 1, 2, and 3
- 4207 Proprinter X24
- 4208 Proprinter XL24
- 4216 Personal Pageprinter II
- 4224 Wire Matrix Printer
- 4234 Dot Brand Printer
- 5152 Graphics Printer
- 5182 Color Printer
- 5201 Quietwriter, Models 1 and 2
- 5202 Quietwriter
- 5204 Quickwriter
- 5223 Wheelprinter E, Model 1

Plotter

- 6180 Color Plotter
- 6182 Color Plotter
- 6184 Color Plotter
- 6185 Color Plotter
- 6186 Color Plotter
- 7371 Color Plotter
- 7372 Color Plotter
- 7374 Color Plotter
- 7375 Color Plotter, Models 1 and 3

Adapters and Storage Medi

- Dual Async Adapter/A (50-19.2K bits per second)
- Token-Ring Network Adapter/A
- Token-Ring Network/16-4 Adapter/A
- 3270 Connection Adapter
- 300/1200/2400 Internal Modem/2400/A
- CD-ROM
- 5.25" External Diskette Drive Adapter/A
- 5.25" External Diskette Drive (360 KB)
- 5279 Internal Tape Backup Unit
- 6157 Tape Drive Adapter
- 6157 Streaming Tape Drive
- 3Com Etherlink 3C523 Adapter
- Display Adapter 8514/A (VGA modes only)
- Ungermann-Bass NICps/2 Adapter 1542
- IBM PS/2 Image Adapter/A
- IBM PS/2 Adapter/A for Ethernet networks
- IBM SCSI Adapter
- IBM SCSI Adapter (with cache)
- Realtime Interface Co-Processor Multiport/2
 - Four Port RS-232 Interface Board
 - Eight Port RS-232 Interface Board
 - Eight Port RS-422 Interface Board
 - Eight Port RS-232/422 Interface Board (4 & 4)
- PS/2 Wizard Adapter

Terminal

- 3151 ASCII Display Station

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Supported Hardware

- 3161 ASCII Display Station
- 3162 ASCII Display Station
- 3163 ASCII Display Station (3161 mode)
- 3164 ASCII Display Station
- IBM personal computers using 3101 emulation:
 - IBM Personal Computer
 - IBM Personal Computer XT
 - IBM Personal Computer AT
 - IBM Portable Personal Computer
 - IBM Convertible Personal Computer
 - IBM PS/2 Models 50 and 60
 - ASCII terminals that adhere to ANSI 3.64 protocol as implemented by DEC VT100 and VT220 or equivalent
- WYSE 60

Othe

- 80387 Math Co-Processor
- 8387 SX Math Co-Processor
- Mouse

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Licensing and Ordering

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Licensing and Ordering

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15.1.1 Licensing

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AIX PS/2 General Information

Licensing

15.1.1

Licensing

These programs are licensed under the terms and conditions of the IBM Program License Agreement. A copy of the agreement is included in the program package.

AIX PS/2 General Information
Ordering

15.1.2

Ordering

Use the following program numbers to order the individual AIX PS/2 packages (which include the programs and documentation):

AIX PS/2 Operating System (program number 5713-AEQ)

AIX PS/2 Operating System Extensions (5713-AFH)

AIX PS/2 DOS Merge (5713-AEY)

AIX PS/2 X-Windows (5713-AEX)

AIXwindows Environment for PS/2 (5601-439)

IBM X-Windows for DOS (5765-025)

AIX PS/2 Usability Services (5713-AFE)

AIX PS/2 INmail/INed/INnet/INftp (5713-AET)

AIX PS/2 Workstation Host Interface Program (5713-AER)

AIX PS/2 TCP/IP (5713-AEW)

AIX PS/2 Transparent Computing Facility (5713-AFK)

AIX PS/2 Network File System (5713-AFG)

AIX PS/2 X.25 (5601-202)

AIX PS/2 Application Development Toolkit (5713-AEP)

AIX PS/2 General Information
Ordering

AIX Access for DOS Users (5709-030)

AIX PS/2 VS FORTRAN (5713-AFA)

AIX PS/2 VS Pascal (5713-AEZ)

AIX PS/2 C Language (5713-AFC)

AIX PS/2 Extended C Language (5621-143)

AIX PS/2 VS COBOL Run Time (5706-035)

AIX PS/2 COBOL Compiler (5706-036)

AIX PS/2 Text Formatting System (5713-AFD)

AIX PS/2 Personal graPHIGS Programming Interface (5601-540)

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Example of an AIX System

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Example of an AIX System

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16.1 Tying together AIX product capabilities

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Tying together AIX product capabilities

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Tying together AIX product capabilities

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16.2

The AIX family of products provides a wide range of function and capabilities. AIX products span three hardware platforms and allow integration of processors in various hardware classes. Supported software products include different languages, communications packages, numerous graphics applications, data base systems, operating system integration packages for DOS, AIX, VM, and many different types of application programs. In addition, DOS application programs can be made available to AIX/370 users.

The following discussion shows how a system might be built from AIX products.

An initial system is configured with AIX Access for DOS Users in the PCs. This product makes a System/370 processor available to DOS users for both batch and interactive use. PC users can use their DOS systems as front ends to the AIX/370 machine, and can start tasks on the 370 machine from DOS. Data can be shared. DOS files can be stored on the 370 and DOS application programs can have transparent access to the data or can execute the files. In addition, users can use **vi** or another DOS-based editor for local editing of data (stored either on the DOS machine or on the 370).

Host print services are also available to the DOS machines, through Ethernet or IBM Token-Ring. This configuration limits users to ASCII-only interactions and assumes that all users have a DOS machine available to them to access the system.

ASCII terminals can also be used to support non-Japanese users. If ASCII terminals are the only user access path, then a PS/2 can be connected to the System/370 via a LAN, using AIX PS/2 with TCF. This will produce a transparent cluster in which non-Japanese users at ASCII terminals perform editing and other highly interactive functions on the PS/2. As the interactive load increases or the number of non-Japanese user connections increases, additional PS/2 machines can be added to the cluster to support the increased load.

Users who prefer a windows-oriented interface to the system may gain access through X-Windows software. Many Japanese users will want such an interface because the PS/55s of the cluster use X-Windows to display Japanese characters.

X-Windows users have several options. They can obtain the *AIX DOS X Server* package and run it on the DOS machines. Or they can obtain PS/2s or RTs with AIX and X-Windows support. Either of these options is entirely sufficient for an ASCII-only user, and either option can display Japanese characters sent by the system (provided the receiving workstation is equipped with the needed Japanese fonts).

But any Japanese user who wishes to interact fully with the system in Japanese characters will require either a PS/55 with AIX PS/2 Release 1.2.1 and X-Windows support or an IBM 5550 XT-class machine. Both of these units include Japanese keyboards which will accept Japanese Language responses from the user in Katakana, Hiragana or Romaji characters.

All of the X-Windows options above require an Ethernet or IBM Token-Ring LAN interface to exchange the data. The IBM 5550 uses a ROM-based Japanese support system and does not need X-Windows; it can function

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through a serial line.

If a PS/2 is selected, the AIX PS/2 TCF package can also be used. This system of the PS/2 and the 370 machines will make additional applications available to the user community, because the two hardware bases have different applications.

X-Windows applications can place a heavier load on systems than ASCII terminals connected to AIX. As a configuration's load grows, the Transparent Computing Facility can make it possible to add computing resources with minimal impact to the existing hardware base.

Using the AIX TCP/IP packages and the appropriate LAN or LANs, data can be exchanged with other TCF clusters, other AIX machines, or other UNIX operating system machines. Using **telnet**, **rsh**, or **rlogin** allows potential access to other TCP/IP machines.

By using AIX Distributed Services or AIX Network File System, data can be shared between clusters or hosts over an Ethernet or IBM Token-Ring LAN. NFS may communicate with machines other than AIX machines. However, note that NFS does not provide all the function of Distributed Services. Using Distributed Services between AIX clusters or machines provides an intercluster data exchange that can span administrative boundaries and provide more security controls than NFS.

Host print services are also available to the DOS machines through Ethernet or IBM Token-Ring. These configurations limit users to ASCII-only interactions and assume that all users have a DOS machine available to them for access to the system.

ASCII terminals can also be used to support non-Japanese users. If ASCII terminals are the only user access path, then a PS/2 can be connected to the System/370 over a LAN, using AIX PS/2 with TCF. This produces a transparent cluster in which non-Japanese users at ASCII terminals perform editing and other highly interactive functions on the PS/2. As the interactive load increases or the number of non-Japanese user connections increases, additional PS/2 machines can be added to the cluster to support the increased load.

Users who prefer a windows-oriented system interface can use the X-Windows software. Japanese users may want this interface because the PS/55s in the cluster can use X-Windows to display Japanese characters.

X-Windows users have several options. They can obtain the AIX DOS Server package and run it on the DOS machines, or they can obtain PS/2s or RTs with AIX and X-Windows support. Either of these options suffices for a European language user and either option displays Japanese characters sent by the system, so long as the receiving display station is equipped with the necessary Japanese fonts.

But any Japanese user who wishes to interact fully with the system in Japanese must have either a PS/55 with AIX PS/2 Version 1.2.1 and X-Windows, or an IBM 5550 XT-class machine. Both of these units include Japanese keyboards that accept Japanese language responses from the user in Katakana, Hiragana, or Romaji input formats.

All of the X-Windows options described above require an Ethernet or IBM Token-Ring LAN interface to exchange the data. The IBM 5550 uses a ROM-based Japanese support system and does not need X-Windows; it can function through a serial line.

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As the processing load on the base cluster grows, machines can be added or replaced in the cluster.

This discussion only partially addresses the capabilities of the AIX family, but shows some examples of how the products can be used as building blocks of a powerful, diverse, and effective system.

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