



AT&T

**UNIX[®] System V/386
Release 3.2**

Product Overview/
Documentation Roadmap

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Introduction

Chapter 1: INTRODUCTION

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Introduction

Purpose and Scope

The *Product Overview* part of this document presents an overview of AT&T UNIX System V/386 and describes the basic structure and benefits of the UNIX operating system. It is divided into the following chapters:

- Chapter 1, "Introduction," presents an overview of AT&T UNIX System V/386.
- Chapter 2, "Key Elements of the UNIX System," presents an overview of the UNIX System describing the structure and components that comprise the operating system. It also describes the benefits a user may realize from using the UNIX System.
- Chapter 3, "Features of AT&T UNIX System V/386 Release 3.2," describes the features and documentation unique to AT&T UNIX System V/386 Release 3.2.
- Glossary, contains a list of terms and their definitions as used in this document.

Audience

The audience for this document includes current and potential users of AT&T UNIX System V/386 Release 3.2.

Important terms are explained as they are introduced. For a description of terms not explained in text, see the Glossary. Most features are described in general terms. Some features are aimed at a more technical audience and may require an understanding of concepts in communications, networking, or programming for which explanations are beyond the scope of this document.

Overview

AT&T UNIX System V/386 Release 3.2, jointly developed by AT&T and MICROSOFT, incorporates XENIX System V compatibility into the advanced technology of AT&T UNIX System V. This provides a standard, multi-tasking, multi-user operating system for INTEL 80386-based machines.

This release supports the MICROSOFT XENIX application programming interface (with system call extensions supporting existing XENIX System V/386 and XENIX System V/286 applications) at both a source code and binary executable level. The product inherits XENIX System V floating point emulation and provides extensions supporting XENIX semaphores, messages, shared data inode types, and mountable file systems.

The system fully conforms to the System V Interface Definition and is compatible with all previous releases of AT&T UNIX System V on the INTEL 80386 at a source, binary executable, and object code level. AT&T UNIX System V/386 Release 3.2 also provides emulation routines supporting AT&T UNIX System V/286 Release 2 binary executables.

The system provides improved performance through the use of enhanced memory mechanisms, broader support for floating point co-processors, and an optional 2-kilobyte file system utility employing a larger block size to improve disk throughput.

This release incorporates shared memory enhancements, a STREAMS based pseudo-terminal subsystem, software terminal control, hardware terminal emulation, and signal mechanism enhancements supporting the X Window System Version 11 Release 2 developed by Massachusetts Institute of Technology. It is fully compatible with VP/ix, enabling the system to simultaneously run multiple MS-DOS applications. Other improvements provided with this release include enhanced LP spooler, Extended Terminal Interface (ETI), automated software setup, and enhanced security features.

AT&T UNIX System V Release 3.2 preserves the software investments of end users and provides them with the opportunity to select from thousands of existing UNIX System and XENIX system applications. It also establishes a standard applications binary interface for the INTEL 80386 machine that will enable independent software vendors to concentrate their efforts on the development of new software products.

Key Elements and Benefits

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Key Elements of the UNIX System

The UNIX System includes the following key elements:

- UNIX operating system kernel
- shell command interpreter and programming language
- UNIX file system
- various user and system commands.

The kernel, shell, and file system are discussed in more detail in the following sections.

Kernel

The UNIX operating system kernel (comprising from 5 to 10 percent of the software provided with the system) is the basic resident software on which the entire system relies. It is the only part of the system that permanently resides in memory. The kernel controls user processes and manages system resources.

The kernel executes the shell, overseeing the execution of user programs (or commands) while controlling access to the file system. These programs seem to execute simultaneously because of the system's ability to share the processor among all the programs. Actually, each program is scheduled to use the processor for a short period of time to the exclusion of all other programs. The capability to run several programs simultaneously is called multi-tasking.

The kernel, using this multi-tasking capability, provides a multi-user capability that lets many people use the system simultaneously. In addition, each of these users can be running several programs at once.

Shell

The shell command interpreter allows the user to communicate with the UNIX System. Besides providing the user interface to the kernel and interpreting operating system commands, the shell can be used as a programming language. The user can quickly and easily write custom "shell scripts" to do simple or complex tasks. The shell allows users to enhance and build on UNIX System capabilities and to adapt the operating system to many user applications without using a compiler or link editor.

File System

The UNIX file system consists of a set of directories and files arranged in a tree-like structure. The file system is built up in a hierarchical way from the root (/) directory, which contains certain standard subdirectories, including **bin**, **dev**, **etc**, **install**, **lib**, **lost+found**, **mnt**, **tmp**, and **usr**. These standard subdirectories are required for the system to operate properly. The root directory may contain other directories, including those that users structure to suit their needs.

Features of the UNIX file system include the following:

- Simple and consistent naming conventions. You can create and reference file and directory names using the same conventions. You can also refer to files and directories with either a full path name (for example, **/usr/bin/program1**) or with a path name (for example, **bin/program1**) relative to the current directory in which a user is working (for example, **/usr**). This convention lets users access logically related files quickly.
- Automatic file space allocation and deallocation that is invisible to the user.
- Facilities for creating, accessing, copying, moving, and processing files, directories, or sets of these in a simple, uniform, and natural way.
- Flexible directory and file protection modes that allow all combinations of read, write, and execute permissions. You can control these access modes independently for the owner of each file or directory, for a group of users (such as all members of a project), and for all other users. The file protection modes are set automatically when a file is created but can be changed from the shell or under program control by the owner of the file.
- Facilities for locking files or records within files. This capability is especially useful for programs that read or update data bases.
- Transparent file sharing among computers. Each computer on a network has control over what local resources other computers can access and what remote resources its users can access.
- Input/output (I/O) routines that treat each physical I/O device the same; from interactive terminals to main memory. This allows uniform file and device input and output.

- Mountable and unmountable file systems and volumes, which allow users easy access to additional disk space.
- File linking across directories of the same file system. This capability allows one file to “logically” exist in several directories without actually existing as multiple copies.

Benefits of the UNIX System

This section describes how the UNIX System differs from most operating systems.

The job of an operating system is to allocate the resources of the computer. Some operating systems process only one request at a time, thereby restricting the resources of the computer to one user (or one task or process) at a time. The UNIX System allows many processes to run simultaneously. For example, it can be sending output to several printers, running a spreadsheet program, updating a data base, sending electronic mail to another computer, and accepting input from several terminals – all at the same time. This is known as multi-tasking. This multi-tasking capability also allows many users to simultaneously interact with the system. This is called multi-user mode. Each user can have several processes running simultaneously.

The design of the UNIX System makes it easy to manipulate files and the input and output of commands. The hierarchical file system structure permits easy addition, deletion, and movement of files within a structure set up by the user. Commands can take input from either a terminal or a file, and direct output to a file or to a peripheral device, as well as to the terminal. In addition, the output of one command can be directed (piped) to be the input of another command, so users can easily build their own specialized functions.

The basic user interface of the UNIX System (the shell) is a command interpreter that recognizes and interprets commands entered by the user. The shell is also a programming language that can be used to create custom applications and functions.

Some operating systems only offer some of these features, but the UNIX System offers them all. These benefits are organized under the topics of power, portability, compatibility, flexibility, and standardization.

Power

The following list summarizes the powerful features of the UNIX System:

- The UNIX System is multi-tasking; this capability enables many tasks to be accomplished simultaneously.
- The UNIX System is a multi-user system; this capability enables many users to accomplish their work simultaneously, as well as share programs and data.

- Each user can run several tasks simultaneously.
- The UNIX System is designed so that applications can be added to it easily and without modification to the source code. Examples of this include the addition of new devices (such as terminals, printers, and plotters) and new communications protocols.
- Files can be shared transparently among computers, yet access can be carefully controlled by system administrators.

Portability

The following list summarizes the portability of the UNIX System:

- The UNIX System runs on computers ranging from microcomputers to mainframes because it can be changed to work on new computer hardware more easily than other operating systems. This portability is possible because most of the operating system is written in the high-level C language (developed at AT&T Bell Laboratories).
- The UNIX System environment is portable. Once you have learned to use the UNIX System, you can use different computer hardware that runs the UNIX System without having to relearn the basics of the system. The applications software, training, documentation, and your knowledge and expertise with the UNIX System can be applied immediately to make you productive on your new hardware.
- The combination of commands, languages, and program libraries makes it easy to develop and maintain new application programs or systems of programs. (Examples include text processing and data base management systems, and applications for medical suppliers, retailers, and other markets.) Once these applications are developed, they are easily ported to new versions of the UNIX System, or to UNIX Systems running on a variety of computer hardware.
- The Extended Terminal Interface (ETI) and **curses/terminfo** utilities allow user programs to produce output on many different types of terminals. This portability provides the programmer with features such as window control, highlighting, scrolling, access to special keys, color, and menus. These utilities work with a data base that describes the

hardware features and control sequences used by different terminals. Thus, the programmer can write terminal-independent applications that use the terminal-dependent specifications found in a common data base.

Compatibility

The following list summarizes the compatibility features of the UNIX system:

- Source code written to run on a given release of the UNIX System is generally compatible across many computer systems. (See the section "Standardization" for a description of efforts to broaden source-code compatibility.)
- AT&T UNIX System V/386 Release 3.2 combines the essential elements of AT&T UNIX System V and XENIX System V to enable end users to use the full range of AT&T UNIX System V and XENIX System V applications written for INTEL 80286- and 80386-based machines.
- When a new release of the UNIX System is issued, every effort is made to ensure that object code for application products continues to work on the new software release.

Flexibility

The following list summarizes the flexibility of the UNIX System:

- The shell command language lets you tailor the user interface to meet specific needs; each user can have a different interface.
- The UNIX System treats all files alike, unlike other systems that have many types of files. This means users access files identically from any program or command.
- A practical (hierarchical) file system structure simplifies file organization and access.
- I/O routines treat each physical I/O device the same, from interactive terminals to main memory. This feature allows uniform file and device input and output.

- The STREAMS facilities simplify networking interfaces (see Chapter 3, "Features of AT&T UNIX System V/386 Release 3.2").

Standardization

The following list summarizes the efforts that AT&T is making to standardize the UNIX System:

- AT&T is participating with other vendors in industry standard groups such as /usr/group, American National Standards Institute (ANSI) X3J11, and Institute of Electrical and Electronic Engineering (IEEE). The IEEE P1003 working group has developed a standard for the portable operating system environment, "POSIX". AT&T UNIX System V/386 Release 3.2 fully conforms to the POSIX standard, as well as all subsequent releases of AT&T UNIX System V. AT&T UNIX System V conforms to the System V Interface Definition (SVID) Issue 2. SVID is a standard for system and subroutine calls and for defining a base system and extensions. These standards will make it easier to develop applications that can be run on many different computers that run the UNIX System.
- The UNIX System supports a Transport Interface based on the the Transport Service Definition (Level 4) of the International Standards Organization (ISO) Reference Model for Open Systems Interconnection (OSI). This interface defines how to access the services of a transport protocol. (For more information, see Chapter 3, "Features of AT&T UNIX System V/386 Release 3.2".)

Features and Software Packaging

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Features of AT&T UNIX System V/386 Release 3.2

This chapter describes the features of AT&T UNIX System V/386 Release 3.2.

XENIX System V Compatibility

AT&T UNIX System V/386 Release 3.2 provides full binary and source code compatibility with applications developed for Microsoft XENIX System V/386, Microsoft XENIX System V/286, AT&T UNIX System V/386, and AT&T UNIX System V/286. The following list describes the level of XENIX System V support:

- Source code written for Microsoft XENIX System V/386 programs and applications can be compiled and linked on AT&T UNIX System V/386 without having to modify the source code.
- Binary executables developed for Microsoft XENIX System V/386 and Microsoft XENIX System V/286 (Release 2.0 and later) can be run on AT&T UNIX System V/386 without having to recompile the applications.
- The structure of the AT&T UNIX System V/386 filesystem allows both Microsoft XENIX System V and AT&T UNIX System V binary applications to be executed. It also supports the mounting of a XENIX removable filesystem.
- Support for XENIX system call extensions enables programs to run as they did under the XENIX system.
- All device driver support routines available under Microsoft XENIX System V/386 are available in AT&T UNIX System V/386.

In addition to the program interface, several Microsoft XENIX System V commands have been added for ease of use and compatibility. Tools are provided that allow the installation of all existing UNIX System and XENIX system packages.

Enhanced Line Printer Spooling Utilities

The Line Printer Spooling Utilities have been expanded to offer easy access to forms (for example, pre-printed invoices and payroll checks) and easier administration of filters.

Enhanced Security Features

UNIX System security features were further enhanced through the addition of features that display the last login time, maintain a log of unsuccessful login attempts, restrict removal of files from public directories, and restrict access to passwords.

Hardware Floating-Point Support

AT&T UNIX System V/386 supports floating-point calculations through the INTEL 80287 and 80387 numeric co-processors or the WEITEK 1167 chip set. In the absence of a co-processor, AT&T UNIX System V/386 provides floating-point emulation.

Remote File Sharing

The Remote File Sharing (RFS) feature lets you share files, directories, devices, and named pipes among computers that are linked by a network. The administrator of each computer on the network controls which local resources are available to other computers and which remote resources local users can access.

Sharing is done at the directory level. When you share a directory, you share its entire contents: files, subdirectories, named pipes, and special devices (such as printers and typesetters). With RFS, you can share data files with other departments, a letter-quality printer or typesetter, and more.

Since RFS is designed to be media- and protocol-independent, you can share files transparently across a wide variety of computer systems and networks that use AT&T UNIX System V and conform to the AT&T Transport Interface.

STREAMS Mechanism and Tools

STREAMS is a general, flexible facility and a set of tools for development of communication and networking services within the UNIX System. STREAMS provides a uniform mechanism for program development, ranging from networking applications to individual device drivers.

STREAMS defines standard interfaces for character I/O within the UNIX System kernel, and between the kernel and the rest of the UNIX System. This standard interface and mechanism enables modular, portable program development and easy integration of network services. These interfaces have been used in the development of protocol modules and device drivers since Release 3.0. STREAMS provides a broad framework that does not impose any specific network architecture. Its user interface is consistent and compatible with the existing character I/O mechanism, so both STREAMS and character I/O mechanisms are available to the programmer. This modularity allows the following functionality:

- User-level programs (commands such as **uucp**) can be independent of underlying protocols and communications media, so the programs need not be changed when new media or protocols between systems become available.
- Network architectures and higher-level protocols can be independent of underlying protocols, drivers, and media.
- Higher-level services can be created by selecting and connecting lower-level services and protocols.

In addition to the standard interfaces, STREAMS provides a set of software tools that help you build modules and drivers.

AT&T Transport Interface

The AT&T Transport Interface supports two modes of transfer. The first mode is circuit-oriented and transports data over an established connection in a reliable, sequenced manner. The second mode is message-oriented and supports data transfer in self-contained units with no logical relationship required among units.

The AT&T Transport Interface defines how a user accesses the services of a transport protocol. The protocol module is called a Transport Provider.

Applications programs access the Transport Provider by using the Transport Interface routines in the new Network Services Library. These routines support access to a Transport Provider in a media- and protocol-independent manner. The Transport Provider uses kernel-level routines to send the information to the desired physical device. By using the AT&T Transport Interface, applications programs can access other Transport Providers that may be available in the future.

Two applications that currently use the Transport Interface are Remote File Sharing and the **uucp** command. Remote File Sharing is implemented in the kernel, so it accesses the STREAMS-based Transport Provider protocol modules directly. The **uucp** command, which is an application program, calls routines in the Network Services Library. In turn, these routines access the Transport Provider.

Media-Independent **uucp**

AT&T UNIX System V/386 provides queued file transfer services to other UNIX Systems by direct-connect and dial-up methods. In addition, **uucp** has been enhanced to work with networks that are compatible with the AT&T Transport Interface, permitting **uucp** to send files to other systems over any Transport Provider that conforms to this interface.

STREAMS-based modules have been provided so that remote login services via **cu** can also be used over a network.

Other new capabilities include the ability to define (within a **Sysfiles** file) different or multiple **Systems**, **Devices**, and **Dialers** files, and the ability to define (within a **Devconfig** file) STREAMS-based transport providers for **cu** and **uucp** services.

At installation, you can indicate which, if any, Transport Providers are available. If new Transport Providers become available, no changes are needed to the software to accommodate the underlying media or protocols.

Listener

For each Transport Provider on a system, there is an active user-level program called a Listener. The purpose of the Listener is to receive requests for network services from another system, interpret which network service is needed, and initiate a process that has been designated to provide the requested network service. The Listener then drops out of the communications path and continues to listen for new service requests.

Shared Libraries

A Shared Library is a library of routines that is accessed dynamically at runtime rather than having those routines combined with an application program at load time. End users of shared libraries benefit in several ways:

- The application program may occupy less space on the disk.
- When routines in a shared library are changed, the new, improved versions are accessible without recompilation of the programs that access them. For example, by improving the performance of one routine, the performance of every application that uses that routine is immediately improved.

A shared library that contains most commonly used routines from the C Library is part of all AT&T UNIX System V/386 systems. Most UNIX System commands use routines from this library, along with any applications that were built with them. When you use commands and applications created using shared libraries, these routines are accessed without any special action on your part.

Shared Libraries Generation

AT&T UNIX System V/386 provides utilities that enable a programmer to build a library of routines that is accessed dynamically at runtime, rather than having those routines combined with an application program at load time. The end user of the application can benefit in several ways (see the previous section, "Shared Libraries").

Command Syntax Standard

A new shell command, **getopts** (an enhanced version of the **getopt** command), is consistent with and supports the applicable rules (Rules 3-10) of the UNIX System command syntax standard. [The standard is described in the *intro(1)* manual page of the *User's/System Administrator's Reference Manual*.] Use of the **getopts** command in place of the **getopt** command is strongly encouraged because the **getopt** command will no longer be supported with the next major release of the UNIX System. To assist in the conversion of affected shell scripts, a conversion command, **getoptcvt**, is provided.

Signal Mechanism Enhancements

A new set of system calls provides an improved mechanism to manage signals. These new calls allow a programmer to establish critical sections of code that will not be interrupted by a set of signals. These signals are not discarded, but are held until released at the end of the critical section. These signal-handling system calls are compatible in name and calling sequences with the BSD 4.1 (Berkeley) version of the UNIX System.

Improved Terminal Support Facilities

There are three improved facilities for supporting terminals:

■ Remote Terminal Support

The Remote Terminal Support (often called **curses/terminfo**) provided with the AT&T UNIX System V/386 has the following new features:

- Support for filters, soft labels, and new AT&T terminals and printers: 510, 513, 4410/5410, 4425/5425, 605, 610, 615, 620, and 630.
- New commands: **captainfo** converts **termcap** entries to **terminfo** entries, and **infocmp** compares two **terminfo** entries or prints entries in several formats. For example,

infocmp -I *termtype*

prints out the description of the terminal *termtype* from the **terminfo** data base.

- New options to the **tput** command to initialize and reset a terminal.
- A version of the **terminfo** compiler, **tic**, that is from 50 to 100 times faster than the previous version and does much better error checking.

■ Terminal Windowing Utilities

AT&T UNIX System V/386 provides the basic software commonly required by AT&T windowing terminals such as the AT&T 630 terminal. Routines included perform the following functions: create, delete, and manipulate terminal windows, query terminal window status, and provide statistics about usage of windowing routines.

■ Extended Terminal Interface (ETI) Utilities

High-level C language subroutine libraries built on **curses/terminfo** provide enhanced character mode screen management functions, color/curses enhancements, and menus. The Extended Terminal Interface also provides a TAM transition library enabling character-based, multi-user applications written to the UNIX PC to be ported with minimal modification.

Crash Command Changes

In addition to providing debugging support for the new operating system features, the user interface to the **crash** command has been changed extensively for ease of use. The syntax of all the functions has been standardized so that similar functions share similar syntax. **crash** has a **help** function, a number base converter, a memory search function, and a disassembler capability.

New Header Files and Definitions

The following three header files and definitions were added to **/usr/include**:

unistd.h contains definitions for symbolic constants introduced and used throughout the 1984 */usr/group Standard* publication

- limits.h** contains definitions for commonly used values that vary for different implementations of the UNIX System
- sys/stat.h** contains new definitions to make it easier for programmers to write portable code.

Internationalization

The following features are for customers writing application software for use in an international environment:

■ Support for 8-bit Code Sets

The **cat**, **ed**, **egrep**, **expr**, **find**, **grep**, **ls**, **pg**, **sed**, **sort**, and **vi** commands and the **curses** library were changed to properly handle code sets that use all 8 bits. Because ASCII uses only 7 of the 8 available bits in a byte, some commands made special use of this eighth bit; other commands assumed that if the bit was set, the byte was invalid. Other commonly used commands, such as **sh** (the shell), already supported 8-bit code sets. In addition, 8-bit characters can be sent between a terminal and the system.

■ Support for Alternate Date and Time Formats

The **cpio**, **date**, **ls**, **mount**, **pr**, and **sort** commands were changed to provide the date and time in the language and format specified by the **LANGUAGE** environment variable. While the United States conventions remain the default, other languages can be supported by creating and installing a file for the language desired in the **/lib/cftime** directory. The contents of that file include:

- month and day (full and abbreviated)
- default local time and date formats
- default output of the **date** command if the **CPTIME** environment variable is not set.

In addition, time zones and alternate time zones (such as daylight time) now can be defined in terms of hours and minutes using the **TZ** environment variable.

- **Support for Alternate Character Classification and Conversion Rules**

The **cat**, **ed**, **egrep**, **grep**, **ls**, **pg**, **sed**, **sort**, and **vi** commands (commands that convert characters from uppercase to lowercase or classify characters as alphabetic, printable, uppercase or lowercase, etc.) were changed to support code sets or classification rules according to the value of the **CHRCLASS** environment variable. While ASCII remains the default for these operations, other conversion and classification rules can be supported by creating and installing a file describing these rules in the **/lib/chrclass** directory. A new administrative command, **chrtbl**, is used to create this file.

New awk (nawk)

awk is a programming language for information retrieval and data manipulation that is often used by people who have no programming background. **nawk** includes the following features:

- ability to define functions
- new keywords: **delete**, **do**, **func**, **function**, **return**
- new built-in functions: **atan2**, **cos**, **sin**, **rand**, **srand**, **gsub**, **sub**, **match**, **close**, and **system**
- new pre-defined variables: **FNR**, **ARGC**, **ARGV**, **RSTART**, and **RLENGTH**
- input field separator variable, **FS**, and the third argument to **split** are treated as regular expressions
- precedence of operations to match C language precedence.

Because some of these enhancements may not be compatible with some existing **awk** programs, you will get the old version when you type **awk**. To take advantage of these new features, you must use the **nawk** command.

Performance Improvements

Performance has been improved in several key areas:

■ **Kernel Size**

The Release 3.2 kernel allows the combination of text and data sections of the kernel to grow to a size greater than that of the Release 3.1 and 3.0 restriction [base memory (usually 640K) minus the size of the boot loader (about 40K)].

Note that there never has been, and still is not, a limit on the total kernel size (text + data + bss).

■ **Enhanced Memory Management**

Enhanced memory management for lower process overhead and greater system throughput is provided.

■ **Paged User Area**

The user area for each process can now be paged like the rest of each process. This enhancement significantly improves the performance of limited-memory systems by making more memory available.

■ **Demand Paging**

Demand paging, a memory-management technique, enables the system to divide the memory space of a process into small, fixed-size units, which are swapped in and out of main memory only as needed. With demand paging, a process size may exceed the system's available memory space. Demand paging can also improve performance when many users are simultaneously using the system.

■ **2-Kilobyte File System Utility**

The 2-Kilobyte File System Utility provides an optional method of file system organization. This method employs 2-Kilobyte block sizes to improve disk I/O performance with applications that use a file system with an unusually high proportion of large files.

■ **Remote File Sharing Client Caching**

This feature enables a client system (one that is accessing data from another system) in a Remote File Sharing (RFS) arrangement to maintain a local copy of the data it needs. This means that when a block of data is read from or written to a remote system, it is placed in

a local buffer where it can be accessed by subsequent requests for data by local processes. This method can significantly reduce the amount of data that needs to be sent across the network, resulting in significant performance improvements for many patterns of remote file use. For example, applications that access data from a small set of files, such as data base systems, will benefit from this feature.

Mechanisms are built into the client-caching feature to ensure file consistency across the network when multiple machines have opened a file and when a process reopens a previously closed cached file.

By default, client caching is enabled; however, caching can be turned off for a particular resource or for an entire system.

- **Improved Recovery of Files from `cpio` Archives**

If users encounter errors while restoring a file from floppy disk using `cpio`, they can now skip over the bad blocks and continue restoring with the next file.

Additional Features

Additional features of UNIX System V/386 include:

- **Remote File Sharing Loop Back**

Loop back, also called self-mount, enables users to simulate the higher levels of Remote File Sharing (RFS) functionality on a single system. Application programs designed to use RFS can be partially tested and demonstrated without actually communicating with a remote computer.

- **Incremental Backup of Nested File Systems**

A procedure has been implemented to permit incremental backup of nested file systems. (`/a1` is a file system; `a1/b1` is a nested file system.)

- **Mandatory File and Record Locking**

This feature permits a process to lock a file or records within a file for exclusive use. This is especially useful for programs that read or update data bases.

■ **Installable Device Drivers/Tunable Parameters**

AT&T UNIX System V/386 provides an automatic installable driver mechanism that permits a user to reconfigure a system with additional device drivers. A user may also modify system parameters to optimize performance in various configurations.

Software Packaging

AT&T UNIX System V/386 Release 3.2 Foundation Set and User Interface Utilities

This product consists of the standard UNIX System V/386 Release 3.2 Foundation Set and additional AT&T utilities supporting the user interface.

The Foundation Set is the UNIX System V/386 Release 3.2 application binary interface standard. It provides the operating system kernel and a basic set of utilities. The Foundation Set is divided into the following eight distinct packages:

- Base System Package
- Editing Package
- Remote Terminal Package
- Security Administration Package
- XENIX File System Utility Package
- 2-Kilobyte File System Utility Package
- Network Support Utilities Package
- Remote File Sharing Package

In addition, the Foundation Set provides the following additional packages supporting the user interface.

- FMLI Package
- FACE Package
- FACE HELP Package

Foundation Set Package Description

Base System Package: The Base System Package is the minimal required UNIX System V/386 Release 3.2 runtime system. All other packages need never be installed if the utilities they provide are not required by the user or by an application the user intends to install. The Base System Package consists of the following utilities:

- Essential utilities providing the operating system kernel, base system device drivers, and ninety of the most essential UNIX System utilities.
- XENIX system commands and system headers added by Microsoft Corporation in support of compatibility features.
- System administration utilities providing the commands for managing the hardware and software resources used on the system.
- Basic networking utilities providing the uucp queued file transfer services.
- Enhanced lineprinter spooler utilities enabling printer sharing through the temporary storage of data and queuing of print request.
- Tunable parameters which enable the system to be modified for maximum performance under various hardware configurations and system load conditions.
- Installable drivers which enable the system to incorporate additional device drivers.
- Interprocess communications utilities permitting cooperating processes to share data and communicate with each other.
- User environment utilities providing the commands used to perform mathematical calculations, check or change the executing environment, schedule commands to be run at a later time, and permit interaction with more than one shell layer or switch between layers.
- Process accounting utilities, terminal filters, and the termcap database.

Editing Package: The Editing Package is optionally installable and consists of the following:

- Advanced editing utilities such as the "vi" screen editor.
- Directory and file management utilities permitting comparison and manipulation of the contents of files and directories.
- Spell utilities that enable checking for misspelled words in a file.

Remote Terminal Package: The Remote Terminal Package is optionally installable and consists of the terminfo database containing the descriptions and operating capabilities of the AT&T 600 series terminals as well as over 150 ANSI 3.64 and curses compatible terminal devices.

Security Administration Package: The Security Administration Package is optionally installable and consists of encryption and decryption algorithms for encoding and decoding sensitive data files.

NOTE

The Security Administration Package is delivered in a separate shrink-wrapped package and is distributed only to domestic customer sites in accordance with government export restrictions.

XENIX File System Utility Package: The XENIX File System Utility Package is optionally installable and provides a mechanism for supporting mountable XENIX file systems. Installation of this package is not required for XENIX application binary compatibility.

2-Kilobyte File System Utility Package: The 2-Kilobyte File System Utility Package is optionally installable and provides alternative method of file system organization employing a larger block size (2K) to improve disk throughput performance. This package is recommended for network server applications.

Network Support Utilities Package: The Network Support Utilities Package is optionally installable and provides the STREAMS and system network extensions supporting applications such as Remote File Sharing and the AT&T XWINGraphical Windowing System with the AT&T OPEN LOOK™ Window Manager.

Remote File Sharing Package: The Remote File Sharing Package is optionally installable and provides the facilities needed to share files transparently across a network.

AT&T User Interface Utilities Packages

FMLI Package: The FMLI Package is optionally installable and provides the forms and menu language interpreter supporting FACE as well as any other similarly developed interface that a user may wish to install in addition to or in substitution for FACE.

FACE Package: The FACE Package consists of the AT&T developed user interface and the virtual terminal layer manager. It provides users with a logical view of UNIX System V through an architecture of objects and actions represented by the concept of an "office". FACE includes menu interfaces to commonly used commands, preferences, task scheduling, program services, and system administration.

FACE HELP Package: The FACE HELP Package provides the context sensitive help screens supporting the FACE user interface.

Documentation

The product also includes the following documents.

- Product Overview/Documentation Roadmap
- User's Guide
- Operations/System Administration Guide
- User's/System Administration Reference Manual
- FACE User's/Administration Guide
- Release Notes

This documentation set may also be ordered separately. More detailed information can be found in the Documentation Roadmap section of this document.

AT&T Software Development Set

The Software Development Set is a product add-on. It delivers a rich software development environment permitting programmers to develop application software products targeted to AT&T UNIX System V/386 Release 3.2.

The Software Development Set consists of two packages.

- C Software Development Set Package
- Extended Terminal Interface Package

Package Descriptions:

C Software Development Set Package

The C Software Development Set Package is optionally installable and provides the following utilities:

- The C Programming Language Utilities and associated software generation utilities containing the C language compiler and a set of software tools designed to aid in development of C language programs.
- Advanced programming utilities providing the Source Code Control System, shared library generation utilities, the system debugger, and miscellaneous programming support tools.
- Programmer productivity tools providing the "cscope", "prof" and "lprof" utilities.

Extended Terminal Interface Package

The Extended Terminal Interface Package, (formerly referred to as the Graphics Programming Utilities), is optionally installable and provides the following utilities:

- The Extended Terminal Interface libraries and header files containing the color enhanced, low level, curses/terminfo libraries.
- The high level function library to curses/terminfo
- The TAM transition library.

Documentation

The product also includes the following documents.

- Programmer's Reference Manual
- Programmer's Guide
- FMLI Programmer's Guide
- Software Development Set Release Notes

This documentation set may also be ordered separately. More detailed information can be found in the Documentation Roadmap section of this document.

Network Programming Utilities Documentation

This product supplies a set of documentation titles not included with any other previously mentioned software products. This documentation is useful to developers of STREAMS base applications and network program development. These titles are:

- STREAMS Primer
- STREAMS Programmer's Guide
- Network Programmer's Guide

More detailed information can be found in the Documentation Roadmap part of this document.

ISV/VAR Documentation Set

This product provides an Integrated Software Development Guide not included with any other previously mentioned software product. This document contains useful information describing application porting considerations, device driver development, and development of application installation scripts. This document is useful to developers of compatible product add-ons.

System Product Add-ons

AT&T also provides the following system product add-ons for use with UNIX System V/386 Release 3.2:

AT&T XWIN Graphical Windowing System Featuring the AT&T OPEN LOOK Window Manager

The AT&T XWIN Graphical Windowing System is based on the M.I.T. X Window System Version 11, Release 2 defacto industry standard. It provides a bit-mapped color graphics programming environment for UNIX System V, and enables users to display several applications running concurrently. The AT&T XWINSystem features the AT&T OPEN LOOK Window Manager that allows the user to view and manipulate windows in which applications are running.

The AT&T XWINSystem consists of two products: The AT&T XWINEnd User System and the AT&T XWINProgrammer's Utility Add-on System. Each may be purchased together as a complete system or separately.

AT&T Simul-Task 386

The Simul-Task 386 product provides customers of UNIX System V/386 the ability to run multiple MS-DOS applications concurrently with UNIX System applications such as Lotus 123, dBASE III, WORDSTAR 2000, AUTOCAD and other popular applications for users on the system console or any PC or ASCII compatible remote terminal.

AT&T Cartridge Tape Utilities

The Cartridge Tape Utilities provides the device drivers and system control utilities for the optional Streaming Tape Kit hardware supplied by AT&T.

AT&T Bus Mouse Driver

The AT&T Bus Mouse Driver provides the device drivers for the optional Bus Mouse hardware supplied by AT&T.

AT&T ISV/VAR Toolkit

The ISV/VAR Toolkit contains the KornShell and Data Reformatter Utility. The KornShell combines the functionality of UNIX System V/386 Release 3.2 Bourne Shell with C Shell interaction mechanisms. It is the best in command interfaces. Also, the KornShell is easily ported to various systems and is coded in standard C. The Data Reformatter converts files to and from popular DOS programs and supports the conversion between ADF (UNIX PC), DIF, WKS, WRK, DFP, PRN, SLK (DOS), PKT (UNIX), and COL (mainframe). VARs and end users will find these helpful in communicating between different operating systems and application programs.

AT&T ETIP Designer

ETIP Designer is a powerful development tool that makes it easier than ever to design and revise sophisticated user interfaces. Applications created with ETIP Designer have a professional appearance and can be produced in significantly less time. ETIP Designer will prototype character based forms, menus, and text which may be repeatedly modified. Once a prototype is completed, ETIP Designer can generate C Source Code referencing the Extended Terminal Interface (ETI) Libraries of UNIX System V Release 3.1 or 3.2.

Other products for UNIX System V/386 Release 3.2 available from AT&T include application software, languages, database management systems, networking, and communications products.

How To Use This Roadmap

Chapter 4: HOW TO USE THIS ROADMAP

Introduction	4-1
Ordering Information	4-2
What's in the Rest of the Roadmap	4-3
What's in the Documents	4-3
Conventions for Document Titles	4-5

Introduction

This *Documentation Roadmap* section will help you identify documents associated with your AT&T UNIX System V/386 Release 3.2. It also identifies separately purchased but related documents that will enhance usage and understanding of the UNIX System. The AT&T UNIX System V/386 Release 3.2 consists of the software, documentation, as defined in the *AT&T UNIX System V/386 Release 3.2 Product Overview*.

Most people will use the *Roadmap* in one of the following ways:

- to understand general relationships among the documents
- to identify the documents they need to do a particular task
- to learn about additional documents that might be of interest
- to learn how to order documents.

The *Roadmap* contains a variety of information. It describes the different types of documents available to you. It shows, in a series of diagrams, the relationships among the different documents you need to do various tasks. For each document, it specifies the intended audience and any prerequisite documents or knowledge, and gives a summary of the contents.

Ordering Information

To order any Software Sets as referred to in the Product Overview section of your *UNIX System V/386 Release 3.2 Product Overview/Documentation Roadmap*, contact your AT&T Sales Representative or authorized dealer.

To order any Documentation Sets or stand-alone documents described in the Roadmap section of your *UNIX System V/386 Release 3.2 Product Overview/Documentation Roadmap*, contact one of these locations.

AT&T Customer Information Center

- Within the continental United States, call 1-800-432-6600
- Outside the continental United States, call 1-317-352-8556

- Send mail orders to:

AT&T Customer Information Center
Customer Service Representative
P.O. Box 19901
Indianapolis, Indiana 46219

OR

AT&T National Parts Sales Center

- Within the continental United States, call 1-800-222-PART

- Send mail orders to:

National Parts Sales Center
2551 East 40th Avenue
Denver, CO 80205
Attn: Order Dept.

What's in the Rest of the Roadmap

The remainder of this chapter describes the different types of documents available—guides, reference manuals, manuals, product overviews, and release notes—and conventions used for document titles.

Chapter 5, *Aids for Identifying Documents*, is where you'll find the "maps." A series of diagrams, arranged much like a flowchart, starts with a high-level view of the six major categories of topics. Pointers from that map direct you to others, and each step brings you closer to identifying the document you need while showing you how the documents are related to one another. There's also an alphabetical index. It's useful when you have a specific topic already in mind. It directs you to Chapter 6, where the documents you need are described in greater detail.

Chapter 6, *Document Descriptions*, is organized alphabetically by document title. For each document it gives: the document title, the name of the product described, any prerequisite documents or knowledge, the intended audience, the document ID number (the number you use to order the document), and a summary of the document's contents.

The Glossary defines UNIX System and computer industry terms that are used in this document although most terms you must know are explained as they are introduced in the text.

What's in the Documents

The titles of the documents follow conventions intended to help you tell, from the title, something about the kind of information you'll find in it. There are five standard types of documents; a definition of each is given on the following pages. Many users find most of the information they need in the first two types (guide and reference manual).

guide

A guide contains both conceptual and procedural information; it tells when and why to do something, as well as how to do it. A guide is usually the best introductory text (often including tutorials), yet it is organized so that experienced users can easily skip to the information they need.

reference manual

A reference manual contains complete descriptions (traditionally known as "manual pages") of commands, utilities, system calls, library functions, or system file formats. The assumption in a reference manual is that you already know when and why a task should be done, so it concentrates on telling you what to do. Although these descriptions are complete, the authors have tried to keep them to one page; as a result they sometimes are cryptic. Once you've become familiar with a product, a reference manual is an efficient source of information.

release notes

A release notes describe what has changed in a new release, and known software problems that users should be aware of, and, if available, ways to get around them. It may also contain page replacements for other documents.

manual

A manual describes the hardware that can be used with a UNIX System V/386, including instructions for installing and operating it. It is complete, detailed, and is usually written for experienced computer users. (A manual is to hardware what a reference manual is to software.)

product overview/roadmap

The product overview part summarizes the standard and optional features of a software product including AT&T product add-ons that may be purchased separately. It highlights aspects of the product that have changed since earlier releases, or that are different from similar products of other vendors. It gives prospective buyers or information systems managers a broad perspective of a system and how it might benefit them.

The roadmap part helps identify which documents are needed to do particular tasks. It describes how a product's documentation is organized, and gives a description of each document.

Conventions for Document Titles

To make them shorter and easier to read, document titles in this book do not show "AT&T" or "UNIX System V/386" even though the official document title does include those words.

For example, the full title is:

UNIX System V/386
Release 3.2

Programmer's Reference Manual

In this document, the shorter or abbreviated title is

Programmer's Reference Manual

Aids for Identifying Documents

Chapter 5: AIDS FOR IDENTIFYING DOCUMENTS

Aids for Identifying Documents
Alphabetical Index

5-1
5-9

Aids for Identifying Documents

Figure 5-1 shows six major categories of computer-related topics: Obtaining Background Information, General Use, Administration, Programming, Networking, and Enhancing the System (for those with UNIX System source licenses).

Figures 5-2 through 5-7 show how the documents that discuss these topics are related. Boxes enclose single document titles and related groups of documents. Overlapping boxes show documents that should be used together. Arrows show the order in which documents usually should be read and point to other major categories you might want to examine.

The Alphabetical Index lists topics associated with each of the six major categories. You can look up a topic in the first column and follow that entry across the page to determine the documents that discuss it. The last column tells where you can find a description of the document in Chapter 6.

There are several ways you might use the figures in this chapter. Two possible scenarios are described below.

First scenario: You want to find out how to send mail electronically. Look in the Alphabetical Index for the word "mail." It is among the entries in the Topic column, and lists the *User's/System Administrator's Reference Manual* as a document that explains how to send mail. If you have a copy, you can look up this information. If you don't have one, you can read the description in Chapter 6, and decide whether or not to order it.

Second scenario: You want to help an inexperienced programmer learn about the UNIX System. Of the categories in Figure 5-1, General Use and Programming seem the most relevant. Turning to Figure 5-3, a more detailed look at the General Use category, examine the box labeled "User Documents." It lists the two related documents that new users should read and indicates the order in which they should be read. By looking at Figure 5-3 in this way, you can identify which documents the programmer needs. Figure 5-3 also points to other categories a general user might want to examine (Programming and Networking). Follow the same procedure for the Programming category. For all documents that you identify as possibilities, you can read the descriptions in Chapter 6.

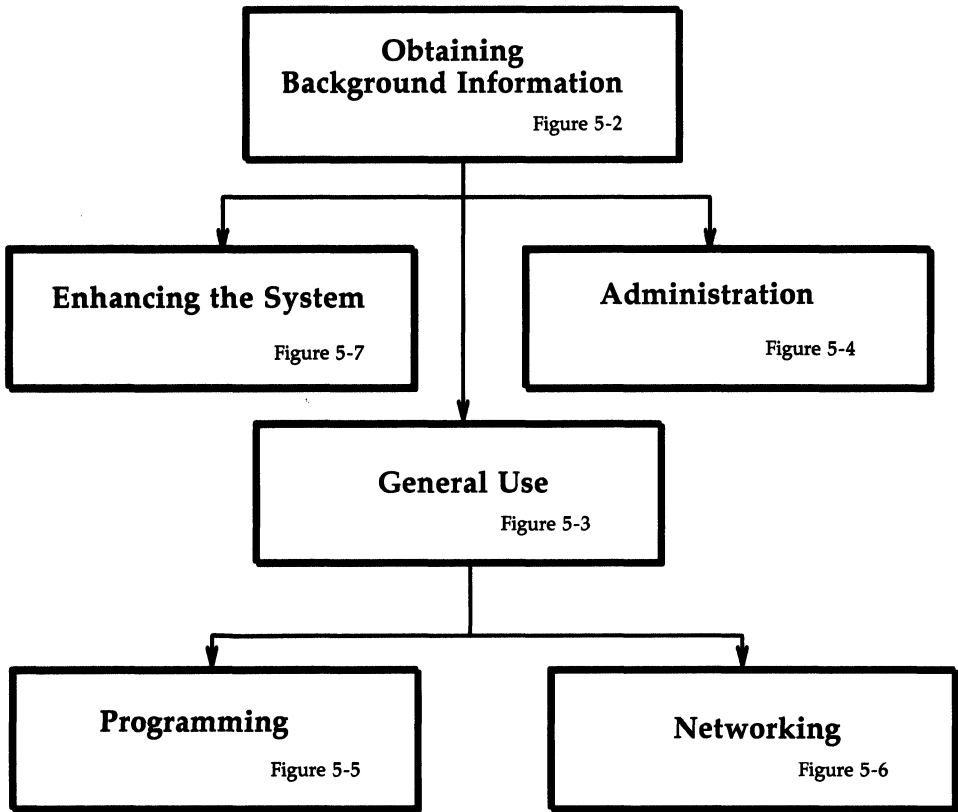


Figure 5-1: The Big Picture: Categories of Tasks

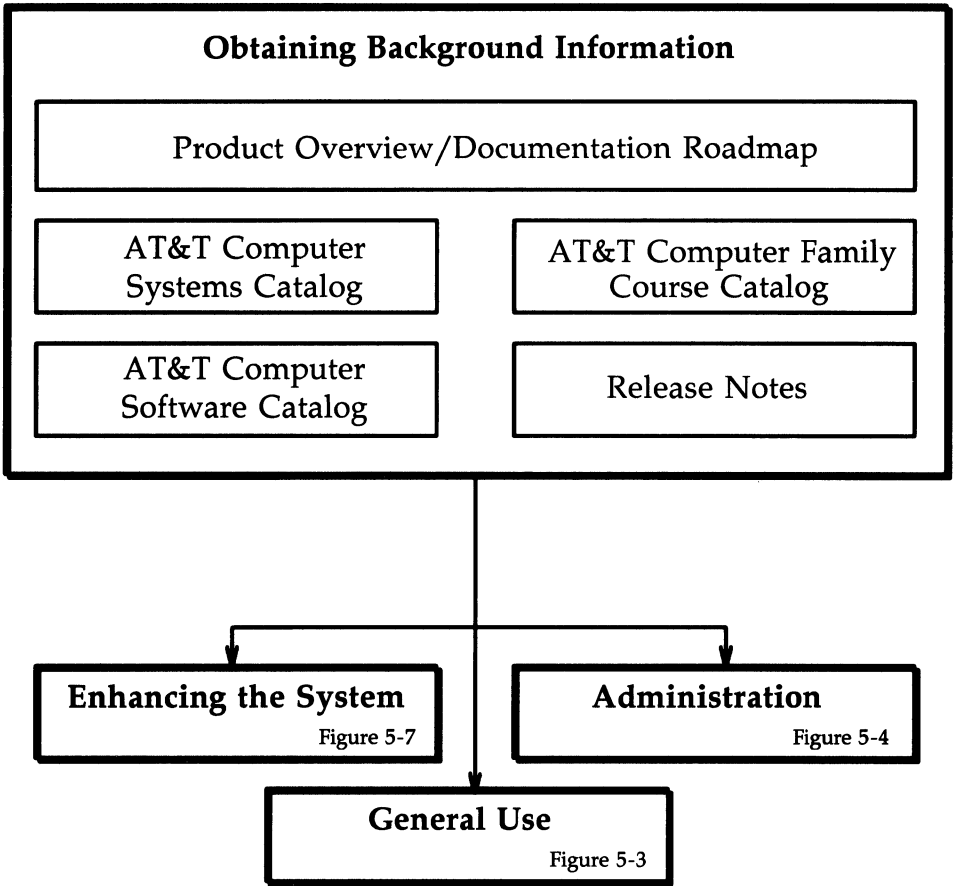


Figure 5-2: Obtaining Background Information

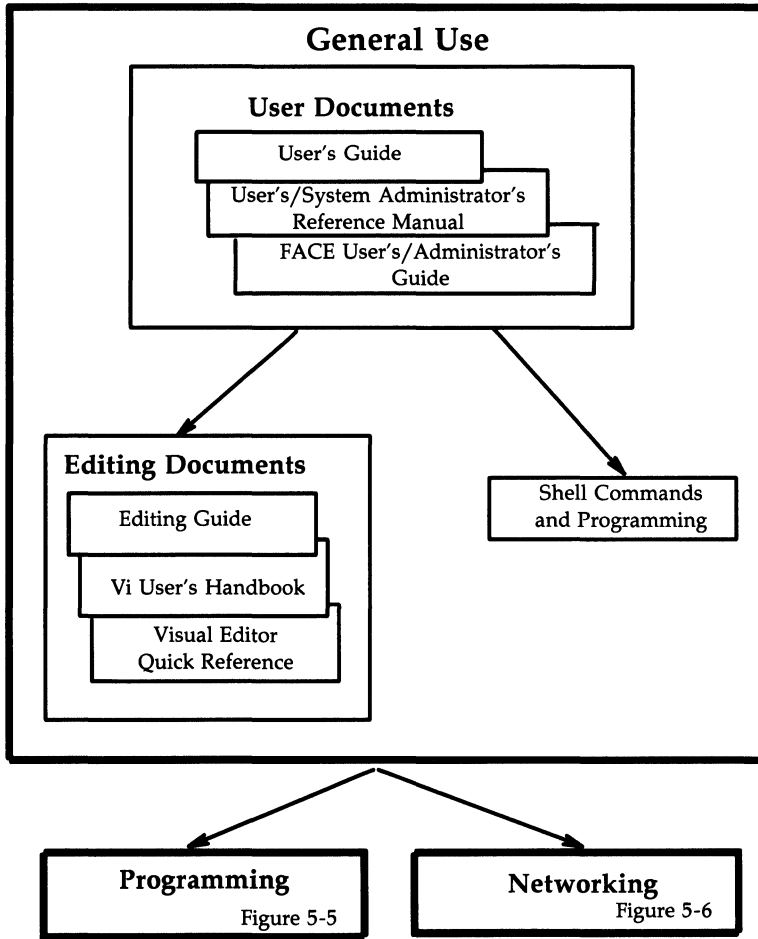


Figure 5-3: General Use

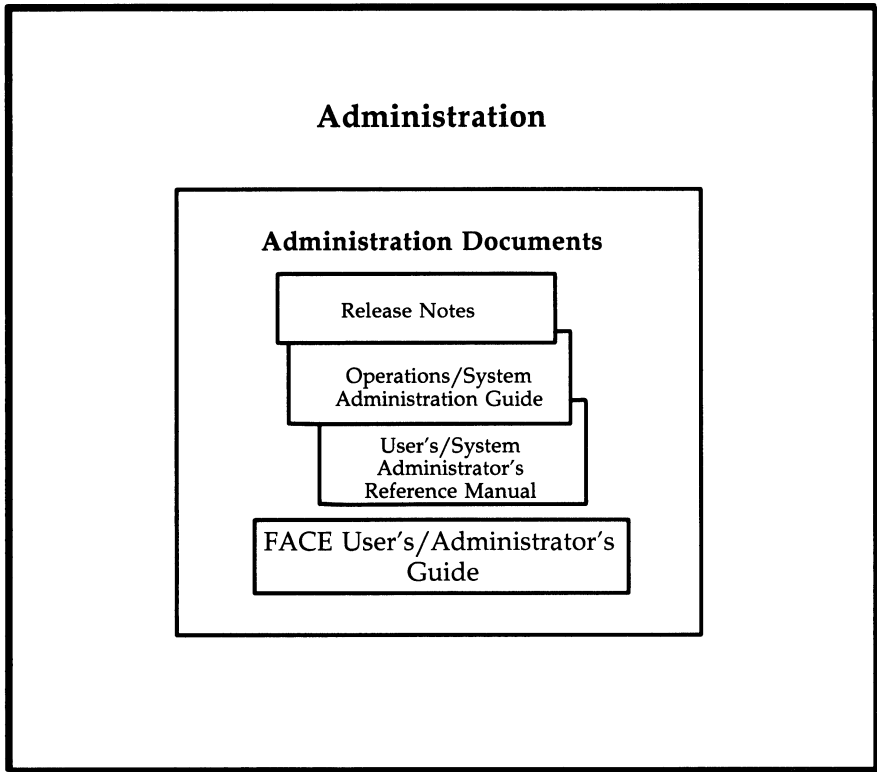


Figure 5-4: Administration

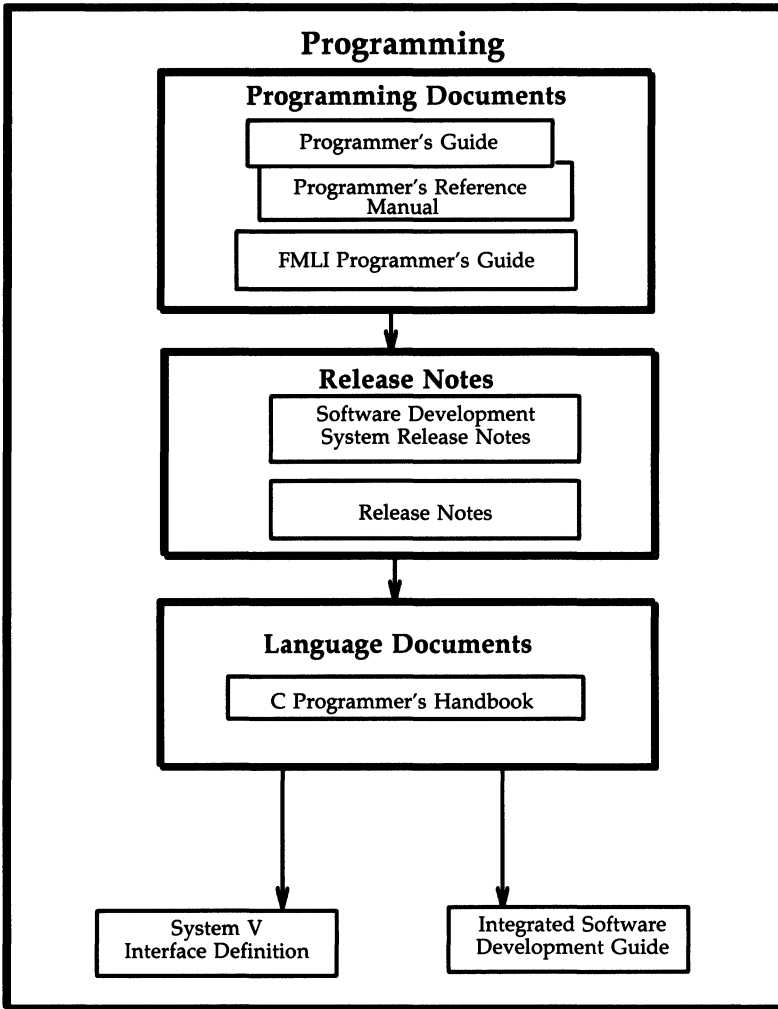


Figure 5-5: Programming

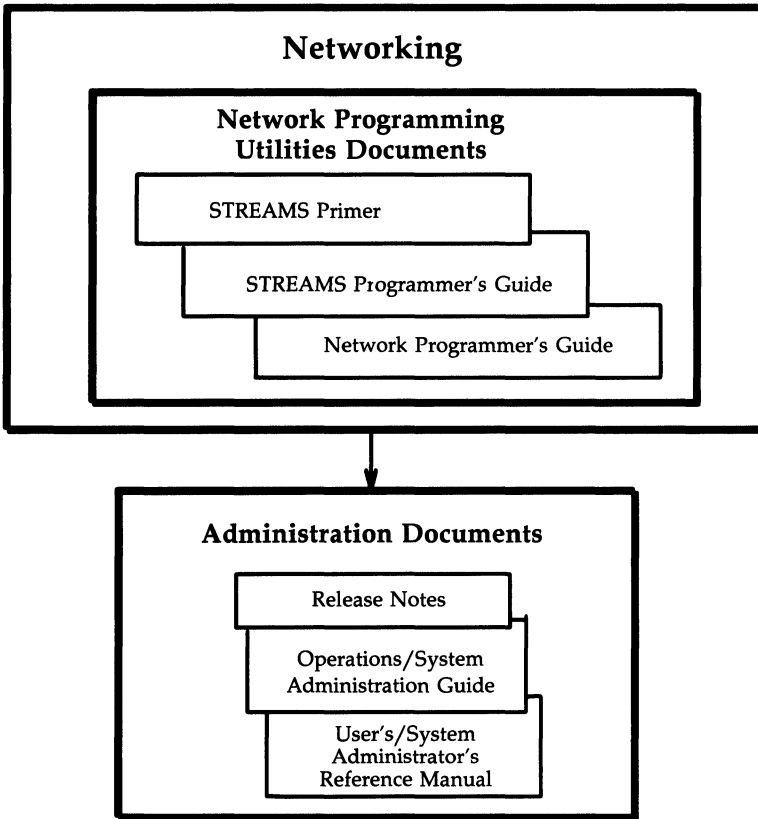


Figure 5-6: Networking

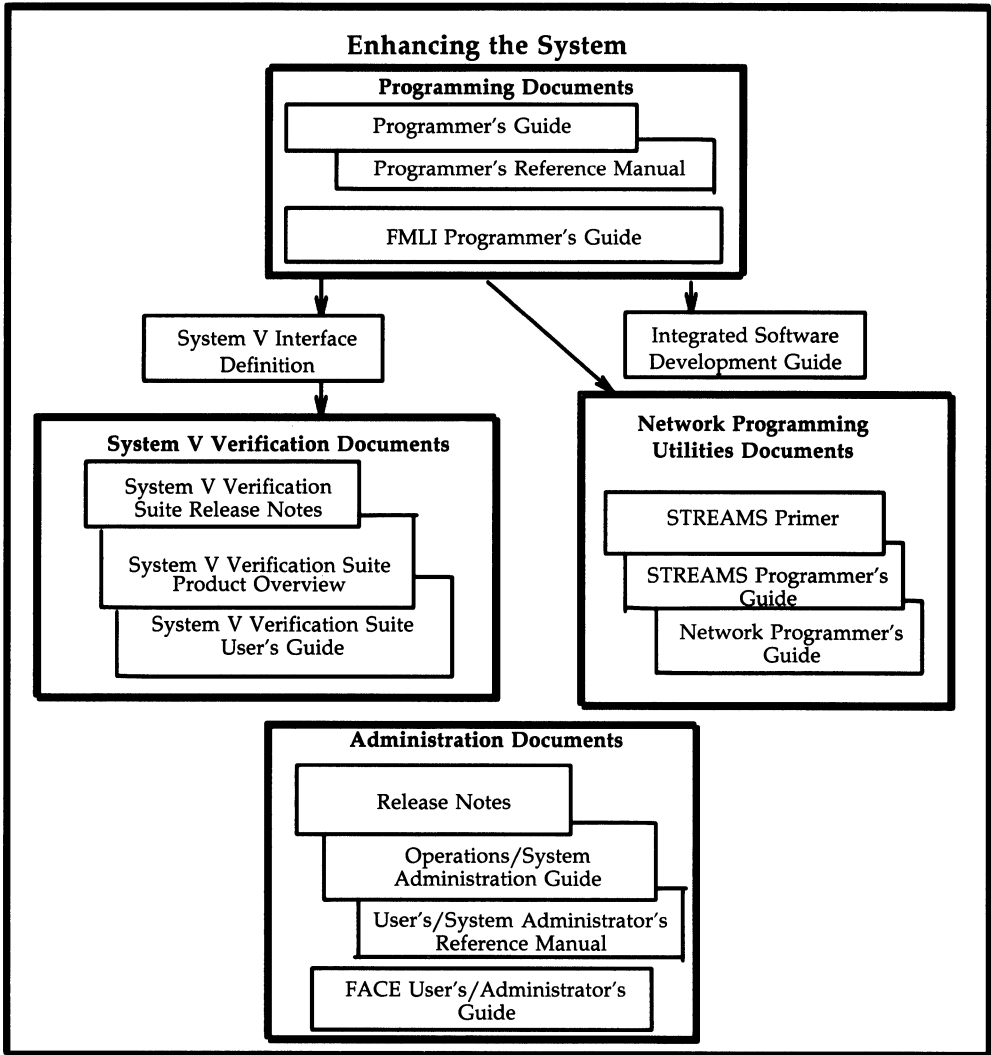


Figure 5-7: Enhancing the System

Alphabetical Index

Topic	Document Title	Page in Roadmap
actions to take if the system crashes	Operations/System Administration Guide	6-7
add-on package	FACE User's/Administrator's Guide	6-5
administration, hardware	see "hardware, install and administer"	
administration, network	see "network, administration"	
administrator, responsibilities of	Operations/System Administration Guide	6-7
alphabetize data	AT&T UNIX System V/386 User's Guide	6-14
applications, how to order	AT&T Computer Software Catalog	6-2
applications, write and install	System V Interface Definition	6-13
	STREAMS Programmer's Guide	6-12
	Network Programmer's Guide	6-7
	Programmer's Guide	6-8
applications, write for transport interface	Network Programmer's Guide	6-7
architecture, software	Product Overview/Documentation Roadmap	6-8
automate routine procedures	User's/System Administrator's Reference Manual	6-15
	Shell Commands and Programming	6-11
	AT&T UNIX System V/386 User's Guide	6-14
boot, how to	Operations/System Administration Guide	6-7
	Release Notes	6-10
built-in functions, FMLI	FMLI Programmer's Guide	6-6

Aids for Identifying Documents

Topic	Document Title	Page in Roadmap
C programming	Programmer's Guide	6-8
	C Programmer's Handbook	6-3
	The C Programming Language	6-3
command syntax	User's/System Administrator's Reference Manual	6-15
command usage	User's/System Administrator's Reference Manual	6-15
	AT&T UNIX System V/386 User's Guide	6-14
compile a program	Programmer's Guide	6-8
	Programmer's Reference Manual	6-9
cutgrep	see "built-in functions"	
crash, recovery from	see "system crash, recovery from"	
data, organize	AT&T UNIX System V/386 User's Guide	6-14
data, print on paper	see "print data on paper"	
data, save and retrieve	AT&T UNIX System V/386 User's Guide	6-14
data, sort	AT&T UNIX System V/386 User's Guide	6-14
debugging, device driver	STREAMS Programmer's Guide	6-12
debugging, general	Programmer's Guide	6-8
	User's/System Administrator's Reference Manual	6-15
device driver, design of	STREAMS Programmer's Guide	6-12
documents, order	Product Overview/Documentation Roadmap	6-8
editors, how to use	Editing Guide	6-5
	Visual Editor Quick Reference	6-17
	vi User's Handbook, The	6-15
	AT&T UNIX System V/386 User's Guide	6-14
electronic mail, send and receive	User's/System Administrator's Reference Manual	6-15
	AT&T UNIX System V/386 User's Guide	6-14

Topic	Document Title	Page in Roadmap
encryption	User's/System Administrator's Reference Manual	6-15
execute a job	User's/System Administrator's Reference Manual	6-15
	AT&T UNIX System V/386 User's Guide	6-14
execute a job on another computer	see "remote execution "	
features	see "new release, features of"	
file, how to edit	see "editors, how to use "	
file, security	see "encryption "	
file, store data in	AT&T UNIX System V/386 User's Guide	6-14
file system, build and maintain	Operations/System Administration Guide	6-7
file system, mount and unmount	Operations/System Administration Guide	6-7
file, version control	Programmer's Guide	6-8
format of system files	Programmer's Reference Manual	6-9
forms defining	FMLI Programmer's Guide	6-6
frames defining	FMLI Programmer's Guide	6-6
hardware, install and administer	Operations/System Administration Guide	6-7
hardware, monitor using diagnostics programs	Operations/System Administration Guide	6-7
installation, new release	Release Notes	6-10
	Operations/System Administration Guide	6-7
kernel modules, write using STREAMS	STREAMS Programmer's Guide	6-12

Aids for Identifying Documents

Topic	Document Title	Page in Roadmap
learn about the UNIX System	AT&T UNIX System V/386 User's Guide	6-14
library functions syntax	Programmer's Reference Manual	6-9
login, how to	User's/System Administrator's Reference Manual	6-15
	AT&T UNIX System V/386 User's Guide	6-14
mail, send and receive	User's/System Administrator's Reference Manual	6-15
	AT&T UNIX System V/386 User's Guide	6-14
manual pages, FMLI	FMLI Programmer's Guide	6-6
	User's/Administrator's Reference Manual	6-15
	Programmer's Reference Manual	6-9
menus	FACE User's/Administrator's Guide	6-5
menus defining	FMLI Programmer's Guide	6-6
messages, send to other users	see "mail, send and receive"	
mount a file system	Operations/System Administration Guide	6-7
network, administration	Operations/System Administration Guide	6-7
	User's/System Administrator's Reference Manual	6-15
network, connect to another computer	Operations/System Administration Guide	6-7
	User's/System Administrator's Reference Manual	6-15
	AT&T UNIX System V/386 User's Guide	6-14
Network Service Library	Network Programmer's Guide	6-7
new release, features of	Product Overview/Documentation Roadmap	6-8
	Release Notes	6-10
new release, install	Release Notes	6-10
	Operations/System Administration Guide	6-7
new release, order	Product Overview/Documentation Roadmap	6-8
office of "login" from menus	FACE User's/Administrator's Guide	6-5

Topic	Document Title	Page in Roadmap
optimize the system	see "system tuning of"	
order applications	AT&T Computer Software Catalog	6-2
order documents	Product Overview/Documentation Roadmap	6-8
order new release	Product Overview/Documentation Roadmap	6-8
order software package	AT&T Computer Software Catalog	6-2
organize data	AT&T UNIX System V/386 User's Guide	6-14
organizing your office with menus	FACE User's/Administrator's Guide	6-5
panic error messages	Operations/System Administration Guide	6-7
performance, program	Programmer's Guide AT&T UNIX System V/386 User's Guide	6-8 6-14
performance, system	see "system, tuning of"	
peripheral	AT&T UNIX System V/386 User's Guide	6-14
portability of AT&T UNIX software	System V Interface Definition System V Verification Suite User's Guide	6-13 6-14
print data on paper	User's/System Administrator's Reference Manual AT&T UNIX System V/386 User's Guide	6-15 6-14
printer operations from menus	FACE User's/Administrator's Guide	6-5
program, how to compile	Programmer's Guide Programmer's Reference Manual	6-8 6-9
program, track versions	Programmer's Guide	6-8
programming, in C	Programmer's Guide C Programmer's Handbook	6-8 6-3
programming, in shell	see "shell scripts, how to write"	

Aids for Identifying Documents

Topic	Document Title	Page in Roadmap
programming languages, available on 386 base computer	AT&T Computer Software Catalog	6-2
release	see "new release"	
remote execution	see "network"	
run a job	User's/System Administrator's Reference Manual AT&T UNIX System V/386 User's Guide	6-15 6-14
running programs from menus	FACE User's/Administrator's Guide	6-5
schedule jobs in advance	User's/System Administrator's Reference Manual AT&T UNIX System V/386 User's Guide	6-15 6-14
scroll bar	FMLI Programmer's Guide	6-6
security, file	see "encryption"	
security, system	Operations/System Administration Guide	6-7
send information to another computer	see "network, connect to another computer"	
send information to other users	User's/System Administrator's Reference Manual AT&T UNIX System V/386 User's Guide	6-15 6-14
shell, how to use	User's/System Administrator's Reference Manual Shell Commands and Programming AT&T UNIX System V/386 User's Guide	6-15 6-11 6-14
shell scripts, how to write	Shell Commands and Programming AT&T UNIX System V/386 User's Guide	6-11 6-14

Aids for Identifying Documents

Topic	Document Title	Page in Roadmap
software architecture	Product Overview/Documentation Roadmap	6-8
software design	System V Interface Definition	6-13
software package, install	Operations/System Administration Guide Release Notes	6-7 6-10
sort data	AT&T UNIX System V/386 User's Guide	6-14
spelling errors, find and fix	User's/System Administrator's Reference Manual	6-15
spooler, lp	see "print data on paper"	
store data in a file	AT&T UNIX System V/386 User's Guide	6-14
STREAMS data structures	STREAMS Programmer's Guide	6-12
STREAMS kernel modules, how to write	STREAMS Programmer's Guide	6-12
STREAMS mechanism	STREAMS Primer	6-12
SVID, verify system forms to	System V Verification Suite User's Guide	6-14
syntax of commands	User's/System Administrator's Reference Manual	6-15
syntax of library functions	Programmer's Reference Manual	6-9
syntax of system calls	Programmer's Reference Manual	6-9
system administration, list of responsibilities	Operations/System Administration Guide	6-7
system administration from menus	FACE User's/Administrator's Guide	6-5

Aids for Identifying Documents

Topic	Document Title	Page in Roadmap
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system files, format of	Programmer's Reference Manual	6-9
system problems, troubleshoot	see "troubleshoot, system problems"	
system security	see "security, system"	
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text editor	see "editors, how to use"	
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transport interface routines	Network Programmer's Guide	6-7
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transport provider protocol, write interface	Network Programmer's Guide	6-7

Topic	Document Title	Page in Roadmap
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	Programmer's Reference Manual	6-9
troubleshoot, system problems	Operations/System Administration Guide	6-7
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Document Descriptions

Chapter 6: DOCUMENT DESCRIPTIONS

Document Descriptions

6-1

Document Descriptions

This chapter contains descriptions of documents that will help you take full advantage of your AT&T UNIX System V/386 Release 3.2. The descriptions are presented in alphabetical order by document title. Each document description contains entries with the following information:

- document title
- name of the product described
- any necessary prerequisite documents or knowledge
- intended audience for the document
- document ID number
- summary of the document's contents

As mentioned in the section "Conventions for Document Titles" in Chapter 1, references to documents about products whose name includes AT&T UNIX System V, etc. omit that qualifier from the title. In this chapter, the "Document Title" and "Prerequisites" entries in the document description follow this convention. Exceptions to this convention may occur in some instances for clarity's sake. For example, *Software Development Set Release Notes* and *System V Verification Suite Release Notes* are used to distinguish between the two documents.

To order documents described in this chapter, see the section "Ordering Information" in Chapter 1.

Document Descriptions

AT&T Computer Family Course Catalog

Product Described:	AT&T Computer Courses
Prerequisites:	None
Audience:	Users, programmers, administrators, sales and service people
Document ID Number:	300-002

This catalog describes courses available from AT&T for their 3B Computer family and the personal computer family. Some of the topics covered in the courses are an introduction to computer technology, operation and maintenance of hardware, system administration, networking administration, Tele-type 5620 DMD terminal programming and text applications, WE 32100 Microsystem architecture and software, using applications software, using editors, writing programs, preparing documents, and sales and marketing.

AT&T Computer Software Catalog

Product Described:	AT&T Computer Software Products
Prerequisites:	None
Audience:	All users
Document ID Number:	311-020

This catalog is a reference for software products that have been reviewed and/or certified for compatibility with AT&T computers running AT&T UNIX System V.

The software has been grouped into ten product categories: (Communications, Database Management Systems, Education/Training, General Business Applications, Graphics, Industry/Vertical, Integrated, Spreadsheets, Systems Programming, and Word Processors). The following information is provided for each product: company, compatible AT&T computers, distribution media (usually a diskette and/or 9-track tape), programming language used, hardware and software requirements, customer support, AT&T UNIX System V Release number, retail price, and distributor. An appendix illustrates AT&T printer compatibility. Indices provide cross-references to the catalog entries.

AT&T Computer Systems Catalog

Product Described:	AT&T Computer Systems
Prerequisites:	None
Audience:	Users who will be ordering computer systems
Document ID Number:	309-500

This catalog describes computer systems and options, and gives information on configuration and ordering. It has separate sections for the AT&T personal computers, AT&T 3B Computers, and AT&T networking systems. Each section begins with an overview of system hardware and software, memory, input/output, storage, and general cabinet configurations and expansion. Details follow, including listings of components in these categories: system packages, central processing unit (CPU) options, memory options, I/O options, disk options, tape options, networking, printers, terminals, and miscellaneous options.

C Programmer's Handbook

Product Described:	C Programming Language Utilities
Prerequisites:	<i>Programmer's Guide</i>
Audience:	C programmers
Document ID Number:	320-022

This handbook is an introduction and a reference to the C programming language for both beginning and experienced programmers. Topics covered include: syntax, data types, operators and expressions, statements, functions, declarations, the preprocessor, program structure, the I/O library, other libraries, formatted output, formatted input, portable C programs, and the character set.

Document Descriptions

C Programming Language, The

Product Described:	C Programming Language, The
Prerequisites:	A basic knowledge of programming, and <i>Programmer's Guide</i>
Audience:	C programmers
Document ID Number:	307-136

This book, written by B. Kernighan and D. Ritchie, and published by Prentice-Hall, is shipped with the C Programming Language Utilities package. It is meant to help you learn how to program in C and contains a tutorial introduction for new users. Each major feature of the language is covered in a separate chapter, and there is a reference manual. Examples at the end of each chapter give you practice in effective use of the language and illustrate useful algorithms and principles of good style and sound design.

Cartridge Tape Operation Guide

Product Described:	6386 WGS
Prerequisites:	None
Audience:	Administrator
Document ID Number:	Part of software kit Contact AT&T Sales Representative or authorized dealer

This document contains information dealing with installing and using the cartridge tape utilities, making back-ups, and restoring your files using a tape cartridge.

Editing Guide

Product Described:	AT&T UNIX System V
Prerequisites:	<i>User's/System Administrator's Reference Manual</i>
Audience:	All users
Document ID Number:	307-258

The UNIX System has several different methods for writing and storing text or computer programs into files. This guide gives tutorial introductions to **ed** and **ex** (interactive, line oriented editors), **vi** (a full screen, interactive editor), **sed** (a non-interactive Stream editor), and **bfs** (big file scanner).

AT&T FACE User's/Administrator's Guide

Product Described:	AT&T UNIX System V/386
Prerequisites:	Release Notes
Audience:	Users and administrators
Document ID Number:	Part of Foundation Set Documentation 999-300-520

This document provides an Overview of AT&T FACE, getting started with FACE, using FACE, System Administration, Installation and the Virtual Terminal Facility. The appendices of this document cover Troubleshooting, Customizing AT&T Menus Using FMLI Utilities, and the System Administration Of Add-On Packages.

The user section tells you everything you need to know about storing, manipulating, and displaying information within the FACE. You will also learn how to navigate within the FACE.

The administration section provides details for configuring the UNIX System. This section discusses UNIX System topics such as setting up electronic mail, support for parallel and serial devices and shutting the system down. Some of the functions in this section require system administration privileges that may not be available to a user.

Document Descriptions

FMLI Programmer's Guide

Product Described:	AT&T UNIX System V/386
Prerequisites:	UNIX System and programming background
Audience:	Programmers
Document ID Number:	Part of Software Development Set Documentation 999-300-521

This document contains information on using the AT&T Form and Menu Language Interpreter (FMLI) as a developer tool to program (define) forms, menus, and other types of frames. Forms and menus are types of windows (frames) used to help make the UNIX System more user friendly. The Interpreter handles the details of frame creation, placement, navigation between frames, and processing the use of frames and menus.

Integrated Software Development Guide (ISDG)

Product Described:	AT&T UNIX System V/386
Prerequisites:	application software, Intel 386 architecture
Audience:	VAR's, ISV's, and IHV's
Document ID Number:	999-300-523

This document specifically addresses the needs of the independent software vendor, the value-added reseller, and system developers. It presents guidelines for device driver development, application interfacing, installation script development, porting, and performance tuning.

Network Programmer's Guide

Product Described: AT&T UNIX System V/386
Prerequisites: *Programmer's Guide* and a background in data communications and networking, including the International Organization for Standardization (ISO) Open Systems Interconnection (OSI) reference model
Audience: Systems programmers
Document ID Number: Part of Network Programming Utilities Documentation 999-300-522

This guide introduces the AT&T Transport Interface, its capabilities, and its applications. It covers the goals of the transport interface, with discussions of OSI, transport protocols, and STREAMS; the transport interface routines in the Network Services Library; and the key areas of the development of applications that interface to transport protocols (illustrated examples).

Operations/System Administration Guide

Product Described: AT&T UNIX System V/386
Prerequisites: *User's/System Administrator's Reference Manual*
Audience: System administrators
Document ID Number: Part of Foundation Set Documentation Set 999-300-520

This document gives clear instructions on how to do administrative tasks. It describes when and why to do these tasks and suggests shell scripts that can help automate some tasks. It also serves as a quick reference for administrative procedures. Information is organized by tasks associated with major subject areas such as the processor (how to get AT&T UNIX System V Release 3.2 into operation and keep it going, the installation and removal of XENIX application packages), the file system (how to build and maintain a file system including the XENIX file system), the user services (things you need to do for other users), the outside world (networking, inter-machine communication), and routine security procedures for UNIX System administration. It includes information about RFS administration.

Document Descriptions

Product Overview/Documentation Roadmap

Product Described:	AT&T UNIX System V/386
Prerequisites:	None
Audience:	Current and potential users
Document ID Number:	Part of Foundation Set Documentation 999-300-520 or separately orderable 999-300-527

This overview/roadmap describes the software and documents for AT&T UNIX System V/386 Release 3.2 as packaged for the 386 Based Computer including XENIX System V compatibility.

Topics covered in the overview include the following: an overview of AT&T UNIX System V describing the kernel, shell, and file system; benefits of the UNIX System; contents of AT&T UNIX System V/386 Release 3.2, including descriptions of software packages; and descriptions of AT&T User Interface Utilities packages.

The roadmap provides illustrations and indices that help you decide which document or sequence of documents you need. Short descriptions of each available document, containing document title, ordering number, the name of the product described, necessary prerequisite knowledge, and a summary of the document's contents are given.

Programmer's Guide

Product Described:	AT&T UNIX System V/386
Prerequisites:	<i>User's/System Administrator's Reference Manual</i> <i>Programmer's Reference Manual</i>
Audience:	All programmers
Document ID Number:	Part of Software Development Set Documentation 999-300-521

This is a two-volume document. The document discusses the UNIX System programming environment as it appears to programmers. It describes relevant utilities (compilers, debuggers, etc.) and presents a generic view of how the UNIX System interfaces with a language (system calls, standard libraries, etc.). Included is a chapter on Extended Terminal Interface (ETI).

This document also defines such UNIX System tools as the C language, the Common Object File Format, and the Link Editor command language. It also includes tutorials on: Shared Libraries, **color curses/terminfo**, File and Record Locking facilities, Inter-Process Communication facilities, **awk** (pattern scanning and processing), **lex** (simple lexical analysis of text), **SCCS** (maintains versions of files automatically), **sdb** (symbolic program debugger), **yacc** (converts a set of rules into tables for use in parsing), and **ETI** (Extended Terminal Interface). Illustrations typically assume the tools will be used with C language programs.

It also describes the C Programmer's Productivity Tools (CPPT) product which contains two utilities: the **cscope** browser for examining or editing C source files, and the **lprof** profiler for line by line frequency profiling (determining the number of times each line of source code is executed). This document provides instructions for using **cscope** and **lprof**, and detailed examples of using these tools to improve C programs.

Programmer's Reference Manual

Product Described:	AT&T UNIX System V/386
Prerequisites:	<i>Programmer's Guide</i>
Audience:	All programmers
Document ID Number:	Part of Software Development Set Documentation 999-300-521

This manual contains the manual pages that describe the programming features of AT&T UNIX System V available to users who have the Software Development Set. Where necessary, modifications and additions have been made to include the XENIX System command information. This set contains the C Programming Language Utilities and Advanced Programming Utilities products. Included in the manual pages are descriptions of commands, system calls, subroutines, libraries, file formats, and miscellaneous information associated with these products. The manual also contains an introduction that explains how to use the manual and a permuted index.

Release Notes

Product Described: AT&T UNIX System V/386
Audience: System administrators
Document ID Number: Part of Foundation Set
Documentation 999-300-520

This document is intended for customers of AT&T UNIX System V/386 Release 3.2. It contains the following: installation notes for installing the AT&T UNIX System V/386 core file system, compatibility information describing last minute changes or corrections and a list of software work-arounds. The installation notes include a non-destructive installation procedure that allows the user to preserve files when installing over previously installed UNIX System releases.

Also, provided is a summary of the networking related features of this release, including how these features affect current users (compatibility information) and a list of software work-arounds. Network Support Utilities is required if your system has Remote File Sharing, STREAMS Mechanisms and Tools, the Transport Interface, Media-independent uucp, and the listener.

Release Notes, Software Development Set

Product Described: AT&T UNIX System V/386
Prerequisites: None
Audience: Programmers
Document ID Number: Part of Software Development Set
Documentation 999-300-521

This document describes the software features and software notes that are applicable to this release in association with the following:

- C Programming Language Utilities
- C Programming Productivity Tools
- Extended Terminal Interface
- Advanced Programming Language Utilities.
- XENIX

Shell Commands and Programming

Product Described:	AT&T UNIX System V
Prerequisites:	<i>User's/System Administrator's Reference Manual</i>
Audience:	All users
Document ID Number:	307-260

This document tells how to use the shell command interpreter to communicate with the UNIX System, and the shell programming language to do simple or complex procedures.

For example, the shell command language enables you to redirect output, string commands together so the output of one is used as the input to the next, and automatically generate filenames that contain similar characters. The shell programming language enables you to save a series of routine commands in a file, define variables, perform loops, perform tests, or perform sequential operations, just like a conventional programming language. There are many well-explained examples.

STREAMS Primer

Product Described: AT&T UNIX System V/386
Prerequisites: *Programmer's Guide* and a background in data communications and networking
Audience: Knowledgeable application programmers and system programmers
Document ID Number: Part of Network Programming Utilities Documentation 999-300-522

STREAMS is a major building block in the networking services provided by the UNIX System. This primer gives a high-level technical overview including: a summary of the STREAMS mechanism; a description of the applications and benefits of STREAMS; illustrations and definitions of STREAMS terminology; a simple example, discussed from both the applications and systems programmer's points of view; a discussion of the facilities provided by STREAMS, and a comparison of certain features of character input/output device drivers to STREAMS modules and drivers.

STREAMS Programmer's Guide

Product Described: AT&T UNIX System V/386
Prerequisites: *STREAMS Primer*
Audience: Knowledgeable application programmers and system programmers
Document ID Number: Part of Network Programming Utilities Documentation 999-300-522

This document is composed of two parts: one for application programmers who use STREAMS modules and one for system programmers who write STREAMS modules.

The first part of this document will provide design and programming information, as well as checklists, for the development and installation of STREAMS applications.

The second part of this document will provide STREAMS module design and programming information. It contains checklist information for the development and installation of STREAMS modules and device drivers.

System V Interface Definition

Product Described:	AT&T UNIX System V
Prerequisites:	<i>Programmer's Guide</i>
Audience:	Applications and system programmers
Document ID Number:	307-131

This document specifies an operating system environment where applications can be written to be independent of any particular computer hardware. It is applicable from personal computers up to mainframes. Users who conform to the System V Interface Definition (SVID) can take advantage of changes in technology and still preserve their software investment.

The *SVID* is a Base Interface Definition, plus a series of Extensions. The Base Interface Definition describes the services that all System V operating systems must provide. The extensions to the base are not required; however, when a component is present it must conform to the specified functionality. The emphasis is on defining a common computing environment for applications and users, and not on the internals of the operating system (such as the scheduler and memory manager).

System V Verification Suite Product Overview

Product Described:	System V Verification Suite (SVVS)
Prerequisites:	<i>System V Interface Definition</i>
Audience:	System V operating system developers
Document ID Number:	307-171

This overview describes software features, gives a brief technical description, and lists documents for the System V Verification Suite (SVVS).

SVVS tests that the resources of a System V operating system conform to the *System V Interface Definition* (SVID). In this way, SVVS verifies that source level interfaces are consistent across System V environments. An applications program that only uses components that are available in the SVID should be compatible with and portable to any system that provides the System V interface.

The SVVS tests can be invoked through a test driver. A report generator formats and prints test results. The test driver and report generator are controlled by a user-friendly front end.

System V Verification Suite Release Notes

Product Described: System V Verification Suite (SVVS)
Document ID Number: 307-172

This document describes how to install System V Verification Suite on the AT&T UNIX System V/386. In addition, it gives transition information for owners of an earlier product release.

System V Verification Suite User's Guide

Product Described: System V Verification Suite (SVVS)
Prerequisites: *System V Verification Suite Product Overview*
Audience: System V operating system developers
Document ID Number: 307-173

This guide describes the verification tests and what, specifically, the verifier tests, as well as the criteria used for testing and grading the system. The user interface is explained in detail, including the driver, journal, report generator, tests, and machine dependencies. Test results are explained with respect to general and test-specific errors. All manual pages applicable to SVVS are contained in an appendix.

AT&T UNIX System V/386 R3.2 User's Guide

Product Described: AT&T UNIX System V
Prerequisites: None
Audience: All users
Select Code: Part of Foundation Set
Documentation 999-300-520

This guide introduces a user to AT&T UNIX System V, the operating system of the AT&T UNIX System V/386 Release 3.2. The guide begins with a general description of the UNIX System, followed by instructions for using a terminal, and instructions for using the file system. Next, it presents tutorials on the three most commonly used tools of the UNIX System: the line editor (**ed**), the screen editor (**vi**), and shell programming (**sh**). Finally, the guide teaches how to communicate with other users of a UNIX System. The reader learns how to exchange messages and files by executing commands such as **mail**, **mailx**, **uuto**, **uupick**, and **uucp**. The guide also includes a glossary and an index.

User's/System Administrator's Reference Manual

Product Described: AT&T UNIX System V/386
Prerequisites: *Operation/System Administration Guide*
Audience: System administrators
Document ID Number: Part of Foundation Set
Documentation 999-300-520

This document describes the UNIX System commands used by system administrators. When appropriate, diagnostic indications, warnings, examples of use, and where to find related information are given.

An "Introduction" describes how to use the manual, and gives basic information needed to get started – logging in and out, and how to run a program. There is a Permuted Index to the command names, and a description of the commands.

vi User's Handbook, The

Product Described: AT&T UNIX System V
Prerequisites: *User's/System Administrator's Reference Manual*
Audience: All users
Document ID Number: 307-138

This short handbook is an introduction and a reference to the **vi** (visual) text editor, for both beginning and experienced users. It includes a summary of **vi** commands, tells how to enter and exit the **vi** editor, display text, move the cursor, search for patterns, add changes, delete text, undo changes, copy and move text, manipulate files, set the **vi** environment, and use **vi** macros and shell commands.

Document Descriptions

Product Overview, XWIN Graphical Windowing System

Product Described:	XWIN Graphical Windowing System
Prerequisites:	<i>None</i>
Audience:	Users/Programmers
Document ID Number:	999-300-526

This document provides a system overview, background information, enhancements, and packaging of the AT&T XWIN Graphical Windowing System Featuring AT&T OPEN LOOK Window Manager.

Visual Editor Quick Reference

Product Described:	UNIX System V
Prerequisites:	<i>User's/System Administrator's Reference Manual</i>
Audience:	Visual editor users
Document ID Number:	307-262

This reference card tells how to enter and leave the **vi** editor, position the cursor, create text, make corrections during text creation, modify text; undo, redo, and retrieve changes; do global searches and changes; manipulate files; escape to the shell; mark and return; do miscellaneous operations; and set options.

Writing Efficient Programs

Product Described:	C Programmer's Productivity Tools
Prerequisites:	Knowledge of programming principles and <i>Programmer's Guide</i>
Audience:	Experienced programmers
Document ID Number:	320-004

This document, written by Jon Bentley and published by Prentice-Hall, addresses the problem of efficiency; often crucial to the usefulness of a software system. A set of general rules to achieve efficiency are described and illustrated with fragments of PASCAL code; examples of use in real systems; and in-depth studies of several subroutines. Challenging exercises conclude each chapter. It also discusses issues of maintenance, robustness, and development time. Appendices give details of the example programs used in the text, a summary of the rules, and a short overview of the PASCAL dialect used in the book.

Glossary

The Glossary defines words and phrases that have become part of the everyday vocabulary of people who use AT&T Computers and the UNIX operating system.

add-on product

A product that AT&T markets for use with the UNIX operating system.

boot

To start the operating system. So called because the kernel must bootstrap itself from secondary storage into memory. No login or process persists across a boot.

command

1. An instruction to the shell, usually to run a program as a child process.
2. By extension, any executable file, especially a utilities program.

device

1. A file that is neither an ordinary text file nor a directory. Tape drives, the null device, and special files are examples.
2. A physical input/output unit.

diagnostic

A diagnostic is a message printed at your terminal that identifies and isolates program errors.

directory

A file that contains files and other directories rather than data or software itself. The organizing principle of the file system, a directory consists of entries that specify further files and constitutes a node of the directory tree.

execute

Informally, to run a program.

file

1. In general, a potential source of input or a destination for output.
2. A directory entry; several directory entries may name the same file.

Glossary

file system

1. A collection of files that is accessible by some path from the root directory of the file system.
2. The collection of all files on a computer.
3. The part of the kernel that deals with file systems.

filter A program that reads data from standard input, transforms it in some way, and writes the results to standard output.

kernel The UNIX system proper; resident code that implements the system calls.

library An archive of object files from which the link editor may select functions and data as needed.

operating system

The program that manages the resources of the computer. It takes care of such things as input/output procedures, process scheduling, the file system, and removing this burden from user programs.

program

1. An executable file.
2. A process.
3. All the usual meanings.

redirection

The feature that reassigns standard input and standard output to files or other devices.

shell

1. The program (called **sh**) that causes other programs to be executed on command; the shell is usually started on a user's behalf when the user logs in.
2. By analogy, any program started upon logging in.

spool

To collect and serialize output from multiple processes competing for a single output service, such as a printer or automatic calling unit.

spooler A program that spools.

spool area A directory in which a spooler collects work.

system calls

1. The set of system primitive functions through which all system operations are allocated, initiated, monitored, manipulated, and terminated.
2. The system primitives invoked by user processes for system-dependent functions, such as I/O, process creation, etc.

UNIX system The name of a family of operating systems such as UNIX System V. (UNIX is not an acronym.) A trademark of AT&T, UNIX should be used as an adjective; for example, "UNIX system," "UNIX software."

Utilities package

A group of programs that performs related functions; examples of packages are directory and file management, performance measurement, and line printer spooling.

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