IBM Network Tape Access and Control System for AIX General Information Version 1 Release 1

Document Number GC23-3990-00

Note!

Before using this information and the product it supports, be sure to read the general information under “Notices” on page v.

First Edition (February 1996)

This edition applies to Release 1 of the IBM Network Tape Access and Control System for AIX (NetTAPE) Licensed Program, program number 5765-637, and the IBM NetTAPE Tape Library Connection (NetTAPE Tape Library Connection) Licensed Program, program number 5765-643, and to all subsequent releases and modifications until otherwise indicated in new editions or Technical Newsletters. This is a new manual.

Order publications through your IBM representative or the IBM branch office serving your locality. Publications are not stocked at the address given below.

IBM welcomes your comments. A form for your comments appears at the back of this publication. If the form has been removed, address your comments to:

IBM Corporation, Department 55JA, Mail Station P384
522 South Road
Poughkeepsie, NY 12601-5400
United States of America

FAX: (International Access Code)+1+914+432-9405

IBMLink (United States customers only): KGNRCF at KGNVMC
IBM Mail Exchange: USIB27BQ at IBMMAIL
Internet: kgnrcf@vnet.ibm.com

When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

© **Copyright IBM Corporation 1996. All rights reserved.**

Note to U.S. Government Users — Documentation related to restricted rights — Use, duplication or disclosure is subject to restrictions set forth in GSA ADP Schedule Contract with IBM Corp.

Contents

Notices v
Trademarks v
Special Terms vi
Related Publications vi

Introducing IBM's Network Tape Products for AIX 1
The Major Benefits of NetTAPE 4
Flexibility 4
Investment Protection 4
Transparency 4
How Can You Use NetTAPE? 5
Sharing Devices between Systems 5
Sharing Data between Platforms 5
Programming AIX Tape Applications More Easily 5
The Major Functions of NetTAPE 6
Consolidated Control of Distributed Tape Operation 6
Transparent, Automated Access to Remote Tape Devices 7
Support for Standard Tape Formats 8
Support for Automation Features of Tape Devices 9
NetTAPE Documentation 10

Overview of NetTAPE Operation 11
NetTAPE Data Flow Overview 11
Using the NetTAPE Tape Command Line Interface 12
Using the NetTAPE Tape API 13

Supported Hardware and Software 15
Workstation Hardware 15
Workstation Software 15
NetTAPE Tape Device Support 15
NetTAPE Tape Library Connection Tape Device Support 16

Operation of NetTAPE with Other Products 19
Operation with ADSM 19
Coexistence with CLIO/S 19
Integration with Non-AIX Workstations 19

© Copyright IBM Corp. 1996

Notices

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service is not intended to state or imply that only IBM's product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any of IBM's intellectual property rights may be used instead of the IBM product, program, or service. Evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, are the user's responsibility.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
500 Columbus Avenue
Thornwood, NY 10594
USA

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
Mail Station P300
522 South Road
Poughkeepsie, NY 12601-5400
USA
Attention: Information Request

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

Note: IBM is exclusively responsible for sales, service, and support for the IBM Network Tape Access and Control System for AIX and IBM NetTAPE Tape Library Connection products.

Trademarks

The following terms are trademarks of the IBM Corporation in the United States or other countries or both:

© Copyright IBM Corp. 1996

ADSTAR
AIX
DB2
IBM
IBMLink
POWERparallel
RISC System/6000
RS/6000
RISC System/6000 Scalable POWERparallel Systems
Scalable POWERparallel Systems
SP

UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company Limited.

Other company, product, and service names, which may be denoted by a double asterisk (**), may be trademarks or service marks of others.

Special Terms

Standard data processing terms are used in this book.

The term workstation includes both RISC System/6000 workstations and RISC System/6000 Scalable POWERparallel Systems (SPs).

Related Publications

CLIO/S: NetTAPE and NetTAPE Tape Library Connection can coexist with MVS and AIX systems that run the IBM Client Input Output/Sockets (CLIO/S) licensed program, program number 5648-129. For more information about CLIO/S, see *CLIO/S General Information*, GC23-3879.

Introducing IBM's Network Tape Products for AIX

IBM provides two network tape products for AIX:

- IBM Network Tape Access and Control System for AIX (NetTAPE)
- IBM NetTAPE Tape Library Connection (NetTAPE Tape Library Connection).

NetTAPE is a program that provides consolidated tape operations and transparent access to a wide variety of remote tape devices on a network of AIX workstations. NetTAPE supports both RISC System/6000 workstations and RISC System/6000 Scalable POWERparallel Systems (SPs), and this book uses the term workstation to refer to both.

NetTAPE Tape Library Connection builds on NetTAPE, adding support for robotic tape library devices. These devices include the IBM 3494 and IBM 3495 Tape Library Dataservers and StorageTek** tape library devices. NetTAPE is a prerequisite product for NetTAPE Tape Library Connection.

Through a set of commands and application programming interfaces (APIs), NetTAPE makes it easier to access data on tape in a network of AIX workstations.

NetTAPE lets you set up your tape operation in the way that is most beneficial to your organization. One or more operators can manage a group of tape devices from a single workstation or multiple workstations, using either a Motif-based graphical user interface or a set of commands. Whether your tape operation is controlled from one or more workstations, all of your operators see the same image of the tape environment. Figure 1 on page 2 shows a sample screen for tape operators.

Multiple physical tape devices can be assigned to one or more logical pools, making tapes easier to use by workstation users. A user or application can request a tape volume to be mounted without having to be concerned about the actual physical device or its status or, if the default pool is acceptable, even the pool to which the device is assigned. Smoother and more central tape operation allows the user to concentrate on processing the data on the tape rather than the mechanics of accessing the tape itself.

In addition, NetTAPE supports a variety of IBM and ANSI standard tape formats. This means you can use AIX workstations to process tapes that were created on other systems, such as MVS.

© Copyright IBM Corp. 1996

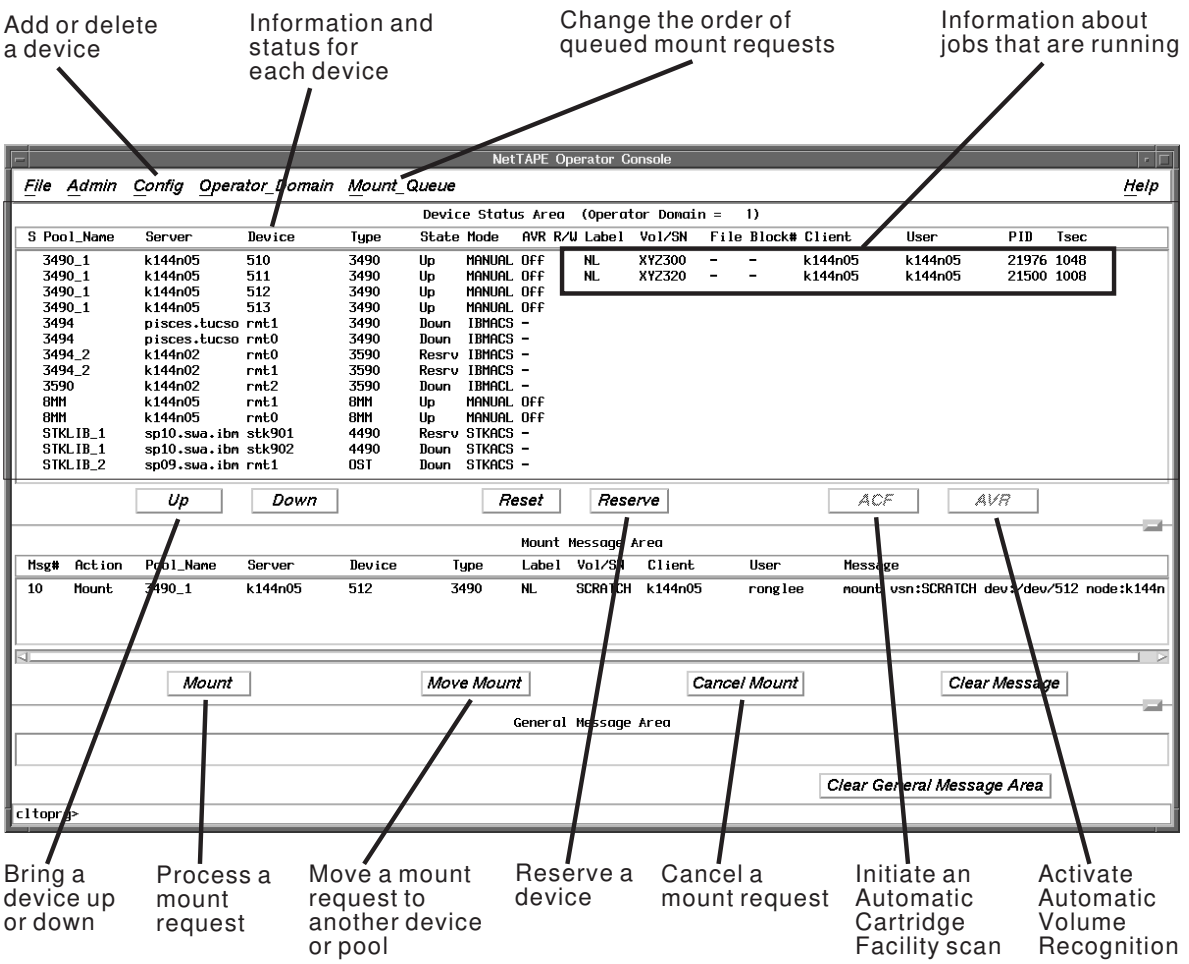

Figure 1. Sample NetTAPE Tape Operator Screen

NetTAPE can be used to:

- **Quickly move data between workstations**. For example, you can store large volumes of seismic data on tape and manage it using one of your workstations as a data server to other workstations in the network. This solution allows you to centralize tape management on a single workstation, perhaps offloading it from a mainframe system, while expanding seismic processing capacity by distributing the work.
- **Access a tape device on a remote AIX workstation as though it were attached locally to your own workstation**. For example, you can store data on tape devices in one location and access it using NetTAPE connections. Or you can use standard AIX tape commands to back up data across a network.
- **Read tapes that were created on other systems and create tapes in formats that can be used on those systems**. NetTAPE supports a variety of IBM and ANSI standard tape formats, as well as unlabeled tapes that are standard for the UNIX** operating system. This lets you exchange tape data easily between platforms (for example, between MVS and AIX) and gives you more flexibility in deciding where to acquire and process the data.

With NetTAPE Tape Library Connection, you can:

- **Use tape library devices to centralize and automate tape operations**. NetTAPE Tape Library Connection supports advanced tape library devices such as the IBM 3494 and 3495 Tape Library Dataservers and StorageTek tape library devices. NetTAPE lets you take advantage of the large capacity and automatic features of these hardware devices in an AIX environment.
- **Share tape devices between ADSTAR Distributed Storage Manager (ADSM) for AIX servers and other AIX users or applications in your network.** NetTAPE can be used to share tape devices dynamically between multiple AIX applications, including ADSM for AIX Version 2.1 servers. With NetTAPE Tape Library Connection, supported devices for this sharing include the IBM 3494 and 3495 Tape Library Dataservers and StorageTek tape library devices.

The Major Benefits of NetTAPE

Flexibility

Flexibility benefits include:

- Centralized tape device operation in an AIX environment
- Support of multiple tape formats, allowing mainframe-created tapes to be processed on workstations and vice versa
- Access to tape data across a network using standard AIX commands (**tar**, **dd**, **cpio**, **backup**, and **restore**)
- Application programming interfaces available for C and FORTRAN
- Communication with MVS tape systems when CLIO/S[1] is installed.

Investment Protection

Investment protection benefits include:

- Shared use of expensive tape devices by both a network of workstation users and other systems, including MVS mainframe systems
- Support of multiple tape formats, protecting your data acquisition investment
- Centralized tape operation that features a graphical user interface for tape operators, requiring minimal operator retraining
- Support for automation, reducing operator expenses
- With NetTAPE Tape Library Connection, support for tape libraries.

Transparency

Transparency benefits include:

- Tape device transparency — NetTAPE lets you access tape data on any supported tape device using standard AIX commands (such as **tar**)
- Network transparency — programs that use tape routines work regardless of where the data resides.

[1] Client Input Output/Sockets (CLIO/S) (program number 5648-129) is a set of commands and application programming interfaces that can be used for high-speed communication and for accessing tape devices on a network of AIX workstations and MVS mainframes.

How Can You Use NetTAPE?

Here are some examples of how NetTAPE and NetTAPE Tape Library Connection can be used.

Sharing Devices between Systems

A company with a large database wants to use ADSM for AIX to provide highly automated backup and archive functions for its mission-critical database. At the same time, it wants to allow access by other users and applications in the network to the same tape library devices to which the database is backed up. These distributed users run AIX applications that analyze data on tape, providing decision support to the company.

With NetTAPE and NetTAPE Tape Library Connection, this company can use the same device for highly automated backup to tape and distributed tape applications. An IBM 3494 Tape Library Dataserver attached to a NetTAPE Tape Library Connection server on an RISC System/6000 that also runs ADSM for AIX gives them the best of both worlds.

Sharing Data between Platforms

A petroleum services company processes a huge amount of raw data, filling thousands of tape volumes. It wants a way to offload the processing of the data to its network of RISC System/6000s, while continuing to create the data on MVS. Using NetTAPE, this company can achieve its goal because AIX users and applications can process the data on the MVS standard label tapes that are mounted on tape devices attached to AIX systems.

Programming AIX Tape Applications More Easily

A company with a substantial investment in programming personnel who write AIX tape application programs has been looking for ways to increase their productivity. By using NetTAPE, the company's programmers can take advantage of a tape application programming interface, spending less time coding the intricacies of tape I/O than with lower-level AIX system call interfaces. Using NetTAPE, programmers can code applications for multiple tape devices faster and with less complicated testing.

The Major Functions of NetTAPE

The NetTAPE product provides industrial-strength tape support in an AIX environment. With NetTAPE, your AIX end users, application programmers, and operators get a single-system image for tape devices. NetTAPE provides:

- Consolidated control of distributed tape operation
- Transparent, automated access to remote tape devices by end users and application programs
- Support for standard tape formats
- Support for automation features of tape devices.

Here's more on how these features can help you.

Consolidated Control of Distributed Tape Operation

NetTAPE provides a flexible and easy-to-use tape operation environment that includes a complete operator interface, a single-system view of tape operations, and tape label processing.

Tape devices can be grouped by device type into multiple device pools. This allows more flexibility in assigning tape drives to users and requires less knowledge by users about the individual tape drives.

Tape devices can also be grouped into multiple operator domains. This means you can have flexibility in assigning responsibility for tape drives to operators. Here are some of the possible ways that you can assign responsibility for tape drive operation:

- One operator can control all of the tape drives in your operation from a single workstation.
- You can divide up your tape operations among several operators, each controlling a subset of the tape drives from a separate workstation
- You can set up some domains so that users can mount their own tapes. Automatic volume recognition makes it easy for a user to mount a labeled tape and then access the tape by its volume identifier rather than hardware device.

Whether you control tape operations at one workstation or several, all operators see the same view of the network's tape operation environment.

NetTAPE manages access and ownership permissions to tape devices so that only the user that allocates the device can read from and write to it.

A tape operator can move a user's mount request to another tape drive for purposes of maintenance or load balancing. NetTAPE support of mount queue management allows your installation to make the best use of its tape hardware. A tape operator can also suspend a running job to free a tape device for a more important job. The suspended job can be resumed later when the higher-priority job has finished or immediately on another device.

A Motif-based graphical user interface for tape operators reduces operator error and makes tape devices easier to manage. Tape device status is provided by a tape status daemon. A command line interface for operators is also provided.

With NetTAPE, you can automate many tape operations. For example, the operator can load multiple tape volumes on devices that have automatic cartridge loaders. Cartridge loading is supported in manual, automatic, and random modes, depending on the capability of the hardware. On devices that support random mode, tape volumes do not necessarily have to be loaded in the order in which they will be used. At the end of a tape, the system switches automatically to the next tape volume, without operator intervention.

When you add NetTAPE Tape Library Connection to NetTAPE, you get support for a number of IBM and StorageTek robotic tape library devices. By including one or more of these automated tape devices in your distributed AIX tape environment, you can achieve a state-of-the-art, lights-out tape operation.

Transparent, Automated Access to Remote Tape Devices

NetTAPE provides two ways to access a tape device on a NetTAPE workstation:

- Using standard AIX commands and system calls
- Using the NetTAPE tape command line interface and application programming interface.

The NetTAPE tape pseudo device driver lets you use many AIX commands and system calls to access tapes on remote systems. You can use AIX commands, such as **tar**, **dd**, **cpio**, **backup**, and **restore**. For example, you can use the AIX **tar** command to back up files to a tape on another AIX system. Alternatively, you can use an application that issues AIX system calls, such as **open**, **read**, **write**, and **ioctl**.

The NetTAPE tape pseudo device driver also lets you use the NetTAPE tape command line interface to access data on remotely-attached tapes transparently and more easily than standard AIX commands. For example, you can use the **cltalloc** command to specify a tape device by device pool without having to be concerned with the actual device.

The NetTAPE tape command line interface consists of the following commands:

- **cltalloc**—allocate and access a virtual tape device
- **cltopen**—access a new dataset
- **cltclose**—close a dataset
- **cltvols**—get a list of tape volumes
- **cltunall**—release a virtual tape device
- **cltterm**—terminate NetTAPE daemons (a privileged command).

With the command line interface, a user can allocate a tape, process the data, and release the tape device. For an example, see “Using the NetTAPE Tape Command Line Interface” on page 12.

The NetTAPE tape server lets you access all standard tape operations using an application programming interface (API). The tape server has a read-ahead, write-behind function to improve network tape performance across TCP/IP.

The NetTAPE tape API consists of the following functions:

- **ctpalloc**—allocate a tape device
- **ctpopen**—open a tape device for use
- **ctpread**—read from a tape
- **ctpwrite**—write to a tape
- **ctpioctl**—issue an **ioctl** command
- **ctprew**—rewind a tape
- **ctpskpf**—skip tape files
- **ctpskpr**—skip tape records
- **ctpweof**—write tape marks
- **ctpvols**—get a list of tape volumes
- **ctpclose**—close a tape
- **ctpunall**—release a tape device.

With the tape API, a user-written application can allocate a tape, process the data, and release the tape device. For an example, see “Using the NetTAPE Tape API” on page 13.

Much of the communication that AIX normally requires between user and operator is handled by the NetTAPE software. A user request to allocate a tape device automatically causes a mount request to be sent to an operator (for manual mount devices) or to an automated tape device.

NetTAPE also supports automatic volume recognition. In situations where a labeled tape has already been loaded into a tape device, a user can allocate the tape by its volume identifier.

Support for Standard Tape Formats

When it comes to processing data on tape, NetTAPE gives you more options than do standard AIX tape functions.

In addition to the unlabeled tapes that are standard for the UNIX operating system, NetTAPE supports IBM standard label and ANSI standard label tapes. Multifile ANSI standard label tapes are also supported, as are multivolume tapes. You can create or use tapes that are organized in the following ways:

- A single file on a single tape volume
- A single file on multiple tape volumes
- Multiple files on a single tape volume
- Multiple files on multiple tape volumes.

Support of these different formats means that workstation users can process tapes that were created on MVS systems and can create tapes that will later be used on MVS systems. Thus, NetTAPE increases the portability of your data on tape.

At the application programming interface level, NetTAPE supports tape characteristics that are compatible with MVS tape management (for example, tape labels, volume IDs, and dataset organization and formats).

Support for Automation Features of Tape Devices

With NetTAPE, cartridge loading is supported in manual, automatic, and random modes, depending on the capability of the hardware.

When you add NetTAPE Tape Library Connection to NetTAPE, you get support for a number of IBM and StorageTek robotic tape library devices.

For details on tape device support, see “NetTAPE Tape Device Support” on page 15 and “NetTAPE Tape Library Connection Tape Device Support” on page 16.

NetTAPE Documentation

This manual is available in two ways:

- **From the IBM MKTTOOLS disk.** Ask your IBM representative to retrieve the NETTAPE package.
- **From an anonymous FTP server.** To copy the file from this server, use **ftp** to connect to **lscftp.kgn.ibm.com** using the user ID **anonymous** and your Internet address as the password. The document is /**pub**/**pps**/**nettape**/**nettape_gi.ps.Z**

  The file is compressed. Download it in binary mode and then uncompress it using the AIX **uncompress** command, as follows:

  ```
  uncompress nettape_gi.ps.Z
  ```

  The /**pub**/**pps**/**nettape** directory will also contain the *NetTAPE User's Guide and Reference* and other information.

Overview of NetTAPE Operation

This chapter provides several high-level overviews of how you can access data using the NetTAPE tape command line interface and the NetTAPE tape API. It includes:

- "NetTAPE Data Flow Overview"
- "Using the NetTAPE Tape Command Line Interface" on page 12
- "Using the NetTAPE Tape API" on page 13.

In this section, "AIX" refers to either a RISC System/6000 or an RS/6000 SP system.

NetTAPE Data Flow Overview

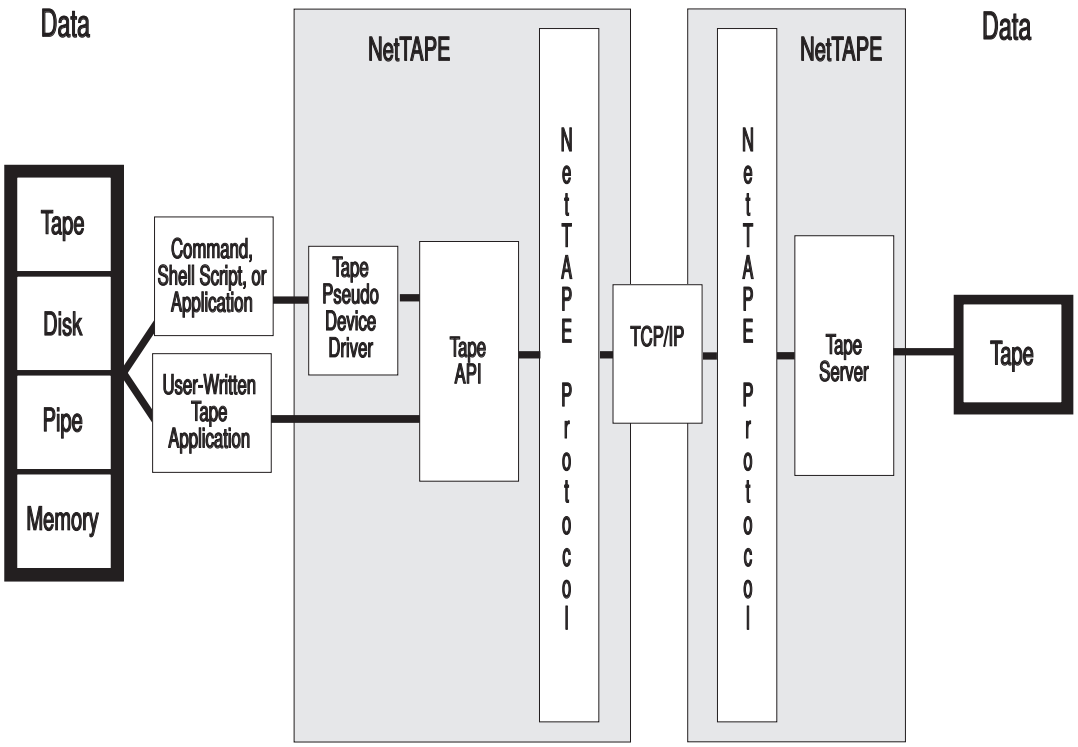

Figure 2. NetTAPE Data Flow Overview

© Copyright IBM Corp. 1996

Using the NetTAPE Tape Command Line Interface

You can use the NetTAPE tape command line interface to access AIX tapes from another AIX system, as shown in Figure 3.

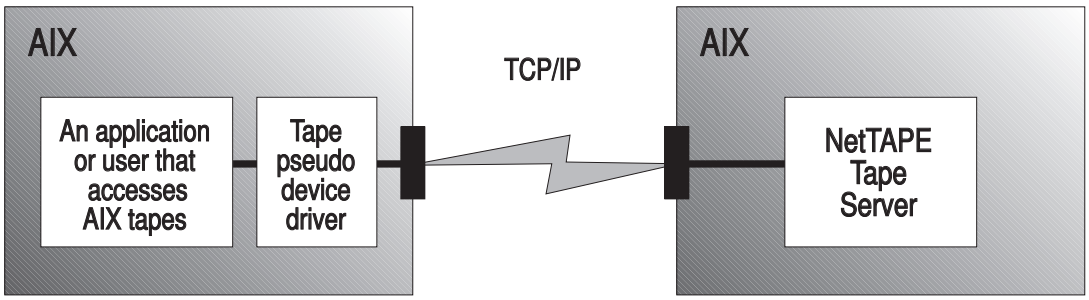

Figure 3. Using the NetTAPE Tape Command Line Interface

Here is a sample command sequence:

```
cltalloc -P 3490_pool
tar -cvf $HOME/mytape /bin
cltunall
```

This command sequence:

- Defines a tape device from a pool of devices called **3490_pool** using the default tape pseudo device name (**$HOME**/**mytape**)
- Creates a **tar** file
- Releases the tape device.

Using the NetTAPE Tape API

You can write an application that uses the NetTAPE tape API to access AIX-attached tapes from remote workstations, as shown in Figure 4.

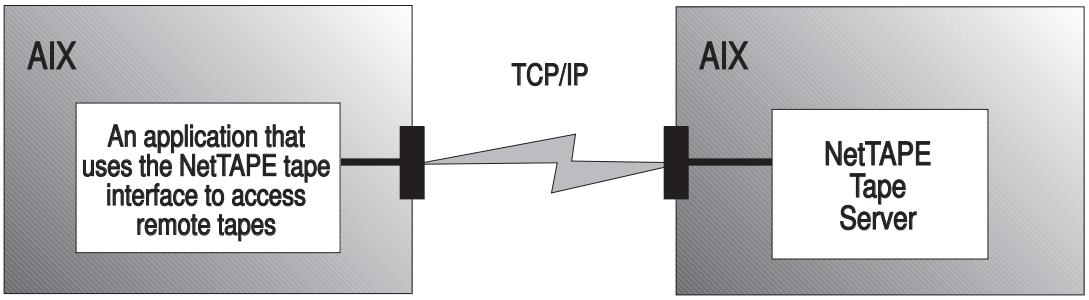

Figure 4. Using the NetTAPE Tape API

Here is a sample sequence of statements using C language interface functions of the NetTAPE tape API:

```
ctpalloc(tplu1, ,150,POOL=3490_pool,dummy)
ctpopen(tplu1, ,3)
ctprew(tplu1)
ctpread(tplu1,buffer,50)
ctpclose(tplu1,0)
ctpunall(tplu1)
```

This sequence:

- Defines a tape device from a pool of devices called **3490_pool**
- Opens the device
- Rewinds the device
- Reads data from the tape
- Closes the device
- Releases the tape device.

Supported Hardware and Software

The following sections list the hardware and software requirements for NetTAPE and NetTAPE Tape Library Connection.

Workstation Hardware

NetTAPE and NetTAPE Tape Library Connection require one or more of the following workstations:

- IBM RISC System/6000 7009 Model C10, 7012, 7013, or 7015
- IBM RISC System/6000 Scalable POWERparallel Systems (SP).

NetTAPE and NetTAPE Tape Library Connection use TCP/IP for the transfer of data between workstations. The TCP/IP connection can use any hardware supported by TCP/IP, including the High Performance Switch, Fiber Distributed Data Interface (FDDI), FCS, Ethernet, or token-ring.

Workstation Software

NetTAPE requires one of the following products:

- IBM AIX Version 3.2.5 (program number 5756-030)
- IBM AIX Version 4.1.4 (program number 5765-393).

NetTAPE Tape Library Connection requires the following product:

- IBM Network Tape Access and Control System for AIX Release 1 (program number 5765-637).

NetTAPE Tape Device Support

NetTAPE supports the tape devices listed below when they are attached to an AIX workstation. For information about the software and hardware requirements for attaching these devices to the AIX workstation, see the hardware documentation for the devices.

- The Ampex DST** 310 Tape Drive

  This Ampex product is supported but not warranted by IBM.
- The IBM 3420 Magnetic Tape Unit
- The IBM 3480 Magnetic Tape Subsystem, including support of the automatic cartridge loader (ACL) in serial mode
- The IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models C10, C11, and C22, including support of the automatic cartridge loader (ACL) in serial mode
- The IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models E01 and E11, including support of the Cartridge Stack Loader in serial mode

© Copyright IBM Corp. 1996

- The IBM 3490E Magnetic Tape Subsystem, including support of the automatic cartridge loader (ACL) in serial mode
- The IBM 3590 High Performance Tape Subsystem, including support of the Automatic Cartridge Facility (ACF) in random or serial mode.

In addition, NetTAPE provides limited tape processing support for devices that are supported by the standard AIX SCSI tape device driver. NetTAPE does not support tape label processing or record format handling for these devices. NetTAPE allows access to these devices as no-label tapes only (standard UNIX format).

The following types of tape drives are currently supported by the AIX SCSI tape device driver. You can use SMIT to list all of the supported tape drives and to configure them to AIX.

- 4mm tape drives of various capacities, such as the IBM 7206 Model 005 External 4mm Tape Drive
- 8mm tape drives of various capacities, such as the IBM 7208 Model 011 External 8mm Tape Drive
- 1/4-inch tape drives of various capacities, such as the IBM 7207 Model 012 External 1/4-inch Cartridge Tape Drive
- 1/2-inch, 9-track tape drives, such as the IBM 9348 Model 012 Tape Drive.

NetTAPE allows twin-tailed tape devices to be shared by multiple NetTAPE workstations.

NetTAPE Tape Library Connection Tape Device Support

When installed with its prerequisite product, NetTAPE, NetTAPE Tape Library Connection adds support for the tape devices listed below when they are attached to an AIX workstation. For information about the software and hardware requirements for attaching these devices to the AIX workstation, see the hardware documentation for the devices.

- The IBM 3494 Tape Library Dataserver
- The IBM 3495 Tape Library Dataserver
- The StorageTek WolfCreek** 9360 Automated Cartridge System.

  This StorageTek product is supported but not warranted by IBM.

NetTAPE Tape Library Connection uses the StorageTek Client System Component (CSC) Developer's Toolkit Version 2.1 which interfaces with the StorageTek Automated Cartridge System Library Server (ACSLS). Applications, such as NetTAPE Tape Library Connection, that are written to the ACSLS interface should have access to any existing StorageTek tape libraries. Other StorageTek tape library devices that are supported by the StorageTek ACSLS interface are also expected to function with NetTAPE Tape Library Connection. Examples of these devices, which have not been explicitly tested by IBM, are the following:

- The StorageTek 4400 Automated Cartridge Subsystem
- The StorageTek PowderHorn** 9310/9311 Automated Cartridge Subsystem.

Operation of NetTAPE with Other Products

This chapter describes the operation of NetTAPE with other products.

Operation with ADSM

NetTAPE can be used to share tape devices dynamically between multiple AIX applications, including ADSM for AIX Version 2.1 servers. With NetTAPE Tape Library Connection, supported devices for this sharing include the IBM 3494 and 3495 Tape Library Dataservers and StorageTek tape library devices.

Coexistence with CLIO/S

The optional Tape Server feature of the Client Input Output/Sockets (CLIO/S) program (program number 5648-129) provides basic support of remote tapes. NetTAPE and CLIO/S can coexist on the same AIX system, providing complementary functions.

If you want to allow AIX users to access MVS tapes or allow MVS users to access AIX tapes, you must install CLIO/S (with the Tape Server feature) on both MVS and AIX.

If you install NetTAPE (with or without NetTAPE Tape Library Connection) and CLIO/S (with the Tape Server feature) on the same AIX workstation, they do not interfere with each other. On an AIX workstation that has both, NetTAPE looks at the syntax of the command or function call that was issued and passes it to CLIO/S if appropriate.

Integration with Non-AIX Workstations

This release of NetTAPE supports only AIX workstations.

© Copyright IBM Corp. 1996