IBM

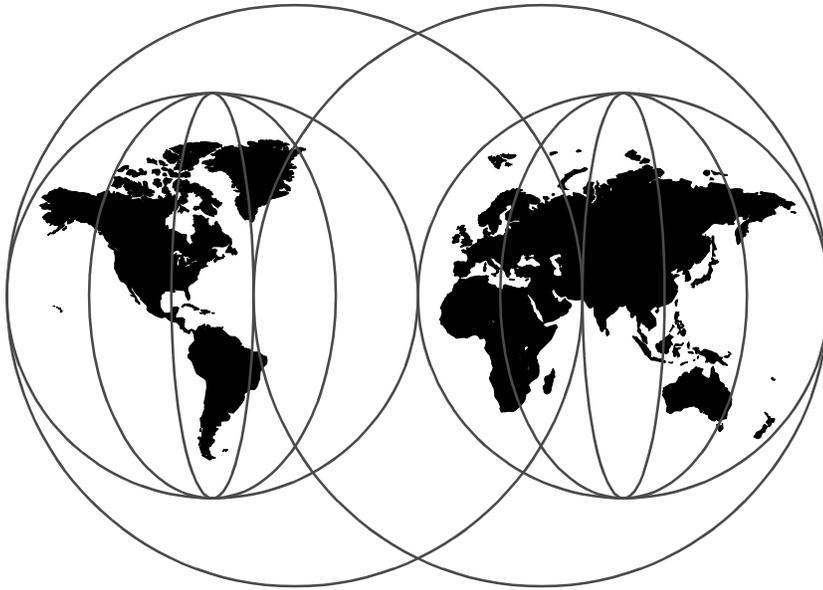# Migrating to OS/2 Warp Server for e-business

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International Technical Support Organization

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SG24-5135-00

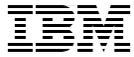International Technical Support Organization

Migrating to OS/2 Warp Server for e-business

January 1999

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Preface

Migrating to OS/2 Warp Server for e-business explores important migration issues for network administrators in charge of migrating their servers from previous OS/2 Warp Server and OS/2 LAN Server releases to the latest member of the OS/2 Warp Server family. In addition to migration issues, this document discusses many new product features introduced with OS/2 Warp Server for e-business, such as Logical Volume Manager, Journaled File System (JFS), new CID functions, and how administrators can make use of them.

System administrators, network specialists, network managers, and other technicians can refer to this book to understand, plan, and execute the migration task. We emphasize effective migration scenarios providing real world examples of procedures that will ease the migration process.

The Story of Y2K — To Fail or Not To Fail

What is Y2K? Discussed in the media all over the world, the Year 2000 issue has been made aware to the computerized world slowly but surely. The Year 2000 problem, or Y2K, originated in the 1960s when software developers conserved valuable memory — memory at that time was precious and expensive — by shortening the year date field from four digits to two. For example, the year 1999 is represented digitally as 99. The problem arises when the world's clocks move from December 31, 1999 to January 1, 2000, which many systems may recognize as 1900. Many personal computers, elevators, security systems, telephone switches, automated processes that are based on microprocessors, and computer software may fail.

IBM has addressed the Year 2000 problem and has created awareness for many years. Hardware and software that is capable of functioning beyond the year 2000 is called Year 2000-compliant. OS/2 Warp Server for e-business with all its subcomponents meets all Year 2000 requirements and is fully Year 2000-compliant. To make it safely into the year 2000, make sure the hardware on which the new server operating system is being installed is also year 2000-compliant.

How This Book Is Organized

Depending on your exact migration scenario, you may need to refer to the chapters in this book in a different order. We recommend that you read Chapter 1 for a good understanding and overview of OS/2 Warp Server for e-business. Then proceed to Chapter 2 and use the flowchart in Figure 1 on

page 19 to determine how to use the remaining chapters of the book. The chapters in this book include:

1. Introduction

2. Planning and Considerations

3. Preparing the Migration Process

4. Local Migration

5. Remote Migration through CID

6. Migrating the Hardware

7. Migrating to the Journaled File System, JFS

In the appendices, you will find some specialized information on:

- Useful Tools
- LAN Server Management Tools, LSMT

The Team That Wrote This Redbook

This redbook was produced by a team of specialists from around the world working at the International Technical Support Organization, Austin Center.

Oscar Cepeda is an Advisory Software Engineer and Project Leader at the International Technical Support Organization, Austin Center. He writes extensively and teaches IBM classes worldwide in areas including OS/2, OS/2 Warp Server, WorkSpace On-Demand, and JavaOS for Business. Before joining the ITSO in 1995, Oscar worked in IBM US Availability Services as an I/T Specialist. He has 10 years of experience with IBM.

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A big Thank You to **Alain Rykaert**, IBM Belgium, also a member of the redbook project team. As an OS/2 LAN Server and CID Integrator, he set up the CID servers that helped the authors test migration scenarios over and over again. His knowledge of REXX programming was also very useful.

The authors wish to thank the following people for their valuable contributions to this project:

IBM Corporation
http://www.ibm.com

- Christie Christopherson, IBM Information Design and Development
- Stephen Cunningham, IBM OS/2 Installation Development
- Bryce Curtis, IBM Software Technology Center
- Steven French, IBM OS/2 Server Development
- Susan King, IBM Information Design and Development
- David Kleikamp, IBM File Systems and Kernel Development
- Jay Leiserson, IBM OS/2 Installation Development
- Maria Lopez-Sharp, IBM Test Team
- Mike McBride, IBM File Systems and Kernel Development
- David Medina, IBM File Systems and Kernel Development

- Steve Pratt, IBM File Systems and Kernel Development

- Ben Rafanello, IBM File Systems and Kernel Development

- Kumar Ravi, IBM Installation Development

- John Stiles, IBM File Systems and Kernel Development

- A special thanks to **Uwe Zimmermann**, NCSD External Performance, for making this redbook a reality and for his dedication to the quality and completeness of this redbook.

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- Send us a note at the following address:

    `redbook@us.ibm.com`

Chapter 1. Introducing OS/2 Warp Server for e-business

You have chosen IBM OS/2 Warp Server for e-business, the latest IBM product in a family of server software that has been used by thousands of customers who range in size from a small home or office to the largest multinational companies on the planet. This document will help you migrate your environment from OS/2 LAN Server and OS/2 Warp Server to OS/2 Warp Server for e-business.

We recommend that you read this chapter to understand the new functions and capabilities of OS/2 Warp Server for e-business then proceed to Chapter 2, "Planning and Considerations" on page 17 to determine how to use the other sections of this document.

This chapter begins with a short discussion of the history of OS/2 Warp Server for e-business. We continue with a description of the needs of today's information technology environment and how OS/2 Warp Server for e-business addresses these needs. A formal description of the major components follows, and we make sure to describe some of the new functions included with this new release. After this, we describe the hardware and software prerequisites, language support, and the packaging of OS/2 Warp Server for e-business.

1.1 Product History

IBM has a long history of providing software products for networking computers of all sizes. In 1984, just a few years after the introduction of the IBM Personal Computer (which eventually revolutionized the industry), IBM announced the IBM PC Network Program—software designed to allow peer-to-peer communications and resource sharing in a DOS environment amongst IBM PCs. Since then, this resource sharing evolved into OS/2-based offerings, with the introduction of OS/2 LAN Server, and the inclusion of other related functions (such as fault tolerance, Symmetric Multiprocessor support, TCP/IP, and Print Services).

OS/2 Warp Server for e-business is the latest member of this family. See Table 1 on page 2 for a list of the PC networking products and their dates of

1

availability. This shows IBM's commitment and long history of support in the PC networking arena.

Table 1. IBM PC Server Software History of Products

Software Product	Date of Introduction
OS/2 Warp Server Advanced, SMP Feature	September 1996
OS/2 Warp Server Version 4	February 1996
OS/2 LAN Server Version 4.0	September 1994
OS/2 LAN Server Version 3.0	October 1992
OS/2 LAN Server Version 2.0	April 1992
OS/2 LAN Server Version 1.3	March 1991
OS/2 LAN Server Version 1.2	March 1990
OS/2 LAN Server Version 1.0	November 1988
PC Network LAN Program Version 1.3	July 1988
PC Network LAN Program Version 1.2	April 1987
PC Network LAN Program Version 1.1	April 1986
PC Network Program	April 1985

1.2 Today's Information Technology Environment

This section describes the evolution of the PC environment and how we arrive to today's I/T needs.

1.2.1 Networking the IBM PC

As you can see from the table in the previous section, customers have been networking PCs for many years. Throughout these years, the infrastructure and management of these PCs has become more expensive and complex. As PCs grew in power, the amount of application and data processing work done on PCs increased greatly. Of course, some of these applications still needed to communicate with mainframe and midrange systems, which had much greater capacity than the PC. From this, the concept of client-server communications was born.

1.2.2 Client-Server Applications

Client-server applications allowed the PC to be the transparent interface between the user and the end result, such as a query of a database or a banking customer transaction. This usually meant communicating with a mainframe system. This environment increased the complexity of the setup and administration especially with the fact that operating systems and applications needed to be upgraded continually.

The cost associated with developing and maintaining client-server applications grew quickly, and companies began questioning if this was really the best way to provide services to end users. In addition, many companies had many different kinds of hardware and operating systems. This meant that an application might be written explicitly for each platform, greatly increasing the development, test, and maintenance of this new application. In a sense, the computer was the center of the universe from a computing standpoint.

Throughout this time, the Internet had slowly increased in popularity. Although it was once used mainly by government, military, and education facilities, Internet use increased by companies in the commercial marketplace.

Companies also began investigating different implementations of cross-platform technology for application development and deployment and object-oriented programming techniques to make developers more productive. They also increased usage of programming languages, such as C, C++, Smalltalk, and a language called Java introduced by Sun.

1.2.3 Network Computing

The need to improve the cost/benefit characteristics of client-server brought about a new paradigm called network computing. This was the idea of separating the presentation, business logic, and data storage components of a business solution. It doesn't really matter what system provides the presentation, and the focus shifts from the PC to the network.

In a similar fashion, programmers want to minimize their development effort and maximize the number of distinct platforms their applications can run on. The Java programming language is one example of a solution for this requirement. By writing an application using 100 percent Pure Java guidelines, this application should be executable on any platform that provides an environment for running these Java-based applications—that is, a Java Runtime Environment.

As we mentioned before, the growth of business and consumer activity on the Internet has spurred new applications that are Web-based and some of which are also Java-enabled. Network servers will need to be able to support this, which many are calling *e-business*. In other words, e-business means providing the application infrastructure for customers to find companies who have solutions of interest, obtain specific information about the products, and purchase these products over the Internet (that is electronically, the *e* in e-business).

1.2.4 Today's I/T Environment: Something Old, Something New

In the United States, there is an old saying, "Something old, something new, something borrowed, and something blue." It is used to describe the things a bride should include in her wedding attire when she gets married. In a sense, our I/T requirements today are a mixture of existing requirements for file and print and client-server (something old), our need to embrace network computing with Web servers and databases, such as Lotus Notes (something new), our idea of the PC as primarily a presentation interface (something borrowed from the host terminal paradigm), and something blue, which, of course, is IBM.

It's important to state that we don't believe that today's Network Computing and Java will replace the existing PC and Windows paradigm, but many customers are adopting this new paradigm in areas where it makes business sense. Both paradigms will be implemented side-by-side, and network products today will need to support both paradigms.

1.3 OS/2 Warp Server for e-business: A Quick Introduction

As you saw in Section 1.1, "Product History" on page 1, OS/2 Warp Server for e-business is the latest in a long family of PC networking products. This section highlights the major functions of OS/2 Warp Server for e-business. We will not include much detail because the focus of this document is to assist you with the migration process. We refer you to another IBM redbook titled *Inside OS/2 Warp Server for e-business*, SG24-5136, which provides much greater detail about the new capabilities in OS/2 Warp Server for e-business.

1.3.1 Base Operating System

Beginning with OS/2 Warp Server, Version 4, the base operating system has been installed as a part of the overall installation process. OS/2 Warp Server, Version 4 was based on OS/2 Warp, Version 3. OS/2 Warp Server for

e-business is now based on OS/2 Warp 4 with some unique modifications and enhancements.

One such enhancement is the inclusion of both the uniprocessor and the Symmetric Multiprocessor (SMP) support in the OS/2 Warp Server for e-business packaging. Previously, this was only available in the SMP Feature version of OS/2 Warp Server, Version 4.0. The SMP support is optimized for 8-way CPUs with support within the architecture for up to 64-way systems. The List I/O and Raw I/O APIs have also been included for use by applications that will need high I/O performance. Pentium Pro support has also been included.

Memory support has also been enhanced since now an application can access a virtual memory address space of up to 3 GB by use of the VIRTUALADDRESSLIMIT = 3072 parameter in CONFIG.SYS. The default value for VIRTUALADDRESSLIMIT in OS/2 Warp Server for e-business is 1 GB. The VIRTUALADDRESSLIMIT parameter is also available for OS/2 Warp Server, SMP Feature. Areas of memory below 512 MB have been remapped for higher availability in that region.

Security Enablement Services (SES) KPIs (Kernel Program Interfaces), previously available in FixPaks for OS/2 Warp, Version 3 and included in OS/2 Warp 4, are also available in the base. Both uniprocessor and SMP versions of SES are available in OS/2 Warp Server for e-business. In addition, there are modified KPIs (those that required a file offset parameter) for supporting files greater than 2 GB in size. These are planned for discussion in the redbook *Inside OS/2 Warp Server for e-business*, SG24-5136.

The enhanced, 32-bit version of CHKDSK, a utility to check and repair file system errors on hard disks, is also included. CHKDSK is also enhanced to support the JFS file system.

There are many other features included that are not discussed in detail here including the following:

- New/Updated Display Drivers, such as GRADD
- New media support, such as LS120 format
- Large drive support (greater than 8.4 GB disk drives)
- Inclusion of Netscape Communicator
- Inclusion of Java Version 1.1.7
- Year 2000 Readiness
- Support for Euro currency

These functions are discussed in more detail in the redbook *Inside OS/2 Warp Server for e-business*, SG25-5136.

1.3.2 File Systems

As you already know, OS/2 Warp Server, Version 4 supports the FAT, HPFS and HPFS386 file systems, which have existed for several years now. OS/2 Warp Server for e-business supports these and also a new file system called Journaled File System (JFS). Let's describe each one briefly to refresh your memory, and then we'll discuss JFS in more detail.

1.3.2.1 FAT

The File Allocation Table used a linear search mechanism to find files, which became very slow as hard disks grew in size, and the number of files in a directory increased. FAT dates back to the early days of DOS and is still supported as a bootable file system primarily for backwards compatibility and data interchange. Installation of OS/2 Warp Server for e-business on a FAT partition is generally not recommended.

1.3.2.2 HPFS

High Performance File System is another bootable file system that is supported in OS/2 Warp Server for e-business. HPFS is preferred over FAT because of the many enhancements in speed and reliability that were made. JFS (see Section 1.3.2.4 below) is faster than HPFS and offers better scalability, caching, and shorter recovery times. Thus, it can replace HPFS in all applications except the boot partition.

1.3.2.3 HPFS386

HPFS386 is implemented at Ring 0 of the Intel processor architecture to eliminate the overhead associated with ring transitions to Ring 3-based device drivers and applications. This means that the transfer of data from the HPFS386 cache to the network adapter driver occurs much more quickly.

HPFS386 is best used for file serving and for 802.2 Remote Initial Program Load (RIPL) of DOS, OS/2, and WorkSpace On-Demand RIPL clients. As of this writing, it is also the only choice if you need DASD limits or the Fault Tolerance Feature since (as of the writing of this redbook) JFS does not implement these.

Before installing over to a machine with HPFS386, you have to remove the HPFS386 DASD limits and access controls (ACLs) as well as the Fault Tolerance from the target volume. See Section 3.12, "Backup Directory Limits" on page 57, Section 3.13, "Backup Access Control Information" on

page 60, and Section 3.20, "Deactivate Fault Tolerance" on page 67 for instructions on how to implement this.

1.3.2.4 JFS

JFS, a 32-bit file system, is especially suited for application servers, such as hosting the data of a Web server or a Lotus Notes server. JFS can be used to replace HPFS in most cases. It offers larger and faster caching capabilities and improves performance over HPFS. Currently, JFS is the only file system in OS/2 Warp Server for e-business that can be extended by adding more partitions to a volume, thus, increasing available file space. JFS also offers better performance and scalability on SMP machines due to the changes in the I/O subsystem and features special optimizations for IP-based services.

Similar to 386HPFS cache, JFS cache does not have a specific maximum—it is dependent on the amount of real memory installed on the system. The default is set to 1/8 of memory, but this default may be overridden by the Tuning Assistant (in the case of an attended installation). The memory used by JFS cache is allocated from the system arena and it is non-swappable.

JFS also includes the following capabilities:

- Unicode support
- Variable block size (512 - 4096 bytes)
- extended filename support (254 characters)
- on-line volume expansion
- on-line defragmentation
- sparse file support

More information on JFS features can be found in the redbook *Inside OS/2 Warp Server for e-business*, SG24-5136.

All components of OS/2 Warp Server for e-business are supported for installation and execution on JFS volumes.

1.3.3 File System Comparisons

It may be helpful to summarize some of a the similarities and differences between the file systems. Refer to Table 2 on page 8 for a comparison of FAT, HPFS, HPFS386, and JFS.

Table 2. File Systems Feature Comparison

Feature	FAT	HPFS	HPFS386	JFS
Bootable	Yes	Yes	Yes	No
Maximum File size	2 GB	2 GB	2 GB	2 TB
Maximum Volume Size	2 GB	64 GB	64 GB	2 TB
Disk Spanning	Yes	Yes	Yes	Yes
Expand on-line	No	No	No	Yes
Sparse Files	No	No	No	Yes
Unicode Filenames	No	No	No	Yes
Maximum Cache size	14 MB	2 MB	system[4]	system[4]
Max. #of file opens	65,536	65,536	65,536	65,536
Max. # of file finds	3072	3072	8192	32,768
ACL storage location	in NET.ACC	in NET.ACC	in File system (Fnode)	in File system (Inode)
Number of ACLs	8192[2]	8192[2]	unlimited	unlimited
Max. # of files per directory	512[3] on the root directory	limited by DASD[4] space	limited by DASD[4] space	4 billion
Bad block relocation	No	Yes	Yes	Yes via LVM
Disk Limits	No	No	Yes	No
Software Fault Tolerance	No	No	Yes	No

[1] Direct access storage device (that is, hard disk).

[2] ACLs are limited to 8192 for FAT, CD-ROMs, and HPFS are the information is stored in the last half of NET.ACC.

[3] FAT imposes a limit on the number of files in the root directory. For hard disks, it generally has a value of 256 or 512 hard-coded in the boot sector.

[4] HPFS386 Cache was previously limited to 320MB. Also depends on setting of VIRTUALADDRESSLIMIT in CONFIG.SYS since increasing VIRTUALADDRESSLIMIT for application arena can decrease the size of the system arena from where cache is allocated. JFS defaults to 1/8 of system memory.

1.3.4 Logical Volume Manager

Employees and consultants who have been working with PC-based systems should be familiar with FDISK; a utility in DOS and OS/2 that enables you to define partitions to be used for operating systems. Defining a partition using FDISK before formatting the logical or physical drive is usually a prerequisite. Because of growing demand for space and availability, customers are seeking enhancements to the existing way of partitioning hard disks.

IBM is introducing a new function called Logical Volume Manager (LVM). LVM manages the physical layout of the hard disk, which provides a layer of abstraction from the user and application. One advantage of this is that the physical layout can change without the application needing to know about the change. For example, a volume can consist of more than one partition across more than one physical disk, and the volume size can be increased as a long as there is available unallocated space.

Along with new function, LVM introduces some new terms:

Partition
A contiguous area of a hard disk that is allocated for use by an operating system. A primary partition is defined in the master boot record of a hard disk. There is a limit of four primary partitions on a hard disk. An extended partition contains one or more logical partitions.

Logical Partition
Contained within an extended partition, a logical partition usually contains data only although some operating systems (such as OS/2) can boot from a logical partition.

Logical Volume
A logical view of a hard disk, consisting of one or more partitions, that looks like one contiguous space. A logical volume can be defined as compatible (formatted FAT or HPFS) or as an LVM volume (FAT, HPFS, or JFS but recognized only by LVM).

Aggregate
A logical structure on a hard disk used to organize and manage the information on a JFS partition.

Fileset
A collection of files and directories managed as a single unit. A fileset resides on an aggregate.

LVM has command-line, full-screen, and graphical interfaces. Although LVM basically replaces FDISK, the full functionality provided by LVM is usable only by the JFS file system for features, such as:

- Disk spanning
- Dynamic volume expansion
- Dynamic drive lettering

- Persistent drive letters

1.3.5 Multiprotocol Transport System

The Multiprotocol Transport System (MPTS) provides support for network adapters and the implementations of protocols on OS/2. The protocols supported are:

- NetWare NetBIOS Emulation
- IBM Kernel Debug Network Protocol
- IBM IEEE 802.2
- IBM OS/2 NetBIOS
- IBM NetWare Requester Support
- IBM OS/2 NetBIOS over TCP/IP
- IBM TCP/IP

The MPTS utility provides the ability to configure adapters and protocols. This utility includes a listing of the network adapters whose support files are included within the product. For a listing of all possible adapters supported, view the following URL:

`http://service.software.ibm.com/os2ddpak/html/lanadapv/index.htm`

1.3.6 I$_2$O Support

The Intelligent I/O (I$_2$O) architecture is an emerging standard for the development of device drivers in networking environments. The architecture enables the I$_2$O-architected adapter to run driver functions that process LAN I/O transactions that are normally handled by the CPU, thus, decreasing the CPU utilization for LAN I/O processing.

OS/2 Warp Server for e-business provides support for I$_2$O ethernet, token-ring, and SCSI devices. MPTS includes an IBM I$_2$O LAN driver (I2OLOSM.OS2) to enable support for I$_2$O-architected devices. This driver is written to Network Device Interface Specification (NDIS), Version 2.01 and behaves as an NDIS V2.01 MAC driver.

Since 1997, IBM has marketed PC systems that are I$_2$O Ready, such as the PC Server 704 and the IBM Netfinity 7000. In January 1999, IBM announced I$_2$O Ready high-speed communications PCI adapters. Intel, Compaq, Hewlett-Packard, Novell, and many other companies also have I$_2$O Ready offerings. For more information about I$_2$O, visit the I$_2$O Special Interest Group at:

`http://www.i2osig.org/`

1.3.7 TCP/IP Services

TCP/IP services have been part of OS/2 Warp Server since the Version 4 release in 1996. Since this time, many enhancements in function and usability have been incorporated into subsequent TCP/IP Services releases. OS/2 Warp Server for e-business includes the latest version of TCP/IP, Version 4.21.

Since this new version of TCP/IP is described in more detail in the redbook *Inside OS/2 Warp Server for e-business*, SG24-5136, we only mention some of the highlights and improvements.

- 32-bit enablement: Since Version 4.1, IBM has enhanced TCP/IP for 32-bit APIs. These can provide better throughput because of 32-bit data grouping.

- New file APIs: Applications that manipulate, send, and receive files, such as Web servers, will see better performance through new `send_file()` and `accept_and_recv()` APIs.

- Enhanced daemons: The file transfer daemon, FTPD, is enhanced for multi-threading for better performance. It also supports the restart of broken connections. TFTPD (Trivial File Transfer Daemon) is also multi-threaded and supports block sizes of up to 8 KB. There is also a security mechanism that enables the administrator to restrict access to certain directories for TFTP clients. The line printer daemons, LPD and LPRPORTD, now have Streaming support to enable IBM Network Station clients to use OS/2-based print servers.

- Java-based configuration: The user and administrative interface for TCP/IP configuration is now a Java application. Most new functions implemented in TCP/IP, Version 4.21 are configured through this enhanced interface. You will see better performance than the original Java interface included with TCP/IP, Version 4.1.

- NFS client and server support: The Network File System, previously available in TCP/IP, Version 2.0, is enhanced and included. This NFS is a 32-bit implementation that is ready for supporting the IBM Network Station. In addition, the administrator can mount NFS shares on UNIX-based systems and redirect these shares locally using NetBIOS, thus, acting as an NFS gateway for OS/2 Warp Server clients that do not have NFS client installed.

- DHCP and DDNS support: These services have been enhanced significantly over the past few years. New is the inclusion of a BINL server that supports Intel Wired for Management specifications. For a good description of the architecture and implementation of DHCP and DDNS in

IBM products, refer to the redbook titled *Beyond DHCP - Work Your TCP/IP Internetwork with Dynamic IP*, SG24-5280.

- VPN support: This functions allows the administrator to create a Virtual Private Network (VPN) between two OS/2 systems running TCP/IP, Version 4.1 or higher. The IP-filtering function of VPN also enables the administrator to create a mini-firewall. This procedure is described in *Inside OS/2 Warp Server for e-business*, SG24-5136. For more information about VPN, refer to the redbook titled *A Comprehensive Guide to Virtual Private Networks, Volume 1: IBM Firewall, Server and Client Solutions*, SG24-5201.

- Enhanced NetBIOS over TCP/IP: Also known as TCPBEUI, this protocol was previously limited to a maximum of four logical interfaces defined on physical LAN adapter 0 in MPTS. IBM has enhanced TCPBEUI to be spread across up to four physical LAN adapters.

1.3.8 File and Print Services

Although Web servers and network computing are gaining momentum, File and Print serving is still the backbone of many servers in place today. Some of the enhancements in File and Print Services include:

- Windows NT User Account manager: This enables administrators to manage user IDs on Windows NT Server systems that are defined as additional servers in the OS/2 Warp Server domain. The User Account Manager function lets administrators consolidate the administration of both NT Server-based additional servers and OS/2 Warp Server-based systems into a single interface, thus, saving time.

- Windows 95/NT client support: The popularity of clients running Windows 95 and Windows NT has increased greatly throughout the 1990s. Although these clients are compatible with OS/2 Warp Server, IBM has released applications to enable these clients to become full participants in the domain, which includes support for IBM-based enhancements, such as aliases, logon assignments, and disk limits.

IBM has also increased the maximum numbers allowable for some resources within the File and Print Services component, such as MAXFILES, MAXWORKERFILES, and MAXOFFERS. This enables OS/2 Warp Server for e-business to continue to scale even higher than it could before making it the ideal choice for Enterprise customers.

1.3.9 Backup and Recovery Services

As in the previous version of OS/2 Warp Server, the Backup and Recovery Services are based on the Personally Safe 'n' Sound (PSnS) product. In OS/2 Warp Server for e-business, PSnS, Version 6.01 is included. This component allows backup of applications, data, and access controls to diskette, tape, local and remote hard disks, optical disks, and also to the ADSTAR Distributed Storage Manager (ADSM) server on any platform.

This version has more hardware device support and also includes the following major enhancements:

- Usability: IBM has enabled PSNS to support backup and restore procedures written in C and REXX through the corresponding APIs (see the on-line documentation for more details).
- Additional media: PSnS now supports backup to removable partitioned media, such as the Iomega JAZ and ZIP drives.
- Dual device backup sets: PSnS allows the first backup to be on one type of media, and subsequent incremental backups to be stored on a different type of media. This enables administrators to select the best backup solutions for their specific environment.
- Support for files greater than 2 GB in size.
- Support for restoring backups taken with older versions of PSnS.

1.3.10 Remote Access Services

In OS/2 Warp Server, Version 4, IBM included the ability for OS/2 and Windows systems to dial into a Remote Access Server to access resources as if the remote clients were actually on the LAN. This function was provided by the LAN Distance program. Since this time, IBM has also added a Point-to-point Protocol (PPP) server and the ability for any PPP client to connect to it. PPP clients include the IBM 8235 Dialer, Windows 95/98 and Windows NT Remote Access, and Shiva PPP.

This PPP server and client support has been included in OS/2 Warp Server for e-business.

Remote Access Services has also been enhanced to provide client support for the dynamic assignment of IP address known as dynamic IP.

1.3.11 System Management Services

IBM has a long history in the Systems Management area on many computing platforms. On the Intel platform, the original systems management function in OS/2 Warp Server, Version 4 was provided by OS/2 SystemView. With the release of OS/2 Warp Server SMP Feature, the Netfinity server function was

introduced. OS/2 Warp Server for e-business now includes Netfinity, Version 5.2.

Also new in OS/2 Warp Server for e-business is the inclusion of a Tivoli Management Agent (TMA). This TMA enables the server to become a managed object in the Tivoli Managed Environment, a very popular cross-platform systems management framework.

1.3.12 Advanced Print Services

The Advanced Print Services of OS/2 Warp Server for e-business are still based on Print Services Facility/2 (PSF/2). PSF/2 allows the administrator to define print conversion transforms for HP-PCL, PPDS, Postscript, and 3270 Host data streams. One major feature of Advanced Print Services is the ability to print Postscript output on non-Postscript printers. With Advanced Print Services, it is also possible to print large PC-based jobs onto host printers with the Upload and Print function.

1.3.13 Lotus Domino Go Web and WebSphere Application Servers

These products are new entries in the OS/2 Warp Server family, and they bring the ability to provide Internet-based services, such as Web serving and Java application serving. These products are planned for greater discussion in the redbook titled *Inside OS/2 Warp Server for e-business*, SG24-5136.

1.3.14 LDAP Client Support

Lightweight Directory Access Protocol is a mechanism used for communicating with servers that provide global directory functions, sometimes called Yellow Pages, named after the telephone books that list all business in a particular area in alphabetical order. OS/2 Warp Server for e-business includes an LDAP client, which allows it to send and receive directory information from an LDAP server.

1.4 Prerequisites

The previous sections provided information on the history of OS/2 Warp Server and also some of the enhancements that have been included into OS/2 Warp Server for e-business. The following sections list the hardware and software prerequisites for OS/2 Warp Server for e-business.

1.4.1 Hardware

This section lists the minimum hardware requirements for OS/2 Warp Server for e-business. As you know, your production environment may require

significantly more resource than listed here, but the minimum requirements are as follows:

- CPU: Intel Pentium 133 MHz or equivalent
- Memory: 64 MB
- Hard Disk: 120 MB of available spaces for the base operating system or 200 MB for the base operating system and all default components (your actual number will vary based on the application selections)
- Display: VGA support of 640x480 with 256 color support
- Network adapter: An adapter with drivers that support the NDIS, Version 2.01 specification, OS/2-compatible
- CD-ROM: An IDE or SCSI-based CD-ROM with OS/2 Warp driver support
- Mouse: An IBM-compatible mouse

If OS/2 Warp Server for e-business is being installed on an SMP system, that system should support the Intel Multiprocessor specification, Version 1.4 or 1.1. Or, it must provide platform-specific drivers for OS/2 Warp Server.

1.4.2 Software

IBM has tested migrations from OS/2 Warp Server for e-business to OS/2 LAN Server, Version 4 and OS/2 Warp Server, Version 4, and there were no specific FixPak requirements found. In the scenarios for this document, we make extensive use of REXX procedures and the OS/2 LAN Server REXX Utility, which does have a FixPak requirement. See 2.2.8, "Does Your Software Meet the Requirements for Migration?" on page 27 for more details.

1.5 National Language Support

IBM intends to make many language versions available concurrent with the first availability of the final code for OS/2 Warp Server for e-business. The languages to be supported are:

- US English
- Brazilian Portuguese
- Danish
- Dutch
- Finnish
- French
- German
- Italian
- Japanese

- Norwegian
- Simplified Chinese
- Spanish
- Swedish
- Traditional Chinese

1.6 Packaging

As of this writing, OS/2 Warp Server for e-business is comprised of six CD-ROMs. In addition to the CD-ROMs (described below), the product ships with three boot diskettes and a *Quick Beginnings* hard copy manual for the specific language version purchased. This section describes the contents of each CD-ROM.

CD-ROM #1   Contains the server code including the OS/2 base, the uniprocessor and symmetric multiprocessor kernels, OS/2 LAN Server functions, MPTS, TCP/IP, Remote Access Services, Backup and Recovery Services, Tivoli Management Agent, Java, Version 1.1.7, Netscape Communicator, and on-line documentation. This CD-ROM comes in the specific language version that was purchased. *This CD-ROM is intended to be bootable for those systems whose BIOS supports boot from CD-ROM.*

CD-ROM #2-3 Contains the Client Connect Pak. This is the client function for OS/2 Warp 4, Windows 95/98, Windows NT, Version 4, and Windows 3.1. The functions included (not necessarily for all platforms) are File and Print, TCP/IP, Remote Access, Tivoli Management Agent, and Java Runtime. These functions are provided in all supported languages.

CD-ROM #4   Contains the Netfinity, Version 5.2 component. This function is provided in the specific language version that was purchased.

CD-ROM #5   Contains the Lotus Domino Go Web Server, Version 4.6.2 and the IBM WebSphere Application Server, Version 1.1. This CD-ROM is provided in the specific language version that was purchased.

Chapter 2. Planning and Considerations

This chapter explains how to use the remainder of this book and provides a roadmap for your migration to OS/2 Warp Server for e-business. You will need to decide how to migrate your server environment, and this may depend on several factors that we will discuss in the following sections. Sometimes a migration on the same machine might not be possible due to, for example, increased hard disk or operational requirements. We will discuss when this is the case and direct you to the proper section within this book that describes how to handle the situation.

To simplify the discussion of migration, we assume you will not add new services to the server to be migrated, at least not during the initial migration step.

The OS/2 Warp Server for e-business product contains many additional functions, such as Lotus Domino Go Webserver, IBM Netfinity 5.2, and WebSphere. The configuration and implementation of these other products is beyond the scope of this book. For a more formal description of the new functions and features in this product, refer to the redbook titled *Inside OS/2 Warp Server for e-business*, SG24-5136.

2.1 Before You Start a Migration Project

Read this chapter and also read the README files that come on OS/2 Warp Server for e-business CD-ROM. If you will be using CID, make sure to read the README.CID, in `\OS2IMAGE\DISK_0` on the CD-ROM. Since this book was written using pre-release code, the README might contain newer information that was not available when this book was produced.

Before attempting to migrate a production system, it is highly advisable that you try an attended installation on a test system first. This way, you will become familiar with the new version of OS/2 Warp Server for e-business. It will also help you identify possible problem areas in advance.

In the same manner, before trying a CID-based migration, a normal, attended installation over an existing configuration can help you identify problems unique to your setup.

Identifying the optimal migration path will probably be an iterative process. Start with the basic services and continue adding function until you have covered every relevant aspect for your system.

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2.2 Migration Decision Road Map

The decision roadmap shown in Figure 1 on page 19 will guide you through the decisions you need to make for your migration project.

When using the roadmap, please write the relevant references down and continue going through the roadmap. That way you'll have a list of chapters and sections that are most useful for your environment.

Together with the other contents of this chapter, the roadmap is intended as a central information hub that will point you to the right places for the actual information. Going through the whole set of questions will help you to make the right assessments.

In addition, Section 2.3, "Special Considerations" on page 29 highlights some points to consider during your migration.

Understand Migration Options
2.2.1, 6.6

Gather Information
2.2.2, 1.4

Verify Backups
2.2.3, 3.8

Use existing system?
2.2.4 — No →

Yes ↓

Is Downtime acceptable?
2.2.9 — No →

Yes ↓

Is Hardware sufficient?
2.2.5 — No →

Yes ↓

Is File System Sufficient?
2.2.7 — No →

Yes ↓

Does SW meet requirements?
2.2.8 — No →

Yes ↓

Unattended Installation?
2.2.10
5.1 - 5.4 — No → Read Ch. 3 / Read Ch. 4

Yes ↓

Read Ch. 3
Read Ch. 5

You must install to new hardware

Unattended Installation? — No →

Yes ↓

Read Ch. 4
Read Ch. 5

Read Ch. 4
Read Ch. 6

Note: The numbers within the boxes indicate which sections to read in order to make your yes/no decision.

Figure 1. Migration Road Map

2.2.1 Understanding Migration Types

We have identified three basic migration situations. The first one we call *panel driven*, which means that the migration process is just a normal

installation over your current server configuration. Chapter 4, "Panel-Driven Installation" on page 71 covers this.

The second scenario is intended as a model for those who use CID and/or software distribution. Chapter 5, "Unattended CID Migration" on page 97 tells you how to do this.

We have also considered a situation where only the configuration is saved, and the server is basically installed from scratch (see Chapter 6, "Migrating Hardware" on page 183).

All the preparatory steps that apply to all of these situations are covered in Chapter 3, "Preparing the Migration Process" on page 37.

2.2.1.1 Migrate Over an Existing Configuration

This is the installation situation that will preserve almost all configuration information. There are a few exceptions (for example, LAN Distance) that must be removed prior to installation. Chapter 3, "Preparing the Migration Process" on page 37 has the information on the general preparatory steps. Section 2.2.2.1, "Run CHKINST" on page 22 will help you identify the necessary steps.

The advantage of this approach is that, after migration has finished, everything will be configured and up and running. In an environment that has only a few servers, this might be the fastest approach to migration (see Chapter 4, "Panel-Driven Installation" on page 71). However, in the event of a catastrophic failure, such as all hard disks lost, or no valid or current backup of the operating environment, you would have to re-implement your whole setup. That's why you might still want to consider a automated setup that can restore your system from scratch. (See Chapter 6, "Migrating Hardware" on page 183).

2.2.1.2 Migrate Current Configuration to a New Machine

Under certain circumstances, it might be necessary to start with a new installation and re-apply the previous configuration. We will show you how to do this and what tools are available for this purpose in Chapter 6, "Migrating Hardware" on page 183.

When Is This Necessary?
- When the free space on your existing partition(s) is not large enough to hold all the features you need. See Section 2.2.6, "Is Repartitioning Necessary?" on page 25 in the roadmap.

- When your performance requirements necessitate a new server machine.

- When you immediately want to migrate your data to JFS and can not add additional hard disk space to your server. There is no conversion of volumes from FAT or both flavors of HPFS to JFS. Because of this, you have to back up and restore at least your data partition.

- When you want to migrate with minimal disruption to your production environment, it might be necessary to have the migrated server ready to take over immediately.

Some customers deliberately forgo backing up the system software and application programs. Instead, they backup all applications, the user data, and save the configuration information. In case of a major failure, they just reinstall everything using software distribution and re-apply the configuration information. In this case, migration means to apply the old saved configuration to a new installation. This is also covered in Chapter 6, "Migrating Hardware" on page 183.

2.2.1.3 Migrate to a New Machine with New Configuration

In some instances, you might want to change so many things from your current implementation (perhaps including the hardware) that the best way to do it is do a new installation and only restore the data. Starting with a clean, new installation might be advantageous for systems that have been up and running for a long time. Such servers tend to accumulate all sorts of electronic rubble that can be hard to sort from the relevant information.

Naturally, this approach means you have to re-do all the configuration and tuning for all the software you are going to install.

It also gives you the opportunity to implement more of the new OS/2 Warp Server for e-business features in one step, such as implementing JFS. This is probably the biggest advantage.

2.2.2 Data Gathering

One of the most important things for a successful migration project is to collect or verify some basic information about the setup currently in use. It will help you select the right migration path for your setup and help you find the chapters in this book that are interesting to you.

Gather Information in the following areas:

Table 3. Basic System Information

Information Needed	Your Environment Data
What is the CPU speed and type?	
What amount of RAM is installed in your systems?	
How large are the hard disks in your servers?	
What are the partition sizes?	
How much hard disk free space is available?	
What products and services are currently installed on each of your servers?	
Can the server be taken down for migration? How long may that period last?	
Will software distribution be used to install/migrate the servers? If so, what kind?	

2.2.2.1 Run CHKINST

CHKINST is a utility supplied with OS/2 Warp Server for e-business and can be used to check your installation and generate a report of preparatory steps you have to perform before you do the actual setup. We recommend that you run CHKINST at the servers you intend to migrate and review the log file generated.

This utility searches for components on the checked system that must be removed from the existing system prior to migration. Such components include Remote Access Services (LAN Distance), IBM Peer Services, or Local Security.

When CHKINST finds unsupported components, such as OpenDoc or AskPSP, it issues a warning that the installation program will remove these components. Other components, such as OS/2 Tutorial, IBM Works, and IBM VoiceType are not likely to cause any failures if they remain on the system. If these components are found by CHKINST, a warning message will be generated showing a list of files that have a more current release level. The installation process does not migrate configuration file information for these components.

CHKINST.EXE can be found on the on the root directory of the OS/2 Warp Server for e-business CD-ROM. It is completely self-contained and can be run from any OS/2 version.

The syntax for **CHKINST** is

```
CHKINST /T:<target drive>
        /L1:<drive letter and path>\<log file>
```

where:

/T: Indicates the target drive being scanned.

/L1:   Specifies a drive and file name of the log file being created. Note
           that all displayed messages will be written to the specified file
           name.

           Example: `CHKINST /T:D /L1:D:\CHKINST.LOG`

`CHKINST` accepts input parameters in any order and in either upper or lower
case. Both parameters are required. `CHKINST` logs each item that was
successfully found. If HPFS386 was detected, an informational message will
be logged advising you to remove access controls prior to the migration
process.

2.2.3 Do You Have a Proven Backup?

Prior to a migration, a backup of all servers selected for migration should be
made in the rare case of an unsuccessful migration. Make sure the backup
was verified to work correctly. Without a backup, you will not be able to
restore your system to a working state if the migration should fail.

More suggestions on this topic can be found in Section 3.8, "Back Up Your
System" on page 44.

2.2.4 Do You Want to Use the Existing Server?

If your server needs have increased or your current hardware does not have
sufficient disk space or memory, it is a good idea to migrate your current
servers to new machines to accomplish your needs. In addition, you might
consider moving to a machine that can exploit the extended SMP support in
OS/2 Warp Server for e-business or the new I$_2$O support.

2.2.4.1 SMP and Uniprocessor Considerations

Since OS/2 Warp Server for e-business comes with both a kernel for
machines with one processor and a kernel for SMP machines, you can easily
upgrade from one-processor machines to SMP machines. For example, if
your current machines support multiple processors, but currently only one
processor is installed, you can later selective-install SMP support whenever
your requirements exceed a uniprocessor environment. A prerequisite,

however, is that your target system comply either with Intel Multiprocessor Specification 1.4 or 1.1, or it must be one of the following server machines:

- Compaq Proliant 2000
- Tricord PowerServer, models 30 and 40
- IBM PC Server 720

If this is not applicable to your system, your hardware manufacturer might have written its own *.PSD driver file to support OS/2 Warp Server for e-business SMP on their hardware. Please check in advance whether such support is available.

If you have decided to move to a new machine, then you will find a description how to do this in Chapter 6, "Migrating Hardware" on page 183.

2.2.4.2 I2O Support

As mentioned in Section 1.3.6, "I2O Support" on page 10, OS/2 Warp Server for e-business now can exploit I_2O-capable hardware. This offloads much of the I/O processing to the I_2O subsystem freeing the main processor from such mundane tasks as servicing I/O interrupts.

I_2O-capable hardware comes in several flavors. One implementation integrates the I/O processor on the server's motherboard, and another implements I_2O support as a PCI Adapter card.

Depending on your choice of hardware, the migration will either mean moving to a new hardware (described in Chapter 6, "Migrating Hardware" on page 183) or doing a migration on the same hardware and adding I_2O Adapters later. Depending on your choice later in the roadmap (Section 2.2.10, "Panel-Driven Installation or CID-Based?" on page 28), you'll find your installation method described either in Chapter 4, "Panel-Driven Installation" on page 71 or in Chapter 5, "Unattended CID Migration" on page 97.

2.2.5 Does the Hardware Meet the Prerequisites?

Table 4 lists the minimum hard disk requirements that need to be met prior to the migration process.

Table 4. Hard Disk Requirements

Component	Hard Disk Space Requirement (MB)
OS/2 Warp Base Operating System (default installation)	96.7
Optional OS/2 Warp Components	150
File and Print Sharing Services	15.0
TCP/IP Services	30.0
Remote Access Services	5.9
Netscape Communicator	11.0
Tivoli Management Agent	1.5
Personally Safe 'n' Sound	7.2
LDAP Services Toolkit	4.2
Advanced Print Services	54.0
MPTS	16.0
First Failure Support Technology (FFST)	0.1
On-line Books	10.0

2.2.6 Is Repartitioning Necessary?

If your system does not have enough free space to install the components you want, you have several options.

1. You could try to alleviate the situation by being selective on components you do not really require, for example, some, or all, Unicode Fonts, Base Multimedia Support, or TCP/IP.

2. You could add additional disk space to your system. The disk subsystem can now assign drive letters in the way you want, which makes this option more appealing. This feature was not available with previous OS/2 Warp Server versions.

   This approach can also be combined with the one above if there is free space on other partitions to meet your needs. You would leave some components out of the initial setup and install them later on to a different

drive. Using this approach can give you the opportunity to install OS/2 Warp Server for e-business components to a JFS-formatted drive.

3. If the two options above are not applicable to your situation, then you will have to repartition your system. In this case, migration will mean applying the previous configuration to the new installation. See Chapter 6, "Migrating Hardware" on page 183 for instructions.

2.2.7 Do You Want or Need to Change the Existing File System?

As described in Section 1.3.2, "File Systems" on page 6, the disk I/O subsystem has changed a lot from previous versions. For example, drive letters can now be assigned to volumes permanently, which makes adding more disks to an already defined volume as easy as possible. You just add hard disks to a volume whenever necessary without being confronted with new drive letters.

Drive letter Sequence

Hard disk partitions can now be assigned any letter you choose. If you have tools or scripts that rely on a sequential assignment of drive letters, be aware that they might have to be reworked if you exploit this.

The CD-ROM is now assigned the first *free* drive letter, which might not be after the last hard drive. This also may impact your tools. You can use the RESERVEDRIVELETTER= statement in the CONFIG.SYS file to move the CD-ROM to a convenient drive letter.

A volume, in turn, can consist of one or more partitions (both logical and primary). However, OS/2 requires the drive letter of the bootable volumes to remain the same always. Changing the assigned drive letter of a bootable volume will subsequently cause the boot process to fail.

Grouping multiple partitions into one larger volume is called disk spanning. Different partitions in a volume do not have to reside on the same physical disk.

Caution

If one partition of a linked volume is lost, usually ALL data in the entire file system will be lost.

The space in a volume is then formatted to be accessible using one of the supported file systems.

OS/2 now supports four hard disk file systems:

- FAT
- HPFS, also known as 16-bit HPFS
- HPFS386, also known as 32-bit HPFS (with license)
- JFS

The basic differences were explained in Section 1.3.2, "File Systems" on page 6.

2.2.8 Does Your Software Meet the Requirements for Migration?

In our tests, we did not find any special prerequisite fixpak requirements to install OS/2 Warp Server for e-business over OS/2 Warp Server, Version 4.

The following tables list the FixPaks we used in our migration tests. They might not reflect the only working combination. Entries marked with a superscript were applied to make our REXX procedures work properly.

Table 5 lists the OS/2 LAN Server 3 FixPak levels used in our migration tests.

Table 5. OS/2 LAN Server 3 Syslevel Prior to the Migration Process

Component	CSD Level
OS/2 Version 2.11	XR_6200
LAN Adapter and Protocol Support (LAPS)	WR_7045[*]
OS/2 LAN Server 3	IP_7045
TCP/IP Version 2.0	UN_0000 [*1]
[1] This FixPak is needed for compatibility reasons for the REXX procedures discussed in this book.	

Table 6 lists OS/2 LAN Server 4 FixPak levels used in our migration tests.

Table 6. OS/2 LAN Server 4 Syslevel Prior to the Migration Process

Component	CSD Level
OS/2 Warp 3	XR_W038
LAN Adapter and Protocol Support (MPTS/LAPS)	WR_8415
OS/2 LAN Server 4	IP_8260
TCP/IP Version 2.0	UN_0000

Table 7 lists OS/2 Warp Server 4 FixPak levels used in our migration tests.

Table 7. OS/2 Warp Server 4 Syslevel Prior to the Migration Process

Component	CSD Level
OS/2 Warp 3	XR_W038
LAN Adapter and Protocol Support (MPTS/LAPS)	WR_8610
File and Print Services (OS/2 LAN Server Version 5)	IP_8528
TCP/IP Version 3.1	UN_0002

2.2.9 Is Server Downtime Acceptable?

If your servers need to be available without interruption, it will be necessary to install the new server while the existing one is still running. After the migration process has finished, you can switch to the new server. Chapter 6, "Migrating Hardware" on page 183 deals with this situation.

If you continue to use HPFS386 and DASD limits, please include the time necessary for directory limit priming in your estimate of server downtime.

DASD Limit Priming

DASD limit priming is performed by HPFS386 at initialization each time after running CHKDSK. With large servers, it can take a considerable amount of time to apply DASD limits. Since it is part of the file system initialization, it is part of the total time for server startup.

For example, on a Netfinity 7000 Server with one 50GB HPFS386 RAID5 array and 1000 home directories with DASD limits applied, priming can take up to three hours. Your actual time may vary.

If your server does not have DASD limits enabled or does not use HPFS386 partitions in that size range, then this concern does not apply to your scenario.

2.2.10 Panel-Driven Installation or CID-Based?

For attended migrations, you can use the normal setup procedures and install over your existing OS/2 Warp Server or OS/2 LAN Server. Chapter 4, "Panel-Driven Installation" on page 71 illustrates this in more detail. The normal installation process is also driven by response files that can be reused in a CID-based migration. Chapter 5, "Unattended CID Migration" on page 97

shows how to setup a sample CID scenario and how to use the response files generated by a panel driven installation.

2.3 Special Considerations

This section details circumstances that may impact your system during migration.

2.3.1 FDISK Command Not Available

In OS/2 Warp Server for e-business, the FDISK command has been replaced by the LVM command to add the support for sticky drive letters and logical volumes. If you use self-written REXX procedures that make use of the FDISK command, you need to modify those to apply the LVM command.

2.3.2 WIndows NT Coexistence on Same Machine

Installation of OS/2 Warp Server for e-business on a machine that already has Windows NT installed is not officially supported. In some configurations, the existing NT system might not be bootable after an OS/2 Warp Server for e-business installation.

OS/2 LVM writes information about assigned drive letters to the last sector of the boot drive, and it changes the master boot record to mark all the existing partitions as compatibility volumes. Windows NT's boot process detects this change and stops. It then displays a message that the kernel cannot be found.

We have successfully installed Windows NT on the same machine after OS/2 Warp Server for e-business has been installed. However, this is not a recommended or supported configuration but might be useful for some test scenarios.

2.3.3 Some HPFS386 Features Not Available with JFS

DASD Limits
The current version of JFS shipped with OS/2 Warp Server for e-business does not support DASD limits (this may be included in an update of JFS).

Depending on your requirements, there are several possible workarounds.

1. Keep the resources that need directory limits on a HPFS386 formatted volume.

2. Use CHKSTOR as a replacement if it is sufficient to send an alert to the Administrator when the limit is exceeded.

Fault Tolerance

There is no replacement for the HPFS386 Fault Tolerance feature in JFS. Current server machines usually come with RAID adapters that can be used to perform this function as a hardware solution.

If you still need to rely on the software disk mirroring provided by HPFS386 the only option is to keep HPFS386.

2.3.4 Drive Letters Referenced in CONFIG.SYS

Although LVM usually can change a drive letter dynamically without rebooting, your applications still might rely on the letter that was previously assigned.

Examples are references in the `PATH`, `LIBPATH`, `DPATH`. For Java applications, `CLASSPATH` variables. In this case, you have several options.

- Change all the occurrences in CONFIG.SYS to the new drive letter and reboot.
- Create a script that updates the variables before starting the application.

  If there are references in `LIBPATH`, use `BEGINLIBPATH` or `ENDLIBPATH` instead.

Another example is a device driver installed for an application. A reboot might not be necessary immediately, but to ensure that the driver is still loaded on the next reboot, do one of the following:

- Move the driver to your boot drive and change the invocation in CONFIG.SYS
- Or change only the CONFIG.SYS

2.3.5 CD-ROM Drive Letter Changes Requiring Reboot

The CD-ROM is assigned the first *free* drive letter. Depending on the drive letters chosen in your setup, the CD-ROM drive can even be mapped as C:.

If you are assigning the drive letter that is currently used by the CD-ROM drive to a volume using `LVM` or `LVMGUI`, the system will prompt you to reboot.

The `RESERVEDRIVELETTER` statement in CONFIG.SYS can help to avoid unnecessary reboots when reassigning the drive letters. It can be used to force the CD-ROM to a convenient letter.

The syntas for `RESERVEDRIVELETTER` is
`RESERVEDRIVELETTER=<letter>`

where:

<letter>   specifies the upper drive letter that needs to be reserved for system use.

This line can be added anywhere in the CONFIG.SYS file. The CD-ROM drive will get the next drive letter *after* <letter> upon the next reboot.

2.3.6 Naming and LVM

LVM introduces a new level of abstraction from the underlying disk structures and allows you to name each of the elements.

- Hard disk
- Compatibility volumes which, when set bootable, should keep the same letter
- LVM volumes, which are not set bootable and might contain multiple partitions on several physical drives
- Partition
- Label (for example, SADUMP for dumping to the hard disk)

As far as naming these elements is concerned, you should avoid situations that might lead to confusion, for example, when identical names are used for different elements, thus, making it hard to distinguish them.

We suggest the following naming rules:

Table 8. Named Elements in LVM

Element	Proposed Name
Physical Disk	IDE_0, IDE_1 or RAID_1,RAID_2
Bootable Compatibility Volumes	WarpServer_C, SOS_D
Non-bootable Compatibility Volumes	Arbitrary name denoting the content
LVM Volumes	
Partition	D0P0 for Disk0 Primary 0, D0P1 for disk 0 primary1, etc, D0L0, D1L0

While the last proposition might seem like a unnecessary duplication, we have found that it helps manage the hard disk space in a dynamic environment.

2.3.7 Windows NT Server Integration

The IBM Networks Account Manager for managing Windows NT servers as additional servers in an OS/2 Warp Server for e-business domain only works with Windows NT V4.0. It does not work with Windows NT 3.51.

The Network Account Manager relies on an OS/2 Warp Server for e-business Primary Domain controller. This might impact the order in which you migrate your servers.

2.3.8 WorkSpace On-Demand V1.0

It is not recommended to install OS/2 Warp Server for e-business on a server that has WorkSpace On-Demand, Version 1.0 installed. OS/2 Warp Server for e-business supports WorkSpace On-Demand, Version 2.0.

If you wish to install OS/2 Warp Server for e-business over an existing WorkSpace On-Demand, Version 1.0, you should first back-up all ACLs (Access Control Lists) prior to the installation (these ACLs must be reinstalled after the migration to OS/2 Warp Sever for e-business has completed). Next, you will have to modify several system files before migrating to Warp Server for e-business as outlined in the following procedure:

1. Copy the WorkSpace On-Demand, Version 1.0 CD-ROM to a temporary directory on your hard drive.

   ```
   XCOPY *.* :\TEMP /S /E /V /H /O /T /R
   ```

2. Remove the read-only attribute from the file REVFIX.CMD.

   ```
   ATTRIB \TEMP\SERVICE\TOOLS\REVFIX.CMD -R
   ```

3. Edit `REVFIX.CMD`. Add `14.037` to the line.

   ```
   build_list='8.260 8.259 8.258 8.257 8.256 8.255', '8.254 8.253 8.252
   8.251 8.250 8.249 8.248 8.247 8.246 7.029'
   ```

   Note

   You should check the final version of OS/2 Warp Server for e-business to determine the revision level with the `VER /R` command.

   ---

4. Copy the file SYSLEVEL.OS2 from a OS/2 Warp Server system that is at the appropriate fixpak level (OS/2 Warp Fixpak 22 or above) to a diskette.

   ```
   COPY \OS2\INSTALL\SYSLEVEL.OS2
   ```

5. On the Warp Server for e-business system, make a backup copy of the file `OS2\INSTALL\SYSLEVEL.OS2`.

   ```
   COPY \OS2\INSTALL\SYSLEVEL.OS2 SYSLEVEL.BAK
   ```

6. Remove the read-only attribute from the file `SYSLEVEL.OS2` on the OS/2 Warp Server for e-business system.

    `ATTRIB \OS2\INSTALL\SYSLEVEL.OS2 -R`

7. Copy the `SYSLEVEL.OS2` file from the diskette to the OS/2 Warp Server for e-business system.

    `COPY A:\SYSLEVEL.OS2 \OS2\INSTALL`

8. Replace the read-only attribute on the file `SYSLEVEL.OS2`.

    `ATTRIB \OS2\INSTALL\SYSLEVEL.OS2 +R`

9. Change to the temporary directory and enter `INSTALL`.

10. After successful installation of WorkSpace On-Demand R1.0, remove the read-only attribute from the `SYSLEVEL.OS2` file. Copy `SYSLEVEL.BAK` to `SYSLEVEL.OS2`. Put the read-only attribute back on the `SYSLEVEL.OS2` file. You are now done.

2.3.9 Backup Software and JFS

JFS now supports larger files under OS/2 than any previous OS/2 version. It also has the feature to support sparse files. Make sure that your backup software can handle these features before you start to exploit them. The PSnS Backup and Recovery Services, included in OS/2 Warp Server for e-business, does support very large files (see Section 1.3.9, "Backup and Recovery Services" on page 13). Sparse files that are backed up with software that does not support them may become dense files upon restore. That is, they may expand to their perceived size by the software.

2.3.10 Components Not in OS/2 Warp Server for e-Business

While most components listed below were not shipped with previous OS/2 Warp Server or OS/2 LAN Server versions, you should be aware that the installation process will delete the listed products if they are found. Of course, you will be warned prior to deletion.

Table 9. Software Removed by OS/2 Warp Server for e-business Installation

Components and Products removed by OS/2 Warp Server for e-business Installation
Ultimedia Video In
OpenDoc
VoiceType
Coaches installation support
MobileFileSync
Password Coordinator
Ultimedia Mail
System View Agent
Warp 4 Tutorial
Warp 4 Hibernate and Trap Door Support (True DOS) support
The following Bonus Pack Utilities:
Ask PSP
Hyper Access Terminal
CompuServe Info Manager
IBM Works
VideoIN for OS/2
RSJ Remote Support for OS/2

CHKINST.EXE on the OS/2 Warp Server for e-business CD-ROM will search for these products and generate a report for you. For more on this see Section 2.2.2.1, "Run CHKINST" on page 22.

2.4 Migration Examples and Model Scenarios Tested

We have successfully migrated the following setups.

Table 10. Table of LAN Server Versions Successfully Migrate

OS/2 Version	LAN Server Version
OS/2 2.11	LAN Server 3.0
OS/2 Warp 3.0 Connect	LAN Server 4.0
OS/2 Warp 3.0	LAN Server 5.0 (In Warp Server 4.0)

Each of our test domains consisted of a primary domain controller and a backup domain controller. We have not done many tests with additional servers since they are less complex to migrate because there is no domain control database to take care of.

Table 11 shows how the hard drives were configured for our tests.

Table 11. Partitioning and Volumes Used for Testing

Partition	Drive letter	Size	Partition Type	File system
(BOOT MANAGER)	N/A	(depends on HD)	primary	N/A
SOS [1]	C:	32 MB	primary	FAT
System	D:	512 MB	logical	HPFS or HPFS386
Dump	E:	RAM size + 1 MB	logical	FAT
Data	F:	(optional)	logical	JFS
CD-ROM	G:	N/A	N/A	CDFS
[1] SOS represents the Maintenance Partition.				

The VCU utility on the boot diskettes automatically converts such a setup and assigns the drive letters to the compatibility volumes it creates. These volumes are assigned letters following the old FDISK rules. A reboot is needed after conversion to make OS/2 Warp Server for e-business recognize the newly assigned sticky drive letters.

Chapter 3. Preparing the Migration Process

This chapter introduces necessary, or at least highly recommended, tasks that should be performed prior to a migration.

We assume that you got here following the roadmap in Chapter 2., "Planning and Considerations" on page 17 and already have an idea which migration path to follow.

3.1 Preparation Overview

Table 12 shows an overview of a step-by-step preparation for the migration to OS/2 Warp Server for e-business. We recommend you execute the listed preparation tasks in the order presented. Depending on your company's resources and environment, not all may be relevant to you.

Table 12. Preparations Roadmap

Preparation Step	Refer to Section	Check when done
Verify FixPak Prerequisites	Section 3.2	
Coexistence with Windows NT	Section 3.3	
Perform a Test Installation	Section 3.4	
Evaluate Disk Utilities and Customer Written Tools	Section 3.5	
Have Access to Hardware Configuration Disks	Section 3.6	
Have Copies of Important Configuration Files Available	Section 3.7	
Back Up your System	Section 3.8	
Prepare for Disaster Recovery	Section 3.9	
Remove LAN Distance	Section 3.10	
Remove Local Security	Section 3.11	
Back Up Directory Limits	Section 3.12	
Back Up Access Control Information	Section 3.13	
Save the DCDB	Section 3.14	
Remove HPFS386 Access Controls	Section 3.15	
Boot-Time Considerations	Section 3.16	
Remove IBM Peer	Section 3.17	
Document Printer and Queue Definitions	Section 3.18	
Document Multimedia Device Configuration	Section 3.19	
Deactivate Fault Tolerance	Section 3.20	

Table 13 below provides an overview about the tools we used for some of the preparation steps listed in Table 12 above. The *Provided By* column indicates *LAN Server* if the tool mentioned is part of your OS/2 LAN Server product; otherwise, it can be found on the CD-ROM accompanying this redbook. It is also available within the RBSAMPLE.ZIP file on the OS/2 Warp Server for

e-business CD-ROM (see Appendix B, "LAN Server Management Tools (LSMT)" on page 255 for more information).

Table 13. Tools for the Preparation

Preparation Step	Tools	Provided By
Backup your System	SRVBU	CD-ROM
Prepare for Disaster Recovery	MAKEDISK	LAN Server
Remove Local Security	PREPACL	LAN Server
Back Up Directory Limits	BACKDASD, SRVBU	CD-ROM, CD-ROM
Back Up Access Control Information	BACKACC, LSMT, SRVBU	LAN Server, CD-ROM, CD-ROM
Save the DCDB	SRVBU	CD-ROM
Remove HPFS386 Access Controls	PREPACL	LAN Server
Document Printer and Queue Definitions	BACKPRN	CD

Some of these tools, for example, BACKDASD, are further described in the related chapter; whereas the description of others, such as LSMT, was moved to the appendix.

3.2 Verify Fixpack Prerequisites

Fortunately, there is not much to say on this so far. During our testing, and during IBM development testing, there were no significant problems discovered causing migration failure or malfunction of OS/2, MPTS, TCP/IP, or File and Print services. Testing environments included different fixlevels on OS/2 LAN Server 3, OS/2 LAN Server 4, OS/2 Warp Server 4, and OS/2 Warp Server SMP.

3.3 Coexistence with Windows NT

You may have OS/2 LAN Server and Windows NT installed side by side on a test machine with OS/2 Boot Manager. During our testing, Windows NT refused to start from the other boot partition after the migration to OS/2 Warp Server for e-business. This was shown in Section 2.3.2, "WIndows NT Coexistence on Same Machine" on page 29.

3.4 Perform a Test Installation

We strongly recommend installing OS/2 Warp Server for e-business on a test machine prior to migrating a production system. Try both a pristine installation and a migration of a cloned machine for achieving the following:

- Become familiar with the installation process.
- Discover hardware related problems.
- Discover software related problems concerning the migration of the operating system, OS/2 LAN Server, MPTS, and TCP/IP.
- Find out if additional programs are migrated in an acceptable manner, such as HP JetAdmin Port Driver, Lexmark Markvision Marknet Port Driver, Bonus Pack Utilities, TME 10 Netfinity Server 4.0, or SystemView 1.0.1.
- Discover software related problems with the JFS file system, such as does your backup software handle JFS formatted drives properly?
- Discover problems of the kind mentioned in Section 2.3.2, "WIndows NT Coexistence on Same Machine" on page 29.
- Get the response files that will be created automatically by the panel driven OS/2 installation program. Refer to Section 4.4.3, "Attended Installation Response Files" on page 92.

Possible hardware-related migration problems could be:

- Your server has a disk array. For some reason, the disk array controller's device driver is downgraded during the migration process, and the RAID is not be accessible after the next reboot.
- The migration routine examines the graphics chipset and installs a driver that, for some reason, is not appropriate. After the next reboot, the screen is unreadable.
- A hardware device that worked under previous OS/2 LAN Server versions fails to work with OS/2 Warp Server for e-business. There is no chance to get it running because an appropriate driver is not yet available.

Possible software-related migration problems could be:

- LVM reassigns drive letters to existing partitions that do not match with those prior to the migration
- HPFS386 formatted volumes are not migrated properly; so, access to the hard disk will be denied due to missing access control information

- Values in some .INI files are modified during the migration; that is, the `CACHESIZE=` parameter in the HPFS386.INI is reset to a standard value, and the server might refuse to start due to lack of memory.

Important Note

If you migrate to a different hardware that is a clone of a currently productive system, be careful not to use duplicate network addresses or names.

3.5 Evaluate Disk Utilities and Customer-Written Tools

Over the years, you may have collected numerous tools to manage hard disk volumes and/or the OS/2 Workplace Shell. Some tools may be started out of self-written REXX procedures. Be aware of problems caused by new features of OS/2 Warp Server for e-business described in the following sections.

3.5.1 Workplace Shell Issues

OS/2 Warp Server for e-business's Workplace Shell, WPS, is based on the desktop of OS/2 Warp 4. The WPS has changed significantly, for example, Warp Center will be installed instead of the launchpad . Some folders have changed name and location, for example, the Network Applications Folder, which can now be found in the Connections folder . Consider that tools that reference to some of these items (for example, during an unattended installation) will need to be modified or rewritten.

3.5.2 File System Issues

As mentioned in the previous chapters, OS/2 Warp Server for e-business introduces two new file system features:

1. The Journaled File System (JFS)

2. The Logical Volume Manager (LVM)

It's very important to know that LVM substitutes the well-known FDISK, which cannot handle the volumes created by LVM during the migration to OS/2 Warp Server for e-business. In order to prevent FDISK from doing any harm to the logical volume structure, it is not part of the product anymore. For this reason, consider replacing all occurrences of FDISK.COM in your source code by LVM.EXE.

```
┌──────────────────────────────────────────────────────────────────────┐
│ ▨ OS/2 Window                                              ▨ ▫ ▯ │
│ OS/2      Ctrl+Esc = Window List        Type HELP = help              │
│                                                                        │
│                                                                        │
│ [C:\]lvm /query                                                        │
│                                                                        │
│ Disk                   Size (MB) Free Space:  Total Largest            │
│                            2016               0      0                  │
│    Disk Partition      Size (MB) Type      Status    Logical Volume    │
│    [ BOOT MANAGER ]            1 Primary   In use                      │
│    [ A ]BootPartition        500 Primary   In use        BootVolume    │
│    [ C ]DataPartition       1476 Logical   In use        DataVolume    │
│    [ B ]DumpPartition         35 Logical   In use        DumpVolume    │
│                                                                        │
│ [C:\]_                                                                 │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
└──────────────────────────────────────────────────────────────────────┘
```

Figure 2. Output of the LVM /QUERY Command

Also, in many current CID environments, the output of `FDISK /QUERY` is used to collect information about number, size, and type of the machine's logical drives. As you can see in Figure 2 above, although the output of `LVM /QUERY` is very similar to FDISK's, it doesn't match perfectly. This may also imply minor modifications to the source code of your custom-written scripts.

┌─ **Important Note** ──┐
│   │
│ If you use third party products to manage your servers' partitions, such as │
│ Powerquest's Partition Magic, please verify that they support LVM and JFS. │
│   │
│ Also, make sure that your backup software can handle JFS-formatted   │
│ drives.   │
│   │
└──┘

3.6 Obtain Hardware Configuration Disks

As part of the process of a maintenance cycle, you might have decided to upgrade the server's hardware, for example, to add more memory, hard disks, or backup devices before migrating to OS/2 Warp Server for e-business.

Some servers, for example, Microchannel or EISA machines, require configuration diskettes in order to recognize the new built-in parts properly. In this case, make sure you have these disks available.

3.7 Have Copies of Important Configuration Files Available

If you plan to migrate an existing machine, it may prove useful to have copies of the important configuration files on a diskette because:

- You may need to look up some machine or user-specific data, for example, MAC address, TCP/IP address and hostname, but you wouldn't be able to check it without interrupting the migration process.

- You may have to reset configuration data to its prior value since it was modified by the installation program during the migration process. We found out that the `CACHESIZE=` in the HPFS386.INI file was reset to a standard value if not configured manually. This prevented the server service to start after the migration.

The following configuration files, if present on your machine, would be candidates for being saved to a diskette.

Table 14. Important Configuration Files

File	In Directory
CONFIG.SYS	Root of Boot drive
STARTUP.CMD	Root of Boot drive
HPFS386.INI	\IBM386FS
PROTOCOL.INI	\IBMCOM
RFCNAMES.LST	\IBMCOM
RFCBCST.LST	\IBMCOM
IBMLAN.INI	\IBMLAN
RPL.MAP	\IBMLAN\RPL
MPTSTART.CMD	\MPTN\BIN
SETUP.CMD	\MPTN\BIN
RESOLV2	\MPTN\ETC
HOSTS	\MPTN\ETC
NAMED.BT	\MPTN\ETC\NAMEDB
NAMED.CA	\MPTN\ETC\NAMEDB
NAMED.REV	\MPTN\ETC\NAMEDB
SYSLOG.CNF	\MPTN\ETC\NAMEDB
TCPSTART.CMD	\TCPIP\BIN

3.8 Back Up Your System

There is no substitute for a comprehensive, reliable backup and recovery strategy. Without one, and without suitable preparation for the migration process, you are placing your business at risk. Here are two examples.

1. OS/2 Warp Server for e-business introduces a new file system (JFS). During the installation, the logical Volume Manager (LVM) will modify the server's partition table. In theory, any modification of disk structure is dangerous for the data residing on this disk and, if something goes wrong, could result in complete data loss. In this case, the only way to get the

machine up and running again is booting from Disaster Recovery
Diskettes and restoring the latest backup. Read more about Disaster
Recovery in the Section 3.9, "Prepare for Disaster Recovery" on page 53.

2. If the migration to OS/2 Warp Server for e-business fails, the system will
   likely be in an undefined state. The machine may no longer boot properly,
   or the server service may refuse to start due to changed, and not yet
   reasonable, configuration parameters. Due to the system's complexity,
   you will have no guarantee in advance to get the system to work properly
   again. If you start to do modifications by hand, it could take hours of work
   to achieve this goal. If you fail, a restore from a previously taken backup
   will be the only way to get back to where you started.

Important Note

Basically, before starting to modify any productive environment, an
administrator is in charge of a server backup. We strongly recommend
not only saving the important files, but instead backing up the whole
system. In other words, backup all partitions on all of the server's hard
disks.

If, for any reason, you are unable to do so, you should at least have a backup
of the following components (if they apply to your system):

1. Company's Data

2. User Home Directories

3. Applications

4. Operating System

5. User Logon Profiles

6. Server Configuration Data

We assume that you are already using a proven reliable backup solution for
items 1-6. For further information on backup strategies, the redbook *Using
ADSM to Back Up OS/2 LAN Server and Warp Server*, SG24-4682 might be
useful.

7. DASD Limits

   For more information, refer to Section 3.12, "Backup Directory Limits" on
   page 57.

8. User/Group Definitions and Access Rights

   For more information, refer to Section 3.13, "Backup Access Control
   Information" on page 60.

9. Domain Setup Information

   For more information, refer to Section 3.14, "Save the DCDB" on page 62.

Steps 6-9 can be performed in one step with the SRVBU utility that will be described in the next section. Another useful tool for modifying your LAN Server environment or extracting information from it is LAN Server Management Tools (LSMT), which is introduced in Section 3.8.2, "LAN Server Management Tools (LSMT)" on page 52 and further described in Appendix B, "LAN Server Management Tools (LSMT)" on page 255. Both tools are available on the CD-ROM accompanying this redbook.

3.8.1 SRVBU Utility

SRVBU is a procedure written in REXX. Running on your server, SRVBU scans a predefined set of logical drives and performs the following actions on each of the scanned drives:

1. Backs up HPFS386 Access Control Information to a file `DISKX.ACL` if `x` is the drive letter of a HPFS386 formatted partition

2. Backs up the `NET.ACC` to the file `NETACC.BKP`

3. Backs up DASD limits to a file named `DISKX.DLM` if `x` is the drive letter of a DASD limit enabled partition

4. Copies important server configuration files as specified in the `SRVBU.INI` file

5. Writes a disk statistics file if specified in the `SRVBU.INI` file

6. Writes a processing log as specified in the `SRVBU.INI` file

7. Writes an error log as specified in the `SRVBU.INI` file.

Figure 3 shows the content of the directory holding the files saved by SRVBU.
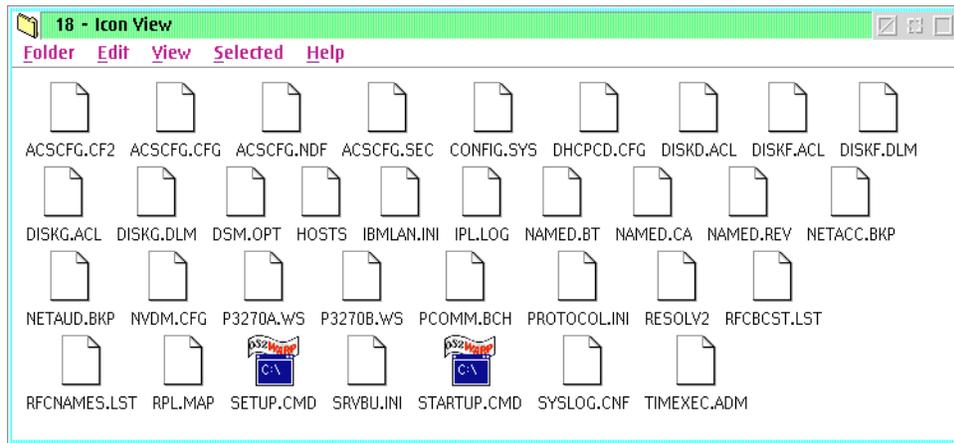
Figure 3. Files Saved by the SRVBU Utility

Figure 4., "SRVBU.INI File (Part 1 of 2)" on page 48 illustrates the `SRVBU.INI` file to help understanding how this utility works:

```
; Purpose:
; - get from all HPFS disks the access control list
; - DASD limit list
; - get statistics from the disks
; - copy crucial files to a safe place based on the Julian date

[TARGET]
DestinationPath = f:\srvbu
StatisticsFile = f:\logs\dskstat.csv
LogFile = f:\logs\srvbu.log
ErrFile = \srvbu.err
DasdFile = f:\logs\dasd.log

[REMOTECOPY]
RemoteCopy = 1
AliasName = SRVBKP
DriveLetter = Y:

[ARCHIVE]
Days = 30

[DISKS]
C:
D:
E:
F:
G:
H:

[FILES]
\config.sys
\startup.cmd

\ibmlan\srvbu\srvbu.ini

\os2\install\ipl.log
\ibm386fs\hpfs386.ini
\ibmcom\protocol.ini

\ibmlan\ibmlan.ini
\ibmlan\rpl\rpl.map
\ibmlan\accounts\netacc.bkp
\ibmlan\logs\netaud.bkp

\mptn\bin\setup.cmd
\mptn\etc\ipdialer.ini

\mptn\etc\namedb\named.bt
\mptn\etc\namedb\named.ca
\mptn\etc\namedb\syslog.cnf
\mptn\etc\namedb\named.rev
\mptn\etc\resolv2
\mptn\etc\hosts
\mptn\etc\dhcpcd.cfg
```

Figure 4. SRVBU.INI File (Part 1 of 2)

```
\cmlib\acscfg.cfg
\cmlib\acscfg.cf2
\cmlib\acscfg.ndf
\cmlib\acscfg.sec

\pcomos2\private\p3270a.ws
\pcomos2\private\p3270b.ws
\pcomos2\private\p3270c.ws
\pcomos2\private\p3270d.ws
\pcomos2\private\p3270e.ws
\pcomos2\private\pcomm.bch

\adsm\dsm.opt
\adsm\dsmc.opt
\adsm\dsmp.opt
\pgms\adsm\dsm.opt
\pgms\adsm\dsmc.opt
\pgms\adsm\dsmp.opt

\netprint\ibm4033.dat
\netprint\redirect.err
\netprint\interact.log

\ibmcom\rfcnames.lst
\ibmcom\rfcbcst.lst

\softdist\nvdm.cfg
\pgms\sofdist\nvdm.cfg
```

Figure 5. SRVBU.INI File (Part 2 of 2)

The [TARGET] section defines the name of the different log files and the path to the directory (DestinationPath=) that will be the root of the subtree containing the backup sets.

If the keyword RemoteCopy= in the [REMOTECOPY] section is set to 1, an additional NET USE command will be performed using the values of the keywords AliasName= and DriveLetter=. Furthermore, a directory with the server's name will be created if not already there, and the gathered information will be stored in a subdirectory underneath. This feature can be used to gather the critical data of all the company's servers on one alias.

No matter if copied locally or remotely, the gathered information is stored in a directory whose unique name is computed based on the Julian date and the number of backup sets specified by the keyword Days= in the [ARCHIVE] section of the SRVBU.INI file. In addition, the DISKX.ACL files are stored in the root directory of each partition they belong to.

```
 [D:\]\IBMLAN\SRVBU\SRVBU
* SRVBU Version 7.12 running at 14/12/98 22:00:07
> Destination Path: F:\SRVBU\18
> Remote Path: Y:\SRV163\18
* SRVBU Ended: 5.92

[D:\]
```

Figure 6. Running the SRVBU Utility

In the example shown in Figure 6, Days= was set to 30, which would give you
access to the last 30 backup sets. On December 14th, 1998, which is the
Julian day 348, the directory's name is 18 calculated from the formula 348
mod 30. This value can also be calculated with the MODCALC utility shown in
Figure 7, which can be found on the CD-ROM accompanying this redbook.
MODCALC is not officially supported by IBM.

Figure 7. SRVBU Directory Name Calculator

Figure 8 on page 51 shows an example of the directory structure created by
SRVBU.

F: 2,280,048 KB free, 3,455,360 KB total
Drive F

Drive F
- Dev
- LOGS
- ShareA
- ShareB
- SRVBU
  - 14
  - 15
  - 16
  - 17
  - 18
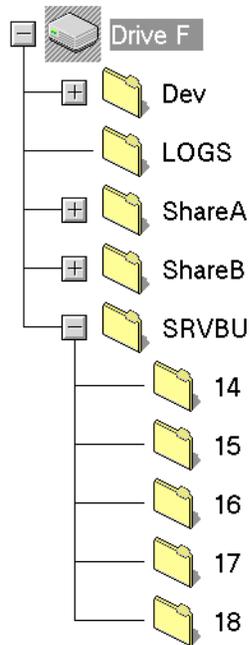
Figure 8. Saving Location of the SRVBU Utility

Hint

Calling SRVBU with the `/t` parameter will output trace information to the screen.

With SRVBU, you can easily set up a scenario where the data of the company's critical servers is saved automatically. Make sure SRVBU is running on each server and that `RemoteCopy=` is set to `1`. Use a scheduling program to start a command file automatically at a certain time. The command file should perform the following:

- Log on automatically to the network (make sure the user has RCWXDA rights or is logged on as with administrator rights).

- Check if the drive letter is already in use. In this case, SRVBU will fail and make an entry in the error log.

- Call `SRVBU.CMD`, which will copy the data to the destination path specified in the SRVBU.INI file.

- Log off from the network.

Gathering multiple generations of the critical server's data in one spot is both extra insurance against data loss and a useful feature for an administrator who could easily get information about all servers just by looking at this one alias.

3.8.2 LAN Server Management Tools (LSMT)

LAN Server Management Tools is a collection of REXX procedures which can either be called from the command line or from a PM-based GUI. LSMT is provided as-is and is not officially supported by IBM. Appendix B, "LAN Server Management Tools (LSMT)" on page 255 provides information on obtaining LSMT.

LSMT acts as a two-way tool. You can:

- Export LAN Server configuration information to ASCII files using the `GETxxxx` commands. These files can easily be modified or backed up.

- Re-import these ASCII files to apply the modifications you have done using the `SETxxxx` commands, which form an exact counterpart to the `GETxxxx` commands following the same syntax.

Table 15 shows the call syntax of the available procedures, a brief functional description, and the name of the related output file that will hold the extracted information. The /m parameter (mute) suppresses output to the screen.

Table 15. LSMT GETxxxx Procedures

Procedure	Purpose	output file
getusers /srv:<srvname> /m	Extract user information	USERS.CSV
getgrps1 /srv:<srvname> /m	Extract group names and comments	GROUPS1.CSV
getgrps2 /srv:<srvname> /m	Extract groups and memberships	GROUPS2.CSV
getalias /srv:<srvname> /m	Extract alias definitions	ALIAS.CSV
getacl /srv:<srvname> /m	Get access profiles	ACL.CSV
getassgn /srv:<srvname> /m	Get user logon assignments	ASSGN.CSV
getappl /srv:<srvname> /m	Get defined public applications	APPL.CSV
getsel /srv:<srvname> /m	Get application assignments	SELECTOR.CSV
getpwd /srv:<srvname> /m	Get passwords (encrypted)	USERS.PWD

For more information about LSMT, please refer to Appendix B, "LAN Server Management Tools (LSMT)" on page 255, where this tool is explained in more detail.

3.9 Prepare for Disaster Recovery

After an unsuccessful migration, the system might refuse to boot. In this case, the only way to access the server's hard disks is by being able to start from the Disaster Recovery Diskettes. If any data is seriously damaged, you have to be able to restore it from a previously-made backup.

Although most administrators will claim to have a reasonable backup method, many of them never consider the restore process since this is not a regularly performed task. Having Disaster Recovery Diskettes available can be the only chance to recover from system failure. If you don't have them available, create them by either of the following methods:

1. Make copies of the OS/2 installation diskettes and modify them manually.

2. When using HPFS386, use the MAKEDISK utility located in \IBMLAN\NETPROG (if running OS/2 Warp Server, double-click on the

Icon **Create 386 HPFS OS/2 Startup Diskette** located in the *IBM LAN Services* folder as shown in Figure 9 below).You will need to have access to the OS/2 Warp Server installation files. Also verify that the CONFIG.SYS contains the `BASEDEV=XDFLOPPY.FLT` entry.
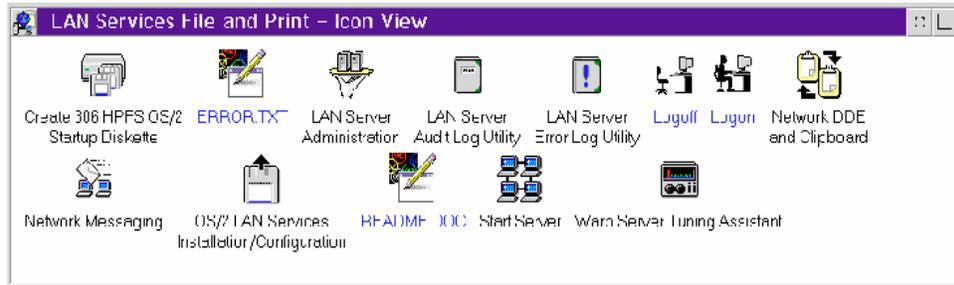
Figure 9. Create 386HPFS OS/2 Startup Diskette Utility

3. If your backup software offers functionality to create Disaster Recovery Diskettes, then do it this way.

Verify that the Disaster Recovery Diskettes contain at least the following additional drivers, and if not, add them manually:

 • HPFS386 driver, if your server has HPFS386 installed

 • SCSI driver, if your backup device is a SCSI device

 • RAID driver, if your server has a RAID array

 • Backup device driver (if required).

Note

In order to be sure the device drivers work as expected, always copy those from your currently running system onto the Disaster Recovery Diskettes instead of getting the latest version from the Internet.

Also, keep in mind, if needed, to copy additional device drivers to the Disaster Recovery Disks whenever the server's hardware has been modified.

> **Important Note**
>
> To be sure disaster recovery works, you should have tested the Disaster
> Recovery Diskettes for the following issues:
>
> - Are you able to boot from the Diskettes and access your server's hard
>   disk?
> - Is the backup device recognized during startup?
> - Are you able to read and restore from the backup media?

Always keep those diskettes in a safe and known place.

3.10 Remove LAN Distance

The OS/2 Warp Server for e-business software cannot be installed over a
previously installed LAN Distance Connection Server or LAN Distance
Remote. You must remove it before installing any OS/2 Warp Server for
e-business software.

This is how we did it:

- If not already part of your regular backup, save your \CONFIG.SYS and
  your \IBMCOM\PROTOCOL.INI to a safe place.
- Call `LDREMOVE.EXE`, which is located in the LAN Distance installation
  directory (`\WAL` by default).
- Select **Archive configuration files** as shown in Figure 10 below.
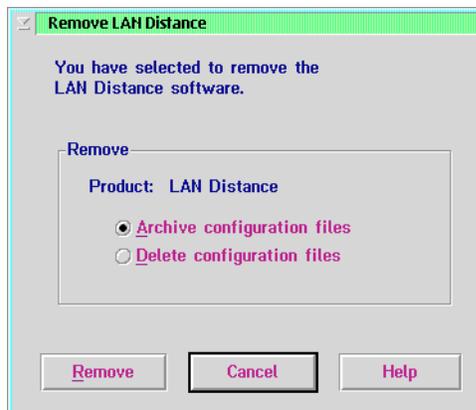
Figure 10. Archiving LAN Distance Configuration Files

This will save the following LAN Distance User Configuration Files that are stored in the LAN Distance installation directory (`\WAL`):

Table 16. LAN Distance User Configuration Files

Name	Description
WCLLOCAL.INI	Local configuration information for the LAN Distance workstation
WCBUSRF.ISF	Security information from the user account database
WCLDIAL.CXD	Telephone numbers and connection information for phone book entries
WCLNET.INI	Modem configuration information

- When the dialog shown in Figure 11 on page 56 is displayed, the removal process has finished, and the server must be rebooted.
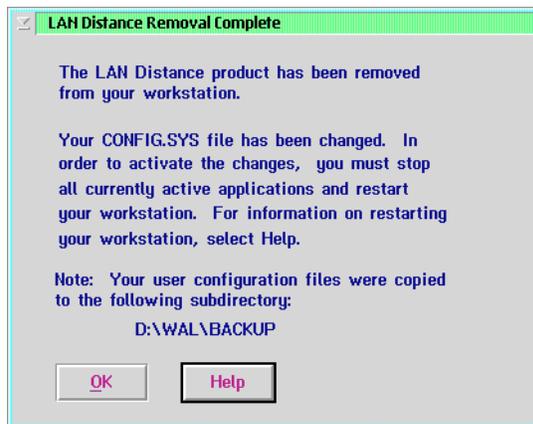
Figure 11. LAN Distance Removal Completed

3.11 Remove Local Security

If you are running OS/2 LAN Server Advanced, you may have installed the Local Security Feature for HPFS386 (referred to as Local Security).

While permissions set for a resource usually apply only to remote users accessing the resource from different workstations, Local Security extends access restrictions to local users working at the server. It protects all files on the server's HPFS386 partitions from unauthorized local access. Files stored on FAT partitions are not protected by Local Security. However, they are still protected from remote access by unauthorized users. Administrators have

permissions for all files on the server and are not subject to access control permissions once they are authenticated.

Local Security also checks file permissions when you run a program that accesses files. Programs that need access to system files (such as BACKACC) or even to the complete hard disk (backup programs) would autologon with administrator rights or gain access by the PRIV utility.

If you are using Local Security on at least one of the HPFS386-formatted partitions, you must deactivate it before migrating to OS/2 Warp Server for e-business by doing the following:

1. In the CONFIG.SYS file change the line

   `PROTSHELL=C:\IBMLAN\NETPROG\SECURESH.EXE C:\OS2\PMSHELL.EXE`

   to:

   `C:\IBMLAN\NETPROG\SECURESH.EXE`

   to remove the local logon procedure.

2. Run the PREPACL utility to remove the access control information supplied by Local Security. Section 3.15, "Remove HPFS386 Access Controls" on page 62 describes how to use PREPACL.

   Important

   If you omit this step, you will not be able to access any directories belonging to the OS/2 subtree.

   ---

3. Reboot the server afterwards.

During the installation process, the Local Security code will be automatically upgraded.

3.12 Backup Directory Limits

Directory limits provide disk space management at the server's directory level. If you applied directory limits to your server's file system, save them and disable them afterwards. If not already part of your regular backup (such as with the SRVBU utility described in Section 3.8.1, "SRVBU Utility" on page 46), keep the saved directory limit information in a safe place for restore purposes.

As shown in Figure 12, you can inquire the DASD limits applied to your system with the NET DASD command.

```
(0)[D:\]net dasd
           Limit          Size          Threshold       Increment
Resource   (KB)           (KB)          (%)             (%)
_____

F:\homedir\USER001
           50000          8232          0               0
F:\homedir\USER002
           30000          12596         0               0
F:\homedir\USER003
           90000          3352          0               0
F:\homedir\USER004
           90000          3             0               0
F:\homedir\USER005
           90000          418           0               0
F:\homedir\USER006
           90000          1035          0               0
F:\homedir\USER007
           90000          123           0               0
F:\homedir\USER008
           90000          878           0               0
F:\homedir\USER009
           90000          4499          0               0
The command completed successfully.

(0)[D:\]_
```

Figure 12. Query DASD Limits with the NET DASD Command

In this example, we backed up DASD limits with the tool BACKDASD, which can be found on the CD-ROM accompanying this redbook.

BACKDASD Example

```
BACKDASD /F:DISK_F.DLM /P:F:\HOMEDIR
```

The BACKDASD command shown above will backup the DASD limits for the subtree HOMEDIR on the server's F: drive to a file DISK_F.DLM. Try the /? parameter to see all possible parameters.

Figure 13 shows how we actually did this.

```
(0)[D:\srvbu]backdasd /f:disk_f.dlm /p:f:\homedir
BACKDASD Version 1.10   Release 25/09/97 (c) Steve Sharrad.
Internet e-mail: ssha@henleycol.ac.uk
 Successfully renamed DISK_F.DLM to DISK_F.BAK
 DASD limit backup file is DISK_F.DLM
 Enumerating DASD limit(s)...
 Writing data to backup file (9 entries)...
 Number of DASD limits backed up to DISK_F.DLM :  9

Total Operation Time: 0 minutes, 0 seconds.
BACKDASD completed successfully.

(0)[D:\srvbu]_
```

Figure 13. Backing Up DASD Limits Using the BACKDASD Utility

After you have backed up all DASD limits from all HPFS386 formatted
volumes, remove the directory limit support. The following example disables
directory limit support for drive F:

NET DASD F: /DISABLE

3.12.1 RESTDASD Command

Before the directory limits previously saved by the BACKDASD command can be
restored to a HPFS386-formatted volume, directory limit support must be
enabled for it. For example, to enable directory limit support for drive F: use
the following command:

NET DASD F: /ENABLE

The following command will restore the directory limits saved with BACKDASD
after the migration: RESTDASD /F:DISK_F.DLM

Figure 14 shows how we did this.

```
(O)[D:\srvbu]restdasd /f:disk_f.dlm
RESTDASD Version 1.10   Release 31/08/97 (c) Steve Sharrad
Internet e-mail: ssha@henleycol.ac.uk
Backup File Statistics:
Backup Created on: 14/12/98      at: 16:20:34
BACKDASD version used to create    : 1.10
Number of DASD limits held in file : 9

Backup file containing DASD limits : DISK_F.DLM
Original backup directory          : "F:\HOMEDIR"
Original backup Server             : \\SRV168
Type of backup                     : Recursive / Recursive HUGE

RESTDASD will perform the following:

Path to restore DASD limits to     : F:\HOMEDIR
Restore to Server (name)           : \\SRV168 (local machine)
Restore sub-directories (recursive): Yes
Error log file reports written to  : \DASD.LOG
Force restore DASD resource limit  : Yes, even if resource is already larger
Overwrite existing DASD limit      : Always


Press Y <enter> to continue, or any other key <enter> to abort.
y

 Restoring limit(s)...

Limits successfully restored: 9 (0 failed).

(O)[D:\srvbu]_
```

Figure 14. Restoring DASD Limits Using the RESTDASD Command

3.13 Backup Access Control Information

The NET.ACC file in `X:\IBMLAN\ACCOUNTS` (where `X` is the drive where your OS/2 LAN Server software is installed) contains user and group information. This file also includes server-specific access control information for File Allocation Table (FAT formatted) drives, pipes, printers, and serial devices. For HPFS386-formatted drives, Access Control Profiles are not stored in NET.ACC because here ACLs are an integral part of the file system.

Furthermore, the NET.AUD file holds the recorded auditing information if network auditing is turned on.

Many backup software vendors, such as Sytron (Sytos) or IBM (ADSM), claim that they will backup any file system including those specific to OS/2 LAN Server. For verification you should

- Perform some disaster recovery stress tests.
- Put in place a procedure that will save the access control information automatically, such as the SRVBU utility described in Section 3.8.1, "SRVBU Utility" on page 46 or the LSMT described in Section 3.8.2, "LAN Server Management Tools (LSMT)" on page 52.

To backup and restore the ACLs, we used the BACKACC command, which is part of the OS/2 LAN Server product and can usually be found in the \IBMLAN\NETPROG directory.

BACKACC performs the following tasks:

1. Copies the NET.ACC file

2. Copies the NET.AUD file

3. Backs up Access Control Profiles for each drive to be converted to or from HPFS386

4. Deletes access control profiles for nonexistent directories

The syntax for BACKACC **is:**

BACKACC d:*<pathname>* /F:*<target>* /S

where:

d:	Specifies an optional drive letter.
<pathname>	Specifies the path to the directory or file of which permissions are to be backed up.
/F:*<target>*	Specifies a target file to store access control profile information to, which can be used as input for the RESTACC utility. If *target* is not an absolute path name, the default directory for *target* is the current working directory.
/S	Recursively backs up all the descendant subdirectories and is valid only if *pathname* points to a valid directory.

If you have multiple HPFS386-formatted drives, you must issue the BACKACC command specifying the drive letter for each drive.

The following example backs up NET.ACC and NET.AUD and updates the target file OS2_C.ACL with the access control information associated with C:\ and the subdirectories below it.

BACKACC C:\ /F:C:\BACKUP\OS2_C.ACL /A /S

Section 6.11.6, "Restoring Access Controls" on page 219 describes how to restore the ACLs saved by BACKACC after the migration.

3.14 Save the DCDB

The Domain Control Database (DCDB) is located on the domain controller containing information about definitions of network resources that users might access. Included in the DCDB are user's automatic logon assignments, public applications definitions, and the details of resources shared through aliases.

The DCDB consists of files that reside in a directory tree (`\IBMLAN\DCDB`) and can be backed up during the normal operation of your server. If not already done on a regular base, the next three sections describe methods to do this.

3.14.1 Manual Backup

A simple way to make a copy of the DCDB subtree is by use of the `XCOPY` command:

`XCOPY C:\IBMLAN\DCDB` *`<drive>`*`:\DCDB /S /E /H /R /T /V`

This command above copies the entire subtree to the directory \DCDB located on a drive specified by *<drive>*.

3.14.2 Replication to a Backup Domain Controller (BDC)

If you have set up one or more Backup Domain Controllers (BDC), a copy of the DCDB should already be there. This is done automatically by the DCDBREPL service. Check that all directories under \IBMLAN\DCDB contain `OK.RP$`, which indicates that replication is functioning properly. An example is shown in Section 6.9.5, "Verifying that DCDB Replication Was Successful" on page 200.

3.14.3 Backup With LSMT

The LAN Server Management Tools, described in Section 3.8.2, "LAN Server Management Tools (LSMT)" on page 52 and in Appendix B, "LAN Server Management Tools (LSMT)" on page 255, are perfect for extracting DCDB information and storing it in ASCII files, which later can be restored by LSMT if necessary.

3.15 Remove HPFS386 Access Controls

If migrating from a HPFS386 system, the HPFS386 access controls should be removed from all HPFS386-formatted drives. If you had installed and disabled Local Security, you already used `PREPACL` in Section 3.11, "Remove Local Security" on page 56 to remove the ACLs on your boot drive.

The PREPACL utility backs up, removes, and, after the migration, restores all HPFS386 Access Control Profiles applied to any subdirectories or files specified as a parameter. Be careful, since PREPACL removes the ACLs and copies backup information to an ASCII file. Careless repetitive usage of this utility will overwrite previous file contents, and the ACLs will be completely lost.

As can be seen in Figure 15 below, the PREPACL utility accepts many parameters.

```
(0)[D:\]prepacl

The PREPACL command syntax to remove and save ACLs is:

  PREPACL /P /B:d:\path\filename | /N [/FL:d:\path\filename |
          /DL:d:\path\filename | /D:d:\path] [/L1:d:\path\filename]
          [/L2:d:\path\filename] [/LR:d:\path] [/O]

  where:
   /P  specifies to remove the ACLs.
   /B  is the file where the removed ACLs will be saved.
   /N  specifies not to save the removed ACLs.
   /FL is a file containing a list of files from which to remove ACLs.
   /DL is a file containing a list of subdirectories from which to remove ACLs.
   /D  is a subdirectory from which to remove ACLs.
   /L1 is the name of the error log file.
   /L2 is the name of the history log file.
   /LR is the path to the \IBMLAN subdirectory.
   /O  specifies to remove only the ACLs specified with this command.

The PREPACL command syntax to restore ACLs is:

  PREPACL /R /B:d:\path\filename [/L1:d:\path\filename]
          [/L2:d:\path\filename] [/LR:d:\path]

  where:
   /R  specifies to restore ACLs.
   /B  is the file containing the ACLs to restore.
   /L1 is the name of the error log file.
   /L2 is the name of the history log file.
   /LR is the path to the \IBMLAN subdirectory.


(-1)[D:\]
```

Figure 15. Syntax of the PREPACL Utility

The following syntax diagram shows only the necessary parameters we used to perform this step:

The syntax for PREPACL is
PREPACL /P /B:*<filename>* /D:*<dirname>*

where:

/P   Removes 386 HPFS access control profiles in preparation for
            OS/2 installation.

/B:*<filename>*   When removing access control profiles, specifies a file name in which to save the access control profiles. If this parameter is not used, /N must be specified.

/D:*<dirname>*   Specifies a single subdirectory from which to remove access control profiles.

In the following example, we used PREPACL to remove the ACLs from the F: drive and save them to a file F:\DISKF.ACL.

```
(0)[D:\]prepacl /p /b:f:\diskf.acl /d:f:

    Preparing ACLs for workstation, Please wait...

    Processing complete.

(0)[D:\]_
```

Figure 16. Backing Up and Removing ACLs with PREPACL

3.16 Boot-Time Considerations

To minimize problems, remark the NET START SERVER statement to prevent the server service from starting after every reboot during the migration.

The following actions are not necessary but can help to avoid problems and shorten installation time:

- Remark all device drivers in the CONFIG.SYS that are not necessarily needed for the migration.
- Remark all programs in the STARTUP.CMD that are not necessarily needed for the migration.
- Remove the icons of all the programs from the Startup folder that are not necessarily needed for the migration.

Don't forget to undo these changes after the migration if you need them for normal server operation.

3.17 Remove IBM Peer

If you have installed IBM Peer for OS/2, remove it by calling LANINST before installing OS/2 Warp Server for e-business. File and Print Services will not install over IBM Peer.

3.18 Document Printer and Queue Definitions

If you have defined printer queues on your server, manually recording all the printer and queue definitions is a tedious task. We used the utility BACKPRN, which backs up printer and job properties to a file. This file can be used later for restoration by RESTPRN (see Section 6.12.2, "RESTPRN" on page 225) or RINSTPRN (the remote printer installation program - see Section 6.12.3, "RINSTPRN" on page 226).

A printer and job properties file consists of printer driver specific data defined for a printer and a queue. The printer part describes hardware-related information, such as which fonts are installed or which options are installed on the printer. The job properties consist of information about what paper to select, what resolution and orientation to use, and so on. So, printer properties belong to the printer, and job properties belong to a queue. These two types of properties are closely related to each other; so, it makes sense to back them up together.

Invoking BACKPRN without any command line parameter will show the syntax of the program as well as the available printers, queues, and the printer drivers used by them.

The syntax for BACKPRN is:

BACKPRN <*printer-name*>[.<*queue-name*>] <*file-name*>

where:

<*printer-name*>	This is the name of the printer to copy the printer properties from.
<*queue-name*>	(Optional) This is the name of the queue to copy the job properties from (if no queue is specified, the first defined for the printer is used).
<*file-name*>	This is the name of the property file.

For example:

BACKPRN PSCRIPT1.PSCRIPT1 pscript.pjp

The property file (extension .pjp) created with BACKPRN contains the printer and job properties as well as information about the driver used.

```
(0)D:\rinstprn>backprn

Backup Printer and Job Properties


Syntax:     BACKPRN [?] | <printer-name>[.<queue-name>] <output-file>

   <printer-name>   Name of the printer (mixed case required!!!)
   <queue-name>     Name of the queue (mixed case required!!!)
   <output-file>    Name of the file to write to

   BACKPRN [?]      Displays a list of available queues
   BACKPRN <printer-name>[.<queue-name>] <output-file>
                    Writes the properties to the file
                    if you don't specify a queue, the default one is taken

ITSC Boca Raton, Florida

Available Printers:


Printer         Queue           Device Driver
=================================================================
IBM4019         IBM4019         IBM4019.IBM 4019 LaserPrinter
HP5             HP5             LASERJET.HP LaserJet 5/5M
IBMNULL1        IBMNULL         IBMNULL
LEXMARK         LEXMARK         PSCRIPT.Lexmark Optra C
KYOCERA         KYOCERA         PSCRIPT.Kyocera FS-600 (KPDL-2)

(0)D:\rinstprn>_
```

Figure 17. BACKPRN Output

To continue the example, the command is executed again to save the
properties of the IBM 4019 printer with the output illustrated in Figure 18 on
page 67.

Although there is a warning in this particular example, the backup completes
successfully. The printer properties that cannot be found are printer driver
specific settings, such as forms and tray information, which, in this case,
have not been changed. We decided to include it in the example because the
help on the utility is not extensive, and we wanted to show that the message
was nothing to worry about.

```
(0)D:\rinstprn>backprn IBM4019.IBM4019 ibm4019.pjp

Backup Printer and Job Properties


Start of backing up printer and job properties

Printer [IBM4019] Queue [IBM4019] Driver [IBM4019.IBM 4019 LaserPrinter]
Warning: Can't find Printer properties information.
Backup to file ibm4019.pjp successfully finished.

(-1)D:\rinstprn>_
```

Figure 18. Using BACKPRN to Save Printer Properties

3.19 Document Multimedia Device Configuration

If, for any reason, you have setup Multimedia Services on your server, manually record any multimedia device configuration parameters. Multimedia Services will not be migrated and have to be set up manually after the migration.

3.20 Deactivate Fault Tolerance

If you are running OS/2 LAN Server Fault Tolerance, unmirror and deactivate all those currently mirrored drives on which services will be installed.

In our test environment, we used OS/2 Warp Server's OS/2 base Syslevel 3005 with fixpack 36 and OS/2 Warp Server's LAN Server syslevel 8200 with fixpack 8506.

As you can see in Figure 19 on page 68, the mirrored Partition G is recognized with FSTYPE 87.

```
(0)[D:\]fdisk /query


Drive Name  Partition Vtype FStype Status   Start     Size

     1 0000003f      :     1    0a      2        0        7
     1 SOS           C:    1    04      1        7       23
     1 SRV163        D:    2    07      1       31      502
     1 0010ab83      E:    2    06      0      533      102
     1 0013db50      :     2    87      0      635     1513
     2 0000003f      :     1    00      0        0        7
     2 00003f00      F:    2    07      0        7      627
     2 0013db50      G:    2    07      0      635     1513
```

Figure 19. Disk Setup for Fault Tolerance

You can deactivate Fault Tolerance by executing the following steps:

1. Start the FTSETUP Program

2. Under Options, select **Deactivate Fault Tolerance...**

   A dialog will appear as shown in Figure 20 on page 69. Choosing
   DEACTIVATE will perform the following:

   • The RUN=FTMONIT.EXE and DEVICE=DISKFT.SYS lines will be removed from
     the CONFIG.SYS file.

   • All drives that are mirrored or pending a mirror are unmirrored, and
     their secondary partitions will be deleted.

   • All detached partitions will be recovered.

3. The system will need to be restarted.

After the migration has completed, disk mirroring can be re-enabled again.
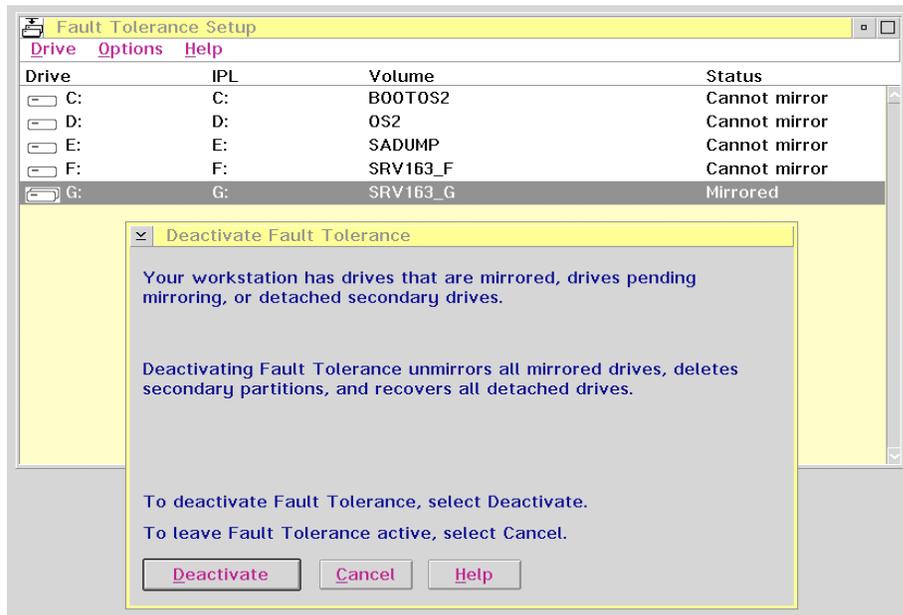
Figure 20. Unmirroring and Deactivating Fault Tolerance

Chapter 4. Panel-Driven Installation

In this chapter, we will review the different steps for the panel-driven installation of OS/2 Warp Server for e-business.

4.1 Introduction

Even if you plan to migrate your servers using the unattended technique, we recommend that you execute a panel-driven installation to get the feeling of what is going on during this process. So, in order to help you as much as we can, we will try to highlight some valuable points when preparing a CID installation.

To clarify terms in this chapter, we will differentiate three types of servers:

Primary Domain Controller (PDC) Responsible for validating user logons and maintaining logon assignments

Backup Domain Controller (BDC) Keeps a read-only copy of the users information and is able to take over the function of the PDC when the PDC is down or just overloaded

Additional Servers Hold the users private and shared files, applications, and control the various print queues

We assume that the PDC and BDC do not hold any user related files that are related to the File and Applications servers. That is, we will certainly find Access Control Lists (ACLs) on these, which will probably have the HPFS386 file system installed, while the PDC and BDC can just use HPFS or even FAT.

In your organization, with your network configuration, the actual servers may play two of these roles. We will assume these functions are on separate servers, but you can logically add the items related to the role actually taken by a given machine to have a good idea of what is to be done during the preparation and the validation of your migration. Obviously, the installation of the new system, by itself, will be the same in all cases, and we will describe it only once.

We will mention some tools we used during our tests. These tools are on the CD-ROM accompanying this redbook. For simplicity, we have put brief information about these tools at the end of this chapter.

4.2 Preparing the Migration

The migration preparation sequence, or the roadmap, has been detailed in Section 2.2, "Migration Decision Road Map" on page 18, so we will just describe the steps needed for each type of server.

4.2.1 General Structure of a Server Disk

This section describes the disk layout we used in our test domain. This disk layout is the same on all servers and represents our real life experience. Your real structure may be different, but the adaptation of the scenario will be easy as long as the operating system and OS/2 Warp Server for e-business components occupy a dedicated partition. For illustration purposes, we show our structure in order to help you understand the various examples that may use a hard-coded boot drive letter.

```
Boot Manager (1 cylinder)
C: Maintenance Partition (Primary, 20M, FAT Formatted, SoS)
D: System Partition (Logical, 500M, HPFS Formatted, OS2)
E: Dump Partition (Logical, Memsize+1M, FAT Formatted, SADUMP)
F: File Area (Logical, Rest of the Disk, HPFS Formatted,Srv_F)
```

Figure 21. Partition Layout of Our Servers

The `F:` partition of our primary and backup domain controllers is either left empty or used for holding the distribution files for unattended installations.

The other servers hold the user directories and files on their `F:` partitions.

All our servers are using the HPFS386 file system (even if this is not specifically needed for the primary and backup domain controllers).

Backup Your Data

It has been mentioned many times in this redbook, but it is worth repeating again: It is highly recommended to have a current and verified backup so that it can be used to restore in case something goes wrong.

4.2.2 Backup Domain Controller

Migrating the Backup Domain Controller is certainly the easiest task in our scenario. We can rely on the replication mechanism to actually refresh all the users related information that could have changed during the installation period. So, the tasks to accomplish are:

1. Check that the server is actually working as expected (using, for example, the LSC.CMD program from the CD-ROM accompanying this book).
2. Remove the Access Control Lists that are present on the system disk because they may prevent the installation program from accessing some of the OS/2 LAN Server-related subdirectories. (A Backup Domain Controller maintains ACLs on its \IBMLAN\DCDB subdirectory).
3. Install the new system.
4. Check that the server still works as expected. If it is needed, you will perhaps have to resynchronize the password of the server (using, for example, the RESYNCPW.CMD program from the same CD-ROM) Normally, the access control lists that are relative to the LAN Server subsystem would have been recreated automatically.

4.2.3 Migrating the File and Print Servers

For these types of machines, you should make sure you have a current NET.ACC backup. Note that the migration of one server of this type will imply the interruption of some services provided to your users. Files and printers under this server control will be unavailable during the migration. If such an interruption is unacceptable, you will have to move all the controlled resources to another server (using one of the means described in Chapter 6, "Migrating Hardware" on page 183) before migrating.

4.2.4 Migrating the Primary Domain Controller

This is certainly the most tricky element. In fact, the best way is to exchange the roles of the Backup and the Primary Domain Controllers. Once they are switched, migrate the Backup Domain Controller. Afterwards, exchange once again the roles to reach the same setup you had before. Performing the migration this way will guarantee that all the modifications that may occur on your domain while you're migrating will be validated and stored by the temporary Primary Domain Controller, and that after the replication of the DCDB tree on the temporary Backup Domain Controller, it will be ready to regain its role of Primary Domain Controller.

Switching Servers Roles

While it is helpful to have some CMD files that will do the job directly, the role switching between a Primary and a Backup Domain Controller is straightforward: Your domain will still be operational if you only have a Backup Domain Controller. Since you cannot have two Primary Domain Controllers, you must change the role of the Primary Domain Controller to Backup, and when this is done, you change the role of the Backup Domain Controller to Primary.

To change the roles, you must first stop the `NETLOGON` and `DCDBREPL` services on the PDC, then change the role and restart the two services. The sequence is:

```
NET STOP NETLOGON
NET STOP DCDBREPL
NET ACCOUNTS /ROLE:BACKUP
NET START DCDBREPL
NET START NETLOGON
```

These commands may be issued from any workstation using the `NET ADMIN /C` command.

Obviously, this cannot be done if you have only one server (which will then be primary domain controller (PBC) and file and print server). In this case, you may consider using a spare machine (it does not have to be a powerful one, nor a machine with large disk space available) to act as a temporary Primary Domain Controller. This can be done in the following way:

1. Install OS/2 Warp Server for e-business on a machine specifying it will be a Backup Domain Controller. This installation can be used to get familiar with the product.
2. Add the server to your domain (for example, by using the ADDSRV.CMD file, which resides on the CD-ROM).
3. Check that the replication has been performed successfully (LSC.CMD and LSDCDB.CMD files may also be used here as described in the chapter dealing with the migration to a new hardware).
4. Define this machine as the Primary Domain Controller by switching the roles using the procedure described in the box above.
5. Migrate your old domain controller to OS/2 Warp Server for e-business.
6. Switch back the roles and free the spare machine.

Note that migration can take a few hours, and that no modification should occur on your network (NET.ACC and DCDB) during the process. Using a temporary Primary Domain Controller can be considered as an insurance

policy: The LAN Server code will keep all your definitions (NET.ACC and DCDB). Access Control Lists (ACLs) are applied to your HPFS386 disks through other methods.

You may consider making the temporary Primary Domain Controller the permanent Primary Domain Controller. If the temporary machine was just not good enough to run your company's favorite word processor, for example, a Pentium 100 with 32 MB of memory and 1 GB of disk space, it could easily perform the tasks of a Primary Domain Controller. Be aware, however, if you have many additional servers, NET.ACC replication can be quite I/O and CPU-intensive.

4.3 Performing the Migration

This section shows how to perform the migration using OS/2 Warp Server for e-business. You may have noticed that no boot diskettes are shipped with the server. This is because CD-ROM #1 is a bootable CD-ROM. If the new machine where OS/2 Warp Server for e-business is being installed does not support booting from a CD-ROM, you can create the set of three boot diskettes with the `CDINST` command.

4.3.1 Installing the OS/2 Base Operating System

The first migration task deals with migrating the previous base operating system to the level of OS/2 Warp Server for e-business. Perform the following steps:

1. Insert the OS/2 Warp Server for e-business CD-ROM in the machine's CD-ROM drive and insert the first boot diskette (Installation Diskette) in drive A:

   Note: Machines that support booting from CD-ROM don't need to boot from boot diskettes since the OS/2 Warp Server CD-ROM is bootable. Insert the first CD-ROM instead and skip the diskette-changing step.

2. Shut down the system and reboot.

3. Insert Diskettes 1 and 2 as prompted. If the CD-ROM was not inserted in the step before, you'll be prompted to do so.

   When .ADD filters are loaded from Diskette 2, some warning messages might be displayed informing you that some Adaptec drivers cannot be loaded (AIC7870.ADD and AIC78U2.ADD), which can be ignored if your hardware does not have these adapters.

   When Diskette 2 has finished loading, the installation program will inspect your system for availability of logical volumes.

Since it is the first time you are installing OS/2 Warp Server for e-business, you will receive a message stating that some compatibility volumes have been created, and that you need to reboot your system.

OS/2 Warp Server for e-business uses a new disk managing technique based on logical volumes. As long as you do not use the new Journal File System (and up to now, you don't), the main difference you'll notice is that the disks are now managed by the Logical Volume Manager, LVM, not FDISK anymore. FDISK, as a command and utility, is no longer available.

Note

Since FDISK is no longer shipped with OS/2 Warp Server for e-business, you might need to modify your self-written utility programs that rely on FDISK. For example, if you used the `FDISK /QUERY` command to determine the CD-ROM drive letter, you would need to rework this procedure using the `LVM /QUERY` command. Note that the output text has changed.

Also worth mentioning is that logical volumes can be assigned any drive letter, and the CD-ROM drive letter can have a fixed one.

If you need to rely on the output of FDISK, to avoid overriding, you can rename FDISK.COM (located in the \OS2 directory of your current installation) to another name, such as OFDISK.COM. However, only use the `/QUERY` parameter since the old FDISK cannot cope with logical volumes. Not doing so might result in very serious problems.

If you rename the old FDISK.COM file to be able to use its output, modify your self-written programs to accommodate the new name and double check that only the `/QUERY` parameter is used.

The installation program continues by displaying a Welcome screen that lists the components and services offered by the product and introduces the panel-driven installation. The following describes the various steps of the process:

1. Preparing the system

    • Select the install volume

    • Format the volume if necessary. (In our case of a migration, we will obviously not format the volume.)

    • Copy the system files

2. Configuring hardware and software options

3. Installing and configuring the server components

The Installation Volume Selection is displayed.

4. Choose the option that says `Specify another volume`, even if the `Accept the selected volume` option is highlighted. Hit **Enter** to continue.

   The LVM text mode screen is presented to you. Only your previously bootable partitions are displayed. Don't panic, the other partitions are still there, but the LVM started in the Logical View mode and only the bootable partitions have been associated automatically with volumes. These volumes have not, however, an assigned drive letter. You will need to provide one.

5. Using the arrow keys, highlight the volume you want and press **Enter**.

   Like in the old FDISK screen, a menu is displayed to you where you can select **Change the Volume Drive Letter**.

   You are prompted with a list to indicate the drive letter you want to assign to this volume. Repeat that step for all the bootable partitions you have. At this time, don't forget to indicate on which partition you want OS/2 Warp Server for e-business to be installed.

6. Assign drive letters to the remaining partitions of your disks using LVM. To locate them, use the Physical view by pressing the **F5** key.

   Their previous labels are not displayed anymore. Instead, remaining partitions are given some names, such as `[A 1]`, `[A 2]`.... Switch back to the logical view by pressing **F5** to create logical volumes.

   Since those partitions are likely to be data partitions, in the following window, you may choose **Create a volume that does not need to be bootable**. This creates a Compatibility Volume (a volume that is associated with only one partition) or a Logical Volume (they can be associated with more that one partition, assuming they are JFS-formatted).

   When defining a volume, you need to assign a drive letter to it (using the same process as described before). The system asks you about the associated partition (you can create a new one or use an already existing one).

7. Since the drive letters have been modified, the system needs to be restarted. Re-insert the installation diskette and press **Ctrl**-**Alt**-**Del**.

   After the reboot, the newly-defined volume will match your specifications, and you will be able to continue the migration process.

> **Another Method**
>
> You can also (if needed) directly call the VCU.EXE program that is located in the `\OS2IMAGE\DISK_6` subdirectory of the CD-ROM. You will then receive a message informing you that the compatibility volumes have been created, and that the system needs to be rebooted.

When you accept the installation volume (you may need to double-check the LVM screen to be sure), the next step consists of specifying what to do with the selected installation volume. The associated screen displays three choices:

1. Not formatting the volume (needed for a migration and the one you should choose).

2. Performing a long format of the volume (the best choice for a new installation).

3. Performing a quick format of the volume (very fast but may leave some unmarked bad blocks on your disk and possibly cause problems later). This option was the default choice for the previous OS/2 Warp Server version. The more experienced user exited to a command line to execute the `FORMAT /L` long format command instead.

8. If your machine uses the HPFS386 file system, an information window is displayed providing you the last chance to remove the ACLs. You can use the F3 key here to get a command prompt or press **Enter** to continue with the installation.

   This installs the OS/2 base operating system to your machine.

9. After all files have been copied to the machine, you will be prompted to reboot the machine. Perform as prompted.

10. Define your system configuration as shown in Figure 22 and Figure 23. Note that these windows have not changed from the OS/2 Warp 4 install.

Figure 22. System Configuration Panel (1 of 2)

Pay attention to the video display that has been detected by the installation program. Previously installed video drivers are not detected and will not be used. If the one presented doesn't exactly match your display adapter, select **Video Graphics Array** (VGA) from the list. This will guarantee the system starts properly. After the migration has completed, you may install your display driver in a separate step using, for example, the DSPINSTL utility or the display installation program that came with the display adapter.
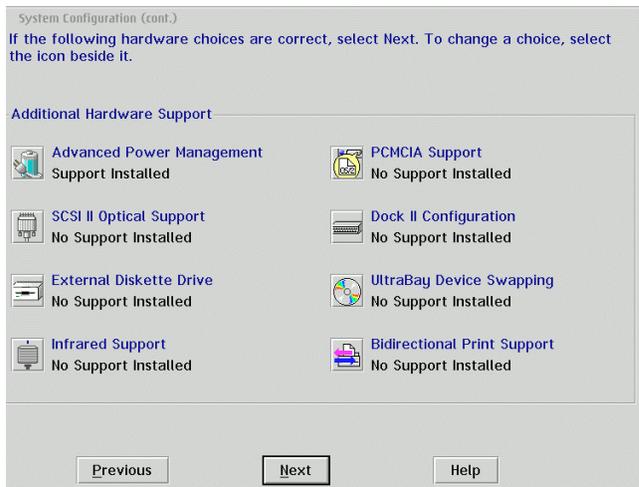
Figure 23. System Configuration Panel (2 of 2)

11.Even if the country was selected in the first configuration panel, you will be presented with the following window where you can select the default and secondary code pages that will be used by your system (850,437 which covers the broadest set of national characters available for Western Europe and English speaking countries is certainly the best choice for these areas).

If you select an European country, you'll even be able to select the use of the European locale. This ensures the Year 2000 compliance of your server in these locations.
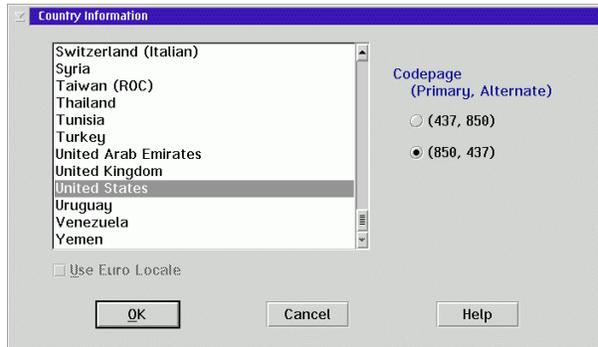
Figure 24. Country Information Panel

12.The usual printer selection panel is then displayed, and you can, if needed, indicate the primary printer associated with the server. If you don't have any preferences, you may install the IBMNULL printer driver. This ensures ASCII text printing from a printer that can be attached to the server.

When all these elements (more or less relative to the hardware) have been collected, the installation program enters its last phase.

You have to specify the elements you want to have added to the base operating system. Unless you have good reasons, we advise you to install as few elements as possible: An OS/2-based server generally runs unattended and is mostly controlled by remote REXX programs and is definitely not a development platform.

Also, note that this phase, just as the preceding one, can be easily restarted after the migration by executing `INSTALL` from the command line or by clicking on the **Selective Installation** icon.
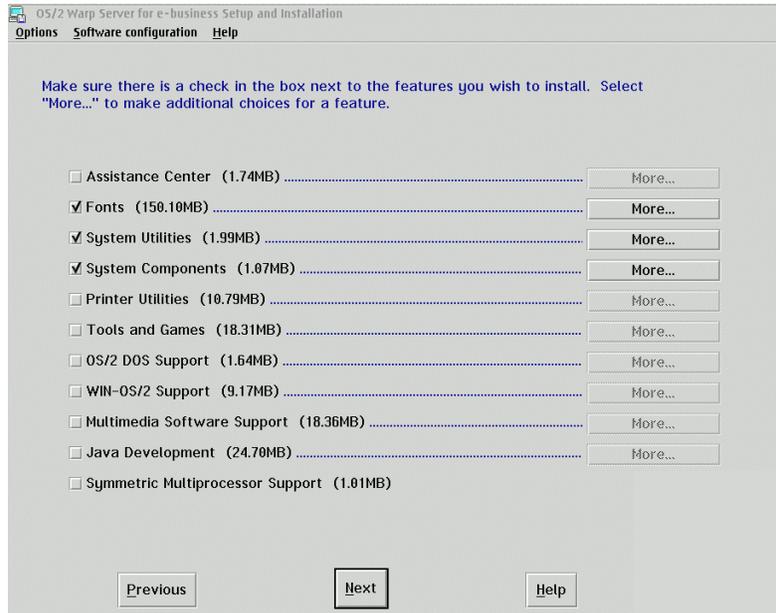
Figure 25. Selecting the Optional System Components

13. As shown in Figure 25, we have only selected **Fonts** (to have a system that will be able to take advantage of the Unicode support), **System Utilities**, and **System Components**.

We have suppressed any DOS Support, Multimedia, Development, and the Tools and Games. (On the CD-ROM that will come with this book, you'll find plenty of OS/2 and Server-oriented tools.) However, if you plan to run OS/2 Warp Server for e-business as a Java Server, we recommend selecting Java Development.

The following three figures show the windows selected in the previous step when pressing the corresponding **More...** button. Figure 26 on page 82 shows that only **Unicode Fonts**, which is the default, is selected.

Figure 26. Fonts Selection Window

Figure 27 displays the System Utilities selection window. All system components but Sort Filter (which, for European countries, doesn't sort at all) are selected.
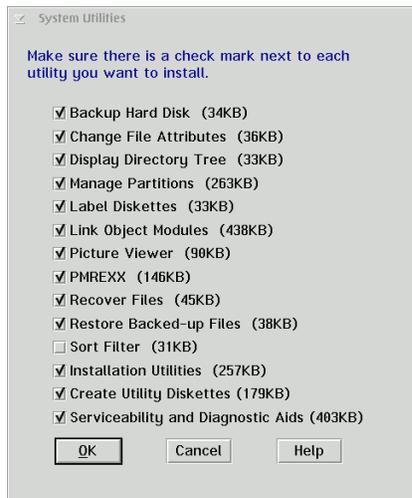
Figure 27. System Utilities Selection Window

Figure 28 on page 83 displays the System Components selection window. The JFS file system will be installed.
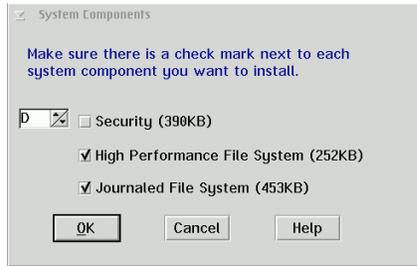
Figure 28. Systems Components Selection Window

> **Note:** The HPFS file system is selected here because the previous server was installed with HPFS partitions.

14.As shown in Figure 29, the last OS/2-related pop-up window appears prompting you how to cope with your previous configuration. Both check boxes are already selected for you. Since it is desirable to migrate previous configuration files and to have the opportunity to make changes to the new CONFIG.SYS file (some previous settings, such as SET PROMPT, are not transferred), press **OK** to continue.
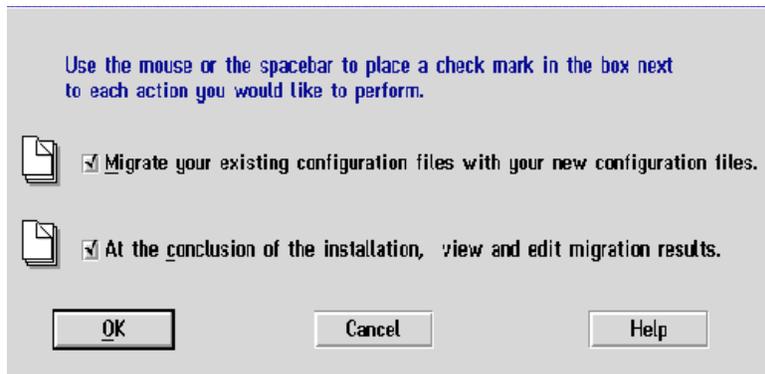
Figure 29. Previous Configuration Handling through Advanced Options Window

4.3.2 Installing the LAN Server Components

The second migration task deals with migrating the previous LAN Server component to the level of OS/2 Warp Server for e-business. After the OS/2 base operating system migration has completed, the installation of the server component will be started, as shown in Figure 30 on page 84. Perform the following steps:
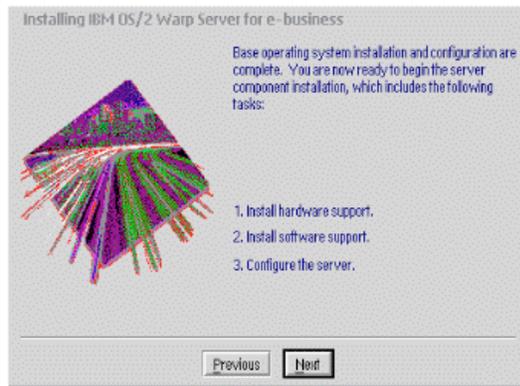
Figure 30. Server Component Installation

As shown in Figure 31 on page 85, you are prompted to select the services you want to install. For each component you select, the installation program will prompt you to provide configuration information. In case the selected component was previously installed, configuration information will be migrated. However, you still will have a chance to make changes to it.

Note that some components are checked by default, for example, TCP/IP Services, and others are mandatory to install, such as Netscape Communicator. The Current Status list informs you whether or not available components were installed before and what level they are, for example, current version or downlevel version.
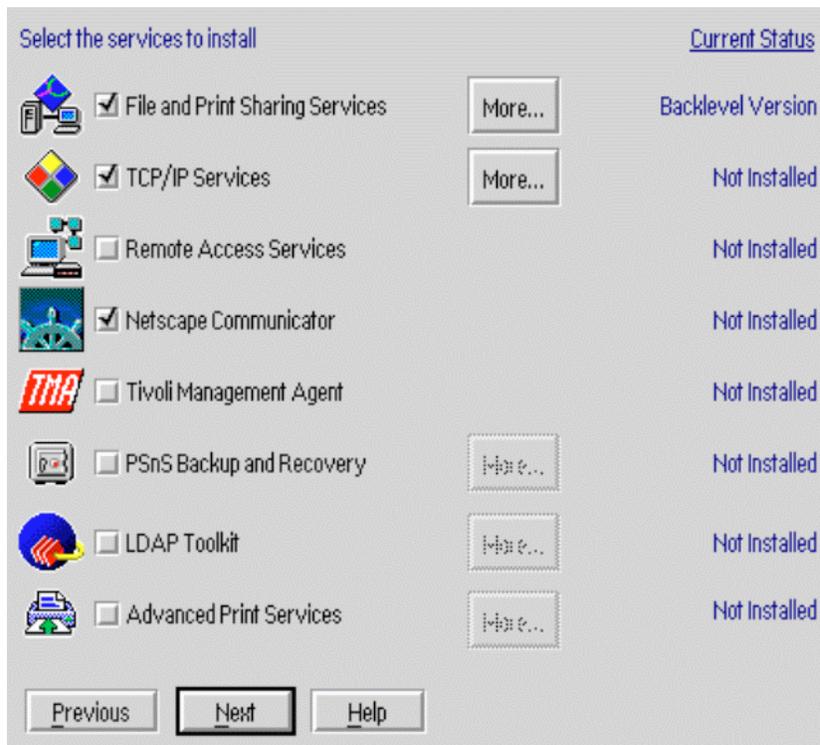
Figure 31. Server Components Selection

Clicking on the **More...** button provides you with a more detailed configuration panel of the component. As for the migration, we advise you to keep the things as simple as possible and just select a migration of the needed and defaulted components. When your server is up and running, you'll have time to add other components.

Most components are installed with the Feature Installer, FISETUP, which requires the Netscape Web browser. In comparison to previous Netscape browsers, this version does not support 16-color graphic configurations (a version that supports 16-color is expected to be available when OS/2 Warp Server for e-business is released).

15. Click **Next** to continue the installation process. As shown in Figure 32 on page 86, the OS/2 Warp Server for e-business Configuration panel will be presented to you.

Because all configuration information has been retrieved from a previous installation, most items are marked with a blue dash, which means that acceptable default settings can be used.

> **Note**
>
> When migrating a Primary Domain Controller, an additional and
> to-be-configured item is added to the list. You will be required to provide an
> administrator ID along with a password.
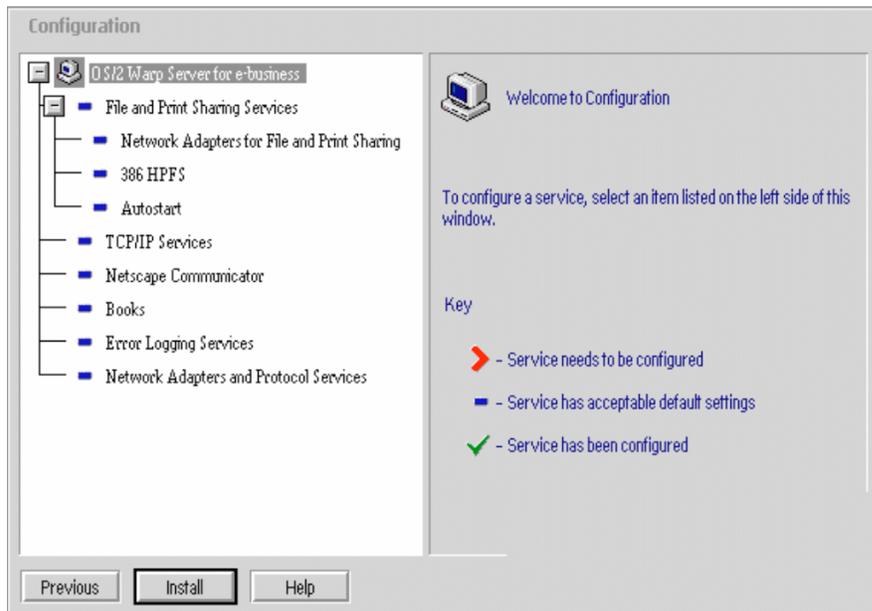
Figure 32. OS/2 Warp Server for e-business Configuration Window

Go from item to item to check or change configuration information.
Especially pay attention to the items that are preceded by a red-colored
arrow.

As shown in Figure 33 on page 87, the previously defined server and
domain names were retrieved.
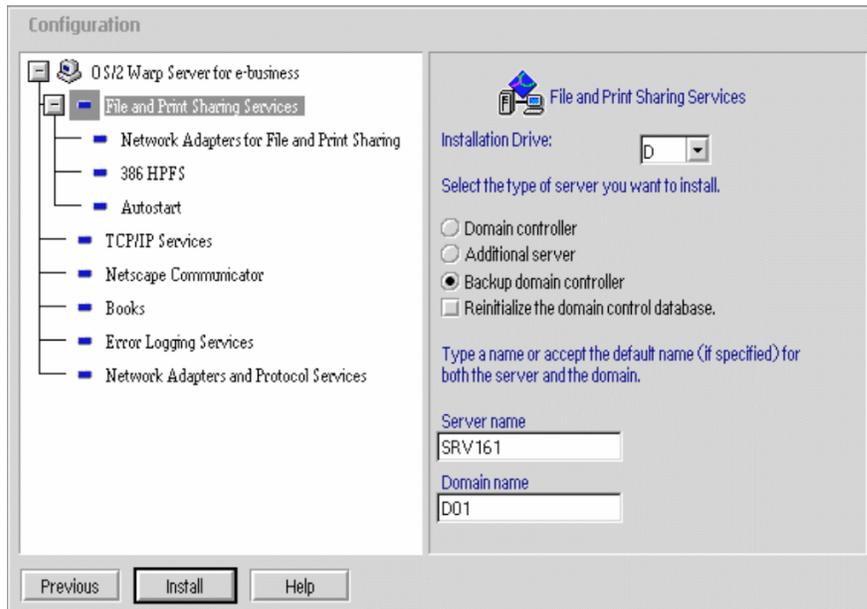
Figure 33. Previous Configuration Values are Preserved

16.When you click on the **Install** button, you will be prompted to confirm your
 selection by clicking on **OK** to complete the installation (see Figure 34).

Figure 34. Starting the Installation

In general, the NetBIOS parameters that were set previously are not
considered as appropriate by the Tuning Assistant, which will tune them
again. An information window will be presented to you, as shown in Figure
35 on page 88.
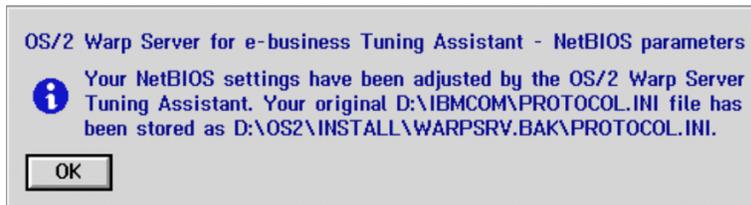
Figure 35. Information from the Warp Server Tuning Assistant

You may, however, have good reasons to use the previous NetBIOS parameters. As indicated in the shown message, the previous `PROTOCOL.INI` file is copied in the `\OS2\INSTALL\` directory with the file name of `WARPSRV.BAK`.

17. Click **OK** to continue.

    All selected components will be installed now, and many files are copied. A progress indicator informs you about the installation progress.

18. You are now presented with the Migrate `CONFIG.SYS/AUTOEXEC.BAT` window, as shown in Figure 36, showing you the modifications that will be performed to the two configuration files.
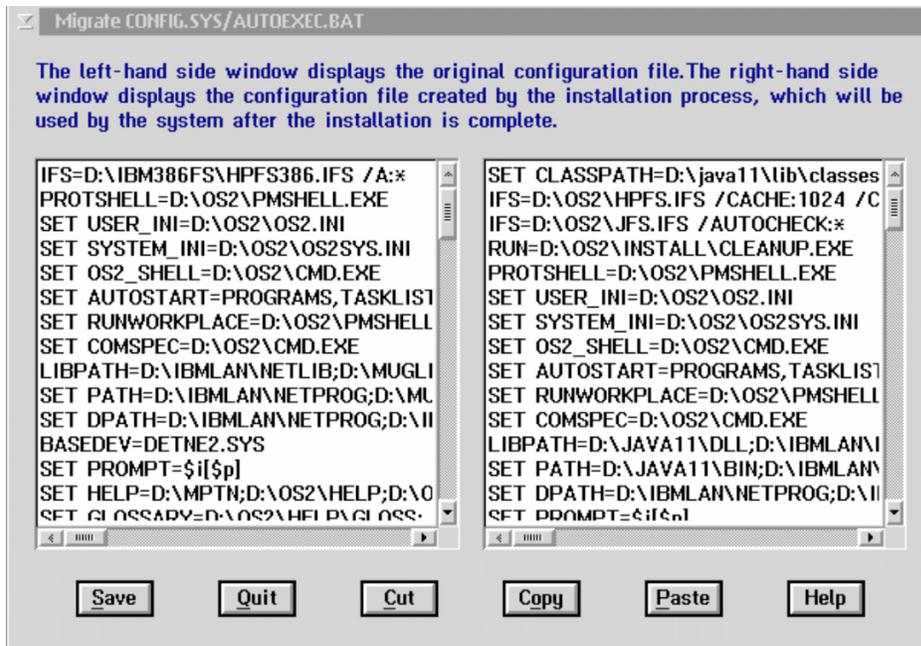
Figure 36. CONFIG.SYS before and after Migration

Figure 36 on page 88 shows you that our server was previously using HPFS386 (first line in the left list) and that the new CONFIG.SYS (the right part) does not reflect the HPFS386 installable file system anymore. This is normal: It will take a further reboot to install it. So, please resist the temptation to modify the IFS part of the new CONFIG.SYS and rely on the install program do it in a timely manner.

You can also notice that, on the right part, we have manually removed the BASEDEV=AIC78U2.ADD line (it usually appears on the second line below the CLASSPATH definition). Our machine does not have Adaptec adapters. Don't forget then to press the **Save** button before pressing the **Quit** button in order to save your modifications. The modifications you perform are not checked before you save them. Make modifications only if you're absolutely sure they will not induce an error during the next reboot. Good candidates for modifications are listed below:

SET PROMPT=($r)[$p]   Modify the prompt in order to display the
                                        return code of the previous command
                                        between parenthesis before the current
                                        path.

SET TZ=CST6CDT   Set the time zone to reflect Central USA.
                                        (If you need some more elements to set
                                        the time zone of your machine correctly,
                                        you can get an excellent freeware,
                                        TIME868, which offers a very nice time
                                        zone calculator.)

SET AUTOSTART=TASKLIST,FOLDERS,WARPCENTER

                                        Remove Programs and Connections from
                                        the AUTOSTART line. That prevents the
                                        automatic restart of any unwanted
                                        program, such as the Reconnect window
                                        at start-up of your server.

SET RESTARTOBJECTS=STARTUPFOLDERSONLY

                                        Restrict the automated restart to the
                                        objects that will be put in any folder
                                        having the startup attribute set (there is
                                        one by default in OS/2 Warp, but you
                                        may define others).

SET SCUSEPRETTYCLOCK=YES

                                        Modify the aspect of the OS/2 Warp
                                        Center (formerly called Smart Center,

hence, the SC prefix) to have it display a
nicer clock than the default one.

`SET SCKILLFEATUREENABLED=YES`   Enables killing a running process by
obtaining the list of the running process
using a Ctrl-Click on the Windows list
button.

`SET SCFINDUTILITY=D:\OS2\APPS\PMSEEK.EXE`

Replaces the object find program by the
more usable PMSeek application.

Depending on your machine type, you may want to remove unnecessary
device drivers, such as either `IBM1FLPY.ADD` or `IBM2FLPY.ADD`.

4.4 Behind the Scenes

This section is intended for those who want to know how the installation
process is really handled behind the panels, and for those who plan to use
Configuration, Installation, and Distribution (CID) techniques in their
organization. Understanding how the manual installation works is a
prerequisite for setting up a working CID scenario.

For a more extensive description of the CID process, please refer to the
redbook titled *The OS/2 Warp 4 CID Software Distribution Guide*,
SG24-2010.

4.4.1 The Philosophy

The installation program, whose installation screens you saw in previous
sections of this chapter, stores all the choices you made while filling in fields
or pushing buttons. These choices are saved in data files that are called
response files. These response files are used to perform the actual
installation. These files are the same type as those used in the unattended
installation.

Some products allow you to create response files through a Graphical User
Interface(GUI). The LAN Server component of the installation program allows
you to do so. If you click on the **Create an Installation Response File** radio
button, your following choices will not be executed but translated into a
Response file that will allow you to perform a remote installation of the
product on any machine (that is not necessarily on the one with which you
created it). Other products, like Communication Manager/2, can produce a
response file from a current configuration, which can prove very helpful.

Obviously, in an unattended installation, you have to handle some parts by yourself (force a reboot, access the code over the network, and so on), but installing the actual software is the same in both cases.

4.4.2 Installation Phases

The installation process is composed of three phases, each separated by a reboot of the system being installed. The following sections provide more detail about each phase.

4.4.2.1 Phase 1

This phase uses the text-based interface. During this phase, the files needed to restart the operating system from the hard disk are copied. Specifically, the CDBOOT.EXE program is started, and under its control, CONINST.EXE (CD-ROM and Network adapter card detection) and SYSINST2.EXE (Installation type query, FDISK Call, actual file copies) are run.

Note

If your machine needs some unique device drivers (such as a specific type of SCSI Adapter), you may need to put them on Diskette 1 of your boot diskettes and add the lines `SET COPYFROMFLOPPY=1` and `SET SAVECONNECT=1` along with the associated `DEVICE=` or `BASEDEV=` statement in the CONFIG.SYS file on this diskette. This will ensure that the drivers loaded will also be copied from the diskette on your hard disk. (The `SET SAVECONNECT=1` line will prevent deletion of the unknown file at the end of the installation).

4.4.2.2 Phase 2

During this phase, the rest of the operating system and the selected components are installed including MPTS.

CID Installers

As the reboot after Phase 1 is just needed to provide a Graphical Interface to the user, in an unattended installation, this intermediate reboot may be skipped.

4.4.2.3 Phase 3

The last phase is used to install TCP/IP and the LAN Server components. The last objects are created and placed in their respective folders. It is followed by the last reboot that will load the default desktop.

CID Installers

It is just after the last reboot that you may move some icons and generally perform the desktop cleanup if you wish.

As you may see in our examples, we reorganize the objects associated with one component just after the installation of this component (through the steps named `CHKxxxxx`). We also collect some server information after the entire system has been set up.

4.4.3 Attended Installation Response Files

Even if the administrator installs OS/2 Warp Server for e-business through the installation panels, selections are stored in response files. They are listed here with the full path and the process that generated them. CID installers will then be able to quickly locate them and adapt them to their needs for future unattended installations.

Table 17. Location and Function of Some Response Files

File	Used for
OS2\INSTALL\USER.RSP	Base OS/2 specification
OS2\INSTALL\FIBASE.RSP	General file for CLIFI (Command Line Interface for Features Install). Not to be modified
OS2\INSTALL\EXIT1.RSP OS2\INSTALL\EXIT2.RSP	Used for configuring the workstation address, router also
IBMINST\RSP\LOCAL\BOOK.RSP	On-line Documentation
IBMINST\RSP\LOCAL\MPTS.RSP	MPTS installation
IBMINST\RSP\LOCAL\TCPAPPS.RSP	TCP/IP installation
IBMINST\RSP\LOCAL\LANSRV.RSP	LAN Server installation
IBMINST\RSP\LOCAL\FS386CID.RSP	HPFS386 installation
IBMINST\RSP\LOCAL\NETSCAPE.RSP	Netscape Communicator installation

4.5 Finishing the Migration

When all the Base OS/2 system and LAN Server components have been installed, there is still some work to do.

If you migrated a Backup Domain Controller, verify that all its functions are correctly restored (for example, investigate the LSC.CMD and LSDCDB.CMD programs). If the machine was originally your Primary Domain Controller, you will have to switch the roles back with the NET ACCOUNTS command.

If you migrated a File and Print server, also verify that the aliases, shares, and access controls have been restored correctly.

If you migrated your Primary Domain Controller, then check that everything is now in place and that your users can access the network and all the shared files.

Important Note

During the migration, many parameter settings are reset to their default values (PATH information is conserved from your previous settings, but most, if not all, of the tuning parameters are reset to their default values). So, an important part of the post-migration task will certainly be to restore these parameters to the values present before the migration if those numbers are still correct.

One way to do so is to utilize a custom-written utility, CUBE.CMD, that can perform modifications to a CONFIG.SYS file. Using this utility in our CID scenario, we have included it on the CD-ROM with its associated documentation.

4.6 Miscellaneous Post-Migration Problems

There could be any number of possible problems and errors you might encounter after a migration over an existing OS/2 LAN Server or OS/2 Warp Server. This section lists a few problems and their solution. In addition to these, refer to the README.TXT in the root directory of the OS/2 Warp Server for e-business CD-ROM for additional errors you might encounter.

4.6.1 OS/2 2.x Programs Not Added to Desktop

If you installed to a system that already had OS/2 2.x installed, and your OS/2 2.x programs do not appear on your Desktop, do the following:

1. Turn on the computer. If the computer is already on, press **Ctrl+Alt+Del** to restart it.

2. When the small white box displays in the upper left-hand corner of your window, press **Alt+F1**.

3. When the Recovery Choices window displays, press **F2**.

4. Delete the **DESKTOP** directory.

5. Press **Ctrl+Alt+Del** to restart your system. The Desktop should be re-created.

6. If the problem continues, re-create the INI files. Follow the instructions in the "Re-creating system files" section of the on-line *OS/2 Desktop Guide* in the Information folder.

If you moved program groups off the Desktop and into a folder, you should move them back on the Desktop before installing OS/2. Otherwise, duplicate icons could display on the window. If you try to delete these icons, the original icons will also be deleted.

4.6.2 Cannot Find DOS and Windows Programs after Installation

During the installation process, your existing DOS and Windows programs are automatically added to your OS/2 Desktop. However, the installation program might not find all programs (for example, programs located on remote servers). If this happens, do the following:

1. From the Desktop, double-click **OS/2 System -->System Setup-->Add Programs**. The Add Programs to the Desktop window is displayed.

2. Click **Search for and select programs to add**, then click **OK**. The Search for Programs window is displayed.

3. Select your search criteria, then click **OK**.

4.7 Quick Reference for the Tools Mentioned in This Chapter

This section provides a short description of the function and of the parameters used by some of the tools we have referenced in this chapter. The files are mostly written in REXX (so that you can customize or enhance them) and display a short help text when they are called with an invalid parameter (since a missing parameter is considered invalid, just invoking the program by its name will force the display of this text).

4.7.1 LAN Server Check (LSC)

This program allows the display of the general status of any server on your network.

The syntax for this tool is:

```
LSC ServerName </STAT>
```

where:

ServerName	Represents the Universal Naming Convention (\\servername) name of the machine to be queried or an asterisk (∗) may be used to represent the local machine.
STAT	Performs the check and provides statistics.

4.7.2 LAN Server Domain Controller Data Base (LSDCDB)

This tool can be used to verify the correctness of the access control profiles that are associated with the Domain Controller Database. It also allows the administrator to fix any incorrect value.

The syntax is:

```
LSDCDB DCName </FIX>
```

DCName	Represents the UNC name of the PDC/BDC to be queried.
FIX	Is a request to fix damaged access control profiles.

Note

Use the /FIX option only to a Primary Domain Controller. Changes made on the PDC are replicated to the BDC. Therefore, it does not make sense to fix the BDC since errors that existed on the PDC will continue to be replicated during normal server operation.

4.7.3 Add a Server to a Domain (AddSrv)

This program will perform for you all the needed steps to declare a new server to your domain. It will declare the required server user ID and add it to the SERVERS group. This is the only requirement when declaring a new server into your domain.

The Syntax is:

```
AddSrv PDCName ServerName ServerComment
```

Where:

PDCName	The name of the Primary Domain Controller (without the leading \\)
ServerName	The name of the server to be added
ServerComment	The comment associated with this server

4.7.4 Resynchronize Passwords (ResyncPW)

When a server has been down for some time or restored from a previous backup, you may receive a NET3062 error message when the SERVER service tries to start. If you then ask to have the explanation of the error (by typing NET ERROR), you are informed that the NETLOGON service could not be started. The reason is that the password used by the server has been changed since the last backup. (Since this process is fully automatic, it is difficult to predict when it occurs). In order to fix this problem, you must extract the password used on one machine and update the one that is stored at the Domain Controller with this value. To accomplish this, the following steps can be performed:

1. Change the role of the server with the NET3062 error to STANDALONE.
2. Logon *locally* on the server as an administrator.
3. Extract (or change) the password for the server.
4. Logon *on the domain* as an administrator.
5. Change the password of the server to the extracted value.
6. Change back the server role to what it was before.

Extraction and setting of the passwords can be achieved by using PWDEXP.EXE and PWDIMP.EXE: The data are in hexadecimal format and the values are still encrypted and stay that way during the process.

The RESYNCH.CMD file does all this asking you only for an administrator ID and password.

If you just installed a new domain, you will have to use the USERID/PASSWORD initial ID and password to log on locally. The program will then ask you for a valid Administrator/Password pair on your domain. As soon as the NETLOGON service will have started, the NET.ACC file of the server will be updated with the definitions valid on the domain, and the USERID/PASSWORD default pair will probably become invalid for this server as a local logon option.

If the server was down for some time, or if you just restarted it after a restore, then the USERID/PASSWORD pair will be invalid, but a previously declared administrator should be accepted for the local logon assuming that the Administrator ID has not had its password changed in the meantime. The domain logon will use the same user ID and password, and you will not be asked to enter this information twice.

This program doesn't require any additional parameters, but it must be run at the failing server (to perform a local logon).

Chapter 5. Unattended CID Migration

This chapter provides a quick overview of CID and then describes the procedure of unattended installation of the various components of OS/2 Warp Server for e-business. We include actual response files for the products that we tested with so that administrators can modify these for their unique environment. To obtain a copy of the response files shown in this chapter, follow these steps:

1. Unzip the MIGRATE.ZIP file under the \BOOKS directory of the OS/2 Warp Server for e-business CD-ROM.

2. One of the files unzipped is RBSAMPLE.ZIP. Unzip this file. Make sure to use the −d option to obtain the subdirectories.

3. You should see a directory called \RSPFILES. The response files are contained in this directory.

There are also sample response files available in the WARPSRV.ZIP file in the \CID\SERVER\MPTS\UTILITY\LCU directory of the OS/2 Warp Server for e-business CD-ROM.

5.1 Introduction

In a complex environment with a large number of servers and hundreds, or even thousands, of clients, it quickly becomes very time consuming if systems must be migrated manually. Automating the procedures makes the entire process easier to handle.

The method used to achieve this is a concept called *Configuration*, *Installation*, and *Distribution* (CID).

There are other reasons to use CID besides time and resource optimization. Imagine that a machine you have to update is not physically accessible, or that the migration must be completed overnight when no one is present to interact with the installation, such as to insert diskettes, click on buttons, and so on.

5.1.1 Migration Versus Pristine Installation

This book focuses on migration. However, most of the information contained in this chapter can also be used during a pristine installation. Where it cannot, the differences are highlighted.

The main difference between a pristine installation and a migration is whether a format of the hard disk is done. A pristine installation assumes that there is no existing valid operating system already on the target machine. Some disk partitioning is also likely in pristine installation. In addition, the way the installation is handled requires certain additional procedures to ensure everything completes successfully.

One approach to migration, outlined in Chapter 6, "Migrating Hardware" on page 183, does, in fact, involve a pristine installation on a new machine.

This chapter provides the necessary information required to complete an unattended migration, or installation, to OS/2 Warp Server for e-business. For the sake of clarity, the installation is discussed initially from a *migration* viewpoint. At each stage, we highlight whether there are specific and different considerations that need to be applied to a pristine installation.

5.2 What is CID?

This section briefly discusses the CID concept and its implementation.

5.2.1 Principles of CID

First, let us describe briefly what CID is. Some of the CID architecture's primary goals are to:

- Simplify the installation of software
- Reduce installation time
- Centralize configuration and remote installation of software
- Reduce software installation costs
- Minimize or eliminate human intervention at the target workstation
- Enable the code executed at the target workstation to perform all required configuration and installation tasks including the integration of previous customization

5.2.2 CID Enablement

Software that is capable of being distributed and configured through the LAN is called CID-enabled. CID-enabled products can be configured and installed remotely on LAN-attached clients with limited or no interaction required locally at each client. CID-enabled software must be able to use a response file to determine which options to install, use a redirected drive, and also log results of the installation to a file.

5.2.3 CID for Migration

In the context of migration, then, the purpose of CID is to enable remote, unattended (or at least lightly attended) software installation. This is achieved by providing answers to installation questions through response files and the actual procedures required for the installation itself.

5.2.4 Response Files

Response files provide predefined responses to any prompts normally aimed at the user during the installation or configuration process. This allows user interaction with the installation process to be bypassed.

Response files are product-specific ASCII files that contain sequences of keyword-value pairs. They are interpreted during the installation and configuration process of a product by the installation (and configuration) program.

5.2.5 Redirected Drives

CID also supports the capability to install from a drive other than A:. This drive could be an alternate drive on the target system, a redirected drive on a LAN or other network, or some other device that appears to the operating system as a logical drive, such as a CD-ROM device.

The workstation that uses a remote (redirected) drive is known as the client or redirector, and the workstation that provides a remote (redirected) drive is known as the server, software distribution server, or code server.

The client workstations will access the drive on the server where the product images reside and will perform the installation. Depending on the method of communications used, there are different ways to connect to a code server. In most cases, the redirected drive will be accessed through a Local Area Network (LAN).

5.2.6 Code Servers

Before starting a CID installation, a code server is required. A code server is the system that contains the source files (or installation diskette images) to be used during the installation or maintenance process. It also contains the response files for each product and an area for log files produced by the installation routines.

Aside from containing the files and programs required for installation, in some environments, the server may also initiate and/or manage the installation of

code in one or more of its clients. In this case, the code server provides more functions than just file sharing.

Some software distribution managers, such as NetView DM/2, implement, for example, functions to schedule or remotely invoke software installation processes. Others, such as LAN CID Utility (LCU), do not have a scheduling capability.

The features of the particular software distribution manager also determine within which system environments it is able to drive the automated installation process. Additionally, these features decide whether this process is required to be invoked locally (at the target workstation) or whether it may be invoked remotely (at the client or server) or at the central site.

A system that is being installed, configured, or maintained, is called the *client*. It utilizes the resources of a code server to gain access to the files and programs it requires, and in some cases, will operate under the direction of a software distribution manager.

In unusual cases, where only very few machines must be installed, or if no network connection exists, an image of the code server can be provided on CD-ROM or on the local hard disk.

5.3 LAN CID Utility

A simple and powerful tool called LAN CID Utility (LCU) ships as part of Multi-Protocol Transport Services (MPTS) included in OS/2 Warp Server for e-business.

From a software distribution standpoint, MPTS consists of three primary components:

 • Adapter and Protocol Services

 • LAN CID Utility (LCU) and Code Server Setup Utility (CASSETUP)

 • SrvIFS (Server Installable File System)

The Adapter and Protocol Services component provides the LAN transport (network communication) subsystem for OS/2 environments. The LCU utility is designed to allow an administrator to chain together a series of CID installations. SrvIFS is actually a small NetBIOS-based file server and requester (THINIFS). This utility provides file redirection in a CID environment, enabling clients to access the code server and, consequently, to install from diskette images.

For complete information on how to set up this feature, please refer to the on-line information (.INF) file *The LAN CID Utility Guide*.

5.4 Software Distribution Managers

Another way to provide a code server is to use a software distribution manager, such as NetView DM/2 (NVDM/2) or Tivoli Software Distribution for OS/2 (SWD).

It is beyond the scope of this book to describe the setup, configuration, and installation of such distribution managers. For complete information on how to set these up in your environment please refer to the documentation that ships with these products.

In this chapter, we consider the following types of code server:

- LAN CID Utility (LCU)
- NetView Distribution Manager/2 (NVDM/2)
- Tivoli TME 10 SD 3.1.3 (SD4OS2)

In our experience, administrators using the latter two distribution managers are also familiar with the underlying CID techniques.

These three distribution managers share much of the underlying functionality of CID. The product response files are the same since they are independent of the software distribution manager. The installation syntaxes are slightly different in NVDM/2 (and its successor, SWD) from LCU. In fact, it is a simple matter to adapt LCU syntaxes to NVDM/2 or SWD Change File Profiles. For this reason, and because there are other good ITSO publications dealing with CID, we have not provided a complete set of NVDM/2 or SWD profiles.

However, we have considered specific issues related to NVDM/2 or SWD in Section 5.12, "NVDM/2 and SWD Implementation" on page 181.

5.5 Chapter Objectives

The principal objective of the remaining sections of this chapter is to demonstrate how to use CID techniques to migrate your existing servers to OS/2 Warp Server for e-business.

Based on our experiences, we have documented all of the steps necessary to complete an unattended migration or installation to OS/2 Warp Server for e-business.

To achieve this, we have provided:

1. Tested, working response files for each installable product

2. LAN CID Utility (LCU) command line installation invocation syntax

The first part of this chapter discusses installation from a LAN CID Utility perspective. Later in the chapter, we provide the specific information needed for installation through NetView DM/2 (NVDM/2). As already stated, the Change Profiles will need to be built from the LCU syntaxes.

5.6 Assumptions in this Chapter

The assumptions we made when writing this book are discussed in the following sections.

5.6.1 Migration

Above all else, please remember that the installation we are performing is a *Migration.* That is, moving an *existing server configuration* to OS/2 Warp Server for e-business. Therefore, *we do not introduce new functionality to the server* as part of the installation.

5.6.2 Distribution Managers

As already discussed in Section 5.4, "Software Distribution Managers" on page 101, we feel that anyone using remote installation techniques today using NVDM/2 or SWD will be able to take our examples and modify them to suit their environment.

5.6.3 Pristine Installation

In spite of the fact that we are considering a migration scenario, the installation of new products that come with OS/2 Warp Server for e-business has been discussed here. However, we emphasize that it is not a specific part of this migration scenario.

New product installation scenarios are described fully in a forthcoming redbook titled *Inside OS/2 Warp Server for e-business*, SG24-5136, available shortly after OS/2 Warp Server for e-business is released.

5.6.4 CID Knowledge

Throughout this chapter, we assume a basic knowledge of CID techniques. We believe that many of the existing Enterprise customers already use either CID, NVDM/2, or SWD products.

If CID concepts are new to you, and you are interested in this very powerful software distribution technique, you may like to read the redbooks titled *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010, and *OS/2 Installation Techniques: The CID Guide*, SG24-4295.

5.6.5 Latest Information

For the latest information on CID-related installations of OS/2 Warp Server for e-business, please refer to the README.CID on the OS/2 Warp Server for e-business CD-ROM.

Important Notice

The response files provided here are tested, working examples, using real parameters related to our environment. *It is vitally important that these files are tailored to YOUR environment prior to installation*. This serves two purposes. It accommodates your configuration and avoids problems where the installed options within any given product vary. In addition, we strongly recommend that you thoroughly test your CID installations before using them in a production environment.

5.7 Preparing the Code Server

This section discusses the preparation required to set up a code server. It is provided by way of background information only. If you already are experienced with unattended software distribution, you can skip this section.

5.7.1 Installing and Tailoring the Code Server

The code server set up consists of the following broad steps:

1. Create the appropriate CID directory structure

2. Load OS/2 CID Utilities to the code server

3. Load product images to server

4. Create response files for each installable product

5. Set up the software distribution manager, if applicable

5.7.2 CID Directory Structure

Most code servers use a redirected client read-only drive for storing product images and response files and a read-write client redirected drive for storing installation log files.

Some possible structures are discussed in detail in *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010, or *OS/2 Installation Techniques: The CID Guide*, SG24-4295.

5.7.2.1 The ITSO CID Test Environment

The structure that we have implemented in our environment, from which we provide tested, working examples of LCU syntaxes and response files, is illustrated in 6.8, "Description of the Example Domain" on page 188.

The two top level directories are used to enable coexistence between LCU and NVDM/2. They conform to the NVDM/2 implementation as directories \SHAREA and \SHAREB. The SHAREA directory is read-only. In the SHAREB, read-write directory, we store our client LCU installation command files, log files and response files. Below SHAREA, we have the \SHAREA\IMG directory that contains all product images by name. Below each product image directory is a version or SYSLEVEL directory. This helps us to manage multiple releases of the same product. You might implement it differently, but this works for us.

Although it is possible to keep our LCU installation command files and response files in a read-only area, our implementation provides flexibility in a working, production environment.

Let us explain what we mean by this. When new LCU batch and response files are created by designated CID administrators, they are created dynamically from a front end user written REXX procedure, which provides some degree of automation. In order to have access to support the dynamic creation of such files, read-write access is needed.

Flexibility in Directory Setup

There is no right or wrong way to set up your code server directory structure just as long as it is consistent and it works for you.

The image of the base operating system is located in the directory \OS2IMAGE. All other products are located in \CID\SERVER. Copy the images to the appropriate directories on your code server. If you want to use our directory structure, you can see it in Figure 37 on page 105.

Once the code server has been installed, the product images must be copied into the correct directories. All product images can be found on the OS/2 Warp Server for e-business Server Pak CD-ROM.
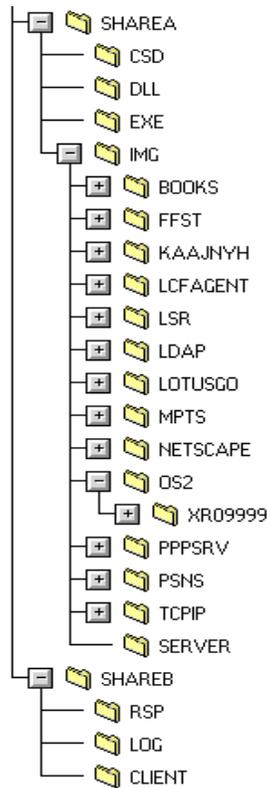
Figure 37. CID Directory Structure in Our Examples

In addition to the images, you will also need a collection of tools that are also delivered on the CD ROM. These utilities provide the LCU code, the REXX library, and executable code that enables the creation of client boot diskettes, supports the installation itself, and some template files with which to build your installation routines.

You can find the utilities in `\CID\DLL\OS2`, `\CID\EXE\OS2`, `\CID\EXE\MPTS`, and `\CID\LOCINSTU` directories on the CD-ROM. If you need further information about any of these utilities, please refer to the README.CID file on the Server Pak CD-ROM.

The following commands will copy the necessary additional files to the right places in the CID tree based on the environment described above. In this set of commands, `x:` is the drive that your CID directory tree is installed on, and `D:` is the drive letter assigned to your CD ROM drive.

```
XCOPY D:\CID\LOCINSTU X:\SHAREA\DLL\ /S /E
XCOPY D:\CID\DLL\OS2 X:\SHAREA\DLL\ /S /E
XCOPY D:\CID\EXE\MPTS X:\SHAREA\EXE\ /S /E
XCOPY D:\CID\EXE\OS2 X:\SHAREA\EXE\ /S /E
```

5.7.3 Creating Response Files

The code server administrator must build the response files in order to install the products on the system that must be migrated. There are several ways to do this.

1. Use Our Supplied Examples

   We have provided sample response files that can be tailored to your environment. They represent working examples, but they are specified with our configuration parameters and will need to be modified prior to being used in another environment.

2. Use Versions Created by Install Program

   Alternatively, after manually migrating a server to OS/2 Warp Server for e-business, or installing all required components on a pristine system, a set of response files are created, built from the user interaction with the GUI.

   Behind the installation shield, the CD-ROM-based installation of OS/2 Warp Server for e-business uses CID techniques. The graphical user interface collects all the necessary configuration information from the user and combines it with template LCU parameters and response files. It then completes a CID installation.

   On a server that has been installed with OS/2 Warp Server for e-business, the response files representing the user's selections for each product are placed in the directory \IBMINST\RSP\LOCAL of the boot drive. This is particularly useful if the test machine is installed with the same or similar configuration as other systems that you might want to migrate later on.

   The response files, like our supplied, working sample response files, can then be customized to meet your specific needs.

3. Write Your Own Response Files

   Using the information available to you (the sample response files and README.CID file supplied with the product, this redbook, and access to the CID redbooks *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010 or *OS/2 Installation Techniques: The CID Guide,* SG24-4295) it is possible to construct your own response files for use in a CID installation.

We feel that this third option has no advantages given, and that options (1) and (2) provide all necessary information.

The CD-ROM contains numerous README files and sample response files that are delivered with the components. For example, on the CD-ROM in the `\IBMINST\TABLES` directory there are a number of template response files. We believe that a review of all available information will help the administrator decide on the best way of creating the response files.

5.7.4 Introducing Feature Installer

Feature Installer, or Command Line Interface Feature Installer (CLIFI) was introduced in OS/2 Warp, Version 4. Feature Installer offers a set of installation services available to software developers that frees software developers from writing customized installation code to install their software.

You can find the executable CLIFI.EXE in the `\OS2\INSTALL` of your boot drive. CLIFI needs two response files for unattended installation:

- A Generic Response File

   This is a response file generated with the CLIFI developers toolkit. It contains a detailed description of all files and objects to be installed. The general response file is often very long, sometimes more than 1 MB. It should not be modified by the user.

- A Partial Response File

   This is a response file that is created/managed by the CID administrator. It contains the user specific details, such as the selection of components, target paths, and other selections. The settings in the partial response file override the defaults from the generic response file.

Before installing any additional components, Feature Installer, itself, must be installed. This happens automatically when the base OS/2 operating system is installed. Since Feature Installer execution requires a Presentation Manager environment, it cannot be started from a maintenance system, which is command-line only.

You can find out more about CLIFI and the generic response files (the response files that comes with every CLIFI-enabled product) in the redbooks *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010 and *The OS/2 Warp 4 CID Rapid Deployment Tools: Migration and Installation Scenarios,* SG24-2012.

The following products are installed using Feature Installer:

- 386HPFS
- Java Development Kit (including Java Runtime Environment - JRE)
- OS/2 Printer Utilities (HP JetAdmin and Lexmark MarkNet)
- Personally Safe 'n' Sound
- Lightweight Directory Access Protocol (LDAP) Client Toolkit
- TCP/IP Applications

In this redbook, we discuss Feature Installer *only* as it directly relates to the installation of the products in this migration scenario.

5.7.5 Introducing Software Installer

Some products are still installed by the Software Installer program. They are:
- Lotus Domino Go Webserver 4.6.2.5
- Netscape Communicator 4.04
- Tivoli Management Agent: TME Endpoint 4.0

Software Installer CID Installation Syntax

```
INSTALL.EXE /X /A:I /O:drive /L1:<error_log_file /L2:<history_log_file>
/R:<response_file>
```

In this redbook, we provide sufficient information (through syntaxes and response files) to enable the installation each of these products. Therefore, there is no need to consider Software Installer any further.

For more detail on Software Installer, including its installation syntax, please refer to the redbook titled *Examples of Using Software Installer*, GG24-2529.

5.8 Overview of Installation Steps

This section discusses the installation steps required when migrating a previous version of OS/2 LAN or Warp Server or installing a pristine system.

The installation steps appear in this chapter logically divided into different phases *roughly* in the order that they need to be executed. Once in Presentation Manager mode, after Phase One, there are no real limitations on the order of installation. There are some prerequisites for specific products, and we highlight them.

We expect that, according to environmental requirements, you might want to add additional steps or modify the order.

Note on Installation Order

We have tried to highlight inter-dependencies between individual product installation steps, but it is impossible to guarantee that in your environment you will not encounter additional issues. Therefore, we repeat our advice that you fully test your CID environment prior to actually migrating a production system.

The complete installation of all products can be divided into a number of broad phases. These help in understanding the different parts of the installation. The installation order within particular phases are, broadly speaking, only important in the preparation phase and Phase One. We highlight product prerequisites where they exist.

Some products require a reboot after installation. However, in many cases, it is possible to install multiple products before calling the reboot. Thus, the installation order can be optimized, depending on the set of products that are being installed, to reduce the number of overall system boots.

The first part of this section provides an overview of the installation order were we to install all of the available products.

This overview is followed with more detailed information on each product's individual installation requirements including prerequisites where they exist. It is in these sections that the working response files and LCU syntaxes are provided.

5.8.1 Preparation Phase

The first part of the installation involves procedures related to system preparation. This phase occurs in advance of the main installation and provides file system access to both the local disk and to the redirected installation drives. It also ensures that no system files are locked, which would prevent installation. The steps involved in this section are described below.

5.8.1.1 Create Maintenance System (SEMAINT)
SEMAINT creates a minimal, maintenance system for the purposes of installation when system files would otherwise be locked. During migration, a maintenance system is necessary because a new version of the operating

system is being installed over the top of an existing installation, and system files are locked.

During a pristine installation, this step is not required.

A maintenance system is a minimal version of the operating system that is stored in a different directory (that is, `C:\MAINT` instead of `C:\OS2`). It may be stored on a different partition, but this is not essential. The existence of a maintenance system eliminates the need to boot from diskettes.

5.8.1.2 Logical Volume Manager (LVM) Issues

OS/2 Warp Server for e-business includes a feature called Logical Volume Manager, which replaces older versions of OS/2's FDISK utility. LVM can handle the new logical volumes available with OS/2 Warp Server for e-business. This introduces some additional considerations into the installation scenario.

5.8.1.3 Seed LAN Transport (THINLAPS)

This program creates a seed LAN transport system.

5.8.1.4 File System Redirection (THINIFS)

The SrvIFS (Server Installable File System) provides an easy means of redirection. THINIFS installs the necessary SrvIFS redirection files on the hard disk.

5.8.1.5 Access to 386 HPFS Volumes (THIN386)

This step is necessary for access to 386 HPFS volumes. We explain this in Section 5.11.4, "386HPFS" on page 155.

5.8.1.6 LCU Installation (CASINSTL)

CASINSTL installs the LAN CID Utility client code.

5.8.2 Base OS/2 Installation - Phase One

Phase One of the installation installs the base OS/2 operating system and a full LAN transport system.

5.8.2.1 Install Base OS/2 Operating System (SEINST)

The base OS/2 operating system is installed in two parts. In Phase One, SEINST installs the base OS/2 operating system, after which, OS/2 boots to a Presentation Manager (PM) interface.

In Phase Two (see 5.8.3, "Installation - Phase Two" on page 111), additional applications are installed through the use of Feature Installer.

5.8.2.2 Multi Protocol Transport Services (MPTS)

MPTS installs LAN transport code (Adapter and Protocol Services) onto the system.

5.8.3 Installation - Phase Two

Phase Two occurs in the Presentation Manager mode. During this phase, any or all of OS/2's installable features (which cannot be installed in maintenance mode) can be installed. The features are installed using OS/2 Feature Installer.

5.8.3.1 Display Driver Install (DSPINSTL)

If SVGA display resolution is required (which generally is unnecessary on a server), it can be installed during this phase of installation. At the time of writing, however, Netscape Communicator requires 256-color support and, thus, installation of an SVGA display is essential. (A version of Netscape Communicator with 16-color support was expected for the final release of OS/2 Warp Server for e-business.)

5.8.3.2 OS/2 Feature Installer (CLIFI)

New to OS/2 Warp, Version 4, and now included in OS/2 Warp Server for e-business, the Feature Installer program installs some additional OS/2 features. As previously mentioned, Feature Installer requires a OS/2 Presentation Manager (PM) interface. Feature Installer is also used to install other applications (see Section 5.7.4, "Introducing Feature Installer" on page 107).

5.8.4 Main Applications

All other applications shipped with OS/2 Warp Server for e-business can also be installed in PM mode during Phase Two. However, for clarity, this section deals with what we consider to be the major applications. These include the File and Print Sharing Services and TCP/IP Application Services.

5.8.4.1 File and Print Sharing Services (LANINSTR)

This installs File and Print Sharing Services, also known as OS/2 LAN or Warp Server.

5.8.4.2 386HPFS (CLIFI)

386HPFS provides improved access to large disk volumes, and it optimizes performance in a server environment where many files are open simultaneously from multiple clients.

If 386HPFS is already installed on the system being migrated, it will be updated. If it is not already on the system, then it can be installed. The install uses Feature Installer. An additional license is required.

5.8.4.3 First Failure Support Technology/2 (FFSTINST)
FFST/2, which used to be installed as part of OS/2 LAN Server or DB2/2, is now installed with the operating system during a local CD-ROM-based install.

In a CID environment, it must be installed by a separate install procedure.

5.8.4.4 TCP/IP Application Services (CLIFI)
Any subset or all of the TCP/IP Application Services can be installed. Individual requirements will vary between environments. It is installed using Feature Installer.

5.8.4.5 Netscape Communicator (INSTALL)
In addition to navigating the World Wide Web, Netscape Communicator can be used as a Graphical User Interface (GUI) for the installation, configuration, and uninstall of various products, for example, TCP/IP installation. It is installed using Software Installer.

5.8.5 Additional OS/2 Warp Server Applications
Also installable in PM mode during Phase Two, this section considers applications that were included in OS/2 Warp Server, Version 4 but not in earlier versions of OS/2 LAN Server. We have grouped the applications here for reasons of clarity alone.

5.8.5.1 Personally Safe 'n' Sound (CLIFI)
Personally Safe 'n' Sound (PSnS), or Backup and Recovery Services, was available in the Warp Server, Version 4 package and could be purchased also as a separate product. It is installed using Feature Installer.

5.8.5.2 Remote Access Services (or PPP Server) (INSTALL)
LAN Distance Connection Server was available in the OS/2 Warp Server, Version 4 package and could be purchased also as a separate product. It has now been replaced by Remote Access Services (or PPP Server as it is known), which allows clients using the PPP protocol to use the LAN by dialing the Remote Access Services server. Any existing OS/2 LAN Distance must first be removed before installing the updated version.

5.8.5.3 Print Services Facility/2 (PSF/2)

Advanced Print Services, or Print Services Facility/2, allows you to print file formats that your printer typically does not support. For example, you can define print transforms that allow you to print postscript output on non-postscript printers.

5.8.5.4 OS/2 Warp Server for e-business Books (INSTBOOK)

The on-line books can be installed, if desired, during Phase Two using Feature Installer.

We believe that the majority of server administration in an Enterprise environment is conducted from an administrator client workstation. It is, therefore, not necessary to install this documentation on the server.

5.8.6 New Applications

The last install section considers applications that have not been shipped with any previous versions of OS/2 LAN or Warp Server. These too can be installed in PM mode during Phase Two. We have grouped the applications here for reasons of clarity alone.

As these applications have not previously been available with OS/2 LAN or Warp Server, they should not be considered part of a true migration scenario. Instead, they are new applications and can be, therefore, considered new installations.

However, we understand that you might want to install these applications. Therefore, we briefly discuss installation of these applications and provide the necessary information required to complete the installation.

5.8.6.1 Netfinity Services (NETFINST)

Netfinity Services supersedes OS/2 SystemView and TME10 Netfinity Server, Version 4. SystemView was included with OS/2 Warp Server, Version 4. An upgrade to TME10 Netfinity Server was available after initial shipment of OS/2 Warp Server, Version 4.

Netfinity Manager and Client Services are highly responsive hardware management features that support key systems management tasks. They can be installed in Phase Two of the installation.

5.8.6.2 Lightweight Directory Access Protocol (LDAP) (CLIFI)

OS/2 Warp Server for e-business supports Lightweight Directory Access Protocol (LDAP) client toolkit. It is installed using Feature Installer.

5.8.6.3 Tivoli Management Agent (INSTALL)

TMA is a replacement for the SystemView agent. It is used for managing PC Servers and supports OS/2 using TCP/IP. It can be installed in Phase Two using the Software Installer program.

5.8.6.4 Lotus Domino Go Webserver (INSTALL)

OS/2 Warp Server for e-business includes a fully functional trial version of Lotus Domino Go Webserver. It can be installed during Phase Two of the installation using the Software Installer program.

5.8.6.5 WebSphere Application Server (WEBSPHER)

WebSphere Application Server is a plug-in for Lotus Domino Go Webserver that adds Java support. It too can be installed during Phase Two of the installation but requires Lotus Domino Go Webserver to be functional prior to installation.

5.8.7 Final Phase - Clean Up

The final phase of the installation cleans the system up and removes all traces of the CID installation. In our environment, we leave the LCU and SrvIFS support installed on the systems but ensure that no connection exists with the remote server at boot time. We do this by removing the SRVATTCH statement from the client CONFIG.SYS file.

5.8.7.1 Delete SrvIFS (IFSDEL)

IFSDEL removes the files installed by THINIFS.

5.8.7.2 Delete LCU (CASDELET)

CASDELET removes LCU files from the system. It is executed as the last step.

5.8.8 Fixpak Installation

At the time of writing, no fixpaks exist for any of the products in the OS/2 Warp Server for e-business package. If, at time of General Availability (GA), fixpaks are required for any of the individual products contained within the product, they should be applied during the overall installation.

We consider this step for completeness because some products, such as the Java Runtime Environment, are developing at a rapid pace.

If the products are OS/2 or LAN Server type products, then the update program to use will be FSERVICE. If the product is a Feature-Installed product, then Feature Installer should be used to update the program. If the

product is a Software-Installed product, then Software Installer should be used to install the fixpak. The update could be an update or a replacement.

Generally, at least one reboot should have taken place between the installation of the base product and the fixpak or update installation although, in the case of an update, it will probably be possible to substitute the product in the installation scripts.

5.9 CID Installation Parameters

In this section, we discuss the individual product installation sections, already outlined in Section 5.8, "Overview of Installation Steps" on page 108, in more detail. In addition we provide working, tested LCU parameters and valid response files.

NVDM/2 and SWD special considerations are considered in Section 5.12, "NVDM/2 and SWD Implementation" on page 181.

Note

We have made extensive use of OS/2 environment variables in our LCU Command File for the purposes of simplifying management of our procedures. The general variables we have used in the LCU installation syntaxes are highlighted in Figure 38. Product-specific variables are provided, as necessary, with each particular product.

```
imgdir = shareA'\IMG'
cmddir = shareA'\CMD'
dllpath = shareA'\DLL\XR09999'
exepath = shareA'\EXE\XR09999'
lcucmd = shareB'\client'
logdir = shareB'\LOG'
resdir = shareB'\RSP'
```

Figure 38. General LCU Variables

5.10 Preparation Phase

This section describes the steps required in the preparation phase.

5.10.1 Create LCU Boot Diskettes

In a pristine installation, it is necessary to create LCU boot diskettes for the system that will be installed. This is not necessary in a migration scenario.

For assistance with the creation of boot diskettes, please refer to *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010 and also to the `README.CID` on the OS/2 Warp Server for e-business CD-ROM.

We briefly describe the steps necessary to create some client boot diskettes for a pristine installation. We assume that the code server is installed already.

1. Create Original Boot Diskettes from CD-ROM images
2. Add LAN Transport and Adapter Support to the diskettes
3. Add LCU Client Support to the diskettes
4. Create a Startup Script
5. Clean up the CONFIG.SYS on DISK 1
6. Make Disk 2 unbootable using DBOOT

When you have prepared your code server, you will be ready to boot with client diskettes and start your pristine installation.

5.10.2 Create Maintenance System (SEMAINT)

The update of the base OS/2 operating system is the most complicated part of the installation. It is not simply a case of executing the installation program. Some preliminary steps are required.

`SEMAINT` creates a maintenance system on your bootable partition or on another partition that will be booted in order to install OS/2. It copies a minimal version of the operating system to a new directory on a designated drive. When booted from the maintenance system, only text-mode programs can run.

`SEMAINT` also alters the boot sector of that drive. On the next reboot, the system does not load the previously installed version of the operating system but the newly-created maintenance system.

```
┌─ SEMAINT Syntax ──────────────────────────────────────────────────┐
 SEMAINT /S:<Source_Path> /S2:<Service_Pak> /T:<Target_Path>
 /B:<Boot_Drive> /L1:<Path><Log_File_Name>
└───────────────────────────────────────────────────────────────────┘
```

For full details of the syntax of SEMAINT, refer to *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010 or *OS/2 Installation Techniques: The CID Guide*, SG24-4295.

5.10.2.1 SEMAINT LCU Command File Syntax
We have implemented procedures in order to execute SEMAINT for various reasons. If you want to execute the program in a simple LCU command file, we recommend that you refer to the books cited above.

However, if you would like to review our implementation, please refer to Section 5.10.3, "Migration Implementation for SEMAINT" on page 118.

Note: Following successful execution of SEMAINT (if executed on the boot drive), the previous version of OS/2 will no longer work since SEMAINT replaced some hidden files on the boot drive (OS2KRNL) with a newer version. If the installation fails at this point, it is probably wise to restore the system from the backup taken before the installation.

Some administrators plan their disk partitioning prior to the initial installation, creating a small partition to be used for maintenance and in recovery situations. We implement this in our environment. Our standard installation uses a small primary C: drive for the maintenance partition with logical drive D: as our boot partition.

Hint

If you have a bootable partition (or maintenance partition) other than the system boot partition on your server, we recommend that you install the maintenance system onto it. That way, if SEMAINT fails, your original system partition will be unaffected, and there should be no need for restoration.

5.10.2.2 PREPMNT Utility for SEMAINT
If you will run SEMAINT or CHKINST on a system where you have never installed OS/2 Warp Server for e-business, then you must run the PREPMNT.CMD utility. This utility updates the device drivers in the \OS2\BOOT directory.

You must copy a new version of the device drivers from the OS/2 Warp Server for e-business CD-ROM. These drivers are located in the \OS2IMAGE\DISK_1 directory on the CD-ROM and need to be copied to the \OS2\BOOT directory of the partition from which you have booted up.

This step can be done manually or by running the `PREPMNT.CMD REXX` utility available in the `\CID\EXE\OS2` directory of the OS/2 Warp Server for e-business CD-ROM. `PREPMNT` will back up the current device drivers to the `\OS2\BOOT\BKP` and then copy the new drivers to `\OS2\BOOT`. `PREPMNT` uses an executable called `FINDBOOT.EXE` (in `\OS2IMAGE\DISK_0` on the OS/2 Warp Server for e-business CD-ROM) to determine the boot drive.

`PREPMNT` can be run from LCU or a Software Distribution Manager environment. After `PREPMNT` is run successfully, the system will reboot and you can now run `CHKINST` or `SEMAINT`.

The syntax for `PREPMNT` **is**
`PREPMNT <Source_path> [Logfile]`

where:

`Source_path`   The fully qualified path to the OS/2 images. This parameter is required.

`Logfile`   The fully qualified name of the file into which log information is to be placed. The directory in which the log file is to be placed must already exist. This parameter is optional.

Example: `prepmnt f:\os2image W:\logs\prepmnt.log`

5.10.3 Migration Implementation for SEMAINT

Further to the generic description of `SEMAINT` given in 5.10.2, "Create Maintenance System (SEMAINT)" on page 116, we now describe our implementation for the migration scenario.

At the time of writing, there were some problems that required intervention in order for the CID installation to work successfully.

Important: SEMAINT and VCU

Logical Volume Manager relies on the utility Volume Conversion Utility (VCU) to have been run and to have created LVM compatibility volumes on disk. These are volumes that LVM is aware of. Since VCU is called from `CDBOOT`(on the boot diskettes) or from `RSPINST` (which itself is called from `SEINST`), this presents a problem. In a maintenance environment for migration, VCU will not yet have been called. The effect of this is that no drive letters are assigned, and the installation fails. Furthermore, the time or writing drive letter assignment from the command line was not possible. We now discuss how we overcame these problems.

5.10.3.1 Worst Case Scenario

In determining how to overcome this problem, there were many possibilities open to us. *We decided to choose the worst case scenario*. That is, we assumed that no remote management software was available, and that the remote server was inaccessible (in a locked room, remote branch, or another country).

The only prerequisite was that the code server was accessible to the remote server on which the procedure would be run over NetBIOS or TCPBEUI.

We felt that should we be able to overcome this problem simply by using the functions and features of the products we are using (LCU, REXX, LAN Server and OS/2). With systems management software, the task would be even easier.

Prerequisite Knowledge

In describing our procedures, some knowledge of REXX is assumed. If you are new to the CID environment or have limited REXX knowledge, then these procedures may be difficult to understand. Our intent is to provide a technique that the experienced CID administrators will be able to use.

5.10.3.2 The Temporary Solution

We wrote some powerful REXX procedures that perform the following functions remotely and unattended in a migration scenario.

Note

All procedures are included on the CD ROM in the `\SEMAINT` directory.

The procedures execute the following tasks:

1. Copy the REXX procedures and required files to the remote server

2. Set up installation environment for SEMAINT

3. Create an icon for the REXX program and launch it

4. Create a maintenance system on the remote server using SEMAINT

5. Create a seed LAN transport system

6. Install SrvIFS redirection files on the hard disk

7. Create Compatibility Volumes on the server with VCU

It also provides a means for querying the disk layout; so, the administrator can verify the events that should have occurred.

When all of the above have been verified, the system can be rebooted to the maintenance partition.

5.10.3.3 The Temporary Solution in Detail

These procedures are somewhat limited in that they do not provide a high degree of error checking. Also, administrator-level access from the workstation initiating the procedures is required. In addition, some advanced configuration of INI files is necessary.

Step 1

The first command file that is executed is SE.CMD (see Figure 39 on page 120). This copies the REXX procedures and other files needed for the REXX procedures to the target system. The SE.CMD procedure accepts three parameters:

- The name of the server to be installed
- The network interface file (NIF) to be used
- The hard drive letter on which the maintenance system will be installed

```
/* SE.CMD */

    @echo off
    if .%1 == . goto Syntax
    if .%2 == . goto Syntax
    if .%3 == . goto Syntax

    echo * Installing Maintenance Partition on: %1
    echo * Using a NIC: %2
    echo * On Disk: %3
    pause

    copy msemaint.cmd \\%1\ibmlan$\netprog
    copy msemaint.ini \\%1\ibmlan$\netprog
    copy mseobj.cmd   \\%1\ibmlan$\netprog
    copy lvmcli.cmd   \\%1\ibmlan$\netprog

    net admin \\%1 /c mseobj %1 %2 %3

    echo * Wait for at least 1 minute and press [ENTER]
    pause

    net admin \\%1 /c lvmcli

    goto End

    :SYNTAX
    Echo ! Error: Invalid Parameter
    echo * Syntax: SE {ServerName} {NICType} {TargetDisk}

    :END
```

Figure 39. SE.CMD

Step 2

After the files have been copied, you will notice that `SE.CMD` runs a `NET ADMIN` command to invoke the next REXX procedure, `MSEOBJ.CMD` (see Figure 40).

```
/*-------------------------------------------------------------------------*\
!   Create an object & start the object          (C) A.Rykaert - NOV98-NOV98 !
\*-------------------------------------------------------------------------*/
    Version = '1.02'

    Parse Upper Arg PWSName NICType TargetDisk
    If PWSName = '' | TargetDisk = '' | NICType = ''
      Then Do
             Say '! Invalid syntax' '07'x
             Say '*'
             Say '* Usage: MSEOBJ {WorkStationName} {NICType} {TargetDisk}'
             Say '*'
             Say '* Sample: MSEOBJ DC01 IBMMPC.NIF C:'
             Exit
           End
      Else Nop

 /*==============================================*/
    ObjectID = '<CID_OS2_MAKEDISK>'
    Title    = 'Maintenance Partition^Creator'
    InstProg = 'msemaint.cmd'
 /*==============================================*/

    If RxFuncQuery('SysLoadFuncs')
      Then Do
             Call RxFuncAdd 'SysLoadFuncs', 'RexxUtil', 'SysLoadFuncs'
             Call SysLoadFuncs
           End
      Else Nop

    Say '* Creating object' ObjectID 'in the Desktop'

    Class    = 'WPProgram'
    Title    = Title
    Location = '<WP_DESKTOP>'
    Setup    = 'OBJECTID='ObjectID';'                     ||,
               'EXENAME='InstProg';'                       ||,
               'PROGTYPE=windowablevio;'                   ||,
               'PARAMETERS='PWSName NICType TargetDisk';'  ||,
               'OPEN=Default;'                             ||,
               'NOAUTOCLOSE=yes'
    Update   = 'Replace'

    RC = SysCreateObject(Class, Title, Location, Setup, Update)
    If RC <> 1
      Then '! Error while creating object, ReturnCode:' RC
      Else Nop

    Exit
```

Figure 40. MSEOBJ.CMD

Our reason for implementing this REXX procedure is that it is not possible to invoke MSEMAINT.CMD remotely by using NET ADMIN. By running MSEMAINT and creating a Program Reference Object for MSEMAINT.CMD with the property <OPEN=DEFAULT>, it is launched on creation.

Step 3

The MSEMAINT.CMD procedure (see Figure 41 on page 124) is included on the CD-ROM as already discussed. MSEMAINT.CMD executes the following actions:

- Format the Maintenance Partition on demand

Note

Be careful not to use this option if you will be installing the maintenance partition to the boot drive.

- Create a Maintenance System using SEMAINT
- Create a seed LAN transport system using THINLAPS
- Install SrvIFS redirection files on the hard disk using THINIFS
- Set up environment information required for the procedures
- Create Compatibility Volumes on the server with VCU

SEMAINT, THINLAPS and THINIFS use the parameters passed to SE.CMD to execute correctly. The commands themselves are described in Section 5.8.1, "Preparation Phase" on page 109; so, they will not be discussed further.

The main procedure, MSEMAINT.CMD, is shown in Figure 41 on page 124. The main steps in the procedure are as follows:

1. Read the MSEMAINT.INI file and store the parameter values in memory.
2. Display these values on the workstation screen (usability feature).
3. Verify all required files are available before proceeding.
4. Extract existing system environment data.
5. Check that required local files are present.
6. Invoke SEMAINT to install maintenance system using INI file parameters.
7. Invoke THINLAPS to install a seed LAN transport system.
8. Invoke THINIFS to provide drive redirection.
9. Copy LVM related files and VCU.EXE to the Server.

> **Note**
>
> At the time of writing, the LVM-related files could be found on DISK 6, and the VCU executable could be found on Disk 2. This might change by the final release of OS/2 Warp Server for e-business.

10. Update CONFIG.SYS on maintenance partition to transfer control to our own LCU procedure CID.CMD when rebooted to the maintenance partition.

11. Execute VCU to generate compatibility volumes and assign drive letters.

The `MSEMAINT.CMD` procedure follows:

```
/*----------------------------------------------------------------------*\
| Make SEMAINT partition          (C) A Rykaert + JP Cabanie - NOV98-NOV98 |
\*----------------------------------------------------------------------*/
    Version = '1.02'
    Say '* MSEMAINT Version' Version

    Parse Upper Arg PWSName NICType TargetDisk .

    If PWSName = '' | NICType = '' | TargetDisk = ''
      Then Do
            Say '! Error: Invalid parameters'
            Say '*'
            Say '* Usage: MSEMAINT {WorkStationName} {NIC Type} {TargetDisk}'
            Exit X2D('1600')
          End
      Else Nop

    Call ReadIni                                  /* Read the .INI file*/

/* Display the curent values as extracted from our .INI file            */
    Say '* PWSName :' PWSName
    Say '* NICType :' NICType
    Say '* TargetDisk :' TargetDisk
    Say '* UserID :' UserID
    Say '* Domain :' Domain
    Say '* Alias :' Alias
    Say '* DriveLetter :' DriveLetter
    Say '* SeMaintCmd :' SeMaintCmd
    Say '* SeMaint Source:' SeMaintSrc
    Say '* Thin386 Command:' Thin386Cmd
    Say '* ThinLaps Command:' ThinLapsCmd
    Say '* ThinLaps Source :' ThinLapsSrc
    Say '* ThinIfs Command:' ThinIfsCmd
    Say '* ThinIfs Source :' ThinIfsSrc
    Say '* Alias 1 :' CIDAlias1
    Say '* Drive 1 :' CIDDrive1
    Say '* Alias 2 :' CIDAlias2
    Say '* Drive 2 :' CIDDrive2
    Say '* CID Command :' CIDCmd

  '@echo off'                           /* Avoid display of issued commands*/
   ESC = '1B'x                      /* Declare some ANSI control sequences*/
   Red = ESC'[0;1;41m'
   Blue = ESC'[0;1;44m'
   Reset = ESC'[0m'

   BootDrive = Left(Value('ComSpec',,'OS2Environment'),2)
   Say Blue '* BootDrive :' BootDrive Reset
 /*                                              This is for Futher Use
```

Figure 41. MSEMAINT.CMD (Part 1 of 5)

```
    Say Blue '* Check if the Target disk is bootable' Reset
    Call ChkFile BootDrive'\os2\fdisk.com'
    RQ = RxQueue('Create')
    Call RXQueue 'Set', RQ
   'fdisk /query | RxQueue' RQ
    Check = 0
    Do While Queued() > 0
      Pull LLine
      Parse Var LLine . . Drive . . Status .
      If Drive = TargetDisk & (Status = '1' | Status = '5' | Status = '6')
        Then Check = 1
        Else Nop
    End
    Call RXQueue 'Delete', RQ
    If Check = 1
      Then Nop
      Else Do
             Say '! Error: Drive' TargetDisk 'is not bootable'
             Exit X2D('1204')
           End
  */
    Say Blue '* Check Resources' Reset
    Call ChkResource

    Say Blue '* Check Files' Reset
    Call ChkFile BootDrive'\os2\format.com'
    Call ChkFile BootDrive'\os2\label.com'
    Call ChkFile SeMaintCmd
    Call ChkFile Thin386Cmd
    Call ChkFile ThinLapsCmd
    Call ChkFile CidCmd

    If FormatSeMaintDisk = 1
      Then Do
             Say Red '* Formatting the disk' TargetDisk Reset
             'label' TargetDisk || 'semaint'
             FormatRSP = BootDrive'\os2\format.rsp'
             'if exist' FormatRSP 'del' FormatRsp
             Call LineOut FormatRsp, 'semaint'
             Call LineOut FormatRsp, 'yes'
             Call Stream  FormatRsp, 'C', 'Close'
             Call Doit 'format' TargetDisk '/FS:fat /V:semaint <' FormatRsp
           End
      Else Nop
Say Blue '* Add Minimum Base OS/2 support' Reset
    Call Doit SeMaintCmd '/S:'SeMaintSrc,
                         '/T:'TargetDisk'\SEMAINT /B:'TargetDisk,
                         '/L1:'TargetDisk'\SEMAINT.LOG'
 /*                                       It's not supported with Aurora
    Say Blue '* Add the Thin386 support' Reset
    Call Doit Thin386Cmd '/B:'TargetDisk,
                         '/T:'TargetDisk'\SEMAINT',
                         '/L1:'TargetDisk'\THIN386.ERR',
                         '/L2:'TargetDisk'\THIN386.LOG'
 */
    Say Blue '* Add the ThinLaps support' Reset
    Call Doit ThinlapsCmd ThinLapsSrc TargetDisk'\SEMAINT' NICType
```

Figure 42. MSEMAINT.CMD (Part 2 of 5)

```
    Say Blue '* Add the SRVIFS support' Reset
        Call Doit ThinIfsCmd '/S:'ThinIfsSrc '/TU:'TargetDisk,
                        '/T:'TargetDisk'\semaint /SRV:'CIDAlias1,
                        '/REQ:'PWSName '/D:'CIDDrive1
    Call Doit ThinIfsCmd '/S:'ThinIfsSrc '/TU:'TargetDisk,
                        '/T:'TargetDisk'\semaint /SRV:'CIDAlias2,
                        '/REQ:'PWSName '/D:'CIDDrive2

    Say Blue '* Copy CID Command File' CIDCmd 'to' TargetDisk'\cid.cmd' Reset
    Call Doit 'copy' CIDCmd TargetDisk'\cid.cmd'

    Say Blue '* Add the CID Command to' TargetDisk'\config.sys' Reset
    Call LineOut TargetDisk'\config.sys',,
                        'set os2_shell=\semaint\cmd.exe /k cid.cmd'
    Call Stream TargetDisk'\config.sys', 'C', 'Close'

    Say Blue '* Add LVM & VCU Support' Reset
/* By chance, these Lan Server for e-business utilities run on Warp 3.0 */
    'copy' SeMaintSrc'\disk_2\vcu.ex*'  TargetDisk'\semaint'
    'copy' SeMaintSrc'\disk_2\vcu.ms*'  TargetDisk'\semaint'
    'copy' SeMaintSrc'\disk_6\lvm.ex*'  TargetDisk'\semaint'
    'copy' SeMaintSrc'\disk_6\lvm.dl*'  TargetDisk'\semaint'
    'copy' SeMaintSrc'\disk_6\lvm.ms*'  TargetDisk'\semaint'
    'copy' SeMaintSrc'\disk_6\lvmh.ms*' TargetDisk'\semaint'

    Say Red Copies('*', 40) Reset
    Say Red '* REBOOT THE SYSTEM FROM DRIVE' TargetDisk Reset
    Say Red Copies('*', 40) Reset

    Say Blue '* Execute VCU to get the drive letters for LVM' Reset
    TargetDisk                                  /* Change default drive*/
    'cd\semaint'                                /* Change default directory*/
    'VCU'

/* The VCU utility is meant to work in an interactive way and will stay in */
/* suspend mode after having declared the compatibility volumes and        */
/* assigned drive letters to them. That means that the following lines will*/
/* never be executed unless a second install is done in which case, VCU    */
/* will just act as a nop                                                  */

    Say Red '* Done' Reset

    Exit X2D('FE00')
                /* CID Return code : Success / Reboot / Don't call me back */

 READINI:/* -------------------------------------------------------------*/

    Parse Upper Source . . ProgName .          /* determine the INI FileName*/
    Parse Value Reverse(ProgName) With . '.' Peek
    IniFileName = Reverse(Peek) || '.INI'
    Say '* IniFileName:' IniFileName
    Call CHKFILE IniFileName
/* Initialize our FormatSemaintDisk is assigned the value 0 while all the  */
/* other ones are affected an empty string value...                        */
    Parse Value '0' With FormatSeMaintDisk UserID Domain DriveLetter   ,
                        Alias SeMaintCmd SeMaintSrc Thin386Cmd          ,
                        ThinLapsCmd ThinLapsSrc ThinIfsCmd ThinIfsSrc   ,
                        CIDAlias1 CIDAlias2 CIDDrive1 CIDDrive2         ,
                        CIDCmd
```

Figure 43. MSEMAINT.CMD (Part 3 of 5

```
/* Read the .INI file and update the previous variables with the values   */
/* specified in this file.                                                 */
    Do While Lines(IniFileName)
      LLine = Strip(LineIn(IniFileName))
      If Left(LLine, 1) = ';' | Left(LLine, 1) = '*'
        Then Iterate                                    /* Comment*/
        Else Interpret LLine
    End

    Return

 CHKFILE:/* ----------------------------------------------------------------*/

    Parse Arg File_To_Check

    If Stream(File_To_Check, 'C', 'Query Exists') = ''
      Then Do
            Text = '! File not found' File_To_Check
            Say Text '07'x
            Exit X2D('0800')
          End
      Else Nop

    Return

 DOIT:/* -------------------------------------------------------------------*/

    Parse Arg InstProg

    InstProg
    If RC = 0 | RC = -512
      Then Return
      Else Do
            Say Copies('!',40)
            Say Red '! Error:' RC '070707'x Reset
            Say Copies('!',40)
            Exit RC
          End

 CHKRESOURCE:/* ------------------------------------------------------------*/

   'logoff /y'
   'logon' UserID '/d:'Domain '/v:d /r'
    If RC = 0
      Then Nop
      Else Do
            Text = '! Error: could not logon' UserID 'to' Domain
            Say Text
            Exit X2D('1604')
          End
'net use' DriveLetter '>nul'
```

Figure 44. MSEMAINT.CMD (Part 4 of 5)

```
If RC = 0
    Then Nop
    Else Do
            'net use' DriveLetter Alias '/domain:'Domain
         If RC = 0
            Then Nop
            Else Do
                    Text = '! Error: could not find' DriveLetter
                    Say Text
                    Exit X2D('1604')
                End
        End

    Return
```

Figure 45. MSEMAINT.CMD (Part 5 of 5)

The environment information is obtained from an INI file called MSEMAINT.INI
(see Figure 47 on page 129). As we already stated, these procedures are
somewhat basic. We stored these parameters in an ASCII INI file because we
felt they might not change very often.

One parameter of particular note within the INI file is FormatSEmaintDisk, which
determines whether the installation partition is formatted. A value of 1 means
format. A value of 0 means do not format.

```
 *---------------------------------------------------------------------------
 * This is the setup file used by the MSEMAINT Procedure (C) A.Rykaert - NOV98
 *---------------------------------------------------------------------------
 * Definitions for the Setup of the Maintenance Partition

  UserID = CID01                              /* UserID used during the Run*/
  Domain = D01                                    /* Domain where to Logon*/
  DriveLetter = Z:        /* DriveLetter of all the Executables and Sources*/
  Alias = ShareA                              /* Domain Alias of the Images*/

  FormatSEmaintDisk = 1                          /* 1=Format, 0=no Format*/

  SemaintCmd = z:\lcu\xr09999\semaint.exe           /* SeMaint Executable*/
  SemaintSrc = z:\img\os2\xr09999                  /* SeMaint Source Path*/

  Thin386Cmd = z:\img\lsr\ip08700\ibm500s1\Thin386.exe/* Thin386 Executable*/

  ThinLapsCmd = z:\img\mpts\WR08620\Thinlaps.exe     /* ThinLap Executable*/
  ThinLapsSrc = z:\img\mpts\WR08620

  ThinIfsCmd = z:\img\srvifs\thinifs.exe            /* ThinIfs Executable*/
  ThinIfsSrc = z:\img\srvifs                       /* ThinIfs Source Path*/

  LogFileName = \msemaint.log                             /* Log FileName*/
```

Figure 46. MSEMAINT.INI (Part 1 of 2)

```
  CIDCmd = z:\dsk\cid.cmd                                /* LCU Batch Filename*/

*-----------------------------------------------------------------------------
* Definitions for the Standard CID

 CIDAlias1 = CODESERV                /* AliasName 1 during the Standard CID*/
 CIDDrive1 = Z:                      /* DriveLetter 1 during the Standard CID*/

 CIDAlias2 = CODESERV\PWS            /* AliasName 2 during the Standard CID*/
 CIDDrive2 = X:                      /* DriveLetter 2 during the Standard CID*/

 * Remark: The WorkStations Name is collected via the external Parameter

 *-----------------------------------------------------------------------------
```

Figure 47. MSEMAINT.INI (Part 2 of 2)

At the end of program execution, the command window can stay open as long as necessary.

Step 4
We have provided an additional procedure in SE.CMD in the form of LVMCLI.CMD. This reports the state of the disk to the administrator, which can be helpful as a verification that all is well.

```
        /* LVMCLI.CMD */
        @echo off
            if .%1 == . goto Syntax
            echo * SEMaint Drive: %1
            if not exist %1\semaint goto DirNotFound

            %1
            cd\semaint
            lvm /query
            goto End

        :SYNTAX
         echo ! Inavlid parameter
         echo *
         echo * Usage: LVMCLI {SEMaintDrive}
         echo *
         echo * Sample: LVMCLI C:
         goto End

        :DIRNOTFOUND
         echo ! Directory %1\semaint not found

        :END
```

Figure 48. LVMCLI.CMD

Step 5

Lastly, the administrator remotely can issue a `SETBOOT` command to reboot the remote system to the maintenance partition and start the installation. For example:

```
NET ADMIN \\ServerName /C SETBOOT /IBD:C
```

and press **Enter**. The installation will then start from whatever maintenance partition was defined.

Step 6

The entire process is documented in a log file. Because of the length of this file, we have placed it in Figure 136 on page 250.

5.10.4 386HPFS File System Access (THIN386)

In past migrations, if you were using 386HPFS formatted drives, THIN386 had to be run. THIN386 installed the 386HPFS file system drivers onto the maintenance system, which ensured that the installation process had unrestricted access to all server drives, which is required during the migration process.

You have the choice of either running THIN386 as in the past, or you can remove the access controls from the file system prior to the migration using PREPACL. If you use PREPACL, then THIN386 is not required. However, PREPACL requires that an ID with administrator privilege be logged on the system, which may be unlikely in the case of a CID installation. In this case, THIN386 is still the preferred mechanism for supporting 386HPFS.

If 386HPFS is not yet installed on the system, or if a pristine installation is being performed, this PREPACL step is not necessary.

Because of the fact that the installation routine removes 386HPFS (see Section 5.11.4, "386HPFS" on page 155 for important installation information), THIN386 should be run twice, once before SEINST and again after running SEINST.

There are some new features included in THIN386 to help with migrating a server with the 386HPFS file system installed. There is a new required switch called `/386Path` that needs one of two paths.

1. The directory where the 386HPFS2.ZIP file resides, usually on the OS/2 LAN Server image `IBM500S1` in versions previous to OS/2 Warp Server for e-business. This file can also be copied to another location. Here's an example of this usage (other required `THIN386` parameters are not listed):
   ```
   THIN386 /386Path:e:\wssmp\cid\server\ibmls\ibm500s1
   ```

2. If the 386HPFS2.ZIP file is not available, point to the directory where the current installed HPFS386 files reside (usually in C:\IBM386FS). Here's and example of this usage (other required parameters are not listed):

```
THIN386 /386Path:c:\ibm386fs
```

5.10.5 Logical Volume Manager (LVM) Issues

OS/2's FDISK utility has been replaced by the Logical Volume Manager (LVM). During migration, the existing partitions must be converted to LVM Compatibility Volumes.

At the time of writing, we had to implement a workaround in order that the installation completed unattended. This is described in Section 5.10.3, "Migration Implementation for SEMAINT" on page 118.

In a CID installation for a pristine environment, the disk must be partitioned through command line procedures using LVM. FDISK, since it is not available and no longer applies especially since FDISK doesn't know how to set up LVM and Compatibility volumes required for installation.

5.10.5.1 Disk Partitioning Using LVM during CID

If you are installing a new server from scratch (that is, pristine installation), and you want to install it unattended using CID, then you need to partition the disks and set up the volumes as required for the rest of the installation.

The supporting files for LVM are located on the OS/2 Warp Server for e-business CD-ROM in `\OS2IMAGE\DISK_6`. They are:

- LVM.DLL
- LVM.EXE
- LVM.MSG
- LVMH.MSG

The following example illustrates the use of LVM from the command line. Your syntax may vary depending on how you want to set up your server disk. The full command-line syntax of LVM is available in Appendix A.3, "LVM Command-Line Syntax" on page 250.

1. First, we delete all definitions on the hard disk by typing:

```
lvm /delete:all,volumes
lvm /delete:all,unused
lvm /delete:all,primary
lvm /delete:all,lvm
lvm /delete:all,logical
lvm /delete:all,compatibility
```

2. Now that the disk is empty, create a Boot Manager partition:

    ```
    lvm /bootmgr:1
    ```

3. Partition the hard disk and create volumes:

    ```
    lvm /create:partition,SoS,1,32,primary,bootable
    lvm /create:volume,compatibility,bootos2,c:,SoS,1,SoS
    lvm /create:partition,system,1,512,logical,bootable
    lvm /create:volume,compatibility,bootos2,d:,system,1,system
    lvm /create:partition,dump,1,129,logical,nonbootable,[ FS1 ],fromstart
    lvm /create:volume,compatibility,noboot,e:,dump,1,dump
    lvm /create:partition,data,1,512,logical,nonbootable,[ FS1 ],fromstart
    lvm /create:volume,lvm,f:,data,1,data
    ```

    For our example, our definitions produce the following disk layout when using
    the `lvm /query` command as shown in Figure 49:

    ```
    Disk               Size (MB) Free Space:  Total Largest
                       4118                   2902   2902
      Disk Partition        Size (MB) Type     Status       Logical Volume
      [ BOOT MANAGER ]             7 Primary  In use
      SoS                        39 Primary  In use        SoS
      system                    517 Logical  In use        system
      dump                      133 Logical  In use        dump
      data                      517 Logical  In use        data
      [ FS1 ]                  2902 Logical  Available
    ```

    Figure 49. LVM Command Line Example Results

5.10.6 Install Base OS/2 Operating System (SEINST)

Once the machine has been booted from the maintenance system, SEINST
can be called to start the first phase of installation of the base OS/2 operating
system.

If an environment variable REMOTE_INSTALL_STATE exists, and if the value
is 0, SEINST first copies back the saved versions of CONFIG.SYS,
AUTOEXEC.BAT, and STARTUP.CMD. It then calls a program called
RSPINST, which actually performs the installation.

The directory or partition that the maintenance system was installed to is
specified by the `/T:` parameter of SEINST. After the successful installation of
OS/2, SEINST cleans up this directory since it is no longer required.

```
SEINST /S:<Source_Path> /T:<Target_Path> /B:<Boot_Drive> /L1:<Log_File>
/R:<Response_File>
```

For full details of the syntax of SEINST, refer to *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010 or *OS/2 Installation Techniques: The CID Guide,* SG24-4295*.*

5.10.6.1 SEINST LCU Command File Syntax

In our working example, the invocation of SEINST, as provided in our LCU client command file, is as follows:

```
x.seinst    = 1
x.1.name    = 'OS/2 4.0'
x.1.statevar = 'CAS_' || x.1.name
x.1.instprog = exepath'\seinst',
               ' /b:'bootdrive,
               ' /s:'OS2img,
               ' /t:'maintdir,
               ' /l1:'logdir'\'client'.OS2',
               ' /r:'
x.1.rspdir   = resdir'\OS2\'
x.1.default  = 'UNIsrv.rsp'
```

Figure 50. Extract of LCU File Illustrating SEINST Program Invocation

Where the variable is:

```
OS2img = imgdir'\OS2\XR09999'
```

Note

SEINST will return CID return codes `0xFF01` or `0xFF02` (reboot and call me back) upon successful completion when started from a maintenance system or from boot diskettes.

The reason for this is that Feature Installer cannot be started since there is no Presentation Manager in these environments. When called again following a reboot, SEINST starts CLIFI to complete the installation process.

When you are using co-requisite groups of NetViewDM/2, this will not work correctly. Please refer to Section 5.12, "NVDM/2 and SWD Implementation" on page 181 for further information.

We recommend that you ignore the return code and start Feature Installer later whenever it is suitable during your installation process. In our

environment, we have changed the REXX procedure so when `SEINST` returns the `0xFF01` or `0xFF02` return codes, they are ignored, the Install State is incremented regardless, and environment data is saved. Two extracts of the LCU files before and after modification are shown in Figure 51 and Figure 52.

```
CheckBoot: /*------------------*/

 if QUEUE_REBOOT <> 0 then do
   if CALL_AGAIN == 0 then
     rc = SetState(OVERALL_STATE+1)
   Call SaveStates
   Call Reboot
 end
 else
   rc = SetState(OVERALL_STATE+1)
 Return
```

Figure 51. Extract of LCU Command File before Modification for SEINST

```
CHECKBOOT2: /*------------------*/

/* Rewritten to avoid SEINST for 2nd time */

   if QUEUE_REBOOT <> 0
    then do
            RC = SetState(OVERALL_STATE+1)
            Call SaveStates
            Call Reboot
         end
    else do
            RC = SetState(OVERALL_STATE+1)
         end
   Return
```

Figure 52. Extract of LCU Command File after Modification for SEINST

`SEINST` and CLIFI share the same response file. To see a working example, please refer to Figure 55 on page 141.

5.10.6.2 What if Errors Occur?

A failure of `SEINST` is probably one of the worst things that can happen during the installation process. In most cases, many files have already been updated resulting in an unpredictable mix of different versions on your hard disk. If this situation arises, recovery can prove very difficult.

In the case of such a failure, make sure that you check the log file. If it tells you that files were changed, you should restore the previous contents of the hard drive from your backup, correct the problem, and start the migration process from scratch. If the reason for the failure is obvious (such as

insufficient hard disk space available) and nothing was changed, you may be able to fix the problem and re-invoke `SEINST`.

Useful Hint

When `SEINST` aborts, reporting that `RSPINST` could not be executed successfully, you might try to call `RSPINST` directly for testing purposes in order to view the error messages. `RSPINST` accepts only one parameter, the fully qualified path and name of the response file. `RSPINST`'s return codes are listed in Appendix A.1, "RSPINST Return Codes" on page 245.

Remember

The maintenance system is running in this situation. Therefore, the collection of tools you can use is somewhat limited.

5.10.6.3 Base OS/2 Operating System Sample Response File

The tested, working response file used in our environment is shown in Figure 55 on page 141. For a detailed explanation of all keywords, refer to SAMPLE.RSP in the `\CID\EXE\OS2` of the OS/2 Warp Server for e-business CD-ROM and to "New Keywords in OS/2 Response File" on page 135.

If you want to install the base OS/2 operating system in a CID environment, make sure that the keyword `RebootRequired = 0`. Otherwise, the installation will start again and run in a loop. The software distribution manager (for example NetViewDM/2 or LCU) needs to receive a return code from `SEINST` and do some post-processing. The software distribution manager will check the return code and then issue a reboot if applicable.

New Keywords in OS/2 Response File

There are a few new keywords in the new OS/2 response file. If you have installed OS/2 Warp 4 using CID methods, you will already know most of them but be aware that some of the keywords introduced with OS/2 Warp 4 (especially those related to Java) have changed for OS/2 Warp Server for e-business.

New keywords control the installation of components, such as MarkVision, which are installed with Feature Installer. The common syntax for these keywords is:

```
Component.Variable = Value
```

All components that use the new syntax have, as a minimum, the keyword `Component.Selection`. A value of `0` means Do not install while a value of `1` means Install. Drives are represented, for example, as `D:`.

For example, the new keyword `HOTPLUG.Selection=0` means that you do not want to add the support for an external floppy disk drive.

Note

It might differ from other information available to you. It is based on our experience testing the product.

A very important new keyword is `FormatJFS`. It allows you to format any partition (except the bootable partitions) with JFS. Just insert the drive letters to be formatted (separated by a comma) after the equal sign.

A list of all the new keywords follows.

- **External Floppy Drive (for Laptop Computers)**

  ```
  HOTPLUG.Selection=
  ```

- **Floppy/CDROM Swapping for Ultra Bay Devices**

  ```
  WARMSWAP.Selection=
  WARMSWAP.ThinkPad=IBM ThinkPad 755CD/CDV
  WARMSWAP.ThinkPad=IBM ThinkPad 760C/CD
  WARMSWAP.ThinkPad=IBM ThinkPad 760E
  WARMSWAP.ThinkPad=IBM ThinkPad 760ED
  WARMSWAP.ThinkPad=IBM ThinkPad 760EL/ELD
  WARMSWAP.ThinkPad=IBM ThinkPad 760X/XD
  WARMSWAP.S506Parm=/A:1 /U:0
  ```

- **Support for Dock II Docking Station for IBM ThinkPads**

  ```
  WARMDOCK.Selection=
  WARMDOCK.ThinkPad=IBM ThinkPad 755CD/CDV
  WARMDOCK.ThinkPad=IBM ThinkPad 755CE/CSE/CV/CX
  WARMDOCK.ThinkPad=IBM ThinkPad 760C/CD
  WARMDOCK.ThinkPad=IBM ThinkPad 760E
  WARMDOCK.ThinkPad=IBM ThinkPad 760ED
  WARMDOCK.ThinkPad=IBM ThinkPad 760EL/ELD
  WARMDOCK.ThinkPad=IBM ThinkPad 760X/XD
  ```

- **Printer Utilities**

  ```
  PRINTERUTIL.Selection=
  ```

- **Jet Admin Server Support**

  ```
  PUHPJETSERVER.Selection=
  ```

```
PUHPJETSERVER.TarDrv=
```

- **Jet Admin Client Support**

```
BPHPJETCLIENT.Selection=
BPHPJETCLIENT.TarDrv=
```

- **MarkVision Support**

```
PUMARKVIS.Selection=
PUMARKVIS.TarDrv=
```

- **MarkNet Port Driver Support**

```
PUMARKNET.Selection=
PUMARKNET.TarDrv=
```

- **Extra Font Support**

```
IBMFONTA.Selection=
IBMFONTG.Selection=
IBMFONTT.Selection=
IBMFONTJ.Selection=
IBMFONTC.Selection=
IBMFONTS.Selection=
IBMFONTK.Selection=
IBMFONTU.Selection=
XIBMFONT.InstDrive=
```

- **Format Partition with JFS**

```
FormatJFS=
```

- **Perform Quick Format of Partitions**

```
FormatQuick=
```

- **Install SMP Support**

```
SMP=
```

- **Path to SMP (PSD) Support Files**

```
SMPPath=C:\OS2\BOOT
```

The following new keywords are *NOT* included in SAMPLE.RSP but provide a way of selecting or deselecting other software that is installed based on a default setting when CLIFI is used.

- **Application Registration**

```
ART.Selection=
```

- **Dax Base**

```
DAXCOMP1.Selection=
DAXCOMP1.TarDrv=
```

- **Serviceability and Diagnostic Aids Option**

  ```
  SRVDIAG.Selection=
  ```

- **Serviceability Documentation Option**

  ```
  SRVDOC.Selection=
  ```

- **Security Base**

  ```
  ODSECBASE.Selection=
  ODSECBASE.TarDrv=
  ```

- **Logical Volume Manager GUI**

  ```
  LVMGUI.Selection=
  ```

- **Java Development Kit (JDK) v1.1.6**

  ```
  Java11.RunDrv=
  Java11.Selection=
  Runtime.Selection=
  Runtimeconfig.Selection=
  Samples.Selection=
  Samplesconfig.Selection=
  Samples.Smpdrv=
  Samples.Smppath=\JAVA11
  Toolkit.Selection=
  Toolkitconfig.Selection=
  Toolkit.Tktdrv=
  Toolkit.Tktpath=\JAVA11
  Tlktdoc.Selection=
  Tlktdocconfig.Selection=
  Tlktdoc.Tdocdrv=
  Tlktdoc.Tdocpath=\JAVA11
  Debugger.Selection=
  Debuggerconfig.Selection=
  Debugger.Dbgdrv=
  Debugger.Dbgpath=\JAVA11\ICATJAVA
  ```

> **Note**
>
> If the Java Samples or the Java Toolkit is selected, the Java Runtime must also be selected, or the Java Samples and the Java Toolkit will not be installed correctly.

In addition, in order to install Java support, the target drive must be formatted using HPFS or JFS since Java needs long file name support. If your boot drive is not HPFS, or you have another HPFS or JFS drive that you want to use for the Java selections, then add the following keyword on a new line after the Java11.Selection keyword.

```
FIBASE.JavaDrive=X:
```

where x: is the drive you want to use.

In our working example OS/2 response file, shown Figure 53 on page 139, we have included the keywords for all Feature Installer components that come with the base OS/2 operating system. Note that, although we have included all the keywords, not all are set to install.

The keywords set in the OS/2 response file needed by Feature Installer are used during Phase Two of the installation.

When looking at the SEINST log file after successful completion, you will see that it lists errors for some of the new keywords. Do not worry (see "Important Note" earlier in 5.10.6.3 on page 135). SEINST ignores these keywords, and CLIFI processes them correctly later.

```
        AdditionalPrinters=0
        APM=0
        AlternateAdapter=0
        * BaseFileSystem=1
        CDROM=1
        CountryCode=001
        CountryKeyboard=US
        DefaultPrinter=0
        DisplayAdapter=0
        Documentation=1
        DOSSupport=0
        WIN-OS/2Support=0
        *WIN-OS/2Desktop=0
        *ExistingWindowsPath=
        *WindowsInstallSourcePath=\WINOS2\DISKETTES
        *ShareDesktopConfigFiles=1
        DPMI=1
        ExitOnError=1
        MousePort=0
        OptionalSystemUtilities=1
        OptionalSystemComponents=1
        *OS2IniData=/AppName/KeyName/KeyValue/
        PCMCIA=0

        * FormatFAT=C:,E:
        * FormatHPFS=D:
        * FormatJFS=F:
        * FormatQuick=C:,D:,E:,F:
        FormatPartition=0
        * Include=include.rsp
        * IncludeAtEnd=atend.rsp
        * IncludeInLine=inline.rsp
        MigrateConfigFiles=1
        Mouse=1
```

Figure 53. OS/2 Response File with All Base and CLIFI Options (Part 1 of 3)

```
        PCMCIAOptions=0
        Optical=0
        Infrared=0
        PrimaryCodePage=1
        PrinterPort=1
        ProcessEnvironment=1
        ProgressIndication=1
        RebootRequired=0
        SCSI=1
        SerialDeviceSupport=1
        * SourcePath=D:\os2se20
        TargetDrive=D:
        *WIN-OS/2TargetDrive=D:
        SMP=0
        SMPPath=D:\OS2\BOOT
        ToolsAndGames=2,6
        * ConfigSysLine=call=D:\OS2\CMD.EXE /Q /C D:\LCUclient.CMD
        * Copy=vga D:\ /n:ini.rc
        * EarlyUserExit=T D:\config.sys
        * ExtendedInstall=PROGRAM.EXE
        * SeedConfigSysLine=REM This is a remark line in the seed CONFIG.SYS.
        * UserExit=T.EXE D:\OS2\INSTALL\INSTALL.LOG
        *DDISrc  = Z:\DDP
        *DDIDest = D:\
        *DDIDDP  = *.DDP
        MultimediaSupport=0
        ART.Selection=0
        DAXCOMP1.Selection=0
        DAXCOMP1.TarDrv=d:
        SRVDIAG.Selection=1
        SRVDOC.Selection=0
        ODSECBASE.Selection=1
        ODSECBASE.TarDrv=D:
        PRINTERUTIL.Selection=0
        PUHPJETCLIENT.Selection=0
        PUHPJETCLIENT.TarDrv=d:
        PUHPJETSERVER.Selection=0
        PUHPJETSERVER.TarDrv=d:
        PUMARKNET.Selection=0
        PUMARKNET.TarDrv=d:
        PUMARKVIS.Selection=0
        PUMARKVIS.TarDrv=d:
        HOTPLUG.Selection=0
        WARMSWAP.Selection=0
        WARMSWAP.ThinkPad=IBM ThinkPad 755CD/CDV
        WARMSWAP.ThinkPad=IBM ThinkPad 760C/CD
        WARMSWAP.ThinkPad=IBM ThinkPad 760E
        WARMSWAP.ThinkPad=IBM ThinkPad 760ED
        WARMSWAP.ThinkPad=IBM ThinkPad 760EL/ELD
        WARMSWAP.ThinkPad=IBM ThinkPad 760X/XD
        WARMSWAP.S506Parm=/A:1 /U:0
        WARMDOCK.Selection=0
        WARMDOCK.ThinkPad=IBM ThinkPad 755CD/CDV
        WARMDOCK.ThinkPad=IBM ThinkPad 755CE/CSE/CV/CX
        WARMDOCK.ThinkPad=IBM ThinkPad 760C/CD
        WARMDOCK.ThinkPad=IBM ThinkPad 760E
        WARMDOCK.ThinkPad=IBM ThinkPad 760ED
        WARMDOCK.ThinkPad=IBM ThinkPad 760EL/ELD
        WARMDOCK.ThinkPad=IBM ThinkPad 760X/XD
```

Figure 54. OS/2 Response File with All Base and CLIFI Options (Part 2 of 3)

```
Java11.RunDrv=d:
Java11.Selection=1
runtime.selection=1
runtimeconfig.selection=1
samples.selection=0
samplesconfig.selection=0
samples.smpdrv=d:
samples.smppath=\JAVA11
toolkit.selection=0
toolkitconfig.selection=0
toolkit.tktdrv=d:
toolkit.tktpath=\JAVA11
tlktdoc.selection=0
tlktdocconfig.selection=0
tlktdoc.tdocdrv=d:
tlktdoc.tdocpath=\JAVA11
debugger.selection=0
debuggerconfig.selection=0
debugger.dbgdrv=d:
debugger.dbgpath=\JAVA11\ICATJAVA
IBMFONTA.Selection=0
IBMFONTG.Selection=0
IBMFONTT.Selection=0
IBMFONTJ.Selection=0
IBMFONTC.Selection=0
IBMFONTS.Selection=0
IBMFONTK.Selection=0
IBMFONTU.Selection=1
XIBMFONT.InstDrive=d:
LVMGUI.Selection=1
```

Figure 55. OS/2 Response File with All Base and CLIFI Options (Part 3 of 3)

Note

This response file installs OS/2 Warp Server for e-business without
formatting the boot partition because it is a migration. If this was a
pristine installation, then the following keywords could be used:

* `FormatFAT=C:,E:`

* `FormatHPFS=D:`

* `FormatJFS=F:`

* `FormatQuick=C:,D:,E:,F:`

5.10.7 Multi Protocol Transport Services (MPTS)

The easiest way to upgrade MPTS is to reinstall it using the same values in
the response file that were specified during the last installation. Installing
MPTS immediately following the migration of the base OS/2 operating system
saves one reboot in the overall installation cycle.

During our testing, we found no significant changes in the way MPTS is installed compared to previous versions.

MPTS CID Installation Syntax

```
MPTS /E:<env> /S:<source_path> /T:<target_path> /TU:<config_path>
/R:<response_file> /L1:<log_file>
```

For full details of the syntax of MPTS, refer to *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010 or *OS/2 Installation Techniques: The CID Guide,* SG24-4295.

Please Note

Of all the parameters used, it is important to note that we are installing in maintenance mode, and, therefore, use the parameter `/E:MAINT` for this.

5.10.7.1 MPTS LCU Command File Syntax

In our working example, the invocation of MPTS, as provided in our LCU client command file, is as follows:

```
x.mpts     = 2
x.2.name    = 'MPTS 5.5'
x.2.statevar = 'CAS_' || x.2.name
x.2.instprog = MPTSimg'\mpts',
               ' /e:maint',
               ' /s:'MPTSimg,
               ' /t:'mptsdrive'\',
               ' /tu:'bootdrive'\',
               ' /l1:'logdir'\'client'.MPTS',
               ' /r:'
x.2.rspdir   = resdir'\mpts\'
x.2.default  = client'.rsp'
```

Figure 56. Extract of LCU File Illustrating MPTS Invocation

Where the variable `MPTSimg` is defined as:

```
MPTSimg = imgdir'\MPTS\WR08620'
```

5.10.7.2 MPTS Sample Response File

The working response file used in our environment is shown below.

> **Please Note**
>
> No additional tuning has been done. This response file is just an example that needs to be customized.

```
      ****************************************************************
      * Model Response File for :                                   *
      *                                                             *
      * Multi Protocol Transport Services                          *
      ****************************************************************

      INST_SECTION = (
          Install      = Product
          Target       = D:
          Upgrade_Level = New
                    )

      PROTOCOL = (

      [PROT_MAN]

         DRIVERNAME = PROTMAN$

      [IBMLXCFG]

         landd_nif = landd.nif
         netbeui_nif = netbeui.nif
         tcpbeui_nif = tcpbeui.nif
         tcpip_nif = tcpip.nif
         ibmmpc_nif = ibmmpc.nif

      [NETBIOS]

         DriverName = netbios$
         ADAPTER0 = netbeui$,0
         ADAPTER1 = tcpbeui$,1

      [landd_nif]

         DriverName = LANDD$
         Bindings = ibmmpc_nif
         ETHERAND_TYPE = "I"
         SYSTEM_KEY = 0x0
         OPEN_OPTIONS = 0x2000
         TRACE = 0x0
         LINKS = 8
         MAX_SAPS = 5
         MAX_G_SAPS = 0
         USERS = 3
         TI_TICK_G1 = 255
         T1_TICK_G1 = 15
         T2_TICK_G1 = 3
         TI_TICK_G2 = 255
         T1_TICK_G2 = 25
         T2_TICK_G2 = 10
         IPACKETS = 250
         UIPACKETS = 100
         MAXTRANSMITS = 6
            MINTRANSMITS = 2
         TCBS = 64
         GDTS = 30
         ELEMENTS = 800
```

Figure 57. MPTS Response File Example (Part 1 of 3)

```
        NETFLAGS = 0x0

[netbeui_nif]

    DriverName = netbeui$
    Bindings = ibmmpc_nif
    ETHERAND_TYPE = "I"
    USEADDRREV = "YES"
    OS2TRACEMASK = 0x0
    SESSIONS = 254
    NCBS = 254
    NAMES = 40
    SELECTORS = 50
    USEMAXDATAGRAM = "NO"
    ADAPTRATE = 1000
    WINDOWERRORS = 0
    MAXDATARCV = 4168
    TI = 30000
    T1 = 1000
    T2 = 200
    MAXIN = 1
    MAXOUT = 1
    NETBIOSTIMEOUT = 500
    NETBIOSRETRIES = 1
    NAMECACHE = 1000
    RNDOPTION = 1
    PIGGYBACKACKS = 1
    DATAGRAMPACKETS = 50
    PACKETS = 300
    LOOPPACKETS = 8
    PIPELINE = 5
    MAXTRANSMITS = 6
    MINTRANSMITS = 2
    DLCRETRIES = 10
    FCPRIORITY = 5
    NETFLAGS = 0x0

[tcpbeui_nif]

    DriverName = tcpbeui$
    Bindings = ,ibmmpc_nif
    NODETYPE = "B-Node"
    OS2TRACEMASK = 0x0
    SESSIONS = 254
    NCBS = 254
    NAMES = 40
    SELECTORS = 15
    USEMAXDATAGRAM = "NO"
    NETBIOSTIMEOUT = 500
    NETBIOSRETRIES = 1
    NAMECACHE = 1000
    PRELOADCACHE = "NO"
    NAMESFILE = 0
    DATAGRAMPACKETS = 20
    PACKETS = 50
    INTERFACERATE = 300

[tcpip_nif]
```

Figure 58. MPTS Response File Example (Part 2 of 3)

```
        [ibmmpc_nif]

          DriverName = IBMMPC$
          NetAddress = "400000000163"
          MaxTransmits = 31
          MaxTxFrameSize = 18000
          MinRcvBuffs = 20
          SizWorkBuf = 2048
          MulticastNum = 16
          EnableTxEofInt = "YES"
          Enet20UTP = "NO"
          EnableHiPriTx = "NO"
          HiPriTxAccess = 5
          HiPriTxThresh = 4
          LLCOnly = "NO"
          EnableTRFDX = "YES"

        )

      MPTS = (

        [CONTROL]
          Local_IPC      = YES
          INET_Access    = YES
          NETBIOS_Access = NO
        [IFCONFIG]
          Interface     = 0
          Address       = 9.3.1.163
          Brdcast       =
          Dest          =
          Enable        = UP
          NetMask       = 255.255.255.0
          Metric        = 0
          Mtu           = 4096
          Trailers      = NO
          Arp           = NO
          Bridge        = NO
          Snap          = NO
          Allrs         = NO
          802.3         = NO
          Icmpred       = NO
          Canonical     = NO
        [ROUTE]
          Type          = default
          Action        = add
          Dest          =
          Router        = 9.3.1.74
          Metric        = 1

        )

      RESOLV = (
         NAME = domain itsc.austin.ibm.com
         NAME = nameserver 9.3.1.69
)
```

Figure 59. MPTS Response File Example (Part 3 of 3)

5.10.8 File System Redirection (THINIFS)

The SrvIFS (Server Installable File System) provides an easy means of redirection. THINIFS installs the necessary SRVIFS redirection files on the hard disk.

We executed THINIFS twice to obtain two redirected drives for the next part of the installation having rebooted to enable Presentation Manager mode.

```
                 THINIFS Syntax

 THINIFS /S:<Source_Path> /T:<Target_Path> /SRV:<CodeServer_Name>
 /REQ:<Client_Name> /D:<Drive_Letter> /TU:<ConfigSys_Path>
 /Ll:<LogFile_Name> /NS:<NB_Sessions> /A:<IFS_Option> /W
```

For full details of the syntax of THINIFS, refer to *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010 or *OS/2 Installation Techniques: The CID Guide,* SG24-4295*.*

5.10.8.1 THINIFS LCU Command File Syntax

In our working example, the invocation of THINIFS, as provided in our LCU client command file, is as follows:

```
x.thinifs   = 16
x.16.name   = 'SRVIFS Requester'
x.16.statevar = ''
x.16.instprog = imgdir'\srvifs\thinifs',
                ' /s:'imgdir'\srvifs',
                ' /t:'BOOTDRIVE'\srvifsrq',
                ' /tu:'BOOTDRIVE'\',
                ' /ll:'logdir'\'client'.thinifs',
                ' /req:'client,
                ' /srv:'server1'shareA',
                ' /d:'shareA
x.16.rspdir   = ''
x.16.default  = ''
```

Figure 60. Extract of LCU File Illustrating THINIFS Program Invocation

Where variable imgdir has already been explained.

```
                 Note

 Only one invocation of THINIFS is provided. The other is nearly identical.
 Refer to the redbooks mentioned above for further assistance.
```

5.10.9 LCU Installation (CASINSTL)

CASINSTL installs the LAN CID Utility client code, which is the actual software distribution manager that works with SRVIFS.

```
 CASINSTL Syntax

 CASINSTL /TU:<Boot_Drive> /CMD:<LCU_Path> /D /D:<Default_CMDFile>
 /L1<LogFile> /L2<LogFile2> /PL:<Path_Values> /PA:<LCU_Path> /PD
 /REQ:<Client_Name> /0
```

For full details of the syntax of CASINSTL, refer to *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010 or *OS/2 Installation Techniques: The CID Guide*, SG24-4295.

5.10.9.1 CASINSTL LCU Command File Syntax

In our working example, the invocation of CASINSTL, as provided in our LCU client command file, is as follows:

```
x.casinstl   = 18
x.18.name     = 'LAN CID Utility'
x.18.statevar = ''
x.18.instprog = ciddir'\locinstu\casinstl',
                ' /cmd:'lcucmd,
                ' /tu:'BOOTDRIVE,
                ' /pl:'DLLPATH,
                ' /pa:'ciddir'\locinstu',
                ' /l1:'logdir'\'client'.cluerr',
                ' /l2:'logdir'\'client'.clulog',
                ' /d',
                ' /req:'client
x.18.rspdir   = ''
x.18.default  = ''
```

Figure 61. Extract of LCU File Illustrating CASINSTL Invocation

---

5.11 Installation - Phase One

The following sections describe the process components of Phase One.

5.11.1 Display Driver Installation

If you need to have better resolution or more colors than the default 640x480x16 setup, you should install the appropriate display driver. For example, Netscape Communicator needs at least 256 colors to run (although a version of Netscape Communicator with 16-color support was expected to be available with the final release of OS/2 Warp Server for e-business).

The program that installs alternative display drivers is called DSPINSTL.

```
┌─ DSPINSTL Syntax ──────────────────────────────────────────────────┐
│                                                                     │
│ DSPINSTL.EXE /PD:<.DSC_file> /T:<boot_drive> /S:<source_drive>      │
│ /RES:<resolution> /U                                                │
│                                                                     │
└─────────────────────────────────────────────────────────────────────┘
```

If you have a system where the video chip set can be automatically detected, then you can use the auto-detect option. If you do not know whether your hardware can be auto-detected, we recommend that you try it out.

```
┌─ DSPINSTL Syntax - AutoDetect ─────────────────────────────────────┐
│                                                                     │
│ DSPINSTL.EXE /T:<boot_drive> /S:<source_drive> /RES:<resolution> /U │
│ /AUTO                                                               │
│                                                                     │
└─────────────────────────────────────────────────────────────────────┘
```

If your video adapter is not supported by OS/2 Warp Server for e-business with a display driver shipped with the product, you can try to use the Generic Non-accelerated GRADD driver, or you can use the OS/2 display drivers that came with your adapter. In this case, refer to the CID installation instructions that came with the display drivers for assistance.

For full details of the syntax of DSPINSTL, refer to *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010 or *OS/2 Installation Techniques: The CID Guide,* SG24-4295.

5.11.1.1 DSPINSTL LCU Command File Syntax
In our working example, the invocation of DSPINSTL, as provided in our LCU client command file, is as follows. It auto-detects the display adapter chipset and sets a screen resolution of 800x600x256.

```
x.SVGA      = 7
x.7.name    = 'SVGA'
x.7.statevar = 'CAS_' || x.7.name
x.7.instprog = 'dspinstl',
              ' /s:'OS2img,
              ' /t:'bootdrive,
              ' /res:800x600x256',
              ' /auto',
              ' /u'
x.7.rspdir  = ''
x.7.default = ''
```

Figure 62. Extract of LCU File Illustrating DSPINSTL Program Invocation

The variable `OS2img` has already been explained.

5.11.2 Feature Installer

As previously mentioned, some components that belong to the base OS/2 operating system are installed by Feature Installer. After the initial installation using SEINST and following a reboot, the Presentation Manager interface is active. With this prerequisite fulfilled, CLIFI.EXE can be used to complete the update.

Since `CLIFI` and `SEINST` share the partial response file for keywords of the `Component.Selection` type, we can still use the same file from Phase One.

The general response file for this invocation of `CLIFI` is `FIBASE.RSP`, which can be found in the `\OS2\INSTALL` directory of the boot drive.

```
── CLIFI CID Installation Syntax ──────────────────────────────────

 CLIFI /A:C /S:<source_path> /B:<boot_drive> /F:<boot_drive>\OS2\INSTALL
 /R:<generic_response_file> /R2:<partial_response_file>
 /L1:<error_log_file> /L2:<history_log_file>
```

For a description of Feature Installer, please refer to Section 5.7.4, "Introducing Feature Installer" on page 107. For full details of the syntax of CLIFI, refer to *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010*.

```
── Important Note ─────────────────────────────────────────────────

 When  CLIFI.EXE is invoked during the Phase Two, it installs Systems
 Management by default. This is required for many other applications, such
 as Communications Server. Therefore, it is advisable to call CLIFI.EXE at
 least once, as soon as possible, after installing the base OS/2 operating
 system.
```

5.11.2.1 CLIFI LCU Command File Syntax

In our working example, the invocation of `CLIFI`, as provided in our LCU client command file, is as follows:

```
x.FIbase    = 4
x.4.name    = 'Feature Install 1.2.3 -  base components'
x.4.statevar = 'CAS_' || x.4.name
x.4.instprog = 'CLIFI.EXE',
              ' /s:'OS2img'\FI',
              ' /a:C',
              ' /b:'bootdrive,
              ' /r:'bootdrive'\OS2\INSTALL\FIBASE.RSP',
              ' /f:'bootdrive'\OS2\INSTALL',
              ' /l1:'logdir'\'client'.FIerr',
              ' /l2:'logdir'\'client'.FIlog',
              ' /r2:'
x.4.rspdir  = resdir'\OS2\'
x.4.default = 'server.rsp'
```

Figure 63. Extract of LCU File Illustrating CLIFI Program Invocation

Where variable `OS2img` has already been explained.

5.11.2.2 CLIFI Sample Response File
The working response file used in our environment is shown below. We have
included only those parts of the response file that are specific to Feature
Installer because the base OS/2 response file is already illustrated in Figure
53 on page 139.

```
        PRINTERUTIL.Selection=0
        PUHPJETCLIENT.Selection=0
        PUHPJETCLIENT.TarDrv=d:
        PUHPJETSERVER.Selection=0
        PUHPJETSERVER.TarDrv=d:
        PUMARKNET.Selection=0
        PUMARKNET.TarDrv=d:
        PUMARKVIS.Selection=0
        PUMARKVIS.TarDrv=d:
        HOTPLUG.Selection=0
        WARMSWAP.Selection=0
        WARMSWAP.ThinkPad=IBM ThinkPad 755CD/CDV
        WARMSWAP.ThinkPad=IBM ThinkPad 760C/CD
        WARMSWAP.ThinkPad=IBM ThinkPad 760E
        WARMSWAP.ThinkPad=IBM ThinkPad 760ED
        WARMSWAP.ThinkPad=IBM ThinkPad 760EL/ELD
        WARMSWAP.ThinkPad=IBM ThinkPad 760X/XD
        WARMSWAP.S506Parm=/A:1 /U:0
        WARMDOCK.Selection=0
        WARMDOCK.ThinkPad=IBM ThinkPad 755CD/CDV
        WARMDOCK.ThinkPad=IBM ThinkPad 755CE/CSE/CV/CX
        WARMDOCK.ThinkPad=IBM ThinkPad 760C/CD
        WARMDOCK.ThinkPad=IBM ThinkPad 760E
        WARMDOCK.ThinkPad=IBM ThinkPad 760ED
        WARMDOCK.ThinkPad=IBM ThinkPad 760EL/ELD
        WARMDOCK.ThinkPad=IBM ThinkPad 760X/XD
```

Figure 64. FI-Specific Portion of Feature Installer Response File (Part 1 of 2)

```
            Java11.RunDrv=d:
            Java11.Selection=1
            runtime.selection=1
            runtimeconfig.selection=1
            samples.selection=0
            samplesconfig.selection=0
            samples.smpdrv=d:
            samples.smppath=\JAVA11
            toolkit.selection=0
            toolkitconfig.selection=0
            toolkit.tktdrv=d:
            toolkit.tktpath=\JAVA11
            tlktdoc.selection=0
            tlktdocconfig.selection=0
            tlktdoc.tdocdrv=d:
            tlktdoc.tdocpath=\JAVA11
            debugger.selection=0
            debuggerconfig.selection=0
            debugger.dbgdrv=d:
            debugger.dbgpath=\JAVA11\ICATJAVA
            IBMFONTA.Selection=0
            IBMFONTG.Selection=0
            IBMFONTT.Selection=0
            IBMFONTJ.Selection=0
            IBMFONTC.Selection=0
            IBMFONTS.Selection=0
            IBMFONTK.Selection=0
            IBMFONTU.Selection=1
            XIBMFONT.InstDrive=d:
            LVMGUI.Selection=1
```

Figure 65. FI-Specific Portion of Feature Installer Response File (Part 2 of 2)

5.11.3 File and Print Sharing Services

The most important difference between this and the previous versions of
OS/2 LAN or Warp Server is that LANINSTR (the File and Print Sharing Services
installation program) no longer installs 386HPFS. However, the parameters of
LANINSTR remain unchanged.

Note

At the time of writing, following a pristine installation, the MAXCONNECTIONS
parameter was not installed, and this prevented the server service from
starting. A manual addition was required to overcome this problem. We
expect that this will be fixed by the time the final product is available.

LANINSTR Syntax

LANINSTR /<type> /R:<response_file> /G:<included_rsp_files>
/L1:<error_log> /L2:<history_log>

For full details of the syntax of LANINSTR, refer to *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010 or *OS/2 Installation Techniques: The CID Guide,* SG24-4295*.*

5.11.3.1 LANINSTR LCU Command File Syntax

In our working example, the invocation of LANINSTR, as provided in our LCU client command file, is as follows:

```
x.lanserver  = 3
x.3.name     = 'LAN Server 5.2'
x.3.statevar = 'CAS_' || x.3.name
x.3.instprog = LSRimg'\laninstr',
               ' /l1:'logdir'\'client'.lsr',
               ' /srv',
               ' /r:'
x.3.rspdir   = resdir'\LSR\'
x.3.default  = 'lansrv.rsp'
```

Figure 66. Extract of LCU File Illustrating LANINSTR Invocation

Where the LSRimg variable is defined as:

LSRimg = imgdir'\LSR\IP08700'

5.11.3.2 LANINSTR Sample Response File

The working response file used in our environment is shown in Figure 67.

```
        DELETEIBMLAN = Networks<

          net3 =
          net4 =
          netlb =

        >

        UPDATEIBMLAN = Networks<

          net1 = NETBEUI$,*,LM10,*,*,*
          net2 = TCPBEUI$,*,LM10,*,*,*
        >

        DELETEIBMLAN = Requester<

          wrknets = NETLB,NET3,NET4
        >
        UPDATEIBMLAN = Requester<

          Computername = SRV163
          Domain = D01
          useallmem = Yes
```

Figure 67. Working OS/2 Warp Server Response File (Part 1 of 2)

```
          ADDIBMLAN = Requester<

wrkservices = MESSENGER
wrknets = NET1, NET2

>

DELETEIBMLAN = Server<

srvservices=ALERTER,DCDBREPL,NETRUN,REMOTEBOOT,REPLICATOR,UPS
srvnets = NETLB, NET3, NET4

>

UPDATEIBMLAN = Server<

  autopath = \IBMLAN\PROFILES\SRVAUTO.PRO

>

ADDIBMLAN = Server<

SrvServices = LSSERVER, NETLOGON
srvnets = NET1, NET2

>
ConfigApplDumpPath = Migrate
ConfigApplMaxDumps = Migrate
ConfigAutoStartFFST = YES
ConfigAutoStartLS = No
ConfigCopyDLR = CopyIfRequired
ConfigCopyLSP = CopyIfRequired
ConfigDisplayMsg = ON
ConfigDosNumber = 0
ConfigMsgLogName = Migrate
ConfigRouteAlertsTo = NETVIEW
ConfigServerType = AdditionalServer
ConfigSourceDrive = None
ConfigSystemDumpPath = d:\OS2\SYSTEM
ConfigSystemMaxDumps = 32
ConfigTargetDrive = D
ConfigWsId = DC01
ConfigWsSerial1 = Migrate
ConfigWsSerial2 = Migrate
ConfigWsType1 = Migrate
ConfigWStype2 = Migrate
InstallDosLanApi = REMOVE
InstallDosRemoteIPL = REMOVE
InstallGenericAlerter = INSTALL
InstallInstallProgram = REMOVE
InstallLoopBackDriver = REMOVE
InstallOS2RemoteIPL = REMOVE
InstallServer = INSTALL
InstallUPM = INSTALL
InstallUps = REMOVE
InstallMSGPopup = REMOVE
InstallGUI = REMOVE
InstallClipBoard = REMOVE
InstallDesktopIcons = YES
```

Figure 68. Working OS/2 Warp Server Response File (Part 2 of 2)

Please note that the response file shown in Figure 68 on page 154 contains the line:

```
ConfigServerType = AdditionalServer
```

Be sure to change this to the appropriate value if you are migrating a Domain Controller or Backup Domain Controller. You will also change the performance and capacity parameters according to your needs.

General Tip

In general, don't install a Primary Domain Controller when introducing a server into an existing domain. Always install it as a Backup Domain Controller and then promote it to Primary Domain Controller as required.

5.11.4 386HPFS

Because 386HPFS is now shipped as a separate product, it is no longer installed by LANINSTR.

Installing 386HPFS

If you are migrating a server using CID, make sure that you install 386HPFS *directly after* File and Print Sharing Services before rebooting the machine. Otherwise, you will have problems rebooting the system.

If you are migrating an existing 386HPFS drive, you do not need to purchase 386HPFS as a separate product. During the installation of the base OS/2 operating system, the file system drivers are detected and removed. However, the installation process stores some information recording that 386HPFS was installed on the system. This information is used to validate the existence of a license. It also allows the reinstallation of the 386HPFS.

The 386HPFS installation, and that of features, such as Fault Tolerance and Local Security, are now performed by Feature Installer. For a description of Feature Installer, please refer to Section 5.7.4, "Introducing Feature Installer" on page 107.

5.11.4.1 386HPFS Install LCU Command File Syntax
The following figure shows the portion of the LCU file where 386 HPFS is installed.

```
x.fs386      = 10
x.10.name    = 'HPFS386'
x.10.statevar = 'CAS_' || x.10.name
x.10.instprog = 'CLIFI.EXE',
               ' /s:'FS386img,
               ' /a:C',
               ' /b:'bootdrive,
               ' /r:'FS386img'\fs386.rsp',
               ' /f:'bootdrive'\OS2\INSTALL',
               ' /l1:'logdir'\'client'.fs386err',
               ' /l2:'logdir'\'client'.fs386log',
               ' /r2:'
x.10.rspdir  = resdir'\FS386\'
x.10.default = 'fs386def.rsp'
```

Figure 69. Extract of LCU File Illustrating 386 HPFS Installation

Where the variable `FS386img` is defined as:

```
FS386img = imgdir'\KAAJNYH\IP08600'
```

5.11.4.2 386HPFS Sample Response File

The working response file used in our environment is shown in Figure 70 on page 157. It can be used when migrating an existing 386HPFS installation. In this example, Fault Tolerance and Local Security are configured, thus, the corresponding variables are set to `1`.

Please note that Feature Installer always requires two response files, one of which is provided by the software manufacturer.

For 386HPFS, this response file is called FS386.RSP, located in the `\CID\SERVER\KAAJNYH` directory the OS/2 Warp Server for e-business CD ROM. It contains the description of all files required to install the product. *Do not change this file.* The other file (in our example in Figure 70) is provided by the user and contains user-specific settings.

If you do not already have 386 HPFS installed, and since 386HPFS is no longer shipped with OS/2 Warp Server for e-business, you will need to have a license diskette or some other proof of license (such as a copy of the Warp Server Advanced CD) in order to install it.

In a CID installation, it does not make sense to have to insert a license diskette during the installation process. Therefore, there is a keyword in the response file that replaces the proof of license.

If you have a valid license, please specify the following `Keyword=Value` pair in your response file:

```
                    HPFS386_Top.HAVEADVANCELICENSE=AGREE
```

Most of the other keywords are used to set the 386HPFS tuning parameters that are found in HPFS386.INI after the installation. You can modify these according to your needs.

```
          Install386HPFS.Selection=0
          InstallFaultTolerance.Selection=1
          InstallLocalSecurity.Selection=1
          WkStaDeterminesCacheSize.Selection=0
          WkStaDeterminesHeapSize.Selection=0
          ConfigLazyWrite.Selection=1
          HPFS386_Top.Config386Cache=512
          HPFS386_Top.ConfigHeap=756
          HPFS386_Top.ConfigMinBufferIdle=550
          HPFS386_Top.ConfigMaxCacheAge=5050
          HPFS386_Top.ConfigUseAllMem=Yes
          HPFS386_Top.HAVEADVANCELICENSE=Agree
          HPFS386_Top.InstallDrive=D:
          HPFS386_Top.isIntegratedInstall=NO
```

Figure 70. Working 386 HPFS Response File

5.11.5 First Failure Support Technology (FFST/2)

In a CID environment, FFST/2 must be installed in a separate step. The installation program is called FFSTINST.EXE.

FFSTINST Syntax
```
FFSTINST /L1:<log_file> /S:<source_path> /ROUT:<code>
```

5.11.5.1 FFSTINST LCU Command File Syntax

In our working example, the invocation of FFSTINST, as provided in our LCU client command file, is as follows:

```
x.FFST      = 15
x.15.name     = 'FFST'
x.15.statevar = 'CAS_' || x.15.name
x.15.instprog = FFSTimg'\ffstinst.exe',
                ' /s:'FFSTimg,
                ' /l1:'logdir'\'client'.ffst',
                ' /rout:1'
x.15.rspdir   = ''
x.15.default  = ''
```

Figure 71. Extract of LCU File Illustrating FFSTINST Invocation

Where the variable FFSTimg is defined as:

```
        FFSTimg    = imgdir'\FFST\WR00530'
```

> ─── **Note** ───
>
> The /ROUT parameter defines the system where alerts will be sent. A value
> of 1 means NetView, a value of 2 states that LAN Network Manager should
> receive the message. A value of 0 means no alerts will be sent.

5.11.5.2 FFSTINST Sample Response File
The installation of FFST/2 needs no response file.

5.11.6 TCP/IP Application Services

Previous versions of TCP/IP used INSTALL.EXE for installation. From
Version 4 onwards, the installation program changed to Feature Installer. The
procedures and response file we have provided represent a working version
and use Feature Installer.

We strongly recommend that you use the Feature Installer to install these
components even though the program INSTALL.EXE still exists.
INSTALL.EXE displays dialog boxes on the screen and waits for user
interaction to click mouse buttons when it encounters a problem, which is not
acceptable in a CID-based installation. In addition, INSTALL.EXE requires
Netscape Communicator.

For further detail on the installation of TCP/IP Application Services refer to
the README.CID or the \CID\SERVER\TCPAPPS directory on the OS/2 Warp
Server for e-business CD-ROM.

Please note that the installation of TCP/IP Services requires Java to be
installed.

5.11.6.1 TCP/IP Installation LCU Command File Syntax
In our working example, the invocation of the TCP/IP installation, using
Feature Installer, as provided in our LCU client command file, is as follows:

```
x.TCPIP     = 5
x.5.name    = 'TCP/IP Application Suite 4.21'
x.5.statevar = 'CAS_' || x.5.name
x.5.instprog = 'CLIFI.EXE',
               ' /s:'TCPIPimg'\install',
               ' /a:C',
               ' /b:'bootdrive,
               ' /r:'TCPIPimg'\install\tcpinst.rsp',
               ' /f:'bootdrive'\OS2\INSTALL',
               ' /l1:'logdir'\'client'.TCPIPerr',
               ' /l2:'logdir'\'client'.TCPIPlog',
               ' /r2:'
x.5.rspdir  = resdir'\TCPIP\'
x.5.default = client'.rsp'
```

Figure 72. LCU File Illustrating TCP/IP Installation Using Feature Installer

Where the variable `TCPIPimg` is defined as:

```
TCPIPimg = imgdir'\TCPIP\UN02100'
```

5.11.6.2 TCP/IP Sample Response File
The working response file used in our environment is shown in a series of
figures beginning with Figure 73 through Figure 76.

```
        * TCPIP.InstallDir=D:\TCPIP

        TCPIP.InstallDrive=D:

        * TARGET_DRIVE=D:
        * LOG_PATH1=C:\TCPINST.LOG
        * LOG_PATH2=C:\TCPINST2.LOG
        * INSTALL_MODE=UNATTENDED
        * BOOT_DRIVE=D:

        *** needed to install NFS -> to put cfg files in \ETC
        TCPIP.MPTS_PATH=D:\MPTN

        * MPTS_RSP_FILE=D:\INSTALL\MPTS\MY.RSP

        * CONFIG_NO_INSTALL=N

        *** needed for DHCP ??? ***
        SERVER_YorN=Y

        LANG=ENUS
        CODEPAGE=850
        PACKAGES = (
                BASE_APPS = Y
        DHCP_DDNS_Server = Y
        UINSTAL = Y
        VPN = Y
        IFOLDER = Y
        NFS = Y
                )
```

Figure 73. Working TCP/IP Response File (Part 1 of 4)

```
          IP_FORWARDING=N

          USE_HOSTS_FIRST=Y

          INETD=(
                  AUTOSTART=Y
                  AUTOSTART_TYPE=START_MIN
                )

          TELNETD=(
                  AUTOSTART=Y
                  AUTOSTART_TYPE=START_MIN
                  )

          FTPD=(
                  AUTOSTART=Y
                  AUTOSTART_TYPE=INETD
                  PARAMETERS=-l
                )

          TFTPD=(
                  AUTOSTART=N
                  AUTOSTART_TYPE=INETD
                )

          REXECD=(
                  AUTOSTART=Y
                  AUTOSTART_TYPE=INETD
                 )

          RSHD=(
                  AUTOSTART=Y
                  AUTOSTART_TYPE=INETD
               )

          LPD=(
                  AUTOSTART=N
                  AUTOSTART_TYPE=INETD
                )

          LPRPORTD=(
                  AUTOSTART=N
                  AUTOSTART_TYPE=START_MIN
                   )

          ROUTED=(
                  AUTOSTART=N
                  AUTOSTART_TYPE=DET
                 )

          PORTMAP=(
                  AUTOSTART=N
                  AUTOSTART_TYPE=DET
                  )

          SENDMAIL=(
                   AUTOSTART=N
                   AUTOSTART_TYPE=START_NORM
```

Figure 74. Working TCP/IP Response File (Part 2 of 4)

```
        )

        RSVPD=(
               AUTOSTART=N
               AUTOSTART_TYPE=DET
            )

        TCPCFG2D=(
                AUTOSTART=N
                AUTOSTART_TYPE=DET
              )

        SYSLOGD=(
               AUTOSTART=Y
               )

        USERNAME=usr146
        TZ=CST6CDT

        ADMIN_PW=12345
        SERVER_USER=(
               USERNAME=admin
               PASSWORD=12345
               UID=0
               GID=0
               COMMENT=New admin
               HOMEDIR=D:\
               TELNETD=(
                       ACTIVE=Y
                       SHELL=telnetd.cmd
                       DISCONNECT=Y
               )
               REXECD=(
                       ACTIVE=Y
               )
               FTPD=(
                       ACTIVE=Y
                       READ_DIR=D:\
CANREAD=Y
                       WRITE_DIR=D:\
                       CANWRITE=Y
                       IDLETIMEOUT=2000
               )
        )

        SERVER_USER=(
               USERNAME=guest
               PASSWORD=guest
               UID=1
               GID=1
               HOMEDIR=D:\GUEST
               FTPD=(
                       ACTIVE=Y
                       READ_DIR=D:\GUEST
                       CANREAD=Y
                       CANWRITE=N
                       LOG=LOGDEL LOGREN LOGPUT
               )
        )
```

Figure 75. Working TCP/IP Response File (Part 3 of 4)

```
        RSH_USER=(
                HOSTNAME=rshhost
                DOMAIN=raleigh.ibm.com
                USERNAME=rshuser
                 )

        TFTP_ACCESS=(
                DIRECTORY=D:\TFTP
                READ_ONLY=N
                HOSTNAME=tftphost
                     )

        ENABLE_SOCKS=Y
        SOCKS_USERID=srv146

        SOCKS_DOMAIN=(
                DOMAIN1=
                DOMAIN2=
                DOMAIN3=
                     )

        SOCKS_NAMESERVER=(
                DOMAIN1=
                DOMAIN2=
                DOMAIN3=
                         )

        DIRECT_ROUTES=(
                DESTINATION=
                NETMASK=
                     )

        SOCKD_SERVER=(
                SERVER=
                DESTINATION=
                NETMASK=
                     )

        *REMOTE_PRINT_SERVER=printer1
        *REMOTE_PRINTER=lpt1
        MAX_LPD_PORTS=12
```

Figure 76. Working TCP/IP Response File (Part 4 of 4)

Note on TCP/IP Installation

You will note that some of the keywords are commented out. At the time of
writing, we were able to install the product sucessfully using the keyword
`TCPIP.InstallDrive`. This may change by the time the product becomes
generally available. We recommend that you check the on-line
documentation and the README.CID for the latest advice.

The default general response file for the installation of TCP/IP Services is called TCPINST.RSP. You will find it in the `\CID\SERVER\TCPAPPS\INSTALL` directory of the OS/2 Warp Server for e-business CD-ROM.

It is not our aim here to explain TCP/IP configuration in detail; this is beyond the scope of this book. If you require detailed information on this topic, refer to the redbook *Beyond DHCP - Work Your TCP/IP Internetwork with Dynamic IP*, SG24-5280. This redbook ships with a CD-ROM that also contains some CID-related information and response files.

5.11.7 Netscape Communicator

Depending on your configuration, you may or may not already have Netscape, Version 2.02 installed on your system. If it does not exist on your system, Netscape Communicator is installed. If you already have it, then updating Netscape Navigator 2.02 to Netscape Communicator 4.04 can be a two-step process depending on whether a Plug-In is needed. A Plug-In provides additional functionality when browsing the World Wide Web.

Netscape Communicator is installed using Software Installer. The basic product is installed by the installation program INSTALL.EXE in the `\CID\SERVER\NETSCAPE` directory on the OS/2 Warp Server for e-business CD-ROM).

Netscape Install Syntax

```
INSTALL /X /A:I /NMSG /O:DRIVE /R:responsefile /L2:outputfile
```

The above syntax is valid for a new installation. If you already have a copy of Netscape installed, you need to substitute the Action (`/A`) parameter keyword Install (`I`) for Update (`U`). Therefore, the new syntax would read:

```
INSTALL /X /A:U /NMSG /O:DRIVE /R:responsefile /L2:outputfile
```

For further information on installing Netscape Navigator, refer to the README file in the `\CID\SERVER\NETSCAPE` directory of the OS/2 Warp Server for e-business CD-ROM.

Note on Plug-Ins

We recommend that multimedia Plug-Ins not be installed on a server. We have included their installation here only for completeness.

If the Plug-In is needed, it can be copied to the Plug-In directory by simply issuing a COPY command as follows:

COPY X:\SOURCE\NPFI.DLL Y:\TARGET\PROGRAM\PLUGINS

where X:\SOURCE represents the source directory, and Y:\TARGET is the directory in which you installed Netscape Communicator.

Note on COPY Command

Since COPY does not return a valid CID return code, we recommend that you create a REXX command file that calls both the installation program and the COPY command and then returns a correct value.

5.11.7.1 Navigator Installation LCU Command File Syntax
In our working example, the invocation of the Netscape Navigator installation as provided in our LCU client command file is as follows:

```
x.Netscape  = 6
x.6.name    = 'Netscape Communicator for OS/2 4.04'
x.6.statevar = 'CAS_' || x.6.name
x.6.instprog = NSimg'\install.exe',
                ' /x',
                ' /a:i',
                ' /o:drive',
                ' /l1:'logdir'\'client'.NSl1',
                ' /l2:'logdir'\'client'.NSl2',
                ' /r:'
x.6.rspdir  = resdir'\netscape\'
x.6.default = 'netscape.rsp'
```

Figure 77. LCU File Illustrating Netscape Navigator Installation

where the variable NSimg is defined as:

      NSimg = imgdir'\NETSCAPE\OS2\XR00404'

5.11.7.2 Netscape Navigator Sample Response File
The working response file used in our environment is shown in Figure 78 on page 166.

```
COMP = Netscape Communicator 4.04 for OS/2

FILE = D:\netscape

AUX1 = D:

DELETEBACKUP     = Yes
SAVEBACKUP       = No
CFGUPDATE        = Auto
OVERWRITE        = Yes

NSCONVERTBROWSER = Yes
NSCONVERTQL      = Yes
NSASSOCIATEHTML  = YES
```

Figure 78. Working Netscape Navigator Response File

5.11.8 Personally Safe 'n' Sound (PSnS)

Like many other products, Personally Safe 'n' Sound is installed by the
Feature Installer. The use of Feature Installer is described in detail in Section
5.7.4, "Introducing Feature Installer" on page 107.

PSNS Install Syntax

```
CLIFI /A:C /R2:PSNSCID.RSP /R:PSNS.RSP /B:C: /S:D:\PSNSTEMP
 /L1:CIDERR.LOG /L2:CIDHIST.LOG
```

For further information on the installation of PSnS, please refer to the on-line
documentation or the \CID\SERVER\PSNS directory on the OS/2 Warp Server for
e-business CD-ROM.

5.11.8.1 PSnS Installation LCU Command File Syntax
In our working example, the invocation of the PSnS installation, used by
Feature Installer as provided in our LCU client command file, is as follows:

```
x.PSnS       = 12
x.12.name    = 'Warp Server Backup/Restore 6.0'
x.12.statevar = 'CAS_' || x.12.name
x.12.instprog = 'CLIFI.EXE',
                ' /s:'PSNSimg,
                ' /a:C',
                ' /b:'bootdrive,
                ' /r:'PSNSimg'\PSNS.rsp',
                ' /f:'bootdrive'\OS2\INSTALL',
                ' /l1:'logdir'\'client'.PSnSerr',
                ' /l2:'logdir'\'client'.PSnSlog',
                ' /r2:'
x.12.rspdir  = resdir'\PSNS\'
x.12.default = 'PSNSdef.rsp'
```

Figure 79. Extract of LCU File Illustrating PSnS Installation Program Invocation

where the variable PSNSimg is defined as:

```
PSNSimg = imgdir'\PSNS\3009103'
```

5.11.8.2 PSnS Sample Response File
The working response file used in our environment is shown in Figure 80.

```
PSNS.InstDrive=D:
PSNS.InstDir=\PSNS

PSNS_GUI.Selection=1
PSNS_CAPI.Selection=1
PSNS_CLI.Selection=1
PSNS_RAPI.Selection=1
PSNS_ADSM.Selection=0
PSNS_DISK.Selection=1
PSNS_LAN.Selection=0
PSNS_OPTICAL.Selection=0
PSNS_PRM.Selection=0
PSNS_REMDRV.Selection=0
PSNS_TAPE.Selection=1
```

Figure 80. Working PSnS Response File

5.11.9 Remote Access Services (RAS) or PPP Server

Remote Access Services (also known as PPP Server) replaces the LAN Distance product. LAN Distance must be removed with the LDREMOVE command prior to installation of Remote Access Services.

It, therefore, takes three steps to migrate LAN Distance to the new Remote Access PPP server. First, LDREMOVE must be run to remove LAN Distance Connection Server before installing the RAS server.

Since LAN Distance Connection Server is deleted, please make a backup of your configuration files prior to installation. After installing the RAS Server, it can be configured using the previously saved configuration.

For further information on the configuration files to be saved and other preparation steps needed in this area, please refer to Section 3.10, "Remove LAN Distance" on page 55.

5.11.9.1 RAS Installation LCU Command File Syntax

In our working example, the invocation of the RAS installation as provided in our LCU client command file is as follows:

```
x.PPPsrv     = 9
x.9.name     = 'PPP server'
x.9.statevar = 'CAS_' || x.9.name
x.9.instprog = PPPimg'\lo510a1\install.exe',
' /r:'
x.9.rspdir   = resdir'\PPPsrv\'
x.9.default  = 'ld_svr.rsp'
```

Figure 81. Extract of LCU File Illustrating RAS Installation Program Invocation

where the variable PPPimg is defined as:

```
PPPimg = imgdir'\PPPSRV\XR09999'
```

5.11.9.2 RAS Sample Response File

The working response file used in our environment is shown in Figure 82.

```
Target = D:\
WorkStationType = SERVER
```

Figure 82. Working RAS Response File

5.11.10 Print Services Facility

PSF/2 allows you to print file formats that your printer typically does not support.

5.11.10.1 PSF/2 Installation LCU Command File Syntax

We needed to implement a two-stage installation of PSF/2. We implement these two steps in one command file called PSF2PREP.CMD, located in the \IBMINST directory of the OS/2 Warp Server for e-business CD-ROM. This procedure first copies the source files to a local drive. It then calls the INSTALL through the LCU batch procedure.

We found that if write access was not provided to the existing \PSF2\INSTALL
directory on the server, then the installation would fail.

In our working example, the invocation of the PSF/2 installation as provided
in our LCU client command file is as follows:

```
x.PSFprep    = 13
x.13.name    = 'IBM PSF/2 Prep'
x.13.statevar = 'CAS_' || x.13.name
x.13.instprog = cmddir'\PSF2prep.cmd',
                ' 'imgdir,
                ' 'psftgtpath
x.13.rspdir  = ''
x.13.default = ''
```

Figure 83. Extract of LCU File Illustrating PSF2PREP.CMD

where the variable psftgtpath is defined as:

        psftgtpath = 'D:'

The variable here is D: *in this case only.* This variable is set in the LCU batch
procedure and might be different depending on your environment.

```
x.PSF2       = 14
x.14.name    = 'IBM PSF/2'
x.14.statevar = 'CAS_' || x.14.name
x.14.instprog = psftgtpath'\PSF2\INSTALL\install.exe',
                ' /a:i',
                ' /x',
                ' /s:'PSF2img,
                ' /o:DRIVE',
                ' /p:"PSF/2 - Install SERVER"',
                ' /t:'psftgtpath,
                ' /L1:'logdir'\'client'.PSFl1',
                ' /L2:'logdir'\'client'.PSFl2',
                ' /L3:'logdir'\'client'.PSFl3',
                ' /r:'
x.14.rspdir  = resdir'\psf2\'
x.14.default = 'psf2srv.rsp'
```

Figure 84. Extract of LCU File Illustrating PSF/2 Installation Program

where the variable PSF2img is defined as:

        PSF2img = imgdir'\PSF2\XR09999'

5.11.10.2 PSF/2 Sample Response File
The working response file used in our environment is shown in Figure 85 on
page 170.

```
FILE=D:
AUX1=D:\PSF2\INSTAll
AUX2=D:
COMP=PSF/2 SERVER - BASE FILES
COMP=*          - RESOURCE LIBRARY
COMP=*          - PARALLEL ATTACHED DEVICES
COMP=*          - CODEDFONTS
COMP=*          - TCP/IP ATTACHED DEVICES
COMP=*          - TRANSFORMS
COMP=*          - 300 dpi COMPATABILITY FONTS
COMP=*          - POSTSCRIPT
CFGUPDATE=AUTO
OVERWRITE=NO
DELETEBACKUP=NO
SAVEBACKUP=NO
```

Figure 85. Working PSF/2 Response File

5.11.11 Netfinity Services

Netfinity Manager and Client Services are highly responsive hardware
management features that support key systems management tasks.

```
┌─Netfinity Services Syntax──────────────────────────────────────┐
│                                                                │
│ NETFINST.EXE /S:<source_drive> /L1:<error_log_file>            │
│ /L2:<history_log_file> /R:<response_file>                      │
│                                                                │
└────────────────────────────────────────────────────────────────┘
```

For further information on the installation of Netfinity Services, refer to the
separate Netfinity Services CD that came with the OS/2 Warp Server for
e-business package.

5.11.11.1 Netfinity Services Installation LCU Command File Syntax
In our working example, the invocation of the Netfinity Services installation as
provided in our LCU client command file is as follows:

```
x.NetFinity  = 23
x.23.name    = 'NetFinity 5.20.2 Passive Services'
x.23.statevar = 'CAS_' || x.23.name
x.23.instprog = NETFINimg'\services\netfinst.exe',
                        ' /s:'NETFINimg'\services',
                        ' /l1:'logdir'\'client'.NFll',
                        ' /l2:'logdir'\'client'.NFl2',
                        ' /r:'
x.23.rspdir  = resdir'\NETFIN\'
x.23.default = client'.rsp'
```

Figure 86. Extract of LCU File Illustrating Netfinity Services Installation

where the variable `NETFINimg` is defined as:

```
NETFINimg = imgdir'\NETFIN\ver5202\OS2'
```

5.11.11.2 Netfinity Services Sample Response File
The working response file used in our environment is shown in Figure 87.

```
Package = Passive
Options = RWC, WebManager
InstallTo = \NETFIN
ChangeConfig = TRUE
RouteNMVT = FALSE
Driver.TCPIP = 1
Driver.NETBIOS = 0
Driver.NETBIOS2 = 0
Driver.IPX = 0
Driver.SERIPC = 0
Driver.SNA_APPC = 0
;Parm1.NETBIOS = MACHINE1
;Parm1.NETBIOS2 = MACHINE2
;Parm1.SERIPC = MACHINE1
Keyword.1 = Server
;NetTimeout = 15
SystemName = SRV163
;ForceRemoteLogons = 1
;ServiceAlerts = 1
;ShowSupportProgram = 1
;ReqUserAuthToScreen = 1
;DisableDNSNameResolution = 1
```

Figure 87. Working Netfinity Services Response File

5.11.12 Lightweight Directory Access Protocol Client Toolkit

OS/2 Warp Server for e-business supports Lightweight Directory Access Protocol (LDAP), and the product contains a client toolkit that may be installed. It is installed using Feature Installer.

For further information on the LDAP client toolkit, please refer to the on-line documentation and the `\CID\SERVER\LDAP` directory on the OS/2 Warp Server for e-business CD-ROM.

5.11.12.1 LDAP Toolkit Installation LCU Command File Syntax
In our working example, the invocation of the LDAP Client Toolkit installation as provided in our LCU client command file is as follows:

```
x.LDAP       = 11
x.11.name    = 'LDAP Client Toolkit API 1.0'
x.11.statevar = 'CAS_' || x.11.name
x.11.instprog = 'CLIFI.EXE',
               ' /s:'LDAPimg,
               ' /a:C',
               ' /b:'bootdrive,
               ' /r:'LDAPimg'\LDAP.rsp',
               ' /f:'bootdrive'\OS2\INSTALL',
               ' /l1:'logdir'\'client'.LDAPerr',
               ' /l2:'logdir'\'client'.LDAPlog',
               ' /r2:'
x.11.rspdir  = resdir'\LDAP\'
x.11.default = 'LDAPdef.rsp'
```

Figure 88. Extract of LCU File Illustrating LDAP Toolkit Installation

where the variable LDAPimg is defined as:

    LDAPimg   = imgdir'\LDAP\IP01000'

5.11.12.2 LDAP Toolkit Sample Response File
The working response file used in our environment is shown in Figure 89.

```
LDAP.InstDrive=D:
LDAP.InstDir=\LDAPADT

LDAP_Tlkt_Feature.Selection=1
LDAP_Toolkit.Selection=1
LDAP_Examples.Selection=0
LDAP_Doc.Selection=0

JAVA_Support.Selection=1
JAVA_Doc.Selection=0
```

Figure 89. Working LDAP Toolkit Response File

5.11.13 Tivoli Management Agent (TMA)

TMA is a replacement for the SystemView agent. It is used for managing PC Servers and supports OS/2 using TCP/IP. It is installed using Software Installer.

For further detail on the installation of the Tivoli Management Agent, refer to the on-line documentation and the \CID\SERVER\LCFAGENT directory on the OS/2 Warp Server for e-business CD-ROM.

5.11.13.1 TMA Installation LCU Command File Syntax
In our working example, the invocation of the Tivoli Management Agent installation as provided in our LCU client command file is as follows:

```
x.LCFagent   = 8
x.8.name     = 'Tivoli Management Agent 4.0'
x.8.statevar = 'CAS_' || x.8.name
x.8.instprog = LCFimg'\install.exe',
                    ' /x',
                    ' /a:I',
                    ' /o:drive',
                    ' /l1:'logdir'\'client'.LCFl1',
                    ' /l2:'logdir'\'client'.LCFl2',
                    ' /r:'
x.8.rspdir   = resdir'\LCF\'
x.8.default  = 'lcfagent.rsp'
```

Figure 90. Extract of LCU File Illustrating TMA Installation Program Invocation

where the variable `LCFimg` is defined as:

>   LCFimg = imgdir'\LCFAGENT\XR09999'

5.11.13.2 TMA Sample Response File
The working response file used in our environment is shown in Figure 91.

```
FILE         = D:\TIVOLI\LCF
CFGUPDATE    = AUTO
OVERWRITE    = YES
SAVEBACKUP   = NO
DELETEBACKUP = NO
GPORT        = 9494
LPORT        = 9494
OPTIONS      =
```

Figure 91. Working TMA Response File

5.11.14 Lotus Domino Go Webserver

OS/2 Warp Server for e-business includes a fully functional trial version of
Lotus Domino Go Webserver. Lotus Domino Go Webserver is installed using
Software Installer.

For further information on the installation of Lotus Domino Go Webserver,
please refer to the on-line documentation on the separate CD-ROM that was
shipped with the OS/2 Warp Server for e-business package.

5.11.14.1 Go Webserver Installation LCU Command File Syntax
In our working example, the invocation of the Go Webserver installation as
provided in our LCU client command file is as follows:

```
x.LotusGO   = 21
x.21.name   = 'Lotus GO webserver 4.62.5'
x.21.statevar = 'CAS_' || x.21.name
x.21.instprog = GOimg'\install.exe',
                ' /x',
                ' /a:I',
                ' /o:drive',
                ' /l1:'logdir'\'client'.GOl1',
                ' /l2:'logdir'\'client'.GOl2',
                ' /r:'
x.21.rspdir  = resdir'\LotusGO\'
x.21.default = 'websrvr.rsp'
```

Figure 92. Extract of LCU File Illustrating Go Webserver Installation Program

where the variable `GOimg` is defined as:

> GOimg = imgdir'\LOTUSGO\4_62_05'

5.11.14.2 Go Webserver Sample Response File

The working response file used in our environment is shown in Figure 94.

```
    *-----------------------------------------------------*
    *   Secure Server Response file                       *
    *-----------------------------------------------------*
    COMP = Lotus Domino Go Webserver
    COMP = Security Files
    *COMP = Java Servlets
    COMP = Search engine for OS/2 Base
    COMP = Search engine: HTTP support
    COMP = Search engine: Coding Samples
    COMP = Installation and Maintenance

    *-----------------------------------------------------*
    *   Directories installed to...                       *
    *-----------------------------------------------------*
    FILE     = D:\WWW\Bin
    AUX1     = D:\WWW\DLL
    AUX2     = D:\WWW\Docs
    AUX3     = D:\WWW\CGI-BIN
    AUX4     = D:\WWW\HTML
    AUX5     = D:\WWW\Admin
    AUX6     = D:\WWW\Icons
    AUX7     = D:\WWW\Logs
    AUX8     = D:\WWW\LABELS
    AUX9     = D:\WWW\Servlets\Public
    AUX10    = D:\netq
    AUX11    = D:\netq\toolkit
```

Figure 93. Working Lotus Go Webserver Response File (Part 1 of 2)

```
          *----------------------------------------------------------------*
          *   Software installer variables...                             *
          *----------------------------------------------------------------*
          CFGUPDATE    = AUTO
          DELETEBACKUP = NO
          OVERWRITE    = YES
          SAVEBACKUP   = NO


          *----------------------------------------------------------------*
          *   Keywords used for installation defaults                     *
          *----------------------------------------------------------------*
          RESPONSE     = YES

          AUTOSTART    = YES
          KEEP_CNF     = NO
          KEEP_PICS    = YES
          HOST         = SRV163
          PORT         = 80
          KEYFILE      = keyfile.kyr
          SSLPORT      = 443
          ADMIN_ID     = adminID
          ADMIN_PWD    = adminPWD
          KEEP_ADMIN   = YES
          KEEP_SRVCNF  = YES
```

Figure 94. Working Lotus Go Webserver Response File (Part 2 of 2)

Note On Go Webserver Installation

There are some specific considerations when installing Go Webserver. A hostname must be specified for the installation to complete successfully. Second, an Admin_ID and Admin_PWD must be specified for the unattended CID installation. If you want to install the WebSphere Application Server, you must not install the component Java Servlets.

You will notice that our response file conforms to this advice even if the administration userid and password are not very creative.

5.11.15 WebSphere Application Server

WebSphere Application Server is a plug-in for Lotus Domino Go Webserver that adds Java support.

We found that the installation of WebSphere was not entirely CID-enabled. In order to achieve a successful unattended installation, we created a REXX command file WEBSPHER.CMD. This command file is shipped on the CD-ROM with this redbook.

```
┌─── WebSphere Installation Syntax ────────────────────────────────────┐
│                                                                       │
│ WEBSPHER.CMD /R:<script_file> /T:<target_path> /L:<log_file>          │
│ /S:<source_path> /VERBOSE                                             │
│                                                                       │
└───────────────────────────────────────────────────────────────────────┘
```

5.11.15.1 WebSphere Installation LCU Command File Syntax

In our working example, the invocation of the WebSphere installation as
provided in our LCU client command file is as follows:

```
x.WebSpher   = 22
x.22.name    = 'WebSphere Application Server 1.10'
x.22.statevar = 'CAS_' || x.22.name
x.22.instprog = cmddir'\webspher.cmd',
                    ' /VERBOSE',
                    ' /S:'WEBimg,
                    ' /L:'logdir'\'client'.WSlog',
                    ' /T:'bootdrive'\web\app\',
                    ' /R:'
x.22.rspdir  = resdir'\WEBSPHER\'
x.22.default = 'webspher.script'
```

Figure 95. Extract of LCU File Illustrating WebSphere Installation Program

where the variable WEBimg:

```
WEBimg = imgdir'\WEBSPHER\1_10'
```

5.11.15.2 WebSphere Sample Response File

The working response file used in our environment is shown in Figure 97.

```
        #Java Install script file
        #
        # general info
        programName=WebSphere Application Server
        programVersion=1.1
        componentName=
        componentVersion=
        #
        # components
        installCorba=true
        installGo=true
        installDoc=true

        installSamples=true
        installCore=true
        installSystem=true
        installCorbaDoc=true
        installServerPages=true
 #
```

Figure 96. Working WebSphere Response File (Part 1 of 2)

```
# installation parameters
scriptPlay=true
zipFileName=data.zip
logFileName=Inst
destinationDirectory={root}WebSphere\\AppServer\\
infoString=Install to directory {root}WebSphere\\AppServer\\\nFolder =
Application Server V1.0\n
#
# folder options
noFolder=false
folder=Application Server V1.0
#
# log options
log=
logToScreen=true
```

Figure 97. Working WebSphere Response File (Part 2 of 2)

5.11.16 OS/2 Warp Server Books

The on-line books (.INF files) can be installed on the server if required. The OS/2 Warp Server books were available with the previous version of OS/2 Warp Server. They are listed here due to their importance.

Since we assume that the majority of server administration in an Enterprise environment is conducted from an administrative client station, it is unnecessary to install this documentation on the server.

However, if they must be installed, this can be accomplished by a REXX script called `INSTBOOK.CMD`, located in the `\IBMINST` directory on the OS/2 Warp Server for e-business CD-ROM.

INSTBOOK Install Syntax

```
INSTBOOK /r:<rsp_file> /l1:<log_file> /s:<source_path> /t:<target_drive>
```

Note on Book Installation

At the time of writing, the installation program correctly copied the source files to the correct directory on the target, but the program reference objects were not created correctly.

An alternative to running the supplied installation program would be to install the books by copying the files to the target directory on the server from the `\CID\BOOKS` directory on the CD ROM and then running a REXX command file that executes some REXX SysCreateObject calls and creates icons on the desktop. The installation may have changed by the time the product is generally available.

5.11.16.1 BOOKS Installation LCU Command File Syntax

In our working example, the invocation of the Warp Server Books installation as provided in our LCU client command file is as follows:

```
x.books     = 24
x.24.name    = 'Warp Server Books'
x.24.statevar = 'CAS_' || x.24.name
x.24.instprog = cmddir'\INSTBOOK.CMD',
               ' /r:'resdir'\BOOKS\books.src',
               ' /l1:'logdir'\'client'.books',
               ' /s:'imgdir'\BOOKS\XR09999',
               ' /t:'bootdrive
x.24.rspdir   = ''
x.24.default  = ''
```

Figure 98. Extract of LCU File Illustrating Warp Server Books Installation

where variable `imgdir` has already been explained.

5.11.16.2 OS/2 Warp Server Books Sample Response File

The following response file installs all books that are shipped with OS/2 Warp Server for e-business. Each line represents one book with entries separated by semicolons.

The first entry in every line names the product the book belongs to. The second entry provides the object ID for the workplace shell. The third is the file name or icon to be used for the workplace shell object. The last entry gives a message number for the title.

Please do not change the lines - if you do not want to install a particular book, just remove the line from the response file.

```
          LANSERVER;<WSLS_BOOK>;folder;70;icon=lsbooks.ico
          LANSERVER;<WSLSA3A41>;A3A41M02.INF;71
          LANSERVER;<WSLSA3A61>;A3A61M02.INF;72
          LANSERVER;<WSLSA3A4G>;A3A4GM02.INF;73
          LANSERVER;<WSLSA3A62>;A3A62M02.INF;74
          LANSERVER;<WSLAS3A4F>;A3A4FM02.INF;75
          LANSERVER;<WSLSA3A4A>;A3A4AM02.INF;76
          LANSERVER;<WSLSA3A4I>;A3A4IM02.INF;77
          LANSERVER;<WSLSA3A4H>;A3A4HM02.INF;78
          LANSERVER;<WSLSA3A53>;A3A53M02.INF;79
          LANSERVER;<WSLSA3A83>;A3A83M02.INF;80
          LANSERVER;<WSLS40GlOS>;LS40GLOS.HLP;83
          MPTS;<WSLSA3V10>;A3V10M02.INF;82
          MPTS;<WSDHCPCLT>;DHCPCLNT.INF;81
          MPTS;<WSLSA3S12>;A3S12M02.INF;81
          LANDISTANCE;<WSLDCSA3T11>;A3T11MST.INF;84
          LANDISTANCE;<WSLDCSA3T12>;A3T12MST.INF;85
          KARAT;<WSUSVINF>;IKOO0MST.INF;86
          KARAT;<WSIFOR1>;I4DU2MST.INF;87
          PSF2;<WSJISCII>;JISCII.INF;91
          PSF2;<WSAINWNW>;NWMST.INF;88
          PSF2;<WSAINVW>;PSF2MST.INF;89
          PSNS;<WSPSNS_PSNSINF>;PSNS.INF;90
          NETWARE;<NVL_CLIENT>;NWBOOK.INF;61
          NETWARE;<NVL_UTILS>;NWUTIL.INF;62
```

Figure 99. Warp Server Books Working Response File

5.11.17 IFSDEL

IFSDEL removes the files installed by THINIFS.

IFSDEL Syntax

```
IFSDEL /T:<Target_Path> /TU:<ConfigSys_Path> /SD:<Optional>
```

For full details of the syntax for IFSDEL, refer to *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010 or *OS/2 Installation Techniques: The CID Guide,* SG24-4295.

5.11.17.1 IFSDEL LCU Command File Syntax

In our working example, the invocation of the IFSDEL command as provided in our LCU client command file is as follows:

```
x.ifsdel    = 20
x.20.name    = 'SRVIFS Delete'
x.20.statevar = ''
x.20.instprog = ciddir'\srvifs\ifsdel',
                ' /t:'bootdrive'\srvifsrq',
                ' /tu:'bootdrive
x.20.rspdir  = ''
x.20.default = ''
```

Figure 100. Extract of LCU File Illustrating IFSDEL Program Invocation

5.11.17.2 IFSDEL Sample Response File

There is no need for an IFSDEL response file.

5.11.18 CASDELET

CASDELET removes all traces of LCU from the system. It is executed after all products have been installed.

CASDELET Syntax

```
CASDELET /TU:<Boot_Drive> /PL:<Path_Values> /L1:<LogFile>
```

For full details of the syntax for CASDELET, refer to *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010 or *OS/2 Installation Techniques: The CID Guide,* SG24-4295.

5.11.18.1 CASDELET LCU Command File Syntax

In our working example, the invocation of the CASDELET as provided in our LCU client command file is as follows:

```
x.casdelet   = 19
x.19.name    = 'LAN CID Utility Delete'
x.19.statevar = ''
x.19.instprog = ciddir'\locinstu\casdelet',
                ' /pl:'dllpath,
                ' /tu:'bootdrive
x.19.rspdir  = ''
x.19.default = ''
```

Figure 101. Extract of LCU File Illustrating CASDELET Program Invocation

5.11.18.2 CASDELET Sample Response File

Just like IFSDEL, CASDELET requires no response file.

5.12 NVDM/2 and SWD Implementation

There are no significant differences between the LCU implementation and the NVDM/2 or SWD implementations for the installation or migration of OS/2 Warp Server for e-business.

Because SWD and NVDM/2 are very similar, we believe that our supplied LCU syntaxes can be adapted to Change File Profiles for these other distribution managers. We leave this exercise to the interested reader.

5.13 Unattended Product Uninstallation or Removal

OS/2 Warp Server for e-business does not support the response-file-based uninstallation of the base components. The uninstallation program, UNINSTAL.EXE, does not support the new keywords included in the OS/2 Warp Server for e-business response files, nor does it return the proper CID value return codes.

Chapter 6. Migrating Hardware

This chapter discusses the migration of an existing OS/2 LAN or Warp Server environment to new, or alternative system hardware. There are several reasons why this might be desirable, or even necessary, depending on your starting point.

Some common reasons are:

- Network resources must remain available and downtime minimized.
- Minimum hardware requirements of OS/2 Warp Server for e-business cannot be met with the existing hardware.
- Hardware is not Year 2000-compliant and must be replaced.
- Existing hardware has reached a capacity limit.
- Hardware is required with future growth capacity.
- Hardware is required to exploit the advantages of OS/2 Warp Server for e-business.
- Existing hardware is due for upgrade as part of a maintenance cycle.
- Additional hardware options are required.

In most cases it is necessary to migrate existing system configuration and data to a new hardware platform with the minimum of disruption.

6.1 Preparing the Hardware

The effort required to prepare new system hardware in advance of migration is dependent on the type, size, and complexity of that hardware. The preparation process includes gathering the right system hardware support diskettes, adapter device drivers, peripheral device drivers, and the hardware configuration itself.

Since the hardware configuration step is a necessary requirement with all new hardware and it is *not* specific to OS/2 Warp Server for e-business, it will not be discussed here.

6.2 Supported Hardware

Information on current supported hardware can be found on the World Wide Web at the following address:

`http://www.software.ibm.com/os/warp/support`

Additional device support is also available at the following address:

`http://service.software.ibm.com/os2ddpak/index.htm`

6.3 Recommended Hardware

This migration scenario relies on moving to alternative hardware. Part of the migration process, then, will involve deciding on what hardware to implement.

This decision can be influenced by many factors. It may differ depending on the environment for which the system is needed. For further assistance in determining the appropriate system hardware specification, please refer to Section 2.2, "Migration Decision Road Map" on page 18.

6.4 System Testing

Before integrating systems into a business environment, they should be thoroughly tested. As a guideline, we recommend that you complete the following steps:

1. Install OS/2 Warp Server for e-business on Test System

2. Complete Functional Verification Testing

3. Complete System Verification Testing

4. Develop a Migration Plan

5. Test Recovery Procedures

6. Test Migration Plan (if possible)

7. Implement Migration Plan

Further information on system testing is provided in Section 3.4, "Perform a Test Installation" on page 40.

After system testing has been completed to your satisfaction, the hardware is ready for deployment.

6.5 Backing Up Your System

There is no substitute for a comprehensive, reliable backup and recovery strategy. Without one, you are placing your business at risk. This is especially true during a migration.

Please refer to Section 3.8, "Back Up Your System" on page 44 for detail on what, and how much, you should backup. In summary, it is advisable that you have a number of backups in place before you proceed with the migration. Specifically, you should prepare the following:

• System Backup

• Data Backup

• Configuration Data

• Proven Recovery Procedures

6.6 Approaches to Migration

The following sections describe the different ways a server can be migrated. You should understand each type and decide which method you will use for your environment.

6.6.1 Introduction

The objective of a migration can be described in the following way. It is the movement of a server, or data/configuration which resides on that server,

from one server/level of software to another server or new level of software transparent to the users of the network.

In either case, the success of the migration can be assured if

- User and Group definitions are not affected.
- All data remains available to network users.
- All network resources remain available to network users.
- Users experience little or no loss of system availability.
- Administrators can use existing systems management routines.

After a migration, if any of the above conditions are not met, then the migration has not been completely successful.

Failure, in any way, can adversely impact users and is a common network administrator's nightmare. However, with careful planning and preparation, such failure can be eliminated, or at the very least, minimized so as to be trivial.

6.6.2 Migration Scenarios

This book discusses three distinct approaches for migration to OS/2 Warp Server for e-business. They can be summarized as follows.

6.6.2.1 CD ROM-Based, Panel-Driven Migration

The *panel-driven* scenario involves an attended installation over the existing environment through a CD-ROM (and three boot diskettes) at the server system. The hard disk is not formatted, and the existing system configuration is migrated in the process.

This installation scenario is described in detail in Chapter 4, "Panel-Driven Installation" on page 71.

6.6.2.2 CID-Based, Unattended Migration

This *CID-based* scenario involves either lightly attended or unattended installation of the product over the existing environment using CID procedures or software distribution tools, such as Netview Distribution Manager or Software Distribution. The hard disk is not formatted, and the existing system configuration is migrated in the process.

This installation scenario is described in detail in Chapter 5, "Unattended CID Migration" on page 97.

6.6.2.3 Pristine Installation with Migration

This last migration scenario involves a pristine installation of a new piece of system hardware (which can be on either a temporary or permanent basis) using either the panel-driven or unattended CID techniques subject to administrator preference.

This scenario can be employed whenever migration is required to different hardware, or the hard disk must be formatted.

After the initial new system installation, the existing system configuration must be migrated to the new system. Since the new system is normally set up from scratch, it is common for the hard disk to be partitioned and formatted.

The migration scenario to new hardware is discussed in the rest of this chapter.

6.6.3 Pros and Cons of Approaches

The CD-ROM and CID-based migrations invariably impact system availability. Typically, the servers that need to be migrated will be unavailable for the duration of the migration. That is to say, the server is likely to be unavailable for the duration of the installation, restoration of any data, and any last minute configuration that is required.

If problems are experienced during this process, down-time can increase further. Also, restoration of large data volumes takes a lot of time if some form of backup and restore is implemented.

CID-based techniques help to minimize system down time because no user interaction is necessary. Every user question is answered through response files. CD-ROM-based migrations take a lot longer especially if detailed configuration data needs to be reentered.

In each case, it is normal for the system administrator to perform the migration during off-peak hours, such as late at night or during the weekend.

In a high availability environment, it is not acceptable for servers to be off-line. Therefore, it becomes desirable to adopt some form of *swapping in* strategy that reduces the time that the server is off-line. However, if configuration or data must also be moved, this issue becomes more complex.

This chapter describes a tried and tested approach to migration that involves installation of a second system, the restoration of the first system's data and its configuration details to that second system, followed by a swapping in procedure.

This approach not only addresses the high availability environment, it can also be considered when moving from one system to new hardware, whatever your reasons for doing so. We recommend this approach as a method, which, in our opinion, is the best approach to migration for a number of reasons. These are:

- Downtime is minimized.
- The new system can be freshly (long) formatted.
- If anything goes wrong before the switchover time, the migration does not need to proceed. The main system is still active, and the administrator can go back and correct the migration problem.

6.7 The Migration

The following sections describe the various steps necessary to migrate a complete OS/2 LAN or Warp Server domain to OS/2 Warp Server for e-business. By example, each type of server (Domain Controller, Backup Domain Controller, File Server, and Print Server) is migrated to a system in turn.

Let us first describe the topology of our example test environment. All of the key server types (Domain Controller, Backup Domain Controller, File Server, and Print Server) are represented. We appreciate that customer environments can vary enormously; however, it was not possible to address every conceivable permutation. We feel that this methodology is adaptable according to your requirements, for example, for use in larger installations.

6.8 Description of the Example Domain

Domain D01 will be migrated. It is illustrated in Figure 102 on page 189. The simplicity of the configuration was selected for illustrative purposes.

The domain consists of the four servers. Server \\DC01 is the Primary Domain Controller (PDC). It is running OS/2 Warp Server, Version 4 and is used solely as a domain controller. No additional network resources are defined.

We understand that many environments double-up role and function. For example, some users' home directories can be implemented on the domain controller in order to avoid problems with DCDB replication and access controls (this is not a recommendation, but has resolved problems in some cases).

Server \\DC02 is the Backup Domain Controller (BDC). It is running OS/2 LAN Server, Version 4. Similar to the PDC, it provides a dedicated backup domain controller function only. No additional network resources are defined.
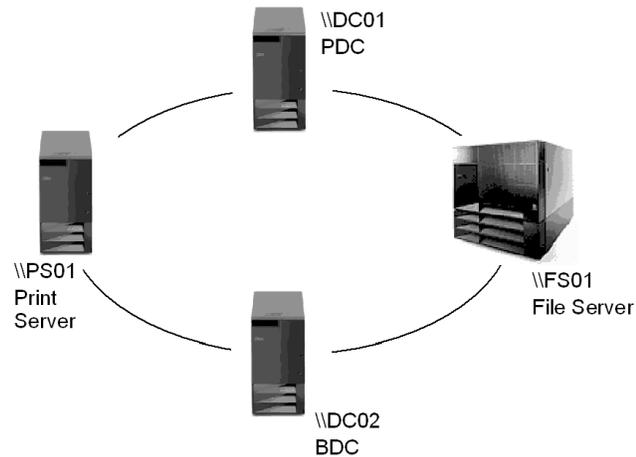

Figure 102. Topology of Example Domain D01

Server \\FS01 is the File Server. Similar to the PDC, it is running OS/2 Warp Server, Version 4. It acts purely as a file server. As such, it has 50GB of HPFS386 volume configured to use RAID Level 5. In addition, DASD limits have been implemented. All of the domain's file system shares and users' home directories are defined on this server.

Lastly, server \\PS01 is the Print Server. Similar to the BDC it is running OS/2 LAN Server, Version 4. It too provides a dedicated print server function. It has multiple ports defined with multiple queues and different types of printers attached.

The current corrective service (CSD) levels of the File and Print Sharing components are summarized in the table below.

> **Note**
>
> These software levels are provided for example only. They represent neither recommendations nor requirements for software levels when migrating to OS/2 Warp Server for e-business. If guidance is required in selecting pre-requisite fixpak CSD levels, please refer to Section 3.2, "Verify Fixpack Prerequisites" on page 39.

Table 18. Domain D01 - Server Software Levels

Server	OS/2 Version	OS/2 Corrective Service Level	OS/2 LAN Server Version	LAN Server CSD Level
\\DC01	v3.00	XR_W029	v5.00	IP_8267
\\DC02	v3.00	XR_W032	v4.00	IP_8235
\\FS01	v3.00	XR_W035	v5.00	IP_8260
\\PS01	v3.00	XR_W017	v4.00	IP_8235

This chapter steps through the process required to complete the migration to OS/2 Warp Server for e-business successfully. The result is a fully functional domain with all servers migrated.

> **Hardware Notice**
>
> This scenario requires an extra system for the migration. If, for reasons such as disk re-partitioning, it is necessary to perform such a migration in order to free up a given server, and a system is not available for this within your existing environment, consider temporarily borrowing a system from a dealer. After the migration, which for these kind of scenarios must take place in two parts, the loaned system can be returned.

6.9 Step 1: Installing the New Backup Domain Controller (BDC)

First, we must install a new backup domain controller (BDC) with OS/2 Warp Server for e-business. The installation itself is straightforward because the BDC (\\DC02) has no network resources defined.

If network resources had been defined on this server, then migration of these resources would also be necessary. With this alternative scenario comes greater complexity.

The following shows the steps needed to install the new backup domain controller.

6.9.1 Installing OS/2 Warp Server for e-business

Install OS/2 Warp Server for e-business on the new system hardware. The installation can be either a CD-ROM panel-driven attended installation or a CID-based unattended installation. Make sure that the new system is configured exactly the same as the original BDC, as it will later replace it (in this case, \\DC02). The new BDC server must be installed with the role set to BACKUP.
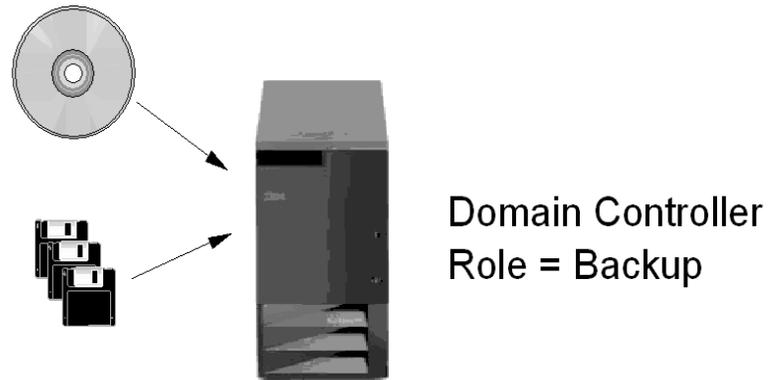

Figure 103. Installing the Backup Domain Controller

If the server is installed on the production network, do not allow any LAN Server services to start after installation.

This can be achieved by commenting out the `NET START SRV` statement in the `STARTUP.CMD` (add the letters `REM` and one space character before the aforementioned statement), or renaming `STARTUP.CMD` to another name. Or, you can rename the `STARTUP.CMD` file so it does not execute upon system startup.

For example:

```
REN STARTUP.CMD STARTUP.OLD
```

then press **Enter**.

Alternatively, the server can be installed on an isolated LAN segment. Make sure that the STARTUP.CMD file is renamed or changed as above prior to moving the system to the production LAN.

6.9.2 Adding the Backup Domain Controller to the Network

First, remove the existing BDC (\\DC02) from the network. This can be done in one of two ways. Either stop all of the LAN Server services or shut the system down completely.

You can stop the server by issuing the following command and following the prompts to stop the services:

```
NET STOP REQ /Y
```

then press **Enter**.

When the original BDC (\\DC02) has been removed from the network, the newly-installed BDC (also configured as \\DC02) can be attached to the network and started.
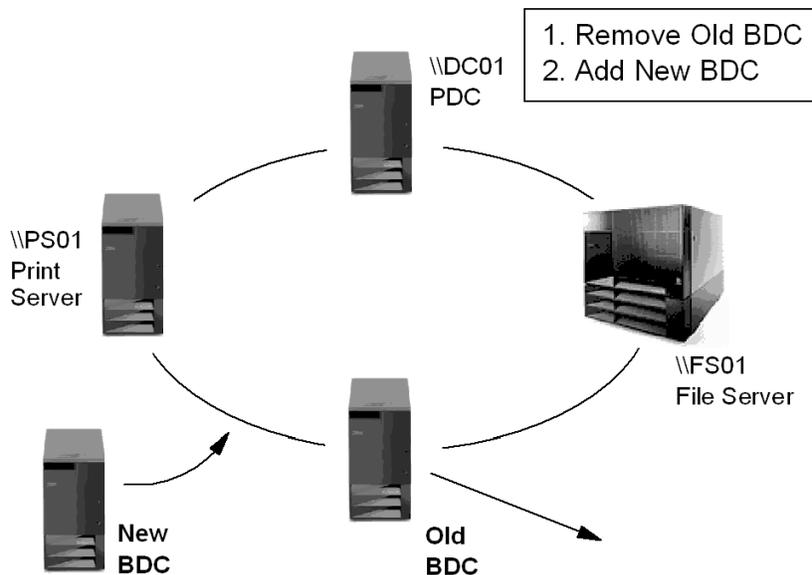
Figure 104. Attaching the Backup Domain Controller to the Network

If the system is already attached to the network, simply start the server by issuing the following command:

```
NET START SRV
```

then press **Enter**.

Now the freshly installed OS/2 Warp Server for e-business image of the BDC (\\DC02) has replaced the original BDC (\\DC02). The PDC (\\DC01) is currently unchanged and will, therefore, continue to handle any logon requests. Up until this point, it is unlikely that any users will have experienced any disruption to service.

6.9.3 Allowing DCDB Replication to Complete

With the new BDC (\\DC02) in place, the LAN Server DCDB (Domain Control Database) Replicator Service will start to replicate user and group information from the PDC to the BDC (the \IBMLAN\DCDB subdirectory tree). This enables the BDC to handle user logon requests whenever the domain controller is busy.
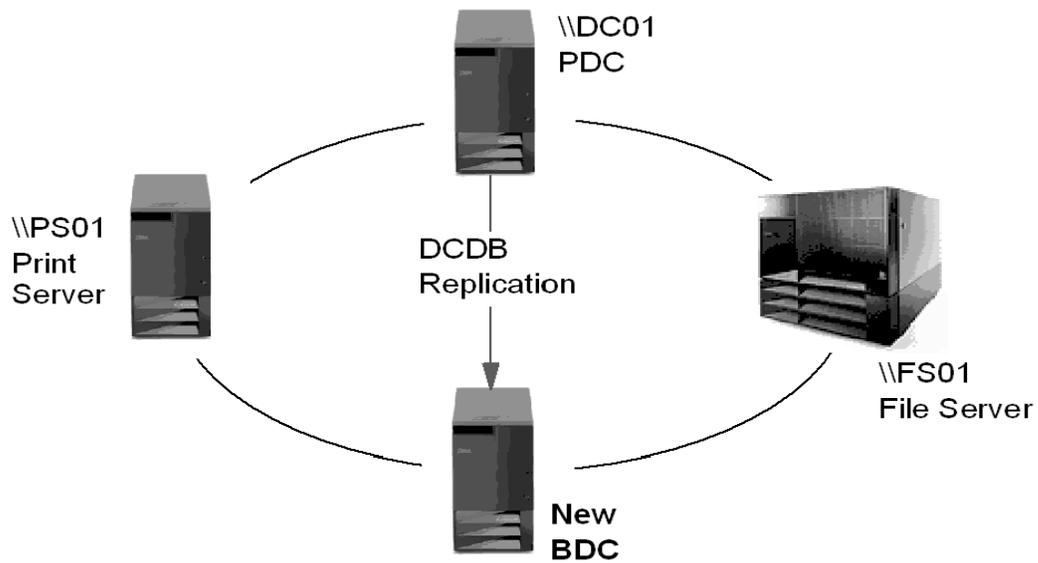
Figure 105. Domain Control Database (DCDB) Replication

Since server \\DC02 is already defined as a valid Machine ID as part of the group SERVERS as a server in the domain, no further action is needed.

Provided that the DCDBREPL service is started on both the PDC (\\DC01) and the BDC (\\DC02), then DCDB replication will start. The status of the replication can be verified by issuing the following command locally:

```
NET START
```

then press **Enter**

or by using the NET ADMIN command and issuing the following command (**Note:** that if expected results are not seen, both PDC and BDCs should be checked):

```
NET ADMIN \\DC01 /C NET START
```

then press **Enter**.

If the DCDBREPL service has started successfully, it will be displayed as
follows:

```
These services are started:
REQUESTER                  MESSENGER                  SERVER
NETLOGON                   LSSERVER                   DCDBREPL
The command completed successfully.
```

Figure 106. Using the NET START Command to Query Services

If the DCDBREPL service is not yet started, you must start it. You can do so
by issuing the following command locally or by pre-pending the `NET ADMIN`
syntax as above when issued from a remote system:

`NET START DCDBREPL`

then press **Enter**.

Occasionally, the DCDB replicator service will not function correctly. The
problem is usually seen on the BDC with it not receiving a copy of the master
user accounts database. If this happens, the problem must be resolved
before continuing. Please refer to Section 6.9.4, "Correcting DCDB
Replication Problems" on page 195 if you find that there are problems. There
are several procedures that can help you.

6.9.4 Correcting DCDB Replication Problems

If DCDB replication is not working properly, it could be due to one of the
following reasons:

1. A User is not logged on at the BDC.

2. The User logged on at the BDC does not have sufficient access rights.

3. The BDC is out of synchronization with the PDC.

The resolution for each of these situations is slightly different. In this section,
the resolutions are described in turn.

6.9.4.1 DCDBREPL Problem 1: User Not Logged On

The DCDBREPL Service uses a UserID on the BDC that effectively logs on to
the PDC in order to receive the updates to the master accounts database.
This is specified normally in the IBMLAN.INI file with the keywords:

```
Logon =
Password =
```

If no user is logged on to the BDC, this can cause problems with the DCDB replication service.

To overcome this problem, you can set up a userid if one has not already been set up. You can do this by adding the information about userid and the password to the IBMLAN.INI of the BDC and then adding a userid. In our example, you could do this logged on to a server in the domain as an administrator as follows:

```
NET ADMIN \\DC01 /C NET USER DCDBUSR /PASSWORDREQ:NO /PRIV:ADMIN
/WORKSTATION:DC02
```

then press **Enter**.

The /WORKSTATION parameter makes sure that this user only has access when logged on at DC02.

6.9.4.2 DCDBREPL Problem 2: User Lacks Access Rights

If the user defined lacks access rights, grant them. Otherwise, the replication will fail.

6.9.4.3 DCDBREPL Problem 3: NET3062 Errors

If a backup domain controller should fail while starting the server part with a NET3062 error, it is usually for one of two reasons.

- The machine is not defined in DCDB.

- The machine is out of sync with DCDB.

We will now describe the scenarios in more detail.

Machine Is Not Defined In DCDB

Using the name convention already discussed, the PDC is \\DC01, and the BDC is \\DC02. In order to solve these problems, you must log on as administrator and complete the following steps. On the BDC, type the command:

```
NET START SRV
```

then press **Enter**.

The following result is displayed:

```
The SERVER service is starting....
The SERVER service could not be started.
NET3062: The sub-service NETLOGON failed to start.
For more information, type HELP NET3062.
```

To find out what the problem is, we have to look into the error log of the machine by typing the following command on server \\DC02:

```
NET ERROR
```

then press **Enter**.

The following output is displayed:

```
Program Message Time
NETLOGON 3055 10-22-96 03:33pm
An error occurred. Refer to the help for the following message:
NET3084: The user accounts system is not configured correctly.
0C 0C ..
SERVER 3113 10-22-96 03:33pm
NET3113: Initialization failed because the requested NETLOGON service
could not be started.
The command completed successfully.
```

This means that this new server is not defined into the domain controller data base (DCDB). In order to solve this problem, we have to do the following steps. First, you need to log on as an administrator *to the domain* by typing the following command (which is not needed if you have already logged on):

```
LOGON ADMIN /P:PASSWORD /V:D
```

where `ADMIN` and `PASSWORD` are valid variables. Then you should add the backup domain controller to the database by typing the following commands at the keyboard of the primary domain controller:

```
NET ADMIN \\DC01 /C NET USER DC02 /PASSWORDREQ:NO
/USERCOMMENT:"Backup DC" /ADD
```

After that, issue the following command:

```
NET ADMIN \\DC01 /C NET GROUP SERVERS DC02 /ADD
```

Finally, log off and start the server with the following commands:

```
LOGOFF
NET START SRV
```

The following result should be displayed:

```
The SERVER service is starting....
The SERVER service was started successfully.
```

Server Password is Out of Sync with PC

The second scenario can also be solved. On server \\DC02, type the following command:

```
NET START SRV
```

The following result is displayed:

```
The SERVER service is starting....
The SERVER service could not be started.
NET3062: The sub-service NETLOGON failed to start.
For more information, type HELP NET3062.
```

In order to find out the cause of the problem, we have to look into the error log of the machine by typing the following command:

```
NET ERROR
```

The following result is displayed:

```
Program Message Time
NETLOGON 3210 10-22-96 03:59pm
NET3210: This server failed to authenticate with DC1,
the domain controller for domain WSDOMAIN.
05 00 ..
NETLOGON 3056 10-22-96 03:59pm
NET3056: A system error has occurred.
05 00 ..
SERVER 3113 10-22-96 03:59pm
NET3113: Initialization failed because the requested NETLOGON
service could not be started.
The command completed successfully.
```

The following process will resolve the problem. Copy these two files onto a diskette:

- PWDEXP.EXE
- PWDIMP.EXE

Go back to the console of \\DC02. Copy the two files from the diskette to the server and set the server role into standalone. Log on locally. Type the following commands:

```
COPY A:\PWDEXP.EXE X:\IBMLAN\NETPROG
```

where x: is the drive letter where you installed OS/2 LAN or Warp Server. Then issue the following commands:

```
NET ACCOUNTS /ROLE:STANDALONE
LOGON USERID /P:PASSWORD /V:L
```

If this the first attempt of the server to reach the PDC, the default user ID will be USERID and the default password will be PASSWORD. Otherwise, ADMIN and

PASSWORD will be valid variables (already) defined in your local database file, NET.ACC.

Extract the (encrypted) password from \\DC02 by typing the following command:

```
PWDEXP DC02
```

For example, a result like this could be displayed:

```
DC2:AAD3B435B51404EEAAD3B435B51404EE
```

Do it again and write the result to a file on diskette by typing the following command:

```
PWDEXP DC02 > A:\DC02.PWD
```

Log off from the local database of \\DC02 and perform a logon to the PDC \\DC01 by typing the following commands:

```
LOGOFF
LOGON ADMIN /P:PASSWORD /V:D
```

where ADMIN and PASSWORD are valid variables.

Get the saved file from the diskette and copy it to the PDC by typing the following command:

```
COPY A:\PWDIMP.EXE \\DC01\IBMLAN$\NETPROG
```

and type the following command to display the file:

```
TYPE A:DC02.PWD
```

For example, the result could be:

```
DC02:AAD3B435B51404EEAAD3B435B51404EE
```

Continue typing the following command:

```
NET ADMIN \\DC01 /C PWDIMP DC02:AAD3B435B51404EEAAD3B435B51404EE
```

It is better to use the clipboard function in order to copy the data. If you make a mistake in the number/letter combination, you will not be able to log on.

Change the server role to Member or Backup of your domain by typing the following commands:

```
NET ACCOUNTS /ROLE:BACKUP
LOGON USERID /P:PASSWORD /V:L
```

Finally, log off and start the server with the following command:

```
LOGOFF
NET START SRV
```

The following result should be displayed:

```
The SERVER service is starting....
The SERVER service was started successfully.
```

Solving the NET3062 Problem the Simple Way

Because there is a lot of room for error, and the process is tedious, we wrote a tool that basically performs the same function as has just been described. It is called RESYNCPW.EXE. We have included this tool on the CD-ROM accompanying this redbook.

When the DCDBREPL services have started successfully on both the PDC and the BDC, and when DCDB replication appears to be functioning correctly, we must verify that all data has been replicated. We do this in the following manner.

6.9.5 Verifying that DCDB Replication Was Successful

If the DCDB replication service is replicating correctly, a file called OK.RP$ can be found in each of the \IBMLAN\DCDB subdirectories. To check whether this is the case, issue the following command and press **Enter** to display output that should look like the following:

```
[D:>]DIR \\DC02\IBMLAN$\DCDB\*.RP$ /S /B

\\DC02\IBMLAN$\DCDB\APPS\OK.RP$
\\DC02\IBMLAN$\DCDB\Data\OK.RP$
\\DC02\IBMLAN$\DCDB\DEVICES\OK.RP$
\\DC02\IBMLAN$\DCDB\FILES\OK.RP$
\\DC02\IBMLAN$\DCDB\IMAGES\OK.RP$
\\DC02\IBMLAN$\DCDB\LISTS\OK.RP$
\\DC02\IBMLAN$\DCDB\PRINTERS\OK.RP$

The command completed successfully
```

Figure 107. Checking DCDB Replication Status by Looking for .RP$ Files

If the output displays any files called NO_SYNC.RP$, this means that the servers are communicating with each other, but that the DCDB replication service updates may not be current, for example, if additional time is needed to complete the replication.

Initially, this does not represent a problem. However, if OK.RP$ is still not displayed after some time, of course dependent on network traffic and the replication parameters in the IBMLAN.INI file, then the problem must be resolved.

If the output displays any files called NO_MASTER.RP$, then there is already a problem. The PDC and BDC are not communicating with one another for one of the following reasons.

- The server exporting the directory is not operating.
- Something is wrong with the replication setup.
- The exporter has stopped exporting this directory.

This situation must be corrected before progressing.

Please refer to Section 6.9.4.1, "DCDBREPL Problem 1: User Not Logged On" on page 195 through Section 6.9.4.3, "DCDBREPL Problem 3: NET3062 Errors" on page 196, or refer to the on-line documentation for further information on how to correct this condition.

When the file OK.RP$ exists in the DCDB subdirectories, this is still not a total guarantee that replication has completed. This simply means that the PDC and the BDC are communicating, and that the DCDB replicator service is functioning.

In a large domain, the replication process can take a long time to complete. This is, of course, dependent on network traffic, the size of the domain, and IBMLAN.INI replication parameters.

We wrote a procedure called LSC.CMD (LAN Server Check and Statistics) to help make sure that the DCDB replication has completed successfully. We have included this tool on the CD-ROM accompanying this redbook. LSC was written to query information about the DCDB directories and to check the status of the server services. This is important because the NETLOGON and DCDBREPL services must be running for DCDBREPL to work properly.

The syntax of LSC.CMD is
LSC {*} {ServerName} {/STAT}

where:

*	Looks at the LOCAL machine on which it is run.
ServerName	Represents the UNC name of the machine to be queried.
STAT	Performs a CHECK and provide statistics.

Figure 108 through Figure 110 illustrates the use of the utility. Key outputs are highlighted in bold.

```
    * LSC Version 2.34
    * Server Name: \\DC01
    *-----------------------------------------------
    * Get Accounts:
    *-----------------------------------------------
      Server Role: Primary server in the domain
      Domain controller for requester domain: \\DC01
    *-----------------------------------------------
    * Get Users:
    *-----------------------------------------------
      Number of users defined on \\DC01 : 60
    *-----------------------------------------------
    * Get services:
    *-----------------------------------------------
      REQUESTER MESSENGER SERVER NETLOGON LSSERVER
      DCDBREPL
    *-----------------------------------------------
    * Check DCDB Replicator:
    *-----------------------------------------------
    DCDB replicator running
      Checking DCDB tree:
      1 APPS      * -none-
      2 DEVICES   * -none-
```

Figure 108. LSC.CMD Output on Primary Domain Controller (Part 1 of 2)

```
      3 DATA      * -none-
      4 FILES     * -none-
      5 IMAGES    * -none-
      6 LISTS     * -none-
      7 PRINTERS  * -none-
      8 SCRIPTS   * -none-
      9 USERS     * -none-
         --> 36 directories
```

Figure 109. LSC.CMD Output on Primary Domain Controller (Part 2 of 2)

The following figure displays the output of \\DC02, a backup domain controller.

```
      * LSC Version 2.34
      * Server Name: \\DC02
      *----------------------------------------------
      * Get Accounts:
      *----------------------------------------------
        Server Role: Backup server in the domain
        Domain controller for requester domain: \\DC01
      *----------------------------------------------
      * Get Users:
      *----------------------------------------------
        Number of users defined on \\DC01 : 60
        Number of users replicated to \\DC02 : 60
      *----------------------------------------------
      * Get services:
      *----------------------------------------------
        REQUESTER MESSENGER SERVER NETLOGON LSSERVER
        DCDBREPL

      *----------------------------------------------
      * Check DCDB Replicator:
      *----------------------------------------------
        DCDB replicator running
        Checking DCDB tree:
        1 APPS          OK        12-09-98   20:54:58
        2 DEVICES       OK        12-09-98   20:54:58
        3 DATA          OK        12-09-98   20:54:58
        4 FILES         OK        12-09-98   20:54:58
        5 IMAGES        OK        12-09-98   20:54:58
        6 LISTS         OK        12-09-98   20:54:58
        7 PRINTERS      OK        12-09-98   20:54:58
        8 SCRIPTS       OK        12-09-98   20:54:58
        9 USERS         OK        12-09-98   20:54:58
          --> 36 directories
        Directories on \\DC01 --> 36
```

Figure 110. LSC.CMD Output on Backup Domain Controller

Another REXX tool, closely related to LSC, is called LSDCDB.CMD (Check Domain Controller Access Control Profiles). It can be used to check the DCDB directory structures on both the BDC and PDC to ensure that they match. We have included this tool on the CD-ROM accompanying this redbook.

To use the tool, run the command on both the PDC and BDC and simply inspect the output. Some patience may be required to wait until the replication has been completed. When the number of subdirectories in the PDC and BDC match, the replication is complete.

The syntax of LSDCDB.CMD is

LSCDCDB {DCName} {/FIX}

where:

DCName   Represents the UNC name of the PDC/BDC to be queried.

FIX   Is a request to fix damaged Access Control Profiles.

> ┌─── **Note** ───┐
>
> Only run LSDCDB /FIX on the Primary Domain Controller. Changes made on
> the PDC are replicated to the BDC. Therefore, it does not make sense to fix
> the BDC since errors that existed on the PDC will continue to be replicated
> during normal server operation re-introducing a problem.

Figure 111 on page 204 and Figure 112 on page 205 illustrate the output of
LSDCDB.

```
      * LSDCDB Version 3.09
      * Server Name: \\DC01
      * Role: Primary server in the domain
      * Getting all users from: \\DC01
      * Total users: 60
      * Getting SysFileTree from: \\DC01\ibmlan$\users
      * Total directories: 36
      ( 1/36) \\DC01\ibmlan$\dcdb\users\$SRV174
      ( 2/36) \\DC01\ibmlan$\dcdb\users\ALAINADM
      ( 3/36) \\DC01\ibmlan$\dcdb\users\CID
      ( 4/36) \\DC01\ibmlan$\dcdb\users\CID01
      ( 5/36) \\DC01\ibmlan$\dcdb\users\FRANKADM
      ( 6/36) \\DC01\ibmlan$\dcdb\users\JPADM
      ( 7/36) \\DC01\ibmlan$\dcdb\users\MAT
      ( 8/36) \\DC01\ibmlan$\dcdb\users\USER001
      ( 9/36) \\DC01\ibmlan$\dcdb\users\USER002
      (10/36) \\DC01\ibmlan$\dcdb\users\USER003
      (11/36) \\DC01\ibmlan$\dcdb\users\USER004
      (12/36) \\DC01\ibmlan$\dcdb\users\USER005
      (13/36) \\DC01\ibmlan$\dcdb\users\USER006
      (14/36) \\DC01\ibmlan$\dcdb\users\USER007
      (15/36) \\DC01\ibmlan$\dcdb\users\USER008
      (16/36) \\DC01\ibmlan$\dcdb\users\USER009
      (17/36) \\DC01\ibmlan$\dcdb\users\USER011
      (18/36) \\DC01\ibmlan$\dcdb\users\USER012
```

Figure 111. LSDCDB.CMD Output on Primary Domain Controller (Part 1 of 2)

```
        (19/36) \\DC01\ibmlan$\dcdb\users\USER013
        (20/36) \\DC01\ibmlan$\dcdb\users\USER014
        (21/36) \\DC01\ibmlan$\dcdb\users\USER015
        (22/36) \\DC01\ibmlan$\dcdb\users\USER016
        (23/36) \\DC01\ibmlan$\dcdb\users\USER017
        (24/36) \\DC01\ibmlan$\dcdb\users\USER018
        (25/36) \\DC01\ibmlan$\dcdb\users\USER019
        (26/36) \\DC01\ibmlan$\dcdb\users\USER020
        (27/36) \\DC01\ibmlan$\dcdb\users\USER021
        (28/36) \\DC01\ibmlan$\dcdb\users\USER022
        (29/36) \\DC01\ibmlan$\dcdb\users\USER023
        (30/36) \\DC01\ibmlan$\dcdb\users\USER024
        (31/36) \\DC01\ibmlan$\dcdb\users\USER025
        (32/36) \\DC01\ibmlan$\dcdb\users\USER026
        (33/36) \\DC01\ibmlan$\dcdb\users\USER027
        (34/36) \\DC01\ibmlan$\dcdb\users\USER028
        (35/36) \\DC01\ibmlan$\dcdb\users\USER029
        (36/36) \\DC01\ibmlan$\dcdb\users\USER030
```

Figure 112. LSDCDB.CMD Output on Primary Domain Controller (Part 2 of 2)

Figure 113 on page 205 represents the output of the Backup Domain
Controller in the process of DCDB replication.

```
        * LSDCDB Version 3.09
        * Server Name: \\DC02
        * Role: Backup server in the domain
        * Getting all users from: \\DC02
        * Total users: 60
        * Getting SysFileTree from: \\DC02\ibmlan$\users
        * Total directories: 13
        ( 1/13) \\DC02\ibmlan$\dcdb\users\$SRV174
        ( 2/13) \\DC02\ibmlan$\dcdb\users\ALAINADM
        ( 3/13) \\DC02\ibmlan$\dcdb\users\CID
        ( 4/13) \\DC02\ibmlan$\dcdb\users\CID01
        ( 5/13) \\DC02\ibmlan$\dcdb\users\FRANKADM
        ( 6/13) \\DC02\ibmlan$\dcdb\users\JPADM
        ( 7/13) \\DC02\ibmlan$\dcdb\users\MAT
        ( 8/13) \\DC02\ibmlan$\dcdb\users\USER001
        ( 9/13) \\DC02\ibmlan$\dcdb\users\USER002
        (10/13) \\DC02\ibmlan$\dcdb\users\USER003
        (11/13) \\DC02\ibmlan$\dcdb\users\USER004
        (12/13) \\DC02\ibmlan$\dcdb\users\USER005
        (13/13) \\DC02\ibmlan$\dcdb\users\USER006
```

Figure 113. LSDCDB.CMD Output on Backup Domain Controller

By looking at the two outputs in this example, we quickly see that only 13 of
the expected 36 directories were replicated when the commands were run.
When all 36 directories have been replicated, the process is complete.

One additional function of this tool that is extremely useful is that of checking
and correcting Access Control Profiles within the DCDB directory structure. It
would defeat the purpose of replicating a new DCDB definition to the new
system if that definition were not correct.

When LSDCDB is run, the existing access control profiles of each user's
directory in the DCDB are automatically compared against the default
RWXCDAP access controls for each user. Incorrect, additional, and missing
access controls found in these directories are highlighted.

Figure 114 on page 206 shows the actual problems (highlighted in bold for
clarity).

```
     * LSDCDB Version 3.09
     * Server Name: \\DC01
     * Role: Primary server in the domain
     * Getting all users from: \\DC01
     * Total users: 60
     * Getting SysFileTree from: \\DC01\ibmlan$\users
     * Total directories: 35
       ( 1/35) \\DC01\ibmlan$\dcdb\users\ALAINADM
       ( 2/35) \\DC01\ibmlan$\dcdb\users\CID
     ! Error: bad ACP
      CID:RWCXDA

       ( 3/35) \\DC01\ibmlan$\dcdb\users\FRANKADM
       ( 4/35) \\DC01\ibmlan$\dcdb\users\JPADM
       ( 5/35) \\DC01\ibmlan$\dcdb\users\MAT
       ( 6/35) \\DC01\ibmlan$\dcdb\users\USER001
       ( 7/35) \\DC01\ibmlan$\dcdb\users\USER002
       ( 8/35) \\DC01\ibmlan$\dcdb\users\USER003
       ( 9/35) \\DC01\ibmlan$\dcdb\users\USER004
       (10/35) \\DC01\ibmlan$\dcdb\users\USER005
     ! Error: multiple ACP
      USER005:RWCXDAP
      USER008:RX
       (11/35) \\DC01\ibmlan$\dcdb\users\USER006
       (12/35) \\DC01\ibmlan$\dcdb\users\USER007
       (13/35) \\DC01\ibmlan$\dcdb\users\USER008
       (14/35) \\DC01\ibmlan$\dcdb\users\USER009
       (15/35) \\DC01\ibmlan$\dcdb\users\USER010
     ! Error: no ACP
      (16/35) \\DC01\ibmlan$\dcdb\users\USER011
       (17/35) \\DC01\ibmlan$\dcdb\users\USER012
       (18/35) \\DC01\ibmlan$\dcdb\users\USER013
       (19/35) \\DC01\ibmlan$\dcdb\users\USER014
       (20/35) \\DC01\ibmlan$\dcdb\users\USER015
       (21/35) \\DC01\ibmlan$\dcdb\users\USER016
       (22/35) \\DC01\ibmlan$\dcdb\users\USER017
       (23/35) \\DC01\ibmlan$\dcdb\users\USER018
       (24/35) \\DC01\ibmlan$\dcdb\users\USER019
       (25/35) \\DC01\ibmlan$\dcdb\users\USER020
       (26/35) \\DC01\ibmlan$\dcdb\users\USER021
       (27/35) \\DC01\ibmlan$\dcdb\users\USER022
       (28/35) \\DC01\ibmlan$\dcdb\users\USER023
       (29/35) \\DC01\ibmlan$\dcdb\users\USER024
       (30/35) \\DC01\ibmlan$\dcdb\users\USER025
```

Figure 114. LSDCDB Output Illustrating ACP Problems (Part 1 of 2)

```
(31/35) \\DC01\ibmlan$\dcdb\users\USER026
(32/35) \\DC01\ibmlan$\dcdb\users\USER027
(33/35) \\DC01\ibmlan$\dcdb\users\USER028
(34/35) \\DC01\ibmlan$\dcdb\users\USER029
(35/35) \\DC01\ibmlan$\dcdb\users\USER030
```

Figure 115. LSDCDB Output Illustrating ACP Problems (Part 2 of 2)

After running the procedure with the /FIX parameter, a look in the log file lists the changes that were made, as shown in Figure 116.

```
03/12/98 21:16:57 Del ACL on \\DC01\ibmlan$\dcdb\users\CID 0
03/12/98 21:16:57 Adding ACL on: \\DC01\ibmlan$\dcdb\users\CID CID:RWCXDAP
03/12/98 21:16:57 Set ACL on \\DC01\ibmlan$\dcdb\users\CID CID:RWCXDAP
03/12/98 21:16:57 Del ACL on \\DC01\ibmlan$\dcdb\users\CID\BATCH 0
03/12/98 21:16:57 Adding ACL on: \\DC01\ibmlan$\dcdb\users\CID\BATCH CID:RWCXDAP
03/12/98 21:16:57 Set ACL on \\DC01\ibmlan$\dcdb\users\CID\BATCH CID:RWCXDAP
03/12/98 21:16:57 Del ACL on \\DC01\ibmlan$\dcdb\users\USER005 0
03/12/98 21:16:57 Adding ACL on: \\DC01\ibmlan$\dcdb\users\USER005 USER005:RWCXDAP
03/12/98 21:16:57 Set ACL on \\DC01\ibmlan$\dcdb\users\USER005 USER005:RWCXDAP
03/12/98 21:16:57 Del ACL on \\DC01\ibmlan$\dcdb\users\USER005\BATCH 0
03/12/98 21:16:57 Adding ACL on: \\DC01\ibmlan$\dcdb\users\USER005\BATCH
USER005:RWCXDAP
03/12/98 21:16:57 Set ACL on \\DC01\ibmlan$\dcdb\users\USER005\BATCH USER005:RWCXDAP
03/12/98 21:16:57 Del ACL on \\DC01\ibmlan$\dcdb\users\USER010 2222 Could not delete
Access profile
03/12/98 21:16:57 Adding ACL on: \\DC01\ibmlan$\dcdb\users\USER010 USER010:RWCXDAP
03/12/98 21:16:57 Set ACL on \\DC01\ibmlan$\dcdb\users\USER010 USER010:RWCXDAP
03/12/98 21:16:57 Del ACL on \\DC01\ibmlan$\dcdb\users\USER010\BATCH 0
03/12/98 21:16:57 Adding ACL on: \\DC01\ibmlan$\dcdb\users\USER010\BATCH
USER010:RWCXDAP
03/12/98 21:16:57 Set ACL on \\DC01\ibmlan$\dcdb\users\USER010\BATCH USER010:RWCXDAP
```

Figure 116. LSDCDB Log FIle Output

If changes are necessary to correct problems with the PDC, it is advisable to make them before proceeding to the next step. Repeat the appropriate procedures described in Section 6.9.3, "Allowing DCDB Replication to Complete" on page 193 and then to wait for a reasonable period of time for the replication to complete successfully.

When you are confident that the DCDB and access controls are OK, continue to the next step.

6.10 Step 2: Changing Server Roles

At this point, the PDC (\\DC01) is still at the original software level. However, the new BDC (\\DC02) has been migrated to OS/2 Warp Server for e-business.

The next step (shown in Figure 117) involves changing the LAN Server roles of both the PDC and BDC. Changing LAN Server roles is a straightforward matter. First, the PDC (\\DC01) should be demoted to either a Backup or Member server. Next, the BDC (\\DC02) should be promoted to Domain Controller. The changes should occur in that order. Typically, this will be done during off-peak hours.
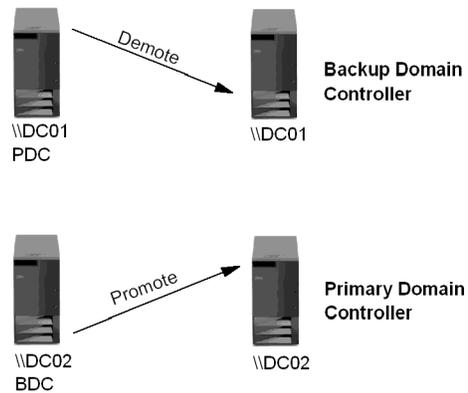
Figure 117. Changing Server Roles

It is very useful to have some simple command files prepared in advance of this task. It speeds up the role change and allows you to think about other things rather than having to remember the correct syntax to use.

The command files in Figure 118 and Figure 119 on page 209 illustrate the steps needed to change server roles in each direction. They will also run as simple batch programs.

6.10.1 Demoting the Primary Domain Controller

The command file BU.CMD, when run on the PDC, demotes it to a Backup DC. If you want to change the role to an Additional Server, then the `/ROLE` keyword should be changed to `MEMBER` rather than `BACKUP`. Everything else stays the same.

```
@ECHO OFF
NET STOP NETLOGON
NET STOP DCDBREPL
NET ACCOUNTS /ROLE:BACKUP
NET START DCDBREPL
NET START NETLOGON
```

Figure 118. BU.CMD - Demoting the Primary Domain Controller

The command file `PR.CMD`, when run on the BDC, promotes it to the role of
Primary DC.

```
@ECHO OFF
NET STOP NETLOGON
NET STOP DCDBREPL
NET ACCOUNTS /ROLE:PRIMARY
NET START DCDBREPL
NET START NETLOGON
```

Figure 119. PR.CMD - Promoting the Backup Domain Controller the Role of PDC

User Logon Considerations

It is *extremely* important that logon profiles (such as `PROFILE.CMD`,
`PROFILE.BAT` and other administrator-written logon scripts) do not contain
hard-coded paths pointing to directories on specific servers. If this is true,
then users will experience problems during logon.

For this reason, we recommend that, prior to migration, an audit of user
logon profiles and scripts is completed. This preparation can be of vital
help in avoiding unnecessary workload immediately following migration.

At this point, the PDC is now server \\DC02 installed with OS/2 Warp Server
for e-business. The old PDC (\\DC01) is now available for reinstallation.

6.10.2 Reinstalling the Old PDC

The complete installation process described above, starting in Section 6.9.1,
"Installing OS/2 Warp Server for e-business" on page 191, lends itself
perfectly to the pristine installation of \\DC01 with OS/2 Warp Server for
e-business.

After installation, the server can be re-introduced to the network as a backup domain controller as described in Section 6.9.2, "Adding the Backup Domain Controller to the Network" on page 192.

After that step, domain D01 will have a functioning PDC (\\DC02) and BDC (\\DC01), both installed with OS/2 Warp Server for e-business. When the two freshly installed servers are replicating the DCDB properly, the first phase of the domain migration is complete.

In the next phase, we turn our attention to the file server.

6.11 Step 3: Migrating the File Server

In our example domain D01 (shown in Figure 102 on page 189), the file server (\\FS01) has 50 GB of hard disk on a RAID-5 partition. It also has Disk Limits (also known as DASD Limits) applied. The data is critical to the business and availability is a top priority. It is essential to perform a migration that minimizes system outages.

Completing the following steps described in the following sections will migrate the file server.

6.11.1 Configuring Hardware

Invariably, some hardware set-up and configuration will be needed particularly where large RAID partitions are concerned. The configuration steps are not discussed in this redbook.

6.11.2 Install OS/2 Warp Server for e-business

First, install OS/2 Warp Server for e-business on the system that has been chosen to become the new file server. The installation itself is not of special importance since, at this stage, the server is not active on the network.

Follow the steps outlined in Section 6.9.1, "Installing OS/2 Warp Server for e-business" on page 191 to complete the installation. It can a be CD-ROM panel-based or CID-based installation. The most important thing is to make sure that the server is configured exactly the same as the existing file server \\FS01.

6.11.3 Save Access Controls

The access control profiles from the existing file server must be saved. This is so that, following migration and data restoration, they can be restored to the new system. If DASD Limits exist, save these too.

There are several ways to back up the access controls. They are described in detail in Section 3.13, "Backup Access Control Information" on page 60, as are the steps needed to back up DASD Limits (3.12, "Backup Directory Limits" on page 57).

Note

One issue of particular interest is that of drive lettering. The utilities BACKACC, RESTACC and PREPACL both record and use drive letter information in the backups that they save or restore.

If disk re-partitioning is planned during the migration, possibly resulting in data residing on drive letters other than those they started out on, restoration of access control information might be impaired.

If drive lettering is likely to be an issue, it is advisable to take one of two approaches.

1. Plan the migration so that the drive letters used are persistent through the migration; that is, if your data starts on F: make sure it ends on F:. That way, there are not likely to be any access problems.

2. Use utilities or REXX procedures during the migration to extract access control information independent of drive letter. By doing this, after installation and following the restoration of data, access controls can be reapplied regardless of the drive to which the data has moved.

   LAN Server Management Tools, an IBM-written as-is utility, can be employed to move access controls to a different drive. It does this by extracting the data to a flat ASCII file that can be manipulated and then reapplied to a drive. Please refer to Appendix B, "LAN Server Management Tools (LSMT)" on page 255 for further information about this.

6.11.4 Introducing the File Server to the Network

The next step is to attach the new file server to the live network and add the required data.

Note on Conflicts

Attaching a server with a duplicate configuration raises conflict issues. Conflicts can arise with duplicate IP addresses, MAC network adapter addresses, communications definitions, and NetBIOS names.

Since the server has been installed with exactly the same configuration (and hence, the same NetBIOS name COMPUTERNAME parameter) as the file

server that already exists on the network, starting the server in this state will lead to a NetBIOS name in conflict condition. A workaround is needed to prevent this condition.

Before the server is attached to the network and powered up, the STARTUP.CMD file should be renamed to prevent any server services starting. This procedure is outlined in Section 6.9.1, "Installing OS/2 Warp Server for e-business" on page 191.

The new system can be attached to the network and started with a different workstation name. Since the new name is not known to the domain controller, it must first be defined.

Decide on a unique new name for the server to be known as on the network when started. In this example, the replacement file server is called \\FS11. We add the server as a User ID in the domain, and then add this User ID to the group SERVERS. Logged on as an administrator, we remotely issue the following commands:

```
NET ADMIN \\DC02 /C NET USER FS11 /ADD /PASSWORDREQ:NO
```

then press **Enter**. Then,

```
NET ADMIN \\DC02 /C NET GROUP SERVERS FS11 /ADD
```

then press **Enter**.

The new domain controller is \\DC02.

Now, on the new file server, the LAN requester service can be started using the /CO: parameter as follows:

```
NET START REQ /CO:FS11
```

then press **Enter**

where FS11 represents the unique NetBIOS name by which the workstation is known on the network.

The server service can then be started on the file server.

```
NET START SERVER
```

then press **Enter**.

In this scenario, the new file server \\FS01 now exists under the name FS11 on the same network as the original file server (\\FS01) for the purposes of restoring data even though the entry in IBMLAN.INI states that it is FS01.
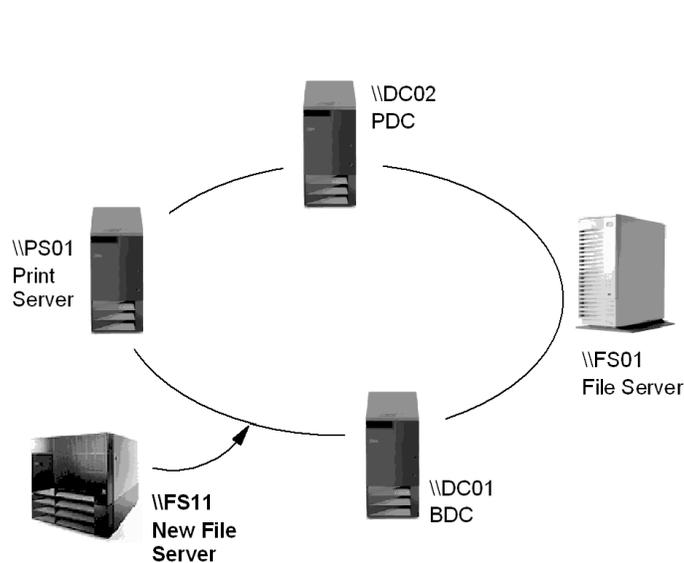
Figure 120. Introducing the File Server to the Network

Now that the server \\FS11 has been defined to the domain, it receives updates to the master User and Group accounts file, NET.ACC.

In a high volume, dynamic data environment, this approach helps to speed up the data restoration process. This is due to the fact that the new server can be installed and data restored while the original server is still running in production.

Once the new server \\FS11 is attached to the network, data can be copied to it from the existing file server. The decision on what method to employ to transfer this data rests with administrator performing the migration.

6.11.5 Transferring Data

The data transfer can be achieved in a number of ways. We discuss some of the possibilities in this section. When deciding which method to deploy to move the data, consideration should be given to convenience, the ease of implementation, and speed of data recovery. Business pressure will probably dictate what is required.
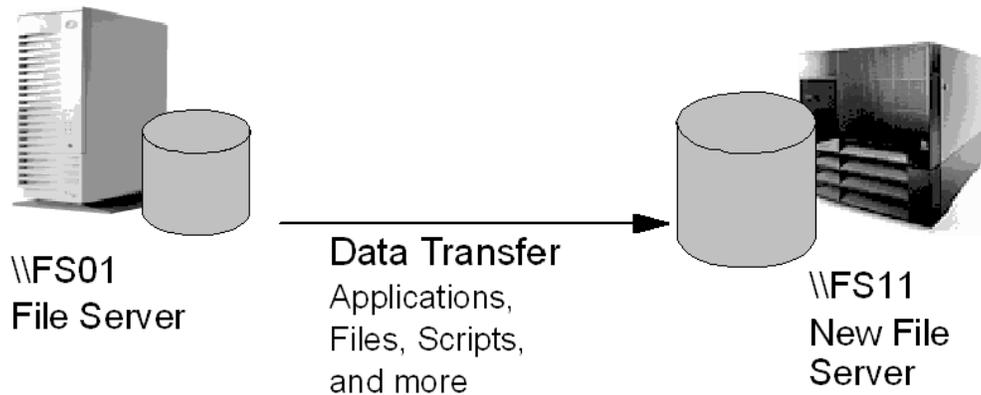
Figure 121. Transferring Data

6.11.5.1 XCOPY

XCOPY is supplied natively with OS/2 Warp Server for e-business. It is a functionally rich program. In situations where data is very dynamic, or there is a large volume of it, XCOPY can be a little slow.

In our experience, average data throughput over Token Ring using XCOPY is around 12 MB per minute. If an XCOPY process is interrupted, the command needs to be restarted. For large data volumes, it can take a long time to complete.

The syntax for XCOPY is

```
XCOPY [drive:][path] filename [drive:][path] filename [/D:date]
[/S][/E][/P][/V][/A or /M][/H][/T][/R][/O][/F]
```

where:

drive:\path\filename	Specifies the location of the file to copy.
drive:\path\filename	Specifies the target destination and file name.
D:date	Copies files changed on or after the specified date.
S	Copies non-empty directories and subdirectories.
E	When used with /S, includes empty directories.
P	Prompts you before performing a copy.

V	Verifies files copied to disk correctly.
A	Copies archived files only but does not turn off the attribute bit of the source file.
M	Copies archived files only and turns off the attribute bit of the source file.
H	Copies hidden files and attributes to the destination.
T	Copies system files and attributes to the destination.
R	Copies read-only files and attributes to the destination.
O	Specifies that any files in the destination can be overwritten by the copy operation.
F	Causes XCOPY to fail if the file to be copied contains extended attributes that are not supported by the destination file system.

XCOPY is a widely used, very reliable program. However, in a migration scenario, we have found quicker and more convenient programs that achieve the same result. These alternatives are CCP and WREPL, discussed in Section 6.11.5.6, "CCP Copy" on page 217 and Section 6.11.5.7, "WREPL" on page 218.

6.11.5.2 ADSTAR Distributed Storage Manager (ADSM)

The award-winning ADSM family of software products is a comprehensive, Enterprise-wide solution integrating unattended network backup and archive with storage management and powerful disaster recovery.

Using ADSM, we have found that the average throughput of data transfer over Token Ring is approximately 12 - 20 MB per minute (your ADSM environment will obviously vary). In a migration scenario, a full or incremental ADSM backup taken on the original system prior to migrating can be restored to the replacement system once that system is present on the network.

Where this approach differs from a straightforward xcopy is that the ADSM client code must be installed on the new system with any co-requisite software (such as TCP/IP or communications software) to facilitate the restoration.

It is also important to consider the identity of the systems on the network. While it is technically possible to force a restoration of data onto a system

other than that from which the data was originally backed up, there is an implication on how the new system must be known on the network.

If the restoration occurs while both systems are attached to the network, their identities should be unique in order to avoid TCP/IP or communications conflicts between the two systems.

If the restoration occurs when only one system is on the network (the new one), then a conflict does not occur.

We do not discuss ADSM in detail in this redbook. If you are already familiar with ADSM, you should consider how you can integrate it into your migration plan. If are not familiar with it, and you want to know more, refer to the redbook titled *Using ADSM to Back Up OS/2 LAN Server and Warp Server*, SG24-4682 or also look on the World Wide Web at the following address:

`http://www.storage.ibm.com/software/adsm/adsmhome.htm`

6.11.5.3 Personally Safe 'n' Sound

Available in OS/2 Warp Server, Version 4, PSnS has an excellent GUI interface for defining backup and restore procedures. PSnS, Version 6.01, included in OS/2 Warp Server for e-business, contains new function as described in Section 1.3.9, "Backup and Recovery Services" on page 13. Normally, when executing backup and restore, these functions are done with the same version of the backup and restore software. However, Version 6.01 was written specifically to support backup sets taken with previous versions of the software. This may or may not be true for other backup software packages.

6.11.5.4 Tapes and Other Backup Media

There are numerous tape backup systems on the market, and newer, removable backup media, such as optical drives and CD-ROMs, are becoming popular.

A backup taken before a migration can be restored after the migration provided OS/2 Warp Server for e-business supports the backup software. It will be necessary to install client backup software onto the new machine. This approach also assumes that the backup and restore program can handle restoring data onto a machine with a different NetBIOS name.

We recommend that before considering using your backup and restore application to transfer data, you should:

- Know, or get to know, your backup product

- Test a backup and restore scenario prior to the migration
- Take into consideration ALL of the issues (speed, convenience, flexibility, conflicts) when deciding on what method to use to transfer data

6.11.5.5 File Replication Service

OS/2 Warp Server File and Print Services is supplied with a service that is similar to the DCDB Replication Service and is simply called the Replication Service. With this service it is possible to define one server as an Exporter and one server as an Importer. It is then possible to define a set of directories to replicate from the Exporter to the Importer.

Full details on setting up the Replication service in OS/2 Warp Server for e-business are provided in the on-line documentation *Network Administrator Tasks*.

This approach is not recommended for restoring large quantities of data. There is less control over the data transfer than with copy programs. For this reason, details have been omitted, but the possibility is presented for completeness.

6.11.5.6 CCP Copy

CCP is a conditional copy program that copies files that match the source file specification(s), excluding those that also match the optional Xsource filename pattern(s), to the target directory. Source files are copied if they do not exist in the target directory or if they have a different time, date, or size in the target directory.

If for some reason a CCP copy is interrupted, it is much quicker to complete the copy of the remaining files with this program than with XCOPY because it is not necessary to start the copy over again.

We have included this tool on the CD-ROM accompanying this redbook.

The syntax for CCP is

CCP [-flags] source [! Xsource] targetdir

> where:

l	Copy source file only if missing or older than in target directory.
d	Create target directory if it doesn't already exist.
e	Ignore source files that don't exist in the target directory.
f	Force copy even if target file is read-only.

n	Don't copy, just list the names of the files that would have been copied.
s	Descend subdirectories and preserve them in the target directory.
t	Show the names of each target file name as well as each source file name.
x	List the names of files that are being excluded (or not copied).
S	Include system and hidden files.
source	Source directory.
xsource	(Optional) source directory that is being compared.
targetdir	Target drive for the copy.

In our experience, we found that CCP is among the quickest and most convenient methods for copying data based on its speed and flexibility. These features make it particularly useful in this migration scenario.

6.11.5.7 WREPL

WREPL is a replicator tool that conditionally copies data from one server to another including access controls. It can be used to synchronize data on two servers in either direction, exporter to importer or vice versa. We have included this tool on the CD-ROM accompanying this redbook.

The syntax for WREPL is

WREPL \\Server ServerPath LocalPath [SleepTime] [/R] [/D] [/L:logfile] [/Q]

where:

\\Server	The UNC name defining the *Exporting* server.
ServerPath	The fully qualified path on the *Exporting* server (F:\DATA).
LocalPath	The path on the Importing server from which the command is being issued.
SleepTime	If present, this is the sleep time interval (in minutes) between loops.
R	Specifies the copy occurs from the local machine to the to remote server.
D	Specifies that if files are not on the source are deleted on the target.
L	Specifies the log file to be used.

Q   Specifies quiet mode with no logging to the screen.

We found that an initial copy with CCP was very effective. On large data volumes, the data will have changed between the start and end of the copy process.

Following a successful transfer of initial data, initiating WREPL provides the final incremental copy of data that is new or changed since the original data transfer started. This ensures that all data is present on the new system prior to its being added to the network as a replacement, migrated system.

Our Approach

In our migration scenario, we initiated CPP to copy most of the data from the old to the new server. We found that this was very effective.

On large data volumes, the data will change *during* the time taken to complete the copy. To synchronize the data, we then used WREPL. This procedure worked well in this and other previously experienced migrations. With the two utilities, we quickly transferred our data.

Of course, there are negative effects to this approach that have to be weighed against the other methods of data restoration; namely, both servers are performing file I/O, and there is additional network traffic to contend with.

6.11.6 Restoring Access Controls

At this stage, two almost identical systems will exist on the network. The access controls must now be restored.

There are a number of utilities available to do this, as described in Section 3.13, "Backup Access Control Information" on page 60. To avoid problems, whatever utility was used to backup the access controls should be used to restore them.

RESTACC restores the permissions for 386HPFS volumes, the user accounts database, and the audit file stored with BACKACC.

The following example shows the use of RESTACC in restoring access control profiles and restoring ACL information stored in the DRIVE_D.ACL file:

RESTACC D:\ /F:C:\BACKUP\DRIVE_D.ACL /S

The full syntax follows:

```
RESTACC [drive:] pathname [[drive:]newname] [/F:[drive:]source]
[/L1:[drive:] [path] [filename]] [/S] [/V]
```

where:

`drive`	Specifies an optional drive letter.
`pathname`	Specifies the directory or file whose access control profiles are restored. If wild card characters are specified, `newname` cannot be specified.
`newname`	Specifies a new file or directory that is to receive the permissions for the file or directory associated with pathname. The existing permissions for `newname` (if any) are replaced with the restored permissions.
`F:source`	Uses source as the source of backed-up access control profiles. If source is not specified, the same naming convention is used to construct the source name as for the BACKACC utility.
`/L1:\pathname\filename`	Is an optional set of parameters that specifies where the LAN Configuration Installation Distribution Utility (LAN CID Utility) writes its log file. If absent, the logging output is written directly to the screen. See *Quick Beginnings: Installing OS/2 Warp Server for e-business*, SCT7-S2NA for more information on the LAN CID Utility.
`S`	Restores subdirectories. This switch is valid only if pathname is a directory and newname, if specified, is a directory.
`V`	Causes the names of the access control files to be displayed as they are restored by the `RESTACC` utility.

6.11.7 Starting the Replacement Server on the Network

The final step in the file server migration is to switch over the servers. The old server must be removed, and the new server started using the name \\FS01.

Stop the server and requester services on both \\FS01 and the new server (currently \\FS11).

```
NET STOP SRV
```

then press **Enter**.

```
NET STOP REQ
```

then press **Enter**.

The server service can then be started on the new file server with:

```
NET START SERVER
```

then press **Enter**.

The replacement server will then start as \\FS01, as defined in its IBMLAN.INI file. The old file then becomes available for reinstallation. The migration of the file server is now complete.

6.12 Step 4: Migrating the Print Server

Print servers often cause the most problems for system administrators. OS/2 INI files can be easily damaged if servers crash. Of course, most of the key information about printers is held in the OS/2 INI files. These INI files can become corrupted when new software is installed. Migration of a print server is, therefore, a potentially complex prospect.

However, there are many tools and utilities available to assist in the migration process. They help to smooth the migration and make it as painless as possible. With the tools, the time consuming, annoying task of having to reinstall the printer configuration from scratch is no longer a concern.

In this section, the discussion is limited to the migration of printer configuration from one server to another. Previous sections of this chapter have already discussed introducing a new system to the network and how data might be migrated.

By way of an overview, the steps required in migrating a print server can be described as follows:

1. Back Up Existing Printer Configuration

2. Install Printer Drivers onto New Server

3. Restore Printer Configuration onto New Server
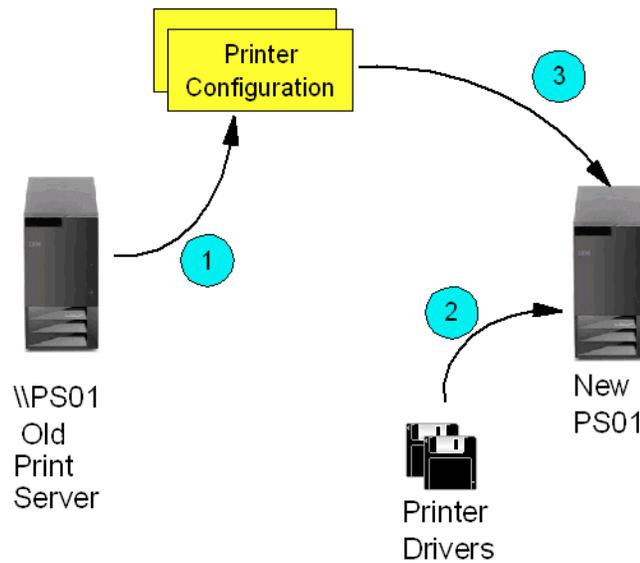
Figure 122. Print Server Migration Overview

We first introduce some of the tools that can be useful in backup and restoration of printer configurations. We then go on to discuss the migration of the print server in example domain D01.

6.12.1 BACKPRN

BACKPRN is a utility that can be used to backup printer and job properties to a file. This file can be used later for restoration by RESTPRN (see Section 6.12.2, "RESTPRN" on page 225) or RINSTPRN (the remote printer installation program - see Section 6.12.3, "RINSTPRN" on page 226).

A printer and job properties file consists of printer driver specific data, defined for a printer and a queue. The printer part describes hardware related information, such as which fonts are installed or which options are installed on the printer. The job properties consist of information about what paper to select, what resolution and orientation to use, and so on. So, printer properties belong to the printer, and job properties belong to a queue. These

two types of properties are closely related to each other; so, it makes sense to back them up together.

Invoking BACKPRN without any command line parameter will show the syntax of the program as well as the available printers, queues, and the printer drivers used by them.

The syntax for BACKPRN is
```
BACKPRN <printer-name>[.<queue-name>] <file-name>
```

where:

<table>
<tr><td><printer-name></td><td>This is the name of the printer to copy the printer properties from.</td></tr>
<tr><td><queue-name></td><td>(Optional) This is the name of the queue to copy the job properties from (if no queue is specified, the first defined for the printer is used).</td></tr>
<tr><td><file-name></td><td>This is the name of the property file.</td></tr>
</table>

For example:

```
BACKPRN PSCRIPT1.PSCRIPT1 pscript.pjp
```

The property file (extension .pjp) created with the BACKPRN contains the printer and job properties as well as information about the driver used. A real example follows.

Note

The following example does NOT relate to the Domain D01 example.

Executing the command without any parameters will display the output as shown in Figure 123 on page 224.

```
(0)D:\rinstprn>backprn

Backup Printer and Job Properties


Syntax:     BACKPRN [?] | <printer-name>[.<queue-name>] <output-file>

    <printer-name>   Name of the printer (mixed case required!!!)
    <queue-name>     Name of the queue (mixed case required!!!)
    <output-file>    Name of the file to write to

    BACKPRN [?]      Displays a list of available queues
    BACKPRN <printer-name>[.<queue-name>] <output-file>
                     Writes the properties to the file
                     if you don't specify a queue, the default one is taken

ITSC Boca Raton, Florida

Available Printers:


Printer         Queue           Device Driver
===============================================================
IBM4019         IBM4019         IBM4019.IBM 4019 LaserPrinter
HP5             HP5             LASERJET.HP LaserJet 5/5M
IBMNULL1        IBMNULL         IBMNULL
LEXMARK         LEXMARK         PSCRIPT.Lexmark Optra C
KYOCERA         KYOCERA         PSCRIPT.Kyocera FS-600 (KPDL-2)

(0)D:\rinstprn>_
```

Figure 123. BACKPRN Output

To continue the example, the command is executed again to save the properties of the IBM 4019 printer with the output as illustrated in Figure 124 on page 225.

Although there is a warning in this particular example, the backup completes successfully. The printer properties that cannot be found are printer driver specific settings (such as forms and tray information) that, in this case, have not been changed. We decided to include it in the example because the help on the utility is not extensive, and we wanted to show that the message was nothing to worry about.

```
(0)D:\rinstprn>backprn IBM4019.IBM4019 ibm4019.pjp
_____
Backup Printer and Job Properties
_____


Start of backing up printer and job properties

Printer [IBM4019] Queue [IBM4019] Driver [IBM4019.IBM 4019 LaserPrinter]
Warning: Can't find Printer properties information.
Backup to file ibm4019.pjp successfully finished.

(-1)D:\rinstprn>_
```

Figure 124. Using BACKPRN to Save Printer Properties

6.12.2 RESTPRN

Printer and job properties can be restored using the RESTPRN program. An invocation without specifying any parameter shows the command line syntax as well as a list of available printers, queues, and their printer drivers.

An invocation, specifying a property file and a question mark, shows the printer name, queue name, and the driver to which the properties stored in the file belong. An invocation with only the name of the property file uses the printer name and queue name stored in the file. If the printer and/or queue does not exist, they will be created by the program.

We have included this tool on the CD-ROM accompanying this redbook.

The syntax for RESTPRN is

RESTPRN <file-name> [<printer-name>[.<queue-name>]]

where:

<file-name>   This is the name of the property file.

<printer-name>   (Optional) This is the name of the printer to copy the printer properties to. If the printer doesn't exist, it will be created. If no printer is specified, the name stored in the property file is used.

<queue-name>   (Optional) This is the name of the queue to copy the job properties to. If the queue doesn't exist, it will be created. If no queue is specified, the name stored in the property file is used.

For example:

```
RESTPRN pscript.pjp PSCRIPT1.PSCRIPT1
```

> **Note on RESTPRN**
>
> Both *OS/2 Installation Techniques: The CID Guide*, SG24-4295 and *The OS/2 Warp 4 CID Software Distribution Guide,* SG24-2010 state that the target machine must be at the same level of OS/2 and NLS support as the backup machine. Clearly, this is not good for a migration scenario.
>
> We used BACKPRN on older versions of OS/2 and restored those properties using RESTPRN onto OS/2 Warp Server for e-business. We did not find any problems. However, as part of your migration testing procedure, you should confirm the results for your specific configurations.

6.12.3 RINSTPRN

The Remote Multiple Printer Installation program (RINSTPRN) for OS/2 was written at the ITSO, Boca Raton, Florida. Its main purpose is to install printers at the time of initial OS/2 installation.

In the context of migrating hardware, this utility can be used as part of the remote CID-based installation prior to implementing the new print server. The utility is not needed in an attended installation. Following installation of the appropriate printer drivers, the system's printer configuration can be restored using RESTPRN.

> **Note**
>
> RINSTPRN was written to run on OS/2 V2.1, OS/2 V2.11, and OS/2 Warp V3. However, it has been widely used in the CID install community for remote printer installation. The utility is supplied by IBM on an as-is basis.
>
> We tested the utility on OS/2 Warp Server for e-business for migration purposes and did not encounter any problems with it. However, we do recommend that you test it prior to implementation. We have included this tool on the CD-ROM accompanying this redbook.

The application makes it possible to install multiple printers and queues using a response file instead of going through many dialogs. It performs the installation of printers, queues, and ports including communication ports. This application also gives the administrator the ability to make final adjustments including print driver-specific information, such as job and printer properties, fonts, options, and so on during the automated process. Finally, it also allows the definition of network queues and the definition of WIN-OS/2 printers.

The program reads a response file, interprets it, and looks for consistency between the defined queues, printers, and other values. After finishing this step, it installs the printers, drivers, and queues. All actions are logged into a log file for administrative purposes.

This program makes it possible to administer complex printer and queue configurations without the administrator being at the installation location.

Note on Print Driver Levels

Printer drivers that are already installed will automatically be replaced by the program. If your printers are using a driver other than that shipped with OS/2 Warp Server for e-business, then adequate procedures are needed to make sure that the end configuration is as it should be. This, again, supports the requirement to do sufficient testing.

The Remote Printer Installation Program is discussed in detail in the ITSO redbooks *OS/2 Installation Techniques: The CID Guide*, SG24-4295 and *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010. There is an associated utility, RMPI_CFG.EXE, a response file generator, which is not discussed here.

Since this chapter deals only with migration of existing printer configurations, we discuss what is required to achieve this. If you want further detail on any of these utilities, please refer to the redbooks referenced above.

RINSTPRN has a number of optional keywords that can be used on the command line.

The syntax for RINSTPRN is

RINSTPRN /DSC /DRV /L1 /R /S /T /WPR /WDR /WT

where the following keywords are described:

DSC   This keyword defines the name of the printer description
                     list. A partially or fully qualified OS/2 path name, including
                     a drive letter, can be used.The PRDESC.LST file changes
                     with every release. A proper printer install can only take
                     place if the PRDESC.LST matches the driver install diskettes.
                     The default is PRDRV.LST in the working directory.

                     For example:

                     RINSTPRN /DSC:X:\IMG\OS2\PMDD_1\PRDESC.LST

DRV	This keyword defines the name of the printer driver list. A partially or fully qualified OS/2 path name, including a drive letter, can be used. The `PRDRV.LST` changes with every release. A proper printer install can only take place if the `PRDRV.LST` matches the driver install diskettes. The default is `PRDRV.LST` in the working directory.

For example:

```
RINSTPRN /DRV:X:\IMG\OS2\PMDD_1\PRDRV.LST
```

L1	This keyword defines the location of the log file into which the `RINSTPRN` program logs its response file analysis, activities, and execution results. A partially or fully qualified OS/2 path name, including a drive letter, can be used. The default is `RINSTPRN.LOG` in the working directory.

For example:

```
RINSTPRN /L1:C:\RINSTPRN.LOG
```

R	This keyword defines the location of the printer install response file. A partially or fully qualified valid OS/2 path name, including a drive letter, can be used. The default is `PRINTER.RSP` in the working directory.

For example:

```
RINSTPRN /R:X:\RSP\OS2\PRINTER.RSP
```

S	This keyword defines the source drive and directory where the drivers and fonts to be installed are located. A fully qualified path name with a drive letter can be used. If the drive is A or B, the program asks for the printer driver diskettes on A: or B:. On any other drive (C to Z), the program looks for subdirectories called PMDD_1 to PMDD_n (depending on how many disks are mentioned in column two of the `PRDRV.LST`) in the specified directory. This drive can also be a redirected drive. The default is `A:`.

For example:

```
RINSTPRN /S:A:
```

T	This keyword defines the target drive where the OS/2 system is installed. Either just the drive letter or the drive letter with a colon can be specified. Use this keyword if OS/2 has been installed to a logical partition rather than a primary partition. The default is `C`.

For example:

```
RINSTPRN /T:D
```

`WPR`	This keyword defines the name of the WIN-OS/2 printer setup file. A partially or fully qualified OS/2 path name, including a drive letter, can be used. Important: This keyword is OS/2 version dependent. The default value for this parameter is `CONTROL.INF`. This file resides in the `\OS2\MDOS\WINOS2\SYSTEM` subdirectory after an installation of OS/2 and may change with every release. This parameter is only used if an installation of WIN-OS/2 printers is requested in the response file. The default is `CONTROL.INF` in the working directory.

For example:

```
RINSTPRN /WPR:X:\EXE\CONTROL.INF
```

`WDR`	This keyword defines the name of the map file between OS/2 and WIN-OS/2 device drivers. A partially or fully qualified OS/2 path name, including a drive letter, can be used. Note: If the drive letters A: or B: are used, make sure a diskette containing the specified file is inserted in the drive before starting the program.The default value for this parameter is `DRVMAP.INF`. This file resides in the `\OS2\MDOS\WINOS2\SYSTEM` subdirectory after an installation of OS/2 and may change with every release. This parameter is only used if the WIN-OS/2 printer installation to an OS/2 printer is requested in the response file. The default is `DRVMAP.INF` in the working directory.

For example:

```
RINSTPRN /WDR:X:\EXE\DRVMAP.INF
```

`WT`	This keyword defines the target drive where WIN-OS/2 is installed. Either just the drive letter or the drive letter with a colon can be specified. Use this keyword if WIN-OS/2 has been installed to a logical partition rather than a primary partition. The default is `C`.

For example:

```
RINSTPRN /WT:D
```

The following complete example looks for a printer response file on redirected drive `Z:` with the name `PRINTER.RSP`. The `PRDRV.LST` is located on redirected drive `Z:` in the root subdirectory `\PMDD_1`. The `PRDESC.LST` is located on redirected drive `Z:` in the root subdirectory `\PMDD_1`. The WIN-OS/2 printer setup file is located in the `Z:` directory and has the name `CONTROL.INF`. The

WIN-OS/2 driver map file is located in the `Z:` directory and has the name `DRVMAP.INF`. The `USERnnnn.LOG` file will be written to the redirected drive `Z:`, thereby, gathering the install information on the server. OS/2 and WIN-OS/2 are installed on drive `D:`. The following example is valid for installation on OS/2 V2.1 and OS/2 Warp V3 since we specify the `CONTROL.INF` file for the `/WPR` keyword.

```
RINSTPRN /R:Z:\PRINTER.RSP /DRV:Z:\PMDD_1\PRDRV.LST
/DSC:Z:\PMDD_1\PRDESC.LST /L1:Z:\USERnnnn.LOG /S:Z: /T:D
/WPR:Z:\CONTROL.INF /WDR:Z:\DRVMAP.INF /WT:D
```

Note

We strongly believe that many customer installations use only `IBMNULL` on the server, thus, allowing the client workstations to format the print jobs. Therefore, this complex example is rather unrealistic even though it shows what *can* be done with this tool.

We have included this tool on the CD-ROM accompanying this redbook.

6.12.4 CHGQUE

The `CHGQUE` utility can be used to hold or release any printer queue from the command line. An invocation without specifying any parameters shows the command line syntax as well as a list of available printers, queues and their printer drivers. An invocation specifying a queue name shows the actual status of the queue (`Hold` or `Release`).

The syntax for CHGQUE is

```
CHGQUE <queue-name> [/H[OLD]] [/R[ELEASE]]
```

where:

`<queue-name>`	This is the name of the queue whose status will be displayed or changed.
`/H[OLD]`	Holds the queue.
`/R[ELEASE]`	Releases the queue.

For example:

```
CHGQUE PSCRIPT1 /H
```

`CHGQUE` is a very useful utility for holding queues prior to, or during, migration and the execution of REXX procedures. It can then release queues on demand. It helps to prevent the loss of print jobs.

We have included this tool on the CD-ROM accompanying this redbook.

6.12.5 QPRINT

QPRINT is a REXX procedure that can be used to query printer and queue settings and then create a response file from them. The generated response file can be used in conjunction with RPRN2.CMD (see Section 6.12.7, "RPRN2.CMD" on page 233) to recreate printers at a later stage in the migration.

Figure 125 shows the command being used on the local machine SRV162 to generate a response file by piping the output to file.

```
(0)D:\rinstprn>qprint
* QPRINT Version 1.11
*
* Usage: QPRINT {*} {ServerName}
*
* Sample: QPRINT \\BEDDC2
*

(5632)D:\rinstprn>qprint * > srv162.rsp

(-512)D:\rinstprn>_
```

Figure 125. Using QPRINT.CMD to Generate a Printer Response File

Figure 126 on page 232 shows the resulting response file itself.

> **Tip**
>
> Printers are often created on the OS/2 Workplace Shell Desktop (Object ID WP_DESKTOP). In this REXX procedure, the printers are created in the folder WP_PRINTERSFOLDER. In our experience, this reduces OS/2 INI file-related printing problems.

```
* QPRINT Version 1.11
* Server Name: \\SRV162
* Getting all queues on \\SRV162

COL;TITLE     ;LOCATION           ;OBJECTID        ;QUEUENAME ;PORTNAME ;PRINTDRIVER                      ;SEPARATORFILE

   ;IBM4019  ;<WP_PRINTERSFOLDER>;<WPPO_IBM4019> ;IBM4019   ;LPT2     ;IBM4019.IBM 4019 LaserPrinter    ;

   ;HP5      ;<WP_PRINTERSFOLDER>;<WPPO_HP5>     ;HP5       ;LPT3     ;LASERJET.HP LaserJet 5/5M        ;

   ;IBMNULL  ;<WP_PRINTERSFOLDER>;<WPPO_IBMNULL> ;IBMNULL   ;LPT4     ;IBMNULL                          ;

   ;LEXMARK  ;<WP_PRINTERSFOLDER>;<WPPO_LEXMARK> ;LEXMARK   ;LPT5     ;PSCRIPT.Lexmark Optra C          ;

   ;KYOCERA  ;<WP_PRINTERSFOLDER>;<WPPO_KYOCERA> ;KYOCERA   ;LPT6     ;PSCRIPT.Kyocera FS-600 (KPDL-2)  ;
```

Figure 126. Printer Response File Generated by QPRINT.CMD

We have included this tool on the CD-ROM accompanying this redbook.

6.12.6 ITSC Print Manager/2

The ITSC Printer Manager/2 utility manages printers on local and remote network systems. It can display, hold, and release queues and jobs and change printer assignments.

Although it is not used specifically in the migration process itself, it is a useful tool that can be employed to obtain information on the print servers that have to be updated. This tool was first supplied in a queue publication titled *OS/2 2.11 Power Techniques*, ISBN 1-56529-286-3. We have included this tool on the CD-ROM accompanying this redbook.
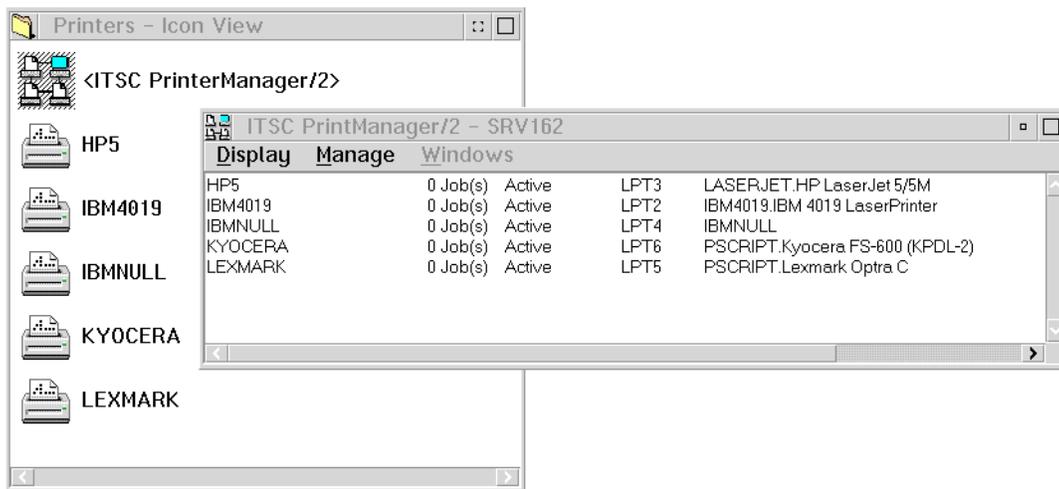
Figure 127. Managing Printers with ITSC Print Manager/2

Of course, let us not forget that some of this function is also provided with OS/2's spooler as illustrated in Figure 128.
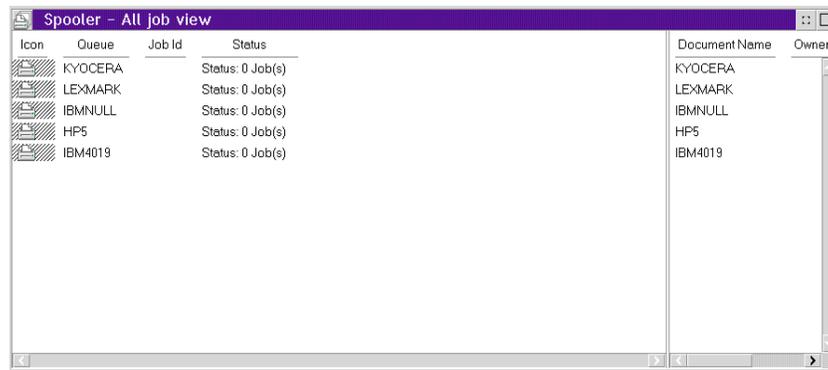
Figure 128. OS/2 Spooler - All Jobs View

6.12.7 RPRN2.CMD

`RPRN2` is a REXX procedure that can be used to create printer definitions. It requires input from a response file created by `QPRINT.CMD`. It uses the utilities `RINSTPRN` and `CHGQUE` to install new printers and to hold the queues.

The syntax for RPRN2.CMD is

`RPRN2 /L:LogFile /R:ResponseFile /S:SourcePath`

where:

`L`	Indicates that a log file will be generated.
`LogFile`	This is the fully qualified path to the generated log file.
`R`	Indicates that a response file is needed.
`ResponseFile`	This is the fully qualified path to the response file.
`S`	This indicates that a path is needed to OS/2 source images.
`SourcePath`	This is the fully qualified path to the OS/2 images.

We have included this tool on the CD-ROM accompanying this redbook.

> **Note**
>
> The utility requires RINSTPRN.EXE and CHGQUE.EXE to be in the \OS2 directory of the boot drive.

Figure 129 shows the screen output following the execution of RPRN2. The response file supplied in this example contains only one printer definition for clarity. However, we tested it in multiple printer scenarios, and it has tested successfully.

The utility first queries the OS/2 INI file and checks (according to the response file supplied) whether the appropriate printer drivers are installed or not. If they are not, the installation is performed using RINSTPRN. The queues are then put into hold status by CHGQUE, which prevents any jobs that might get sent to them during the procedure from being printed.

Limitation

RPRN2 will not restore specific printer properties, such as forms and tray settings. If special settings are required, we recommend using RPRN2 followed by the use of the RESTPRN to restore these properties. Since the queues are already on hold, this is a simple procedure to execute.

RPRN2 screen output is shown in Figure 129.

```
(0)[D:\rinstprn]z:\cmd\rprn2 /l:d:\rinstprn\rprn2.log /r:d:\rinstprn\rprn2.rsp /s:z:\img\os2\xr09999
* RPRN2 Parameters *

 Log File ...... = D:\RINSTPRN\RPRN2.LOG
 Response File . = D:\RINSTPRN\RPRN2.RSP
 Source Path ... = Z:\IMG\OS2\XR09999

* Check for D:\RINSTPRN\RPRN2.RSP * OK
* Check for D:\OS2\RINSTPRN.EXE * OK
* Check for D:\OS2\CHGQUE.EXE * OK
* Check for Z:\IMG\OS2\XR09999\PMDD_1\PRDRV.LST * OK
* Check for Z:\IMG\OS2\XR09999\PMDD_1\PRDESC.LST * OK
* Reading the Columns description
* Check if driver IBM4019.IBM 4019 LaserPrinter exists
*        Determining the linenumber for "IBM4019.IBM 4019 LaserPrinter"
*        LineNumber: 383
* 10/12/98 18:09:57 Installing Driver IBM4019.IBM 4019 LaserPrinter (383)
*        Installing IBM4019.IBM 4019 LaserPrinter
* Check for D:\os2\rinstprn.exe * OK
D:\RINSTPRN\RPRN2.LOG
D:\os2\RPRN2.LOG
        1 file(s) copied.
* Destroying <WPPO_IBM4019>
* Creating <WPPO_IBM4019>
* 10/12/98 18:10:01 * Creating Object IBM4019 ... OK
Status of queue IBM4019 successfully changed to Hold.

(-512)[D:\rinstprn]_
```

Figure 129. Using RPRN2.CMD to Create a Printer

6.12.8 LPTADD

We wrote a simple REXX procedure called `LPTADD.CMD` that installs multiple printer ports. This is particularly useful when used in conjunction with `RINSTPRN` or `RESTPRN`. The command takes a value of between 3 and 24 as parameters and creates the ports requested. A reboot is needed after the command is run to ensure that the ports are set in the OS/2 INI file.

We have included this tool on the CD-ROM accompanying this redbook.

6.12.9 Considerations for Multiple Printer Ports

Network Printer utilities that provide multiple network printer port support, such as Lexmark MarkVision and IBM 4033 boxes, have specific OS/2 INI file port associations. These must be saved from the old system and restored onto the new system during migration. For example, in the case of the Network Printer Utilities, the file `\NETPRINT\IBM4033.DAT` must be saved.

Different programs provide different methods of achieving this. Before migrating, fully test for any incompatibilities between the version's printer software and the two base operating system versions: OS/2 Warp Server, Version 4 and OS/2 Warp Server for e-business.

6.12.10 OS/2 INI File Tools

There are many OS/2 INI file utilities on the market that might be useful in extracting printer information for use in a migration. In addition (such as the power of REXX in OS/2), procedures can be written to query, extract, and restore vital information about OS/2 printers just as QPRINT.CMD does.

We consider the utilities listed here to be quite sufficient for most printer migration purposes. Therefore, no further utilities are considered.

6.13 Migrating the Example Print Server in Domain D01

In this section, we provide an overview of the steps needed to complete the migration of the print server in the example domain D01. The tools have now been discussed. The methods for installing new systems and introducing them to the network have also been described.

1. Use `QPRINT` to extract the Printer Configuration from \\PS01 to a Response File

2. Use `BACKPRN` to extract printer and job properties information

3. Install replacement print server as \\PS01

4. Install printer drivers (optional) on the new \\PS01

5. Introduce a new \\PS01 to the network with a different NetBIOS name

6. Run RPRN2 with a response file on the new \\PS01

7. Restore printer and job properties on the new \\PS01 using RESTPRN

8. Restore access controls on the new \\PS01

9. Perform other post-installation procedures

10. Hold the queues on the original \\PS01

11. Inform users and stop sharing printers on the original \\PS01

12. Allow spooled print jobs to print on the original \\PS01

13. Take the original \\PS01 off-line

14. Restart new \\PS01 properly

15. Release printer queues on \\PS01

16. Inform users that print server change is complete

6.14 Recovering Your System

With careful planning, testing, and implementation, it should not be necessary to recover lost data from a migration failure. However, unforeseen problems do arise from time to time, and it is, therefore, useful to have a backup plan in case of such an emergency.

If you have not already done so, please review both Chapter 2, "Planning and Considerations" on page 17 and particularly Chapter 3, "Preparing the Migration Process" on page 37. If appropriate preparations have been made prior to starting a migration, recovery is not difficult to achieve.

6.15 Summary

Migration is a complex process. However, with adequate planning and preparation, it becomes a process of simply executing the plan.

Migration can take many forms. Migration to new hardware provides advantages for system availability that should not be discounted even if a migration over an original system was first planned.

With automated installation techniques, such as CID, and armed with appropriate utilities to extract key configuration information from the server,

migrating to new system hardware becomes a reasonably straightforward matter.

Chapter 7. Migration to JFS

As you read in Section 1.3.2, "File Systems" on page 6, the Journaled File System (JFS) is new to OS/2 Warp Server for e-business but has been in existence on AIX for several years now. Many administrators will be interested in migrating their HPFS data partitions to JFS to take advantage of larger cache size, dynamic expansion capabilities, and transaction-oriented file systems included in JFS. This chapter discusses these migration considerations.

Note

Since not all of the functions of 386HPFS (such as Fault Tolerance and DASD Limits) are not fully implemented in JFS; so, we do not expect that administrators will migrate 386HPFS partitions to JFS, so we do not discuss this option. Our focus is to migrate data on HPFS drives to JFS volumes.

Since there is no utility to convert an existing volume to JFS, migrating applications and data is accomplished in one of two ways:

- Backup, reformat the drive to JFS, and restore the data
- Copy the data from the HPFS drive to the JFS volume

This chapter describes these two methods and their execution.

7.1 Using a Backup & Restore Program

As described above, one way to migrate data from HPFS to JFS is to backup the data, redefine the drive(s) to be formatted to JFS, and then restore the data. This assumes that the drive letters do not change, and if they do, the applications using the data can still access it somehow.

A production server usually has a backup device directly attached to the system or is using a mechanism, such as ADSM, to backup to a centralized server. Both options can be used to migrate a volume to JFS. Depending on the size of your hard disks, this might be the only option that is available to you.

The Backup and Recovery Services feature of OS/2 Warp Server for e-business can also backup to a remote drive over the LAN assuming the drive is shared using NET SHARE on the remote server. If you did not

originally install this service, you can restart the Installation program to select the Backup and Recovery Services component.

Here are the basic steps for completing an in-place migration of data from HPFS to JFS.

1. Backup the HPFS drive using your normal backup method. In our example, we used the Backup and Restore function to backup the data on our D: drive (HPFS) to a hard disk from another system on the LAN as shown in Figure 130.
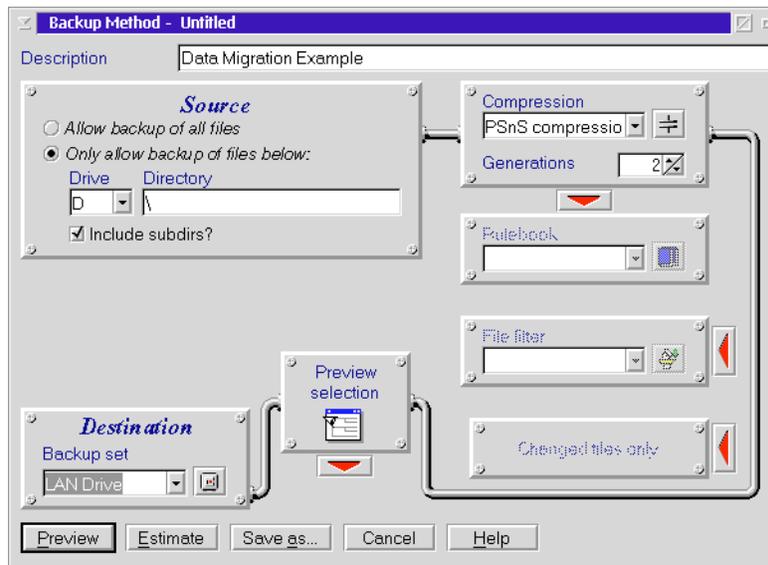
Figure 130. OS/2 Warp Server Backup and Restore Method Definition

2. After the backup completes, the administrator should verify the success by checking the log files generated by the backup program. Once this is done, proceed to the next step.

3. Delete the HPFS drive and redefine it as a JFS volume. In our example, we deleted the D: drive associated with our HPFS data drive. We redefined it as an LVM volume with the same drive letter and same size.

4. When formatting the new JFS volume, execute a long format. In our example, we entered `format d: /fs:jfs /l`. Note that we did not need to reboot the system to format the new drive.

5. The next step is to restore the data to the newly-created JFS volume. In our example, we used the Backup and Restore program to do this copying data from the LAN drive back to the D: drive.

6. Verify the data restored to the new drive. In our example, we verified that the data (number of files, total file size) was identical compared to the data backed up in step 1.

7.2 Adding Disk Space

Another option for data migration is to create a new LVM volume formatted as JFS. The data is copied from the existing HPFS drive to the JFS volume. Since this volume will probably have a different drive letter, the administrator should reassign the drive letter for the JFS volume to the same as the HPFS drive to ensure that the data migration is transparent if accessed by any applications local to the server.
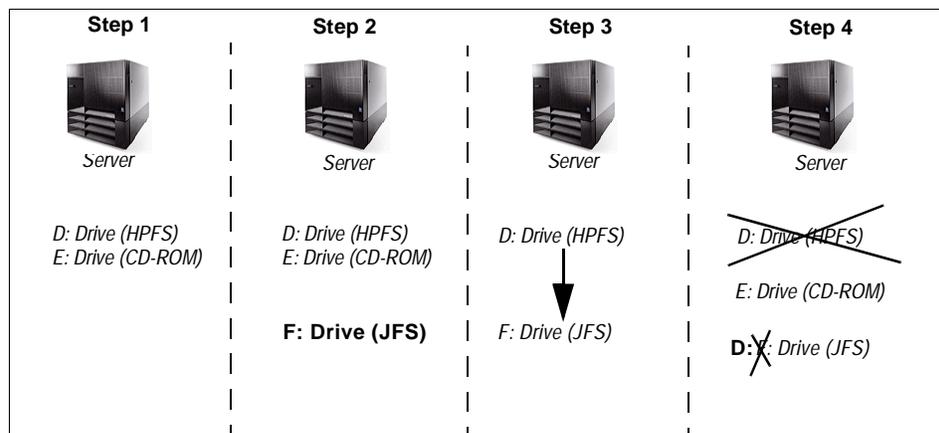
Figure 131. Adding a JFS Volume to Migrate Data on a HPFS Drive

As shown in Figure 131, here is the sequence of steps:

1. In Step 1, we determine the size of the drive to be migrated to JFS. In this case, we are migrating the D: drive, which is 350 MB in size.

2. In Step 2, using LVM, we create a new volume that does not need to be bootable and define it as an LVM volume and then select the next available drive letter, which is F: in our example, as shown in Figure 132 on page 242. The new JFS drive can be formatted without reboot using the command `format f: /fs:jfs /l`.

```
┌─────────────────────────────────────────────────────────────────┐
│ ▓ LVM.EXE                                              ☒ □ □     │
│          Logical Volume Management Tool - Logical View            │
│  ┌──────────────────────────────────────────────────────────┐   │
│  │ Logical Volume          Type        Status    File System  Size (MB) │
│  │                                                            │   │
│  │ cvol               C:   Compatibility  Bootable     HPFS      600 │
│  │ dvol               D:   Compatibility               HPFS      350 │
│  │ [ CDROM 1 ]       *->E: Compatibility               CDFS      128 │
│  │ jfsvol             F:   LVM                          None      350 │
│  │                                                            │   │
│  │                                                            │   │
│  │                                                            │   │
│  │                                                            │   │
│  │                                                            │   │
│  └──────────────────────────────────────────────────────────┘   │
│  ┌──────────────────────────────────────────────────────────┐   │
│  │ Disk Partition        Size (MB)              Disk Name     │   │
│  │                                                            │   │
│  │ jfspart                 350                  [ D1 ]        │   │
│  │                                                            │   │
│  │                                                            │   │
│  └──────────────────────────────────────────────────────────┘   │
│   F1=help   F3=exit   F5=Physical View   Enter=Options  Tab=Window│
└─────────────────────────────────────────────────────────────────┘
```

Figure 132. LVM Partitioning for Data Movement to JFS Volume (F:)

3. In Step 3, we XCOPY the data from the HPFS drive to the JFS Volume. The administrator should execute this step during off-hours to ensure that the data is not in use or otherwise locked. You can also use one of the methods described in Section 6.11.5, "Transferring Data" on page 213.

4. Once the data is copied, the administrator should verify that the copied data is valid and complete. After doing this, the administrator can delete the HPFS drive and reassign the drive letter of the JFS volume to that of the deleted HPFS drive. In our case, we reassigned the JFS volume to be the D: drive. This reassignment is dynamic and does not require a reboot.

7.2.1 Using Removable Media

OS/2 Warp Server for e-business supports removable media like the JAZ, JAZ2, and Syquest drives. If the data volume to be moved is small (less than 1 GB), it might be possible for you to backup to a removable media when moving to JFS.

┌─── **Note** ───┐
│   │
│ If you use removable media, make sure there is a cartridge or some │
│ medium in the drive at server boot time to avoid errors.   │
│   │
└──┘

7.2.2 Non-RAID Systems

Since drive letter assignment now is controlled using LVM, new hard disks can always be added to a system without disrupting the existing drive letter assignments. However, you still have to be careful that you do not change the physical order of disks as they are seen by your system's BIOS and OS/2.

Considerations
1. In general, IDE hard disks are searched before SCSI devices. Thus when adding an IDE hard disk to a SCSI-based system, the IDE disk should not be configured in the PC's BIOS to avoid boot problems.

2. Adding SCSI hard disks to a SCSI-based system: Depending on how your adapter scans the SCSI IDs (upwards or downwards), hard disks should always be added *after* the existing drives. Consult your SCSI adapter documentation to determine how the adapter scans for SCSI IDs.

7.2.3 RAID Systems

Some RAID controllers can expand a RAID array without disrupting existing data and partitions. In this case, you can expand your existing RAID using that function and add the amount of space required including the amount of space used for RAID overhead by the disk subsystem.

Appendix A. Miscellaneous Information

This Appendix contains the details of the response file return codes, log files, and LVM syntax.

A.1 RSPINST Return Codes

Return Code	Definition
702	Invalid Line in response file
707	Invalid Key Value
708	No response file found
710	Windows system missing or invalid
711	Cannot format a Windows partition if you support it
712	Response file keyword conflict
715	Not enough free space on the targetdrive
901	Partition size error
905	LVM unsuccessful
906	Less than x MB primary partition exists
907	Primary partition exists greater than the x MB available
908	No primary partition exists less than the x MB available
909	Greater than a x MB primary partition exists
911	Could not create a file
914	System installation detected an internal error
915	System installation failed to initialize
916	System installation failed to start the session
920	Load module error
921	Target drive error. Use LVM to add target drive to the boot manager menu
932	Copy file error
933	Delete file error
934	Device configuration error while determining the system configuration
935	Close file error

936	Make directory error
937	Rename file error
938	Open file error
939	Read file error
940	Write file error
941	Format error
942	Display panel error
944	Display driver install error
945	Format error. The target drive is not formatted and the format partition option was not selected
946	Video system error
947	System install internal error
948	Error accessing OS/2 ini file
949	System file transfer error
950	Unpack file not found
951	Unpack partial copy
952	Unpack ctrl+break error
953	Unpack critical error
954	Run program error
955	Get/Set file attributes error
957	Memory allocation error
1000-1020	System installation detected an internal error(00-20)
1060	Invalid base product level incorrect version
1061	Invalid base product level incorrect type
1062	Invalid base product level missing the syslevel file
1063	Memory Allocation Error
1064	CheckSum failure unable to OPEN or READ specified file
1065	CheckSum failure and an unknown CheckSum return code
1066	Invalid base product level
1067	Invalid file system
1068	Microsoft Windows NT files found

1069	The version of OS/2 on the target system is newer than the OS/2 Installation files

A.2 MSEMAINT.LOG File Example

This section lists a sample log file as referenced in "Step 6" on page 130.

```
* MSEMAINT Version 1.02
* IniFileName: D:\IBMLAN\NETPROG\MSEMAINT.INI
* PWSName : SRV168
* NICType : IBMTOK.NIF
* TargetDisk : C:
* UserID : CID01
* Domain : D01
* Alias : SHAREA
* DriveLetter : Z:
* SeMaintCmd : Z:\LCU\XR09999\SEMAINT.EXE
* SeMaint Source: Z:\IMG\OS2\XR09999
* Thin386 Command: Z:\IMG\LSR\IP08700\IBM500S1\THIN386.EXE
* ThinLaps Command: Z:\IMG\MPTS\WR08620\THINLAPS.EXE
* ThinLaps Source : Z:\IMG\MPTS\WR08620
* ThinIfs Command: Z:\IMG\SRVIFS\THINIFS.EXE
* ThinIfs Source : Z:\IMG\SRVIFS
* Alias 1 : CODESERV
* Drive 1 : Z:
* Alias 2 : CODESERV\PWS
* Drive 2 : X:
* CID Command : Z:\DSK\CID.CMD
* BootDrive : D:
* Check Resources
The command completed successfully.
The command completed successfully.

* Check Files

* Formatting the disk C:
The type of file system for the disk is FAT.
Enter the current volume label for drive C: semaint
Warning!  All data on hard disk C: will be lost!
Proceed with FORMAT (Y/N)? yes
100 percent of disk formatted
The Volume Serial Number is E2BE-8C15.
      24705024 bytes total disk space
      24705024 bytes available on disk
          2048 bytes in each allocation unit.
         12063 available allocation units on disk.

* Add Minimum Base OS/2 support
Copying C:\CONFIG.SYS to C:\SEMAINT\CONFIG.S13 . . .
C:\CONFIG.SYS was not found.
Copying C:\STARTUP.CMD to C:\SEMAINT\STARTUP.S13 . . .
```

Figure 133. MSEMAINT.LOG Example File (Part 1 of 4)

```
C:\STARTUP.CMD was not found.
Copying C:\AUTOEXEC.BAT to C:\SEMAINT\AUTOEXEC.S13 . . .
C:\AUTOEXEC.BAT was not found.
Copying C:\OS2VER to C:\SEMAINT\OS2VER.S13 . . .
C:\OS2VER was not found.
Copying Z:\IMG\OS2\XR09999\DISK_0\*.* to C:\SEMAINT . . .
Copying Z:\IMG\OS2\XR09999\DISK_1\*.* to C:\SEMAINT . . .
Copying Z:\IMG\OS2\XR09999\DISK_2\*.* to C:\SEMAINT . . .
Copying Z:\IMG\OS2\XR09999\DISK_3\UHPFS.DLL to C:\SEMAINT\UHPFS.DLL . . .
Copying Z:\IMG\OS2\XR09999\DISK_3\UNPACK.EXE to C:\SEMAINT\UNPACK.EXE . . .
Copying Z:\IMG\OS2\XR09999\DISK_3\UNPACK2.EXE to C:\SEMAINT\UNPACK2.EXE . . .
Copying Z:\IMG\OS2\XR09999\DISK_3\CHKDSK.SYS to C:\SEMAINT\CHKDSK.SYS . . .
Copying Z:\IMG\OS2\XR09999\DISK_3\CHKDSK32.DLL to C:\SEMAINT\CHKDSK32.DLL . . .
Copying Z:\IMG\OS2\XR09999\DISK_3\JFS.MSG to C:\SEMAINT\JFS.MSG . . .
Copying Z:\IMG\OS2\XR09999\DISK_3\UJFS.DLL to C:\SEMAINT\UJFS.DLL . . .
Copying Z:\IMG\OS2\XR09999\DISK_3\CHKDSK.COM to C:\SEMAINT\CHKDSK.COM . . .
Copying Z:\IMG\OS2\XR09999\DISK_3\UNPACK2.EXE to C:\SEMAINT\UNPACK2.EXE . . .
Unpacking BVHVGA.DLL from Z:\IMG\OS2\XR09999\DISK_5\VGA . . .
Unpacking PMDD.SYS from Z:\IMG\OS2\XR09999\DISK_4\BUNDLE . . .
Unpacking VIOTBL.DCP from Z:\IMG\OS2\XR09999\DISK_3\BUNDLE . . .
Unpacking INSCFG32.DLL from Z:\IMG\OS2\XR09999\DISK_3\BUNDLE . . .
Unpacking REFPART.SYS from Z:\IMG\OS2\XR09999\DISK_4\BUNDLE . . .
Unpacking OSO001.MSG from Z:\IMG\OS2\XR09999\DISK_4\BUNDLE . . .
Unpacking SHPIINST.DLL from Z:\IMG\OS2\XR09999\DISK_3\BUNDLE . . .
Copying C:\SEMAINT\*.BIO  to C:\ . . .
Copying C:\SEMAINT\*.SYS  to C:\ . . .
Copying C:\SEMAINT\*.ADD  to C:\ . . .
Copying C:\SEMAINT\*.DMD  to C:\ . . .
Copying C:\SEMAINT\XDFLOPPY.FLT  to C:\XDFLOPPY.FLT  . . .
Copying C:\SEMAINT\ISAPNP.SNP  to C:\ISAPNP.SNP  . . .
Copying C:\SEMAINT\*.I13  to C:\ . . .
Copying C:\SEMAINT\OS2KRNLI to C:\OS2KRNL . . .
Copying C:\SEMAINT\OS2LDR to C:\OS2LDR . . .
Copying C:\SEMAINT\OS2VER to C:\OS2VER . . .
Copying C:\SEMAINT\CONFIG.X to C:\CONFIG.X . . .
Copying C:\SEMAINT\ALTF1.CMD to C:\ALTF1.CMD . . .
Copying C:\SEMAINT\ALTF1TOP.SCR to C:\ALTF1TOP.SCR . . .
Copying C:\SEMAINT\ALTF1BOT.SCR to C:\ALTF1BOT.SCR . . .
Copying C:\SEMAINT\OS2LDR.MSG to C:\OS2LDR.MSG . . .
Copying C:\SEMAINT\OS2BOOT to C:\OS2BOOT . . .
Copying C:\SEMAINT\OS2LOGO to C:\OS2LOGO . . .
Updating C:\CONFIG.SYS . . .
Updating C:\CONFIG.X . . .
* Add the ThinLaps support
PKUNZIP (R) FAST!  Extract Utility  Ver 1.11-OS/2 Prot Mode  9-01-92
Copr. 1989-1992 PKWARE Inc. All Rights Reserved. PKUNZIP/h for help
PKUNZIP Reg. U.S. Pat. and Tm. Off.          IBM LICENSED VERSION
Searching ZIP: Z:/IMG/MPTS/WR08620/IBMCOM/MACS/MACS.ZIP
  Exploding: C:/SEMAINT/ibmtok.nif
PKUNZIP (R) FAST!  Extract Utility  Ver 1.11-OS/2 Prot Mode  9-01-92
Copr. 1989-1992 PKWARE Inc. All Rights Reserved. PKUNZIP/h for help
PKUNZIP Reg. U.S. Pat. and Tm. Off.          IBM LICENSED VERSION
Searching ZIP: Z:/IMG/MPTS/WR08620/IBMCOM/IBMCOM.ZIP
  Exploding: C:/SEMAINT/lt2.msg
PKUNZIP (R) FAST!  Extract Utility  Ver 1.11-OS/2 Prot Mode  9-01-92
Copr. 1989-1992 PKWARE Inc. All Rights Reserved. PKUNZIP/h for help
PKUNZIP Reg. U.S. Pat. and Tm. Off.          IBM LICENSED VERSION
Searching ZIP: Z:/IMG/MPTS/WR08620/IBMCOM/MACS/MACS.ZIP
  Exploding: C:/SEMAINT/ibmtok.os2
```

Figure 134. MSEMAINT.LOG (Part 2 of 4)

```
PKUNZIP (R) FAST!  Extract Utility  Ver 1.11-OS/2 Prot Mode  9-01-92
Copr. 1989-1992 PKWARE Inc. All Rights Reserved. PKUNZIP/h for help
PKUNZIP Reg. U.S. Pat. and Tm. Off.          IBM LICENSED VERSION
Searching ZIP: Z:/IMG/MPTS/WR08620/IBMCOM/IBMCOM.ZIP
  Exploding: C:/SEMAINT/protman.os2
PKUNZIP (R) FAST!  Extract Utility  Ver 1.11-OS/2 Prot Mode  9-01-92
Copr. 1989-1992 PKWARE Inc. All Rights Reserved. PKUNZIP/h for help
PKUNZIP Reg. U.S. Pat. and Tm. Off.          IBM LICENSED VERSION
Searching ZIP: Z:/IMG/MPTS/WR08620/IBMCOM/IBMCOM.ZIP
  Exploding: C:/SEMAINT/pro.msg
PKUNZIP (R) FAST!  Extract Utility  Ver 1.11-OS/2 Prot Mode  9-01-92
Copr. 1989-1992 PKWARE Inc. All Rights Reserved. PKUNZIP/h for help
PKUNZIP Reg. U.S. Pat. and Tm. Off.          IBM LICENSED VERSION
Searching ZIP: Z:/IMG/MPTS/WR08620/IBMCOM/IBMCOM.ZIP
  Exploding: C:/SEMAINT/lanmsgdd.os2
PKUNZIP (R) FAST!  Extract Utility  Ver 1.11-OS/2 Prot Mode  9-01-92
Copr. 1989-1992 PKWARE Inc. All Rights Reserved. PKUNZIP/h for help
PKUNZIP Reg. U.S. Pat. and Tm. Off.          IBM LICENSED VERSION
Searching ZIP: Z:/IMG/MPTS/WR08620/IBMCOM/IBMCOM.ZIP
  Exploding: C:/SEMAINT/lanmsgex.exe
PKUNZIP (R) FAST!  Extract Utility  Ver 1.11-OS/2 Prot Mode  9-01-92
Copr. 1989-1992 PKWARE Inc. All Rights Reserved. PKUNZIP/h for help
PKUNZIP Reg. U.S. Pat. and Tm. Off.          IBM LICENSED VERSION
Searching ZIP: Z:/IMG/MPTS/WR08620/IBMCOM/DLL/DLL.ZIP
  Exploding: C:/SEMAINT/acsnetb.dll
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THINLAPS completed successfully.
* Add the SRVIFS support
THINIFS completed successfully.
THINIFS completed successfully.
* Copy CID Command File Z:\DSK\CID.CMD to C:\cid.cmd
        1 file(s) copied.
* Add the CID Command to C:\config.sys
* Add LVM & VCU Support
Z:\IMG\OS2\XR09999\disk_2\VCU.EXE
        1 file(s) copied.
Z:\IMG\OS2\XR09999\disk_2\VCU.MSG
        1 file(s) copied.
Z:\IMG\OS2\XR09999\disk_6\LVM.EXE
        1 file(s) copied.
```

Figure 135. MSEMAINT.LOG (Part 3 of 4)

```
Z:\IMG\OS2\XR09999\disk_6\LVM.DLL
        1 file(s) copied.

Z:\IMG\OS2\XR09999\disk_6\LVM.MSG
        1 file(s) copied.
Z:\IMG\OS2\XR09999\disk_6\LVMH.MSG
        1 file(s) copied.
*****************************************
* REBOOT THE SYSTEM FROM DRIVE C:
*****************************************
* Execute VCU to get the drive letters for LVM
* Done
```

Figure 136. MSEMAINT.LOG (Part 4 of 4)

A.3 LVM Command-Line Syntax

This section documents the command-line parameters for Logical Volume Manager. This syntax is also useful for CID-based installations.

Table 19. LVM Command-Line Parameters

Command-Line Parameters for LVM.EXE		
Option	Parameters	Description
/FILE:	<file_name>	Response file with LVM commands
/QUERY:	<Query_Parameters>	Query configuration
/CREATE:	<Creation_Parameters>	Create a volume or partition
/DELETE:	<Deletion_Parameters>	Delete volumes or partitions
/HIDE	<volume_name>	Hide from OS/2
/BOOTMGR:	Physical drive number [This can only be 1 or 2]	Install Boot Manager on the specified physical drive
/SETNAME:	<Name_Chg_Parameters>	Set volume, partition, or disk name
/SETSTARTABLE:	<Setstartable_Parameters>	Set the startable flag on primary partitions or bootable volumes
/NEWMBR	<drive_number>	Write a new master boot record
/EXPAND	<Expand_Parameters>	Expand a JFS volume

The figures that follow provide more detail on each of the main command-line parameters shown in Table 19.
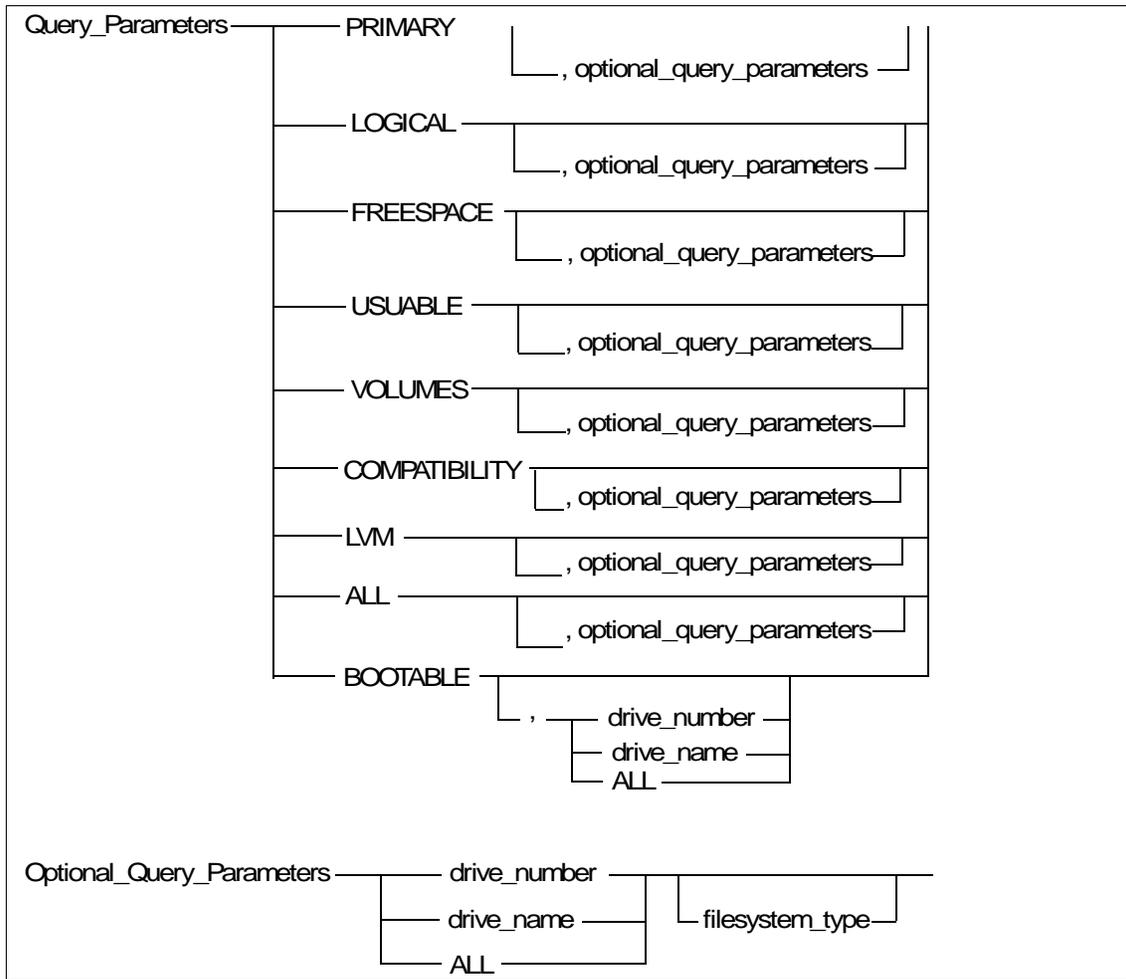
Figure 137. LVM Command Line Parameter Syntax (Part 1 of 3)
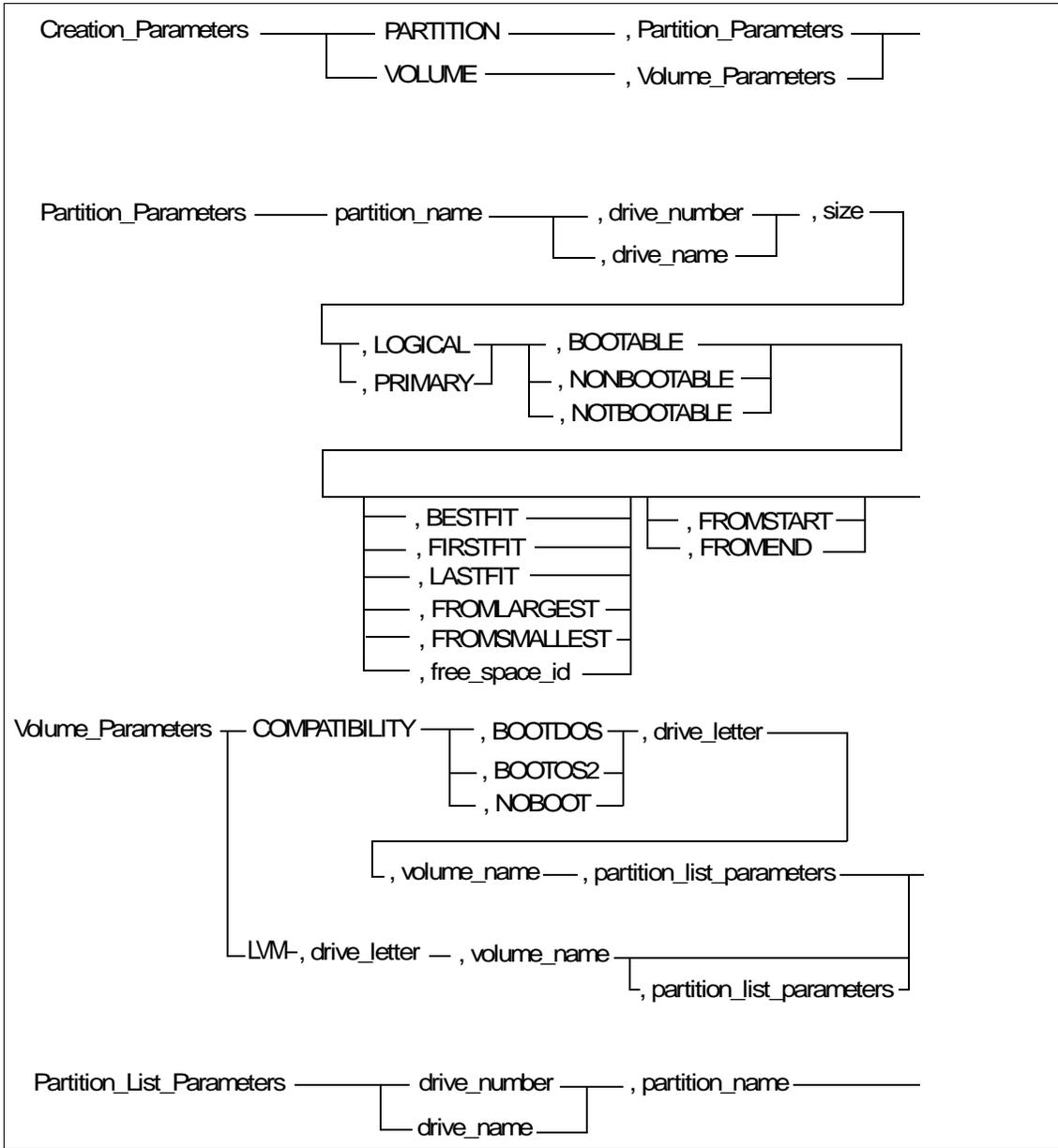
Figure 138. LVM Command Line Parameter Syntax (Part 2 of 3)
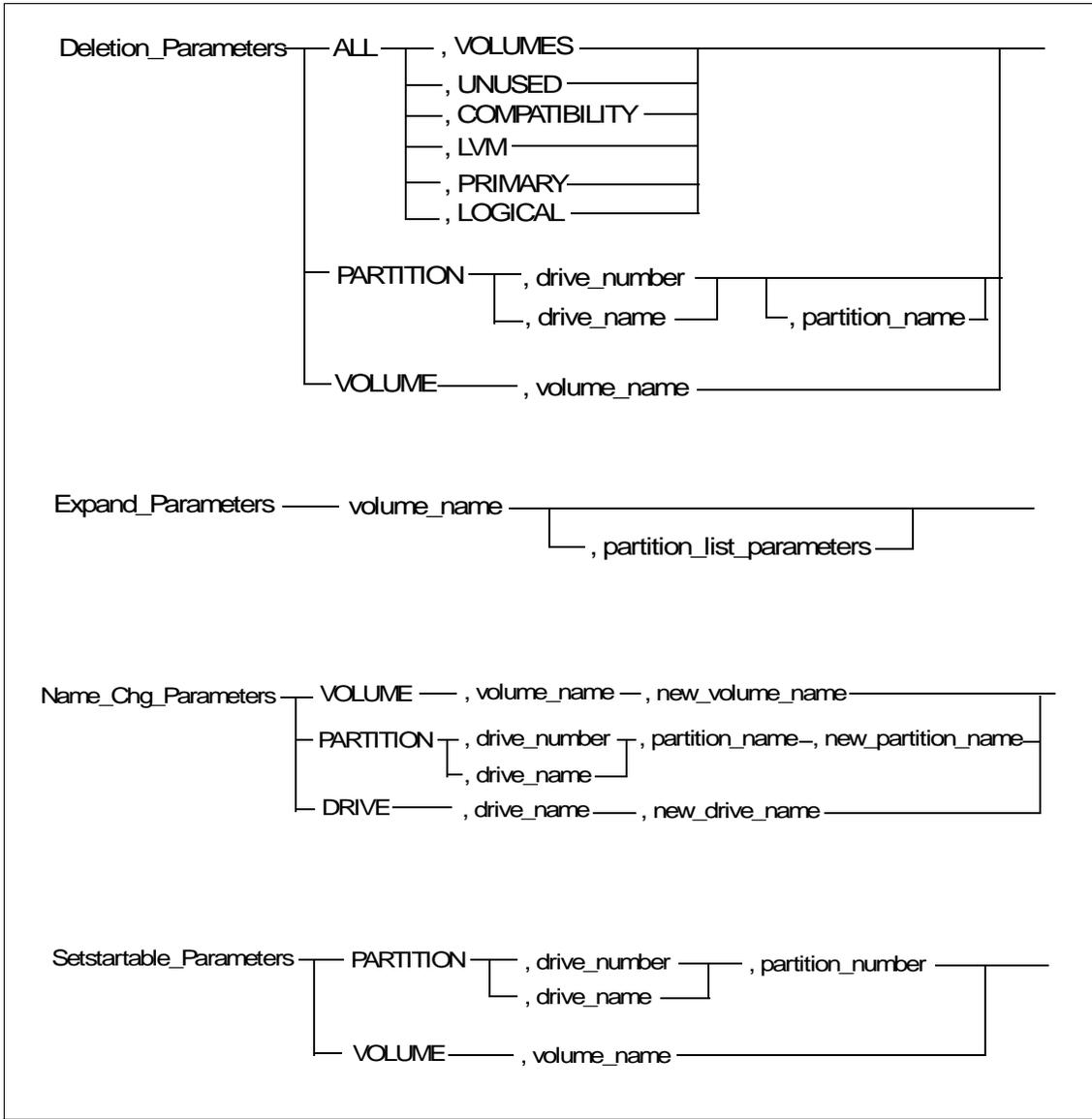
Figure 139. LVM Command Line Parameter Syntax (Part 3 of 3)

Appendix B. LAN Server Management Tools (LSMT)

This Appendix provides some additional information about the LAN Server Management Tools (LSMT) and what they can do for your server environment.

LSMT is available in the RBSAMPLE.ZIP file on the OS/2 Warp Server for e-business CD-ROM.

The following figures show how some of the generated files look. To get more information about LSMT, please refer to Chapter 3 in the redbook titled *How to Manage PC Server Environments*, SG24-4879. This redbook is provided in Adobe Acrobat (PDF) format within the MANAGEPC.ZIP file, which is contained within the RBSAMPLE.ZIP file, which is within the MIGRATE.ZIP file underneath the \BOOKS directory of the OS/2 Warp Server for e-business CD-ROM. Figure 140 may help you understand where the file is.
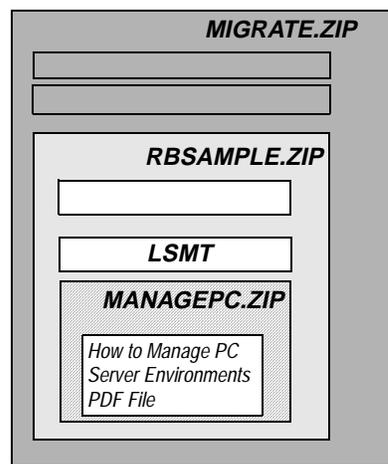
Figure 140. Location of Redbook: How to Manage PC Server Environments

Figure 141 on page 256 shows a snapshot of the USERS.CSV file extracted by the GETUSERS command.

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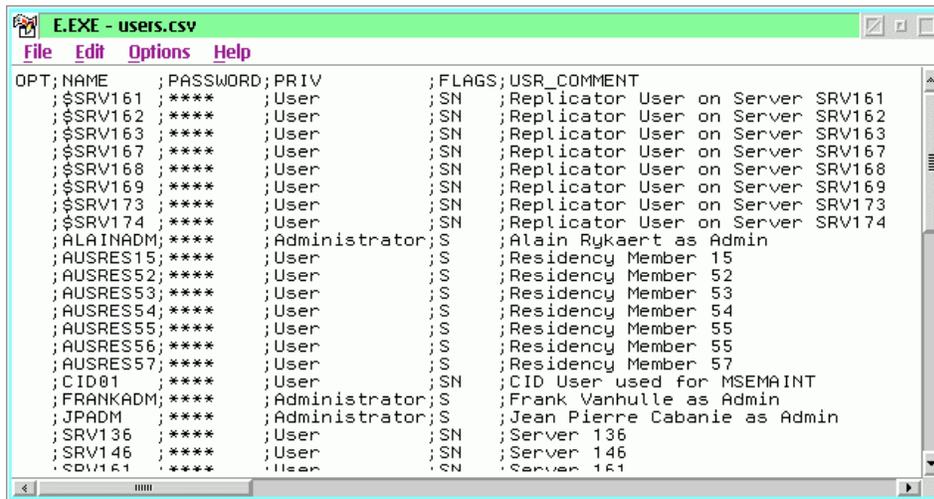
Figure 141. Users.CSV File

Figure 142 shows a snapshot of the GROUPS1.CSV file extracted with the `GETGRPS1` command.
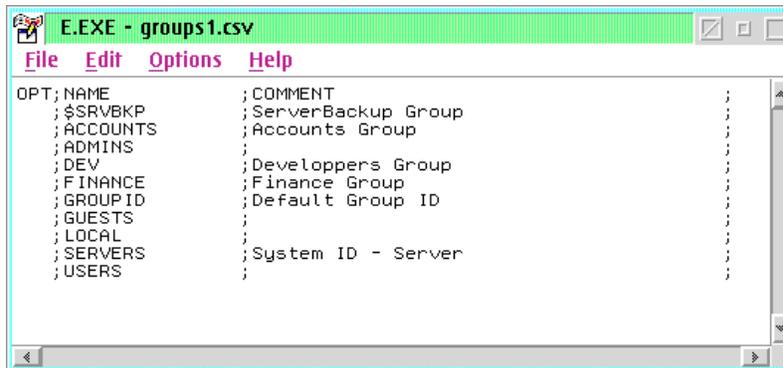
Figure 142. GROUPS1.CSV File

Figure 143 on page 257 shows a snapshot of the GROUPS2.CSV file extracted with the `GETGRPS2` command.

Figure 143. GROUPS2.CSV File

Figure 144 shows a snapshot of the GETALIAS.CSV file extracted with the
GETALIAS command.

Figure 144. ALIAS.CSV File

Figure 145 on page 258 shows a snapshot of the ASSGN.CSV file extracted
with the GETASSGN command.

Figure 145. ASSGN.CSV File

Figure 146 shows a snapshot of the USERS.PWD file extracted with the GETPWD command.

Figure 146. USERS.PWD File

Please note that there is no way to determine the clear-text password using the hexadecimal encrypted value of the passwords displayed above. This is not a security issue.

Appendix C. Special Notices

This publication is intended to assist you with the planning and implementation of a migration to OS/2 Warp Server for e-business. The information in this publication is not intended as the specification of any programming interfaces that are provided by OS/2 Warp Server for e-business. See the PUBLICATIONS section of the IBM Programming Announcement for OS/2 Warp Server for e-business for more information about what publications are considered to be product documentation.

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Appendix D. Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this redbook.

D.1 International Technical Support Organization Publications

For information on ordering these ITSO publications see "How to Get ITSO Redbooks" on page 265.

- *Inside OS/2 Warp Server for e-business*, SG24-5136
- *OS/2 Installation Techniques: The CID Guide*, SG24-4295
- *The OS/2 Warp 4 CID Software Distribution Guide*, SG24-2010
- *The OS/2 Warp 4 CID Rapid Deployment Tools: Migration and Installation Scenarios*, SG24-2012
- *Beyond DHCP - Work Your TCP/IP Internetwork with Dynamic IP*, SG24-5280
- *How to Manage PC Server Environments*, SG24-4879
- *Using ADSM to Back Up OS/2 LAN Server and Warp Server*, SG24-4682
- *Examples of Using Software Installer*, GG24-2529
- *A Comprehensive Guide to Virtual Private Networks, Volume 1: IBM Firewall, Server and Client Solutions*, SG24-5201

D.2 Redbooks on CD-ROMs

Redbooks are also available on the following CD-ROMs:

CD-ROM Title	Collection Kit Number
System/390 Redbooks Collection	SK2T-2177
Networking and Systems Management Redbooks Collection	SK2T-6022
Transaction Processing and Data Management Redbook	SK2T-8038
Lotus Redbooks Collection	SK2T-8039
Tivoli Redbooks Collection	SK2T-8044
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RS/6000 Redbooks Collection (PostScript)	SK2T-8041
RS/6000 Redbooks Collection (PDF Format)	SK2T-8043
Application Development Redbooks Collection	SK2T-8037

D.3 Other Publications

These publications are also relevant as further information sources:

- *Quick Beginning: Installing OS/2 Warp Server for e-business,* SCT7-S2NA
- *OS/2 2.11 Power Techniques*, ISBN 1-56529-286-3

The following are product documentation and can only be obtained through purchasing the OS/2 Warp Server for e-business product:

- *On-line Command Reference*
- *On-line LAN CID Utility Guide*

How to Get ITSO Redbooks

This section explains how both customers and IBM employees can find out about ITSO redbooks, redpieces, and CD-ROMs. A form for ordering books and CD-ROMs by fax or e-mail is also provided.

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List of Abbreviations

ACL	Access Control List	**LDAP**	Lightweight Directory Access Protocol
ADSM	ADSTAR Distributed Storage Manager	**LVM**	Logical Volume Manager
BDC	Backup Domain Controller	**LSMT**	LAN Server Management Tools
BINL	Binary Negotiation Image Layer	**I2O**	Intelligent Input/Output
CCP	Conditional Copy Program	**IBM**	International Business Machines Corporation
CHKDSK	Check Disk	**ITSO**	International Technical Support Organization
CID	Configuration Installation Distribution	**LCU**	LAN CID Utility
CLIFI	Command Line Interface Feature Installer	**MBR**	Master Boot Record
		MPTS	MultiProtocol Transport Services
CSV	Comma Separated Value	**NC**	Network Computing
DASD	Direct Access Storage Device	**NDIS**	Network Device Interface Specification
DCDB	Domain Controller Database	**NFS**	Network File System
DDNS	Dynamic Domain Name System	**PDC**	Primary Domain Controller
DHCP	Dynamic Host Configuration Protocol	**PM**	Presentation Manager
		PPP	Point to Point Protocol
FAT	File Allocation Table	**PSF/2**	Print Services Facility/2
GA	General Availiability	**PSNS**	Personally Safe 'n' Sound
GUI	Graphical User Interface	**RIPL**	Remote Initial Program Load
HPFS	High Performance File System	**SES**	Security Enablement Services
HPFS386	High Performance File Sysrem 386	**SMP**	Symmetric Multiprocessing
IP	Internet Protocol	**SRVIFS**	Server Installable File System
JFS	Journaled File System	**TCPBEUI**	NetBIOS Over TCP/IP
KPI	Kernel Program Interface		

TCP/IP	Transmission Control Protocol/Internet Protocol
TFTPD	Trivial File Transfer Protocol Daemon
TMA	Tivoli Management Agent
VCU	Volume Conversion Utility
VPN	Virtual Private Networking
WPS	Workplace Shell
Y2K	Year 2000

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Numerics

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