

OS/2 SYSTEMS MIGRATION CONSIDERATIONS

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Contents

	Notices XIV
	About This Book
	General Description
	Who Should Read This Book
	How This Book Is Organized
	OS/2 Systems Migration Team
OS/2 Version 2.0	
	Chapter 1. Previous OS/2 Users
	Installing Programs
	Creating Program Groups
	Locating Desktop Manager Features
	Using the System Editor
	Locating File Manager Features
	Locating the Manager Foundation
	oop, mg, moving, and become
	Trinking Objects and Folders
	Searching for Objects
	Renaming Objects
	Associating Objects
	Viewing Your Directory Tree
	Working with Disks and Diskettes
	Locating Command Prompts
	Locating Utility Programs
	Control Panel
	Picture Utility Programs
	Lockup
	Locating the Task List Features 1-9
	Minimizing Programs and Objects
	Shutting Down the System
	OS/2 Summary
	Chapter 2. Previous Microsoft Windows Users
	Installing Microsoft Windows Programs 2-1
	Starting Programs
	Locating the Program Manager Features
	Locating the File Manager Features
	Copying, Moving, and Deleting Objects 2-4
	Printing Objects
	Editing Data-File Objects
	Searching for Objects
	Renaming Objects
	Associating Objects
	Viewing the Directory Tree
	Working with Disks and Diskettes
	Locating Command Prompts
	Locating the Control Panel Features
	Locating the Task List Features
	Minimizing Programs and Objects
	minimizing riograms and objects

	Shutting Down the System
Packaging	- Extended Services and LAN Server 2.0
	Chapter 3. Packaging of Extended Services 1.0 and LAN Server Version 2.0 3-1
	OS/2 1.3
	LAN Transport
	OS/2 2.0
	Extended Services
	Packaging of LAN Server 2.0
	Repackaging of Requesters
	DOS LAN Requester 3-4
Extended 8	Services - Database Manager
	Chapter 4. Extended Services Database Manager Desktop Folder 4-1
	Command Line Interface
	Directory Tool
	Configuration Tool 4-2 Recovery Tool 4-3
	Database Manager Messages
	Chapter 5. Migrating Databases from Previous Releases of Extended Edition
	Database Manager
	Migration Considerations
	Current and Valid Backup
	Storage Requirements
	Time Requirements
	Authorizations
	Migrating Databases
	Using the Restore Database Utility
	Using Query Manager
	Using the Command Line
	Using the SQLEMIGD API
	osing the oquelinos Art
	Chapter 6. SQL Enhancements 6-1
	TRANSLATE Function
	SQLSTATE
	Date/Time Scalar Arithmetic
	User-defined Collating Sequences
	Soci defined conditing ocquerices
	Chapter 7. Backup/Recovery Migration Considerations
	Recovery Overview
	Crash Recovery
	Version Recovery
	Roll-Forward Recovery
	Database Logs
	Roll-Forward Recovery Considerations
	Data and Time Importance
	Point of Recovery
	Frequency for Backup

	Storage Considerations
	Roll-Forward Recovery Configuration
	Database Configuration File
	SQLUEXIT 7-7
	Backup
	Restore
	Archive and Retrieve
	Samples
	SQLUEXIT Considerations
	Chapter 8. Remote Data Services
	Remote Data Services Client Support 8-1
	Nomote Bata Corridos Chem Capport
	Nometo Bata Control Bata Control Copper
	Migrating Workstations to NETBIOS
	Migrating Existing Communications Manager .CFG Files 8-3
	Configuring Extended Services Clients 8-4
	Which Protocol Should I Use? 8-4
	OS/2 Remote Data Services NETBIOS Configuration 8-4
	OS/2 Remote Data Services APPN Configuration 8-5
	Database Manager Client Application Enablers 8-5
	Directory Structure
	System Directory
	Workstation Directory
	Cataloging
	UPM with Remote Data Services 8-8
	Distributed Database Connection Services/2 (DDCS/2) 8-8
	Distributed Database Connection Services/2 (DDCS/2) 8-8 Chapter 9. Database Manager Application Migration 9-1
	Chapter 9. Database Manager Application Migration
	Chapter 9. Database Manager Application Migration 9-1
	Chapter 9. Database Manager Application Migration 9-1 1.1 APIs 9-1 Host Language Support 9-1
	Chapter 9. Database Manager Application Migration9-11.1 APIs9-1Host Language Support9-1New APIs for Database Manager9-2
	Chapter 9. Database Manager Application Migration9-11.1 APIs9-1Host Language Support9-1New APIs for Database Manager9-2
Extended Service	Chapter 9. Database Manager Application Migration9-11.1 APIs9-1Host Language Support9-1New APIs for Database Manager9-2
Extended Service	Chapter 9. Database Manager Application Migration9-11.1 APIs9-1Host Language Support9-1New APIs for Database Manager9-232-bit versus 16-bit9-2
Extended Service	Chapter 9. Database Manager Application Migration9-11.1 APIs9-1Host Language Support9-1New APIs for Database Manager9-232-bit versus 16-bit9-2
Extended Service	Chapter 9. Database Manager Application Migration 9-1 1.1 APIs 9-1 Host Language Support 9-1 New APIs for Database Manager 9-2 32-bit versus 16-bit 9-2 Ces - Communications Manager Chapter 10. Communications Manager Desktop Group 10-1
Extended Service	Chapter 9. Database Manager Application Migration 9-1 1.1 APIs 9-1 Host Language Support 9-1 New APIs for Database Manager 9-2 32-bit versus 16-bit 9-2 Ces - Communications Manager Chapter 10. Communications Manager Desktop Group 10-1 Display SNA Configuration Log 10-1
Extended Service	Chapter 9. Database Manager Application Migration 9-1 1.1 APIs 9-1 Host Language Support 9-1 New APIs for Database Manager 9-2 32-bit versus 16-bit 9-2 Ces - Communications Manager Chapter 10. Communications Manager Desktop Group 10-1 Display SNA Configuration Log 10-1 Display Active SNA Configuration 10-2
Extended Service	Chapter 9. Database Manager Application Migration 9-1 1.1 APIs 9-1 Host Language Support 9-1 New APIs for Database Manager 9-2 32-bit versus 16-bit 9-2 Ces - Communications Manager Chapter 10. Communications Manager Desktop Group 10-1 Display SNA Configuration Log 10-1 Display Active SNA Configuration 10-2 Manage SNA Logical Links 10-2
Extended Service	Chapter 9. Database Manager Application Migration 9-1 1.1 APIs 9-1 Host Language Support 9-1 New APIs for Database Manager 9-2 32-bit versus 16-bit 9-2 Ces - Communications Manager Chapter 10. Communications Manager Desktop Group 10-1 Display SNA Configuration Log 10-1 Display Active SNA Configuration 10-2 Manage SNA Logical Links 10-2 Verify SNA Network Definitions 10-3
Extended Service	Chapter 9. Database Manager Application Migration 1.1 APIs Host Language Support New APIs for Database Manager 32-bit versus 16-bit 9-2 Ces - Communications Manager Chapter 10. Communications Manager Desktop Group Display SNA Configuration Log Display Active SNA Configuration Manage SNA Logical Links Verify SNA Network Definitions SNA Network Definition Configuration 10-3 SNA Network Definition Configuration 10-3
Extended Service	Chapter 9. Database Manager Application Migration 9-1 1.1 APIs 9-1 Host Language Support 9-1 New APIs for Database Manager 9-2 32-bit versus 16-bit 9-2 Ces - Communications Manager Chapter 10. Communications Manager Desktop Group 10-1 Display SNA Configuration Log 10-1 Display Active SNA Configuration 10-2 Manage SNA Logical Links 10-2 Verify SNA Network Definitions 10-3 SNA Network Definition Configuration 10-3 Format SNA Trace Information 10-4
Extended Service	Chapter 9. Database Manager Application Migration 9-1 1.1 APIs 9-1 Host Language Support 9-1 New APIs for Database Manager 9-2 32-bit versus 16-bit 9-2 Ces - Communications Manager Chapter 10. Communications Manager Desktop Group 10-1 Display SNA Configuration Log 10-1 Display Active SNA Configuration 10-2 Manage SNA Logical Links 10-2 Verify SNA Network Definitions 10-3 SNA Network Definition Configuration 10-3 Format SNA Trace Information 10-4 Configuration File Manager 10-4
Extended Service	Chapter 9. Database Manager Application Migration 9-1 1.1 APIs 9-1 Host Language Support 9-1 New APIs for Database Manager 9-2 32-bit versus 16-bit 9-2 Ces - Communications Manager Chapter 10. Communications Manager Desktop Group 10-1 Display SNA Configuration Log 10-1 Display Active SNA Configuration 10-2 Manage SNA Logical Links 10-2 Verify SNA Network Definitions 10-3 SNA Network Definition Configuration 10-3 Format SNA Trace Information 10-4
Extended Service	Chapter 9. Database Manager Application Migration 9-1 1.1 APIs 9-1 Host Language Support 9-1 New APIs for Database Manager 9-2 32-bit versus 16-bit 9-2 Ces - Communications Manager Chapter 10. Communications Manager Desktop Group 10-1 Display SNA Configuration Log 10-1 Display Active SNA Configuration 10-2 Manage SNA Logical Links 10-2 Verify SNA Network Definitions 10-3 SNA Network Definition Configuration 10-3 Format SNA Trace Information 10-4 Configuration File Manager 10-4
Extended Service	Chapter 9. Database Manager Application Migration 1.1 APIs Host Language Support New APIs for Database Manager 32-bit versus 16-bit Ces - Communications Manager Chapter 10. Communications Manager Desktop Group Display SNA Configuration Log Display Active SNA Configuration Manage SNA Logical Links Verify SNA Network Definitions SNA Network Definition Configuration Format SNA Trace Information Configuration File Manager Start/Stop CM Trace 10-5
Extended Service	Chapter 9. Database Manager Application Migration 1.1 APIs Host Language Support New APIs for Database Manager 32-bit versus 16-bit Ces - Communications Manager Chapter 10. Communications Manager Desktop Group Display SNA Configuration Log Display Active SNA Configuration Manage SNA Logical Links Verify SNA Network Definitions SNA Network Definition Configuration Format SNA Trace Information Configuration File Manager Start/Stop CM Trace 10-5
Extended Service	Chapter 9. Database Manager Application Migration 1.1 APIs 9-1 Host Language Support 9-1 New APIs for Database Manager 9-2 32-bit versus 16-bit 9-2 Ces - Communications Manager Chapter 10. Communications Manager Desktop Group 10-1 Display SNA Configuration Log 10-1 Display Active SNA Configuration 10-2 Manage SNA Logical Links 10-2 Verify SNA Network Definitions 10-3 SNA Network Definition Configuration 10-3 Format SNA Trace Information 10-4 Configuration File Manager 10-4 Start/Stop CM Trace 10-5 Consideration 10-6 Chapter 11. Extended Services Desktop Group 11-1
Extended Service	Chapter 9. Database Manager Application Migration 1.1 APIs 9-1 Host Language Support 9-1 New APIs for Database Manager 9-2 32-bit versus 16-bit 9-2 Ces - Communications Manager Chapter 10. Communications Manager Desktop Group 10-1 Display SNA Configuration Log 10-1 Display Active SNA Configuration 10-2 Manage SNA Logical Links 10-2 Verify SNA Network Definitions 10-3 SNA Network Definition Configuration 10-3 SNA Network Definition 10-3 SNA Network Definition 10-4 Configuration File Manager 10-4 Start/Stop CM Trace 10-5 Consideration 10-6 Chapter 11. Extended Services Desktop Group 11-1 View Custom Build History File 11-1
Extended Service	Chapter 9. Database Manager Application Migration 1.1 APIs 9-1 Host Language Support 9-1 New APIs for Database Manager 9-2 32-bit versus 16-bit 9-2 Ces - Communications Manager Chapter 10. Communications Manager Desktop Group 10-1 Display SNA Configuration Log 10-1 Display Active SNA Configuration 10-2 Manage SNA Logical Links 10-2 Verify SNA Network Definitions 10-3 SNA Network Definition Configuration 10-3 SNA Network Definition Configuration 10-4 Configuration File Manager 10-4 Start/Stop CM Trace 10-5 Consideration 10-6 Chapter 11. Extended Services Desktop Group 11-1 View Custom Build History File 11-1 Create Custom Install Diskette 11-1
Extended Service	Chapter 9. Database Manager Application Migration 1.1 APIs Host Language Support New APIs for Database Manager 32-bit versus 16-bit Ces - Communications Manager Chapter 10. Communications Manager Chapter 10. Communications Manager Display SNA Configuration Log Display Active SNA Configuration Manage SNA Logical Links Verify SNA Network Definitions SNA Network Definition Configuration Format SNA Trace Information Configuration File Manager Start/Stop CM Trace Consideration Chapter 11. Extended Services Desktop Group View Custom Build History File Create Custom Install Diskette View Install History File 11-2
Extended Service	Chapter 9. Database Manager Application Migration 1.1 APIs 9-1 Host Language Support 9-1 New APIs for Database Manager 9-2 32-bit versus 16-bit 9-2 Ces - Communications Manager Chapter 10. Communications Manager Desktop Group 10-1 Display SNA Configuration Log 10-1 Display Active SNA Configuration 10-2 Manage SNA Logical Links 10-2 Verify SNA Network Definitions 10-3 SNA Network Definition Configuration 10-3 SNA Network Definition Configuration 10-4 Configuration File Manager 10-4 Start/Stop CM Trace 10-5 Consideration 10-6 Chapter 11. Extended Services Desktop Group 11-1 View Custom Build History File 11-1 Create Custom Install Diskette 11-1

Basic Configuration and Installation	11-3
Chapter 12. Programmable Configuration	12-1 12-1
Overview of Programmable Configuration	12-2
Migration	12-3
RCBUPG Migration Tool	12-3
Using RCBUPG	12-3
Syntax	12-3
Parameters	12-4
Remarks	12-4
Limitations of RCBUPG	12-4
	40.4
Chapter 13. Communications Manager Functions	13-1
Installation	13-1
Communications Manager Files	13-1
Networking Services/2 Files	13-2
OS/2 SNA Gateway	13-2
Segmentation	13-2
New Pooling Algorithm	13-4
Increased Number of Workstations Support	13-4
Migration	13-4
APPN Functions	13-5
Configuration Files	13-5
Migration	13-6
Productivity Aids	13-7
ALMCOPY	13-7
PCPrint	13-7
Toggle	13-7
SnapDump	13-7
APL Print and Display Fonts	13-7
Host Printing via Printer Definition Tables	13-7
CM STOP API	13-8
3174 LAN Over Coax	13-9
ROPS	13-9
Persistent Verification	13-10
5250 Workstation Feature (WSF) in Text Window	13-10
File Transfer Support for Extended Attribute	13-10
Auto-activate DLC after Failure	13-11
Device Driver	13-11
Asynchronous Device Drivers	13-11
NETBIOS Drivers	13-11
Chapter 14. Installing Extended Services for OS/2 from an Alternate Drive	14-1
Extended Services	14-1
Sample Scenarios	14-2
Additional Information	14-3
Database Client Application Enablers	14-4
Sample Scenarios	14-4
Chapter 15. Problem Determination Aids	15-1
Communications Manager Trace Events	15-1
THE PROBLEM WINE	
Chapter 16. LAN Adapter and Protocol Support (LAPS)	16-1
OS/2 EE LAN Transport	16-1

		6-1 6-1
	등 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	6-2
		6-2
		6-4
	Control of the state of the sta	
Personal Commu	nications/3270 Migration	
		7-1
		7-1
		7-1
		7-7
		7-8
		7-8
		7-8
		7-8
		7-8
	사용 보고 있었습니다. (1) 10 10 10 10 10 10 10 10 10 10 10 10 10	7-9
	Additional Setup for LAN Connections	
	Installing LAN Support Program and RESETOKN.SYS	
	Updating the PC/3270 Object for LAN Device Drivers	
	Operating PC/3270 for Windows under OS/2	-15
	Chapter 18. PC/3270 for DOS on OS/2	8-1
		8-1
	BEN TO SERVE CONTROL	8-4
		8-4
	#####################################	8-4
	Additional Setup for LAN Connections	8-8
	Installing LAN Support Program and RESETOKN.SYS	8-9
	할 것 그리고 있는데 그렇게 하는데 가는데 그리고 있는데 그리고 있는데 그리고 있다면 하는데 하는데 그리고 있는데 그리고 있는	8-9
	Operating PC/3270 for DOS under OS/2	10
	Chapter 19. Automated PC/3270 Program Object Definition under OS/2 . 19	9-1
	서 보고 있다면 하는 사람이 있는데 보고 있다면 하는데 하는데 하는데 하는데 하는데 하는데 보고 있다면 하는데 이렇게 되었다면 하는데	9-1
	PC/3270 for Windows - Additional WIN-OS/2 Session Configuration 19	9-2
	PC/3270 for DOS - Additional Session Configuration	9-4
	Chapter 20. Migrate Personal Communications/3270 to OS/2	0-1
		0-1
	BOAN (프로그램, BOAN) 및 공연하다 및 공연하다 및 경기 (BOAN) 등 등 등 등 등 등 등 등 등 등 등 등 등 등 등 등 등 등	0-1
	가는 사람들은 사람들이 아무리 없었다. 이 귀를 받는 다른 사람들은 사람들이 되었다. 그는 사람들은 사람들이 아무리를 하는 것이다. 그는 사람들이 나를 하는 것이다.	0-6
		0-6
	PC/3270 to Extended Services Communications Manager Gotchas 20-	
OS/2 LAN Server	2.0	
	Chapter 24 J.AN Services Deckton Crown Folder	1.4
		1-1
	BET NOTE NOTE NOTE NOTE NOTE NOTE NOTE NO	1-1
	리 이 보통하는 1980년 1985년 1985년 1985년 1985년 1985년 1985년 1985년 1987년 1986년 1985년 1986년 1986년 1986년 1986년 1986년 1986년 1987년 1987년 1	1-2
		1-3 1-3
		1-3
	Utilities	1-0

Exit LAN Messaging OS/2 LAN Services Installation/Configuration Basic Installation Advanced Installation Custom Installation OS/2 LAN Command Reference OS/2 LAN Online Reference Chapter 22. Network Group Folder	21-3 21-4 21-4 21-5 21-5 21-6 21-6 21-7
Master Help Index Folder Printing Changes	22-2 22-3
Chapter 23. User Profile Management Services Folder	23-1 23-1
User Profile Management (UPM)	23-1
Logoff	23-2
Chapter 24. Application Folders	24-1
Public Applications Folder	24-1
Private Applications Folder	24-2
Chapter 25. Additional LAN Server Enhancements	25-1
Common Services	25-2
Packaging of LAN Server 2.0	25-2
Entry Server	25-2
Advanced Server (386 HPFS)	25-2
Ring 3 Versus Ring 0 Server	25-4
Local Security	25-5
Backup Logon Server	25-5
LAN Adapter and Protocol Support (LAPS)	25-5
New Function Table	25-6
Memory Requirements	25-7
LAN Server 2.0	25-7
LAN Server 1.3	25-7
User Interface	25-8
Fixed Disk Configurations	25-8
Multiple DOS Sessions	25-9
Security	25-10
Operator Rights	25-10 25-10
Remote Initial Program Load (RIPL)	25-10
Home Directory	25-11
HDCON	25-11
Fault Tolerance	25-12
Mirroring	25-12
Duplexing	25-13
Additional Options	25-13
Multi-Logon	25-13
NET.ACC Utilities	25-14
Generic Alerter Service	25-14
First Failure Support Technology/2	25-15
Chapter 26. OS/2 LAN Server 2.0 Migration	26-1
Migration Scenarios	26-1

wing attom other or a series of the series o	6-2
Additional Migration Considerations	6-2
Domain Control and Access Control Profile Information	6-3
	6-3
Start Here Table 2	6-4
	6-6
	6-6
	6-7
Definition Mapping	26-7
	26-8
	26-8
	26-9
Reinstalling Novell NetWare Servers	6-10
Rolliotanning Horon Hothard Control	6-10
Hottraro E.E and officeron in the second sec	5-11
Migration Tables	-11
Chapter 27. LAN Server Compatibility	27-1
External Resources	27-1
	27-1
	27-1
	27-2
	27-3
	27-6
	27-8
	7-10
Walliple 200 descions	
Appendix A. Changing OS/2 2.0 to Look Like OS/2 1.3	A-1
Appendix B. Changing WIN-OS/2 2.0 to Look Like Microsoft Windows 3.0	B-1
Glossary of Terms and Abbreviations	X-1
Bibliography	X-7
에게 하늘에게 다른데 그렇게 되었다면 되었다면 되었다면 하는데	X-7
Index	X-9

Figures

3-1	Packaging of OS/2 2.0, Extended Services, and LAN Server 2.0	3-1
	OS/2 Communications Manager XID Trace - Hex>	15-4
	OS/2 Communications Manager XID Trace - Formatted	15-5
	LAN Server 2.0 Install and Remove Panel	21-6
25-1.	Ring 0 Versus Ring 3 Paths	25-4
25-2.	Fixed Disk Configurations	25-8
26-1.	Typical LAN Server Network	26-6
27-1.	External Resources	27-1
27-2.	Novell NetWare and IBM Requesters Coexistence	27-2
27-3.	ODI Network Device Driver Specification Support	27-4

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Tables

Locating OS/2 1.X Desktop Manager Features 1-	3
Locating Windows 3.0 Features 2-	4
Database Server 3-	2
	3
Remote Data Services Client and Protocol Support under Extended	
Services	1
	2
OS/2 Communications Manager and PC/3270 Matching	
Parameters	4
	4
마리크로 마르크로 이 경에 전혀 있다면 보다 다른데 다른데 다른데 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이	7
3	7
	5
Migration Steps for the OS/2 LAN Server Component of LAN	
Server 2.0	1
Migration Steps for the OS/2 LAN Requester and DOS LAN	
Requester Components of LAN Server 2.0 26-1	3
	Locating Windows 3.0 Features 2- Database Server 3- Database Clients Possibilities 3- Remote Data Services Client and Protocol Support under Extended Services. 8- OS/2 Communications Manager Trace Events 15- OS/2 Communications Manager and PC/3270 Matching Parameters 20-1 PC/3270 to ES Communications Manager Gotchas 20-1 Memory Requirements 25- Memory Requirements 25- Start Here 26- Migration Steps for the OS/2 LAN Server Component of LAN Server 2.0 26-1 Migration Steps for the OS/2 LAN Requester and DOS LAN

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About This Book

General Description

The OS/2 2.0 Systems Migration Considerations book is designed to address many of the technical considerations for migrating to IBM OS/2 2.0, Extended Services and/or LAN Server 2.0 environments.

The reader's knowledge of the previous version of the operating system and the extensions software; knowledge of the new IBM OS/2 2.0 and Extended Services and LAN Server 2.0 products; and the information in this book should enable a successful migration plan to be established and implemented for your IBM OS/2 2.0 environment.

In some scenarios, step-by-step procedures for performing the migration activity may be documented. Primarily, the migration considerations are listed and any specific product publications are referenced as appropriate.

This book is NOT intended to replace any of the other publications provided with the products or that can be ordered separately. When appropriate to provide specific detail on how to perform a function, a specific manual is referenced. A list of product publications for OS/2 2.0, Extended Services and LAN Server 2.0 is provided in the reference section of this book.

Who Should Read This Book

This book is intended as a reference for those who are interested in migrating to the different components of OS/2. Users of this book include system administrators, users, and network administrators.

How This Book Is Organized

This book contains the following chapters and appendixes:

- Chapter 1, "Previous OS/2 Users" on page 1-1 describes features of previous versions of OS/2 and helps you to locate those same features in OS/2 2.0.
- Chapter 2, "Previous Microsoft Windows Users" on page 2-1 describes features of Microsoft Windows and helps you to locate those same features in OS/2 2.0.
- Chapter 3, "Packaging of Extended Services 1.0 and LAN Server Version 2.0" on page 3-1 sets the stage for the rest of the book with a brief overview of the packaging changes in OS/2 2.0, Extended Services, and LAN Server 2.0.
- Chapter 4, "Extended Services Database Manager Desktop Folder" on page 4-1 introduces the new Extended Services Database Manager folder and the objects that are in the folder (or group if Extended Services is installed on an OS/2 1.3 base operating system).

- · Chapter 5, "Migrating Databases from Previous Releases of Extended Edition Database Manager" on page 5-1 explains some considerations and methods to remember when migrating your Extended Edition database.
- Chapter 6, "SQL Enhancements" on page 6-1 briefly describes the SQL enhancements that are part of Extended Services Database Manager.
- Chapter 7, "Backup/Recovery Migration Considerations" on page 7-1 discusses the new backup and recovery features and the associated migration considerations.
- · Chapter 8, "Remote Data Services" on page 8-1 explains the changes to Remote Data Services and the issues involved when performing that migration.
- Chapter 9, "Database Manager Application Migration" on page 9-1 presents some migration issues involved in porting Database Manager applications from Extended Edition to Extended Services.
- · Chapter 10, "Communications Manager Desktop Group" on page 10-1 describes the new desktop folder found when Communications Manager is installed. Each of the objects found in that folder is described.
- · Chapter 11, "Extended Services Desktop Group" on page 11-1 describes the new desktop folder found when Extended Services is installed. Each of the objects found in that folder is described.
- Chapter 12, "Programmable Configuration" on page 12-1 describes the migration from Batch Configuration Utility (BCU) to Programmable Configuration.
- Chapter 13, "Communications Manager Functions" on page 13-1 describes the Communications Manager Functions and migration considerations.
- Chapter 14. "Installing Extended Services for OS/2 from an Alternate Drive" on page 14-1 explains how to use an alternate drive to quicken the installation of Extended Services.
- · Chapter 15, "Problem Determination Aids" on page 15-1 documents the Communications Manager trace events and steps to capture these trace events.
- Chapter 16. "LAN Adapter and Protocol Support (LAPS)" on page 16-1 describes this function which is shipped with both Extended Services 1.0 as well as Lan Server 2.0.
 - . Chapter 17. "PC/3270 for Windows on OS/2" on page 17-1 discusses the steps necessary to install and setup PC/3270 for Windows to run as a Windows application under OS/2 2.0.
 - Chapter 18, "PC/3270 for DOS on OS/2" on page 18-1 discusses the steps necessary to install and setup PC/3270 for DOS to run as a DOS application under OS/2 2.0.
 - Chapter 19, "Automated PC/3270 Program Object Definition under OS/2" on page 19-1 describes several steps that can be automated when migrating PC/3270 from a DOS environment to an OS/2 environment.
 - Chapter 20, "Migrate Personal Communications/3270 to OS/2" on page 20-1 details a specific example of migrating PC/3270 to the Extended Services Communication Manager.
 - Chapter 21, "LAN Services Desktop Group Folder" on page 21-1 describes the functions available from the LAN Services group (on an OS/2 1.3 desktop)

- and the LAN Services folder (on an OS/2 2.0 desktop). From here, you can log on, go to the LAN Server full-screen interface, use LAN messaging, run the installation/configuration utility, and view the online references.
- Chapter 22, "Network Group Folder" on page 22-1 introduces the Network folder available on the OS/2 2.0 desktop. From this folder, you can log on, view servers, and view and connect to shared resources.
- Chapter 23, "User Profile Management Services Folder" on page 23-1 introduces the User Profile Management folder used to log on, log off, and manage users and groups.
- Chapter 24, "Application Folders" on page 24-1 discusses the Application folders that are placed on the OS/2 2.0 desktop to access network applications.
- Chapter 25, "Additional LAN Server Enhancements" on page 25-1 describes the new and changed OS/2 LAN Server 2.0 functions along with migration issues where applicable.
- Chapter 26, "OS/2 LAN Server 2.0 Migration" on page 26-1 provides an overview of migrating from previous releases of OS/2 LAN Server, PCLP 1.3 servers, and Novell NetWare servers to OS/2 LAN Server 2.0.
- Chapter 27, "LAN Server Compatibility" on page 27-1 discusses compatibility among various IBM LAN server and requester products and Novell NetWare.
- Appendix A lists the steps for making OS/2 2.0 look like OS/2 Version 1.3.
- Appendix B lists the steps for making WIN-OS/2 look like Microsoft Windows Version 3.0.

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OS/2 Systems Migration Team

Bret Curran Brian Curran Rose McAlister **Brenda Terry**

Rick Weaver

Alice Turlington Team Leader

Debra Young Manager

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Barbara Barker Harris A. Berman Len Brissette Christopher Cleveland Fran Collins **Barry Cunningham** Craig Elliott Chad Fitzgerald Romelia Flores

Andy Frankford Mike Fujimura Fred Getz Marilyn Halbrook Wayne Holmes Chris Jagger Tommy Johnson Berit Kragas David B. Lection

Pat LeMaster Michael Logan Chip McGuill **Brian Sanders** Matt Turlington **Dwight Warak** Kim Windelkin **David Young**

OS/2 Version 2.0

Chapter 1. Previous OS/2 Users

The new graphical appearance of OS/2 2.0 called the *OS/2 Workplace Shell* is different from the shell provided with OS/2 Version 1.3. Its appearance is designed to make more efficient use of the Desktop Manager, File Manager, Print Manager, and Control Panel.

In the OS/2 Workplace Shell, everything is on one screen (the desktop) for easy access.

The following sections describe familiar tasks you perform in OS/2 Version 1.3 and how to accomplish them in the OS/2 Workplace Shell.

Installing Programs

If you have previously installed programs on your hard disk and did not choose to format your hard disk during installation, the already existing programs are saved in folders. The folders are named using the existing program group name. For example, if you had all your editing programs installed in a program group called "Editors," they are saved in a folder with the same name.

After you install OS/2 2.0 and want to install new programs, follow the instructions that come with the programs. Most programs written for OS/2 2.0 will have an installation object.

To install a program that has an installation object:

- 1. Place the installation diskette in your primary drive (typically, Drive A).
- 2. Double-click on the OS/2 System folder
- 3. Double-click on the Drives folder.
- 4. Double-click on the **Drive A** object (or the object that corresponds to the drive where you placed the diskette) to display the contents of the diskette.
- 5. Drag the installation object from drive A to the Desktop folder or to any folder you create.

To start (run) an installed program, you still double-click on it. However, instead of double-clicking on the name of the program, you double-click on its program object. For more information about installing new programs, refer to OS/2 2.0 Using the Operating System.

Creating Program Groups

As in previous versions, you can still group like programs together. However, in this version of the operating system, you do not need to create a group and then add programs to that group. Instead, you can create a folder and then drag program objects to that folder. For example, to create a folder that contains program objects:

 Double-click on the **Templates** folder. (Templates are blank forms for objects. The template has properties that distinguish it from other objects. In this example, the Folder template has properties that tell the operating system, "This is a blank folder.")

- 2. Drag the Folder template to any location in the Desktop folder that is blank. (This action "creates" a new, blank folder.)
- 3. Name the folder using the direct name editing feature. To do this, using a mouse:
 - a. Move the mouse pointer over the name of the folder. (Since you have just created the folder, its name is Folder.)
 - b. Press and hold the Alt key, then press mouse button 1 once. (This changes the name field to a field that you can edit.)
 - c. Delete the existing name from the field.
 - d. Type the new name for the folder.
 - e. Move the mouse pointer away from the name field.
 - f. Click mouse button 1.
- 4. Drag any installed programs that you want to group together to this new folder.

Locating Desktop Manager Features

The Desktop Manager is used to manage programs, to start the OS/2 Tutorial, File Manager, Print Manager, System Editor, or command prompt sessions, and to access utility programs. Generally, all of these features are now objects and folders.

You can organize your Desktop Manager data into groupings that make sense to you. Similarly, you can organize your data into folders in the OS/2 Workplace

The following table shows where Desktop Manager features are located in the OS/2 Workplace Shell.

Feature	Description	Workplace Shell Location
File Manager	Used to organize and manipulate files and directories	The Desktop folder
Disk and diskette utility programs	Used to format, copy, or diskcopy	Pop-up menus on drive objects located in the Drives folder that is located in the OS/2 System folder.
Print Manager	Used to manage the printing of files	Print objects on the desktop
Control Panel	Used to change the way your system is set up	System Setup folder
Clipboard	Used to transfer information from one program to another	Clipboard Viewer, located in the Productivity folder
Command prompts	Used to access a full screen or window command prompt	Command Prompts folder
OS/2 System Editor	Used to edit and create data files	OS/2 System Editor located in the Productivity folder
Previously installed OS/2 programs	A list of OS/2 applications that appears only if any OS/2-based applications are found on your hard disk during shell installation.	OS/2 Programs folder
Previously installed Non-OS/2 programs	A list of non-OS/2 applications that installation was able to install in its own group.	DOS Programs and OS/2 Programs folders

Using the System Editor

The System Editor is the default editor for this version of the operating system and is the same System Editor you are already familiar with. The only difference between this System Editor and the System Editor of OS/2 Version 1.3 is its location. The System Editor was listed in the Group-Main window of the Desktop Manager. The System Editor is now an object in the Productivity folder, which is located in the OS/2 System folder. If you open a data-file object that is not associated with any other program object, by default it is associated with the System Editor.

If you want to edit a new file, you create a data-file object. To create the object:

- 1. Double-click on the Templates folder. (A template has properties that distinguish it from other objects. In this example, the data-file template has properties that tell the operating system "this is a blank data-file object.")
- 2. Drag the data-file template to any location in the Desktop folder that is blank. (This action "creates" a new, blank data-file object)
- 3. Double-click on the data-file object and then begin editing the file.

To rename the new folder using the direct name editing feature:

- 1. Move the mouse pointer over the name of the folder. (If you have just created a new folder, its name is Folder.)
- 2. Press and hold the Alt key; then click mouse button 1. (This changes the name field to a field that you can edit.)

- 3. Delete the existing name from the field.
- 4. Type the new name for the folder.
- 5. Move the mouse pointer away from the name field.
- 6. Click mouse button 1.

Locating File Manager Features

In previous versions of the OS/2 operating system, the File Manager was used to organize and manipulate your files and directories. You also could use the File Manager to start your programs.

In the OS/2 Workplace Shell, your files (objects) and directories (folders) can be organized and manipulated on the desktop with your mouse. Although common tasks such as copying, moving, or deleting objects can still be done with menus, the easiest way to accomplish them is by using your mouse to drag and drop objects on the location you want.

Copying, Moving, and Deleting Objects

To copy an object in the OS/2 Workplace Shell:

- 1. Move the mouse pointer over the object; then press and hold Ctrl and press mouse button 2.
- Drag the object to the new location.
- 3. Release Ctrl and mouse button 2 to drop the object.

To move an object, drag it while pressing mouse button 2 only. To delete an object, drag it to the Shredder object.

Printing Objects and Folders

In OS/2 Version 1.3, you set up your printers through the Control Panel. When you printed from a program, a print file was sent to the Print Manager, which is in Group-Main. From this point on, Print Manager managed the printing of the file.

In the OS/2 Workplace Shell, you set up print objects that determine how and where your files will be printed.

If you selected a printer during system installation, the print object that represents that printer is on the desktop. To print the contents of an object, drag the file to the print object using mouse button 2.

To print an object or folder:

- 1. Click on the object.
- 2. Press and hold down mouse button 2.
- 3. Drag the object to the Printer object.
- 4. When the object is over the Printer object, release mouse button 2.

Searching for Objects

In previous versions of the OS/2 operating system, when you used Search from the File menu in the File Manager to find out where a file or directory was located, a Search Results window was created. It listed the full path name for each file and directory found.

In the OS/2 Workplace Shell, however, you search for objects by using Find, which is available from the pop-up menu of any folder. A Find Results folder is created on the desktop that displays the results of the search. To find an object in the OS/2 Workplace Shell, do the following:

- 1. Move the mouse pointer over an object and click mouse button 2.
- 2. Click on Find.
- 3. Type the name of the object you want to find.
- 4. Select an object type from the list.
- 5. Click on Search just this folder or Search all subfolders.
- 6. Click on Find.

Renaming Objects

In OS/2 Version 1.3, you renamed files or directories by selecting the Rename choice from the File menu in the File Manager.

To rename objects in the OS/2 Workplace Shell using a pop-up menu:

- 1. Display the pop-up menu for the object you want to rename.
- 2. Click on Open.
- 3. Click on Settings.
- 4. Click on the General tab, and then type the new name in the Title field.
- 5. Close the window by double-clicking on the title-bar icon.

To name the folder using the direct name editing feature:

- 1. Move the mouse pointer over the name of the folder. (If you have just created a new folder, its name is Folder).
- 2. Press and hold the Alt key; then click mouse button 1. (This changes the name field to a field that you can edit.)
- 3. Delete the existing name from the field.
- 4. Type the new name for the folder.
- 5. Move the mouse pointer away from the name field.
- 6. Click mouse button 1.

Associating Objects

You can associate multiple data-file objects to a program object. For example, if you have many existing data files with the same type or extension, you can associate them with one program object. Then, each time a data-file object of that type or extension is opened, the program object is also opened.

1. Display the pop-up menu for the program object that you want to associate to a group of data files by pointing at the program object and then clicking mouse button 2.

- 2. Click on the arrow to the right of Open.
- 3. Click on Settings.
- 4. Click on the Association tab.
- 5. To associate by file type, click on a type from the Available types list (for example, Plain Text); then click on Add. The type is displayed in the Current types list. You can add as many types as needed.
 - Instead of associating by file type, you can associate by extension. Type an extension (for example, DOC, TXT, or SCR) in the New name field; then click on Add.
- 6. Close the program object Settings notebook.

You also can associate data-file objects with program objects. Then each time a data-file object is opened, it is displayed in a program object. By default, all data-file objects are considered "plain text" and associated to the OS/2 System Editor.

Note: Typically, you associate a data-file template so you only have to do the associating once.

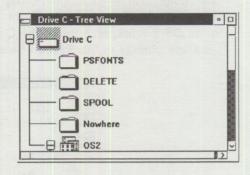
To associate a data-file object with a program object:

- 1. Display the pop-up menu for the data-file object by pointing at it; then click mouse button 2.
- 2. Click on the arrow to the right of Open.
- 3. Click on Settings.
- 4. Click on the Menu tab.
- 5. Click on Open in the Available menus list.
- 6. Click on Create another to the right of Actions on menus. The Menu Item Settings window appears.
- 7. If you know the exact path and file name of the program-file object, type the name you want for the menu choice in the Menu item name field, and the drive, path, and program name in the Name field. If you do not know the exact path and file name, click on Find program; then do the following:
 - a. From the Find window, click on Search all subfolders.
 - b. Click on Find. All program objects in the Desktop folder and the subfolders are displayed.
 - c. Double-click on the program name you want.
 - d. Click on OK. The program name is displayed as a menu choice on the data-file object.
- 8. Click on OK in the Menu Item Settings window. The program menu choice is added to the Actions on menu list. It is also added to the Open cascaded menu for the data-file object.
- 9. Close the Settings notebook unless you want to make the new program object the default menu choice. For more information, refer to OS/2 2.0 Using the Operating System.

Viewing Your Directory Tree

To view your directories and files in a tree-structure format similar to that used in the File Manager:

- 1. Double-click on the OS/2 System folder.
- 2. Double-click on the Drives folder.
- 3. Double-click on the drive of your choice. A directory tree of all your files is displayed.



Working with Disks and Diskettes

Disk and diskette tasks, for example formatting or checking, are now located in the Drives folder, which is located in the OS/2 System folder. The tasks are on the pop-up menu for the diskette drive or hard disk drive.

For example, to format a diskette in drive A:

- 1. Double-click on the OS/2 System folder.
- 2. Click on the Drives folder.
- 3. Display the pop-up menu for Drive A by moving the mouse pointer over the object and clicking mouse button 2.
- 4. Click on Format disk.

Locating Command Prompts

Command prompts for an OS/2 full-screen or window session or a DOS fullscreen session are still available in this version of the operating system. In addition, a DOS window session is now available. This command prompt was added because, in OS/2 2.0, more than one DOS program can be run at one time. A Win-OS/2 full-screen command prompt has also been added because programs that run under Microsoft Windows now also run in this version of the OS/2 operating system.

To start command prompts in the OS/2 Workplace Shell:

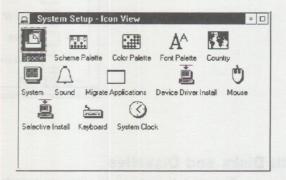
- 1. Double-click on the OS/2 System folder.
- 2. Double-click on the Command Prompts folder.
- 3. Double-click on one of the command prompts.

Locating Utility Programs

Utility programs that helped you customize the system, work with disks and diskettes, view picture files, and lock up your system are still available. The following screens show where the Utility programs are now located and how to gain access to these programs.

Control Panel

The customization tasks previously available from the Control Panel are now located in the System Setup folder, which is located in the OS/2 System folder. In the OS/2 Workplace Shell, the Control Panel tasks are represented as separate objects in the System Setup folder.



Instead of using menus to access these tasks, open an object that represents the device or the feature you want to customize, then change its settings. For example, to customize your screen colors, mouse, or keyboard:

- 1. Double-click on the OS/2 System folder.
- 2. Double-click on the System Setup folder.
- 3. To change the colors on your screen, select the Color Palette object. To change the default settings for your mouse, select the Mouse object. To change the default settings for some of the keys, or to start Special Needs (a new feature), select the Keyboard object.

Picture Utility Programs

The Picture Utility programs are now located in the Productivity folder, which is located in the OS/2 System folder. The Print Picture, Display Picture, and Convert Picture programs have been combined into one program, Picture Viewer. To display the Picture Viewer:

- 1. Double-click on the OS/2 System folder.
- 2. Double-click on the Productivity folder.
- 3. Double-click on the Picture Viewer object.

Lockup

The Lockup program is located in the Settings notebook for the Desktop folder. To lock your system immediately:

- 1. Display the pop-up menu for the Desktop folder. To do this, move the mouse pointer to any blank area of the Desktop folder, then click mouse button 2 once.
- 2. Click on Lockup now.

To change the settings for the Lockup program:

- 1. Display the pop-up menu for the Desktop folder. To do this, move the mouse pointer to any blank area of the Desktop folder, then click mouse button 2 once.
- 2. Click on the arrow to the right of the Open choice.
- 3. Click on Settings.
- 4. Click on the Lockup tab.

Locating the Task List Features

The Task List was used in previous versions of the OS/2 operating system to switch between (or end) running programs, to arrange icons, or to tile or cascade open windows.

In the OS/2 Workplace Shell, these functions are handled in the Window List. Display the Window List by moving your mouse pointer over a blank area on the desktop and clicking mouse buttons 1 and 2 at the same time. You also can display the Window List by pressing Ctrl and Esc at the same time.

Once you select items in the Window List, you can display a pop-up menu by pressing mouse button 2 on the selected items to show, hide, tile, cascade, or close open windows.

Minimizing Programs and Objects

In OS/2 Version 1.3, you minimized programs by clicking on the minimize button in the upper right corner of the window. The programs then became icons located at the bottom of your screen. In the OS/2 Workplace Shell, these icons are located in the Minimized Window Viewer.

The Minimized Window Viewer is a folder object on the desktop. It contains the icons of the minimized windows of program objects and program-file objects. This object is displayed on the desktop only when one or more programs are minimized.

A new feature of the OS/2 Workplace Shell allows you to hide windows. For more information about hiding windows or changing the default settings for minimize and hide, refer to OS/2 2.0 Using the Operating System.

Shutting Down the System

You exit from OS/2 Version 1.3 by selecting the Shutdown choice from the Desktop menu in the Desktop Manager. A window is displayed that allows you to save the current layout of the Desktop Manager window. If you save the current layout, all open windows, groups, and icons are saved in their current position, and appear in the same position the next time you start the operating system.

In the OS/2 Workplace Shell, you can save the current layout by doing the following:

- 1. Move the mouse pointer to a blank area of the desktop and press mouse button 2 to display the pop-up menu for the desktop.
- 2. Click on Shutdown.

OS/2 Summary

Most of the functions found in OS/2 Version 1.3 exist in the OS/2 Workplace Shell. Your files and directories are represented by folders and objects on the desktop. Print Manager is replaced by a printer device located on the desktop.

In OS/2 Version 1.3, you organized your data into groups. In the OS/2 Workplace Shell, you organize your data into folders instead. File management is done on the desktop by using your mouse or pop-up menus.

For more information about how to use the OS/2 Workplace Shell, select a topic in the Master Help Index, which is located on the desktop, or refer to OS/2 2.0 Using the Operating System.

Chapter 2. Previous Microsoft Windows Users

The new graphical appearance of OS/2 2.0, called the *OS/2 Workplace Shell*, is different from the shell provided with Microsoft Windows. Its appearance is designed to make more efficient use of the Program Manager, File Manager, Print Manager, and Control Panel.

In the OS/2 Workplace Shell, everything is on one screen (the desktop) for easy access.

The following sections describe familiar tasks you perform in Microsoft Windows, and how to accomplish them in the OS/2 Workplace Shell.

For more information about how to use Microsoft Windows programs on the OS/2 Workplace Shell, select the appropriate topic in the *Master Help Index*, located on the desktop.

Installing Microsoft Windows Programs

If you had Microsoft Windows programs on your hard disk before you installed OS/2 2.0 and did not choose to format your hard disk during installation, a **Windows Programs** folder is created on the desktop. It contains objects used to start most of your Microsoft Windows programs. During installation, the Migrate utility program automatically selects the best settings for these programs.

To install a new Microsoft Windows program:

1. Follow the program installation instructions.

To install the program from a DOS command prompt:

- a. Double-click on the OS/2 System folder.
- b. Double-click on the Command Prompts folder.
- c. Double-click on the DOS Full Screen object.
- d. Type the installation command as specified in the installation instructions. For example:
 a:setup
- e. Follow the instructions on the screen.

To install the program from the Windows Program Manager:

- a. Double-click on the OS/2 System folder;
- b. Double-click on the Command Prompts folder.
- c. Double-click on WIN-OS2 Full Screen.
- d. Click on Run from the File menu.

e. Type the installation command as specified in the installation instructions. For example:

a:setup

f. Follow the instructions on the screen.

Note: If you are installing a Windows program that does not require the Windows Program Manager, the following message appears:

This program will not run in a WIN-OS/2 session. Use an OS/2 or DOS session to run this program.

Try installing the program from a DOS command prompt.

- 2. When installation is complete, close the Command Prompts folder.
- 3. Double-click on the System Setup folder.
- 4. Double-click on Migrate Applications to create a program object in a folder on the desktop.
- 5. When migration is complete, close the System Setup folder.
- 6. Close the OS/2 System folder.
- 7. Start the program from the Windows Programs folder or the Additional Windows Programs folder on the desktop.

Note: Some Microsoft Windows programs contain DOS programs. After migration, these Windows program objects are placed on the desktop in a folder with the program name.

For additional help during migration, select the Help push button in any window of Migrate Applications. For a detailed description of the Migrate Applications program, refer to the online Master Help Index.

Warning: The OS/2 CONFIG.SYS program-file object might be overwritten with incompatible information during the installation of some Windows programs. Should this occur, refer to "Recovering the CONFIG.SYS File" in the OS/2 2.0 Installation Guide.

Note: The Migrate Applications program always sets up Windows programs to run in a WIN-OS/2 window session with the OS/2 2.0 operating system. For more information about programs that run in a WIN-OS/2 window session, refer to the online Master Help Index.

Starting Programs

You can start a program in Microsoft Windows by double-clicking on the appropriate icon in the Program Manager. You also can start a program by double-clicking on a program file (a file with a .COM, .EXE, .PIF, or .BAT file-name extension) in a File Manager directory window.

In the Workplace Shell, you can start programs similarly by double-clicking on the appropriate program object on the desktop. To start a program from a directory tree window:

- 1. Double-click on the OS/2 System folder.
- 2. Double-click on the Drives folder.
- 3. Double-click on a drive object.

4. Click on a directory, and then double-click on the appropriate program object.

To start a program from the desktop with optional parameters:

- 1. Move the mouse pointer over the program object and click mouse button 2 once.
- 2. Click on the arrow to the right of Open.
- 3. Click on Settings.
- 4. Click on the Program tab.
- 5. Type the parameters in the Parameters field.
- 6. Close the window by double-clicking on the title-bar icon in the upper-left corner of the window.

As you did in Microsoft Windows, you can start a program in OS/2 2.0 by typing the program name at a command prompt. To start a Microsoft Windows program from a full-screen OS/2 or DOS command prompt:

- 1. Double-click on the OS/2 System folder.
- 2. Double-click on the Command Prompts folder.
- 3. Double-click on an OS/2 or DOS full-screen command prompt.
- 4. Type the command WIN or WINOS2 followed by the name of the program. For example:

win excel

Locating the Program Manager Features

In Microsoft Windows Version 3.0, the Program Manager manages programs, starts the File Manager, Print Manager, or DOS command prompt session, and accesses utility programs. Generally, all of these features are now objects and folders in the OS/2 Workplace Shell.

You can organize your Program Manager data into groupings that make sense to you. Similarly, you can organize your data into folders in the OS/2 Workplace Shell.

For example, Microsoft Windows Version 3.0 has several games logically located in the Games Group. In the OS/2 Workplace Shell, games are located in the Games folder. The Accessories Group in Microsoft Windows has programs such as word processors, calendars, calculators, and note pads. In the OS/2 Workplace Shell, these programs are found in the Productivity folder.

The following table shows where Program Manager features are located in the OS/2 Workplace Shell.

Feature	Description	Workplace Shell Location
File Manager	Used to organize and manipulate files and directories	The Desktop folder
Disk and diskette utilities	Used to format, copy, or diskcopy	Pop-up menus on drive objects located in the Drives folder that is located in the OS/2 System folder
Print Manager	Used to manage the printing of files	Print objects on the desktop
Control Panel	Used to change the way your system is set up	System Setup folder
Clipboard	Used to transfer information from one program to another	Clipboard Viewer, located in the Productivity folder
Command prompts	Used to access a full screen or window command prompt	Command Prompts folder
Editors	Used to edit and create data files	OS/2 System Editor
Windows Applications Group	A list of Windows applications that appear only if any Windows-based applications are found on your hard disk during shell installation	Windows Programs folder
Non-Windows Applications Group	A list of non-Windows applications that installation was able to install in its own group	DOS Programs and OS/2 Programs folders

Locating the File Manager Features

The File Manager in Microsoft Windows Version 3.0 helped you organize and manipulate your files and directories. You also could use the File Manager to start your programs.

In the OS/2 Workplace Shell, your files (objects) and directories (folders) can be organized and manipulated on the desktop with your mouse. Although common tasks such as copying, moving, or deleting objects can still be done with menus, the easiest way to accomplish them is by using your mouse to drag and drop objects on the location you want.

Copying, Moving, and Deleting Objects

To copy an object in the OS/2 Workplace Shell:

- 1. Move the mouse pointer over the object; then press and hold Ctrl and press mouse button 2.
- 2. Drag the object to the new location.
- 3. Release Ctrl and mouse button 2 to drop the object.

To move an object, drag it while pressing mouse button 2 only. To delete an object, drag it to the Shredder object.

Printing Objects

In Microsoft Windows Version 3.0, printers are set up through the Control Panel. When you printed from a Windows program, a print file was sent to the Print Manager, which is in the Group-Main. From this point on, Print Manager managed the printing of the file.

In the OS/2 Workplace Shell, you set up *printer objects* that determine how and where your files will be printed.

If you selected a printer during system installation, the printer object that represents that printer is on the desktop. To print the contents of an object, drag the file to the printer object using mouse button 2.

To print an object or folder using a pop-up menu:

- 1. Move the mouse pointer over the object or folder.
- 2. Click mouse button 2 to display the pop-up menu.
- 3. Click on the Print object.

To print an object or folder directly:

- 1. Click on the object.
- 2. Press and hold down mouse button 2.
- 3. Drag the object to the printer object.
- 4. When the object is over the printer object, release mouse button 2.

Editing Data-File Objects

The Write program in Microsoft Windows Version 3.0 was used to create and edit data files.

The System Editor is the default editor for Version 3.0 of the operating system. The System Editor is an object in the Productivity folder that is located in the OS/2 System folder. If you open a data-file object that is not associated with any other program object, it is associated with the System Editor by default.

If you want to edit a new file, create a data-file object. To create the object:

- Double-click on the **Templates** folder. (A template has properties that distinguish it from other objects. In this example, the data-file template has properties that tell the operating system, "This is a blank data-file object.")
- 2. Drag the data-file template to any location in the Desktop folder that is blank. (This action "creates" a new, blank data-file object.)
- 3. Double-click on the data-file object and then begin editing the file.

To rename the new folder using the direct name editing feature:

- 1. Move the mouse pointer over the name of the folder. (If you have just created a new folder, its name is Folder.)
- 2. Press and hold the Alt key; then click mouse button 1. (This changes the name field to a field that you can edit.)
- 3. Delete the existing name from the field.
- 4. Type the new name for the folder.
- 5. Move the mouse pointer away from the name field.
- 6. Click mouse button 1.

Searching for Objects

In Microsoft Windows Version 3.0, you used the Search choice from the File menu in the File Manager to find out where a file or directory is located. A Search Results window was created that lists the full path name for each file and directory found.

In the OS/2 Workplace Shell, however, you search for objects by using the Find choice, which is available from the pop-up menu of any folder. A Find Results folder is created that displays the results of the search. To find an object in the OS/2 Workplace Shell, do the following:

- 1. Move the mouse pointer over an object and press mouse button 2 once.
- 2. Click on Find.
- 3. Type the name of the object you want to find.
- 4. Select an object type from the list.
- 5. Click on Search just this folder or Search all subfolders. If you select Search just this folder, you can also select Include sub-folders to search all folders in the current folder.
- 6. Click on the Find push button.

Renaming Objects

In Microsoft Windows Version 3.0, you rename files or directories by selecting the Rename choice from the File menu in the File Manager.

To rename objects in the OS/2 Workplace Shell using a pop-up menu:

- 1. Display the pop-up menu for the object you want to rename.
- 2. Click on the arrow to the right of Open.
- 3. Click on Settings.
- 4. Click on the General tab, and then type the new name in the Title field.
- 5. Close the window by double-clicking on the title-bar icon.

To name the folder using the direct name editing feature:

- 1. Move the mouse pointer over the name of the folder. (If you have just created a new folder, its name is Folder.)
- 2. Press and hold the Alt key; then click mouse button 1. (This changes the name field to a field that you can edit.)
- 3. Delete the existing name from the field.
- 4. Type the new name for the folder.
- 5. Move the mouse pointer away from the name field.
- 6. Press mouse button 1 once.

Associating Objects

You can associate multiple data-file objects to a program object. For example, if you have many existing data files with the same type or extension, you can associate them to one program object. Then, each time a data-file object of that type or extension is opened, the program object is also opened.

- 1. Display the pop-up menu for the program object that you want to associate with a group of data files by pointing at the program object and then clicking mouse button 2.
- 2. Click on the arrow to the right of Open.
- 3. Click on Settings.
- 4. Click on the Association tab.
- 5. To associate by file type, click on a type from the Available types list (for example. Plain Text): then click on Add. The type is displayed in the Current types list. You can add as many types as needed.
 - Instead of associating by file type, you can associate by extension. Type an extension (for example, DOC, TXT, or SCR) in the New name field; then click
- 6. Close the program object Settings notebook.

You also can associate data-file objects with program objects so that when the data-file object is selected the program is automatically started. In Microsoft Windows Version 3.0, this was done in the File Manager by first selecting the data file, and then selecting Associate from the File menu. By default, all data-file objects are considered "plain text" and associated to the OS/2 System Editor.

Note: Typically, you associate a data-file template so you only have to perform the action once.

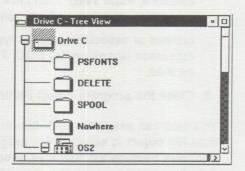
To associate a data-file object with a program object:

- 1. Display the pop-up menu for the data-file object by pointing at it; then click mouse button 2.
- 2. Click on the arrow to the right of Open.
- 3. Click on Settings.
- 4. Click on the Menu tab.
- 5. Click on Open in the Available menus list.
- 6. Click on Create another to the right of Actions on menus. The Menu Item Settings window appears.
- 7. If you know the exact path and file name of the program-file object, type the name you want for the menu choice in the Menu item name field, and the drive, path, and program name in the Name field. If you do not know the exact path and file name, click on Find program; then do the following:
 - a. From the Find window, click on Search all subfolders.
 - b. Click on Find. All program objects in the Desktop folder and the subfolders are displayed.
 - c. Double-click on the program name you want.
 - d. Click on OK. The program name is displayed as a menu choice on the data-file object.
- 8. Click on OK in the Menu Item Settings window. The program menu choice is added to the Actions on menu list. It is also added to the Open cascaded menu for the data-file object.
- 9. Close the Settings notebook unless you want to make the new program object the default menu choice. For more information, refer to OS/2 2.0 Using the Operating System.

Viewing the Directory Tree

To view your directories and files in a tree-structure format similar to that used in the File Manager:

- 1. Double-click on the OS/2 System folder.
- 2. Double-click on the Drives folder.
- 3. Double-click on the drive of your choice. A directory tree of all your files is displayed.



Working with Disks and Diskettes

In File Manager, the Disk menu includes commands that enable you to format, diskcopy, or copy diskettes.

In the OS/2 Workplace Shell, these commands are located in the OS/2 System folder. The tasks are on the pop-up menu for the diskette drive or hard disk drive.

For example, to format a diskette in drive A:

- 1. Double-click on the OS/2 System folder.
- 2. Double-click on the Drives folder.
- 3. Display the pop-up menu for drive A by moving the mouse pointer over the object and pressing mouse button 2.
- 4. Click on Format disk.

Locating Command Prompts

To run a non-Windows application in Microsoft Windows Version 3.0, start a full-screen DOS prompt by opening the Group-Main in Program Manager, and then double-clicking on the DOS Prompt.

To start command prompts in the OS/2 Workplace Shell:

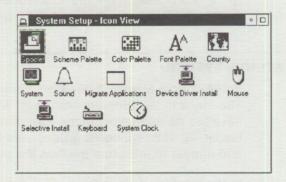
- 1. Double-click on the OS/2 System folder.
- 2. Double-click on the Command prompts folder.
- 3. Double-click on one of the command prompts.

Command prompts for an OS/2 full-screen or window session, or a DOS fullscreen or window session are available in this version of the operating system. Also available is a WIN-OS/2 full-screen session, which allows you to run Microsoft Windows programs.

Locating the Control Panel Features

The Control Panel in Microsoft Windows Version 3.0 enables you to change the setup of your system, such as your screen colors, system fonts, keyboard, mouse, and sound rate. You started the Control Panel by opening the Group-Main window and double-clicking on **Control Panel**.

In the OS/2 Workplace Shell, the Control Panel tasks are represented as separate objects in the System Setup folder.



Instead of using menus to access these tasks, open an object that represents the device or feature you want to customize, and then change its settings. For example, to customize your screen colors, mouse, or keyboard:

- 1. Double-click on the OS/2 System folder.
- 2. Double-click on the System Setup folder.
- 3. To change the colors on your screen, select the Color Palette object. To change the default settings for your mouse, open the Mouse object. To change the default settings for some of the keys, or to activate Special Needs (a new feature), select the Keyboard object.

Locating the Task List Features

You used the Task List in Microsoft Windows Version 3.0 to switch between (or end) running programs, to arrange icons, or to tile or cascade open windows.

In the OS/2 Workplace Shell, these functions are handled in the **Window List**. Display the Window List by moving your mouse pointer over a blank area on the desktop and clicking mouse buttons 1 and 2 at the same time. You also can display the Window List by pressing Ctrl and Esc at the same time.

Once you select (highlight) items in the Window List, you can display a pop-up menu by clicking mouse button 2 on the selected items to show, hide, cascade, or close open windows.

Minimizing Programs and Objects

Using Microsoft Windows 3.0, you minimized programs by clicking on the minimize button in the upper right corner of the window. The programs then became icons located at the bottom of your screen. In the OS/2 Workplace Shell, these icons are located in the Minimized Window Viewer.

The Minimized Window Viewer is a folder object on the desktop. It contains the icons of the minimized windows of program objects and program-file objects. This object is displayed on the desktop only when one or more programs are minimized.

A new feature of the OS/2 Workplace Shell allows you to hide windows. For more information about hiding windows or changing the default settings for minimize and hide, refer to OS/2 2.0 Using the Operating System.

Shutting Down the System

You exit from Microsoft Windows Version 3.0 by selecting Exit Windows from the File menu in the Program Manager. A window is displayed that allows you to save the current layout of the Program Manager window. If you save the current layout, all open windows, groups, and icons are saved in their current position, and appear in the same position the next time you start the operating system.

In the OS/2 Workplace Shell, save the current layout by doing the following:

- 1. Move the mouse pointer to a blank area on the desktop and click mouse button 2.
- 2. Click on Shutdown.

Microsoft Windows Summary

Most of the functions found in Microsoft Windows Version 3.0 exist in the OS/2 Workplace Shell. Files and directories are represented by folders and objects on the desktop. Print Manager is replaced by a printer device located on the desktop.

In Microsoft Windows, you organized your data into groups. In the OS/2 Workplace Shell, data is organized into folders instead. File management is done on the desktop by using a mouse or pop-up menus.

For more information about how to use Microsoft Windows programs with the OS/2 Workplace Shell, select a topic in the online Master Help Index, which is located on the desktop, or refer to OS/2 2.0 Using the Operating System.

Packaging - Extended Services and LAN Server 2.0

Chapter 3. Packaging of Extended Services 1.0 and LAN Server Version 2.0

Before discussing the details of Extended Services 1.0 and LAN Server Version 2.0, this chapter very briefly describes the packaging changes and differences implemented since OS/2 Extended Edition.

The following figure represents the changes that have occurred from the OS/2 Extended Edition 1.3 environment to the current environment:

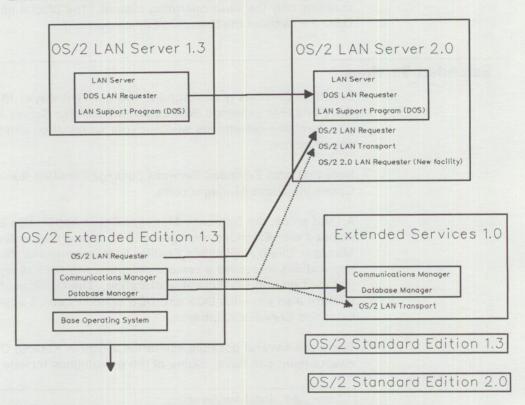


Figure 3-1. Packaging of OS/2 2.0, Extended Services, and LAN Server 2.0.

OS/2 1.3

In the previous version of OS/2, few decisions had to be made as the packaging was quite simple, containing only three separate program products:

- · Standard Edition, which was the base operating system only
- Extended Edition, which included the base operating system,
 Communications Manager, Database Manager, and OS/2 LAN Requester
- LAN Server, which contained the LAN Server, the DOS LAN Requester, and the LAN Support Program for the DOS LAN Requester.

The subsequent sections show that much has changed. These changes provide the customer more choices as well as the ability to purchase only the portions that are needed.

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LAN Transport

The LAN Transport code, previously only a part of Communications Manager, is now shipped in both LAN Server and Extended Services. For more information on this, refer to Chapter 16, "LAN Adapter and Protocol Support (LAPS)" on page 16-1 later in this document.

OS/2 2.0

OS/2 2.0 is packaged similarly to OS/2 Standard Edition 1.3, in that this product contains only the base operating system. The official name of the product is OS/2 2.0 (without the Standard Edition portion).

Extended Services

Extended Services is packaged in two different ways: IBM Extended Services for OS/2 and IBM Extended Services with Database Server for OS/2. The package you purchase determines whether your workstation can function as a database server or not.

Note that both Extended Services packages contain the identical Communications Manager code.

A third piece, the Database Manager Client Application Enabler Feature, is shipped with Extended Services with Database Server for OS/2. The Database Manager Client Application Enabler Feature provides the ability for OS/2 client applications to access a remote database without having Extended Services installed on that OS/2 client workstation. The Database Manager Client Enabler Feature also provides DOS and DOS Windows client applications access to Extended Services databases.

There are several possible scenarios a typical Remote Data Services environment can have. Some of the possibilities include:

Table 3-1. Database Server	
Operating System	Software Requirements
OS/2 1.30.1 or OS/2 2.0	Extended Services with Database Server for OS/2

Operating System	Software Requirements	Store Local Databases?	Communication Protocols
OS/2 1.30.1 or OS/2 2.0	Extended Services for OS/2	Y or N	NETBIOS, APPN, or APPC
OS/2 1.2 or 1.3	Extended Edition	Y or N	SQLLOO or APPC
OS/2 1.30.1 or OS/2 2.0	Database Client Distributed Feature	N	NETBIOS
DOS 3.3 or higher	Database Client Distributed Feature	N	NETBIOS
DOS 4.0 or higher & Windows 3.0 or higher	Database Client Distributed Feature	N	NETBIOS

The Database Manager Client Application Enabler is an identified portion of the product with which it is packaged. Users are licensed by the Program License Agreement or the Conditions of Use to use this portion (Database Manager Client Application Enabler) on the same workstation as the product. IBM authorization is required before copying and distributing it for use on a different workstation. (See your IBM representative for specific ordering information on the Database Manager Client Application Enabler.)

Packaging of LAN Server 2.0

In previous versions of LAN Server, the adapter and protocol support was provided by the Communications Manager portion of Extended Edition, making Communications Manager a prerequisite for LAN Server/Requester. Before 2.0, the OS/2 Requester code was shipped with the Extended Edition package. Now, the LAN Server code provides the adapter and protocol support; therefore, Communications Manager is no longer a prerequisite. Both requesters, OS/2 and DOS are shipped with the server code.

Two separately sold server packages (Entry and Advanced) are available. The Advanced package features the performance-optimized Ring 0 server in addition to the Ring 3 server (see the Advanced Server (386 HPFS) section in the LAN Server chapter). While the Entry server can run on either an OS/2 1.3 or OS/2 2.0 base, the Advanced server runs only on an OS/2 1.3 base in this release.

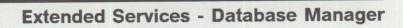
Repackaging of Requesters

Both requesters (DOS and OS/2) come with LAN Server 2.0 (Entry and Advanced). Also, two versions of the requester code come with LAN Server 2.0, one for a 1.30.2 installation and one for 2.0. The install program checks to see which operating system is installed and then installs the appropriate requester for that operating system.

DOS LAN Requester

Several enhancements are available with the DOS LAN Requester 2.0 feature, which are listed below:

- Upgrade from previous version of DLR and PCLP from the server remotely
- · DOS 5.0 compatibility and exploitation: High Memory Area (HMA) and Upper Memory Blocks (UMB) support. DLR 2.0 is still supported on DOS 3.3 and DOS 4.01, although no defect support is provided.
- DOS LAN Requester Windows (IBM version, comes with DLR code)
- · Double-byte Character Set (DBCS) enabling
- Compatibility within OS/2 Multiple DOS sessions:
 - Virtual device driver (VDD) for DOS LAN Transport
 - Up to four instances of DLR in multiple DOS sessions with the VDD.



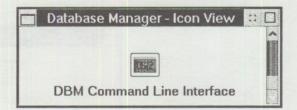
Chapter 4. Extended Services Database Manager Desktop Folder

After installation of Extended Services Database Manager, Database Manager folder is an icon on your Workplace Shell desktop. The Database Manager folder contains icons for the following objects:

- DBM Command Line Interface
- Directory Tool
- · Configuration Tool
- Recovery Tool
- Query Manager
- Database Manager Messages.

These icons represent several new tools for working with Database Manager. Although the tools are available, a user may choose not to include them at installation time.

Command Line Interface



This interface allows you to process SQL statements and database manager commands from the command line prompt or a command file. This interface creates and maintains a history file (DBM.RUN), which can be viewed or edited, in the directory where database manager is installed. It has a retention capacity of 32KB. When this number is reached, the interface erases the earliest entries and adds the new ones. The history file can be suppressed by setting the DBMHIST environment variable to "no."

Directory Tool



This tool allows you to manage access to local and remote databases. There are four Database Manager directories: Database Connection Services, System, Volume, and Workstation. Each one allows the operator to perform one or more administrative functions, such as create, catalog, uncatalog, or drop, depending on which window is active.

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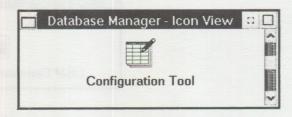
Database Connection Services directory is accessible ONLY when using SAA Distributed Database Connection Services/2 (DDCS/2). This directory lists local and target databases, parameters, comments, and code pages associated with them. DDCS/2 allows access to other relational database platforms and can be ordered separately.

System Database Directory lists all the databases cataloged in your workstation, both local and remote. If the database is local, the drive on which it is stored is listed. If the system is remote, the location is listed. Also listed are comments and the code pages.

Volume Directory displays a list of databases on each volume, for example; diskette drives, and disk partitions connected to the workstation, along with comments and associated code pages.

Workstation Directory lists server names, adapters, network IDs, LLU and PLU aliases, and Transmission Service modes for all the cataloged workstations. In addition, the comment and code pages are listed.

Configuration Tool



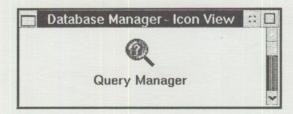
This tool allows you to display or change settings that affect the allocated resources for either databases or Database Manager. The tool lists databases by alias name, drive, and workstation. Icons displayed on the screen indicate remote or local databases. The tool also supports the use of copy and paste for database configurations.

Recovery Tool



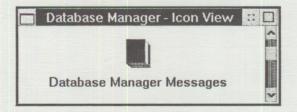
This tool is an operator's interface to the BACKUP and RECOVERY functions provided in Extended Services. The window lists the cataloged databases by alias name, drive, or workstation. One or two icons may be positioned next to each name. The first icon indicates whether the database is local or remote, and the second, if present, informs the operator which action should be taken. There are three functions associated with this tool: Backup, Recovery, and Restart. The Recovery Tool can be executed only by a user with SYSADM authority.

Query Manager



Extended Services Query Manager is very similar to Extended Edition's Query Manager, but most administrative functions are more conveniently located on vour desktop.

Database Manager Messages



Database Manager Messages assists the operator in identifying messages that occur because of system or user problems and in obtaining information on resolving the problems. Most messages are identified by a prefix followed by a number, however, SQLSTATE messages do not have a prefix. Some of the identifying prefixes are: DBA for Database Tool, DBM for Command Line Interface, QRW for Query Manager, and SQL for Database Manager. These messages are conveniently provided in Information Processing Facility format,

which is the format used for the OS/2 Command Reference. The provided Search facility is very convenient when trying to find an error number and associated error message.

Chapter 5. Migrating Databases from Previous Releases of Extended Edition Database Manager

Extended Services Database Manager requires that all databases created with a previous version of Database Manager be migrated.

This section contains the highlights of how to migrate databases created with Extended Edition to Extended Services, as well as considerations to remember when migrating. For more detailed information on this topic, or if you are migrating from Version 1.1, please see Appendix A of IBM Extended Services Guide to Database Manager.

Migration Considerations

Before beginning the actual migration of your database, the following should be considered:

- Is the increased storage requirement a factor?
- · Is the time requirement a factor?
- · Are the database access authorizations accurate after migrating?

Each of these migration considerations is explained in more detail in the following sections.

Current and Valid Backup

- Note

Please make SURE that you have at least one current backup of your database before attempting to migrate your database to Extended Services.

Test the current backup by performing a restore with it to gauge its accuracy.

Storage Requirements

Using Extended Services Database Manager, additional storage space is needed for your database after migrating it from Extended Edition. The size increases by at least 200 KiloBytes per database, because of the additional files required to support the increased function with Extended Services Database Manager.

Time Requirements

After a database is migrated, additional time may be required to rebuild the indexes when a table with indexes is first accessed.

The time to migrate a database depends more on the number of tables and packages (formerly called plans or access plans with previous versions of Extended Edition Database Manager) than the amount of data within the database.

Authorizations

Authorizations are automatically established after a database has been migrated. These authorizations can be changed by using SQL GRANT and REVOKE. To ensure that the proper authorizations are assigned correctly for your specific scenario, it is recommended that the user with SYSADM authority query the system privilege catalogs after the database is migrated.

Migrating Databases

A database from a previous release of Database Manager can be migrated to Extended Services in one of the following ways:

- RESTORE DATABASE Utility
- · Query Manager
- Command Line (MIGRATE1 command)
- SQLEMIGD Application Programming Interface.

The method you use to migrate your database depends directly on your environment:

- The RESTORE DATABASE utility should be used when one of the following is true:
 - The database is physically being moved from one computer to another computer.
 - The hard disk is going to be reformatted.
 - The database is in the format of a backup (using a previous version Database Manager's BACKUP utility).
- If your database can still be accessed after installing Extended Services, you may either use the MIGRATE1 command or use the Query Manager to perform the migration of your database. This method may be used:
 - When the database is on a separate partition or drive that is not being reformatted during the installation of Extended Services.
- Similar to using the MIGRATE1 command or Query Manager, you may elect to use the SQLEMIGD API if you have written a program to utilize the API and the databases do not have to be restored using the RESTORE DATABASE utility. This may be beneficial if you have many databases to migrate, and want to do so programmatically.

Using the Restore Database Utility

The RESTORE DATABASE utility is located in the Recovery Tool, which is in the Extended Services Database Manager folder. The migration is performed automatically when you choose to RESTORE the database that has been backed up with a previous version of Database Manager.

Using Query Manager

Query Manager will automatically perform the migration the first time you attempt to connect to a database that has not been migrated. A message is displayed which asks for confirmation to migrate the selected database.

Using the Command Line

You may use the Migrate Database (MIGRATE1) command at any OS/2 command prompt to migrate your database. Use the following procedure:

- 1. Start Database Manager using the STARTDBM command.
- 2. Type the following at the command prompt:

MIGRATE1 database password

where **database** is the name of the database to be migrated, and **password** is the password, if required, for the database specified.

3. Log on if prompted to do so.

Using the SQLEMIGD API

See the IBM Extended Services for OS/2 Database Manager Programming Guide and Reference to migrate a database from an application program using SQLEMIGD.

Chapter 6. SQL Enhancements

Several Structured Query Language (SQL) enhancements have been provided with Extended Services Database Manager. This section contains an overview of the enhancements and how they might affect your migration efforts. For more detailed information, please refer to the *IBM Extended Services SQL Reference*.

The following is the list of SQL enhancements that are provided in Extended Services Database Manager:

- TRANSLATE Function
- · SQLSTATE
- · Date / Time Scalar Arithmetic
- · User-defined Collating Sequence.

Additionally, Extended Services Database Manager is now compliant with Systems Application Architecture SQL (SAA) Level 1.

TRANSLATE Function

TRANSLATE is an SQL function that is used to change one or more characters to other characters within an expression. The expression must have character data type (CHAR or VARCHAR).

This function is used for many purposes, such as uppercase/lowercase mapping; however, one of the best uses of this function is for case insensitive searches. The following example illustrates this point:

SELECT NAME FROM TABLE1 WHERE TRANSLATE(NAME)='SMITH'

If NAME contains the rows "SMITH," "Smith," and "SmItH," all three rows would be returned by the query.

SQLSTATE

SQLSTATE exists in a previously reserved field in SQLCA (SQL Communication Area); however, it is now provided in a return code for the most recently executed SQL statement. SQLSTATE can be used instead of, or in addition to, SQLCODE.

One difference between SQLSTATE and SQLCODE (which also provides return codes) is that SQLSTATE's return codes are common among IBM's SAA relational databases, which are:

- OS/2 Database Manager
- MVS DB2
- VM SQL/DS
- OS/400 SQL/400

By using SQLSTATE, the return codes issued when using one of these platforms are identical to those in any one of the other platforms. Another difference between SQLSTATE and SQLCODE exists in the implementation of the API call on the OS/2 platform. A programmer can retrieve the message text when using SQLCODE, but the same capability does not exist for SQLSTATE.

This use of SQLSTATE is consistent with ANSI/ISO standards.

Date/Time Scalar Arithmetic

With the introduction of Date/Time Scalar Arithmetic, simple mathematical operations on date and time fields are now available as SQL functions. Previously, the same mathematical operation had to be solved by using a program. For example:

DATE('1991-01-01') + 1 MONTH ==> 1991-02-01

Conversions of dates and time into strings, and vice versa, are also now just a simple matter of calling the correct function, such as:

DATE('1991001')

==> 01/01/1991

This new Database Manager capability conforms to SAA SQL Level 1.

User-defined Collating Sequences

With Extended Services, Database Manager supports the use of user-defined collating sequences. Each individual database can be created with one of the following collating sequences:

- · ASCII
- · EBCDIC
- User-defined

This allows Database Manager to provide compatibility with host SQL query results. Previously, the SQL results were produced with a different sorting order: EBCDIC on the host, and ASCII on the personal computer. For example, when sorting with the ASCII collating sequence, numbers appear before letters; however, when sorting with the EBCDIC collating sequence, letters appear before numbers.

The selection of a user-defined collating sequence must be performed at Create Database time. In other words, one cannot modify or change the collating sequence for an existing database.

For more information on creating or using collating sequences, to IBM Extended Services Database Manager Programming Guide and Reference, Chapter 5 -Advanced Topics.

Chapter 7. Backup/Recovery Migration Considerations

Extended Services Database Manager Backup and Recovery functions have dramatically changed when compared to the similar functions of OS/2 Extended Edition Database Manager. Several critical features have been added to the product. These new features greatly enhance the usability of OS/2 Database Manager in corporate environments as well as in small work group settings.

This chapter discusses the Backup and Recovery enhancements that are available with Extended Services Database Manager. A working knowledge of these new features will help in a migration effort from OS/2 1.x EE Database Manager to Extended Services Database Manager. There are two main Backup and Recovery enhancements: Roll-Forward Recovery and SQLUEXIT.

Several items need to be discussed in explaining these two enhancements. The structure of this chapter is as follows:

- Recovery Overview
- Database Logs
- Roll-Forward Recovery Considerations
- · Roll-Forward Recovery Configuration
- · User Exit.

Recovery Overview

Database management systems employ recovery features to increase data integrity, improve system availability, and protect data from loss because of system failures. Three types of recovery are available to ensure database integrity with the Extended Services Database Manager.

- · Crash Recovery
- Version Recovery
- · Roll-Forward Recovery

Crash and Version Recovery exist in the previous Database Manager versions. A third type, Roll-Forward Recovery, is introduced with Extended Services Database Manager. The purpose of this section is to introduce you to Roll-Forward Recovery. A brief discussion of Crash and Version Recovery is provided before Roll-Forward Recovery is discussed.

Crash Recovery

Crash recovery refers to the feature of Database Manager that protects a database from being left in an inconsistent or unusable state in the event of a system failure.

Changes to a database are not complete until all the changes within a unit of work have been committed to the database. Should a failure occur before a unit of work is complete, the changes in progress but not yet committed will be rolled back when the database is restarted.

When a unit of work is committed, updated data is first written to the database buffers and log. Should a failure occur immediately after this point, the updated information may not have been written to the physical database on the hard

drive. It is the responsibility of the Crash Recovery mechanism to recognize that a problem has occurred and to recover from the problem.

In previous versions of Database Manager, an error code was returned when the START USING command was performed on a database in this state. An application program had to check for this return code and, on receiving it, would perform the RESTART operation. The RESTART option then read the database log to return the database to a consistent state.

Extended Services Database Manager improves this method. Each database has an additional configuration parameter, Auto Restart. The Auto Restart parameter, when enabled, allows a database to be restarted automatically without the requirement for the application program to check for a restart condition. For more information about Crash Recovery, see the Auto Restart parameter in the Guide to Database Manager. For more information on the Unit of Work concept, refer to the Guide to Database Manager.

Version Recovery

Version Recovery permits a database to be restored from a previous backup. If the original database is damaged or lost, the database can be rebuilt from the latest version of the database that has been backed up. One must deliberately make this backup with the Database Manager Backup Database utility or Recovery tool.

Version Recovery was introduced in the OS/2 EE 1.2 Database Manager. It remains an integral component of Extended Services Database Manager. However, when using only Version Recovery, any changes made to a database since the last backup will be lost if the current database is damaged or rendered unusable. This requires frequent backups or extensive loss of data can occur when a database is damaged.

Roll-Forward Recovery

Roll-Forward Recovery enhances Restore Recovery by allowing one to reapply the changes made to a database since the last BACKUP was performed. In the event of a failure, a database can be recovered to a particular point in time or to the end of the database logs.

Although it is commonly referred to as Roll-Forward Recovery, the Extended Services Database Manager implementation of this type of recovery actually utilizes a restore and roll forward methodology. With this methodology, a database is restored and then is optionally rolled forward through the roll-forward logs.

Roll-Forward Recovery is made available for the first time in an IBM OS/2 Database Manager product with Extended Services Database Manager. The Extended Services Database Manager Roll-Forward Recovery feature greatly increases the level of data integrity available with the Database Manager product.

Database Logs

Database management systems use logs to track changes to a database, much the same way that an application may use logging to track user activity so that an actual sequence of events can be re-created.

Extended Services Database Manager uses three types of logs to enable the Roll-Forward Recovery feature. Each type of log has a specific purpose. A description of each follows.

Active Log Files

Through the use of write-ahead logging, active log files contain information about transactions that have not been committed to the database, as well as information about transactions that have been committed but not yet applied to the database. With this type of information, Database Manager can recover a database to a consistent state in the event of a system failure. In the simplest sense, the Database Manager recovers a database by applying transactions that were committed and backing out any transactions that were not.

The active log file is used for two types of recovery. As described, it is the key log file that allows Crash Recovery to be performed in the event of a system failure. Additionally, the active log file is an integral part and the first of three types of logs used to implement Roll-Forward Recovery.

Online Archived Log Files

The second log file used in the process of Roll-Forward recovery is the online archived log file. When all changes in the active log are no longer needed for normal processing, the log file is closed and the log file becomes an archived log. In other words, an active log file is not closed until all transactions contained in the log file are committed, and only then can it become an archived log file. The active log cannot be changed to an archived log file until all changes are committed as the active log file is necessary for Crash Recovery processing. Once the active log file contains only committed and applied transactions, the active log file is then closed and becomes an archived log file.

An archived log file is online when it is stored in the database log path directory, as specified by the newlogpath parameter.

Offline Archived Log Files

Database Manager provides the capability for storing archived log files in a location other than the database log path directory. An archived log file is offline when it is not located in the database log path directory.

Database Manager provides the capability to move archived log files from online to offline. Archived log files are located in the database log path directory and are associated with the database. If the database is dropped, the online archived log files will be deleted as well as the database.

Online archived log files should be moved to an offline location to prevent their accidental erasure if a database has to be deleted. This also reduces the possibility of a catastrophic failure destroying the database, backup of the database, and the archived log files.

To prevent an administrator from having to move an archived log file manually from an online to an offline location, a User Exit is provided with Extended

Services Database Manager. This very flexible User Exit automatically transfers an archived log file to an offline location when the log file status changes from active to archived.

Roll-Forward Recovery Considerations

Data and Time Importance

Several factors must be considered when deciding either to use the Restore or Roll-Forward type of recovery. However, all considerations should be secondary to the importance of the data. Each installation must decide how critical a particular database is to the business and how well the employees could perform their job without the database. The importance and critical nature of most databases will be a significant factor in deciding whether to implement Roll-Forward Recovery.

When planning for the migration to Extended Services Database Manager, it is highly recommended that the advantages of Roll-Forward Recovery be considered. Certain databases do not need Roll-Forward Recovery. For example, a read-only database will not incur any changes, so it is not necessary to implement Roll-Forward Recovery. For most installations, if the data is important enough to justify the creation and maintenance of a database, the data is important enough to justify Roll-Forward Recovery.

Point of Recovery

There are two recovery methods, Restore and Roll-Forward. Each provides a different point of recovery.

The Restore Recovery method only provides database currency up to the time when the most recent backup was performed. A similar level of protection is found in most text editors. As such, the most recent copy of the file is only as recent as the latest save for that file. If a system, application, or user failure occurs while making changes to the file, all changes made since the last save will be lost.

Changes to a text file may not be very significant, but changes to a checking account certainly are! Roll-Forward Recovery provides a more recent point of recovery necessary to maintain data integrity for important databases, such as a bank account. For example, if the database server malfunctions because of a system failure, the most current completed transaction exists in the database after it has been restored and rebuilt using the roll-forward logs.

The database can be "rolled" forward to a particular point in time or to the end of the logs. In most situations, the logs are played forward until the end. However, if an application updates data erroneously, it is possible to restore the database and roll-forward the logs until the time when the errant application began.

Frequency for Backup

Using version recovery, it is necessary to perform frequent backups of the database in attempting to maintain some level of data integrity. However, the dedicated time required to perform the database backup conflicts with the necessity for database availability. Database Manager customers who use version recovery are left no other choice for maintaining data integrity than to increase the frequency of their backups.

Nonetheless, with Extended Services Database Manager, Roll-Forward Recovery significantly reduces the frequency needed for performing a backup while providing a higher level of data integrity. However, backups should still be performed on a regular basis to reduce the amount of time the recovery process will require. For example, if a backup is rarely performed, the number of logs that must be "re-played" during a Roll-Forward Recovery execution may be enormous. Using either method of recovery, a regular backup schedule is recommended.

Storage Considerations

The amount and type of storage necessary for each method of recovery needs also to be considered. The Roll-Forward method of recovery provides more recent data and greater data integrity, but it also requires more hard drive space for storing the database logs and executing the recovery process.

The minimum DASD requirement of the Version Recovery method is the amount of storage necessary to keep the backup copy only. The minimum requirement of the Roll-Forward Recovery method is the amount of storage necessary to hold the backup copy as well as the roll-forward logs. However, this extra required storage contains the changes to the database since the last backup. If the Version Recovery method is used, those changes are lost.

The database logs can require a large amount of storage. If backups are rarely performed on a database that frequently changes, it is possible to have a greater storage requirement for the logs than the database itself.

Note: The database and roll-forward logs do not have to reside on the same hard drive. In fact, Extended Services Database Manager provides the capability to archive the roll-forward logs on a non-standard device such as a tape drive. This capability is explained in the SQLUEXIT portion of this chapter.

Roll-Forward Recovery Configuration

Database Configuration File

Six parameters related to Roll-Forward Recovery with Extended Services
Database Manager are specified in the database configuration file. A complete
description of each can be found in Chapter 5 in the *Guide to Database Manager*,
but an introduction to each here helps the preparation for migration.

Primary Log Files (Logprimary)

The primary log file parameter specifies the number of primary log files that will be created. When a database is configured for Roll-Forward Recovery, secondary log files are ignored!

Log Size (Logsize)

This parameter determines the size in 4K pages for the configured primary and secondary log files.

The size and number of primary log files have a direct bearing on performance. When the database is configured for Roll-Forward Recovery, a request is issued for allocation and initialization of a new log file each time a primary log is closed. However, a primary log file is not closed until all active processes connected to it have committed all transactions.

Choosing the right size for your roll-forward log files is a judgment call. Log files that are either too small or too large can have a detrimental impact on your system performance. A generic recommendation for the best size for the log files cannot be given. The age-old answer of "it depends" applies to this situation. What is offered by this section, however, are some of the advantages and disadvantages for having large or small log files.

If a database is configured to use very large log files, the log file will naturally take longer to fill up. The advantage here is that the extra processing for closing and allocating a new log file is not required as frequently. One disadvantage is that a larger amount of data could be lost in the event of a media failure.

If a database is configured to use very small log files, a different set of results exists. The time between the allocation of new log files is relatively shorter with more frequent but smaller amounts of additional processing required for closing and opening the log files.

While there is finer granularity associated with smaller log files, these small log files can pose problems. If, for example, log retain and user exit are enabled so that Roll-Forward Recovery and the User Exit are used, a small log file fills up in a very short period of time. When all transactions represented in that log file are committed, Database Services closes the log file. At that point, Database Services calls the User Exit program to pass the archived log to the tape drive.

While that is happening, assume that much database activity has occurred and another log file is ready to be archived. It is possible for the second archived log file to be sent to the tape drive before the first one is complete. Depending on the tape drive and the application software used with the tape drive, an error could result.

To determine if the tape drive software you want to use will work, simply try issuing a second request to the tape drive before the first request is completed. If the tape application correctly queues the requests, the synchronization problem discussed above will not affect you.

Loghead

A log is said to have a head and a tail. The loghead is the point in the active log where the current transaction is being written. Log files created before the log head are part of the tail. Log files that are part of the tail (those that are no longer the loghead) are no longer needed for normal processing and can be archived.

New Log Path (Newlogpath)

A database log is initially created in SQLOGDIR, a subdirectory of the \SQLLIB database directory. The newlogpath parameter allows the location where log files are placed to be changed. Existing files in the log path directory are not affected if the database is configured for roll-forward recovery.

Log Retain

This parameter must be changed to enable Roll-Forward Recovery for the database. Enabling log retain causes archived log files to be kept in the database log path directory. As you might have noticed, since the roll-forward parameter is in the database configuration file, the recovery method is associated with each database. For example, one database can use Roll-Forward Recovery while another uses Restore Recovery.

User Exit

User Exit causes Database Manager to call a User Exit program which archives and retrieves log files. For information about the User Exit, see Appendix F in the Guide to Database Manager. The Database Manager User Exit is briefly discussed in the last portion of this chapter.

SQLUEXIT

Extended Services Database Manager provides the capability to call a User Exit function for the storage and retrieval of database files. Appendix F of the Guide to Database Manager examines how Database Manager uses the User Exit function, contains a description of sample User Exit programs that are provided with Database Manager, and discusses considerations for using the User Exit as well as information on User Exit return codes.

Backup

The BACKUP utility may call the User Exit function to store database files. The User Exit function is called by using a zero as the drive parameter in the BACKUP utility.

Restore

The RESTORE utility calls the User Exit function to retrieve database files stored by a BACKUP call to the user exit function. Again, the User Exit function is called by using a zero as the drive parameter in the RESTORE utility

Archive and Retrieve

The archive and retrieve functions call the User Exit function to store database logs and to manage the location of archived log files. The User Exit function is called if the database configuration file parameter User Exit is on. (The User Exit configuration parameter applies to archiving and retrieving of database log files only; it does not apply to BACKUP and RESTORE functions.)

Samples

Several sample SQLUEXIT REXX programs are included with Database Manager. As stated in the documentation, IBM does not warrant that these samples will work in your environment. However, the sample programs provide the best technical documentation for writing a customized sample program for your environment.

SQLUEXIT Considerations

Several considerations exist when calling the User Exit function from either the BACKUP and RESTORE utilities or the Archive and Retrieve functions. These considerations are outlined in Appendix F of the Guide to Database Manager.

It is highly recommended that these considerations be reviewed before implementing the User Exit function.

Chapter 8. Remote Data Services

Extended Services has changed Remote Data Services significantly. New features, ease of configuration, and support of new clients are some of the new features found in Remote Data Services under Extended Services.

This chapter is organized as follows:

- Migrating Communications Manager's Remote Data Services configuration files
- Using NETBIOS for OS/2 clients
- Using APPN for OS/2 clients
- Using the Database Manager Client Enabler Distributed Feature
- The DBM directory structure
- Cataloging
- · DDCS/2

Remote Data Services Client Support

Extended Services includes major enhancements for Remote Data Services. With OS/2 Extended Edition 1.2 and 1.3, Remote Data Services supported both OS/2 Extended Edition requesters and DOS Database requesters. The OS/2 Extended Edition requesters could use either the SQL LAN Only Option (SQLLOO) or APPC as a protocol for the Remote Data Services connection to the Extended Edition database server. The DOS database requesters used NETBIOS as a protocol to communicate with the Extended Edition database server.

Using Extended Services, a Database Manager server can now support the following clients using these protocols:

Client	Protocol
OS/2 Extended Services Database Client	NETBIOS
OS/2 Extended Services Database Client	APPN
OS/2 Extended Services Database Client	APPC
OS/2 Extended Edition Database Client	SQLLOO
OS/2 Extended Edition Database Client	APPC
DOS Database Client	NETBIOS
Windows Database client	NETBIOS

Note: An OS/2 Extended Services database client can no longer use SQLLOO as a protocol. However, an OS/2 Extended Services database server CAN support Extended Edition database clients using SQLLOO.

Remote Data Services Database Server Support

The features provided by the Remote Data Services database server support are greatly enhanced in Extended Services. Key areas such as data integrity, database administration, and installability have been improved. The improvements for an Extended Services database server include:

- Data Integrity (Forward Recovery, Backup, Restore)
- Catalog/Node support of OS/2 NETBIOS Clients, DOS Windows Clients, and APPN Networking
- · Increased client connections
- · SQL Date/Time, Arithmetic, Scalar
- User-defined Collating Sequence
- Support for Distributed Database Connection Services/2.

Additionally, the Extended Services Database Manager provides support for "downlevel" clients. By providing this support, your entire network is positioned to benefit from the advantages of the Extended Services Database Manager database server.

Please note that an OS/2 Extended Services database client cannot access an OS/2 Extended Edition database server. Extended Services Database Manager does not include support for database clients to access "downlevel" servers.

For the above reasons, the recommended network migration path for a Remote Data Services environment is to migrate your database server to Extended Services first. You can then choose to take advantage of the "downlevel" client support to ease your migration. For example, you may want to dedicate the first phase of migration to upgrading your database servers to Extended Services. The second phase is dedicated to migrating database clients to Extended Services. Using this migration path, your entire network is migrated over a time, not all at once. However, your entire database network benefits from the improvements of the Extended Services database server (listed above) immediately after Phase 1.

Of course, you may choose to perform the migration of clients and servers at the same time, which is certainly an available option. Now, the advantages of Extended Services is realized by the servers as well as the clients.

Migrating Workstations to NETBIOS

If you install Extended Services over Extended Edition, those workstations using SQLLOO as a protocol for Remote Data Services are migrated to an Extended Services workstation using NETBIOS. The remote workstation name in the workstation directory becomes the workstation name for the NETBIOS entry and a zero is assigned for the NETBIOS adapter number.

Note: This applies only if you install Extended Services over Extended Edition. If you do format your drive before installing, there are no workstation directories to migrate.

After installing Extended Services over Extended Edition, you should check the SQLCONV.LOG file to see whether the migration of the workstation directory was successful. This log is located in the \OS2\INSTALL subdirectory.

Migrating Existing Communications Manager .CFG Files

There are two ways to migrate existing Communications Manager .CFG files from Extended Edition to Extended Services: Using the CMUPGRAD tool provided with Extended Services and using advanced installation during the installation of Extended Services. Both topics are covered in the next paragraphs.

When Extended Services is installed, a tool provided with Communications Manager helps migrate Extended Edition configuration files to Extended Services configuration files. The tool, called CMUPGRAD, is found in the \CMLIB subdirectory.

Specific to Remote Data Services, the protocol used with Extended Edition database clients determines which protocol is used for the newly upgraded Extended Services database client. If you were using SQLLOO as a protocol under Extended Edition, then, when your old .CFG file is upgraded to Extended Services, the migration tool changes the protocol from SQLLOO to NETBIOS since SQLLOO is not a supported protocol for clients under Extended Services.

If your Extended Edition database client used APPC as a protocol, then APPC is the protocol used when the Extended Edition configuration file is migrated.

Before you begin your migration of Communications Manager configuration files, MAKE SURE that you have a backup copy of your Extended Edition configuration file on diskette. That way, if you have any problems, you still have a backup сору.

Once you have installed Extended Services, you can migrate your old .CFG files to Extended Services by doing the following:

- · Open an OS/2 Window or Full Screen
- Change to the directory \CMLIB
- Copy your Extended Edition .CFG file to \CMLIB
- Execute the CM migration program by issuing the command:

CMUPGRAD CFGNAME.CFG

(CFGNAME.CFG should be the name of your CM configuration file)

Once CMUPGRAD is complete, you can use your migrated configuration file under Extended Services.

Extended Edition configuration files can also be migrated during installation. Using the advanced installation option during the installation of Extended Services migrates the Extended Edition configuration file. Once migrated, the installation process installs the Communications Manager code necessary to support the functions specified in the configuration file.

Note that, even if you used SQLLOO as a protocol under Extended Edition, the local LU profile, partner LU profile, and transmission service mode profile are copied into your new Extended Services .CFG file. Looking in the SNA Network Definitions Configuration, you see a local LU of LU1, a partner LU of LU2, and a transmission service mode of SQLLOO (if you simply used Basic Configuration Services to create your CFG file for Remote Data Services under Extended Edition). These profiles will not be used. SQLLOO is not a supported protocol for Extended Services database clients. Although you can name your local LU

LU1, and your partner LU LU2, you cannot use SQLLOO as a protocol for your Remote Data Services connection for an Extended Services client

To avoid some confusion, consider deleting these old SQLLOO profiles from your Extended Services configuration file once your configuration file has been successfully migrated.

Configuring Extended Services Clients

Which Protocol Should I Use?

Deciding which protocol to use should be one of the first migration decisions for Remote Data Services. Your needs influence your choice of which protocol to use. NETBIOS is very easy to set up and configure. APPN and APPC are a little more difficult, but provide much more administrative function. Features such as subsystem management, deactivation and reactivation of APPC TP programs, conversation security, and session security are available if you use APPN or APPC as a protocol.

In summary, here is a list of some of the advantages of using NETBIOS and APPN:

NETBIOS

- · Easy to configure
- · Communications Manager does not need to be running to make a Remote Data Services connection to a remote database.

APPN

- · Directory routing
- Subsystem Management is available for administering LU 6.2 sessions
- · Conversation and Session level security.

APPC offers all the features of APPN listed above except for directory routing.

For more information on some of the features of APPN and APPC, see the Extended Services for OS/2 Communications Manager Configuration Guide.

OS/2 Remote Data Services NETBIOS Configuration

As mentioned previously, NETBIOS is very easy to configure. Basic Configuration Services (BCS) installs the NETBIOS code and creates the configuration file for you, making installation very easy.

When you install Extended Services, you can create a Basic Configuration file at install time or you can create (or modify an existing BCS file) one later. The steps to create a Basic Configuration file for an OS/2 Remote Data Services NETBIOS Client are as follows:

- · Open an OS/2 Window or Full Screen
- Type ESCFG
- Select CREATE
- · Choose a CFG name
- · Select Database Manager using Remote Data Services.

At this point, choose whether you want this workstation to be a client, server, or both. When your selection is made, ESCFG verifies your CFG file, and then installs it for you. Afterwards, you can run REINST, which then installs the code needed for a NETBIOS Client. REINST adds the needed NETBIOS drivers in the CONFIG.SYS if they are not already installed.

For more information on ESCFG and REINST, please see the online command reference for Communications Manager.

Note that Communications Manager does not have to be up and running, or even installed on the client, for Remote Data Services to work properly. The NETBIOS drivers, which are loaded when your system starts, handle the Remote Data Services requests.

If the database server will also be handling APPN, APPC, or SQLLOO clients, then the server must have Communications Manager up and completely started before a STARTDBM is issued. If the Extended Services Database Server will not need to support APPN, APPC, or SQLLOO clients, then a STARTDBM is all that is required; Communications Manager is not required to be up and running.

The final step is to catalog the DBM directories through the DBM Directory Tool, the Command Line Interface, or the DBM directory APIs. This topic is covered later in the "Directory Structure and Cataloging" sections.

OS/2 Remote Data Services APPN Configuration

Configuring APPN clients and enabling a database server for APPN clients should be done using Basic Configuration Services first. This is not a necessary step, but it makes configuration much easier. Basic Configuration Services creates the Transaction Program (TP) profiles and configures your workstation as end node. Thus, you will not have to build these profiles manually.

Once the configuration files have been built through BCS, a typical APPN configuration should be used. The actual configuration of an APPN client is beyond the scope of this manual. A guide for configuring APPN can be found in the Extended Services for OS/2 Communications Manager Configuration Guide.

APPN or APPC requires that Communications Manager is started and running before a STARTDBM is issued. Failure to do so may cause communications errors to occur when trying to connect to a remote database.

Planning should be emphasized. Decisions on how many Network Nodes, End Nodes, and so on, should be calculated and documented well in advance of the actual configuration. A network topology should be used as a guide if possible.

Database Manager Client Application Enablers

The Database Manager Client Application Enabler feature provides a run-time environment that allows database applications running on a client to access remote databases.

The Database Manager Client Application Enabler feature is an identified portion of the product with which it is packaged. You are licensed by the Program License Agreement to use this portion (distributed feature) on the same workstation as your product. IBM authorization is required before copying and distributing it on a different workstation.

On an OS/2 database client that has the Database Manager Client Application Enabler installed, the following components are added to the workstation:

- Database Manager provides only the code required for a database client to access a remote database. Query Manager and the new database tools are NOT installed on a client which is using the distributed feature.
- Communications Manager provides only the NETBIOS communications protocol. If you need any other protocol on the database client, you must purchase the Extended Services for OS/2 package.
- User Profile Management is required to log on to the remote database server and to be able to catalog the remote workstation and remote database at the workstation.

The following types of clients, which can use the Database Manager Client Application Enabler Feature, can be installed:

- DOS database clients
- Windows database clients
- OS/2 NETBIOS clients.

Remember that, even if you do purchase Extended Services with Database Server and install it on your database server, your server can still serve Extended Edition clients and Extended Services APPN or APPC clients. However, the Database Manager clients using the Database Manager Client Application Enabler Feature can use only NETBIOS as a protocol.

The IBM Extended Services for OS/2 Guide to Database Manager Client Application Enablers Manual contains instructions on how to set up the Database Manager Client Application Enabler feature on OS/2, DOS, and DOW Windows clients. It is highly recommended that you order this manual if you will be installing clients using the Database Manager Client Application Enabler Feature.

Directory Structure

Once communications are configured successfully, the Database Manager directories must be cataloged correctly in order for Remote Data Services to work. These directories are only cataloged on the client.

In Database Manager, a series of Database Manager directories are used to determine where a database is located. Extended Services has three directories. There is also a fourth directory, which is to be used only if DDCS/2 is installed (DDCS/2 is discussed later in this chapter.). The four directory structures are as follows:

- System Directory
- Workstation Directory¹
- Volume Directory
- Database Connection Services Directory.²

¹ Also known as the node directory.

² Only used if DDCS/2 is installed.

System Directory

A system database directory resides on the drive where Database Manager is installed. (This directory is stored in \SQLLIB\SQLDBDIR.)

The system directory is used to access any database, whether it is local, on a remote database server, or even on a host system.³ Each system directory database entry contains the database name, an indication if this database is local or remote, the drive name, the name of the workstation where the remote database is located, and other system information.

Workstation Directory

The Workstation directory contains entries for all workstations that the database client will access. The workstation directory is used to obtain information for network connections when the database is referenced as remote. For NETBIOS Connections, the Server Node Name and the adapter number is some of the information stored in the workstation directory. For APPN connections, the Fully Qualified Partner LU name, Local LU Name, and Transmission Service Mode are recorded in the workstation directory.

There is one workstation directory per database client. This node directory is located in the subdirectory \SQLLIB\SQLNODIR.

Volume Directory

A volume directory exists on each volume (drive) that contains a Database Manager database. For example, if you create the SAMPLE database on drive D, a volume directory is created on drive D that contains the database name and the name of the file system directory where it is stored. The volume directory is stored in the subdirectory \SQLDBDIR on each drive that contains a database.

DCS Directory

The Distributed Connection Services directory (DCS) stores information used by Database Manager to access remote databases stored on a host system. Information such as the database name, its alias, and the application requester are stored in the DCS directory.

There is one DCS directory per workstation which has DDCS/2 installed. The DCS directory is stored in the subdirectory \SQLLIB\SQLGWDIR.

Cataloging

The Database Manager directories can be cataloged in a variety of ways. This is a very critical step, because if the directories are cataloged incorrectly, the Remote Data Services or DDCS/2 connection will not work. Refer to the *Guide to Database Manager* for more detail on cataloging the Database Manager directories.

The new directory tool, located in the Database Manager folder, can be used to catalog System, Node, and DCS directories. The new command line interface can also be used to catalog the DBM directories. Both the Directory tool and the

³ If DDCS/2 is being used.

Command Line Interface use APIs to actually catalog the directories. These directory APIs are also available for your use. A program could be written in C, COBOL, FORTRAN, or REXX which would catalog the Database Manager directories. These APIs are documented in the IBM Extended Services/2 Database Manager Programming Guide and Reference.

UPM with Remote Data Services

There are no significant changes to UPM for Database Manager and Remote Data Services. The user at a client workstation logs on to the database server with a USERID and PASSWORD that exists on the server. This is exactly the same in OS/2 EE 1.2 and 1.3. For specific information on how UPM works with Database Manager, see the IBM Extended Services for OS/2 Guide to Database Manager.

New UPM APIs exist that are now available for a program to call. These new APIs which can be called from a program include the following:

- Get Userid Locally: Returns the locally logged on Userid and type.
- · Get Userid: Returns a list of Userids logged on to locally or remotely.
- · Logoff User: Logs off the Userid associated with a UPM logon routine
- Logon Locally: Allows a user to perform a local logon through the logon window.
- · Logon User: Performs a logon for the user

For a description of all the UPM APIs, refer to the IBM Extended Services for OS/2 Guide to User Profile Management.

Finally, there have been some changes with the LOGON process from a DOS database requester that you should remember:

- · SQLLOGON is only used if your application was created and bound using DOS database requester from an Extended Edition version of Database Manager. SQLLOGN2 should be used in all other cases. SQLLOGN2 creates and stores a LOGON entry that is used when you connect to a database.
- If a DOS client has been logged on using SQLLOGON, SQLLOGOF should be used to logoff the client. SQLLOGOF will remove the logged on USERID and PASSWORD, but it will not terminate SQLLOGON.
- SQLLOGF2 should be used any time SQLLOGN2 is used to log on a DOS windows or DOS database client. SQLLOGF2 does terminate SQLLOGN2 after successful completion.

For more information on SQLLOGON, SQLLOGOF, SQLLOGN2, and SQLLOGF2, see the IBM Extended Services for OS/2 Guide to Database Manager Client Application Enablers.

Distributed Database Connection Services/2 (DDCS/2)

DDCS/2 is a separately purchased product for Extended Services/2 that provides the ability to transparently access host relational databases. The host database systems which DDCS/2 can connect to include DB2, SQL/DS, and SQL/400.

Some of the features of DDCS/2 include:

- · Remote Unit of Work (RUW) on a host system
- Static and Dynamic SQL support
- Cursors
- · Full Select, Insert, Update, Delete capabilities
- SAA SQL level 1 compliant
- Implements Distributed Relational Database Architecture (DRDA).

DDCS/2 is packaged in two ways: a multi-user package and a single-user package. The multi-user package gives OS/2 Extended Services Clients, OS/2 Extended Edition Clients, DOS and DOS Windows clients the ability to go through a DDCS/2 gateway up to a host system. The multi-user package can be installed only on an Extended Services workstation with Database Server installed. The single-user package provides the ability for one workstation with OS/2 2.0 or OS/2 1.30.1 or greater and Extended Services/2 installed to access a host database system.

Manipulating database objects and defining database objects using DDCS/2 is very easy. The Structured Query Language (SQL) is the database language used to perform queries, add data, delete data, and update data. The SQL can be embedded in an application program written in C, COBOL, FORTRAN, or REXX, or the new Command Line Interface (CLI) can be used to issue SQL requests against a host database system. All the requesting application must do is issue a START USING command and the directory structure of Database Manager routes and makes the connection to the remote host database system if the communication configuration and directory structure have been configured correctly.

The connection between the DDCS/2 workstation and the host is LU 6.2. If the connection is going to DB2 or SQL/DS, then APPC is the protocol. If the connection is going to SQL/400, then APPC or APPN can be used as a protocol between the DDCS/2 workstation and the host.

If the multi-user package is being used, the downstream database clients going through the DDCS/2 workstation can use NETBIOS, APPC, APPN, or SQLLOO as a protocol to connect to the DDCS/2 workstation.

For more information on configuration, software requirements, and other DDCS/2 information, see the following manuals:

- IBM Extended Services for OS/2 Guide to SAA Distributed Database Connection Services/2.
- Distributed Relational Database Connectivity Guide.

Chapter 9. Database Manager Application Migration

Migrating a database application from Extended Edition to Extended Services should be fairly easy. Depending on whether the database has been migrated using the MIGRATE API or recreated, application migration may involve nothing more than a rebind. Applications that access a database using the Database Manager 1.1 APIs need special consideration. This is covered in the next section, entitled 1.1 APIs.

Some changes and issues you need to consider include:

- · Host language support
- API changes
- · 32-bit versus 16-bit.

These topics will be covered in the subsequent sections in this chapter.

1.1 APIs

Extended Services no longer supports the older Database Manager 1.1 APIs. These APIs are described in Appendix H of the *IBM Extended Edition 1.3 Programming Reference*. An example of the 1.1 API is the Start Using Database which requires a password to be passed in.¹

Since the 1.1 Database Manager APIs no longer exist under Extended Services, every application using these older APIs must be changed to use the newer APIs. The newer Database Manager APIs are documented in the *IBM Extended Services for OS/2 Database Manager Programming Guide and Reference*.

Host Language Support

The following list contains all application programming languages that are supported for developing Database Manager applications:

- · IBM C Set/2
- Microsoft C 6.0
- MicroFocus COBOL V 2.5.37 or higher
- IBM FORTRAN 1.1.1 or higher
- · REXX.

More information on each of these languages and their support as host languages for Database Manager can be found in the *IBM Extended Services for OS/2 Database Manager Programming Guide and Reference*.

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¹ In Extended Edition version 1.1, there was no User Profile Management (UPM). This required that, on the Start Using Database, a password had to be passed.

New APIs for Database Manager

The new APIs available for Extended Services/2 Database Manager are associated with the new functions for Database Manager under Extended Services/2

Here is a list of the new Database Manager APIs and a brief description of each:

- Catalog DCS Database: This routine stores information about a host database in the Database Connection Services directory.
- · Close DCS Directory Scan: This routine frees the resources allocated by the Open DCS Directory Scan.
- · Get Code Page: This routine is used by a Windows Database Client to get the code page of the database it is trying to access.
- · Get DCS Directory Entry for Database: This routine returns an entry from the Database Connection Services directory.
- · Get DCS Directory Entries: This routine transfers a copy of the Database Connection Services directory to an application supplied buffer.
- Interrupt2: This routine allows a Windows Database Client to terminate a database request made by another Windows Database Client application.
- · Open DCS Directory Scan: This routine stores a copy in memory of the Database Connection Services directory entries and returns the number of entries in the DCS directory.
- · Roll Forward Database: This routine rolls forward a database by applying the transactions recorded in the archive logs to the database.
- · Uncatalog DCS Directory: This routine removes a previously cataloged entry from the Database Connection Services directory.

The Database Manager APIs are described in the IBM Extended Services for OS/2 Database Manager Programming Guide and Reference.

Another important point to remember is that some of the Database Manager Data structures have changed from Extended Edition to Extended Services. One example is the data structure used to catalog a NETBIOS entry in the Node directory. A list of the Database Manager data structures can be found in Chapter 10 of the Database Manager Programming Guide and Reference.

32-bit versus 16-bit

The Extended Services Database Manager, as noted previously, can be installed on top of OS/2 2.0 or OS/2 1.3.01 or higher. The Database Manager engine and its APIs are 16-bit. This means that Database Manager, whether installed on OS/2 1.3.01 or 2.0, is running as a 16-bit application.

You CAN write 32-bit applications which can access an Extended Services Database. This process of a 32-bit application calling a 16 bit functions and routines is known as "thunking." The Database Manager header files (SQLENV.H, SQLUTIL.H, and so forth) do the "thunking" for you. So when an application program calls the 16-bit Database Manager APIs from a 32-bit application, it is completely transparent to the program and the programmer.

Extended Services - Communications Manager

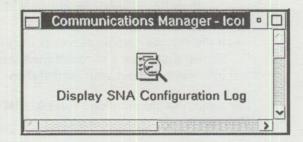
For those Communications Manager users who are not familiar with some of the new Advanced Peer-to-Peer Networking (APPN) concepts, read chapter 12 of this book before continuing.

Chapter 10. Communications Manager Desktop Group

As mentioned in Chapters 1 and 2, OS/2 2.0 has a new graphical appearance called the OS/2 Workplace Shell. When Communications Manager is installed on 1.3 level of the base operating system, only one entry is written to the desktop: Communications Manager. Using IBM Extended Services 1.0, it places two folders on the workplace shell, one titled Communications Manager Desktop Group, and one titled Extended Services Desktop Group. Within each of these folders are objects that a user can select to perform a certain task. As its name implies, the Communications Manager Desktop Group contains Communications Manager specific objects. This chapter describes the different objects found in this group. Also, the Extended Services Desktop Group contains Extended Services object. These objects are used for both Communications Manager and Database Manager. The different objects found in the Extended Services Desktop Group are described in the next chapter. The Communications Manager Desktop Group contains the following objects:

- · Display SNA Configuration Log
- Display Active SNA Configuration
- Manage SNA Logical Links
- · Verify SNA Network Definitions
- SNA Network Definition Configuration
- Format SNA Trace Information
- Configuration File Manager
- · Start/Stop CM Trace.

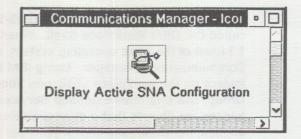
Display SNA Configuration Log



When selected, this icon invokes the command to display an SNA configuration log. This command uses the Presentation Manager interface to display the log entries, allowing the user to view the file_name.LOG file created by the verification process. For more information on the verification process, refer to "Verify SNA Network Definitions" on page 10-3.

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Display Active SNA Configuration

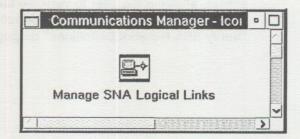


This icon invokes the PMDSPLAY command. This command displays status and configuration information for an active SNA configuration of Communications Manager.

- · The PMDSPLAY command is a Presentation Manager interface of the DISPLAY command.
- The PMDSPLAY command is also invoked when Display active SNA configuration is selected from the Communications Manager Subsystem Management menu. Three operational modes can be selected from the Option pull-down:
 - Display to the screen (the default).
 - Display to the screen and place the display results in a file.
 - Display the active SNA information of a remote (target) workstation. When you select this mode, the active SNA configuration of a remote workstation is displayed. You must provide a configured partner LU name for the remote workstation, and the remote display server program (RDSPSRVR.EXE) must be installed and operational at the remote workstation.
- · If the remote display server is installed and operational at your local workstation, users at remote workstations can acquire active SNA information about your workstation.

For additional information, refer to IBM Extended Services for OS/2 Command Reference.

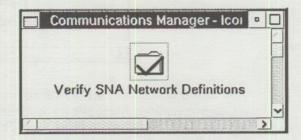
Manage SNA Logical Links



When selected, this icon invokes the command APPNLINK. This command displays information about the currently active link configuration and provides a means to modify the status of the links. This command can also be invoked via

Communications Manager's main menu, which is the same as the SNA Logical Link Management menu. The APPNLINK command uses the Presentation Manager interface to display the information.

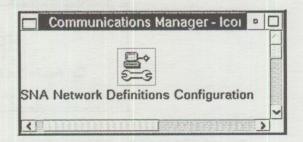
Verify SNA Network Definitions



When this icon is selected, a pop-up window is displayed to ask for the Node Definitions File name (.NDF). This is the Communications Manager configuration file you want to verify. This function verifies a node definitions file and creates a binary configuration file (.CF2) and security file (.SEC). During the verification of the configuration file, all messages are logged to the configuration_file.LOG file.

For additional information on the node definitions file, binary configuration file, and security file, refer to "APPN Functions" on page 13-5.

SNA Network Definition Configuration



This icon invokes the APPNC command. It modifies a Communications Manager Systems Network Architecture (SNA) configuration and creates or edits a node definitions file (.NDF).

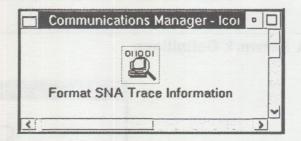
When this icon is invoked, a pop-up menu is displayed to prompt the user for the node definitions (.NDF) file name. The APPNC command then automatically creates the following files if they do not already exist:

- A node definitions file (.NDF)
- · A security file (.SEC)
- A complete message log (.LOG) with both status and error messages.

These files are stored in the directory \CMLIB\APPN.

Note: A matching Communications Manager configuration file (.CFG) must already exist if you use this command to create a new .NDF file.

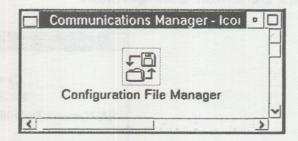
Format SNA Trace Information



This icon invokes the FMTTRACE command. This command allows you to format a Communications Manager trace file into a form that is easier to interpret than the hex data, and formats trace records for the APPC API, APPC send events, and DLC data. You can produce two types of formatted output: a summary file (in sequence diagram form with one line per trace event) and a detail file (with one line per formatted field). FMTTRACE is installed using the "Utilities" selection on the Additional Features panel accessed during installation.

For more information on the FMTTRACE command, see IBM Extended Services for OS/2 Programming Services and Advanced Problem Determination for Communications.

Configuration File Manager



This icon invokes the COPYCFG command. This command gathers all the necessary files for a given .CFG configuration file and copies them to a specified target location. Communications Manager configuration information is contained in several related files when either LAN or SNA is configured. In addition to the primary .CFG configuration file, SNA information is stored in .CF2, .NDF, .SEC, and .LOG files. LAN configuration information is stored in an .INF file.

The COPYCFG command may be used to:

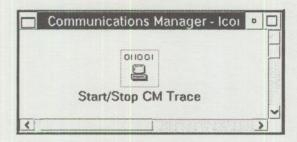
- Automatically copy a configuration file with all its related files to a diskette. Use the configuration file diskette for installing Communications Manager features.
- Automatically gather all configuration information from the various Communications Manager runtime directories to a single directory location. This is useful in managing, maintaining, and distributing configuration files for multiple users.

 Automatically copy a configuration file and all related files to the appropriate run time directories for Communications Manager. This function is useful if you plan to install Communications Manager features using an existing configuration file or simply replace an existing configuration file and its related files.

COPYCFG is installed using the Utilities selection on the Additional Features panel. This panel is accessed during installation.

Start/Stop CM Trace

COPY



This icon invokes the CMTRACE command. This command provides command line control over the Communications Manager trace functions. With CMTRACE, you can start and stop tracing of particular trace categories and copy a trace to a file. CMTRACE provides an alternative means for running a trace. This additional icon and the CMTRACE function is only available when you install "Utilities" on the Additional Features panel during installation. Some of the parameters you can use with this command are:

? Displays an online summary of the CMTRACE command. This is the default. If you do not specify a parameter, the online CM TRACE summary is displayed.

START Starts one or more trace categories using the following options: /key, /api, /data, /event, /reset, /trunc, and /storage. If no trace category is specified, the START option enables any categories previously specified.

Stops one or more trace categories using the following options: /key, /api, /data, and /event. If no trace category is specified, the STOP option stops the tracing of all categories.

Copies a trace to a file using one of the following options: /key or /stdout. Either a file name or the /stdout option must be specified with the COPY option.

AUTOSTART Enables auto-start trace using the following options: /key, /api, /data, /event, /trunc, and /storage. All previously enabled auto-trace options are disabled. If no trace category is specified, the AUTOSTART option enables any categories previously specified.

For additional information, refer to *IBM Extended Services for OS/2 Programming Services and Advanced Problem Determination for Communications*.

Consideration

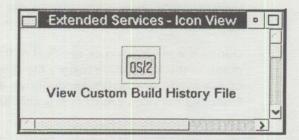
When using the command line interface instead of the menu interface, make sure that you issue the START parameter with the /Reset flag. This is to flush out the previously traced data from the buffer. Otherwise, the newly traced data is appended to the old trace data. When the user selects the Stop Tracing option from the menu interface, the buffer is flushed automatically.

Chapter 11. Extended Services Desktop Group

The Extended Services Desktop Group folder contains installation tools and the online Command Reference. This folder contains the following objects:

- · View Custom Build History File
- Create Custom Install Diskette
- View Install History File
- · Add or Remove Feature
- Extended Services/2 Command Reference
- · Basic Configuration and Installation.

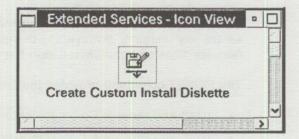
View Custom Build History File



This icon invokes the VIEWBLOG command, allowing the system administrator to view the custom build history file.

Any errors encountered during a custom build are listed in the custom build history file (CUSTBLD.HST). The VIEWBLOG command allows the user to view this error log.

Create Custom Install Diskette

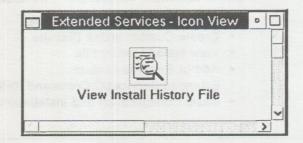


This icon invokes the CUSTBLD command. This command allows the system administrator to create a custom installation diskette used for initial installations on other workstations.

The CUSTBLD command gives the system administrator the ability to answer most of the user's installation questions. The answers to the installation questions are placed on a diskette and then used to install the Extended Services program on other workstations. This allows for a simple end-user installation.

The custom installation diskette must be inserted in drive A during this process.

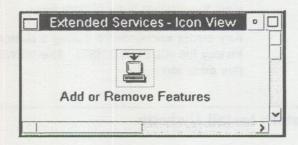
View Install History File



This icon invokes the VIEWLOG command. This command allows the user to view the installation history file to see what was installed or removed and to check for errors encountered during installation.

During the installation or removal of the Extended Services program, entries are made to the installation history file (ESINST.HST), recording what was installed or removed. Any errors encountered during installation or removal of the Extended Services program are also listed in this file.

Add or Remove Feature



This icon invokes the REINST command. This command permits you to selectively install or remove any of the Extended Services components and their features after an initial installation has been completed.

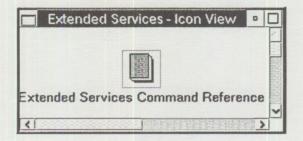
The REINST command provides the following functions:

- Install and remove Communications Manager
- · Install and remove a Communications Manager configuration file and its features
- Install and remove Communications Manager additional features
- · Install and remove Database Manager
- Install and remove Query Manager
- · Install and remove Database Tools
- · Install and remove DOS Database Client Support
- Install and remove DOS Windows Database Client Support.

You need the IBM Extended Services for OS/2 diskettes if you are adding an Extended Services component, such as Database Manager. However, the diskettes are not required to see what has been installed, to remove components, or to add features of a component (such as adding application programming interfaces to Communications Manager).

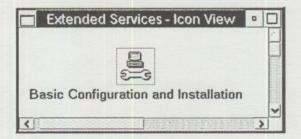
Use the REINST command to make changes to your Communications Manager or Database Manager environments only. Use the ESINST command for initial installations.

Extended Services Command Reference



Extended Services/2 Communications Manager and Database Manager Commands are documented online as well as hard copy. When invoked, this icon has the online documentation for Extended Services/2 commands.

Basic Configuration and Installation



This icon invokes the ESCFG command. It allows the user to create or change a configuration file, either for the local workstation or for another workstation. The following list of functions can be selected for create or change:

- · 3270 terminal emulation
- · ASCII terminal emulation
- 5250 Work Station Feature (AS/400 host or S/36 Host)
- Database Manager using Remote Data Services.

Chapter 12. Programmable Configuration

The Batch Configuration Utility of OS/2 1.3 EE is no longer supported by Communications Manager. It has been replaced by the new Programmable Configuration feature of Extended Services/2. You can now create or modify one or more user-specific configurations using Programmable Configuration commands in a single Restructured Extended Executor (REXX) program. Programmable Configuration commands are an extension to the REXX programming language, and can also be used in application programs by use of the REXX application programming interface (API). Programmable Configuration offers greater flexibility and functionality while enhancing usability with REXX. To use Programmable Configuration, you will need to install this function by choosing Utilities during installation.

Overview of the Batch Configuration Utility (BCU)

BCU lets you manage many configuration files using a prototype or template configuration and an ASCII input file. The ASCII file specifies the name of each new configuration file to create and the parameter values specific to each configuration file. BCU supports creating, updating or deleting the following Communications Manager features:

- · Workstation definition
- · Systems Network Architecture (SNA) data link control support
 - Synchronous Data Link Control
 - Local area networks
 - Twinaxial
 - X.25
- SNA gateway
- Conventional LU Application (LUA) Custom Feature
- 3270 Distributed Function Terminal (3270 DFT) emulation
- · 3270 SNA (Non-DFT) emulation
- X.25
- · LAN Adapter and Protocol Support
- · APPC.

BCU uses the following procedure:

- 1. Use Advanced Configuration of Communications Manager to create a prototype or template configuration file for all the workstations.
- Create the ASCII input file containing the user-specific settings for the workstations.

3. Run the BCU (CMCONFIG).

TEMPLATE.CFG + ASCII input file ==> USER1.CFG USER2.CFG USER3.CFG

MYCONFIG.CFG + ASCII input file ==> MYCONFIG.CFG (updated)

Advantages of BCU:

· Requires no programming skills.

Disadvantages of BCU:

- Many of the options configurable via the Advanced Configuration panels cannot be created or changed via the ASCII input file, requiring multiple prototype configurations and considerable planning.
- The ASCII input file is keyword- and column-sensitive, and rather cryptic unless well documented.
- Each configuration to be created must have its own section in the ASCII input file, since no variables or loop constructs are provided.

Overview of Programmable Configuration

Programmable Configuration replaces BCU, allowing you to manage many configurations. It expands the functionality of BCU by increasing the number of features supported and the number of parameters supported within those features. Flexibility and usability is also enhanced by REXX. Programmable Configuration programs are easily readable, and the REXX variable and loop construct capabilities eliminate the need to use the panel-driven configuration process for most configurations.

New configuration files are created by using a model configuration as a template. Any existing configuration can serve as a model; Programmable Configuration uses one of the IBM-supplied default configurations if one is not specified. You can write a REXX program using your own terminology for commands and parameters if you wish, or use the Programmable Configuration utility to convert your programs into a REXX executable program. Also provided is a utility that converts BCU ASCII input files into equivalent REXX Programmable Configuration programs, to help users of BCU migrate to Programmable Configuration.

Programmable Configuration supports the following features:

- · Workstation definition
- 5250 Work Station Feature
- · Systems Network Architecture (SNA) data link control support for:
 - Synchronous Data Link Control
 - Local area networks
 - Twinaxial
 - X.25

- SNA gateway
- Conventional LU Application (LUA) Custom Feature
- Server-Requester Programming Interface (SRPI)
- 3270 Distributed Function Terminal (3270 DFT) emulation
- 3270 SNA emulation
- Asynchronous Communications Device Interface (ACDI) Port and Device String profiles
- · X.25
- LAN Adapter and Protocol Support
- · Advanced Peer-to-Peer Networking (APPN).

For each feature, you can:

- · Create and update a new record
- · Delete a record
- · Get the field values of a record
- · List record names that optionally meet a qualifier value
- · List all field names of a record
- · Update field values in a record
- · Reset a record.

Additional commands create and update an X.25 Routing Table Entry, a 3270 DFT record, and a 3270 SNA record.

Migration

RCBUPG Migration Tool

The RCBUPG utility is a REXX program provided with Programmable Configuration. It is a conversion program for users of the Batch Configuration Utility, which converts their BCU ASCII input files into equivalent REXX Programmable Configuration programs.

RCBUPG supports all of the Communications Manager features supported by BCU except for APPC. Input the name of the ASCII file to RCBUPG, along with the name of the REXX program and, optionally, the name of the model configuration file you specified when using BCU. The output is a REXX .CMD file having the equivalent function of the BCU ASCII input file.

Using RCBUPG

Use RCBUPG from the OS/2 command prompt. Be sure the BCU ASCII input file is in the current directory.

Syntax

RCBUPG input file output file {model name}

Parameters

The BCU ASCII file name. Specify file name and file input file

The REXX program name. If you specify a file extension it output file

must be .CMD (the default).

model_file Optional parameter specifying a configuration file name of

a model configuration used under BCU.

Remarks

· The syntax of the ASCII file is not checked.

- · Any error messages are written as comments to the output REXX .CMD file with the corresponding BCU record indicated.
- A line beginning with an invalid BCU keyword is skipped and an error message is issued.
- The JOB(BEGIN, job name) and JOB(END) commands are added to the beginning and end of the output file after conversion. The job_name is the name of the output .CMD file.
- Comments are converted into REXX comments without changing their content.
- · The fields following a valid record ID are parsed by column and translated into Programmable Configuration field names.
- · All leading and trailing blanks of a user-specified string are removed after conversion.
- · Any 1 or 2 that indicates Yes or No is converted to Y or N.
- The value of the adapter type in the IEEE 802.2 record in BCU LAN statements is converted to the corresponding Programmable Configuration value.1
- · The ETHERAND network protocol for IEEE 802.2 is converted to the corresponding Programmable Configuration value.1
- The command FILE(VERIFY,'*') is added to the end of the output file to verify the configuration files of that job.
- The output REXX program is stored in the current directory.

Limitations of RCBUPG

All APPC Feature Profile BCU Statements Are Not Converted: APPC feature profiles are no longer valid in Communications Manager, they have been replaced by APPN. It is possible that a converted configuration will not verify if APPC is required for the configuration. APPC lines are converted to comments in the REXX .CMD file, along with error messages.

¹ Refer to IBM Extended Services for OS/2 Programmable Configuration Reference, Appendix D for a conversion table.

The SNA Base Record Is Not Converted

SNA Gateway Pool Class Additions or Deletions Are Not Converted: Records in the ASCII file for adding or removing a pool class to an SNA gateway host connection profile cannot be converted by RCBUPG. The pool classes are always renumbered by Programmable Configuration, and it is impossible for RCBUPG to identify the entry number of a specified pool class to be added or removed.

After verification, the pool class index value for each set of existing field mnemonics with the same pool class index is modified according to the ascending value of the LU_START_ADDR field. The pool class index values begin with 1 and continue in ascending order.

It is a good practice to assign pool class indexes according to the ascending order of the LU_START_ADDR field values, so that the field mnemonics do not change during verification.

Example of Pool Class Renumbering: In the following example, the set of field mnemonics with the lowest LU_START_ADDR value (3) has a pool class index of 5. After verification, this set of field mnemonics has a pool class index of 1, and the set of field mnemonics with the next higher LU_START_ADDR value (10) has a pool class index of 2.

Before verification		After verification	
POOL_CLASS.4	6	POOL_CLASS.1	8
LU_START_ADDR.4	10	LU_START_ADDR.1	3
	11	LU_END_ADDR.1	4
POOL_CLA_AUTOLOG.4	Υ	POOL_CLA_AUTOLOG.1	Υ
POOL_CLASS.5	8	POOL_CLASS.2	6
LU_START_ADDR.5	3	LU_START_ADDR.2	10
LU_END_ADDR.5	4	LU_END_ADDR.2	11
POOL_CLA_AUTOLOG.5	Υ	POOL_CLA_AUTOLOG.2	Y

Because of this renumbering, RCBUPG cannot identify the entry number of a specified pool class to be added or removed. Since it cannot convert the statements, RCBUPG places comment lines in the REXX .CMD file. The BCU ASCII lines

```
FNM USER4
ADD GWH 1111 22 33 4
REM GWH 1111 22 33
```

are converted to the following REXX comments (ACSCFG was the model used in this example.):

```
RC = FILE( ADD, 'USER4', MODEL EQ 'ACSCFG')

/* GATEWAY( PUT, GWH,POOL_CLASS.??? EQ '111',

LU_START_ADDR.??? EQ '22',

LU_END_ADDR.??? EQ '33', POOL_CLA_AUTOLOGO.??? EQ ' ') */

/* ERROR: Adding, removing or updating a CLASS for

gateway host connection is not supported. */

/* GATEWAY( PUT, GWH,POOL_CLASS.??? EQ '', LU_START_ADDR.??? EQ '',

LU_END_ADDR.??? EQ '') */

/* ERROR: Adding, removing or updating a CLASS for

gateway host connection is not supported. */
```

To migrate these statements, we must determine what pool class index should replace the "???" in each of the above PUT commands. Following is a REXX program that can be run after the one created by RCBUPG, to ADD pool classes. It assumes that the configuration file has already been verified by Programmable Configuration (RCBUPG automatically places the FILE(VERIFY,'*') command at the end of the output REXX .CMD file.). This is necessary to insure that the pool class renumbering described above has taken place, thus the pool classes are guaranteed to be grouped in the first 1 through n pool class indexes.

```
/* Find a pool class index for a new pool class, then add it.
                           /* Name of configuration, no extension */
CONFIGNAME='filename'
                           /* Pool Class to add, range 1-254
FIELD1='111'
FIELD2='22'
                           /* LU address range (start)
FIELD3='33'
                           /* LU address range (end)
FIELD4='4'
                           /* Auto-logoff, Y for Yes, N for No
/* FIELD1 through FIELD4 correspond to the fields of the ADD GWH
/* statement in the BCU ASCII input file, except FIELD1 is now
/* only 3 characters in length, and FIELD4 is a 'Y' or an 'N'.
RC=JOB(BEGIN.MYJOB)
RC=FILE(OPEN, CONFIGNAME)
/* Remove the comment marks from the following statement if the
/* configuration hasn't been previously verified by Programmable
/* Configuration.
/* RC=FILE(VERIFY, CONFIGNAME)
DROP FIELDVALUES.
DROP FOUNDINDEX
DROP FREEINDEX
/* Read in all pool class indexes, looking for a match.
/* This can take awhile...
SAY 'Please wait...'
DO L=1 BY 1 WHILE L <= 254
 RC=GATEWAY(GET, GWH, FIELDVALUES.L EQ POOL_CLASS.L)
 IF FIELDVALUES.L=FIELD1 THEN FOUNDINDEX=L
/* If we find an empty slot, that is where we will PUT the new class */
 IF FIELDVALUES.L='' THEN FREEINDEX=L
/* and we know there aren't any more classes to read since the
/* file has been verified by Programmable Configuration already.
    IF FIELDVALUES.L='' THEN L=255
FND
IF FREEINDEX='FREEINDEX' THEN DO
    SAY 'Error: No free pool class indexes.'
    SIGNAL DONE
END
IF FOUNDINDEX \= 'FOUNDINDEX' THEN
  DO
                                                    EQ FIELD1,,
    RC=GATEWAY(PUT,GWH,POOL CLASS.FREEINDEX
                                                    EQ FIELD2,,
                       LU START ADDR. FREEINDEX
                                                    EQ FIELD3,,
                       LU END ADDR. FREEINDEX
                       POOL CLA AUTOLOGO.FREEINDEX EQ FIELD4)
    RC=FILE(VERIFY, CONFIGNAME)
  FND
  SAY 'Error: Pool class 'FIELD1' already exists.'
DONE:
RC=JOB(END)
```

The code to handle removing a Pool Class is a bit simpler:

```
/* Find the pool class index of the pool class to delete, then
  /* delete it.
  CONFIGNAME='filename'
                              /* Name of configuration, no extension */
  FIELD1='111'
                              /* Pool Class to delete, range 1-254
  FIELD2='22'
                             /* LU address range (start)
                             /* LU address range (end)
                                                                     */
  FIELD3='33'
  /* FIELD1 through FIELD3 correspond to the fields of the REM GWH */
  /* statement, except FIELD1 is only 3 characters in length.
  RC=JOB(BEGIN, MYJOB)
  RC=FILE(OPEN, CONFIGNAME)
   /* Remove the comment marks from the following statement if the
                                                                     */
   /* configuration has not been previously verified by
   /* Programmable Configuration.
                                                                     */
   /* RC=FILE(VERIFY, CONFIGNAME)
  DROP FIELDVALUES.
  DROP FOUNDINDEX
   /* Read in all of the pool classes, looking for a match.
   /* This may take awhile...
  SAY 'Please wait...'
  DO L=1 BY 1 WHILE L <= 254
    RC=GATEWAY(GET,GWH,FIELDVALUES.L EQ POOL CLASS.L)
    IF FIELDVALUES.L=FIELD1 THEN FOUNDINDEX=L
    IF FIELDVALUES.L='' THEN L=255
END
  DROP TEMP
   IF FOUNDINDEX='FOUNDINDEX' THEN
   SAY 'Error: Pool Class 'FIELD1' not found.'
  ELSE
       RC=GATEWAY(GET, GWH, TEMP EQ LU START ADDR. FOUNDINDEX)
       IF TEMP=FIELD2 THEN
         DO
           DROP TEMP
           RC=GATEWAY (GET, GWH, TEMP EQ LU END ADDR. FOUNDINDEX)
           IF TEMP=FIELD3 THEN
             DO
               RC=GATEWAY(PUT,GWY,POOL CLASS.FOUNDINDEX
                                                         EQ '',,
                                  LU START ADDR. FOUNDINDEX EQ '',,
                                  LU_END_ADDR.FOUNDINDEX EQ '')
              RC=FILE(VERIFY, CONFIGNAME)
             END
           ELSE
       ELSE
         SAY 'Error: Pool Class 'FIELD1' found but LU_START_ADDR or'
         SAY 'LU END ADDR do not match.'
     END
   DONE:
   RC=JOB(END)
```

The 3270 DFT 3LT Statement Is Not Converted

The BCU ASCII line

```
3LT 11111111 22 33 4(12) 55555555
```

is converted into two comments.

```
/* 3270SNA( PUT, SESSION EQ '?', SESN_ID EQ '111111111' , NAU EQ '22' ) */
/* 3270SNA( PUT, CONNECT, ADAPT NUM EQ '33', DEST_ADDR EQ '444444444444',
X25 DIR EQ '55555555' ) */
```

The user must determine what SESSION record to PUT, by replacing the "?" with a single digit, 1 through 5. Then remove the comment marks.

The LAN NETBIOS Statement Is Not Converted

In fact, the following lines are generated:

```
RC = LAN( PUT, NETB EQ '1', SESSIONS EQ '444',
NCBS EQ '555', NAMES EQ '666',
NETBIOSTIMEOUT EQ '77' )
```

This is partially correct. RCBUPG correctly truncates field 1 to a single character, and converts fields 4 through 6 correctly. Field 7, however, the NETBIOS query timeout, is a decimal value from 0 to 20 representing some half-seconds in the BCU ASCII input file. This needs to be converted to a 3- to 5-digit decimal value from 500 to 10000 representing several milliseconds for Programmable Configuration. RCBUPG does not convert the value at all. Finally, fields 2 and 3 are not converted.

The LAN Shared RAM Address Field Is Not Converted.

The BCU ASCII lines

```
FNM USER6
LN1 01 22 33333 4
```

are converted into the following REXX statements:

```
RC = FILE( ADD, 'USER6', MODEL EQ 'ACSCFG' )
RC = LAN( PUT, IEEE8022 EQ '1', ADAPT TYPE EQ '22',
RAM EQ '????', ETHERAND EQ '4' )
```

The RAM address from the BCU ASCII statement needs to be truncated to four characters to replace the "????" in the above PUT statement. This can be done easily, since the BCU address is 5 hex digits as an absolute address in the first megabyte of real memory, and the Programmable Configuration address is 4 hex digits as a segment address. The conversion can be made by removing the last zero from the BCU address (that is, C8000 becomes C800).

For additional information, refer to the following documents:

- IBM Extended Services for OS/2 Programmable Configuration Reference
- IBM OS/2 Extended Edition Version 1.3 System Administrator's Guide for Communications

Chapter 13. Communications Manager Functions

Installation

Extended Services can be installed on any local drive. However, if you plan to install Extended Services on a driver other than your boot drive, you will need additional 4.5MB of disk space on your boot drive. Extended Services writes IBMCOM and MUGLIB subdirectories as well as other files on your boot drive regardless of which drive you install your Extended Services on.

Communications Manager Files

There are some Communications Manager files that you might want to use when installing the Extended Services program. These files contain information specific to your current Communications Manager configuration. You should backup these files before installing Extended Services. These files are listed below:

- NET.ACC Contains user IDs and passwords for User Profile Management.
 Controls access to protected objects, such as APPC applications and AS/400 host access using 5250 Work Station Feature. See the Guide to User Profile Management for more information.
- filename.CFG Communications Manager configuration files. Describe the devices, optional features, communication parameters, and programs. See the Communications Manager Configuration Guide for more detailed information.
- filename.CPT Communications Manager user-defined code page tables in the range 65280 through 65535. Define character meanings for specific languages and countries used.
- PROTOCOL.INI In Extended Edition, this file contains configuration information for the ETHERAND Network. In Extended Services, this file contains configuration information for all supported LAN networks.

If you install the Communications Manager component of the Extended Services program using a Communications Manager configuration file from a previous version, that configuration file is automatically upgraded (if selected) together with the features it specified.

The configuration services and keyboard remap additional features are automatically installed. You must select any other additional feature that you want to install, regardless of whether it has been installed previously.

Note: If you are upgrading to the Extended Services program from Extended Edition 1.2 or 1.1 and have previously remapped your keyboard, you may have to remap again after installation is complete to restore all the functions you previously used.

Networking Services/2 Files

If you have Networking Services/2 installed on your machine used with Extended Edition Communications Manager, you should consider backing up the following files:

- filename.CFG Communications Manager configuration files. Describe the devices, optional features, communication parameters, and programs.
- · filename.CF2 Contains the information required to initialize the SNA definitions used when APPC is started.
- · filename.SEC Contains the node security information.

If you install the Extended Services Communications Manager component using Communications Manager and Networking Services/2 configuration information from a previous installation, that configuration information is automatically upgraded.

If you install the Extended Services program using Advanced Installation, you can upgrade a valid Communications Manager user configuration file set saved from a previous Networking Services/2 installation. If you have more than one set of such files that you want to use, you can select all of them during Extended Services Advanced Installation.

When you upgrade to the Extended Services program, APPN configuration services are automatically installed as part of Communications Manager configuration services.

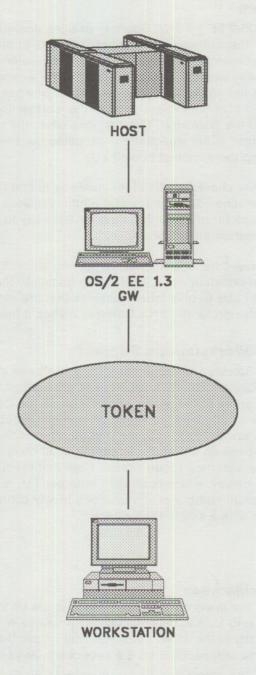
To install the trace utilities and remote display facilities for use with APPN, you must select Utilities in the Communications Manager Additional Features menu.

Refer to Extended Services Workstation Installation Guide for additional information on installation.

OS/2 SNA Gateway

Segmentation

In the OS/2 EE 1.3 environment, the OS/2 SNA gateway does not support segmentation. This means that if the RU size for the upstream link is not configured the same as the RU size for the downstream link, you will receive an error. For example:



In this environment, if the OS/2 EE 1.3 SNA Gateway's Token-Ring RU size is set at 1920, then the downstream workstation's RU size must also be 1920. In a scenario where one of the downstream workstations is limited to a small RU size, for example 256, because the RU sizes must match the gateway, the OS/2 EE 1.3 gateway is limited to the RU size of 256. All the other downstream workstations are also limited to the RU size of 256.

In the Extended Services environment, the OS/2 SNA gateway now supports segmentation. Therefore, you can use different RU sizes between the SNA gateway and the downstream workstations. The OS/2 SNA gateway will take care of the differences in the RU sizes.

New Pooling Algorithm

The OS/2 EE 1.3 SNA Gateway assigns pooled LUs to a supported workstation when the workstation establishes its link to the Gateway. This means that if the workstation is configured to have five sessions through the Gateway, then the Gateway assigns five pooled LUs to the workstation when the workstation brings up its link to the Gateway, regardless of what it really needs. The assigned pooled LUs remain assigned to the workstation until the workstation drops its link to the Gateway. This happens when the user exits out of Communications Manager at the workstation. Stopping the sessions at the workstation does not free up the assigned pooled LUs.

Another characteristic of the gateway is that the auto-logoff function works per workstation. This means that all the sessions at a workstation must be idle for the configured amount of time for Gateway to logoff the sessions at the workstation automatically.

The new Extended Services/2 pooling algorithm does not assign pooled LUs to the workstation when it brings up its link to the Gateway. The Gateway assigns pooled LUs to only those sessions that are started by the end user. Using this new design for the SNA Gateway makes it more efficient to use pooled LUs.

Increased Number of Workstations Support

SNA Gateway environment testing has been extended and, as a result, support for more attached workstations is announced. It is now possible to configure and use up to 254 workstations through the Communications Manager's SNA Gateway attached via single or multiple adapters. Successful operation in a given environment may depend on other factors such as application load and/or line speed so the ability to exploit a full complement of 254 workstations should not be assumed for all cases. Note that the total number of LU sessions (254) per gateway, which is an SNA limit per PU, is not increased. Thus, the maximum number of workstations in any configuration utilizing a single gateway is 254 with a single LU for each.

Migration

Consideration

- If the previous SNA Gateway was set up to support downstream workstations using LU 6.2. these sessions should be redefined to use the Network Node (NN) of the APPN function. This allows the downstream LU 6.2 sessions to use independent LU 6.2 sessions instead of the dependent LU 6.2 sessions.
- In OS/2 EE 1.3, a user with 3270 emulation defined as a pooled LU at the SNA gateway gets a "COMM695" when the pooled LU is not available. With the new pooling algorithm, the same user will no longer see the "COMM695" message.
- Because of the change in the pooling algorithm, an administrator should consider changing some previously defined dedicated LUs to pooled LUs where user environment is appropriate. The REXX Programmable Configuration or the Advanced Configuration can be used to perform the necessary changes.

Warning

If you plan to use the SNA Gateway, you must ensure that your machine is configured with a Fully Qualified Control Point (CP) Name. This name is created automatically during Extended Services install/configuration upgrade based on the Network Name and Puname (Physical Unit Name) in your current configuration file. Be aware that a naming collision means that you may not be able to establish a 3270 session through an Extended Services SNA Gateway to a host.

APPN Functions

Configuration Files

Following are the configuration files used in the APPN environment:

- CFG Communications Manager binary configuration file, which contains DLC, SNA Gateway, X.25, 3270 LU, and LUA information.
- .NDF Node definitions configuration file, which contains an ASCII representation of the verbs used to configure APPN at startup time. You can use the .NDF file to perform additional SNA configuration by editing the file with any type of ASCII editor.
 - This file is created following completion of the SNA Feature Configuration panel during configuration and is placed in the \CMLIB\APPN directory.
- .CF2 APPN binary configuration file, which contains a binary representation of the verbs used to configure APPN at startup time. This file must exist and cannot be empty to start APPN function.
 - This file is created following Verify and is placed in the \CMLIB\APPN directory.
- · .SEC Binary security configuration. This file is created following completion of the SNA Feature Configuration panel during configuration and is placed in the \CMLIB\APPN directory.
- .INI This file supports LAN adapter and protocol function and is stored in the \IBMCOM directory. PROTOCOL.INI is the name of the .INI file for the active configuration on your workstation.

The node definitions (.NDF) and .INI files can be modified using a text editor. You can modify the other configuration files using the Communications Manager configuration panels.

Your entire SNA network should have a name, known as the SNA network name, network ID, or NETID. In addition, each control point, LU, and connection network in the SNA network must be assigned a unique name. This unique name is used by Communications Manager to calculate correct routes.

With Extended Edition Version 1.3, it was not as important to have unique names throughout the SNA network. However, this can cause problems when you upgrade to Extended Services Communications Manager. Duplicate names cause alerts to be generated indicating that Communications Manager has located different owners of the same LU name. Be aware of this condition when you first enable your SNA network.

Using Extended Edition Version 1.3, you were not required to have a network ID. With Extended Services Communications Manager, a network ID is required to enable the SNA routing capability. If you have other nodes connecting with Communications Manager that are expecting a blank network ID, your sessions might fail. This is an important consideration when you are upgrading a configuration to Extended Services Communications Manager. It might require configuration changes to partner LU profiles on the nodes that do not have Extended Services Communications Manager installed.

Specifically, if you used Basic Configuration Services (BCS) with Extended Edition Communications Manager, it might have configured APPC with a blank network ID and LU names that could be duplicated throughout the SNA network. Similarly, Extended Edition Version 1.3 Remote Data Services (RDS) configurations might have LU names that are not unique among workstations.

For more information on SNA Network Naming Conventions, refer to the IBM Extended Services for OS/2 Communications Manager Configuration Guide.

Migration

You can use the following methods to upgrade configurations:

- Communications Manager installation or reinstallation procedures
- Communications Manager Advanced Configuration
- The CMUPGRAD command.

The installation process is the fastest method because it requires fewer steps to upgrade the configurations and install the required features. As an administrator, you can use this method to upgrade your own configuration files.

You can use Advanced Configuration or the CMUPGRAD command to upgrade configuration files for your users because they produce the report file and do not affect features you have loaded on your own workstation. You can then build a Custom Install diskette for each user, specifying the upgraded configuration.

If you are upgrading configurations that already exist in the \CMLIB, Communications Manager automatically overwrites the existing configurations when they are upgraded. If you need the original versions of the configurations, copy them to another directory or archive them.

For detailed steps on how to upgrade your configuration file using one of the above methods, refer to the IBM Extended Services for OS/2 Communications Manager Configuration Guide.

With the Extended Services program, Communications Manager provides three node types:

- Network Node (NN). A Network Node supports the APPN networking features. It provides routing and directory services for the end nodes or low entry networking nodes connected to it. It can also provide intermediate routing services for other network nodes, end nodes, or low entry networking nodes.
- . End Node (EN). An End Node supports the APPN networking features. It must have a connection to a network node.
- · Low Entry Networking (LEN) Node. A Low Entry Networking Node supports APPC communications but does not support the APPN networking features.

By default, when SNA configurations are upgraded, all nodes are upgraded as LEN nodes. This enables the LEN node to use the Communications Manager APPC enhancements but not the APPN networking features.

For information on mapping parameters between Extended Edition 1.3 and Extended Services, refer to the IBM Extended Services for OS/2 Communications Manager Configuration Guide.

Productivity Aids

All of the applications described below are provided as-is and without support of any kind from IBM. No warranties of any kind are offered or implied. IBM is under no obligation to continue to provide these utilities in future software offerings.

ALMCOPY

ALMCOPY supports uploading or downloading files between a PC and a 370 VM host. It has facilities such as "wildcard" naming to enhance performance, particularly with multiple file transfers.

PCPrint

PCPRINT supports printing to one or more PC printers with a wide selection of printer, queues, drivers, and fonts. Printing may be from PC, VM, or MVS/TSO files with many pagination options.

Toggle

TOGGLE provides additional keyboard and mouse support to facilitate control of and navigation between 3270 sessions.

SnapDump

SNAPDUMP is a set of tools designed to facilitate problem determination. It collects data from multiple sources, including errors and traces, formats it for security, and has options for forwarding the data to other service points.

APL Print and Display Fonts

Extended Services Communications Manager supports APL character set. The support includes keyboard entry, display, and print. The product packages a sample configuration profile which includes the APL character set to give the customer something to get started with.

Host Printing via Printer Definition Tables

This function provides additional function and closer control for 3270 host printing. It enables the rotate facility and enhances performance of database applications.

CM STOP API

In the OS/2 EE 1.3 environment, the only way to stop Communications Manager after it is running is via the Communications Manager Main menu under the "EXIT" pull-down. In cases where an application program is used to invoke Communications Manager, it is ideal to have the application program also stop Communications Manager.

In Extended Services, this function is provided. An API is available to stop Communications Manager. Following is detailed information on how to use this API:

```
CmkDeactivateService -
Request to Stop the Communication Manger
This call will have the Communications Manager start exit processing
when the Main Menu is displayed.
CmkDeactivateService (StopType, Service, Reserved 1, Reserved 2, rc)
PARAMETERS
  StopType(USHORT) - input
      Type of stop process requested.
         StopType codes:
         *CMK SOFT 0 - Exit when Complete
         *CMK HARD
                    1 - Exit Immediate
  Service(ULONG) - input
      Service number of Communication Manager
         *CMK ALL FEATURES
                            1 - Stop Communications Manager
  Reserved 1(ULONG) - input
      Reserved and should be set to 0
  Reserved 2(USHORT) - input
      Reserved and should be set to 0
  rc(USHORT) - return
      Return code descriptions are:
              CMK CUCCESSFUL
      22
              CMK ERR-INVALID SERVICE
      23
              CMK ERR SYSTEM ERROR
```

This API requests the Communications Manager to start exit processing. The CMK SOFT stop is the equivalent of selecting "Exit when Complete" from the EXIT pull-down on the Communications Manager Main Menu. The CMK HARD stop corresponds to the "Exit immediately" option.

Processing of the stop request only occurs when the Main Panel is being displayed, or when user returns to the Main Panel after performing some action such as configuration.

Note: Two calls are actually required to stop Communications Manager. There is a registration call which must precede the CmkDeactivateServices. See the System Management Programming Reference for details. There is an executable version of a program (CMSTOP) on the Sample Program diskette that can be used to exercise this interface.

3174 LAN Over Coax

The 3174 Peer Communications provides peer-to-peer communication for programmable workstations connected to an IBM 3174 Control Unit via IBM 3270 communications adapter using currently supported wiring media: coaxial cable or telephone twisted-pair wire.

This function provides LU 6.2, IEEE 802.2, and NETBIOS data flows to other LAN participants via coax attachment. Therefore, it allows customers to use installed coax to access LAN servers and other functions.

The two major components required for LAN over coax are:

- The LAN over coax MAC driver (IBMXLN.OS2) that resides in the \IBMCOM\MACS sub-directory.
- The 3174 Peer Communication Licensed Internal Code feature for Configuration Support C Release 1 that resides in the 3174 Establishment Controller.

ROPS

A network can be managed remotely by initiating commands from the NetView program that are processed on an OS/2 workstation. The standard output generated by the command is returned to the NetView program on the host.

Extended Services/2 contains two functions that provide for this network management capability. These two components are Service Point Application Router (SPAR) and Remote Operations Service (ROPS). SPA Router and ROP Services provide the following features:

- Support of multiple local area networks (LANs) and multiple physical units (PUs)
- · Administration of large area networks
- · A tool for system administration
- · Administration of different domains.

SPA Router is an OS/2 program that receives the command from the Host NetView program and sends it to the specified OS/2 application. The application can be any OS/2 program that runs in protected mode. The advantage of having a separate program, the SPA Router, that directs the commands to the applications is that multiple OS/2 applications can receive commands from NetView concurrently.

ROP Service is an application that processes the command sent by the NetView program through the SPA Router. The commands sent to ROP Service may be any OS/2 command that has a command line interface and that does not need interactive user input. In addition to using ROP Service, you can also send commands from the NetView program through the SPA Router to IBM LAN programming interface (API) for SPA Router to develop your own applications.

Persistent Verification

The persistent verification enhancement consists of a sign on (see note below) of a user from a local LU and an initial user verification by a remote LU. The results of the user verification persist across subsequent conversation requests from that user to that remote LU until the user is signed off from that remote LU.

Note: The term "sign on" is distinguished from the term "log on" in that "sign on" is the action taken when a local LU sends an Attach which indicates "sign on" ALLOCATE with the security parameter set to SAME to start a conversation. "Log on" is the term used in this context as a local application facility which provides user ID and password verification.

Signing on consists of providing a valid user ID and password along with an indication of a desire to "sign on" in the outbound Attach command to the remote LU. Attach is generated from the ALLOCATE verb issued to the LU from a Transaction Program (TP) to begin a conversation. The user ID and password are retrieved via OS/2 ES and UPM, when the ALLOCATE SECURITY parameter equals SAME. With a successful sign on, the user's ID and other relevant information are entered in the local LU's Signed On To list and the remote LU's Signed On From list.

After a user's LU has successfully "signed on" the user to a remote LU, that user may request access, via conversations, to secure resources at the remote LU without provision of the user's password in subsequent outbound Attach requests; the remote LU considers the user "Already Verified."

Signing off is the removal of the user's ID and the LU name from the local and remote LU's Signed On lists.

Extended Services/2 will provide PV send support only.

5250 Workstation Feature (WSF) in Text Window

In OS/2 Extended Edition/2 V.1.3, the 5250 Workstation Feature is presented in the full screen. If the user applied CSD 5015, the 5250 WSF can then be chosen to run in the text window. This function is provided in the OS/2 Extended Services/2. By default, 5250 WSF is run in text window rather than in full screen. Use the following steps to change mode back to full screen:

- 1. Edit STARTCM.CMD in the \CMLIB directory.
- 2. Place a REM before the SET EM5250 = WIN statement.
- 3. CM will need to be stopped and restarted after this change for it to take effect.

File Transfer Support for Extended Attribute

Extended Attributes (EAs) are supported by both the HPFS and FAT file systems. EAs are used by file systems to maintain a set of information about each file. This information consists of a STANDARD set such as: date of creation, date of last access, and so on, and any additional data added by user application, the operating system, or the file system. EAs are not a part of the file object's data, but are maintained separately and managed by the File System that maintains the file. A file that has an Extended Attribute marked as CRITICAL is considered to be unusable without the information stored in the EA. Therefore, a warning is created if files with the Extended Attributes marked critical are to be transferred.

Auto-activate DLC after Failure

If adapter failure occurs in Extended Services/2 Communications Manager, the adapter will always be reactivated after the adapter is working. This feature only applies to the SNA connections and excludes X.25.

Device Driver

Asynchronous Device Drivers

On a PS/2 Model 90 or Model 95, both ASYNCDDC and ASYNCDDB drivers are provided in the CONFIG.SYS when support for asynchronous ports is installed. The ASYNCDDC driver is the high speed device driver for up to 64 KBPS. If DMA is not present for COM1, then the code will use ASYNCDDB.SYS. Otherwise, if DMA (high speed capability) is present, then ASYNCDDC is used.

NETBIOS Drivers

NETBEUI.OS2 is used for the logical link control interface; NETBIOS.OS2 handles IBM NETBIOS API requests.

Chapter 14. Installing Extended Services for OS/2 from an Alternate Drive

Extended Services

Extended Services installation utilities are no longer restricted to using diskette drive A:. They now support the use of an alternate drive, which may be any valid local or remote drive. This section documents a procedure for installing Extended Services from an alternate drive.

The following installation utilities support an alternate drive:

ESINST

Initial install

REINST

Adding and removing features

ESCFG

Basic configuration and installation

ROPS

ROPS (Remote Operations and SPA Router) installation.

Note: When you use the Custom Installation selection during initial install

(ESINST), the custom install diskette must be in drive A:.

Sample Scenarios

Installing from a Remote Drive

1. Use the XCOPY command to copy all of the Extended Services diskettes into a single directory on the remote server.

Note: This only needs to be done once at the server.

2. Establish your connection to the remote drive on the server. For example, you may use LAN Requester to obtain access to the remote server.

Note: Extended Services alone does not provide support for a redirected install to a remote drive.

3. Before starting the installation process, from the OS/2 command prompt, SET SRCDRV=source path

where source path is the path to the directory on the remote drive.

Note: Do not append a "\" to source path.

For example, if you wish to install Extended Services from Z:\ES10, type: SET SRCDRV=Z:\ES10

- 4. Type in the appropriate commands as follows:
 - · For initial install:

Z:\ES10\ESINST

For adding and removing features:

 For basic configuration and installation: **ESCFG**

· For ROPS installation:

Z:\ES10\ROPS

Note: The source path should not precede REINST and ESCFG.

Installing from a Local Hard Drive

- 1. Use the XCOPY command to copy all of the Extended Services diskettes into a single directory on the local drive.
- 2. Before starting the installation process, from the OS/2 command prompt,

SET SRCDRV = source_path

where source path is the path to the directory on the local drive.

Note: Do not append a "\" to source path.

For example, if you wish to install Extended Services from C:\ES10, type: SET SRCDRV=C:\ES10

- 3. Type in the appropriate commands as follows:
 - · For initial install:

C:\ES10\ESINST

· For adding and removing features: REINST

· For basic configuration and installation: ESCFG

· For ROPS installation:

C:\ES10\ROPS

Note: The source_path should not precede REINST and ESCFG.

Installing from a Local Diskette Drive (other than A:)

1. Before starting the installation process, from the OS/2 command prompt,

SET SRCDRV=d:

where "d:" is the alternate diskette drive. Do not append a "\" after the ":" when entering the SET command.

For example, if you wish to install Extended Services from your B: drive, type:

SET SRCDRV=B:

- 2. Type in the appropriate commands as follows:
 - For initial install:

B:\ESINST

· For adding and removing features:

REINST

· For basic configuration and installation:

ESCFG

· For ROPS installation:

B:\ROPS

Note: The "d:," should not precede REINST and ESCFG.

Additional Information

Installing from an Alternate Drive and Regular Install

Installations from drive A: and from an alternate drive can be mixed if you always use the same diskette type.

If you plan doing installations of both types, do the following:

- 1. Create separate directories for 31/2 and "51/4" diskette type.
- 2. Copy the diskettes to their corresponding directories.
- 3. When setting SRCDRV, point to the directory that matches the drive type in the machine.

Separate Packages

There are two Extended Services packages:

- Extended Services for OS/2
- · Extended Services with Database Server for OS/2.

If you plan doing installations of both types, do the following:

1. Create separate directories for each package.

- Copy the diskettes to their corresponding directories.
- 3. When setting SRCDRV, point to the directory that matches the package you want to install on the machine.

Database Client Application Enablers

The Database Client Application Enabler installation is not restricted to using a diskette drive. It supports the use of an alternate drive, which may be any valid local or remote drive. This section documents a procedure using SQLINST, the Database Client Application Enabler install program, to install from an alternate drive.

The install program attempts to use the drive that it was started from as the source location of the files to install. If the files are not found, it prompts for a drive for the files. The prompts refer to diskette drives, although any drive is valid. If the files to be installed are on a drive different from the install program, that drive can be specified as a parameter to the install program.

For example:

SQLINST d

Note: When you use the Custom Installation selection during install, the custom install diskette must be in drive A:.

Sample Scenarios

Installing from a Hard Drive

- 1. Use the XCOPY command to copy all of the Database Client Application Enabler diskettes (including subdirectories) into the root directory of a single drive.
- 2. If the drive is a remote drive, establish a connection to the drive. For example, you may use LAN Server 2.0 to access the remote server.

Note: Extended Services does not provide support to connect to a remote drive.

3. Type in the appropriate command as follows:

z:\SQLINST

where "z:\" is the hard drive.

Chapter 15. Problem Determination Aids

Communications Manager Trace Events

The OS/2 Communications Manager provides users and administrators with several tools to determine which components may be failing or causing problems. Among these are the message log, the error log, and the trace facility.

There are several reasons to use the trace facility in OS/2 Communications Manager. The simplest scenario is when all the configured functions are working correctly. Here, the user should take a trace of the scenario for the records. If problems are encountered later, the good trace data can be compared to the problem trace data.

Another scenario is when two devices are having a problem communicating. If the error log and message log do not provide enough information to fix the problem, then a trace can get the detailed information to solve the problem.

A user can also invoke the trace facility to find problems with user-written applications for specific communications Application Programming Interfaces (APIs). This helps the user determine which calls were issued and which return codes resulted.

There are two ways to use the trace facility. The first is to start tracing a specific event after Communications Manager has been running. For example, a user needs to log on to the host and a database server across the LAN. The logon to the host is successful; however, when starting the connection to the database server, communication fails. Now, to identify the source of the problem, it is not necessary to trace the information connecting to the host. Instead, start the connection to the host, then turn on the trace to capture the data going to the database server.

The second way is to start the trace automatically when Communications Manager is started. This allows the user to trace the functions Communications Manager is automatically starting. For example, Communications Manager allows the user to automatically start 3270 sessions. If this option is set, when Communications Manager is brought up, Communications Manager keeps control until the 3270 sessions are brought up. If there is a problem with the host connection, and the auto-start 3270 session is selected, then the user will not see the connection traces unless the auto-trace is not turned on.

Many functions and components can be traced by the trace facility, including the following:

- APIs. APPC, SRPI, ACDI, SERVICES, X.25, EHLLAPI, LUA_RUI, LUA_SLI, and SUBSYSM
- DLCs. DFT, IBMPCNET, SDLC, IBMTRNET, X.25, TWINAXIAL, X.25 FRAM, and ETHERAND
- Events. Figure 1 lists all 30 Communications Manager trace events that can be used in problem determination and contains detailed information on each of the trace events. Trace events are not documented anywhere, but the

information captured by trace events may help identify the source of the problem. For example, look at event 5, which captures data about exchange identifiers (XIDs). XIDs are used to establish logical links. Therefore, if you have a problem establishing a session with another device, event 5 trace data can help determine whether the XID exchange is successful, and if not, what data is being passed.

If the trace data becomes so large that it will not fit in the trace file, the file wraps; that is, new entries will be written over previous ones. Therefore, be careful when tracing and interpreting system events as there will be no warning.

Note: Ensure your trace buffer is large enough to accommodate your trace data.

The traced data is written to a file in binary format. To make this data readable, use the trace formatting tool provided by OS/2 Extended Services or Networking Services/2.

Figure 1 shows an example of the XID trace entry in hex format. Figure 2 shows the formatted output of the hex XID entry in figure 1.

System Event Number	System Event Function	System Event Description	
1 messallen A. Remains and A. Remains and E. Messallen an	APPC CCB	This trace event displays command control block information. These trace entries are of little significance outside the development organization.	
2	APPC INT	Except for the fact that the verb IDs are different, these trace events look exactly like the regular APPC API trace entries. Also, these entries are copies of control blocks that are passed from the application to the APPC subsystem and the control blocks that are returned from the APPC subsystem to the application.	
	APPC PROCESS	APPC includes several processes/functions. These processes are based on the SNA LU 6.2 architectural model. These processes can be created, destroyed, dispatched, and suspended. The process event entries trace the progress of these processes.	
4	APPC SEND/RCV	This trace event traces the exchange of internal communications signals.	
5	APPC XID	This system event traces the XID frames that are exchanged.	

System Event Number	System Event Function	System Event Description	
6	ASYNC API	This trace event collects data from internal events within the ACDI subsystem. This trace event should be selected for all ACDI and Async Emulator traces.	
7	ASYNC EMULATOR EVENT01	This trace event traces the internal operations of the Async Emulator. This trace event should be selected for all Async Emulation problems.	
8	ASYNC EMULATOR EVENT02	This trace event logs Async File Transfer information. Select this trace when tracing a file transfer problem.	
9	DFT	The DLC trace events capture information that is passed within the DLC layer. This is the DLC level trace event for DFT.	
10		Same as event 9 except it traces the PCNET data.	
11	SDLC	Same as event 9 except it traces the SDLC data.	
12	COMMON SERVICES	Trace event for the SERVICES API. These APIs are Communications Manager services verbs. (Convert, Copy_Trace_to_File, Define_Dump, Define_traceetc.).	
13	SRPI EVENT01	Trace event for Server-Requester Programming Interface (SRPI).	
14	IBMTRNET	Same as event 9 except it traces the Token-Ring data.	
15	3270 EVENT01	This trace selection invokes the tracing of internal 3270 function calls.	
16	3270 EVENT02	This trace selection traces a set of very low level internal calls.	
17	5250 EMULATOR EVENT01	Trace event for the 5250 workstation feature.	
18	5250 EMULATOR EVENT02	Same as event 17.	

System Event Number	System Event Function	System Event Description	
19	X.25 API EVENT01(XACI)	This trace selection causes tracing of the X.25 Adapter code Interface (XACI) to occur. This data is not readily interpreted by the customer or support personnel.	
20	X.25 DLC	This trace selection should be used for SNA problems in the X.25 environment. This data is not readily interpreted by the customer or support personnel.	
21	TWINAXIAL DLC	Same as event 9 except it traces the TWINAXIAL data.	
22	SRPI EVENT02	Same as event 13.	
23	X.25 API EVENT02(INTERNAL VERBS)	This trace selection causes the tracing of internal X.25 API operations.	
24	X.25 API EVENT03(Q-THREAD)	This selection is important in the problem determination of X.25 API operations for internal problems.	
25	LUA	Trace event for LU Application (LUA).	
26	Not currently used.	Not currently used.	
27	3270 HOST GRAPHICS I	Trace event for Host Graphics.	
28	3270 HOST GRAPHICS II	Same as event 27.	
29	ETHERAND(ETHERNET)	Same as event 9 except it traces the ETHERAND data.	
30	SUBSYSTEM MANAGEMENT API	Trace event for Subsystem Management API. These APIs allow applications to call the Subsystem Management functions such as CNOS, DEACTIVATE_LOGICAL_LINK, DEACTIVATE SESSION,etc	

```
<==SEND===== IBMTRNET #00 40000155101104 42B817C2926F2520 XID
                                                                  10:07:48:81
   325F05D1 53110000 8034C000 00000080 <2_.JS....4.....>
                                         <...q..i......4>
<APPNKALICE..7|AA>
   00010B71 00078900 01000001 000E0BF4
   C1D7D7D5 4BC1D3C9 C3C50E09 F77CC1C1
   C1C1C1C1 C1102800 1111040E 02F5F6F2 <AAAAA.(.....562>
   F1F2F1F3 F0F1F1F0 F0161103 130011F8
                                            <121301100.....8>
   F5F7F0F0 F0F0F0F0 F0F0F0 F0F0F0
                                            <5700000000000000000 >
```

Figure 15-1. OS/2 Communications Manager XID Trace - Hex>

```
EMTTRACE
(C) Copyright IBM Corporation 1990, 1991
          1 Send XID
Time stamp: 10:07:48:81
DLC type: IBMTRNET
Adapter number: 00
Destination address: 40000155101104
ALS ID: 42B817C2926F2520
XID:
  Format = 3
  Node type = 2
  Total length = 95
   Node ID = 0 \times 05 d15311
   Init-self = Cannot receive
   Stand-alone BIND = Can receive
   BIND segment generation = Can generate
   BIND segment receipt = Can receive
   ACTPU suppression = ACTPU requested
   APPN network node = No
   CP-CP sessions requested = Yes
   CP-CP sessions supported = Yes
   Exchange states indicator = Negotiation proceeding
   Secondary into non-activation = Not supported
   Adaptive BIND pacing sender = Supported
   Adaptive BIND pacing receiver = Supported
   Parallel TGs = Supported
   TG number = 0
   DLC type = SDLC
   DLC data length = 11
   ABM = Supported
   Link station role = Negotiable
   Short hold mode status = Not reconnection
   Short hold mode capability = Not supported
   Transmit/receive capability = Primary
   Maximum receive BTU length = 1929
   SDLC CR profile = SNA
   SIM/RIM options = Not supported
   Maximum I-frames before ACK = 1
   Network name control vector:
      Network name type = CP
      Name = APPN.ALICE
   Network name control vector:
      Network name type = LS
      Name = @AAAAAAA
   Product set ID control vector:
      Hex dump:
                                                   <.(.....56212130>
         10280011 11040e02 f5f6f2f1 f2f1f3f0
                                                  <1100.....857000>
         f1f1f0f0 16110313 0011f8f5 f7f0f0f0
         f0f0f0f0 f0f0f0f0 f0f0
                                                   <00000000000
```

Figure 15-2. OS/2 Communications Manager XID Trace - Formatted

Trace events can be turned on in two different ways. One is to use the menu interface provided by Communications Manager; the other is to use the command-line interface. OS/2 Extended Services comes with a command line interface. OS/2 Extended Edition 1.3 and earlier releases do not provide the command line interface. However, if SAA Networking Services/2 is installed, you can use the command line interface under OS/2 Extended Edition 1.3. For more information about the command-line interface, refer to the *Programming Services* and Advanced Problem Determinations Guide.

Use the following steps to use Communications Manager's menu interface to turn on the trace events:

- 1. From Communications Manager's main screen, press F10 to go to the action bar.
- 2. Select Advanced.
- 3. From the pull-down menu, select option 3, Problem Determination Aids.
- 4. Select option 2, Trace Services.
- If you are not using the auto-trace facility, go to step 8. If you are using the auto-trace facility, continue with step 6.
- 6. Select option 6, Auto-Trace Services.
- 7. Choose option 1, Select and Store Auto-Traces. Skip step 8.
- 8. Select option 1, Select Traces.
- 9. At the Trace Type Selection menu, move the cursor to Advanced Trace Selections. Press the space bar to select it, then press Enter.
- 10. At the Advanced Trace Selections menu, you see the different events. Move your cursor to the event(s) you want to turn on, and press the space bar to turn on an event. To turn off the selection, press the space bar again.
- 11. After selecting all the events, press Enter to save the information.
- 12. Back at the Auto-Trace Services panel, select Trace Storage Size.
- 13. Set the size to 16 x 64k.
- 14. Back at the Auto-Trace Services panel, select Enable Auto Trace.
- 15. Press the Esc key to get out of the Auto-Trace Services menu.
- 16. Press the Esc key to get out of the Problem Determination Aids menu.
- 17. You are back to the Communications Manager main menu, and the trace events are turned on.
- 18. Exit Communications Manager.
- 19. Restart Communications Manager and re-create the problem.
- 20. At the point of the failure, go back into Communications Manager's Problem Determination Aids and Trace Services
- 21. From Trace Services, select Stop Traces.
- 22. Select Copy Storage Trace to File.

There are many different tools to help you perform problem determination in Communications Manager. This chapter showed one of the tools: trace events. Trace events should be used as the final problem determination tool. Check the message log, error log, and other traces before using the trace events. Understanding the use of these various tools will help you find the source of the problem.

Chapter 16. LAN Adapter and Protocol Support (LAPS)

OS/2 EE LAN Transport

The LAN transport subsystem of OS/2 EE is designed and implemented by using the IEEE 802.2 interface. This means that all communications between workstation and attached network are conducted using the IEEE 802.2 interface. This environment has many limitations:

- · Complex and hard to maintain
- · Tightly coupled to adapter hardware
- Must support new IBM or OEM adapter at IEEE 802.2 interface
- Adapter support tied to operating system support release.

IBM Extended Services/2 LAN Transport

The LAN transport function in Extended Services/2 has been enhanced. This new LAN transport is called the LAN Adapter and Protocol Support (LAPS). It provides the following enhancements:

- Support for EE 1.2 and EE 1.3 supported adapters.
- Support for new IBM LAN adapters including the IBM Token-Ring Busmaster adapter card/A.
- · OEM adapter enabling allows for increased adapter support.
- Support for multiple LAN protocols including NETBIOS, IEEE 802.2, TCP/IP.
- Improved performance for NETBIOS, IEEE 802.2 and TCP/IP.
- Support for up to four network adapters. (Communications Manager functions that use LAN still limit supported adapters to two.)
- · PM screens for ease of configuration.
- Programmable Configuration can be used to configure LAPS.

Network Driver Interface Specification (NDIS)

The Network Driver Interface Specification (NDIS) Version 2.0 provides a standardized method for communications between network adapter drivers and protocol drivers. *Network adapter drivers* are drivers that interface between NDIS and a network adapter. *Protocol drivers* are drivers that interface between NDIS and an application.¹

MAC layer interface (NDIS 1.02) that optimizes performance for NETBIOS (not multi-threaded, round-robin routing), increases the number of adapters and type of adapters that are supported (by writing MAC device drivers for the cards) and supports multiple LAN protocols applications. LAN Server 2.0 uses LAPS. The NetBeui protocol is the NETBIOS internal interface.

The file named PROTOCOL.INI contains the NDIS configuration information for network adapter drivers and protocol drivers for a workstation. Your LAPs

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¹ OS/2 SAPR Guide

configuration selections determine the LAN configuration information in this file. At system startup, network adapter driver and protocol driver combinations that you selected in LAPs configuration are bound together. The binding process allows network adapter drivers and protocol drivers to exchange information so that they can communicate.

Differences

In migrating from Extended Edition 1.3 to Extended Services 1.0, you will find that some LAN parameters no longer exist. You will also find that there are new parameters added to the PROTOCOL.INI file.

IEEE 802.2

These IEEE 802.2 parameters used to exist in the .CFG file. They do not have equivalent parameters in the PROTOCOL.INI file.

- Load LAN support. Drivers will be loaded if configured and the configuration file is installed.
- Maximum members per group SAP. It is now fixed at 128.
- Adapter work area size this value is now fixed at 16KB.

The following parameters are new parameters that are added to the PROTOCOL.INI file:

- · LAN adapter type
- Shared RAM location
- Transmit buffer size
- · Number of transmit buffers
- · Receive buffer size
- Minimum receive buffers
- · Override token release default.

NETBIOS

The following parameters used to be in the NETBIOS profile in the .CFG file. They no longer exist in the PROTOCOL.INI file.

- Load NETBIOS support
- · Datagrams use remote directory
- · Maximum link stations
- Ring access priority.

Note: NETBIOS links are no longer tied to IEEE 802.2 links. They are configured indirectly in the NETBEUI section of PROTOCOL.INI using the sessions keyword. One link is allocated for every session allocated. The default is 40 and is independent of adapter type.

Migration/Coexistance Considerations

Assume that you are using IBM EE 1.3x with a user configuration file created either by the BCS or by the Advanced installation. This configuration file is automatically upgraded when you use it to install IBM Extended Services/2 using Advanced Installation Main Menu. The Extended Services/2 migrates the existing .CFG file parameters into the PROTOCOL.INI file. However, if the file contains Database Manager information, only the Communications Manager part is installed. You must re-select Database Manager options you need during Advanced Installation

If you are installing the OS/2 NETBIOS Database Client over IBM Extended Edition 1.3, all existing Database Manager, Communications Manager, and LAN requester functions of your IBM Extended Edition configuration are not usable after the OS/2 NETBIOS Database Client has been installed. If you need functions other than those provided by the OS/2 NETBIOS Database Client, you must install the Extended Services program.

OS/2 EE 1.2 and 1.3 configure the Ethernet networks in the PROTOCOL.INI file. Ethernet parameters from these previous environments are migrated into the appropriate section in the PROTOCOL.INI file.

The Extended Services installation program either replaces an existing PROTOCOL.INI file or merges LAN configuration information into it. If LAN Server 2.0 is not installed on the target workstation or an OEM protocol driver is not configured in the existing PROTOCOL.INI file, the Extended Services installation program replaces the existing PROTOCOL.INI file on the target workstation.

A merge of LAN configuration information into an existing PROTOCOL.INI file occurs only if LAN Server 2.0 is installed on the target workstation or an OEM protocol driver is configured in the existing PROTOCOL.INI file on the target workstation.

The Extended Services installation program searches for an existing PROTOCOL.INI file in the IBMCOM subdirectory of the boot drive only. In PROTOCOL.INI file replacement, the old PROTOCOL.INI file is renamed to PROTOCOL.BAK and placed in the OS2\INSTALL subdirectory of the boot drive.

For more information on LAPS, refer to the IBM Extended Services for OS/2 LAN Adapter and Protocol Support Configuration Guide.

In addition to packaging OS/2 LAN Requester with LAN Server 2.0, other changes were made that may have an impact on migration to the LAN Server 2.0 environment. NETBIOS and IEEE 802.2 support code has been replaced with a new NETBIOS and IEEE 802.2 implementation that supports the Network Driver Interface Specification (NDIS) Version 1.02. Because of these changes, NETBIOS no longer requires the 802.2 interface. The new code, which is referred to as LAN Adapter and Protocol Support, is included in both LAN Server 2.0 and the Extended Services program.

Up to four adapters are supported in one machine. Restrictions are:

- No more than two Token-Ring Network adapters are supported.
- PC Network and Ethernet adapter combinations are not supported.
- · No bridging or routing support has the multiple adapter capability because of NETBIOS restrictions.

If you choose to install four adapters, the IBMLAN.INI file will list four NET statements and the PROTOCOL.INI file will also list four entries under the NETBEUI NIF section to initialize the adapters.

The application must be able to identify the adapter number it needs via the NCB ADPTR NUM field that is being expanded to include 02 and 03 (existing applications will change the field to 0 or 1). LAN Server 2.0 can identify the appropriate adapter number although not all NETBIOS applications have this capability.

Interrupts are a major consideration in this environment. The total number of adapters is hardware-dependent (some Personal Computers only have three slots).

If you are currently using Extended Edition and you want to install Extended Services and LAN Server 2.0, you must install Extended Services first to ensure proper migration of configuration information related to IBM adapters. Extended Services migrates information from the .CFG files and the PROTOCOL.INI file, whereas LAN Server 2.0 migrates information only from the PROTOCOL.INI file. If you install LAN Server before Extended Services, the .INI file will be a higher level than the one Communications Manager is expecting to migrate.2

Configuration Files

Changes made through the LAN Adapter and Protocol Support interface impact your PROTOCOL.INI file. This file replaces the .CFG files that were updated via Communications Manager NETBIOS and IEEE 802.2 panels. The IBMLAN.INI and PROTOCOL.INI files have some parameter relationships, similar to those between IBMLAN.INI and the .CFG files in previous releases. Those relationships are as follows:

IBMLAN.INI NET Line Sessions X1 Commands X3 Names

Maximum sessions X2 Maximum commands (NCBs) Maximum names PROTOCOL.INI LANDD NIF

PROTOCOL.INI NETBEUI_NIF

IBMLAN.INI NET Line Maxusers Sessions (NET Line, X1) Names (NET Line, X3)

Maximum number of users Maximum link stations Maximum names

Note: Use the LAN Services Installation/Configuration program to make changes.

For more information see:

- IBM Operating System/2 Local Area Network Server Version 2.0 Network Administrator Reference Volume 1: Planning and Installation
- Extended Services/2 V1.0 LAN Adapter and Protocol Support Configuration Guide
- IBM OS/2 LAN Server V2.0 Network Administrator Reference Volume 2: Performance Tuning.

² OS/2 2.0 SAPR Guide

Personal Communications/3270 Migration

Internal IBM users can get a copy of this section of the document from the PCTOOLS or MKTTOOLS disk. It is part of the PCOMDOCS PACKAGE and is called PCOMOS2 TERS3820. From a command line the IBM User can enter:

TOOLS SENDTO KGNVMZ PCTOOLS PCTOOLS GET PCOMOS2 TERS3820

Chapter 17. PC/3270 for Windows on OS/2

This part of the document shows you how to set up PC/3270 for Windows on the OS/2 Version 2.0 operating system and how to make it work as a Windows application running from the OS/2 desktop.

Installing PC/3270 for Windows

This section covers installing PC/3270 Windows Mode and any Corrective Service Diskettes. You must have installed OS/2 Version 2.0 and included the Windows support in order for this to work.

From the OS/2 Desktop:

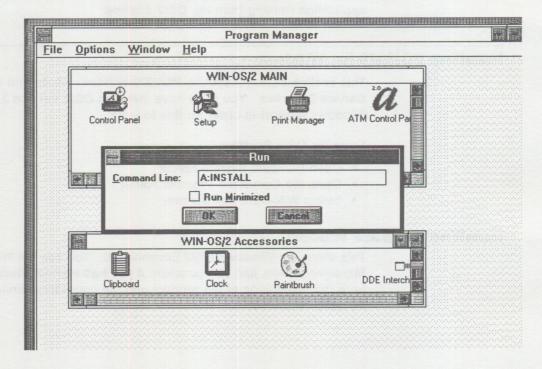
- · Open the OS/2 System Folder
- · Open the Command Prompts Folder
- · Select WIN-OS/2 Full Screen.

Installing the Base Product

This starts the Windows-OS/2 Environment. You see the Windows Program Manager screen, just as you would if you had started Windows natively. From here the installation of the product and the corrective service is just as it would be under Windows.

From the Program Manager Action Bar:

- · Select File
- · Select Run
- Insert PC/3270 Windows Diskette 1 in the A: drive
- On the command line enter: A:INSTALL



Now, fill out the installation and configuration screens just as you do when installing PC/3270 directly under Windows. The screens that follow are for a simple DFT (coax) connection with 2 host sessions.

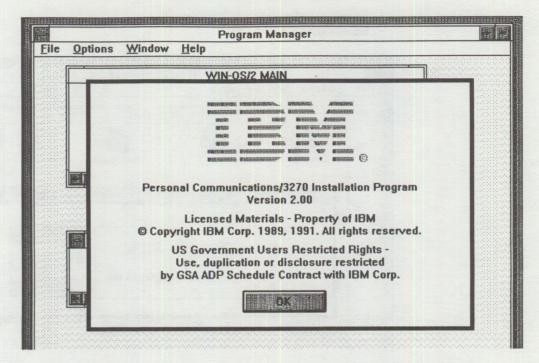
In this sample installation, we will use the following conventions throughout this part of the document:

is the drive where OS/2 Version 2.0 is installed

C:\PC3270W is the drive and subdirectory where PC/3270 is installed

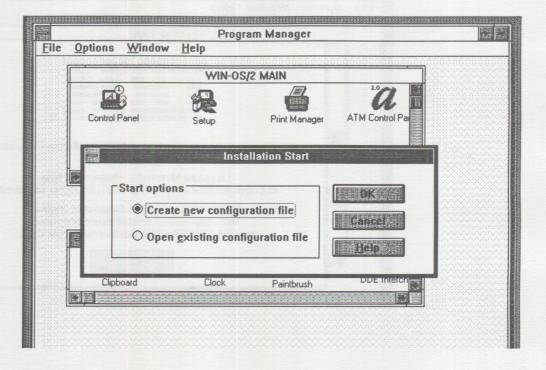
is the name of the configuration file we create PC3270W

Select OK on the PC/3270 Installation Logo Screen:



On the Installation Start Screen:

- · Select create new configuration file
- · Select OK.

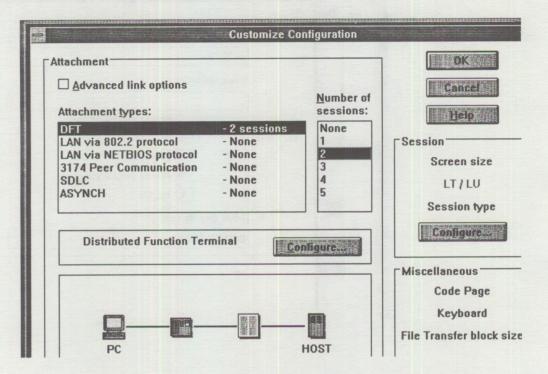


On the Customize Configuration Screen:

 Select connection type (Our sample uses DFT, but you can select the one you want. DFT, LAN 802.2, SDLC, and IIN Async at 9600bps have been tested.)

If you select other than DFT, you need to configure your communications parameters before you can continue.

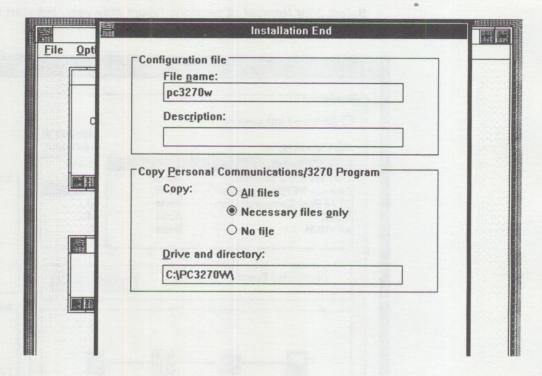
- · Select 2 for Number of sessions (yours may vary, but start simple).
- · Select OK.



On the Installation End Screen:

- Enter a Configuration file name of PC3270W
- · Select Copy Necessary files only (or if you want: All files)
- Enter Drive and directory of C:\PC3270W\
- · Select OK.

(These are the defaults)



On the Add PC/3270 to Program Manager Screen:

- · Select WIN-OS/2 Main in the to Group section
- · Select OK.

There are 3 more pop-up screens with information about the installation completion, just select OK on each of them to complete the installation.

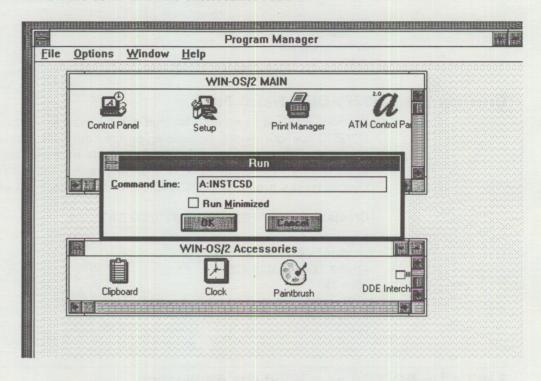
Note: If you are configuring 802.2 LAN installations, you will probably get a PCS121 error at the completion of the install. The install process is trying to update the CONFIG.SYS file and is having problems. Just continue installing the corrective service diskette in the next section.

Installing the Corrective Service Diskette

Now install the PC/3270 Corrective Service Diskette.

From the Program Manager Action Bar:

- · Select File
- Select Run
- Insert PC/3270 Corrective Service Diskette in the A: drive
- On the command line enter: A:INSTCSD



You see a pop-up menu telling you that the CSD will replace files in the C:\PC3270W\ directory, select OK to continue the update.

When the CSD installation is complete, you get a pop-up menu telling you that it is complete. Select OK.

Close the WIN-OS/2 Full Screen Session.

On the Program Manager Action Bar:

- Select the System icon (upper left corner)
- Select Close
- · Select OK on the Exit WIN-OS/2 popup.

Creating a PC/3270 Batch File for OS/2

You now need to check the Windows Initialization file and create a batch file for PC/3270. This batch file is used in the setup of the PC/3270 desktop object later.

Checking the Windows Initialization File

The PC/3270 Windows installation should have updated the WIN.INI file. Check the C:\OS2\MDOS\WINOS2\WIN.INI file for the following:

[PCS3270] DIR=C:\PC3270W\

Creating the PC/3270-OS/2 Batch File

We now create a new batch file that can be used to start any of the various PC/3270 configurations. Depending on the communications link you are using, you may need to execute a PC3270W.BAT file to invoke the WIN-OS/2 environment. The other types of links invoke WIN-OS/2 directly. This batch file checks for the presence of PC3270W.BAT and uses it if it exists.

Create the file C:\PC3270W\PC3270WO.BAT

@ECHO OFF IF EXIST PC3270W BAT GOTO TSR WINOS2.COM PCS3270.EXE GOTO END :TSR PC3270W.BAT PCS3270.EXE :END

Setting Up PC/3270 as a Windows Application

Now we have PC/3270 installed and the batch and configuration files ready to go. The next step is to create an object on the desktop and set the various attributes of that object.

Create a New Object on the Desktop

To create an object for PC/3270, from the desktop:

- · Open the Templates folder
- · Select the Program folder with the right mouse button
- Select Create another from the popup
- Select OS/2 Desktop from the list of folders
- · Select Create on the bottom of the window.

The Program-Settings folder will now open for this new object so you can set the attributes in the next section.

Setting the Attributes of the PC/3270 Windows Object

Now we have to set the attributes of this new object so that it starts PC/3270 as a Windows application.

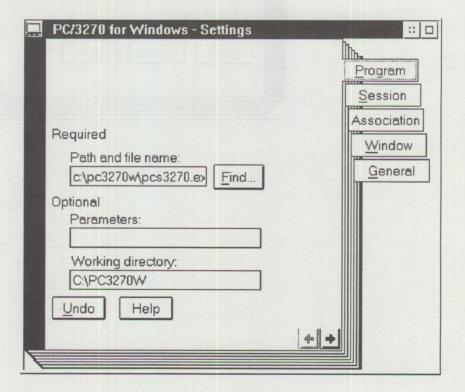
The following steps are common to all types of connections. As the LAN 802.2 and 3174 Peer connections need some unique device drivers, they require some additional steps covered later.

You are now on the Program Settings for this Object. This is where you need to set up all of the various attributes that will go with this object. Move around by selecting the proper "tab" on this "book."

Select the Program Tab (should be selected):

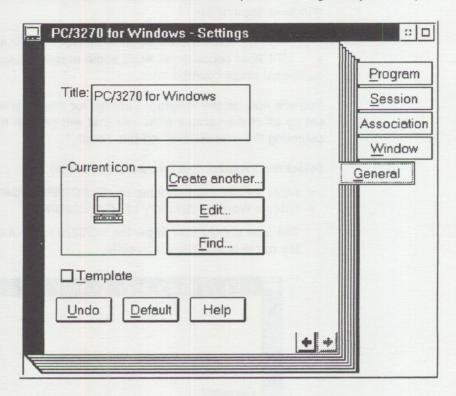
- Enter a Path and file name of: C:\PC3270W\PCS3270.EXE
- Enter a Working directory of: C:\PC3270W

The icon should now show the PC/3270 icon. If it does not, then the path and file name is entered incorrectly.



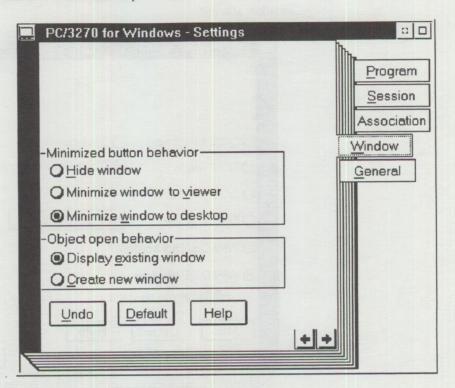
Select the General Tab:

• Enter a Title of: PC/3270 for Windows (or something else you want)



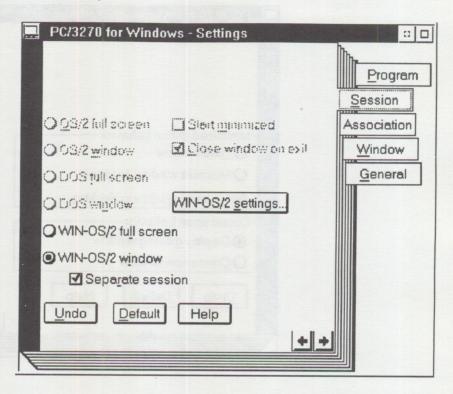
Select the Window Tab

· Select Minimize window to desktop for the Minimized button behavior (this will minimize the PC/3270 icon on the desktop instead of the minimized window viewer folder).



Select the Session Tab:

- · Select WIN-OS/2 window
- · Select Separate session (this allows PC/3270 to load any required Terminate-Stay-Resident (TSR) programs even if it is not the first WIN-OS2 session started).



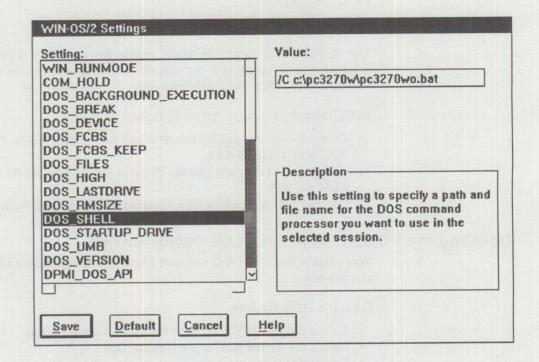
Select WIN-OS/2 Settings

From the WIN-OS/2 Settings Screen

- Select and Set COM HOLD = ON (for async only)
- Select and Set DOS HIGH=ON (allows DOS to be loaded above 640KB)
- Select and Set DOS UMB = ON (allows TSR programs to be loaded in upper memory blocks)
- Select and Set IDLE SENSITIVITY = 100 (disables the idle detection so PC/3270 will get the maximum amount of processor time).
- Select and Set KBD ALTHOME BYPASS = ON (so PA2 will work)
- · Select and Set DOS SHELL to:

C:\OS2\MDOS\COMMAND.COM C:\OS2\MDOS /P /C C:\PC3270W\PC3270WO.BAT

Note: This is the batch file we created in the previous step.



· Select Save when complete.

Close the Settings Window:

- · Select the System icon (small PC/3270 icon in upper left hand corner of Settings screen), or press F10.
- Select Close to close and save these object changes.

Additional Setup for LAN Connections

The LAN connections require some additional device drivers to communicate with the adapter.

Note: When PC/3270 is using a LAN adapter, then that adapter cannot be used by any other program on this workstation. Now there is no 802.2 Virtual Device Driver to allow adapter sharing, which means that PC/3270 has exclusive use of this adapter when it is running.

We will set up PC/3270 to use a Token-Ring adapter. You could set it up to use Ethernet, PC Network or 3174 Peer (LAN over coax) using the same technique.

Installing LAN Support Program and RESETOKN.SYS

You must install the PC LAN Support program so that you have the proper device drivers. You should use the COPY command to copy the device drivers from the LSP 1 2x diskette in drive A.

MD C:\LSP COPY A:\DXMAOMOD.SYS C:\LSP COPY A:\DXMCOMOD.SYS C:\LSP

Additionally, you should get the RESETOKN.SYS device driver and copy it into the C:\LSP directory.

COPY A:\RESETOKN.SYS C:\LSP

The RESETOKN.SYS device driver resets the Token-Ring adapter when it is invoked, it is not required, but suggested. This allows you to stop and restart PC/3270 in a Token-Ring environment.

RESETOKN.SYS can be retrieved from:

- CompuServe by issuing GO IBMOS2 and downloading RESTKN.ZIP from SECTION 17, IBMFILES
- IBM National Support Center Bulletin Board System by downloading RESTKN.ZIP
- Internal IBM users can GET the TRR304 PACKAGE from OS2TOOLS

Updating the PC/3270 Object for LAN Device Drivers

Now update the WIN-OS/2 session attributes to add some DEVICE DRIVER statements.

From the OS/2 Desktop:

- Select the PC/3270 icon with the right mouse button
- · Select the arrow just to the right of Open
- · Select Settings.

You are now on the Program Settings for the PC/3270 object, as before when you did the majority of the setup above.

Select the Sessions Tab:

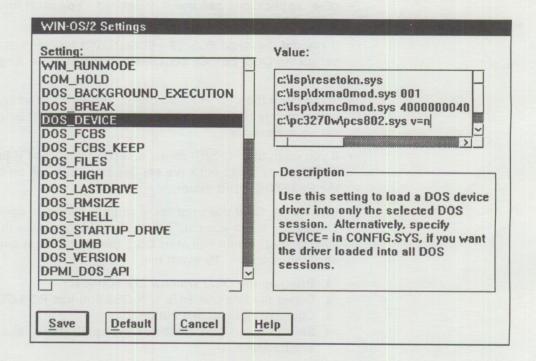
· Select WIN-OS/2 Settings

From the WIN-OS/2 Settings Screen

Select and Set DOS DEVICE and enter the following in the Value window:

C:\LSP\RESETOKN.SYS C:\LSP\DXMAOMOD.SYS 001 C:\LSP\DXMCOMOD.SYS 400000004001 C:\PC3270W\PCS802.SYS V=N

Note: The 400000004001 is the locally administered address (LAA) for the LAN, it may be optional for your installation.



Select Save when complete

Close the Settings Window:

- · Select the System icon (small PC/3270 Icon in upper left hand corner of Settings screen), or press F10.
- · Select Close to close and save these object changes.

Operating PC/3270 for Windows under OS/2

You should now have the PC/3270 for Windows icon on the desktop and be ready to start PC/3270. Just open the object and wait for the sessions to start.

For some of the configurations you see the Communications/3270 Manager screen, and you will have to run Start Communications. If you want, you can go into Profile and set Start Automatically so that it will automatically start the sessions from then on.

You get the A, B, and so on, sessions as well as a Communications/3270 Manager session. All of the icons look the same, but they have different titles. If you minimize them, they will go to the OS/2 desktop. Remember, we changed from the default which would place them in the Minimized Window Viewer folder.

Warnings and Suggestions:

- Remember that the adapter is in use EXCLUSIVELY by PC/3270. This is true for all of the adapters (DFT, SDLC, LAN).
- · If you included the RESETOKN.SYS mentioned earlier, then you can shut down and restart PC/3270 Token-Ring connections. This package also comes with a RESETOKN.EXE file that can be used to close the adapter so other applications can use it, if desired. You must invoke this after shutting down PC/3270.
- If you get message PCS232 PCS802.SYS Module not found, you probably set up the DOS DEVICE statements incorrectly, or forgot to install the LSP
- If you open the new PC/3270 object and it closes after a few seconds, then you probably have the DOS SHELL or the PC3270 Batch file PC3270WO.BAT set up incorrectly.
- If you open the PC/3270 object a second time, and it just sits there doing nothing, you might not have set Separate Session on or you did not include the RESETOKN.SYS driver.
- Sometimes OS/2 does not know when a Windows Application closes. Therefore, when you shut down, the desktop thinks that the application is still running. When you start OS/2 the next time, it automatically starts the application again. To avoid this:
 - 1. Bring up the OS/2 Window List (Ctrl-Esc)
 - 2. Select the line that says WIN-OS2 and has PC/3270 listed under it
 - 3. Click the right mouse button
 - 4. Select Close. This closes all the applications, and the WIN-OS2

A side effect is that all Windows Applications that OS/2 thinks are still open will be officially closed. The applications will no longer have hash marks over their icons. You can now shut down gracefully.

 Internal IBM users can obtain a copy of ZIPPER, a utility that customizes PC/3270 and adds several additional printing functions to PC/3270. See the PC3270 FORUM on IBMPC for details.

Chapter 18. PC/3270 for DOS on OS/2

This part of the document shows you how to set up PC/3270 for DOS on the OS/2 Version 2.0 operating system. It shows you how to make it work as a DOS full screen application running from the OS/2 desktop.

Installing PC/3270 for DOS

This section covers the actual PC/3270 Installation process. The intent is not to give you configuration information for PC/3270, but demonstrates how to install it on OS/2 with a sample quick configuration.

In this sample installation, the following conventions are used throughout this part of the document:

C: is the drive where OS/2 Version 2.0 is installed C:\PC3270 is the drive and subdirectory were PC/3270 is installed PC3270 is the name of the configuration file we create

From the OS/2 Desktop:

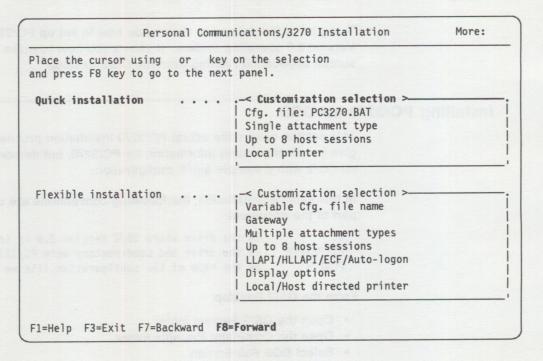
- · Open the OS/2 System folder
- · Open the Command Prompts folder
- Select DOS Full Screen
- Insert PC/3270 for DOS diskette 1 in the A: drive
- Enter: A:INSTALL from the DOS command prompt.

This starts the PC/3270 installation program. After the PC/3270 Logo is displayed, you get the introduction screen, which tells you how to use the function keys during the configuration process. The fields preceded with a question mark (?), show up on the PC as an arrow up/down character, indicating the selectable field.

	More: +
modifies your configuration file fo 9) and copies necessary files from	or the
struction >	
try field	
in this field o change choice	
change choice	
ee help screen.	
	modifies your configuration file form the struction > ition in panels F3: Exit from the program F8: Go to the next panel F10: Change to next choice try field in this field o change choice

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Select Quick installation, which installs PC/3270 in the C:\PC3270 directory with a configuration file of PC3270.BAT.



You must change PC/3270 starts automatically to NO

		Instal	1		More: -+
Press F10 to chan	ge choice	ed photo s	yest nations		
Drive to instal	1 PC/3270 on		[c]		
PC/3270 starts (modify AUTOEX]	
F1=Help F3=Exit	F7=Backward	F8=Forward	F9=Prev Cho	ice F10=Next	C

We will choose DFT for our connection, just as an example. If you select one of the other connection types, you have more configuration information to enter, which is not included in this document. DFT, LAN 802.2, SDLC and IIN Async at 9600pbs have been tested.

```
Attachment Type
                                                                     More: -+
Select one of the following
 Attachment . . . [1] 1. Distributed Function Terminal (DFT)
                          2. LAN via 802.2 protocol
                          3. LAN via NETBIOS
                          4. 3174 Peer Communication
                          5. Synchronous Data Link Control
                          6. Asynchronous Data Link Control
 Number of host sessions
    . . . . . . . [2]
F1=Help F3=Exit F7=Backward F8=Forward
```

Make changes if you want. Here, we are using the defaults:

```
Screen, Keyboard and Printer
                                                               More: -+
Press F10 to change choice.
 Screen
   Session ID
                        Screen size (row x column)
    a . . . . . . . ?[24 x 80 ]
                        ?[24 x 80 ]
 Keyboard
   Country . . . . . ?[U.S. (English)
   Type . . . . . ?[Enhanced
 Local printer . . . . . ?[None ]
F1=Help F3=Exit F7=Backward F8=Forward F9=Prev Choice F10=Next C
```

Press F6 to complete the installation and copy the files to disk:

```
End of Customization
                                                                       More: -
You have now completed your selections and are ready to copy PC/3270.
Press one of the following keys to proceed:
  F6: Create configuration file and start to copy
  F7: Review and change your selections
F1=Help F3=Exit F6=Install F7=Backward
```

When this is completed, just press F3 to exit the installation process. You can then enter EXIT to close the DOS window.

Setting Up PC/3270 as a DOS Application

The next step is to create an object on the desktop and set the various attributes of that object.

Create a New Object on the Desktop

To create an object for PC/3270, from the desktop:

- · Open the Templates folder
- · Select the Program folder with the right mouse button
- · Select Create another from the popup
- Select OS/2 Desktop from the list of folders
- Select Create on the bottom of the window.

The Program-Settings folder will now open for the new object just created.

Setting the Attributes of the PC/3270 DOS Object

Now we have to set the attributes of this new object so that it starts PC/3270 as a DOS application.

The following steps are common to all types of connections. As the LAN 802.2 and 3174 Peer connections need some unique device drivers, they require some additional steps that are covered later.

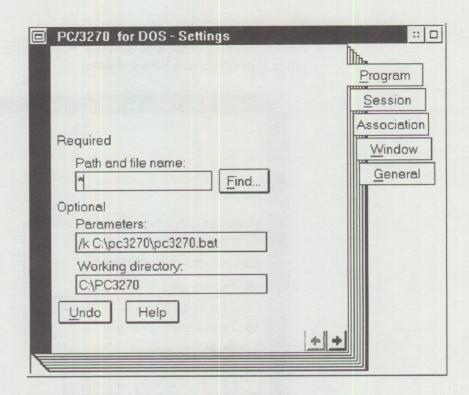
You are now on the Program Settings for this Object. This is where you need to set up all of the various attributes that go with this object. Move around by selecting the proper "tab" on this "book."

Select the Program Tab (should be selected):

- . Enter a Path and file name of: *
 - The asterisk starts a command processor.
- Enter Parameter of: /K C:\PC3270\PC3270.BAT

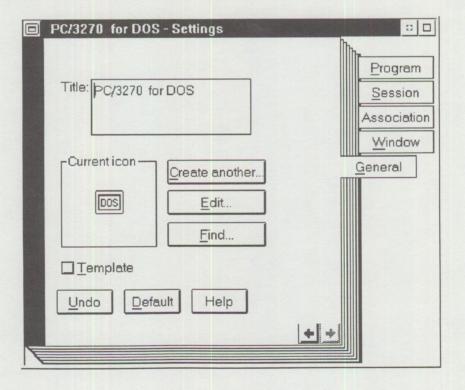
The /K is required to load a command processor after the PC3270.BAT is executed.

Enter a Working directory of: C:\PC3270



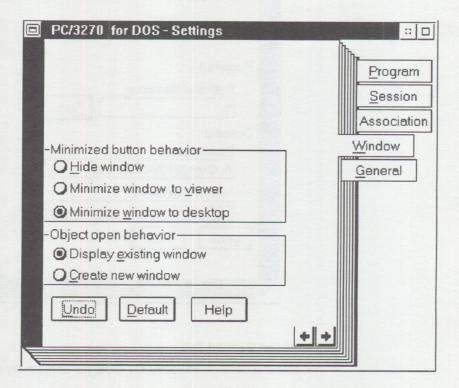
Select the General Tab:

• Enter a Title of: PC/3270 for DOS (or something else you want)



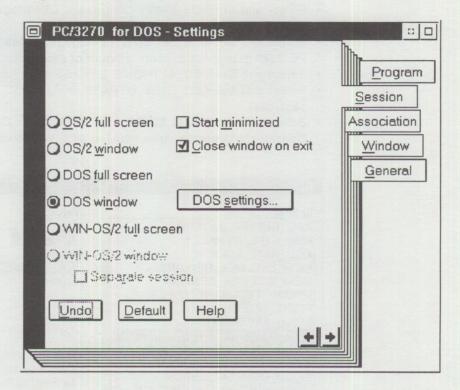
Select the Window Tab

 Select Minimize window to desktop (this puts PC/3270 on the desktop instead of the minimized icon viewer folder).



Select the Session Tab:

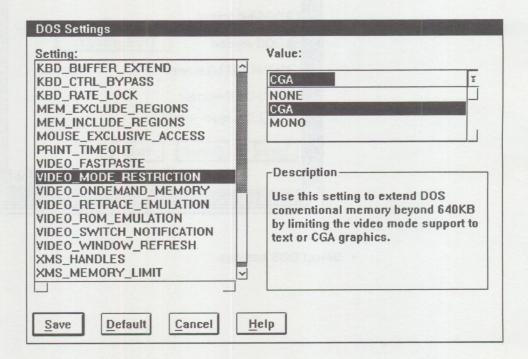
· Select DOS Full Screen or DOS Window. We are using the DOS Window setting in this example.



· Select DOS settings.

From the DOS Settings Screen

- Select and Set COM HOLD = ON (for async only)
- Select and Set DOS HIGH=ON (allows DOS to be loaded above 640KB)
- Select and Set DOS UMB = ON (allows TSR programs to be loaded in upper memory blocks)
- Select and Set IDLE_SENSITIVITY = 100 (disables the idle detection so PC/3270 gets the maximum amount of processor time).
- Select and Set KBD ALTHOME BYPASS = ON (so PA2 will work)
- Select and Set KBD CTRL BYPASS = ALT ESC (so you can switch sessions)
- Select and Set VIDEO_MODE RESTRICTION = CGA (enables you to get the Operator Information Area (OIA) in DOS Windows mode).



· Select Save when complete

Close the Settings Window:

- Select the System icon (small icon in upper left hand corner of Settings screen), or press F10.
- · Select Close to close and save these object changes.

Additional Setup for LAN Connections

The LAN connections require some additional device drivers to communicate with the adapter.

Note: When PC/3270 is using a LAN Adapter, that adapter cannot be used by any other program on this workstation. Currently, there is not an 802.2 Virtual Device Driver to allow adapter sharing, which means that PC/3270 has exclusive use of this adapter when it is running.

We will set up PC/3270 to use a Token-Ring adapter. You could set it up to use Ethernet, PC Network or 3174 Peer (LAN over coax) using the same technique.

Installing LAN Support Program and RESETOKN.SYS

You must install the PC LAN Support program so that you have the proper device drivers. You should use the COPY command to copy the device drivers from the LSP 1.2x diskette in drive A:

MD C:\LSP COPY A:\DXMAOMOD.SYS C:\LSP COPY A:\DXMCOMOD.SYS C:\LSP

Additionally you should get the RESETOKN.SYS device driver and copy it into the C:\LSP directory.

COPY A:\RESETOKN.SYS C:\LSP

The RESETOKN.SYS device driver resets the Token-Ring adapter when it is invoked, it is not required, but suggested. This will allow you to stop and restart PC/3270 in a Token-Ring environment.

RESETOKN SYS can be retrieved from:

- CompuServe by issuing GO IBMOS2 and downloading RESTKN.ZIP from SECTION 17, IBMFILES
- IBM National Support Center Bulletin Board System by downloading RESTKN.ZIP
- Internal IBM users can GET the TRR304 PACKAGE from OS2TOOLS.

Updating the PC/3270 Object for LAN Device Drivers

Following are the steps to update the DOS session attributes in order to add some DEVICE DRIVER statements.

From the OS/2 Desktop:

- Select the PC/3270 for DOS Icon with the right mouse button,
- · Select the arrow just to the right of Open
- · Select Settings.

You are now on the Program Settings for the PC/3270 object, as before, when the majority of the setup above was done.

Select the Sessions Tab:

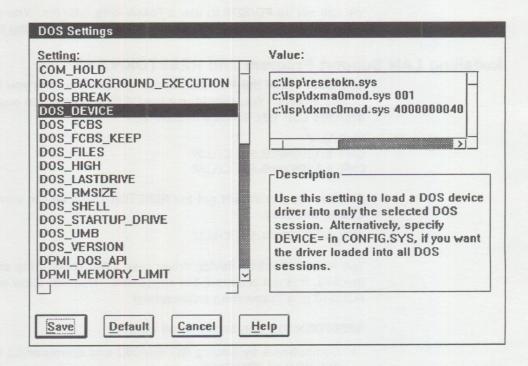
Select DOS Settings

From the DOS Settings Screen

Select and Set DOS DEVICE and enter the following in the Value window:

C:\LSP\RESETOKN.SYS C:\LSP\DXMAOMOD.SYS 001 C:\LSP\DXMCOMOD.SYS 400000004001

Note: The 40000004001 is the locally administered address (LAA) for the LAN, it may be optional for your installation.



· Select Save when complete.

Close the Settings Window:

- · Select the System icon (small icon in upper left hand corner of Settings screen), or press F10.
- · Select Close to close and save these object changes.

Operating PC/3270 for DOS under OS/2

You should now have the PC/3270 for DOS Icon on the desktop and be ready to start PC/3270. Just open the object and wait for the sessions to start.

You see the DOS full screen or window start, and finally the host logon screen. You can press Alt-Esc to rotate through your sessions and the PC/3270 Setup and Utility screen.

Warnings and Suggestions:

- If you terminate PC/3270 with Ctrl-End, you must exit to DOS and then EXIT to close the DOS window and free up the adapter. It is recommended that you close the window from the System Icon instead.
- If you start the PC/3270 for DOS object and get a message that the path is invalid for the new COMMAND.COM, check your Object Program parameters. Sometimes they must be changed and resaved, even when they are accurate.
- Remember that the adapter is in use EXCLUSIVELY by PC/3270. This is true for all of the adapters (DFT, SDLC, LAN).

- If you included the RESETOKN.SYS mentioned earlier, then you can shut down and restart PC/3270 Token-Ring connections. This package also comes with a RESETOKN.EXE file that can be used to close the adapter so other applications can use it, if desired. You must invoke this after shutting down PC/3270.
- Performance of PC/3270 for DOS can be very slow if you open other DOS or Windows sessions. This can cause loss of the communications link.
- . Sometimes the Shift, Alt and Ctrl keys get "stuck" when toggling the screen between host and DOS sessions. Simply press the keys again to remove the
- You should specify Graphics Save = Yes when doing Flexible Install and use Display Options.
- · If you jump back from the host and have a blank DOS session screen you need to set VIDEO MODE RESTRICTION = CGA.

Chapter 19. Automated PC/3270 Program Object Definition under OS/2

This section explains how to automate many of the steps necessary when migrating an existing PC/3270 V2.0 installation from a DOS environment to an OS/2 2.0 environment. The material here is optional and designed to help systems administrators automate the installation of PC/3270 on OS/2.

Setting Up and Running the Migrate Applications Program

Most of the work is done by running the OS/2 Migrate Applications program with the default migration database, OS2\INSTALL\DATABASE.DAT.

If you are curious about the DOS and/or WIN-OS/2 settings that the default migration database defines for PC/3270 DOS and Windows, take a look at the source file \OS2\INSTALL\DATABASE.TXT and you will see:

REM		
		/3270 V2.0 for DOS by IBM
	NAME	PC3270.BAT
	TITLE	IBM PC/3270 V2.0 for DOS
	TYPE	DOS
	ASSOC_FILE	PCSUTIL.EXE
	DEF_DIR	\PC3270
	COM_HOLD	ON
	DOS_HIGH	ON
	KBD_ALTHOME_BYPASS	ON ALT ESC
	KBD_CTRL_BYPASS	ALT_ESC
REM		
		/3270 V2.0 for Windows by IBM
REM		D000070 FVF
	NAME	PCS3270.EXE
	TITLE	IBM PC/3270 V2.0 for Windows Windows
	TYPE ASSOC FILE	PCS3270.INI
	DEF DIR	\PC3270W
	COM HOLD	ON
	DOS HIGH	ON
	MOUSE EXCLUSIVE ACCESS	OFF
	KBD CTRL BYPASS	CTRL ESC
	COMMON_SESSION	OFF -
	KBD ALTHOME_BYPASS	ON
	VIDEO_8514A_XGA_IOTRAP	ON
	DPMI_MEMORY_LIMIT	3

System administrators may copy the entries for PC/3270 into a separate file, modify them and add to them as desired, and then create a custom migration database using the \OS2\INSTALL\PARSEDB.EXE utility of OS/2. The defaults for the settings themselves are found in the \OS2\INSTALL\DBTAGS.DAT file. For more information on this subject, look in the OS/2 Master Help Index online under "creating a migration database, using PARSEDB" and in Appendix D of the OS/2 2.0 Installation Guide.

To begin the migration process:

- 1. Open the OS/2 System folder
- 2. Open the System Setup sub-folder
- 3. Start the Migrate Applications program object
- 4. Select Find...

You see a "Searching for programs. Please wait..." message momentarily. Use the mouse and vertical scroll bar to view all the programs that were located using the default migration database \OS2\INSTALL\DATABASE.DAT.

Make sure you see IBM PC/3270 V2.0 for DOS or IBM PC/3270 V2.0 for Windows. Note that PC/3270 DOS will only migrate if your start-up batch file is named PC3270.BAT, which is the default. As documented in the OS/2 2.0 README file, occasionally the Migrate Applications program might not find all applications. Now, retry the Find Programs (Find...) operation.

- 5. Select Migrate
- 6. Select OK after all programs are found.
- 7. Close the Find Programs window and select OK.

Now proceed with a few manual configuration steps, as documented below, for either PC/3270 V2.0 for Windows or PC/3270 V2.0 for DOS.

PC/3270 for Windows - Additional WIN-OS/2 Session Configuration

After you have run the above Migrate applications, there are a few minor adjustments you have to make to the PC/3270 for Windows object.

- 1. Open the Windows Programs folder created by the OS/2 Migrate Applications program and the default migration database.
- 2. Start the IBM PC/3270 V2.0 for Windows program object and follow the instructions below based on the PC/3270 Windows message(s) observed. PCS212 - PC/3270 is installed incorrectly.
 - · Respond with OK.
 - Open the OS/2 System folder.
 - · Open the Command Prompts sub-folder.
 - Start the WIN-OS/2 Full Screen program object.
 - · From the Program Manager menu, select File + Run....
 - Enter

d:\path\INSTALL

(INSTALL.EXE of existing PC/3270 Windows directory).

- Select Open existing configuration file and pick the name of an existing CNF file.
- · Select OK.
- Select OK again unless you plan to make changes to the CNF file itself.
- Verify

d:\path\name.CNF

in the File name: field.

· Select "No file" (if you made no changes to the existing CNF file).

Verify

d:\path\

in the Drive and directory field.

- · Respond OK.
- Respond Cancel to "Add PC/3270 to Program Manager" since you will start PC/3270 directly from the OS/2 Workplace Shell.
- · Respond OK again.
- Respond OK to Installation.
- From the Program Manager menu, select File + Exit WIN-OS/2...

PCS119 - Your system settings (CONFIG.SYS) have been changed; you will need to restart the system. A backup of your previous CONFIG.SYS has been copied to CONFIG.BAK.

--- OR --

PCS121 - C:\CONFIG.SYS not found or PC LAN Support Program is not installed. Exit Windows and install the PC LAN Support program, then retry the operation.

· Respond with OK. Ignore this message since you must load the PC LAN Support Program device drivers into the DOS DEVICE statement of WIN-OS/2 settings... on the Session page of the program object, IBM PC/3270 V2.0 for Windows. After finishing installation and closing the associated WIN-OS/2 session, proceed with the steps under PCS232...

PC/3270 Installation did not complete successfully; the configuration file has been saved.

 Respond with OK. Ignore this message if it came directly after PCS121... noted above.

PCS232 - PCS802.SYS Module not found.

- Open the IBM PC/3270 V2.0 for Windows program object Settings.
- Select the Session page.
- Select WIN-OS/2 settings...
- · Add

d:\PC3270W\PCS802.SYS V=N

on the DOS DEVICE statement after the IEEE 802.2 device driver, that is, DXMC0MOD.SYS for the IBM Token-Ring adapter. d:\PC3270W\ is the default PC/3270 Windows directory. For example, when using an IBM token-ring adapter specify:

d:\path\RESETOKN.SYS

d:\path\DXMA0MOD.SYS

d:\path\DXMCOMOD.SYS

d:\PC3270W\PCS802.SYS V=N

- Set IDLE SENSITIVITY = 100 to disable idle detection, so PC/3270 will get the maximum amount of processor time.
- · Save the WIN-OS/2 settings.
- Verify that the Separate session check mark is ON for the Session page, unless PC/3270 Windows will be the first Windows application started under WIN-OS/2.
- · Close the program object Settings window.

PCS123 - The configuration you have selected requires that PC/3270 loads some programs before you start Windows. PC/3270 has created a batch file PC3270W.BAT which will load the program and also start Windows for you. Exit Windows and restart Windows by typing PC3270W instead of WIN.

--- OR

PCS234 - The current configuration file does not include valid TSR information.

- Open the IBM PC/3270 V2.0 for Windows program object Settings.
- · Select the Session page.
- Select WIN-OS/2 settings...
- Append /C PC3270WO.BAT to the end of the DOS SHELL statement.
- The PC3270WO.BAT file should be created and placed in the PC/3270 Windows directory as follows:

@ECHO OFF IF EXIST PC3270W.BAT GOTO TSR WINOS2.COM PCS3270.EXE GOTO END :TSR PC3270W.BAT PCS3270.EXE : END

This will also allow a TSR configuration of PC/3270 Windows to operate as a WIN-OS/2 window or "seamless" program object.

- Save the WIN-OS/2 settings.
- Verify that the Separate session check mark is ON for the Session page, unless PC/3270 Windows will be the first Windows application started under WIN-OS/2.
- · Close the program object Settings window.

PC/3270 for DOS - Additional Session Configuration

After you have run the above Migrate applications, there are a few minor adjustments you have to make to the PC/3270 for DOS object.

- 1. Open the DOS Programs folder created by the OS/2 Migrate applications program and the default migration database.
- Select Open -> Settings for the IBM PC/3270 V2.0 for DOS program object, and specify...

Path and file name:

Parameters: /K d:\path\PC3270.BAT Working directory: d:\path

The /K parameter insures that a command processor is loaded after PC3270.BAT executes loading a sequence of PC/3270 TSR (Terminate-and-Stay-Resident) program modules.

- 3. Select the Session page and specify DOS full screen or DOS window
- 4. Select DOS settings...
 - If DOS Window specify VIDEO MODE RESTRICTION = CGA; especially to view the OIA if using the default INSTALL.EXE/CONFIG.EXE setting of "Enhance front of screen = YES" for PC/3270 DOS.
 - If using an installation of PC/3270 DOS that requires communications device drivers to be loaded, for example, LAN via 802.2 protocol, specify

these device drivers on the DOS DEVICE statement. For example, when using an IBM token-ring adapter:

d:\path\RESETOKN.SYS d:\path\DXMAOMOD.SYS d:\path\DXMCOMOD.SYS

- Set IDLE SENSITIVITY = 100 to disable idle detection, so PC/3270 gets the maximum amount of processor time.
- · System administrators may use the PARSEDB.EXE utility to create a custom migration database for PC/3270, specifically for use with the OS/2 Migrate Applications program. Knowing the OS/2 boot drive letter of the system(s) to be migrated, the system administrator can then build the /K parameter directly into a custom migration database by appending /K PC3270.BAT to a DOS SHELL statement. Build your custom migration database entry based on the IBM PC/3270 V2.0 for DOS definition found in the default migration database source file.

\OS2\INSTALL\DATABASE.TXT. The OS/2 boot drive letter must be known so it may be "hard-coded" into the DOS SHELL statement. For example:

d:\OS2\MDOS\COMMAND.COM d:\OS2\MDOS /P /K PC3270.BAT DOS SHELL

When using this technique, you must prevent the "CFG36 Parameter specified is incorrect" message of PC/3270 DOS by adding the line

if x%1 == x/C goto exit

just before the line

echo CFG36 Parameter specified is incorrect

in the PC/3270 start-up batch file, usually PC3270.BAT. You must add this line again each time after running CONFIG.EXE of PC/3270 DOS. Note that this is only necessary if adding /K via the DOS SHELL statement and not when adding /K to the Parameters: field of the IBM PC/3270 V2.0 for DOS object Program page as discussed earlier. This technique may also be used in a system administrator generated custom migration database to append /C PC3270WO.BAT to the DOS SHELL statement of a PC/3270 Windows custom migration database entry. See PCS123.../PCS234... in the previous section for more information on use of the PC3270WO.BAT file and its contents.

5. Save these settings by closing the IBM PC/3270 V2.0 for DOS - Settings window.

Chapter 20. Migrate Personal Communications/3270 to OS/2

Migrate PC/3270 to Extended Services Communications Manager

The following guidelines specifically apply to migration:

- FROM -

- 1. Personal Communications/3270 V2.0 (PC/3270)
- 2. DOS mode
- 3. 802.2 LLC
- 4. Network Station
- 5. IBM Token-Ring adapter
- 6. Single link upstream (thru a single gateway)

TO

- 1. OS/2 Extended Services (ES) V1.0 Communications Manager (CM)
- 2. 3270 Terminal Emulation
- 3. IBM Token-Ring adapter

The concepts discussed also generally apply to migration from a PC/3270 V2.0 Windows mode installation.

For the examples used in the remainder of this section the PC/3270 Network Stations has the following definitions:

- 1. Network Station
- 2. 2 Display Sessions
 - 1 24×80
 - 1 27x132
- 3. 1 Host Addressable Printer Session

PC/3270 Configuration Parameters

Before migrating from PC/3270, first run through your PC/3270 configuration panels and note certain parameters which will be required by CM. In the given example we have 2 display sessions and 1 printer session (implies Advanced link options = Yes) using IEEE 802.2 protocol over the LAN. You might see:

Fill in the fields.		
Total number of sessions for:		
Distributed Function Terminal	(DFT)	[0]
LAN via 802.2 protocol		[3]
LAN via NETBIOS		[0]
3174 Peer Communication		[0]
Synchronous Data Link Control	(SDLC)	[0]
Asynchronous Data Link Contro	1 (ASYNCH)	[0]
CCITT X.25 Network (X.25)	Single link upstream t	[0]

This is the total number of sessions, including session(s) for host directed printing. See Adv. Options for LAN Attachment via 802.2 Protocol for special considerations when multiple gateways are involved.

```
Adv. Options for LAN Attachment via 802.2 Protocol
                                                                     More: -+
Fill in the fields.
  Total number of LAN sessions
  Link name . . . . . . . . . . . .
                                 lan1
  Destination address . . . .
                                [400001551011]
  Number of sessions for this
  [3]
  Physical Unit ID . . . . . .
                                [16272]
  Adapter number . . . . . .
                                [0]
  Remote SAP . . . . . . . . . .
                                [04]
  Block ID . . . . . . . . . . . .
                                [061]
  PIU size . . . . . . . . . . .
                                [2012]
F1=Help F3=Exit F7=Backward F8=Forward
```

Total number of LAN sessions and Number of sessions for this Gateway must be equal in order to do a complete migration from PC/3270 to ES/CM. If this is not the case, you will only be able to migrate the session to a single gateway since ES/CM is single link upstream per DLC.

Destination Address and PIU size are "need to know" parameters regardless of your host/pc gateway type. PIU size corresponds to Maximum RU size in ES/CM configuration. Note that Maximum RU size is equal to PIU size - 9

Physical Unit ID is required for the migration, if the upstream gateway is either PC/3270, 37xx or a 9370. Physical Unit ID with Block ID make up the XID parts IDNUM and IDBLK, respectively. Block ID is the equivalent to IDBLK as defined in VTAM/NCP when communicating via token-ring, to a 37xx, 3172 or 93xx. PC/3270, in our example, uses the default IDBLK ID of 061, and ES/CM requires a IDBLK of 05D, thus you must change the IDBLK defined at VTAM/NCP to 05D to enable the ES/CM connection to the host. Remember, this holds true only when the PU is a switched major node to VTAM/NCP. If your gateway is a 3174, IDBLK does not play a role.

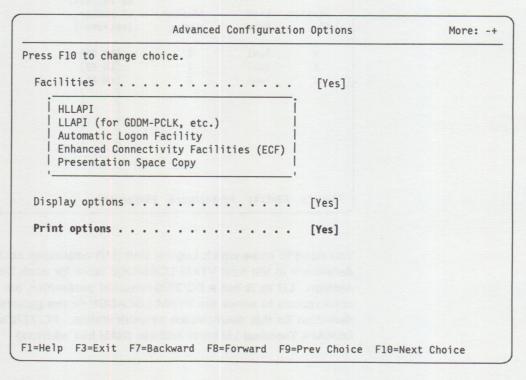
If the Remote SAP defined in the PC/3270 configuration is a value other than 04, you will need to change the SAP value defined at the gateway to 04 in order for ES/CM to communicate through the gateway.

		Advanced Opt	tions for Network Stations	More: -
Fill in the	e fields.		961 ather 1	
Non-SNA	block siz	e [0	97160]	
SNA block	k size .	[0	92500]	
Session ID	Link type	Adapter number	LU address/ LT number (optional)	
a b c	lan1 lan1 lan1	0 0 0	[LU 03] [LU 02] [LU 04]	
F1=Help F:	3=Exit F	7=Backward F8	B=Forward	

You need to know which Logical Unit (LU) addresses correspond with the definitions in the host VTAM LOGMODE table for each Display and Printer session. LU xx is not a PC/3270 required parameter, but if specified, it corresponds to either the VTAM LOCADDR or the gateway remapped LU definition for this downstream network station. PC/3270's LU xx corresponds to ES/CM's Terminal LU local address (NAU hex address)

		Network Station Options	More: -+
Press Fi	10 to change cho	ice.	
Logica	al terminal		
		Screen	
ID	Link name	size	
a	lan1	[27 x 132]	
b	lan1	[24 x 80]	
C	lan1	[24 x 132]	
Name o	of definition fil	e for keyboard,	
color	and alarm	• or [1 o espainement of MORS]
1-Weln	F2-Evi+ F7-Pag	kward F8=Forward F9=Prev Choice F	10-Newt Chains

Even though Screen size may not keep you from establishing a session, it can cause you to lose a session. The PC/3270 Screen size corresponds to ES/CM's 3270 Base Feature Profiles Screen size.



In our example we had one host-directed print session, thus in the PC/3270's Advanced Configurations Options, Print options is set to Yes to allow for host-directed print setup.

Pr	int Options	More: -+
Press F10 to change choice.		
Local copy	Yes	
Host-directed printing	[Yes]	
F1=Help F3=Exit F7=Backward F8=F	orward F9=Prev Choice	F10=Next Choice

Host-directed printing is set to Yes since in our example we have a printer session. The selection of printer session is made in the subsequent panel.

		S	ession Types		More: -+
Press F10 to	change cl	hoice.			
Session ID	Link type	Adapter number	LU address/ LT number	Session type	Host code page
a b c	lan1 lan1 lan1	0 0	LU 03 LU 02 LU 04	[Display] [Display] [Printer] [[037] [037] [037] [] [] []
F1=Help F3=	Exit F7=	Backward F8=	Forward F9=Prev	Choice F10=Nex	xt Choice

At this point, LU address is not a modifiable value, but you must take note of this value since it will determine which session you will define as a Printer session. In our example, LOCADDR 04 is a printer, so the corresponding LU 04 has been defined as Printer session in the PC/3270 configuration. This corresponds to the Printer LU local address (NAU hex address) parameter on the ES/CM 3270 Terminal Emulation LAN Defaults panel.

Other Configuration Parameters

You will also need the following information from your AUTOEXEC.BAT and CONFIG.SYS files, along with the specific type of IBM token-ring adapter card you are using. A call to your PC3270.BAT file indicates that you have configured for PC/3270 to start automatically. For example:

> AUTOEXEC. BAT d: CD \path CALL PC3270.BAT

If a number 40000000000 to 7FFFFFFFFF follows the IBM LAN Support Program DXMC0MOD.SYS device driver, this means that you are using a Locally Administered Address. If present, record this value.

> CONFIG.SYS DEVICE=DXMCOMOD.SYS XXXXXXXXXXX

Installing Extended Services for OS/2

Information contained in this section has been extracted from the Extended Services for OS/2 Local Area Network 3270 Emulation Sample Installations authored by Dave Young of the IBM Western Area Systems Center and is available in its entirety on the PCTOOLS disk as LANES LIST3820.

This section will not cover the installation of the base OS/2 product. It can be one of the following:

- 1. OS/2 Standard Edition 1.3 (CSD XR05050)
- 2. OS/2 Extended Edition 1.3 (CSD WR05050)
- 3. OS/2 Version 2.0

You must install one of these base systems before you can proceed with installing ES for OS/2.

To install CM, open either an OS/2 Full Screen session or an OS/2 Window session from the OS/2 System - Command Prompts folder. Insert the ES for OS/2 Diskette 1 in the A: drive and enter:

A: FSINST

A message will be displayed stating

Transferring files, please wait...

while files are being copied from diskette #1. You will be prompted to remove diskette #1 from drive A:, to insert diskette #2, and to press Enter to continue copying the necessary files.

After the necessary files have been copied, you will be presented with an Extended Services banner screen. Press Enter to continue. An information screen followed by an Introduction screen will then be displayed. Press Enter to continue with the installation process.

IBM Extended Services with Database Server for OS/2 Installation

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- (C) Copyright Microsoft Corp. 1981, 1991.

Enter to continue or Esc to cancel

Enter Esc=Cancel

We will select Basic Configuration and Installation. This will prompt us for some input data and configure some basic 3270 sessions, as well as install ES for OS/2.

Extended Services Installation Options

Select the installation option you want to use for installing Communications Manager and Database Manager.

- > 1. Basic Configuration and Installation
 - 3270 terminal emulation
 - ASCII terminal emulation
 - 5250 Work Station Feature (AS/400 host or S/36 host)
 - Database Manager using Remote Data Services
- 2. Advanced Installation
 - install using an existing configuration file
 - selective install of features
- 3. Custom Installation

Select F1=Help for additional information about these options. Enter Esc=Cancel F1=Help

Enter a name for this configuration file. In this example, we will use PC3270MI for the file name, just to document that we are migrating from PC/3270 for ES/CM.

Create Basic Configuration File

Type a file name for the Basic Configuration file to be created and Enter.

Basic Configuration file name. [pc3270mi]

Enter Esc=Cancel F1=Help

Enter some descriptive information about this configuration file.

Create Basic Configuration File

Change Basic Configuration File Comments

Comment. [Extended Services LAN 3270 Emulation Migration from PC/3270]

Enter Esc=Cancel F1=Help

Select 3270 Terminal Emulation to configure the 3270 emulation features, then press Enter.

Basic Configuration Services Main Menu

Select a Communications Manager Basic Configuration feature that you want to create or change.

- > 1. 3270 terminal emulation
- 2. ASCII terminal emulation
- 3. 5250 Work Station Feature (AS/400 host or S/36 Host)
- 4. Database Manager using Remote Data Services

You will return to this menu for additional selections. Select F3=Exit when your last selection is complete.

Esc=Cancel F1=Help F3=Exit

In our example, we selected 2 host sessions, 1 printer session, start all sessions automatically, and a LAN connection.

3270 Terminal Emulation Defaults

Use the spacebar to change 3270 terminal emulation selections. An arrow is displayed next to the option when it is selected. Press Enter when you have completed all of the selections.

Number of 3270 host sessions			- 1 > 2 - 3 - 4
3270 printer session			" Yes - No
Start all sessions automatically			> Yes - No
Connection type			- DFT > LAN - SDLC

Enter Esc=Cancel F1=Help

Select the type of LAN adapter, IBM Token-Ring in this example.

Select LAN Network Type

Select the network type and press Enter.

Network type.

IBM Token-Ring Network...

- IBM PC Network
- ETHERAND Network...
- IBM 3174 Peer Communication Network

Enter Esc=Cancel F1=Help

Select the specific IBM Token-Ring Adapter that is installed in your system unit. In this example we have the 16/4 /A adapter.

Select Token-Ring Network Adapter

Select the type of adapter and press Enter.

Adapter type. :

- IBM Token-Ring Network Adapter /A
- > IBM Token-Ring Network Adapter 16/4 /A
- IBM Token-Ring Network Bus Master 16/4 Adapter

Enter Esc=Cancel F1=Help

We will select Specify a locally administered address, since the CONFIG.SYS, when using PC/3270, has a LAA following the LAN Support Program DXMCOMOD.SYS device driver.

Select LAN Address Type

Select the type of network address and press Enter.

Network address type :

- Use universal address
- > Specify a locally administered address

Enter Esc=Cancel F1=Help

Enter the Locally Administered Address for this machine. This is important. If you are connecting to a 3174, then Q940 in the 3174 customization MUST contain this address.

Select LAN Address Type

Select the type of network address and press Enter.

Local LAN Adapter Address

The Local LAN adapter address must be unique for each

workstation on the LAN.

Type the correct Local LAN adapter address for your workstation and Enter.

Local LAN adapter address [400000004001]

Enter Esc=Cancel F1=Help

Specifying Destination and LU Addresses

The 3270 NAU addresses will default to 02 and 03. These are almost always correct. In our example PC/3270 configuration, the LU addresses were specified in the order LU 03, LU 02 and LU 04, where LU 04, is the printer LU. Follow that scheme at this point in the ES/CM configuration.

The LAN Destination address is the address of the Gateway to which you are going to connect. In the PC/3270 example configuration, this was **400001551011**. For a 3174, this was what was entered in response to Q900 in the 3174 customization. For a 37XX or 9370, it is what was entered in the VTAM/NCP definitions for the TIC or LAN adapter (LOCADD = or MACADDR =). For the 3172, it is ICP Adapter Profile, Node Address (see below for more information).

3270 Terminal Emulation LAN Defaults

Use the 3270 terminal emulation defaults displayed below or type your specific information. Type the correct LAN destination address and Enter.

Terminal LU	local address (NAU	nex addre	255).	 	 	:
3270 Host	session 1			 	 	.[03]
3270 Host	session 2			 	 	.[02]
3270 Host	session 3			 	 	.[]
3270 Host	session 4			 	 	.[]
Printer LU	local address (NAU	hex addres	ss)	 	 	.[04]

LAN destination address [400001551011]

Note: For ETHERAND, the address format may need to be reversed. Press F1 for more information.

Enter Esc=Cancel F1=Help

Specifying Local Node Network Names

Local node name and Network ID are not PC/3270 configurable options, so for our example this is not required for connection.

The Local node name field is used in Alert information, as well as when you code CPNAME= in the VTAM switched lists (NCP and 3172 connections). In our example the name is CP4001 which will match the CPNAME= in the VTAM definitions. For 3174 connections, this parameter is not as important because it is not used for anything other than alerts.

The Network Name field is the name of your VTAM Network, which is the NETID = parameter in the VTAM Startup list (ACTSTR00). Our designated Network name is USIBMNSC.

The Node ID is important if you are connecting to a 37XX, 9370, or a PC/3270 gateway. This is the IDNUM = value in your VTAM Switched list definition. They must match. The IDBLK = 05D for OS/2, must also match. In the example, you must change the VTAM Switched for IDBLK from 061 to 05D (if you were to connect via a 37XX/9370 or 3172). Local Node ID (in hex) is known as Physical Unit ID for PC/3270. Per the example, this value is 16272. XID combination of the IDBLK and IDNUM would be 05D16272, which is the exchange ID.

Configuration Network Defaults Enter to use the configuration defaults displayed below or type your specific information and Enter. Local node name. [CP4001] Network ID [USIBMNSC] Local node ID (in hex) [16272] Enter Esc=Cancel F1=Help

That completes the configuration portion of this install. Press F3 to exit.

Basic Configuration Services Main Menu

Select a Communications Manager Basic Configuration feature that you want to create or change.

- > 1. 3270 terminal emulation
- 2. ASCII terminal emulation
- 3. 5250 Work Station Feature (AS/400 host or S/36 Host)
- 4. Database Manager using Remote Data Services

You will return to this menu for Select F3=Exit when your last sell

3270 terminal emulation feature configuration has successfully completed. Select another feature or select F3=Exit.

Esc=Cancel F1=Help F3=Exit

Insert the diskettes as prompted. These screens are not shown.

Select the drive on which you want to install Communications Manager.

Target Drive Specification Type the drive letter that will be used as the target drive for the installation of the Extended Services component listed below and Enter. Component name. Communications Manager Target drive. [C] Enter F1=Help

Insert the diskettes as prompted. These screens are not shown.

That completes the installation. Press F3 to exit.

Extended Services Install/Remove Menu

Select an option.

- 1. Install Communications Manager
- > 2. Install Database Manager
 - 3. Remove Communications Manager
 - 4. Remove Database Manager

You will return to this menu for a Select F3=Exit when your last sele!

Communications Manager has been successfully installed. Select another option or select F3=Exit to complete the installation.

F1=Help F3=Exit

When you see this screen, you can shut down your system and reboot!

Install/Remove Complete

Extended Services Install/Remove has completed successfully.

The CONFIG.SYS file has been updated. You must restart your workstation to activate these changes.

To restart your workstation:

- 1. Ensure that there is no Extended Services diskette in drive A.
- 2. Stop all other currently active applications.
- 3. Shutdown your workstation from the Desktop or Desktop Manager.

Select F1=Help for information about stopping applications and Shutdown.

Once your computer has restarted, double-click on the Communications Manager Icon. Then double-click on the Communications Manager from within the Communications Manager folder. You will be prompted to enter the name of your configuration file. Type the name that you entered as the configuration file name on the Create Basic Configuration File screen and press Enter. Your host sessions will then become active if all configuration parameters were migrated properly.

CM Parameters	PC/3270 Parameters
Basic Configuration file name	Name of PC/3270 batch file
Comment	None
Number of 3270 Host Sessions	Number of 802.2 Sessions
3270 Printer Session	Yes to Print Options Host Print and define one of the sessions as Printer
Start Sessions Automatically	AUTOEXEC.BAT call to PC3270.BAT file
Connection Type	Number of 802.2 Sessions
Use Universal Address	No address following DXMC0MOD.SYS (802.2 device driver)
Local LAN Adapter Address	Address following DXMC0MOD.SYS (802.2 device driver)
Terminal LU Local Address	None
Printer LU Local Address	Session Defined as Printer
LAN Destination Address	Destination Address
Local Node Name	None
Network ID	None
Local Node ID	Physical Unit ID (PUID)
None, but always X'05D'	Block ID
Maximum RU size (PIU size - 9)	PIU size (Maximum RU size + 9)

PC/3270 to Extended Services Communications Manager Gotchas

Parameter	PC/3270	ES Communications Manager
Destination SAP	You can define at configuration as REMOTE SAP.	Required that the host/pc gateway has a SAP of 04. Not a customizable item.
IDBLK	Defaults to 061 but is configurable as BLOCKID.	Hardcoded as 05D. If the VTAM/NCP definition for the PU has the PC/3270 default IDBLK (or any value other than 05D) and the gateway is a 3172 or 37x5, you will need to change the PU IDBLK definition at VTAM/NCP.
Multiple Gateways	PC/3270 can communicate concurrently upstream to up to 8 gateways via token ring.	Single link upstream per DLC (in this case 802.2/802.5). If the PC/3270 Network Station being considered for migration has multiple links upstream, you will only be able to do a partial migration to ES/CM.

OS/2 LAN Server 2.0

Chapter 21. LAN Services Desktop Group Folder

LAN Server 2.0 has many changes in functions and requirements that need to be considered as customers move from the LAN Server 1.30 to the OS/2 LAN Server 2.0. Some of the migration considerations are upgrading hardware, purchasing additional memory, implementing new functions and determining how much of the existing configuration can be maintained and what procedures are required.

After OS/2 2.0 and OS/2 LAN Server 2.0 have been installed, two group folders that apply to LAN Server 2.0 will display on the OS/2 2.0 Workplace Shell (LAN Services and UPM). The last two folders will appear after resources have been defined through the LAN Requester function. The folders and their contents are discussed in this and the next three chapters. The four folders are:

- LAN Services Desktop Group Folder
- User Profile Management Folder
- Network Group Folder
- Applications Folder.

LAN Services is an icon in the OS/2 2.0 desktop folder that contains the LAN Server and LAN Requester function. The folder contains a Network Group folder for LAN Server/Requester 2.0 called LAN Services-ICON View. You may logon from the Command Line Interface (CLI), the Network Folder, or through User Profile Management (UPM), but your password must be changed in UPM.

On an OS/2 1.30.2 desktop, LAN Services is listed on Desktop Manager. Selecting LAN Services and Group - LAN Services opens a window list with the same LAN Server 2.0 functions as you see in the LAN Services - ICON View.

Migration Consideration

The location and access to LAN Server functions have changed from the OS/2 1.3 environment. If you install LAN Server 2.0 on both OS/2 2.0 and OS/2 1.30.2 Standard Edition (SE), you need to become familiar with two very different methods of manipulating your systems.

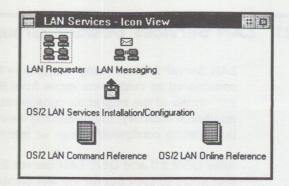
The use of the following icons and any migration considerations that may apply are briefly discussed in this chapter:

- · LAN Services ICON View
- LAN Messaging
- LAN Requester
- OS/2 LAN Services Installation/Configuration
- OS/2 LAN Command Reference
- OS/2 LAN Online Reference.

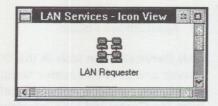
LAN Services - ICON View

The LAN Services - ICON View contains several icons that represent LAN Server/Requester 2.0 function. Enhancements have been made to each of these server options, except for the OS/2 LAN Services Installation / Configuration program which is completely new.

Double-click on the LAN Services icon and the contents of the LAN Services Group Folder are displayed as below:



LAN Requester



The LAN Requester icon above displays the LAN Requester Main Panel. The OS/2 2.0 Requester runs on OS/2 1.30.2 and OS/2 2.0.

Migration Consideration

There is no mixing and matching of the 1.3 Extended Edition LAN Requester version with the 2.0 LAN Requester version, which is now packaged with OS/2 LAN Server 2.0. The function has been enhanced and many of the network resources defined through LAN Requester have been significantly changed from the 1.3 version.

Below is an example of the LAN Requester Main Panel, which has not changed:

Actions Definitions Utilities	Exit	F1=Help
	Main Panel	
Date	: 02-14-92	
Time	: 15:52	
Machine ID	: VJHSRV	
User ID	: SHANA	
User type		
Domain name	: ETTDOM	
Preselected server		

Note: ★ Preselected Server is displayed if you are logged on as an administrator.

Actions

The Actions pull-down menu allows temporary changes on the network.

Auditing

LAN Server auditing has been significantly enhanced. In the past, it was either ON or OFF. Now, specific server events concerning resource access can be audited, such as successful or unsuccessful logons and resource access violations.

For further information, see IBM Operating System/2 Local Area Network Server Version 2.0 Network Administrator Reference Volume 2: Performance Tuning.

Definitions

Use the options on the Definitions pull-down to make changes to the network environment and to define shared resources (applications, printers, and external resources).

Home Directories

Previous versions of LAN Server required that a user's home directory have aliases. This has not been true since LAN Server 1.30.1. If you migrate home directories that had aliases (PCLP and LAN Server 1.0, 1.2 and 1.30), you have the option to use the HDCON utility to convert those home directories to the new style directories that no longer require aliases.

Use LAN Requester Main Panel >> Definitions >> Users >> Logon Details >> Assign Home Directory to define home directories.

Remote Initial Program Load (RIPL)

OS/2 Remote Initial Program Load (RIPL) is new with this release of LAN Server 2.0. You use the same facility for defining OS/2 RIPL users and DOS RIPL users. However, this new function has additional definition requirements and utilities, such as GETRPL and the File Index Table (FIT). This information is discussed in Chapter 25, "Additional LAN Server Enhancements" on page 25-1.

DOS RIPL Images are available for Token-Ring Networks and for Ethernet Networks. DLR will run on DOS 3.3, 4.0 or 5.0.

Use LAN Requester Main Panel >> Definitions >> IPL Images >> Manage Images to define RIPL Images.

Utilities

The utilities pull-down provides network management utilities such as copying files, moving files, listing logged-on users, and viewing online reference information.

Exit

This pull-down allows you to exit LAN Requester or to resume, which removes the pull-down.

LAN Messaging



The LAN Messaging icon above invokes the LAN Messaging function. The location of this function has changed from its location in the Group - Main panel Task List in OS/2 1.3 and now resides in the LAN Services - ICON View group folder in OS/2 LAN Server 2.0. When you install LAN Server 2.0 on an OS/2 1.30.2 base, the LAN Server function is listed on the Group - LAN Services window list. Therefore, the location of the function on the desktop is dependent on the operating system you install.

Messages are logged to ?:\IBMLAN\LOGS\MESSAGES.LOG. Some messaging menus are streamlined and one option, Preselected Servers, is no longer available on the Messaging Destination menu.

This is the path to access the Messaging function:

LAN Services icon>> LAN Services - ICON View>> Messaging - Main Panel.

```
Send Manage ★ Exit
                                                               F1=Help
           Messaging - Main Panel
Current Machine. . . . . . : VJHSRV
Message Logging Status . . . : On
Logfile Name . . . . . . : D:\IBMLAN\LOGS\MESSAGES.LOG
                Forwarded to
Name
VJHSRV
```

★ Indicates the change in this menu (Preselected Server no longer listed) for LAN Messaging in OS/2 2.0.

OS/2 LAN Services Installation/Configuration



The OS/2 LAN Services Installation/Configuration icon above invokes the OS/2 LAN Services Installation/Configuration Program. Type A:laninst (changed from A:srvinst in 1.3) on the Command Line Interface (CLI) to initially install OS/2 LAN Server 2.0 Entry or Advanced, or OS/2 LAN Requester. During the Advanced Installation path, you are given a choice to install or not install the OS/2 LAN Services Installation/Configuration utility. This program resides in the LAN Services - ICON View folder and is used for future installations, configurations, removals and upgrades for LAN Server 2.0.

Basic, Advanced, and Custom installation paths are provided. In previous versions of LAN Server, one path was available. No PM install program was available and the method to reconfigure adapters, NETBIOS and IEEE 802.2 resources was done through Communications Manager of Extended Edition. Those same resources are now requested through the PROTOCOL.INI file which is discussed in the Chapter 16, "LAN Adapter and Protocol Support (LAPS)" on page 16-1.

Note: LAN Server 2.0 requires that OS/2 SE 1.30.2 or OS/2 SE 2.0 be installed before installation of an OS/2 Requester or Server. The Advanced Server is not supported to run on OS/2 2.0, but it will install as an Entry Server minus the additional function provided by the Advanced Server (several warning panels pop up during installation). The Entry Server installs on either OS/2 SE 1.30.2 or OS/2 2.0.

Each installation path can be used to install either LAN Server 2.0 package.

Basic Installation

The Basic Installation path is simple, users need only respond to a few questions. The workstation is installed as an Additional Server (AS) and cannot be installed as a domain controller using this installation path. If you mistakenly use this approach and try to log on, you receive the message, "Remote node not available." This message is displayed because the server is looking for its domain controller. Reinstall, using the Advanced Installation path, and select the option to install a domain controller.

The choices you make during the installation are used to update configuration files (CONFIG.SYS, IBMLAN.INI and PROTOCOL.INI).

Advanced Installation

The Advanced Installation path, more complex than the Basic Installation, allows the installation of either an additional server or a domain controller. During installation, you are forced to make choices that are used to update the configuration files (CONFIG.SYS, IBMLAN.INI and PROTOCOL.INI).

Remote Initial Program Load (RIPL) and Fault Tolerance are functions selected during this process. Both must be installed after the LAN Server installation through one of the following utilities: GETRPL and FTSETUP respectively.

The following is an example of the Install and Remove panel where features are selected for installation on the new server:

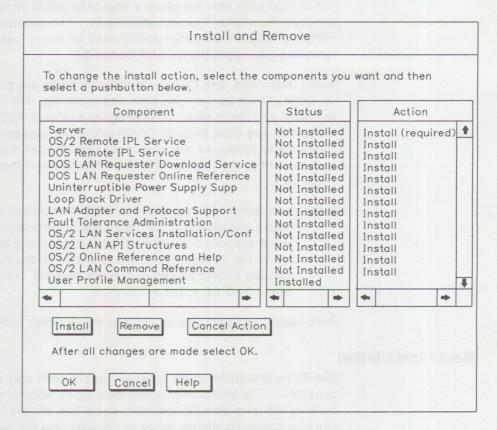


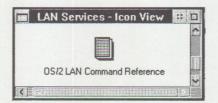
Figure 21-1. LAN Server 2.0 Install and Remove Panel

Panels similar to the one above will display to allow the user to select LAN adapter and protocol support, IEEE 802.2 resources and NETBIOS resources. The choices you make are copied to the applicable sections in the appropriate configuration files (PROTOCOL.INI, IBMLAN.INI and the CONFIG.SYS). Since LAN Server now supports up to 4 adapters, the IBMLAN.INI can have four NET (NET1, NET2, NET3, and NET4) statements that map to the NETBEUI NIF section of the PROTOCOL.INI file.

Custom Installation

A Custom Install creates custom installation diskettes for users, which simplifies workstation installations for requesters and servers.

OS/2 LAN Command Reference

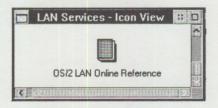


The OS/2 LAN Command Reference icon above invokes the OS/2 LAN Command Reference. This information is online in a hypertext format. It is also available in documentation that can be ordered separately.

Migration Consideration

If you select OS/2 LAN Server 2.0 Commands and Search all libraries for **Migration** information, you see the Managing Domains: Overview option and the RUN option (applies to Database Manager). The first option is discussed further in the next topic. There was no specific information about the Migration Utilities of the migration process, that information is contained in the *Migration Handbook*.

OS/2 LAN Online Reference



The OS/2 LAN Online Reference icon above invokes the OS/2 LAN Server Online Reference. This information is online in hypertext format and also available in documentation that can be ordered separately.¹

Migration Consideration

If you select Administrator Tasks and Search on **Migration** for all sections, the Managing Domains: Overview is listed. The information is extensive, following are topics that are most beneficial for migration:

- Managing Network Printing (installing and managing for OS/2 1.3 and OS/2 2.0)
- Aliases for printers
- Remote Initial Program Load (especially for OS/2 RIPL and the use of the GETRPL utility for both DOS and OS/2).
- External resources
- · Access Control Profiles (ACP).

[•] IBM Operating System/2 Local Area Network Server Version 2.0 Network Administrator Reference (3 volumes)

⁻ Volume 1 - Planning and Installation, S04G-1032

Volume 2 - Performance Tuning, S04G-1033

Volume 3 - Network Administrator Tasks, S04G-1034

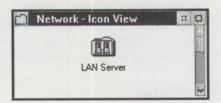
LAN Server Version 2.0 Network Administrators Reference Supplement for OS/2 2.0, S04G-1080.

Chapter 22. Network Group Folder

The Network Group Folder is also new with OS/2 2.0. It is a folder that will help administrators manage shared resources within and outside the current domain. The folder is displayed when using the LAN-independent desktop when OS/2 LAN Server 2.0 or OS/2 2.0 Requester is installed. The Network folder is activated when the system is configured for LAN use and there is at least one network group folder defined. It contains:

- Network folder contains a network group folder for each configured network and will reside initially in the Desktop folder.
- Network group folder contains a server folder for each server in the group.
 The Novell group will consist of all servers in the Novell network. The IBM OS/2 LAN Server/Requester group will consist of servers in the log on domain and domains in OTHDOMAIN from IBMLAN.INI.
- Server folder contains a network resource object for each network printer and network directory. The server names must be unique.
- Network printer object contains a network printer object for each network printer on that server.
- Network directory object contains a network directory object for each network directory on that server.

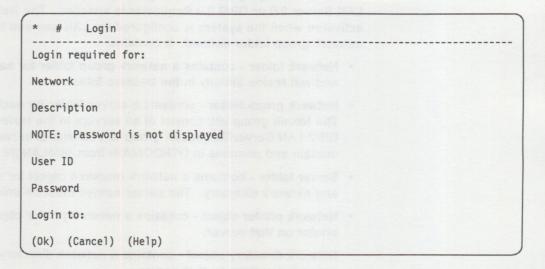
The icon below is an example of how a server folder appears if the user is logged on to one server:



The LAN Server folder consists of a server folder for each server in the domain where you are logged on (both LAN Server and Novell NetWare). There is also a server folder called *ALIAS. When you open the *ALIAS server folder, all the aliases in the logged-on domain are displayed. In addition, the LAN Server folder can contain the servers in domains specified by the OTHDOMAINS parameter in the IBMLAN.INI file. For NetWare servers it would be those specified in the login script with the ATTACH command statement.

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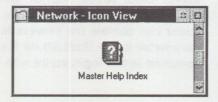
The Network folder provides a subset of the non-administrative functions available from User Profile Management Services and the LAN Requester full-screen interface. For example, you can logon (login) and logoff (logout) from within the Network folder. However, if you need to change your password, you must do so through UPM. An example of the Network folder Login screen is displayed below:



Shared printer or files resources can be used from the Network folder. You can manipulate the shared resources on the desktop using direct manipulation (mouse or another pointing device to work with objects, rather than by using the menus). You can also assign a shared printer to a local port or assign a shared directory to a local drive, then manipulate the shared resources outside the desktop. You can access external servers (servers outside the current domain), by creating another server folder.1

Master Help Index Folder

An icon is placed on the OS/2 Desktop after OS/2 is installed. Review the reference information contained in this folder to understand the function and services offered in the Network Folder.



[·] Master HELP Index on OS/2 2.0 Desktop

IBM Operating System/2 Local Area Network Server Version 2.0 Network Administrator Reference Supplement for OS/2 2.0, S04G-1080.

LAN Server Network Administrator Reference Volume 2: Performance Tuning, S04G-1033.

The following is a list of some of the management activities discussed for the Network Folder:

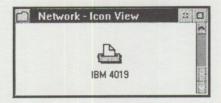
- · Remote print objects
- · Remote print administration
- · Browse and manipulate network shared resources.

Printing Changes

Print objects have replaced the Print Manager used in OS/2 1.X. Print objects combine the spooler queue, print drive queue, network options, pooling options, and the printer port into a single object represented by a printer icon.

To customize your printer, select the print object and click the mouse for settings.

Use the Network Folder to use and manage network print objects. LAN Requester is still used to define printers as shareable resources for network users.



A printer, which the icon above depicts, can be selected during the OS/2 base operating system installation. To create another print object, use the Templates Folder. You can customize for a separator page and serial COM port settings. Customary methods of printing are still available (COPY, NETCOPY, PRINT, and from applications) as well as the new print object.

For more on LAN printing in the 2.0 environment, see the OS/2 LAN Server V2.0 Network Administrator Reference Supplement for OS/2 2.0, and the OS/2 Online Reference.

Migration Consideration

After exporting and before importing your definitions to the new domain controller, check the temporary DCDB file to reconcile print definitions. After migrating to the LAN Server environment, if you used the migration utility to migrate PCLP 1.3x or LAN Server 1.0, check your print definitions, re-create queues, and eliminate duplicate names.

Chapter 23. User Profile Management Services Folder

User Profile Management (UPM), the LAN transport code, and FFST/2 are packaged with both Extended Services and LAN Server 2.0. The UPM component is automatically installed during LAN Services Installation/Configuration and now appears as an icon on the new OS/2 2.0 Desktop.

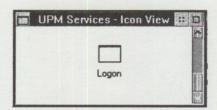
Migration Consideration

UPM is reinstalled if a lower level is installed by Extended Services (ES) when 2.0 LAN Server is installed.

Double-click on the UPM icon to open the folder. The following options accompanied by icons are displayed:

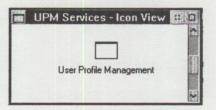
- Logon
- · User Profile Management
- Logoff.

Logon



Click on the UPM Logon icon above to begin the logon process. You may logon from the Network Folder, LAN Requester, CLI, and UPM.

User Profile Management (UPM)

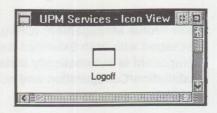


Click on the UPM icon above after you have successfully logged on.

Administrators may manage users and groups (add and delete users, specify passwords, enable users and groups and so on). Passwords must be changed through UPM Services even though users are allowed logon privileges from other locations.

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Logoff



Click on the UPM Logoff icon above when you are ready to logoff the network.

For more information on the UPM service refer to:

- IBM Operating System/2 Local Area Network Server Version 2.0 Network Administrator Reference Volume 1: Planning and Installation .
- IBM Operating System/2 Local Area Network Server Version 2.0 Network Administrator Reference Volume 3: Network Administrator Tasks.

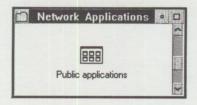
Chapter 24. Application Folders

Application folders are created and placed on the Desktop after the applications are installed, defined through LAN Requester and added to the Program Starter for users. The application folders on the OS/2 2.0 desktop are:

- · Public applications
- · Private applications

Applications need to be rewritten to take full advantage of the new 32-bit operating system. They should be created with IBM C SET/2 Version 1.0 compiler that allows 32-bit applications to call 16-bit APIs. Microsoft C Version 6.0 is also supported on LAN Server 2.0.

Public Applications Folder



The Public applications icon above (OS/2 only) appears on the OS/2 2.0 desktop after the application is installed, defined and added to the program starter. If the icon does not appear, click the right mouse button and then click on *Arrange*. Double-clicking on the icon causes the Public Applications - ICON View to display.

OS/2 public application can be defined to call a DOS application.

- 1. Go to LAN Requester Definitions and select Applications.
- 2. In the Create OS/2 Application Details panel for the parameters listed below, ADD the information in parentheses:
 - a. Drive of Alias . . . (C)
 - b. Remaining path to program . . . (\OS2)
 - c. Command line . . . (CMD /C C:\OS2\IBMDOS\WordPerfect)
 - d. Exit
 - e. Select Starter and ADD the application to the program starter for the user.

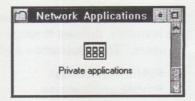
The icon for the DOS application should appear on the OS/2 2.0 desktop.

Migration Consideration

OS/2 1.3 applications should be backed up before upgrading to LAN Server 2.0. If you are using the migration utility to migrate from LAN Server 1.0 or PCLP, then edit the temporary file, point the application definitions to the correct drive on the new server, import the definitions to the new server, and copy the application data to the new server. After migration, redefine aliases, (Access Control Profiles for PCLP) which may not have had any, and redefine working directory input if the application requires it.

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Private Applications Folder



The Private applications icon above (DOS and OS/2) appears on the OS/2 2.0 desktop after the application is installed, defined, and added to the program starter. If the icon does not appear, click the right mouse button and then click on Arrange. Double clicking on the icon causes the Public Applications - ICON View to display.1

[•] IBM Operating System/2 Local Area Network Server Version 2.0 Network Administrator Reference Volume 3: Network Administrator Tasks

Chapter 25. Additional LAN Server Enhancements

This chapter includes enhancements not discussed in previous chapters or that may be included with more detailed information on migration considerations. As mentioned in preceding chapters, OS/2 LAN Server 2.0 is very different from previous versions of OS/2 LAN Server.

Changes from LAN Server 1.3 to LAN Server 2.0 are briefly discussed, along with applicable migration issues. As you can see on the following list, LAN Server has gone through several exciting changes, including a new Presentation Manager installation interface, repackaging of LAN Server and Requester, 32-bit implementation of a 386 version of HPFS (386 HPFS), disk fault tolerance, OS/2 Remote Initial Program Load (RIPL), and several new utilities.

There are two IBM LAN Server (LS) 2.0 packages: LS 2.0 - Entry and LS 2.0 - Advanced.

- LS 2.0 Entry, which is 16-bit, runs at the application layer (Ring 3) and is 32-bit tolerant.
- LS 2.0 Advanced has code that runs at the OS/2 kernel level (Ring 0). The Ring 0 server, the 386 HPFS, and the special IFS are 32-bit implementations written in Assembler running at Ring 0. Additionally, there is a Ring 3 server that runs at the application layer, which is 16-bit.

Current LAN applications run on LS 2.0 without requiring any changes. In a later release, when LS 2.0 has 32-bit APIs, these applications will continue to run or may be modified to take advantage of the 32-bit APIs.

In addition to support of Token-Ring Network, PC Network, and Ethernet networks, LAN Server 2.0 also supports workstations coax-attached to 3174 control units.

Following is a list of LAN Server 2.0 topics that are discussed briefly in this chapter:

- · Packaging of LAN Server 2.0
- Entry Server
- Advanced Server (386 HPFS)
- Backup Logon Server
- New Function Table
- Memory requirements
- User Interface
- · Multiple DOS sessions
- Security
- Remote Initial Program Load (RIPL)
- Home directory
- Fault Tolerance
- Multi Logon
- NET.ACC Utilities
- · Generic Alerter Service.

Common Services

LAN Adapter and Protocol Support (the LAN Transport code), User Profile Management (UPM), and First Failure Support Technology/2 (used for forwarding messages to NetView or IBM LAN Network Manager) are services common to both LAN Server 2.0 and Extended Services. This allows customers to purchase only products they need.

Note: Refer to the "New Function Table" shown later in this chapter for a list of functions in both LAN Server 2.0 packages.

Packaging of LAN Server 2.0

Refer to Chapter 3, "Packaging of Extended Services 1.0 and LAN Server Version 2.0" on page 3-1 for detailed information on changes to LAN Server 2.0 packaging.

Entry Server

The OS/2 LAN Server 2.0 Entry Server still runs at a Ring 3 priority level as do previous versions of OS/2 LAN Server. It runs on a HPFS or FAT file system and has OS/2 APIs for I/O requests to the file system. Entry Server runs on an Intel 286 or above microprocessor with OS/2 1.3.x, or on 386 with OS/2 2.0.

Use Entry to RIPL up to 18 concurrent RIPL requesters, or up to 10 requesters concurrently transferring data to and from the server. Use also if less than 32 requesters are infrequently transferring data to and from the server (for example read file from server, manipulate it at the requester, then store at the server).

Entry Server contains the DOS LAN Requester and OS/2 LAN Requester code. The DOS LAN Requester runs on DOS 3.3, 4.01 (PTF 31300 or higher), and 5.0. The OS/2 LAN Requester runs on OS/2 2.0, OS/2 Standard Edition 1.3 manufacturing level 1.30.2, or Corrective Service level (CSD XR05050).

Advanced Server (386 HPFS)

The OS/2 LAN Server 2.0 Advanced Server is the first IBM Server product that runs at Ring 0, priority level for the OS/2 Kernel, and now for 386 HPFS drives. When the new LAN Server 386 HPFS is installed, it automatically replaces the OS/2 2.0 HPFS. Drives that were HPFS become 386 HPFS; FAT drives are still FAT. The Ring 3 server is still used to get requests from FAT drives, printers, and serial devices.

The Advanced Server, which requires an Intel 386 microprocessor, provides all the function of Entry Server plus disk mirroring, disk duplexing, 386 HPFS, and local security. Local security provides a greater degree of file protection against unauthorized local access at the server.

A bootable HPFS diskette can be created in case of disk failure to aid in recovery. This was not an option for OS/2 1.3 when HPFS was on the boot drive. For this reason, many 1.3 customers made the decision to use FAT on their C: partition and HPFS on another partition. There is no need to back up and reformat unless you are migrating from FAT to HPFS.

The Advanced Server is recommended for heavily loaded or performance-critical servers, such as those supporting RIPL workstations or high workload environments, servers with high data availability, reliability or security requirements. It can be much faster than the Entry package on 1.30.2 because it is a Ring 0 server. It runs on OS/2 SE 1.3 at CSD level 5050 (1.30.2) or later, or on compatible versions of OS/2 Operating Systems.

Note: HPFS and 386 HPFS cannot be mixed on a server. Advanced server installation replaces all HPFS drives with 386 HPFS.

Migration Consideration

Following is more information about the Advanced Server and 386 HPFS:

- If your current domain controller is using a 286 machine, upgrade your hardware to at least a 386 machine before you start to migrate to the new LAN Server 2.0 environment using the Advanced Server product. You may also need to purchase more memory and adapters to support some of the new functions (multiple adapter support).
- Local security is available only when the boot drive is 386 HPFS (not FAT). If you plan to use local security, be sure the boot drive is HPFS before you install the Advanced Server. (It is possible to install 386 HPFS when the boot drive is FAT; however, the local security function will not be available.)
- Maximum of 16,000 Access Control Profiles (ACP) can be defined.
- The DOS box must be disabled as HPFS uses the same Kernel and file structures that DOS uses.
- · Removable media is not supported.

Ring 3 Versus Ring 0 Server

Ring 3 applications run at the lowest privilege level of the software. Ring 3 is sometimes referred to as the user level, since this is the ring that applications run. Ring 0 is the highest privilege level of the software; this is where the kernel and now the 386 HPFS Advanced Server run. Ring 0 is referred to as the supervisor level.

The Entry Server, which is a Ring 3 server, can only access certain memory (memory designated for the Server application and shared memory) and must use special interfaces to access the OS/2 kernel or device driver services.

The Advanced Server includes both a Ring 0 and a Ring 3 server. The Ring 0 server, or 386 HPFS server, can access all memory, and can communicate with device drivers. This 386 HPFS server only handles requests for data on 386 HPFS drives (any drives that were HPFS when the 386 HPFS server is installed). Any requests for data on FAT drives, printer resources, or named pipes continue to go through the Ring 3 server (as the Entry server does). Logon requests are also handled by the Ring 3 server.

Note: 386 HPFS ignores NUMBIGBUF, but shares REQBUFS between Ring 3 and Ring 0. NUMBIGBUFs are still needed for Ring 3 servers.

The following figure depicts the Ring path for the Ring 3 and Ring 0 servers:

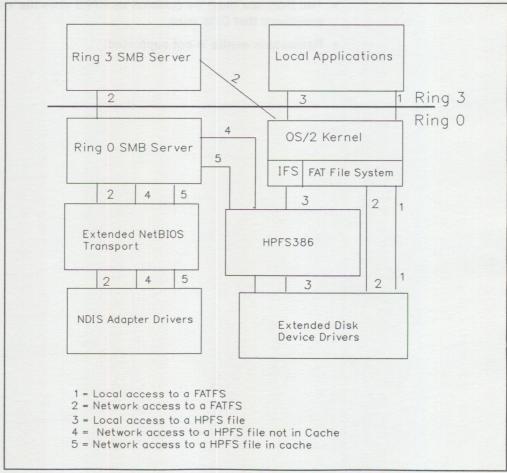


Figure 25-1. Ring 0 Versus Ring 3 Paths

Local Security

Local Security is new with the Advanced Server when 386 HPFS is installed on the boot drive. It allows network administrators to restrict access to local files on the 386 HPFS partitions of a server. Local security is in effect even when the LAN Server code is not running, because the 386 HPFS access rights reside within the file system structure. Access control information for FAT drives and printer resources is still stored in NET.ACC: these resources are not protected by the new Local Security function.

For further information, see: IBM Operating System/2 Local Area Network Server Version 2.0 Network Administrator Reference Volume 3: Network Administrator Tasks.

Migration Consideration

You may not want to install local security until you have migrated 1.2 or 1.3 data to 2.0. Local Security requires an enhanced disk device driver (IBM Micro Channel workstation support is included with this product). When local security denies access to a file for security reasons, some programs may display error messages that do not indicate that access was denied.

Backup Logon Server

Use the NET ACCOUNTS command to specify a server as a backup domain controller to allow users to logon if the primary domain controller is down. Multiple backup servers can be defined. These backup servers will not automatically assume the primary role, but they can handle CLI and FSI logon requests.

All servers defined as backup servers can log users onto the LAN. In the event that the domain controllers fails, all of the backup servers will continue to be able to log users on. If the domain controller is down, some of the user's logon assignments will fail. The backup servers monitor all NETLOGON requests. If a logon request has not been handled after three tries, one of the backup servers will automatically log the user onto the domain. The backup provides the user logon assignments by contacting the domain controller (all of this is transparent to users). If the domain controller is down, the user will receive error messages when logon assignments fail. Unless the role of one of the backup servers is changed to primary, logged on users do not have to log on again.

LAN Adapter and Protocol Support (LAPS)

Refer to Chapter 16, "LAN Adapter and Protocol Support (LAPS)" on page 16-1 in this book for detailed information.

New Function Table

Several new features are available with OS/2 LAN Server 2.0. All features apply to both the Entry and Advanced server except for those identified by ★: mirroring, duplexing, local security and 386 HPFS.

This table of information is an overview of the function for both the Entry and Advanced packages:

bale and make made that sour deligance	LAN S	erver 2.0
emetoV soper gett liste skillinge. Alove a	Entry	Advanced
Server Supported on OS/2 1.30.2	X	×
Server Supported on OS/2 2.0	X	*
Requester Supported on OS/2 1.30.2	X	X
Requester Supported on OS/2 2.0	X	X
Reorganized/Improved Publications	X	X
PM Hypertext-based Online Reference	X	X
PM Based Graphical Install	X	X
High Performance File System Server	*	X
Local Security (386 HPFS on Boot Drive)	*	X
Fault Tolerance:		
Disk Mirroring and Duplexing	*	X
UPS Support	X	X
Support for Multiple LAN Adapters	X	X
NDIS Support	X	X
IBM Token-Ring Busmaster/A Support	X	X
Remote IPL Enhancements:		
OS/2 Requesters (1.3 and 2.0)	X	X
Ethernet (DOS and OS/2 Requesters)	X	X
DOS Requester Enhancements:	ersons on the	
Enhanced Windows 3.0	X	X
DBCS Command Line Support	X	X
DBCS Printer Support	X	X
DOS 5.0 HIMEM Exploitation	X	X
ALERT Support (35 to LM or NetView)	X	X
1.3 and 2.0 Domain Coexistence	X	X
Operator Rights	X	X
Time Source Service	X	X
Multi-Logon Support (DOS and OS/2)	X	X
NetWare Interoperability	X	X

Note: ★ = Not supported.

Memory Requirements

Memory requirements are changed for LAN Server 2.0. Some differences between the two products are shown in the next two tables.

LAN Server 2.0

The table below shows memory requirements for LAN Server 2.0.

LAN Station	RAM (MB) Required	Disk (MB) Space Required
LAN Requester 2.0	0.6	5.5
LAN Server 2.0 (DC) - Entry/Advanced	3.5/10	9.4/10.4
LAN Server 2.0 (AS) - Entry/Advanced	2.5/9.0B	7.2/8.2
DOS LAN Requester - (depends on DOS)	105-180 KB	3.7/5.3
DOS Remote IPL	0.6	0.1
OS/2 Remote IPL	1.1	0.6
LAN Services INST/CNFG program	0.6	1.0
Fault Tolerance for Fixed Disk UPS Mirroring (partition) Local Security	0.1	0.8
OS/2 LAN Online Reference and Help	N/A	1.1
Base Operating System (required)	1.5	7.5(2.2)*
Base Operating System (optional)	0.3 - 1.6	3.5**

Migration Consideration

LAN Server 2.0 requires more memory than LAN Server 1.3, therefore existing 1.3 machines may need to be upgraded (hardware and more memory).

Note: DC = Domain controller and AS = Additional server.

LAN Server 1.3

The table below shows memory requirements for LAN Server 1.3:

LAN Station	RAM in Megabytes	Disk in Megabytes
Base Operating System w/Spooler	1.5	13.0
Segment Swap Data set	N/A	> =2.5
Communications Manager	0.7	3.3
LAN Requester (over CM base)	0.4	4.6
LAN Server 1.3	2.3	6.2
OOS Compatibility	0.5	2.0-3.0

User Interface

The OS/2 2.0 Desktop differs from the OS/2 1.3 Desktop Manager in several significant ways. For instance, the Desktop Manager, File Manager, Print Manager, and Control Panel are replaced by folders and objects; the Task List is now called the Window List; LAN Services and User Profile Management are now represented by icons. Public Applications folders or Private Applications folders are displayed on the Desktop (which is a folder that is always open), the first screen you see when your system is started.

OS/2 2.0 provides a Network folder that allows Users to view and connect to shared network resources. It also allows Administrators to manage remote printers.

Fixed Disk Configurations

The following is an example of some of the new interfaces available with LAN Server 2.0 and the possible configurations:

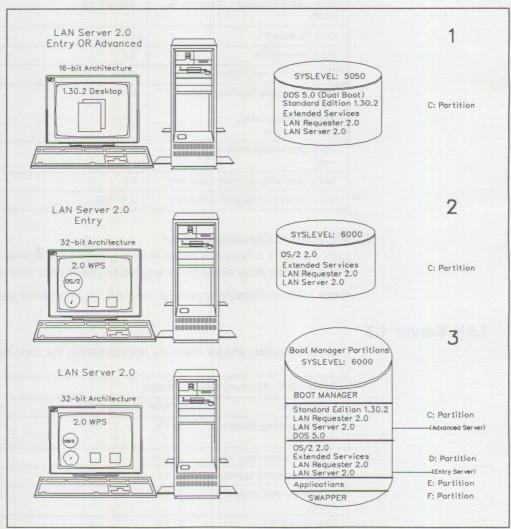


Figure 25-2. Fixed Disk Configurations

- 1 = Configuration one has one partition, Operating System 1.30.2 based with an interface which is familiar. The Advanced Server runs on this level (1.30.2) of the Operating System, **but not on OS/2 2.0**.
- 2 = Configuration two has one partition, Operating System 2.0 based, with a graphical user interface (Workplace Shell) and the Entry Server installed.
- 3 = Configuration three, which is also Operating System 2.0 based, allows up to four primary partitions and no extended partitions, or three primary partitions and multiple extended partitions with Boot Manager. If you plan to install the Advanced LAN Server (HPFS drive required) and Communications Manager on C:, consider making your partition at least 60 MB. For the D: partition, if you plan to install OS/2 LAN Server Entry (FATFS or HPFS) and Communications Manager, consider 70 to 80 MB drives. Since the SWAPPER.DAT grows quite large, it is best to direct it to its own partition.

Migration Consideration

Boot Manager configuration considerations: If you are migrating from PCLP 1.3X or LAN Server 1.0 and using the migration utility, edit the DCDB temp.file to point definitions to the correct drive on the new server.

Multiple DOS Sessions

LAN Server 2.0 provides the OS/2 2.0 Virtual DOS LAN Support device drivers needed for communication with NETBIOS. This support allows DOS NETBIOS applications to share an adapter with other OS/2 DOS applications. With this support, you can have up to four concurrent DOS LAN Requester 1.3, DOS LAN Requester 2.0, or PCLP 1.34 sessions on an OS/2 workstation. Real DOS must be booted either from a partition, diskette, or image; the DLR sessions do not run using emulated DOS provided by OS/2 2.0.

To use the OS/2 2.0 Virtual DOS LAN Support, run SETUPVDD (under \IBMCOM) to add 3 lines to the end of the CONFIG.SYS, which will load additional device drivers on the next reboot. The LTSVCFG utility configures NETBIOS resources for each DOS session (sessions, commands, and names).

Rather than use the OS/2 2.0 Virtual DOS LAN Support device driver, you can use the LAN Support Program to support one DOS LAN Requester or one PC LAN Program session. No other NETBIOS application will be able to run on adapter 0 at the same time when using LAN Support Program.

For more information, see the OS/2 LAN Server V2.0 Network Administrator Reference Supplement for OS/2 2.0.

Migration Consideration

DLR and PCLP must use adapter 0; each DOS session must have a different machine ID.

Security

LAN Server 2.0 has enhanced security, including local security, more flexible auditing, and operator rights.

Operator Rights

New in LAN Server 2.0, an administrator can use the NET USER command to give a user operator rights. The types of operators are:

- · Accounts Operator Allows the user to add, change, or delete users through UPM. An accounts operator cannot add, change, or delete an Administrator ID. An accounts operator can use UPM or the command line.
- · Server Operator Allows the user to manage aliases and other shared resources using the command line.
- · Print Operator Allows the user to manage print queues and print jobs, and to share print queues using Print Manager or the command line.
- Comm Operator Allows the user to manage serial devices and serial device shares using the command line.

Remote Initial Program Load (RIPL)

The OS/2 Remote IPL service is new for LAN Server 2.0. The REMOTEBOOT service that is part of Microsoft LAN Manager 2.0** replaced the previous Remote IPL service (PCDOSRPL). Along with this new service come new RIPL utilities (CHGBOOT, GETRPL, RPLDSABL and RPLENABL), and a new RPL.MAP file where a File Index Table (FIT) is defined. Up to 300 definitions may be defined. The RPL process must have access to OS/2 MUGLIB, IBMLAN and the user directories. Access is gained through two netnames, RPLFILES for workstations and WRKFILES (OS2.INI, SWAPPER.DAT, NET.ERR and LANTRAN.LOG).

RIPL (OS/2 and DOS) is supported on the Entry and Advanced Servers, however it is recommended that the drive be HPFS for better performance.

Install RIPL and run GETRPL to activate the RIPL.IPL. GETRPL migrates DOS remote IPL requester profiles from previous releases, sets up the Access Control Profile (ACP), and installs all OS/2 device drivers and display support (DLL).

Following is more information about RIPL:

- · Works with Boot Manager.
- 1.3 server can boot 2.0 clients.
- Bigbufs and cache sizes may need to be increased to support the large sequential data transfers involved with Remote IPL.1
- RXCDA default access under RIPL User tree.
- Support for requesters (DOS or OS/2) with Token-Ring, PC Network baseband or broadband, or Ethernet (PS/2 only) adapters. Refer to announcement letter 291-630 for a list of supported LAN adapters.

¹ OS/2 SAPR Guide, SA90-121.

 OS/2 requesters can optionally use the GUEST ID, but DOS requesters must still use the GUEST ID.

Migration Consideration

Remote IPL images prepared by OS/2 LAN Server 1.0 or PC LAN Program Version 1.3 (or later) are not compatible with LAN Server 2.0 and are not migrated. Therefore, you must re-create IPL images after upgrading from OS/2 LAN Server 1.0 or PC LAN Program Version 1.3 (or later).

If you are upgrading OS/2 LAN Server 1.2 or 1.3, or reinstalling LAN Server 2.0, DOS remote IPL data is upgraded unless you select to remove the DOS Remote IPL service during installation and configuration. On a reinstallation, the same is true for OS/2 remote IPL data if you do not select to remove the OS/2 Remote IPL service.

Note: RIPL across bridges was never officially supported and it is not supported for OS/2 RIPL. The frames are too large, causing the bridge to timeout before a connection can be established.

GETRPL

The GETRPL utility takes care of migrating over existing RIPL definitions, and puts existing users in an RPL group.

CHGBOOT

The CHGBOOT is a new RIPL utility that allows users to select an alternate workstation CONFIG.SYS for use at next IPL. The configuration is temporary as the workstation returns to the default configuration with the next IPL.

For more information, please see:

- IBM Operating System/2 Local Area Network Server Version 2.0 Network Administrator Reference
 - Volume 1 Planning and Installation
 - Volume 3 Network Administrator Tasks
- LAN Server Version 2.0 Network Administrators Reference Supplement for OS/2 2.0.

Home Directory

Previous versions of LAN Server (1.0 and 1.2) and PCLP 1.3X required user's home directories to have a unique alias. Aliases were not easily shared and caused additional overhead as the server had to check them along with access. LAN Server 2.0 (1.30.1 and 1.30.2) no longer requires aliases and users can share the same home directory. Home directories can be defined via the Command Line Interface (CLI) or the Full Screen Interface (FSI).

HDCON

HDCON (?\IBMLAN\NETPROG\HDCON.EXE) is a utility that converts home directory aliases from the old style (before 1.30.1) to the new style (LAN Server 1.30.1 and LAN Server 2.0). It also converts new style home directory aliases to the old style alias. Home directory aliases in the domain can be converted all at once or individually.

Migration Consideration

Administrators use this conversion tool, HDCON, to convert as many home directories to the new version as possible so that they may be shared. Administrators also convert the home directories so that the performance impact on servers is lessened.

CHKSTOR

The CHKSTOR utility (\IBMLAN\NETPROG\CHKSTOR.EXE) checks home directory storage usage against the maximum amount of storage defined for users, but does not enforce user space limits on the disk. Use the NET USER maxstorage command on the CLI to define the maximum amount of storage for users.

The following is an example that causes storage information for all users to be listed:

CHKSTOR

\\servername\username /alerts /all alerts:yes.

These results may be sent to a file or displayed.

Fault Tolerance

The Fault Tolerance Administration icon is found on Group - LAN Services for 1.30.2 and on LAN Services - ICON View for OS/2 LAN Server 2.0.

Fault Tolerance is an addition to LAN Server 2.0 and consists of disk mirroring and duplexing that are available for the Advanced server configuration only. Fault Tolerance must be configured via the FTSETUP utility after installation.

Following is a list of Fault Tolerance Utilities:

- FTSETUP
- FTADMIN
- FTMONIT

Note: AST Model PREMIUM 486-33TE does not support either Fault Tolerance or the Security functions in the Advanced Installation.

Mirroring

Drive mirroring is the duplication of a single logical drive or volume on two partitions that do not reside on the same physical disk.

There are several icons that represent whether a drive is mirrored, not mirrored, or cracked.

Migration Consideration

If you are migrating information using the Migration Utility to a newly created mirrored drive, you should first backup and export your data, then edit the DCDB temporary ASCII file that it generates to resolve those definitions that may be pointing to the wrong drive, then import the data to the new 2.0 LAN Server. Two drives are required for drive mirroring as well as for drive duplexing.

Duplexing

Drive duplexing, a special type of drive mirroring, is also new to LAN Server 2.0. The two partitions are controlled by two different disk controllers. Both the drive and controller are mirrored.

Additional Options

The next two options are not specific to OS/2 LAN Server Fault Tolerance. However, they serve to enhance the stability of the network environment.

Hotfix

When certain disk errors occur, the HPFS automatically recovers the data through hotfixing. Hotfixing detects bad sectors and reroutes data to a good sector in a reserved area on the drive. Hotfixing is automatic and can only be done on a drive with the HPFS. The hotfix corrects both the primary and secondary partitions.2 There is a way to get some information on hotfix activity, but tools are not available to provide the extensive reports that are available for the Novell NetWare hotfix.

See Volume 1 - Planning and Installation, for more information.

UPS

Uninterruptible Power Supply (UPS) service provides warning and orderly shutdown with a compatible power supply from an OEM vendor. The UPS signals the server through the serial port. LAN Server pauses the server service, the server sends out alerts to users, flushes data cache, logs events, and closes all open files.

UPS parameters in IBMLAN.INI allow you to control the server shutdown process. For example, you can specify a .CMD file to be executed at server shutdown. The LAN Server knows which files are open and automatically closes each of those files before shutdown. About 30 seconds elapse between the signal from the UPS box and complete shutdown when all services are stopped. The functions provided by the orderly shutdown process are all that are necessary in most environments. Specification of a .CMD file does not guarantee that there is always time to complete execution before shutdown.

Migration Consideration

Check with the UPS vendor to see if the appropriate cables are provided. After migration, make sure the entry for UPS comes before other COM drivers in the CONFIG.SYS file (only COM 1 and 2 are supported). UPSDRV.OS2 must be placed before COM02.SYS in the CONFIG.SYS file.

Multi-Logon

Multi-logon support is also new to LAN Server 2.0 and eliminates the need to logoff before logging in again on the same server. DOS and OS/2 requests may participate. This function allows a user to log on to the same domain from more than one workstation. To enable this, in the IBMLAN.INI of the second

² IBM Operating System/2 Local Area Network Server Version 2.0 Network Administrator Reference Volume 3: Network Administrator Tasks, S04G-1034.

workstation (and any subsequent workstations where the user may log on), change the MULTILOGON parameter value (in the LSCLIENT section) to Yes.

NET.ACC Utilities

Prior to 2.0, when the NET.ACC file (keeps userid, groups, passwords, and Access Control Profiles) was damaged, and no good backup existed, the best recovery method was to reinstall. This release of LAN Server allows you to fix damaged NET.ACC files using the new FIXACC utility found on the migration diskette.

UTILITY DESCRIPTION BACKACC Backs up NET.ACC, NET.AUD, and access control information. (File access control only, it does not back up printer or COM resources, and it deletes ACPs for non-existent directories.) RESTACC Restores access control information stored by BACKACC such as 386 HPFS file system ACPs.

Note: Deletes Access Control Profiles (ACPs) from NET.ACC for file/directory resources that no longer exist. (This does not happen with 386 HPFS.)

Rebuilds a damaged NET.ACC (NET2247 message) and compresses dead space to reduce seek time. It is very slow (800K NET.ACC can take up to half an hour to complete. It is disk I/O intensive). Do not start any program that uses NET.ACC while FIXACC is running (UPM).

Note: BACKACC, RESTACC and FIXACC are in the following two places: on the migration utility diskette and in ?:\IBMLAN\NETPROG after the migration utility is installed on the domain controller.

Migration Consideration

FIXACC

Access control profiles for resources on FAT and HPFS drives, printer resources, and serial device resources are stored in NET.ACC. Access control information for files resources on 386 HPFS drives are stored within the file system structure.

The LAN Access Control APIs automatically determine where the Access Control information is located. On 386 HPFS, any disk-related access control in NET.ACC is ignored (file, COM port, and printers only).

For more information see the following references:

- IBM Operating System/2 Local Area Network Server Version 2.0 Network Administrator Reference Volume 1: Planning and Installation
- IBM Operating System/2 Local Area Network Server Version 2.0 Network Administrator Reference Volume 3: Network Administrator Tasks

Generic Alerter Service

LAN Server now has a Generic Alerter service that generates, builds, and sends SNA alerts to LAN Network Manager (LNM) using 802.2 sessions or to NetView using LU 6.2 sessions (Alerts can be filtered at the host.) The Generic Alerter service is available in both the Entry and Advanced packages.

Only LAN Server alerts, not requester messages, are supported. LAN Network Manager 1.0 supports all LAN Server alerts. NetView V2R3 supports a total of 35

LAN Server alerts. NetView V2R2 supports 15 LAN Server alerts. Purchase and installation of the products just mentioned may be required to use this new service.

The following list is an example of a few of the forwarded alerts:

- · Disk nearing capacity
- Error log almost full
- · System resource limit reached
- · User's maximum storage exceeded
- · Fault Tolerance disk read error.

Note: To get the total number of LAN Server alerts with NetView V2R2, update the NetView user tables.

For further information, refer to Volume 2: 2.0 Problem Determination Reference: LAN Alerts.

First Failure Support Technology/2

First Failure Support Technology/2 (FFST/2) collects, logs, and routes error messages to LAN Network Manager and NetView for the Alerter service. FFST/2 is a new common service between LAN Server and Extended Services for 2.0.

For more information, see OS/2 LAN Server V2.0 Problem Determination Reference Volume 2: LAN Alerts.

Chapter 26. OS/2 LAN Server 2.0 Migration

This chapter provides an overview of OS/2 LAN Server migration considerations. LAN Server migration methods, steps, and scenarios are documented extensively in *Migration Handbook*. That information will not be duplicated in this manual.¹

The following topics are briefly discussed in this chapter:

- Migration Utilities
- Additional Migration Considerations
- · Start Here Table
- Typical LAN Server Network
- Upgrading to OS/2 2.0
- Migrating PCLP 1.3x and OS/2 LAN Server 1.0
- Upgrading LAN Server 1.2 or LAN Server 1.3
- Reinstalling Novell Netware Servers
- Migration Tables (servers and requesters).

Migration Scenarios

To migrate to LAN Server 2.0, use one or both of the following scenarios in a staged or complete cutover migration:

- Use the existing DC (if it has the appropriate microprocessor) to update to 2.0 (PCLP 1.3X, LS 1.0, 1.2, 1.3, or OEM). The Migration Utility is available for PCLP 1.3X and LS 1.0 migration. Use the BACKACC and RESTACC utilities for 1.2 or 1.3 domain controllers to backup and restore access information.
- Install new Domain controller: Backup, reformat and reinstall (going from OEM server, changing file system from FAT to HPFS, or upgrading hardware).

Note: Perform migrations after hours or on weekends as users cannot be logged on while migration activity is in progress. Users should back up their own local databases, and change their passwords after the migration process is complete.

For a full discussion of migration procedures, refer to the IBM Operating System/2 Local Area Network Server Version 2.0 Migration Handbook

[·] Migration specific:

⁻ IBM Operating System/2 LAN Server 2.0 Migration Handbook.

[•] IBM Extended Services for Operating System/2 Example Scenarios

Integrating Operating System/2 Workstations and Local Area Networks into Enterprise Networks, Version 1.3.

Migration Utilities

The Export utility is required for PCLP 1.3X and LAN Server 1.0 migration to LAN Server 2.0. The Import utility only imports data that has been exported by the export utility to the new server. The BACKACC and RESTACC utilities are used to assist with the upgrade of 1.2 and 1.3 servers to the new 2.0 environment and to back up the NET.ACC file. FIXACC is used for routine maintenance of damaged NET.ACC files. These utilities are installed with LAN Server and another copy of them is on the Migration diskette.

Available migration utilities are listed below:

- PCLPEXPO.EXE to export definitions from the PCLP 1.3X domain controller to a DCDB.TEMP file.
- LS10EXPO.EXE to export definitions from the OS/2 LAN Server 1.0 domain controller to a DCDB.TEMP file.
- The BACKACC utility backs up domain definitions and data from OS/2 LAN Server 1.2 and 1.3 domain controllers.
- The RESTACC utility restores domain definitions and data to the OS/2 LAN Server 2.0 that was backed up with the BACKACC utility for OS/2 LAN Server 1.2 and 1.3.
- LS12IMPO.EXE to import definitions from the DCDB.TEMP file to the 2.0 server
- · The FIXACC utility is used to fix damaged NET.ACC files.

Migration Consideration

The Migration Utility does not migrate global access list (LS 1.0) or DOS RIPL images.

Migration error messages are now in Volume 3 - LAN Error Messages, S04G-1043 not in the Migration Handbook. The Migration Handbook is no longer included on the migration diskette as it was with previous versions of LAN Server.

Additional Migration Considerations

- Before you install a new version of the operating system, upgrade a previous version of OS/2 LAN Server or reinstall LAN Server 2.0, preserve important data, such as remote IPL images, NET.ACC, access control information, and DCDB and configuration files.
- In the past, the operating system must first be upgraded to migrate a server. For example, Extended Edition 1.3 needed to be installed before LAN Server 1.2 could be upgraded to LAN Server 1.3. This basic operating system upgrade requirement still applies, but in situations where LAN Server is running together with Database Manager or Communications Manager (or both) on the same workstation, the new LAN Adapter and Protocol Support requires additional consideration.
- Any time the workstation's Extended Edition functions (Communications Manager, Database Manager, OS/2 LAN Requester, or OS/2 LAN Server) are updated to new versions that support NDIS, all components that are used must be updated: Communications Manager and Database Manager to the Extended Services program; OS/2 LAN Server and OS/2 LAN Requester to the OS/2 LAN Server; and OS/2 LAN Requester components of LAN Server 2.0.

- · If the Extended Services program is installed, the OS/2 LAN Server function is not restored until LAN Server 2.0 is installed.
- · If LAN Server 2.0 is installed, the Database Manager or Communications Manager functions (or both) are not restored until the Extended Services program is installed.
- · If the database function of an OS/2 LAN Requester workstation that also serves as a Database Client workstation is upgraded to the Extended Services program, the OS/2 LAN Requester function is not restored until the OS/2 LAN Requester component from LAN Server 2.0 is installed.
- Sequence of installations: Start with OS/2 2.0 if you plan to use Boot Manager, that allows you to have multiple operating systems on your server. Then, depending on the function you require, determine which packages to install first; LAN Server or Extended Services, for example.

The level of OS/2 (1.30.2 or 2.0) determines available function.

Domain Control and Access Control Profile Information

Domain control information, such as group and user information and the access control profiles, can be migrated in different ways depending on the server version you upgrade. Domain definitions are housed in the DCDB for LAN Server 1.0, 1.2, 1.3 and 2.0. This information is kept in directories for PC LAN Program. The DCDB contains:

- · User logon assignments
- · Application selector information
- · Shared resource definitions
- · .CMD and .BAT files for external resources and applications
- · DOS .img and .def files

If you install an additional server over a domain controller, the domain control database (DCDB) is discarded. Do not discard the user and group information stored in the NET.ACC file, (which includes the access control profiles). The user and group information is deleted when the additional server logs on to the domain.

Upgrading or Reinstalling on a Different Fixed Disk

If you are upgrading a previous version of OS/2 LAN Server on a different fixed disk and want to migrate DCDB and access control profile information, run the installation and configuration program twice.

First, follow the guidelines in the Migration Handbook, then install LAN Server 2.0 on the same disk where the previous version resided (for example, drive C). Once the new version has been installed on that drive, restart your system and run the LAN Services installation/configuration program a second time. On the Fixed Disk window, specify the drive that you want to install LAN Services on (for example, drive D). All files are then copied from drive C to drive D. You may still have to redefine aliases in the DCDB since they will be pointing to the wrong drive.

To migrate DCDB and access control profiles when reinstalling LAN Server 2.0 on a different fixed disk, run the LAN Services installation/configuration program and do not reinitialize the DCDB. You do not need to run the LAN Services installation/configuration program twice.

Note: The LAN Services installation/configuration program does not move current IBMCOM, MUGLIB, and IBM386FS subdirectories to a different fixed disk. These directories, if they exist, remain on the OS/2 boot drive.

Start Here Table

The following table lists considerations and requirements you need to address to complete a successful migration to LAN Server 2.0.

Migration Considerations	Tips	Comments
Review New features, Enhanced features, and Migration Issues, in this guide.		
Review: Vol 1: Planning and Installation (S04G-1032) LS 2.0 Network Administrator Reference Supplement for OS/2 2.0 Migration Handbook	Select migration scenario	
Upgrade Hardware PS/2 model (286, 386, or 486) OEM model	Entry LS 2.0 = 286 or and higher Advanced LS 2.0 = 386 or 486 only	
Multiple adapters Busmaster (Olivetti P750 = no) 16/4 adapter	Hardware model (# of slots) Configure 64KB RAM during hardware install	
File System HPFS (Ring 3) HPFS386 (Ring 0) Local Security	Entry (DC or print server) Advanced (application server) C:partition for Boot Manager Install on boot drive only	
FATFS Fault Tolerance (mirroring and duplexing)	Need 2 drives, HPFS386 only	
UPS	Compatibility issues - OEM vendor	
Remote IPL DOS (PCLP and DLR) OS/2 (1.0, 1.2 and 1.3) Ethernet (PS/2 adapter) NetWare	RIPL chip, memory Not compatible (recreate IPL images) Etherand Networks not supported	
Multilogon		
Multiple DOS Sessions or dual boot		
Install Operating System OS/2 1.30.2 (5050) and LS 2.0 (Advanced) OS/2 2.0 (6000) and LS 2.0 (Entry) DOS 3.3, 4.01, 5.0, PCLP and DLR Install Migration Utility	Check memory charts Select to install migration utility Install ES 1.0 for database and CM	
GO TO <i>Migration Handbook</i> Use Migration Utilities from Migration diskette	Export, edit temp file, and import data Use appropriate migration scenario	
 Manually move applications and redefine the working directory. Copy data and files to target. Create print queues and definitions. Recreate images as applicable. Update ACP (1.2 = on server with with resource, 1.0 = domain controller PCLP = in directories). Tune and test (IBMLAN.INI, PROTOCOL.INI and CONFIG.SYS). 		

Typical LAN Server Network

Your network probably looks like the picture below. The migration steps needed to move to an OS/2 2.0 environment are provided on the following pages.

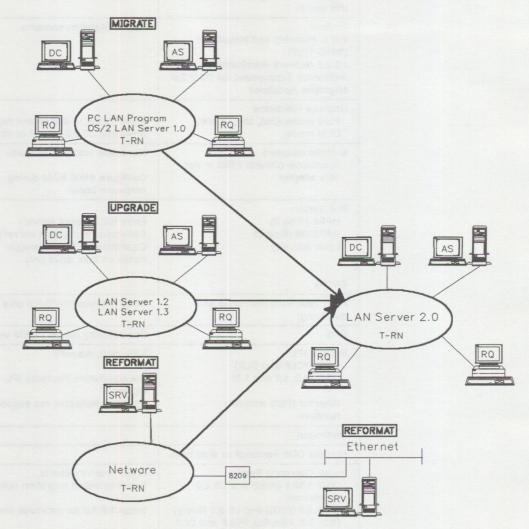


Figure 26-1. Typical LAN Server Network

Upgrading to OS/2 2.0

The server and requester components of LAN Server 2.0 are specific to the operating system that is installed. If you have installed OS/2 LAN Server on OS/2 1.3 and then upgrade your operating system to OS/2 2.0, you must reinstall the server component of LAN Server 2.0. If you have installed OS/2 LAN Requester on OS/2 1.3 and then upgrade your operating system to OS/2 2.0, you must reinstall the requester component of LAN Server 2.0. Use the advanced installation path to reinstall either the server or requester component. Refer to the LAN Server Network Administrator Reference Volume 1: Planning and Installation for information on reinstalling a component of LAN Server 2.0.

If you have installed the LAN Server 2.0 - Advanced package on OS/2 1.3 and you want to upgrade your operating system to OS/2 2.0, you must first remove the 386 HPFS component of LAN 2.0 before installing OS/2 2.0. Before removing the 386 HPFS from your server, use the BACKACC utility to back up the access control profiles for 386 HPFS drives. After removing the 386 HPFS and installing OS/2 2.0, install the server component of the LAN Server 2.0 - Entry package. Use the RESTACC utility, after installing the server component, to restore the access control profiles, if necessary,2

Migrating PC LAN Program 1.3x or OS/2 LAN Server 1.0

You must run the Migration Export Utility (Table 26-1 on page 26-5) to save the DCDB of a domain controller from OS/2 LAN Server Version 1.0 or PC LAN Program Version 1.3. This should be done before installing a new OS/2 version or running the LAN Services installation/configuration program. The Migration Export Utility is provided on the Migration Utility diskette, which is part of the installation package. When you run the LAN Services installation/configuration program, be sure to follow the advanced path and to install the Migration Import Utility. Run the LAN Services installation/configuration program on all additional servers on your domain. On completion of the LAN Services installation/configuration program, make sure that all additional servers are started and running. Run the Migration Import Utility (Table 26-1 on page 26-5) on the domain controller to reapply the information saved by the Migration Export Utility. This method migrates the access control profiles and other domain control information. There is no need to run the Migration Import Utility for each additional server.

Definition Mapping

Following is a list of definitions that can be migrated from PCLP or LAN Server 1.0 to OS/2 LAN Server 2.0:

Definition	Migrated
Users	Migrated (kept in NET.ACC & DCDB)
Groups	Migrated (kept in NET.ACC & DCDB)
Applications	Definitions
Printers	Definitions
Home directories	Definitions
Access control profiles	Definitions
LAN objects	Definitions
RIPL	Definitions

Following is a list of definitions that CANNOT be migrated from PCLP or LAN Server 1.0 to OS/2 LAN Server 2.0:

Definition	Not Migrated
Files and data	Copy to restore
LPT1	Change to LPT1Q, create spooler queues
External resources	Redefine

[·] LAN Server Network Administrator Reference Volume 1: Planning and Installation for information on removing components of LAN Server 2.0.

See the LAN Server Network Administrator Reference Volume 3: Network Administrator Tasks for information on using the BACKACC and RESTACC utilities.

IBM Operating System/2 Local Area Network Server Version 2.0 Network Administrator Reference Supplement for OS/2 2.0

Global Access lists RPL.MAP file and images Passwords (PCLP and LS 1.0) Passwords (LS 1.2 and LS 1.3) Domain Controller name DOS users **Applications**

LS 1.0 (not compatible with OS/2 2.0) Redefine or copy over Redefine, randomly reset Manually copy (stored in DCDBPSWD.BAT) Must be unique Define as OS/2 to access LS 1.0 Redefine working directory

Migration Consideration

The migration utility is used for PCLP 1.3X and LAN Server 1.0 migration. The utility randomly sets new passwords for each migrated user. They will be located in file \IBMLAN\NETPROG\DCDBPSWD.DAT file on the LAN Server 2.0 domain controller. Administrators must notify users that they must change their passwords.

Passwords do not need to be changed if moving from LAN Server 1.2 or LAN Server 1.3 to LAN Server 2.0. The password information is stored in \IBMLAN\NETPROG\DCDBPSWD.DAT in LAN Server 1.2, 1.3 and 2.0 and can easily be backed up and restored after LAN Server 2.0 has been installed.

PCLP 1.3x

Steps to migrate to LS 2.0:

Step	1	logon assignments application selector, and resources to be shared).
Step	2	Back up data and applications using XCOPY or the BACKUP command.
Step	3	Upgrade hardware (286 for Entry and 386 for Advanced).
Step	4	Run the export utility found on the migration utilities diskette.
Step	5	Edit the temporary DCDB file to reconcile definitions and Access Control Profiles (ACPs).
Step	6	Install LAN Server 2.0 (install local security after migration).
Step	7	Run import utility on the new server.
Step	8	Copy files, applications and data to 2.0 server.
Step	9	Create access control profiles for applications, restore applications and data (must be copied) and redefine spooler and queues for printers.
Step	10	Recreate RIPL images.
Step	11	Use HDCON to convert home directory aliases to LS 2.0 format.
Step	12	Test and tune the server along with user access.
Step	13	Inform users to change their passwords.
_ Step	14	Upgrade requesters.
Refer to	IRM	Operating System/2 LAN Server 2.0 Migration Handbook for

LAN Server 1.0

Steps to migrate to LAN Server 2.0:

in-depth migration steps.

- 1 Print DCDB contents. Step
- 2 Back up data using DCDBBACK or XCOPY.

Step	3	Use the export migration utility to export definitions to a temporary DCDB file.
Step	4	Upgrade hardware (286 for Entry and 386 for Advanced).
Step	5	Install OS/2 2.0 and LAN Server 2.0.
Step	6	Change access control profiles (DC only) for file resources. Access control profiles are processed differently on LS 1.0 and LS 2.0. Existing LS 1.0 applications may not have access profiles.
Step	7	Update home directory aliases for private applications. Use HDCON to convert home directory aliases to LAN Server 2.0 format.
Step	8	Copy applications and user files must be manually copied to the new server.
Step	9	Change Domain/Server name in the temporary file before attempting to import the file to LAN Server 2.0.
Step	10	Import DCDB (UPM and local security are not available for LS 1.0). The LAN Server 1.0 Global access list is not used in LAN Server 2.0 and is not migrated.
Step	11	Tune and test the server along with user access.
Step	12	Inform users to change their passwords.
Step	13	Upgrade requesters.
Refer to	IBM	Operating System/2 LAN Server 2.0 Migration Handbook, for

Upgrading OS/2 LAN Server 1.2 or 1.3

in-depth migration steps.

To upgrade an OS/2 LAN Server 1.2 or 1.3 domain controller or to reinstall a LAN Server 2.0 domain controller, follow the advanced installation path. The LAN Services installation/configuration program presents the choice of using existing domain control definitions (not reinitializing the DCDB) or not using existing control definitions (reinitializing or erasing the DCDB). If you choose not to reinitialize, the DCDB contents are saved. This procedure takes care of migrating the access control profiles if you are preserving the same file system (either FAT or HPFS).

If you are installing a 386 HPFS over an HPFS or FAT file system and you want to migrate the access control profiles, run the BACKACC utility before installing LAN Server 2.0 on an additional server or a domain controller. After installing, run the RESTACC utility to reapply the saved information.

Both the BACKACC and RESTACC utilities can be obtained from the Migration Utility Diskette, which is part of the installation package. BACKACC, RESTACC and FIXACC utilities can also be obtained from ?:\IBMLAN\NETPROG where it is stored during the LAN Server installation if the option is selected to copy the files from the migration diskette.

Steps to upgrade 1.2 or 1.3 to 2.0:

Step 1 Back up NET.ACC and NET.AUD using OS/2 Backup and Restore commands.

Step	2	Upgrade hardware.
Step	3	Use A:LANINST or use the LAN Services installation/configuration program, select the advanced path, and do not reinitialize the Domain Control Data Base (DCDB). Access Control Profiles (ACP) are preserved if you do not change file systems.
Step	4	If Database Manager or Communications Manager is required, install the appropriate operating system (2.0 or 1.30.2), LAN Requester, LAN Server 2.0, and Extended Services. (Communications Manager is required.)
Step	5	Run the RESTACC utility to restore your data to the new server.
Step	6	Redefine Aliases if installing on two disks. Aliases may be pointing to the wrong drive. Convert home directory aliases using the HDCON utility.
Step	7	Test and tune the server along with user access.
Step	8	Upgrade requesters.
Note: CS	D40	98 hacked up data must be restored to the same drive letter on

LAN Server 2.0 as it was previously on the 1.2 servers.

Refer to IBM Operating System/2 LAN Server 2.0 Migration Handbook, for in-depth migration steps.

Reinstalling Novell NetWare Servers

NetWare 2.2 and 3.11 Servers

Novell NetWare provides two utilities to back up data (SBACKUP, NBACKUP, or DOS Backup). NBACKUP requires that the data be restored to a like system. If you can back up data to a SYTOS system that LAN Server understands, you may be able to restore the data to LAN Server 2.0.

Steps to move to LAN Server 2.0:

St	tep	1	Back up data using SYTOS Plus so the data can be restored to LAN Server. It is not clear if NetWare is compatible with the same version of SYTOS and if that is the case, a complete reinstall would be required. Obviously, this would only be advisable in new account or in a small shop where the loss of data would not be an issue.
St	ер	2	Print out a copy of the existing system.
St	ер	3	Format (low level) the server machine.
St	ер	4	Install LAN Server 2.0.
St	ер	5	Define users, applications, and other resources.
St	ер	6	Restore data to the new LAN Server 2.0.
St	ер	7	Test and tune the server along with user access.
St	ер	8	Inform users to change their passwords.
St	ер	9	Upgrade requesters.

Migration Tables

The following tables provide an overview of the basic steps involved in migration from servers and requesters to the new LAN Server 2.0 environment. The assumption is that the fixed disk is not reformatted. If reformatting is involved, additional steps are required to save the contents of the fixed disk for restoration purposes after the formatting is complete.

Migration Consideration

As indicated in the steps column, LAN Server 2.0 and the Extended Services program can be installed in any sequence for some migration scenarios. In such cases, you may want to consider installing the Extended Services program first to ensure proper migration of configuration information related to IBM Token-Ring Network adapters and IBM PC Network adapter drivers. The Extended Services program retrieves adapter information from old .CFG files; LAN Server 2.0 does not.

From	То	Steps
PCLP 1.3 / DOS 3.3, 4.01, 5.0 LS 1.0 / EE 1.1 (LS only)	LS 2.0 / SE 1.3	8c, 1, 2, 3, 10c
LS 1.2 / EE 1.2 (LS only)	LS 2.0 / SE 1.3	1, 2, 3
LS 1.3 / EE 1.3 (LS only)	LS 2.0 / SE 1.3	3, 2a or 1b, 2, 3 or 4, 3a
LS 1.0 / EE 1.1 (DBM and/or CM)	LS 2.0, ES 1.0 with DBM and/or CM / SE 1.3	8c, 1, 2, 3, 10c, 7 or 8c, 1, 2, 7, 3, 10c
LS 1.2 / EE 1.2 (DBM and/or CM)	LS 2.0, ES 1.0 with DBM and/or CM / SE 1.3	1, 2, 7, 3 or 1, 2, 3, 7
LS 1.3 / EE 1.3 (DBM and/or CM)	LS 2.0, ES 1.0 with DBM and/or CM / SE 1.3	3, 2a, 7 or 7, 2, 3
PCLP 1.3 / DOS 3.3, 4.01, 5.0 LS 1.0 / EE 1.1 (LS only)	LS 2.0 Entry / SE 2.0	8c, 5, 6, 3, 10c
LS 1.2 / EE 1.2 (LS only) LS 1.3 / EE 1.3 (LS only)	LS 2.0 Entry / SE 2.0	5, 6, 3
PCLP 1.3 / DOS 3.3, 4.01, 5.0 LS 1.0 / EE 1.1 (DBM and/or CM)	LS 2.0 Entry, ES 1.0 with DBM and/or CM / SE 2.0	8c, 5, 6, 3, 10c, 7 or 8c, 5, 6, 7, 3, 10c
LS 1.2 / EE 1.2 (DBM and/or CM) LS 1.3 / EE 1.3 (DBM and/or CM)	LS 2.0 Entry, ES 1.0 with DBM and/or CM / SE 2.0	5, 6, 3, 7 or 5, 6, 7, 3

Table 26-2 (Page 2 of 2). Migration Steps for the OS/2 LAN Server Component of LAN Server 2.0

From	То	Steps
Key to Steps:	Key to Notes:	
 Install SE 1.3. Apply SE 1.3 CSD (if required). Install LS 2.0 Entry or Advanced (check IBMLAN.INI) Install EE 1.3 CSD. Install SE 2.0. Install SE 2.0 CSD (if required). Install ES 1.0. Use Migration Utility to export LAN definitions. Check temporary file for dupes and correct (tab char), add print queue, and change domain name. Use Migration Utility to import LAN definitions. 	 a. Desktop is preserved. EE 1.3 DBM and/or CM references are removed from the STARTUP.CMD and CONFIG.SYS files and the Group – Main window. b. SE 1.3 system configuration is required. Desktop is preserved. EE 1.3 DBM and/or CM references must be manually removed from the CONFIG.SYS file and the Group – Main window. c. Refer to the Migration Handbook, S04G-1044. 	
Abbreviations:	18 1 1865 S 275 S 255 S 1	

- CM = Communications Manager
- CSD = Corrective Service diskette
- DBM = Database Manager
- EE = OS/2 Extended Edition
- ES = IBM Extended Services for OS/2
- LS = LAN Server
- SE = Standard Edition

From	То	Steps
PCLP 1.3 / DOS 3.3, 4.01, 5.0 DOS LAN Requester 1.2 DOS LAN Requester 1.3	DOS LAN Requester / DOS 3.3, 4.01, 5.0	4
PCLP 1.3 / DOS 3.3, 4.01, 5.0 DOS LAN Requester 1.2 and 1.3 EE 1.1 (LAN only) EE 1.2 (LAN only)	LS 2.0 Requester / SE 1.3	1, 2, 5
EE 1.3 (LAN only)	LS 2.0 Requester / SE 1.3	5, 2a or 1b, 2, 5 or 3, 5a
PCLP 1.3 / DOS 3.3, 4.01, 5.0 EE 1.1 (DBM and/or CM) EE 1.2 (DBM and/or CM)	LS 2.0 Requester, ES 1.0 with DBM and/or CM / SE 1.3	1, 2, 5, 8 or 1, 2, 8, 5
EE 1.3 (DBM and/or CM)	LS 2.0 Requester, ES 1.0 with DBM and/or CM / SE 1.3	5, 2a, 8 or 3, 5a 8 or 3, 8, 5 or 8, 2, 5
PCLP 1.3 / DOS 3.3, 4.01, 5.0 DOS LAN Requester 1.2 & 1.3 EE 1.1 (LAN only or with DBM and/or CM) EE 1.2 (LAN only or with DBM and/or CM) EE 1.3 (LAN only or with DBM and/or CM)	LS 2.0 Requester / SE 2.0	6, 7, 5
PCLP 1.3 / DOS 3.3, 4.01, 5.0 DOS LAN Requester 1.2 & 1.3 EE 1.1 (LAN only or with DBM and/or CM) EE 1.2 (LAN only or with DBM and/or CM) EE 1.3 (LAN only or with DBM and/or CM)	LS 2.0 Requester, ES 1.0 with DBM and/or CM / SE 2.0	6, 7, 5, 8 or 6, 7 8, 5
Key to Steps:	Key to Notes:	
Install SE 1.3. Apply SE 1.3 CSD (if required). Install EE 1.3 CSD. Install DOS LAN Requester using DLRINST service or diskette.	Desktop is preserved. EE 1.3 DBM and/or CM references are removed from the STARTUP.CMD and CONFIG.SYS files and the Group – Main window.	
5. Install OS/2 LAN Requester from LS 2.0. 6. Install SE 2.0. 7. Install SE 2.0 CSD (if required). 8. Install ES 1.0.	b. SE 1.3 system configuration is required. Desktop is preserved. EE 1.3 DBM and/or CM references must be manually removed from the CONFIG.SYS file and the Group – Main window.	

- CSD = Corrective Service diskette

 DBM = Database Manager

 EE = OS/2 Extended Edition

 ES = IBM Extended Services for OS/2

 LS = LAN Server

 PCLP = PC LAN Program

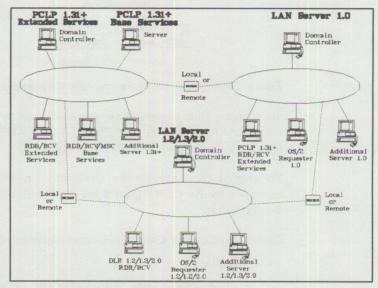
 SE = Standard Edition

Chapter 27. LAN Server Compatibility

This chapter describes the compatibility among various IBM LAN server and requester products and Novell NetWare servers.

External Resources

External resources need to be redefined after migrating to LAN Server 2.0. Resources can be shared by all the servers and requesters shown in the picture below. Also, a NetWare server can be added to one of the Token-Rings to share resources with IBM DOS and OS/2 requesters.



Cross Domain Access: 1. External Resources
2. Base Services via Command Line Interface (CLI)

Figure 27-1. External Resources

Logon Capabilities

Refer to announcement letter 291-630, and *IBM Operating System/2 Local Area Network Server Version 2.0 Network Administrator Reference Volume 1: Planning and Installation* for charts that show interoperability between LAN Servers and LAN Requesters.

Novell NetWare and IBM DOS and OS/2 LAN Requesters

Users at IBM DOS and OS/2 LAN Requester workstations can logon to both IBM and Novell** servers and access resources available on both servers.

COEXISTENCE

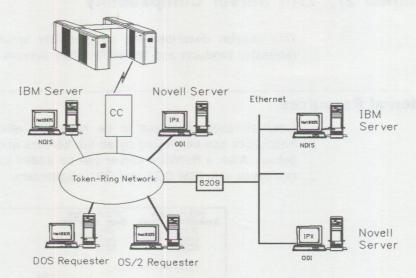


Figure 27-2. Novell NetWare and IBM Requesters Coexistence

To enable this coexistence capability on a DOS workstation, you must make some changes to the CONFIG.SYS and AUTOEXEC.BAT files and install Novell NetWare Requester for DOS workstations.

To enable the coexistence capability on an OS/2 workstation, you must make changes to the CONFIG.SYS file and install Novell NetWare Requester for OS/2 workstations.

Concurrent use of LAN Server and NetWare Servers:

- DOS clients
 - IBM DOS LAN Requester or PCLP with the NetWare DOS Shell (NETX.COM).
- OS/2 clients
 - IBM OS/2 LAN Requester with NetWare requester for OS/2.

IBM/Novell LAN Coexistence

Under OS/2 2.0, Ethernet, Communications Manager, and APPN (PU 2.1), concurrent sharing of the same Ethernet adapter is not documented in product publications.

This section describes issues relating to the ability of IBM and Novell communications software to share LAN hardware, particularly as it relates to IBM's OS/2 LAN Requester 2.0 and the latest version of Novell's Requester for OS/2. "Coexistence" with NetWare means that IBM and Novell communications software share the same network hardware, (an example is IBM and Novell communications software sharing a LAN adapter via different protocols such as IEEE 802.2, NETBIOS, TCP/IP, and IPX).

This section covers coexistence of the following IBM and Novell software:

IBM software:

OS/2 2.0 OS/2 Extended Services OS/2 LAN Server 2.0 OS/2 LAN Requester 2.0

Novell software:

NetWare Requester for OS/2 2.0

Previous versions of the OS/2 program made it difficult for two LAN .IFS files to be installed at one time, preventing the simultaneous operation, or coexistence, of OS/2 LAN Requester and Novell's NetWare Requester for OS/2. The enhanced functionality of the OS/2 program now enables both IBM OS/2 LAN Requester and Novell NetWare Requester for OS/2 to be installed and configured to share the same LAN adapter and cabling.

ODINSUP is Novell's new product to support the NDIS protocol stack on top of the Open data-link interface (ODI). Installing the ODINSUP driver requires modification of the CONFIG.SYS, NET.CFG, and PROTOCOL.INI files. This section explains how to modify these files.

ODI Network Device Interface Specification (NDIS) Support

IBM OS/2 LAN Server 2.0 and Extended Services support the NDIS-compatible network and protocol drivers. This support is an enhancement over LAN Server and Extended Edition 1.30.1, which provided NDIS-compatible communications only for Ethernet. Support of the NDIS architecture enables OS/2 LAN Requester to coexist with Novell NetWare Requester for OS/2 through Novell's ODI specification using OS/2 2.0.

ODI is similar to NDIS interface in that it supports multiple LAN adapters and multiple protocols on a single workstation. ODI creates a "logical network board," allowing multiple frame formats to be sent across the same network hardware. The main advantage of ODI over NDIS is that protocol stack drivers (for example, IPX, NETBIOS, TCP/IP) written to ODI specifications are not dependent on the type of LAN hardware topology being used. Therefore programmers do not have to include code in their protocol device drivers to support specific LAN topologies.

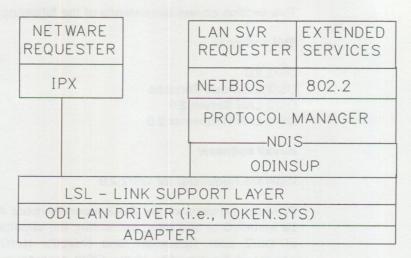


Figure 27-3. ODI Network Device Driver Specification Support

Changes to CONFIG.SYS

The Novell ODI MAC driver, ODINSUP.SYS, allows OS/2 LAN Requester 2.0 to coexist with other communications software compatible with IBM's NDIS communications configuration.

When OS/2 LAN Requester 2.0 or Extended Services is installed with NETBIOS support, a LAN-adapter-specific NDIS LAN driver is installed and loaded by the CONFIG.SYS. For example, if your network is an IBM Token-Ring Network, the IBMTOK.OS2 NDIS MAC driver is installed. For communications coexistence to take place (as with OS/2 LAN Requester 2.0 and NetWare Requester for OS/2). the NDIS LAN driver is replaced with the ODI LAN driver for IBM Token-Ring (TOKEN.SYS), and the Link Support Layer driver (LSL.SYS) must be added to support the building of the ODI stack. ODINSUP.SYS must be substituted into the NDIS stack to hook into the Link support layer (LSL).

Example Config.sys

Example 1 below is a portion of a CONFIG.SYS showing the configuration for OS/2 LAN coexistence using OS/2 1.30.2 and OS/2 2.0, with an IBM Token-Ring as the primary adapter and a 3Com 3C523 Ethernet adapter as the secondary adapter.

The loading order is important.

- 1. LSL.SYS and the ODI LAN drivers must be loaded before ODINSUP.SYS.
- 2. The NDIS drivers PROTMAN.OS2 and NETBIND.EXE, are still required; and PROTMAN.OS2 must be loaded before ODINSUP.SYS.
- 3. The protocol stack drivers (such as LANDD.OS2) must be loaded before ODINSUP.SYS.

Notice in the example that the NDIS MAC driver IBMTOK.OS2 is commented out. Its functionality has been replaced by the combination of LSL.SYS. TOKEN.SYS. and ODINSUP.SYS.

Note: Except for the ODINSUP.SYS reference, all NetWare Requester references shown are added automatically by the NetWare Requester installation procedure.

*Modify the LIBPATH to include the path to the .DLL files. This path *must be specified after the \MUGLIB\DLL directory entry to prevent *possible conflicts with the NETAPI.DLL in the C:\NETWARE directory. LIBPATH=C:\MUGLIB\DLL;...C:\NETWARE;...

*Append to the PATH statement the path to the NetWare *OS/2 utilities (L:\OS2). SET PATH=C:\IBMLAN\NETPROG;...L:\OS2;...

*Modify the DPATH to include the directory where the NetWare *message (.MSG) files were copied. SET DPATH=C:\IBMLAN\NETPROG;...;C:\NETWARE;...

REM --- NetWare Requester statements BEGIN ---

*The Link Support Layer driver, LSL.SYS, begins the NetWare ODI *driver stack and must be loaded before any other NetWare driver. DEVICE=C:\NETWARE\LSL.SYS RUN=C:\NETWARE\DDAEMON.EXE

*The ODI LAN driver must match the adapter installed. This example *is for IBM Token Ring. DEVICE=C:\NETWARE\TOKEN.SYS

*Used only with TOKEN.SYS, ROUTE.SYS must load immediately after for *source routing. DEVICE=C:\NETWARE\ROUTE.SYS

*This driver is for the 3Com 3C523 Ethernet (secondary adapter). DEVICE=C:\NETWARE\3C523.SYS

*The IPX driver must be loaded after the ODI LAN driver. DEVICE=C:\NETWARE\IPX.SYS

*The SPX driver is optional, but must be loaded to use the *printing utilities and Named Pipes. It is also required to run *Transport Level Interface (TLI) applications. DEVICE=C:\NETWARE\SPX.SYS RUN=C:\NETWARE\SPDAEMON.EXE

*Named Pipe support is optional, and must be loaded after the SPX driver. *Two configurations are possible -- "client only" and "server."

*Load the NMPIPE.SYS driver for Named Pipes client-only support. DEVICE=C:\NETWARE\NMPIPE.SYS

*Load the NPSERVER.SYS driver, along with NMPIPE.SYS, for Named *Pipes server support. DEVICE=C:\NETWARE\NPSERVER.SYS

*NPDAEMON.EXE must be executed for both Named Pipe configurations. *If configured as a "server," a server name must be specified. RUN=C:\NETWARE\NPDAEMON.EXE np_servername

*The NetWare OS/2 requester driver must be loaded after IPX, SPX, *and the Named Pipes drivers. DEVICE=C:\NETWARE\NWREQ.SYS

*The NetWare OS/2 Installable File System must be loaded after the *Requester driver. IFS=C:\NETWARE\NWIFS.IFS

*The NetWare Daemon must be loaded after the NetWare OS/2 Requester RUN=C:\NETWARE\NWDAEMON.EXE

*THE NETWARE NETBIOS DRIVER SHOULD NOT BE LOADED IN AN ES OR *LS environment. rem DEVICE=C:\NETWARE\NETBIOS.SYS rem RUN=C:\NETWARE\NBDAEMON.EXE

*THE NETWARE SUPPORT FOR MVDMS IS OPTIONAL, BUT IT IS REQUIRED *TO RUN THE DOS NETWARE UTILITIES, IE SYSCON. DEVICE=C:\NETWARE\VIPX.SYS

*The NetWare Print Spooler driver is optional. This is required *only if you want to print to a NetWare network printer queue. RUN=C:\NETWARE\NWSPOOL.EXE REM --- NetWare Requester statements END ---

DEVICE=C:\IBMCOM\LANMSGDD.OS2 /I:C:\IBMCOM

DEVICE=C:\IBMCOM\PROTMAN.OS2 /I:C:\IBMCOM DEVICE=C:\IBMCOM\PROTOCOL\LANDD.OS2 DEVICE=C:\IBMCOM\PROTOCOL\LANDLLDD.OS2 DEVICE=C:\IBMCOM\PROTOCOL\NETBEUI.OS2 *The ODINSUP.SYS driver must be loaded before NETWKSTA.SYS (.200). DEVICE=C:\NETWARE\ODINSUP.SYS *The NDIS MAC driver(s) must be commented out (IBMTOK.OS2 and *ELNKMC.OS2 in this example). rem DEVICE=C:\IBMCOM\MACS\IBMTOK.OS2 rem DEVICE=C:\IBMCOM\MACS\ELNKMC.OS2 RUN=C:\IBMCOM\PROTOCOL\LANDLL.EXE RUN=C:\IBMCOM\PROTOCOL\NETBIND.EXE RUN=C:\IBMCOM\LANMSGEX.EXE DEVICE=C:\IBMLAN\NETPROG\RDRHELP.200 IFS=C:\IBMLAN\NETPROG\NETWKSTA.200 /I:C:\IBMLAN *The NETBIOS.OS2 driver must be loaded after NETWKSTA.SYS (.200). DEVICE=C:\IBMCOM\PROTOCOL\NETBIOS.OS2

REM -----END OF CONFIG.SYS-----

Configuration Using NET.CFG

Several NetWare configuration concerns must be dealt with when installing the ODI MAC drivers. Most of these are resolved by modifying the NET.CFG file. This file is similar to the IBM OS/2 LAN Requester IBMLAN.INI file and the NDIS parameter file PROTOCOL.INI, which contain fields for configurable parameters. The NET.CFG file must be modified to update the following fields:

- Increase the size of the Link support buffers.
- · Specify binding information for the ODI MAC protocol driver, ODINSUP.SYS (required if using multiple boards or, if you do not want the default, for a particular board).
- · Enable the supported frame types for the ODI LAN driver.

When using ODINSUP.SYS, increase the size of the LSL buffers if you want packet sizes larger than the default of 1514. The default value is sufficient for Ethernet and for use with Token-Ring cards supporting a maximum 2KB frame size. For Token-Ring cards supporting 4KB frame sizes (newer 16/4 cards) a packet size of 4210 is recommended.

For older cards with maximum frame size of 2KB, add this statement:

link support buffers 15 1514

For newer cards with maximum frame size of 4KB, add this statement:

link support buffers 15 4210

When the NetWare Requester is initialized, it tries to establish a connection with the primary network board. Using multiple network boards can increase communication speed if the workstation is connected to multiple physical networks.

The ODINSUP driver must bind to an ODI LAN driver for network communication to take place. If no binding information is specified in the NET.CFG file, ODINSUP, by default, attempts to locate a supported ODI LAN driver. If an ODI LAN driver is found, ODINSUP.SYS attempts to bind to it.

The NET.CFG must be modified to support more than one ODI LAN driver or to specify which ODI LAN driver to bind. ODINSUP.SYS can be bound to as many as four ODI LAN drivers.

A bind entry specifies the name of the ODI LAN driver and, optionally, the instance number of the adapter. The name of the ODI LAN driver is usually the name of the ODI LAN driver file (TOKEN for TOKEN.SYS, and so on). If more than one LAN adapter is installed in the workstation (for example two 3C523 adapters), the instance number may be required. If an instance number is not specified, ODINSUP.SYS will bind to the first ODI LAN driver found. For example, if two 3C523 (3Com Ethernet) adapters are installed, ODINSUP.SYS binds to the first loaded instance of the ODI LAN driver. If not specified, the default value for the instance number is 1.

Example NET.CFG:

Currently, ODINSUP.SYS supports only ODI LAN drivers compatible with Token-Ring and Ethernet LANs. The NET.CFG file must by modified to enable the minimum number of frame types for Token-Ring and Ethernet. For Token-Ring ODI LAN drivers, the TOKEN-RING, and TOKEN-RING_SNAP frame types must be For the Ethernet ODI LAN driver, the ETHERNET_802.2, specified. ETHERNET_SNAP, and ETHERNET II frame types must be specified. following is a sample NET.CFG file showing how these frame types are specified.

Example NET.CFG:

link support buffers 15 4210

protocol odinsup

bind token Bind to the first instance of TOKEN ODI LAN driver bind 3c523 1 Bind to the first instance of 3C523 ODI LAN driver bind 3c523 2 ;Bind to the second instance of 3C523 ODI LAN driver

link driver token

frame token-ring ; Required frame token-ring snap ; Required

link driver 3c523

frame ethernet 802.3 ;Optional frame ethernet 802.2 ; Required frame ethernet ii ; Required frame ethernet snap ; Required

The NET.CFG file can be used for other NetWare Requester configuration requirements. Refer to the Novell booklet, NetWare Requester for OS/2 that comes with the NetWare Operating System documentation for more information on how to configure the NetWare drivers using the NET.CFG file.

Changes to PROTOCOL.INI

The NDIS PROTOCOL.INI file is required to tell the NDIS protocol(s) which ODI MAC driver to bind to. Usually, all PROTOCOL.INI information for NDIS MAC drivers can be removed, because no ODI MAC-specific information is necessary in the PROTOCOL.INI.

The PROTOCOL.INI must also specify sections for each NDIS protocol used. For example, one section is the "Bindings = ..." statement, which specifies the NDIS MAC(s) to which the protocol should bind. The name specified should be the name of the ODI LAN driver installed (3C523, TOKEN, or 3C503). If the ODI LAN driver name starts with a number (3C523), the MAC name for the "Bindings = ..." statement must be preceded with the letter 'x'. Therefore, the "Bindings = ..." statement for the 3C523 LAN driver would be "Bindings = x3C523." If binding to multiple ODI LAN drivers, the entries on the "Bindings = ..." statement should be separated by a comma (Bindings = TOKEN, X3C503).

When an adapter instance other than the first is used (when ODINSUP.SYS is bound to the second TOKEN ODI LAN driver), the MAC name must have the instance number appended to the end of the ODI LAN driver name (TOKEN2 for the second instance, x3C5234 for the fourth instance). Appropriate MAC names are displayed when ODINSUP.SYS is loaded.

The following example is the PROTOCOL.INI file for OS/2 1.30.2 and OS/2 2.0 running OS/2 LAN Requester 2.0 and NetWare Requester for OS/2. This example shows the binding instruction changes required for the ODINSUP driver:

```
{PROT MAN}
DriverName = PROTMAN$
{IBMLXCFG}
LANDD nif = LANDD.nif
NETBEUI nif = NETBEUI.nif
: *______*
;*----- PROTOCOL SECTION -----
{LANDD nif}
DriverName = LANDD$
; Bindings = IBMTOK nif, ELNKMC nif
; For first instance of TOKEN board and first instance of 3C523 board.
Bindings = TOKEN, x3C523
{NETBEUI nif}
DriverName = netbeui$
; Bindings = IBMTOK_nif,ELNKMC_nif
; For first instance of TOKEN board and first instance of 3C523 board.
Bindings = TOKEN, x3C523
;*-----*
```

Note: The above PROTOCOL.INI example is a complete file. All portions of the PROTOCOL.INI that are NDIS-related may be deleted or remarked out.

The following example is PROTOCOL.INI file for OS/2 EE 1.30.1, using the NDIS-compatible Ethernet MAC driver for the 3Com 3C523 adapter:

Note: Communications Manager cannot handle an OS2 EE entry such as "Bindings = x3C523,x3C5232."

Limitations

The ODINSUP.SYS driver for OS/2 requires LSL.SYS dated later than 19 May, 1991. TOKEN.SYS dated earlier than 27 September, 1991 does not support ODINSUP.SYS.

The ODINSUP driver is supported for only those configurations for which an ODI-compatible LAN driver for the network adapters is available. requirement may limit the use of ODINSUP (especially in the Ethernet environment) because Novell ships a limited number of ODI LAN drivers with its latest release of the NetWare Requester for OS/2. Now, several ODI LAN adapter drivers are being developed by third-party vendors, but no release data is available.

Currently, starting the IBM OS/2 LAN Server on a machine with the NetWare Requester drivers installed is not officially supported. However, most environments where this configuration is attempted should execute successfully.

Multiple DOS Sessions

If you need to run NetWare utilities or IPX applications in MVDMs, be sure to select the "Multiple DOS Sessions SUPPORT" option while installing the requester. Also, you must make the following changes to allow the NetWare shell to load in the Multiple DOS Sessions:

- 1. Click the mouse button (RMB or LMB) on the DOS Window icon.
- 2. LMB on the Open arrow.
- 3. LMB on Settings.
- 4. LMB on Session.
- 5. LMB on DOS Settings.
- 6. LMB on DOS LASTDRIVE. Enter the last physical drive on your workstation.

Note: The NetWare shell automatically sets the net drive to the LOGIN directory. Do not leave last drive at Z.

- 7. LMB on DOS VERSION. Find NET3.COM,.... and change it to "NETX.COM,4,00,255." This causes the NetWare shell to think it is running on DOS version 4.0.
- 8. Edit your AUTOEXEC.BAT before entering a Multiple DOS session. Include the following lines:

PATH C:\OS2:C:\OS2\MDOS:C:\NETWARE APPEND c:\OS2:C:\OS2\MDOS;C:\NETWARE

Repeat Steps 1-7 above for any other DOS or Windows environments. (OS/2 defaults to DOS Full Screen and Windows Full Screen, but you may have added others.)

Loading NETX.COM causes an additional connection to the NetWare server for every DOS session. All drives mapped in that session are for that Multiple DOS Session only, and the NetWare LOGIN script run is the DOS LOGIN script.

If you want your multiple DOS sessions to have access to drives mapped system-wide by the NetWare Requester, then do not load NETX.COM. To avoid loading NETX.COM, make NETX.COM the last entry in your AUTOEXEC.BAT and add a PAUSE command just before it. When the system pauses, press CTRL-BREAK.

Warning: If you do not load NETX.COM, you may not have important network support for your multiple DOS sessions. Windows network support and the NetWare utility for OS/2 may not work properly.

Appendix A. Changing OS/2 2.0 to Look Like OS/2 1.3

You can change OS/2 2.0 to have an OS/2 1.3 look. The following procedure must be performed immediately following the installation of OS/2 2.0. This is not a recommended procedure and is not to be attempted by an inexperienced user. The procedure is being provided only as a way for existing OS/2 1.3 users to migrate to the OS/2 2.0 Workplace Shell. Remember, this is only going to provide the look of OS/2 1.3, not the functionality, so you may find some inconsistencies. For example, the OS/2 Tutorial and online help system have changed dramatically since OS/2 1.3 and will not be consistent with what you are used to.

To change your system to look like OS/2 1.3:

- 1. Place the Installation Diskette into drive A.
- 2. Turn on your computer or press and hold Ctrl + Alt, and press Del to restart the system.
- 3. When you see the logo screen, remove the *Installation Diskette* and place *Diskette 1* into drive A.
- 4. Press Enter.
- 5. When you see the Welcome screen, press Esc to display the command prompt.
- 6. Change to the drive where your operating system resides. For example, if the operating system resides on drive C, type:

C:

7. Change to the OS/2 subdirectory by typing:

CD\OS2

and then pressing Enter.

8. Erase the current OS2.INI file by typing:

ERASE OS2. INI

9. Create a new user INI file by typing:

MAKEINI OS2.INI OS213.RC

and pressing Enter.

10. Restart your system.

If you decide you want to return to the OS/2 2.0 Workplace Shell, follow the above steps 1 through 8 and then type:

MAKEINI OS2. INI MODLOOK. RC

and press Enter and then restart your system.

Appendix B. Changing WIN-OS/2 2.0 to Look Like Microsoft Windows 3.0

You can change OS/2 2.0's WIN-OS/2 to have a Microsoft Windows 3.0 look. The following procedure must be performed immediately following the installation of OS/2 2.0. The procedure is not a recommended procedure and is not to be attempted by an inexperienced user. This is being provided only as a way for existing Windows 3.0 users to migrate to the OS/2 2.0 Workplace Shell and WIN-OS/2. Remember, this is only going to provide the look of Windows 3.0, not the functionality, so you may find some inconsistencies. For example, the online help system has changed dramatically and will not be consistent with what you are used to.

To change your system to look like Microsoft Windows 3.0:

- 1. Place the Installation Diskette into drive A.
- 2. Turn on your computer or press and hold Ctrl + Alt, and press Del to restart the system.
- 3. When you see the logo screen, remove the *Installation Diskette* and place *Diskette 1* into drive A.
- 4. Press Enter.
- 5. When you see the Welcome screen, press Esc to display the command prompt.
- 6. Change to the drive where your operating system resides. For example, if the operating system resides on drive C, type:

C:

7. Change to the OS/2 subdirectory by typing:

CD\0S2

and then pressing Enter.

8. Erase the current OS2.INI file by typing:

ERASE OS2.INI

9. Create a new user INI file by typing:

MAKEINI OS2.INI WIN30.RC

and pressing Enter.

10. Restart your system.

If you decide you want to return to the OS/2 2.0 Workplace Shell and WIN-OS/2, follow the above steps 1 through 8 and then type:

MAKEINI OS2.INI MODLOOK.RC

and press Enter and then restart your system.

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Glossary of Terms and Abbreviations

A

access control profile. A list of the access privileges assigned to users and groups for a particular network resource in a domain.

Advanced Peer-to-Peer Networking (IBM program product).. (1) A set of protocols based on Advanced Program-to-Program Communications (APPC) that provides dynamic networking services for nodes supporting the protocols. (2) An extension to SNA featuring (a) greater distributed network control that avoids critical hierarchical dependencies, thereby isolating the effects of single points of failure; (b) dynamic exchange of network topology information to foster ease of connection and reconfiguration adaptive route selection, and simplified network definitions; (c) automated resource registration and directory lookup. APPN extends the LU6.2 peer orientation for end-user services to network control; APPN also uses LU6.2 protocols on its own control point sessions that provide the network control.

Advanced Program-to-Program Communication. (An implementation of the Systems Network Architecture (SNA) logical unit (LU) 6.2 protocol that allows interconnected systems to communicate and share the processing of programs. See logical unit 6.2 (LU6.2). (2) The general facility characterizing the LU 6.2 architecture and its product implementations as a whole, or an LU6.2 product feature in particular, such as an APPC application programming interface.

alias. A nickname set up by the network administrator for a file, printer, or serial device.

American National Standard Code for Information Interchange (ASCII). The standard code with a coded character set consisting of 7-bit coded characters (8 bits including parity check), used for information interchange among data processing systems and data communication systems.

application programming interface (API). A formally-defined programming language interface between a IBM system control program or a licensed program and the user of a program.

APPN. See Advanced Peer-to-Peer Networking.

Asynchronous Communications Device Interface. An application programming interface (API) for asynchronous communications provided by Extended Services Communications Manager.

B

BCS. basic configuration services.

BCU. batch configuration utility.

binary. Pertaining to the base two system of numbers. The binary digits are 0 and 1.

C

command-line interface. The OS/2 or DOS command prompt at which commands are entered. Contrast with full-screen interface.

Communications Manager. Communications Manager supports the development and use of OS/2 applications involving two or more connected systems of workstation. It provides support for multiple concurrent connectivities using different protocols, such as concurrent 3270, 5250, and ASCII emulations, and file transfers. It supports a range of APIs, which may be called concurrently and which are designed for both traditional and contemporary applications. It also has the requisite interfaces for network management.

CONFIG.SYS. A file that contains configuration options for an OS/2 program installed on a workstation.

CM. See Communications Manager.

CP. control point

CSD. corrective service diskette

D

database management system (DBMS). A computer program that manages data by providing the services of centralized control, data independence, and complex physical structures for efficient access, integrity, recovery, concurrency control, privacy, and security.

DBCS. See double-byte character set.

DDCS. Distributed Data Connection Services/2. IBM program product that provides transparent access to hosts from OS/2 Database Manager.

DFT. distributed function terminal.

Disk Operating System (DOS). An operating system for computer systems that use disk and diskettes for auxiliary storage of programs and data.

Distributed Relational Database Architecture (DRDA). The connection architecture for IBM's relational database management system (DBMS) products.

DLC. data link control

domain. A set of servers that allocates shared network resources within a single logical system.

domain controller. A server within the domain that provides details of the OS/2 LAN Server to all other servers on the domain. The domain controller is responsible for coordinating and maintaining activities on the domain.

DOS. See Disk Operating System.

DOS LAN Requester. A part of LAN Services that allows DOS users to act as requesters on an OS/2 LAN Server network.

double-byte character set (DBCS). (1) A set of characters which each character is represented by two bytes. (2) A set of characters used by national languages such as Japanese and Chinese that have more symbols than can be represented by the 256 single-byte positions. Each character is two bytes in length. Contrast with single-byte character set.

DRDA. See Distributed Relational Database Architecture.

E

EBCDIC. See extended binary-coded decimal interchange code.

ETHERAND**. The name of a LAN protocol that utilizes the protocol definitions of Ethernet Digital Intel Xerox (DIX) version 2.0 and IEEE 802.3.

EXE. The extension for a DOS or OS/2 executable file (a program).

external resource. A file, printer, or serial device resource supplied by a server outside the current

extended binary-coded decimal interchange code (EBCDIC). A coded character set consisting of 8-bit coded characters used by host computers.

F

file allocation table (FAT). In IBM workstations, a table used to allocate space on a disk for a file. This can then be used to locate and chain together parts of the file that may be scattered on different sectors so that the file can be used in a random or sequential

file index table (FIT). An ASCII file used by the REMOTEBOOT service that indicates the path to the files that will start a remote workstation.

First Failure Support Technology/2 (FFST/2). A subsystem containing a set of API functions that Extended Services and other applications can use for problem determination. FFST/2 functions include logging and displaying errors and messages, formatting and routing generic alerts, and generating data dumps.

full-screen interface. The set of panels and windows through which LAN users and administrators perform tasks. Contrast with command-line interface.

н

high performance file system (HPFS). An installable file system that provides fast access to very large disk volumes. The system also supports the coexistence of multiple, active file systems on a single workstation with the capability of multiple and different storage devices.

IBM DOS LAN Requester. The component of OS/2 LAN Server that allows users at DOS workstations to access shared resources on an OS/2 LAN Server network.

IBM Operating System/2 LAN Server. A program that allows resources to be shared with other workstations on the network. See server.

IBMLAN.INI file. A file containing network parameters that configure the LAN software for an OS/2 workstation.

icon. A graphical representation of an object, consisting of an image, image background, and a label.

IEEE. Institute of Electrical and Electronics Engineers

IEEE 802.3. An interface adhering to the 802.3 logical link control (LLC) Standard of the Institute of Electrical and Electronics Engineers (IEEE). This standard is one of several standards for local area networks approved by the IEEE.

image. A binary file that is structured to look like the files used during a normal workstation initial program load (IPL). Images are used to load software on DOS workstations that are not loaded from their own fixed disk or diskette drives. Synonymous with IPL image.

image definition. Details of an image that identify it to the domain and tell the local area network (LAN) software you intend to create an image.

image definition file. An ASCII file that contains names of files used to produce an image. It consists of an image name, a description of the image, and how it is defined.

initial program load (IPL). (1) The initialization procedure that starts an operating system. (2) The process of loading programs and preparing a system to run jobs.

K

Kb. kilobyte (1024 bytes).

LAN Requester. A component of the OS/2 program that allows users to access shared network resources made available by OS/2 LAN Servers. See requester.

LAN Services. As used in this information, refers to the IBM Operating System/2 LAN Server 2.0 product. LAN Services also refers to the components that can be installed with the above products, such as the OS/2 LAN Server, OS/2 LAN Requester, and DOS LAN Requester.

LAN Services Installation/Configuration Program. The OS/2 LAN Server component that copies the installation/configuration program to the fixed disk of the workstation. After this installation is complete, the program can be run from the fixed disk instead of run from a diskette.

LAN Support Program. The DOS software used to operate network adapter cards in an IBM workstation and to provide a common interface to application programs.

local area network (LAN). (1) Two or more computing units connected for local resource sharing. (2) A network which communications are limited to a moderate-sized geographic area. Such as a single office building, warehouse, or campus.

Link stations. (1) The hardware and software components within a node representing a connection to an adjacent node over a specific link. For example, if node A is the primary end of a multipoint line that connects to three adjacent nodes, node A will have three link stations representing the connections to the adjacent nodes. (2) In Systems Network Architecture (SNA), the combination of hardware and software that allows a node to attach to and provide control for a link. (3) On a local area Network (LAN), part of a service access point (SAP) that enables an adapter to communicate with another adapter.

logical unit (LU). In Systems Network Architecture (SNA), a port through which an end user accesses the SNA network to communicate with another end user

and through which end users access the functions provided by system services control points (SSCPs).

logical unit 6.2 (LU6.2). (1) Supports sessions between two applications. Also known as Advanced Program-to-Program Communications (APPC). (2) A particular type of Systems Network Architecture (SNA) logical unit (LU) that provides a connection between resources and transaction programs running on different network nodes. See Advanced Program-to-Program Communications (APPC). (3) A type of logical unit that supports general communication between programs in a distributed processing environment. LU6.2 is characterized by (a) a peer relationship between session partners, (b) efficient utilization of a session for multiple transactions, (c) comprehensive end-to-end error processing, and (d) a generic application program interface consisting of structured verbs that are mapped into a product implementation.

LU6.2. (1) Also known as APPC. Supports sessions between two applications. (2) See logical unit 6.2.

LUA. logical unit address.

logoff. The procedure by which a user ends a logon session.

logon. The process that allows a user to access the system after entering a proper user ID and password combination. (The password may be optional.) This user ID is then used to determine permissions and authorization to access protected resources on a network such as files, printers, and serial devices.

logon assignment. A resource assignment that is made automatically each time a user logs on to the network. Contrast with temporary assignments.

M

Mb. megabyte (1,048,576 bytes)

migrate. (1) To move data from one hierarchy of storage to another. (2) To move to a changed environment, usually to a new release or version of a system.

migration. The process of converting an earlier released LAN Server domain control database (DCDB) to a current LAN Server DCDB. Migration allows you to acquire the capabilities of the current or new DCDB without losing the data you created on the earlier released DCDB.

Multiple Virtual DOS Machines. Feature of OS/2 Version 2.0 which enables multiple DOS applications to execute concurrently in full screen

MVDM. See Multiple Virtual DOS Machines.

MVS. multiple virtual storage (IBM System 370 and

N

NDF. Node definition file (NCP/EP)

NDIS. network device interface specification

NETBIOS. An application programming interface (API) between a local area network adapter and programs.

NETID. See network identifier.

NetView. A System 370-based program used to monitor a network, manage it, and diagnose its problems. See also NetView/PC.

NetView/PC. A PC-based program through which application programs can be used to monitor, manage, and diagnose problems in IBM Token-Ring Networks, LANS, non-SNA communications devices, and voice networks.

NetWare. NetWare. Novell's network computing software (Novell, Inc., marketed by IBM)

network administrator. The person responsible for the installation, management, control, and configuration of a network. The network administrator defines the resources to be shared and user access to the shared resources, and determines the type of access those users can have to the resource.

network application. A network program, or combination of a program and data, that performs a task. A network application is defined to and shared on a domain. See private application and public application.

network assignments. Resource assignments specifying resources to which a network application needs access when the application is invoked. Connections to these resources are made when the application is invoked and released when the application ends.

network identifier (NETID). A 1 to 8-byte customer-selected name or an 8-byte registered name that uniquely identifies a specific subnetwork. See also registered network ID.

network-aware application. An application that uses network resources and is designed to run on a network. Contrast with a standalone application, which is designed to be stored and run on a local machine only.

network printer. A printer that is shared on a LAN. A job to be printed can be sent to the spooler of a network printer and it will be printed when the session is activated.

node. An end point of a communications link or a junction common to two or more links in a network. Nodes can be processors, communications, controllers, cluster controllers, terminals, or workstations. Nodes can vary in routing and other functional capabilities.

node address. The address of a node in a network.

OEM. original equipment manufacturer

operating system. The software that controls the running of programs. An operating system may provide services such as resource allocation, scheduling, input/output (I/O) control, and data management.

OS. See operating system.

OS/2 LAN API Structures. The OS/2 LAN Server component that allows access to the network functions through a well-defined interface for high-level languages.

OS/2 LAN Command Reference. The publication that contains all the LAN Server commands, as well as some User Profile Management commands.

OS/2 LAN Online Reference. The online publication that contains steps for user and administrative tasks that can be performed through the full-screen interface.

P

partition. A section of a physical disk that would normally appear as a logical volume or drive.

Personal Computer Local Area Network Program (PCLP). This product provides the ability to share programs, data, and printer resources among multiple workstations running DOS. These workstations are connected to an IBM Token-Ring Network, IBM PC Network, or IBM PC Network Baseband.

physical unit (PU). (1) in Systems Network Architecture (SNA), the component that manages and monitors the resources of a node, as requested by a system services control point (SSCP) using a system services control point-physical unit (SSCP-PU) session. Each node of an SNA network contains a physical unit (PU). (2) The component that manages and monitors the resources (such as attached links and adjacent link stations) associated with a node, as requested by an SSCP through an SSCP-PU session. An SSCP activates a session with the PU to indirectly manage, through the PU, resources of the node such as attached links. This term applies to types 2.0, 4, and 5 nodes only.

Presentation Manager (PM). The interface of the OS/2 program that presents, in windows, a graphics-based interface to applications and files installed and running on the OS/2 program.

printer object. An object representing a physical printer or plotter, its printer driver, queue, and other settings. The printer or plotter can be connected to a port at the back of a computer or a network server.

private application. An application maintained by an individual user and not available across a network. Contrast with public application.

Procedures Language 2/REXX. A superset of the Systems Application Architecture (SAA) Procedures Language. See also REstructured eXtended eXecuter language.

public application. An application maintained by the network administrator and shared with users on a network. Contrast with private application.

O

queue. A line or list formed by items waiting to be processed; for example, a list of print jobs waiting to be printed.

QM. query manager

R

random access memory (RAM). A memory device into which data is entered and from which data is retrieved in a nonsequential manner.

RDS. See Remote Data Services

registered network ID. An 8-byte name included in an IBM-maintained worldwide registry that has a structured format and is assigned to a particular IBM customer to identify a specific network uniquely.

Remote Data Services. A Database Manager component that enables an application to access Database Manager and a database on a remote workstation. The application does not need to know the physical location of the database. Remote Data Services determines the database location and manages the transmission of the request to Database Manager and the reply back to the application.

Remoteboot service. Synonymous with Remote IPL service.

remote initial program load (remote IPL). The initial program load of a remote workstation by a server on which the appropriate IPL files are located.

remote IPL server. A server that provides remote IPL initial program load) support for one or more remote IPL workstations.

Remote IPL service. An OS/2 LAN Server service that supports remote IPL of both DOS and OS/2 workstations. DOS and OS/2 workstations request remote IPL from a server. Only servers with the Server service started can run the service. These servers are referred to as remote IPL servers.

remote IPL workstation. A workstation requiring its startup from a remote IPL (initial program load) server.

response unit (RU). In Systems Network Architecture (SNA), a message that acknowledges a request unit. Contrast with request unit.

request unit. (1) In Systems Network Architecture (SAA), a message unit that signals initiation of a particular action or protocol. (2) A message unit that contains control information such as a request code, function management header (FMH), end-user data, or a combination of these types of information. (3) If positive, the response unit may contain additional information (such as session parameters in response to BIND SESSION), or if negative, the response unit contains sense data defining the exception condition. In Systems Network Architecture (SNA), a term used for a request unit or a response unit. Contrast with response unit.

REstructured eXtended eXecuter (REXX) language. A general purpose programming language that provides a structured environment for an interpreted language.

requester. A workstation that accesses shared network resources made available by other workstations running as servers on the network.

Requester service. The LAN Server service that allows a requester workstation to access shared network resources.

REXX. See REstructured eXtended eXecutor language. See also Procedures Language 2/REXX.

RU. See request unit and response unit.

S

SAA. See Systems Application Architecture.

separator page. A page that prints before each print job to separate printouts from each job. A separator page can contain such information as the user ID of the job submitter, the job number, and the time the job prints.

server. A workstation that shares its resources with other workstations on the network.

Server-requester programming interface (SRPI). An application programming interface (API) used by requester and server programs to communicate with the personal computer or host routers.

Server service. The LAN Server service that allows a workstation to share its resources with other workstations on the network.

session. A logical connection between a server and a requester that begins with a successful request for a shared resource.

SNA. See Systems Network Architecture.

SQL. See Structured Query Language.

SQL communication area (SQLCA). In Database Manager, a collection of variables that provides an application program with information about the execution of its Structured Query Language (SQL) statements or its Database Manager request.

SQL descriptor area (SQLDA). In Database Manager, a collection of variables used in the processing of certain Structured Query Language (SQL) statements. The SQLDA is intended for dynamic SQL statements.

Structured Query Language. An established set of statements used to manage information stored in a database. By using these statements, users can add, delete, or update information in a table, request information through a query, and display the results in a report.

Systems Application Architecture (SAA). The description of the logical structure, formats, protocols, and operational sequences for transmitting information units through the networks and also the operational sequences for controlling the configuration and operation of networks.

system services control point (SSCP). (1) In Systems Network Architecture (SNA), a control point in a host node that provides network services for dependent nodes. (2) A control point within a subarea network for managing the configuration, coordinating the network operator and problem determination requests, and providing the session services and directory support for end users of the network. Multiple SSCPs, cooperating as peers with one control with each SSCP having a hierarchical control relationship to the physical units and logical units within its own domain.

U

user access list. A list that defines individual users and their access authorities.

user ID. A unique name that identifies a user to the network.

user interface. The hardware, software, or both that allows a user to interact with and perform operations on a system, program, or device.

User Profile Management (UPM). User Profile Management is automatically installed with the IBM Extended Services for OS/2 program. It provides user ID validation and user and group management facilities that are used by LAN Requester, Database Manager, and Communications Manager. It provides the mechanism for users to logon to and log off from the system and to identify and authenticate system users.

V

Virtual DOS Machine. A protected mode process under OS/2 Version 2.0 which emulates a DOS operating system environment, so DOS applications executing within the virtual machine operate exactly as if they were running under DOS. DOS virtual machines support both text and graphics applications. Virtual DOS machines use the virtual 8086 mode of the 80386 and 80486 processors.

W

Workplace Shell (WPS). Object-oriented user shell implemented by Presentation Manager in OS/2 Version 2.0. The Workplace Shell uses icons to represent objects such as files or devices, and allows the user to perform work tasks by directly manipulating these icons on the desktop with the mouse or keyboard.

Numerics

16-bit. Term used to describe an application which uses the 16:16 addressing scheme implemented under DOS and previous versions of OS/2. In fact, such applications use a 24-bit address since the segment selector and offset are normally overlapped. Such applications typically use the 16-bit instruction set implemented under the Intel 80286 processor.

32-bit. Term used to describe an application which uses the 0:32 addressing scheme implemented under OS/2 Version 2.0. Such applications may make full use of the 80386 instruction set.

80386. Intel 80386 microprocessor, the 32-bit processor on which OS/2 Version 2.0 operating system is based.

80486. Intel 80486 microprocessor, a 32-bit processor which implements a superset of the 80386 processor instruction set.

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Title	Form	Example Scenarios	S04G-1005
	Number	Problem Determination for the Service	S04G-1006
IBM Operating System/2 Information	G326-0160	Coordinator	
and Planning Guide		Programming Services and Advanced Problem Determination for	S04G-1007
Systems Application Architecture Common User Access		Communications	
Advanced Interface Design Guide	SC26-4582	Communications Manager Systems	S04G-1116
IBM Systems Application Architecture	SC26-4356	Management Programming Reference	
Common Programming Interface Dialog Reference		Title	Form
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Presentation Reference		Planning Guide	2010 1000
IBM Operating System/2 Adapter Interface (diskettes and publication)	G68X-2300	Database Manager Programming Guide and Reference	S04G-1022
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Coordinator Guide		LAN Server 2.0 Vendor Integration Guide	
Procedures Language/2 REXX Users Guide	S01F-0272	Commands Reference	S04G-1020
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		ACDI Redirection Information and Guide	S04G-1024
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Workstation Installation Guide	S04G-1008	Title	Form
Guide to Database Application Enablers	S04G-1114		Number
PC LAN Support Program User's Guide	S04G-1115	APPC Programming Reference	S04G-1025
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Title	Form Number
OS/2 LAN Server 2.0 Network Administrator Reference Volume 1: Planning and Installation	S04G-1032
OS/2 LAN Server 2.0 Network Administrator Reference Volume 2: Performance Tuning	S04G-1033
OS/2 LAN Server 2.0 Network Administrator Reference Volume 3: Network Administrator Tasks	S04G-1034
OS/2 LAN Server 2.0 User's Quick Reference	S04G-1035
OS/2 LAN Server 2.0 DOS LAN Requester User's Quick Reference	S04G-1037
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Index

A	changing (continued)
Accessories group in Microsoft Windows 2-3	the names of objects and folders 1-2
Advanced Server 21-5, 25-4	WIN-OS/2 to look like Microsoft Windows 3.0 B-1
FATFS 25-2	changing OS/2 2.0 to look like OS/2 1.3 A-1
HPFS 25-2	changing WIN-OS/2 to look like Microsoft Windows
	3.0 B-1
OS/2 Kernel 25-2	CHKSTOR 25-12
Ring 0 server 25-2	command prompts
Ring 3 server 25-2	DOS full screen 1-7, 2-8
386 HPFS 25-2	DOS windowed 1-7, 2-8
Advanced server installation 21-5	locating in the OS/2 workplace shell for previous
appendixes	Microsoft Windows users 2-8
changing OS/2 2.0 to look like OS/2 1.3 A-1	locating in the OS/2 workplace shell for previous
changing WIN-OS/2 to look like Microsoft Windows	OS/2 users 1-7
3.0 B-1	OS/2 full screen 1-7, 2-8
associating programs and files	OS/2 windowed 1-7, 2-8
data files to programs for previous Microsoft	Windows full screen 1-7, 2-8
Windows users 2-6	Common Services
data-files to programs for previous OS/2	
users 1-5	First Failure Support Technology/2 (FFST/2) 25-2
programs to data files for previous Microsoft	LAN adapter and Protocol Support (LAPS) 25-2
Windows users 2-6	User Profile Management (UPM) 25-2
programs to data-files for previous OS/2	Control Panel in Microsoft Windows
users 1-5	copying
Auditing 21-3	objects for previous Microsoft Windows users 2-4
Additing 21-5	objects for previous OS/2 users 1-4
	creating
В	folders 1-1
BACKACC 25-14, 26-1	print objects for previous Microsoft Windows
	users 2-5
Backup Logon Server 25-5 Basic server installation 21-5	print objects for previous OS/2 users 1-4
	program groups 1-1
Boot Manager 25-9, 26-3	Custom server installation 21-6
C	
changing	D
	data files
keyboard settings for previous Microsoft Windows	editing in the Workplace Shell 2-5
users 2-9	printing for previous Microsoft Windows users 2-5
keyboard settings for previous OS/2 users 1-8	printing for previous OS/2 users 1-4
mouse settings for previous Microsoft Windows	Definition mapping 26-7
users 2-9	deleting
mouse settings for previous OS/2 users 1-8	objects for previous Microsoft Windows users 2-4
OS/2 2.0 to look like OS/2 1.3 A-1	objects for previous OS/2 users 1-4
screen colors for previous Microsoft Windows	Desktop Manager features 1-2
users 2-9	direct name editing 1-2, 1-3, 1-5, 2-5, 2-6
screen colors for previous OS/2 users 1-8	directory trees
sound rate for previous Microsoft Windows	viewing from the Drives folder for previous
users 2-9	Microsoft Windows users 2-8
sound rate for previous OS/2 users 1-8	
system fonts for previous Microsoft Windows	viewing from the Drives folder for previous OS/2 users 1-7
users 2-9	그렇게 하나 아니라 그렇게 하는 사람이 있다. 이 아이는 아이는 아이는 아이는 아이는 아이는 아이는 아이는 아이는 아
system fonts for previous OS/2 users 1-8	diskette tasks
system setup in the OS/2 Workplace Shell for	copying diskettes for previous Microsoft Windows
previous Microsoft Windows users 2-9	users 2-8
system setup in the OS/2 Workplace Shell for	formatting for previous Microsoft Windows
previous OS/2 users 1-8	users 2-8

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displaying	files (continued)
Lockup settings 1-8	printing for previous Microsoft Windows users 2-5
the Picture Viewer window 1-8	printing for previous OS/2 users 1-4
DLR sessions under OS/2 25-9	starting from Program Manager in Microsoft
DOS remote IPL data 25-11	Windows 2-3
Drives folder	finding objects in the OS/2 Workplace Shell 1-5, 2-6
using for previous Microsoft Windows users 2-8	First Failure Support Technology/2 25-15
using for previous OS/2 users 1-7	FIXACC 25-14
Duplexing 25-13	folders
	changing the names of 1-2
	copying for previous Microsoft Windows users 2-4
E and the second	copying for previous OS/2 users 1-4
editing files	creating 1-1
in Microsoft Windows 2-5	deleting for previous Microsoft Windows users 2-4
in the OS/2 Workplace Shell 1-3, 2-5	deleting for previous OS/2 users 1-4
Entry Server 21-5, 25-2, 25-4	minimizing for previous Microsoft Windows
DOS requesters 25-2	users 2-10
OS/2 requesters 25-2	
Remote Initial Program Load (RIPL) 25-2	minimizing for previous OS/2 Version 1.3
	users 1-9
Ring 0 server 25-2	moving for previous Microsoft Windows users 2-4
Ring 3 server 25-2	moving for previous OS/2 users 1-4
exiting 1-9	renaming for previous Microsoft Windows
the OS/2 Workplace Shell for previous Microsoft	users 2-6
Windows users 2-10	renaming for previous OS/2 users 1-5
the OS/2 Workplace Shell for previous OS/2	summary for previous Microsoft Windows
users 1-9	users 2-10
External Resources 27-1	summary for previous OS/2 users 1-10
	formatting
- Advisory Didd suppose of strong	diskettes for previous Microsoft Windows
F	users 1-7, 2-8
Fault Tolerance 21-5, 25-12	40010 11, 20
features	
Desktop Manager, locating 1-2	G
locating printing for previous Microsoft Windows	Games folder in the OS/2 Workplace Shell 2-3
users 2-5	Games group in Microsoft Windows 2-3
locating printing for previous OS/2 users 1-4	games, location of 2-3
File Manager	in Microsoft Windows 2-3
features of 1-4	
locating features of, for previous OS/2 users 1-4	in Workplace Shell 2-3
	Generic Alerter Service 25-14
File Manager in Microsoft Windows	Generic alerts 25-15
features of 2-4	GETRPL 25-11
locating features of in the OS/2 Workplace	groups, creating program 1-1
Shell 2-4	
files	H 65 mes
associating to programs for previous Microsoft	
Windows users 2-6	HDCON 25-11
associating to programs for previous OS/2	HDCON utility 21-3
users 1-5	Home Directory 25-11
copying for previous Microsoft Windows users 2-4	HDCON 26-8
copying for previous OS/2 users 1-4	Hypertext format 21-7
creating data for previous OS/2 users 1-3	
creating data in Microsoft Windows 2-5	- Programme and the state of th
deleting for previous Microsoft Windows users 2-4	SAC ENGLISHED DESCRIPTION OF SACRETAINED
deleting for previous OS/2 users 1-4	IBMLAN.INI 21-6
editing for previous Microsoft Windows users 2-5	installing
editing for previous OS/2 users 1-3	programs for previous Microsoft Windows
editing in the OS/2 Workplace Shell 1-3, 2-5	users 2-1
	programs for previous OS/2 users 1-1
moving for previous Microsoft Windows users 2-4	F 3
moving for previous OS/2 users 1-4	

locking your keyboard and mouse 1-8 K keyboard settings, changing in the OS/2 Workplace M Shell 1-8, 2-9 managing your programs 2-3 into folders in the OS/2 Workplace Shell 2-3 into groups in Microsoft Windows 2-3 LAN Adapter Protocol Support 25-5 Master Help Index Folder 22-2 LAN Printing Migrate utility 2-1 Network folder 22-3 migration of remote IPL data 25-11 LAN Server Desktop Folder 21-1 migration utility 26-7, 26-12 LAN Server installation paths 21-5 minimizing programs and objects 1-9, 2-10 LAN Server memory requirements 25-7 Mirroring 25-12 LAN Server migration considerations 26-2 mouse settings, changing in the OS/2 Workplace LAN Server migration utilities Shell 1-8, 2-9 BACKACC 26-2 moving DCDB temporary file 26-2 objects for previous Microsoft Windows users 2-4 Errors 26-2 objects for previous OS/2 users 1-4 Export 26-2 Multi-Logon 25-13 Import 26-2 multiple DLR sessions 25-9 RESTACC 26-2 Multiple DOS Sessions LAN Server security Virtual DOS LAN Support 25-9 Auditing 25-10 Local security 25-10 N Operator rights 25-10 Passwords 25-10 NDIS 16-3 UPM 25-10 NetWare 27-2 LAN Server 2.0 NBACKUP 26-10 Backup logon server 25-1 SBACKUP 26-10 LAN Server Advanced 25-1 Network folder LAN Server Entry 25-1 LAN-Independent desktop 22-1 Ring 0 Server 25-1 Network group folder 22-1 Ring 3 Server 25-1 Server folder 22-1 LAN Services-ICON View 21-1 ALIAS server folder 22-1 LANINST 21-4 Network directory object 22-1 Local security 25-5 Network printer object 22-1 NET2247 25-14 command prompts for previous Microsoft Windows NET8300 - NET8329 25-15 users 2-8 NET.ACC utilities 25-14 command prompts for previous OS/2 users 1-7 Novell NetWare 22-1, 27-1 Desktop Manager features in the OS/2 Workplace Shell 1-2 0 features of the Control Panel for previous Microsoft objects Windows users 2-9 associating data files for previous Microsoft features of the Control Panel for previous OS/2 users 1-8 Windows users 2-6 associating data-files for previous OS/2 users 1-5 File Manager features for previous OS/2 associating programs for previous Microsoft users 1-4 Windows users 2-6 objects in the OS/2 Workplace Shell 1-5, 2-6 associating programs for previous OS/2 users 1-5 Picture Utility programs in the OS/2 Workplace Shell 1-8 changing the names of 1-2 copying for previous Microsoft Windows users 2-4 printing features for previous Microsoft Windows copying for previous OS/2 users 1-4 users 2-5 creating 1-1 printing features for previous OS/2 users 1-4 deleting for previous Microsoft Windows users 2-4 the Lockup tool in the OS/2 Workplace Shell 1-8 deleting for previous OS/2 users 1-4 the Task List for previous Microsoft Windows editing in the Workplace Shell 1-3, 2-5 users 2-9 finding for, for previous OS/2 users 1-5

the Task List for previous OS/2 users 1-9

finding, for previous Microsoft Windows users 2-6

objects (continued) OS/2 Workplace Shell (continued) minimizing for previous Microsoft Windows moving objects in 1-4, 2-4 users 2-10 printing objects in 1-4, 2-5 minimizing for previous OS/2 Version 1.3 shutting down for previous Microsoft Windows users 1-9 users 2-10 moving for previous Microsoft Windows users 2-4 shutting down for previous OS/2 users 1-9 moving for previous OS/2 users 1-4 using command prompts for previous Microsoft printing for previous Microsoft Windows users 2-5 Windows users 2-8 printing for previous OS/2 users 1-4 using command prompts for previous OS/2 renaming for previous Microsoft Windows users 1-7 users 2-6 using Lockup 1-8 renaming for previous OS/2 users 1-5 using the Picture Viewer 1-8 searching for, for previous OS/2 users 1-5 viewing directory structure in, for previous searching, for previous Microsoft Windows Microsoft Windows users 2-8 users 2-6 viewing directory structure in, for previous OS/2 summary for previous Microsoft Windows users 1-7 users 2-10 summary for previous OS/2 users 1-10 operator rights 25-10 Picture Viewer 1-8 organizing your data 2-3 previous Microsoft Windows users into folders in the OS/2 Workplace Shell 2-3 changing WIN-OS/2 to look like Microsoft Windows into groups in Microsoft Windows 2-3 OS/2 LAN Server 1.0 26-7 3.0 B-1 OS/2 LAN Server 1.2 25-11, 26-9 copying disks and diskettes 2-8 finding objects 2-6 OS/2 LAN Server 1.3 25-11, 26-9 formatting disks and diskettes 2-8 OS/2 Remote IPL 25-11 locating command prompts 2-8 OS/2 remote IPL data 25-11 locating Control Panel features 2-9 OS/2 RIPL 25-10 locating the Task List in the OS/2 Workplace OS/2 System Editor Shell 2-9 editing data-file objects in 1-3, 2-5 location of for previous Microsoft Windows minimizing programs and objects 2-10 renaming objects 2-6 users 2-5 searching for objects 2-6 location of, for previous OS/2 users 1-3 using the Window List in the OS/2 Workplace OS/2 Workplace Shell Shell 2-9 changing keyboard settings for previous Microsoft viewing directory trees 2-8 Windows users 2-9 Windows summary 2-10 changing keyboard settings for previous OS/2 working with disks and diskettes 2-8 users 1-8 previous OS/2 users changing mouse settings for previous Microsoft changing the names of objects and folders 1-2 Windows users 2-9 changing your system to look like OS/2 1.3 A-1 changing mouse settings for previous OS/2 copying disks and diskettes 1-7 users 1-8 copying, moving, deleting objects 1-4 changing screen colors for previous Microsoft creating program groups 1-1 Windows users 2-9 finding objects 1-5 changing screen colors for previous OS/2 formatting disks and diskettes 1-7 users 1-8 changing sound rate for previous Microsoft installing programs 1-1 locating command prompts 1-7 Windows users 2-9 changing sound rate for previous OS/2 users 1-8 locating Control Panel features 1-8 locating Desktop Manager features 1-2 changing system fonts for previous Microsoft locating Lockup Utility in the OS/2 Workplace Windows users 2-9 Shell 1-8 changing system fonts for previous OS/2 locating Picture Utility programs in the OS/2 users 1-8 Workplace Shell 1-8 copying objects in 1-4, 2-4 locating the Task List in the OS/2 Workplace deleting objects in 1-4, 2-4 Shell 1-9 editing data-file objects in 1-3, 2-5 locating Picture Utility programs 1-8 minimizing programs and objects 1-9 locating the Lockup utility 1-8 OS/2 summary 1-10 renaming objects 1-5

system fonts, changing in the OS/2 Workplace previous OS/2 users (continued) Shell 1-8, 2-9 searching for objects 1-5 using Lockup in the OS/2 Workplace Shell 1-8 SYTOS 26-10 using the Picture Viewer in the OS/2 Workplace Shell 1-8 T using the Window List in the OS/2 Workplace Task List Shell 1-9 features of, for previous Microsoft Windows viewing directory trees 1-7 users 2-9 working with disks and diskettes 1-7 features of, for previous OS/2 users 1-9 previous version of OS/2 LAN Server 25-11 in OS/2 for previous Microsoft Windows users 2-9 Print Manager in Microsoft Windows in OS/2 for previous OS/2 users 1-9 Productivity folder in the OS/2 Workplace Shell 2-3 Program Manager in Microsoft Windows locating features in the OS/2 Workplace Shell 2-3 purpose of 2-3 Uninterruptible Power Supply (UPS) 25-13 programs UPM 23-1 associating for previous Microsoft Windows User interface 25-8 users 2-6 using associating for previous OS/2 users 1-5 command prompts for previous Microsoft Windows creating groups 1-1 users 2-8 installing for previous Microsoft Windows command prompts for previous OS/2 users 1-7 users 2-1 Lockup 1-8 installing for previous OS/2 users 1-1 Picture Viewer 1-8 minimizing for previous Microsoft Windows the Window List for previous Microsoft Windows users 2-10 users 2-9 minimizing for previous OS/2 Version 1.3 the Window List for previous OS/2 users 1-9 users 1-9 PROTOCOL.INI 21-6 Virtual device driver (VDD) 25-4 remote IPL data 25-11 Remote node not available 21-5 W renaming objects Window List in the OS/2 Workplace Shell for previous Microsoft Windows users 2-6 features of, for previous Microsoft Windows for previous OS/2 users 1-5 users 2-9 RESTACC 25-14, 26-1 features of, for previous OS/2 users 1-9 Ring 0 server 25-2, 25-4 in the OS/2 Workplace Shell for previous Microsoft Ring 3 server 25-2, 25-4 Windows users 2-9 Ring 3 Versus Ring 0 server 25-4 in the OS/2 Workplace Shell for previous OS/2 RIPL 21-3, 21-5 users 1-9 Windows summary 2-10 working with disks and diskettes 1-7 S Write program in Microsoft Windows 2-5 screen colors, changing in the OS/2 Workplace Shell 1-8, 2-9 searching **Numerics** for objects in the OS/2 Workplace Shell 1-5, 2-6 16-bit API 25-1 Shredder, using the 1-4, 2-4 16-bit application 24-1 Shutdown 1-9, 2-10 16-bit architecture 25-6 shutting down your system 1-9, 2-10 32-bit API 25-1 sound rate, changing in the OS/2 Workplace **386 HPFS** Shell 1-8, 2-9 DOS box 25-3 starting programs 2-2 fault tolerance 25-3 in Microsoft Windows 2-2 Local security 25-3 in the OS/2 Workplace Shell 2-2 Ring-0 server 25-3 summarizing Ring-3 server 25-3 OS/2 features for the OS/2 Workplace Shell 1-10 Windows features for the OS/2 Workplace

Shell 2-10

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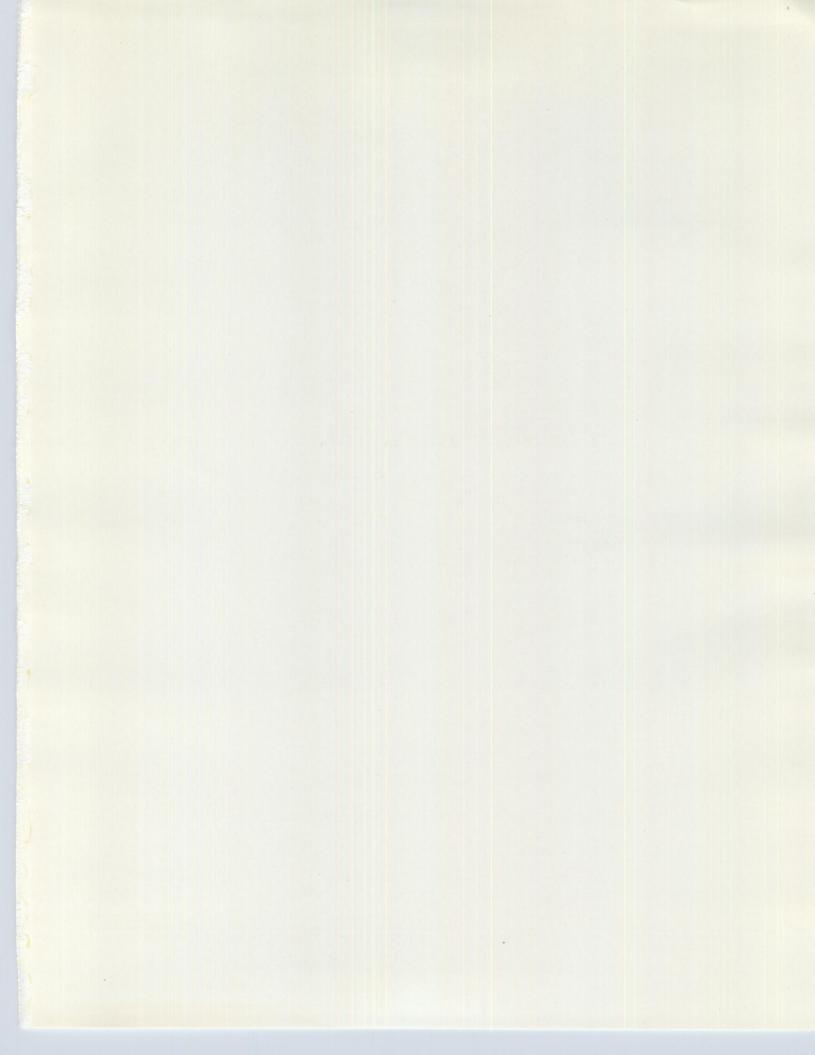


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