



IBM eServerJ iSeriesJ

Session: 450041

# Accessing Windows Files

The QNTC File System

Vern Yetzer  
yetzer@us.ibm.com  
September, 2003

© Copyright IBM Corporation, 2003. All Rights Reserved.  
This publication may refer to products that are not currently available in your country. IBM makes no commitment to make available any products referred to herein.

## Session Objectives

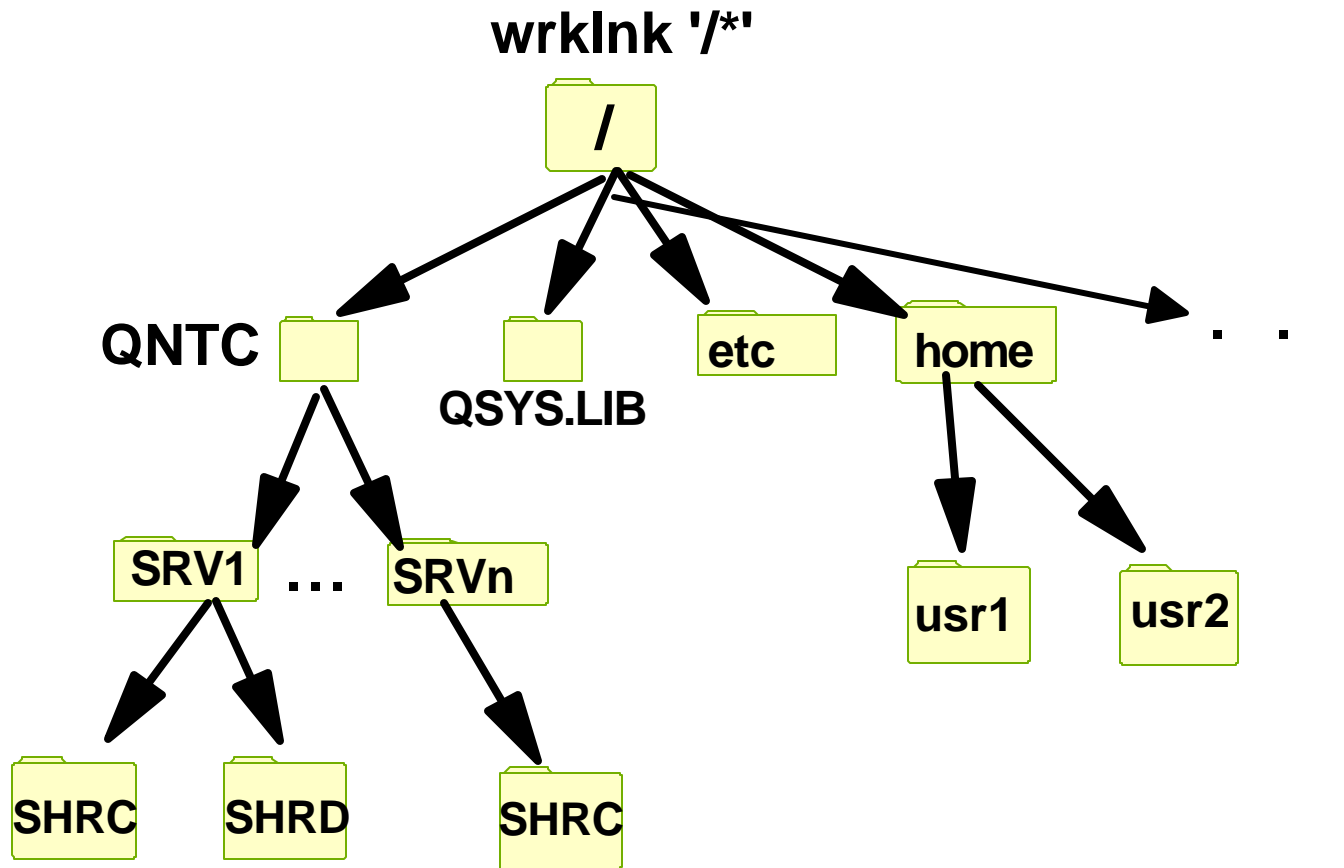
- Be able to define QNTC and how it fits into the iSeries IFS.
- Learn how QNTC is being used on the iSeries.
- Learn to configure an iSeries for QNTC.
- Learn how to improve QNTC performance.
- Learn how to debug common QNTC data access issues.

# Agenda

- IFS and the QNTC file system
- What are companies doing with QNTC
- Configuration
- Security
- Tips / Troubleshooting

# iSeries NetClient - QNTC

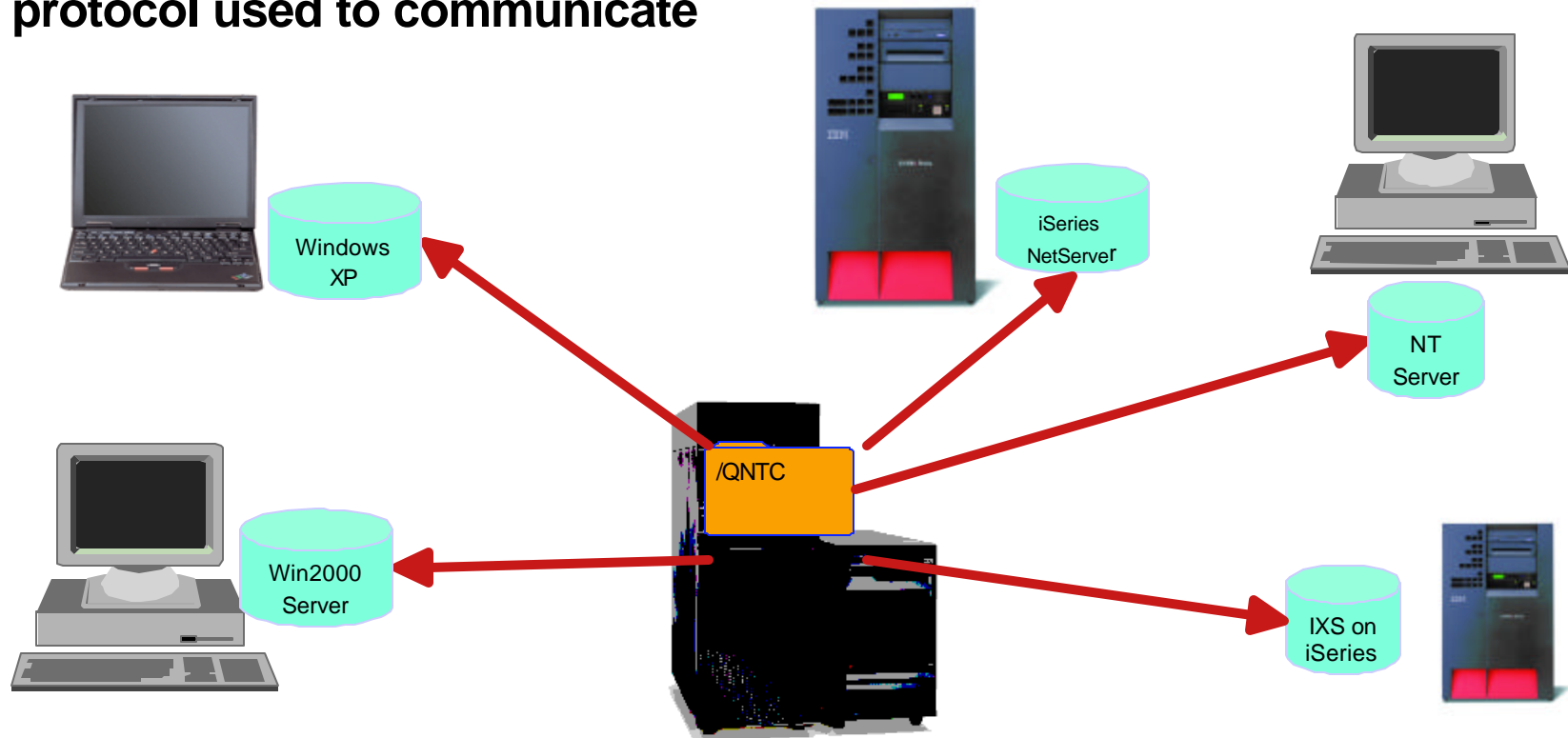
*What a QNTC user will see:*



## iSeries NetClient - QNTC

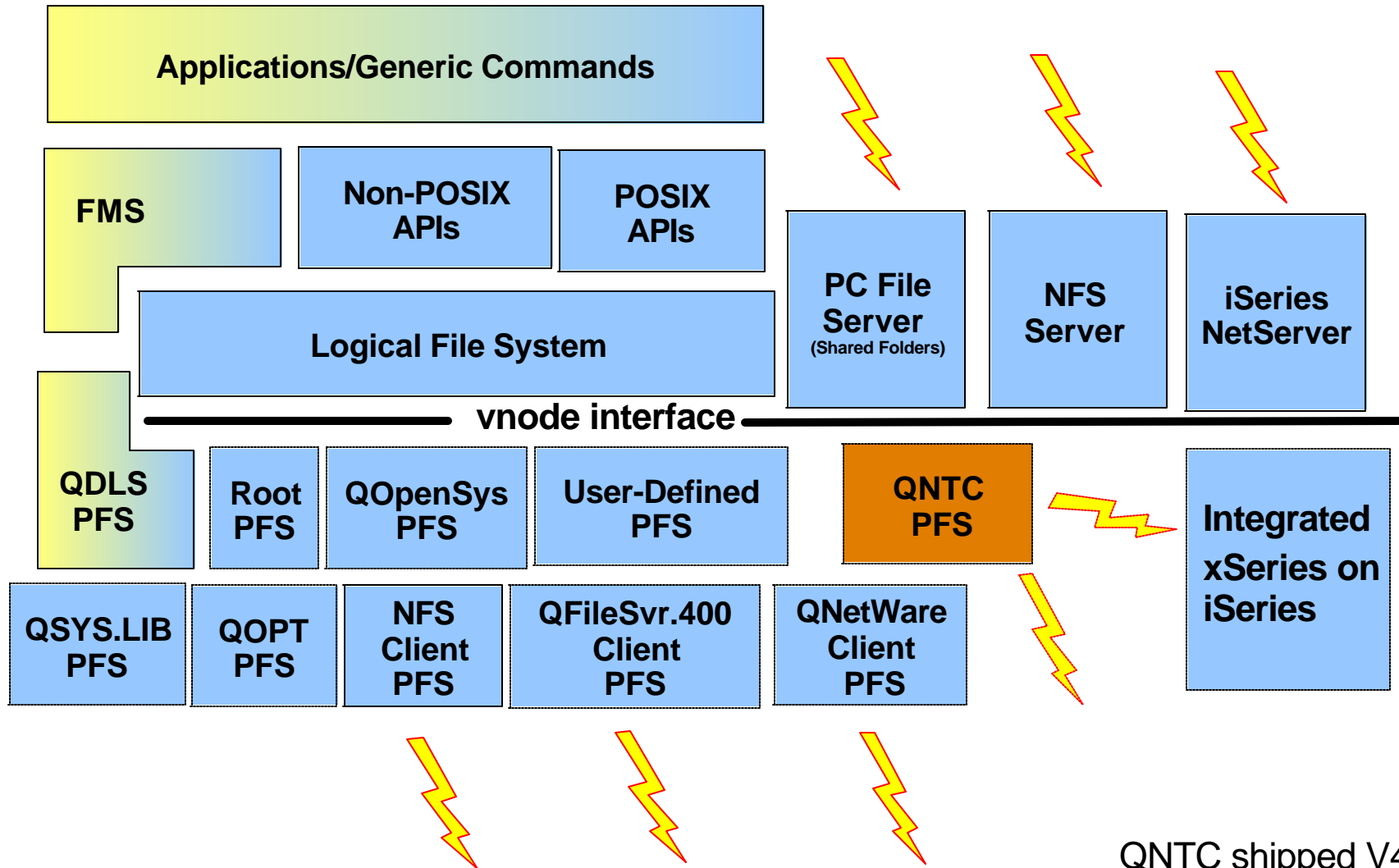
### *File share access to network data via CIFS*

- Windows / iSeries Netserver servers have shared resources defined
- QNTC maps the shared file resources into the iSeries file space
- cifs protocol used to communicate



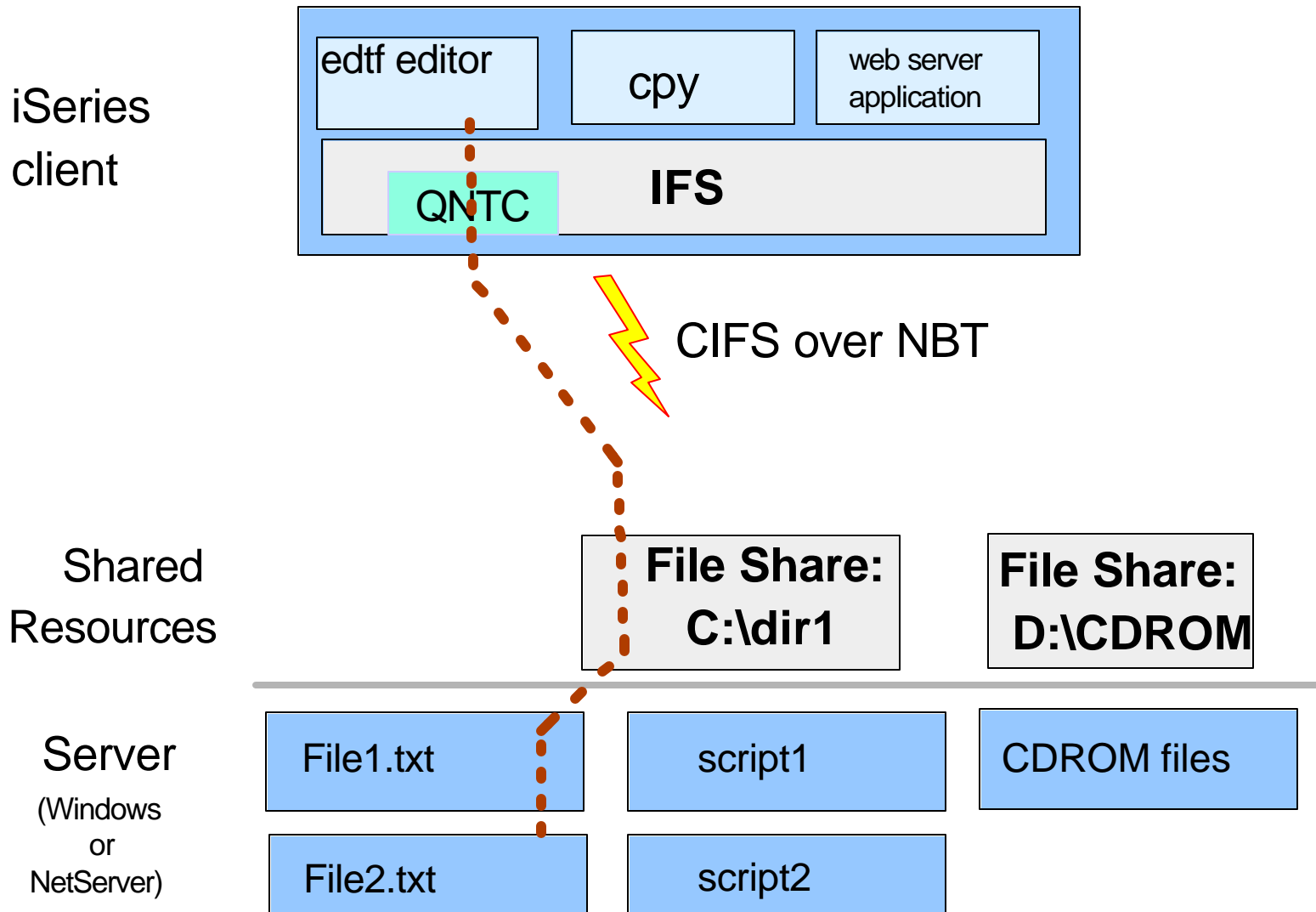
# Integrated File System - iSeries NetClient

## Internal Structure



QNTC shipped V4R3

# Example client/server request



## Accessing QNTC - 5250 session

```
LP096AB
File Edit Transfer Appearance Communication Assist Window Help
PrtScrn Copy Paste Send Recv Display Color Map Record Stop Play Quit
MAIN
Select one of the following:
System: LP096AB
1. User tasks
2. Office tasks
3. General system tasks
4. Files, libraries, and folders
5. Programming
6. Communications
7. Define or change the system
8. Problem handling
9. Display a menu
10. Information Assistant options
11. Client Access/400 tasks
90. Sign off
Selection or command
===> wrklnk '/qntc/muserver/sharec/*'
F3=Exit F4=Prompt F9=Retrieve F12=Cancel F13=Information Assistant
F23=Set initial menu
M e 20/039
Connected to remote server/host lp096ab using port 23
```

Some other ways to use QNTC:

- wrklnk
- sav / rst
- cpytostmf
- APIs



# Access QNTC - iSeries Navigator

The screenshot displays the iSeries Navigator interface. The left pane shows a tree view of the environment 'My Connections' under 'Lpar4g8p'. The 'QNTC' folder is selected, showing its contents: WINSRV1, WINSRV2, WINSRV3, WIN20031, WIN20032, WIN20033, XPDESK1, and XPSTAFF. The right pane shows a detailed view of the selected folder, listing the same items with their names, sizes, and types (all are File Folders). The status bar at the bottom indicates '1 minutes old' and 'For Help, press F1'.

Name	Size	Type
WINSRV1		File Folder
WINSRV2		File Folder
WINSRV3		File Folder
WIN20031		File Folder
WIN20032		File Folder
WIN20033		File Folder
XPDESK1		File Folder
XPSTAFF		File Folder

## *Uses for QNTC*

## Using QNTC: iSeries Example

### *Save Integrated File Server Data*

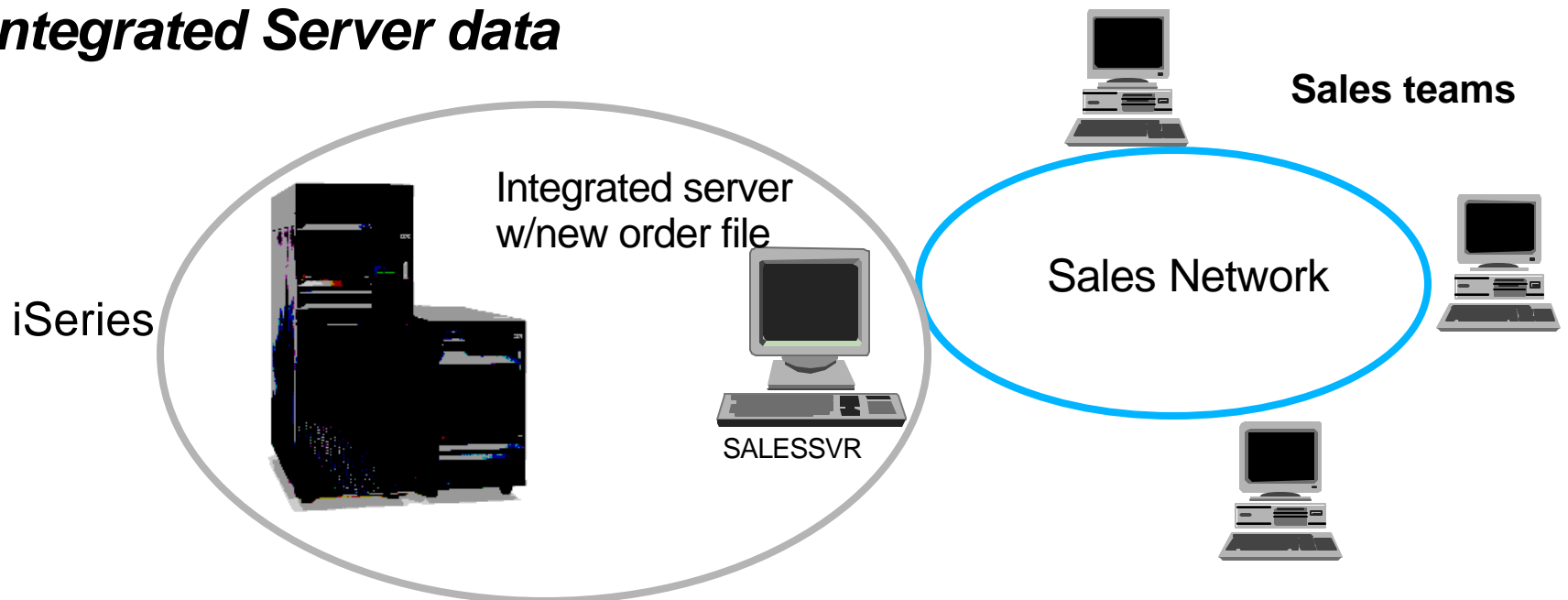
#### Business Problem

**Multiple sales representatives input orders through an application that stores the data in a database on the Sales department's Windows 2003 Server. To protect this important data it needs to be saved on an hourly basis.**

**Every night the iSeries system is backed up to a tape library.**

# QNTC: iSeries NetClient Example

## *Saving Integrated Server data*



```
SAV DEV('/QSYS.LIB/JUL2003.LIB/SALES013.FILE')  
OBJ('/QNTC/SALESSVR/DDRIVE/OPTOINC/SALES.123')
```

IFS root      File system      Server      File Share      File Path/Name

Arrows point from the labels below to the corresponding parts of the path in the code above.

## QNTC - Other Customer Scenarios

- Move data to xSeries so applications have local access to the data
- iSeries applications access to data stored on xSeries server.
- SAV / RST applications with integrated servers
- Store iSeries database data remotely

## *Configuring QNTC*

# QNTC Configuration

## *Prerequisites for using QNTC support*

- iSeries NetServer must be configured and active.
- Servers must have NetBios over TCP/IP configured.
- iSeries users that will be using QNTC must have a Windows user profile with the same name and password.
- Server names must be browsable by the NetServer in order to automatically appear in IFS.

## QNTC Configuration

- No QNTC specific configuration !!!
  
- Dependent on the configuration of other products
  - ▶ iSeries NetServer
  - ▶ Server configurations
  - ▶ User profile synchronization
  - ▶ Network topologies



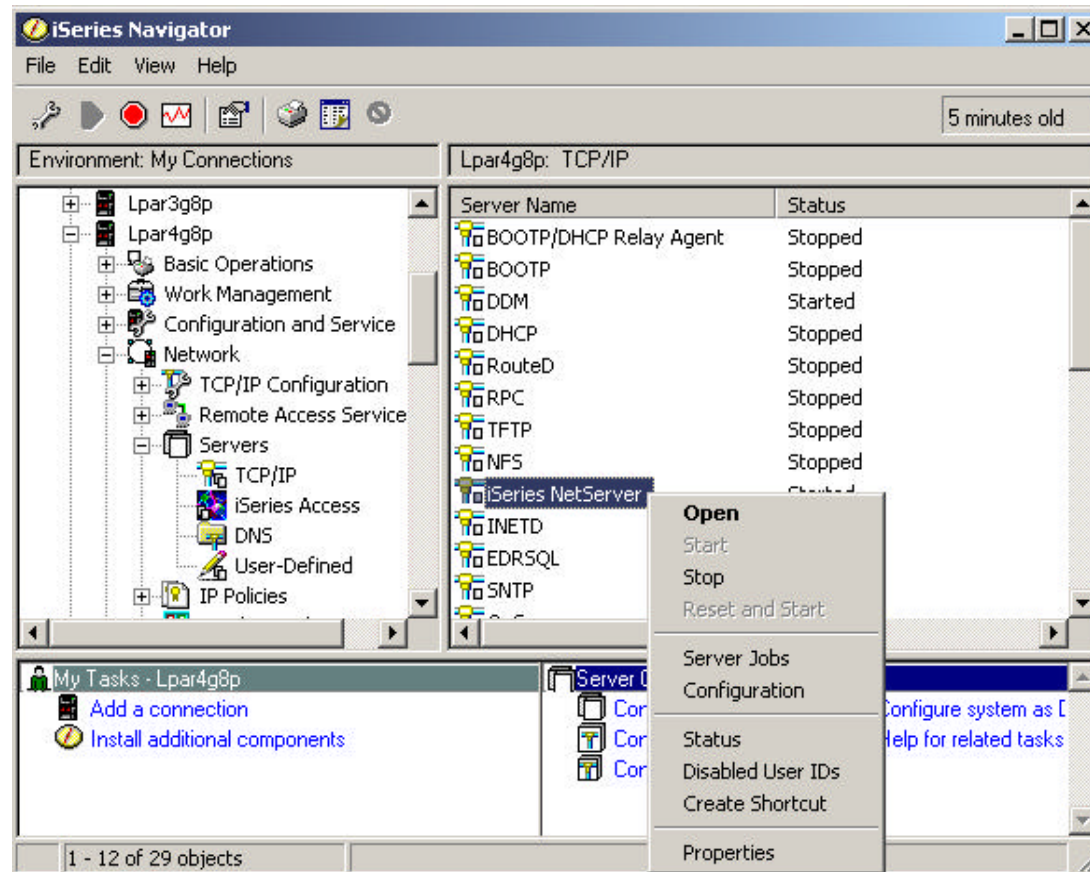
# QNTC Configuration

*What will show up in the QNTC directory?*

- QNTC uses network browsers to build the directory
- Browsing = a method for locating resources within an organization
- Factors affecting browsing:
  - ▶ Master Browsers
  - ▶ Domain topology
  - ▶ Network topology
  - ▶ System configurations

# Configuring QNTC

## *iSeries NetServer Configuration*



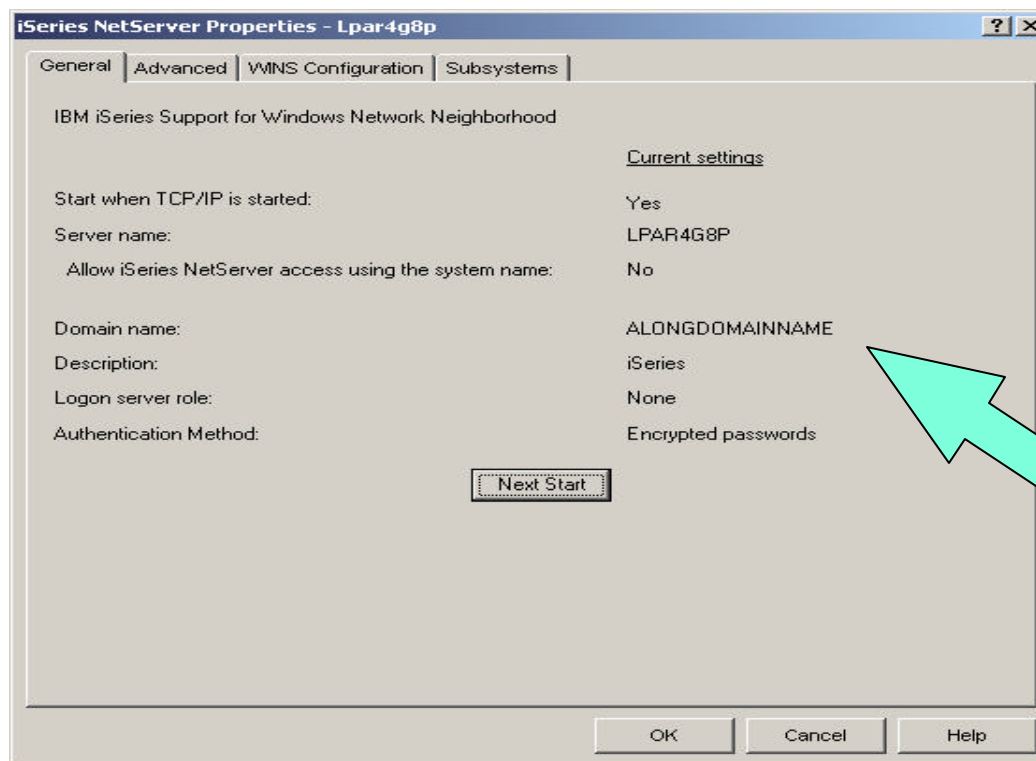
Configure iSeries NetServer using Navigator

# Configuring QNTC

## *iSeries NetServer Configuration*

iSeries NetServer must be configured then started.

For more info see 406170 - iSeries NetServer Setup and Usage



Domain will determine what appears in the /QNTC directory

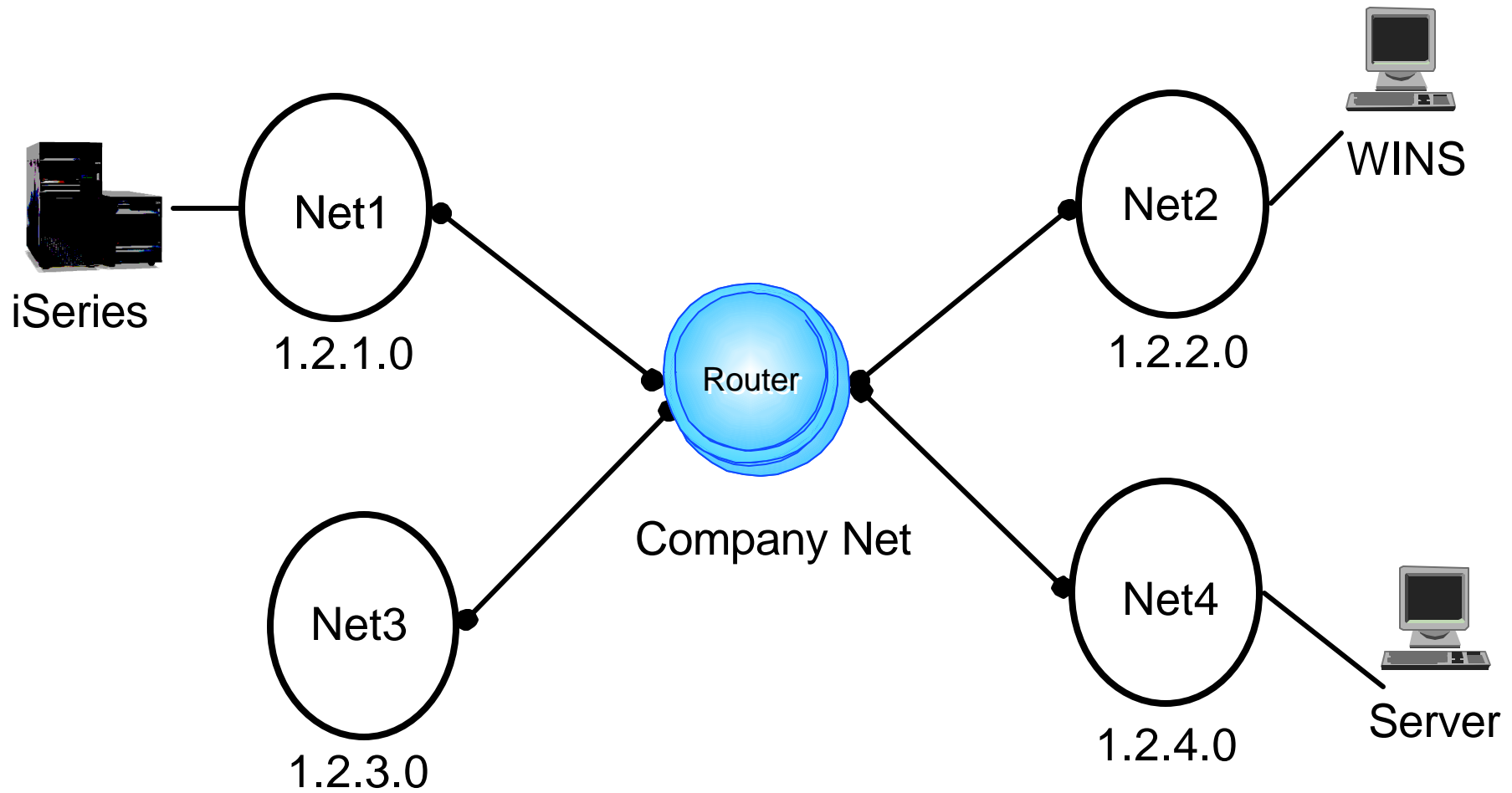
# Configuring QNTC

## *Browsing for Server Names*

- **QNTC directory contents come from iSeries NetServer**
- **NetServer gets a list of Servers from a domain local browser**
  - **NetServer must be able to find a domain local browser**
  - **More than 1 domain local browser may exist**
- **WINS gives consistency across routed networks**

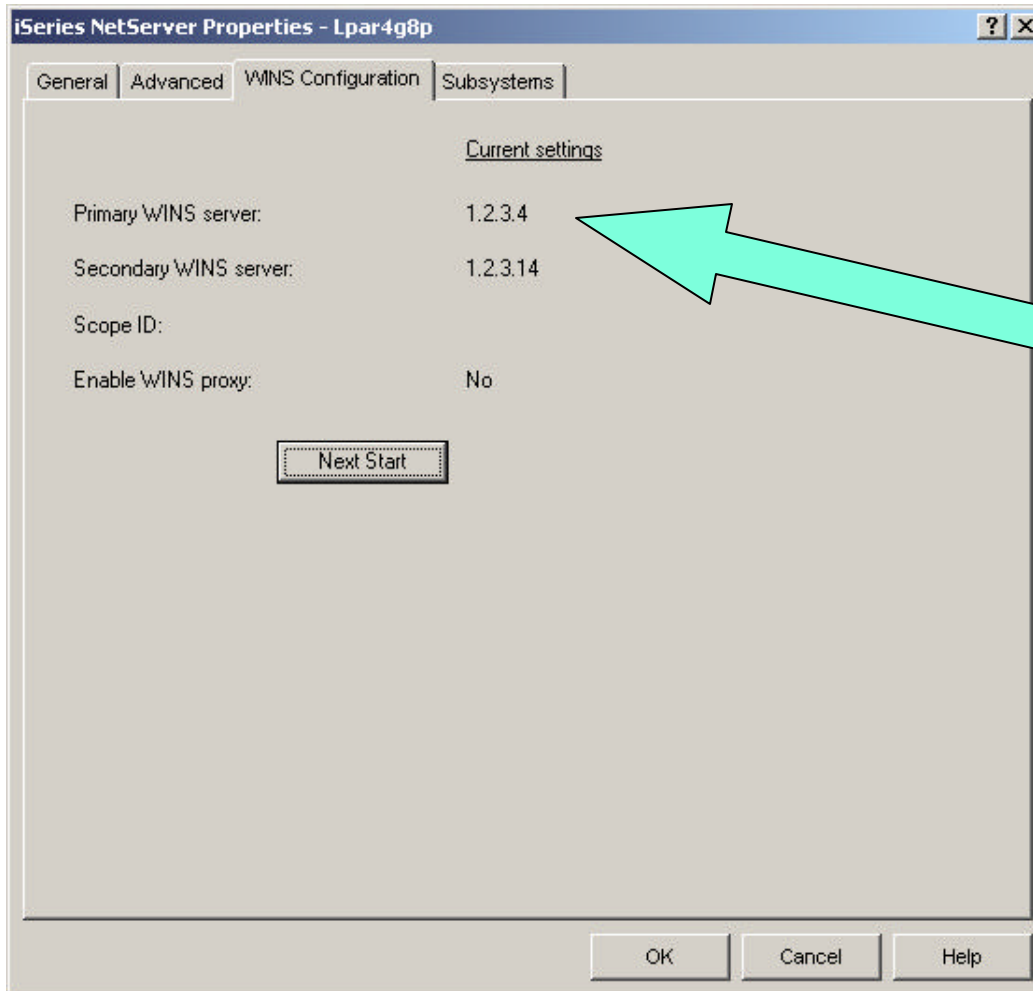
# Configuring QNTC

## WINS Configuration



# Configuring QNTC

## *iSeries NetServer Configuration*

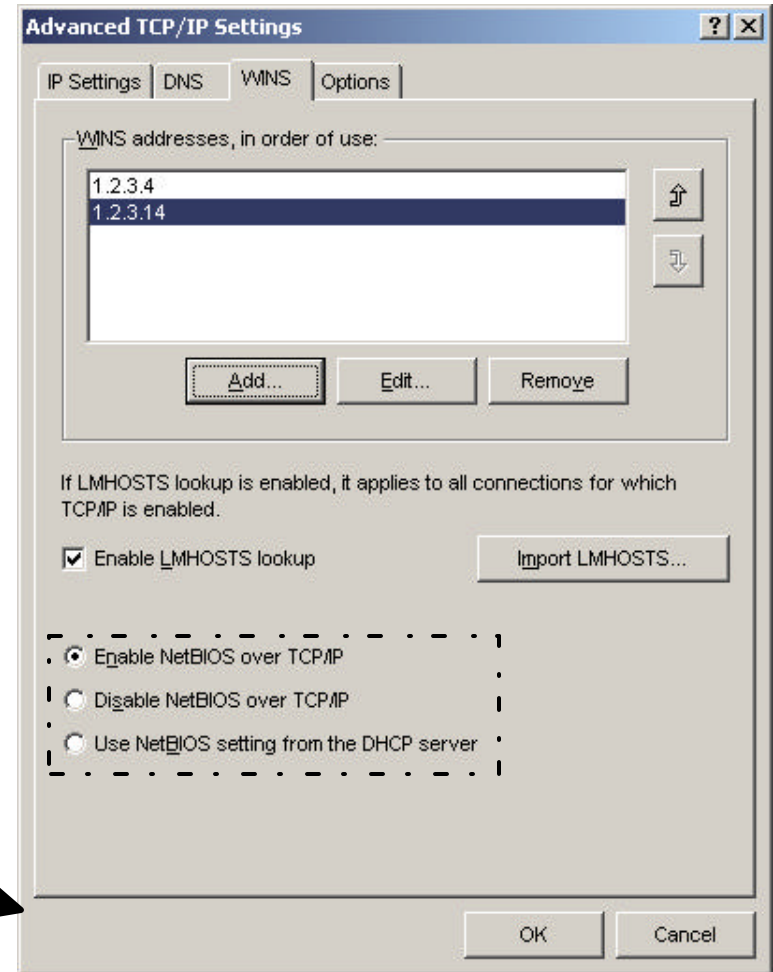
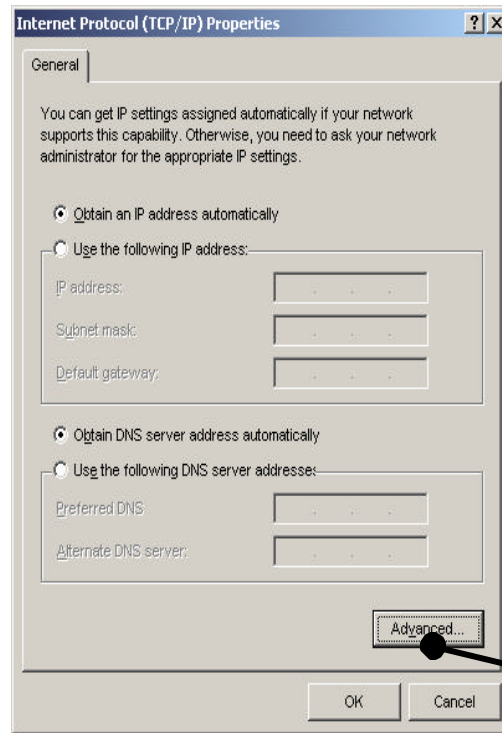
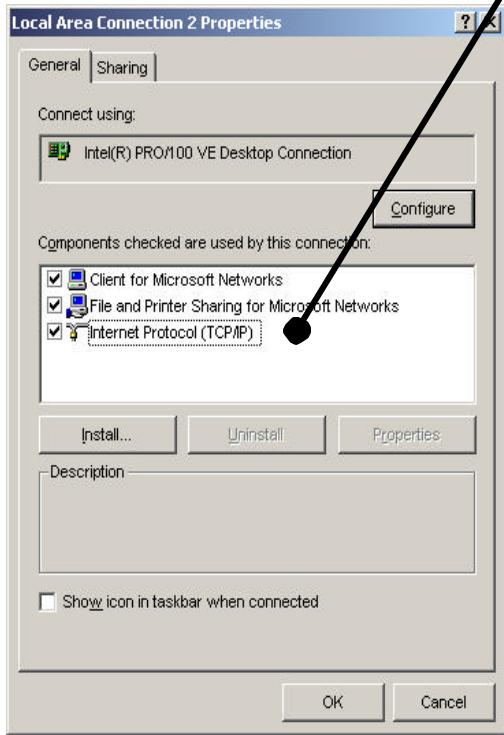


Determines which servers you will be able to access.

Use the same WINS Server as your Windows Domain Controller.

# Configuring QNTC

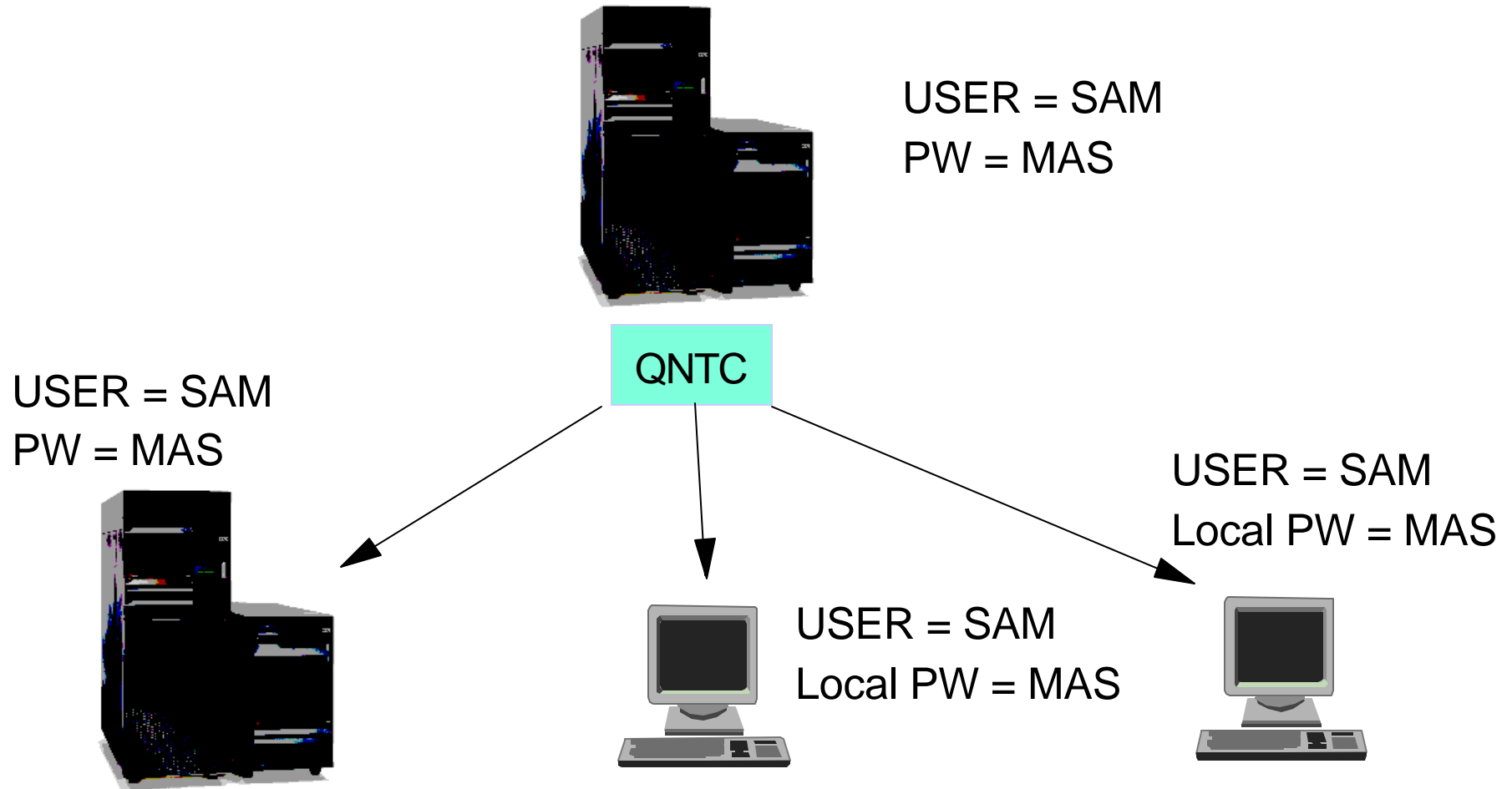
*NetBios over TCP/IP configured on Server*



Windows 2000 Server

# Configuring QNTC

*Passwords must be synchronized*



## Standalone Servers

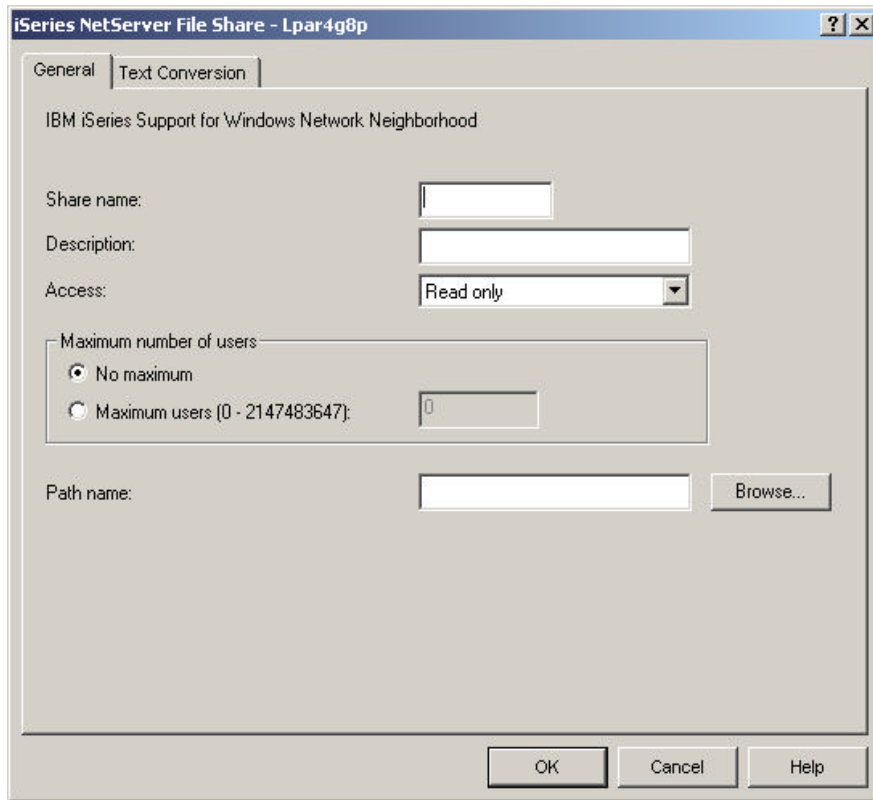


## *Securing QNTC Data*

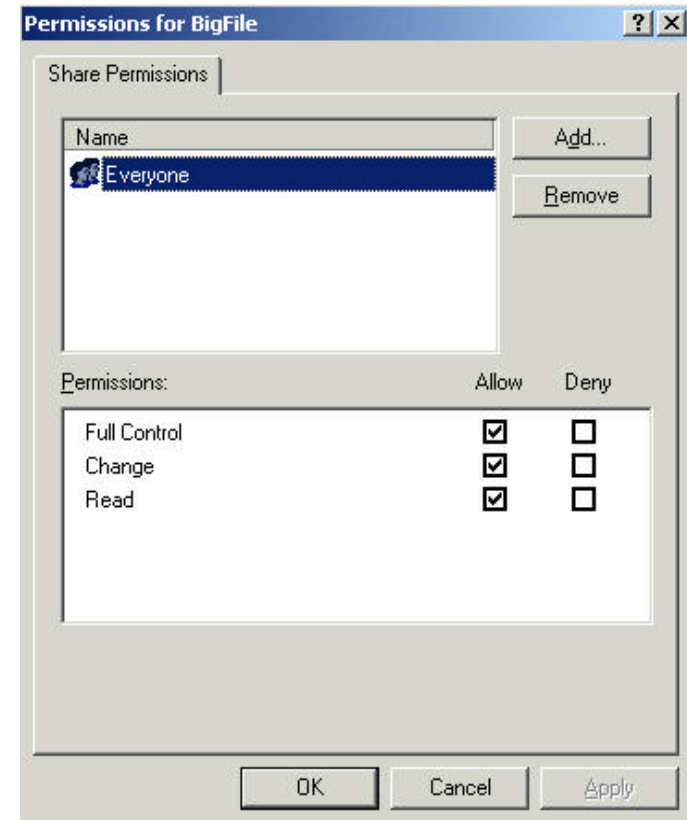
## QNTC - Security

- ✘ QNTC subdirectories and files are distributed objects.
- ✘ Access to server data is controlled by the server (Windows or iSeries), not QNTC.
  - ✘ Share level security
    - Defines the permission that a user has to the share.
  - ✘ Object level security
    - Defines the permission that a user has to the file or directory.

# Security - Share permissions

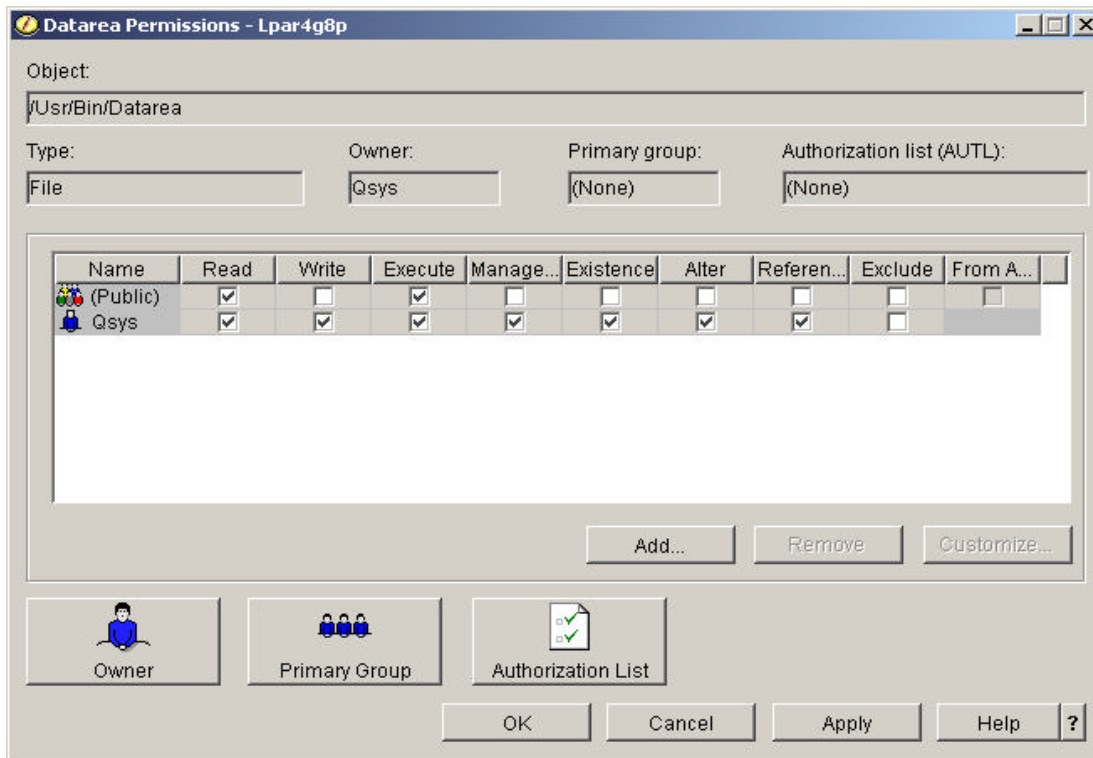


iSeries NetServer share access level

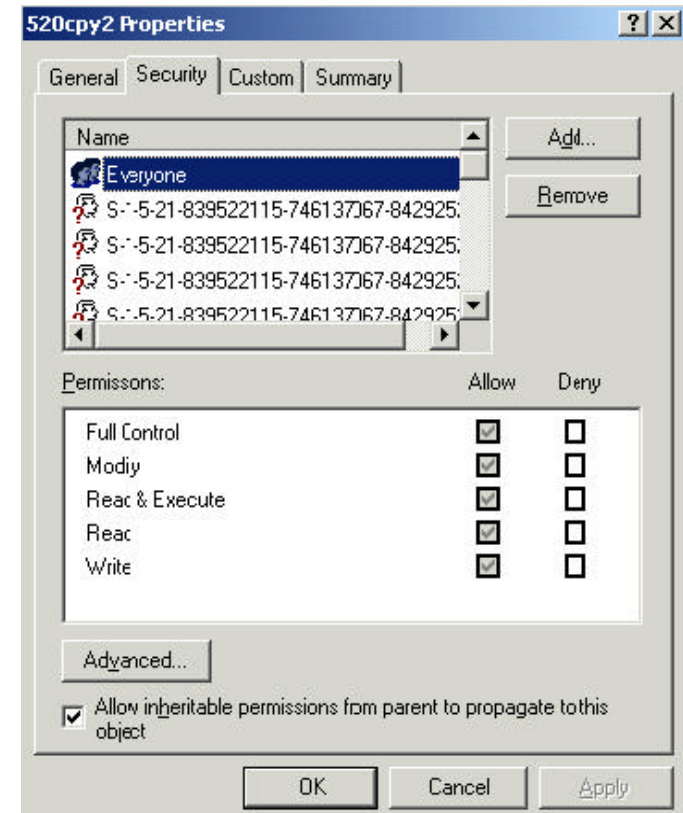


Win2000 share permissions

# Security - object permission



iSeries object permissions



Windows file permissions

# QNTC - Security

## *Security Tips*

- Share only what you need to share
- Don't allow access to root level ( /\* or C:\ )
- Set appropriate permissions on shared files/directories
- Use Group Profiles to make managing access easier
- Use strong passwords

# *QNTC Tips and Troubleshooting*

## QNTC Tips

- Improve performance with environment variable
  - `ADDENVVAR ENVVAR(QZLC_SERVERLIST) VALUE(1) LEVEL(*SYS)`
- Domain size can affect performance
- Adding servers from other domains
  - `mkdir '/qntc/svrName'`

## QNTC Troubleshooting- Common Problems

- No data in a QNTC directory or subdirectory
  - ✓ User was rejected by server
    - passwords don't match
    - local vs domain profiles
    - Digitally signing required by server
  - ✓ Master browser cannot be located
    - NetServer isn't configured for correct domain
    - Broadcasts aren't being routed and no WINS
- Server lists don't match on 2 different iSeries
  - ✓ Different networks
  - ✓ Multiple interfaces



## QNTC Troubleshooting - Common Messages

### Display detailed messages

- CPDB055 - Comm error on session to Network Server
  - Netbios errors - Check server configuration
- CPDB050 - Session initialization error with Network Server
  - 109 error - Name found, session rejected
  - 110 error - Name not found
  - 3448 error - NetServer is not started
- CPF692 - SPI QzlsGetComputerInfo failed with reason code 4
  - Network browsing problem (rc 4) - couldn't find a Browser
    - No browsers for domain
    - WINS configuration problems
    - Scope ID configuration problems

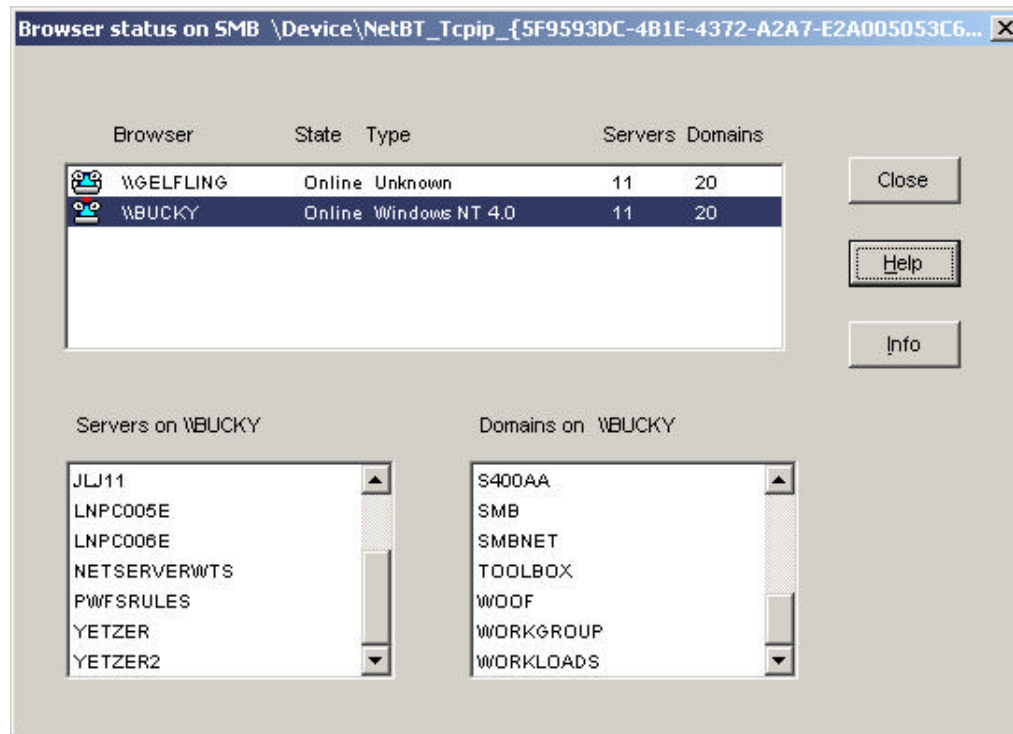
## More QNTC Troubleshooting Messages

- CPFA0A9 - Object not Found
  - (Browseable server) The server isn't active in this domain
  - (nonBrowseable server) The server dir hasn't been created
- CPDB054 - Error connecting to IPC\$
  - Current releases of QNTC don't support Message Auth Codes
  - Local security policy can't REQUIRE digital signing

## QNTC - Diagnostic Tools

- Browse tools (browmon.EXE) useful for problems finding servers.
- Network Trace tools (Ethereal) for troubleshooting connection problems.
- QNTC trace tool
  - `CALL QZLCTRC (t x'FFFFFFFF')` - start trace
  - `CALL QZLCTRC (t x'00000000')` - stop trace
  - `CALL QZLCTRC (p)` - print
  - `CALL QZLCTRC (c)` - clear
  - output file is QSYSPRT

# BROWMON



Helps understand the topology of your network

# Ethereal

The screenshot shows the Ethereal (Wireshark) interface with a packet capture named 'TRACE.CAP'. The main display area shows a list of captured packets. Packet 690 is selected, showing details for Ethernet II, Internet Protocol, Transmission Control Protocol, NetBIOS Session Service, and SMB (Server Message Block Protocol). The packet bytes pane shows the raw data of the selected packet.

No.	Time	Source	Destination	Protocol	Info
688	12.098000	9.5.175.29	9.5.80.107	TCP	5155 > netbios-
689	12.107000	9.5.175.29	9.5.80.107	SMB	Negotiate Protc
690	12.107000	9.5.80.107	9.5.175.29	SMB	Negotiate Protc
691	12.107000	9.5.175.29	9.5.80.107	TCP	5155 > netbios-

Frame 690 (268 bytes on wire, 268 bytes captured)

- Ethernet II, Src: 02:01:ff:00:ff:00, Dst: 02:01:ff:00:ff:04
- Internet Protocol, src Addr: 9.5.80.107 (9.5.80.107), dst Addr: 9.5.175.29 (9.5.175.29)
- Transmission Control Protocol, Src Port: netbios-ssn (139), Dst Port: 5155 (5155)
- NetBIOS Session Service
- SMB (Server Message Block Protocol)

Packet bytes (hex):

```

0040 53 b4 00 00 00 c6 ff 53 4d 42 72 00 00 00 00 98  S.....S MBr.....
0050 07 88 00 00 00 00 00 00 00 00 00 00 00 00 00  . . . . .
0060 34 12 00 00 00 b1 08 11 00 00 0f 32 00 01 00 04 11 4..... ..2.....
0070 00 00 00 00 00 01 00 00 00 00 00 fd f3 01 80 a2 ae  . . . . .
0080 9a 0d bb 09 c3 01 2c 01 00 81 00 74 c3 f1 a2 45  . . . . . ..t...E
0090 8c 02 44 b8 05 6f c6 24 e6 95 b5 60 6f 06 06 2b  ..D..o.$ ...`o..+
00a0 06 01 05 05 02 a0 65 30 63 a0 30 30 2e 06 09 2a  . . . . .e0 c.00...*
00b0 86 48 82 f7 12 01 02 02 06 09 2a 86 48 86 f7 12  .H..... *.H...
00c0 01 02 02 06 0a 2a 86 48 86 f7 12 01 02 02 03 06  . . . . .*.H . . . . .
00d0 0a 2b 06 01 04 01 82 37 02 02 0a a3 2f 30 2d a0  .+.....7 .../0-.
    
```

Analyze network connectivity problems

# QZLCTRC Output

```

Session B - [24 x 80]
File Edit Transfer Appearance Communication Assist Window Help
PrtScrn Copy Paste Send Recv Display Color Map Record Stop P
File . . . . . : QSYSVRT                               Page/Line 1/54
Control . . . . . :                               Columns 1 - 78
Find . . . . . :

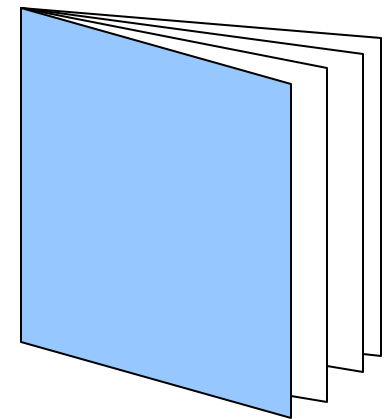
072423-0021:QzlcLock                QzlcUtil 0332 ENT
072423-0021:QzlcLock                QzlcUtil.C 0418 LEA rc:0
072423-0021:QzlcUnlock             QzlcUtil 0430 ENT
072423-0021:QzlcUnlock             QzlcUtil.C 0456 LEA rc:0
072423-0021:QzlcQueryServers       QzlcTopo 0707 ENT
072423-0021:GetComputerInfo failed. Exception info:
0000: C3D7C6C2 F6F9F2F0 D8A993A2 C785A3C3
0010: 969497A4 A38599C9 95869640 40404040
0020: 40404040 40404040 40404040 40404040
0030: 40404040 40404040 40400000 00050000
0040: 00000000 00000000 00000000 00000000
0050: 00000000 00000000 00000000 00000000
0060: 00000000 00000000 00000000 00000000
0070: 00000000 010D7800 00000000 00000000
072423-0021:QzlcQueryServers       QzlcTopo 0757 LEA rc:3406
072423-0021:QryServers failed: stat 3406

F3=Exit  F12=Cancel  F19=Left  F20=Right  F24=More keys
MA b MW 03/022
Connected to remote server/host rchas602 using port 23
    
```

Low level QNTC debug

## More Information

- **Integrated File System Introduction (SC41-5711)**
- **iSeries NetServer website**
  - <http://www.ibm.com/servers/eserver/series/netserver>
  - "Service Update Link" for current PTFs
- **iSeries Information Center web site:**
  - <http://www.ibm.com/as400/infocenter>



# Questions:

- Define QNTC and how it fits into the iSeries IFS.
- Show how QNTC is being used on the iSeries.
- Describe how to configure iSeries for QNTC.
- Review common data access issues and debugging them.



# Trademarks and Disclaimers

© IBM Corporation 1994-2003. All rights reserved.

References in this document to IBM products or services do not imply that IBM intends to make them available in every country.

The following terms are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both:

AS/400  
AS/400e  
eServer  


IBM  
IBM (logo)  
iSeries  
OS/400

xSeries

Windows, Windows 2000, Windows XP and Windows NT are registered trademarks of Microsoft Corporation in the United States, other countries, or both.

Other company, product or service names may be trademarks or service marks of others.

Information is provided "AS IS" without warranty of any kind.

All customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics may vary by customer.

Information in this presentation concerning non-IBM products was obtained from a supplier of these products, published announcement material, or other publicly available sources and does not constitute an endorsement of such products by IBM. Sources for non-IBM list prices and performance numbers are taken from publicly available information, including vendor announcements and vendor worldwide homepages. IBM has not tested these products and cannot confirm the accuracy of performance, capability, or any other claims related to non-IBM products. Questions on the capability of non-IBM products should be addressed to the supplier of those products.

All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only. Contact your local IBM office or IBM authorized reseller for the full text of the specific Statement of Direction.

Some information in this presentation addresses anticipated future capabilities. Such information is not intended as a definitive statement of a commitment to specific levels of performance, function or delivery schedules with respect to any future products. Such commitments are only made in IBM product announcements. The information is presented here to communicate IBM's current investment and development activities as a good faith effort to help with our customers' future planning.

Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput or performance improvements equivalent to the ratios stated here.

Photographs shown are of engineering prototypes. Changes may be incorporated in production models.