

Moving an AS/400 into a TCP/IP Environment

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Abstract

You probably have one or more of these requirements in your future:

- Internet
- intranet
- Web surfing
- Lotus Domino
- IBM Network Stations

All require TCP/IP on the AS/400. So what are you waiting for!? Everyone knows that the AS/400 has excellent TCP/IP support built right into the operating system. Come to this session where we'll explore strategies for adding TCP/IP support to your existing SNA environment.

Agenda

Why TCP/IP?

Comparison of SNA and TCP/IP

TCP/IP Planning

An example of adding TCP/IP to an SNA Network

- Adding TCP/IP LAN support
- Adding TCP/IP WAN support

Why TCP/IP?

Internet Access

Multi-vendor application interoperability

Intranet Applications

- Client/Server applications
- Network Computing applications
- e-business applications

Client Connectivity

TCP/IP has become universal for client connectivity

Virtually all Clients come with TCP/IP Built In

- Windows 95, Windows 98
- Windows/NT
- AIX and all UNIX Workstation variants
- OS/2 WARP
- IBM Network Station
- etc...

Differences between IP and SNA

Brief Overview



Addressing

APPC/APPN

- 8 character network name, a '.', and an 8 character LU name
 - eg, USEAST12.FRED
- Network id registry is available

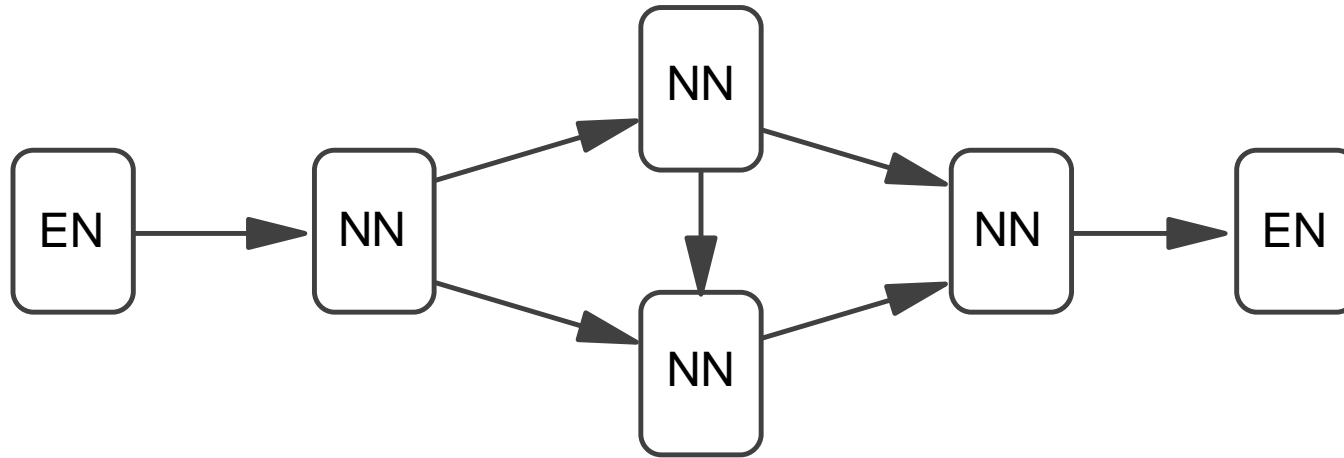
TCP/IP

- Hierarchical naming, name3.name2.name1
 - e.g., as400.ibm.com
- Names map to 32-bit IP addresses
- Mapping normally done using domain name service (DNS)
- How you define subnetworks controls routing

Network Components

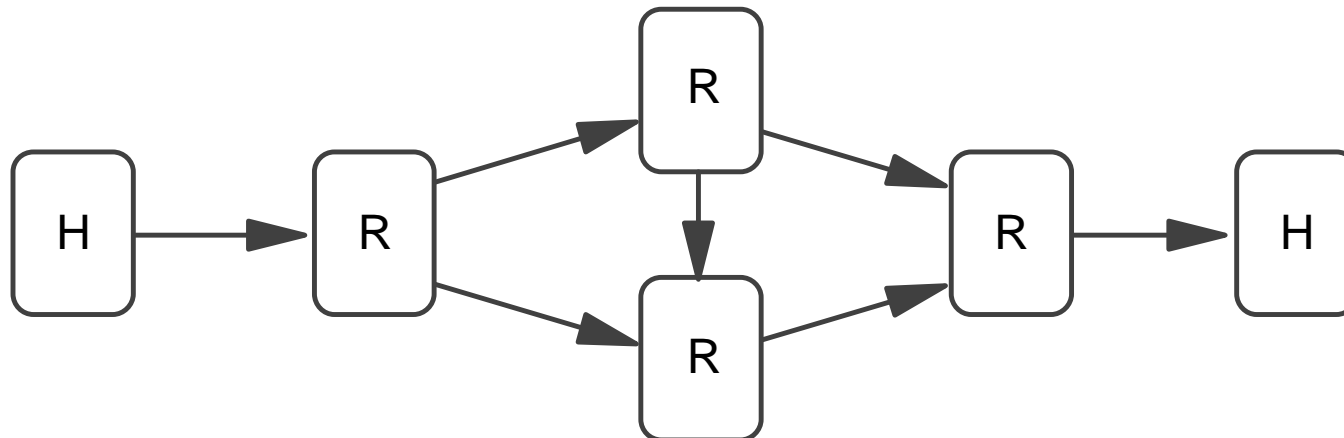
EN - End Node
 NN - Network Node

APPN Network



H - Host Node
 R - Router

TCP/IP Network



Configuration

APPC/APPN

Required Items:

- Local net ID and Control Point (CHGNETA)
- Line Description Exp: (CRTLINTRN, etc.)

TCP/IP

Required Items:

- Local IP address (ADDTCPIFC - Option 1 from CFGTCP)
- Line Description Exp: (CRTLINTRN, etc.)
- Hostname entries for local and remote hosts
 - Either:
 - ▶ Host Table (ADDTCPHTE - Option 10 off CFGTCP)
 - ▶ DNS

Security

APPC/APPN

- Security built into the protocol
- Application level Security
 - ◆ Security: Same, Program, None, Strong
- Session level security
 - ◆ Password substitution and encryption

TCP/IP

- Normally Security is left to the application
 - ◆ SSL, SET, HTTPs, S/MIME, TN5250E
- Session level Security being added: IP Security
- Firewalls provide Security between networks

Comparison of Native Functions on AS/400

	APPN/APPC	TCP/IP
Full Duplex	★	✓
Half Duplex	✓	
Expedited data	★	✓
Stream data		✓
Record data	✓	
Access to internet		✓
Connection oriented data	✓	✓
Connectionless data		✓
Broadcast		✓
Routing capabilities	✓	✓
Two Phase Commit	✓	

★ Architected, but not available on AS/400

TCP/IP Planning

TCP/IP Physical Interface Options

In most cases, AS/400 TCP/IP and SNA can share a physical connection

LANs

- IBM Token-ring
- Ethernet (10 and 100 Mb)
- DDI (SDDI and FDDI)
- ATM (LAN-Emulation)
- Wireless LAN
- Twinax (emulates a LAN)

WANs

- X.25 (PVC, SVC and ISDN)
- Frame Relay
- SLIP Asynchronous
- PPP Synch & Asynchronous (analog, ISDN, Sw56k, T1/E1, etc)

Assigning IP Addresses

Each IP address must be unique in the entire network

Globally unique IP network addresses

- Necessary for visibility on the global Internet
- Must be obtained from a central allocation authority

Network Solutions

InterNIC Registration Services

505 Huntmar Park Drive, Herndon, VA 22070

Phone: 1-703-742-4777, FAX: 1-703-742-4811

Private IP network addresses

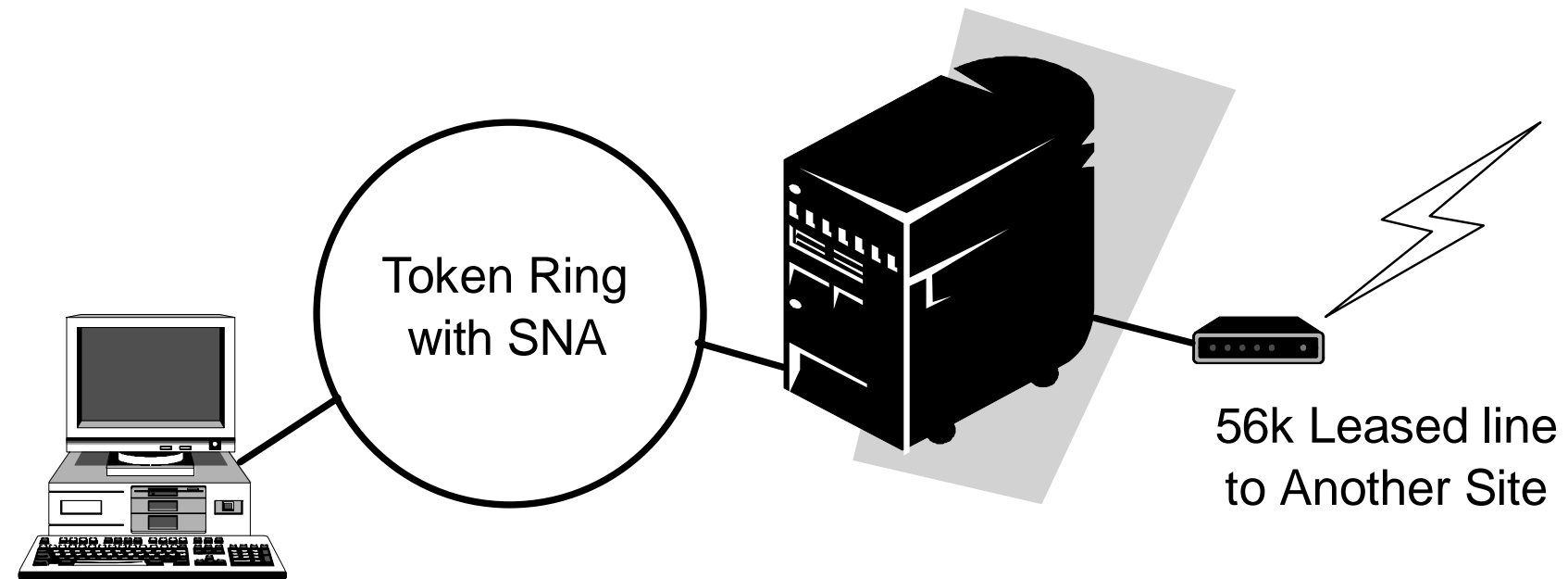
- Addresses cannot be visible on the global Internet
- Internet access accomplished through proxy or address translation techniques (e.g. NAT and Masquarading)
- Can be used freely for private networks
 - ◆ 10.xx.xx.xx
 - ◆ 172.16.xx.xx through 172.31.xx.xx
 - ◆ 192.168.0.xx through 192.168.255.xx

Adding TCP/IP to an Existing LAN



Existing SNA Configuration

New Requirement: add intranet web serving



Client Access
Windows 95

New Requirement:

Implement an internal web server and provide access from internal workstations.

Implementation Approach

Add TCP/IP networking to the existing physical network

- Define IP subnets and host addresses
- Configure TCP/IP on AS/400 server
- Configure TCP/IP on Windows 95 clients

Activate AS/400 built-in web server

- Install TCP/IP (TC1) LP that came with OS/400 (SS1)
- Configure Web Server
- Add content for the intranet Web server

Defining IP Subnets

What is an IP Subnet?

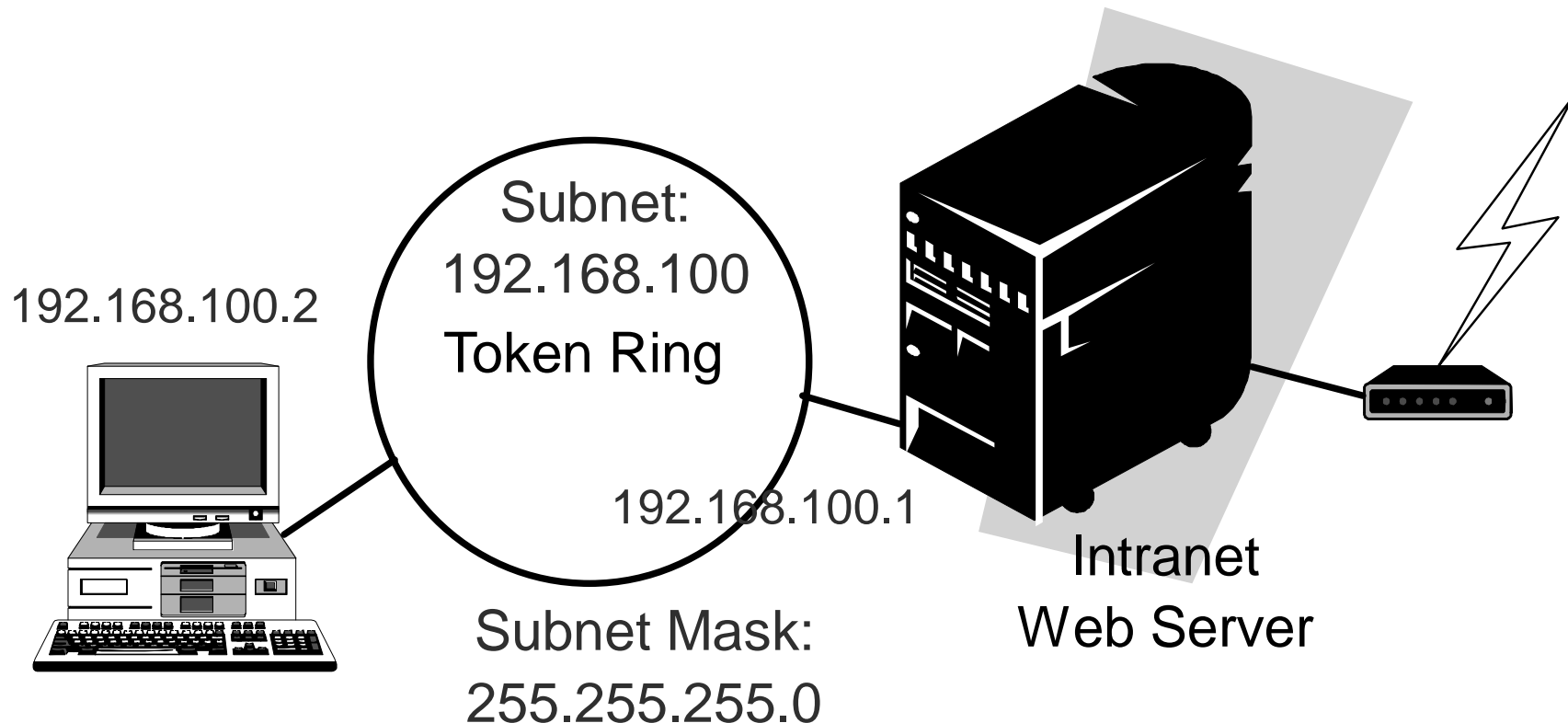
- A collection of networked computers ("hosts") that can communicate directly with one another without the aid of an IP router

What defines an IP Subnet?

- The 32 bits of an IP address are logically divided into two parts: <(network number), (host number)>
 - ◆ Subnets are identified by their unique network number
- Though the number of bits allocated to the network number is variable, the most common division is a 24 bit network number and an 8 bit host number
 - ◆ An address with a 24 bit network number is called a Class C address
- A "**Subnet Mask**" indicates the number of bits allocated to the network number

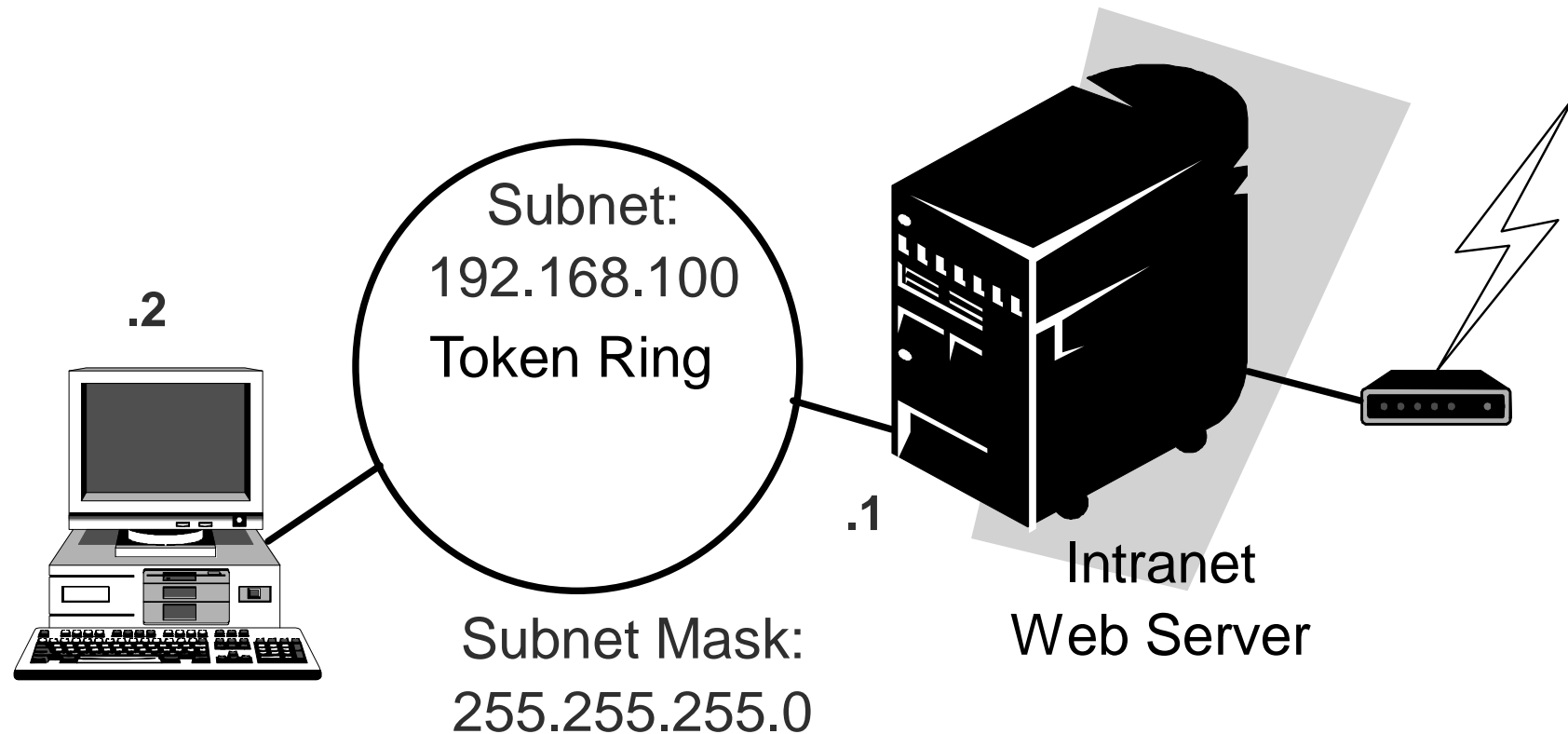
Define Your IP Network

For this example we chose to use private addresses



Define Your IP Network

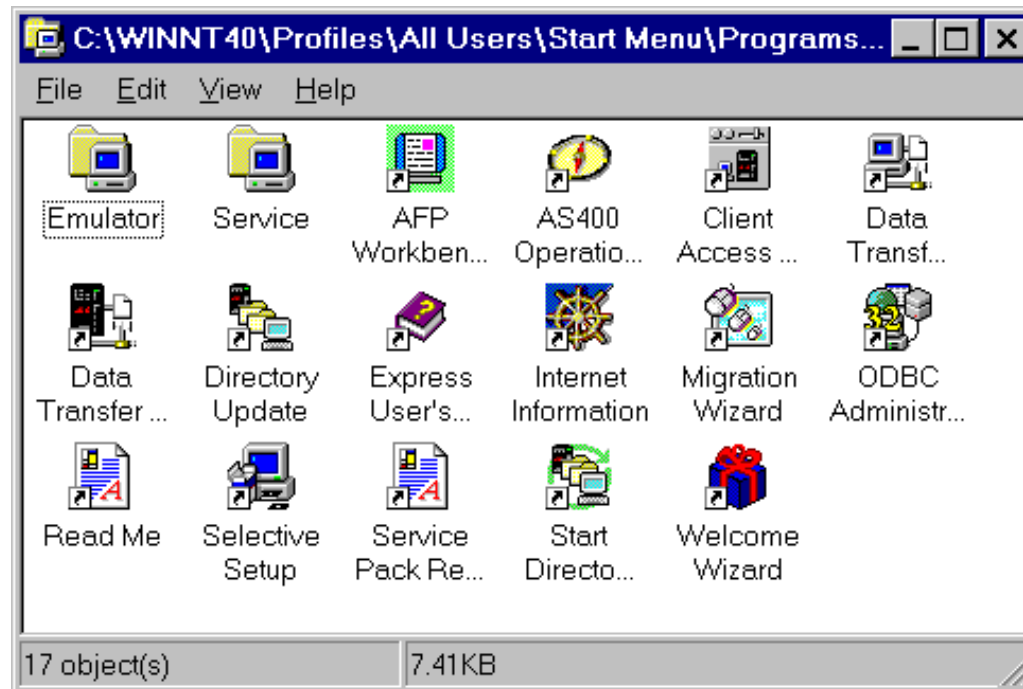
For this example we chose to use private addresses



AS/400 TCP/IP Graphical Administration

Operations Navigator

- Free and shipped with each AS/400 on Client Access CD-ROM
- Installed using Client Access installation program and selecting AS/400 Operations Navigator and the Network component



AS/400 Operations Navigator Network item

- Network tree item
 - Integrates and provides one place for TCP/IP administration
- Several wizards!

The screenshot displays the AS/400 Operations Navigator application window. The title bar reads "AS/400 Operations Navigator". The menu bar includes "File", "Edit", "View", "Options", and "Help". A toolbar with various icons is visible below the menu bar. The status bar at the top right indicates "0 minutes old".

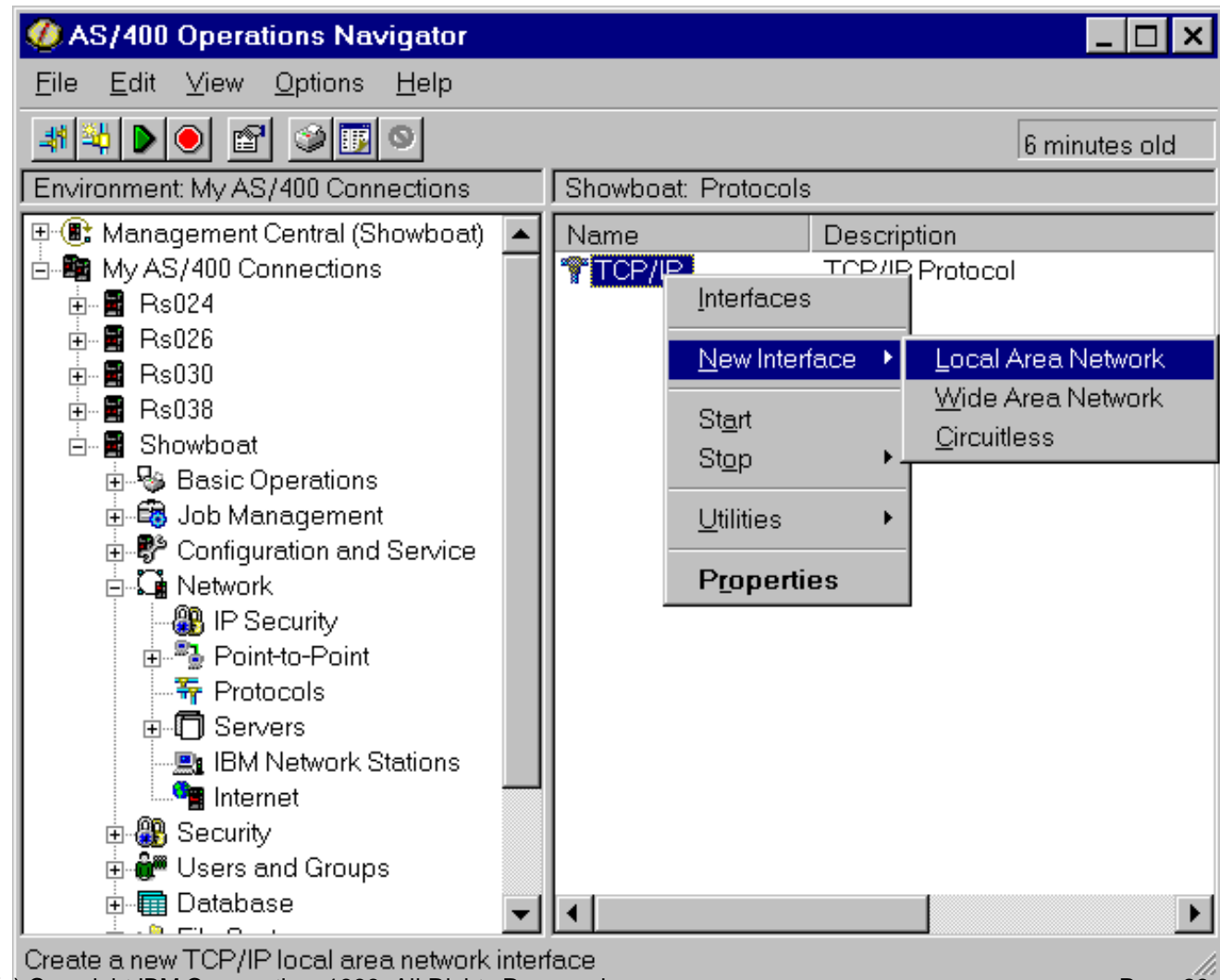
The main window is divided into two panes. The left pane, titled "Environment: My AS/400 Connections", shows a tree view of the system structure. The "Showboat" item is selected and highlighted. The right pane, titled "Showboat:", displays a table with the following data:

Name	Description
Basic Operations	Manage AS/400 messages, printer output, and
Job Management	Manage AS/400 jobs and server jobs.
Configuration and Servi...	Display system inventory, work with fixes, and
Network	Manage AS/400 TCP/IP and Internet support
Security	Configure and manage AS/400 security.
Users and Groups	Manage AS/400 users and user groups.
Database	Administer DB2/400.
File Systems	Work with AS/400 file systems.
Multimedia	Store and share multimedia data on the AS/4
Backup	Schedule backups of AS/400 data.
Application Developm...	Work with AS/400 application development to

At the bottom of the window, a footer reads "For Help, press F1" and "(c) Copyright IBM Corporation, 1999. All Rights Reserved".

TCP/IP Administration - Interfaces and Protocol

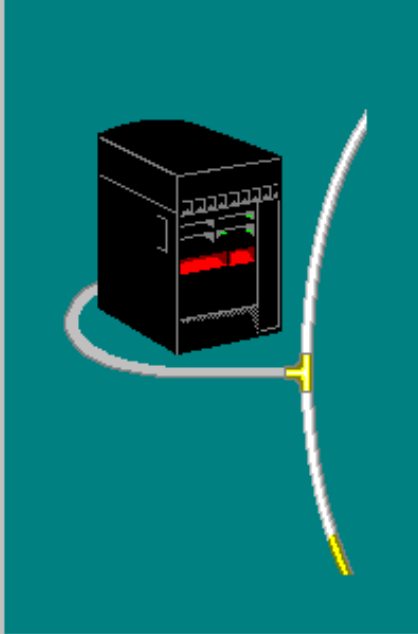
- TCP/IP Interfaces can be managed from one screen (Start, Stop, Delete, Properties)
- New TCP/IP interfaces can be created for:
 - LAN
 - WAN
 - Circuitless
- TCP/IP protocol management:
 - Start, Stop
 - Properties
 - Remote Ping



TCP/IP Administration - New Interface LAN Wizard

- Simplified TCP/IP interface creation through a step-based approach

New TCP/IP Interface - Showboat



Welcome to the AS/400 Operations Navigator Local Area Network (LAN) TCP/IP interface wizard.

The wizard will take you through the steps needed to configure a TCP/IP interface for the AS/400.

You may need to get certain information from your network administrator in order to answer some of the questions.

You can cancel the configuration process at anytime by clicking the Cancel button. Click the Help button to see a list of the information needed to create the interface.

< Back Next > Cancel Help

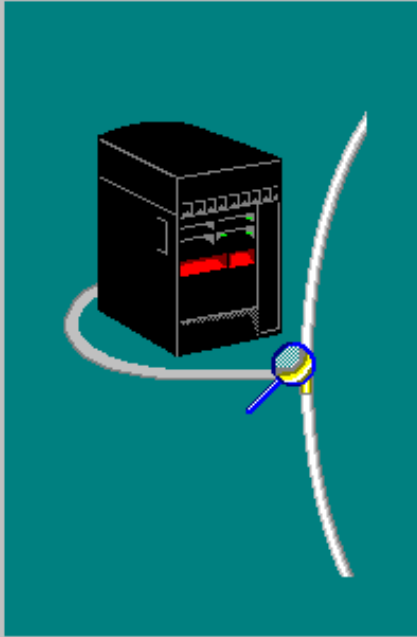
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TCP/IP Administration - New Interface LAN Wizard

- Select Interface type

New TCP/IP Interface Type - Showboat



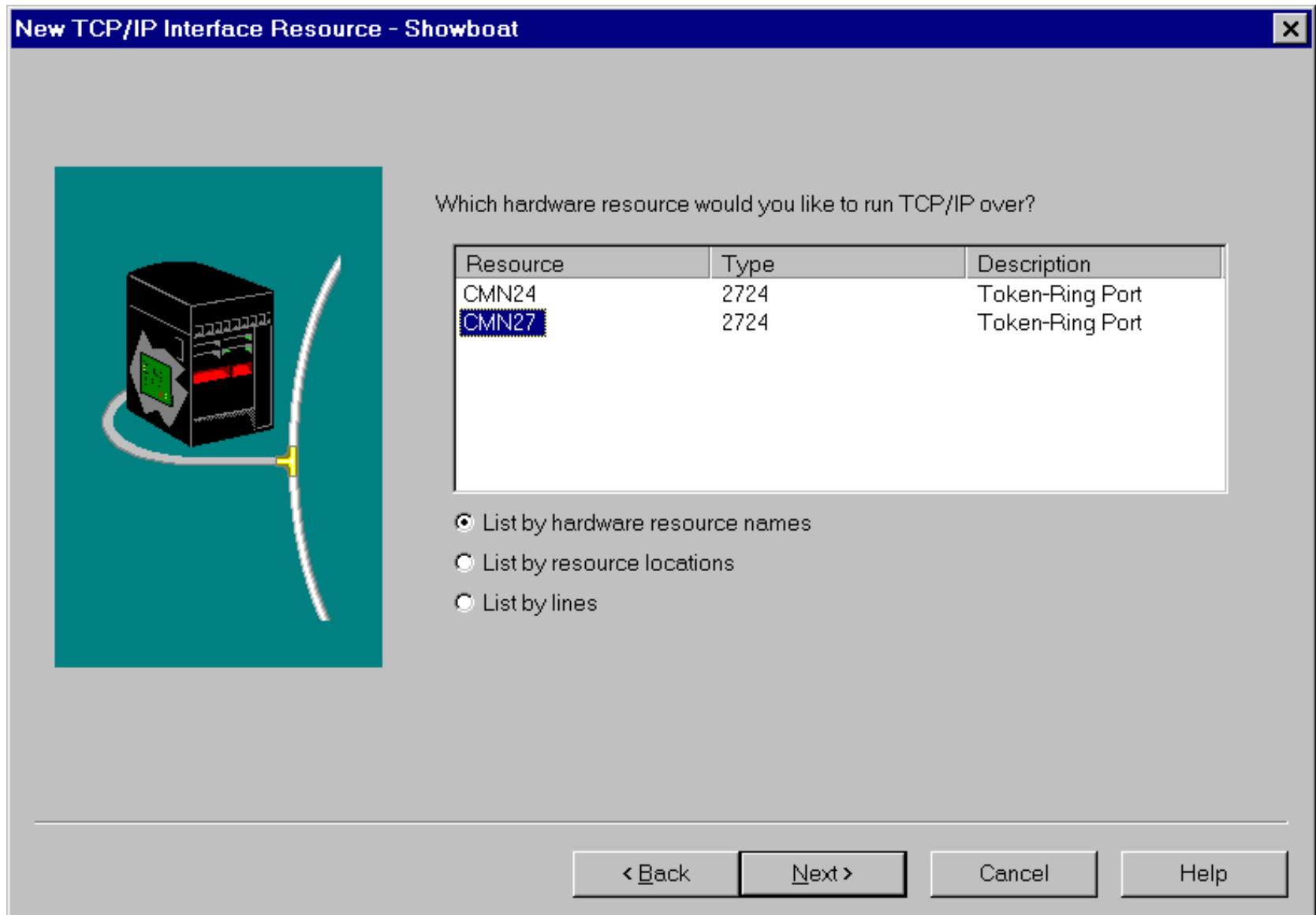
What type of LAN connection will you be using for TCP/IP?

- Ethernet
- Token ring
- Distributed data interface (DDI)
- Wireless
- OptiConnect

< Back Next > Cancel Help

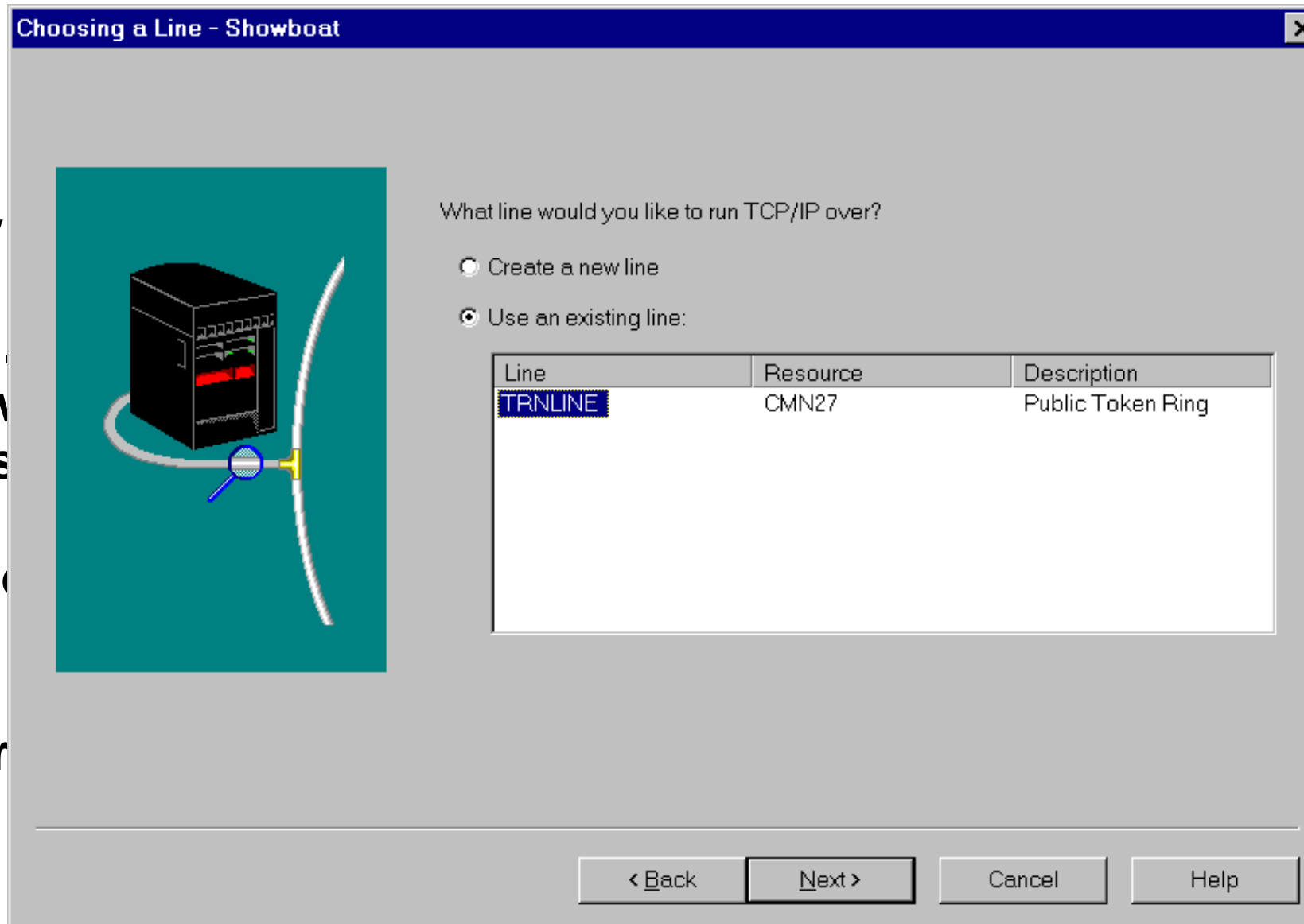
TCP/IP Administration - New Interface LAN Wizard

- Select hardware by name location or use an existing line



TCP/IP Administration - New Interface LAN Wizard

- Can "list by hardware resources".
- Create a new line if one is needed
- We'll use the TRNLINE that's already there

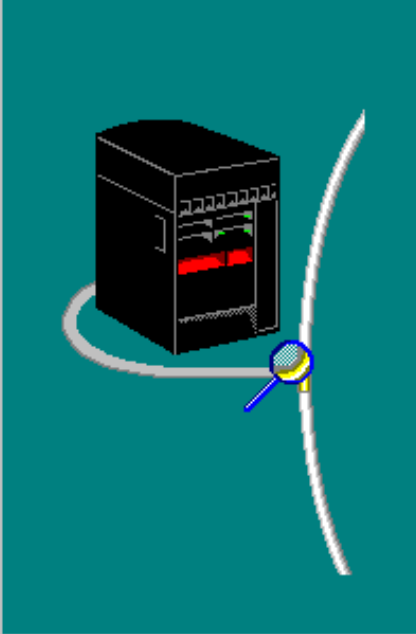


TCP/IP Administration - New Interface LAN Wizard

- Enter TCP/IP interface settings
- Modify TCP/IP stack settings, if necessary

TCP/IP Interface Settings - Showboat

What are the settings for this TCP/IP interface?



IP address: 192.168.100.1

Interface name: COMMON99

Subnet mask: 255.255.255.0

Network: 192.168.100.0

Host: 0.0.0.1

Network name: common.net

Maximum transmission units: Use line value

Do you want to work with TCP/IP settings that affect the entire system? If you are configuring a second interface you might want to change IP forwarding.

Yes

No

< Back Next > Cancel Help

TCP/IP Administration - New Interface LAN Wizard

Enter
default
gateways

Enter
additional
routing
information,
if necessary

- Dynamic routing
- Network routes
- Host routes

TCP/IP Routing - Showboat

Network name: common.net

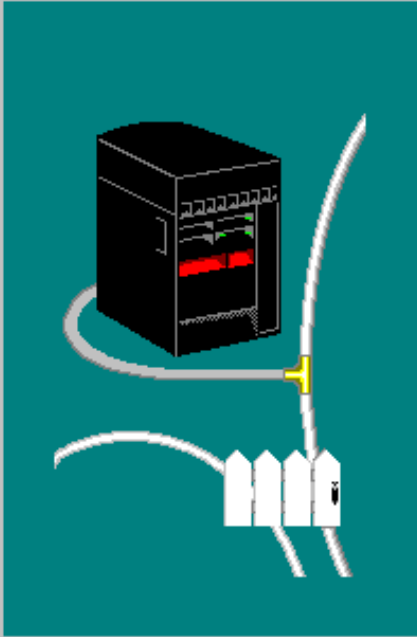
Network: 192.168.100

Please enter up to three default gateway addresses.

Would you like to set additional routing information for this network interface?

Yes

No



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TCP/IP Administration - New Interface LAN Wizard

Select installed servers to start automatically when TCP/IP is started

Servers to be Started - Showboat

Which servers would you like automatically started when TCP/IP is started?

Start when TCP/IP is started:

- BOOTP
- DDM
- DHCP
- RouteD
- TFTP
- NFS
- INETD
- Management Central
- RPC
- AS/400 NetServer
- EDRSQL
- DNS
- FTP
- LPD
- POP
- Remote execution

< Back Next > Cancel Help

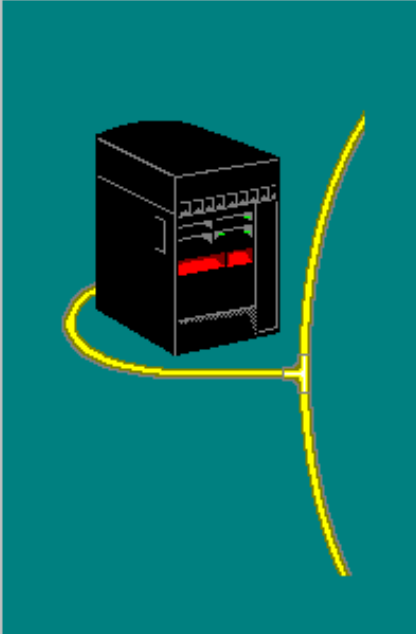
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TCP/IP Administration - New Interface LAN Wizard

Select autostart for this interface, and also start it now.

Start TCP/IP Interface - Showboat



Do you want to start this TCP/IP interface every time TCP/IP is started?

Yes
 No

Do you want to start this TCP/IP interface now?

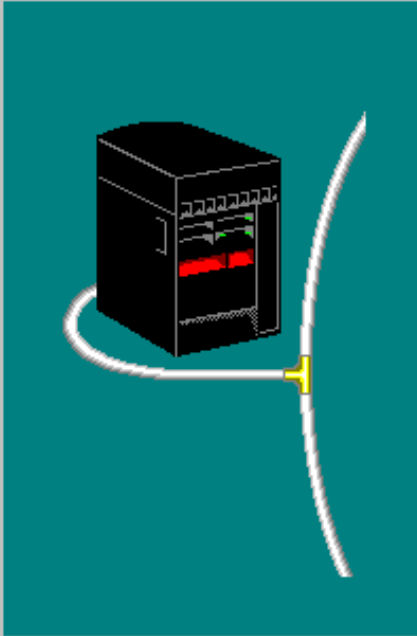
Yes
 No

< Back Next > Cancel Help

TCP/IP Administration - New Interface LAN Wizard

Summary information of all the options you've chosen
Select Finish, and TCP/IP has been setup.

New TCP/IP Interface Summary - Showboat



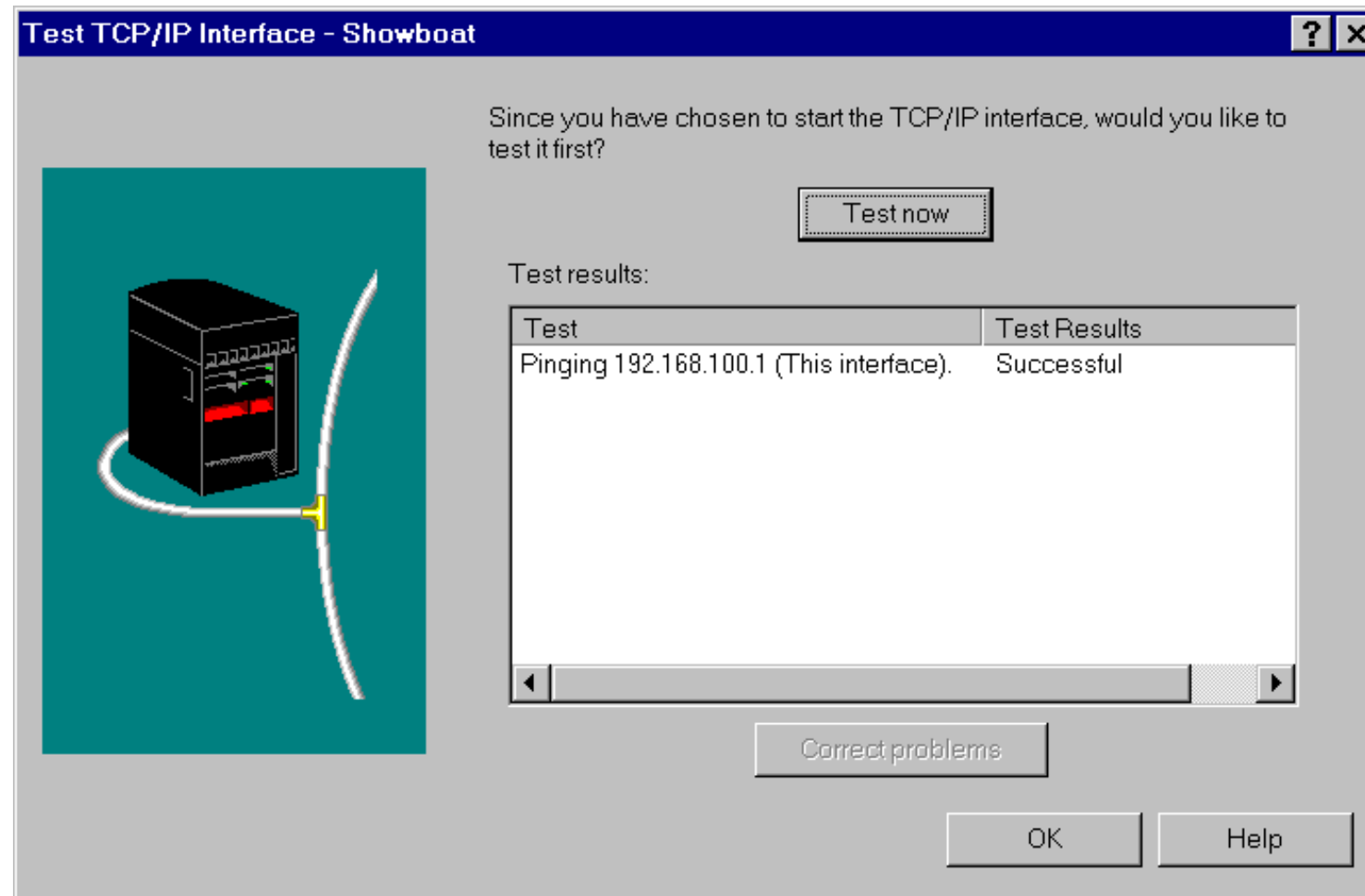
Hardware resource:	CMN27
Line name:	TRNLINE
Connection type:	Token Ring
Network name:	common.net
IP address:	192.168.100.1
Interface name:	COMMON99
Subnet mask:	255.255.255.0
Network:	192.168.100.0
Host address:	0.0.0.1

< Back Finish Cancel Help

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TCP/IP Administration - New Interface LAN Wizard

- Push the Test Now button.
- This "PING"s the interface



TCP/IP Administration - TCP/IP protocol Properties

TCP/IP protocol attributes:

- Host and Domain information
- Protocol settings
- Port Restrictions management
- Servers to start when TCP/IP is started
- SOCKS client settings

The screenshot shows the 'TCP/IP Properties - Showboat' dialog box with the 'Settings' tab selected. The dialog has several tabs: 'Host Domain Information', 'Host Table', 'Settings', 'Port Restrictions', 'Servers to Start', and 'SOCKS'. The 'Settings' tab contains the following configuration options:

- IP datagram forwarding
- TCP keep-alive time (1 - 40,320): 120 minutes
- TCP urgent pointer convention:
 - BSD
 - RFC
- TCP receive buffer size (512 - 8,388,608): 8192 bytes
- TCP send buffer size (512 - 8,388,608): 8192 bytes
- IP reassembly timeout (5 - 120): 10 seconds
- IP time-to-live (1 - 255): 64 hops
- ARP cache timeout (1 - 1440): 15 minutes
- UDP checksum
- IP source routing
- Log protocol errors
- Path MTU discovery interval (5 - 40320): 10 minutes

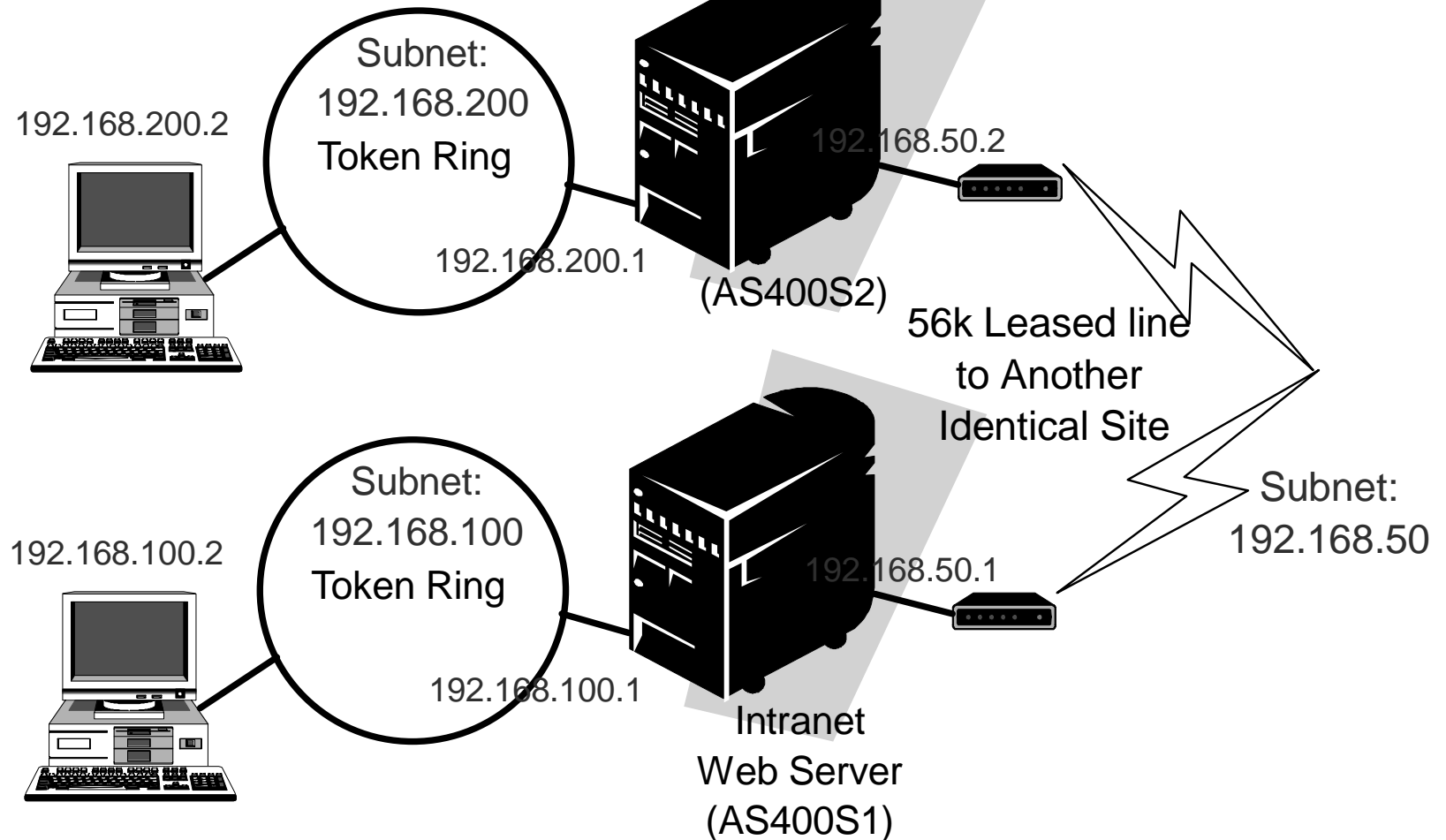
At the bottom of the dialog are 'OK', 'Cancel', and 'Help' buttons. The footer text reads: '(c) Copyright IBM Corporation, 1999. All Rights Reserved' and 'Page 34'.

Adding TCP/IP to an Existing WAN



Define IP Addressing

For this example we continue to use private addresses



Change SDLC Link to Frame Relay

Can run both SNA & IP over existing leased line

TCP/IP cannot run over SDLC Links

Both TCP/IP and SNA run over Frame Relay link

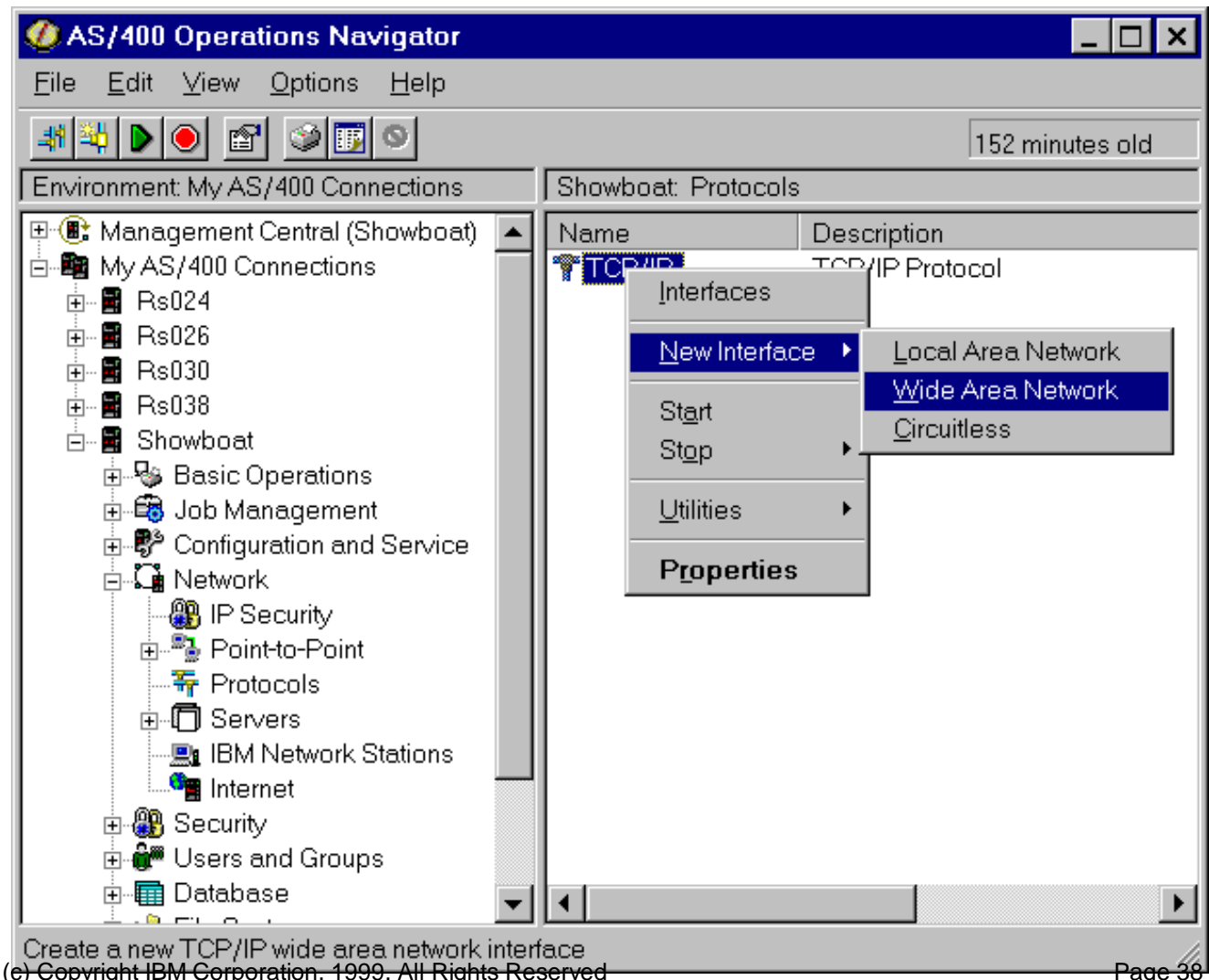
- Configuring a Frame Relay link does NOT necessarily require a subscription to a Frame Relay service ("cloud")
- Can run point-to-point Frame Relay on a standard leased line

To Add a Frame Relay connection to existing leased line

- Create a Frame Relay Network Interface (CRTNWIFR)
- Create a Frame Relay Line Description (CRTLINFR)
- We'll do this using the Operations Navigator Wizard for adding interfaces

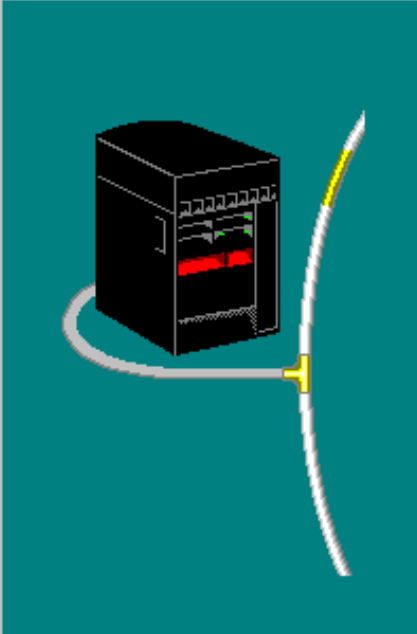
TCP/IP Administration - New Interface WAN Wizard

- We'll configure AS400S2 first
- Right Click the "TCP/IP" protocol box and select "New Interface" - "WAN"



TCP/IP Administration - New Interface WAN Wizard

New TCP/IP Interface - Showboat



Welcome to the AS/400 Operations Navigator Wide Area Network (WAN) TCP/IP interface wizard.

The wizard will take you through the steps needed to configure a TCP/IP interface for the AS/400.

You may need to get certain information from your network administrator in order to answer some of the questions.

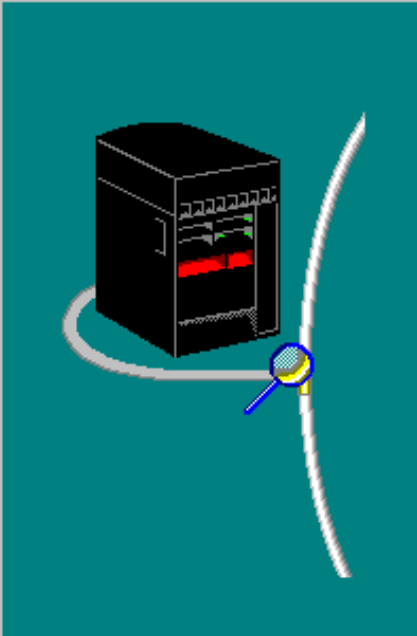
You can cancel the configuration process at anytime by clicking the Cancel button. Click the Help button to see a list of the information needed to create the interface.

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TCP/IP Administration - New Interface WAN Wizard

Select
Direct

New TCP/IP Interface Type - Showboat



What type of frame relay connection will you be using for TCP/IP?

Bridged:

- Ethernet
- Token ring
- Distributed data interface (DDI)

Non-bridged:

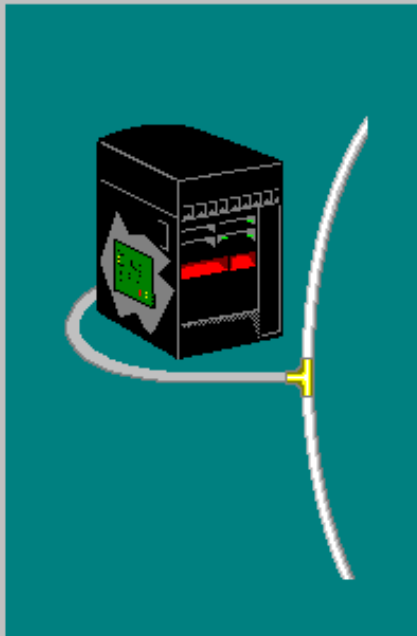
- Direct

< Back Next > Cancel Help

TCP/IP Administration - New Interface WAN

Wizard

New TCP/IP Interface Resource - Showboat



Which hardware resource would you like to run TCP/IP over?

Resource	Type	Description
CMN06	2720	Comm Port
CMN18	2721	Comm Port
CMN19	2721	Comm Port
CMN28	2721	Comm Port
CMN29	2721	Comm Port

- List by hardware resource names
- List by resource locations
- List by network connections

< Back

Next >

Cancel

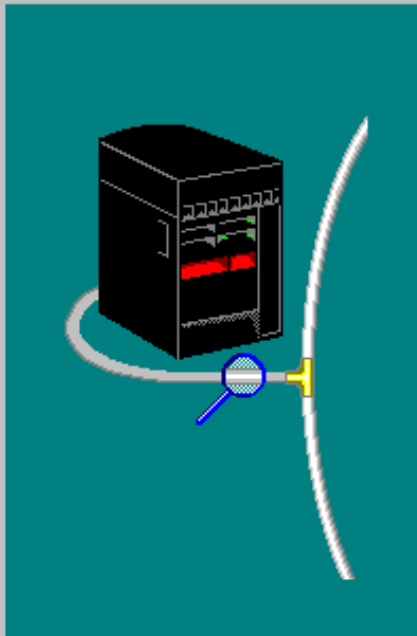
Help

- Choose the hardware resource that supports the SDLC modem.

TCP/IP Administration - New Interface WAN Wizard

Type a network connection name. The name is not important for this application

Creating a New Frame Relay Network Connection - Showboat



What is the information for the new network connection?

Hardware resource: CMN18

Network connection name: FRAS400S1

Description: Frame Relay link to the AS/400

Physical connection: RS-499/V.36

Local management interface: Terminal equipment

Line speed: 1536000 bits per second

Authority: Libcrtaut

< Back

Next >

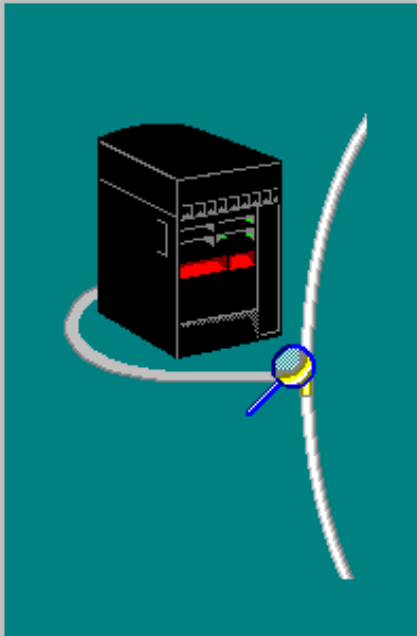
Cancel

Help

TCP/IP Administration - New Interface WAN Wizard

Select
Numbered
network

Creating a New TCP/IP Frame Relay Interface - Showboat



What type of direct frame relay interface are you creating?

- Numbered network
- Transparent subnet
- Non-broadcast multi access (NBMA)

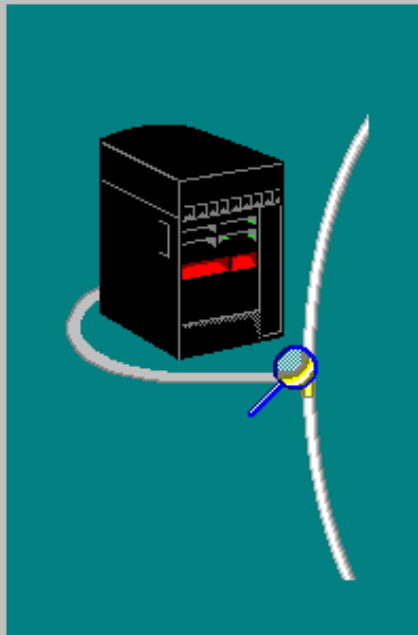
< Back Next > Cancel Help

TCP/IP Administration - New Interface WAN

Wizard

Creating a New Line Description - Showboat

For this application use "10" for the DLC identifier. Type a Line name - the name is not important for this application.



What is the connection information for the interface?

DLC identifier (1 - 1018):

Description:

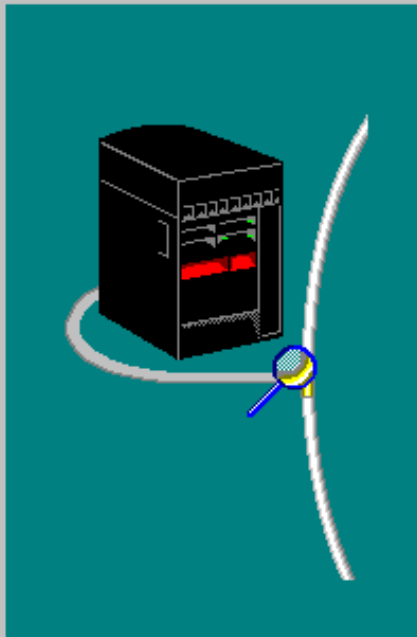
Line name:

TCP/IP Administration - New Interface WAN

Wizard

TCP/IP Frame Relay Interface Settings - Showboat

Type the local IP address per our network diagram
Type an interface name and network name
Select Routes to add a default route



What are the settings for the interface?

Remote IP address:

Calculated

Local IP address:

192.168.50.2

Interface name:

TOPAS400

Subnet mask:

255.255.255.0

Network:

192.168.50.0

Network name:

EXTWAN.NET

Maximum transmission units:

Use line value

Advanced

Routes

< Back

Next >

Cancel

Help

TCP/IP Administration - New Interface WAN Wizard

It's easy to add a default route! Check the box "enable static routing" Push the button "Add default route" Push "OK".

The screenshot shows the 'TCP/IP Routing - Showboat' window with the 'Add Default Route - Showboat' dialog box open. The dialog box has a 'Gateway address' field containing '192.168.50.2' and an 'Advanced' button. The main window has several options: 'Route redistribution type' (Full, Limited), 'Dynamic routing' (None, RIP1, RIP2), and a checked 'Enable static routing' checkbox. Below these is a table with columns 'Remote Network', 'Subnet Mask', and 'Gateway Address'. At the bottom of the main window are buttons for 'Add default route', 'Add network route', 'Add host route', 'Remove', 'Open', 'OK', 'Cancel', and 'Help'.

TCP/IP Routing - Showboat

Route redistribution type:

- Full
- Limited

Dynamic routing:

- None
- RIP1
- RIP2

Enable static routing

Remote Network	Subnet Mask	Gateway Address
----------------	-------------	-----------------

Add Default Route - Showboat

Gateway address: 192.168.50.2

Advanced

OK Cancel Help

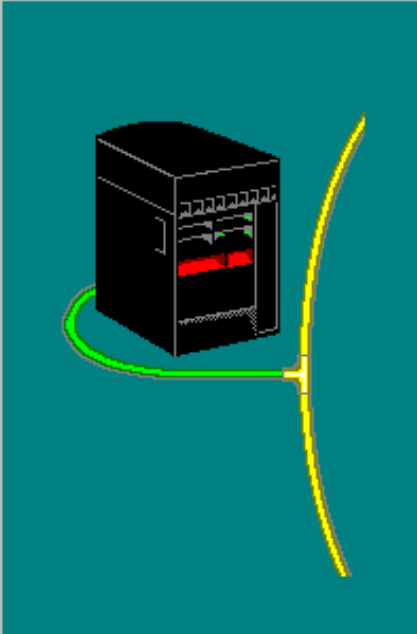
Add default route Add network route Add host route Remove Open

OK Cancel Help

TCP/IP Administration - New Interface WAN Wizard

You can
select to
have this
interface
started
automatic
(and right
now)

Start TCP/IP Interface - Showboat



Do you want to start the TCP/IP interface(s) every time TCP/IP is started?

Yes
 No

Do you want to start the TCP/IP interface(s) now?

Yes
 No

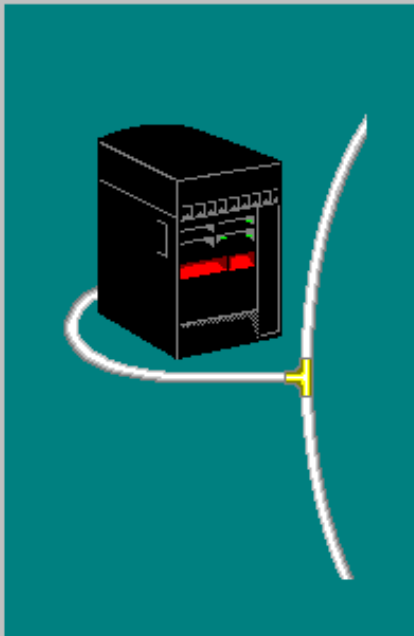
< Back Next > Cancel Help

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TCP/IP Administration - New Interface WAN Wizard

New TCP/IP Interface Summary - Showboat



Congratulations! You have successfully completed the Wide Area Network (WAN) interface wizard.

Click Finish to create the following WAN interfaces:

DLC ID	Description	Local IP	Remote IP	Type
10	Artificial Number -...	192.168.50.2	Calculated	Numbered netw

Details

< Back

Finish

Cancel

Help

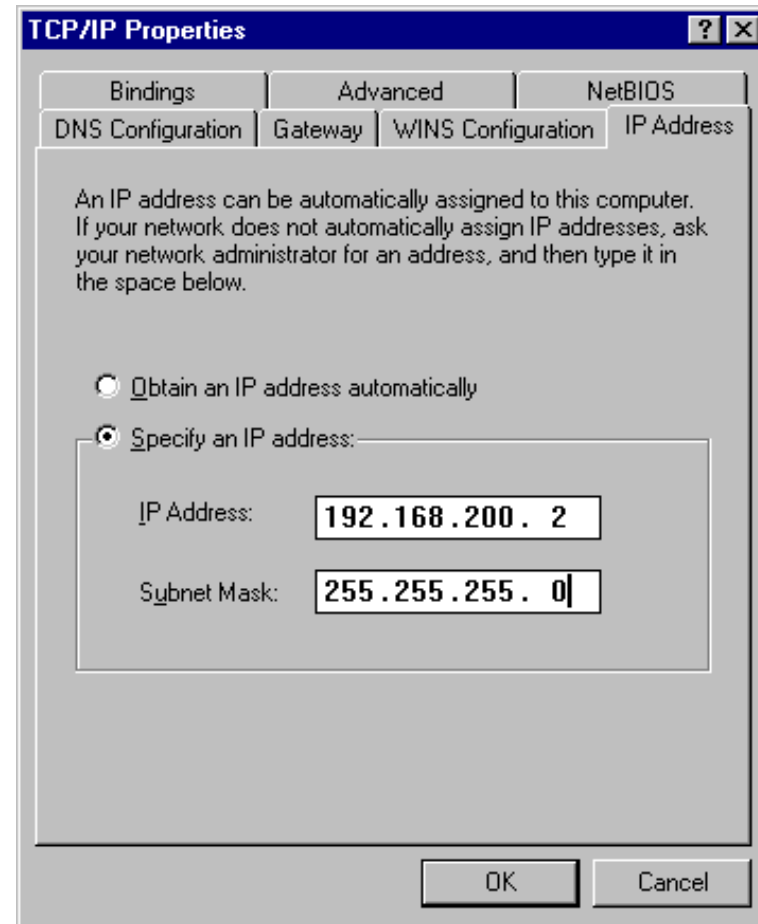
Configure TCP/IP on Workstations

Go to Windows 95 "Network" Configuration

- START-SETTINGS-CONTROL PANEL then double-click on NETWORK icon
- To add TCP/IP, Click ADD button then Click on PROTOCOL selection
 - ◆ Make sure the CONFIGURATION tab is selected
- In left pane, under Manufacturers, click on Microsoft then, in right pane, double-click on TCP/IP
 - ◆ This will return you to the NETWORK dialog box
- Now that you've added the TCP/IP protocol, it should appear as a item in the top scroll box (something like "TCP/IP -> IBM Token Ring Card..."). Double-click on this TCP/IP item.
 - ◆ A "TCP/IP Properties" dialog box should appear

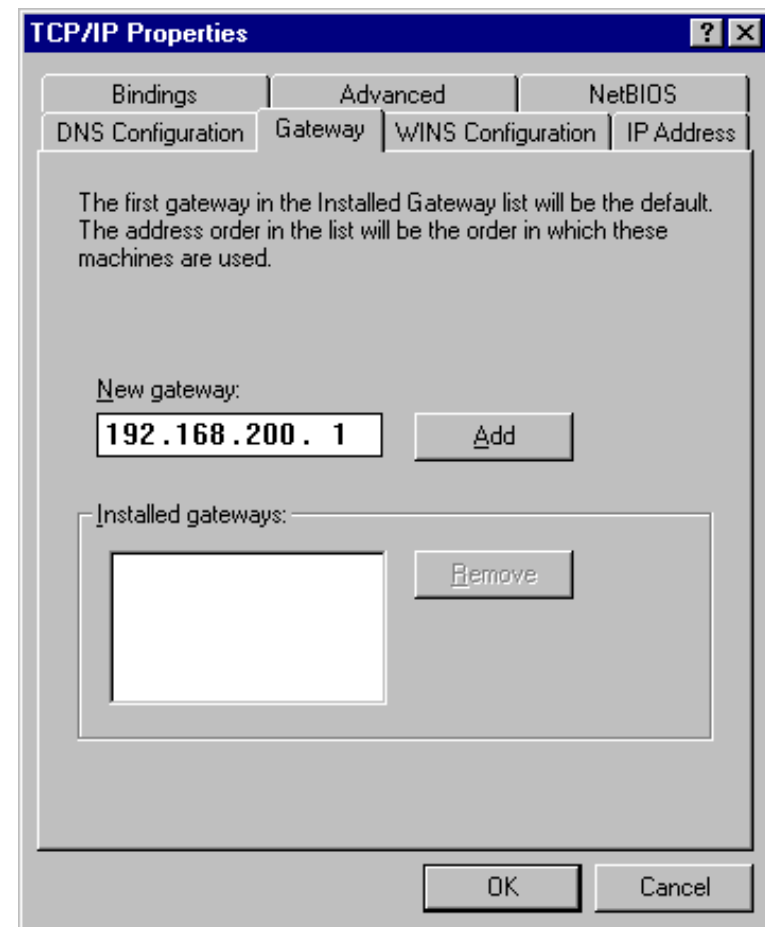
Configure Workstation IP Address

- This is the workstation on the 192.168.200 network
- (the top network)



Add IP Gateway (Router) Entry

- The gateway address is the "top" AS/400
- It will route (using the default route) to the "bottom" AS/400



Add a Web server

For V4R2 and prior, install xxxx-TC1 (GOLICPGM)

For V4R3 and after, install 5769-DG1 (GOLICPGM)

Develop your Intranet Web content

Configure and Activate the HTTP (web) Server

- These references will help:
 - ◆ ICS & ICSS Quick Beginnings (GC41-5433)
 - ◆ Webmaster's Guide (GC41-5434)
 - ◆ Web Programming Guide (GC41-5435)

TCP/IP Capabilities of AS/400

All (except ^{*}) come with OS/400 at no additional charge
Since V3R1

- Telnet (terminal emulation), FTP (file transfer)
- LPD/LPR (remote printing), SMTP (e-mail exchange)
- SNMP (network mgmt), NETSTAT (network status)

New in V3R2/V3R7

- SLIP (TCP/IP dial-up support), POP (e-mail server)
- HTTP (web server), net.data (web access to DB2 data)
- HTTP/5250 Workstation Gateway

New in V4R1

- Secure Web Server*, Integrated TCP/IP Firewall*
- RIP (dynamic IP routing), IP Printing enhancements

New in V4R2

- DNS (TCP/IP name server), DHCP (IP autoconfiguration)
- PPP (TCP/IP asynch & synch WAN support), RIP ver 2
- Tn5250 printing & device name, TCP/IP GUI Admin & Config Wizard

Summary

Similarities and differences between IP and SNA

Planning to add TCP/IP to an existing SNA network:

- Can usually share physical connections
- Can add TCP/IP to both LANs and WANs
- AS/400 Built-in TCP/IP is easy to configure
- No new hardware or software is required
 - ◆ for larger networks, IP routers should be considered

AS/400 Intranet Web serving comes with OS/400

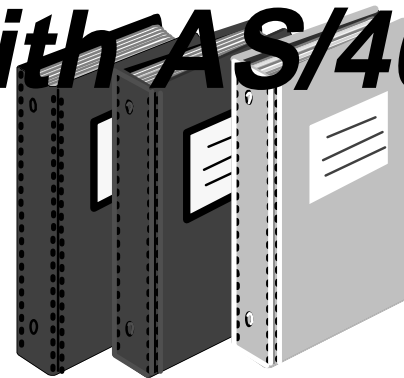
Other Intranet services come with OS/400, too

- E-mail, network printing, file transfer, etc.

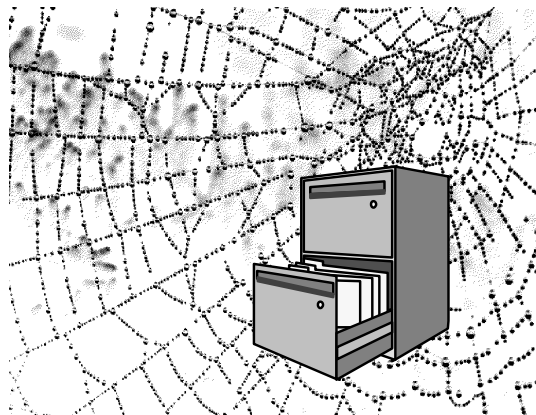
What are you waiting for???

Network Computing with AS/400

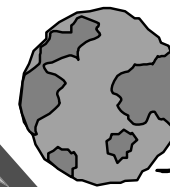
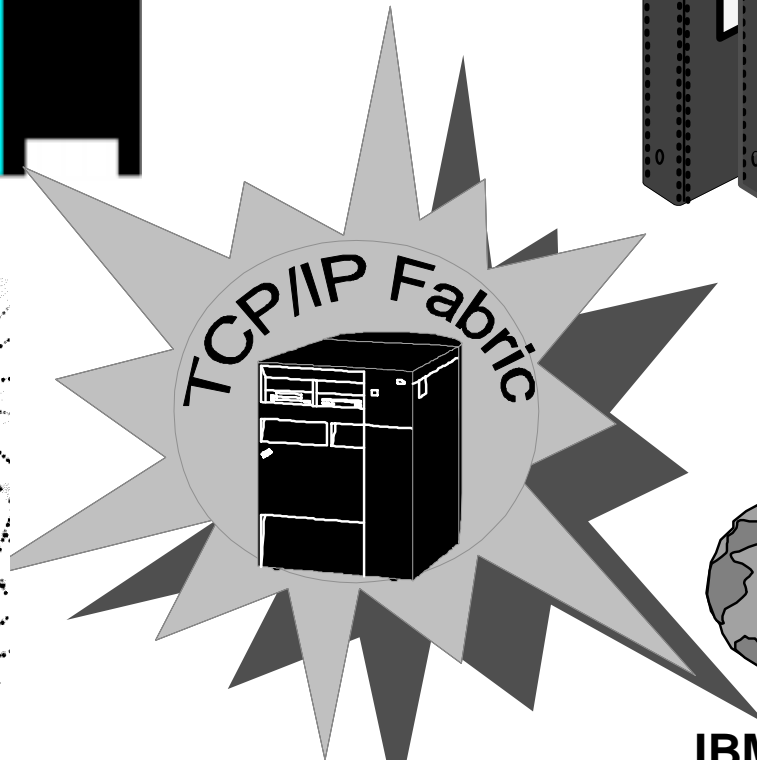
Domino &
POP3 Mail



net.data
DB2 access



HTTP (Web) Server



IBM Network
Station



E-Commerce
Enablement



Configure AS/400 TCP/IP

TCPADM

TCP/IP Administration

System: AS400S1

Select one of the following:

1. Configure TCP/IP
2. Configure TCP/IP applications
3. Start TCP/IP
4. End TCP/IP
5. Start TCP/IP servers
6. End TCP/IP servers
7. Work with TCP/IP network status
8. Verify TCP/IP connection
9. Start TCP/IP FTP session
10. Start TCP/IP TELNET session
11. Send TCP/IP spooled file

20. Work with TCP/IP jobs in QSYSWRK subsystem

Selection or command

==> 1

F3=Exit F4=Prompt F9=Retrieve F12=Cancel

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Add an IP address to the AS/400 Server

In other words, add a TCP/IP interface

CFGTCP

Configure TCP/IP

System: AS400S1

Select one of the following:

1. Work with TCP/IP interfaces
2. Work with TCP/IP routes
3. Change TCP/IP attributes
4. Work with TCP/IP port restrictions
5. Work with TCP/IP remote system information

10. Work with TCP/IP host table entries
11. Merge TCP/IP host table
12. Change local domain and host names
13. Change remote name server

20. Configure TCP/IP applications
21. Configure related tables
22. Configure point-to-point TCP/IP

Selection or command

==> 1

F3=Exit F4=Prompt F9=Retrieve F12=Cancel

Add a TCP/IP Interface

Work with TCP/IP Interfaces

System: AS400S1

Type options, press Enter.

1=Add 2=Change 4=Remove 5=Display 9=Start 10=End

Opt	Internet Address	Subnet Mask	Line Description	Line Type
1	<u>192.168.100.1</u>			

Bottom

F3=Exit F5=Refresh F6=Print list F11=Display interface status
F12=Cancel F17=Top F18=Bottom

Add a TCP/IP Interface...

Add TCP/IP Interface (ADDTCPIFC)

Type choices, press Enter.

```

Internet address . . . . . > '192.168.100.1'
Line description . . . . . TRNLINE      Name, *LOOPBACK
Subnet mask . . . . . 255.255.255.0
Type of service . . . . . *NORMAL      *MINDELAY, *MAXTHRPUT...
Maximum transmission unit . . . *LIND      576-16388, *LIND
Autostart . . . . . *YES             *YES, *NO
PVC logical channel identifier
      + for more values
X.25 idle circuit timeout . . . 60             1-600
X.25 maximum virtual circuits . 64             0-64
X.25 DDN interface . . . . . *NO             *YES, *NO
TRLAN bit sequencing . . . . . *MSB           *MSB, *LSB
  
```

Bottom

F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
 F24=More keys

Give the AS/400 a TCP/IP Host Name

CFGTCP

Configure TCP/IP

System: AS400S1

Select one of the following:

1. Work with TCP/IP interfaces
2. Work with TCP/IP routes
3. Change TCP/IP attributes
4. Work with TCP/IP port restrictions
5. Work with TCP/IP remote system information

10. Work with TCP/IP host table entries
11. Merge TCP/IP host table
12. Change local domain and host names
13. Change remote name server

20. Configure TCP/IP applications
21. Configure related tables
22. Configure point-to-point TCP/IP

Selection or command

==> 12

F3=Exit F4=Prompt F9=Retrieve F12=Cancel

Give the AS/400 a TCP/IP Host Name...

Change Local Domain and Host Names

System: AS400S1

Type choices, press Enter.

Local domain name . . . MYCOMPANY.COM

Local host name RESEARCH1

F3=Exit F12=Cancel

Bottom

Start TCP/IP

CFGTCP

Configure TCP/IP

System: AS400S1

Select one of the following:

1. Work with TCP/IP interfaces
2. Work with TCP/IP routes
3. Change TCP/IP attributes
4. Work with TCP/IP port restrictions
5. Work with TCP/IP remote system information

10. Work with TCP/IP host table entries
11. Merge TCP/IP host table
12. Change local domain and host names
13. Change remote name server

20. Configure TCP/IP applications
21. Configure related tables
22. Configure point-to-point TCP/IP

Selection or command

==> strtcp

F3=Exit F4=Prompt F9=Retrieve F12=Cancel

Verify TCP/IP Configuration

Line Status

```

                                Work with Configuration Status
                                                                AS400S1
                                                                03/06/97 13:37:43
Position to . . . . .           Starting characters

Type options, press Enter.
  1=Vary on   2=Vary off   5=Work with job   8=Work with description
  9=Display mode status ...

Opt  Description      Status      -----Job-----
      TRNLINNET      ACTIVE
      TRNLINET       ACTIVE
      TRNLINTCP      ACTIVE      QTCPIP      QTCP      020676
      QESLINE        VARIED OFF
      QTILINE        VARIED OFF
      TESTEXTR       VARIED OFF
      TESTENET       VARIED OFF
      TESTETCP       VARIED OFF

                                                                More...

Parameters or command
===>
F3=Exit   F4=Prompt   F12=Cancel   F23=More options   F24=More keys

Intermediate assistance level used.
  
```

Verify TCP/IP Configuration...

NETSTAT

Work with TCP/IP Network Status

System: AS400S1

Select one of the following:

1. Work with TCP/IP interface status
2. Display TCP/IP route information
3. Work with TCP/IP connection status

Selection or command

===> 1

F3=Exit F4=Prompt F9=Retrieve F12=Cancel

Verify TCP/IP Configuration...

NETSTAT

Work with TCP/IP Interface Status

System: AS400S1

Type options, press Enter.

5=Display details 8=Display associated routes 9=Start 10=End

12=Work with configuration status

Opt	Internet Address	Network Address	Line Description	Interface Status
	192.168.100.1	192.168.100.0	TRNLIN	Active
	127.0.0.1	127.0.0.0	*LOOPBACK	Active

Bottom

F3=Exit F4=Prompt

F5=Refresh F11=Display line information

F12=Cancel

F13=Sort by column

F24=More keys

Verify TCP/IP Configuration...

Ping your own IP address

CFGTCP

Configure TCP/IP

System: AS400S1

Select one of the following:

1. Work with TCP/IP interfaces
2. Work with TCP/IP routes
3. Change TCP/IP attributes
4. Work with TCP/IP port restrictions
5. Work with TCP/IP remote system information

10. Work with TCP/IP host table entries
11. Merge TCP/IP host table
12. Change local domain and host names
13. Change remote name server

20. Configure TCP/IP applications
21. Configure related tables
22. Configure point-to-point TCP/IP

Selection or command

==> ping '192.168.100.1'

F3=Exit F4=Prompt F9=Retrieve F12=Cancel

Verify TCP/IP Configuration

PING results

```
Command Entry                                AS400S1
Request level: 1

Previous commands and messages:
Connection verification 1 took .010 seconds. 1 successful connection
verifications.
Connection verification 2 took .007 seconds. 2 successful connection
verifications.
Connection verification 3 took .007 seconds. 3 successful connection
verifications.
Connection verification 4 took .007 seconds. 4 successful connection
verifications.
Connection verification 5 took .008 seconds. 5 successful connection
verifications.
Round-trip (in milliseconds) min/avg/max = 7/7/10
Connection verification statistics: 5 of 5 successful (100 %).

Type command, press Enter.
===>
```

```
F3=Exit   F4=Prompt   F9=Retrieve   F10=Include detailed messages
F11=Display full   F12=Cancel   F13=Information Assistant   F24=More keys
```

- Repeat the PING for another system in your network

Create a Frame Relay Network Interface

Create Network Interface (FR) (CRTNWIFR)

Type choices, press Enter.

Network interface description .	FRNWI	Name
Resource name	CCN1	Name
Online at IPL	*YES	*YES, *NO
Vary on wait	*NOWAIT	*NOWAIT, 15-180 seconds
Data link connection ID:		
DLCI number	*NONE	1-1018, *NONE
Line description		Name
+ for more values		
NRZI data encoding	*NO	*NO, *YES
Physical interface	*RS449V36	*RS449V36, *V35, *X21
Clocking	*MODEM	*MODEM, *LOOP, *INVERT
Line speed	1536000	56000-2048000, 56000...
LMI mode	*TE	*TE, *FH, *NONE, *ANNEXA
Polling interval	10	5-30
Full inquiry interval	6	1-255

More...

F3=Exit	F4=Prompt	F5=Refresh	F10=Additional parameters	F12=Cancel
F13=How to use this display			F24=More keys	
Parameter NWID required.				

+

Create a Frame Relay Line Description

Create Line Desc (Frame Relay) (CRTLINFR)

Type choices, press Enter.

Line description	FRLINE	Name
Attached NWI	FRNWI	Name, *NONE
DLC identifier	*NONE	1-1018, *NONE
Online at IPL	*YES	*YES, *NO
Vary on wait	*NOWAIT	*NOWAIT, 15-180 seconds
Maximum controllers	40	1-256
Maximum frame size	1590	265-8182, 1590
Exchange identifier	*SYSGEN	05600000-056FFFFFF, *SYSGEN
SSAP list:		
Source service access point	*SYSGEN	02-FE, *SYSGEN
SSAP maximum frame		*MAXFRAME, 265-8182
SSAP type		*CALC, *NONSNA, *SNA, *HPR
+ for more values		
Text 'description'	*BLANK	

Bottom

F3=Exit	F4=Prompt	F5=Refresh	F10=Additional parameters	F12=Cancel
F13=How to use this display			F24=More keys	

Add a TCP/IP Interface

Define IP address for WAN link

Add TCP/IP Interface (ADDTCPIFC)

System: AS400S2

Type choices, press Enter.

```

Internet address . . . . . > '192.168.50.2'
Line description . . . . . FRLINE      Name, *LOOPBACK
Subnet mask . . . . . 255.255.255.0
Type of service . . . . . *NORMAL      *MINDELAY, *MAXTHRPUT...
Maximum transmission unit . . . *LIND      576-16388, *LIND
Autostart . . . . . *YES           *YES, *NO
PVC logical channel identifier
      + for more values
X.25 idle circuit timeout . . . 60       1-600
X.25 maximum virtual circuits . 64       0-64
X.25 DDN interface . . . . . *NO      *YES, *NO
TRLAN bit sequencing . . . . . *MSB     *MSB, *LSB
  
```

Bottom

F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
 F24=More keys

Add Routing Information

CFGTCP

Configure TCP/IP

System: AS400S2

Select one of the following:

1. Work with TCP/IP interfaces
2. Work with TCP/IP routes
3. Change TCP/IP attributes
4. Work with TCP/IP port restrictions
5. Work with TCP/IP remote system information

10. Work with TCP/IP host table entries
11. Merge TCP/IP host table
12. Change local domain and host names
13. Change remote name server

20. Configure TCP/IP applications
21. Configure related tables
22. Configure point-to-point TCP/IP

Selection or command

==> 2

F3=Exit F4=Prompt F9=Retrieve F12=Cancel

Add Routing Information...

So that Workstations at site 2 can access web server

Work with TCP/IP Routes

System: AS400S2

Type options, press Enter.

1=Add 2=Change 4=Remove 5=Display

Opt	Route Destination	Subnet Mask	Type of Service	Next Hop
1	*dftroute	*none	*normal	192.168.50.1

F3=Exit F5=Refresh F6=Print list F12=Cancel F17=Top F18=Bottom Bottom

TCP/IP Attributes

CFGTCP

Configure TCP/IP

System: AS400S2

Select one of the following:

1. Work with TCP/IP interfaces
2. Work with TCP/IP routes
3. Change TCP/IP attributes
4. Work with TCP/IP port restrictions
5. Work with TCP/IP remote system information

10. Work with TCP/IP host table entries
11. Merge TCP/IP host table
12. Change local domain and host names
13. Change remote name server

20. Configure TCP/IP applications
21. Configure related tables
22. Configure point-to-point TCP/IP

Selection or command

==> 3

F3=Exit F4=Prompt F9=Retrieve F12=Cancel

Change TCP/IP Attributes

Change TCP/IP Attributes (CHGTCPA)

System: AS400S2

Type choices, press Enter.

TCP keep alive	120	1-40320, *SAME, *DFT
TCP urgent pointer	*BSD	*SAME, *BSD, *RFC
TCP receive buffer size	64000	512-8388608, *SAME, *DFT
TCP send buffer size	64000	512-8388608, *SAME, *DFT
UDP checksum	*YES	*SAME, *YES, *NO
IP datagram forwarding	<u>*YES</u>	*SAME, *YES, *NO
IP reassembly time-out	120	60-120, *SAME, *DFT
IP time to live	64	1-255, *SAME, *DFT
ARP cache timeout	5	1-1440, *SAME, *DFT
Log protocol errors	*NO	*SAME, *YES, *NO

Bottom

F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys

- IP Datagram Forwarding
 - This field specifies whether your system should forward datagrams destined for other networks

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<http://as400bks.rochester.ibm.com>

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- TCP/IP Illustrated, Vol. 3: TCP for Transactions, HTTP, NNTP, and the Unix Domain Protocols by W. Richard Stevens (ISBN 0-201-63495-3)
- The Simple Book: An Introduction to Management of TCP/IP - Based Internets by Marshall T. Rose
- Internet Primer for Information Professionals by Elizabeth Lane and Craig Summerhill

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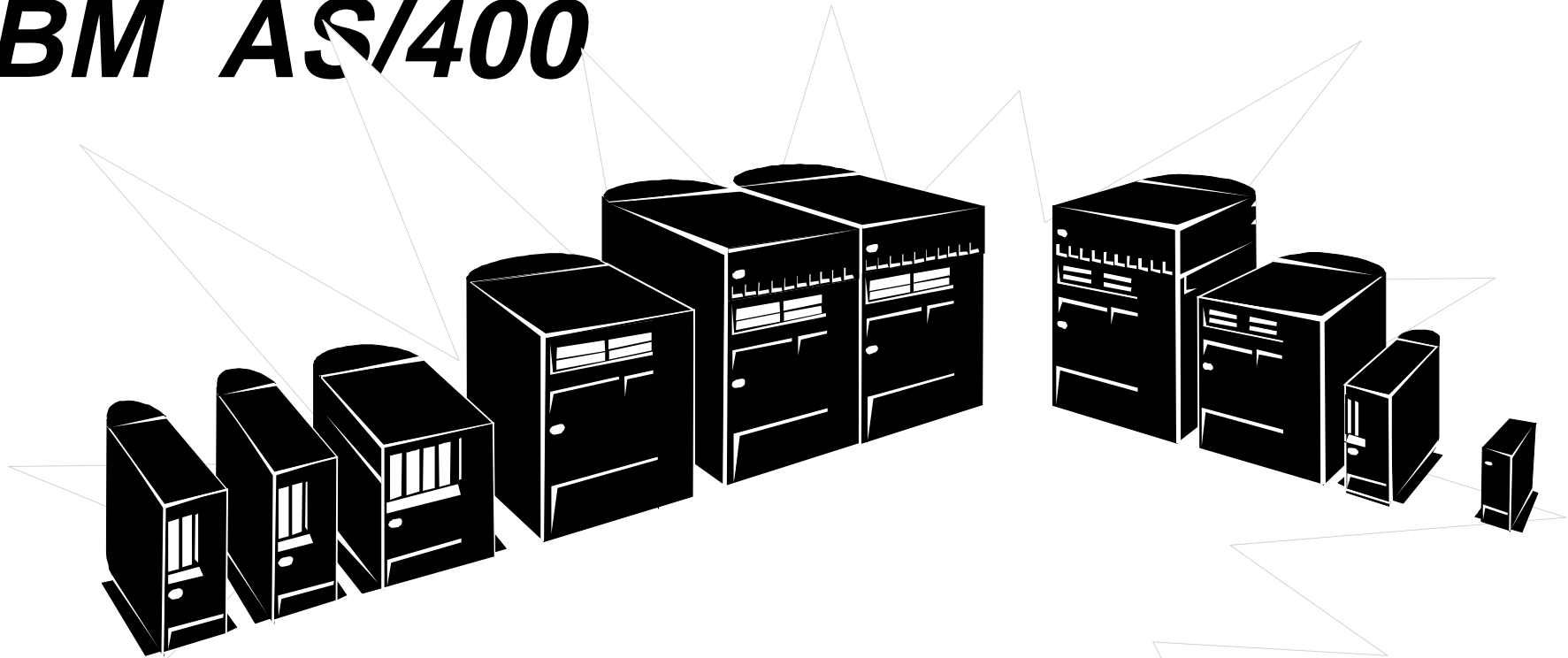
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IBM AS/400



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