AS/400e

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

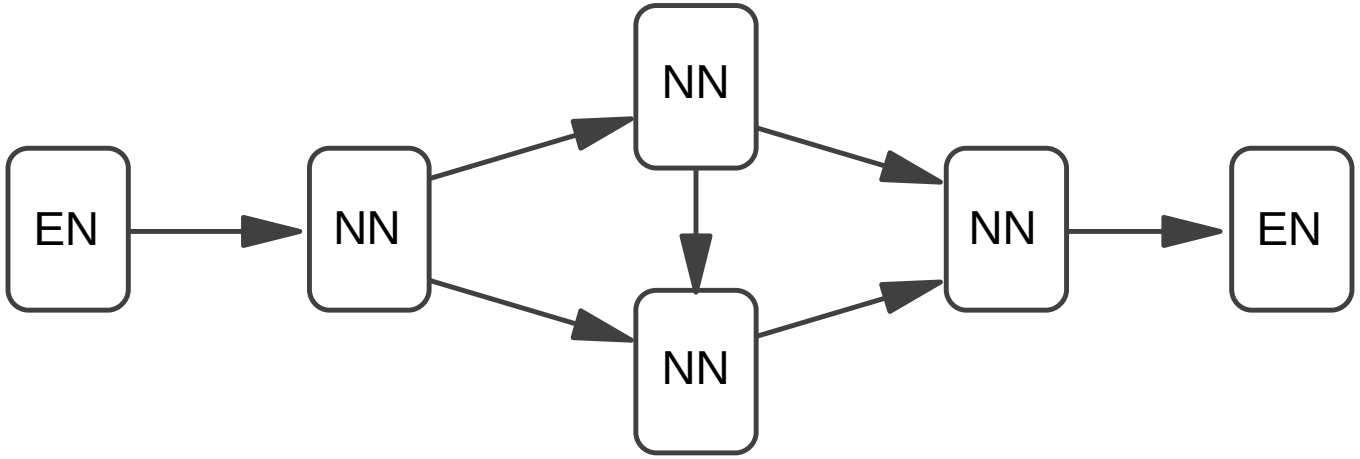
TCP/IP

- 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

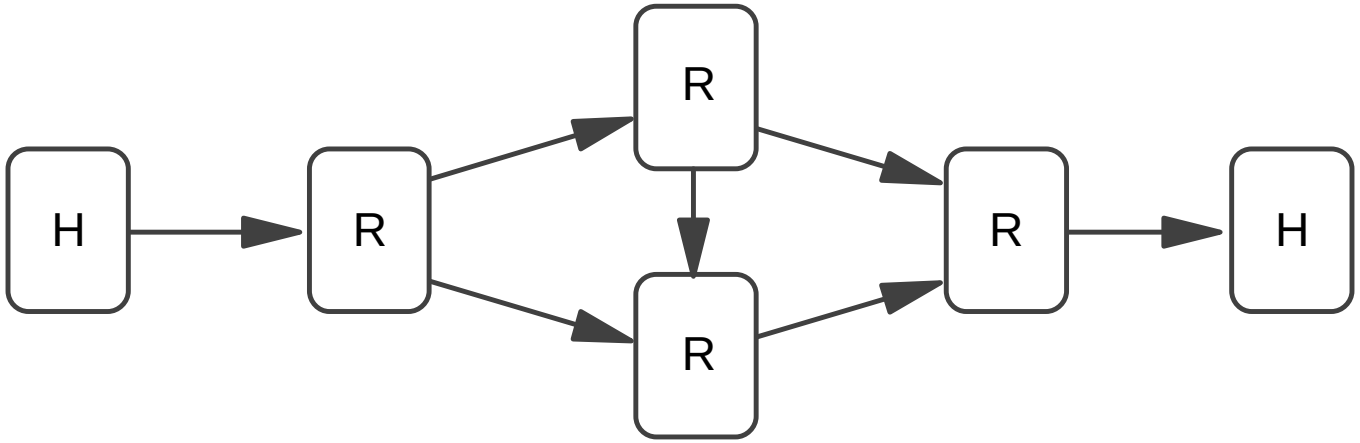
EN - End Node
NN - Network Node

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 visability 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

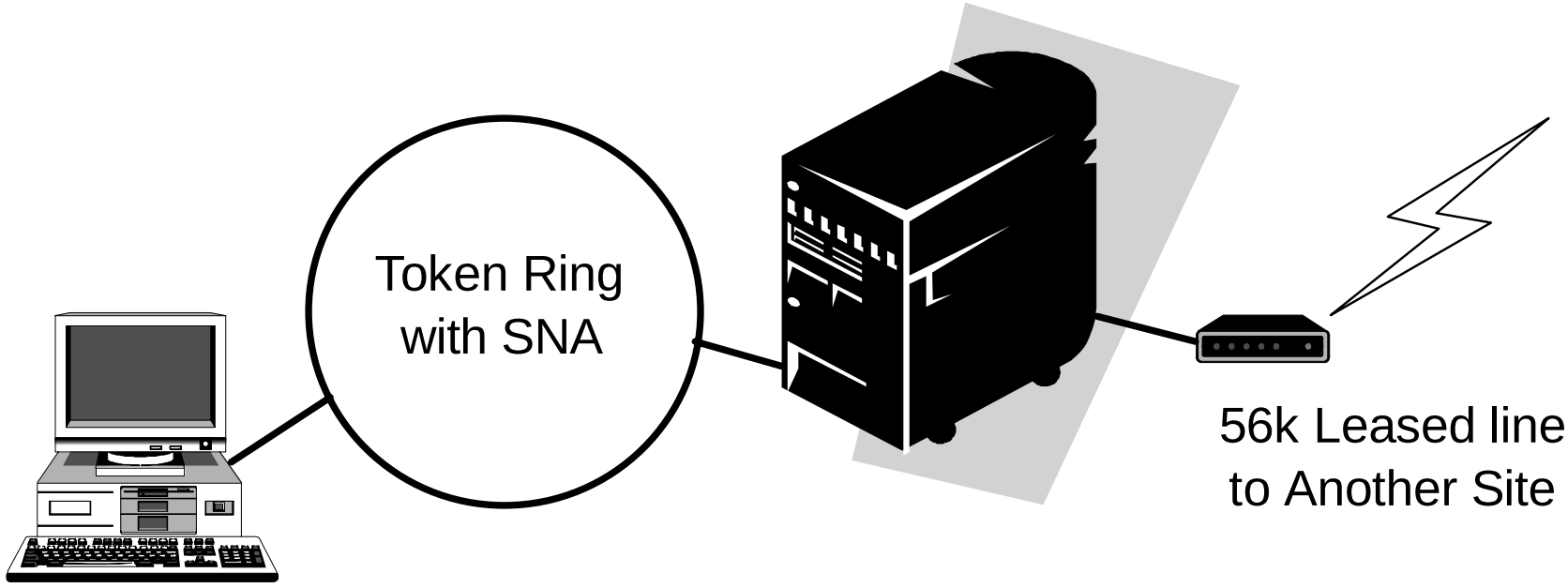
Private IP network addresses

- Addresses cannot be visable 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 Aproach

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?

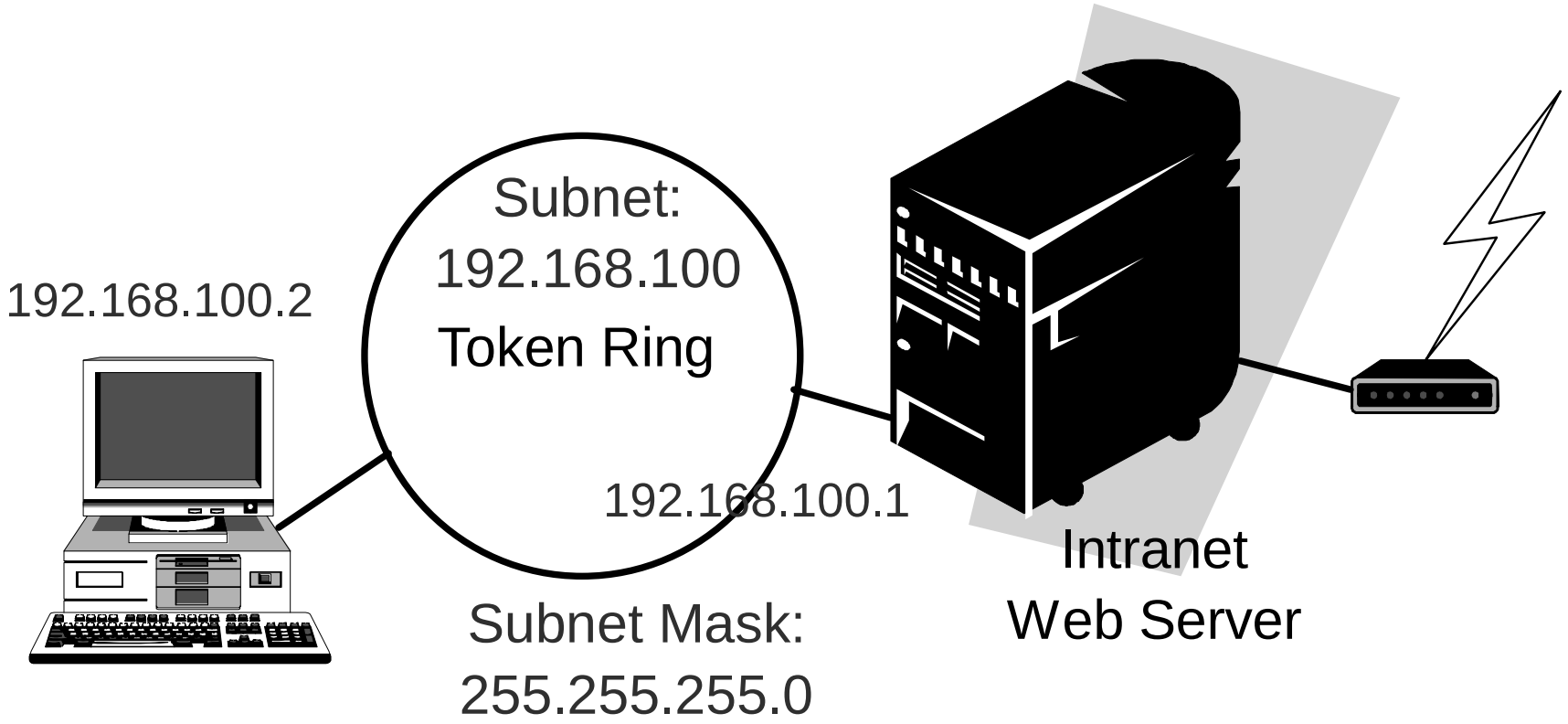
- A collection of networked computers ("hosts") that can communicate directly with one another without the aid of an IP router

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 alloacted to the network number

Define Your IP Network

For this example we chose to use private addresses



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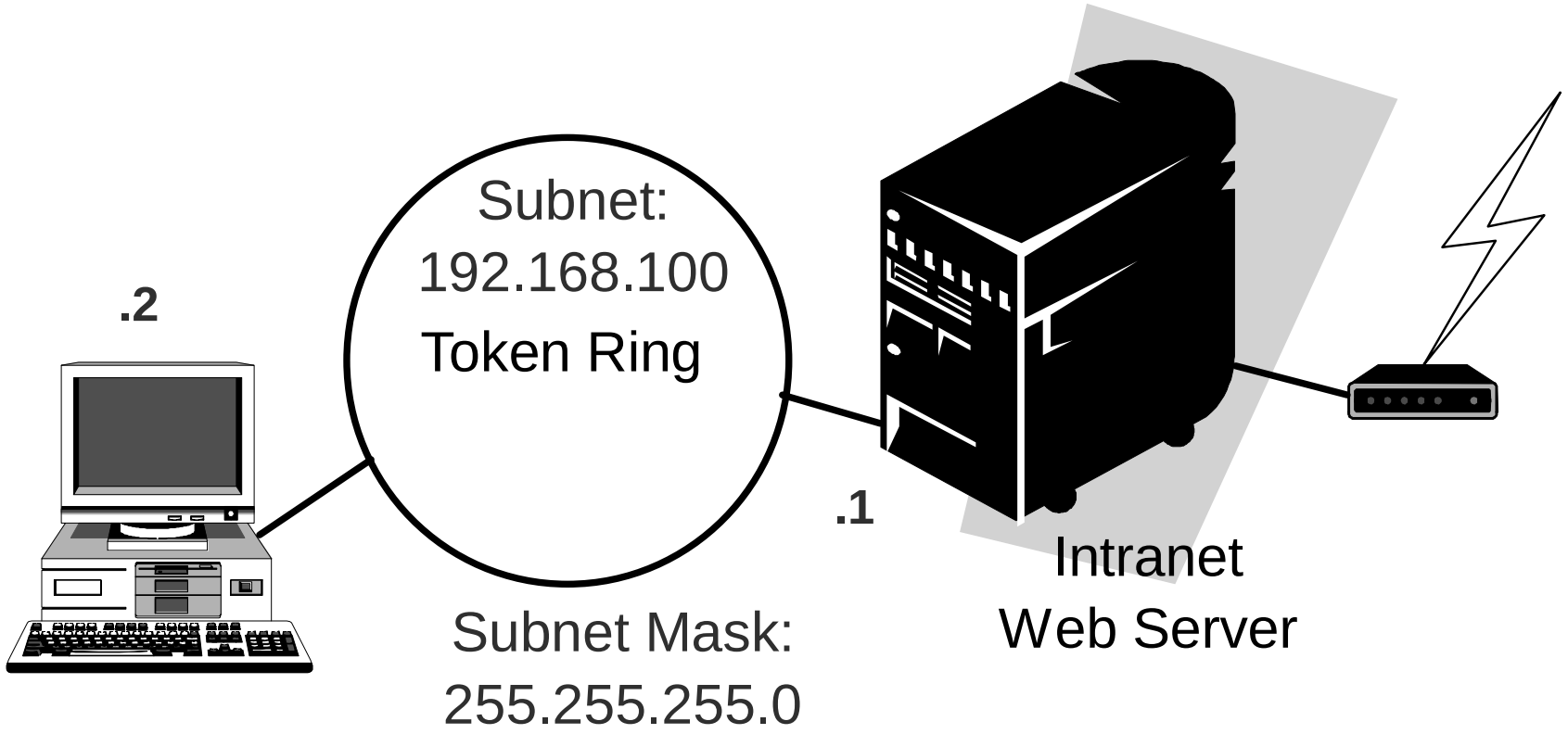
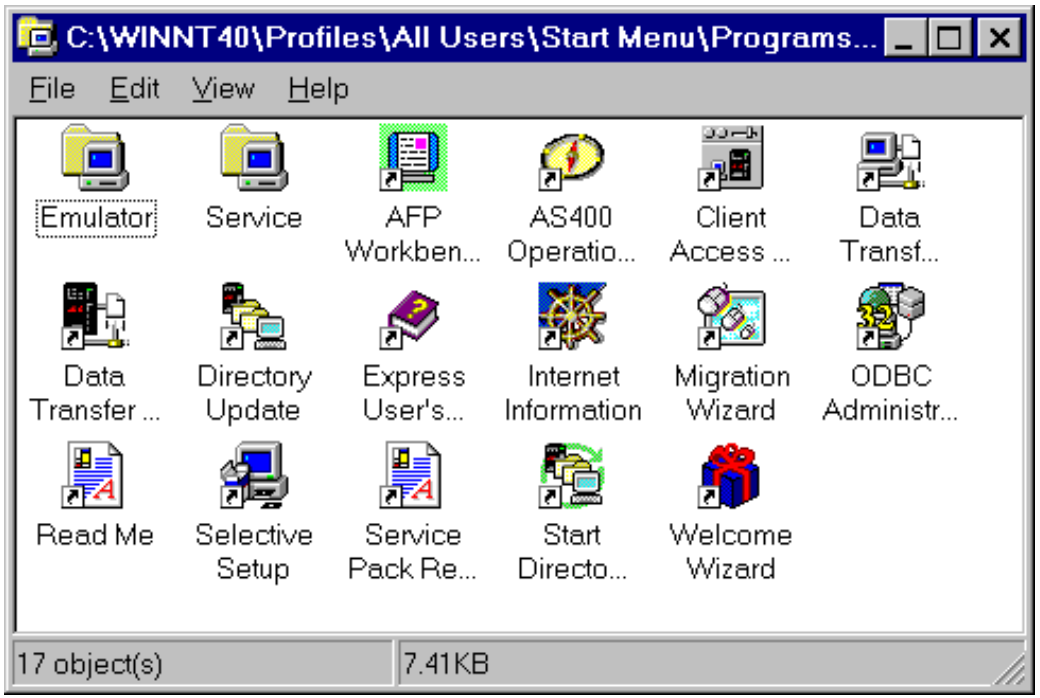


AS/400 TCP/IP Graphical Administration

Operations Navigator

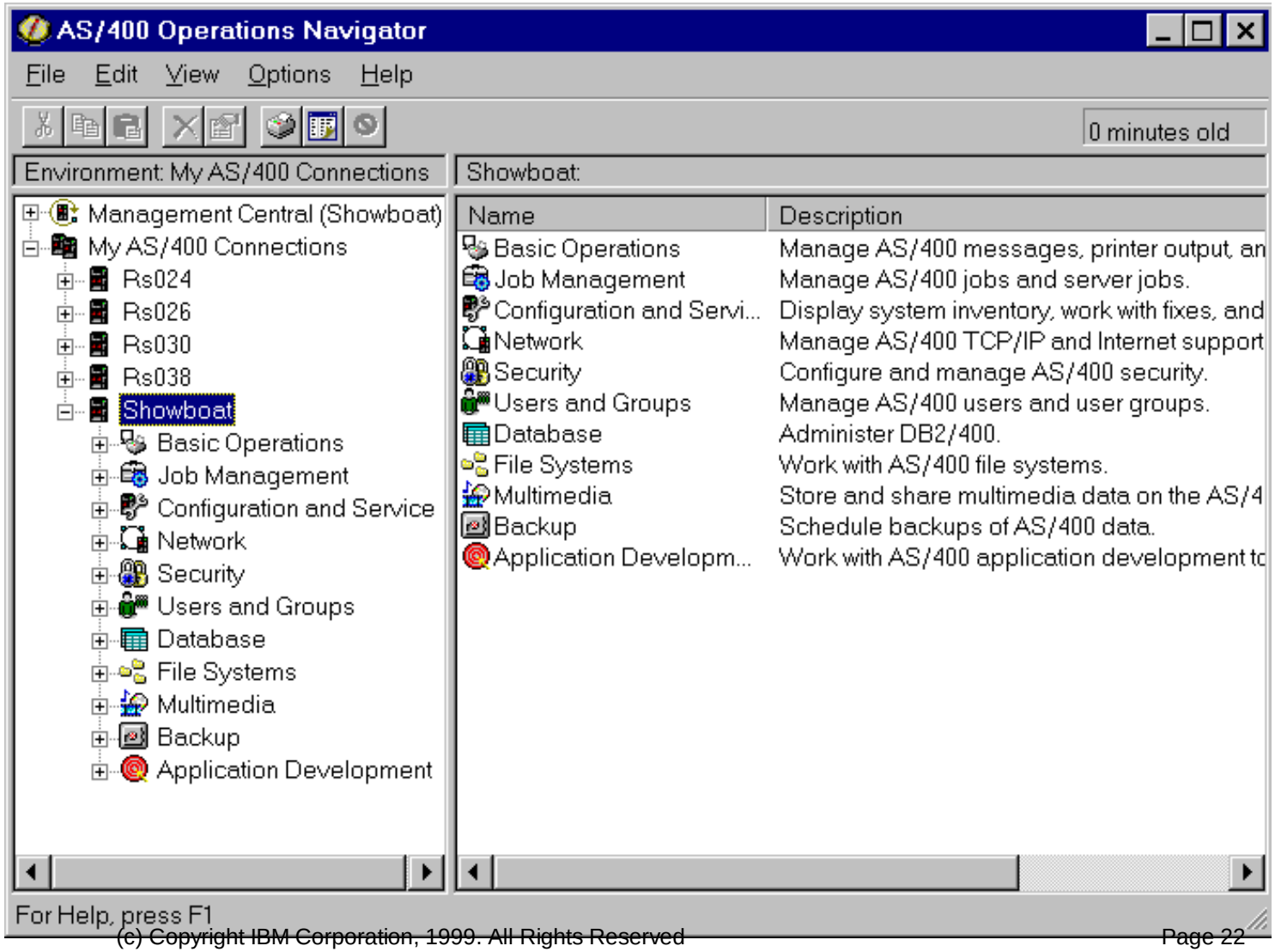
- **Free and shipped with each AS/400 on Client Access CD-ROM**

- **Installed using Client Access installation program and selecting AS/400 Operations Navigator and the Network component**



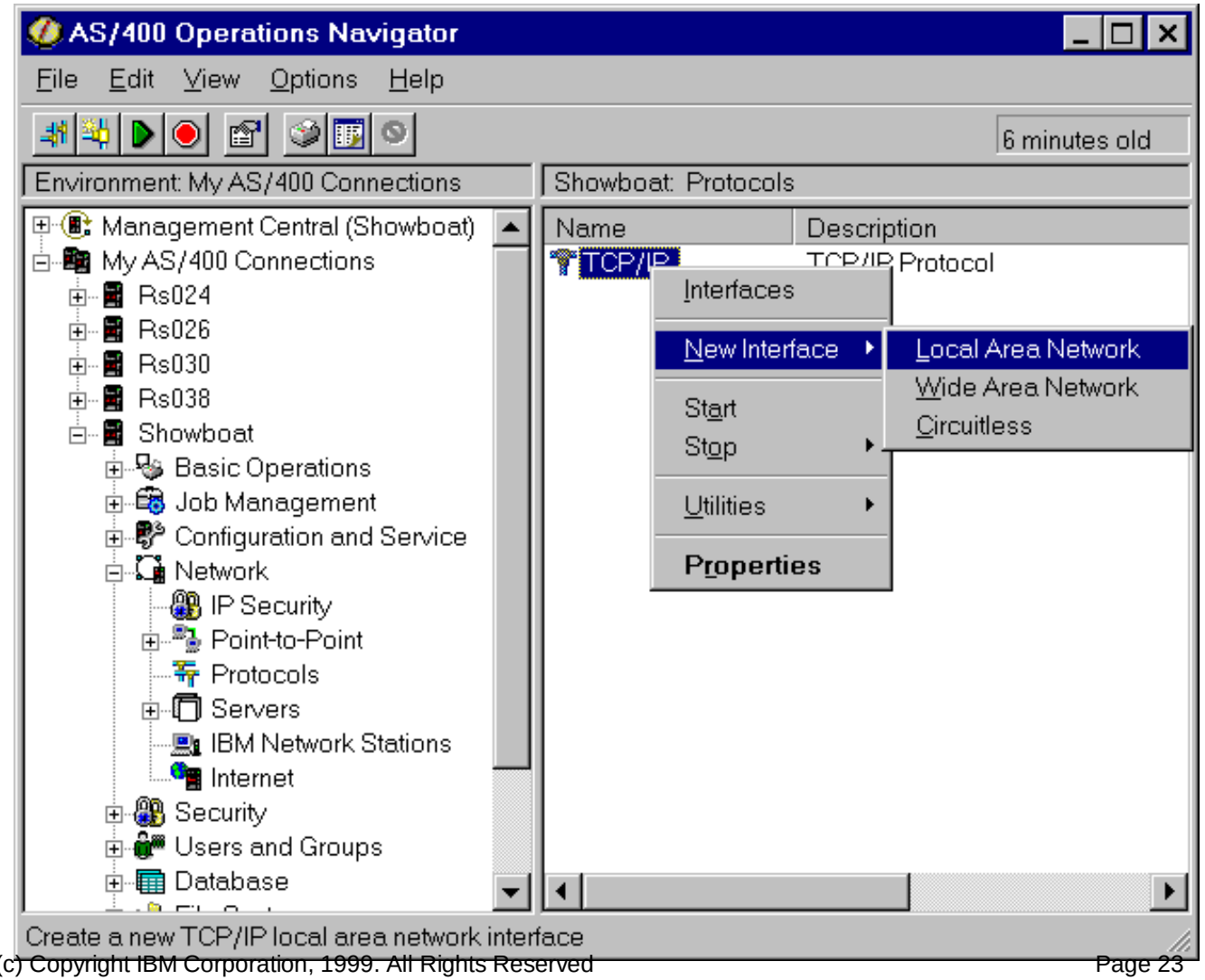
AS/400 Operations Navigator Network item

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



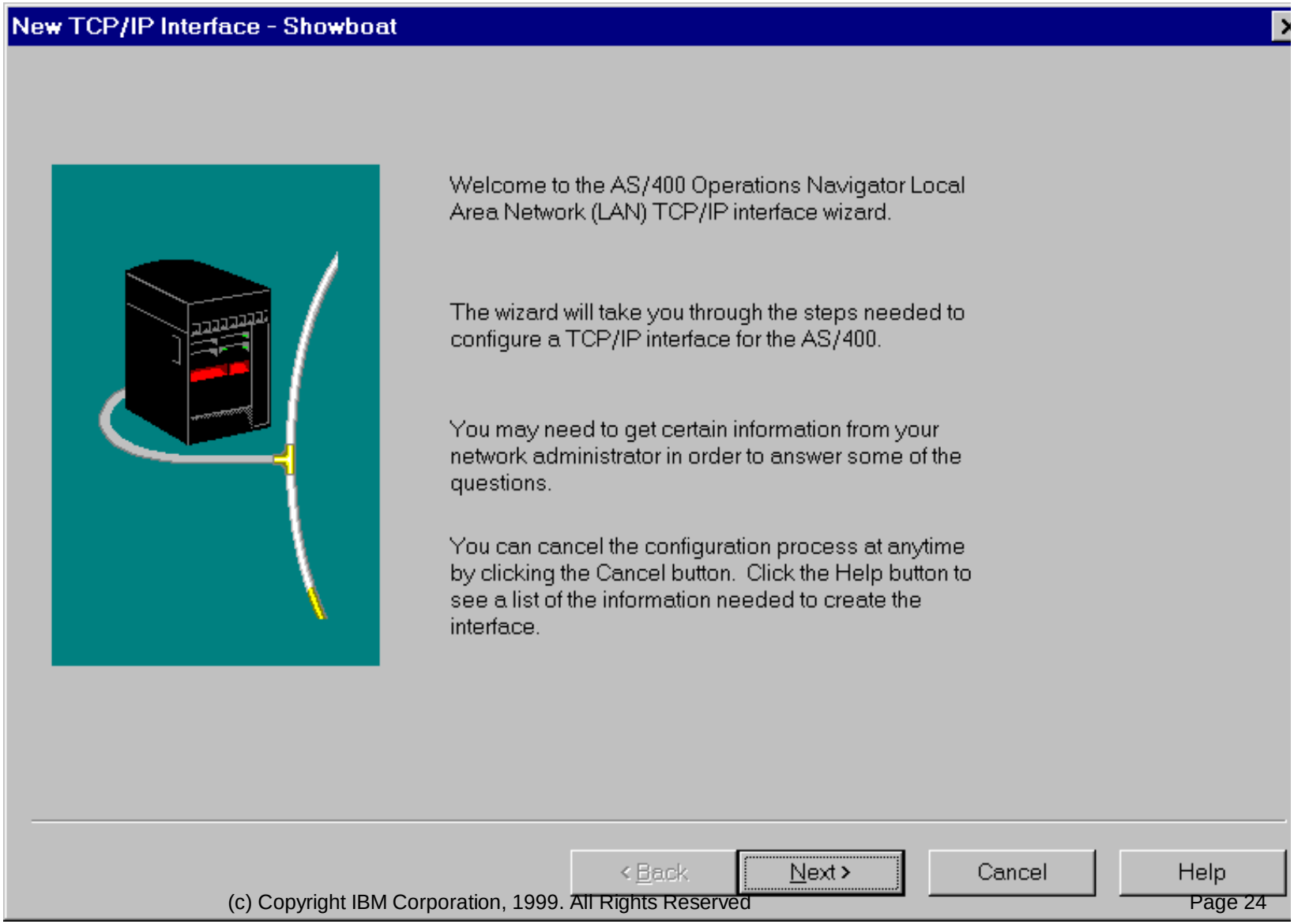
TCP/IP Administration - Interfaces and Protocol

- **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**



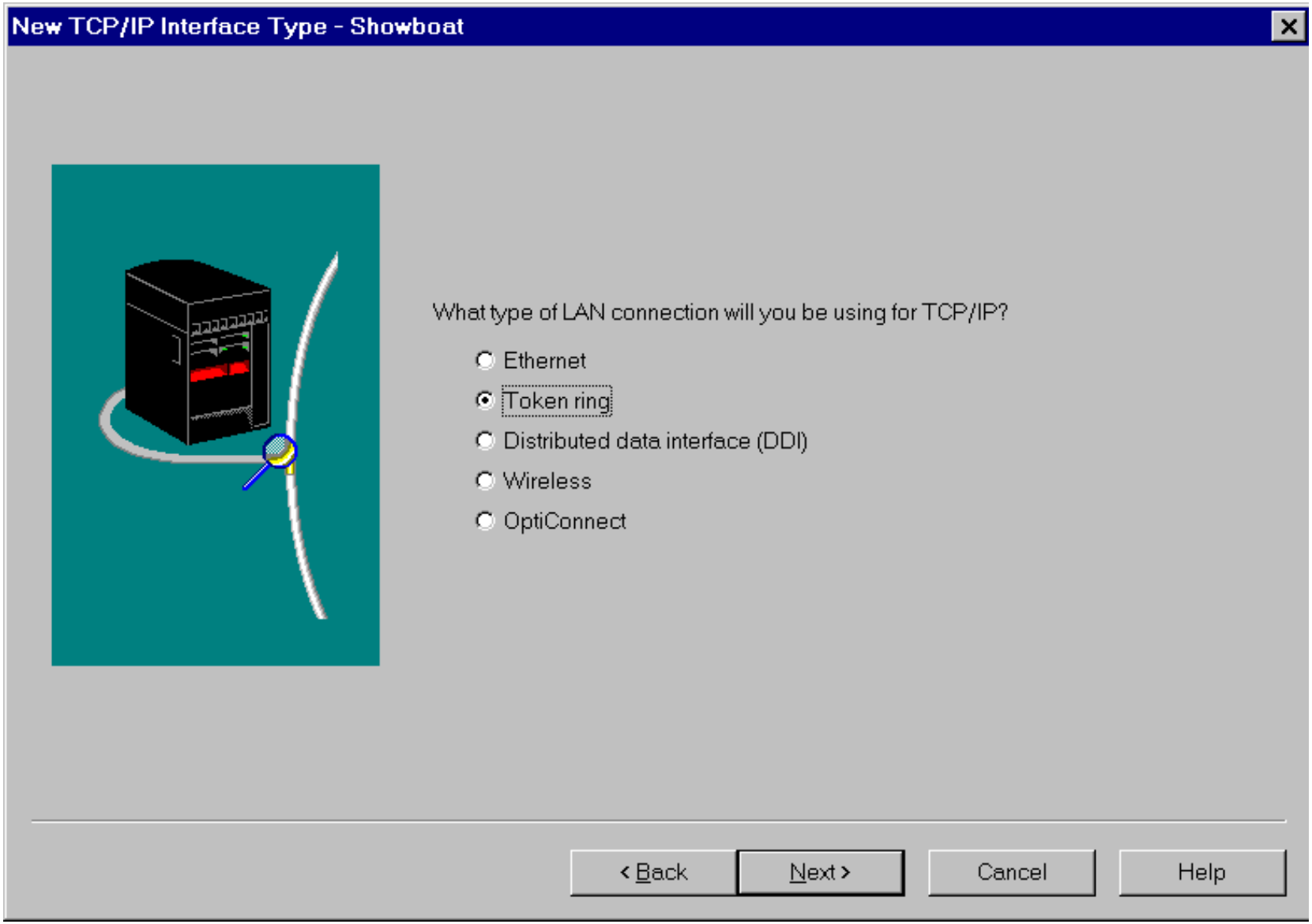
TCP/IP Administration - New Interface LAN Wizard

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



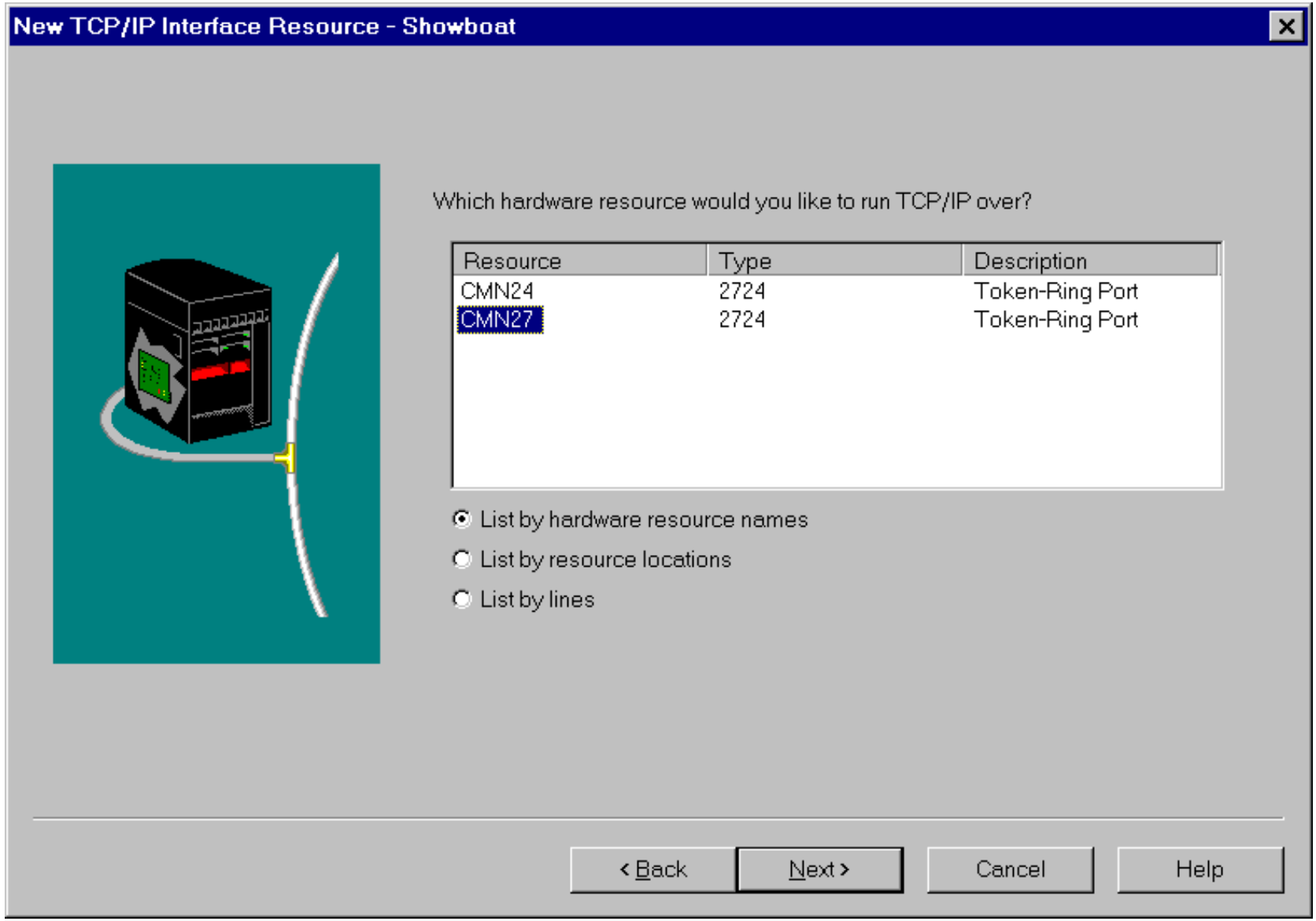
TCP/IP Administration - New Interface LAN Wizard

- **Select Interface type**



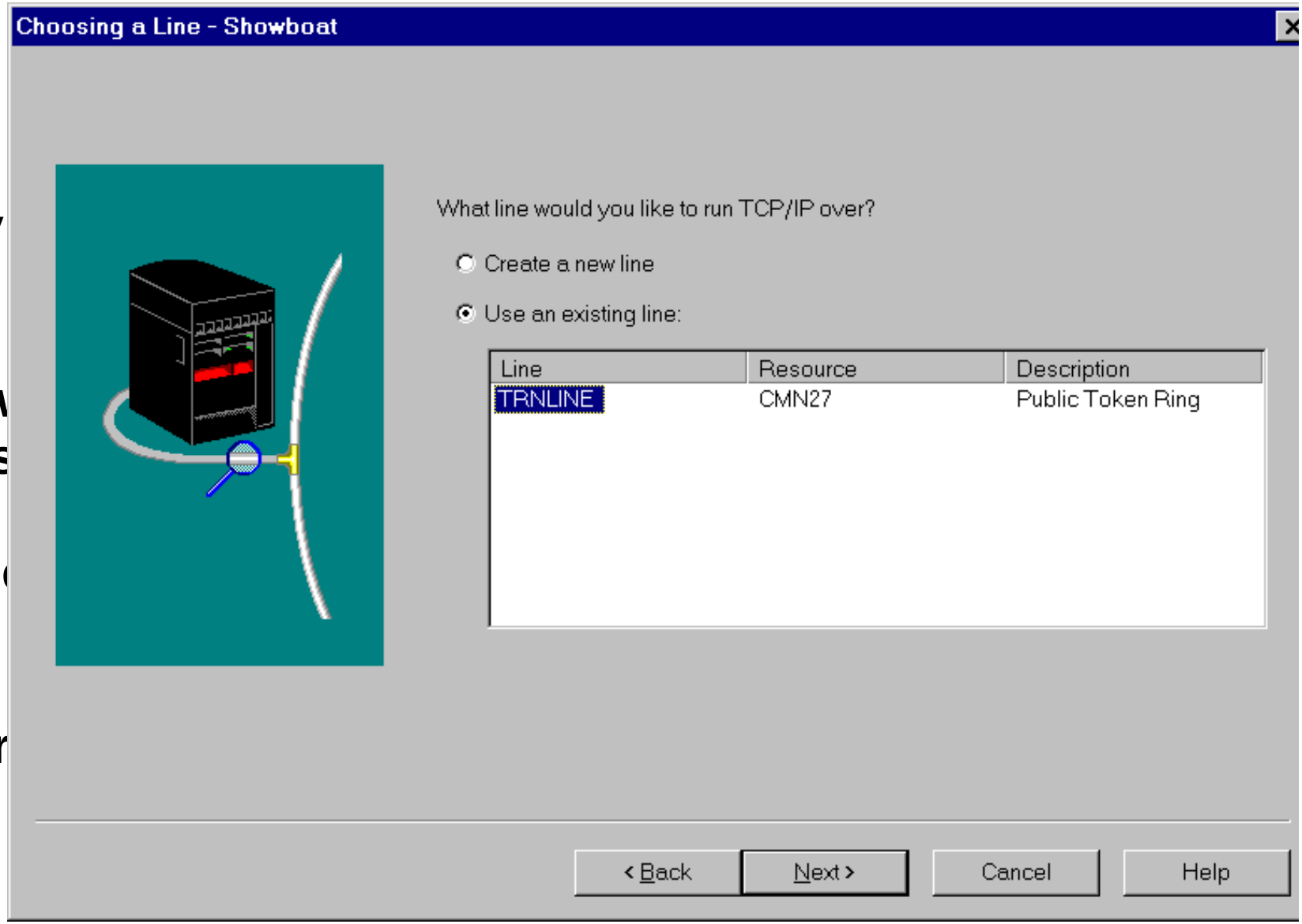
TCP/IP Administration - New Interface LAN Wizard

- **Select hardware by name location or use an existing line**



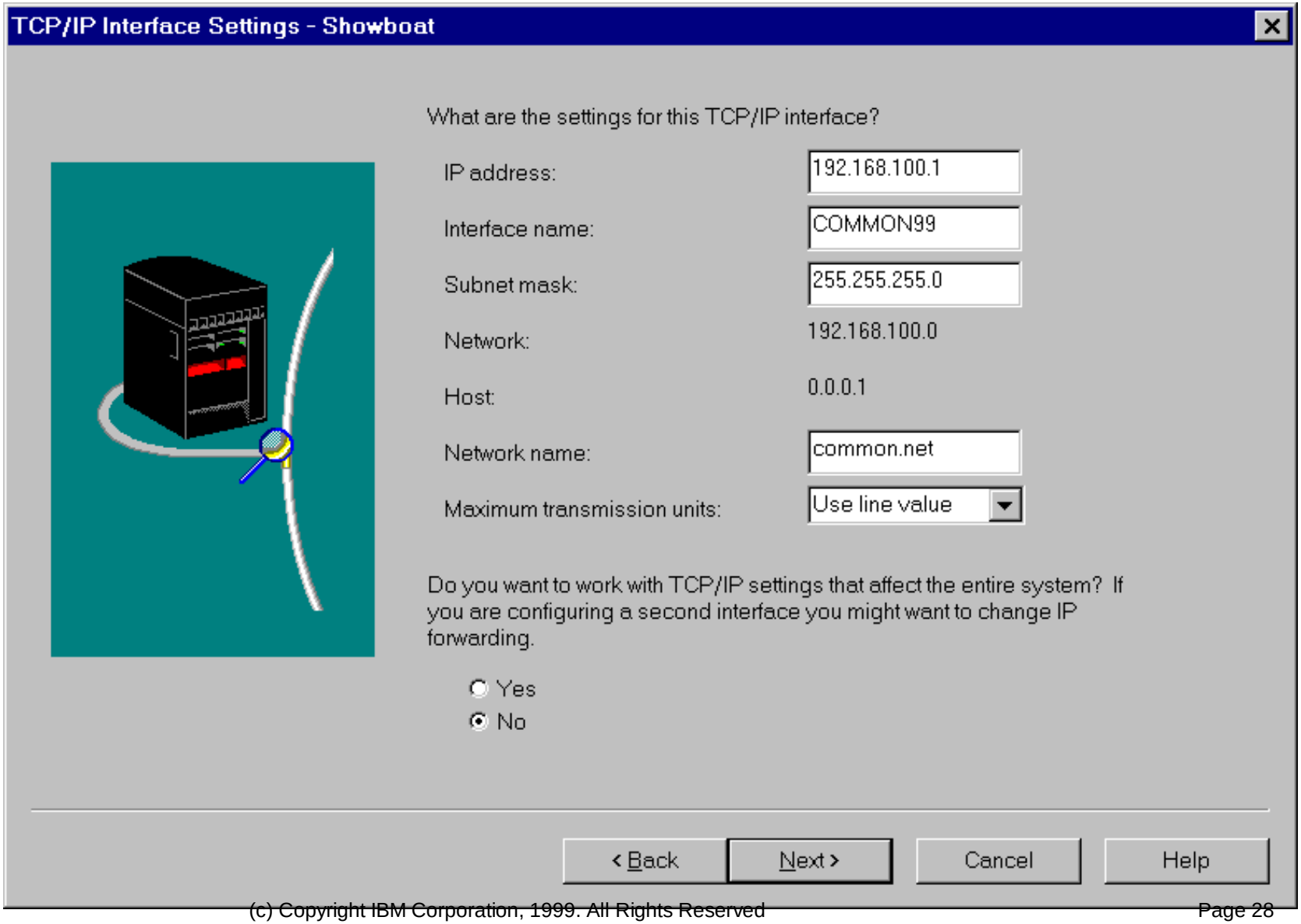
TCP/IP Administration - New Interface LAN Wizard

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



TCP/IP Administration - New Interface LAN Wizard

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

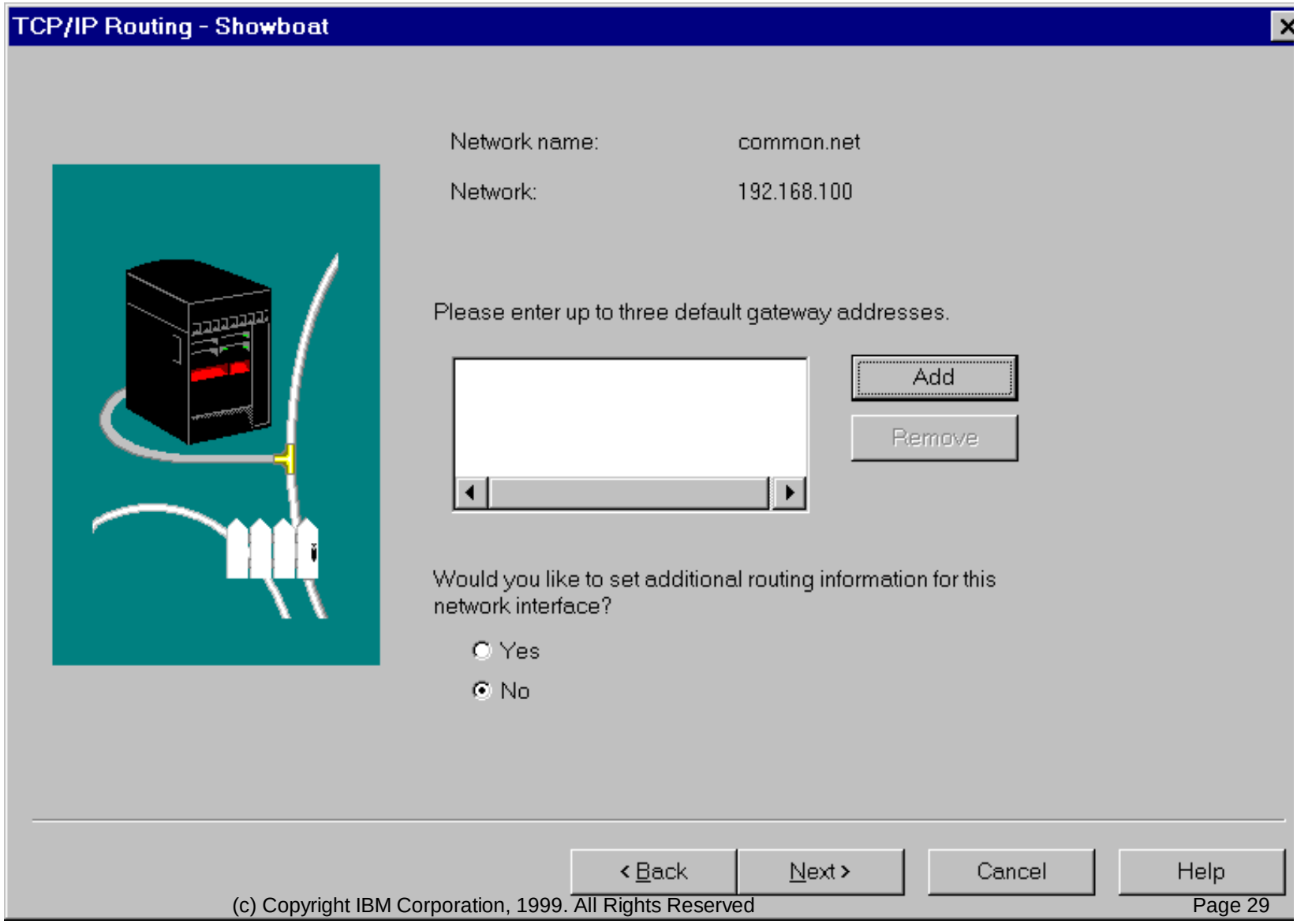


TCP/IP Administration - New Interface LAN Wizard

Enter default gateways

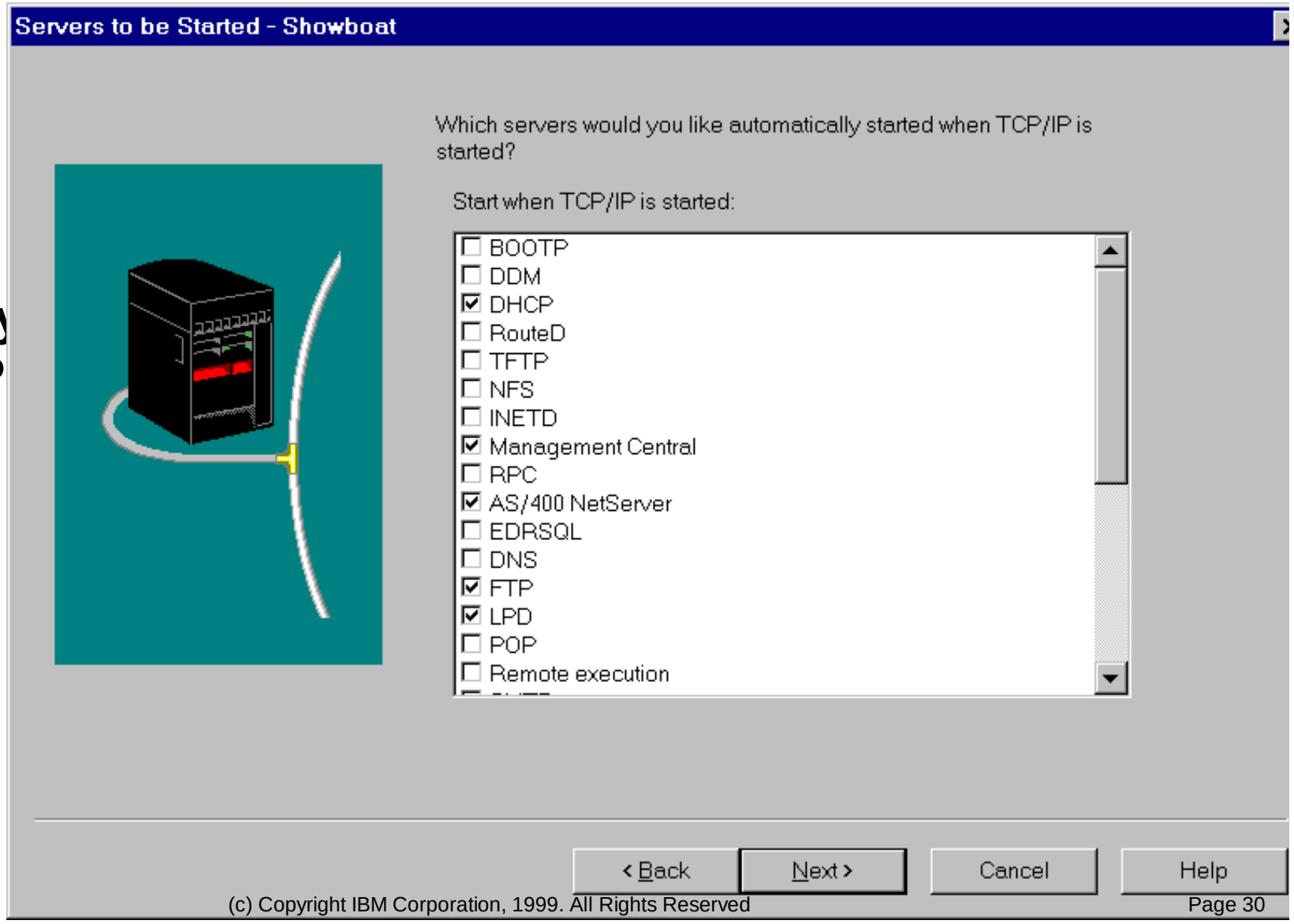
Enter additional routing information, if necessary

- **Dynamic routing**
- **Network routes**
- **Host routes**



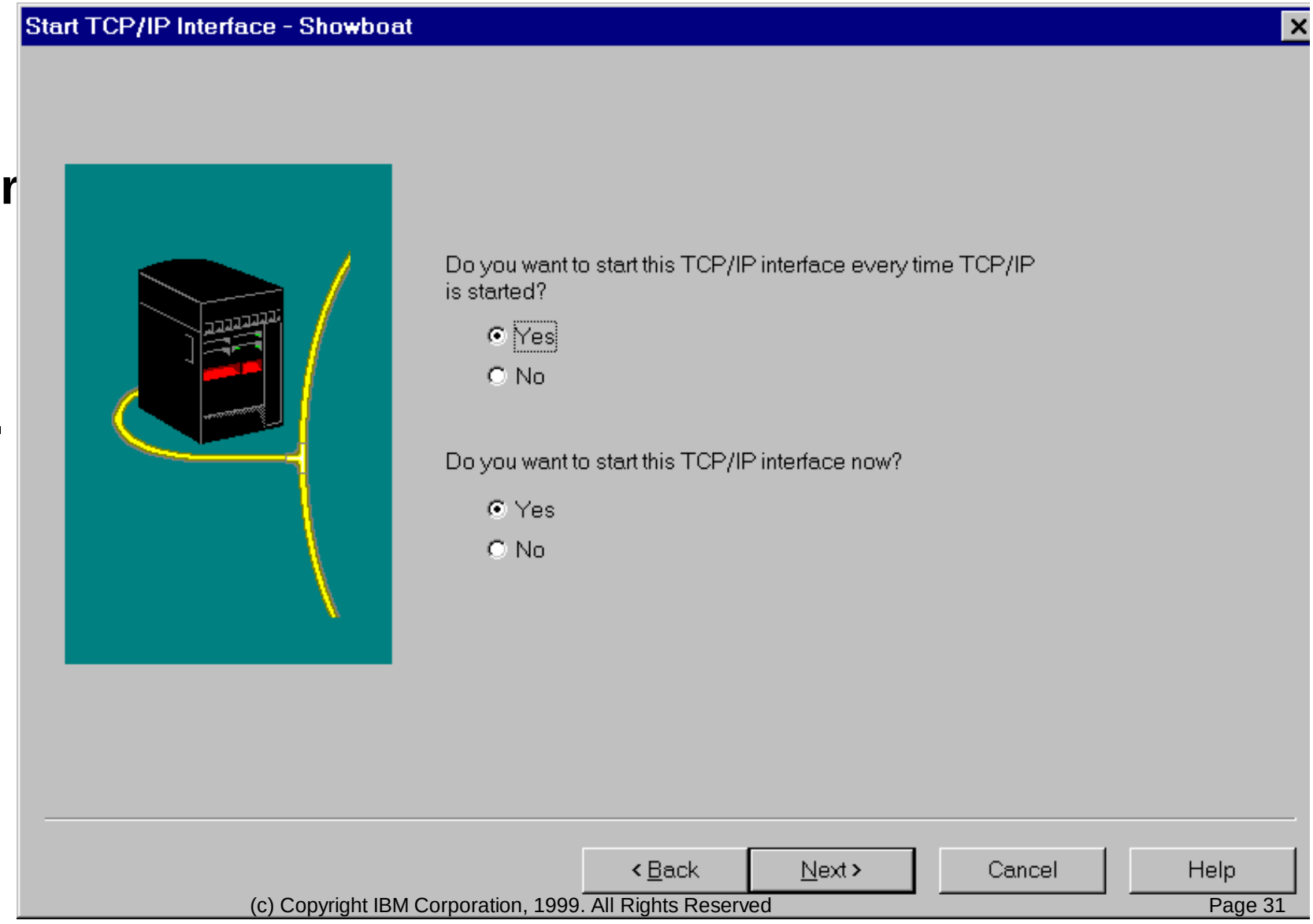
TCP/IP Administration - New Interface LAN Wizard

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



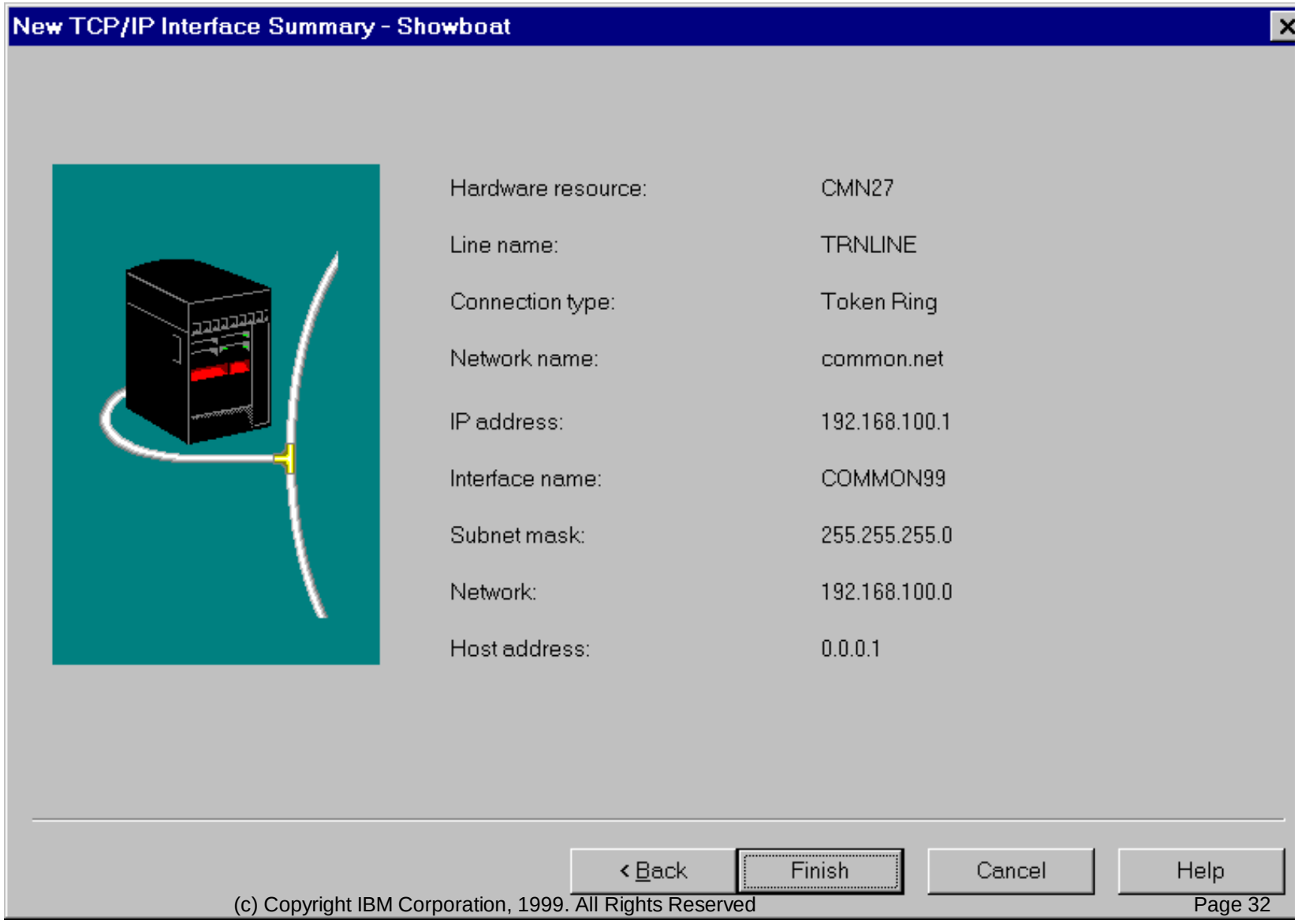
TCP/IP Administration - New Interface LAN Wizard

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



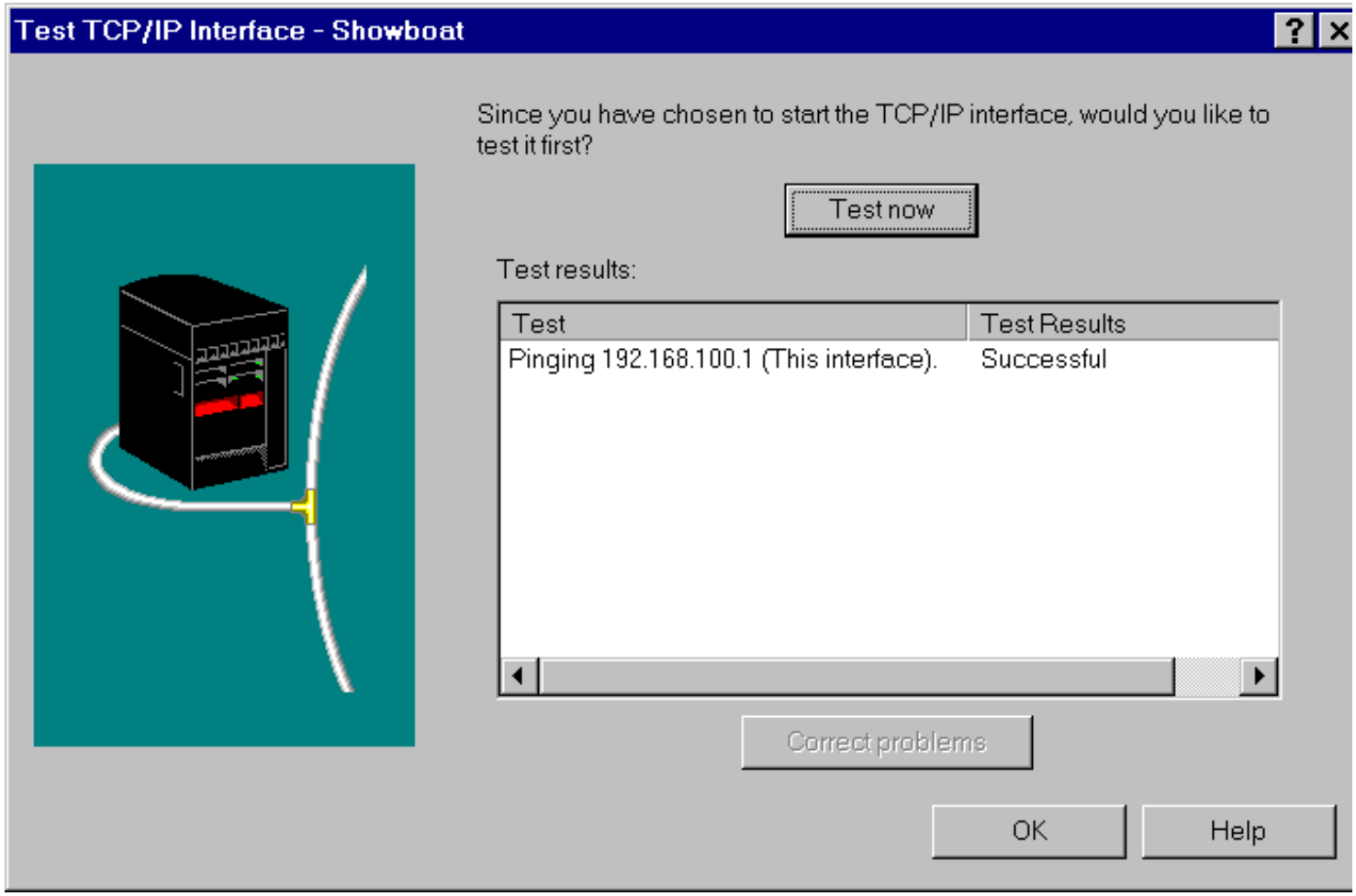
TCP/IP Administration - New Interface LAN Wizard

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



TCP/IP Administration - New Interface LAN Wizard

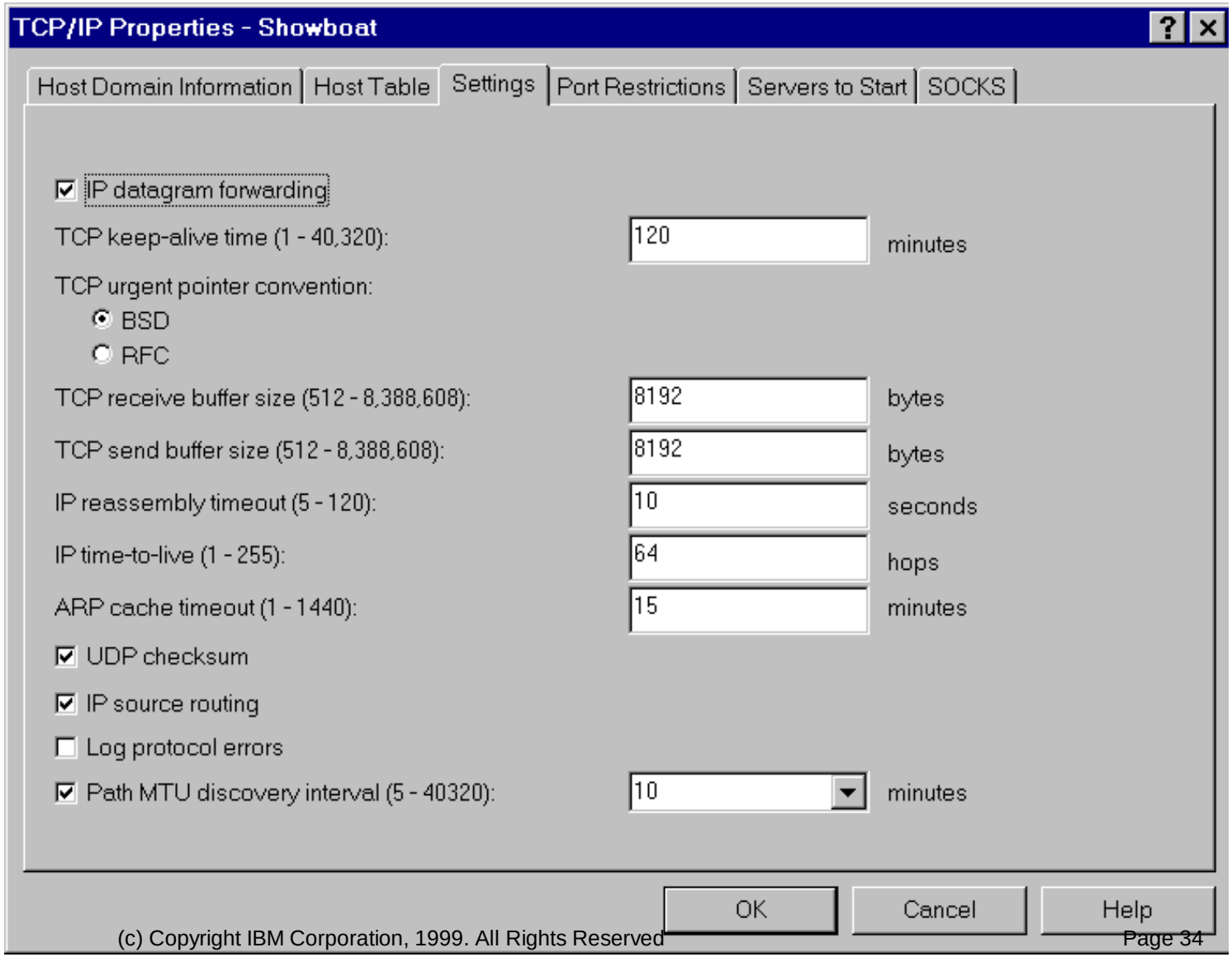
- Push the Test Now button.
- This "PING"s the interface



TCP/IP Administration -TCP/IP protocol Properties

TCP/IP protocol attributes:

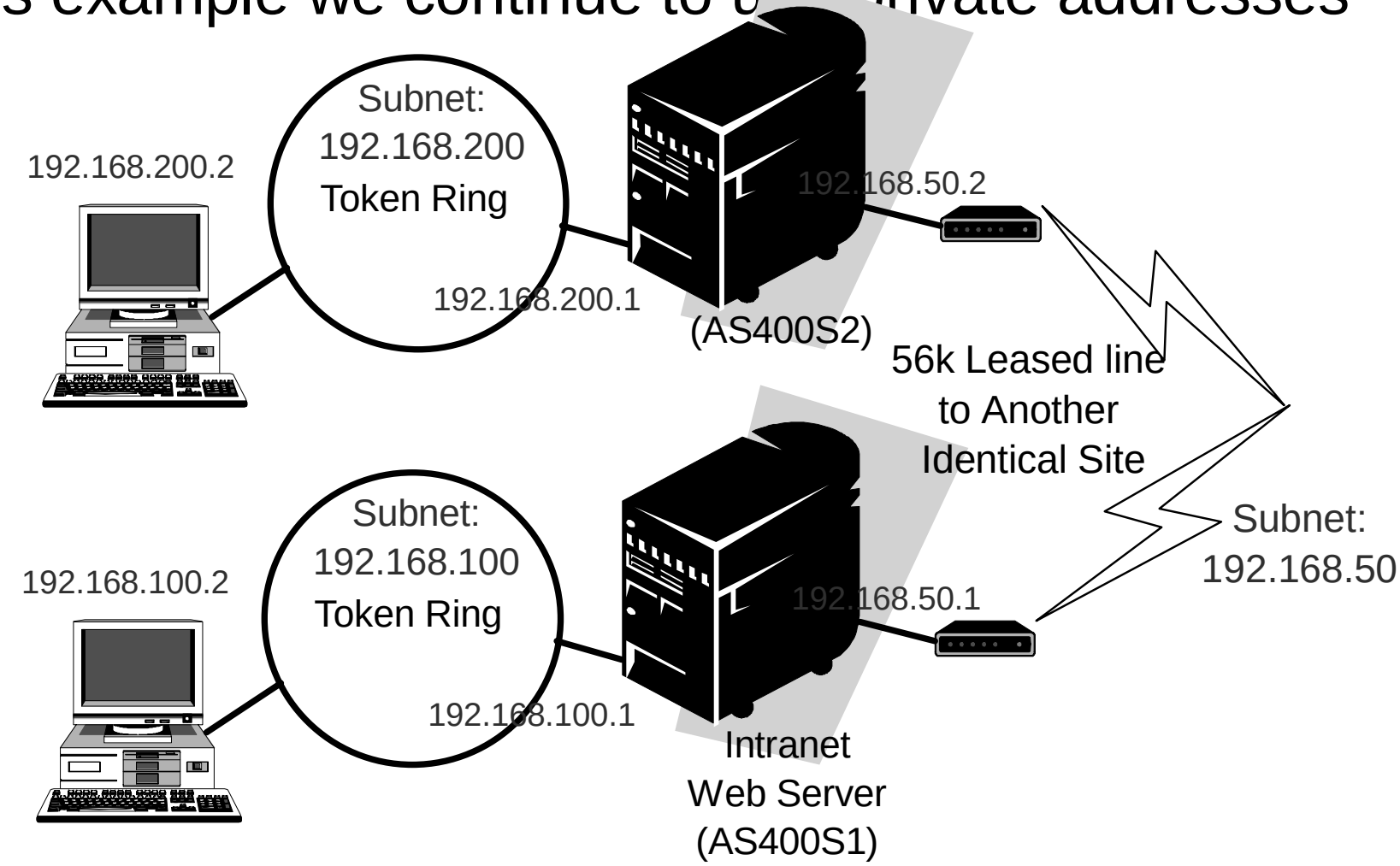
- **Host and Domain information**
- **Protocol settings**
- **Port Restrictions management**
- **Servers to start when TCP/IP is started**
- **SOCKS client settings**



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

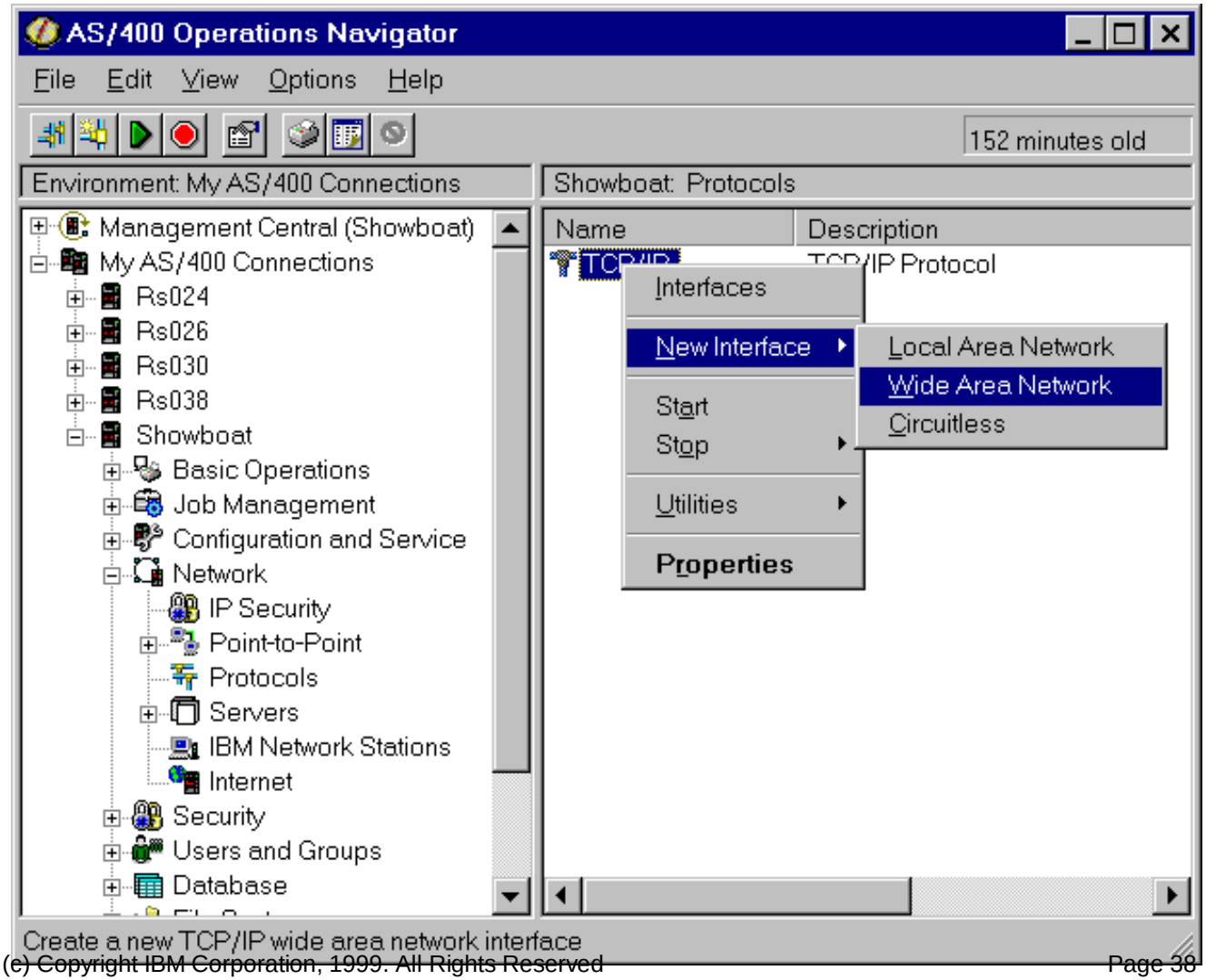
- Configuring a Frame Relay link does NOT necessarily require a subscription to a Frame Relay service ("cloud")
- Can run point-to-point Frame Relay on a standard leased line

To Add a Frame Relay connection to existing leased line

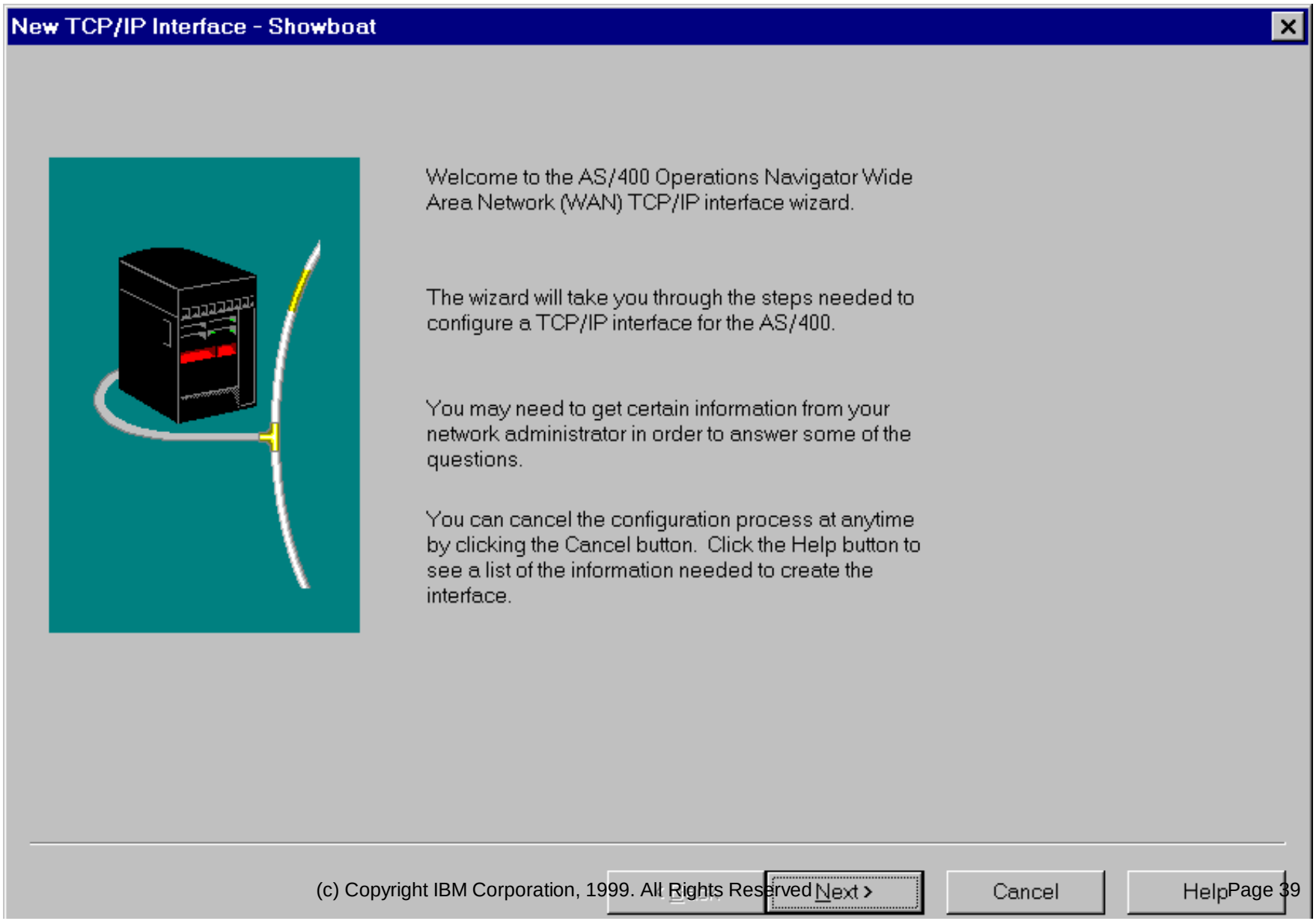
- Create a Frame Relay Network Interface (CRTNWIFR)
- Create a Frame Relay Line Description (CRTLINFR)
- We'll do this using the Operations Navigator Wizard for adding interfaces

TCP/IP Administration - New Interface WAN Wizard

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

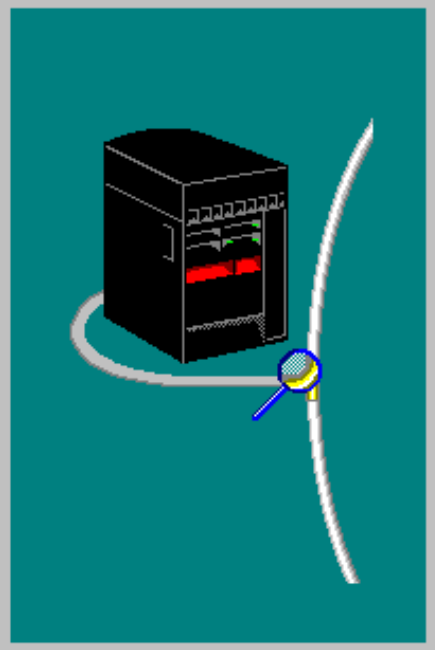


TCP/IP Administration - New Interface WAN Wizard



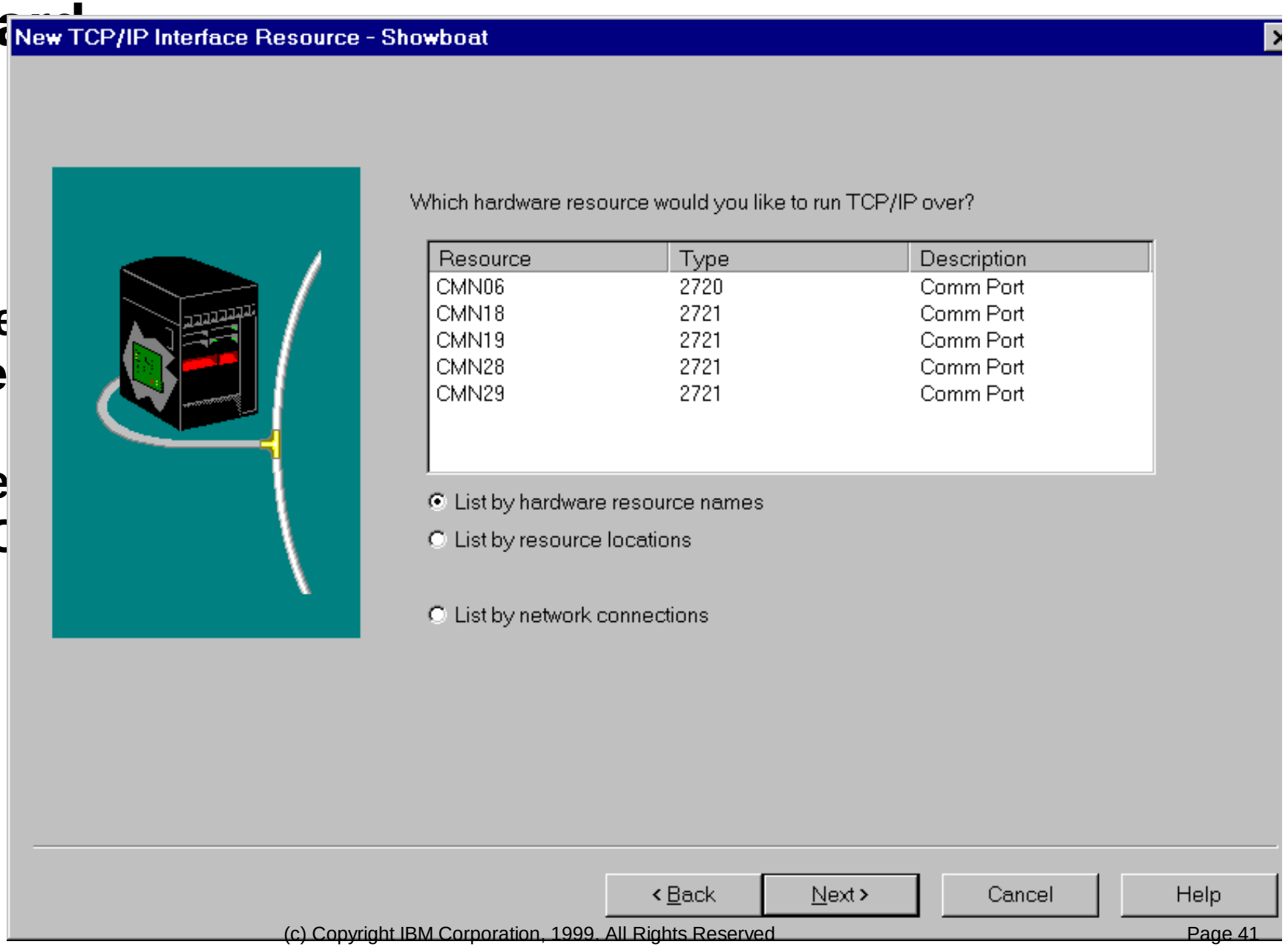
TCP/IP Administration - New Interface WAN Wizard

Select Direct



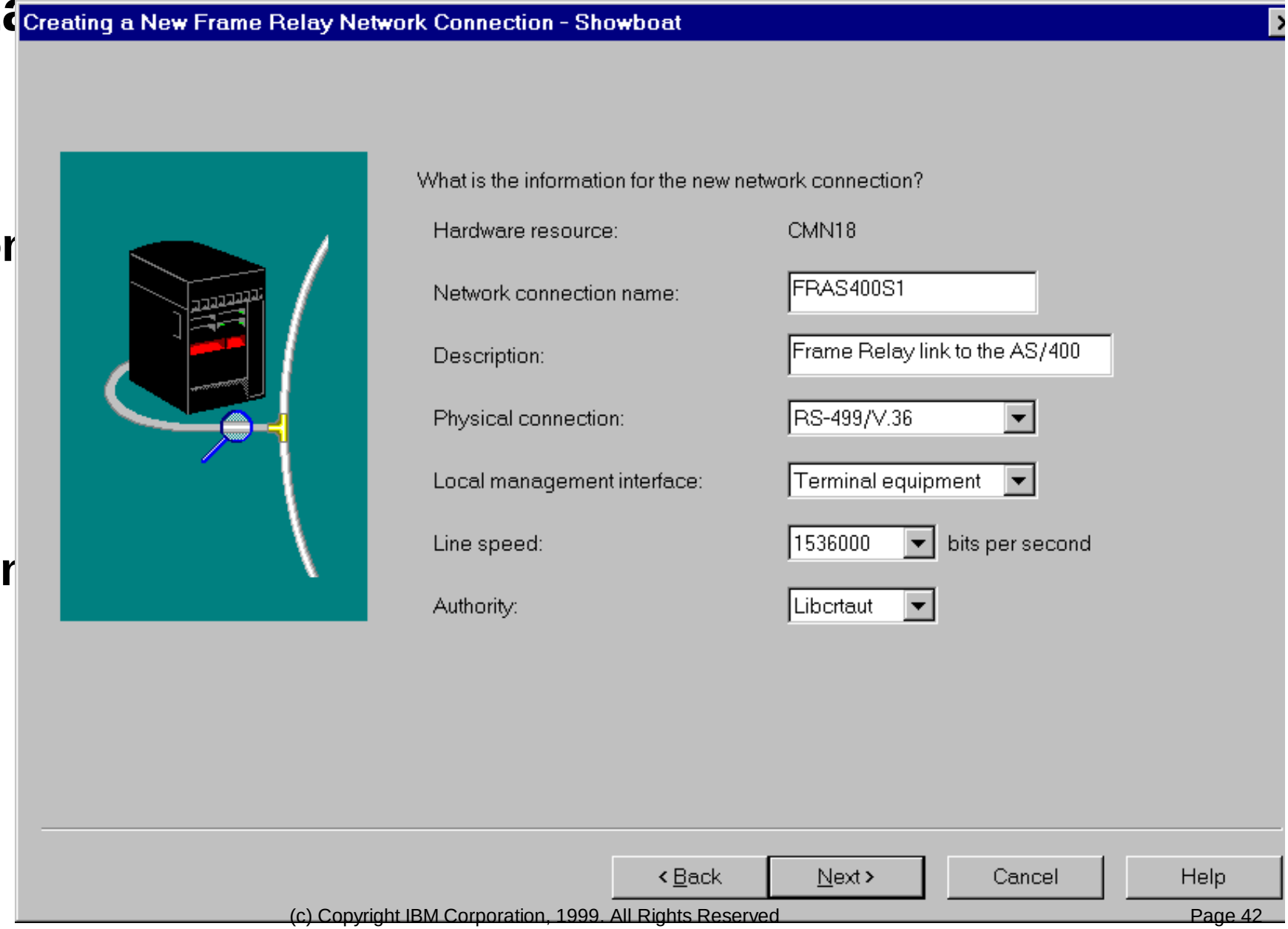
TCP/IP Administration - New Interface WAN Wiza

- Choose the hardware resource that supporte the SDLC modem.



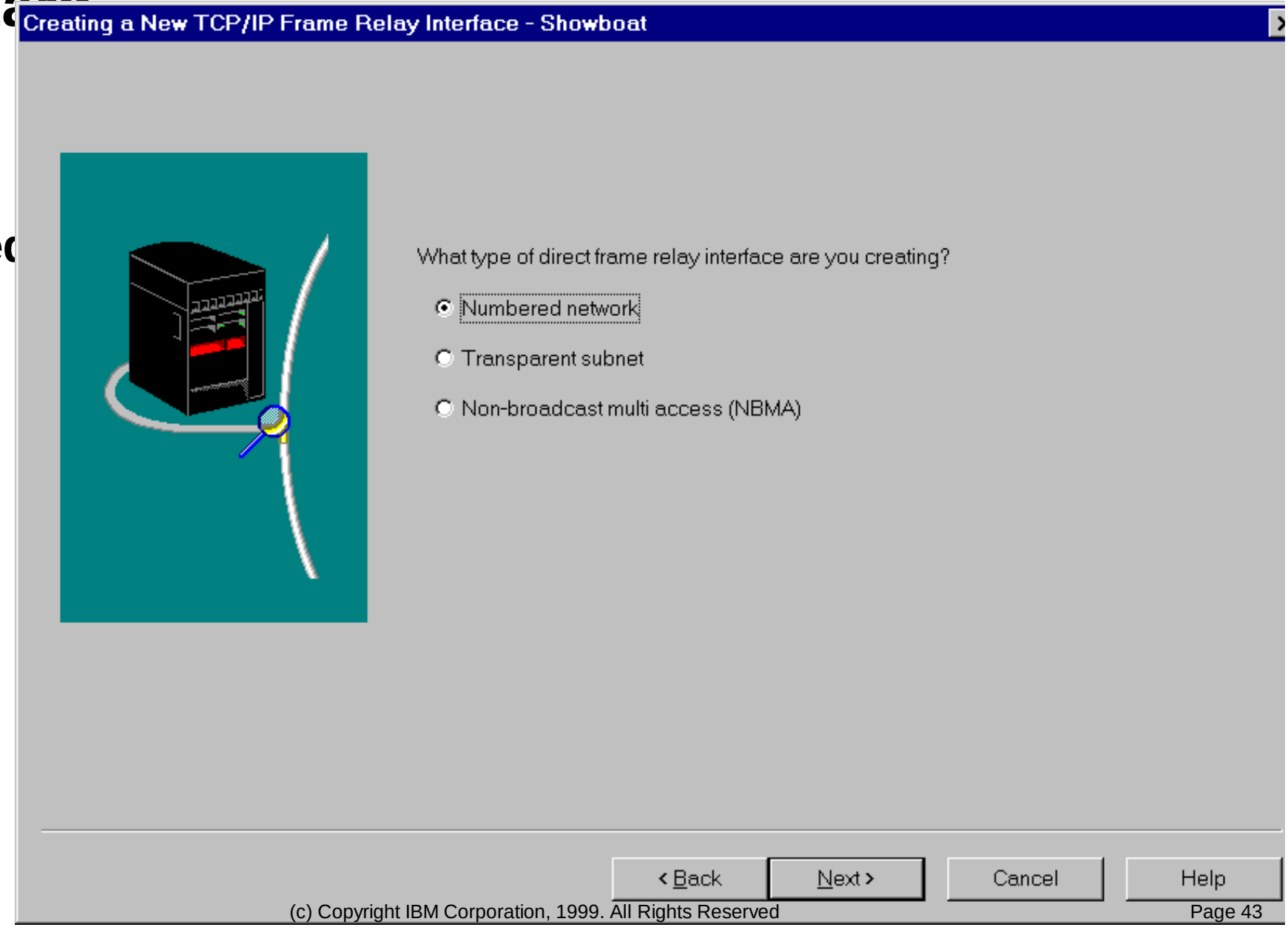
TCP/IP Administration - New Interface WAN Wiza

Type a network connectior name. The name is not important for this applicatior



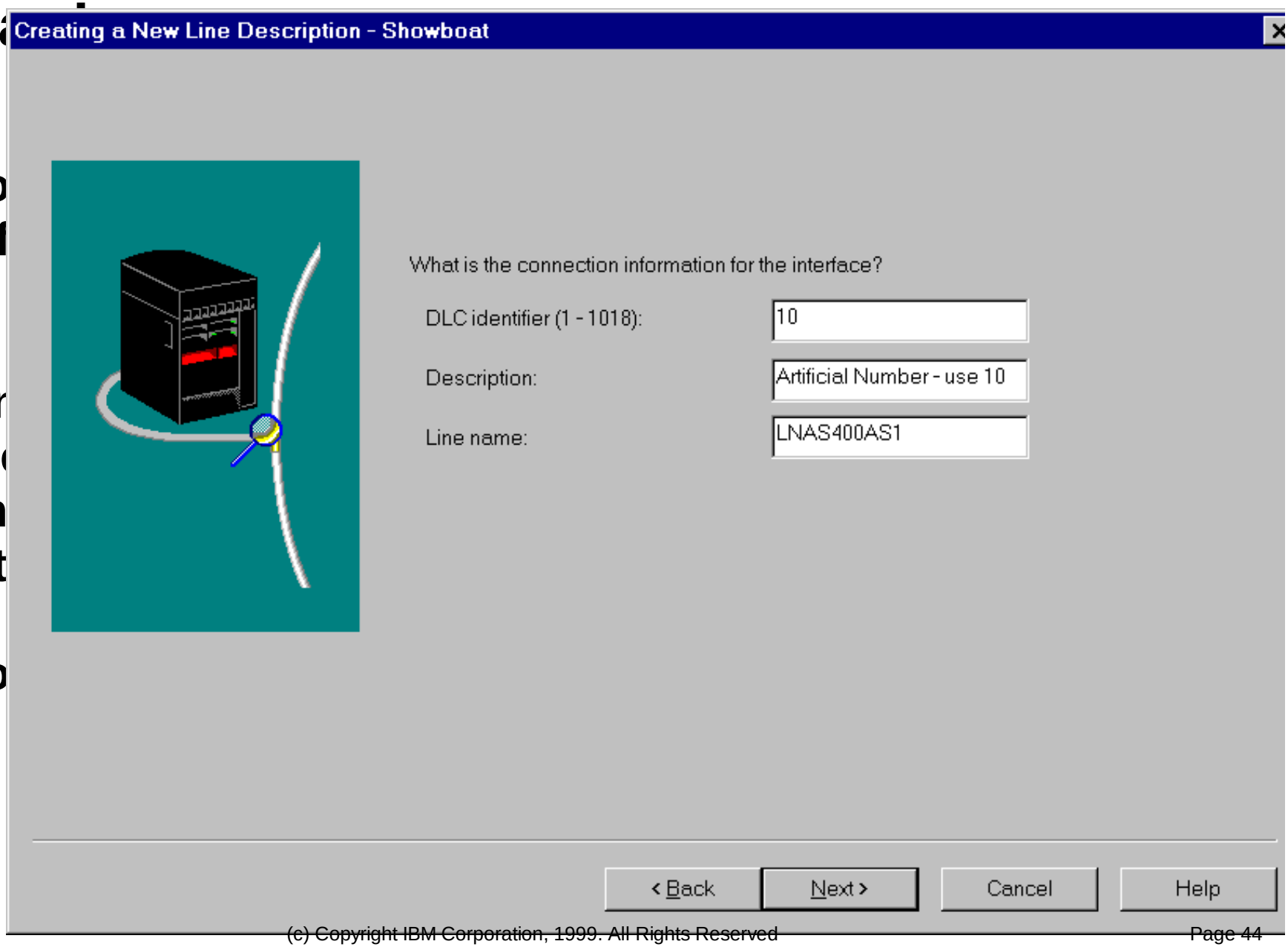
TCP/IP Administration - New Interface WAN Wizard

Select Numbered network



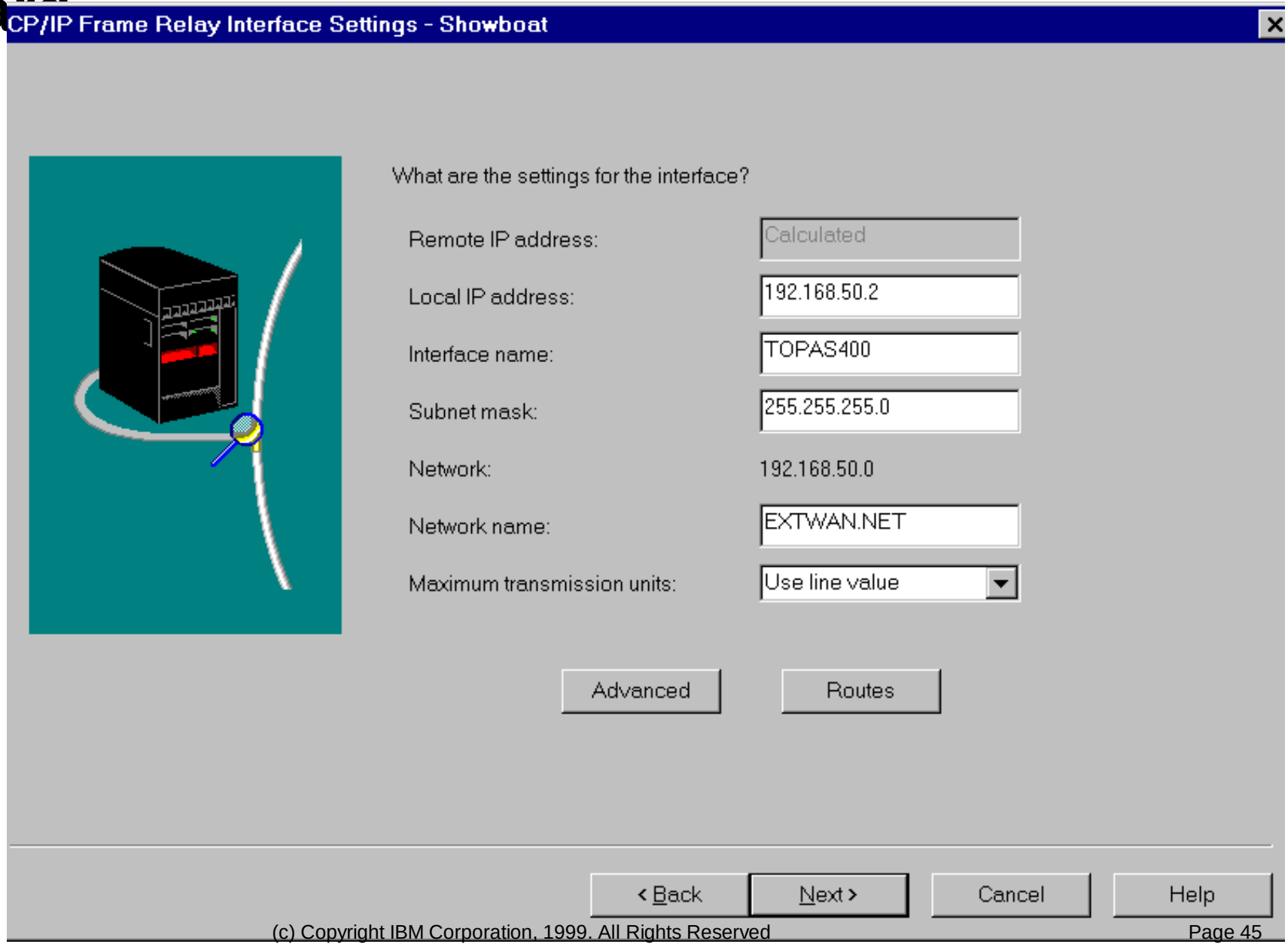
TCP/IP Administration - New Interface WAN Wiza

For this applicatio use "10" f the DLC identifier Type a Lir name - th name is n important for this applicatio



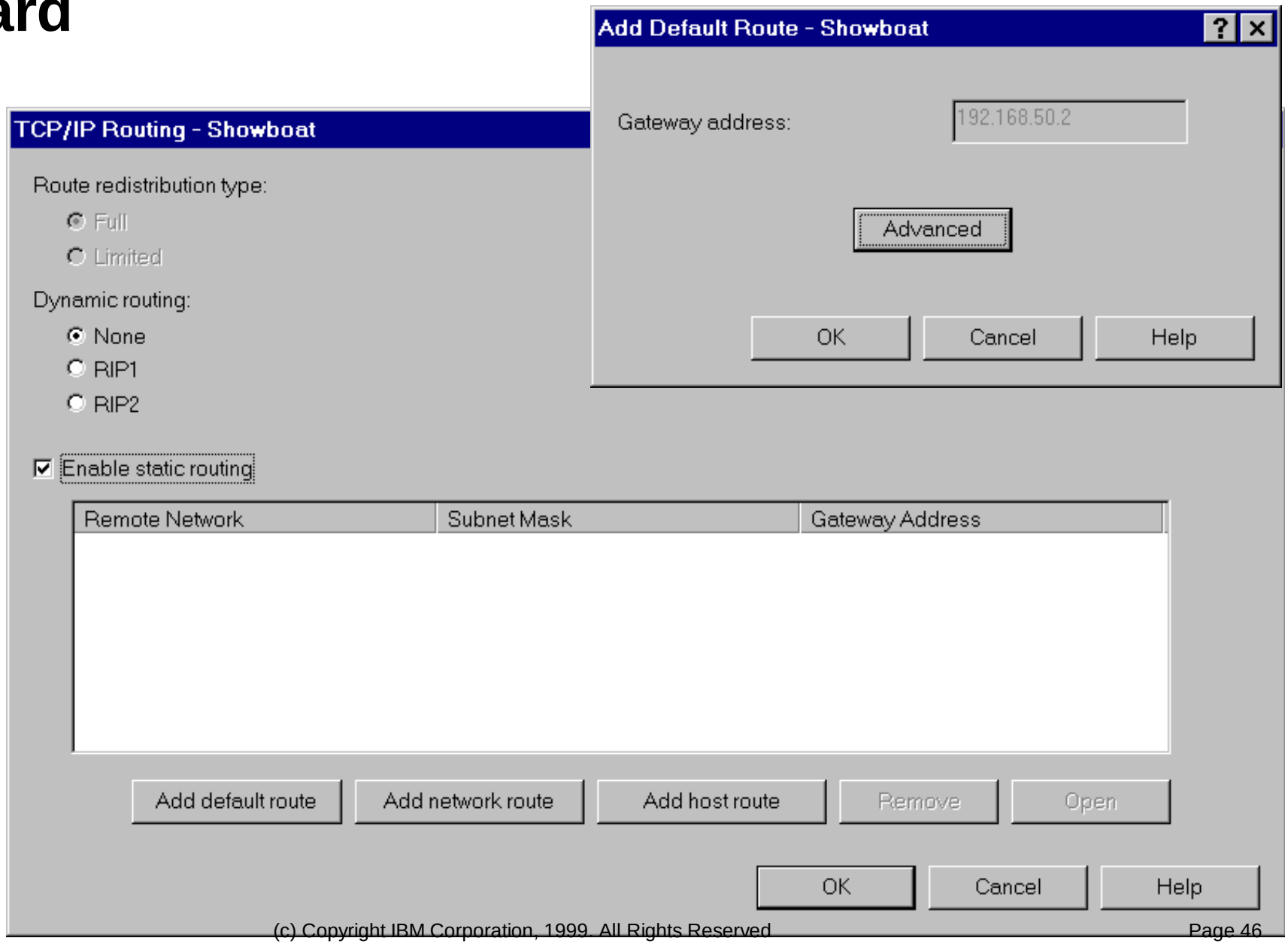
TCP/IP Administration - New Interface WAN Wizard

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



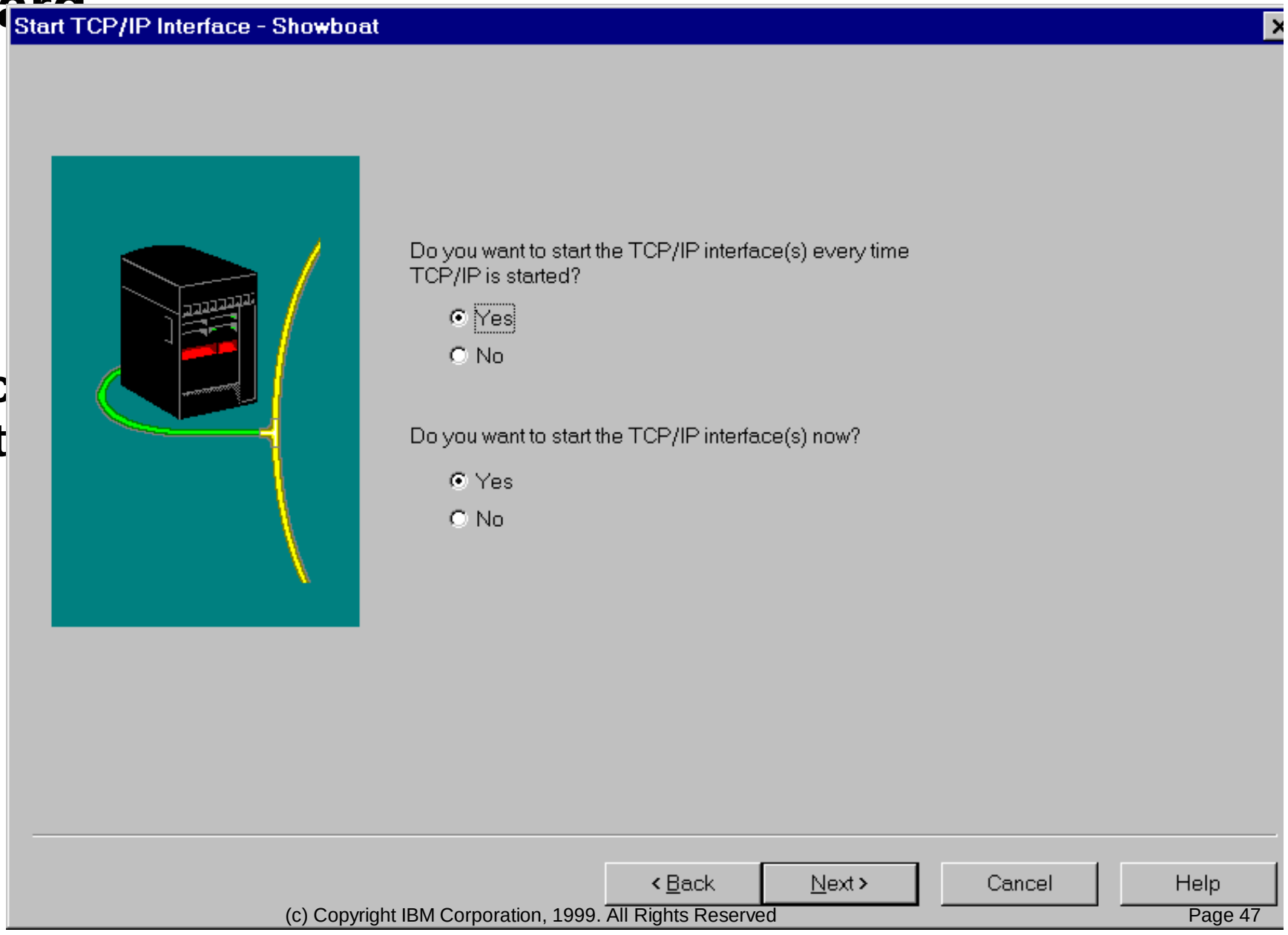
TCP/IP Administration - New Interface WAN Wizard

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

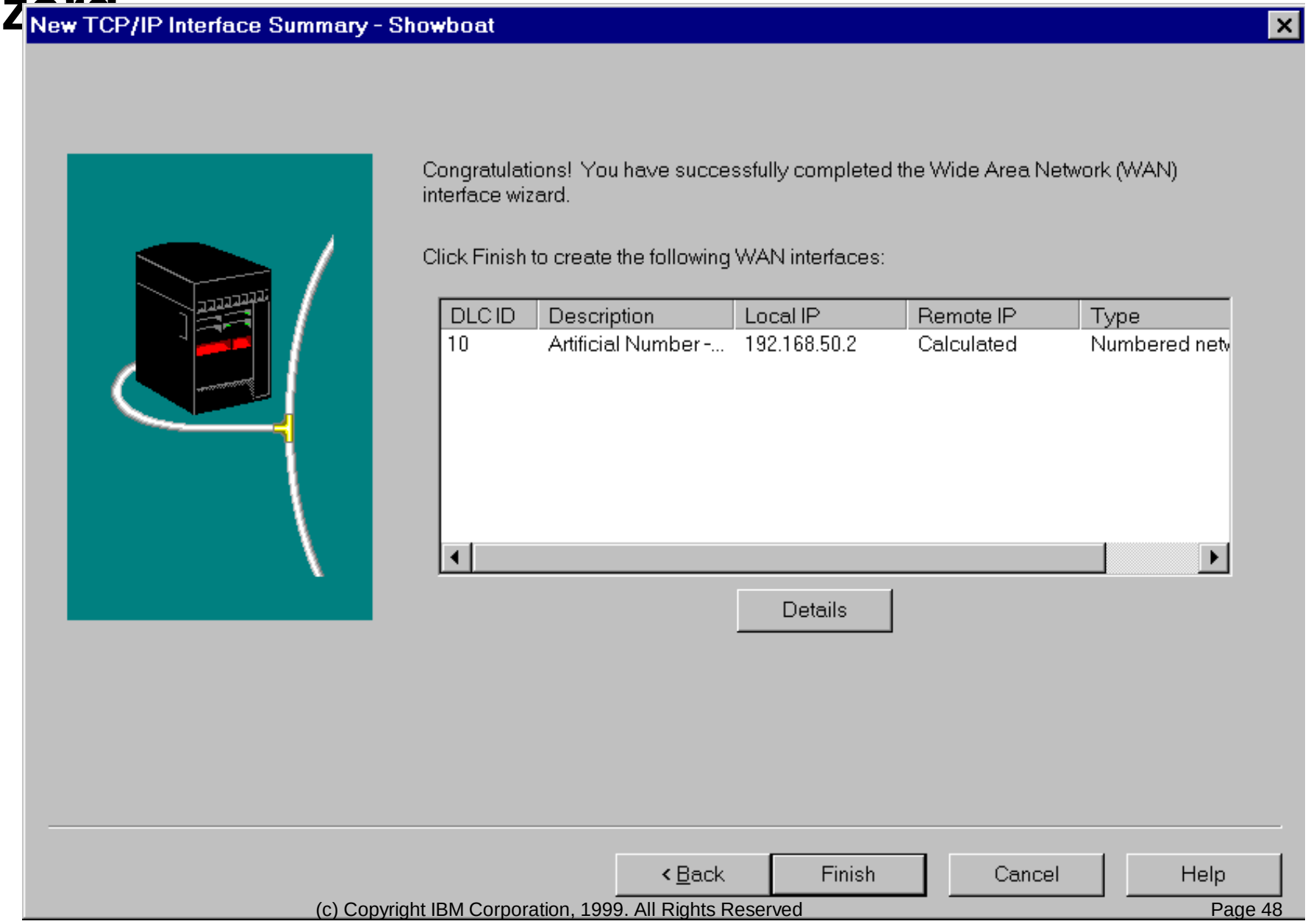


TCP/IP Administration - New Interface WAN Wizard

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



TCP/IP Administration - New Interface WAN Wizard



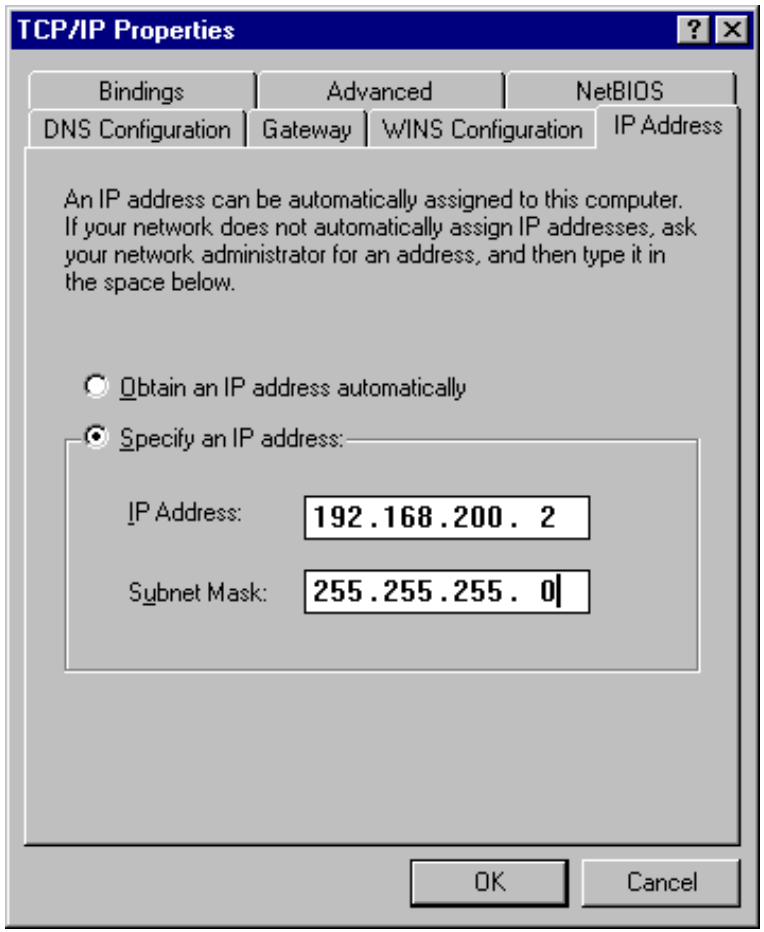
Configure TCP/IP on Workstations

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

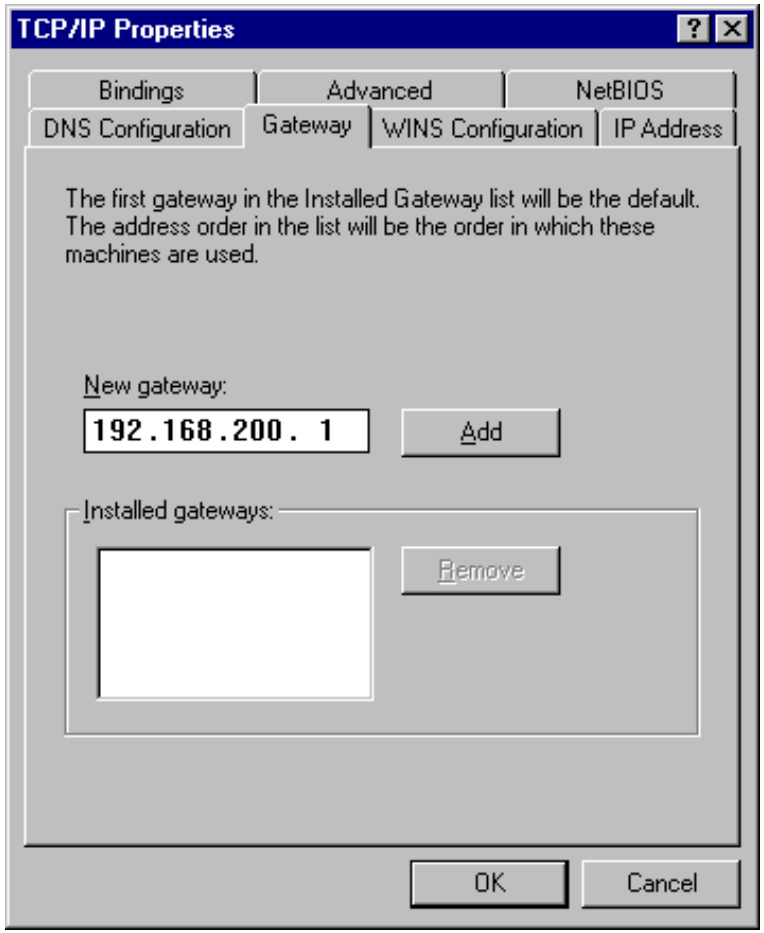
Configure Workstation IP Address

- 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

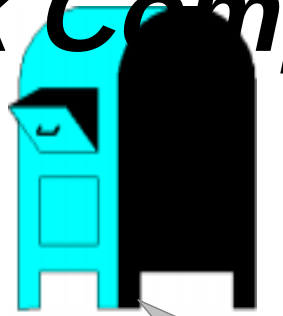
Other Intranet services come with OS/400, too

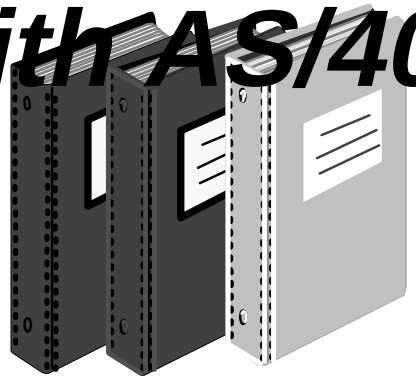
- E-mail, network printing, file transfer, etc.

What are you waiting for???

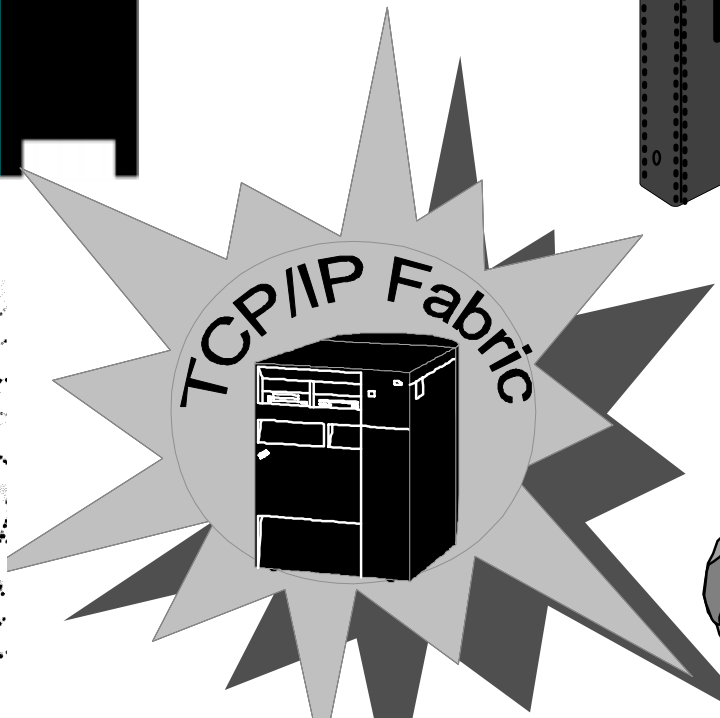
Network Computing with AS/400

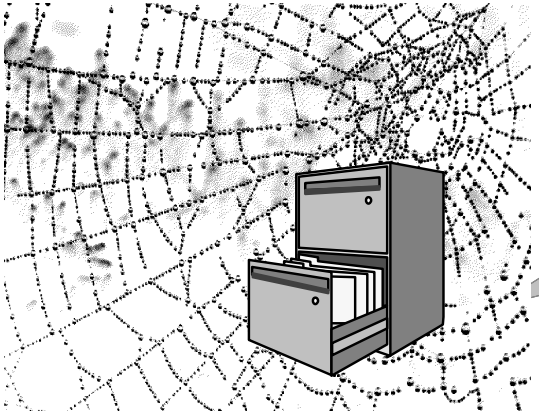
Domino &
POP3 Mail



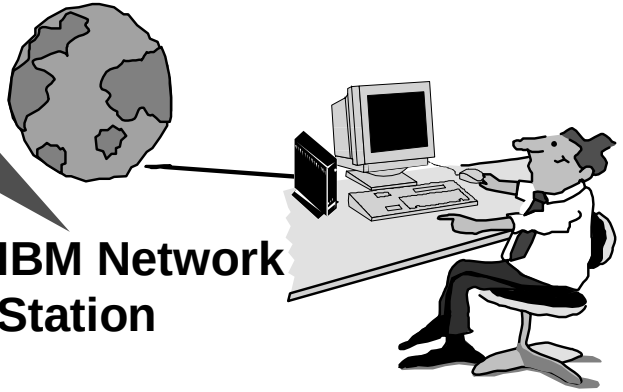


net.data
DB2 access





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
(C) COPYRIGHT IBM CORP. 1980, 1996.
```

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

     Internet         Subnet             Line      Line
Opt  Address          Mask            Description  Type
1    192.168.100.1

                                                                    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                    001-FFF
              + 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




                                                                          Bottom
F3=Exit   F12=Cancel
```

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--------------
     TRNLINE          ACTIVE
       TRNLINNET      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

     Internet            Network             Line      Interface
Opt  Address             Address           Description  Status
     192.168.100.1    192.168.100.0         TRNLINE     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 %).
                                                                       Bottom
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       05600000-056FFFFF, *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                     001-FFF
              + 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

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

                                                                       Bottom
F3=Exit   F5=Refresh   F6=Print list   F12=Cancel   F17=Top   F18=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 . . . .  *YES      *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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Note: All IBM AS/400 publications can be viewed and ordered on the Internet at:
http://as400bks.rochester.ibm.com

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- 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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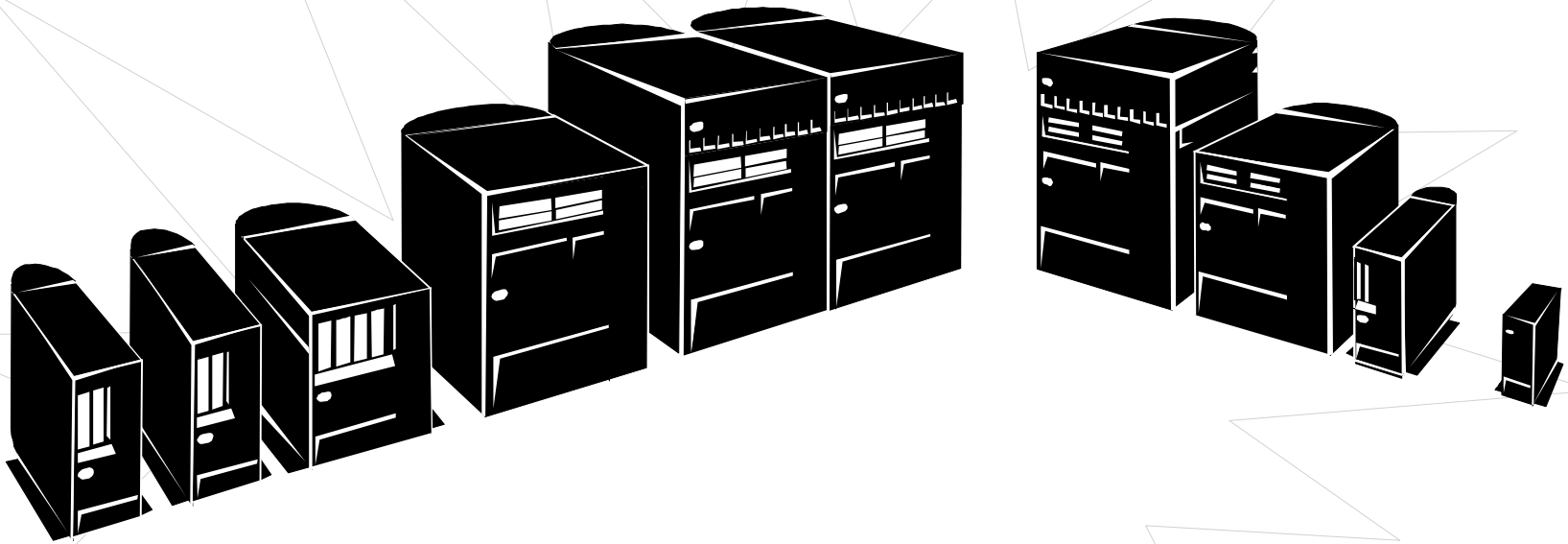
IBM AS/400



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