System i

Networking
Network scenarios

Version 5 Release 4

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Note

Before using this information and the product it supports, read the information in "Notices," on page 39.

Third Edition (February 2006)

This edition applies to version 5, release 4, modification 0 of IBM i5/OS (product number 5722-SS1), and to all subsequent releases and modifications until otherwise indicated in new editions. This version does not run on all reduced instruction set computer (RISC) models nor does it run on CISC models.

Contents

Network scenarios

The purpose of this topic collection is to provide examples of i5/OS® technology used in specific networking environments.

The subject of networking encompasses an enormous amount of information. The scenarios in this topic collection are intended to demonstrate how to take advantage of networking services and applications available on your system.

Printable PDFs

Use this to view and print PDFs of this information.

To view or download the PDF version of this document, select Network scenarios (about 585 KB).

You can view or download these related topics:

- TCP/IP setup (about 666 KB) contains the following topics:
  - Internet Protocol version 6 (IPv6)
  - Planning TCP/IP setup
  - Installing TCP/IP
  - Configuring TCP/IP
  - Customizing TCP/IP
  - TCP/IP techniques over virtual Ethernet
- Remote access services: PPP connections (about 1059 KB) contains the following topics:
  - PPP scenarios
  - PPP concepts
  - Planning PPP
  - Configuring PPP
  - Managing PPP
  - Troubleshooting PPP
- Virtual private networking (about 1113 KB) contains the following topics:
  - VPN scenarios
  - VPN concepts
  - Planning VPN
  - Configuring VPN
  - Managing VPN
  - Troubleshooting VPN
- TCP/IP troubleshooting (921 KB) contains the following topics:
  - Interactive troubleshooter
  - Troubleshooting tools and techniques
  - Troubleshooting problems related to specific applications

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Network planning worksheet

You can use this network planning worksheet to supplement your network planning research.

Each scenario includes similar tables with prerequisites and assumptions made about the network environment. The following tables do not cover a complete network design for every environment, but provide you with a basis to start thinking about your own environment. For example, before coming to these scenarios, you need to plan for system availability, performance, and capability.

System worksheet	Company answer
Record the system model.	
Record the operating system version.	
Understand and document the logical partitioning environment.	
Determine the client needed to connect to the system.	
Record the type of communication adapter installed. See Network communications for more information on Ethernet, token ring, and others.	
Record the communication resource name.	
Record the IP address for the system.	
Record the subnet mask for the system.	
Record the gateway address.	
Record the host name and domain name.	
Record the IP address for the Domain Name System (DNS).	

Network worksheet	Company answer
Establish clear network goals.	
Who are the users and what are their requirements?	
What applications support those requirements?	
What performance is expected from those applications?	
What protocol is required? Keep interoperability in mind. Most networks use TCP/IP; however, there are other alternatives. See Network communications for more information.	
Do some applications require higher priority than others?	
Are the applications sensitive to delay or packet loss?	
What applications have specific security needs? Security planning should be integrated with network planning. See the security planner for a resource on planning network security.	
Will this network grow in the future and how quickly? Make sure to consider security in your basic network architecture.	

Network worksheet	Company answer
What technologies should be used for the LAN?	
What other devices will be connected to the network?	
Draw a picture of your network.	

Related reference

"Reviewing planning worksheet" on page 4
A network planning worksheet helps you better understand your network environment.

Scenario: Setting up System i to communicate with LAN

As a network administrator, you would like to add a new system to your local area network (LAN). This scenario provides a network administrator with prerequisite information as well as instructions on how to set up your system to communicate with the LAN.

Situation

You are the network administrator for a small wholesale company, Sampson Organic Produce. Your customers include area grocery stores and individual families who want organically grown, high-quality produce. Your business has been growing and you have recently purchased a new System i product to help manage your inventory more efficiently. In the past, resources and key business applications were stored on individual workstations. As your business developed, it became apparent that data from these applications needed to be shared more easily. For example, employees who take telephone orders need a quicker way to check stock to determine product availability. In the past, they made customers wait while checking with an employee who had access to the in-stock database.

You plan to consolidate all of these key business applications on the new system. You have already completed all the required hardware planning and setup tasks for your new system. You have researched communication and networking and have decided to create an Ethernet LAN.

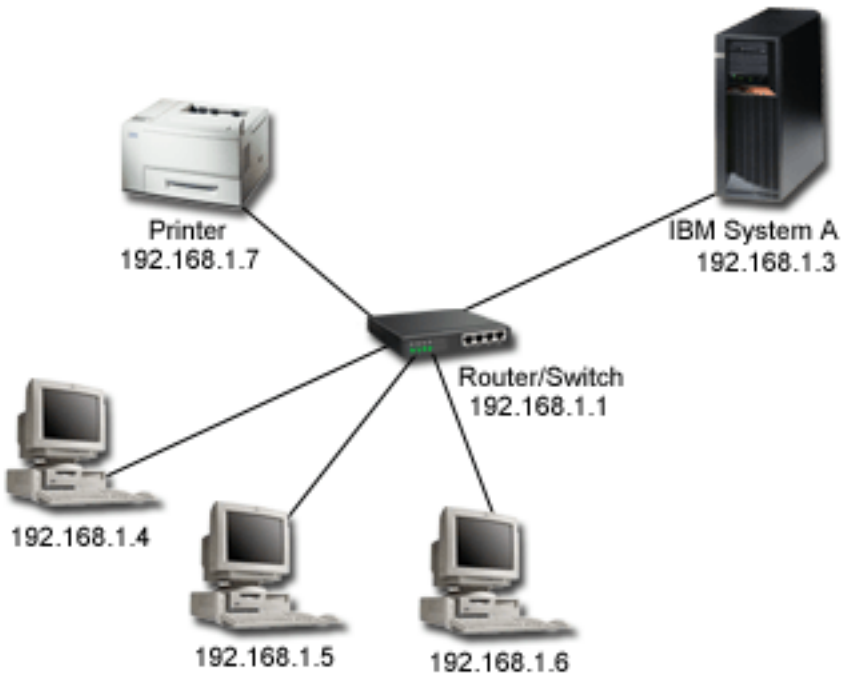
Objectives

After you add your system to the LAN, you need to meet the following objectives:

- To set up the system to communicate with the LAN.
- To set up a printer for the LAN.
- To ensure that the data stored on the system is protected.
- To locate TCP/IP services to communicate with other hosts.

Details

The following figure shows a System i product that is connected to a router. Three workstations and a printer are also connected to the router, depicting the network for Sampson Organic Produce.



- System A runs on i5/OS Version 5 Release 4 (V5R4).
- System A has the IP address 192.168.1.3.
- System A has the subnet mask of 255.255.255.128.
- Workstation 1 has the IP address of 192.168.1.4.
- Workstation 2 has the IP address of 192.168.1.5.
- Workstation 3 has the IP address of 192.168.1.6.
- The printer has the IP address of 192.168.1.7.
- The router in the network has the IP address of 192.168.1.1.

Tip: When no external network connection is planned, you can use a hub in place of a router or switch.

Prerequisites and assumptions

This scenario assumes the following prerequisites have been met in this network environment:

- All cabling and hardware setup has been completed for the network.
- If you use a router, the router has been configured. Configuration is not applicable to hubs or switches.

Configuration steps

Complete the following tasks. After each step, there is a link to the next task.

Reviewing planning worksheet

A network planning worksheet helps you better understand your network environment.

After thorough planning, the network administrator answered the following questions, which directly affect the tasks presented in this scenario. For a blank table (to create your own worksheet), see the Network planning worksheet.

System worksheet	Company answer
Record the system model.	Model 520
Record the operating system or systems.	i5/OS
Understand and document the current logical partitioning environment.	No logical partitions
Determine the client needed to connect to your system.	IBM® iSeries™ Access for Windows® that includes iSeries Navigator
Record the type of communication adapter installed.	Ethernet
Record the communication resource name.	cmn01
Record the IP address for your system.	192.168.1.3
Record the subnet mask for your system.	255.255.255.128
Record the gateway address.	192.168.1.1
Record the host name and domain name.	systema.sampson.com
Record the IP address for domain name server.	DNS is not needed because the LAN is not connected to another network. The company adds host table entries for all systems on the network.

Network assumptions	Company decisions
Who are the users and what are their requirements?	3 areas taking customer orders
What applications support those requirements?	An in-house ordering application that is not Web-based
What protocol is required? Keep interoperability in mind.	TCP/IP
Are your applications sensitive to delay or packet loss?	No
Do your applications need specific security considerations?	Basic system security. Details are integrated into the scenario.
Will this network grow in the future and how quickly? Make sure to consider security in your basic network architecture.	Yes. Not sure.
What other devices will be connected to your network?	Printer—IBM Infoprint® 40
Draw a picture of your network.	See scenario diagram.

Related concepts

"Network planning worksheet" on page 2
You can use this network planning worksheet to supplement your network planning research.

Installing the TCP/IP Connectivity Utilities for i5/OS licensed program

Use this procedure to install the TCP/IP Connectivity Utilities for i5/OS licensed program.

1. Insert your installation media for TCP/IP into your system. The system uses a CD-ROM device as the installation media.
2. At the command line, type `GO LICPGM` and press Enter to access the Work with Licensed Programs display.
3. Select Option 11 (Install licensed programs) on the Work with Licensed Programs display to see a list of licensed programs and optional features of licensed programs.

4. Type 1 (Install) in the Option column next to 57xxTC1 (TCP/IP Connectivity Utilities for i5/OS), 57xxCM1 (Communications Utilities), and 57xxXE1 (iSeries Access for Windows). Press Enter. The Confirm Licensed Programs to Install display shows the licensed programs you selected to install.
5. Press Enter to confirm.
6. The network administrator enters the following choices on the Install Options display:
   - Installation device: QOPT (This is for installing from a CD-ROM device.)
   - Objects to install: Both programs and language objects.
   - Automatic Restart: Yes (determines whether the system will automatically restart after the installation has completed successfully).

   When TCP/IP Connectivity Utilities is successfully installed, either the Work with Licensed Programs menu or the Sign On display opens.
7. Select Option 50 (Display log for messages) to verify that you have installed the licensed program successfully.

Configuring TCP/IP

Use this procedure to configure TCP/IP.

1. At a command line, type `WRKHDWRSC *CMN` to display the Work with Communication Resources menu.
2. Type `5` beside the communication resource for the Ethernet port and press Enter.
3. On the Work with Configuration Descriptions menu, type 1 and press Enter to display the Create Line Description (Ethernet) (CRTLINETH) menu.
4. In the **Line Description** field, enter a description for the line. In this example, the network administrator chose `Eth01`.
5. Enter the information for the **Line speed** and **Duplex** fields. Ensure that these values match the port on the switch connecting to the system. In this example, 100M and *HALF are used. *AUTO and *AUTO are preferred if your switch supports this capability. Press Enter.
6. Press F10 to view additional parameters. You might have to press Page Down to view them.
7. Change the **Link speed** field to match the line speed you entered previously (in this example, 100M).
8. Accept all other default values and press Enter.
9. Press F3 to return to the Work with Communication Resources menu.
10. Press F3 again to return to the Command entry menu.
11. At the command line, type `CFGTCP` to display the Configure TCP/IP menu.
12. On the Configure TCP/IP menu, select Option 1 (Work with TCP/IP interfaces).
13. Select Option 1 (Add) to show the Add TCP/IP Interface display, and press Enter.
14. Enter the following values to create a new TCP/IP interface and press Enter:
    - Internet address: 192.168.1.3
    - Line description: `Eth01`
    - Subnet mask: 255.255.255.128

    Important: These addresses are used for example purposes only. You need to enter the values that pertain to your own network.
15. Press F3 to return to the Configure TCP/IP menu.
16. On the Configure TCP/IP menu, select Option 2 (Work with TCP/IP routes).
17. Select Option 1 (Add) to go to the Add TCP/IP Route (ADDTCPRTE) display, and press Enter.
18. Enter the following values to create a route and press Enter:
    - Route destination: `*DFTROUTE`
    - Subnet mask: `*NONE`
    - Next hop: 192.168.1.1

Note: If you are not connected to another network, this route is unnecessary. It is added here because this company knows it will connect to the Internet in the future.

19. Select Option 10 (Work with TCP/IP Host Table Entries) from the Configure TCP/IP menu, and press Enter.
20. Select Option 1 (Add) to go to the Add TCP/IP Host Table Entry display, and press Enter.
21. Enter the following values to add a host table entry and press Enter:
    - IP address: 192.168.1.3
    - Host names: systema.sampson.com
    - Name: systema
22. Repeat Step 21 for each system on your network. Because the system is not configured as a Domain Name System (DNS), each system must have host table entries. For example, to allow System A to communicate with workstation 1 (192.168.1.4/wstn1), add an additional host table entry: **IP address**: 192.168.1.4, **Host name**: wstn1.sampson.com, and **Name**: wstn1. If this is not realistic for your network environment, see the Configuring Domain Name System topic in the information center.
23. On the command line, type `STRTCP` to start TCP/IP. This should also start your interfaces and lines.

Testing TCP/IP

Use this procedure to test TCP/IP connections.

After you have successfully installed TCP/IP Connectivity Utilities for i5/OS licensed program and configured TCP/IP on your system, you should test your TCP/IP connections.

To test your TCP/IP connection to the network, follow these steps:

1. Verify that TCP/IP communication is configured and started on each of the workstations. Use the documentation provided by your workstation vendor.
2. From workstation 1, open a command prompt and type `ping 192.168.1.3`. You might receive a message that confirms that the packet has been sent to System A. This verifies that the workstation can access the system. If the connection to the network fails, see TCP/IP troubleshooting for more information.

Installing and configuring iSeries Access for Windows on your workstation

In order to use iSeries Navigator (a component of iSeries Access for Windows), you must also install the client on your personal computer.

During the licensed program (LP) installation procedure, Sampson Organic Produce installed the LP for iSeries Access for Windows on the system. See the iSeries Access for Windows instructions for details on how to install the client on your PC.

Configuring printers on the LAN

In order to set up a System i™ product as a print server that manages print jobs, you need to configure the printers on the LAN.

You need to provide print services to your users by allowing them to share a common printer attached to the office LAN. The printer in your network is compatible with Simple Network Management Protocol (SNMP). You will use your system as a print server to manage print jobs and to send them to this printer on your LAN. This printer is attached to the LAN with a network adapter.

To set up the System i product as a print server that manages print jobs, complete the following steps:

1. Configure printers.
    a. Ensure that all cabling is complete.

b. Ensure the printer is set up using the printer's instructions manual.
c. On the control panel of the printer, set the Port Timeout to 300 (5 minutes). This timer controls the amount of time in seconds (5 to 300) that the printer waits before printing the last page. The timer does not end with a command to print the page.

2. Create the printer device description.
   a. From a character-based interface, type `CRTDEVPRT` to create a printer device description. A printer device description should be created when your printer is directly attached to LAN.
   b. On the Create Device Description (Printer) display, enter the following parameters:

      Tip: At times, you might need to press F10 (Additional parameters) and Enter to view all parameters. You can accept the default values for parameters that you see on the display that are not included in the following list. For a detailed description of each parameter, use the CL command finder in the i5/OS Information Center. Search by name for the CRTDEVPRT command and select the Create Device Description (Printer) (CRTDEVPRT) command.

      - Device description: PRINTER1
      - Device class: *LAN
      - Device type: 3812
      - Device model: 1
      - LAN attachment: *IP
      - Port number: 2501
      - Form feed: *AUTOCUT
      - Printer error message: *INFO
      - Manufacturer type and model: *IBM4340
      - Paper source 1: *LETTER
      - Paper source 2: *LETTER
      - Envelope source: *NONE
      - Name or address: 192.168.1.7
      - User-defined options: *IBMSHRCNN
      - System driver program: *IBMSNMPDRV
      - Text description: *LAN 3812 SNMP Device Description for IBM IP40

   c. From the command line, type `VRYCFG` (the Vary Configuration command), to vary on the configuration for PRINTER1.
   d. On the Vary Configuration display, enter the following information:
      - Configuration object: PRINTER1
      - Type: *DEV
      - Status: *ON
   e. After completing these fields, press Enter.
   f. On the command line, type `STRPRTWTR`, the Start Printer Writer command, to start the printer writer.
   g. On the Start Printer Writer display, enter `PRINTER1` in the **Printer** field. Press Enter.

3. Test the printer connection.
   a. Ensure that the printer is turned on and ready.
   b. Type `WRKWTR` (the Work with Writers command) to verify that the printer device status is STR.
   c. Verify that System A can communicate with the printer by typing `ping 192.168.1.7`. You will receive confirmation that the system is connected to the printer.

Related reference

CL command finder

Testing network connections

After you have completed the printer configuration for the network, you should test all connections in the network.

To test all your connections in your network, complete the following steps:

1. From a command line, type `ping xx.xx.xx.xx` where *xx.xx.xx.xx* is the IP address of each of the workstations and the printer.
2. From a command prompt on each of the workstations, type `ping xx.xx.xx.xx` where *xx.xx.xx.xx* is the IP address of the system and the printer.

   Tip: You must configure the new printer on each workstation and add the printer IP address to each host table.
3. Optional: Print a test page using the following instructions:
   a. From iSeries Navigator, select **Basic operations** → **Printer Output**.
   b. Right-click an output name in the right pane, and select **Open** to view the output.
   c. From the Viewer, select **File** → **Print**.
   d. Select your print options and click **Print**. This page should be sent to the printer.

If these connections do not work, the network administrator for Sampson Organic can use TCP/IP troubleshooting to locate problems.

Securing your system

The recommended system values are generated by the IBM eServer™ Security Planner for the Sampson Organic Produce Company.

Complete the IBM eServer Security Planner to review these details.

Tip: The following recommendations do not include full descriptions of security values and operational considerations for these system values.

Table 1. General security recommendations

System value	Recommended value
QSECURITY	40
QINACTITV	60
QINACTMSGQ	*DSCJOB
QDSCJOBITV	240
QSHRMEMCTL	1 (Yes)
QRETSVRSEC	1 (Yes)
QRMTSRVATR	0 (No)
QRMTIPL	*NONE

Table 2. Password policy recommendations

System value	Recommended value
QPWDLVL	0
QPWDEXPITV	90
QPWDMINLEN	8
QPWDRQDDIF	8
QPWDLMTCHR	*NONE

Table 2. Password policy recommendations (continued)

System value	Recommended value
QPWDLMTAJC	0 (allowed)
QPWDLMTREP	0 (characters can be repeated)
QPWDPOSDIF	0 (No)
QPWDRQDDGT	1 (Yes)
QPWDVLDPGM	*NONE

Table 3. Sign-on policy recommendations

System value	Recommended value
QDSPSGNINF	1 (Yes)
QLMTDEVSSN	0 (No)
QLMTSECOFR	1 (Yes)
QMAXSIGN	3
QMAXSGNACN	2 (disable user profile)
QRMTSIGN	*FRCSIGNON (always display sign-on)

Table 4. Restore policy recommendations

System value	Recommended value
QALWOBJRST	*ALWPTF
QVFYOBJRST	3
QFRCCVNRST	3

Table 5. Auditing policy recommendations

System value	Recommended value
QAUDCTL	*AUDLVL,*OBJAUD, *NOQTEMP
QAUDCTL	*NONE
Note: Auditing reports will be scheduled monthly.	

Related reference

Security Reference

Security Planner

Related information

i5/OS system value finder

Implementing system security recommendations

Use this procedure to implement security on System i.

To protect assets stored on the system, Sampson Organic Produce used the IBM eServer Security Planner, an interactive planning tool that creates a dynamic set of recommendations based on the system environment. You can use the security recommendations that the administrator for Sampson Organic Produce generated from the Security Planner as an example for implementing your own security settings.

To implement security on System A, complete the following steps:

1. In iSeries Navigator, expand *System A*. Right-click **Security** and select **Configure**.
2. On the Welcome page, click **Next**.
3. Select **Average** to describe your general security policy. Click **Next**.
4. Select **Running business applications** to describe how your system will be used. Click **Next**.
5. Select **No** and click **Next**.
6. Select **No** for your Advanced Program-to-Program Communication (APPC) use and click **Next**.
7. Select **No** to indicate that you are not connecting to the Internet and click **Next**.
8. Select **No** and click **Next**.
9. Select **No** to indicate that you are not using IBM iSeries NetServer™. Click **Next**.
10. Select **No** and click **Next** twice.
11. Select **Yes** to audit security-related actions on the system. Click **Next**.
12. Select **Yes** to schedule reports to monitor security on the system. Click **Next**.
13. Select **Once a month** for scheduling these reports. Click **Next**.
14. To review the security recommendations, click **Details**. You can change the security values by clearing the appropriate security control. Click **OK**. Then click **Next**.
15. Specify the directory in which you would like to store the Administrator and User Information Reports. Click **Next**. You can review each of these reports.
16. Click **Next** again.
17. Select **Yes, make changes now** and click **Finish**. You have now completed security configuration on System A.

Related reference

Security Planner

Exploring TCP/IP services, applications, and protocols

There are many other TCP/IP services that Sampson Organic Produce can implement in the future. The most common utilities are Telnet and File Transfer Protocol (FTP). In addition, the company might want more information about printing, TCP/IP applications, protocols, services, and iSeries Navigator for additional features.

Related reference

TCP/IP applications, protocols, and services

Basic printing

Scenario: Enabling remote connections

Your company has a branch sales office that has several remote sales personnel who need to connect to your system. You also connect to your corporate office located in another state. Because the information that is transmitted between these areas of your company is sensitive, you are concerned about protecting it as it is sent across the Internet. Use this scenario to configure connections to remote clients and servers.

Situation

You are the network administrator for a branch sales office that manages several mobile sales employees. You also work with the corporate office located in another state. Both the remote sales personnel and the corporate office need access to your internal network; however, you are concerned about protecting information as it is transmitted over the Internet.

The corporate office often needs access to sensitive information like customer accounts and billing statements. Your mobile sales employees transmit information to your branch sales office by dialing an Internet service provider (ISP) through the Point-to-Point Protocol (PPP). Because they also transmit

sensitive information, you need to ensure data integrity and privacy in these communications. You do not want sensitive credit card numbers or customer contact information exposed to the Internet. After researching your options for both groups of users, you have decided to use a virtual private network (VPN) to protect your connections to the corporate office and to use Layer Two Tunnel Protocol (L2TP) protected with a VPN for your remote employees.

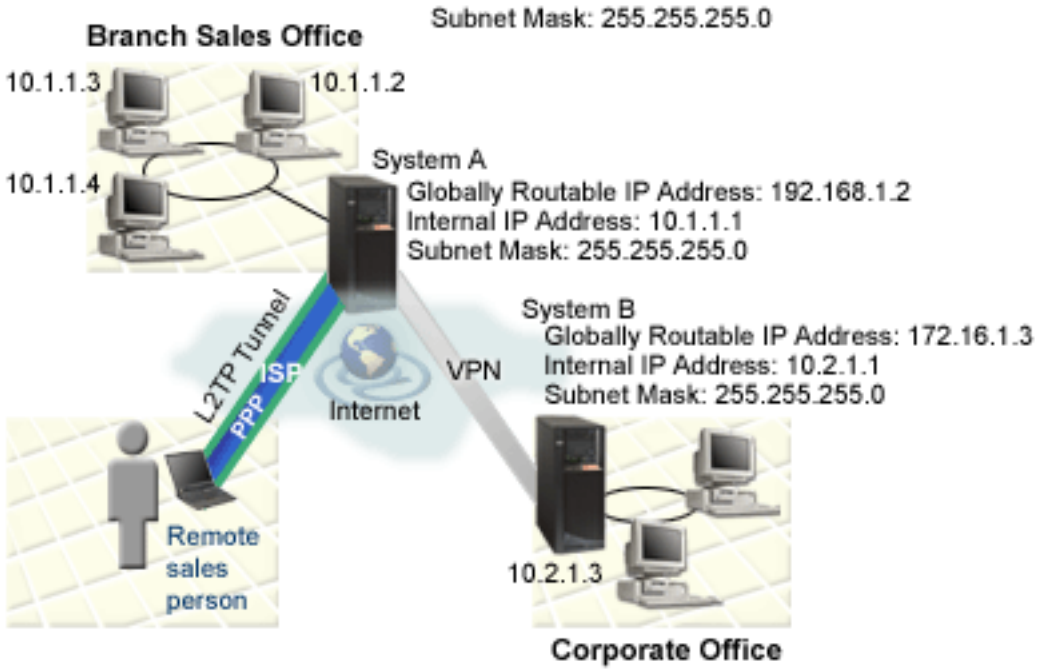
Objectives

The administrators for MyCo, Inc have the following objectives:

- To provide access to remote sales people and the corporate office
- To use existing systems to support these goals
- To allow remote sales people and the corporate office to access the branch office network

Details

The following network topology shows the connections between a branch sales office and a corporate headquarters and remote sales personnel. Connections to the branch sales office are protected through a VPN. The following descriptions of each part of this network provide details on their configuration.



Branch sale office

- System A runs on i5/OS Version 5 Release 4 (V5R4)
- System A acts as the gateway for the VPN connection with the branch sales office.
- System A has IP address 192.168.1.2, which is globally routable.

  Important: IP addresses used in this scenario are meant for example purposes only. They do not reflect an IP address scheme and should not be used in any actual configuration. Use your own IP addresses when completing these tasks.
- Subnet mask is 255.255.255.0.
- System A connects to its subnet with the IP address 10.1.1.1.

- Within the internal network of the branch sales office, all PCs have been configured with a default route that points to System A.
- The fully qualified host name of System A is systema.myco.min.com.
- Both System A and B can initiate connections.
- Remote employees use a pool of IP addresses that range from of 10.1.1.100 to 10.1.1.150.

Corporate office

- System B runs on i5/OS Version 5 Release 3 and contains all pertinent business applications.
- System B acts as the gateway for the VPN connection for corporate office.
- System B has the IP address of 172.16.1.3 that is globally routable.

  Important: IP addresses used in this scenario are meant for example purposes only. They do not reflect an IP addressing scheme and should not be used in any actual configuration. You should use your own IP addresses when completing these tasks.
- Subnet mask is 255.255.255.0.
- System B connects to its subnet with the IP address 10.2.1.1.
- Within the internal network of the corporate office, all PCs have been configured with a default route that points to System B.
- The fully qualified host name of System B is systemb.myco.wis.com.

Remote sales personnel

- Notebook with a Microsoft® Windows XP operating system
- Remote employees use a pool of IP addresses that range from 10.1.1.100 to 10.1.1.150.

Prerequisites and assumptions

This scenario provides an example VPN configuration between a branch sales office and a corporate office. It also provides instructions on how to configure remote access for travelling sales people connecting to the branch office. This scenario assumes that several prerequisite steps have been completed and tested, and are operational before beginning these configuration steps. These prerequisites are assumed to have been completed for this scenario:

1. Ensure that the following licensed programs have been installed:
   - i5/OS Version 5 Release 2 (5722-SS1), or later
   - Digital Certificate Manager (5722-SS1 Option 34)

     Note: This scenario assumes that DCM has been installed on both systems, but it has not been configured on either system.
   - TCP/IP Connectivity Utilities for i5/OS (5722-TC1)
   - IBM HTTP Server for i5/OS (5722-DG1)
   - IBM iSeries Access for Windows (5722-XE1) and iSeries Navigator
   - IBM Developer Kit for Java™ (5722-JV1)
   - Ensure that you have the latest PTFs installed on your system.
2. Ensure that the following system setup has been completed:
   - TCP/IP must be configured, including IP interfaces, routes, local host name, and local domain name.
   - Basic system security has been configured and tested.
   - The Network component of iSeries Navigator has been installed.
   - The retain server security data (QRETSVRSEC *SEC) system value has been set to 1.
   - The shared memory (QSHRMEMCTL) system value has been set to 1.

- Normal TCP/IP communications has been established between required endpoints.

3. Ensure that the following requirements are on the PC that is used for remote employees:
   - Windows XP client with a Windows 32-bit operating system is properly connected to your system and configured for TCP/IP.
   - A 233 MHZ (megahertz) processing unit.
   - Windows XP clients must have 64 MB RAM.
   - iSeries Access for Windows and iSeries Navigator have been installed on the client PC.
   - Software must support IP Security (IPSec) protocol.
   - Software must support L2TP.
   - Connection to an ISP has been established.

In addition to these prerequisites, it is assumed that both networks have set up and activated filter rules on their networks, configured routing, and established an IP addressing scheme.

Tip: This scenario shows the system security gateways attached directly to the Internet. The absence of a firewall is intended to simplify the scenario. It does not imply that the use of a firewall is not necessary. In fact, you should consider the security risks involved anytime you connect to the Internet.

Related reference

IP filtering and network address translation (NAT)

TCP/IP routing and workload balancing

AS/400 Internet Security Scenarios: A Practical Approach, SG24-5954-00

DCM scenarios

VPN scenarios

Scenarios: Remote access using PPP connections

Setting up certificate authority with Digital Certificate Manager

Before setting up a certificate authority (CA), the administrator for the branch office needs to ensure that several planning tasks are completed. Ensure that all the prerequisites for this scenario have been completed before performing these tasks.

Completing planning worksheets for Digital Certificate Manager

MyCo, Inc. completes the planning worksheets to help set up digital certificates to issue to their business partner.

Table 6. Planning worksheet for creating a certificate authority (CA) with Digital Certificate Manager (DCM)

Questions	Answers
What key size do you plan to use for generating the public and private keys for the certificate?	1024
What is the certificate store password?	secret **Important:** All passwords that are used in this scenario are for example purposes only. Do not use these passwords in any actual configuration.
What is the name of the certificate authority?	mycoca
What is the name of your organization?	myco
How many days do you want the certificate authority to be valid?	1095 (3 years)

Table 6. Planning worksheet for creating a certificate authority (CA) with Digital Certificate Manager (DCM) (continued)

Questions	Answers
What is your browser?	Windows Internet Explorer version 6.0
Will you issue certificates to users on the network?	No

Table 7. Planning worksheet for digital certificate for System A

Questions	Answers
What key size do you plan to use for generating the public and private keys for the certificate?	1024
What is the certificate store password?	secret **Important:** All passwords that are used in this scenario are for example purposes only. Do not use these passwords in any actual configuration.
What is the name of the certificate label?	mycocert
What is the common name for your certificate?	mycocert
What is the name of your organization?	MyCo, Inc
What is the IP address of your system?	192.168.1.2 **Important:** IP addresses used in this scenario are meant for example purpose only. They do not reflect an IP addressing scheme and should not be used in any actual configuration. You should use your own IP addresses when completing these tasks.
What is the fully qualified host name of your system?	systema.myco.min.com

Table 8. Planning worksheet for digital certificates for System B

Questions	Answers
What key size do you plan to use for generating the public and private keys for the certificate?	1024
What is the name of the certificate label?	corporatecert
What is the common name for your certificate?	corporatecert
What is the certificate store path and filename?	/tmp/systemb.kdb
What is the certificate store password?	secret2 **Important:** All passwords that are used in this scenario are for example purposes only. Do not use these passwords in any actual configuration.
What is the common name of the digital certificate?	corporatecert
What is the organizational name that owns this certificate?	MyCo, Inc

Table 8. Planning worksheet for digital certificates for System B (continued)

Questions	Answers
What is the IP address of your system?	172.16.1.3 **Important:** IP addresses used in this scenario are meant for example purposes only. They do not reflect an IP addressing scheme and should not be used in any actual configuration. You should use your own IP addresses when completing these tasks.
What is the fully qualified host name of your system?	systemb.myco.wis.com

Starting IBM HTTP Server for i5/OS on System A

Use this procedure to start IBM HTTP Server for i5/OS on System A.

To access the Digital Certificate Manager (DCM) interface, you must start the administrative instance of the HTTP Server by completing the following tasks.

1. From System A, sign on to a character-based interface.
2. At the command prompt, type `strtcpsvr server(*HTTP) httpsvr(*admin)`. This starts the administration system of the HTTP Server.

Configuring System A as a certificate authority

Use this procedure to configure System A as a certificate authority (CA).

1. In a Web browser, type `http://systema:2001`. This launches the Task Page that allows you to access the Digital Certificate Manager (DCM) interface.
2. Log on with your System A user profile name and password.
3. Select **Digital Certificate Manager**.
4. From the left navigation pane, select **Create a Certificate Authority (CA)**.
5. On the Create a Certificate Authority (CA) page, fill in the following required fields with the information from the DCM planning worksheet:
   - **Key size:** 1024
   - **Certificate store password:** secret
   - **Confirm password:** secret

     Important: All passwords that are used in this scenario are for example purposes only. Do not use these passwords in any actual configuration.
   - **Certificate Authority name:** mycoca
   - **Organization name:** MyCo, Inc
   - **State or province:** min
   - **Country or region:** us
   - **Validity period of Certificate Authority (2-7300):** 1095
6. Click **Continue**.
7. On the **Install Local CA certificate** page, click **Continue**.
8. On the **Certificate Authority (CA) Policy Data** page, select the following options:
   - **Allow creation of user certificates:** Yes
   - **Validity period of certificates that are issued by this Certificate Authority (1-2000):** 365

9. On the Policy Data Accepted page, read the messages that are displayed and click **Continue** to create the default server certificate store (*SYSTEM) and a server certificate signed by your CA. Read the confirmation message and click **Continue**.
10. On the Create a Server or Client Certificate page, enter the following information:
    - **Key size:** 1024
    - **Certificate label:** mycocert
    - **Certificate store password:** secret
    - **Confirm password:** secret

      Important: All passwords that are used in this scenario are for example purposes only. Do not use these passwords in any actual configuration.
    - **Common name:** mycocert
    - **Organization name:** myco
    - **State or province:** min
    - **Country or region:** us
    - **IP version 4 address:** 192.168.1.2

      Note: IP addresses used in this scenario are meant for example purposes only. They do not reflect an IP addressing scheme and should not be used in any actual configuration. You should use your own IP addresses when completing these tasks.
    - **Fully qualified domain name:** systema.myco.min.com
    - **E-mail address:** administrator@myco.min.com
11. Click **Continue**.
12. On the Select Application page, click **Continue**.

    Tip: The VPN New Connection wizard automatically assigns the certificate you just created to the i5/OS VPN key manager application. If you have other applications that might use this certificate, you can select them on this page. Because this scenario only uses certificates for VPN connections, there is no need to select any additional applications.
13. On the Application Status page, read the messages that are displayed and click **Cancel**. This accepts the changes that you created.

    Note: If you want to create a certificate store to contain certificates that are used to sign objects, select **Continue**.
14. When the DCM interface is refreshed, select **Select a Certificate Store**.
15. On the Select a Certificate Store page, select ***SYSTEM**. Click **Continue**.
16. On the Certificate Store and Password page, enter `secret`. Click **Continue**.
17. In the left navigation frame, select **Manage Applications**.
18. On the Manage Applications page, select **Define CA trust list**. Click **Continue**.
19. On the Define CA Trust List page, select **Server**. Click **Continue**.
20. Select **i5/OS VPN Key Manager**. Click **Define CA Trust List**.
21. On the Define CA Trust List page, select **LOCAL_CERTIFICATE_AUTHORITY**. Click **OK**.

Creating digital certificate for System B

Use this procedure to create digital certificate for System B.

1. In the left navigation pane, click **Create Certificate** and select **Server or client certificate for another iSeries**.
2. Click **Continue**.
3. On the Create Server or Client Certificate for another iSeries page, select **V5R3**. This is the release level for System B. Click **Continue**.

4. On the Create a Server or Client Certificate page, enter the following information:
   - **Key size:** 1024
   - **Certificate label:** corporatecert
   - **Certificate store path and filename:** /tmp/systemb.kdb
   - **Certificate store password:** secret2
   - **Confirm password:** secret2

     Note: All passwords that are used in this scenario are for example purposes only. Do not use these passwords in any actual configuration.
   - **Common name:** corporatecert
   - **Organization name:** MyCo, Inc
   - **State or province:** wis
   - **Country or region:** us
   - **IP version 4 address:** 172.16.1.3

     Important: IP addresses used in this scenario are meant for example purposes only. They do not reflect an IP addressing scheme and should not be used in any actual configuration. You should use your own IP addresses when completing these tasks.
   - **Fully qualified host name:** systemb.myco.wis.com
   - **E-mail address:** administrator@myco.wis.com
5. Click **Continue**. You will receive a confirmation message verifying that a server certificate has been created on System A for System B. As the administrator of the network for the branch sales office, you send these files to the administrator at the corporate office through encrypted e-mail. The administrator at the corporate office must now move and rename the certificate store (.KDB) file and the request (.RDB) file to System B. The administrator at the corporate office will need to move these files to the /QIBM/USERDATA/ICSS/CERT/SERVER directory in the integrated file system using binary FTP. After that is completed, the administrator must rename these files in the appropriate directory.

Renaming .KDB and .RDB files on System B

Use this procedure to rename .KDB and .RDB files on System B.

Because the *SYSTEM certificate store does not exist on System B, the administrator of the corporate network needs to rename the systemb.kdb and systemb.RDB files to DEFAULT.KDB and DEFAULT.RDB, using these transferred files as the *SYSTEM certificate store on System B.

1. In iSeries Navigator, expand ***System B*** → **File Systems** → **Integrated File System** → **Qibm** → **UserData** → **ICSS** → **Cert** → **Server**, and verify that the files systemb.kdb and systemb.RDB are listed in this directory.
2. On a command line, type `wrklnk ('/qibm/userdata/icss/cert/server')`.
3. On the Work with Link Objects page, select 7 (Rename) to rename the systemb.kdb file. Press Enter.
4. On the Rename Object page, enter `DEFAULT.KDB` in the **New Object** field. Press Enter.
5. Repeat Step 3 and Step 4 to rename the systemb.RDB file to DEFAULT.RDB.
6. Verify that these files have been changed by refreshing iSeries Navigator and expanding ***System B*** → **File Systems** → **Integrated File System** → **Qibm** → **UserData** → **ICSS** → **Cert** → **Server**. The DEFAULT.KDB and DEFAULT.RDB files must be listed in the directory.

Changing certificate store password on System B

Use this procedure to change certificate store password on System B.

Now the network administrator for the corporate office must change the password for the new *SYSTEM certificate store that was created when the DEFAULT.KDB and DEFAULT.RDB files were created.

Note: You must change the *SYSTEM certificate store password. When you change the password, it is stashed so that the application can automatically recover it and open the certificate store to access certificates.

1. In a browser, type `http://systemb:2001`. Click **Select a Certificate Store**.
2. Select ***SYSTEM Certificate Store** and enter `secret2` for the password. This is the password that the administrator of the branch sales office specified when creating the server certificate for System B. Click **Continue**.
3. In the left navigation frame, select **Manage Certificate Store** and select **Change Password** and click **Continue**.
4. On the Change Certificate Store Password page, enter `corporatepwd` in the **New password** and **Confirm password** fields.
5. Select **Password does not expire** for the expiration policy. Click **Continue**. A confirmation page is loaded. Click **OK**.
6. On the Change Certificate Store Password confirmation page, read the message on that display and click **OK**.
7. On the Certificate Store and Password page that is reloaded, enter `coporatepwd` in the **Certificate Store Password** field. Click **Continue**.

Defining CA trust for i5/OS VPN key manager on System B

Use this procedure to define CA trust for VPN key manager on System B.

1. In the left navigation frame, select **Manage Applications**.
2. On the Manage Applications page, select **Define CA trust list**. Click **Continue**.
3. On the Define CA Trust List page, select **Server**. Click **Continue**.
4. Select **i5/OS VPN Key Manager**. Click **Define CA Trust List**.
5. On the Define CA Trust List page, select **LOCAL_CERTIFICATE_AUTHORITY**. Click **OK**.

Now the administrators for the branch sales office and corporate office can begin VPN configuration.

Configuring VPN connection between the branch sales office and the corporate office

The administrator of the branch sales office needs to configure a virtual private network (VPN) connection between the branch sales office and the corporate office to enable the remote connections.

Completing planning worksheets for VPN connection from the branch office to remote sales employees

The administrator of the branch sales office uses the VPN planning advisor to create dynamic planning worksheets to help them configure virtual private network (VPN) between the branch sales office and the corporate office.

The VPN planning advisor is an interactive tool that asks specific questions regarding your VPN needs. Based on your answers, the advisor generates a customized planning worksheet for your environment that can be used when you configure your VPN connection. Each of the following planning worksheets is generated with the VPN planning advisor and is used to configure a VPN, using the VPN New Connection wizard in iSeries Navigator.

Table 9. Planning worksheet for VPN connection between the branch sales office and corporate office

What the VPN wizard asks	What the VPN advisor recommends
What would you like to name this connection group?	SalestoCorporate
What type of connection group would you like to create?	Select **Connect your gateway to another gateway**

Table 9. Planning worksheet for VPN connection between the branch sales office and corporate office (continued)

What the VPN wizard asks	What the VPN advisor recommends
What Internet Key Exchange policy do you want to use to protect your key?	Select **Create a new policy,** and then select **Highest Security, lowest performance**
Are you using certificates?	Select **Yes** and **mycocert** as the certificate. **Note:** This certificate was created during the steps for setting up certificate authority with Digital Certificate Manager on System A.
Select the identifier to represent the local connection endpoint.	Select the identifier type **IP version 4 address** and identifier **192.168.1.2** from the list of identifier types and identifiers that were defined in the certificate you chose. **Note:** IP addresses used in this scenario are meant for example purpose only. They do not reflect an IP addressing scheme and should not be used in any actual configuration. You should use your own IP addresses when completing these tasks.
What is the identifier of the key server that you want to connect to?	Select the identifier type **IP version 4 address** and identifier: **172.16.1.3**. **Note:** IP addresses used in this scenario are meant for example purposes only. They do not reflect an IP addressing scheme and should not be used in any actual configuration. You should use your own IP addresses when completing these tasks.
What are the local endpoints of the data that this connection will protect?	**Identifier type:** IP version 4 subnet, **Identifier:** 10.1.1.0, **Mask:** 255.255.255.0
What are the remote endpoints of the data that this connection will protect?	**Identifier type:** IP version 4 subnet, **Identifier:** 10.2.1.0, **Mask:** 255.255.255.0
What are the ports and protocols of the data that this connection will protect?	**Local Port:** Any port **Remote Port:** Any port **Protocol:** Any protocol
What data policy do you want to use to protect the data?	Select **Create a new policy**, and then select **Highest security, lowest performance**
Check the interfaces on the local system to which this connection will be applied.	• ETHLINE (branch sales office) • ELINE (corporate office)

Related reference

VPN planning advisor

Configuring VPN on System A

After completing your planning for virtual private network (VPN) connections, you can configure System A to use VPN to secure transmission of data between the two networks.

Tip: If VPN server is already started when you run the VPN New Connection wizard, the wizard will not automatically find the certificate store or any of the certificates you just created. If the VPN server is running, you must restart it on iSeries Navigator before running the VPN New Connection wizard.

Important: IP addresses used in this scenario are meant for example purposes only. They do not reflect an IP addressing scheme and should not be used in any actual configuration. Use your own IP addresses when completing these tasks.

The administrator for MyCo, Inc uses the planning worksheet generated from the VPN planning advisor to configure a VPN on System A.

1. In iSeries Navigator, expand ***System A*** → **Network** → **IP Policies**.
2. Right-click **Virtual Private Networking** and select **New Connection** to start the Connection wizard. Review the Welcome page for information about what objects the wizard creates.
3. On the Connection Name page, enter `SalestoCorporate` in the **Name** field. (Optional) Specify a description for this connection group. Click **Next**.
4. On the Connection Scenario page, select **Connect your gateway to another gateway**. Click **Next**.
5. On the Internet Key Exchange Policy page, select **Create a new policy** and then select **Highest security, lowest performance**. Click **Next**.
6. On the Certificate for Local Connection Endpoint page, select **Yes** and select **mycocert** from the list of certificates. Click **Next**.
7. On the Local Connection Endpoint Identifier page, select **Version 4 IP address** as the identifier type. The associated IP address should be 192.168.1.2. This information is defined in the certificate that you create in Digital Certificate Manager (DCM). Click **Next** twice.
8. On the Remote Key Server page, select **Version 4 IP address** in the **Identifier type** field. Enter `172.16.1.3` in the **Identifier** field. This is the IP address for System B in the network of the corporate office. Click **Next**.
9. On the Local Data Endpoint page, select **IP version 4 subnet** as the identifier type, and enter `10.1.1.0` for the identifier, and `255.255.255.0` as the mask.
10. On the Remote Data Endpoint page, select **IP version 4 subnet** as the identifier type, and enter `10.2.1.0` for the identifier, and `255.255.255.0` as the mask.
11. On the Data Services page, select **Any port** for the local port, **Any port** for the remote port, and **Any protocol** for the protocol. Click **Next**.
12. On the Data Policy page, select **Create a new policy**, and then select **Highest security, lowest performance**. Click **Next**.
13. On the Applicable Interfaces page, select **ETHLINE**. Click **Next**.
14. On the Summary page, review the objects that the wizard will create to ensure they are correct.
15. Click **Finish** to complete the configuration. When the Activate Policy Filters dialog opens, select **No, packet rules will be activated at a later time**, and then click **OK**.

Configuring VPN on System B

The administrator for the corporate office follows the same steps that the administrator at the branch sales office used when System A was configured, reversing the IP address when necessary.

Use the planning worksheets for guidance.

After this administrator finishes configuring System B, both administrators can activate filter rules on both systems.

Activating filter rules on both systems

The wizard automatically creates the packet rules that this connection requires to work properly. However, you must activate them on both systems before you can start the virtual private network (VPN) connection.

To do this on System A, follow these steps:

Note: If you lose connection to the system after activating filter rules, you must delete all filter rules currently active on the system. To do this, use the RMVTCPTBL (*ALL) command from a character-based interface.

1. In iSeries Navigator, expand ***System A*** → **Network** → **IP Policies**.
2. Right-click **Packet Rules** and select **Activate Rules**.
3. On the Activate Packet Rules page, select **activate only the VPN generated rules** and select **ETHLINE** as the interface on which you would like to activate these filter rules. Click **OK**.
4. Repeat these steps to activate packet rules on System B, using ELINE instead of ETHLINE for the interface.

Starting the VPN connection

Use this procedure to start the VPN connection.

Follow these steps to start the SalestoCorporate connection from System A:

1. In iSeries Navigator, expand ***System A*** → **Network** → **IP Policies**.
2. Right-click **Virtual Private Networking** and select **Start** to start the VPN server.
3. Expand **Virtual Private Networking** → **Secure Connections**. Click **All Connections** to display a list of connections in the right pane. Right-click **SalestoCorporate**, and select **Start**.
4. From the **View** menu, select **Refresh**. If the connection starts successfully, the status changes from idle to enabled. The connection might take a few minutes to start, so periodically click **Refresh** until the status changes to Enabled.
5. Repeat these steps on System B.

Testing VPN connection between endpoints

After you finish configuring both systems and have successfully started the connection, you should test the connectivity to ensure that the remote hosts can communicate with each other.

Tip: For any traffic with the destination of the remote network, ensure that the local clients have the appropriate routes configured.

On a Windows XP workstation within the branch sales office, the network administrator should complete these steps:

1. From the command prompt, enter `ping 10.2.1.3`. This is the IP address of one of the workstations in the network of the corporate office.

   Important: IP addresses used in this scenario are meant for example purposes only. They do not reflect an IP addressing scheme and should not be used in any actual configuration. You should use your own IP addresses when completing these tasks.
2. Use the ping command to test the connectivity from the corporate office to the branch office.

Configuring VPN connection to remote users

The administrator needs to configure a virtual private network (VPN) connection to remote users to enable the remote connections.

The following tasks show you how the administrator configures a VPN connection to remote users.

Completing planning worksheets for VPN connection from the branch office to remote sales people

The administrator for the branch sales office uses the VPN planning advisor to create dynamic planning worksheets to help them configure virtual private network (VPN) on their systems and remote workstations.

The VPN planning advisor is an interactive tool that asks specific questions regarding your VPN needs. Based on your answers, the advisor generates a customized planning worksheet for your environment that can be used when you configure your VPN connection. This worksheet can then be used when you configure a VPN on your system. Each of the following planning worksheets is generated with the VPN planning advisor and is used to configure a VPN, using the VPN New Connection wizard in iSeries Navigator.

Table 10. Planning worksheet for VPN connection between branch sales office and remote sales people

What the VPN wizard asks	**What the VPN advisor recommends**
What would you like to name this connection group?	SalestoRemote
What type of connection group would you like to create?	Select **Connect your host to another host**
What Internet Key Exchange policy do you want to use to protect your key?	Select **Create a new policy** and then select **highest security, lowest performance**
Are you using certificates?	Select **No**
Enter the identifier to represent the local key server for this connection.	Identifier type: **IP version 4 address**, IP address:**192.168.1.2** **Note:** IP addresses used in this scenario are meant for example purposes only. They do not reflect an IP addressing scheme and should not be used in any actual configuration. You should use your own IP addresses when completing these tasks.
What is the identifier of the key server that you want to connect to?	Identifier type: **Any IP address**, **Pre-shared key**: mycokey. **Note:** The pre-shared key is a 32-character text string that i5/OS VPN uses to authenticate the connection as well as to establish the keys that protect your data. In general, you should treat a pre-shared key in the same way you treat a password.
What are the ports and protocols of the data that this connection will protect?	**Local Port**: 1701, **Remote Port**: Any port, **Protocol**: UDP
What data policy do you want to use to protect the data?	Select **Create a new policy** and then select **highest security, lowest performance**
Check the interfaces on the local system that this connection will be applied to.	ETHLINE (Branch sales office)

Related reference

VPN planning advisor

Configuring L2TP terminator profile for System A

If you want to configure the remote connections to remote workstations, you need to set up System A to accept inbound connections from these clients.

To configure a Layer Two Tunneling Protocol (L2TP) terminator profile for System A, complete the following steps:

1. From iSeries Navigator, expand ***System A*** → **Network** → **Remote Access Services**.
2. Right-click **Receiver Connection Profiles** to set the System A as a server that allows incoming connections from remote users, and select **New Profile**.
3. Select the following options on the Setup page:
   - **Protocol type:** PPP
   - **Connection type:** L2TP (virtual line)

     Note: The **Operating mode** field should automatically display **Terminator (network server)**.
   - **Line service type:** Single line
4. Click **OK**. This will launch the New Point-to-Point Profile Properties page.
5. On the **General** tab, complete the following fields:
   - **Name**: MYCOL2TP
   - Select **Start profile with TCP** if you would like the profile to automatically start with TCP.
6. On the **Connection** tab, select **192.168.1.2** for the **Local tunnel endpoint IP address**.

   Important: IP addresses used in this scenario are meant for example purposes only. They do not reflect an IP addressing scheme and should not be used in any actual configuration. Use your own IP addresses when completing these tasks.
7. Select **MYCOL2TP** as the **Virtual line name**. This will launch the New L2TP Properties page.
8. On the Authentication page, enter `systema` as the host name. Click **OK**. This will return you to the Connection page.
9. On the Connection page, select the following options and enter `25` as the **Maximum number of connections**.
   a. Click the **Authentication** tab and select **Require this iSeries server to verify the identity of the remote system**.
   b. Select **Authenticate locally with validation list**.
   c. Enter `QL2TP` in **Validation list name** field, and click **New**.
10. On the Validation list page, select **Add**.
11. Add user names and passwords for each of your remote employees. Click **OK**.
12. On the Password confirmation page, re-enter the password for each remote employees. Click **OK**.
13. On the TCP/IP Setting page, select 10.1.1.1 for **Local IP address**.
14. In the **IP address assignment method** field, select **Address pool**.
15. In the **Starting IP address** field, enter `10.1.1.100` and `49` for the **Number of addresses**.
16. Select **Allow remote system to access other networks (IP forwarding)**. Click **OK**.

Starting receiver connection profile

After configuring Layer Two Tunneling Protocol (L2TP) receiver connection profile for System A, the administrator needs to start this connection so that it will listen for incoming requests from remote clients.

Note: You might receive an error message that the QUSRWRK subsystem is not started. This message occurs when attempting to start the receiver connection profile. To start the QUSRWRK subsystem, complete these steps:

1. In a character-based interface, enter `strsbs`.
2. On the Start Subsystem display, enter `QUSRWRK` in the **Subsystem description** field.

To start the receiver connection profile for remote clients, complete these tasks:

1. In iSeries Navigator, select **Refresh** from the **View** menu. This will refresh your instance of iSeries Navigator.
2. In iSeries Navigator, expand ***System A*** → **Network** → **Remote Access Services**.
3. Double-click **Receiver Connection Profiles** and right-click **MYCOL2TP** and select **Start**.
4. The **Status** field will display, **Waiting for connection requests**.

Configuring a VPN connection on System A for remote clients

After configuring and starting the Layer Two Tunneling Protocol (L2TP) receiver connection profile for System A, the administrator needs to configure a virtual private network (VPN) to protect the connection between remote clients and the network in the branch sales office.

To configure a VPN for remote clients, complete these steps:

Important: IP addresses used in this scenario are meant for example purposes only. They do not reflect an IP addressing scheme and should not be used in any actual configuration. Use your own IP addresses when completing these tasks.

1. From iSeries Navigator, expand ***System A*** → **Network** → **IP Policies**.
2. Right-click **Virtual Private Networking** and select **New Connection** to start the VPN New Connection wizard. Review the Welcome page for information about what objects the wizard creates.
3. Click **Next** to go to the Connection Name page.
4. In the **Name** field, enter `SalestoRemote`.
5. Optional: Specify a description for this connection group. Click **Next**.
6. On the Connection Scenario page, select **Connect your host to another host**. Click **Next**
7. On the Internet Key Exchange Policy page, select **Create a new policy**, and then select **Highest security, lowest performance**. Click **Next**.
8. On the Certificate for Local Connection Endpoint page, select **No**. Click **Next**.
9. On the Local Key Server page, select **Version 4 IP address** as the identifier type. The associated IP address should be 192.168.1.2. Click **Next**.
10. On the Remote Key Server page, select **Any IP address** in the **Identifier type** field. In the **Pre-shared key** field, enter `mycokey`. Click **Next**.
11. On the Data Services page, enter `1701` for the local port. Then select `1701` for the remote port and select **UDP** for the protocol. Click **Next**.
12. On the Data Policy page, select **Create a new policy** and then select **Highest security, lowest performance**. Click **Next**.
13. On the Applicable Interfaces page, select **ETHLINE**. Click **Next**.
14. On the Summary page, review the objects that the wizard will create to ensure they are correct.
15. Click **Finish** to complete the configuration. When the Activate Policy Filters window opens, select **No, packet rules will be activated at a later time**. Click **OK**.

Updating VPN policies for remote connections from Windows XP and Windows 2000 clients

Because the wizard creates a standard connection that can be used for most virtual private network (VPN) configurations, you will need to update the policies that are generated by the wizard to ensure interoperability with Windows XP and Windows 2000 clients.

To update these VPN policies, complete the following tasks:

1. From iSeries Navigator, expand *System A* → **Network** → **IP Policies** → **Virtual Private Networking** → **IP Security Policies**.
2. Double-click **Internet Key Exchange Policies** and right-click **Any IP address** and select **Properties**.
3. On the Transform page, click **Add**.
4. On the Add Internet Key Exchange Transform page, select the following options:
   - **Authentication method:** Pre-shared key
   - **Hash algorithm:** MD5
   - **Encryption algorithm:** DES-CBC
   - **Diffie-Hellman group:** Group 1
5. Click **OK**.
6. From iSeries Navigator, expand *System A* → **Network** → **IP Policies** → **Virtual Private Networking** → **IP Security Policies**.
7. Double-click **Data Policies** and right-click **SalestoRemote** and select **Properties**.
8. On the General page, clear **Use Diffie-Hellman perfect forward secrecy**.
9. Select the **ESP Proposal**, click **Edit**.
10. On the Data Policy Proposal page, modify the options as follows:
    - **Encapsulation mode:** Transport
    - **Key expiration:** 15 minutes
    - **Expire at size limit:** 100000
11. On the Transform page, click **Add**.
12. On the Add Data Policy Transform page, select the following options:
    - **Protocol:** Encapsulating security payload (ESP)
    - **Authentication algorithm:** MD5
    - **Encryption algorithm:** DES-CBC
13. Click **OK** twice.

Activating filter rules

The wizard automatically creates the packet rules that this connection requires to work properly. However, you must activate them on both systems before you can start the virtual private network (VPN) connection.

To activate filter rules on System A, follow these steps:

Important: IP addresses used in this scenario are meant for example purposes only. They do not reflect an IP addressing scheme and should not be used in any actual configuration. You should use your own IP addresses when completing these tasks.

1. From iSeries Navigator, expand *System A* → **Network** → **IP Policies**.
2. Right-click **Packet Rules** and select **Activate Rules**.
3. On the Activate Packet Rules page, select **activate only the VPN generated rules** and select **ETHLINE** as the interface on which you would like to activate these filter rules. Click **OK**.

Before remote users can configure their Windows XP workstations, the administrator gives them the following information so they can set up their side of the connection. For each of your remote users, give them the following information:

- Name of Pre-shared key: `mycokey`
- IP address of System A: 192.168.1.2
- User name and password for the connection

Note: These were created when the administrator added the user name and passwords to a validation list during the configuration of Layer Two Tunneling Protocol (L2TP) terminator profile.

Configuring VPN on Windows XP client

Use this procedure to configure VPN on Windows XP client.

Remote users at MyCo, Inc need to set up their remote Windows XP client by completing the following steps:

1. In the Windows XP **Start** menu, expand **All Programs** → **Accessories** → **Communications** → **New Connection Wizard**.
2. On the Welcome page, read the overview information. Click **Next**.
3. On the Network Connection Type page, select **Connect to the network at my workplace**. Click **Next**.
4. On the Network Connection page, select **Virtual Private Network connection**. Click **Next**.
5. On the Connection Name page, enter `Connection to Branch office` in the **Company Name** field. Click **Next**.
6. On the Public Network page, select **Do not dial the initial connection**. Click **Next**.
7. On the VPN Server Selection page, enter `192.168.1.2` in the **Host name or IP address** field. Click **Next**.
8. On the Connection Availability page, select **My Use Only**. Click **Next**.
9. On the Summary page, click **Add a shortcut to this connection to my desktop**. Click **Finish**.
10. Click the **Connect Connection to MyCo** icon that has been created on your desktop.
11. On the Connect Connection to MyCo page, enter the user name and password that the administrator provided.
12. Select **Save this user name and password for the following users** and **Me only**. Click **Properties**.
13. On the **Security** page, ensure that the following **Security options** are selected:
    - **Typical**
    - **Require secured password**
    - **Require data encryption**

    Click **IPSec Settings**.
14. On the IPSec Settings page, select **Use pre-shared key for authentication** and enter `mycokey` in the **Pre-shared key** field. Click **OK**.
15. On Networking page, select **L2TP IPSec VPN** as the **Type of VPN**. Click **OK**.
16. Sign on with user name and password and click **Connect**.

To start the virtual private network (VPN) connection on the client side, click the icon that appears on your desktop after completing the connection wizard.

Testing VPN connection between endpoints

After you finish configuring the connection between System A and remote users and have successfully started the connection, you should test the connectivity to ensure that the remote hosts can communicate with each other.

To test the connectivity, follow these steps:

1. From iSeries Navigator, expand *System A* → **Network**.
2. Right-click **TCP/IP Configuration** and select **Utilities** and then select **Ping**.
3. From the **Ping from** dialog, enter `10.1.1.101` in the **Ping** field.

Note: 10.1.1.101 represents the IP address dynamically assigned (to the remote sales client) from the address pool specified in the Layer Two Tunneling Protocol (L2TP) terminator profile on System A.

4. Click **Ping Now** to verify connectivity from System A to a remote workstation. Click **OK**.

To test the connection from the remote client, the remote employee completes these steps on a workstation that is running Windows:

1. From the command prompt, enter `ping 10.1.1.2`. This is the IP address of one of the workstations in the network of the corporate office.
2. Repeat these steps to test the connectivity from the corporate office to the branch office.

Scenario: Creating a virtual Ethernet for interpartition communications

As a system administrator of a small company, you use a system that is divided into four logical partitions. You need to allow communication between all four logical partitions. Because money and space is limited in your IT department, you want to avoid purchasing excess Ethernet cards and cables.

Situation

Your hardware has a limited number of card slots available for local area network (LAN) cards. Therefore, you must find a solution that does not require additional LAN cards.

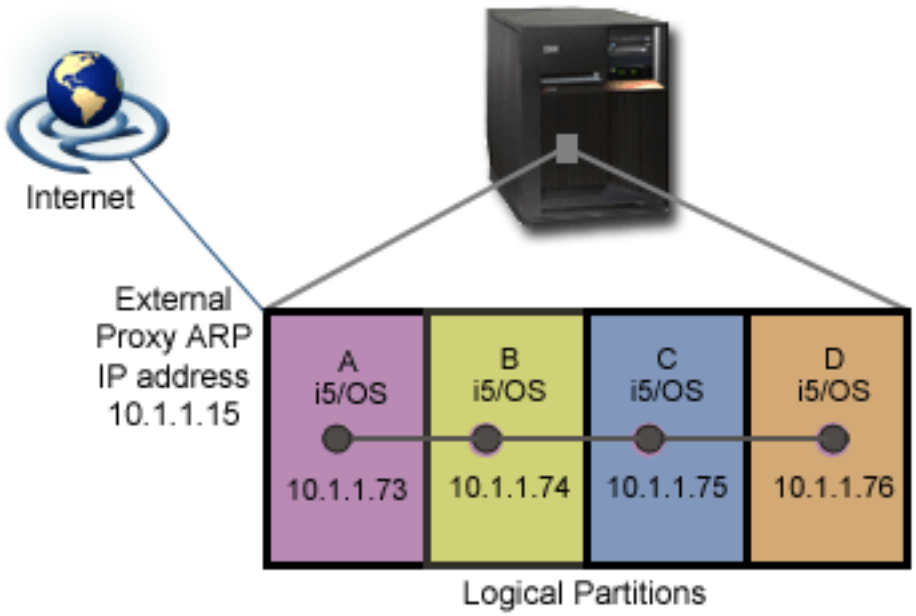
Objectives

As the system administrator for this company, you have the following objectives:

- To create a virtual Ethernet network to allow communications between logical partitions.
- To enable proxy ARP to connect the virtual Ethernet network to an external LAN.
- To configure the necessary lines, interfaces and routes.

Details

This figure shows a virtual Ethernet that enables communication among four logical partitions and uses proxy ARP to allow the data to flow between the virtual Ethernet and the external LAN.



- Four logical partitions have been created on the system.
- Each partition runs on i5/OS Version 5 Release 4.

- A virtual TCP/IP interface is configured on each partition using these IP addresses:
  - Partition A has the IP address 10.1.1.73.
  - Partition B has the IP address 10.1.1.74.
  - Partition C has the IP address 10.1.1.75.
  - Partition D has the IP address 10.1.1.76.
- An external proxy ARP interface is configured on Partition A using the IP address 10.1.1.15.

Prerequisites and assumptions

Setup requirements are as follows:

- i5/OS Version 5 Release 3 or later installed on the primary logical partition
- IBM System i
- Four logical partitions (LPAR) on the system. The primary logical partition must have i5/OS Version 5 Release 3, or later, installed. The other logical partitions can have i5/OS V5R3 or Linux® installed.

  In this scenario, all of the logical partitions are using System i products.

Note: If you use IBM System i5 products, the concept of a primary logical partition is not applicable. In addition, the steps to enable the logical partitions to participate in a virtual Ethernet are performed from a Hardware Management Console (HMC).

Related reference

Logical partitions

Related information

Virtual Ethernet for i5/OS logical partitions

Enabling the logical partitions to participate in a virtual Ethernet

Use this procedure to enable virtual Ethernet.

1. At the command line on the primary partition (partition A), type `STRSST` and press Enter.
2. Type your service tools user ID and password.
3. From the System Service Tools (SST) display, select Option 5 (Work with System Partitions).
4. From the Work with System Partitions display, select Option 3 (Work with partition configuration).
5. Press F10 (Work with Virtual Ethernet).
6. Type 1 in the appropriate column for the primary partition and the secondary partition to enable the partitions to communicate with one another over virtual Ethernet.
7. Exit System Service Tools (SST) to return to the command line.

Creating the Ethernet line descriptions

Use this procedure to configure new Ethernet line descriptions to support virtual Ethernet.

1. At the command line on logical partition A, type `WRKHDWRSC *CMN`, and press Enter.
2. From the Work with Communication Resources display, select Option 7 (Display resource detail) next to the appropriate virtual Ethernet port.

   The Ethernet port identified as 268C is the virtual Ethernet resource. There will be one for each virtual Ethernet that is connected to the logical partition.
3. From the Display Resource Detail display, scroll down to find the port address.

   The port address corresponds to the virtual Ethernet you selected during the configuration of the logical partition.
4. From the Work with Communication Resources display, select Option 5 (Work with configuration descriptions) next to the appropriate virtual Ethernet port, and press Enter.

5. From the Work with Configuration Descriptions display, select Option 1 (Create), and press Enter to see the Create Line Description Ethernet (CRTLINETH) display.
   a. For the *Line description* prompt, type `VETH0`. The name VETH0, although arbitrary, corresponds to the numbered column on the Virtual Ethernet page in which you enabled the logical partitions to communicate. If you use the same names for the line descriptions and their associated virtual Ethernet, you can easily keep track of your virtual Ethernet configurations.
   b. For the *Line speed* prompt, type `1G`.
   c. For the *Duplex* prompt, type `*FULL`, and press Enter.
   d. For the *Maximum frame size* prompt, type `8996`, and press Enter.

      By changing the frame size to 8996, the transfer of data across the virtual Ethernet is improved.

      You will see a message stating the line description has been created.
6. Vary on the line description. Type `WRKCFGSTS *LIN` and select Option 1 (Vary on) for VETH0.
7. Repeat steps 1 through 6, but perform the steps from the command lines on logical partitions B, C, and D to create an Ethernet line description for each logical partition.

   Although the names of your line descriptions are arbitrary, it is helpful to use the same names for all of the line descriptions associated with the virtual Ethernet. In this scenario, all the line descriptions are named VETH0.

Turning on IP datagram forwarding

You need to turn on IP datagram forwarding on the partition that connects the virtual Ethernet to the external LAN. IP datagram forwarding enables the IP packets to be forwarded among different subnets.

For this scenario, you need to turn on IP datagram forwarding on Partition A.

To turn on IP datagram forwarding, follow these steps:

1. At the command line on partition A, type `CHGTCPA` and press F4.
2. For the *IP datagram forwarding* prompt, type `*YES`.

Creating the interface to enable proxy ARP

Before you create the TCP/IP interfaces, you need to decide how you want to connect your virtual Ethernet to a physical local area network (LAN). To allow your logical partitions to communicate with systems on an external LAN, you need to enable the TCP/IP traffic to travel between the virtual Ethernet and the external LAN.

There are three methods for connecting the virtual and external networks: Proxy ARP, network address translation (NAT), and TCP/IP routing. This scenario uses the Proxy ARP method. For more information about all three methods of connecting this network traffic, see TCP/IP techniques connecting virtual Ethernet to external LANs.

To create the TCP/IP interface to enable proxy ARP, complete these steps:

1. Obtain a contiguous block of IP addresses that are routable by your network.

   Because you have a total of four logical partitions in this virtual Ethernet, you need a block of eight addresses. The fourth segment of the first IP address in the block must be divisible by eight. The first and last IP addresses of this block are the subnet and broadcast IP addresses are unusable. The second address can be used for a virtual TCP/IP interface on logical partition A, and the third, fourth, and fifth addresses can be used for the TCP/IP connections on each of the other logical partitions. For this scenario, the IP address block is 10.1.1.72 through 10.1.1.79 with a subnet mask of 255.255.255.248.

   You also need a single IP address for your external TCP/IP address. This IP address should not belong to your block of contiguous addresses, but it must be within the same original subnet mask of 255.255.255.0.

2. Create an i5/OS TCP/IP interface for logical partition A. This interface is known as the external, proxy ARP IP interface.

   To create the interface, follow these steps:

   a. At the command line on partition A, type `CFGTCP`, and press Enter to see the Configure TCP/IP display.
   b. Select Option 1 (Work with TCP/IP Interfaces), and press Enter.
   c. Select Option 1 (Add), and press Enter to see the Add TCP/IP Interface (ADDTCPIFC) display.
   d. For the Internet address prompt, type `10.1.1.15`.
   e. For the Line description prompt, type the name of your line description, such as ETHLINE.
   f. For the Subnet mask prompt, type `255.255.255.0`.
3. Start the interface. On the Work with TCP/IP Interfaces display, select Option 9 (Start) by the interface you want to start.

Related reference

TCP/IP techniques connecting virtual Ethernet to external LANs

Creating the virtual Ethernet interface on partition A

Use this procedure to create the virtual Ethernet interface on partition A.

1. At the command line on partition A, type `CFGTCP`, and press Enter to see the Configure TCP/IP display.
2. Select Option 1 (Work with TCP/IP Interfaces), and press Enter.
3. Select Option 1 (Add), and press Enter to see the Add TCP/IP Interface (ADDTCPIFC) display.
4. For the Internet address prompt, type `10.1.1.73`.
5. For the Line description prompt, type `VETH0`.
6. For the Subnet mask prompt, type `255.255.255.248`.
7. For the Associated local interface prompt, type `10.1.1.15`. This associates the virtual Ethernet interface to the external interface and enables proxy ARP to forward packets between the virtual Ethernet interface 10.1.1.73 and the external interface 10.1.1.15.
8. Start the interface. On the Work with TCP/IP Interfaces display, select Option 9 (Start) by the interface you want to start.

Creating the virtual Ethernet interface on partition B

Use this procedure to create the virtual Ethernet interface on partition B.

1. At the command line on partition B, type `CFGTCP`, and press Enter to see the Configure TCP/IP display.
2. Select Option 1 (Work with TCP/IP Interfaces), and press Enter.
3. Select Option 1 (Add), and press Enter to see the Add TCP/IP Interface (ADDTCPIFC) display.
4. For the Internet address prompt, type `10.1.1.74`.
5. For the Line description prompt, type `VETH0`.
6. For the Subnet mask prompt, type `255.255.255.248`.
7. Start the interface. On the Work with TCP/IP Interfaces display, select Option 9 (Start) by the interface you want to start.

Creating the virtual Ethernet interface on partition C

Use this procedure to create the virtual Ethernet interface on partition C.

1. At the command line on partition C, type `CFGTCP`, and press Enter to see the Configure TCP/IP display.
2. Select Option 1 (Work with TCP/IP Interfaces), and press Enter.

3. Select Option 1 (Add), and press Enter to see the Add TCP/IP Interface (ADDTCPIFC) display.
4. For the Internet address prompt, type `10.1.1.75`.
5. For the Line description prompt, type `VETH0`.
6. For the Subnet mask prompt, type `255.255.255.248`.
7. Start the interface. On the Work with TCP/IP Interfaces display, select Option 9 (Start) by the interface you want to start.

Creating the virtual Ethernet interface on partition D

Use this procedure to create the virtual Ethernet interface on partition D.

1. At the command line on partition D, type `CFGTCP`, and press Enter to see the Configure TCP/IP display.
2. Select Option 1 (Work with TCP/IP Interfaces), and press Enter.
3. Select Option 1 (Add), and press Enter to see the Add TCP/IP Interface (ADDTCPIFC) display.
4. For the Internet address prompt, type `10.1.1.76`.
5. For the Line description prompt, type `VETH0`.
6. For the Subnet mask prompt, type `255.255.255.248`.
7. Start the interface. On the Work with TCP/IP Interfaces display, select Option 9 (Start) by the interface you want to start.

Creating the routes

Use this procedure to create the default routers to enable the packets to exit the virtual Ethernet.

1. At the command line on partition B, type `CFGTCP`, and press Enter.
2. Select Option 2 (Work with TCP/IP Routes), and press Enter.
3. Select Option 1 (Add), and press Enter.
4. For the Route destination prompt, type `*DFTROUTE`.
5. For the Subnet mask prompt, type `*NONE`.
6. For the Next hop prompt, type `10.1.1.73`.
7. Repeat steps 1 through 6 for partitions C and D to create a default route on each of those logical partitions. Specify 10.1.1.73 as the next hop address in each case.

   Packets from each of these logical partitions travel over the virtual Ethernet to the 10.1.1.73 interface using these default routes. Because 10.1.1.73 is associated with the external proxy ARP interface 10.1.1.15, the packets continue out of the virtual Ethernet using the proxy ARP interface.

Verifying network communications

Use the ping command to verify your network communications.

- From partitions B, C, and D, ping the virtual Ethernet interface 10.1.1.73 and an external host.
- From an external i5/OS host, ping each of the virtual Ethernet interfaces 10.1.1.73, 10.1.1.74, 10.1.1.75, and 10.1.1.76.

Related reference

Ping

Scenario: Sharing a modem between logical partitions using L2TP

You have virtual Ethernet set up across four logical partitions. You want selected logical partitions to share a modem to access an external LAN.

Situation

You are the system administrator at a medium-sized company. It is time to update your computer equipment, but you want to do more than that; you want to streamline your hardware. You start the process by consolidating the work of three old systems onto one new system. You create three logical partitions on the system. The new system comes with a 2793 internal modem. This is the only input/output processor (IOP) you have that supports Point-to-Point Protocol (PPP). You also have an old 7852–400 electronic customer support modem.

Solution

Multiple systems and partitions can share the same modems for dial-up connections, eliminating the need for each system or partition to have its own modem. This is possible if you use L2TP tunnels and configure L2TP profiles that allow outgoing calls. In your network, the tunnels will run over a virtual Ethernet network and a physical network. The physical line is connected to another system that shares the modems in your network.

Details

The following figure illustrates the network characteristics for this scenario:

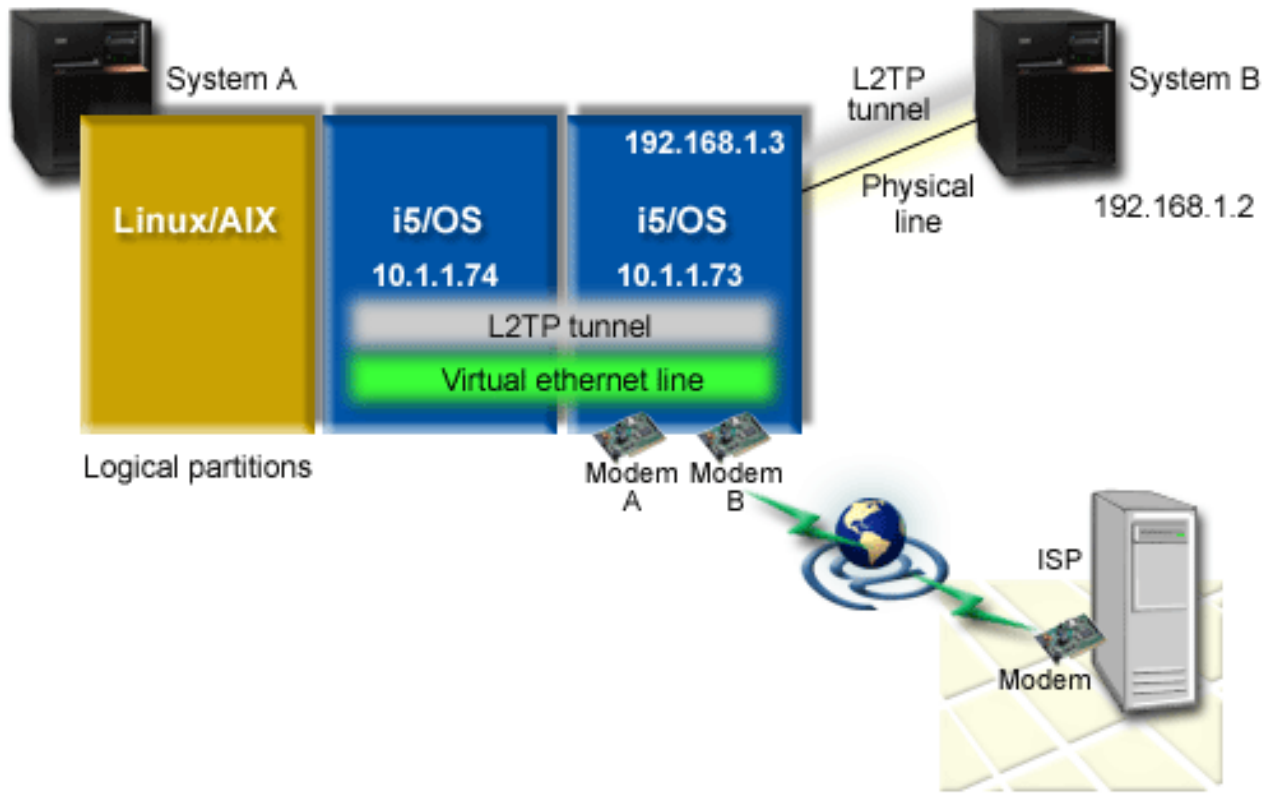


Figure 1. Multiple systems sharing the same modem for dial-up connections

Prerequisites and assumptions

System A must meet the following setup requirements:

- i5/OS Version 5 Release 3 or later, installed on the partition that owns the ASYNC capable modems
- Hardware that allows you to partition.

- iSeries Access for Windows and iSeries Navigator (Configuration and Service component of iSeries Navigator), Version 5 Release 3, or later,
- You have created at least two logical partitions (LPAR) on the system. The partition that owns the modem must have i5/OS V5R3, or later, installed. The other partitions can have OS/400® V5R2, i5/OS V5R3, Linux, or AIX® installed. In this scenario, the partitions are either using the i5/OS or the Linux operating system.
- You have virtual Ethernet created to communicate across partitions. See the following scenario: Scenario: Creating a virtual Ethernet for interpartition communications.

System B must have the licensed program and relevant components of iSeries Navigator installed: iSeries Access for Windows and iSeries Navigator (Configuration and Service component of iSeries Navigator) V5R2, or later.

Scenario details: Sharing a modem between logical partitions using L2TP

After you complete the prerequisites, you are ready to begin configuring the Layer Two Tunneling Protocol (L2TP) profiles.

Step 1: Configuring the L2TP terminator profile for any interface on the partition that owns the modems

To create a terminator profile for any interface, follow these steps:

1. In iSeries Navigator, expand *your system* → **Network** → **Remote Access Services**.
2. Right-click **Receiver Connection Profiles**, and select **New Profile**.
3. Select the following options on the Setup page and click **OK**:
   - **Protocol type**: PPP
   - **Connection type**: L2TP (virtual line)
   - **Operating mode**: Terminator (network server)
   - **Type of line service**: Single line
4. On the **New Profile - General** tab, complete the following fields:
   - **Name**: toExternal
   - **Description**: Receiver connection to dial out
   - Select **Start profile with TCP**.
5. On the **New Profile - Connection** tab, complete the following fields.
   - **Local tunnel endpoint IP address**: ANY
   - **Virtual line name**: toExternal. This line has no associated physical interfaces. The virtual line describes various characteristics of this PPP profile. After the L2TP Line Properties window opens, click the **Authentication** tab and enter your system's host name. Click **OK** to return to the **Connection** tab on the New PPP Profile Properties window.
6. Click **Allow out-going call establishment**. The **Outgoing call dial properties** dialog appears.
7. On the Outgoing Call Dial Properties page, select a line service type.
   - **Type of line service**: Line pool
   - **Name**: dialOut
   - Click **New**. The **New Line Pool Properties** dialog appears.
8. On the New line pool properties window, select the lines and modems to which you will allow the outgoing calls and click **Add**. If you need to define these lines, select **New Line**. The interfaces on the partition which owns these modems will try to use whichever line is open from this line pool. The new Line Properties window opens.
9. On the **New Line Properties - General** tab, enter information in the following fields:
   - **Name**: line1

- **Description**: first line and first modem for line pool (2793 internal modem)
- **Hardware resource**: cmn03 (communication port)

10. Accept the defaults on all other tabs and click **OK** to return to the New Line Pool Properties window.
11. On the New Line Pool Properties window, select the lines and modems to which you will allow the outgoing calls and click **Add**. Verify the 2793 modem is a selected for the pool.
12. Select **New Line** again to add the 7852–400 electronic customer support modem. The new Line Properties window opens.
13. On the **New Line Properties - General** tab, enter information in the following fields:
    - **Name**: line2
    - **Description**: second line and second modem for line pool (7852-400 external electronic customer support modem)
    - **Hardware resource**: cmn04 (V.24 port)
    - **Framing**: Asynchronous
14. On the **New Line Properties - Modem** tab, select the external modem (7852–400) and click **OK** to return to the New Line Pool Properties window.
15. Select any other available lines you want to add to the line pool and click **Add**. In this example, verify the two new modems you added above are listed under the **Selected lines for pool** field and click **OK** to return to the Outgoing Call Dial Properties window.
16. On the Outgoing Call Dial Properties window, enter the `Default Dial Numbers` and click **OK** to return to the New PPP Profile Properties window.

    Note: These numbers might be something like your Internet service provider (ISP) which is going to be frequently called by the other systems using these modems. If the other systems specify a telephone number of *PRIMARY or *BACKUP, the actual numbers dialed will be the ones specified here. If the other systems specify an actual telephone number, the telephone number will be used instead.
17. On the **TCP/IP Settings** tab, select the following values:
    - **Local IP address**: None
    - **Remote IP address**: None

    Note: If you want to use the profile to end L2TP sessions, you need to pick the local IP address that represents the system. For the remote IP address, you can select an address pool that is in the same subnet as your system. All L2TP sessions get their IP addresses from this pool.
18. On the **Authentication** tab, accept all default values.

You are now finished configuring an L2TP terminator profile on the partition with the modems. The next step is to configure an L2TP remote dial, the originator profile for 10.1.1.74.

Step 2: Configuring an L2TP originator profile on 10.1.1.74

These steps guide you to create a Layer Two Tunneling Protocol (L2TP) originator profile:

1. In iSeries Navigator, expand **10.1.1.74 → Network → Remote Access Services**.
2. Right-click **Originator Connection Profiles**, and select **New Profile**.
3. Select the following options on the Setup page and click **OK**:
    - **Protocol type**: PPP
    - **Connection type**: L2TP (virtual line)
    - **Operating mode**: Remote dial
    - **Type of line service**: Single line
4. On the **General** tab, complete the following fields:
    - **Name**: toModem

- **Description**: originator connection going to partition owning modem

5. On the **Connection** tab, complete the following fields:

   Virtual line name: toModem. This line has no associated physical interface. The virtual line describes various characteristics of this PPP profile. The L2TP Line Properties window opens.
6. On the **General** tab, enter a description for the virtual line.
7. On the **Authentication** tab, enter the local host name of the partition and click **OK** to return to the Connection page.
8. In the **Remote telephone numbers** field, add `*PRIMARY` and `*BACKUP`. This allows the profile to use the same telephone numbers as the terminator profile on the partition owning the modems.
9. In the **Remote tunnel endpoint host name or IP address** field, enter the remote tunnel endpoint IP address (`10.1.1.73`).
10. On the **Authentication** tab, select **Allow the remote system to verify the identity of this iSeries server**.
11. Under Authentication protocol to use, select **Require encrypted password (CHAP-MD5)**. By default, **Allow extensible authentication protocol** is also selected.

    Note: The protocol should match whatever protocol the system to which you are dialing uses.
12. Enter your user name and password.

    Note: The user name and password need to match whatever the valid user name and password are on the system to which you are dialing.
13. Go to the **TCP/IP Settings** tab and verify the required fields:
    - **Local IP address**: Assigned by remote system
    - **Remote IP address**: Assigned by remote system
    - **Routing**: No additional routing is required
14. Click **OK** to save the PPP profile.

Step 3: Configuring an L2TP remote dial profile for 192.168.1.2

You can configure a Layer Two Tunneling Protocol (L2TP) remote dial profile for 192.168.1.2 by repeating Step 2 and changing the remote tunnel endpoint to 192.168.1.3 (the physical interface to which System B connects).

Note: These are fictitious IP addresses and used for example purposes only.

Step 4: Testing the connection

After you finish configuring both systems, you should test the connectivity to ensure that the systems are sharing the modem to reach external networks.

1. Ensure that the Layer Two Tunneling Protocol (L2TP) terminator profile is active.
   a. In iSeries Navigator, expand **10.1.1.73** → **Network** → **Remote Access Services** → **Receiver Connection Profiles**.
   b. In the right pane, find the required profile (toExternal) and verify the **Status** field is Active. If not, right-click the profile and select **Start**.
2. Start the Remote dial profile on 10.1.1.74.
   a. In iSeries Navigator, expand **10.1.1.74** → **Network** → **Remote Access Services** → **Originator Connection Profiles**.
   b. In the right pane, find the required profile (toModem) and verify the **Status** field is Active. If not, right-click the profile and select **Start**.
3. Start the remote dial profile on System B.
   a. In iSeries Navigator, expand **192.168.1.2** → **Network** → **Remote Access Services** → **Originator Connection Profiles**.

b. In the right pane, find the profile you created and verify the **Status** field is Active. If not, right-click the profile and select **Start**.

4. If possible, ping the Internet service provider (ISP) or other destination that you've dialed to verify both profiles are active. You will attempt the ping from both 10.1.1.74 and 192.168.1.2.
5. As an alternative, you can also check the connection status.
   a. In iSeries Navigator, expand **the system → Network → Remote Access Services → Originator Connection Profiles**.
   b. In the right pane, right-click the profile you created and select **Connections**. On the Connection Status window you can see which profiles are active, inactive, connecting, and more.

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