



EL02
Student Guide
V5 iSeries Dynamic IP



ITS0 iSeries Technical Forum 2003

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Introduction to this Lab

iSeries Navigator is built for the most part with a single iSeries administrator in mind. That is, it is very unlikely that you will have two iSeries administrators both changing the DHCP configuration, for example.

The green screen example is that it would be rare (and dangerous) if two administrators were in the middle of the CHGTCPA. In this case the last administrator to hit enter 'wins' and that configuration is saved and used on the iSeries.

iSeries Navigator is the same way.

What makes matters worse is that in this lab environment we will have from 12 to 20 teams (administrators) all requesting the same Operation Navigator functions.

To resolve this conflict some of the configurations that you would normally do to set up a server on the iSeries via iSeries Navigator has been done for you. All you must do is **browse** the configuration and **cancel** - making sure you do not make any changes.

In other more interesting places you will still be expected to go in and make the changes - but only one team at a time can do so.

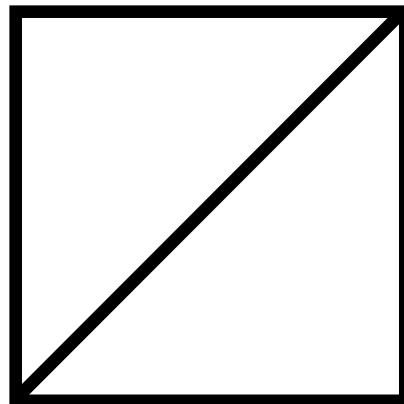
To prevent conflicts, your administrator will manage a board controlling access to certain functions within iSeries Navigator and the physical lines.

This is the symbol you will use to indicate your team is IN a restricted area.

Multilink - Use the Board

You **MUST** use the board to wait your turn to access the Multilink test area!

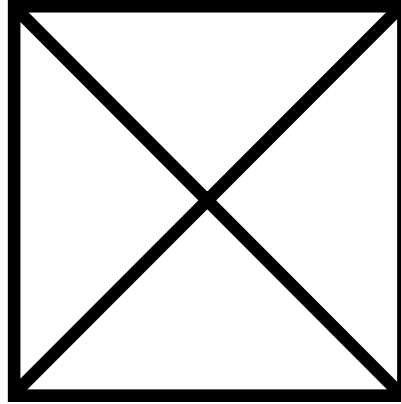
This symbol means my team is IN - and everybody else must be OUT.



Multilink - Use the Board

You MUST use the board to leave the Multilink test area!

This symbol means my team is OUT - let the next team that is in queue know.



And above is the symbol when you are finished and out - meaning you have closed all the iSeries Navigator configuration and stopped all your active configurations.

0.1 The hardware lab environment

Figure 1 shows the hardware environment as used in the following labs. You will need the information when performing several of the configuration tasks. You might want to 'rip this page out'

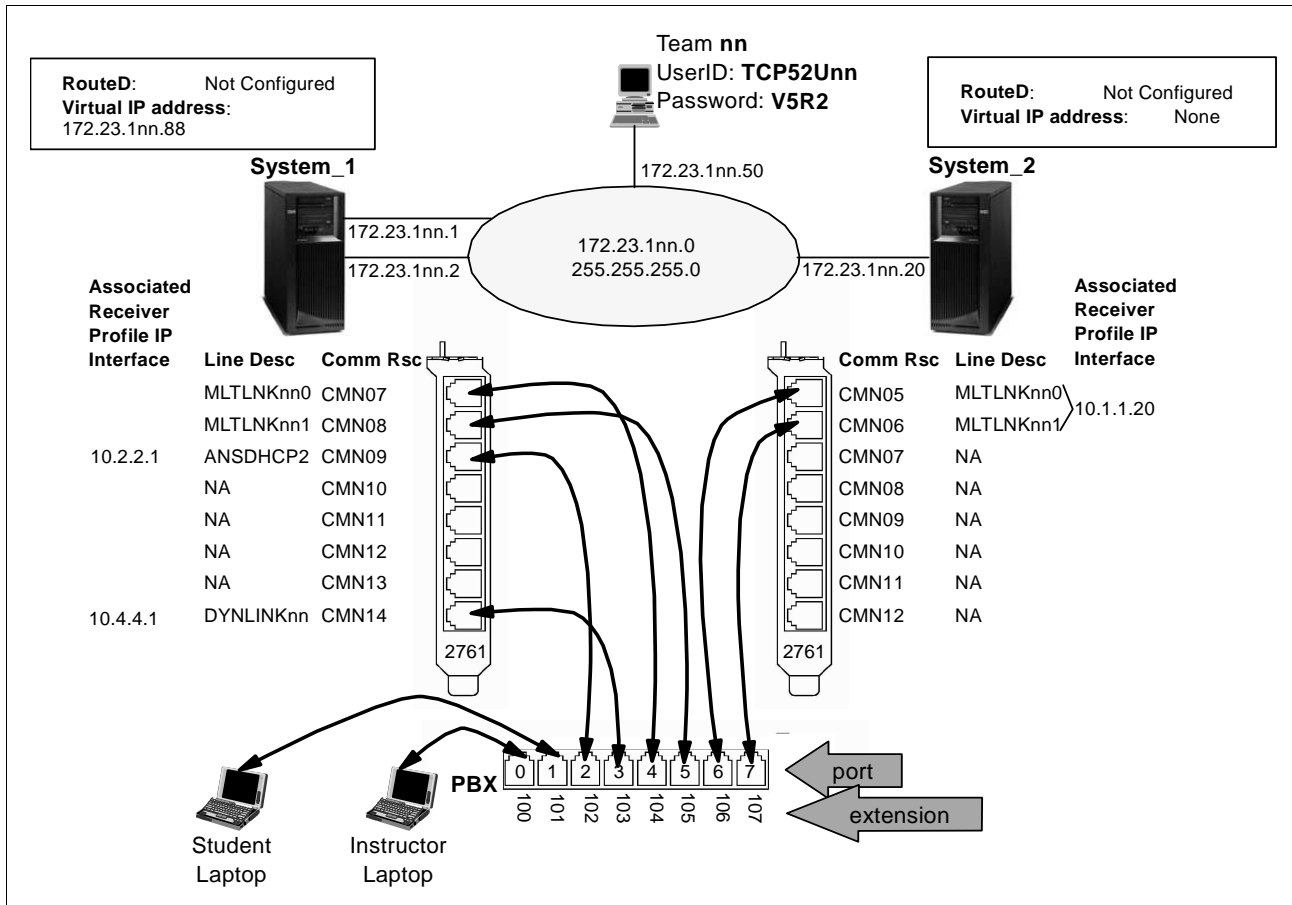


Figure 1. Lab hardware environment for Team nn

0.2 Your Team number: nn = _____

0.3 Physical layout of the iSeries servers

Open two iSeries Navigator windows. Left: <System_1> and right: <System_2>:

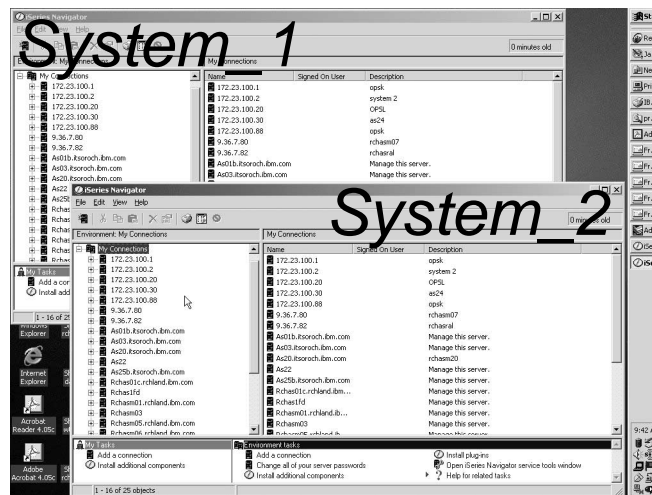


Figure 2. Open two iSeries Navigator windows to administer your two servers

Lab 1. Virtual IP Interface and proxy ARP

This lab provides you the opportunity to configure a virtual IP interface with fault tolerance through the use of proxy ARP.

After you complete this lab, you will have an ability to configure a virtual IP interface on the iSeries server considering the fault tolerance.

Objectives

This lab allows you to learn how to:

- Configure a virtual IP interface on the iSeries server.
- Plan the network configuration using virtual IP fault tolerance.

Scenario

Your customer requires uninterrupted IP communication to the iSeries server to improve availability of business-critical applications. Two physical Token-Ring interfaces (TRNLINE1 and TRNLINE2) are hooked up to the Token-Ring network. Using these two physical lines, is it possible to provide an uninterrupted and fault tolerant IP communication path using a single virtual IP address to access the iSeries server. This setup allows uninterrupted access to the system even if one of the physical interfaces goes down.

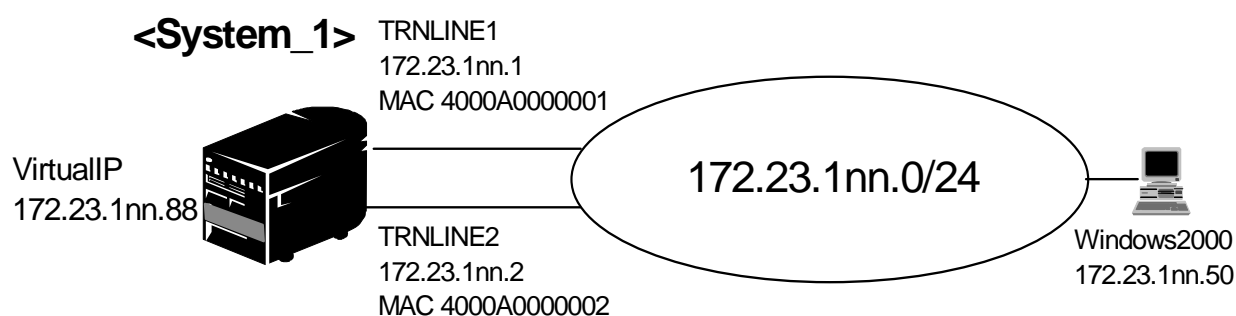


Figure 3. Virtual IP Interface and proxy ARP

You will perform the following tasks in order:

- Task 1: "Create a new virtual IP interface" on page 9.
- Task 2: "Verify your virtual IP address from your workstation" on page 13.
- Task 3: "Enable Proxy ARP for Virtual IP address" on page 13.
- Task 4: "Configure iSeries Navigator to use your virtual IP address" on page 14.
- Task 5: "Test fault tolerance with your virtual IP interface" on page 15.

Task 1: Create a new virtual IP interface

Important: In this lab, you will be working with the <System_1> server. Login to the correct system using iSeries Navigator. Use Figure 3 as a guide.

- ___ 1. Start iSeries Navigator on your workstation by clicking **Start -> Programs -> IBM iSeries Access for Windows -> iSeries Navigator**. iSeries Navigator window will appear.
- ___ 2. Double-click **My Connections**.
- ___ 3. Expand your iSeries server **<System_1>**. You may be asked to enter your userid and password.

UserID TCP52Unn
Password V5R2
- ___ 4. Expand **Network -> TCP/IP Configuration -> IPv4**.
- ___ 5. Right-click **Interfaces** and select **New Interface -> Virtual IP** as shown in Figure 4.

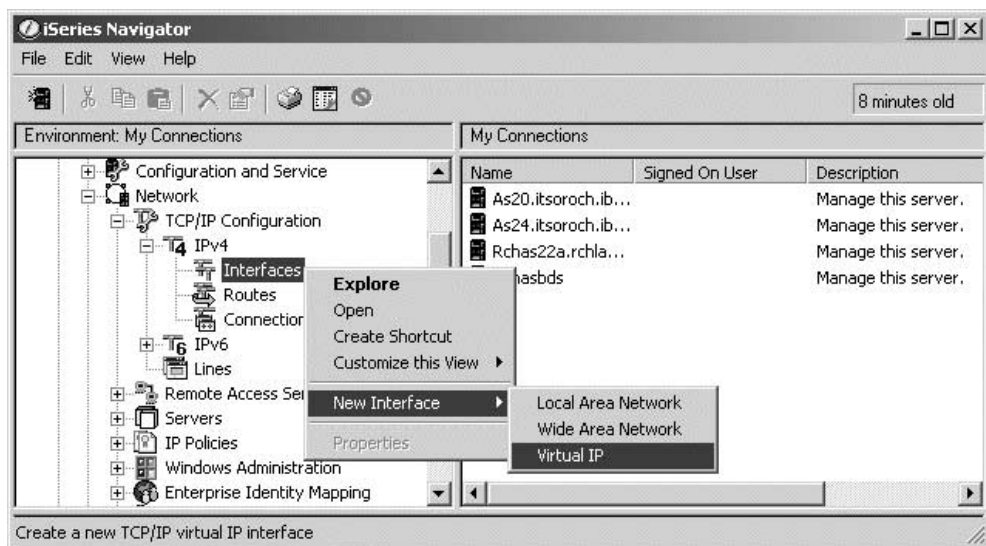


Figure 4. Interfaces: New Interface: Virtual IP

- ___ 6. The Welcome panel of the New IPv4 Interface wizard appears as shown in Figure 5. Click **Next**.

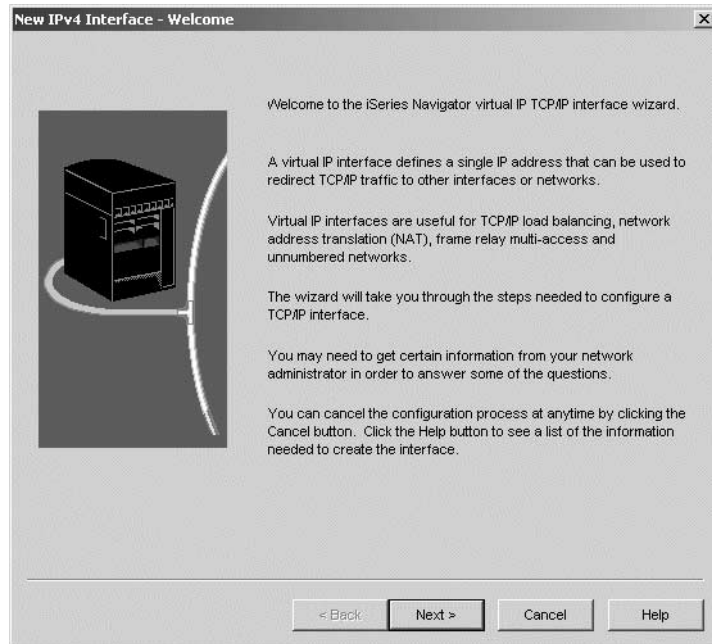


Figure 5. New IPv4 Interface wizard: Welcome page

- ___ 7. In the Settings window, enter the virtual IP address **172.23.1nn.88**, a description for the interface (used in iSeries Navigator only) and the subnet mask **255.255.255.255** as shown in Figure 6. The subnet mask should be 255.255.255.255 to avoid routing ambiguity. Click **Next**.

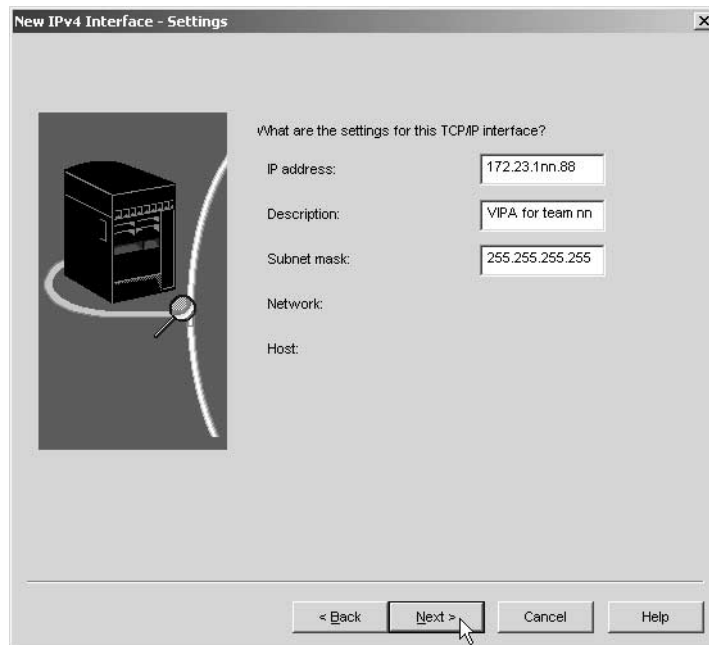


Figure 6. New IPv4 Interface wizard: Settings

- ___ 8. The Start TCP/IP panel is presented as shown in Figure 7. Accept the default values and click **Next**.

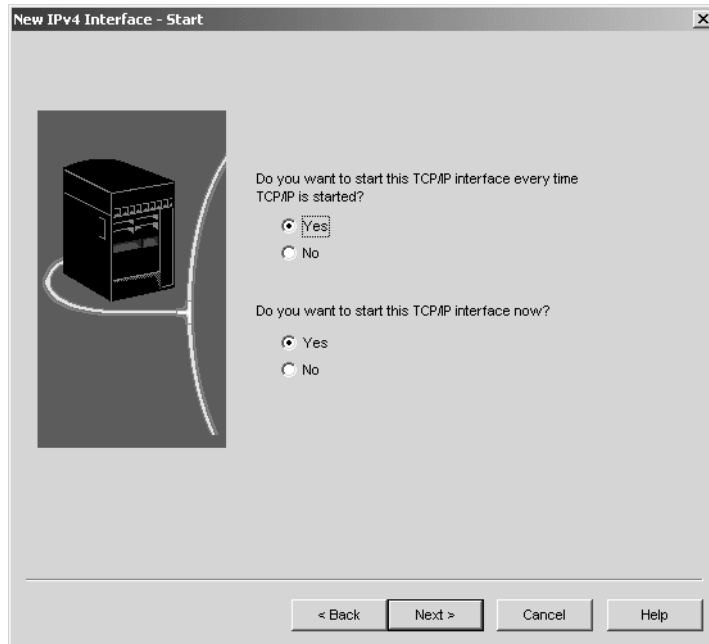


Figure 7. New IPv4 Interface wizard: Start

___ 9. The Summary window is presented as shown in Figure 8. It shows the values that have been selected in the creation process. Click on **Finish**.

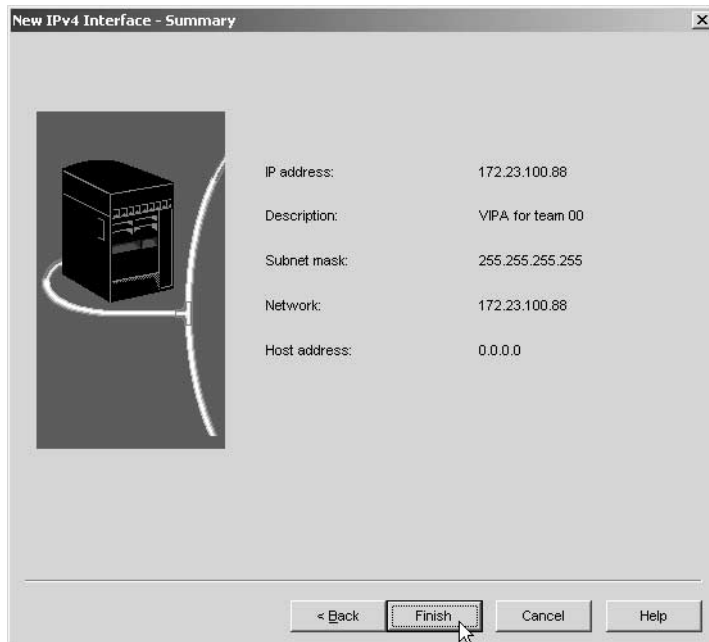


Figure 8. New IPv4 Interface wizard: Summary

___ 10. You are now presented with the Test TCP/IP Interface window as shown in Figure 9. If the **Test now** button is clicked, a PING will be done to the interface. After running the test, click the **OK** to finish running the wizard.

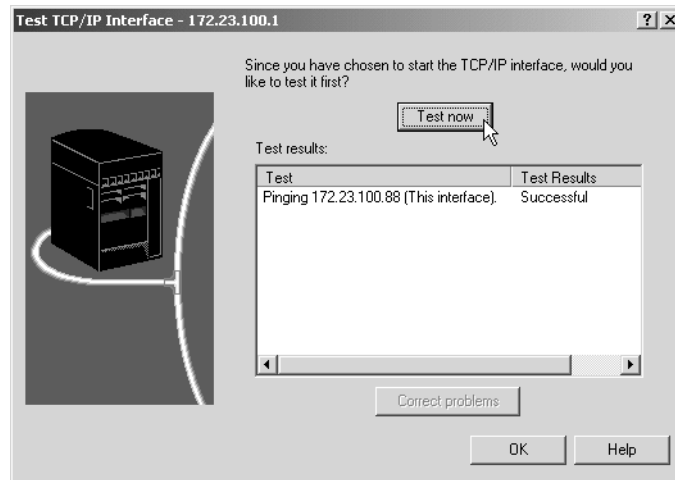


Figure 9. New IPv4 Interface wizard: Test TCP/IP Interface

Question 1: Where was the option to configure Proxy ARP for this IPv4 Virtual IP address?

Task 2: Verify your virtual IP address from your workstation

In this task, you will try to PING your newly created virtual IP address using a command prompt on your Windows 2000 workstation.

- ___ 1. Click **Start->Programs->Accessories->Command Prompt** to start a command prompt on your workstation.
- ___ 2. Enter the following command to PING your team's virtual IP address on the iSeries server:

```
ping 172.23.100.88
```

Question 2: Did the PING complete successfully?

Question 3: If not, why did the PING fail?

Task 3: Enable Proxy ARP for Virtual IP address

By now, you have noticed that the new IPv4 Interface wizard did not enable proxy ARP by default. To enable proxy ARP, you have to manually change the virtual IP interface configuration as described in the following steps:

- ___ 1. Using iSeries Navigator to <system_1>, expand **Network -> TCP/IP Configuration -> IPv4**.
- ___ 2. Click **Interfaces**.
- ___ 3. Right-click on your team's virtual IP interface and select **Stop**.
- ___ 4. Right-click on your team's virtual IP interface and select **Properties**. The interface Properties window appears as shown in Figure 10.

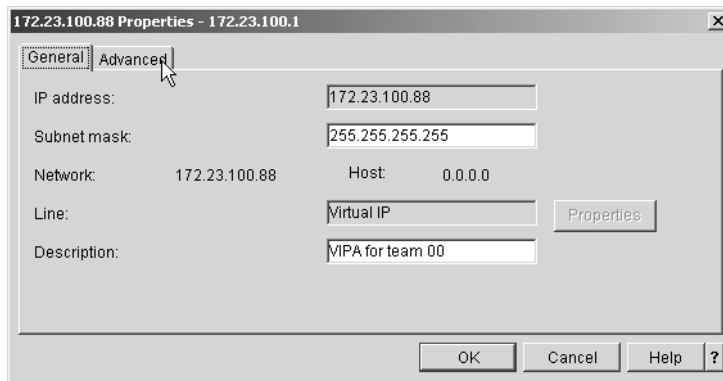


Figure 10. Virtual IP: Properties: General tab:

- ___ 5. Click the **Advanced** tab. The window in Figure 11 is shown. Check the box next to **Enable proxy ARP** and click **OK** to save your changes.

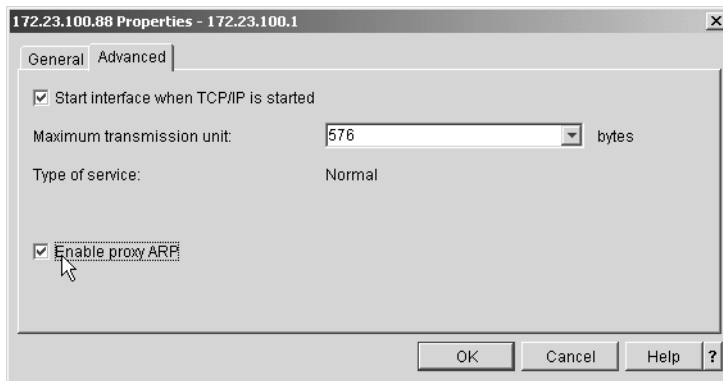


Figure 11. Virtual IP interface: Properties: Advanced tab

- ___ 6. Right-click on your team's virtual IP interface and select **Start**. Proxy ARP is now active for your virtual IP interface.

Task 4: Configure iSeries Navigator to use your virtual IP address

In the following steps you will add a new connection to your iSeries Navigator that uses your team's virtual IP address. This step serves two purposes. First, it allows you to verify that a client application, such as iSeries Navigator, can use the virtual IP address you just created. Secondly, this connection is necessary to test fault tolerance without interrupting the connection from your workstation to the iSeries server, which would be the case when you disable the interface address you are currently connected to.

- ___ 1. Within iSeries Navigator right-click **My Connections** and select **Connection to Servers -> Add connection**.
- ___ 2. Enter your team's Virtual IP interface address 172.23.1nn.88 as the Server name as shown in Figure 12 and click **Next**.

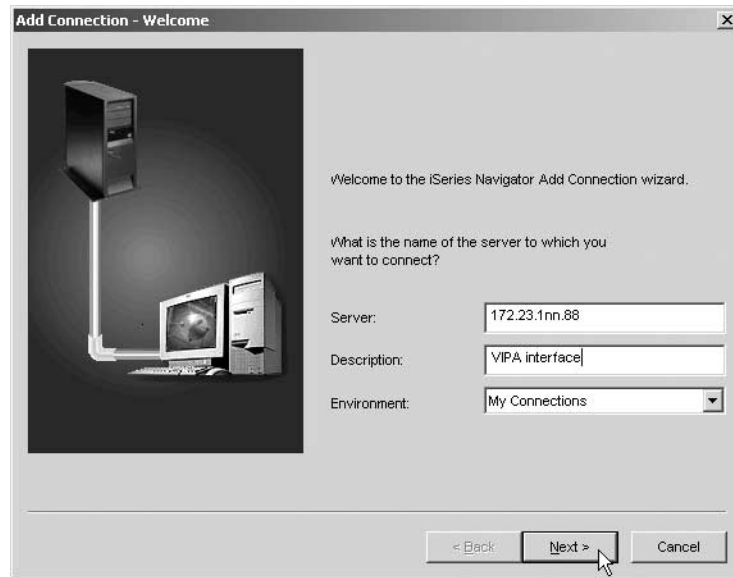


Figure 12. Add Connection window

- ___ 3. On the Signon Information window, enter your user profile and click **Next**.
- ___ 4. Click **Finish** on the Verify Connection window.
- ___ 5. Expand your new system connection and sign on to verify that iSeries Navigator is able to connect to the iSeries server using the virtual IP address.

Task 5: Test fault tolerance with your virtual IP interface

After proxy ARP has been activated for your virtual IP interface, the iSeries server should now respond to ARP requests and answer your PING requests.

- ___ 1. From the Windows 2000 command prompt enter the following command:

```
ping 172.23.1nn.88 -t
```

This command will keep sending ICMP Echo requests to your virtual IP interface address 172.23.1nn.88. To end the PING press Ctrl-C.

- ___ 2. Open a second Windows 2000 command prompt window and enter the following command:

```
arp -a
```

The arp -a command displays the ARP cache of the Windows 2000 workstation. The following example shows that the MAC address of the first Token-Ring line on the iSeries server is associated with the virtual IP address.

```
C:\>arp -a
```

```
Interface: 172.23.102.50 on Interface 0x2000003
   Internet Address      Physical Address      Type
   172.23.102.88         40-00-a0-00-00-01    dynamic
```

Note down the Physical Address (MAC address) that is associated with your team's virtual IP address.

- ___ 3. While the Windows2000 client is sending ICMP Echo requests to 172.23.1nn.88, use iSeries Navigator to disable the IP address that is associated with the MAC address you wrote down in the previous step. For example, if you are team 02 and the MAC address from the previous step is 40-00-0a-00-00-01 which is the MAC address of TRNLINE1 (associated IP address 172.23.102.1), you need to disable the interface 172.23.1nn.1. If the MAC address ends with a 2, you need to disable the IP interface with the address 172.23.1nn.2. You can disable IP interfaces by expanding the iSeries Navigator tree to **Network -> TCP/IP Configuration -> IPv4 -> Interfaces** and then right-click the interface you want to work with and select **Stop**.

Question 4: Does the PING still work?

- ___ 4. Enter the `arp -a` command again.

Question 5: What MAC address is now associated with your team's virtual IP address?

- ___ 5. Enable the IP interface you previously disabled. You will not experience any interruption of the ICMP Echo Requests.
- ___ 6. Now disable the second IP interface and display the ARP cache on the Window 2000 workstation again.

Question 6: Did the associated MAC address change again?

- ___ 7. Start the second IP interface again.

You have now seen that proxy ARP allows you to build a fault tolerant IP network that helps you improve your server's availability by performing just a few simple configuration steps.

Lab 2. Multilink PPP configuration

This lab provides you with the opportunity to configure multilink PPP configuration for fault tolerance.

After you complete this lab, you will have learned how to configure multilink PPP configuration for fault tolerance. You will also have the knowledge to plan a reliable PPP network configuration using the multilink protocol.

Objectives

This lab allows you to learn how to:

- Configure multilink PPP configuration for fault tolerance.
- Plan a reliable PPP network configuration using the multilink protocol.

Scenario

Two iSeries servers are connected with two PPP connections through a public analog network (switched line). Due to line quality problems, these PPP connections often experience unexpected disconnections. Your customer requires a reliable and highly available PPP connection and automated re dial in case of a disconnected line.

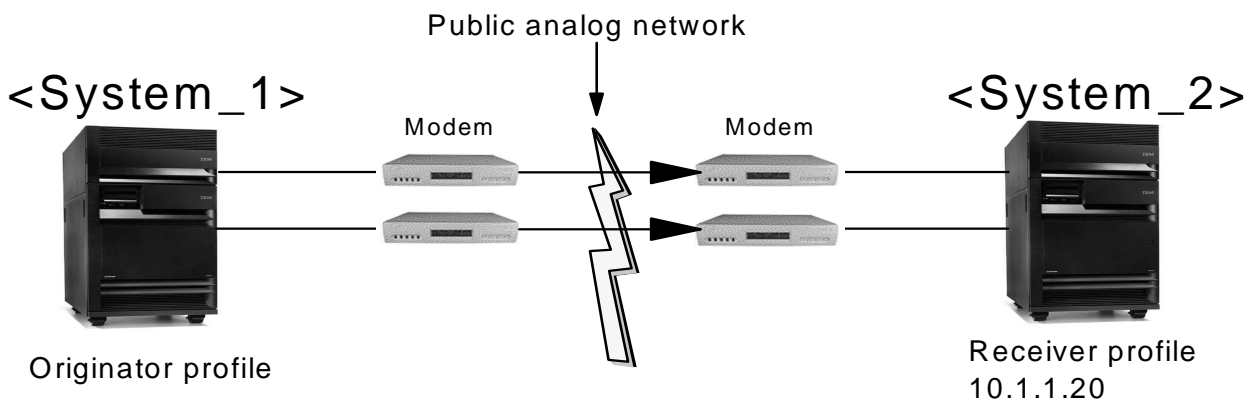


Figure 13. Multilink PPP configuration fault tolerance lab

You will perform the following tasks in order:

- Task 1: “Create Originator profile on <System_1> to support fault tolerance” on page 17.
- Task 2: “Create a Receiver profile on <System_2> to support fault tolerance” on page 24.
- Task 3: “Test the configuration” on page 30.

Task 1: Create Originator profile on <System_1> to support fault tolerance

Before you get started please make sure you understand the big picture of what you are trying to accomplish in this task. Refer to Figure 1 on page 7.

At a high level you are going to be creating an Originator profile on <System_1> that contains two links in a multilink bundle. Each link is represented by a line

description on the iSeries that is associated to a Communications Resource name. These Communication Resource names in turn are associated to the physical ports on the #2761 which are connected to ports on our PBX phone system.

Question 7: What are the two Communication Resource names that you will be using to make the originating calls from <System_1> to <System_2>?

Question 8: What are the two phone numbers that <System_1> must call to connect to <System_2>?

- ___ 1. Start the iSeries Navigator by clicking **Start -> Programs -> IBM iSeries Access for Windows -> iSeries Navigator**. The iSeries Navigator window appears.
- ___ 2. Expand your iSeries server **<System_1>** (refer to Figure 1 on page 7 for the IP address of this system). This may require that you enter a userid and password.
- ___ 3. Expand **Network -> Remote Access Services**.
- ___ 4. Right-click **Originator Connection Profiles** and select **New Profile** as shown in Figure 14.

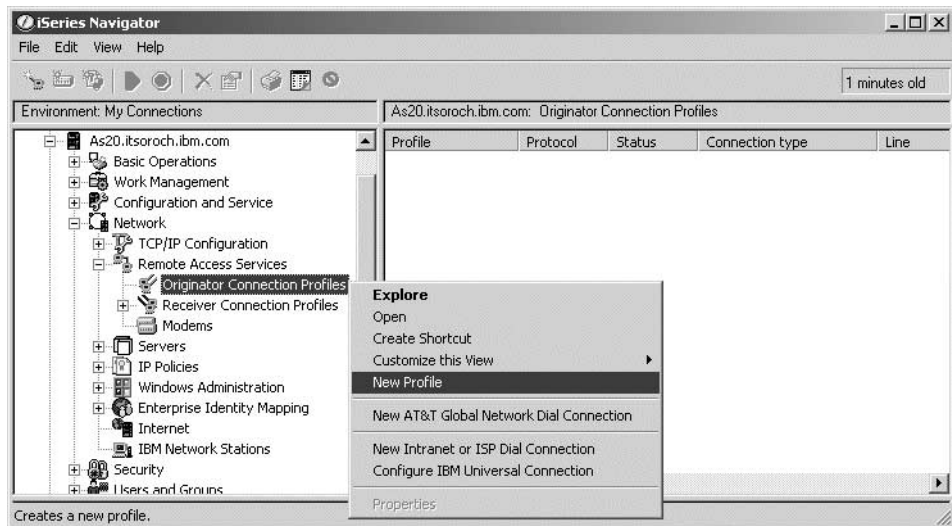


Figure 14. Originator Connection Profile: New Profile

- ___ 5. The New Point-to-Point Connection Profile Setup window appears as shown in Figure 15. The only parameter that needs to be changed on this window is **Type of line service**. Select **Line pool** and then click **OK** to proceed to the next window.

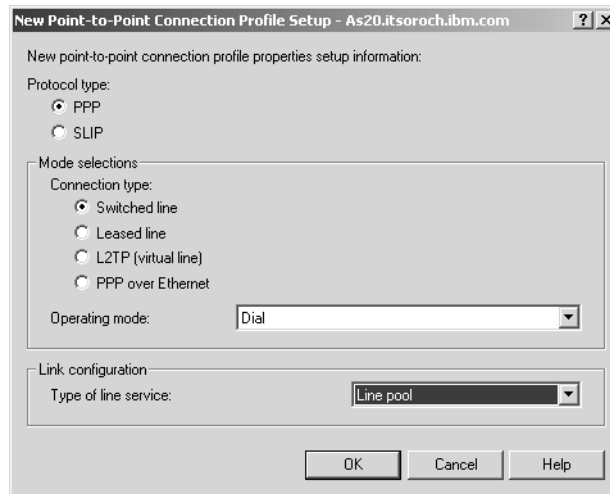


Figure 15. Originator Connection Profile: Type of line service: Line pool

- ___ 6. The New Point-to-Point Profile Properties window General tab is displayed as shown in Figure 16. Enter a name for the profile, for example, `Multiorgnm` as a short hand note to ourselves that this is a multilink originator profile that we are configuring. Optionally enter a description.

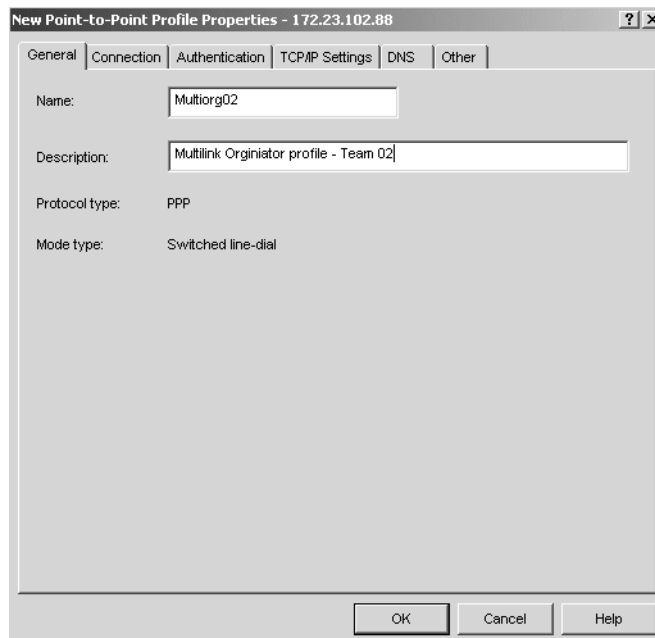


Figure 16. Originator Connection Profile: General tab

- ___ 7. Click the **Connection** tab. From the Connection tab, you need to give the line pool a name of `Multilinem` as shown in Figure 17. Click **New** to proceed to the New Line Pool Properties window.

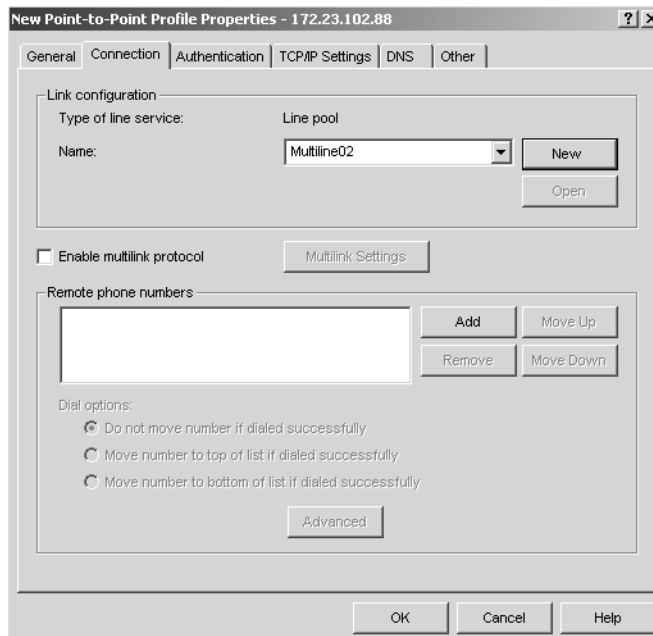


Figure 17. Originator Connection Profile: Connection tab: Connection tab

- ___ 8. The New Line Pool Properties window appears as shown in Figure 18. New lines are created by clicking on the New Line button. Lines that are created will appear in the left pane. Lines in the left pane may be moved to the line pool in the right pane by selecting the buttons that reside between the two panes. You need to create your own lines **MLTLNKnn0** and **MLTLNKnn1**. Click **New Line** to add the first line for your team.

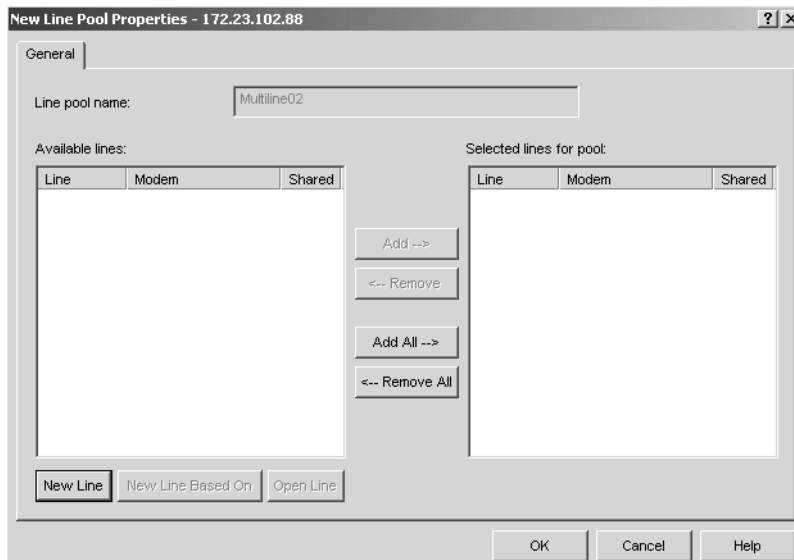


Figure 18. Originator Connection Profile: New Line Pool Properties: Selected lines for pool

- ___ 9. The New Line Properties window appears. Enter **MLTLNKnn0** as the name for the first line you are about to create. Next you need to select the hardware resource of your modem as shown in Figure 19. Refer to Figure 1 on page 7 for the **CMNx** hardware resource name of the modem for this lab.

Important

The CMNxx resource pictured in Figure 19 most likely is not the correct resource. Please refer to Figure 1 on page 7 or ask your instructor if you are not sure which is the correct resource.

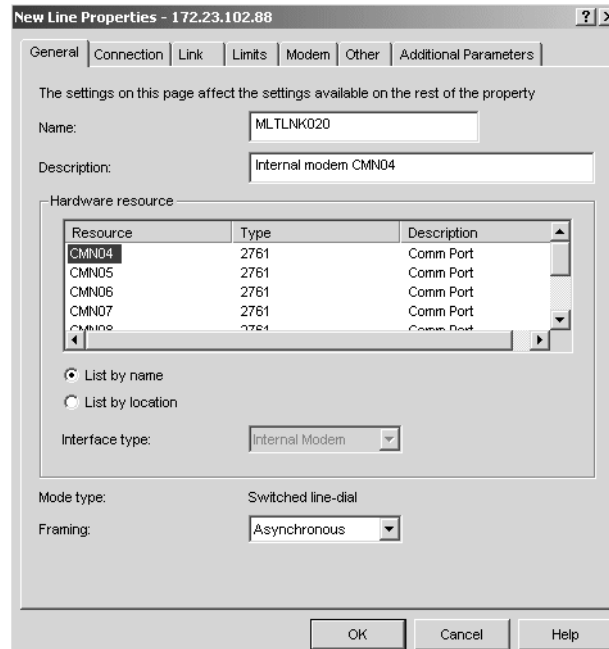


Figure 19. New Line Properties window

- ___ 10. Click **OK** to save your new line.
- ___ 11. Repeat the previous step to create the second line for your line pool. Use the line name **MLTLNKnn1** and the corresponding hardware resource as listed in Figure 1 on page 7.
- ___ 12. From the New Line Pool Properties window select your lines **MLTLNKnn0** and **MLTLNKnn1** and add them to the Selected lines for pool pane as shown in Figure 20.

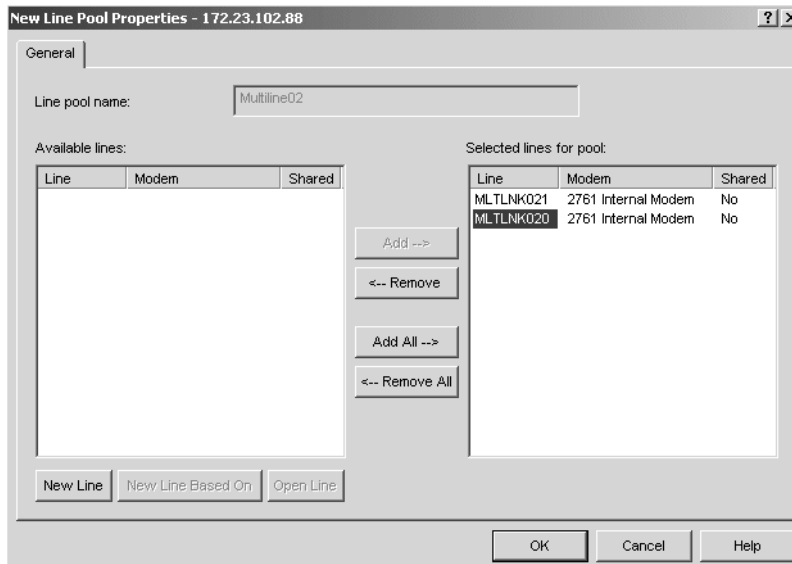


Figure 20. New Line Pool Properties window

___ 13. Click **OK** to save your new line pool definition.

___ 14. You are brought back to the Connection tab as shown in Figure 21. Select **Enable multilink protocol** to enable MP.

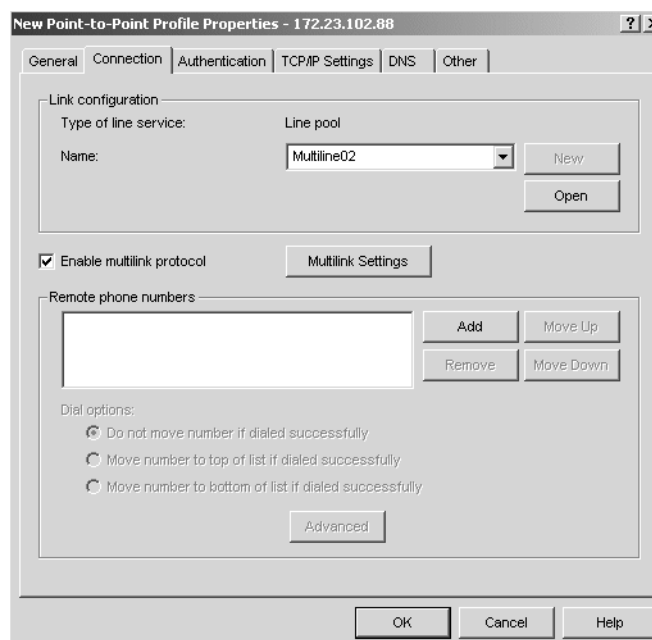


Figure 21. Originator Connection Profile: Connection tab: Enable multilink protocol

___ 15. The Define Multilink Configuration window appears as shown in Figure 22. **Maximum number of links per bundle** will remain at two since you will use two links for the multilink connection. Click **OK**.

Question 9: Why should you *not* select Allow remote system to initiate a call from this system?

Question 10: Why should you *not* select Enable bandwidth utilization monitoring?

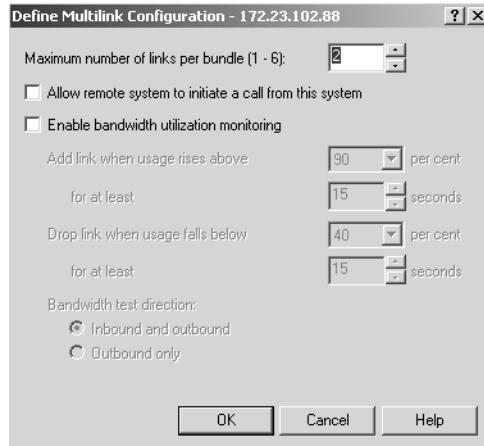


Figure 22. Define Multilink Configuration window

___ 16. We will now add the phone numbers for the remote site. Click **Add** and enter the phone numbers for the remote location as shown in Figure 23. Refer to Figure 1 on page 7 for the two phone numbers you have to enter. Once you are finished, click **Advanced**.

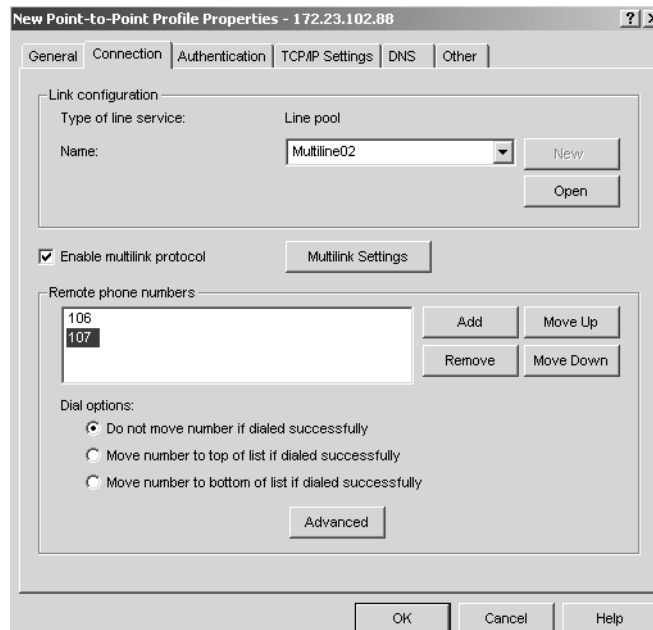


Figure 23. Originator Connecting Profile: Connection tab: Remote phone numbers

___ 17. On the Advanced Dial Parameters window, check **Re-dial on disconnect** as shown in Figure 24. Click **OK** to continue.

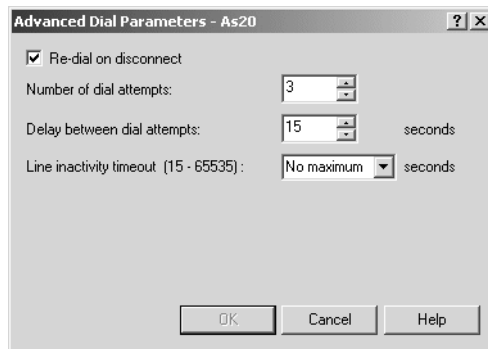


Figure 24. Advanced Dial Parameters window

- ___ 18. On the New Point-to-Point Profile Properties window, click the **TCP/IP Settings** tab.
- ___ 19. In this lab you will allow **<System_2>** to assign IP addresses and therefore will take the defaults as shown in Figure 25. Click **OK** to save the new originator connection profile.

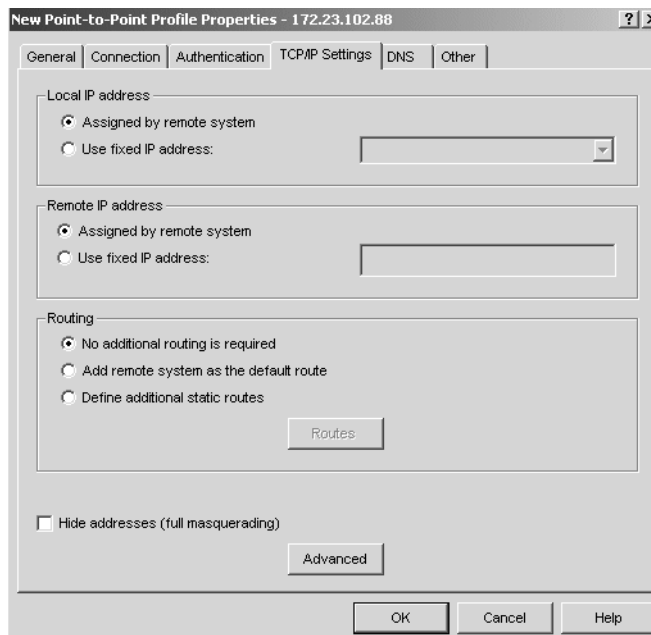


Figure 25. Originator Connection Profile: TCP/IP Settings

Task 2: Create a Receiver profile on <System_2> to support fault tolerance

In this task you will configure the system that answers connection requests. You will configure a receiver connection profile that will listen on two communication lines for incoming requests.

Question 11: What are the two Communication Resource names that you will be using to receive the calls on <System_2>?

- 1. Start the iSeries Navigator by clicking **Start -> Programs -> IBM iSeries Access for Windows -> iSeries Navigator**. The iSeries Navigator window appears.

Note:

It may be necessary to create a new connection to this system by its IP address.

- 2. Expand your iSeries server **<System_2>** (refer to Figure 1 on page 7 for the IP address of this system). This may require that you enter a userid and password.
- 3. Expand **Network -> Remote Access Services**.
- 4. Right-click on **Receiver Connection Profiles** and select **New Profile** as shown in Figure 26.

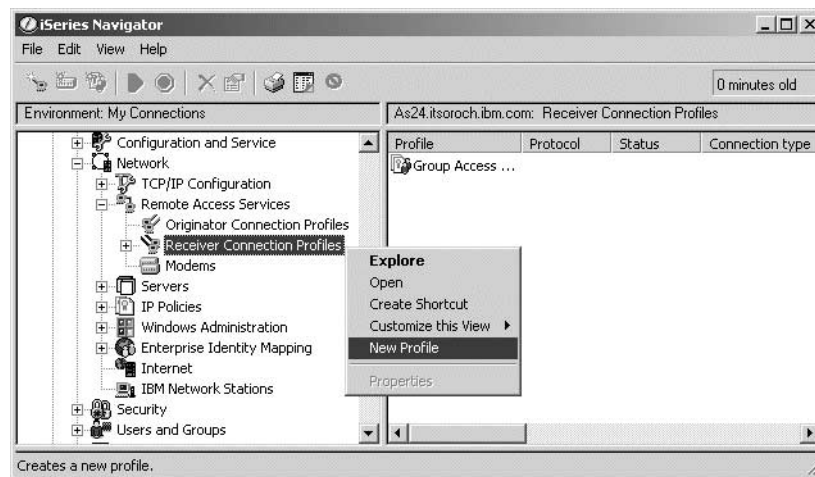


Figure 26. Receiver Connection Profiles: New Profile

- 5. The New Point-to-Point Connection Profile Setup window appears as shown in Figure 27. The only parameter that needs to be changed on this window is **Type of line service**. Select **Line pool** and then click **OK** to proceed to the next window.

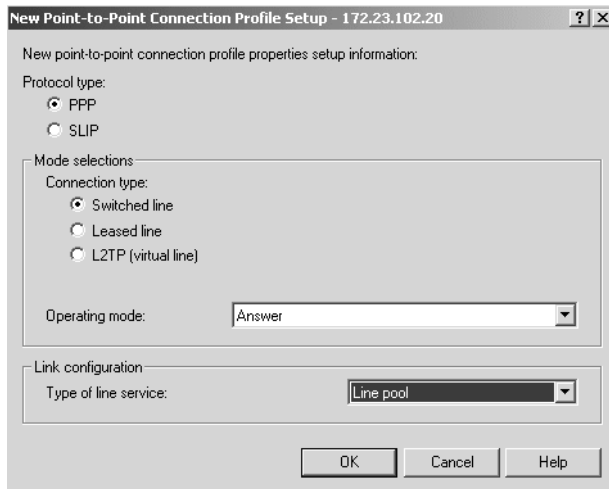


Figure 27. Receiver Connection Profile: Type of line service: Line pool

- ___ 6. The New Point-to-Point Profile Properties window General tab is displayed as shown in Figure 28. Enter `Multircv02` as the name for your receiver profile. Optionally enter a description.

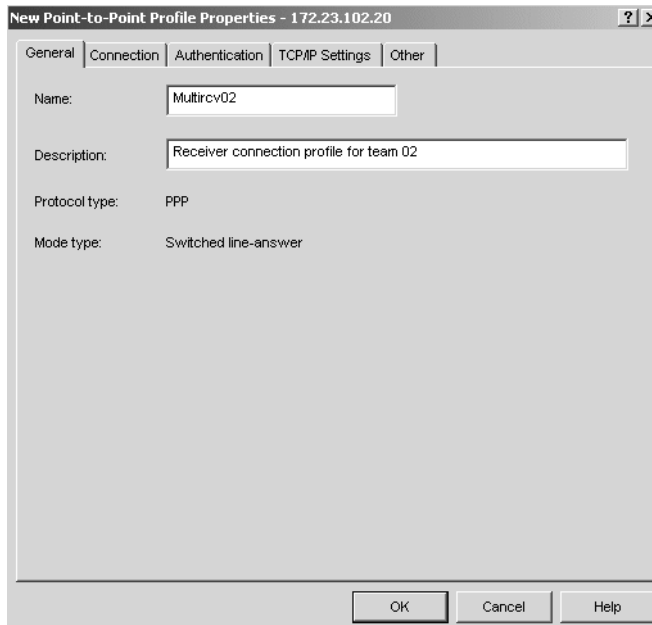


Figure 28. Receiver Connection Profile: General tab: Name: Multirec

- ___ 7. Click the **Connection** tab. From the Connection tab, define the lines to be used for MP. Enter the name `Multiline02` as the name for your line pool as shown in Figure 29. Click **New**.

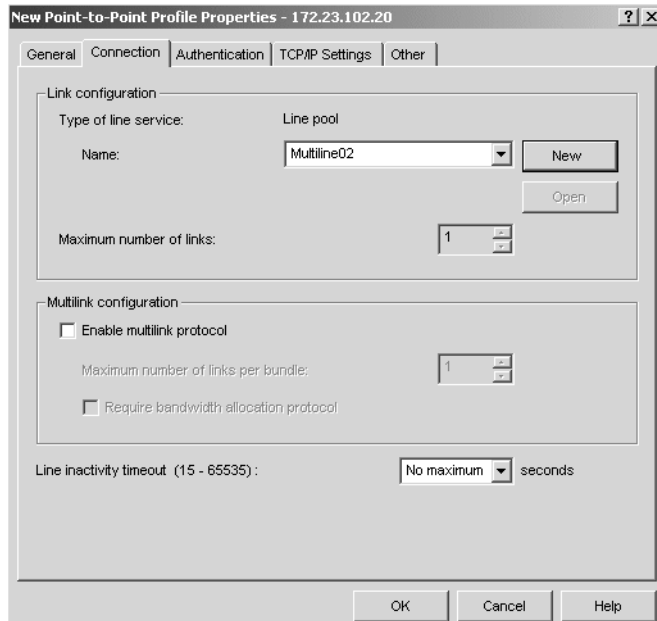


Figure 29. Receiver Connection Profile: Line pool name: Multilinenn

8. The New Line Pool Properties window appears as shown in Figure 30. New lines are created by clicking on the New Line button. Lines that are created will appear in the left pane. Lines in the left pane may be moved to the line pool in the right pane by selecting the buttons that reside between the two panes. You need to create your own lines **MLTLNKnn0** and **MLTLNKnn1**. Click **New Line** to add the first line for your team.

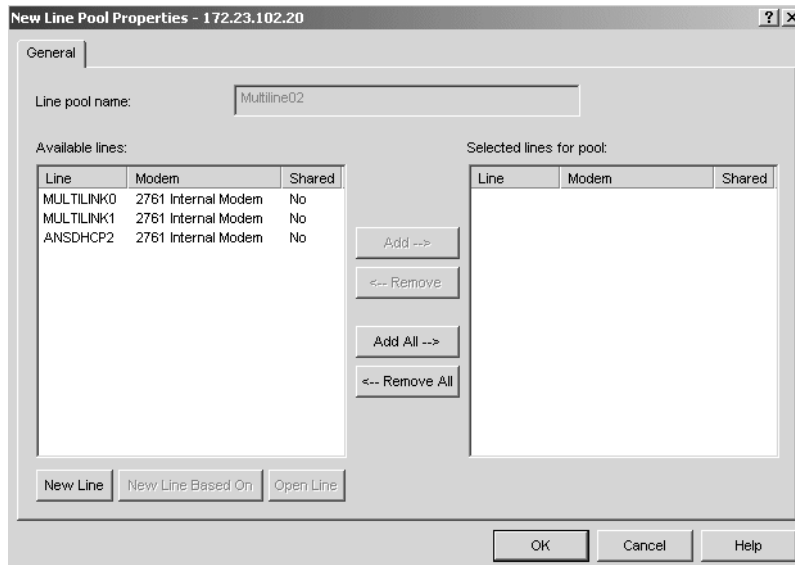


Figure 30. Receiver Connection Profile: Multilinenn Properties

9. The New Line Properties window appears. Enter **MLTLNKnn0** as the name for the first line you are about to create. Next you need to select the hardware resource of your modem as shown in Figure 31. Refer to Figure 1 on page 7 for the hardware resource name of the modem for this lab.

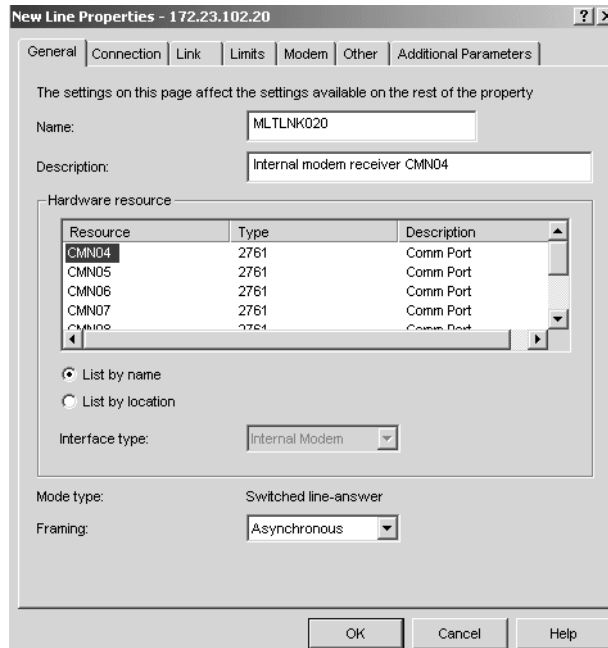


Figure 31. New Line Properties window

- ___ 10. Click **OK** to save your new line.
- ___ 11. Repeat the previous step to create the second line for your line pool. Use the line name **MLTLNKnn1** and the corresponding hardware resource as listed in Figure 1 on page 7.
- ___ 12. From the New Line Pool Properties window select your lines **MLTLNKnn0** and **MLTLNKnn1** and add them to the Selected lines for pool pane as shown in Figure 20.

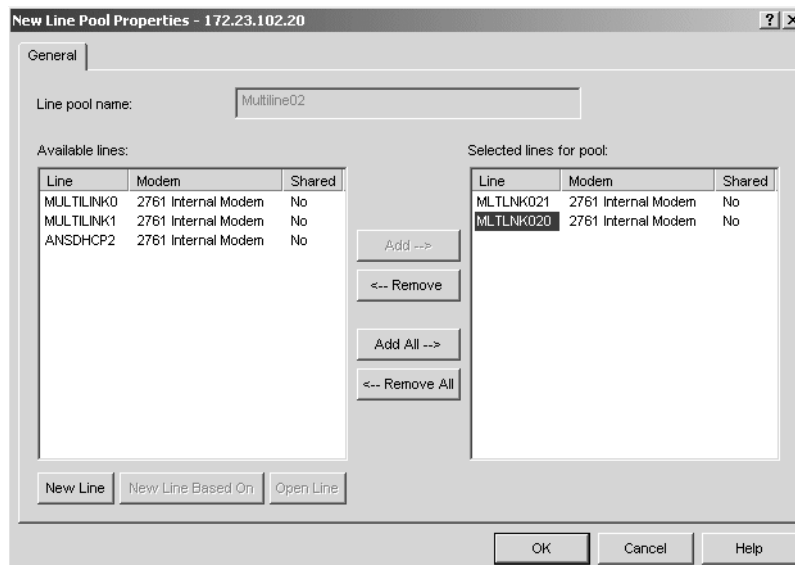


Figure 32. New Line Pool Properties window

- ___ 13. Click **OK** to save your new line pool definition.

___ 14. You are brought back to the Connection tab. Click **Enable multilink protocol** as shown in Figure 33. You have two lines available in your pool and will therefore specify two for **Maximum number of links per bundle**.

Question 12: Should you enable Require bandwidth allocation protocol for this profile?

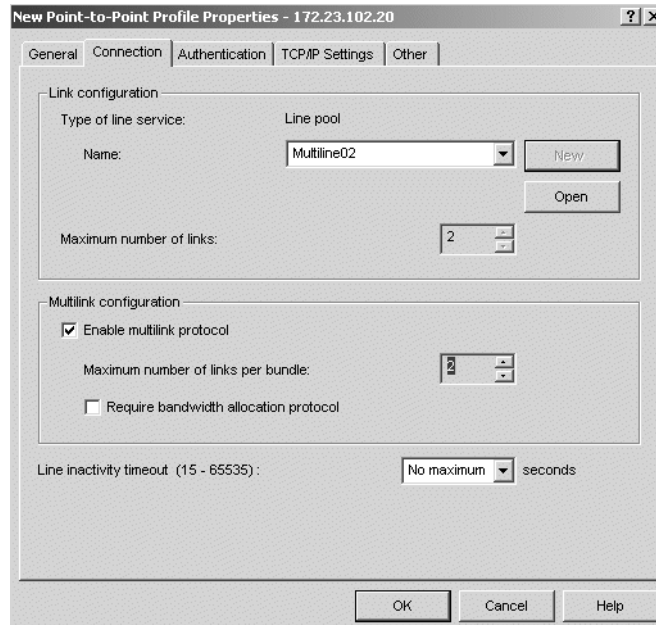


Figure 33. Receiver Connection Profile: Multilink configuration: Enable multilink protocol

___ 15. Click the **TCP/IP Settings** tab. You need to specify a local and remote IP address. The local address needs to be an existing interface on the iSeries **<System_2>**. In this case, the local address is the local LAN interface address for your team on **<System_2>**. Refer to the hardware environment as shown in Figure 1 on page 7 for the IP address to be used as the local address. For the remote address enter 10.1.1.1m. Enter the information as shown in Figure 34 and click **OK** to save the connection profile.

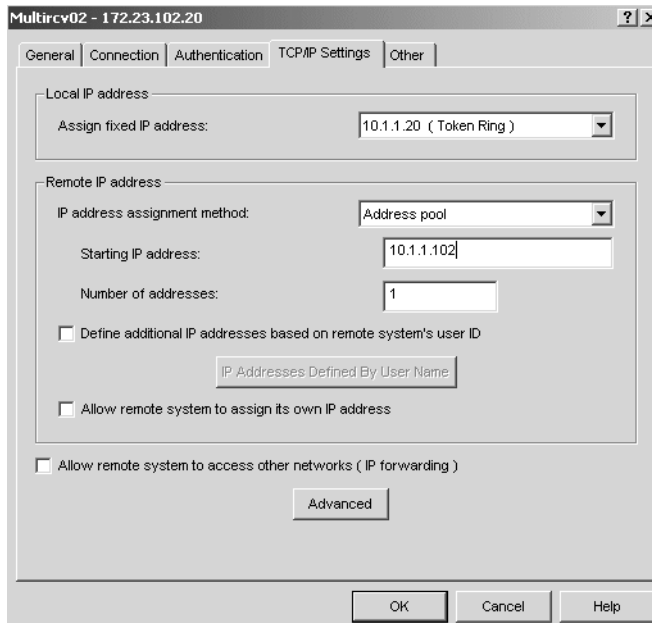


Figure 34. Receiver Connection Profile: TCP/IP settings

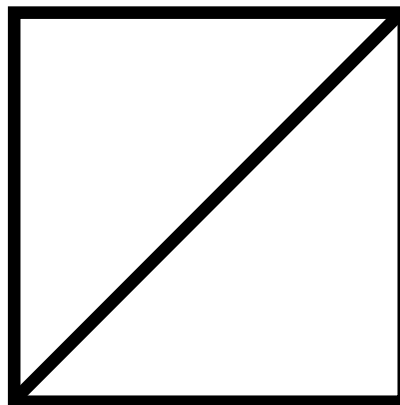
Task 3: Test the configuration

Now it is time to test your multilink configuration. You will test the configuration by first establishing a connection over both links in the multilink protocol (MP) bundle and then simply disconnecting one of the active RJ-11 connectors from the telephone switch (PBX).

Multilink - Use the Board

You **MUST** use the board to wait your turn to test your multilink Configuration!

This symbol means my team is IN - and everybody else must be OUT.



1. To start the receiver profile on **<System_2>**, right-click on the profile **Multircvnn** and select **Start** as shown in Figure 35.

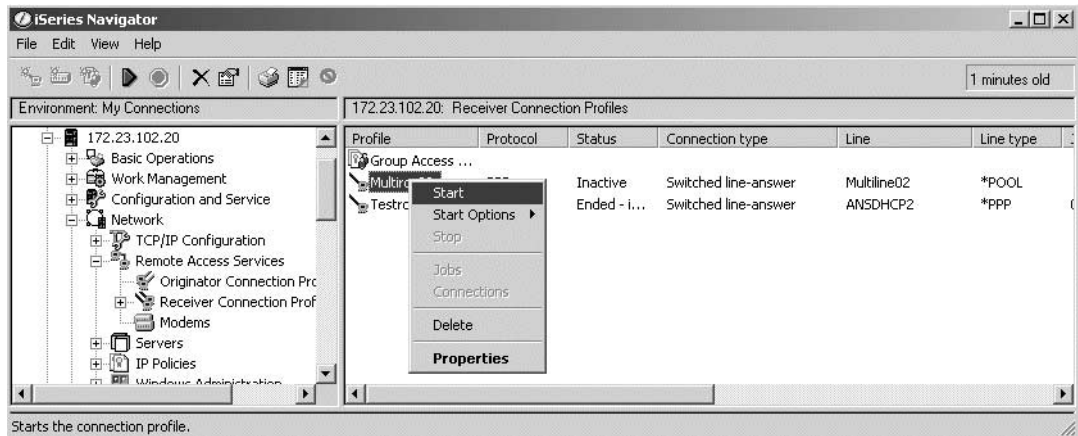


Figure 35. Receiver Connection Profile: Start

- ___ 2. To start the originator profile on <System_1>, right-click on the profile and select **Start** as shown in Figure 36.

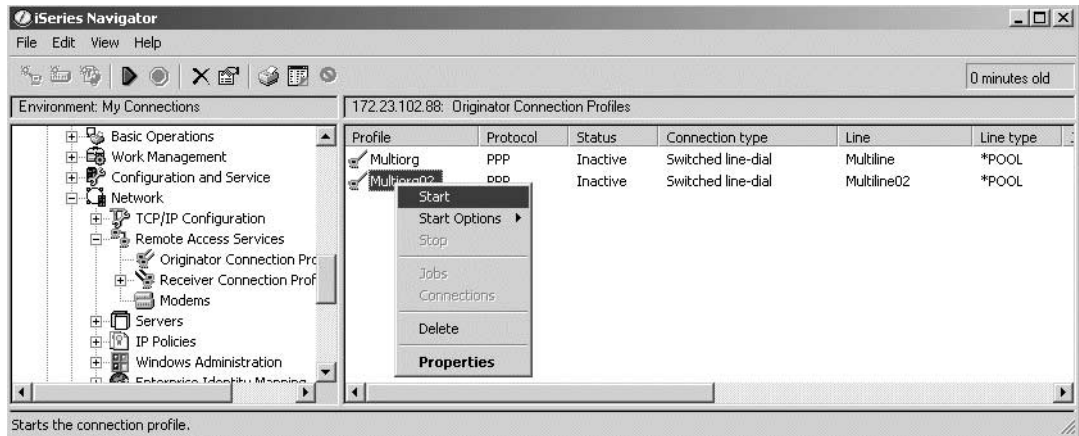


Figure 36. Originator Connection Profile: Start

- ___ 3. Right-click on Originator profile on <System_1> and select **Connections** to view the status of the connection (see Figure 37).

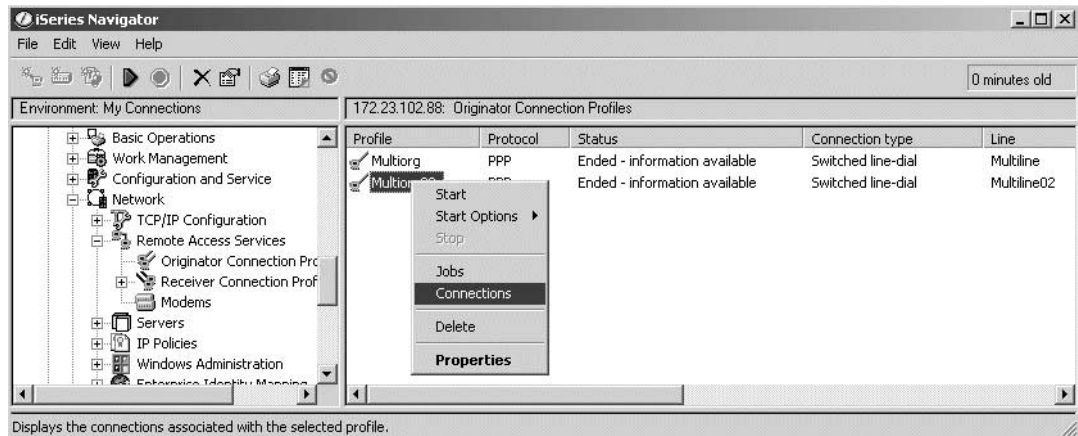


Figure 37. Originator Connection Profile: Connections

- ___ 4. The Connections window is displayed as shown in Figure 38. The first line shows the active connection between the two iSeries servers. The second and third line show the modem connections. You should have two links active.

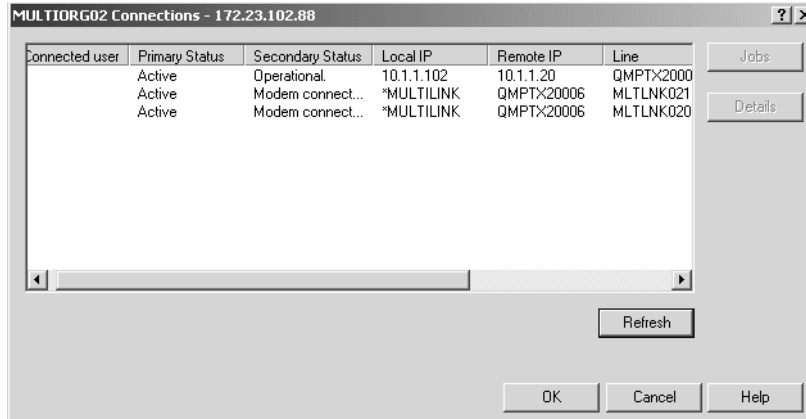


Figure 38. Originator Connection Profile: Multiorig connections: Two lines active

- ___ 5. Pull one of the phone jacks from PBX Line sharing device that are used for your multilink connection. This causes a failure to one of the lines. The connections window shows that one modem connection remains active and keeps the connection functional as seen Figure 39. The originator system will try to reestablish a connection over the failed line until the number of retries are exceeded.

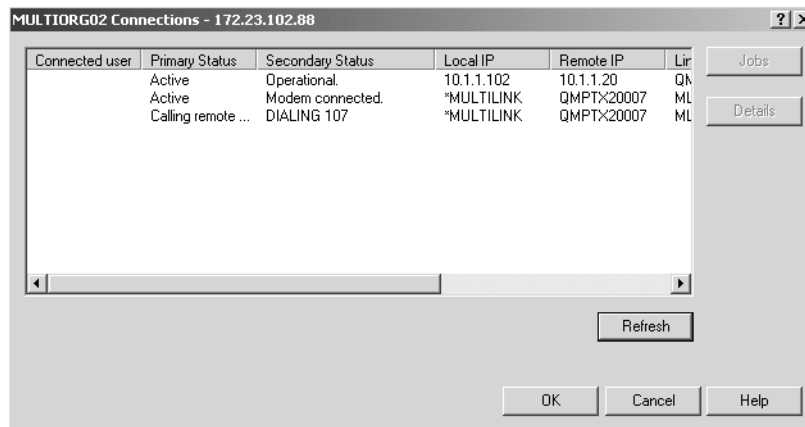


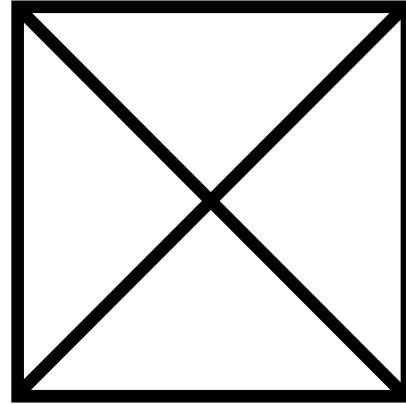
Figure 39. Originator Connection Profile: Multiorig connections: Link failure

- ___ 6. From <System_1> ping <System_2> at IP address 10.1.1.20.
 ___ 7. Reconnect the line and verify that both lines return to active.
 ___ 8. Stop your Originator profile on <System_1> and the Receiver profile on <System_2>.

Multilink - Use the Board

You **MUST** use the board to leave the multilink test area!

This symbol means my team is **OUT** - let the next team that is in queue know.



Lab 3. Dynamic resource sharing scenario

The PPP Dynamic Resource Sharing function provides the capability to designate an (analog) line resource as *shared*, allowing PPP dial profiles to “borrow” a line being used to listen for incoming calls in order to place an outgoing call.

In this scenario, we are going to show how to configure the dynamic resource sharing for both an originator and receiver connection profile.

Scenario overview

Here are the conditions that you may choose this scenario:

- If your communication application needs Receiver connection profile running for incoming call and Originator profile running for outgoing calls
- These calls need not to be active at the same time.
- You have a limited number of switched line ports and you cannot afford to dedicate each port for either an originating or receiving application.

Sample network configuration

Figure 40 shows the sample network configuration of this scenario.

Note

You will not be using the PBX or clients in this scenario. In this scenario you will be configuring the iSeries (only) and watching the behavior of the dynamic resource sharing Originator and Receiver profiles.

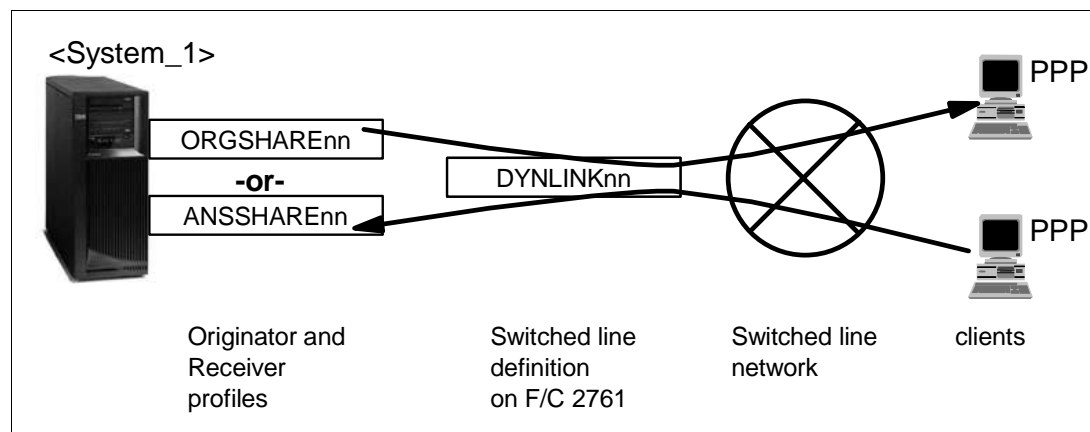


Figure 40. Sample network configuration: Dynamic resource sharing scenario

Task 1: Configuring the Originator resource and shared Link configuration

Question 13:How many line descriptions will you be creating to support the Originator and Receiver profiles?

To configure an Originator profile and associated shared Link configuration do the following steps:

- ___ 1. Start the iSeries Navigator on by clicking **Start -> Programs -> IBM iSeries Access for Windows -> iSeries Navigator**. The iSeries Navigator window appears.
- ___ 2. Expand your iSeries server **<System_1>** (refer to Figure 1 on page 7 for the IP address of this system). This may require that you enter a userid and password.
- ___ 3. Expand **Network -> Remote Access Services**.
- ___ 4. Right-click **Originator Connection Profiles** and select **New Profile** as shown in Figure 41.

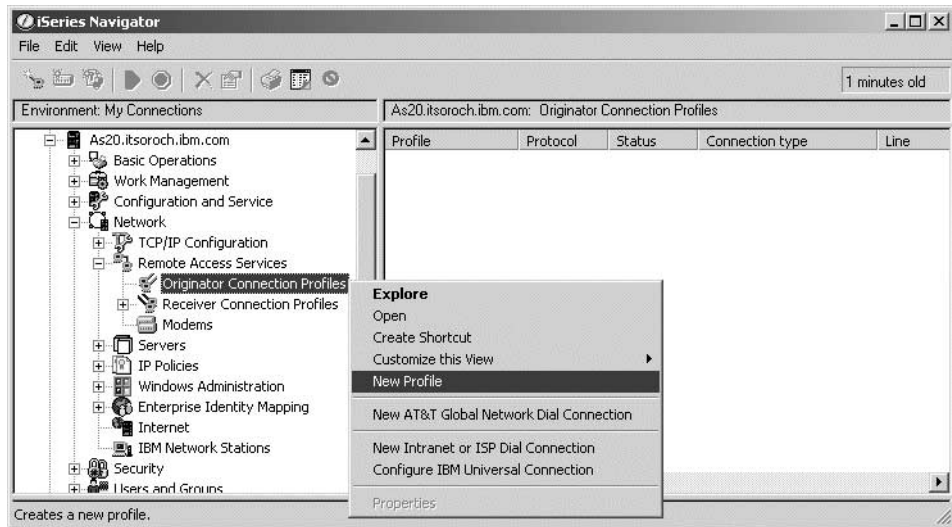


Figure 41. Originator Connection Profile: New Profile

- ___ 5. The New Point-to-Point Connection Profile Setup window appears as shown in Figure 42. Accept the defaults and click **OK** to proceed to the next window.

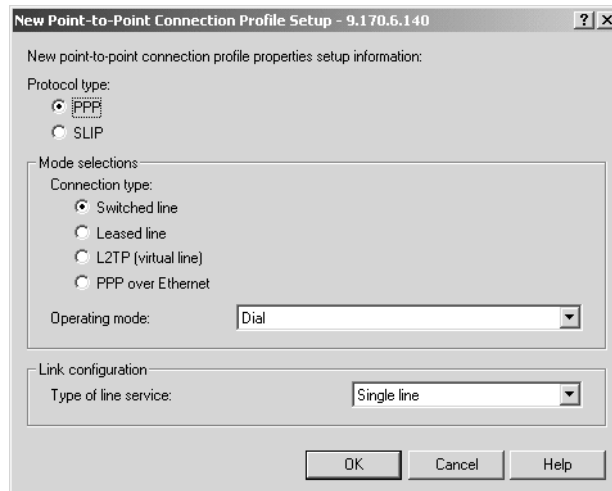


Figure 42. Originator Connection Profile: Type of line service: Line pool

6. The New Point-to-Point Profile Properties window General tab is displayed as shown in Figure 43. Enter a name for the profile, for example, ORGSHAREnn as a short hand note to ourselves that this is an originator profile that we are configuring that will share the link resource. Optionally enter a description.

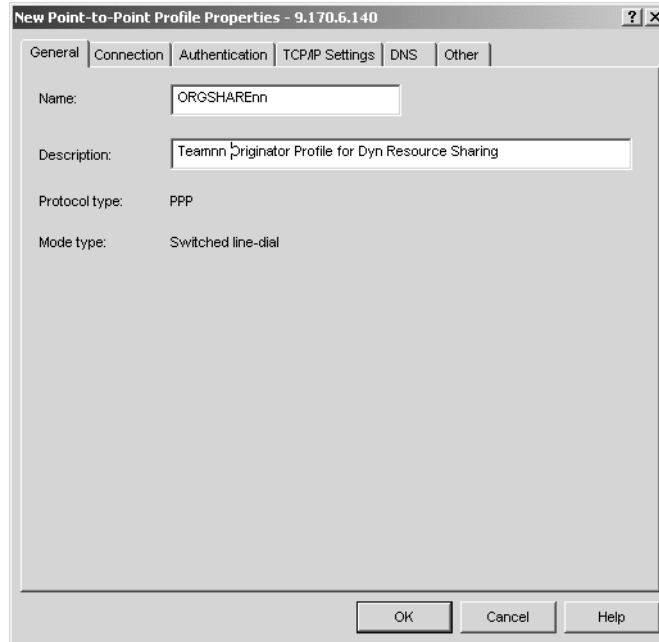


Figure 43. Originator Connection Profile: General tab

7. Click the **Connection** tab. From the Connection tab, you need to give the line pool a name of DYNLINKnn as shown in Figure 44. Click **New** to proceed to the New Line Pool Properties window.

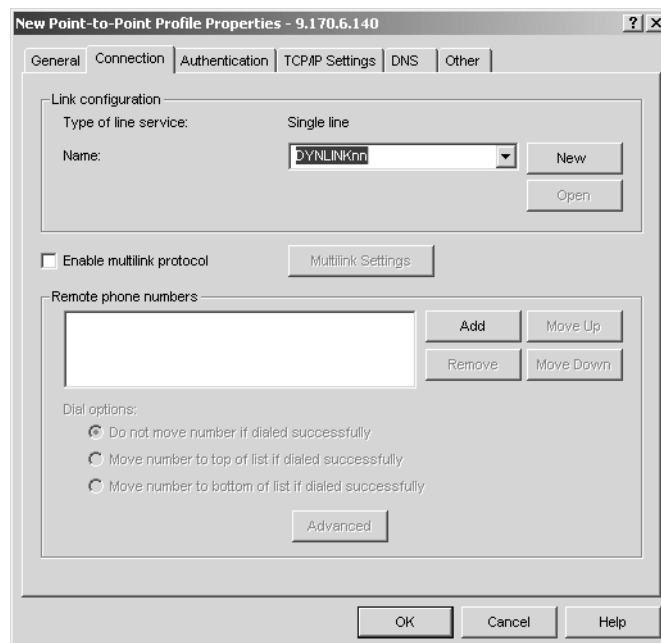


Figure 44. Originator Connection Profile: Connection tab: Connection tab

- ___ 8. The New Line Properties window appears as shown in Figure 45. You need to select the hardware resource of your modem. Refer to Figure 1 on page 7 for the hardware resource name of the modem for this lab. Select the Modem tab.

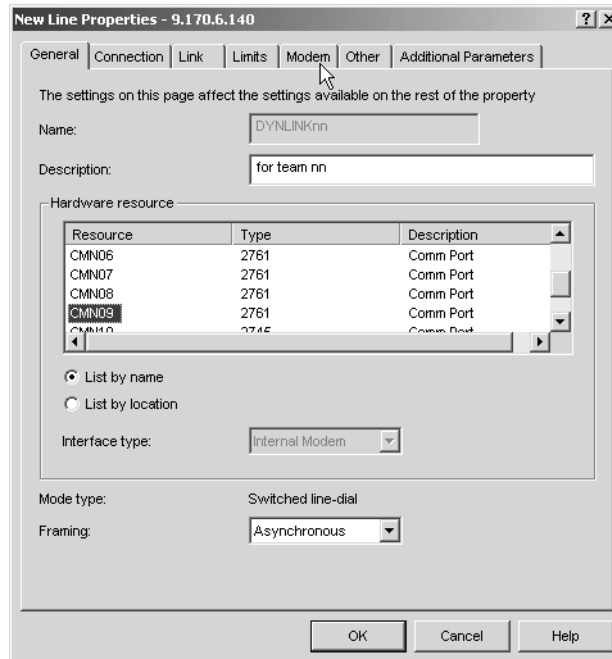


Figure 45. New Line Properties window

- ___ 9. The New Line Properties panel is shown as seen in Figure 46. Select Enable dynamic resource sharing.

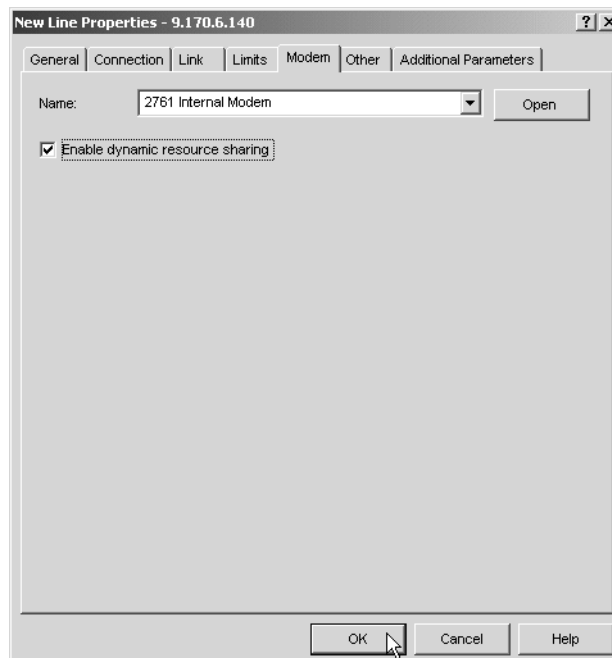


Figure 46. New Line Properties: Select Enable Dynamic Resource Sharing

- ___ 10. Click **OK** to save your new line.
- ___ 11. On your Originator profile screen **Connection** tab enter a phone number such as 555. We will not be making a call so it does not matter what number you use.

Task 2: Configuring the Receiver profile to use the shared link configuration

To configure an Receiver profile and associated shared Link configuration do the following steps:

- ___ 1. Right click on **Receiver Connection Profiles** and select **New Profile** from the context menu. This is shown in Figure 47. Examine the choices. You will take all the defaults. Click **OK** to continue.

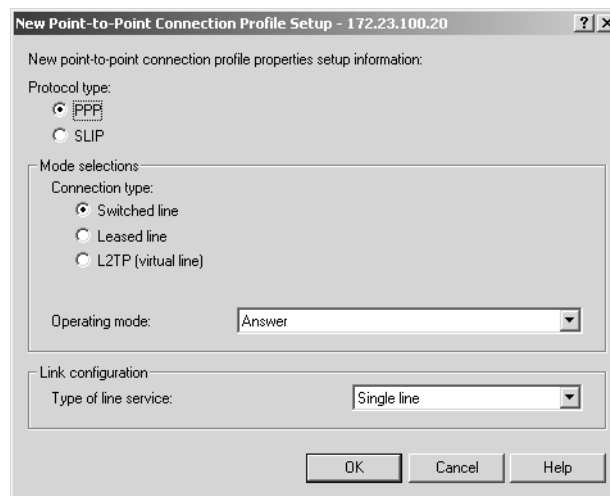


Figure 47. New Point-to-Point Connection Profile Setup

- ___ 2. On the General tab, name your Receiver profile ANSHAREnn and give it a description that is worthy of your team as shown in Figure 48. Click the **Connection** tab to continue.

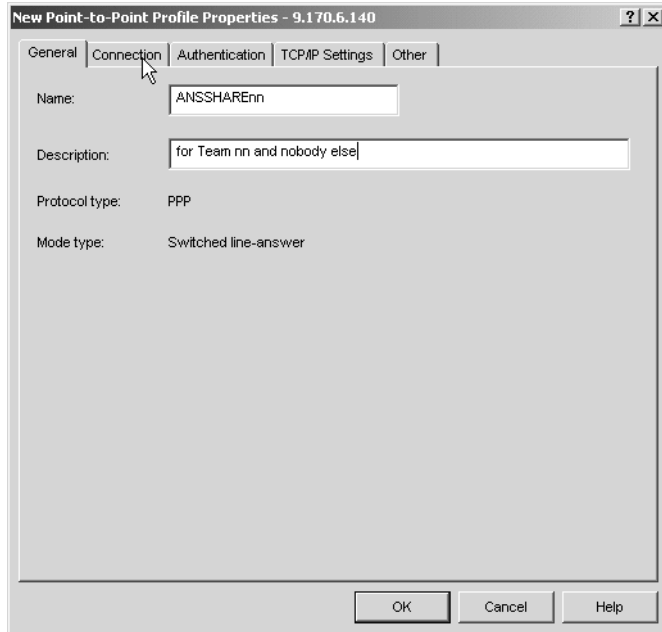


Figure 48. New Point-to-Point Connection Profile Properties: General tab

3. On the Connection tab, pull down the line description name of DYNLINKnn as shown in Figure 49. This name is the same as you created for a previous step and is mapped to port on the #2761 to which you will be making your modem connection. See Figure 1 on page 7 for a diagram of the network.

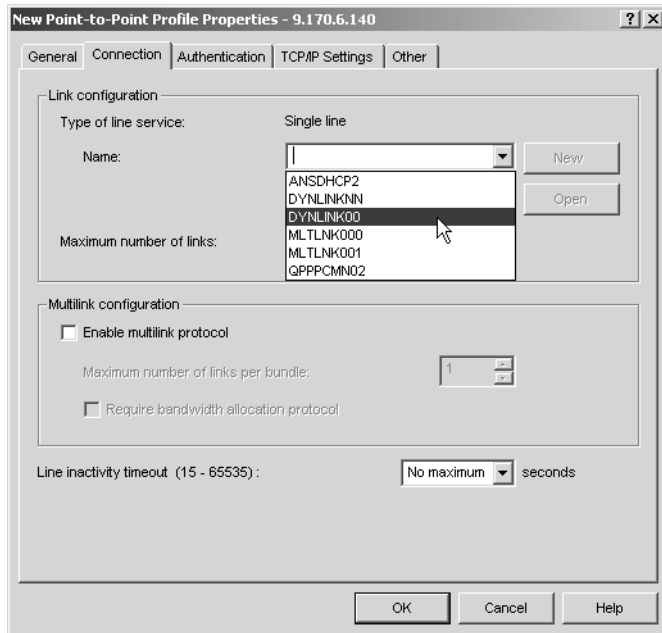


Figure 49. New Point-to-Point Connection Profile Properties: Connection tab

4. Click **Open** to view the properties for DYNLINKnn to confirm that this is the same line definition as you created in Task 1: Create Originator profile on

<System_1> to support fault tolerance. In addition, click on the Modem tab to verify that Enable dynamic resource sharing is still selected.

Click **OK** to continue.

- ___ 5. Click the **TCP/IP Settings** tab to continue.
- ___ 6. On the TCP/IP Settings tab, pull down Assigned fixed IP address to **10.4.4.1** as shown in Figure 50. For the Remote IP address we will assign this using a fixed IP address starting at **10.4.4.2**. Click **OK** to create your Receiver profile.

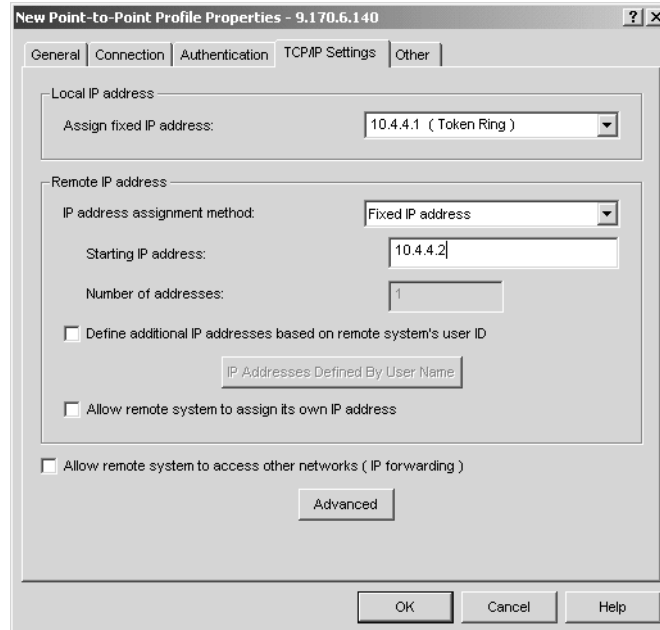


Figure 50. New Point-to-Point Connection Profile Properties: Connection tab

Do not yet start your Receiver or Originator profiles as other teams may be using the communication resource right now.

Task 3: Testing the dynamic resource sharing scenario

No two teams can use the same communications resource.

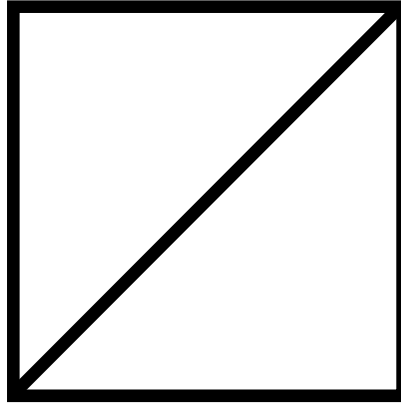
Hint

As you are starting and stopping both Receiver and Originator profiles you should be refreshing the status of both profiles as they 'interact' with each other. The screen shots that follow do not show all the profile states.

Resource Sharing - Use the Board

You **MUST** use the board to wait your turn to test your Resource Sharing!

This symbol means my team is **IN** - and everybody else must be **OUT**.



1. On iSeries Navigator screen, start your Receiver profile which shares the line resource with Originator profile. In this example, start the Receiver profile **ANSSHAREnn** as shown in Figure 51. The status will change to **Waiting for incoming call**.

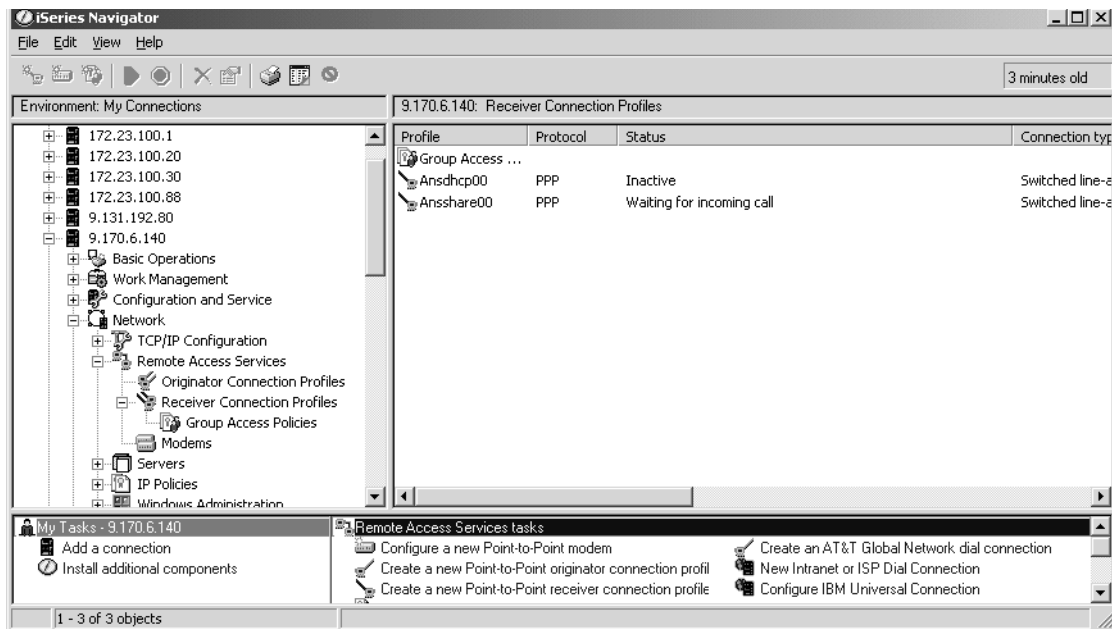


Figure 51. iSeries Navigator screen: ANSSHAREnn is Waiting for incoming call

2. On iSeries Navigator screen, start your Originator profile which shares the line resource with Receiver profile. In this example, start the Originator profile **ORGSHAREnn** as shown in Figure 52. The status of ORGSHAREnn is now **Calling remote system**.

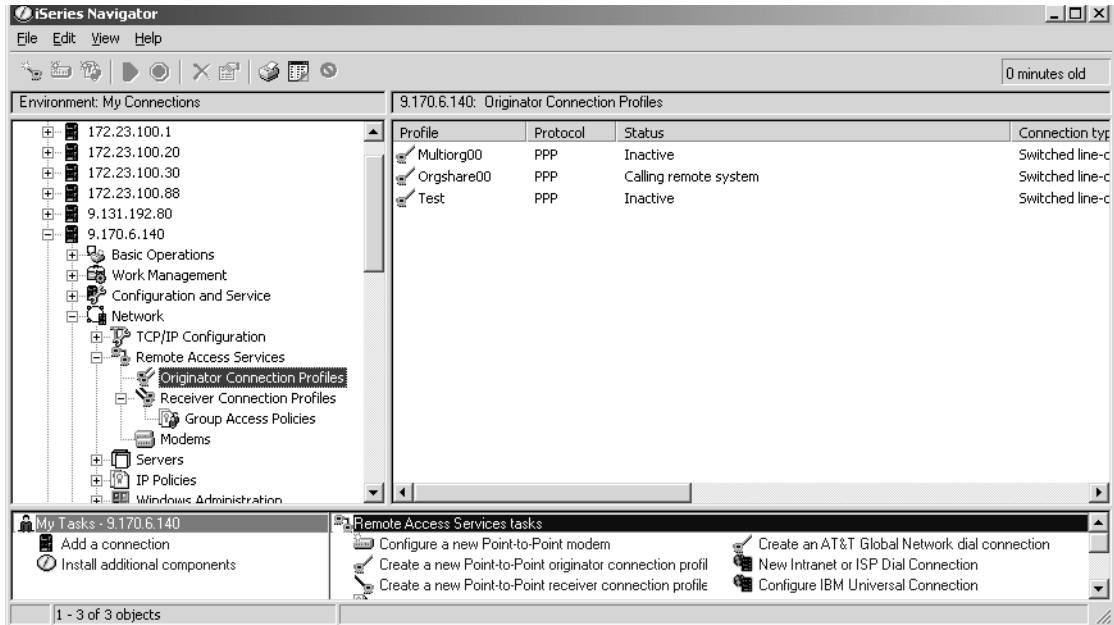


Figure 52. Series Navigator screen: Cm10org is Calling remote system

- ___ 3. While the Originator profile is initiating a call, look at the Receiver profile status. In this example, look at the Receiver profile **ANSSHAREnn** as shown in Figure 53. The status of ANSSHAREnn is now **Resource sharing - waiting for line to become active**. This represents that Receiver profile ANSSHAREnn is waiting for a line resource ready which is currently used by Originator profile ORGSHAREnn.

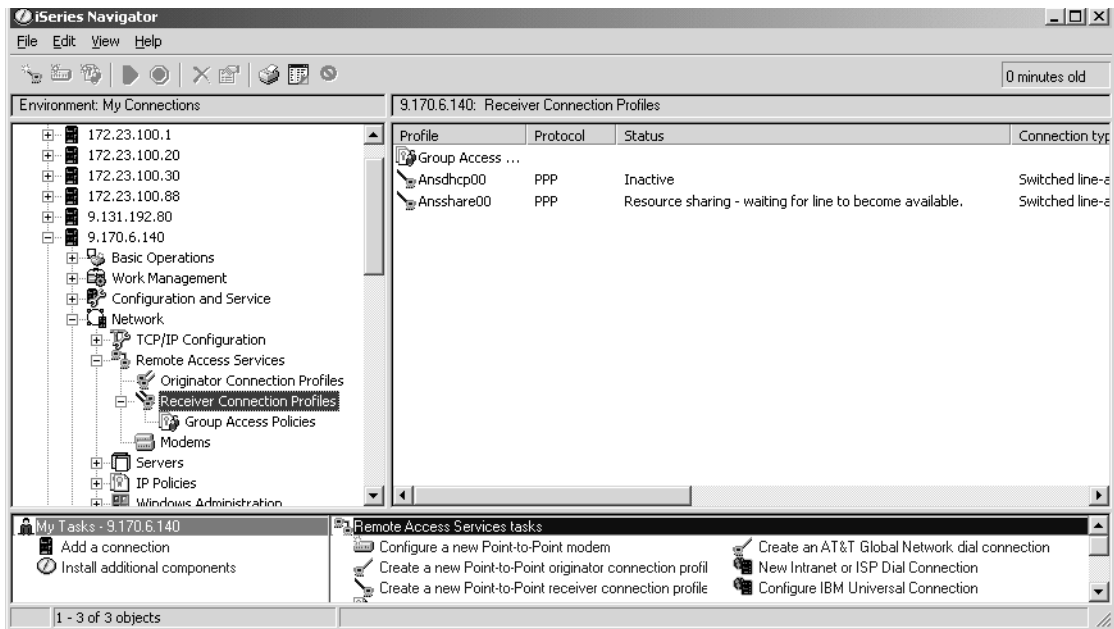


Figure 53. iSeries Navigator screen: ANSSHAREnn is now Resource sharing

- ___ 4. Next stop the Originator connection profile ORGSHAREnn. Again, watch the status change on both ORGSHAREnn and ANSSHAREnn.

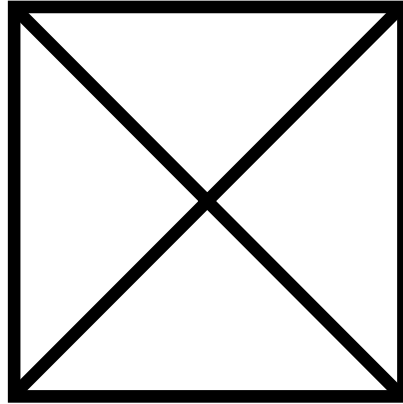
Eventually watch the Receiver Connection profile go back to a status of Waiting for incoming call.

__ 5. Stop the Receiver connection profile ANSSHAREnn.

Resource Sharing - Use the Board

You MUST use the board to leave the Resource Sharing area!

This symbol means my team is OUT - let the next team that is in queue know.



Lab 4. DHCP Proxy Client

This lab provides you the opportunity to configure DHCP proxy client working with PPP connection. DHCP proxy client leases IP address to the remote PPP client.

After you complete this lab, you will have an ability to configure DHCP proxy client configuration and Receiver connection profile for DHCP proxy client.

Objectives

This lab allows you to learn how to:

- Configure DHCP proxy client
- Configure Receiver connection profile for DHCP proxy client

Scenario

Your customer has DHCP server running in Token Ring network. Clients running in Token Ring network have IP address leased by DHCP server. Now your customer has a plan to install several remote PPP clients. Your customer needs remote PPP clients to have IP addresses assigned within the IP address range specified in DHCP server configuration.

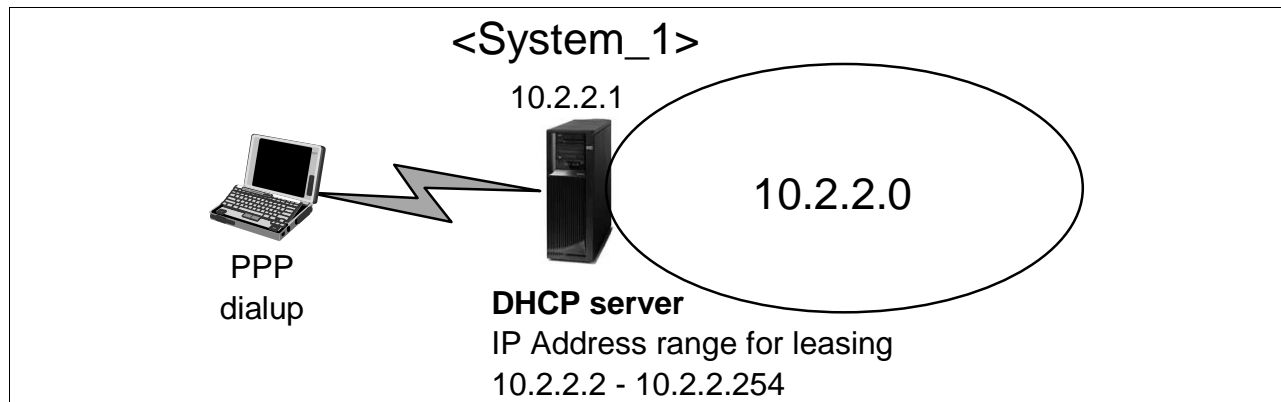


Figure 54. DHCP server and remote PPP clients

Task 1: Verify DHCP server configuration on <System_1>

Before you arrived your instructor configured the DHCP server on <System_1>. As pictured in Figure 54 this DHCP server will lease addresses for the 10.2.2.0 subnetwork with the address range of 10.2.2.2 through 10.2.2.254. 10.2.2.1 is reserved for the iSeries local LAN address.

You should verify the DHCP configuration on <System_1> before you start.

- ___ 1. Expand **Network** -> **Servers**.
- ___ 2. Click **TCP/IP** to bring up a list of all the servers on the right. Find the DHCP server and make sure it is Started.
If not, please feel free to start it yourself.
- ___ 3. Right click on DHCP and select **Configuration** from the context menu. You will be presented with the DHCP Server Configuration window as shown in

Figure 55. Right click on Subnet 10dot2 and select **Properties** from the context menu.

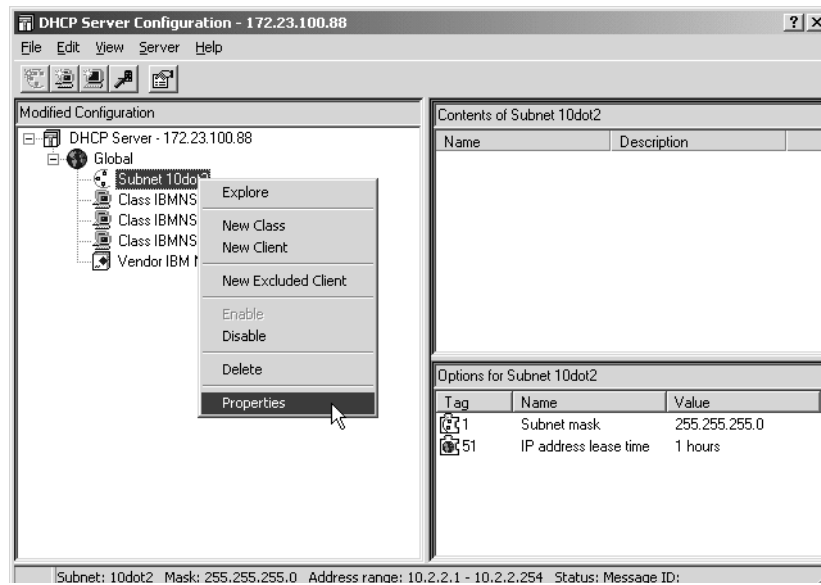


Figure 55. DHCP Server Configuration: Right click on Subnet 10dot2 to see the Properties

4. Examine the different tabs on the Subnet 10dot2 Properties panel. The one you should be the most interested in is the **Address Pool** tab as shown in Figure 56.

As pictured in Figure 54 on page 45 this DHCP server will lease addresses for the 10.2.2.0 subnetwork with the address range of 10.2.2.2 through 10.2.2.254. 10.2.2.1 is reserved for the iSeries local LAN address.

Do not make any changes. Click **Cancel** on the Subnet 10dot2 Properties panel and close the DHCP Server Configuration panel. Do not save any changes.

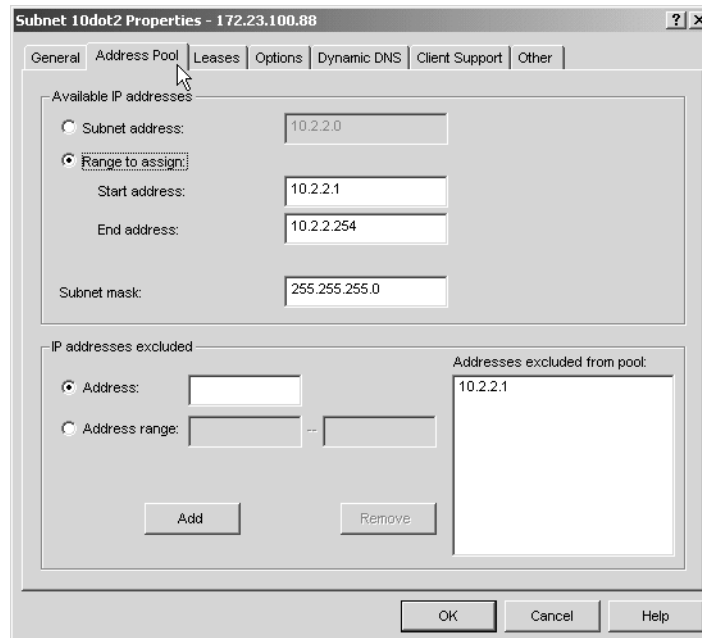


Figure 56. Subnet 10dot2 Properties

Task 2: Verify DHCP proxy client is enabled on <System_1>

Normally you must right click the **Remote Access Services** and select **Services** from the context menu to enable DHCP proxy client on the iSeries. Then, you would proceed to use DHCP proxy client in your Receiver connection profiles.

Due to the nature of this lab environment the DHCP proxy client has already been enabled for you in the Remote Access Services. Your task is to merely verify that the DHCP proxy client function has been enabled.

- ___ 1. Expand **Network**.
- ___ 2. Right click on **Remote Access Services** and select **Services** from the context menu as shown in Figure 57.

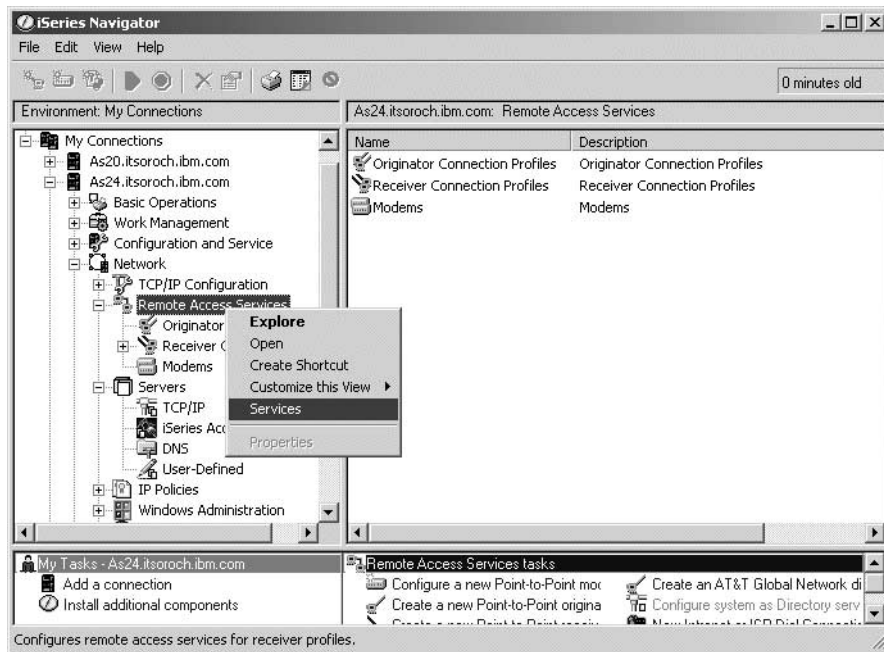


Figure 57. Remote Access Services: Services

3. The Remote Access Services for Receiver Profiles is displayed. Select the **DHCP WAN Client** tab as shown in Figure 58. The Enable DHCP WAN client check box should be checked and the Client IP address are already completed for you. Click **Cancel** (do not make any changes).

Question 14: Why is this called a DHCP WAN Client?

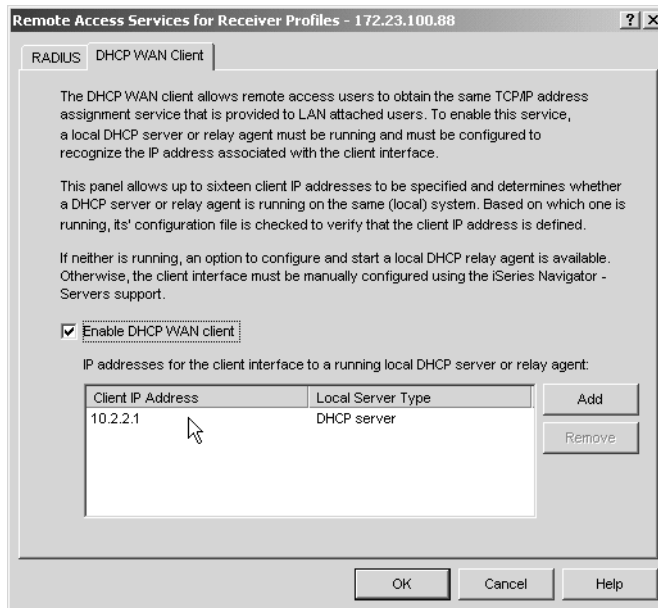


Figure 58. Remote Access Services for Receiver Profiles: DHCP WAN Client

Task 3: Configure Receiver connection profile for DHCP proxy client

Question 15:What is the Communication Resource name that you will be using to receive the incoming calls on <System_1>?

1. Right click on **Receiver Connection Profiles** and select **New Profile** from the context menu. This is shown in Figure 59. Examine the choices. You will take all the defaults. Click **OK** to continue.

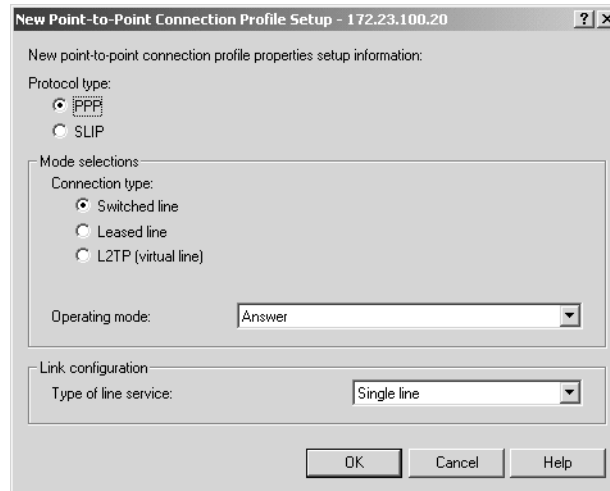


Figure 59. New Point-to-Point Connection Profile Setup

2. On the General tab, name your Receiver profile ANSDHCPnn and give it a description that is worthy of your team as shown in Figure 60. Click the **Connection** tab to continue.

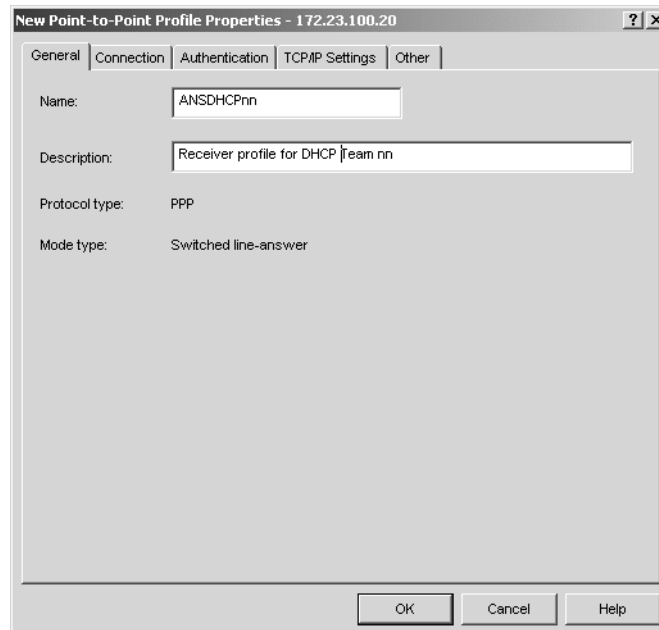


Figure 60. New Point-to-Point Connection Profile Properties: General tab

- ___ 3. On the Connection tab's Link configuration enter a line description Name of **DHCPLINnn** as shown in Figure 61. Click **New** to configure the details of this new line description including the ever-important hardware resource identifier.

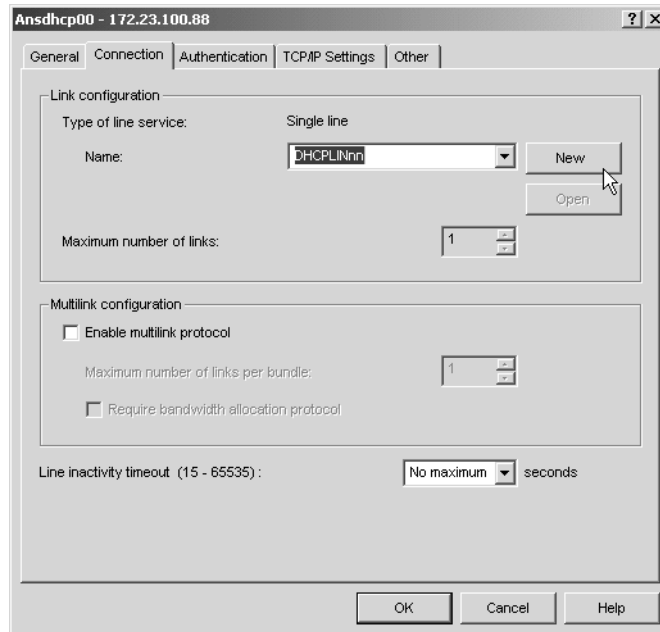


Figure 61. New Point-to-Point Connection Profile Properties: Connection tab

- ___ 4. A new window will pop up (as seen in Figure 62) that allows you to associate this new line description with the CMNxx communications resource that will be handling all the incoming calls for your ANSDHCPnn Receiver profile. Enter a description.

Select the correct communications hardware resource. Click **OK** to continue.

Important

The CMNxx resource pictured in Figure 62 most likely is not the correct resource. Please refer to Figure 1 on page 7 or ask your instructor if you are not sure which is the correct resource.

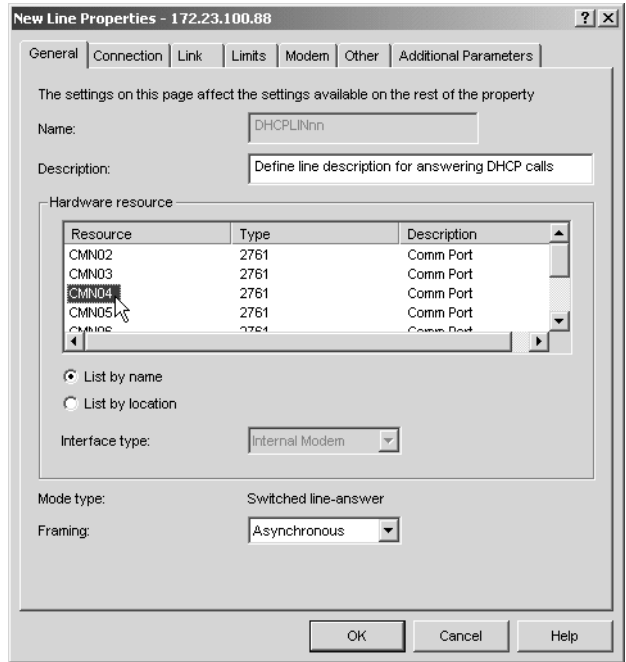


Figure 62. New Line Properties: Associating the line description with the CMNxx resource

5. Back to the New Point to Point Profile Properties select the TCP/IP Settings tab and pull down Assigned fixed IP address to **10.2.2.1** as shown in Figure 63. For the Remote IP address we will assign this using DHCP WAN Client. Use the pull down to select **DHCP**. Click **OK** to create your Receiver profile.

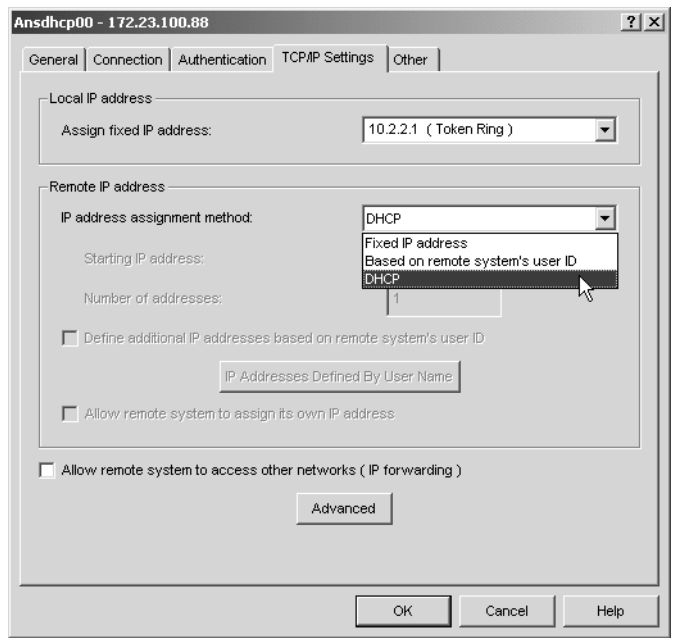


Figure 63. New Point-to-Point Connection Profile Properties: Connection tab

Do not yet start your Receiver profile as other teams may be using the communication resource right now. You are now ready to configure the Windows 2000 client for the call.

Task 4: Configure your Windows 2000 client for a call

If you are using your Instructors laptop!!!

Your instructor has already created outgoing connections and placed them on his desktop. They are named to102 through to107 to indicate which port on the PBX they will call. You can use icons if you want.

1. Right click on **My Network Places** (found on the Windows desktop) and select **Properties** from the context menu. This is shown in Figure 64. Double click **Make New Connection**.

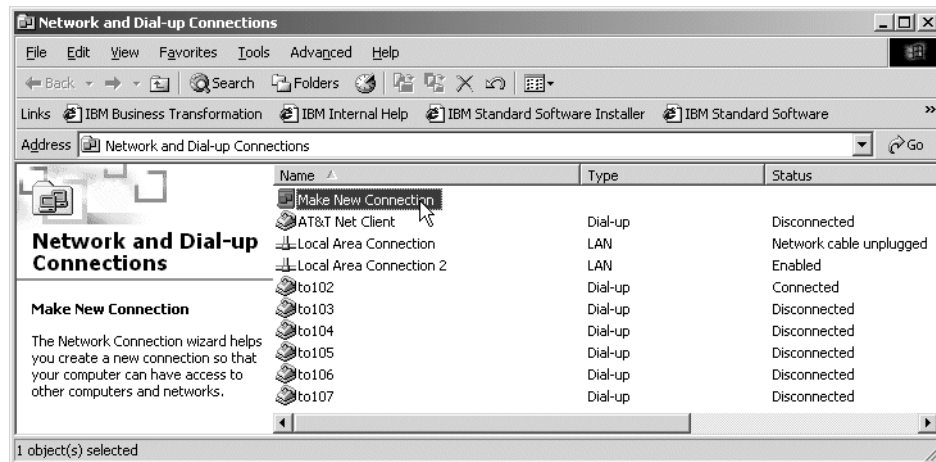


Figure 64. Network and Dial-up Connections

2. Answer all the questions in the Network Connection Wizard. You should specify:

Network Connection Type Dial up to private Network
Modem Select your modem (only)
Phone Number Use the three digit extension number for port at which your Receiver profile is waiting to answer. Use Figure 1 on page 7 for that information.
Name it callDHCPnn

You are now ready to make the call.

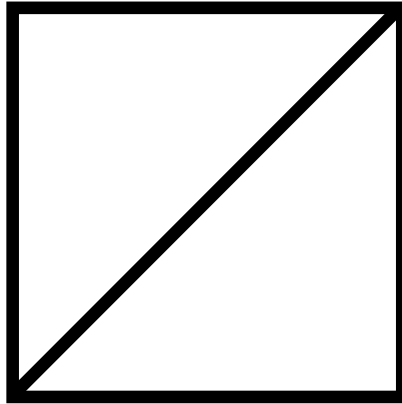
Task 5: Make the call and test the connection

You are now ready to make the call and test your connection.

DHCP Proxy Client- Use the Board

You MUST use the board to wait your turn to test your DHCP Proxy Client Configuration!

This symbol means my team is IN - and everybody else must be OUT.



1. You now want to start your Receiver profile ANSDHCPnn. Right click on the profile name and select **Start** from the context menu as shown in Figure 65.

Make sure the Status goes to Waiting for incoming calls.

Note!

You may have to refresh the Receiver Connection Profile screen to enable the Start option in the context menu.

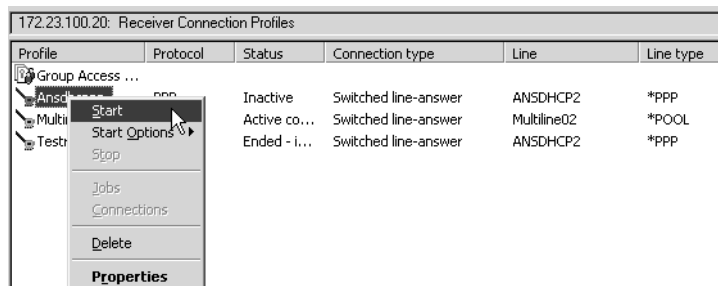


Figure 65. Start Receiver Connection Profiles

2. Make the call. On your Windows 2000 client Double click on the connection document that will originate the call.
3. On your iSeries Navigator connection to the iSeries <System_1> monitor the connection. You should see it going through a series of states ending with Active as shown in Figure 66.

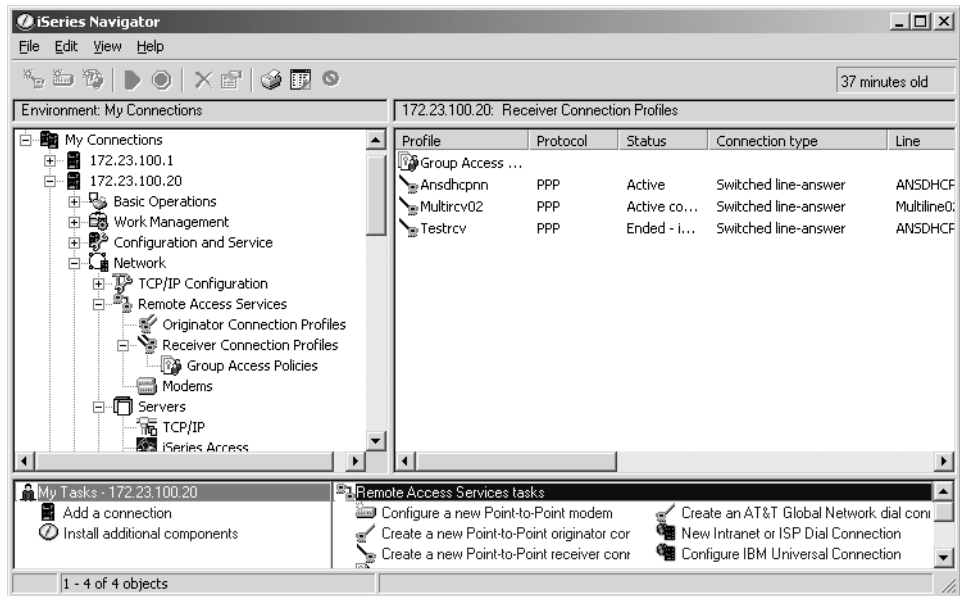


Figure 66. iSeries Navigator: Receiver Connection Profiles: Monitor using refresh

___ 4. On your Windows 2000 client PING your iSeries:

```
ping 10.2.2.1
```

___ 5. On your Windows 2000 client find the IP address that has been dynamically assigned by the iSeries DHCP server.

```
ipconfig /all
```

You should see something similar to:

```
PPP adapter to102:
```

```

Connection-specific DNS Suffix . . :
Description . . . . . : WAN (PPP/SLIP) Interface
Physical Address. . . . . : 00-53-45-00-00-00
DHCP Enabled. . . . . : No
IP Address. . . . . : 10.2.2.1
Subnet Mask . . . . . : 255.255.255.255
Default Gateway . . . . . : 10.2.2.1
DNS Servers . . . . . :

```

___ 6. On your iSeries Navigator connection to the iSeries <System_1> use the DHCP monitor to identify the lease for your Windows 2000 client. To do this expand **Network** -> **Servers** and then select **TCP/IP**. Right click on **DHCP** and select **Monitor** from the context menu. You should be able to find your lease based upon the IP address assigned to you from the DHCP server as shown in Figure 67.

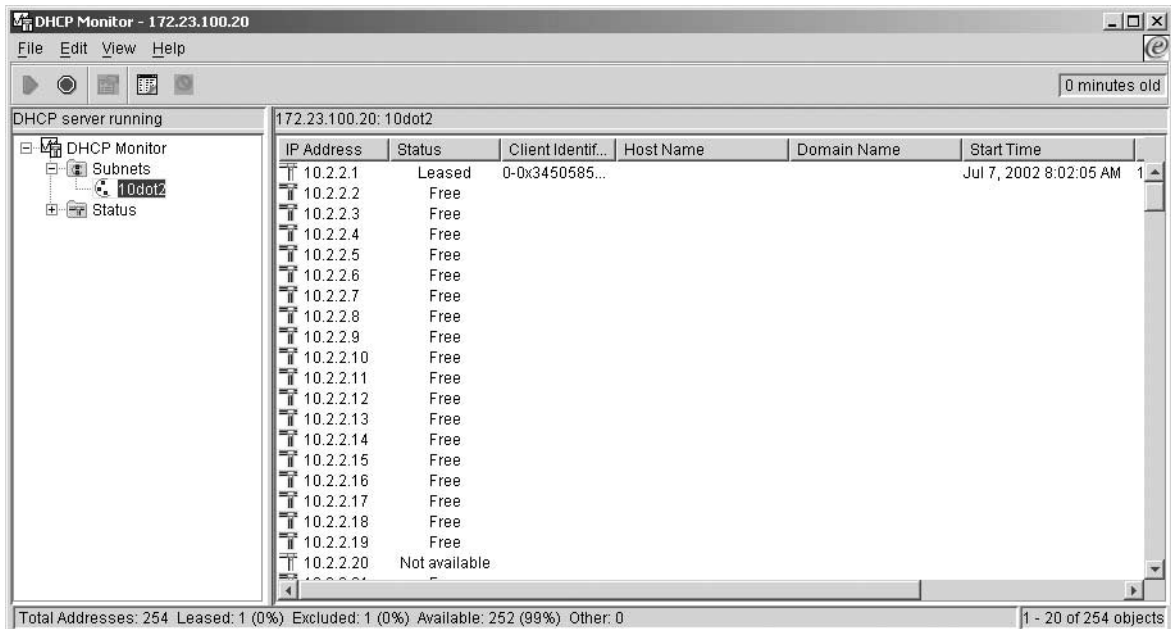


Figure 67. DHCP Monitor: Shows the active lease for clients in the 10.2 subnet

Task 6: Clean up for the next team!

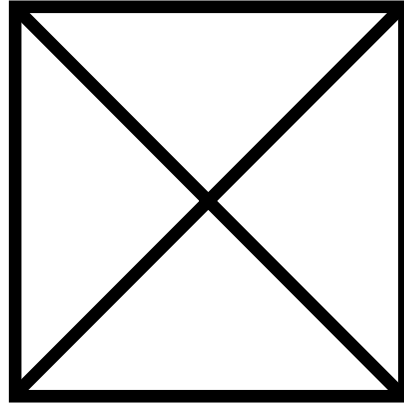
You need to end your analog connection to iSeries <System_1> and end your Receiver profile ANSDHCPnn.

- ___ 1. End the call. On your Windows 2000 client Double click on the connection document and click **Disconnect**.
- ___ 2. On your iSeries Navigator connection to the iSeries <System_1> click **Receiver Connection Profiles**. Right click on your profile ANSDHCPnn and select **Stop** from the context menu.

DHCP Proxy Client- Use the Board

You **MUST** use the board to leave the DHCP Proxy Client test area!

This symbol means my team is **OUT** - let the next team that is in queue know.



Answers

This is the Answers section. Include answers to all questions, and fill in any incomplete tables that the reader was previously required to complete. Also, include any other relevant information that the reader may find useful. Provide answers and completed tables by lab task number.

Lab 1. Virtual IP Interface and proxy ARP

These are the answers.

Question 1: Where was the option to configure Proxy ARP for this IPv4 Virtual IP address?

The New IPv4 Interface wizard does not give you the choice to create a Virtual IP address with the option for Proxy ARP.

Let's continue on and test to see how your new Virtual IP address behaves.

Question 2: Did the PING complete successfully?

No it did not.

Question 3: If not, why did the PING fail?

The New IPv4 Interface wizard did not give you the choice to create a Virtual IP address with the option for Proxy ARP. As is usual for the iSeries - the default for a new configuration option is the old (V5R1) value - that is, no Proxy ARP for Virtual IP addresses.

Question 4: Does the PING still work?

Yes it does. In fact, with the -t option causing your Windows 2000 client to issue the ICMP Echo Request about once a second - you should not even notice a missing ICMP Echo Response coming from the iSeries Virtual IP address.

Question 5: What MAC address is now associated with your team's virtual IP address?

It should be the 'other' one.

Question 6: Did the associated MAC address change again?

Yes. The only that can cause a failure would be if all the physical (and logical) interfaces to your iSeries broken at the same time. Or, if the power went out... (smile).

Lab 2. Multilink PPP configuration

Question 7: What are the two Communication Resource names that you will be using to make the originating calls from <System_1> to <System_2>?

The first port on the #2761 has been assigned the Communications Resource name of CMN07. From this port a telephone line is connected to port 4 on the PBX.

The second port on the #2761 has been assigned the Communications Resource name of CMN08. From this port a telephone line is connected to port 5 on the PBX.

Question 8: What are the two phone numbers that <System_1> must call to connect to <System_2>?

The Remote phone numbers specified in the Originator profile on <System_1> should be 106 and 107.

Question 9: Why should you *not* select Allow remote system to initiate a call from this system?

Because we are configuring all the links to be originated from <System_1>.

Question 10: Why should you *not* select Enable bandwidth utilization monitoring?

We are defining a fault-tolerant solution with multiline. In this case it is better to have all the links establish a connection right away in case one or more of the links fail. As we are starting all the links (and configuring the links to dynamically recover in the case of failure) we do not need to enable the BUM protocol.

Question 11: What are the two Communication Resource names that you will be using to receive the calls on <System_2>?

Port 6 (extension 106) on the PBX is connected to the first port on the #2761 which has been assigned the Communications Resource name of CMN05.

Port 7 (extension 107) on the PBX is connected to the second port on the #2761 which has been assigned the Communications Resource name of CMN06.

Question 12: Should you enable Require bandwidth allocation protocol for this profile?

You will not enable Require bandwidth allocation protocol for this profile. This is because the originator profile you are using supports BAP and therefore there was no reason to require it to be used. You would enable this option if you wanted to allow only BAP enabled connections. If you have both BAP and non-BAP clients connecting to the same profile, you would not enable this.

Lab 3. Dynamic resource sharing scenario

Question 13: How many line descriptions will you be creating to support the Originator and Receiver profiles?

Just one. In the properties for this one line description you will enable sharing for dynamic resource sharing.

Lab 4. DHCP Proxy Client

Question 14: Why is this called a DHCP WAN Client?

Because the DHCP WAN Client will act as a proxy for the PPP client that will be connecting to your system. As a proxy, it will act as a DHCP client and connect

directly with the configured DHCP server or indirectly through a DHCP relay agent.

Question 15: What is the Communication Resource name that you will be using to receive the incoming calls on <System_1>?

Port number 2 (extension 102) on the PBX is connected to the third port on the iSeries #2761. This port has been assigned a Communications Resource of CMN09.

