CNT 4603: System Administration Spring 2011

Project Four – Preliminary Set-up And Notes

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Project Four: Overview

- **Title:** "Project Four: Creating A Virtual Network"

- **Points:** assigned to each phase

- **Date:** not yet something to worry about – we'll do it in phases.

- **Objectives:** In Project One you had some exposure to setting up a virtual machine and Project Two had you dealing with the planning of an Active Directory structure. This project will be the first step into real system administration of a network of servers and clients. This project will have you set up a virtual network of servers over which you will be the system administrator. This first part is some preliminary set-up and background work.

Project Four: The Scenario

- In this project you will build a virtual demonstration network for a fictitious company, System Administration Virtual Network Company (SAVN).

- SAVN is a virtual (fictitious) company headquartered in Orlando. In the past, the company has relied on several independent desktop computers to manage their assets. SAVN has grown, and management has come to realize that the company could benefit by implementing a network.

- As the IT manager for SAVN, implementing the network will be your responsibility.

- As a user of Microsoft software, SAVN will build its network around Microsoft Windows Server 2008. SAVN utilizes Microsoft Vista Business as its desktop operating system of choice.

Project Four: The Scenario

- Although there are a number of different ways to implement a virtual network design, we'll make this project focus on the three roles found in all networks (1) designing the network configuration, (2) verifying IP configurations and (3), implementing centralized, secure management of the network.

- In this project, I've designed the network configuration that we'll use and you will implement it using virtualization.

- The initial network diagram is shown on the next page.

- `Server01` and `Server02` are virtual machines running Windows Server 2008. `Client01` is a virtual desktop computer running Microsoft Vista Business.

- These machines will communicate with one another over a local virtual network.

Virtual network switch

Server01 – domain controller

Server02 – file server

Client01 – desktop client

Host computer – Your machine

Physical network switch

The SAVN network

Server01 Role – Domain Controller

- `Server01` is the virtual machine that manages the `savn.local` domain.

- Recall from our discussion of Active Directory that a domain is a logical group of computers that shares access to network resources with centralized administration and security policies.

- `Server01` is the domain controller – the server that responds to security authentication requests within the Windows Server 2008 domain. The domain controller is the server that essentially makes networking (at least in a secure fashion) possible.

- You will ultimately implement the domain controller role by promoting `Server01` to function as the domain controller for the SAVN network.

Server01 Role – Domain Controller

- Recall that ADDS uses the Domain Name System (DNS) to maintain domain naming structures and to locate network resources.

- DNS maintains a database of IP addresses and host names and ADDS is designed to take full advantage of DNS's powerful capabilities, so ADDS names must follow standard DNS naming conventions.

- You will implement the DNS role on `Server01` for the `savn.local` domain as part of establishing `Server01` as a domain controller.

Server02 Role – File Server

- `Server02` will serve as a file server, meaning it is the computer system responsible for the central storage and management of data files so that other computers on the `savon.local` network can access these files.

- To take advantage of ADDS security features, you will need to join `Server02` to the `savn.local` domain.

- As a domain member, `Server02` can coordinate the security access of its files with the domain controller (`Server01`).

Client01 – Desktop Client

- `Client01` is a desktop client that will use software applications to access various system resources, including folders, and files on the network file server (`Server02`).

- `Server01`, with ADDS and DNS, helps locate network resources and controls security access to these network resources. `Server02` holds the data that `Client01`'s applications require.

> **IMPORTANT ! ! !**
>
> You'll need to download the `.iso` image for Microsoft Vista Business from Academic Alliance using the same procedure you utilized to download the Server 2008 `.iso` image. I'm assuming that you still have the server that was created in Project One. If so, you can kill it now – we will no longer need it.

Operating System Requirements

- When planning for RAM and hard disk space requirements, you need to take into consideration the role that the particular virtual machines will be playing in your network.

- The table below presents a summary of these two critical variables for the virtual machines in the `savn.local` network.

Virtual Machine	Role	OS	RAM requirement	Virtual Hard Disk Requirement	OS hard disk requirement
Server01	Domain controller	Windows Server 2008	640 MB	65,536 MB	65,536 MB
Server02	File server	Windows Server 2008	512 MB	65,536 MB	16,384 MB
Client01	Desktop	Windows Vista Business	512 MB	65,536 MB	65,536 MB

Operating System Requirements

- Two configuration settings stand out when compared to the Microsoft recommendations that will appear when you set up the virtual machines.

- Because `Server01` serves as a domain controller, it requires 640 MB of RAM to run Windows Server 2008. Microsoft recommend 512 MB of RAM, the extra 128 MB of RAM for `Server01` will provide better performance for this specialized application server.

- Because `Server02` is a file server, special partition allocations are recommended. Although you will create a virtual hard disk of 65536 MB for `Server02,` you will allocate only 16384 MB for the OS. This is done to split the OS files from the data files. We'll worry about this partitioning later.
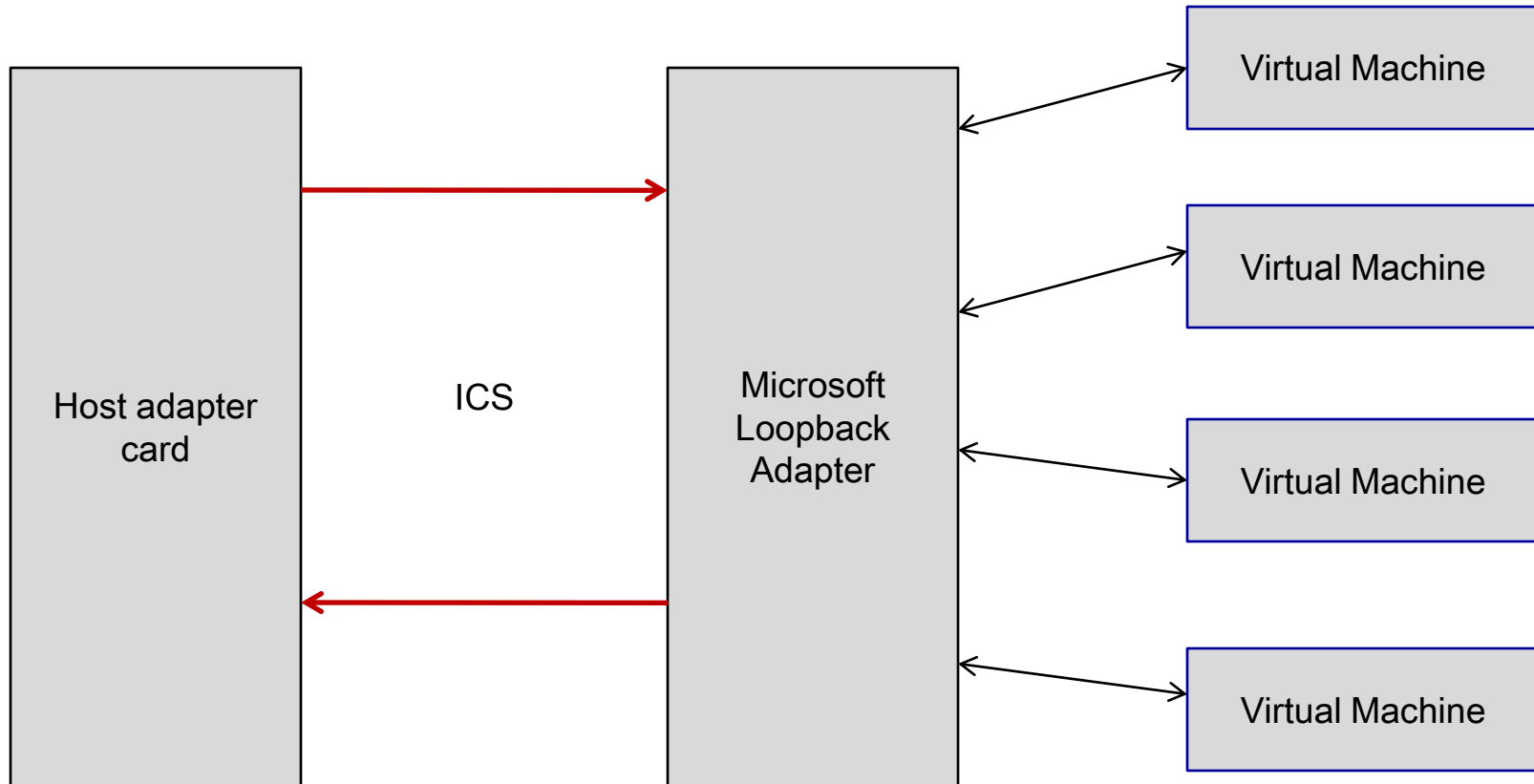
Project Four: Preliminary Set-Up

- The first step in the preliminary set-up for Project Four Step 1 is to configure your host computer for Internet connection sharing. We'll want to do this to allow our virtual machines to have Internet access so that we can get OS updates for them.

- NOTE: I'm not entirely sure if we'll actually need this, so this step is optional at this point. I'm not really sure if we need to worry about keeping our virtual machine OS updated automatically.

- With Internet Connection Sharing (ICS), which is included in the Microsoft Vista OS, you can connect one or more virtual machines to the Internet using the Internet connection provided by your host computer.

- ICS is the preferred method for allowing virtual machines to access the Internet.

Project Four: Preliminary Set-Up

Host adapter card

ICS

Microsoft Loopback Adapter

Virtual Machine

Virtual Machine

Virtual Machine

Virtual Machine

Internet Connection Sharing

Project Four: Preliminary Set-Up

- The host computer needs two network connections:

  - The local area network connection, automatically created by installing a network adapter in your host computer, connects to the computers on your main network.

  - The other network adapter is provided by the Microsoft Loopback Adapter – a built-in network interface driver that lets you create a local-only network interface device.

- The local area connection connects to the main network that provides Internet access for the host computer.

- ICS links the local area connection in the host computer to the Microsoft Loopback Adapter (MLA). The MLA then connects to the local area connection within each virtual machine.

Project Four: Preliminary Set-Up

- You need to ensure that ICS is enabled on the connection that has the Internet connection. By doing this, the shared connection can connect your virtual machines to the main network and thus gain access to the Internet.

- ICS provides the services required by the virtual machines to access both the main network and the virtual network shared by the virtual machines.

- There are three services provided by ICS and these are shown on the next page.
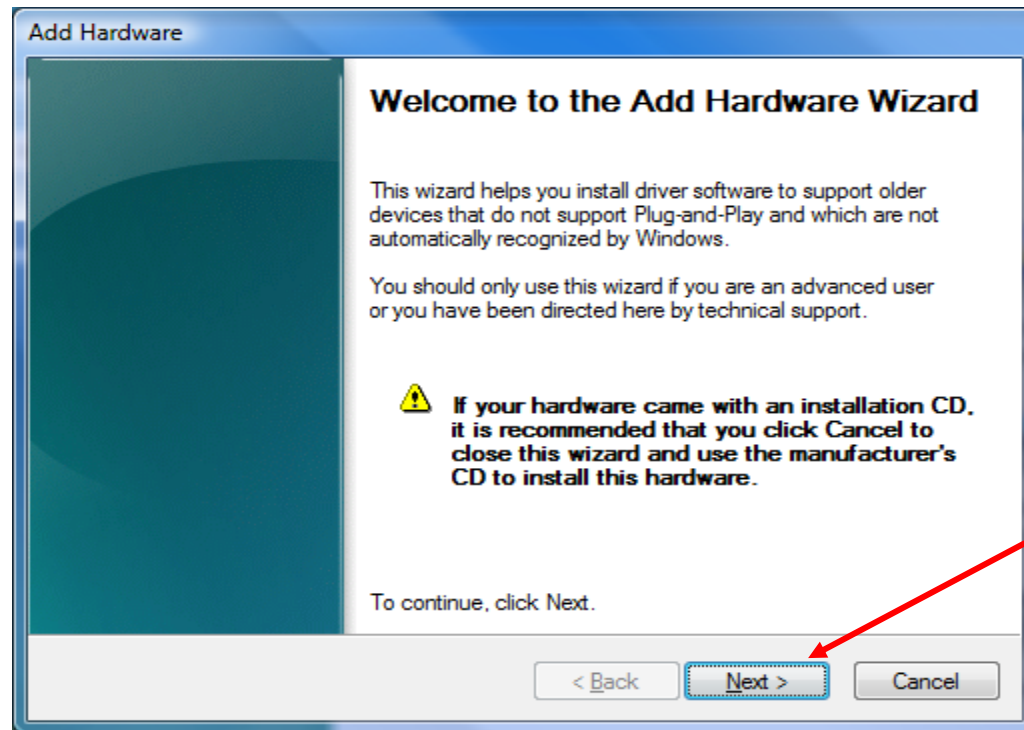
Project Four: Preliminary Set-Up

1. Network Address Translation (NAT) – translates an IP address used within one network (in our case, the virtual network) to an IP address known within another network (in our case, the main network).

2. IP addressing – provides the IP address, subnet mask, and gateway address for each virtual machine.

3. Name resolution services – enables host names to be resolved to IP addresses.
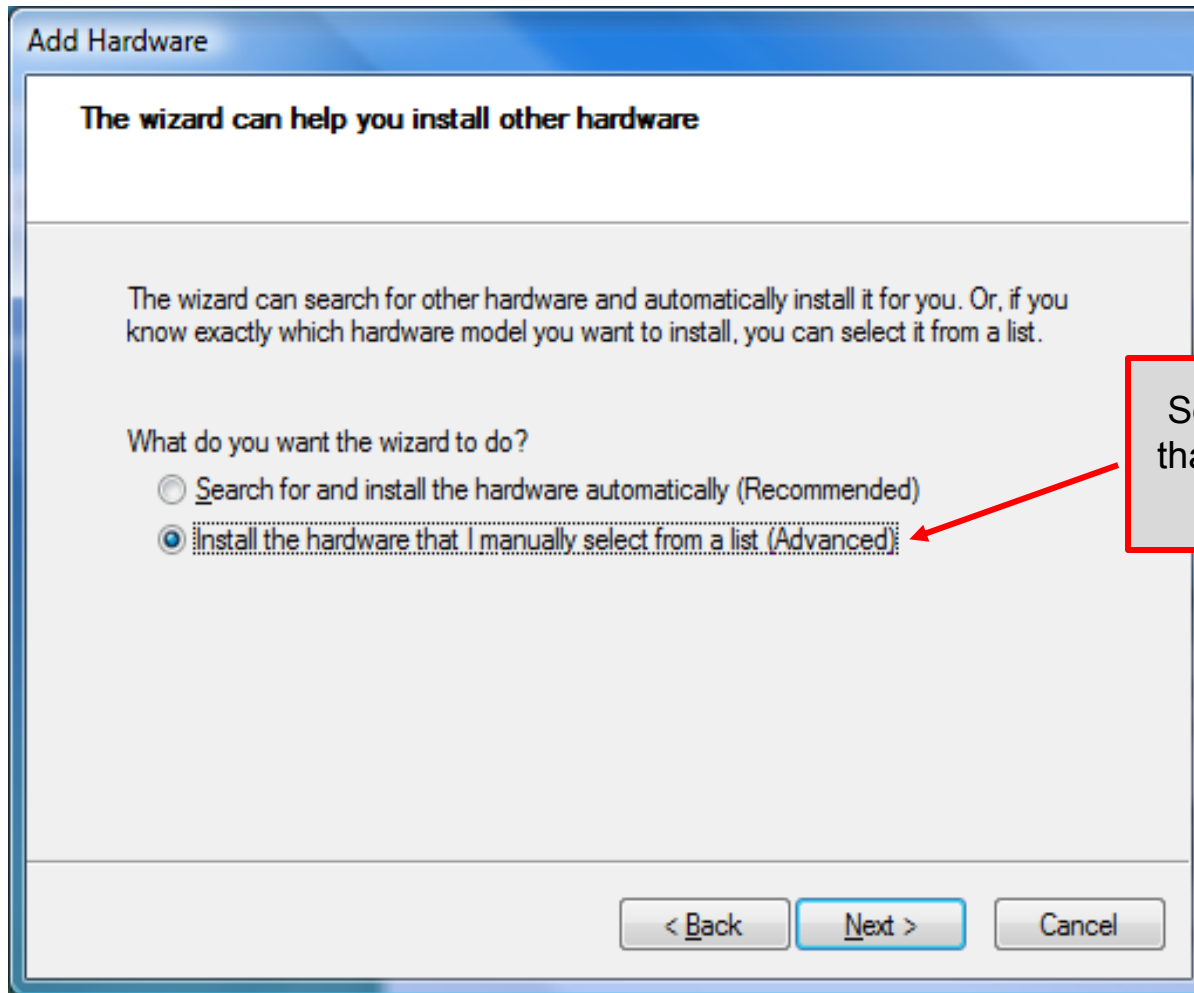
Project Four: Installing ICS

- On your host machine open the Add Hardware dialog box by clicking Start, clicking Control Panel, clicking Classic View, then double-clicking Add Hardware.

- You should then see the following wizard dialog box appear:
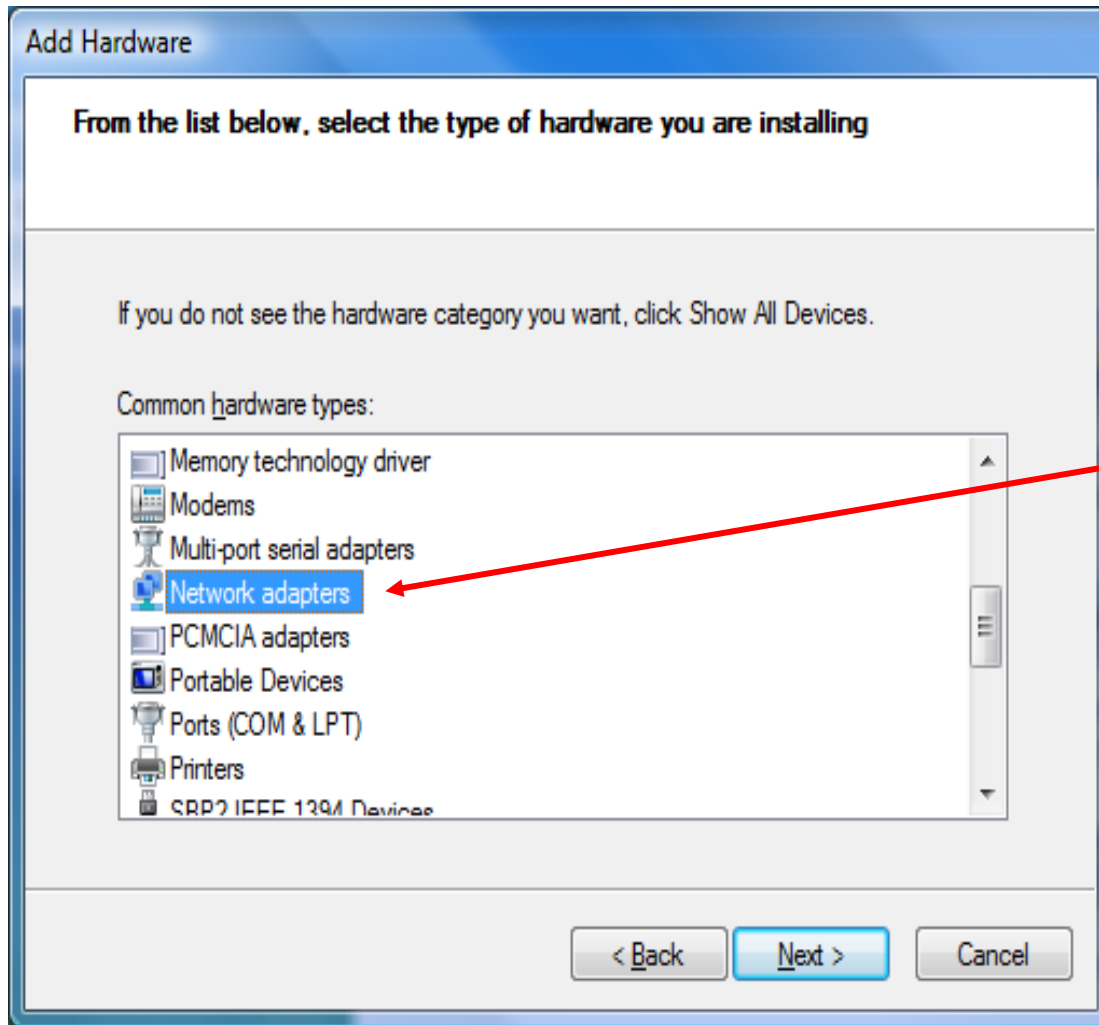

Click Next

Project Four: Installing ICS

Add Hardware

The wizard can help you install other hardware

The wizard can search for other hardware and automatically install it for you. Or, if you know exactly which hardware model you want to install, you can select it from a list.

What do you want the wizard to do?

○ Search for and install the hardware automatically (Recommended)

◉ Install the hardware that I manually select from a list (Advanced)

Select the "Install the hardware that I manually select from a list" option, then click Next

< Back   Next >   Cancel

Project Four: Installing ICS

Add Hardware

From the list below, select the type of hardware you are installing

If you do not see the hardware category you want, click Show All Devices.

Common hardware types:

- Memory technology driver
- Modems
- Multi-port serial adapters
- Network adapters
- PCMCIA adapters
- Portable Devices
- Ports (COM & LPT)
- Printers
- SBP2 IEEE 1394 Devices

Scroll down the list and find the "Network adapters" entry and click on it, then click Next

[< Back] [Next >] [Cancel]

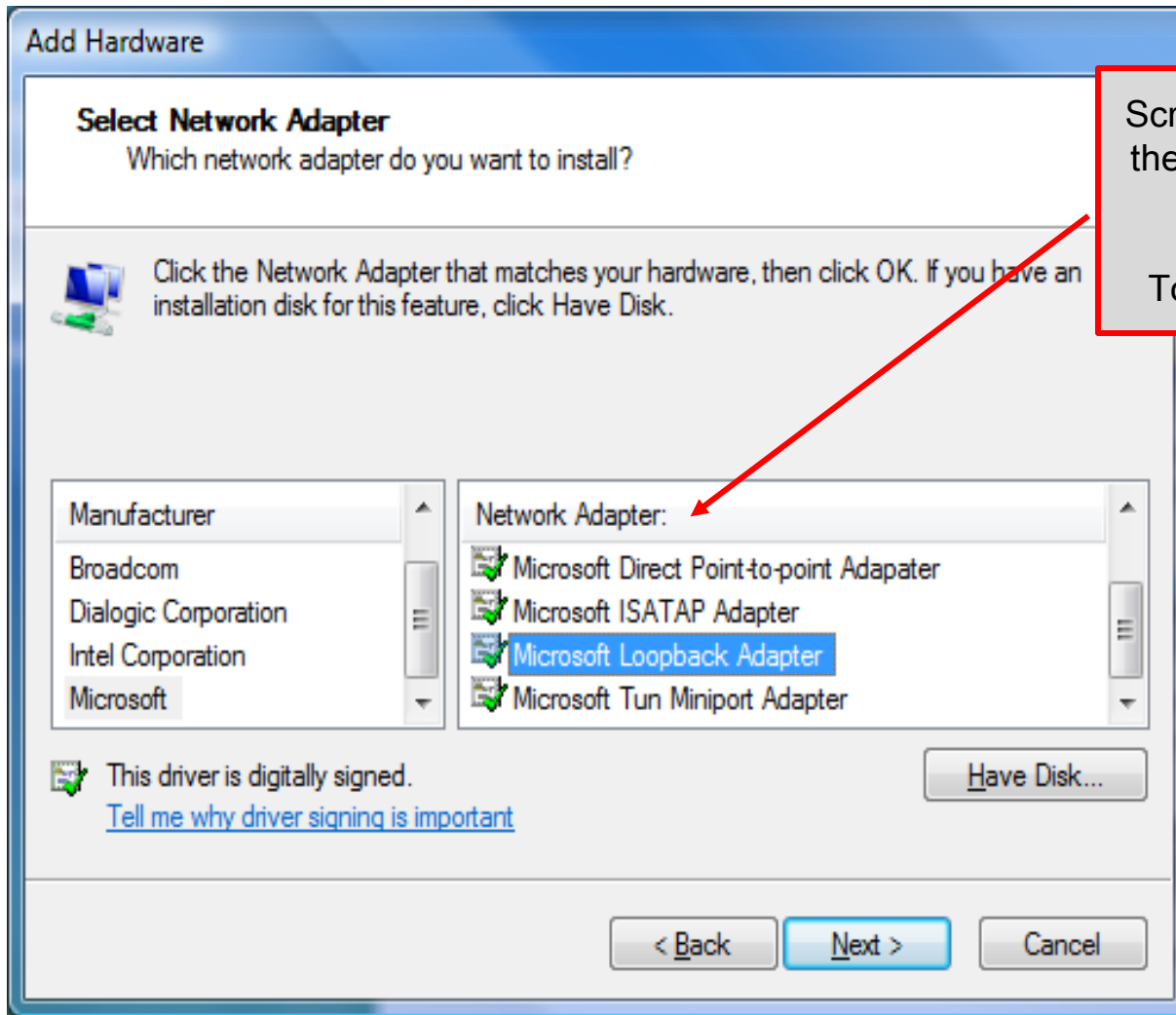# Project Four: Installing ICS
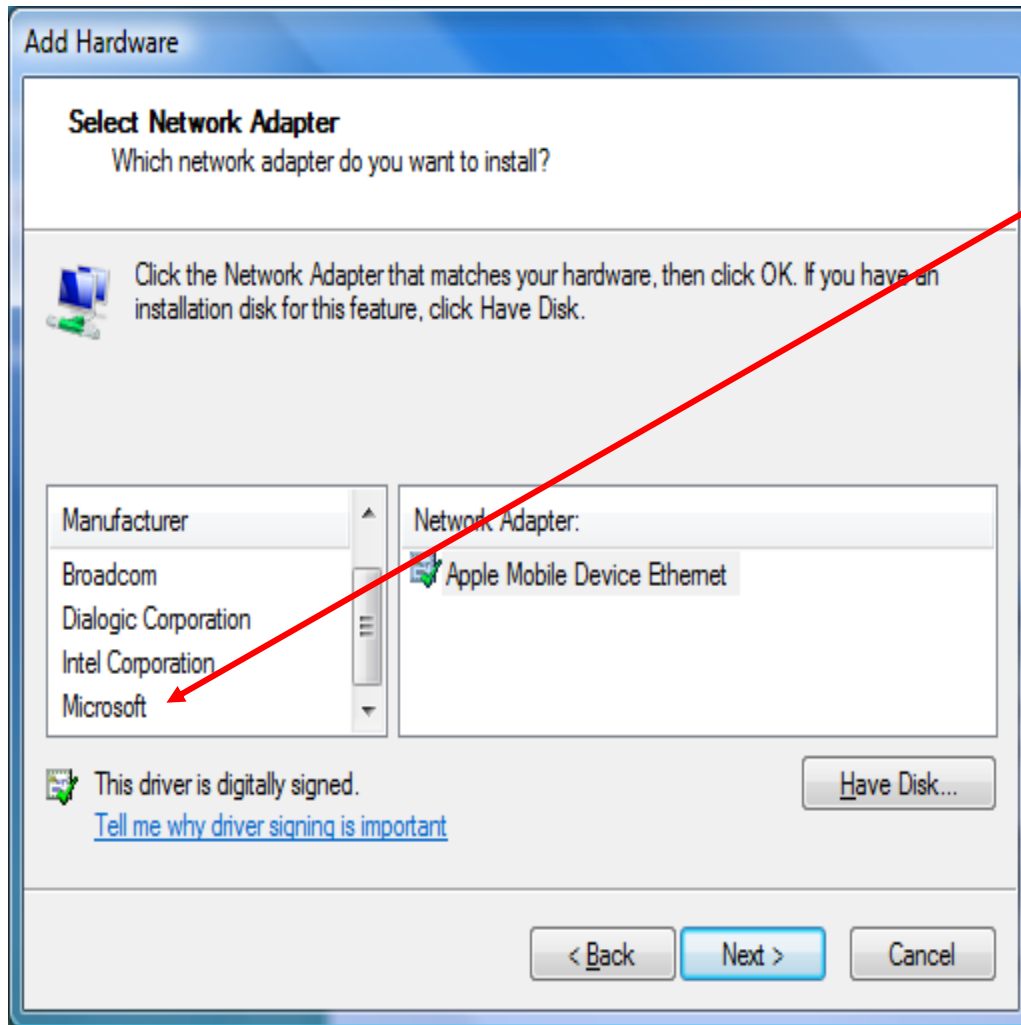
Scroll down this list until you find the Microsoft entry and select it.

Project Four: Installing ICS

Add Hardware

Select Network Adapter
Which network adapter do you want to install?

Click the Network Adapter that matches your hardware, then click OK. If you have an installation disk for this feature, click Have Disk.

Manufacturer	Network Adapter:
Broadcom	Microsoft Direct Point-to-point Adapater
Dialogic Corporation	Microsoft ISATAP Adapter
Intel Corporation	Microsoft Loopback Adapter
Microsoft	Microsoft Tun Miniport Adapter

This driver is digitally signed.
Tell me why driver signing is important

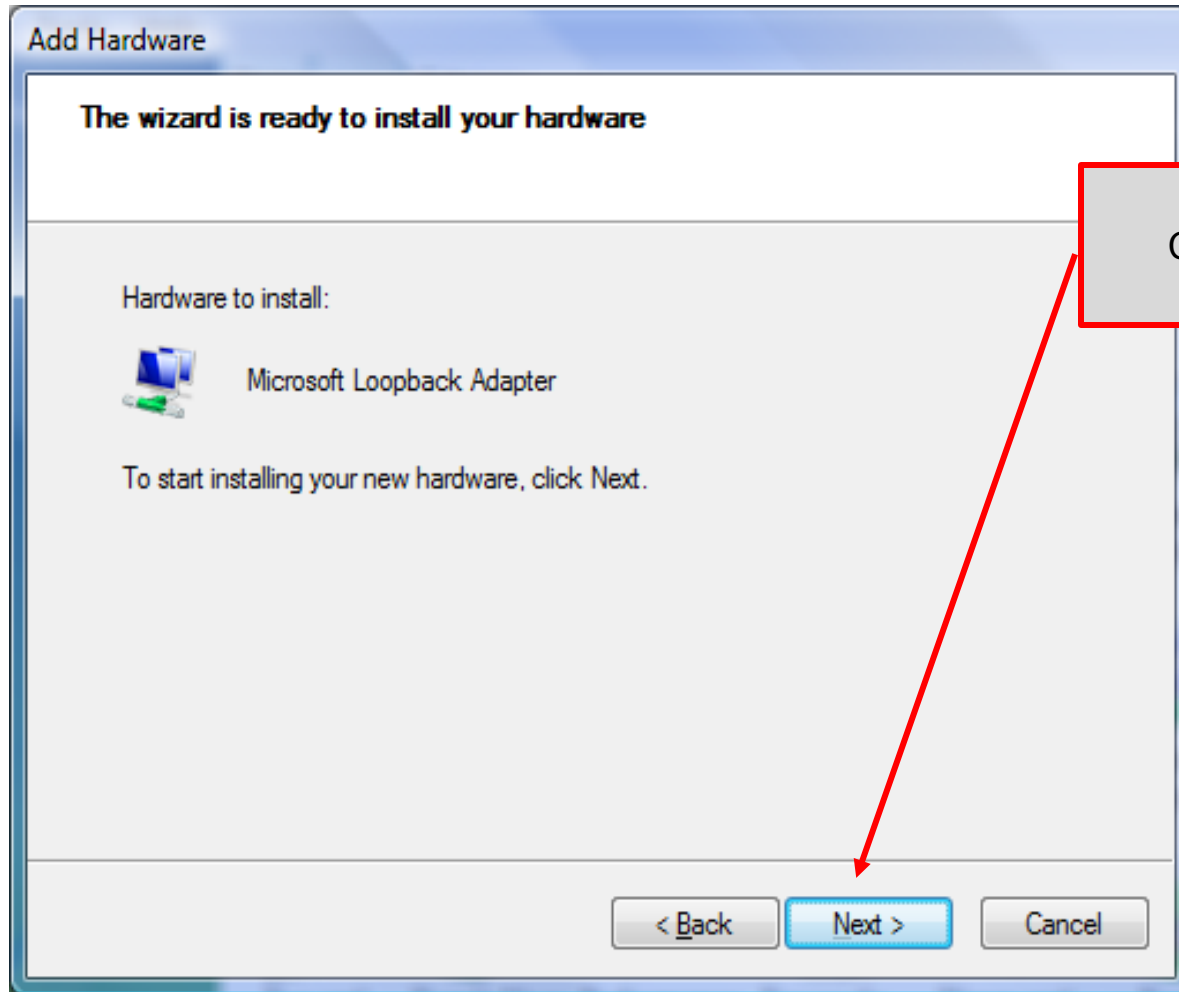Have Disk...

< Back   Next >   Cancel

Scroll down this list until you find the Microsoft Loopback Adapter entry and select it.

To install the MLA, click Next.

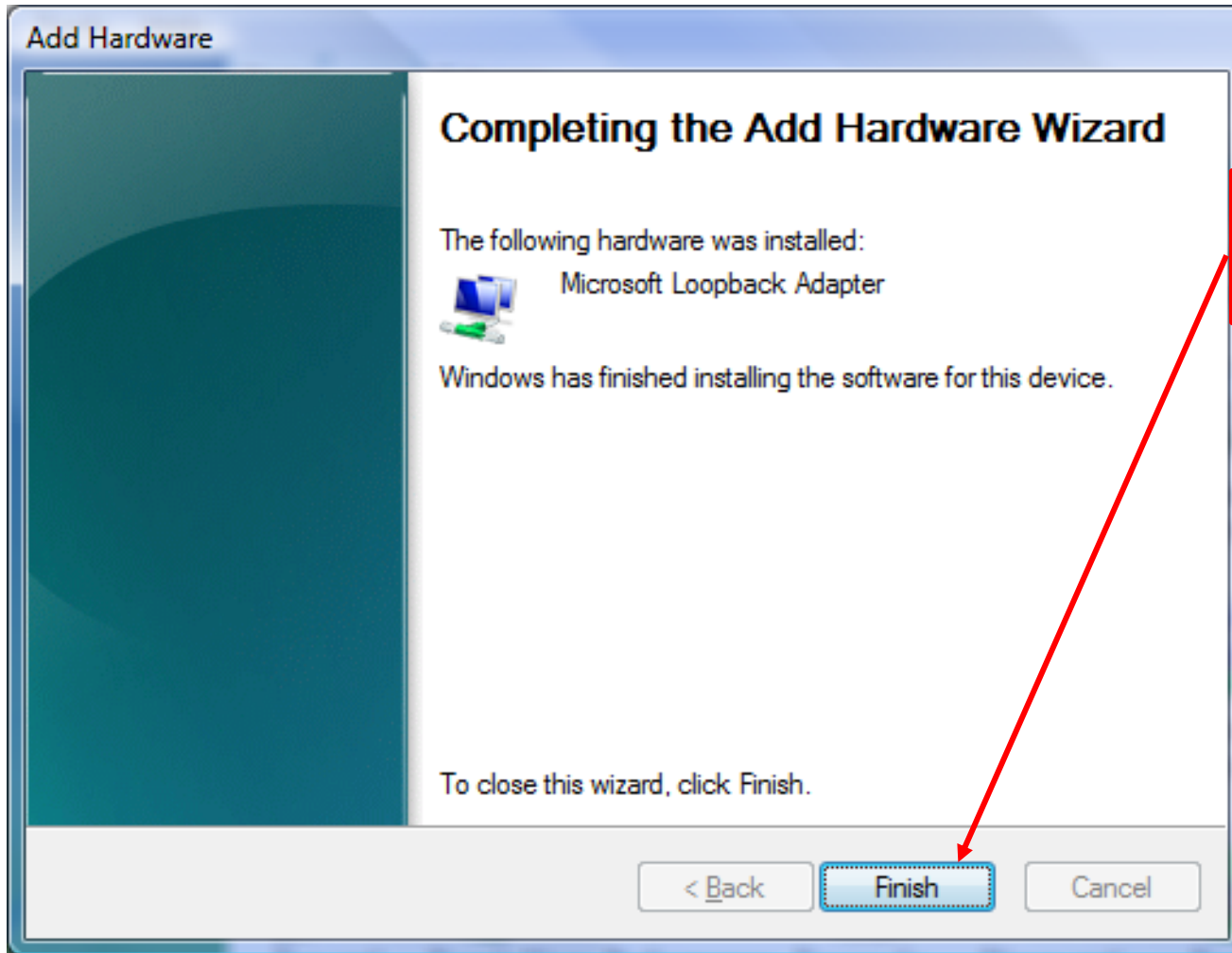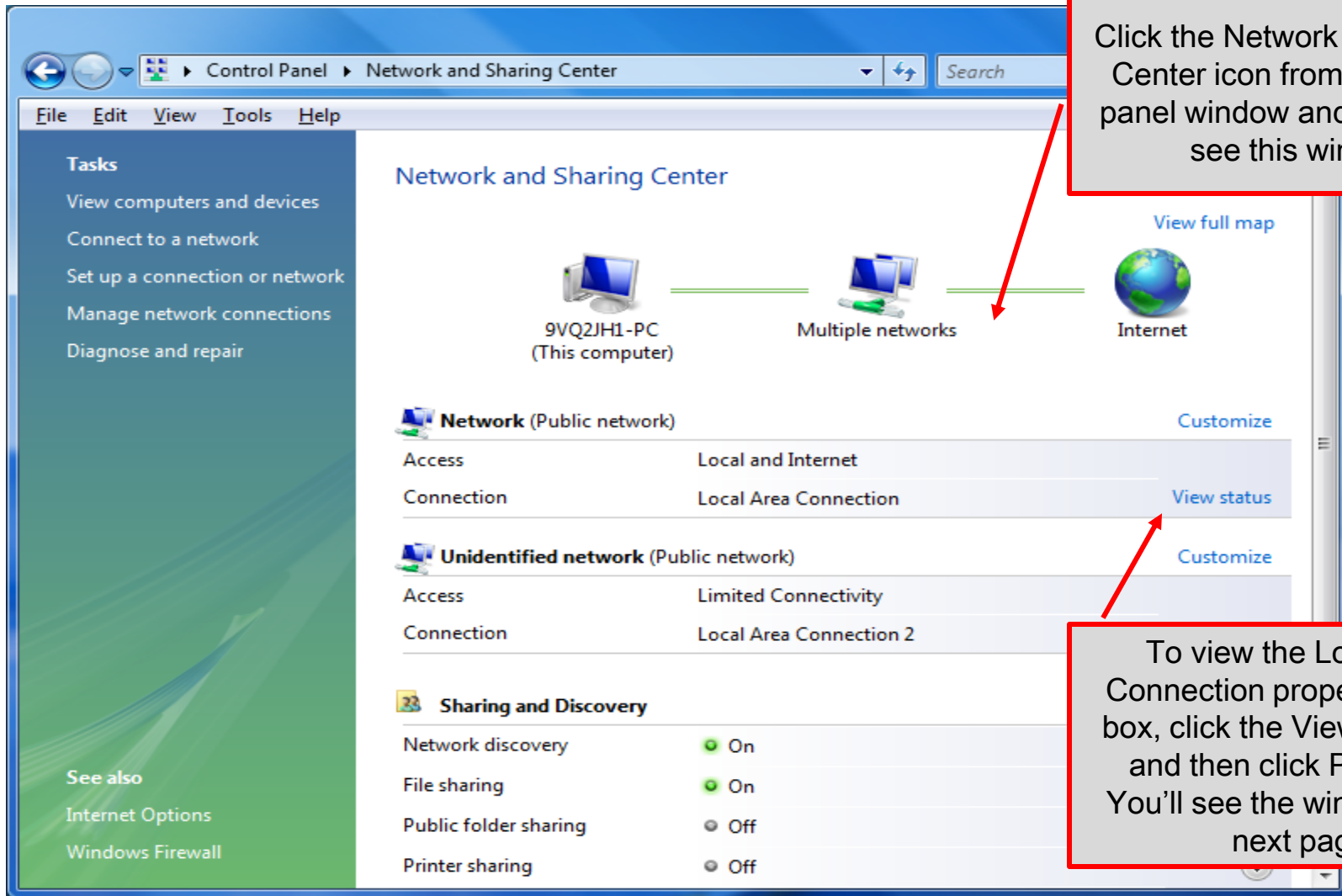# Project Four: Installing ICS

Add Hardware

The wizard is ready to install your hardware

Hardware to install:

Microsoft Loopback Adapter

To start installing your new hardware, click Next.

< Back   Next >   Cancel

Click Next.

Project Four: Installing ICS

Add Hardware

Completing the Add Hardware Wizard

The following hardware was installed:

Microsoft Loopback Adapter

Windows has finished installing the software for this device.

Click Finish and you're done!

To close this wizard, click Finish.

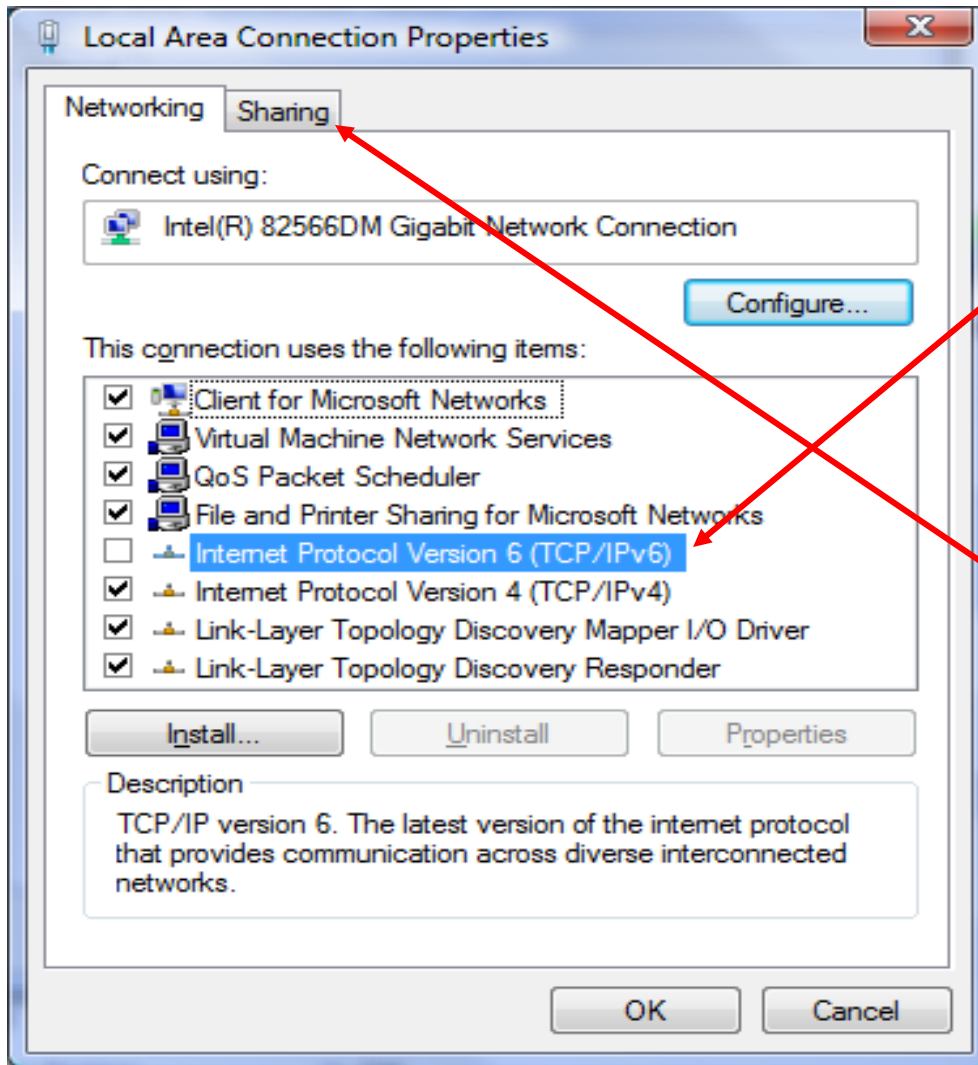< Back   Finish   Cancel

Project Four: Installing ICS

Click the Network and Sharing Center icon from the control panel window and you should see this window.

To view the Local Area Connection properties dialog box, click the View status link and then click Properties. You'll see the window on the next page.

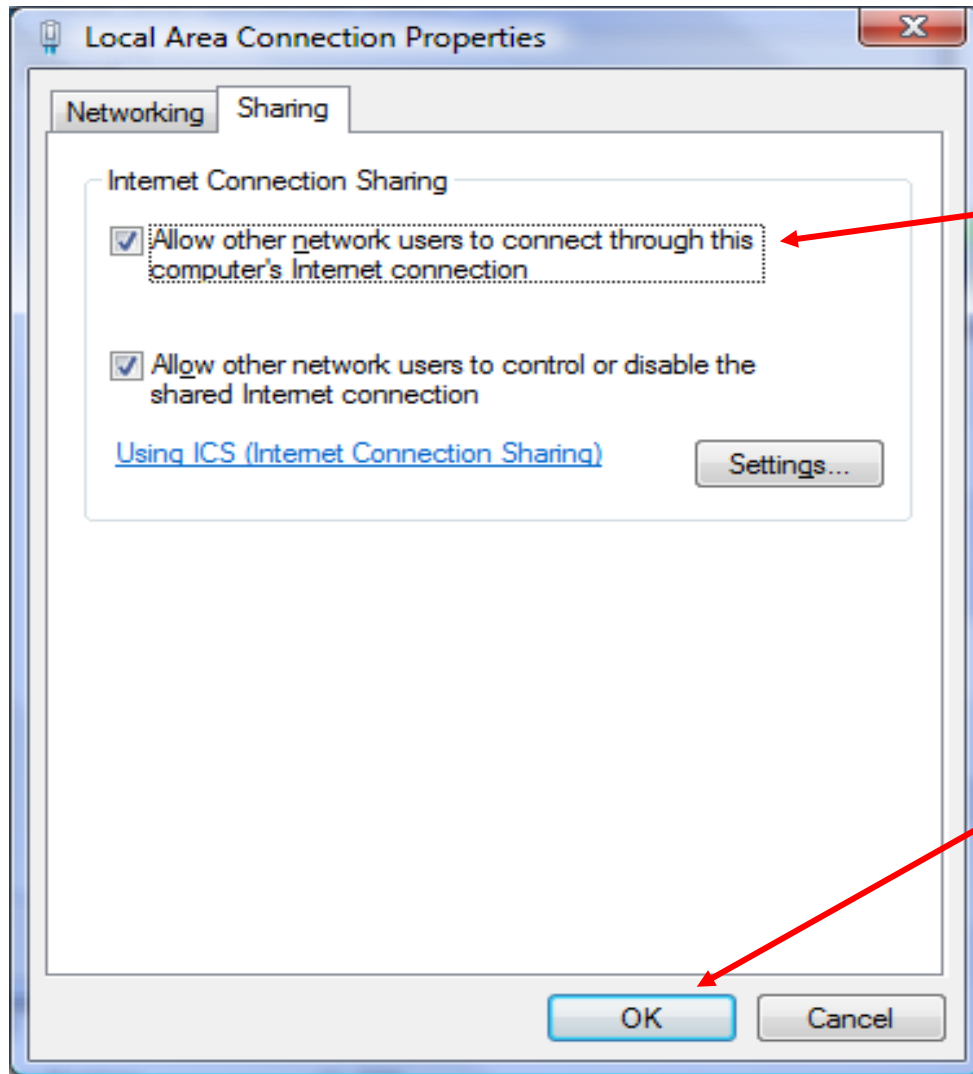# Project Four: Installing ICS

Step 1:

To remove TCP/IPv6, clear the Internet Protocol Version 6 (TCP/IPv6) checkbox.

Step 2:

To enable ICS, select the Sharing tab – go to next page.

Project Four: Installing ICS

Local Area Connection Properties

Networking | Sharing

Internet Connection Sharing

☑ Allow other network users to connect through this computer's Internet connection

☑ Allow other network users to control or disable the shared Internet connection

Using ICS (Internet Connection Sharing) | Settings...
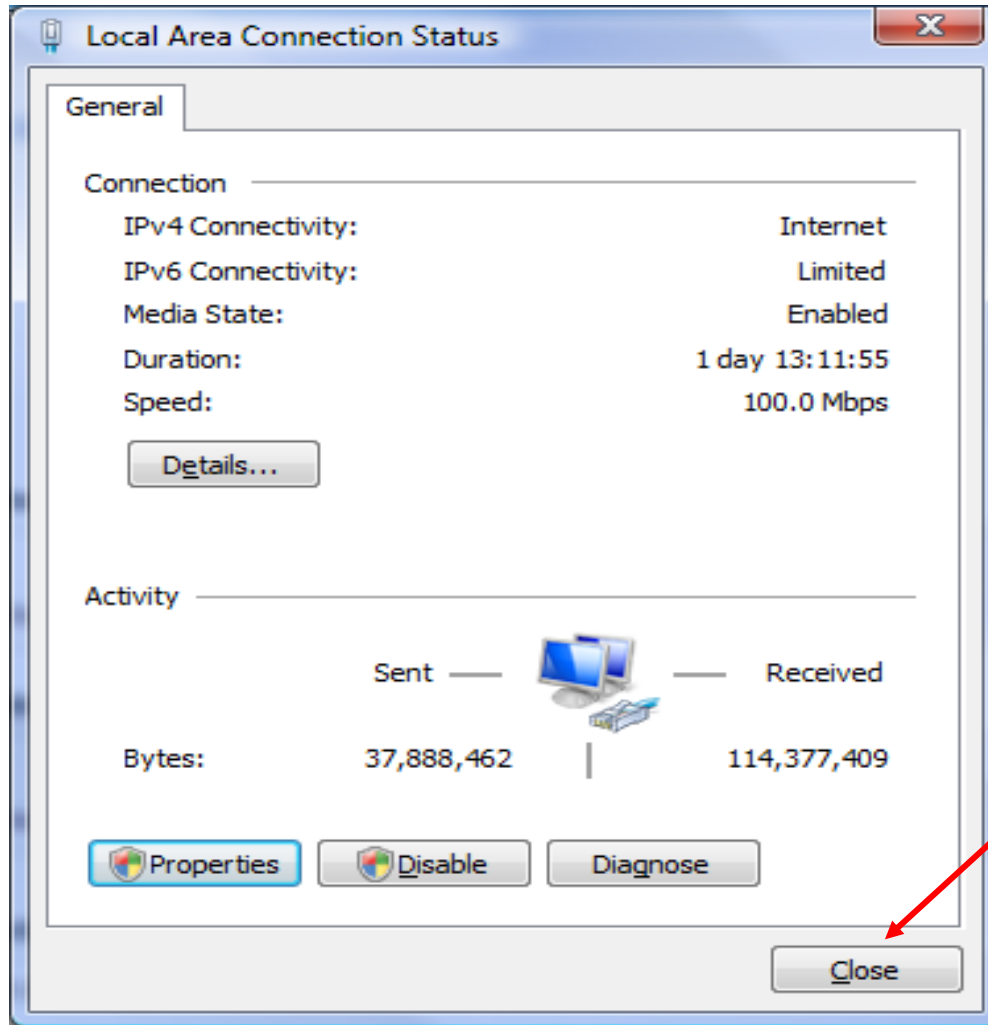
OK | Cancel

Step 1:

Check "Allow other network users to connect through this computer's Internet connection".

Step 2:

Click OK

Project Four: Installing ICS

Click Close

Project Four: Preliminary Set-Up

- The second step in the preliminary set-up for Project Four is to create the three virtual machines that will make up the SAVN network.

- First we'll create virtual machine Server01, followed by Server02, followed by Client01.

- Start Microsoft Virtual PC 2007 then follow the steps on the following pages. (Note that these are the same instructions you followed for Project One.)

Project Four: Creating VM `Server01`

1. Click New, confirm that the "Create a virtual machine" option button is selected then click Next.

2. Type `Server01` in the Name and location text box, then click Next.

3. To specify the Windows Server 2008 operating system, click the "Operating System" drop-down list arrow, select Windows Server 2008 and then click Next.

4. To specify the RAM allocation, click the "Adjusting the RAM" option button, type 640 in the MB text box, then click Next.

5. To create a new virtual disk in the default location, click the "A new virtual hard disk" option button, click Next and type 65536 in the "Virtual hard disk size" text box.

Project Four: Creating VM `Server01`

6. To configure the network adapter, click the Settings button, click Networking, click the "Adapter 1" drop-down menu, then click Microsoft Loopback Adapter.

7. To disable sound, click Sound, clear the "Enable sound card" check box, and then click OK.

• You've now completed the creation of the virtual machine named `Server01`. Note that the OS is not yet installed, we'll do that in Phase 1 of the project.

• Now go to the next page and create the virtual machine `Server02`.

Project Four: Creating VM `Server02`

1. Click New, confirm that the "Create a virtual machine" option button is selected then click Next.

2. Type `Server02` in the Name and location text box, then click Next.

3. To specify the Windows Server 2008 operating system, click the "Operating System" drop-down list arrow, select Windows Server 2008 and then click Next.

4. To specify the RAM allocation, click the "Adjusting the RAM" option button, type 512 in the MB text box, then click Next.

5. To create a new virtual disk in the default location, click the "A new virtual hard disk" option button, click Next and type 65536 in the "Virtual hard disk size" text box.

Project Four: Creating VM `Server02`

6. To configure the network adapter, click the Settings button, click Networking, click the "Adapter 1" drop-down menu, then click Microsoft Loopback Adapter.

7. To disable sound, click Sound, clear the "Enable sound card" check box, and then click OK.

• You've now completed the creation of the virtual machine named `Server02`. Note that the OS is not yet installed, we'll do that in Phase 1 of the project.

• Now go to the next page and create the virtual machine `Client01`.

Project Four: Creating VM `Client01`

1. Click New, confirm that the "Create a virtual machine" option button is selected then click Next.

2. Type `Client01` in the Name and location text box, then click Next.

3. To specify the Windows Server 2008 operating system, click the "Operating System" drop-down list arrow, select Windows Vista and then click Next. (Before the next phase of the project you will need to get Windows Vista Business from Academic Alliance.)

4. To use the recommended RAM, retain the "Using the recommended RAM" option button, then click Next.

5. To create a new virtual disk in the default location, click the "A new virtual hard disk" option button, click Next and type 65536 in the "Virtual hard disk size" text box.

Project Four: Creating VM `Client01`

6. To configure the network adapter, click the Settings button, click Networking, click the "Adapter 1" drop-down menu, then click Microsoft Loopback Adapter.

7. To disable sound, click Sound, clear the "Enable sound card" check box, and then click OK.

*   You've now completed the creation of the virtual machine named `Client01`. Note that the OS is not yet installed, we'll do that in Phase 1 of the project.

Project Four: Creating VM `Client01`

- You should now have three virtual machines configured but no operating systems installed in any of them.

- You should already have the `.iso` image for Server 2008 from Project One, but you will need to get the `.iso` image for Vista Business from Academic Alliance in order to complete the first phase of Project Four.

- I'll probably get Project Four – Phase One posted by class time on Wednesday.