CNT 4603: System Administration
Spring 2015

Project Four - Installing And Configuring A Virtual Network

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Project Four: Overview

- **Title:** "Project Four: Installing And Configuring The Network "
- **Points:** 50 points
- **Due Date: Sunday March 8. 2015 by 11:59 pm (WebCourses time)**

- **Objectives:** To create and configure a small network of computers to be used for practicing system administration activities in subsequent projects.
- **Deliverables:** Six screen shots as indicated on pages 25-27.

Project Four: Overview

- In this project you will install and configure several different virtual computers into a network that will be used in subsequent assignments for practicing various system administration activities.
- In this project you will create two server systems and one client system. The servers will be running Windows Server 2008 and the client will run a Windows based OS. I'm using Windows Vista Business for my client, but you can choose any non-server based Windows OS you'd like for your client system.

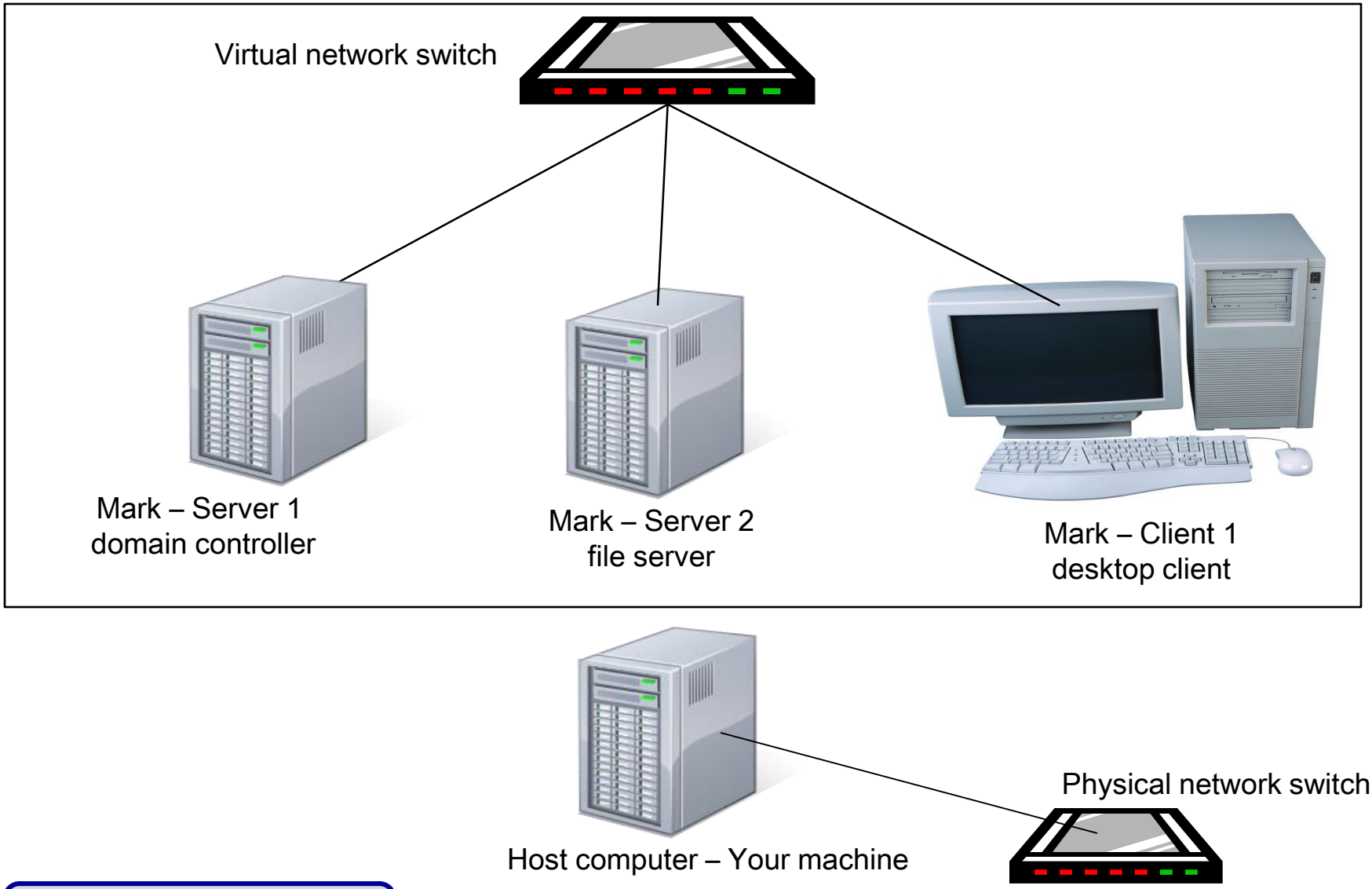
The pages that follow explain the details of the project, stepping you through the actions of a system administration installing and uninstalling server roles. In the various callouts, the items that appear in **bold green** text require you to do screen captures and/or answer questions. These screen captures and answers will constitute your submission for this project.

Project Four: The Scenario

- In this project you will build a virtual demonstration network named `SAVN.local` 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.
- `Mark-Server 1` and `Mark-Server 2` are virtual machines running Windows Server 2008. `Mark-Client 1` is a virtual desktop computer running Microsoft Vista Business.
- These machines will communicate with one another over a local virtual network.



The SAVN network

Mark-Server 1 Role – Domain Controller

- `Mark - Server 1` 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.
- `Mark - Server 1` 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 `Mark - Server 1` to function as the domain controller for the SAVN network.

Mark - Server 1 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 `Mark - Server 1` for the `savn.local` domain as part of establishing `Mark - Server 1` as a domain controller.

Mark - Server 2 Role – File Server

- `Mark - Server 2` 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 `Mark - Server 2` to the `savn.local` domain.
- As a domain member, `Mark - Server 2` can coordinate the security access of its files with the domain controller (`Mark - Server 1`).

Mark - Client 1 – Desktop Client

- `Mark - Client 1` is a desktop client that will use software applications to access various system resources, including folders, and files on the network file server (`Mark - Server 2`).

- `Mark - Server 1`, with ADDS and DNS, helps locate network resources and controls security access to these network resources. `Mark - Server 2` holds the data that `Mark - Client 1`'s applications require.

IMPORTANT ! ! !

You'll need to download the `.iso` image for Microsoft Vista Business (or any other Microsoft Windows-based client OS you'd prefer) from DreamSpark using the same procedure you utilized to download the Server 2008 `.iso` image. Do not use the "home" version of a client OS as they typically will not allow joining a domain.

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
Mark - Server 1	Domain controller	Windows Server 2008	640 MB	65,536 MB	65,536 MB
Mark - Server 2	File server	Windows Server 2008	512 MB	65,536 MB	16,384 MB
Mark - Client 1	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 `Mark - Server 1` 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 `Mark - Server 1` will provide better performance for this specialized application server.
- Because `Mark - Server 2` is a file server, special partition allocations are recommended. Although you will create a virtual hard disk of 65536 MB for `Mark - Server 2`, 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: Details – Step 1

- The first step is to create two virtual servers each running Windows Server 2008 and a client machine running a Windows based OS (not a server OS). For the virtual systems used in this project use the naming conventions shown below:

IMPORTANT !

Create the virtual machines with the following naming conventions:

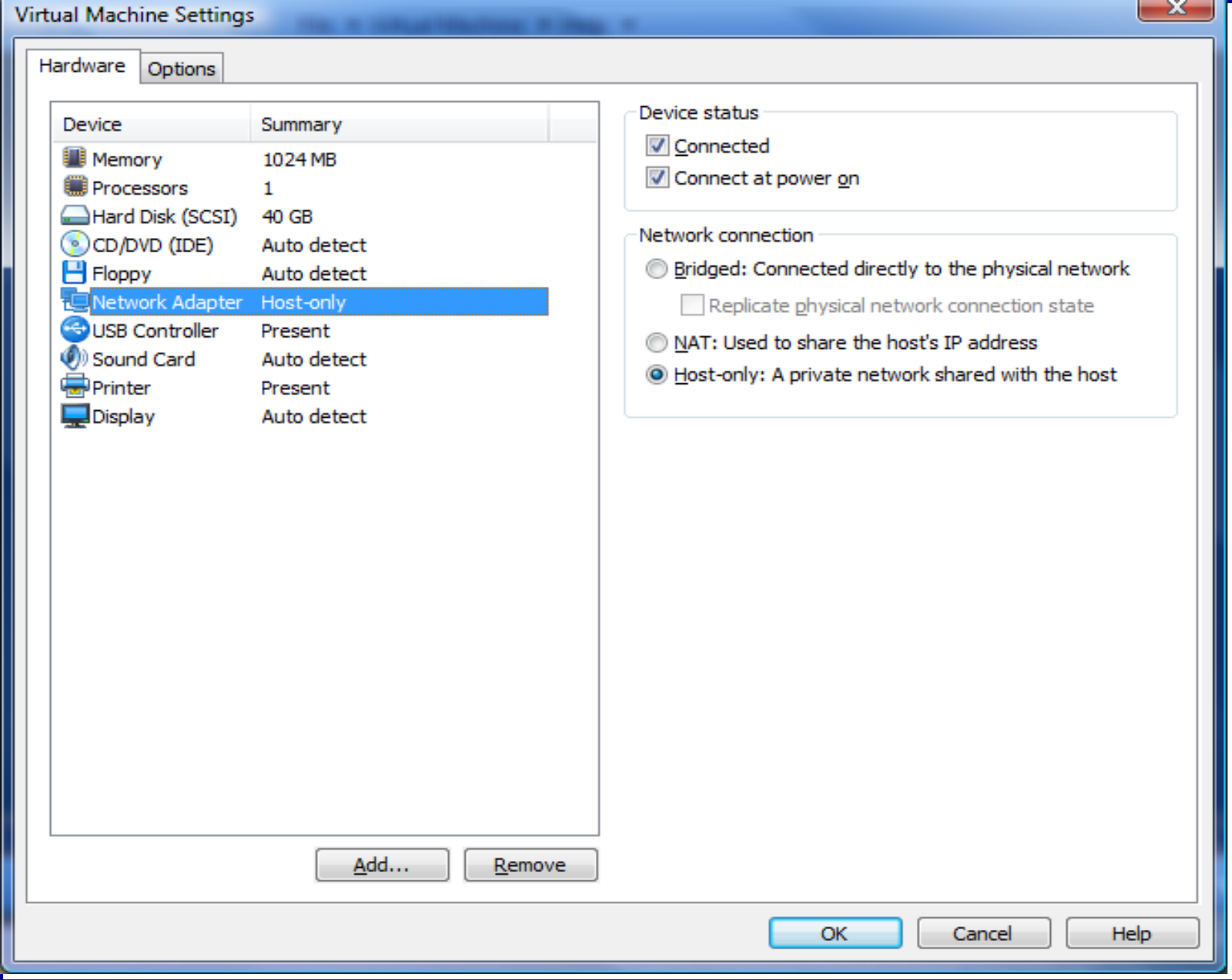
Your first name – Server 1
Your first name – Server 2
Your first name – Client 1

Project Four: Details – Step 2

- Once your three virtual machines have been created, you need to configure them into a network where each of the virtual machines will be able to communicate with each other.
- While `Mark – Server 1` can act as a gateway to your host computer in order to gain Internet access, this won't really be required for anything that will be doing.
- Thus, for all three virtual machines, we will configure them to use Host-Only Networking. This limits a virtual machine to communicate with only the physical host on which it resides and to other virtual machines running on the same host. This type of networking is most useful when you need multiple virtual machines to be able to communicate with each other, but prevent the virtual machines from directly communicating with any other systems.

Project Four: Details – Step 2

- As with previous projects, I'll be illustrating the steps you need to perform using VMware Player. If you are using another virtualization product the exact procedure to follow may be different, but you want ultimately to achieve the same effect as illustrated.
- To configure the virtual machines to use host-only networking in VMware Player, from the VMware Player window for a virtual machine that is running, select the "Virtual Machine" list at the top of the window and then select the "Virtual Machine Settings" option (it's the first one in the list).
- Under the "Hardware" tab, highlight the "Network Adapter" entry and choose "Host-only" as shown on the next page.
- Do this for each of your three virtual machines.


Virtual Machine Settings
Hardware
Options
Device
Summary
Memory
1024 MB
Processors
1
Hard Disk (SCSI)
40 GB
CD/DVD (IDE)
Auto detect
Floppy
Auto detect
Network Adapter
Host-only
USB Controller
Present
Sound Card
Auto detect
Printer
Present
Display
Auto detect
Add...
Remove
Device status
Connected
Connect at power on
Network connection
Bridged: Connected directly to the physical network
Replicate physical network connection state
NAT: Used to share the host's IP address
Host-only: A private network shared with the host
OK
Cancel
Help

Project Four: Details – Step 3

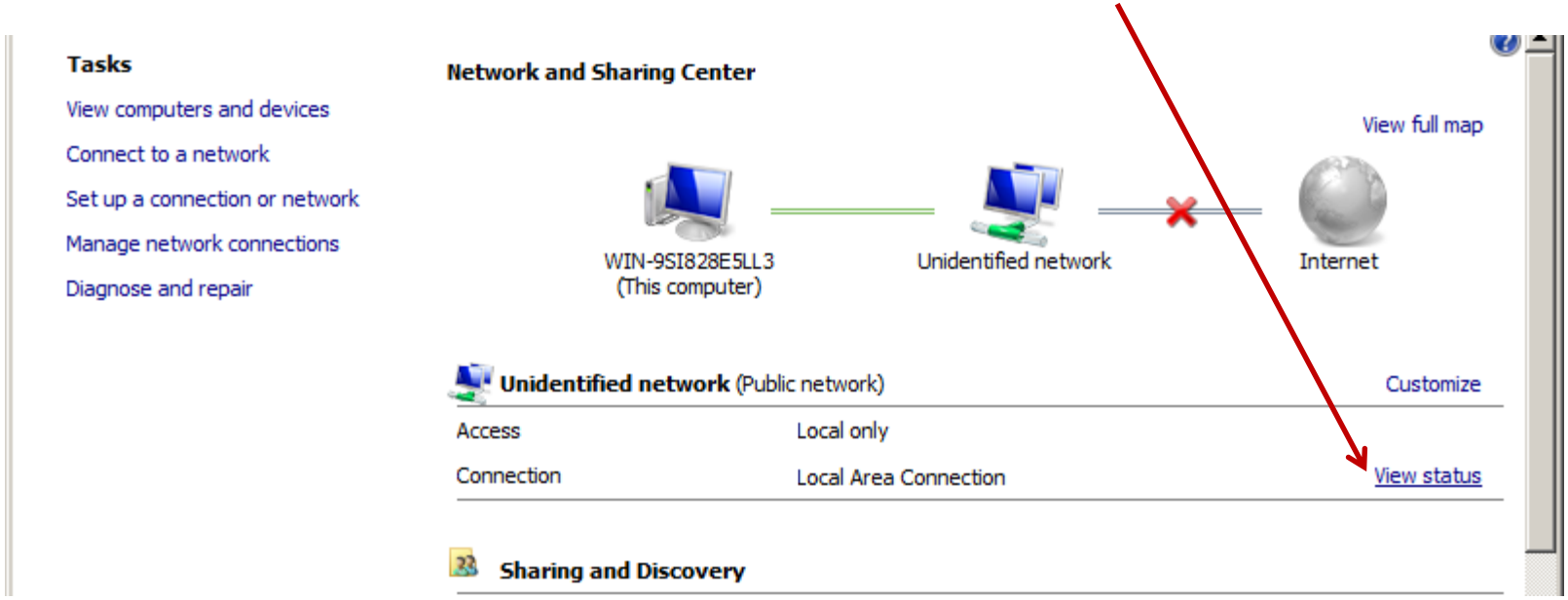
- The next step in this project is assigning the IP addresses for the machines that will make up the virtual network.
- To ensure reliable communication between the virtual machines, we will employ static IP addressing.
- The table on the next page illustrates the IP addresses that will be used for each virtual machine in our network.
- To configure these static IP addresses, follow the steps beginning on page 19.

Project Four: Details – Step 3

Virtual machine/ Computer	Assigned IP address	Subnet mask	Gateway address	DNS address
Mark – Server 1	192.168.0.101	255.255.255.0	192.168.0.1	192.168.0.101
Mark – Server 2	192.168.0.102	255.255.255.0	192.168.0.1	192.168.0.101
Mark – Client 1	192.168.0.103	255.255.255.0	192.168.0.1	192.168.0.101

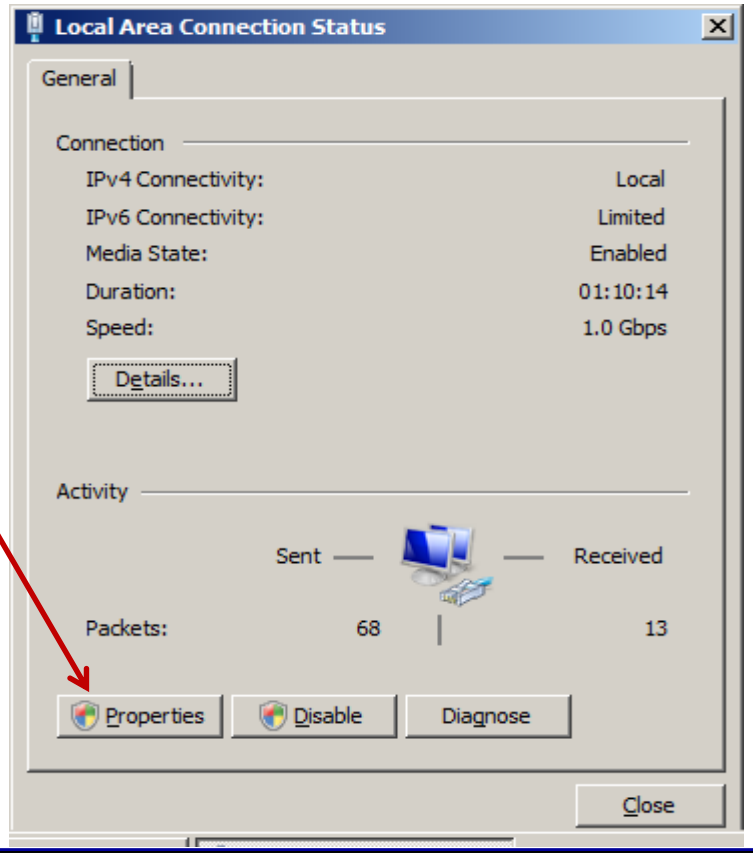
Project Four: Details – Step 3

- The steps are essentially the same in all of the machines whether they are servers or clients, so I only provide an example for `Mark-Server 1`.
- From the Control Panel, select the Network and Sharing Center.
- Click View Status under the Local Area Connection.



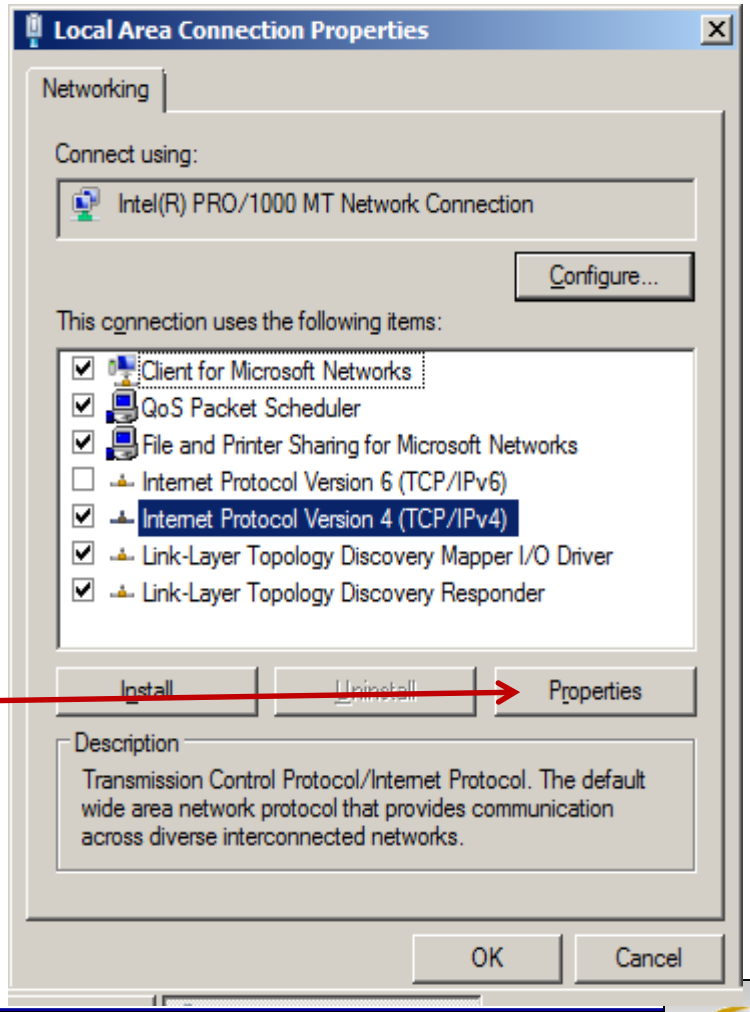
Project Four: Details – Step 3

- A smaller dialog box will appear that is concerned with the Local Area Connection Status.
- Click the Properties button on the lower left side of this box.



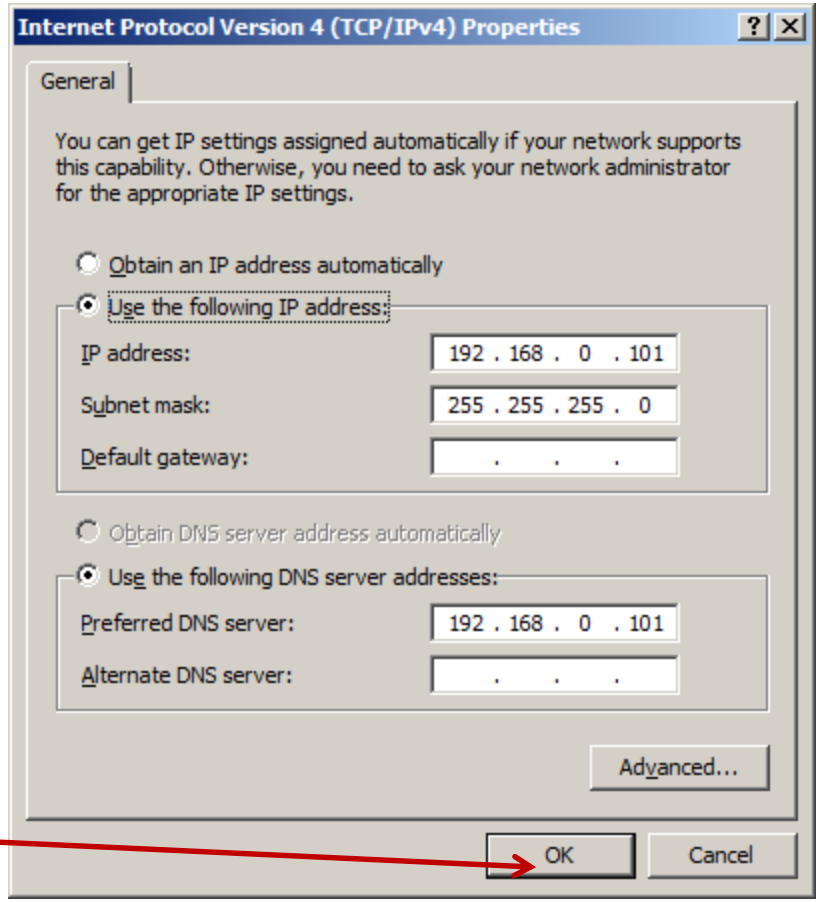
Project Four: Details – Step 3

- A new dialog box listing the Local Area Connection Properties will appear. Deselect (uncheck) both Internet Protocol Version 6 (TCP/IPv6) and Internet Protocol Version 4 (TCP/IPv4).
- Then select (check) Internet Protocol Version 4 (TCP/IPv4).
- After reselecting Internet Protocol Version 4 (TCP/IPv4), click the Properties button.



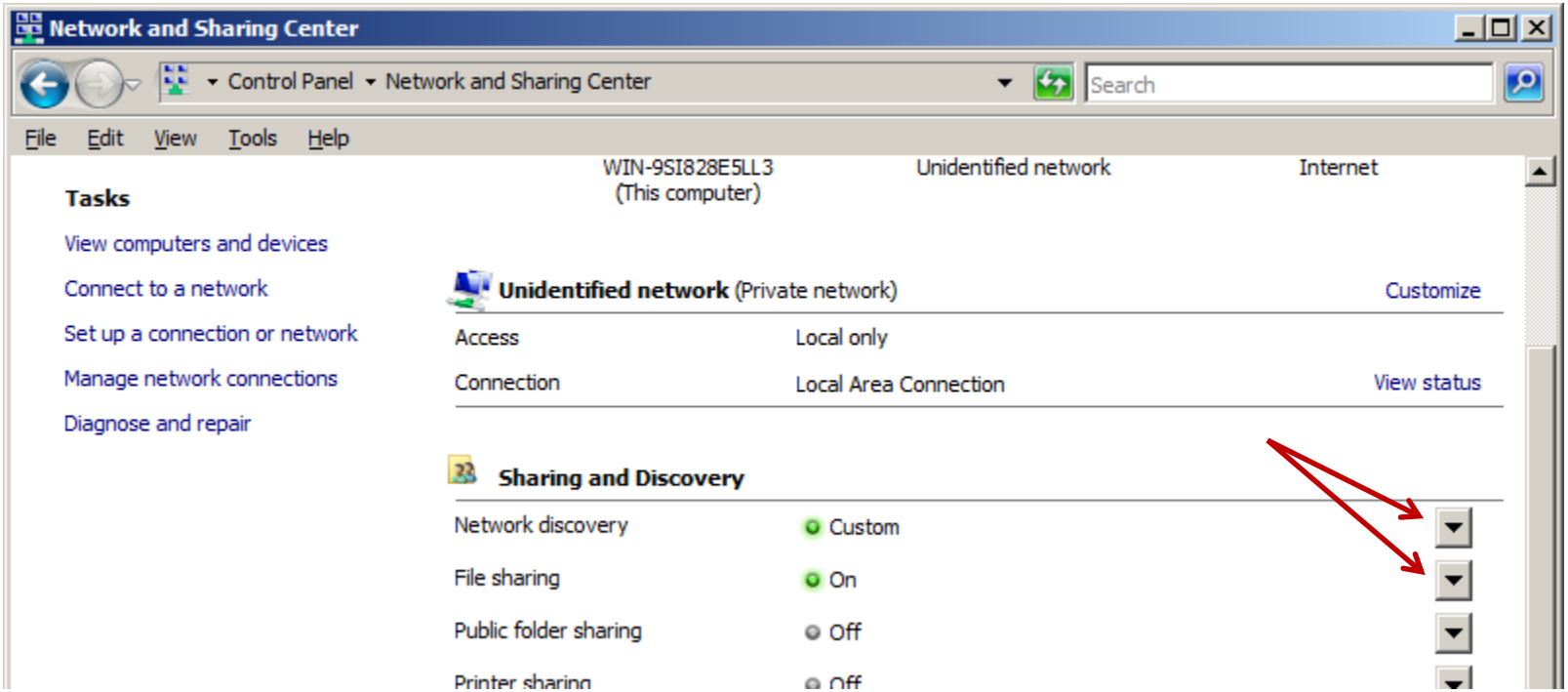
Project Four: Details – Step 3

- For each virtual machine complete the entries in this new dialog box according to the table shown on page 18.
- Use the tab button to move from field to field and entry to entry. If an IP address field does not include 3 digits, you can use the arrow key or the tab key to move to the next entry.
- When the dialog is filled in correctly, click the OK button.
- Repeat this step for each virtual machine.



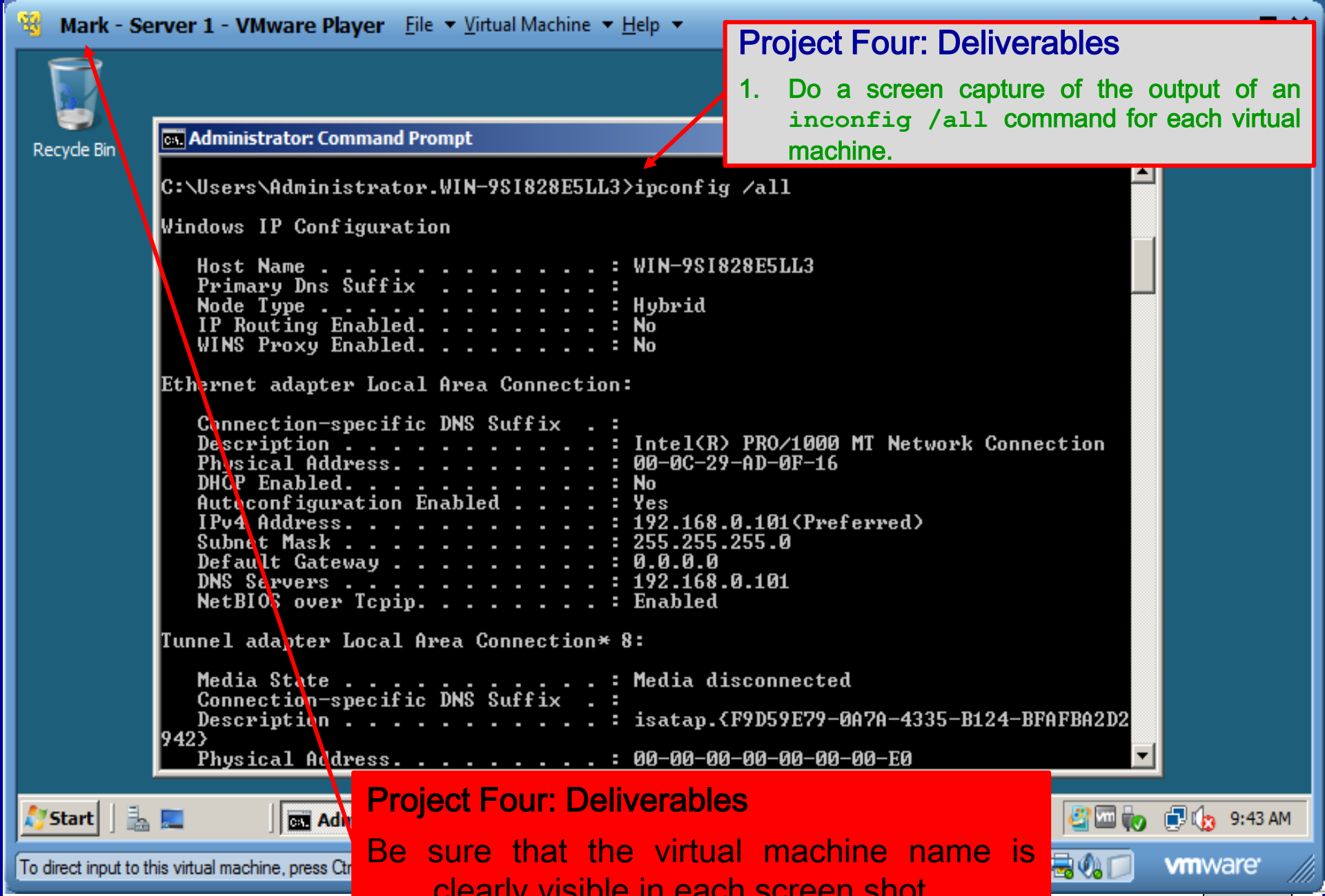
Project Four: Details – Step 4

- The next step for each virtual machine is to turn on network discovery and file sharing.
- Return to the Network and Sharing Center and turn on both of these features for all three of your virtual machines.



Project Four: Deliverables – Step 5

- Once you have the three virtual machines installed and their IP addresses correctly figured, the next step of this project is the verification that the virtual machines can all communicate with each other, as well as the verification that the machines are properly configured.
- You will need to take several different screen shots that verify the correctness of your network configuration and the communication between the various machines.
- To verify the network/virtual machine configurations, you will need to open a Command Prompt window in each of the virtual machines and issue a `ipconfig /all` command. There may be a fair amount of output from this command. We are most concerned with the top part of the listing so be sure that is what is included in your screen shots. This is illustrated on the next 3 pages.

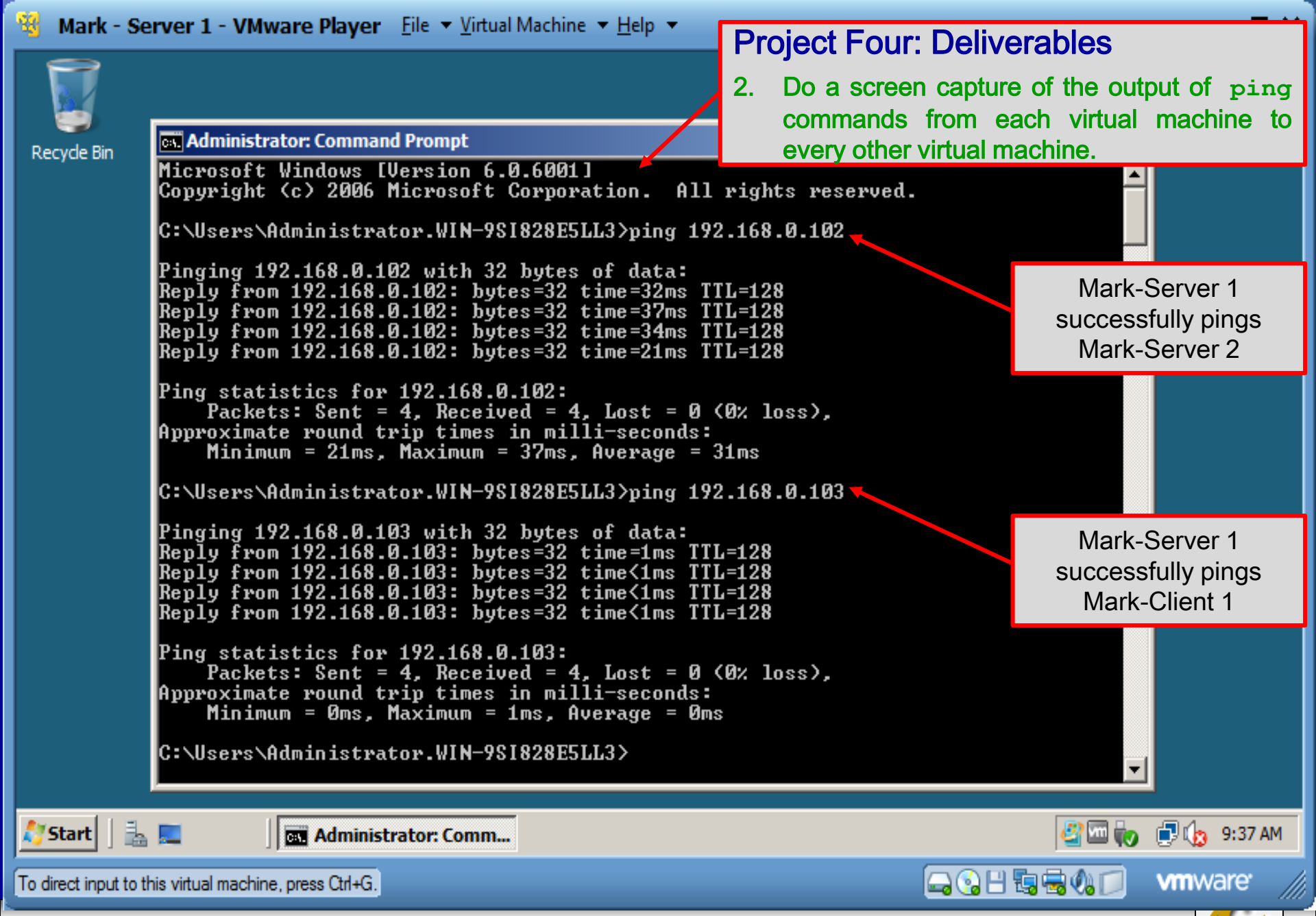


Project Four: Deliverables

1. Do a screen capture of the output of an `inconfig /all` command for each virtual machine.

Project Four: Deliverables

Be sure that the virtual machine name is clearly visible in each screen shot.


Mark - Server 1 - VMware Player
File
Virtual Machine
Help
Recycle Bin
Administrator: Command Prompt
Microsoft Windows [Version 6.0.6001]
Copyright (c) 2006 Microsoft Corporation. All rights reserved.
C:\Users\Administrator.WIN-9SI828E5LL3>ping 192.168.0.102
Pinging 192.168.0.102 with 32 bytes of data:
Reply from 192.168.0.102: bytes=32 time=32ms TTL=128
Reply from 192.168.0.102: bytes=32 time=37ms TTL=128
Reply from 192.168.0.102: bytes=32 time=34ms TTL=128
Reply from 192.168.0.102: bytes=32 time=21ms TTL=128
Ping statistics for 192.168.0.102:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 21ms, Maximum = 37ms, Average = 31ms
C:\Users\Administrator.WIN-9SI828E5LL3>ping 192.168.0.103
Pinging 192.168.0.103 with 32 bytes of data:
Reply from 192.168.0.103: bytes=32 time=1ms TTL=128
Reply from 192.168.0.103: bytes=32 time<1ms TTL=128
Reply from 192.168.0.103: bytes=32 time<1ms TTL=128
Reply from 192.168.0.103: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.0.103:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\Users\Administrator.WIN-9SI828E5LL3>
Project Four: Deliverables
2. Do a screen capture of the output of ping commands from each virtual machine to every other virtual machine.
Mark-Server 1 successfully pings Mark-Server 2
Mark-Server 1 successfully pings Mark-Client 1
Start
Administrator: Comm...
9:37 AM
To direct input to this virtual machine, press Ctrl+G.
vmware

Project Four: Deliverables – Step 5

- You should ultimately produce a set of six (6) screen shots as the set of deliverables for this project.
- Specifically the screen shots are:
  - `Mark – Server 1, ipconfig /all` output
  - `Mark – Server 2, ipconfig /all` output
  - `Mark – Client 1, ipconfig /all` output
  - `Mark – Server 1,` successful `ping` to other two VMs
  - `Mark – Server 2,` successful `ping` to other two VMs
  - `Mark – Client 1,` successful `ping` to other two VMs