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 savn.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.

<table>
<thead>
<tr>
<th>Virtual Machine</th>
<th>Role</th>
<th>OS</th>
<th>RAM requirement</th>
<th>Virtual Hard Disk Requirement</th>
<th>OS hard disk requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server01</td>
<td>Domain controller</td>
<td>Windows Server 2008</td>
<td>640 MB</td>
<td>65,536 MB</td>
<td>65,536 MB</td>
</tr>
<tr>
<td>Server02</td>
<td>File server</td>
<td>Windows Server 2008</td>
<td>512 MB</td>
<td>65,536 MB</td>
<td>16,384 MB</td>
</tr>
<tr>
<td>Client01</td>
<td>Desktop</td>
<td>Windows Vista Business</td>
<td>512 MB</td>
<td>65,536 MB</td>
<td>65,536 MB</td>
</tr>
</tbody>
</table>
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

ICS

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.
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:

  ![Add Hardware Wizard](image)

  Click Next
Project Four: Installing ICS

Select the “Install the hardware that I manually select from a list” option, then click Next.
Project Four: Installing ICS

Scroll down the list and find the “Network adapters” entry and click on it, then click Next.
Scroll down this list until you find the Microsoft entry and select it.
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

Click Next.
Click Finish and you’re done!
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.
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

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.