Exercise 4, "Basic System Setup"

Instructions and preparatory questions

Computer Systems Administration, Fall 2008

This document is available online at:
http://www.hh.se/te2003/

Exercise 4 – Basic System Setup

Practical information – Read this first!

This exercise consists of <u>two</u> parts:

1. Preparatory questions in this document that should be answered <u>before</u> coming to the exercise session (before starting the exercise session the assistant will ask you to show and explain your answers)
2. A practical exercise session where you will work with actual equipment in order to answer the remaining questions in this document.

The work on preparatory questions as well as practical exercise work is to be carried out together <u>with your assigned partner</u>.

Before starting the practical part show the assistant that you have finished the preparatory questions, when you are done with the practical part you must notify the assistant so that he/she can check and sign your work. No signature = no credits for the exercise.

If you get stuck on the practical part the assistant is there to assist you, however in order to learn you are of course expected to come up with solutions mainly on your own.

Information necessary to complete both the preparatory and practical part of the exercise will be given at the lectures. Lecture slides are available at the course webpage http://www.hh.se/te2003/

Good luck and have fun!

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Introduction

In this laboratory exercise you will learn how to
- o Connect a computer to a Local Area Network (LAN)
- o Install device drivers and security updates (using Windows Update)
- o Manage users, groups and file permissions
- o Sharing files on a network using shared folders

These are typical administrative tasks and in order to perform them you will need special privileges in the computer's operating system. In order to grant such privileges without compromising the security of the university network, these administrative tasks will be performed on a *virtual machine*.

Virtualization is a technique that makes it possible to run more than one operating system at the same time, on the same hardware. Virtualization software allows "guest" operating systems to run as processes under a "host" operating system. The software making this possible is called a Virtual Machine Monitor, or "Hypervisor". The Hypervisor provides virtual hardware devices used by the guest operating systems.

Preparatory question 1
Read the short introduction to virtualization at VMware's homepage (http://www.vmware.com/virtualization).

The Host Machine

The host machine is the computer mounted under your desk. It is a Dell PC running Microsoft's Vista operating system (or windows XP, depending on which room you are in). Start by logging in to the computer using one group member's student account.

After logging in, use the Device Manager to answer the questions below.

Hint: The Device Manager is a control panel applet for viewing and managing hardware components and device drivers in Windows operating systems. To start the Device manager in Windows XP, do the following:
o Open the Control Panel
o Click on the "System" icon. This will open the System Properties window
o Click on the "Hardware" tab
o Click on the "Device Manager" button
o A new window appears. It has a tree-like view of the computer's hardware resources. You might see a warning message about not having sufficient privileges to make changes. This is OK, since all we want to do is browse the list of devices.

If your host computer is running Windows Vista:
o Type "Device Manager" in the search field in the Start Menu and press Enter.

Central Processing Unit (CPU)

Manufacturer and model: _____

Clock Frequency (MHz): _____

Two instances of the same CPU are listed. Why is this?

_____

_____

Display adapter

Manufacturer and model: _____

Hard Disk Drive

Manufacturer and model: _____

DVD / CD-ROM Drive

Manufacturer and model: _____

Network Interface Cards

There are three network interface cards. One of these is a physical device (corresponding to actual hardware) and the others are virtual devices provided by the VMware hypervisor. Fill out the table and indicate whether you think devices are physical or virtual.

Device	Manufacturer and model	Physical / Virtual
1		
2		
3		

The Virtual Machine

A VMware virtual machine consists of two parts: a *machine configuration file* and one or more *disk files*. The machine configuration file contains instructions for the hypervisor about what hardware to virtualize, what network connections to use, etc. Disk files hold the data of virtual hard disk drives. Machine configuration files have suffix ".vmx". Disk files have suffix ".vmdk".

The virtual machine used in this exercise has been installed on the host computer. To start the machine, **Do the following**:

o   Use Windows Explorer to navigate to the directory D:\VMW\te2003_ex4

o   Start the virtual machine by double-clicking the machine configuration file

o   You should see Windows Server 2003 booting. When you reach the login prompt, log in as Administrator
    User name: **Administrator**
    Password: **ide**

    Hint: In order to log in you first need to press Ctrl-Alt-Delete. Make sure that the virtual machine has keyboard focus when doing so; otherwise that key combination will be picked up by the host operating system. VMware provides a workaround for this: Pressing Ctrl-Alt-Insert instead will have the same effect without interfering with the host operating system.

o   This copy of Windows 2003 Server is starting for the very first time. The "Windows Server Post-Setup Security Updates" window appears. **Do not close this window at this point**
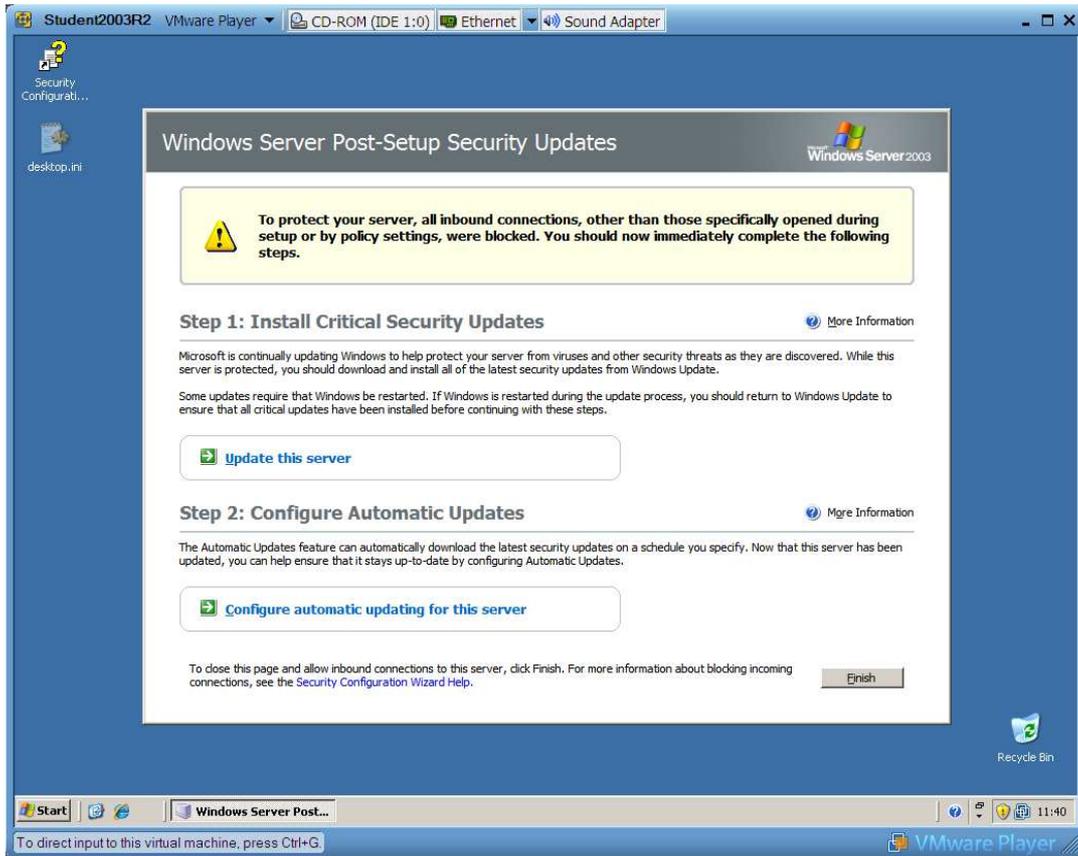
Why are inbound network connections blocked when the operating system starts for the first time?

_____

_____

_____

Stopping the Virtual Machine

When stopping the virtual machine, you don't have to shut down the guest operating system. Try the following:

o Close the virtual machine window (Click the cross in the upper right corner)

o When the window has been closed, have a look in the folder containing the machine configuration file. You should see some new files

o Start the virtual machine again by double-clicking the machine configuration file

Describe what happened.

_____

_____

_____

Exploring the Virtual Machine's Hardware

Before we start configuring the server, let's have a look at the machine's hardware components. Use the Device Manager to fill out the table below. Indicate whether you think devices are physical (actual hardware) or virtual (provided by the hypervisor).

Hint: Using two operating systems at the same time can be confusing. It is a good idea to run the virtual machine in full-screen mode by maximizing the virtual machine window.

Device	Manufacturer and model	Physical / Virtual
CPU		
Hard Disk Drive		
CD-ROM / DVD Drive		
Display Adapter		
Network Interface Card		

Basic System Setup

You will need two pieces of information that is specific to your lab group, a hostname and an IP address. This information is printed on stickers at the front of your computer. There are two stickers, one for the host computer and one for the virtual machine. The virtual machines hostname is the one containing "virt".

Our hostname is: _____

Our IP address is: _____

Setting the Computer Name

Change the hostname to match the sticker on the front of your computer.

Hint: To change the hostname in Windows Server 2003, do the following:
o   From the Start menu, select Control Panel → System. This will open the System Properties window
o   Click on the "Computer Name" tab
o   You can add an optional computer description. To change the computer name, click the "Change" button
o   After changing the name you will be asked to restart your computer. You don't need to restart at this point. You will restart the computer later

Configuring a Local Area Network (LAN) Connection

The network connection is not working. You need to provide correct TCP/IP settings. Configure the LAN connection to use the IP address from the sticker and the following network specification:

Subnet mask	255.255.255.128
Default gateway	192.168.203.1
Preferred DNS server	194.47.0.30
Alternate DNS server	194.47.0.23

Verify that you can access the internet.

Hint: To change TCP/IP settings in Windows 2003 Server, do the following:
o   From the Start menu, select
    Control Panel → Network Connections → Local Area Connection
o   A new window appears. Click the "Properties" button. This will open the Connection Properties window
o   In the list of used items, select "Internet Protocol (TCP/IP)" and click the "Properties" button

How did you test the internet connection?

_____

_____

Installing Security Updates

Go back to the Windows Server Post-Setup Security Updates window and click the "Update this Server" Button. Install all available High-priority updates.

How many updates were available? _____

Write down the names of five updates that seem important:

Restart the computer (the virtual machine) when the updates have finished. When you log in after rebooting, the Windows Server Post-Setup Security Updates screen will appear again. You can now safely press the "Finish" button.

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Preparatory Question 2
Use an internet search engine to find information about Windows file permissions. Answer the questions below.

What is the meaning of the following six access levels?

Access level	Explanation
Read	
Write	
List Folder Contents	
Read & Execute	
Modify	
Full Control	

What is the difference between the Modify access level and the Read, Write, List Folder Contents and Read & Execute levels combined?

_____

_____

What is the difference between the Full Control access level and the five other levels combined?

_____

_____

Users, Groups and Permissions

Your server will have three users; Alice, Bob and Eve. Let's say that Alice, Bob and Eve are working together in a project. They will need a common working directory where they can keep all files associated with the project. The working directory and its subfolders need specific security settings according to the table below:

Folder	Permissions
C:\Project	All users on the computer can read and execute files. Project members (Alice, Bob and Eve) can read, write, delete and execute files
C:\Project\Members	Project members have full control Other users have no access
C:\Project\Eve	Eve has full control Other users (including Alice and Bob) have no access
C:\Project\AliceAndBob	Alice and Bob have full control Other users (including Eve) have no access

Create the four folders listed in the table above. ☐

Create three users: Alice, Bob and Eve. ☐

Create a group of users called ProjectMembers. Alice, Bob and Eve should be members of this group. ☐

Hint: To manage users and groups in Windows Server 2003, do the following
o From the Start Menu, select
   Control Panel→Administrative Tools→Computer Management
o Select "Local Users and Groups" from the list on the left
o To add a new user, right-click the "Users" folder and select "New User…"
o To add a new group, right-click the "Group" folder and select "New Group…"

Adjust the security settings for the four folders. For each folder, you will need to change the access levels of a number of users or groups. Fill out the tables on next page. ☐

Hint 1: To change security settings for a file or folder, do the following:
o Start Windows Explorer and find the file or folder in question
o Right-click on the file or folder and select "Sharing and Security"
o Click on the "Security" tab
o You will see a list of users and groups. For each user or group you can allow or deny access levels using the check-boxes below the list
o You can add other users and groups to the list by pressing the "Add" button

Hint 2: All users on the computer are members of the group Users. Access levels Read, Read & Execute and List Folder Contents are allowed by default for this group (These permissions are inherited from the parent folder). To change this behavior, do the following:
- o Bring up the security settings for the "Project" folder (according to Hint 1)
- o Click the "Advanced" button
- o Uncheck "Allow inheritable permissions…"
- o A dialog window appears, click the "Copy" button to copy permissions from the parent folder

C:\Project

User/Group	Access Levels
Users	
ProjectMembers	

C:\Project\Members

User/Group	Access Levels
Users	
ProjectMembers	

C:\Project\Eve

User/Group	Access Levels
Eve	
Users	

C:\Project\AliceAndBob

User/Group	Access Levels
Alice	
Bob	
Users	

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Log off Administrator and log in as Alice ☐

Create a file (for example a text document) and save it in C:\Project\Members ☐

Create another file and save it in C:\Project\AliceAndBob ☐

If you are not allowed to save files in these folders you will need to go back and adjust your security settings. If you do so, make sure you update the tables on the previous page as well.

Log off Alice and log in as Eve ☐

Make sure you can open and modify the file in the "Members" folder ☐

Make sure you **can't** access the file in the "AliceAndBob" folder. ☐

Again, if this doesn't work as expected you need to go back and adjust the settings.

Log off Eve and log in as Administrator ☐

Sharing files on a network

We want to allow project members to access their files from other computers on the network. One way of doing this is to create a shared folder.

Creating a Windows Share

Share the "Project" folder on the network so that Alice, Bob and Eve can access their files remotely.

Hint: To share a Windows folder, start Windows Explorer and right click on the folder you want to share. Then Select "Sharing and Security". You need to give the shared folder a name which will be used when accessing the folder remotely.

Mapping a Network Drive

To test if the shared folder works we will map it as a network disk drive on another computer. You can do this by teaming up with another group in the same room. You can also connect to the server from the host operating system (remember, you are running two operating systems here).

Verify that you can access the shared folder and that you can create and modify shared files.

Hint: To connect to a network disk, do the following:
o   Open My Computer
o   Select Tools → Map Network Drive
o   Choose a drive letter.
o   Enter the IP address of the server and the name of the shared folder

Configuring the Windows Firewall

The Windows Firewall is a filter that allows us to block communication on ports that are not supposed to be used in your current configuration. First of all we nee to enable the firewall and then we have to configure it.

Turning on the Windows Firewall

From the Control Panel you can access the Windows Firewall. When you start it for the first time you will be asked if you want to enable the firewall service. Answare "Yes" to this and take note of that any services currently running will not be affected by the firewall prior to reboot.
After a short while the Windows Firewall configuration interface will show. Turn on the firewall by clicking the radio button labeled "On" and retain the checkbox "Don't allow exception" unchecked since we are to add exceptions to the system. Click "OK" and restart the Windows Firewall configuration interface. Now your computer is protected by the firewall.

VM preparation

We need to prepare the VM by opening up a port that we could connect to and use to evaluate the configurations of the Windows Firewall. To do this we will use a service called telnet. Telnet is a communication service used to allow remote terminal access on a system. However, telnet is an unencrypted service and should not be used in real situations. However, in this lab example it will be sufficient.
Open up the service manager (Services) from "Administrative Tools". Find the telnet service in the list ("Telnet") and open up its properties. Change start-up type to "Manual" and click "Apply". Now start the service by clicking "Start". Close the dialog by clicking "OK". Now there is a telnet service running on your VM.
You will need the IP of your VM, so make sure you have this at hand.

Test 1

Start a command line shell ("cmd") on your <u>host</u> computer. give the command "telnet IP", where IP is replaced by the IP of your VM. What happens?

_____

_____

Configuration 1

Open up the configuration interface for the Windows Firewall and add an exception under the tab "Exceptions". Add an exception linked to a program by clicking "Add Program…" and browsing to "C:\Windows\System32\tlntsvr.exe" which is the name of the telnet server we started earlier.

Test 2

Start a command line shell ("cmd") on your <u>host</u> computer. give the command "telnet IP", where IP is replaced by the IP of your VM. What happens?

_____

_____

Configuration 2

Disable or remove the exception added under "Configuration 1" and add a exception linked to a port by clicking "Add Port…" Telnet is a service that operates on TCP port 23, for which you specify an exception labeled "Telnet".

Test 3

Start a command line shell ("cmd") on your <u>host</u> computer. give the command "telnet IP", where IP is replaced by the IP of your VM. What happens?

_____

_____

In Depth Material
If you are interested to learn more about the Windows Firewall there are some very well written documents on Microsoft technet.

http://technet.microsoft.com/sv-se/library/cc700820(en-us).aspx
http://technet.microsoft.com/en-us/library/cc787835(WS.10).aspx

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Exercise 4 report sheet – Fill out in ink

Group member 1

First name

Last name

Personal number

						-				

Group member 2

First name

Last name

Personal number

						-				

Exercise 4 assistant signatures

Preparatory questions OK: _____

Exercise session OK: _____

Date: _____

LAB ASSISTANT DETACHES AND KEEPS THIS PART

Your signatures below indicate that you have completed the preparatory questions and <u>exercise 4</u> session on your own. Sharing code, answers etc. between groups is not allowed.

_____
Signature group member 1   Personal number   Date

_____
Signature group member 2   Personal number   Date