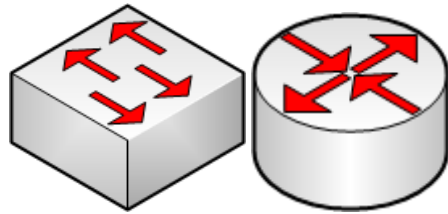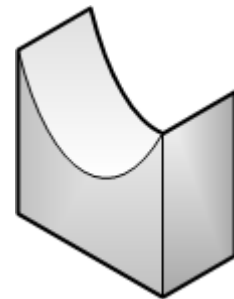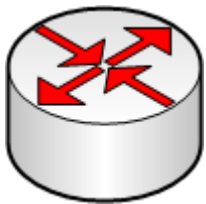# VIRTUAL NETWORKING
WITH "WINDOWS VIRTUAL PC"

Summary:

"Windows Virtual PC" provides four virtual networking configurations for the virtual machines of a "Windows 7" host computer:

1. a "Other" gateway/router in "Windows Virtual PC" is similar to the "Shared Folders" virtual network in "Microsoft Virtual PC 2007", "VMware Player" and "Oracle VM VirtualBox":
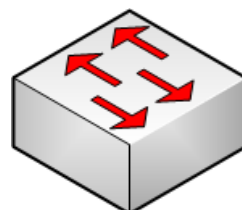
2. a "Shared Networking (NAT)" router with "Network Address Translation"

3. a "Bridged" bridge (with no internal LAN switching)

and

4. an "Internal Network" LAN switch

VIRTUAL NETWORK ADAPTERS

You can provide up to 4 network adapters for each virtual machine:
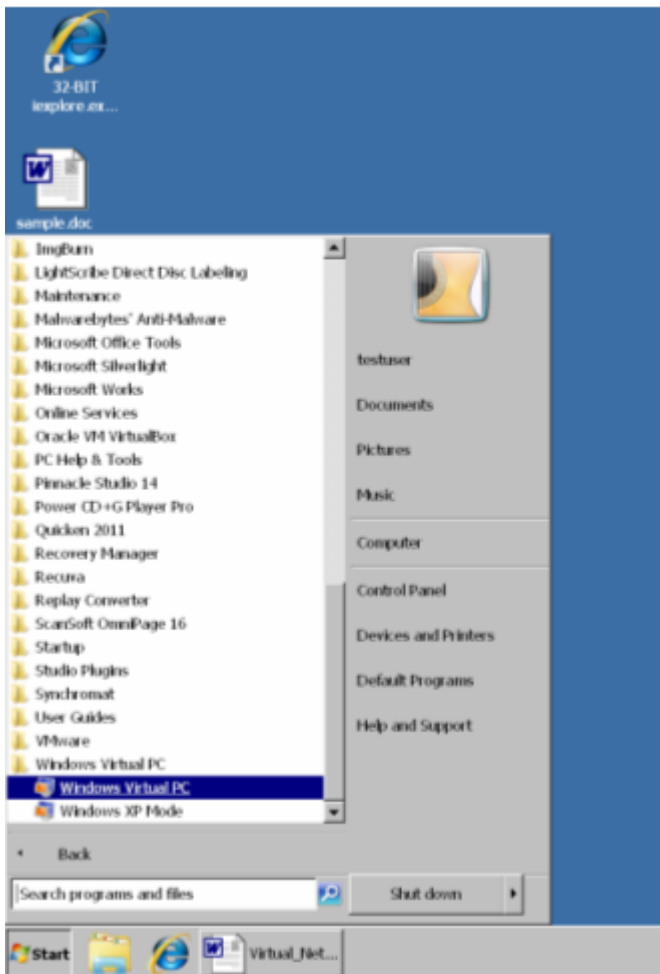
Click on the Windows "Start" button of the host computer.
Click on "All Programs".
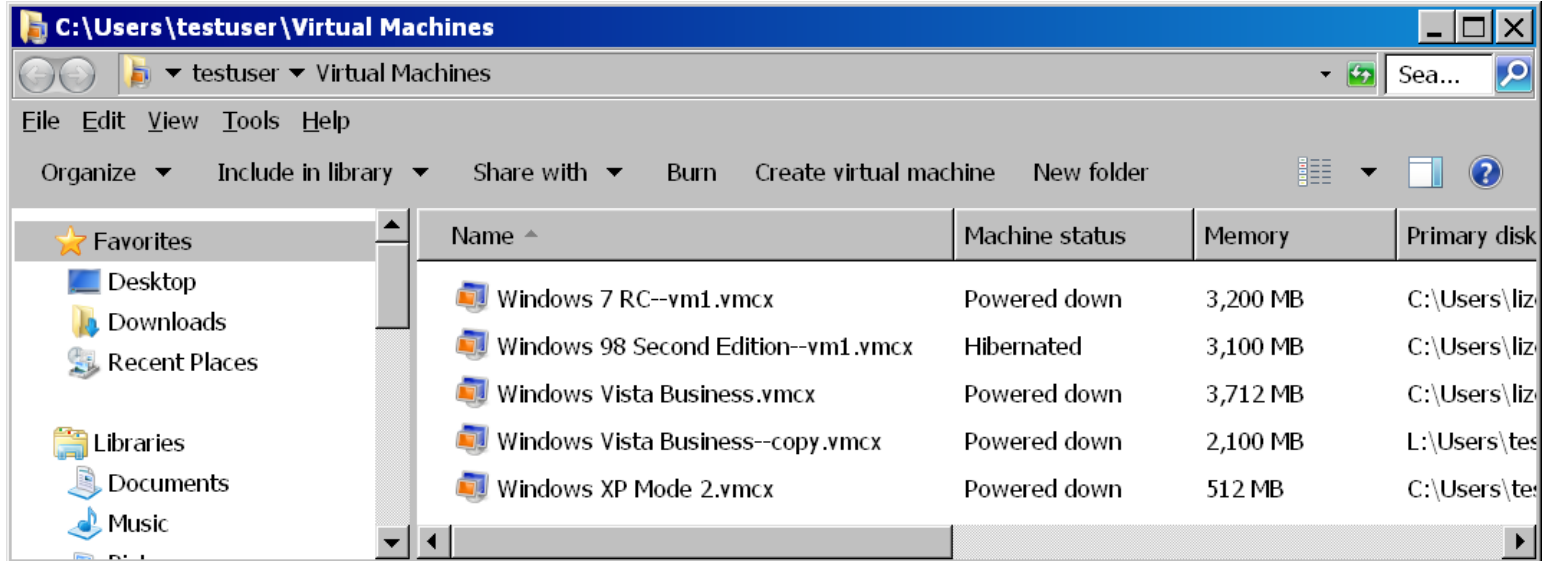Click on "Windows Virtual PC".
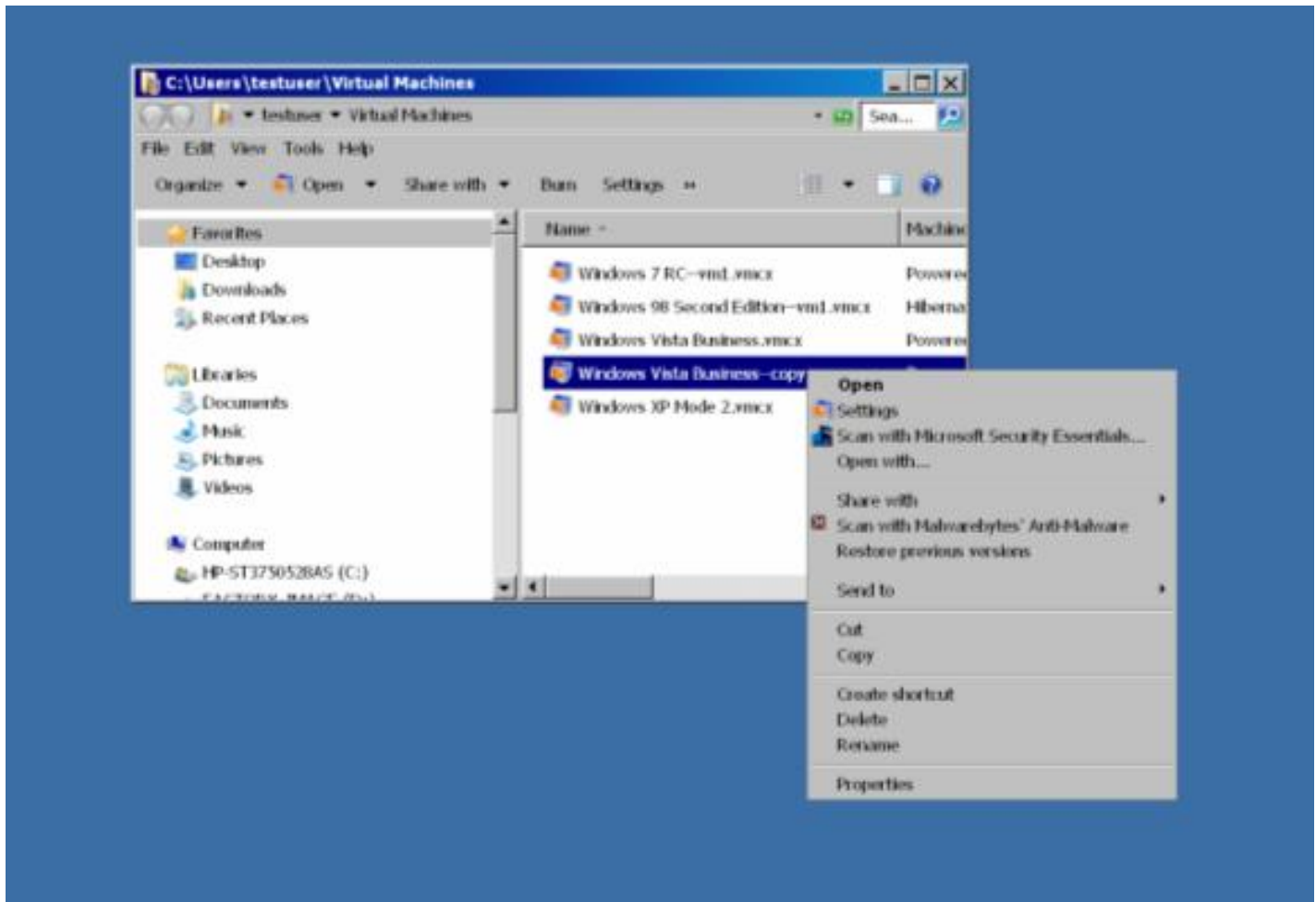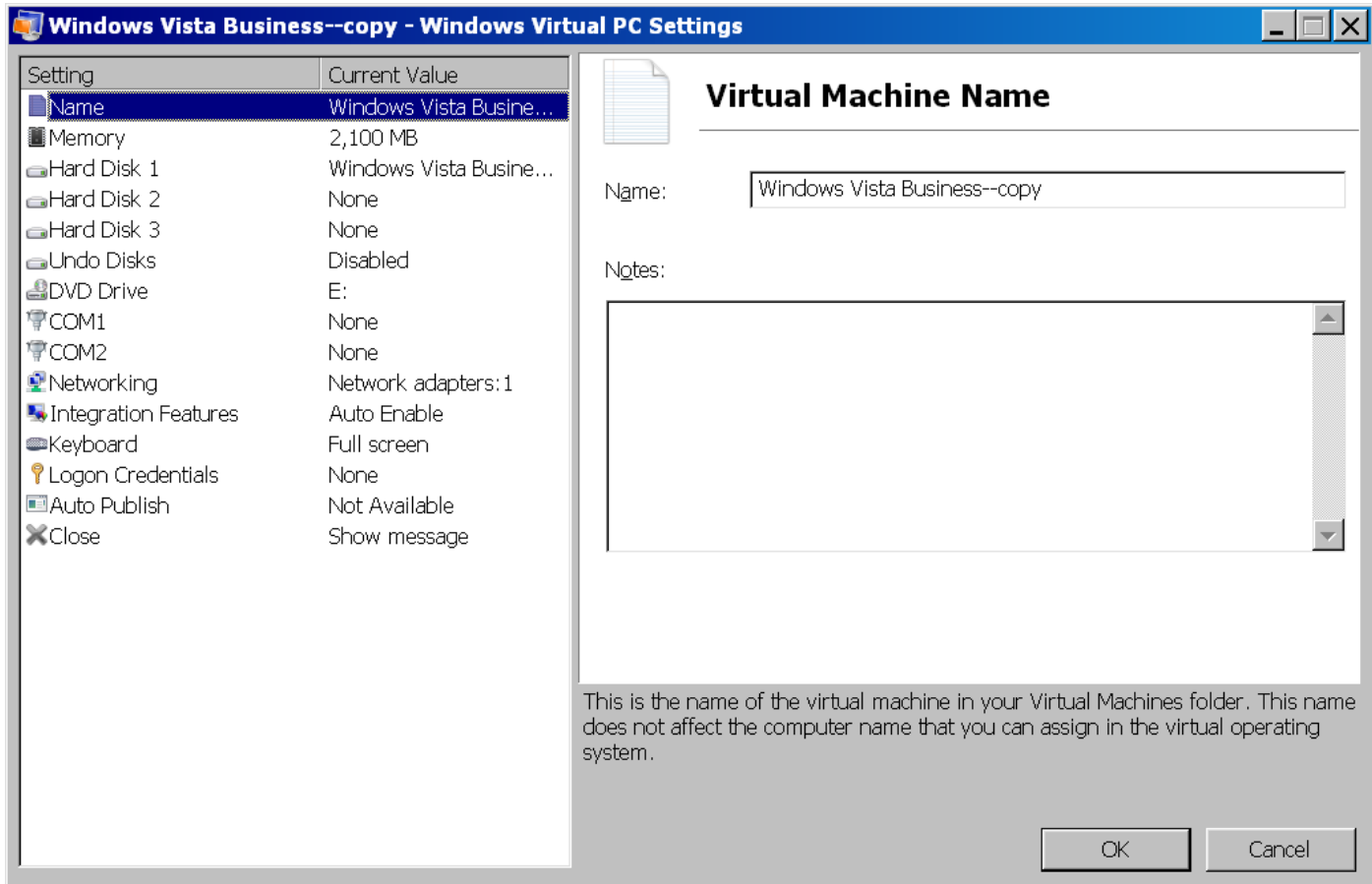Click on "Windows Virtual PC" in the sub-menu.

*

*

All of your virtual machines will be displayed:
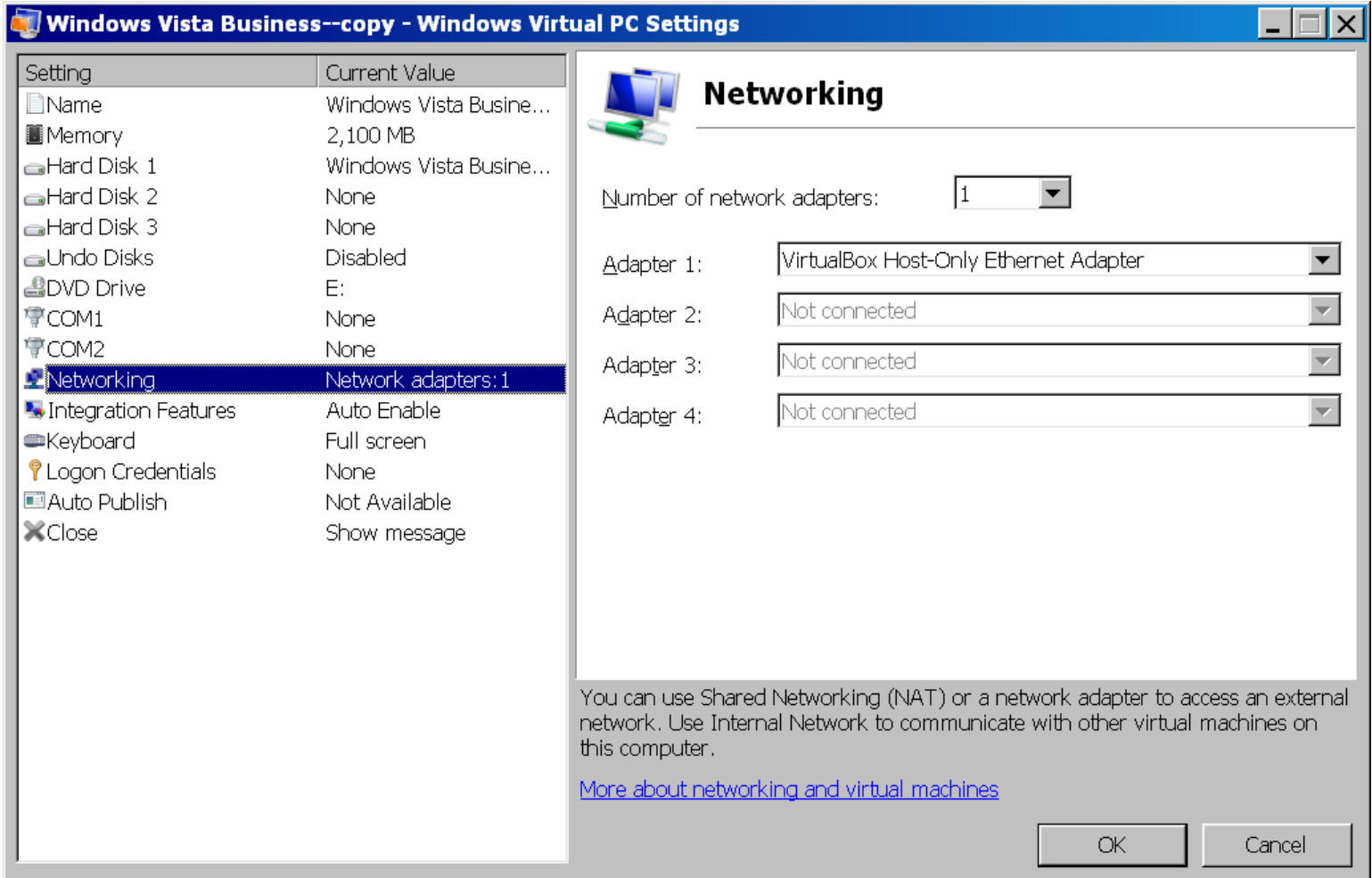
Use your right mouse button to click on the desired virtual machine:

Click on "Settings" in the popup context menu:

Click on "Networking" in the left pane:

*
Note (as shown in the right pane) that the virtual machine is allowed to have up to 4 network adapters.

Click on the drop down list button at the right-most end of any of the network adapters:
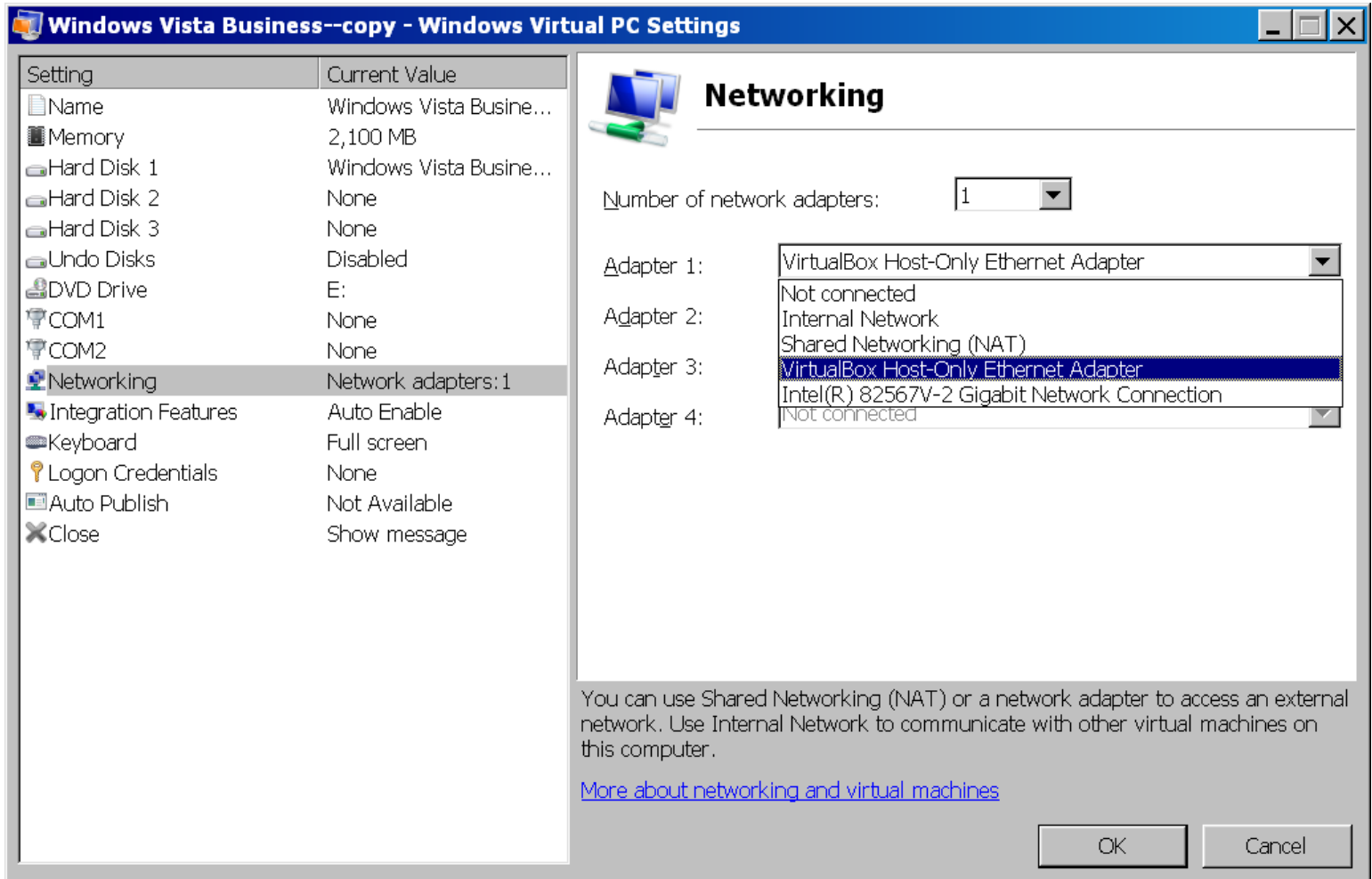
The virtual networks that each network adapter can attach to are:
"Not connected" (= No connection)
"Internal Network"
"Shared Networking (NAT)"
"VirtualBox Host-Only Ethernet Adapter
"Intel(R) 82567V-2 Gigabit Network Connection

(Ignore "VirtualBox Host-Only Ethernet Adapter" since it belongs to the virtual "Host-Only" router of the "Oracle VM VirtualBox" system. Never use this virtual adapter for a "Windows Virtual PC" virtual machine.)

The "Intel(R) 82567V-2 Gigabit Network Connection" is the network adapter of the host computer. If you select this option, you will be connecting the virtual adapter of the

virtual machine to a virtual "Bridged" bridge that makes the virtual machine act like it is directly attached to the real, physical network.

A description of each of the networking configuration options in the above-mentioned drop-down list can be found at
http://technet.microsoft.com/en-us/library/ee449441(WS.10).aspx

The operating system of the virtual machine treats all of the virtual network adapters as if they were a real items of hardware:

For example, if you start up a "Windows Vista Business" virtual machine, go to the Windows "Control Panel", double-click on "Network and Sharing Center", and click on "Manage network connections":

In this example, the virtual machine detects that it is attached to an "Intel 2110-Based PCI Fast Ethernet" network adapter:

*
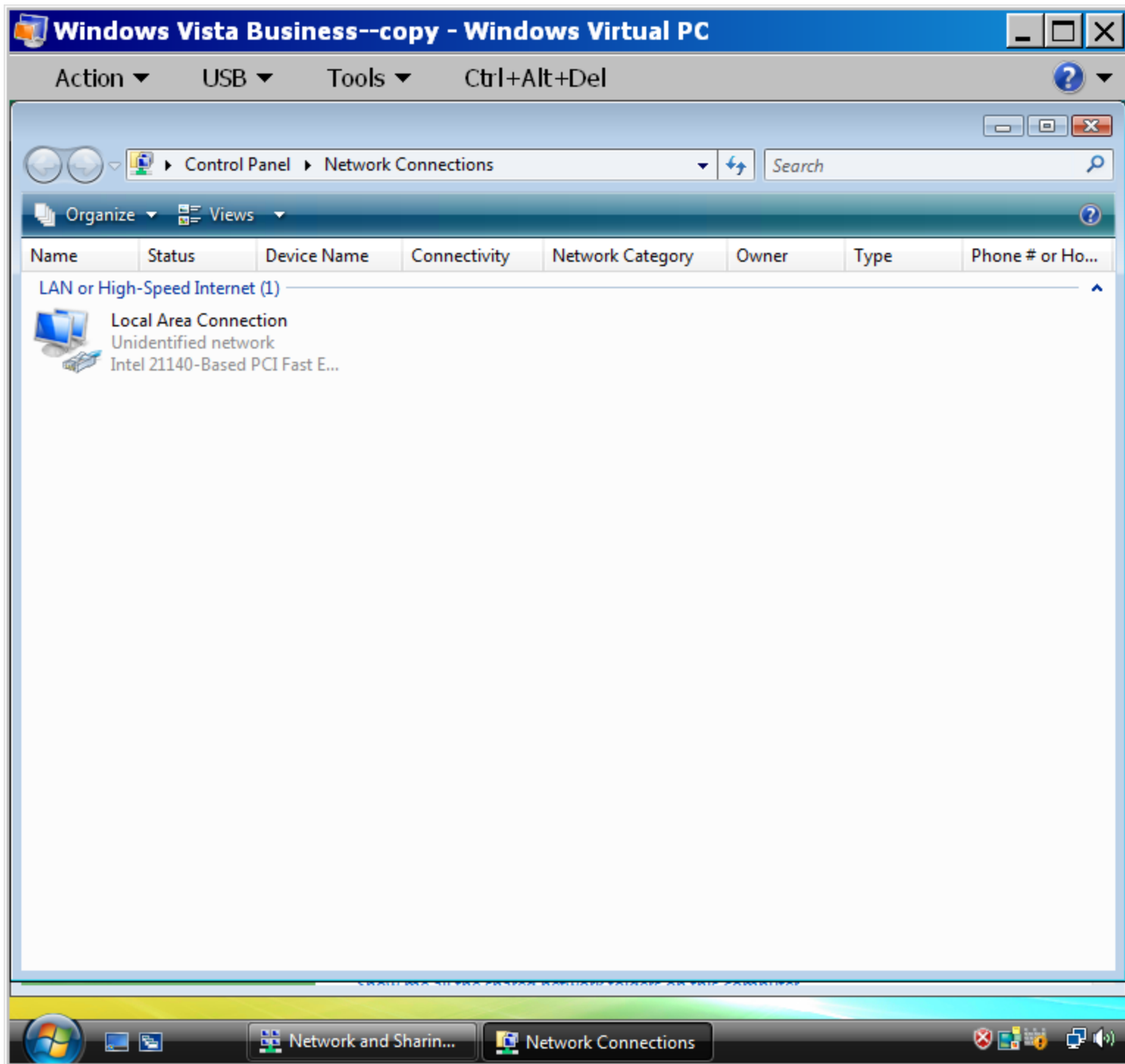
To change the virtual network configuration for any virtual machine while it is running, click on "Tools" in the menu bar of the virtual machine; then click on "Settings"; then click on "Network". It is okay to change the network configuration of any virtual machine while it is running:

*

Windows 2000 Professional - Windows Virtual PC Settings

Setting	Current Value
Name	Windows 2000 Profe...
Memory	1,612 MB
Hard Disk 1	Windows 2000 Profe...
Hard Disk 2	None
Hard Disk 3	None
Undo Disks	Disabled
DVD Drive	Win98.iso
COM1	None
COM2	None
Networking	Network adapters:1
Integration Features	Not Available
Keyboard	Full screen
Logon Credentials	None
Auto Publish	Not Available
Close	Show message

Virtual Machine Name

Name: Windows 2000 Professional

Notes:

ⓘ The virtual machine must be shut down before you can change the name. How do I shut down?

This is the name of the virtual machine in your Virtual Machines folder. This name does not affect the computer name that you can assign in the virtual operating system.

OK   Cancel

*

Windows 2000 Professional - Windows Virtual PC Settings

Setting	Current Value
Name	Windows 2000 Profe...
Memory	1,612 MB
Hard Disk 1	Windows 2000 Profe...
Hard Disk 2	None
Hard Disk 3	None
Undo Disks	Disabled
DVD Drive	Win98.iso
COM1	None
COM2	None
Networking	Network adapters:1
Integration Features	Not Available
Keyboard	Full screen
Logon Credentials	None
Auto Publish	Not Available
Close	Show message

Networking

Number of network adapters: 1

Adapter 1: Intel(R) PRO/1000 MT Network Connection

Adapter 2: Not connected

Adapter 3: Not connected

Adapter 4: Not connected

ⓘ The virtual machine must be shut down before you can add or remove a network adapter. How do I shut down?

You can use Shared Networking (NAT) or a network adapter to access an external network. Use Internal Network to communicate with other virtual machines on this computer.

More about networking and virtual machines

OK   Cancel

*

Windows 2000 Professional – Windows Virtual PC Settings

Setting	Current Value
Name	Windows 2000 Profe...
Memory	1,612 MB
Hard Disk 1	Windows 2000 Profe...
Hard Disk 2	None
Hard Disk 3	None
Undo Disks	Disabled
DVD Drive	Win98.iso
COM1	None
COM2	None
Networking	Network adapters:1
Integration Features	Not Available
Keyboard	Full screen
Logon Credentials	None
Auto Publish	Not Available
Close	Show message

Networking

Number of network adapters: 1

Adapter 1: Shared Networking (NAT)

Adapter 2: Not connected

Adapter 3: Not connected

Adapter 4: Not connected

The virtual machine must be shut down before you can add or remove a network adapter. How do I shut down?

You can use Shared Networking (NAT) or a network adapter to access an external network. Use Internal Network to communicate with other virtual machines on this computer.

More about networking and virtual machines

OK   Cancel

*

VIEW OF THE VIRTUAL NETWORK
FROM THE HOST AND THE VIRTUAL MACHINE

From a "Windows 7" host, there is little indication that you have a virtual network that is provided by "Windows Virtual PC". This can be considered to be one of the integration features of "Windows Virtual PC". In comparison, in "VMware Player" and "Oracle VM VirtualBox", the virtual networks are shown as an "Unidentified Network" of type "Public network" in a "Windows" host:

"Windows Virtual PC" "binds" a "Virtual PC Network Filter Driver" to the upstream ("toward the Internet") network adapter of the host computer. This is part of the "Bridged" bridge "virtual network" of "Windows Virtual PC AND the "NAT" virtual network of "Windows Virtual PC":
The "Properties" box of the upstream, real network adapter of the host computer will look like this:

Local Area Connection Properties

Networking | Sharing

Connect using:

📟 Intel(R) 82567V-2 Gigabit Network Connection

Configure...

This connection uses the following items:

- ☑ 📟 Client for Microsoft Networks
- ☑ 🖥 VirtualBox Bridged Networking Driver
- ☑ 🖥 VMware Bridge Protocol
- ☑ 🖥 Virtual PC Network Filter Driver
- ☑ 🖥 QoS Packet Scheduler
- ☑ 🖥 File and Printer Sharing for Microsoft Networks
- ☐ ⚙ Internet Protocol Version 6 (TCP/IPv6)

Install... | Uninstall | Properties

Description

OK | Cancel

For the "Properties" box of the real upstream network adapter of the host computer, "Virtual PC Network Filter Driver" must have a checkmark if the "Bridged" bridge virtual network of "Windows Virtual PC" is used for any virtual machines. If the checkmark is not there, then the "Bridged" bridge virtual network will not have a connection to the real Local Area Network (LAN) and the virtual machines will have no connection to other real or virtual computers on the Local Area Network and the virtual machines will not have an Internet connection either.

For the "Properties" box of the real upstream network adapter of the host computer, "Virtual PC Network Filter Driver" must have a checkmark if the "NAT" ("Network Address Translation) virtual router/network of "Windows Virtual PC" is used for any virtual machines. If the checkmark is not there, then the "NAT" virtual router/network will not have a connection to the real Local Area Network (LAN) and the virtual machines will have no access to the real Internet connection.

VIEW OF THE VIRTUAL NETWORK
FROM INSIDE THE VIRTUAL MACHINE

View your basic network information and set up connections
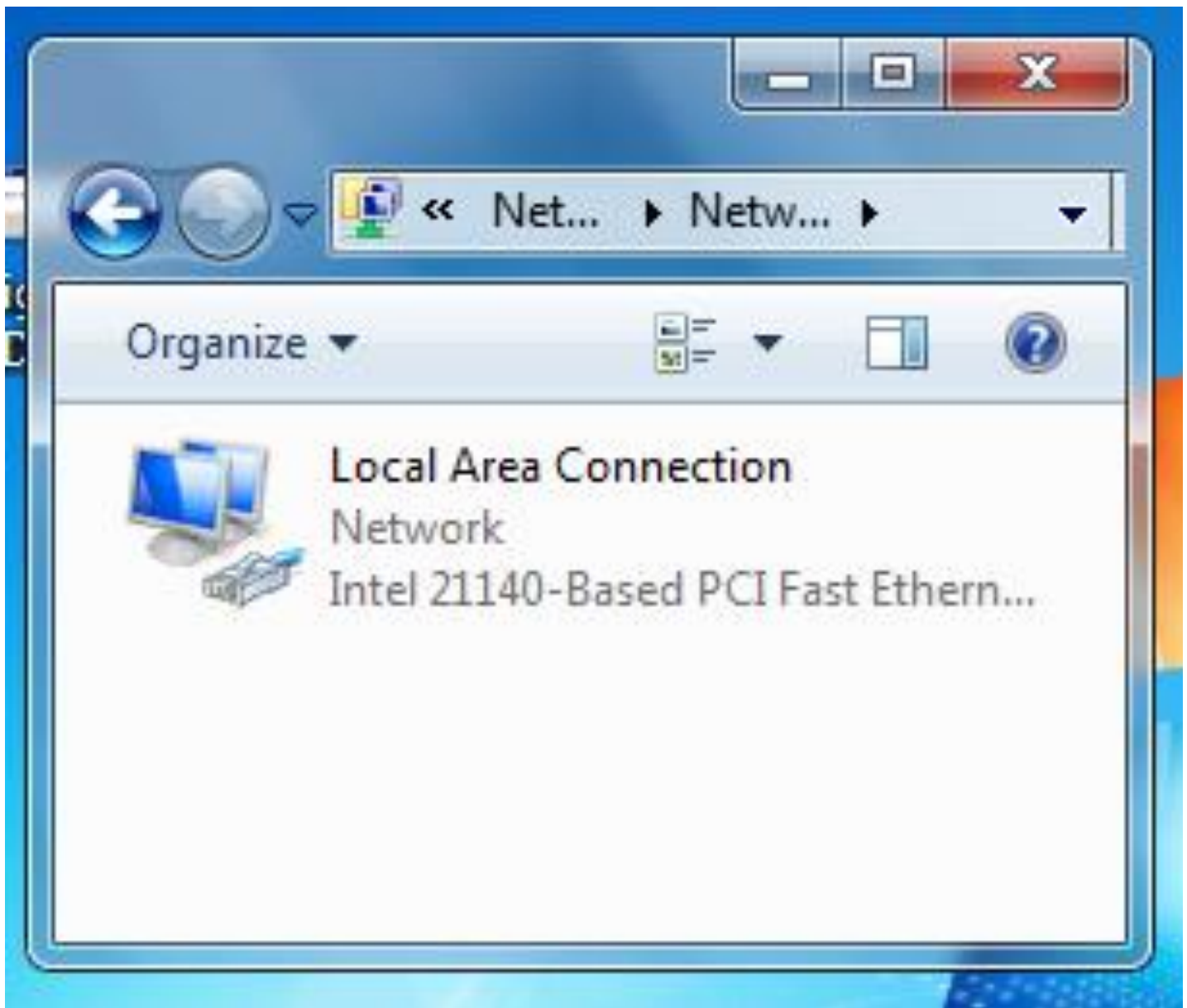
See f

WINDOWS7ENTWVPC
(This computer)
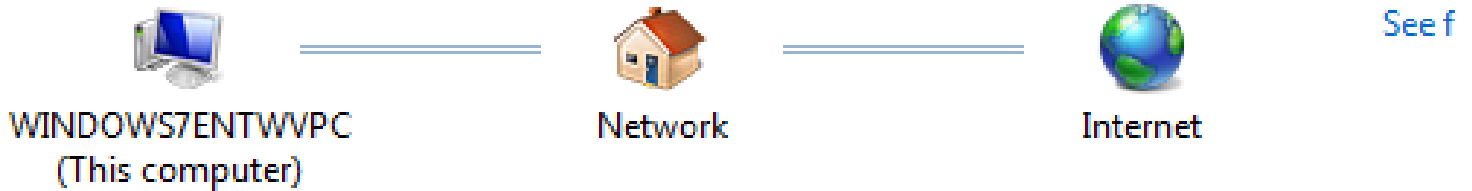
Network

Internet

View your active networks ———————————————— Connect or disc

Network
Home network

Access type:	Internet
HomeGroup:	Joined
Connections:	Local Area Connection

*

*

Local Area Connection Properties

Networking

Connect using:

🖧 Intel 21140-Based PCI Fast Ethernet Adapter (Emulated)

[Configure...]

This connection uses the following items:

- ☑ 🖳 Client for Microsoft Networks
- ☑ 🖳 QoS Packet Scheduler
- ☑ 🖳 File and Printer Sharing for Microsoft Networks
- ☐ ⏦ Internet Protocol Version 6 (TCP/IPv6)
- ☑ ⏦ Internet Protocol Version 4 (TCP/IPv4)
- ☑ ⏦ Link-Layer Topology Discovery Mapper I/O Driver
- ☑ ⏦ Link-Layer Topology Discovery Responder

[Install...] [Uninstall] [Properties]

Description

Allows your computer to access resources on a Microsoft network.

[OK] [Cancel]

"OTHER" GATEWAY/ROUTER
with designated target drives located on the host
with no accessible or visible network interfaces in the host or the virtual machine
with no upstream routing to the Internet.
"Virtual PC Integration Components" software must be installed into each virtual machine.
In a Windows host, the "Virtual PC Integration Components" software for a Windows virtual machine is located at
C:\Program Files (x86)\Windows Virtual PC\Integration Components\
Multiple virtual machines can access the same target folder on the host.
Host drive access must be configured for each virtual machine.
A "Windows" virtual machine sees a shared drive inside the "Other" phantom network.
No indication in host file system that a folder is being shared.

Host computer

Virtual Machine


```
☐ 🖳 Network
   ☐ 🖳 32-BITWIN7HPVM
   ☐ 🖳 VBOXSVR  .
      ☐ 📁  \\VBOXSVR\Shared_from_VM
```
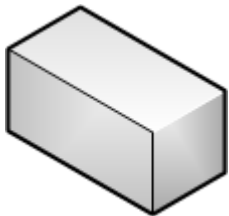
"Other" shared drive
= host drive access
   from virtual machine
File system of virtual machine
   does not indicate that the
   drive is shared.
The host computer has no access to file system of virtual machine

"Other"
Gateway/Router
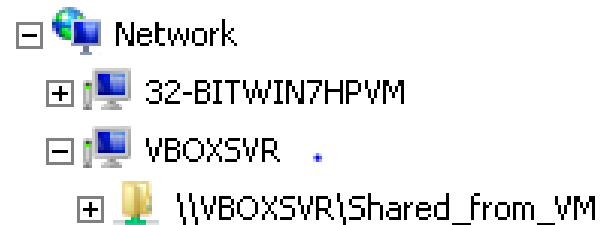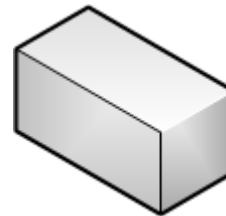
Virtual machine sees a phantom
   network called "Other"
Virtual network adapter is not used.

When you download and install the "Windows XP Mode" virtual machine "Virtual PC Integration Components" is automatically installed as a software program inside "Windows XP Mode":
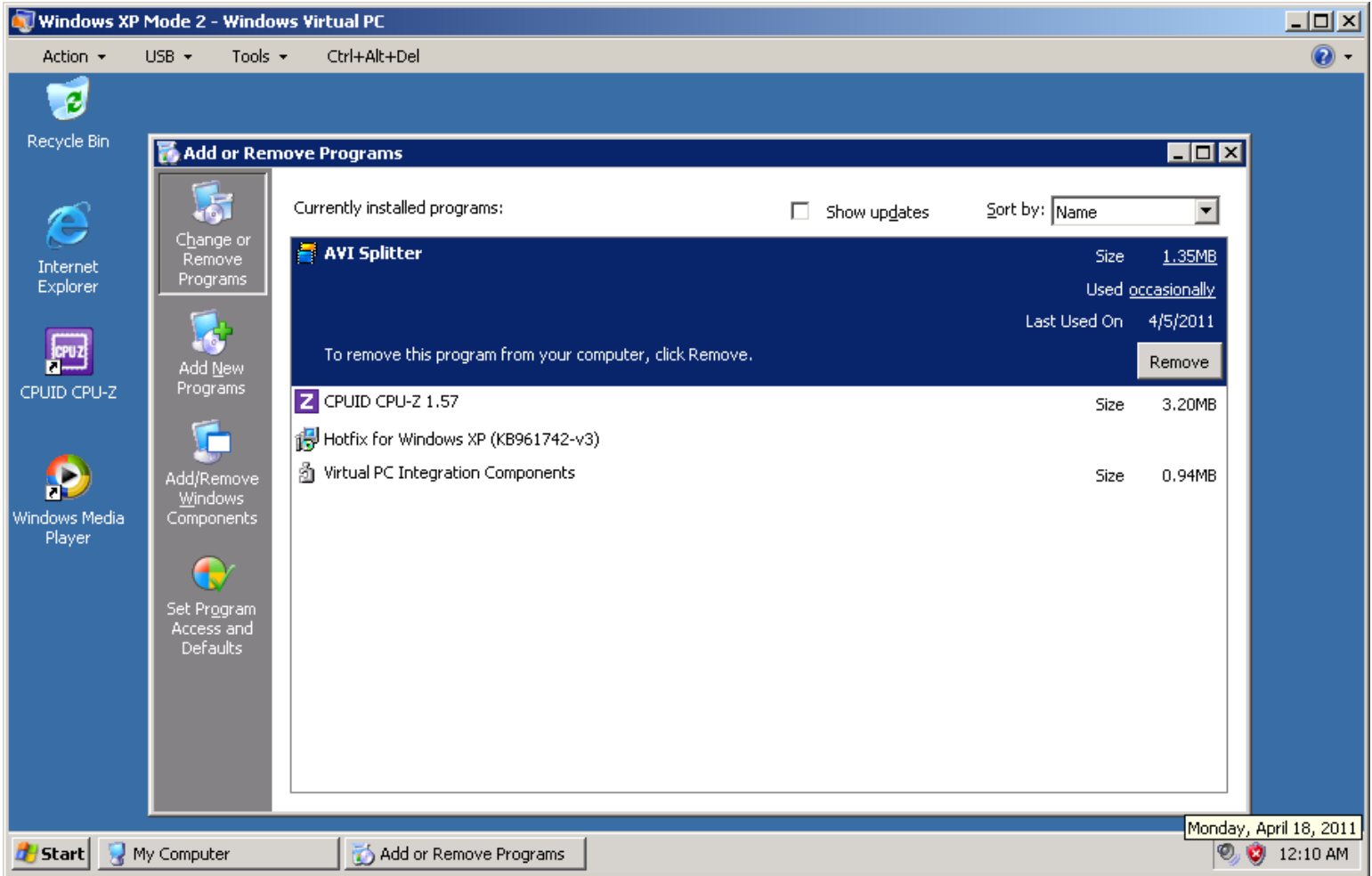
The "Virtual PC Integration Components" software program is automatically installed and enabled during the installation of the "Windows XP Mode" virtual machine.

The "Virtual PC Integration Components" software program is not automatically enabled during the installation of the virtual machines that run "Windows Vista" and "Windows 7" virtual machines.

One of the "Integration Features" of "Virtual PC Integration Components" is the provision of an "Other" virtual network that provides the "Windows XP Mode" virtual machine with access to all of the drives on the host computer.

When the host drive sharing of "Integration Features" is active:
from inside a "Windows.." virtual machine, you can use "My Computer" or "Windows Explorer" to access designated host drives from the "Other" virtual router/gateway.
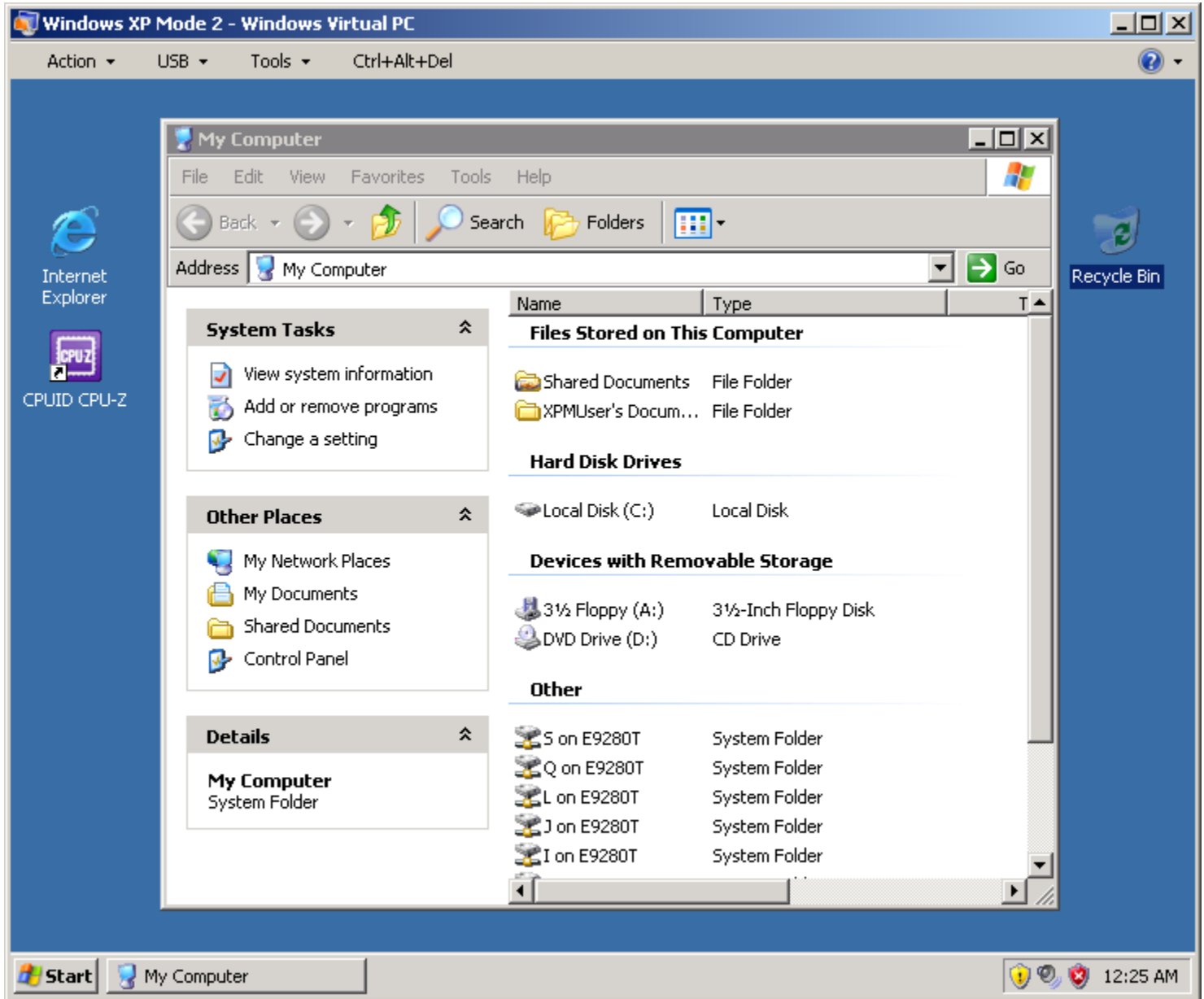
The virtual "Other" gateway/router of "Windows Virtual PC" is similar to the "Shared Folders" gateway/routers in "Microsoft Virtual PC 2007", "Oracle VM VirtualBox", and "VMware Player".

The "Other" virtual network feature does not depend on communications through any virtual network cards.

Like other "Integration Features", the "Other" virtual network can be controlled with the "Settings" dialog box of the virtual machine:

If the "Windows .." virtual machine is running, click on "Tools" on the top menu bar.
Then click on "Settings".

Then click on "Integration Features":
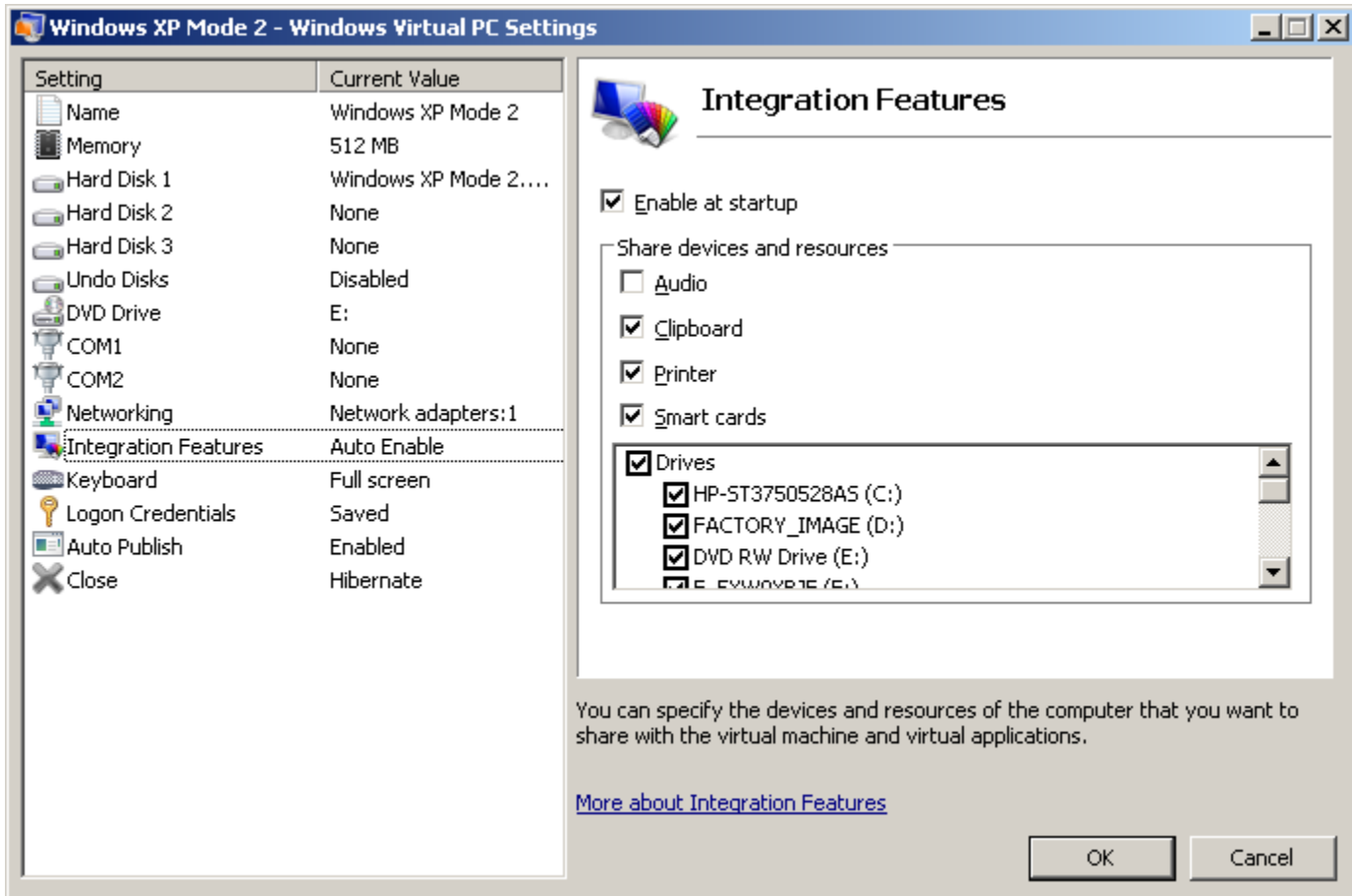
From the right-most pane, you can do the following:
You can select which drives on the host computer to allow the virtual machine to access.
You can select to turn off all access to the hard drives of the host computer.
Click on the "OK" button when you are finished with configuring the "Other" virtual network.

"Shared Networking (NAT) router
with NAT service, DHCP server, and upstream routing to the Internet,
This is the default virtual network that is set up by the "Windows Virtual PC" virtual machine
program for the virtual network adapter of a "Windows XP Mode" virtual machine.

Host computer

Virtual Machine

Local Area Connection
Network, Shared
Intel(R) PRO/1000 MT Desktop Adap...
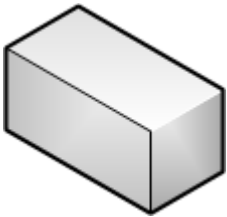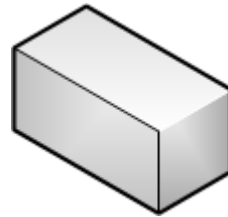
Internet access
  from virtual machine
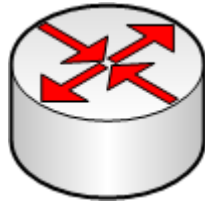
"NAT" router
  with NAT service
  with DHCP server
  with upstream routing
   to the Internet
(with no LAN switching between
   virtual machines)
(with no LAN switching between
   the host and virtual machines)

To connect a virtual network adapter to the virtual "Shared Networking (NAT)" router, use the drop-down list button to bring up a list of virtual networks. Then select "Shared Networking (NAT) from the drop-down list:

*

Windows Business Trial with IE7 - Windows Virtual PC Settings

Setting	Current Value
Name	Windows Business Tr...
Memory	3,500 MB
Hard Disk 1	Vista Business with I...
Hard Disk 2	None
Hard Disk 3	None
Undo Disks	Disabled
DVD Drive	IntegrationCompone...
COM1	None
COM2	None
Networking	Network adapters:1
Integration Features	Auto Enable
Keyboard	Full screen
Logon Credentials	None
Auto Publish	Not Available
Close	Show message

Networking

Number of network adapters: 1

Adapter 1:   Shared Networking (NAT)

Adapter 2:   Not connected

Adapter 3:   Not connected

Adapter 4:   Not connected

You can use Shared Networking (NAT) or a network adapter to access an external network. Use Internal Network to communicate with other virtual machines on this computer.

More about networking and virtual machines

OK   Cancel

"Bridged" bridge
with mandatory "TEE" connection to either an upstream, real network adapter
(or to an operating system-provided virtual bridge on the host such as the "Windows Network Bridge")
with no internal LAN switching
(with LAN switching between virtual machines performed by the real physical network)
(with LAN switching between the host and virtual machines performed by the real physical network)
(with NAT server and DHCP server provided by the real physical network)
With this virtual network option, the virtual machine(s) participate on the real physical network as "peers" with the host.
This is the default virtual network that is set up by the "Windows Virtual PC" virtual machine program for the virtual network adapter of any virtual machine that you create in "Windows Virtual PC" (with the exception of a "Windows XP Mode" virtual machine which will default to a "Shared Networking (NAT)" connection for it's virtual network adapter).

Host computer   Virtual Machine

Local Area Connection
Network, Shared
Intel(R) PRO/1000 MT Desktop Adap...
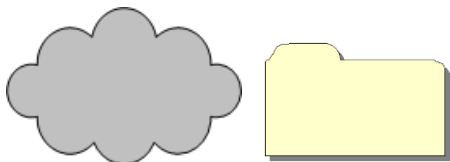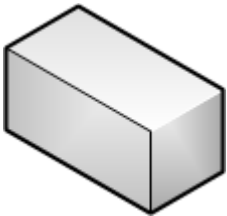
Internet access
  from virtual machine
Optional host folder access
  from virtual machine
  by means of
  Windows "File Sharing"
  or "Homegroups"
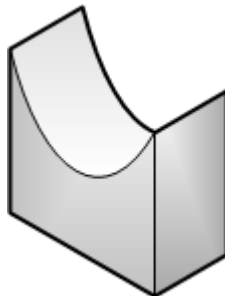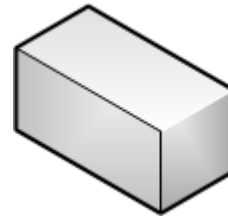
"Bridged" bridge
  provides "TEE"
  to a real physical
  physical network
  adapter but does not
  switch between
  virtual machines

VIEW OF THE "BRIDGED BRIDGE" FROM THE "NETWORK ADAPTER" SCREENS OF THE HOST COMPUTER:

The "TEE" connection between the virtual "Bridged" bridge and the physical network adapter is performed by a "Virtual PC Network Filter Driver" which is configured in the "..Properties" box of the real, physical network adapter in the "Control Panel" of the host operating system:

Wireless Network Connection 11 Properties ✕

| Networking | Sharing |

Connect using:

🖳 Linksys WUSB600N Wireless-N USB Network Adapter with

[Configure...]

This connection uses the following items:

- ☑ 🖳 Client for Microsoft Networks
- ☑ 🖳 VMware Bridge Protocol
- ☑ 🖳 VirtualBox Bridged Networking Driver
- ☑ 🖳 Virtual PC Network Filter Driver
- ☑ 🖳 QoS Packet Scheduler
- ☑ 🖳 File and Printer Sharing for Microsoft Networks
- ☑ ⊥ Internet Protocol Version 6 (TCP/IPv6)
- ☑ ⊥ Internet Protocol Version 4 (TCP/IPv4)

[Install...] [Uninstall] [Properties]

Description

Allows your computer to access resources on a Microsoft network.

[OK] [Cancel]

The checkmark for "Virtual PC Network Filter Driver" means that the real upstream network adapter of the host computer is connected to the virtual "Bridged" bridge of the "Windows Virtual PC" system.

VIEW OF THE "BRIDGED BRIDGE" VIRTUAL NETWORK FROM THE "NETWORK ADAPTER" SCREENS IN THE "SETTINGS" SCREENS OF THE SPECIFIC VIRTUAL MACHINE:

The real physical network provides DHCP services, upstream routing to the Internet, NAT services, LAN switching between the host and virtual machines, and LAN switching between virtual machines.

When you use the configuration screens that are provided by "Windows Virtual PC" to select the "virtual network" that a "virtual network adapter" is connected to, you will find that that the term "bridged" is not available as an option. Unlike "VMware Player" or "Oracle VM VirtualBox", you get an option that is the name of of a real, physical network adapter that is part of the host computer. In "Windows Virtual PC", if you select the real network adapter, you are then connecting the "virtual network adapter" to the virtual "bridged bridge" network that is provided by "Windows Virtual PC".

Reference:
http://blogs.technet.com/b/windows_vpc/archive/2009/12/07/networking-in-windows-virtual-pc.aspx

*

Windows Business Trial with IE7 - Windows Virtual PC Settings

Setting	Current Value
Name	Windows Business Tr...
Memory	3,500 MB
Hard Disk 1	Vista Business with I...
Hard Disk 2	None
Hard Disk 3	None
Undo Disks	Disabled
DVD Drive	IntegrationCompone...
COM1	None
COM2	None
Networking	Network adapters:1
Integration Features	Auto Enable
Keyboard	Full screen
Logon Credentials	None
Auto Publish	Not Available
Close	Show message

Networking

Number of network adapters: 1

Adapter 1: Intel(R) 82567V-2 Gigabit Network Connection

Adapter 2: Not connected

Adapter 3: Not connected

Adapter 4: Not connected

You can use Shared Networking (NAT) or a network adapter to access an external network. Use Internal Network to communicate with other virtual machines on this computer.

More about networking and virtual machines

OK   Cancel

"Internal Network" switch ("intnet")
with LAN switching between virtual machines
with no LAN switching or routing between virtual machines and the host
with no NAT server, and no upstream routing to the Internet

Host computer

Virtual Machine

Local Area Connection
Network, Shared
Intel(R) PRO/1000 MT Desktop Adap...

No host folder access
   from virtual machine
No internet access
   from virtual machine

"intnet"
switch
with
LAN switching
between
virtual
machines

To connect a virtual network adapter to the virtual "Internal Network" switch, use the drop-down list button to bring up a list of virtual networks. Then select "Internal Network" from the drop-down list:

Setting	Current Value
Name	Windows Business Tr...
Memory	3,500 MB
Hard Disk 1	Vista Business with I...
Hard Disk 2	None
Hard Disk 3	None
Undo Disks	Disabled
DVD Drive	IntegrationCompone...
COM1	None
COM2	None
Networking	Network adapters:1
Integration Features	Auto Enable
Keyboard	Full screen
Logon Credentials	None
Auto Publish	Not Available
Close	Show message

Windows Business Trial with IE7 - Windows Virtual PC Settings

Networking

Number of network adapters: 1

Adapter 1: Shared Networking (NAT)

Not connected
Internal Network
Shared Networking (NAT)
VirtualBox Host-Only Ethernet Adapter
Intel(R) 82567V-2 Gigabit Network Connection

Adapter 2:
Adapter 3:
Adapter 4: Not connected

You can use Shared Networking (NAT) or a network adapter to access an external network. Use Internal Network to communicate with other virtual machines on this computer.
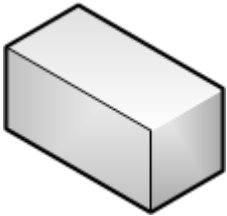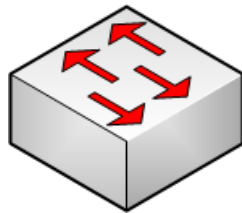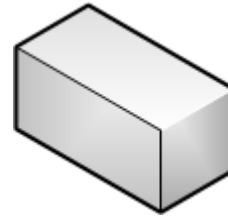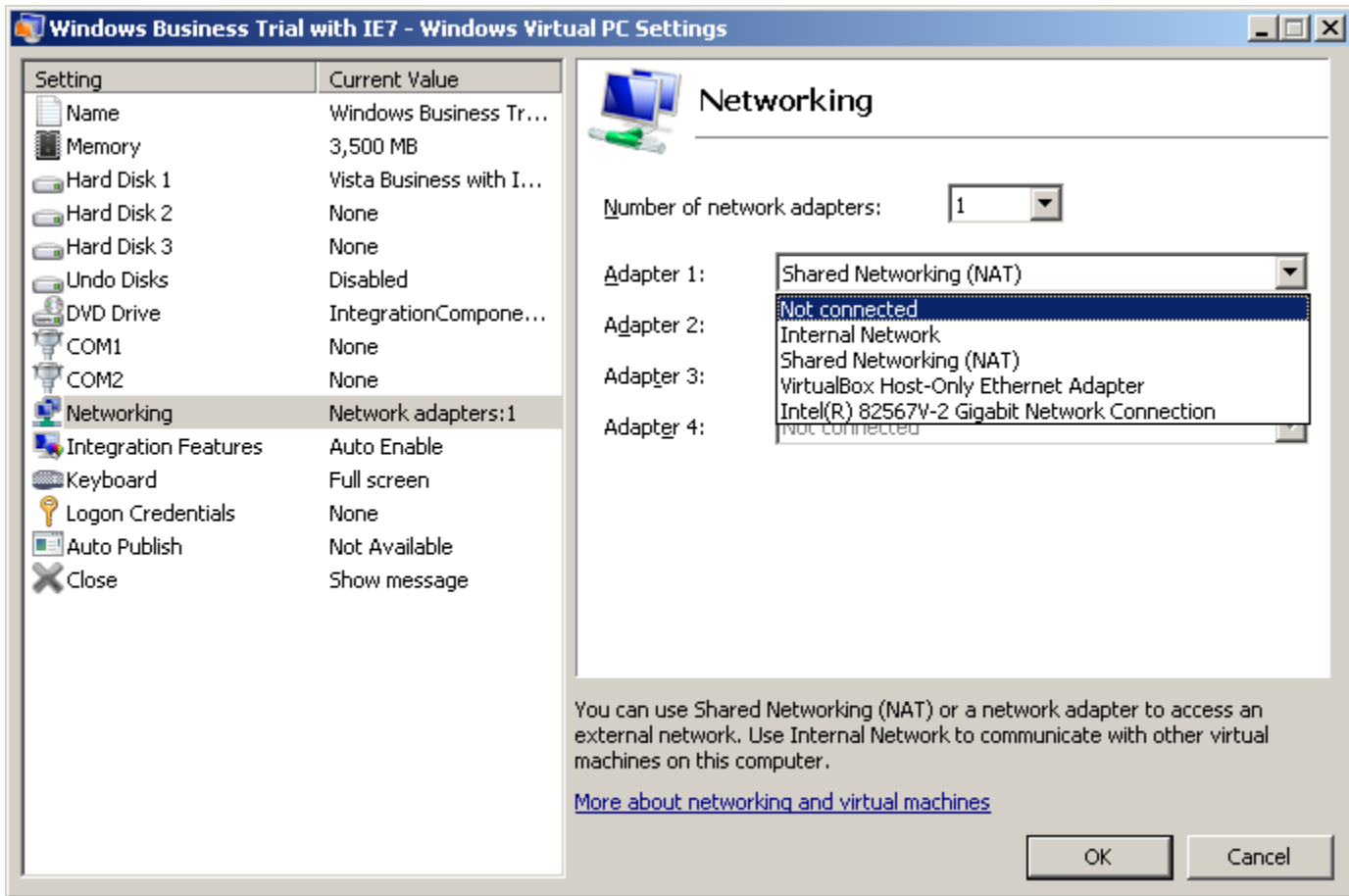
More about networking and virtual machines

OK   Cancel

*

Windows Business Trial with IE7 – Windows Virtual PC Settings

Setting	Current Value
Name	Windows Business Tr...
Memory	3,500 MB
Hard Disk 1	Vista Business with I...
Hard Disk 2	None
Hard Disk 3	None
Undo Disks	Disabled
DVD Drive	IntegrationCompone...
COM1	None
COM2	None
Networking	Network adapters:1
Integration Features	Auto Enable
Keyboard	Full screen
Logon Credentials	None
Auto Publish	Not Available
Close	Show message

Networking

Number of network adapters: 1

Adapter 1:   Internal Network

Adapter 2:   Not connected

Adapter 3:   Not connected

Adapter 4:   Not connected

You can use Shared Networking (NAT) or a network adapter to access an external network. Use Internal Network to communicate with other virtual machines on this computer.

More about networking and virtual machines

OK   Cancel

NETWORKING PROBLEMS AND WORKAROUNDS FOR "WINDOWS VIRTUAL PC"

See
http://aztcs.org/meeting_notes/winhardsig/virtualmachines/WindowsVirtualPC/NetworkProblemsWithWVPC.pdf

References:

http://blogs.technet.com/b/windows_vpc/archive/2009/12/07/networking-in-windows-virtual-pc.aspx
and
http://blogs.technet.com/b/windows_vpc/archive/2009/09/26/networking-and-using-windows-xp-mode.aspx