VIRTUAL NETWORKING
WITH "Oracle VM VirtualBox"
FROM A "WINDOWS" PERSPECTIVE

Summary:
"VirtualBox" provides five virtual networking configurations for the virtual machines of a Windows host computer:

- a "Shared Folders" gateway/router

- a "Network Address Translation" ("NAT") router (with no internal LAN switching)

- a "Bridged" bridge (with no internal LAN switching)

- a "Host-Only" router with internal LAN switching

and

- an "Internal Network" LAN switch with optional DHCP services
VIEW OF THE VIRTUAL NETWORK FROM THE "WINDOWS" HOST COMPUTER

From a "Windows Vista", "Windows 7", or "Windows 8" host, the virtual network is shown as an "Unidentified network" of type ="Public network":

![Image of network settings in Windows control panel]

- E928TWH (This computer)
- Multiple networks
- Internet
- belkin.533d.5ghz Home network
- Unidentified network Public network

See also:
- HomeGroup
- Internet Options
- Windows Firewall
"Oracle VM VirtualBox" "binds" a "VirtualBox Bridged Networking Driver" to the existing upstream ("toward the Internet") network adapter of the host computer. This is part of the "Bridged" bridge "virtual network" of "Oracle VM VirtualBox".

![Local Area Connection Properties dialog box](image)
When you install "VirtualBox" into a host computer, "VirtualBox" provides one virtual network adapter for the host computer:

It is called the "VirtualBox Host-Only Ethernet Adapter":

![VirtualBox Host-Only Ethernet Adapter](image)

The "VirtualBox Host-Only Ethernet Adapter" connects the host computer to the virtual "Host-Only" router.
VIEW OF THE VIRTUAL NETWORK FROM INSIDE A VIRTUAL MACHINE

From the "Settings" screens in the "Oracle VM VirtualBox" software program, you can provide up to 4 network adapters for each virtual machine:
If you click on the drop-down list button to the right of the "Attached to:" field, you will see a list of the virtual networks that "Oracle VM VirtualBox" provides to a virtual machine:

Please note that "NAT" is the virtual "Network Address Translation" ("NAT") router,

"Bridged Adapter" is the virtual "Bridged" bridge,

"Host-only Adapter" is the virtual "Host-Only" router,

and

"Internal Network" is the virtual "Internal Network" LAN switch.
The operating system of the virtual machine treats all of the virtual network adapters as if they were real items of hardware:
"**SHARED FOLDERS**" GATEWAY/ROUTER  
with designated target folder 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.  
Oracle's "Guest Addtions" software must be installed into each virtual machine.  
"Guest Addtions" software is provided to you as an *.iso CD image file called  
VBoxGuestAddtions.iso  
at  
C:\Program Files\Oracle\VirtualBox\  
of the host computer when you install "VirtualBox" into the host computer.  
Multiple virtual machines can access the same target folder on the host.  
"Shared Folders" must be configured for each virtual machine.  
"Windows" virtual machine sees a "Shared Folder" inside the "VBOXSVR" virtual server.  
"Linux" virtual machine sees a folder mounted in /media but no access is permitted.  
The "Shared Folders" gateway/router does not work for Macintosh virtual machines at the present time.  
(In "VirtualBox", a Linux virtual machine sees and accesses a folder in /mnt/hgfs.)  
There is no indication in host file system that a folder is being shared.

Host computer

Virtual Machine

"Shared" Folder(s)  
= host folder access from virtual machine

File system of virtual machine does not show indicate that the folder is shared.

Host has no access to file system of virtual machine
This is not Windows "File Sharing" or "Homegrouping"
ADDITIONAL INFORMATION ABOUT THE VIRTUAL "SHARED FOLDERS" GATEWAY/ROUTER:

Oracle's instructions for setting up "Shared Folders" for a "Windows" or "Linux" virtual machine can be found at
http://www.virtualbox.org/manual/ch04.html#sharedfolders

For additional instructions for setting up "Shared Folders for a "Ubuntu" virtual machine, see
https://help.ubuntu.com/community/VirtualBox/SharedFolders
and
http://blogs.oracle.com/tao/entry/virtual_box_shared_folder_between
"Network Address Translation" ("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 "Oracle VM VirtualBox" virtual machine program when you use the "New Virtual Machine Wizard" to create a new virtual machine.

Host computer

Virtual Machine

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)
"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.
The "TEE" connection between the virtual "Bridged" bridge and the physical network adapter is performed by a "VirtualBox Bridged Networking Driver" in the real, upstream, physical network adapter in the host computer:

![Local Area Connection Properties](image)

The real physical local area network (LAN) provides DHCP services, upstream routing to the Internet, NAT services, LAN switching between the host and virtual machines, and LAN switching between virtual machines.
"Host-Only" router
with mandatory LAN switching between the host and the virtual machine,
with LAN switching or routing between virtual machines,
with an optional DHCP server, no NAT server, and no upstream routing to the Internet.

Host computer

Virtual Machine

No Internet Access from virtual machine
Optional host folder access from virtual machine by means of Windows "File Sharing" or "Homegroups"

"Host-only" router with mandatory LAN switching between host and virtual machines
with LAN switching or routing between virtual machines.

Host has a "Virtual Host-Only Ethernet Adapter"
which connects the file system of the host to the "Host-only" router

The "Host-only" router acts as a firewall to prevent communications between the Internet and all virtual machines.
This is the hardest configuration to set up:
It often takes multiple reboots and long waits before the host can see shared files on the virtual machines and vice versa.
Sometimes it is necessary to attach more than one virtual machine to the "Host-only" router before file sharing starts up between virtual machines and between virtual machines and the host.
"Internal Network" switch ("intnet")
with LAN switching between virtual machines
with no LAN switching or routing between virtual machines and the host
with an optional DHCP server (a router function)
with no NAT server, and no upstream routing to the Internet

Host computer

Virtual Machine

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

"intnet" switch with LAN switching between virtual machines
Optional DHCP server

References:

http://www.virtualbox.org/manual/ch06.html
http://www.dedoimedo.com/computers/virtualbox-network-sharing.html
http://ninjazebra.com/virtualbox_network_scenarios