VIRTUAL NETWORKS IN VIRTUAL MACHINE PROGRAMS

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SUMMARY

When you install a “virtual machine program” (such as “Vmware Workstation Player..”, “Oracle VM VirtualBox”, or "Desktop Hyper-V"), you automatically install some "virtual machine networks". One of these "virtual machine networks" will usually be automatically connected to any virtual machine that you create.

TOPICS

- “VIRTUAL NETWORK” BASICS
- VIEW OF A “VIRTUAL NETWORK” FROM A “WINDOWS” HOST COMPUTER
- VIEW OF A “VIRTUAL NETWORK” FROM WITHIN A VIRTUAL MACHINE
- GENERIC DESCRIPTION OF THE "VIRTUAL NETWORKS" CREATED BY MOST "VIRTUAL MACHINE PROGRAMS"

TOPICS (continued)

- “VIRTUAL NETWORKS” PROVIDED BY “VMWARE WORKSTATION PLAYER”
- “VIRTUAL NETWORKS” PROVIDED BY “ORACLE VM VIRTUALBOX”
- “VIRTUAL NETWORKS” PROVIDED BY “WINDOWS VIRTUAL PC” AND “MICROSOFT VIRTUAL PC 2007”

TOPICS (continued)

- MAKING A “VIRTUAL MACHINE” ACT LIKE IT IS DIRECTLY CONNECTED TO YOUR REAL “LOCAL AREA NETWORK” (“LAN”)

“VIRTUAL NETWORK” BASICS

- All virtual machine programs provide you with "virtual networks":
  - When you install a "virtual machine program" such as "VMware Workstation Player" (free), Oracle "VirtualBox" (free), or "Desktop Hyper-V" (free) **into your "Windows.." computer**, you will also be automatically installing some "virtual networks" that belong to the "virtual machine program".

“VIRTUAL NETWORK” BASICS (continued)

- All virtual machine programs provide you with "virtual networks":
  - When you install a "virtual machine program" such as Oracle "VirtualBox" (free), "Parallels" (not free), or "VMware Fusion" (not free) **into your "Mac" "host" computer**, you will also be automatically installing some "virtual networks" that belong to the "virtual machine program".

“VIRTUAL NETWORK” BASICS (continued)

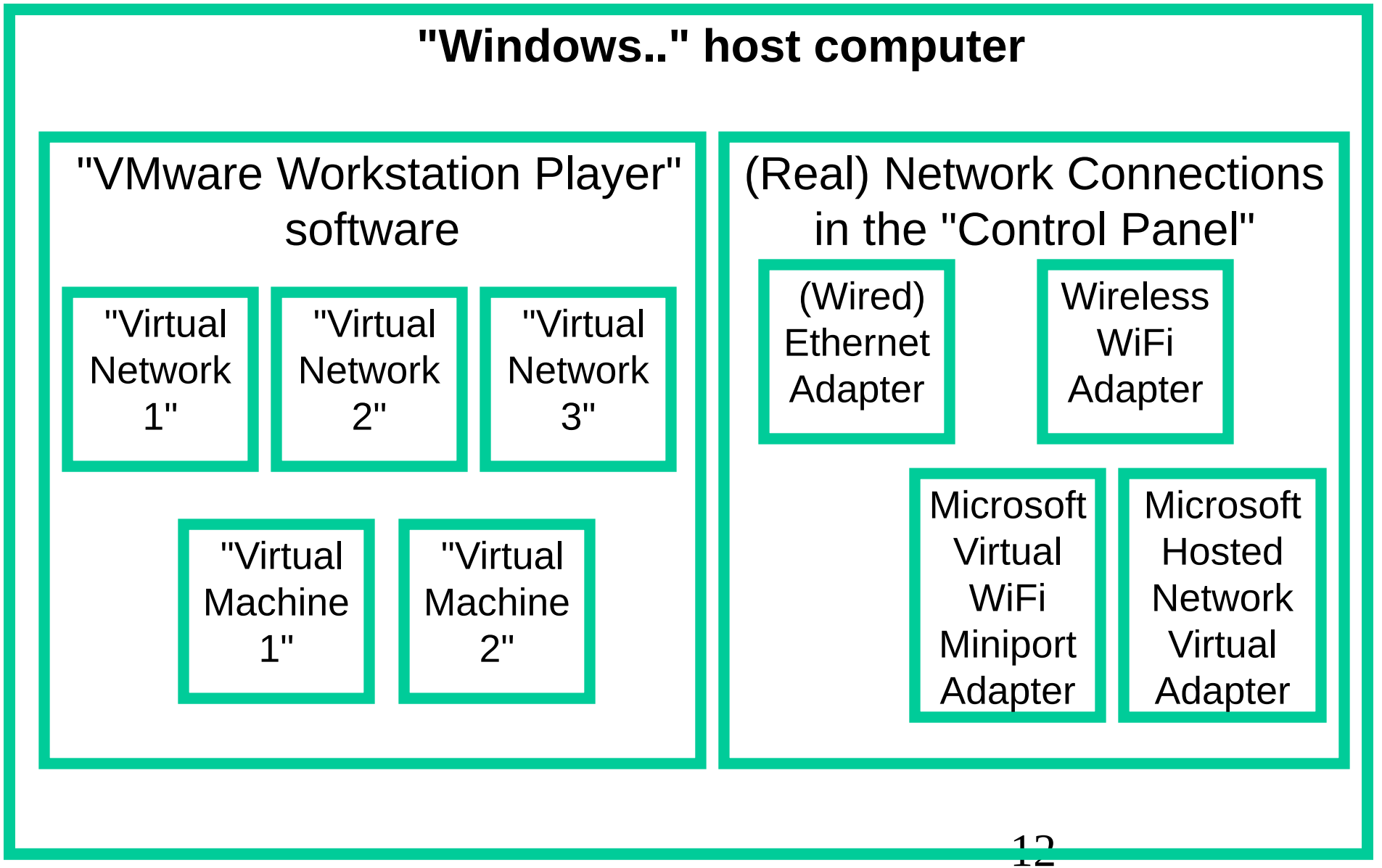
- All virtual machine programs provide you with "virtual networks":
  - When you install a "virtual machine program" such as "VMware Workstation Player" (free), or "Oracle "VirtualBox" (free), into your **"GNU/Linux" "host" computer**, you will also be automatically installing some "virtual networks" that belong to the "virtual machine program"

“VIRTUAL NETWORK” BASICS (continued)

- All virtual machine programs provide you with "virtual networks":
  - –These "virtual machine networks" are mandatory modules that are proprietary and specific parts of the "virtual machine program".

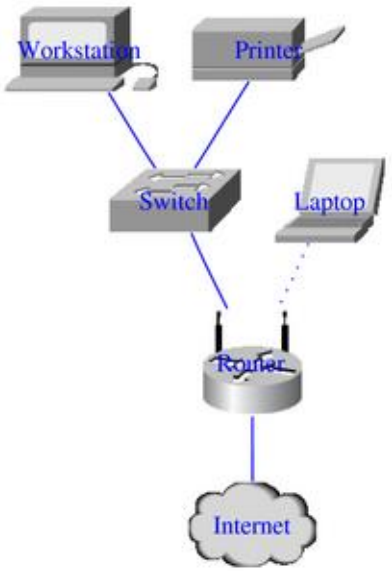
“VIRTUAL NETWORK” BASICS (continued)

- All virtual machine programs provide you with "virtual networks" (continued):
  - A "virtual network" that is part of a certain "virtual machine program" cannot interoperate with a "virtual machine program" that is part of another "virtual machine program".


"Windows.." host computer
"VMware Workstation Player" software
"Virtual Network 1"
"Virtual Network 2"
"Virtual Network 3"
"Virtual Machine 1"
"Virtual Machine 2"
(Real) Network Connections in the "Control Panel"
(Wired) Ethernet Adapter
Wireless WiFi Adapter
Microsoft Virtual WiFi Miniport Adapter
Microsoft Hosted Network Virtual Adapter

“VIRTUAL NETWORK” BASICS (continued)

- All virtual machine programs provide you with "virtual networks":



“VIRTUAL NETWORK” BASICS (continued)

- All "virtual machine" programs provide you with "virtual networks” (continued):
  - The "virtual networks" allow you to test networking capabilities of operating systems and application software, without actually having to purchase and install piles of network equipment.

VIEW OF A VIRTUAL NETWORK FROM A VIRTUAL MACHINE

- When you create a “virtual machine” and install an operating system into it, the operating system in the "virtual machine" will treat its “virtual network adapter” and the entire “virtual network” as if these items were real hardware components of a real physical network hardware.

GENERIC DESCRIPTION OF THE "VIRTUAL NETWORKS" CREATED BY MOST "VIRTUAL MACHINE PROGRAMS"

- When you install a "virtual machine program" into your real "host" computer, the "virtual machine program" will create the following "virtual networks":

GENERIC DESCRIPTION OF "VIRTUAL NETWORKS"...(CONTINUED)

- A virtual "router" network with "Dynamic Host Configuration Protocol"("DHCP") service, "Network Address Translation"("NAT"), and wired LAN switching for virtual machines. (These are standard functions that you will find in any off-the-shelf router that you buy.)

GENERIC DESCRIPTION OF "VIRTUAL NETWORKS"...(CONTINUED)

- A virtual "shared folders" hidden network that allows the host computer to share files with any virtual machine.
  - This "hidden network" is not shown in most of the network configuration screens of the operating system of the virtual machine
  - This "hidden network is not shown in the operating system of the host computer
  - This "hidden network" is an add-on software program that has to installed into the operating system of a virtual machine. This add-on software program is provided by your "virtual machine program".

GENERIC DESCRIPTION OF "VIRTUAL NETWORKS"...(CONTINUED)

- A virtual "bridged network" that provides a virtual network bridge between virtual machines and the real (upstream) network adapter in the host computer
  - A virtual machine that is connected to the virtual "bridged" network will act like it is directly attached to the real physical LAN that the host computer is attached to. It will depend on the real physical router on your LAN for DHCP and NAT services.

GENERIC DESCRIPTION OF "VIRTUAL NETWORKS"...(CONTINUED)

- A virtual "host-only" or "internal" router network which interconnects the host computer and all virtual machines with a virtual LAN switch. This "host-only" or "internal" router network does not provide Internet access to virtual machines.

"VIRTUAL NETWORKS" PROVIDED BY "VMWARE WORKSTATION PLAYER"

- For information on the "virtual networks" that are provided by "VMware Workstation Player", see

  http://aztcs.apcug.org/meeting_notes/winhardsig/virtualmachines/vmware/Virtual_Networks_in_VMware--Windows.pdf

“VIRTUAL NETWORKS” PROVIDED BY “ORACLE VM VIRTUALBOX”

- For information on the “virtual networks” that are provided by “Oracle VM VirtualBox”, see

  http://aztcs.apcug.org/meeting_notes/winhardsig/virtualmachines/virtualbox/Virtual_Networks_in_VirtualBox--Windows.pdf

MAKING A "VIRTUAL MACHINE" ACT LIKE IT IS DIRECTLY CONNECTED TO YOUR REAL "LOCAL AREA NETWORK" ("LAN")

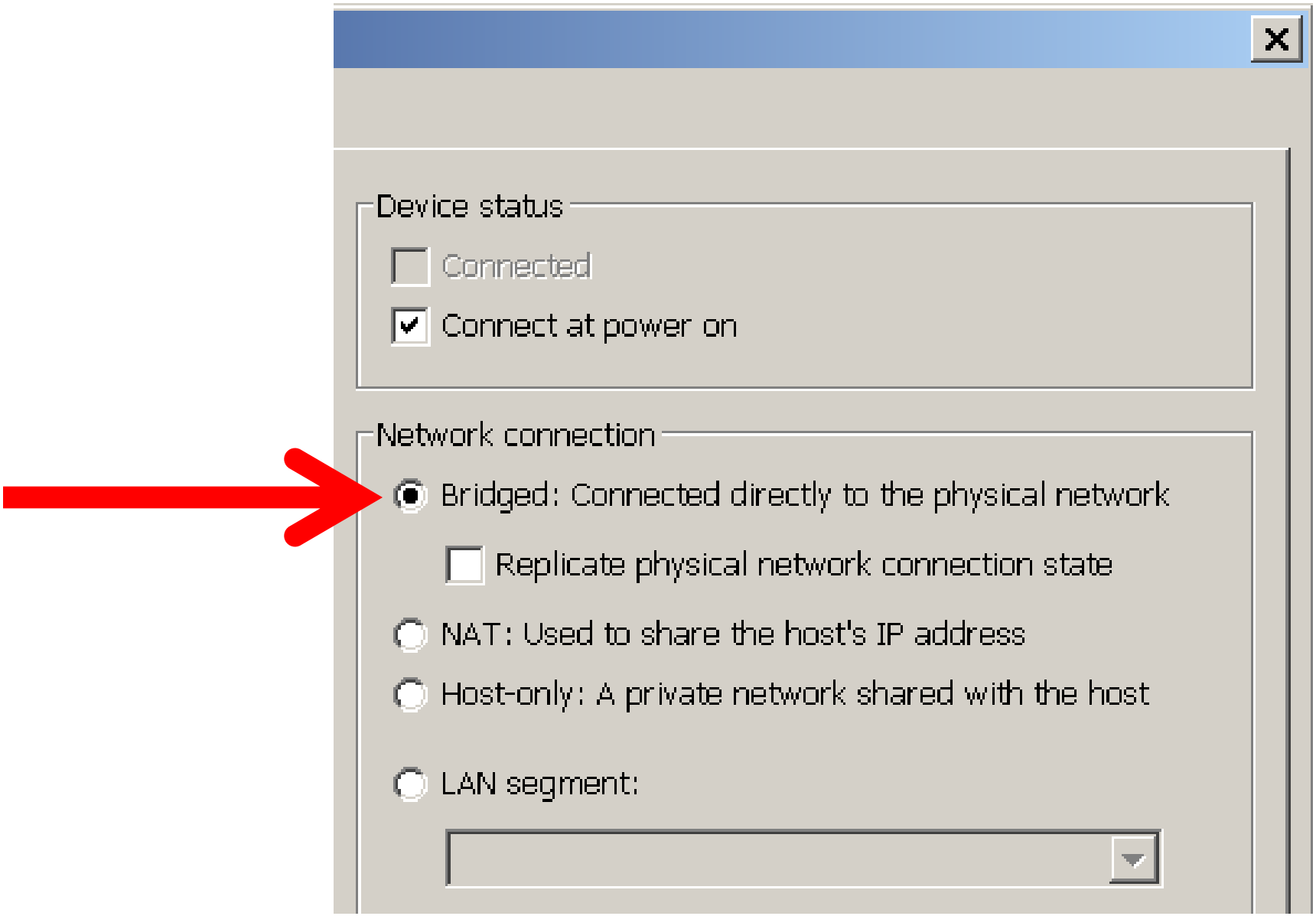
- All "virtual machine programs" provide you with a "virtual network" that allows you to connect a "virtual machine" directly to your real "local area network"("LAN").
- In most "virtual machine programs", this "virtual machine" is called "Bridged.."

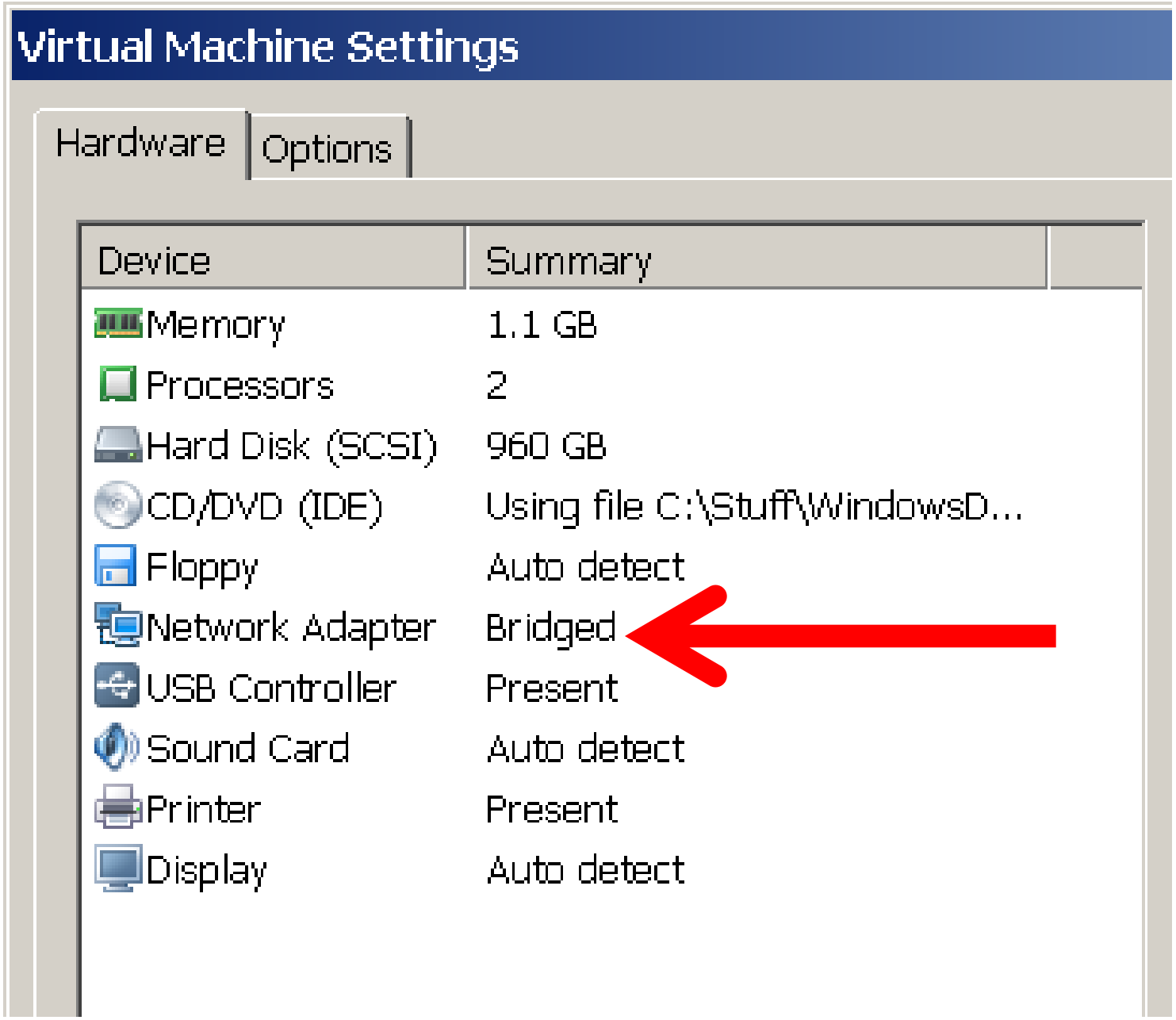
MAKING A “VIRTUAL MACHINE” ACT LIKE IT IS DIRECTLY CONNECTED TO YOUR REAL “LOCAL AREA NETWORK” (“LAN”) (continued)

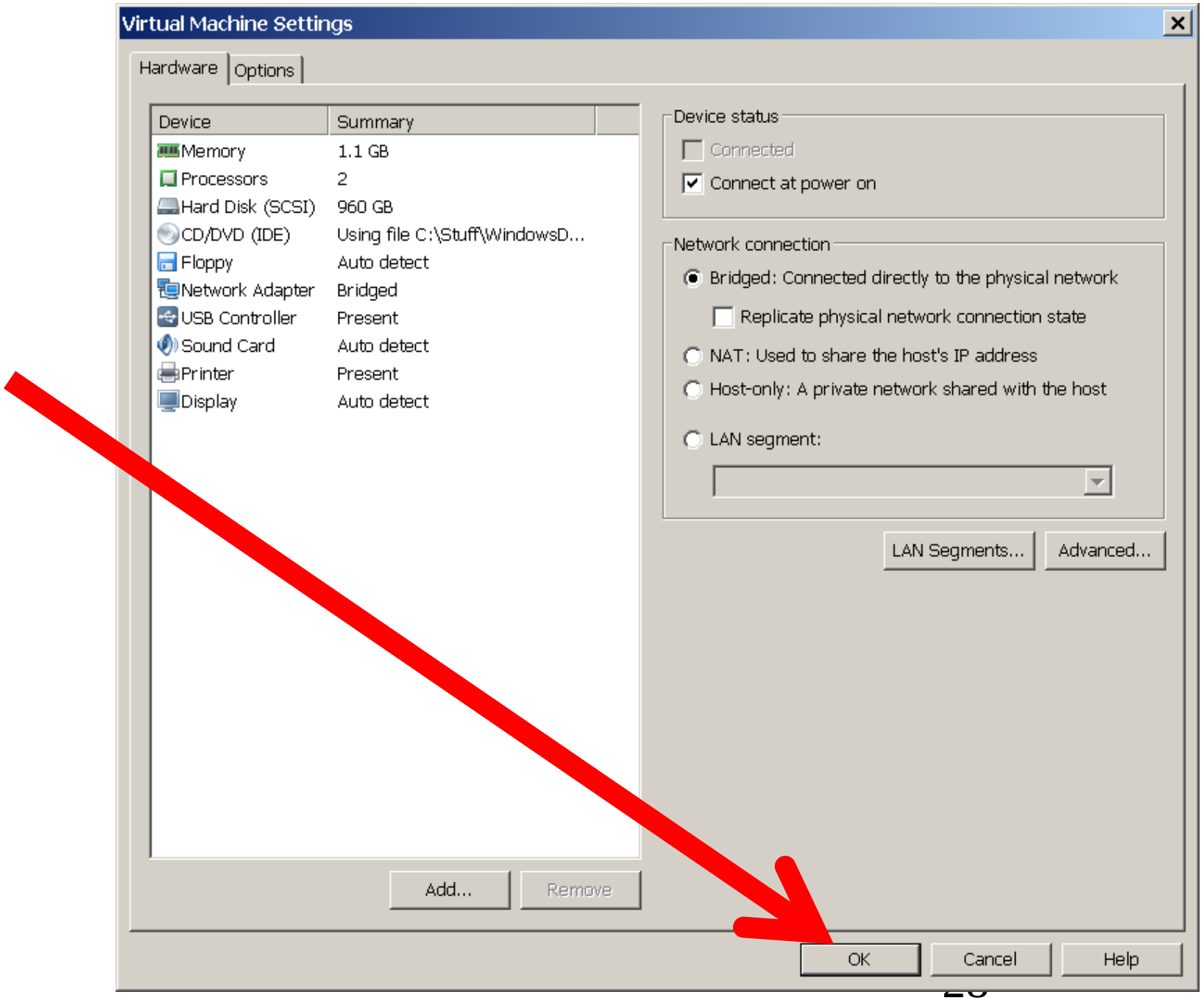
- A “bridged” “virtual network” lets you share files and printers between your real computers and your virtual machines

MAKING A "VIRTUAL MACHINE" ACT LIKE IT IS DIRECTLY CONNECTED TO YOUR REAL "LOCAL AREA NETWORK" ("LAN") (continued)

- For example, in "Vmware Workstation Player", you attach a virtual machine to the "bridged" "virtual network" by means of a "radio option" form:


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
LAN segment:


Virtual Machine Settings
Hardware
Options
Device
Summary
Memory
1.1 GB
Processors
2
Hard Disk (SCSI)
960 GB
CD/DVD (IDE)
Using file C:\Stuff\WindowsD...
Floppy
Auto detect
Network Adapter
Bridged
USB Controller
Present
Sound Card
Auto detect
Printer
Present
Display
Auto detect


Virtual Machine Settings
Hardware
Options
Device
Summary
Memory
1.1 GB
Processors
2
Hard Disk (SCSI)
960 GB
CD/DVD (IDE)
Using file C:\Stuff\WindowsD...
Floppy
Auto detect
Network Adapter
Bridged
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
LAN segment:
LAN Segments...
Advanced...
OK
Cancel
Help

APPENDIX 1
"ADD-ON" SOFTWARE FOR VIRTUAL MACHINES

- "ADD-ON" SOFTWARE TO INSTALL INTO EACH VIRTUAL MACHINE:

  AFTER YOU CREATE A VIRTUAL MACHINE, YOU SHOULD START THE VIRTUAL MACHINE AND INSTALL "ADD-ON" SOFTWARE THAT IS PROVIDED BY THE MAKER OF THE "VIRTUAL MACHINE PROGRAM.

APPENDIX 1(continued)
"ADD-ON" SOFTWARE FOR VIRTUAL MACHINES

- Add on "VMware Tools" into each"VMware Workstation Player" virtual machine to enable enhanced functions such as the "Shared Folders" virtual network. See

  http://www.vmware.com/download/packages.html

  and

  http://www.hackernotcracker.com/2007-02/obtaining-vmware-tools-for-vmware-player-through-extraction.html