By:Amir Mokhtari

Network Laboratory

Introduce to Some Network Statements

- Workgroup & Domain Networks
- Point to Point & Client Server
- Group Policy
- IP
- Subnet Mask
- Gateway
- Ping

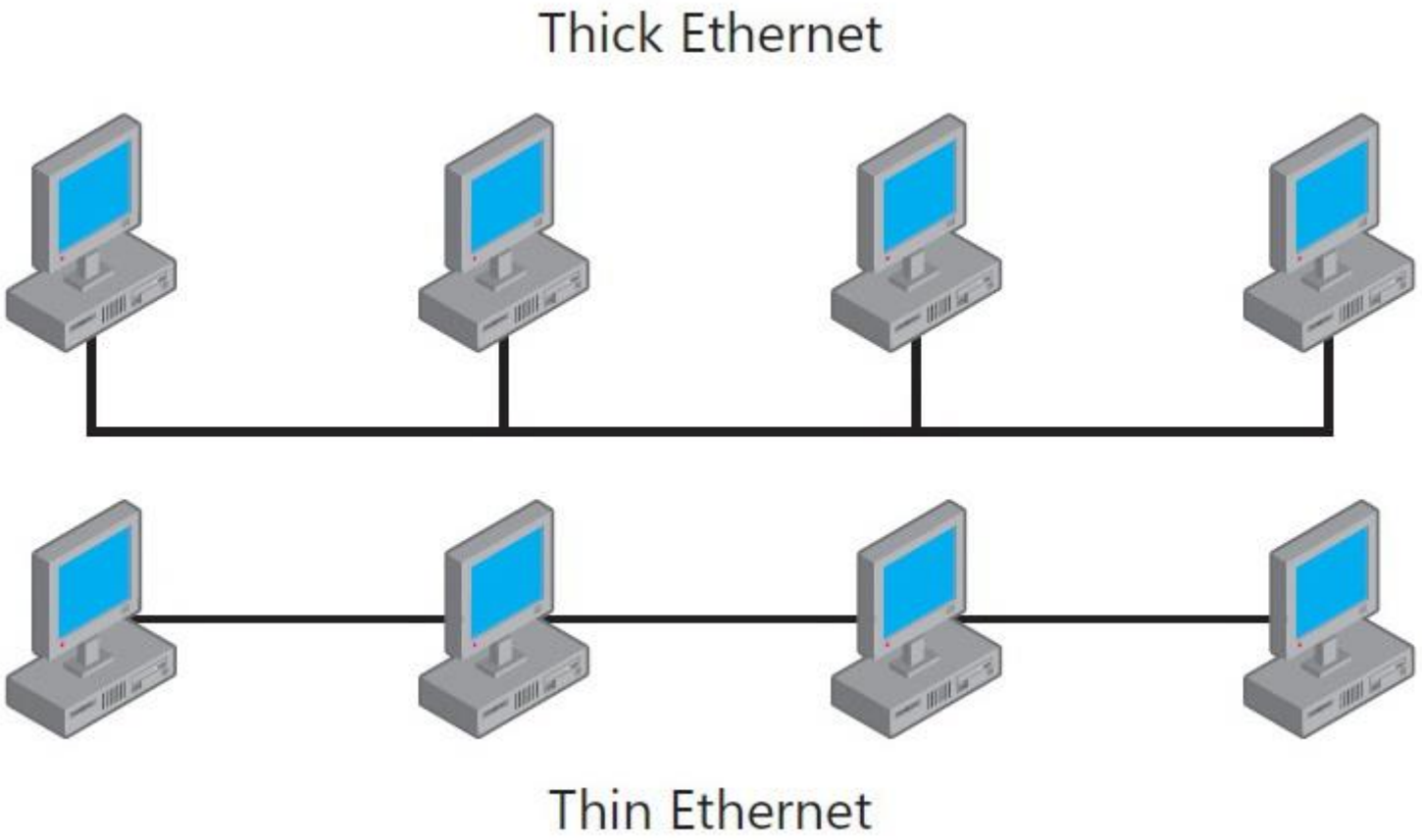
Introduce to Some Network Statements

- Hub
- Switch
- Router
- Repeater

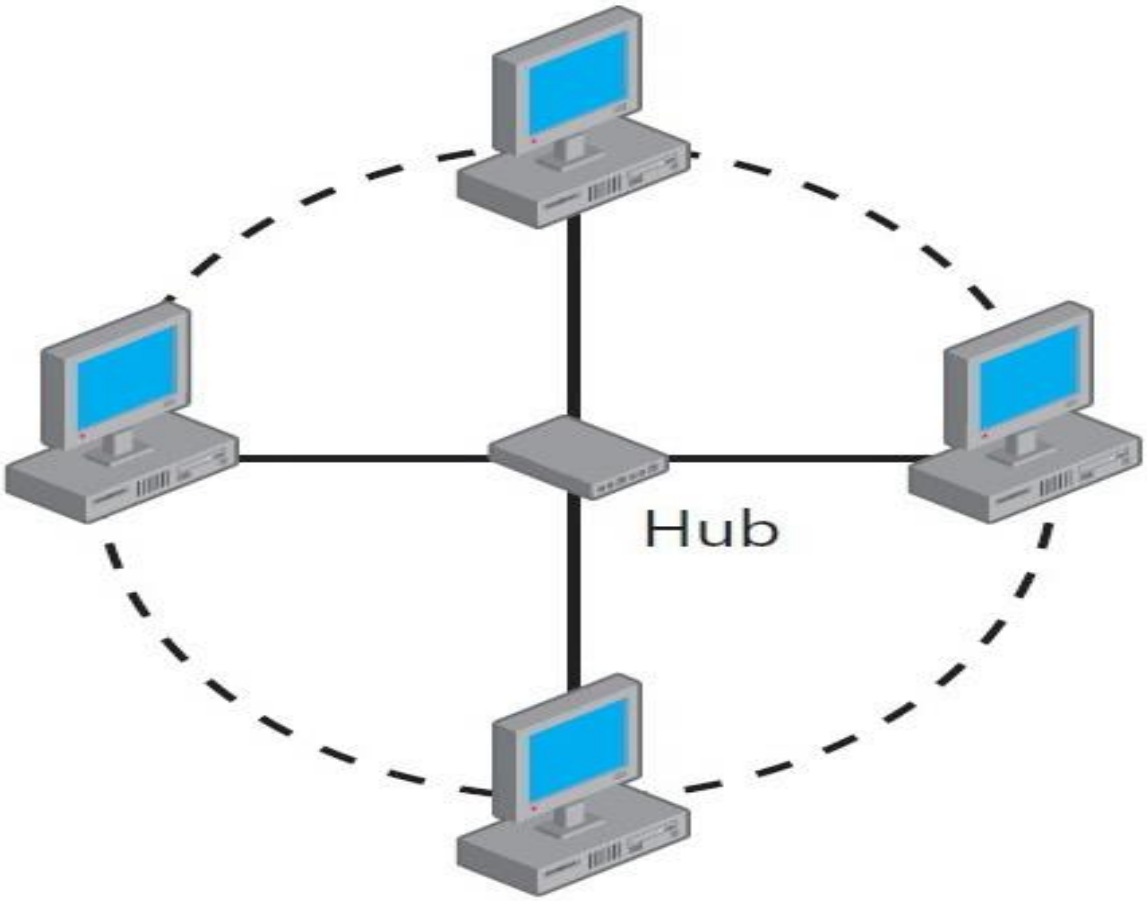
Cable Topologies

- Bus
- Ring
- Star
- Mesh

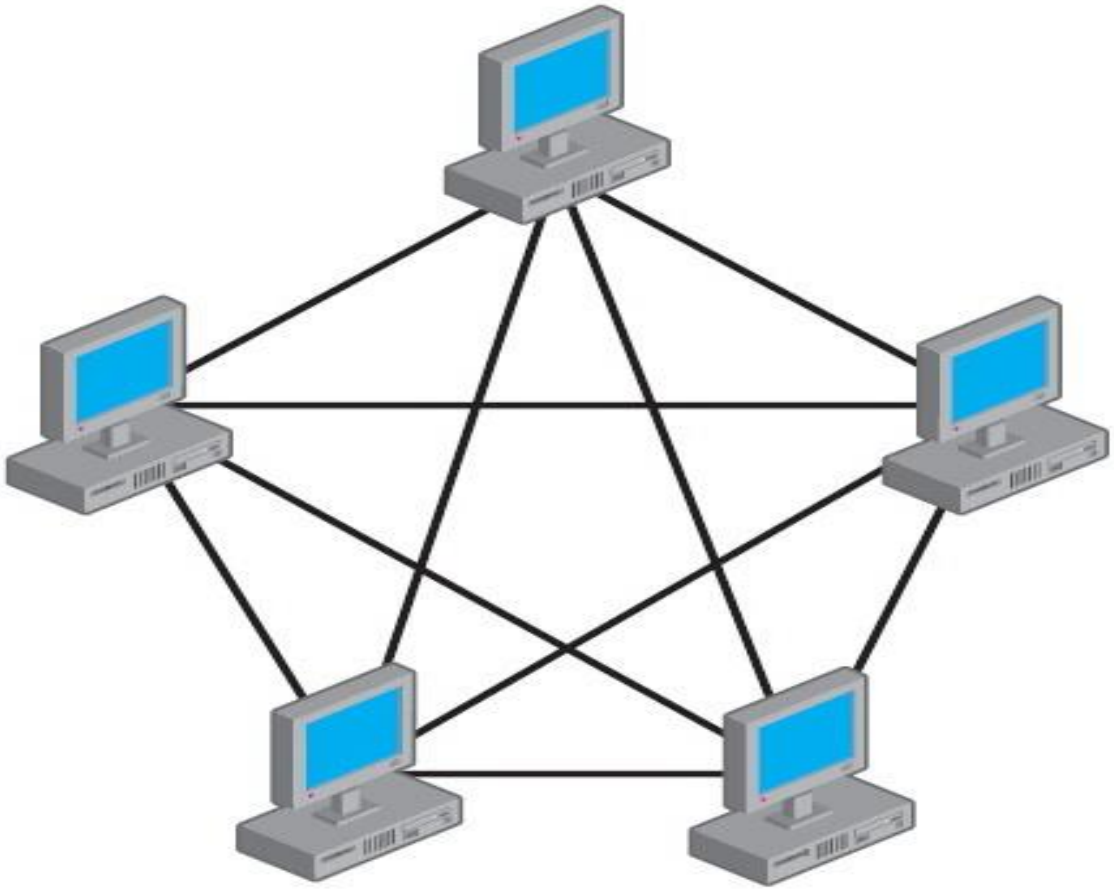
Bus Topology



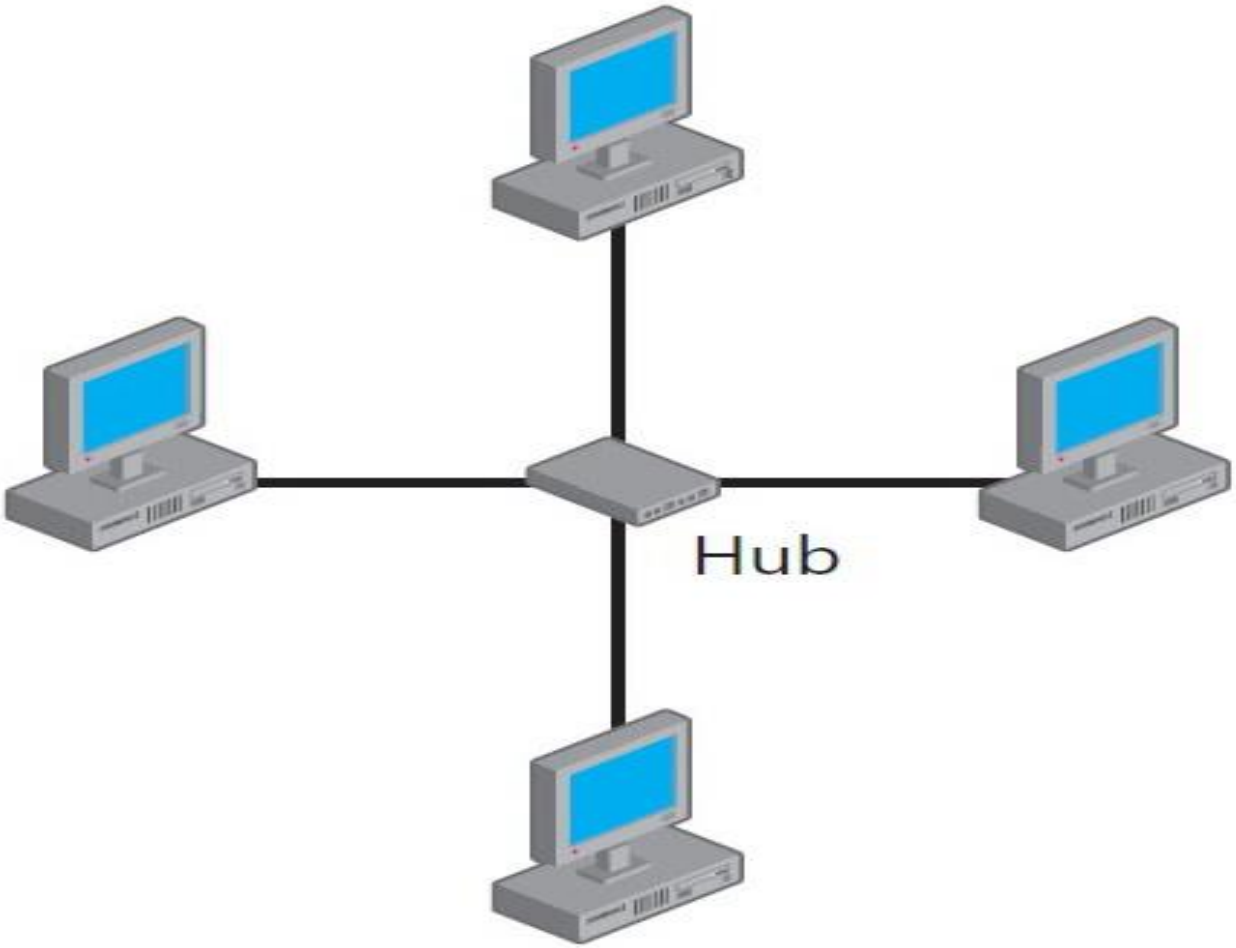
Ring Topologies



Mesh Topologies



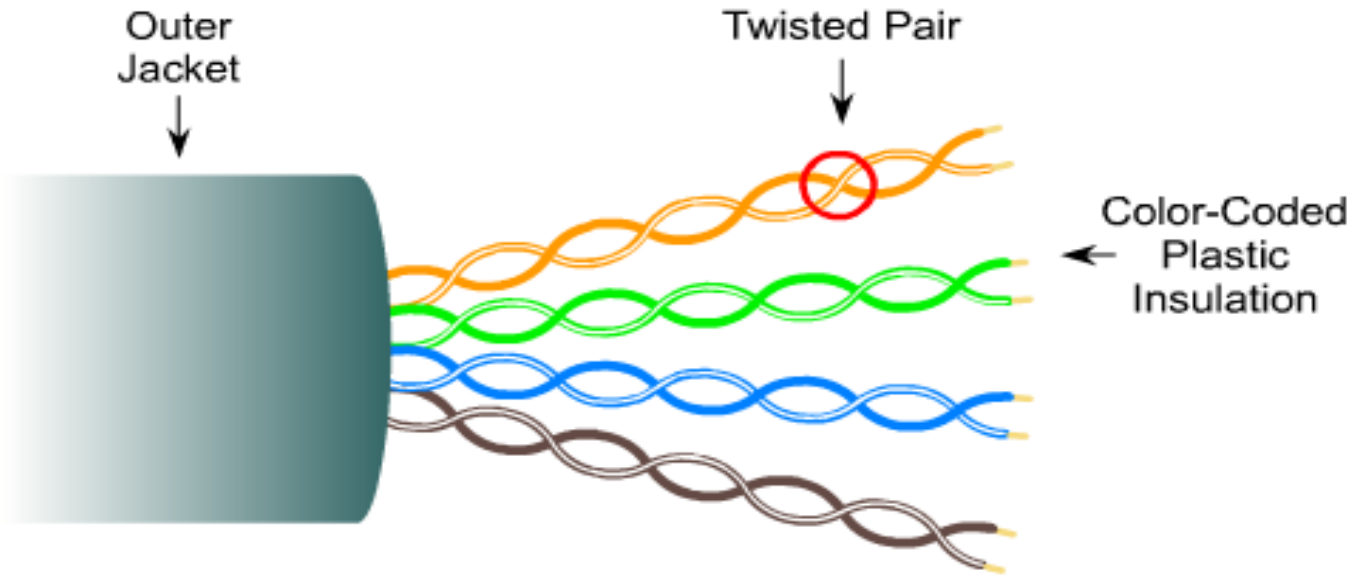
Star Topologies



Cable Types

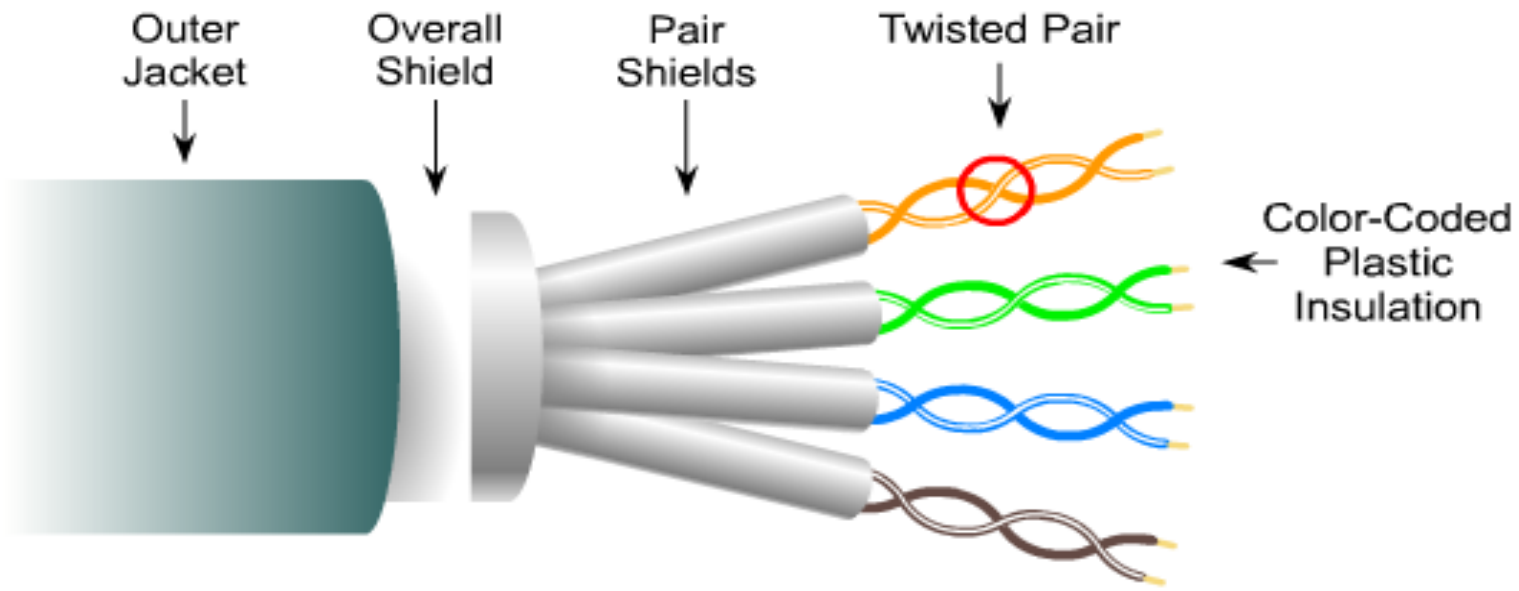
- Twisted Pair:
  - UTP (Unshielded Twisted Pair)
  - STP (Shielded Twisted Pair)
- Coaxial
- Fiber Optic

UTP Cable



- Speed and throughput: 10 - 100 - 1000 Mbps (depending on the quality/category of cable)
- Average $ per node: Least Expensive
- Media and connector size: Small
- Maximum cable length: 100m

STP Cable

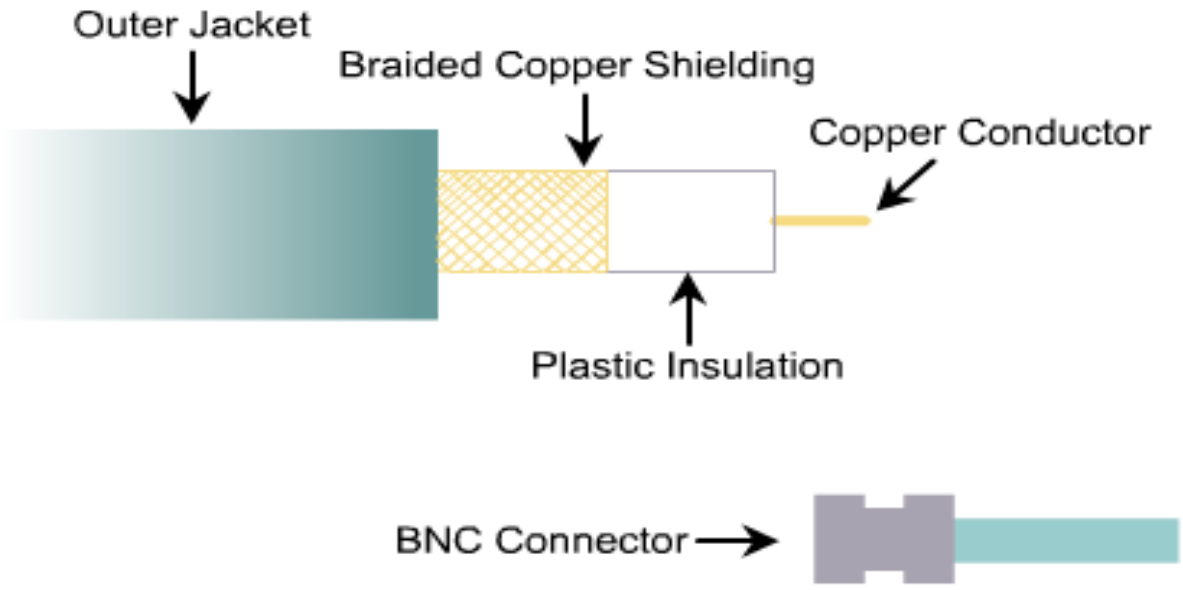


- Speed and throughput: 10 - 100 Mbps
- Average $ per node: Moderately Expensive
- Media and connector size: Medium to Large
- Maximum cable length: 100m

Most Common Types of Ethernet

Common Name	Speed	Alternative Name	Name of IEEE Standard	Cable Type, Maximum Length
Ethernet	10 Mbps	10BASE-T	IEEE 802.3	Copper, 100m
Fast Ethernet	100 Mbps	100BASE-TX	IEEE 802.3u	Copper, 100m
Gigabit Ethernet	1000 Mbps	1000BASE-T	IEEE 802.3ab	Copper, 100 m
Gigabit Ethernet	1000 Mbps	1000BASE-LX, 1000BASE-SX	IEEE 802.3z	Fiber, 550m(SX) 5km (LX)

Coaxial Cable



- Speed and throughput: 10 - 100 Mbps
- Average $ per node: Inexpensive
- Media and connector size: Medium
- Maximum cable length: 500m

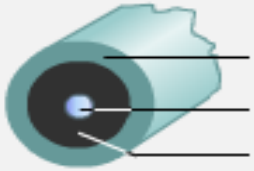
Coaxial Cable (Original Ethernet Standards)

Name	Cable	MAX	Nodes
10Base5	Thick Coax	500m	100
10Base2	Thin Coax	185m	30

Fiber Optic Cable

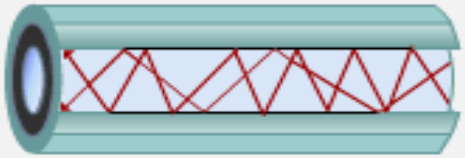
Single-mode

Requires very straight path

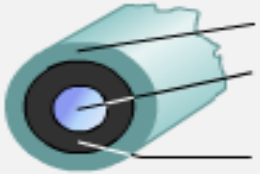


- Small core
- Less dispersion
- Suited for long distance applications (up to ~3km, 9,840 ft)
- Uses lasers as the light source often within campus backbones for distances of several thousand meters

Multimode



Multiple paths-sloppy



- Larger core than single-mode cable (50 or 62.5 microns or greater)
- Allows greater dipersion and therefore, loss of signal
- Used for long distance application, but shorter than single-mode (up to ~2km, 6,560 ft)
- Uses LEDs as the light source often within LANs or distances of a couple hundred meters within a campus network

Ethernet UTP Cabling

(Unshielded Twisted Pair)

- Straight Through
- Cross Over
- Roll Over

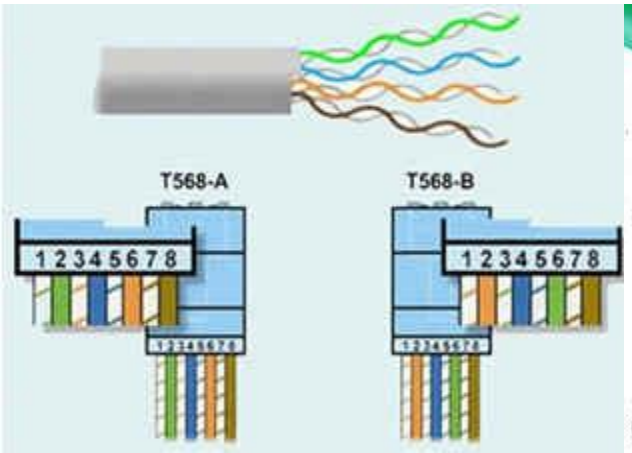
UTP Cabling Standards

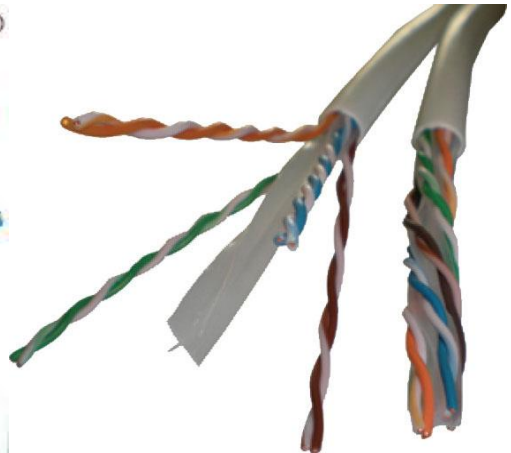
- TIA/EIA 568A :
- TIA/EIA568B:

(Telecommunicational Industry Association /Electronic Industries Alliance)

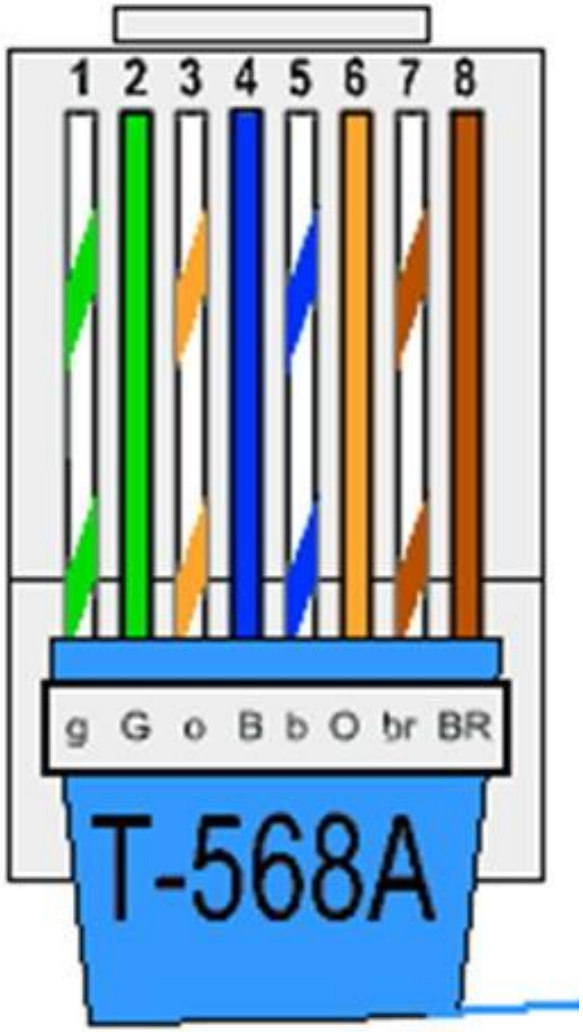
UTP Cabling Standard Colors

- Green/White Green
- Orange/White Orange
- Blue/White Blue
- Brown/White Brown

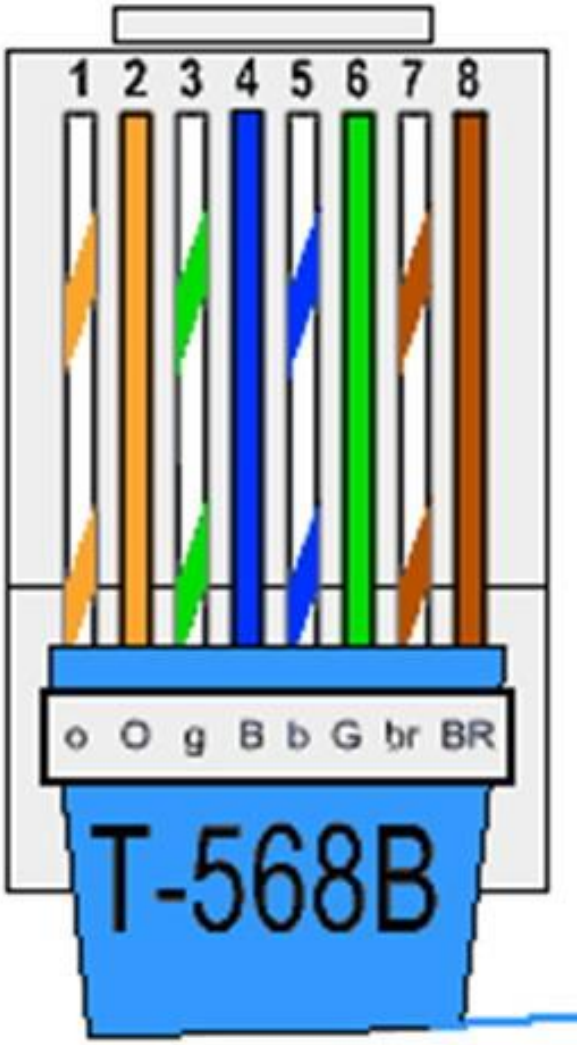




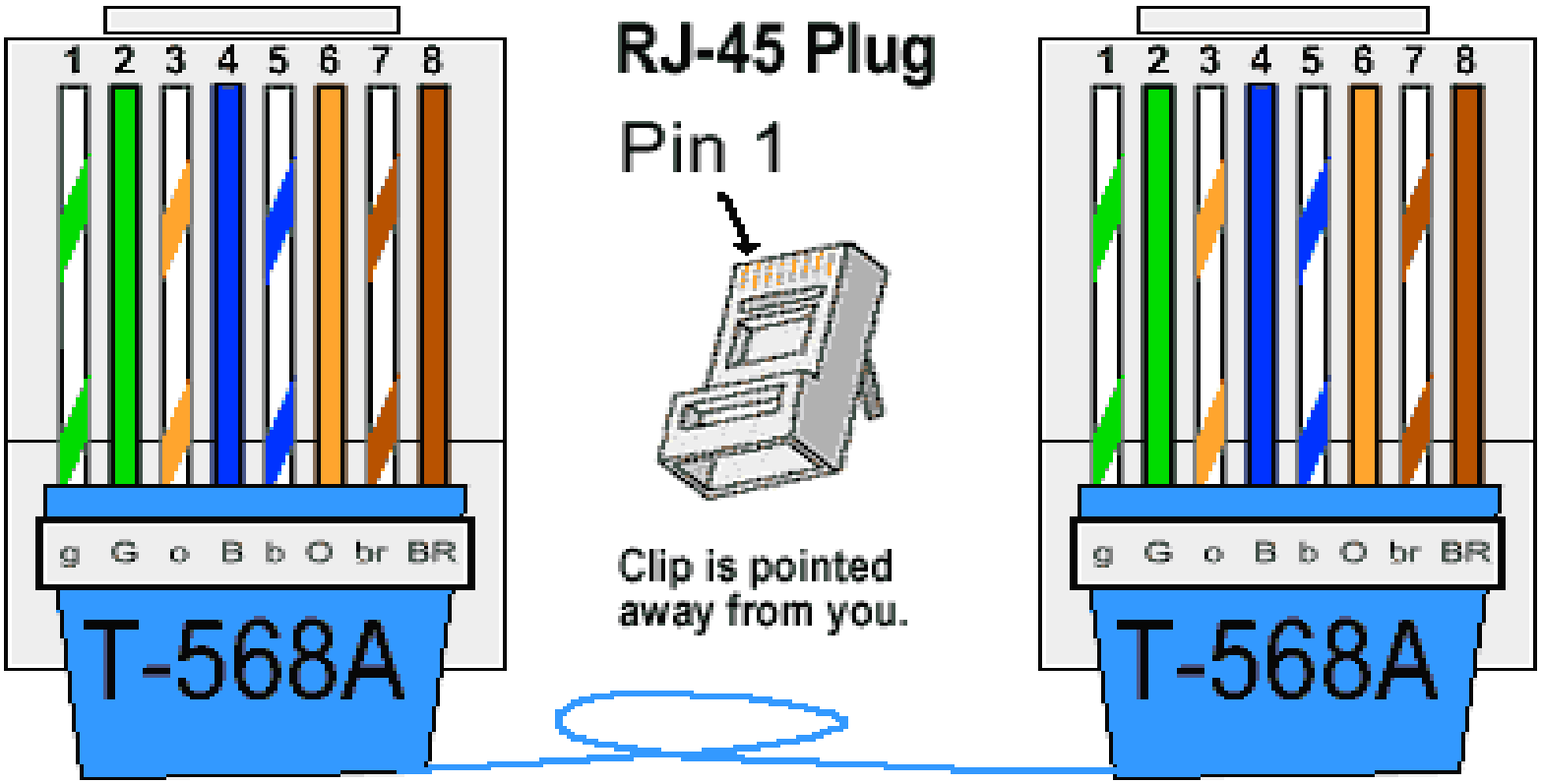
TIA/EIA 568A



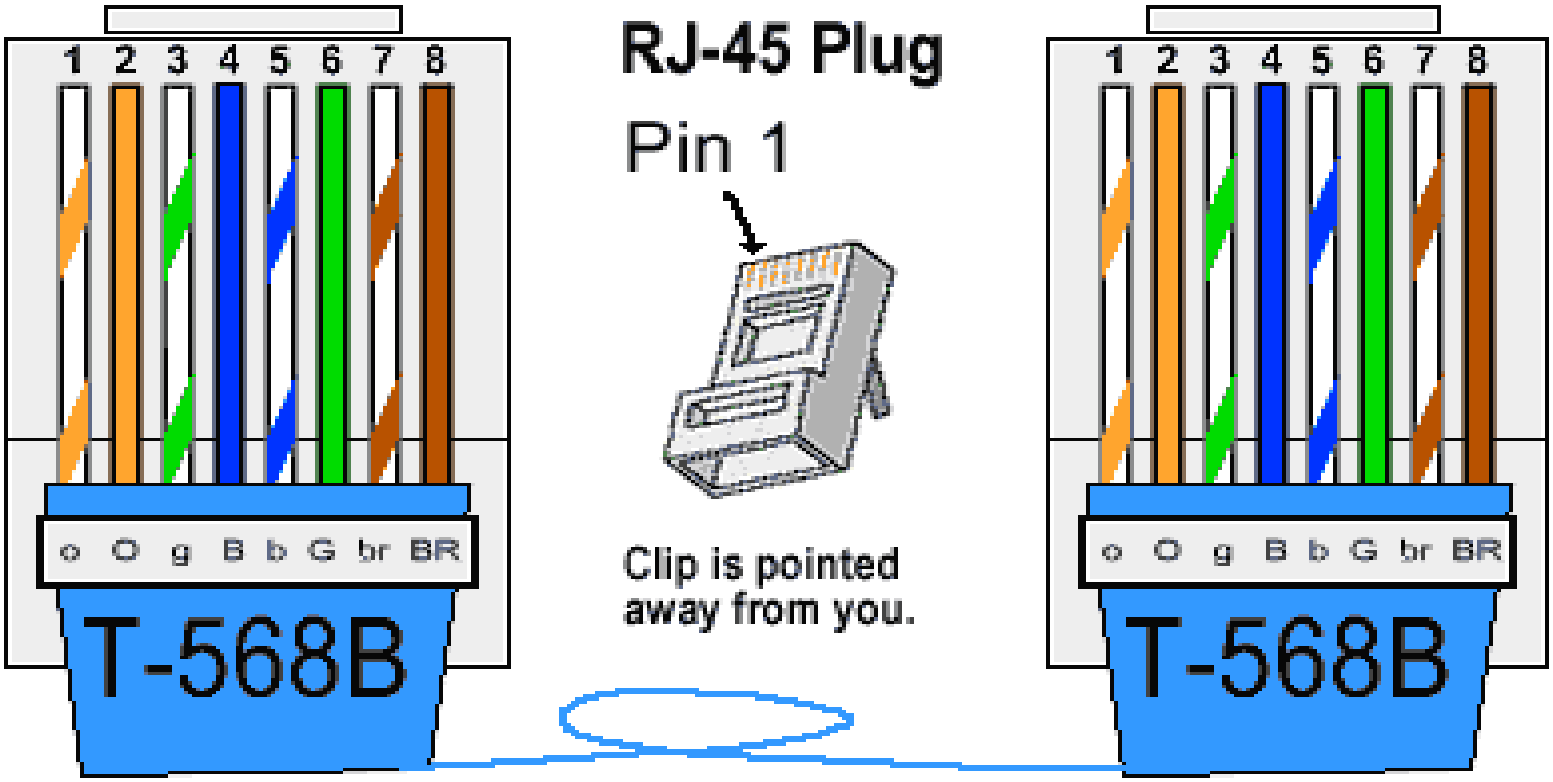
TIA/EIA 568B



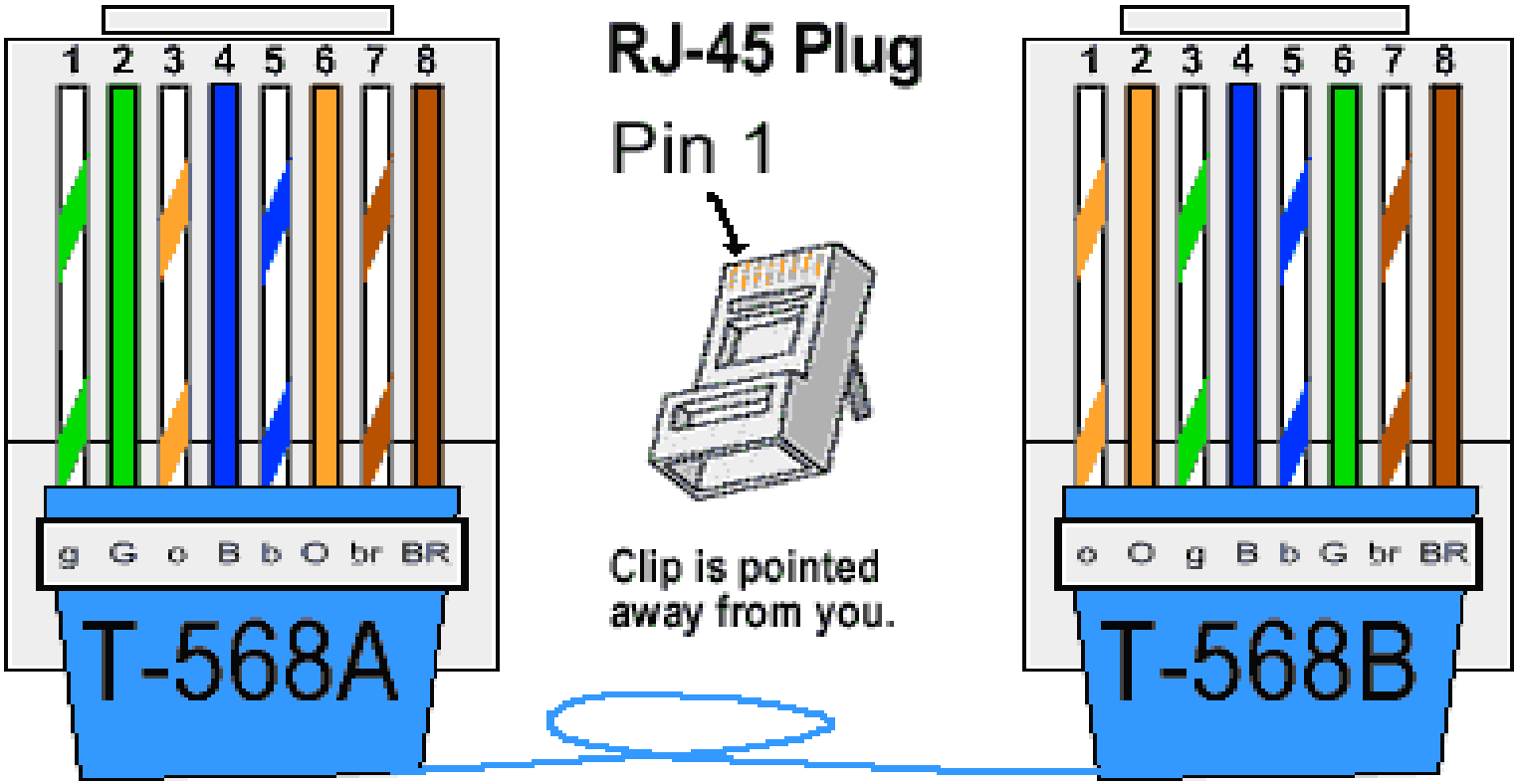
Straight Through (1)



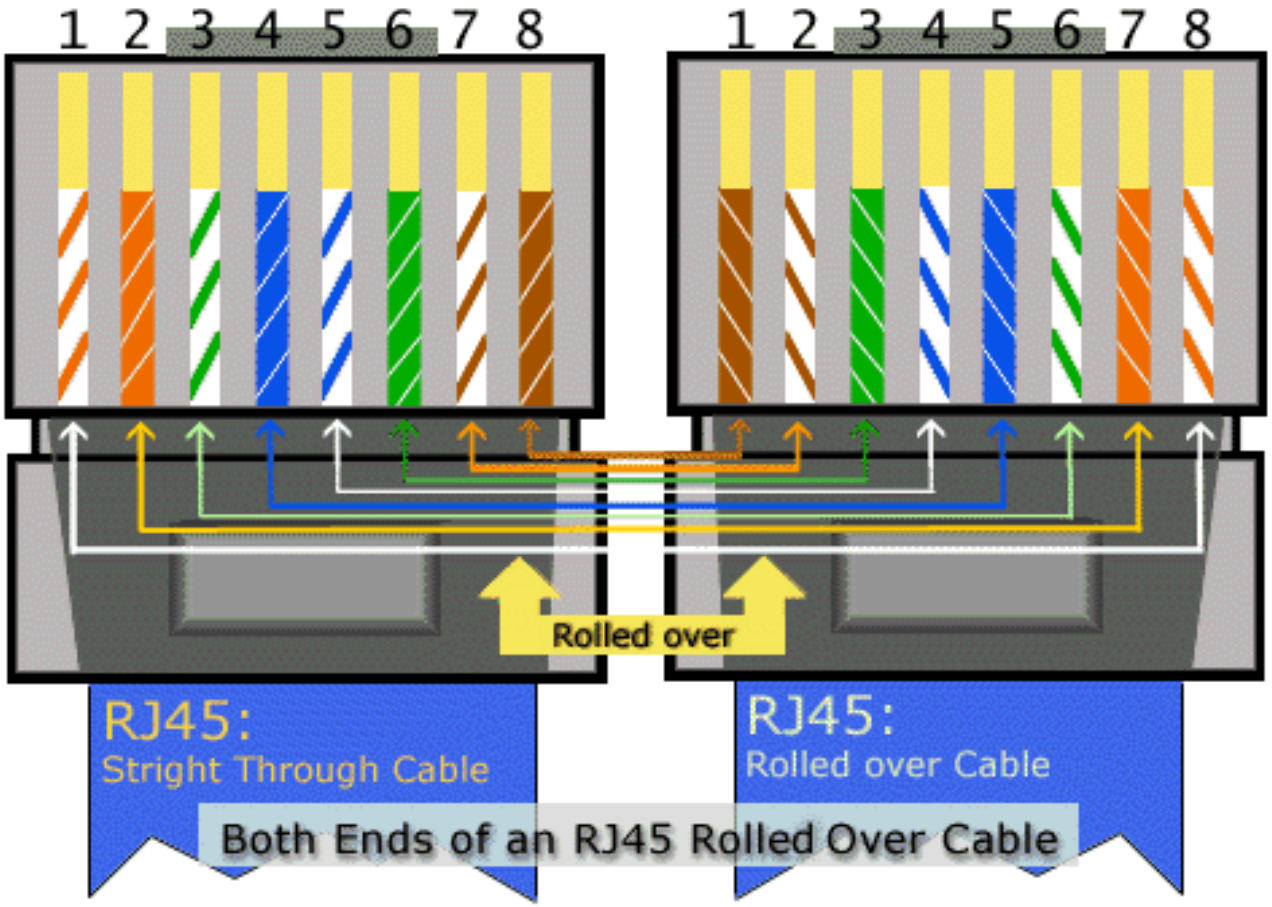
Straight Through (2)



Cross Over


1 2 3 4 5 6 7 8
g G o B b O br BR
T-568A
RJ-45 Plug
Pin 1
Clip is pointed away from you.
1 2 3 4 5 6 7 8
o O g B b G br BR
T-568B

Roll Over


1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8
Rolled over
RJ45:
Stright Through Cable
RJ45:
Rolled over Cable
Both Ends of an RJ45 Rolled Over Cable

Roll Over

Device Connections

- PC to PC: C
- Switch to Switch: C
- Router to Router: C
- PC to Switch: S
- Switch to Router: S
- PC to Router: C

Device Connections

Devices That Transmit on 1,2 and Receive on 3,6	Devices That Transmit on 3,6 and Receive on 1,2
PC	Hub
Router	Switch

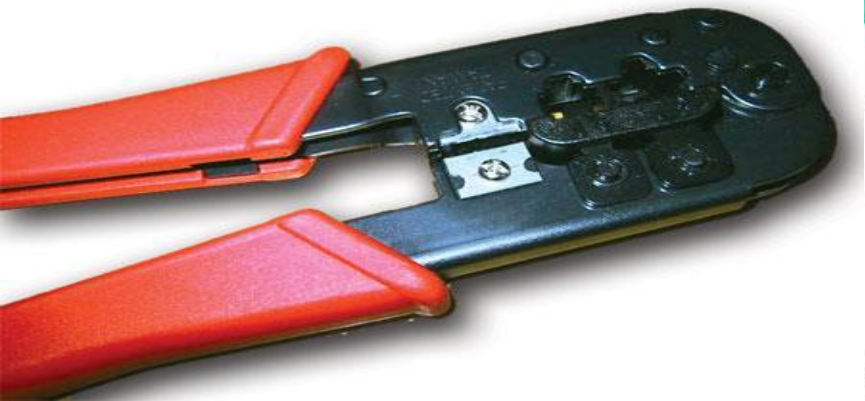
Cross

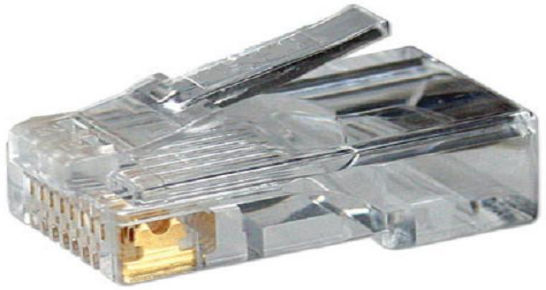
Straight

RJ45 Socket

Required Devices for Cabling

- RJ45 Socket Pliers
- RJ45 Socket
- UTP Cable





Network Simulators & Emulators

- VM Ware
- Packet Tracer
- GNS3

VM Ware

- Install VM Ware:
- Installing Operation System in VM Ware:
  - Insert WIN Disk / File Menu / New / Virtual Machine / Typical / Installer Disk? / Product Key? & Password? (Optional) / Machine Name? & Destination Address to Save? / Disk Capacity? / Finish . .

VM Ware

- Secondary Settings After Install Operating System:
  - Right Click on Machine Tab / Settings / Hardware Tab

Changing SID

- What is SID?
- Why we need to change SID?
- Change SID Methods:
  - New SID
  - Sysprep (Win7)
    - Run: Sysprep.exe (C:\ Windows\ System32\ Sysprep\ Sysprep.exe) \

Connecting Operating Systems

- Connecting Systems in Real World:
  - Connecting Two Systems by Cross Cable
  - Connecting more than two Systems by Switch and Straight Cable
- Connecting System in VM Ware:
  - Pre configuration in VM Ware as follow:
    - R Click on Virtual Machine Tab & Setting / Network Adapter/ Select One of the “Network Connection” Offers . . .

Requirements for Connecting Two or More Systems together

- 1) Physical Connectivity
- 2) Network Connection Setting (Just for Virtual Machines)
  - R Click on Virtual Machine Tab / Setting / Network Adapter / Select One of the “Network Connection” Offers . . .
- 3) Set IP Address, Subnet Mask, DNS & Default Gateway:

Connectivity Test

- Ping
  - Go to Command Prompt (CMD) / Type "*Ping* Destination IP Address"
  - Note:
    - Firewall Off

File & Folder Sharing

- File and Folder Sharing Methods:
  - Simple Sharing
  - Advance Sharing

File & Folder Sharing

- How we can share file and folder:
  - R Click on a Folder & Select Properties / Sharing Tab / √ Share This Folder & OK

Permission

- R Click on Shared Folder & Properties / Sharing Tab / Determine Groups and Determine Permission for that Group

Viewpoints for File and Folder Sharing

- 1) Set Password for all users
- 2) Set Firewall: Off Temporarily
- 3) Set Anti Virus Firewall: Off Temporarily
- 4) Run “Network Setup Wizard” (XP)
- 5) Enable All Sharing Alternatives in “Advanced Sharing Setting” Part

Some More Viewpoints

- After running “Network Setup Wizard” firewall will change to On
- After Password configuration, Reset system or Logon again
- Be careful about Connected Tick (√) in Virtual Machine:
  - R Click on Virtual Machine Tab / Setting / Network Adapter / Device Status / “Connected”
-

Access to Shared Files and Folders

- Run / Type “*Destination IP address*” & OK
- or
- Go to “My Network Places” or “Network”

Laboratory

- Create two folders with the name of “Data” and “Security” on two computers and share them as the following permission:
  - PC1 can change the “Data” folder content but cannot change “Security” folder content
  - PC2 cannot change “Data” folder content and don’t have permission for access to “Security” folder

Installing Loopback Adapter

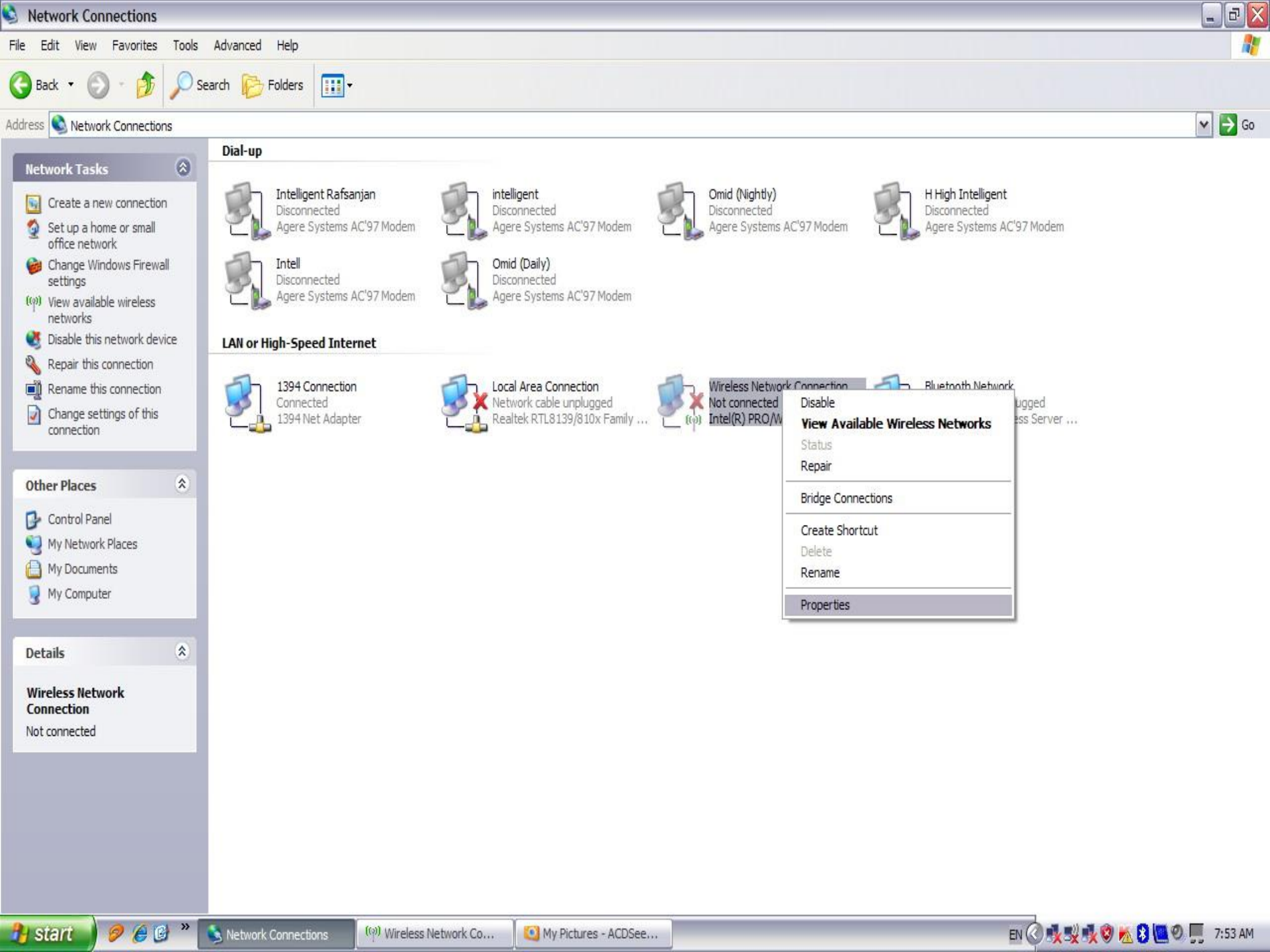
- Control Panel / Add Hardware / Hardware Connected: YES / Select "Add a New Hardware Device" & Next / Select Install Manually & Next / Select Network Adapter & Next / Select Microsoft on the Left and Microsoft Loopback Adapter on the Right & Next / Next / Finish
- Assign IP to Loopback Adapter

Printer Sharing in Windows XP & 7

- Step 1: Control Panel / Open “Printers and Foxes” (Win7: Devices and Printers) / R Click on the Printer & Properties (Win7: Printer Properties) / Sharing Tab / Select “Share this printer” & OK
- Step 2: Go to another PC / Connect to Printer PC / Find Shared Printer (From “My Network place”) / R Click on Shared Printer & Select “Connect” then “Yes”
- Step 3: Test Printer

Ad-hoc in Windows XP

- Step 1: R Click on Wireless Network Connection & Properties / Wireless Network Tab / Advanced / Select “Computer to Computer (ad hoc) Networks Only” & Close / Add / SSID? & Network Authentication: Open & Data Encryption: WEP & Remove √Of “The Key is Provided for me Automatically” & Enter Network Key & OK
- Step 2: Go to “View Available Wireless Networks” / Connect to the Add-hoc
- Step 3: Go to another PC and do Step 2
- Step 4: Use Shared Files and Folders


Network Connections
File Edit View Favorites Tools Advanced Help
Back Search Folders
Address Network Connections
Go
Network Tasks
Create a new connection
Set up a home or small office network
Change Windows Firewall settings
View available wireless networks
Disable this network device
Repair this connection
Rename this connection
Change settings of this connection
Other Places
Control Panel
My Network Places
My Documents
My Computer
Details
Wireless Network Connection
Not connected
Dial-up
Intelligent Rafsanjan
Disconnected
Agere Systems AC'97 Modem
intelligent
Disconnected
Agere Systems AC'97 Modem
Omid (Nightly)
Disconnected
Agere Systems AC'97 Modem
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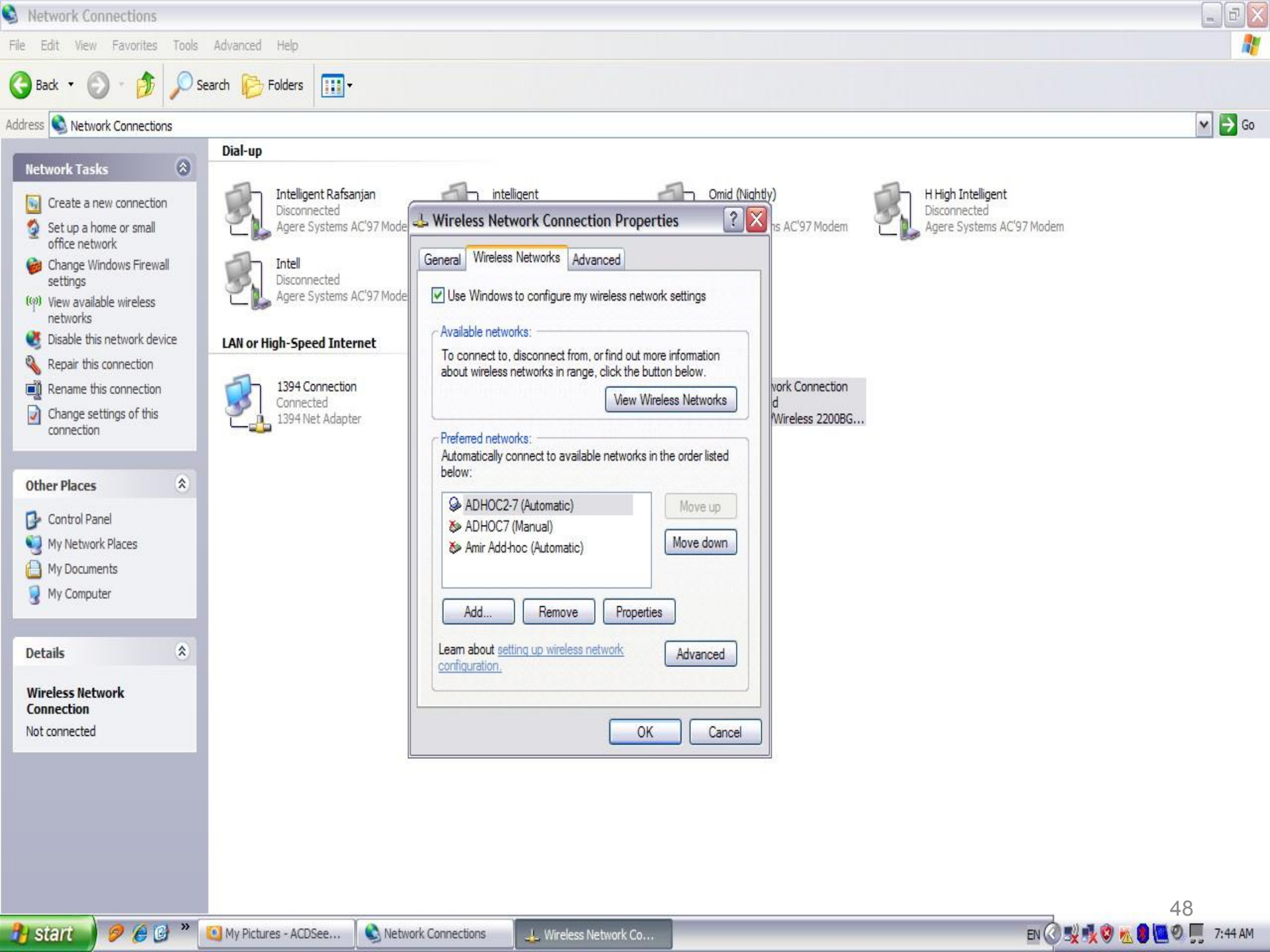
Disconnected
Agere Systems AC'97 Modem
LAN or High-Speed Internet
1394 Connection
Connected
1394 Net Adapter
Local Area Connection
Network cable unplugged
Realtek RTL8139/810x Family ...
Wireless Network Connection
Not connected
Intel(R) PRO/W
Bluetooth Network
Disable
View Available Wireless Networks
Status
Repair
Bridge Connections
Create Shortcut
Delete
Rename
Properties
start
Network Connections
Wireless Network Co...
My Pictures - ACDSee...
EN
7:53 AM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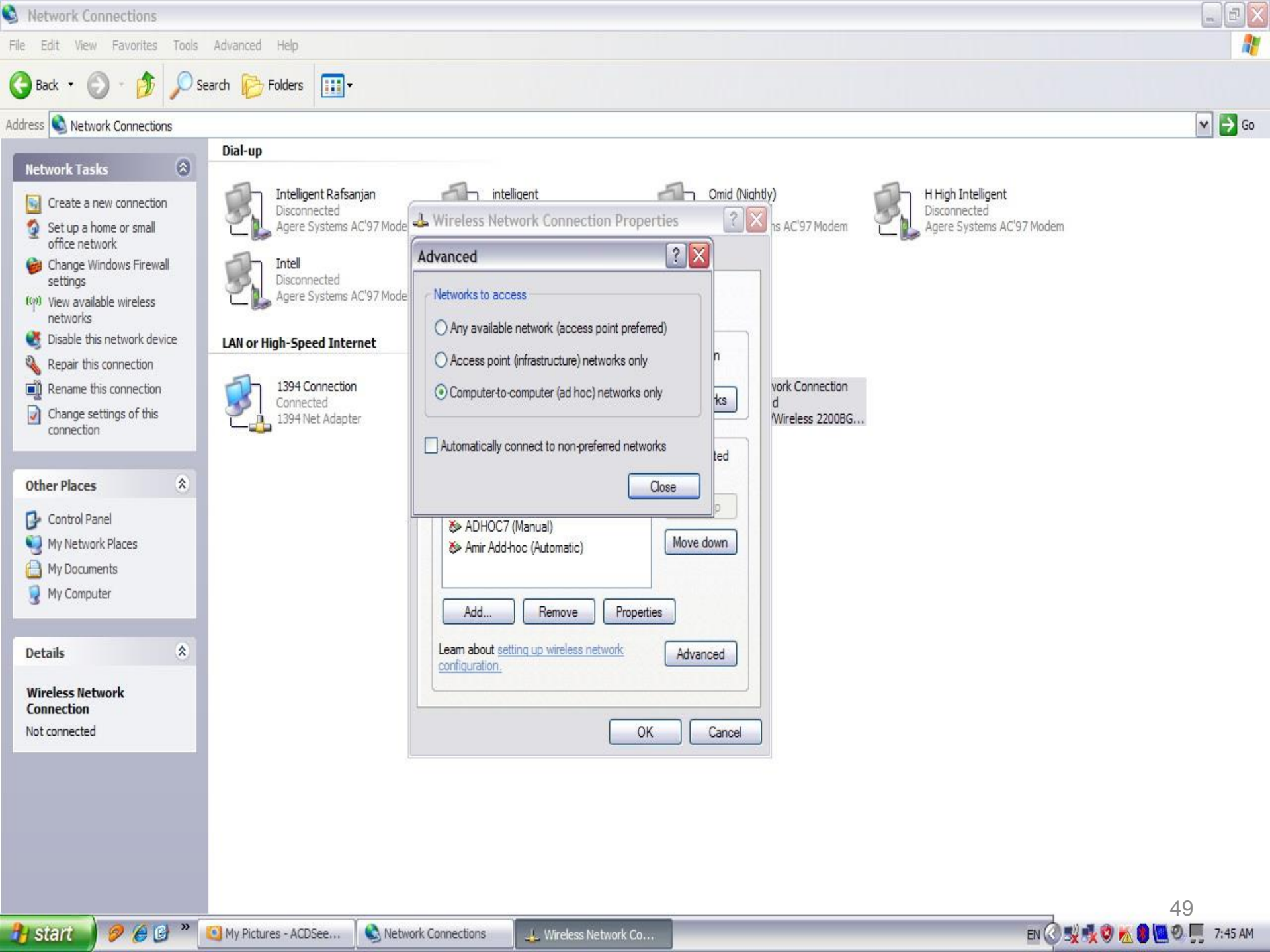
LAN or High-Speed Internet
1394 Connection
Connected
1394 Net Adapter
Wireless Network Connection Properties
General
Wireless Networks
Advanced
Use Windows to configure my wireless network settings
Available networks:
To connect to, disconnect from, or find out more information about wireless networks in range, click the button below.
View Wireless Networks
Preferred networks:
Automatically connect to available networks in the order listed below:
ADHOC2-7 (Automatic)
ADHOC7 (Manual)
Amir Add-hoc (Automatic)
Move up
Move down
Add...
Remove
Properties
Learn about setting up wireless network configuration.
Advanced
OK
Cancel
start
My Pictures - ACDSee...
Network Connections
Wireless Network Co...
EN
7:44 AM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1394 Net Adapter
Wireless Network Connection Properties
Advanced
Networks to access
Any available network (access point preferred)
Access point (infrastructure) networks only
Computer-to-computer (ad hoc) networks only
Automatically connect to non-preferred networks
Close
ADHOC7 (Manual)
Amir Add-hoc (Automatic)
Move down
Add...
Remove
Properties
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Advanced
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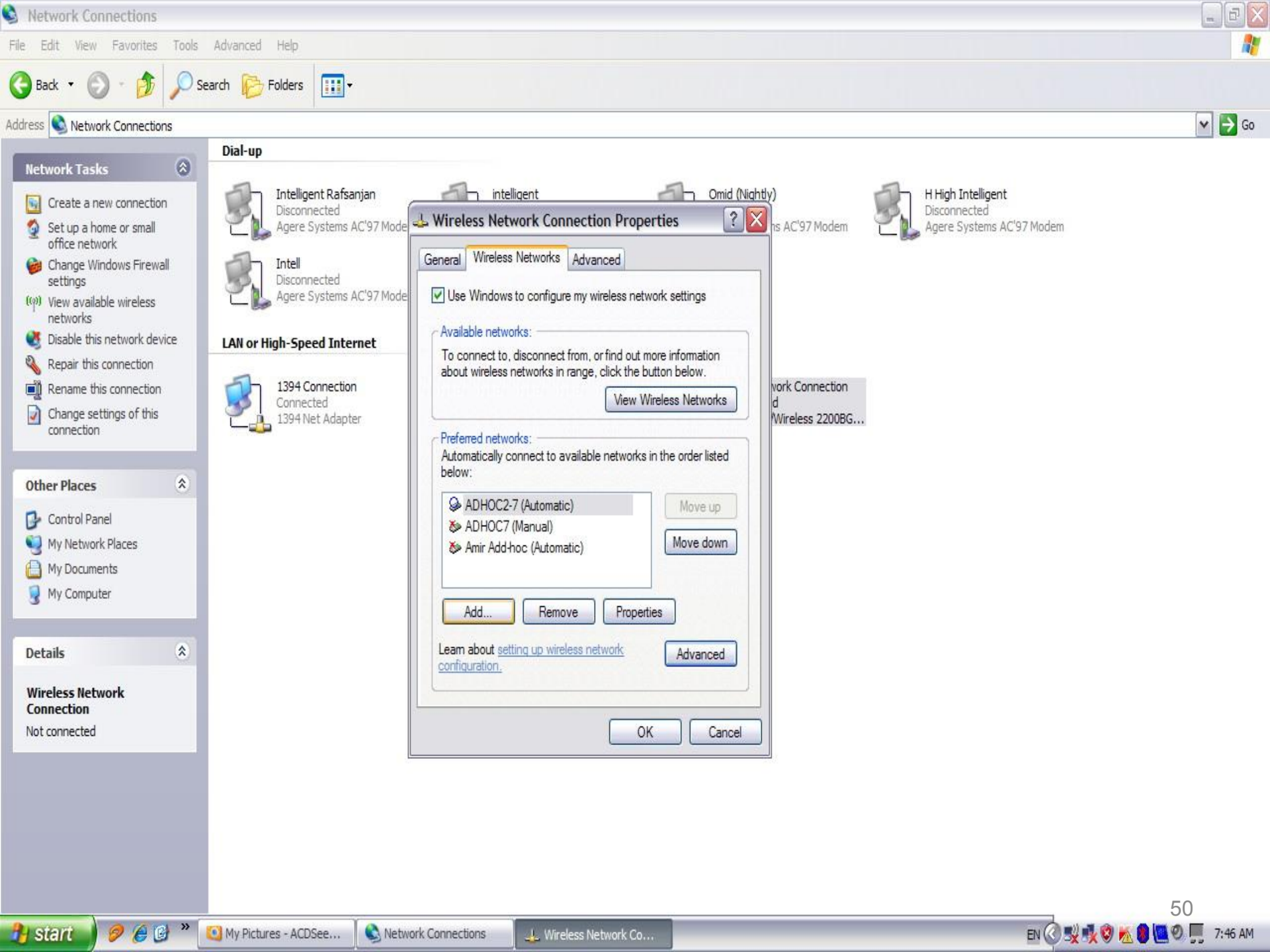
7:45 AM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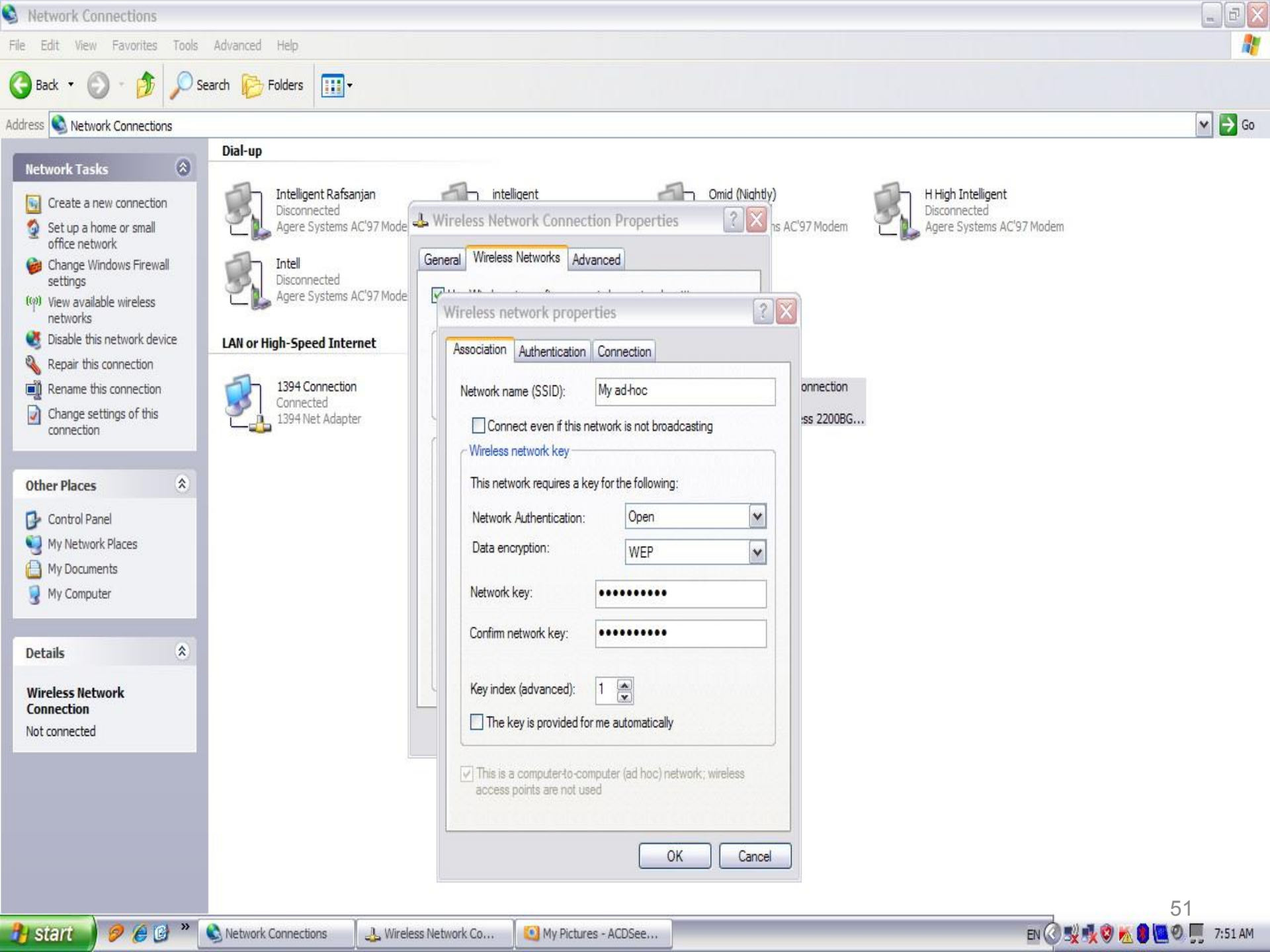
7:46 AM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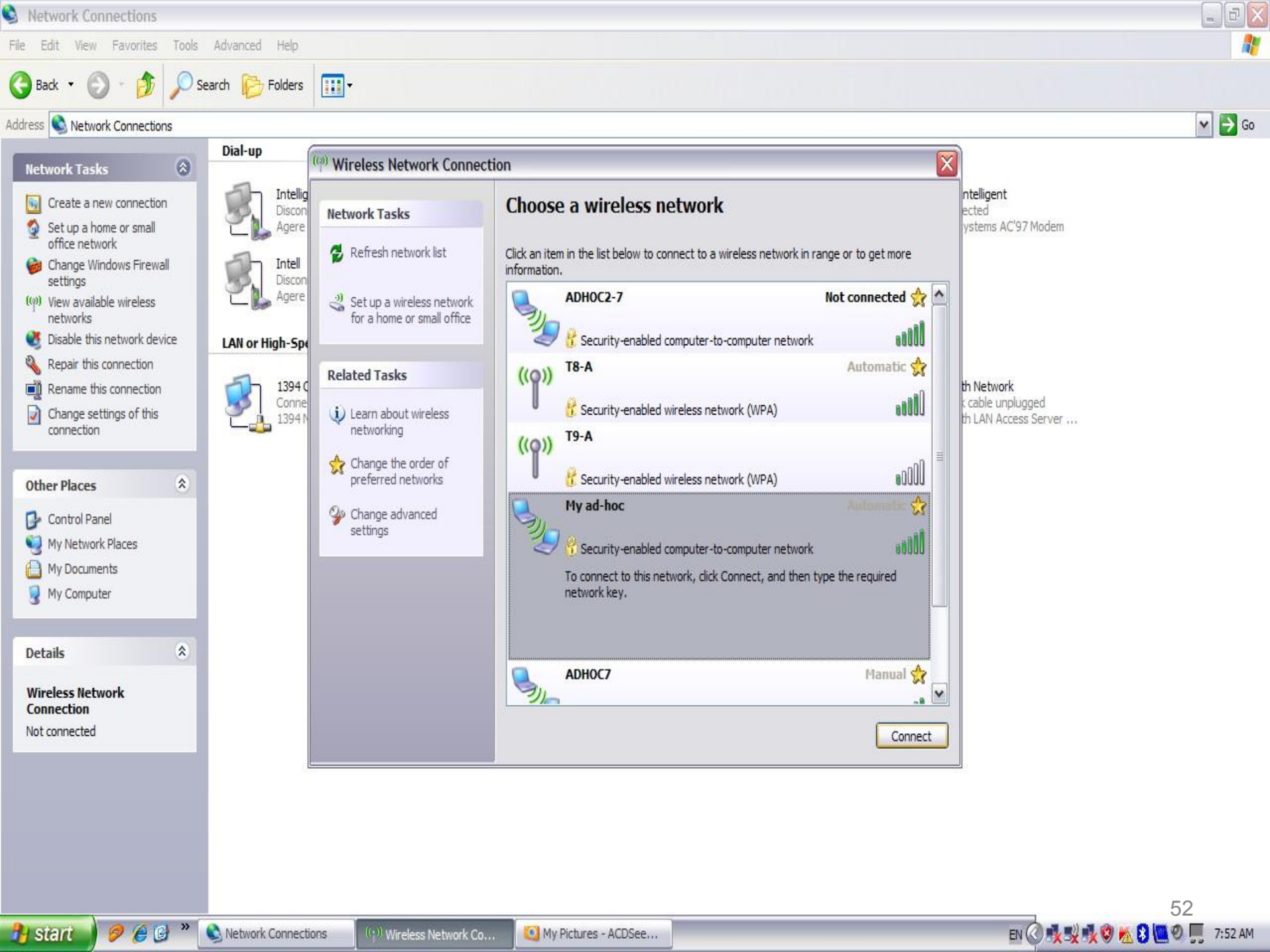
Agere Systems AC'97 Mode
LAN or High-Speed Internet
1394 Connection
Connected
1394 Net Adapter
Wireless Network Connection Properties
General
Wireless Networks
Advanced
Wireless network properties
Association
Authentication
Connection
Network name (SSID):
My ad-hoc
Connect even if this network is not broadcasting
Wireless network key
This network requires a key for the following:
Network Authentication:
Open
Data encryption:
WEP
Network key:
Confirm network key:
Key index (advanced):
1
The key is provided for me automatically
This is a computer-to-computer (ad hoc) network; wireless access points are not used
OK
Cancel
start
Network Connections
Wireless Network Co...
My Pictures - ACDSee...
EN
7:51 AM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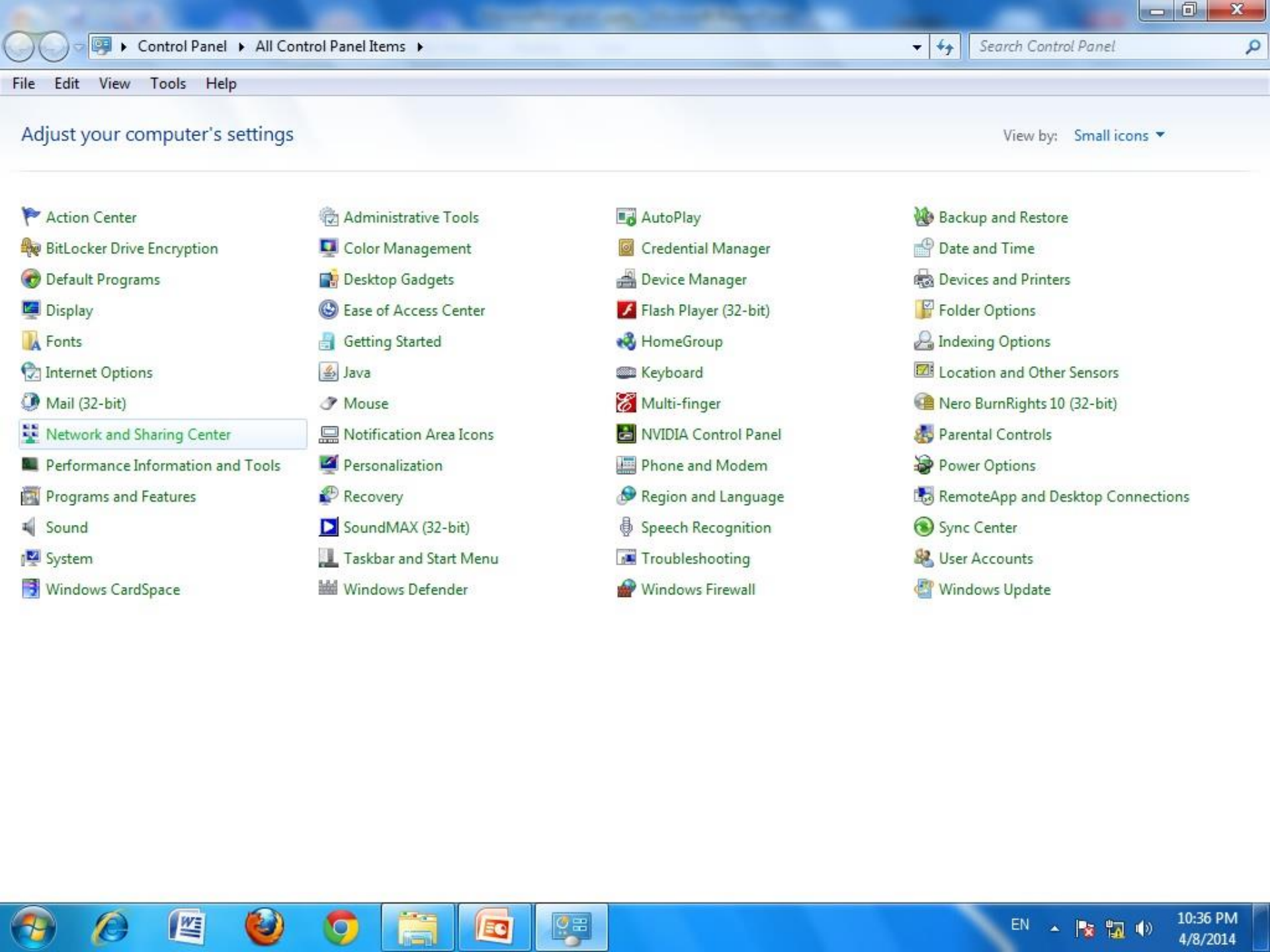
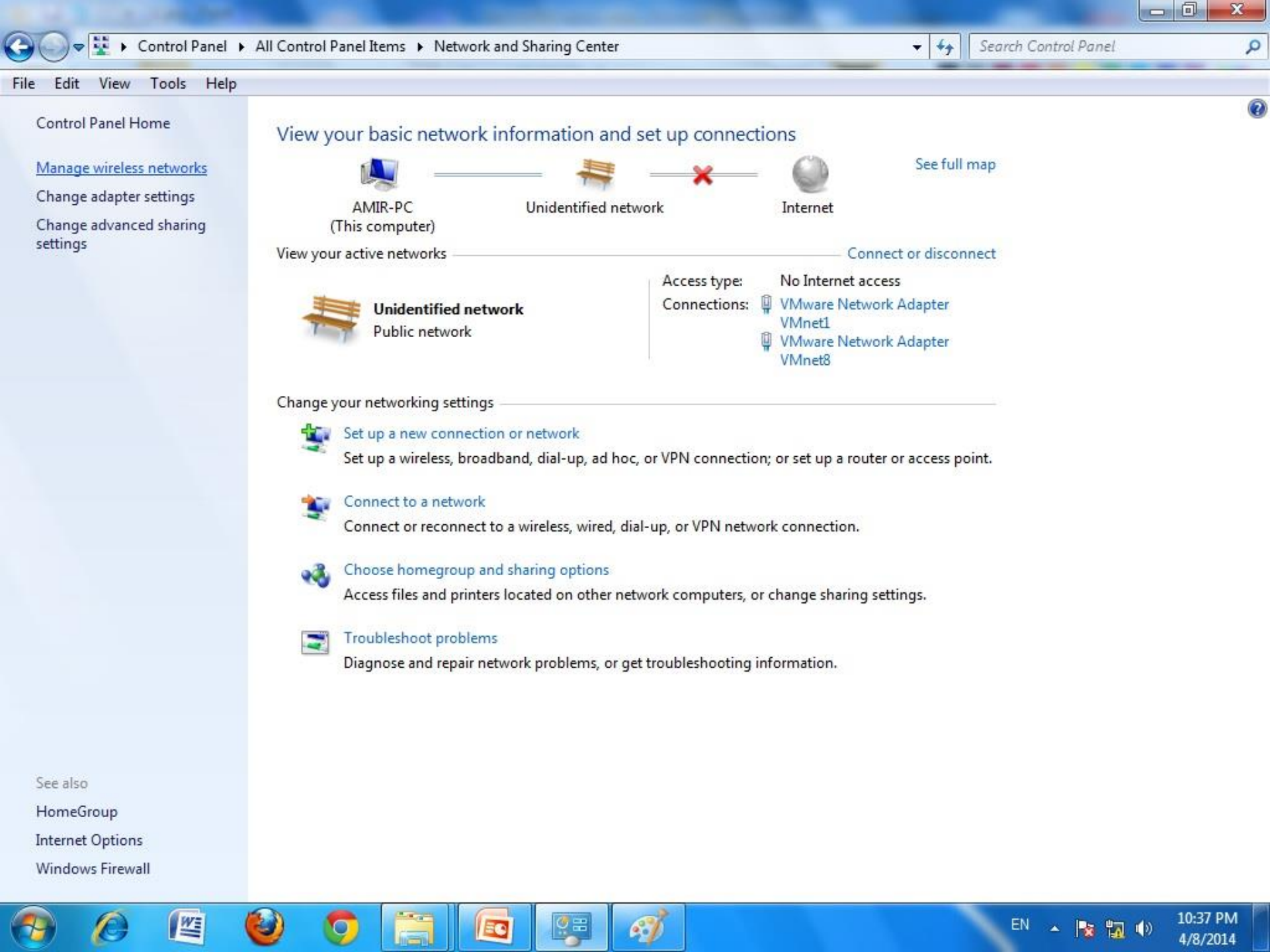
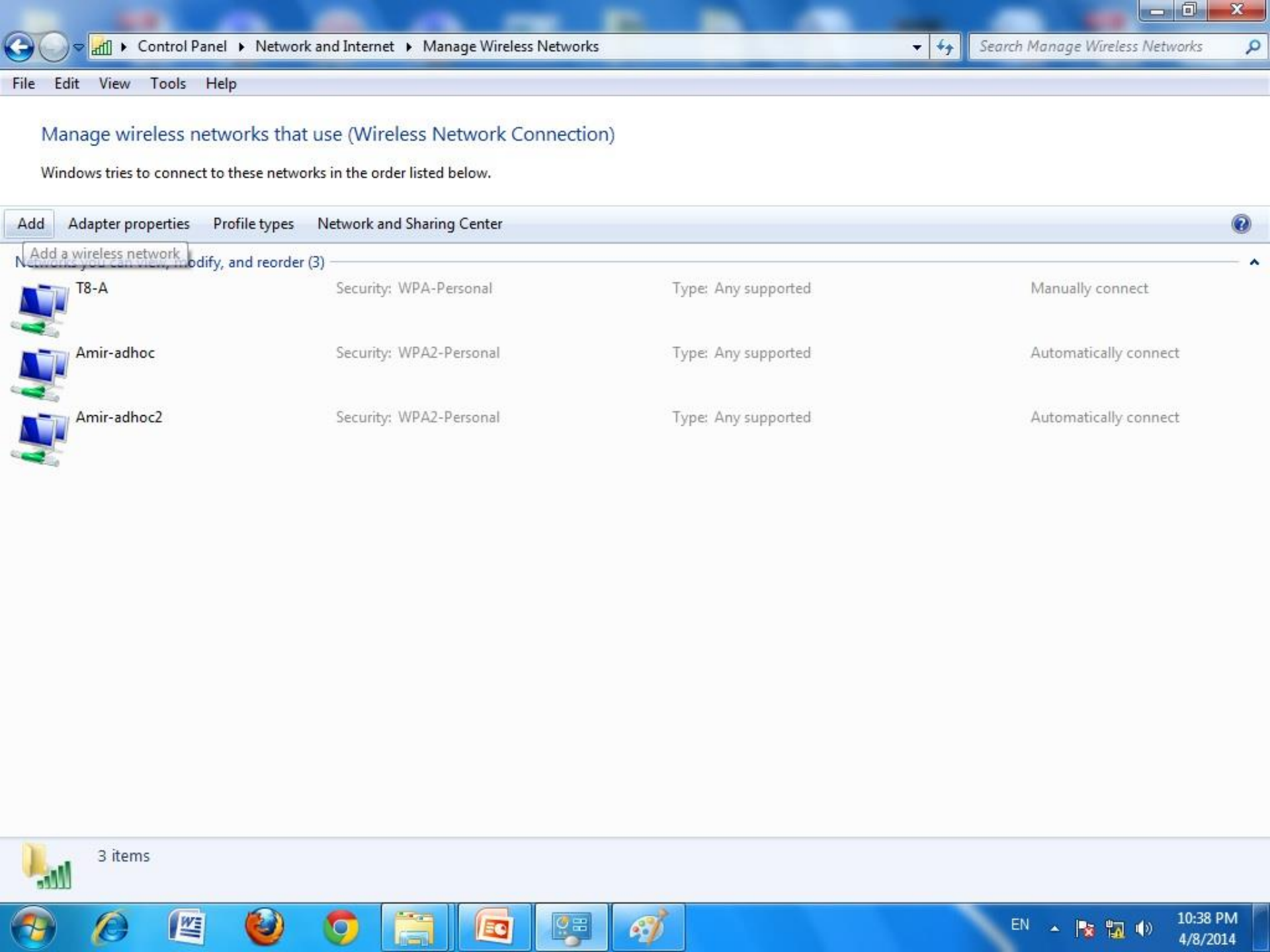
Other Places
Control Panel
My Network Places
My Documents
My Computer
Details
Wireless Network Connection
Not connected
Dial-up
LAN or High-Speed
Wireless Network Connection
Network Tasks
Refresh network list
Set up a wireless network for a home or small office
Related Tasks
Learn about wireless networking
Change the order of preferred networks
Change advanced settings
Choose a wireless network
Click an item in the list below to connect to a wireless network in range or to get more information.
ADHOC2-7
Not connected
Security-enabled computer-to-computer network
T8-A
Automatic
Security-enabled wireless network (WPA)
T9-A
Security-enabled wireless network (WPA)
My ad-hoc
Security-enabled computer-to-computer network
To connect to this network, click Connect, and then type the required network key.
ADHOC7
Manual
Connect
start
Network Connections
Wireless Network Co...
My Pictures - ACDSee...
EN
7:52 AM

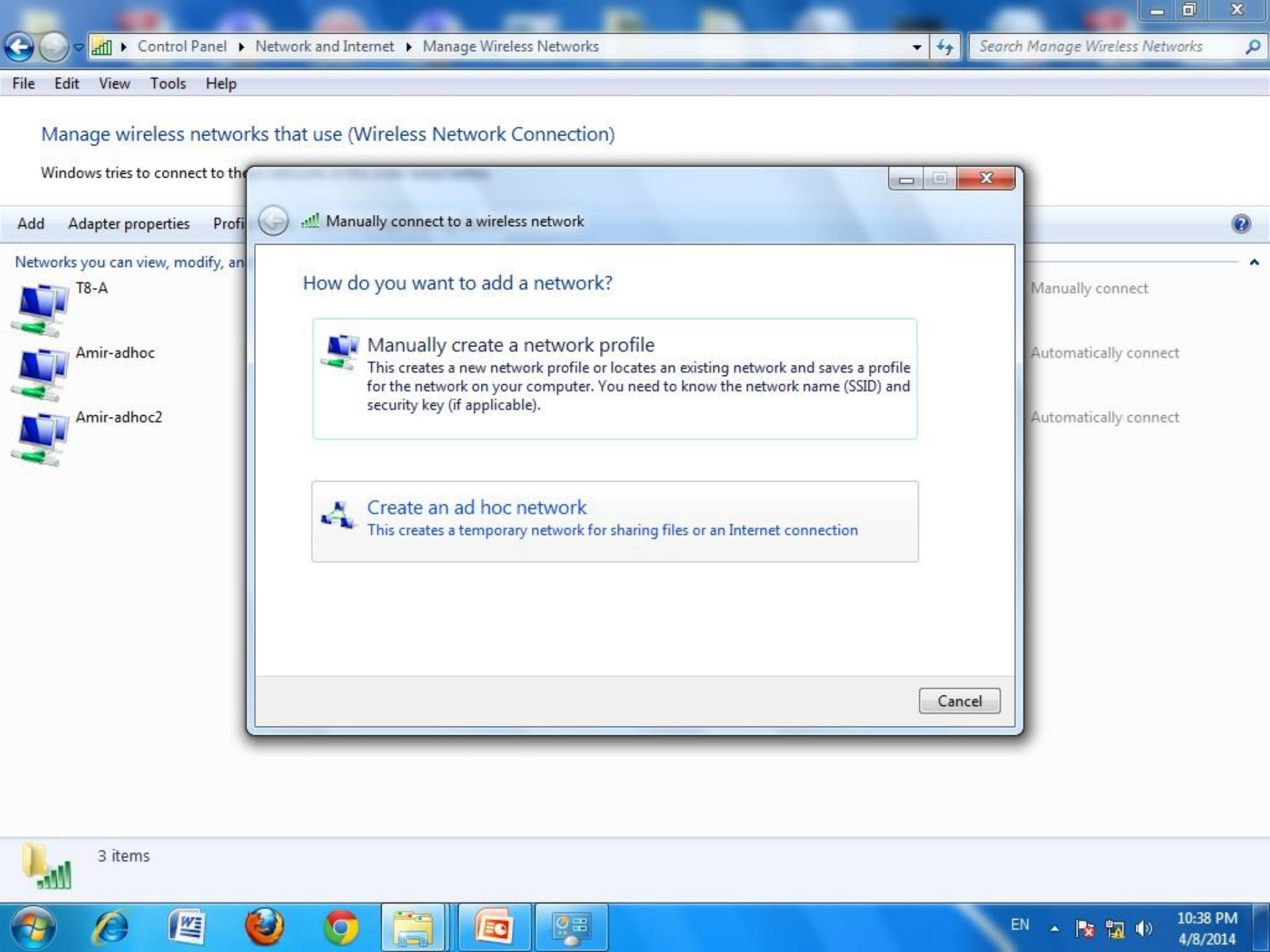
Ad-hoc in Windows 7

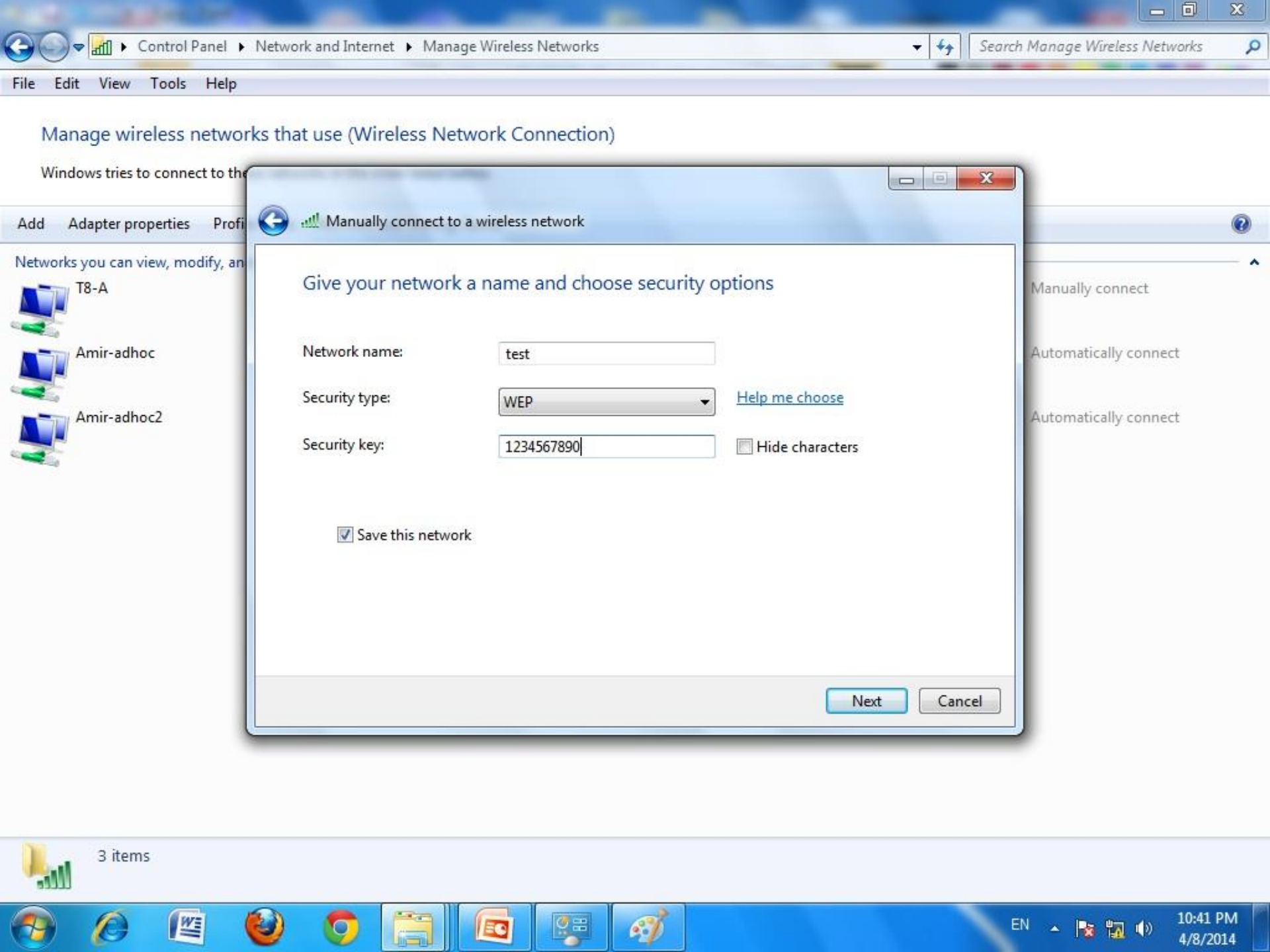
- Go to “Open Network and Sharing Center” / Click on “Manage Wireless Networks (or Go to Start Menu & Type: wireless & Select “Manage Wireless Networks”) / Add / Create an Ad hoc Network / Determine Network Name, Network Type: WPA2 or WEP, Security Key, √Save this network and Next . .

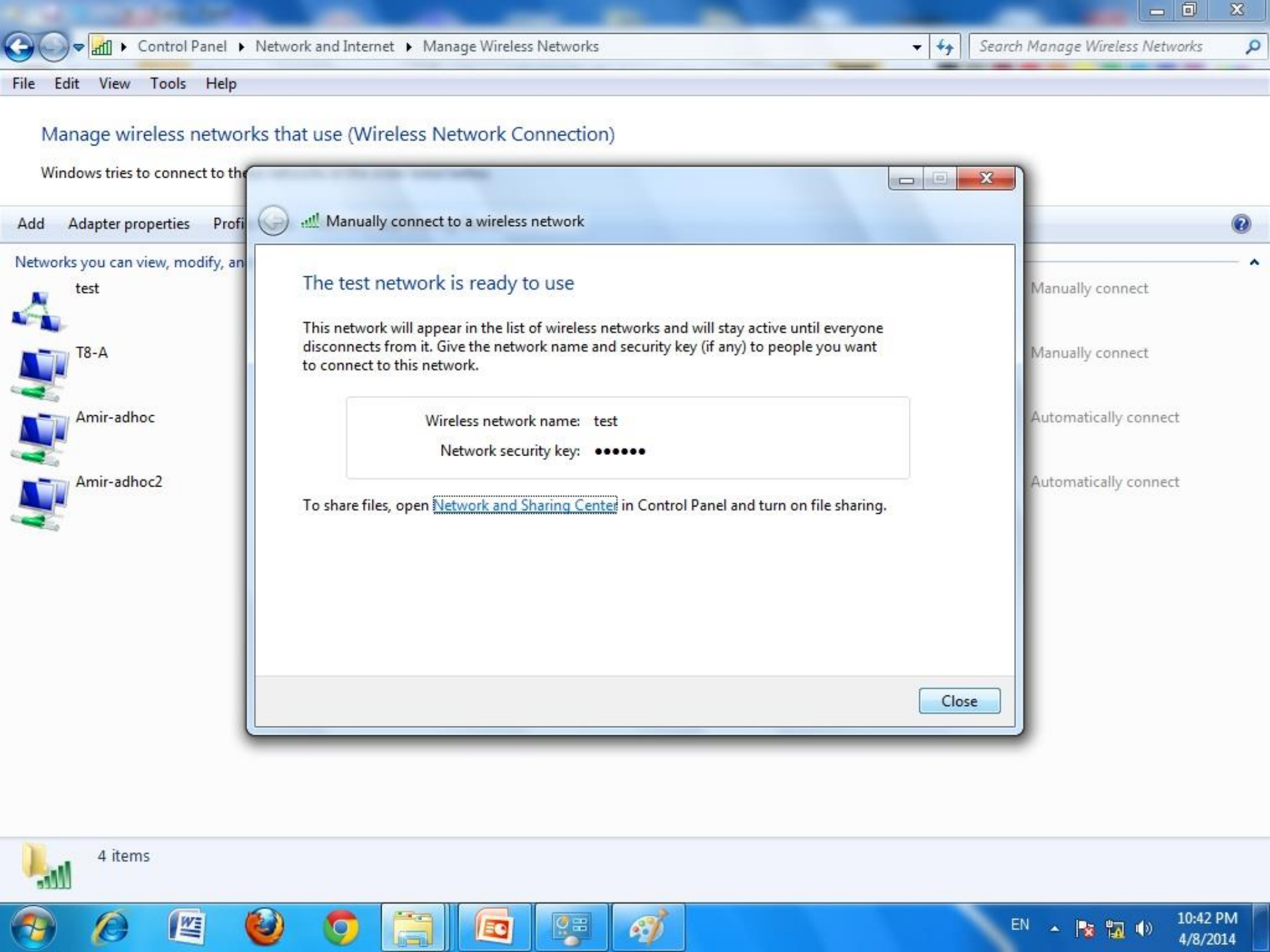

Control Panel ▸ All Control Panel Items ▸
Search Control Panel
File Edit View Tools Help
Adjust your computer's settings
View by: Small icons
Action Center
BitLocker Drive Encryption
Default Programs
Display
Fonts
Internet Options
Mail (32-bit)
Network and Sharing Center
Performance Information and Tools
Programs and Features
Sound
System
Windows CardSpace
Administrative Tools
Color Management
Desktop Gadgets
Ease of Access Center
Getting Started
Java
Mouse
Notification Area Icons
Personalization
Recovery
SoundMAX (32-bit)
Taskbar and Start Menu
Windows Defender
AutoPlay
Credential Manager
Device Manager
Flash Player (32-bit)
HomeGroup
Keyboard
Multi-finger
NVIDIA Control Panel
Phone and Modem
Region and Language
Speech Recognition
Troubleshooting
Windows Firewall
Backup and Restore
Date and Time
Devices and Printers
Folder Options
Indexing Options
Location and Other Sensors
Nero BurnRights 10 (32-bit)
Parental Controls
Power Options
RemoteApp and Desktop Connections
Sync Center
User Accounts
Windows Update
EN
10:36 PM
4/8/2014


Control Panel ▸ All Control Panel Items ▸ Network and Sharing Center
Search Control Panel
File Edit View Tools Help
Control Panel Home
Manage wireless networks
Change adapter settings
Change advanced sharing settings
View your basic network information and set up connections
See full map
AMIR-PC
(This computer)
Unidentified network
Internet
View your active networks
Connect or disconnect
Unidentified network
Public network
Access type: No Internet access
Connections: VMware Network Adapter VMnet1
VMware Network Adapter VMnet8
Change your networking settings
Set up a new connection or network
Set up a wireless, broadband, dial-up, ad hoc, or VPN connection; or set up a router or access point.
Connect to a network
Connect or reconnect to a wireless, wired, dial-up, or VPN network connection.
Choose homegroup and sharing options
Access files and printers located on other network computers, or change sharing settings.
Troubleshoot problems
Diagnose and repair network problems, or get troubleshooting information.
See also
HomeGroup
Internet Options
Windows Firewall
EN
10:37 PM
4/8/2014


Control Panel ▸ Network and Internet ▸ Manage Wireless Networks
Search Manage Wireless Networks
File Edit View Tools Help
Manage wireless networks that use (Wireless Network Connection)
Windows tries to connect to these networks in the order listed below.
Add Adapter properties Profile types Network and Sharing Center
Add a wireless network
odify, and reorder (3)
T8-A Security: WPA-Personal Type: Any supported Manually connect
Amir-adhoc Security: WPA2-Personal Type: Any supported Automatically connect
Amir-adhoc2 Security: WPA2-Personal Type: Any supported Automatically connect
3 items
EN
10:38 PM
4/8/2014


Control Panel ▸ Network and Internet ▸ Manage Wireless Networks
Search Manage Wireless Networks
File Edit View Tools Help
Manage wireless networks that use (Wireless Network Connection)
Windows tries to connect to the
Add Adapter properties Profi
Networks you can view, modify, an
T8-A
Amir-adhoc
Amir-adhoc2
Manually connect
Automatically connect
Automatically connect
Manually connect to a wireless network
How do you want to add a network?
Manually create a network profile
This creates a new network profile or locates an existing network and saves a profile for the network on your computer. You need to know the network name (SSID) and security key (if applicable).
Create an ad hoc network
This creates a temporary network for sharing files or an Internet connection
Cancel
3 items
EN
10:38 PM
4/8/2014

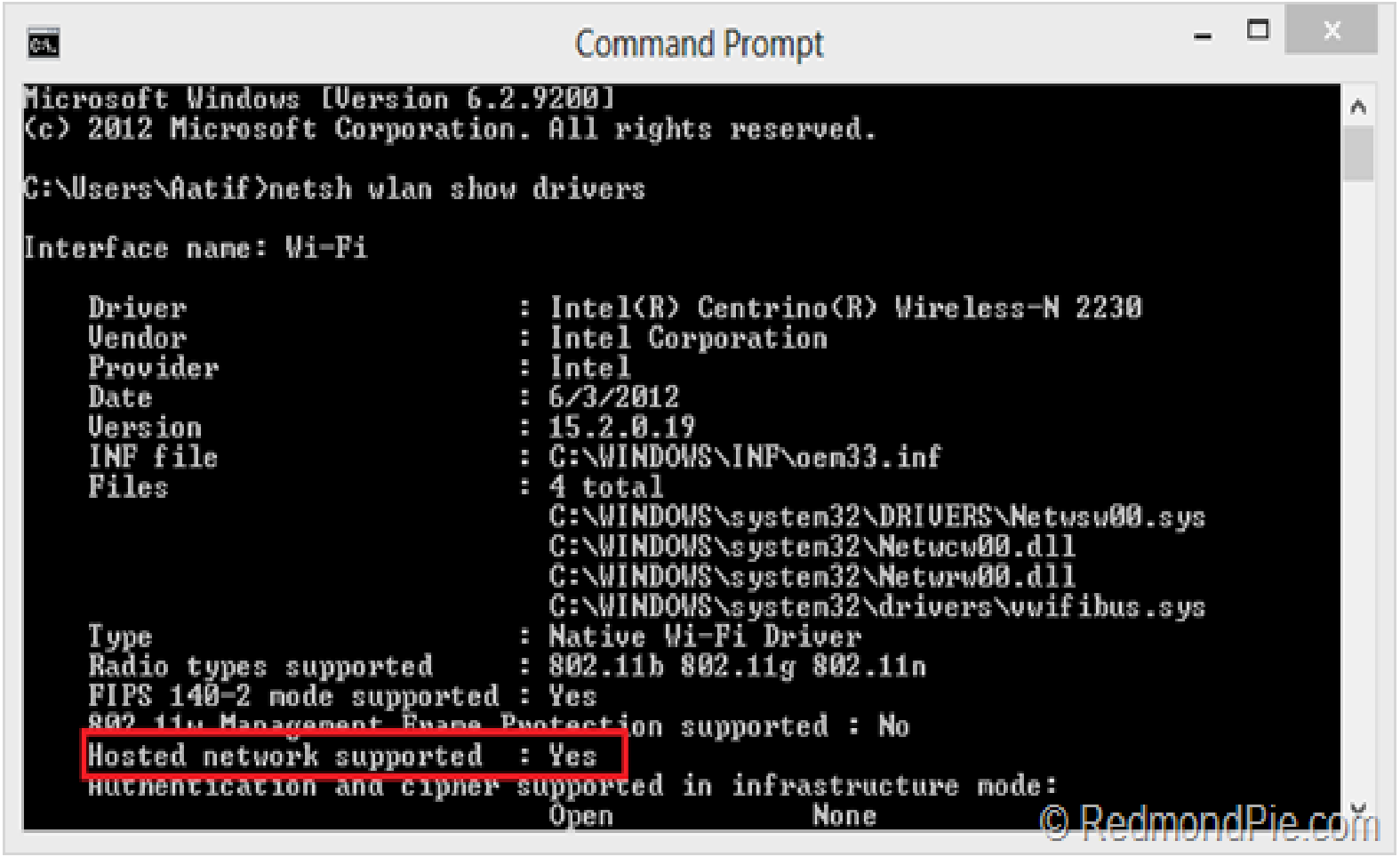

Control Panel ▸ Network and Internet ▸ Manage Wireless Networks
Search Manage Wireless Networks
File Edit View Tools Help
Manage wireless networks that use (Wireless Network Connection)
Windows tries to connect to the
Add Adapter properties Profi
Networks you can view, modify, an
T8-A
Amir-adhoc
Amir-adhoc2
Manually connect
Automatically connect
Automatically connect
3 items
Manually connect to a wireless network
Give your network a name and choose security options
Network name: test
Security type: WEP
Help me choose
Security key: 1234567890
Hide characters
Save this network
Next
Cancel
EN
10:41 PM
4/8/2014


Control Panel ▸ Network and Internet ▸ Manage Wireless Networks
Search Manage Wireless Networks
File Edit View Tools Help
Manage wireless networks that use (Wireless Network Connection)
Windows tries to connect to the
Add Adapter properties Profi
Networks you can view, modify, an
test
T8-A
Amir-adhoc
Amir-adhoc2
Manually connect
Manually connect
Automatically connect
Automatically connect
4 items
Manually connect to a wireless network
The test network is ready to use
This network will appear in the list of wireless networks and will stay active until everyone disconnects from it. Give the network name and security key (if any) to people you want to connect to this network.
Wireless network name: test
Network security key: ••••••
To share files, open Network and Sharing Center in Control Panel and turn on file sharing.
Close
EN
10:42 PM
4/8/2014

Ad-hoc in Windows 8

- Step 1: Launch an elevated command prompt under Windows 8 (one with administrator privileges).
- Step 2: Run the following command to verify that your network interface supports virtualization:
  - *netsh wlan show drivers*

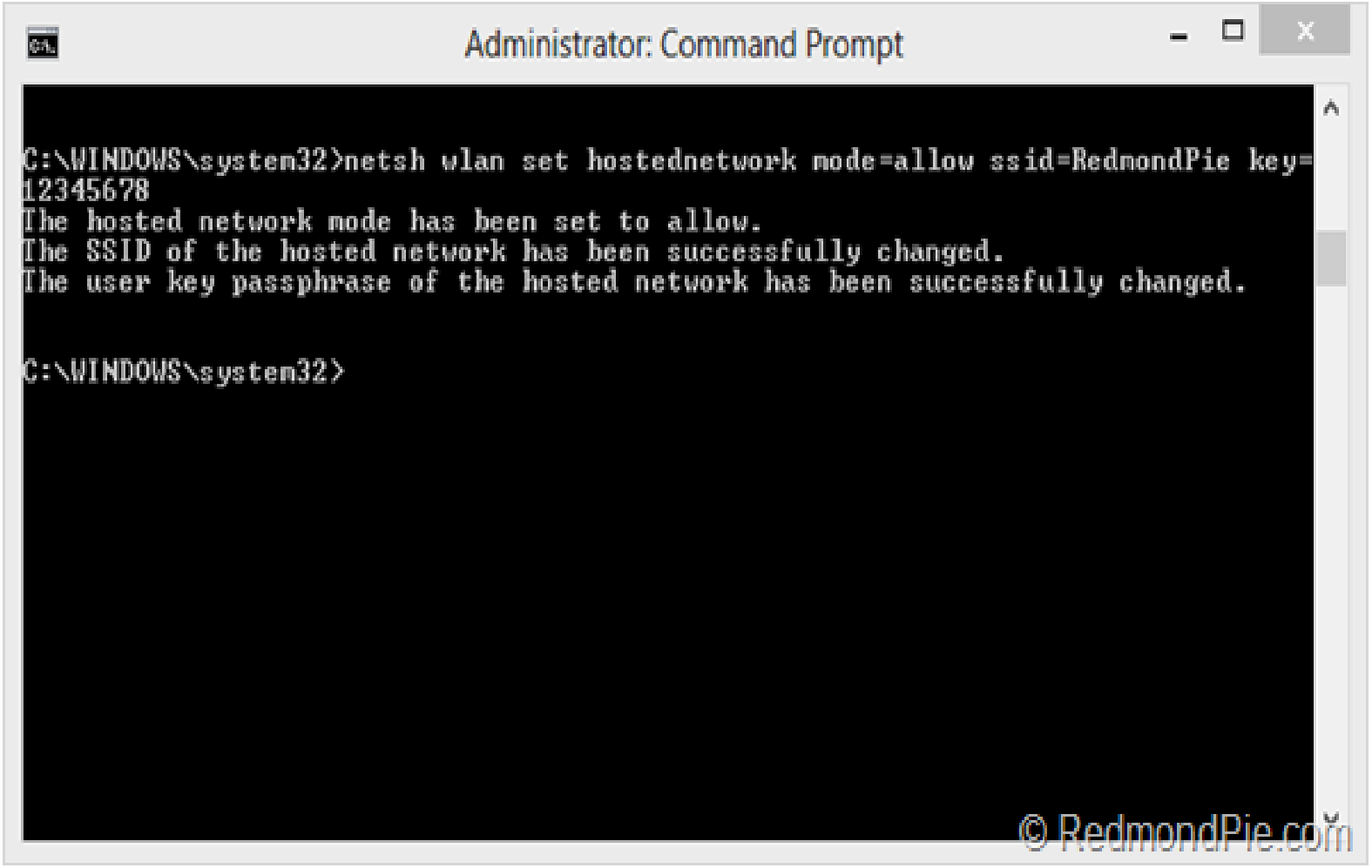
Ad-hoc in Windows 8



Ad-hoc in Windows 8

- Step 3: Now, set up the ad hoc wireless network using this command. Replace the parts in markup tags with your own choices
- *netsh wlan set hostednetwork mode=allow* *ssid*=<enter_network_name_here> *key*=<enter_password_here>

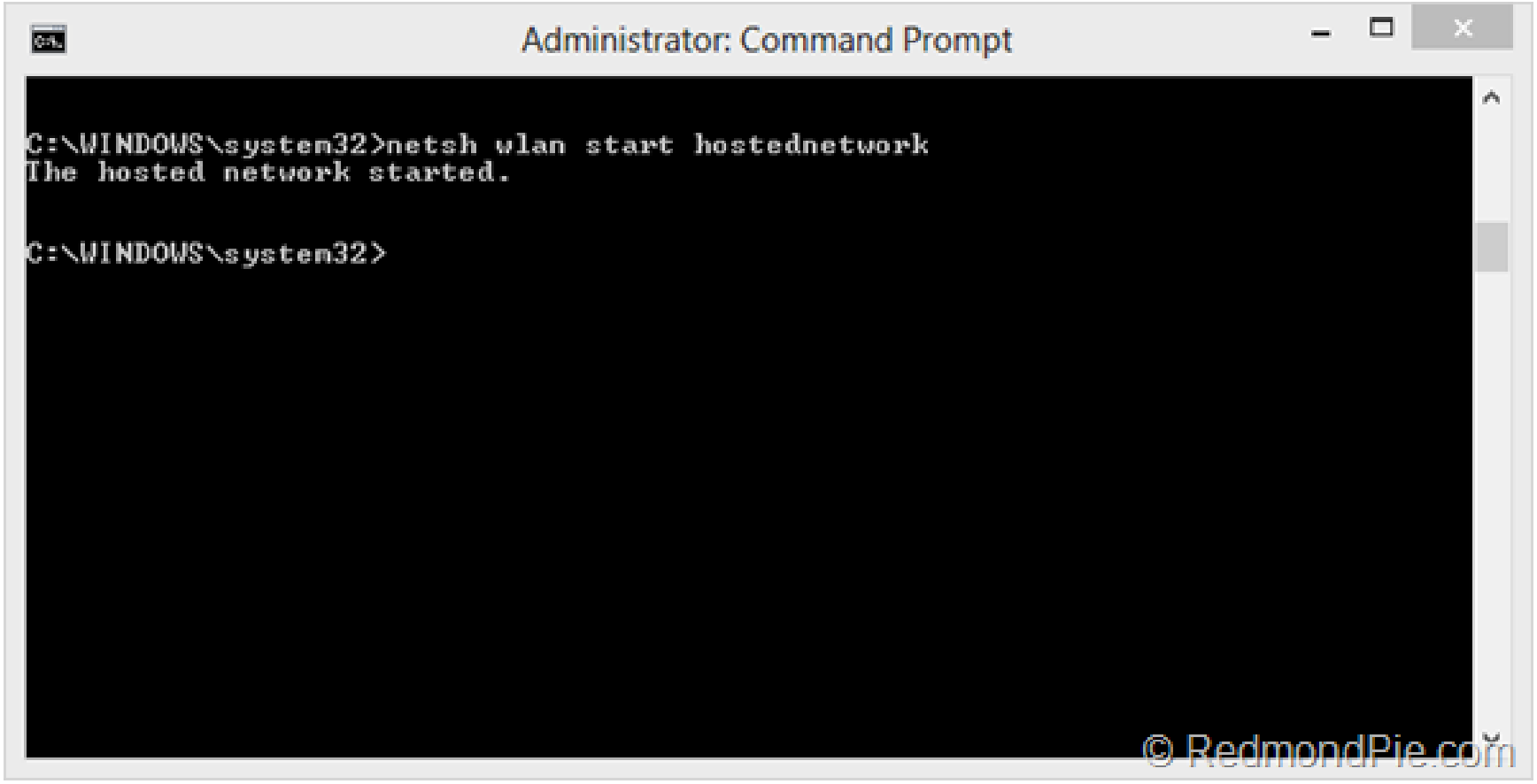
Ad-hoc in Windows 8



Ad-hoc in Windows 8

- Step 4: Until now, your hosted network has been created. Now, you need to start it. Use the command below:
  - *netsh wlan start hostednetwork*

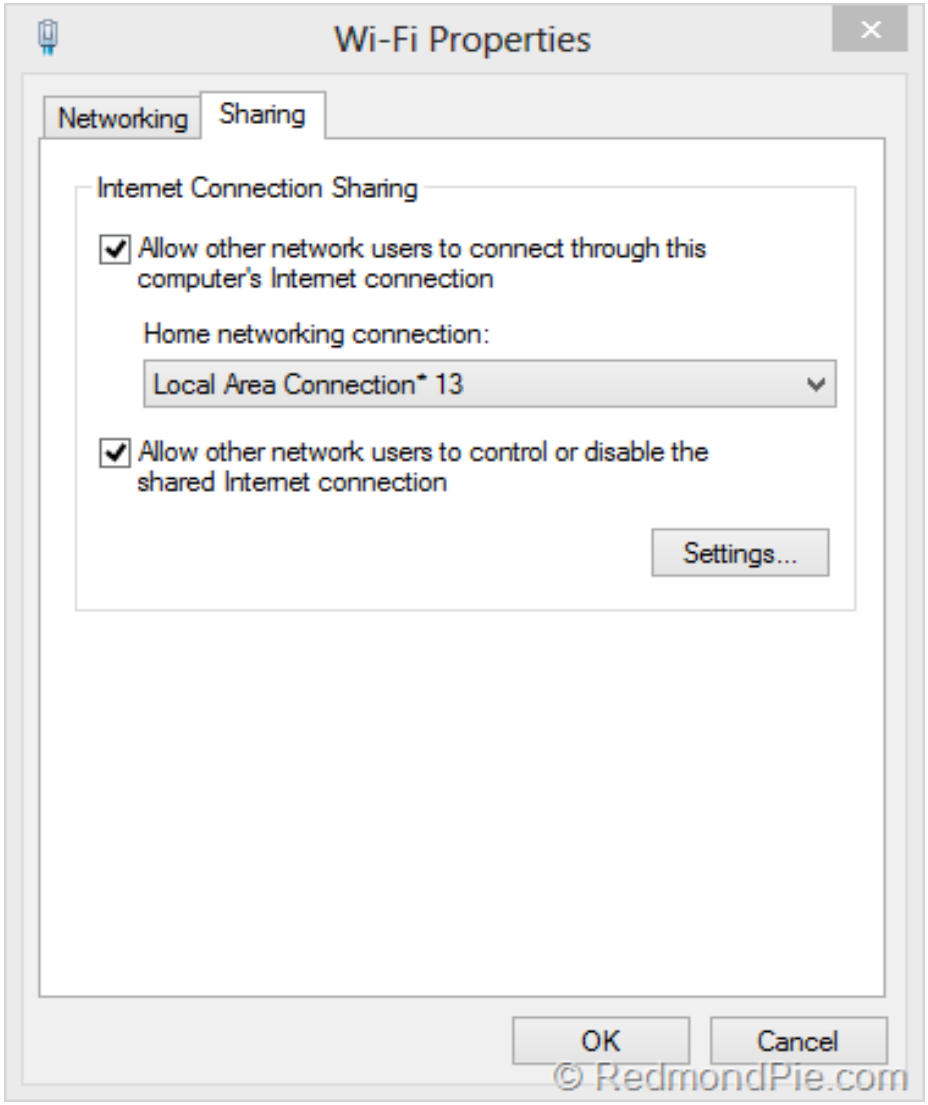
Ad-hoc in Windows 8

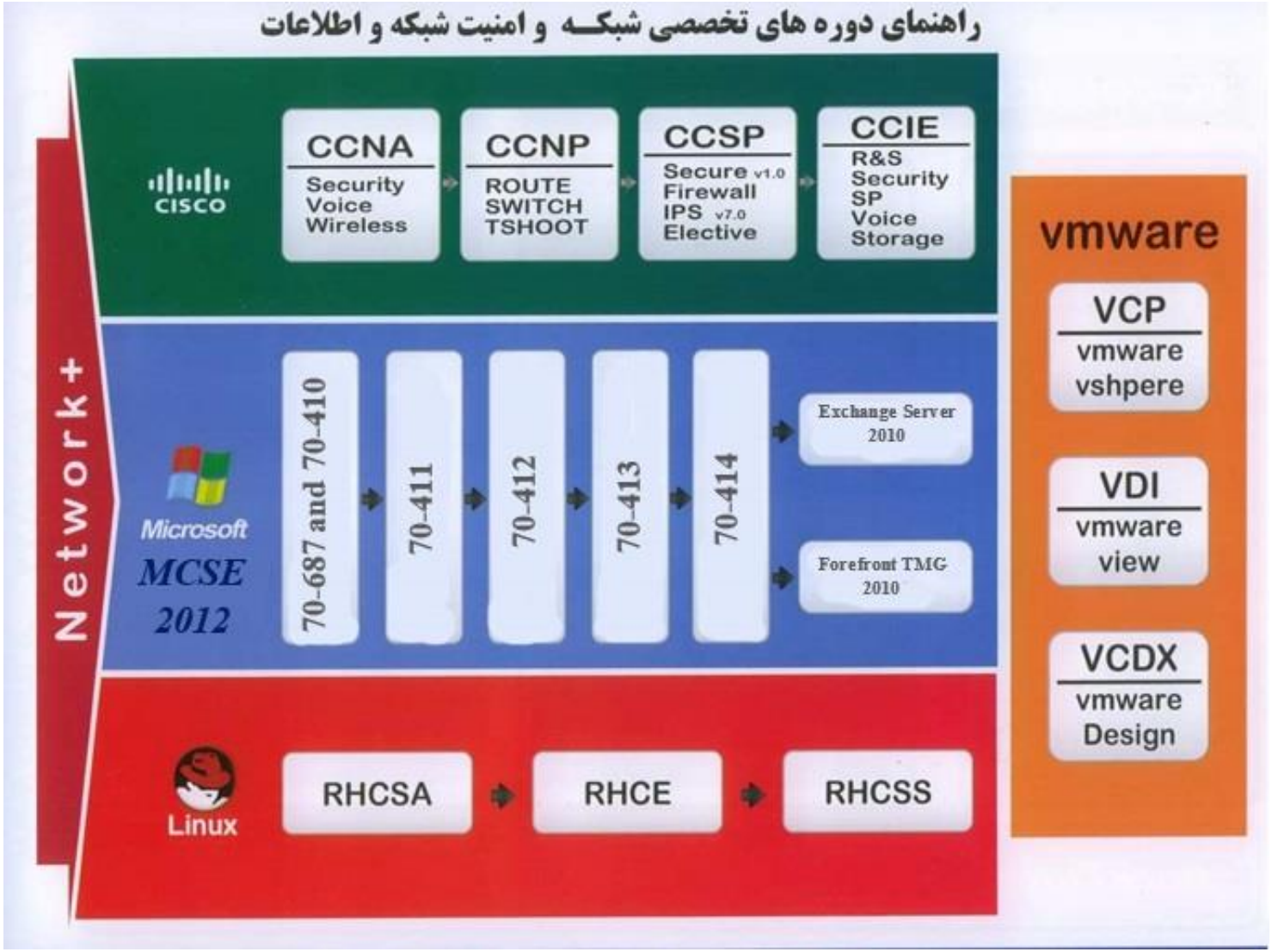


Ad-hoc in Windows 8

- Step 5: You're all set, with just one thing remaining. If it's not already enabled, you need to allow Internet Connection Sharing (ICS) for your currently-active internet connection. Simply head over to Network & Sharing Center, and in the properties for the current internet connection, enable ICS. Make sure to select the ad hoc connection under Home networking connection.

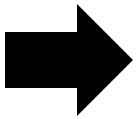
Ad-hoc in Windows 8




راهنمای دوره های تخصصی شبکـــه و امنیت شبکه و اطلاعات
Network+
CISCO
CCNA
Security
Voice
Wireless
CCNP
ROUTE
SWITCH
TSHOOT
CCSP
Secure v1.0
Firewall
IPS v7.0
Elective
CCIE
R&S
Security
SP
Voice
Storage
Microsoft
MCSE
2012
70-687 and 70-410
70-411
70-412
70-413
70-414
Exchange Server 2010
Forefront TMG 2010
Linux
RHCSA
RHCE
RHCSS
vmware
VCP
vmware
vshpere
VDI
vmware
view
VCDX
vmware
Design

- Microsoft:
  - MCSE:
    - Configuring Windows 8 (70-687)
    - Installing and Configuring Windows Server 2012 (70-410)
    - Administering Windows Server 2012 (70-411)
    - Configuring Advance Windows Server 2012 Services (70-412)
    - Design and Implementing a Server Infrastructure (70-413)
    - Implementing and Advanced Server Infrastructure (70-414)

- Cisco:
  - CCNA:
    - ICND1 (100-101)
    - ICND2 (200-101)



CCNA (200-120)

  - CCNP:
    - CCNP Route (642-902)
    - CCNP Switch (642-813)
    - CCNP T-Shoot (642-832)