Network Laboratory

Introduce to Some Network Statements

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

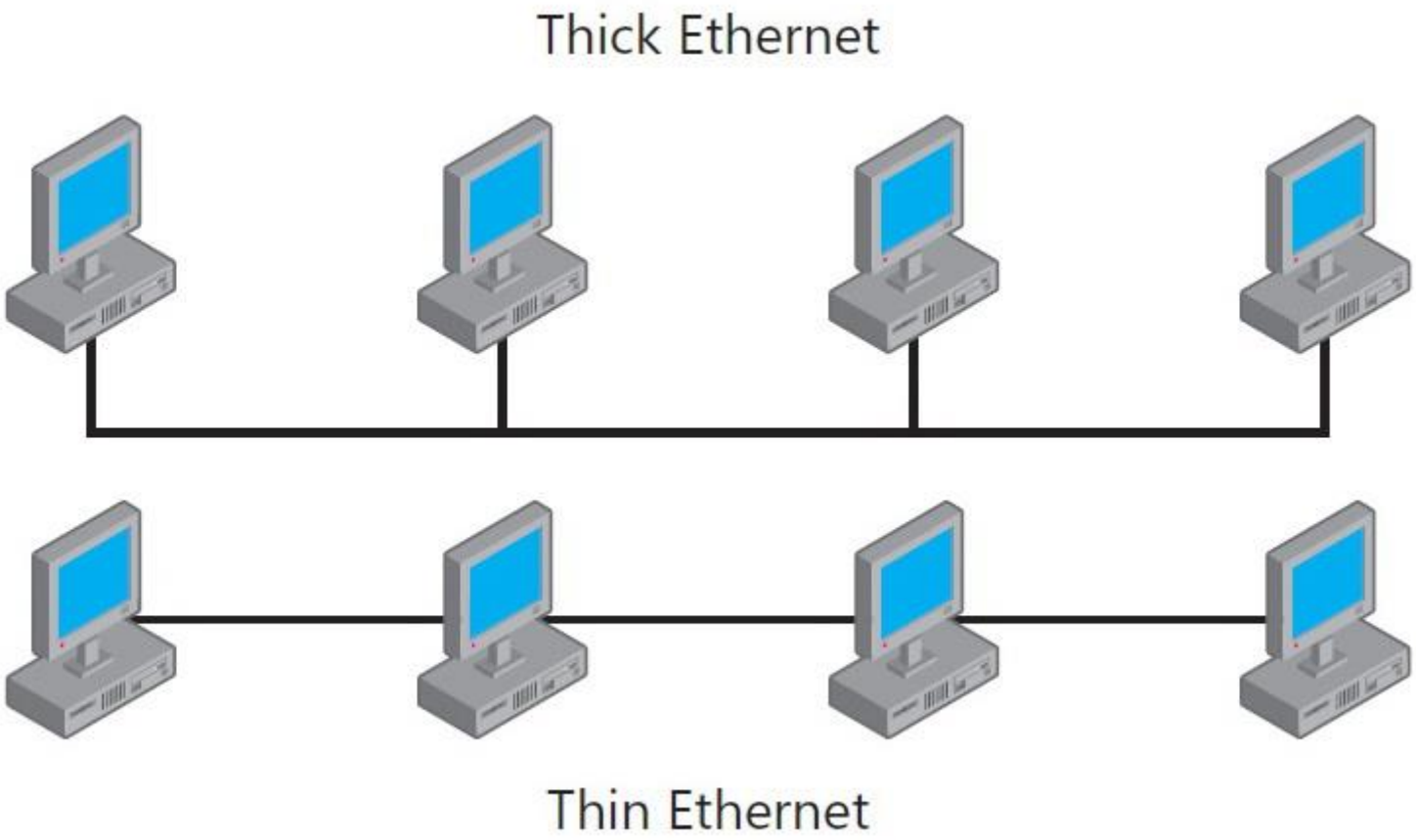
Introduce to Some Network Statements

- Hub
- Switch
- Router

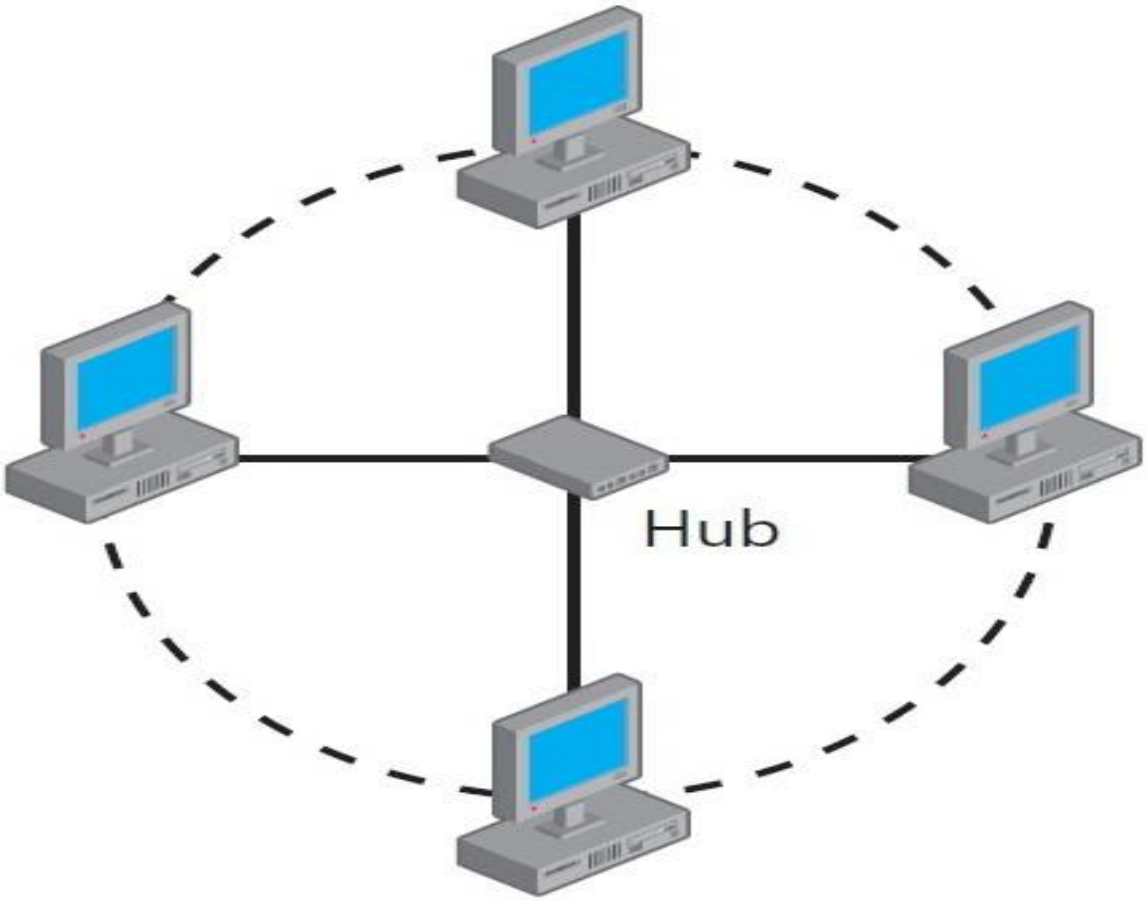
Cable Topologies

- Bus
- Ring
- Star
- Mesh

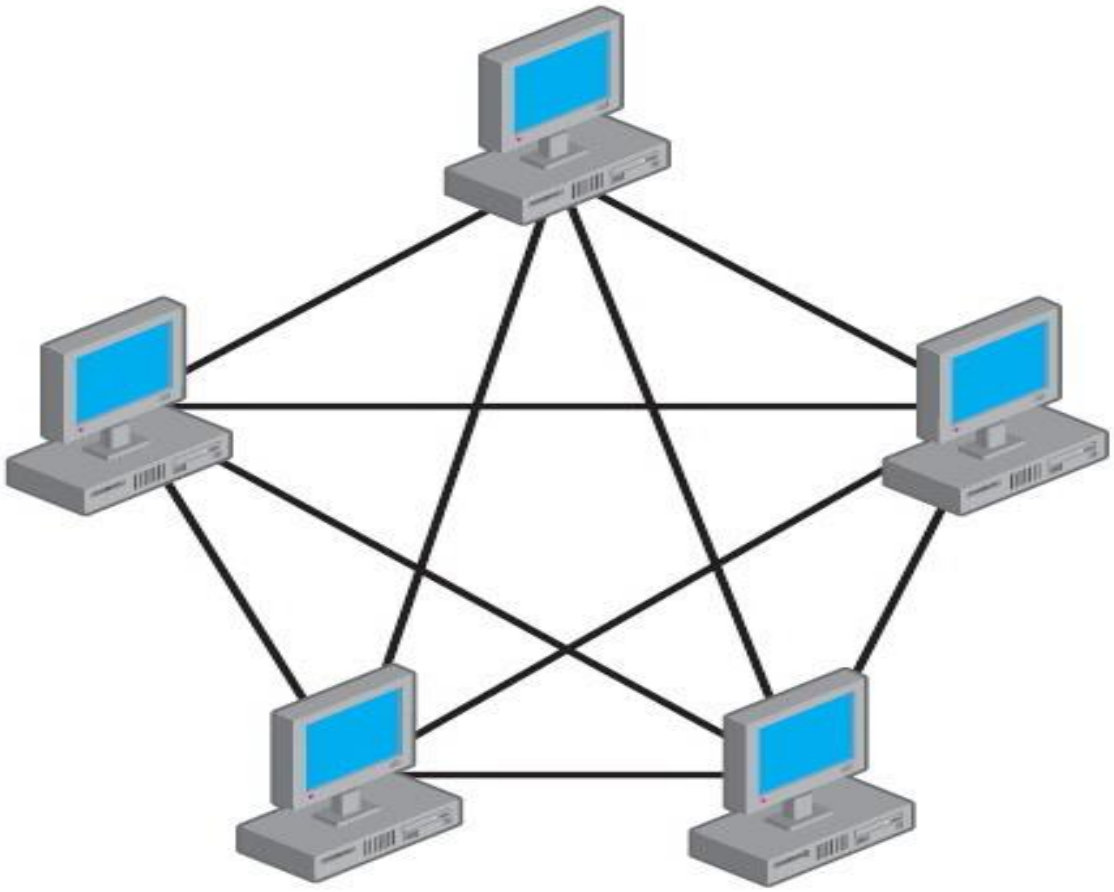
Bus Topology



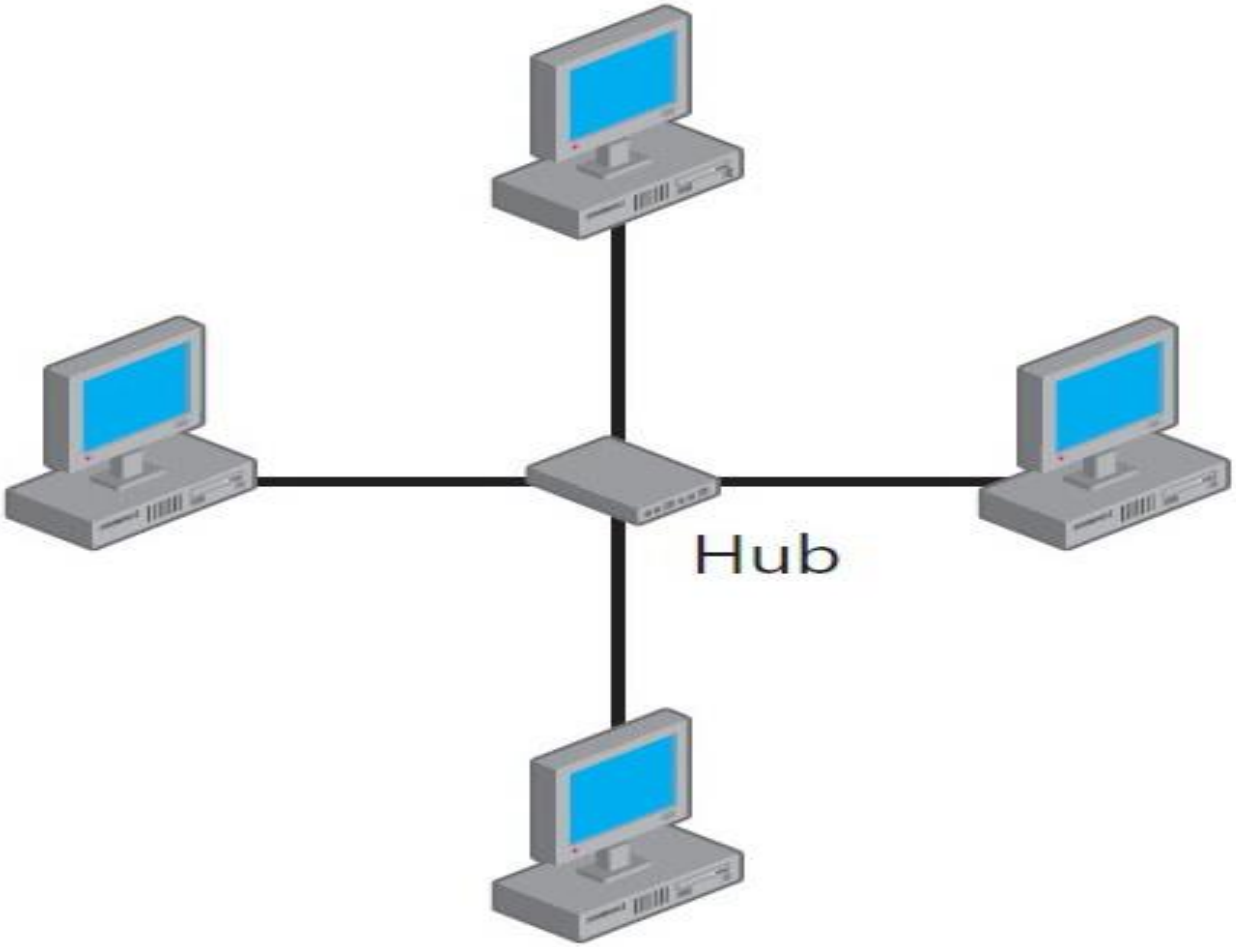
Ring Topologies



Mesh Topologies



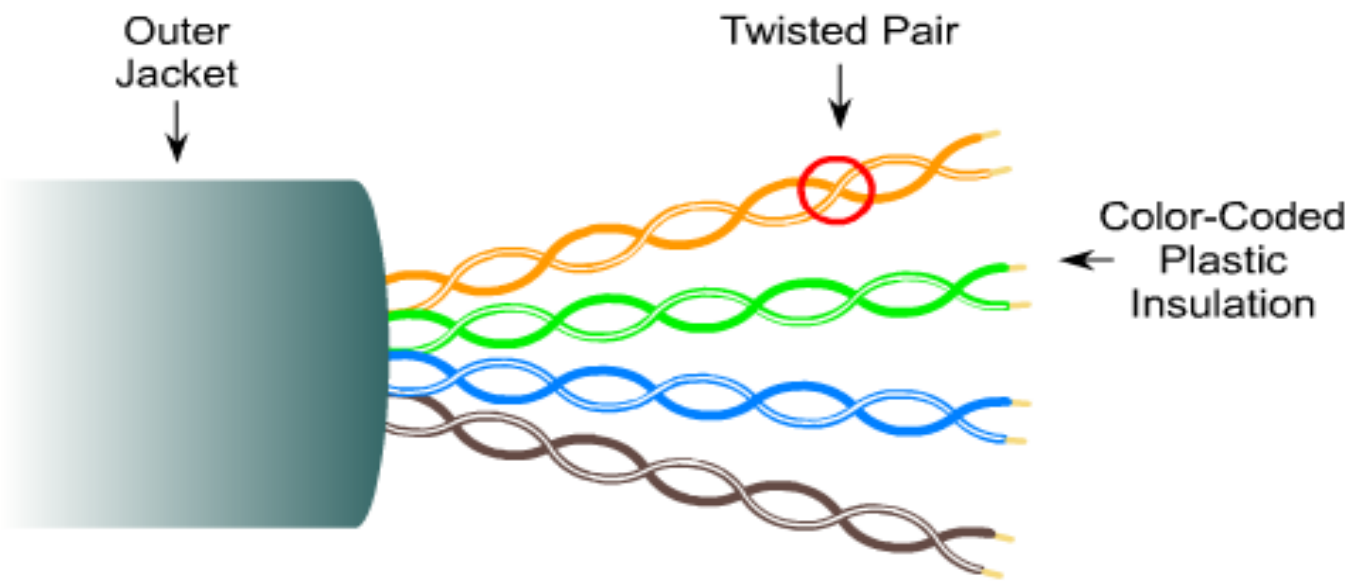
Star Topologies



Cable Types

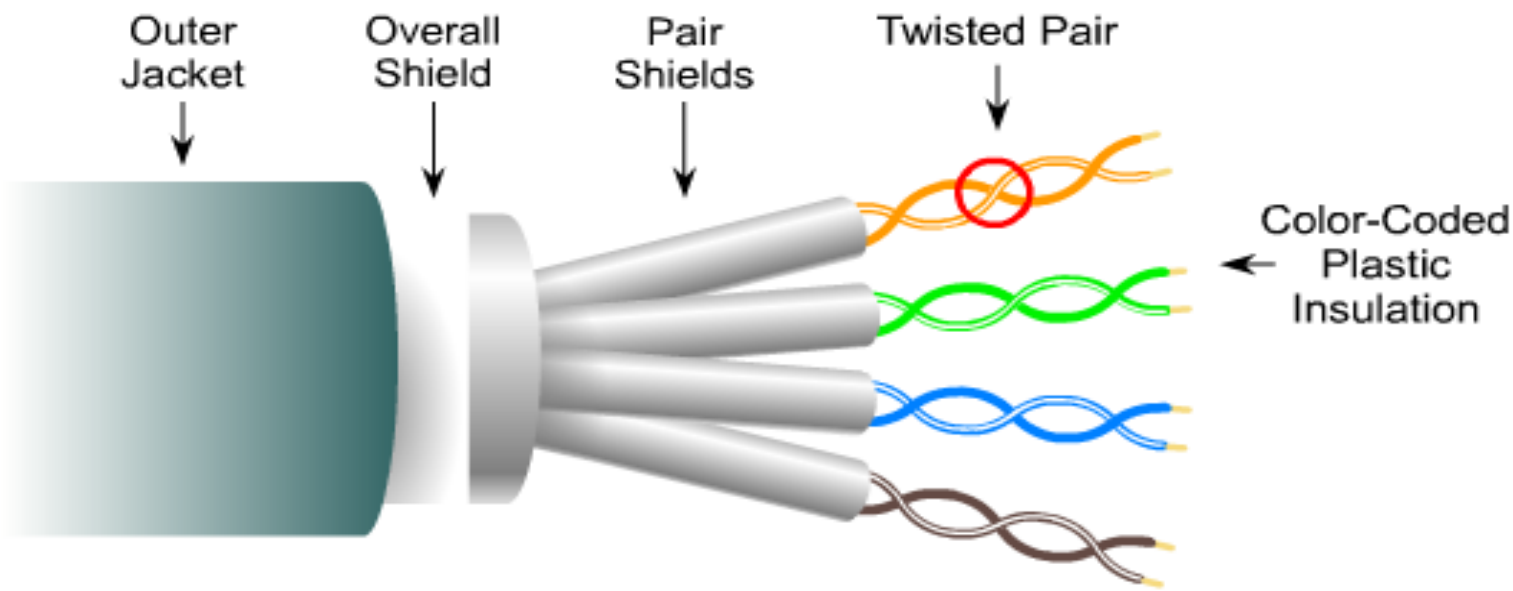
- Twisted Pair:
  - UTP (Unshielded Twisted Pair)
  - STP (Shielded Twisted Pair)
- Coaxial
- Fiber Optic

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

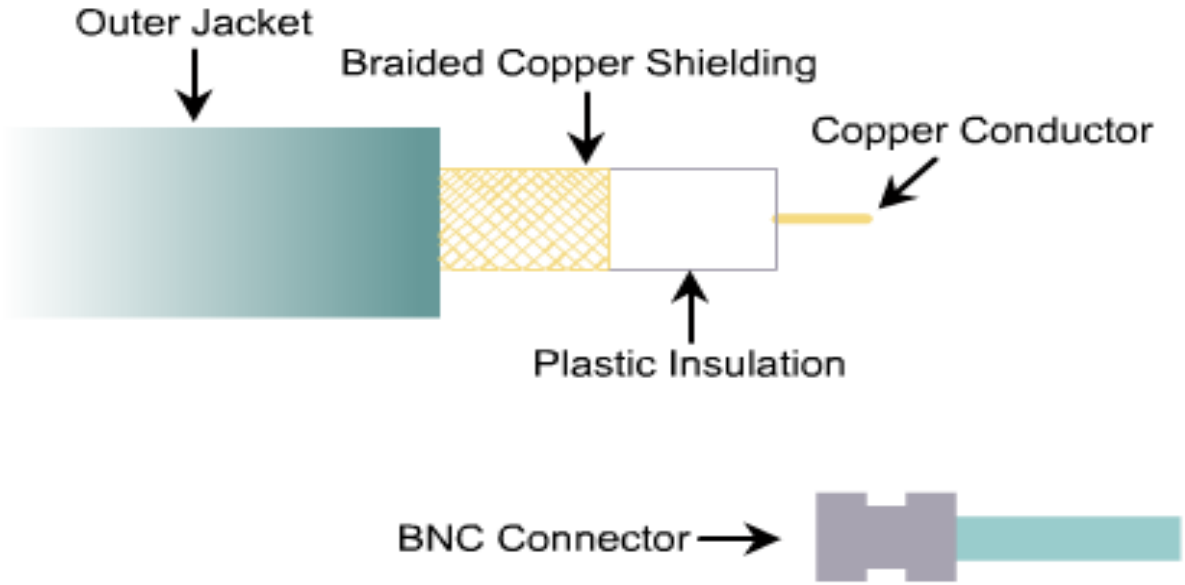


- Speed and throughput: 10 - 100 Mbps
- Average $ per node: Moderately Expensive
- Media and connector size: Medium to Large
- Maximum cable length: 100m

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

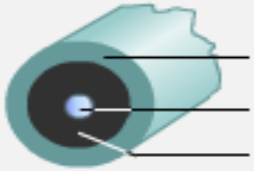
Coaxial Cable (Original Ethernet Standards)

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

Fiber Optic Cable

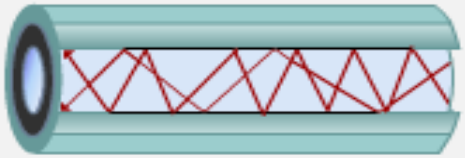
Single-mode

Requires very straight path

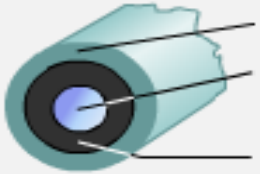


- Small core
- Less dispersion
- Suited for long distance applications (up to ~3km, 9,840 ft)
- Uses lasers as the light source often within campus backbones for distances of several thousand meters

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

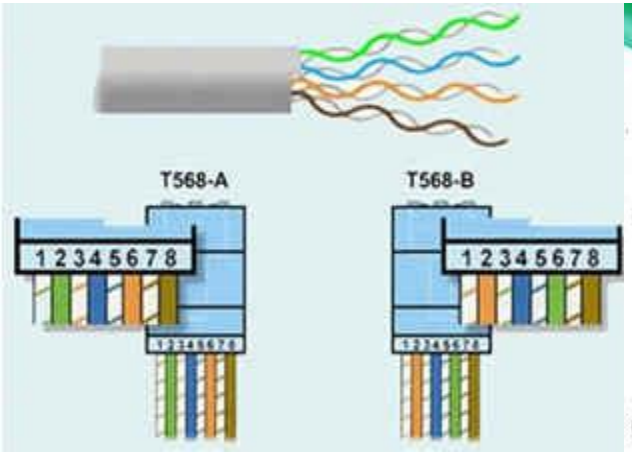
UTP Cabling Standards

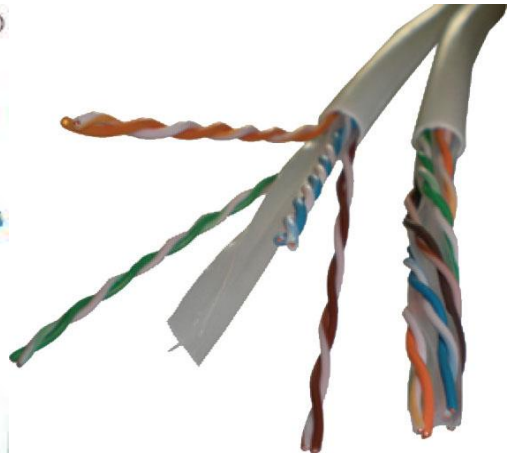
- TIA/EIA 568A :
- TIA/EIA568B:

(Telecommunicational Industry Association /Electronic Industries Alliance)

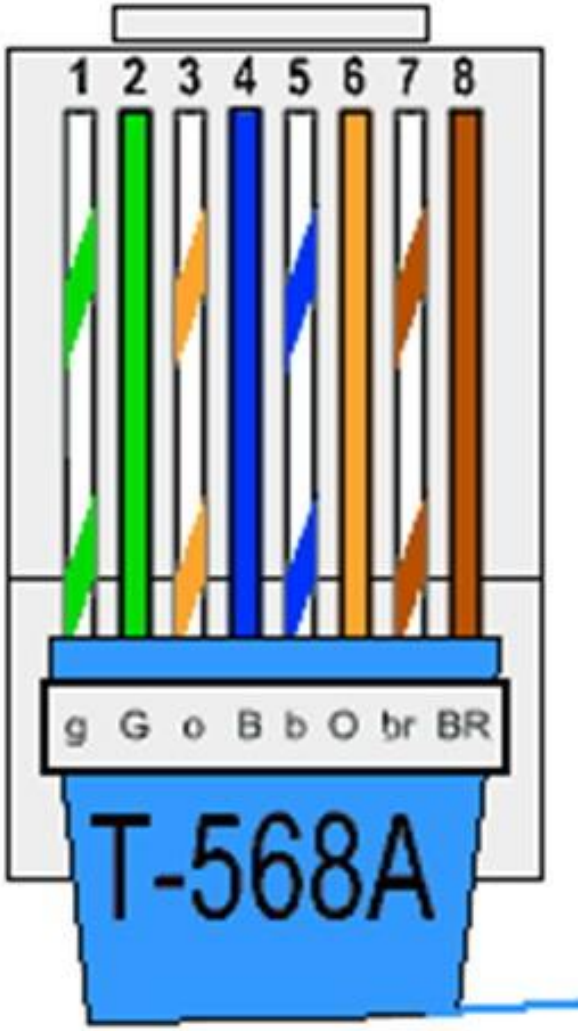
UTP Cabling Standard Colors

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

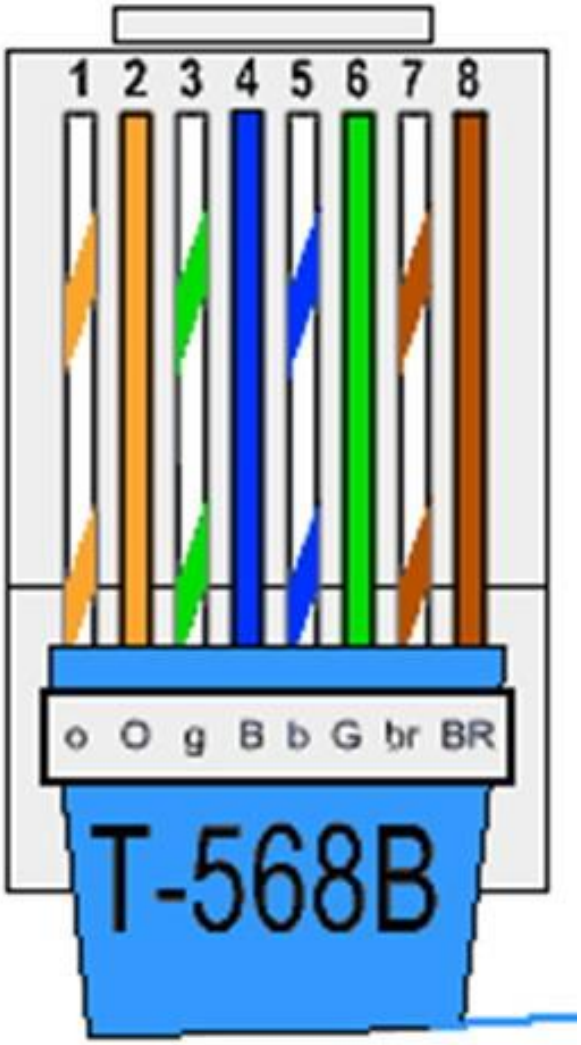




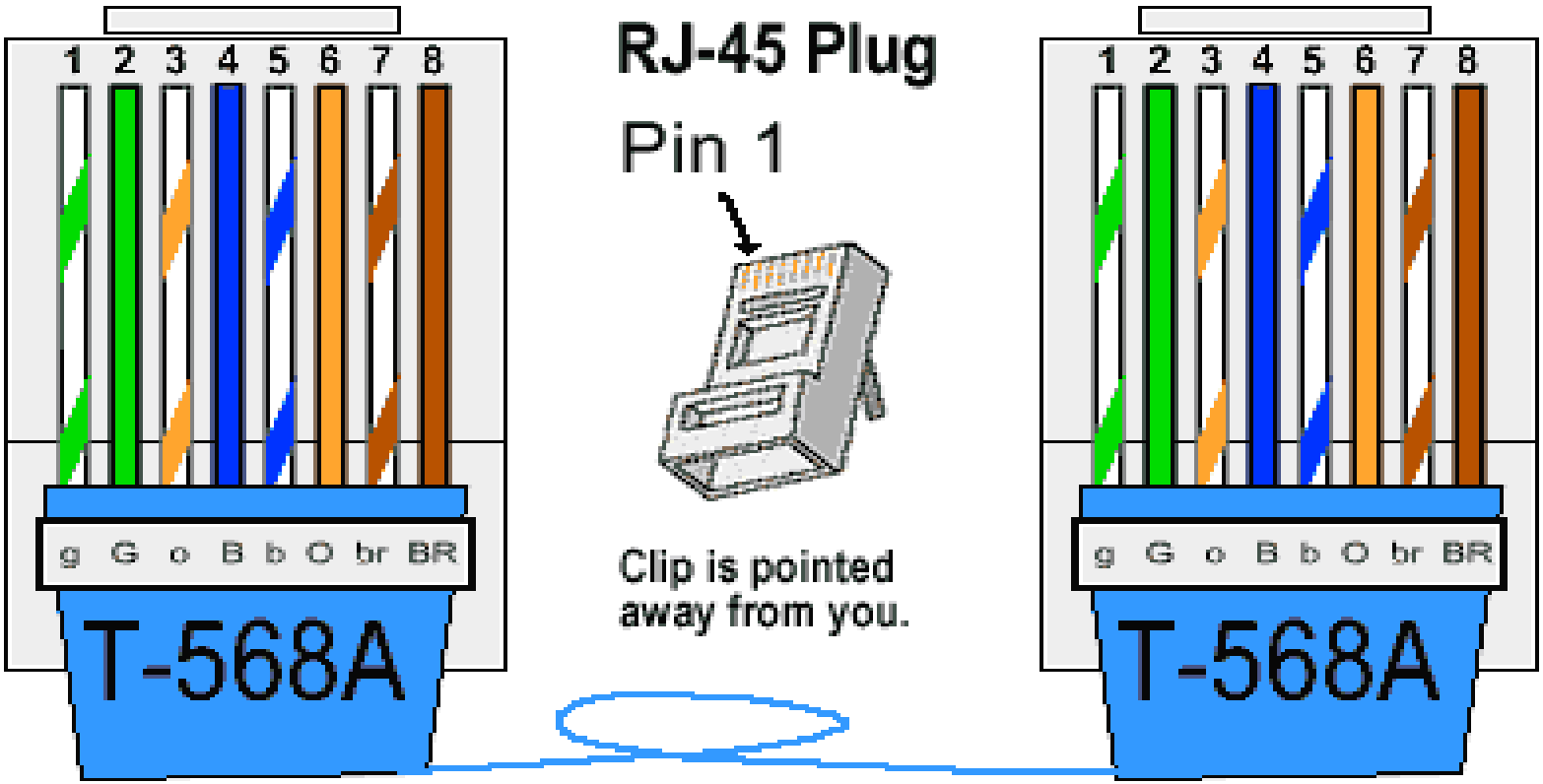
TIA/EIA 568A



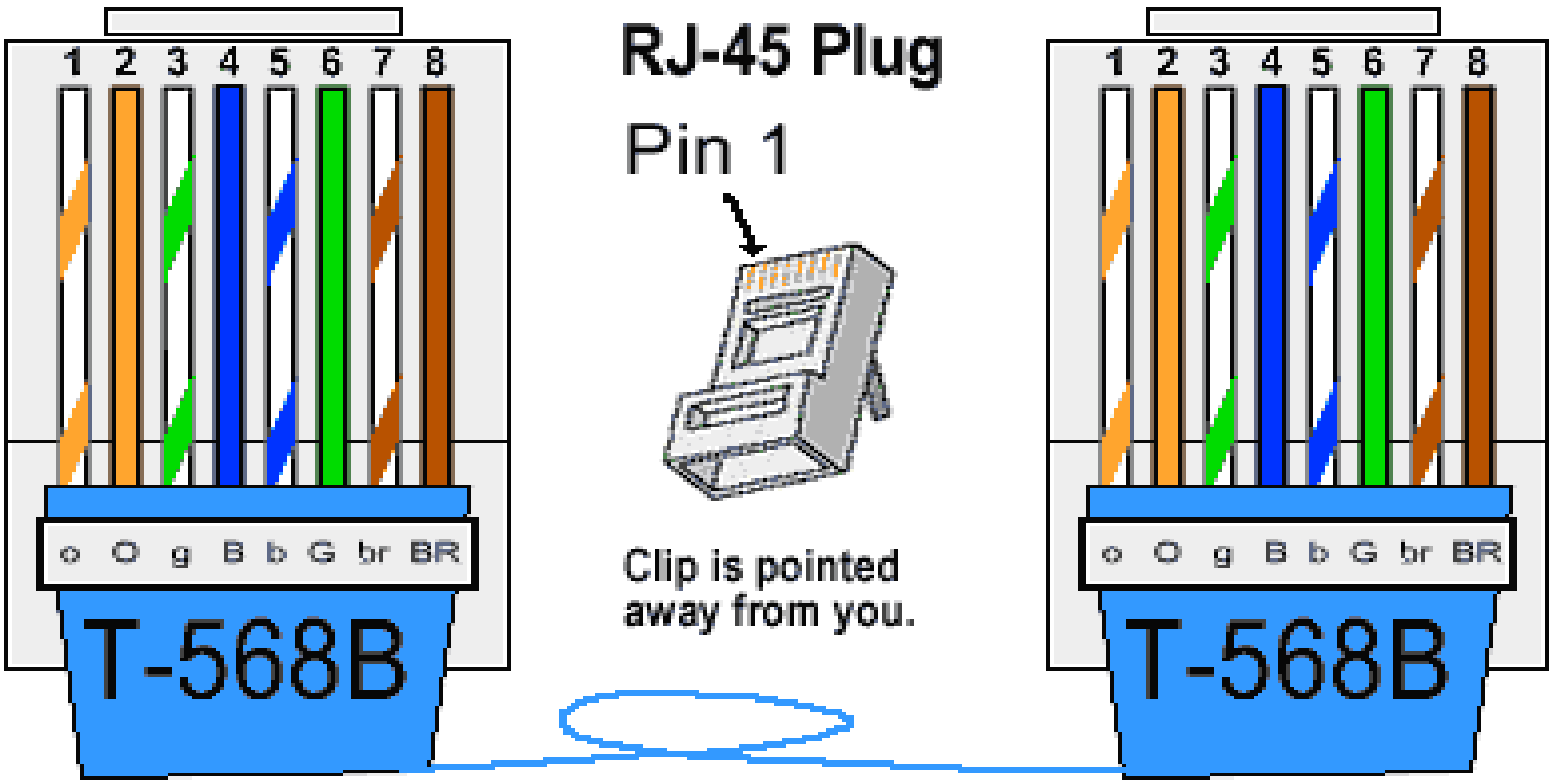
TIA/EIA 568B



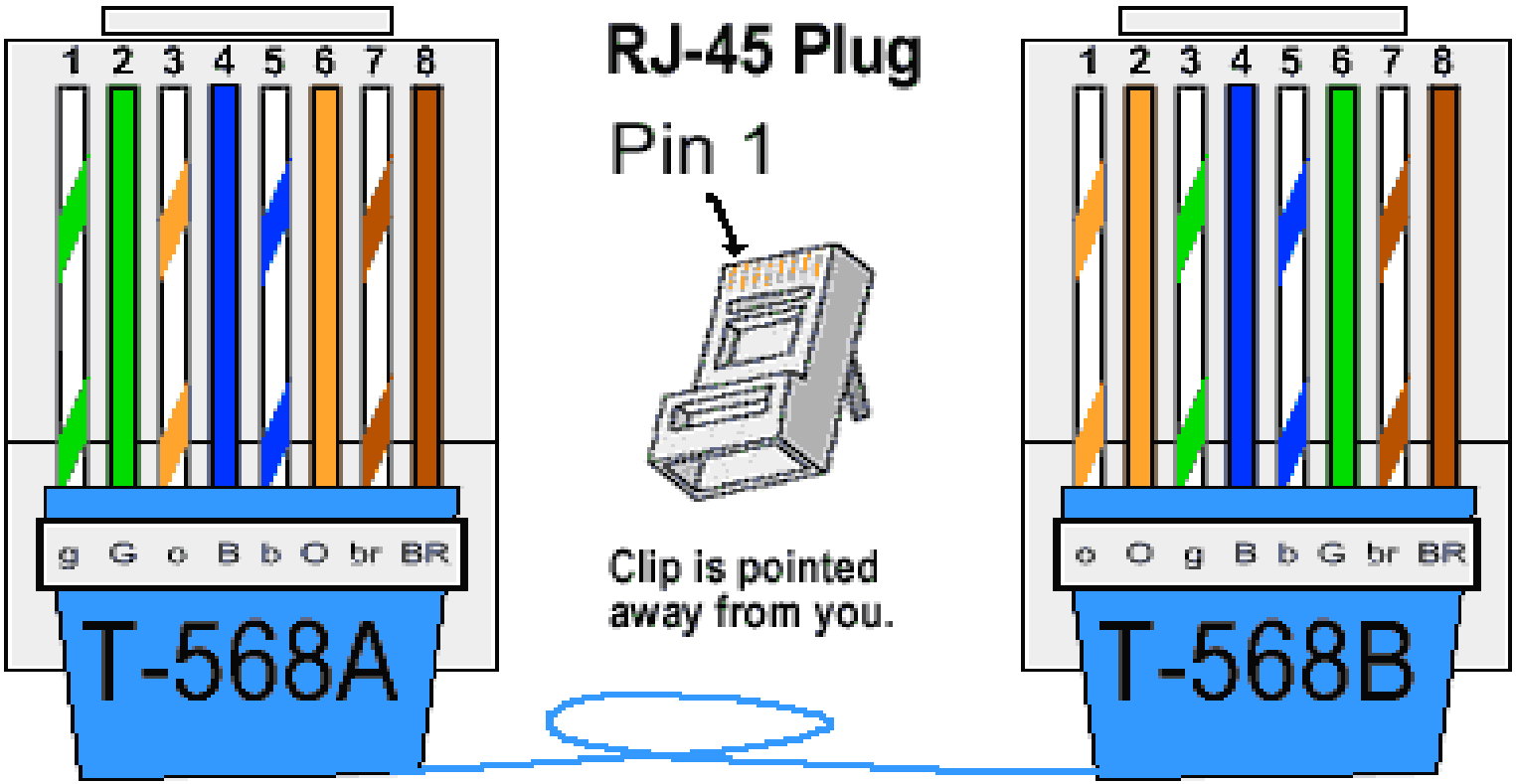
Straight Through (1)



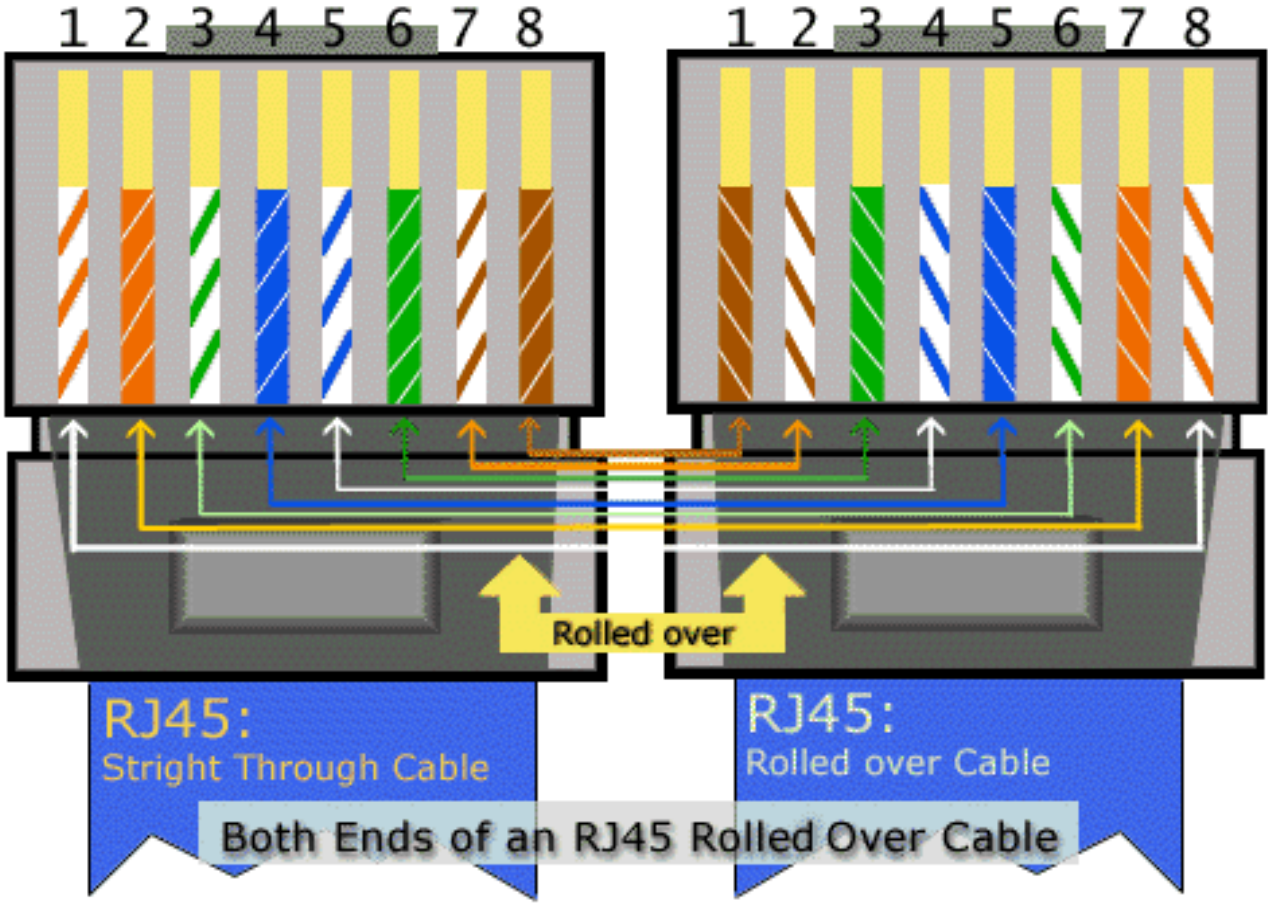
Straight Through (2)



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

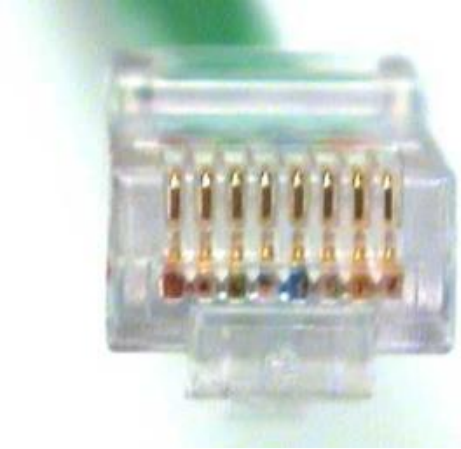
- PC to PC: Cross
- Switch to Switch: Cross
- Router to Router: Cross
- Hub to Hub: Cross
- PC to Switch: Straight
- Switch to Router: Straight
- PC to Router: Cross
- Switch to Hub: Cross

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

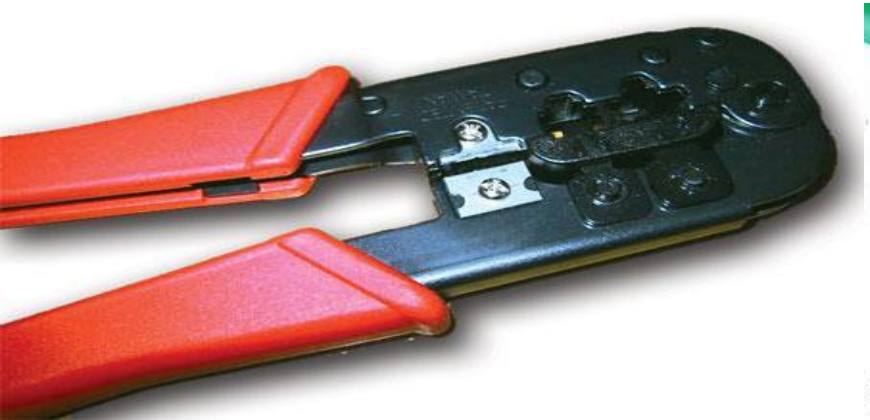
Straight

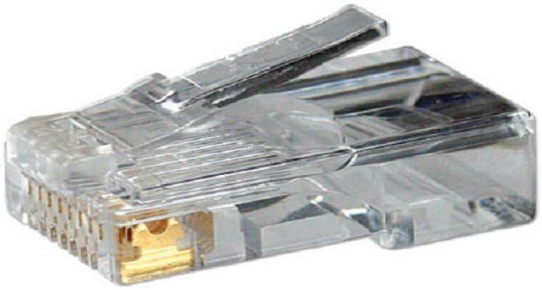


RJ45 Socket

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

H High Intelligent
Disconnected
Agere Systems AC'97 Modem

Intell
Disconnected
Agere Systems AC'97 Modem

Omid (Daily)
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
ugged
ess Server ...

- 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

Network Connections

File Edit View Favorites Tools Advanced Help

Back Search Folders

Address Network Connections Go

Network Tasks

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Details

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Agere Systems AC'97 Mode

intelligent

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H High Intelligent
Disconnected
Agere Systems AC'97 Modem

Intell
Disconnected
Agere Systems AC'97 Mode

LAN or High-Speed Internet

1394 Connection
Connected
1394 Net Adapter

work Connection
d
Wireless 2200BG...

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

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
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- Change settings of this connection

Other Places

- Control Panel
- My Network Places
- My Documents
- My Computer

Details

Wireless Network Connection

Not connected

Dial-up

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Disconnected
Agere Systems AC'97 Mode

intelligent

Omid (Nightly)
ns AC'97 Modem

H High Intelligent
Disconnected
Agere Systems AC'97 Modem

Intell
Disconnected
Agere Systems AC'97 Mode

LAN or High-Speed Internet

1394 Connection
Connected
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

Learn about setting up wireless network configuration.

Advanced

OK Cancel

work Connection
d
Wireless 2200BG...

start My Pictures - ACDSee... Network Connections Wireless Network Co... EN 7:45 AM

Network Connections

File Edit View Favorites Tools Advanced Help

Back Search Folders

Address Network Connections Go

Network Tasks

- Create a new connection
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- My Network Places
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- My Computer

Details

Wireless Network Connection

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Dial-up

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Agere Systems AC'97 Mode

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Omid (Nightly)
ns AC'97 Modem

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Disconnected
Agere Systems AC'97 Mode

LAN or High-Speed Internet

1394 Connection
Connected
1394 Net Adapter

work Connection
d
Wireless 2200BG...

Wireless Network Connection Properties

General | Wireless Networks | Advanced

☑ Use Windows to configure my wireless network settings

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- 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 | 7:46 AM

Network Connections

File Edit View Favorites Tools Advanced Help

Back Search Folders

Address Network Connections Go

Network Tasks

- Create a new connection
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- Disable this network device
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Other Places

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- My Network Places
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Agere Systems AC'97 Mode

intelligent

Omid (Nightly)
ns AC'97 Modem

H High Intelligent
Disconnected
Agere Systems AC'97 Modem

Intell
Disconnected
Agere Systems AC'97 Mode

LAN or High-Speed Internet

1394 Connection
Connected
1394 Net Adapter

onnection
ss 2200BG...

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

Network Connections

File Edit View Favorites Tools Advanced Help

Back Search Folders

Address Network Connections Go

Network Tasks

- Create a new connection
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- Change Windows Firewall settings
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- Disable this network device
- Repair this connection
- Rename this connection
- Change settings of this connection

Other Places

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- My Network Places
- My Documents
- My Computer

Details

Wireless Network Connection

Not connected

Dial-up

Intelligent
Disconnected
Agere Systems AC'97 Modem

Intelligent
Disconnected
Agere Systems AC'97 Modem

LAN or High-Speed

1394 Connection
1394 Network

Network Network
cable unplugged
LAN Access Server ...

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 — Automatic
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

Networks you can view, modify, 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	Manually connect
Amir-adhoc	Automatically connect
Amir-adhoc2	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

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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 — Manually connect

Amir-adhoc — Automatically connect

Amir-adhoc2 — Automatically connect

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

3 items

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	Manually connect
T8-A	Manually connect
Amir-adhoc	Automatically connect
Amir-adhoc2	Automatically connect

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

4 items

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

Command Prompt

```
Microsoft Windows [Version 6.2.9200]
(c) 2012 Microsoft Corporation. All rights reserved.

C:\Users\Aatif>netsh wlan show drivers

Interface name: Wi-Fi

    Driver                  : Intel(R) Centrino(R) Wireless-N 2230
    Vendor                  : Intel Corporation
    Provider                : Intel
    Date                    : 6/3/2012
    Version                 : 15.2.0.19
    INF file                : C:\WINDOWS\INF\oem33.inf
    Files                   : 4 total
                              C:\WINDOWS\system32\DRIVERS\Netwsw00.sys
                              C:\WINDOWS\system32\Netwcw00.dll
                              C:\WINDOWS\system32\Netwrw00.dll
                              C:\WINDOWS\system32\drivers\vwifibus.sys
    Type                    : Native Wi-Fi Driver
    Radio types supported   : 802.11b 802.11g 802.11n
    FIPS 140-2 mode supported : Yes
    802.11w Management Frame Protection supported : No
    Hosted network supported  : Yes
    Authentication and cipher supported in infrastructure mode:
                              Open            None
```

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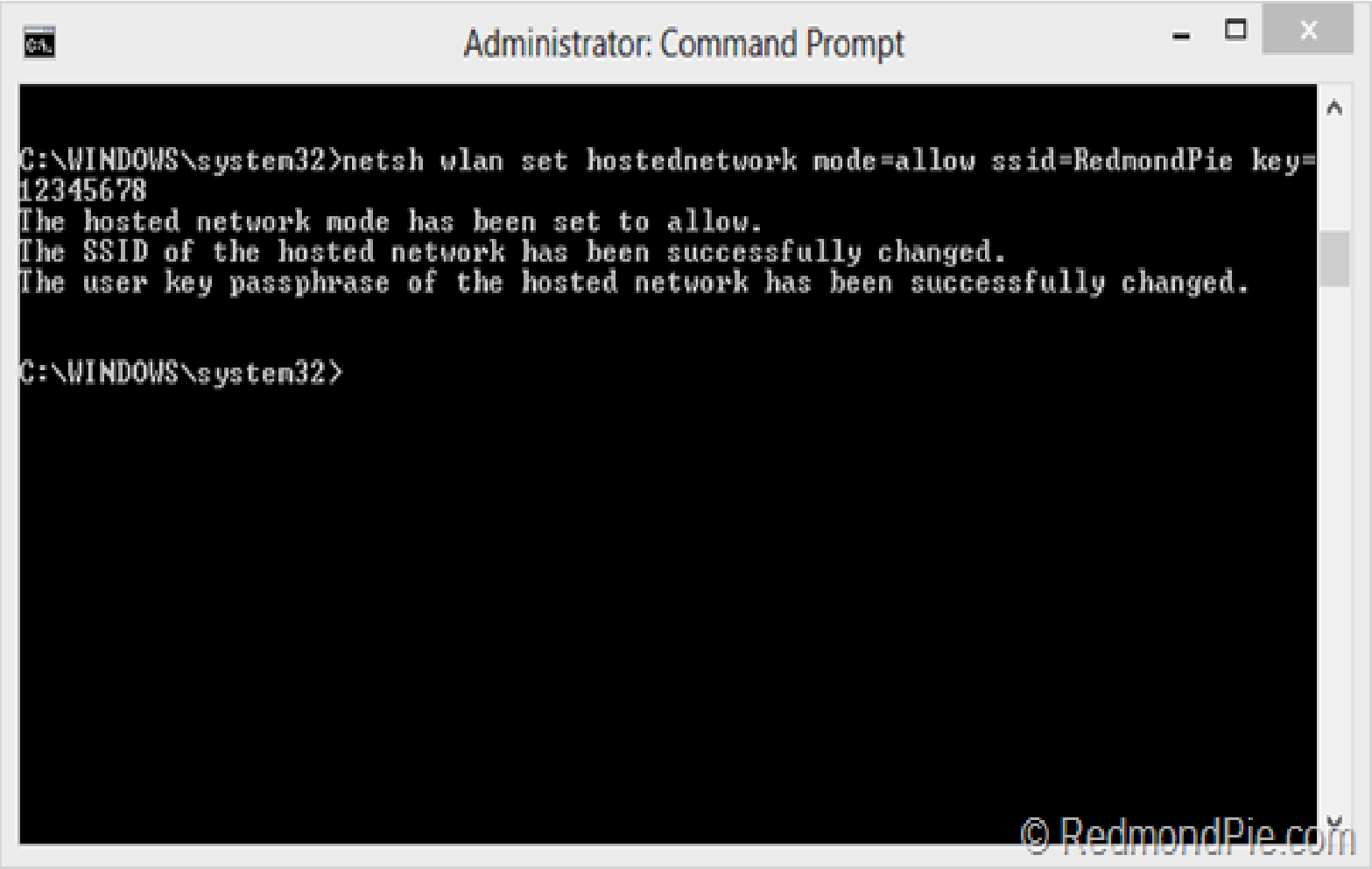
Ad-hoc in Windows 8

- 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>

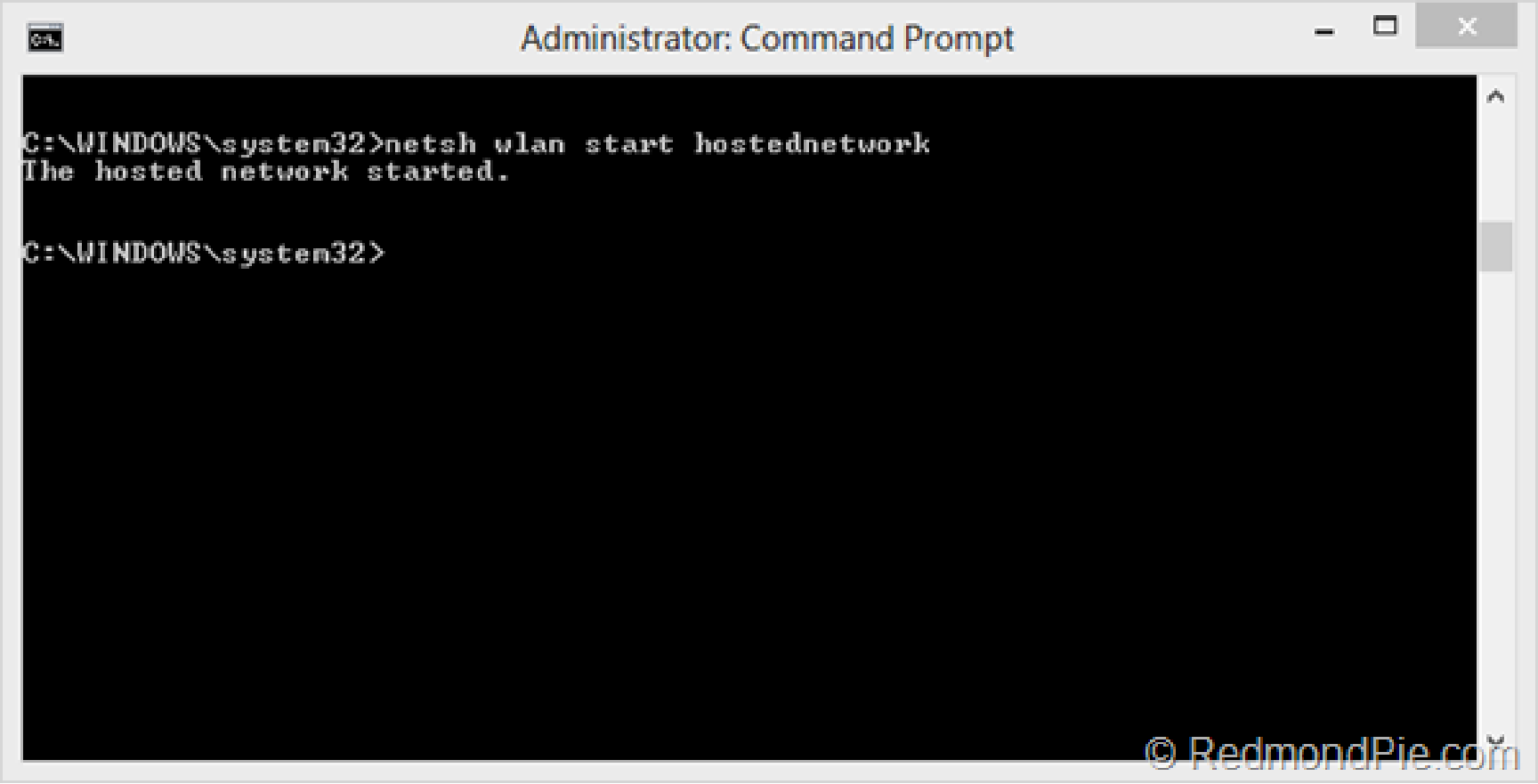
Ad-hoc in Windows 8



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*

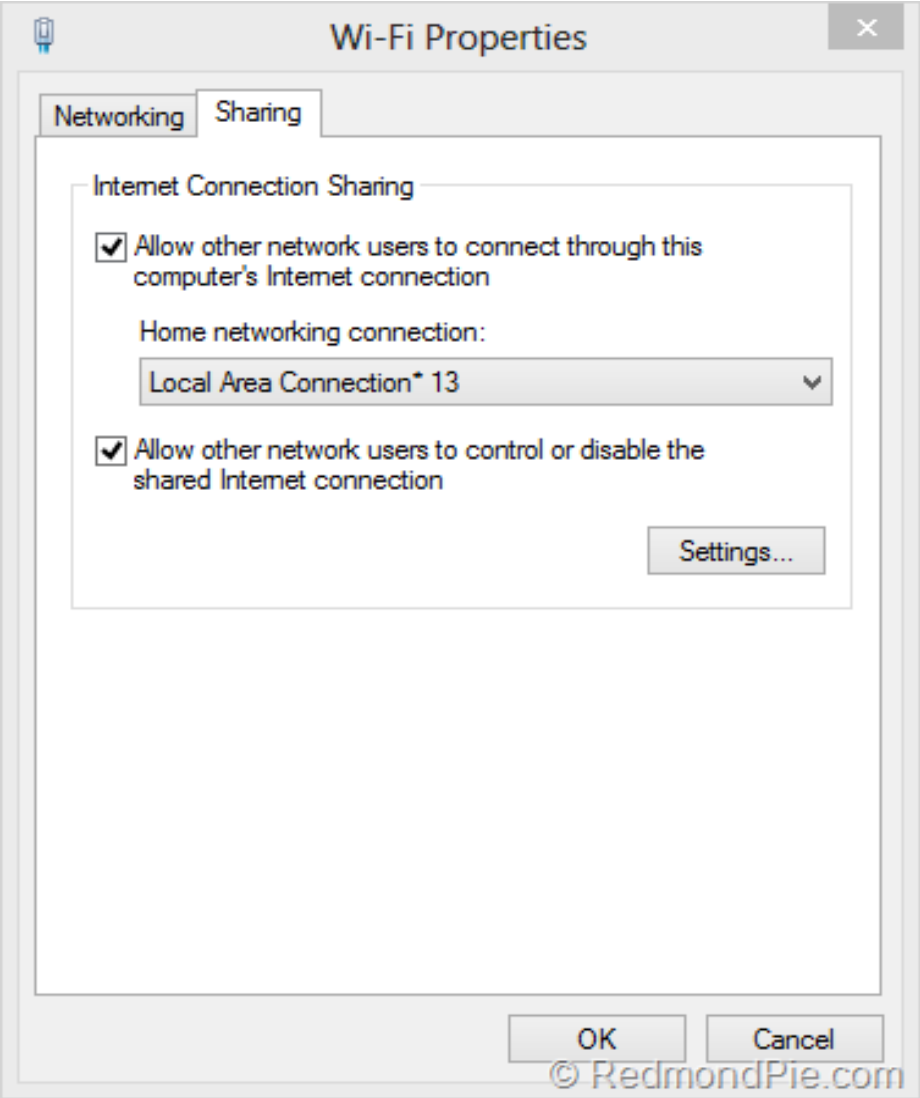
Ad-hoc in Windows 8

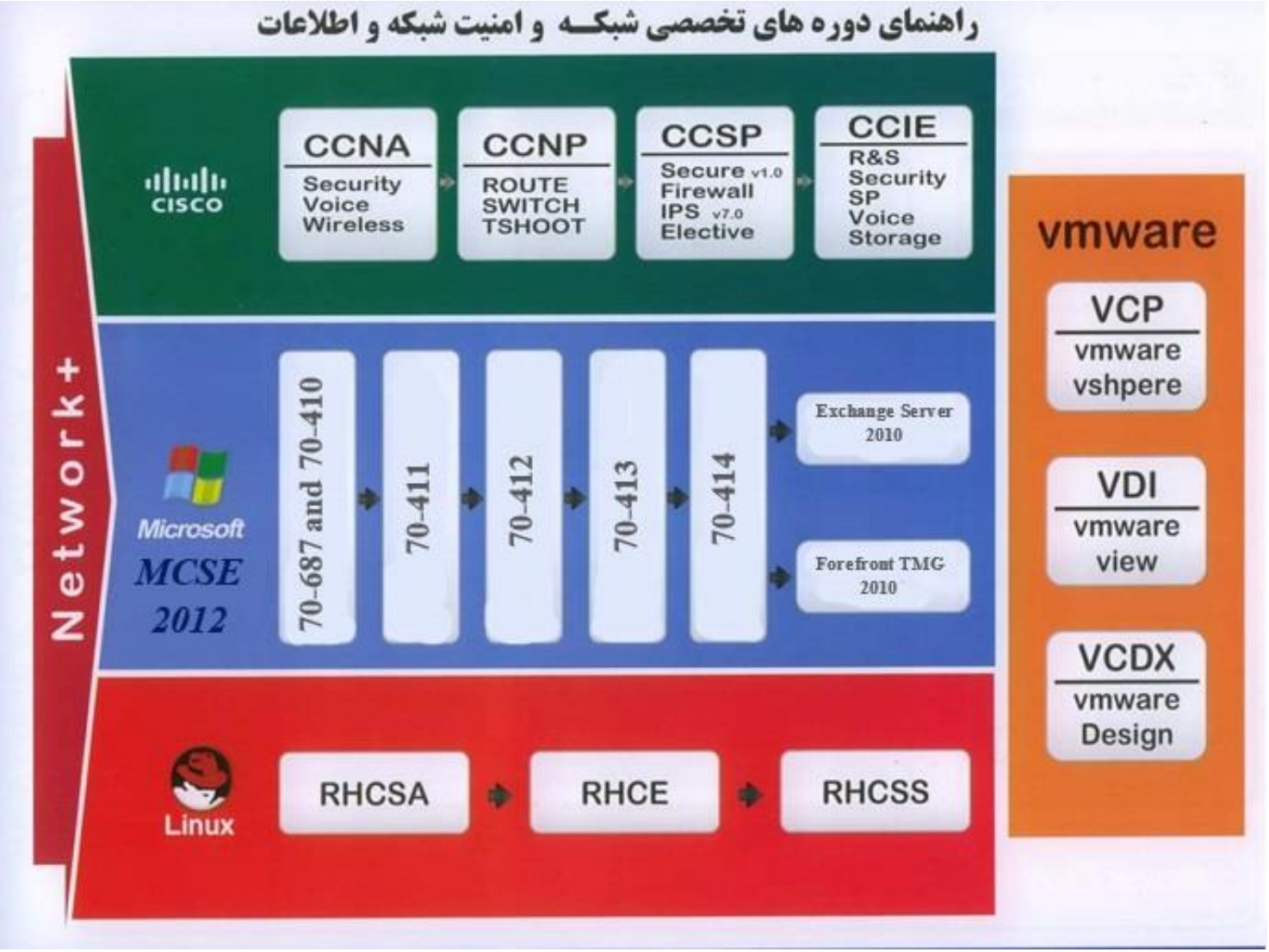


Ad-hoc in Windows 8

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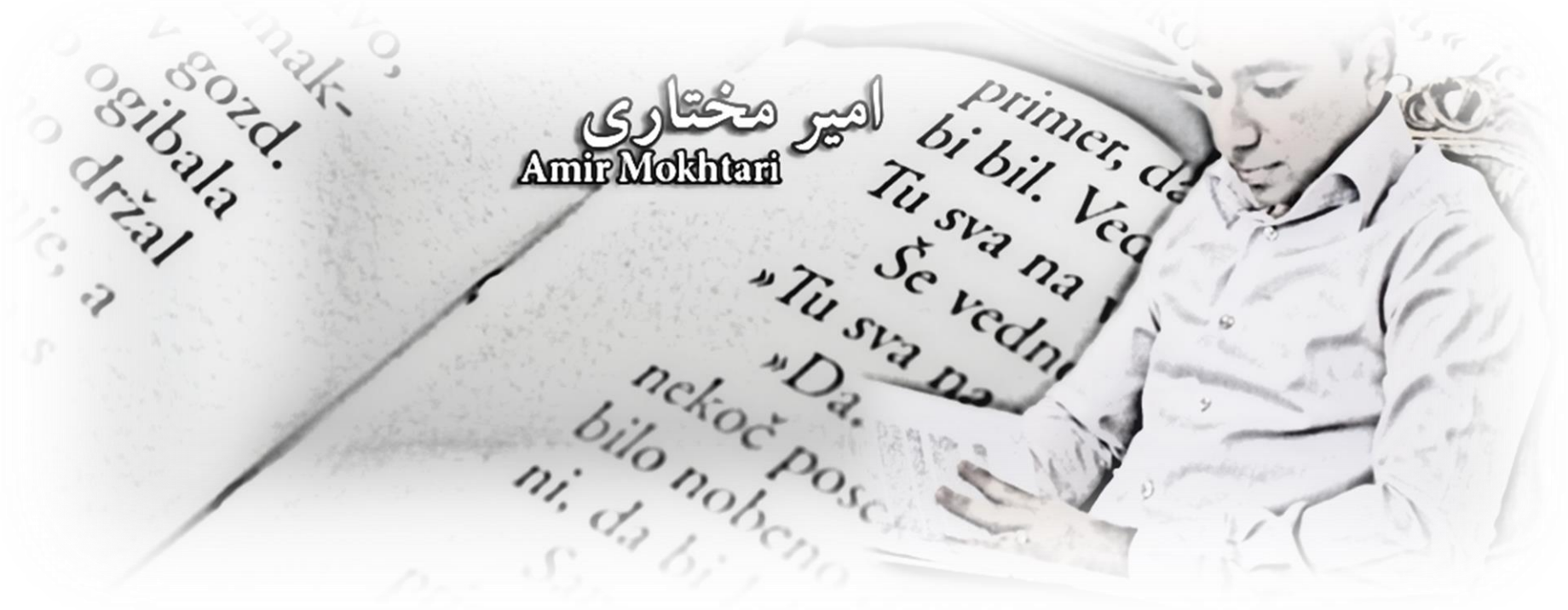
  - CCNA:
    - ICND1 (100-101)
    - ICND2 (200-101)

    → CCNA (200-120)
  - CCNP:
    - CCNP Route (642-902)
    - CCNP Switch (642-813)
    - CCNP T-Shoot (642-832)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