FIFTH EDITION

Data Communications AND Networking

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Computer Networks

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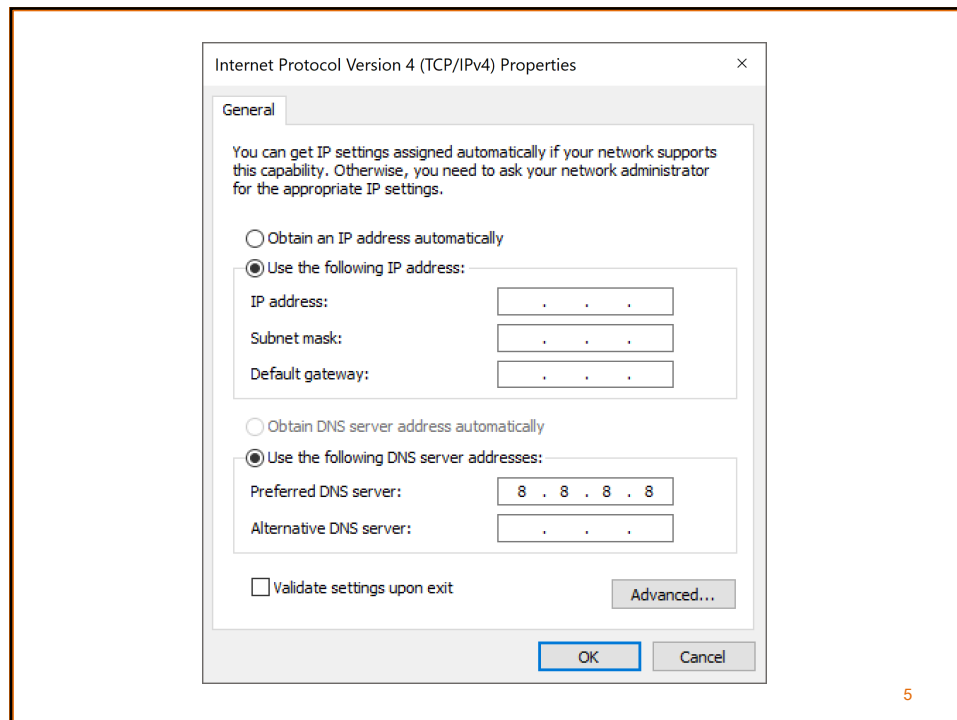
DHCP

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Dynamic Host Configuration Protocol (DHCP)

– Address **assignment** in an organization can be done **automatically** using the **DHCP.**

– **DHCP** is an application-layer **program**, using the **client-server** paradigm, that actually helps TCP/IP at the network layer.

– **DHCP** often called a *plug-and-play protocol*.

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DHCP Usage

– **Four** pieces of **information** are normally needed by any **host** and can be **provided** by DHCP:
1. Computer address (**IP**).
2. Prefix (**Mask**).
3. Address of a router (**Gateway**).
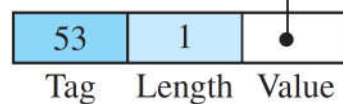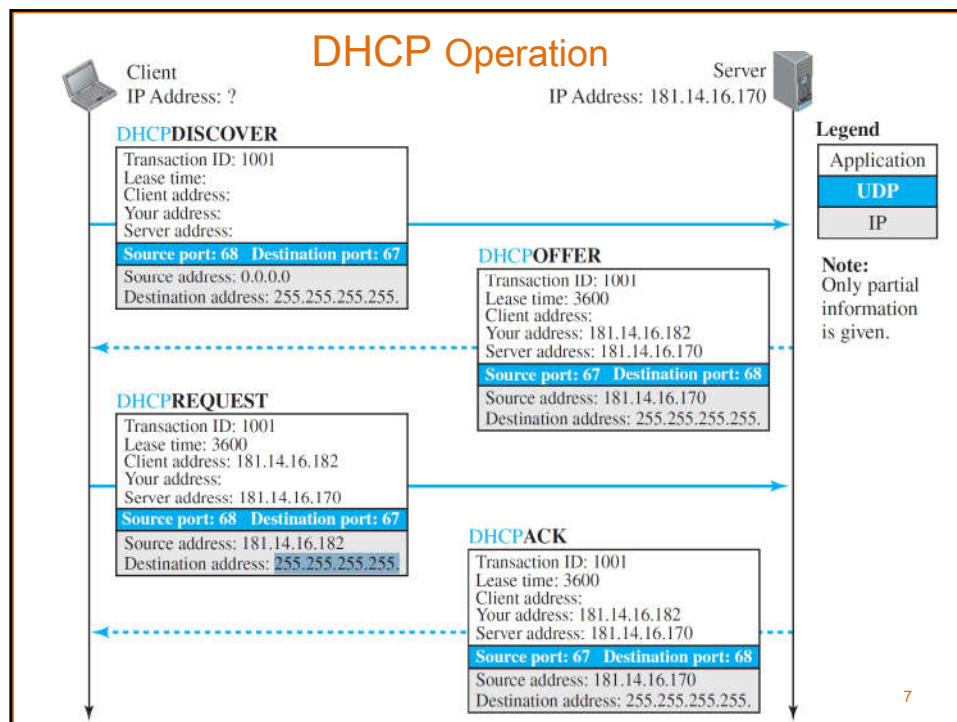4. IP address of a name server (**DNS**).

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Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically
◉ Use the following IP address:

IP address: . . .
Subnet mask: . . .
Default gateway: . . .

○ Obtain DNS server address automatically
◉ Use the following DNS server addresses:

Preferred DNS server: 8 . 8 . 8 . 8
Alternative DNS server: . . .

☐ Validate settings upon exit   Advanced...

OK   Cancel

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DHCP Message Options Field

Option format

1 **DHCP**DISCOVER   5 **DHCP**ACK
2 **DHCP**OFFER   6 **DHCP**NACK
3 **DHCP**REQUEST   7 **DHCP**RELEASE
4 **DHCP**DECLINE   8 **DHCP**INFORM

| 53 | 1 | ● |
| Tag | Length | Value |

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DHCP Operation

Client
IP Address: ?

Server
IP Address: 181.14.16.170

DHCPDISCOVER
Transaction ID: 1001
Lease time:
Client address:
Your address:
Server address:
Source port: 68   Destination port: 67
Source address: 0.0.0.0
Destination address: 255.255.255.255.

DHCPOFFER
Transaction ID: 1001
Lease time: 3600
Client address:
Your address: 181.14.16.182
Server address: 181.14.16.170
Source port: 67   Destination port: 68
Source address: 181.14.16.170
Destination address: 255.255.255.255.

DHCPREQUEST
Transaction ID: 1001
Lease time: 3600
Client address: 181.14.16.182
Your address:
Server address: 181.14.16.170
Source port: 68   Destination port: 67
Source address: 181.14.16.182
Destination address: 255.255.255.255.

DHCPACK
Transaction ID: 1001
Lease time: 3600
Client address:
Your address: 181.14.16.182
Server address: 181.14.16.170
Source port: 67   Destination port: 68
Source address: 181.14.16.170
Destination address: 255.255.255.255.

Legend
Application
UDP
IP

Note:
Only partial
information
is given.

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Automatic Private IP Addressing (APIPA)

– To get an IPv4 address, the **client** will **select** an address at **random** in the range **169.254.1.0** to **169.254.254.255**, with a netmask of **255.255.0.0**.

– The client will then **send** an Address Resolution Protocol (**ARP)** packet **asking** for the **MAC** address that corresponds to the randomly-generated **IPv4** address.

– If any other **machine** is **using** that **address**, the client will generate **another random** address and **try again**.

– **APIPA** is **implemented** in Windows **98** and **later**.

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