

# Computer Networks: Application Layer Servers & Protocols



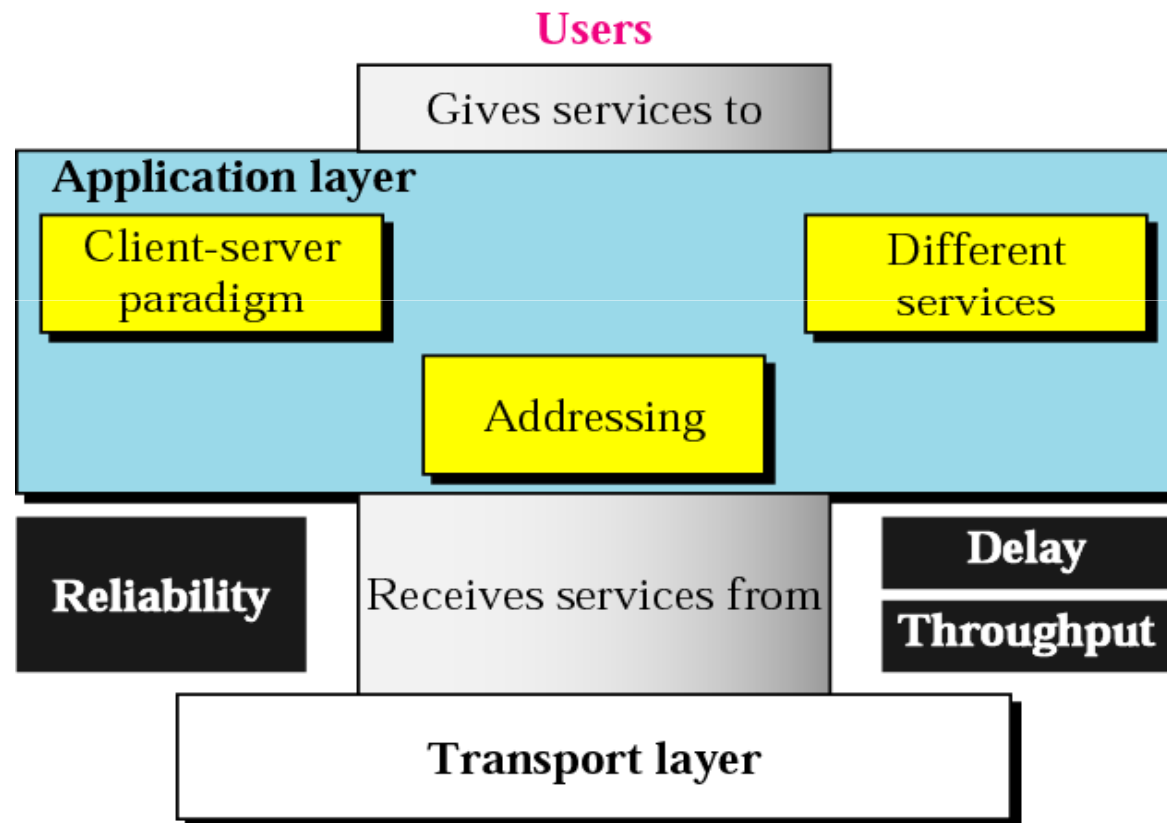
**By,**

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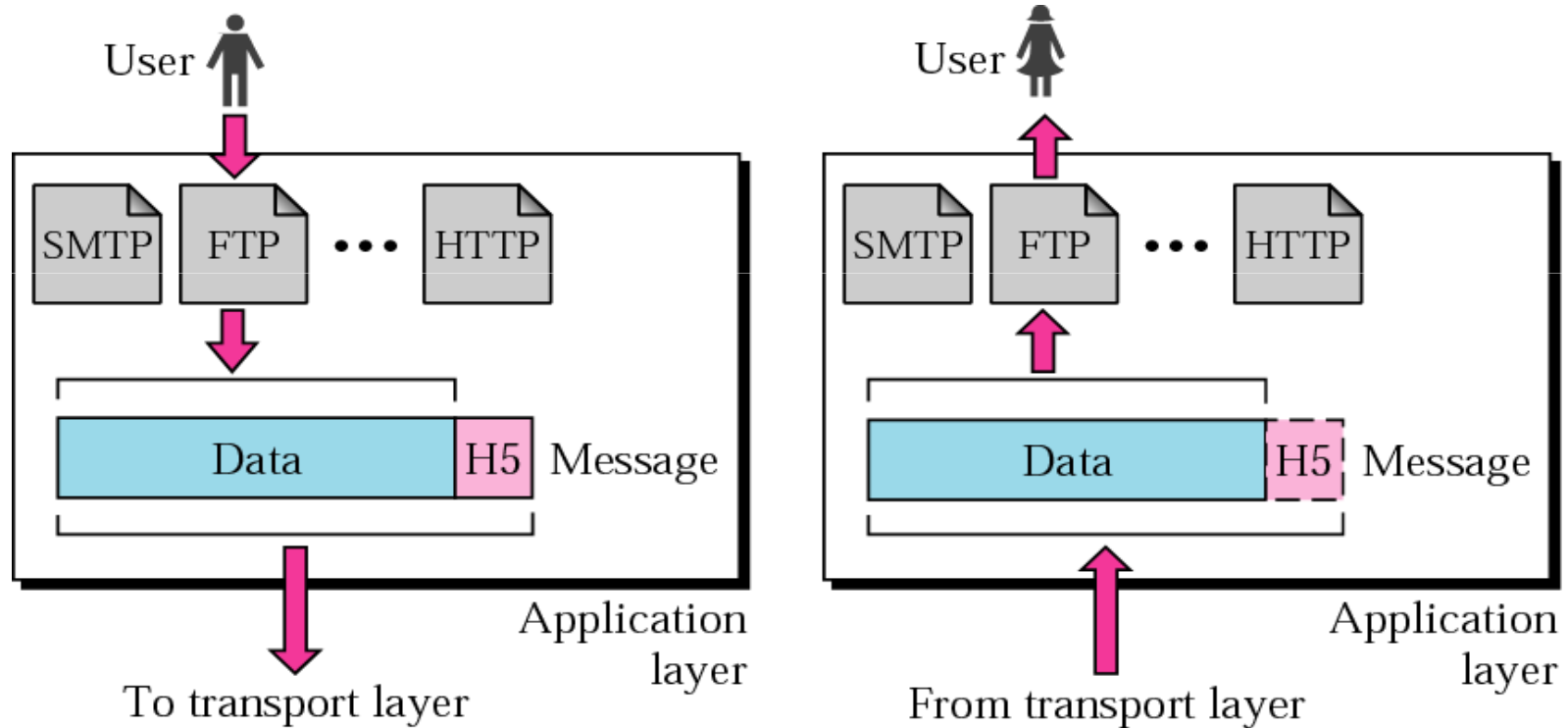
# Application Layer : Duties ??

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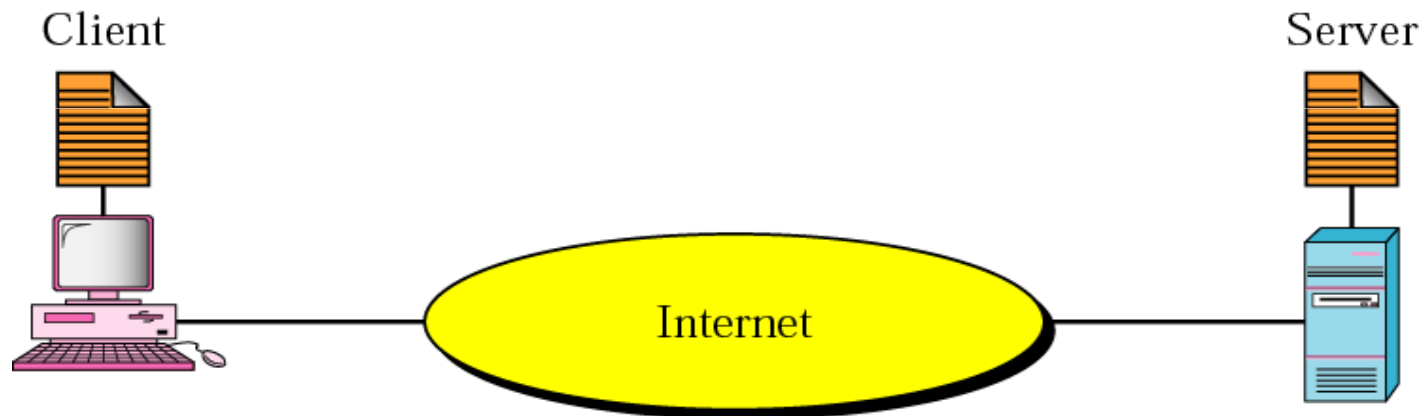
# Application Layer : Application Services

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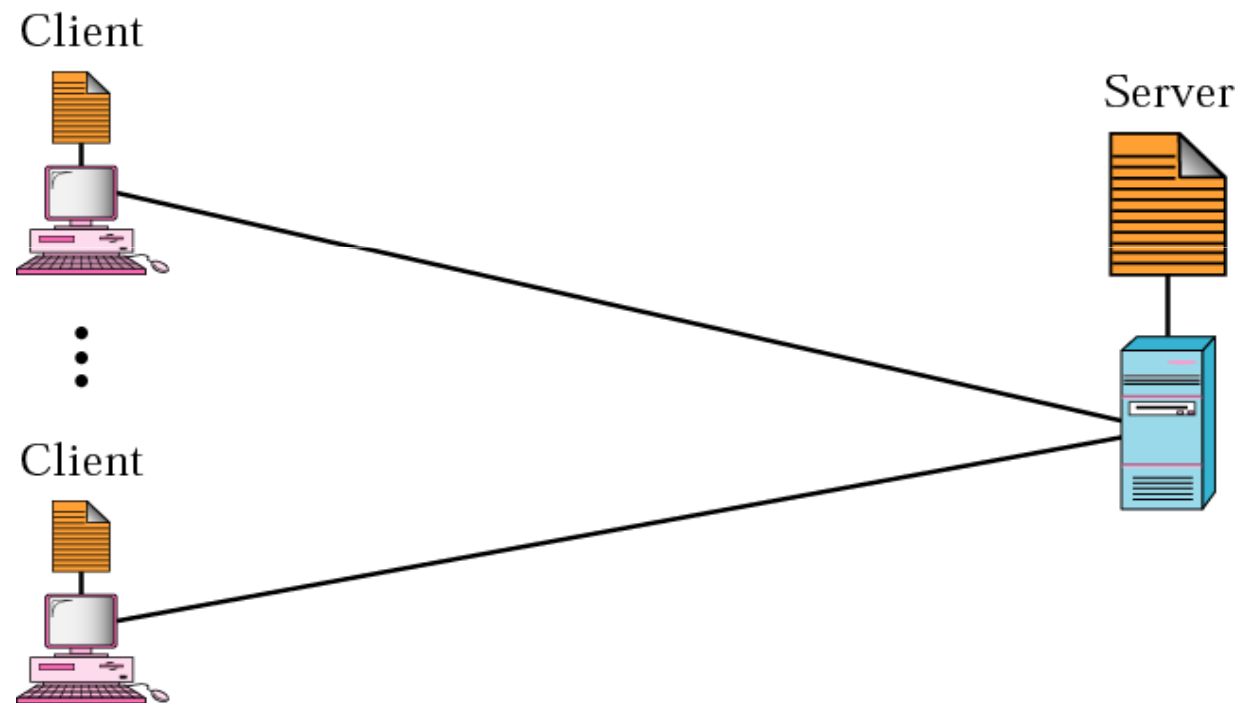
# Client Server Model : Generic Diagram

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# Client Server Relationship

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# DNS : Domain Name System

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- Hierarchical Naming System Built on a Distributed Database.
- Responsible to Translate Human Address into IP Address.
- Example => How To Verify ??

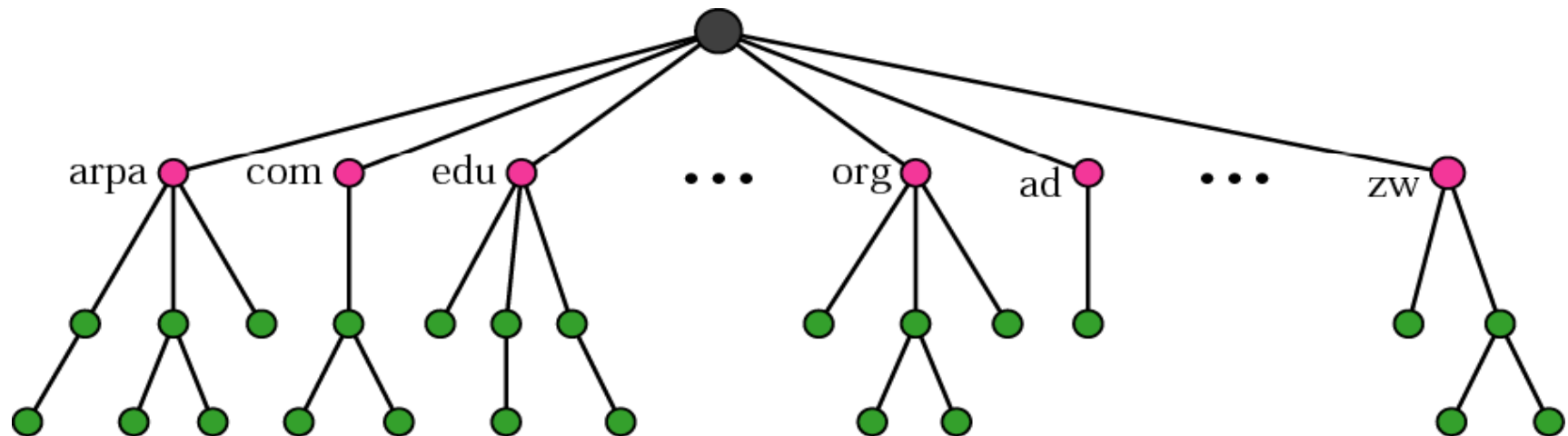
```
C:\Users\Kumar>nslookup www.google.com.np
Server:  ns1.wlink.com.np
Address:  202.79.32.4

Non-authoritative answer:
Name:     www.l.google.com
Address:  209.85.231.104
Aliases:  www.google.com.np
          www.google.com

C:\Users\Kumar>
```

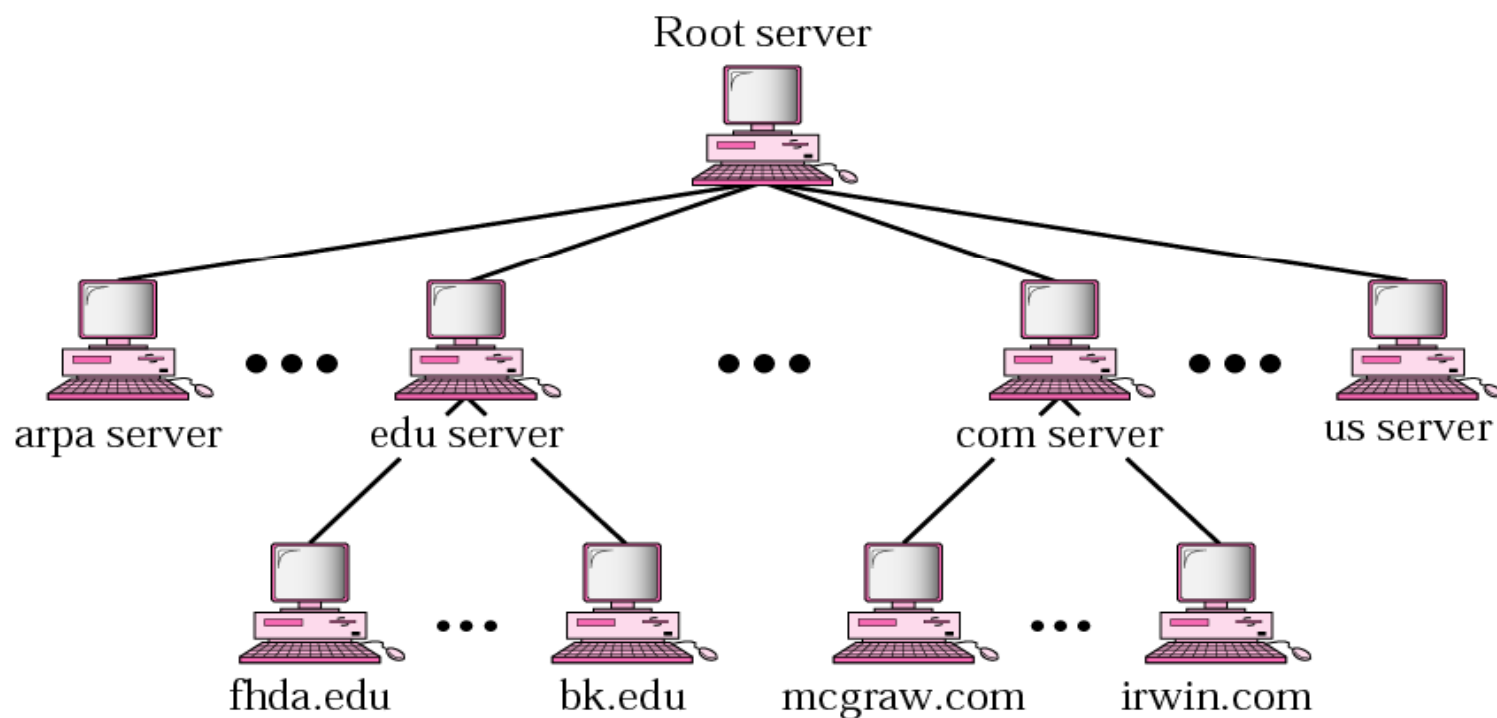
# Domain Name System : Hierarchical Naming

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# Domain Name System : Hierarchy of Name Servers

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# Domain Name System : Types

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- Root Name Servers
  - ✓ Contracts Authoritative Name Server if Mapping Not Found.
  - ✓ Gets Mapping.
  - ✓ Returns Mapping to Local Name Server.
  
- Top Level Domain Servers
  - ✓ Responsible for com, org, net.
  - ✓ All top level Country domains like us, uk, fr, np, in.
  
- Authoritative Domain Servers
  - ✓ Organization's DNS Servers.

# Domain Name Space : Root Name Servers

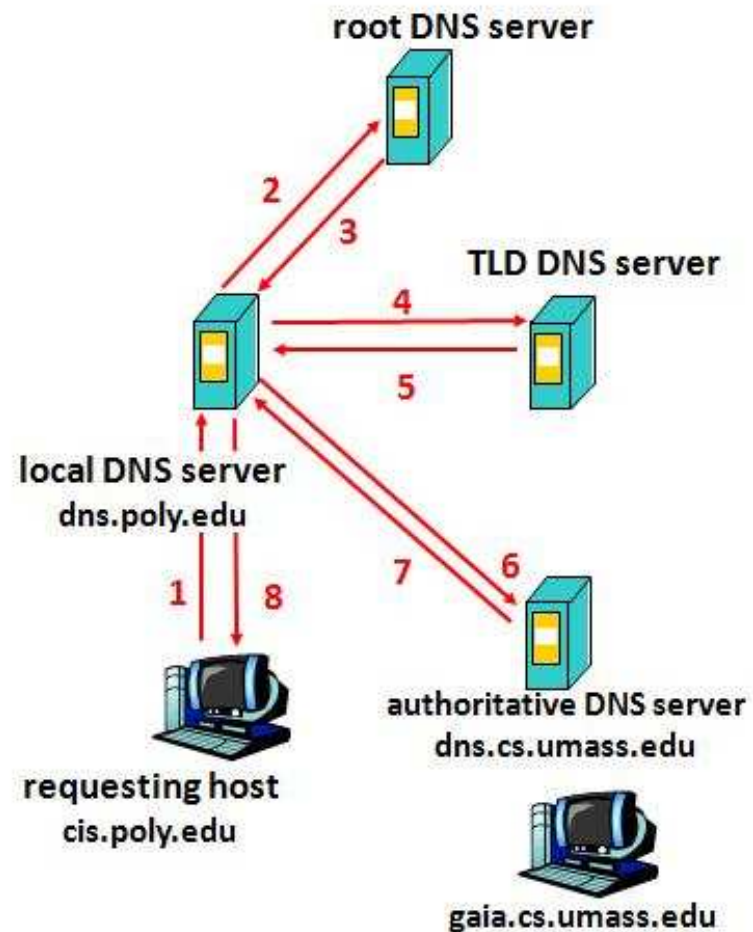
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13 Root Name Servers Worldwide

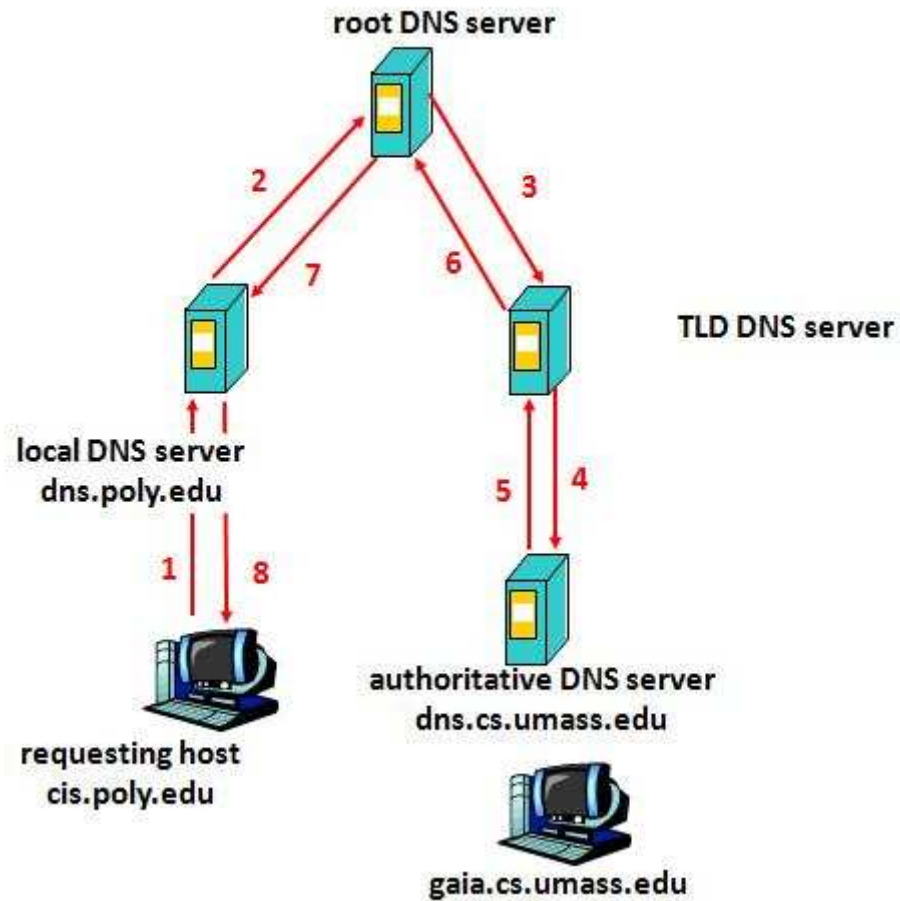
# DNS Name Resolution : Iterated Query

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# DNS Name Resolution : Recursive Query

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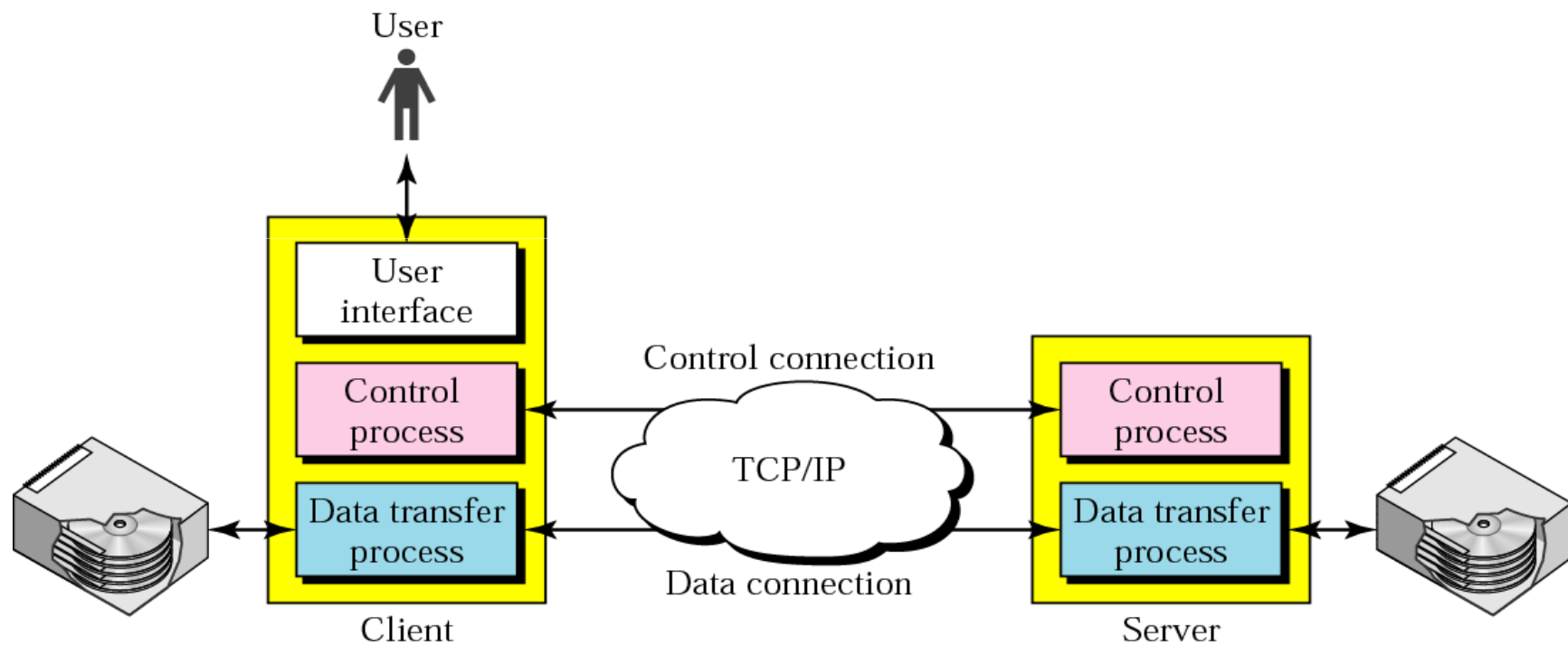
# FTP : File Transfer Protocol

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- Protocol used to Copy File from One Host to Another.
- It uses the Services of TCP.
- It needs Two TCP Connections.
- The Well Known Port 21 is used for Control Connection.
- The Well Known Port 20 is used for Data Connection.

# FTP : File Transfer Protocol

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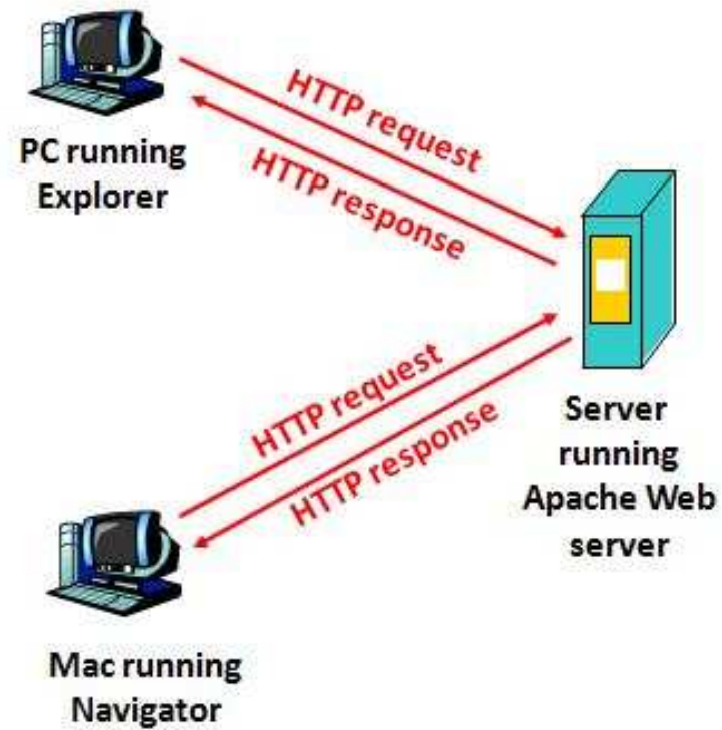
# HTTP : Hyper Text Transfer Protocol

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- Foundation of Data Communication For World Wide Web.
- HTTP Functions as Request/Response Protocol in Client Server Computing Model.
- Web Browser : Client
- Web Server : Apache Web Server
- HTTP is "Stateless" => No Information of Past Client Requests.
- HTTP Connections => Non Persistent and Persistent.

# HTTP : Request/Response Protocol

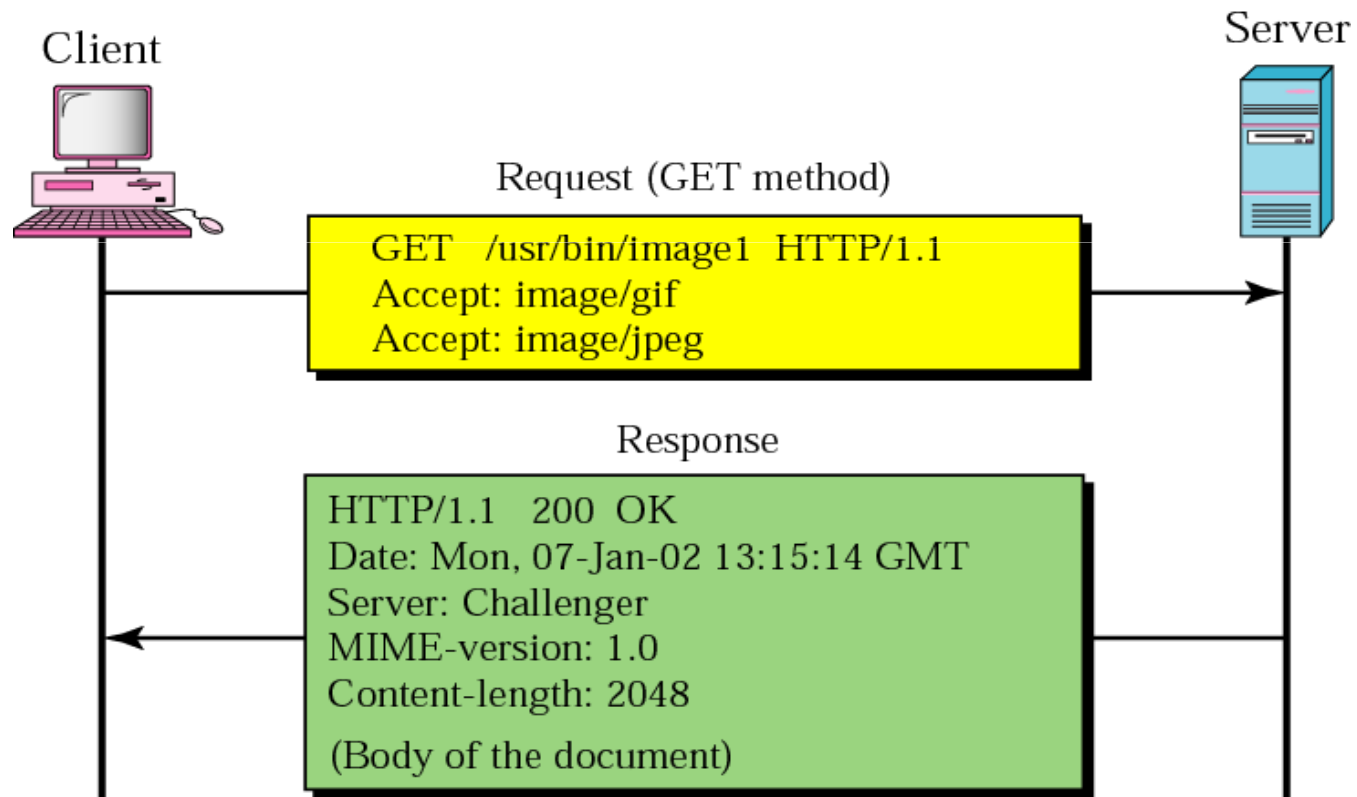
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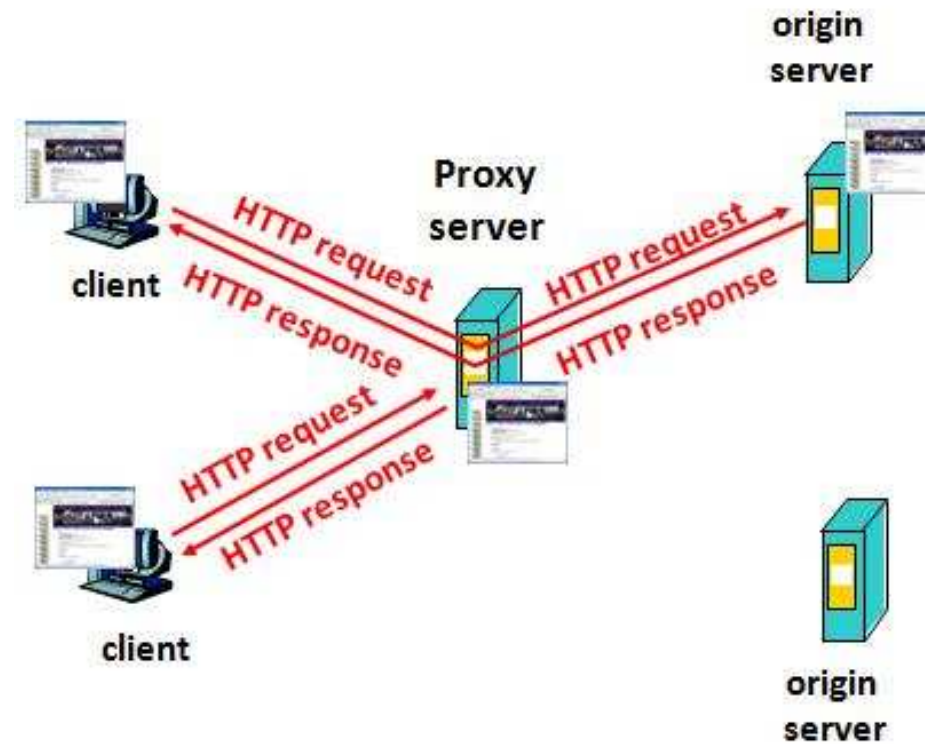
# HTTP : Request/Response Example

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# Proxy Server : Web Caching

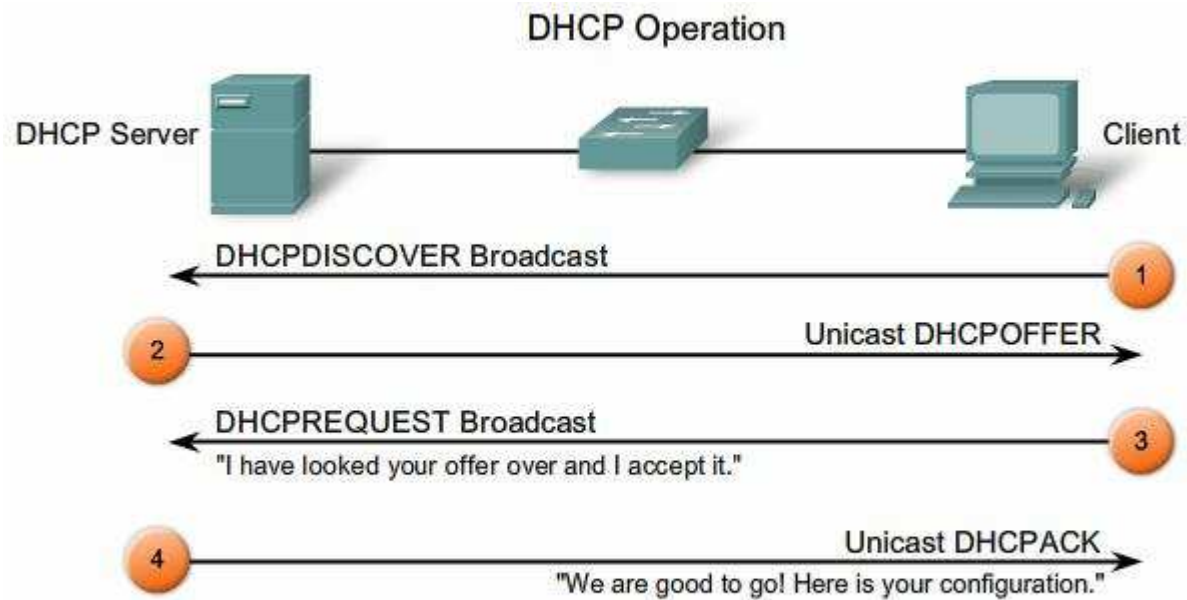
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Satisfy Client Request without Involving Origin Server

# DHCP : Dynamic Host Configuration Protocol

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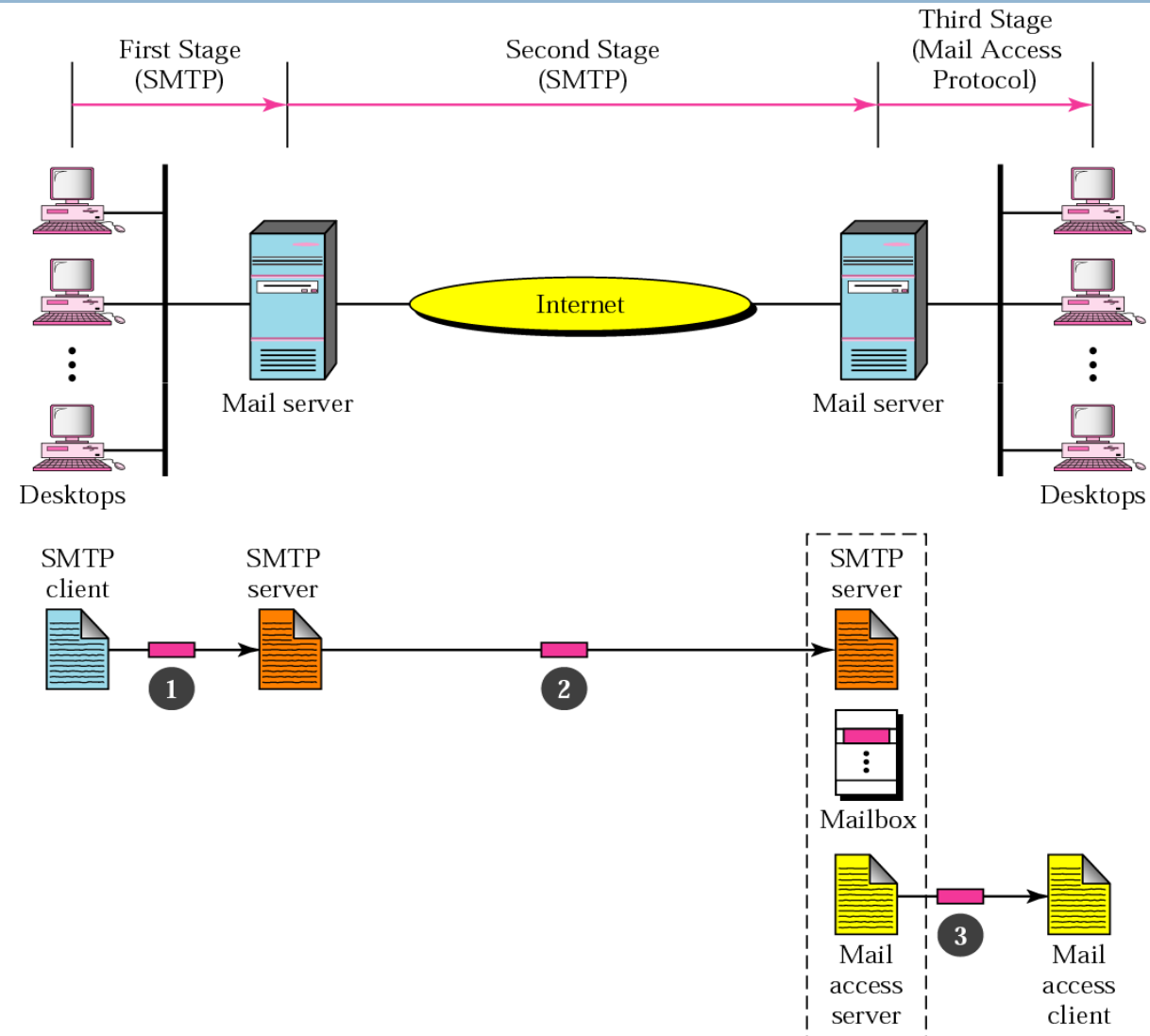
# SMTP : Simple Mail Transfer Protocol

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- Internet Standard for Electronic Mail Transmission.
- It is Specified for Outgoing Mail Transport.
- Uses TCP Port No 25.
- For Receiving Messages Clients Use IMAP or POP.
  - ✓ IMAP : Internet Message Access Protocol
  - ✓ POP : Post Office Protocol

# SMTP : Example

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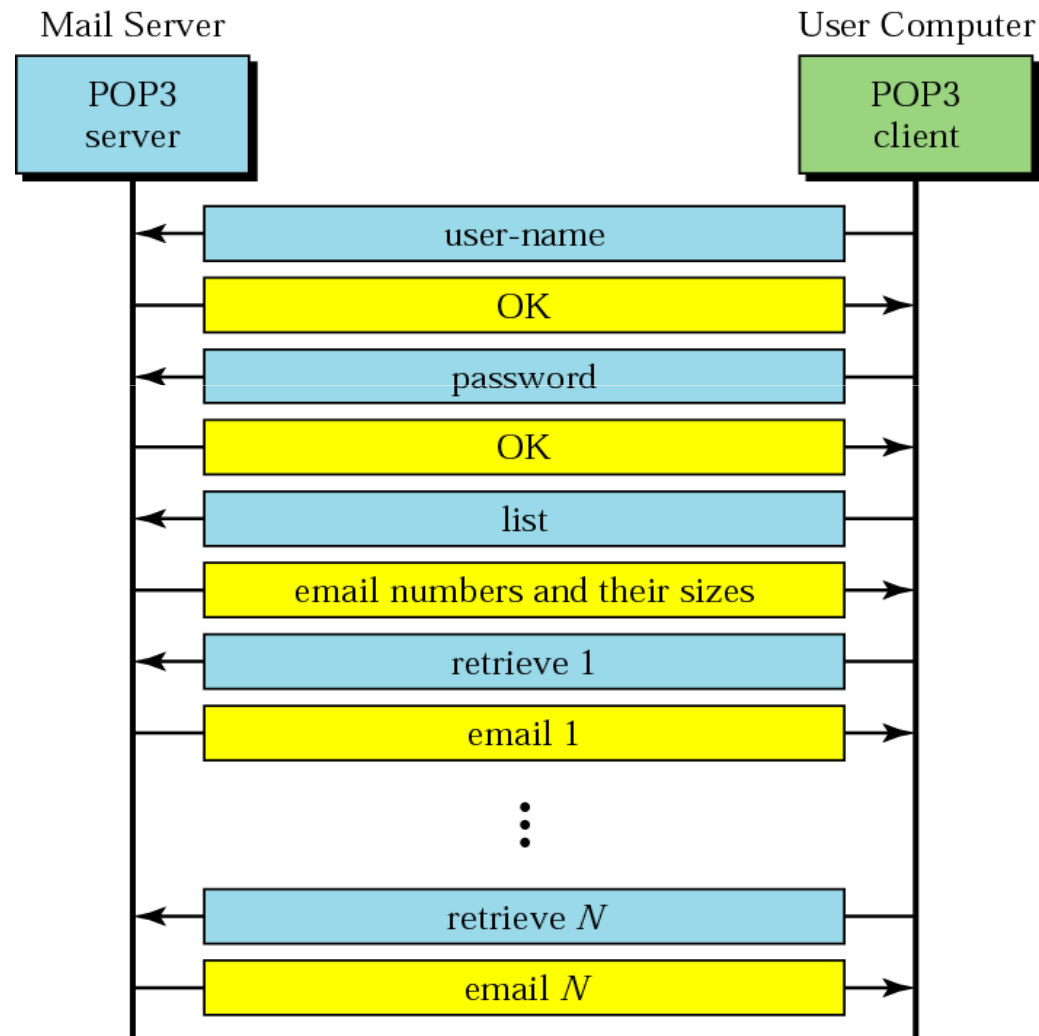
# POP : Post Office Protocol

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- Application Layer Protocol used by Email Clients to retrieve Email From Remote Server.
- POP Version 3 is referred as POP3.
- A POP3 Servers Listens on Well Know Port 110.
- Encryption Communication for POP3 Using SSL.
- It uses Well Known TCP Port 995 (Eg. Google Gmail).

# POP3 : Post Office Protocol Version 3 (Steps)

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# IMAP : Internet Message Access Protocol

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- It is one of the Prevalent Application Layer Protocol for Email Retrieval.
- All Modern Email Clients and Servers Supports IMAP.
- An IMAP Server Listens at Port 143.
- IMAP4 is referred as IMAP Version 4.
- Multiple Clients can Simultaneously connect to Same Mailbox.
- It allows Connected and Disconnected Mode of Operation.
- Multiple Mailboxes on the Server.



# Tools For Client Server:

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- Web Servers and Clients
  - ✓ Apache Tomcat
  - ✓ Microsoft IIS
  - ✓ Oracle Web Tier
  
  - ✓ Internet Explorer
  - ✓ Google Chrome
  - ✓ Mozilla Firefox
  
- Email Servers and Clients
  - ✓ Microsoft Exchange Server
  - ✓ Horde
  - ✓ WorldClient
  
  - ✓ Microsoft Outlook Express
  - ✓ Thunderbird

Thank You