IT Infrastructure Overview

- IT infrastructure as enabling technologies
- Network services overview
- Middleware services overview
- Platforms for mobile computing and EC/EB

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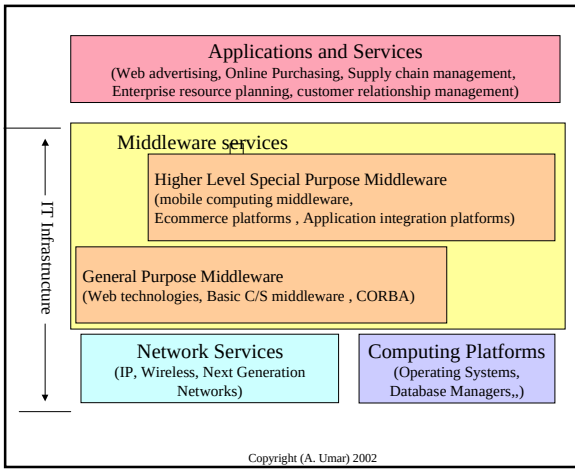
Introduction

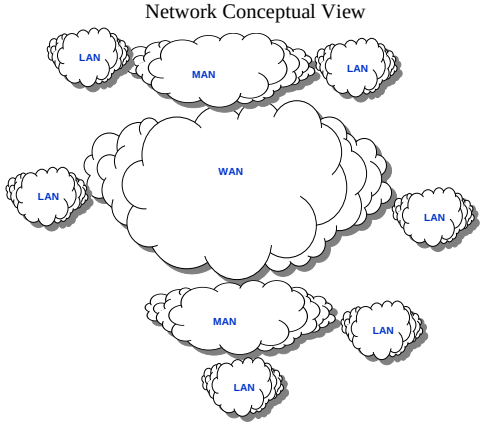
- The IT infrastructure enables ebusiness applications and is a key enabler of ebusiness strategies.
- Enabling technology building blocks:
  - Networks that provide the network transport between remote parties
  - Operating systems and computing hardware to provide the basic scheduling and hardware services
  - Middleware that interconnects remotely located, including but not restricted to, EB partners.
  - Specialized (higher level) middleware services being packaged as middleware platforms for ecommerce, mobile computing, etc.

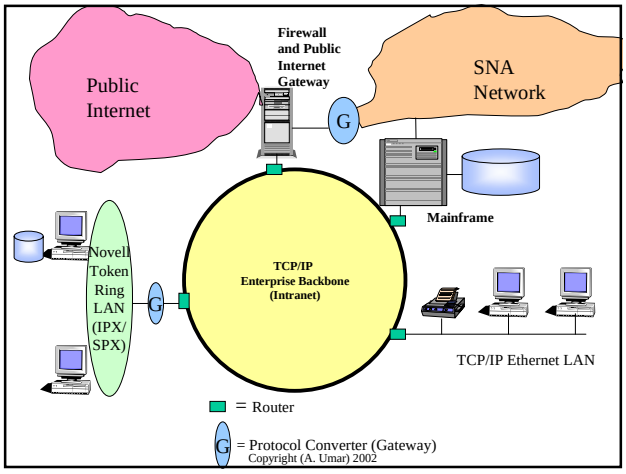


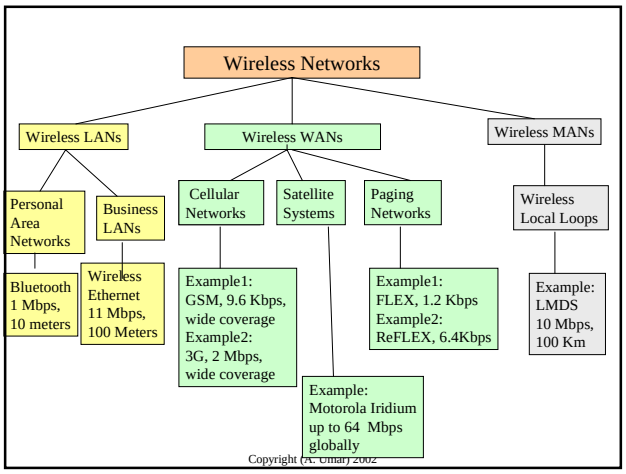
Network Overview

- At present by distance (changing)
- Local area networks (LANs):
  - Private ownership
  - Typically short distances (building, campus)
  - Ethernet, Token Ring
  - Data rates: 10 Mbps, 100 Mbps, higher
- Metropolitan area networks (MANs):
  - One agency ownership (e.g., cable company)
  - Typically a city or a suburb
  - FDDI (100 Mbps)
- Wide area networks (WANs):
  - Common carrier ownership (e.g., telephone company)
  - Typically long distances (state, country)
  - Typically packet switching (break message into packets and route)e.g., ATM, frame Relay, X.25, ISDN
  - Data rates: 56 Kbps (voice), 1.54 Mbps (T1), 43 Mbps (T3), 100+ Mbps (Sonet), many in between

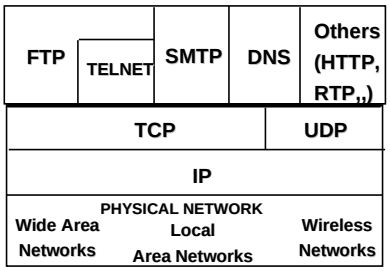
Network Conceptual View



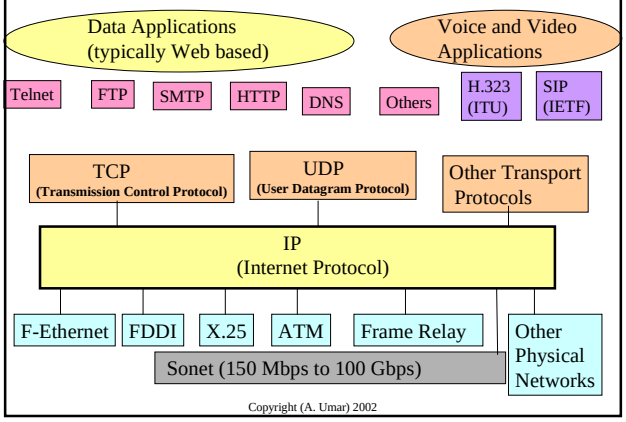




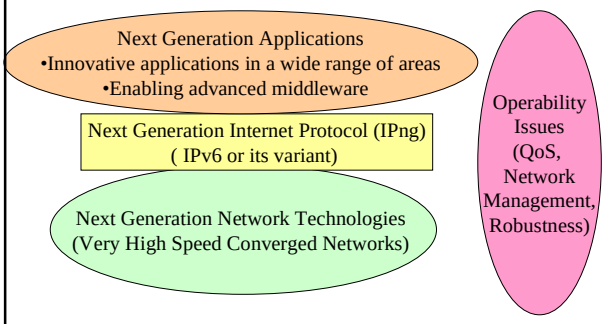
Service Delivery in Internet



Internet Everywhere ("IP Dialtone")



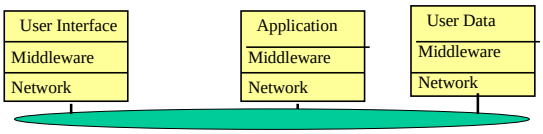
Next Generation Internet



Operating Systems and Local System Software

- **Operating system**: allocates computer resources (memory, CPU, I/O devices, files, etc.) to processes (user commands, jobs, database managers, other operating systems).
- Local Systems Software
  - Database managers
  - Transaction managers
  - File managers
  - Print managers

Middleware Concepts



Definition: MIDDLEWARE is a set of common business-unaware services enabling applications and end users to interact with each other across a network.

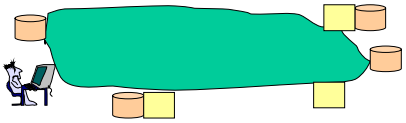
It resides above the network and below the business-aware software.

Examples: Email, Web, ODBC, EDI, distributed transaction processors, CORBA, DCOM etc

Important: Middleware typically supports client/server interactions across machines.

Example: a client uses middleware to access a machine for a catalog. However, some information is in master catalog.

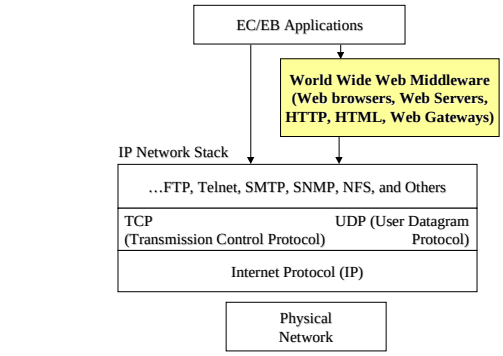
Thus the middle machine may house a client that accesses a third machine



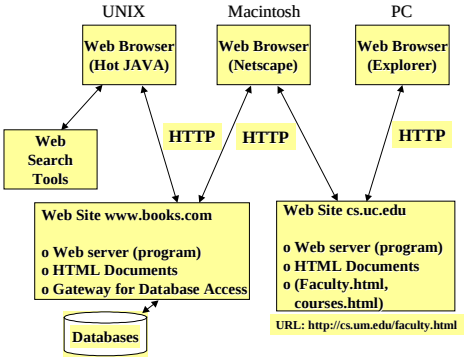
Middleware Services Overview

- Remote logon; extend local logon
- Remote file transfer: extend local file transfer
- Client/Server Services; extend local program and data access
  - Remote procedure call (RPC)
  - Message oriented middleware (MOM)
  - Remote database access (RDA)
  - Remote Presentation access (RPA)
- Web Middleware (Web Browsers, Web Servers, Web Gateways)
- Distributed Object Technolgies (CORBA, DCOM)
- Distributed Transaction Processors (TP-Lite, TP-Heavy)

World Wide Web Overview



Example of Web



Consulting Group1

Welcome to our consulting group. You can do the following:

- **Read about our services**
- **Access home pages of the groups we work with (WWW)**

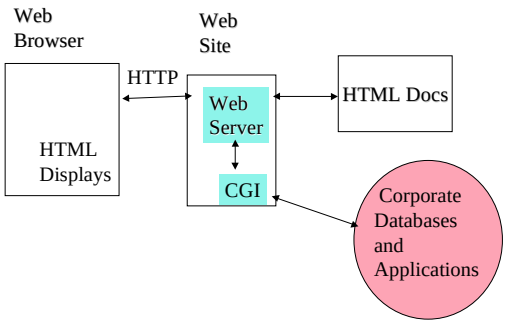
Now choose the connections by clicking on the following

- **Our services**
- **WWW Information**

The following HTML statements can be used to design this home page (we have inserted appropriate URL's for the hot links):

```
<html>
<TITLE>Consulting Group1 </TITLE>
<H1>Consulting Group1 </H1>
<P> Welcome to our consulting group. You can do the following:
<UL>
<LI> Read about our services .
<LI> Access home pages of the groups we work with (WWW)
</UL>
<P> Now choose the connections by clicking on the following
<a href="http://www.myserver.com/services.html"> Our services</a>
<a href="http://www.w3.org"> WWW Information</a>
</html>
```


First Generation Web Architectures (HTML, HTTP, CGI)



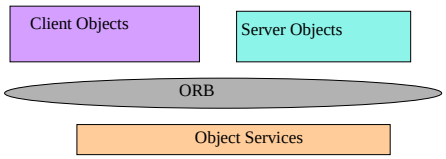
XML (eXtensible Markup Language)

- Gaining importance for common data representation
- "Simpler" than SGML (subset of SGML)
- More "general" than HTML
- Example:

```
<CUSTOMER>
    <NAME> Joe </NAME>
    <ADDRESS> NY </ADDRESS>
</CUSTOMER>
```

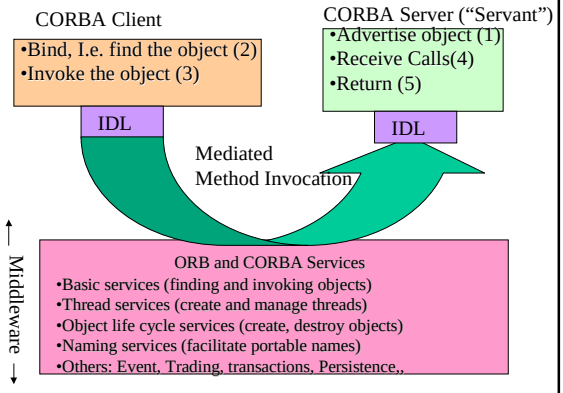
- Great deal of activity in Ecommerce (competition to EDI), messaging middleware, data transformers, data management, publishing, etc.

CORBA Facilities

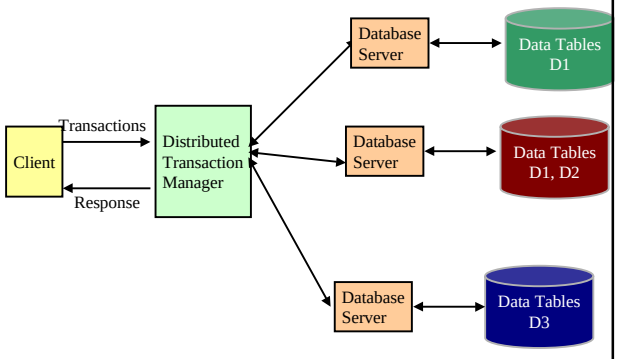


- Application Objects: Application logic in C++, Java, Smalltalk
- Object-Request Brokers (ORB)
  - Support delivery of client requests to distributed objects.
  - ORBs format requests for sending to each object.
  - ORBs support synchronous and asynchronous
- Object Services: Keep track of info about each object, including address of each object in system.
- Common Facilities: For different domains

CORBA At Work: A Simple Example

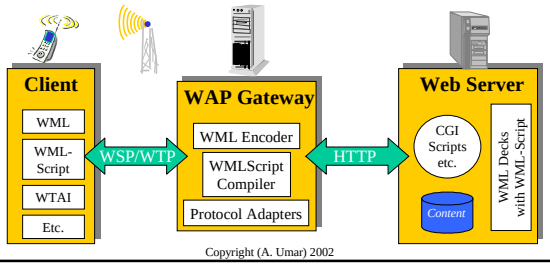


Distributed Transaction Managers



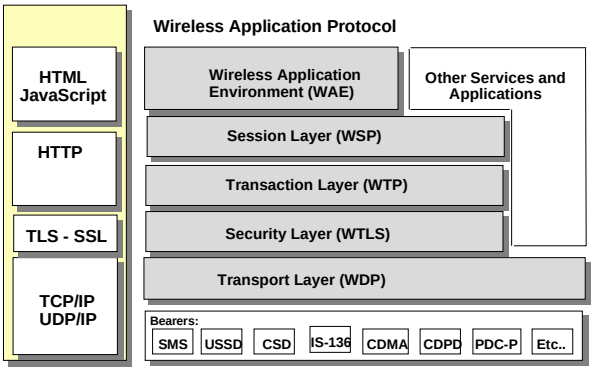
WAP(Wireless Application Protocol)

•Intended for data entry/display on cellular phones
•"An open, global specification that empowers mobile users with wireless devices to easily access and interact with information and services instantly." *www.wapforum.org*
•Complete protocol stack similar to Internet protocols but optimized for wireless information pull and push transport layer and above; across multiple wireless technologie



Slide from WAP web site

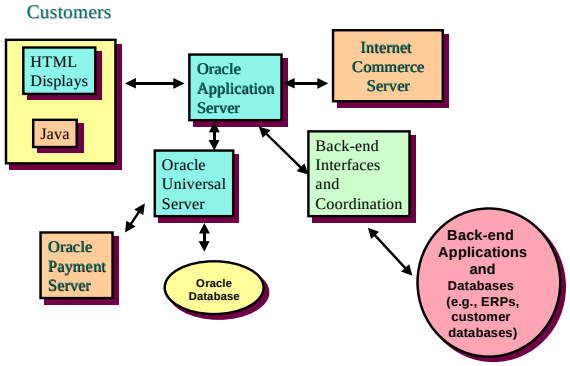
WAP and Internet protocol layering



EC Platforms

- Combine
  - Network services (usually assume IP)
  - EC Middleware
    - catalog
    - purchasing
    - Web services
    - Gateways to legacy systems
  - Becoming more sophisticated

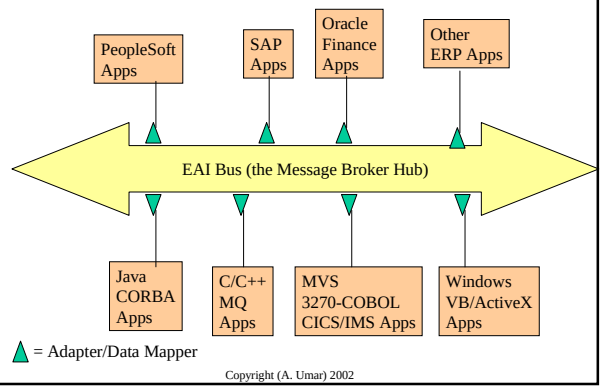
Oracle's Ecommerce Platform



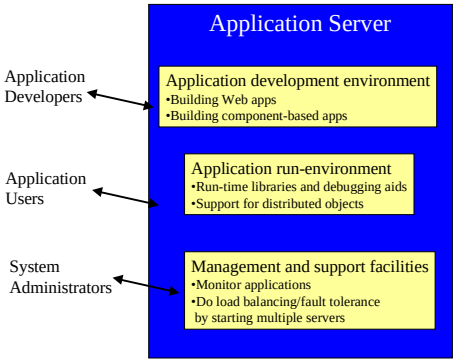
Enterprise Application Integration Platforms

- Many systems (networks, apps, business processes) from different vintages at different platforms need to interwork/interoperate wfor ebusiness
- Key challenge: Integrate systems
  - Within the enterprise
  - External partners
- Why?
  - On the average, a customer purchase involves 10 to 11 applications
  - These systems, if not integrated, can increase service time, introduce errors, increase "hassles"
- EAI platforms address the integration issues
- Origin: enterprises
- Trend: B2B

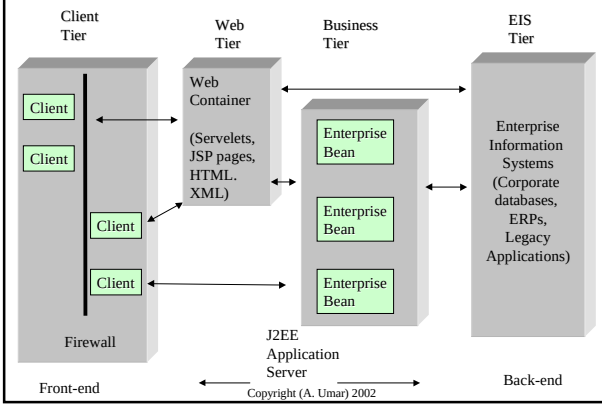
eAI Overview



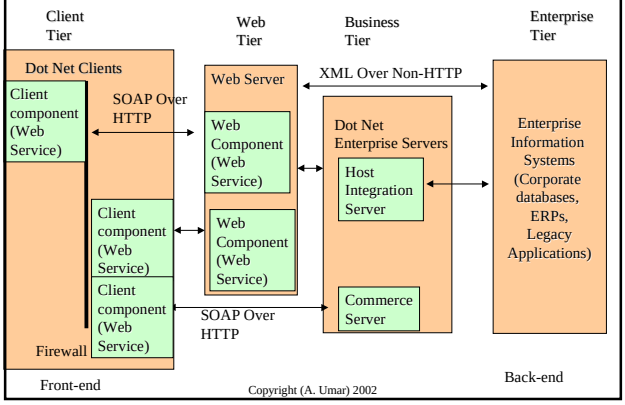
Application Servers



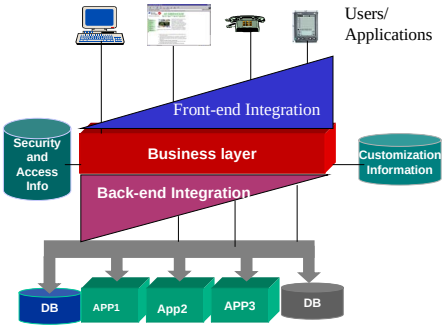
Sun J2EE Platform



Microsoft's Dot Net Architectures



High Level EB Architecture



Relating Technologies To Applications - Quick Analysis

	E-CRM	**ASP**	**Portals**	**Electronic Marketplaces**
Front-end Integration	Web, XML, WAP, VOIP, VML	Web, XML	Web, XML, WAP, VOIP,VML	Web, XML
Business Layer Technologies	Web server, CORBA/ DCOM EJB, app servers	Web server, CORBA/ DCOM, EJBs, App servers	Web server, EJBs	Web server, Catalogs, e-payment
Back-end Integration	Remote access,legacy gateways, EAI, XML	Remote access,legacy gateways, EAI, XML	Remote access,legacy gateways, EAI, XML	Remote access,legacy gateways, EAI, XML