TIM 50 - Business Information Systems

Lecture 10

Instructor: Terry Allen
UC Santa Cruz
10/28/2011

Outline

- Announcements
- Review Alibris Case Study
- Information Technology
- Student Presentations
- Client-Server Architecture
- The SUN N-Tier Architecture

Announcements

- Assignment 3 will be posted next week

Review - Alibris

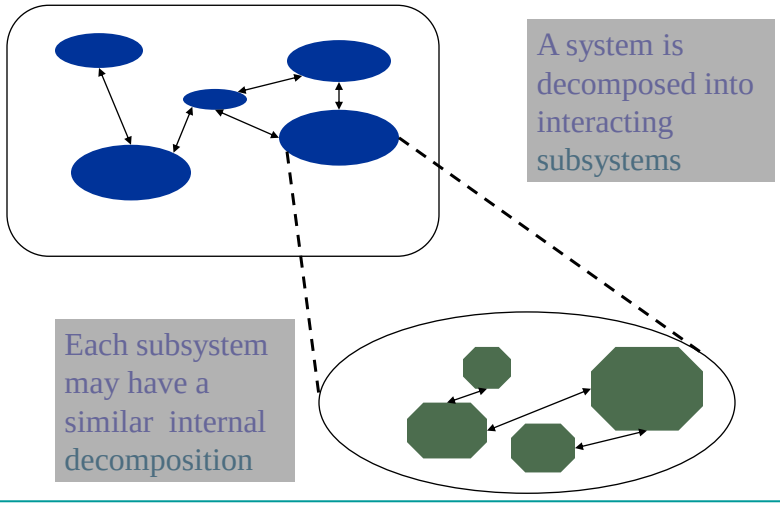
- A start-up to sell used books on the Internet.
- Interloc, Alibris' predecessor, functioned like a classified ads page for book dealers
- Alibris changing Interloc's model
  - Actually sell the books
  - Charge a fee per sale (instead of per listing)
  - Intermediary strategy
    - Buy books from dealers
    - Ship to warehouse
    - Re-pack, consolidate order, ship to customer

Architecture

What is Architecture?

How do you architect a solution?

Architecture



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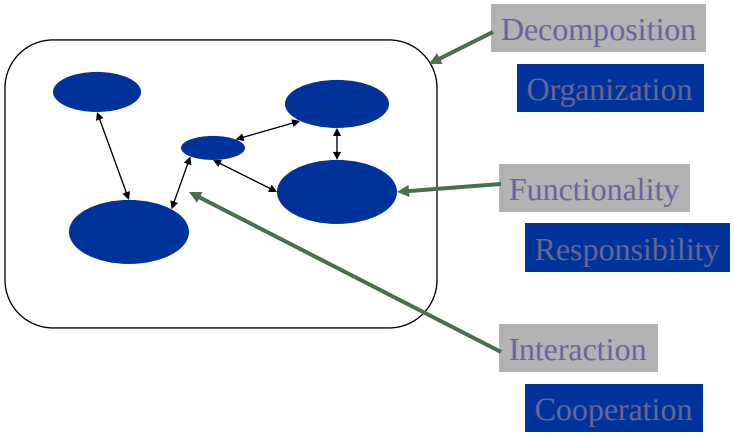
System Architecture

- System: A composition of subsystems that cooperate to accomplish some purpose
- Sub-system: An element within the system that performs some well-defined action on behalf of that system

Three properties of architecture



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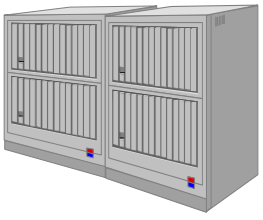
Time sharing

Point-to-point wire

(no network)

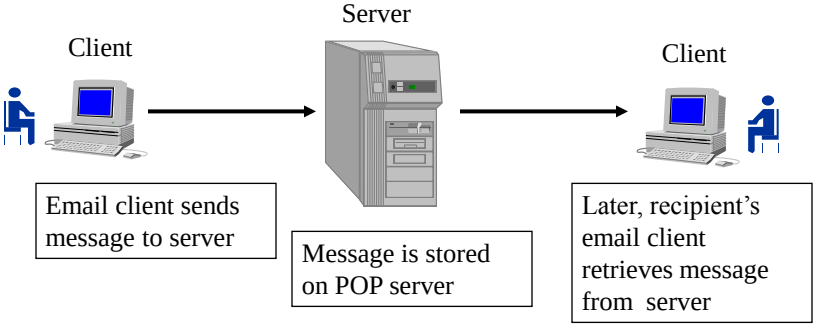


ASCII terminal
(no graphics)

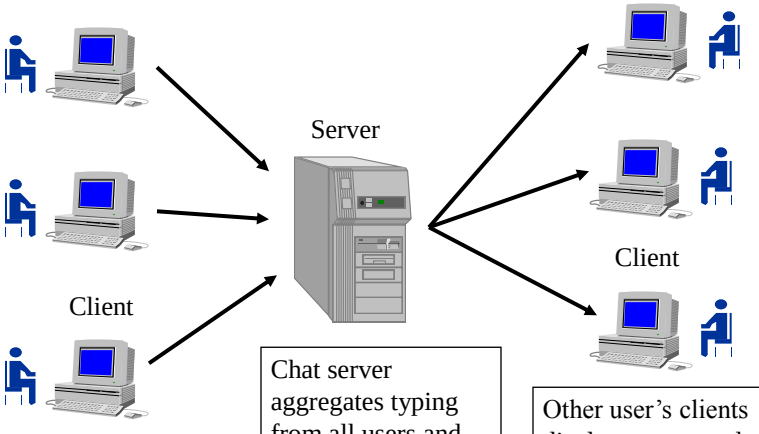
Mainframe
(database and
application server)

Two-tier client/server

Email application



Chat application



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System integration

Architecture

-> subsystem implementation

-> system integration

Bring together subsystems and make them cooperate properly to achieve desired system functionality

- Always requires testing
- May require modifications to architecture and/or subsystem implementation

Why system decomposition in subsystems?

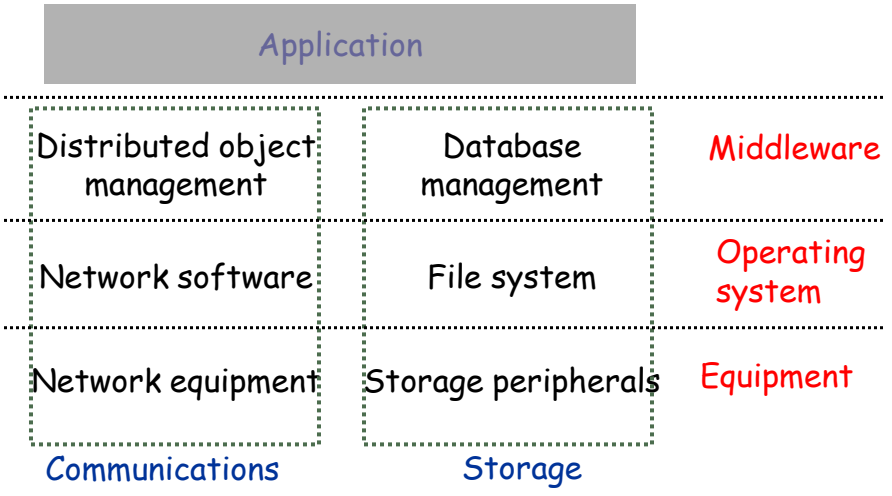
- Divide and conquer approach to reduce complexity
- Reuse components
- In accordance with industry structure
- Others?

Networked computing infrastructure

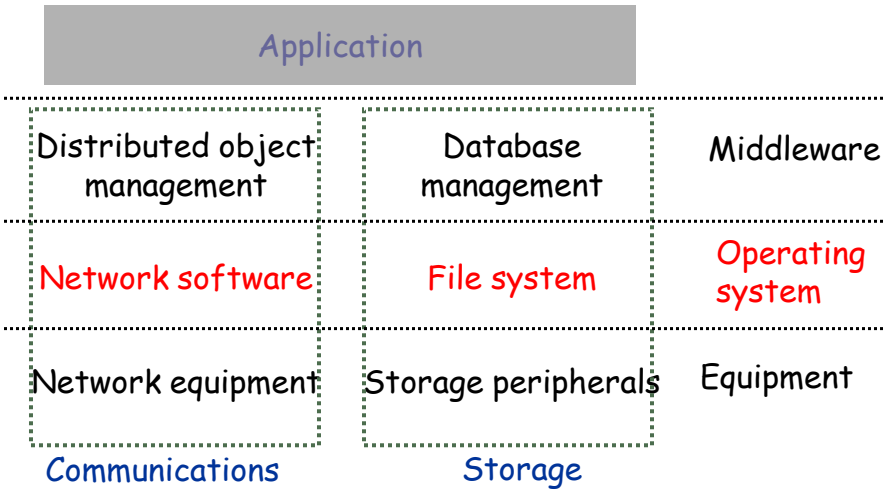
Infrastructure Layering

- Infrastructure decomposed into layers
- Each layer
  - depends on the layer below
  - provides services to the layer above
  - Only interacts with layers immediately above or below
- E.g software is "riding on top of" equipment
  - Software itself is also layered

Simplified infrastructure layering



Simplified infrastructure layering



Operating system functions

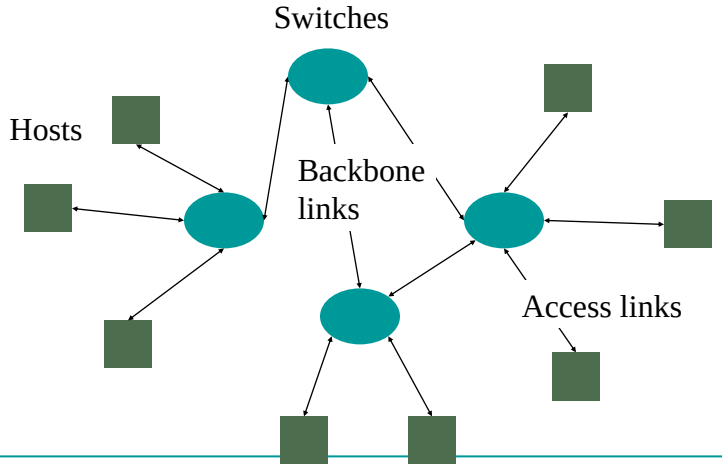
- Graphical user interface (client only)
- Hide details of equipment from the application
- Multitasking
- Resource management
  - Processing, memory, storage, etc

  etc

File system (OS)

- Hides details of storage equipment from applications
- Enables services such as creating/accessing files
- A **File** is:
  - Collection of data managed for the benefit of the application
    - E.g. word document, excel spreadsheet
    - Size known, but unspecified structure and interpretation
  - Name
  - Location in naming hierarchy

Network equipment



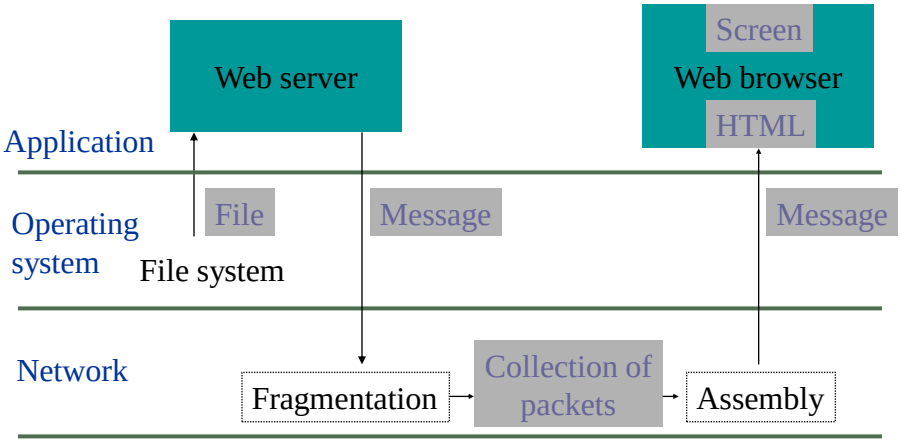
Messages and packets

Simplest network communication service is the message

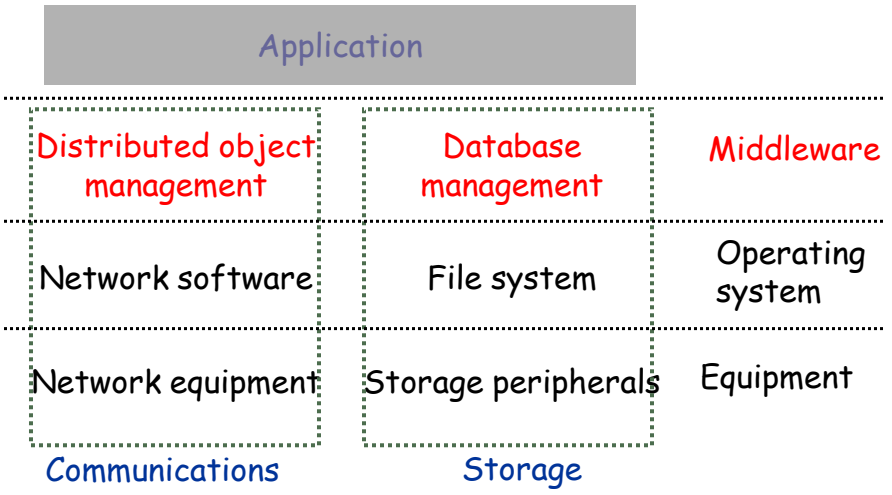
- Smallest unit of communicated data meaningful to application
- Size, but unknown structure and interpretation
- Analogous to file in storage

Internally, the network may fragment a message into packets, and reassemble those packets back into a message

Example



Simplified infrastructure layering



Middleware Functions

- Capabilities that can be shared by many applications, but that is not part of OS
  - Example: Database Management System (DBMS)
- Hide details of OS from application
  - Java Virtual Machine
- More purposes we'll talk about later.

Communication middleware

- Location independence
  - makes distributed application look similar to centralized
- Many possible other functions

Storage middleware

- Database
  - File with specified structure
  - Example: relational table
  - Oriented toward business applications
- Database management system (DBMS)
  - Manage multiple databases
  - Basis of online transaction processing (OLTP)

A Database

Year	City	Accommodation	Tourists
2002	Oakley	Bed&Breakfast	14
2002	Oakley	Resort	190
2002	Oakland	Bed&Breakfast	340
2002	Oakland	Resort	230
2002	Berkeley	Camping	120000
2002	Berkeley	Bed&Breakfast	3450
2002	Berkeley	Resort	390800
2002	Albany	Camping	8790
2002	Albany	Bed&Breakfast	3240
2003	Oakley	Bed&Breakfast	55
2003	Oakley	Resort	320
2003	Oakland	Bed&Breakfast	280
2003	Oakland	Resort	210
2003	Berkeley	Camping	115800
2003	Berkeley	Bed&Breakfast	4560
2003	Berkeley	Resort	419000
2003	Albany	Camping	7650
2003	Albany	Bed&Breakfast	6750

- The **DBMS** enables updating and searching the database

- QUERIES
  - E.g. "How many B&B are there in Berkeley?"
  - E.g. "What accomodation did most tourists visiting Oakley preferred?"

Some DBMS functions

- Logical structure separated from physical structure
- Platform independence
- Implement standard queries
- Access from multiple users/applications
- Manage data as asset separate from applications

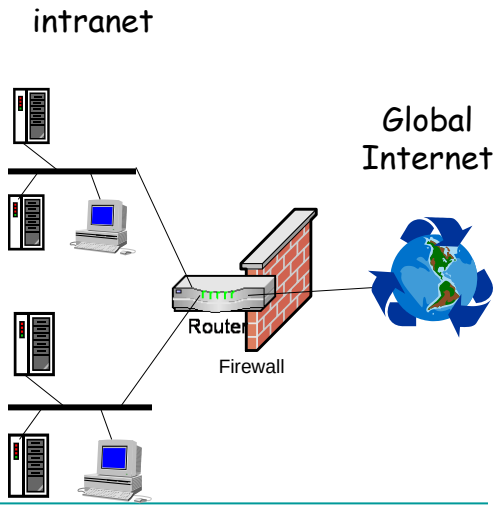
The Internet

Intranet

Private internet

Often connected to Internet

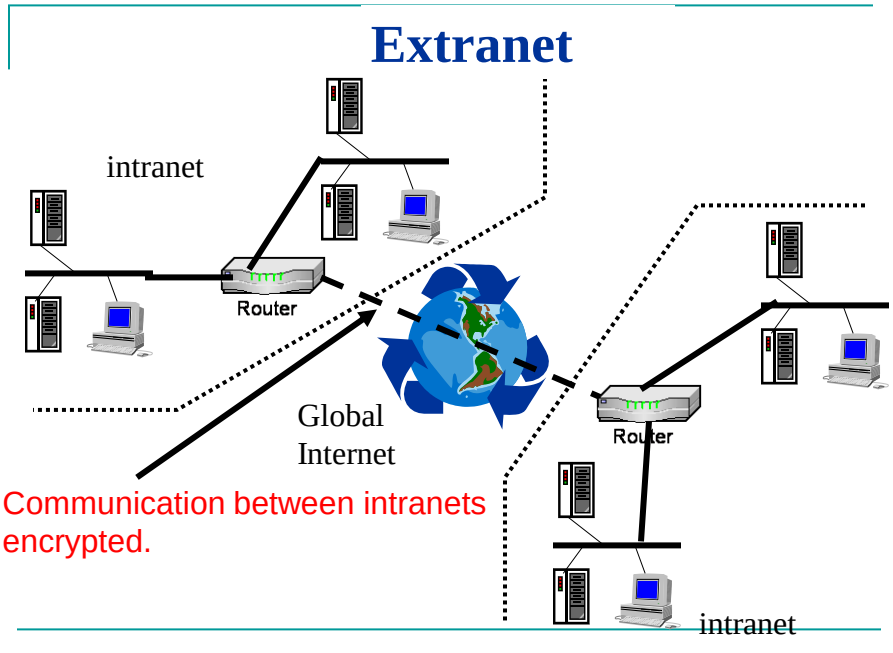
- Firewall creates a protected enclave



Extranet

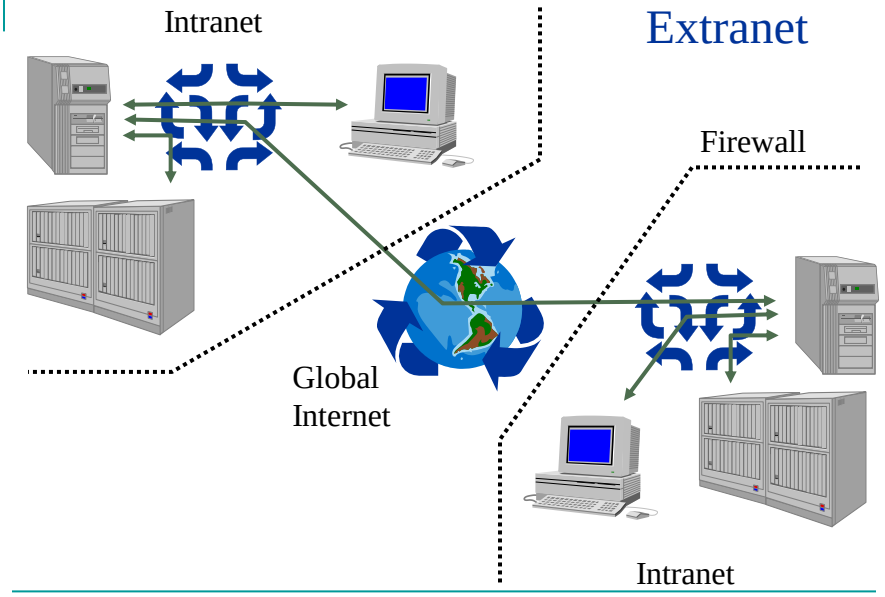
An **Extranet** is composed of

- Intranets *connected* through an *unprotected domain* (typically the Internet)
  - Encryption and other security technologies used to
    - protect proprietary information
    - prevent imposters, vandals, etc

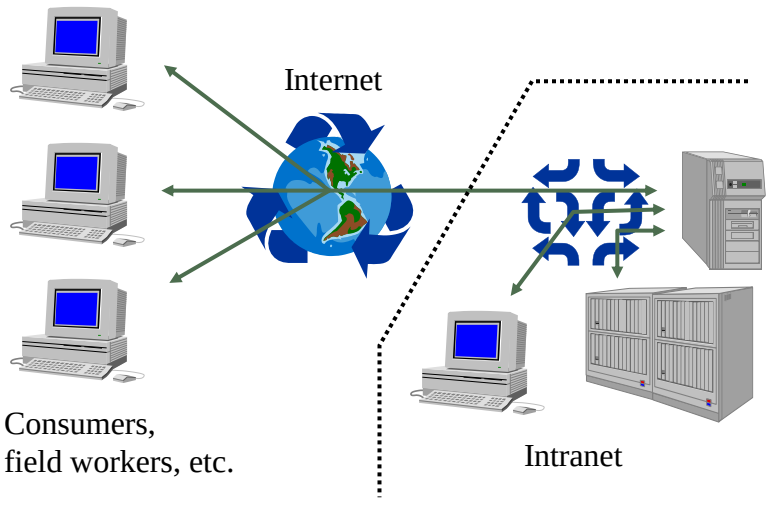


What is the Internet?

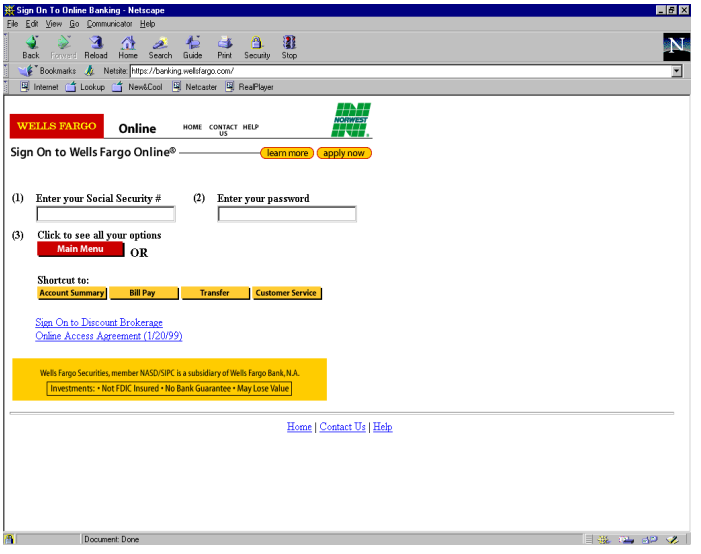
- An internet is a "network of networks"
  - Interconnect standard for LAN's, MAN's, and WAN's
- Internet = the major global internet
- A private internet is called an intranet
- An extranet is an interconnection of intranets through the Internet

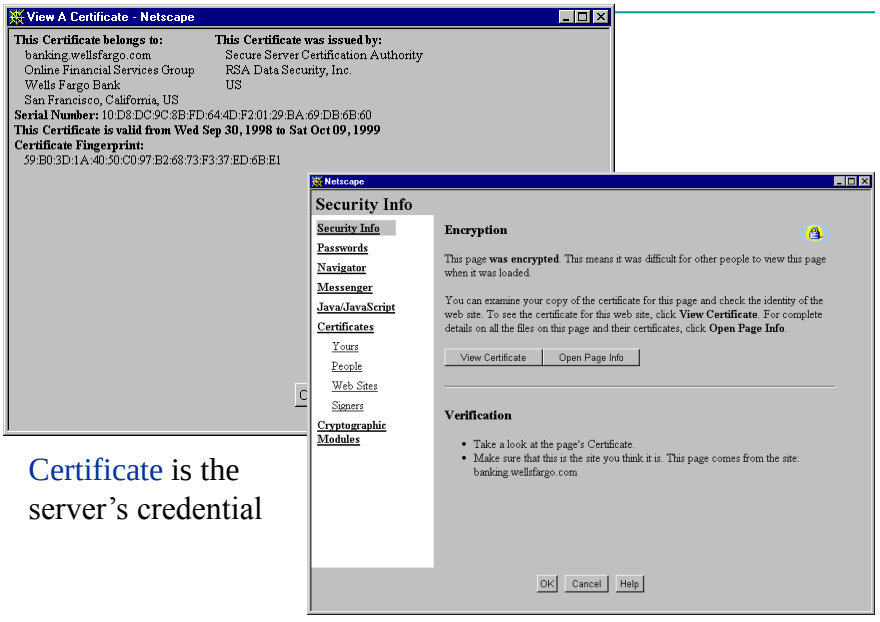


Extranet



Lock icon indicates this is an extranet





Certificate is the server's credential

Questions

What business purposes do nomadic workers serve?

Mobile?

What advantage does direct Internet access have over long distance telephony?

Ideas and examples (Chapters 4-5)

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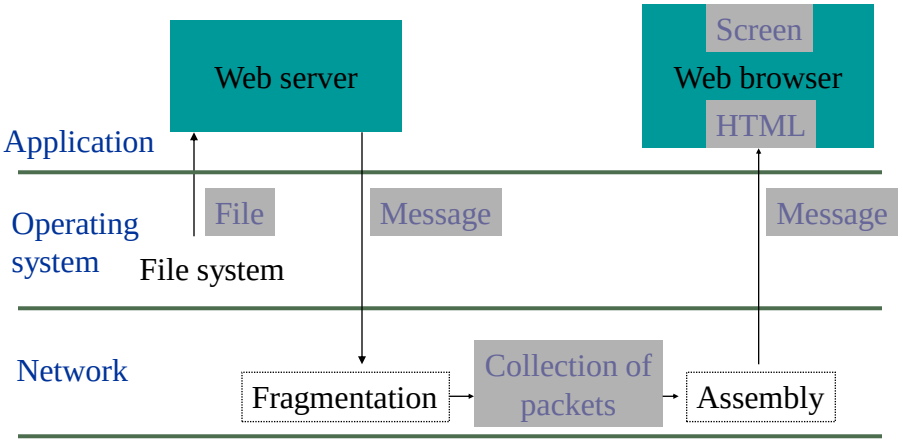
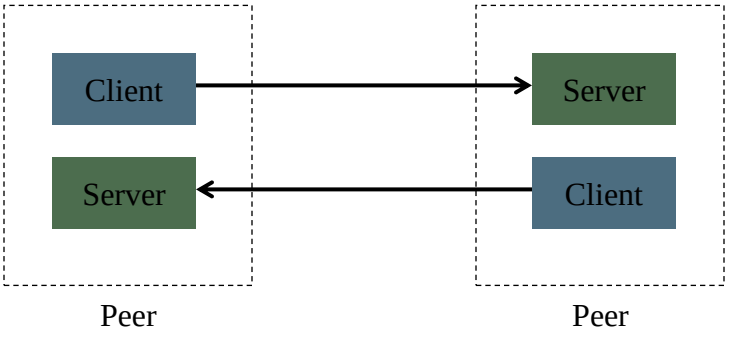
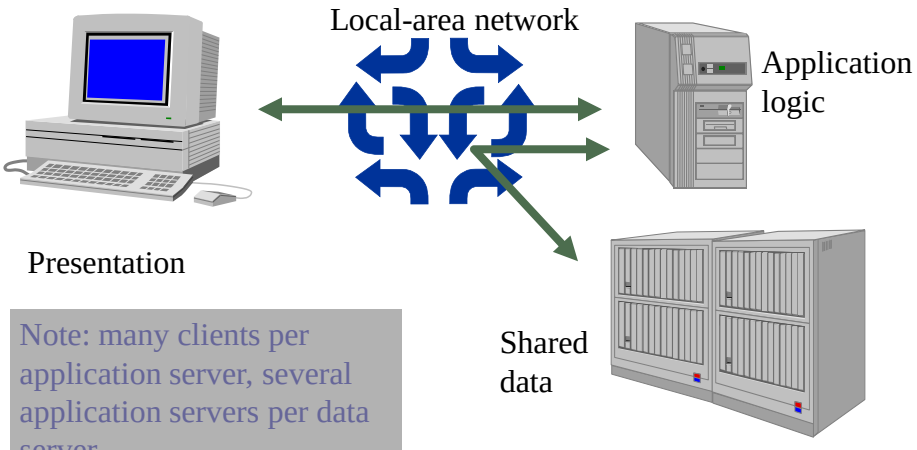
Example



Peer to peer



Three-tier client/server



Note: many clients per application server, several application servers per data server

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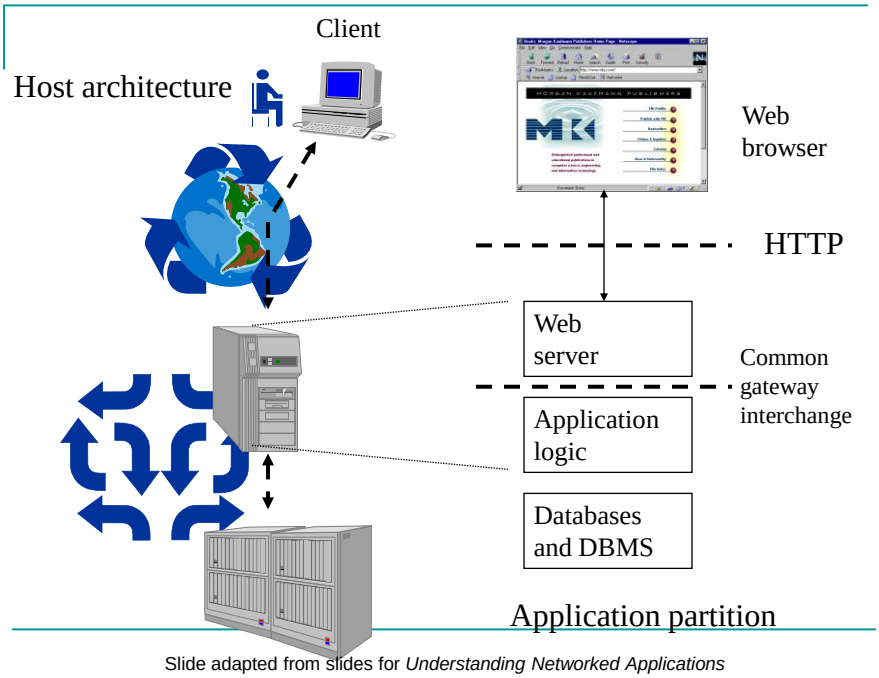

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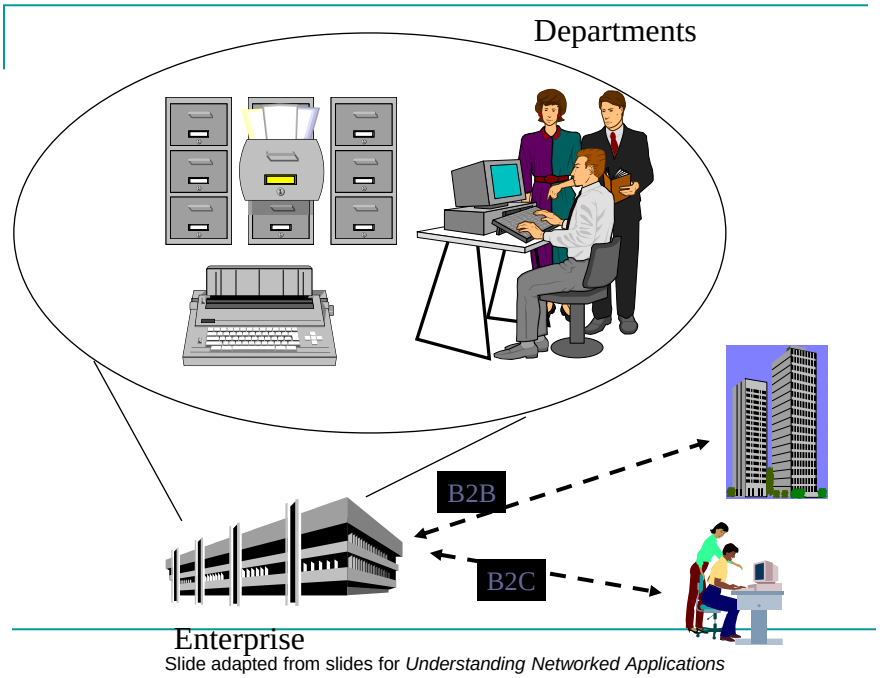

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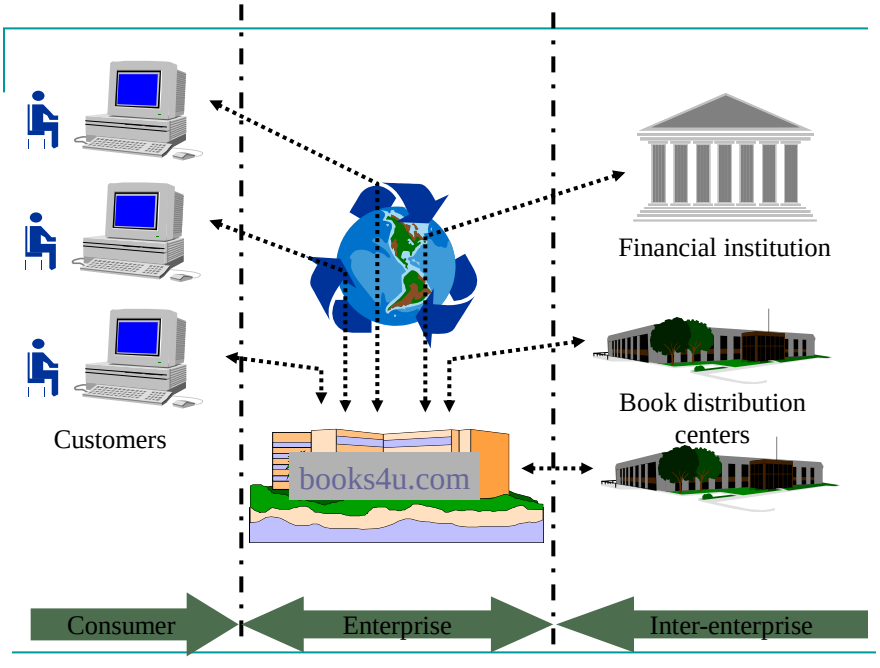

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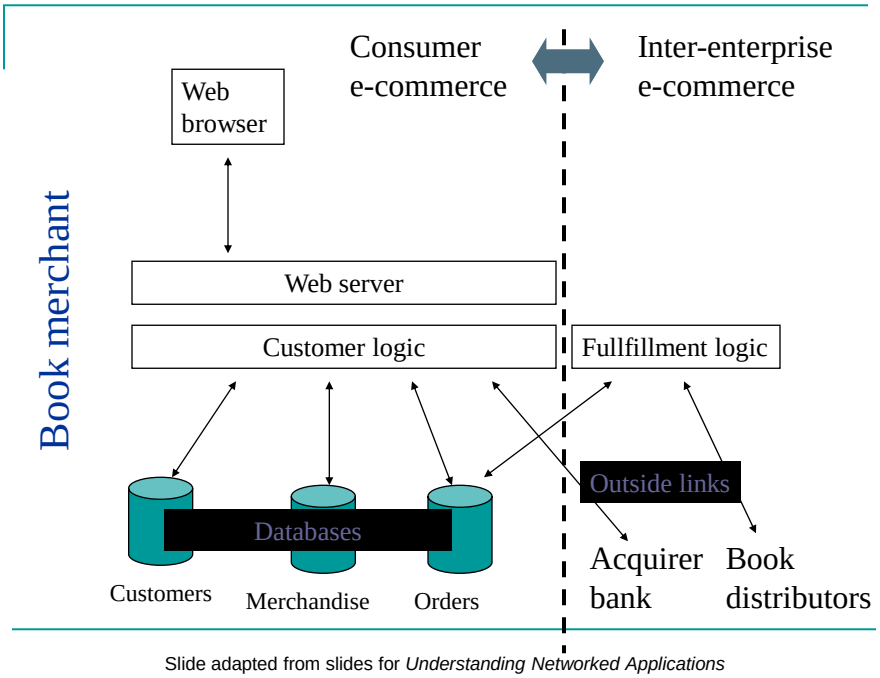

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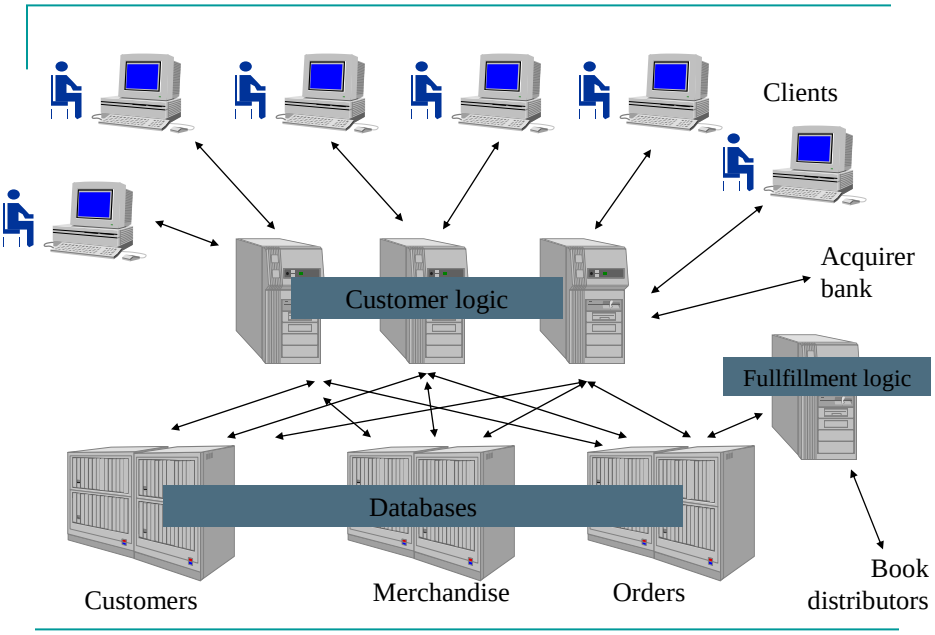

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B2C Examples

Consumer e-commerce (B2C)

- What are the advantages and disadvantages compared to a retail store or direct mail catalog?

Some Advantages

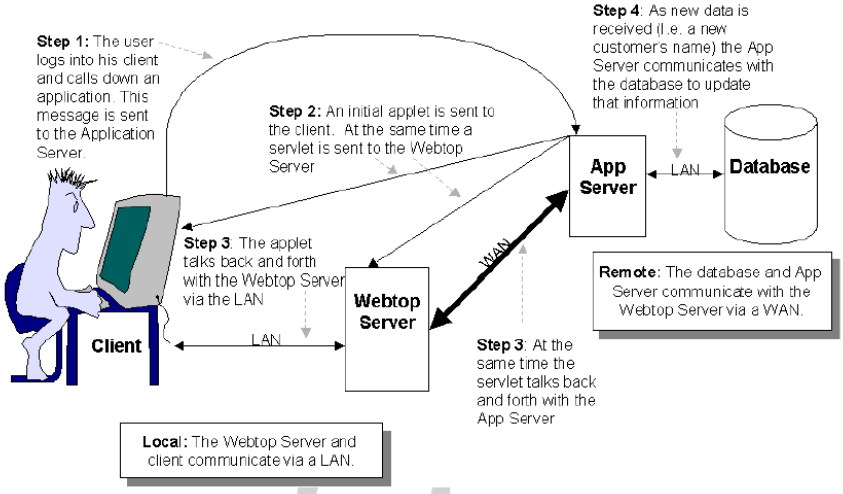
- For the Consumer
  - Check prices at many vendors with minimal effort
  - Anonymity
  - Mass customization
  - Order tracking
  - Recommendations
- For the Business
  - Global reach
  - Automate order taking (cost savings)
  - Price Discrimination

Sun Case

Java Applets

- Key feature of Java
- Applets: chunks of Java code
  - Initially enabled animations on web pages
  - Later used to facilitate e-commerce applications, in cellular phones, etc.
- Applets are downloaded through the browser
  - Only what and when was needed
  - No need to keep a copy on client!
- Servlets: Applets that run on Webtop servers

Sun N-Tier



xhibit 3 How the N-tier Architecture Works

What would you do…

- If you were in the executive board of Microsoft?