



Systems

Reading:

Chapter 2 – An Introduction to System Concepts and System Architecture (read lightly)

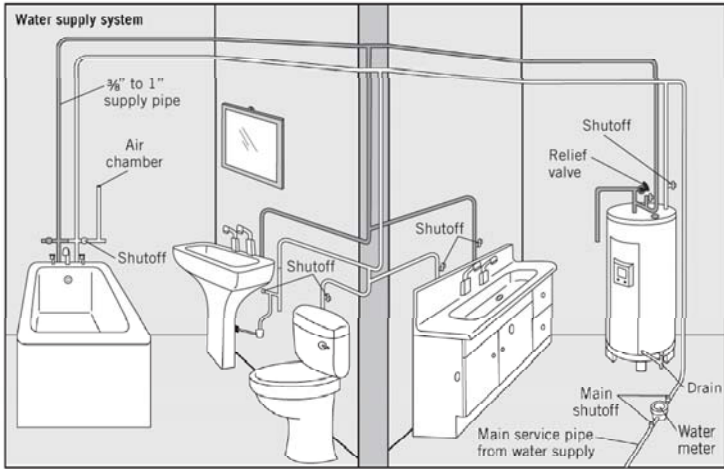


What is a system?

- What do the following systems have in common?
 1. Plumbing system
 2. Solar system
 3. Home network system
 4. Inventory control system



Plumbing System

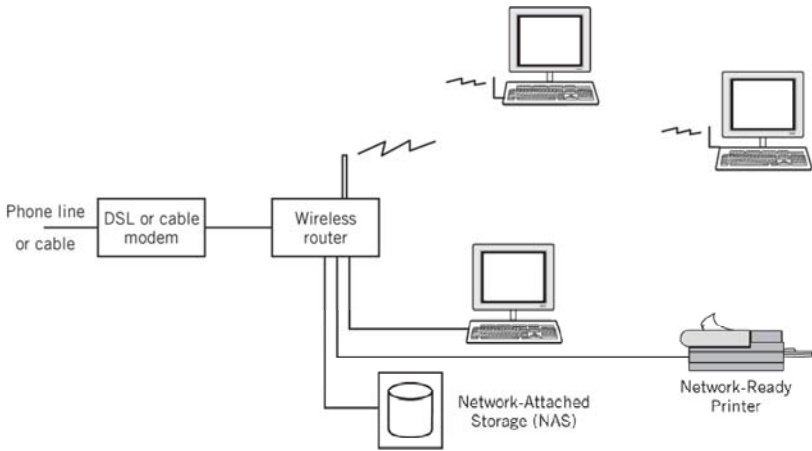


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Home Network System



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Definition of a System

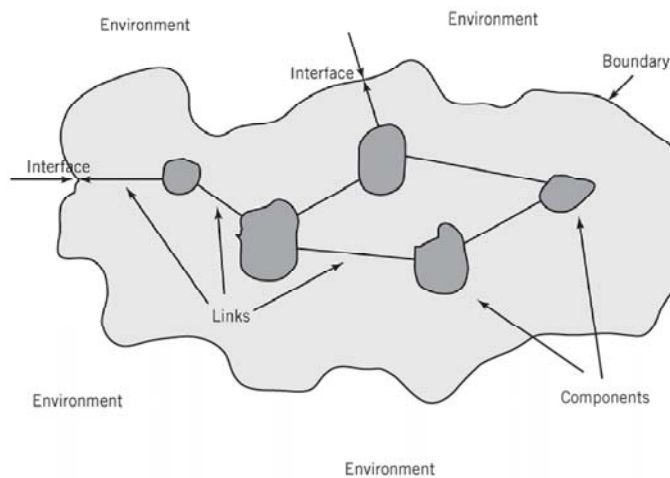
- “A systems is a collection of components linked together and organized in such a way as to be recognizable as a single unit.”
- Linked components of a system also define the boundary for the system
- The environment is anything outside of the system

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General Representation of a System



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Does the diagram represent an OS?

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System Decomposition

- Components
 - May be irreducible or
 - May be subsystems
- Decomposition
 - The division of a system into its components and linkages
 - Hierarchical

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System Architecture

“The fundamental properties, and the patterns of relationships, connections, constraints, and linkages among the components and between the system and its environment are known collectively as the architecture of the system”

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IT System Architectures

- Distributed processing systems
 - Client-Server Computing
 - 2-tier architecture
 - 3-tier architecture
 - N-tier architecture
 - Web-Based Computing
 - Peer-to-Peer Computing

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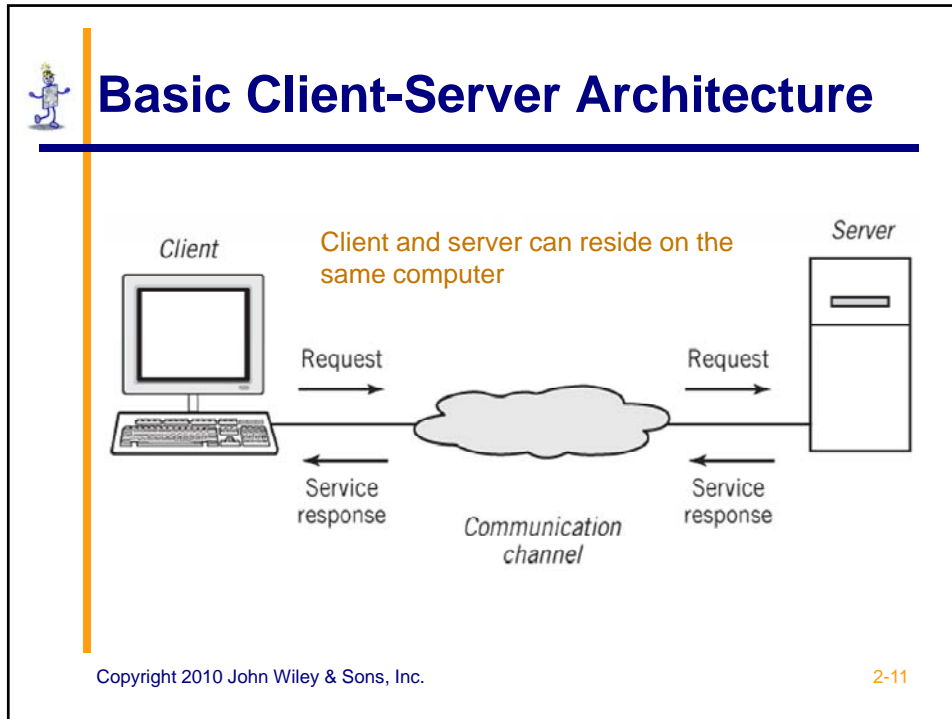


Client-Server Computing

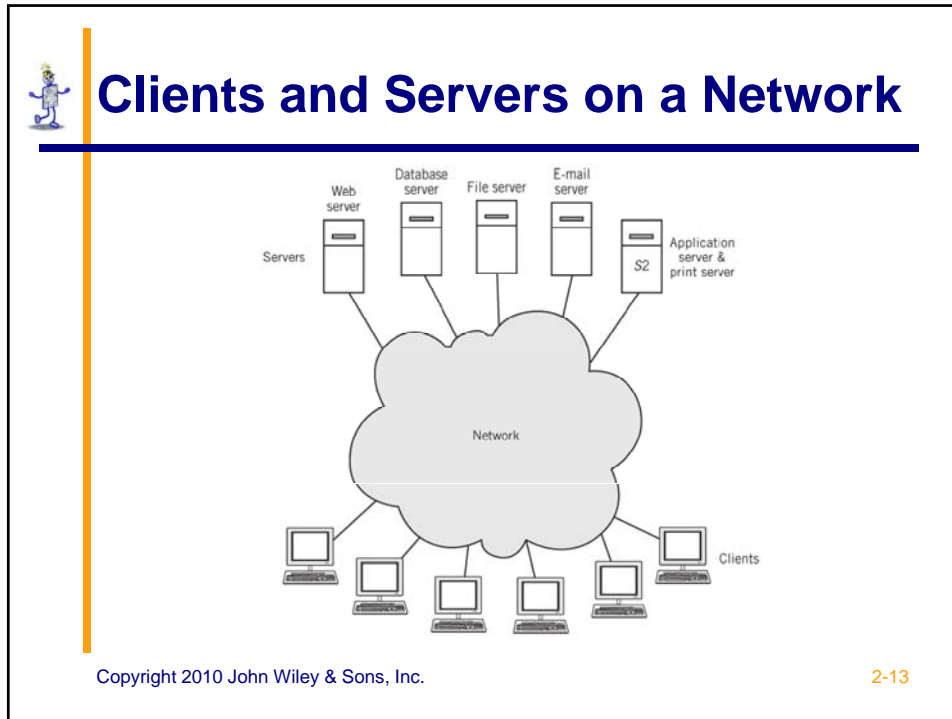
- A program on a client computer requests services from a program on a server computer
- Examples:
 - Email services, file services, print services, directory services, Web services, database services, application services, remote access services

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- ## Client-Server Architecture Advantages
- Centralization of services permits
 - Easier administration of services by IT professionals
 - Easy availability and location by users
 - Data sharing
 - More efficient and cost-effective hardware procurement
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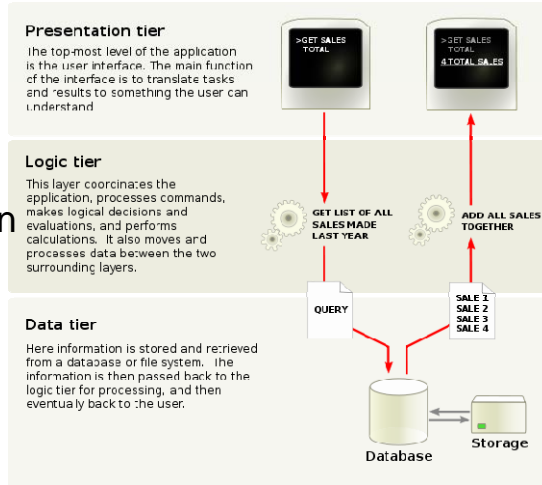


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- The diagram is a list of multi-tier architectures. It features a small cartoon character in the top left corner. The title "Multi-tier (N-tier) Architectures" is underlined. The list includes:
- Forms of client-server architecture
 - Two-tier architecture
 - Two computers are involved in a service.
 - Example: Web-browser and Web server model used in intranets and on the Internet
 - Three-tier architecture
 - Three computers are involved in a service
 - Example: client computer, Web server, database server
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3-Tier Architecture Example

- Note the independent modules
- All communication must pass through a middle tier



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Diagram from Wikipedia

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Peer-to-Peer Computing

- Computers on a network are treated as equals
- Each computer can share resources with the other computers on the network
- Disadvantages
 - Difficult to establish centralized control of services
 - Difficult to locate services
 - Difficult to synchronize versions of files or software
 - Difficult to secure network from unauthorized access and from viruses
- Advantages
 - Sharing files between personal computers
 - Internet file sharing

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Hybrid Model of Computing

- Client-server technology used to locate systems and files
- Then systems can participate in peer-to-peer transactions
- Examples
 - Instant messaging
 - Skype
 - Napster