

Architectural Design

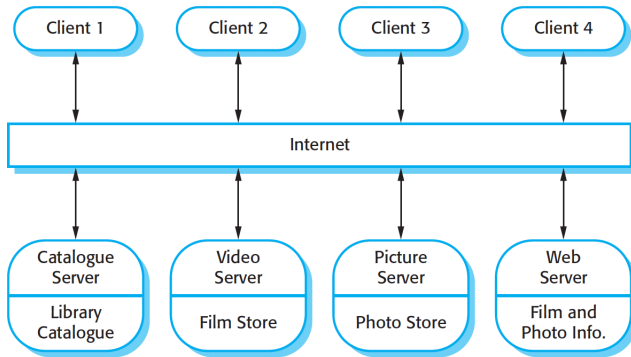
Client-Server and Pipe-and-Filer Architecture Patterns

Indranil Saha

Department of Computer Science and Engineering
Indian Institute of Technology Kanpur



Client-Server Architecture



Example: A Film Library

- **When Used:**

- When data in a shared database has to be accessed from a range of locations

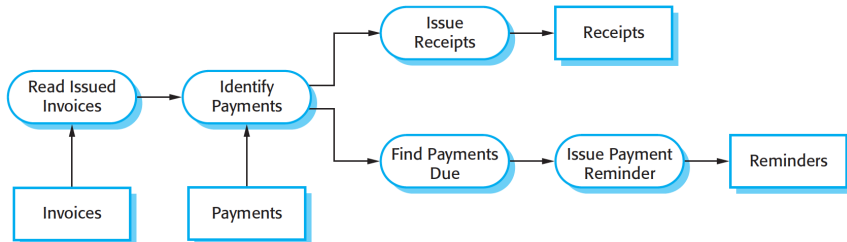
- **Advantages:**

- The servers can be distributed across a network
- General functionality (e.g., a printing service) can be available to all clients and does not need to be implemented by all services

- **Disadvantages:**

- Each service is a single point of failure so susceptible to denial of service attacks or server failure
- Performance may be unpredictable because it depends on the network as well as the system
- May be management problems if servers are owned by different organizations

Pipe and Filter Architecture



Example: Invoice Processing System

- **When Used:**

- Commonly used in data processing applications where inputs are processed in separate stages to generate related outputs

- **Advantages:**

- Easy to understand and supports transformation reuse
- Workflow style matches the structure of many business processes
- Evolution by adding transformations is straightforward
- Can be implemented as either a sequential or concurrent system

- **Disadvantages:**

- The format for data transfer has to be agreed upon between communicating transformations
 - impossible to reuse functional transformations that use incompatible data structures.

Architectural Design

Client-Server and Pipe-and-Filer Architecture Patterns

Indranil Saha

Department of Computer Science and Engineering
Indian Institute of Technology Kanpur

