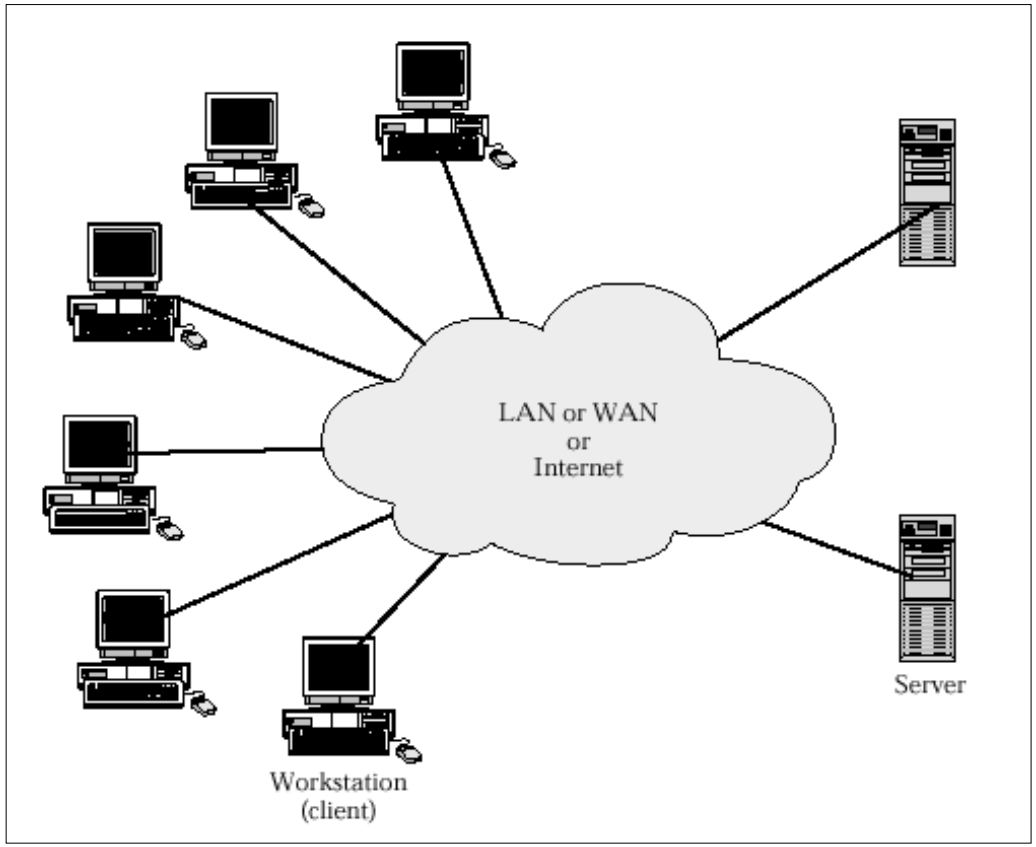
Client Server Computing and Intranets

See Stallings, Business Data Communications, Chapter 17

Client-Server Terminology

- Applications Programming Interface (API)
- Client
- Middleware
- Relational Database
- Server
- Structured Query Language (SQL)

Client-Server Environment



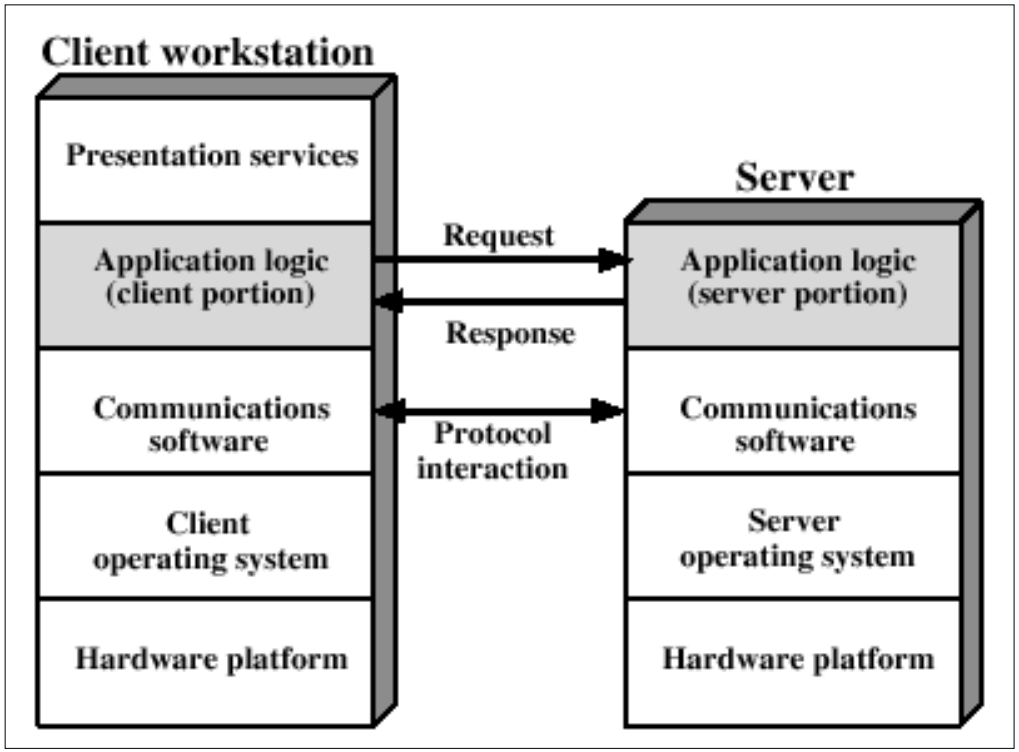
Why is Client-Server Different?

- Emphasis on user-friendly client applications
- Focus on access to centralized databases
- Commitment to open and modular applications
- Networking is fundamental to the organization

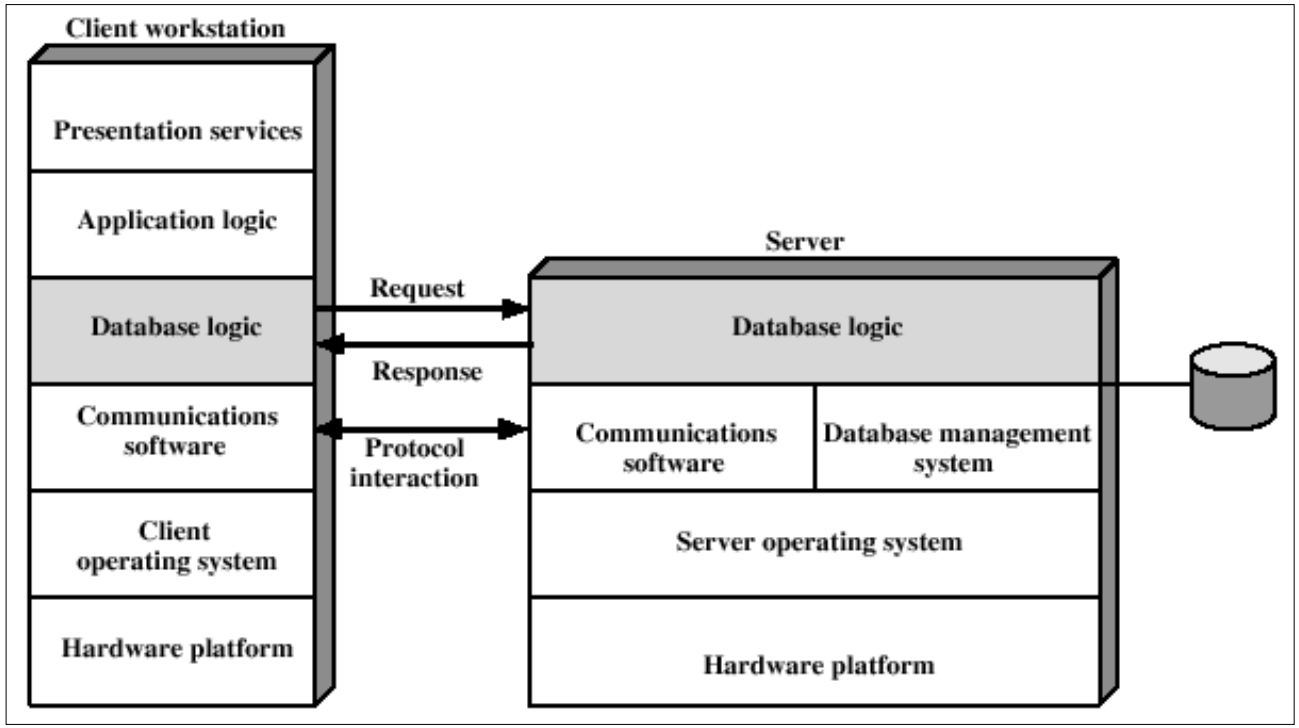
Client-Server Pros & Cons

- Advantages
  - Networked web of computers
  - Inexpensive but powerful array of processors
  - Open systems
  - Grows easily
  - Individual client operating systems
- Disadvantages
  - Maintenance nightmares
  - Support tools lacking
  - Retraining required

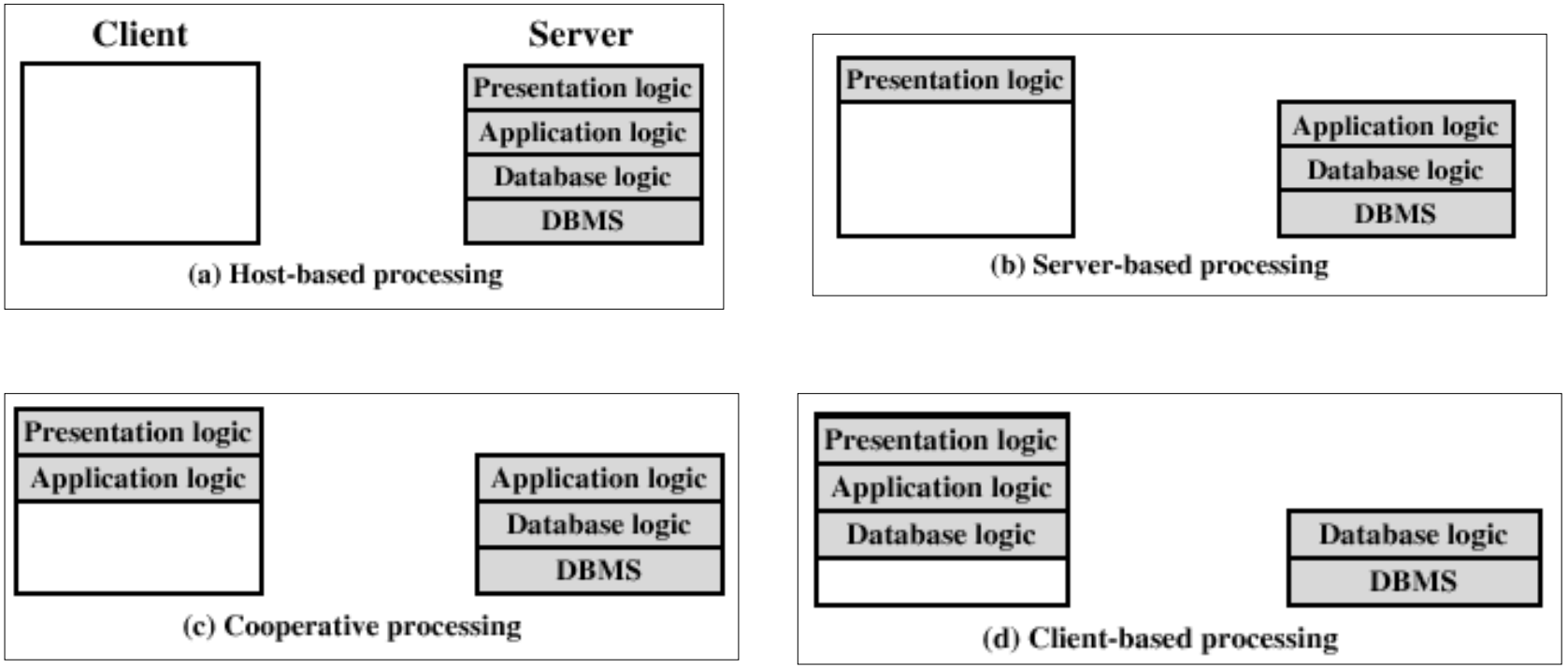
Generic Client/Server Architecture



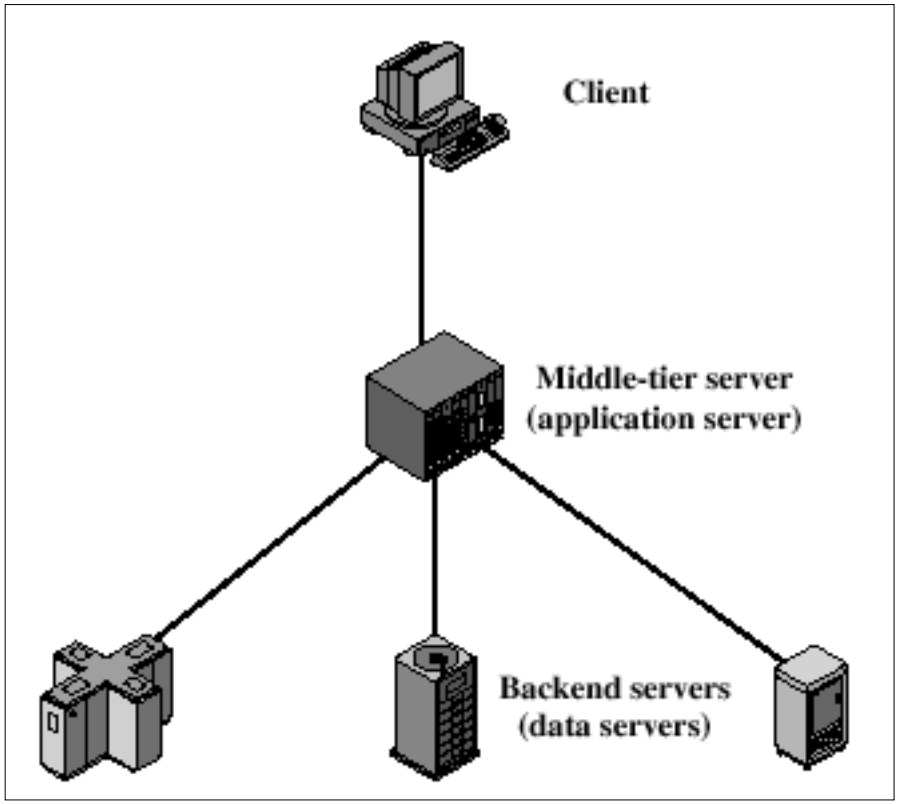
Database Client/Server Architecture



Classes of Client/Server Architecture



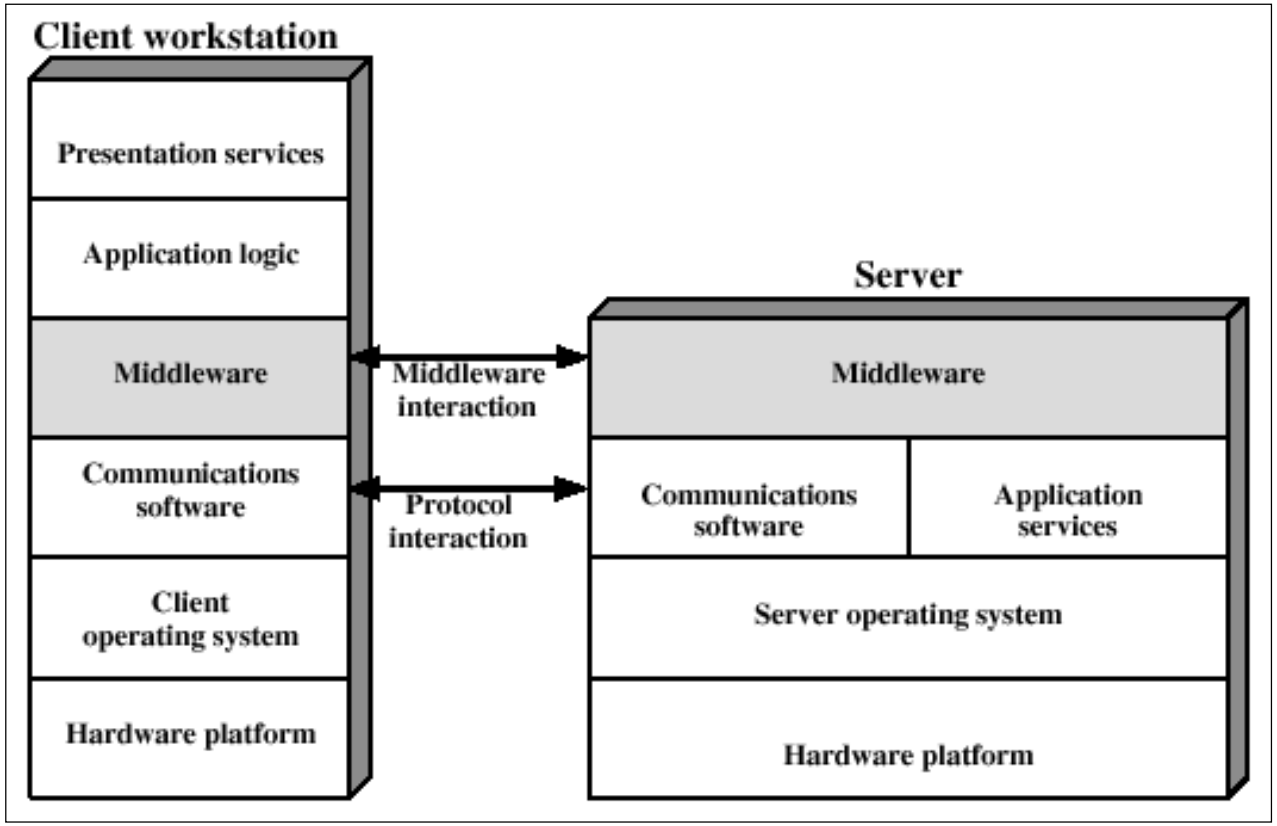
3-Tier Client/Server Architecture



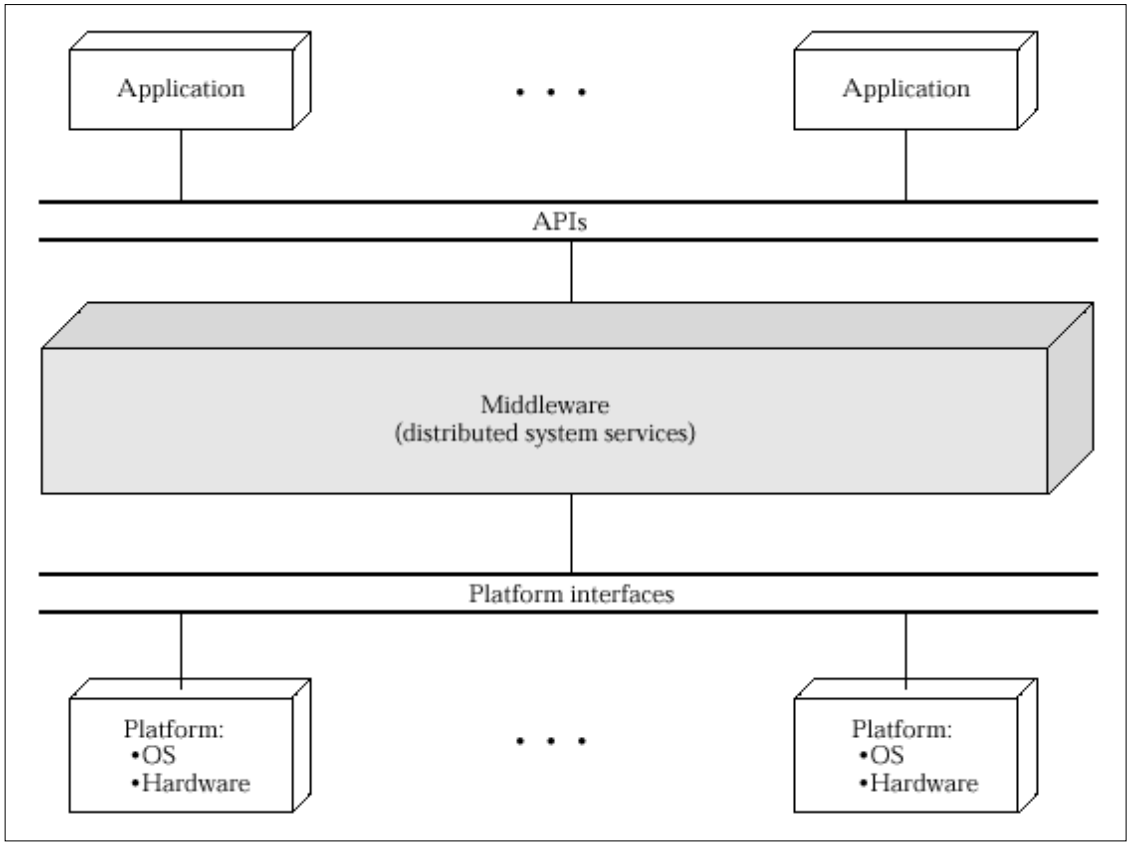
Middleware

- Standardized interfaces and protocols between clients and back-end databases
- Hides complexity of data sources from the end-user
- Compatible with a range of client and server options
- All applications operate over a uniform applications programming interface (API).

Middleware Architecture



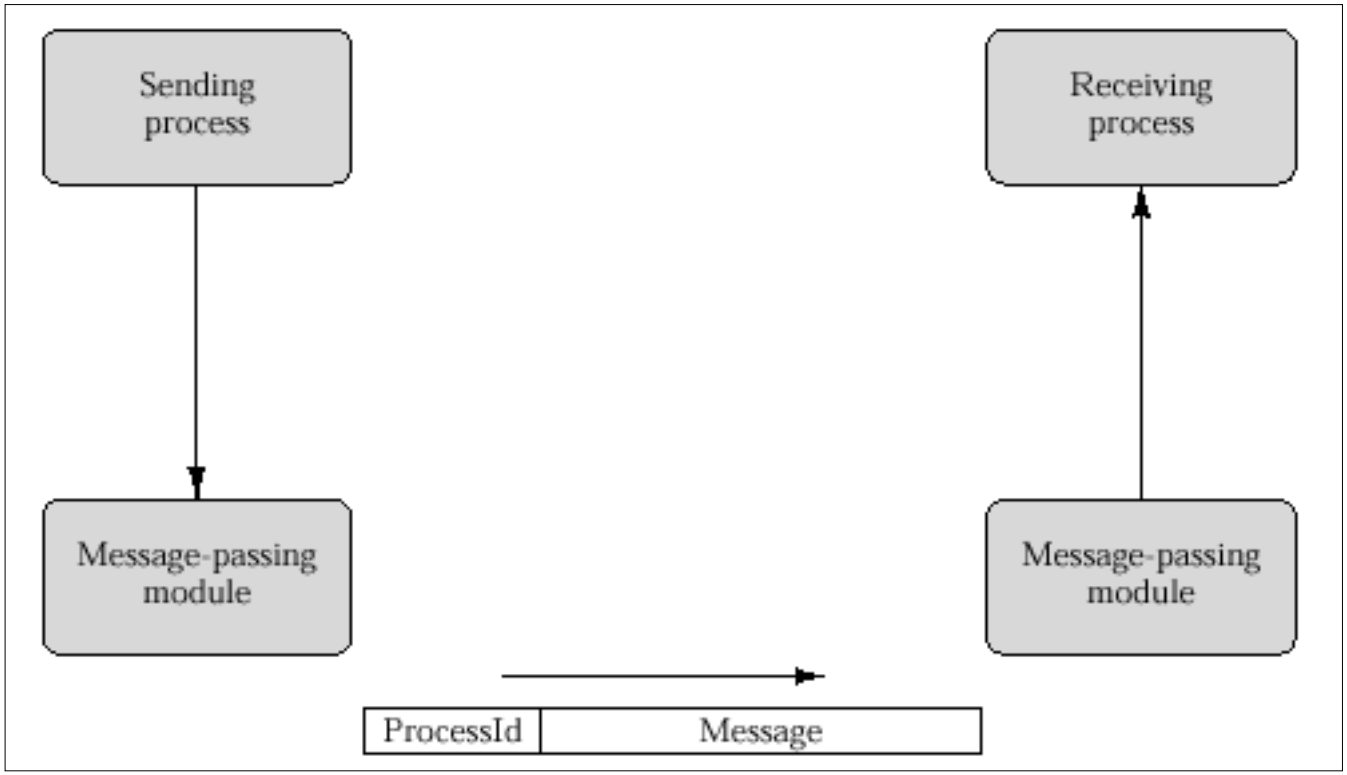
Logical View of Middleware



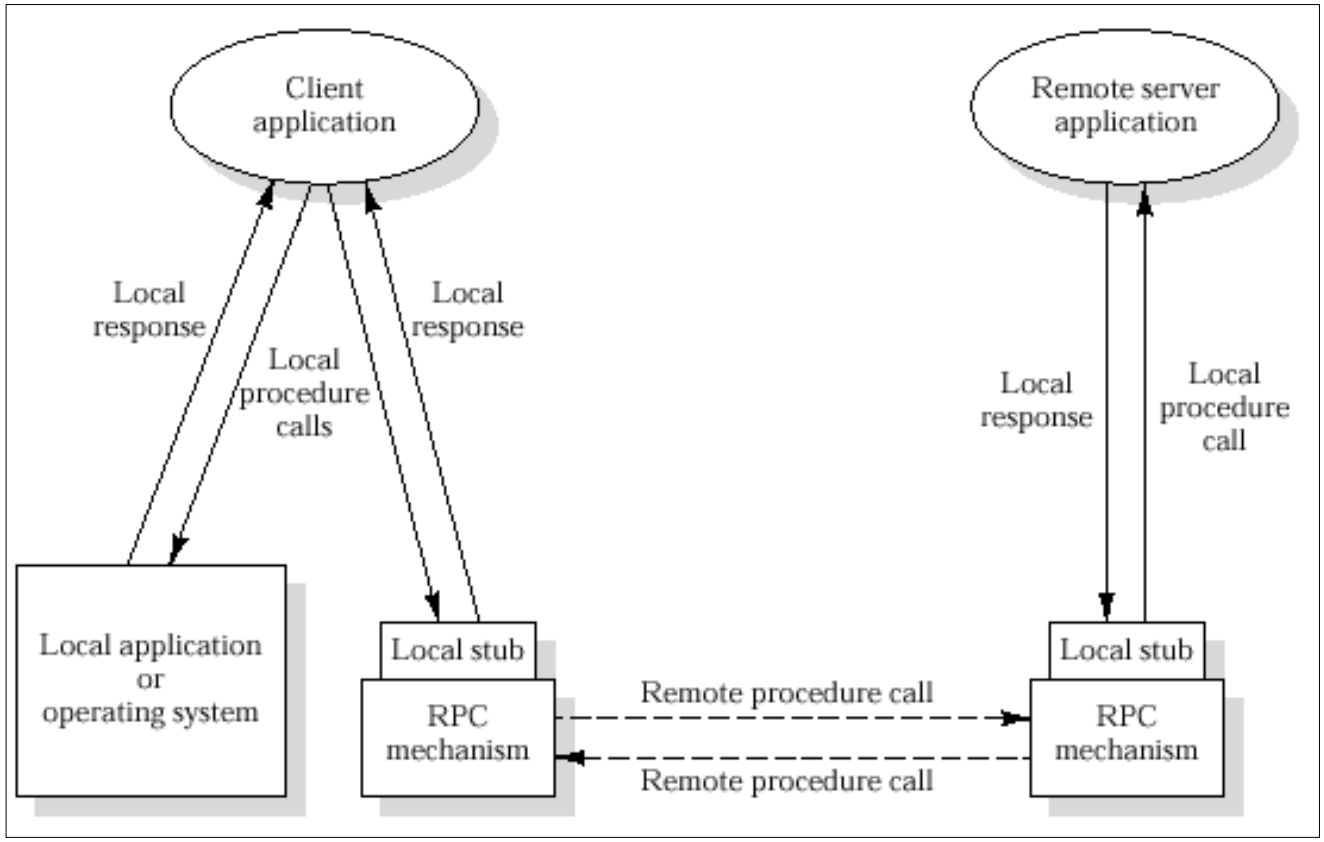
Middleware Mechanisms

- Message-Oriented Middleware
- Remote Procedure Calls
- Object Request Brokers

Basic Message Passing Primitives



Remote Procedure Call Mechanism



Object-Oriented Mechanisms

- Clients and servers ship messages between objects.
- May rely on an underlying message or RPC structure or be developed directly on top of object-oriented capabilities in the operating system
- Success depends on standardization of the object mechanism, but competing models exist
  - COM, OLE, CORBA

Intranets

- Implementation of internet-based client/server technology within an organization, rather than for global connectivity
- Immensely successful in corporate computing contexts

Advantages of Intranets

- Rapid prototyping
- Scales effectively
- Little training required
- Can be implemented on variety of systems
- Open architecture allows interaction across platforms
- Supports a range of distributed servers
- Allows integration of legacy systems on client and server side
- Supports a range of media types
- Inexpensive to implement

The Intranet Web

- Web Content
  - The web can be used to effectively distribute content in a way that requires no new training for end-users
- Web/Database Connectivity
  - Multiple tools exist to serve as middleware between web servers and data sources
- Electronic Mail
- Network News

Web/Database Connectivity

- Advantages
  - Ease of administration
  - Deployment
  - Development speed
  - Flexible information presentation
- Disadvantages
  - Limited functionality
  - Stateless operation makes tracking difficult

The Extranet Web

- Extends the intranet concept to provide information and services to selected outside populations, such as customers and suppliers
- Enables the sharing of information between companies
- A TCP/IP enabled form of EDI

Advantages of Extranets

- Reduced costs
- More marketable products
- Increased productivity
- Enhanced profits
- Reduced inventories
- Faster time to market

Methods for Converting Intranets to Extranets

- Long-distance dial-up access
- Internet access to intranet with security
- Internet access to an external server that duplicates some of a company's intranet data
- Internet access to an external server that originates database queries to internal servers
- Virtual private network