CT053-3-1
Fundamentals of Web Design and Development

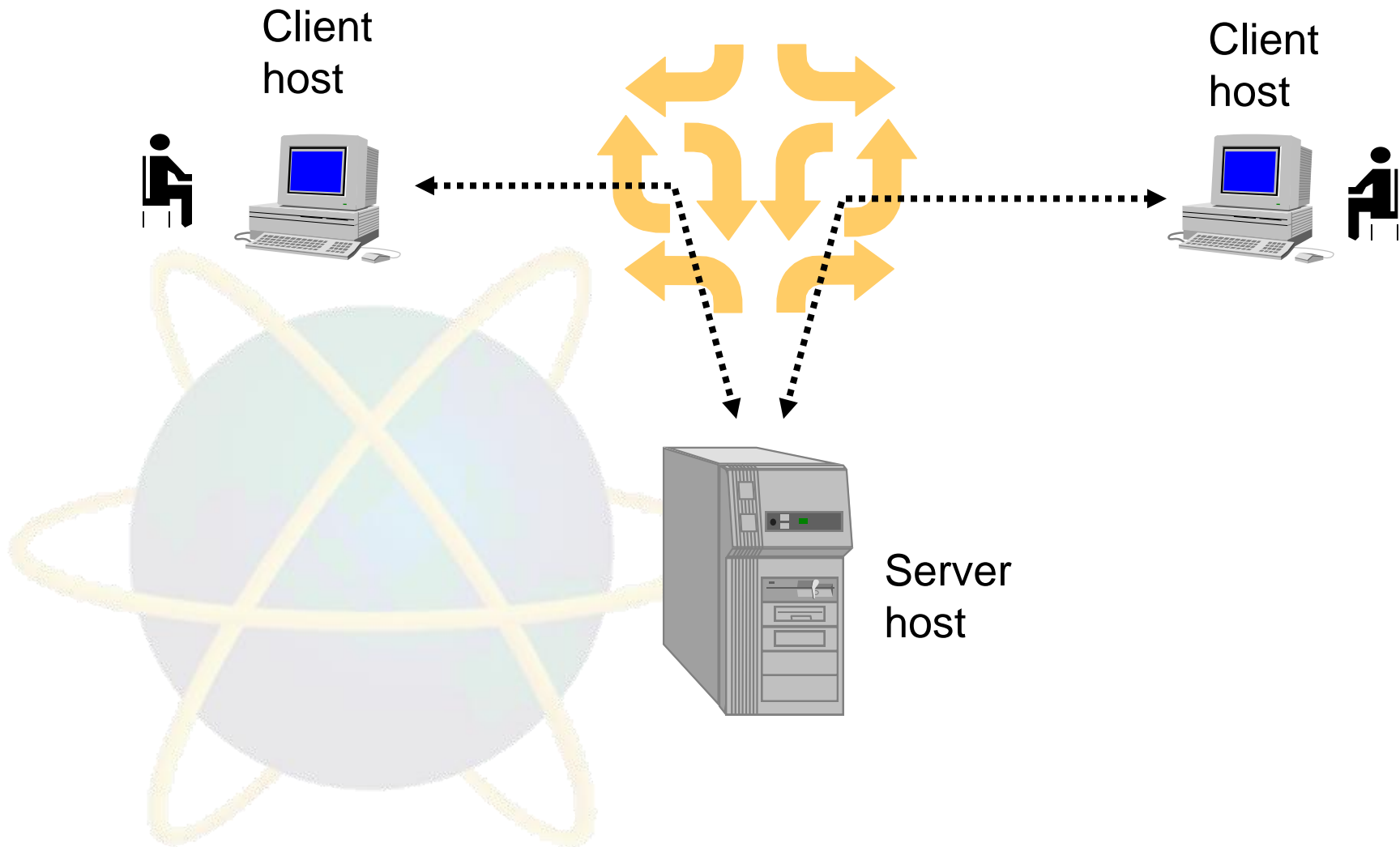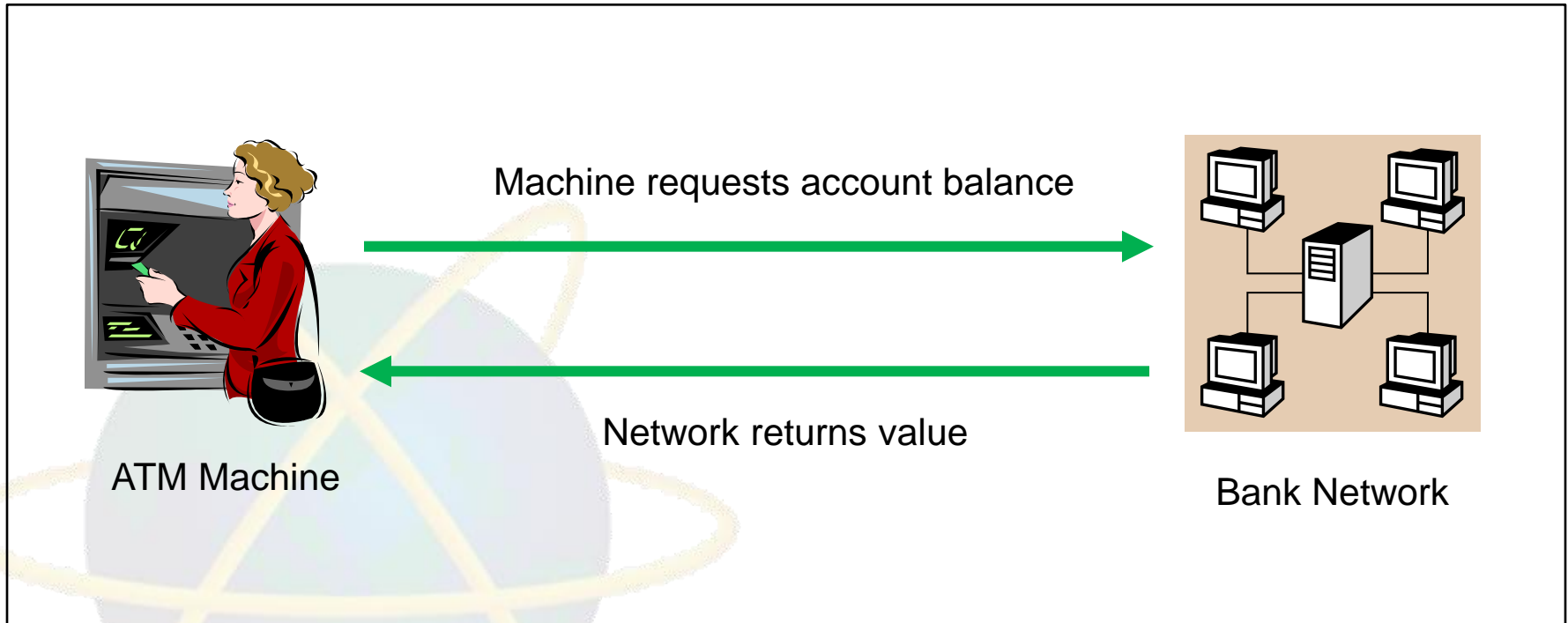## Client Server Architecture

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Client Server Model

- Client/server Model:
  - Describes the relationship between two computer programs - the client, makes a service request from another program, the server, which fulfills the request.

- Deployed on a network.

- Specific types of servers include web servers, application servers, file servers, terminal servers, and mail servers. While their purposes vary somewhat, the basic architecture remains the same.
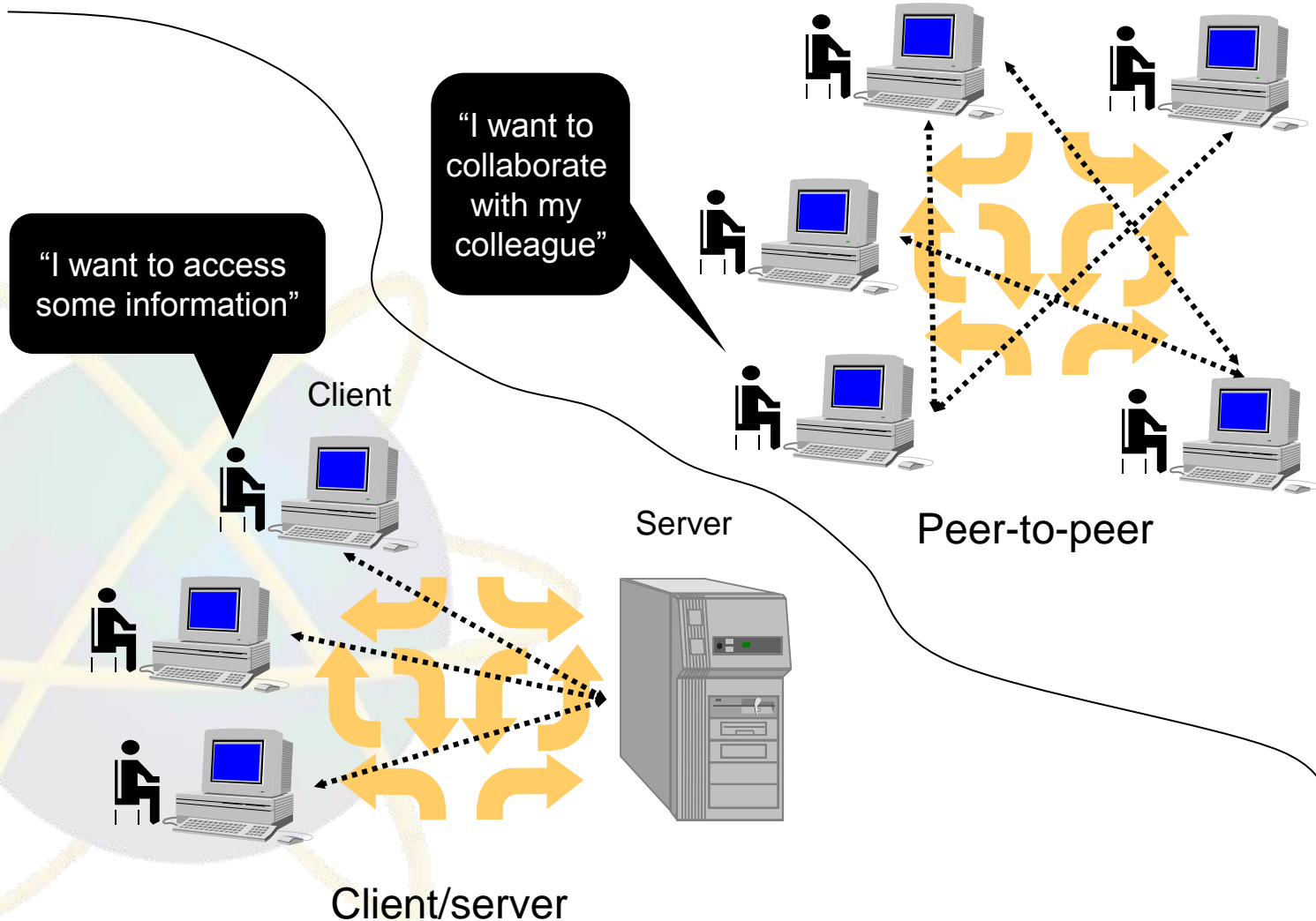
Client
host

Client
host

Server
host

Client Server Model

Machine requests account balance

Network returns value

ATM Machine

Bank Network

A simplified transaction between a client and server

Client-server vs. Peer-to-peer

Client

"I want to access some information"

"I want to collaborate with my colleague"

Server

Peer-to-peer

Client/server

Client-server vs. Peer-to-peer

- ## Client-server
  - Asymmetric relationship
  - Client predominately makes requests, server makes replies

- ## Peer-to-peer
  - Symmetric relationship

Three-tier Client/ Server

Local-area network

Application logic

Presentation

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

Shared data
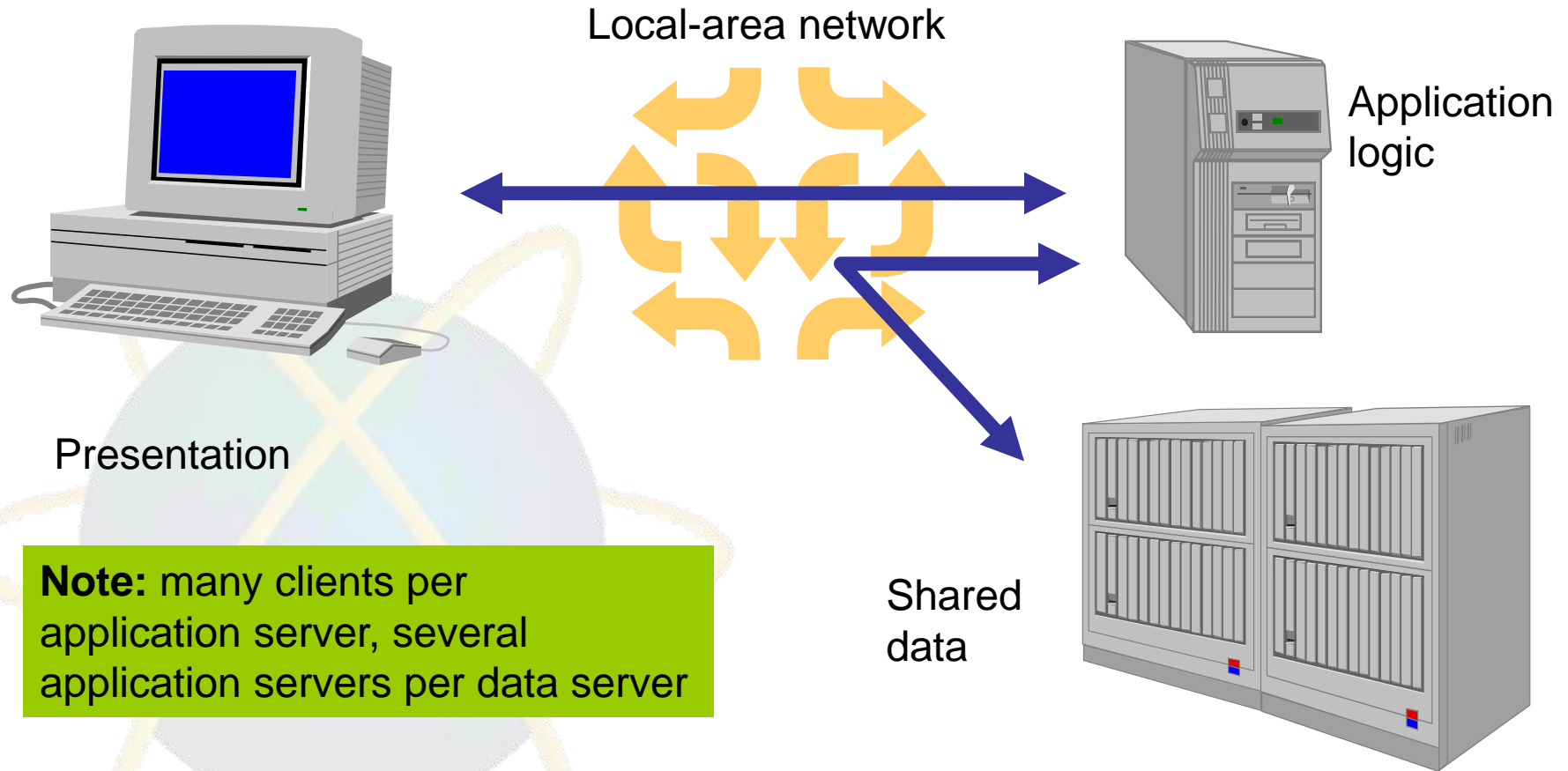
Client Server Architecture

- The Internet is an example of a client-server environment

- Relative to the Internet, your Web browser is a client program that requests services (the sending of Web pages or files) from a Web server.

- The server is another computer on the Internet

- The client-server environment has replaced the monolithic mainframe based environment (or Peer-to-Peer Model), whereby machines were dumb terminals connected to a mainframe.

Client Server Architecture

- A generic client/server architecture has two types of nodes on the network: clients and servers. These generic architectures are referred to as "two-tier" architectures.

- Some networks will consist of three different kinds of nodes:

  i.   **client** (user interface),

  ii. **application servers** (a software engine that delivers applications to client computers or devices and process data for the clients) and

  iii. **database servers** (store data for the application servers). This configuration is called a "three-tier" architecture (or 3-layer architecture).

- "Three-tier" is maintained as independent modules.

The Client-Server Architecture

The 3-Tier architecture has the following 3-tiers (or 3-layer):

1. Presentation Tier
2. Application Tier/Logic Tier/Business Logic Tier
3. Data Tier

Presentation tier

The top-most level of the application is the user interface. The main function of the interface is to translate tasks and results to something the user can understand.
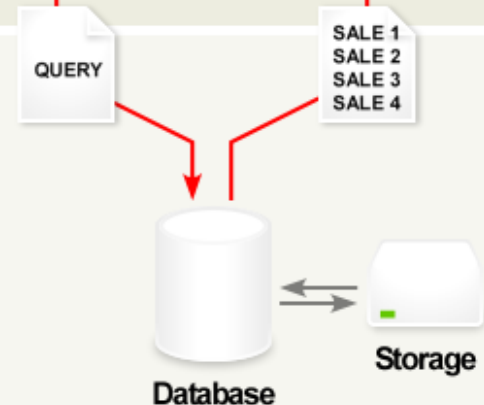
> GET SALES TOTAL

> GET SALES TOTAL
4 TOTAL SALES

Logic tier

This layer coordinates the application, processes commands, makes logical decisions and evaluations, and performs calculations. It also moves and processes data between the two surrounding layers.

GET LIST OF ALL SALES MADE LAST YEAR

ADD ALL SALES TOGETHER

QUERY
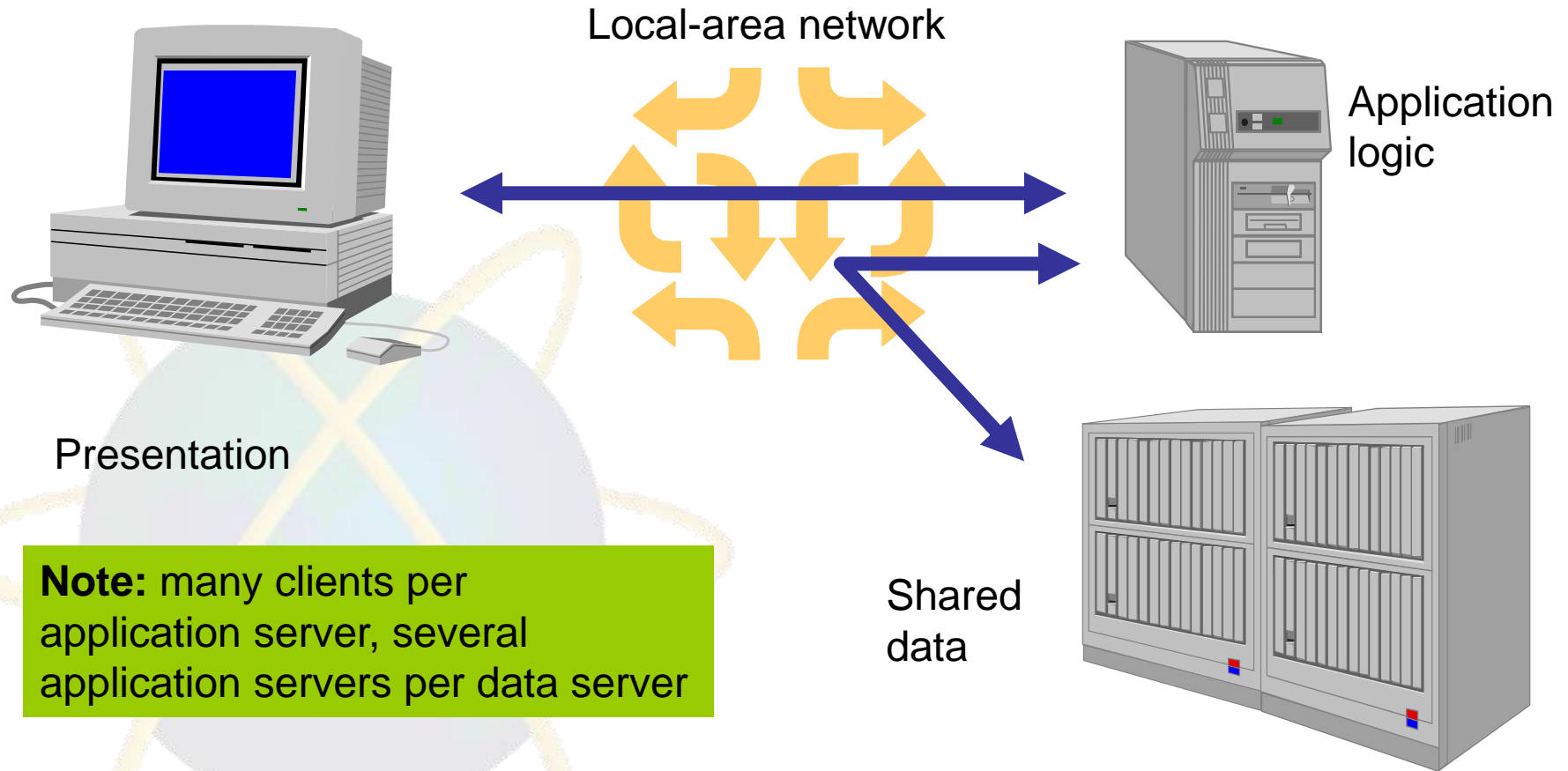
SALE 1
SALE 2
SALE 3
SALE 4

Data tier

Here information is stored and retrieved from a database or file system. The information is then passed back to the logic tier for processing, and then eventually back to the user.
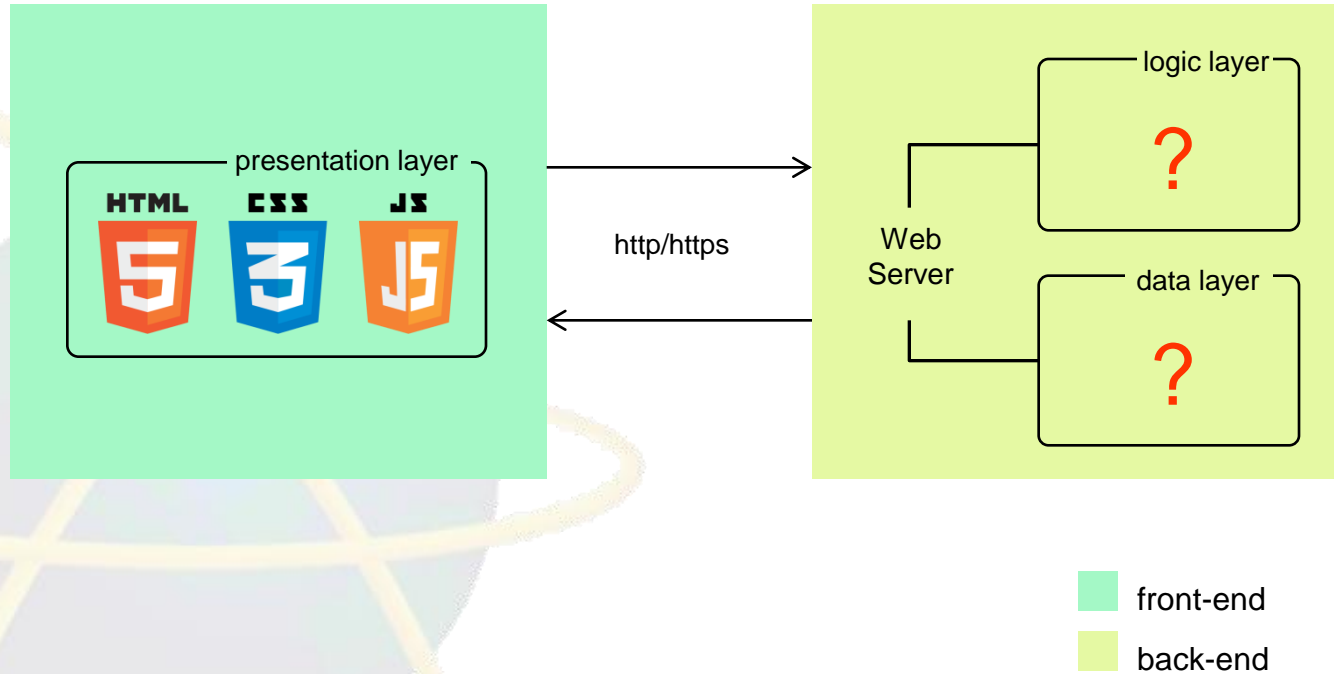
Database

Storage

The Client-Server Architecture

Local-area network

Application logic

Presentation

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

Shared data

The Client-Server Architecture – Web Application Example

presentation layer

HTML 5 · CSS 3 · JS

http/https

Web Server

logic layer

?

data layer

?

front-end
back-end

Characteristics of Client-Server

- Characteristics of a server:
  - Passive (slave)
  - Waits for requests
  - Upon receipt of requests, processes them and then serves replies

- Characteristics of a client:
  - Active (master)
  - Sends requests
  - Waits for and receives server replies

Advantages of Client Server Model

- Advantages:
  - All the data are stored at the servers - better security
  - Control ability.
  - The server can control access to make sure only let permitted users access and change data.
  - More flexible than P2P paradigm for updating the data.
  - Already many matured technologies designed for client-server
  - model which ensures security.
  - User-friendliness of the interface and ease of use.
  - Any element of a client-server network can be easily upgraded (Scalable)
  - Coupled with wireless technologies is possible
  - Centralized – makes data management controllable.

Disadvantages of Client Server Model

- Disadvantages:
  - Traffic congestion
  - When a large number of clients send requests to the same server at the same time, it might cause a lot of troubles for the server.
  - When the server is down, clients requests cannot be fulfilled. In most of P2P networks, resources are usually located on nodes all over the network. Even if one or a few nodes depart or abandon the downloading, other nodes can still finish the downloading by getting data from the rest of the nodes in the network.

Advantages and Disadvantages of 3-Tier architecture

- The advantage of an n-tier architecture compared with a two-tier architecture (or a three-tier with a two-tier):
  - n-tier architecture separates out the processing that occurs to better balance the load on the different servers.
  - More scalable.

- The disadvantages of n-tier architectures are:
  - Puts more load on the network.
  - More difficult to program and test software than in two-tier architecture because more devices have to communicate to complete a user's transaction.

Web Hosting

- A web hosting service is a type of Internet hosting service that allows individuals and organizations to make their website accessible via the World Wide Web.

- Web hosts are companies that provide space on a server owned or leased for use by clients, as well as providing Internet connectivity, typically in a data center.

Free vs. Paid Web Hosting

Criteria	Free	Paid
Uniqueness	provide a domain address that has their company's name included in the URL	provide a personalized domain name, creating a unique identity for businesses online
Reliability	do not offer the same uptime like paid web hosting companies	guarantee 99 percent uptime
Search Engine Rankings	frowned upon by search engines and contribute to lower search engine rankings	higher search engine rankings and better online visibility
Bandwidth & Storage	provide limited bandwidth and storage space	give the freedom for businesses to choose from a variety of packages, with different bandwidth and storage space
Support & Assistance	do not provide immediate support in case of any technical glitches	24/7 technical support via phone, email or chat, promising peace of mind even during a crisis

Factors in choosing a Web Hosting

- Operating System

- Scripting languages

- Databases

- Single / Multiple domain support

- Price

- Space

- Bandwidth

Web Hosting Capacities

- How much disk space ?

- It depends on the need and the content of the website

- Small or medium website will need between 10MB to 100MB

- Average size of HTML files are very small, not even 1 KB, the bigger size come from images (button, banner, etc.)

Web Hosting Capacities

- **Monthly Traffic**
  - A small or medium website will consume between 1 to 5 GB of data transfer per month.
  - Average page size X number of expected page view per month.

- **Example :**
  - Average page size 30KB
  - 50,000 pages view per month
  - Bandwidth = 0.03MB X 50,000 = 1.5 GB

Web Hosting Technology

- Windows Hosting
  - hosting of web services that runs on the Windows operating system
  - Choose this hosting if you plan to use any other Microsoft software for your server
  - Unix Hosting
  - hosting of web services that runs on the Unix operating system.

- Unix
  - Was the first (original) web server operating system, and it is known for being reliable and stable.
  - Often less expensive than Windows.

Q & A