

# Study Sheet: How the Web Works

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## How the Web Works

### 1. The Internet

- **Networks:** Devices connect via wired/wireless links → form a network.
- **Switches:** Manage communication between devices, preventing chaos.
- **Interconnected networks:** Switches link to other switches → global Internet.
- **Client–Server model:**
  - Clients = our devices.
  - Servers = powerful computers providing services (websites, streaming).
- **Global reach:** Undersea cables carry massive data across continents.
- **Big picture:** Internet = networks of networks enabling worldwide communication.

### 2. Web Servers

- **Definition:** A server = computer providing services to clients.
- **Data centers:** Store thousands of servers with power, cooling, and Internet.
- **Hardware vs. Software:**
  - Hardware = physical components (CPU, memory, storage).
  - Software = code running on the server (easy to update/change).
- **Web server functions:**
  - Store/manage websites.
  - Handle data storage & security.
  - Manage email services.
  - Process **web requests**.
- **Request–response cycle:** Browser requests → server responds with content.
- **Capacity:** Web servers handle thousands of requests per second.

### 3. Web Hosting

- **Definition:** Renting space on a hosting company's server to make your site accessible.
- **Types of hosting:**
  - **Shared hosting:** Cheapest, many sites share resources → best for small sites.
  - **VPS (Virtual Private Server):** Dedicated resources, mid-range cost → stable for medium sites.
  - **Dedicated hosting:** Entire physical server for one user → expensive, high

- performance.
- **Cloud hosting**: Runs across multiple servers, scalable, pay-as-you-go → used by major apps.
- **Big picture**: Hosting choice depends on site size, traffic, and growth needs.

## 4. Web Browsers

- **Definition**: Software application to access the web.
- **How it works**:
  1. Browser sends a **request** to a web server.
  2. Server sends a **response** with content.
  3. Browser **renders** content for display.
- **URL (Uniform Resource Locator)**:
  - Protocol (HTTP/HTTPS).
  - Domain name (e.g., google.com).
  - File path (specific page).
- **HTTP protocol**: Governs communication between browser and server.
- **Example**: Searching “restaurants near me” → browser request → server queries database → sends results → browser displays page.
- **Big picture**: Browsers = clients, servers = providers, all powered by the **request–response cycle**.

### Quick Recap (All Together)

- **Internet** = global network of networks.
- **Servers** = computers providing services, stored in data centers.
- **Web hosting** = renting server space (shared, VPS, dedicated, cloud).
- **Browsers** = client software that requests and displays content.
- **Core mechanism** = **Request → Response** cycle.

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