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**Part 1: Understanding the Web**

**1. How the Web Works**

The World Wide Web (WWW) helps people access and share information on the internet. Here’s how it works:

* **Client-Server Model:**
  + A web browser (like Chrome) sends a request to a server (where websites are stored).
  + The server sends back the requested webpage.
* **HTTP/HTTPS Protocols:**
  + HTTP is a way for browsers and servers to communicate.
  + HTTPS is the secure version of HTTP, which uses encryption to protect data.
* **Domain Name System (DNS):**
  + DNS helps change easy-to-remember website names (like google.com) into numbers (IP addresses) that computers use.
* **Browsers:**
  + Browsers like Chrome or Firefox read website code (HTML, CSS, JavaScript) and show the website to users.

**2. Exploring Web Hosting Options**

Web hosting is where websites are stored on servers, so people can access them online. Here are some hosting types:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Hosting Type** | **Cost** | **Reliability** | **Scalability** | **Best For** |
| Shared Hosting | Low | Moderate | Limited | Small websites & beginners |
| VPS (Virtual Private Server) | Medium | High | Good | Growing websites |
| Dedicated Hosting | High | Very High | Excellent | Large businesses & high-traffic sites |
| Cloud Hosting | Varies | Very High | Excellent | Scalable applications |

When choosing a hosting provider, think about cost, uptime, customer support, scalability, and security.

**Part 2: Deployment and Security**

**3. Deploying a Website**

To launch a website, follow these steps:

1. **Domain Registration:** Buy a domain name (like yourwebsite.com).
2. **Choose a Hosting Provider:** Pick a hosting provider that suits your needs.
3. **Upload Website Files:** Use tools like FTP/SFTP to upload your website files to the server.
4. **Configure File Permissions:** Set permissions to control who can access your files.
5. **Set Up a Database:** Use databases like MySQL if your website needs to store data.
6. **Enable HTTPS:** Install an SSL/TLS certificate to make your site secure.

**4. Web Security Essentials**

Websites face security risks. Here are common threats and how to prevent them:

| **Security Threat** | **What it is** | **How to Prevent** |
| --- | --- | --- |
| SQL Injection | Attackers change database queries | Use safe coding practices like prepared statements |
| Cross-Site Scripting (XSS) | Malicious code injected into websites | Sanitize user input and use Content Security Policy (CSP) |
| Man-in-the-Middle (MITM) Attacks | Intercepted communication | Use HTTPS for secure communication |
| DDoS Attacks | Overloading a server with traffic | Use Web Application Firewalls (WAF) and CDN protection |

**Part 3: Research and Presentation**

**5. Emerging Trends in Web Development**

**Progressive Web Apps (PWA)**

* **What it is:** PWAs are web apps that behave like native mobile apps.
* **Benefits:**
  + **Works Offline:** Can function without an internet connection.
  + **Fast Performance:** Loads quickly, even with slow internet.
  + **Works on Any Device:** Accessible on both mobile and desktop.
  + **No App Store Needed:** Can be installed directly from a browser.
* **Challenges:**
  + Limited support on iPhones.
  + Cannot access some device features (like Bluetooth).
* **Real-World Examples:**
  + **Twitter Lite:** Uses less data and works faster.
  + **Starbucks PWA:** Works well even when there's a poor internet connection.