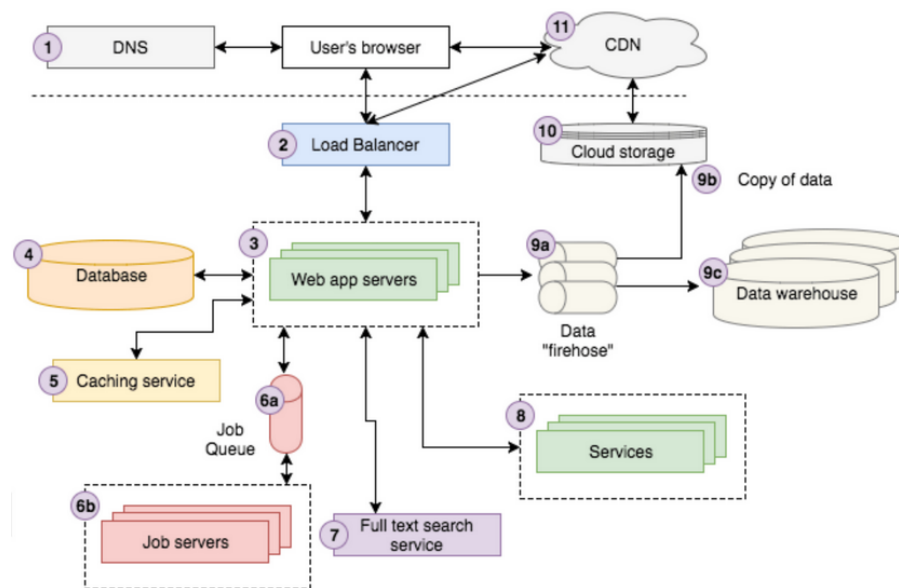


Question 1

Nguyen Truong Thinh - 2213298

December 18, 2024

Question: Describe the components in the picture below, what they are and their role in a high-performance system.



Answer:

1. DNS (Domain Name System)

- Role:** Translates the human-readable domain name (e.g., example.com) into an IP address so the browser can connect to the server.

- **Contribution to Performance:** Ensures fast lookup times for efficient routing to the appropriate servers.

2. User's Browser

- **Role:** The user's browser sends HTTP requests to access resources like web pages, images, or scripts.
- **Contribution to Performance:** Acts as the client interface for the user, initiating requests to the system.

3. CDN (Content Delivery Network)

- **Role:** Distributes static content (e.g., images, videos, scripts) to servers geographically closer to the user.
- **Contribution to Performance:** Reduces latency and load on the main server by serving cached content.

4. Load Balancer

- **Role:** Distributes incoming user requests across multiple servers to prevent overloading any single server.
- **Contribution to Performance:** Ensures high availability and reliability, reducing the chance of downtime or bottlenecks.

5. Cloud Storage

- **Role:** Stores data (like media or backup files) remotely and provides scalable access to this data.
- **Contribution to Performance:** Provides scalability, reliability, and ensures large data can be fetched efficiently.

6. Database

- **Role:** Stores and manages dynamic data required by the system (e.g., user profiles, transactions).
- **Contribution to Performance:** Optimized databases can handle complex queries quickly, ensuring fast response times.

7. Caching Service

- **Role:** Stores frequently accessed data in memory for quick retrieval, reducing the need for repeated database queries.
- **Contribution to Performance:** Significantly reduces latency and increases speed for common requests.

8. Web App Servers

- **Role:** Handle business logic, process requests, and interact with the database or caching service.
- **Contribution to Performance:** Scalability and optimization of web servers ensure quick processing of user requests.

9. Job Queue

- **Role:** Manages background tasks (e.g., sending emails, generating reports) that do not require immediate user interaction.
- **Contribution to Performance:** Offloads non-critical tasks to prevent slowing down the main system.

10. Job Servers

- **Role:** Execute the tasks queued in the job queue (e.g., batch jobs, background processing).
- **Contribution to Performance:** Allows asynchronous processing of heavy tasks, improving user-facing performance.

11. Data Warehouse

- **Role:** Stores large volumes of data for analytics and reporting.
- **Contribution to Performance:** Separates analytics queries from transactional databases, ensuring faster analytics.

12. Services

- **Role:** These are microservices or other backend services that perform specific tasks (e.g., payment processing, user management).
- **Contribution to Performance:** Modular and scalable architecture ensures better fault tolerance and fast execution.

13. Full-Text Search Service

- **Role:** Provides fast and efficient search capabilities for large datasets.
- **Contribution to Performance:** Optimizes search functionality to quickly return relevant results.