Cloud-Based Multiplayer Game Server with AWS EC2

*(13 size) A Project Based Learning Report Submitted in partial fulfilment of the requirements for the award of the degree*

*of*

**Bachelor of Technology**

**in The Department of Computer Science & Engineering**

**Cloud Based AI/ML Speciality (22SDCS07A)**

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FEB - 2025.

**Introduction**

A **cloud-based multiplayer game server** using **AWS EC2, AWS Auto Scaling, and Amazon DynamoDB** provides a fast and reliable gaming experience. **Amazon EC2** is the main service that runs the game, handling player connections, game logic, and real-time interactions. It offers flexible computing power, allowing developers to choose the right server size based on game requirements. EC2 ensures smooth gameplay by processing player actions quickly and efficiently.

**AWS Auto Scaling** helps manage server load by automatically adding or removing EC2 instances based on player activity. When more players join, it increases server capacity to prevent slowdowns. During low traffic times, it reduces resources to lower costs. This ensures the game runs smoothly without wasting money on unused servers.

**Amazon DynamoDB** is a fast, scalable database that stores game data, such as player profiles, match results, leaderboards, and game progress. It handles millions of requests per second, ensuring quick data retrieval and a seamless experience. Since DynamoDB is fully managed, developers don’t need to worry about database maintenance or scaling issues.

By combining **Amazon EC2, AWS Auto Scaling, and Amazon DynamoDB**, developers can create a **scalable, cost-effective, and high-performance** multiplayer gaming experience. These services work together to handle large numbers of players, keep game data secure, and maintain fast response times. This allows game developers to focus on improving the game itself rather than managing the server infrastructure.

**Literature Review/** **Application Survey**

**1. Real-Time Applications Using AWS EC2, Auto Scaling, and DynamoDB**

**1.1 Cloud-Based Multiplayer Gaming**

AWS EC2 is widely used in the gaming industry to host multiplayer game servers with low latency and high availability [1]. Games like Fortnite and Apex Legends rely on EC2 instances to handle real-time interactions and game logic. AWS Auto Scaling dynamically adjusts resources based on player demand, ensuring smooth gameplay and cost efficiency [2]. DynamoDB is used for player data storage, leaderboards, and session management, providing low-latency performance for real-time transactions [3].

**1.2 E-Commerce and Retail**

E-commerce platforms like Amazon and Shopify utilize AWS EC2 for handling large-scale web traffic and dynamic content rendering [4]. Auto Scaling ensures that servers automatically adjust during peak shopping events, such as Black Friday sales, preventing downtime and ensuring a seamless shopping experience [5]. DynamoDB stores user profiles, shopping cart data, and order history, enabling personalized recommendations and real-time inventory tracking [6].

**1.3 Financial Services and Fraud Detection**

Financial institutions such as PayPal and Capital One use AWS EC2 for processing real-time transactions securely [7]. Auto Scaling helps manage fluctuating workloads during high-volume trading hours [8]. DynamoDB stores transaction logs and uses AI-driven analytics to detect fraudulent activities in real-time [9].

**1.4 Social Media and Messaging**

Platforms like Snapchat and LinkedIn use AWS EC2 to manage real-time messaging and social interactions [10]. Auto Scaling allows the system to handle unpredictable user surges, ensuring a smooth user experience [11]. DynamoDB supports chat history storage, user notifications, and content recommendations, making interactions seamless and responsive [12].

**1.5 IoT and Smart Devices**

IoT applications leverage AWS EC2 for processing real-time telemetry data from connected devices [13]. Companies like Tesla and Siemens use EC2 to manage sensor data and predictive maintenance [14]. Auto Scaling ensures that resources scale efficiently as device connections increase. DynamoDB is used to store and analyze time-series data, enabling efficient monitoring and alerting [15].

**1.6 Healthcare and Telemedicine**

Healthcare platforms utilize AWS EC2 for video consultations and electronic health record management [16]. Auto Scaling enables healthcare applications to handle high demand during peak hours. DynamoDB ensures secure storage of patient records and real-time synchronization across multiple healthcare providers [17].

**2. Organizations Using AWS EC2, Auto Scaling, and DynamoDB**

**2.1 Netflix**

Netflix runs its streaming services on AWS EC2, ensuring high availability and performance. Auto Scaling allows the system to adjust capacity based on user demand. DynamoDB supports metadata storage and personalized content recommendations.

**2.2 Airbnb**

Airbnb uses AWS EC2 to handle real-time booking requests and user interactions. Auto Scaling dynamically manages traffic spikes during peak travel seasons. DynamoDB is used for storing user preferences and reservation history.

**2.3 Uber**

Uber relies on AWS EC2 for real-time ride-matching and fare calculations. Auto Scaling optimizes performance during high-traffic events. DynamoDB stores user ride history, location data, and transaction records.

**2.4 Twitter**

Twitter hosts its social media platform on AWS EC2 for handling high-traffic tweet processing. Auto Scaling ensures efficient workload distribution. DynamoDB supports real-time user activity feeds and trending topic calculations.

**2.5 NASA**

NASA uses AWS EC2 for space mission simulations and data analysis. Auto Scaling helps manage high-performance computing needs. DynamoDB is used to store mission telemetry data and real-time analytics.

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