Real-time communication tools for web applications in a cloud environment

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Abstract. This research analyzes AWS AppSync's effectiveness in enabling scalable, real-time communication between web applications. It highlights the benefits of serverless models in resource efficiency and cost. A comparison between AWS AppSync and WebSockets via API Gateway is performed, with load testing to assess performance. Despite some limitations like GraphQL constraints and connection caps, AppSync proves efficient for complex, interactive applications. The study outlines key selection criteria, including scalability, integration, security, and cost, concluding that the choice depends on the application's specific architecture and needs.

Outline of the main material. Cloud computing, with benefits like cost reduction, flexibility, high availability, and robust data security, has become essential for modern businesses. Alongside this, real-time communication has emerged as a critical technology for immediate information exchange, enhancing decision-making speed, customer support, and operational productivity [1].

A separate area within cloud technologies is serverless computing, a cloud model where resources are dynamically allocated by the platform without needing a fixed infrastructure. Serverless solutions automatically scale resources according to demand, making them ideal for real-time communication applications that need to handle varying user loads [2].

In our research, we compare two serverless technologies for RTC in web applications: AWS AppSync [3] and WebSockets through API Gateway [4, 5]. Both provide real-time, low-latency communication capabilities, ensuring that updates are promptly delivered to users. AWS AppSync, which uses GraphQL, allows efficient querying and manipulation of data in real time, while WebSockets through API Gateway provide a more traditional, lightweight messaging protocol for low-latency updates.

Conclusions. The comparative analysis of the testing results indicates that AWS AppSync is a competitive option for building real-time communication systems in a cloud environment. AWS AppSync offers seamless integration with other AWS services and robust security features, making it a strong choice for developers building secure, scalable, real-time applications. However, constraints such as connection caps and performance limitations with large datasets need consideration. The cost-effectiveness of these technologies, especially for complex queries, highlights serverless computing as an optimal solution for many modern web applications requiring real-time communication.

References

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