

Performance Evaluation of REST and GraphQL API Models in Microservices Software Development Domain

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Abstract : This study presents a comprehensive comparative analysis of REST and GraphQL API models within the context of microservices development, offering empirical insights into the strengths and limitations of each approach. The research explores the effectiveness and efficiency of GraphQL versus REST, focusing on their impact on critical software quality metrics and user experience. Using a controlled experimental setup, the study evaluates key performance indicators, including response time, data transfer efficiency, and error rates. The findings reveal that REST APIs demonstrate superior memory efficiency and faster response times, particularly under high-load conditions, making them a reliable choice for performance-critical microservices. On the other hand, GraphQL excels in offering greater flexibility for data fetching but exhibits higher response times and increased error rates when handling complex queries. This research provides a nuanced understanding of the trade-offs between REST and GraphQL API interaction models, offering actionable guidance for developers and researchers in selecting the optimal API model for microservice-based applications. The insights are particularly valuable for balancing considerations such as performance, flexibility, and reliability in real-world implementations.

Keywords : REST API, GraphQL AP, microservice, software development

Conference Title : ICSEA 2025 : International Conference on Software Engineering and Applications

Conference Location : Florence, Italy

Conference Dates : May 08-09, 2025