

DESIGN AND IMPLEMENTATION OF A SCALABLE SOCIAL NETWORK PLATFORM USING MICROSERVICES

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INTRODUCTION

Modern social media platforms face significant challenges related to scalability, security, and content relevance. Previous solutions often fail under high demand or struggle to balance consistency and availability. Additionally, efficient data handling and fast query performance remain critical issues in large-scale applications.

GOAL

- How to design a functional and scalable modular social network while maintaining optimal response times using both SQL and NoSQL databases?
- A functional X-like application (formerly Twitter), based on microservices and optimized for database design and query performance.

PROPOSED SOLUTION

Our solution is a modular social network built on a microservices architecture. Each core functionality (user management, post creation, authentication, moderation, media handling, etc.) is decoupled into independent services that communicate via an API Gateway.

EXPERIMENTS

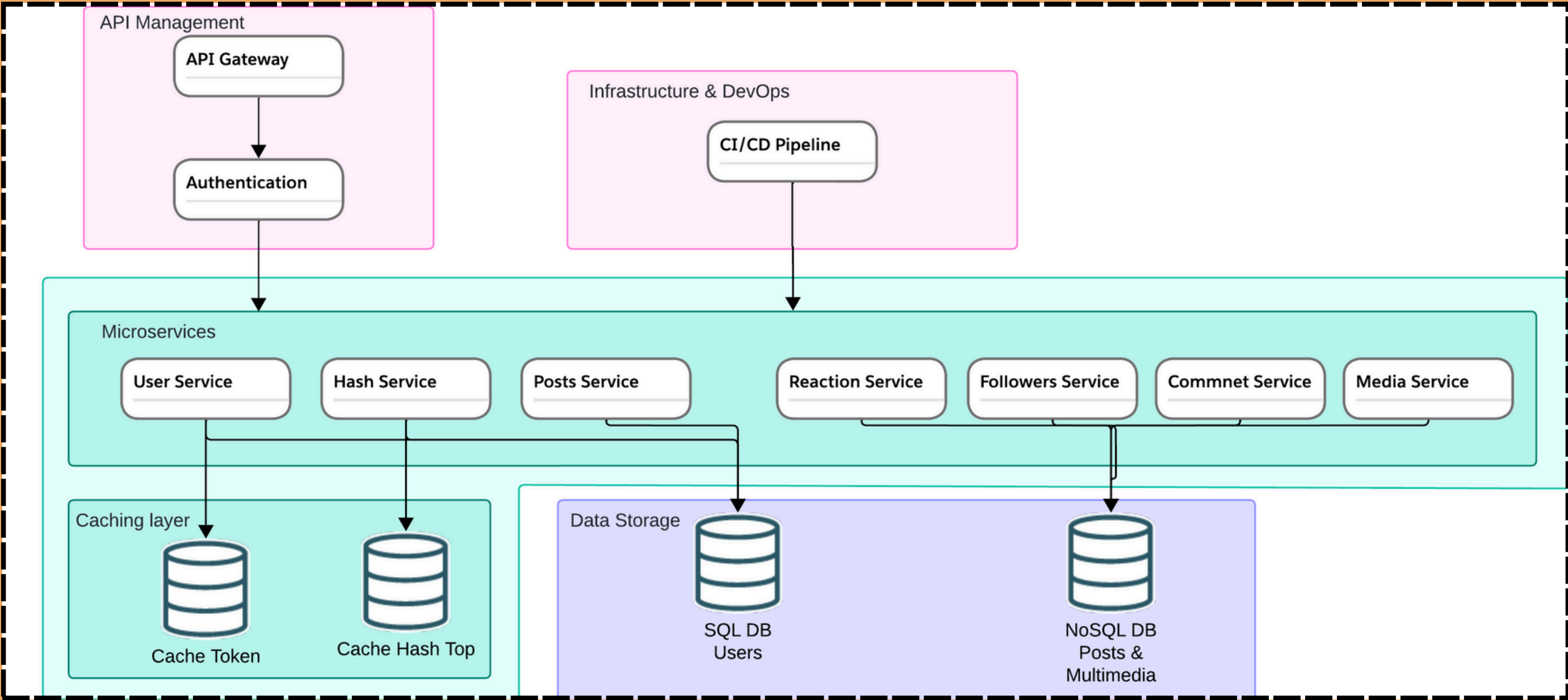
Test	Description	Tool	Key Metric
Bulk post insertion	1.000 posts from multiple users	Postman	Average write time
Concurrent Register Users	1000 parallel sessions	Postman	Login time and success rate
Concurrent Following Users	5000 parallel Following Registration	Postman	Following time and success rate

RESULTS

Test	Iterations	Success (%)	Avg. Resp. Time
Bulk post insertion	1000	96.7%	17 ms
Concurrent Register Users	1000	96.5%	21 ms
Concurrent Following Users	5000	100%	11 ms

CONCLUSIONS

Registration and post insertion, likely handled by relational databases, showed lower performance under load, while follow operations were more efficient—indicating a more optimized backend and the benefits of using NoSQL.



References

Global Media Journal, The Impact of Social Media on Modern Communication: Evolution and Future Prospects 2024. [Online].

A. Ahmed, M. A. Hossain, and K. Andersson, "Scalable data models for social networks," IEEE Access, vol. 6, pp. 58694–58705, 2018.