

Restructuring Software Architecture: Moving From Monoliths to Microservices

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Abstract: *The shift from monolithic software architectures to microservices has become a key approach in contemporary software development, offering improvements in scalability, flexibility, and maintainability. This transformation addresses the limitations of tightly integrated systems, such as reduced agility and challenges in scaling individual components. In contrast, microservices advocate for a decentralized model, where independent services communicate via lightweight protocols, such as REST or message queues. This paper explores the key reasons for adopting microservices, including the ability to support rapid deployment cycles, enhance fault isolation, and optimize resource utilization. It delves into the core principles of microservices architecture, such as domain-driven design, bounded contexts, and continuous delivery. The paper also addresses the technical and organizational hurdles of migrating to microservices, including issues like data consistency, greater operational complexity, and the need for comprehensive monitoring and logging. It presents practical approaches for transitioning from a monolithic to a microservices-based system, such as incremental decomposition, implementing API gateways, and utilizing containerization technologies. The conclusion emphasizes the importance of aligning organizational structures with the new architectural approach, as highlighted by Conway's Law, to fully realize the advantages of this transformation.*

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