Sathish Kumar Subramani

14 DESIGN PATTERNS FOR SCALABLE MICROSERVICES

Explore proven system design patterns for building scalable, reliable, and maintainable microservices architectures with ease.

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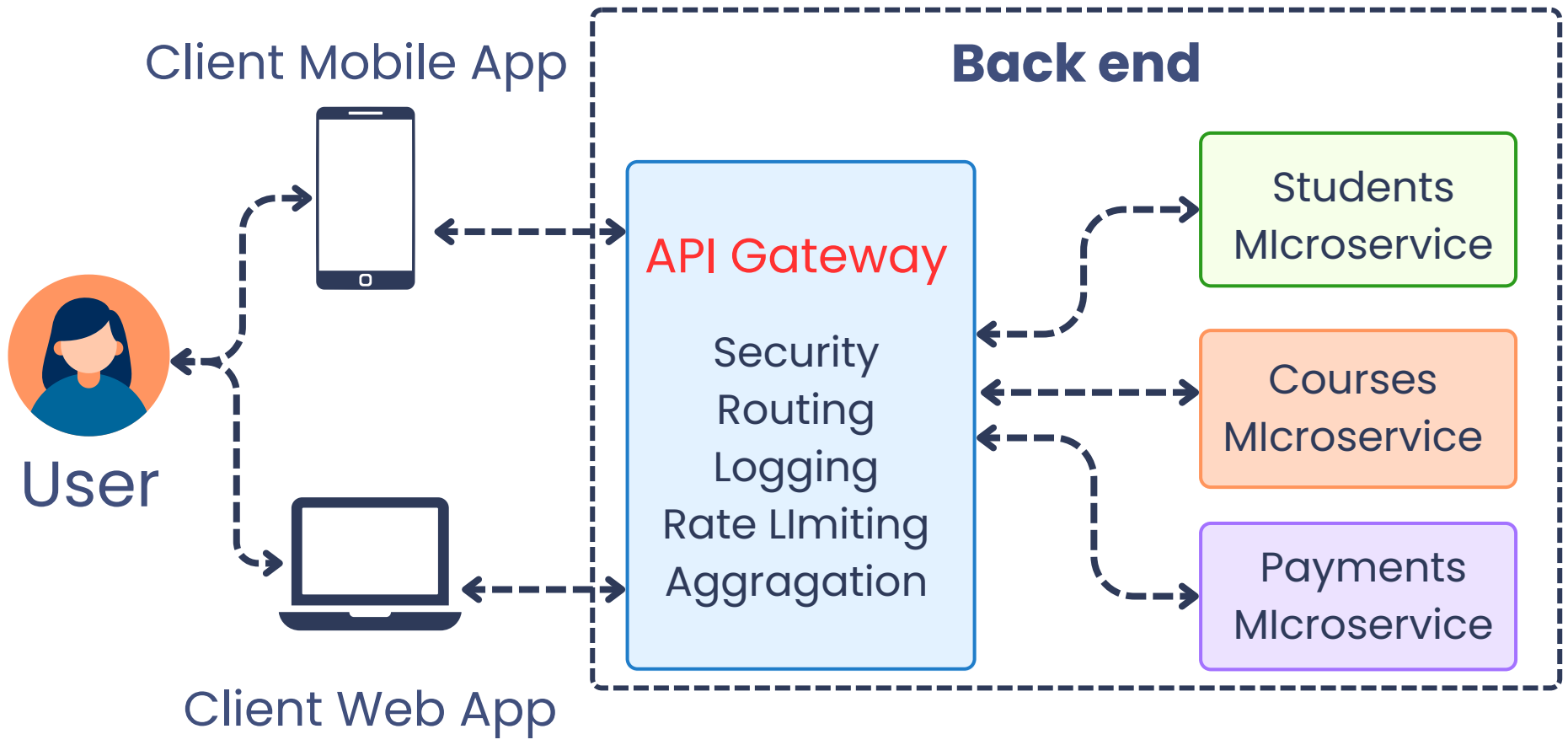
Gateway Pattern



An API Gateway manages client requests by handling routing, authentication, logging, and load balancing across multiple backend microservices efficiently and centrally.

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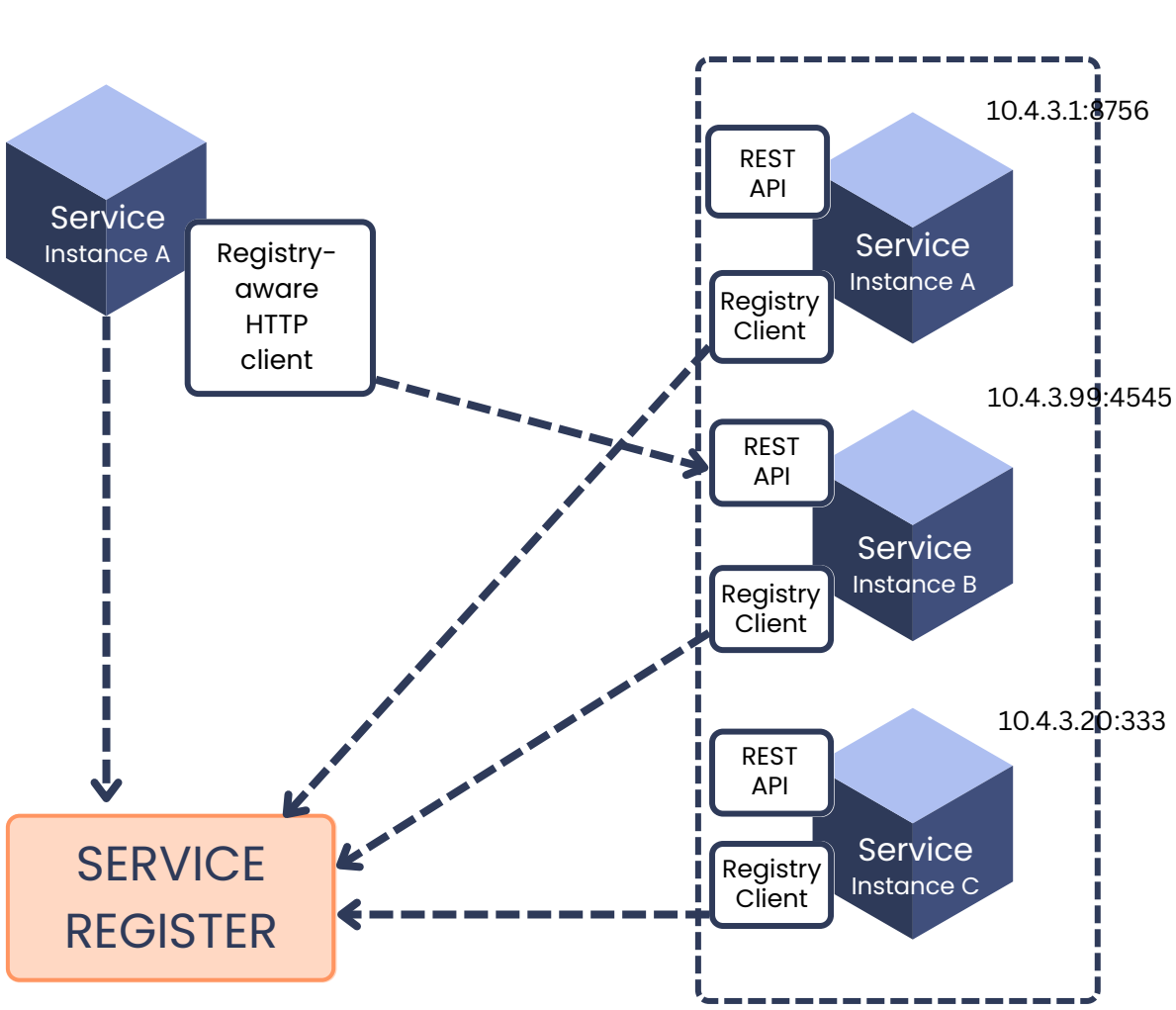
Service Registry Pattern



A service registry allows microservices to register and discover each other dynamically, enabling flexible, scalable communication without hardcoded service addresses.

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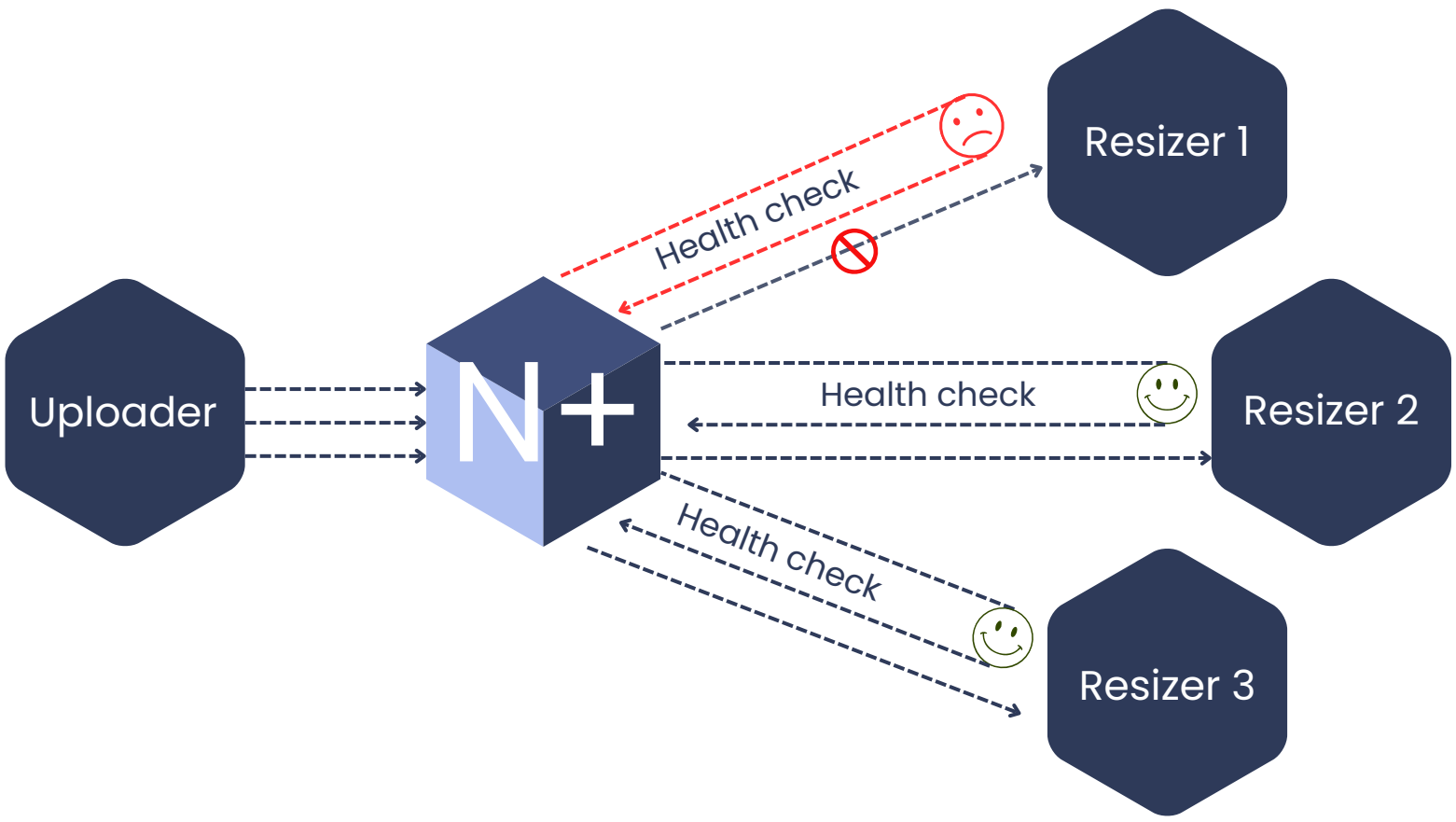
Circuit Breaker Pattern



Circuit breakers detect failing services and temporarily block requests to them, preventing cascading system failures and enabling fallback logic to maintain resilience.

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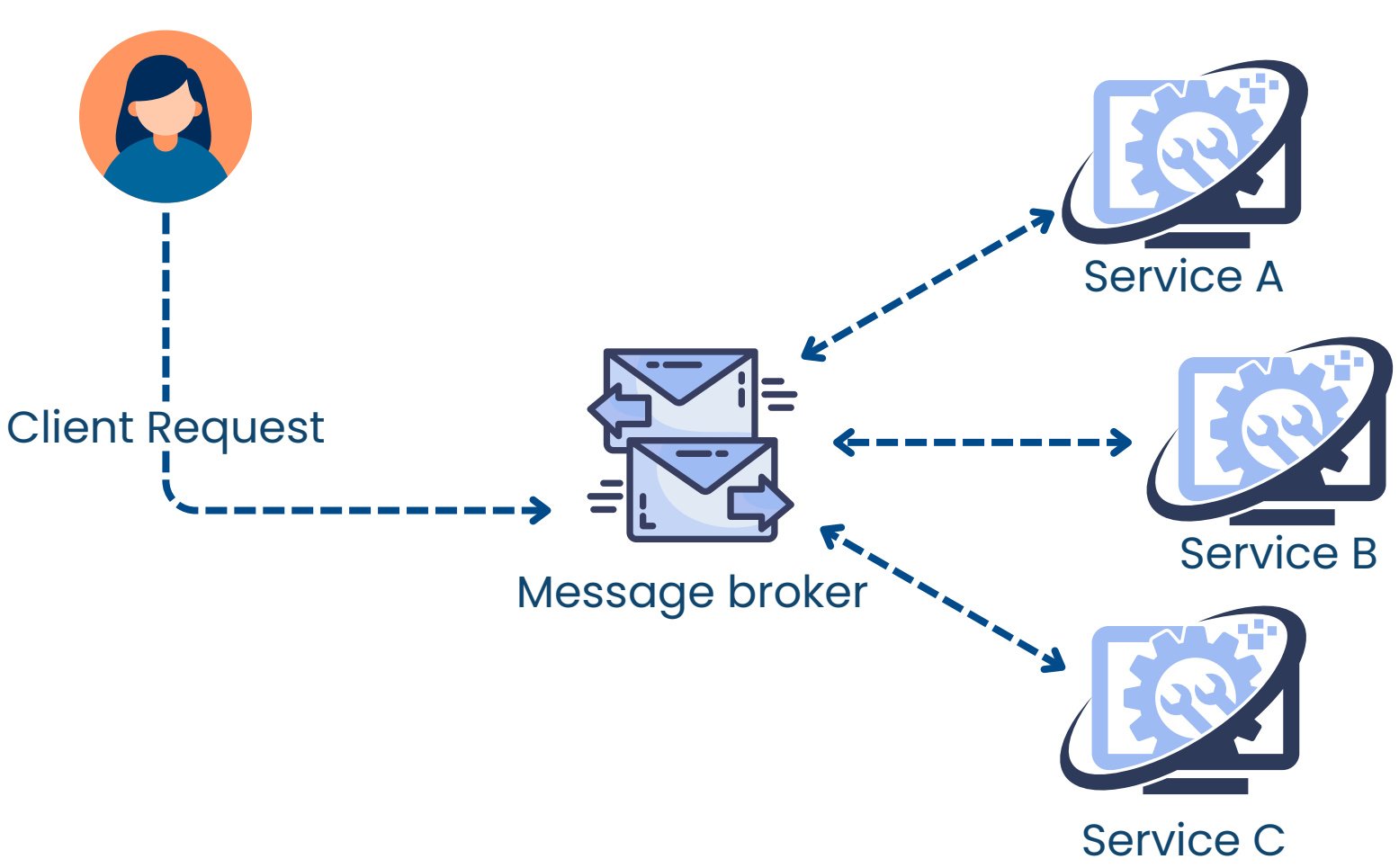
Saga Pattern



The Saga pattern divides long-running business transactions into smaller coordinated steps across services, ensuring consistency in distributed systems without locking resources.

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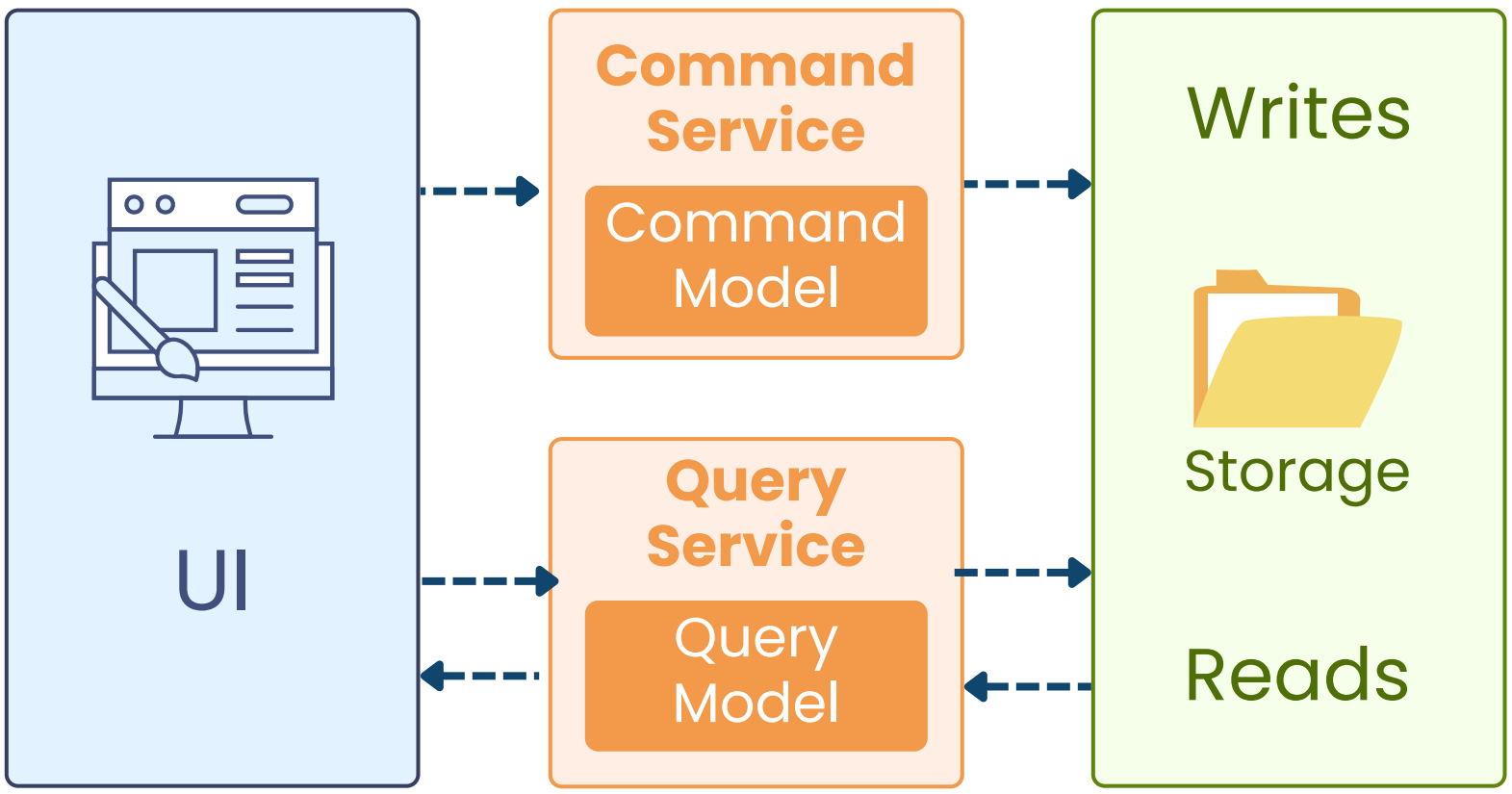
CQRS Pattern



The CQRS pattern separates the system's read and write operations into different models for better scalability, maintainability, and system performance.

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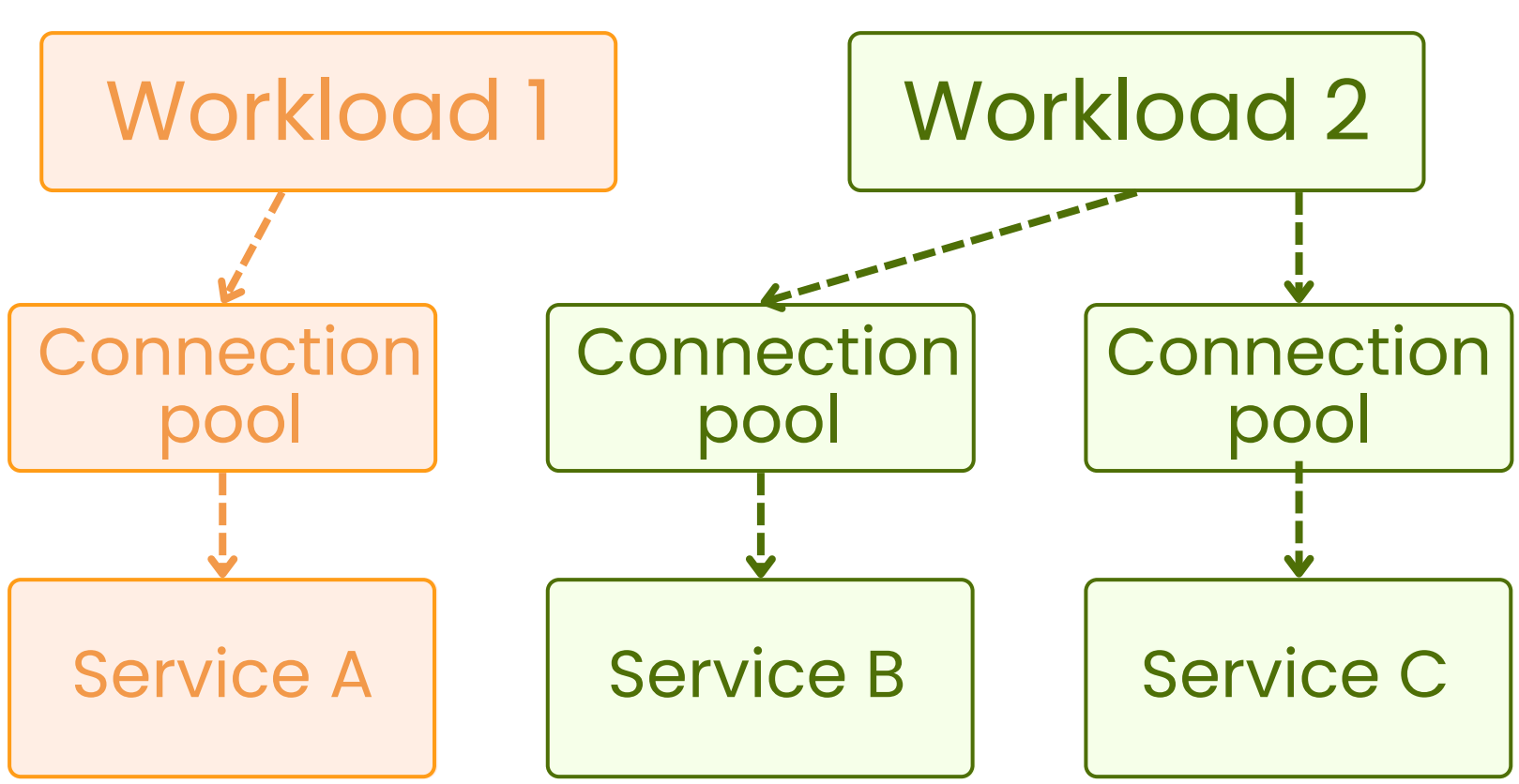
Bulkhead Pattern



Bulkhead pattern isolates services into compartments so failures in one area don’t bring down the entire system architecture.

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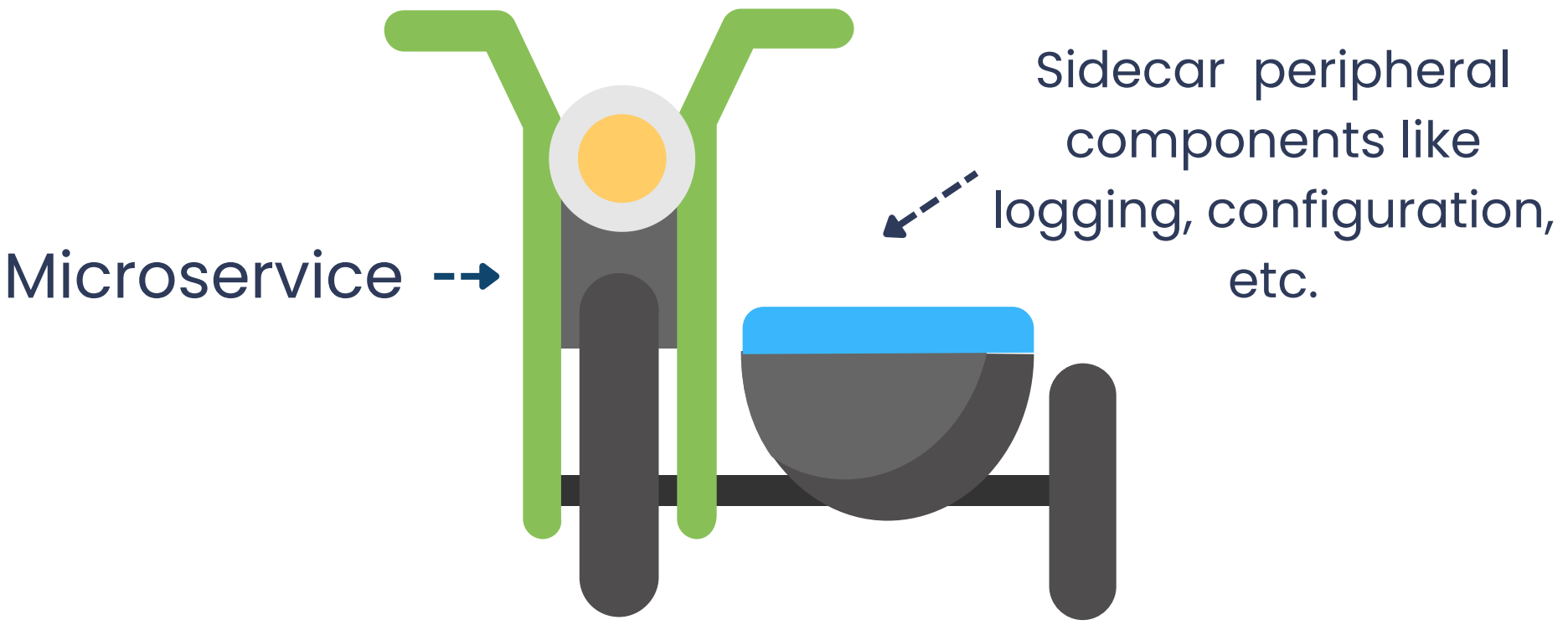
Sidecar Pattern



Sidecar attaches auxiliary microservices to a core service to handle cross-cutting concerns like configuration, logging, monitoring, and service discovery.

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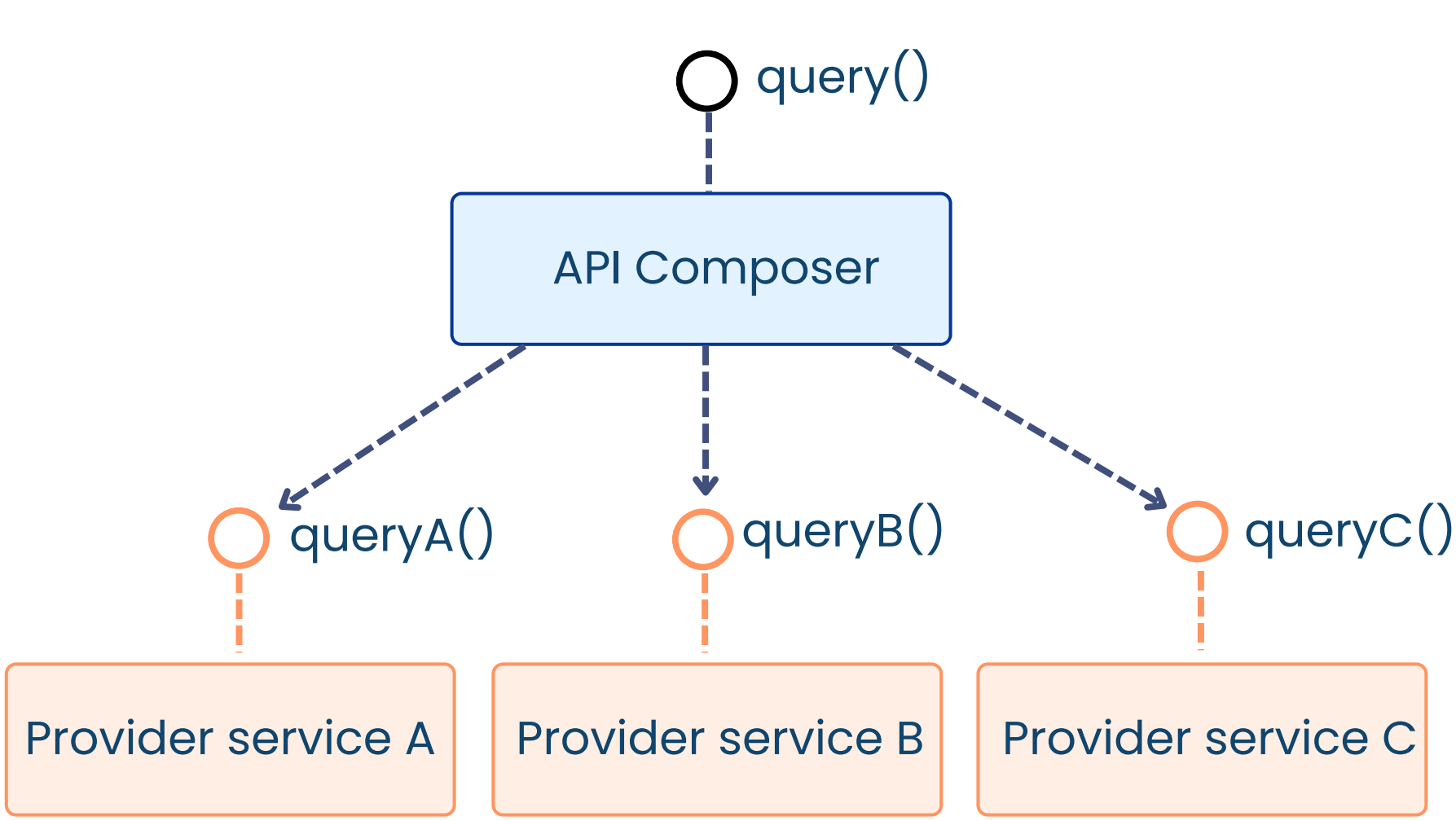
API Composition Pattern



Combine data from multiple services into a single response by composing APIs, delivering rich, client-optimized responses with reduced client overhead.

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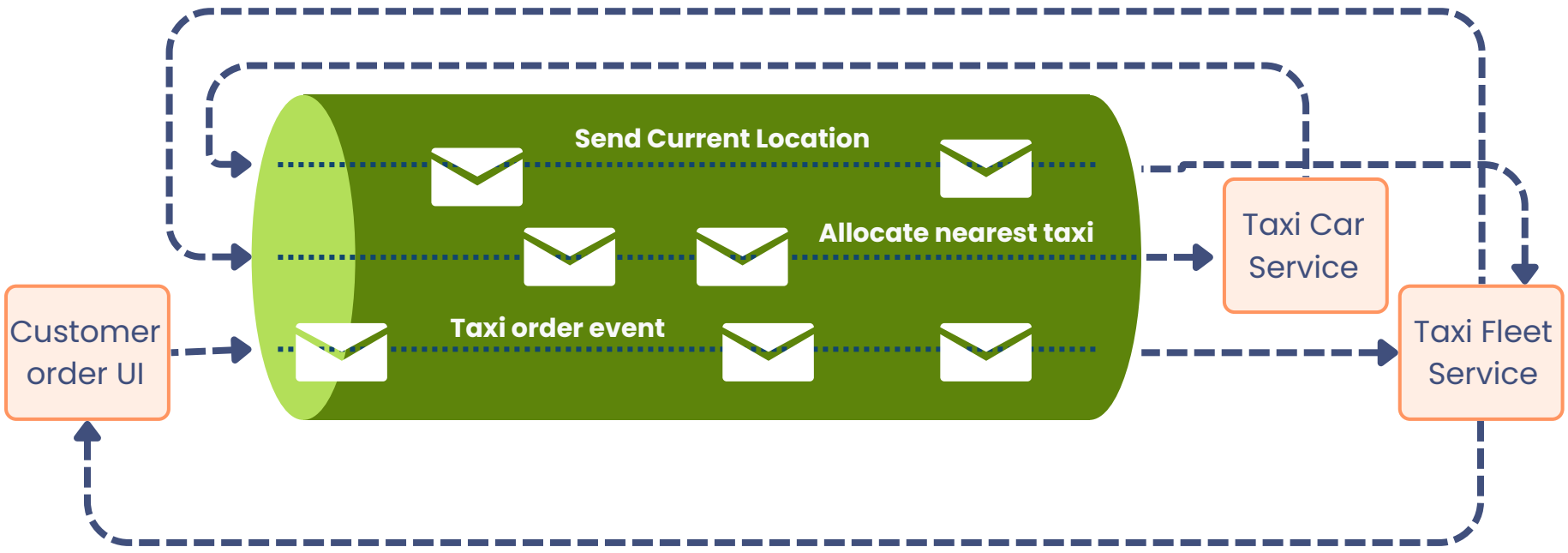
Event-Driven Architecture Pattern



Microservices communicate asynchronously via events, promoting scalability, loose coupling, and independent service evolution in distributed systems architecture.

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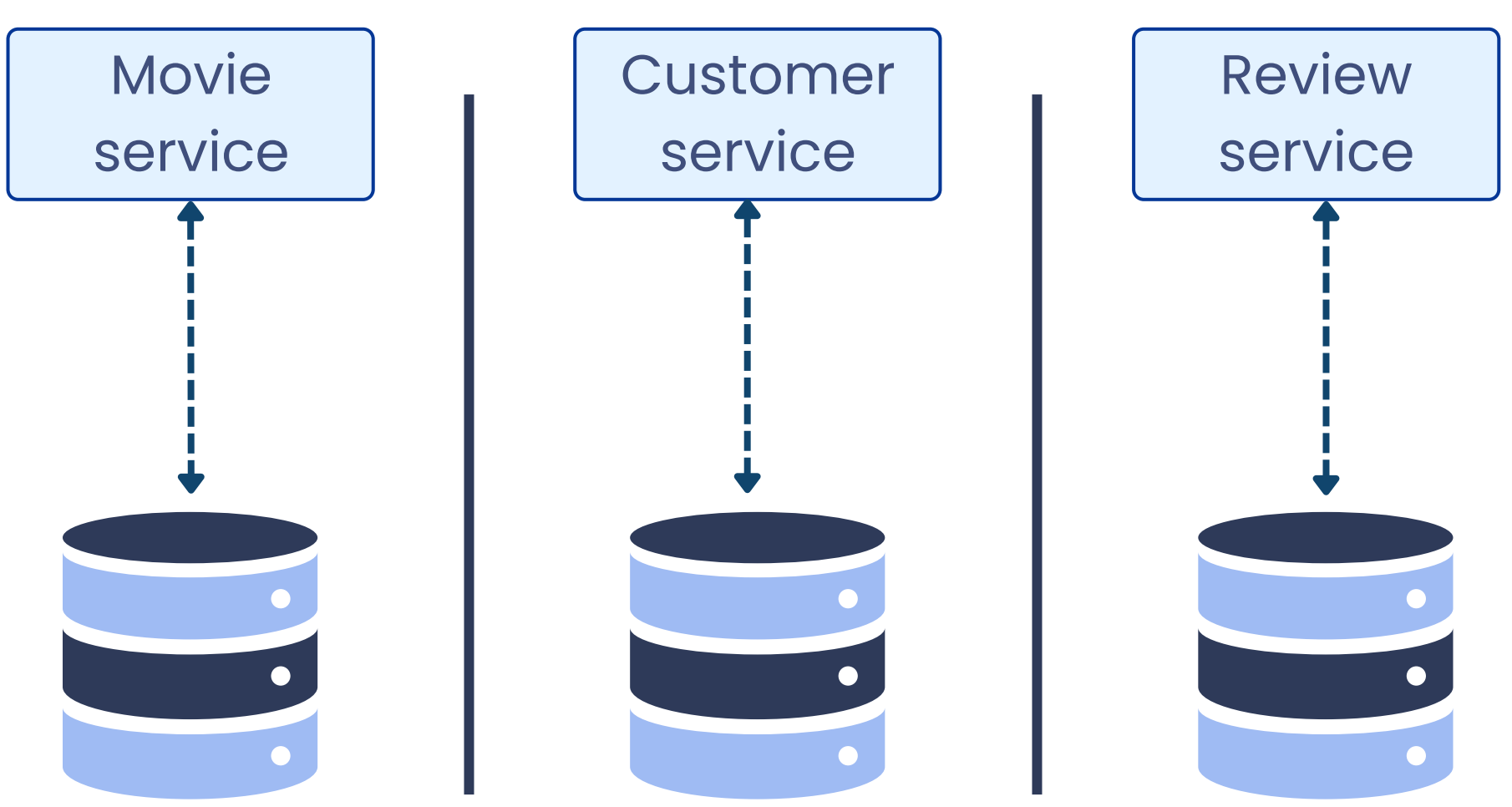
Database per Service Pattern



Each microservice uses its own database, promoting autonomy, decoupling, and independent scaling, updates, and deployments for better microservice isolation.

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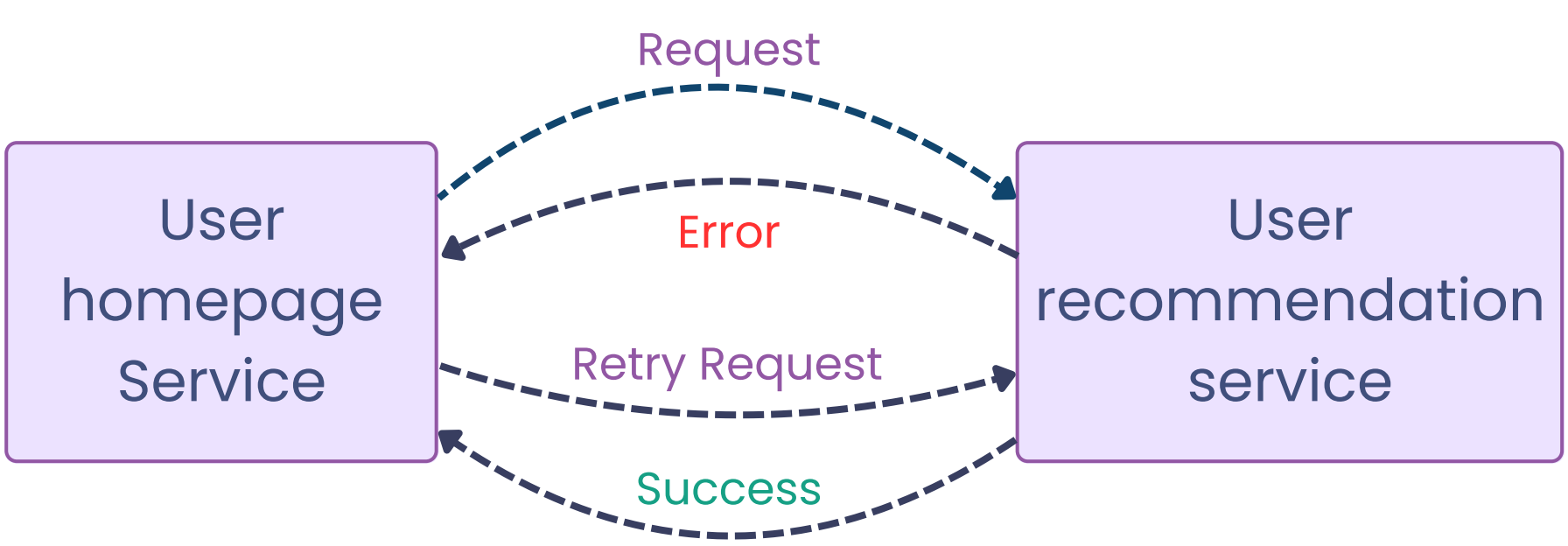
Retry Pattern



The Retry pattern automatically re-attempts failed operations after delays, increasing the system’s reliability, fault-tolerance, and chances of successful responses.

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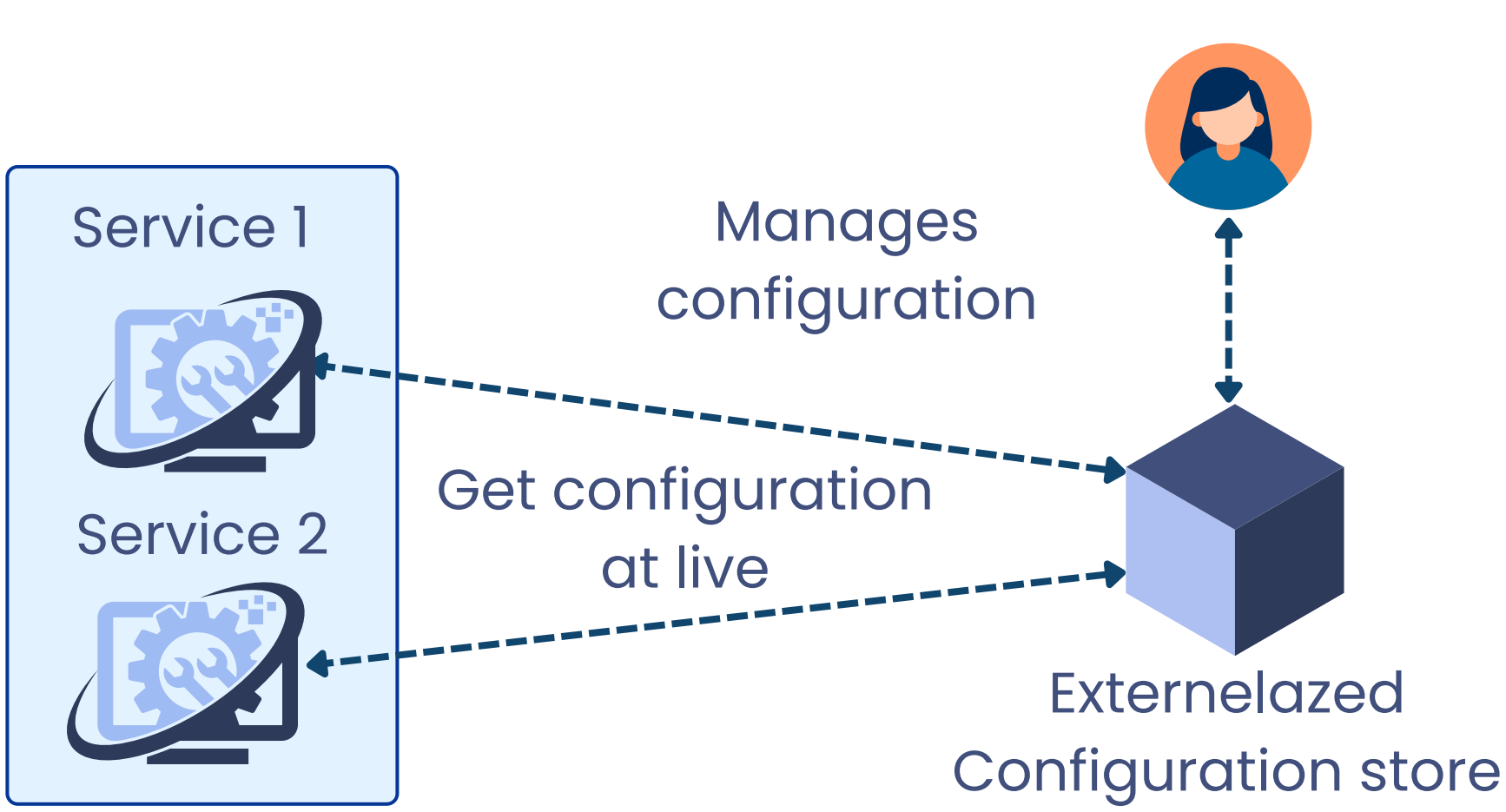
Configuration Externalization Pattern



Externalize configuration settings from application code for centralized management, making updates easier and ensuring consistency across environments.

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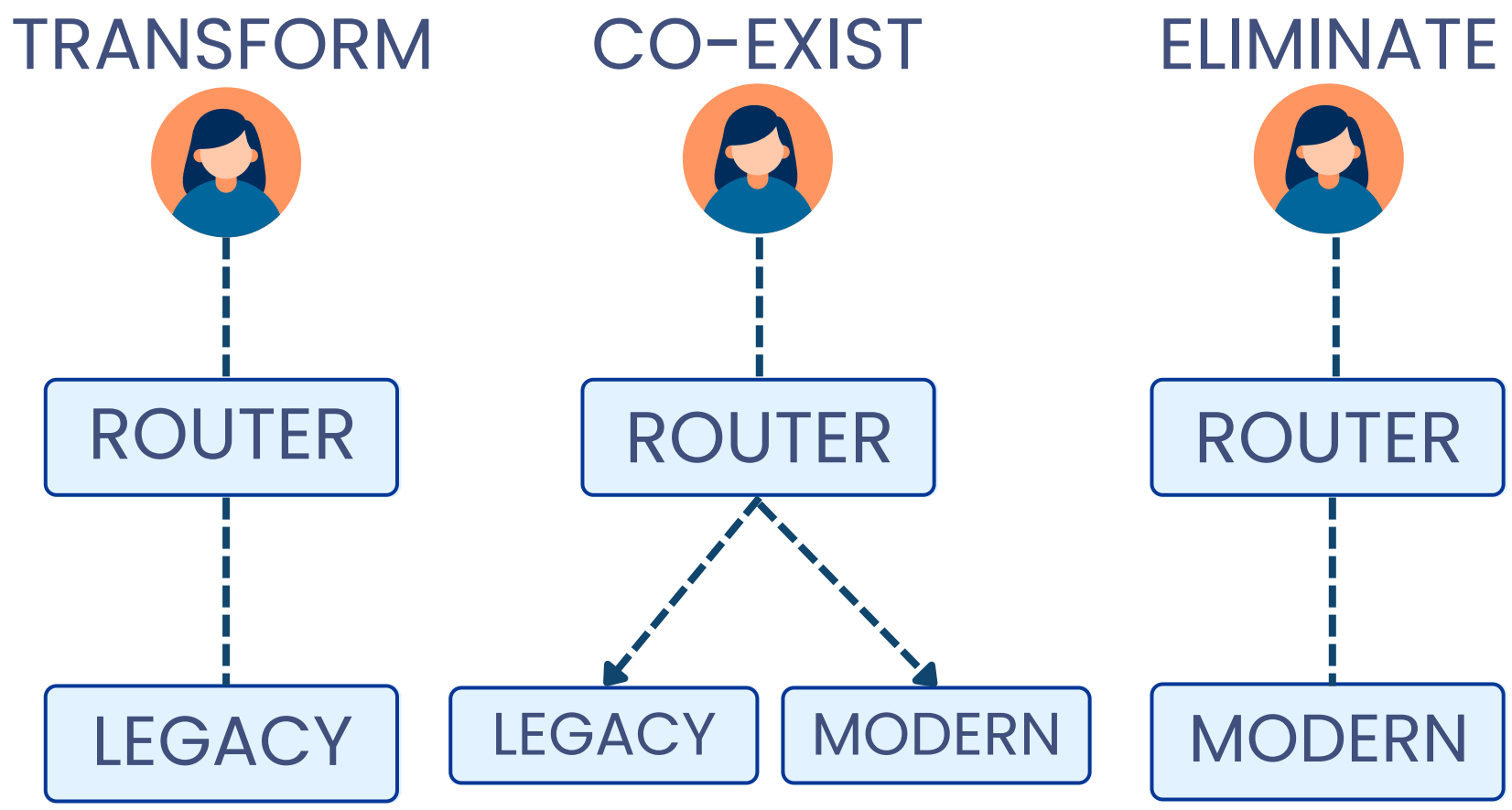
Strangler Fig Pattern



Strangler Fig gradually replaces legacy systems by routing traffic to new components, allowing safe, staged modernization without full replacement.

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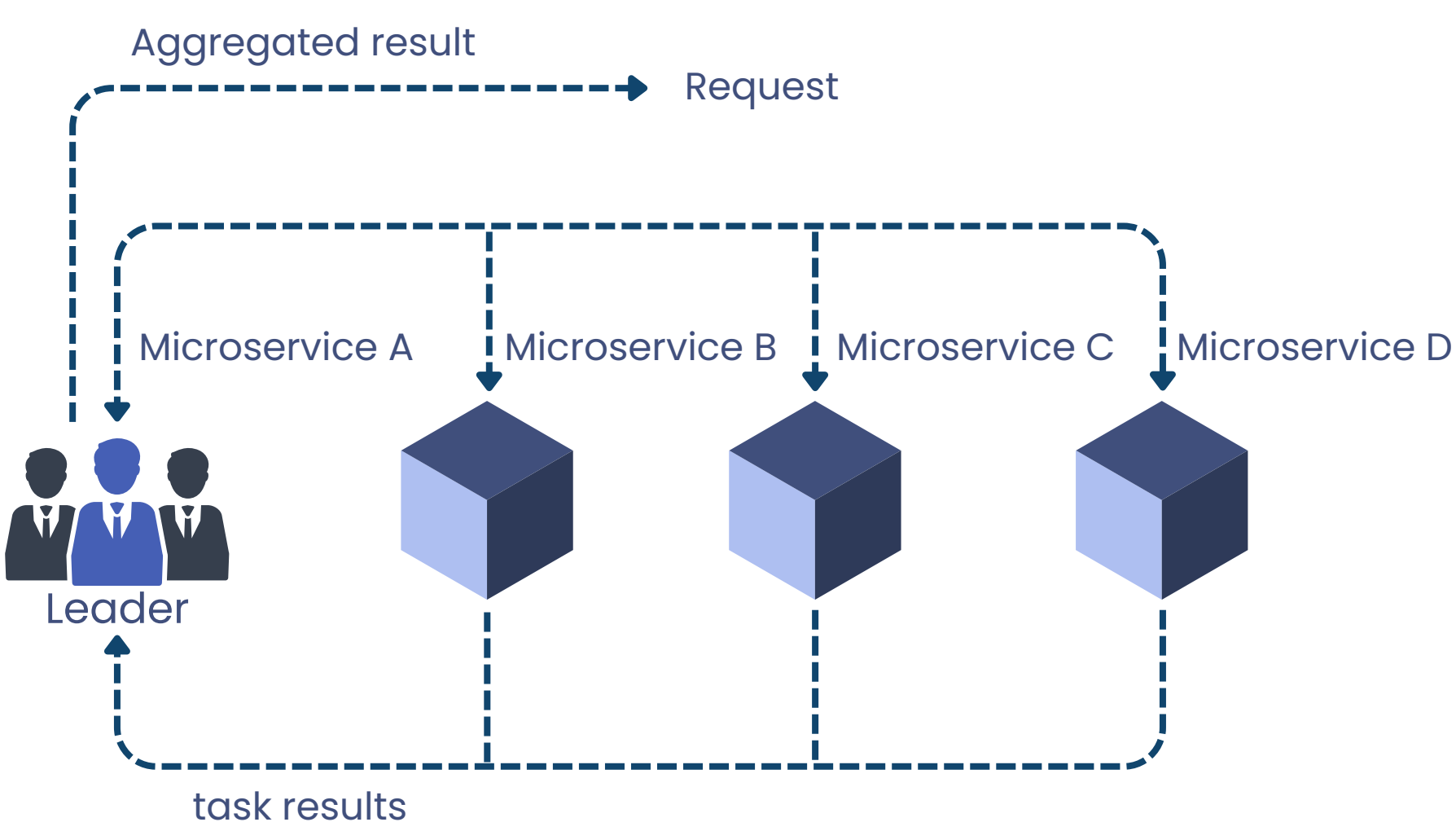
Leader Election Pattern



Elect a leader among service instances to coordinate tasks, improve consistency, and manage distributed workflows requiring single ownership.

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