

Decomposing Monoliths

CSSE6400

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Question

What are the benefits of a monolith architecture?

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- Simple deployment

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- Simple deployment
- Simple communication between modules
- Simple system testing & debugging

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- Easy to defeat modularity
- Cannot scale components of system
- Monolith databases scale poorly

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- Greenfields replacement

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- Greenfields replacement
- Migrate to another architecture

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How do I migrate a monolith to a new architecture?

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Answer

Decompose the monolith into services.

Strangler Fig Pattern



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- Develop API for application's UI



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- Progressively replace monolith
- Shadow & Blue-Green Deployment



Monolith Deployment



Monolith Decompose: Step 1



Monolith Decompose: Step 2



Decomposition Process

- Identify bounded-contexts

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- Simple first service
 - e.g. Authentication
- Minimise dependency from services to monolith
 - Monolith may use services

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- Reduce coupling between bounded-contexts
 - e.g. Customer account management
 - Profile, Wish List, Payment Preferences – separate services

Decomposition Process

- Reduce coupling between bounded-contexts
 - e.g. Customer account management
 - Profile, Wish List, Payment Preferences – separate services
- Decouple vertically
 - Service delivers entire bounded-context
 - Data is decoupled from monolith

Decomposition Process

- Focus on pain points
 - Bottlenecks
 - Frequently changing behaviour

Decomposition Process

- Focus on pain points
 - Bottlenecks
 - Frequently changing behaviour
- Rewrite, don't reuse
 - Redesign for new infrastructure
 - Reuse complex logic
 - e.g. Discounts based on customer loyalty and behaviour, bundle offers, ...

Atomic Decomposition

- Refactor monolith
 - Use service to deliver application functionality
 - Monolith may need to invoke service
 - Remove service logic from monolith

Stepwise Decomposition

Replace application functionality one service at a time.

Definition 0. Macroservice

Separate service, but may span more than one domain or share a database with the monolith or other services.

Definition 0. Nanoservice

Service that depends on other services and cannot be deployed independently – its context is too small.