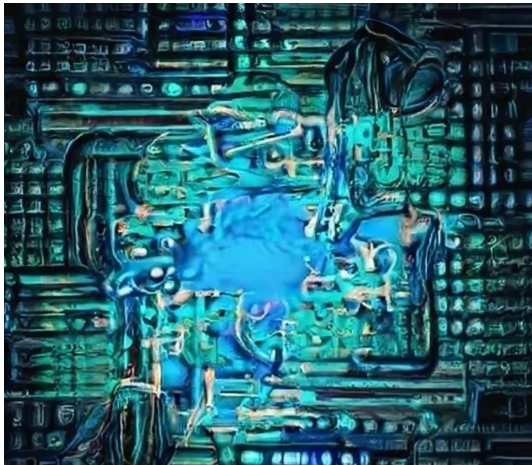


Decomposing Monoliths

CSSE6400

Richard Thomas

May 18, 2026



Question

What are the benefits of a monolith architecture?

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Answer

- Simple deployment

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- Simple communication between modules

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

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- Many legacy system nightmares were monoliths

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- Many legacy system nightmares were monoliths
- Easy to defeat modularity
- Cannot scale components of system
- Monolith databases scale poorly

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What can be done if a monolith architecture is no longer suitable?

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Answer

- Greenfield replacement

Question

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Answer

- Greenfield replacement
- Migrate to another architecture

Question

How do I migrate a monolith to a new architecture?

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Answer

Decompose the monolith into services.

Strangler Fig Pattern *[Fowler, 2024]*



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- Develop API for application's UI



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- Proxy intercepts API calls
 - Proxy directs calls to application or new services



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- Progressively replace monolith

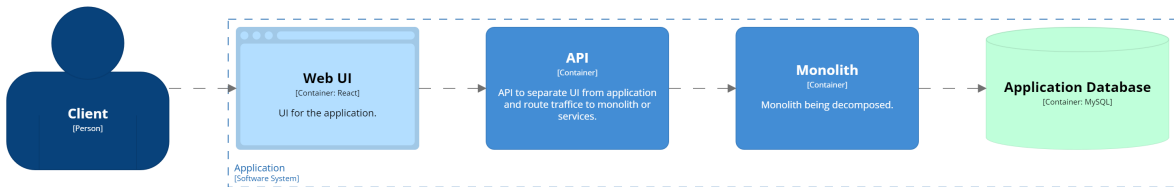


Strangler Fig Pattern *[Fowler, 2024]*

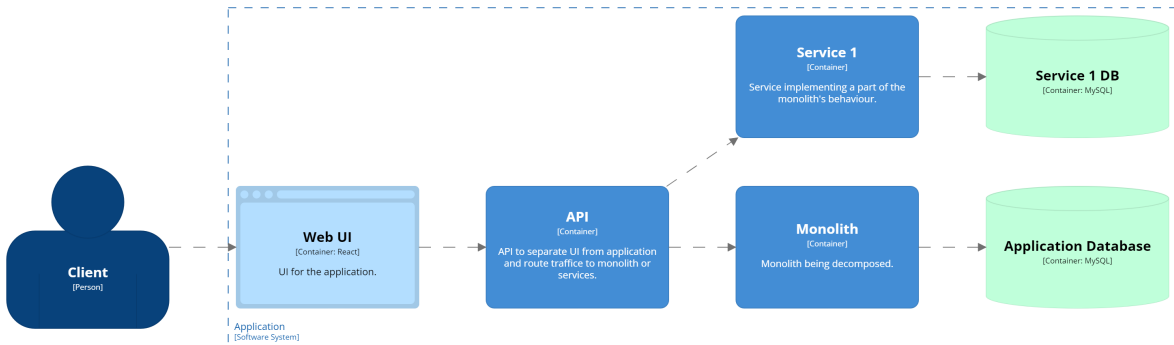
- Develop API for application's UI
- Proxy intercepts API calls
 - Proxy directs calls to application or new services
- Implement a service
 - Redirect calls to service
- Progressively replace monolith
- Shadow & Blue-Green Deployment



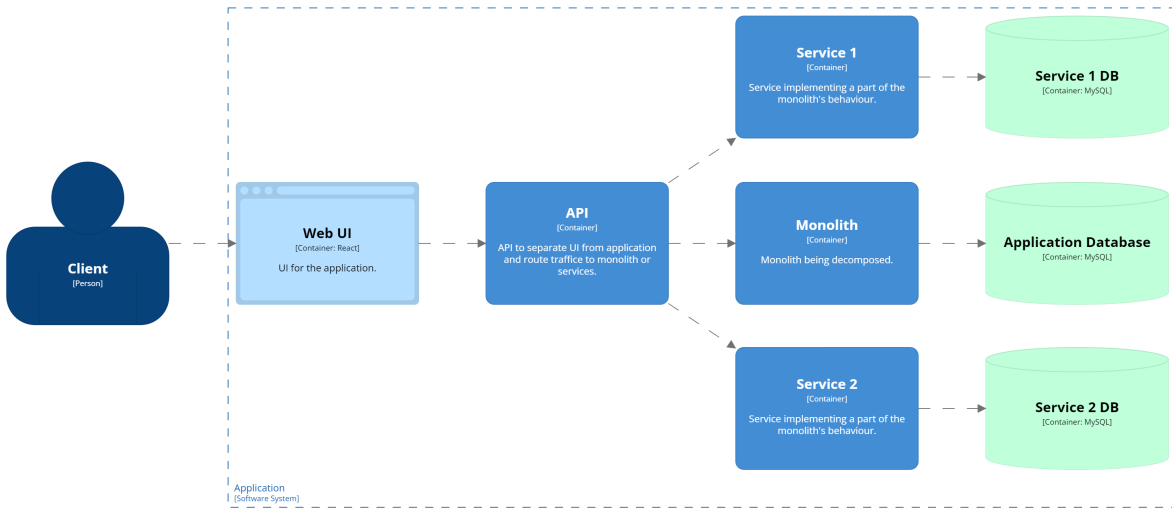
Monolith Deployment



Monolith Decompose: Step 1



Monolith Decompose: Step 2



Decomposition Process

- Identify bounded-contexts

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- Simple first service
 - e.g. Authentication

Decomposition Process

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

Decomposition Process

- 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.

References

[Fowler, 2024] Fowler, M. (2024).

Strangler fig.

<https://martinfowler.com/bliki/StranglerFigApplication.html>.