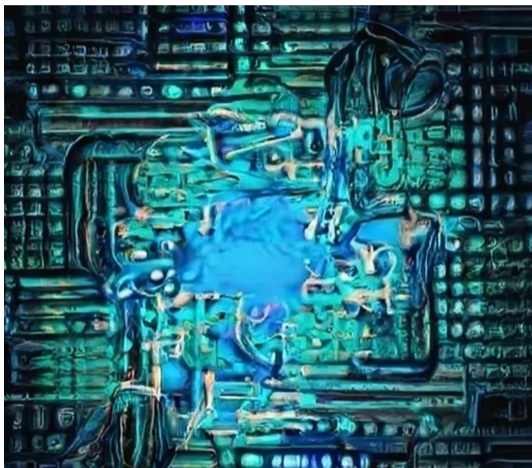


# Decomposing Monoliths

*CSSE6400*

Richard Thomas

May 20, 2024



*Question*

What are the benefits of a monolith architecture?

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*Answer*

- Simple deployment

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

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*Answer*

- Many legacy system nightmares were monoliths

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Why do monoliths have a bad name?

### *Answer*

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

*Question*

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

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*Answer*

- Greenfields replacement

*Question*

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

*Answer*

- Greenfields replacement
- Migrate to another architecture

*Question*

How do I migrate a monolith to a new architecture?

*Question*

How do I migrate a monolith to a new architecture?

*Answer*

Decompose the monolith into services.

# Strangler Fig Pattern





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- Develop API for application's UI



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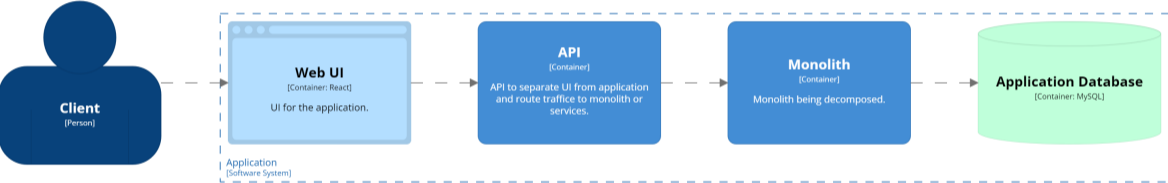


## Strangler Fig Pattern

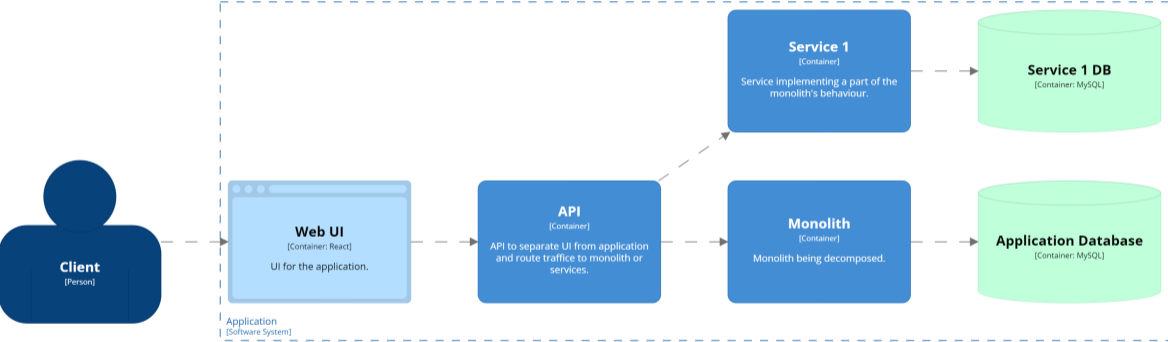
- Develop API for application's UI
- Proxy intercepts API calls
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- Progressively replace monolith
- Shadow & Blue-Green Deployment



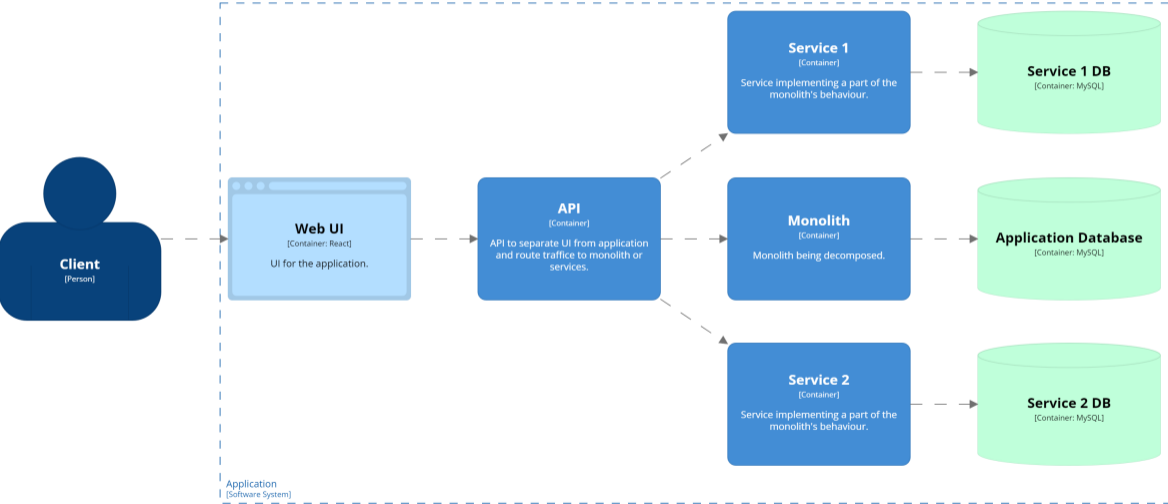
# Monolith Deployment



# Monolith Decompose: Step 1



# Monolith Decompose: Step 2





## Decomposition Process

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- Identify bounded-contexts
- Simple first service
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- 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 1. Macroservice*

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

*Definition 2.* Nanoservice

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