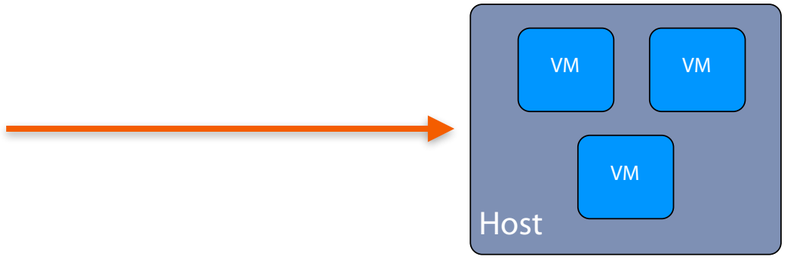
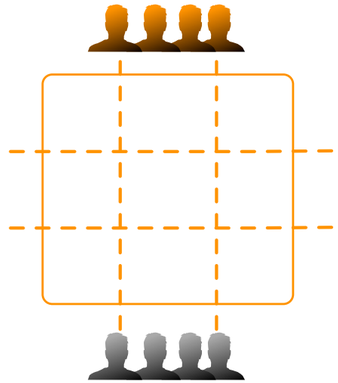
Course Overview

First Module
Introduction

Second Module
Design Approach

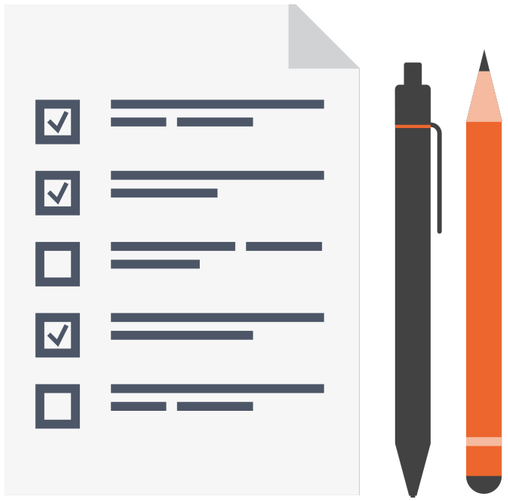


Third Module
Technology



Fourth Module
Moving Forwards

Module Overview



Microservices

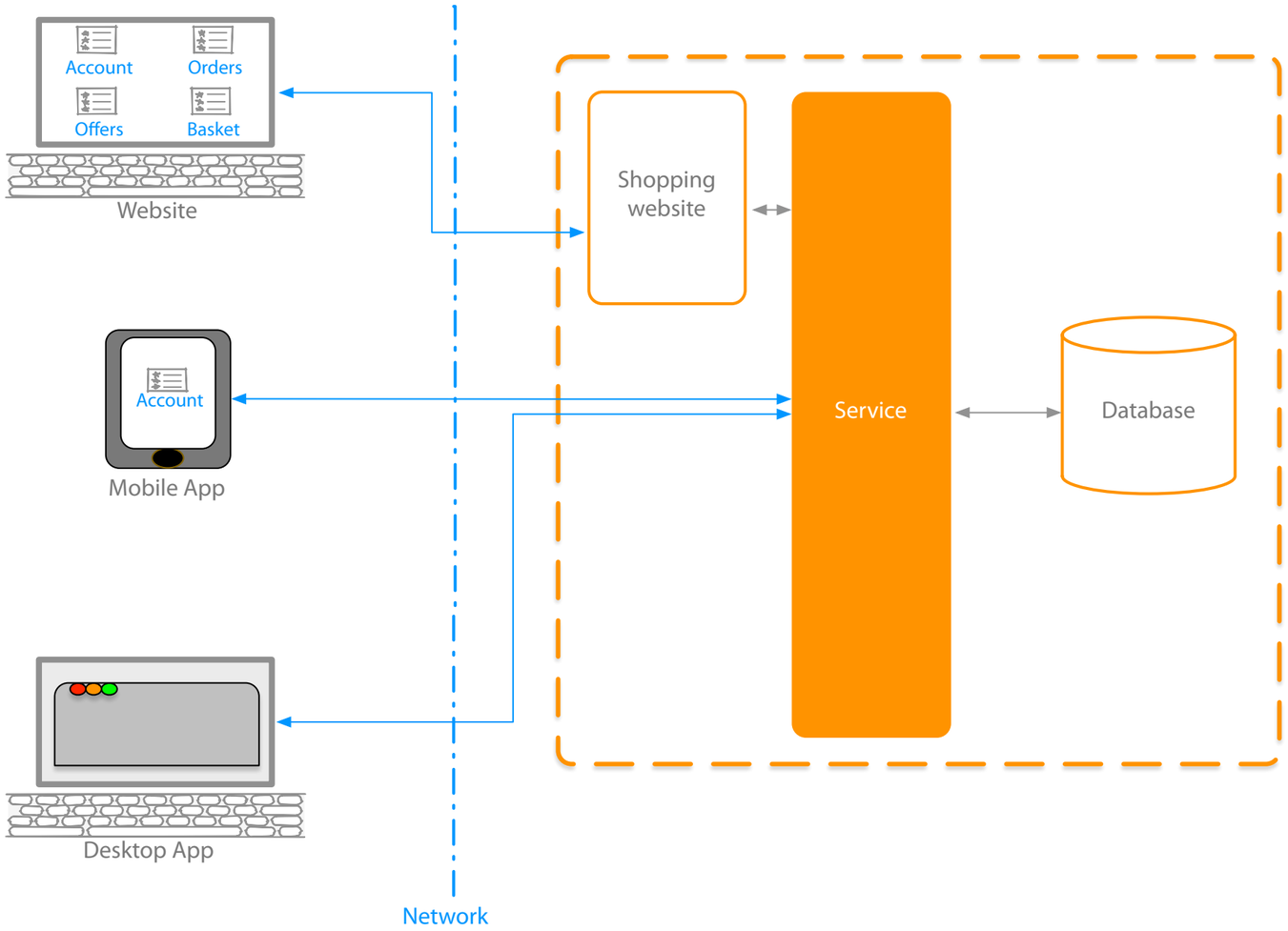
Emergence of Microservices

Microservices Design Principles

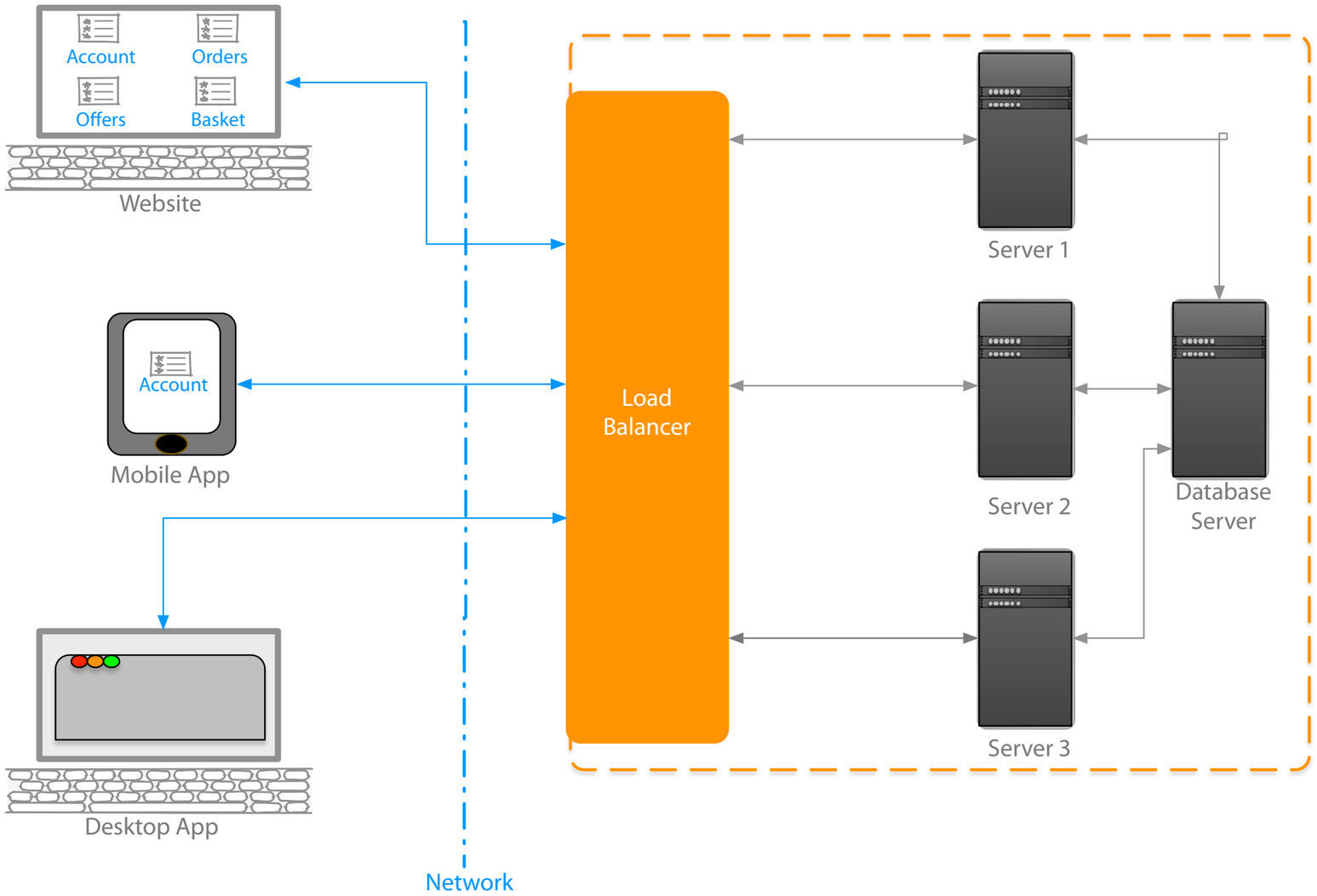
Microservices

What is a Service? | Introduction | The Monolithic

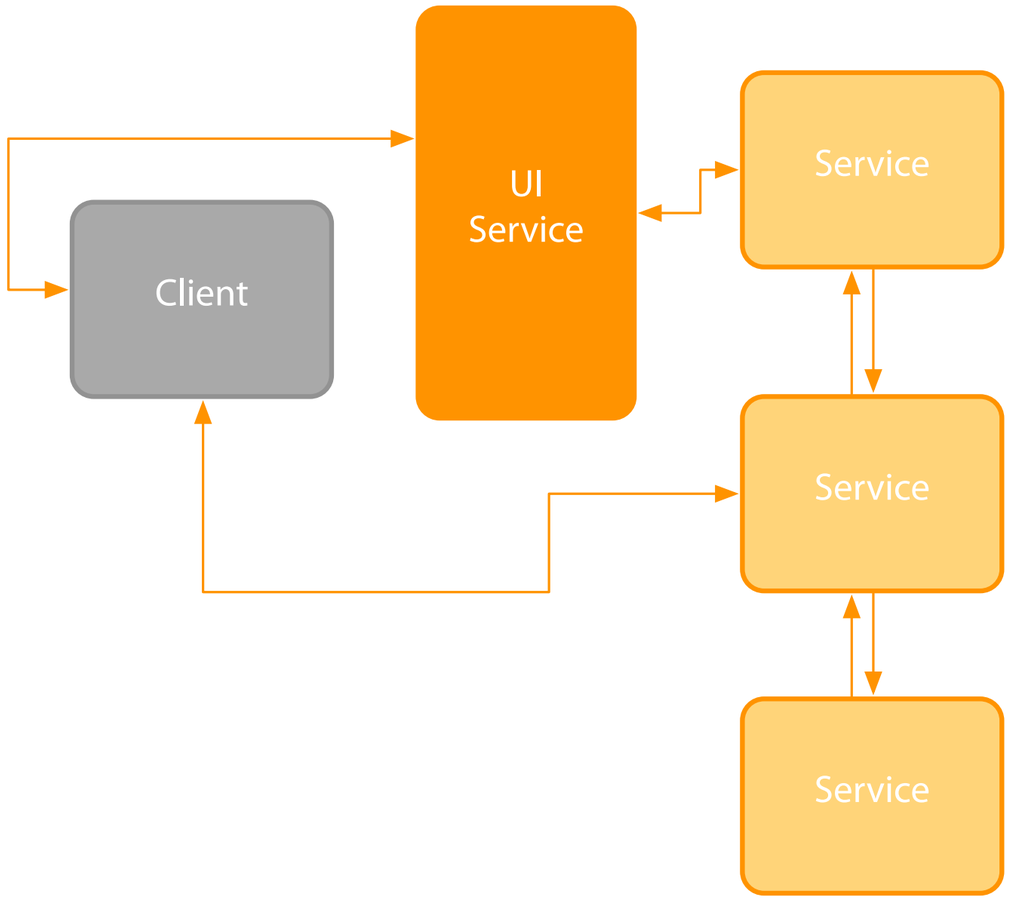
Microservices: What is a Service?



Microservices: What is a Service?

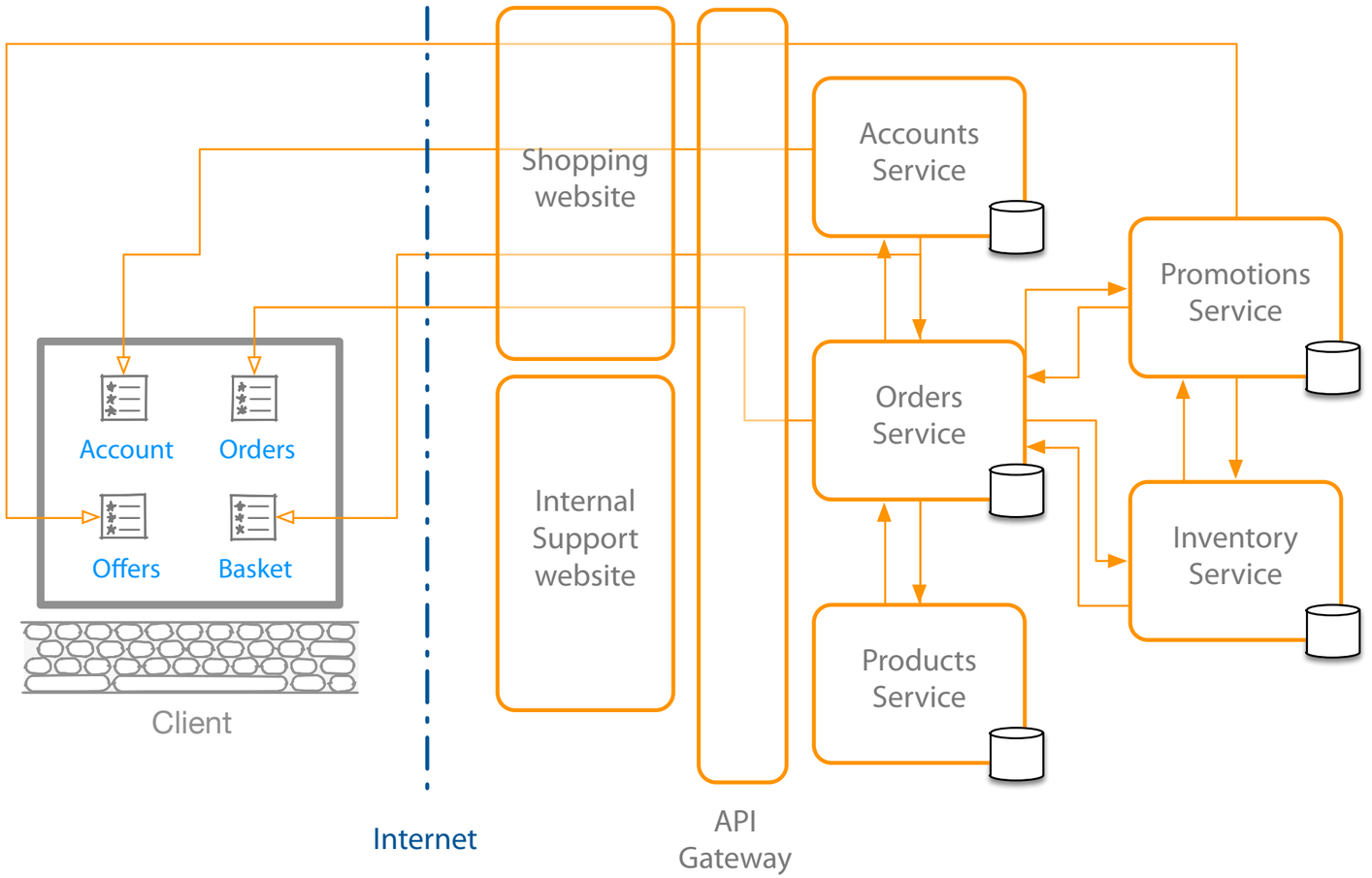


Microservices: Introduction



- SOA done well
  - Knowing how to size a service
  - Traditional SOA resulted in monolithic services
- Micro sized services provide
  - Efficiently scalable applications
  - Flexible applications
  - High performance applications
- Application(s) powered by multiple services
- Small service with a single focus
- Lightweight communication mechanism
  - Both client to service and service to service
- Technology agnostic API
- Independent data storage
- Independently changeable
- Independently deployable
- Distributed transactions
- Centralized tooling for management

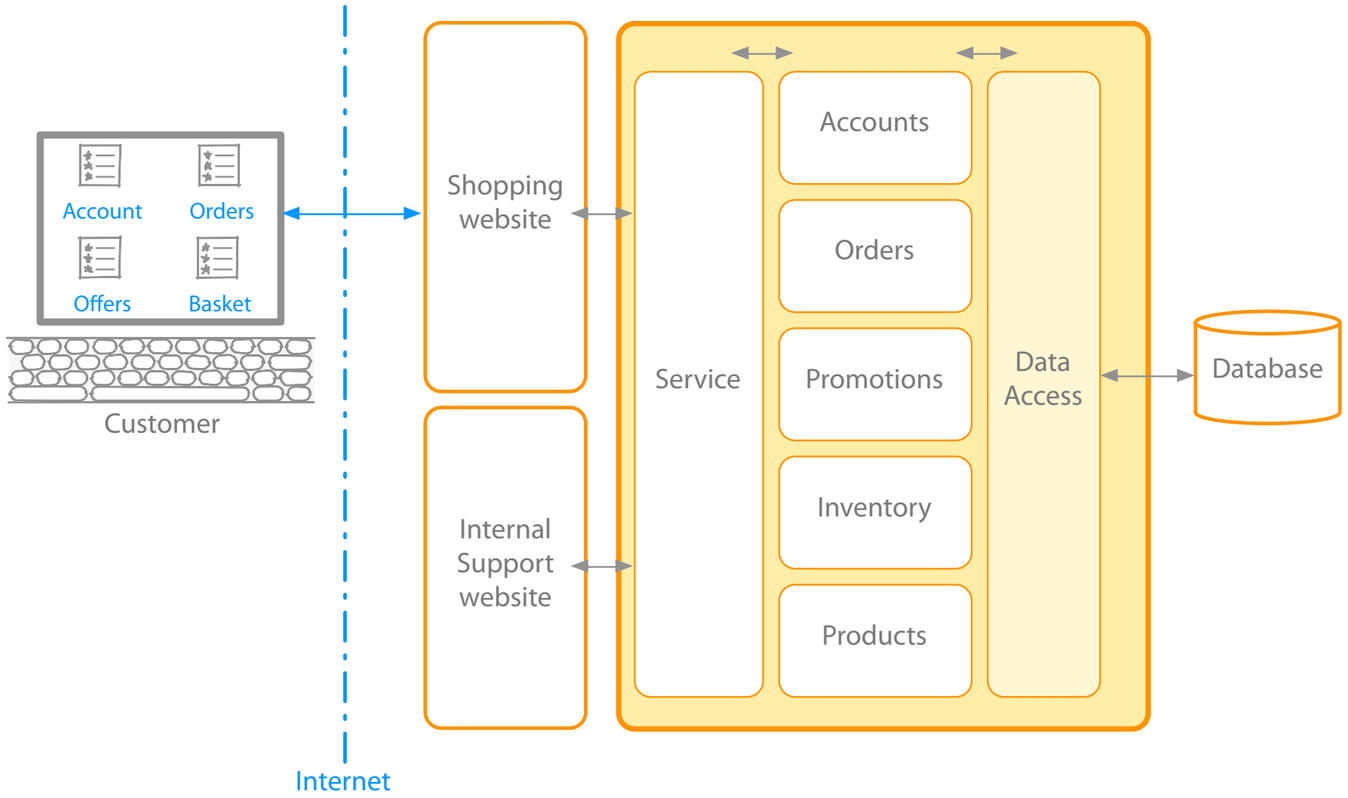
Microservices: Introduction



Microservices

What is a Service? | Introduction | The Monolithic

Microservices: The Monolithic



Typical enterprise application

No restriction on size

Large codebase

Longer development times

Challenging deployment

Inaccessible features

Fixed technology stack

High levels of coupling

- Between modules
- Between services

Failure could affect whole system

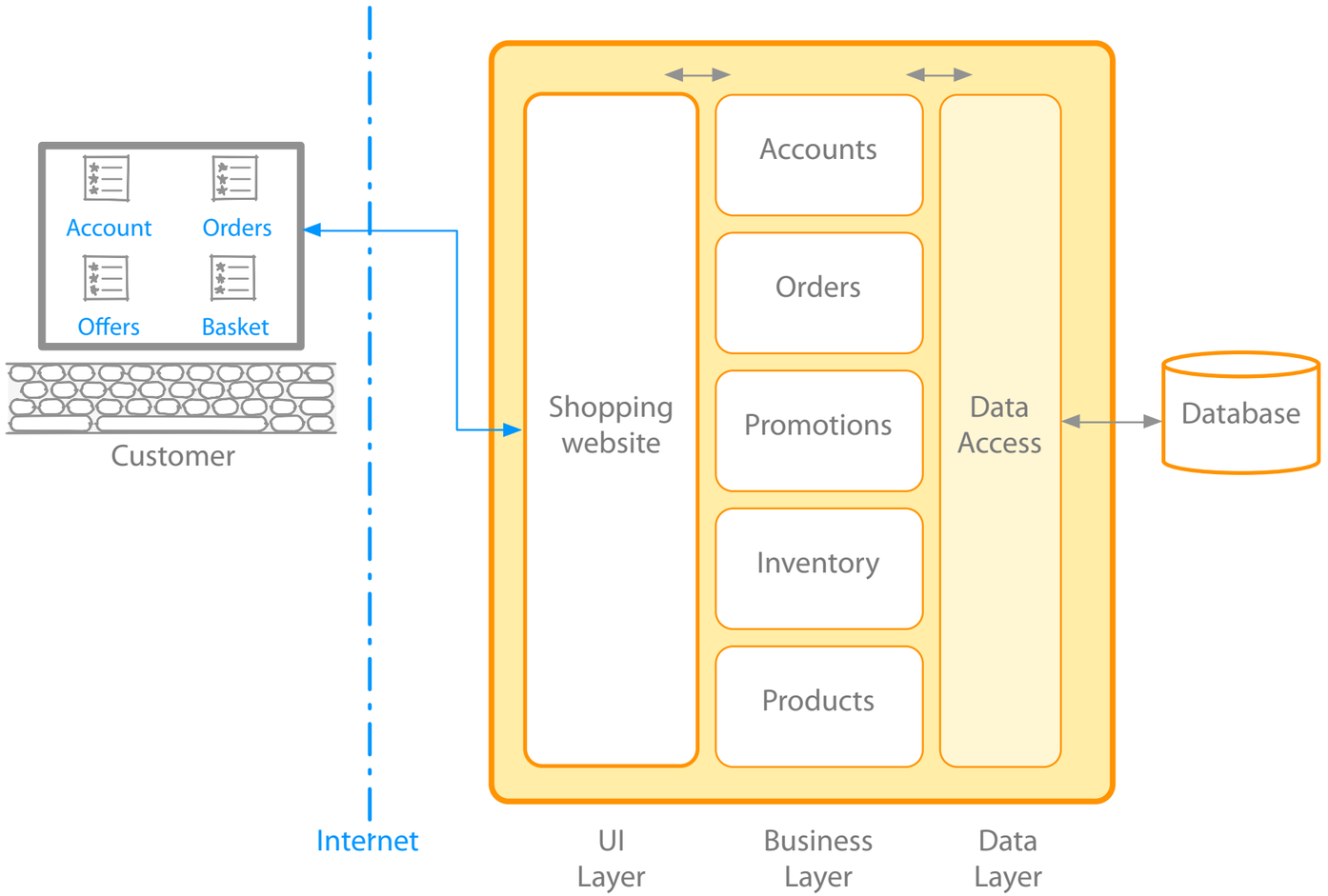
Scaling requires duplication of the whole

Single service on server

Minor change could result in complete rebuild

Easy to replicate environment

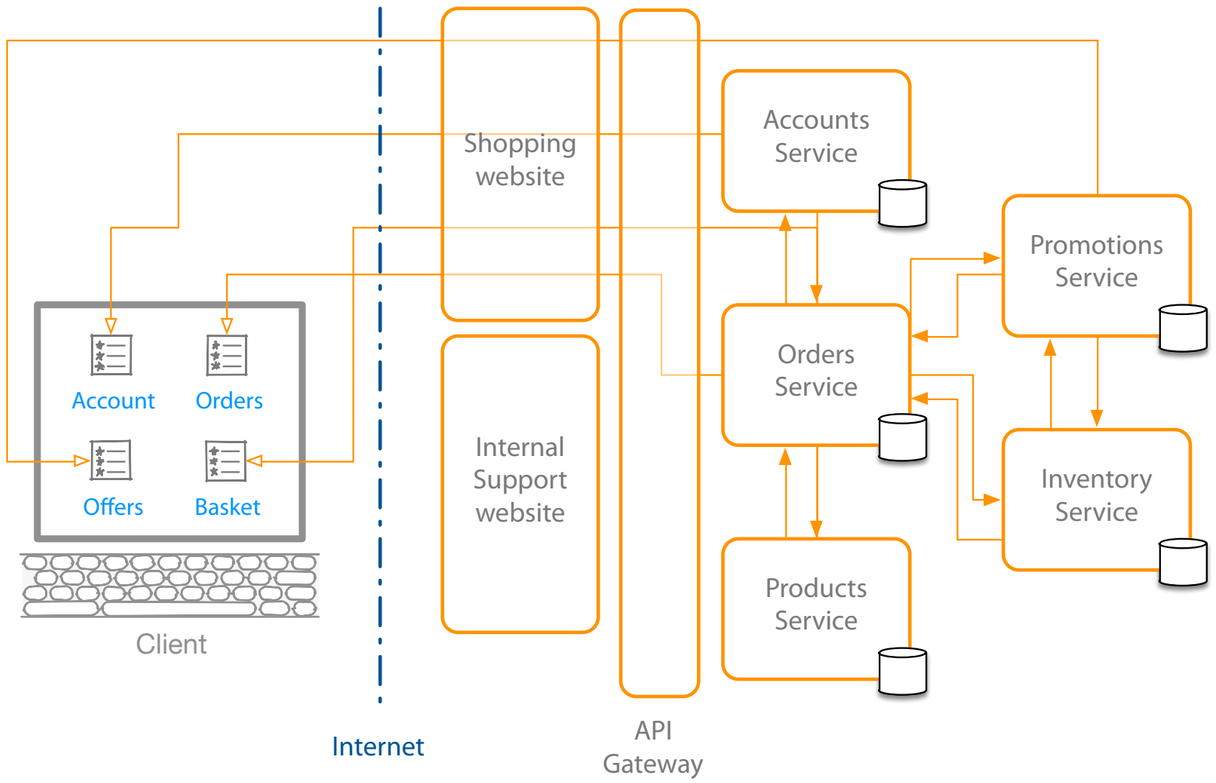
Microservices: The Monolithic



Emergence of Microservices

Why Now? | Benefits

Emergence of Microservices : Why Now?



Need to respond to change quickly

Need for reliability

Business domain-driven design

Automated test tools

Release and deployment tools

On-demand hosting technology

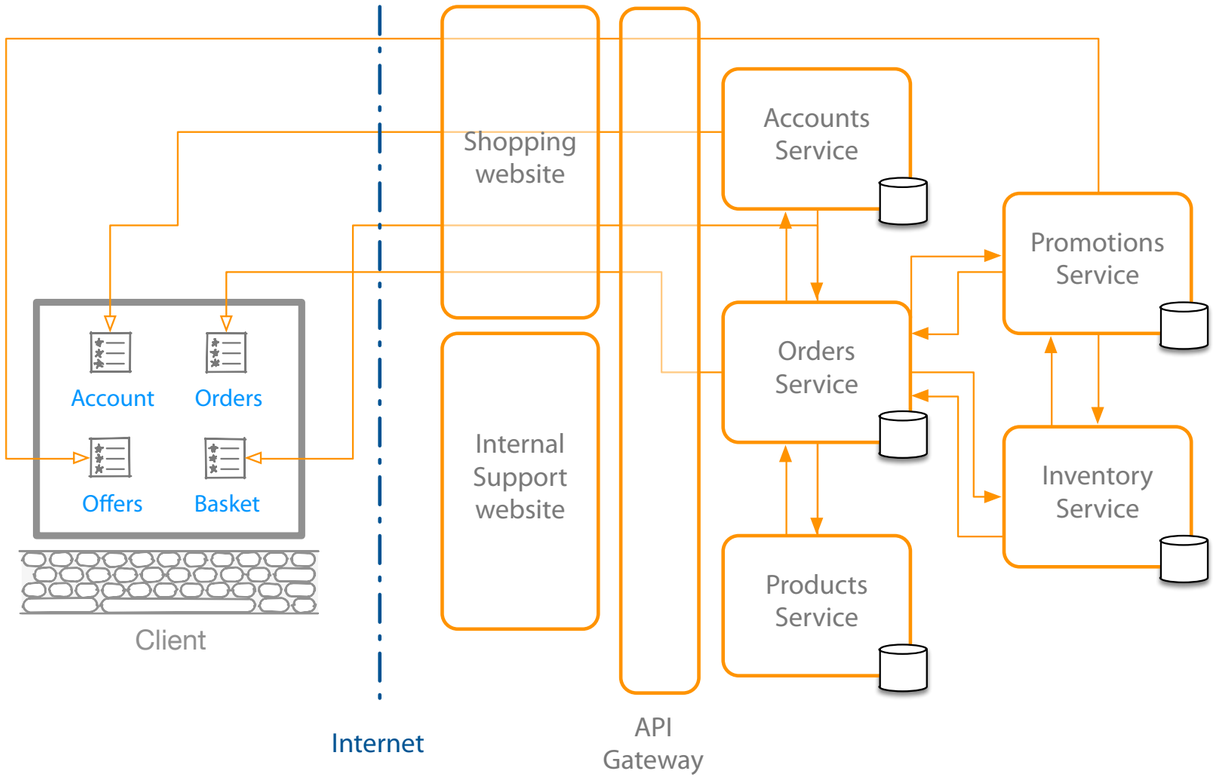
On-line cloud services

Need to embrace new technology

Asynchronous communication technology

Simpler server side and client side technology

Emergence of Microservices : Benefits



Shorter development times

Reliable and faster deployment

Enables frequent updates

Decouple the changeable parts

Security

Increased uptime

Fast issue resolution

Highly scalable and better performance

Better ownership and knowledge

Right technology

Enables distributed teams

Microservices Design Principles

Introduction | Principles | Summary

Microservices Design Principles: Introduction

High Cohesion

Autonomous

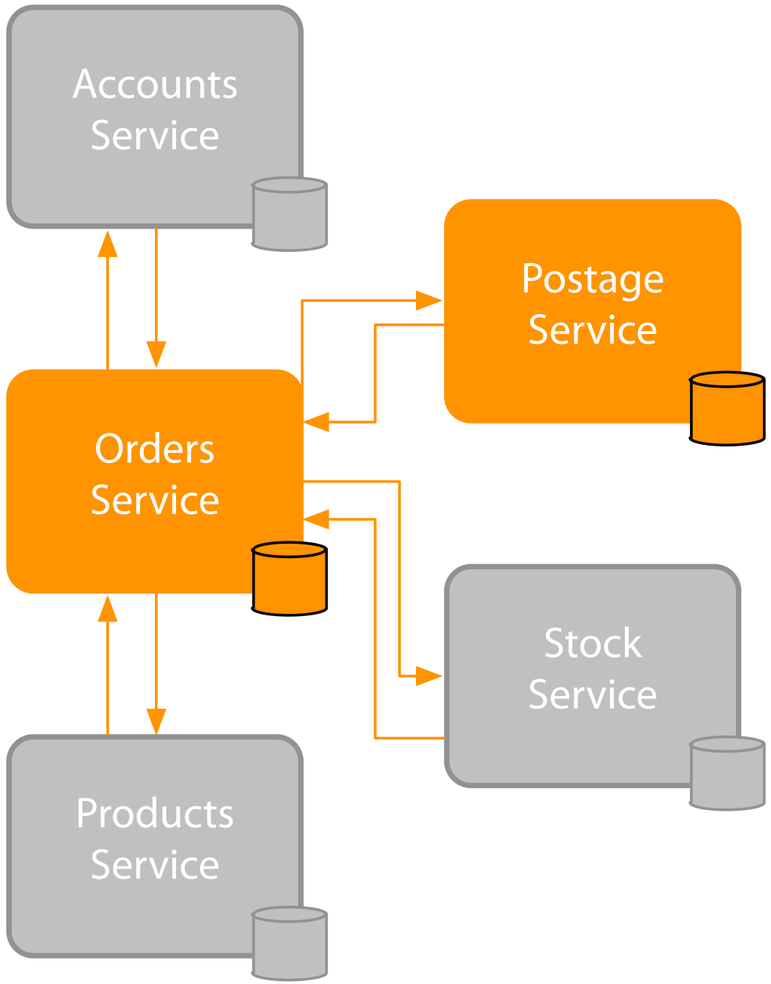
Business Domain Centric

Resilience

Observable

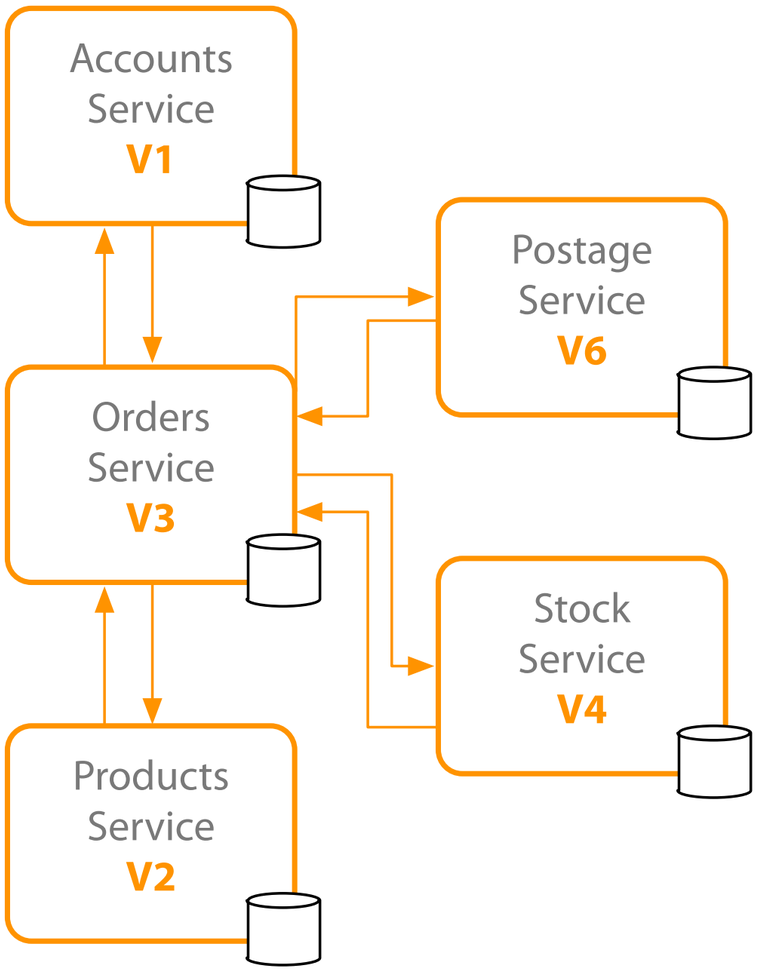
Automation

Microservices Design Principles: High Cohesion



- Single focus
- Single responsibility
  - SOLID principle
  - Only change for one reason
- Reason represents
  - A business function
  - A business domain
- Encapsulation principle
  - OOP principle
- Easily rewritable code
- Why
  - Scalability
  - Flexibility
  - Reliability

Microservices Design Principles: Autonomous



Loose coupling

Honor contracts and interfaces

Stateless

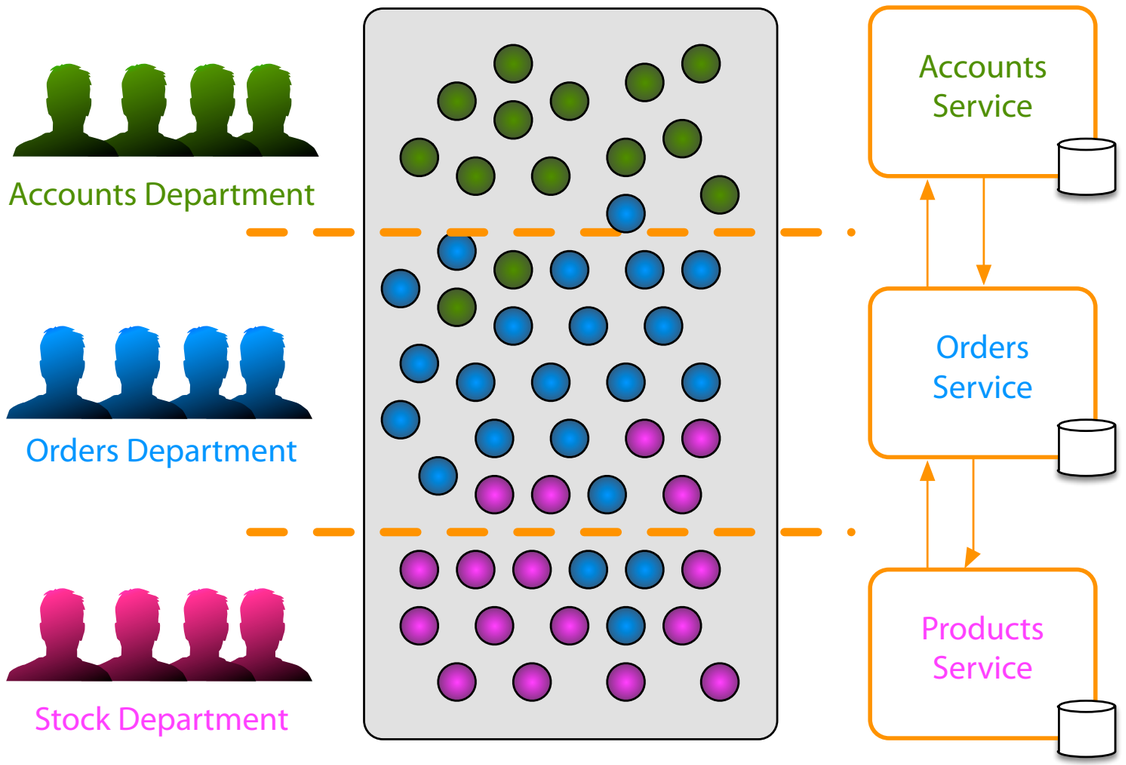
Independently changeable

Independently deployable

Backwards compatible

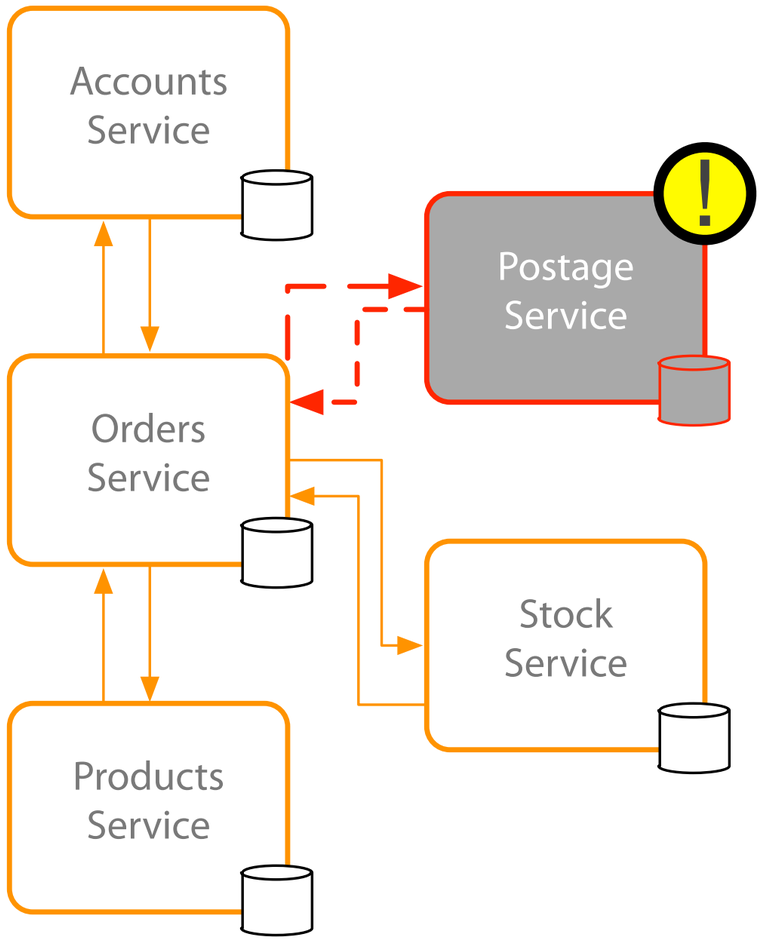
Concurrent development

Design Principles: Business Domain Centric



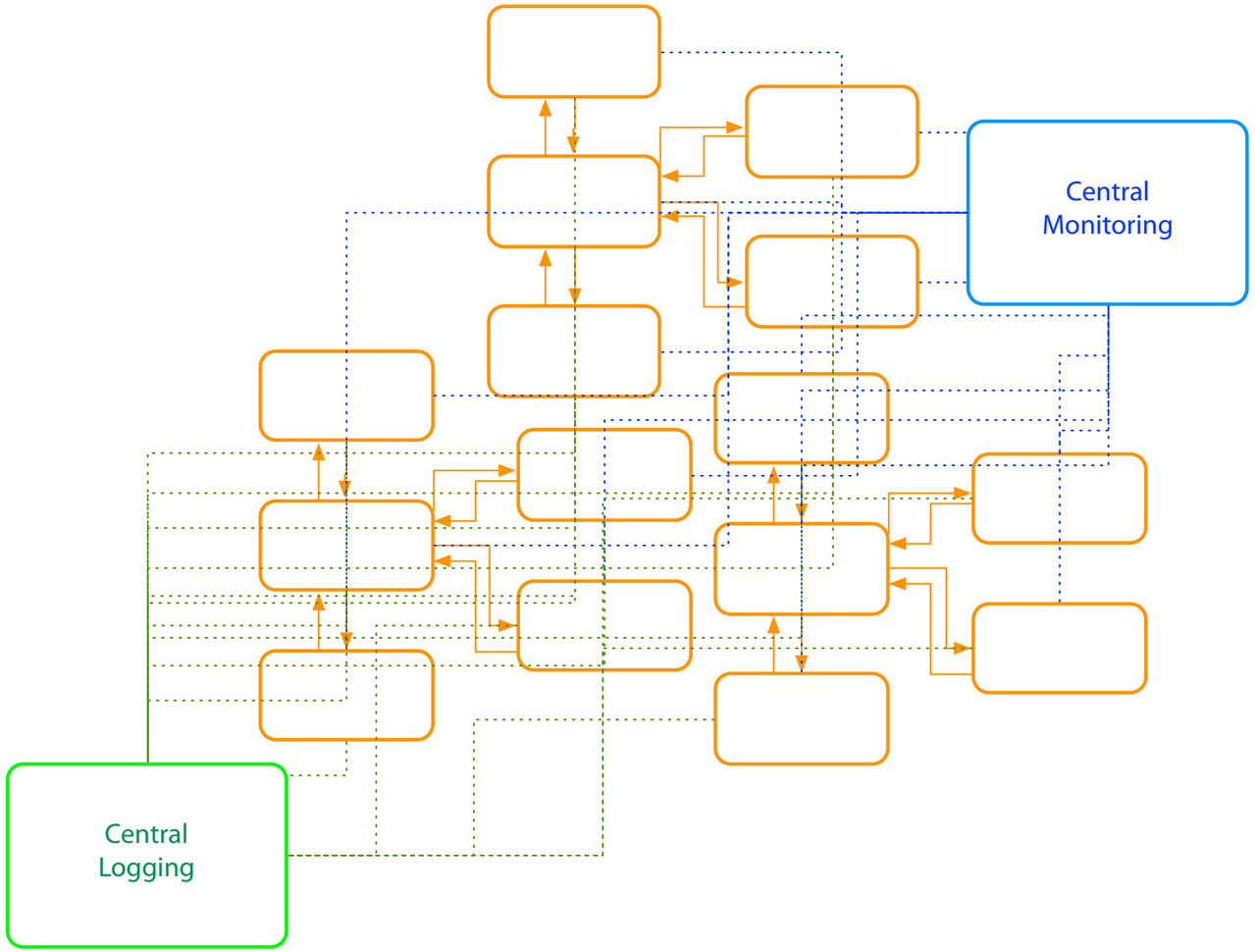
- Service represents business function
  - Accounts Department
  - Postage calculator
- Scope of service
- Bounded context from DDD
- Identify boundaries\seams
- Shuffle code if required
  - Group related code into a service
  - Aim for high cohesion
- Responsive to business change

Microservices Design Principles: Resilience



- Embrace failure
  - Another service
  - Specific connection
  - Third-party system
- Degrade functionality
- Default functionality
- Multiple instances
  - Register on startup
  - Deregister on failure
- Types of failure
  - Exceptions\Errors
  - Delays
  - Unavailability
- Network issues
  - Delay
  - Unavailability
- Validate input
  - Service to service
  - Client to service

Microservices Design Principles: Observable



System Health

- Status
- Logs
- Errors

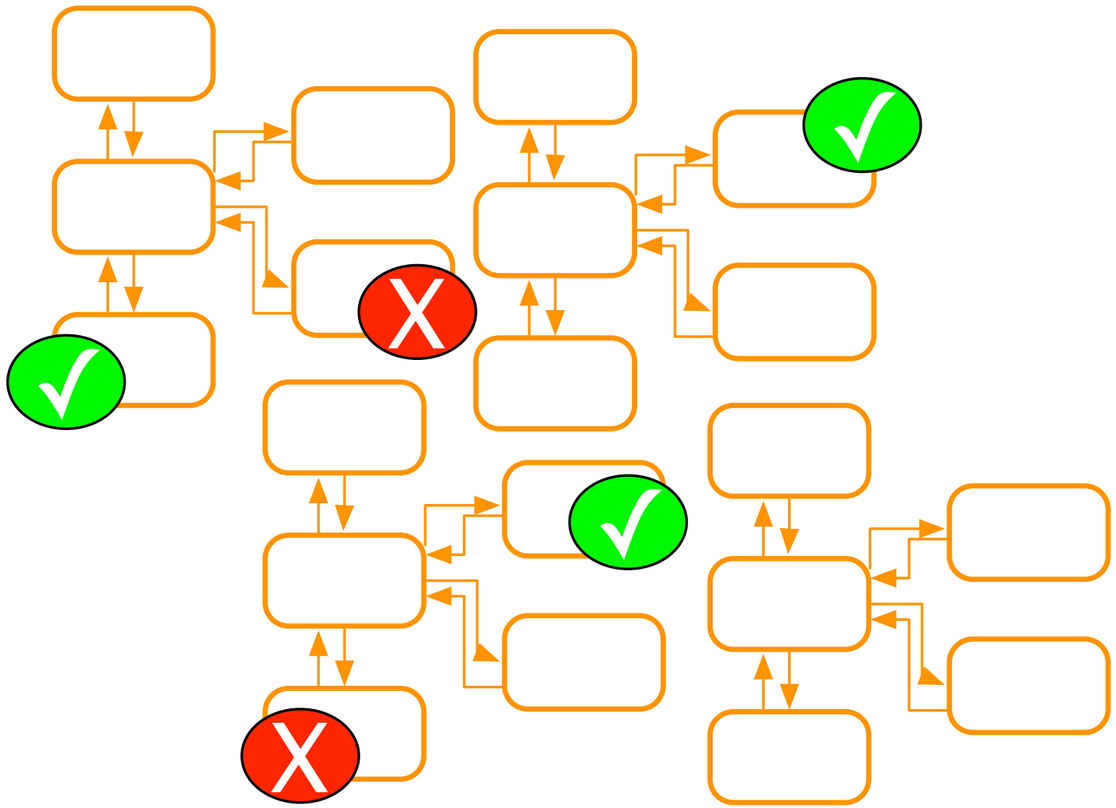
Centralized monitoring

Centralized logging

Why

- Distributed transactions
- Quick problem solving
- Quick deployment requires feedback
- Data used for capacity planning
- Data used for scaling
- Whats actually used
- Monitor business data

Microservices Design Principles: Automation



Tools to reduce testing

- Manual regression testing
- Time taken on testing integration
- Environment setup for testing

Tools to provide quick feedback

- Integration feedback on check in
- Continous Integration

Tools to provide quick deployment

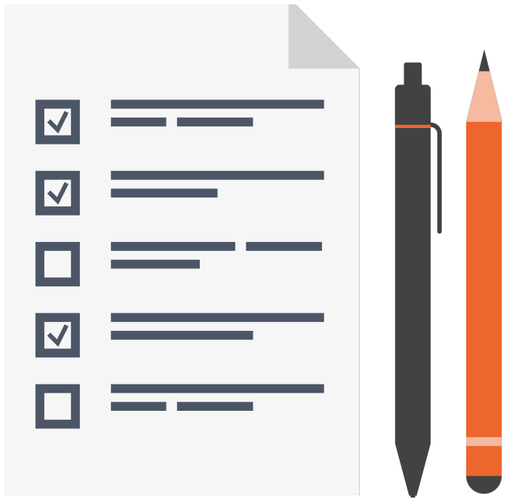
- Pipeline to deployment
- Deployment ready status
- Automated deployment

- Reliable deployment
- Continuous Deployment

Why

- Distributed system
- Multiple instances of services
- Manual integration testing too time consuming
- Manual deployment time consuming and unreliable

Module Summary



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