

SAMSUNG SDS

Foresee

Techtonic 2021

Disrupt

Partner



MSA Reference Platform

임지훈 프로

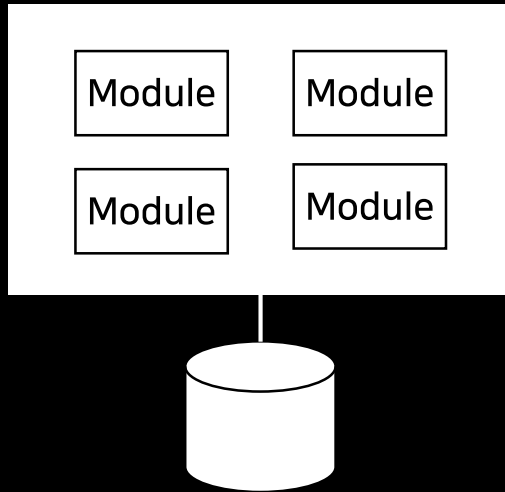
AGENDA

- Monolithic vs MSA
- Cloud Native Application
- MSA Difficulties
- MSA Reference Platform
- 향후 방향

Monolithic vs MSA

Monolithic Architecture

- Composed all in one piece
- Module : linked into a process at runtime
- Tightly coupled



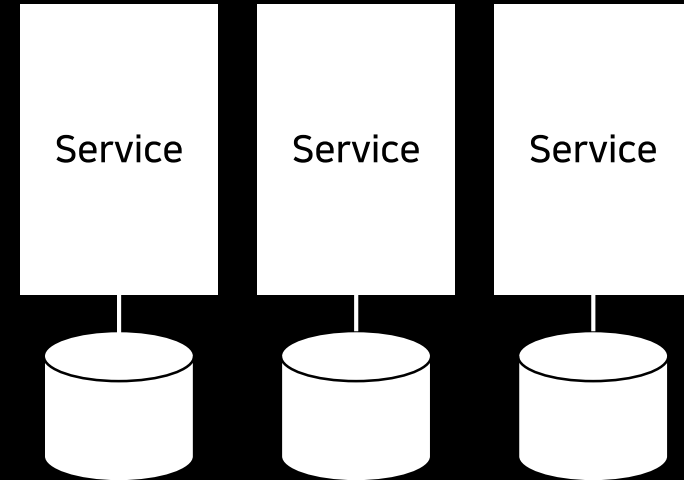
캠브릿지 사전

Monolithic : *Too large and unwilling or unable to be changed*

<https://dictionary.cambridge.org/us/dictionary/english/monolithic>

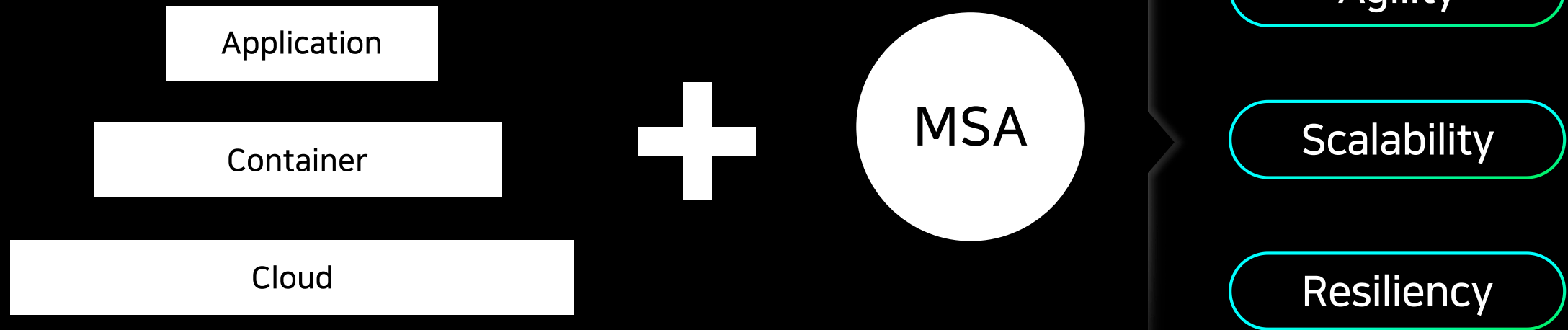
Microservice Architecture

- Composed a set of services
- Service : independently deployable
- Loosely coupled



Cloud Native Application

클라우드를 최대한 활용하는 MSA 구조 애플리케이션

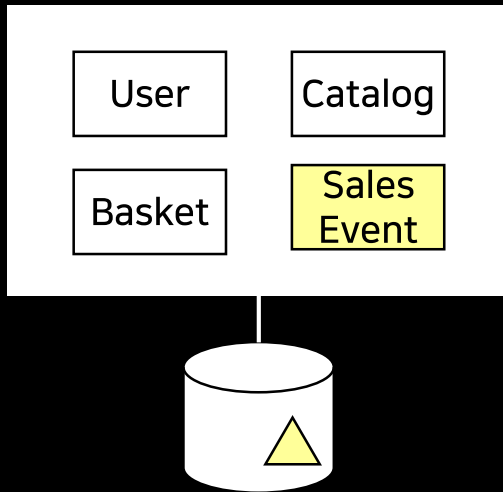


Cloud Native Application

Agility

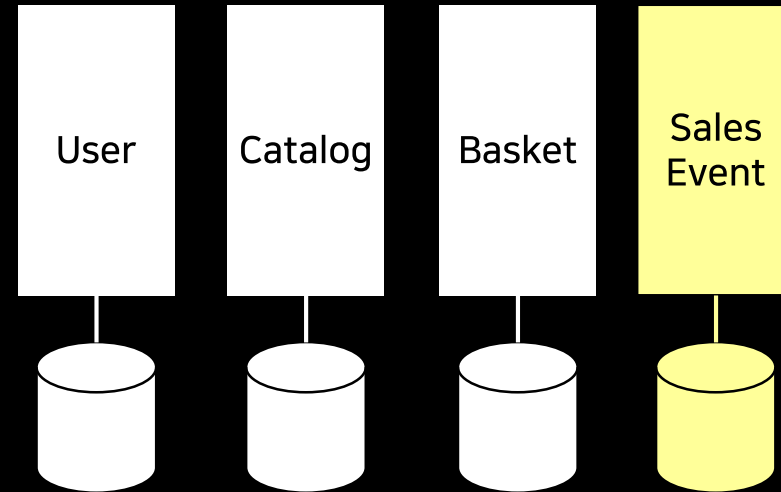
Sales Event 관련 기능을 추가하는 경우

Monolithic Architecture (e-Commerce)



- 배포 단위 : Application 전체
- 배포 Lead Time : 5시간 이상

Microservice Architecture (e-Commerce)



- 배포 단위 : 서비스
- 배포 Lead Time : 1시간 30분 이내

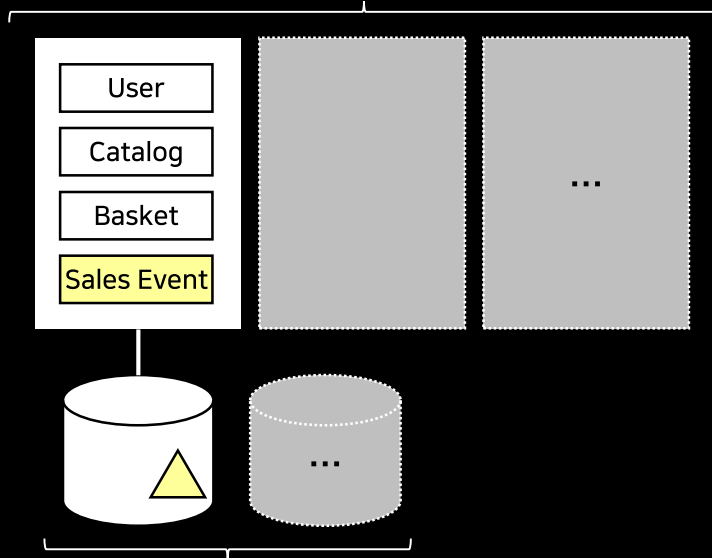
※ 배포 Lead Time : Build, Test, 그리고 Deploy 하는데 소요되는 시간

Cloud Native Application

Scalability

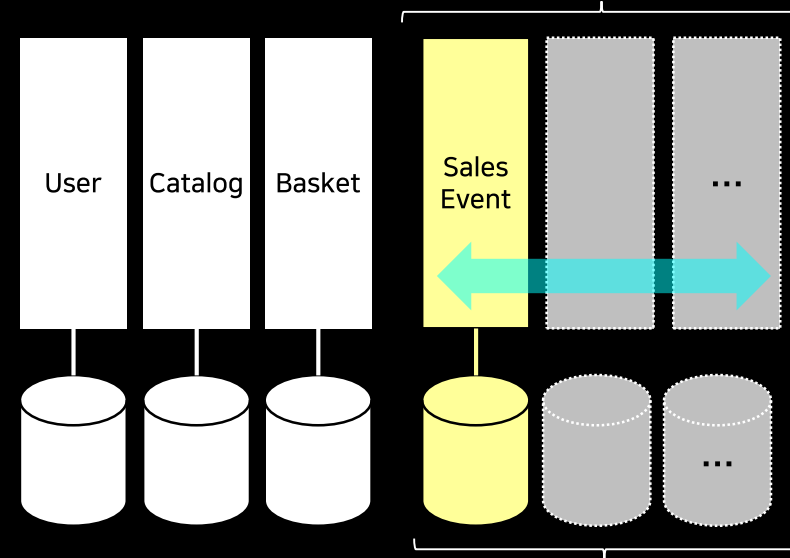
Sales Event 사용자 유입 급증 시 확장성 고려

Monolithic Architecture (e-Commerce)



- Application 전체 확장 → 시간/비용 소모 과다
- RDB 확장에는 이슈가 발생

Microservice Architecture (e-Commerce)



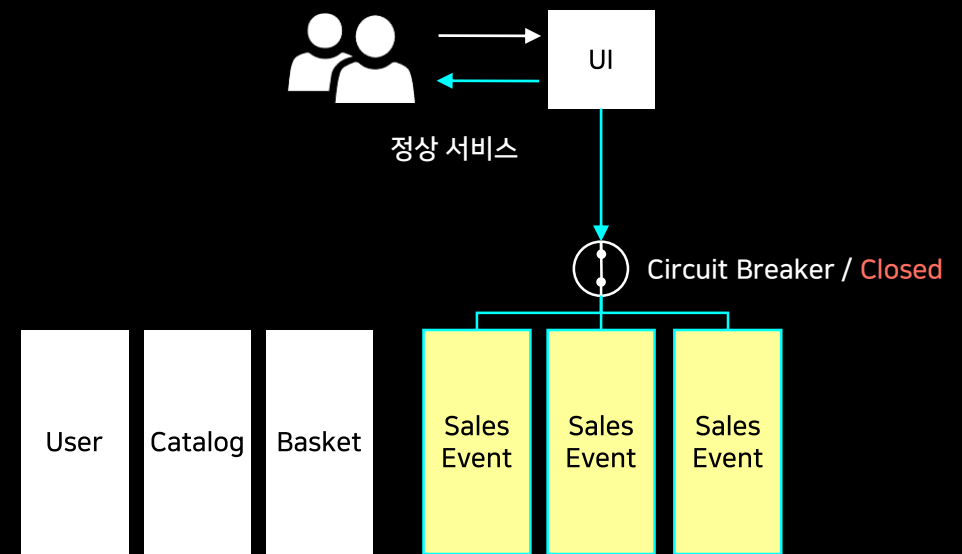
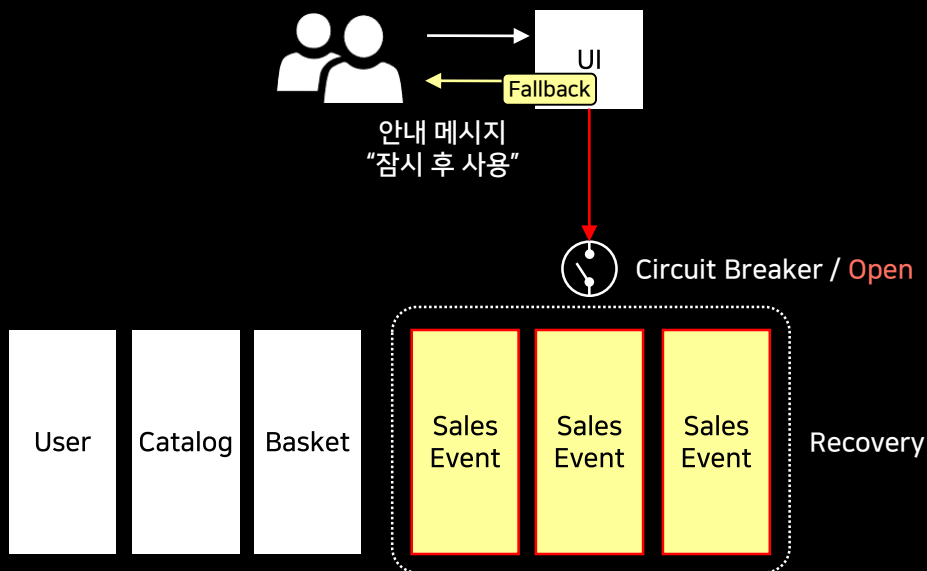
- 서비스 단위 확장 → 시간/비용 소모 국소적
- NoSQL 등을 활용하여 확장 용이

Cloud Native Application

Resiliency

Sales Event 서비스 과부하로 Circuit Breaker 발동

Microservice Architecture
(e-Commerce)

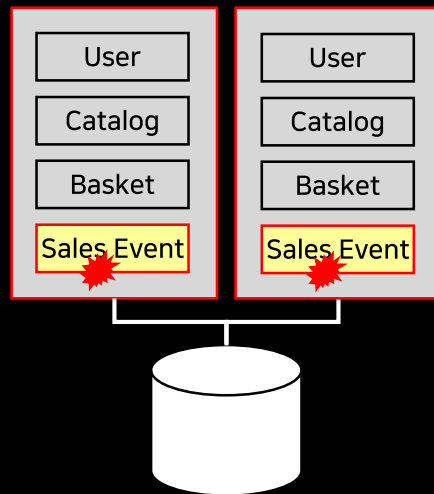


Cloud Native Application

Resiliency

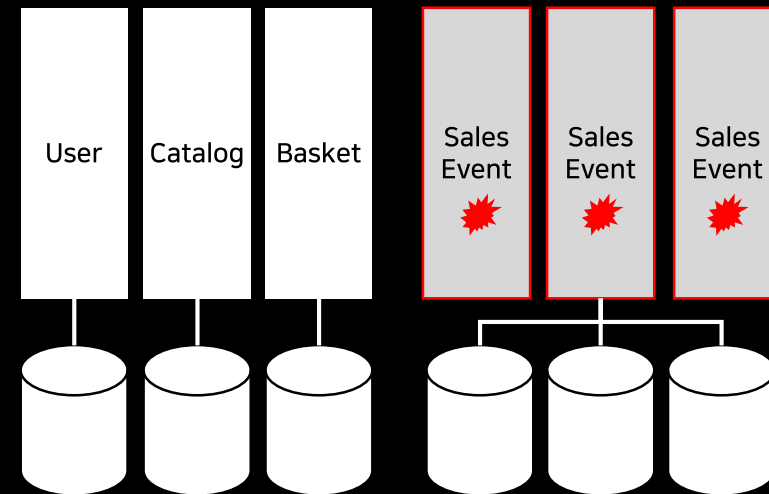
Sales Event 신규 기능에 심각한 버그 발생

Monolithic Architecture (e-Commerce)



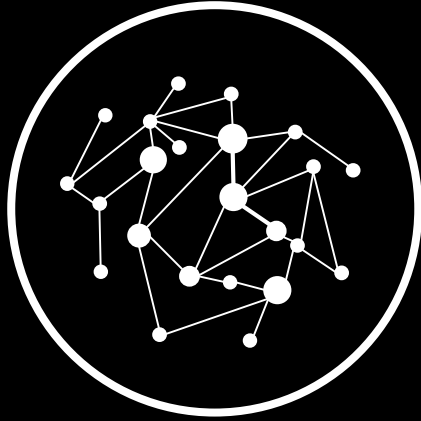
- 전체 시스템 장애, 서비스 불가

Microservice Architecture (e-Commerce)



- 장애는 관련 서비스에 국한, 다른 서비스 정상 동작

MSA Difficulties



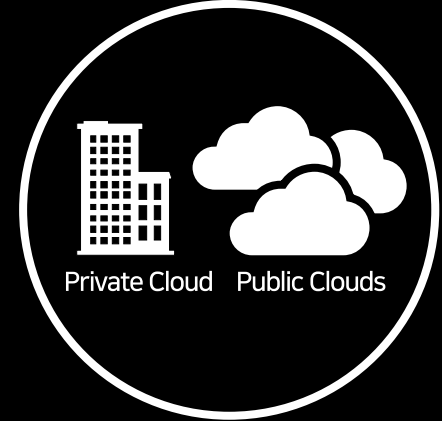
복잡도 증가

서비스 구성
분산 트랜잭션 처리
운영 모니터링



OSS 활용 증가

OSS 선정의 어려움
OSS 간 정합성/통합 어려움
라이선스 이슈



Infra 별 구성 변화

Private Cloud 제약사항
Public Cloud 플랫폼 종속성 / 비용 고민
Hybrid/Multi Cloud 운영 복잡도 증가

Solution: MSA Reference Platform

MSA 구조의 Cloud Native Application 개발을 위한 Full Set

1 Reference Architecture

- Modernized MSA
- Private/Public Cloud 아키텍처

2 Reference Implementation

- 코드 / 디자인 패턴
- 기술 가이드 Wiki

3 Reference OSS Stack

- 30여종의 OSS 사용
- 현장 적용 가능한 수준의 레퍼런스 제공

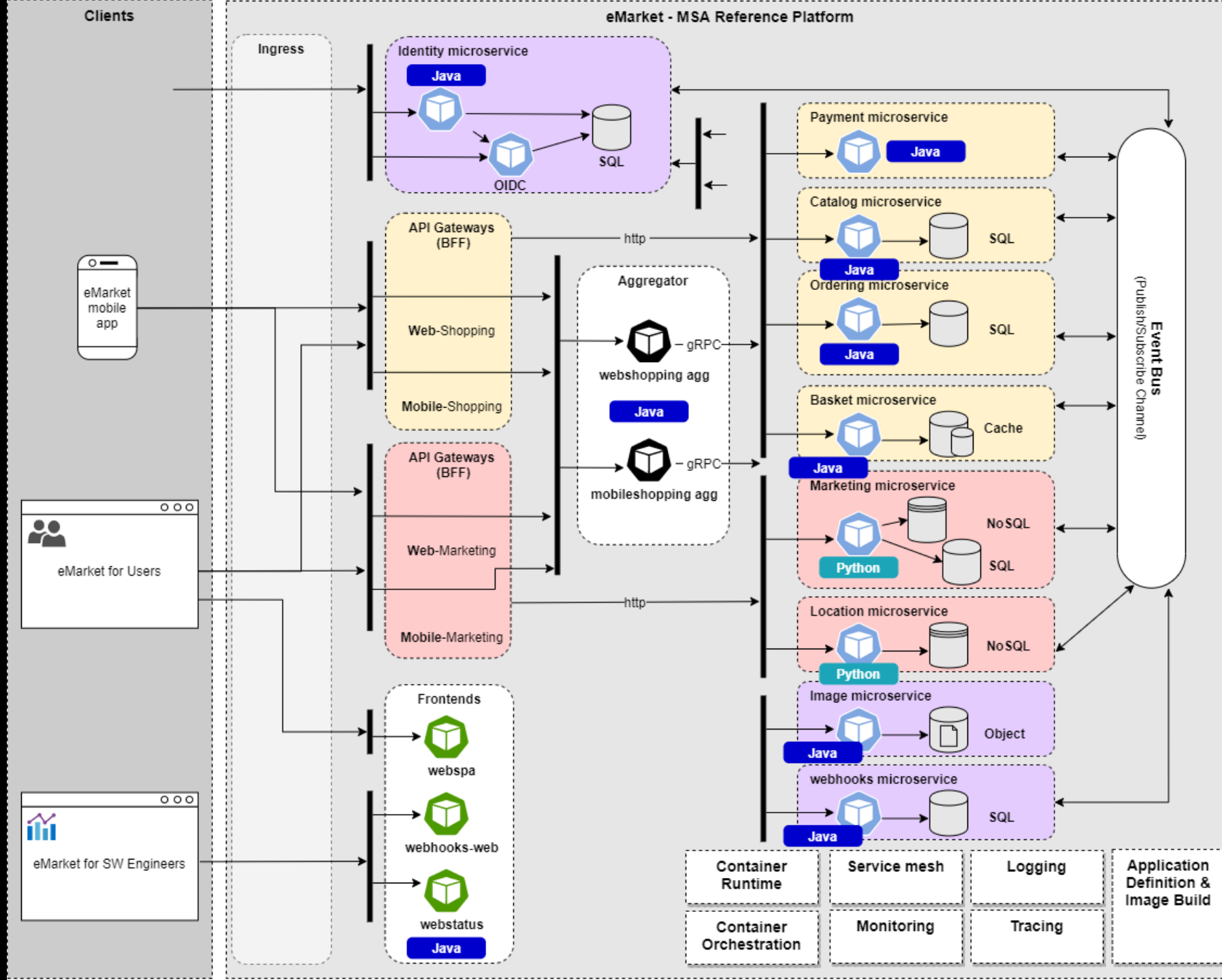
4 MSA 개발 방법론

- MSA 개발 프로세스 및 템플릿

→ SDS 내 Cloud Native App 구축을 위한 표준 스택으로 활용

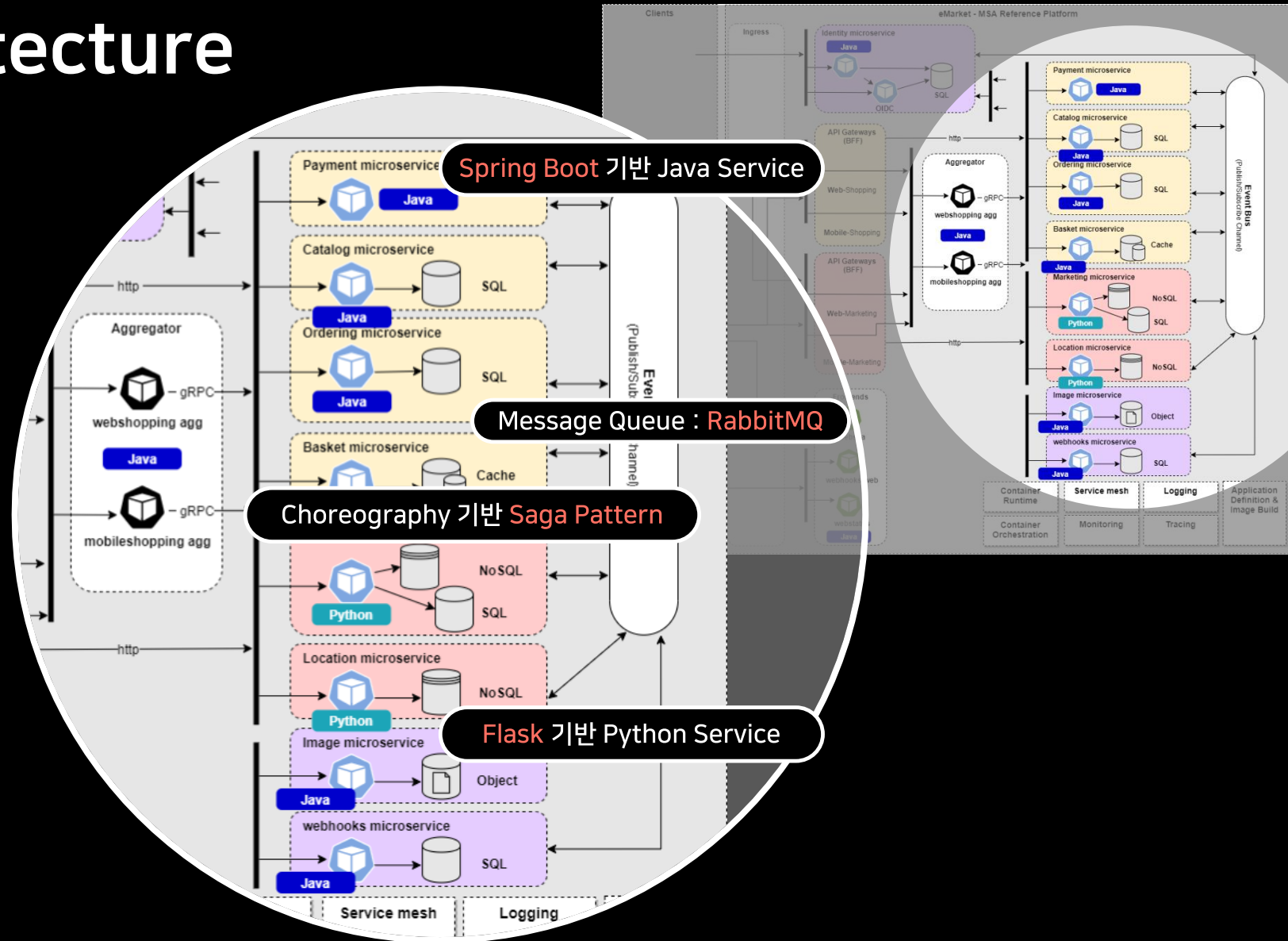
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- Architecture Style
 - Event Driven
- 인증 및 권한
 - Open ID Connect
- Performance
 - gRPC, NoSQL, 분산 캐쉬
- Portability
 - Container 기술
 - Private/Public Cloud 지원
- Scalability
 - Json Web Token
 - Horizontal Pod Autoscaler
- Observability
 - 로그 및 분산 트랜잭션 추적성
 - 시스템 메트릭 모니터링
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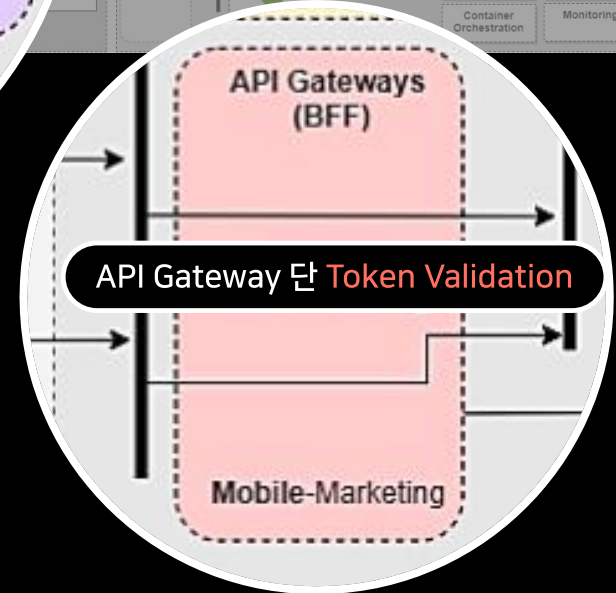
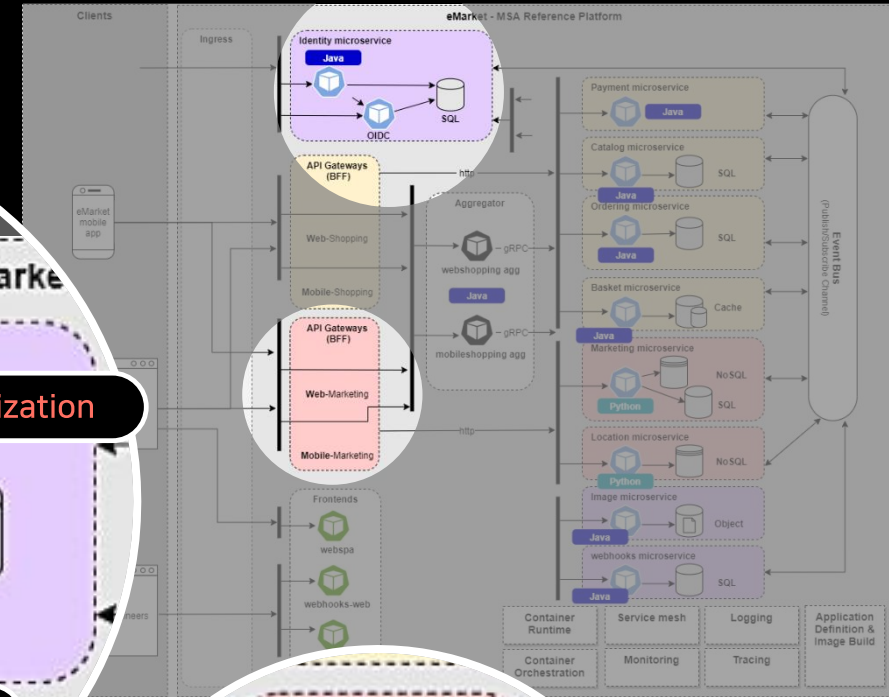
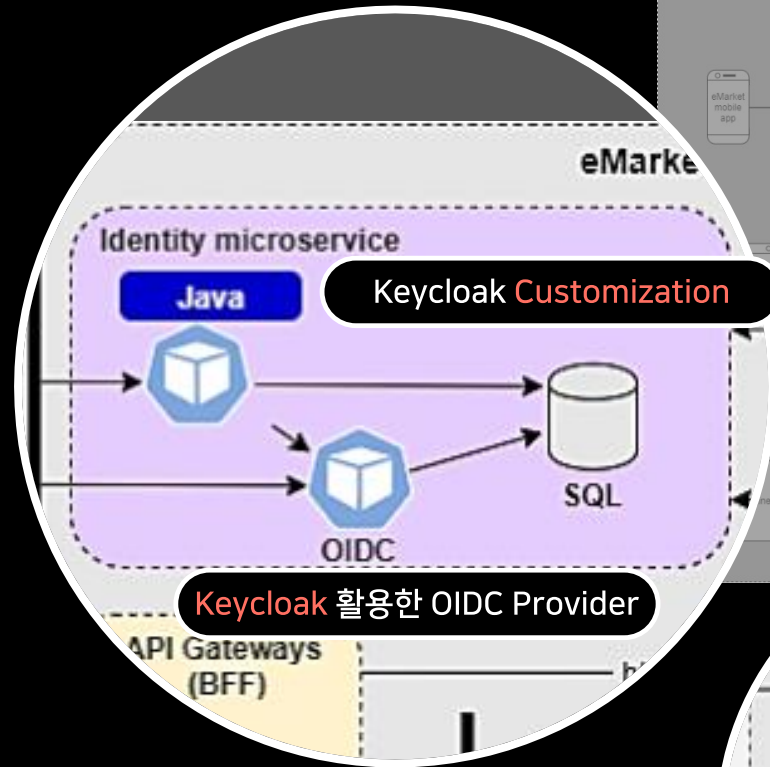
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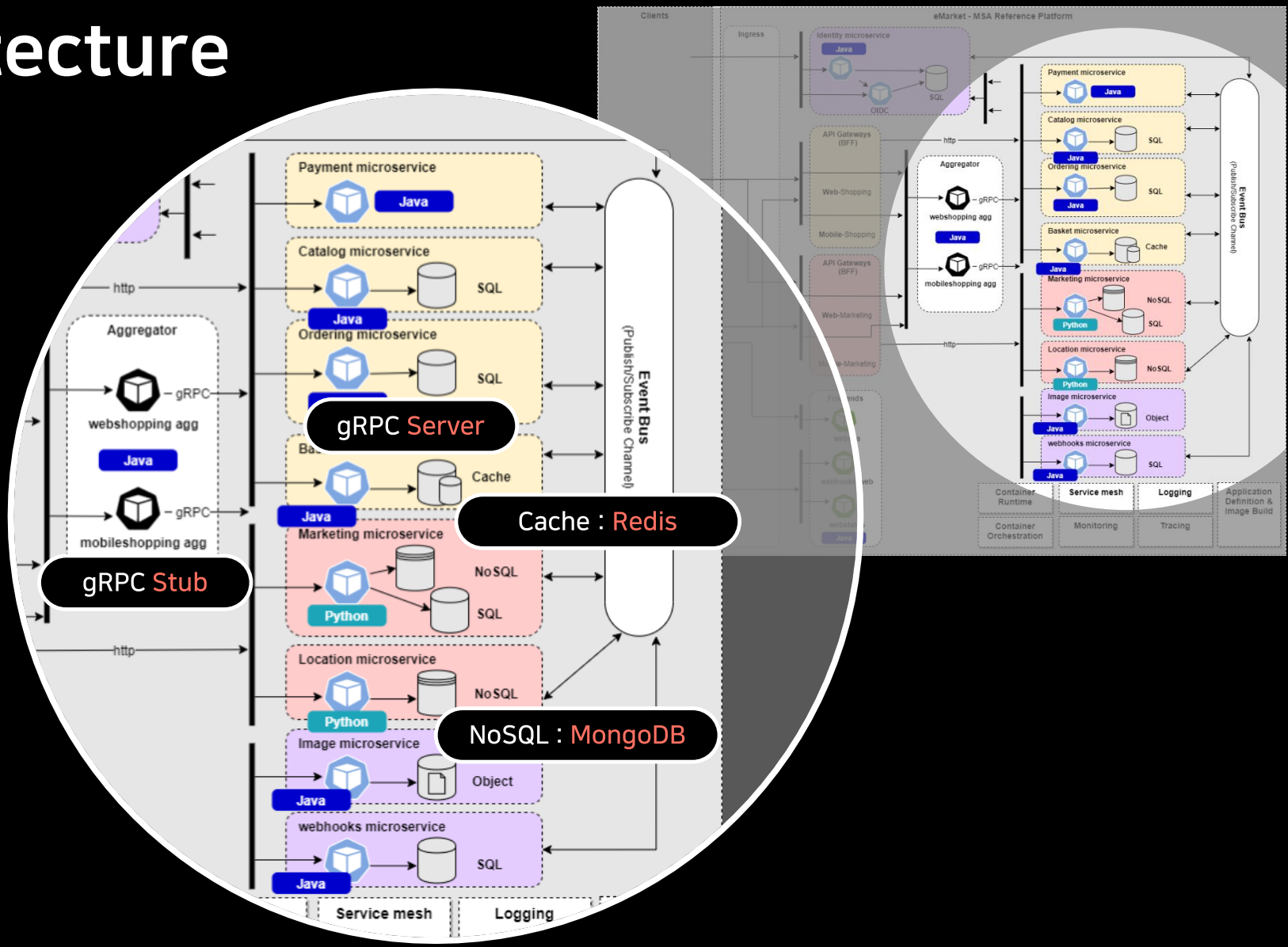
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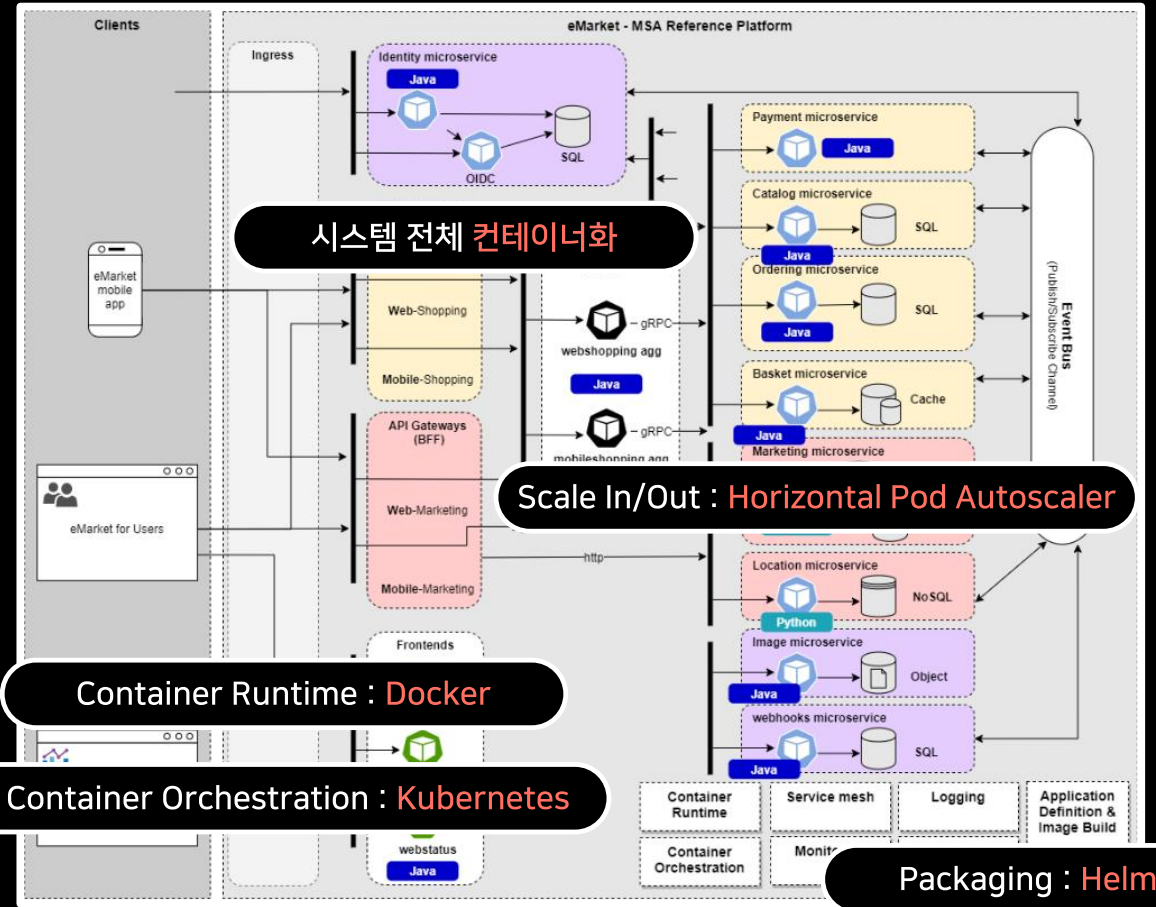
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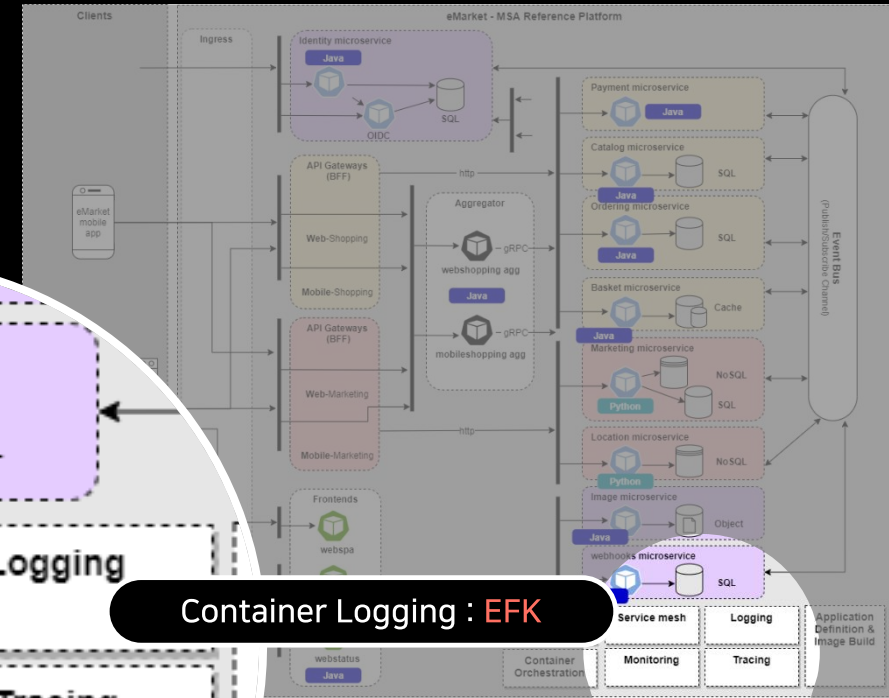
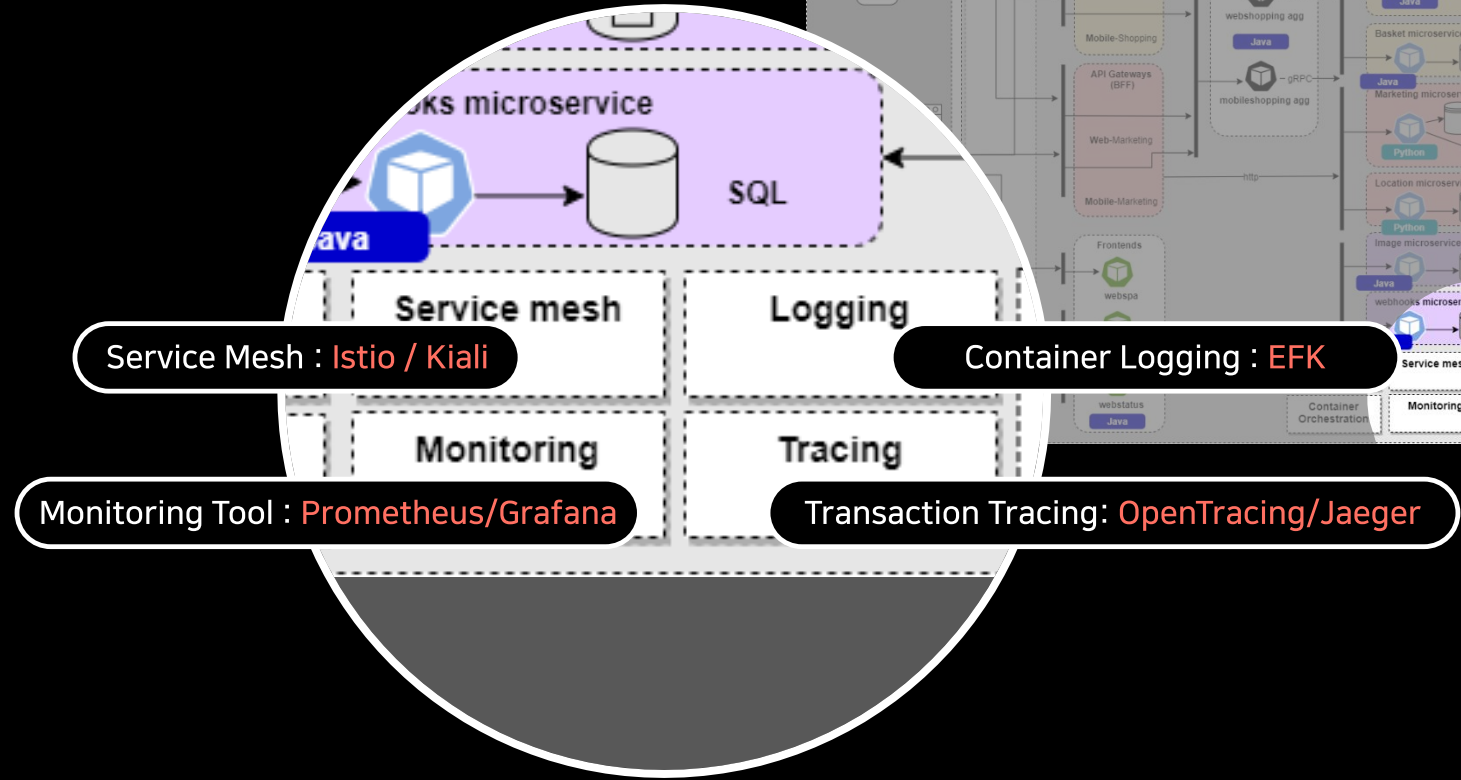
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2 Reference Implementation

Frontend Development

SPA Web App React
Mobile App React Native

Backend Development

Polyglot Microservices Java / Python
인증 및 권한 OIDC Provider
Traffic Control API Gateway
Service Mesh
API Design Pattern Backend For Front
API Composition Pattern
REST API 설계 및 문서화 OpenAPI
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양방향 통신 STOMP
Transaction & Orchestration Saga Pattern : Choreography
CQRS

Backing Services

SQL NoSQL Cache Message Queue Object

SaaS Architecture

Multi Tenancy 논리적 격리

Logging & Monitoring

Monitoring Service Health System Metric

Service Mesh

Logging 분산 트랜잭션 Container

SSO Integration OIDC Provider

Deployment

Packaging Compact Full

Automation CI / CD

Environment Private Cloud Public Cloud

Local (개발용)

Production Ready

Scalability HPA

Stability Service HA Backing Service HA

→ SDS Github으로 전사 공유 중

2 Reference Implementation

Frontend Development

SPA Web App

React

Mobile App

React Native

Backend Development

Polyglot Microservices

Java / Python

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STOMP

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CQRS

Backing Services

SQL

NoSQL

Cache

Message Queue

Object

SaaS Architecture

Multi Tenancy

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Logging & Monitoring

Monitoring

Service Health

System Metric

Service Mesh

Logging

분산 트랜잭션

Container

SSO Integration

OIDC Provider

Deployment

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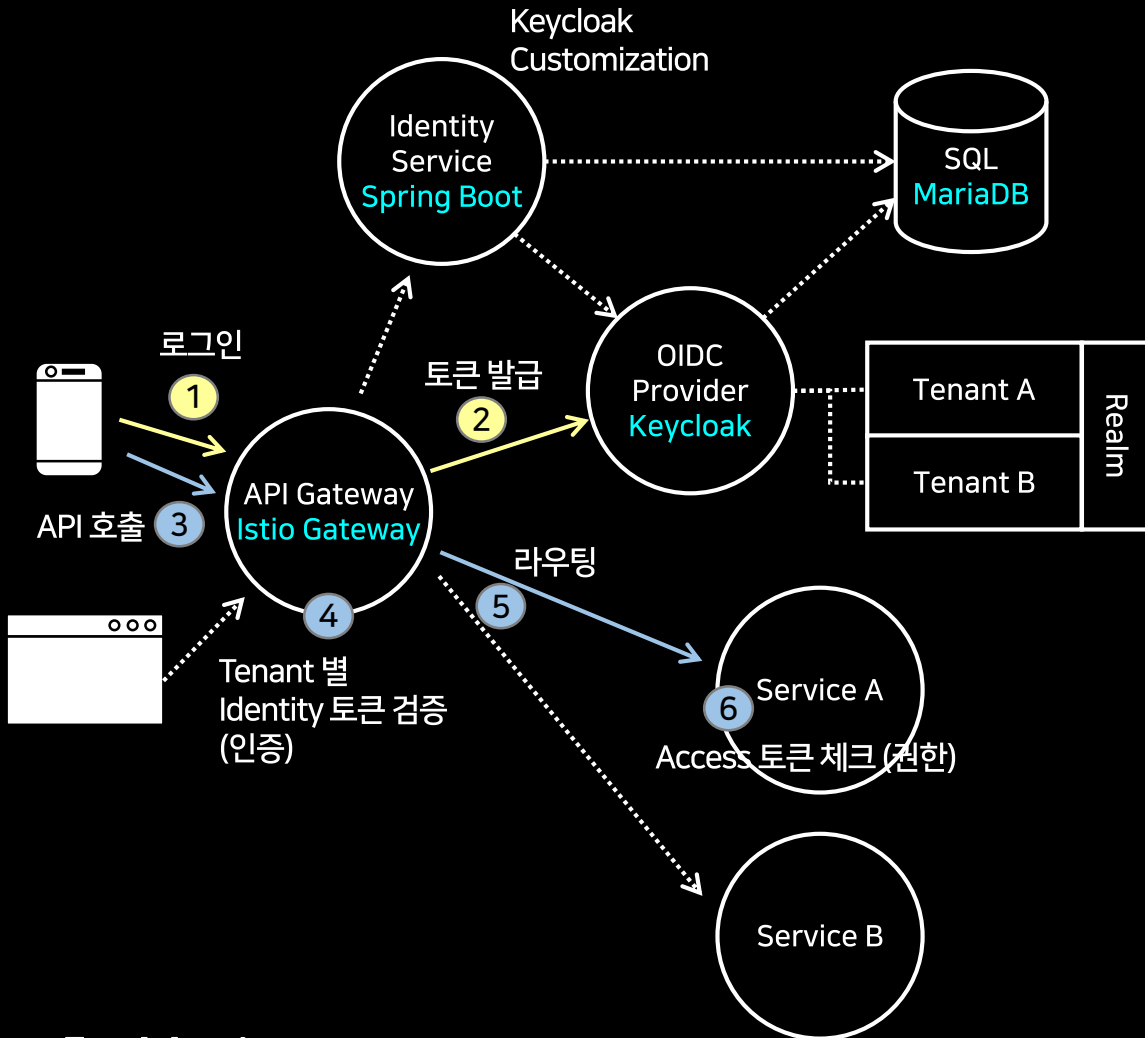
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인증 및 권한 구현



OIDC

- OAuth2(권한) + 인증
- Json Web Token (JWT)

Keycloak 활용

- 사용자 및 클라이언트 인증과 권한 부여
- Identity/Access Token 발급
- 사용자 등록 및 관리

Keycloak Customization

- Web/Mobile 용 로그인/등록 페이지
- 사용자 정보 Customization (email 필수, Custom Field 추가)

Token Validation

- 서비스 단에서 Spring Security 를 이용
- Multi-tenancy 를 지원하면서 Tenant 별 Token 검증 가능한 형태로 로직 변경이 필요 → 서비스 단의 인증 로직을 API Gateway 단으로 변경 (서비스 구조 단순화)

3 Reference OSS Stack

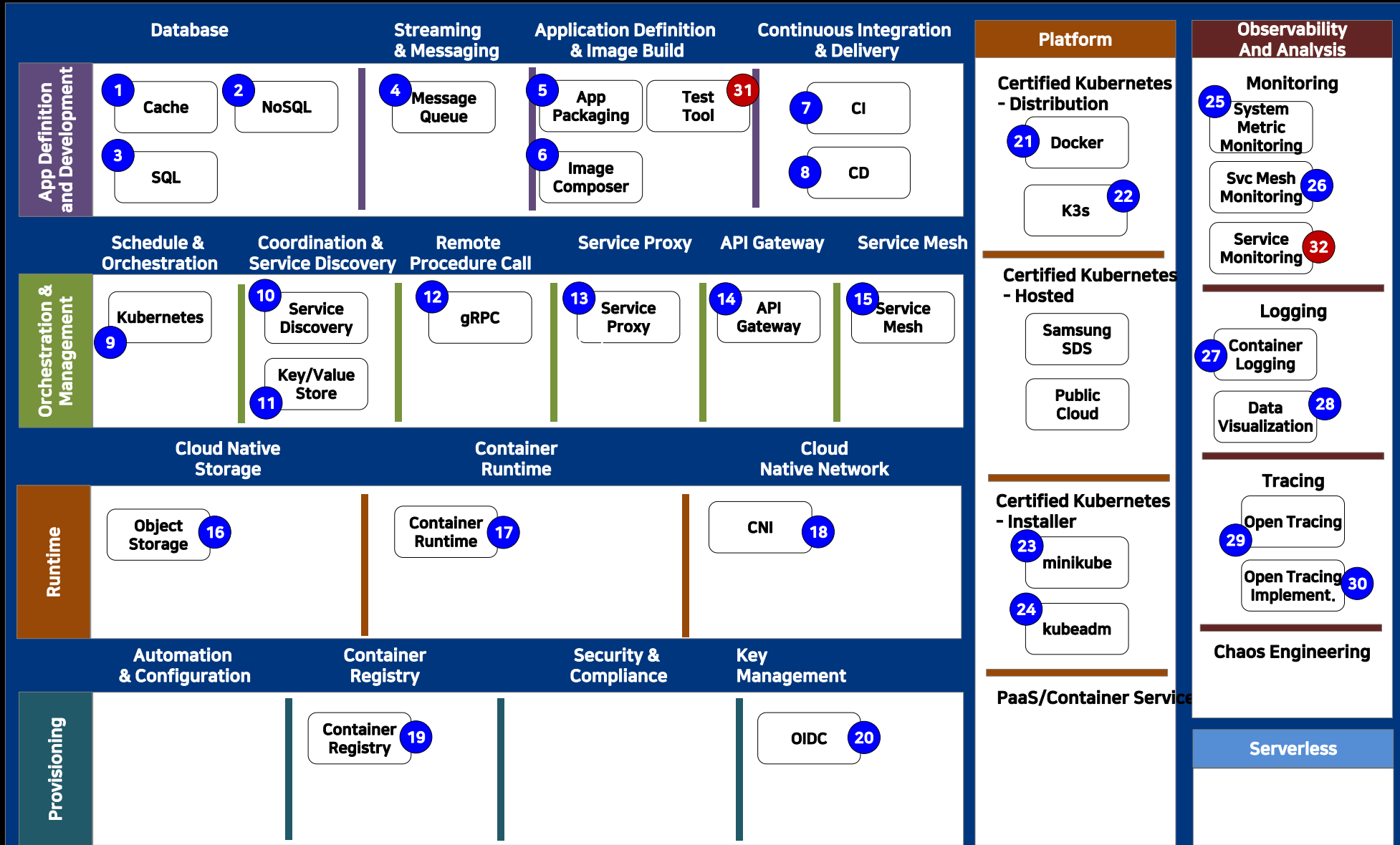
CNCF 기준 30종
중요 오픈소스 사용

※ 기타 오픈소스 2종

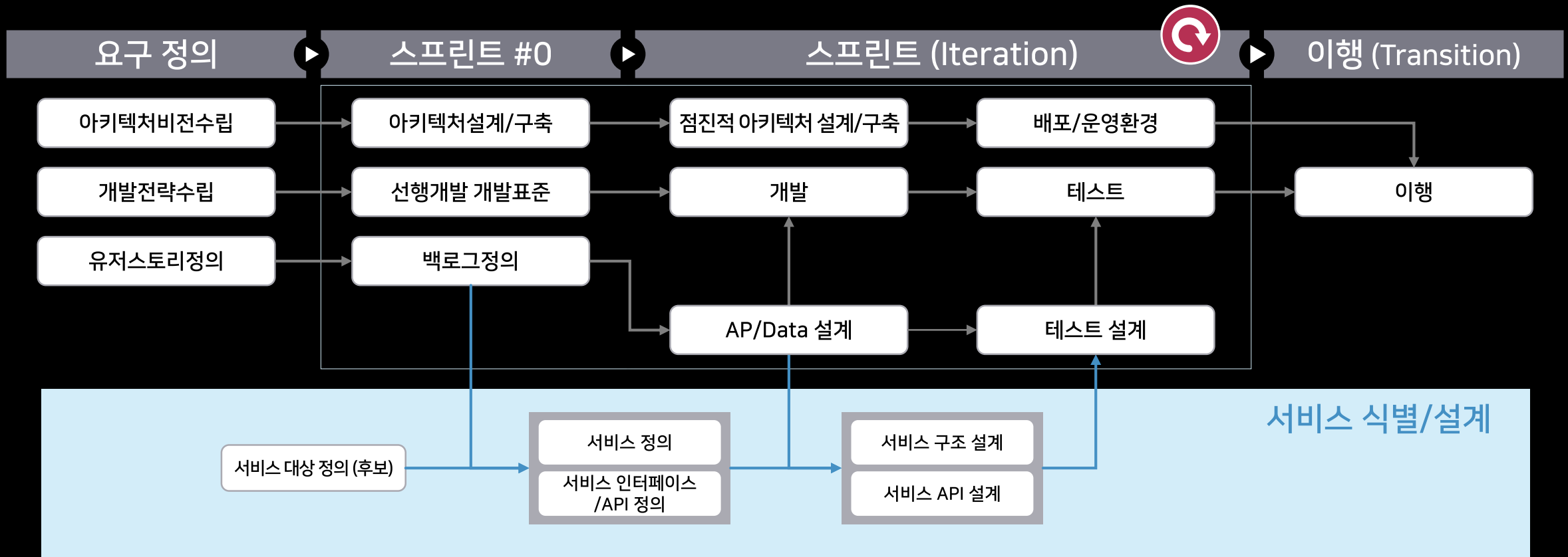
현장 적용 가능한
검증된 레퍼런스 제공

※ Product Validation 수행

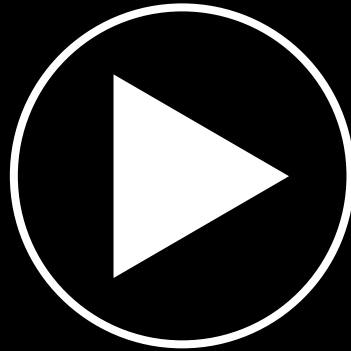
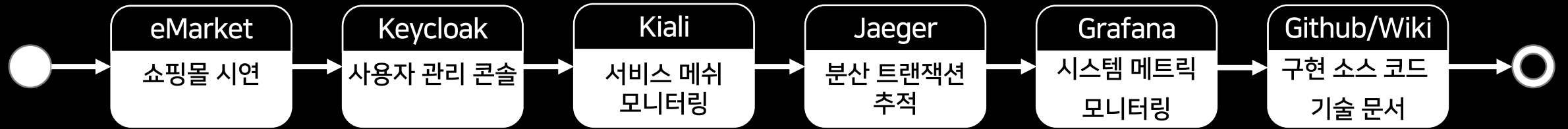
- OSS 검증
- Security 검증
- 기능 검증
- Performance 검증



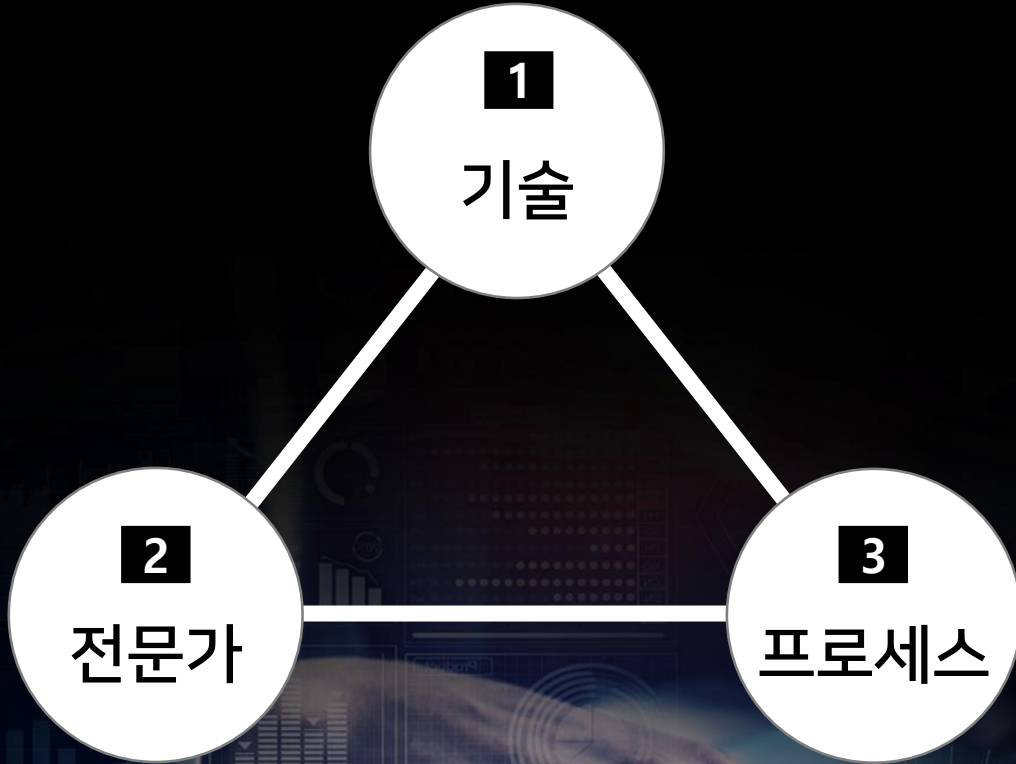
4 Agile 기반 MSA 개발 방법론



Demo 동영상



향후 방향



SDS 표준 참조 모델로 지속 확산

1. 기술

- ✓ IaC, PaC 등 손쉬운 배포를 Provisioning
- ✓ 현장 경험과 사례를 통한 노하우 축적 / 개발 플랫폼 연계
- ✓ 도메인 중심 레퍼런스 구체화 (e-Commerce, 인터넷뱅킹 등)

2. 전문가

- ✓ 초급 과정 외 중급 과정, 전문가 과정 등 교육 개발

3. 프로세스

- ✓ Enterprise Agile 기반의 MSA 구축
- ✓ 서비스 식별/설계 체계 고도화

 Reference
Architecture

 Reference
Implementation

 Reference
OSS Stack

 MSA Development
Methodology

Thank you

SAMSUNG SDS