WSO2CON 2025

Modularity With DDD Using Cell-Based Architecture on Choreo



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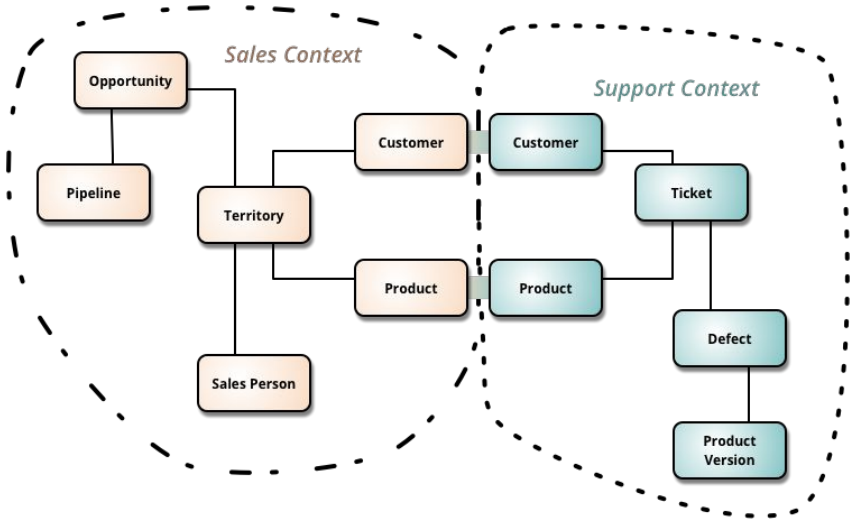
Agenda: What we'll cover today

- Introduction to Domain Driven Design (DDD)
- Challenges of microservices and the need for Cell-Based Architecture
- Overview of Cell-Based Architecture (CBA)
- Choreo: An internal developer platform (IDP)
- Implementing DDD with Cell-Based Architecture
- Q&A

Introduction to Domain Driven Design (DDD)

Introduction to Domain Driven Design (DDD)

- A software design approach focusing on modeling the business domain
- Key concepts:
  - **Bounded context**: Defines clear boundaries across business domains
  - **Ubiquitous language**: Shared vocabulary between developers and domain experts
  - **Aggregates & Entities**: Core building blocks of the domain model
- Goal: Align software with business needs for maintainability and scalability



Ref: https://martinfowler.com/bliki/BoundedContext.html

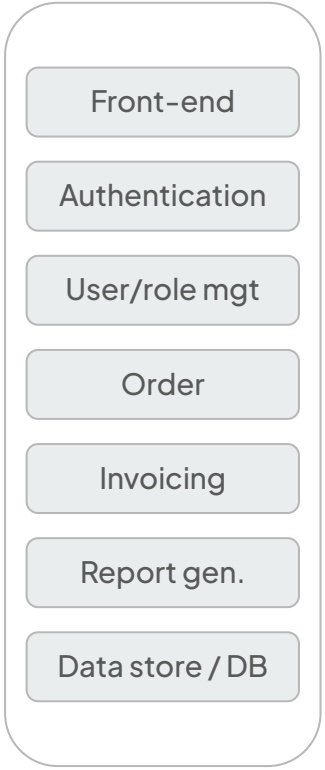
Challenges of microservices

Challenges of microservices: power and pitfalls

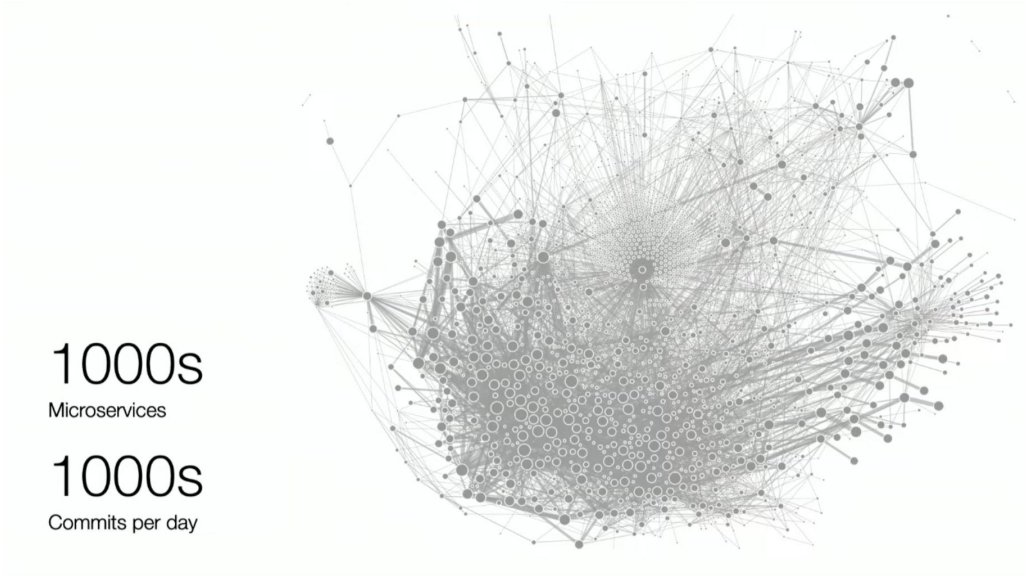
- Benefits: Independence, Scalability, Technology diversity
- Challenges
  - Granularity leads to governance complexity
  - Deployment overhead and inter-service communication issues
  - Difficult to align with business domains at scale
- Technical challenges
  - Packaging, Testing (A/B, Blue-Green…), Versioning, Config mgt, Discovery, Monitoring

Challenges of microservices: power and pitfalls

Monolith



Microservices at scale

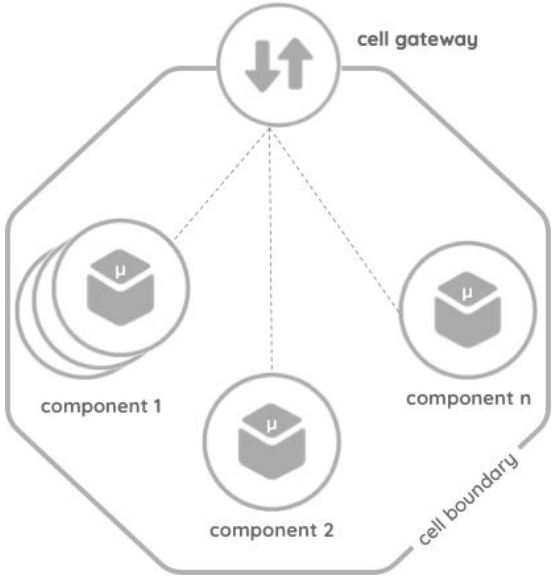


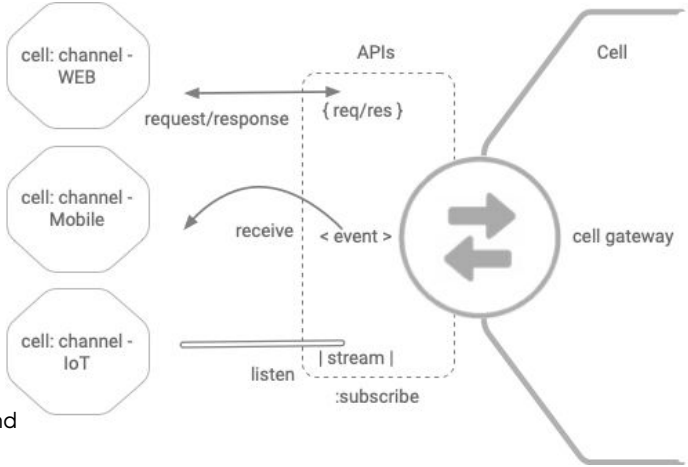
Ref: Uber (SRECon 2019)
https://www.youtube.com/watch?v=nllFmja65_g


Need a better solution to manage microservices at scale

Overview of Cell-Based Architecture

- Definition: Self-contained, independently deployable units (cells) grouping related components
- Core principles:
  - Scalability: Adapts to workload changes
  - Modularity: Versioned components with well defined interfaces
  - Composability: Recursive, uniform architecture
  - Governance: Manage and observe systems
- Moves from centralised to decentralised architecture





https://github.com/wso2/reference-architecture/blob/master/reference-architecture-cell-based.md

Choreo implements Cell-Based Architecture

Choreo: An Internal Developer Platform (IDP)

- What is Choreo?
  - A cloud-native IDP by WSO2 for building, deploying and managing apps
  - Focus: Developer productivity and innovation
- Key features:
  - Simplified platform engineering, CI/CD, observability and governance
  - Simplified developer concerns - secret management, life cycles, API management
  - Supports cloud-native, microservices based development
- Why? Accelerates digital transformation

DDD meets Cell-Based Architecture in Choreo

- Bounded Contexts as Cells:
  - Each cell encapsulates a domain or subdomain
  - Maps to DDD's bounded context principle
- Modularity in action:
  - Microservices, gateways and data stores grouped into cells
- Team ownership:
  - One team per cell, mirroring Conway's law
- This leads to:
  - Cohesive, domain-aligned units with clear boundaries

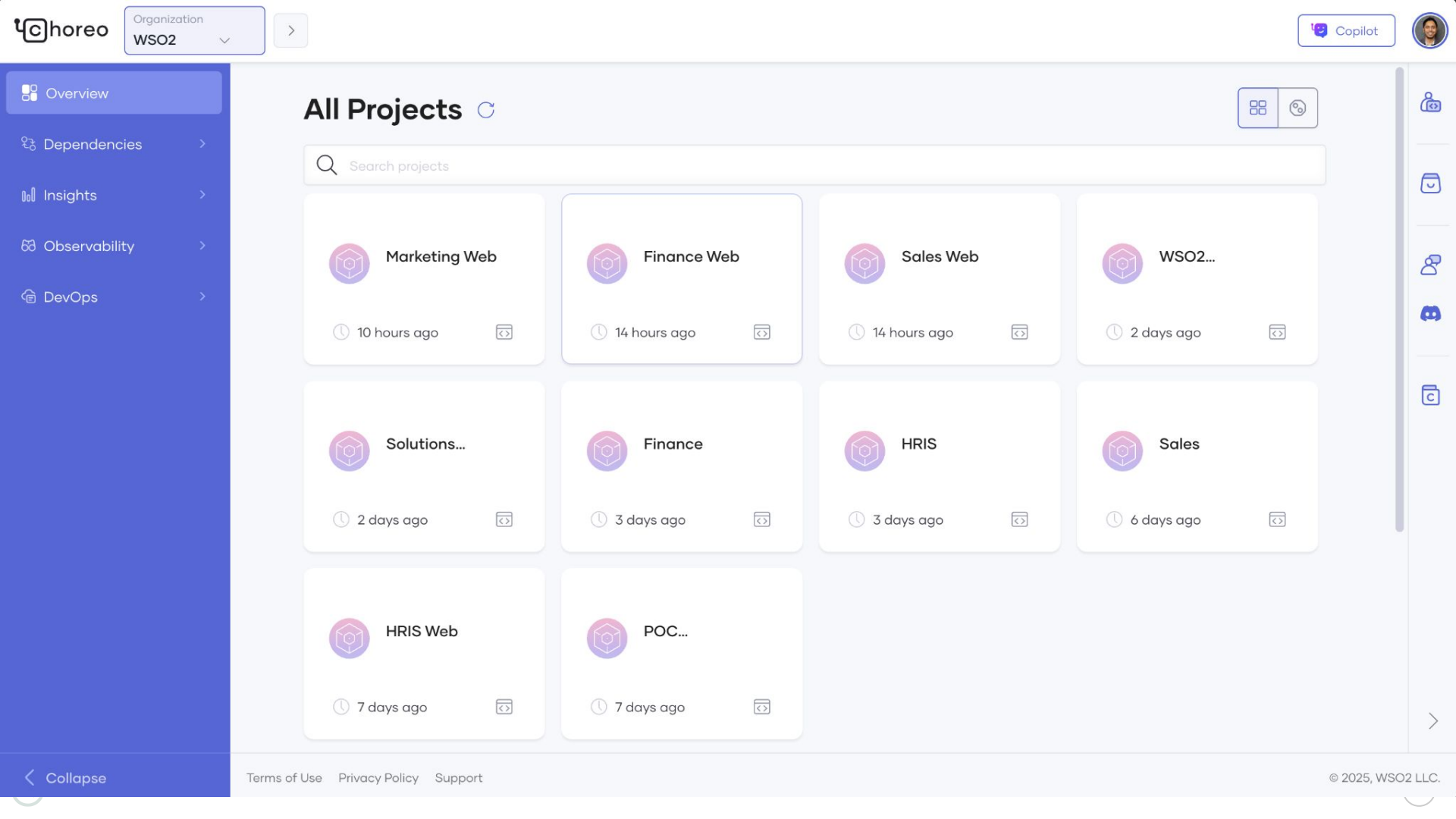
Strategies for identifying cells or domains

Strategies for identifying cell boundries

- Use DDD to define bounded contexts = cell boundary
- Map microservices to teams responsible for them (2 pizza teams)
- Based on component interaction and dependency graph
- Based on business capabilities
- Cell type categorization (logic, integration, data, legacy etc…)

Functionality highlights Choreo's cell based implementation

- Deployment: Immutable cells deployed via CI/CD pipelines
- Scaling: Independent scaling per cell for workload flexibility
- Governance: Managed APIs, and policy enforcement at cell gateways
- Security: Local or federated security models per cell
- Observability: Built-in monitoring and logging for each cell


Organization
WSO2
Copilot
Overview
Dependencies
Insights
Observability
DevOps
All Projects
Search projects
Marketing Web
10 hours ago
Finance Web
14 hours ago
Sales Web
14 hours ago
WSO2...
2 days ago
Solutions...
2 days ago
Finance
3 days ago
HRIS
3 days ago
Sales
6 days ago
HRIS Web
7 days ago
POC...
7 days ago
Collapse
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Overview
Components
Dependencies
Insights
Observability
DevOps

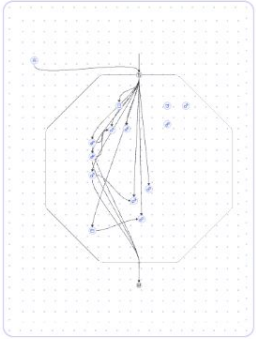
Marketing Web

Web apps related to Marketing

Component Listing

Name	Description	Type	Last Updated
WSO2Con App Backend		Service	10 hours ago
Conference App Notificat...	Scheduled task to p...	Scheduled Task	15 hours ago
Choreo Dev Website	Choreo developer w...	Web Application	1 day ago
WSO2Con AI Agent Servi...		Service	2 days ago
WSO2Con Registrant Ap...	Microapp used to re...	Service	2 days ago
WSO2Con AI Personalizer...		Service	4 days ago
TEMP - Sahan testing clie...		External Consumer	9 days ago

Architecture



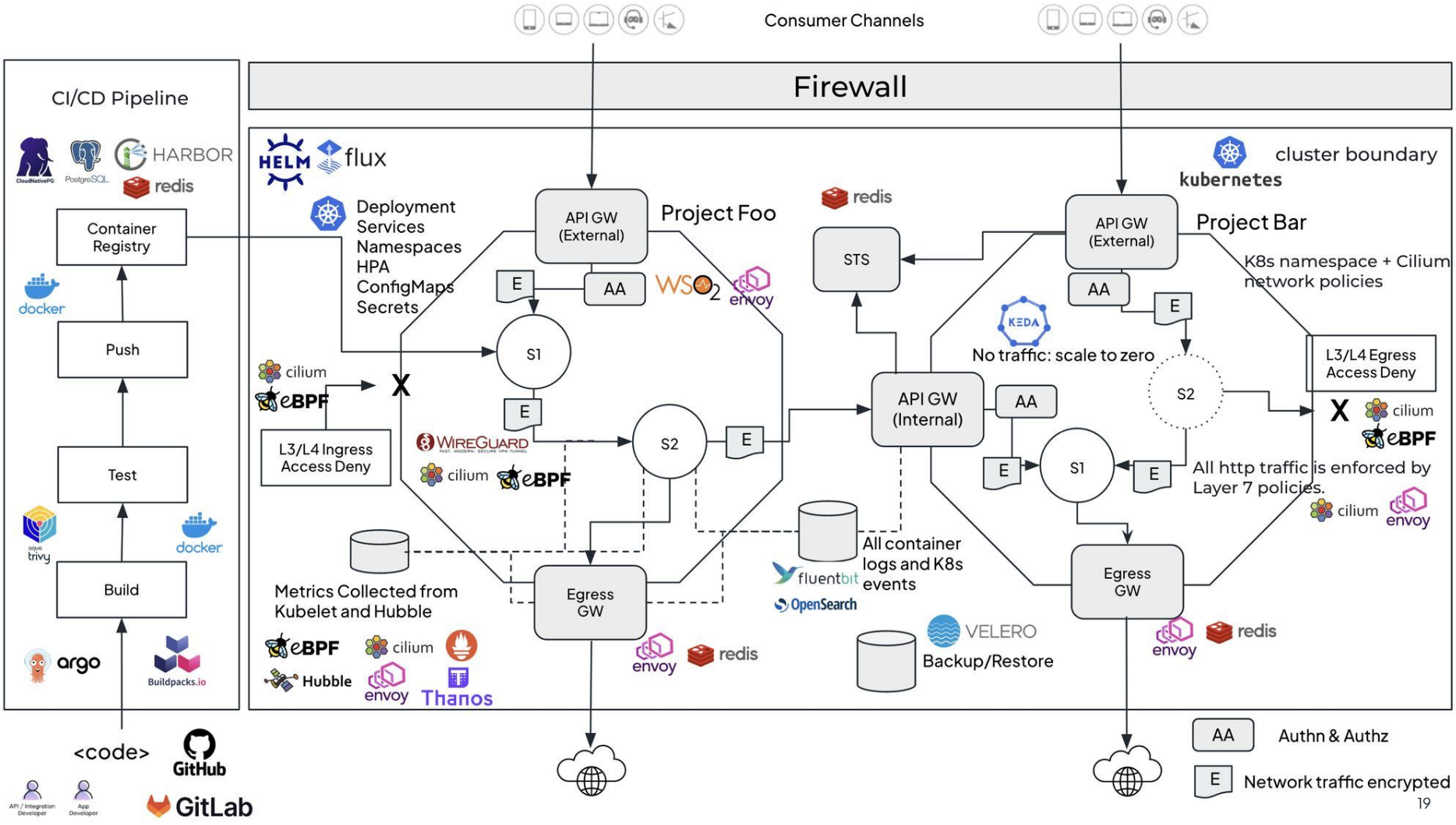
Component Types

Service	10
Web Application	2

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Benefits for Devs and Enterprises: Why it matters

- For developers:
  - Simplified workflows, focus on innovation
  - Clear boundaries reduce complexity
- For enterprises:
  - Agility: Faster response to market changes
  - Scalability: Handle growth efficiently
  - Maintainability: Easier updates and governance
- Operational simplicity
  - **Without cell-boundary, design time governance cannot be enforced in runtime**
- Resulting in a composable, cloud-native enterprise architecture


Consumer Channels
Firewall
CI/CD Pipeline
CloudNativePG
PostgreSQL
HARBOR
redis
Container Registry
docker
Push
Test
trivy
docker
Build
argo
Buildpacks.io
<code>
GitHub
GitLab
API / Integration Developer
App Developer
HELM
flux
Deployment
Services
Namespaces
HPA
ConfigMaps
Secrets
cilium
eBPF
L3/L4 Ingress Access Deny
API GW (External)
Project Foo
E
AA
WSO2
envoy
S1
E
WireGuard
cilium
eBPF
S2
E
Metrics Collected from Kubelet and Hubble
eBPF
cilium
Hubble
envoy
Thanos
Egress GW
envoy
redis
redis
STS
API GW (Internal)
AA
E
S1
E
S2
E
fluentbit
OpenSearch
All container logs and K8s events
VELERO
Backup/Restore
kubernetes
cluster boundary
API GW (External)
Project Bar
K8s namespace + Cilium network policies
AA
E
KEDA
No traffic: scale to zero
S2
L3/L4 Egress Access Deny
cilium
eBPF
All http traffic is enforced by Layer 7 policies.
cilium
envoy
Egress GW
envoy
redis
AA
Authn & Authz
E
Network traffic encrypted

Summary

- DDD provides the domain focus; cell-based architecture add structure
- Choreo operationalize this with a powerful IDP
- Takeaway: Embrace modularity for digital transformation success

Try out Choreo - https://choreo.dev

Question Time!




Thank you!
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