20TH ANNIVERSARY EDITION

WSO2CON ASIA

PLATFORMLESS MODERNIZATION

Modern Enterprise Architectures with APIs

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WSO2

How Many APIs Do You Use ?

API Usage in Modern Organizations

Average Number of API endpoints per Organization – 613

(State of API Security 2024 - Imperva)

55% of the Organizations have at least 500 APIs

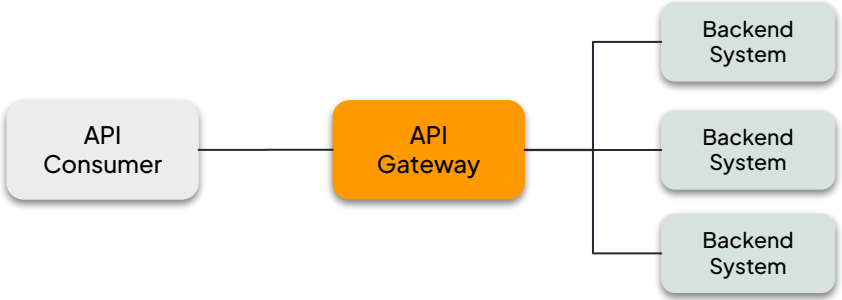
(2025 Global State of API Security - Traceable)

Enterprise Architecture

The right Enterprise Architecture allows your organization to be agile, scalable and be truly inter-connected

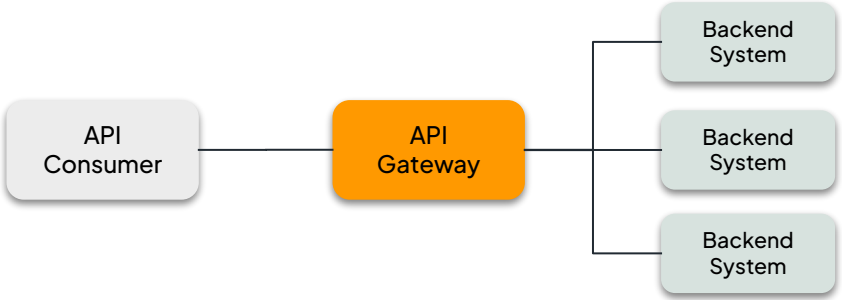
APIs in Enterprise Architecture

- API Gateway
  - Secure Access to API
  - Ensure fair usage
  - Expose versions of the same API



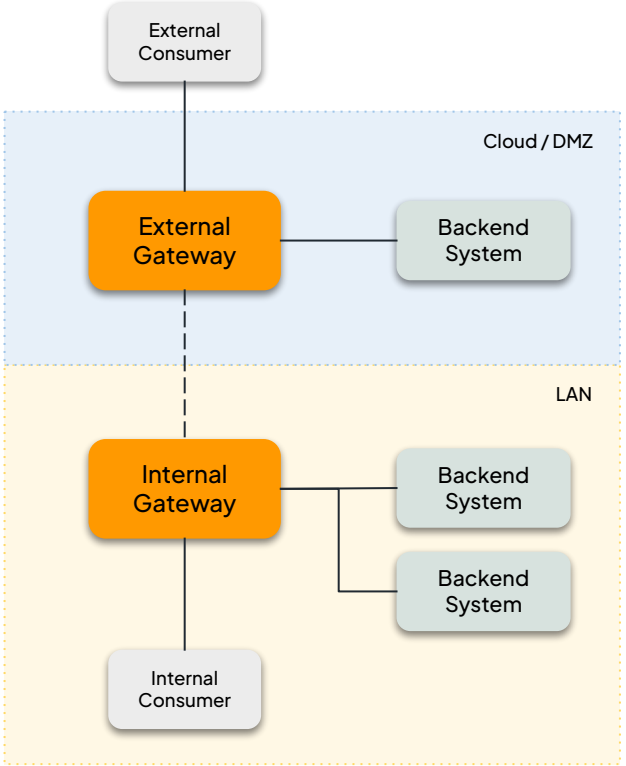
APIs in Enterprise Architecture

- API Gateway
- API Façade
  - Hides the complexities behind GW
  - Simplified API to Consumer



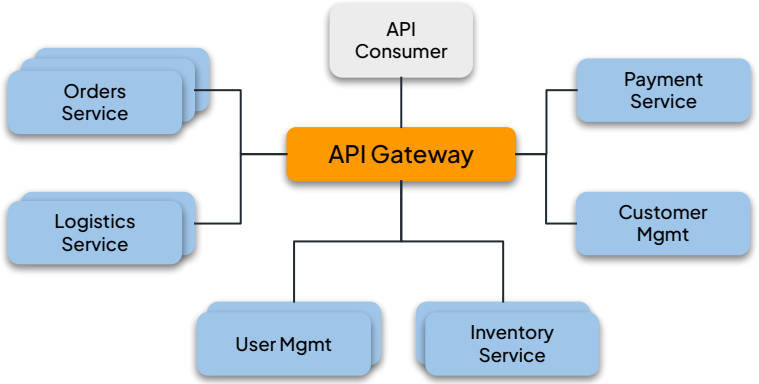
APIs in Enterprise Architecture

- API Gateway
- API Façade
- Internal and External Traffic Separation
  - Separate network boundaries
  - Different policies for different traffic types
  - Enhanced Security



APIs in Enterprise Architecture

- API Gateway
- API Façade
- Internal and External Traffic Separation
- Microservices Architecture
  - Services can be deployed and managed and scaled independently
  - Increased Agility
  - Services can be polyglot



Modernization

Modern Enterprises

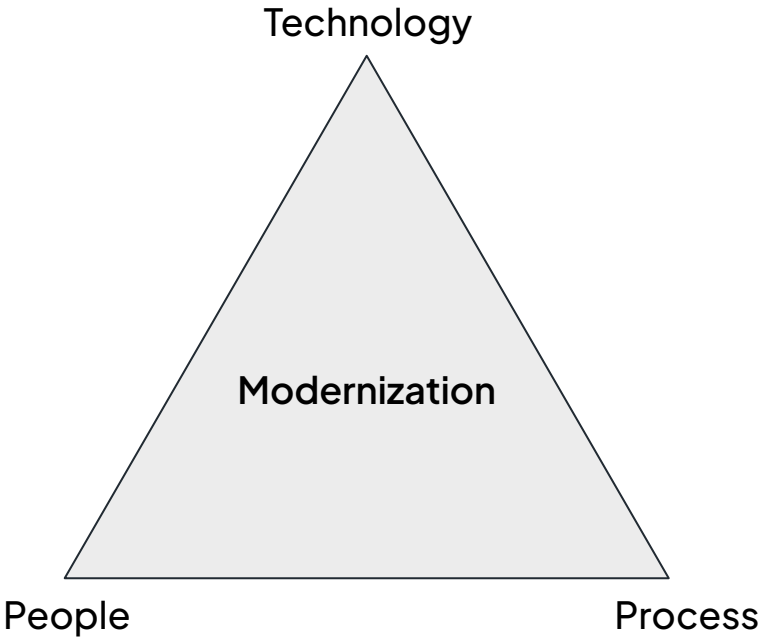
Modern Enterprises are more decentralized, have multiple teams working on different aspects of Digital Experiences they build for their stakeholders

Modern Enterprises need
Modern Enterprise Architectures !

Modern Enterprise Architectures Allow You…

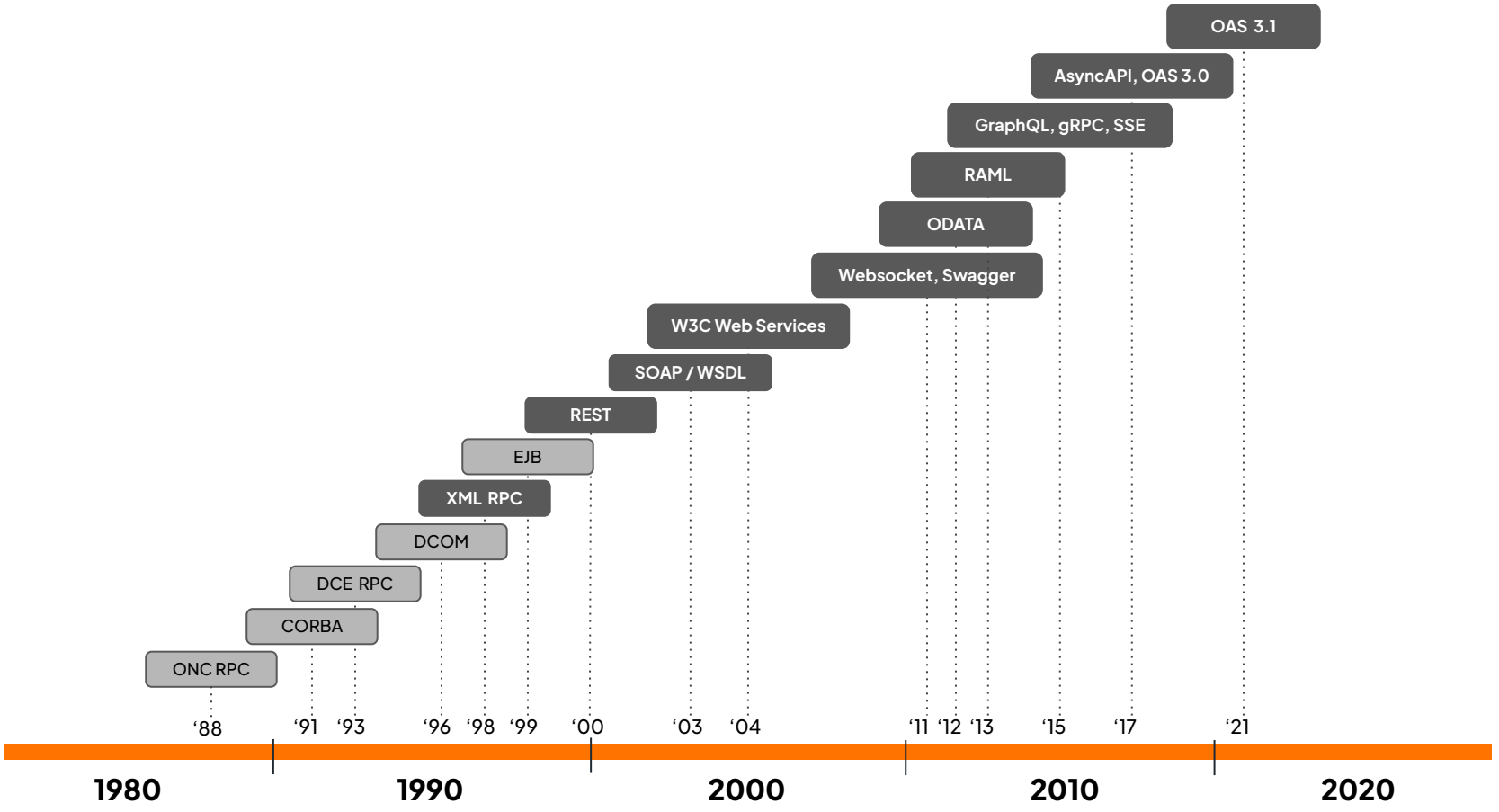
- Composability
  - Move towards smaller, independent, deployable units
  - Agility, fault isolation, independent scaling
- Decentralization & Domain-Driven Design
  - Empowers teams to own their services and data
  - Align architectures with business domains
- Cloud-Native principles
  - Leverage Cloud Services
  - Scalability, Resiliency and cost-efficiency
- Emphasis on Data Flow and Real-time capabilities
  - Allows data to flow freely and be accessible easily
  - React to events when they happen

Pillars of Modernization

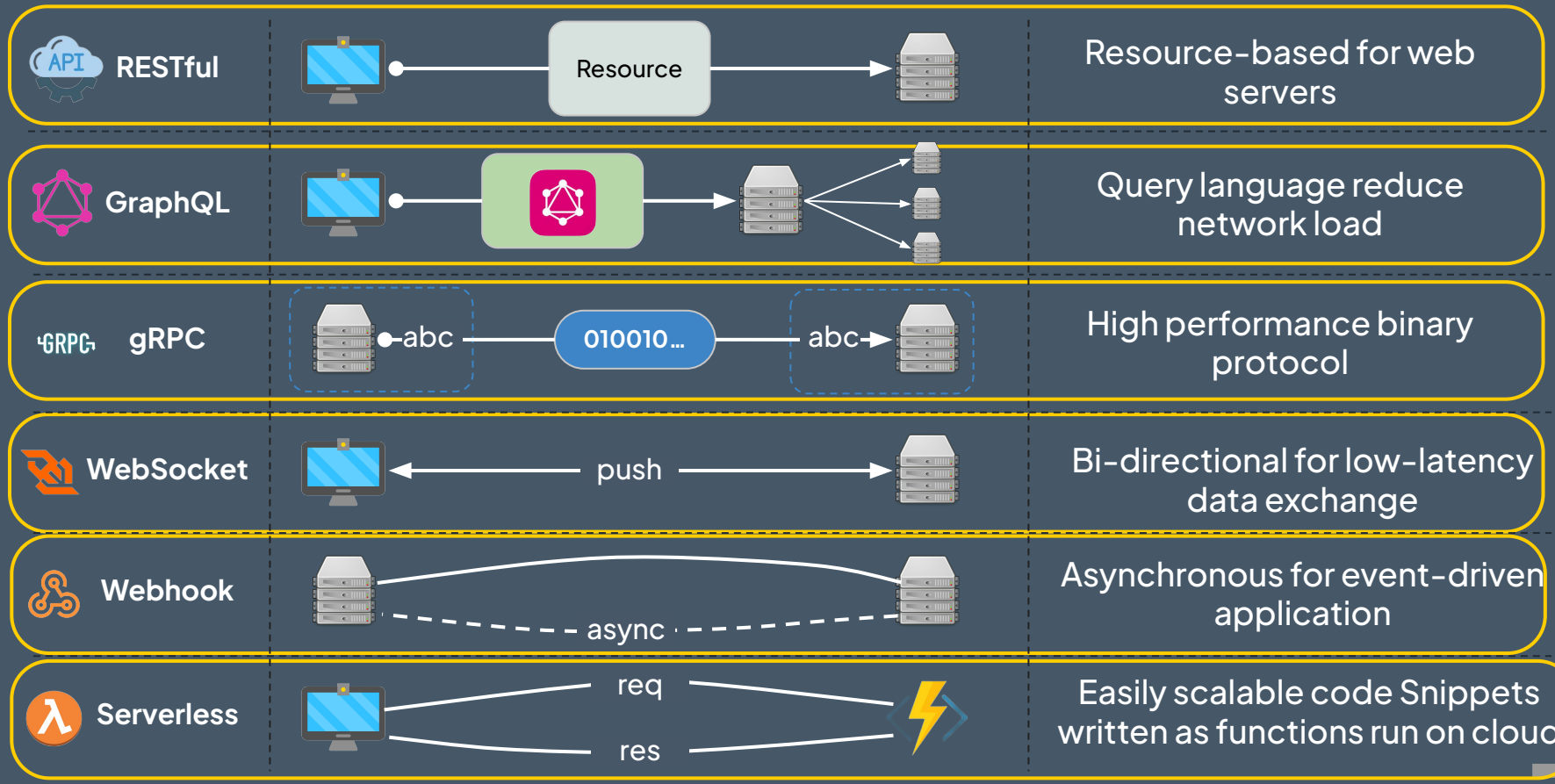


Modern API Technologies and Specifications

Evolution of API Technologies and Standards

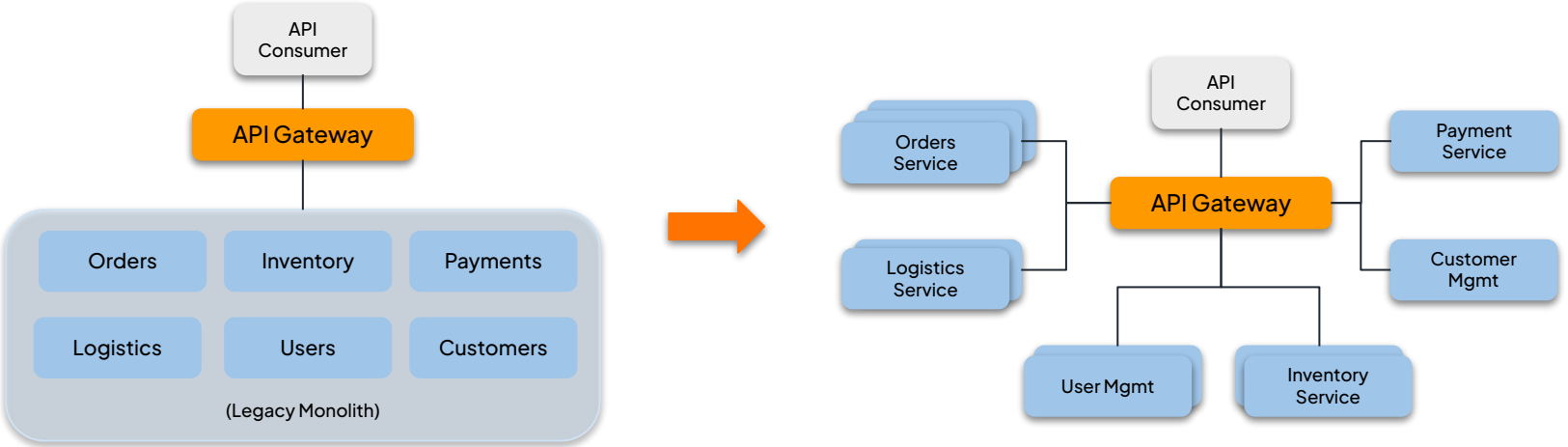


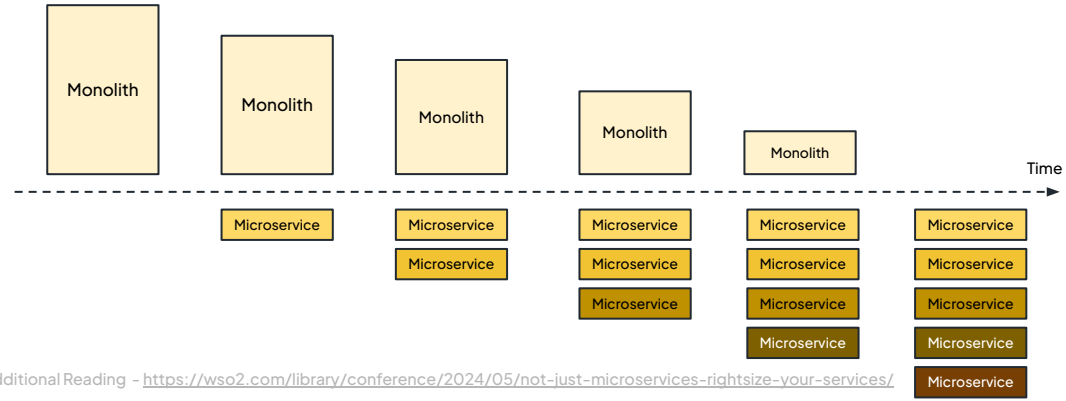
Modern API Architecture Styles



API Architectures That Match the Modern Enterprise

Monolith to Microservices Architecture



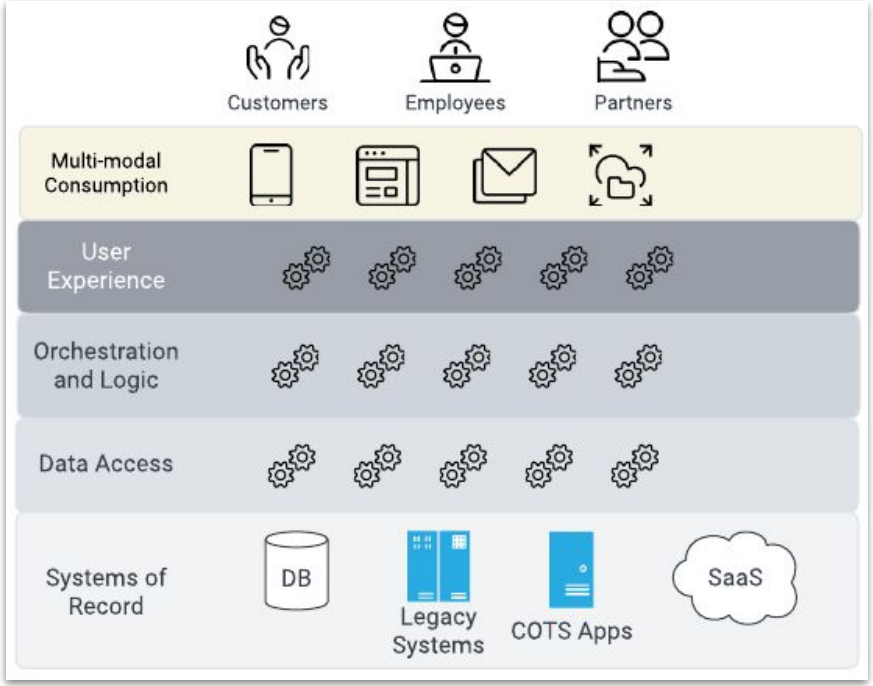


Strangler (Fig) Pattern

Additional Reading - https://wso2.com/library/conference/2024/05/not-just-microservices-rightsize-your-services/

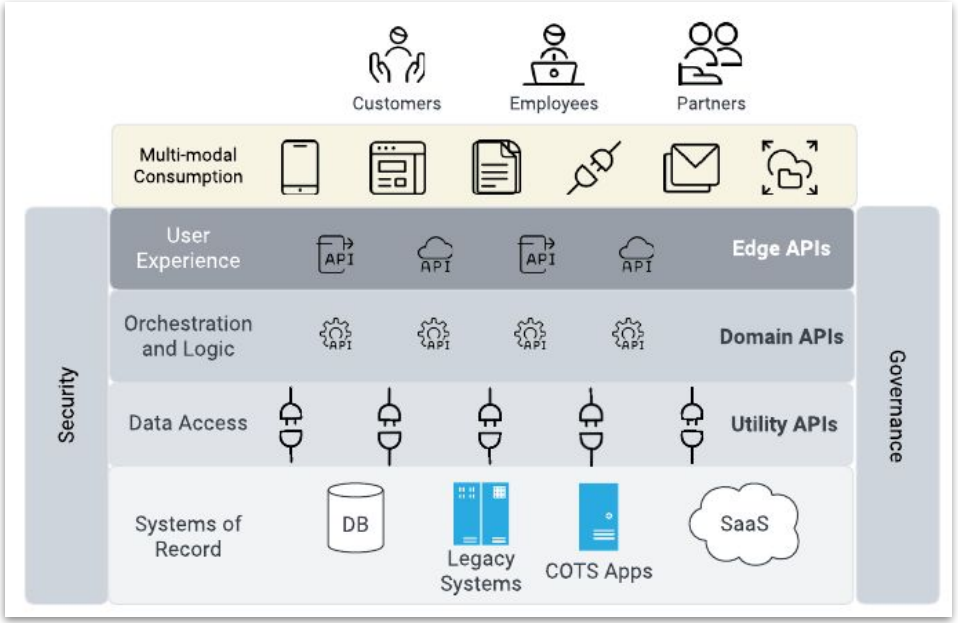
Layered Architecture

- A common EA pattern
- No of layers and what they are, may differ
- It's a natural progression of things in computing from centralized to decentralized
- Components are grouped together by function
- Layers may reflect how teams operate in an organization (can be centralized or decentralized)



Layered API Architecture

- Use of APIs in each layer brings their inherent benefits (decoupling, open standards, agility, etc.)
- Can be combined with MSA (Each API could be a Microservice)
- Add the missing layers to your current architecture
- First step of being decentralized



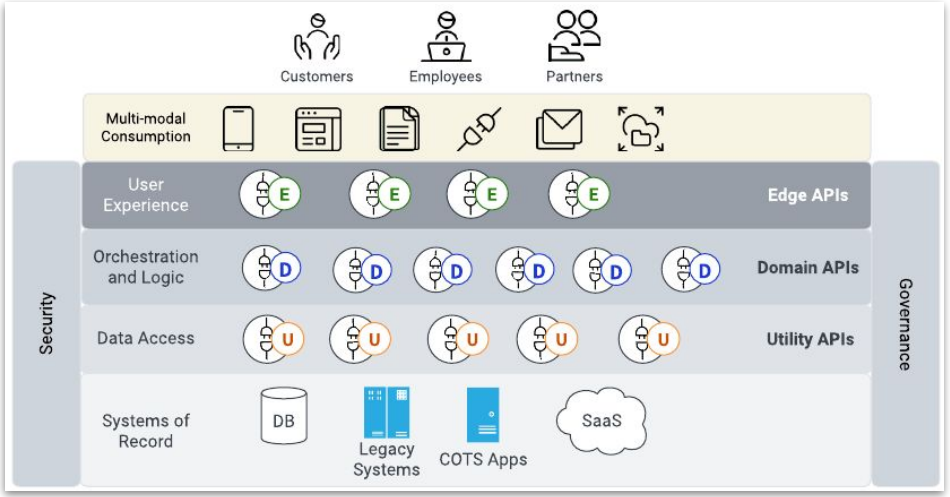
Reference - https://github.com/wso2/reference-architecture/blob/master/reference-architecture-layered-segmented.md

Layered API Architecture

- API Architectural styles can be used in implementing APIs in each layer
- GRPC for high performance data exchange
- GraphQL for better Ux
- Async APIs such as Websockets (bi-directional data exchange) and Webhooks for Server initiated calls
- Allows non-disruptive introduction of new technologies

Segmented API Architecture

- Retains the same basic structure and principles of Layered
- Segmented based on how enterprises are organized
- Can be BUs, Functional Teams, or Centres of Excellence
- Segment own everything in all layers
- Sub-teams (two-pizza sized) may work on individual layers
- More freedom and ownership



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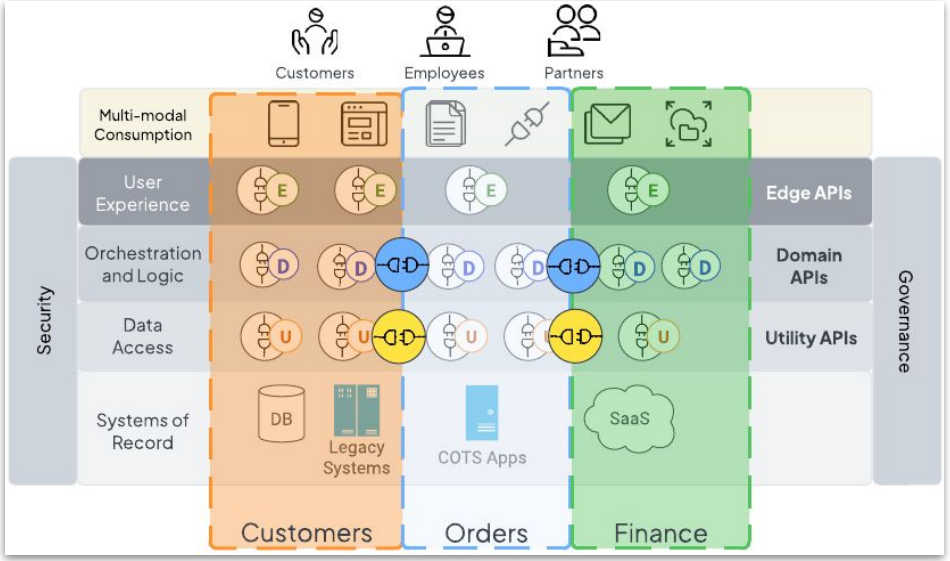

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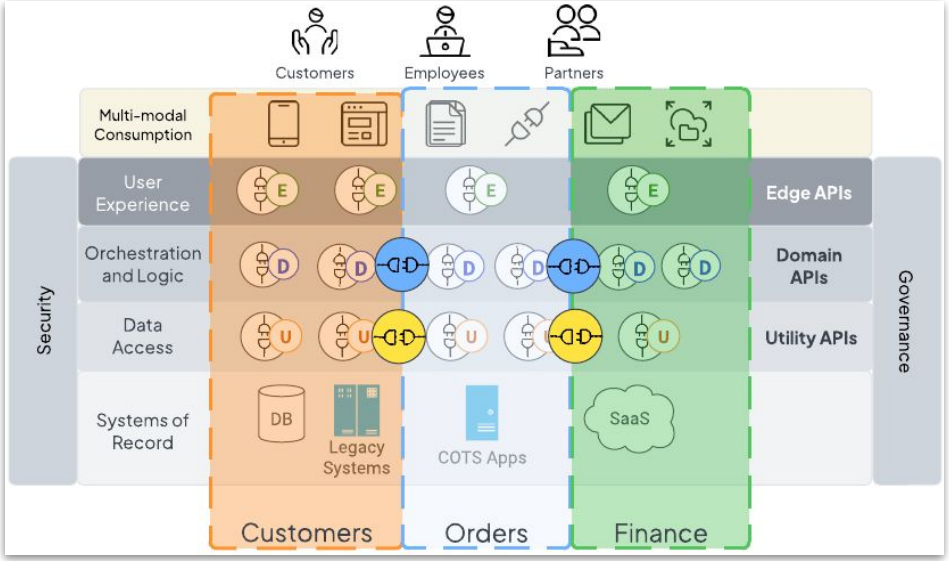
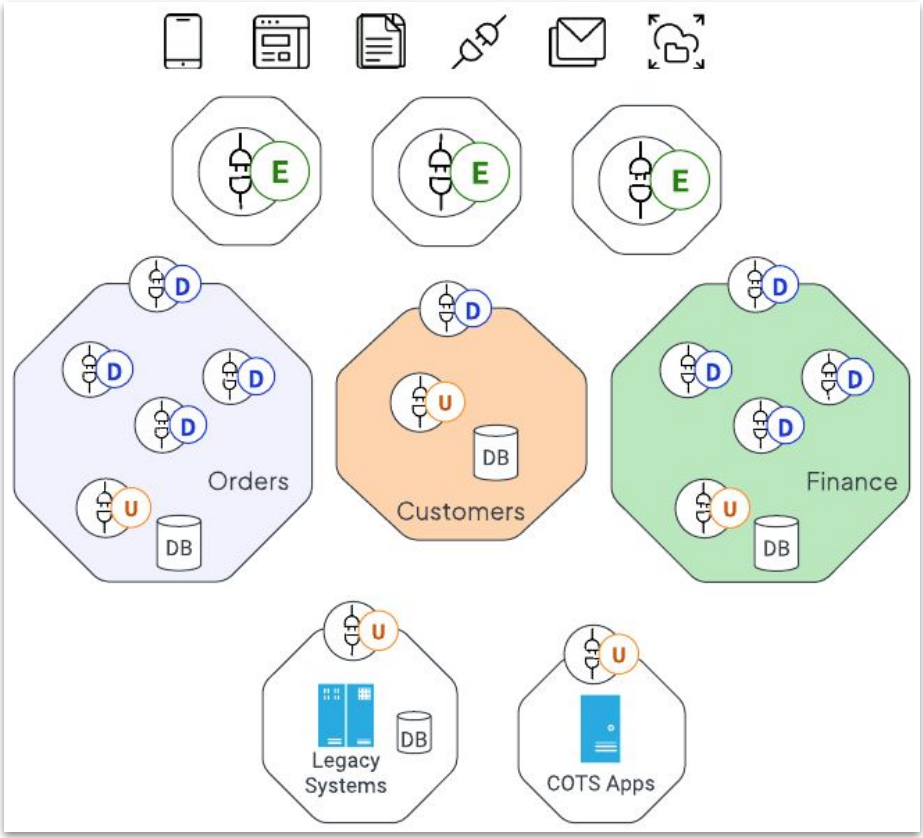
Segmented API Architecture

- APIs are used for communication between layers and segments
- Segments could be separated using Runtime partitioning, Multi-tenancy
- In larger organizations, each segment may have their own platform
- Platform of platforms !



Cell-based API Architecture

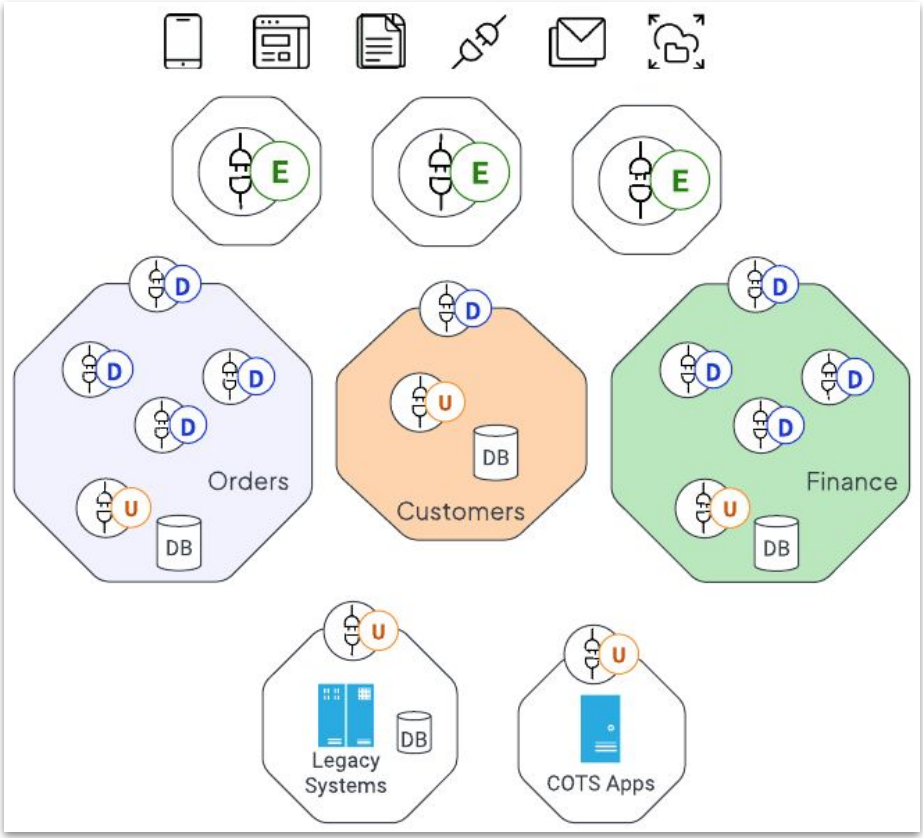
- Cell is a collection of one or more components (APIs)
- Designed, implemented, deployed and managed together
- Each cell has a capability and it is network accessible through APIs
- APIs used for
  - Inter-cell communication
  - Intra-cell communication
- Isolation of cells can be physical or virtual (VMs, Containers, etc.)



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

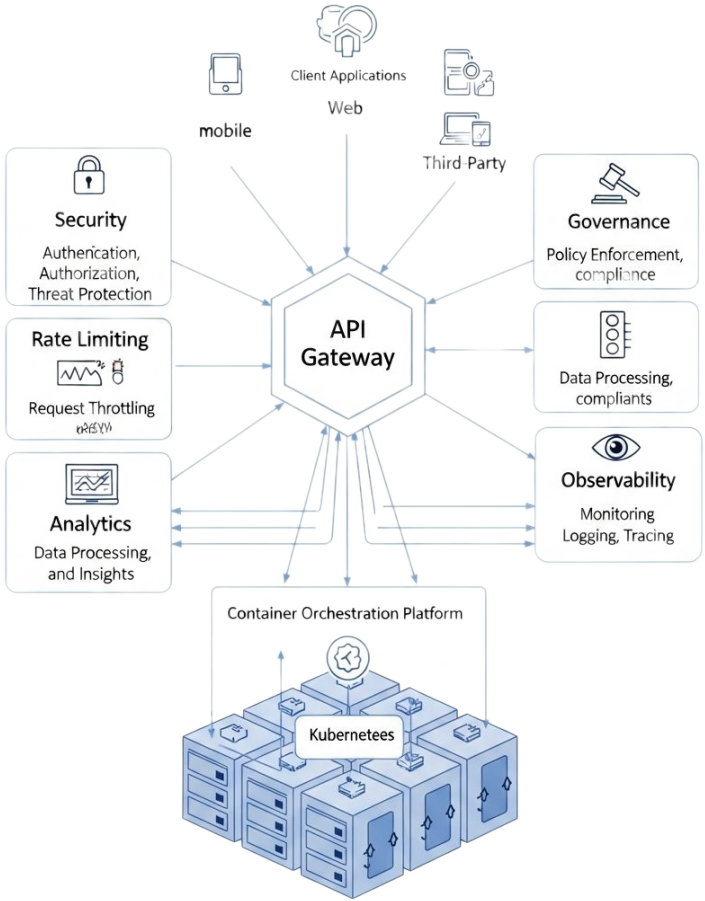
Cell-based API Architecture

- Cells can be versioned
- Deploying all components in a cell can be automated (CI/CD)
- Increased agility and isolation (vs Layered, Segmented)
  - Component level iteration
  - Cell Level iteration
  - Architecture level iteration
- Cells can be created by grouping existing (Micro)services
- A team can own one or more cells



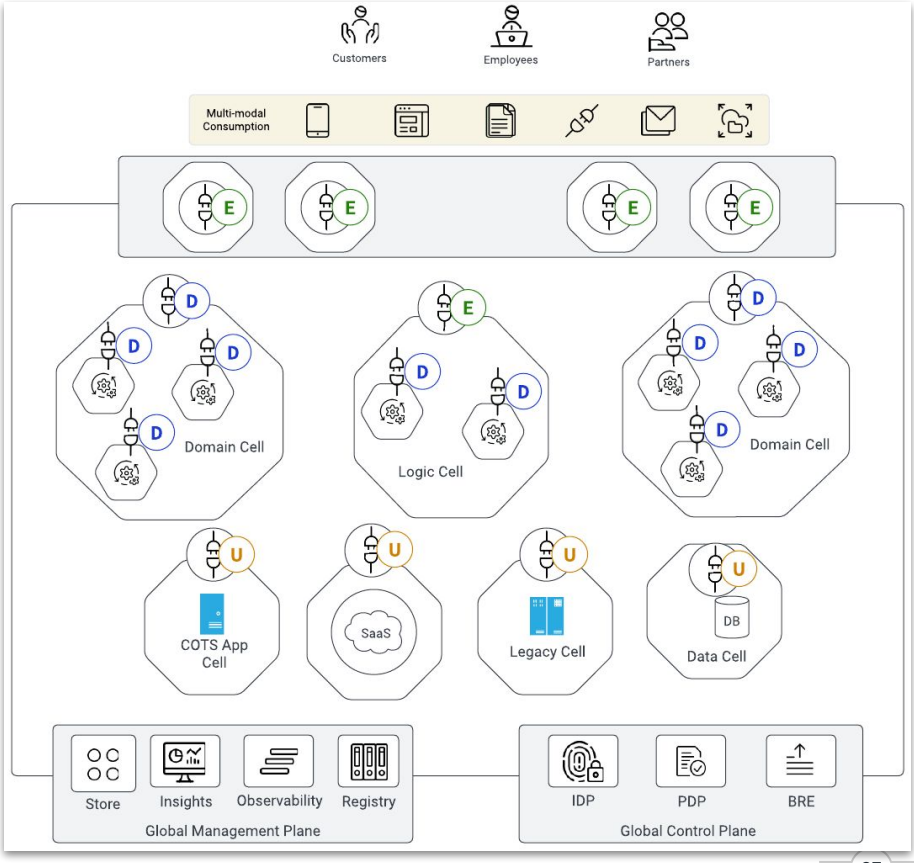
Cross-cutting Concerns

- Security
- Governance
- Rate Limiting
- Observability
- Insights and Analytics
- Deployment Architecture



Implementing Cross Cutting Concerns

- Most of these can be implemented at a global level
- Some such as security and rate limiting may be implemented locally (i.e. within a cell)
- Hybrid is also a possibility
- Modernize processes such as how APIs, cells, features are versioned and deployed
- *Cloud-Native API Architecture*



Key Takeaways

- Modern organizations need Modern Enterprise Architectures
- They allow you to adopt new tech, new org structures and processes
- Empowers teams to be decentralized and be more agile
- Start simple and adopt new EA as you grow

  (Layered -> Layered + MSA -> Segmented -> Cell-based)
- It’s not a one time decision, but a process
- All API Architectures can be implemented using WSO2

  (If you need help, please talk to us)
- You can also go platformless with Bijira !

Question Time!


Thank you!
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