



Serving Millions of Customers with Cloud Native and DevSecOps

Cloud Native Computing Foundation Webinar
July 15, 2020



About the speakers



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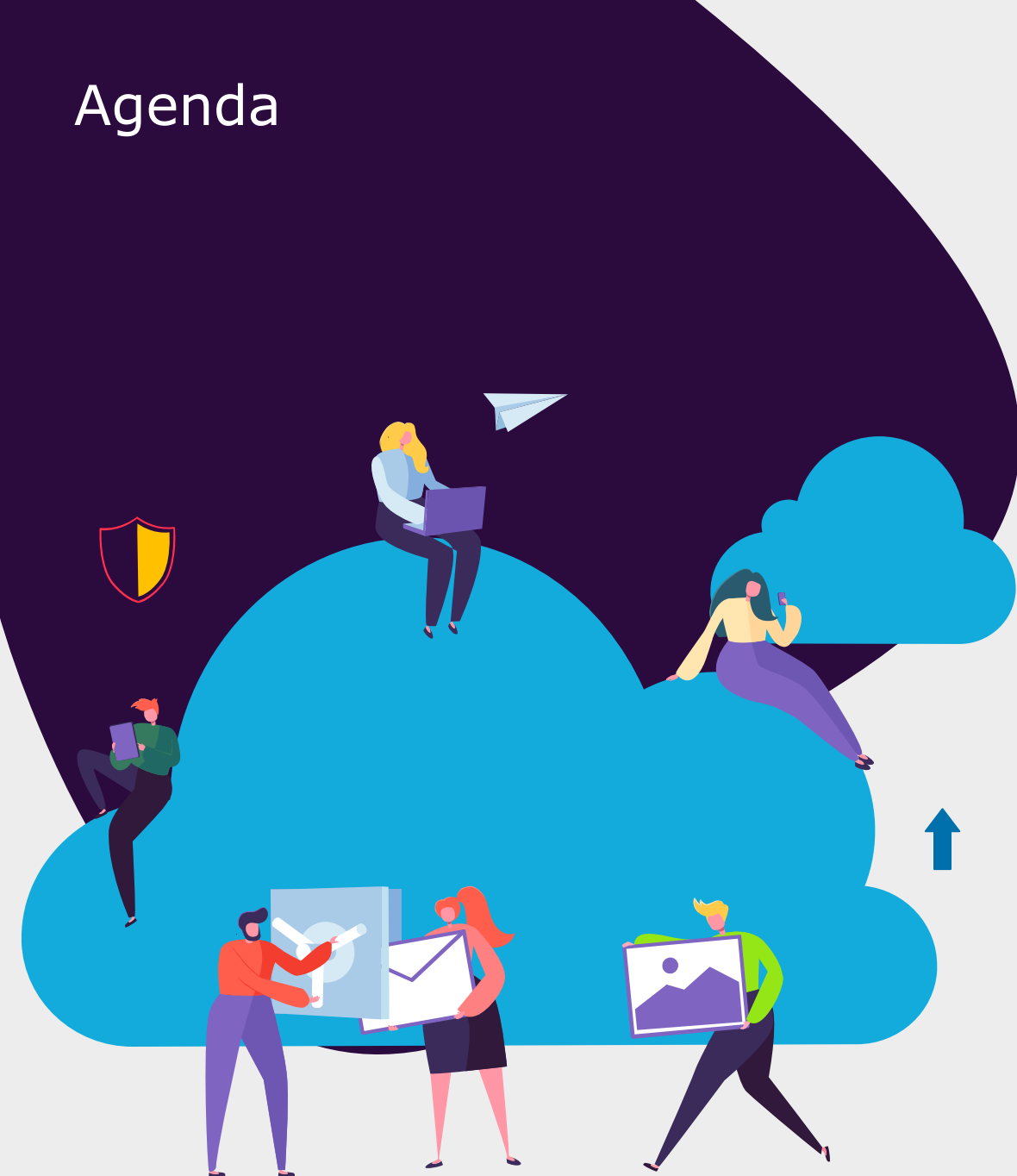
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Agenda



Customer

Challenge

Solution

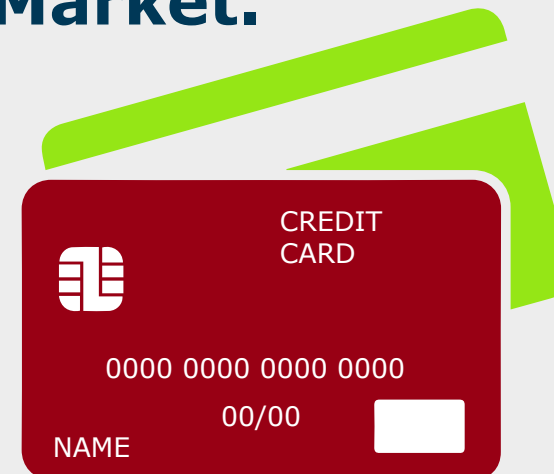
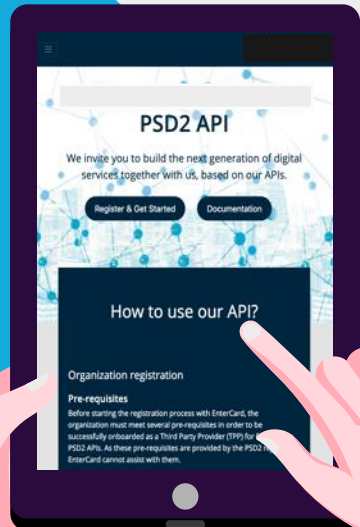
Results

The Customer

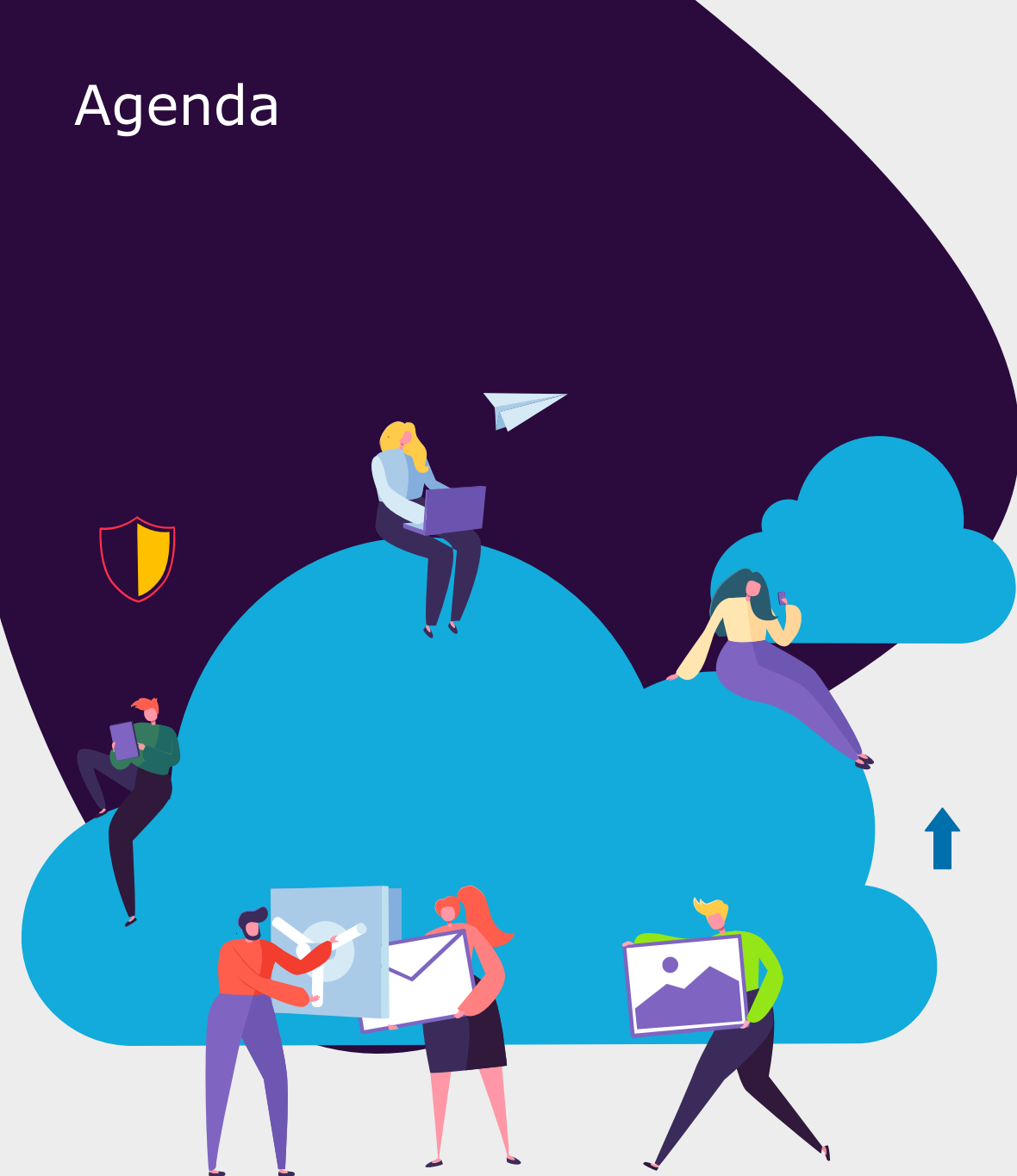
One of Scandinavia's leading credit market companies with over 2 million customers in three markets.

Present in Norway, Sweden and Denmark and have 450 dedicated employees.

Making up 20% of the Credit Card Scandinavian Market.



Agenda



Challenge

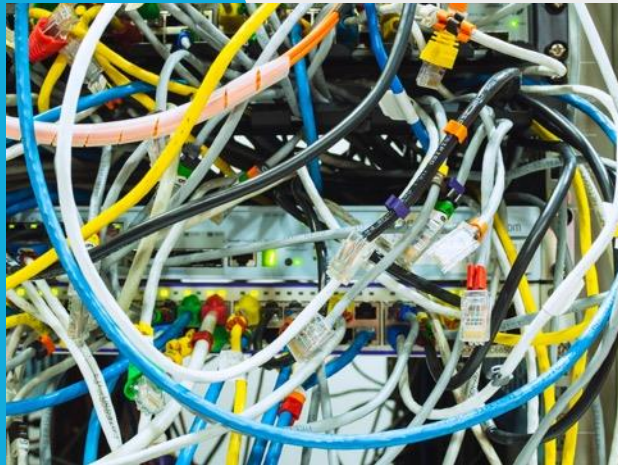
Challenges



Compliance Deadlines



Open Banking Strategy



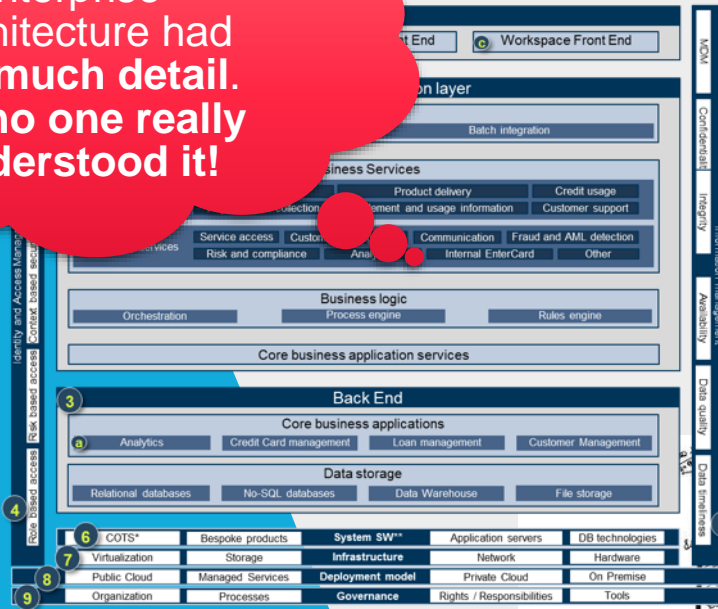
Aging Infrastructure



Legacy Architecture

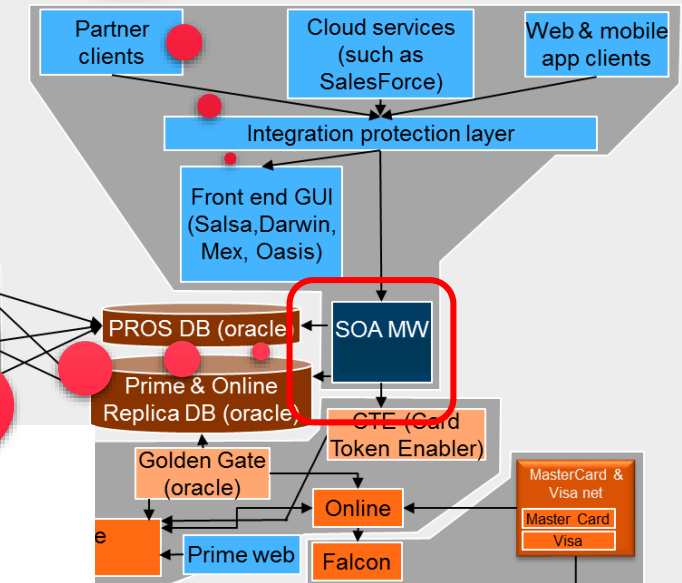
Key Challenges in Architecture

Enterprise Architecture had too much detail. But no one really understood it!



No one really had good understanding of the entire IT Landscape and available capabilities

No clear capabilities to deliver, secure and manage REST APIs



"All eggs in one basket" and "no change" culture no longer helping the business.

Disconnect between Conceptual and Technical Architectures made it extremely difficult to define future roadmaps

Must-have Non-Functional Requirements



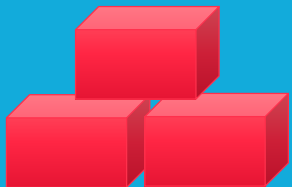
Speed to Market

- Quick to build, change and deploy
- Rapidly responsive to business needs
- API-based



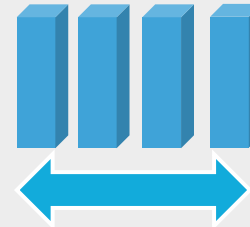
Performance / Stability

- Stable and highly available
- Able to handle large volumes
- Sub-500ms API response times
- Monitoring framework with notifications and eventing



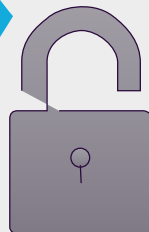
Modular & Decoupled

- Architecture based on microservices and event streaming
- Services grouped by business capability
- Loosely couple different capabilities



Scalable

- Elastically scalable on demand
- Hybrid. Able to run on-premise or cloud
- Configurable to accommodate future services

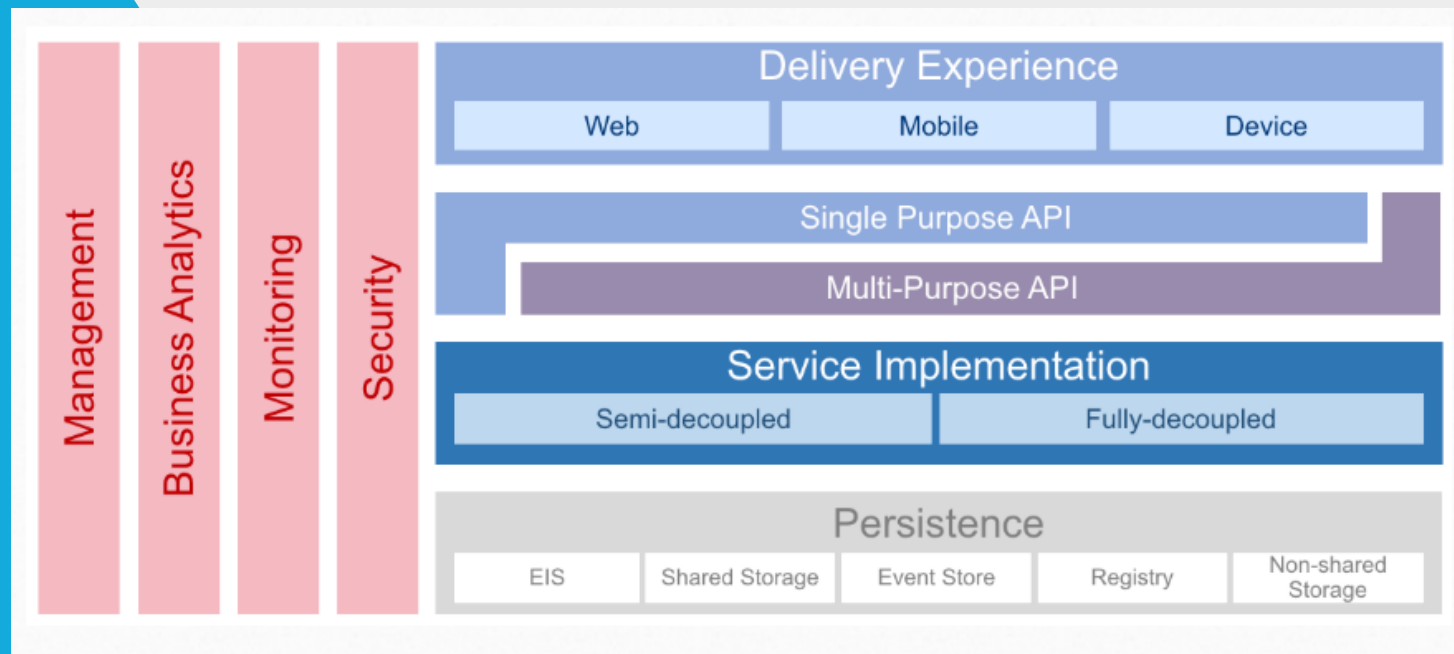


Secure

- Banking-grade security
- Lightweight, modern authorisation protocol
- Integration with third party OAuth server

Agile Innovation Platform – The basis

Embracing the core concepts of omesa.io, Capgemini Agile Innovation Platform is a platform of tools and accelerators which enable architects to design elegant solutions with the primary aim of delivering business benefit.

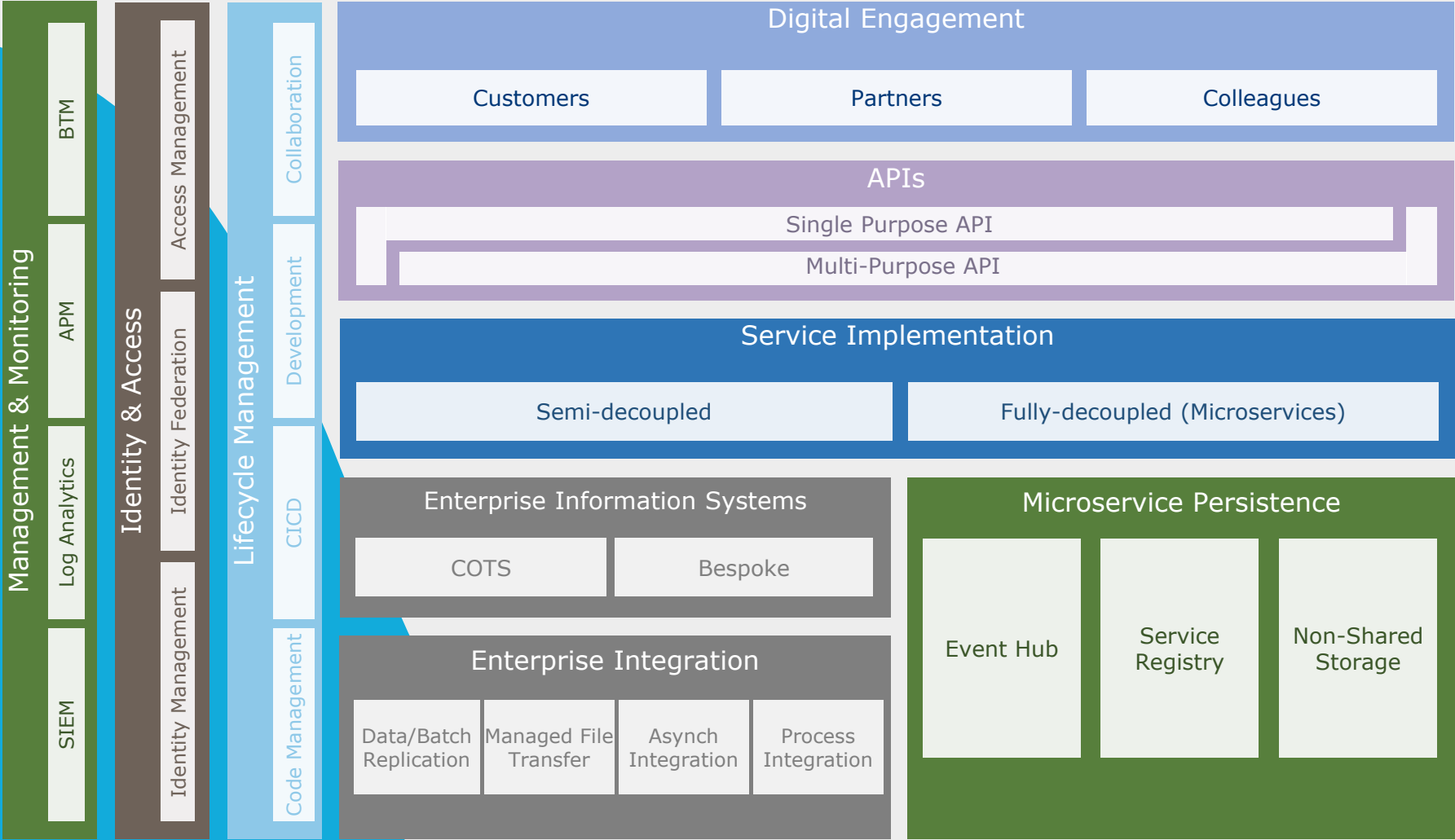


AIP supports –

- Microservice Architecture
- Digital Transformation
- Cloud-Native development
- Modern App Development
- Integration with on-premise and legacy solutions
- Application Pace Layering (Gartner)

Capgemini Agile Innovation Platform ***blends legacy/proprietary*** technology with ***new/Open Source*** technology in the right combination for the target solution.

Agile Innovation Platform – The evolution

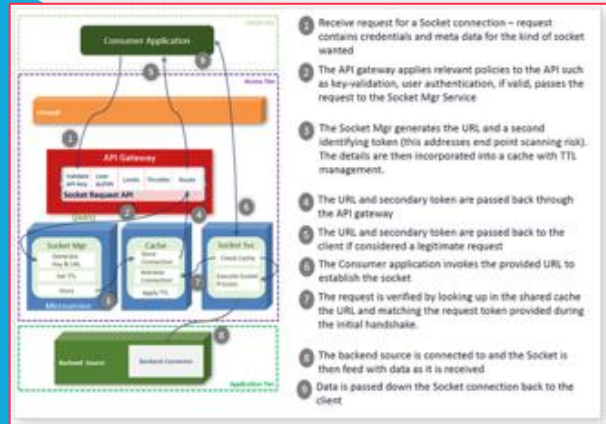


The first step was to re-define the Enterprise Architecture into an API-led architecture based on OMESA.IO



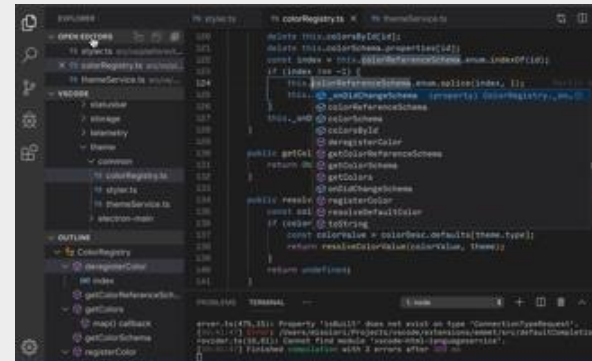
Capgemini Accelerators

Patterns



- Patterns for globalization
- Documented patterns to address particular requirements
- Design guidelines – e.g. Technology selection
- NFR Different approaches

Code



Code, ranging from...

- Terraform Templates
- Code framework generators
- Continuous Delivery build and deploy pipelines
- Support tools

Processes



Operational Processes & Monitoring:

- Standardized monitoring,
- Tools to support operational processes
- Operational guidance

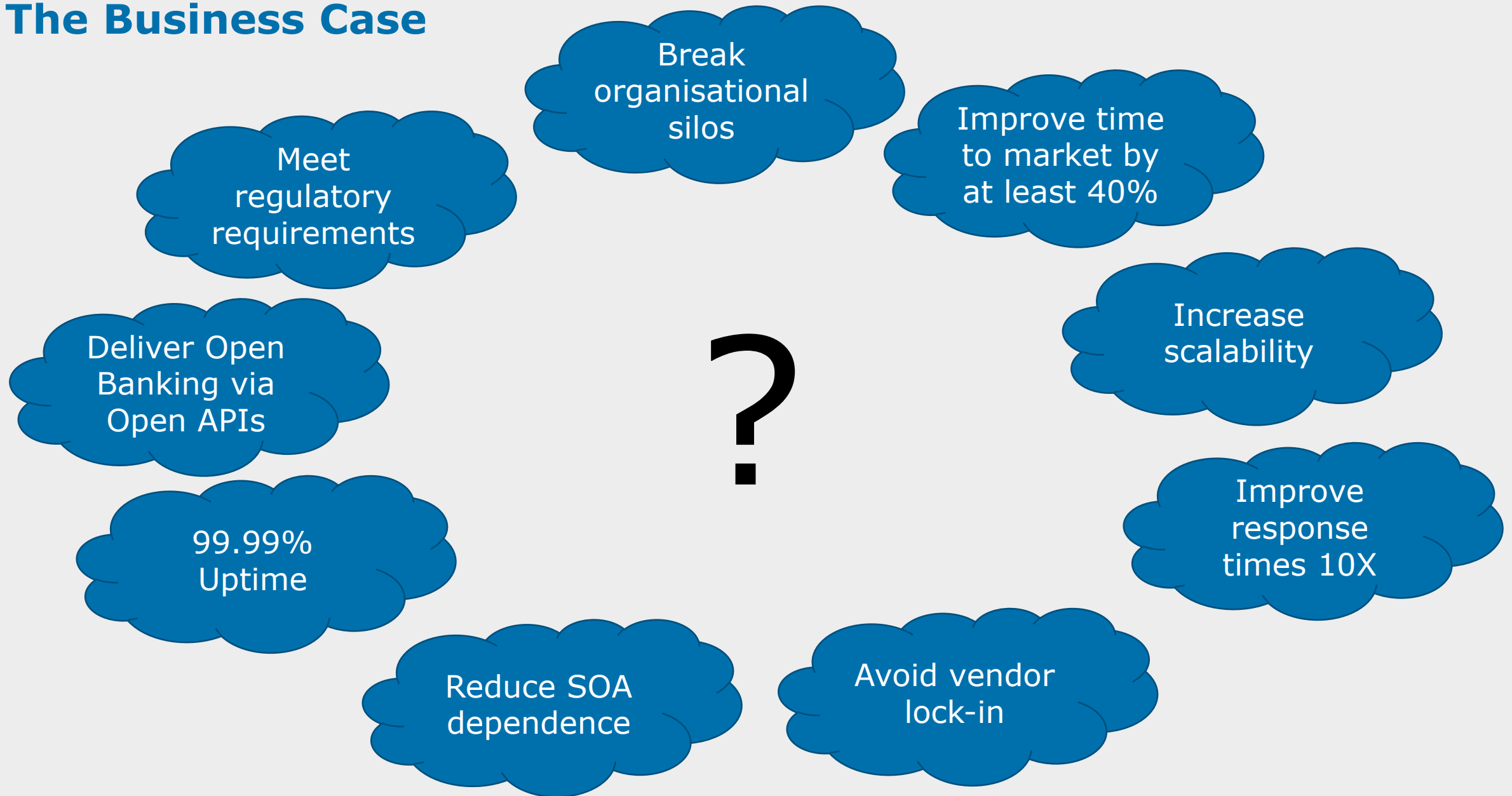
Why Oracle?

- CNCF Platinum member
- Linux Foundation Platinum member
- Open Container Initiative (OCI) Member
- Eclipse Foundation
- Sponsor & contributor to key conferences
- DockerCon, Kubecon, CoreOS Fest, others

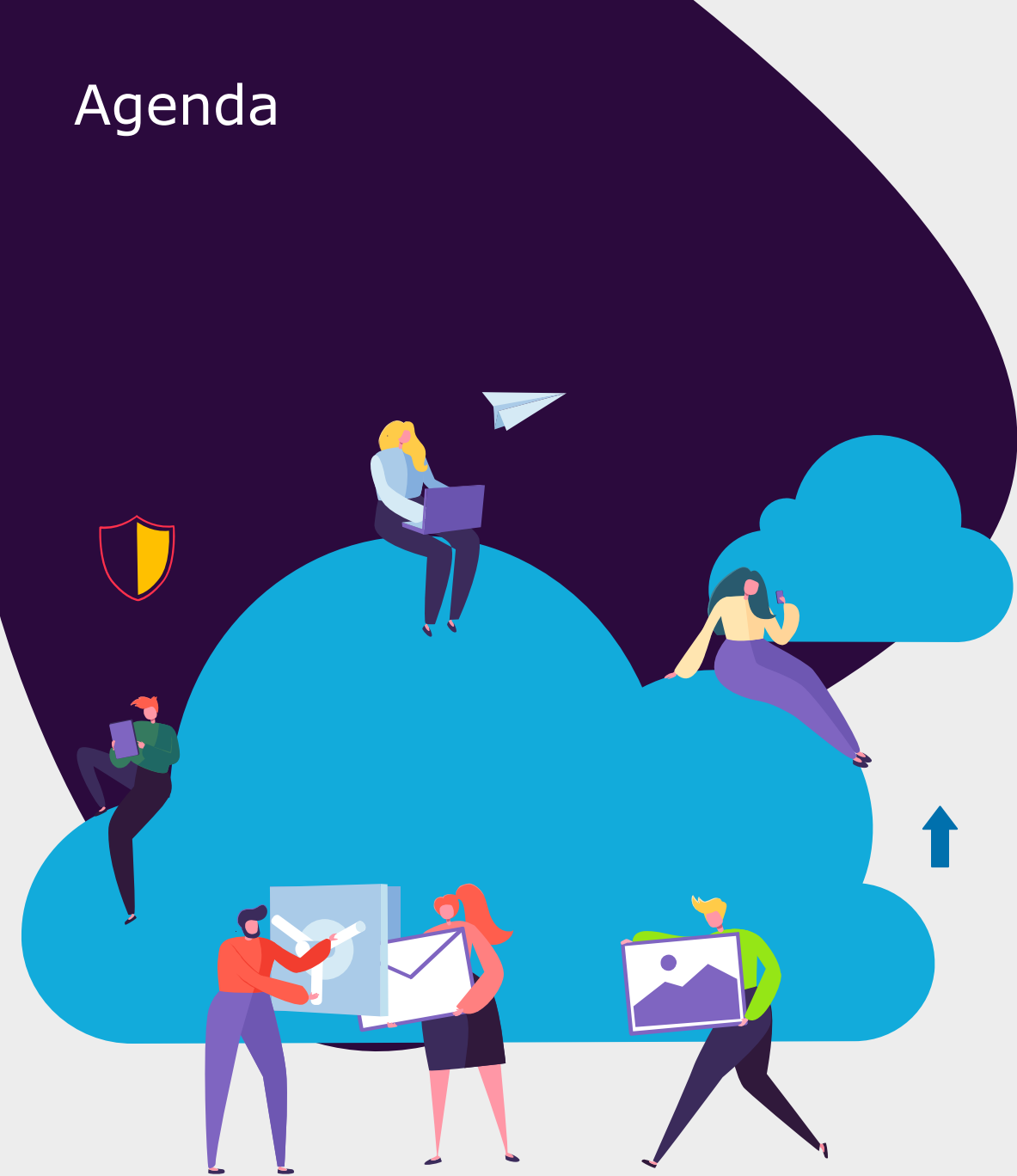
- Oracle Container Engine for Kubernetes (OKE)
- Oracle Functions (Fn Project)
- Oracle Blockchain Cloud Service (Hyperledger Fabric)
- Oracle Event Hub (Apache Kafka)
- MySQL Cloud Service
- Big Data - Hadoop and Spark



The Business Case

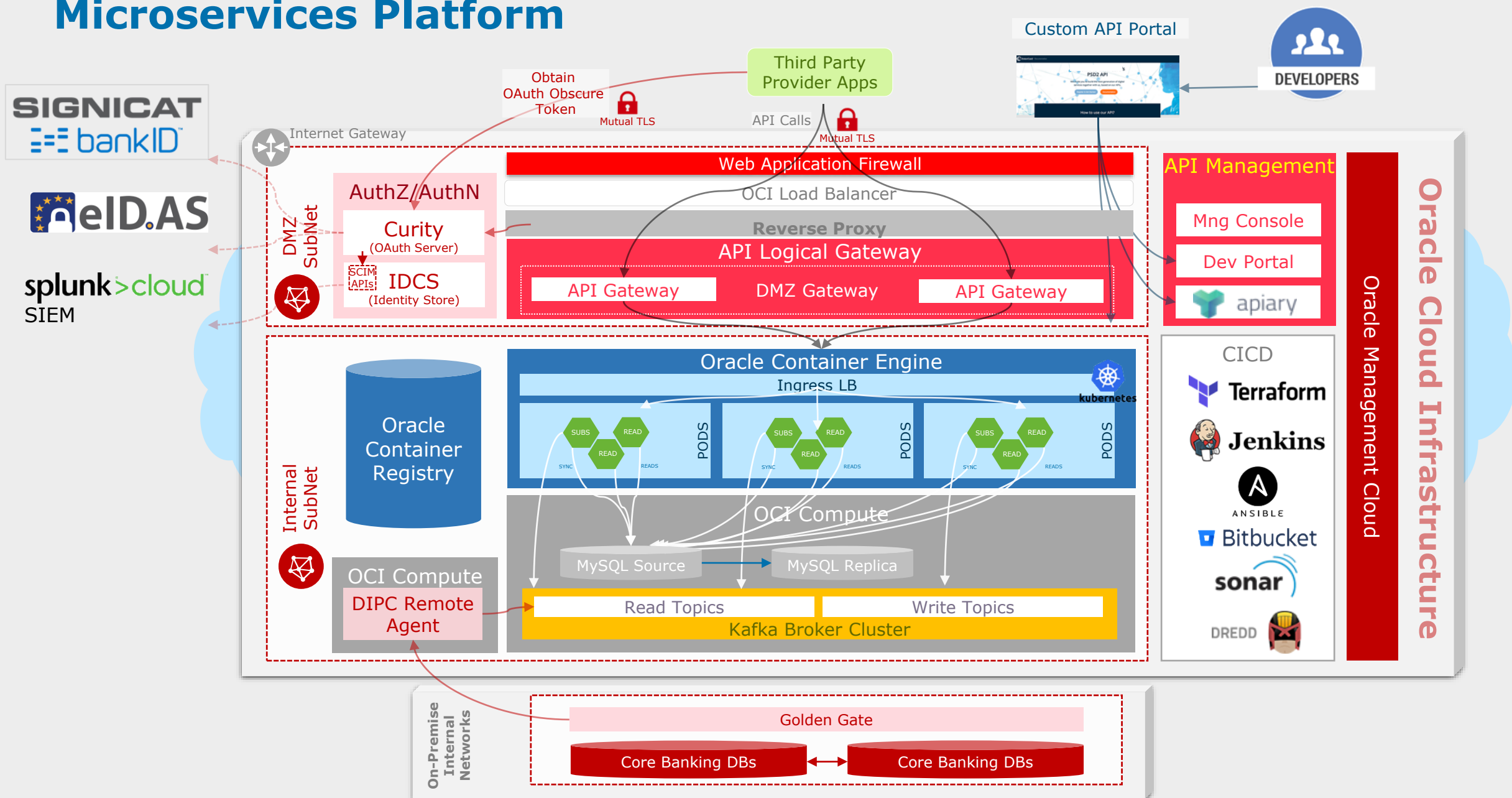


Agenda



Solution

Microservices Platform

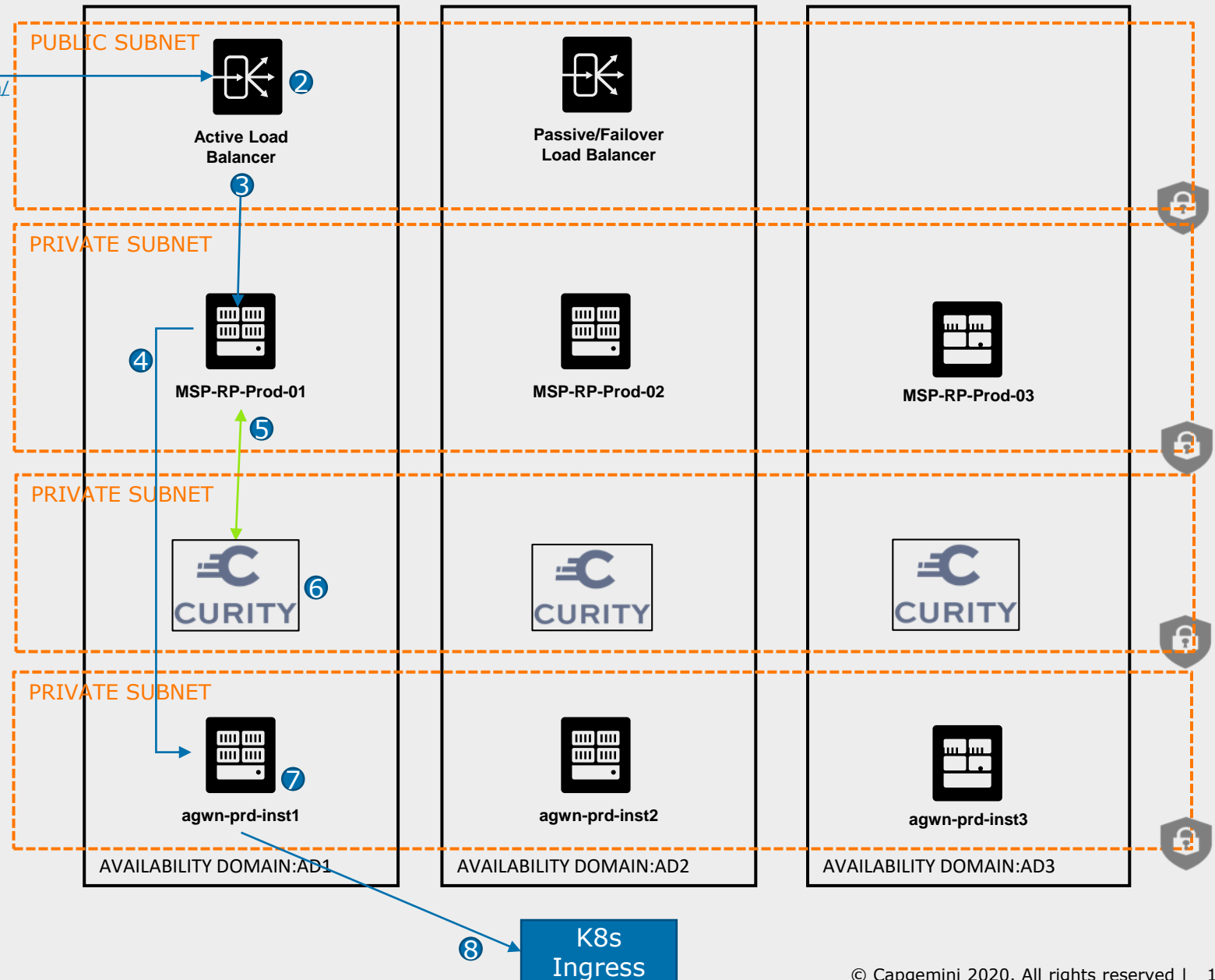


API Request Flow – LB/Mutual TLS or Curity/API Gateway Node



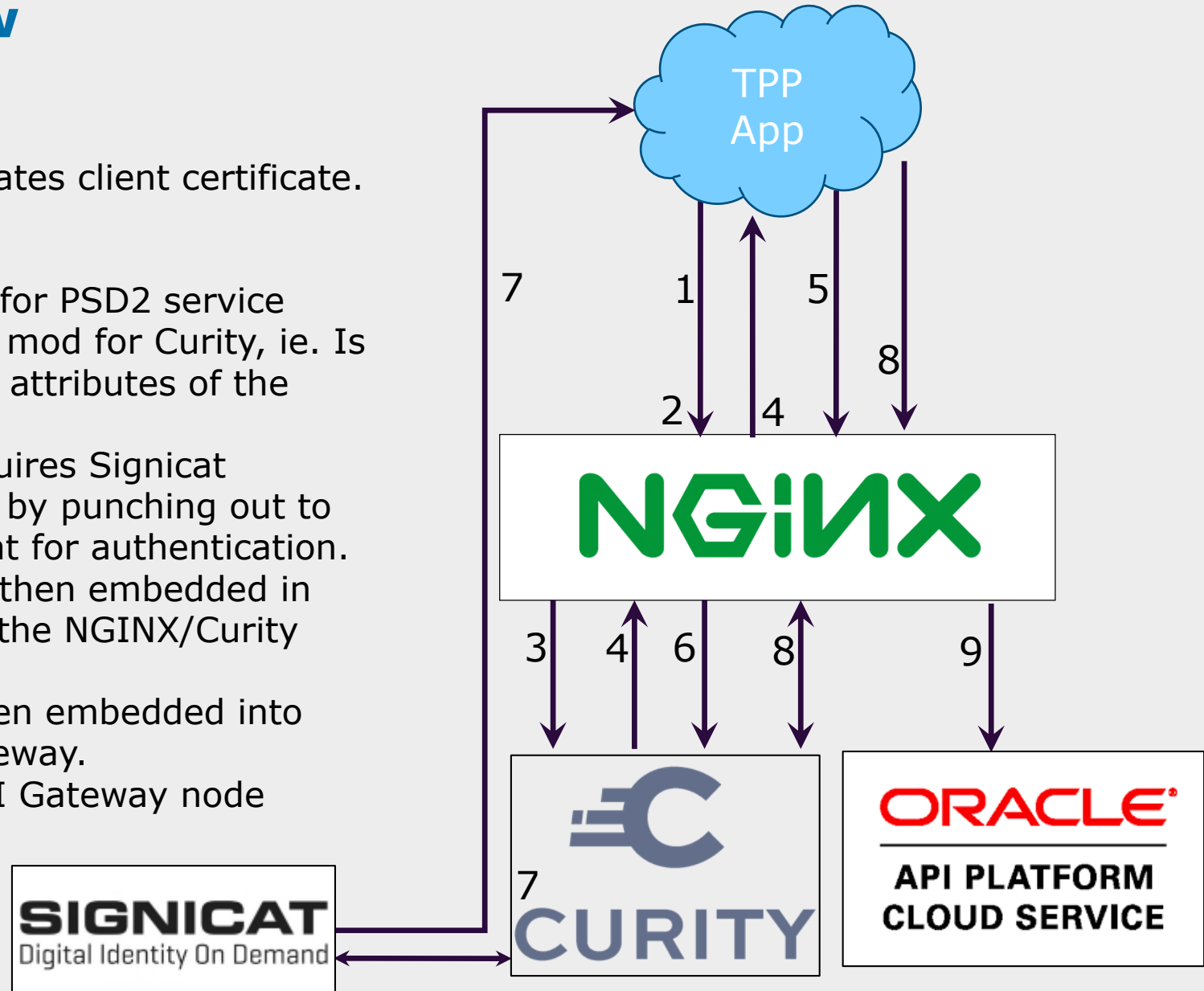
API Traffic

1. Request from external API consumer to public IP is routed to Oracle Load Balancer.
2. Load Balancer configured as pass through for 3 back ends.
3. Traffic sent via round robin to Mutual TLS/Reverse Proxies.
4. Reverse proxies authenticate request through use of Mutual TLS certificate and serial number check or forwarded to Curity for authentication/authorisation (5). The authentication mechanism is determined via URL path rules in the Reverse Proxy configuration
5. Request sent to Curity for token authorisation flow (see next slide)
6. If authentication success, then request is forwarded to the API Gateway Nodes via round robin.
7. API Gateway node receives the request, checks whether API is deployed and applies policies as applicable.
8. Request is forwarded onto the Kubernetes Ingress service to send the request onto the Micro Service



Runtime authorisation flow

1. API request from TPP
2. Mutual TLS termination. NGINX validates client certificate.
3. OAUTH token requested
4. OAUTH token returned
5. API call with OAUTH token in header for PSD2 service
6. Token introspection call using NGINX mod for Curity, ie. Is this a valid token and what are some attributes of the caller?
7. Validate token. If the service call requires Signicat authentication, then Curity does that by punching out to Signicat. User is redirected to Signicat for authentication. A certified and signed SAML token is then embedded in the user request that is validated by the NGINX/Curity Authenticator.
8. Validated requested as the SAML token embedded into JWT and forwarded onto the API Gateway.
9. Original API request forwarded to API Gateway node



Data Integration Platform Cloud - OGG for Big Data

➔ Realtime Data replication to Kafka via DIPC Remote Agent running OGG Big Data



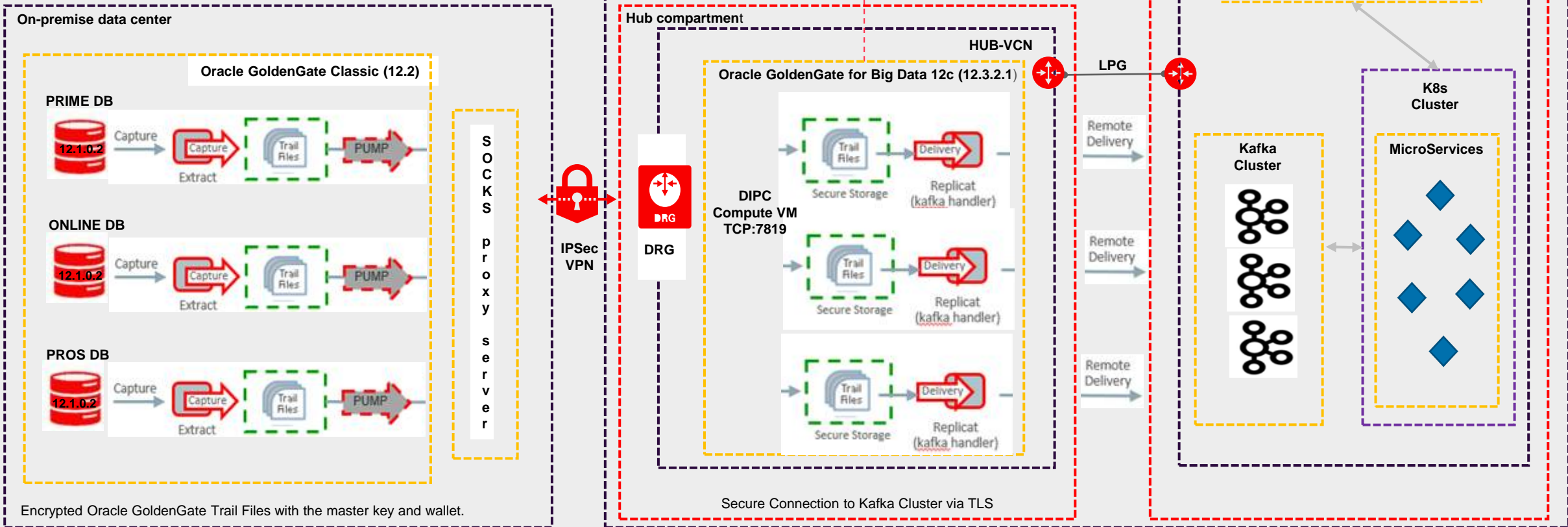
Local Peering Gateway (LPG)



IPSec VPN



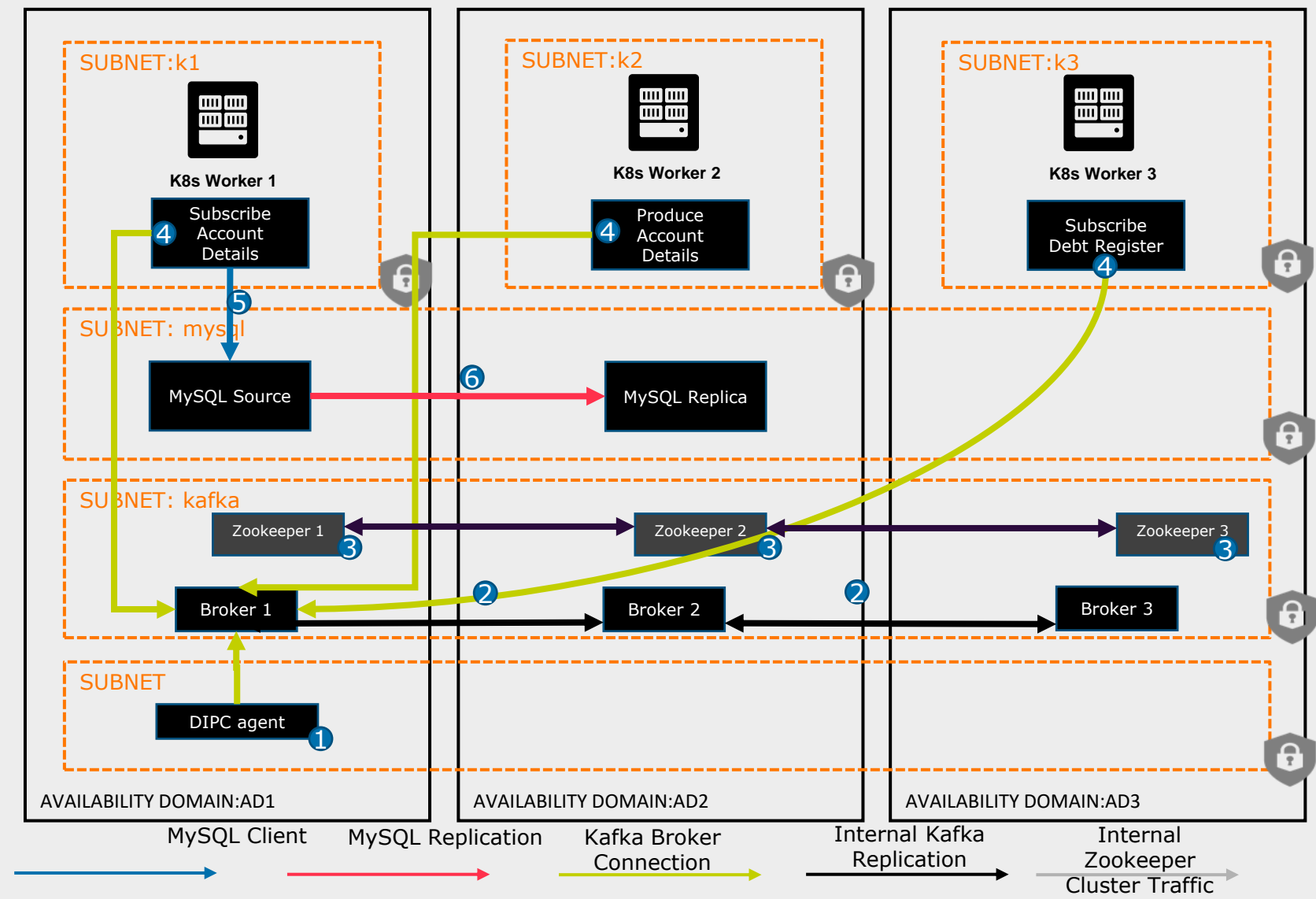
Dynamic Routing Gateway



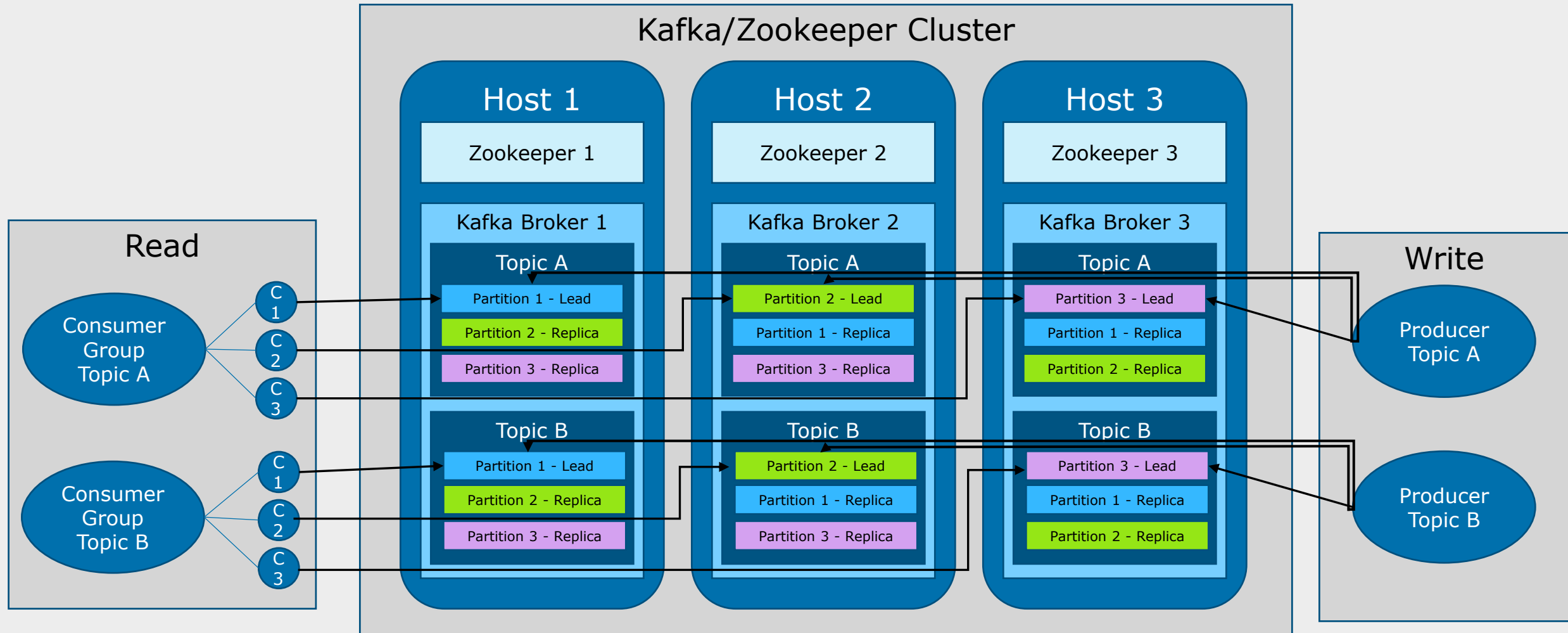
Kafka Data Flow

Microservice Access to MySQL

1. DIPC agent Producer sends data to Transactional Kafka Topic
2. Kafka identifies changes and replicates to replicas on other Kafka Brokers
3. Zookeeper keeps a record of the Broker, Topics, offsets and consumer status for the local Broker and shares this with the Zookeeper cluster
4. MS Subscriber(Consumer)/Producers read/write data from Transactional Kafka Topic respectively
5. MS Subscriber(Consumer) Account Details and inserts/updates into MySQL Master
6. MySQL Replica connection to Source requests change log details and applies changes to the Replica DB

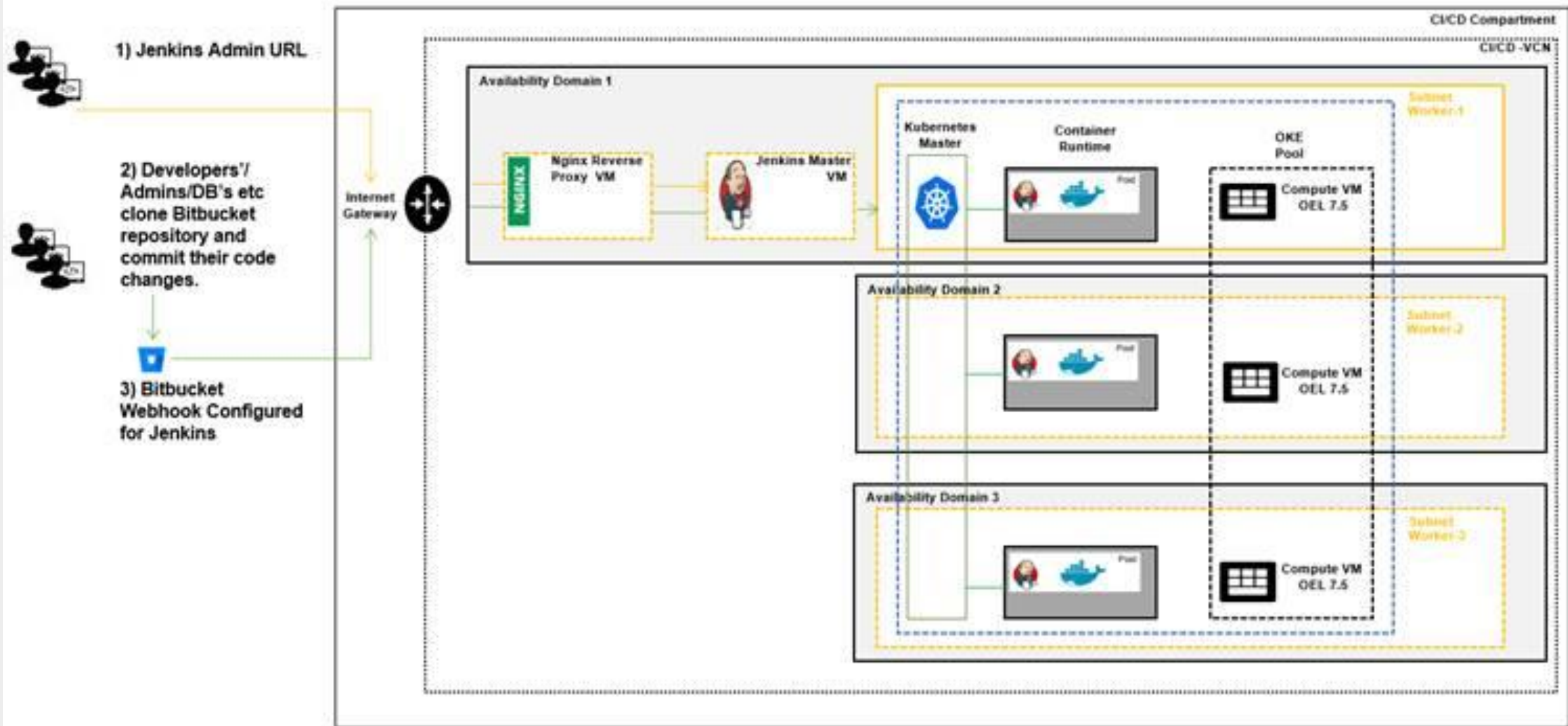


Kafka Solution – Experience and Lessons Learned



- Lessons learned
 - Different configurations for different requirements
 - Parallelism has limitations

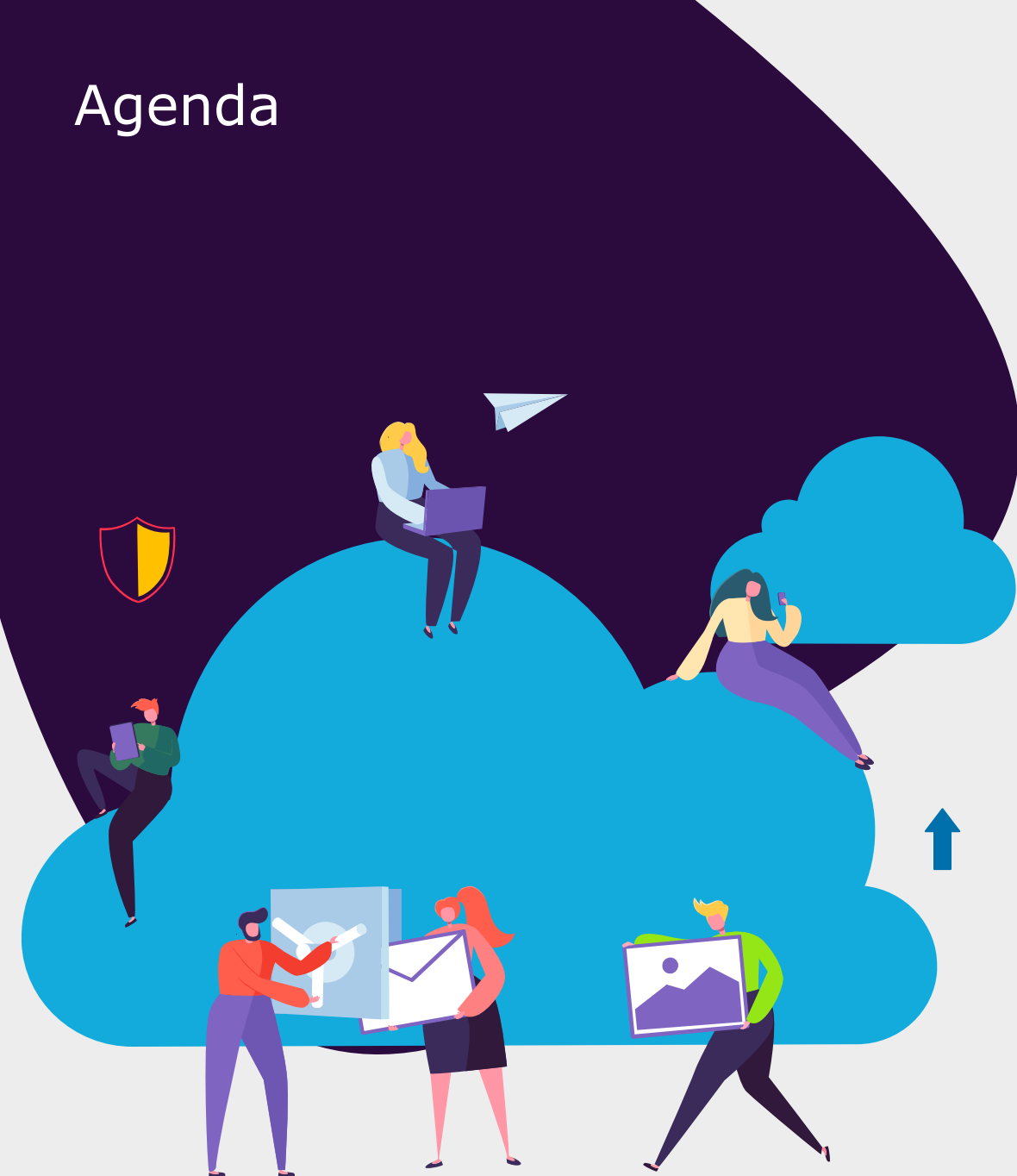
CI/CD Architecture on OCI



CI/CD for Infrastructure

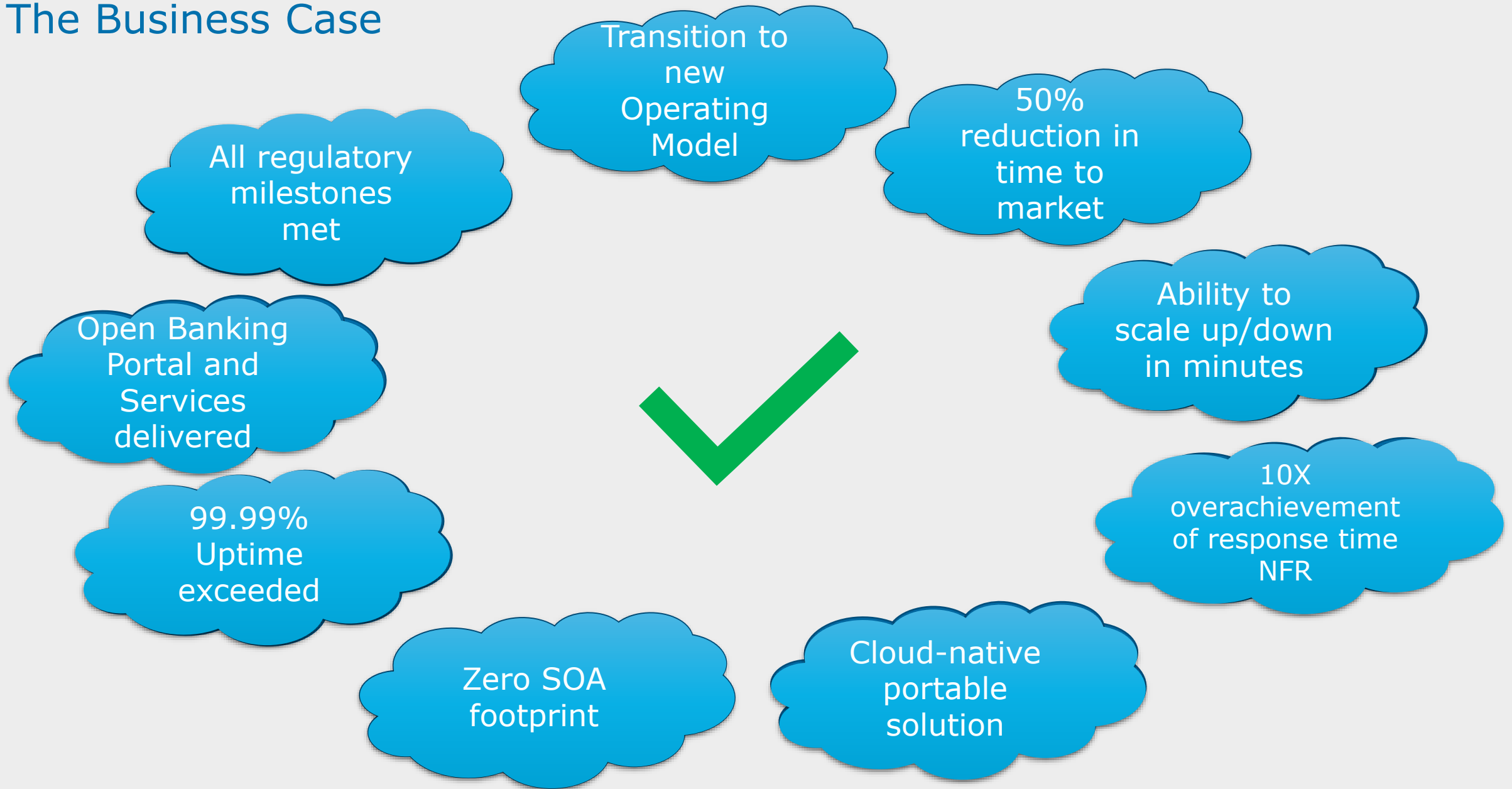
- Deployed Jenkins on Oracle Cloud Infrastructure (OCI) with Container Engine for Kubernetes (OKE) in Master/Worker Architecture
- Configured Jenkins with SSL Using Nginx Reverse Proxy
- Integrated Jenkins with Bitbucket Webhook
- Installed and Configured Terraform for provisioning infrastructure on Oracle Cloud Infrastructure (OCI). Used local-exec and remote-exec provisioners with terraform to configure VMs and software
- Used OCI Object Storage as backend to store the tfstate files

Agenda

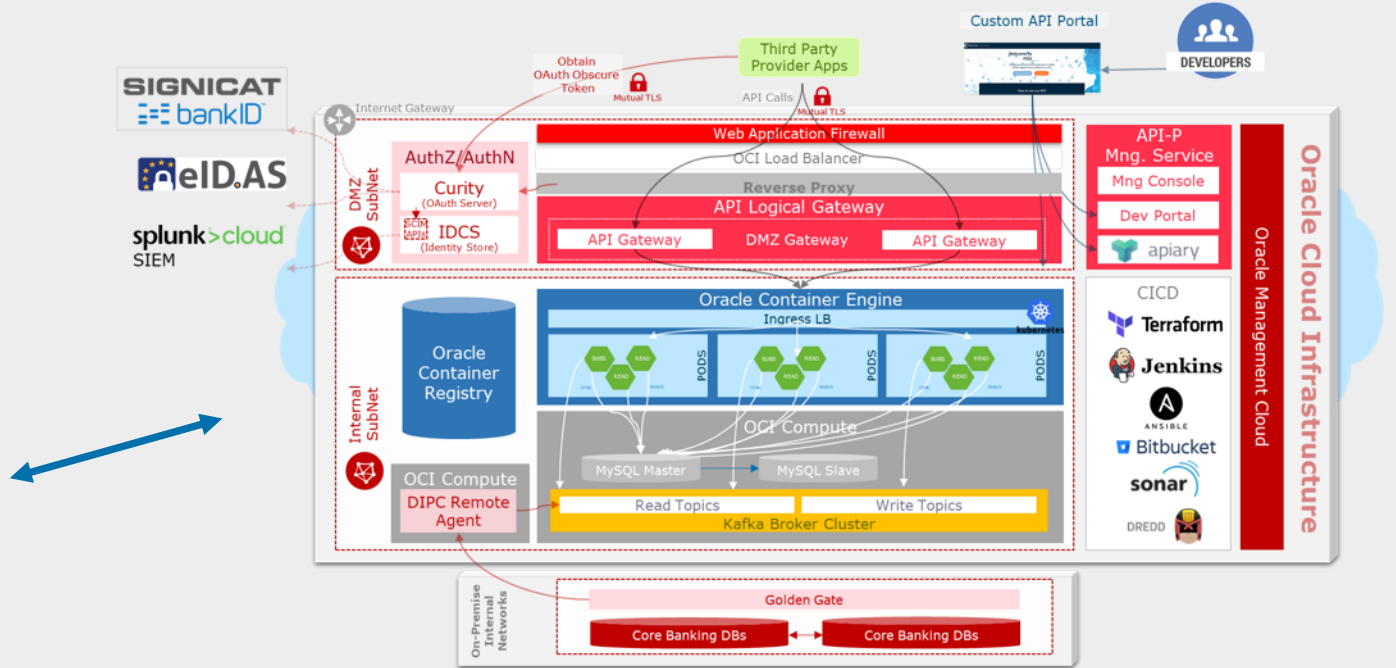
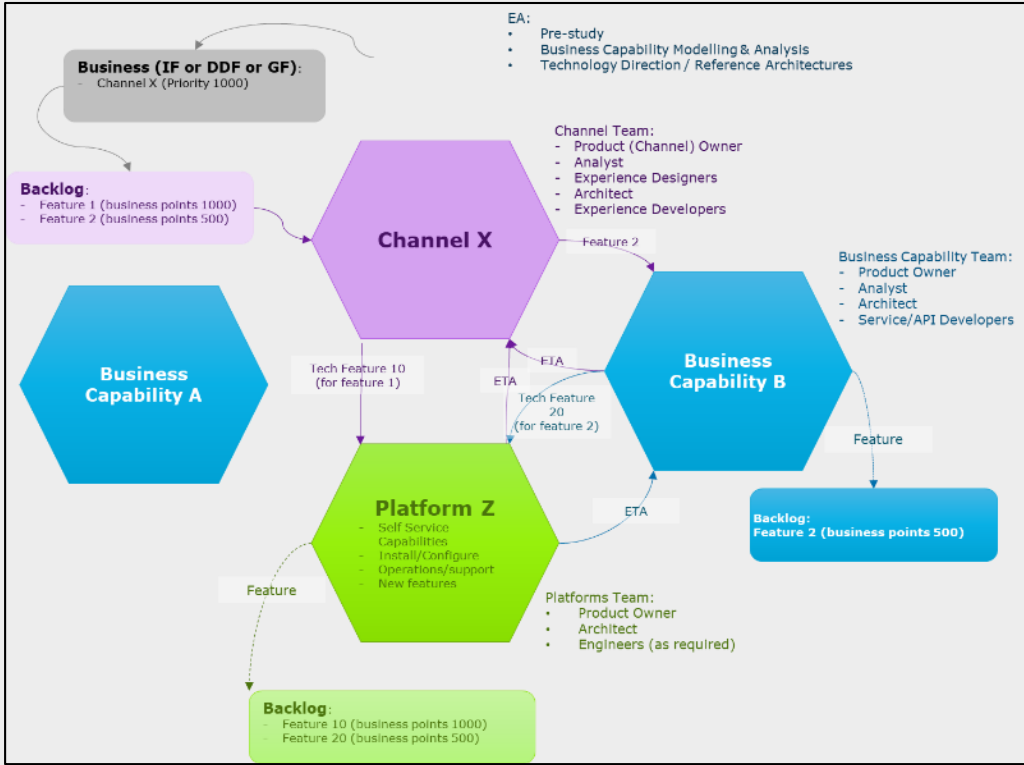


Results

The Business Case



Customer Open Banking Platform - Delivered



'I cannot stress enough the opportunity that lies in what this team has delivered. If we look past the undeniable and impressively better response times, we have provided Customer with flexibility to better organize and align its business around its APIs.'

'This is more than compliance, it is the ability to deliver automation, new business opportunities, new business models even, better and faster.'

Customer's Head of Digital Proposition & Design

Resources



Agile Innovation Platform

<https://cutt.ly/9ooB4CO>

ORACLE
Cloud

Free Tier

oracle.com/cloud/free

Learn more

oracle.com/cloud-native

A blue ribbon graphic with a 3D effect, featuring the text "THANK YOU!" in white, bold, italicized capital letters.

THANK YOU!

A red ribbon graphic with a 3D effect, featuring the text "THANK YOU!" in white, bold, italicized capital letters.

THANK YOU!