Multitenant SaaS applications using CAP

Alper Dedeoglu, Martin Frick SAP

April 14, 2023

Introduction

**SAP** **P** PLATFORM ADOPTION ADVISORY

Alper Dedeoglu

"Our mission is to make the SAP Business Technology Platform (BTP) the preferred choice for our customers and partners for integration, extension, and insights touching SAP apps and data."
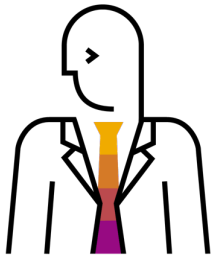
Martin Frick

Agenda

- SAP BTP multitenant SaaS applications

  - Basics, benefits and challenges of multitenancy

  - Data isolation and SAP multitenancy offerings

  - CAP as central part of multitenant SaaS apps

- "Sustainable SaaS" sample scenario

  - Kyma & Cloud Foundry architectures

  - Sample application deep dive

- Questions & Answers
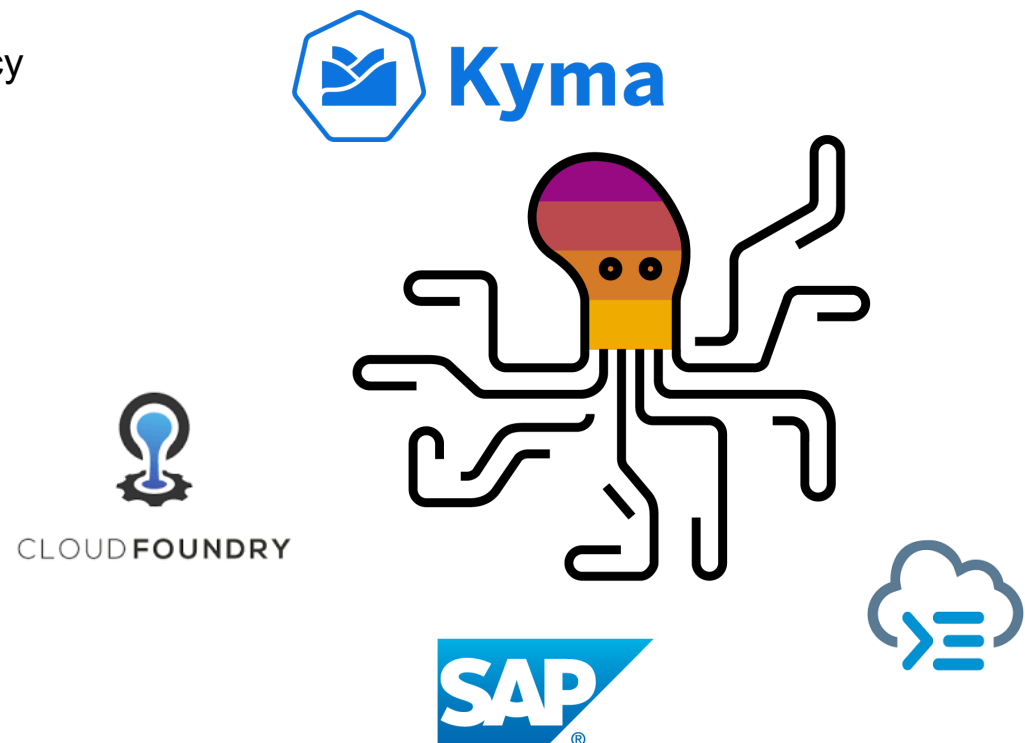
C-Level perspective

John Saver - CEO

*"We've migrated most of our teams to the Cloud, still our **TCO is way too high**! What are we doing wrong?"*
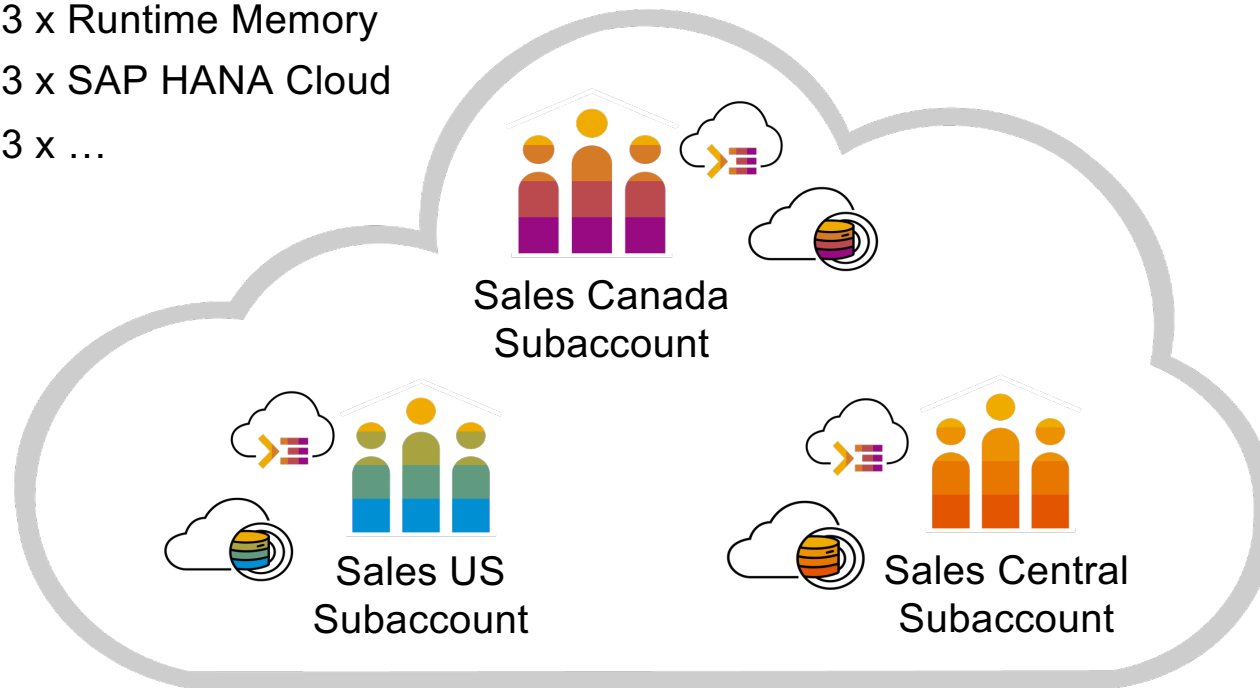
Sales Canada

Sales US

Sales Global

Amanda Chilling - CIO

*"I expected significantly reduced **maintenance** and **support efforts** by moving to the Cloud… Currently I see the exact opposite!"*

Under the hood issues

Similar application requirements but

3 x Runtime Memory

3 x SAP HANA Cloud

3 x …

Sales Canada
Subaccount

Sales US
Subaccount

Sales Central
Subaccount

Customers are…

- deploying and managing **similar application stacks** repeatedly for different teams, departments or legal entities in isolated subaccounts

- spending a lot of time and effort maintaining **costly resources, users** and **permissions** in an increasingly complex Global Account setup

SAP BTP multitenancy SaaS with CAP to the help

What is multitenant SaaS?

Multitenancy is an architecture pattern in which

- A **single instance** of an application serves **multiple customers**

- Each customer is called a **tenant**

- Multiple customers (tenants) use the same computing resources – **physically integrated but logically separated**

- Even though resources are shared, each tenant's **data and configuration are isolated**

Single Tenant

Customer 1 Customer 2 Customer 3

Multi-Tenant

Customer 1 Customer 2 Customer 3
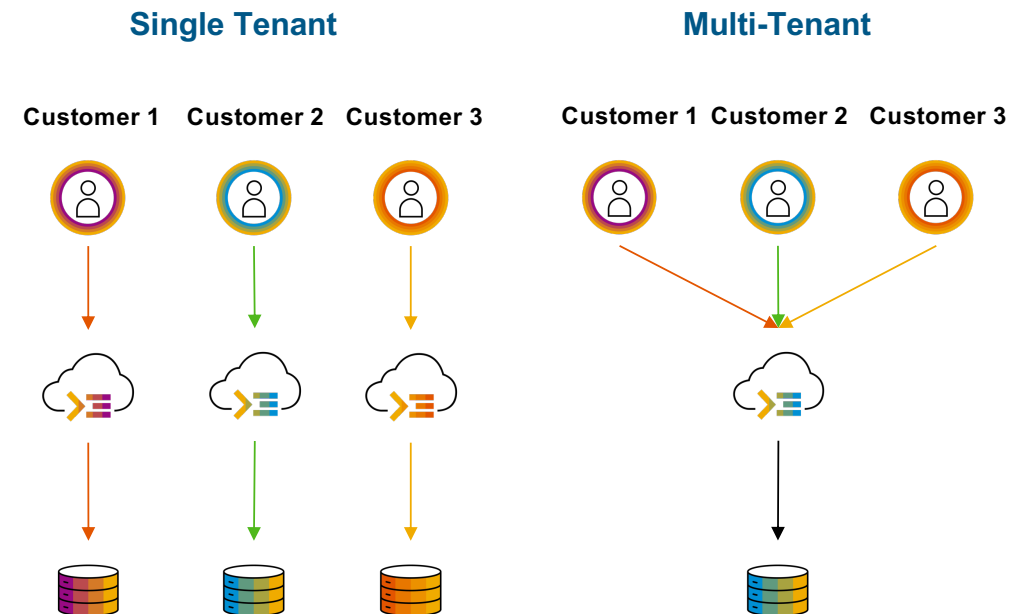
Multitenancy is commonly used in **Software as a Service (SaaS)** applications, where the provider offers the application as a service to multiple customers.

Multitenant application benefits

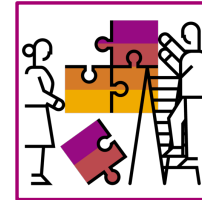Sharing of Resource

→ **Reduced Cost**

Effective Resource Usage

→ **Improved Scalability**

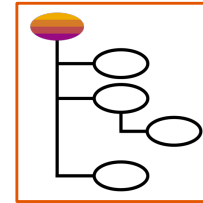Single Codebase & Infra

→ **Easier Maintenance**

Update in a single step

→ **Simplified Upgrade**
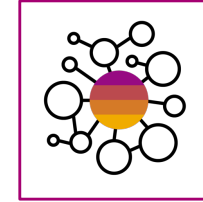
Multitenant application challenges

Ensure multitenancy,
availability and scalability

→ **Increased complexity**

Deal with the one has to fit
it all approach and limitations

→ **Less flexibility**

Meet diverse customer
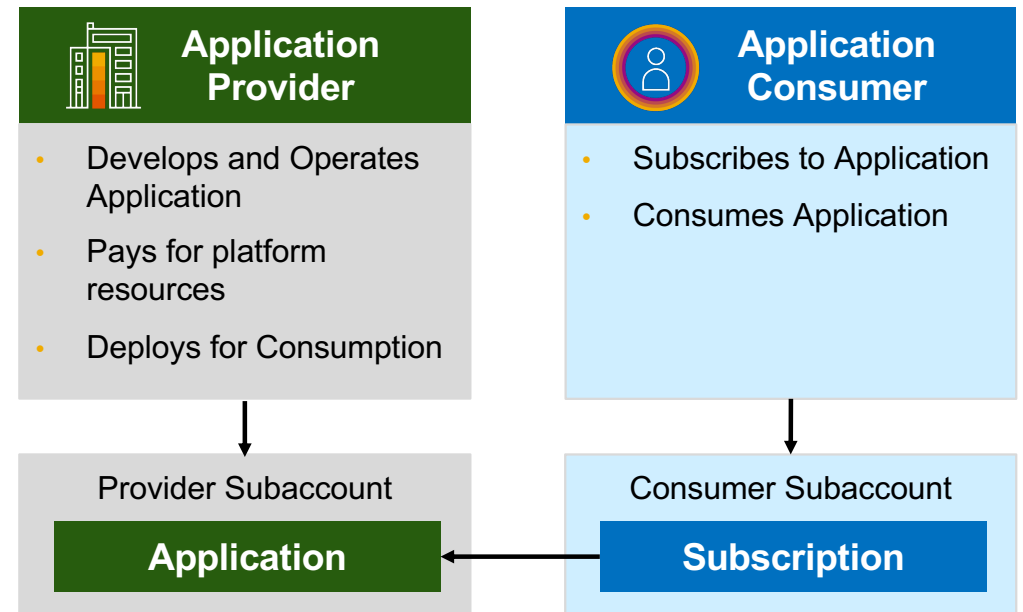data security requirements

→ **Regulatory challenges**

Handle complex data
management scenarios

→ **Integration efforts**

Multitenant applications on SAP BTP

A SaaS application provider must ensure that each SaaS customer

- Has a dedicated **consumer subaccount** in the application provider's global account

- Subscribes to the application running in a dedicated **provider subaccount** in the application provider's global account

- Receives a **dedicated URL** so that its business users can access the application

Application Provider
- Develops and Operates Application
- Pays for platform resources
- Deploys for Consumption

Application Consumer
- Subscribes to Application
- Consumes Application

Provider Subaccount

Application

Consumer Subaccount

Subscription

Subscriptions (1)	Instances (0)	Environments (0)

Application		Plan
Sustainable SaaS		default

Multitenancy for SAP Customers

"If we are able to offer our SaaS solutions to internal teams at scale, can we also license them to other interested companies?"
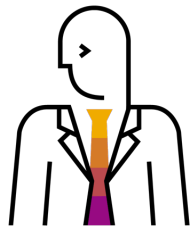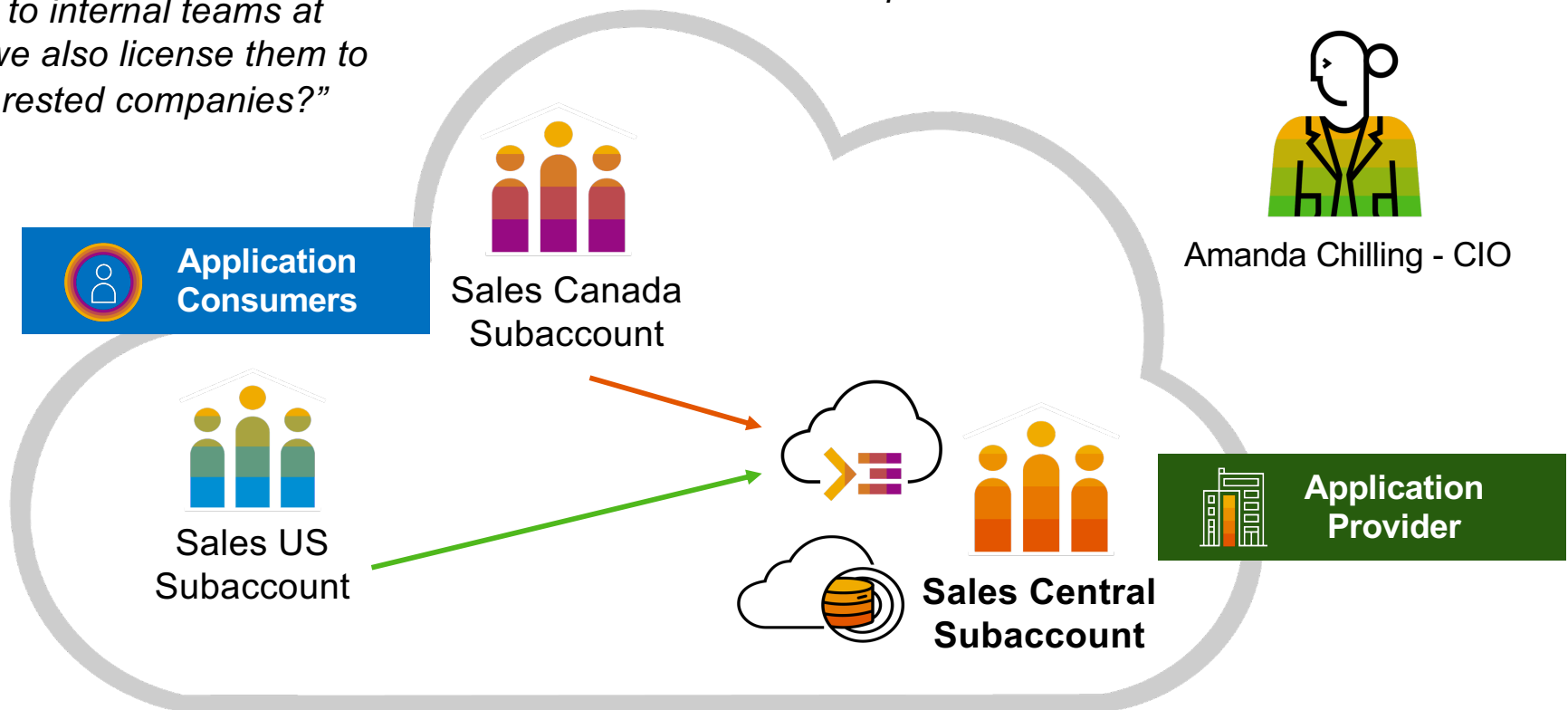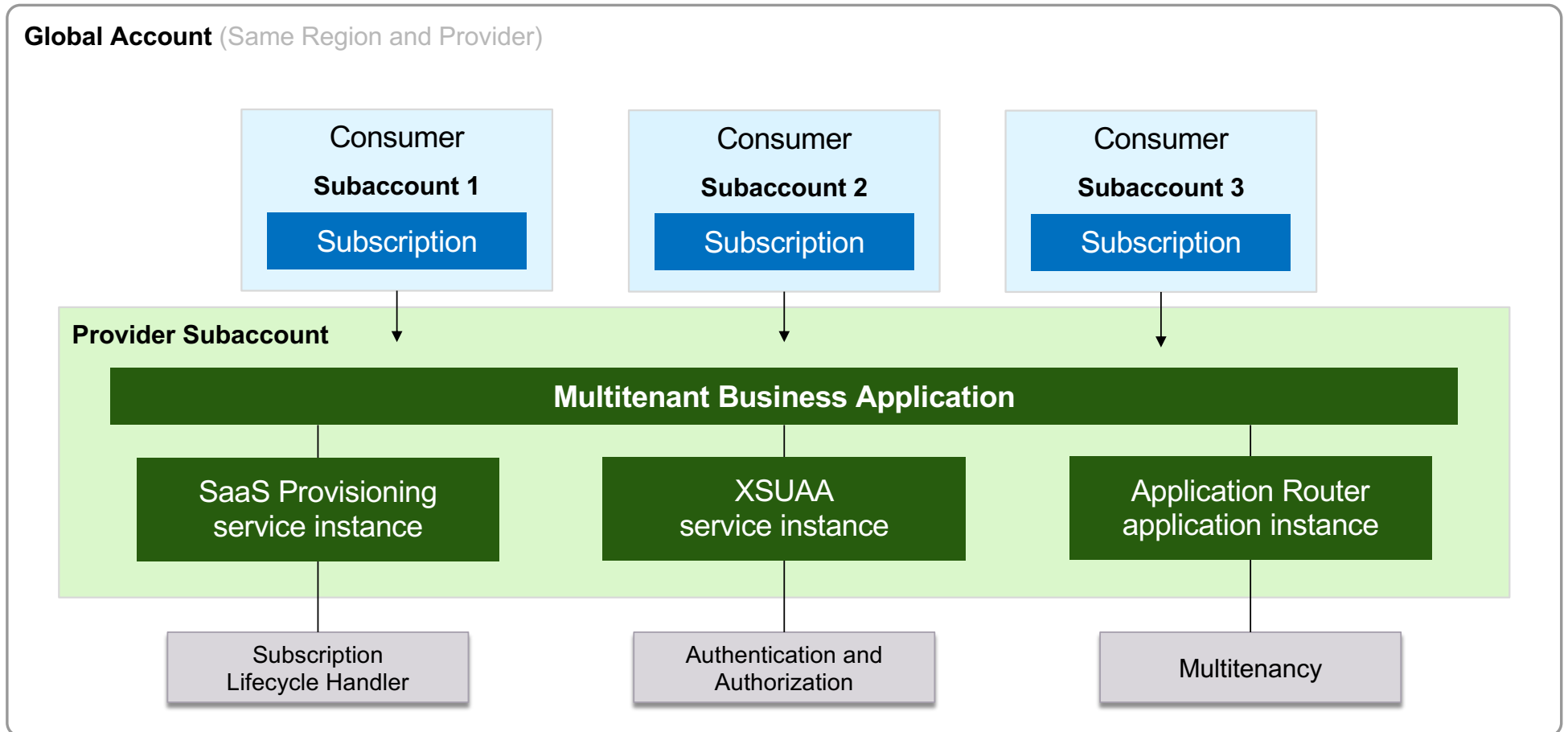
John Saver - CEO

*"Hosting most **apps centrally** and securely sharing resoures, significantly reduces our update and maintenance efforts!"*
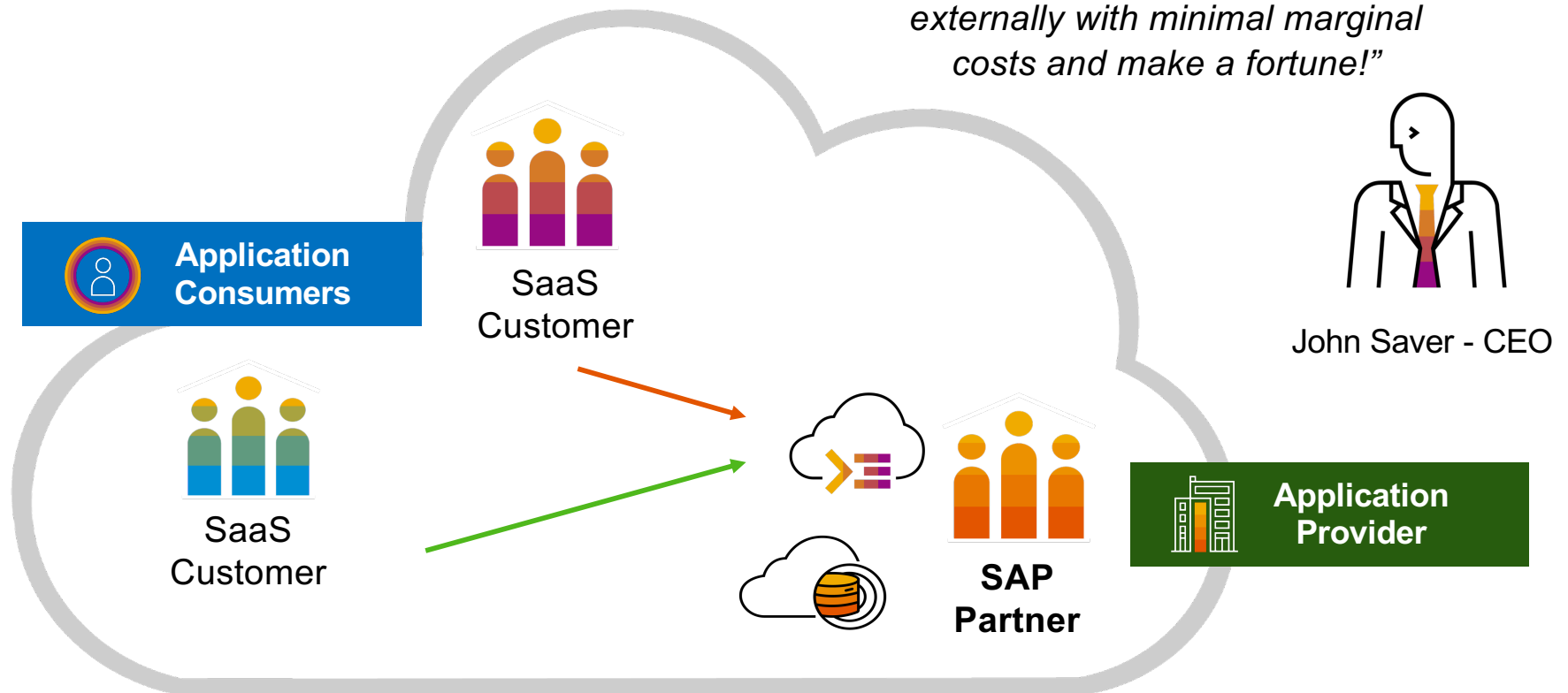
Amanda Chilling - CIO

Application Consumers

Sales Canada Subaccount

Sales US Subaccount

Sales Central Subaccount

Application Provider

Multitenant applications on SAP BTP

Global Account (Same Region and Provider)

Consumer
Subaccount 1
Subscription

Consumer
Subaccount 2
Subscription

Consumer
Subaccount 3
Subscription

Provider Subaccount

Multitenant Business Application

SaaS Provisioning
service instance

XSUAA
service instance

Application Router
application instance

Subscription
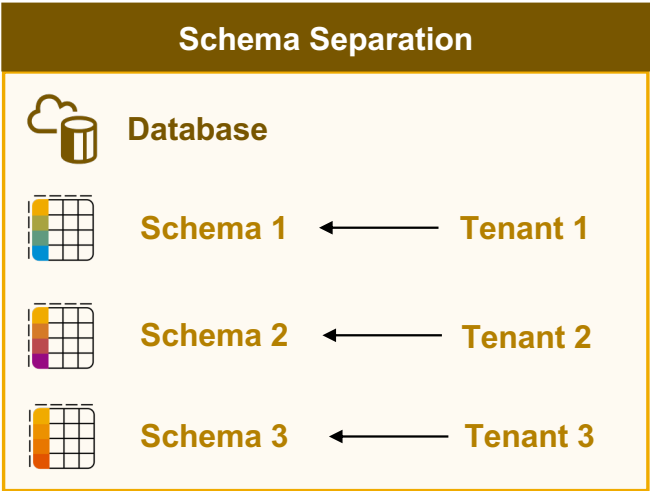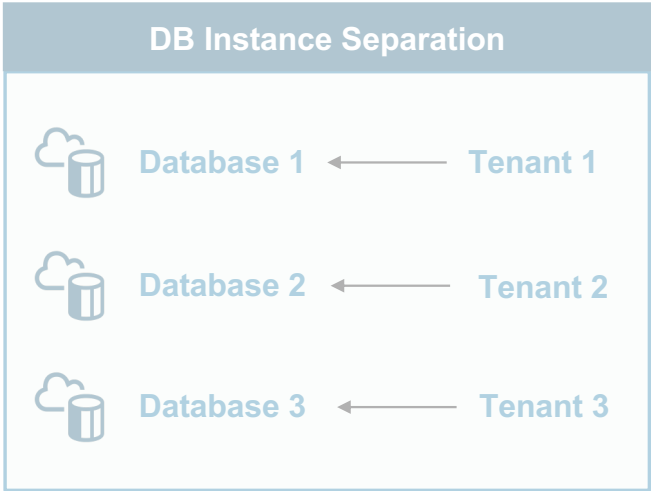Lifecycle Handler
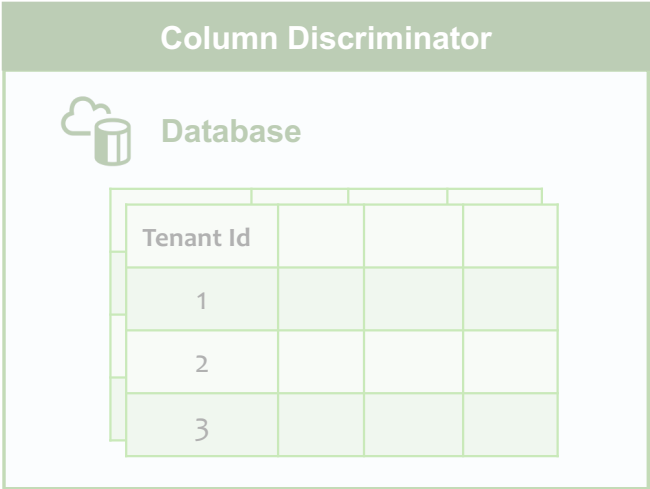
Authentication and
Authorization

Multitenancy

Multitenancy for SAP Partners

"This way we can monetize our existing developments even externally with minimal marginal costs and make a fortune!"

John Saver - CEO

Application Consumers

SaaS Customer

SaaS Customer

SAP Partner

Application Provider

Data Separation in multitenant scenarios

DB Instance Separation

Database 1 ⟵ Tenant 1

Database 2 ⟵ Tenant 2

Database 3 ⟵ Tenant 3

Schema Separation

Database

Schema 1 ⟵ Tenant 1

Schema 2 ⟵ Tenant 2

Schema 3 ⟵ Tenant 3

Natively supported by
CAP and **SAP HANA Cloud**

Column Discriminator

Database

Tenant Id			
1			
2			
3			

SAP BTP and CAP multitenancy offerings

SAP Business Technology Platform

- **Multitenant services**, runtimes & frameworks
  - HANA Cloud, Event Mesh, Destination Service, Custom Domain, SaaS Provisioning Service, HTML5 Application Repository, Job Scheduler, Document Management, XSUAA, …
  - Kyma, Cloud Foundry & ABAP Cloud
  - CAP, RAP, SAP Cloud SDK
- **Partner benefits**
  - Revenue share models for partner apps
  - SAP Store listing of partner solutions
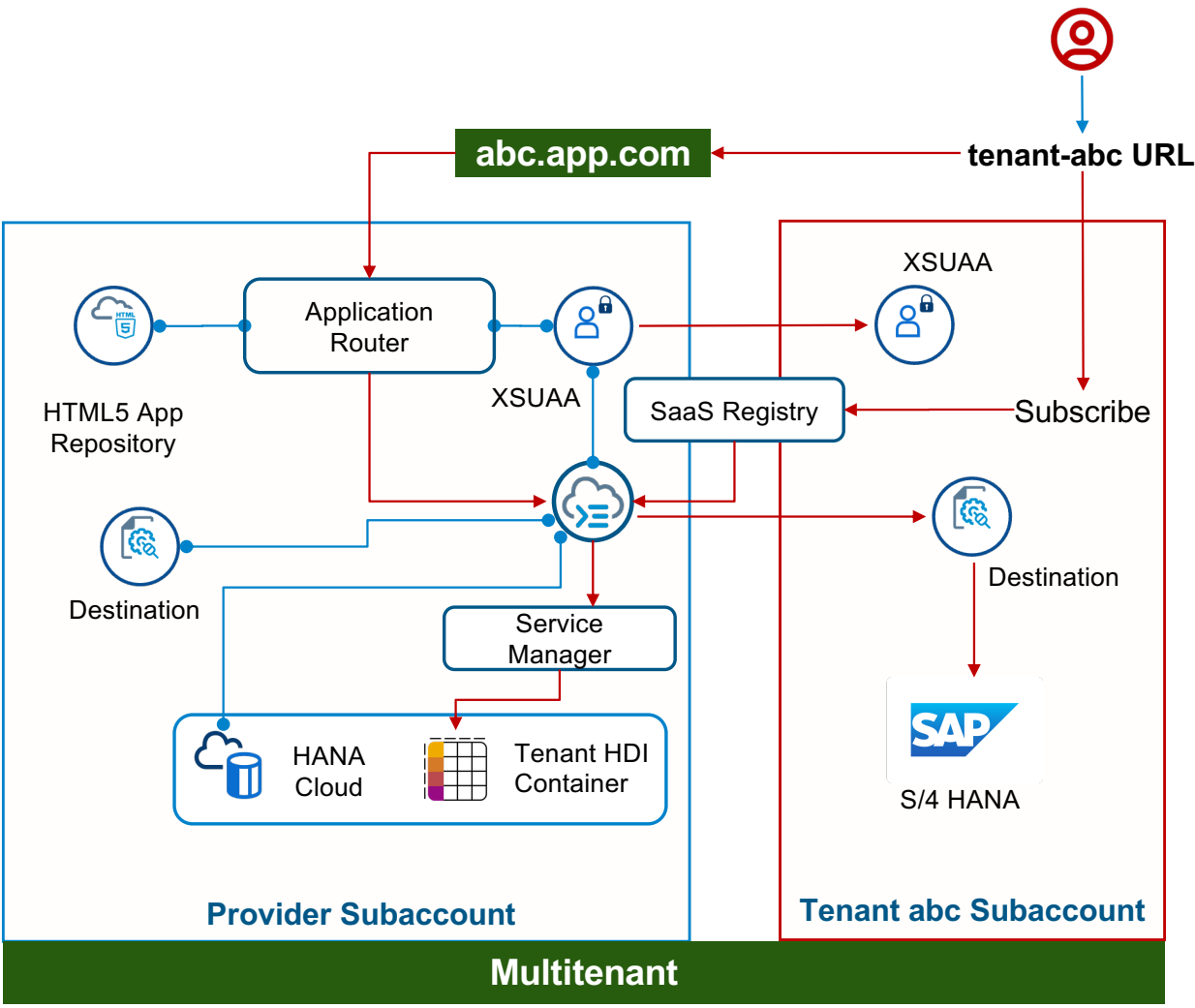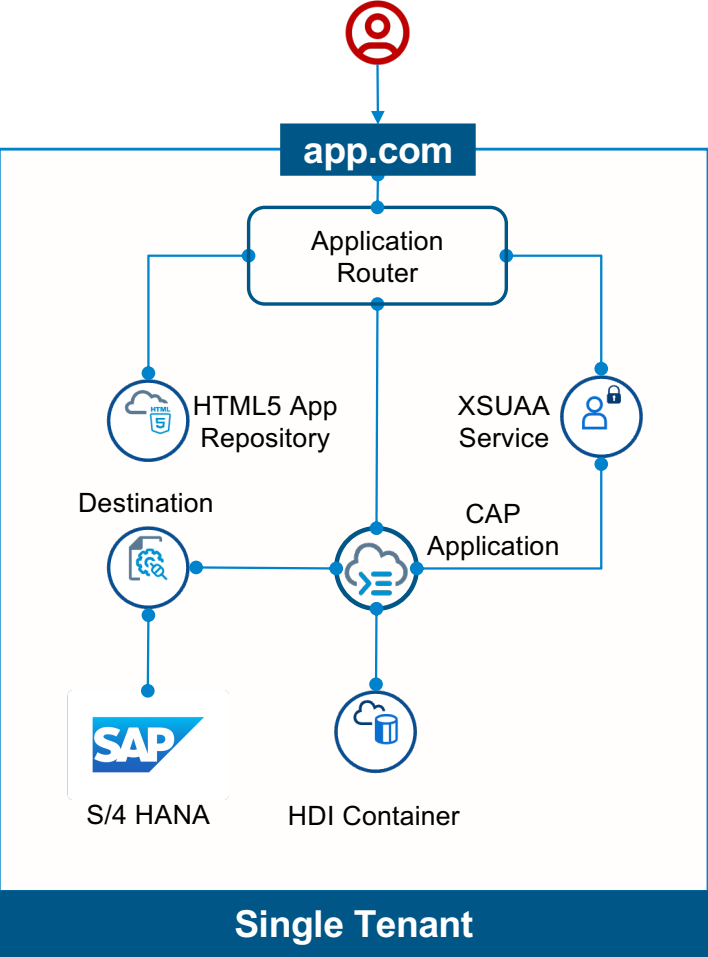 - Special service pricing for partners
- …

Cloud Application Programming (CAP)

- **Out-of-the-box** service integrations
  - Authentication & Authorization
  - Service Manager (Container)
  - Destination Service
  - Connectivity Service
  - Event Mesh
  - …
- **Multitenancy tools** (mtxs)
  - Extensibility & Feature Toggles
  - Deployment services
  - Local testing features
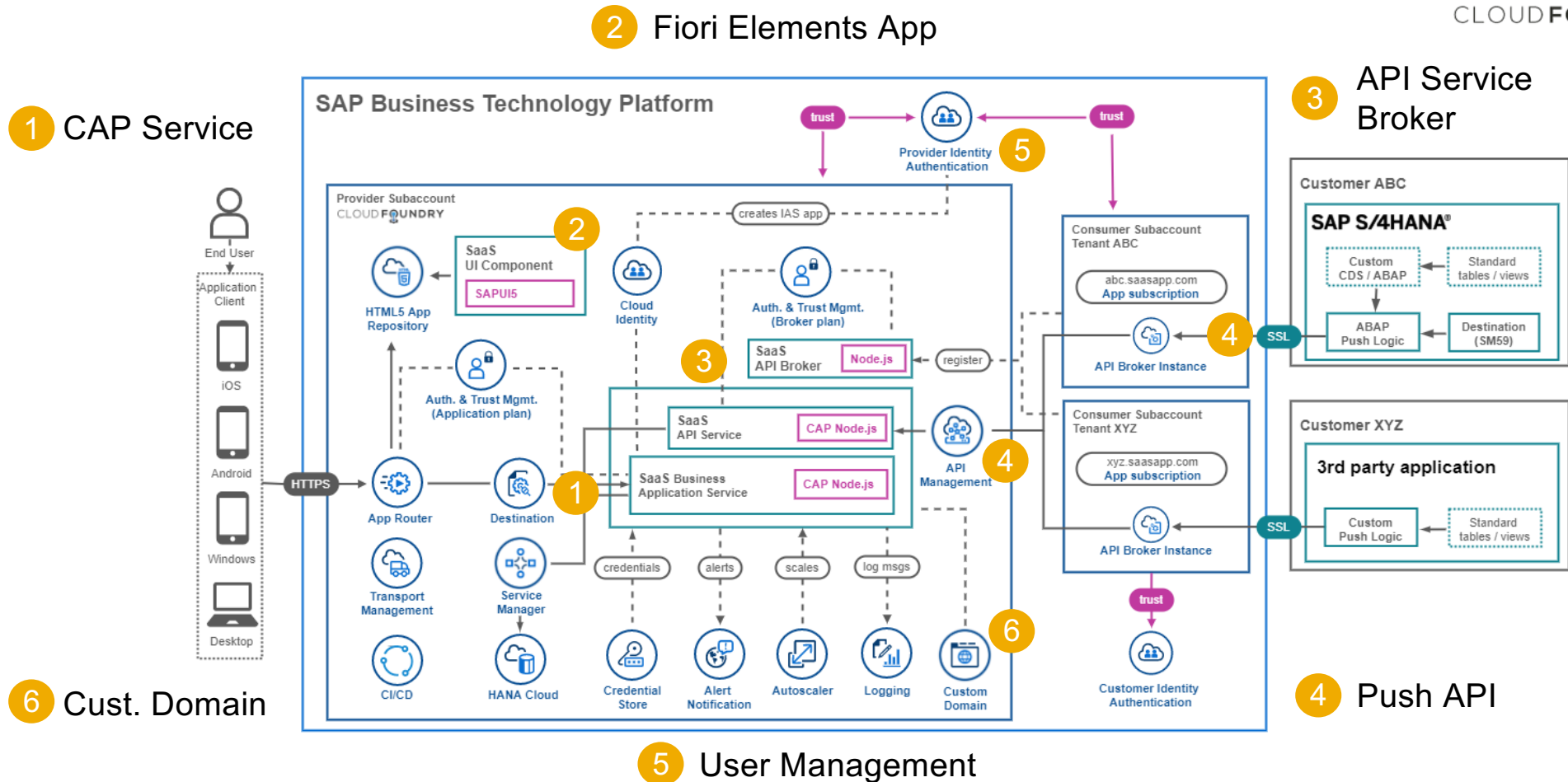- …

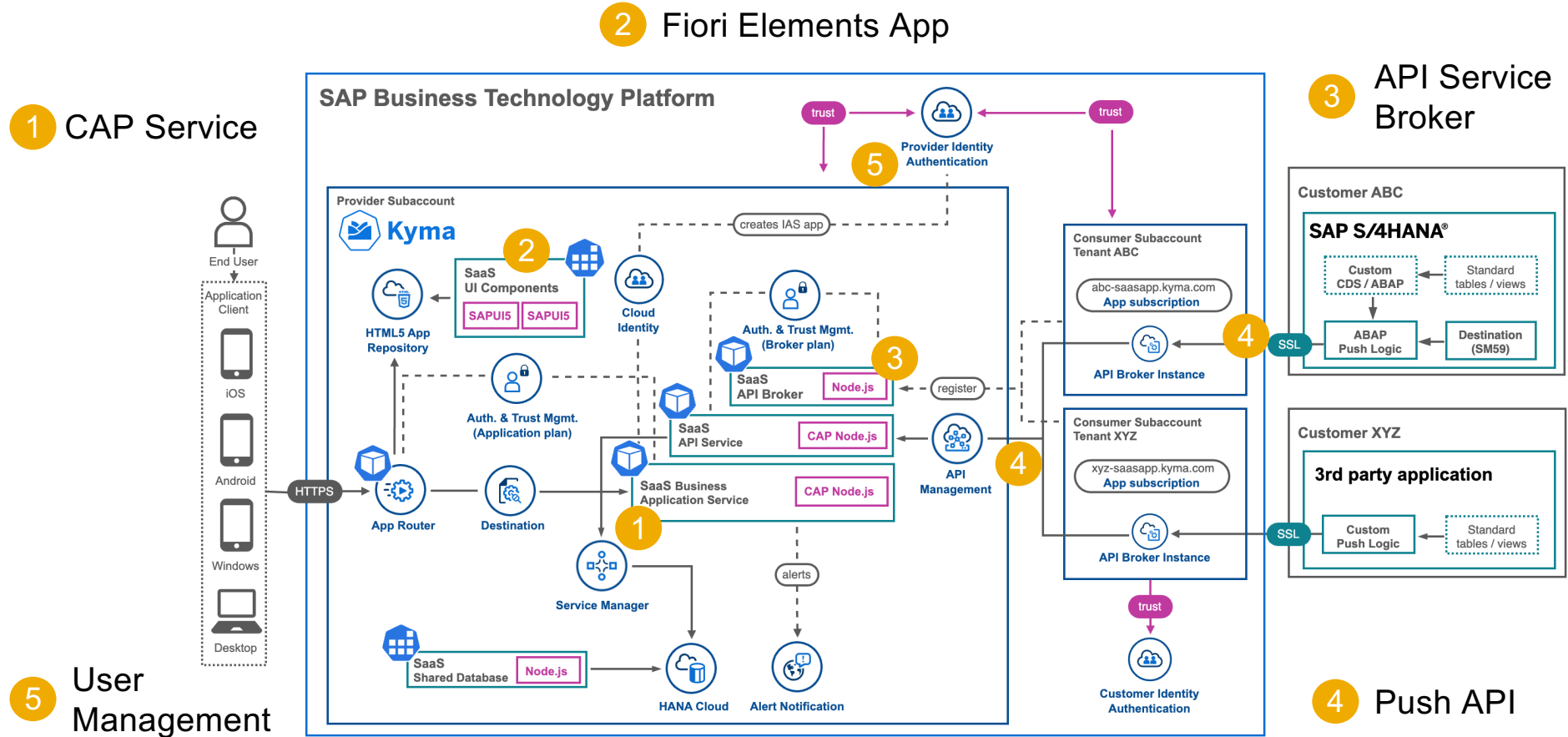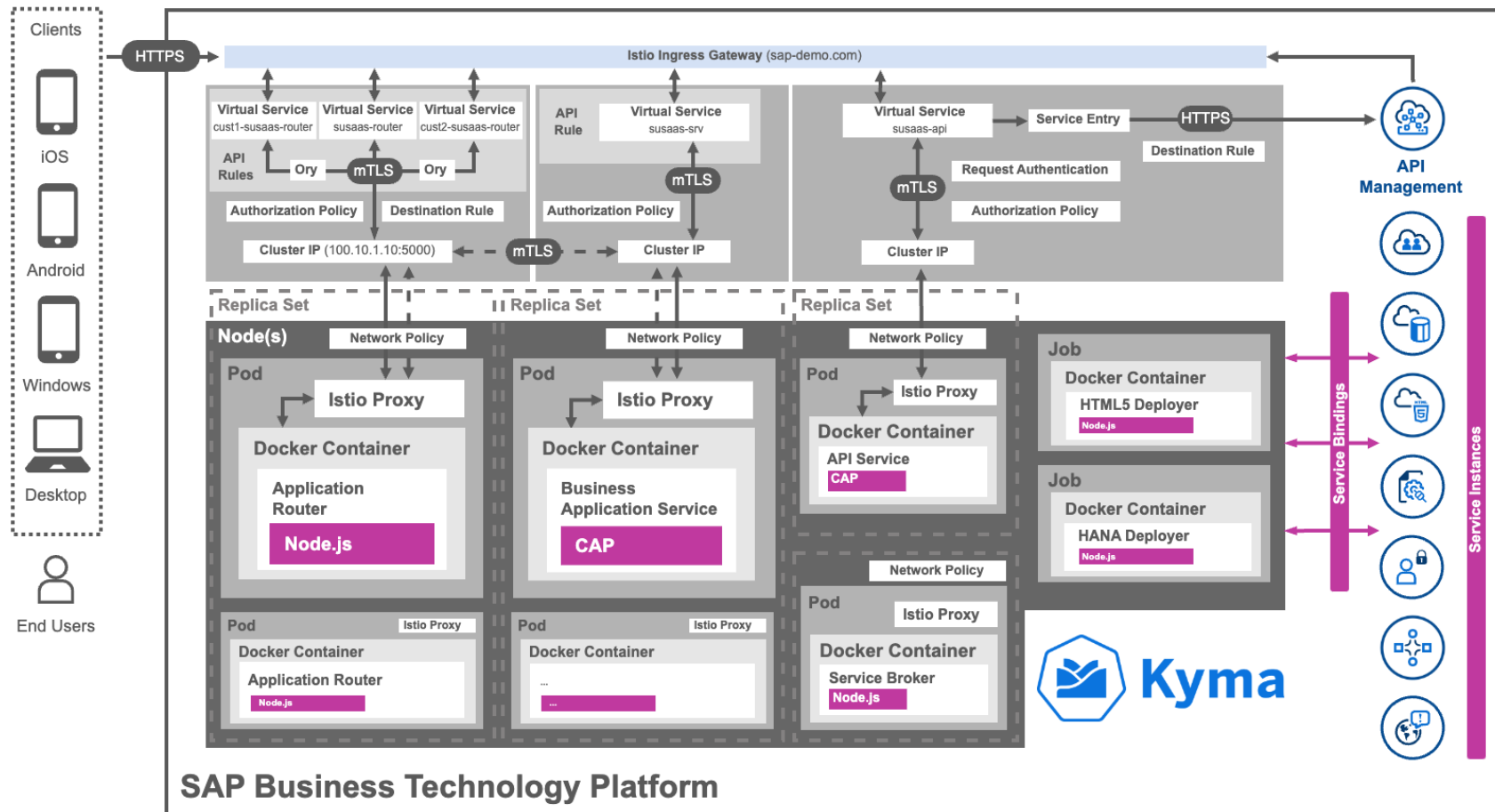# Cloud Foundry and Kubernetes Architectures

CAP gluing it all together

Single Tenant

Multitenant

Cloud Foundry Architecture

② Fiori Elements App

③ API Service Broker

① CAP Service

⑥ Cust. Domain

④ Push API

⑤ User Management

https://blogs.sap.com/2022/10/19/multitenant-saas-applications-on-sap-btp-using-cap-tried-and-true/

Kyma Architecture

https://blogs.sap.com/2023/04/05/multitenant-saas-applications-on-btp-using-cap-sap-btp-kyma-runtime/

Kyma Architecture

https://blogs.sap.com/2023/04/05/multitenant-saas-applications-on-btp-using-cap-sap-btp-kyma-runtime/
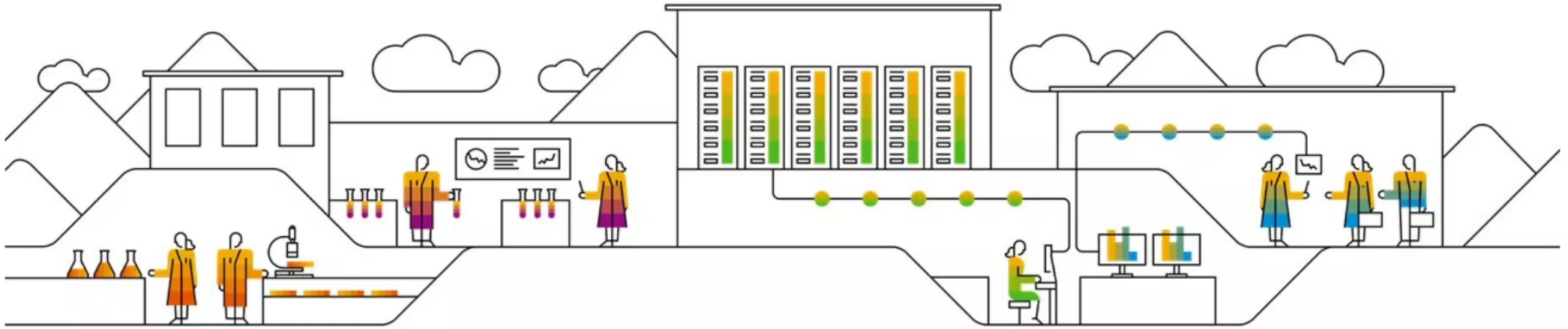
Multitenant SaaS application on SAP BTP using CAP
Application Walkthrough

PUBLIC

THE BEST RUN SAP

Questions and answers