The Developer Advocates present

SAP CodeJam

2024

> **SAP** Cloud Application Programming Model with SAP HANA Cloud

SAP

Combine SAP Cloud Application Programming Model with SAP HANA Cloud to Create Full-Stack Applications

Agenda

- Introduction to SAP Cloud Application Programming Model
- Introduction to SAP Business Application Studio / Build Code
- Exercise 1 - Set Up SAP HANA Cloud and Development Environment
- Exercise 2 - Create an SAP Cloud Application Programming Model Project for SAP HANA Cloud
- Exercise 3 - Create Database Artifacts Using Core Data Services for SAP HANA Cloud
- Exercise 4 - Create a User Interface with CAP
- Exercise 5 - Add User Authentication to Your Application
- Exercise 6 - Create Calculation View and Expose via CAP
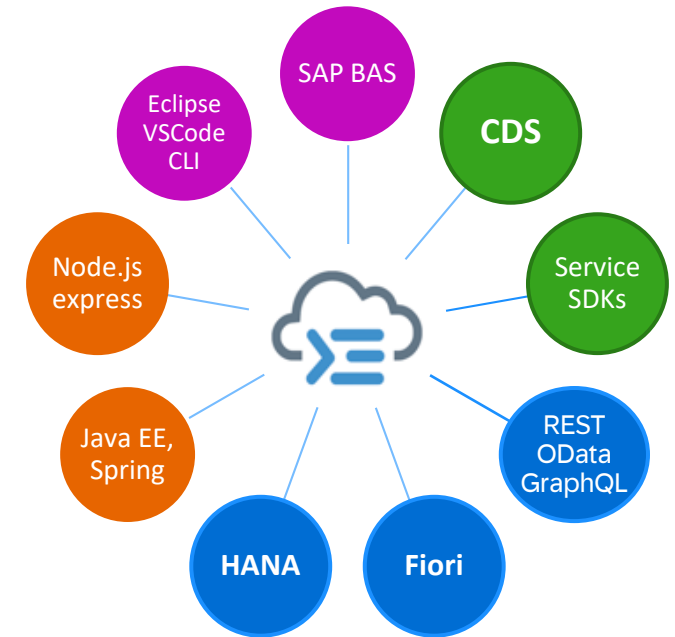- Exercise 7 - Create HANA Stored Procedure and Expose as CAP Service Function
- Wrap-Up

Introduction to SAP Cloud Application Programming Model

Introduction – Cloud Application Programming Model

The SAP Cloud Application Programming Model is an **opinionated**, yet **open** framework of tools, languages and libraries to efficiently build enterprise-grade services and applications.

It guides developers along a 'golden path' of proven **best practices**, while minimizing boilerplate so they can **focus on their domain** problems at hand.

The framework features a mix of broadly adopted **open-source** and **SAP** tools and technologies.
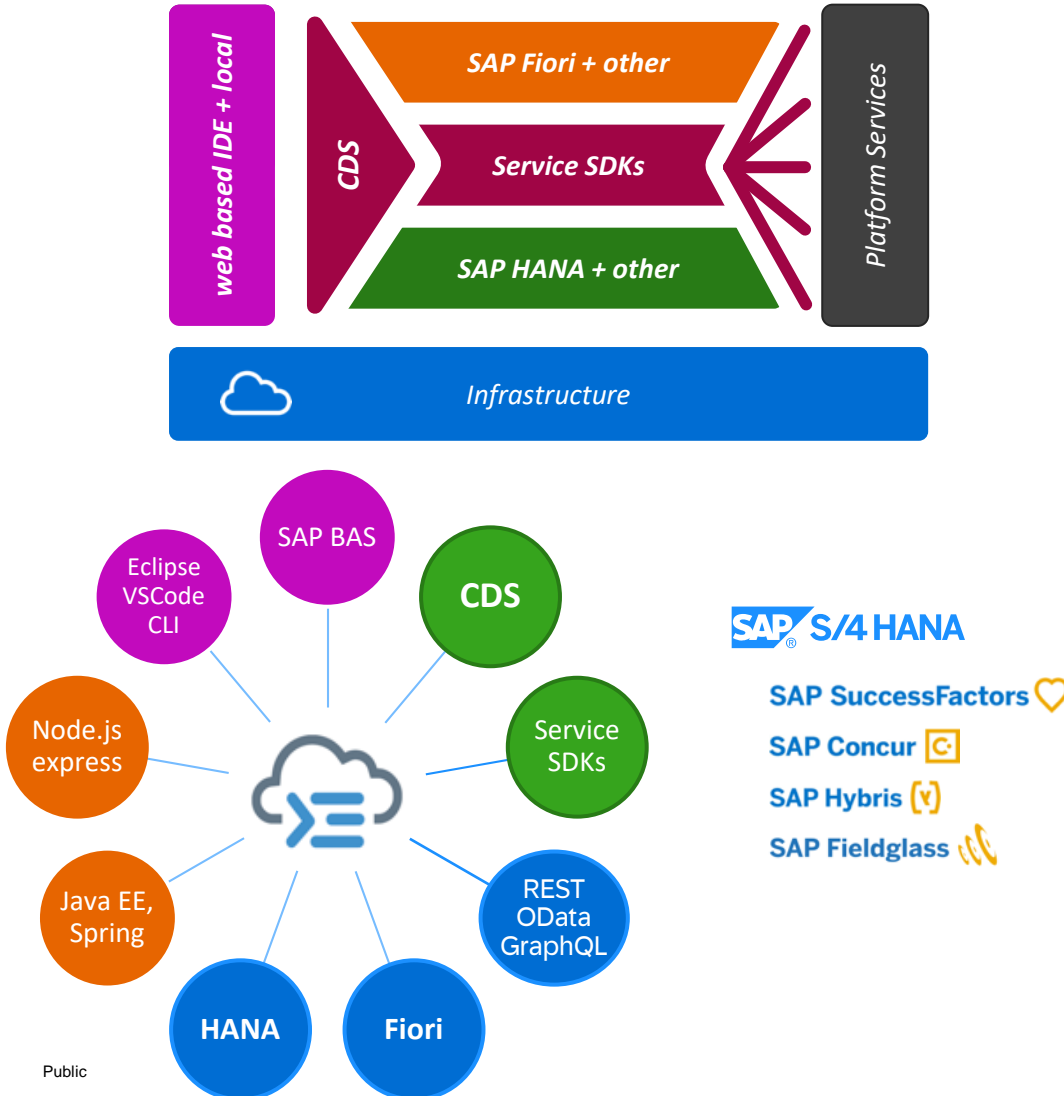
SAP Cloud Application Programming Model – One Level Deeper

We complement *cloud-native technologies* with…

- a **CDS-based Services** framework…
- w/ intrinsic **enterprise** & **cloud** qualities
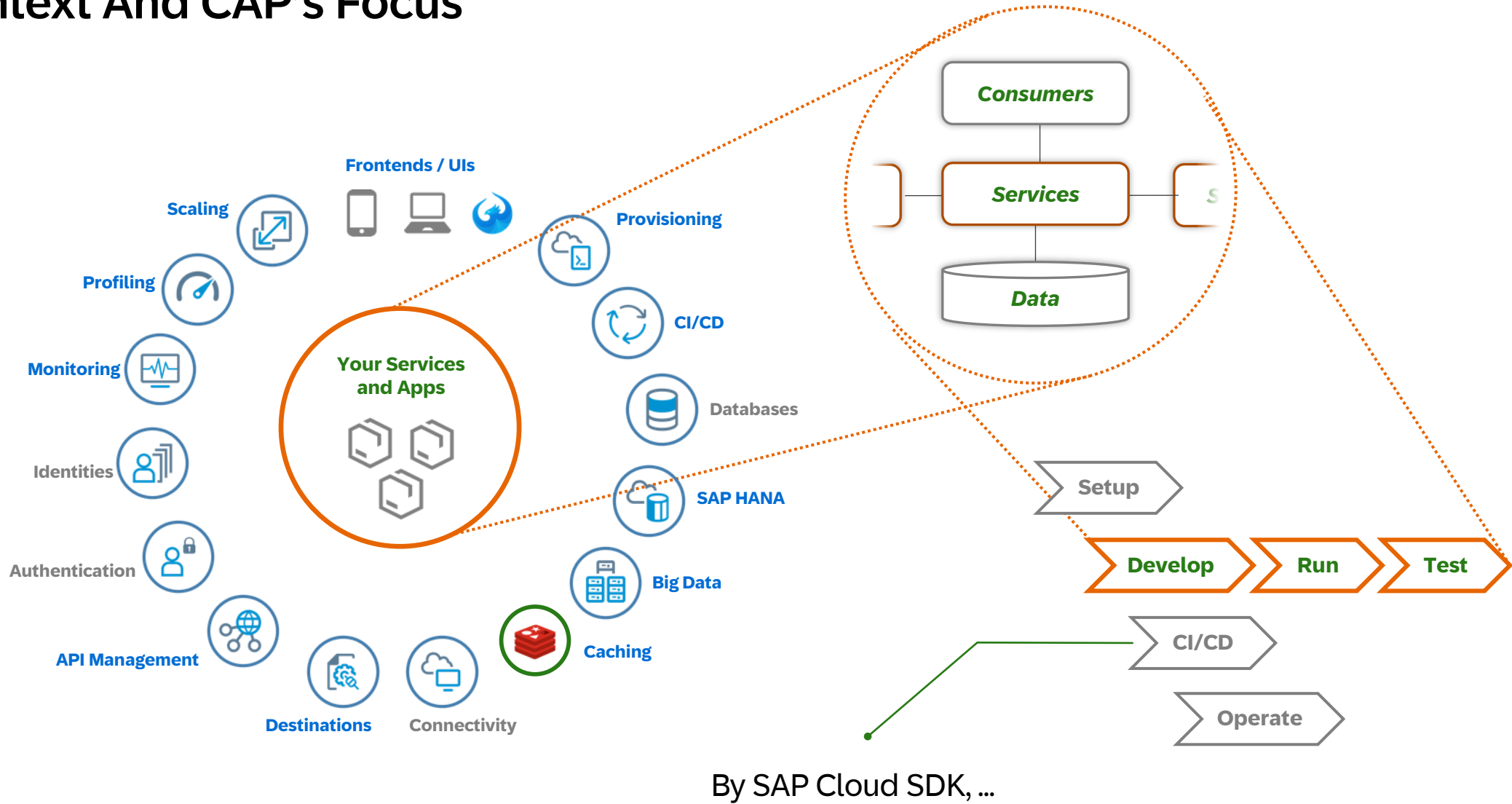
w/ *1st-class support* by and for…

- **SAP Business Application Studio**
- **SAP Fiori**
- **SAP HANA**
- **S/4 Extension** scenarios, …

without lock-in!

→ **Guidance** and **best practices** leveraging proven SAP technologies **+** Open Source software

→ A *consistent* end-to-end **programming model** for *enterprise* services & applications

Context And CAP's Focus

Frontends / UIs

Scaling

Profiling

Monitoring

Identities

Authentication

API Management

Destinations

Connectivity

Caching

Big Data

SAP HANA

Databases

CI/CD

Provisioning

Your Services and Apps

Consumers

Services

S

Data

Setup

Develop   **Run**   **Test**

CI/CD

Operate

By SAP Cloud SDK, …

CAP Focus Areas Breakdown

Serving Fiori UIs

- OData v2+v4
- Draft support
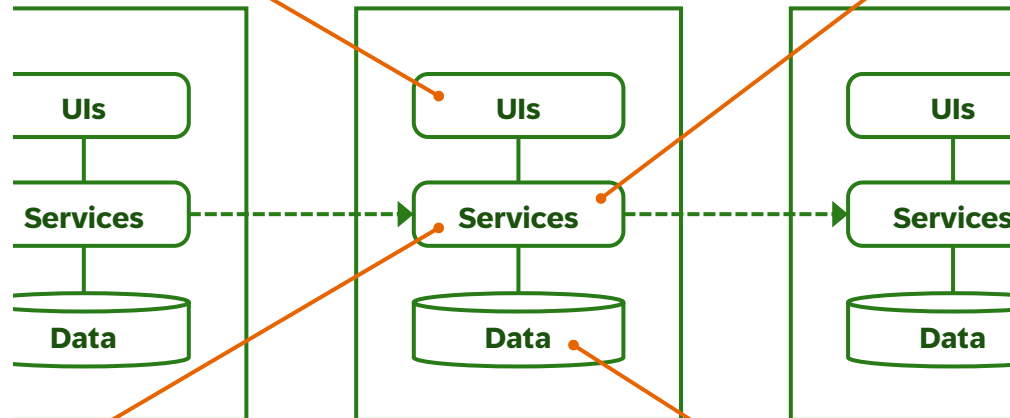- $batch support

Providing Services

- Service Definitions in CDS
- Service Providers
- Event Handlers → generic + custom
- **Emitting Events**

Consuming Services

- Import Service Definitions from OData, ...
- Mashup with local services (using CDS)
- Service Client APIs → typed / cds.ql; pre-built S/4
- Connectivity & Resilience by SDKs
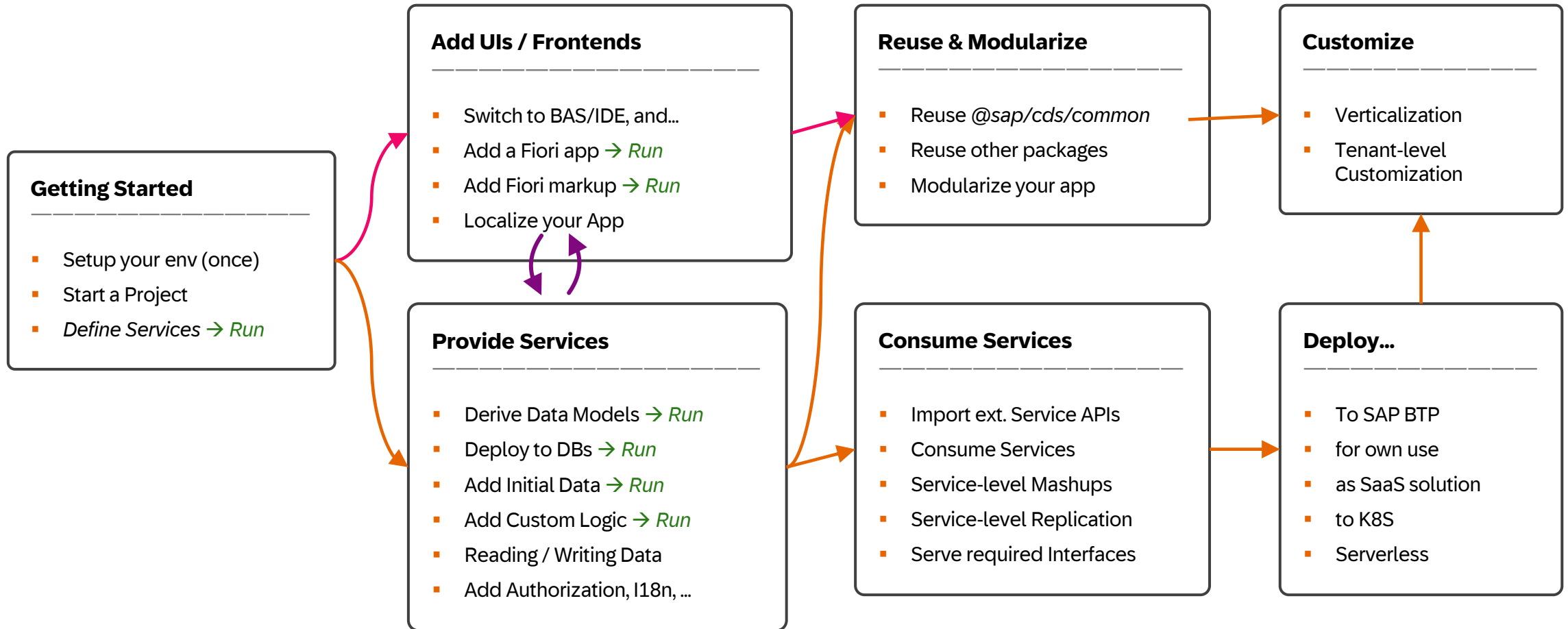- **Subscribing to & Handling Events**

Database Support

- Out-of-the-box: **HANA, sqlite**, PostgreSQL (community)
- Extensible Data Access layers (cds.ql)
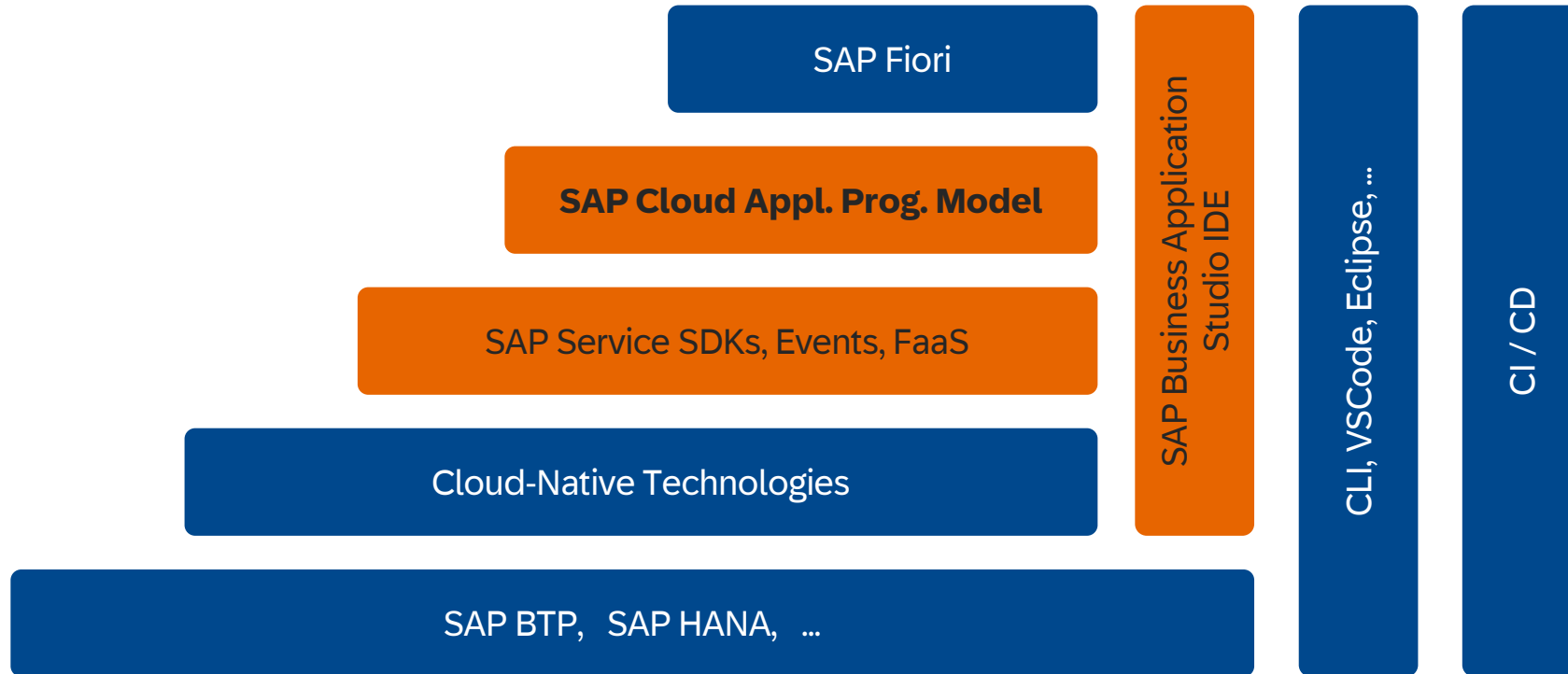- **Schema evolution**

CAP: Key Value Propositions

✓ Guidance and Best Practices → opinionated *and* staying open and flexible

✓ Intrinsic Enterprise & Cloud Qualities → taken care of out-of-the-box

✓ Integration and Interoperability → easily reuse models and services

✓ Accelerated Development → grow as you go & time to market

✓ Focus on your Domain → what, not how; minimized boilerplate

✓ Minimized Footprint → enabling serverless deployments

✓ Safeguarded Investments → e.g. on journeys to new platform picks

Cookbook — Walking Through Your Tasks...

Add UIs / Frontends
_____

- Switch to BAS/IDE, and...
- Add a Fiori app → *Run*
- Add Fiori markup → *Run*
- Localize your App

Getting Started
_____

- Setup your env (once)
- Start a Project
- *Define Services* → *Run*

Provide Services
_____

- Derive Data Models → *Run*
- Deploy to DBs → *Run*
- Add Initial Data → *Run*
- Add Custom Logic → *Run*
- Reading / Writing Data
- Add Authorization, I18n, ...

Reuse & Modularize
_____

- Reuse *@sap/cds/common*
- Reuse other packages
- Modularize your app

Consume Services
_____

- Import ext. Service APIs
- Consume Services
- Service-level Mashups
- Service-level Replication
- Serve required Interfaces

Customize
_____

- Verticalization
- Tenant-level Customization

Deploy...
_____

- To SAP BTP
- for own use
- as SaaS solution
- to K8S
- Serverless

CAP: A Layered Model

SAP Fiori

SAP Cloud Appl. Prog. Model

SAP Service SDKs, Events, FaaS

Cloud-Native Technologies

SAP BTP,   SAP HANA,   ...

SAP Business Application Studio IDE

CLI, VSCode, Eclipse, ...

CI / CD

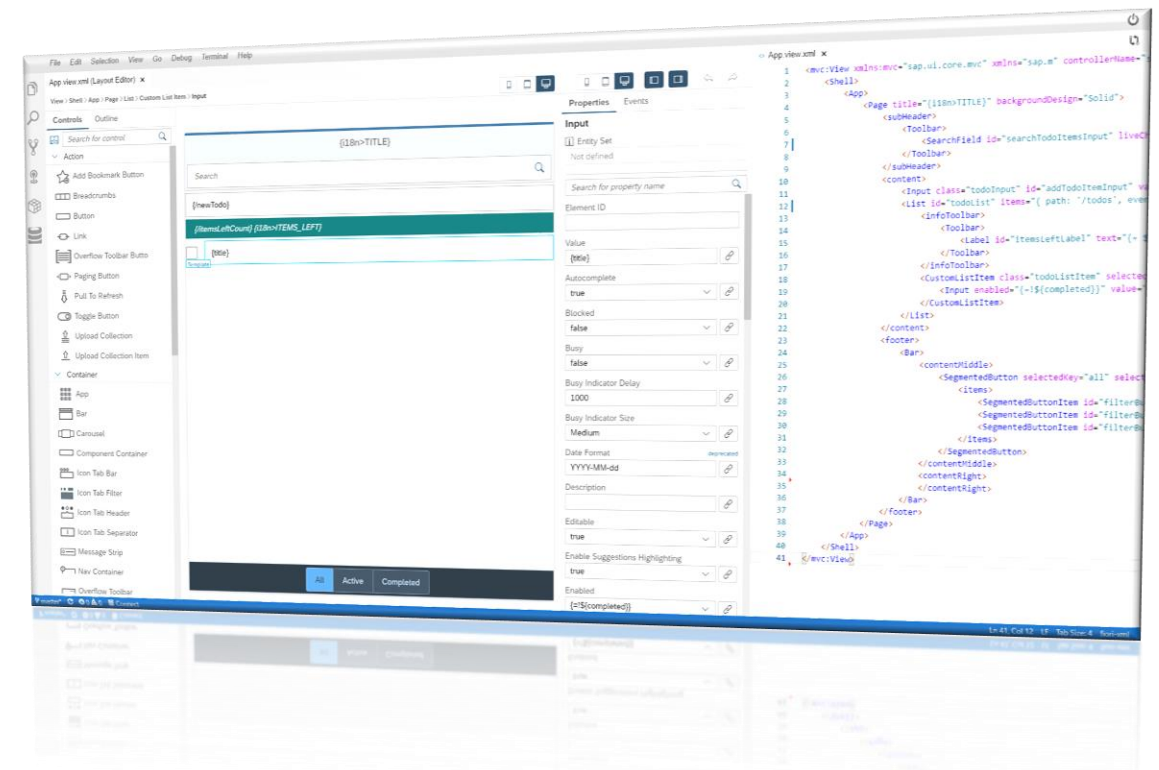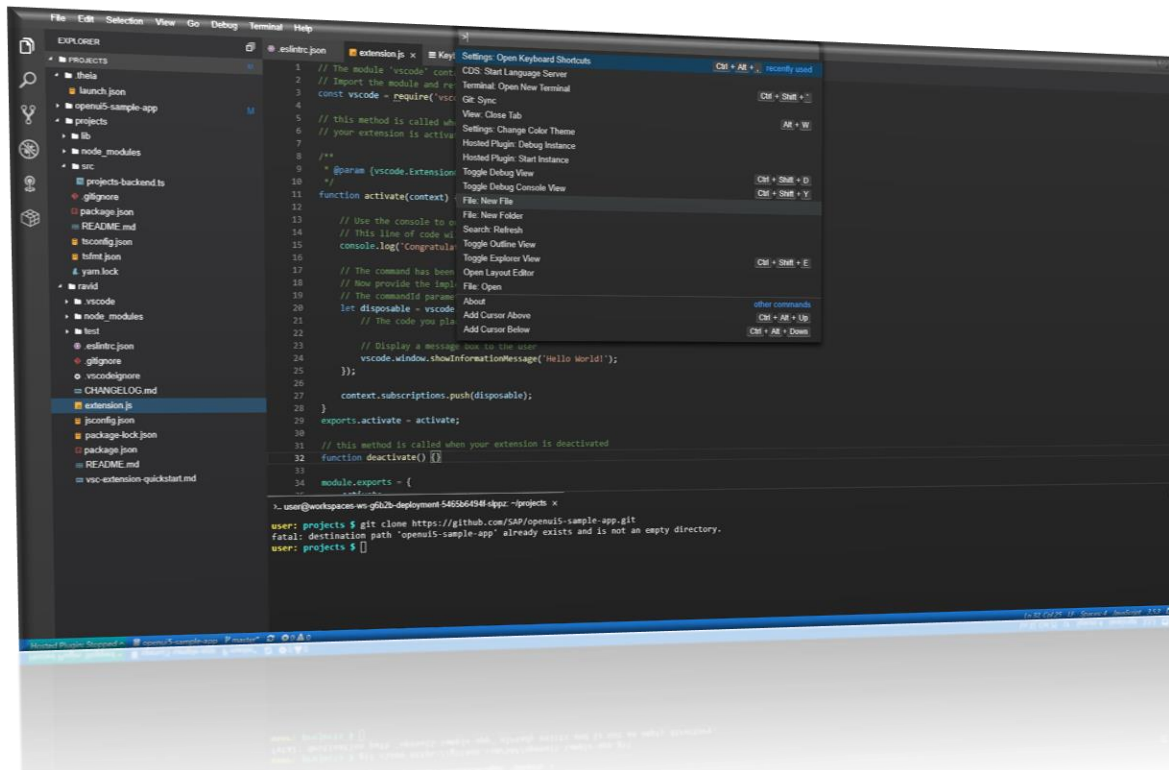# Introduction to SAP Business Application Studio

Introduction to SAP Business Application Studio / Build Code

SAP Business Application Studio on BTP
General Availability on Azure, AWS, Google, and Ali-Cloud

A modern development environment, tailored for efficient development of business applications for SAP enterprise scenarios
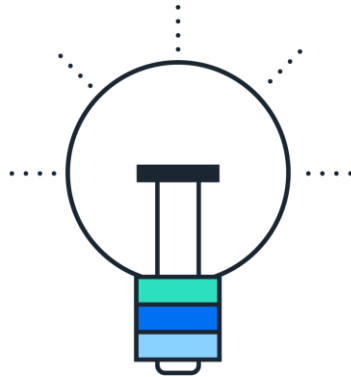
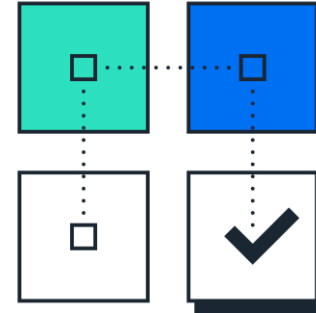# SAP Business Application Studio / Build Code
Value Proposition

Turn-key Solution

Instantly spin-up pre-packaged environments with tools and runtimes, tailored for developing SAP business applications
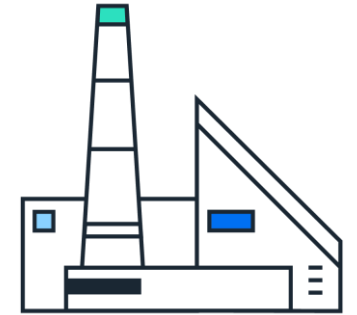
Simplified Development

Enjoy a seamless end-to-end development environment with a desktop like experience in the cloud - available anywhere, anytime

Integrate SAP Solutions

Build smarter, more intelligent applications integrating SAP services, technologies, and solutions to cater for your business needs
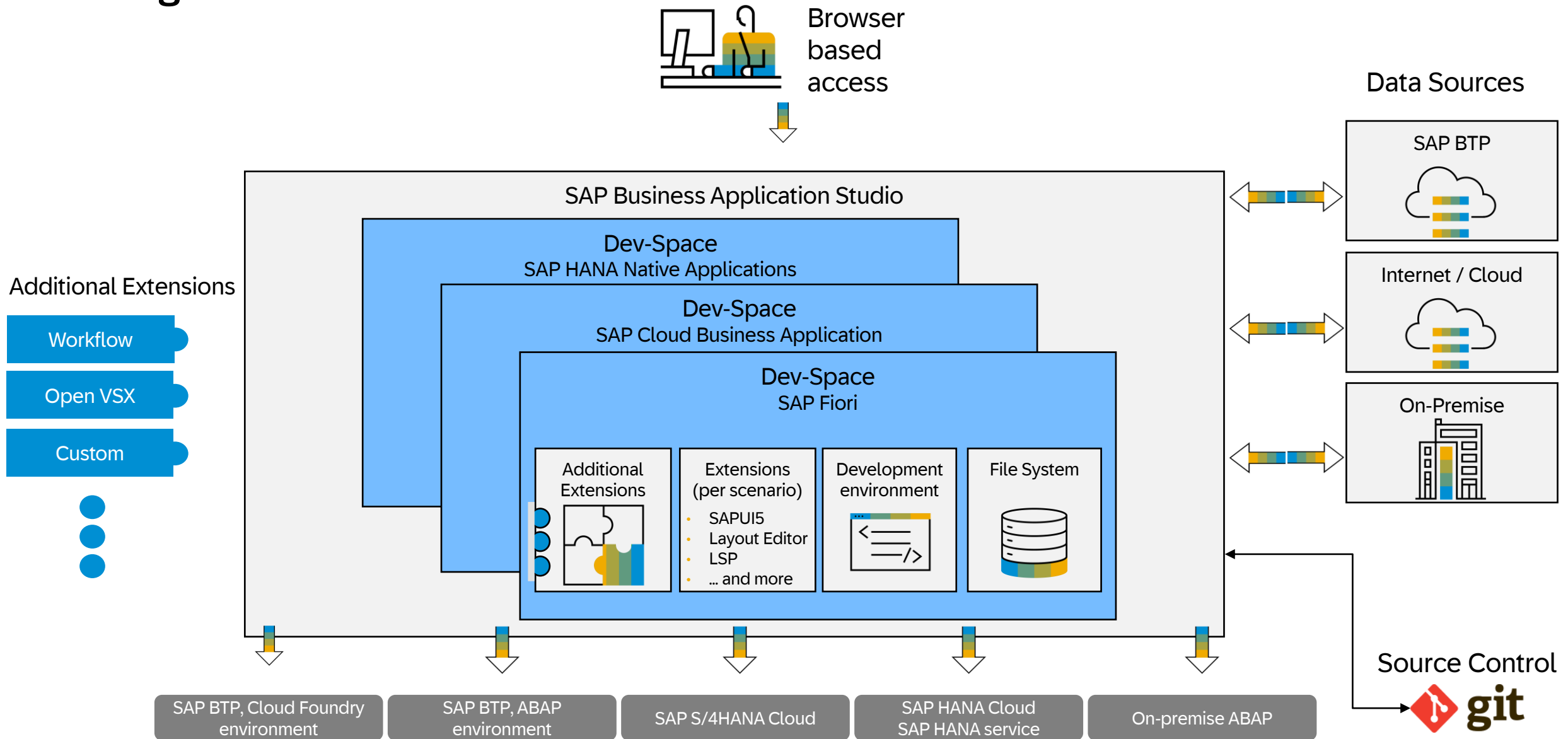
Ultimate Productivity

Accelerate app development using wizards, optimized code & graphical editors, local test run & debug, terminal (CLI) access, quick deployment, and more

SAP Business Application Studio is built on Open Source and leading industry standards

The Big Picture

Browser based access

Data Sources

SAP Business Application Studio

Dev-Space
SAP HANA Native Applications

Dev-Space
SAP Cloud Business Application

Dev-Space
SAP Fiori

Additional Extensions	Extensions (per scenario)	Development environment	File System
	• SAPUI5 • Layout Editor • LSP • … and more		

Additional Extensions

- Workflow
- Open VSX
- Custom

SAP BTP

Internet / Cloud

On-Premise

SAP BTP, Cloud Foundry environment

SAP BTP, ABAP environment

SAP S/4HANA Cloud

SAP HANA Cloud
SAP HANA service

On-premise ABAP

Source Control

git

SAP Business Application Studio Vs. SAP Web IDE

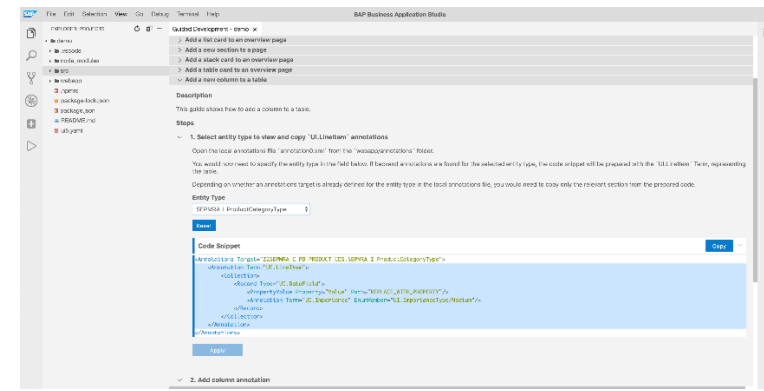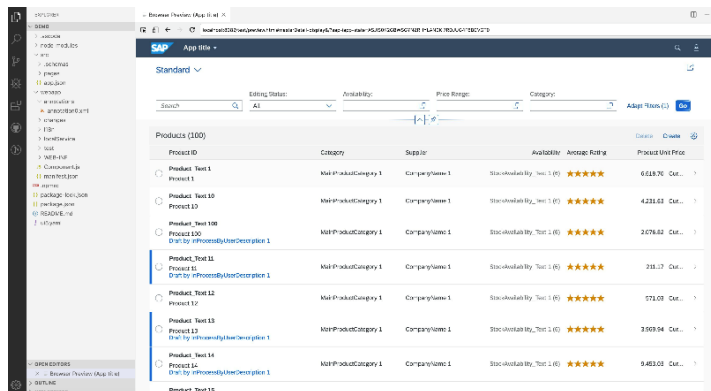|	SAP Business Application Studio	SAP Web IDE Full Stack
Available on	SAP BTP, Cloud Foundry environment	SAP BTP, Neo environment
Deployment target	SAP BTP, Cloud Foundry environment, on-premise ABAP SAP BTP, ABAP environment	SAP BTP, Cloud Foundry environment, on-premise ABAP, SAP BTP, Neo environment
Solution	**Instantly spin-up pre-packaged isolated environments**/Dev-spaces ("virtual machine on the cloud") with tools and runtimes, tailored per business scenario which provide **more control over the environment and code Configure and share Dev-spaces***	Generic workspace that contains many tools. Some tools are not necessarily required for the target business scenario
Experience	**Embraces VS Code experience**, will provide the ability to add custom extensions* **Desktop like experience in the cloud** including local test, run & debug, terminal (CLI) access, and superior code editors	SAP proprietary experience Browser based experience
Support for various personas	**Better support for pro-code, cloud and full stack developers** with superior for Java and node. js coding Additional personas can be supported with a suited experience per persona using dev-spaces concept.	• Cloud and full stack developers – partial • Web/mobile developers • Similar experience for all personas
Open Source & standards	**Based on open source & leading industry standards** Provides possibility to **quickly integrate capabilities and technologies** that exist in the market*	Uses open sources but majority is proprietary SAP proprietary framework with limited number of extensions

Visual Studio Code and SAP Business Application Studio

Visual Studio Code

- Provides development flexibility with **offline** capabilities

- Features a **developer-controlled**, highly configurable development environment

- Allows access to thousands of extensions from the Visual Studio Code marketplace

- Is part of a fast growing open source community

SAP Business Application Studio / Build Code

- Provides a **managed**, preconfigured, **hosted environment**, optimized for SAP application development

- Can be **centrally administrated** with tools repositories, systems access and company policies

- Integrates with existing SAP solutions, systems & services

- Easy access to Visual Studio Code-compatible extensions from open source Theia marketplace

Hands-on Exercises

https://github.com/SAP-samples/cap-hana-exercises-codejam

SAPinsider

Hands-on Exercises

Where to Find More Information

https://github.com/SAP-samples/cap-hana-exercises-codejam
Exercise Instruction

https://pages.community.sap.com/topics/hana
HANA Topic Page

https://pages.community.sap.com/topics/business-application-studio
Business Application Studio Topic Page

https://pages.community.sap.com/topics/cloud-application-programming
SAP Cloud Application Programming Model Topic Page

https://cap.cloud.sap/docs/
SAP Cloud Application Programming Model Documentation

Key Points to Take Home

- The value of the dev space in the SAP Business Application Studio

- How to use SAP Cloud Application Programming Model (CAP) Core Data Services (CDS) to create simple database entities

- How to define database-agnostic artifacts in the persistence module

- How to create an SAP Fiori freestyle web interface

- How to configure the AppRouter

- How to create an instance of the User Authentication and Authorization service

- How to configure Cloud Application Programming (CAP) service authentication

Thank you.

Contact information:

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THE BEST RUN SAP