



SAP BTP Extension Suite

Cloud Application Programming

SAP BTP Solution Architects
SAP Global Partner Organization

July, 2021

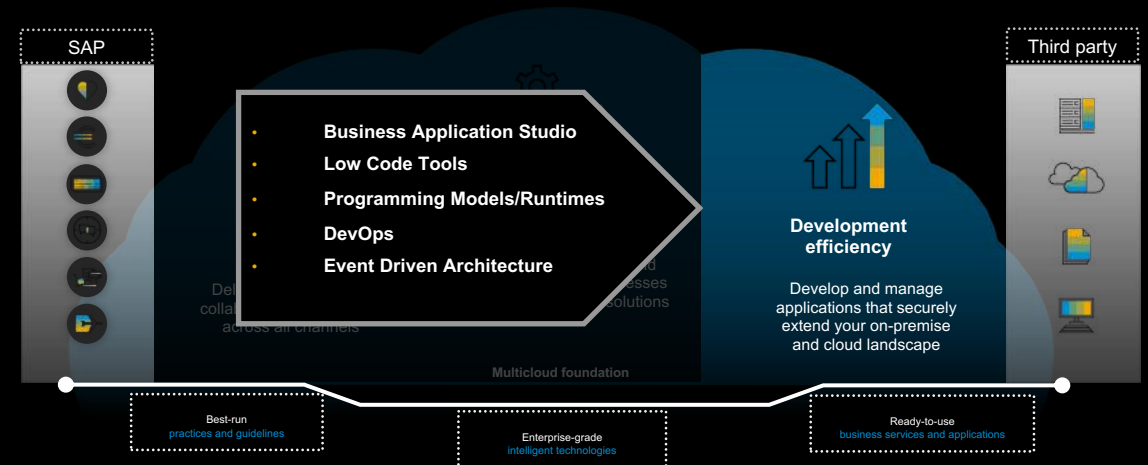
PUBLIC



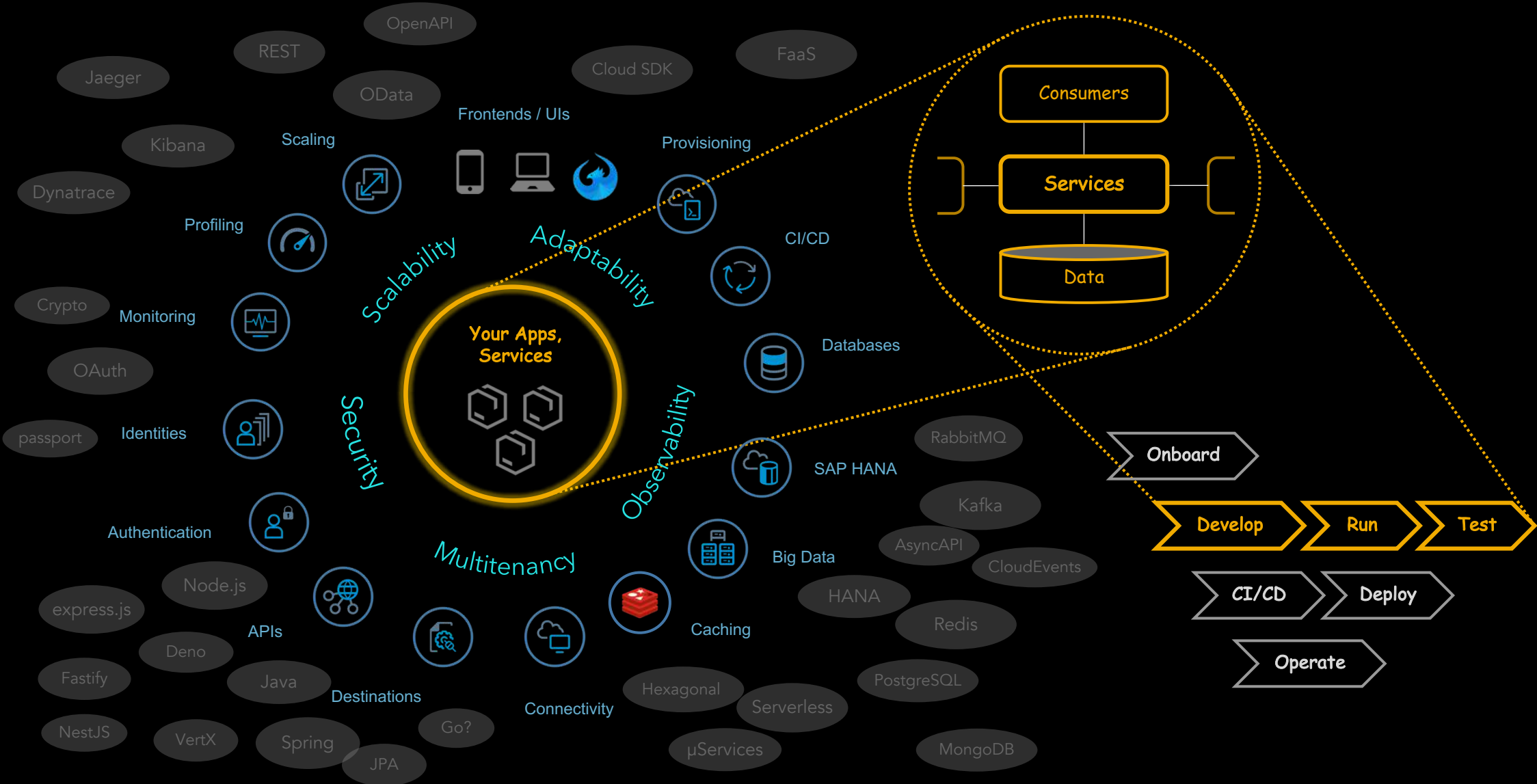
THE BEST RUN **SAP**

Agenda

- Motivation (why)
- Core Concepts (what)
- How to Get Started, Demo & Golden Path (how)
- Key Takeaways & Summary



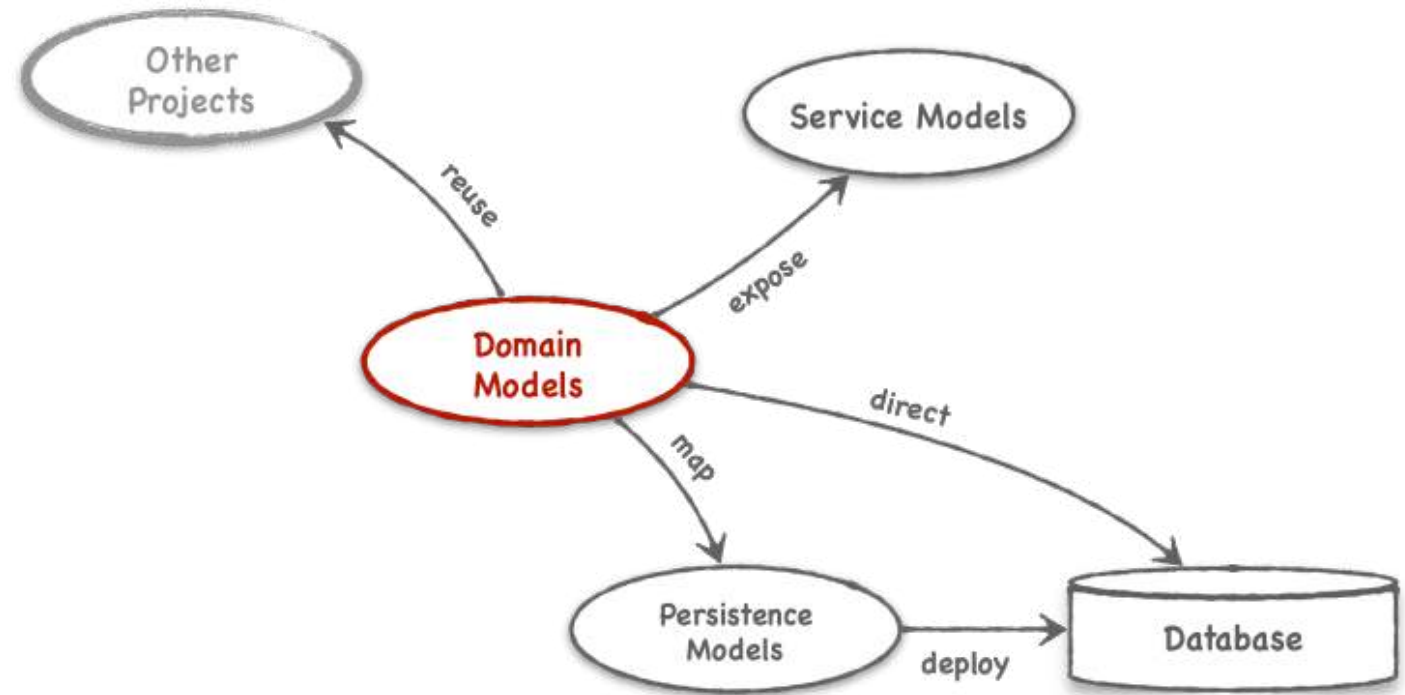
Why CAP? → Guidance & Focus on Domain → “What, not How”



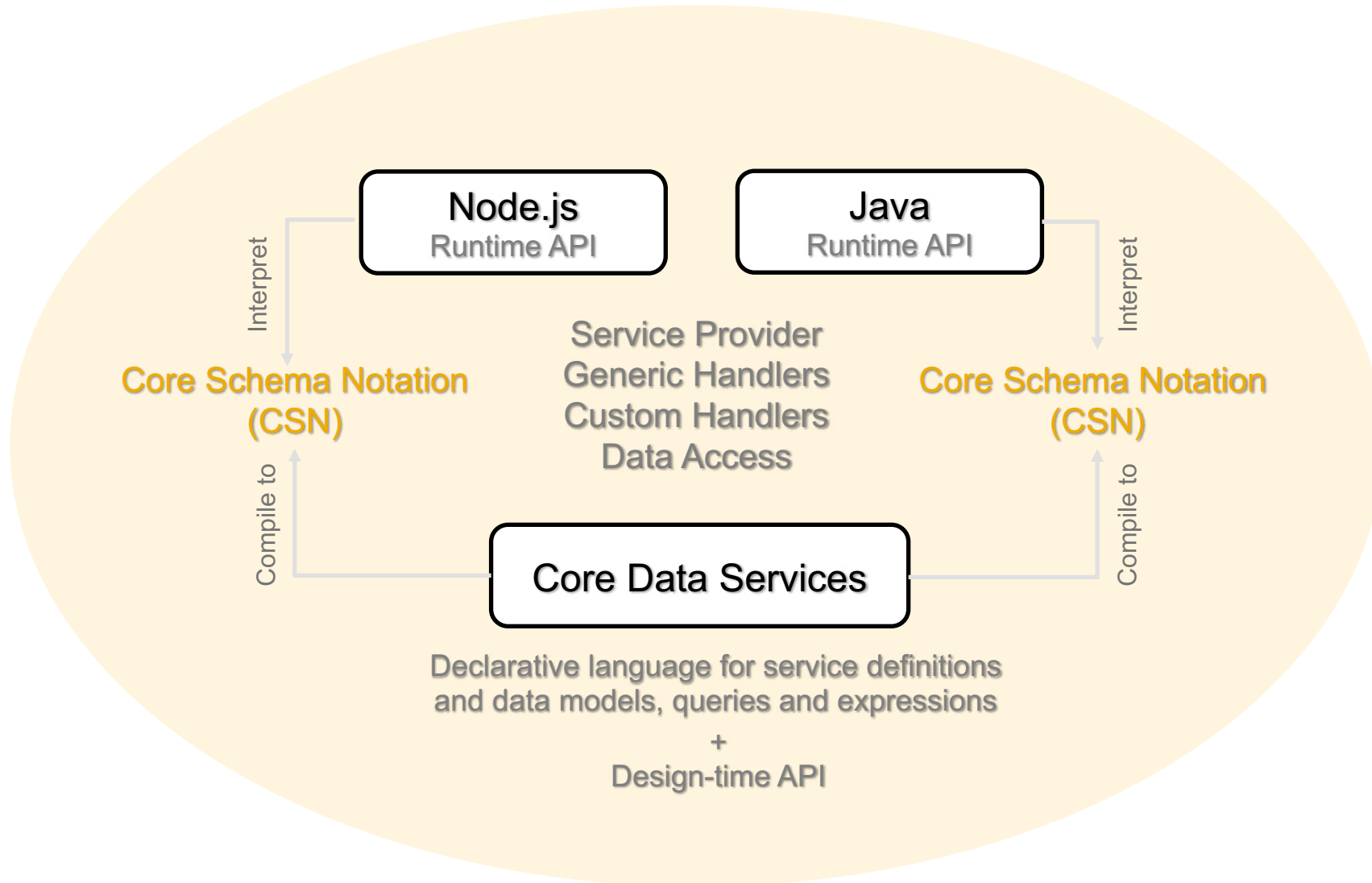
Core Concept – Managing Domain Models



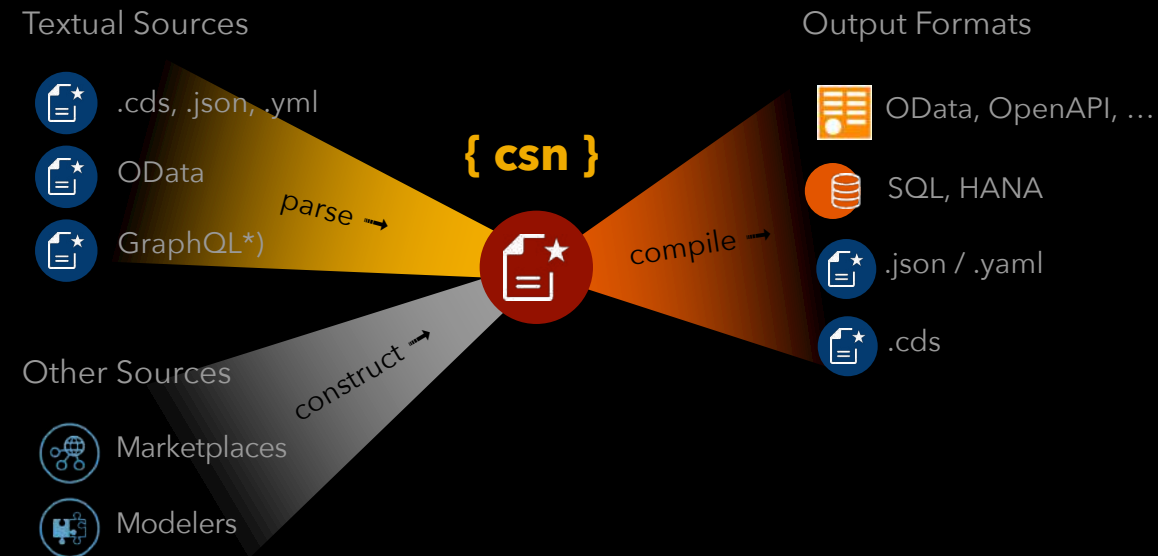
- **Goal:** Foster close collaboration of technical and domain experts (→ Domain-driven Design)
- Therefore: Keep them **clean**, **concise** and **comprehensible** using...
- ✓ **Aspects** to separate and factor out technical concerns, verticalization and extensibility
- ✓ **Common Reuse Types**
e.g. like Code lists, etc.
- ✓ **Enterprise Features**
e.g. localized data, temporal data, authorization, etc.



Backbone of CAP – Core Data Services (CDS)



Domain Modeling → Focus on Domain, powered by CDS



- ⇒ **Capture Intent** – that is *What, not How* – in **concise** and **comprehensible** models, promoting close collaboration of **developers** and **domain experts** to iteratively and gradually refine **domain knowledge** across layered **reuse** and **extension** packages
- ⇒ **Declarative Approach** fueling generic runtimes → out-of-the-box **enterprise services**

CDS Powerful Querying in Comparison



Feature	GraphQL *)	OData	CDS / CQL
Schemas	yes	yes	yes
Mutations / Custom Ops	yes	yes	yes
Queries	yes	yes	yes
- select	yes	yes	yes
- expand	yes	yes	yes
- filtering	**)	yes	yes
- sorting	**)	yes	yes
- pagination	**)	yes	yes
- analytics	**)	yes	yes
References → Associations / Compositions	***)	yes	yes
Select * (→ default in REST)		yes	yes
CRUD defaults		yes	yes
Schema Annotations		yes	yes
Translating b/w QLs → Delegate / Push-down			yes
Views → Generic Providers			yes
Denormalized Projections / Results			yes
Imports → Reuse & Compose			yes
Aspects → Extensibility, Verticalization			yes
Database support ootb, schema evolution			yes
Full SQL query options			yes

*) with Apollo framework

***) requires hard-coded functions
→ no extensibility

***) using hard-coded field resolvers
→ no extensibility
→ bad performance

CDS Frequently Used Commands for the CDS CLI



Description	Command
Jump-start cds-based projects	<code>cds init <project></code>
Add a feature to an existing project	<code>cds add <feature></code>
Add models from external sources	<code>cds import <api></code>
Compile cds models to different outputs	<code>cds compile <models></code>
Run your services in local server	<code>cds serve <services></code>
Run and restart on file changes	<code>cds watch</code>
Read-eval-event loop	<code>cds repl</code>
Inspect effective configuration	<code>cds env</code>
Prepare for deployment	<code>cds build</code>
Deploy to databases or cloud	<code>cds deploy</code>
Create an extension project	<code>cds extend <app-url></code>
Activate an extension project	<code>cds activate</code>
Login to extendable SaaS application	<code>cds login <app-url></code>
Logout from extendable SaaS application	<code>cds logout</code>












Dev Spaces

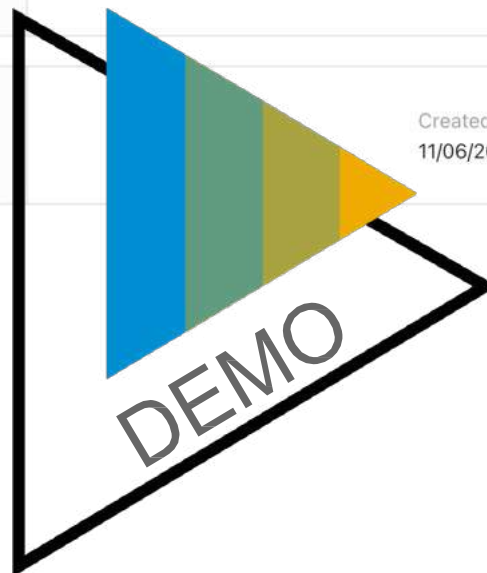
Create and manage your development environment according to the type of applications you want to develop.
You can add extensions and tools to further enhance your development options.

[Create Dev Space](#)

⚠ You're using a trial version. Any dev space that hasn't been running for 30 days will be deleted. See the full list of [restrictions](#).

You are allowed a total of 2 dev spaces, with only 1 running at a time.

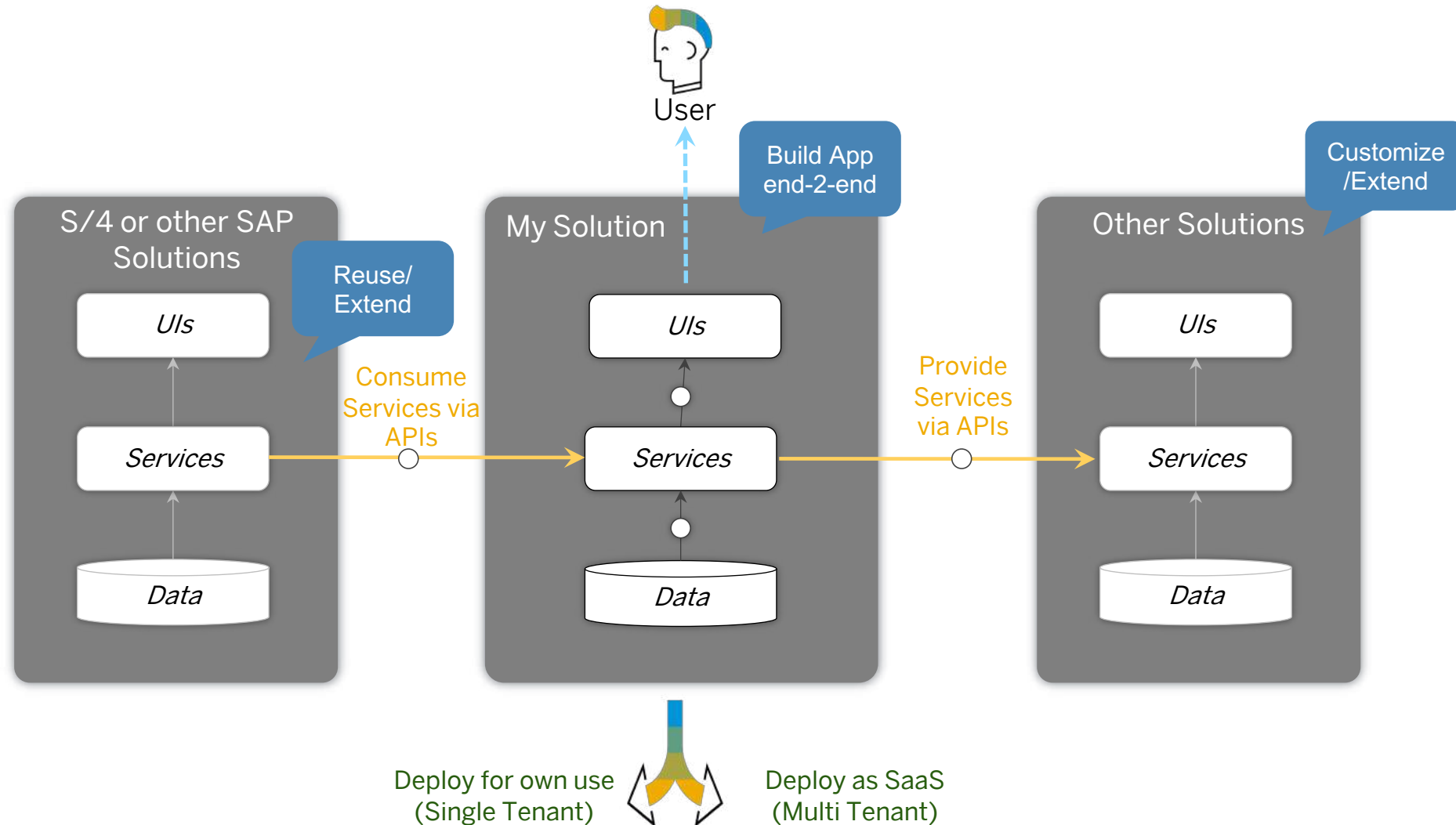
	fullstack Full Stack Cloud Application	STARTING	Created On 05/07/2021 4:08 PM	ID ws-6fvx2	   
	jacob SAP Fiori		Created On 11/06/2020 12:29 PM	ID ws-ps447	   



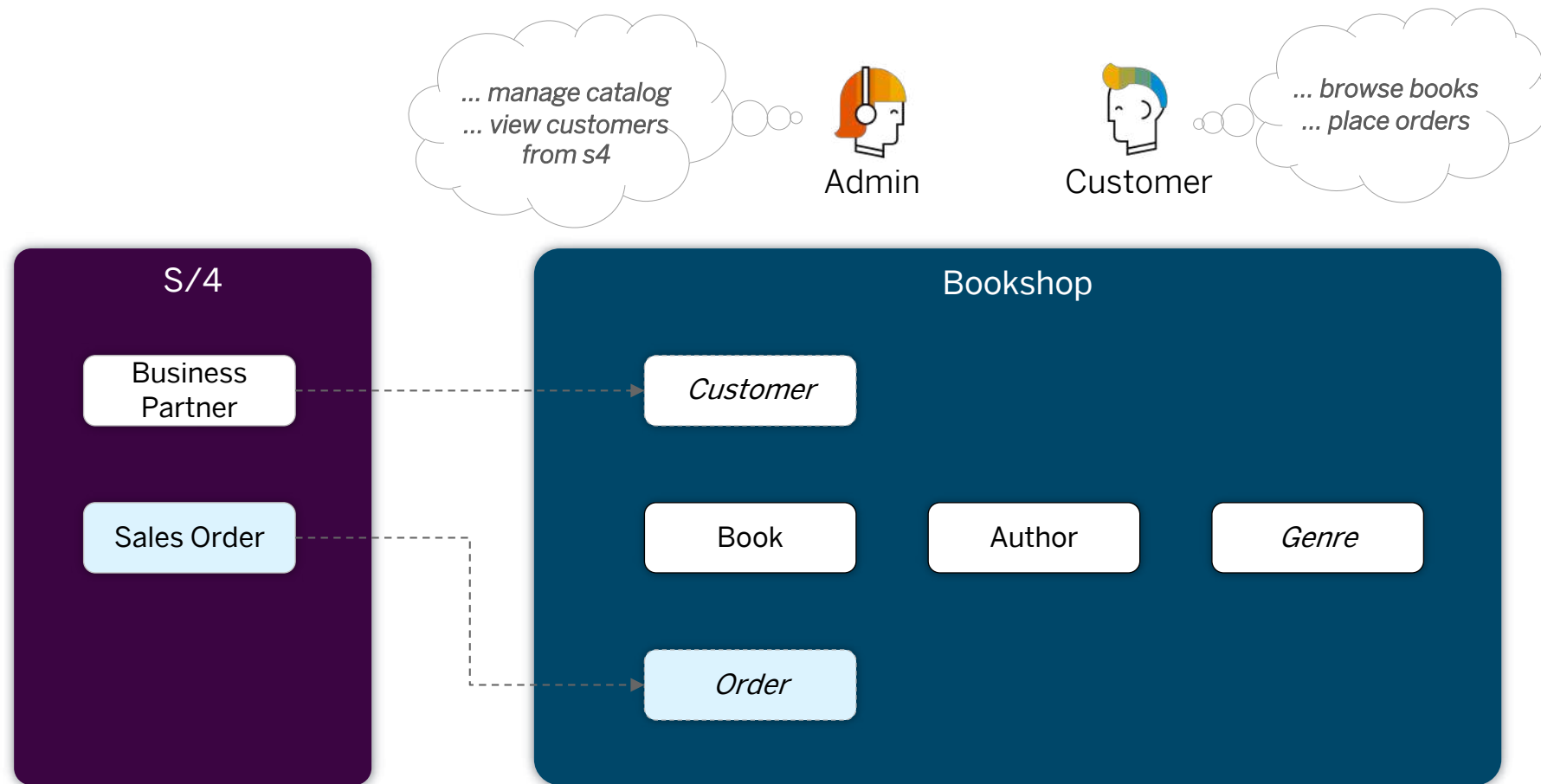
2
minutes



What are some of the typical **Use Case Scenarios**?



Scenario of a Bookshop Management Solution



Developed with CAP, coupled with SAP Cloud SDK & SAP HANA Cloud on SAP BTP.
As highlighted – scope will not be covered in today's demo.

Welcome to CAP

SAP Cloud Application Programming Model



```
cds serve my-services
```



Latest News

- [The May 2021 release is available → See What's New](#)
- [Build a Business Application Using CAP for Node.js → Try it out](#)
- [Build a Business Application Using CAP for Java → Try it out](#)
- [CAP has its own Learning Journey → Open It](#)



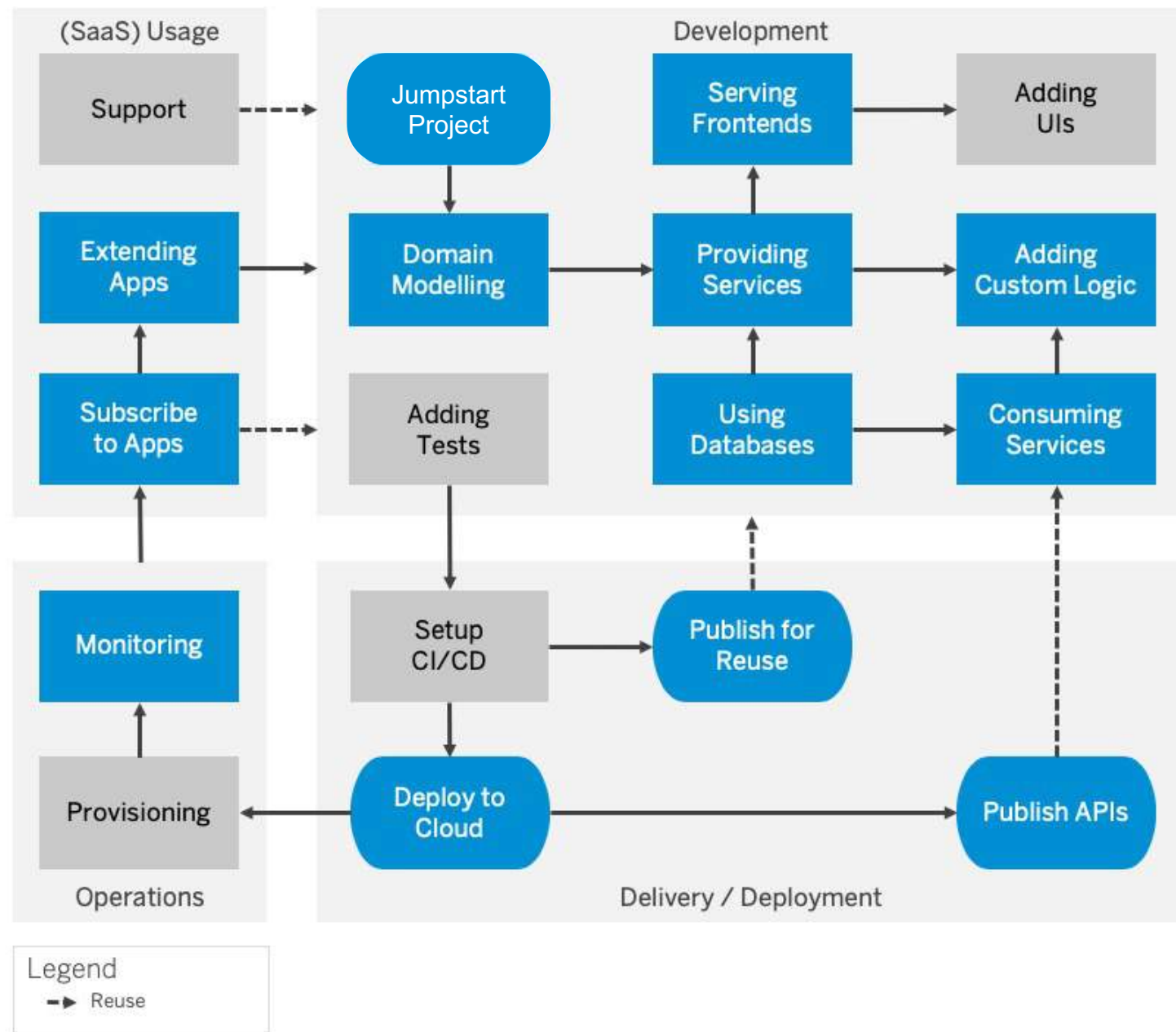
See Samples



Read Blog Posts



Get Support



Building Cloud Native App with Enterprise Qualities

Additional Reading

- [Getting Started in a Nutshell](#)
- [Project Setup & Layouts](#)
- [Jumpstart & Grow-as-you-go](#)
 - [Features Overview](#)

Jumpstart Project

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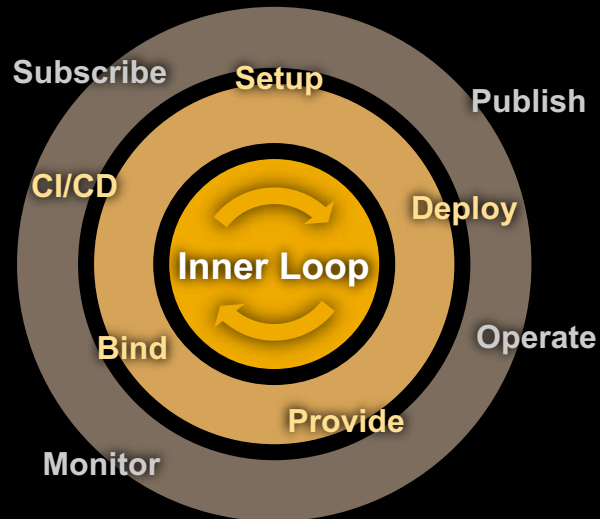
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...



- ***cds init*** starts projects w/o upfront setup
- ***cds run*** + ***watch*** full-fledged servers from the very beginning



1-digit seconds
turn-around times

Work in Inner Loops as much as possible → min complexity & turn-around times

- ***cds add*** more things only when required → convention over configuration
- ***cds mock*** platform services as well as remote business services
- ***cds bind*** to cloud or backends only when required → min complexity
- ***cds deploy*** to cloud only when required → saving time & costs

Contracts/APIs First → served out-of-the-box by CAP → **parallelize** your work

Late-cut μ Services → thru CAP's agnostic services → avoid pre-mature miscuts

Reuse, Compose & Extend → start out from others' work & share with others

Building Cloud Native App with Enterprise Qualities

Jumpstart Project

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CLI & Tools Support

CLI commands

Jump-start cds-based projects	<code>cds init <project></code>	✓
Add a feature to an existing project	<code>cds add <feature></code>	✓
Load models from external sources	<code>cds import <api></code>	✓
Export models to different outputs	<code>cds compile <models></code>	✓
Start on local server	<code>cds serve <services></code>	✓
Start on file changes	<code>cds watch</code>	✓
Load-eval event loop	<code>cds run</code>	✓
Inspect effective configuration	<code>cds env</code>	✓
Prepare for deployment	<code>cds build</code>	✓
Deploy to databases or cloud	<code>cds deploy</code>	✓
Create an extension project	<code>cds extend <app-url></code>	✓
Activate an extension project	<code>cds activate</code>	✓
Login to extendable SaaS application	<code>cds login <app-url></code>	✓
Logout from extendable SaaS application	<code>cds logout</code>	✓



1
minutes

Run `cds help <command>` to find details about an individual command. Use `cds version` to check the version that you've installed. To know what is the latest version, see the [Release Notes](#) for CAP.



Building Cloud Native App with Enterprise Qualities

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Domain Modelling

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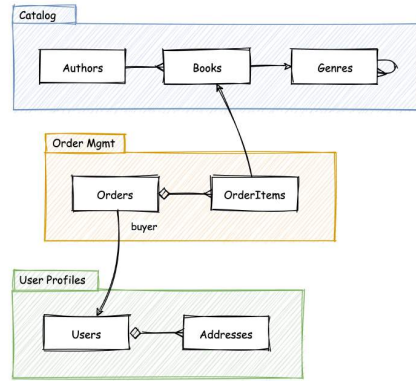
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...



Domain
Models

```
namespace capire.bookshop;

entity Books {
    key ID : Integer;
    title : localized String;
    descr : localized String;
    author : Association to Authors;
    genre : Association to Genres;
    price : Decimal;
}

entity Authors {
    key ID : Integer;
    name : String;
    books : Association to many Books;
}

entity Genres : cuid, CodeList {
    children : Composition of many Genres;
}

entity Orders : cuid {
    Items : Composition of many {
        book : Association to Books;
        amount : Integer;
    }
    status : enum { delivered; ... }
    tags : array of String;
    buyer : User;
    virtual total : Decimal;
}
```

2 Capture a **Domain Model**, using CDS entities, Associations, and other higher-level constructs...

- ⇒ **Conceptual Modelling by CDS:** concise and comprehensible models, allowing to stay close to your conceptual thinking
- ⇒ **Promoting Domain-driven Design:** close collaboration of **developers** and **domain experts** to iteratively refine domain knowledge
- ⇒ **Document-oriented Modelling:** fueling advanced generic providers, and mapping to relational as well as NoSQL databases

Building Cloud Native App with Enterprise Qualities

1

Domain Modelling

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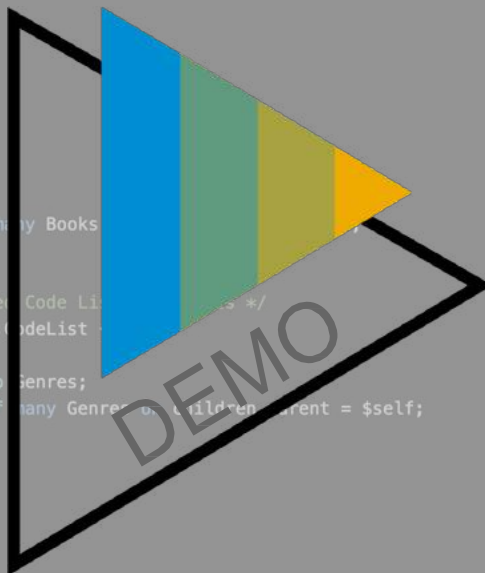
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...

```
1 using { Currency, managed, sap } from '@sap/cds/common';
2 namespace sap.capi.bookshop;
3
4 entity Books : managed {
5   key ID : Integer;
6   genre : Association to Genres;
7   stock : Integer;
8   price : Decimal(9,2);
9   currency : Currency;
10 }
11
12 entity Authors : managed {
13   key ID : Integer;
14   name : String(111);
15   dateOfBirth : Date;
16   dateOfDeath : Date;
17   placeOfBirth : String;
18   placeOfDeath : String;
19   books : Association to many Books;
20 }
21
22 /** Hierarchically organized Code List */
23 entity Genres : sap.common.CodeList {
24   key ID : Integer;
25   parent : Association to Genres;
26   children : Composition of many Genres on Children parent = $self;
27 }
28
29
30
31
```



3
minutes

Problems ~/projects ~/projects/bookshop x

user: bookshop \$

> NPM SCRIPTS

> SAP HANA PROJECTS

> CAP DATA MODELS AND SERVICES

Building Cloud Native App with Enterprise Qualities

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Providing Services

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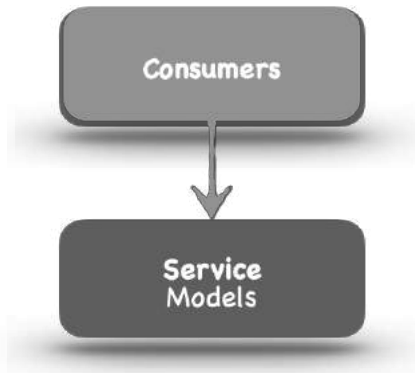
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...



```
entity Books {
  key ID : Integer;
  title : localized String;
  descr : localized String;
  author : Association to Authors;
  genre : Association to Genres;
  price : Decimal;
}
entity Authors {
  key ID : Integer;
  name : String;
  books : Association to many Books;
}
entity Genres : cuid, CodeList {
  children : Composition of many Genres;
}
```

```
using capire.bookshop as my from './schema';
```

```
// for browsing by end users
service CatalogService {
  entity Books as projection on my.Books {
    *, author.name as author
  } excluding {
    createdBy, modifiedBy
  }
  action submitOrder ( book, amount );
  event news : array of { book, info };
}
```

```
// for maintenance by administrators
service AdminService {
  entity Books as projection on my.Books;
  entity Authors as projection on my.Authors;
  entity Genres as projection on my.Genres;
}
```

- 3 Add **Service Models** as APIs and **facades** to consumers, capturing **behavioral aspects** of your domain
 - ⇒ **Service-centric Paradigm:**
every active thing is a (stateless) Service, processing (passive) data
 - ⇒ **Powerful View Building:**
to expose **denormalized** views on underlying domain models
 - ⇒ **Single-purposed 'Nano' Services:**
rule of thumb: 1 service per use case to modularize and optimize

Welcome to @sap/cds Server

Serving bookshop 1.0.0

These are the paths currently served ...

Building Cloud Native App with Enterprise Qualities



Service Endpoints:

/admin / \$metadata

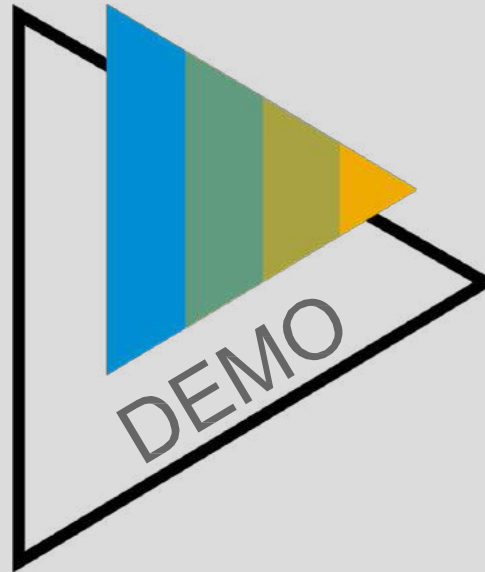
- Authors → Fiori preview
- Books → Fiori preview
- Currencies → Fiori preview
- Genres → Fiori preview

/browse / \$metadata

- Books → Fiori preview
- Currencies → Fiori preview
- Genres → Fiori preview

This is an automatically generated page.

You can replace it with a custom `./app/index.html`.



5
minutes



Building Cloud Native App with Enterprise Qualities

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Serving Frontends

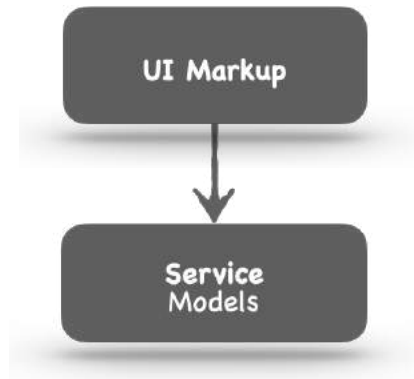
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```

// Fiori Markup
annotate Books with @(
  UI.SelectionFields: [
    ID, title, price
  ],
  UI.LineItem: [
    { Value: title, Label: 'Book Title' },
    { Value: author, ... },
    { Value: price, ... },
  ]
);
  
```

- 4 Using **Annotations** for semantic enrichment for various contexts and consumers, e.g...

⇒ **UI Markup**

e.g. Fiori UIs served completely out of CDS Models

⇒ **Analytics Markup**

for Embedded Analytics as well as SAP Analytics Cloud

⇒ **Custom Vocabularies**

everybody can introduce and add new annotation vocabularies

Combined with Aspects:

in separate models, possibly in separate projects

Standard ▾

Building Cloud Native App with Enterprise Qualities

Price:

Currency:

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Serving Frontends

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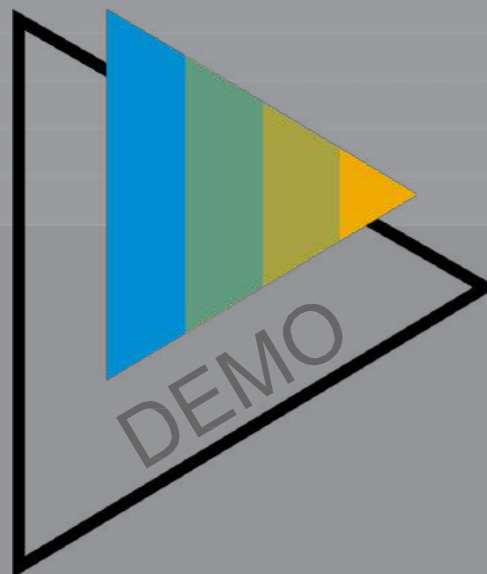
...

Go Adapt Filters

Books (5)

↑↓ ⚙️ 📄 ▾

Title	Author	Price	
Wuthering Heights	Emily Brontë	11.11	>
Jane Eyre	Charlotte Brontë	12.34	>
The Raven	Edgar Allen Poe	13.13	>
Eleonora	Edgar Allen Poe	14.00	>
Catweazle	Richard Carpenter	150.00	>



 **6 minutes**



Building Cloud Native App with Enterprise Qualities

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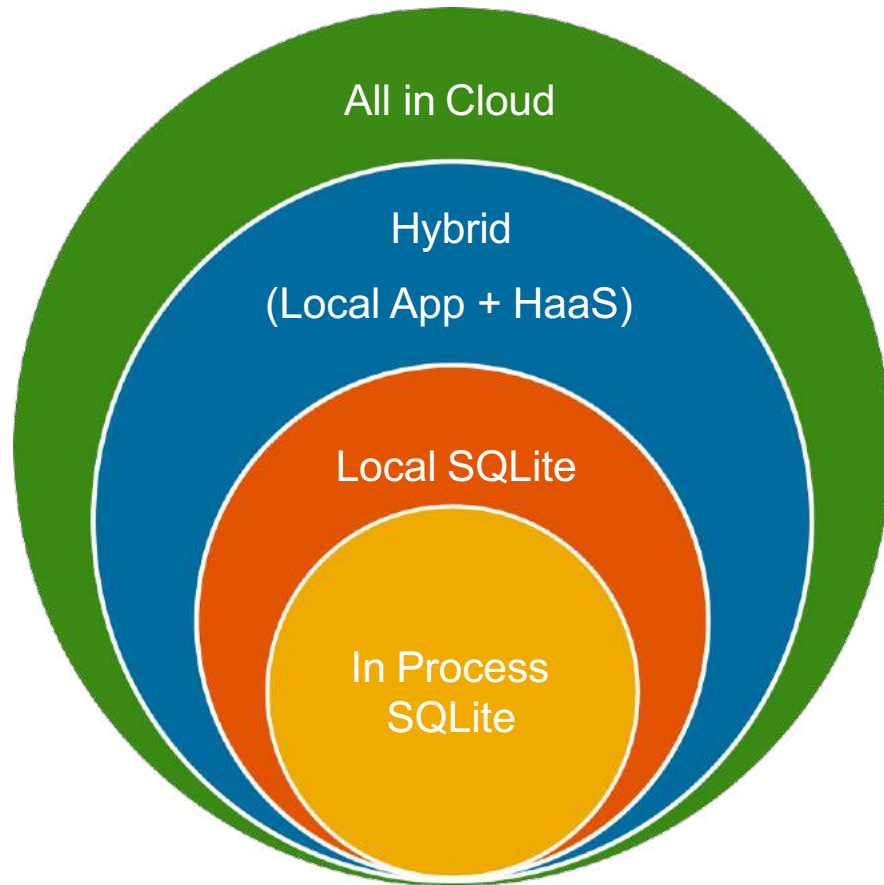
Using Databases

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Deploying for Production [1]

Deploy MTA to SAP Cloud Platform



SAP HANA

`cds deploy --to hana` [2]

Deploy data to SAP HANA

App stays local



SAP HANA

`cds deploy --to sqlite`

Deploy to local SQLite database



Local
SQLite

`cds run [app] --in-memory`

Run app with in-memory SQLite



In-Memory
SQLite

Building Cloud Native App with Enterprise Qualities

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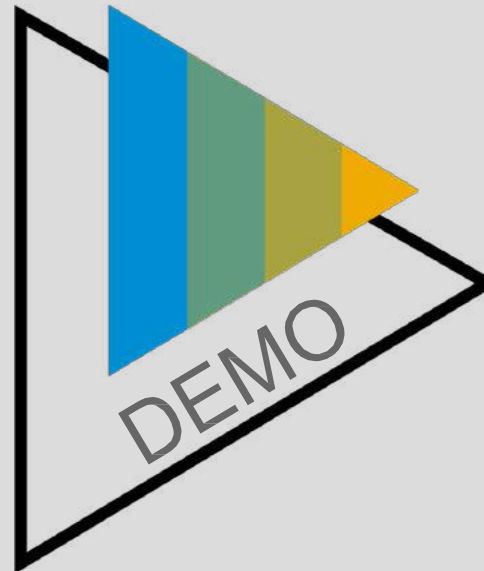
Using Databases

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8
minutes



Building Cloud Native App with Enterprise Qualities

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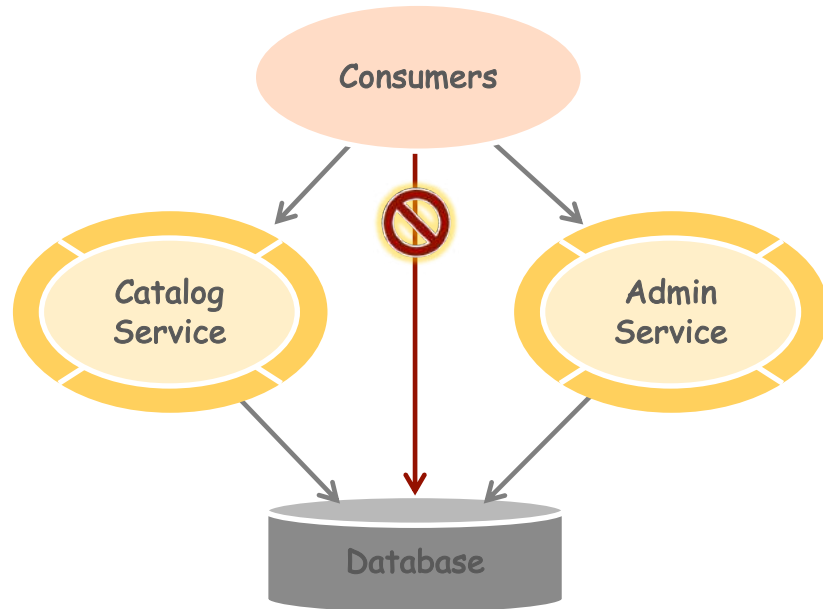
5

Consuming Services & Custom Logic

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...



⇒ Exposing restricted APIs with denormalized projections on underlying entities

⇒ All services support common APIs to consume and implement services

Every active thing in CAP is a Service...

- always **stateless**, acting on **passive data** → scalability
- reflecting individual **use cases** → 'nano services'
- acting as **facades** for consumers to access data
- including **technical/framework** services in CAP
- exchanging messages via **uniform APIs**

// some consumer code...

```
const cats = cds.connect.to('CatalogService')
let books = await cats.read('Books')
for (let book of books)
  if ('→ like it? ') cats.addToBasket(book)
```

// implementing provided services...

```
CatService.on('READ', 'Books', (req) => { ... })
```

// intercepting consumed services...

```
db.on('READ', '*', (req) => { ... })
```

1 2 3 4 5 Consuming Services & Custom Logic 7 8 ...

7 8

minutes

DEMO

Building Cloud Native App with Enterprise Qualities

Show Items

1

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Deploy to Cloud

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...

Prototypes

Destination Demo
Destination Services



PoC

Enable Now Demo
Kickstart B1



PoC

Purchasing

New Orders
Shopping Cart



Order Now!

Search POs
Search for Purchase ...



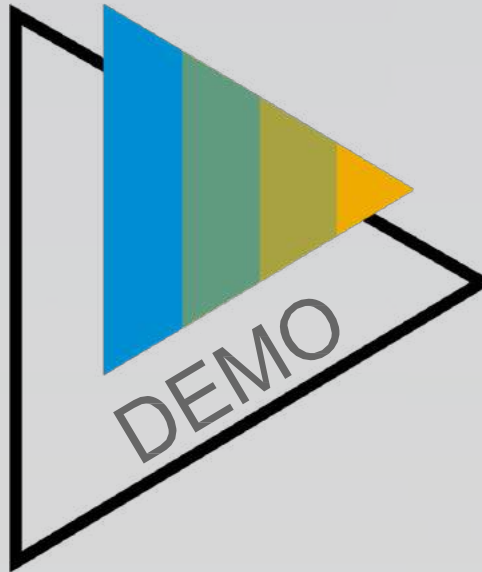
SAP Gateway ES5

SAP

Innovation at SAP
SAP.iO program



Learn about SAP.iO



10
minutes



Building Cloud Native App with Enterprise Qualities

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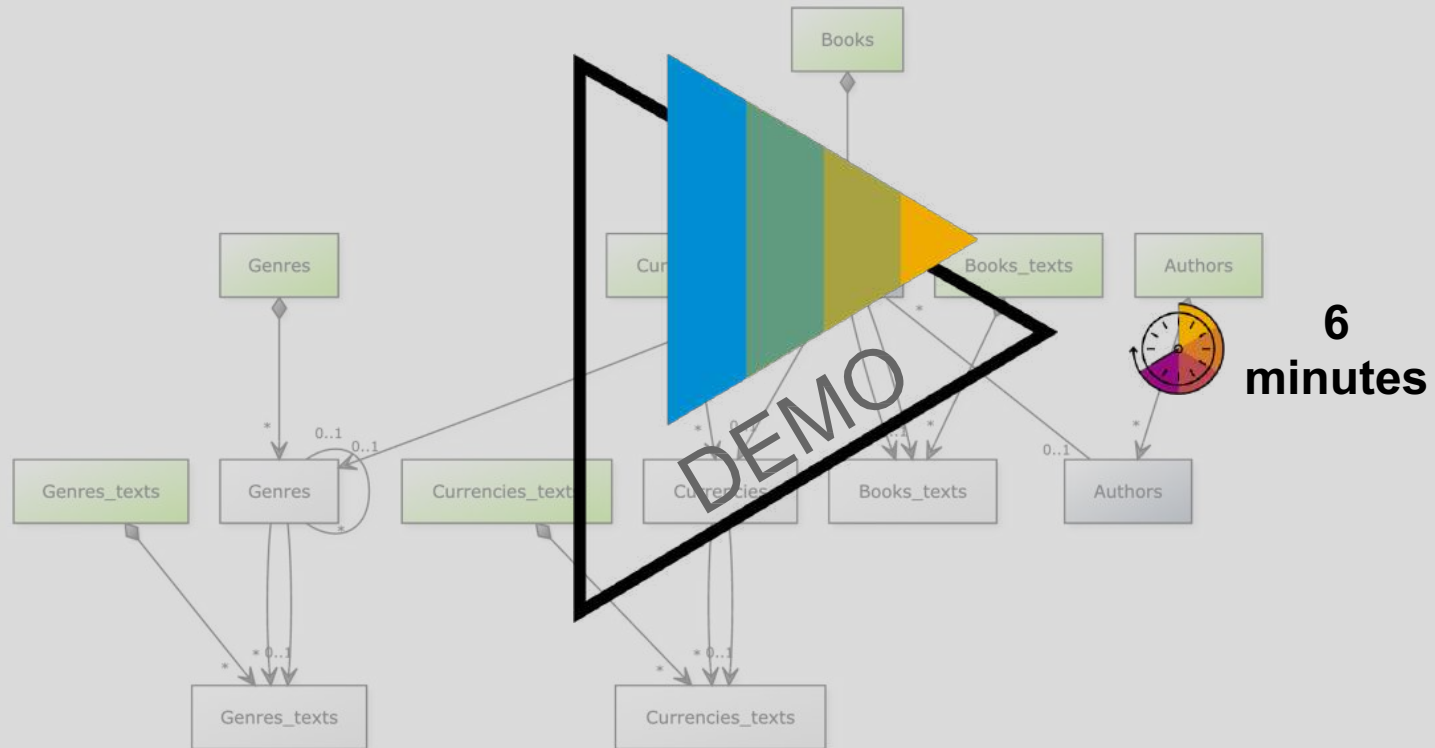
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Advanced Features

...

Entity Data Model



6
minutes

CREATED WITH YUML

Legend

EntitySet/Singleton/Operation

EntityType

ComplexType

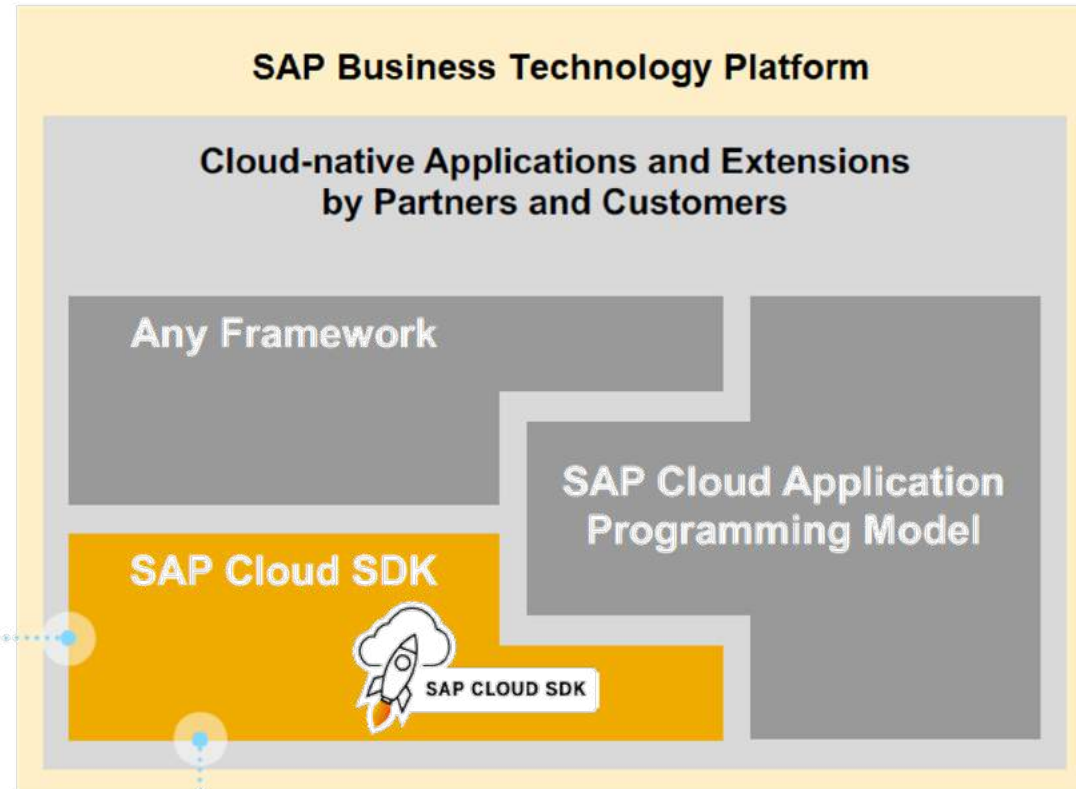
External.Type



Building Cloud Native App with Enterprise Qualities

Additional Reading

- [SAP Cloud SDK official documentation](#)
- [Blog on a working example](#)
- [Getting started with Cloud SDK NodeJS](#)
- [S4 Virtual Data Model](#)



*Check what features are available in each language [here](#).

Benefits of SAP Cloud SDK

Example: Connecting to SAP S/4HANA

Without SDK
(already simplified) Instead of menial, error-prone, low-level code...

```
// Implement tenant-aware logic to retrieve S4HC destination from SAP Cloud Platform
String destinationUrl = retrieveDestinationFromCloudPlatform();

// Implement potentially complex authentication flow (OAuth 2) depending on customer configuration
String authHeader = createAuthorizationHeader();

// Manually build up request URL (and, possibly request body)
StringBuilder url = new StringBuilder(destinationUrl);
url.append("/sap/opu/odata/sap/API_BUSINESS_PARTNER/A_BusinessPartner");
url.append("&$select=BusinessPartner,LastName");
url.append("&$filter=BusinessPartnerCategory eq '1'");

URL urlObj = new URL(url.toString());
URLConnection connection = (URLConnection) urlObj.openConnection();
connection.setRequestMethod("GET");
connection.setRequestProperty("Content-Type", "application/json");
connection.setRequestProperty("Accept", "application/json");
connection.setRequestProperty("Authorization", authHeader);
if (onPremise) {
    // Determine and add connectivity header required by SAP Cloud Connector
    // ...
}
connection.setDoInput(true);

try {
    int responseCode = connection.getResponseCode();
} catch (IOException e) {
    // Exception handling (non-resilient)
}

final InputStreamReader in = new InputStreamReader(connection.getInputStream());
String response = CharStreams.toString(in);

// Implement own Java class for result set with 100+ properties and parse response
List<MyBusinessPartner> result = Arrays.asList(
    new Gson().fromJson(response, MyBusinessPartner[].class));
```

Retrieve config

Authenticate

Build request

Connect

Handle response

Convert result



With SDK ... let developers focus on solving business problems.

```
final List<BusinessPartner> businessPartners = service.getAllBusinessPartner()
    .select(BusinessPartner.BUSINESS_PARTNER, BusinessPartner.LAST_NAME)
    .filter(BusinessPartner.BUSINESS_PARTNER_CATEGORY.eq(CATEGORY_PERSON))
    .execute();
```

Easy, **type-safe**, and fluent access to **CRUD APIs** + additional **advanced features**:

- Dependency injection & mocking
- Optimistic concurrency control
- Multi-tenancy
- Resilience*, Cache* and Security
- Extensibility
- And more...



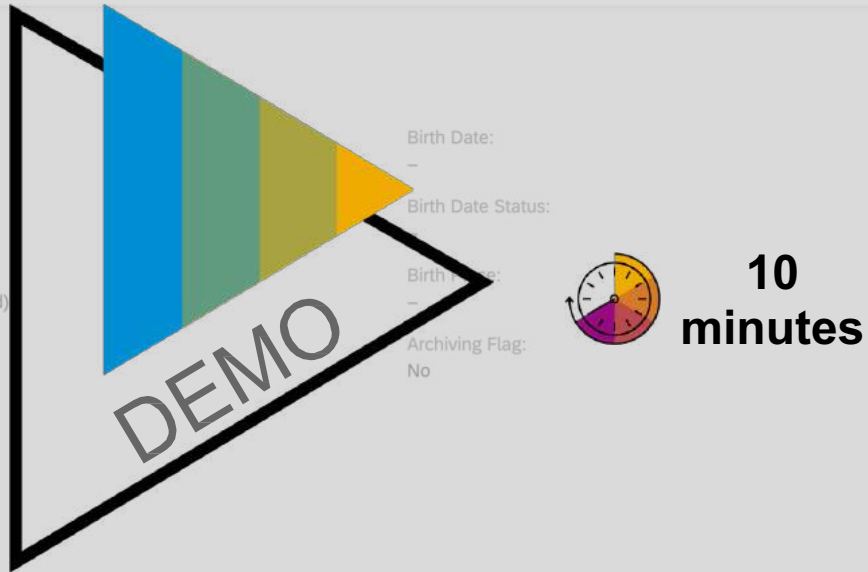
Building Cloud Native App with Enterprise Qualities

1 2 3 4 5 6 7 8 SAP Cloud SDK ...

Basic Data Roles Address Address Independent Communication Bank Accounts Payment Cards Identification Contacts Relationships Classification Attachments

General Information

Title:	Gender:	Birth Date:	Created By:
—	Unknown	—	SA_IN_API_USER (CC0000000182)
First Name:	Academic Title:	Birth Date Status:	Created On:
Amazon	—	—	06/28/2021
Last Name:	Authorization Group:	Birth Name:	Last Changed By:
Bootcamp	Visibility 0 (Unrestricted)	—	—
Search Term 1:	Natural Person:	Archiving Flag:	Last Changed On:
—	No	No	—
Search Term 2:	External BP Number:		
—	—		



Notes

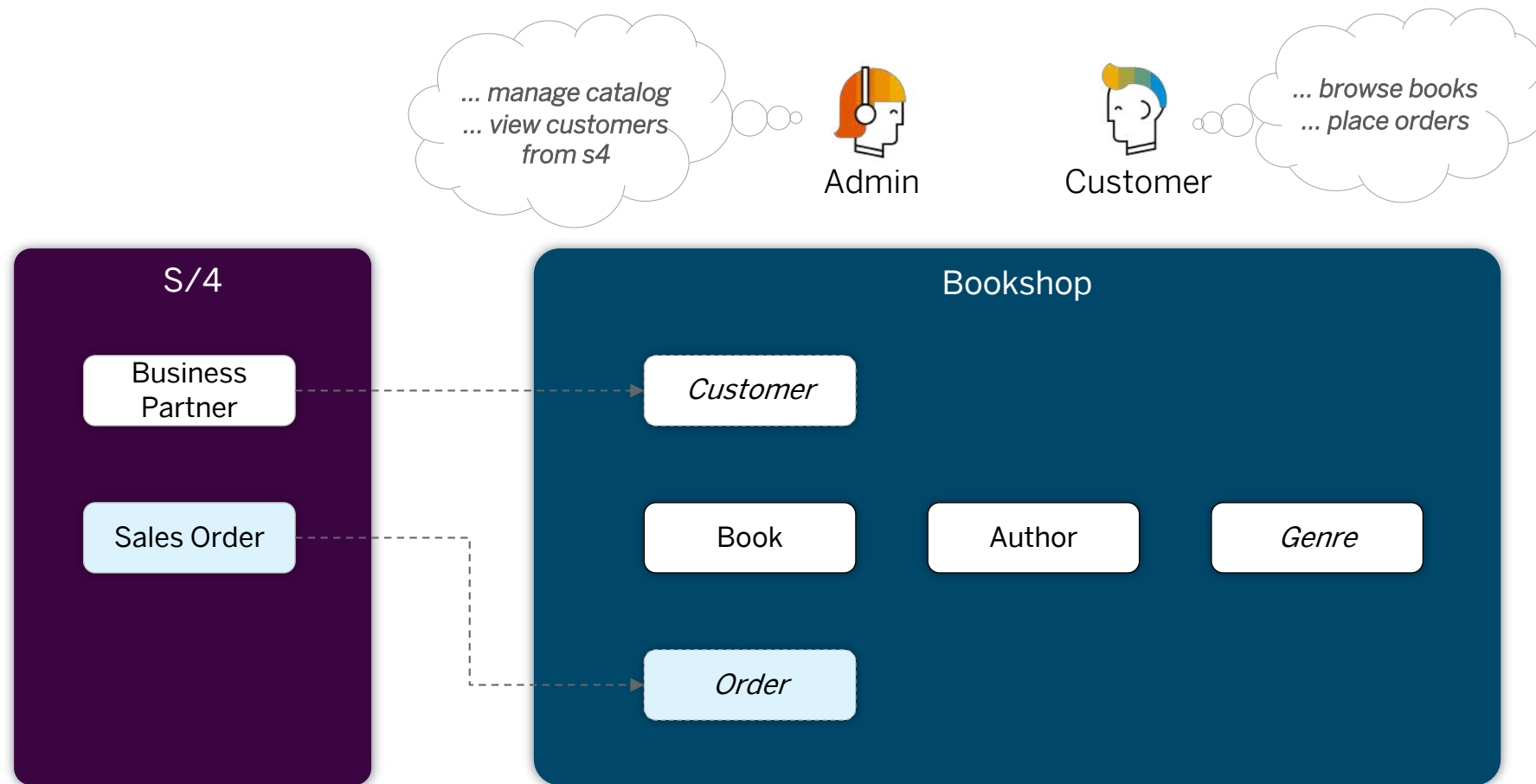
Language	ID	Long Text
No data found.		

Roles

Roles (0)

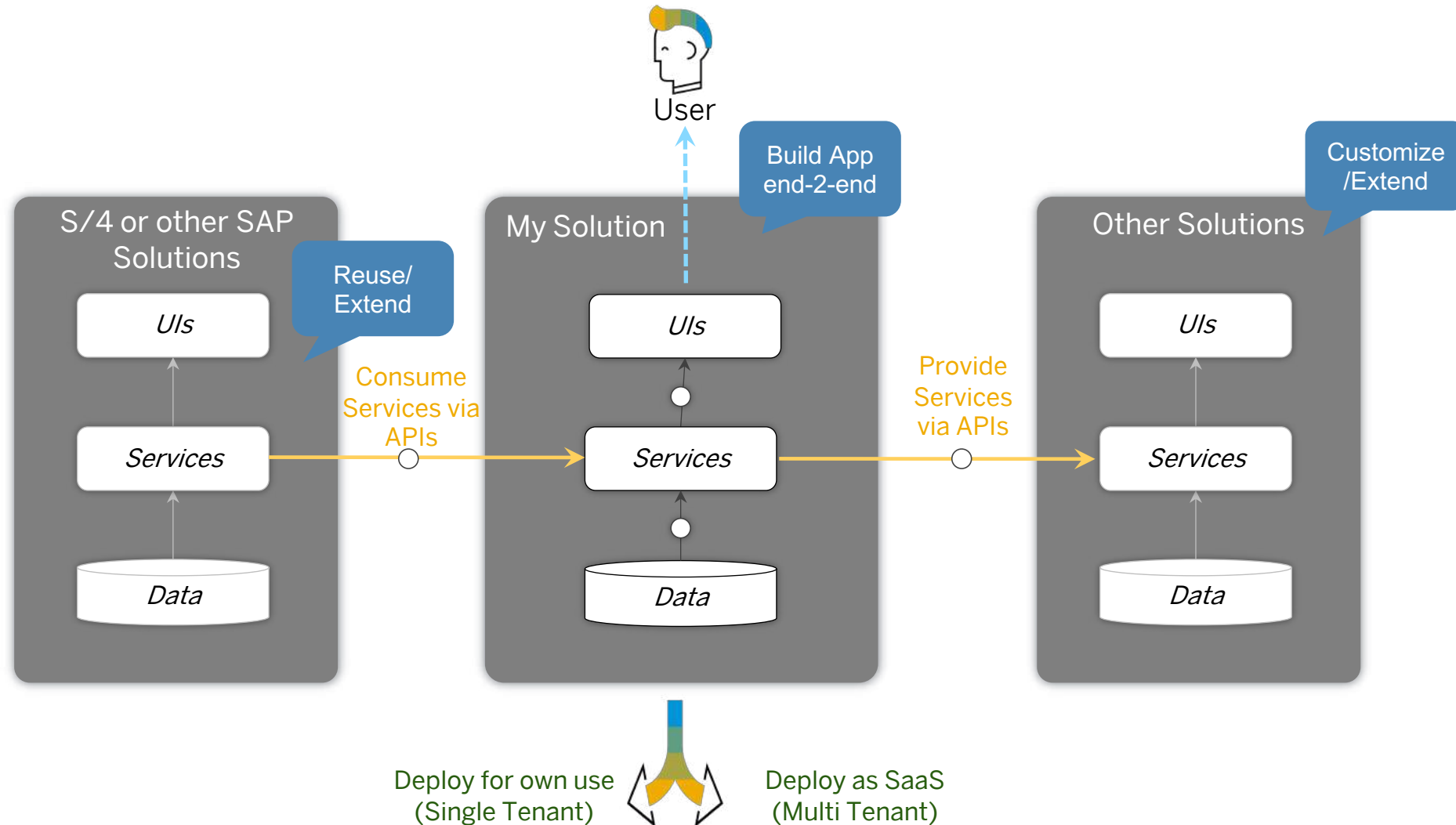
Business Partner Role	Valid From	Valid To
-----------------------	------------	----------

Recap: Scenario of a Bookshop Management Solution



Developed with CAP, coupled with SAP Cloud SDK & SAP HANA Cloud on SAP BTP.
As highlighted – scope will not be covered in today's demo.

Recap: Use Case Scenarios



Recap & Summary



What a Journey! Highlighting CAP Features & Qualities



Serving Frontends

- *Angular, React, Vue.js, ... via ajax*
- *Fiori via Annotations + Draft*
- *Analytical Queries*

Streamlined & Accelerated Development

- *Jumpstart & Grow-as-you-go...*
- *Scalability, Security, Multitenancy*

Platform Integration out-of-the-box

- *Simplified, Platform-Agnostic APIs*
- *Safeguarding Investments*

Providing Services

- *Generic Providers → Low Code*
- *Synchronous & Asynchronous*
- *Via REST, OData, ...*

Core Concepts

- *Domain Modeling* → *focus on domain; powd. by CDS*
- *Mixed-in Aspects* → *sep. of concerns - verticalization*
- *Powerful Querying* → *de-normalized views - mashups*
- *Pervasive Services* → *service-centric paradigm*
- *Ubiquitous Events* → *intrinsic messaging*

Consuming Services

- *Via Uniform, Protocol-Agnostic APIs*
- *Synchronous & Asynchronous*
- *CDS-based Mashups*

Enterprise Features out-of-the-box

- *Best Practices served out-of-the-box*
- *for data-centric business apps*
- *Minimizing tedious recurring tasks*

Cloud-Native Qualities by Design

- *Adaptability, Extensibility, Observability*
- *Scalability, Security, Multitenancy*

Database Support

- *CDS → DB Schema; Schema Evolution*
- *HANA, H2, SQLite, ... → SQL + NoSQL*

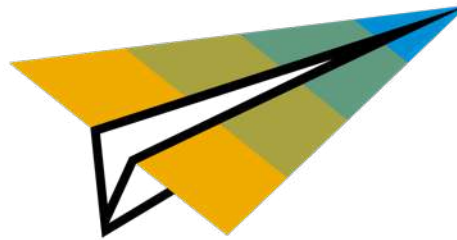
Key Takeaways



The **Application Programming Model** is SAP's programming model for building enterprise business applications by guiding developers with SAP best practices for full stack development.



Seamlessly integrates Open Source Software and SAP technologies into one consistent **e2e programming model** and development experience.



Light-weight & modular implementation of CDS allowing rapid development of persistency, business logic and UI, tailored for SAP Business Technology Platform.



Guides developers with by providing a set of enterprise-grade tools, languages and libraries, allowing them to **focus only on their domain logic**.

Call to Action

Now, it's your turn to take action to put your learnings into prototypes.



Complete 3 Learnings Resources

1. Build an Application End-to-End Using CAP, Node.js and VS Code ([SAP Dev Tutorial](#)) ~240 minutes
2. In-depth Tutorials of CAP ([YouTube Playlist](#)) ~150 minutes
3. Any one of the learning resources shared later based on your specific exposure.

Objectives

For new & seasoned developers to be familiarise with SAP Cloud Application Programming model & NodeJS.

Assignment

1. Clone [Bookshop](#) Git Repository.
2. Deploy to your own SAP BTP Trial Account.
3. Complete & Extend Use Case of your selection from the following choices:
 - a. Extend S/4HANA's Sales Order module into existing Bookshop use case as illustrated in the demo.
 - b. Extend ANY system with a valid use case of your choice with CAP.
 - c. Enhance CAP project of the existing Bookshop solution WITHOUT any extended system.

Navigating MS Teams for Assignments & Collaboration

The screenshot displays the Microsoft Teams interface. On the left, the 'Teams' sidebar shows a list of teams, including 'SAP Extension Suite & SAP Integration...' and 'Exercise - CAP'. The main area shows a task list for the 'Exercise - CAP' team. The task list is organized into sections: 'Pre-requisite', 'Learning', and 'Assignment'. A 'Copy Task' dialog box is open, showing options to copy task information such as 'Plan name', 'Assignments', 'Bucket name', 'Include', 'Assignment', 'Progress', 'Dates', 'Description', 'Checklist', 'Attachments', and 'Labels'. A large, stylized graphic of a person's head and shoulders is overlaid on the right side of the dialog box. The background is a dark gray, and the overall layout is clean and modern.

Teams

Exercise - CAP

Posts Files Assignments Issues +

Group by Bucket Filter List Board Charts Schedule

COPY ONLY. DO NOT EDIT/DELETE/MOVE

Jacob Tan

Add new bucket

+ Add task

+ Add task

Pre-requisite

Pre-requisite

Prepare Your Development Environment for CAP

<https://developers.sap.com/group.btp-app-cap-prepare.html>

Complete duration: ~40 minutes

Learning

Build an Application End-to-End Using CAP, Node.js and VS Code

<https://developers.sap.com/mission.btp-application-cap-e2e.html>

Complete duration: ~240 minutes

Learning

In-depth SAP CAP Tutorials

<https://youtube.com/playlist?list=PL6RpkC85SLO8Fi4SK77b2y4EwIXMV...>

Complete duration: ~150 minutes

Assignment

Clone Bookshop Git Repo & Deploy on SAP BTP Trial Account

<https://github.com/jacobahtan/bootcamp-cap-bookshop>

Copy Task

New task name

Build an Application End-to-End Using CAP, Node.js and VS Code

Plan name

Assignments

Bucket name

COPY ONLY. DO NOT

Include

Assignment

Progress

Dates

Description

Checklist

Attachments

Labels

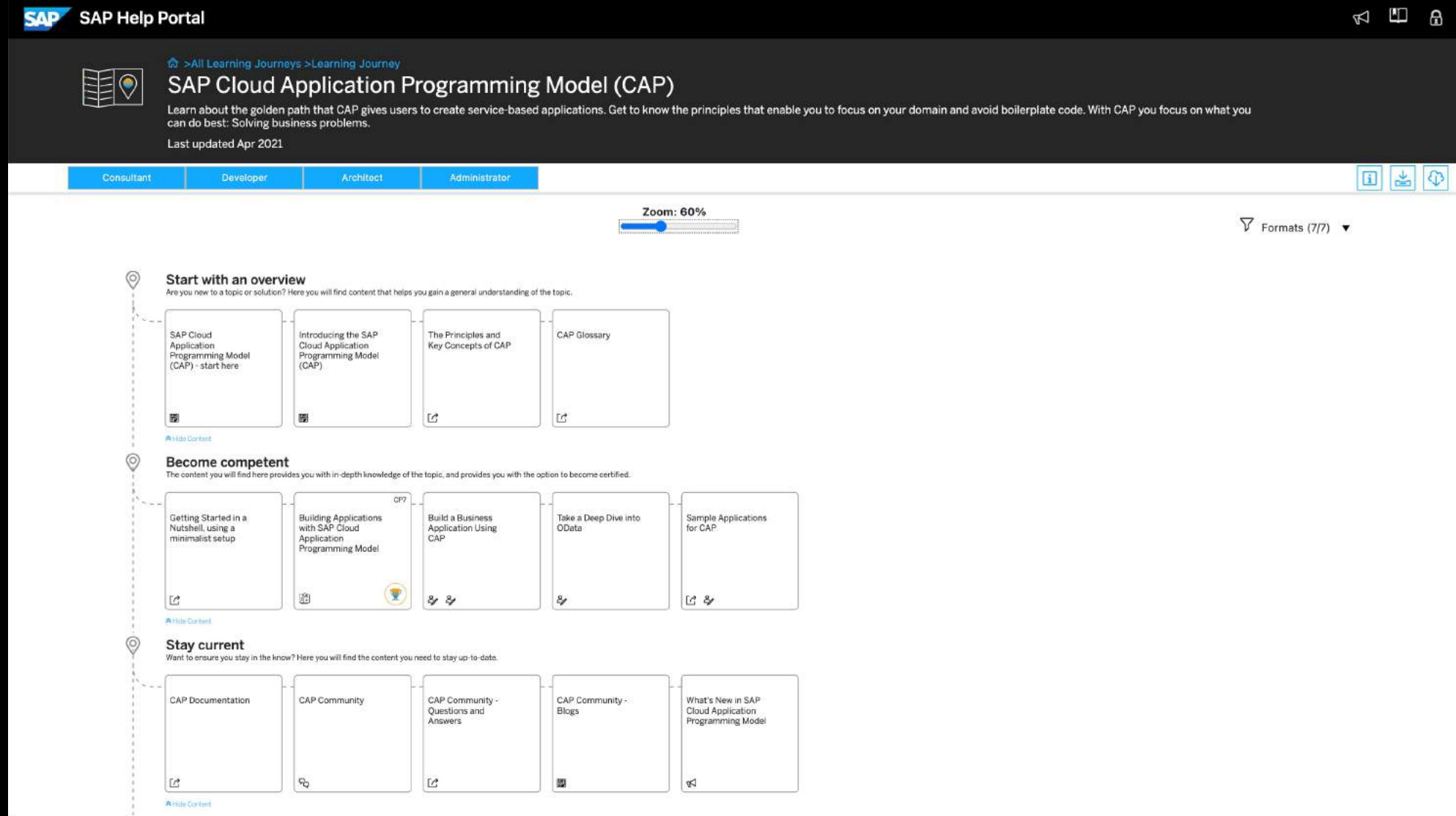
Copy Cancel

Task copied

Resources



SAP Learning Journey on SAP CAP ([Link](#))



The screenshot displays the SAP Help Portal interface for the SAP Cloud Application Programming Model (CAP) learning journey. The header includes the SAP logo and 'SAP Help Portal' text. A navigation bar shows roles: Consultant, Developer, Architect, and Administrator. The main content area is titled 'SAP Cloud Application Programming Model (CAP)' and includes a brief description and a 'Last updated Apr 2021' note. A zoom slider is set to 60%. The journey is divided into three sections: 'Start with an overview', 'Become competent', and 'Stay current'. Each section contains a series of content cards with titles and icons, connected by a dashed line. The 'Start with an overview' section includes cards for 'SAP Cloud Application Programming Model (CAP) - start here', 'Introducing the SAP Cloud Application Programming Model (CAP)', 'The Principles and Key Concepts of CAP', and 'CAP Glossary'. The 'Become competent' section includes 'Getting Started in a Nutshell, using a minimalist setup', 'Building Applications with SAP Cloud Application Programming Model', 'Build a Business Application Using CAP', 'Take a Deep Dive into OData', and 'Sample Applications for CAP'. The 'Stay current' section includes 'CAP Documentation', 'CAP Community', 'CAP Community - Questions and Answers', 'CAP Community - Blogs', and 'What's New in SAP Cloud Application Programming Model'. A 'Formats (7/7)' dropdown is visible in the top right corner.

SAP SAP Help Portal

>All Learning Journeys >Learning Journey

SAP Cloud Application Programming Model (CAP)

Learn about the golden path that CAP gives users to create service-based applications. Get to know the principles that enable you to focus on your domain and avoid boilerplate code. With CAP you focus on what you can do best: Solving business problems.

Last updated Apr 2021

Consultant Developer Architect Administrator

Zoom: 60%

Formats (7/7)

Start with an overview

Are you new to a topic or solution? Here you will find content that helps you gain a general understanding of the topic.

- SAP Cloud Application Programming Model (CAP) - start here
- Introducing the SAP Cloud Application Programming Model (CAP)
- The Principles and Key Concepts of CAP
- CAP Glossary

Become competent

The content you will find here provides you with in-depth knowledge of the topic, and provides you with the option to become certified.

- Getting Started in a Nutshell, using a minimalist setup
- Building Applications with SAP Cloud Application Programming Model
- Build a Business Application Using CAP
- Take a Deep Dive into OData
- Sample Applications for CAP

Stay current

Want to ensure you stay in the know? Here you will find the content you need to stay up-to-date.

- CAP Documentation
- CAP Community
- CAP Community - Questions and Answers
- CAP Community - Blogs
- What's New in SAP Cloud Application Programming Model

Building Applications with SAP Cloud Application Programming Model

openSAP – Self-paced Course



Duration: 4 weeks

Effort required: 4-6 hours per week

Week 1: Introducing SAP Cloud Application Programming Model

Week 2: Development Tasks

Week 3: Add Enterprise Qualities


Week 4: Extend the Digital Core and Other Topics



Sign up for free: <https://open.sap.com/courses/cp7>

In-depth CAP focused video tutorials & other resources ([Link](#))








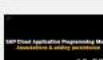
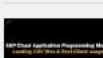
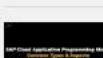
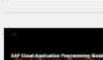
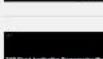

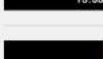

SAP Cloud Application Programming Model - Devtoberfest Enablement

11 videos • 9,650 views • Last updated on 23 Mar 2021

In a series of videos the SAP Developer Advocates will not only introduce you to the Big Picture and the concepts of the SAP Cloud Application Programming Model (CAP), they'll also explain the steps to build your first standalone application. You will start with a very rudimentary data model and simple OData services, and then make enhancements with some server-side JavaScript (Node.js) to implement your own business logic. Finally, you'll use different database systems such as SQLite and SAP HANA Cloud for storing your data and use SAP Cloud Platform as the target runtime environment for your first CAP application.

<https://github.com/SAP-samples/sap-de...>

SAP Developers SUBSCRIBED

-  **SAP Cloud Application Programming Model - Introduction**
SAP Developers
WATCHED 23:33
-  **SAP Cloud Application Programming Model - Ex. 01 - Get to know the Development Tools**
SAP Developers
5:45
-  **SAP Cloud Application Programming Model - Ex. 02 - Creating a new project**
SAP Developers
11:24
-  **SAP Cloud Application Programming Model - Ex. 03 - Associations & adding persistence**
SAP Developers
10:58
-  **SAP Cloud Application Programming Model - Ex. 04 - Loading CSV files & Rest Client usage**
SAP Developers
7:56
-  **SAP Cloud Application Programming Model - Ex. 05 - Common Types & Aspects**
SAP Developers
9:56
-  **SAP Cloud Application Programming Model - Ex. 06 - Enhancing the service with annotations**
SAP Developers
8:47
-  **SAP Cloud Application Programming Model - Ex.07 - Second Service & Namespaces**
SAP Developers
12:54
-  **SAP Cloud Application Programming Model - Ex. 08 - Custom Logic & Debugging**
SAP Developers
13:53
-  **SAP Cloud Application Programming Model - Ex. 09 - Introducing an app at the UI layer**
SAP Developers
19:24
-  **SAP Cloud Application Programming Model - Ex.10 - Deployment SAP HANA Cloud & SAP Cloud Platform**
SAP Developers
27:29

Key Take Away

- Getting Started & Learning about the Dev Tools
- First project based on CAP model
- Adding persistence layer to your app
- Building microservices with annotations
- Adding custom logic and debugging
- Custom UI layer
- Deployment

EXPECTED COMPLETION DURATION

Duration may vary based on technical scenario and Partner expertise level, below we present an expectation only.

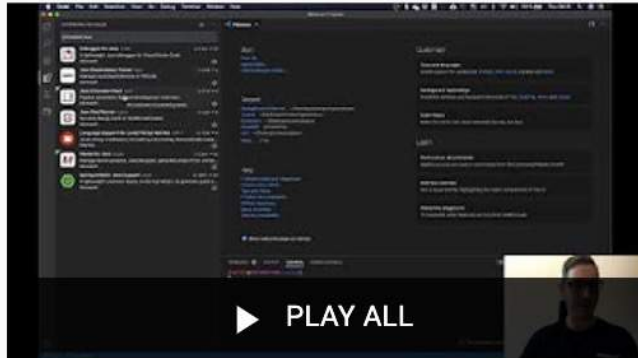
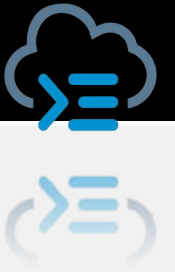


■ Best scenario ■ Worst scenario

150 Minutes

1 Day

Video Tutorials on CAP Model focusing with Java ([Link](#))



Cloud Application Programming Model - Java

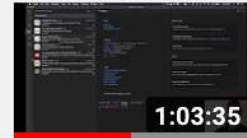
5 videos • 539 views • Last updated on 27 May 2020



Max Streifeneder

SUBSCRIBE

1



Ep0. - CAPch (catch) up with Java

Max Streifeneder

2



Ep1. - CAP Java - Custom Logic

Max Streifeneder

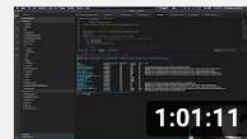
3



Ep2. - CAP Java - Database operations and Deployment options

Max Streifeneder

4



Ep3. - CAP Java - MTA, CF CLI, Monitoring

Max Streifeneder

5




Ep4. - CAP Java - Logging/Monitoring

Max Streifeneder

In-depth S/4HANA Cloud with CAP and Cloud SDK focused video tutorials & other resources ([Link](#))





Building Extensions for SAP S/4HANA Cloud using APIs and Events

12 videos • 9,658 views • Last updated on 6 Apr 2021



In this series of hands-on video tutorials Philip Mugglestone covers a simple scenario that outlines how to extend SAP S/4HANA Cloud using APIs and events.












Tutorials cover a simple scenario that incorporates key aspects of developing side-by-side extensions to SAP S/4HANA Cloud. Components used include SAP API Business Hub, SAP Business Technology Platform, SAP S/4HANA Cloud Extensibility, SAP Event Mesh, SAP HANA Cloud, and SAP Cloud Application Programming Model (CAP).

For the blog post, visit <https://blogs.sap.com/2021/03/30/building-extensions-for-sap-s4hana-cloud-using-apis-and-events/>

Find the latest SAP HANA Academy video tutorials here: <https://youtube.com/saphanaacademy>

SHOW MORE

 **SAP HANA Academy** SUBSCRIBED 

-  **Extend S/4HANA Cloud: 01. Getting Started**
SAP HANA Academy 9:18
-  **Extend S/4HANA Cloud: 02. Register Systems**
SAP HANA Academy 6:59
-  **Extend S/4HANA Cloud: 03. Consume APIs**
SAP HANA Academy 6:56
-  **Extend S/4HANA Cloud: 04. Consume Events**
SAP HANA Academy 6:27
-  **Extend S/4HANA Cloud: 05. Subscriptions**
SAP HANA Academy 9:19
-  **Extend S/4HANA Cloud: 06. Create Extension App**
SAP HANA Academy 9:41
-  **Extend S/4HANA Cloud: 07. Review Extension App**
SAP HANA Academy 12:35
-  **Extend S/4HANA Cloud: 08. Deploy Extension App**
SAP HANA Academy 11:38
-  **Extend S/4HANA Cloud: 09. Ongoing Development**
SAP HANA Academy 9:35
-  **Extend S/4HANA Cloud: 10. Local Development**
SAP HANA Academy 7:13
-  **Extend S/4HANA Cloud: 11. Cleanup**
SAP HANA Academy 9:17

Key Take Away

- Side-by-side extensions to S/4 HANA Cloud
- How to consume events from external app
- Creating and deploy an extension app
- Using CAP and Cloud SDK to extend S4 Business Partner

EXPECTED COMPLETION DURATION

Duration may vary based on technical scenario and Partner expertise level, below we present an expectation only.



■ Best scenario ■ Worst scenario

120 Minutes

1 Day

SAP Developer Tutorials focus on SAP CAP ([Link](#))



4 Mission 10 Group 48 Tutorial

<p>Mission Beginner 2 hr. 15 min. 8 tutorials</p> <p>Build a Business Application Using CAP for Java</p> <p>Develop a business application using SAP Cloud Application Programming Model (CAP) for Java. Start with the SAP Business Application Studio and deploy to SAP Business Technology Platform.</p> <p>SAP Cloud Application Programming Model</p>	<p>Mission Beginner 1 hr. 20 min. 2 tutorials</p> <p>Build a Business Application Using CAP for Node.js</p> <p>Develop a business application using SAP Cloud Application Programming Model (CAP). Start on your local environment and deploy to SAP Business Technology Platform.</p> <p>SAP Cloud Application Programming Model</p>	<p>Mission Beginner 4 hr. 16 tutorials</p> <p>NEW Build an Application End-to-End using CAP, Node.js and VS Code</p> <p>Develop a business application using SAP Cloud Application Programming Model (CAP). Start on your local environment, create UIs and deploy your application to SAP Business Technology Platform (SAP BTP).</p> <p>SAP Cloud Application Programming Model</p>	<p>Mission Beginner 2 hr. 15 min. 8 tutorials</p> <p>Combine CAP with SAP HANA Cloud to Create Full-Stack Applications</p> <p>Deploy and configure an instance of the SAP HANA Cloud trial, develop a multi-target application using SAP Business Application Studio and SAP Cloud Application Programming Model, and create a service layer and SAP Fiori UI that also includes SAP HANA native artifacts, such as calculation views.</p> <p>SAP HANA Cloud</p>	<p>Group Beginner 40 min. 2 tutorials</p> <p>Add SAP HANA Cloud Native Artifacts to a CAP Application</p> <p>Add SAP HANA Cloud native artifacts, such as calculation views and stored procedures, to an SAP Cloud Application Programming Model (CAP) application.</p> <p>SAP HANA Cloud</p>
<p>Group Beginner 1 hr. 3 tutorials</p> <p>Build Your First OData-Based Backend Service</p> <p>Build a simple OData backend service using Core Data Services (CDS), and interact with the service using simple OData query operations.</p> <p>SAP Business Technology Platform</p>	<p>Group Beginner 1 hr. 20 min. 6 tutorials</p> <p>NEW Create a CAP Application and SAP Fiori UI</p> <p>Create a CAP application, enhance it with an SAP Fiori UI, and add business logic to it. Add a Launch Page to start the UIs, add roles and authorization checks, and run the application locally.</p> <p>SAP Cloud Application Programming Model</p>	<p>Group Beginner 1 hr. 30 min. 4 tutorials</p> <p>Create an Incident Management App with SAP Fiori Elements for OData V4</p> <p>Create a list-report object page application using SAP Business Application Studio. The application is based on an OData V4 service built with the SAP Cloud Application Programming Model. Learn how to refine the app by using UI annotations and how to extend it by leveraging the Flexible Programming Model.</p> <p>SAP Fiori</p>	<p>Group Beginner 1 hr. 50 min. 5 tutorials</p> <p>NEW Create Full-Stack SAP Launchpad App with SAP HANA Cloud, CAP, and SAP Fiori Elements</p> <p>Develop a multi-target application using SAP Business Application Studio and SAP Cloud Application Programming Model, and create a service layer and SAP Fiori elements UI that will be embedded in a SAP Fiori launchpad.</p> <p>SAP Business Technology Platform</p>	<p>Group Beginner 2 hr. 7 tutorials</p> <p>NEW Deploy Your CAP Application on SAP BTP Cloud Foundry Environment</p> <p>Deploy your CAP application to SAP Business Technology Platform, Cloud Foundry environment as a Multi-Target Application (MTA). Set up SAP HANA Cloud as a database and the Launchpad service to access your UIs.</p> <p>SAP Cloud Application Programming Model</p>
<p>Group Beginner 55 min. 4 tutorials</p> <p>Develop a CAP Node.js App Using SAP Business Application Studio</p> <p>Use SAP Business Application Studio to develop a basic CAP Node.js application for Cloud Foundry. Along the way, learn how to set up SAP Business Application Studio for end-to-end business application development.</p> <p>SAP Business Application Studio</p>	<p>Group Beginner 40 min. 3 tutorials</p> <p>NEW Prepare Your Development Environment for CAP</p> <p>Perform the required setup steps and software installation to develop your CAP application using VS Code as an editor.</p> <p>SAP Cloud Application Programming Model</p>	<p>Group Beginner 55 min. 4 tutorials</p> <p>Set Up SAP HANA Cloud and CAP Project</p> <p>Create an instance of SAP HANA Cloud, set up your development project and perform basic database modeling using SAP Cloud Application Programming Model (CAP) Core Data Services.</p> <p>SAP HANA Cloud</p>	<p>Group Beginner 40 min. 2 tutorials</p> <p>Use SAP HANA Cloud and CAP to Build a Full-Stack Application</p> <p>Extend a basic SAP Cloud Application Programming Model (CAP) project to include service enablement, an SAP Fiori user interface, and real authentication and authorizations via an Application Router and XSUAA instance.</p> <p>SAP HANA Cloud</p>	<p>Tutorial Beginner 10 min. 1 tutorial</p> <p>Add a Custom Event Handler</p> <p>Write your first CAP Java Custom Event Handler.</p> <p>SAP Cloud Application Programming Model</p>
<p>Tutorial Beginner 20 min. 1 tutorial</p> <p>NEW Add a List Report Interface to the CAP App (SAP HANA Cloud)</p> <p>Run the CAP app locally and add an SAP Fiori elements list report to display the data.</p> <p>SAP Fiori</p>	<p>Tutorial Beginner 1 hr. 1 tutorial</p> <p>Add Automated System Tests for CAP-Based Projects to Your CI/CD Pipeline</p> <p>Use UI5Verbs to create system tests against a CAP-based sample application. Automate your tests through a CI/CD pipeline.</p> <p>SAP Cloud Application Programming Model</p>	<p>Tutorial Beginner 5 min. 1 tutorial</p> <p>NEW Add Business Logic to Your Application</p> <p>This tutorial shows you how to create an SAP Fiori Elements app on top of your previously created CAP application.</p> <p>SAP Cloud Application Programming Model</p>	<p>Tutorial Beginner 15 min. 1 tutorial</p> <p>NEW Add More Than One Application to the Launch Page</p> <p>This tutorial shows you how to create an SAP Fiori elements app on top of your previously created CAP service.</p> <p>SAP Cloud Application Programming Model</p>	<p>Tutorial Beginner 20 min. 1 tutorial</p> <p>NEW Add the SAP Launchpad Service</p> <p>This tutorial shows you how to add the SAP Launchpad application.</p> <p>SAP Cloud Application Programming Model</p>
<p>Tutorial Intermediate 20 min. 1 tutorial</p> <p>Add User Authentication to Your Application (SAP HANA Cloud)</p> <p>Define security and enable user authentication and authorization for your SAP HANA Cloud CAP application.</p> <p>SAP HANA Cloud</p>	<p>Tutorial Beginner 30 min. 1 tutorial</p> <p>NEW Assign a Role Collection to a User</p> <p>This tutorial shows you how to assign roles to users.</p> <p>SAP Cloud Application Programming Model</p>	<p>Tutorial Beginner 45 min. 1 tutorial</p> <p>Build a Service-Centric Application with CAP on Kyma</p> <p>Deploy and run an existing CAP application in Kyma runtime by using built-in tools like API Gateway and Service Mesh technology.</p> <p>SAP BTP Kyma runtime</p>	<p>Tutorial Beginner 90 min. 1 tutorial</p> <p>Create a Business Service with Node.js Using Visual Studio Code</p> <p>Develop a sample business service using Core Data & Services (CDS), Node.js, and SQLite by using the SAP Cloud Application Programming Model (CAP) and developing on your local environment.</p> <p>SAP Cloud Application Programming Model</p>	<p>Tutorial Beginner 15 min. 1 tutorial</p> <p>NEW Create a CAP-Based Application</p> <p>This tutorial shows you how to create a new CAP-based application, which exposes the OData V4 protocol.</p> <p>SAP Cloud Application Programming Model</p>
<p>Tutorial Beginner 10 min. 1 tutorial</p> <p>NEW Create a Directory for Development</p> <p>This tutorial shows you how to start building your application with CAP and VS Code.</p> <p>SAP Cloud Application Programming Model</p>	<p>Tutorial Beginner 20 min. 1 tutorial</p> <p>Create a Reusable Service</p> <p>Create a service that will later on be reused in another CAP Java project.</p> <p>SAP Cloud Application Programming Model</p>	<p>Tutorial Beginner 20 min. 1 tutorial</p> <p>NEW Create a UI Using Freestyle SAPUI5</p> <p>This tutorial shows you how to create a Freestyle SAPUI5 app on top of your CAP application.</p> <p>SAP Cloud Application Programming Model</p>	<p>Tutorial Beginner 20 min. 1 tutorial</p> <p>Create a User Interface with CAP (SAP HANA Cloud)</p> <p>Use services based on SAP Cloud Application Programming Model Node.js and use an SAP Fiori wizard to create a user interface.</p> <p>SAP HANA Cloud</p>	<p>Tutorial Beginner 15 min. 1 tutorial</p> <p>Create an SAP Cloud Application Programming Model Project for SAP HANA Cloud</p> <p>Use the wizard for the SAP Cloud Application Programming Model to create a project in SAP Business Application Studio that will also support SAP HANA Cloud.</p> <p>SAP HANA Cloud</p>

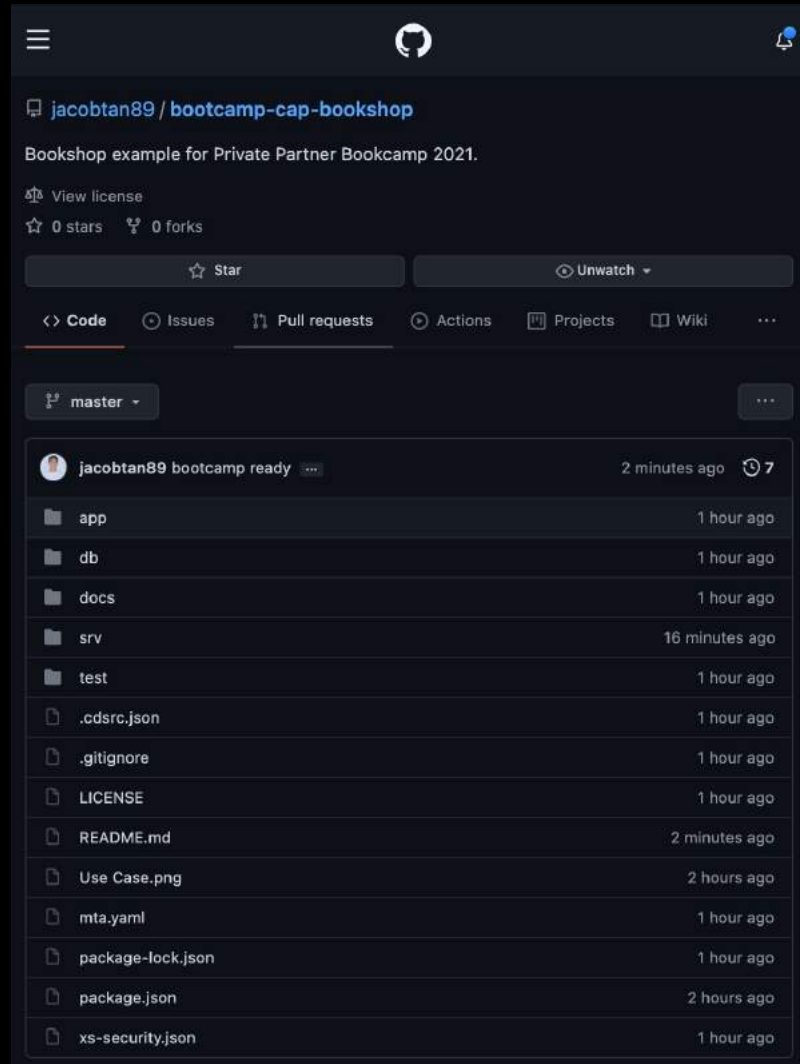
SAP Developer Tutorials focus on SAP Cloud SDK ([Link](#))



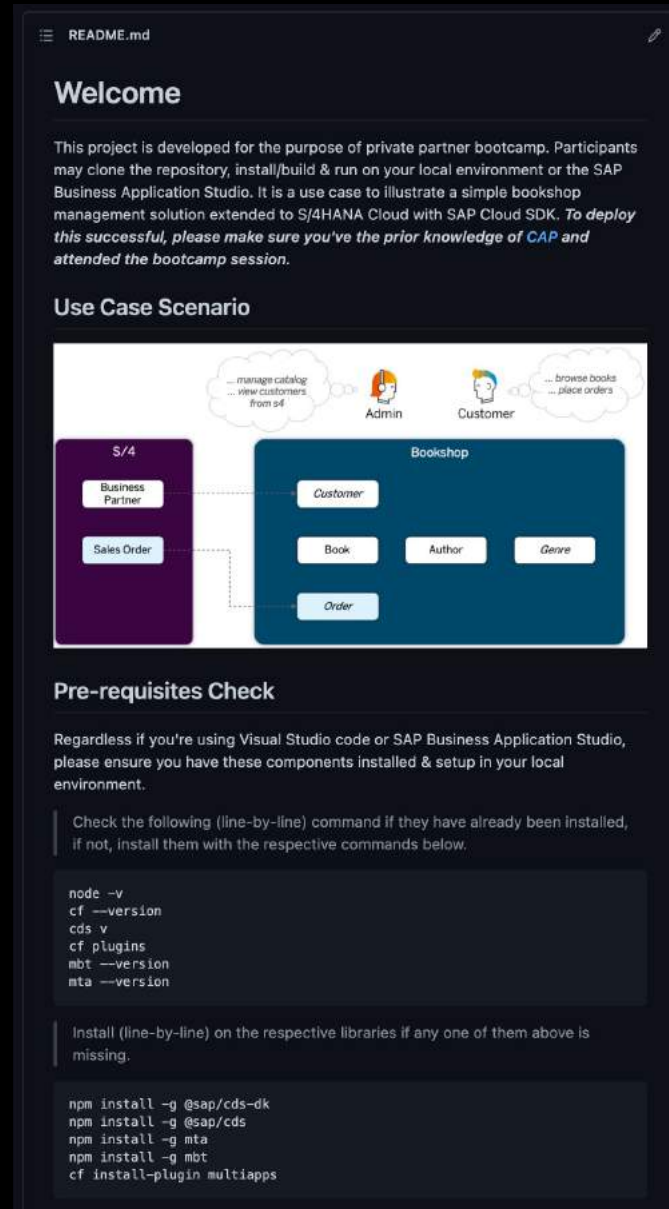
1 Mission 5 Group 28 Tutorial

<p>Mission Intermediate ⌚ 2 hr. 40 min. 6 tutorials</p> <p>Create a Cloud Foundry App Using SAP Cloud SDK</p> <p>Create a Cloud Foundry app using SAP Cloud SDK, then add security and other advanced features like resilience and caching.</p> <p>SAP Cloud SDK</p>	<p>Group Intermediate ⌚ 1 hr. 40 min. 3 tutorials</p> <p>Add Security and More to Your SAP Cloud SDK App</p> <p>Introduce resilience and caching to your application using the SAP Cloud SDK and protect your Java-based Hello World microservice with authenticated and authorized users.</p> <p>SAP Cloud SDK</p>	<p>Group Intermediate ⌚ 1 hr. 40 min. 6 tutorials</p> <p>Build an Address Manager with the SAP Cloud SDK's OData Virtual Data Model</p> <p>Use the SAP Cloud SDK's OData virtual data model by building an address manager application using NestJS.</p> <p>SAP Cloud SDK</p>	<p>Group Intermediate ⌚ 1 hr. 3 tutorials</p> <p>Create a Neo App Using SAP Cloud SDK</p> <p>Using the SAP Cloud SDK, create a simple SAP Cloud Platform, Neo app that calls an S/4HANA OData service.</p> <p>SAP Cloud SDK</p>	<p>Group Intermediate ⌚ 1 hr. 3 tutorials</p> <p>Create a Simple Cloud Foundry App Using SAP Cloud SDK</p> <p>Using the SAP Cloud SDK, create a simple SAP Cloud Platform, Cloud Foundry app that calls an S/4HANA OData service.</p> <p>SAP Cloud SDK</p>
<p>Group Beginner ⌚ 1 hr. 4 tutorials</p> <p>Create an App Using SAP Cloud SDK for JavaScript</p> <p>Create your first app on Cloud Foundry using the SAP Cloud SDK for JavaScript.</p> <p>SAP Cloud SDK</p>	<p>Tutorial Intermediate ⌚ 30 min.</p> <p>Build OData Queries with the SAP Cloud SDK's Virtual Data Model</p> <p>Build OData queries with the SAP Cloud SDK's virtual data model to build an address manager application.</p> <p>SAP Cloud SDK</p>	<p>Tutorial Intermediate ⌚ 20 min.</p> <p>Connect to OData Service on Cloud Foundry Using SAP Cloud SDK</p> <p>Create a basic Java project to call OData services using the SAP Cloud SDK on Cloud Foundry.</p> <p>SAP Cloud SDK</p>	<p>Tutorial Intermediate ⌚ 20 min.</p> <p>Connect to OData service on Neo using SAP Cloud SDK</p> <p>Create a basic Java project to call OData services using the SAP Cloud SDK on Neo.</p> <p>SAP Cloud SDK</p>	<p>Tutorial Intermediate ⌚ 20 min.</p> <p>Create a Sample Application on Cloud Foundry Using SAP Cloud SDK</p> <p>Create the very first Hello World example on Cloud Foundry using the SAP Cloud SDK.</p> <p>SAP Cloud SDK</p>
<p>Tutorial Intermediate ⌚ 20 min.</p> <p>Create a Sample Application on SCP Neo Using SAP Cloud SDK</p> <p>Create your very first Hello World sample application on SAP Cloud Platform Neo using the SAP Cloud SDK.</p> <p>SAP Cloud SDK</p>	<p>Tutorial Intermediate ⌚ 30 min.</p> <p>Create and Deep Insert with the Virtual Data Model for OData</p> <p>Create and deep insert functionality for OData as supported by the SAP S/4HANA Cloud SDK.</p> <p>SAP Cloud SDK</p>	<p>Tutorial Intermediate ⌚ 20 min.</p> <p>Create OData Entities with the SAP Cloud SDK's Virtual Data Model</p> <p>Create OData entities with the SAP Cloud SDK's virtual data model to build an address manager application.</p> <p>SAP Cloud SDK</p>	<p>Tutorial Beginner ⌚ 10 min.</p> <p>Create Your First Application with SAP Cloud SDK for JavaScript</p> <p>Learn the fundamentals of the SAP Cloud SDK for JavaScript and integrate with an SAP S/4HANA Cloud system.</p> <p>SAP Cloud SDK</p>	<p>Tutorial Intermediate ⌚ 15 min.</p> <p>Delete OData Entities with the SAP Cloud SDK's Virtual Data Model</p> <p>Delete OData entities with the SAP Cloud SDK's virtual data model to build an address manager application.</p> <p>SAP Cloud SDK</p>
<p>Tutorial Beginner ⌚ 20 min.</p> <p>Deploy Application to Cloud Foundry with SAP Cloud SDK for JavaScript</p> <p>Deploy an existing application and deploy it to Cloud Foundry in SAP Cloud Platform.</p> <p>SAP Cloud SDK</p>	<p>Tutorial Intermediate ⌚ 30 min.</p> <p>Develop an S/4HANA Extension Without a S/4HANA System</p> <p>Learn about the mocking capabilities of the SAP Cloud SDK and how to test and develop your S/4HANA extension without an S/4HANA system.</p> <p>SAP Cloud SDK</p>	<p>Tutorial Intermediate ⌚ 5 min.</p> <p>End to End Test for Secure Applications</p> <p>Learn how to write end-to-end tests for secured applications based on the SAP Cloud SDK.</p> <p>SAP Cloud SDK</p>	<p>Tutorial Beginner ⌚ 10 min.</p> <p>End-to-End Tests for SAP Cloud SDK Projects</p> <p>Implement end-to-end tests, the highest level of automated tests, and run them in a pipeline.</p> <p>SAP Cloud SDK</p>	<p>Tutorial Intermediate ⌚ 30 min.</p> <p>Extensibility, Type-Safe Expand, and Dependency Injection with the Virtual Data Model for OData</p> <p>Use the latest features of the SAP Cloud SDK regarding extensibility, eager and type-safe expand as well as dependency injection with the Virtual Data Model for OData for any SAP S/4HANA system.</p> <p>Java</p>

Clone the Git Repo from today's demo ([Link](#))



The screenshot shows the GitHub repository page for `jacobtan89 / bootcamp-cap-bookshop`. The repository is described as a "Bookshop example for Private Partner Bookcamp 2021." It has 0 stars and 0 forks. The repository is on the `master` branch. A list of files and folders is shown, including `app`, `db`, `docs`, `srv`, `test`, `.cdsrc.json`, `.gitignore`, `LICENSE`, `README.md`, `Use Case.png`, `mta.yaml`, `package-lock.json`, `package.json`, and `xs-security.json`.

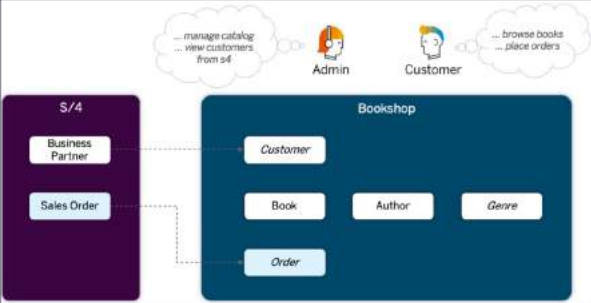


The screenshot shows the `README.md` file. It includes a "Welcome" section, a "Use Case Scenario" diagram, a "Pre-requisites Check" section, and a "Learn More" section.

Welcome

This project is developed for the purpose of private partner bootcamp. Participants may clone the repository, install/build & run on your local environment or the SAP Business Application Studio. It is a use case to illustrate a simple bookshop management solution extended to S/4HANA Cloud with SAP Cloud SDK. *To deploy this successful, please make sure you've the prior knowledge of CAP and attended the bootcamp session.*

Use Case Scenario



```
graph LR
    subgraph S4 [S/4]
        BP[Business Partner]
        SO[Sales Order]
    end
    subgraph Bookshop [Bookshop]
        C[Customer]
        B[Book]
        A[Author]
        G[Genre]
        O[Order]
    end
    BP --- C
    SO --- C
    C --- B
    C --- A
    C --- G
    C --- O
```

Pre-requisites Check

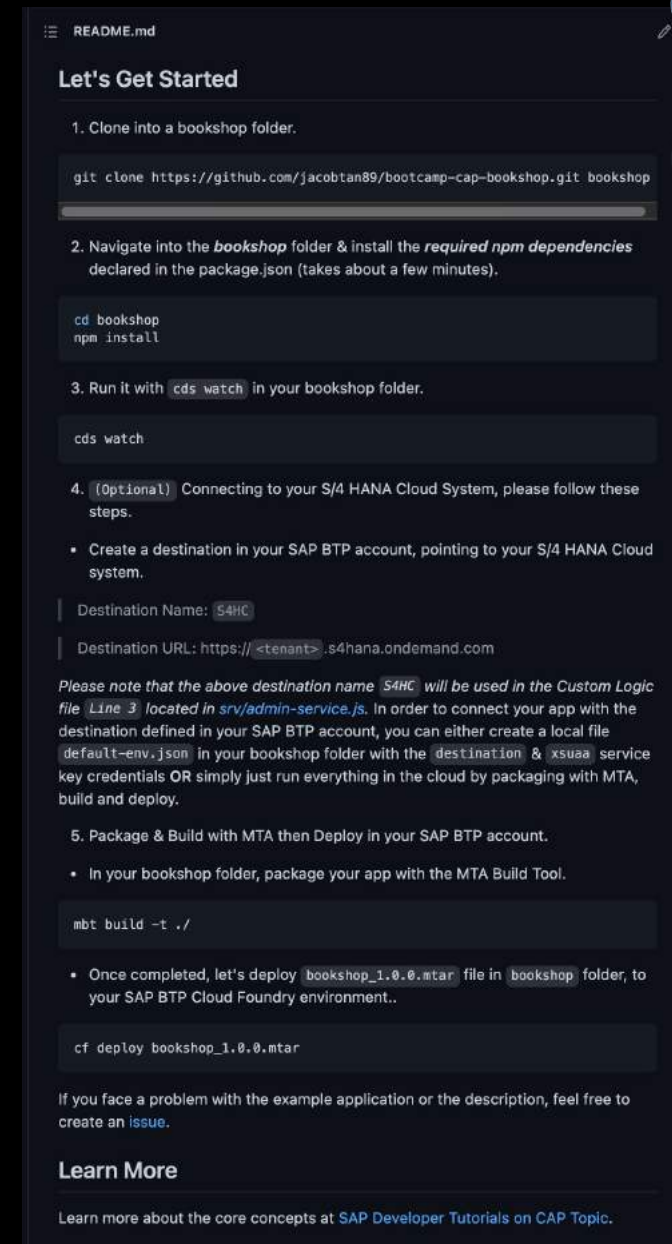
Regardless if you're using Visual Studio code or SAP Business Application Studio, please ensure you have these components installed & setup in your local environment.

Check the following (line-by-line) command if they have already been installed, if not, install them with the respective commands below.

```
node -v
cf --version
cds v
cf plugins
mbt --version
mta --version
```

Install (line-by-line) on the respective libraries if any one of them above is missing.

```
npm install -g @sap/cds-dk
npm install -g @sap/cds
npm install -g mta
npm install -g mbt
cf install-plugin multiapps
```



Let's Get Started

1. Clone into a bookshop folder.

```
git clone https://github.com/jacobtan89/bootcamp-cap-bookshop.git bookshop
```

2. Navigate into the `bookshop` folder & install the **required npm dependencies** declared in the `package.json` (takes about a few minutes).

```
cd bookshop
npm install
```

3. Run it with `cds watch` in your bookshop folder.

```
cds watch
```

4. (Optional) Connecting to your S/4 HANA Cloud System, please follow these steps.
 - Create a destination in your SAP BTP account, pointing to your S/4 HANA Cloud system.

Destination Name: `S4HC`

Destination URL: `https://<tenant>.s4hana.ondemand.com`

Please note that the above destination name `S4HC` will be used in the Custom Logic file `Line 3` located in `srv/admin-service.js`. In order to connect your app with the destination defined in your SAP BTP account, you can either create a local file `default-env.json` in your bookshop folder with the `destination` & `xsuaa` service key credentials OR simply just run everything in the cloud by packaging with MTA, build and deploy.

5. Package & Build with MTA then Deploy in your SAP BTP account.
 - In your bookshop folder, package your app with the MTA Build Tool.

```
mbt build -t ./
```

- Once completed, let's deploy `bookshop_1.0.0.mtar` file in `bookshop` folder, to your SAP BTP Cloud Foundry environment..

```
cf deploy bookshop_1.0.0.mtar
```

If you face a problem with the example application or the description, feel free to create an [issue](#).

Learn More

Learn more about the core concepts at [SAP Developer Tutorials on CAP Topic](#).

Thank you.

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