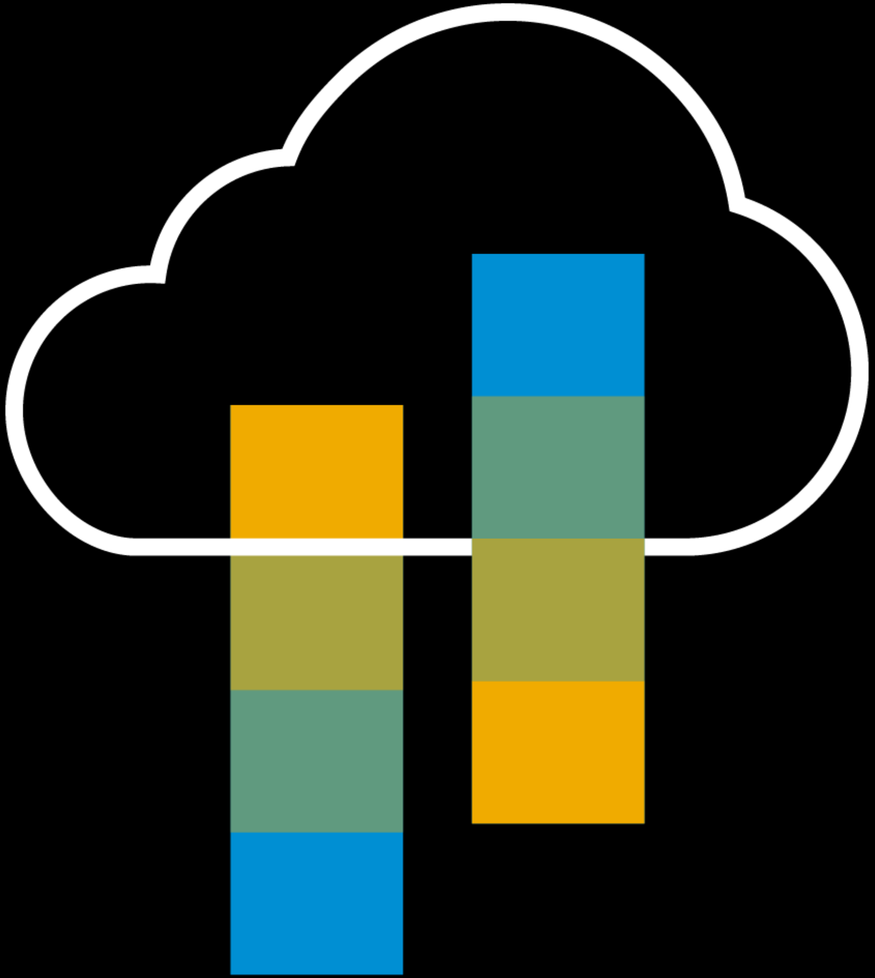
SAP S/4HANA Cloud SDK

Develop your first SAP S/4HANA Extension App on SAP Cloud Platform Cloud Foundry



November 15, 2017
Henning Heitkötter, SAP S/4HANA Cloud SDK

PUBLIC

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Agenda

DEVELOPMENT OF CLOUD-NATIVE APPLICATIONS

INTRODUCTION TO THE SAP S/4HANA CLOUD SDK

WALKTHROUGH

Cloud-native Applications

Side-by-side Extensibility of SAP S/4HANA Cloud

Smart App Development

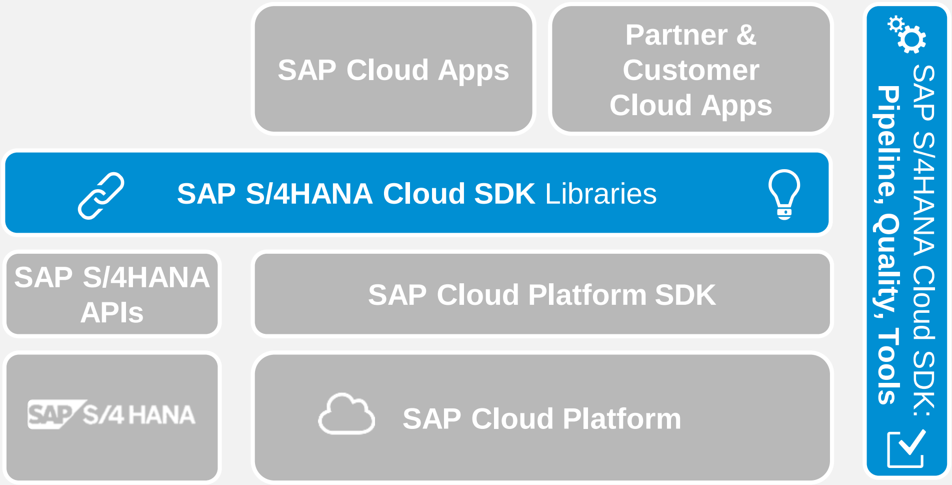
Digital transformation requires

Differentiating and responding quickly to changing market conditions

Best-in-class software quality to mitigate risks introduced by change

Ensuring fast time-to-value by leveraging rich ecosystem

SAP S/4HANA Cloud Software Development Kit (SDK)



SAP Cloud Apps

Partner & Customer Cloud Apps

SAP S/4HANA Cloud SDK Libraries

SAP S/4HANA APIs

SAP Cloud Platform SDK

SAP S/4HANA

SAP Cloud Platform

SAP S/4HANA Cloud SDK: **Pipeline, Quality, Tools**

SAP S/4HANA Cloud SDK provides

Boost of development efficiency for flexible innovations on top of SAP S/4HANA functionality on SAP Cloud Platform

Established and proven quality standards ensured by automated means of SAP S/4HANA Cloud SDK

SAP App Center as Go-to-Market platform for all digital services by SAP and partners

Engineering principles for successful cloud development

SCALABILITY

Design applications for horizontal scalability.

Partition and decompose workloads into discrete units.

Ensure applications and services are stateless.

Cache items that do not change much.

RESILIENCE

Understand potential failures, impact, and recovery.

Use load balancing to distribute workloads.

Use bulkheads to contain potential failures.

Use circuit breakers to handle persistent failures.

SECURITY

Don’t trust, verify.

Apply defense in depth, secure all resources.

Fail securely.

Protect data at rest.

Use only secure tunnels for on-prem connectivity.

DESIGN

Prefer loosely-coupled components with asynchronous coms.

Separate infrastructure logic from domain logic.

Prefer REST APIs for external communication.

Prefer asynchronous messaging for internal coms.

OPERATIONS

Design for IT ops (deploy, monitor, investigate, secure)

Automate build and deploy processes.

Implement logging and alerting in all components.

Inventory, inspect and audit cloud resources.

These engineering principles are reflected in the **twelve-factor app** methodology for building software-as-a-service apps: https://12factor.net/

SAP S/4HANA Cloud SDK

Introduction
SAP S/4HANA Cloud SDK

SAP S/4HANA Cloud SDK reduces the effort of building applications running on SAP Cloud Platform for extending S/4HANA, by providing Java libraries and toolsets for developers

Goal: attractive development environment to enable customers and partners to efficiently develop applications for S/4HANA on SAP Cloud Platform

Framework of choice for extending S/4HANA (Cloud & on premise) on SAP Cloud Platform (Neo & Cloud Foundry)

Helps ensuring high S/4HANA quality standards with regards to performance, resource consumption and operations also on SAP Cloud Platform

Value Proposition
SAP S/4HANA Cloud SDK

Key Objectives

- Provide **attractive development environment** to enable customers and partners to efficiently develop applications for S/4HANA on SAP Cloud Platform
- **Ensure high S/4HANA quality standards** with regards to performance, resource consumption and operations

Key Features of SAP S/4HANA Cloud SDK

- **Enable developers to easily connect to S/4HANA systems** while leaving the configuration to SAP Cloud Platform: S/4HANA Virtual Data Model & abstract layer for connections to S/4HANA Cloud and on premise systems
- **Facilitate effective coding** and support seamless transition between SAP CP Neo and SAP CP Cloud Foundry: Abstraction layer for key platform services such as multi-tenancy and authentication
- **Ensure high quality native cloud software**, e.g. by offering resilience engineering basics out of the box, and by supporting the integration of **third-party libraries** such as state-of-the-art frameworks for logging, data persistency frameworks, feature toggling and others
- **Jump start application development** by offering project templates, tutorials, and code samples
- **Continuous integration and delivery pipeline** provided out-of-the-box, including testing support and code checks

Timeline

SAPPHIRE 2017

Beta release for selected partners

SAP TechEd 2017

GA release for customers & partners

Bi-weekly releases of updates*

*based on current planning / subject to change

Walkthrough

Overview

A. Generate Project & Explore Structure

B. Package App & Deploy on Cloud Foundry

C. Extend App: Integrate with S/4HANA

D. Make App Resilient

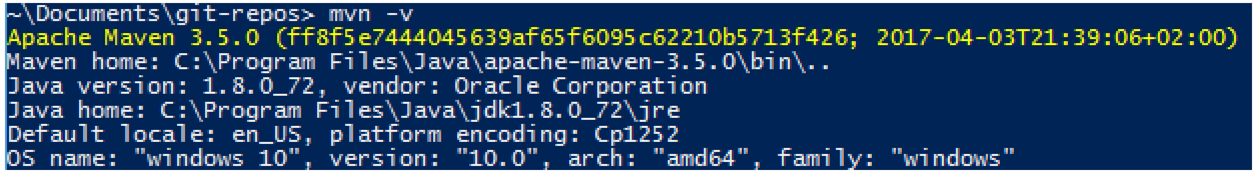
E. Implement Caching

F. Continuous Integration and Delivery

- Walkthrough covers steps 1–6, 10 & 14 of SAP S/4HANA Cloud SDK Tutorial Series (example adapted, see www.sap.com/s4sdk > Community > SAP S/4HANA Cloud SDK Overview – direct link)
- Code available from GitHub

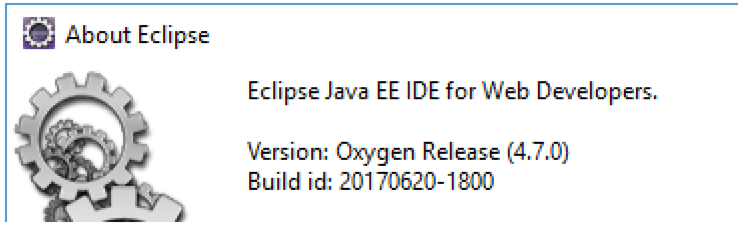
Local Environment Setup

- Java (JDK, 1.8.0)
  - – Java home: points to JDK
- Apache Maven (3.5.0)



```
~\Documents\git-repos> mvn -v
Apache Maven 3.5.0 (ff8f5e7444045639af65f6095c62210b5713f426; 2017-04-03T21:39:06+02:00)
Maven home: C:\Program Files\Java\apache-maven-3.5.0\bin\..
Java version: 1.8.0_72, vendor: Oracle Corporation
Java home: C:\Program Files\Java\jdk1.8.0_72\jre
Default locale: en_US, platform encoding: Cp1252
OS name: "windows 10", version: "10.0", arch: "amd64", family: "windows"
```

- Eclipse (Oxygen Release) Java EE IDE for Web Developers (optional)

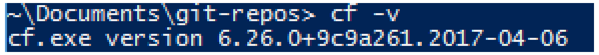


About Eclipse

Eclipse Java EE IDE for Web Developers.

Version: Oxygen Release (4.7.0)
Build id: 20170620-1800

- Cloud Foundry Command Line Interface (CLI; optional)



```
~\Documents\git-repos> cf -v
cf.exe version 6.26.0+9c9a261.2017-04-06
```

A) Generate Project & Explore Structure

Tutorial: Step 3

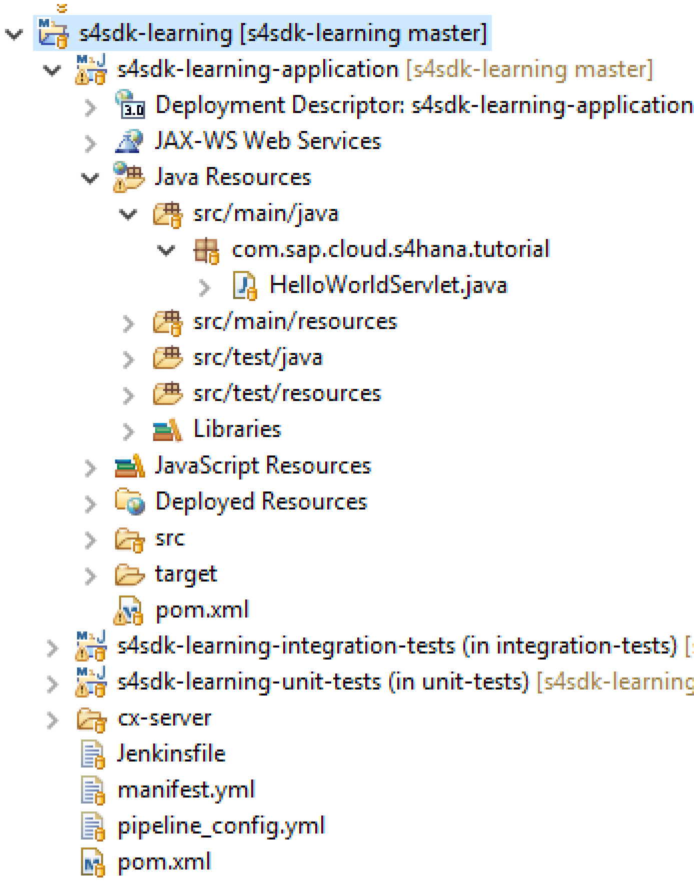
Run

- `mvn archetype:generate -DarchetypeGroupId=com.sap.cloud.s4hana.archetypes -DarchetypeArtifactId=scp-cf-tomee -DarchetypeVersion=1.3.0`
  - groupId: `com.sap.cloud.s4hana.tutorial`
  - artifactId: `s4sdk-learning`
  - version and package: keep defaults (hit enter)
  - uniqueHostname: `s4sdk-learning-<unique-identifier>`

Import generated Maven Projects into Eclipse

Explore generated folder `s4sdk-learning`

- Take a look at `./application/src/main/java/com/sap/cloud/s4hana/tutorial/HelloWorldServlet.java`



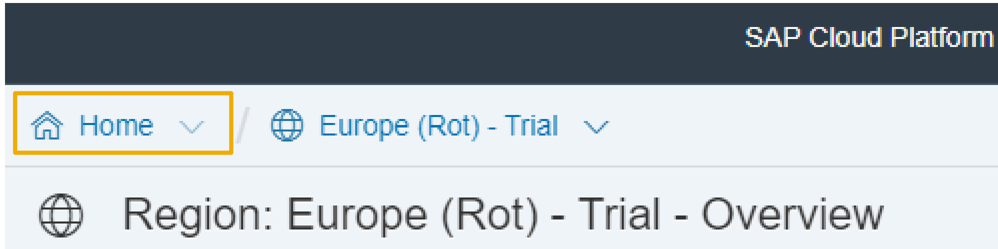
```
s4sdk-learning [s4sdk-learning master]
  s4sdk-learning-application [s4sdk-learning master]
    Deployment Descriptor: s4sdk-learning-application
    JAX-WS Web Services
    Java Resources
      src/main/java
        com.sap.cloud.s4hana.tutorial
          HelloWorldServlet.java
      src/main/resources
      src/test/java
      src/test/resources
      Libraries
    JavaScript Resources
    Deployed Resources
    src
    target
    pom.xml
  s4sdk-learning-integration-tests (in integration-tests) [
  s4sdk-learning-unit-tests (in unit-tests) [s4sdk-learning
  cx-server
  Jenkinsfile
  manifest.yml
  pipeline_config.yml
  pom.xml
```

B) Package App & Deploy on Cloud Foundry

Tutorial: Step 3

Run

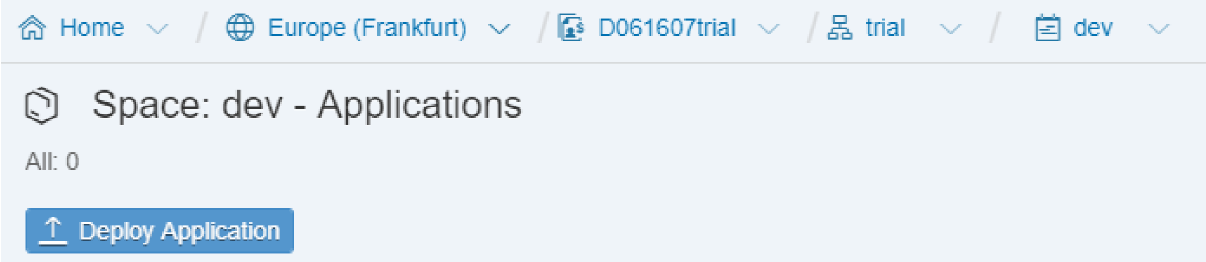
- `cd s4sdk-learning`
- `mvn clean package`



Deploy to Cloud Platform Cloud Foundry

1. Visit https://cloudplatform.sap.com/try.html and login
2. In Cloud Platform Cockpit, go to "Home" and create Cloud Foundry trial in region Europe (Frankfurt)
3. Go to trial > Spaces > dev
4. Choose Deploy Application
   - File Location: `./application/target/s4sdk-learning-application.war`
   - Use Manifest & Location: `./manifest.yml`

   – *OR* run the following with CF CLI
   - `cf api https://api.cf.eu10.hana.ondemand.com`
   - `cf login`
   - `cf push`



5. Visit `https://your-unique-hostname.cfapps.eu10.hana.ondemand.com/hello`

C) Extend App: Integrate with S/4HANA

Tutorial: Step 4
& Step 10

Create *BusinessPartnerServlet*

- Copy & paste template to `./application/src/main/java/com/sap/cloud/s4hana/tutorial/BusinessPartnerServlet.java`
- Search for default representation of business partner service in package `com.sap.cloud.sdk.s4hana.datamodel.odata.services`, instantiate it using the default constructor, and call method to get all business partners
- Select the fields business partner (ID) and business partner name
- Filter for organizations (business partner category “2”)
- Execute the service call
- Return the result as JSON using `new Gson().toJson(…)`

C) Extend App: Test Integration with S/4HANA

Tutorial: Step 4
& Step 10

Add test

- Add `./integration-tests/src/test/java/com/sap/cloud/s4hana/tutorial/BusinessParterServiceTest.java`

Prepare test environment

- Add `./integration-tests/src/test/resources/systems.json` and adapt to your S/4HANA Cloud system
- Add `./integration-tests/src/test/resources/credentials.yml` based on template with the credentials of your communication user

Run test

- `mvn clean package` will also run the new test

C) Extend App: Deploy Integration with S/4HANA

Tutorial: Step 4 & Step 10

Deploy on Cloud Foundry

- `mvn clean package`
- Deploy again (as before)
- Set environment variable `destinations` to the following value
  `[{name: 'ErpQueryEndpoint', url: 'https://URL-to-S4HANA', username: '...', password: '...'}]`
  - Go to app > User-provided variables > Add variable
  - *OR* `cf set-env s4sdk-learning destinations "[{name: 'ErpQueryEndpoint', url: 'https://URL-to-S4HANA', username: '...', password: '...'}]"`
- Restart app (> Overview > Restart *OR* `cf restart s4sdk-learning`)

D) Make App Resilient

Tutorial: Step 5
& Step 10

Introduce Hystrix command

- Copy & paste template to `./application/src/main/java/com/sap/cloud/s4hana/tutorial/GetBusinessPartnersCommand.java`
- Implement run method based on previous step
  - Command shall wrap the call to service and return result
  - Use `getConfigContext()` to retrieve ERP context
- Adapt `BusinessPartnerServlet`: create command (with ERP context) and execute
- Test

Deploy on Cloud Foundry

- `mvn clean package`
- Deploy again (as before)
- Set environment variable `destinations` as before (not necessary with cf push)
- Add environment variable `ALLOW_MOCKED_AUTH_HEADER` with value `true`
- Restart app

E) Implement Caching

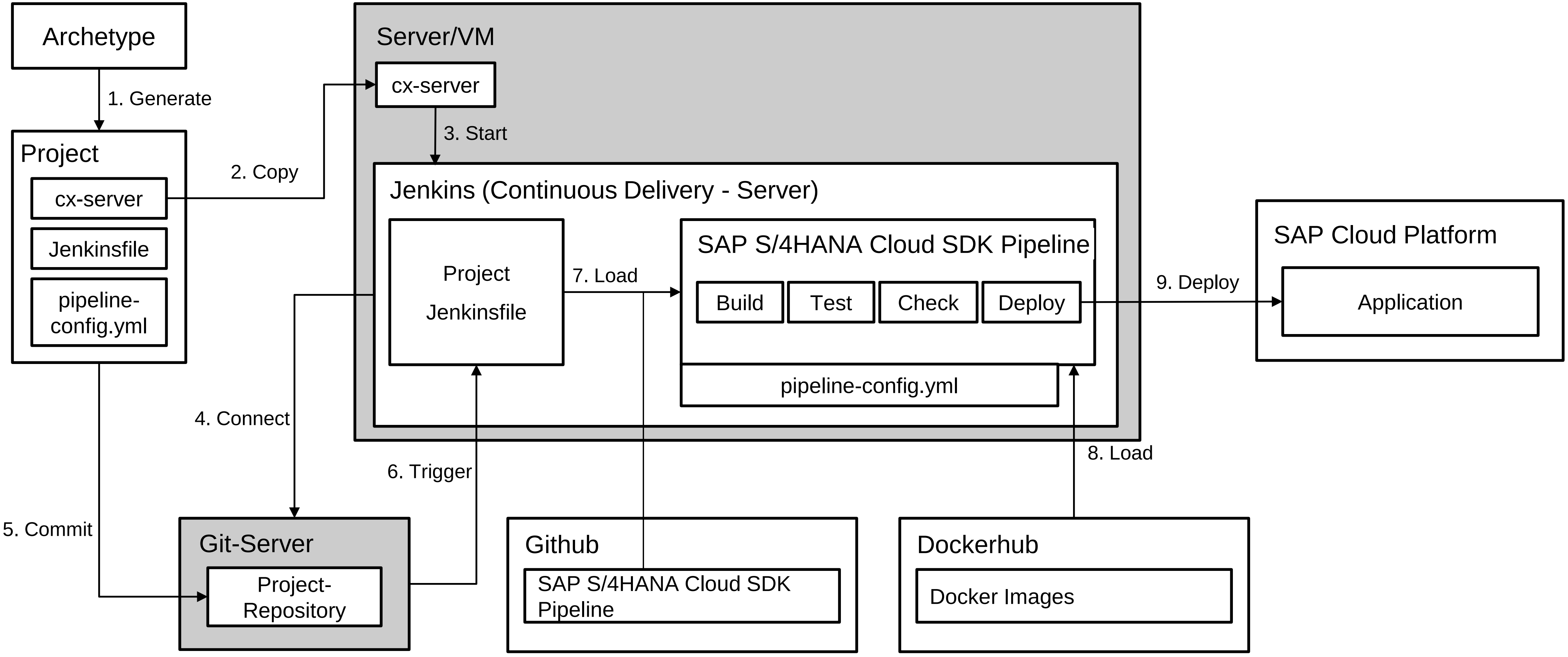
Tutorial: Step 6
& Step 10

Adapt *GetBusinessPartnersCommand* to cache the result

- Extend *CachingErpCommand*
- Rename `run()` method to `runCacheable()`
- Create `cache` field and initialize with `com.google.common.cache.CacheBuilder.newBuilder().build();`
- Implement `getCache()` method from super class and return cache

F) Continuous Integration and Delivery

Overview of Support by SAP S/4HANA Cloud SDK for Whole Development Lifecycle



▨ Provided by Customer/Partner

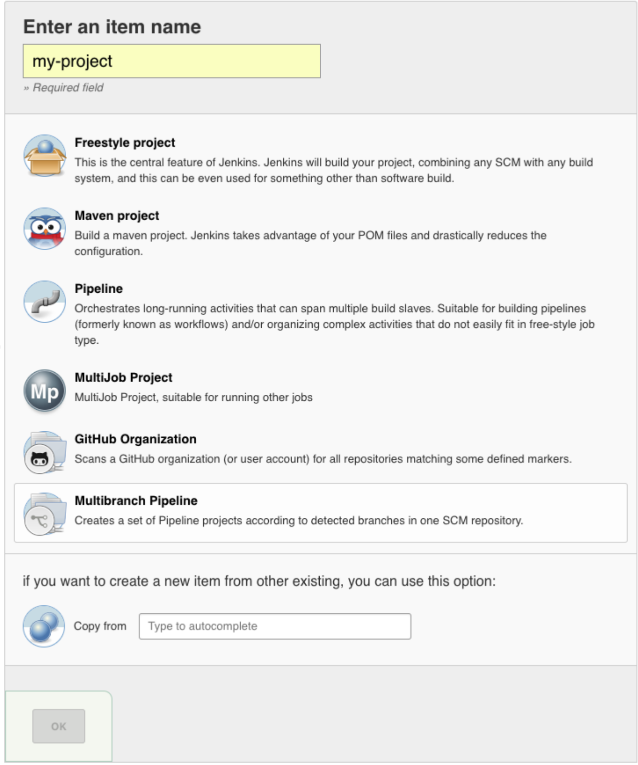
F) Continuous Integration and Delivery

Run CX server to build application

Start cx-server

- Copy cx-server script to Linux server and make executable (`chmod +x cx-server`)
- Start Jenkins instance with `./cx-server start`
- Visit http://localhost

(Configure for your GitHub instance – see blog)



Enter an item name

my-project

» Required field

Freestyle project
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.

Maven project
Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.

Pipeline
Orchestrates long-running activities that can span multiple build slaves. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

MultiJob Project
MultiJob Project, suitable for running other jobs

GitHub Organization
Scans a GitHub organization (or user account) for all repositories matching some defined markers.

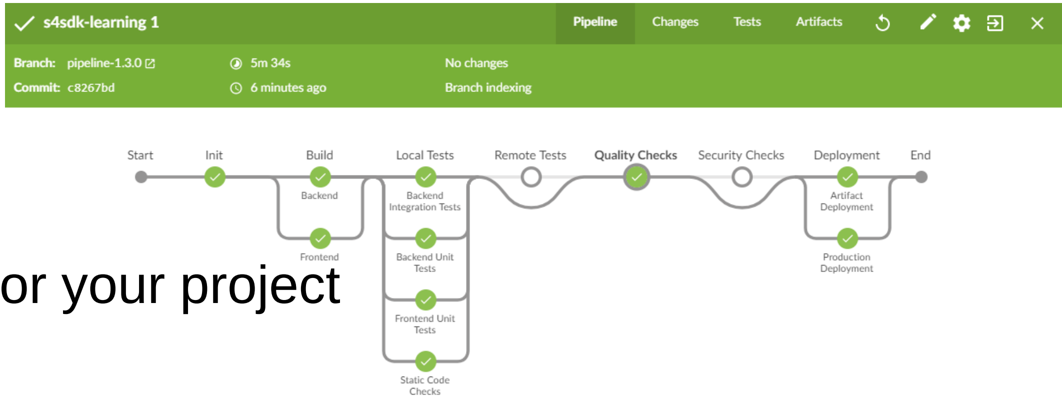
Multibranch Pipeline
Creates a set of Pipeline projects according to detected branches in one SCM repository.

if you want to create a new item from other existing, you can use this option:

Copy from: Type to autocomplete

Create **new pipeline** on Jenkins

- Click New Item > Multibranch Pipeline and enter a name, e.g., `s4sdk-learning`
- Click Add source and choose GitHub
- Select your GitHub instance, enter organization and repository
- Click Save



✓ s4sdk-learning 1

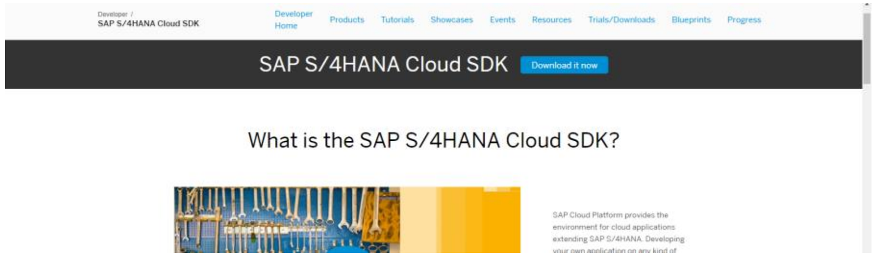
Branch: pipeline-1.3.0
Commit: c8267bd

5m 34s
6 minutes ago

No changes
Branch indexing

Jenkins will automatically run all the stages of the pipeline for your project

Information Resources
SAP S/4HANA Cloud SDK



Developer /
SAP S/4HANA Cloud SDK

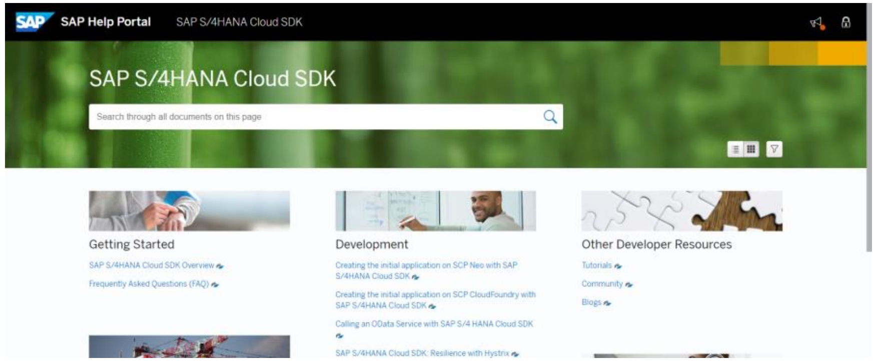
SAP S/4HANA Cloud SDK

What is the SAP S/4HANA Cloud SDK?

SAP Cloud Platform provides the environment for cloud applications extending SAP S/4HANA. Developing your own application on any kind of

Official website of SAP S/4HANA Cloud SDK on sap.com

www.sap.com/s4sdk



SAP S/4HANA Cloud SDK

Getting Started

- SAP S/4HANA Cloud SDK Overview
- Frequently Asked Questions (FAQ)

Development

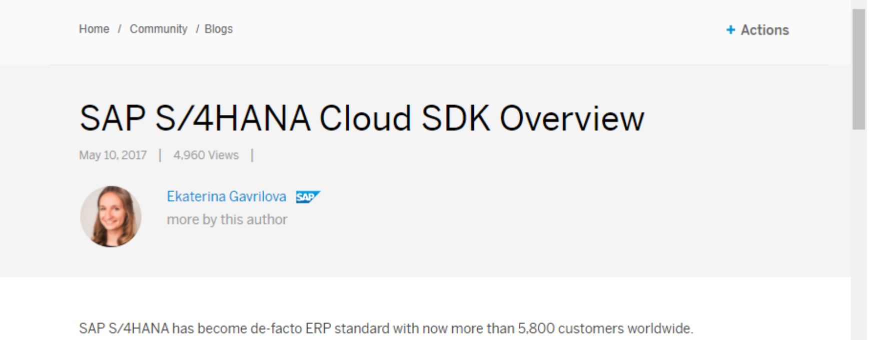
- Creating the initial application on SCP Neo with SAP S/4HANA Cloud SDK
- Creating the initial application on SCP CloudFoundry with SAP S/4HANA Cloud SDK
- Calling an OData Service with SAP S/4 HANA Cloud SDK
- SAP S/4HANA Cloud SDK: Resilience with Hystrix

Other Developer Resources

- Tutorials
- Community
- Blogs

Official help page

[help.sap.com > S/4HANA Cloud SDK](help.sap.com)



SAP S/4HANA Cloud SDK Overview

May 10, 2017 | 4,960 Views |

Ekaterina Gavrilova
more by this author

SAP S/4HANA has become de-facto ERP standard with now more than 5,800 customers worldwide.

… including tutorials

blogs.sap.com

Stack Overflow: s4sdk

Central contact address:

s4sdk@sap.com

Developing extensions for S/4HANA using SAP S/4HANA Cloud SDK

Step 1
Enroll to SAP PartnerEdge program

Step 2
Build your S/4HANA solution

Step 3
Market your S/4HANA extension

Enroll

Our engagement model was created for partners that design, develop, and build applications, software, and integrated solutions based on SAP technology and platforms.

If you're an ISV, developer or even looking to bundle or embed SAP technologies with your own via an OEM relationship – you're in the right place…

Discover

Leverage your individual expertise to design extensions for SAP S/4HANA.

- Get started with dev enablement content and application architecture concepts
- Register your idea with SAP and run a launch workshop with SAP

Develop

Develop an extension for SAP S/4HANA on SAP Cloud Platform using SAP S/4HANA Cloud SDK

- Get your S/4HANA Cloud Innovation Pack from SAP PartnerEdge
- Download the SAP S/4HANA Cloud SDK
- Setup your development environment
- Get started with the development tutorial

Deploy

Deploy your S/4HANA extension in your SAP Cloud Platform environment

- Publish your extension to your SAP Cloud Platform tenant
- Run your extension against your development SAP S/4HANA system

SAP App Center

The SAP App Center is a globally available, multi-currency digital marketplace for enterprise applications that extend the SAP digital core.

SAP App Center provides a role based workflow driven platform to manage the entire lifecycle of purchases, from license acquisition to user management and renewals.

Thank you.

Contact information:

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s4sdk@sap.com

Run Simple