



Introducing Continuous Delivery to the SAP Ecosystem

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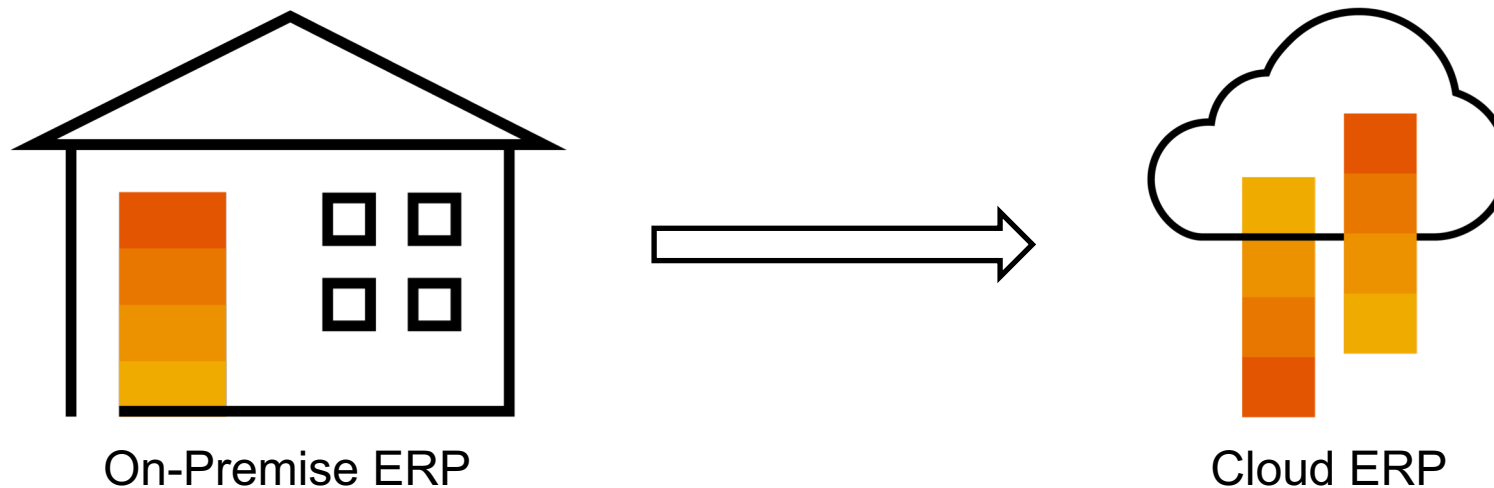
Introducing SAP and the Innovation Center Potsdam



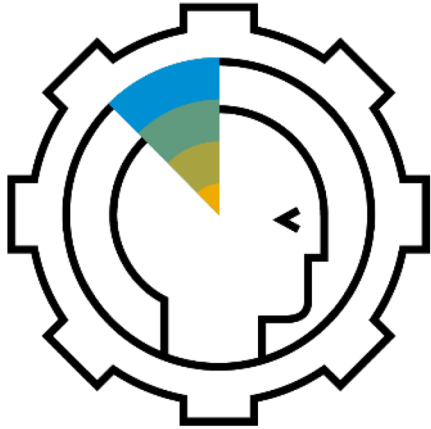
Introducing Enterprise Resource Planning (ERP)

Supports core processes of business (finance, procurement, production etc.)

SAP S/4HANA: Most recent SAP ERP generation fully powered by In-Memory Database SAP HANA

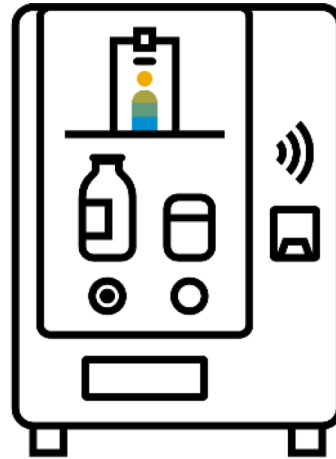


Possible Reasons for Extending an ERP



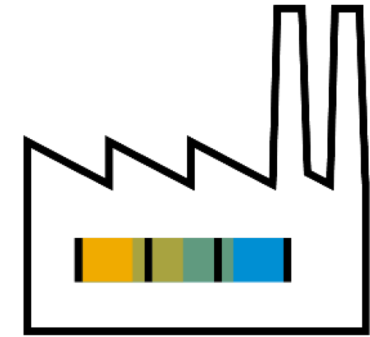
Additional requirements to business processes of SAP S/4HANA

- Gather additional data about a company's customers
- Integrate external data into business process



Innovative business solution leveraging SAP S/4HANA

- Differentiate from competitors with innovative solutions
- Leverage data and functionality of SAP S/4HANA to achieve customer value quickly



Industry solutions for requirements not covered by SAP S/4HANA

- Partner builds extensions as SaaS
- Expands scope of SAP S/4HANA for industry-specific requirements and processes

ERP in the Cloud Age

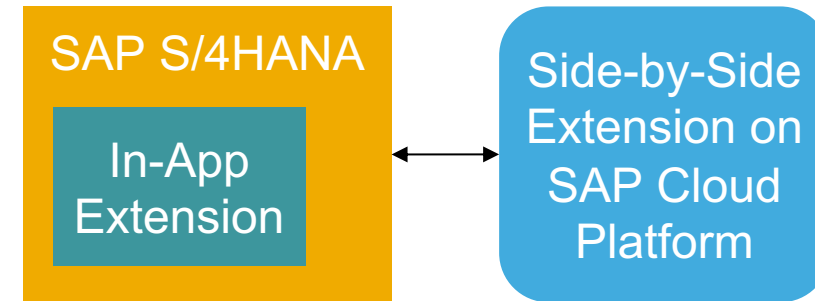
ERP system extensibility then and now

Then



- Highly-coupled extension code
- Breaking updates
- Homogeneous technology setup
- Not scalable
- Reduced time-to-value

Now



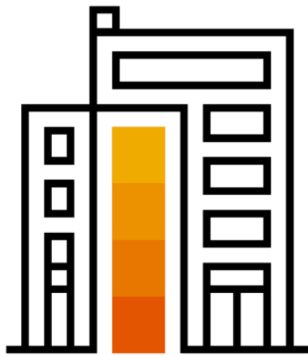
- Well-defined extension model
- Loosely coupled side-by-side extensions
- Stable contract of SAP S/4HANA interfaces
- Free choice of technologies
- Individually scalable
- Quick time-to-value

Introducing DevOps

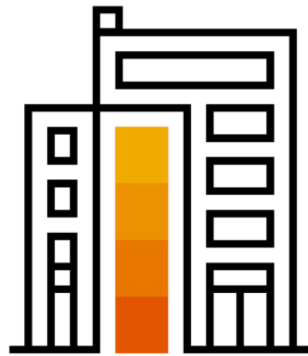


Introducing DevOps

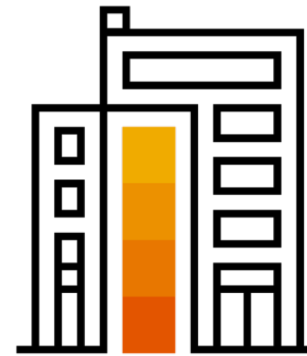
DevOps in the IT industry



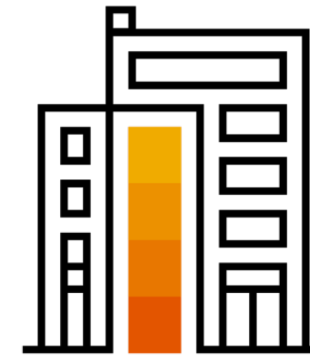
Amazon



Netflix



eBay



LinkedIn

DevOps

Motivation



IT Champions

46x

more change
deployments

440x

quicker lead times

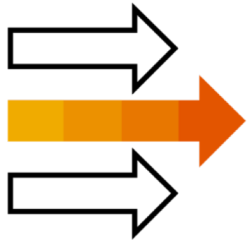
96x

quicker time to
recovery

(cf. Forsgren et. al, 2017 State of DevOps Report, 2017)

Introducing DevOps

DevOps principles



Flow aims for the quick delivery of software from development to customers.



Feedback aims to quickly sense problems in the value chain, leading to a continuous improvement of process and product quality.

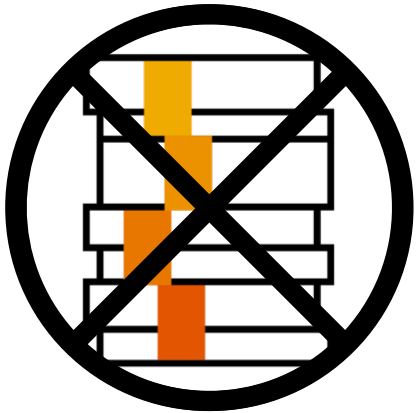


Continuous learning and experimentation aims at establishing a culture that motivates experimentation, risk-taking, and learning from failure.

(cf. Gene Kim et. al, *The DevOps Handbook*, 2016)

Introducing DevOps

DevOps principles – Flow



Avoid batch work style

Large batches



Waiting

● First feature ready

Single piece flow



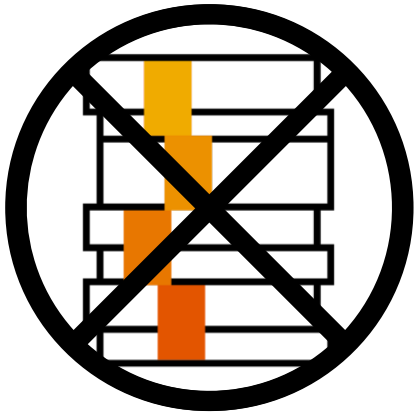
Waiting

● First feature ready

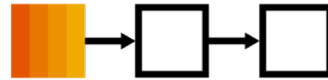
(cf. Stefan Luyten, Single Piece Flow, 2014, <https://medium.com/@stefanluyten/single-piece-flow-5d2c2bec845b>)

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DevOps principles – Flow



Avoid batch work style



Identify model of value chain

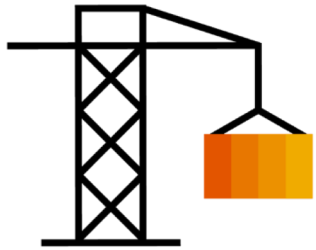


Measure work in value chain

(cf. Gene Kim et. al, *The DevOps Handbook*, 2016)

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DevOps principles – Typical flow inhibitors



Creation of
environments



Manual testing



Overly tight
architectures
on technical or
organizational level

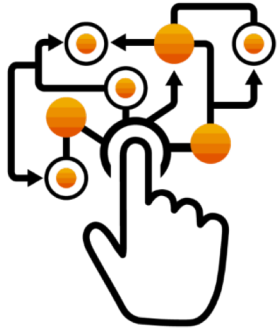


Complex and manual
deployment processes

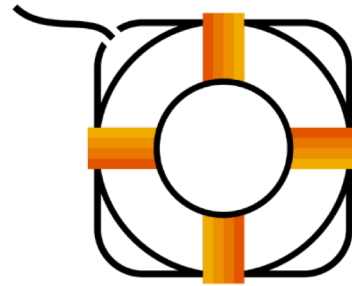
(cf. Gene Kim et. al, *The DevOps Handbook*, 2016)

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DevOps principles – Feedback



Complex systems are
hard to understand and
predict



Install safety measures
in system of work to
detect errors early



Avoid handovers and
context switches

(cf. Gene Kim et. al, *The DevOps Handbook*, 2016)

Introducing DevOps

DevOps principles – Continuous learning and experimentation



IT is moving rapidly –
continuously challenge
the status quo



Reserve time to
improve and innovate



Codify and reuse
knowledge



Establish generative
organizational culture
and coach teams

(cf. Gene Kim et. al, *The DevOps Handbook*, 2016)

Introducing Continuous Delivery and the SAP S/4HANA Cloud SDK CD Toolkit



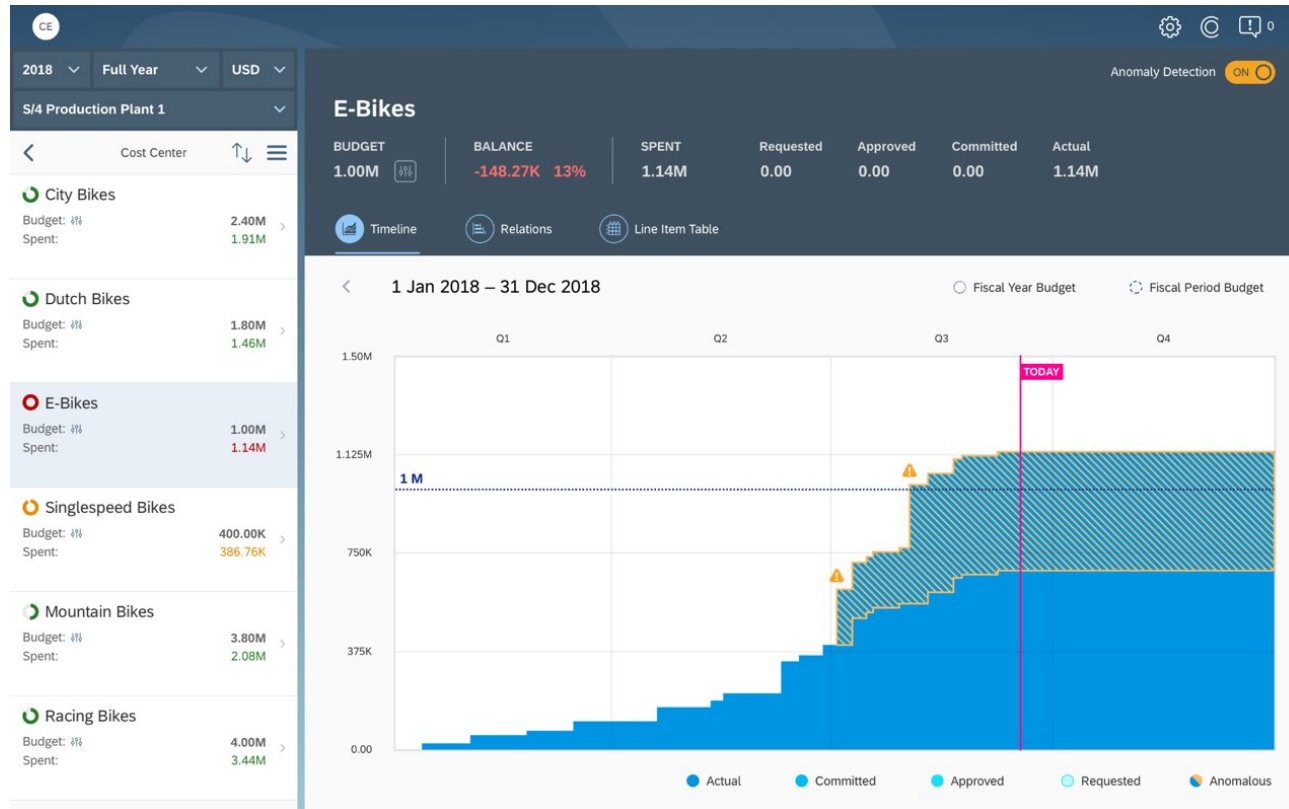


Continuous Delivery

is the production, testing, and deployment of software in short cycles and in a reliable, fully automated manner.

Example: SAP RealSpend

Cloud-based extension for integrated expense and budget management



Built and operated by a single team



Full multitenancy



No changes to ERP

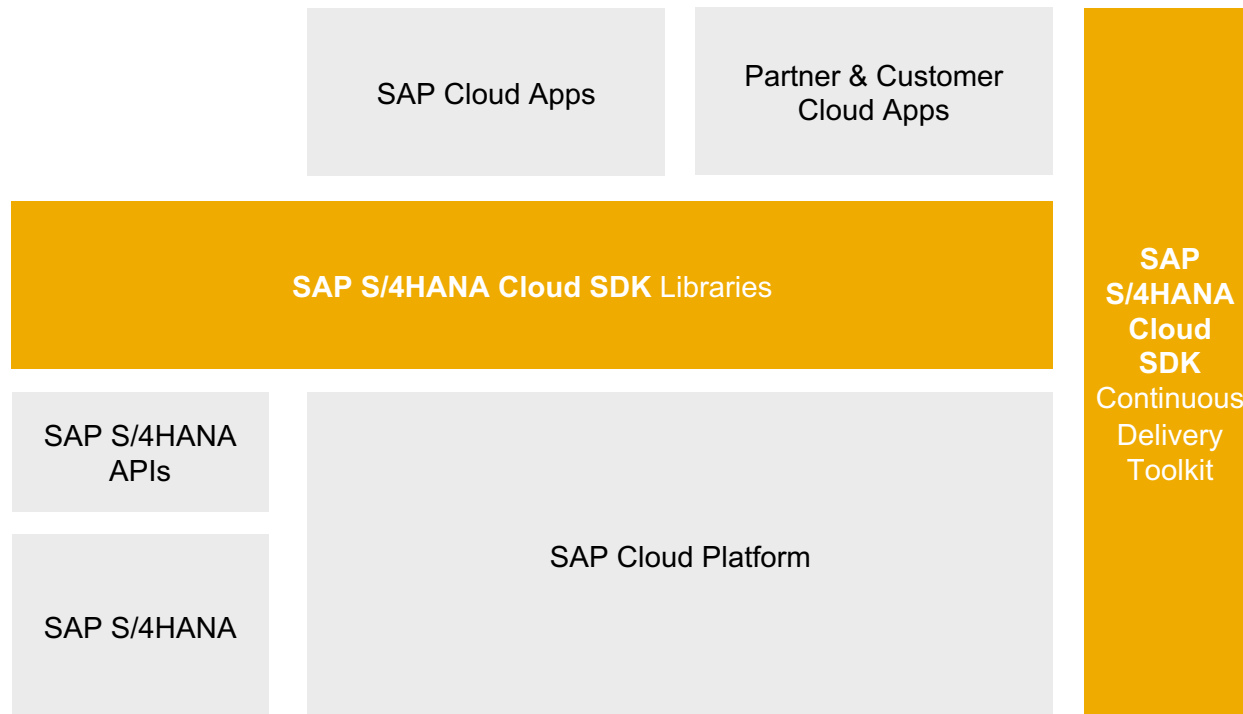


Built on the shoulders of open source



Deployed multiple times per day

What is the S/4HANA Cloud SDK?



- Rapidly build, test and deliver cloud-native SAP S/4HANA extensions.
- Detect violations of relevant quality standards and SAP guidelines
- Recommended way for SAP ecosystem (internal & external projects) to extend SAP S/4HANA
- Drastically simplifies ensuring certification-relevant qualities, thus, later also the certification process

Building Blocks of the S/4HANA Cloud SDK CD Toolkit



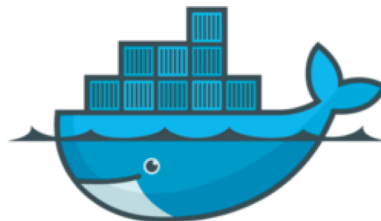
**Continuous Delivery
Toolkit**

Pipeline as Code - Automatically build, test, and deploy



Jenkins

Infrastructure as Code - Automated, repeatable setup



docker



kubernetes

Qualities of the S/4HANA Cloud SDK CD Toolkit



Easy to consume

- Fully automated instantiation and lifecycle management via cx-server script
- Best practice based pipeline (start simple – adopt more features as your project matures)
- Separation of concerns (project archetype is agnostic of pipeline)



Quick

- Highly parallelized CD pipeline
- Local read-only cache for project dependencies
- Easy scale-out (Kubernetes / Jenkins agents)



Reliable

- Pipeline implements the “Build Once Principle”
- Isolation of builds
- Isolation of build steps (use of ephemeral containers, functional programming style)



Future-proof

- Seamless updates of pipeline (GitHub) and infrastructure (Docker Hub)
- Fully containerized build process based on Jenkins
- Only contract to user is pipeline configuration yaml file + project structure



Extensible

- Support for custom extensions (via aspect oriented breakouts)

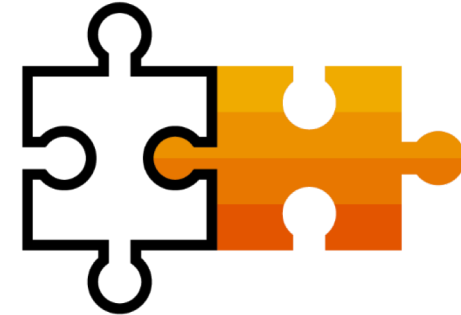
Qualities Ensured by the S/4HANA Cloud SDK CD Toolkit



Resilience



Fulfillment of functional
and non-functional
requirements



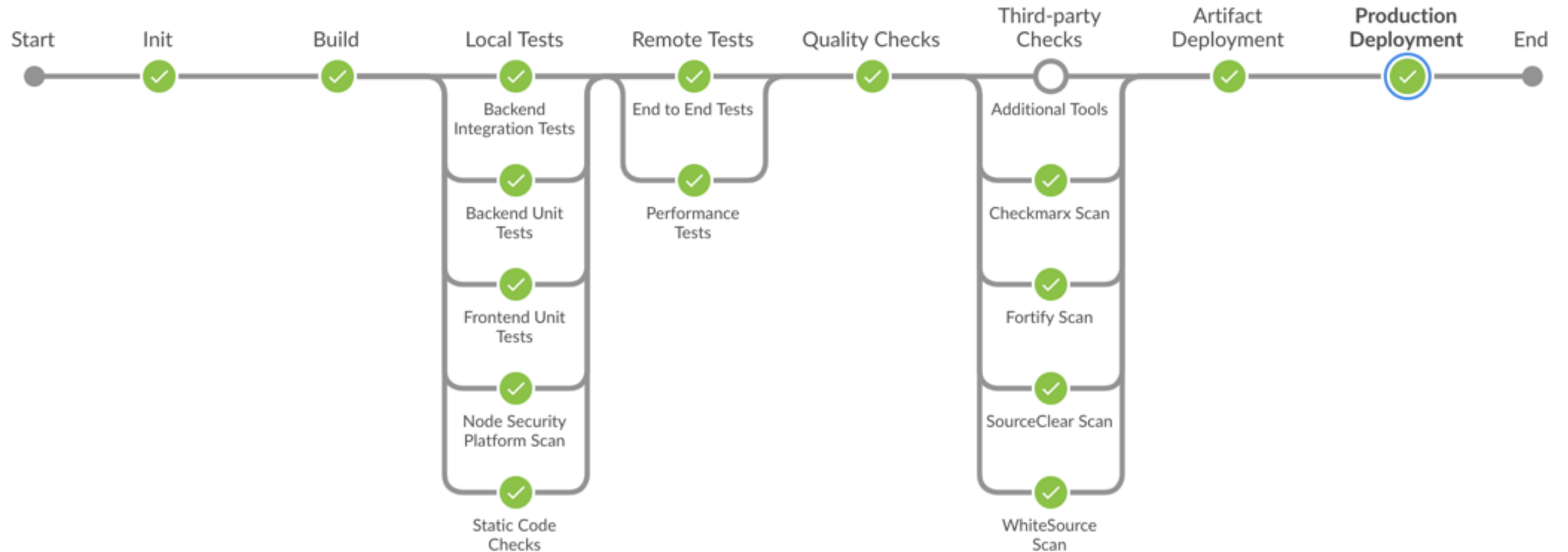
Public APIs only

Demo



Setting up Continuous Delivery with the SAP
S/4HANA Cloud SDK continuous delivery toolkit

S/4HANA Cloud SDK Pipeline at Full Use



Questions and answers

Thank you.

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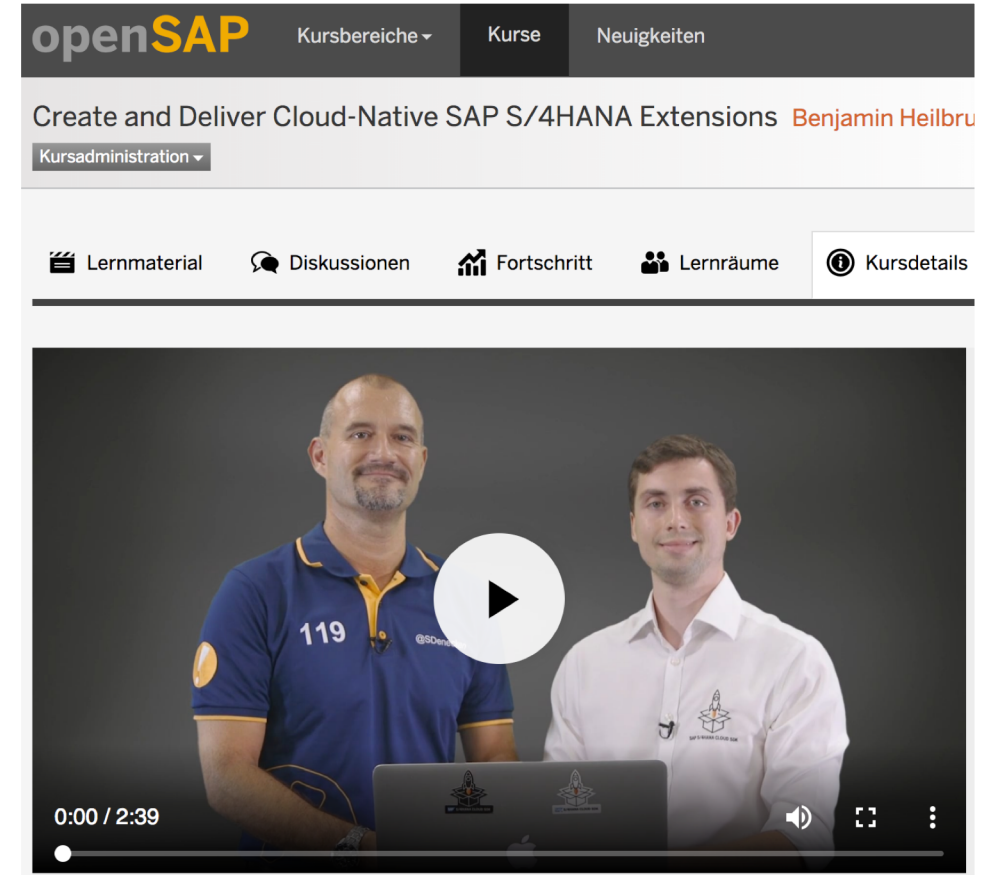
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