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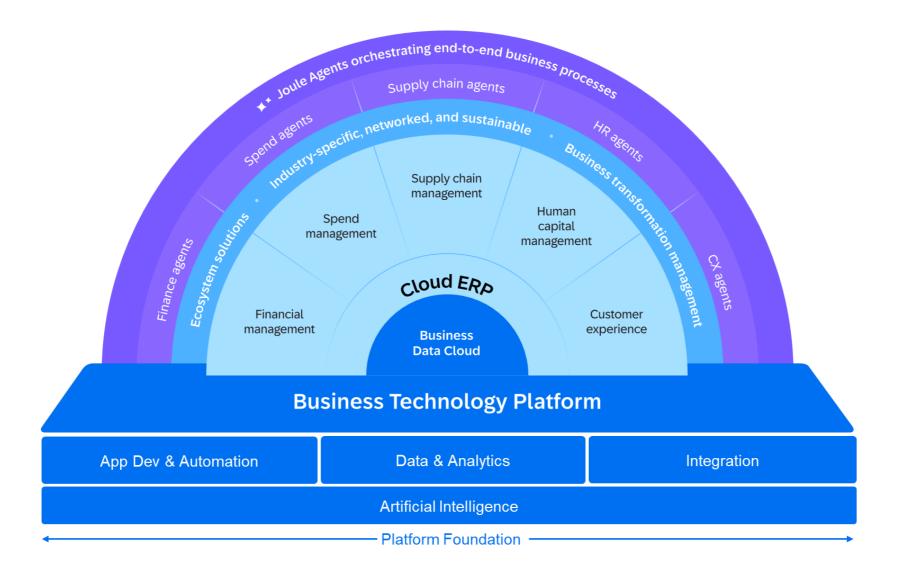
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# **SAP BTP – Platform Foundation** Run secure and enterprise ready

Arne Speck, Boris Zarske, Michael Friedrich, Joerg Latza, Manol Valchev, Colin Joy

# **SAP Business Technology Platform**



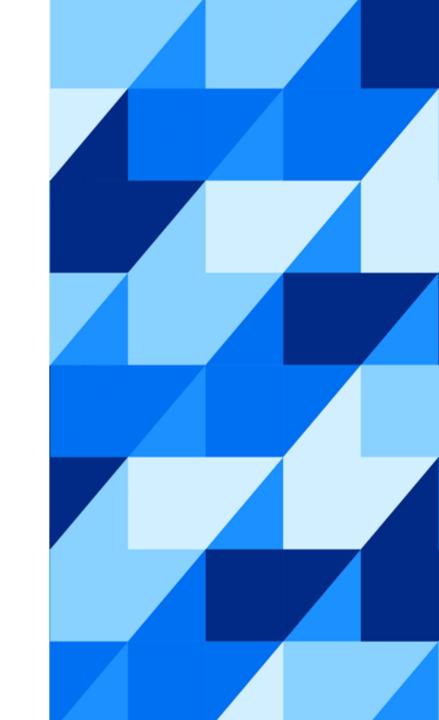
# **SAP Foundational services**

Runtimes & Application Lifecycle Management	Security & Compliance	Persistency	Connectivity	Administration and operations	
Choose the perfect foundation for your development	Securing your business processes and ensuring compliance	Trust SAP with your data in our persistency services	Connect all types of applications	Manage your stack	
SAP BTP offers three runtimes: Cloud Foundry providing simple deployment and handling for cloud applications, Kyma for more complex application requirements, and the ABAP Environment to continue existing development efforts. With integrated DevOps tools as well as openness to leverage existing tools and pipelines, SAP BTP streamlines the application lifecycle to accelerate development, deployment and operations.	SAP BTP ensures top-tier security and compliance with built-in authentication, single sign-on, and strong authorization controls. It supports global compliance requirements and simplifies audit logging for custom apps, allowing you to focus on development while ensuring data security and compliance.	SAP BTP provides SAP HANA Cloud, a secure, reliable database-as-a-service that combines in-memory database and data lake solution. It handles all data types - structured, unstructured, graph, vector and more - in one platform. This serves as the optimal foundation for all your applications, data and AI scenarios.	SAP BTP ensures seamless, secure connectivity across hybrid IT landscapes, integrating public cloud, private cloud, and on-prem systems and applications. This allows you to integrate your existing IT investments without disrupting your core operations.	SAP BTP offers comprehensive administration and operations tools for enterprise management, including account control, entitlements, and centralized automation. This enables proactive management, optimized resource use, and supports enterprise-level governance.	

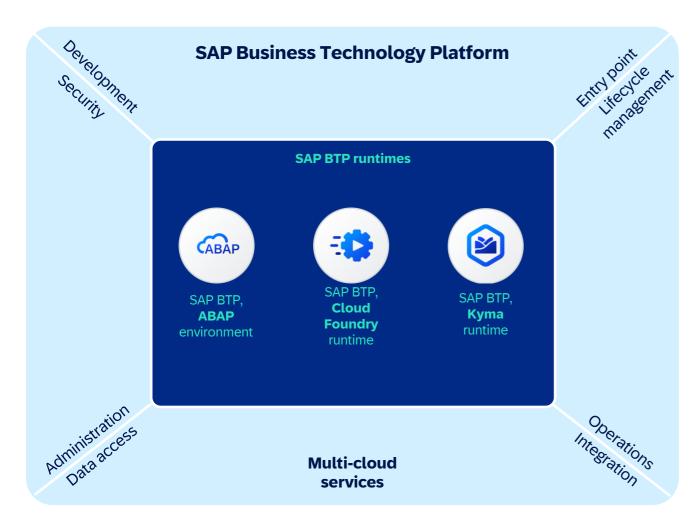
# Runtimes & Application Lifecycle Management Choose the perfect foundation

for your development

Arne Speck, Boris Zarske



# SAP Business Technology Platform – Recommended development approaches





SAP is offering clear development recommendations and guidelines for application and extension development on SAP BTP.

# SAP Cloud Application Programming Model and ABAP Cloud model

These models are the basis for these recommendations and guidelines, building on top of the runtimes below.

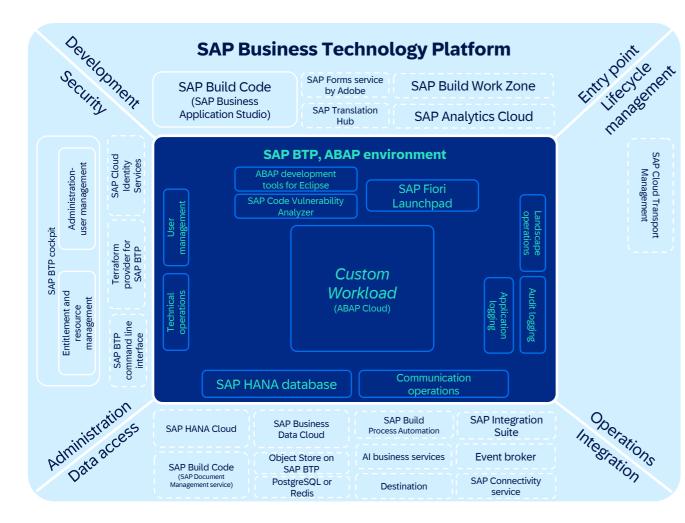
#### **Three strategic SAP BTP runtimes:**

- ABAP environment
- Cloud Foundry runtime
- Kyma runtime



SAP BTP Developer's Guide

# ABAP development on SAP BTP, ABAP environment



#### What is it?

 Complete ABAP environment including SAP HANA persistency layer to run and operate ABAP Cloud–based extensions and applications loosely coupled from SAP ERP or SAP S/4HANA (cloud or on premise)

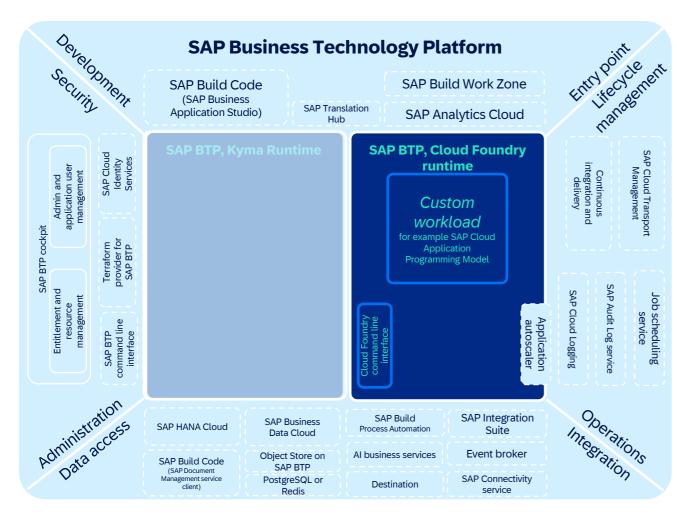
#### What is it best for?

- SAP S/4HANA extensions that require or benefit from loosely coupled nature of extension (but still closely related):
  - Fast-changing and evolving solutions with back-end independent lifecycle requirements
  - Requirements to serve non-SAP S/4HANA or SAP ERP users
  - Scenarios spanning across several SAP S/4HANA or SAP ERP systems (hub scenario)
- Multi-tenancy software-as-a-service applications (especially for SAP partners)

#### What are the benefits?

- Fully SAP-operated platform with latest ABAP and SAP HANA stacks
- Possibility to leverage ABAP developer community with broad set of business process knowledge
- Possibility to migrate or convert existing ABAP extensions to follow a clean core concept
- Custom code analysis including checks by the SAP Code Vulnerability
   Analyzer tool
- Simple consumption of and integration into SAP BTP multi-cloud service portfolio

# Cloud-native development, Option I – SAP BTP, Cloud Foundry runtime



#### What is it?

- Runtime to run polyglot cloud-native applications on SAP BTP
- Based on the highly efficient, open-source Cloud Foundry platform for cloud-native application development
- Support for the top programming languages and developer frameworks, like SAP Cloud Application Programming Model, to support the development of business application extensions

#### What is it best for?

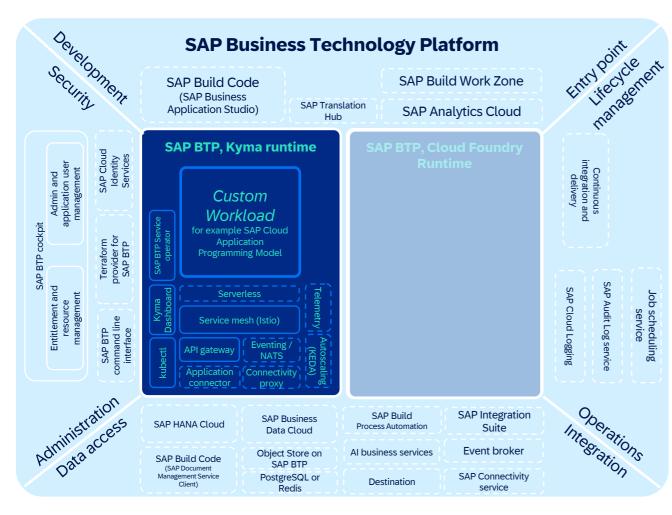
- Loosely coupled SAP business application extensions and less complex business applications integrating modern technologies, languages, and frameworks
- Focus on development of business scenario rather than having to deal with technical details and configuration of runtime

#### What are the benefits?

- User-friendly and intuitive to operate; no runtime technology knowledge required
- Language independent (Java, Node.JS, Python fully supported by SAP)
- Fully compatible with SAP Cloud Application Programming Model (Java, Node.JS)
- Simple consumption of and integration into SAP BTP multi-cloud service portfolio

Click for <u>runtime guide</u>

# Cloud-native development, Option II – SAP BTP, Kyma runtime



#### Click for <u>runtime guide</u>

#### What is it?

- Kubernetes-based application runtime including all necessary capabilities to simplify the development and run cloud-native applications
- SAP-managed powerful open-source Kyma stack based on modular building blocks
- Support for the top programming languages and developer frameworks, like SAP Cloud Application Programming Model, to support the development of business application extensions

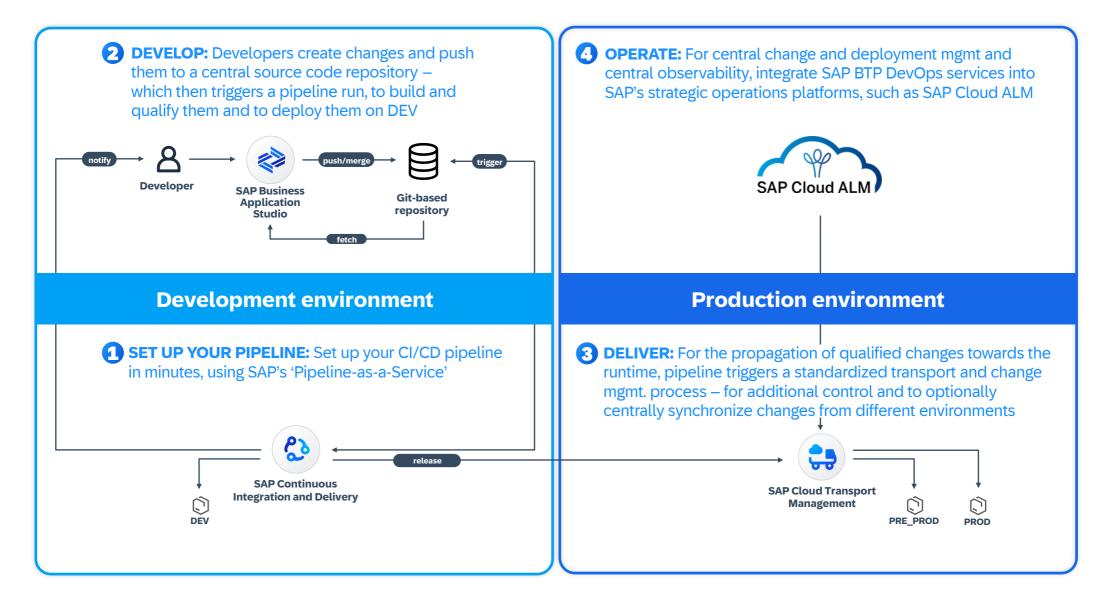
#### What is it best for?

- Best suited for complex business applications and SAP business application extensions with enhanced runtime requirements (such as for scaling, orchestration, access to heavy machinery, or in-cluster functionality)
- Development of microservices-based and serverless solutions
- · Cost-efficient operations of large number of applications or extensions

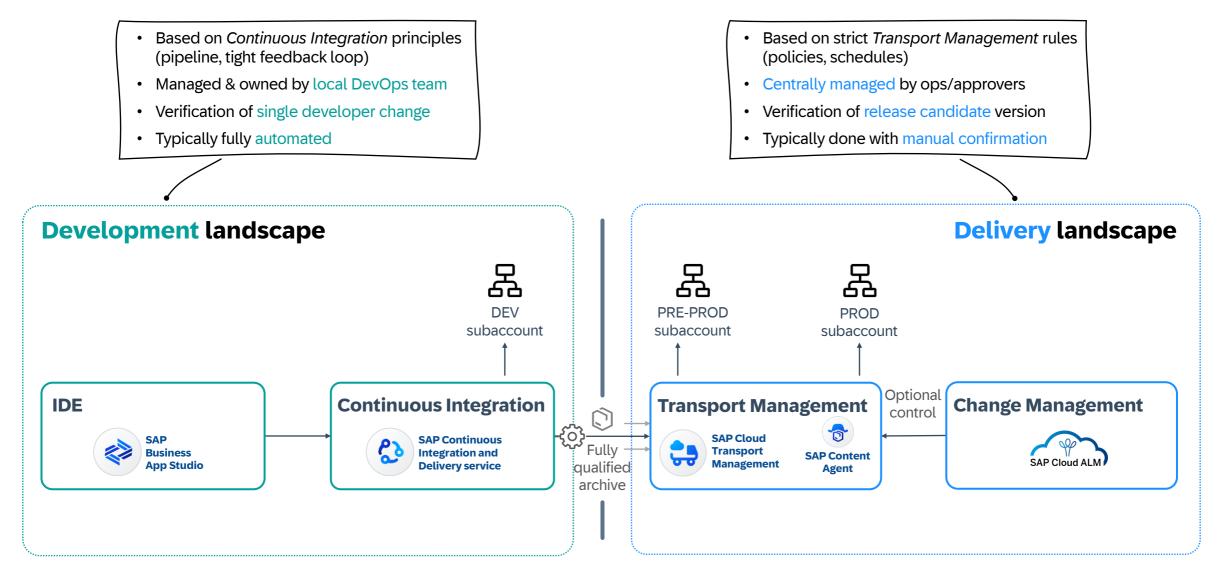
#### What are the benefits?

- Fully modularized SAP-managed Kyma stack while offering intuitive access to advanced Kubernetes feature set
- Language independent (Node.JS and Python for serverless functions)
- Fully compatible with SAP Cloud Application Programming Model (Java, Node.JS)
- Simple consumption of and integration into SAP BTP multi-cloud service portfolio

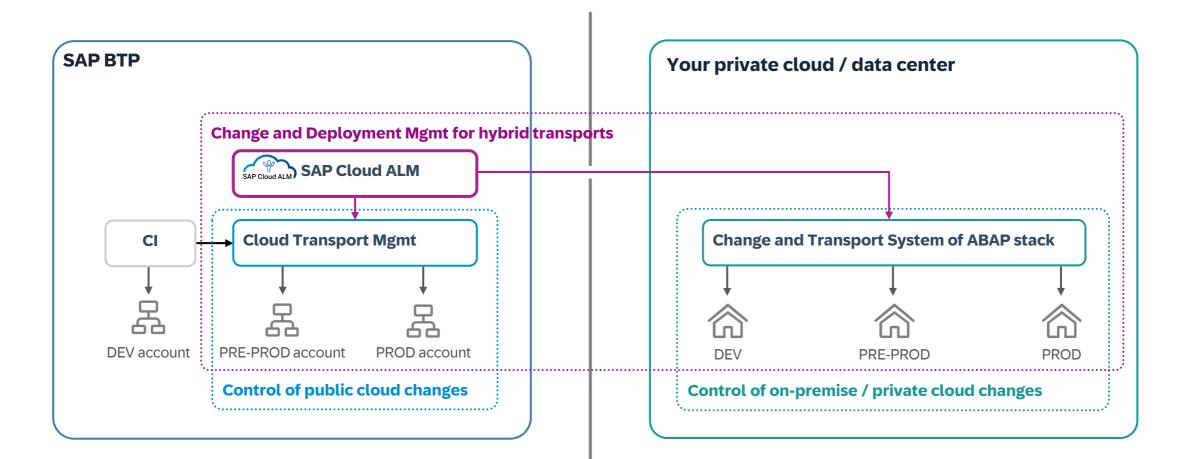
## Integrated **DevOps** tools for guided development with built-in governance



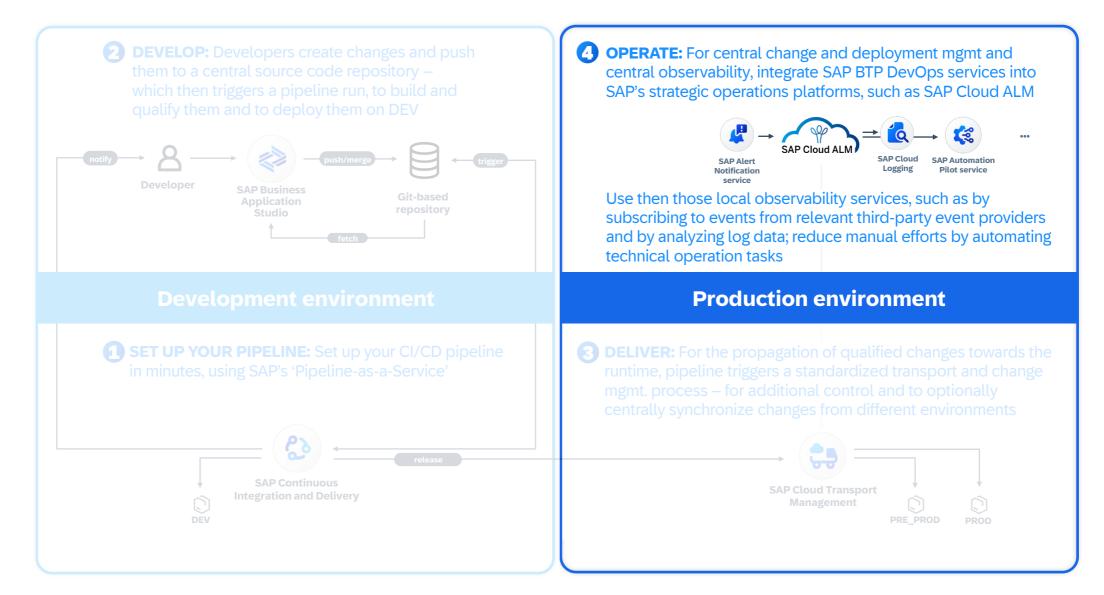
## Principle of additional control for delivery towards production



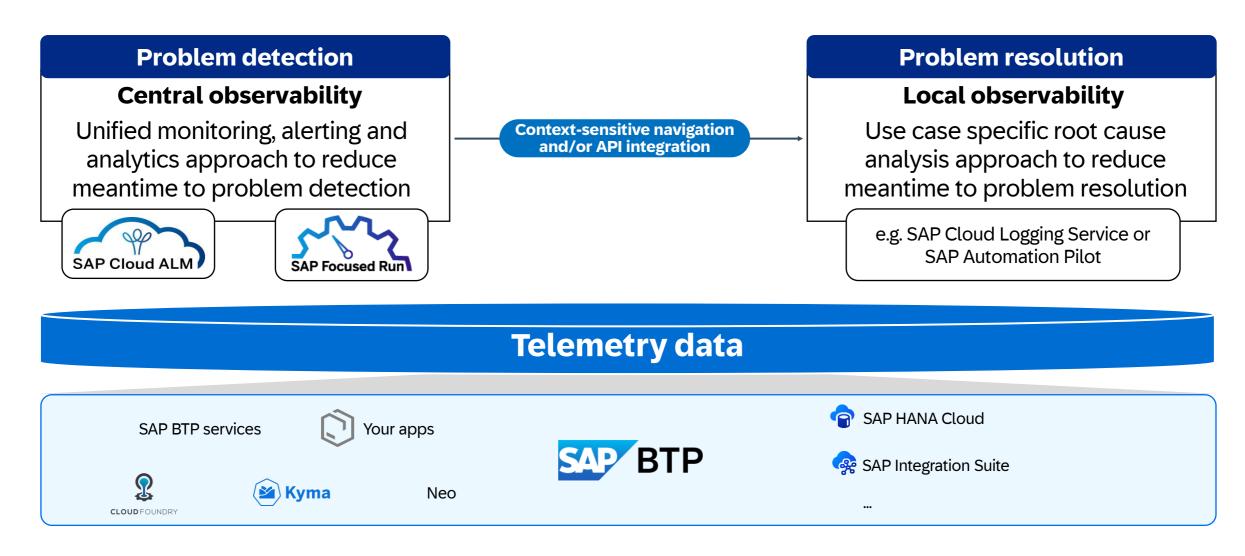
# **Deliver** your hybrid changes toward production – with SAP Cloud ALM



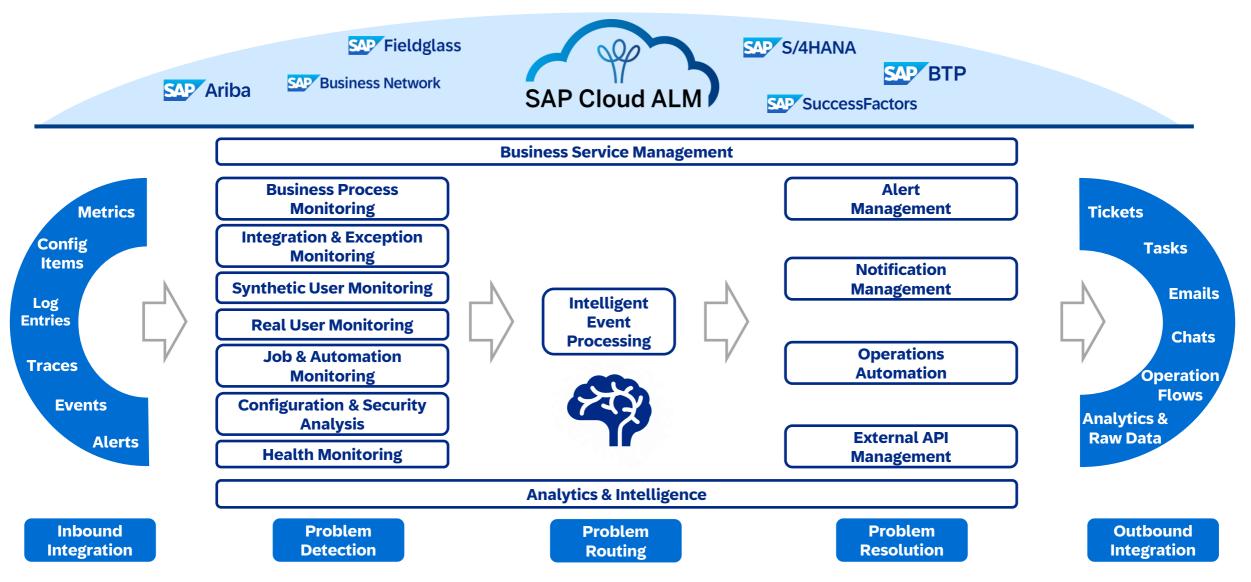
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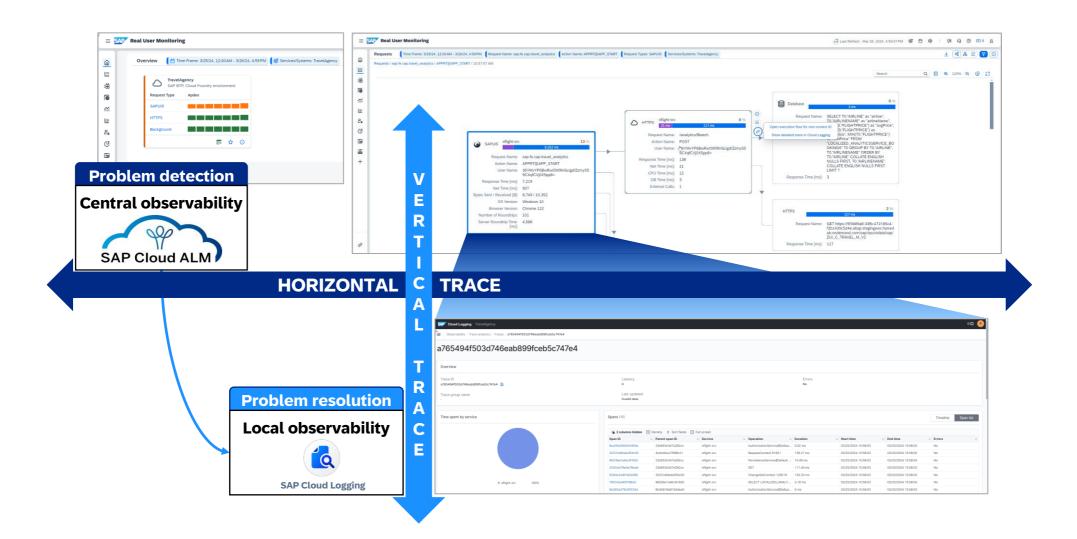
# Problem detection & problem resolution for your apps on SAP BTP



## **SAP Cloud ALM for Operations**



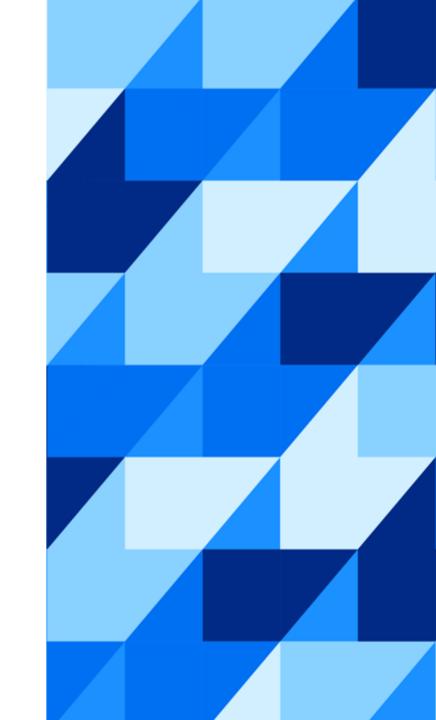
# 4. Operations: Real User Monitoring for custom apps built on SAP BTP



# Security & Compliance

Securing your business processes and ensuring compliance

Michael Friedrich



#### SAP Business Technology Platform – Security

#### **Platform security**

- SAP BTP is developed securely with built-in, comprehensive **security features and privacy capabilities**.
- Use the **services for security with SAP BTP** to support the security policies of your organization, such as authentication, identity lifecycle, authorization, connectivity, data protection, and privacy.

#### Compliance

- Services for SAP BTP and the underlying infrastructure hold various **certifications and attestations**.
- SAP BTP offers a security foundation that helps ensure your organization acts in accordance with security requirements based on laws, regulations, industry standards, and your policies.

#### Guidance

- Security recommendations through SAP BTP enable you to secure the configuration and operation of SAP BTP services in your landscape.
- The first services are already Integrated with the SAP Cloud ALM solution configuration and security analysis.



pages.community.sap.com/ topics/btp-security

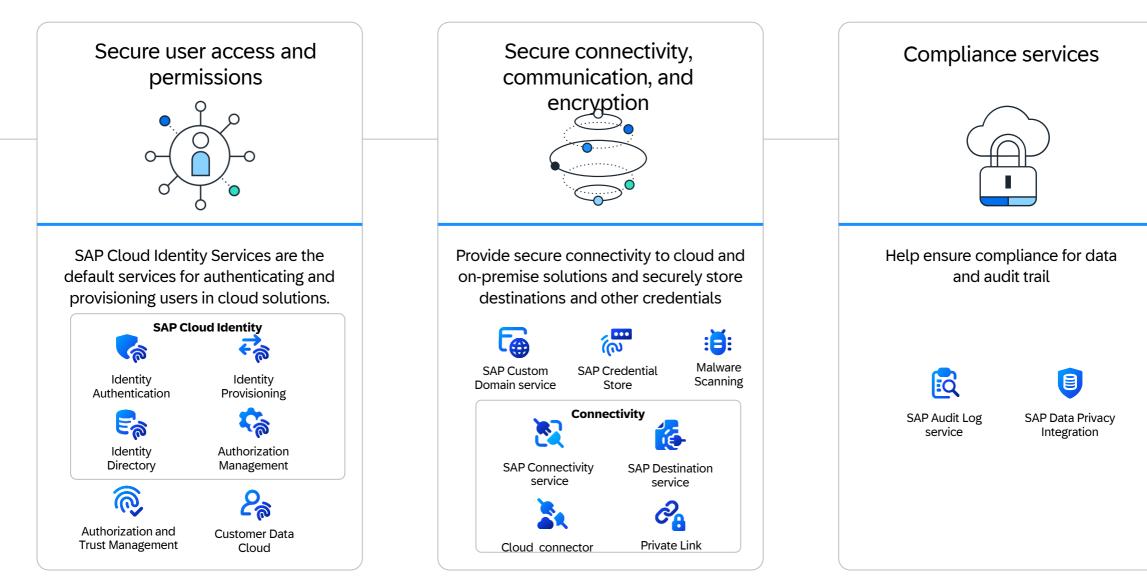






http://help.sap.com/docs/btp/ sap-btp-security-recommendations

## SAP Business Technology Platform – Security and compliance services



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http://help.sap.com/docs/btp/ sap-btp-security-recommendations

# SAP BTP shared responsibility model

Customer	Account Management	Customer application access	
Customer	Application Creation, Evolution and Change Management		
Or SAP	SAP HANA Service Management	Cloud operations from SAP and Customers	
	Runtime and Services Management		
SAP	Resource and Account Provisioning		
	Operation System (OS) Maintenance	Cloud operations from SAP	
	Database and Storage Management		
	Infrastructure Maintenance	laaS orchestration	
SAP or Hyperscaler	Network Storage Compute		
	Data Center and Hardware	Physical fabric	

#### SAP Business Technology Platform – Security

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pages.community.sap.com/ topics/btp-security



www.sap.com/about/trustcenter/certification-compliance.html

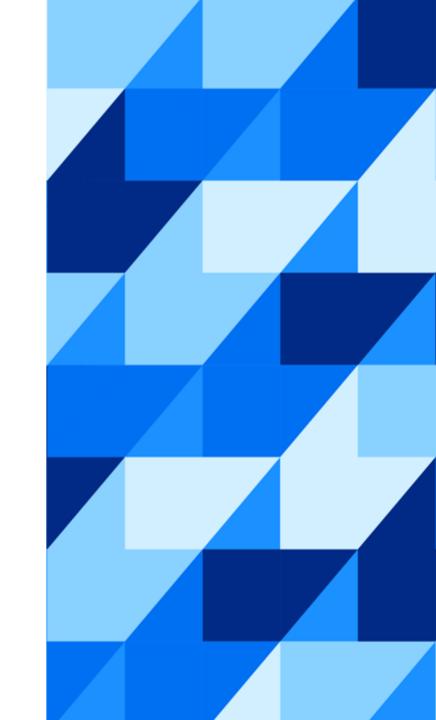


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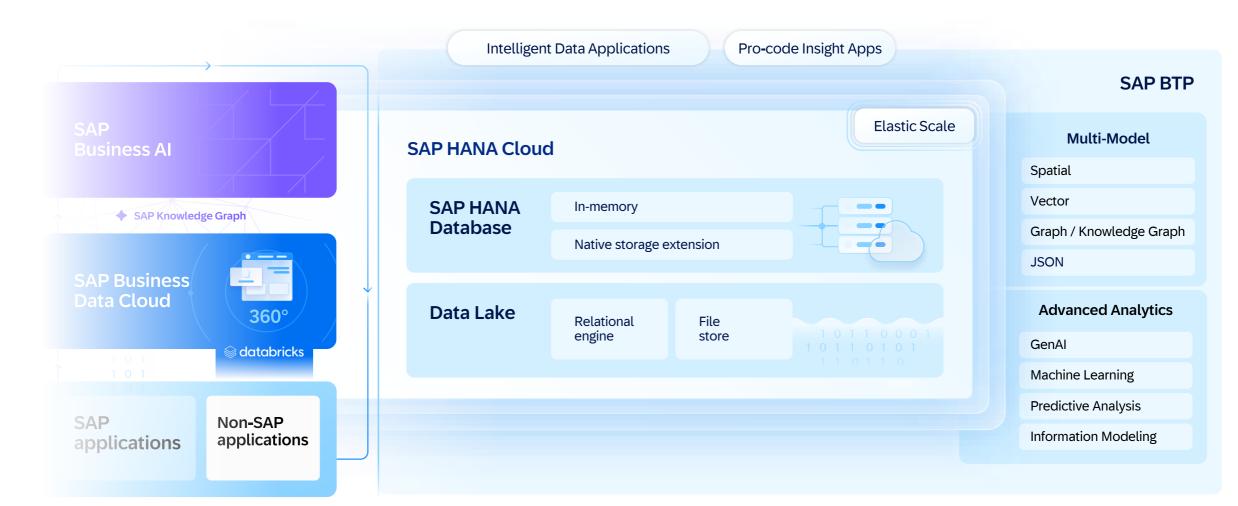
# Persistency

# Trust SAP with your data in our persistency services

Joerg Latza



# **SAP HANA Cloud**



**SAP HANA Cloud** is the de-facto and strategic cloud DBaaS and persistency for SAP Applications & Services and Intelligent Data Applications with the objective to maximize consumption, customer satisfaction, revenue, and margin

# Enterprise data adds intelligence to every application

sources – maximize value by making all data

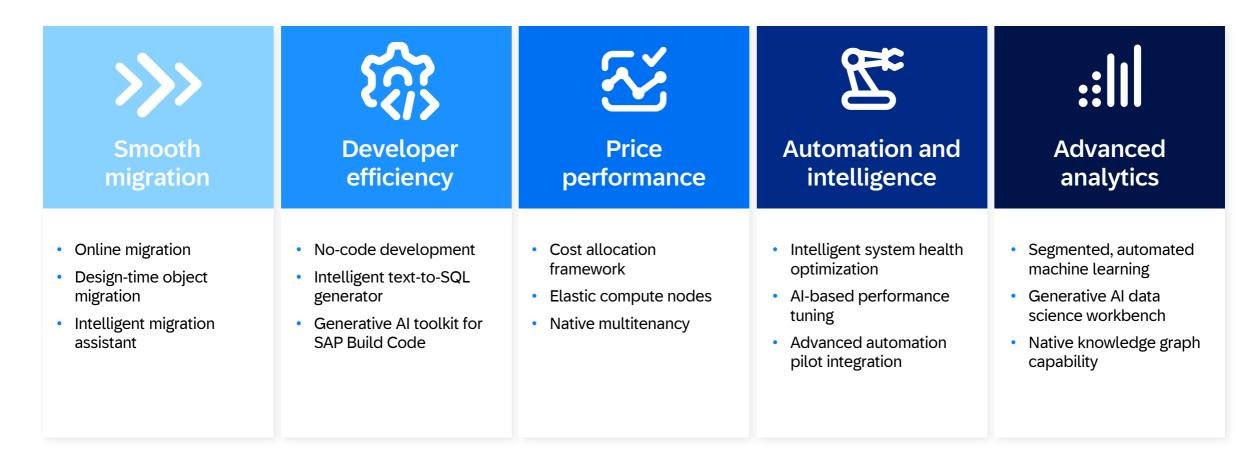
available to cloud applications

#### UX **Interact Naturally** SAP Fiori App 3rd Party IDE's, Tools SAC SAP Build Code Transform the decision-making process and optimize business operations **SAP HANA Cloud Generative AI Machine Learning** Utilize multi-model engines to augment LLM's Library of 100+ business and scientific algorithms enabling natural language use cases for key ML scenarios **Understanding & Intuition** Create context-aware applications infused with generative AI, machine **Multi-Model Processing Tiered Data Storage** learning, and multi-model processing Process any data type and model at scale using Architect data storage according to a single solution, a single copy of data, and a single user requirements while optimizing price / query language performance **Gather Knowledge** SAP **On-Premises** side-by-side SAP HANA Securely ingest, blend and store any data **Applications** extensibility **On-Premises** (e.g., S/4 HANA) type or model from SAP and/or 3<sup>rd</sup> party **3rd Party Data Sources**

PUBLIC

Cloud

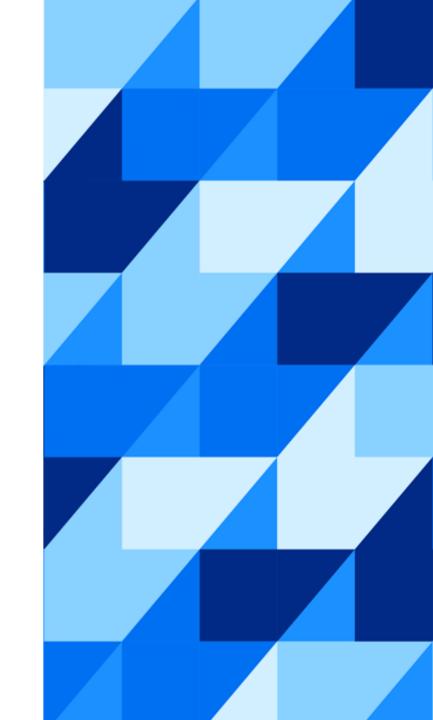
## SAP HANA Cloud | Strategic key priorities





# **Connectivity** Connect all types of applications

Manol Valchev



# **SAP Destination Service**

An integral part of SAP BTP Connectivity

Secure, flexible and centralized **technical connection configuration management** via key entities

- *destinations* key-value parameters holding information about technically accessing the remote system protocol, host, port, credentials, etc.
- destination fragments partial configurations
- certificates multiple file and keystore formats

Self-service for issuing X.509 client certificates part of SAP Cloud PKI.

Multiple storage levels and scopes of visibility.

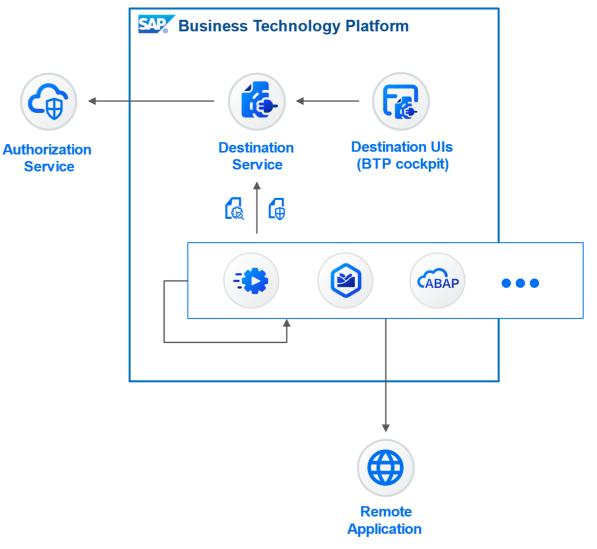
Administration via BTP cockpit and REST API.

Programatic runtime access via REST API:

- tenant-specific destination look-up
- automated access token retrieval

Multi-tenant, cross-environment service consumption.

Simplified consumption via Transparent Proxy and Cloud SDK.



# **SAP Connectivity Service**

An integral part of SAP BTP Connectivity

Secure technical connectivity between cloud applications and such hosted in private, fenced network environments.

#### BTP environment-native and Hyperscaler-agnostic solution.

Communication protocol-specific processing, enforcement of access controls, auditing and monitoring.

Multiple communication protocols:

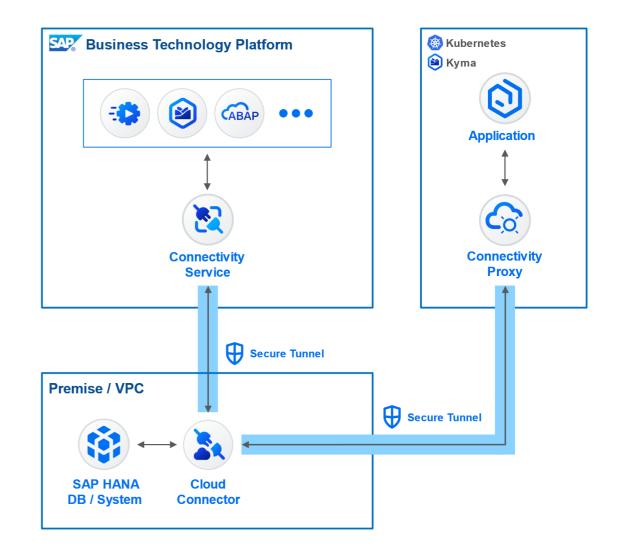
- HTTP, RFC, LDAP protocol-specific processing
- TCP generic data transfer of any TCP-based protocol

BTP-native runtime consumption via

- destinations with ProxyType=On-Premise
- **Transparent Proxy** as main entry point for virtually transparent, unified connectivity experience

Connectivity Proxy as Kyma Module

• **enable**  $\rightarrow$  **configure**  $\rightarrow$  **use**. Supportability SLAs by SAP.



# **Transparent Proxy** as the main entry point

An integral part of SAP BTP Connectivity

The **entry point** at runtime for **applications** and **services** to leverage the features and capabilities of **SAP BTP Connectivity**.

Virtually transparent, unified connectivity to any remote target application modelled as a destination in SAP Destination Service.

- Local access to the remote applications via Kubernetes Services
- Transparent Proxy takes care of client authorization, mTLS, SOCKS5, principal propagation, etc.

Native integration with SAP Destination service and SAP Connectivity service

- Auto-wiring with Connectivity Proxy Kyma Module
- Automated SOCKS5 handshake with Connectivity Proxy

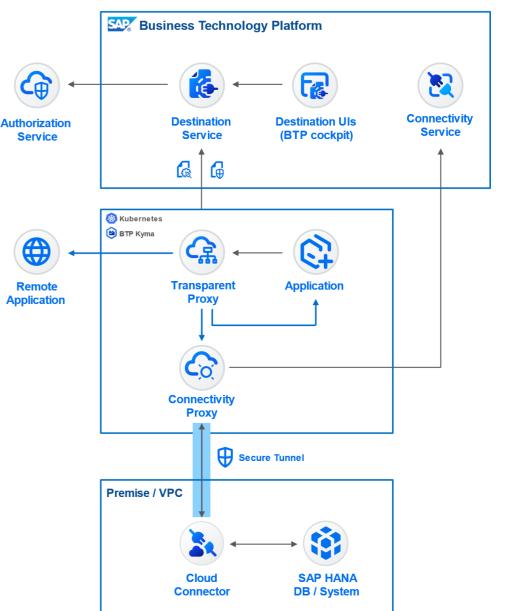
#### Transparent Proxy as Kyma Module

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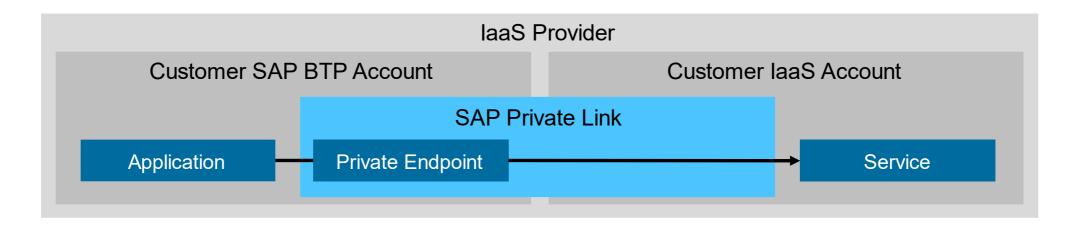
# Custom deployment on Kubernetes. Lifecycle management via **Operator** and **Helm**.

Enterprise readyness – multi-tenant, resilient, highly available.

Automated scaling based on Kubernetes HPA.



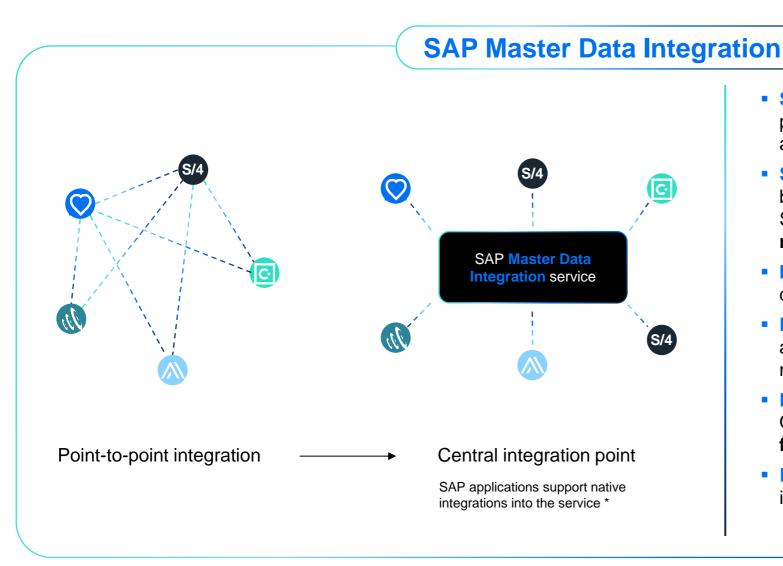
## **SAP Private Link Service**



- Establishes a private connection between selected SAP BTP services and selected services in laaS provider accounts
- Traffic remains within the Hyperscaler's secure network and does not reach public Internet.
- **Azure and aws** as supported laaS providers.
- Available on 🕂 and 😰 SAP BTP runtimes.

#### **SAP Master Data Integration**

#### Help business applications to arrive at a consistent view on master data



- SAP Master Data Integration service provides a consistent view on master data across a hybrid customer landscape
- SAP One Domain Model is used as the basis across the integrations of various SAP applications which makes data mapping obsolete.
- Initial load to optimize time-to-value, due to data persistency
- Filtering capabilities to define replication according to business process needs per master data object and application
- Extensibility capabilities to extend the SAP One Domain Model with customer specific fields
- Key mapping to share and receive information on application-local IDs

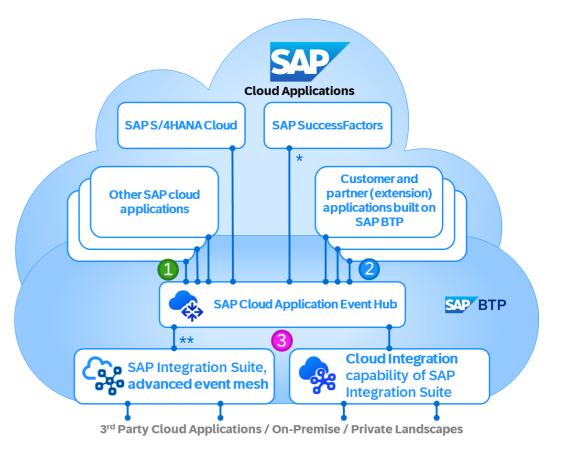
# **SAP Cloud Application Event Hub**

Pre-built event-based integration between SAP cloud applications for easy and error-free event distribution between SAP cloud applications.

- 2 Customer and partner (extension) applications built on SAP BTP can use SAP Cloud Application Event Hub for event-based integration with SAP cloud applications to achieve real-time integration while adhering to the clean core concept.
  - For a deeper look into extension application scenario: <u>Devtoberfest - Use SAP Cloud Application Event Hub to consume</u> <u>business events in a CAP application</u>

3 Exchange events with SAP Integration Suite EDA and mediation offerings for 3<sup>rd</sup> party and on-premise integration. SAP Cloud Application Event Hub provides a central access point for business events from SAP cloud applications.

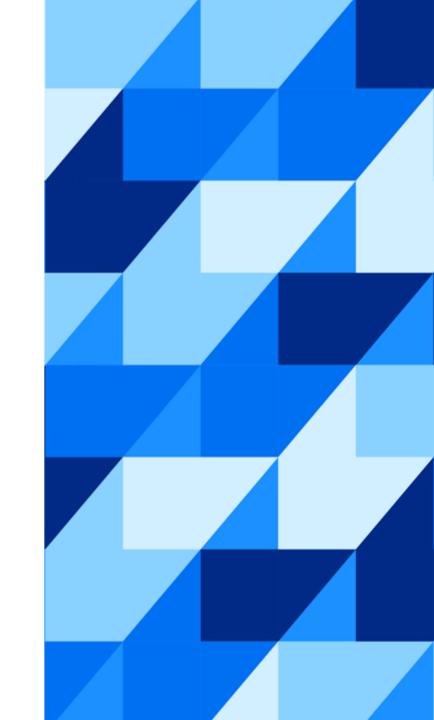
SAP Tech Bytes: SAP S/4HANA Cloud events to SAP Cloud Integration via SAP Cloud Application Event Hub



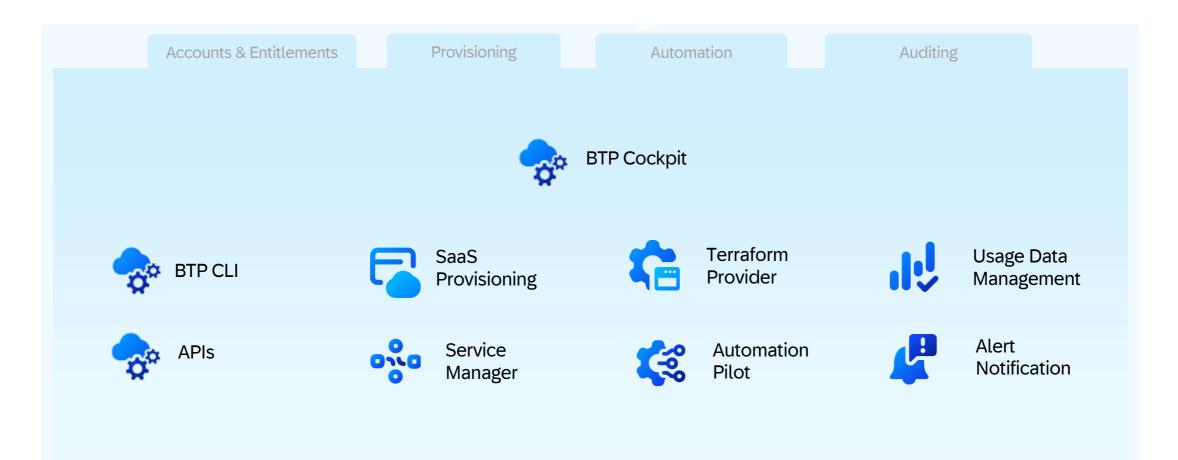
\* Early Adopter Care Program, see <u>Customer Community post</u> \*\* Planned innovation

# Administration and operations Manage your stack

Colin Joy



# **Administration & Operations**



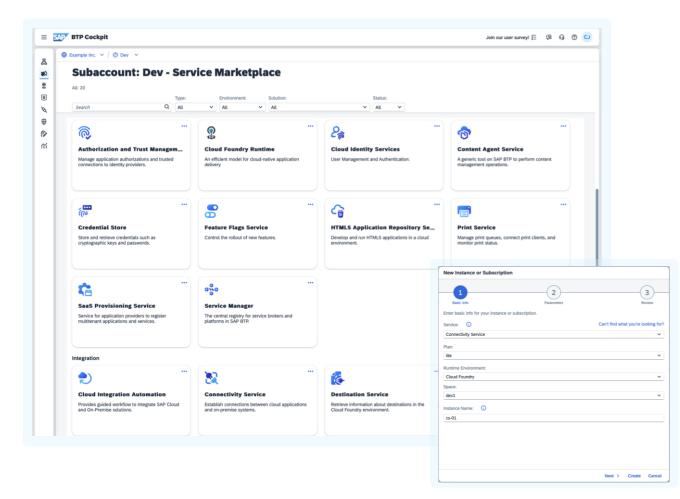
# **SAP BTP Cockpit**

≡ SAP BTP Cockpit						Join our user survey! žੂੰΞ (≌ G	@ <mark>CJ</mark>
-	-	) Example Inc. 🗸					¢
品 Account Explorer	•		nt. Ex	omnlo	Inc	Create V Switch Glob	al Account
ିଶ୍ୱ Resource Providers		Global Accou		ample	inc. –	Since of Since and	
Boosters		Account Expl					
ြာ System Landscape	~	All: 8 directories, 9 subaccounts   Subdomain: xmpl-inc					
Systems							
Formations		Search	Q All	ons:			
Entitlements	~	Search	Q Au	·	Hide entities you don't have	/e access to	
Entity Assignments							
Service Assignments		Directories and Subaccounts	Subaccount	ts (9)			
Security	~	(III) #				Expand All Collapse All 🚳	æ
Users		Name	=	Туре	Provider	Region	
Role Collections		<ul> <li></li></ul>		Global Account	:		•••
Trust Configuration		Co AMER		Directory (Mana	aged)		•••
Trust Configuration (New)		Ca APAC		Directory (Mana	aged)		•••
谷 Usage		✓ C₃ EMEA		Directory (Mana	aged)		•••
		Y D BTP CoE		Directory			•••
		Y D Project A		Directory			•••
		Dev		Subaccount	Microsoft Azure	Europe (Netherlands)	•••

#### **Central Administration Console for BTP**

- Web-UI providing access to essential capabilities for administration and operations on the Business Technology Platform
- Account management
- Fine-granular control of entitlements
- Configuration of **users & permissions**
- Connectivity
- Provisioning for BTP services and subscriptions
- Usage Insights
- Deploy and operate workloads on the **Cloud Foundry** runtime
- Manage Alert Notifications, Credentials, ...

### **Entitlements, Services & Subscriptions**



# SAP BTP Cockpit lets you provision our large selection of business-centric services and technology.

#### Service Marketplace

The Services Marketplace in the BTP Cockpit lists the services and subscriptions available in the context of the respective subaccount. From there, you can also provision, update or delete instance.

#### • Entitlements

Entitlements are the instrument that allows you to have fine-granular control over the services and service quota that should be available to individual subaccounts or directories.

### Account Model

ame	±	Туре	Provider	Region	
<ul> <li></li></ul>		Global Account			•
Ca AMER		Directory (Managed	)		•
Co APAC		Directory (Managed	)		•
✓ C₀ EMEA		Directory (Managed	)		•
➤ BTP CoE		Directory			•
Y D Project A		Directory			•
O Dev		Subaccount	Microsoft Azure	Europe (Netherlands)	•
Prod		Subaccount	Amazon Web Services (AWS)	Europe (Frankfurt)	•
() Qual		Subaccount	Google Cloud Platform	Europe (Eemshaven)	•
		Directory			•
Operations		Directory			•
<ul> <li>Sandbox</li> </ul>		Directory			•
S Example 1		Subaccount	Amazon Web Services (AWS)	💽 Brazil (São Paulo)	•
Example 2		Subaccount	Google Cloud Platform	Australia (Sydney)	•
Example 3		Subaccount	Microsoft Azure	🛃 Canada (Toronto)	
Example 4		Subaccount	Amazon Web Services (AWS)	Japan (Tokyo)	•
Example 5		Subaccount	Google Cloud Platform	💶 India (Mumbai)	
Example 6		Subaccount	Microsoft Azure	US West (WA)	

### **Entities of the Account Model**

#### Global Account

Representation of your contractual agreement with SAP.

• **Directory** (Optional)

Allows you to organize and manage subaccounts based on business or technical requirements. Supports central management of e.g. users and entitlements across a set of subaccounts.

Subaccount

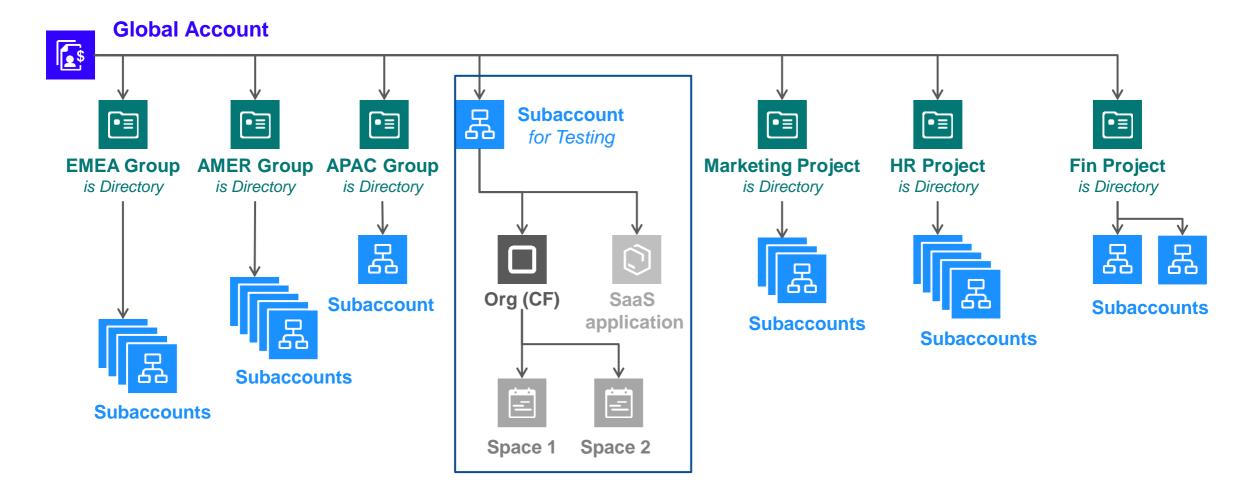
Holds the applications, services and subscriptions – the content of that you work with. Plays an important role in our tenancy model and serves as the key entity to isolate content and permission.

Region

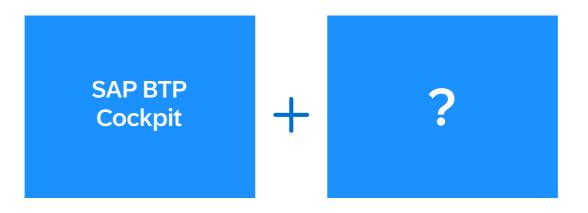
Represents the geographical location where applications, services or data are hosted.



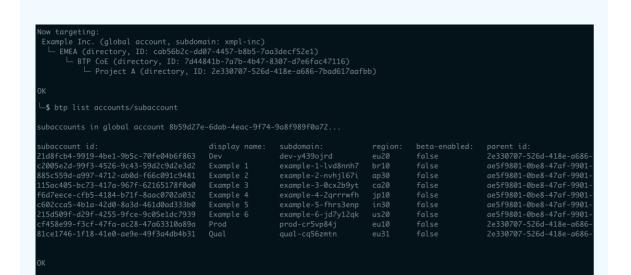
### Account Model



### Administration at Scale



### SAP BTP Command Line Interface (BTP CLI)



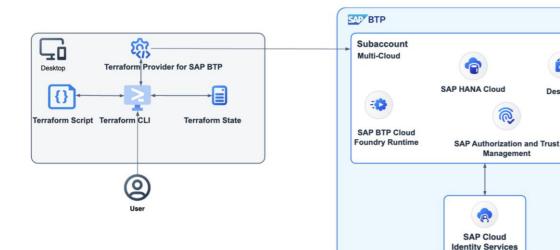
#### About

#### Interactive UI

The btp CLI offers **an alternative to the cockpit** for users who prefer working on the command line. It consists of a client and a server. The client is installed on your computer and it interacts with SAP BTP through a server. You connect to this CLI server (<u>https://cli.btp.cloud.sap/</u>) when you log on to your global account through the btp CLI.

- The CLI can also be used for scripting, where it's machine readable responses make it possible to build complex automation
- Today, most important platform administration capabilities are available, for example:
  - Creating subaccounts and directories
  - · Managing entitlements of global accounts and subaccounts
  - Managing users and their authorizations in global accounts and subaccounts
  - Subscribing to applications

### **BTP Terraform Provider**



### About

Destination

- **Infrastructure as Code** (IaC) enables you to automate infrastructure provisioning and management using code instead of manual actions.
- IaC uses a **declarative approach**. You define the desired state of the system, including what resources you need and any properties they should have. The IaC tool will take this target configuration and execute the necessary steps to match it.

### Key benefits:

- Consistency
- Scalability
- Versioning
- Collaboration
- Documentation of target state

### **SAP** Automation Pilot

Automation Pilot					e	0	
Dashboard My Catalogs	HttpSyncCommandExample C Catalog: welcome, Version: 1			Retrigger	t	5	C
Provided Catalogs Commands	>>> Status Progress Finished	Elapsed Time Input 3s ƏShow	Output Started By ➡Show &				
Inputs			<ul> <li>A</li> <li>A</li> </ul>				
Executions •	Execution Tree						
Scheduled Executions							
Operators	¢		syncHttpRequest				>
Service Accounts							
Alert Notification							
Content Connectors	Additional Information						
	General	Time	Usage	Audit			
	D:	Started On:	Size:	Action Log:			
	-0000001732103152809-0-1	20/11/2024, 11:45:52 UTC	3.53 KB	Show			
	G Command:	Last Modified On:	Used Quota:				
	HttpSyncCommandExample (Catalog: welcome, Version: 1)	20/11/2024, 11:45:55 UTC	1				
Terms & Conditions	Execution Tags (1)			Search			
API	Name =	Value					

#### About

Automation Pilot is a service to help simplify your operational effort behind cloud solutions on SAP BTP. It gives you an access to a wide variety of provided fully automated procedures like: Database and Application Lifecycle Management, Monitoring, HTTP Requests, Bash Scripting and more

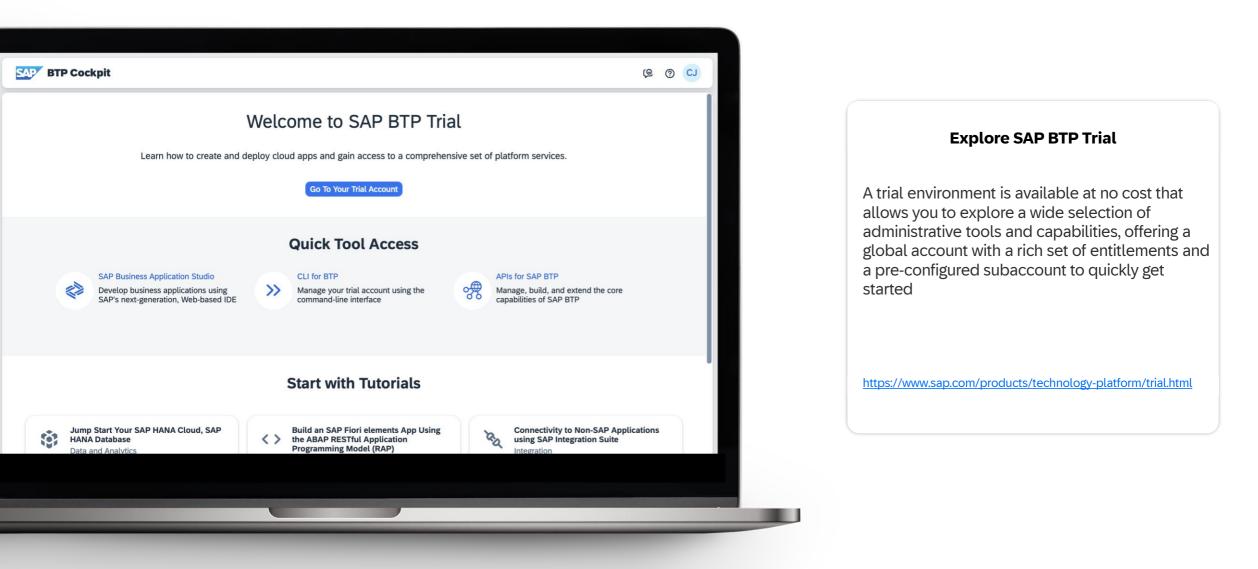
#### **Capabilities**:

- Running Predefined Commands
- Building Custom Commands
- Storing Data Securely
- Scheduling Executions
- React on Events

### Administration at Scale

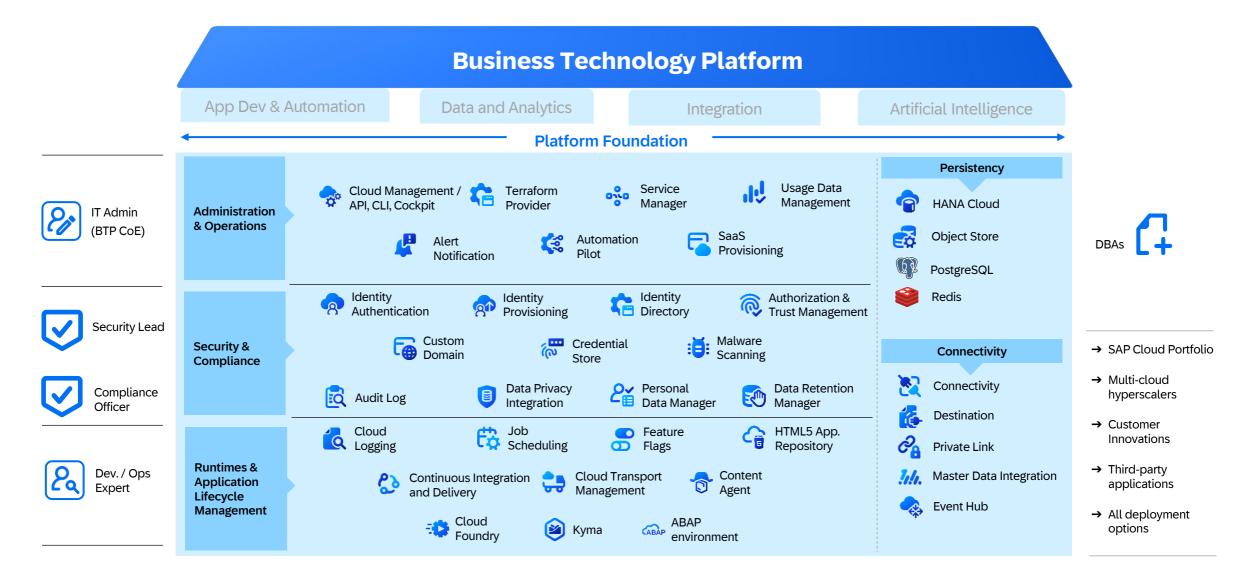


### **SAP BTP Trial**



# Summary

## **Platform Foundation**





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