



Event Mesh and Event-Driven Architecture with SAP

September 2021

Agenda

Event-Driven Architectures with SAP

- Basics
- Concepts, Advantages & Challenges
- The Big Picture and Vision

SAP Event Mesh

- Overview
- Capabilities
- Benefits

Put Event Mesh to Play

- Selected Use Cases
- Examples
- Quick Demo



Event-Driven Architectures with SAP



What is an event in an SAP context?

An event is a significant change in state

The event description holds context and data of the actual event

Notification Events or Data Events can be sent from the event source to inform other systems, microservices, and applications of the change

A message holding the event description in an encoded format is sent via an event broker

Event consumers have registered with the event broker and are informed of the event



cloudevents

A specification for describing event data in a common way

SAP, Google, Microsoft, Amazon, Alibaba, IBM, Oracle ... support cloudevents

```
{"type":"BO.SalesOrder.Created","specversion":"1.0","source":"urn:sap:topicNS:sap/abap/test","id":"XqnXqrPdW4DhAACmIUGQ==","time":"2020-05-04T13:17:44Z","datacontenttype":"application/json","data":{"KEY":[{"SALESORDER":"0000017716"}]}}
```

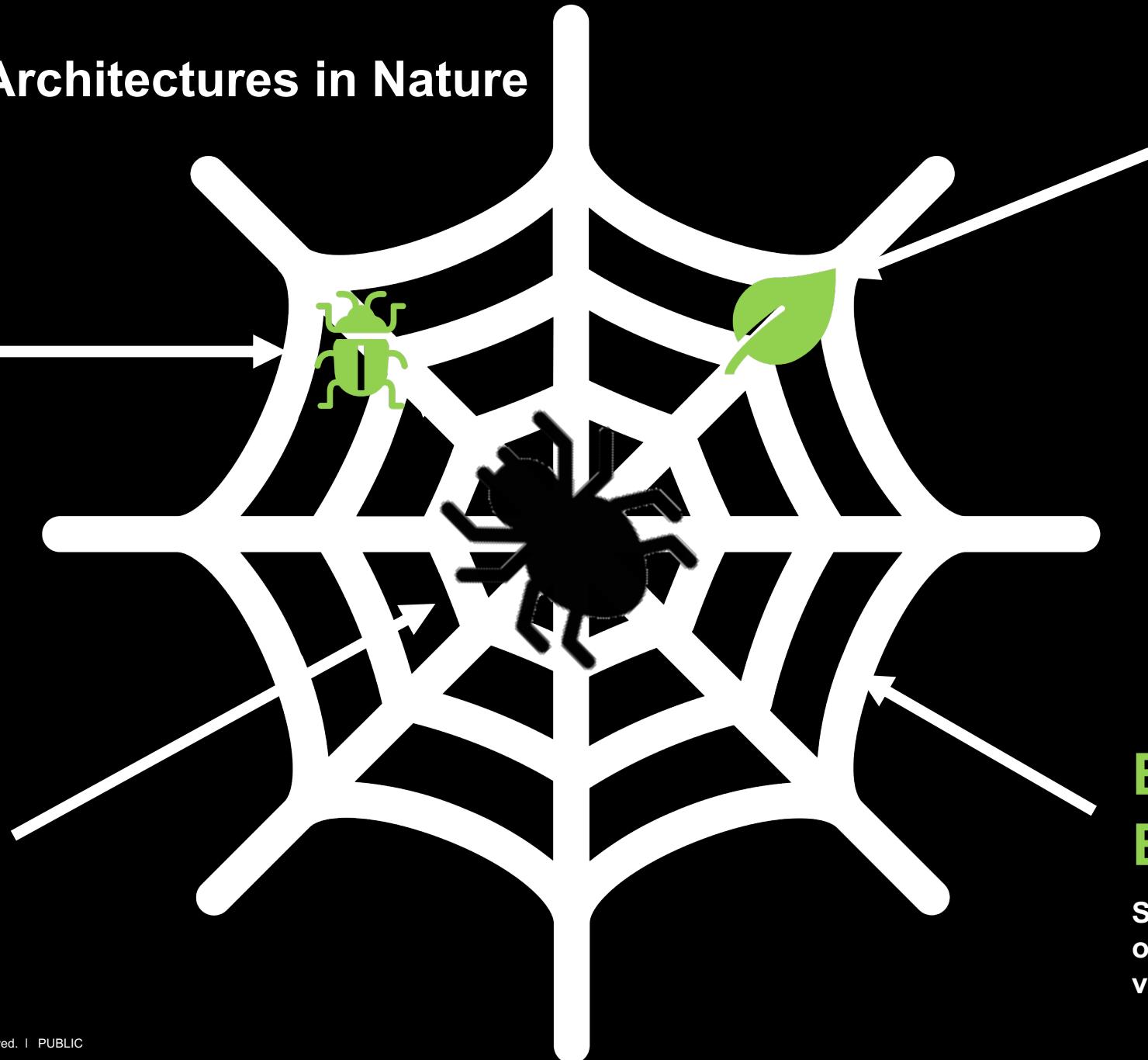
Event-Driven Architectures in Nature

Event

A significant change
of state in a spider's
web

**Event
Consumer**

Listening for and
reacting to events



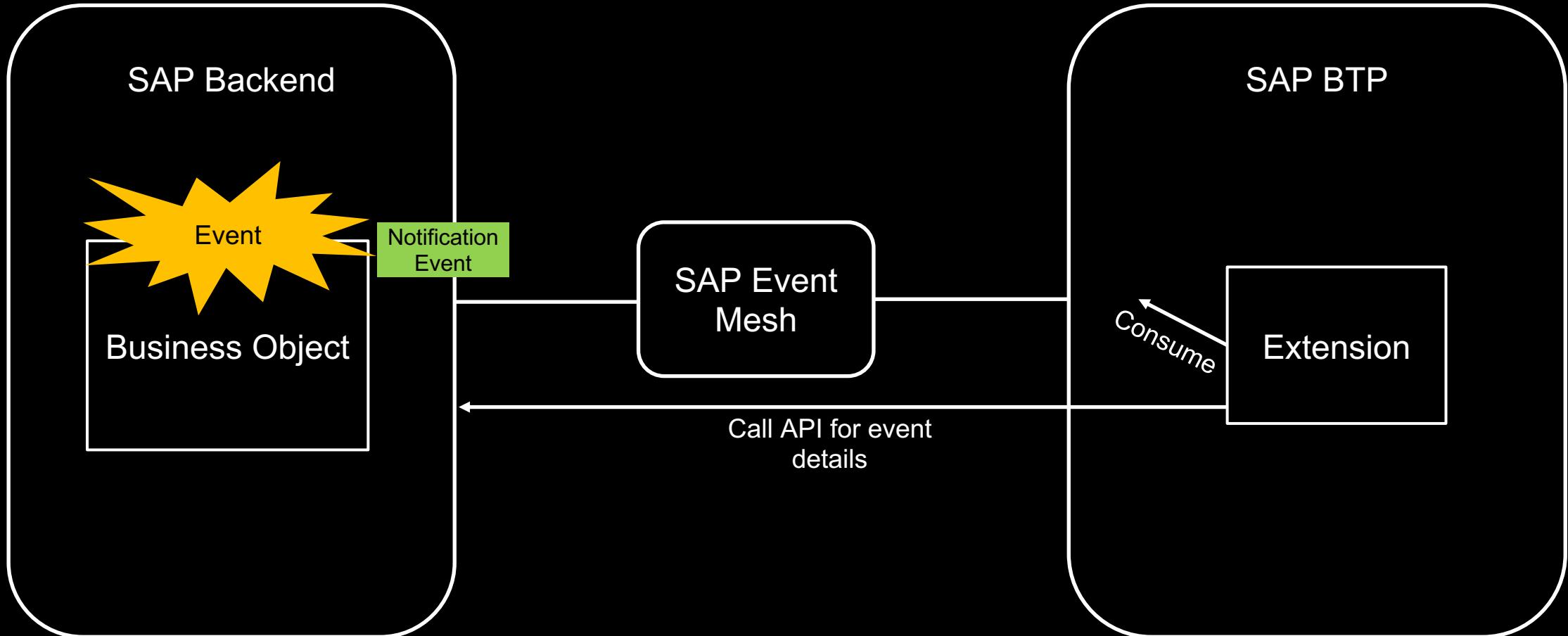
Event

A significant change
of state in a spider's
web

**Event
Broker**

Spider's web passes
on events via
vibrations

Notification Event based SAP Side-by-Side Extension



Notification Events: Advantages and Challenges

Advantages

- Very small
- Only minimal required data set, access to data can be controlled well
- Depending on number of required API calls to fetch additional data, can be very efficient

Challenges

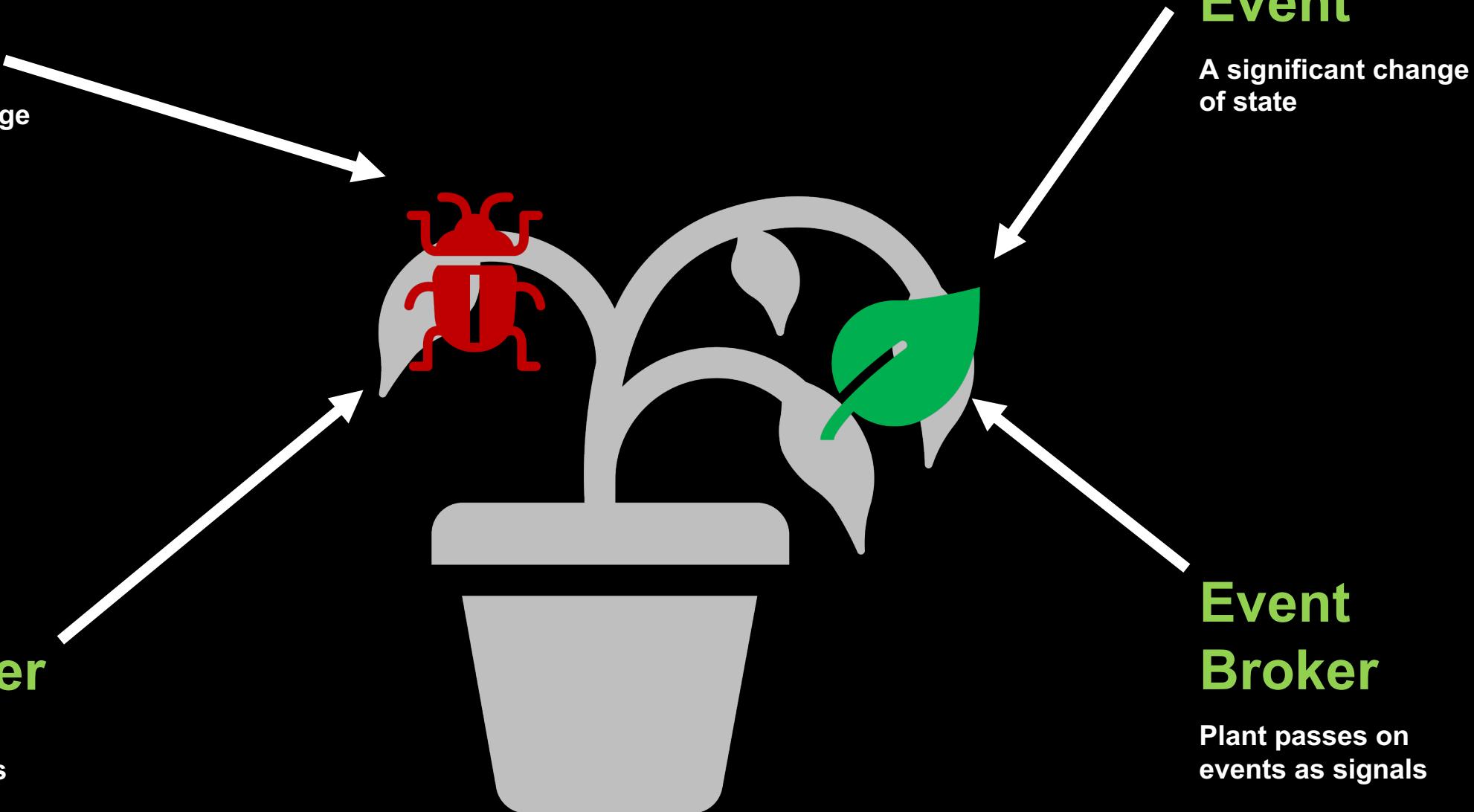
- Additional synchronous step required
- Depending on number of required API calls to fetch additional data, can be inefficient
- Suitable API needed, so it is not sufficient to just have a suitable event.



Data Events in Nature – Traps in Carnivorous Plants

Event

A significant change
of state



**Event
Consumer**

Listening for and
reacting to events

Event

A significant change
of state

**Event
Broker**

Plant passes on
events as signals

What is a Data Event?



Data Event contains full data set of business object for which significant change has happened

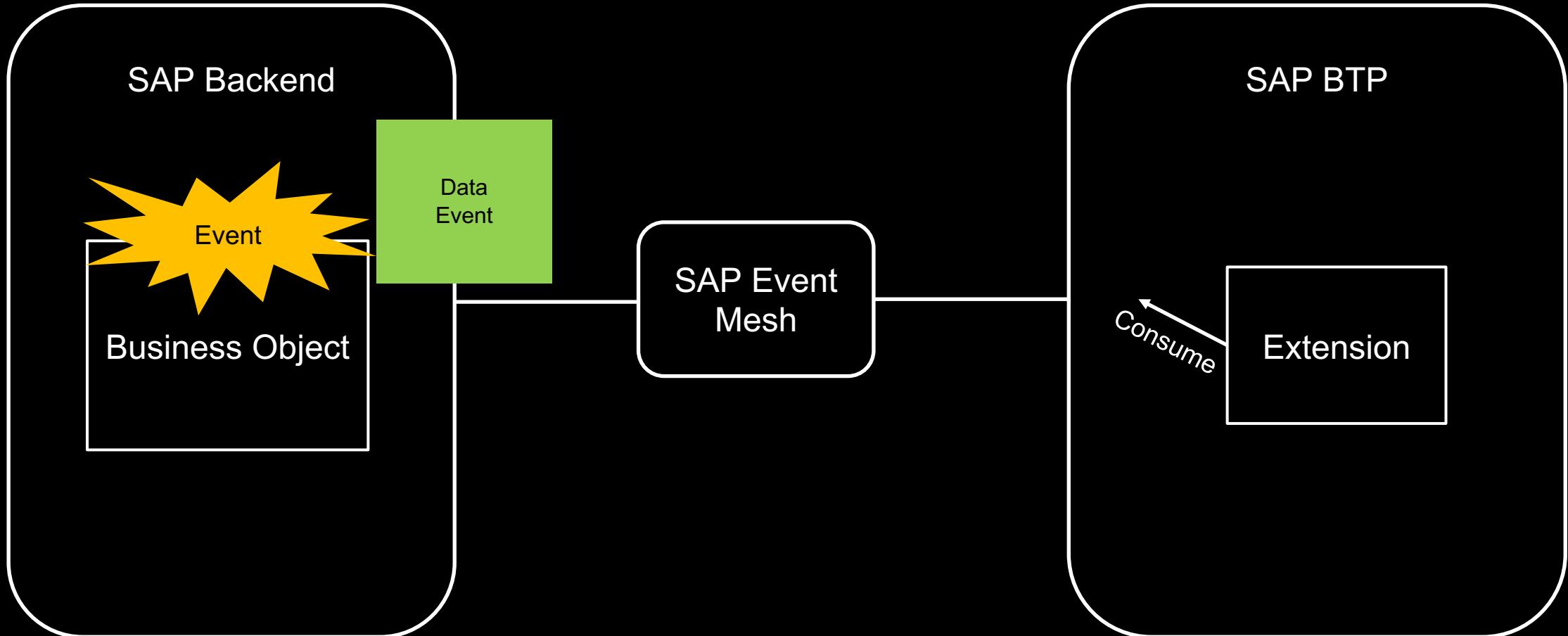
- No additional backend call needed
- A lot bigger
- Potentially contains sensitive data
- Raises topics like data access and protection

SOAP Request for Employee Hire

Sample Code

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:ExternalEvent xmlns:ns2="http://.....event.successfactors.com">
  <ns2:externalEventMeta xsi:type="eenAlertRequestMeta"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <ns2:externalEventId>94343027-c93b-4895-905c-3abbcfa78c30</
  ns2:externalEventId>
  <ns2:type>com.successfactors.Employment.AssignmentInformation.Hire</
  ns2:type>
  <ns2:publishedAt>0</ns2:publishedAt>
  <ns2:publishedBy>admin</ns2:publishedBy>
  <ns2:effectiveFuture></ns2:effective>
  <ns2:repost>false</ns2:repost>
</ns2:externalEventMeta>
<ns2:events>
  <ns2:event xsi:type="eenAlertRequestData"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <ns2:eventId>b9f867ab-c7ba-439e-be76-aaf33350336e</ns2:eventId>
    <ns2:entityType>EmpJob</ns2:entityType>
    <ns2:effectiveStartDate>2015-03-28</ns2:effectiveStartDate>
    <ns2:publishedAt>1459828362036</ns2:publishedAt>
    <ns2:publishedBy>admin</ns2:publishedBy>
    <ns2:repost>false</ns2:repost>
    <ns2:entityKeys>
      <ns2:entityKey>
        <name>userId</name>
        <value>user1000</value>
      </ns2:entityKey>
      <ns2:entityKey>
        <name>seqNumber</name>
        <value>1</value>
      </ns2:entityKey>
    </ns2:entityKeys>
    <ns2:params>
      <ns2:param>
        <name>changedFields</name>
        <value/>
      </ns2:param>
    </ns2:params>
  </ns2:event>
</ns2:events>
</ns2:ExternalEvent>
```

Data Event based SAP Side-by-Side Extension



Data Events: Advantages and Challenges

Advantages

- All potentially needed data included in event
- No additional backend call needed
- A lot bigger
- Good for use cases in which the consumer requires a full data set in majority of cases

Challenges

- Loss of control in respect to potentially sensitive data
- Raises topics like data access and protection
- Higher resource consumption for source, event broker and consumer



APIs vs. Events

Application programming interfaces are a contract between client and server.

Synchronous and blocking.

Need to be called actively.



Events inform interested parties on significant changes.

Asynchronous and non-blocking.

Register once - no additional action needed.



Event Sources

SAP S/4HANA Cloud +
On Premise

S/4

< SAP Channel ▾

SAP_CP_XF_1899

Outbound Topic Bindings

Inbound Topic Bindings

Subscriptions

Outbound Topics (3)

Topic

- sap/s4/beh/businesspartner/v1/BusinessPartner/Changed/*
- sap/s4/beh/businesspartner/v1/BusinessPartner/Changed/v1
- sap/s4/beh/businesspartner/v1/BusinessPartner/Created/v1

SAP SuccessFactors



Recruiting	Onboarding and Offboarding	Hiring	Job Changes	Talent Management
Update of Job Requisition	Onboarding Step Complete	Employee Hire	First Time Manager	Add Development Objective
Update of Job Application	Offboarding Step Complete	Employee Rehire	Change in Manager	Spot Award
Approval of Offer Detail			Job Transfer	New Successor

SuccessFactors Intelligent Service events can be enabled following this blog [How to use SAP Enterprise Messaging as an event bus for SuccessFactors](#)

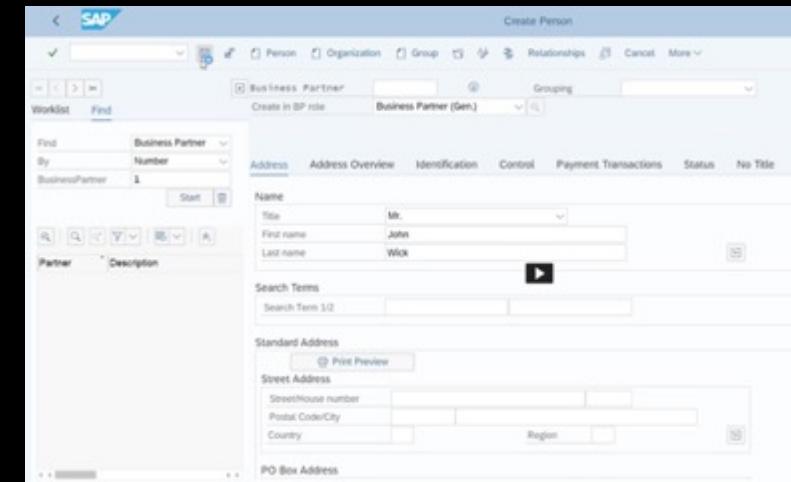


cloudevents

A specification for describing event data in a common way

ECC NetWeaver 7.31+ Event Enablement Add-On

ECC



Highly scalable to bring events and data to the cloud:

- notification and data events
- delta loads / change pointers
- outbound and inbound

SAP API Business Hub (<https://api.sap.com/themes/Events>)

The screenshot shows the SAP API Business Hub interface with a dark blue header. The top navigation bar includes links for "Getting Started", "Explorers", "My Favorites", "Community", and "Partner With Us". Below the header, a banner says "Experience the enhanced look and features of the SAP API Business Hub!" with a "Launch Beta" button. The main content area is titled "Events" and contains a sub-header: "Explore all Business Events from SAP. These events provide next-generation event definitions that help run your businesses simple in a digital world." On the left, there's a "Refine By" section with a checked checkbox for "SAP Event Package". Below this, five event packages are listed in a grid:

Event Package	Description	Object Count	Last Update
SAP Subscription Billing Business Events	Provides business events for SAP Subscription Billing to trigger follow-up processes in other applications.	3 Event Objects	0.1K+
SAP S/4HANA Business Events	Provides the next generation digital events of SAP S/4HANA business objects.	61 Event Objects	0.1K+
SAP S/4HANA Cloud Business Events	Provides the next generation digital events of SAP S/4HANA Cloud business objects.	56 Event Objects	7.1K+
SAP Marketing Cloud Business Events	Provides the next generation digital events of SAP Marketing Cloud business objects.	7 Event Objects	0.9K+
SAP Digital Vehicle Hub Business Events	Provides business events for SAP Digital Vehicle Hub to trigger follow-up processes in other applications.	1 Event Objects	0.1K+

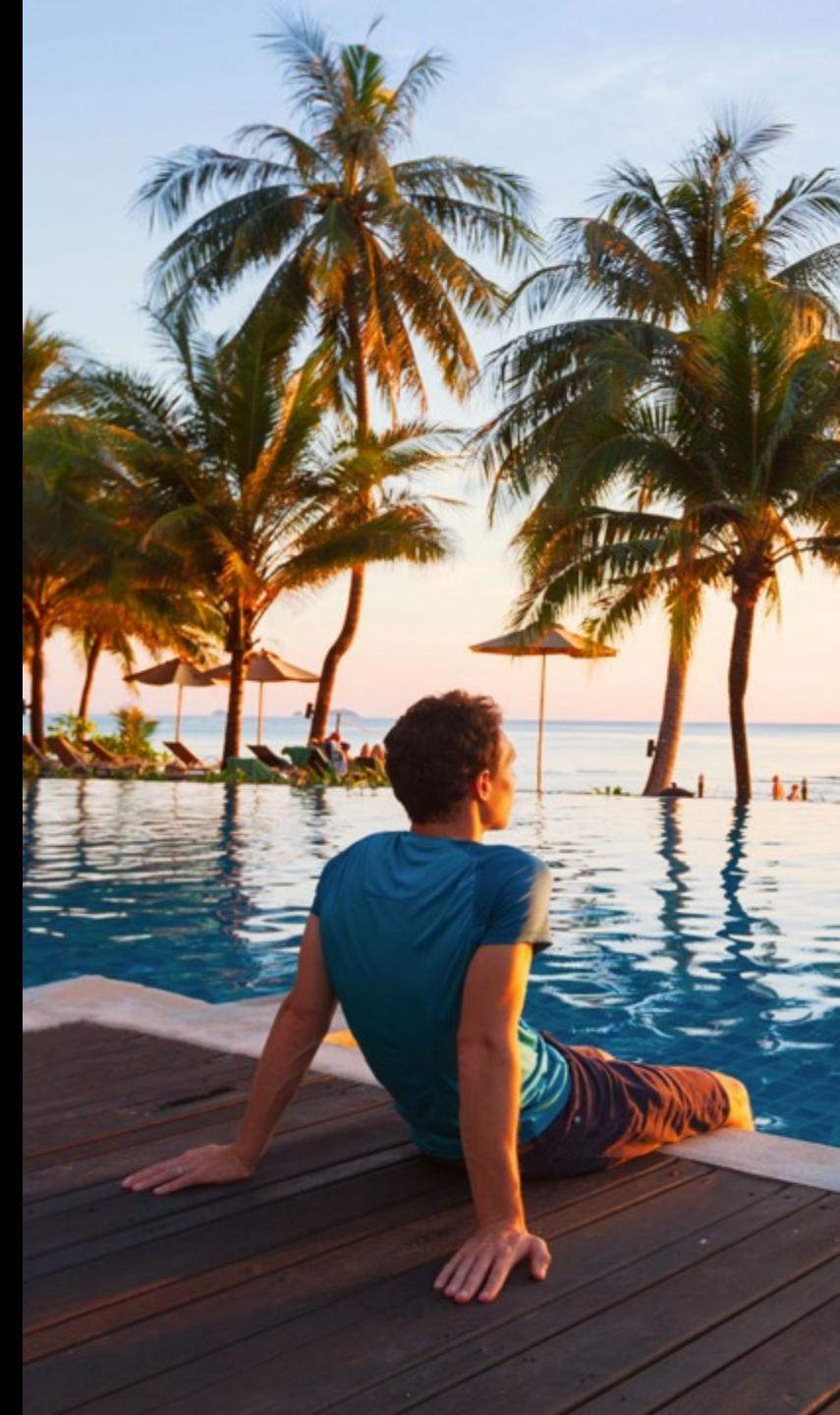
This screenshot shows a detailed view of an API endpoint for "Bill Of Material Events". The top navigation bar has "Event References" and "Details" tabs, with "Event References" selected. The main content area includes:

- POST** `Jaap.a4.bch.billofmaterial:v1.BillOfMaterial.itemCreated:v1`: BILL OF MATERIAL ITEM CREATED
- A note: "This event is raised when a bill of material item is created."
- Parameters**: No parameters.
- Request body**: A dropdown menu set to "application/json".
- Example Value : Schema**: A JSON schema for the CloudEvents context fields:

```
Schema for the CloudEvents context fields. ✓ {  
  description:  
    specification*  
      string;  
    The version of the CloudEvents specification which the event uses. This enables the interpretation of the context.  
  type*  
    string;  
  source*  
    string<br>reference;  
    The source of the event producer.  
  subject  
    string;  
    minLength: 2;  
    The subject of the event in the context of the event producer (identified by source).  
  id*  
    string;  
    minLength: 2;  
    ID of the event.  
  time  
    string<br>(date-time);  
    Time stamp of when the occurrence happened. Must adhere to RFC 3339.  
  datacontexttype  
    string;  
    Describe the data encoding format:  
  data  
    sap.a4.bch.billofmaterial:v1.BillOfMaterial.itemCreated:v1; ➤ (...)}
```
- Responses**: A table with one row for "default".
- Links**: A table with one row for "Business Rule".

Benefits of event-driven architectures

- Loose Coupling results in **flexibility** and **scalability**
- **Responsive** applications that react to events in other systems and applications in **real time** allowing for a new kind of integrations and extensions
- **Incremental Growth** by adding event consumers and event sources step by step resulting in **better operations** and **improved quality**
- Improved **fault tolerance** by applying suitable patterns
- Facilitates pay-per-use consumption saving money by **removing “always on”**



Challenges of event-driven architectures

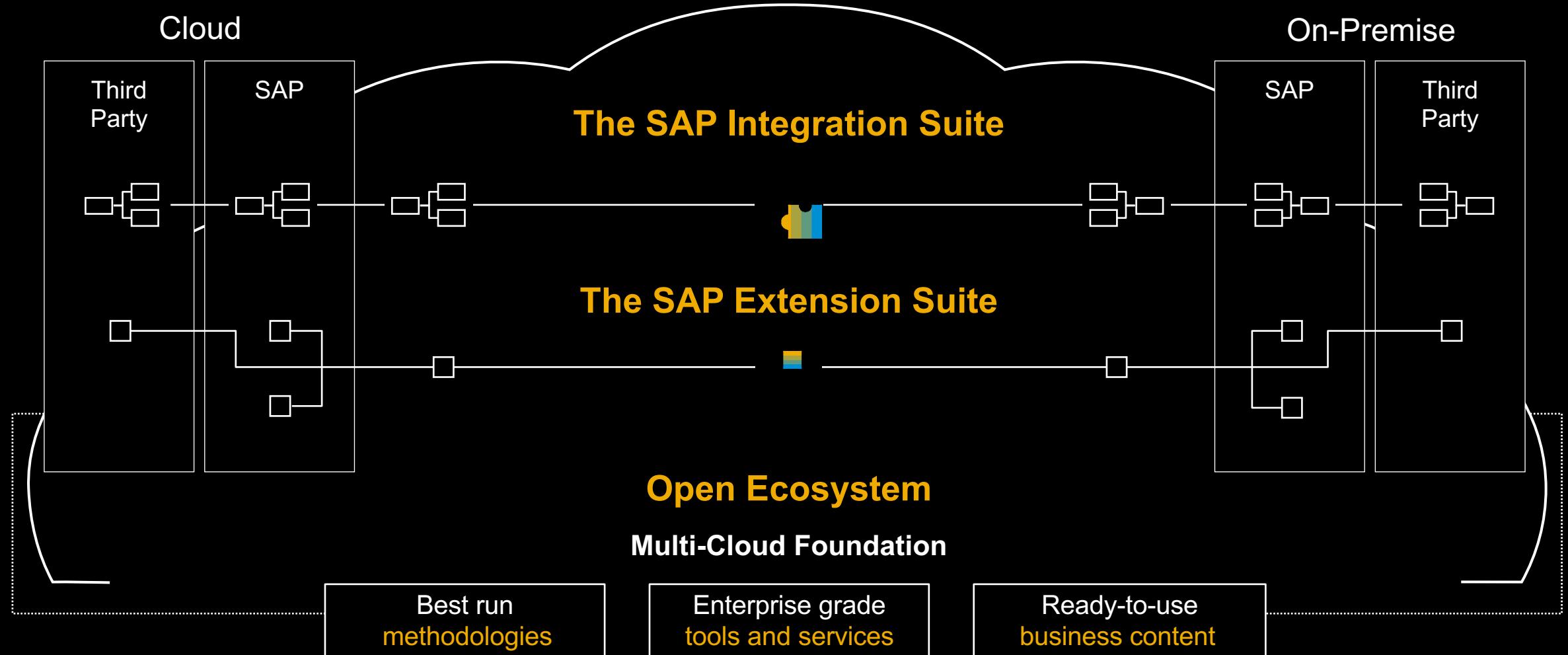
- Decoupled communication makes **monitoring and understanding** what is going on in an event-driven landscape hard
- **Tracing and debugging** can be more difficult than in traditional landscapes due to highly parallel nature of EDAs
- **Data security** to be watched closely when using **data events**



The Big Picture: Extension Suite



SAP Business Technology Platform – Drive agility during rapid change



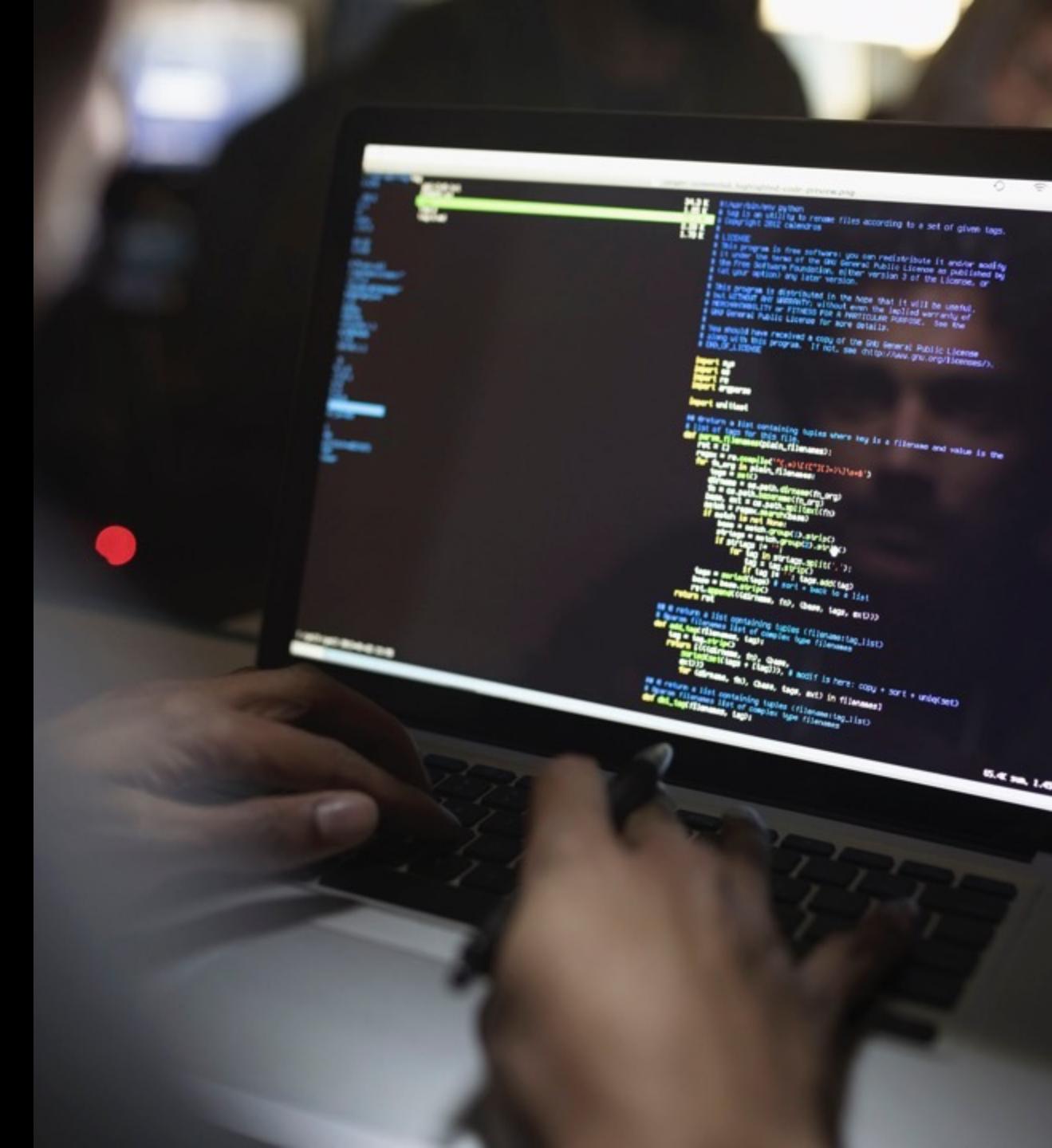
SAP Extension Suite

Extensions – The Engineering View

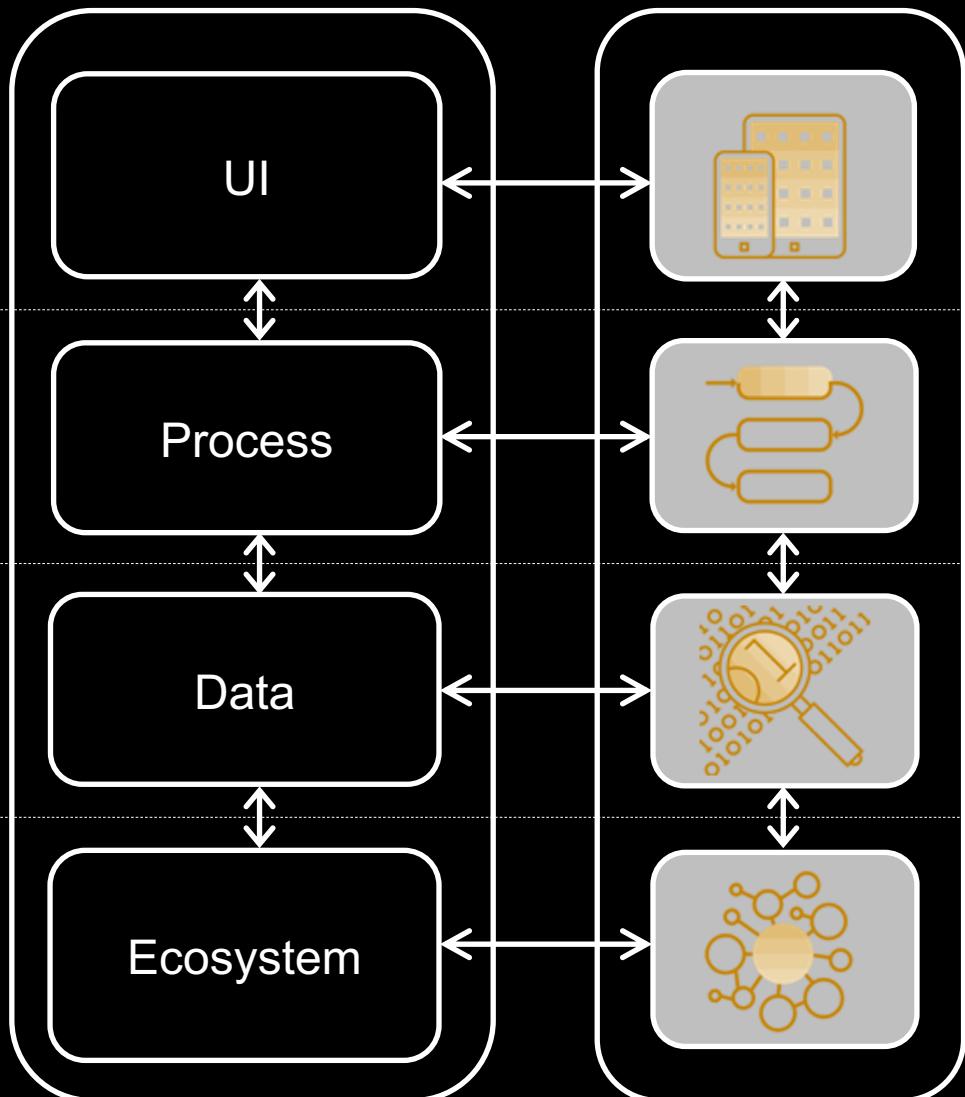
Software engineering principle that allows for **enhancements** without impairing existing system functions

Extensions can be **addition of new functionality** or through **modification of existing functionality**

Extensibility is measure of **ability to extend** and **effort required** to implement extension



Use Cases for Side-by-Side Extensions



Extend **user experience** of existing processes and address additional **user groups**.

Extend **business process** with additional steps for optimization or innovation.

Extend **data insight** by consolidating and combining data in one central place.

Extend **ecosystem** by creating and operating a SaaS application and selling it to multiple customers

Advantages of Side-by-Side Extensibility



Business

Extend Reach
to new user groups

Extend Scope
with custom solutions

Complement
from backends

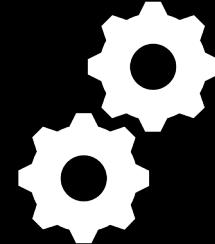
Stay Flexible
and adjust quickly

Digital core
remains focused

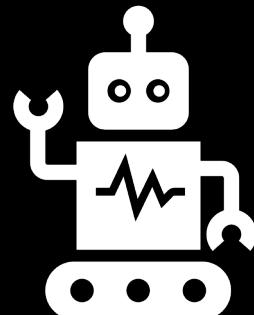
Share
extension applications

Test and Support
with less effort

Operations



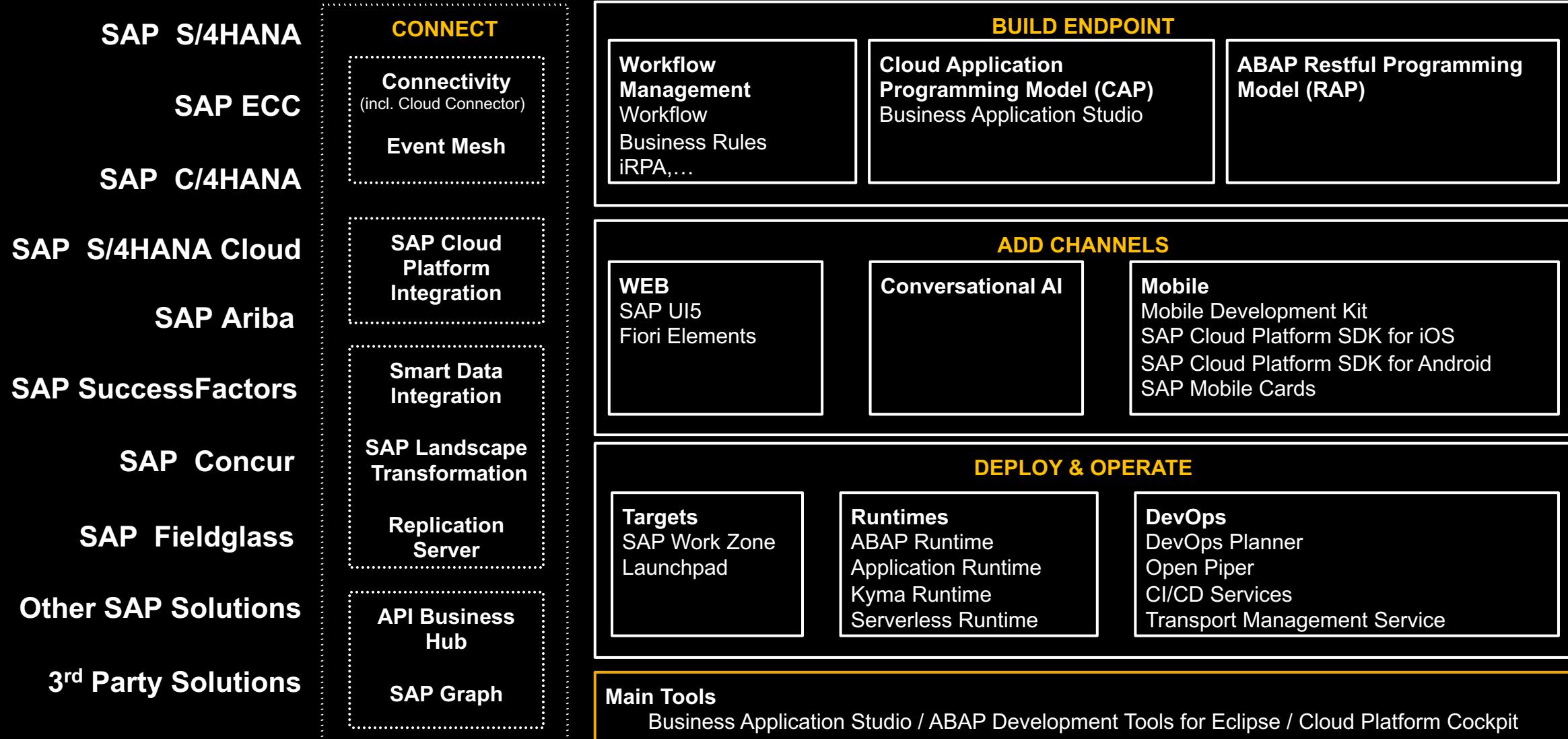
Technology



Use Technology
of choice

Central Skillset & Technology
resulting in lower costs

SAP Extension Suite at a Glance



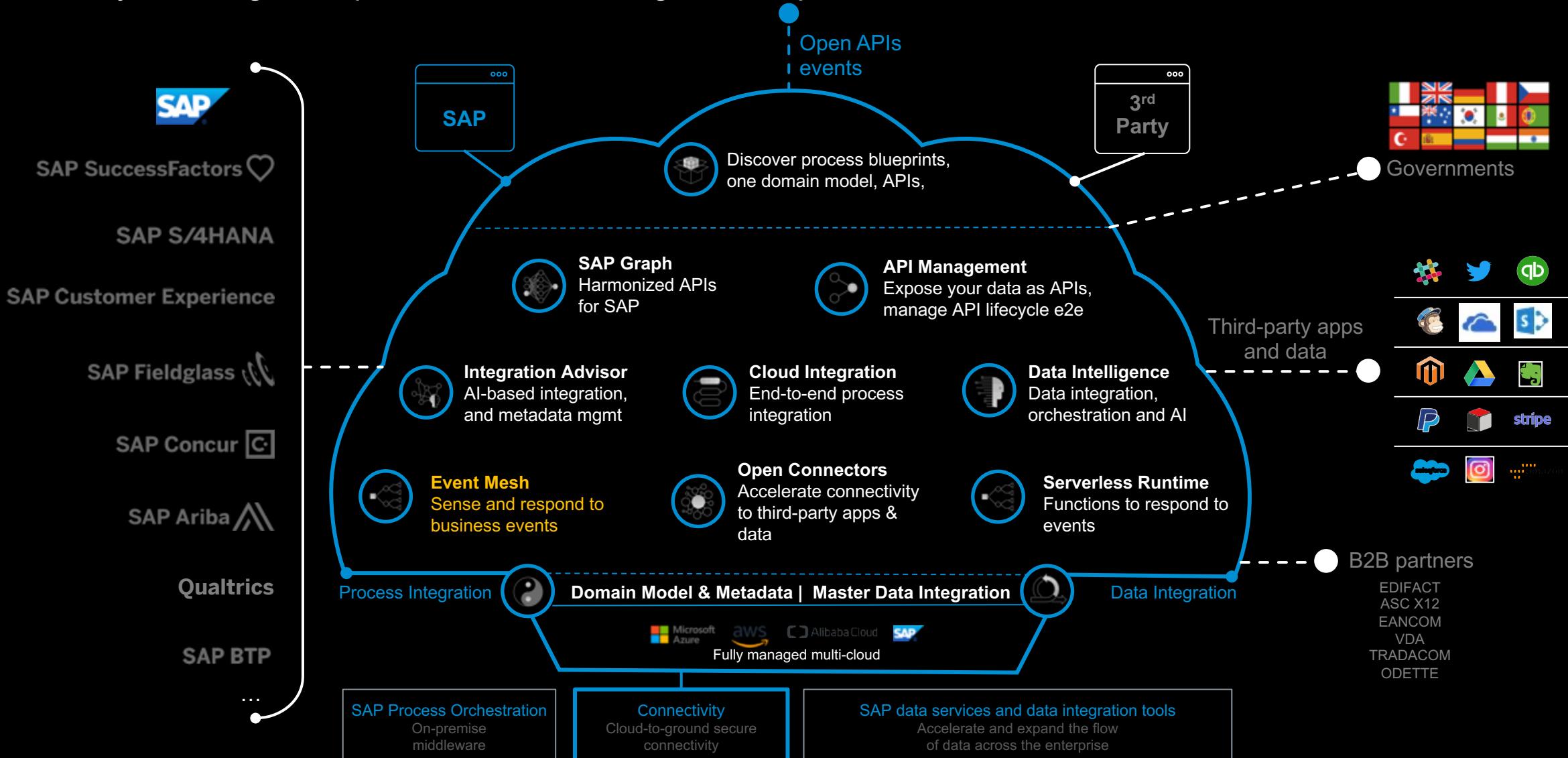
The Big Picture: Integration Suite

SAP's Hybrid Integration Platform for Intelligent Enterprise



SAP Integration Suite

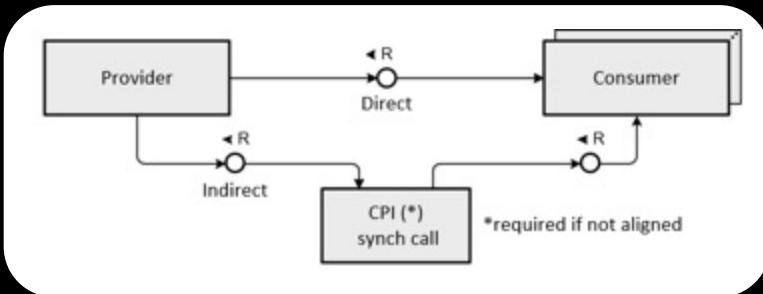
SAP's hybrid integration platform for the intelligent enterprise



Integration patterns in SAP Integration Suite

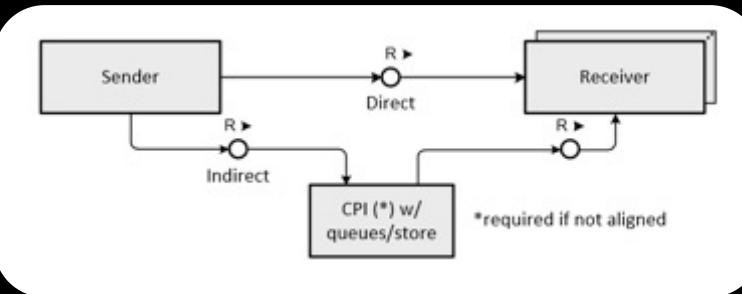
Pull pattern

- Sync request/response
- Consumer driven
- Polling/not real time
- No routing model



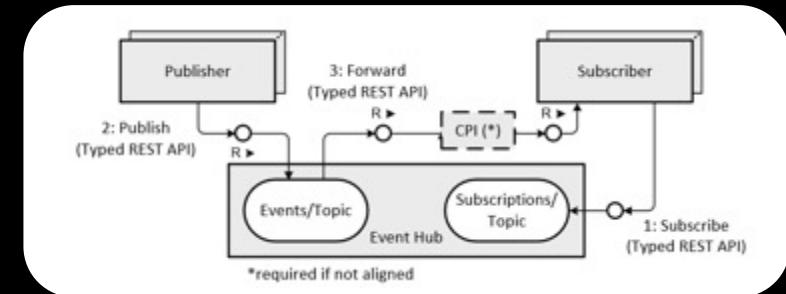
Push pattern

- Async messaging
- Provider driven
- Real time
- Static routing model at provider



Event pattern

- Publish/subscribe
- Consumer and provider driven
- Real time
- Dynamic routing / Subscriptions



SAP Event Mesh

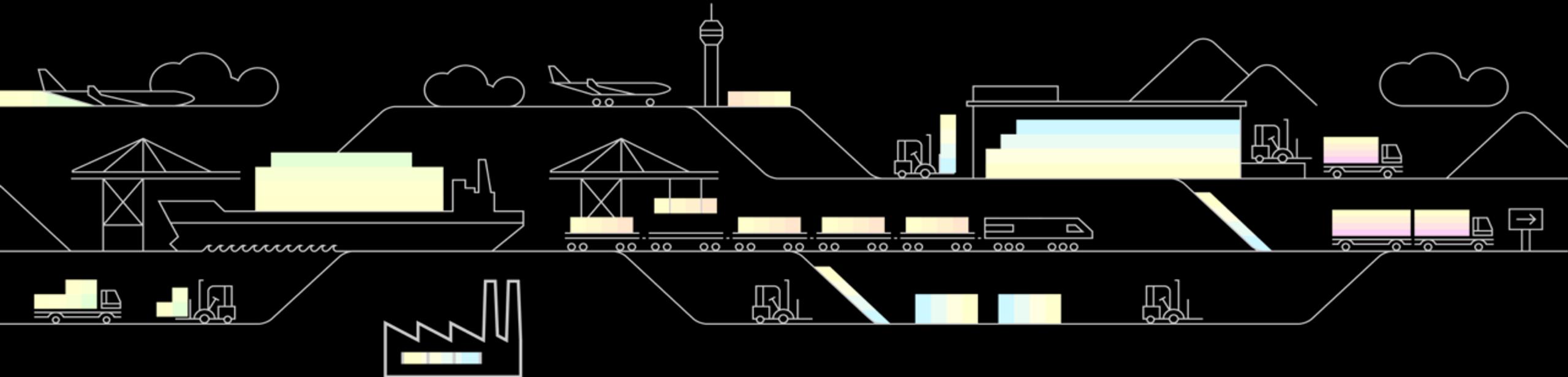




SAP Event Mesh

Decoupled, asynchronous, indirect
communication

by exchanging events and messages between
distributed software components
supported by an
intermediary broker as a service





SAP Event Mesh

Fully-managed cloud service for enabling applications to communicate asynchronously through messages and events.



Event enablement

- Transports events from event source to the Cloud for seamless integration of hybrid landscapes.
- Build responsive applications, integrations and extensions that react to events in real-time.



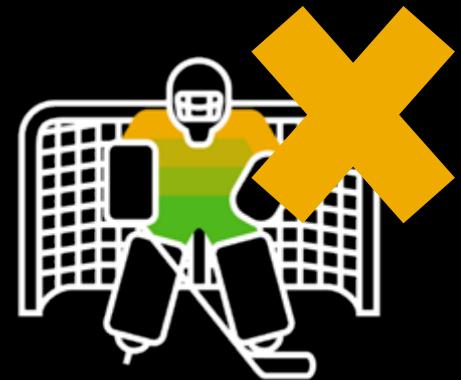
Seamless connectivity

- Connect your applications and microservices seamlessly using standard protocols (MQTT, AMQP 1.0, REST)
- APIs (Java JMS, Node.js)
- Exchange patterns (e.g. pub/sub)



Reliable communication

- Messaging SaaS middleware decouples communication for flexibility and scalability.
- Choose from different Quality of Service levels to ensure messages are delivered reliably.



Non-blocking communication

- Asynchronous patterns provide elasticity meaning unexpected peaks in data traffic can be handled efficiently.

TOP 10 DIFFERENTIATING CAPABILITIES

SAP EVENT MESH

Ecosystem <p>Event Mesh is not just a plain event broker – it comes as fully integrated part of the SAP Event Driven Ecosystem that includes SAP targeted end-to-end offerings (e.g. SAP Extension Suite, SAP Integration Suite)</p> <p>1</p>	Plug and Play <p>Efficiency boost and improved ease of use by plug and play with selected other SAP technologies (e.g. queue creation out of CAP)</p> <p>2</p>	Backend Event Enablement <p>Native event broker for SAP S/4HANA and the usage of the event enablement add-on for SAP ERP and on premise SAP S/4HANA is included in traffic based pricing</p> <p>3</p>	Multi Platform Support <p>Available as part of SAP BTP on different hypercloud provider environments</p> <p>4</p>	Event Exploration <p>Exploration of SAP backend events out of the event broker UI for SAP S/4HANA Cloud</p> <p>5</p>
Connectivity <p>Highly efficient setup of connectivity and trust with selected SAP backends</p> <p>6</p>	Ease of Use and Pricing <p>Fully managed event broker service with traffic based pricing: low entry barrier and pay only for what you use</p> <p>7</p>	Support <p>One-stop SAP support allows for support from event source to event consumers without vendor barriers</p> <p>8</p>	Openness and Focus <p>Support of standard concepts (e.g. CloudEvents) and protocols (e.g. AMQP, REST) with a full focus on typical SAP customer use cases</p> <p>9</p>	Future Proof <p>Event Mesh is fully future proof in SAP environments and is SAP's event broker of choice internally as well</p> <p>10</p>

Use SAP Event Mesh to

- **Decouple communication** between applications, services, and systems using asynchronous patterns
- Support **event-driven architectures** and **microservices**
- **Publish business events** from SAP and non-SAP sources across hybrid landscapes from the digital core to extension applications
- Build **event-driven extensions and integrations** and subscribe to events from core SAP systems to enable cloud-native extensions and integrations to respond to the latest business developments in **real-time**
- Part of the **SAP Integration Suite** and **SAP Extension Suite** to implement extension and integration scenarios in guided and at the same time flexible approaches



Selected Use Cases



Selected SAP Specific Example Use Cases

Extensions



New User Groups



ECC → S/4 Migration



Quick Innovations

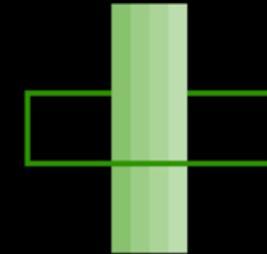


Real Time

Integrations



(Smart) Replication



Data Enrichment

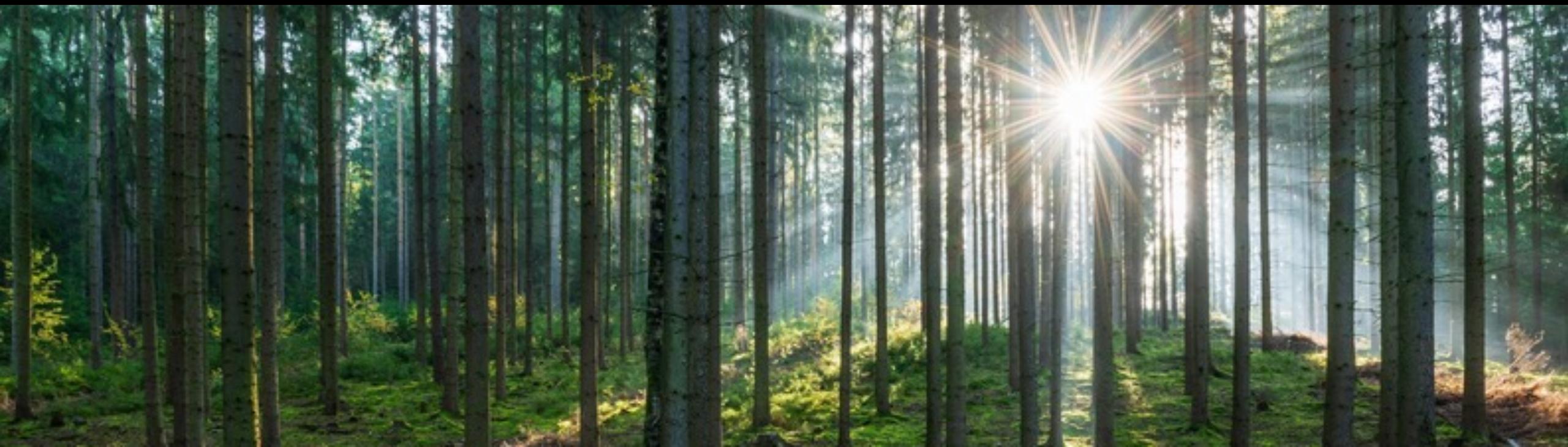


(Smart) Trigger

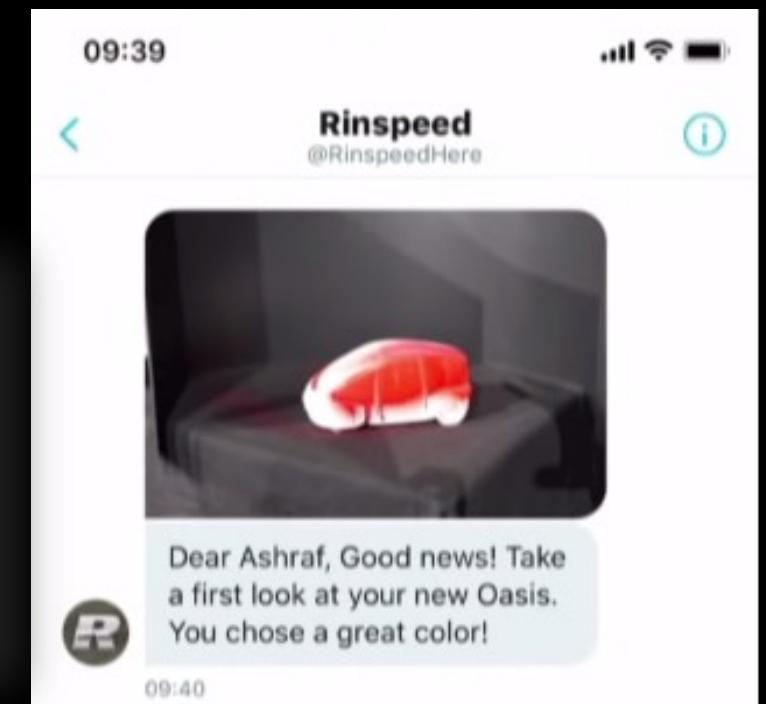
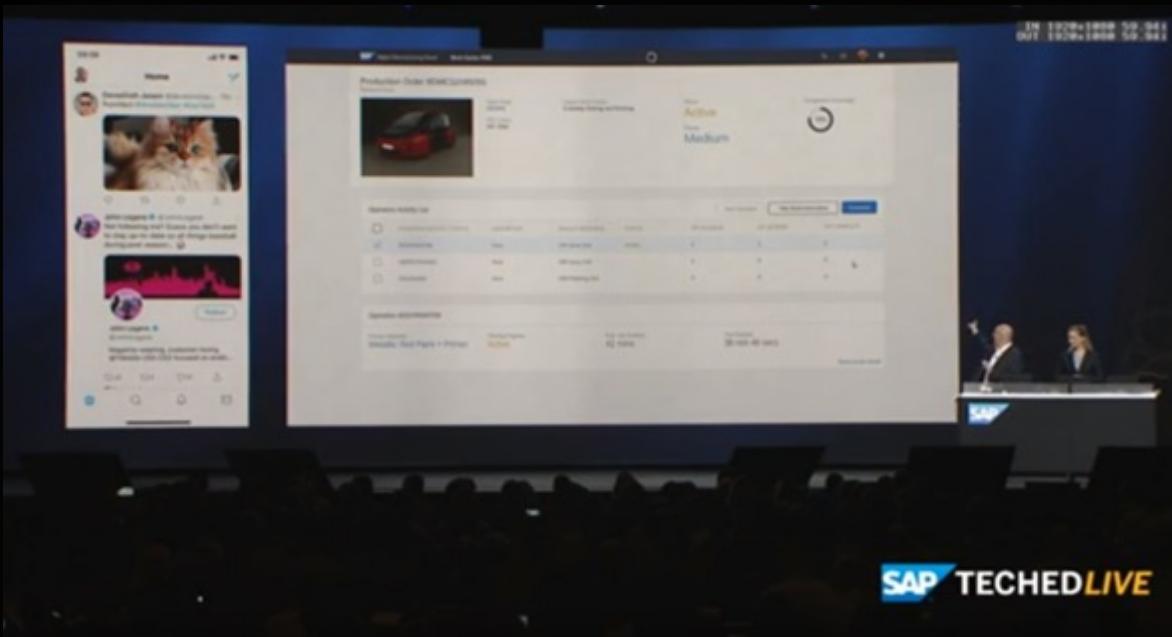


Real Time

Example Use Cases

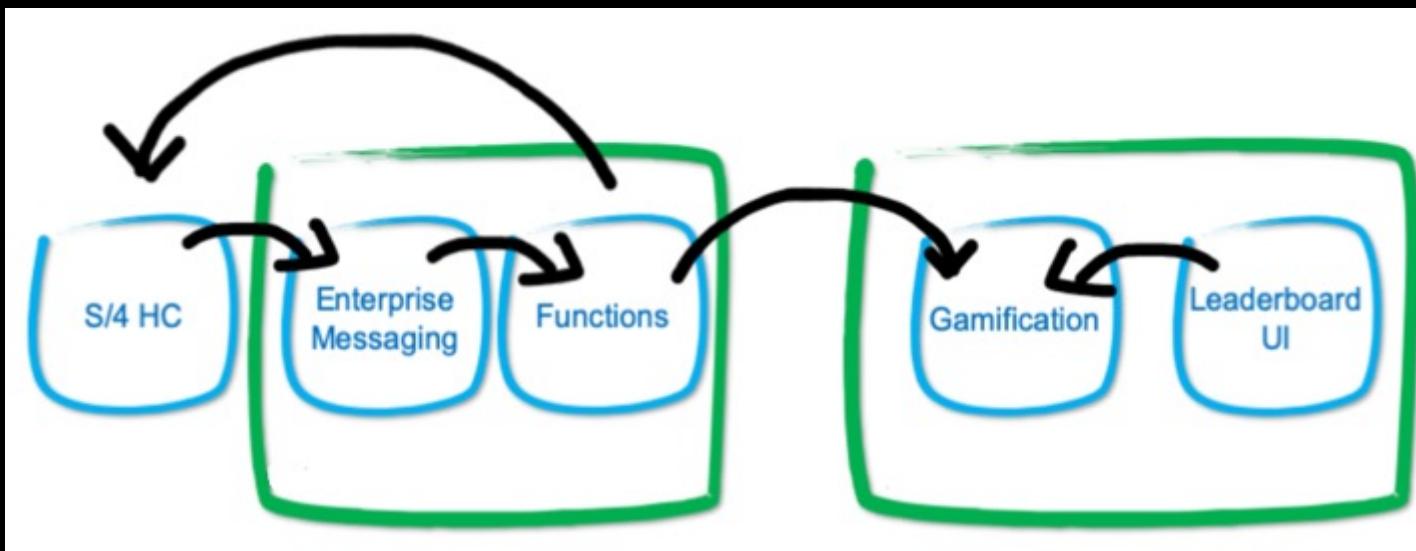


Almost Historic: SAP TechEd Las Vegas 2018 – Keynote



SAP S/4HANA Cloud Extension: Sales Order Process Gamification

Sales Order created in S/4 HC → Event fired and points for order booked to the sales reps gamification account. Leaderboard shows ranking.



The screenshot shows the SAP LeaderBoard interface with the following data:

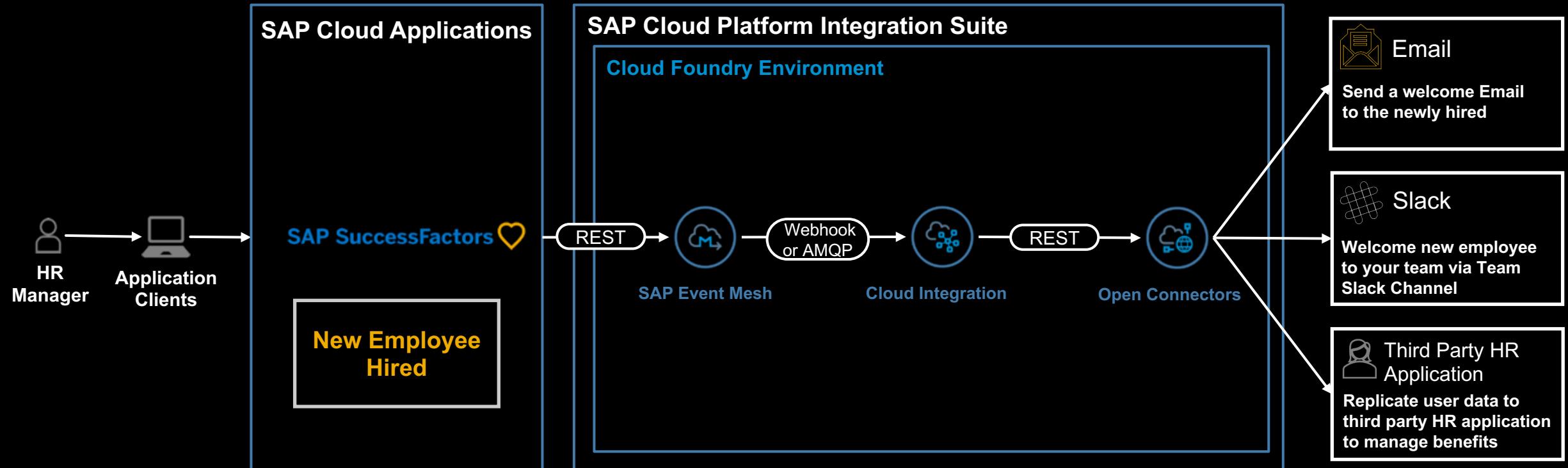
Rank	User	Points Earned	Current Level
1	Harish Yarra	466	Silver
2	Richard Castle	314	Silver
5	Javier Esposito	15	Beginner

Badges Earned:

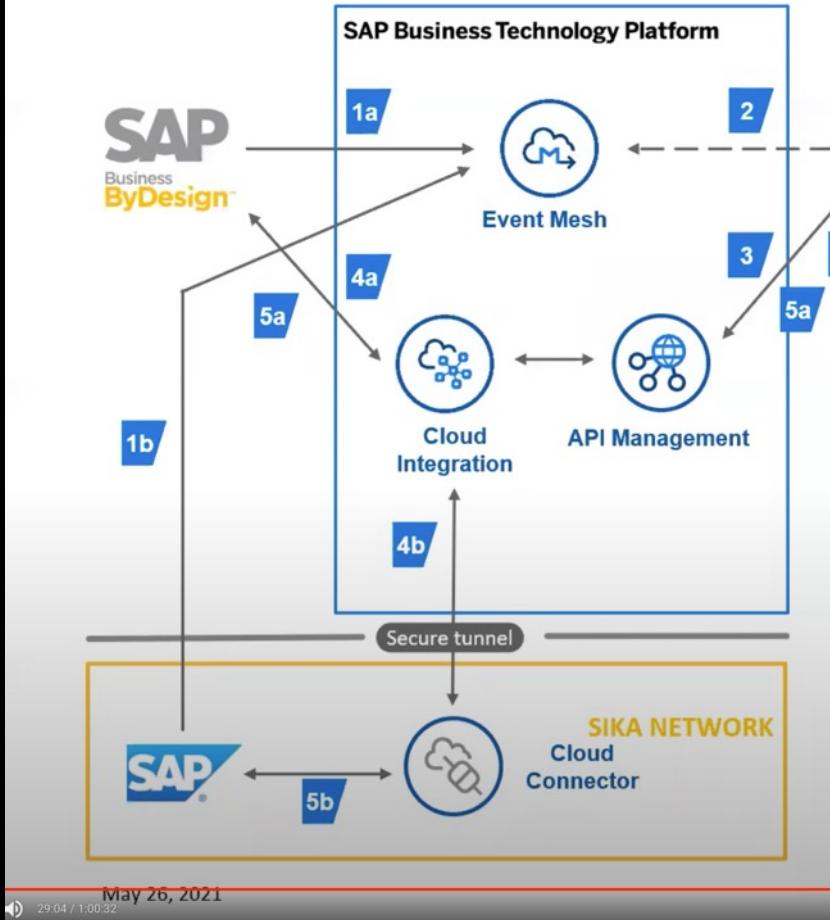
- BASIC
- BEGINNER
- BRONZE
- SILVER
- GOAL

TechEd 2020 Demo Scenario: Event-based Integration

New Employee Hired in SuccessFactors



CASE 2 – EVENT MESH, CLOUD INTEGRATION & API-M IN ACTION

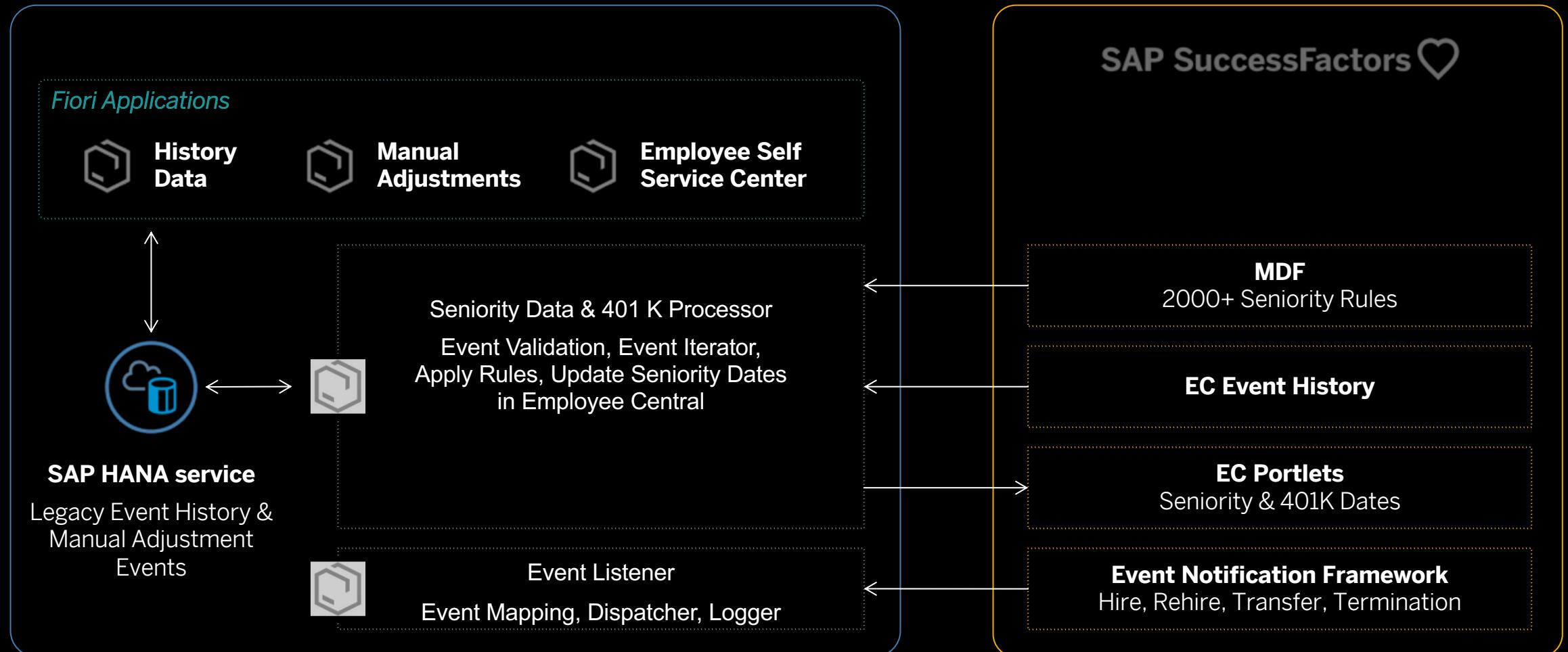


1. SAP ByD and S/4 will send event notifications to the same topic created in Event Mesh. The event will be propagated to all the queues subscribed to that topic.
1b. Out of the box functionality to send events
2. Salesforce will get/receive the events depending which option (rest, amqp/mqtt or webhook) is used.
3. Salesforce will call an API to get the data based on the inputs of step 2.
4. API will forward the request to Cloud Integration to make the request to the corresponding source backend system.
5. Information from the source system is sent back to Salesforce as response of the call done in step 4.

SIKA AG use case on YouTube: <https://www.youtube.com/watch?v=wd5-7ubsARs>

SAP SuccessFactors Extension: Transforming the New American Airlines to a “People First” Culture

Provide one consolidated solution for trainings, employee support and leadership enablement on a global scale.

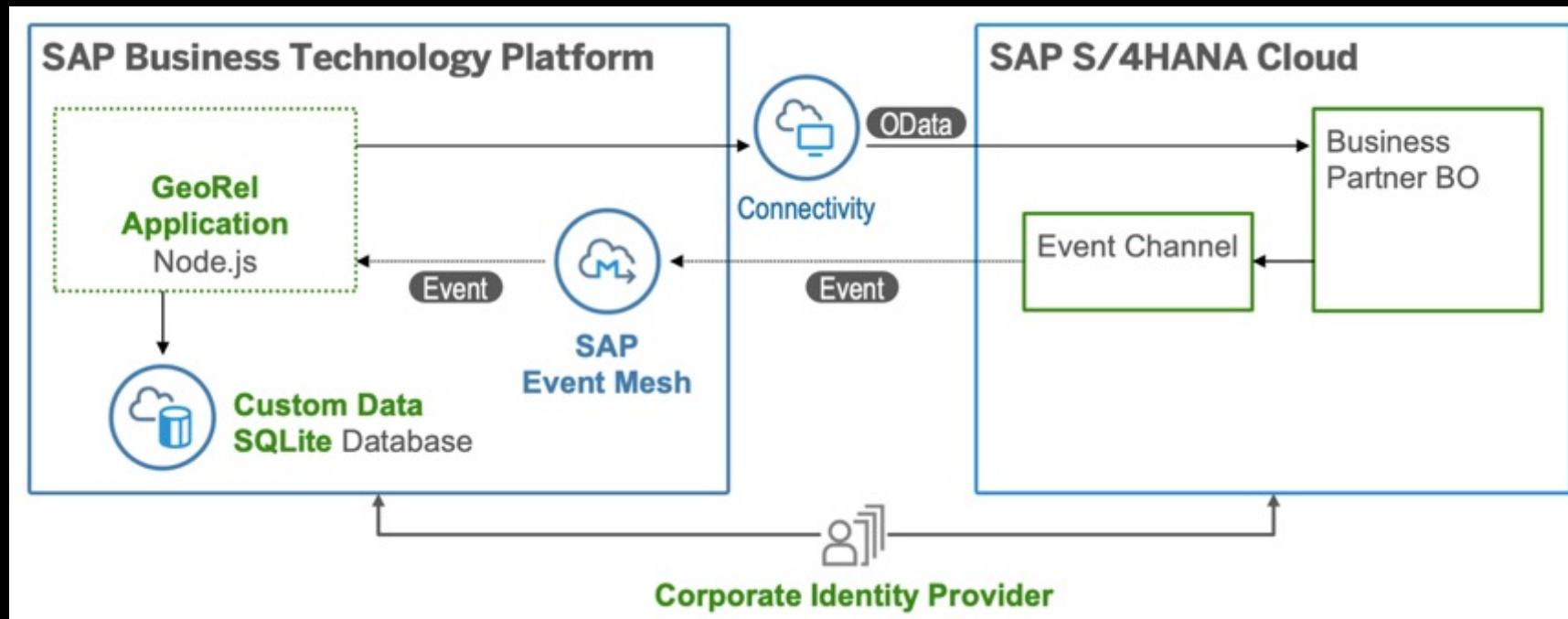


GeoRel GeoMarketing Extension to SAP S/4HANA Cloud

Selected customers in **focus regions** receive **special attention**.

Newly created and updated **customers** in focus regions to be contacted by **call center** agents.

Call Center personell has no access to S/4HANA and requires a dedicated application.



A scuba diver in a full diving suit and mask is swimming through a narrow, rocky underwater canyon. The water is a deep, translucent blue, and sunlight filters down from the surface in bright rays, illuminating the diver and the rocky walls of the canyon. The diver is positioned in the center-left of the frame, moving towards the right.

Quick Demo

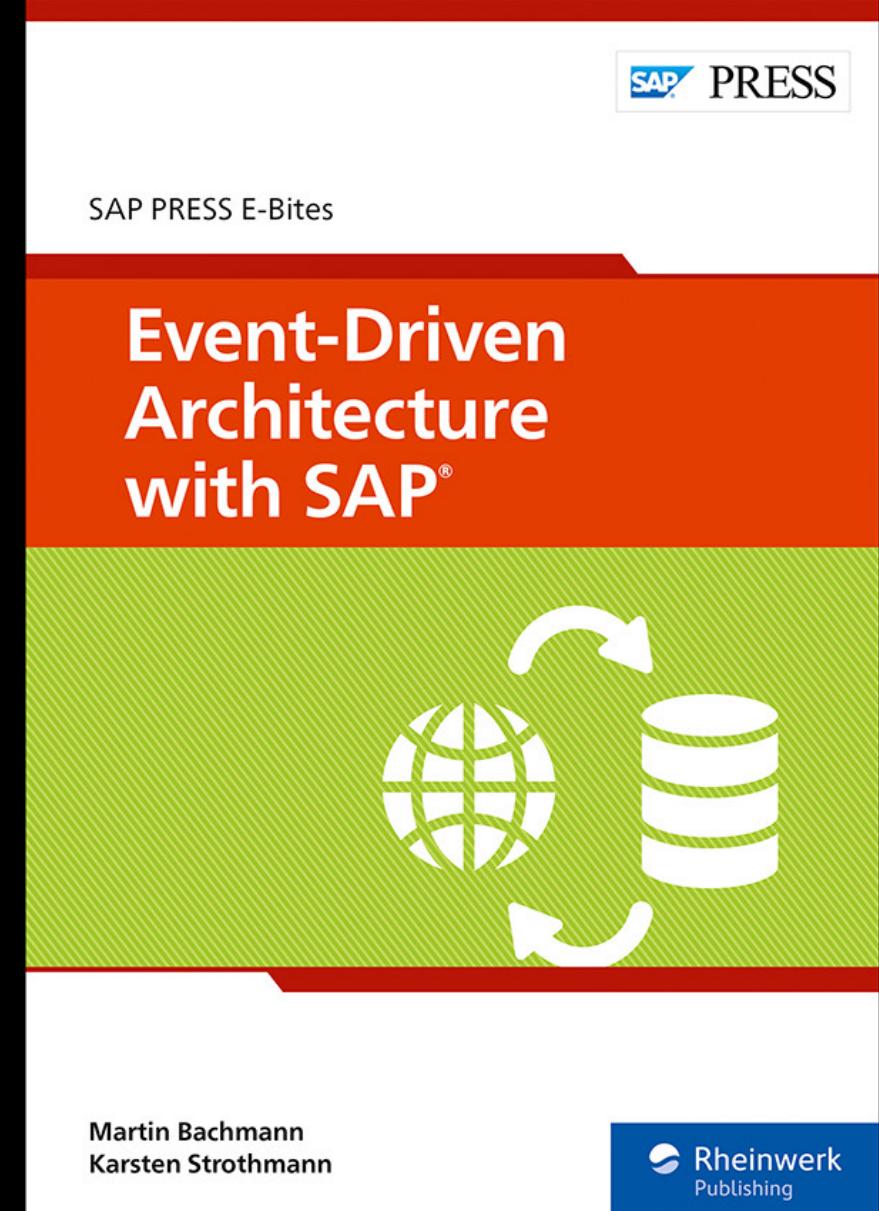
Additional Material and Summary



Additional Material

[Discovery Center Missions](#)

[openSAP Invites Podcast](#)



SAP Event Mesh

- is SAP's **event broker as a service** and supports event-driven extensions and integrations
- is an integral part of SAP's **event-driven ecosystem**
- comes **stand-alone** as part of BTP and as a component of SAP Extension Suite and SAP **Integration Suite**



Event-Driven Architectures with SAP

Questions from your side?



Thank you.

Contact information:

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