



# Building event-driven application with RAP Business Events in ABAP Cloud



SAP Mentor  
since 2014



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SAP Consultant  
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NL for Business  
Founded in 2001  
SAP Service Partner

# Digital Revolution

from Human Brain to Intelligence & Robotics  
(1950-....)



1947 1953 1957 1960 1967 1973 1979 1980 1993 2002 2007 2013 ...

Transistor Computer

Transistor

Integrated Circuit

Mainframe

Handheld Calculator

Micro Computers

Personal Computer

ERP

Home Computer

Internet

Smart Phone

Social Networking

EAI & B2B

Machine Learning

Robotics

Predictive

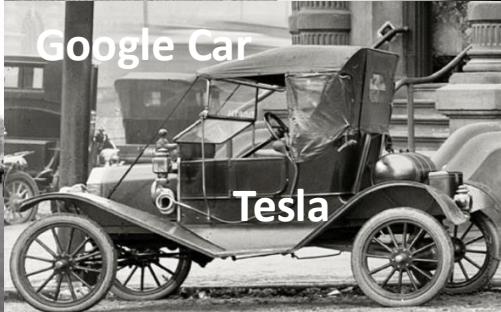
Internet of Things

Block Chain

Micro Services

Event Mesh

Conversational Container UI



Digital Revolution changes the way we work

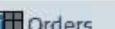


We solve the same challenges.





## Create Standard Order: Overview



Standard Order

Net value

3.500,00

EUR

Sold-To Party

1032

Institut fuer Umweltforschung / Bernauer Strasse 12 / 81669 ...



Ship-To Party

1032

Institut fuer Umweltforschung / Bernauer Strasse 12 / 81669 ...

PO Number

PO date



Sales

Item overview

Item detail

Ordering party

Procurement

Shipping

Reason for rejection

Req. deliv.date

D 05.03.2012

Deliver.Plant



Complete dlv.

Total Weight

290

KG

Delivery block

Volume

0,780

M3

Billing block

Pricing date

03.03.2012

Payment card

Exp.date

Card Verif.Code

Payment terms

ZB01 14 Days 3%, 30/2...

Incoterms CFR München

Order reason

All items

Item	Material	Order Quantity	Un	Description	S	Customer Material Numbr
10 P-109		1 PC		Pumpe Stahlguss IDES ...	<input checked="" type="checkbox"/>	



'Classic' ERP  
User  
Interactions  
at today's  
customers  
  
are complex

# Modern Business systems will still be Complex and need more Data.

The screenshot shows a SAP Fiori application interface for a Sales Order. At the top, there's a header bar with the SAP logo, a search icon, and a user profile for "William Intsales". The main area is titled "Sales Order" and displays a "Standard Order 1800". Key details shown include:

- Sold-To Party: Electronics, INC (HU) (S21100870)
- Overall Status: Completed
- Delivery Status: Completed
- Credit Status: Not Performed
- Net Value: 14,000 HUF

Below this, there are tabs for "GENERAL INFORMATION", "ITEMS", "BUSINESS PARTNERS", "PROCESS FLOW", "RELATED DELIVERIES", "RELATED INVOICES", and "RELATED CUSTOMER RET". Under "GENERAL INFORMATION", there are fields for Sales Area (Dom. Sales Org HU, Product Division 00, Direct Sales), Customer Reference (xxx), Employee Responsible, and Customer Ref. Date. The Document Date is listed as 03/11/2016.

The "ITEMS" section contains a table with columns: Item, Material, Order Quantity, Item Category, Delivery Date, Net Value, Delivery Block Stat., and Delivery Block Status Desc. One item is listed:

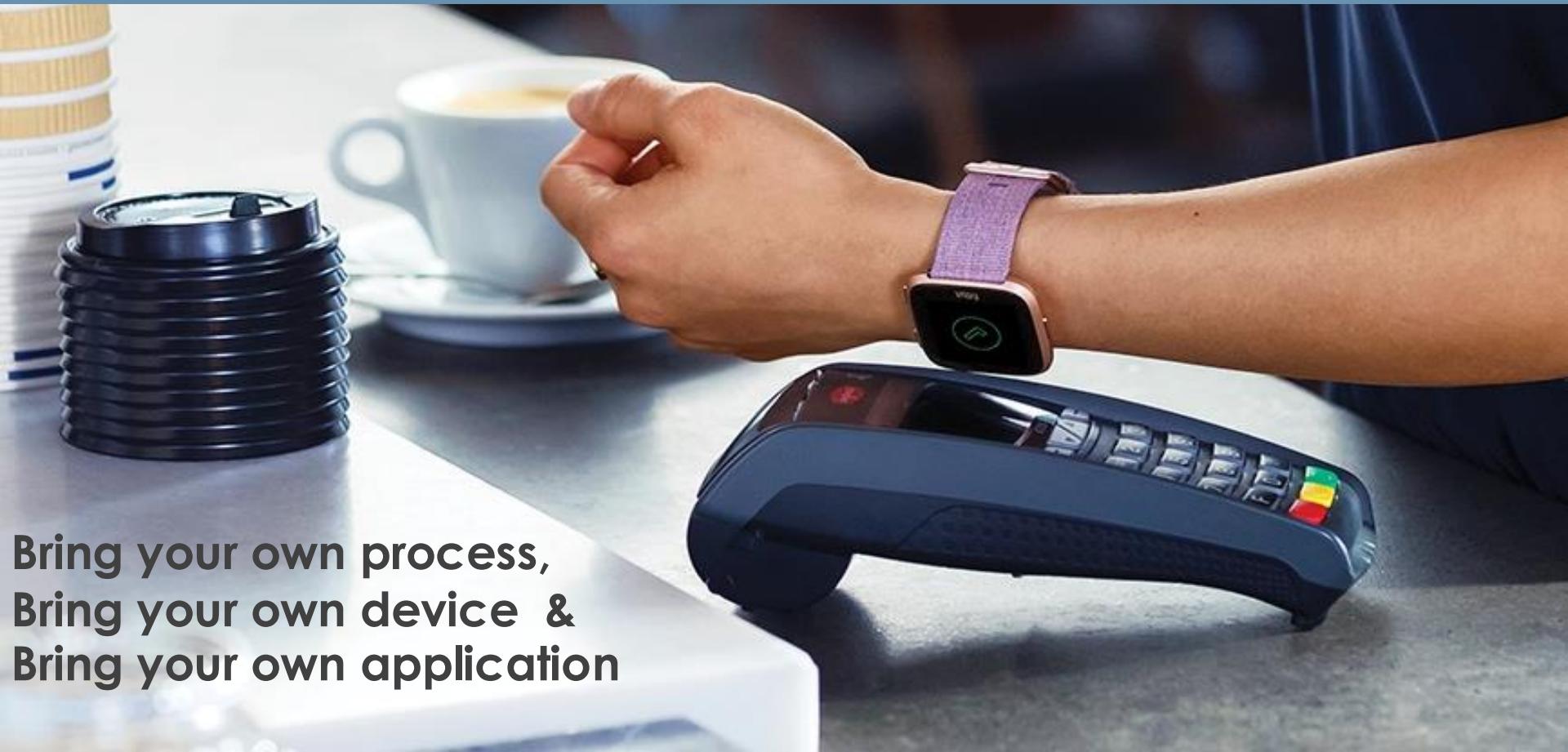
Item	Material	Order Quantity	Item Category	Delivery Date	Net Value	Delivery Block Stat.	Delivery Block Status Desc
10	Trading Good,Reorder PointTG-D010 TG-D010	10.000 PC	Standard Item TAN	03/11/2016	14,000 HUF	Not Blocked	Not Blocked

The "BUSINESS PARTNERS" section lists three entries, all associated with "Electronics, INC (HU)".

User Interaction should be simplified and smart.



... or even fully automated



**Bring your own process,  
Bring your own device &  
Bring your own application**

# Hide complexity from end-user



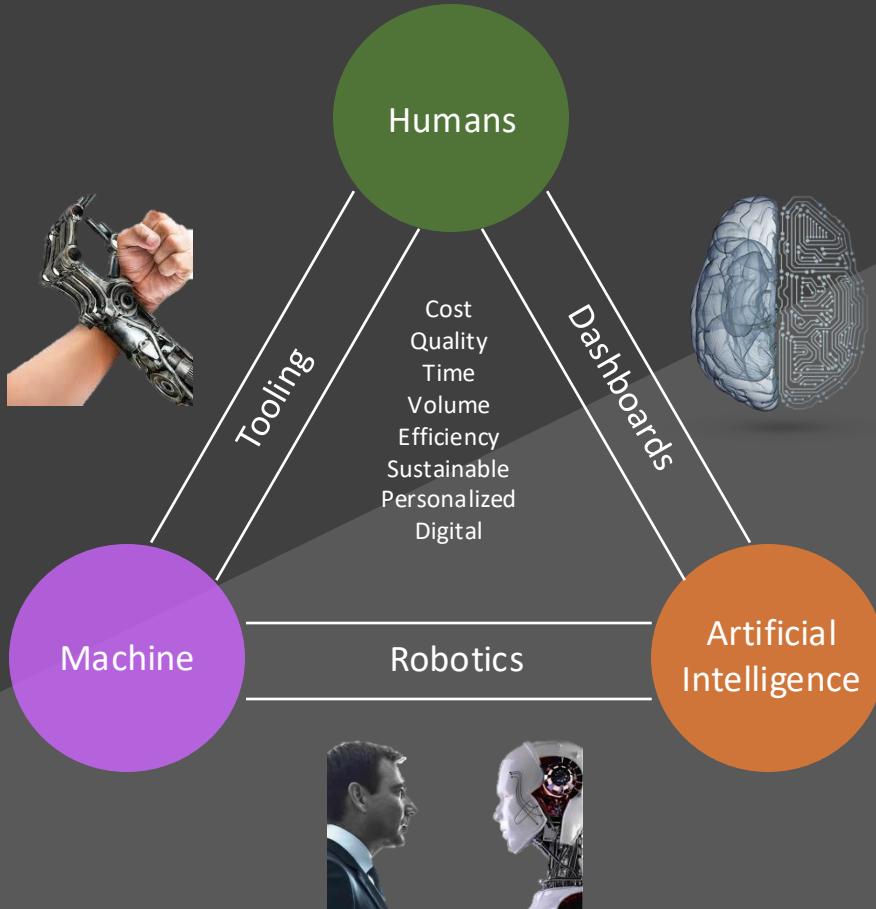


Find a balance between data entry, automated data collection, and automated decisions.

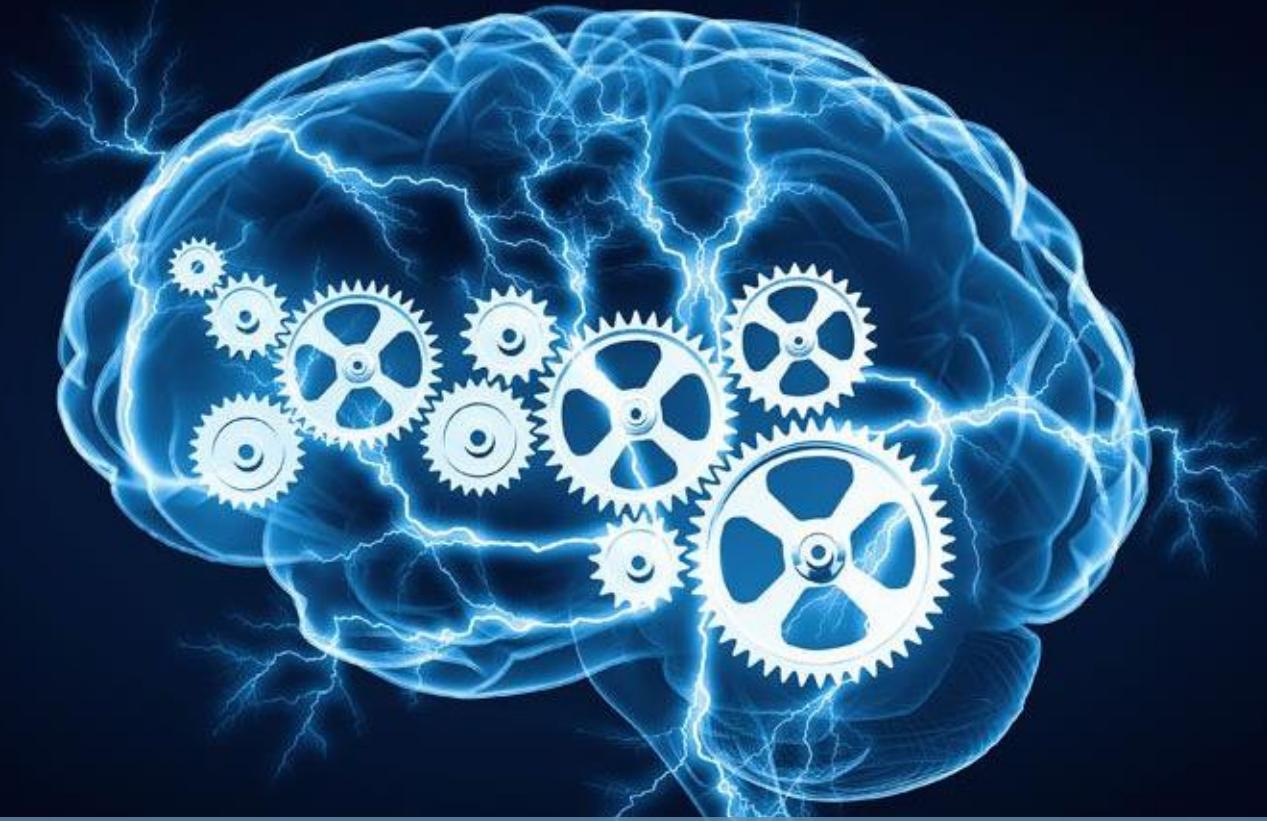
# Human vs Automated

# automate human tasks

Industrial Revolution



Digital Revolution



Applications should work like our brains.



Data streams should be connected.

...and timing is crucial



The background of the slide features a complex, abstract digital grid. It consists of numerous small, glowing blue and cyan nodes connected by thin lines, forming a three-dimensional mesh that curves across the frame. The lighting is dynamic, with brighter highlights on the left side and darker shadows on the right, giving it a sense of depth and motion.

# Event Driven Applications

The background of the image is a dark blue night sky filled with numerous small white stars of varying brightness. Below the horizon, there is a dark silhouette of mountain peaks. On the right side of the silhouette, there is a small, glowing orange and yellow area, possibly representing a campfire or a town at night.

High volume of events



Not every event is relevant



Events can be overruled



Applications can react different on same event



Events should speak the same language



Lowcode/Nocode  
Platforms

Container based  
Computing

Intelligent  
ERP

Analytics

Cloud  
Applications

Office  
Applications

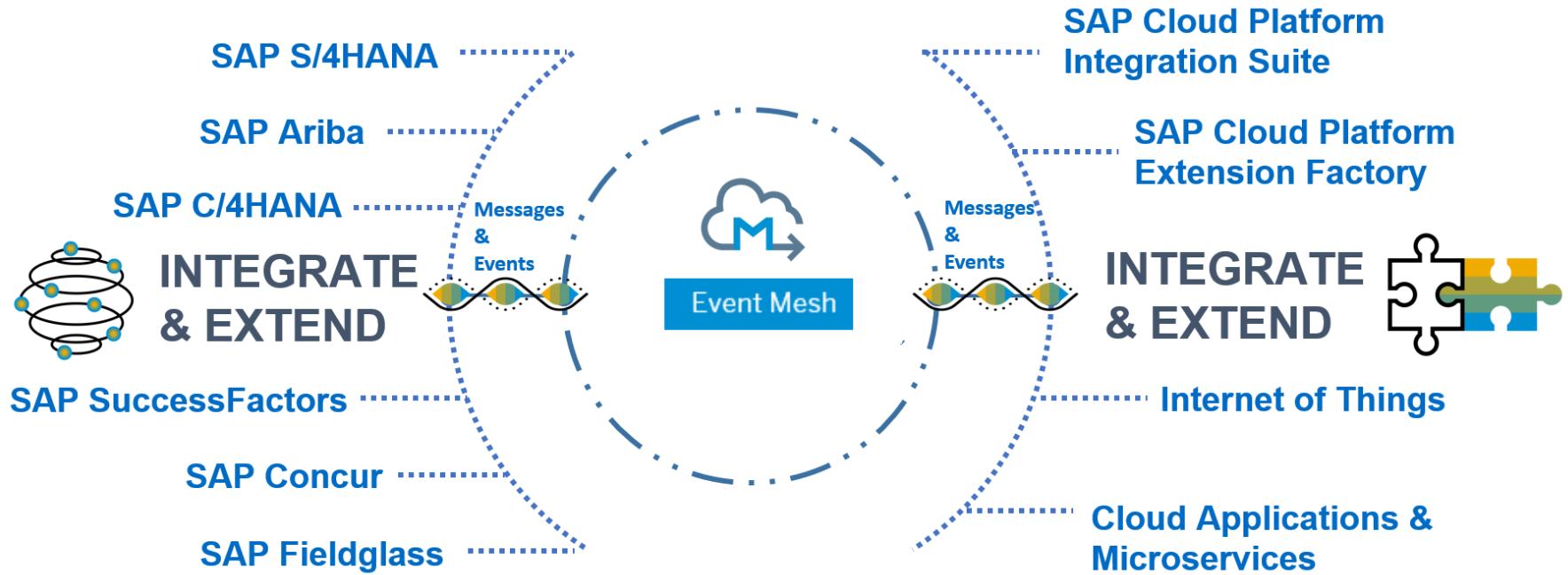
Social  
Media

Chat  
bots

RPA

IoT

Events should not be silo based



SAP recognize the importance of events



## ABAP Cloud Local Events (XBE)



## SAP Cloud Application Event Hub



## SAP Event Mesh

- Default Plan
- Connectivity Plan to connect with Microsoft Azure Event Grid



## SAP Advanced Event Mesh (AEM)

# SAP Event Brokers



**SAP NetWeaver** Add-On for Event Enablement (based on ASAPIO)

**S/4HANA**

**S/4HANA Business Events**



**ABAP Cloud Custom events**



**SAP Customer Experience Business Events**



**SAP Cloud Integration AMQP Channel**



**SAP Cloud Application Programs on SAP BTP**

and others.

**SAP Event Providers/Consumers**

Any Application



Business Partner

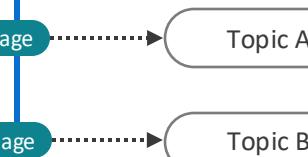


Purchase Order  
Create"

ODATA/REST

## SAP Business Technology Platform

### SAP Event Mesh



Queue 1

Queue 2

Queue 3

Webhook

message

message

ODATA/REST

PULLED

PUSHED



Cloud  
Solution

REST or AMQP

REST or MQTT

OnPremise  
Solution



**SAP** ® Business  
ByDesign

ODATA or SOAP

Cloud Application

SAP Event Mesh is system agnostic

SAP\_CX\_XF\_NQ40

[Copy Bindings From Previous Version](#)[Outbound Topic Bindings](#) [Inbound Topic Bindings](#) [Subscriptions](#)

## Outbound Topics (4)

[Create](#) [Delete](#)

Topic	Channel	
sap/s4/beh/businesspartner/v1/BusinessPartner/*	SAP_CX_XF_NQ40	>
sap/s4/beh/product/v1/Product/*	SAP_CX_XF_NQ40	>
sap/s4/beh/purchaseorder/v1/PurchaseOrder/*	SAP_CX_XF_NQ40	>
sap/s4/beh/salesorder/v1/SalesOrder/*	SAP_CX_XF_NQ40	>

## Inbound Topic Bindings

## Inbound Topics (0)

[Create](#) [Delete](#)

Topic	
No data found.	

## Subscriptions

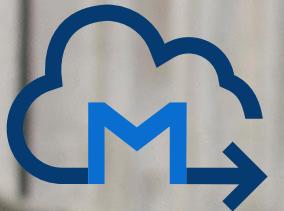
## Subscriptions (0)

[Create](#) [Delete](#)

Status

# S/4HANA Notification Events

```
{  
  "type": "sap.s4.beh.salesorder.v1.SalesOrder.Changed.v1",  
  "specversion": "1.0",  
  "source": "/default/sap.s4.beh/0000000007",  
  "id": "fa163e62-59b2-1edc-89ed-9ac5c80fa163",  
  "time": "2021-10-07T12:48:15Z",  
  "datacontenttype": "application/json",  
  "data": {  
    "SalesOrder": "47"  
  }  
}
```



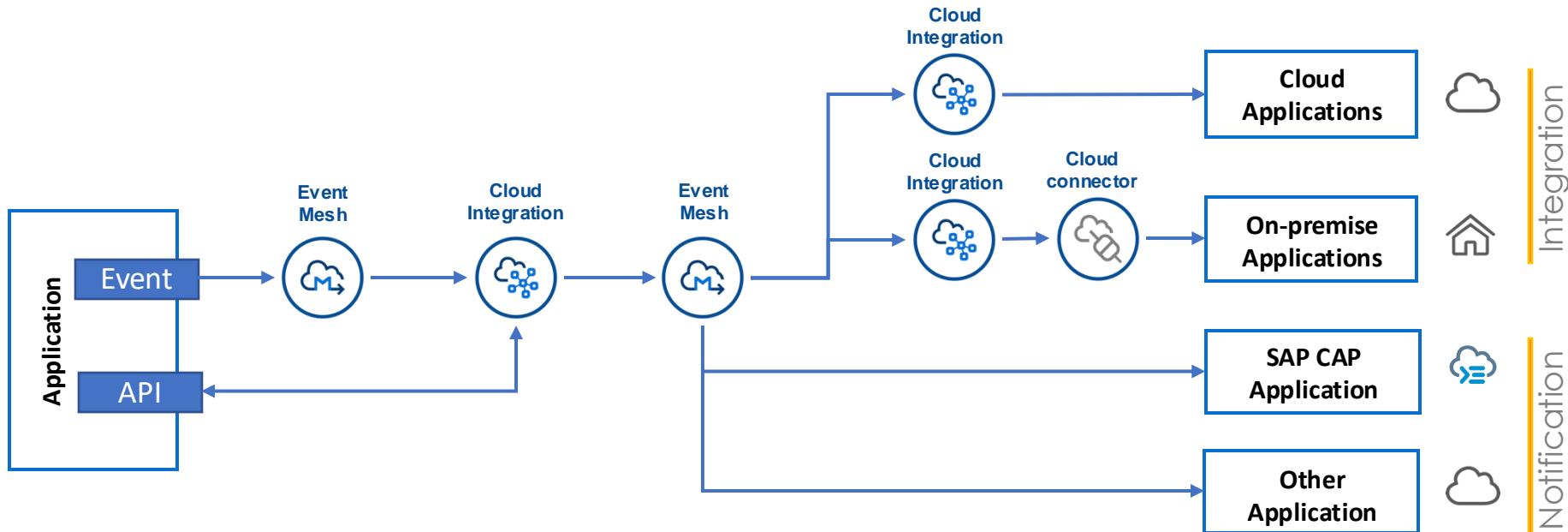
Event Mesh + Integration platform

## Trigger

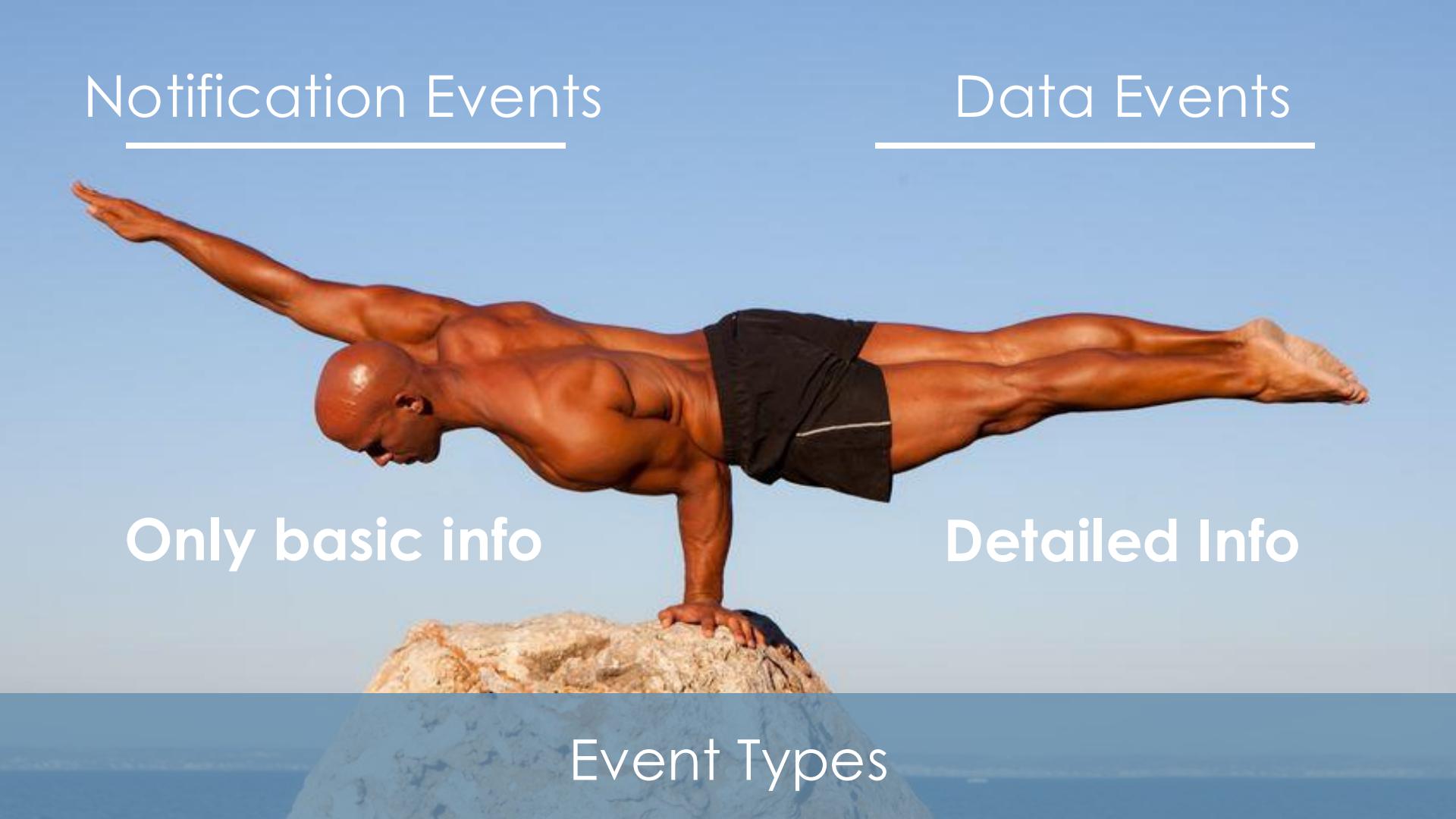
## Enrich

## Dispatch

## Process



Notification versus Integration

A muscular man with a shaved head is performing a handstand on a large, light-colored rock. He is wearing black shorts. His body is perfectly straight, forming a horizontal line from his toes to his head. The background is a clear, bright blue sky.

Notification Events

---

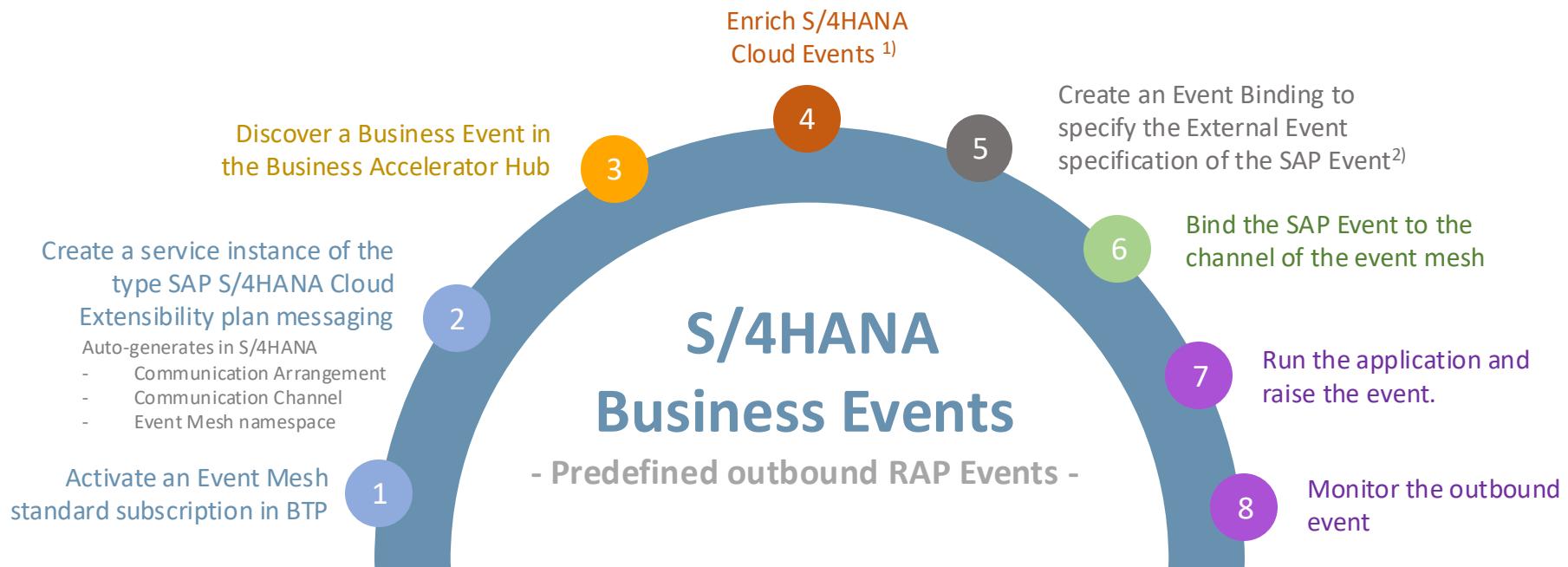
Data Events

---

Only basic info

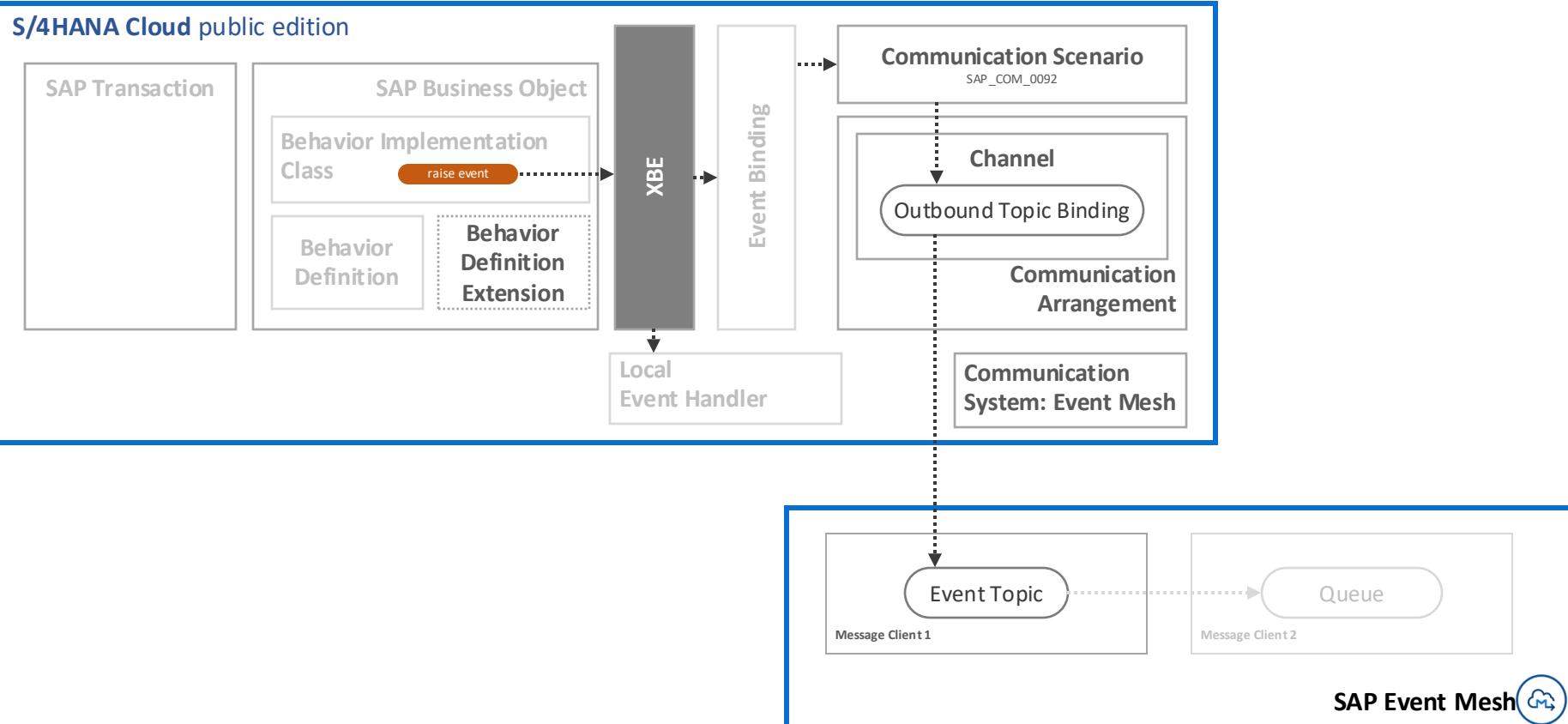
Detailed Info

Event Types



Steps to publish S/4HANA Business Events

## S/4HANA Cloud public edition



message

# Process Flow Inbound Events

New Instance or Subscription

1 Basic Info      2 Parameters      3 Review

Enter basic info for your instance or subscription.

Service:  Can't find what you're looking for?

Event Mesh

Plan:

Instances  
default

Subscriptions  
standard

Next > Create

Create subscription

SAP BTP Cockpit

Event Mesh

Application Technical Name: enterprise-messaging-hub  
Plan Display Name: standard  
Plan: standard  
Status: Subscribed

Created On: 2 Mar 2022  
Changed On: 2 Mar 2022  
Created By: robert.elipe@nl4b.com  
Changed By: robert.elipe@nl4b.com

Overview Roles

The SAP Event Mesh service decouples communication and allows for event-driven business processes.

Labels (0)

No labels assigned to this subscription. Click Add to assign labels.

Additional Links Documentation

Event Mesh subscription in BTP

SAP Event Mesh

Default Plan Subdomain: docloudnow-d-2beudmr

Message Clients

Queues Resource Allocation Resource Usage Test

Event Mesh application

# Activate Event Mesh in BTP

New Instance or Subscription

- 1 Basic Info
- 2 Parameters
- 3 Review

Enter basic info for your instance or subscription.

Service: SAP S/4HANA Cloud Extensibility

Plan: messaging

This service plan is not bindable.

Understand that enabling a service might result in costs, depending on the plan selected.  
See Services Catalog

Runtime Environment: Cloud Foundry

Space: dev

System Name: SAP4H\_CLOUD\_PARTNER\_SYSTEM\_100

Instance Name: EM\_S4HANA\_SZSK

[Next >](#) [Create](#) [Cancel](#)

Create a service instance of the type SAP S/4HANA Cloud Extensibility plan messaging

SAP Event Mesh

Default Plan Subdomain: dcloudnow-d-2beudmz

Message Clients

szsk (Type: instance)

Message Client in Event Mesh Application

SAP Communication Arrangements

SAP\_CLOUD\_PLATFORM\_XF\_szsk

Scenario ID: SAP\_COM\_0002 Scenario: Enterprise Eventing Integration Changed By: Robert Egle Changed On: 05/14/2024, 20:25:42 Editing Status: Active

Common Data

Arrangement Name: SAP\_CLOUD\_PLATFORM\_XF\_szsk Communication System: A3D030DC3E9A4BD1BAACDE9C130A809 Display Own SAP Cloud System: OM54759 API-URL: https://my40401/api.s4hana.cloud.sap

Additional Properties

Property Name Channel Property Value SAP\_CP\_XF\_SZSK Integration with Enterprise Messaging for EM Client (szsk) sapS4HANA00szsk

Description Topic Space

QoS Reconnect Attempts 1

Reconnect Wait Time (sec) 0 5

Inbound Communication Supported Authentication Methods

Channel Namespace

### Communication Arrangement in S/4HANA

SAP Event Mesh

Default Plan Subdomain: dcloudnow-d-2beudmz

szsk (Type: instance)

Management: Enabled Messaging: Enabled Messaging REST: Enabled

Overview Rules Queues Webhooks Events Service Descriptor Test

```

1: {
2:   "options": {
3:     "management": {
4:       "messageProcessor": "Inbox",
5:       "messaging": "true"
6:     },
7:     "rules": [
8:       {
9:         "topicPath": {
10:           "topic": "sapS4HANA00szsk",
11:           "path": []
12:         }
13:       }
14:     ],
15:     "queues": [
16:       "sapS4HANA00szsk"
17:     ]
18:   }
19: }
20: 
```

S/4HANA Message Client Details

# Create a Message Client for SAP S/4HANA Cloud

## SAP S/4HANA Cloud Public Edition

Ready-to-run cloud ERP that delivers the latest industry best practices and continuous innovations. You can also accelerate and grow your business with continuous innovations.

[Overview](#) [APIs](#) [Events](#) [On Stack Extensibility](#) [Integrations](#) [Business Processes](#) [Build](#) [VPUC](#) [Analytics](#)[Event Objects](#) [Packages](#)

Showing 1-12 of 19 results

< Previous Page  of 2 Next >

Sort by: Updated

Event Object

### Sales Order Events

Inform a remote system about created, changed, and deleted sales orders in an SAP S/4HANA Cloud tenant

Version 1.0.0 ACTIVE

Event Object

### Sales Order Without Charge Events

Inform a remote system about created, changed, and deleted sales order without charge in the SAP S/4HANA Cloud tenant

Version 1.0.0 ACTIVE

Event Object

### Warehouse Order Events

Inform a remote system about created, canceled, and confirmed warehouse task of a warehouse order in the SAP S/4HANA Cloud tenant

Version 1.0.0 ACTIVE

Event Object

### Freight Order Events

Inform a remote system about created, changed, and deleted freight order in the SAP S/4HANA Cloud tenant

Version 1.0.0 ACTIVE

Event Object

### Production Order Events

Inform a remote system about created and changed Production orders in an SAP S/4HANA Cloud tenant

Version 1.0.0 ACTIVE

Event Object

### Maintenance Order Events

Inform a remote system about closed, approved, and rejected events for maintenance orders in an SAP S/4HANA Cloud tenant

Version 1.0.0 ACTIVE

Event Object

### Service Order Events

Inform a remote system about created, changed, completed, released, and deleted service orders in an SAP S/4HANA Cloud tenant

Version 1.0.0 ACTIVE

Event Object

### Process Order Events

Inform a remote system about created, changed Process order in the SAP S/4HANA Cloud tenant

Version 1.0.0 ACTIVE

Event Object

### Sales Order Events

Inform a remote system about created, changed, and deleted sales orders in an SAP S/4HANA Cloud tenant

Version 1.0.0 ACTIVE

**Operations**

**PUB** ce/sap/s4/beh/salesord er/v1/SalesOrder/Appro valStsChanged/v1

**PUB** ce/sap/s4/beh/salesord er/v1/SalesOrder/Chang ed/v1

**PUB** ce/sap/s4/beh/salesord er/v1/SalesOrder/Create d/v1

**PUB** ce/sap/s4/beh/salesord er/v1/SalesOrder/Delete d/v1

**PUB** ce/sap/s4/beh/salesord er/v1/SalesOrder/RemC hanged/v1

**SUB** ce/sap/s4/beh/salesorder/v1/SalesOrder/ApprovalStsChanged/v1

Operation ID: [subscribe](#)

Accepts the following message:

SalesOrder Approval Status Changed  
This event is raised when the approval status of a sales order is changed.

**Payload** > [Expand all](#) **Object**

**Headers** > [Expand all](#) **Object**

**Examples**

**Payload** > [Payload](#) **Headers** > [Headers](#)

FEEDBACK

Chat (Beta)

SAP Business Accelerator Hub

# S/4HANA Notification Event

```
{  
  "type": "sap.s4.beh.salesorder.v1.SalesOrder.Created.v1",  
  "specversion": "1.0",  
  "source": "/default/sap.s4.beh/743798665",  
  "id": "77e43f3a-3619-1eef-a6ee-0f6d7a660d72",  
  "time": "2024-11-05T12:21:29Z",  
  
  "datacontenttype": "application/json",  
  "data": {  
    "SalesOrder": "5",  
    "EventRaisedDateTime": "2024-11-05T12:21:28.657291Z",  
    "SalesOrderType": "TA",  
    "SalesOrganization": "3710",  
    "DistributionChannel": "10",  
    "OrganizationDivision": "00",  
    "SoldToParty": "37101011"  
  }  
}
```



The screenshot shows the SAP Sales Order interface. At the top, it displays a new sales order with the following details:

- Status: Open
- Net Sales Volume (YTD): 0.00 EUR
- Net Value: 1,350.00 EUR

Below the header, there are several tabs: General Information, Name, Partners, Price, Tools, Status and Block, Output Items, and Basic Data. The Basic Data tab is active, showing fields for Sales To Party (Billeren Kantoorn No. 1 (77100001)), Document Date (10/2024), Customer Group (01 (B)), Shipment Party (Billeren Kantoorn No. 1 (77100001)), and Address (Korteweg 2, 7522 HP Apeldoorn, Netherlands). The middle section contains sections for Order Details, Pricing and Billing, and Organizational Data. The bottom section shows a grid of sales items with columns for Item Category, Customer Material, Required Delivery Date, Confirmed Delivery Date, Availability, Net Value, and Higher-Level Line Item.

## Data Extension

```
{  
  "type": "fexs.s4.beh.fexs.SalesOrder.Created.v1",  
  "specversion": "1.0",  
  "source": "/default/sap.abap.custom/743798665",  
  "id": "77e43f3a-3619-1eef-a6ef-818acd5aed72",  
  "time": "2024-11-05T13:44:17Z",  
  "xsapsalesordersoldto": "37100001",  
  "xsapsalesordertype": "OR",  
  "datacontenttype": "application/json",  
  "data": {  
    "SalesOrder": "10",  
    "EventRaisedDateTime": "2024-11-05T13:44:15Z",  
    "SalesOrderType": "OR",  
    "SalesOrganization": "3710",  
    "DistributionChannel": "10",  
    "OrganizationDivision": "00",  
    "SoldToParty": "37100001",  
    "TotalNetAmount": 1350,  
    "TransactionCurrency": "EUR",  
    "PricingDate": "2024-11-05",  
    "PurchaseOrderByCustomer": "Kadootje",  
    "BillingCompanyCode": "3710",  
    "ControllingArea": "A000"  
  }  
}
```

# Enrich S/4HANA Business Events

# S/4HANA Data Event

```
(ZSK,080) I_SALESORDERTP X
@Open Documentation
1 interface;
2 extensible;
3
4 with privileged mode;
5
6 define behavior for I_SalesOrderTP alias SalesOrder
7 use etag;
8 {
9   use create;
10  use update;
11  use action CreateWithReference;
12
13  use event Created;
14  use event Changed;
15  use event Deleted;
16
17 field ( readonly ) SalesOrder;
18 use association _Item { create; }
19 use association _Partner { create; }
20 use association _Text { create; }
21 use association _PricingElement { create; }
22 }
23
24 define behavior for I_SalesOrderPartnerTP alias SalesOrderPartner
25 use etag;
26 {
27   use update;
28   use delete;
29
30 field ( suppress ) SalesOrganization, DistributionChannel, OrganizationDivision, SalesOrderType;
31   use association _SalesOrder;
32 }
33
34 define behavior for I_SalesOrderTextTP alias SalesOrderText
35 use etag;
36
37 }
```

Original interface I\_SalesOrderTP

```
(ZSK,080) D_SALESORDERCREATED X
@Open Documentation
1 @EndUserText.label: 'Sales Order Created'
2 @objectModel.sapObjectNodeType.name: 'SalesOrder'
3 @objectModel.supportedCapabilities: [#DATA_STRUCTURE]
4 @DM.usage.type: [#EVENT_SIGNATURE]
5 @metadata.allowExtensions: true
6
7 define abstract entity D_SalesOrderCreated {
8
9   @Event.raisedAt.dateTime: true
10  EventRaisedDateTime : vdm_lastchangedon;
11
12  SalesOrderType : auart_unv;
13
14  SalesOrganization : vkorg;
15
16  DistributionChannel : vtweg;
17
18  OrganizationDivision : spart;
19
20  SoldToParty : kunnr;
21
22 }
```

Original notification event data D\_SalesOrderCreated

extension using interface i\_salesordertp;

```
extend behavior for SalesOrder{
managed event /fexs/_created on Created parameter /fexs/D_SalesOrderCreated;
managed event /fexs/_changed on Changed parameter /fexs/D_SalesOrderChanged;
}
```

## RAP Behavior Definition Extension

```
@AccessControlAuthorizat ionCheck: #NOT_REQUIRED
@EndUserTextLabel: 'Event data Sales Order Change'd
@Metadata.ignorePropagatedAnnotations: false
@Search.searchable: false
```

```
define view entity /FEXS/D_SALESORDERCREATED
as select from I_SalesOrder
{
```

key SalesOrder,

```
@Event.raisedAt.dateTime: true
cast( tstamp_current_utcTimestamp() as timestamp )
as EventRaisedDateTime,
```

```
@Event.context.attribute: 'xsapsalesordertype'
SalesOrderType,
SalesOrganization,
DistributionChannel,
OrganizationDivision,
@Event.context.attribute: 'xsapsalesorder soldto'
SoldToParty,
```

```
// Additional Data Fields
TotalNetAmount,
TransactionCurrency,
PricingDate,
PurchaseOrderByCustomer,
BillingCompanyCode,
ControllingArea
}
```

## RAP CDS View Entity for Event Data

Event Binding: /FEXS/S\_SALES\_ORDER\_CREATED

General Information	
Type Namespace:	fees.ad.bath
SAP Object Type:	PrivateOrder
Operation:	Created
Type:	fees.ad.bath.fexs.SalesOrderCreated*
Event Versions	
Major Version	Minor Version
0001	0

Add Event

Event

Minor Version: 0

Patch Version: 0

Entity Name: \* I\_SALESORDERTR

Entity Event Name: \* /FEXS/\_CREATED

## Event Binding

# Extend the behavior definition

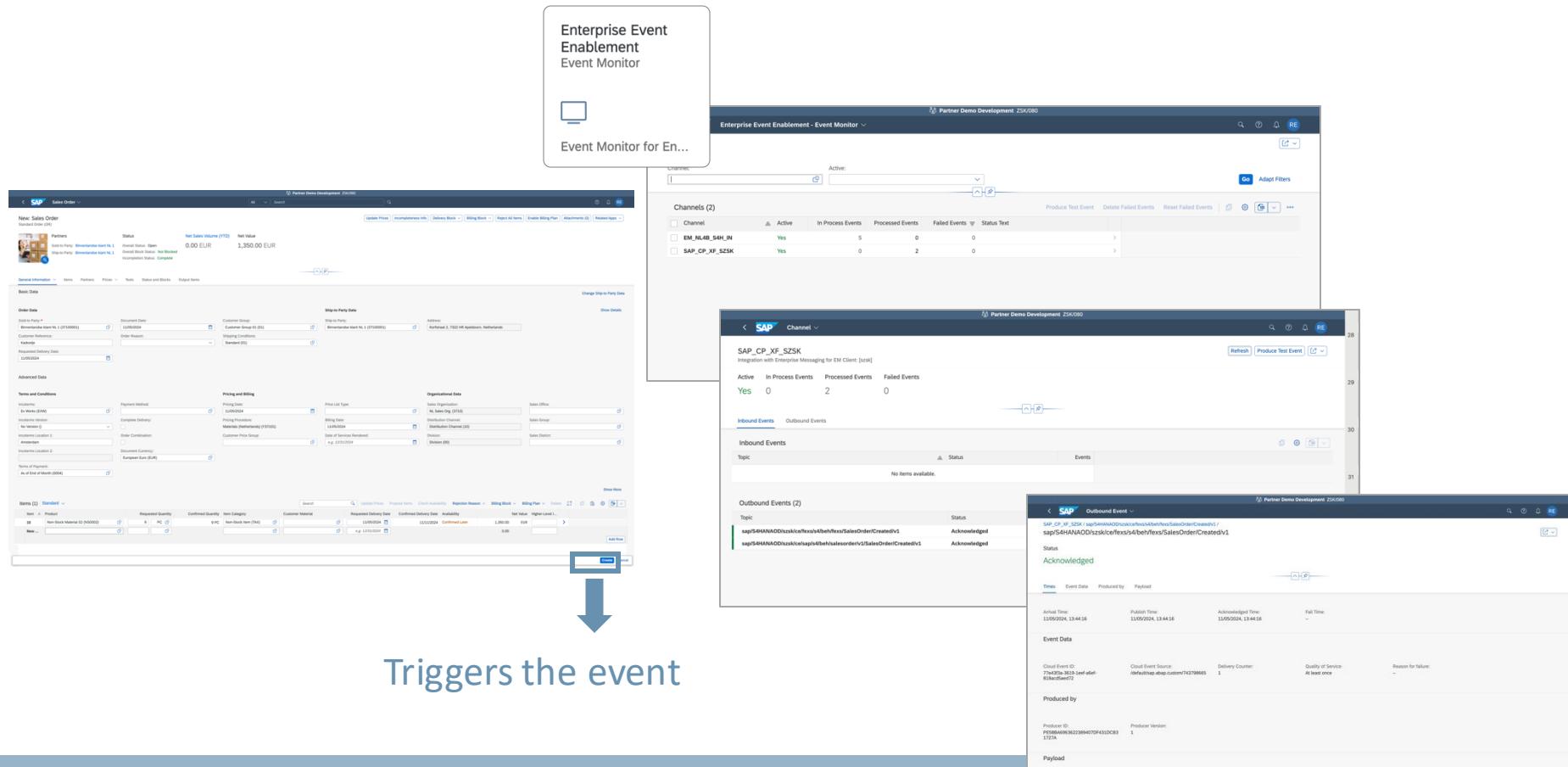
## Enterprise Event Enablement



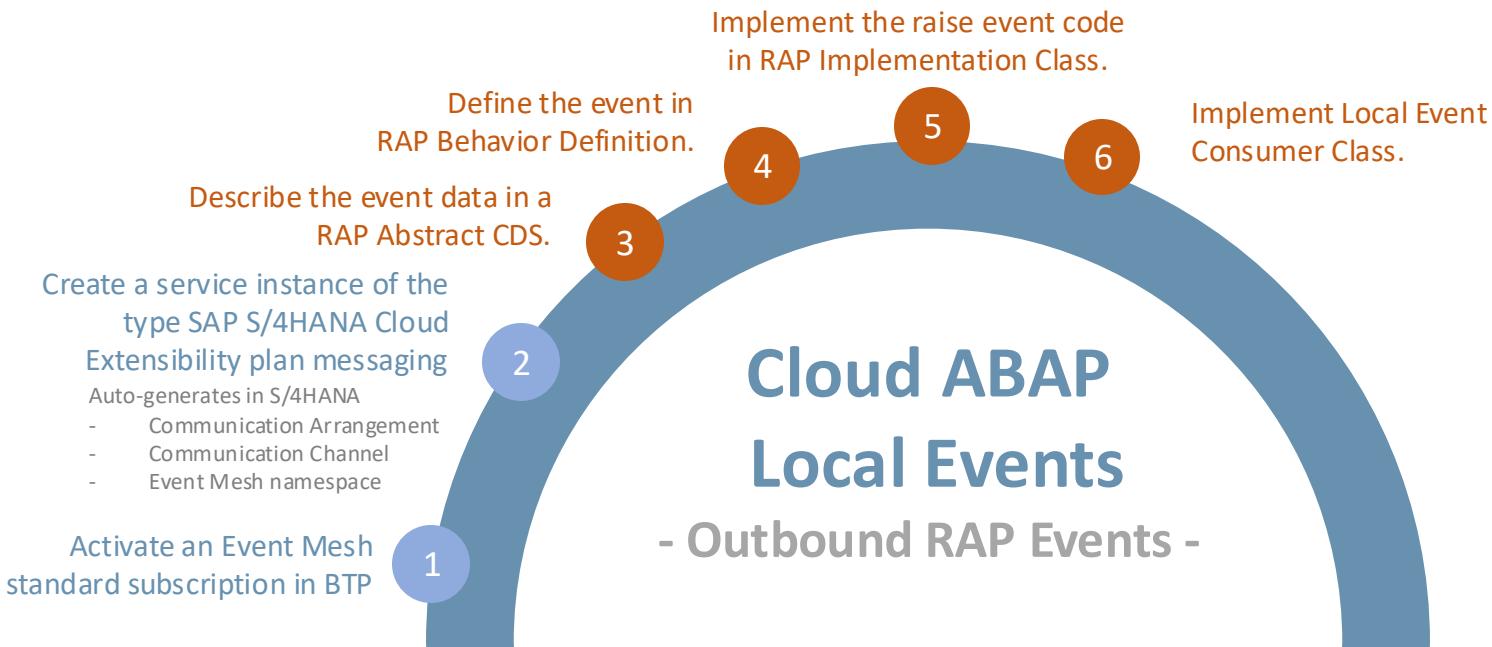
#### Configure Channel B.

The screenshot illustrates the SAP Fiori interface for managing event channel bindings. The main screen shows a list of channels, each with an 'Active' status indicator. A specific channel, 'SAP\_CP\_XF\_S2SK', is selected, leading to a detailed configuration page. This page includes sections for Outbound Topic Bindings and Inbound Topic Bindings. An example of an Outbound Topic binding is shown, detailing its configuration and the structure of the event message it generates. The message structure is displayed as a JSON-like object with various fields and their values.

# Bind the event to the Channel

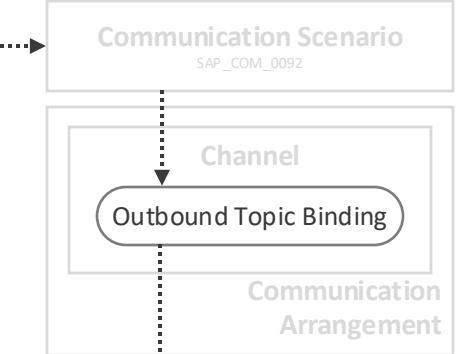
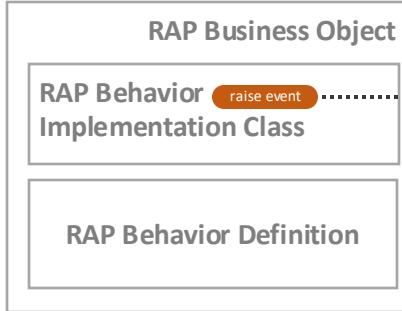
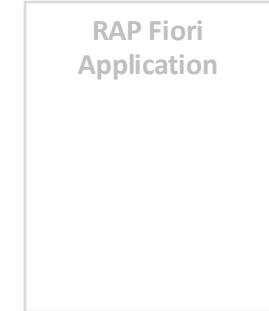


# Trigger an event and monitor

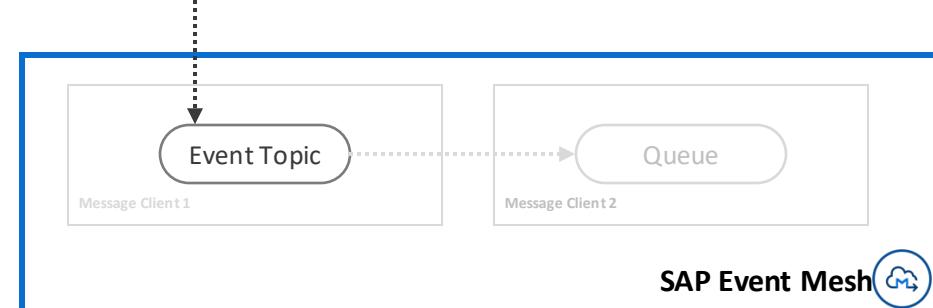
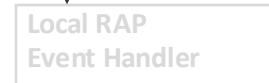


Steps to publish an RAP Events

## S/4HANA Cloud public edition



or SAP BTP ABAP environment



message

# Process Flow Inbound Events

```
@EndUserText.label: 'event parameter for Order Item'  
define abstract entity ZA_ORDER_ITEM_000  
{  
    orderid : abap.numc(8);  
    ordereditem : abap.char(40);  
    orderitemtext : abap.char(40);  
    @Semantics.amount.currencyCode: 'currency'  
    price : abap.curr(11,2);  
    @Semantics.amount.currencyCode: 'currency'  
    totalprice : abap.curr(11,2);  
    currency : abap.cuky;  
    orderquantity : abap.numc(4);  
    deliverydate : abap.dats;  
    overallstatus : abap.char(30);  
    notes : abap.string(256);  
    name1 : abap.char(40);  
    name2 : abap.char(40);  
    street : abap.char(60);  
    housenumber : abap.char(10);  
    postalcode : ad_pstcd1;  
    city : abap.char(40);  
    countrycode : land1;  
    country : abap.char(50);  
}
```

RAP Abstract CDS Entity

Describe your event data

```
managed implementation in class ZBP_ONLINESHOPTP_000 unique;  
strict( 2 );  
with draft;  
define behavior for ZR_ONLINESHOPTP_000 alias OnlineShop  
draft table ZDONLINESHOP_000  
etag master LocalLastChangedAt  
lock master total etag LastChangedAt  
authorization master( global )  
with unmanaged save  
{  
    create;  
    update( features:instance );  
    delete;  
  
event ItemIsOrdered parameter ZA_ORDER_ITEM_000;  
...}
```

RAP Behavior Definition

```
METHOD save_modified.  
  
DATA : lt_online_shop_as TYPE STANDARD TABLE OF zaonlineshop_000,  
      ls_online_shop_as TYPE zaonlineshop_000.  
IF create-onlineshop IS NOT INITIAL.  
  lt_online_shop_as = CORRESPONDING #(  
    create-onlineshop MAPPING FROM ENTITY ).  
INSERT zaonlineshop_000 FROM TABLE @lt_online_shop_as.  
  
RAISE ENTITY EVENT zr_onlineshoptp_000~ItemIsOrdered  
  FROM VALUE #(  
    FOR online_shop IN create-onlineshop (  
      %key = online_shop-%key  
      %param-ordered_item = online_shop-OrderedItem )  
    ).  
...  
  
ENDIF.
```

RAP Implementation Class

### RAP Local Event Consumer Class

```
CLASS zcl_locl_evt_shop DEFINITION
PUBLIC
ABSTRACT
FINAL
FOR EVENTS OF zr_onlineshopptp_000.
```

```
PUBLIC SECTION.
PROTECTED SECTION.
PRIVATE SECTION.
ENDCLASS.
```

```
CLASS lcl_locl_evt_shop_handler DEFINITION INHERITING FROM
cl_abap_behavior_event_handler.
```

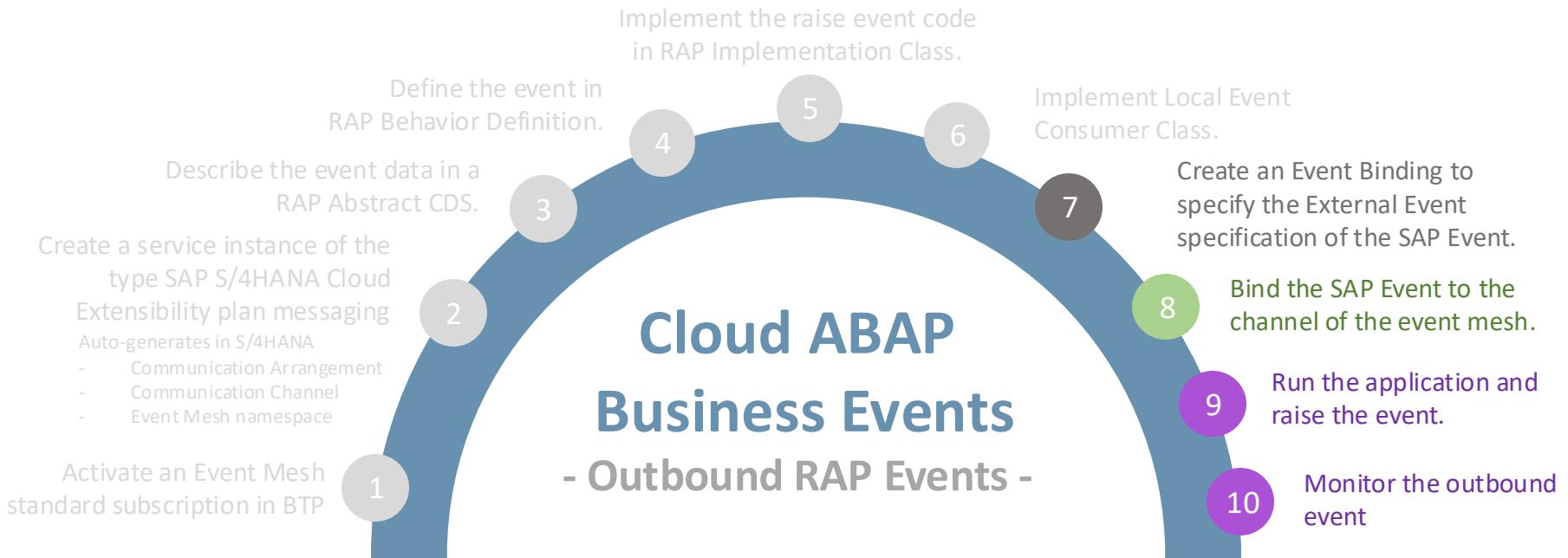
```
PRIVATE SECTION.
METHODS item_is_ordered
FOR ENTITY EVENT ordered_items
FOR OnlineShop^ItemsOrdered.
ENDCLASS.
```

```
CLASS lcl_locl_evt_shop_handler IMPLEMENTATION.
METHOD item_is_ordered.
LOOP AT ordered_items INTO DATA(ordered_item).
...
ENDLOOP.
ENDMETHOD.
ENDCLASS.
```

Global Class

Local Types

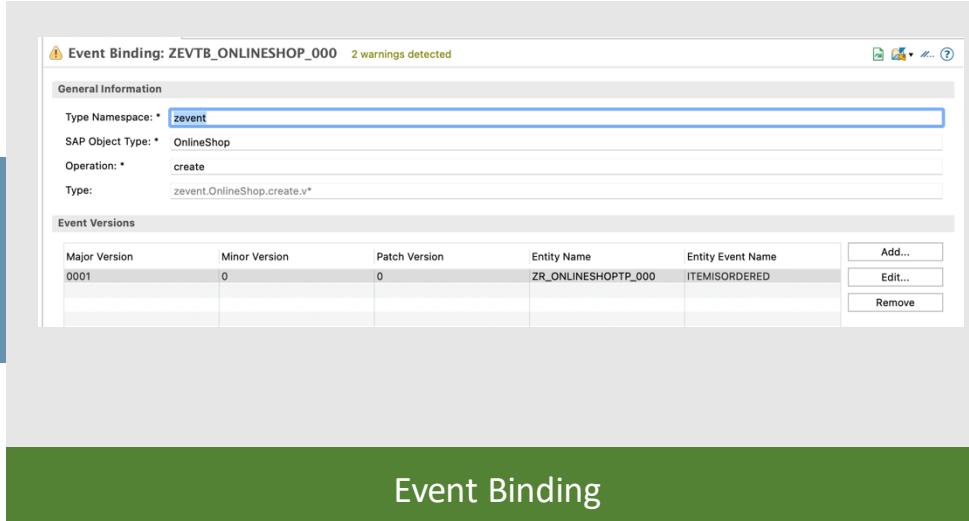
# RAP Local Event Consumer



Steps to publish an RAP Events



ABAP RAP  
Event



The screenshot shows the SAP Event Binding configuration interface. At the top, it displays "Event Binding: ZEVTB\_ONLINESHOP\_000" and "2 warnings detected". The main area is divided into sections: "General Information" and "Event Versions".  
**General Information:**

- Type Namespace: \* zevent
- SAP Object Type: \* OnlineShop
- Operation: \* create
- Type: zevent.OnlineShop.create.v\*

  
**Event Versions:**

Major Version	Minor Version	Patch Version	Entity Name	Entity Event Name	Action Buttons
0001	0	0	ZR_ONLINESHOPTP_000	ITEMISORDERED	Add... Edit... Remove

At the bottom of the interface is a green bar with the text "Event Binding".



RAP  
Business  
Event

RAP External Business Event

Enterprise Event  
Enablement  
Configure Channel B...



Configure Channel B.

SAP Maintain Event Channel Binding

Standard

Channel: Active:

Channels (2)

Channel	Active
EM_NL4B_S4H_IN	Yes >
SAP_CP_XF_SZSK	Yes >

SAP Channel

Integration with Enterprise Messaging for EM Client: [szsk]

Active: Yes

Outbound Topic Bindings (5) Standard

Topic	Status	Has Event Filters	API State
fxssacAlertEvent*	OK	No	
fxssacProcessRun*	OK	No	
saphAchpproductsV1Product*	OK	No	
saphAchpPurchaseRequisitionV1PurchaseSelfEquation*	OK	No	
zeventOnlineShop*	OK	No	

Inbound Topic Bindings Standard

Topic	Status	Maintained by
		No items available.

Studio

Information

Operations

Events from SAP S/4HANA 1.0.0

This is an event type catalog from an event provider of type SAP S/4HANA.

Operations

Operations

Accepts the following message:

Ordering create

Payload X Event.v1 Object

Headers X Event.v1 Object

Examples

Message

Type: Message

VALID AUTOREFRESH ON NOT LAYOUT JSON

111 Asynchronous document should have "verb" field.

111 Asynchronous document should have "id" field.

111 Asynchronous document should have "verb" field.

# Bind the event to the Channel

**Enterprise Event Enablement Event Monitor**

**Event Monitor for En**

**Standard**

**Channel:** Active:

**Channels (2)**

Channel	Active	In Process Events	Processed Events	Failed Events	Status Text
EM_NL4B_S4H_IN	Yes	5	0	0	
SAP_CP_XF_SZSK	Yes	0	1	0	

**Go Adapt Filters**

**Partner Demo Development ZSK/080**

**Shop for Gift Cards**

**Giftcard Request** **Giftcard details** **Receiver** **Note from requester** **Purchase Requisition**

Request ID: 12 Overall Status: New / Composing Delivery Date: 10/10/2024

**Giftcard details**

GRF Card: GIFTCARD0101 Price: 10.00 EUR Order Quantity: 1

**Receiver**

Name: Test User House Number: 12 City: MijWoonHeads Street: Egenen PostalCode: County: NL

**Create** **Draft up** **Draft**

**Triggers the event**

**SAP CP XF SZSK**

Integration with Enterprise Messaging for EM Client: [szsk]

Active In Process Events Processed Events Failed Events  
Yes 0 1 0

**Inbound Events** **Outbound Events**

**Inbound Events**

Topic: SAP CP XF SZSK / sap/S4HANAOD/szsk/ce/zevent/OnlineShop/createV1

No Results

**Outbound Events (1)**

Topic: sap/S4HANAOD/szsk/ce/zevent/OnlineShop/createV1

**Acknowledged**

**Outbound Event**

Arrival Time: 11/01/2024, 17:47:09 Acknowledged Time: 11/01/2024, 17:47:09

Published Time: 11/01/2024, 17:47:09 Fail Time: -

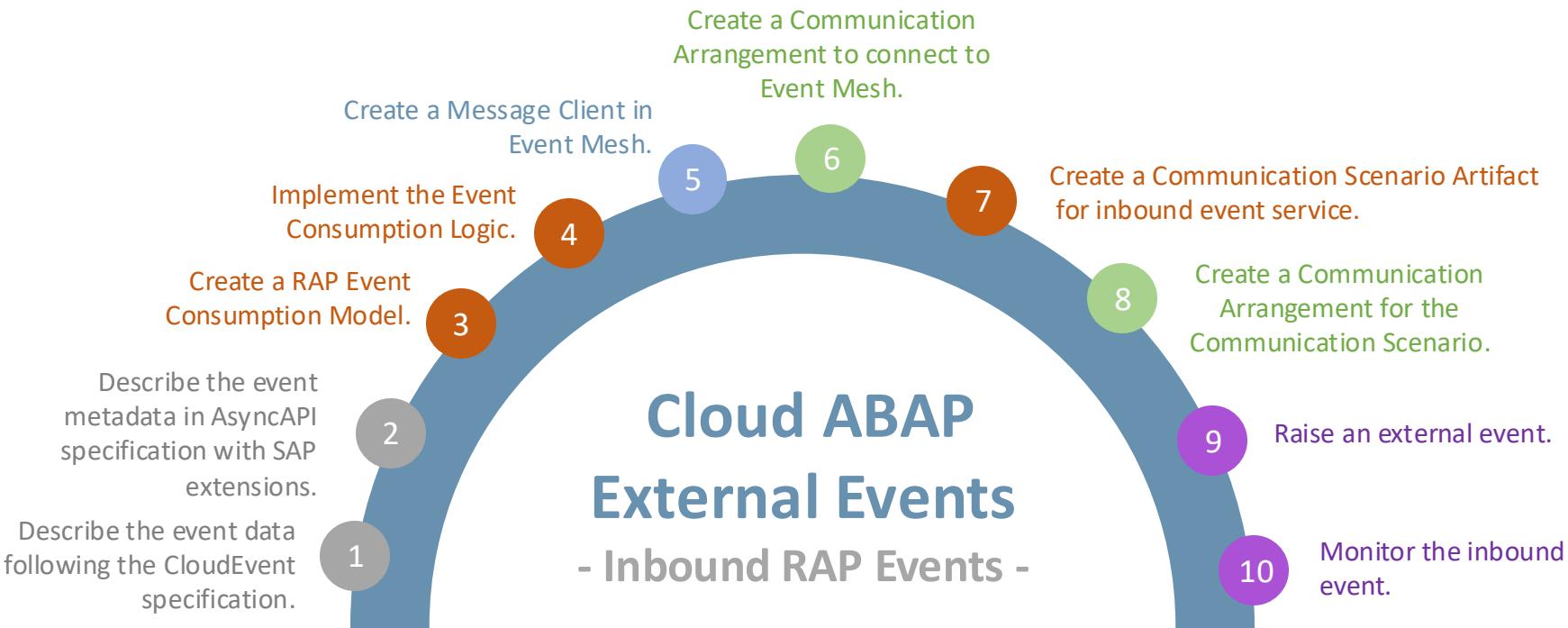
Times Event Data Produced by Payload

Event Data

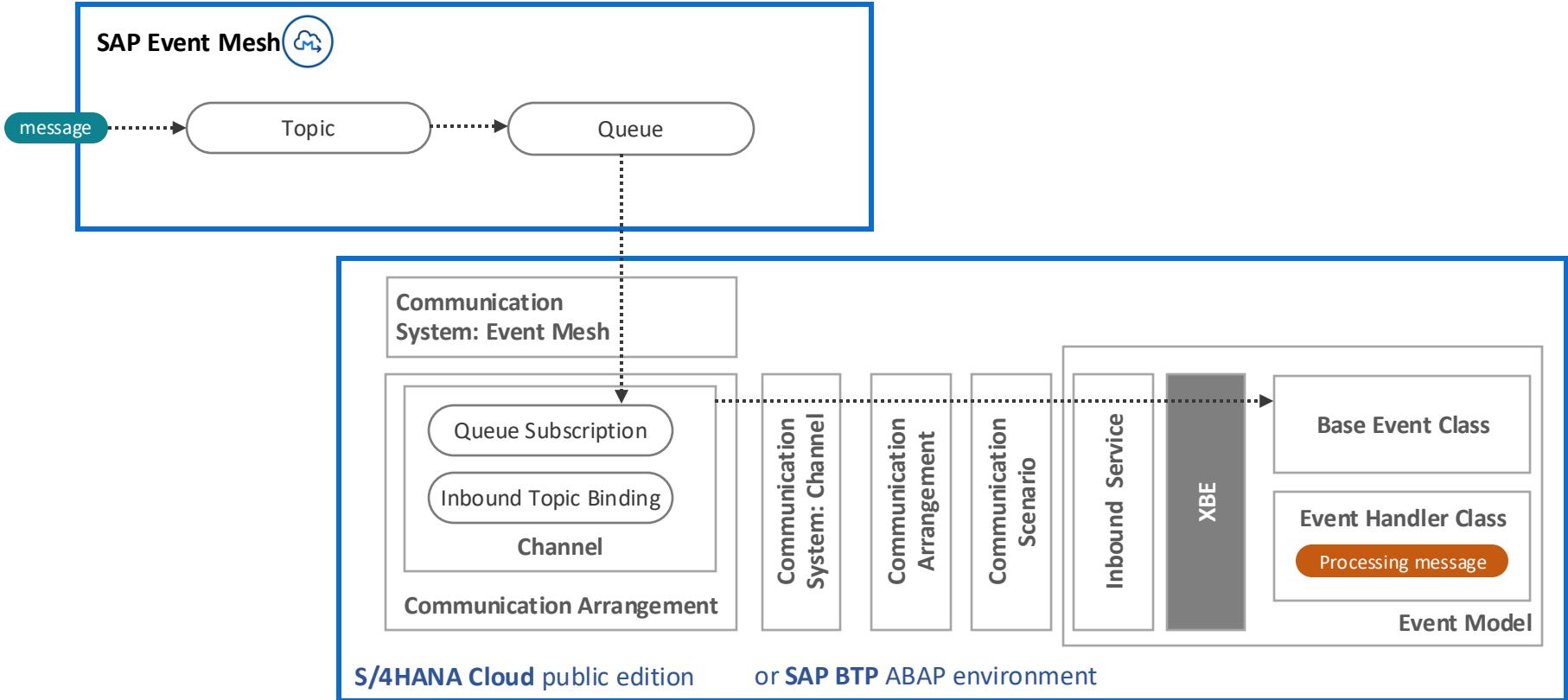
Cloud Event ID: 451c8086-dc5d-1ee1-a68f-2a25ee7af566 Cloud Event Source: /deflate/abap/custom/743798665 Delivery Counter: 1 Quality of Service: At least once Reason for failure: -

Produced by

# Trigger an event and monitor



Steps to Consume External Events in SAP RAP



## Process Flow Inbound Events



# cloudevents

```
{  
  "id": "81327fe9-9776-11ef-b73c-eeee0a876e7e",  
  "data": {  
    "decision": "Approved",  
    "OrderUUID": "451c3806-dc5d-1eef-a5ee-cf0a79a90d64",  
    "ordered_item": "GIFTCARDBOL",  
    "note": "No problem"  
  },  
  "time": "2023-11-11T16:00:00+00:00",  
  "type": "zcap.event.MyShop.confirm.v1",  
  "source": "/default/sap-build",  
  "specversion": "1.0",  
  "datacontenttype": "application/cloudevents+json"  
}
```

Event Data

CloudEvent  
Wrapper

More info: <https://cloudevents.io/>

SAP follows the Cloud Event specifications

The screenshot displays the AsyncAPI Studio Beta interface, which provides a visual editor and runtime environment for AsyncAPI documents.

**Left Panel (Editor):**

- Information:** Shows the document title "sap/S4HANAOD/szsk/ce/zcap/event/MyShop/confirm\_v1".
- Operations:** Shows a single operation: `PUB sap/S4HANAOD/szsk/ce/zcap/event/MyShop/confirm_v1`.
- Messages:** Shows a message definition: `zcap_event_MyShop_confirm_v1`.
- Schemas:** Shows a schema definition: `zcap_event_MyShop_confirm_v1`.
- DIAGNOSTICS:** Shows two diagnostic messages:
  - Line 1: "AsyncAPI document should have 'defaultContentType' field."
  - Line 1: "AsyncAPI document should have 'id' field."

**Right Panel (Runtime):**

### Events from SAP S/4HANA 1.0

This is an event type catalog from an event provider of type SAP S/4HANA

### Operations

`PUB sap/S4HANAOD/szsk/ce/zcap/event/MyShop/confirm_v1`

Operation ID: `subscribe`

Accepts the following message:

`MyShop confirm`

**Payload** > Expand all Object

**Headers** > Expand all Object

**Examples**

**Payload** >

```
{
  "ordered_item": "string",
  "OrderID": "2701ef69-d685-4c29-9780-a3a6f5780853"
}
```

This example has been generated automatically.

**Headers** >

### Messages

#1 `zcap_event_MyShop_confirm_v1`

MyShop confirm

Message ID: `zcap_event_MyShop_confirm_v1`

**Payload** > Expand all Object

**Headers** > Expand all Object

### Schemas

`zcap_event_MyShop_confirm_v1` > Expand all Object

More info: <https://studio.asyncapi.com/>

# Specify the Event Metadata with AsyncAPI

New Event Consumption Model

### Event Consumption Model

Create Event Consumption Model

Project: \* ZSK\_EN

Package: \* Z\_PURCHASE\_REQ\_000

Add to favorite packages

Name: ZEVTSOPH000 0001

Description: \* Event Consumption for CAP shop

Original Language: EN

Namespace / Prefix / Identifier: \*

<No namespace in package> / Z / EVTSHOP000

Event Specification File: \*

/Users/robertelijpe/Documents/AiE2209workspace/Documentation/asyncapi.cap\_online\_shop.json

Namespace and Prefix for objects to be generated:

Z

Select Event Types

Specify event types for event consumption

Event Type	Entity Name	Behavior Definition	Event Interface	Issue
zcap.event.MyShop.confirm.v1	Z_MyShop_confirm_v1	Z_MyShop_confirm_v1	ZIF_MYSHOP_CONFIRM_V1	

Define Consumer Artifacts

Specify consumer artifacts

Consumer Class: \* ZCL\_EVTSHOP000\_BASE

Consumer Extension Class: \* ZCL\_EVTSHOP000

Consumer Interface: \* ZIF\_EVTSHOP000\_HANDLER

ABAP Artifact Generation List

List of ABAP artifacts that are going to be generated

ABAP Artifact Name	Type
ZEVTSOPH000 0001	Event Consumption Model
ZEVTSOPH000_EEBC	Inbound Service
ID will be generated after creation	Authorization Default Values
ZCL_EVTSHOP000_BASE	Global Class
ZCL_EVTSHOP000	Global Class
ZIF_EVTSHOP000_HANDLER	Interface
ZIF_MYSHOP_CONFIRM_V1	Interface
Z_MYSHOP_CONFIRM_V1	Data Definition
Z_MyShop_confirm_v1	Behavior Definition

Event Consumption Model: ZEVTSOPH000 0001

Event Consumption Model

Consumer Class: \* ZCL\_EVTSHOP000

Event Types

Type: zcap.event.MyShop.confirm.v1

Entity Name: Z\_MyShop\_confirm\_v1

Edit...  
Simulate Consumption

# Create an Event Consumption Model

Event Consumption Models (1)	
ZEVTSOP000	0001 Event Consumption for CAP shop
Abstract Entities	
Z_MYSHOP_CONFIRM_V1	Z_MyShop_confirm_v1 generated
Inbound Services	
ZEVTSOP000_EEEC	
Behavior Definitions	
Z_MYSHOP_CONFIRM_V1	
Classes	
ZCL_EVTSHOP000	Generated extension class for ZCL_EVTSHOP000_BASE
ZCL_EVTSHOP000_BASE	Generated base class for ZEVTSOP000
Interfaces	
ZIF_EVTSHOP000_HANDLER	Generated handler interface for ZCL_EVTSHOP000_BASE
ZIF_MYSHOP_CONFIRM_V1	Generated event interface for ZCL_EVTSHOP000_BASE
Authorization Default Values	
F915D88932141EEDE261BD59DA0BBCHT	R3TR EEEC ZEVTSOP000 0001

# Generate RAP Artifacts

```

@EndUserText.label: 'Z_MyShop_confirm_v1_F773 generated'
define root abstract entity Z_MyShop_confirm_v1_F773
{
    @Event.element.externalName: 'ordered_item'
    ordered_item : abap.strg;
    @Event.element.externalName: 'OrderUUID'
    OrderUUID : abap.raw( 16 );
    @Event.element.externalName: 'note'
    note : abap.strg;
    @Event.element.externalName: 'decision'
    decision : abap.strg;
}

```

Type in AsyncAPI File	Format in AsyncAPI File	Generated ABAP Type (abstract BDEF)
boolean		abap.boolean
integer	int8	abap.int1( 3 )
	int16	abap.int2( 5 )
	int32	abap.int4( 10 )
	int64	abap.int8( 19 )
	uint8	abap.int2( 5 )
number	decimal	abap.d34n( 34 )
	double	abap.fltp( 16, 16 )
	float	abap.fltp( 16, 16 )
		abap.strg
string	base64url	abap.rstr
	date	abap.dat( 8 )
	date-time	timestampl
	duration	abap.dec( 27, 12 )
	time	abap.tims( 6 )
	uri_reference	abap.strg
	uuid	abap.raw( 16 )

# Generate abstract entity of event data

```

► ZCL_EVTSHOP000 ►
1 CLASS zcl_evtshop000 DEFINITION
2 PUBLIC
3 INHERITING FROM zcl_evtshop000_base
4 FINAL
5 CREATE PUBLIC .
6
7 PUBLIC SECTION.
8
9 METHODS zif_evtshop000_handler~handle_myshop_confirm_v1
10   REDEFINITION .
11 PROTECTED SECTION.
12 PRIVATE SECTION.
13 ENDCLASS.|
```

14

```

15 CLASS zcl_evtshop000 IMPLEMENTATION.
16 METHOD zif_evtshop000_handler~handle_myshop_confirm_v1.
17   " Event Type: zcap.event.MyShop.confirm.v1
18   DATA business_evtdata  TYPE STRUCTURE FOR HIERARCHY Z_MyShop_confirm_v1.
19   DATA business_event_data TYPE Z_MyShop_confirm_v1.
20   DATA update_line      TYPE STRUCTURE FOR UPDATE zr_onlineshoptp_000\OnlineShop.
21   DATA update_lines     TYPE TABLE FOR UPDATE zr_onlineshoptp_000\OnlineShop.
22
23   business_evtdata = io_event->get_business_data( ).  

24   business_event_data = CORRESPONDING #( business_evtdata ).  

25
26   update_line->tky-OrderUUID = business_event_data-OrderUUID.  

27   update_line-OverallStatus = `Confirmed`.  

28   APPEND update_line TO update_lines.  

29
30   MODIFY ENTITIES OF zr_onlineshoptp_000
31     ENTITY OnlineShop
32       UPDATE
33         FIELDS ( OverallStatus )
34         WITH update_lines
35       REPORTED DATA(reported)
36       FAILED DATA(failed)
37       MAPPED DATA(mapped).
38
39 IF lines( failed-onlineshop ) > 0 .
40   ROLLBACK ENTITIES.
41   RETURN.
42 ENDIF.
43 COMMIT ENTITIES
44   RESPONSES FAILED FINAL(failed_late)
45   REPORTED FINAL(reported_late).
46 IF lines( failed_late ) > 0 .
47   LOOP AT failed_late ASSIGNING FIELD-SYMBOL(<failed_late>).
48
49 *           raise message based on error in reported_late.
50   ENDLOOP.
51   ROLLBACK ENTITIES.
52   RETURN.
53 ENDIF.
54 ENDMETHOD.
55 ENDCLASS.
```

[Global Class](#) | [Class-relevant Local Types](#) | [Local Types](#) | [Test Classes](#) | [Macros](#)

# Implement the logic of the event handler

New Instance or Subscription

1 Basic Info    2 Parameters    3 Review

Enter basic info for your instance or subscription.

Service • Event Mesh

Plan: default

I understand that enabling a service might result in costs, depending on the plan selected.  
See Services Catalog

Routine Environment: Cloud Foundry  
Space: dev  
Instance Name: EM\_NL4B\_S4H

Next > Create

The SAP BTP Cockpit interface shows the creation of a new instance named 'EM\_NL4B\_S4H'. The 'Basic Info' step is completed with the service set to 'Event Mesh', plan to 'default', and routine environment to 'Cloud Foundry' in space 'dev'. The instance name is 'EM\_NL4B\_S4H'. The 'Parameters' and 'Review' steps are shown below.

SAP BTP Cockpit

EM\_NL4B\_S4H

Plan Display Name: default  
Created On: 25 May 2023  
Changed On: 14 Nov 2023  
Service: Event Mesh  
Service Technical Name: enterprise-messaging  
Status: Created  
Scope: dev

Bound Applications (0) Service Keys (2) Labels (0)

Message Clients

EM\_NL4B\_S4H

Subdomain: dedoudou-n-2beudmr

Default Plan Subdomain: dedoudou-n-2beudmr

Message Clients

EM\_NL4B\_S4H

Subdomain: dedoudou-n-2beudmr

Default Plan Subdomain: dedoudou-n-2beudmr

Queues Management Messaging REST

Queue Name Messages Unacknowledged Messages Queue Size (bytes) Access Type Actions

n4b/EmNl4bS4h/S4hCapShopItemConfirmed 0 0 0 NON\_EXCLUSIVE

Queue Subscriptions

This queue can only subscribe to topics which follow the rules defined in the service descriptor

Queue Name: n4b/EmNl4bS4h/S4hCapShopItemConfirmed  
Topic: Enter a topic or topic pattern

Subscribed Topic Name Actions

n4b/EmNl4bS4h/S4hCapShopItemConfirmed/v1

Add Close

# Create a Message Client in Event Mesh

SAP Communication Arrangements

EM\_NL4B\_S4H\_IN

Scenario ID: SAP\_COM\_0092  
Scenario: Enterprise Eventing Integration

Changed By: Robert Eijpe  
Changed On: 05/17/2024, 19:10:36

Editing Status: Active

Edit Update by Service Key Display Changes Delete

### Common Data

Arrangement Name: EM\_NL4B\_S4H\_IN Own SAP Cloud System: OM5ATS9

Communication System: \* EM\_NL4B\_S4H\_IN Display API-URL: https://my408401-api.s4hana.cloud.sap

### Additional Properties

Property Name	Property Value
Channel	EM_NL4B_S4H_IN
Description	Channel EM_NL4B_S4H_IN for Enterprise Event Enablement
Topic Space	nl4b/EmNL4bS4h/S4H
QoS	1
Reconnect Attempts	0
Reconnect wait time(sec)	100

### Inbound Communication

User Name: \* EM\_NL4B\_S4H\_USER Authentication Method: User ID and Password

### Supported Authentication Methods

### Inbound Services

Service	Application Protocol	Service URL/Service Interface	WSDL/Service Metadata	Additional Properties
Discovery of Events	ODATA V2	https://my408401-api.s4hana.cloud.sap/sap/opu/odata/WXBE/BROWSER_SRV	<a href="#">Download</a>	

# Create a Communication Arrangement (SAP\_COM\_0092) to connect to Event Mesh

Communication Scenario: Z\_EVTSHOP\_COM\_000

General

Communication Scenario Type: \* Customer Managed

Allowed Instances: \* One instance per scenario & communication system

Status: Unpublished

Additional Properties

Property Name Default Value Data Element Is Multiple Is Secure Is Hidden Value Help

<Enter new value>

Communication Scenario: Z\_EVTSHOP\_COM\_000

Inbound Settings

Supported Authentication Methods

Basic  X.509  OAuth 2.0

Inbound Services

Add... Remove

type filter text

Number	Inbound Service ID
0001	ZEVTS000_EEEC

Inbound Service

Inbound ID: 0001 Service Type: Event Consumer

New Inbound Service

General Attributes

Enter the general attributes for the new inbound service

Inbound ID: 0001  
Inbound Service ID: \* ZEVTS000\_EEEC Browse  
Service Type: Event Consumer

Name: Generated Inbound Service for ZEVTS000

Finish

Publish Locally

Publish Locally

# Create a Communication Scenario Artifact for inbound event service

**Z\_EVTSHOP\_COM\_000**

Scenario ID: Z\_EVTSHOP\_COM\_000      Changed By: Robert Eijpe      Changed On: 01/22/2024, 20:30:49      Editing Status: Active

**Common Data**

Arrangement Name:	Z_EVTSHOP_COM_000	Own SAP Cloud System:	0M5ATS9
Communication System:	S4H_INBOUND_EVENT	API-URL:	https://my408401-api.s4hana.cloud.sap

**Inbound Communication**

User Name:	EM_NL4B_S4H_USER	Authentication Method:	...
------------	------------------	------------------------	-----

**Inbound Services**

Service	Application Protocol	Active	Service URL/Service Interface
Generated Inbound Service for ZEVTS...001	Event Consumer	✓	

**New Communication Arrangement**

Scenario: \*  
Z\_EVTSHOP\_COM\_000

Arrangement Name:  
Z\_EVTSHOP\_COM\_000

**Create** **Cancel**

**Communication System**

S4H\_INBOUND\_EVENT  
S4H\_INBOUND\_EVENT

Changed By: Robert Eijpe      Editing Status: Active  
Changed On: 01/22/2024, 20:19

**General** **Users for Inbound Communication** **Communication Arrangements**

**General Data**

System ID:	S4H_INBOUND_EVENT	Contact Person Name:	
System Name:	S4H_INBOUND_EVENT	E-Mail:	
Notes:		Phone Number:	

**Technical Data**

**General**

Logical System:	Business System:
Inbound Only:	

**OAuth 2.0 Settings**

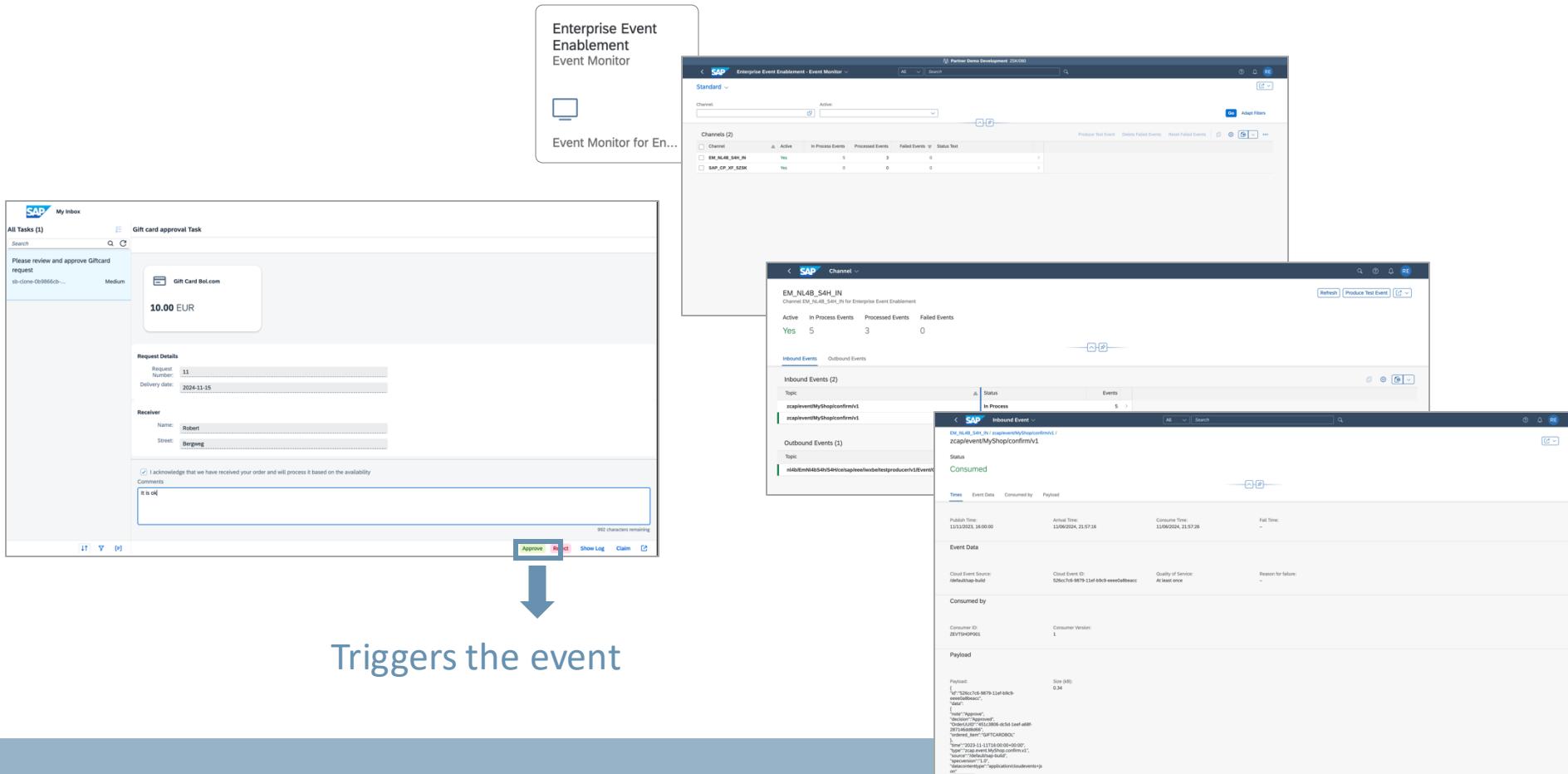
**Inbound OAuth 2.0 Client Settings**

Client Redirect URI Type:	<input checked="" type="radio"/> Standard <input type="radio"/> Loopback
Client Redirect URIs:	

**Event Exchange Infrastructure**

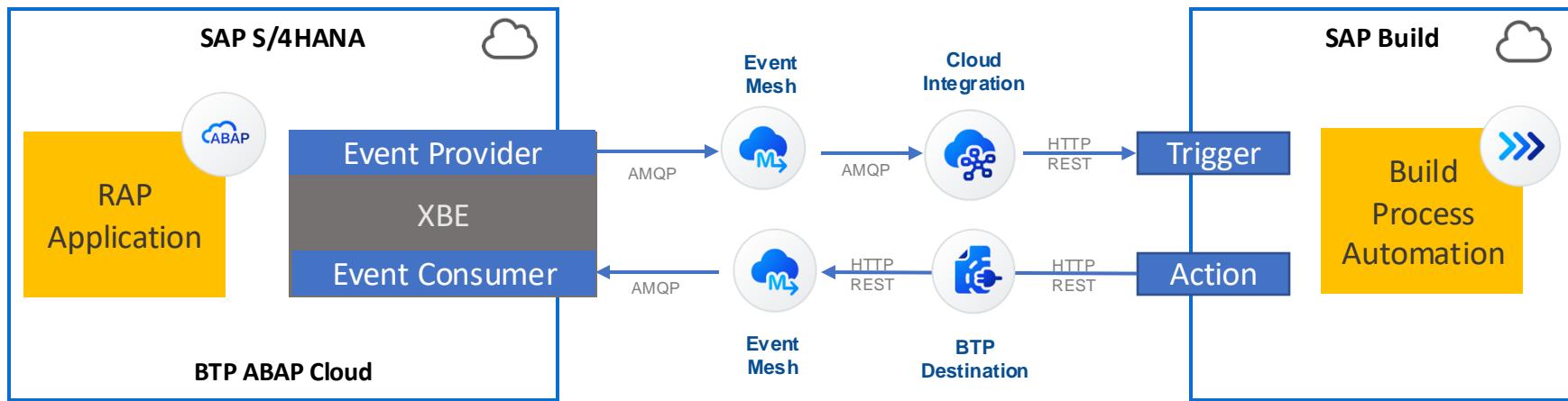
Event Channel:	EM_NL4B_S4H_IN	Communication Scenario ID:	SAP_COM_0092	Communication Scenario Description:	Enterprise Eventing Integration
----------------	----------------	----------------------------	--------------	-------------------------------------	---------------------------------

# Create a Communication Arrangement of created Communication Scenario



# Trigger an event and monitor

# SEE IT IN ACTION



Demo

## Lessons learned...

- Developing and adopting SAP Events is still in progress
  - Many SAP Business Objects do not support local event handlers and are unavailable for event extensibility.
  - Due to understanding the AsyncApi specification and data type mapping, inbound RAP events are complex in the beginning. Only AsyncApi version 1 is currently supported.
- Building your own RAP outbound events and local event handlers is very easy.
- Commits in Local RAP Event handlers can only be supported by uncontrolled bgPF
- Eventing is an easy way to exchange data between CAP and RAP applications.
- Interaction with SAP Build Process Information for Custom events needs some additional work.

## My Experiences

## More info...

- Blog **CloudEvents at SAP** from Antonio Maradiaga
- A lot of sessions at **SAP Devtoberfest 2024**
- **Tutorial** at SAP Community
- Youtube: **Extending SAP S/4HANA Cloud events with RAP and event filtering** plus dynamic topics in S4HC
- YouTube: What's New in the **ABAP RESTful Application Programming Model** (RAP)?
- SAP **Help**

Extend your knowledge



Extend your knowledge

## Take away points

- Event-Driven Architecture (EDA) is the future
- Implementing an EDA needs a good design.
  - Notification versus Data events
- Handling and monitoring of events is different from traditional integration.
- Events and API belong together.
- SAP only supports AsyncAPI version 1.0 to describe the event metadata



NL for Business

Intelligent Enterprises runs better and faster

Thank you



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Architect for SAP  
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