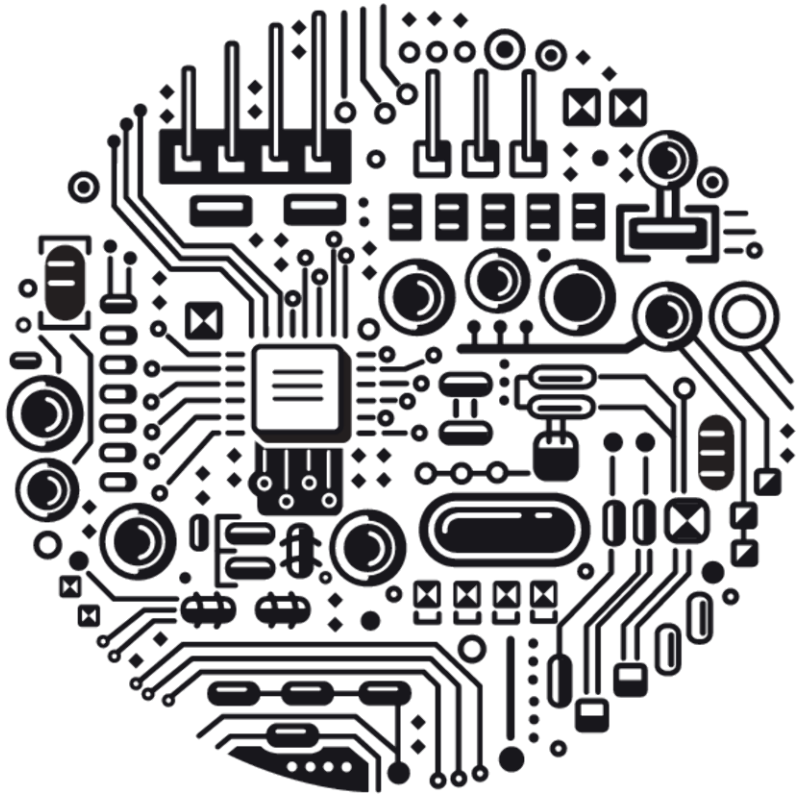
Deloitte.



SAP Cloud Platform – Enabling the IT Strategy & Use Case Demo

Harald Ahorner

Agenda

Topic
1. Introduction to SAP Cloud Platform
2. Integration Pattern
3. Extensibility Pattern
4. User Experience Pattern

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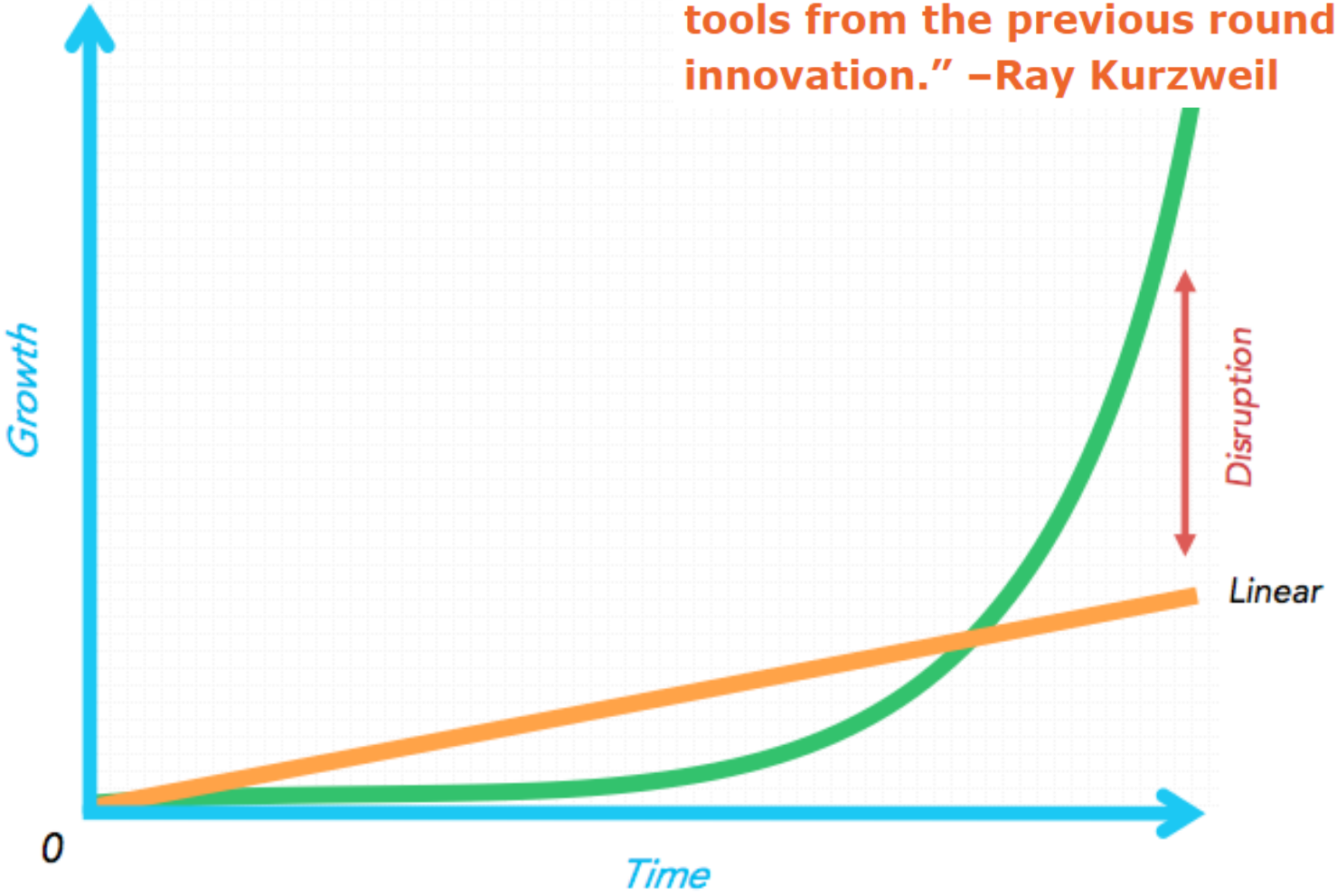
Exponential Growth

"Technology goes beyond mere tool making; it is a process of creating ever more powerful technology using the tools from the previous round of innovation." –Ray Kurzweil

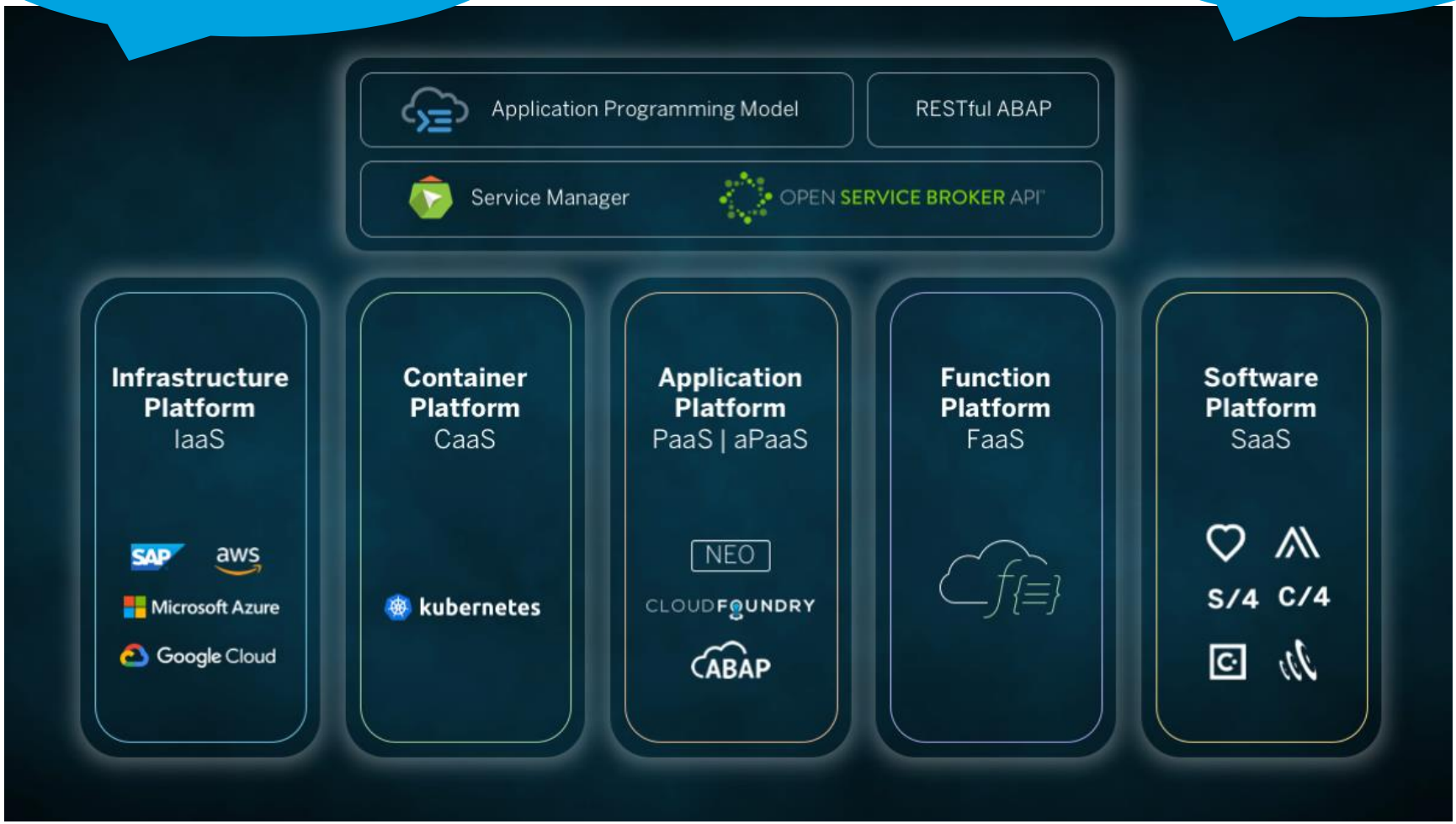


https://su.org/concepts/

Digital Platform – SAP Cloud Platform

- **Integration**
- **Extension**
- **Building new cloud apps**
- **Providing a consistent UX**

Data is currently silos
Take control - via internal and external integration



From Matthias Steiner: https://blogs.sap.com/2018/10/02/how-sap-cloud-platform-powers-the-intelligent-enterprise-part-2/

Agenda

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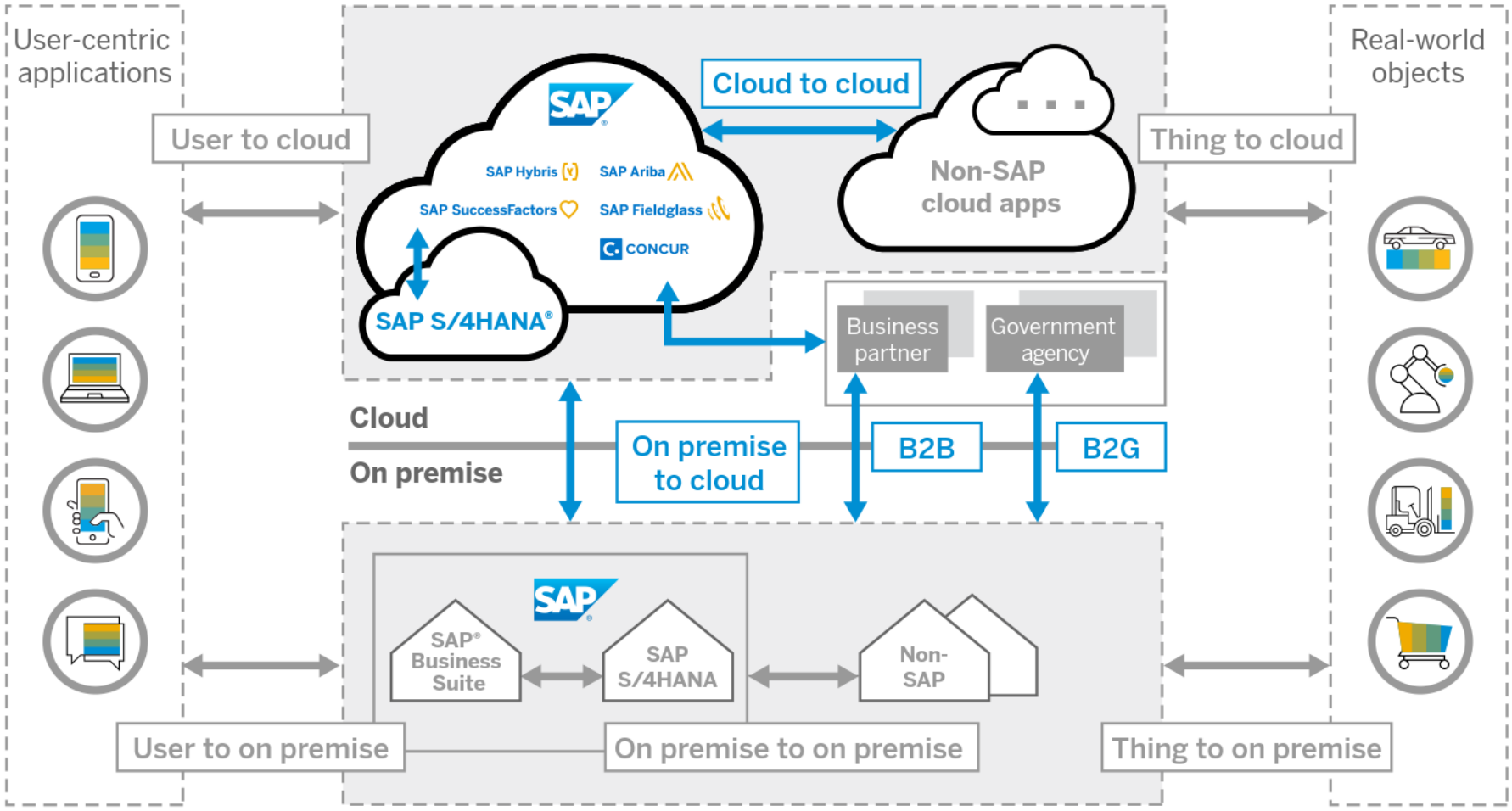
Integration Domains

Integration: A Key Customer Requirement



B2B = business to business, B2G = business to government

Integration Design Principles

Integration scenarios	SAP-managed	SAP Best Practices	Customer-driven
Scenario characteristics	▪ **SAP cloud to SAP cloud** pre-delivered ▪ Upgrades managed by SAP	▪ **SAP-verified content** guaranties DIY implementation success ▪ Customer owns and manages their integration	▪ Based on **robust SAP-delivered APIs** ▪ Customer **owns and manages** the integration scenarios
Operated by	**SAP**	**Customer**	**Customer**
Created by	**Predefined & implemented by SAP**	**Predefined content by SAP Implemented by Customer**	**Developed by Customer**
Key benefits	**Maximum speed to value, lowest project risk**	**Low TCI / TCO**	**Highest flexibility**

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SAP Cloud Platform – Integration Pattern / IoT

DEMO

- **SAP Cloud Platform Services**
  - IoT MMS Neo
  - SAP Cloud Platform Integration
  - Cloud Connector
  - Fiori Launchpad / Fiori Dashboard
  - Destination Service
- **SAP ERP Business Suite EhP8**
  - PM Notifications
  - Functional Locations / Measuring Points
  - SAP Workflow

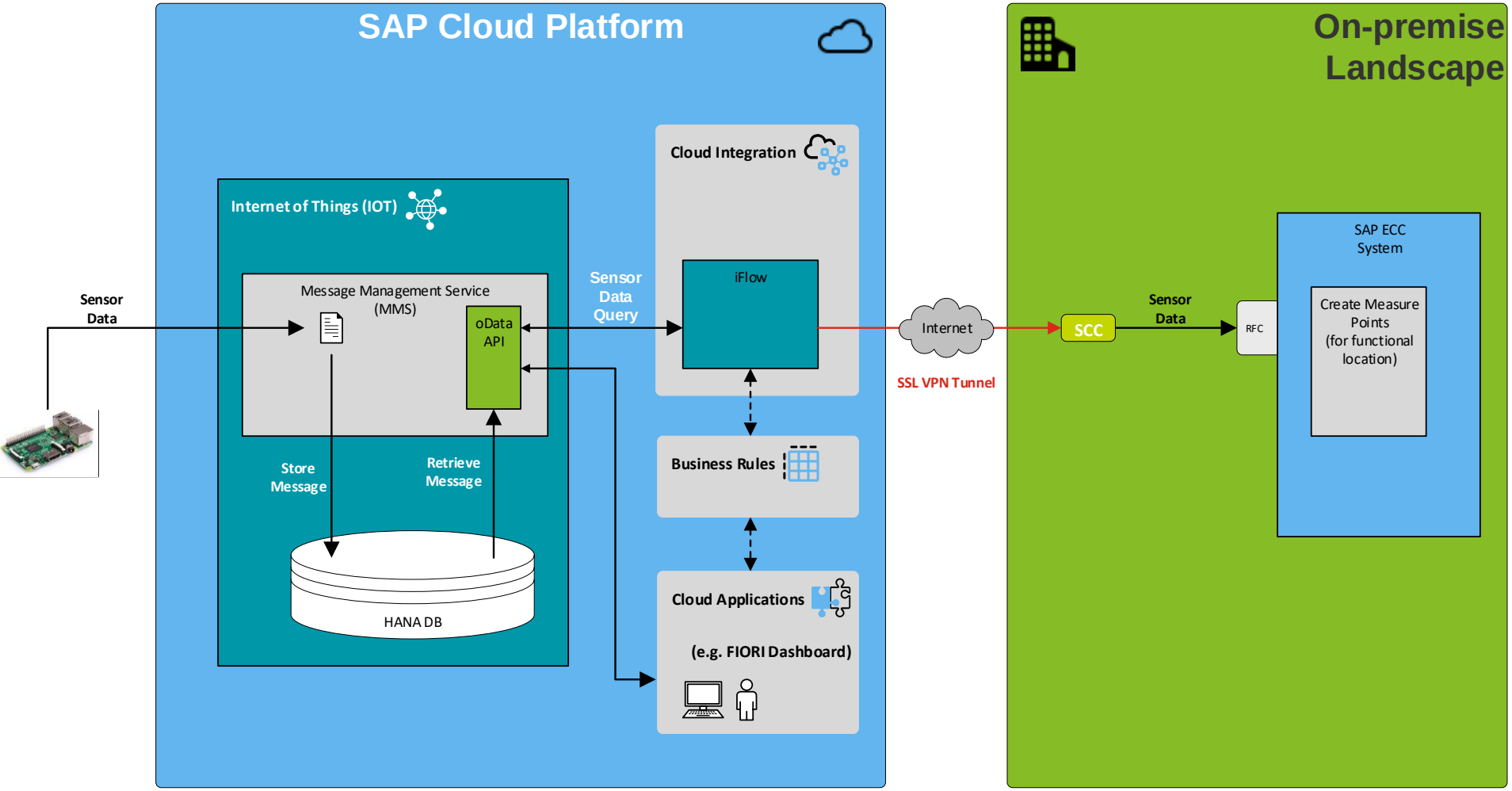
SAP Cloud Platform Integration / IoT

Scenario – Save the Mushrooms

Our mushrooms grow best in a humidity interval from 50% to 60%. If this interval is exceeded, a maintenance technician needs to be notified via e-mail and a PM notification created to check the incident.

SAP S/4HANA Cloud integration

Architecture



Starting Point – Raspberry PI with Sense Hat

```
url='https://iotmms' + scp_user + scp_host + '/com.sap.iotservices.mms/v1/api/http/data/' + str(device_id)
urllib3.disable_warnings()
sense = SenseHat()

sense.show_message('Reading sensor data...')
# do an infinite loop while sending sensor data
while True:
    temperature=sense.get_temperature()
    humidity=sense.get_humidity()
    timestamp=int(time.time())
    body1='{"mode":"sync", "messageType":"' + str(device_message_id) + '", "messages":[{"timestamp":' + '"' + str(timestamp)
    message_temp=http.urlopen('POST',url,body=body1,headers=headers)
    body2='{"mode":"sync", "messageType":"' + str(device_message_id) + '", "messages":[{"timestamp":' + '"' + str(timestamp)
    message_humid=http.urlopen('POST',url,body=body2,headers=headers)
    print(message_temp.data)
    print(message_humid.data)
    time.sleep(1)
```

IoT – MMS sensor data repository

Table | Chart

REFRESH Last updated on 8/21/2018, 11:15:00 PM

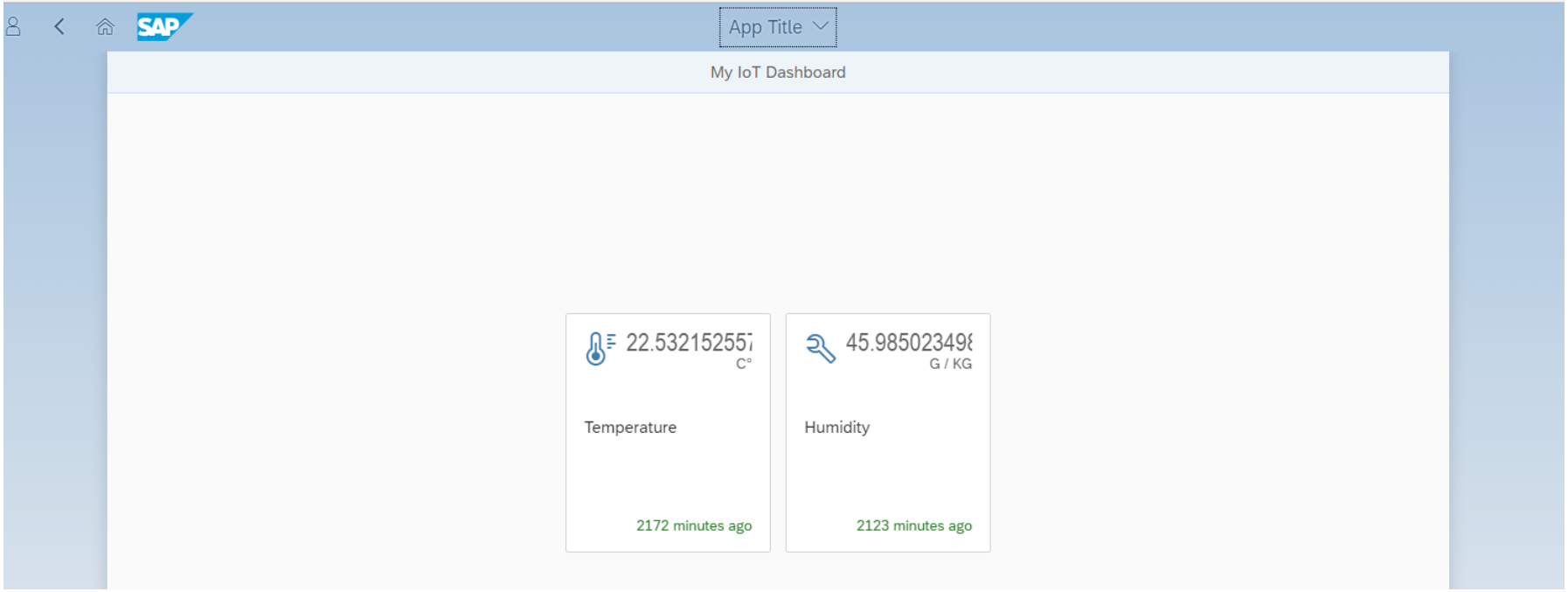
Table SYSTEM.T_IOT_92C501AA4A931FA71AAE
(50 row(s) out of 2717 loaded. Newest on top.)

OData API

G_DEVICE	G_CREATED	C_TIMESTAMP	C_SENSORTYPE	C_SENSORVALUE
05b9ff84-7d87-4df6-b3db-ca886c1054f1	Mon Aug 20 2018 12:03:41 GMT+1200 (New Zealand Standard Time)	Mon Aug 20 2018 12:03:36 GMT+1200 (New Zealand Standard Time)	humidity	45.985023498535156
05b9ff84-7d87-4df6-b3db-ca886c1054f1	Mon Aug 20 2018 12:03:36 GMT+1200 (New Zealand Standard Time)	Mon Aug 20 2018 12:03:31 GMT+1200 (New Zealand Standard Time)	humidity	47.736854553222656
05b9ff84-7d87-4df6-b3db-ca886c1054f1	Mon Aug 20 2018 12:03:31 GMT+1200 (New Zealand Standard Time)	Mon Aug 20 2018 12:03:30 GMT+1200 (New Zealand Standard Time)	humidity	46.484214782714844

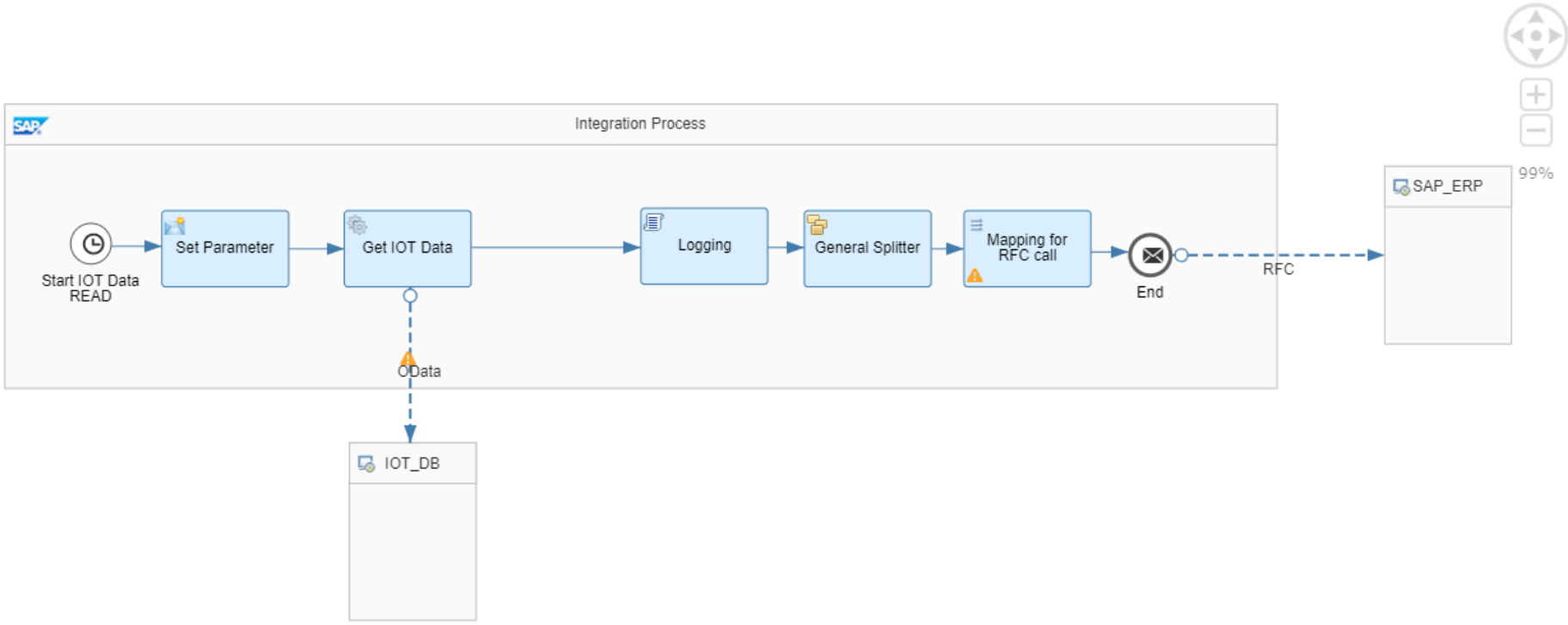
Fiori Launch Pad in SAP Cloud Platform

Dash Board leveraging real time info



Cloud Platform Integration Scenario

Integration flow



Cloud Platform Integration Scenario

RFC Function Module to create Measuring Documents

Function Builder: Display ZPM_SENSORDATA_INBOUND_RFC

Pattern | Pretty Printer | Function Module Documentation | Text elements

Function module: ZPM_SENSORDATA_INBOUND_RFC — Active

Attributes | Import | Export | Changing | Tables | Exceptions | Source code

```
1  FUNCTION zpm_sensordata_inbound_rfc.
2  *"----------------------------------------------------------------------
3  *"*"Local Interface:
4  *"  IMPORTING
5  *"     VALUE(SENSOR_READING) TYPE  ZPM_SENSOR_READING
6  *"  EXPORTING
7  *"     VALUE(MESSAGES) TYPE  BAPIRET2_T
8  *"----------------------------------------------------------------------
9    TRY.
10       DATA(lo_api) = zcl_pm_sensor_api=>get_instance( ).
11       lo_api->process_reading( sensor_reading ).
12       messages = lo_api->get_messages( ).
13     CATCH zcx_pm_sensor_bus INTO DATA(lo_bus_ex). "catch business exceptions and set message
14       messages = lo_bus_ex->get_message( ).
15     CATCH zcx_pm_sensor_tech INTO DATA(lo_tech_ex). "catch technical exceptions and set message
16       messages = lo_tech_ex->get_message( ).
17   ENDTRY.
18
19 ENDFUNCTION.
```

Structure: ZPM_SENSOR_READING — Active

Short Description: Sensor reading structure

Attributes | Components | Input Help/Check | Currency/quantity fields

Predefined Type — 1 / 4

Component	Typing Method	Component Type	Data Type	Length	Decim...	Short Description
DEVICE_ID	Types	ZDE_DEVICE_ID	CHAR	36	0	Sensor device ID
TIMESTAMP	Types	XSDDATETIME_Z	DEC	15	0	XSD Time (UTC): yyyy-mm-ddThh:mm:ssZ [ext.]
SENSORTYPE	Types	ZDE_SENSOR_TYPE	CHAR	20	0	Sensor Type
SENSORVALUE	Types	ZDE_SENSOR_VALUE	CHAR	20	0	Sensor Value

Plant Maintenance

Measuring Documents

Display Measurement Documents: Measurement Document List

Measurement Document | Measuring Point

S	Measurement document	Measuring point	Date	Meas/TotCountrRdg	Unit	Text
	830	22	19.08.2018	64.9079	g/kg	
	829	22	19.08.2018	71.8532	g/kg	
	828	22	19.08.2018	82.0573	g/kg	
	827	22	19.08.2018	66.8675	g/kg	
	826	22	19.08.2018	65.9373	g/kg	
	825	22	19.08.2018	64.4273	g/kg	

PM Notification

Change PM Notification: Maintenance Request

Partner

Notification: 10000677 | M1 | Mushroom Farm Humidity 66 GKG

Notific. Status: OSNO

Order:

Notification | Reference object | Malfunction, breakdown | Location data | Scheduling overview | Items | Tasks | Activities

Reference object

Functional loc.: CL1-C001-0001 — Mushroom Farm 001

Equipment:

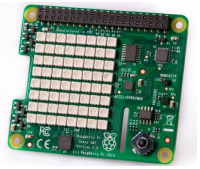
Assembly:

Subject

Coding:

Description: Mushroom Farm Humidity 66 GKG

Plant Maintenance



Measuring Points within a functional location

Measuring Points Edit Goto Extras Environment System Help

Display Measuring Point: General Data

Additional Data... MeasDocuments Last Measurement Document...

Measuring point	22	Cat. M	MeasPoint (general)
MeasPosition	HUMIDITY		
Description	Humidity Sensor		
Functional Loc.	CL1-C001-0001		
Description	Mushroom Farm 001		

Additional Data

Measurement Range Limits

Upper range limit	60.0000	
Lower range limit	50.0000	
MeasurmntRangeUnit	g/kg	Gram/kilogram

Transmission of Measurement and Counter Readings

Transfer supported

Workflow Log

View: WF Chronicle | View: Workflow Agents | View: Workflow Objects

Workflow and task	Details	Graphic	Agent	Status	Result	Date	Time
Approve PM Notification 10000630				Completed	Workflow started	22.08.2...	12:40...
• Generate object instance using key				Completed		22.08.2...	12:40...
• Maintenance Notification 10000630				Completed	Mail sent	22.08.2...	12:40...

Agenda

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1. Introduction to exponential growth
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Decoupled Extensions – a mind shift

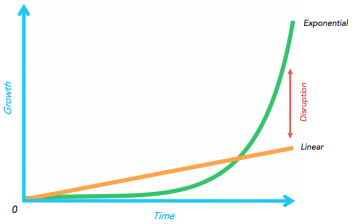
Tight Integration

Access to Source Code

Infrastructure

Change Management

Gets superseded by

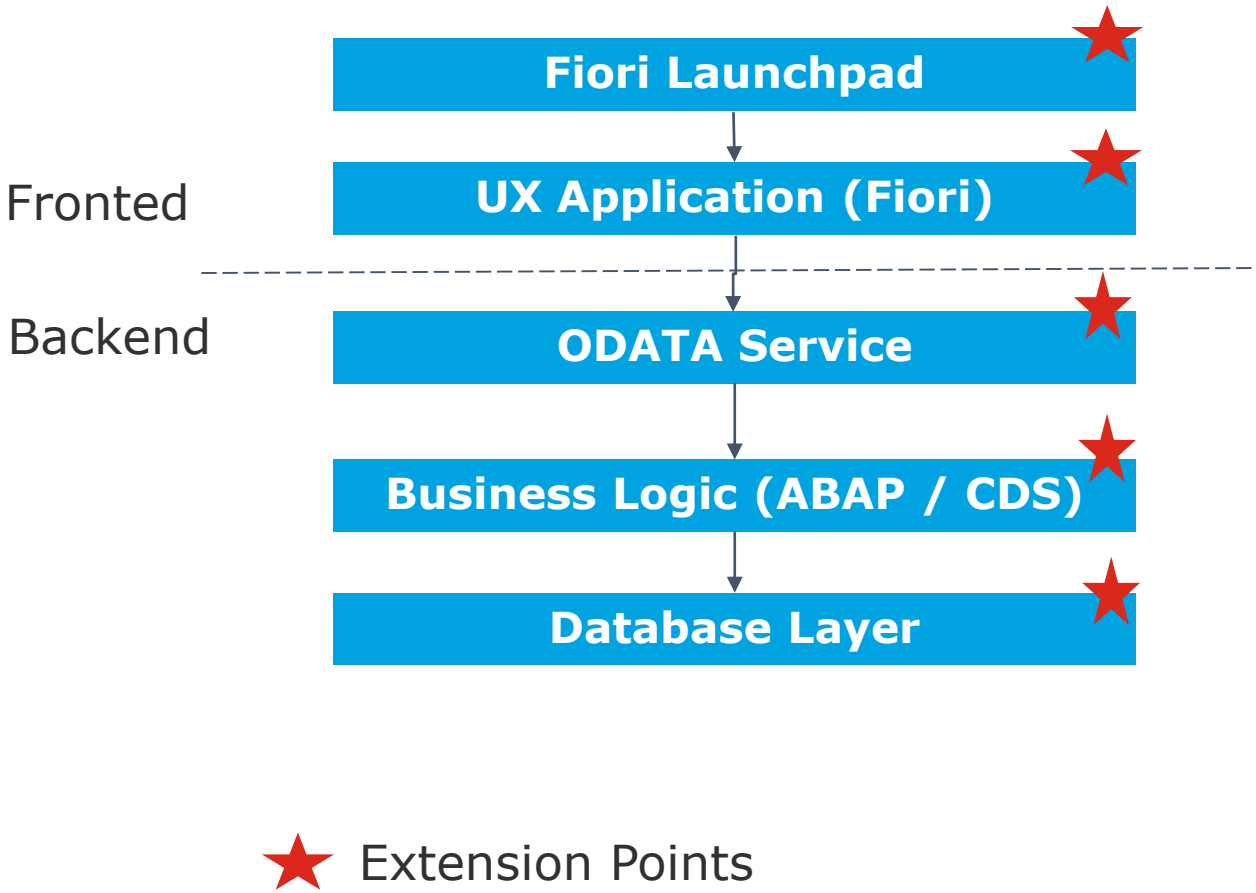


Principle of the least knowledge

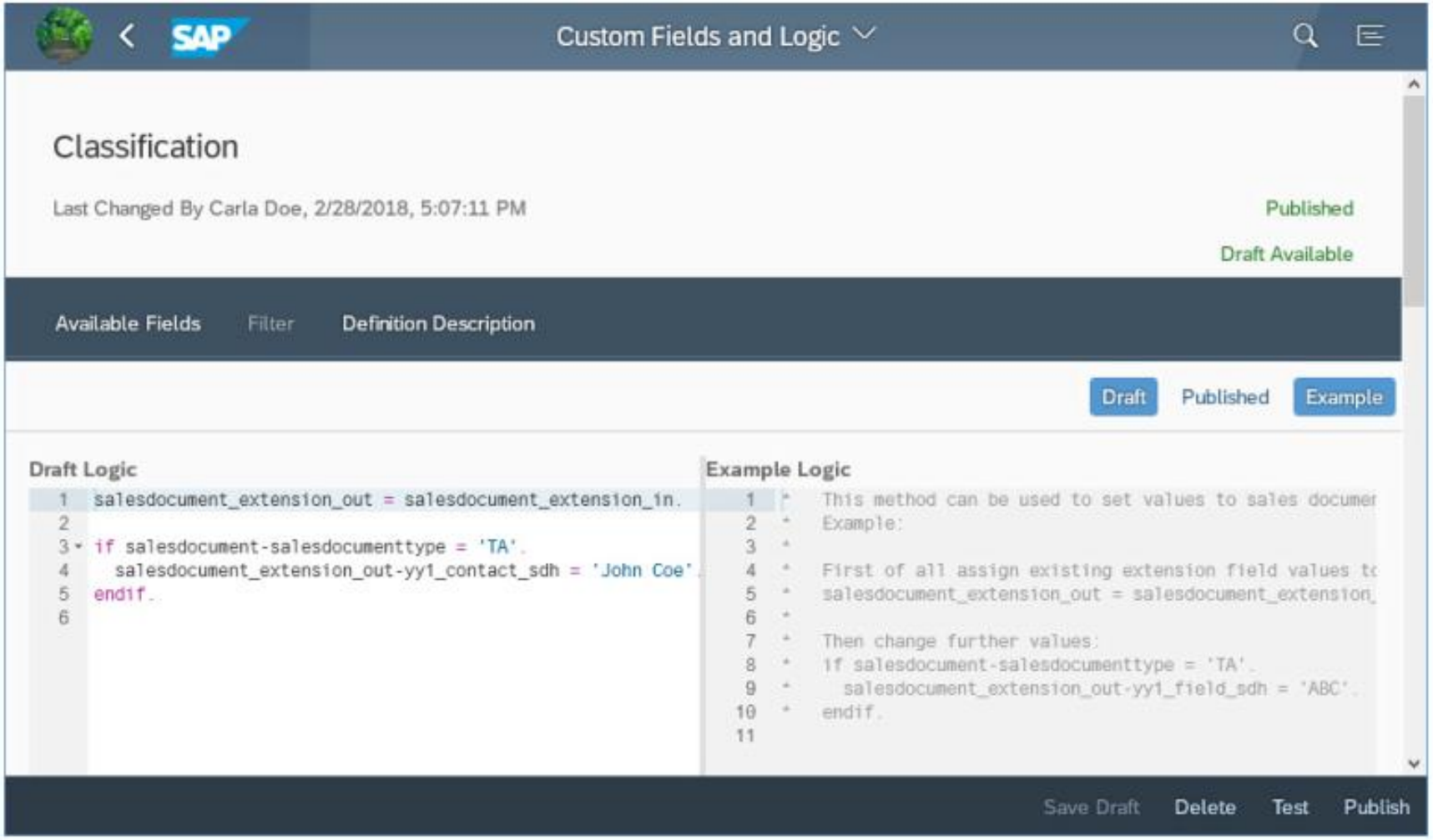
In-App Extensibility

Side by Side Extensibility

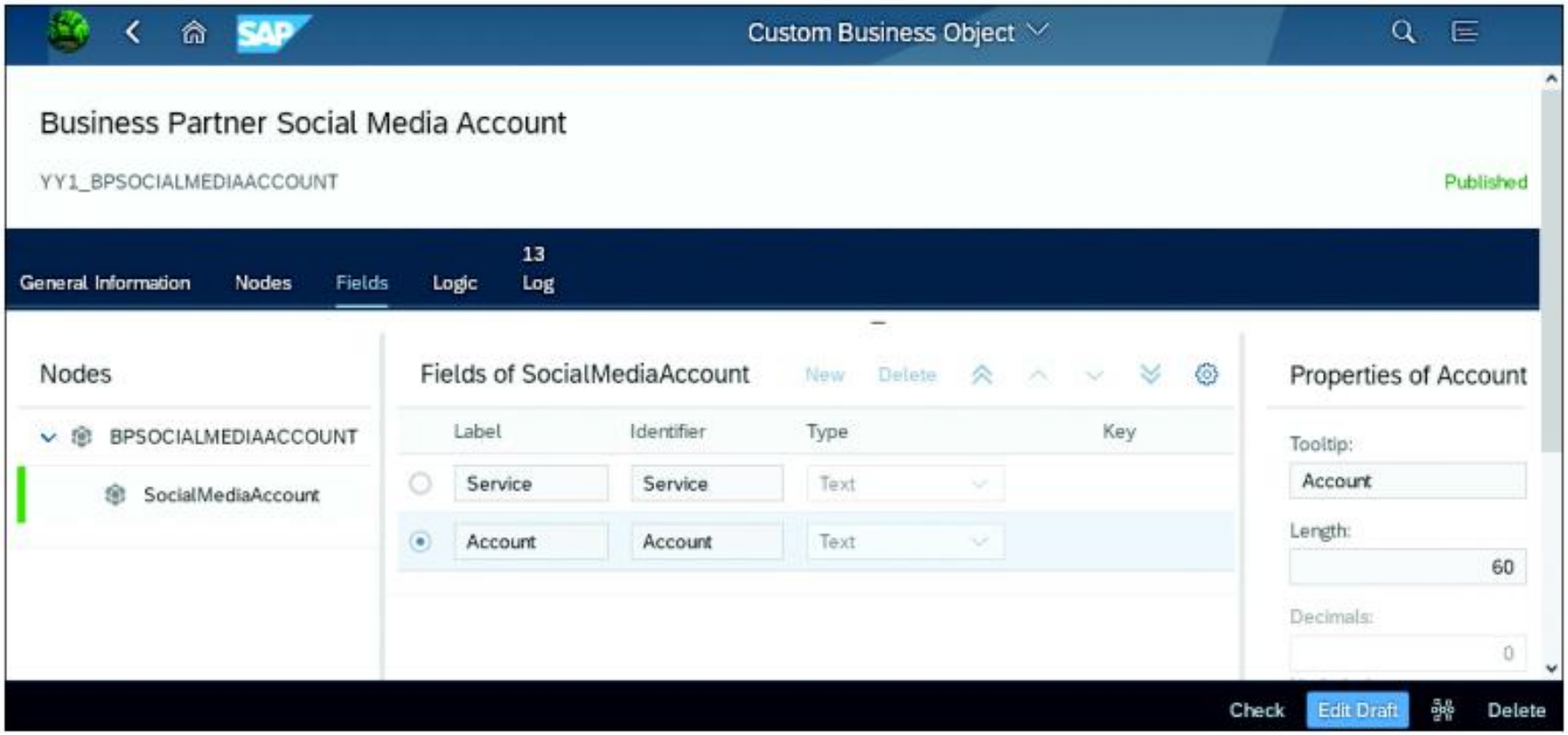
In-App Extensibility Overview



In-App Extensibility – Enhancement Spots with ABAP WebEditor S/4 Public Cloud

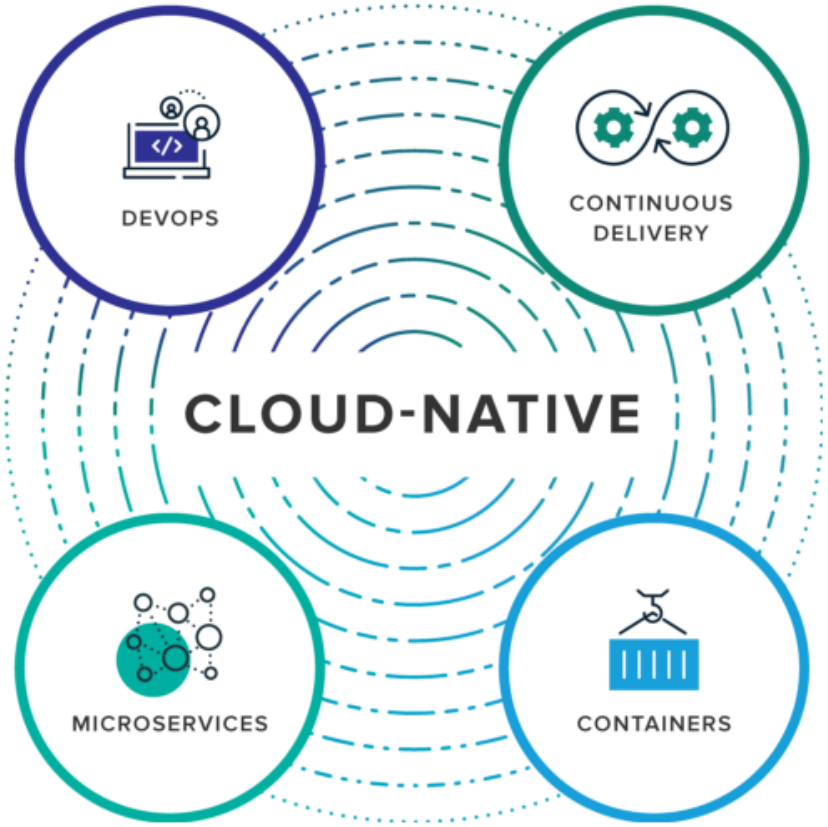


In-App Extensibility – Custom Business Objects
S/4 Public Cloud



Side by Side Extensibility

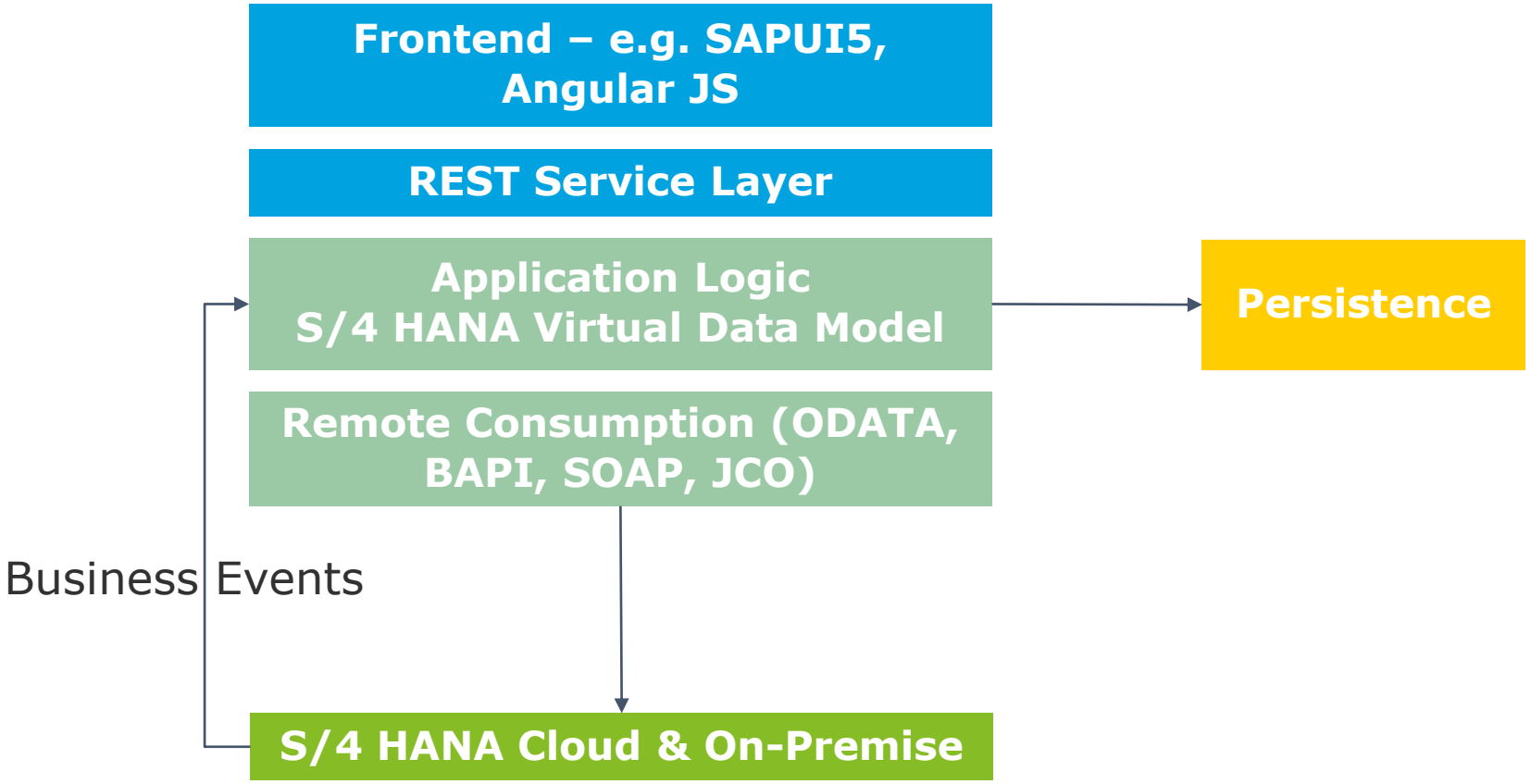
Motivation -> building cloud native application



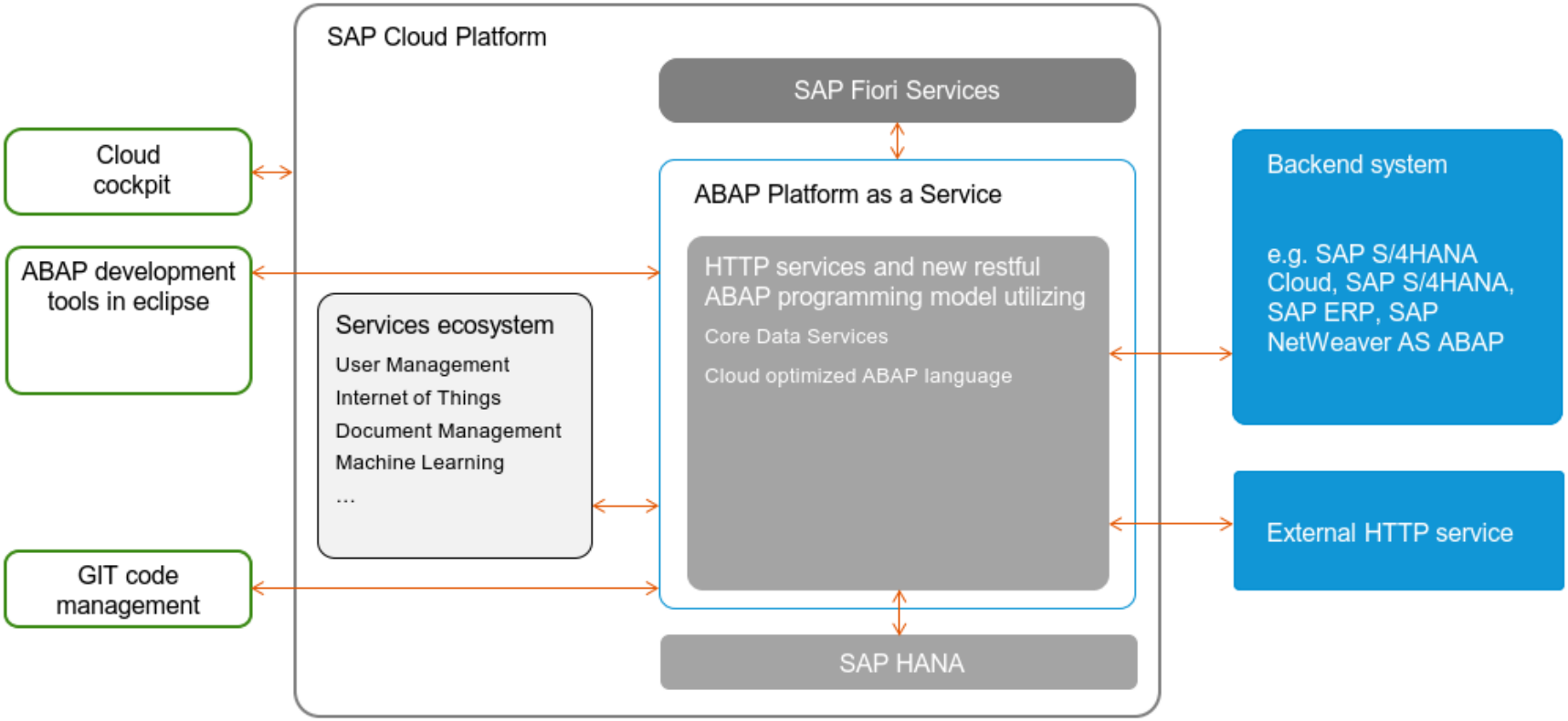
https://pivotal.io/cloud-native

Java Based Side by Side Application Architecture

S/4 HANA Cloud SDK



ABAP PaaS - Architecture



Side By Side Extensibility

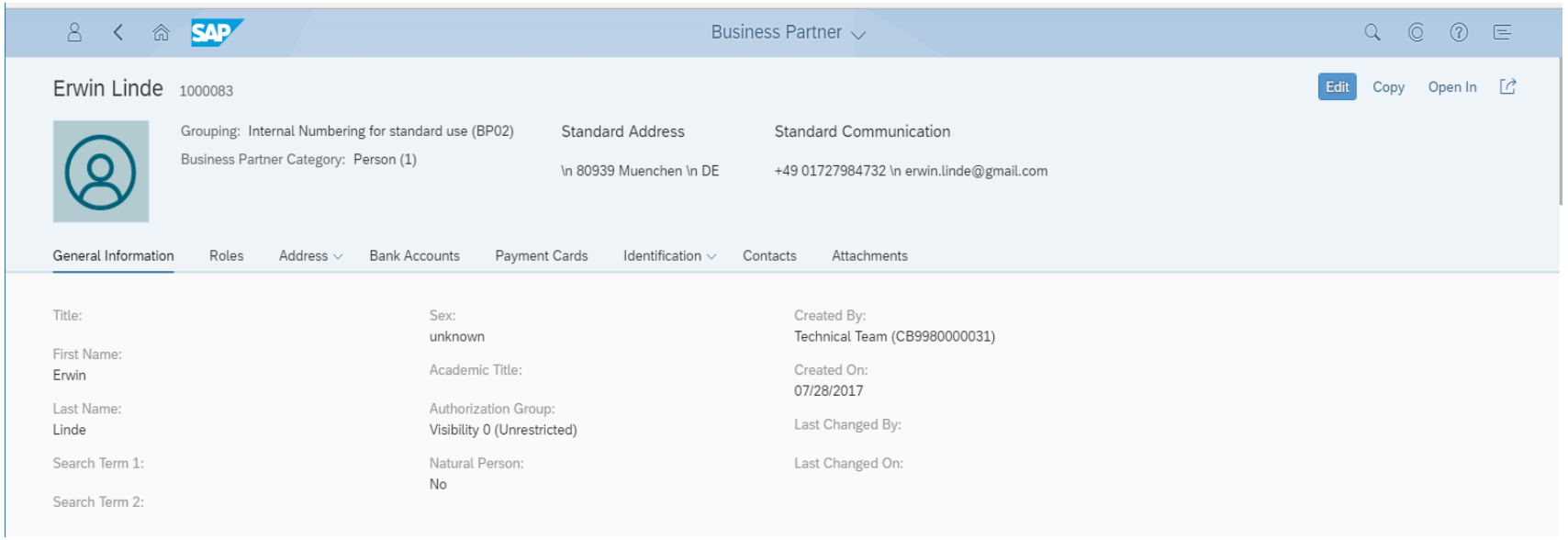
DEMO

- **SAP Cloud Platform Services**
  - Cloud Foundry
  - SAP S/4 HANA Cloud SDK
  - Destination Service
- **SAP S/4 Public Cloud Instance**
  - Business Partners API

Side By Side Extensibility

Scenario – New Business Partner Application

A new cloud native application needs to be developed to search and update business partner applications in a more simplified way. The application should be useable by non SAP users and easy to use with SAP Fiori technology.



Business Partner API – S/4 Public Cloud

https://myXXXXXX.s4hana.ondemand.com:443/sap/opu/odata/sap/API_BUSINESS_PARTNER/A_BusinessPartner('1000083')

```
<content type="application/xml">
    <m:properties>
        <d:BusinessPartner>1000083</d:BusinessPartner>
        <d:Customer/>
        <d:Supplier/>
        <d:AcademicTitle/>
        <d:AuthorizationGroup/>
        <d:BusinessPartnerCategory>1</d:BusinessPartnerCategory>
        <d:BusinessPartnerFullName>Erwin Linde</d:BusinessPartnerFullName>
        <d:BusinessPartnerGrouping>BP02</d:BusinessPartnerGrouping>
        <d:BusinessPartnerName>Erwin Linde</d:BusinessPartnerName>
        <d:BusinessPartnerUUID>00163e36-7e59-1ed7-9cf1-a5a1fb11a0bc</d:BusinessPartnerUUID>
        <d:CorrespondenceLanguage/>
        <d:CreatedByUser>CB9980000031</d:CreatedByUser>
        <d:CreationDate>2017-07-28T00:00:00</d:CreationDate>
        <d:CreationTime>PT12H06M25S</d:CreationTime>
        <d:FirstName>Erwin</d:FirstName>
```

https://api.sap.com/ ←API Business Hub

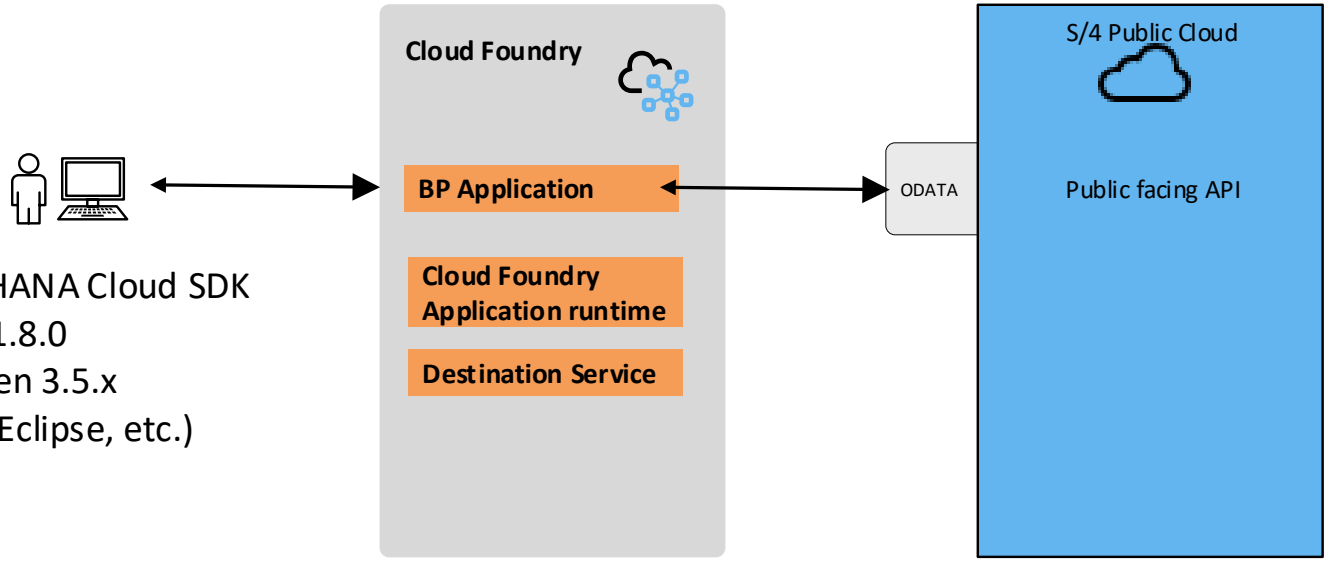
Business Partner – micro service (running on Cloud Foundry)

https://address-manager-quick-kudu.cfapps.eu10.hana.ondemand.com/api/business-partners?id=1000083

{"BusinessPartner":"1000083","CreationDate":1501200000000,"FirstName":"Erwin","IsFemale":false,"IsMale":false,"LastName":"Linde","to_BusinessPartnerAddress":[{"BusinessPartner":"1000083","AddressID":"26610","CityName":"Muenchen","Country":"DE","HouseNumber":"","PostalCode":"80939","StreetName":""}]}

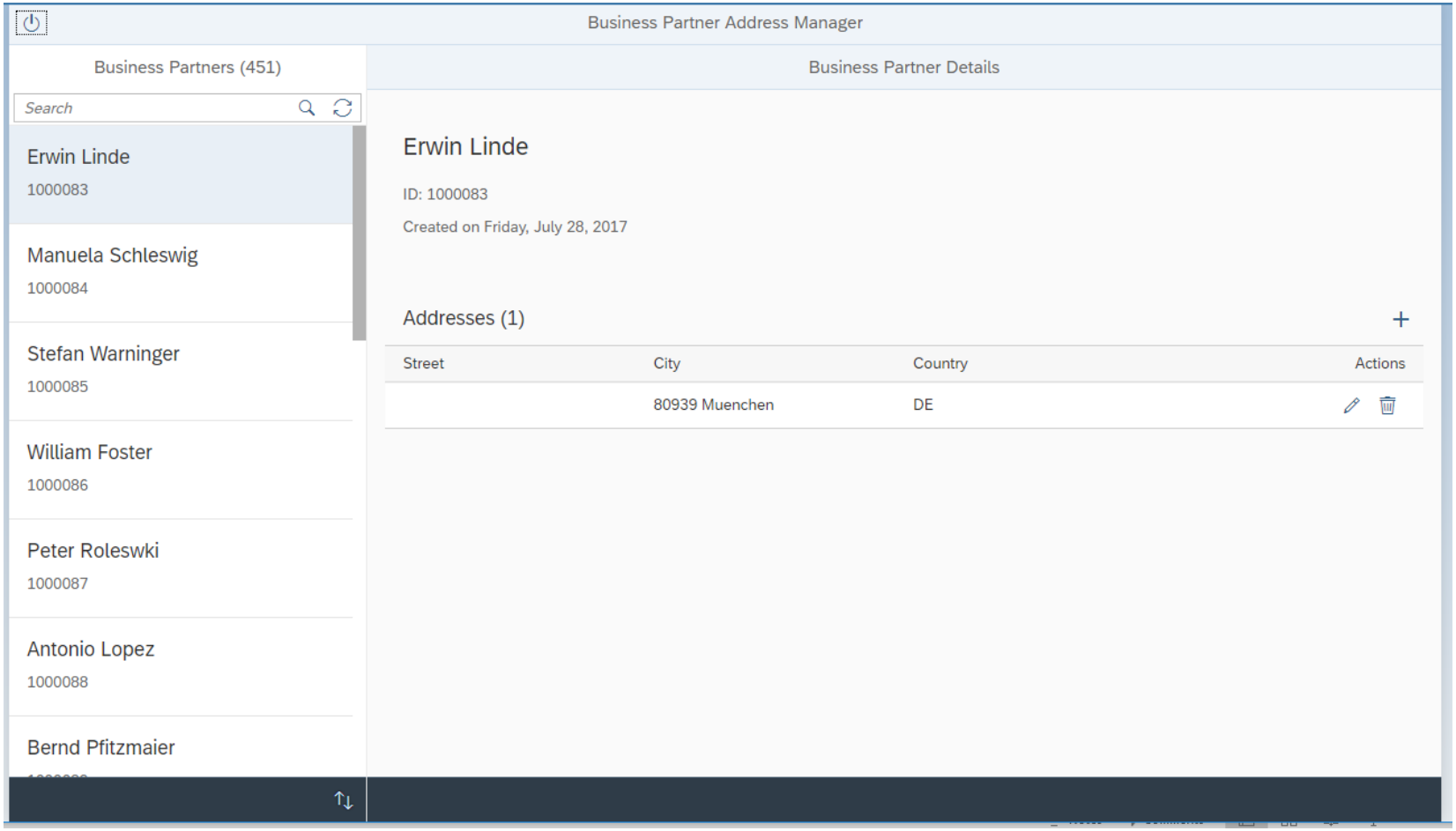
```
@WebServlet("/api/business-partners")
public class BusinessPartnerServlet extends HttpServlet {
    private static final long serialVersionUID = 1L;
    private static final Logger logger = CloudLoggerFactory.getLogger(BusinessPartnerServlet.class);

    private static final String CATEGORY_PERSON = "1";

    @Override
    protected void doGet(final HttpServletRequest request, final HttpServletResponse response)
            throws ServletException, IOException {
        final String id = request.getParameter("id");

        final String jsonResult;
        try {
            if (id == null) {
                final List<BusinessPartner> result = new DefaultBusinessPartnerService()
                        .getAllBusinessPartner()
                        .select(BusinessPartner.BUSINESS_PARTNER,
                                BusinessPartner.LAST_NAME,
                                BusinessPartner.FIRST_NAME)
                        .filter(BusinessPartner.BUSINESS_PARTNER_CATEGORY.eq(CATEGORY_PERSON))
                        .orderBy(BusinessPartner.LAST_NAME, Order.ASC)
                        .execute();
                jsonResult = new Gson().toJson(result);
            } else {
                final BusinessPartner result = new DefaultBusinessPartnerService()
                        .getBusinessPartnerByKey(id)
                        .select(BusinessPartner.BUSINESS_PARTNER,
                                BusinessPartner.LAST_NAME,
                                BusinessPartner.FIRST_NAME,
                                BusinessPartner.IS_MALE,
                                BusinessPartner.IS_FEMALE,
                                BusinessPartner.CREATION_DATE,
                                BusinessPartner.TO_BUSINESS_PARTNER_ADDRESS.select(
```

Business Partner API – S/4 Public Cloud



- S/4 HANA Cloud SDK
- JDK 1.8.0
- Maven 3.5.x
- IDE (Eclipse, etc.)

Business Partner application on Cloud Foundry



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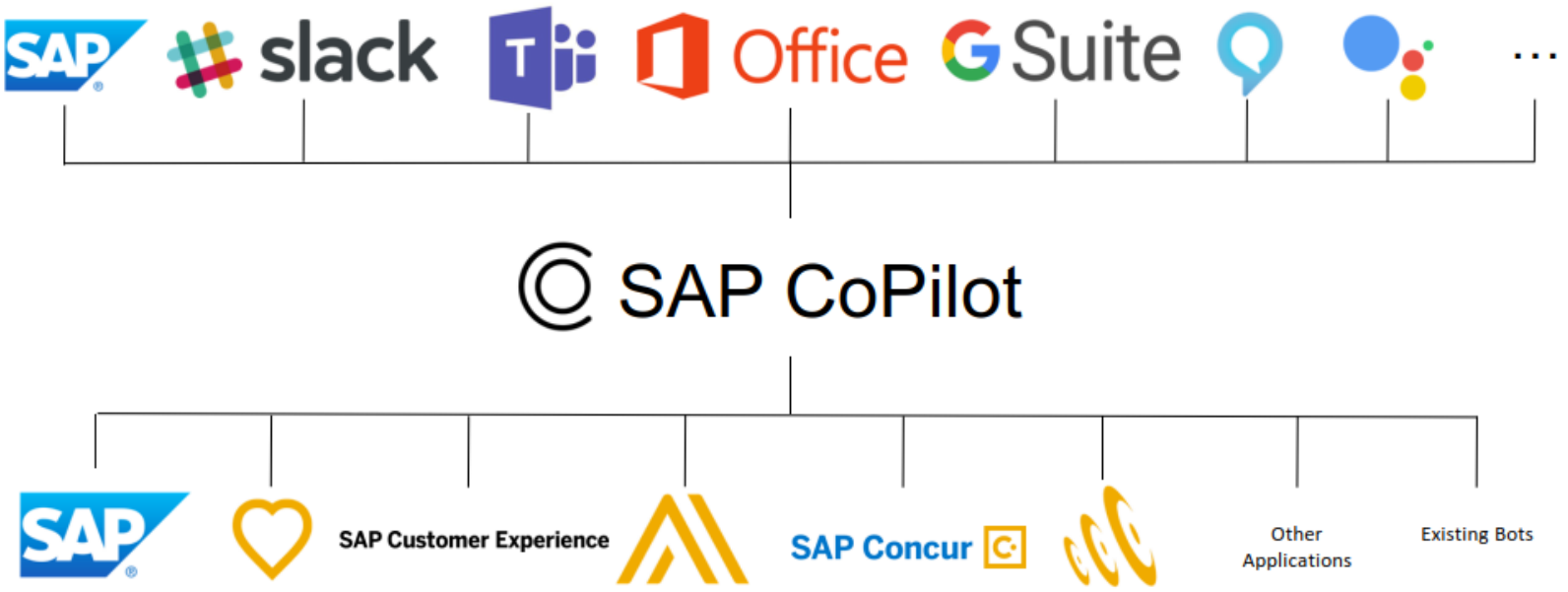
SAP CoPilot – Bot Integration Hub

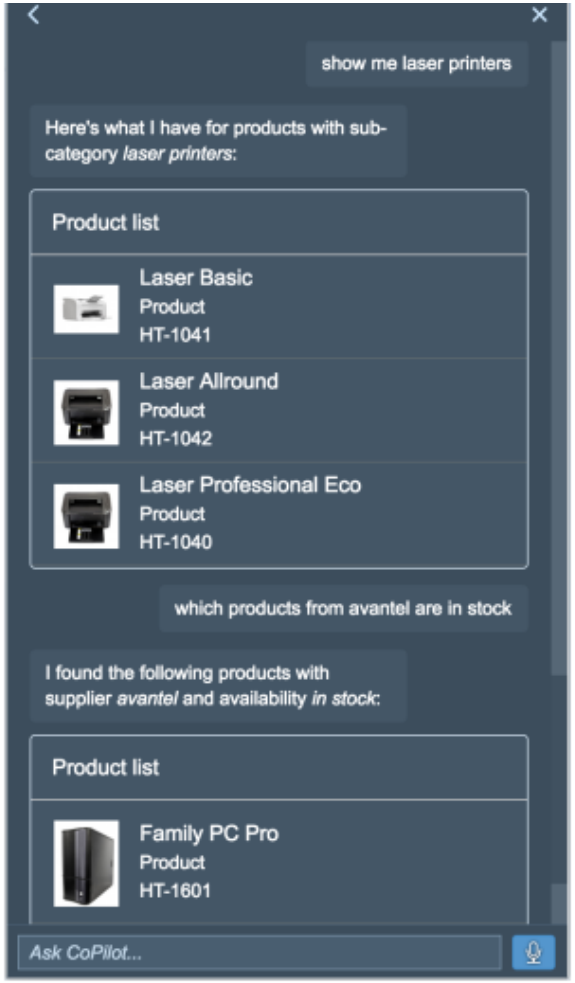


Enable natural language interaction for enterprise applications at scale

SAP CoPilot – Bot Integration

What is Natural Language Processing in SAP CoPilot?

- Query for business entities using various parameters
- Look up a specific business entity by name or id
- Retrieve the value of an attribute of a specific business entity
- Create simple new entities, including line items.
- Update entities
- Help on SAP CoPilot skills



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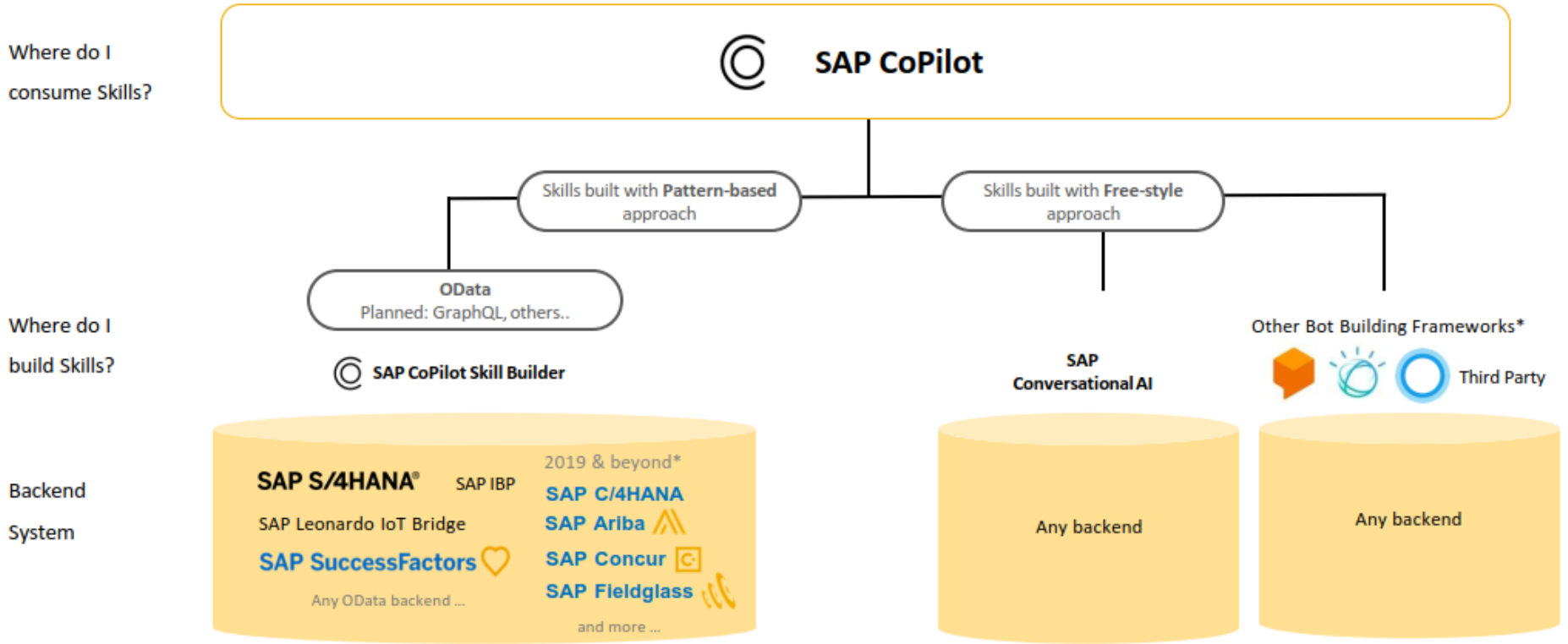
SAP CoPilot – Bot Integration Hub

Two approaches to build CoPilot skills: Pattern-based and Free-style



Side By Side Extensibility

DEMO

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  - SAP Co Pilot
- **SAP S/4 Public Cloud Instance**
  - Product API