



Adam Kiwon

# A Practical Guide to SAP® Cloud Integration

- ▶ Understand SAP's Cloud Middleware and the Integration Suite
- ▶ Configure standard integration content
- ▶ Quality aspects for a robust design
- ▶ Reference guide for integration patterns

# Table of Contents

<b>Foreword</b>	<b>7</b>
<b>1 Interface platforms</b>	<b>9</b>
<b>2 SAP Business Technology Platform</b>	<b>11</b>
2.1 Integration Platform as a Service	11
2.2 Deployment options	13
2.3 Data Services and Process Integration	14
2.4 Account cockpit	15
2.5 SAP CPI onboarding	16
<b>3 Interface development with SAP CPI</b>	<b>19</b>
3.1 Architecture	20
3.2 Integration content	26
3.3 Development process	36
3.4 Modularization	47
3.5 Error handling	50
3.6 Transportation	52
3.7 Security	57
3.8 Quality and integration excellence	67
<b>4 Integration patterns</b>	<b>69</b>
4.1 Events	69
4.2 Connectivity	72
4.3 Transformations	100
4.4 Calls	113
4.5 Routings	118
4.6 Persistence	125
4.7 Message security	129
4.8 Runtime variables	130
<b>5 Example scenario</b>	<b>133</b>
5.1 Overview	133
5.2 Implementation	134
5.3 Implementation of a variant	152

<b>6</b>	<b>Standard integration content</b>	<b>159</b>
6.1	Configuring interfaces	159
6.2	Updates	163
6.3	Enhancements	164
<b>7</b>	<b>Monitoring and operations</b>	<b>169</b>
7.1	Messages and artifacts	169
7.2	Alerting	172
7.3	Certificates and identities	173
7.4	Storage	174
7.5	Logs and traces	175
7.6	Eclipse	176
7.7	SAP Solution Manager and Focused Run	177
7.8	SAP Cloud ALM	178
<b>8</b>	<b>Additional topics</b>	<b>179</b>
8.1	B2B add-on	179
8.2	Partner Directory	180
8.3	Integration Advisor	181
8.4	Local deployment	182
8.5	API Management	187
8.6	Event Mesh	188
8.7	Open Connectors	189
8.8	Workflow and Business Rules	191
8.9	SAP partner add-ons	193
<b>9</b>	<b>Summary and outlook</b>	<b>195</b>
<b>A</b>	<b>The Author</b>	<b>199</b>
<b>B</b>	<b>Index</b>	<b>201</b>
<b>C</b>	<b>Disclaimer</b>	<b>204</b>

# 2 SAP Business Technology Platform

This chapter provides an overview of the main functions of the SAP Business Technology Platform with regard to integration, and explains basic concepts of management and commissioning.

SAP Business Technology Platform (SAP BTP)—previously known as SAP Cloud Platform until January 2021—represents SAP's *Platform as a Service (PaaS)*. This term is used to describe cloud services that enable the creation and operation of web applications. The various services offered are diverse and each takes on a specific task; for example, databases, development environments, document management, user interfaces (UIs) and integration functions. Services that are part of the integration functionality of a platform are called *Integration Platform as a Service (iPaaS)*.

## ! Name change

SAP Cloud Platform was renamed to SAP Business Technology Platform in January 2021. Note that several images in this book refer to SAP Cloud Platform. You will also find that a significant amount of documentation on the web still uses this product name.

## 2.1 Integration Platform as a Service

SAP's iPaaS currently includes the following services (and the offering is continuously evolving):

- ▶ API Management
- ▶ Cloud Integration (CPI)
- ▶ Connectivity Service
- ▶ Event Mesh (Enterprise Messaging)
- ▶ Integration Advisor
- ▶ Open Connectors
- ▶ SAP Data Intelligence
- ▶ SAP Edge Services
- ▶ SAP IoT

## ◀ Overview of SAP Business Technology Platform services

For further information about current services and their costs, please refer to: <https://discovery-center.cloud.sap/>.

Two different editions of SAP CPI are currently available: the Process Integration (PI) edition and the more comprehensive enterprise edition. The PI version includes three connections and ten gigabytes of bandwidth per production environment. One connection is an application, typically an IP address, through which messages are exchanged. Additional connections can be licensed, with additional costs. The enterprise edition, on the other hand, includes additional services (e.g., B2B adapter, covered in Section 8.1, and Enterprise Messaging, see Section 8.6) and is not limited in the number of connections.

Since 2019, SAP has been bundling these rather self-sufficient services under the term SAP Integration Suite (see Figure 2.1). The aim is to improve their coexistence and interaction and to make them easier to market.

SAP Integration Suite is currently licensed in three different editions, each providing a different number of environments:

- ▶ Basic—SAP CPI
- ▶ Standard—contains the Basic scope including:
  - ▶ JMS (see Section 4.2.20),
  - ▶ API Management (see Section 8.5),
  - ▶ Open Connectors (see Section 8.7)
  - ▶ Integration Advisor (see Section 8.3)
- ▶ Premium—contains the Standard edition including:
  - ▶ Alert Notification Service (see Section 3.3.3)
  - ▶ Transport Management Service (see Section 3.6.2)

## ◀ SAP CPI editions

An overview of the available editions can be found in the following SAP blog: <https://bit.ly/3fx5CND>.

Explore all our integration suite services that connect business processes and applications seamlessly on-premise or in the cloud below.

**Related use cases for the integration suite**

Explore real architecture diagrams of how customers built their environment along with guidance on what you need to get started.

[Explore our use cases](#)

**Resources for integration suite services**

Explore a breadth of helpful resources, including documents, videos, solution briefs and more to help you learn more about our services.

[Browse all resources](#)

**On this page**

- [Cloud Integration](#)
- [API Management](#)
- [Integration Advisor](#)
- [Open Connectors](#)
- [OData Provisioning](#)
- [Smart Data Integration](#)
- [Connectivity](#)
- [Internet of Things](#)
- [SAP Leonardo Internet of Things](#)

[Contact Us](#)

Figure 2.1: SAP Integration Suite

## 2.2 Deployment options

SAP currently differentiates between two types of data centers in which the iPaaS services are operated:

- ▶ Neo—SAP-owned data centers with proprietary provision and management
- ▶ *Cloud Foundry*—via the data centers of hyperscalers

Cloud Foundry is an open source PaaS used by various software vendors (e.g., SAP) and provided by infrastructure vendors (hyperscalers).

Hyperscalers, on the other hand, are service providers in the cloud environment, through which a multitude of systems and entire IT landscapes can be used by connecting thousands of servers in data centers. Among the better known are:

- ▶ Microsoft Azure
- ▶ Amazon Web Services (AWS)
- ▶ Google Cloud Platform
- ▶ Alibaba Cloud (Aliyun)

It should be noted that these hyperscalers operate their own platforms, which are often similar in terms of their respective functionality (databases, runtime environments and many other services). However, in the following sections we will only consider them as alternative data centers.

Some SAP Business Technology Platform (BTP) services exist exclusively in only one of the two environments.

While some SAP BTP services have existed in the Cloud Foundry from the very beginning, SAP CPI has only been available in this environment since 2019.

### SAP CPI trial in Cloud Foundry

For a free trial of this service, see: <https://www.sap.com/cmp/td/sap-cloud-platform-trial.html>.

However, the functionality of this trial version is still quite limited—certain adapters, transports, and APIs are missing. This is described in detail in SAP Note 2752867, at: <https://launchpad.support.sap.com/#/notes/2752867>.

## 2.3 Data Services and Process Integration

SAP CPI is offered via two different usage types or characteristics:

- ▶ Process Integration (PI)
- ▶ Data Services (DS)

CPI-PI is explained in detail in this book. It forms the SAP middleware for message-based and process-oriented integration in the cloud, while the *SAP Cloud Integration for Data Services* version takes the data perspective. The primary focus of Data Services is the replication of data—usually directly from database tables—via an ETL tool (Extract, Transform, Load). Currently, the primary integration scenario used by CPI-DS is SAP Integrated Business Planning (SAP IBP). Data from SAP ECC or SAP S/4HANA is loaded into the cloud via locally installed agents in order to supply the corresponding planning application with data and provide suitable functionalities.

## 2.4 Account cockpit

The central administration of services takes place in the account cockpit. It is accessed via <https://account.hana.ondemand.com> and you sign in with your S-User ID.

Every company that enters into a contract with SAP (e.g., buys or subscribes to an SAP CPI license) is assigned a global account. This is directly linked to the license and the term. To avoid a large number of global accounts, SAP recommends a consumption-based commercial model (see: <https://wiki.scn.sap.com/wiki/pages/viewpage.action?pageId=489198716>). This includes the Cloud Platform Enterprise Agreement (CPEA)—a subscription procedure using cloud credits—which is obtained to activate individual services without constantly creating new global accounts. Every service that is available under the SAP Business Technology Platform Service Description Guide and Agreement can be selected (see: <https://www.sap.com/about/agreements/policies/cloud-platform.html>). Each global account is assigned to exactly one region and, therefore, to one data center.

Within a global account, several subaccounts are created, which are typically assigned to one tenant. A tenant typically corresponds to exactly one virtual machine (VM) on which the services are deployed and executed at runtime. For each subaccount, you then activate the services that you want to use.

When using SAP CPI, it is recommended to use different tenants. Each environment (development, quality assurance, production) is assigned to one tenant. Figure 2.2 shows the individual tenants of a global account: DEV is the development environment, QA (quality assurance) is the test environment and PRD is the production system. The subaccounts contain their own Java runtime environment within a VM and a schema in a HANA database.

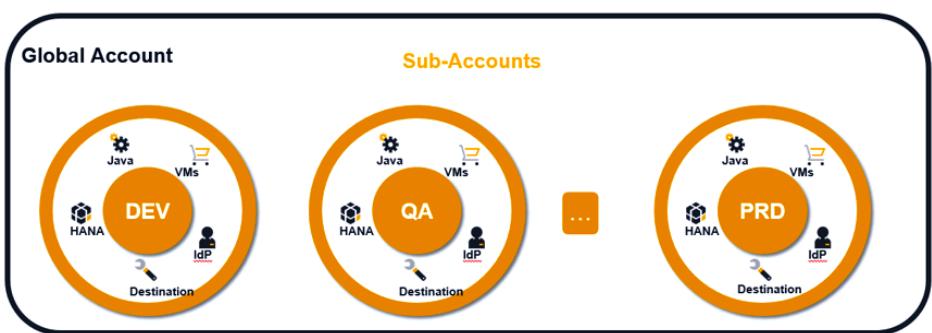


Figure 2.2: Global account and subaccounts

# B Index

## A

Account Cockpit 15  
  Global Account 15  
  Sub-Account 15  
  Tenant 15  
Adapter 72  
  Ariba 90  
  AS2 85  
  AS4 87  
Adapter Development Kit (ADK) 99  
Aggregator 124  
Alerting 172  
AMQP-Adapter 83  
Apache Camel 21  
Application-to-Application (A2A) 72  
Authentication methods 57  
Authorizations 62

## B

B2B Add-on 179  
B2B Business-to-Business 72  
B2G Business-to-Government 72  
Base64 110  
BPMN 36

## C

Calls 113  
Certificates 173  
Certificate-to-User-Mappings 173  
Connectivity-Tests 64  
Content Enricher 115  
Content Modifier 42, 104  
Converter 109  
CPI Content in SAP PO 183  
CPI Data Services 14

## D

Data Store 126  
Decoder 110  
Decryptor 129  
Deployment 40  
Design Guidelines 67

## E

Eclipse 176  
Elasticity 67  
Electronic Data Interchange (EDI) 72  
Elster-Adapter 97  
Encoder 110  
Encryptor 129  
Enhancement concept 164  
Enterprise Integration Patterns 21  
Events 69  
Exception Subprocess 50, 69  
Externalization of parameters 52

## F

Facebook-Adapter 98  
Filter 111

## G

Gateway 119  
Gather 120  
Groovy scripts 106

## H

High availability 67  
HTTP-Adapter 73

**I**

- IDoc-Adapter 88
- Integration Content 26
- Integration Content Advisor 181
- Integration Flow 27
- Integration Package 26
- Integration Pattern 69
  - Process Call 117
  - Send 116
- Integration Platform as a Service (iPaaS) 11
- Integration Process 28

**J**

- JavaScript 108
- JDBC-Adapter 95
- JMS-Adapter 96
- Join 120

**L**

- LDAP-Adapter 84
- Logs 175
- Lokale Integrationsprozesse 47

**M**

- Mail-Adapter 80
- Mappings 100
- Message Header 42
- Message Mappings 100
- Message Processing Log 50
- Message Queues 174
- Message Store 125
- Modularization 47
- Monitoring 169
- Multicast 120
  - Parallel Multicast 120
  - Sequential Multicast 120

**N**

- Number Ranges 174

**O**

- OData-Adapter 82
- OData-Service 32
- Onboarding 16
- Open Connectors 189
- OpenConnectors-Adapter 94

**P**

- Partner Directory 180
- Persist 125
- Platform as a Service (PaaS) 11
- Process Call
  - Looping Process Call 117
- ProcessDirect-Adapter 48, 96

**Q**

- Queueing 51

**R**

- Request-Reply 114
- RFC-Adapter 89
- Router 119
- Routings 118
- Runtime Node 21
- Runtime variables 130

**S**

- SAP Alert Notification service 68
- SAP API Business Hub 159
- SAP API-Management 187
- SAP Cloud ALM for Operations 178
- SAP Cloud Connector 65
- SAP Enterprise Messaging 188
- SAP Event Mesh 188
- SAP Focused Run (FRUN) 177
- SAP Integration Suite 12
- SAP Process Integration (PI) 9
- SAP Process Orchestration (PO)
  - 182
- SAP Solution Manager 177

SAP Transport management Service 56  
SAP Trust Center 24  
SAP Workflow Service 191  
SFTP-Adapter 77  
Signer 130  
SOAP-Adapter 75  
Splitter 122  
    EDI Splitter 123  
    General Splitter 123  
    IDoc Splitter 122  
    Iterating Splitter 122  
    PKCS#7/CMS Splitter 122  
SuccessFactors-Adapter 91

## Z

Zertifizierungsstellen 60  
ZIP 110

Tenant Management Node 20  
Timer Start Event 70  
Trace 171  
Transformations 100  
Transport 39, 52, 54  
Twitter-Adapter 98

## U

Update concept 163  
User role 58, 62

## V

Value Mapping 34  
Variables 128  
Verifier 130

## X

XI-Adapter 92  
XML Validator 130  
XSLT Mappings 102