

Unit 3 – Managing APIs

Developing with SAP Integration Suite

C_CPI_2404

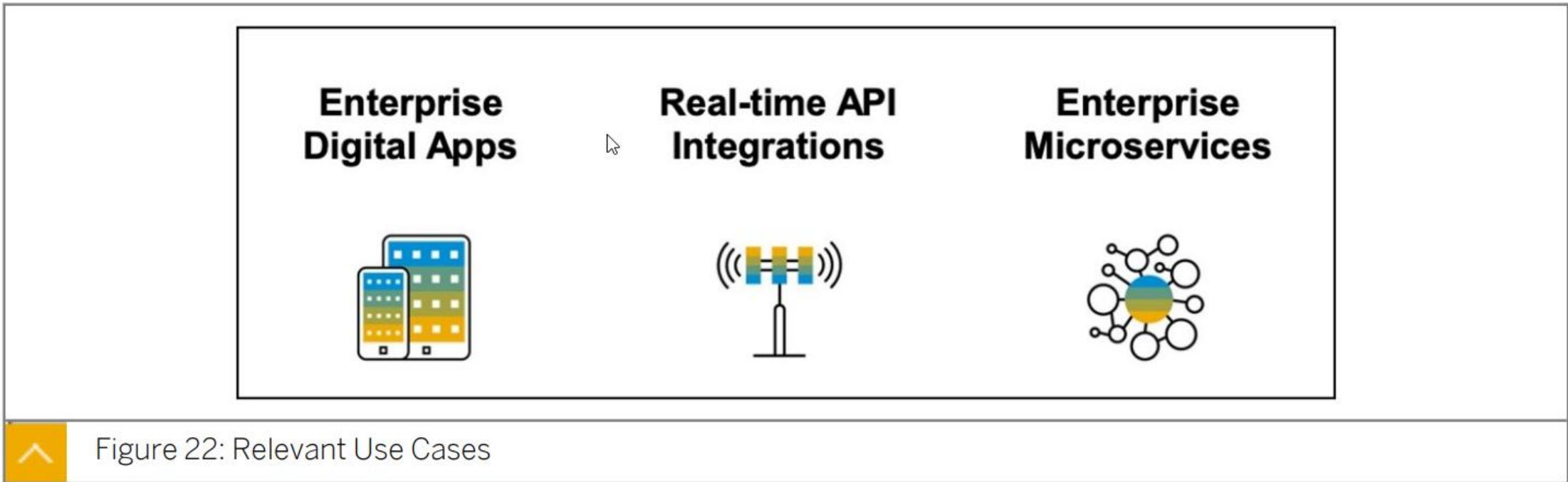
Agenda

- SAP API Management
- Components of SAP API Management
- Creating an API Provider
- Creating an API (proxy)
- Using Policies
- Creating a Product
- Logging and Monitoring
- Key Summary Points

SAP API Management

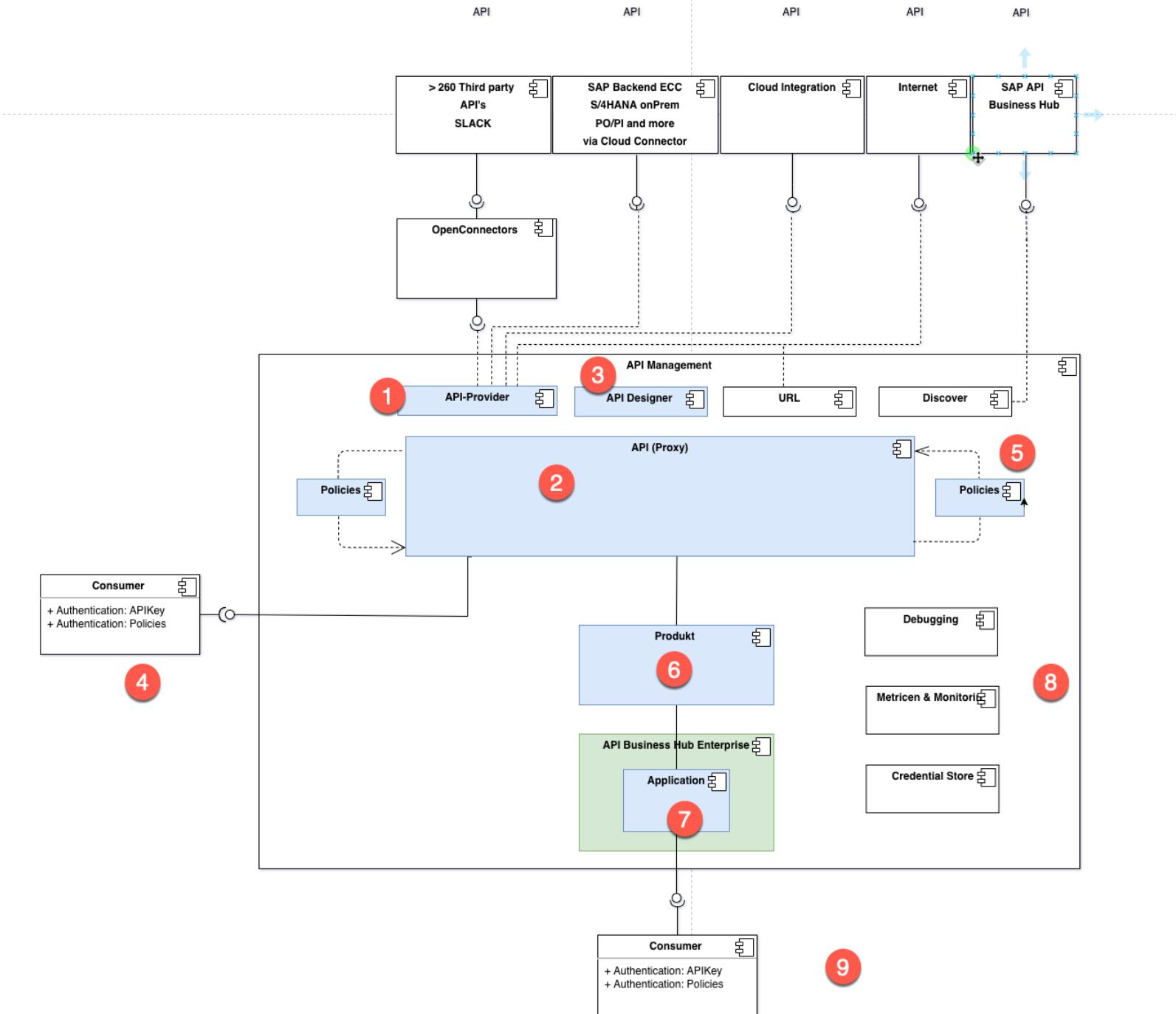
- Building APIs (proxies)
- Publishing APIs (Bundle APIs as Product)
- Analyzing APIs
- Consuming APIs
- Monetizing APIs
- Discover API Packages
- API (proxy) Designer

Relevant Use Cases



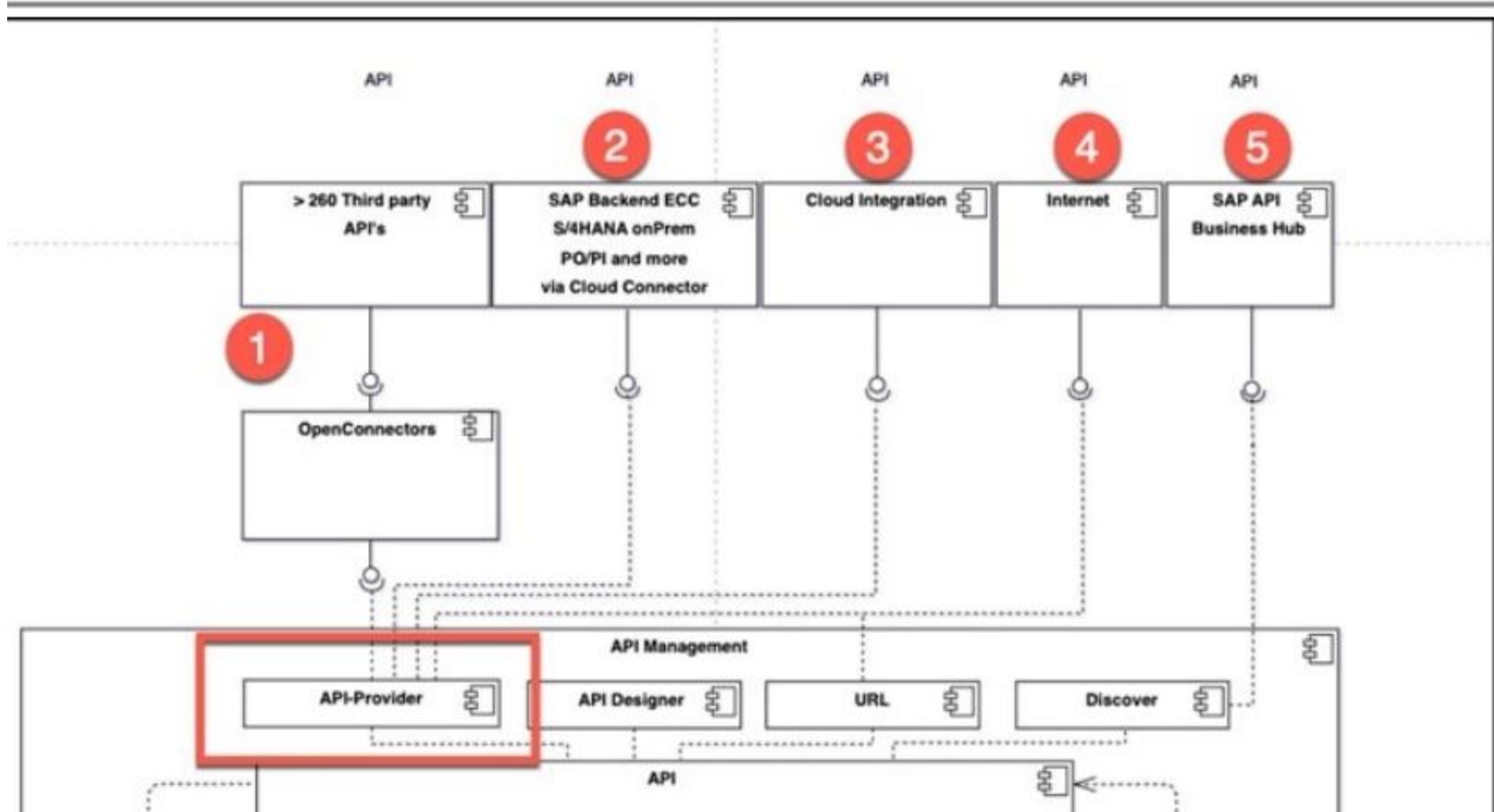
Components of SAP API Management

- API Provider
 - Concept in API Management that defines connection details for existing services
- API (Proxy)
 - Managed facades for existing services (sits in front of the existing service)
 - Applications connect to API (proxy)
- Policies
 - Provides capabilities to define behavior of an API (proxy)
- Product
 - Bundle and publish API (proxies) as a Product for consumption
- Application
 - Consumes the Product (bundle of API proxies) using api key and secret



Creating an API Provider

- Concept in SAP API Management
- Defines the connection details for services
 - Details of the host
 - Additional details to establish connection – for example, proxy settings



Demo: API Provider (5 different sources)

- Open Connectors
- Through Cloud Connector to SAP On-Premise backends
- Cloud Integration
- APIs from internet
- SAP Business Accelerator Hub (API Business Hub)

Overview Connection Catalog Service Settings

Type: *①

Internet

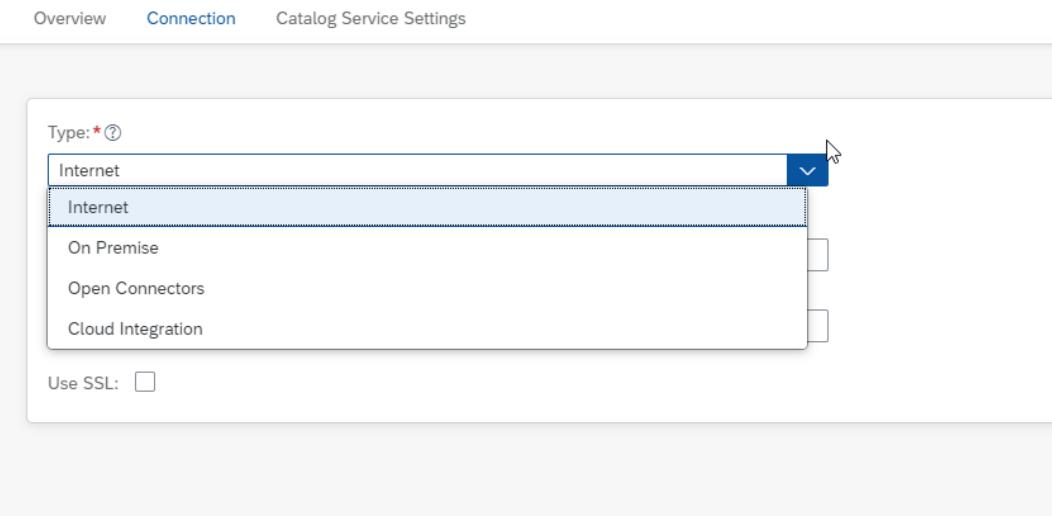
Internet

On Premise

Open Connectors

Cloud Integration

Use SSL:



Demo: API Provider

Field Name	Input
Type	Internet
Host	sapes5.sapdevcenter.com
Port	443
Use SSL	Checked
Path Prefix	/sap/opu/odata
Service Collection URL	/IWFND/CATALOGSERVICE/ServiceCollection
Authentication Type	Basic
Username	<i>Credentials only used to create API Provider</i>
Password	<i>Not for the actual call of API</i>

Catalog Service

The catalog service provides a list of all available services for your area. Exploration of OData services is crucial for several tools to identify a suitable service for the realization of a business use case. Therefore certain search capabilities are required.

Metadata exploration is available using standard OData mechanisms. It is built on top of OData Channel to have full OData feature support when accessing the local database. Exposure of metadata uses search capabilities (scanning the English version of a description of a service), for example, search for all service documents where SalesOrder is used in the description.

Note

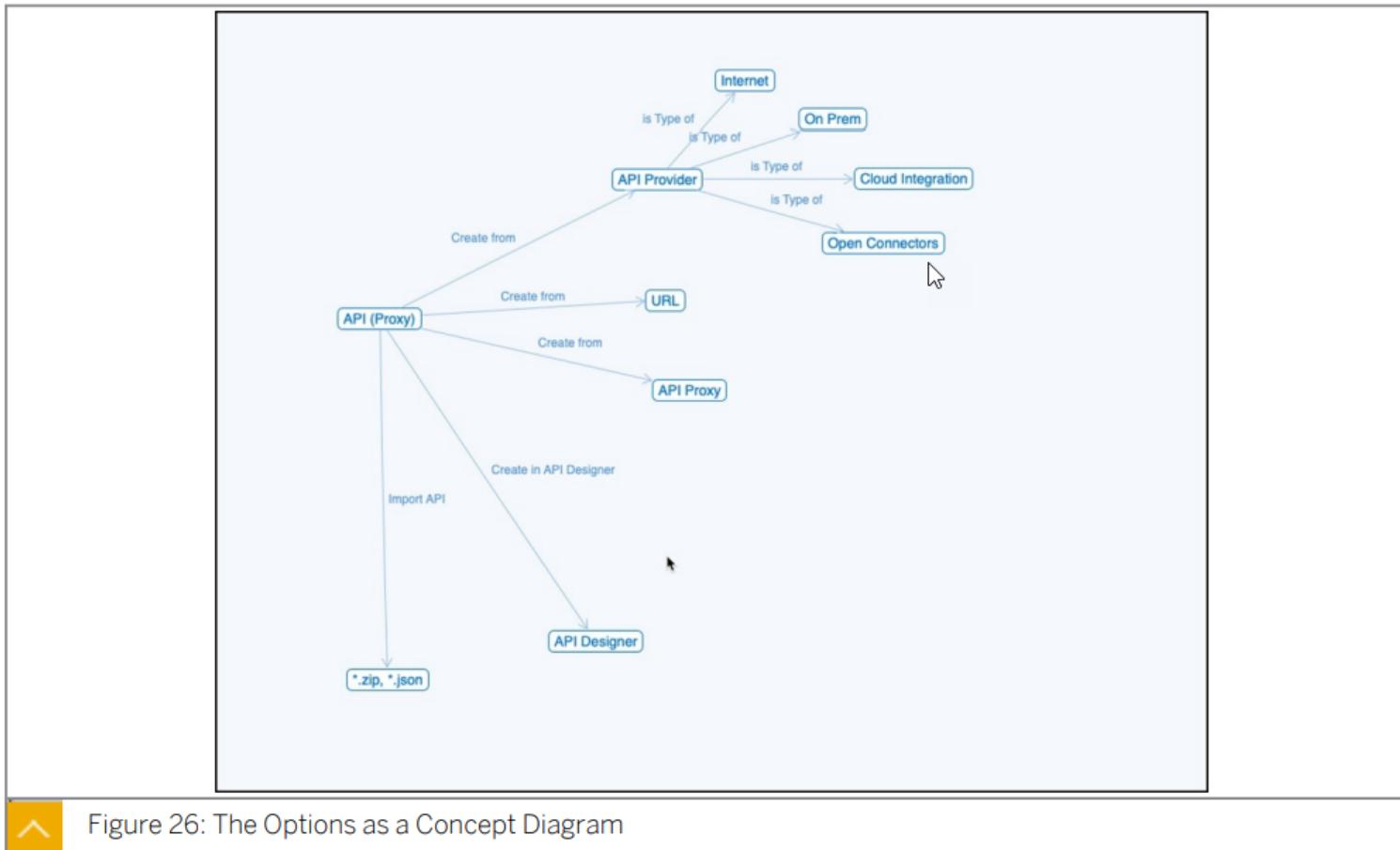
Exploration of the remote OData Channel's services and the registration of its services on SAP Gateway is also provided.

The **catalog service** retrieves a list of all available services on SAP Gateway. It is based on a catalog service pattern proposed by Microsoft™ and consists of an implementation approach of the catalog service pattern in the context of SAP Gateway.

Note

There are two versions of the catalog service available in SAP Gateway, Version 1 and Version 2. Version 2 has EntitySet collection, Tag collection, Vocabulary collection and Annotations. The open search functionality is also enhanced in Version 2. You can choose the version based on your requirement.

Creating an API (proxy)



Demo: API Proxy

- Create Button
 - API Provider
 - API Proxy (copy an existing proxy)
 - URL
- Import API
- Create in API Designer

SAP Integration Suite

Develop

Create APIs, Products, import Policy Templates and view Applications here.

APIs (3) Products (0) Applications (0) Policy Templates (0)

Custom Type System Design and develop API artifacts

1

2 3 4

Create Import API Create in API Designer Filter

Name	Title	Status	Type	Changed By	Last Updated
GWSAMPLE_BASIC	GWSAMPLE_BASIC	Deployed	ODATA	milton.chandra...	5/27/2023, 4:51:14 PM
kubectl-c-81b58c5	Kubernetes (api.c-81b58c5.kyma.shoot.live.k8s...)	Deployed	REST	piotr.tesny@sa...	5/3/2023, 8:42:25 AM
HelloWorldAPI	HelloWorldAPI	Deployed	REST		5/3/2023, 7:25:11 AM

Home Discover Design Integrations APIs 1 Custom Type System Design and develop API artifacts MIGs MAGs Test Configure Monitor Monetize Settings

Using Policies

- Policy is a program that executes a specific function at runtime
- Adds common functionality to API (proxy)
- Provides features to secure APIs, control API traffic etc.
- Also customize the behavior of API by adding scripts

Prebuilt policies

- Access Control
- Basic Authentication
- Extract Variables
- JavaScript
- Oauth v2.0
- Quota
- Verify API Key
- And so on...



APIs

1

Find APIs to integrate and extend.

Packages

All

SOAP

ODATA V2

ODATA V4

GraphQ

REST

Policy Template

2

Sort by: A-Z ▾

performance| 3 x



Policy Template

Performance_Traceability

This policy template assists in API Proxy Execution Performance assessment

4

Version 1



Policy Template

cacheMetadata

Improve performance of Odata API Proxies
by caching metadata across invocations

Version 1

/ SAP API Management Debugging and Traceability

Performance_Traceability 1

This policy template assists in API Proxy Execution Performance assessment

Download4

Overview

This policy template assists in API Proxy Execution Performance assessment

Version: 1

Last Modified: 07 Apr 2022

Type: Policy Template

Policies		
proxy_request_receiving_latency.js	ProxyEndPoint	PreFlow
proxy_processing_time.js	ProxyEndPoint	PostFlow
targetreceivinglatency.js	TargetEndPoint	PreFlow
target_processing_time.js	TargetEndPoint	PreFlow

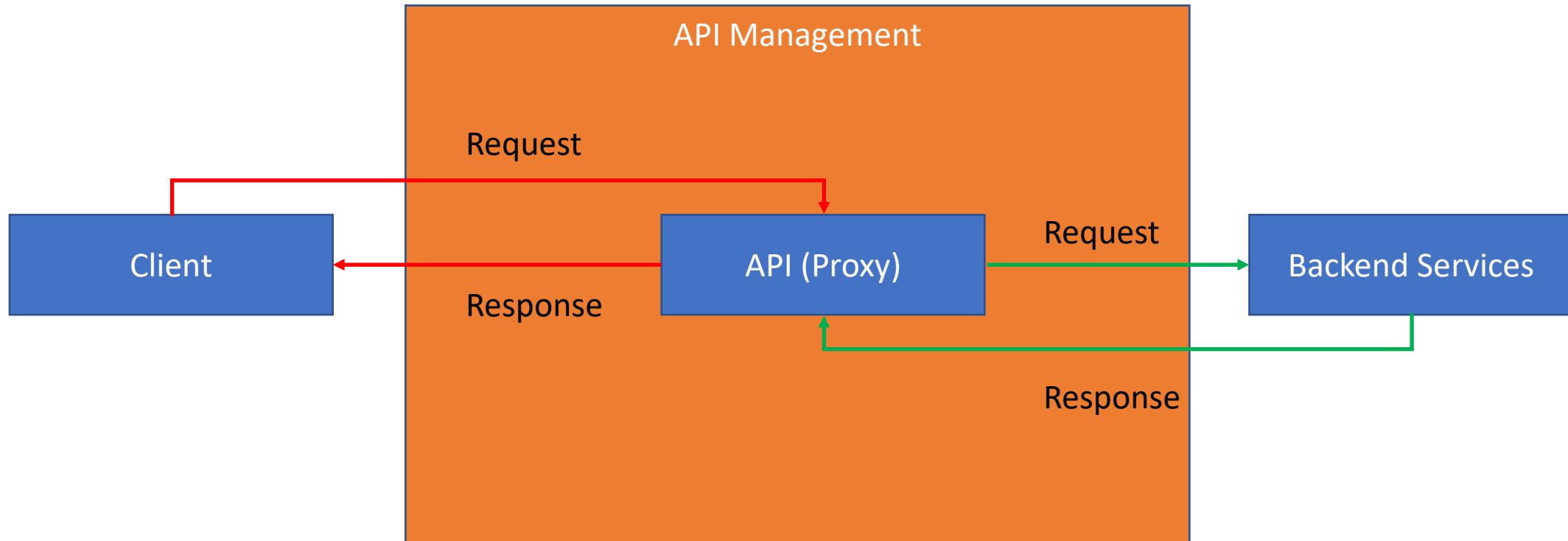
Flow Type:



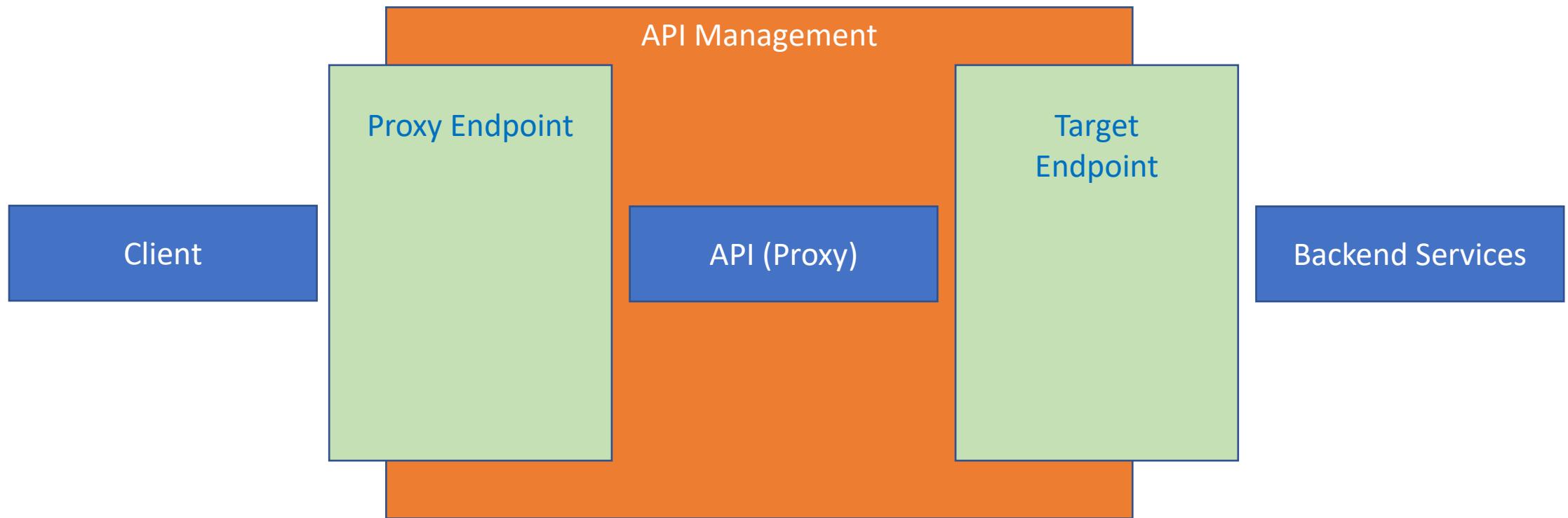
Scripts		
proxy_processing_time.js		
proxy_request_receiving_latency.js		
target_processing_time.js		
targetreceivinglatency.js		

FEEDBACK

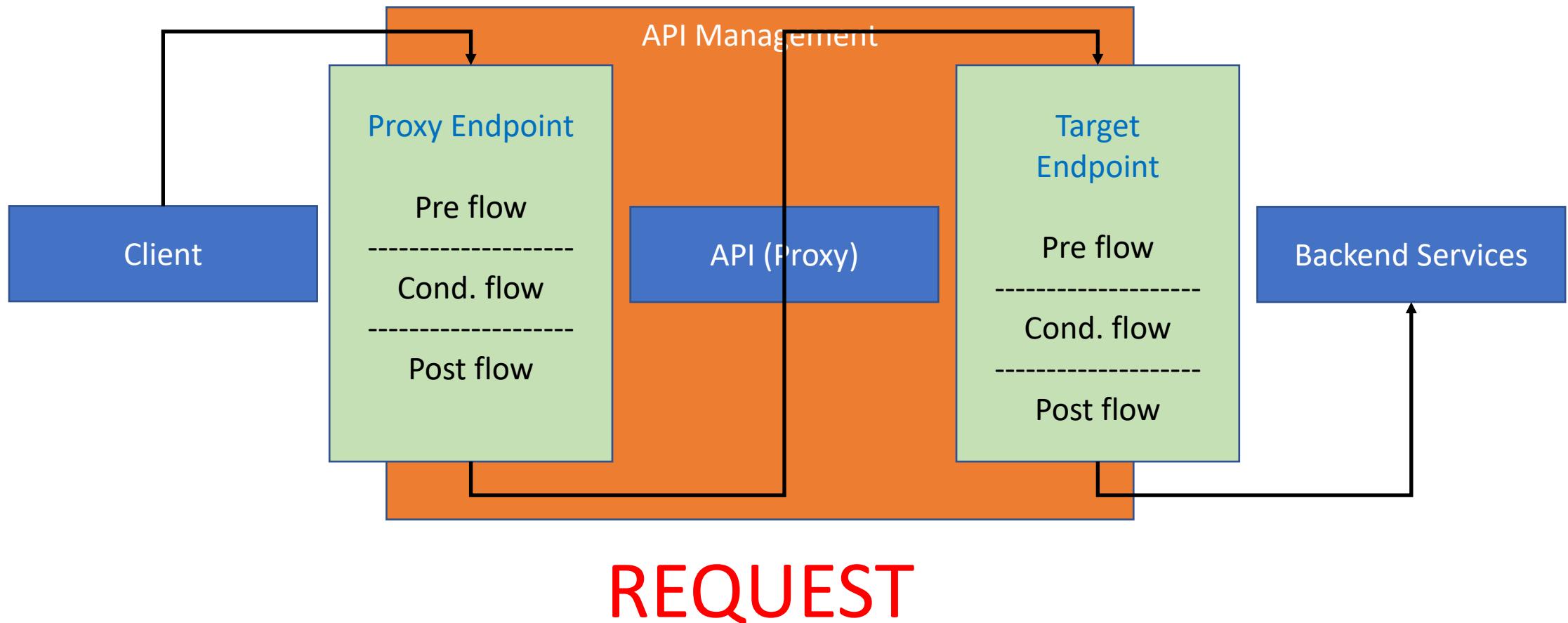
Flows – Where should I apply my policies ?



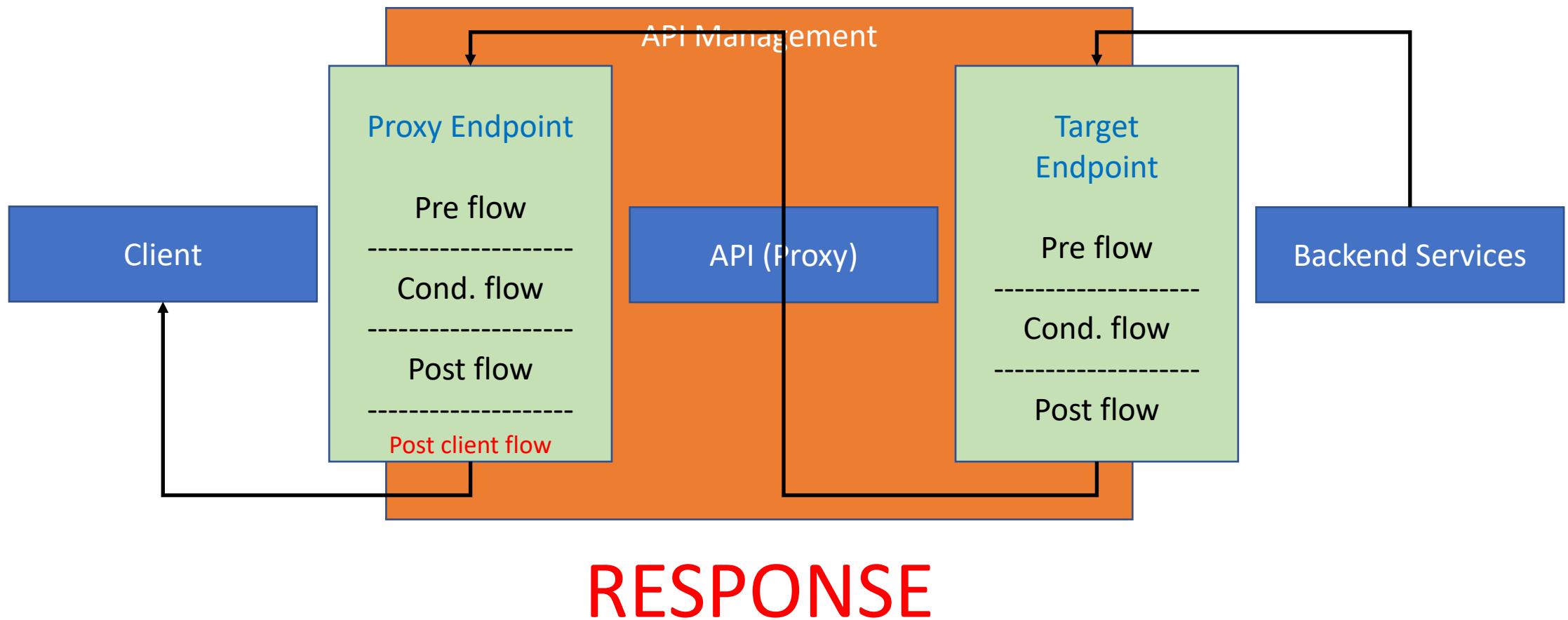
Flows – Where should I apply my policies ?



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Flows – Where should I apply my policies ?



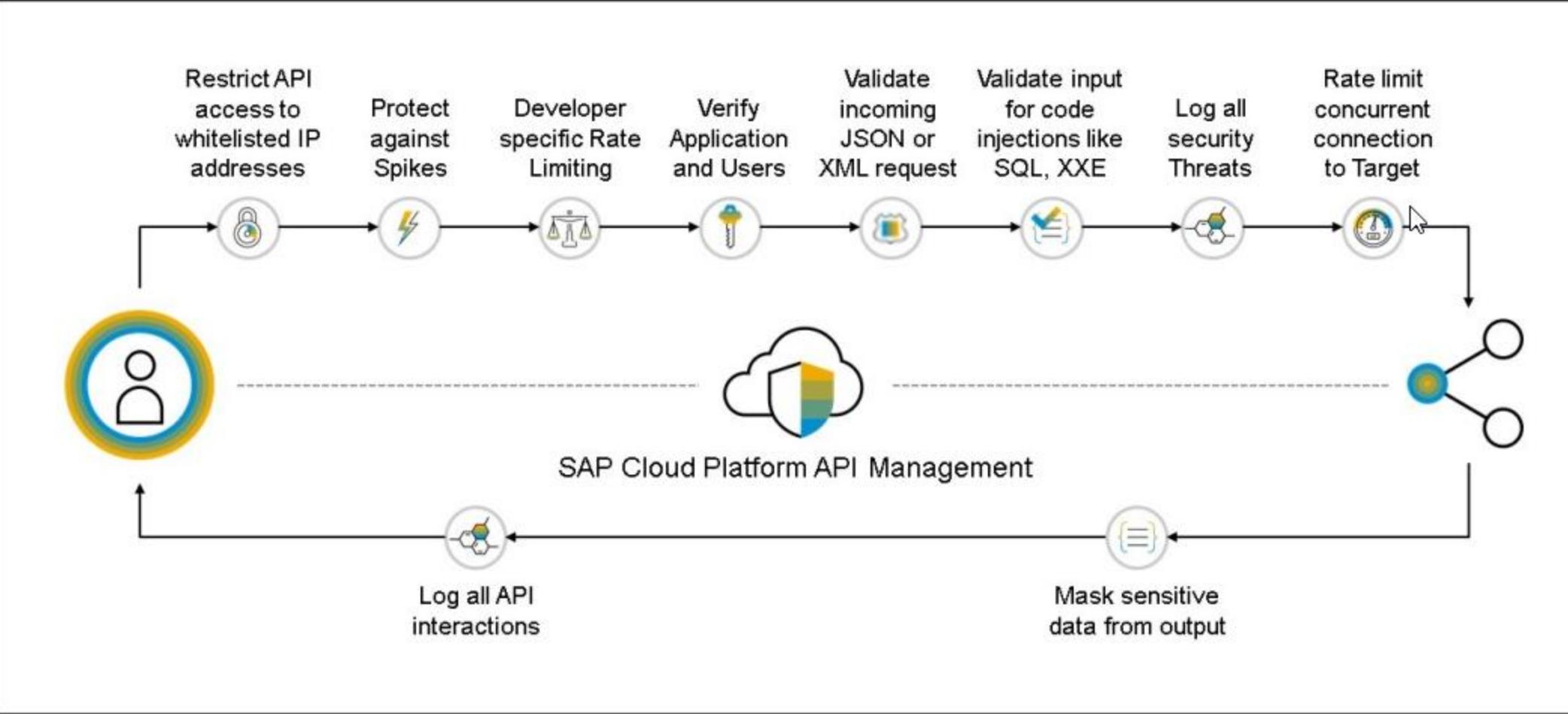


Figure 44: SAP Cloud Platform API Management

Demo: Policies for basic authentication

SAP Integration Suite API Portal

API Artifacts for GWSAMPLE_BASIC_v1

Policy Editor

Flows 1 < ProxyEndpoint +>

TargetEndpoint +>

PreFlow 0

PostFlow 2

Created Policies 0

Scripts 0 +

setCredentials... → setBasicAuth... ←

User → Computer

Update Policy Template Cancel

Policies

Security Policies

- Basic Authentication
- DecodeJWT
- GenerateJWT
- JSON Threat Protection
- OAuth v2.0
- OAuth v2.0 GET
- OAuth v2.0 SET
- Regular Expression Protection
- SAML Assertion Generation
- SAML Assertion Validation
- Verify API Key
- VerifyJWT
- XML Threat Protection

Traffic Management Policies

- Access Control
- Concurrent Rate Limit
- Invalidate Cache
- Lookup Cache
- Populate Cache

```
1 - <BasicAuthentication async='true' continueOnError='false' enabled='true' xmlns='http://www.sap.com/cpmget'>
2   <!-- Operation can be Encode or Decode -->
3   <Operation>Encode</Operation>
4   <IgnoreUnresolvedVariables>true</IgnoreUnresolvedVariables>
5   <!-- for Encode, User element can be used to dynamically populate the user value -->
6   <User ref='request.header.username'></User>
7   <!-- for Encode, Password element can be used to dynamically populate the password value -->
8   <Password ref='request.header.password'></Password>
9   <!-- Source is used to retrieve the encoded value of username and password. This should not be used if the operation is
      Encode-->
10  <Source>request.header.Authorization</Source>
11  <!-- AssignTo is used to assign the encoded value of username and password to a variable. This should not be used if the
      operation is Decode -->
12  <AssignTo createNew='false'>request.header.Authorization</AssignTo>
13 </BasicAuthentication>
```

The screenshot shows the SAP Integration Suite Policy Editor interface. On the left, there's a sidebar with sections for Flows, TargetEndpoint, Scripts, and Policies. The main area displays a flow diagram with nodes for 'setCredentials...' and 'setBasicAuth...'. Below the diagram is a snippet of XML code for a BasicAuthentication policy. On the right, a sidebar lists various security and traffic management policies, with the 'Basic Authentication' policy highlighted. A red box highlights the 'Update' button at the top right of the editor.

Demo: Policies for basic authentication

Field Name	Value
Policy Type	Assign Message
Policy Name	setCredentials
Endpoint Type	TargetEndpoint
Flow Type	Postflow
Stream	Incoming Request
Policy Type	Basic Authentication
Policy Name	setBasicAuthentication
Endpoint Type	TargetEndpoint
Flow Type	Postflow
Stream	Incoming Request

Editing APIs

The screenshot shows the SAP API Management interface for the API **GWSAMPLE_BASIC**. The API is currently **Deployed** and can be reached via the **API Proxy URL**: https://quovadis.test.apimanagement.eu10.hana.ondemand.com:443/GWSAMPLE_BASIC.

The main navigation bar includes links for **Transport**, **Policies**, **Copy**, **Edit**, and more. Below the navigation, there are four tabs numbered 1 through 4:

- 1** Overview (highlighted)
- 2** Proxy EndPoint
- 3** Target EndPoint
- 4** Resources

The **Overview** section displays the following details:

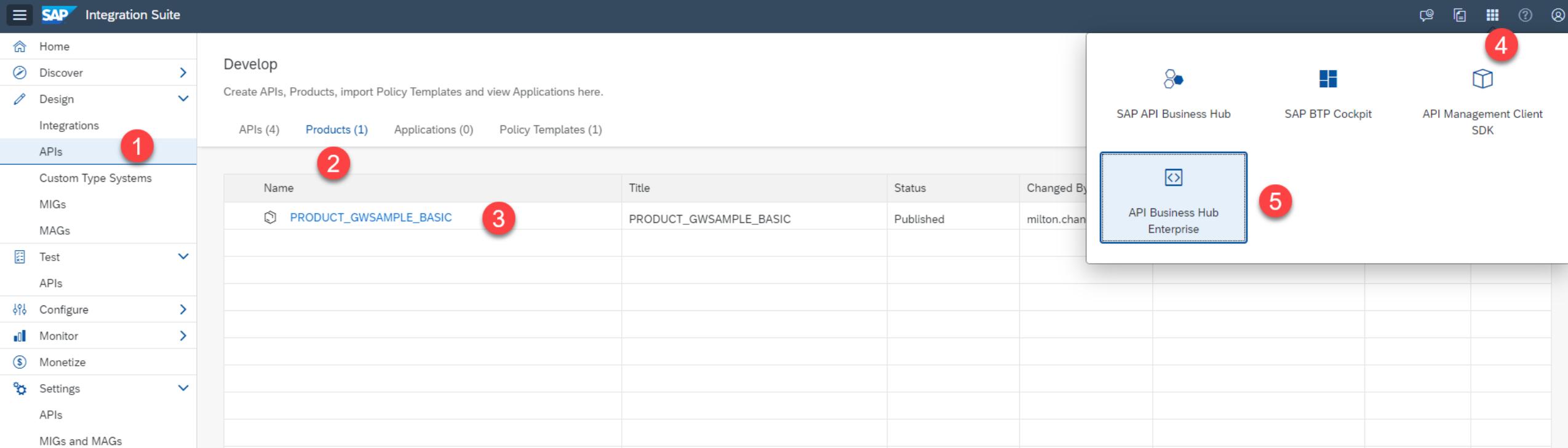
- Title:** GWSAMPLE_BASIC
- Host Alias:** quovadis.test.apimanagement.eu10.hana.ondemand.com
- API Base Path:** /GWSAMPLE_BASIC
- API State:** Active
- Description:** (empty)

On the right side, there are two summary boxes:

- Calls(05/01/2023 - 05/29/2023):** 3.5k
- API Health:** A green bar chart indicating 3487 calls, with a red line at 0.

Creating a Product

- Products are artifacts that appear in the SAP API Business Hub Enterprise Portal
- Role Collections
 - AuthGroup.API.Admin
 - AuthGroup.API.ApplicationDeveloper



API Business Hub Enterprise

Centralized API catalog to discover, consume and monitor APIs

Type here to search



PRODUCT_GWSAMPLE_BASIC

API Based on the SAP Gateway
Demo System (ES5). The
authorization against the source
interface is realized via policies. No...

Published on May 29 2023

1 API

Logging and Monitoring

SAP Integration Suite

Home Discover Design Integrations APIs Custom Type Systems MIGs MAGs Test APIs Configure Monitor APIs Monetize Settings APIs MIGs and MAGs

Analyze

Here you can view the KPIs for the highlights and information related to various APIs

Overview Health Usage + Add (UTC+0:0) UTC

May 23, 2023 - May 29, 2023

Total API Calls: 3496 △ Difference from last week

API Response Time: 93.2 ms △ Difference from last week

Request Processing Latency: 4445 ms △ Difference from last week

Total API Errors: 0 Difference from last week

Target System Errors: 0 Difference from last week

Target Response Time: 91.5 ms △ Difference from last week

API Calls Number of calls per day

All APIs Select APIs from the list

Cumulative Failure Success

3.44K

The screenshot shows the SAP Integration Suite Analyze dashboard. The left sidebar has a red circle labeled '1' over the 'APIs' menu item. The main area has three red circles labeled '2', '3', and '4' over the 'Overview', 'Health', and 'Usage' tabs respectively. The dashboard displays various KPIs for the week of May 23-29, 2023. It includes cards for Total API Calls (3496), API Response Time (93.2 ms), Request Processing Latency (4445 ms), Total API Errors (0), Target System Errors (0), and Target Response Time (91.5 ms). Below these are sections for API Calls (number of calls per day) and a line chart showing cumulative, failure, and success API calls over time, with a peak of 3.44K.

Key Summary Points – Unit 3

Q10. What are the reasons for using policies in API management?



Access Control



Identity Management



Data Management



Correct

Correct. The reason for using policies in API management is Access Control.

Key Summary Points – Unit 3

Q8. Where can you download standardized, reusable policy templates?

- A SAP API Business Hub Enterprise
- B Enterprise Hub for APIs
- C SAP Business Accelerator Hub



Correct

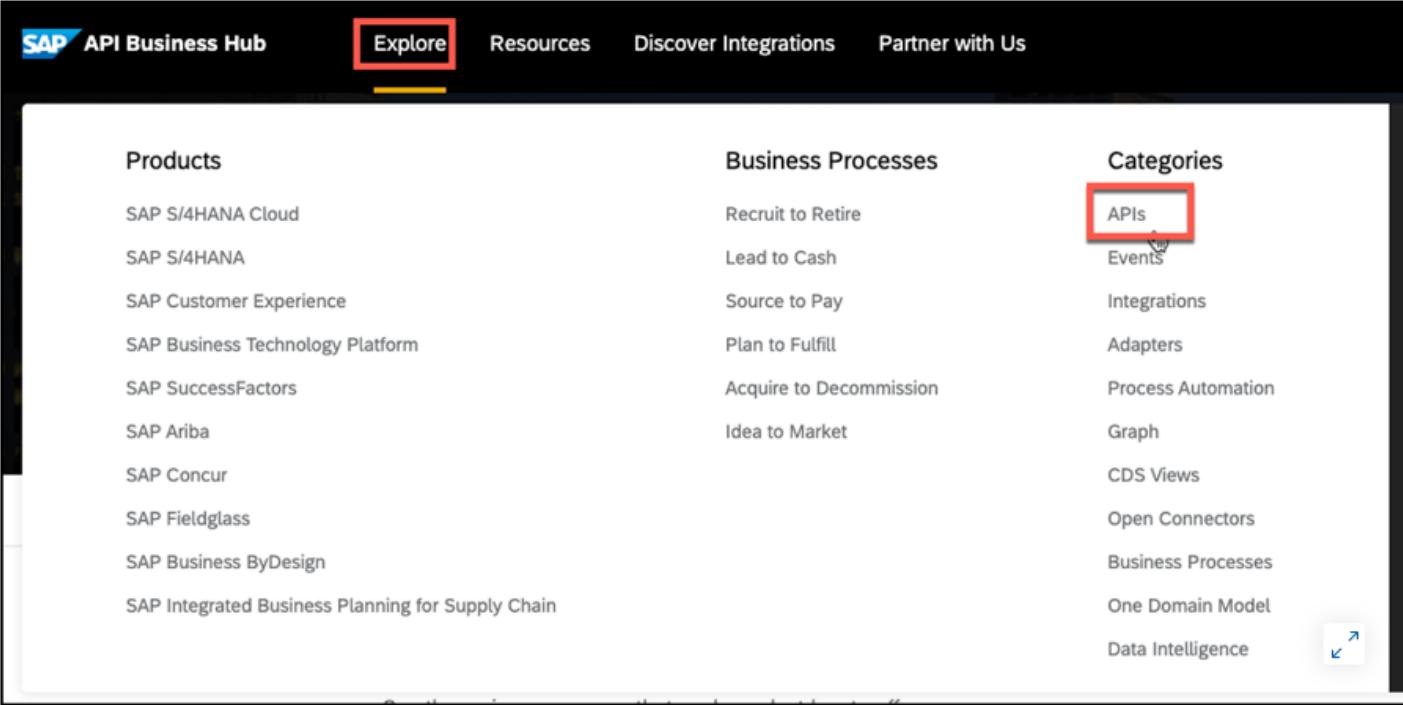
Incorrect. You can you download standardized, reusable policy templates from the SAP Business Accelerator Hub.

Key Summary Points – Unit 3

Use predefined policies

There are predefined sets of policies for specific applications. These can be found in the SAP Business Accelerator Hub.

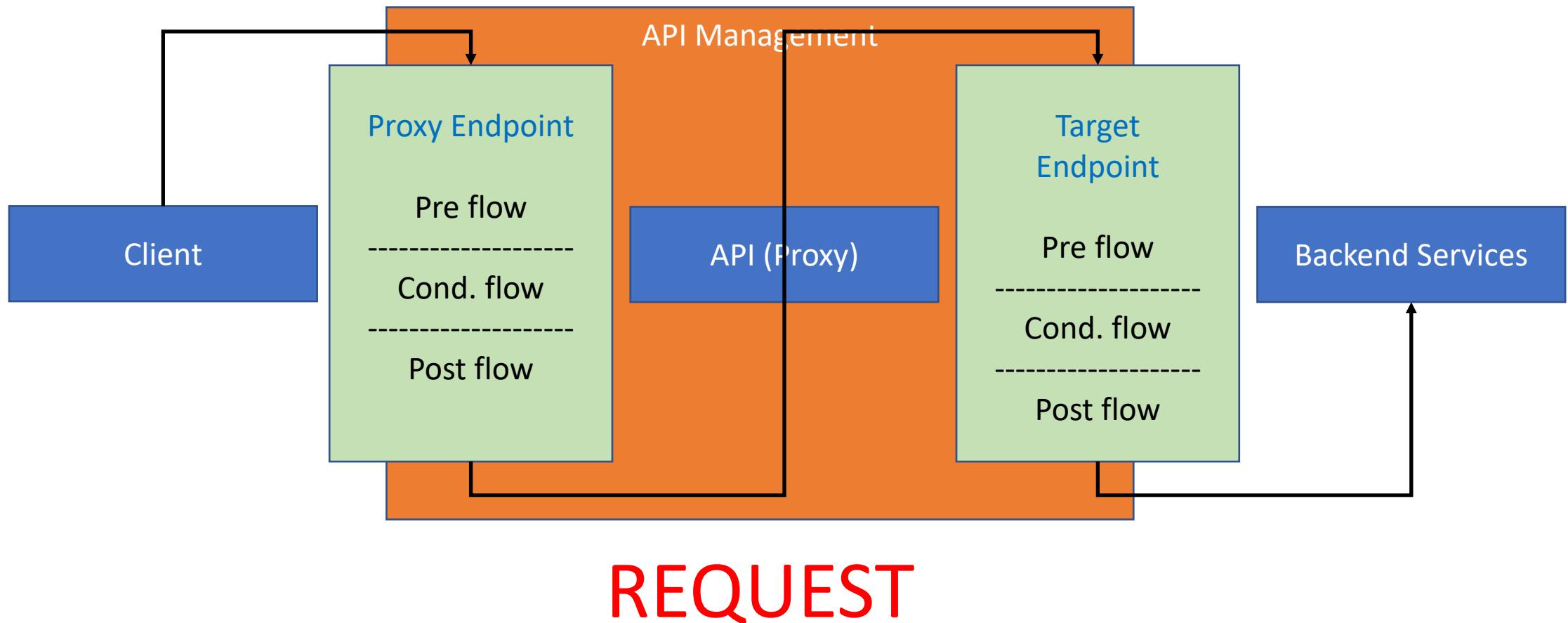
Navigate to <https://api.sap.com/>  to Explore → APIs.



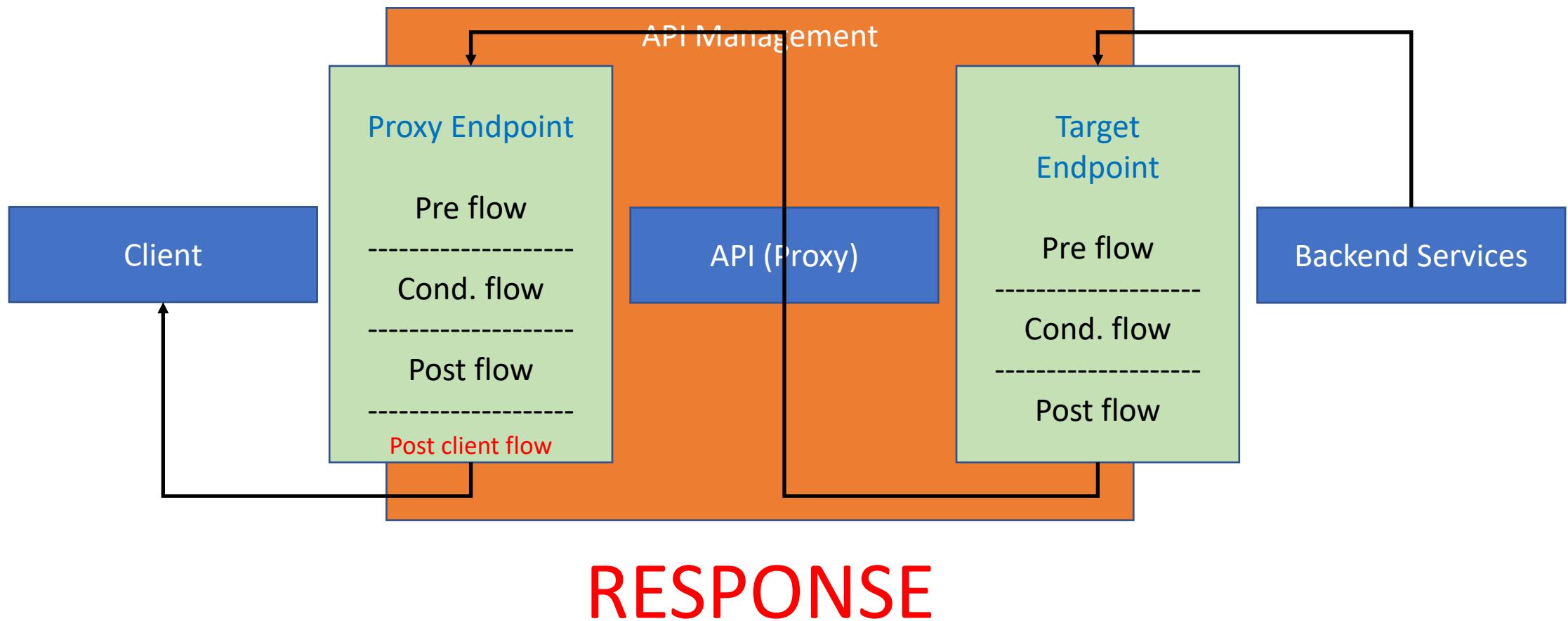
The screenshot shows the SAP API Business Hub homepage. The top navigation bar includes links for SAP API Business Hub, Explore (which is highlighted with a red box), Resources, Discover Integrations, and Partner with Us. Below the navigation is a main content area divided into three columns: Products, Business Processes, and Categories. The Products column lists various SAP products. The Business Processes column lists several business processes. The Categories column lists various categories, with 'APIs' highlighted by a red box. A cursor is hovering over the 'Events' link in the Categories section. At the bottom right of the content area, there is a small blue arrow icon pointing upwards and to the left.

Products	Business Processes	Categories
SAP S/4HANA Cloud	Recruit to Retire	APIs
SAP S/4HANA	Lead to Cash	Events
SAP Customer Experience	Source to Pay	Integrations
SAP Business Technology Platform	Plan to Fulfill	Adapters
SAP SuccessFactors	Acquire to Decommission	Process Automation
SAP Ariba	Idea to Market	Graph
SAP Concur		CDS Views
SAP Fieldglass		Open Connectors
SAP Business ByDesign		Business Processes
SAP Integrated Business Planning for Supply Chain		One Domain Model
		Data Intelligence

Flows – Where should I apply my policies ?



Flows – Where should I apply my policies ?



Key Summary Points – Unit 3

Q9. Which Role Collections do you need to use the API Business Hub Enterprise?

A AuthGroupAPIADMINDesigner,AuthGroupAdministrator

AuthGroup.API.Admin, AuthGroup.API.ApplicationDeveloper

C AuthgroupHeadofManager,AuthgroupChildhoodCaseManager

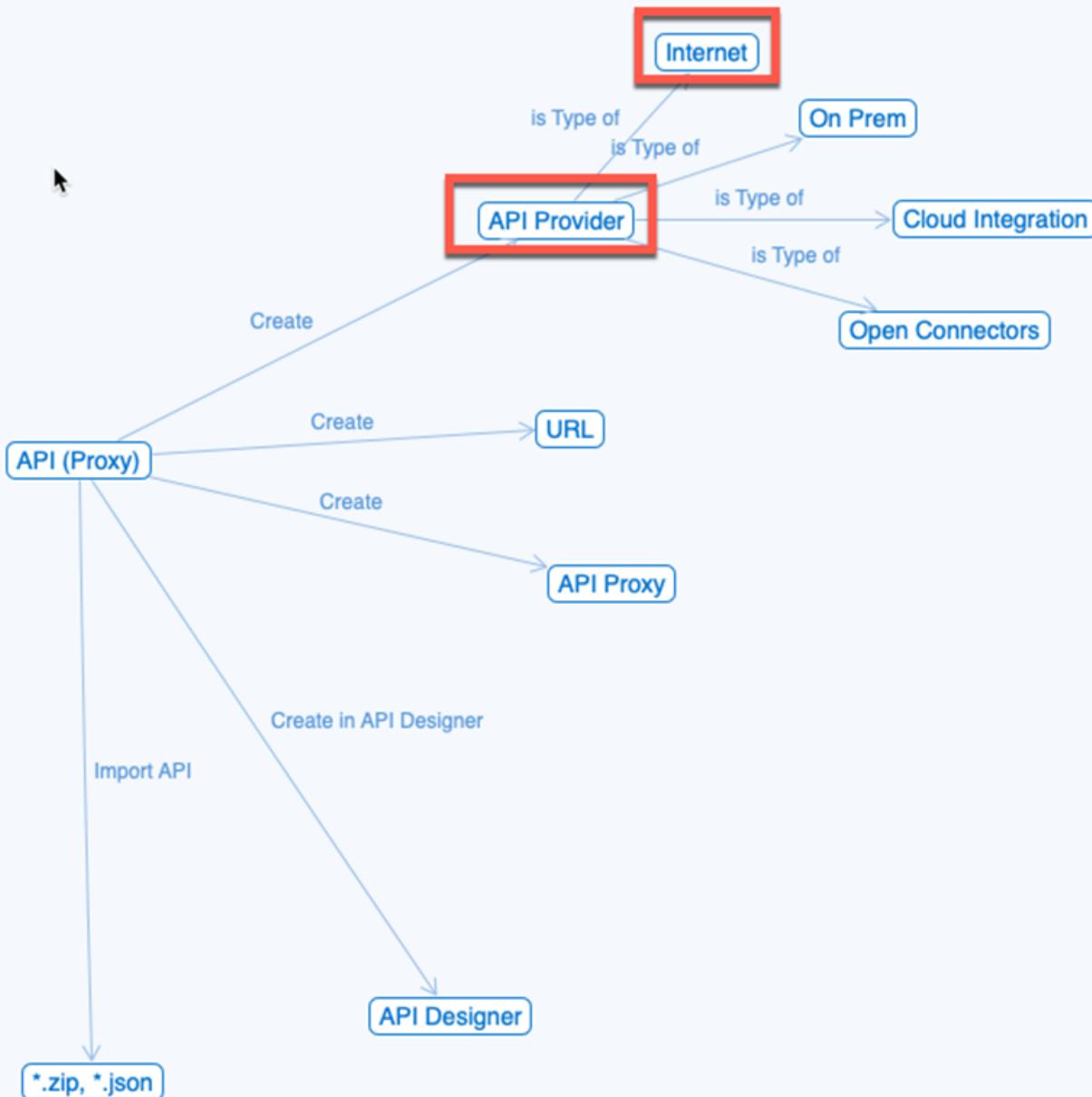


Correct

Correct. To use the API Business Hub Enterprise you need the Role Collections AuthGroup.API.Admin, and AuthGroup.API.ApplicationDeveloper.

Components of SAP API Management

- API Provider
 - Concept in API Management that defines connection details for existing services
- API (Proxy)
 - Managed facades for existing services (sits in front of the existing service)
 - Applications connect to API (proxy)
- Policies
 - Provides capabilities to define behavior of an API (proxy)
- Product
 - Bundle and publish API (proxies) as a Product for consumption
- Application
 - Consumes the Product (bundle of API proxies) using api key and secret



Demo: API Provider (5 different sources)

- Open Connectors
- Through Cloud Connector to SAP On-Premise backends
- Cloud Integration
- APIs from internet
- SAP Business Accelerator Hub (API Business Hub)

Overview Connection Catalog Service Settings

Type: *①

Internet

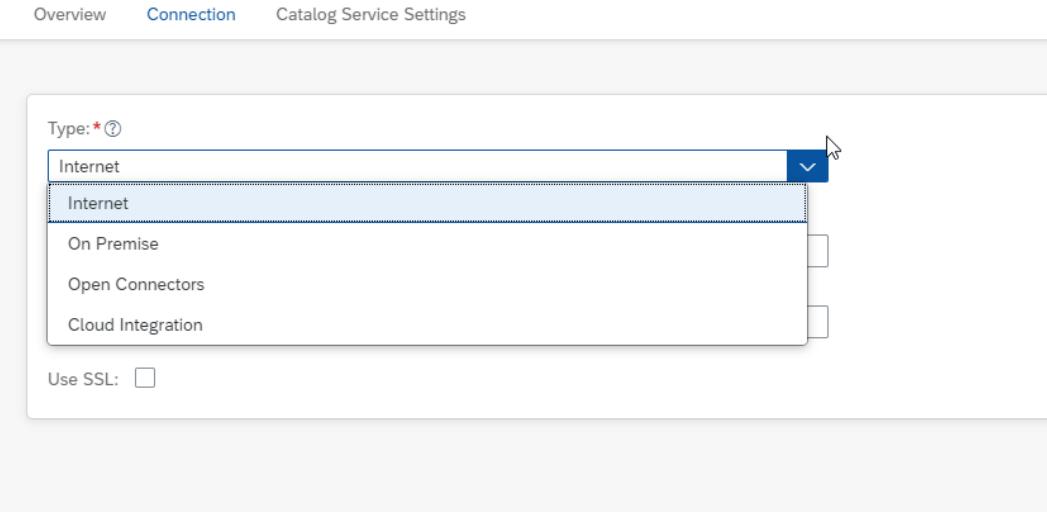
Internet

On Premise

Open Connectors

Cloud Integration

Use SSL:



Overview **Connection** Catalog Service Settings

Type: *①

On Premise

Host: *②

Port: *②

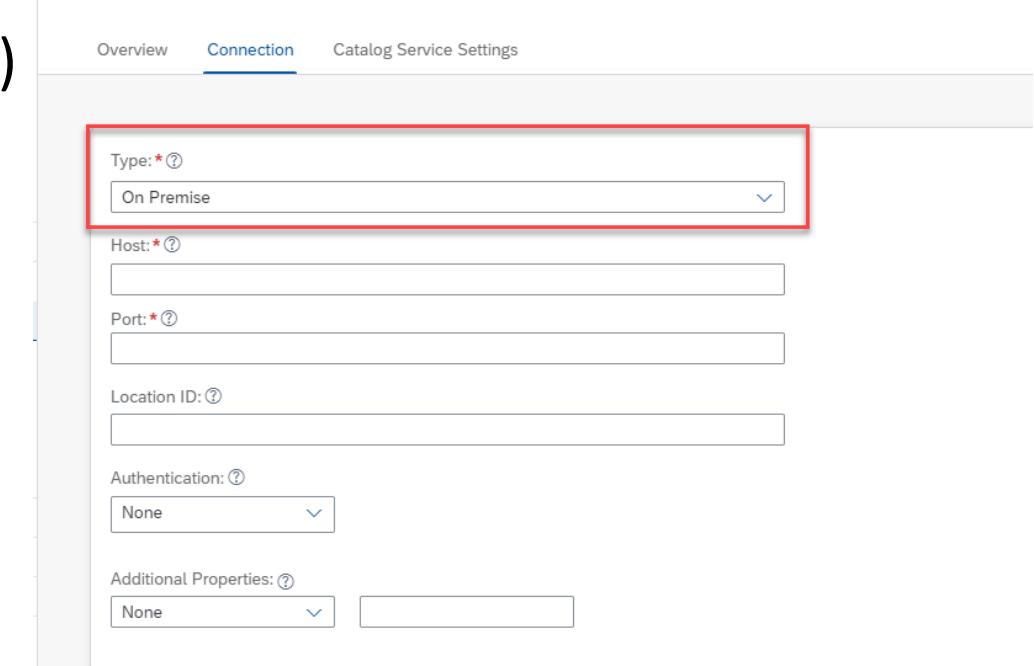
Location ID: ②

Authentication: ②

None

Additional Properties: ②

None



Demo: API Provider

Field Name	Input
Type	Internet
Host	sapes5.sapdevcenter.com
Port	443
Use SSL	Checked
Path Prefix	/sap/opu/odata
Service Collection URL	/IWFND/CATALOGSERVICE/ServiceCollection
Authentication Type	Basic
Username	<i>Credentials only used to create API Provider</i>
Password	<i>Not for the actual call of API</i>

Key Summary Points – Unit 3

Summary

An API provider encapsulates access to APIs from various sources. More than 260 third-party REST-based APIs are connected through the Open Connector. SAP backend systems such as SAP S/4HANA On-Prem or ECC/PI/PO can be connected through the Cloud Connector. SOAP APIs can also be made available through the Cloud Integration. Ultimately, almost all APIs can be connected. The procedure for connecting a foreign API is wizard-controlled.

The screenshot shows the SAP Integration Suite API Portal interface. The top navigation bar includes the SAP logo, 'Integration Suite', and 'API Portal'. Below the navigation, the page title is 'SAPGatewayDemoSystemES5_Provider'. The main content area has tabs for 'Overview', 'Connection', and 'Catalog Service Settings'. The 'Connection' tab is active, showing fields for 'Path Prefix' (/sap/opu/odata), 'Service Collection URL' (/WFND/CATALOGSERVICE/ServiceCollection), and 'Catalog URL' (<http://sapes5.sapdevcenter.com:443/sap/opu/odata/IWFND/CATALOGSERVICE/ServiceCollection>). Under 'Authentication type', it says 'BASIC'. There are fields for 'Username:' (P2005722030) and 'Password:' (*****). At the top right of this section, there are 'Transport' and 'Test Connection' buttons, with 'Test Connection' being highlighted with a red box.

The screenshot shows the SAP Integration Suite API Portal interface, specifically the 'Connection' tab for 'SAPGatewayDemoSystemES5_Provider'. The top navigation bar includes the SAP logo, 'Integration Suite', and 'API Portal'. Below the navigation, the page title is 'SAPGatewayDemoSystemES5_Provider'. The main content area has tabs for 'Overview', 'Connection', and 'Catalog Service Settings'. A success message is displayed in a green box: 'Connection to the system was successful with response code : 200; Message : OK'. At the bottom of the page, there are fields for 'Path Prefix' (/sap/opu/odata), 'Service Collection URL' (/WFND/CATALOGSERVICE/ServiceCollection), and 'Catalog URL' (<https://sapes5.sapdevcenter.com:443/sap/opu/odata/IWFND/CATALOGSERVICE/ServiceCollection>). Under 'Authentication type', it says 'BASIC'. There are fields for 'Username:' (P2005722030) and 'Password:' (*****). There is also a 'Trust All' checkbox.

Key Summary Points – Unit 3

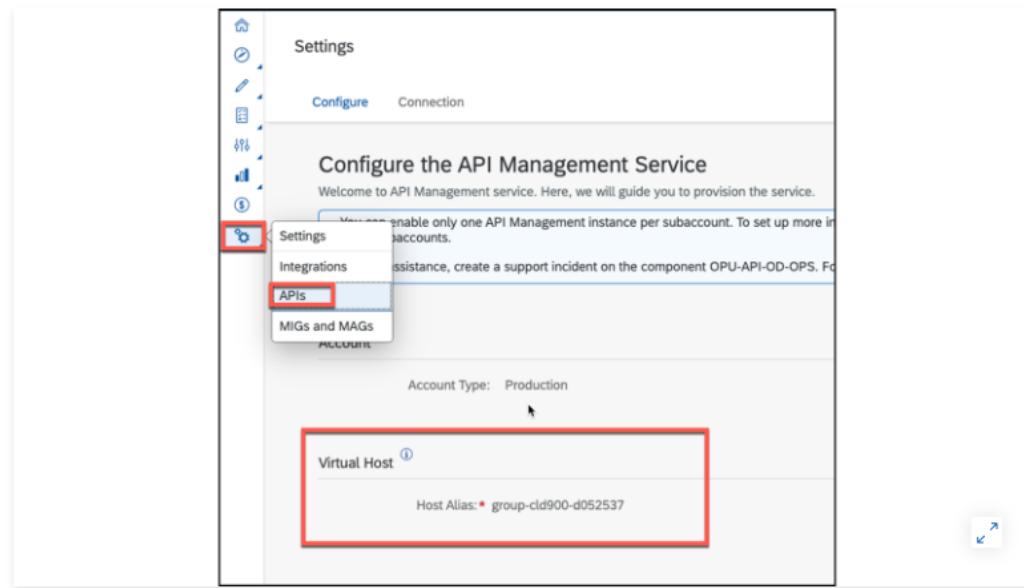
API URL - Proxy URL (No. 1)

At No. 1, you can see the new URL (proxy URL) with which you can now call the original source API. The *URL* consists of the following elements:

- API URL: https://group-cld900-d052537.prod01.apimanagement.eu10.hana.ondemand.com:443/GWSAMPLE_BASIC
- Application protocol: https
- Virtual Host: group-cld900-d052537
- API Host: prod01.apimanagement.eu10.hana.ondemand.com
- API Port: 443
- API Name: GWSAMPLE_BASIC

Virtual Host

The virtual host was created during the provisioning of API management and can be changed at any time using *Settings* → *APIs*.



Key Summary Points – Unit 3

Create API

Select: API Provider API Proxy URL

API Provider: * SAPGatewayDemoSystemES5_Provider Link API Provider

URL * ? /sap/opu/odata/iwbep/GWDEMO

API Details

Name: * GWDEMO

Title: * GWDEMO

API State: * Active

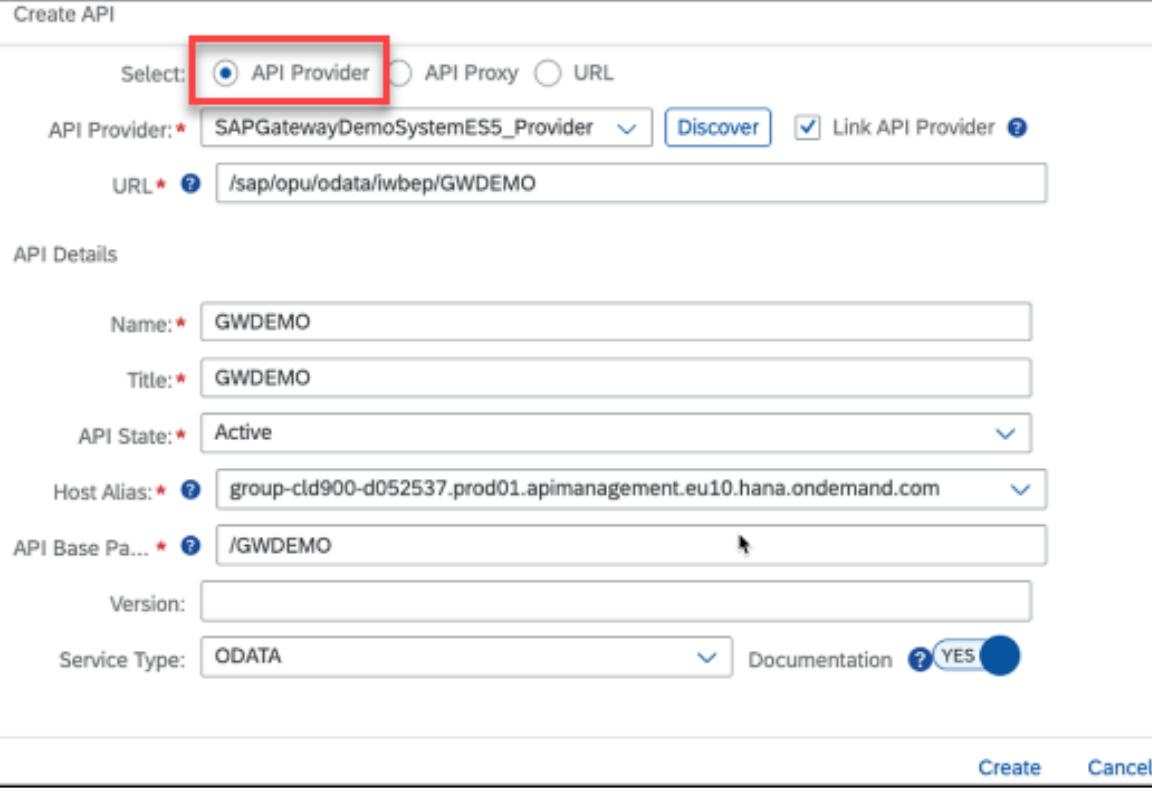
Host Alias: * ? group-cld900-d052537.prod01.apimanager.eu10.hana.ondemand.com

API Base Pa... * ? /GWDEMO

Version:

Service Type: ODATA Documentation ? YES

Create Cancel



When you finish creating this API (Proxy), it has to be deployed so that it can be used. After that, the API (proxy) is ready for testing. The service type is automatically defined. In this case, it is OData.

Key Summary Points – Unit 3

In this case, you must enter the data manually (marked). The *Service Type* can only be *REST* or *SOAP*.

Create API

Select: API Provider API Proxy URL

URL * https://sapes5.sapdevcenter.com/sap/opu/odata/iwbep/GWSAMPLE_BASIC

API Details

Name: GWSAMPLE_BASIC_URL

Title: GWSAMPLE_BASIC_URL

API State: * Active

Host Alias: * group-cld900-d052537.prod01.apimanagement.eu10.hana.ondemand.com

API Base Pa... * /GWSAMPLE_BASIC_URL

Version:

Service Type: REST

[Create](#) [Cancel](#)

Editing APIs

The screenshot shows the SAP API Management interface for editing APIs. The top navigation bar includes 'View API' (with a back arrow), 'Transport', 'Policies', 'Copy', 'Edit', and a 'More' option.

The main area displays the API details for 'GWSAMPLE_BASIC'. The status is 'Deployed' and the API Proxy URL is https://quovadis.test.apimanagement.eu10.hana.ondemand.com:443/GWSAMPLE_BASIC.

Four tabs are visible at the top of the main content area: **1 Overview**, **2 Proxy EndPoint**, **3 Target EndPoint**, and **4 Resources**. The 'Overview' tab is selected.

The left sidebar contains the following information:

- Title: GWSAMPLE_BASIC
- Host Alias: quovadis.test.apimanagement.eu10.hana.ondemand.com
- API Base Path: /GWSAMPLE_BASIC
- API State: Active
- Description: (empty)

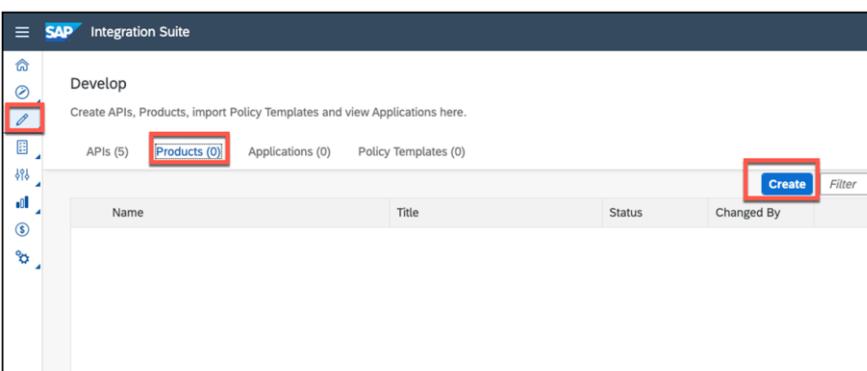
The right sidebar displays two cards:

- Calls(05/01/2023 - 05/29/2023)**: 3.5k calls.
- API Health**: A chart showing 3487 successful calls and 0 errors.

Creating a Product

- Products are artifacts that appear in the SAP API Business Hub Enterprise Portal
- Bundle and publish one or more API (proxies) as a Product for consumption
- Role Collections
 - AuthGroup.API.Admin
 - AuthGroup.API.ApplicationDeveloper

Key Summary Points – Unit 3



The screenshot shows the 'Create Product' dialog for 'P_GWSAMPLE_BASIC_v1'. The 'Overview' tab is selected, indicated by a red box. The product name is 'P_GWSAMPLE_BASIC_v1' and the title is also 'P_GWSAMPLE_BASIC_v1'. The 'Description' field contains the text: 'An API based on the Enterprise Procurement Model (EPM). Authentication is done via policies. No additional authentication required.'

The screenshot shows the 'Add APIs' dialog. The 'APIs (0)' tab is selected, indicated by a red box. An 'Add' button is highlighted with a red box. In the list, the 'GWSAMPLE_BASIC_v1' API is selected and highlighted with a red box. The 'OK' button at the bottom is also highlighted with a red box.

Key Summary Points – Unit 3

- API Designer
 - Visualization of openAPI specification is done using swagger UI
 - Swagger UI is an open source JavaScript framework to make APIs tangible

The screenshot shows the Swagger UI API Designer interface. At the top, there are buttons for 'Import' (1), 'Download' (2), 'Paste' (3), 'Generate Server Stub' (4), 'Save', and 'Cancel'. On the left, there's a sidebar with 'Swagger OAS' and 'Version: 1.0.0'. Below it, under the 'pet' category, is a 'POST /pet' endpoint with a 'Try out' button. The main area displays the OpenAPI specification code:

```
1  openapi: 3.0.1
2  info:
3    title: Swagger OAS
4    description: This is a sample server Petstore server
5    version: 1.0.0
6  servers:
7    - url: 'http://petstore.swagger.io/v212'
8  paths:
9    /pet:
10   post:
11     tags:
12       - pet
13     summary: Add a new pet to the store
14     operationId: addPet
15     requestBody:
16       description: Pet object that needs to be added to the store
17       content:
18         application/json: {}
19         application/xml: {}
20       required: true
21 
```

A red circle with the number 5 is overlaid on the bottom left of the interface.