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API Lifecycle Governance with IBM API Connect v2018

Course Guide

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Course Guide

API Lifecycle Governance with IBM API Connect v2018

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IBM Training

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Contents

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Course description

API Lifecycle Governance with IBM API Connect v2018

Duration: 2 days

Purpose

This course teaches you how to configure the gateway, portal, and analytics services in Cloud Manager that are used by the API Connect infrastructure through all phases of the API lifecycle. You manage all aspects of the provider organization in the API Manager user interface to create, publish, version, and retire API artifacts such as Products, plans and APIs themselves. You also learn how to manage consumer organizations who use the APIs that are made available on the Developer Portal. You learn how to add members to the consumer organization that provides access to the APIs on the Developer Portal. You learn how the layout of the Developer Portal can be customized. Finally, you call the APIs on the secure gateway and you view the graphs and metrics of API usage.

Audience

This course is designed for API Connect cloud administrators, lifecycle administrators, and application developers.

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Prerequisites

Conceptual knowledge of APIs; for more information, see the resources at https://developer.ibm.com/apiconnect/

Objectives

- Configure services in Cloud Manager for an on-premises installation of API Connect V2018
- Identify the container runtime infrastructure that supports the API Connect services
- Create a catalog and Developer Portal
- Create a consumer organization
- Manage member roles and permissions in the Developer Portal
- Define APIs, Products, and plans in API Manager
- Identify the API lifecycle stages
- Stage, publish, version, migrate, deprecate, and retire Products and APIs
- Review and approve API lifecycle requests
- Customize the Developer Portal
- Create an application and subscribe to a plan

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- Review API analytics in the Developer Portal
- Review analytics dashboards and visualizations in API Manager

Contents

- Configuring the API Connect cloud topology
- Managing catalogs and consumer organizations
- Defining an API and Product
- Managing and approving API Products
- Customizing the Developer Portal
- Creating an application and subscribing to a plan
- Calling APIs on the gateway and analyzing usage

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Agenda

Note

The following unit and exercise durations are estimates, and might not reflect every class experience.

Day 1

(00:15) Course introduction
(01:00) Unit 1. Managing the API Connect cloud topology
(00:45) Exercise 1. Configuring the cloud topology
(00:45) Unit 2. Managing catalogs and consumer organizations
(01:00) Exercise 2. Managing catalogs and consumer organizations
(00:30) Unit 3. Defining APIs in API Manager
(00:45) Exercise 3. Defining an API and Product in API Manager
(01:15) Unit 4. The Product lifecycle

Day 2

(01:00) Exercise 4. Managing and approving API Products
(00:45) Unit 5. Customizing the Developer Portal
(00:45) Exercise 5. Customizing the Developer Portal
(00:30) Unit 6. Creating an application and subscribing to a plan
(00:45) Exercise 6. Creating an application and subscribing to a plan
(00:45) Unit 7. API analytics
(01:00) Exercise 7. Calling an API on the gateway and monitoring API usage
(00:05) Unit 8. Course summary

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Unit 1. Managing the API Connect cloud topology

Estimated time

01:00

Overview

When you install IBM API Connect, you must define an on-premises cloud. You define the topology of your on-premises cloud with the Cloud Manager web user interface. As the Cloud administrator, you configure the services that run in your cloud: the Analytics service, the Gateway service, and the Developer Portal service. In addition, you manage the membership of provider organizations by creating the owner for the organization that creates APIs.

How you will check your progress

- Review questions
- Lab exercise

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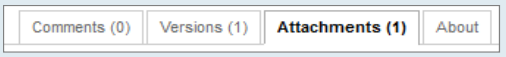
How to check online for course material updates

Note: If your classroom does not have Internet access, ask your instructor for more information.

Instructions

1. Enter this URL in your browser: **ibm.biz**/CloudEduCourses
2. Find the product category for your course, and click the link to view all products and courses.
3. Find your course in the course list and then click the link.
4. The wiki page displays information for the course. If a course corrections document is available, this page is where it is found.
5. If you want to download an attachment, such as a course corrections document, click the **Attachments** tab at the bottom of the page.



6. To save the file to your computer, click the document link and follow the prompts.

Managing the API Connect cloud topology

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Figure 1-1. How to check online for course material updates

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Unit objectives

- Explain the concept of the API Connect cloud
- Describe the purpose of the Cloud Manager user interface
- Explain the role of the Cloud administrator
- Review the topology of an API Connect cloud
- Identify the gateway service types
- Examine the configuration of gateway service
- Define an email server
- Describe the purpose of user registries
- Identify the types of supported user registries in Cloud Manager
- Describe the role of Transport Layer Security profiles
- Explain the concept of a provider organization
- Describe the API Connect user interfaces by function
- Identify deployment options for API Connect at installation
- Describe the function of the installation assist utility
- Identify the components of the runtime environment

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Figure 1-2. Unit objectives

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IBM API Connect solution

- A comprehensive solution to create, secure, control, publish, manage, and monitor application programming interfaces (APIs)
- The IBM API Connect solution has four installation offerings:
  - Install and managed on your own network with the on-premises edition
  - IBM Cloud Private (ICP)
  - Dedicated IBM Cloud
  - As a service on the IBM Cloud
- **IBM API Connect on-premises** edition is a single, or multi-organization cloud solution
- The "API Connect cloud" is the combination of virtual appliances or Docker containers that are needed to host your APIs
  - A set of servers and services that are provided by an API Connect installation, whether it is installed on-premises or hosted as a cloud-based service

Managing the API Connect cloud topology

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Figure 1-3. IBM API Connect solution

Global Knowledge®

IBM API Connect is a comprehensive solution to create, secure, control, publish, manage, and monitor APIs.

IBM API Connect has a range of installation and management options ranging from on-premises through hosted services that run on the public IBM Cloud architecture.

IBM API Connect is an on-premises, single, or multi-organization, cloud-based solution.

The on-premises solution runs in-house on the customer's network, hardware, and software infrastructure.

The on-premises cloud can be a combination of new and existing physical appliances and virtual appliances or can be entirely composed of virtual appliances.

Information

For more information, see the topic “Available deployment options of API Connect” in the IBM Knowledge Center for IBM API Connect at https://www.ibm.com/support/knowledgecenter/SSMNED_2018/com.ibm.apic.overview.doc/rapic_overview_apic_formats.html.

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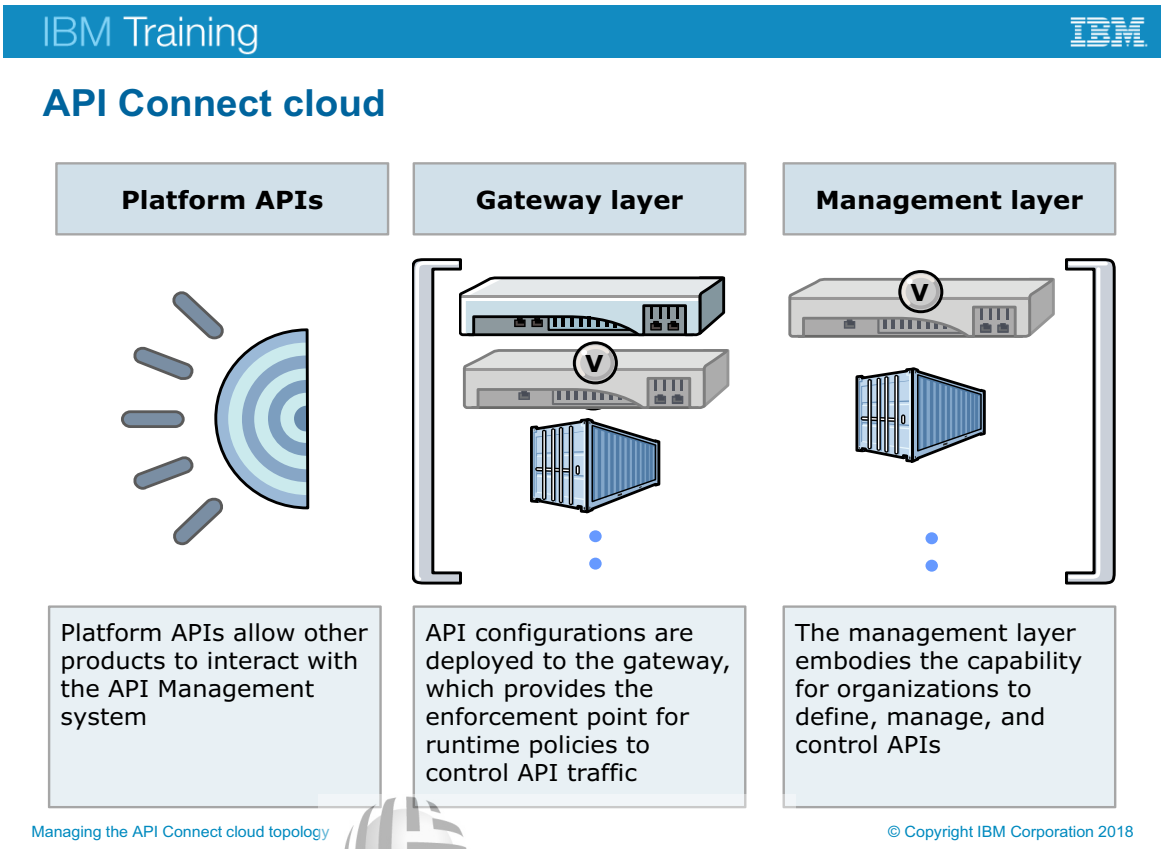

Figure 1-4. API Connect cloud

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When you install IBM API Connect, you define an on-premises cloud. To determine the topology of appliances for this cloud, consider the number of Management and Gateway services that are required to address your API needs.

The Gateway provides the enforcement point for runtime policies to control API traffic.

The Management layer embodies the capability for organizations to define, manage, expose, and control APIs.

At least one Management service and one Gateway service are required to create a cloud capable of running the API Connect solution.

Not shown in the figure is the consumer organization components that includes the Developer Portal.

There are two types of deployment scenarios for API Connect v2018:

- Appliance-based deployment using .ova files on virtual machines
- Container-based deployment using Docker and Kubernetes clusters.

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Information

The image that is used for the exercises in this course are built with a container-based deployment using Docker and Kubernetes clusters.

IBM API Connect and API Connect are used interchangeably in the remaining presentations in this course.

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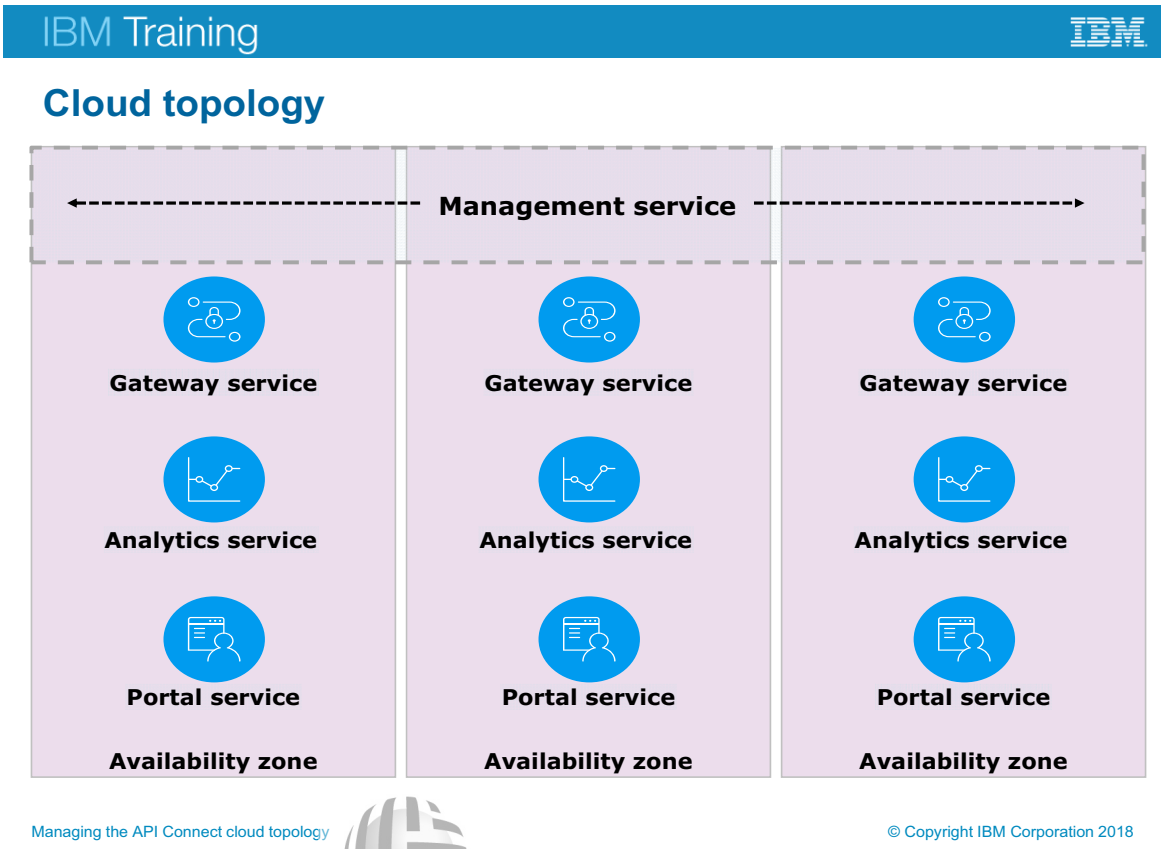

Figure 1-5. Cloud topology

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The Cloud Manager topology consists of availability zones that contain the API Connect services - management, gateway, analytics and portal services. Availability zones can contain one or more gateway services, analytics service, and portal service, but there is one management service that spans all availability zones.

A default availability zone is created during installation that includes a Management service.

An availability zone is a logical or physical set of data centers containing one or more API Connect services. Availability zones provide redundancy and failover in the event of network issues.

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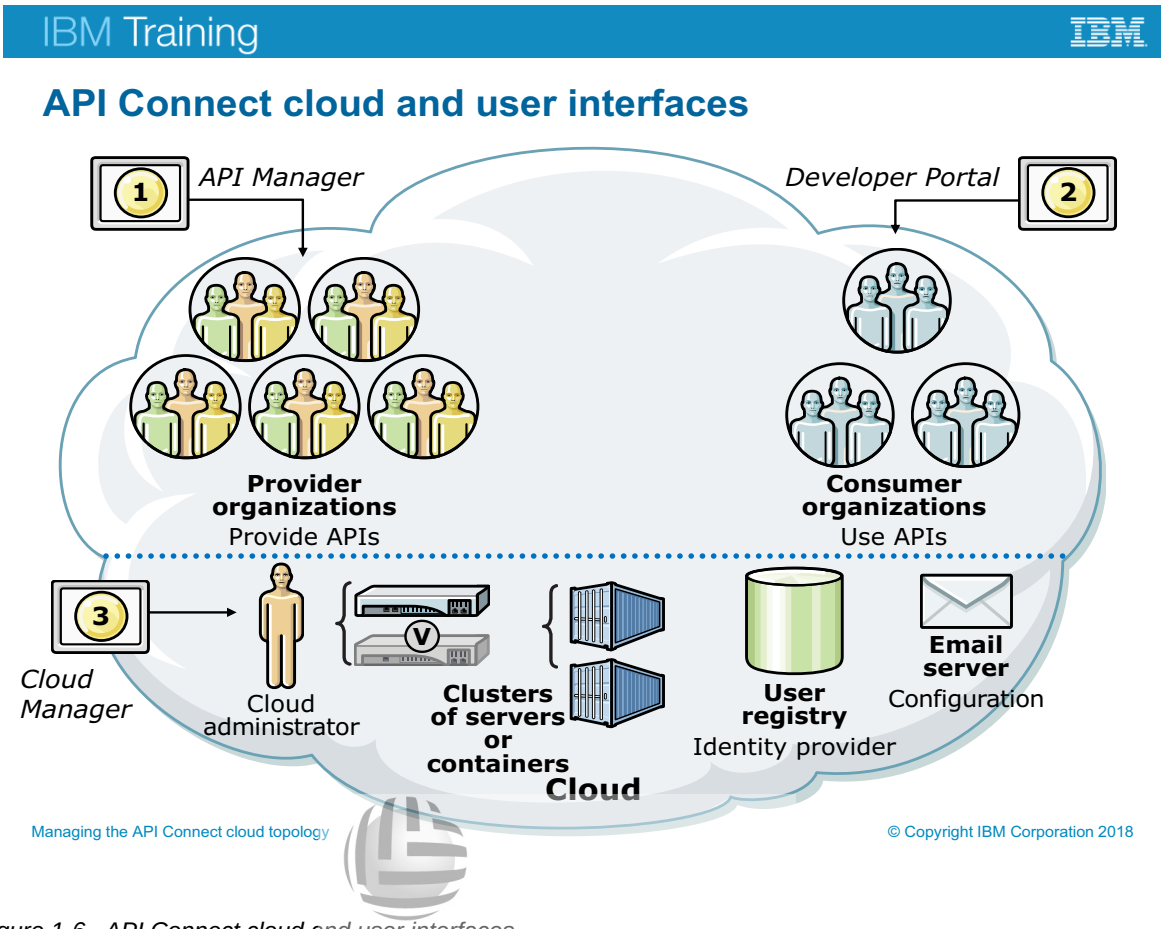

Figure 1-6. API Connect cloud and user interfaces

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The diagram shows the infrastructure and organizations for an API Connect on-premises cloud.

1. The API Manager user interface provides authorized access to the APIs, Products, and plans and related linked services capability for the API provider.
2. The Developer Portal provides access for consumer organizations to the Products, plans, and APIs that are published by an API provider organization to a catalog.
3. The Cloud Manager user interface provides access for authorized users to administer the servers and user registries that make up the cloud infrastructure.

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Cloud Manager user interface

- Configure Cloud
- Configure topology
- Manage resources
- Manage organizations

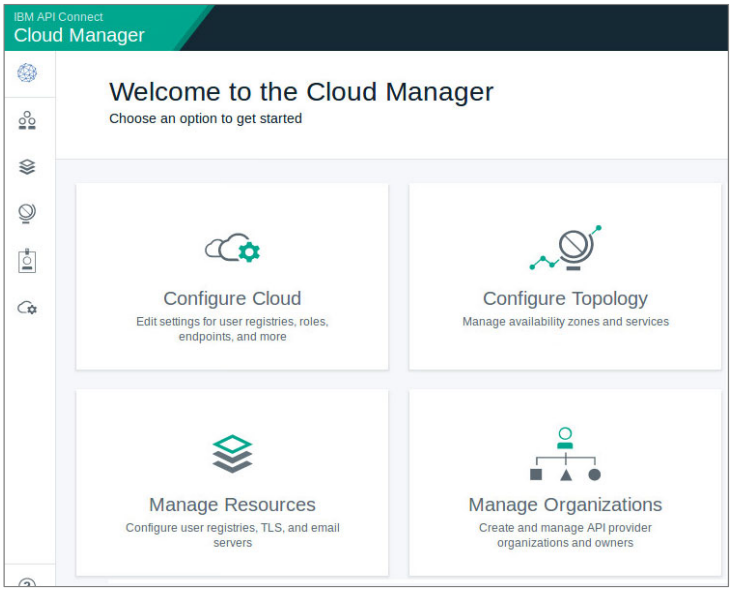

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Figure 1-7. Cloud Manager user interface

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The page shows the Home page for the Cloud Manager user interface of API Connect.

The Cloud administrator signs in to the Cloud Manager. The administrator can click the icons to configure the cloud, configure topology, manage resources, and manage organizations. The Cloud Manager user interface also has a navigation menu on the left side of the page that provides other ways to access the administration functions.

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Cloud Manager functions

- Enables a Cloud Administrator to *configure*, and *manage* the API Connect on-premises cloud
  - Not available when running API Connect as a service on IBM Cloud Public
- Configure:
  - Declare settings such as timeout values for invitations to join an organization
  - Configure member roles and role defaults
  - Define user registries
  - Define provider organizations
  - Connect to an existing SMTP mail server
  - Configure endpoints for the analytics, gateway, and portal services
- Manage
  - Register new services and manage existing services
  - Manage Transport Layer Security (TLS) server and client profiles
  - Manage provider organizations

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Figure 1-8. Cloud Manager functions

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The Cloud Manager user interface is the part of IBM API Connect that enables a Cloud Administrator to define, configure, and manage the API Connect on-premises cloud.

You can use the Cloud Manager to configure the existing API Connect cloud to update settings at the cloud level.

You can use the Cloud Manager to manage organizations.

API Connect may need to transmit data across an untrusted network, for example, when accessing the Gateway, email server, or LDAP server. TLS provides secure network layer transportation of data between two parties.

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Role-based administration of the cloud

- Cloud administrator
  - Installation process creates a user ID **admin**
  - Prompted to change the default password on first sign-in to Cloud Manager

Role	Permissions	Actions	Description
Cloud Administrator	Cloud-settings	View, manage	View, define, and configure settings and defaults
	Topology	View, manage	View, register, edit, and delete analytics, gateway, and portal services
	Provider organizations	View, manage	Add, update, and delete provider organizations
	Users	View, edit	View, add, update, and delete Cloud Manager users

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Figure 1-9. Role-based administration of the cloud

Global Knowledge

Cloud Administrator role.

- Installation process creates a user ID **admin**
- Prompted to change the default password on first sign in to Cloud Manager.

The Cloud Manager URL is in the format: <cloud>.<hostname>.<domainname>

In the course, the URL to display the Cloud Manager in the browser is: https://cloud.think.ibm

The Cloud Administrator can create users who can be assigned roles that are given some permissions for administering the cloud.

A Topology Administrator is given the same permissions as the Cloud Administrator, except the permissions to view and edit users.

The Cloud Administrator can create, update, and delete provider organizations and their owners.

One of the important first tasks of the Cloud Administrator is to create a provider organization account and add an owner to the account. Then, members can be added to the provider organization to start creating and publishing APIs.

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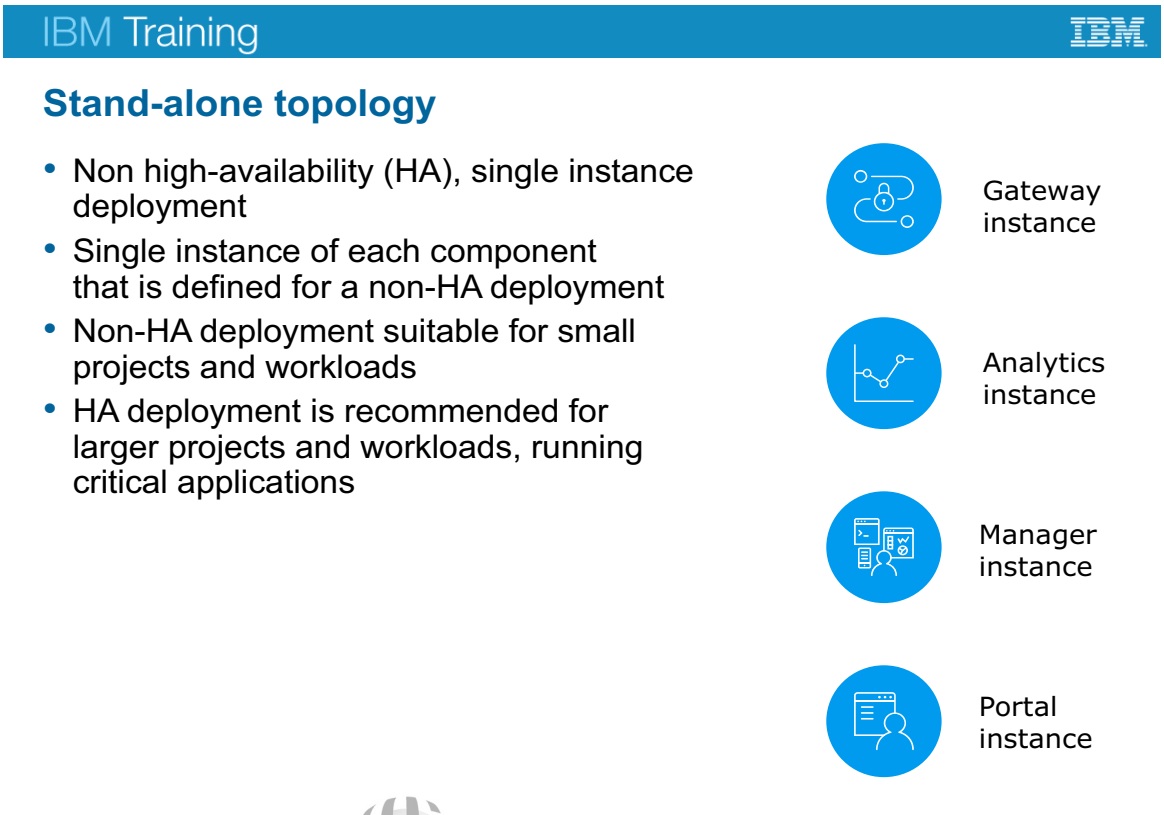

Figure 1-10. Stand-alone topology

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Depending on what you want to use your API Connect cloud for, consider the topology that you want to implement.

For small projects, install a single instance of each components by specifying the deployment mode of *dev* in the Install Assist YAML file. The other mode option is *standard*.

The standalone topology was used to create the environment for the course exercises.

Note

In API Connect 2018.3.4 the deployment mode of *demo* was used for a standalone topology.

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Gateway service types

- DataPower gateway (Classic) is a V5-compatible gateway
  - Use for complex API assembly requirements
- DataPower API gateway
  - Newer gateway with performance benefits
  - Does not yet include all the policies that are offered by the V5 gateway
  - Policies to be added over time

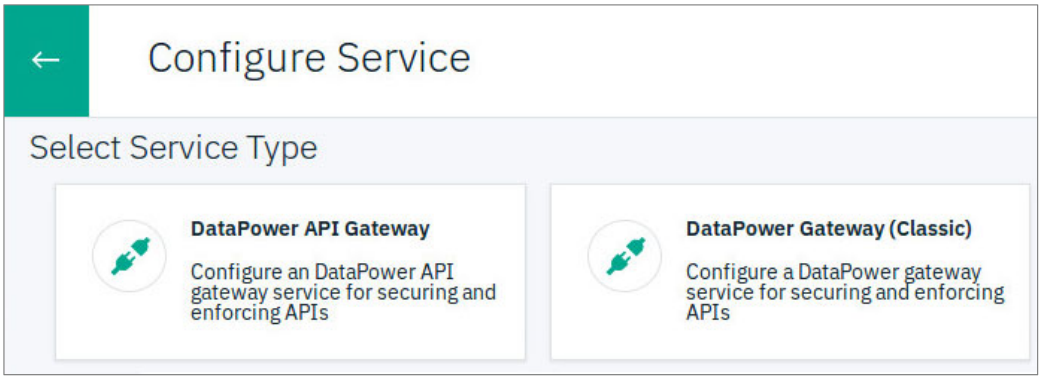

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Figure 1-11. Gateway service types

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The DataPower API Gateway is a new gateway that has been designed with APIs in mind, and with the same security focus as DataPower Gateway (v5 compatible). Where DataPower Gateway (v5 compatible) was built for flexibility, DataPower API Gateway is built specifically for the API use case, with resulting performance benefits.

Since the DataPower API Gateway did not support all the policies that are provided by the v5-compatible gateway, the DataPower Classic gateway is used in the course lab exercises.

For more information see:
https://www.ibm.com/support/knowledgecenter/SSMNED_2018/com.ibm.apic.overview.doc/rapic_gateway_types.html

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Configuring the gateway service

- Management endpoint
  - URL that the Management server connects to the gateway
- API invocation endpoint
  - Base portion of the URL that maps to the base portion of the URL for incoming API traffic
  - A public address (FQDN) with appended with paths that are specific to your API calls

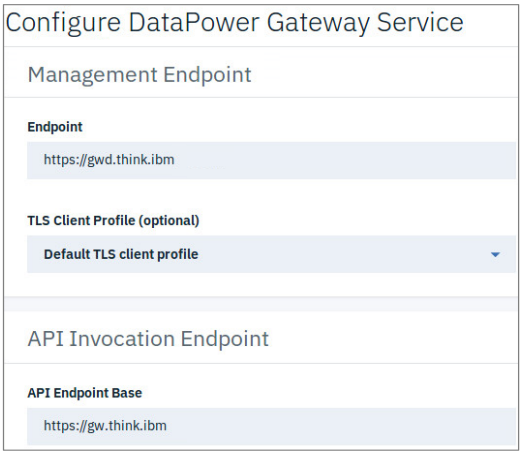

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Figure 1-12. Configuring the gateway service

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When you configure the gateway, you specify the Management endpoint and the API Invocation endpoint.

If the API Connect product is installed into a Kubernetes runtime environment, the endpoints that you specify when you register the gateway service should match the values contained in the apicup installation utility.

You can use Kubernetes and Docker containers to run API Connect. The Install Assist utility program automates the installation process which is initiated by entering apicup init from the command line to start the installation process.

More information on the installation utility is given later in this unit.

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Services that are registered in Cloud Manager

- Gateway Service, Portal Service, and Analytics Service are registered

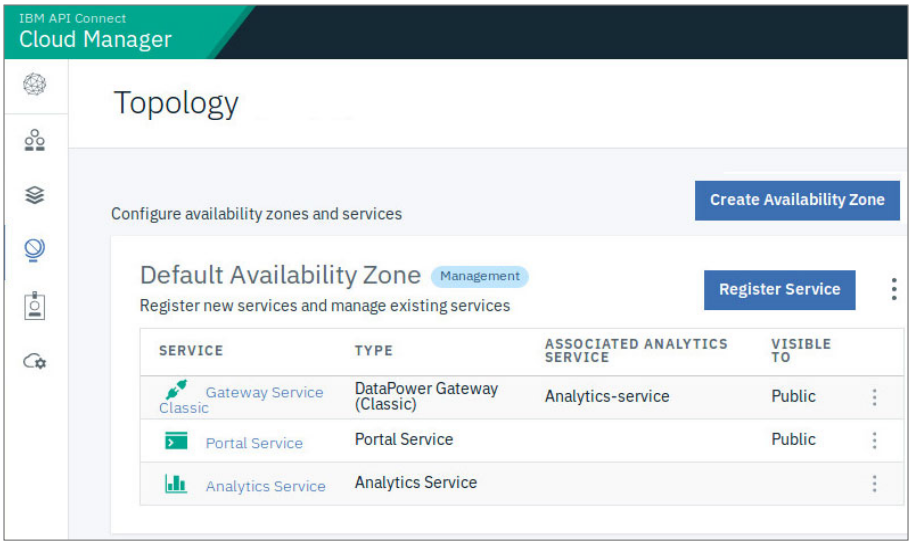

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Figure 1-13. Services that are registered in Cloud Manager

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The default availability zone contains the Management Service.

When the Gateway Service, Portal Service, and Analytics Service are registered, the API Connect Cloud is configured for the stand-alone topology that is used in the class exercises.

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Configure the cloud environment: SMTP server

- To define the email server, select the **Resources** option
  - Then, selected **Notifications**

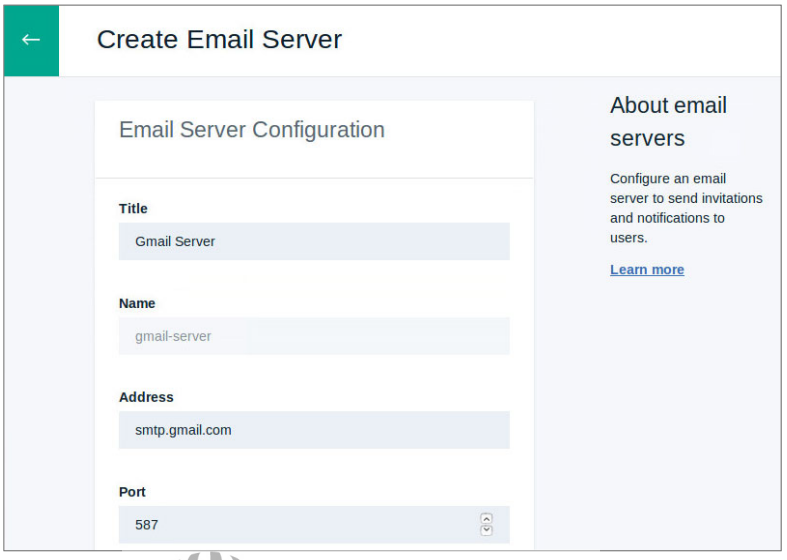

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Figure 1-14. Configure the cloud environment: SMTP server

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In the Cloud Manager, you configure an email server from the **Resources > Notifications** option.

You must configure an email server in Cloud Manager.

Email notifications are sent for invitations for members to join a provider organization or a consumer organization. The member joins the organization by responding to the activation link that is sent in the email message.

1+1=2 **Example**

In the example on the page, the Gmail SMTP server is configured as the email server. The lab files in the course use a different internal email server.

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View the cloud environment: Endpoints

- View endpoint settings from Cloud Settings
- API Manager endpoint is the URL used to sign on to the API Manager user interface

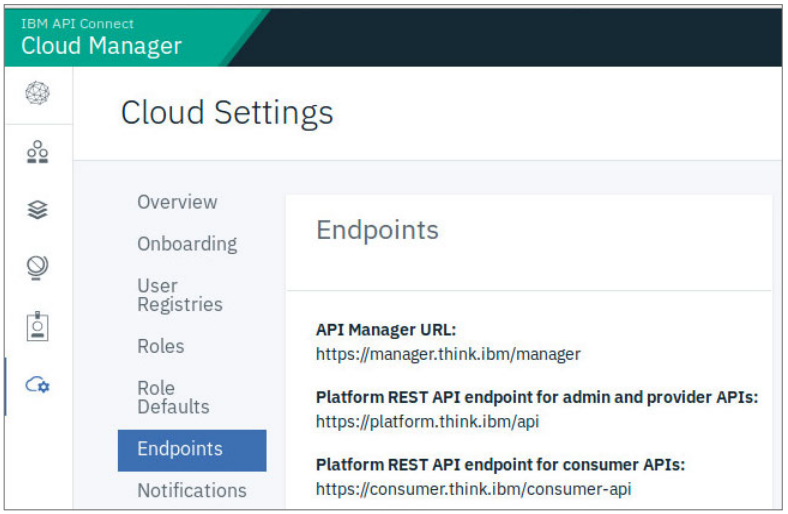

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Figure 1-15. View the cloud environment: Endpoints

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In the Cloud Manager, the **Cloud Settings** option in the navigation menu is used to configure the cloud environment.

From the **Endpoints** option, you can view the endpoints that are configured for the cloud environment.

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Working with user registries

- To secure your API Connect catalogs, you authenticate with a user registry
- View the user registries that are configured for Cloud Manager and API Manager
  - In Cloud Manager, select **Cloud Settings** > **User Registries**
- Default user registry is the local user registry that cannot be configured
- A registry cannot be changed after a user is invited to be the owner of a provider organization

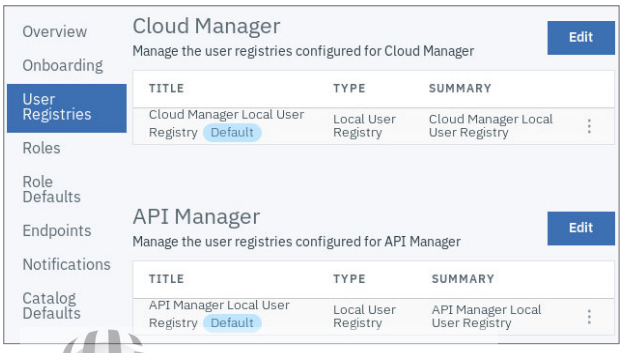

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Figure 1-16. Working with user registries

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Registries supported in the Cloud Manager and API Manager:

- Local user registry
- URL authentication
- LDAP

Default user registry is the local user registry that cannot be configured.

The admin user is unique and always remains in the Cloud Manager local user registry.

You can add user registries from the **Resources > User Registries** page in Cloud Manager.

In the Cloud Manager and API Manager, a registry cannot be changed after a user is invited to be the owner of a provider organization, even if the invitation is not yet accepted.

The example that is shown is taken from the Cloud Manager user interface and it displays the user registries that are configured for Cloud Manager and API Manager.

In the example, Cloud Manager and API Manager use separate local user registries.

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Authenticating with user registries

- User registries of the following types can be used for authentication in API Connect:

User registry type	Description	Used for:
Local user registry	An internal registry that is stored with API Connect	Authentication of users
LDAP directory	Lightweight Directory Access Protocol (LDAP)	Authentication, API security
Authentication URL	Enables integration with third-party authentication providers	Authentication, API security

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Figure 1-17. Authenticating with user registries

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By using an enterprise registry such as LDAP, gives you access to all the users that are already defined in the LDAP directory when it is configured in API Connect.

A local user registry cannot be pre-populated since users can only be added by using Cloud Manager, API Manager, or the Developer Portal user interfaces.

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TLS profiles

- TLS profiles are used in API Connect to secure transmission of data through websites
- TLS (Transport Layer Security) certificates ensure that information that you submit is not going to be stolen or altered
- API Connect provides a Default TLS profile
  - Uses self-signed certificates
  - Can be used for development and testing

Important

API Connect includes several default TLS profiles to help you get started working with the application. The default profiles should not be used in a production environment. It is important to create your own profiles to ensure a secure network.

Managing the API Connect cloud topology

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Figure 1-18. TLS profiles

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In API Connect, TLS profiles are used to secure transmission of data through websites.

Transport Layer Security (TLS) are cryptographic protocols that provide communications security over a computer network.

API Connect may need to transmit data across an untrusted network, for example, when accessing the Gateway, email server, or LDAP server. TLS provides secure network layer transportation of data between two parties.

Note

The course lab environment uses the default TLS profiles that are provided with API Connect.

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IBM Training

Default TLS profiles

- A TLS Server Profile is used by the Gateway to configure its endpoint for use during API execution
- A TLS Client profile is used whenever the system needs to communicate with another endpoint over TLS

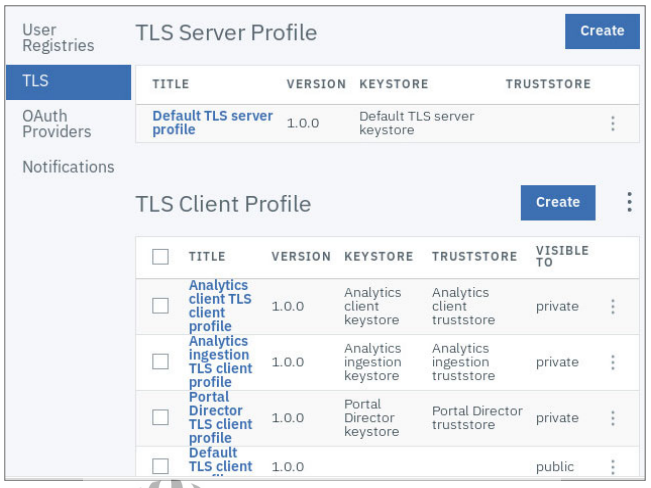

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Figure 1-19. Default TLS profiles

Global Knowledge®

API Connect provides two types of TLS Profiles: a Default TLS Server and Default TLS Client Profile. Information regarding the protocol, self-signed certificate, and cipher settings can be viewed or edited by clicking the relevant profile.

Information

For production systems, consider replacing the certificates with those created by your organization or with one from a certificate authority (CA).

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IBM Training

Organizational concept

- Users can belong to one or more *organizations*
  - Users work on the APIs or applications that belong to the organization
- Provider organization
  - These organizations own APIs and associated plans
  - Defines members who can work on products, plans, and APIs
  - Members in the provider organization work mainly with the developer toolkit and the API Manager user interfaces
  - Pre-configured roles are set in Cloud Manager
  - Initial provider organization is defined in Cloud Manager
- Consumer organization
  - Members in these organizations use the APIs by creating applications that call the APIs
  - Pre-defined default roles are set in Cloud Manager
  - Initial consumer organization for a catalog is defined in API Manager

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Figure 1-20. Organizational concept

Global Knowledge®

With the infrastructure in place, organizations of members can create and test APIs.

Members can belong to one or more organizations and individually or collectively work on the APIs or applications that belong to the organization.

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IBM Training

Role defaults

- Role defaults for provider organizations and consumer organizations are pre-configured in Cloud Manager
- The default permissions can be changed except for the member and owner

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Figure 1-21. Role defaults

Global Knowledge®

Role defaults for provider organizations and consumer organizations are pre-configured in Cloud Manager.

Except for the owner and member roles, you can edit the roles and change the default permissions by selecting the list of options ellipsis in the row for the role.

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IBM Training

API Connect user interfaces: By function

User interface	Function
Cloud Manager	Configure resources
API Manager	Create, assemble, stage, publish, retire, archive, and version APIs
Developer Portal	Search for APIs and register applications

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Figure 1-22. API Connect user interfaces: By function

Global Knowledge®

API Connect provides built-in user interfaces to access cloud-based resources:

- **Cloud Manager**: The graphical user interface that is used to configure and manage the resources of the on-premises cloud.
- **API Manager**: A graphical user interface that facilitates the creation, versioning, and lifecycle management of APIs.
- **Developer Portal**: A portal where APIs are published to encourage the development of new applications.

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IBM Training

Deployment options

IBM API Connect v2018 can be deployed to any of these environments:

- **Kubernetes** runtime environment
  - Runtime that is used in course lab environment
  - Uses Docker containers that are orchestrated by Kubernetes
- **IBM Cloud Private**
  - Elastic runtime based on Kubernetes
- Into a **VSphere** environment
  - Deploy by using OVA files
  - Implements a Kubernetes runtime

- Deploy to any of these environments with the Install Assist installation method
- **Install Assist** tool contains the **apicup** installation utility program, which provides an automated installation process for API Connect
  - The installation of API Connect to the Kubernetes runtime is already done
  - Configure Cloud Manager settings to set up the cloud environment

Managing the API Connect cloud topology

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Figure 1-23. Deployment options

Global Knowledge®

When IBM API Connect is installed, you choose one of the deployment options: Kubernetes, IBM Cloud Private, or VSphere OVA files.

For the exercises in this class, IBM API Connect was deployed to the Kubernetes runtime environment. The API Connect product is fully installed at the start of the class and students only need to configure some of the settings in Cloud Manager.

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Installation utility program (apicup)

- Provides a script-based installation into the Kubernetes runtime environment
  - YAML-based installation script
  - Reference the YAML file when you are registering services in Cloud Manager

```
kind: apiconnect-up
subsystems:
  analytics:
    endpoints:
    - hostname: ai.think.ibm
      name: analytics-ingestion
    - hostname: ac.think.ibm
      name: analytics-client
    kvs:
      coordinating-max-memory-gb: "12"
      data-max-memory-gb: "8"
      data-storage-size-gb: "50"
      enable-persistence: "true"
      extra-values-file: ""
      ingress-type: ingress
      master-max-memory-gb: "8"
      master-storage-size-gb: "5"
      mode: demo
      namespace: apiconnect
      registry: localhost:5000
      registry-secret: my-localreg-secret
      storage-class: velox-block
    target: k8s
    type: analytics
  gw:
    endpoints:
    - hostname: gw.think.ibm
```


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Figure 1-24. Installation utility program (apicup)

Global Knowledge®

API Connect V2018 can be installed by using the Install Assist installation method.

The **Install Assist** tool provides script-based installation into a Kubernetes runtime environment.

The Install Assist tool contains the apicup installation utility program.

An example of the apiconnect-up installation utility programs is shown.

Reference the endpoints that are defined in the installation utility program when you register the Analytics, Gateway, and Portal services in Cloud Manager.

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IBM Training

Unit summary

- Explain the concept of the API Connect cloud
- Describe the purpose of the Cloud Manager user interface
- Explain the role of the Cloud administrator
- Review the topology of an API Connect cloud
- Identify the gateway service types
- Examine the configuration of gateway service
- Define an email server
- Describe the purpose of user registries
- Identify the types of supported user registries in Cloud Manager
- Describe the role of Transport Layer Security profiles
- Explain the concept of a provider organization
- Describe the API Connect user interfaces by function
- Identify deployment options for API Connect at installation
- Describe the function of the installation assist utility
- Identify the components of the runtime environment

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Figure 1-25. Unit summary

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IBM Training

Review questions

1. True or False: The initial owner of the provider organization is set in Cloud Manager.

2. True or False: The default permissions for the owner of the provider organization can be changed in Cloud Manager.

3. True or False: You must configure an email server in Cloud Manager before you can add a provider organization.

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Figure 1-26. Review questions

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Write your answers here:

1.

2.

3.

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IBM Training

Review answers

1. True or False: The initial owner of the provider organization is set in Cloud Manager.
   The answer is True.

2. True or False: The default permissions for the owner of the provider organization can be changed in Cloud Manager.
   The answer is False.
   Neither the owner nor the member roles in the provider organization can be edited.

3. True or False: You must configure an email server in Cloud Manager before you can add a provider organization.
   The answer is True.

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Figure 1-27. Review answers

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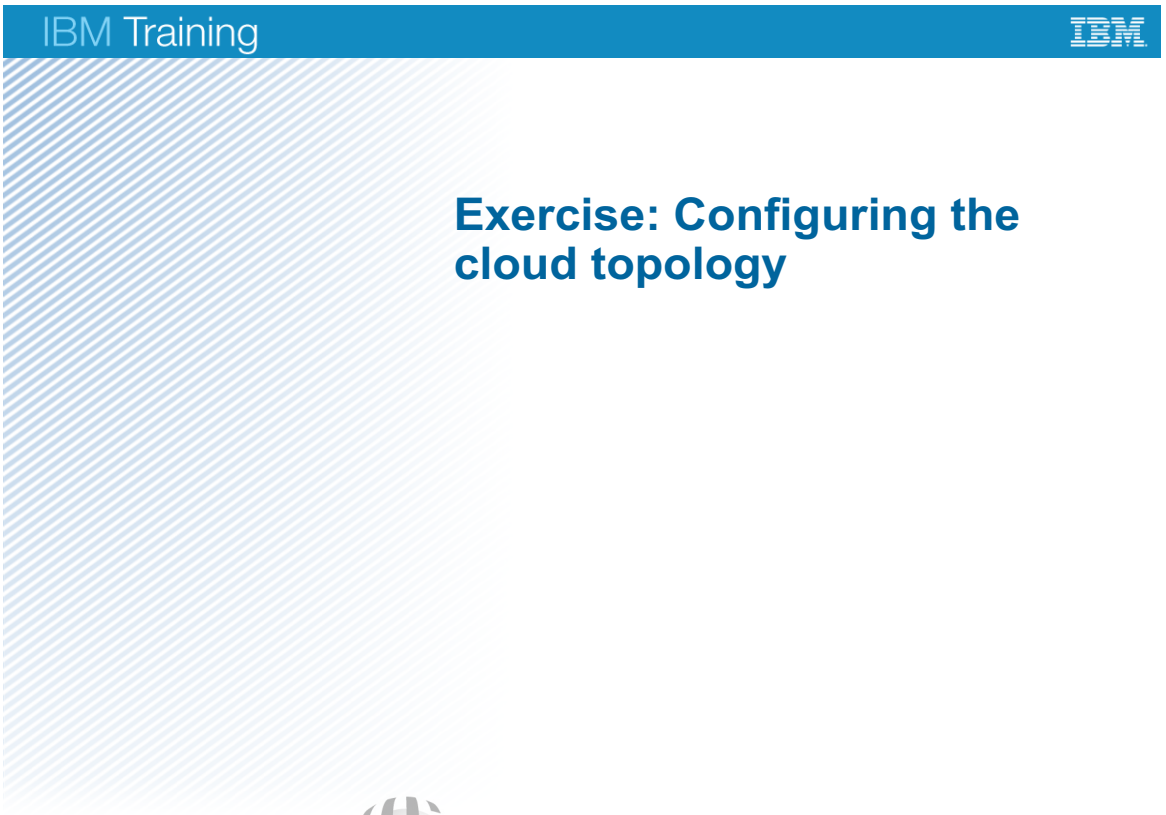

Figure 1-28. Exercise: Configuring the cloud topology

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IBM Training

Exercise objectives

- Test the operation of the private DNS on the image
- Review the Kubernetes runtime components
- Ensure that the API Connect pods are operational
- Sign on to the Cloud Manager graphical interface
- Enable the email notification service for the cloud
- Register the analytics, portal, and gateway services in Cloud Manager
- Associate the analytics service with the gateway
- Review the provider organization in Cloud Manager
- Review the user registries in Cloud Manager
- Review the settings in Cloud Manager

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Figure 1-29. Exercise objectives

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Unit 2. Managing catalogs and consumer organizations

Estimated time

00:45

Overview

Users in consumer organizations subscribe to products, plans, and APIs that you create in API Connect. In this unit, you learn how to define a catalog and Developer Portal in API Manager. You see where the Developer Portal user registry is defined. You create a consumer organization in the API Manager. Review the Developer Portal user interface.

How you will check your progress

- Review questions
- Lab exercise

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IBM Training

Unit objectives

- Describe the interaction between organizations and catalogs
- Explain how to create a catalog and a Developer Portal
- Describe the use of spaces within a catalog
- Configure a Developer Portal for the catalog
- Identify the administration menu options in the Developer Portal
- Describe the relationship between the provider organization owner and the owner of the consumer organization
- Describe how to create a consumer organization
- Describe the management options that are available to the owner of a consumer organization in the Developer Portal
- Describe how to add a member in the Developer Portal
- Describe the consumer roles that are defined in API Manager
- Identify the roles that are defined in the Developer Portal
- Explain the password lockout criteria

Managing catalogs and consumer organizations

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Figure 2-1. Unit objectives

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IBM Training

Catalogs

- Provider organizations can create separate deployment targets that are called *catalogs* for testing and production
- Each catalog:
  - Is included in the path of a specific API endpoint
  - Has its own Developer Portal
- A default development catalog named "Sandbox" is provided
  - Used for testing
- A catalog is a staging target
  - The URL for API calls and the Developer Portal is specific to a particular catalog

Figure 2-2. Catalogs

Global Knowledge®

While developing and maintaining APIs, members of a provider organization can create separate deployment targets called *catalogs* for testing and production. Each contained catalog is associated with a specific Developer Portal and endpoints. The URL for API calls and the Developer Portal are specific to a particular catalog.

By default, a development catalog is provided for you.

The development catalog is named *Sandbox*.

Other catalogs are added by the organization owner.

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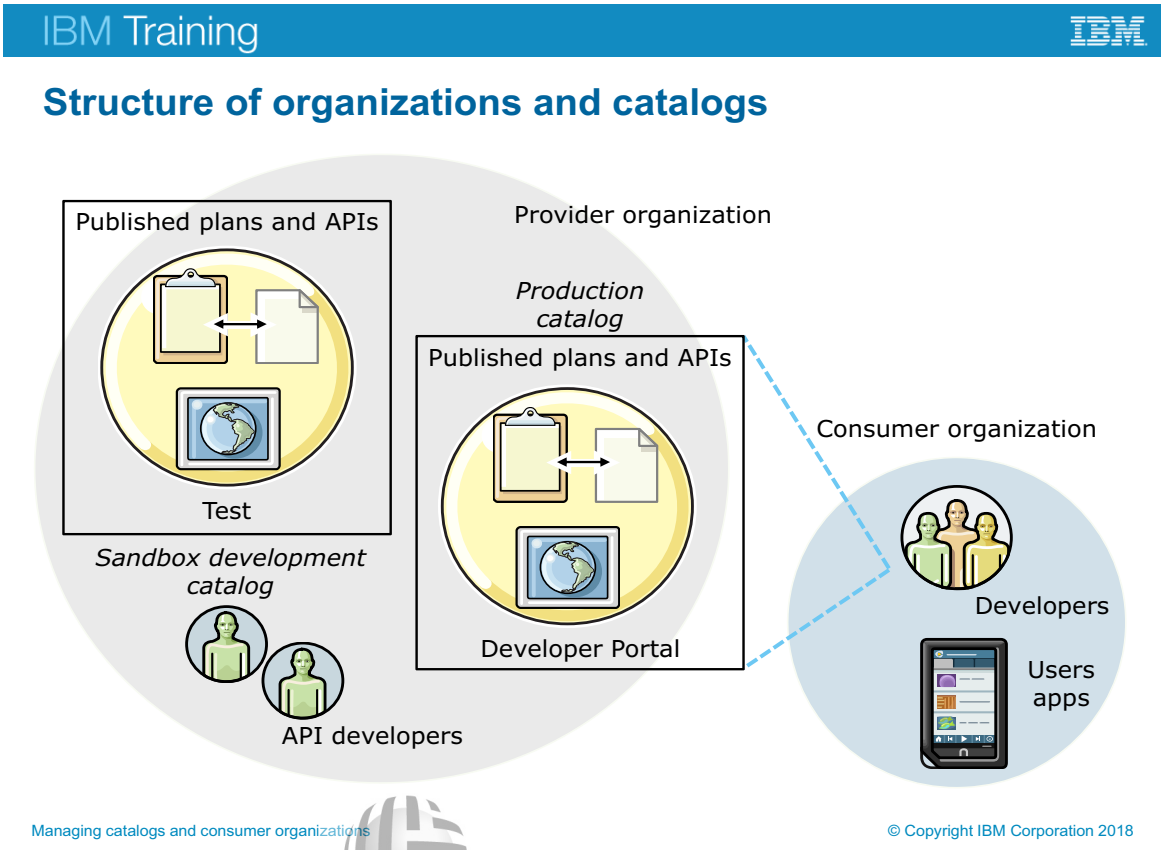

Figure 2-3. Structure of organizations and catalogs

Global Knowledge®

To become available to consumers, APIs must be staged and published to a catalog. A catalog has an associated developer portal.

After you create and test APIs, publish one or more plans to expose the plan and API resources on the Developer Portal.

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IBM Training

Steps to create a catalog and portal

1. Ensure that Portal service is configured in Cloud Manager
2. Add a user registry in API Manager if you are not using the default local registry for the portal
3. Create the catalog in API Manager
4. Open the catalog in API Manager to manage the settings
5. Set permissions for lifecycle actions
6. Add a gateway setting if default gateway settings are not configured in Cloud Manager
7. Configure the portal from the settings
   - Select the Portal Service that was created in Cloud Manager
8. Save changes to settings in API Manager
9. Portal is created and an email is sent
10. Click the email activation link to open the portal and change the `admin` password
11. The portal is available for use

Managing catalogs and consumer organizations

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Figure 2-4. Steps to create a catalog and portal

Global Knowledge®

The steps that are performed to create a catalog and its associated portal are provided on the slide. The first step is done in the Cloud Manager to ensure that an existing API Connect portal installation is used.

Steps 2 through 9 are done from the API Manager user interface.

The final steps are done on the email server and the Developer Portal.

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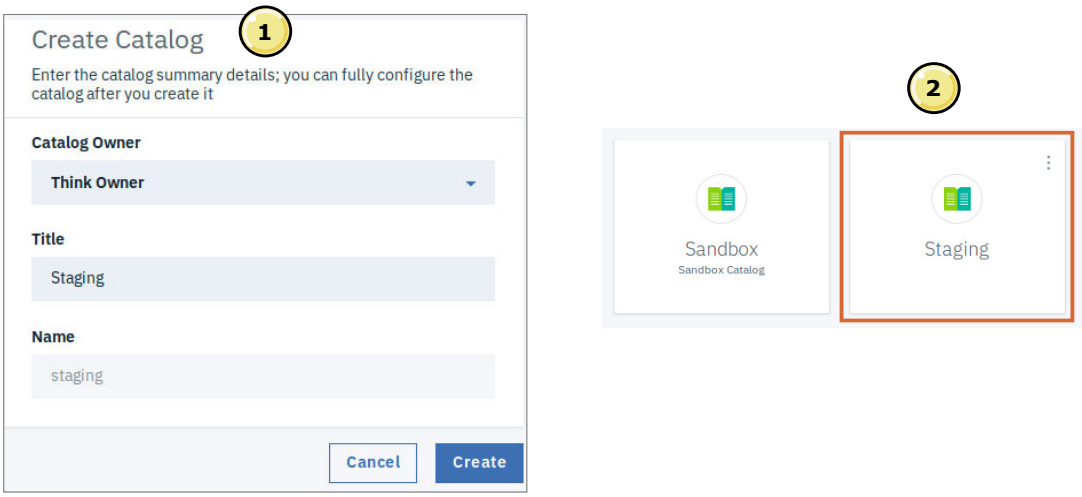
IBM Training

Create a catalog

- Sign in to API Manager as the owner of the provider organization
  - Select Manage Catalogs from the Home page



Managing catalogs and consumer organizations

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Figure 2-5. Create a catalog

Global Knowledge®

To add a catalog, sign in to API Manager as the owner of the provider organization.

Select the Manage Catalogs tile from the Home page. Then, click the Add icon to create a catalog. Complete the fields in the dialog, by giving the catalog a name.

Then, click Create.

The catalog is added and is displayed as a tile in the list of catalogs from the Manage page.

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IBM Training

Catalog settings: Overview tab

- From the Manage menu item in API Manager
  - Select the catalog tile
  - Select **Settings**
- **Overview** tab
  - Toggle Production mode
  - Toggle Spaces
  - Toggle Application lifecycle

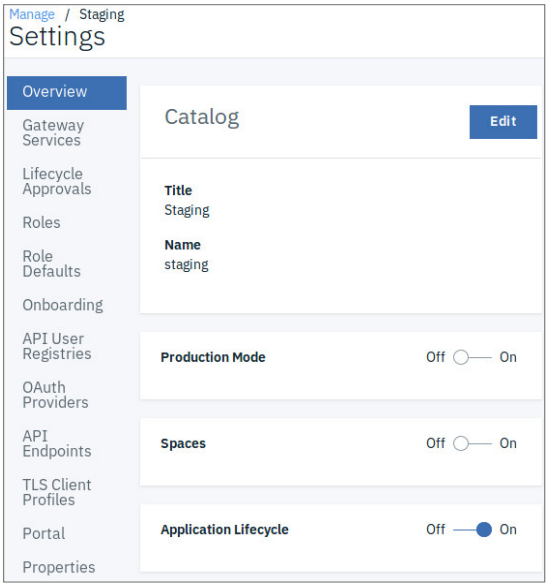

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Figure 2-6. Catalog settings: Overview tab

Global Knowledge®

From the Manage navigation in API Manager, select the catalog that you want to configure. Then, select **Settings**.

From the Overview tab there are toggles for setting production mode, spaces, and application lifecycle.

By default, the new catalog is a development catalog.

To use the catalog in production, set the Production Mode slider control to the On position, then click Confirm.

In a development catalog, staging and publishing actions are forced, meaning that if you republish a previously published Product it is overwritten without warning.

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IBM Training

Spaces

- You can partition your catalog into spaces
- Each Space is used by a different API provider development team
  - Each team manages their APIs independently
- Coordinated offering on the Developer Portal

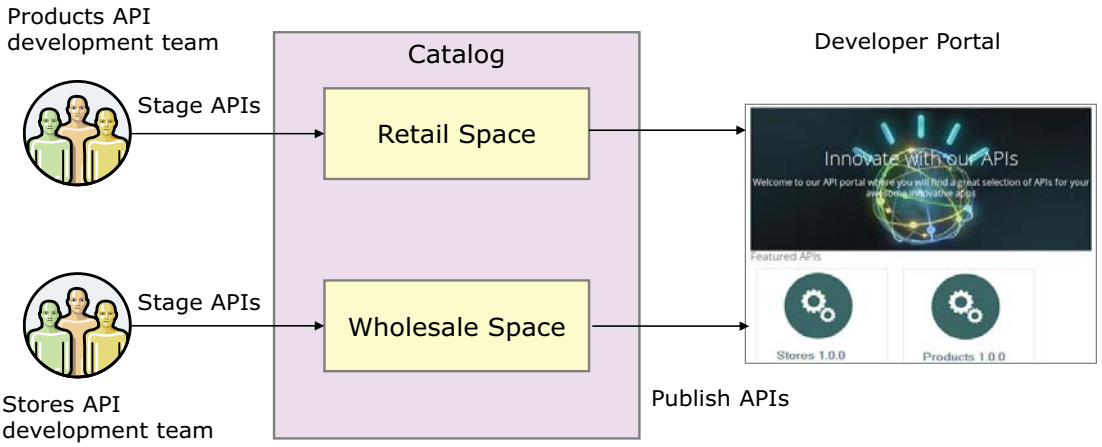

Figure 2-7. Spaces

Global Knowledge®

A catalog can be partitioned into multiple spaces that can be leveraged by different groups of users. A space has its own set of management capabilities for product lifecycle, developers, and subscriptions.

Spaces can be set on from the Overview tab in the Manage catalog page.

Information

The Staging catalog does not use spaces in the course exercises.

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IBM Training

Catalog settings: Gateway services

- Configure the gateway service
- Click **Edit** in the gateway service.
- Select the gateway service that was defined in Cloud Manager. Then, **Save**

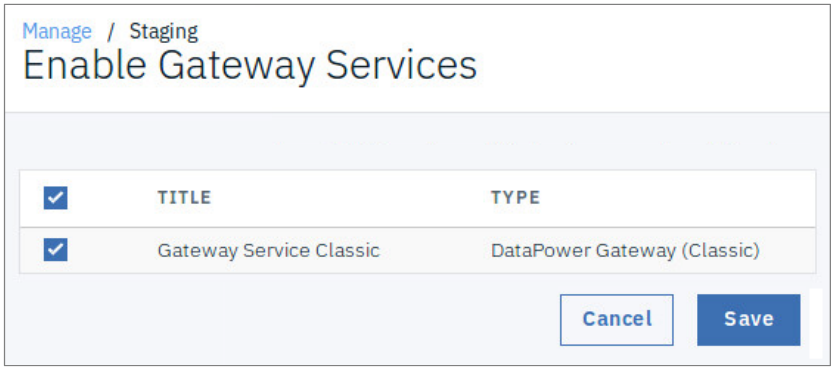

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Figure 2-8. Catalog settings: Gateway services

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Configure the gateway service if the default gateway service for all catalogs is not configured in Cloud Manager

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IBM Training

Catalog settings: API Endpoints

- Customize the gateway URL
- The default API Connect gateway URL is in the format:
  - `https://gateway_cluster_hostname/organization/catalog`
- If you want to achieve custom branding for APIs that are deployed to API Connect, you can specify a custom gateway URL
  - Specify a custom URL for your enterprise in the **API Endpoints** field of the catalog settings
  - Endpoints in the Developer Portal are displayed with the custom name

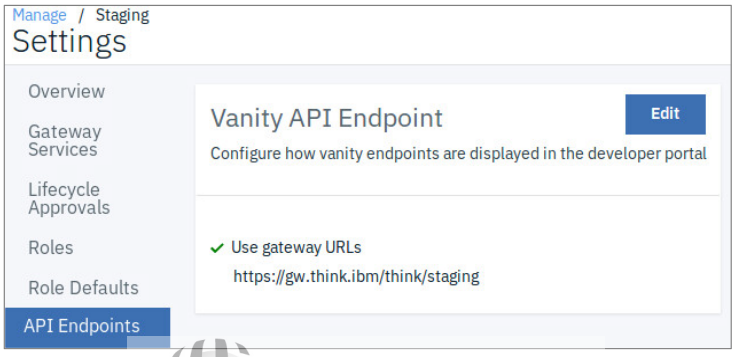

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Figure 2-9. Catalog settings: API Endpoints

Global Knowledge®

You can create a custom gateway URL when you configure the catalog in API Manager.

If you want to achieve custom branding for APIs that are deployed to API Connect, you can specify a custom gateway URL.

Specify a custom URL for your enterprise in the **API Endpoints** field of the catalog settings.

Endpoints in the Developer Portal are displayed with the custom name.
You must configure a DNS entry that maps the custom name to the default name.

Configure APIs so that the gateway enforces them.

Ensure that the same custom gateway URL is not applied to multiple catalogs.

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IBM Training

Catalog settings: Portal tab

- Configure a portal from the Portal tab
  - Click **Create** if no portal exists
- Specify:
  - Portal service to use for the catalog
  - Portal URL (usually pre-filled)
  - Click **Create**
- When you create a portal and no user registry is defined in the catalog settings, API Manager automatically creates a *separate* local user registry for the portal

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Figure 2-10. Catalog settings: Portal tab

Global Knowledge®

Configure a portal from the Portal tab.

Click **Create** if no portal exists.

Specify:

Portal service to use for the catalog

Portal URL (usually pre-filled)

Click **Create.**

When you create a portal, and no user registry is configured in the settings for the catalog, API Manager automatically creates a *separate* local user registry for the portal

The portal local registry stores members of consumer organizations

The API Manager local registry stores members of the provider organization

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IBM Training

Email activation for Developer Portal

- Respond to the email by selecting the activation link for the *admin* user in the email message

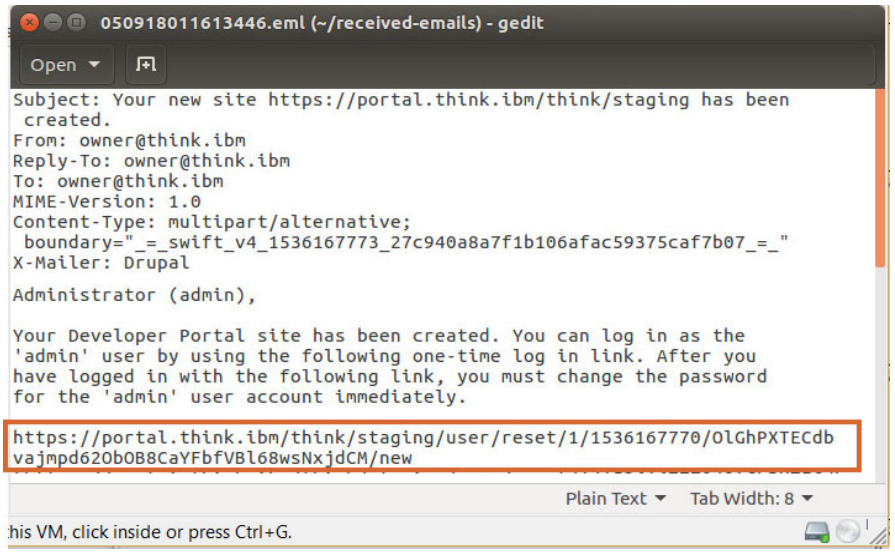

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Figure 2-11. Email activation for Developer Portal

Global Knowledge®

Respond to the email by selecting the activation link for the *admin* user in the email message

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IBM Training

One-time sign in for Developer Portal admin user

- The activation link opens the Developer Portal
- Use the one-time link to sign-in and change the password for the *admin* user

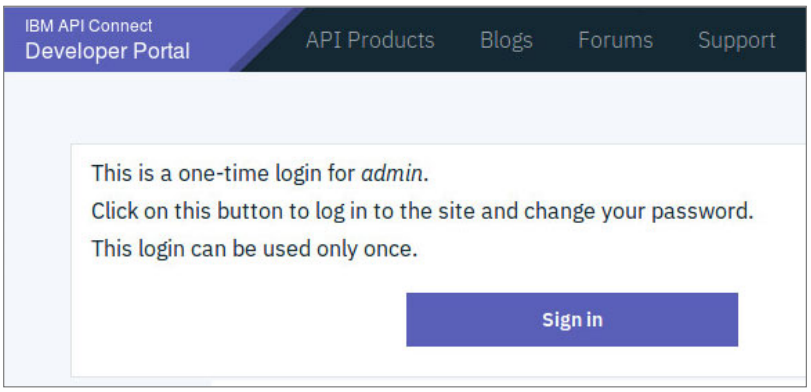

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Figure 2-12. One-time sign in for Developer Portal admin user

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Signed in to the Developer Portal

- The Developer Portal is created with the admin user signed in

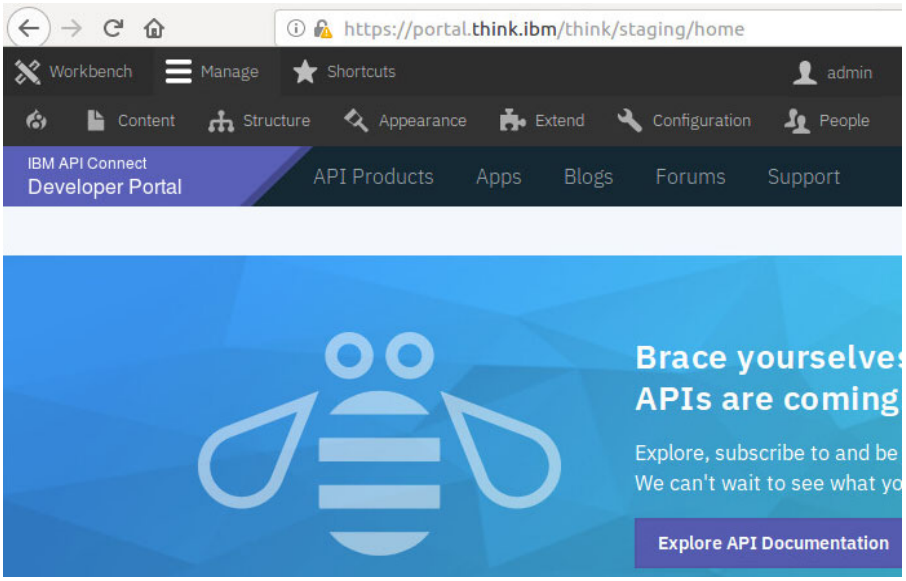

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Figure 2-13. Signed in to the Developer Portal

Global Knowledge®

The portal for the catalog is created and the admin user is signed in.

The admin user is used to administer and customize the Developer Portal.

Next, you create a consumer organization in API Manager that will user the APIs that are made available when they are published to the Developer Portal.

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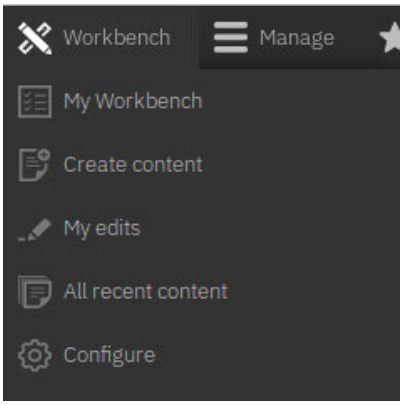
IBM Training

Developer Portal administration menu

- Workbench menu



- Manage menu

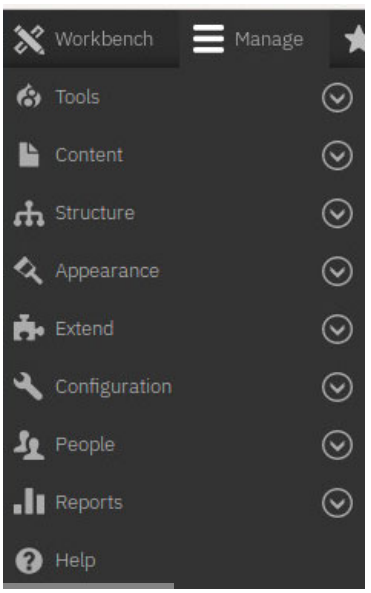


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Figure 2-14. Developer Portal administration menu

Global Knowledge®

The Developer Portal has responsive web pages and the pages resize according to the browser width.

Displayed on the left side of the page is the admin Workbench menu items.

On the right side of the page are the expanded Manage menu items.

The administration menu the Drupal components of the Developer Portal.

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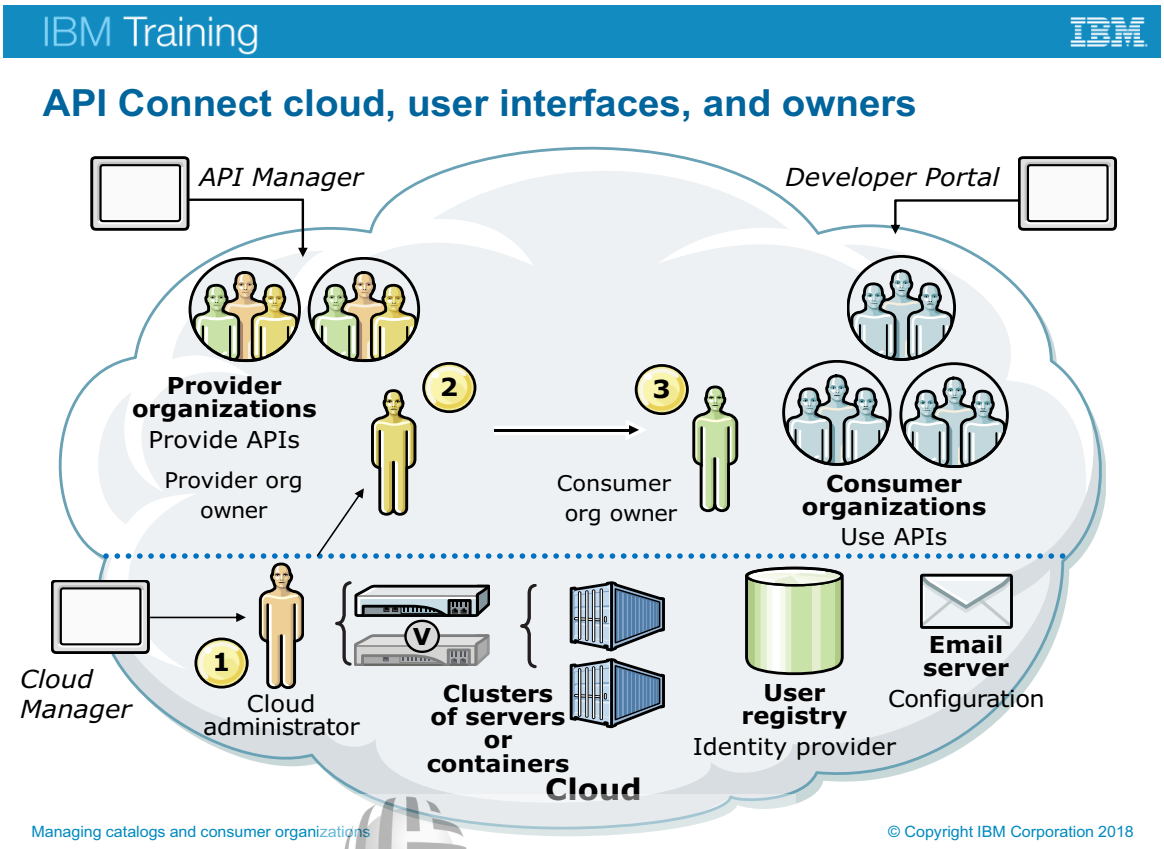

Figure 2-15. API Connect cloud, user interfaces, and owners

Global Knowledge®

The diagram shows the sequence for the creation of users in API Connect.

1. The Cloud Administrator is created when the API Connect product is installed. The administrator signs on to the Cloud Manager user interface to configure the resources and topology of the on-premises cloud. The administrator creates the provider organization and assigns an owner.
2. The owner of the provider organization signs on to the API Manager user interface and creates the members of the provider organization who create APIs, Products, and plans. The owner of the provider organization creates a consumer organization and assigns an owner.
3. The owner of the consumer organization signs on to the Developer Portal to create members of the consumer organization and assign roles. Members of the consumer organization use APIs and create applications and subscribe to Products and plans.

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IBM Training

Role of owners of the provider and consumer organizations

- Provider organization exposes business functions as APIs
- **Provider organization owner**
  - Works in the API Manager user interface
  - Manages API developers
  - Creates catalog and configures Developer Portal settings
  - Creates a Consumer Organization and assigns an owner
- **Developer Portal administrator (admin)**
  - Customizes the portal for all Developer organizations
- **Consumer organization owner**
  - Works on the Developer Portal
  - Manage and add members (application developers, administrators, viewers)
- **Application developers**
  - Discover APIs on the Developer Portal
  - Create applications and subscribe to plans
  - Create web or mobile apps that call Products, plans, and APIs with the key (client ID) provided by the application

Managing catalogs and consumer organizations

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Figure 2-16. Role of owners of the provider and consumer organizations

Global Knowledge®

After the owner of the provider organization has created a catalog and configured the portal settings, the owner saves the changes in API Manager. At this point, the Developer Portal for the catalog is created.

The administrator of the Developer Portal activates the portal. The administrator does not belong to any consumer organization. The administrator is responsible for the customization of the Developer Portal.

The owner of the provider organization adds the initial consumer organization and owner from the **Community** tab in API Manager.

The owner of the Developer organization then signs on to the Developer Portal to activate the account.

Depending on the permissions set for the Developer Portal in API Manager, the owner of the Developer organization might be able to add more users (application developers) and Developer organizations.

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IBM Training

Create a consumer organization

In **API Manager**, as the owner of the provider organization:

- Select the target catalog for the Developer organization
- Select **Consumer Organizations** from the navigation menu
- Select **Add**.
  Then, **Create Organization**
- Specify:
  - Title
  - Organization name
  - User registry
  - Specify the owner

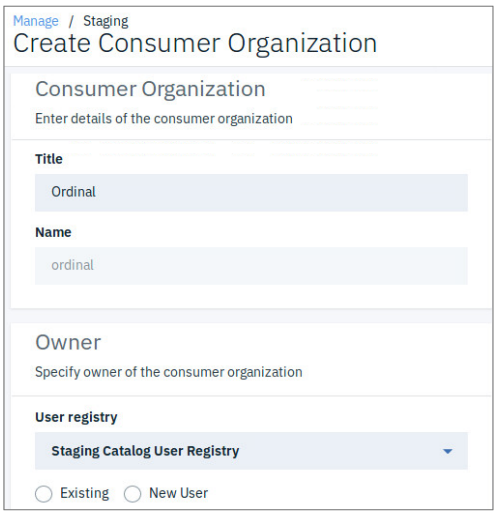

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Figure 2-17. Create a consumer organization

Global Knowledge®

If you have permission to manage developers, you can create developer organizations.

The Developer Portal must be enabled and configured in API Manager before you perform this task.

Create the consumer organization from the Consumer Organizations menu after you have selected the catalog in API Manager.

In the Create Consumer Organization dialog box, type:

- Title
- Name
- User registry
- Owner information

If New User is selected, specify:

- User Name
- Email address
- First name
- Last name

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- Password

Then, click Create.

The consumer organization is added to the list of consumer organizations for the catalog.

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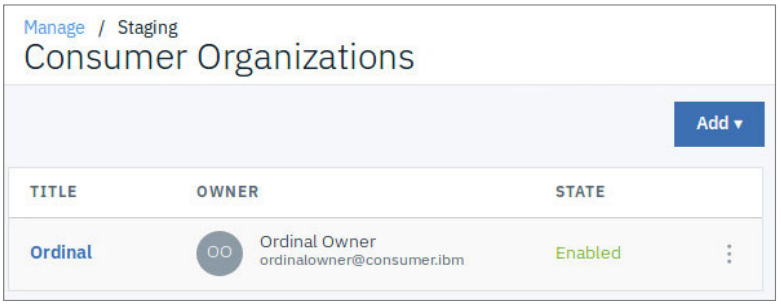
Result of adding a consumer organization

- New consumer organization is added to the Consumer Organizations list
- The owner is automatically approved and the state is shown as `Enabled`



- The owner can sign on to the Developer Portal with the user name and password credentials that were provided during the creation of the consumer organization

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Figure 2-18. Result of adding a consumer organization

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The consumer organization is added to the catalog and the user is automatically approved as the owner. The owner can sign on to the Developer Portal with the user name and password credentials.

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IBM Training

Sign on to the Developer Portal

- Sign in to the Developer Portal as the consumer organization owner

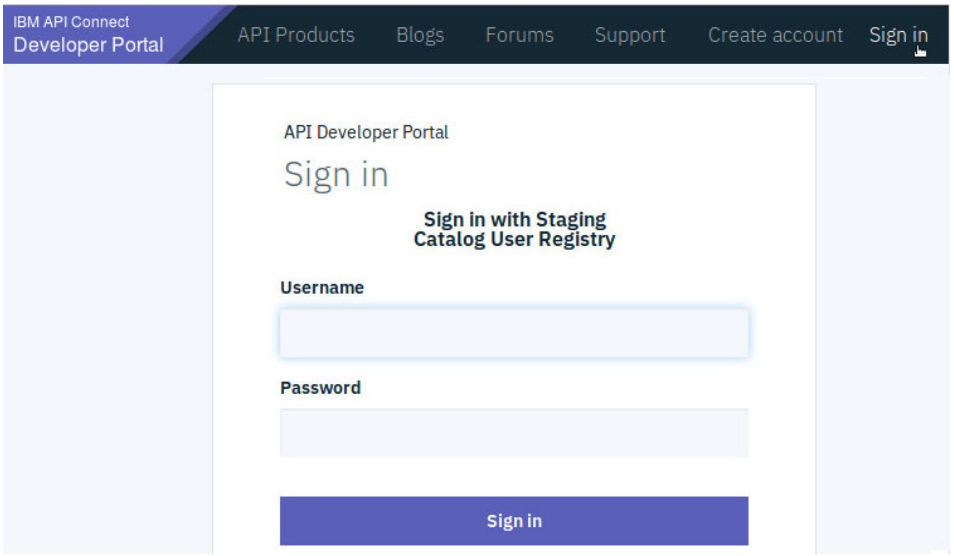

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Figure 2-19. Sign on to the Developer Portal

Global Knowledge®

The consumer organization owner can sign on to the Developer Portal. When the owner is signed in, the owner can manage the developer organization from the Developer Portal, and does not use the API Manager user interface. There are tools in the Portal to manage the consumer organization. Next, you see some of the capabilities that the consumer organization owner has on the Developer Portal.

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IBM Training

Consumer organization owner manage options

- Manage options for an organization owner in the Developer Portal:
  - My organization
  - Create organization
  - Select organization

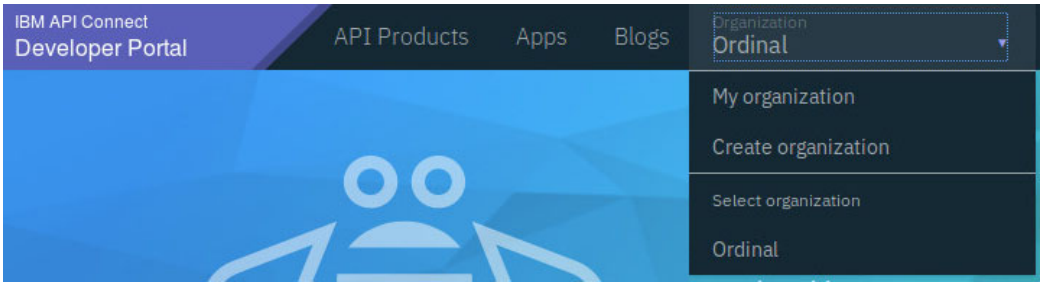

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Figure 2-20. Consumer organization owner manage options

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After signing on to the Developer Portal, the consumer organization owner can access the manage organization menu from the menu drop-down.

From this menu, owners can manage their own consumer organization.

For development catalogs, the owner can also create a new organization.

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IBM Training

Add a member to a consumer organization

- Sign in to the Developer Portal
- Select the organization from the list of consumer organizations
- Select My Organization
- From the **Manage** tab, select **Invite**
- Type the *email address* for the user
- Assign a *role*
- Click **Submit**

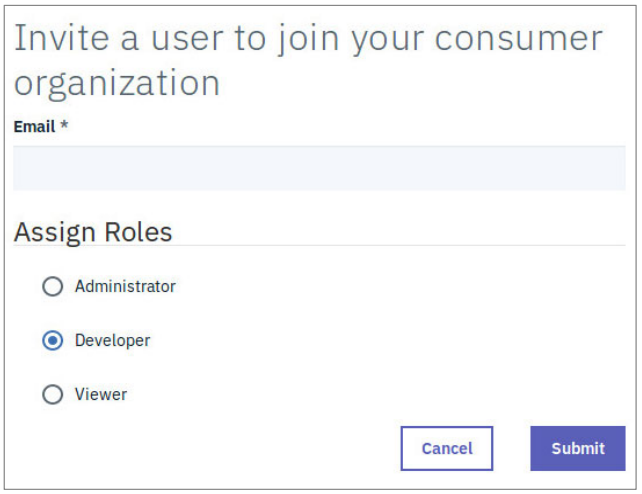

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Figure 2-21. Add a member to a consumer organization

Global Knowledge®

The owner of the consumer organization can add members to the consumer organization with the Invite panel. Those members can then access the Developer Portal and use the APIs that have been made available to the consumer organization.

Results:

The member is added to the consumer organization with a status of *pending*, and an email is sent to the member with the subject line: “Invitation to an API consumer organization in the *catalog_name* developer portal". The member must click the link that is provided to activate their account and complete the setup.

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IBM Training

Consumer organization member list

- The member accepts the invitation and signs on to the Developer Portal
- The member status is changed to *Active*

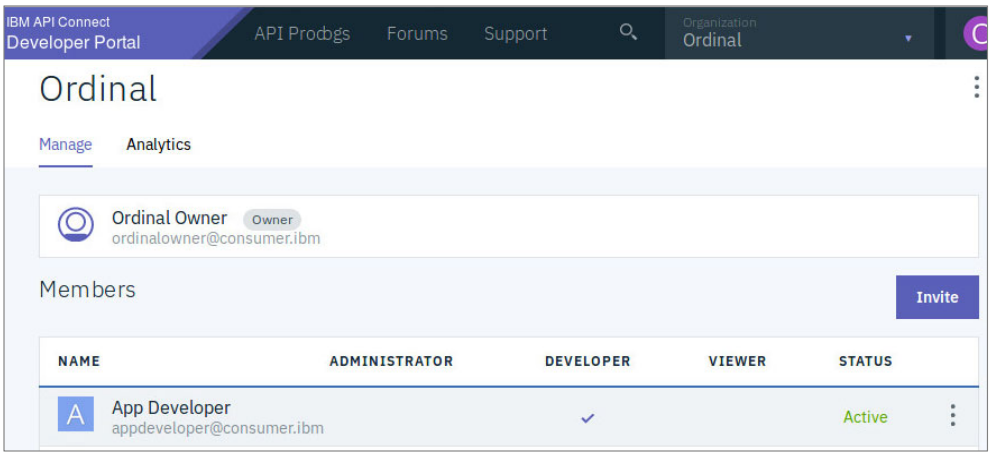

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Figure 2-22. Consumer organization member list

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The owner of the consumer organization can view or edit the members of the organization in the Developer Portal. The member that was invited responds to the email invitation and joins the consumer organization by signing on to the Developer Portal.

The member status is changed to *Active* in the list of members.

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IBM Training

Consumer organization default roles

- Roles that are defined in Cloud Manager

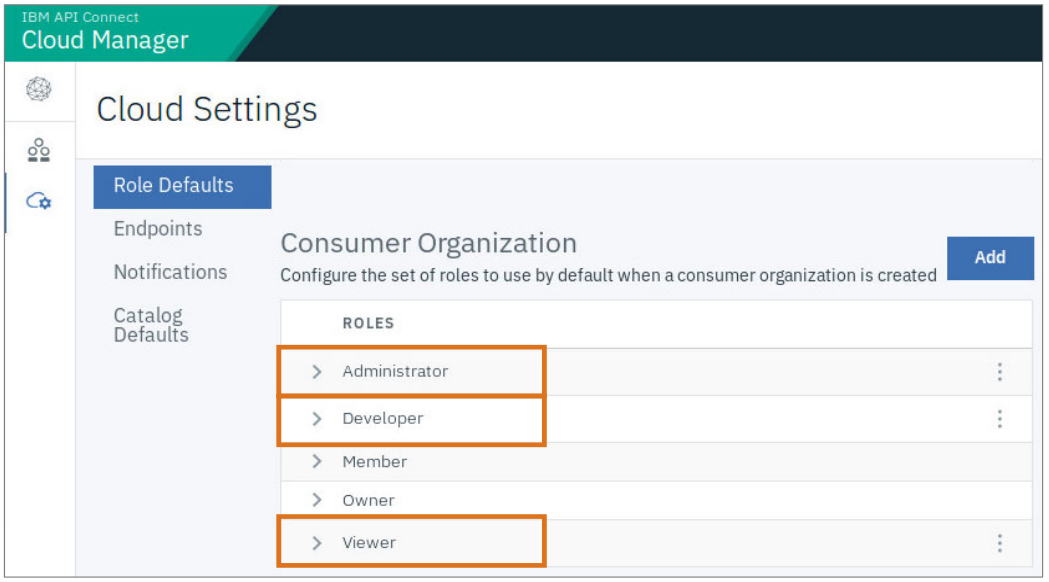

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Figure 2-23. Consumer organization default roles

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When the owner of a consumer organization invites a member to join the organization, the member is assigned a role. The default roles that the owner can assign are administrator, developer, or viewer. In the previous slides, the role of developer is assigned.

The default roles for a consumer organization are defined in Cloud Manager.

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Assign further roles to the member

- Developer Portal (Drupal) roles
- Assigned by the administrator of the Developer Portal by using the administrative menu
  - **Manage > People > Permissions**
- Drupal roles include:
  - Administrator
  - Anonymous user
  - Authenticated user
  - Content author
  - Forum moderator
  - Superuser

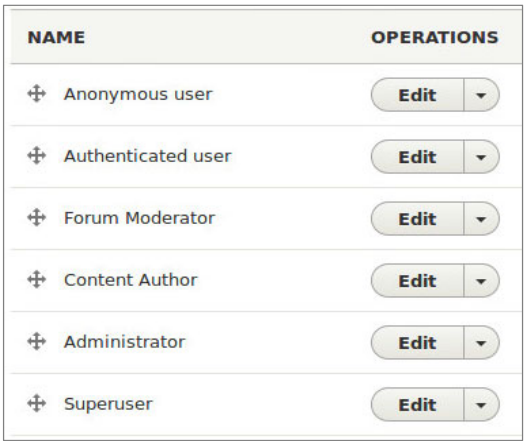

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Figure 2-24. Assign further roles to the member

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The administrator of the Developer Portal can assign additional portal-related roles to the member of the organization.

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Portal roles

- By using roles, you can fine-tune the security and administration of Drupal
  - A role defines a group of users that have certain privileges as defined on the permissions page
- **Anonymous user**: Role that is used for users that do not have a user account or that are not authenticated
- **Authenticated user**: This role is automatically granted to all logged in users
- **Content author**: Role that is used to edit or add content
- **Forum moderator**: Role that controls access to the portal forums
- **Superuser**:
  Can see all the site content
  Automatically assigned to the Administrator
- **Administrator**:
  Manages all other roles

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Figure 2-25. Portal roles

Global Knowledge®

You can use roles to fine-tune the security and administration of Drupal. A role defines a group of users that have certain privileges as defined on the permissions page. Examples of roles include: anonymous user, authenticated user, moderator, administrator, and other roles. The administrator can define the names and order of the roles on your site. It is recommended to order your roles from least permissive (anonymous user) to most permissive (administrator).

By default, Drupal comes with two user roles:

- Anonymous user: This role is used for users that do not have a user account or that are not authenticated.
- Authenticated user: This role is automatically granted to all logged in users.

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Example of members that are assigned Drupal roles

- Members of the consumer organization have API Connect roles and Drupal roles

USERNAME	STATUS	ROLES	LAST ACCESS	OPERATIONS
AppDeveloper	Active	• Forum Moderator	1 week 2 days ago	Edit
OrdinalOwner	Active		2 days 16 hours ago	Edit
admin	Active	• Administrator • Superuser	10 seconds ago	Edit

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Figure 2-26. Example of members that are assigned Drupal roles

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Password lockout

- API Connect **Local User Registries** apply a lockout criteria
- Repeated unsuccessful login attempts can lock your account
- Length of time that you are locked out of using the account is based on the number of consecutive failed attempts
  - Length of time increases as the number of consecutive failed attempts increases
  - Locks you out for 15 seconds after five consecutive failed attempts
  - Locks you out for 32 minutes after 12 consecutive failed attempts
- External user registries, such as LDAP, might enforce their own lockout criteria

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Figure 2-27. Password lockout

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Account lockout only applies to local user registries.

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Unit summary

- Describe the interaction between organizations and catalogs
- Explain how to create a catalog and a Developer Portal
- Describe the use of spaces within a catalog
- Configure a Developer Portal for the catalog
- Identify the administration menu options in the Developer Portal
- Describe the relationship between the provider organization owner and the owner of the consumer organization
- Describe how to create a consumer organization
- Describe the management options that are available to the owner of a consumer organization in the Developer Portal
- Describe how to add a member in the Developer Portal
- Describe the consumer roles that are defined in API Manager
- Identify the roles that are defined in the Developer Portal
- Explain the password lockout criteria

Managing catalogs and consumer organizations

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Figure 2-28. Unit summary

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Review questions

1. Provider organizations can create separate deployment targets for testing and production. These targets are called:
   A. Catalogs.
   B. Permissions.
   C. Roles.
   D. User registries.

2. True or False: If you do not explicitly configure a user registry in the API User Registries settings of the Manage catalog page in API Manager, then a local user registry is created when the portal is created.

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Figure 2-29. Review questions

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Write your answers here:

1.

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Review answers

1. Provider organizations can create separate deployment targets for testing and production. These targets are called:
   A. Catalogs.
   B. Permissions.
   C. Roles.
   D. User registries.
   The answer is A.

2. True or False: If you do not explicitly configure a user registry in the API User Registries settings of the Manage catalog page in API Manager, then a local user registry is created when the portal is created.
   The answer is True.

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Figure 2-30. Review answers

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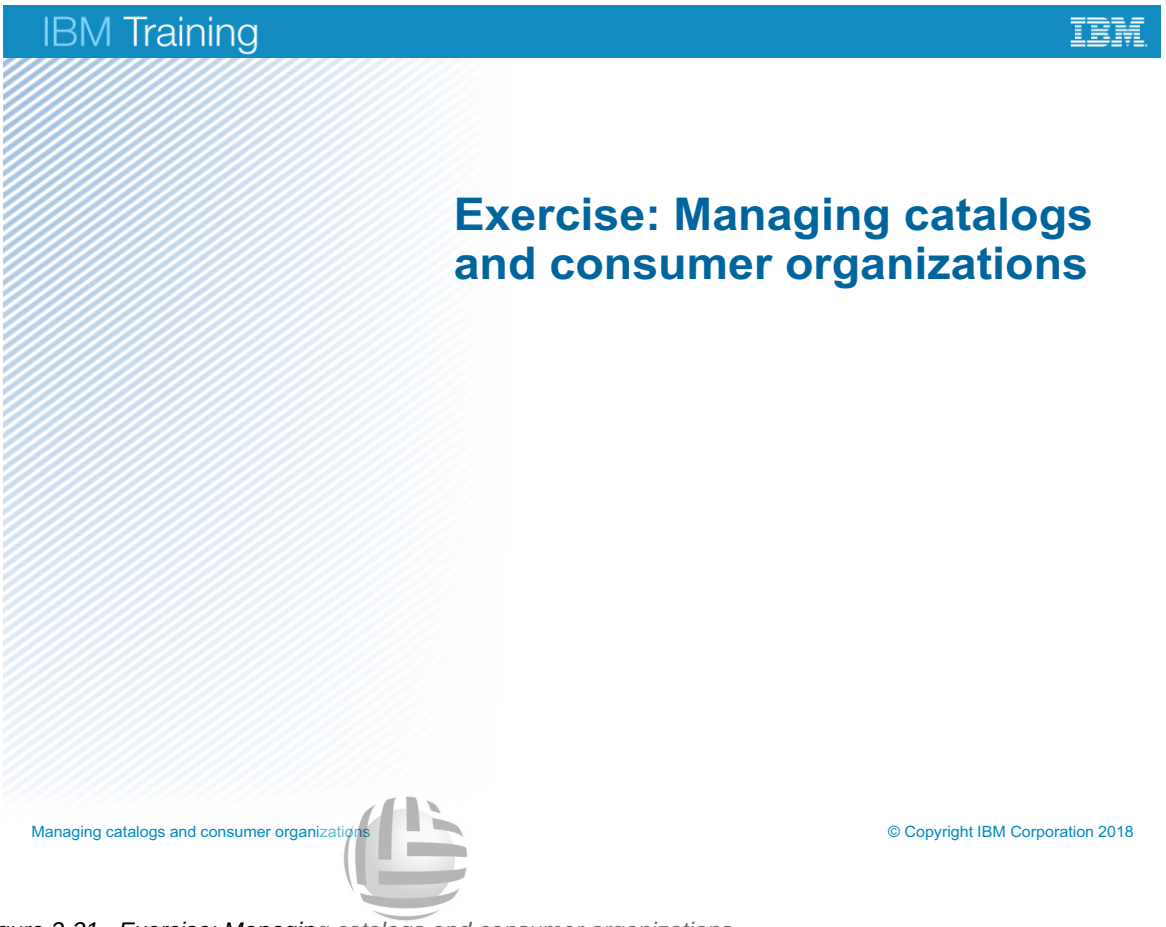

Figure 2-31. Exercise: Managing catalogs and consumer organizations

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Exercise objectives

- Create a catalog
- Configure settings for the Developer Portal
- Define a Developer Portal and user registry in API Manager
- Activate the admin user for the Developer Portal
- Configure modules in the Developer Portal
- Create a consumer organization in API Manager
- Add a member to the consumer organization
- Respond to the email message to activate the app developer member
- Manage member roles and permissions in the Developer Portal

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Figure 2-32. Exercise objectives

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Unit 3. Defining APIs in API Manager

Estimated time

00:30

Overview

This unit describes the options for defining APIs in API Manager. You examine the Assemble feature that are used to tailor your API to include logic and policy constructs. You learn how to use the test feature of API Manager to test APIs.

How you will check your progress

- Review questions
- Lab exercise

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Unit objectives

- Describe the features in API Manager for defining APIs, Products, and plans
- Examine the OpenAPI definition file
- Describe the purpose of the Assemble view in API Manager
- Explain how to test API operations in API Manager
- Describe the use of a Product for grouping common APIs
- Describe the role of plans to manage API usage

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Figure 3-1. Unit objectives

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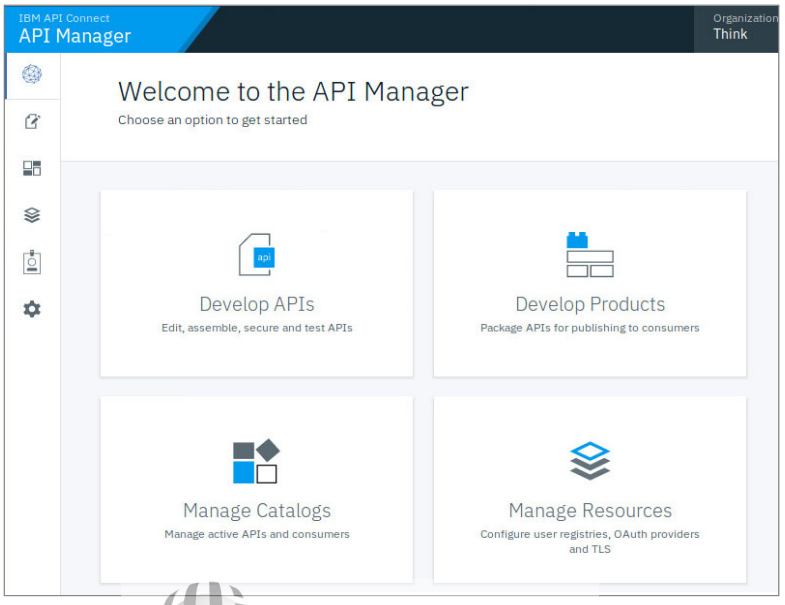
API Manager for development

- API Manager can be used for development and management of APIs



Defining APIs in API Manager

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Figure 3-2. API Manager for development

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Developers often use the API Connect Designer UI that is installed on their workstations to develop APIs and Products.

The browser-based API Manager user interface also has features for developing APIs and Products, if the user has role-based permission to do so.

In this course, you use API Manager to create and assemble APIs, and add Products and plans for these APIs.

You complete the task of creating your APIs with either the API Designer or the API Manager user interface.

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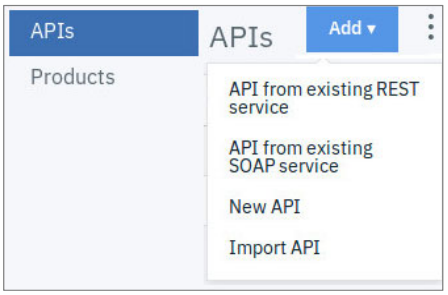
Create an API

Options for creating an API in API Manager:

- API from existing REST service
  - Create a REST proxy API from a REST service
- API from existing SOAP service
  - Create a REST proxy API from a SOAP service
- New API
  - Create an OpenAPI definition from scratch
- Import API
  - Import an existing OpenAPI definition



Defining APIs in API Manager

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Figure 3-3. Create an API

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If you have an existing REST service that you want to expose through an OpenAPI definition, you can create a proxy API and specify the target endpoint by using the API Manager.

If you have an existing SOAP service, you can use the WSDL file to add a REST API definition.

You can add a new API and create an OpenAPI definition.

You can import an existing OpenAPI definition into API Manager.

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Edit the API definition: Design view

- Design view
  - You can configure your definition by editing the different sections in the page navigation side bar of the editor

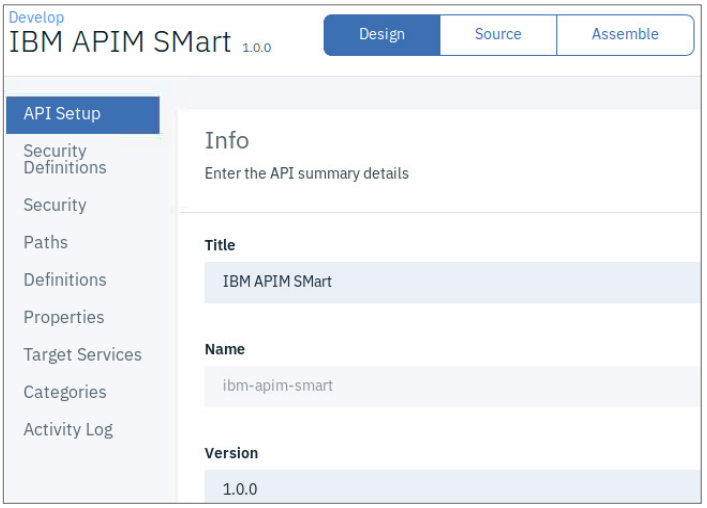

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Figure 3-4. Edit the API definition: Design view

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Edit the API definition in the Design view. You can configure your definition by selecting and editing the different sections in the page navigation side bar of the Develop API editor.

For example, from the Paths section of the navigation side bar you can select Paths and then specify the path for the API.

A path is a unit of a REST API that you can call. A path comprises an HTTP verb and a URL path that, when exposed, is combined with the base path of the API. By configuring the path, you define how the API is exposed to your developers.

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Edit the API definition: Source view

- Source view
  - Displays the OpenAPI definition in YAML format

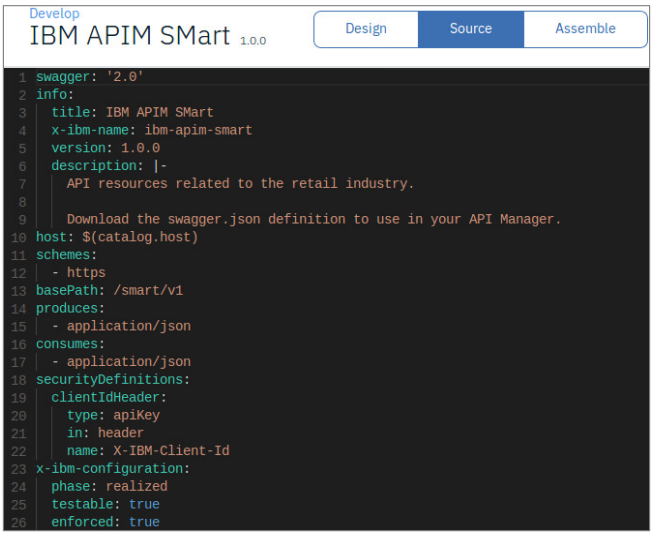

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Figure 3-5. Edit the API definition: Source view

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The Source view displays the API definition in YAML format.

The example show the first part of the OpenAPI YAML document.

Syntax

swagger: '2.0‘

info:

title: IBM APIM Smart

x-ibm-name: ibm-apim-smart

version: 1.0.0 description: |-

API resources related to the retail industry.

Download the swagger.json definition to use in your API Manager.

host: $(catalog.host)

schemes:

- httpsbasePath: /smart/v1produces:

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```
  - application/json
consumes:  - application/json
securityDefinitions:
  clientIdHeader:
    type: apiKey
    in: header
    name: X-IBM-Client-Id
```

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Edit the API definition: Assemble view (1 of 2)

- Tailor APIs to include constructs that are linked into an assembly
- Logic or policy constructs
- Applied to calls to and responses from API operations

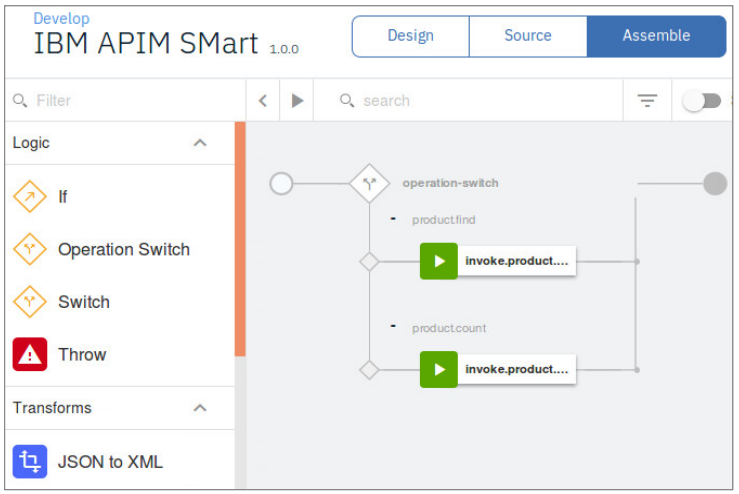

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Figure 3-6. Edit the API definition: Assemble view (1 of 2)

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The Assemble view of API Manager features an Assemble view that you can use to create assemblies.

With assemblies, you can readily tailor your APIs to include logic or policy constructs that are applied to calls to and responses from operations in your API.

The Assemble view includes a palette of logic and policy constructs and a free-form canvas.

Drag the components from the palette onto the canvas.

Components are applied from the left unfilled circle (start) to the right filled circle (end).

The assembly is executed in order from the left filled, circle to the right unfilled, circle. However, branching can occur, when if and operation-switch logic constructs are used.

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Edit the API definition: Assemble view (2 of 2)

- Click each component on the canvas to display and edit the component properties

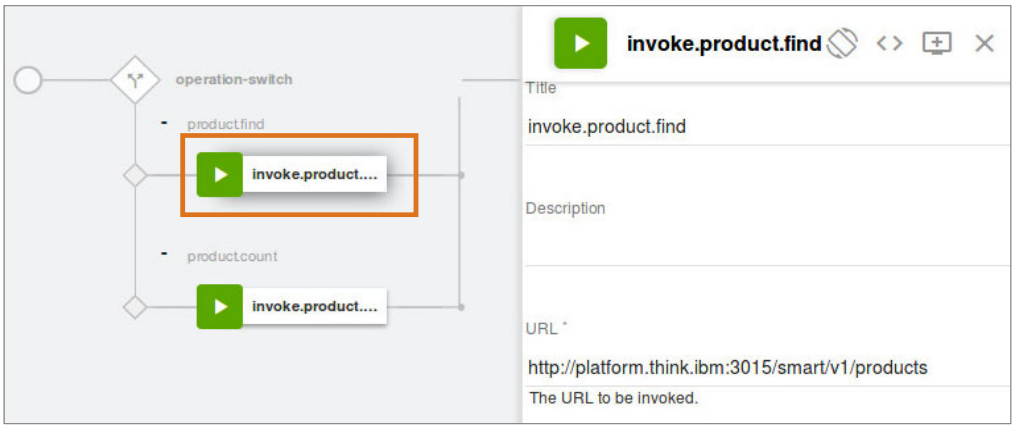

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Figure 3-7. Edit the API definition: Assemble view (2 of 2)

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Add and edit properties of the component by clicking the component and using the property sheet that is shown on the right of the page.

In the example, the invoke policy calls an application that is running on the target URL that is specified in the properties dialog.

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IBM Training

Test an API operation (1 of 5)

- Test feature of the API Assembly
  - Available from the menu in the API Assemble view

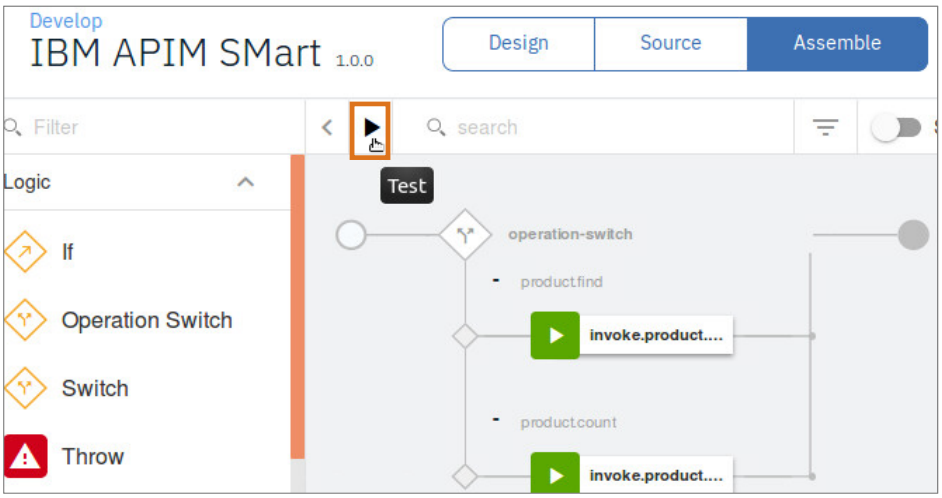

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Figure 3-8. Test an API operation (1 of 5)

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To test the API definition, use the API Manager test tool by clicking the Test icon in the Assemble view.

The Test dialog opens.

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Test an API operation (2 of 5)

- Test dialog: Setup
  - Select the catalog, Product, plan, and test application

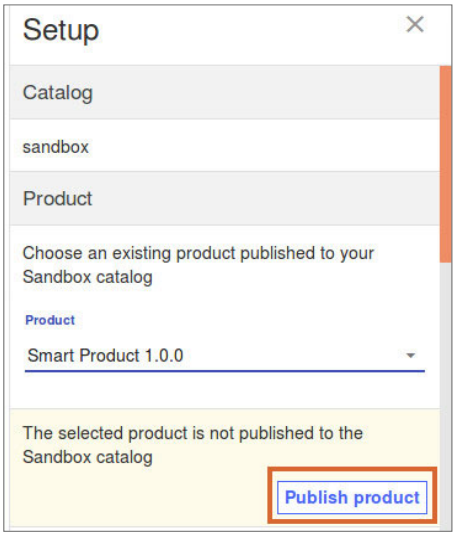

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Figure 3-9. Test an API operation (2 of 5)

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When you click the Test icon in the Assemble view, the Test feature opens with the Setup dialog.

Specify the target catalog, Product, plan, and test application.

If the Product has not previously been published, you must publish the Product before the test can run.

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Test an API operation (3 of 5)

- Test dialog: Setup
  - Subscribe to the application
  - Then, click **Next** to continue with the test

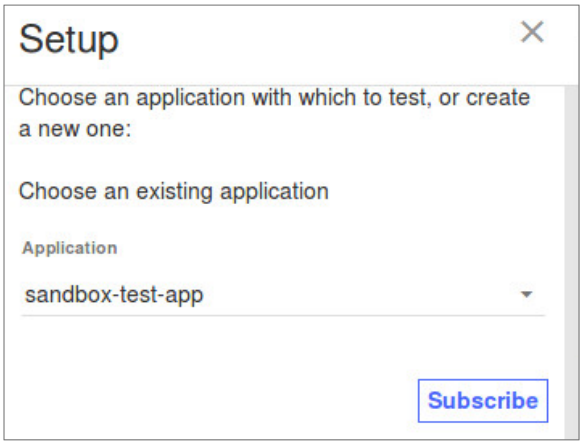

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Figure 3-10. Test an API operation (3 of 5)

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In this version of API Connect V2018, you must manually subscribe to the sandbox-test-app.

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Test an API operation (4 of 5)

- Test dialog: Operation
  - Select the API operation to call
  - Then, click **Invoke**

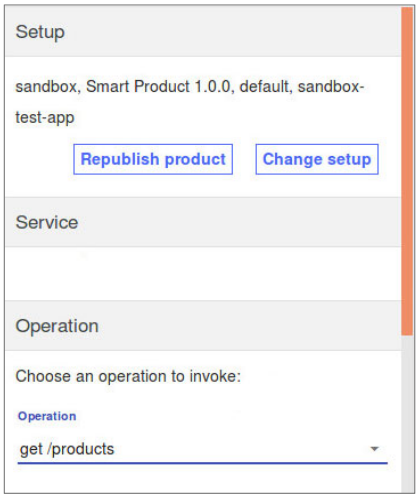

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Figure 3-11. Test an API operation (4 of 5)

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After the Product is published, select the API operation that you want to test.

Then, click the Invoke icon in the Test feature.

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Test an API operation (5 of 5)

- Test dialog: Request and response
  - The test results are displayed

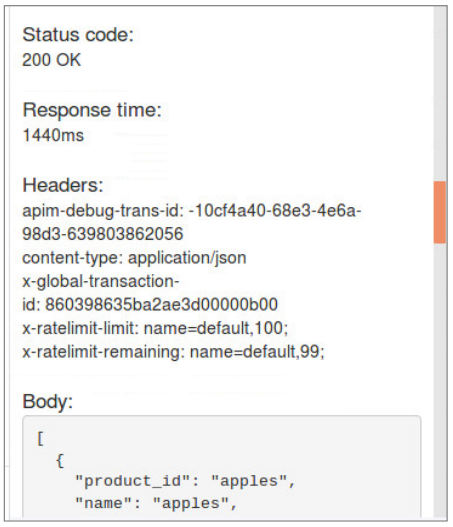

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Figure 3-12. Test an API operation (5 of 5)

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The test feature displays the operation request and response messages.

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IBM Training

Products

- A set of APIs and plans are grouped into a Product
  - An offering that is made available to developers
- Products must be staged to a catalog and then published to so that developers in consumer organizations can integrate the APIs into their applications
- In a non-production catalog, staging and publishing actions are forced, which means that if you republish a previously published Product version, it is overwritten without warning
  - Overwrites a published Product version on the Developer Portal even if the API operations are being used on the Developer Portal

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Figure 3-13. Products

Global Knowledge®

A set of APIs and plans are grouped into a Product, which is an offering that is made available to developers.

In non-production catalogs, publishing actions are forced and previously published Product versions are overwritten.

In production catalogs, you need to create a new Product version if the Product version is already published.

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Plans

- Plans are used to control access to APIs and to manage API usage
  - A Plan contains API operations and any rate limits that apply
- Limit the calls that are made to an API by second, minute, hour, day, or week
  - A rate limit at the plan level creates a default limit for all API operations within the plan
  - Specific

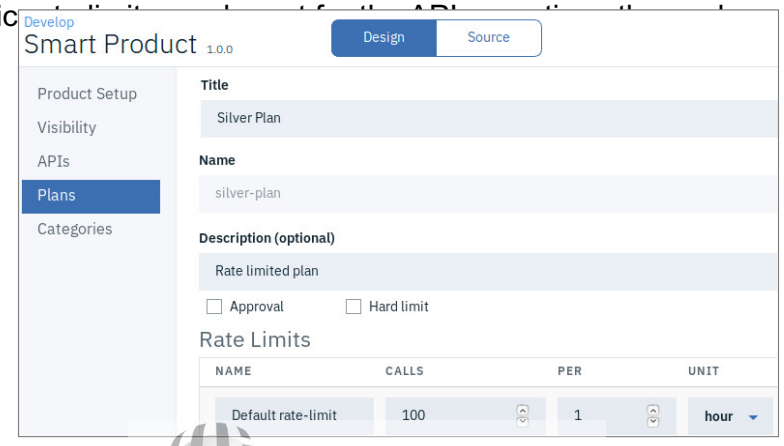

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Figure 3-14. Plans

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A Product includes one or more plans that control access to APIs and manage API usage.

Plans are used to control access to APIs and to manage API usage.

Applying a rate limit at the plan level creates a default rate limit that is shared across all the operations within the plan. If you need to set specific rate limits for specific operations, you must set these within the operations themselves and these settings will override the setting at the plan level.

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IBM Training

Publish a Product

- When you publish a Product, you select a target catalog and Developer Portal
- If spaces are configured for the catalog, the target server for the Developer Portal is the same for all spaces of the catalog

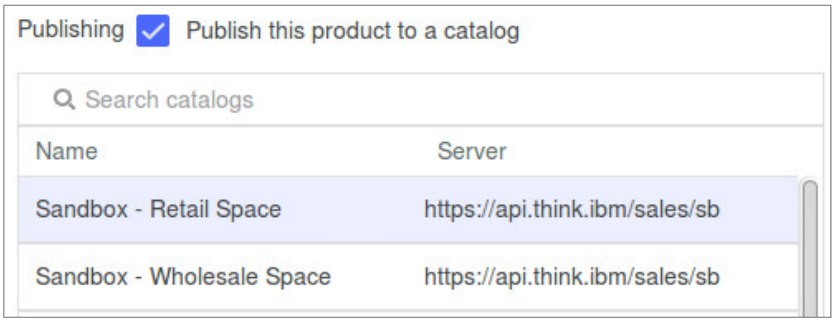

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Figure 3-15. Publish a Product

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In the example, you are about to publish a Product to a catalog in which two spaces are configured. When you select a catalog for publishing that contains spaces, the URL for the target server is the same for all spaces of the catalog.

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IBM Training

Unit summary

- Describe the features in API Manager for defining APIs, Products, and plans
- Examine the OpenAPI definition file
- Describe the purpose of the Assemble view in API Manager
- Explain how to test API operations in API Manager
- Describe the use of a Product for grouping common APIs
- Describe the role of plans to manage API usage

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Figure 3-16. Unit summary

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IBM Training

Review questions

1. True or False: Spaces enable the management of Products and APIs that are specific to that space. But the target URL on the Portal is the same for all spaces of a catalog.

2. True or False: A rate limit at the plan level overrides a rate limit at the API operation level.

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Figure 3-17. Review questions

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Write your answers here:

1.

2.

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IBM Training

Review answers

1. True or False: Spaces enable the management of Products and APIs that are specific to that space. But the target URL on the Portal is the same for all spaces of a catalog.
   The answer is True.

2. True or False: A rate limit at the plan level overrides a rate limit at the API operation level.
   The answer is False.
   Setting rate limits for specific operations overrides the setting at the plan level.

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Figure 3-18. Review answers

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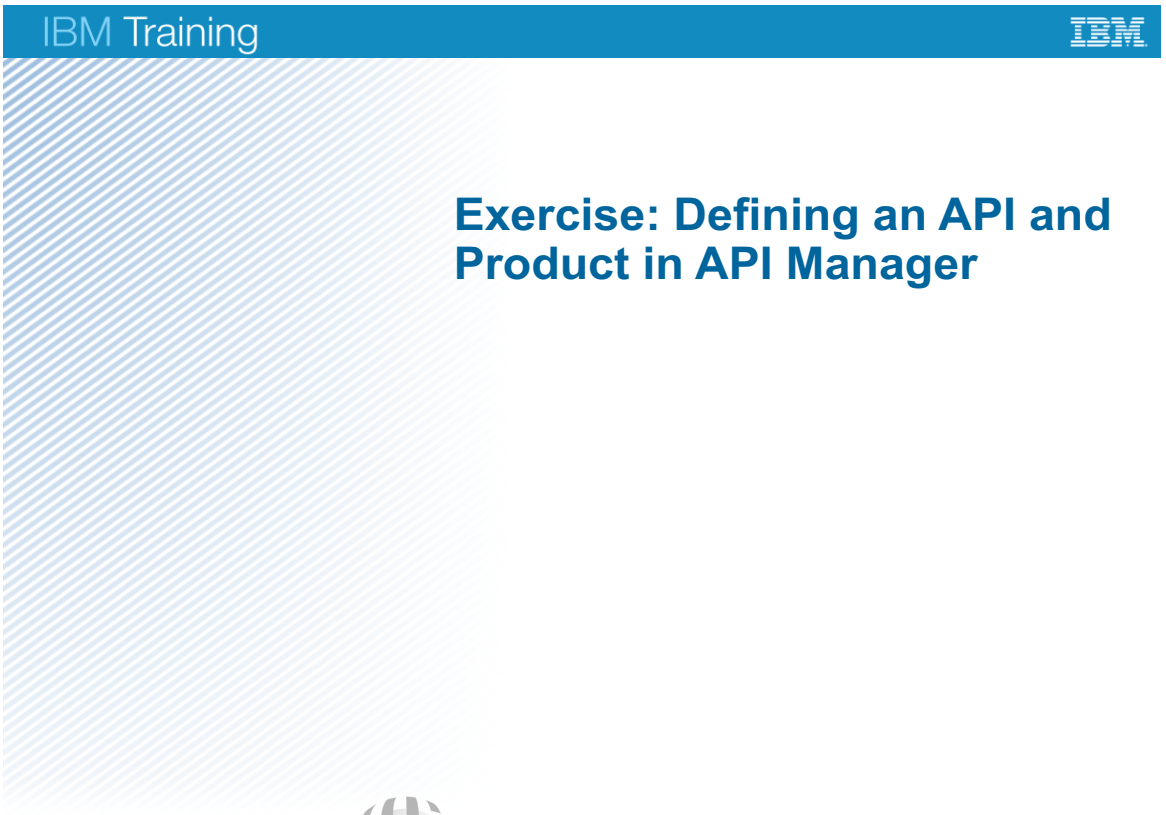

Figure 3-19. Exercise: Defining an API and Product in API Manager

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Exercise objectives

- Sign in to API Manager
- Create a draft API and import an OpenAPI definition
- Modify the API definition in API Manager
- Create a Product and a plan in API Manager
- Assemble the API operations to control aspects of processing in the gateway
- Specify the target URL for the operation
- Start the back-end NodeJS application
- Test the API in API Manager

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Figure 3-20. Exercise objectives

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Unit 4. The Product lifecycle

Estimated time

01:15

Overview

This unit explains the concept of the Product lifecycle. The lifecycle management feature controls the staging of a Product version to a catalog. Lifecycle management continues through publishing to make the Product version available to your application developers. The lifecycle governance eventually controls retiring and archiving of the Product and APIs.

How you will check your progress

- Review questions
- Lab exercise

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IBM Training

Unit objectives

- Describe provider organization roles and permissions
- Explain the Product lifecycle stages
- Describe how staging and publishing differ in development and production catalogs
- Describe how lifecycle events are managed in API Manager
- Explain the product availability and visibility settings
- Describe how to create versions of Products and APIs
- Explain the concept of replacing and superseding published Products
- Explain how to migrate application subscriptions to a new Product version and plan
- Explain how application subscriptions are created in API Manager
- Describe the state changes that occur when approvals are enabled

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Figure 4-1. Unit objectives

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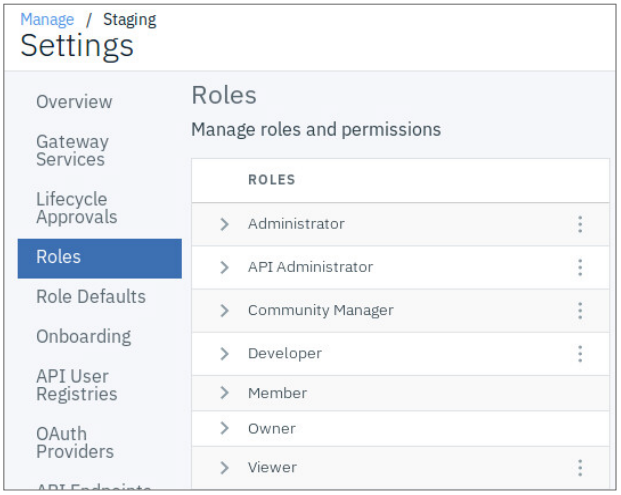
IBM Training

Default provider organization roles

- Roles that are defined for a catalog in API Manager
  - Administrator
  - API Administrator
  - Community Manager
  - Developer
  - Member
  - Owner
  - Viewer



- The organizational owner has all permissions to perform all actions on catalogs, organizations, and spaces.

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Figure 4-2. Default provider organization roles

Global Knowledge®

In the Settings for a catalog in API Manager, click **Roles**.

Default roles for provider organization catalog are displayed.

The predefined roles for provider organizations are:

Administrator

API Administrator
manager

Community Manager

Developer

Member

Owner

Viewer

The organizational owner has all permissions to perform all actions on catalogs, organizations, and spaces. The owner cannot be unassigned from performing these permissions. Any assigned role is automatically also assigned a member role.

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Note

Default roles for provider and consumer organizations are set in Cloud Manager.

The cloud administrator can add other custom roles by clicking the **Add** icon for the provider organization from the Default Roles page.

The roles that are defined in Cloud Manager for a provider organization are inherited in API Manager. The owner of the provider organization can edit these roles and change permissions.

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IBM Training

Default provider organization permissions

- Each role is assigned permissions for lifecycle actions
  - View, stage, manage, and so on
- For example, the Developer role has permission to view, stage, and manage Products in the provider organization
  - The owner can change these permissions by clicking the Edit option three buttons

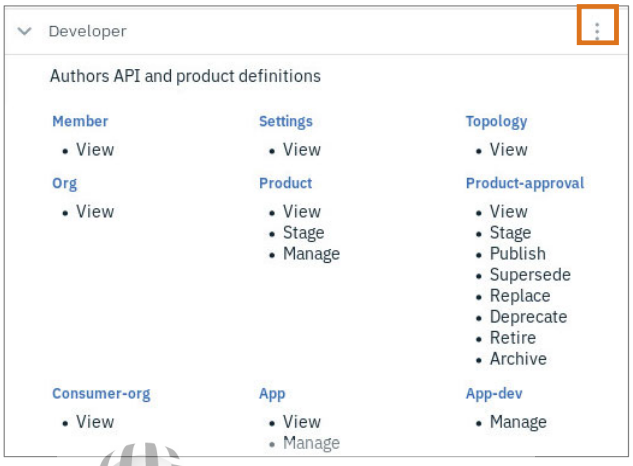

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Figure 4-3. Default provider organization permissions

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Permissions for performing actions on lifecycle events are pre-set for each role. These permissions can be viewed in API Manager.

The example on the page shows that the Developer role has permission to view, stage, and manage Products in the provider organization. The Developer role can also perform many lifecycle changes related to product approval.

The organization owner can change permissions by clicking the Edit ellipsis icon for the particular role.

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IBM Training

View members and permissions for a catalog

- Click the tile to open the catalog from the Manage option in API Manager
  - Select **Members**

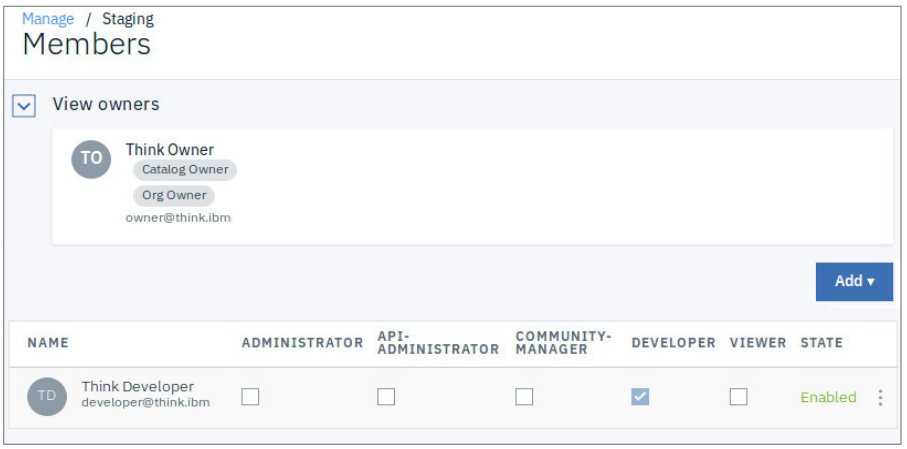

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Figure 4-4. View members and permissions for a catalog

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You can display the members and their roles for a catalog in API Manager. Open the catalog, then select the Members option.

The example in the figure shows there are two members that are defined. The owner of the provider organization and a member with a role of developer.

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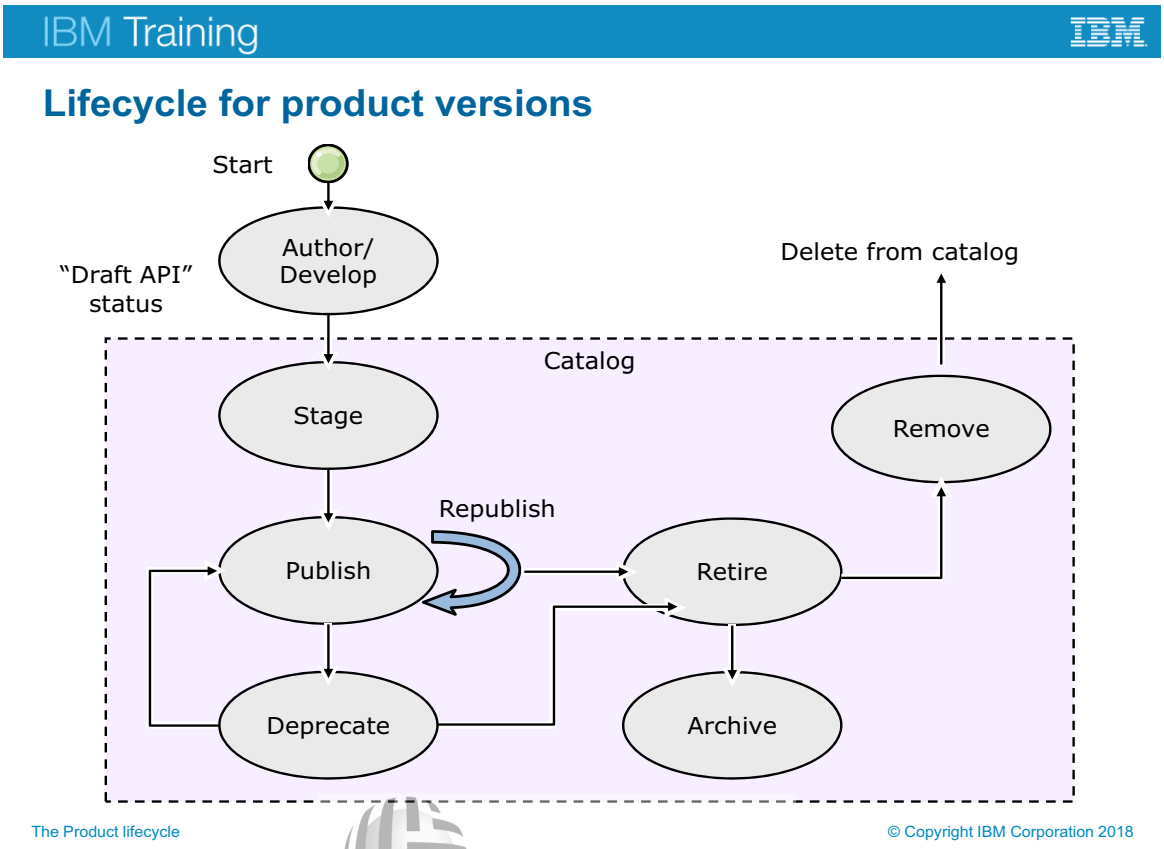

Figure 4-5. Lifecycle for product versions

Global Knowledge®

Here you see a lifecycle for Products and their contained API operations as they move through the different states.

Except for the authoring step, all the actions involve state changes to the Product version and API operations within a particular catalog.

When you first create the API in the draft API status, the API and its requisite Product exist independently of the catalog.

When you manage your Product versions, you move them through a series of lifecycle states, from initially staging a Product version to a catalog, through to publishing to make the Product version available to your application developers, and to eventual retiring and archiving.

When a Product version is moved to the deprecated state, the plan is visible only to developers whose applications are currently subscribed to the plan version. No new subscriptions to the plan are possible.

A Product version in the retired state cannot be viewed or subscribed to, and all of the associated APIs are stopped.

Archived Products are similar to those in the retired state. However, archived Products are not displayed by default in the Product Management page of the API Manager.

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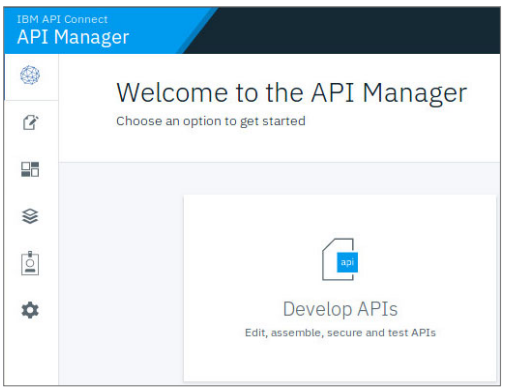
IBM Training

Tools for authoring APIs

- API Designer
  - Workstation-based graphical editor and command line interface
- API Manager
  - Browser-based user interface
  - Defined in the Develop option
  - Create or import APIs
  - Define Products



The Product lifecycle

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Figure 4-6. Tools for authoring APIs

Global Knowledge®

You can author APIs by using the API Designer command line or graphical editor features.

You can author APIs by creating or importing them in API Manager. The APIs and Products are defined in the Develop option of API Manager.

The API Manager use interface is used in this course.

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IBM Training

Catalog production mode setting

- Setting a catalog mode as a development or production catalog
- Product versions are overwritten without warning when they are published to development catalogs
  - Overwrites a published Product version on the Developer Portal even if the API operations are being used on the Developer Portal
- In production catalogs, you must create a new Product version if the Product version is already published, unless you are simply changing the Product visibility settings (republishing)

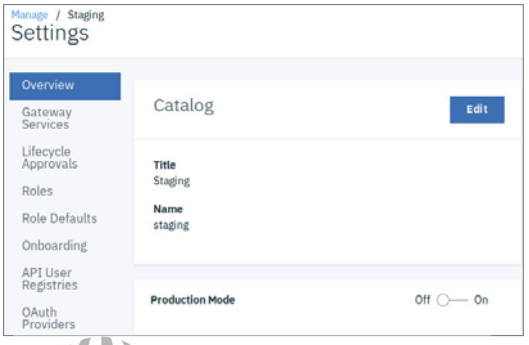

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Figure 4-7. Catalog production mode setting

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Some lifecycle state changes happen differently in production versus development catalogs.

When the Production Mode option is Off under the **Settings** tab for a particular catalog, staging and publishing actions are forced.

For the Sandbox catalog and other development catalogs, this means that the existing Product version is overwritten without warning when the Stage or Publish actions are invoked in API Manager.

The Sandbox catalog can only be used for development and testing purposes. There is no Production Mode option for the Sandbox catalog.

When publishing a Product version to a production catalog, you should create a new Product version if the original Product version is already in the published state.

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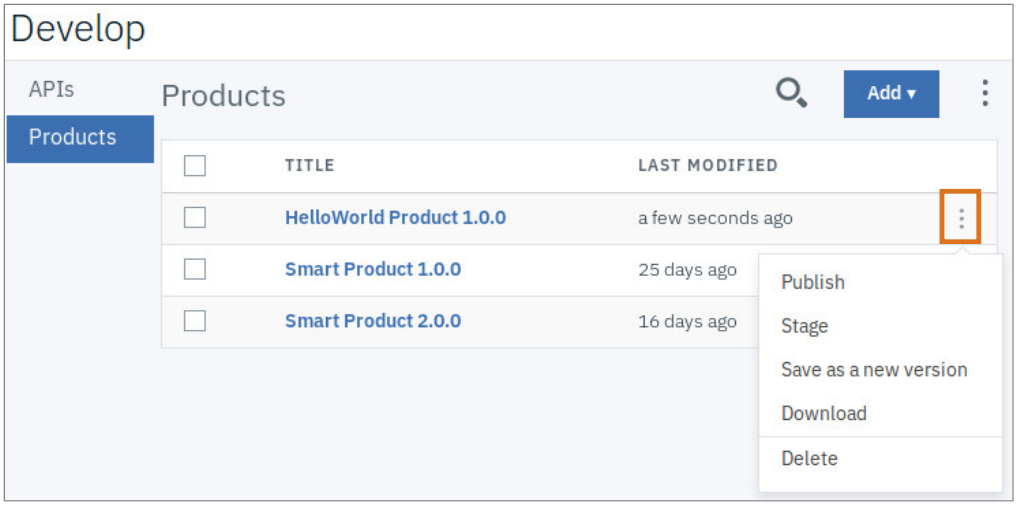
IBM Training

Manage the lifecycle of Products in API Manager

- Products and APIs are created or imported into API Manager
  - The product lifecycle can now be managed from API Manager by using the list of options drop-down



The Product lifecycle

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Figure 4-8. Manage the lifecycle of Products in API Manager

Global Knowledge®

After the Product is created, it is visible on the **Products** tab from the Develop page. The Product can be managed from the manage list of options icon.

From this view, you can move the Products through their lifecycle.

The actions that are available from the manage menu icon change according to the current state of the Product.

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IBM Training

Stage a Product to a development catalog (1 of 3)

- Stage the Product to a development catalog
  - Select the Product version to be staged
  - Set the target of the staging step to the development catalog
  - Overwrites a previously staged Product version
- Creates a snapshot of the Product
  - Snapshot is taken of the Product definition and the OpenAPI definition
  - For example:
    `Hello World Product 1.0.0`
    `HelloWorld 1.0.0 (API)`
  - Updates that you make to the Product or API are not reflected in the staged version

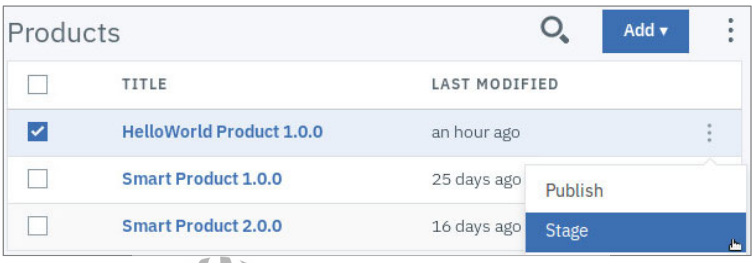

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Figure 4-9. Stage a Product to a development catalog (1 of 3)

Global Knowledge®

When you stage a Product, you create a specific version of the Product on a target catalog.

A catalog is a deployment target, and behaves as a logical partition of the gateway and Developer Portal. When you stage a Product, a snapshot or a definitive copy, of the Product is created.

Since it is a snapshot, any updates you make to a Product, are not reflected in the staged version.

Staging a Product that is defined in the Develop page in API Manager is straightforward.

Select the Product version. Then, from the list of options click the **Stage** icon.

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IBM Training

Stage a Product to a development catalog (2 of 3)

- Select the target catalog where the Product is to be staged from the list of defined catalogs

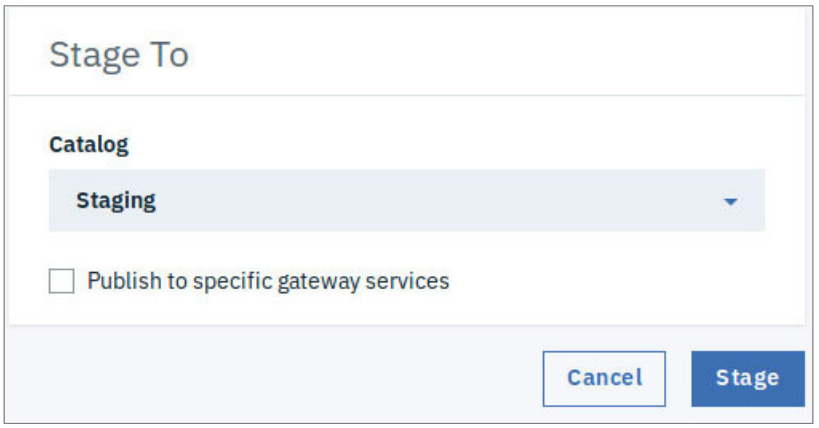

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Figure 4-10. Stage a Product to a development catalog (2 of 3)

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Select the target catalog where the Product is to be staged from the drop-down menu.

The Staging catalog that is selected in the example has been defined as a development catalog. The Sandbox catalog is also a development catalog.

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Stage a Product to a development catalog (3 of 3)

- Open the target catalog from the Manage page in API Manager
- The Product is displayed in the list of Products with a state of `Staged`

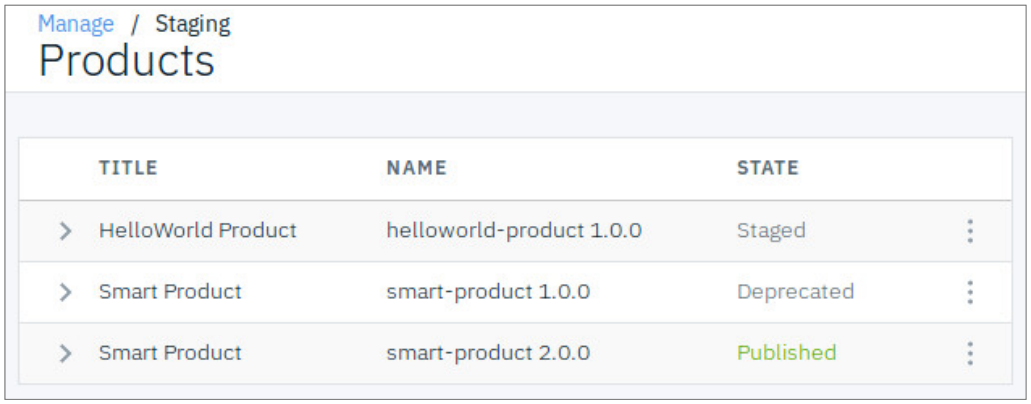

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Figure 4-11. Stage a Product to a development catalog (3 of 3)

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After the Product is staged, you can see its state from the Manage page for the catalog.

If you remove a Product from the staged state, it is removed from the catalog and the Product goes back to the draft state in the Develop area of API Manager.

The Product or API details can be edited and changed. Then, the Product can be staged again.

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Publish a Product to a development catalog (1 of 3)

- From the staged product, select the **Publish** option

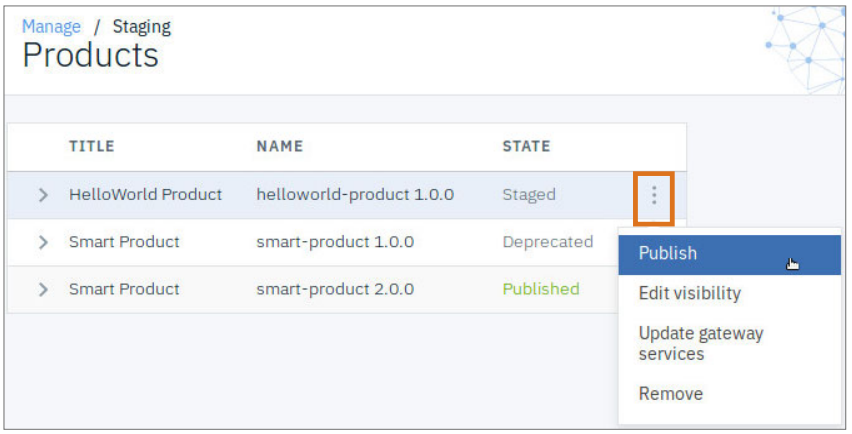

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Figure 4-12. Publish a Product to a development catalog (1 of 3)

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To publish a Product in API Manager, go to the Manage page for the catalog.

Select Publish from the list of options for the Product.

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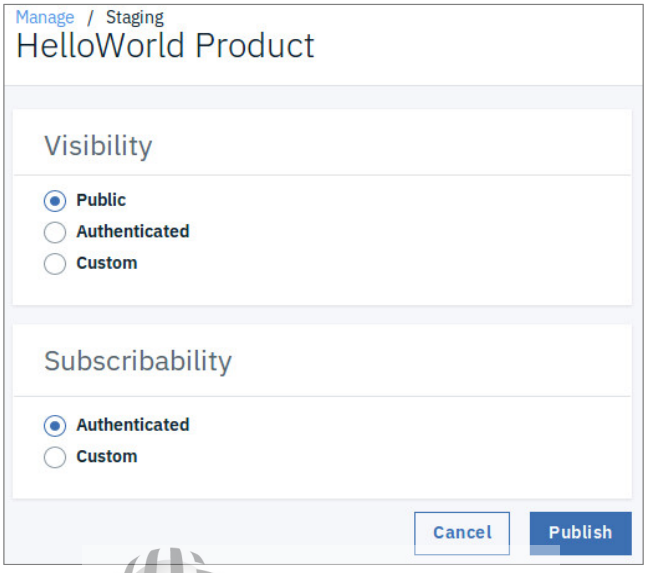
Publish a Product to a development catalog (2 of 3)

- Select the required visibility and subscribability options
- Then, **Publish**



The Product lifecycle

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Figure 4-13. Publish a Product to a development catalog (2 of 3)

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On the second dialog for publishing a Product, select the required options for Product visibility and subscribability.

The default value for visibility is public, which means that non-authenticated users can see the published product on the Developer Portal.

The default value for subscribability is authenticated, which means that only authenticated users can subscribe applications to the published product on the Developer Portal.

Click the Publish button to Publish the Product.

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Publish a Product to a development catalog (3 of 3)

- The Product is moved to the `Published Pending` state if approvals are set for publishing, or
- The Product moved to the `Published` state

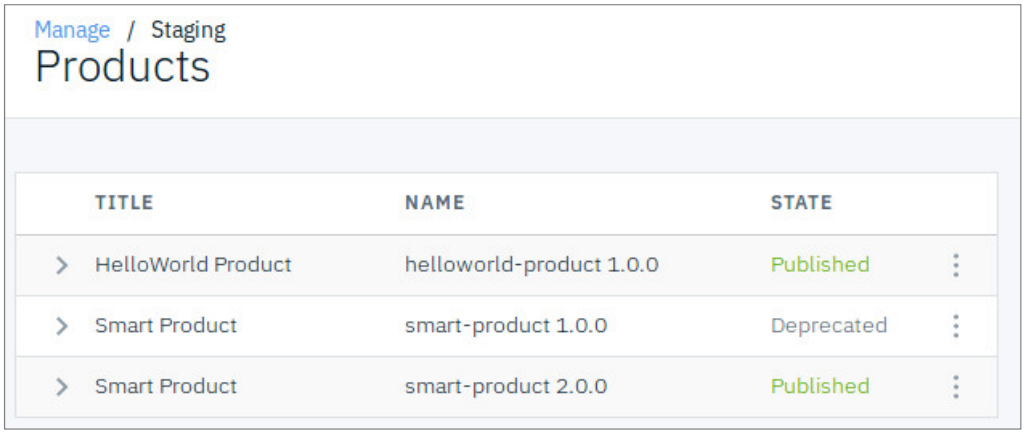

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Figure 4-14. Publish a Product to a development catalog (3 of 3)

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Clicking the Publish button publishes the Product and makes it available on the Developer Portal, or moves it to a published pending state if approval is required.

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Published Product on the Developer Portal

- Product is visible on the Developer Portal depending on the visibility settings in API Manager

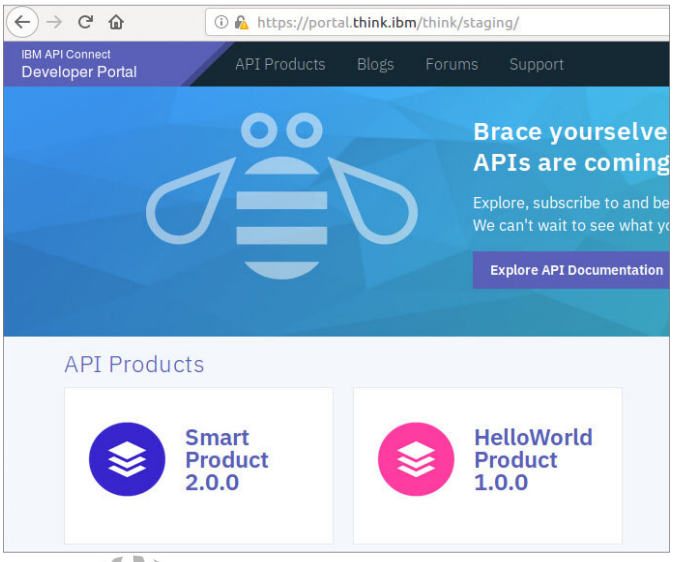

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Figure 4-15. Published Product on the Developer Portal

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Published Products are visible when the developer is signed on to the Developer Portal. Non-authenticated users see Products with visibility set to public.

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IBM Training

Lifecycle actions for published Products

- Manage options change according to the lifecycle state
  - Current state of the Product is displayed
  - Green label with the text `Published` is displayed in API Manager
  - Multiple versions of the same Product can be in different states in the catalog

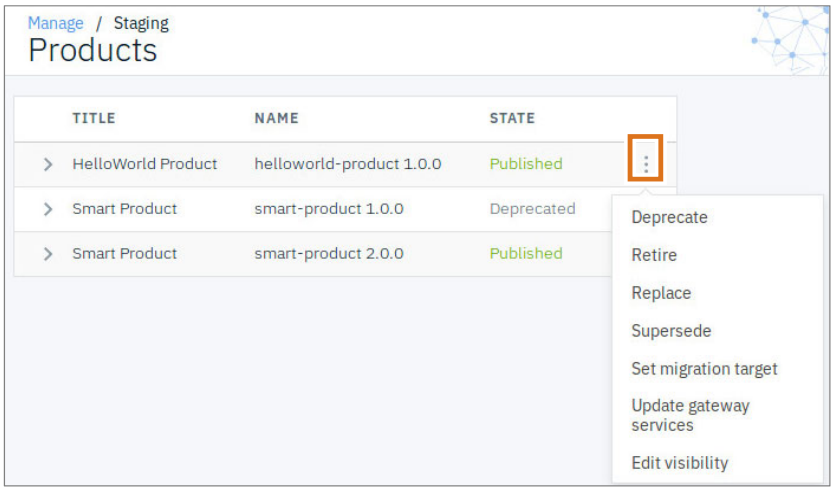

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Figure 4-16. Lifecycle actions for published Products

Global Knowledge®

Products have visual labels that provide visual cues as to the state of the plan.

Multiple versions of the same Product can be in different states in the catalog.

The actions that are available from the manage menu icon change according to the current state of the Product.

A Product in the published state can be deprecated, retired, replaced, superseded, or republished with a different visibility.

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IBM Training

Deprecate a Product version

- Prevents developers from subscribing to the plans in this Product without hiding it from existing subscribers

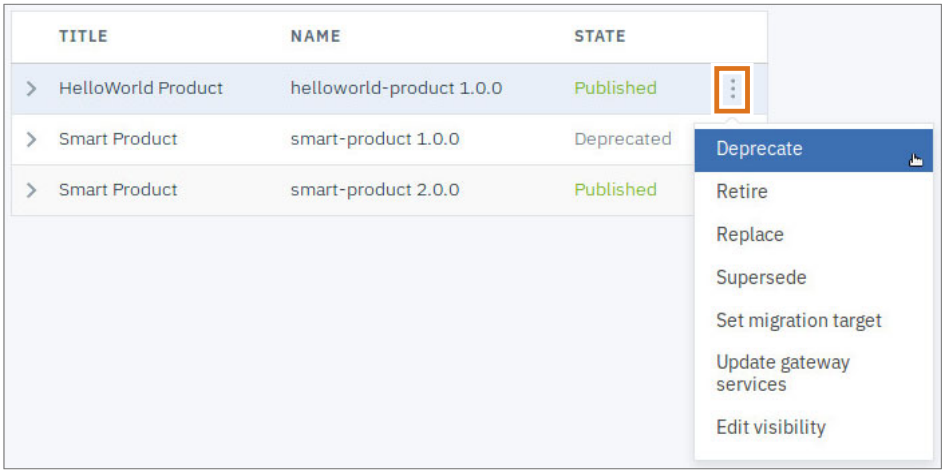

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Figure 4-17. Deprecate a Product version

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Deprecating a Product prevents new developers from subscribing to the plans in this Product, without hiding it from existing subscribers.

A Product owner might deprecate a Product in anticipation of the next version release, but is forced to keep a previous release for clients that have not yet adopted the new features, or are unwilling to upgrade their code in the short term.

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IBM Training

Retire a Product version

- Retire a published or deprecated Product from the Manage icon in API Manager
- When a Product is retired, all associated APIs are taken offline, and any subscriptions become unavailable

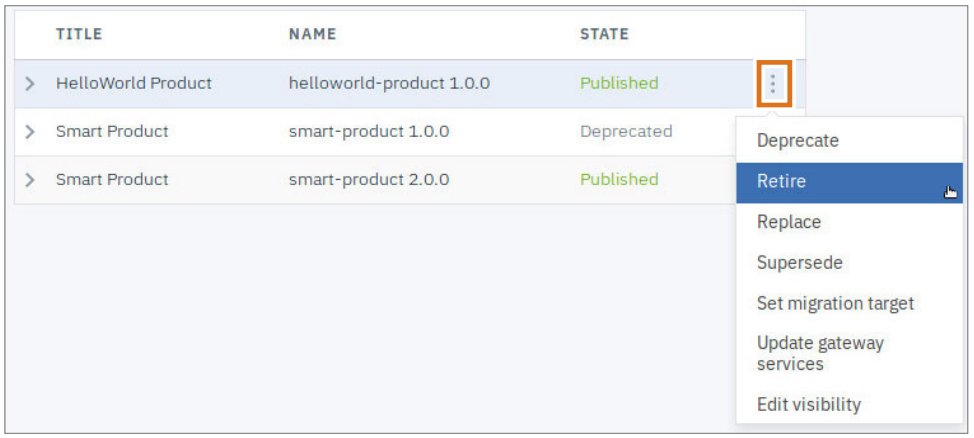

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Figure 4-18. Retire a Product version

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The **Retire** operation moves a Product version from the Published to the **Retired** state.

Before a published plan version can be removed from a catalog, it must first be retired.

You can retire a published or deprecated Product by using the Manage icon in API Manager.

When a Product is retired, all associated APIs are taken offline, and any subscriptions become inactive.

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IBM Training

Delete from catalog

- A retired Product version can be removed from the catalog

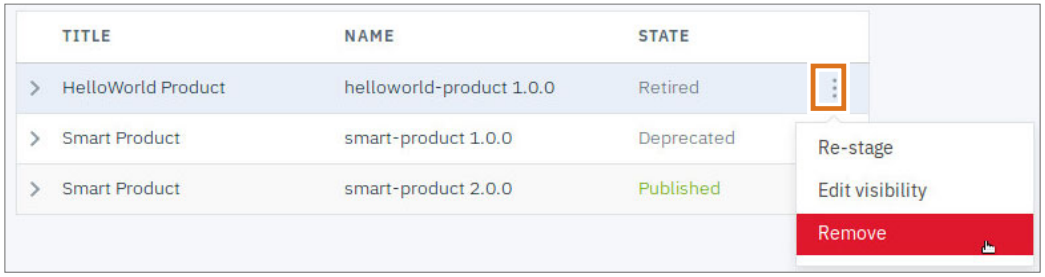

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Figure 4-19. Delete from catalog

Global Knowledge®

In the example, you intend to remove version 1.0.0 of the HelloWorld Product from the Staging catalog.

The Product version is already in the retired state. From the manage icon, select **Remove**. Then, click **Confirm** in the remove product dialog.

The Product version is removed from the catalog.

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IBM Training

Product version status

- In the example, version 1.0.0 of the HelloWorld Product is no longer associated with the Staging catalog

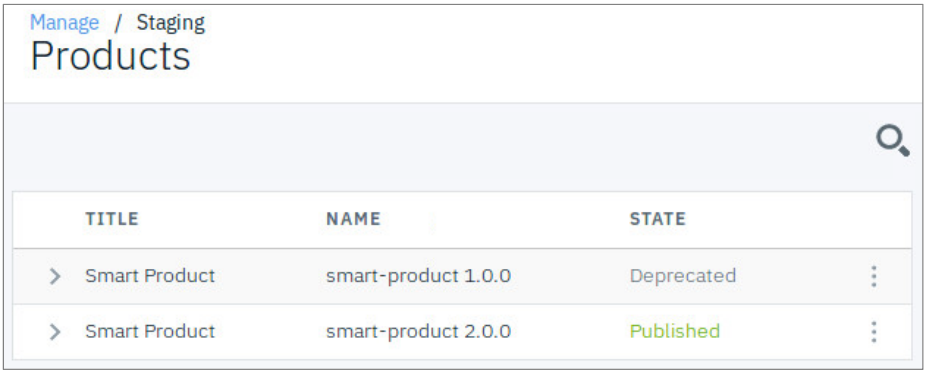

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Figure 4-20. Product version status

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In the example, there are no HelloWorld Product versions in the selected catalog.

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IBM Training

Stage a Product to a production catalog

Creating a new version of a Product and its APIs before they are staged and published to a non-Sandbox catalog is a recommended practice

- Version
  - Stage a Product version that has been tested and is ready for publishing
- API changes
  - API Developers who work on draft APIs should create Product and API versions to add feature enhancements to the APIs
- Not yet visible to consumers
  - Publishing is a later step that makes the Product and its resources visible on the developer portal for that environment

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Figure 4-21. Stage a Product to a production catalog

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When testing is completed for an API, the containing Product version is staged to the catalog to create a specific snapshot of that Product.

API Developers should make feature enhancements to a new version of the Product and its API resources.

You can create versions of Products and APIs at any time.

Before a Product can be published, you must first stage that Product to a catalog.

A staged Product that has not been published is not visible to the users on the Developer Portal.

Creating new versions of Products and APIs before they are staged and published to a non-Sandbox catalog is a recommended practice.

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IBM Training

Change an API version (1 of 3)

- Open the Develop page in API Manager
  - APIs tab is selected
  - Then, select Save as new version from the list of options for the API

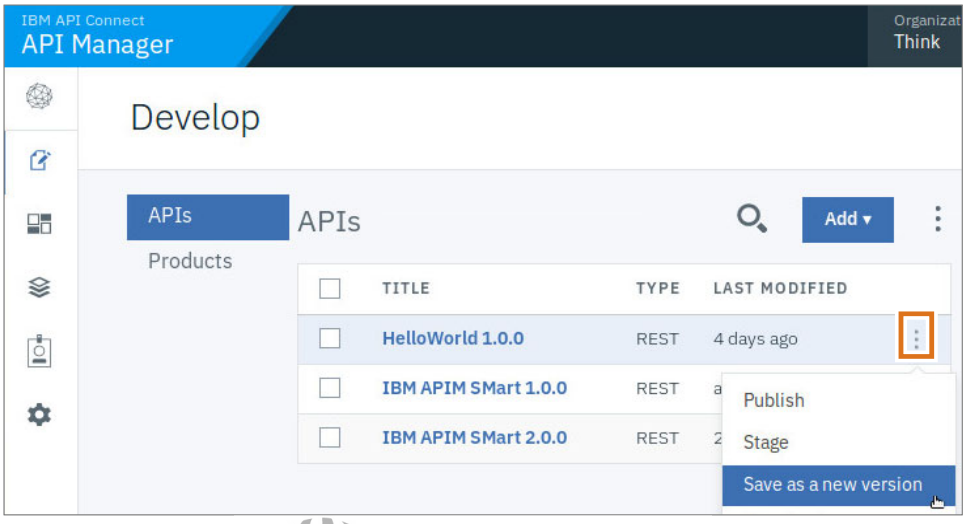

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Figure 4-22. Change an API version (1 of 3)

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You can create a new version of an API from the Develop page of API Manager.

With the APIs tab selected, select the Save as a new version option for the API for which you want to create a new version.

Note

Check the provider organization role permissions to verify whether or not the member can create a new version for the API.

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Change an API version (2 of 3)

- Type the version number in the dialog
- Then, click **Save**

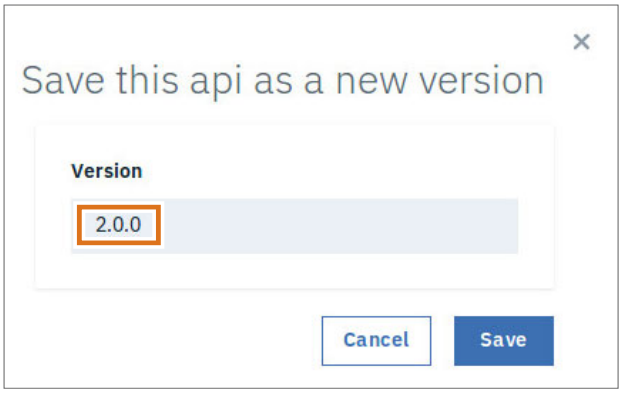

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Figure 4-23. Change an API version (2 of 3)

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When you save a new version of the API, you are prompted to type the version number. Then, click **Save**.

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Change an API version (3 of 3)

- The new version of the API is saved

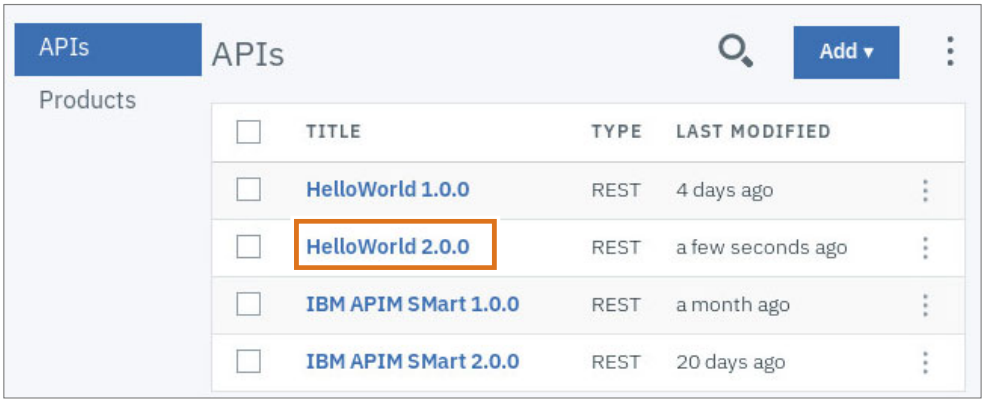

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Figure 4-24. Change an API version (3 of 3)

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The new version of the API is saved and is displayed in the list of APIs.

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Change a Product version (1 of 3)

- Open the Develop page in API Manager
  - Select the Products option
  - Then, select Save as new version from the list of options for the Product

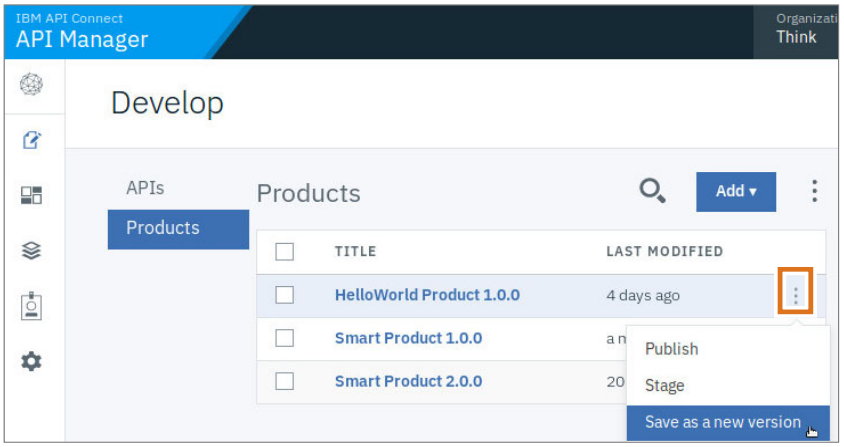

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Figure 4-25. Change a Product version (1 of 3)

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You can change the Product version from the Develop page in API Manager.

Select the Products tab. Then, from the list of options for the API, select Save as a new version.

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Change a Product version (2 of 3)

- Type the version number in the dialog
- Then, click **Save**

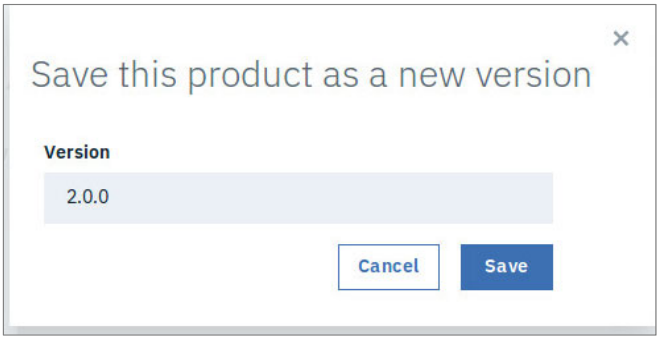

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Figure 4-26. Change a Product version (2 of 3)

Global Knowledge®

When you save a new version of the Product, you are prompted to type the version number. Then, click **Save**.

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Change a Product version (3 of 3)

- The new version of the Product is saved.

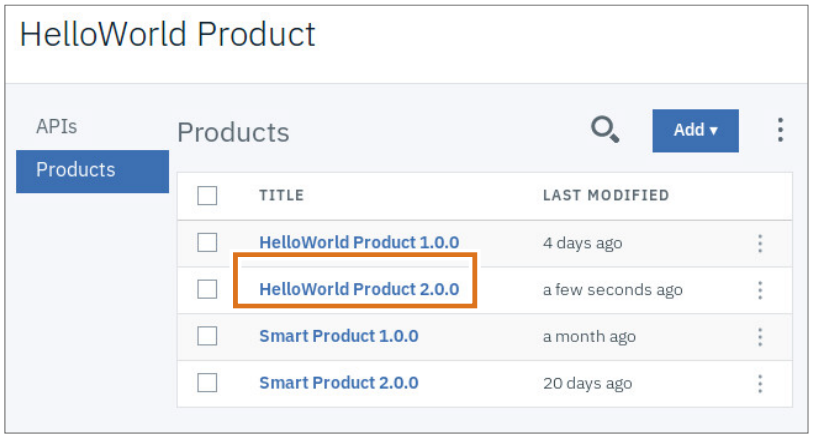

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Figure 4-27. Change a Product version (3 of 3)

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The new version of the Product is saved and is displayed in the list of Products.

The next step is to open the Product in the editor and add the new version of the API to the Product.

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Add the later version of the API to the Product (1 of 3)

- Open the later Product version (2.0.0) with the editor
- Select **APIs**
- Click **Edit**

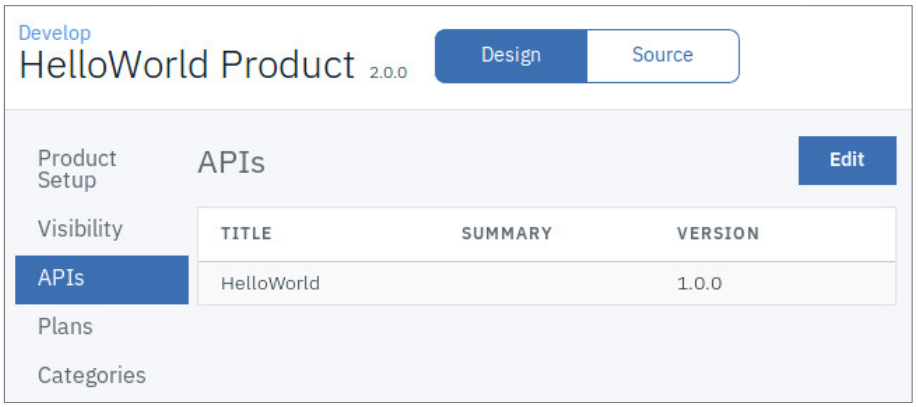

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Figure 4-28. Add the later version of the API to the Product (1 of 3)

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To assign the latest version of the API to the Product, start by opening the recently-created Product version with the editor in API Manager.

With the Product open in the editor, select the APIs tab. Then, click the Edit button to display the APIs that are associated with the Product version.

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Add the later version of the API to the Product (2 of 3)

In the Add APIs to Product dialog:

- Clear the older API version (1.0.0)
- Select the newer API version (2.0.0)
- Click **Save**

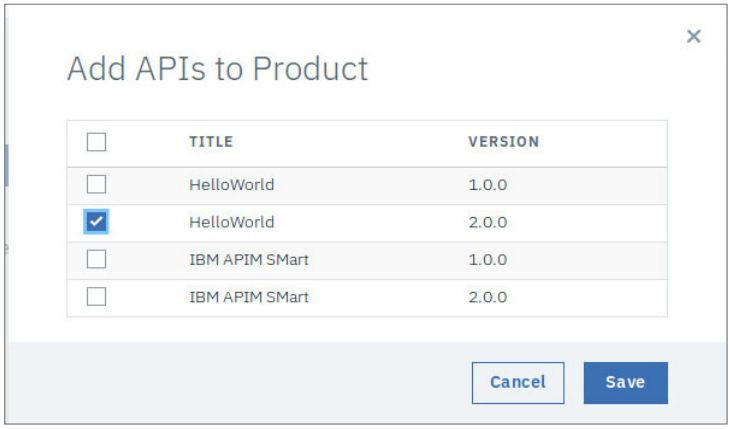

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Figure 4-29. Add the later version of the API to the Product (2 of 3)

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The list of APIs that are assigned to the Product are displayed. Deselect the older API version 1.0.0 and select the newer API version 2.0.0, in this case.

Save the changes.

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Add the later version of the API to the Product (3 of 3)

- The newer API version is now assigned to the Product version

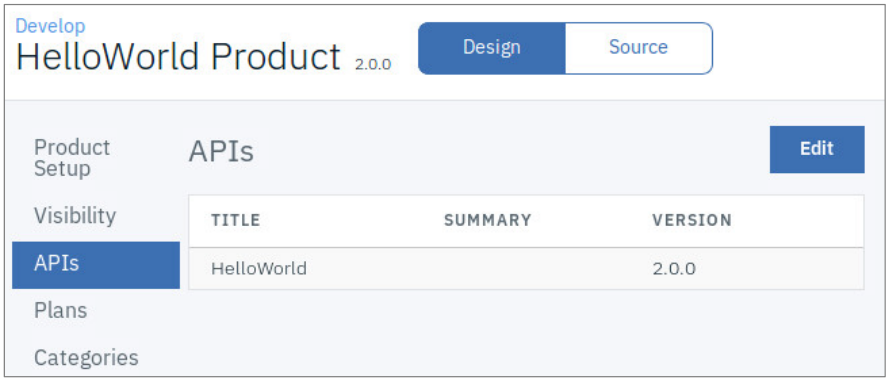

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Figure 4-30. Add the later version of the API to the Product (3 of 3)

Global Knowledge®

The list of APIs that are assigned to the Product are displayed. Deselect the older API version 1.0.0 and select the newer API version 2.0.0, in this case.

Save the changes.

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Replace a Product version with another version (1 of 4)

- Replace an existing Product version with another Product version
  - Newer version might include fixes
- The replacement Product must be in the `Staged` or `Deprecated` state, and the Product to be replaced must be in the `Published` state

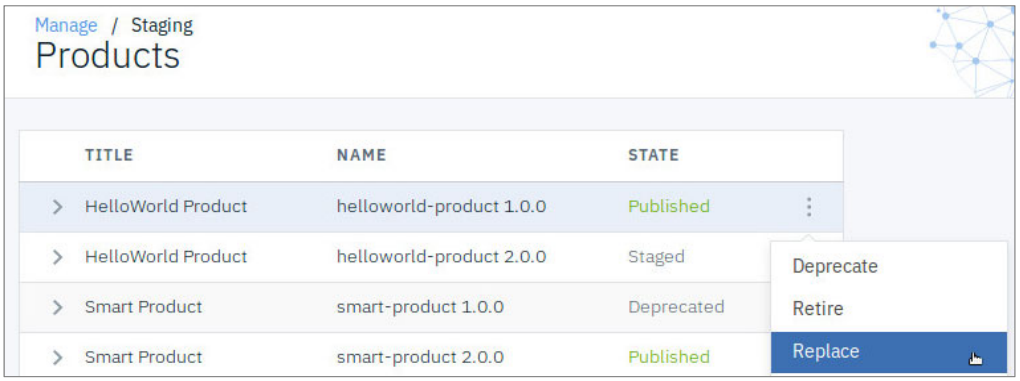

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Figure 4-31. Replace a Product version with another version (1 of 4)

Global Knowledge®

Scenario: Bug fixes to an existing Product version.

This feature is equivalent to swapping an existing Product version with a later version.

In this scenario, a previously published Product version (1.0.0) is going to be replaced by a later staged version (2.0.0) that contains the bug fixes.

When you replace a Product with another Product, the following actions are taken:

- The replacement Product is published.
- The same visibility, subscriber, and gateway enforcement settings from the original Product are used in the replacement Product.
- The subscribers to the original Product are migrated to the replacement Product.
- The original Product is moved to the Retired state. Products in the Retired state are removed from the Developer Portal; they are no longer visible to the application developers, and any subscriptions to them are canceled.

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Replace a Product version with another version (2 of 4)

- Select the replacement Product from the list

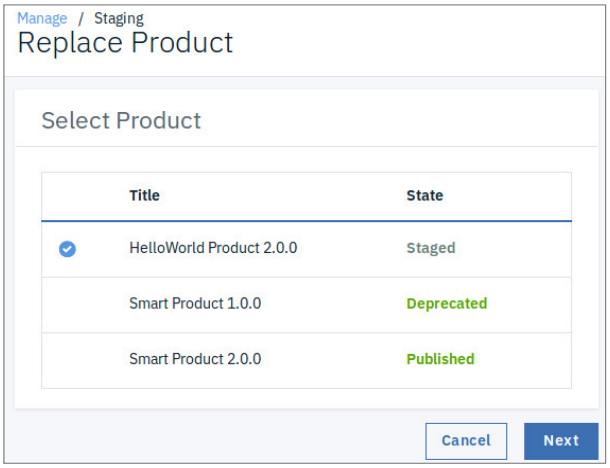

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Figure 4-32. Replace a Product version with another version (2 of 4)

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The dialog box that is displayed when you choose to replace an existing Product version carries out the following actions:

1. The replacement Product will be published.
2. The same visibility and subscriber settings of the original Product version will be used.
3. The subscribers will be migrated.
4. The Product that is being replaced will be retired.

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Replace a Product version with another version (3 of 4)

- Select the plans that are supported in the replacement Product

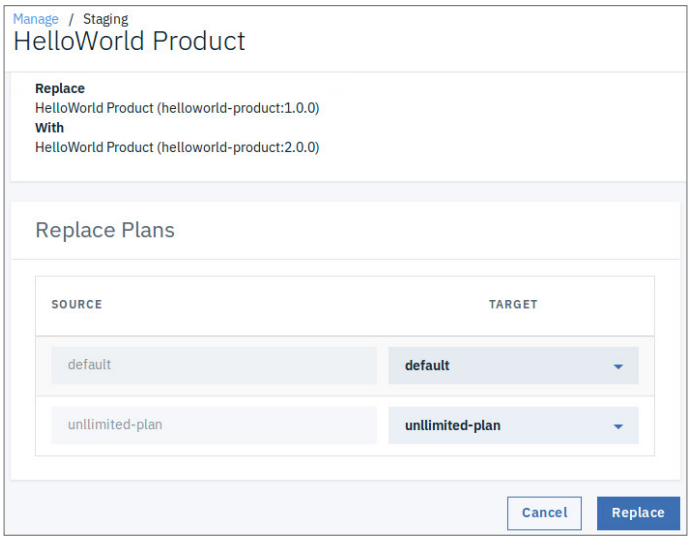

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Figure 4-33. Replace a Product version with another version (3 of 4)

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The dialog prompts you to select the plans that are supported in the replacement plan. You can select multiple plans in the dialog.

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Replace a Product version with another version (4 of 4)

- Product version 1.0.0 is retired and is replaced by 2.0.0
- Product version 2.0.0 is now published with the bug fixes, or moved to the published pending state when approvals are required for the publishing action

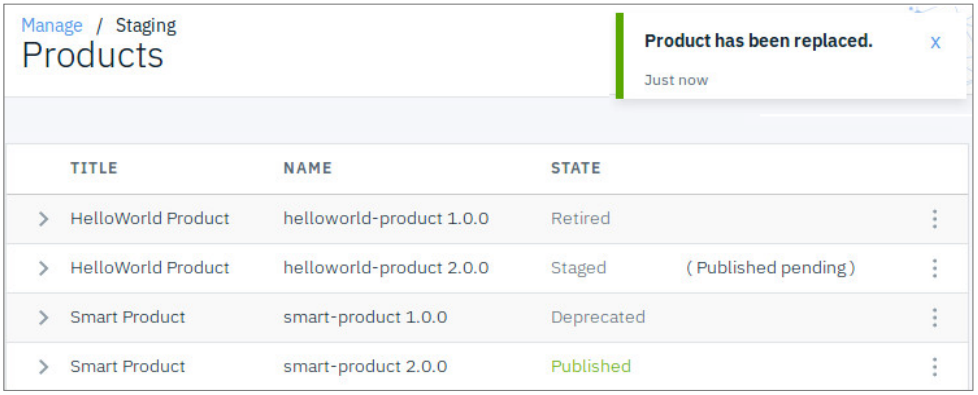

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Figure 4-34. Replace a Product version with another version (4 of 4)

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The slide shows the results from the publish with replace feature of API Manager.

The original Product version is retired and the new Product version and plan are published or in the pending publishing state if approvals are required

The subscribers are migrated from the original plan to the plan that is associated with the later Product version.

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Supersede a Product version with another version (1 of 4)

The superseding Product must be in the `Staged` or `Deprecated` state, and the Product to be superseded must be in the `Published` state

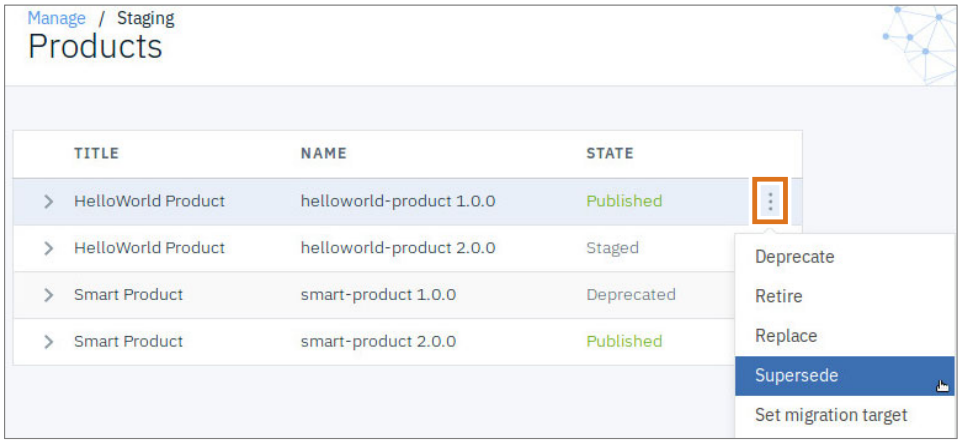

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Figure 4-35. Supersede a Product version with another version (1 of 4)

Global Knowledge®

Scenario: Enhancements to a Product version.

Enhancements are made to some APIs that are contained in HelloWorld Product version 2.0.0.

Version 2.0.0 of the HelloWorld Product is staged to the Staging catalog and is about to supersede HelloWorld Product version 1.0.0.

Note

The HelloWorld Product 1.0.0 and 2.0.0 are reused in this example. The two Products are reset to the staged and published states respectively at the start of process.

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Supersede a Product version with another version (2 of 4)

- Select the superseding Product from the list of Products

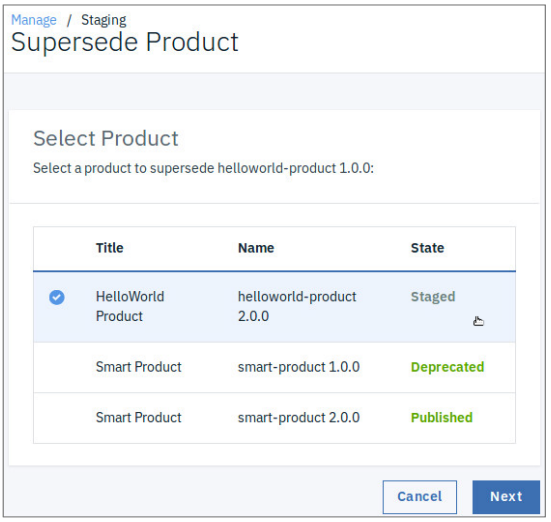

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Figure 4-36. Supersede a Product version with another version (2 of 4)

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Choose the Product that is superseding the published version from the list of Products.

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Supersede a Product version with another version (3 of 4)

- Select the plans that are to be migrated to the superseding Product

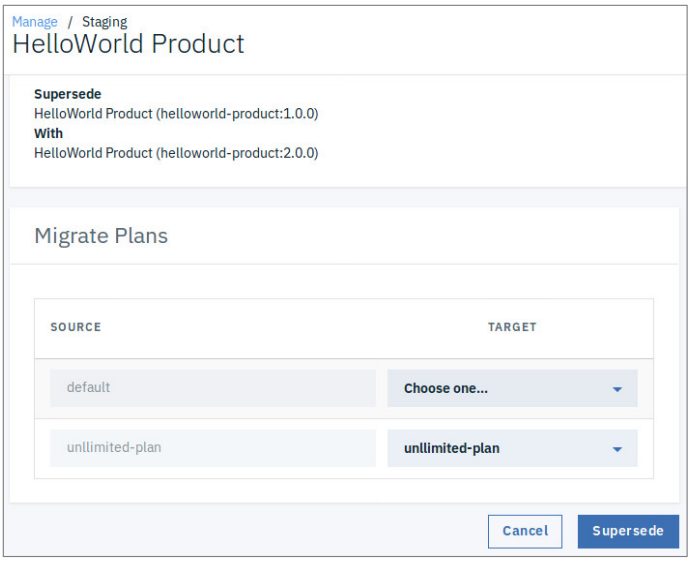

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Figure 4-37. Supersede a Product version with another version (3 of 4)

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Verify the Products that are being superseded and each plan within the product that is to be migrated.

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Supersede a Product version with another version (4 of 4)

- Product version 2.0.0 is deprecated
  - Application developers that are already subscribed to the product can continue to use it, but no new developers can subscribe to the product
- Product version 3.0.0 is now published with the enhancements

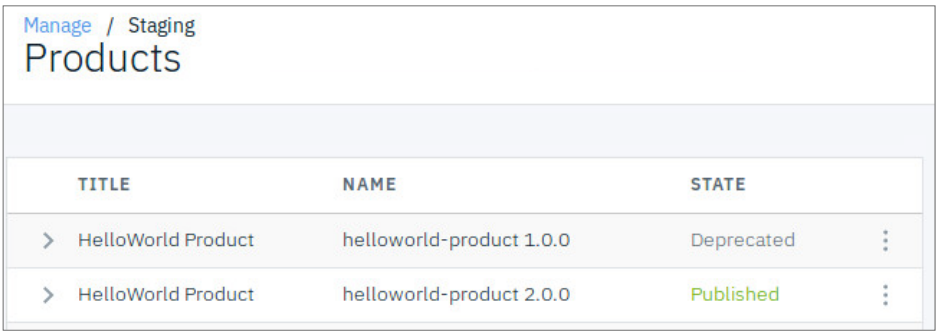

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Figure 4-38. Supersede a Product version with another version (4 of 4)

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When you supersede a Product with another Product, the following actions are taken:

- The superseding Product is published.
- The same visibility, subscriber, and gateway enforcement settings from the original Product are used for the superseding Product.
- The original Product is moved to the Deprecated state. When a Product is deprecated, application developers that are already subscribed to the Product can continue to use it, but no new developers can subscribe to the Product.

Subscribers of the Product version are not automatically migrated. This means that the subscribers will still use the deprecated Product until they subscribe to the new Product version.

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Product on the Developer Portal

- The superseded Product version is displayed on the Developer Portal

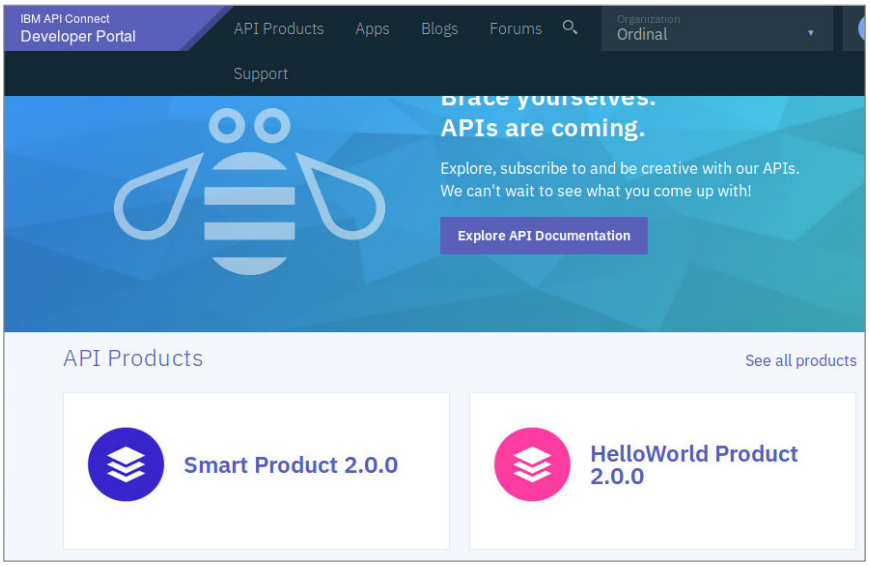

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Figure 4-39. Product on the Developer Portal

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Subscriptions

- An application must subscribe to a plan
  - A plan is a collection of API operations and any rate limits that might apply
- An application plan subscription allows the application to call API resources by the plan
- Application developers initially subscribe their applications to one or more plans by using the Developer Portal

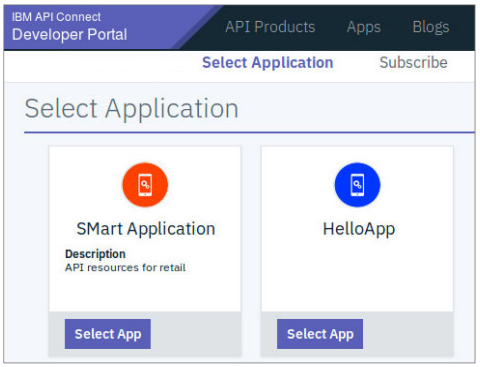

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Figure 4-40. Subscriptions

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Application developers create applications in the Developer Portal. Then, the developers subscribe their applications to one or more plans by using the Developer Portal.

Applications are generated with a client ID that can be used to authorize the application to call the API operations. The plan that the application subscribes to can restrict the number of API calls the application can make during a time period.

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Migrate subscriptions between plans (1 of 3)

- Application developers can migrate their subscribed applications to the newer Product version and plan in the Developer Portal

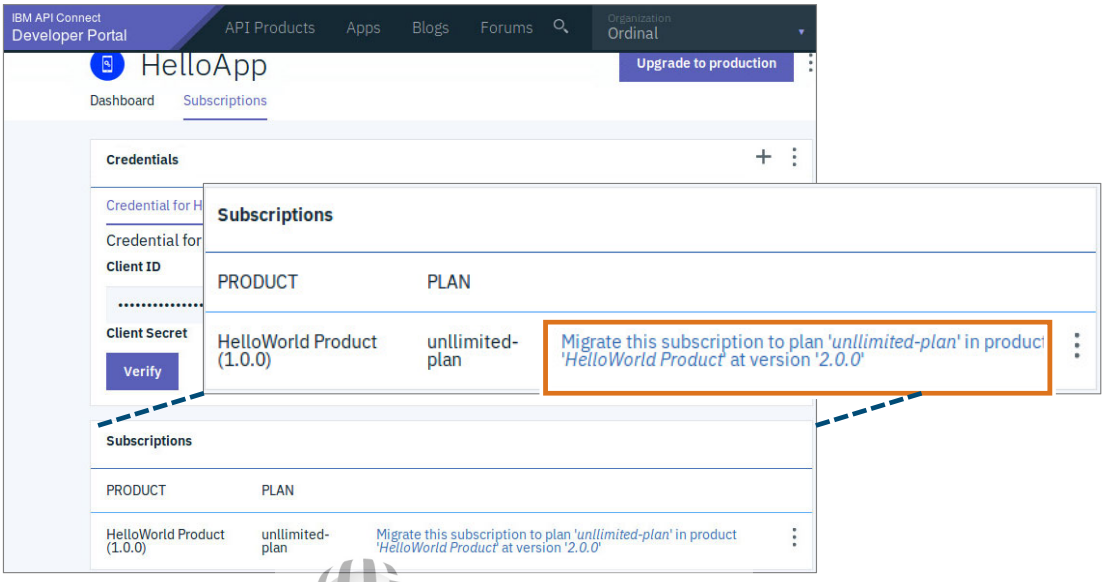

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Figure 4-41. Migrate subscriptions between plans (1 of 3)

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After a Product is superseded in API Manager, the published instance of the later Product version is visible to authenticated users on the Developer Portal, along with the deprecated Product version.

The signed-on developer can elect to migrate the application subscription to the newer version of the Product and plan from the Subscriptions tab of the application.

By clicking the link that starts with “Migrate this subscription to plan”, the application migration is triggered.

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Migrate subscriptions between plans (2 of 3)

- The migrate subscription confirmation dialog is displayed.

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Figure 4-42. Migrate subscriptions between plans (2 of 3)

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Proceed with the migration from the deprecated Product version to the newer Product version. Click **Migrate subscription**.

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Migrate subscriptions between plans (3 of 3)

- The application subscription is moved from the deprecated Product version and plan to the newer Product version and plan

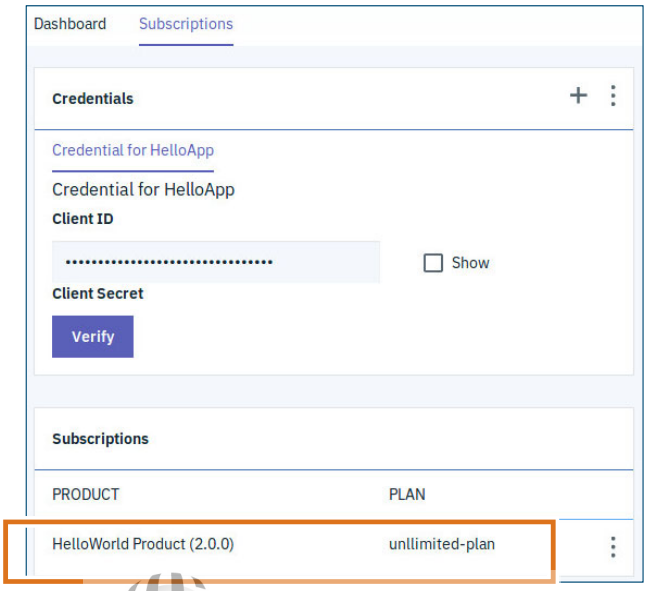

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Figure 4-43. Migrate subscriptions between plans (3 of 3)

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The subscription is migrated to the new Product version and plan, and those subscriptions are removed from the deprecated Product version and plan from which they were migrated.

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Unsubscribing from a Product and plan

- An authenticated user can unsubscribe an application from a Product and plan in the Developer Portal

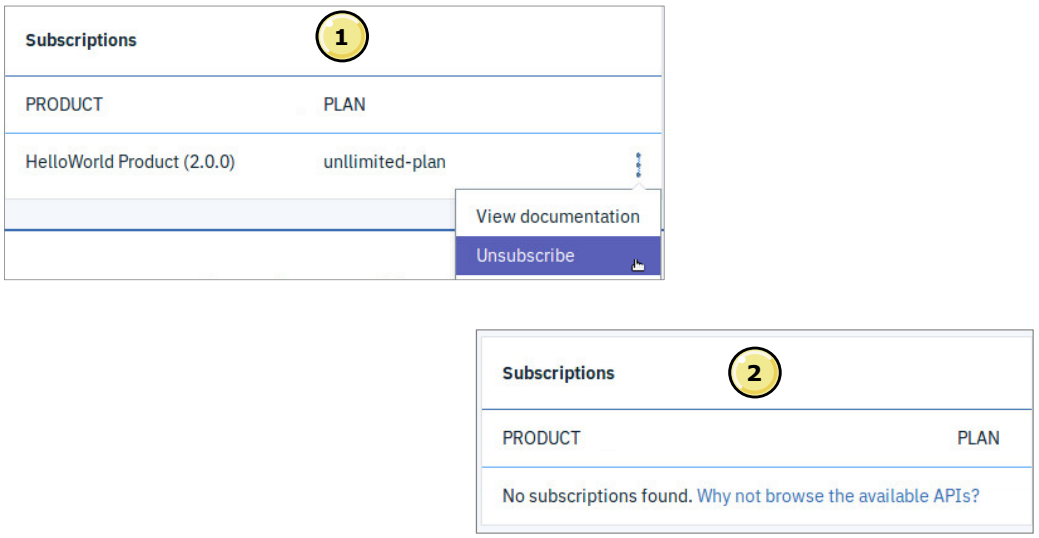

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Figure 4-44. Unsubscribing from a Product and plan

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An authenticated user can unsubscribe an application from a Product and plan in the Developer Portal.

1. The application is unsubscribed from the Product and the plan by selecting the Unsubscribe option.
2. The application displays that there are no current subscriptions.

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Manage subscriptions in API Manager (1 of 3)

- With the right permissions, a member of a provider organization can create subscriptions from the Applications page for a catalog
- Can be done for Product and plans that do not already have a subscription

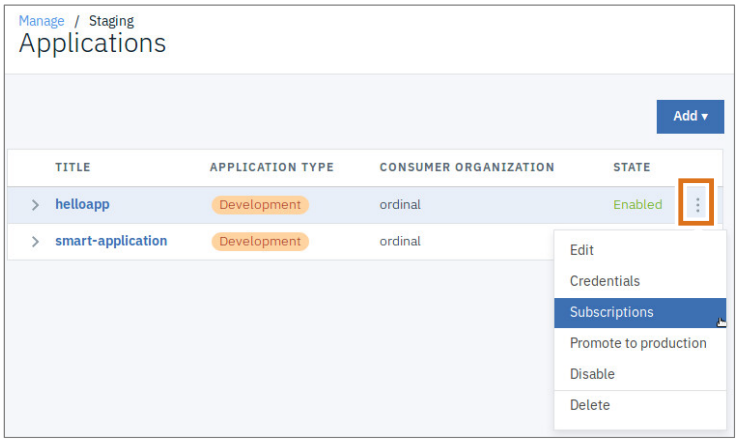

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Figure 4-45. Manage subscriptions in API Manager (1 of 3)

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Members of provider organizations who have permission can create subscriptions from the API Manager user interface. Open the catalog. Then, select Applications from the Manage option.

From the Applications page for a catalog, select **Subscriptions** from the manage options for the application.

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Manage subscriptions in API Manager (2 of 3)

- Select the Product and plan for the application subscription
- Then, select **Create**

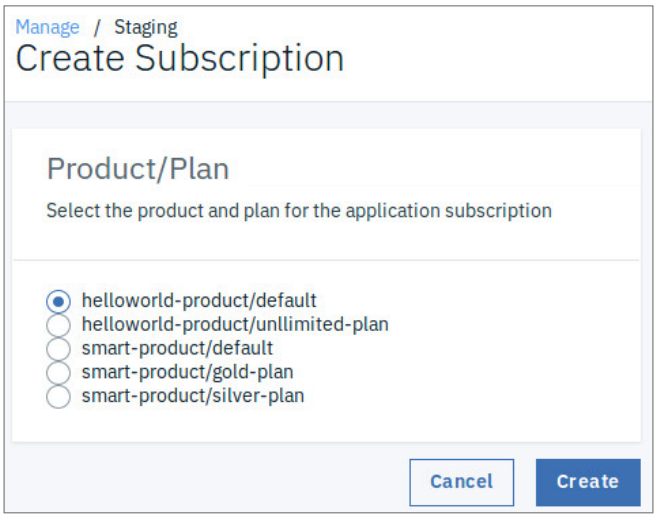

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Figure 4-46. Manage subscriptions in API Manager (2 of 3)

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In the Create Subscription dialog in API Manager, select the Product and plan for the application subscription. Then, click **Create**.

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Manage subscriptions in API Manager (3 of 3)

- The subscription is created and can be seen in the application subscriptions on the Developer Portal

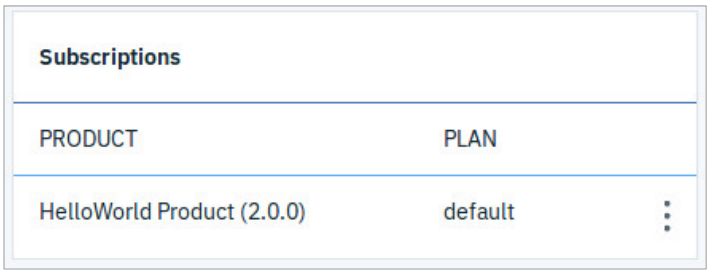

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Figure 4-47. Manage subscriptions in API Manager (3 of 3)

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Verify that the subscription is created for the application by signing on to the Developer Portal and viewing the subscriptions for the application. You see that the application is subscribed to the Product and uses the default plan.

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Enable approvals for lifecycle state changes (1 of 2)

- Approvals for lifecycle state changes are configured in the Settings for the catalog
  - Click **Edit** to add or remove lifecycle approvals

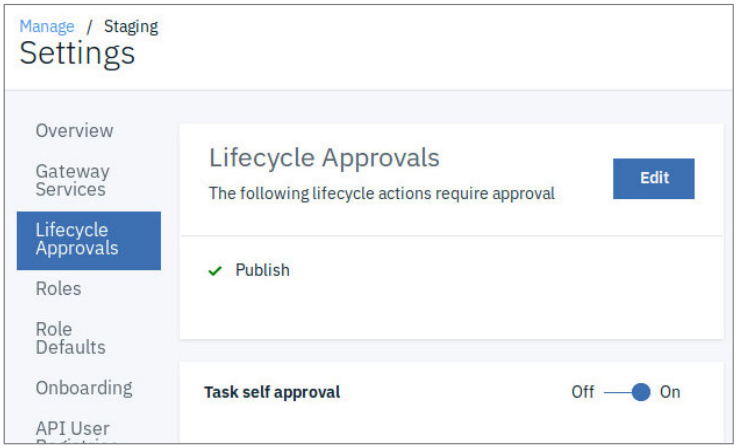

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Figure 4-48. Enable approvals for lifecycle state changes (1 of 2)

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Approvals for lifecycle state changes are configured in the Settings for the catalog. Then, click the **Lifecycle Approvals** tab.

The page displays the lifecycle states that require approval. In the example, only the Publish option requires approval. Click the **Edit** button to configure approvals for other lifecycle state changes.

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Enable approvals for lifecycle state changes (2 of 2)

- Select the lifecycle events that require approvals
  - Click **Save** to add or remove lifecycle approvals

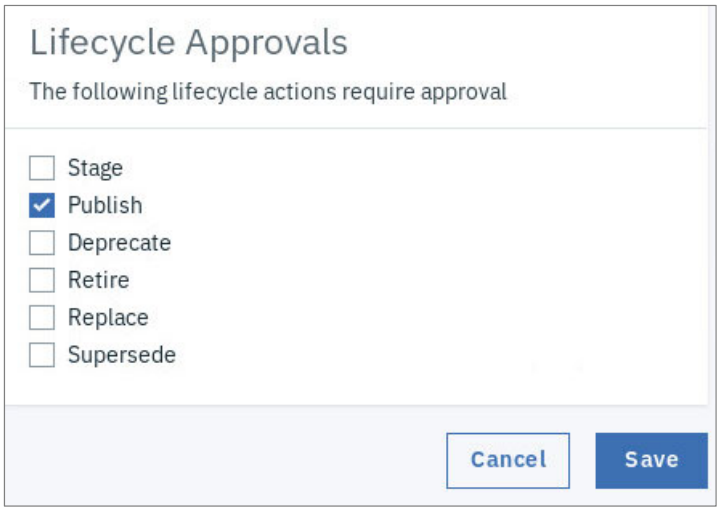

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Figure 4-49. Enable approvals for lifecycle state changes (2 of 2)

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When the Edit button is clicked from the Lifecycle Approvals page, a dialog is displayed where you can enable or disable lifecycle approvals.

If approval is required for a Product management operation, an approval request is sent and the Product version moves to the pending state. When the request is approved, the operation is completed.

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Lifecycle state changes when approvals are enabled

- If approval is required for a product management operation, an approval request is sent and the Product version moves to the `Pending` state
- This request is displayed on the **Tasks** tab of the catalog, from where the request can be approved or declined
- When the request is approved, the operation is completed and the Product version moves to the next lifecycle state
  - If approval is not required, the operation is completed immediately

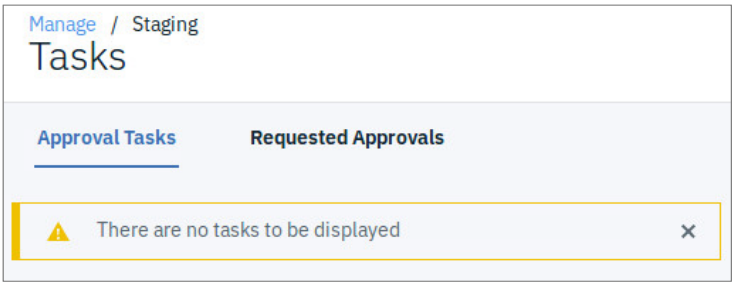

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Figure 4-50. Lifecycle state changes when approvals are enabled

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If approvals for Product lifecycle changes have been enabled for a catalog, then an attempt to change the lifecycle state of a Product results in an approval request being sent. This request is displayed on the **Tasks** tab of the catalog, from where the request can be approved or declined. The authority to approve Product lifecycle state changes is restricted to users in specified roles.

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Unit summary

- Describe provider organization roles and permissions
- Explain the Product lifecycle stages
- Describe how staging and publishing differ in development and production catalogs
- Describe how lifecycle events are managed in API Manager
- Explain the product availability and visibility settings
- Describe how to create versions of Products and APIs
- Explain the concept of replacing and superseding published Products
- Explain how to migrate application subscriptions to a new Product version and plan
- Explain how application subscriptions are created in API Manager
- Describe the state changes that occur when approvals are enabled

The Product lifecycle

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Figure 4-51. Unit summary

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Review questions

1. True or False: An application must subscribe to a plan before it can be used.

2. Which of these statements is true about lifecycle changes in a development catalog?
   A. Staging and publishing actions overwrite the existing version.
   B. The system automatically resolves any staging or publishing conflicts.
   C. All predefined roles can stage and publish API Products.
   D. A and B
   E. All of the above.

The Product lifecycle

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Figure 4-52. Review questions

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Write your answers here:

1.

2.

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IBM Training

Review answers

1. True or False: An application must subscribe to a plan before it can be used.
   The answer is True.

2. Which of these statements is true about lifecycle changes in a development catalog?
   A. Staging and publishing actions overwrite the existing version.
   B. The system automatically resolves any staging or publishing conflicts.
   C. All predefined roles can stage and publish API Products.
   D. A and B.
   E. All of the above.

   The answer is D.
   In the API Manager Settings for a catalog, select Roles to edit the permissions for the catalog

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Figure 4-53. Review answers

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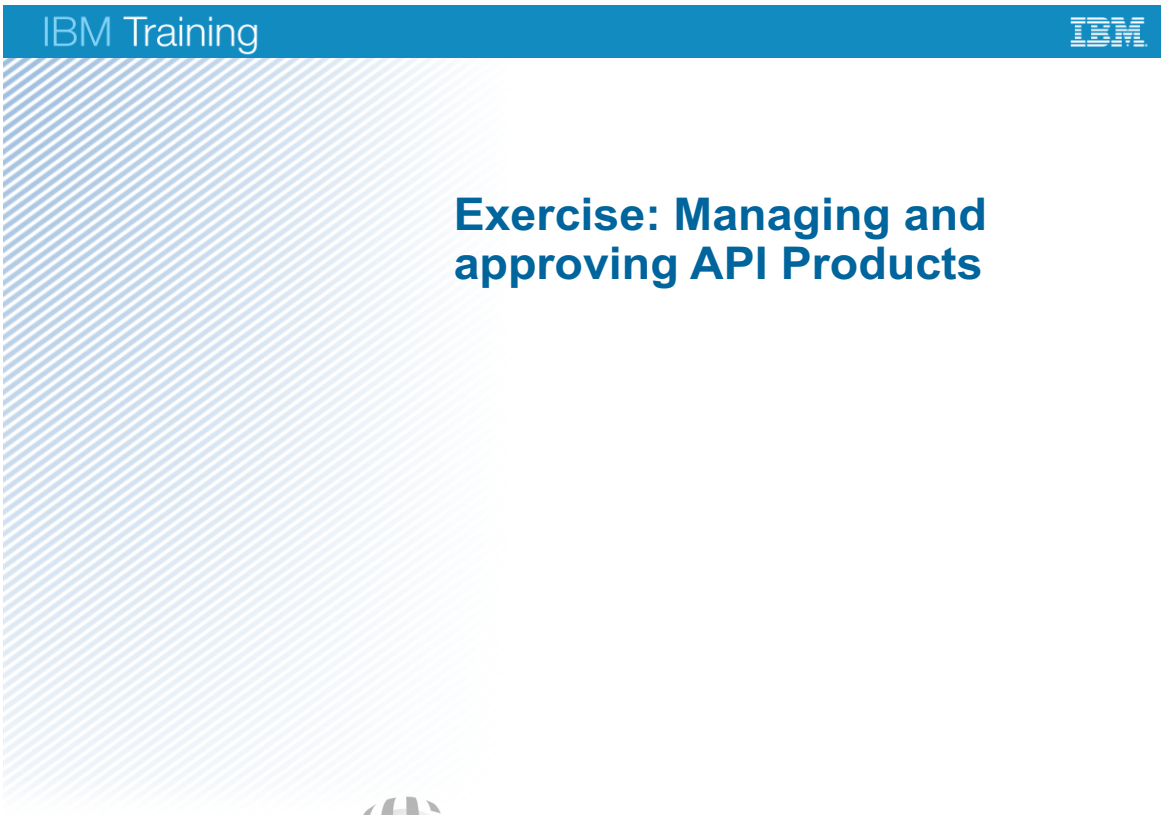

Figure 4-54. Exercise: Managing and approving API Products

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Exercise objectives

- Review product availability and visibility settings
- Create and configure plans
- Review the roles and members of the provider organization
- Create a provider organization member with the developer role
- Sign in to API Manager with the owner role
- Configure lifecycle and approval settings
- Publish a Product and APIs to the Staging catalog
- Create a version of the API and Product
- Approve a published Product

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Figure 4-55. Exercise objectives

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Unit 5. Customizing the Developer Portal

Estimated time

00:45

Overview

As the administrator, you can change the appearance and layout of the Developer Portal. This unit describes the customization options that are available to you. You learn how to customize the Developer Portal through the administration menu, and examine the options for using themes and sub-themes on the Developer Portal.

How you will check your progress

- Review questions
- Lab exercise

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Unit objectives

- Briefly explain the purpose of the Developer Portal
- Explain the role of the Drupal open source project in the Developer Portal
- Explain the concept of modules and themes
- List the roles that are defined in the Developer Portal
- Describe the Drupal terminology that is used when administering the portal
- Describe the various ways to create a theme for the Developer Portal
- Describe the use of sub-themes for customizing the standard API Connect Developer Portal theme

Customizing the Developer Portal

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Figure 5-1. Unit objectives

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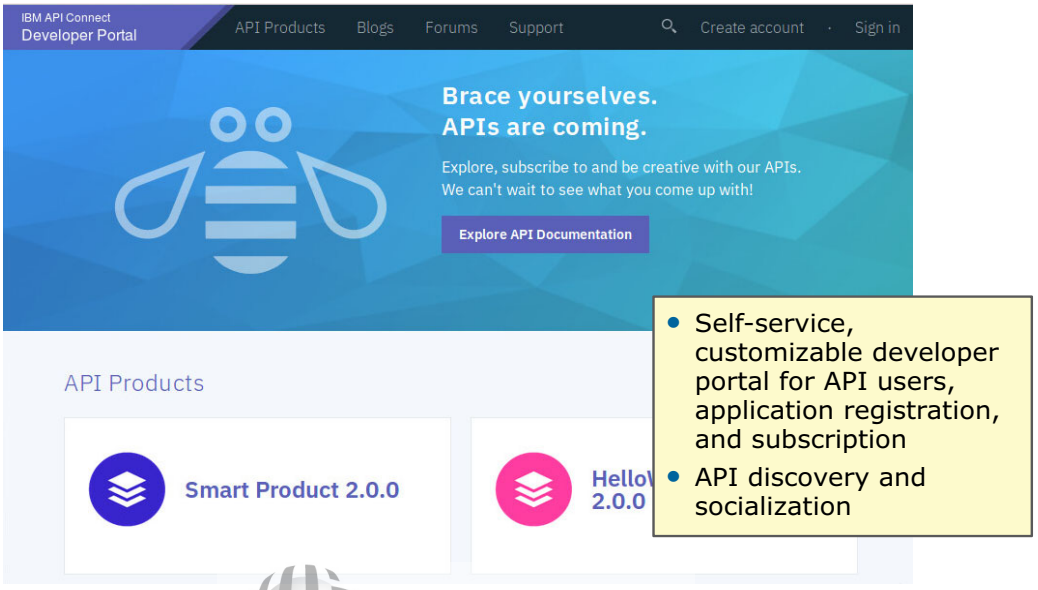
Developer Portal

- The Developer Portal provides application developers a set of tools to find, subscribe, and test APIs in the API Connect cloud



Customizing the Developer Portal

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Figure 5-2. Developer Portal

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The API Connect Developer Portal provides a complete content management, and customizable developer portal for your APIs.

The Developer portal provides application developers a set of tools to find, subscribe, and test APIs that are built in the API Connect cloud.

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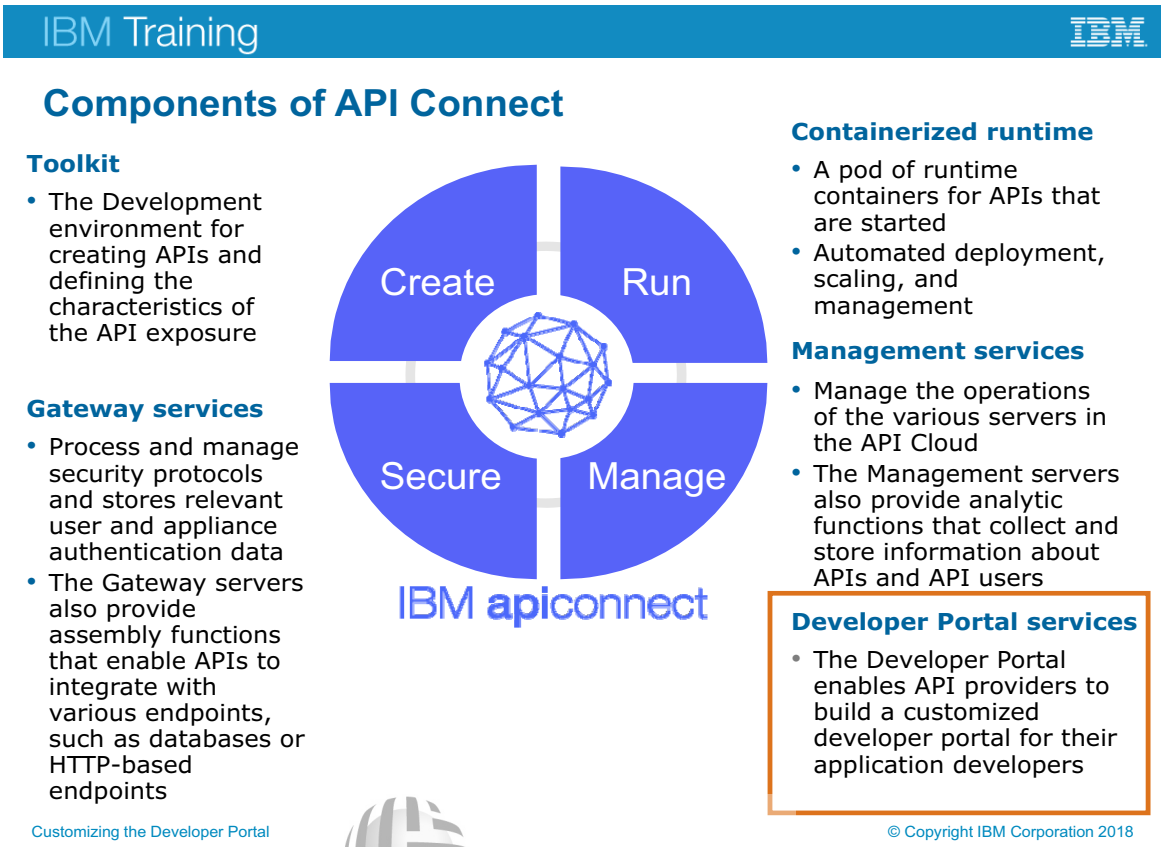

Figure 5-3. Components of API Connect

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This page shows the components and capabilities of the IBM API Connect solution.

The Developer Portal enables API providers to build a customized developer portal for their application developers.

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Features of the Developer Portal

- Self-service account creation (if enabled)
  - User can create an account on the Developer Portal
- Manage consumer organizations (owners)
  - Add users
  - View analytics
  - Create consumer organizations
- Authenticated users
  - Create applications
  - Manage subscriptions
- Portal administrators
  - Import custom themes
  - Customize layout and menus
  - Set permissions

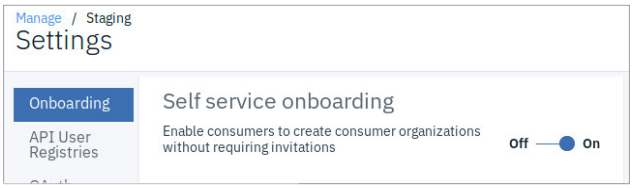

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Figure 5-4. Features of the Developer Portal

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Owners of a consumer organization can manage their communities and view analytics from the Developer Portal.

Authenticated Portal users who are granted permission, can create applications and manage subscriptions.

Portal administrators can customize the Developer Portal.

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Powered by Drupal

- Drupal is a free, open source web content management tool for content, community, and commerce
  - LAMP (Linux, Apache, MySQL, and PHP) software
- Customizable platform
- Supports responsive websites to deliver optimal visitor experiences from any device
- Flexible content architecture
  - Admin interface
  - Display only the content appropriate for each display with Views
  - Customizable menus
- Content authoring
  - Authentication and permissions for editing workflows and content
- The Developer Portal is based on the open source Drupal 8 content management software
  - Customizable

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Figure 5-5. Powered by Drupal

Global Knowledge®

Drupal is an open-source web content management platform.

The Drupal platform runs on LAMP, a software stack that consists of the Linux operating system, Apache web server, MySQL database, and the PHP scripting language.

The Developer Portal is based on the open source Drupal 8 content management software, and consequently is almost completely customizable.

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Drupal modules

- A *module* (usually PHP and CSS) is a software component that makes up or extends Drupal features and function
- “Core”
  - Files and modules that are included with a Drupal version or download
- “Contributed”
  - Modules or themes that are not part of the Core Drupal product
  - Available for separate download from the modules or themes of Drupal.org download site
- You can extend your Developer Portal site by installing custom modules that you created, and also installing contributed modules from the Drupal 8 community
  - You must have administrator access to complete this task

Customizing the Developer Portal

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Figure 5-6. Drupal modules

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You can extend your Developer Portal site by installing custom modules that you created, and also installing contributed modules from the Drupal 8 community. You must have administrator access to complete this task.

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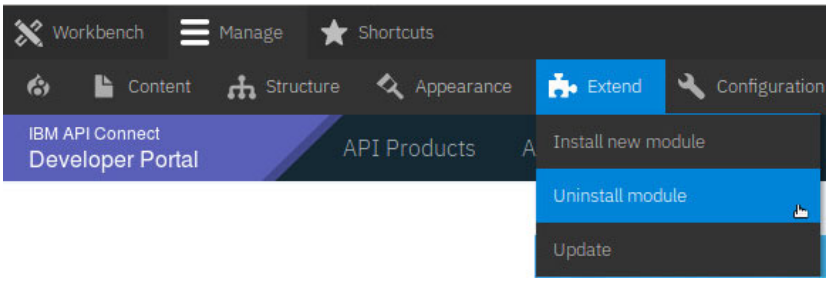
Disable modules

- You can disable an entire module in the Developer Portal to improve performance, or remove functionality
  - You must have administrator access to complete this task
- With the Manage option selected on the administration menu, select **Extend**. Then, select **Uninstall module**



- The list of modules is displayed
  - Select the module to be uninstalled
  - Click the Uninstall icon

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Figure 5-7. Disable modules

Global Knowledge®

You can disable an entire module in the Developer Portal if you want to improve performance, or remove functionality. You must have administrator access to complete this task.

With the Manage option selected on the administration menu, click Extend. Then, select Uninstall module.

From the list of installed modules, select the module to be uninstalled. Then, click the Uninstall icon.

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Drupal themes

- A *theme* is a collection of templates, configuration files, and asset files (JavaScript, CSS, images, fonts) which together determine the appearance of a site
- Contains elements such as headers, block layouts, and icons

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Figure 5-8. Drupal themes

Global Knowledge®

A *theme* is a collection of templates, configuration files, and asset files (JavaScript, CSS, images, fonts) which together determine the appearance of a site.

Adminimal is a popular administration theme for Drupal.

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Sub-themes

- Sub-themes are just like any other theme, with one difference:
  - The sub-theme inherits resources from the parent theme
  - You can then override specific resources to configure your required customizations
- The Developer Portal comes with a default API Connect theme
  - Directly editing the API Connect theme is not permitted or supported, as edited versions of these files are overwritten when product fixes or upgrades are installed
- Create a custom sub-theme of the standard API Connect theme that the Developer Portal uses by default
  - Your custom sub-theme CSS file needs to contain only the changes or overrides that you want to make from the default theme

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Figure 5-9. Sub-themes

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Drupal 8 sub-themes are just like any other theme, with one difference: they inherit resources from the parent theme.

The Developer Portal comes with a default API Connect theme.

Directly editing the API Connect theme is not permitted or supported, as edited versions of these files are overwritten when product fixes or upgrades are installed.

The way to create a custom theme is to create a custom sub-theme of the standard API Connect theme that the Developer Portal uses by default. A sub-theme inherits the parent theme's resources, and this means that your custom sub-theme CSS file needs to contain only the changes or overrides that you want to make from the default theme. The CSS file can contain as little or as many updates as you like.

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IBM Training

Developer Portal: Public interface

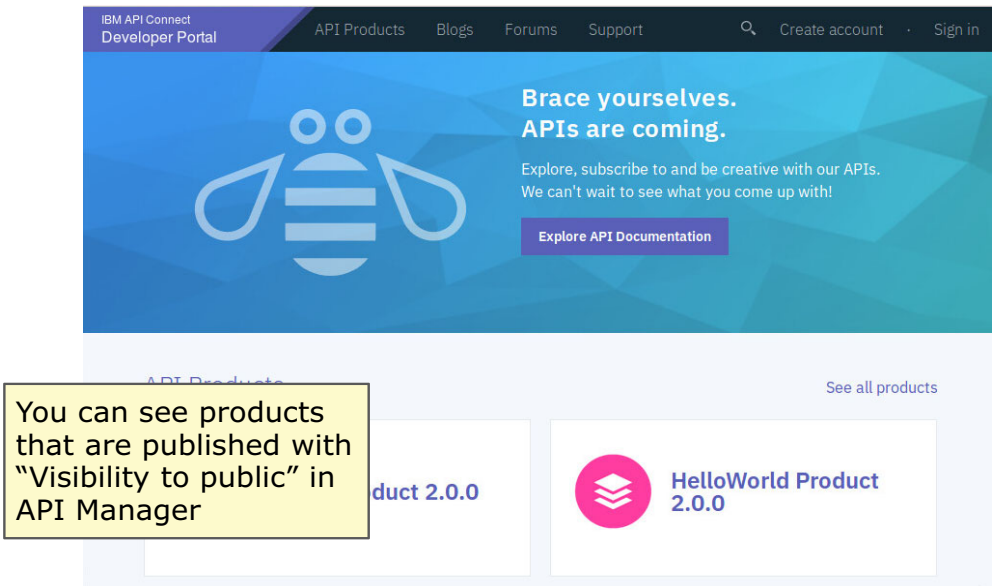

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Figure 5-10. Developer Portal: Public interface

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Any Products that are published with a visibility option of "Public" are displayed if the user click the **API Products** tab of the Developer Portal. The user does not need to sign on to the Developer Portal to view these Products and APIs.

Products that are published with visibility options other than "Public" are not visible on the portal for unauthenticated users.

You can have visibility set to “Public” and Subscribability set to “Authenticated”. In this case, the Products are visible on the public interface of the Developer Portal but only authenticated users can subscribe to use the Product and APIs.

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IBM Training

Developer Portal: Authenticated user

- Can see Products that are published with “Authenticated user” in API Manager
- Can also see Products that are published with “Public” in API Manager

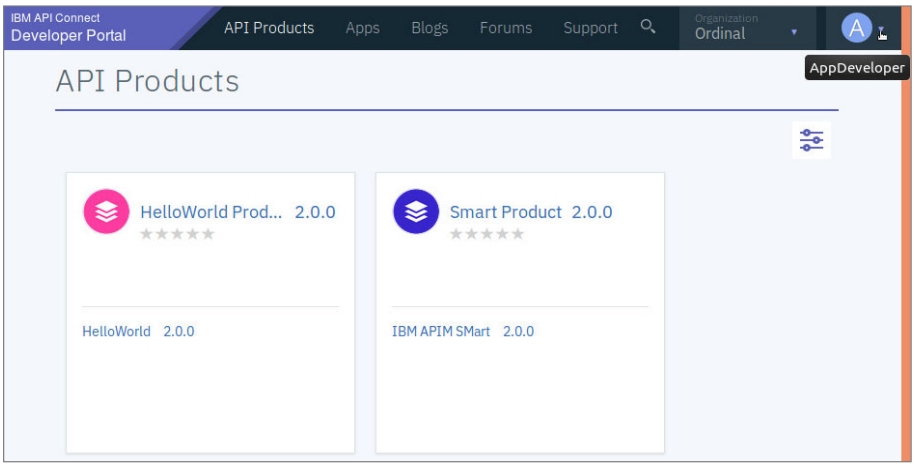

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Figure 5-11. Developer Portal: Authenticated user

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An authenticated user can see Products that are published with “Authenticated user” in API Manager.

In the example, the user is signed on to the Developer Portal and two Products are displayed with the **API Products** tab selected.

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Portal roles

- By using roles, you can fine-tune the security and administration of Drupal
  - A role defines a group of users that have certain privileges as defined on the permissions page
- **Anonymous user**: Role that is used for users that do not have a user account or that are not authenticated
- **Authenticated user**: This role is automatically granted to all logged in users
- **Content author**: Role that is used to edit or add content
- **Forum moderator**: Role that controls access to the portal forums
- **Administrator**: Manages all other roles
- **Superuser**: Access to all content

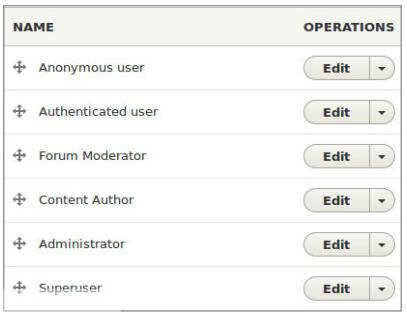

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Figure 5-12. Portal roles

Global Knowledge®

You can use roles to fine-tune the security and administration of Drupal. A role defines a group of users that have certain privileges as defined on the permissions page. Examples of roles include: anonymous user, authenticated user, moderator, administrator, and other roles. The administrator can define the names and order of the roles on your site. It is recommended to order your roles from least permissive (anonymous user) to most permissive (superuser).

The superuser role is assigned by default to the admin user when a Developer Portal site is enabled in the API Manager.

By default, Drupal comes with two user roles:

- Anonymous user: This role is used for users that do not have a user account or that are not authenticated.
- Authenticated user: This role is automatically granted to all logged in users.

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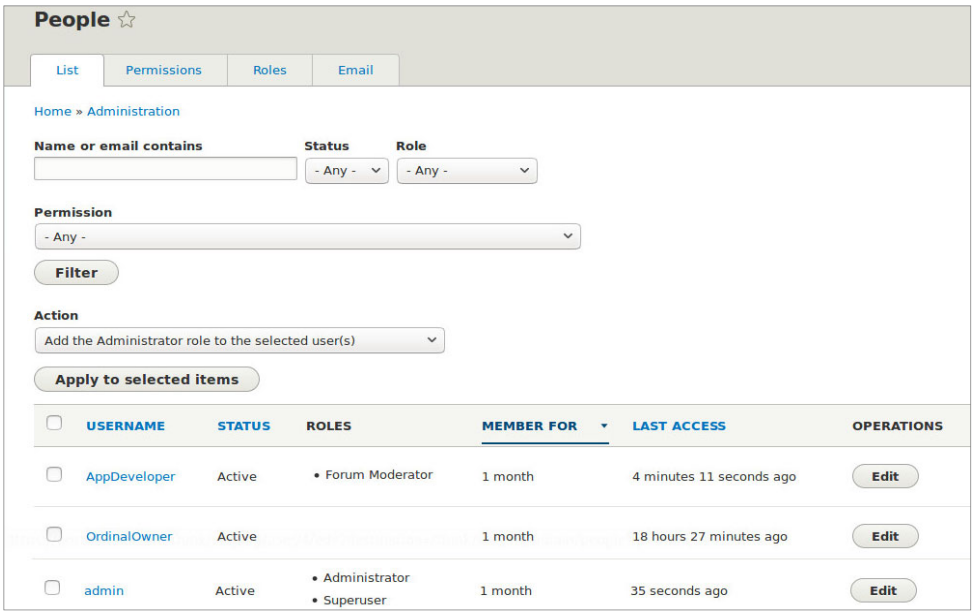
List all members displayed in the Developer Portal



Customizing the Developer Portal

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Figure 5-13. List all members displayed in the Developer Portal

Global Knowledge®

You can get a list of members that are defined on the Developer Portal by selecting the **People** option from the administration Manage menu.

By default, members are defined with a role of authenticated user.

You can define additional roles for a user on the Developer Portal by selecting the member, then selecting a role from the **Action** options sub-menu.

Information

From the standpoint of the default roles for the consumer organization, members are classified as administrators, owners, developers, or viewers in the settings for the catalog. The roles that are defined by the portal administrator are Drupal roles for managing the content that is provided in the Developer Portal.

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IBM Training

Developer Portal terminology

- Regions
  - Specific areas of a Developer Portal site in which content can be placed
- Blocks
  - Boxes of content that are displayed in regions on the Developer Portal page
  - *Blocks* can be made available to your Developer Portal site by enabling specific modules
  - After a block is created, its appearance, size, and position can be modified
- Fields
  - Data types that can be added to an element
  - For example, Title, Body, Tags, Image
- Nodes
  - Each piece of content in a Developer Portal site is a *node*
  - For example, an article, blog entry, forum topic, or page
- Panels
  - A drag-and-drop Content Manager that you can use to visually design a layout, and place content within that layout

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Figure 5-14. Developer Portal terminology

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You are recommended to understand the various Drupal concepts and terminology that are referenced throughout the Developer Portal.

For more information, see the topic “Concepts in the Developer Portal” in the IBM Knowledge Center for API Connect at https://www.ibm.com/support/knowledgecenter/SSMNED_2018/com.ibm.apic.devportal.doc/capic_portal_devportal_concepts.html

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IBM Training

Administration menu

- Menu is displayed when the *admin* user signs on to the Developer Portal
  - Responsive multi-level menu for administering the Portal

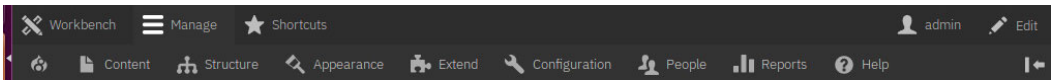

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Figure 5-15. Administration menu

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The administration menu is displayed when the admin user logs in to the Developer Portal.

The menu is displayed either as a drop-down enabled responsive menu or the menu is displayed horizontally along the top of the Developer Portal on an expanded page.

Responsive web pages are mobile-friendly and they change according to the page size.

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IBM Training

Status report

- Reports menu option of the admin menu
- Displays the Drupal version of the Developer Portal
  - Important information when importing or creating a custom theme
  - Theme should match the Drupal version

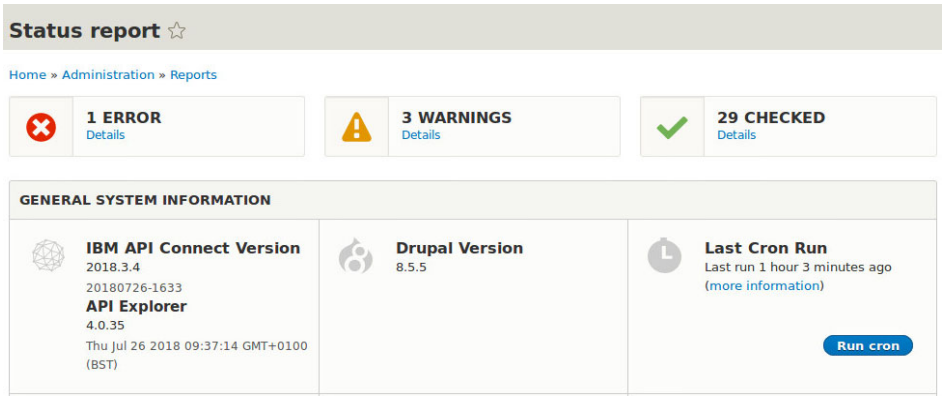

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Figure 5-16. Status report

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The status report gives an overview of the Developer Portal parameters and any problems that are detected with the installation. It might be useful to paste this information into support requests that are filed with IBM API Connect or drupal.org support forums.

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View the enabled themes (1 of 2)

- From the Administration menu, select **Appearance > Settings**
- The **Settings** tab displays Global settings and settings for any other enabled themes
  - Global settings apply to all themes
- Five themes are enabled in the example
  - Bartik: A mobile first theme
  - Seven: An administration theme
  - Bootstrap: Built to use the Bootstrap framework for web pages
  - connect_theme: Default theme for the Developer Portal
  - custom_: Customized theme based on the IBM API Connect Theme
- One of the enabled themes is set as the default theme that is used by the Developer Portal

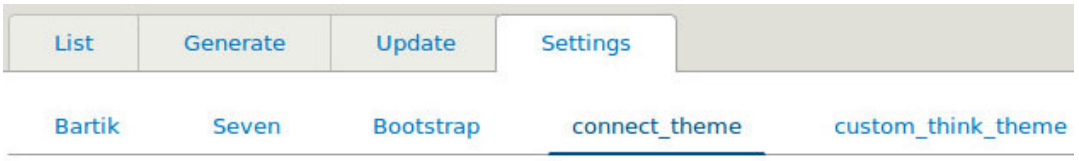

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Figure 5-17. View the enabled themes (1 of 2)

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From the administration menu, select **Appearance**, then select **Settings**.

The tabs in the settings include the global settings and tabs for currently enabled themes.

Global settings control the default display settings for your entire site, across all themes. Unless they have been overridden by a specific theme, these settings are used.

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View the enabled themes (2 of 2)

- From the Administration menu, select **Appearance > Settings**
  - Click the **List** tab to see screen captures of the enabled themes
  - The Administration menu can have its own theme
- In the example, the Seven theme is used as the administration theme
  - Selects the fonts, check boxes, and style for the administration of the Developer Portal

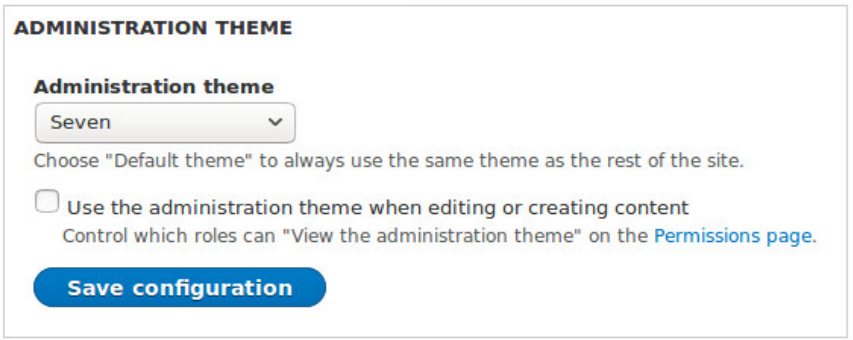

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Figure 5-18. View the enabled themes (2 of 2)

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Click the **List** tab from the settings menu to see thumbnail icons of the enabled themes.

You can select an administration theme in the dialog box by scrolling down when the **List** tab of the settings is selected.

You can choose to use the default scheme to use the same theme as the rest of the site, or you can use a different theme for the appearance of the content when working with the administration of the Developer Portal.

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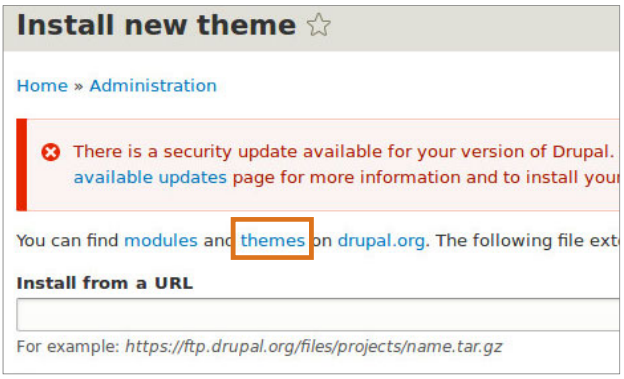
Theme creation

- Enable a theme in one of these ways:
  a. Identify and use a theme that is provided by the Drupal community at `drupal.org/project/project_theme`



  b. Extend the code of an existing theme by creating a sub-theme
     - Creating a sub-theme is the only supported option for changing the theme of the IBM-supplied API Connect Developer Portal

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Figure 5-19. Theme creation

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You can use themes to control the appearance of your Developer Portal site.

You can install a new theme from the administration Manage menu by selecting the option Appearance. Then, select Install new theme.

When you go to the drupal.org website, you can discover themes by using the search filter. For example, you can search for administration themes on the Drupal site. The Adminimal theme is one of the administration themes.

Note

You can import a different administration theme and replace the Seven administration theme.

Directly editing or replacing the API Connect theme entirely is not permitted or supported, as edited versions of these files are overwritten when product fixes or upgrades are installed.

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IBM Training

Generate a sub-theme

- Generate a sub-theme of the latest Developer Portal theme from the administration Manage menu item. Select **Appearance**. Then, select **Generate sub-theme**
  - Give the sub-theme a name
  - Select the sub-theme type: CSS or SCSS
  - Choose one of the IBM-supplied templates for the theme

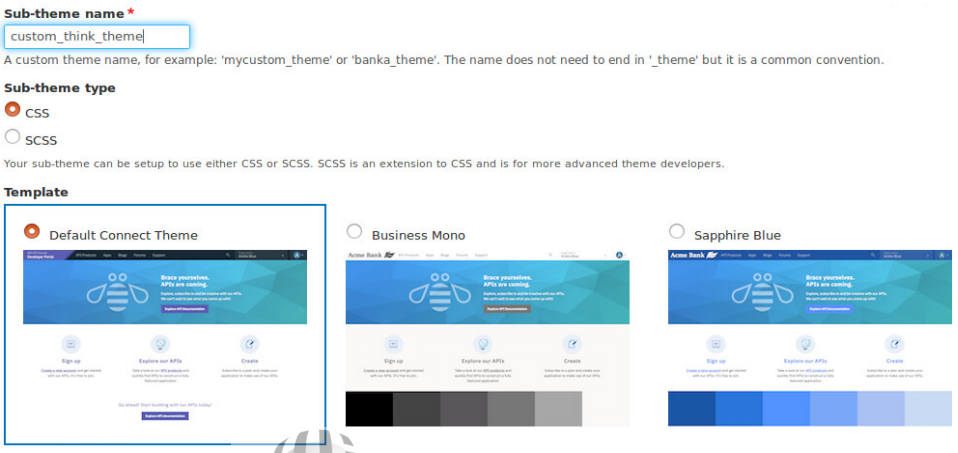

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Figure 5-20. Generate a sub-theme

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Generate a sub-theme of the latest Developer Portal theme from the administration Manage menu item and give it a name. From the administration Manage menu, select **Appearance**. Then, select **Generate sub-theme.**

Provide a name for the sub-theme. Select the sub-theme style type. The choices are CSS or SCSS. Select one of the IBM-supplied color templates for the sub-theme. Then, click **Generate**.

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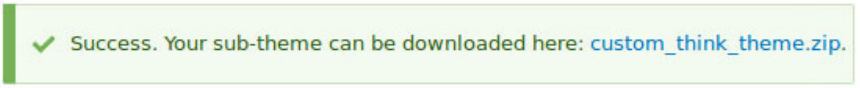
Customize the sub-theme

- A compressed file with the sub-theme is generated and can be downloaded from the Developer Portal



- Download and expand the compressed sub-theme file
- Overwrite any style specifications in the sub-theme with the customizations that you require
  - A sub-theme inherits all the settings of its parent scheme, unless the settings are overridden
  - Most changes are made to the `overrides.css` file in the CSS folder
  - Refer to the Drupal documentation for customizing styles
- When customizations are completed, create an archive file for uploading to the Developer Portal

Customizing the Developer Portal

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Figure 5-21. Customize the sub-theme

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Download the generated sub-theme from the Developer Portal and then expand the archive.

A sub-theme inherits all the settings of its parent scheme, unless the settings are overridden.

Overwrite any style specifications in the sub-theme with the customizations that you require.

Style changes can be made to the overrides.css file in the CSS folder in the expanded archive.

Refer to the Drupal documentation for creating a sub-theme at https://www.drupal.org/docs/8/theming-drupal-8/creating-a-drupal-8-sub-theme-or-sub-theme-of-sub-theme.

When customizations are completed, create an archive file that is ready for uploading to the Developer Portal.

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IBM Training

Install the sub-theme

- Install the customized sub-theme on the Developer Portal theme from the administration Manage menu item. Select **Appearance**. Then, select **Install new theme**
  - Then, upload the theme archive to install

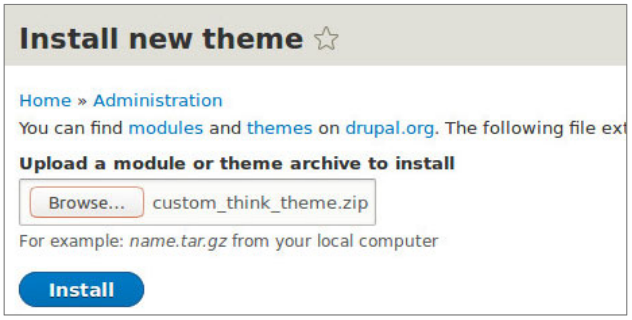

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Figure 5-22. Install the sub-theme

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You can install a theme from the Appearance > Install new theme option of the administration menu.

In the example, the theme is uploaded from an archive file.

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Enable the theme

- When the new theme is installed, you can enable the theme in the Developer Portal

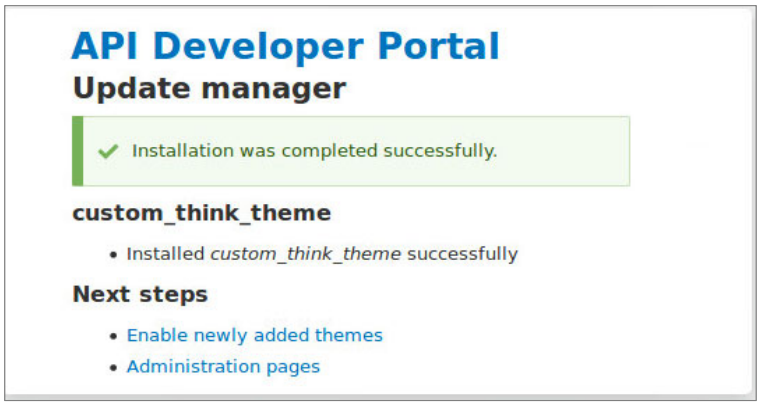

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Figure 5-23. Enable the theme

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You can install a theme from the Appearance > Install new theme option of the administration menu.

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Set the customized theme as the default

- When the new theme is enabled, you can set the theme as the default theme in the Developer Portal
  - The custom theme is now the theme that is used

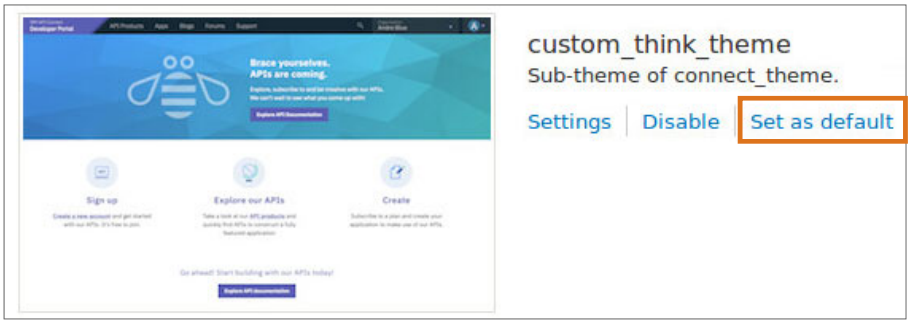

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Figure 5-24. Set the customized theme as the default

Global Knowledge®

You can install a theme from the Appearance > Install new theme option of the administration menu.

In the example, the theme is uploaded from an archive file.

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IBM Training

Unit summary

- Briefly explain the purpose of the Developer Portal
- Explain the role of the Drupal open source project in the Developer Portal
- Explain the concept of modules and themes
- List the roles that are defined in the Developer Portal
- Describe the Drupal terminology that is used when administering the portal
- Describe the various ways to create a theme for the Developer Portal
- Describe the use of sub-themes for customizing the standard API Connect Developer Portal theme

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Figure 5-25. Unit summary

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IBM Training

Review questions

1. True or False: Public APIs are displayed on the public interface and on the interface for authenticated users of the Developer Portal.

2. True or False: Themes that you import should match the Drupal version

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Figure 5-26. Review questions

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Write your answers here:

1.

2.

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IBM Training

Review answers

1. True or False: Public APIs are displayed on the public interface and on the interface for authenticated users of the Developer Portal.
   The answer is True.

2. True or False: Themes that you import should match the Drupal version.
   The answer is True.

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Figure 5-27. Review answers

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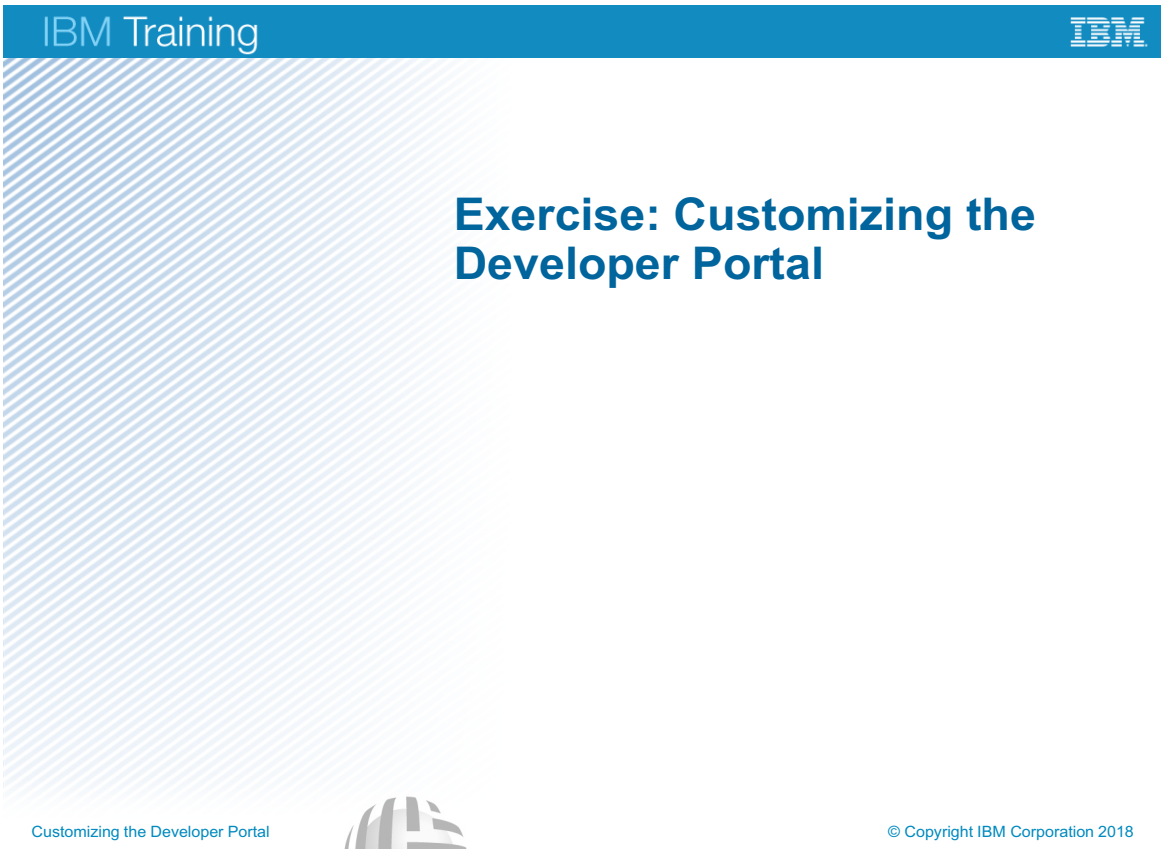

Figure 5-28. Exercise: Customizing the Developer Portal

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IBM Training

Exercise objectives

- Sign in to the Developer Portal as a Portal administrator
- Generate a Developer Portal sub-theme
- Review and customize the sub-theme
- Install the sub-theme on the Developer Portal
- Review the forum features in the Developer Portal

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Figure 5-29. Exercise objectives

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Unit 6. Creating an application and subscribing to a plan

Estimated time

00:30

Overview

This unit covers the creation of an application and subscribing the application to a Product and plan on the Developer Portal. An application developer discovers APIs, plans, and Products that are published to the Developer Portal. The developer can review the details of the APIs and plans and can optionally test the API operations in the Developer Portal. To use APIs, an application developer creates an application in the Developer Portal, and then subscribes the application to a plan that is associated with the API and Product.

How you will check your progress

- Review questions
- Lab exercise

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IBM Training

Unit objectives

- Review the published Products in API Manager
- Review the visibility settings for published Products and APIs
- Discover Products, plans, and APIs in the Developer Portal
- Describe how to create an application in the Developer Portal
- Describe how to subscribe to a Product plan

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Figure 6-1. Unit objectives

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Example: Review published Products

- List of published Products for a catalog in API Manager

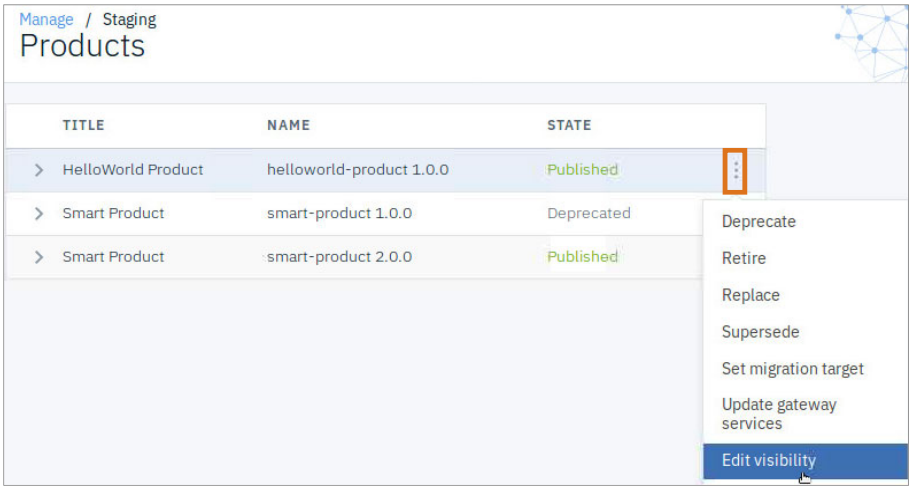

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Figure 6-2. Example: Review published Products

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You can display the Products that are published by opening the catalog in API Manager. Then, go to the Products option from the navigation menu.

In the example, there is an helloworld-product 1.0.0 that is published and two versions of smart-product.

Next, you review the visibility for the helloworld-product 1.0.0 by selecting the Edit visibility from the list of options.

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Example: Published Product visibility options

- The visibility options can be viewed or set for the published Product
- The Product is:
  - Visible to the public on the Developer Portal
  - Subscribable by authenticated users on the Developer Portal

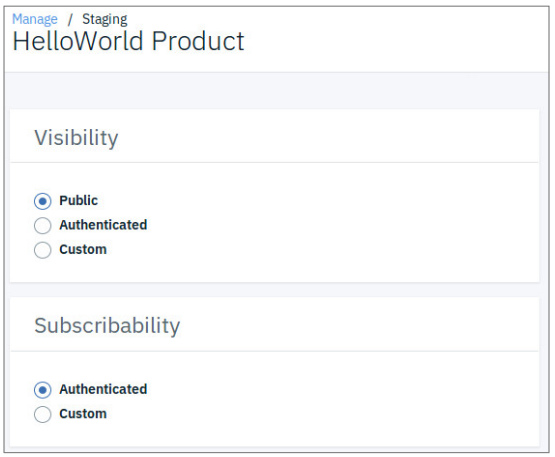

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Figure 6-3. Example: Published Product visibility options

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From the **Products** tab for the catalog, select the Edit visibility option for a published Product.

The visibility options are displayed and can be changed.

The visibility and subscription options include:

- Public
- Authenticated
- Custom

The subscription options include:

- Authenticated
- Custom

Use the Custom option to make the Product visible or subscribable to a selected consumer organization.

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Example: Display applications in API Manager

- View the applications and their subscriptions in API Manager
  - The smart-application is the only application in the example

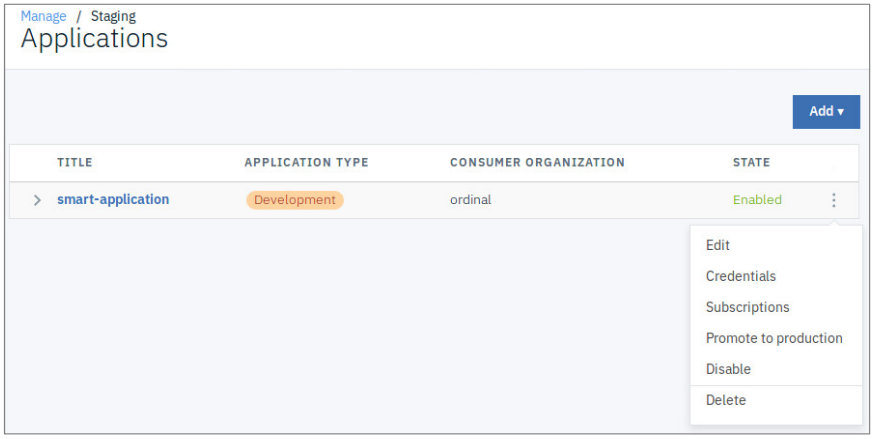

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Figure 6-4. Example: Display applications in API Manager

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With the catalog opened, click Applications from the navigation menu in API Manager.

The list of applications is displayed.

If there are no subscriptions already for an application, you can create a subscription for the application, Product, and plan by selecting the Subscriptions option from the options list.

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IBM Training

Discover the Products in the Developer Portal (1 of 2)

- View the publicly available Products by opening the Developer Portal

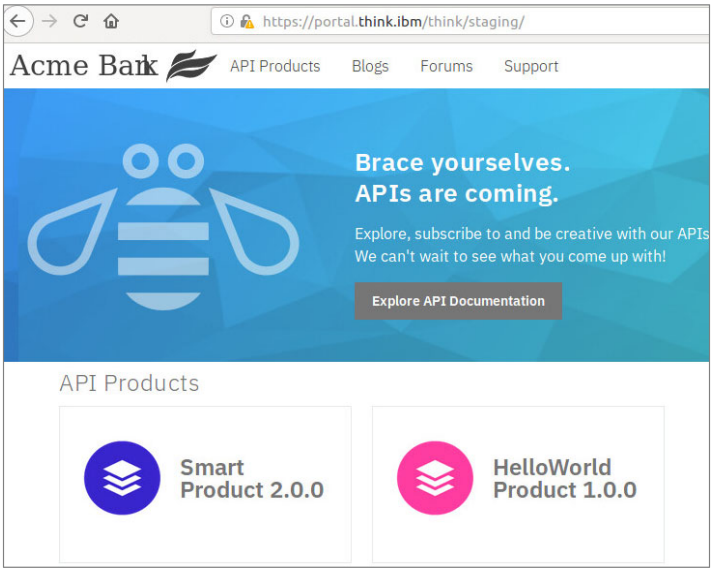

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Figure 6-5. Discover the Products in the Developer Portal (1 of 2)

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View the publicly available Products by opening the Developer Portal.

The HelloWorld Product visibility is set to public, so it is visible on the public interface of the Developer Portal.

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IBM Training

Discover the Products in the Developer Portal (2 of 2)

- View the APIs and plans for the Product

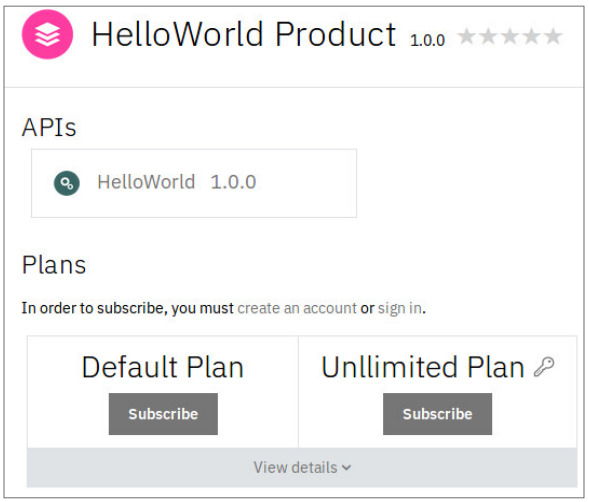

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Figure 6-6. Discover the Products in the Developer Portal (2 of 2)

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View the APIs and plans that are associated with this Product.

To create an application and subscribe to a plan, you must sign on.

Earlier, you saw that the subscribability option for the Product is set to authenticated user.

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IBM Training

Application creation

- An **Application Developer** creates an application to use a Product and its associated APIs
- Then, the application must subscribe to a plan that is defined for the Product
  - By subscribing to a plan, the application establishes the contract for use of the Product and APIs
- An **API Developer** in the provider organization might add a **client ID** security requirement to the API
- The application that is registered to use the API must then provide a client ID to successfully call the API

Figure 6-7. Application creation

Global Knowledge®

Questions

Why might the API developer enforce the client ID requirement for an application to access the API?

Answers:

1. To restrict API access to authorized applications or users.
2. To reset the client ID to exclude errant application usage.
3. For analytics, to monitor and track API usage by a particular client.

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Create an application (1 of 4)

- Sign on to the Developer Portal as an application developer
- Select **Apps** from the menu
- Then, click **Create new App**

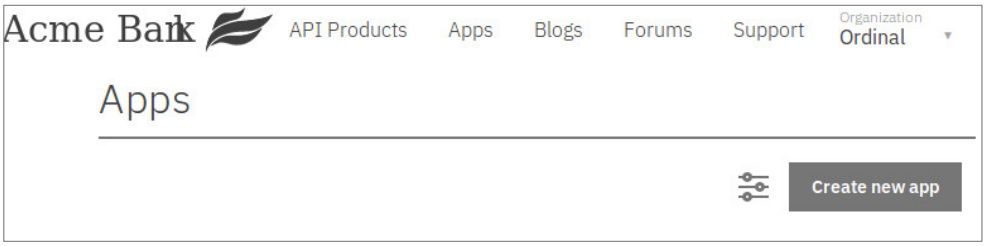

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Figure 6-8. Create an application (1 of 4)

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Sign-in to the Developer Portal. Then, click the Apps link on the menu. The link that is named **Create new App** is available from the **Apps** tab on the Developer Portal.

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Create an application (2 of 4)

- Type the name in the Title field and optional description
- Click **Submit**

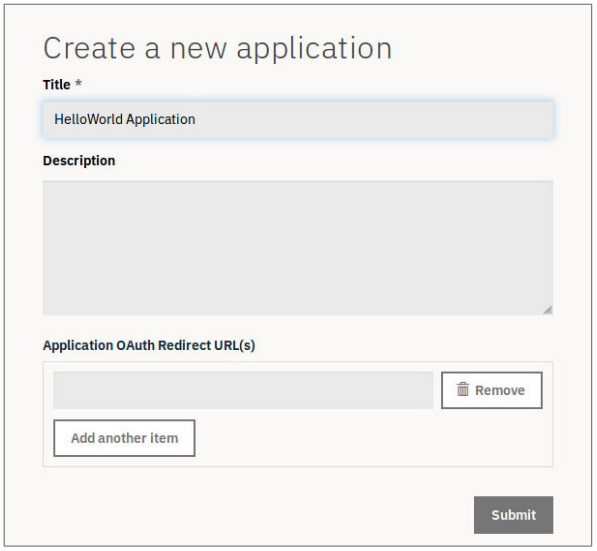

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Figure 6-9. Create an application (2 of 4)

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In the first dialog box, you specify a title.

Optionally, specify a description and an OAuth redirect URI.

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Create an application (3 of 4)

- Application is created
- Select the **Show** check box to display the client secret and client ID

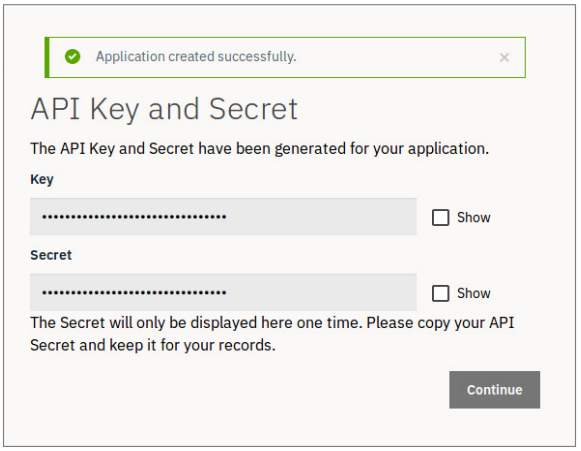

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Figure 6-10. Create an application (3 of 4)

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You can require that, when calling an API operation, an application must provide either a client ID, or a client ID and client secret.

The identification requirements for calling an API are specified in the API security definitions in API Manager.

These requirements include supplying a client ID, client ID and client secret, or none.

Select the **Show** check box to display the client secret and client ID.

Information

If the API definition includes security such as requiring a client ID (apiKey) or client secret, then you must select the Show option to display these values. You must also record these values for later use.

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Create an application (4 of 4)

- The application dashboard is displayed
- Select the **Subscriptions** link to view subscriptions

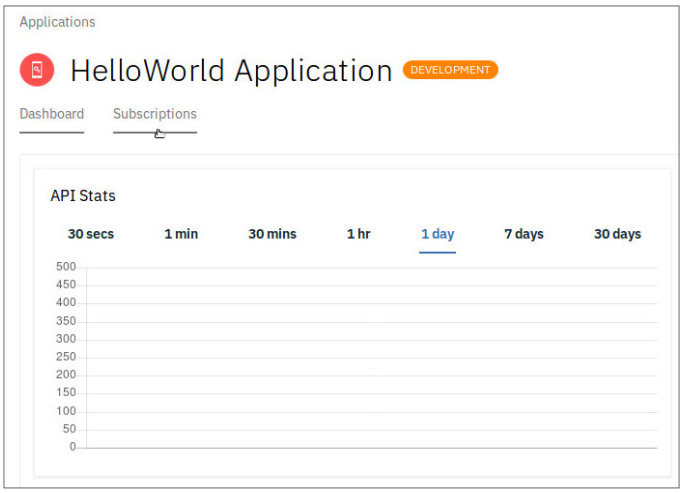

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Figure 6-11. Create an application (4 of 4)

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The application is created and the application dashboard is displayed.

Next, you click the Subscriptions tab to create a subscription for the application.

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Subscribe an application to a Product plan (1 of 6)

- You can browse the available APIs at the bottom of the registration form and subscribe to a plan
- Click the **available APIs** link

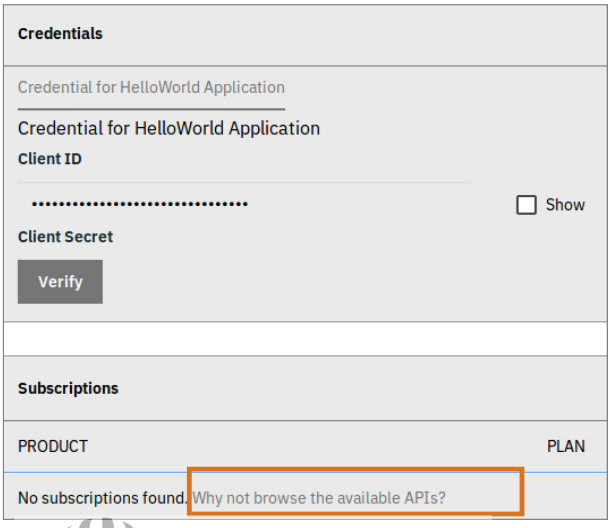

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Figure 6-12. Subscribe an application to a Product plan (1 of 6)

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The **available APIs** link is at the bottom of the page with the Client ID and Client secret.

Clicking the available APIs link takes you to the list of Products and their associated APIs. You can also navigate there from the API Products link on the Developer Portal menu.

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Subscribe an application to a Product plan (2 of 6)

- The list of Products is displayed
- Click the link for the Product

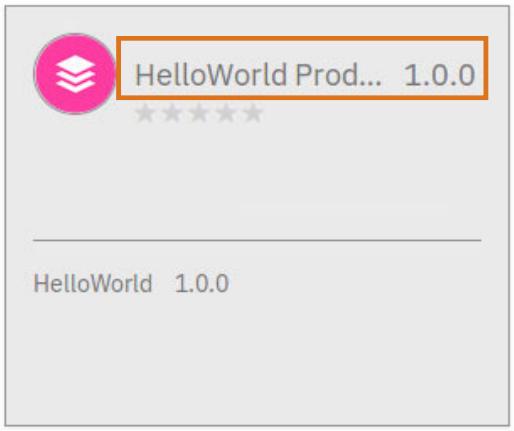

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Figure 6-13. Subscribe an application to a Product plan (2 of 6)

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Click the link for the Product to open the Product and view the list of APIs and plans.

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Subscribe an application to a Product plan (3 of 6)

- Go to the Plans section
- Subscribe to a plan

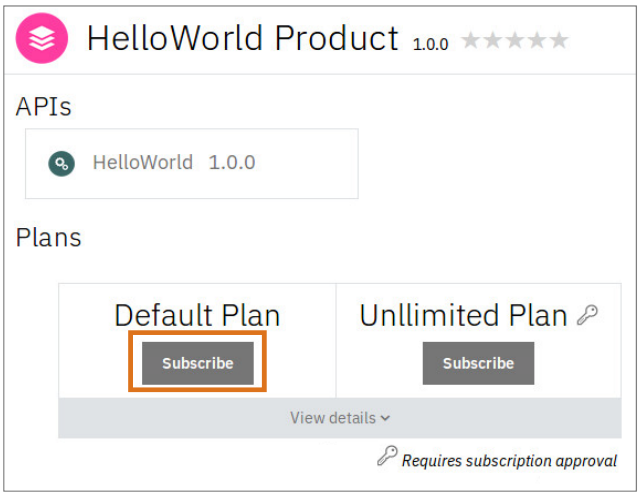

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Figure 6-14. Subscribe an application to a Product plan (3 of 6)

Global Knowledge

You see the APIs for the Product.

Go to the Plans section of the Product page to view and subscribe to a plan.

Information

An application can only subscribe to one plan from a specific Product. Multiple plans within a single Product are useful in that they can fulfill similar purposes but with differing levels of performance. For example, you can have a "Demo Plan", which makes a single API available, and a "Full Plan", which makes several APIs available.

In this case, you need to register two different applications that each use a different plan from the Product.

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Subscribe an application to a Product plan (4 of 6)

- Select the application that is to be subscribed to the plan
- Click **Select App**

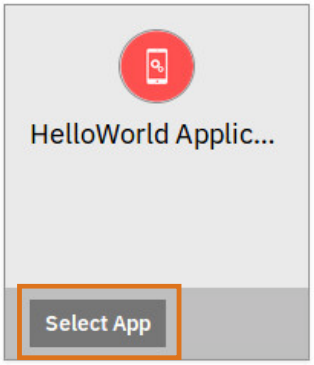

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Figure 6-15. Subscribe an application to a Product plan (4 of 6)

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Select the application that is being subscribed to the plan.

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Subscribe an application to a Product plan (5 of 6)

- Confirm the subscription
- Click **Next**

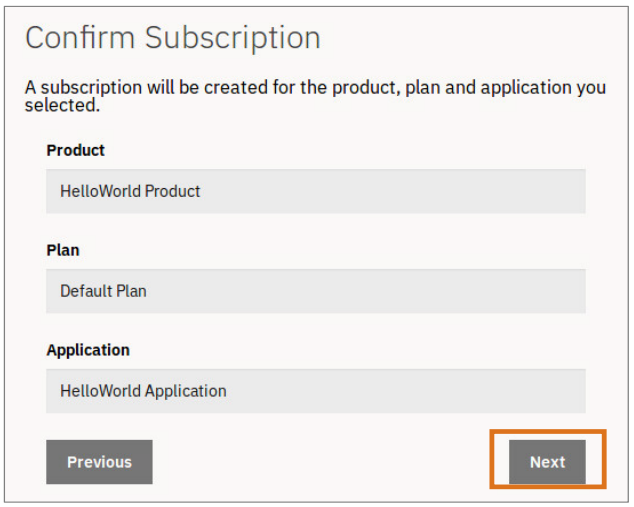

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Figure 6-16. Subscribe an application to a Product plan (5 of 6)

Global Knowledge

The application is subscribed to the plan and can now call the APIs.

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Subscribe an application to a Product plan (6 of 6)

- The subscription is complete
- The application can now call and test the APIs

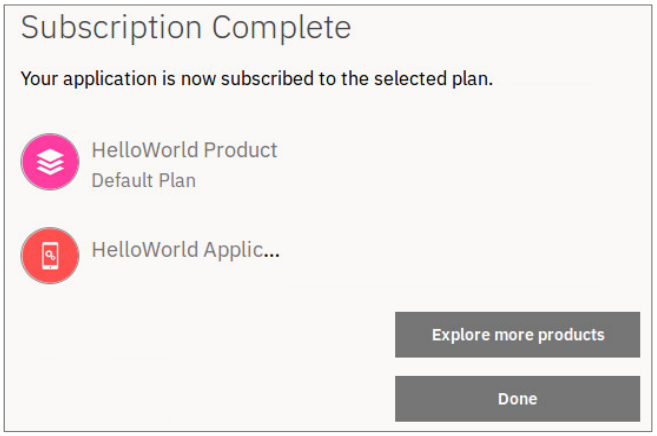

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Figure 6-17. Subscribe an application to a Product plan (6 of 6)

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The application is subscribed to the plan and can now call the APIs.

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Application is visible in API Manager

- The application is visible in API Manager

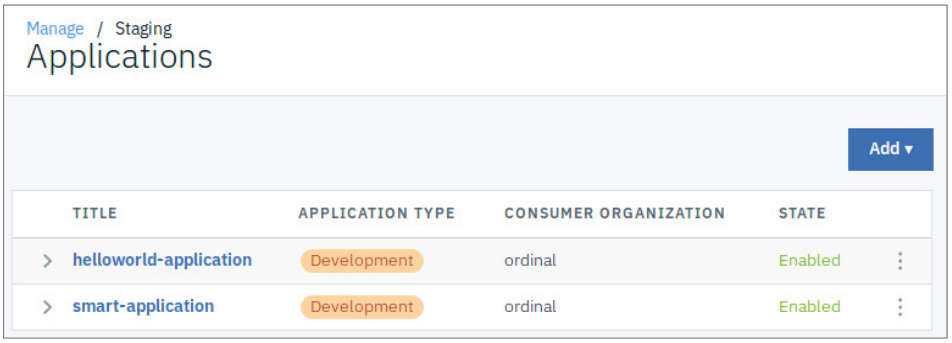

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Figure 6-18. Application is visible in API Manager

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After the application is created and subscribed to a Product, it can be viewed and managed by the owner of the Provider organization in API Manager.

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IBM Training

Unit summary

- Review the published Products in API Manager
- Review the visibility settings for published Products and APIs
- Discover Products, plans, and APIs in the Developer Portal
- Describe how to create an application in the Developer Portal
- Describe how to subscribe to a Product plan

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Figure 6-19. Unit summary

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Review questions

1. True or False: The subscribable option can limit which consumer organization can subscribe to a Product plan if the subscribable option is set to `Custom`.

2. True or False: An application can subscribe to more than one plan from a specific Product.

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Figure 6-20. Review questions

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Write your answers here:

1.

2.

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IBM Training

Review answers

1. True or False: The subscribable option can limit which consumer organization can subscribe to a Product plan if the subscribable option is set to `Custom`.
   The answer is True.
   Select `Custom` from the Subscribable by drop-down and then type an organization name, for example, `Ordinal`.

2. True or False: An application can subscribe to more than one plan from a specific Product.
   The answer is False.
   An application can subscribe to only one plan from a specific Product. Create a different application for each Product plan that you subscribe to.

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Figure 6-21. Review answers

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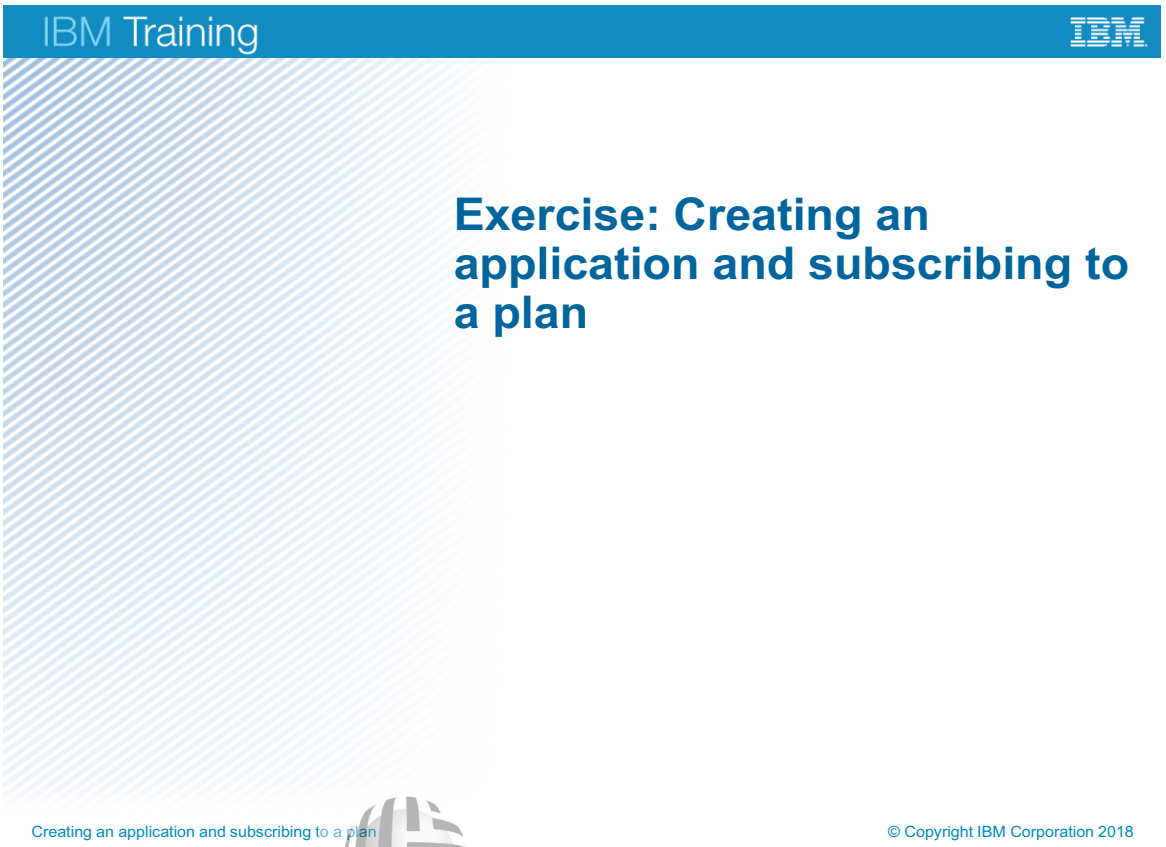

Figure 6-22. Exercise: Creating an application and subscribing to a plan

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Exercise objectives

- Sign on as a developer to the Developer Portal
- Create an application that uses the published Product
- Subscribe to a plan
- Sign on to API Manager as the owner of the provider organization
- Stage a new version of the Product
- Supersede the published Product on the Staging catalog
- Review the results in the Developer Portal

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Figure 6-23. Exercise objectives

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Unit 7. API analytics

Estimated time

00:45

Overview

This unit describes the API analytics features in IBM API Connect. API analytics is built on the Kibana open source analytics and visualization platform. You review some default dashboards and visualizations that are provided with the API Connect analytics service.

How you will check your progress

- Review questions
- Lab exercise

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Unit objectives

- Describe what is API Connect analytics
- Describe the role of the Kibana open source platform in the API Connect API analytics feature
- Describe where analytics are configured and captured
- Identify which user interfaces in API Connect provide access to analytical data
- Review analytics in the Developer Portal
- Describe the purpose of default dashboards
- Review the features of default visualizations
- Create a visualization
- Describe API events and event records
- Describe how to export analytics and API event data

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Figure 7-1. Unit objectives

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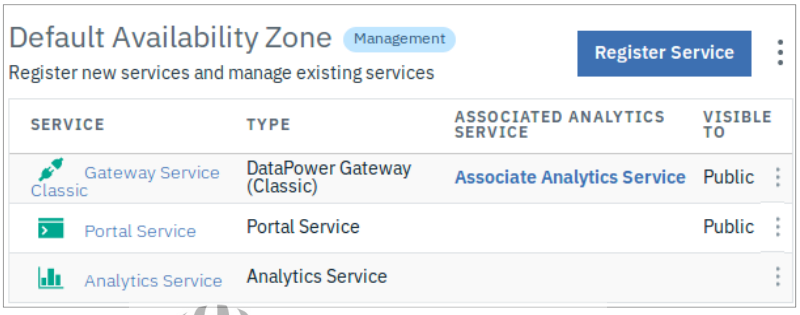
API analytics

- API Connect provides the capability to filter, sort, and aggregate your API event data
  - The data is then presented within correlated charts, tables, and maps
  - Help you manage service levels, set quotas, establish controls, and analyze trends
- The data for analytics is collated from API events that are logged when API operations are called on the gateway
- The analytics server provides analytic functions that collect and store information about APIs and applications



API analytics

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Figure 7-2. API analytics

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API Connect provides the capability to filter, sort, and aggregate your API event data. This data is then presented within correlated charts, tables, and maps to help you manage service levels, set quotas, establish controls, and analyze trends.

The data for analytics is collated from API events that are logged when API operations are called on the gateway.

The analytics service provides analytic functions that collect and store information about APIs and applications.

The analytics service, gateway service, and portal service are configured in Cloud Manager. The analytics service is also associated with a gateway service in the Cloud Manager user interface.

You can disable all analytics collection by un-associating the analytics service from the gateway.

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IBM Training

Open source analytics and visualization platform

- API analytics is built on the Kibana open source analytics and visualization platform, which is designed to work with the Elasticsearch real-time distributed search and analytics engine

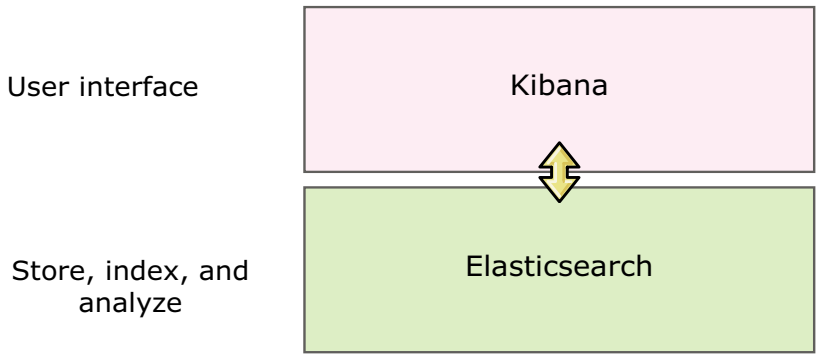

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Figure 7-3. Open source analytics and visualization platform

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API analytics in API Connect is built on the Kibana V5.5.1 open source analytics and visualization platform, which is designed to work with the Elasticsearch real-time distributed search and analytics engine.

The Elasticsearch engine performs logging, indexing, and analysis of log and metric data.

Data is retrieved from indexed data for all API events

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IBM Training

Where analytics are accessed in API Connect

- Analytics data and the analytics visualization features are accessed in these user interfaces:
  - **API Manager** for provider organizations
  - **Developer Portal** for consumer organizations
- Access is controlled through the roles and permissions that are assigned to the members of the provider or consumer organizations

API analytics

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Figure 7-4. Where analytics are accessed in API Connect

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Access to the analytics data, and to the analytics functions, can be managed by using catalogs in the API Manager user interface.

You can view predefined or customized analytics information for your API Connect catalogs within dashboards.

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Analytics in the Developer Portal (1 of 2)

- From the **Apps** menu
  - Dashboard tab displays graphs and metrics for the application

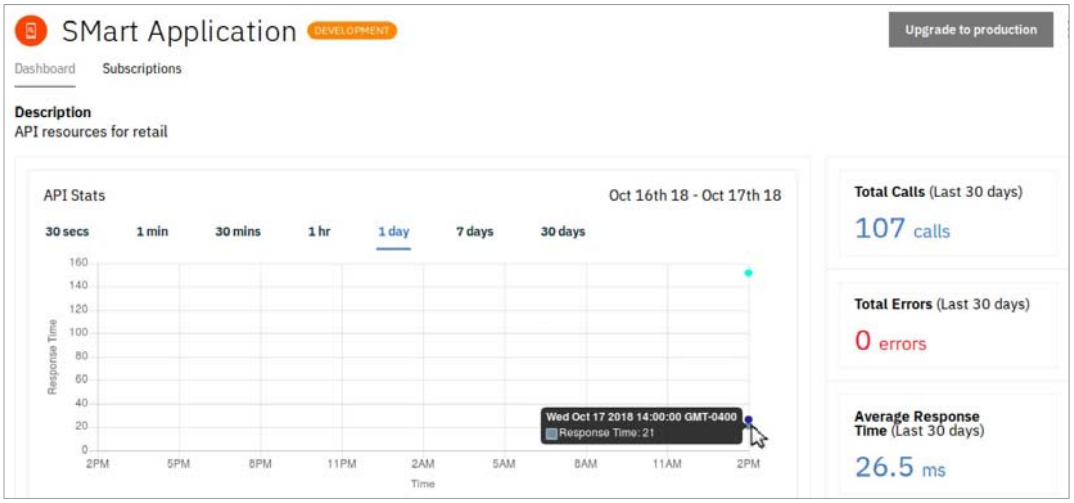

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Figure 7-5. Analytics in the Developer Portal (1 of 2)

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You can view analytics for APIs in the Developer Portal at the application and organization levels.

The information is displayed in dashboard views that show the analytics metrics in the form of visualizations, represented as charts.

Information

The analytics service uses the Client ID (apiKey) to map the application to the APIs that are called on the gateway. No analytical data is available in the Developer Portal for applications that use APIs where no security is configured.

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Analytics in the Developer Portal (2 of 2)

- From the **My organization** drop-down menu of an organization owner
  - Analytics tab displays graphs and metrics for the application

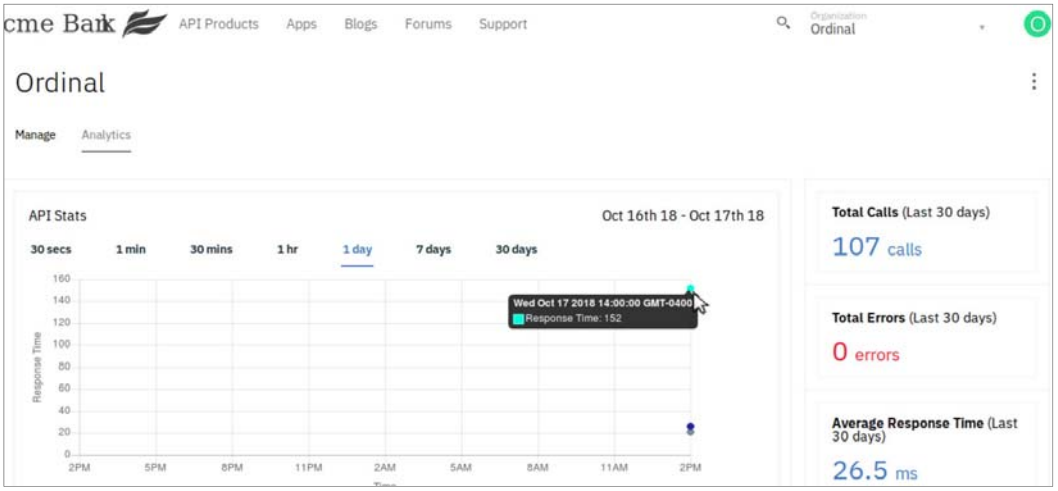

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Figure 7-6. Analytics in the Developer Portal (2 of 2)

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From the Developer Portal, you can view interactive analytic information for all of the APIs within an organization.

Information

In the example, the statistical values that are displayed are the same values for the organization as they are for the application that is shown previously.

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IBM Training

Analytics in API Manager

- Open the catalog
- Select **Analytics** from the navigation menu
  - Then, you can view predefined or customized analytics information for your IBM API Connect catalogs within dashboards

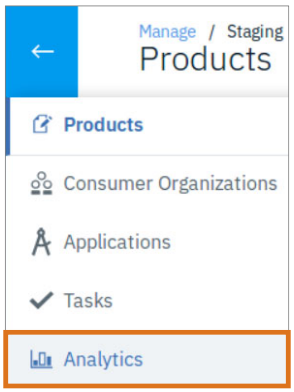

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Figure 7-7. Analytics in API Manager

Global Knowledge®

You can view predefined or customized analytics information for your IBM API Connect catalogs within dashboards. If spaces are enabled in your catalogs, you can also view predefined or customized analytics information for your API Connect spaces within dashboards.

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IBM Training

Analytics dashboard for catalogs

- Each catalog provides pre-configured dashboards
  - Dashboard is a grouping of views for you to use
  - Displays analytical information in the form of visualizations

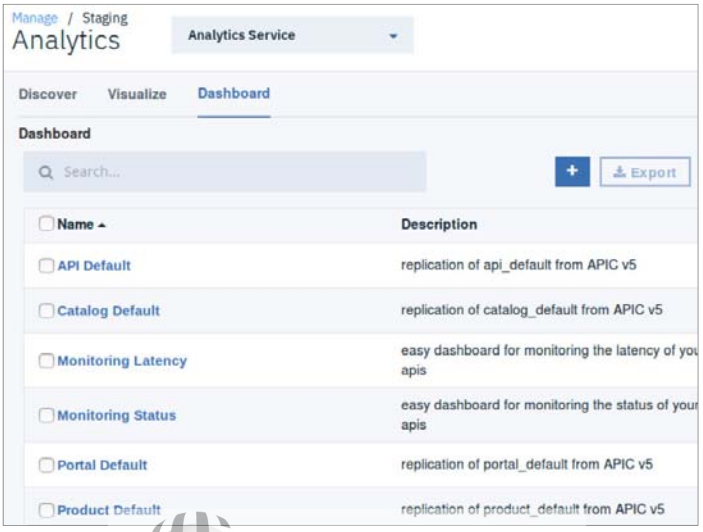

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Figure 7-8. Analytics dashboard for catalogs

Global Knowledge®

API Connect analytics provides some preconfigured dashboards to view common analytics data.

A list of dashboards is displayed when you open the default dashboards page for the first time. These dashboards provide examples of the data that you can view when using the analytics dashboards. You can use these dashboards as they are, or clone them to customize them to your needs.

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Example dashboard: Catalog default

- Information about the most used Products and APIs in your catalog

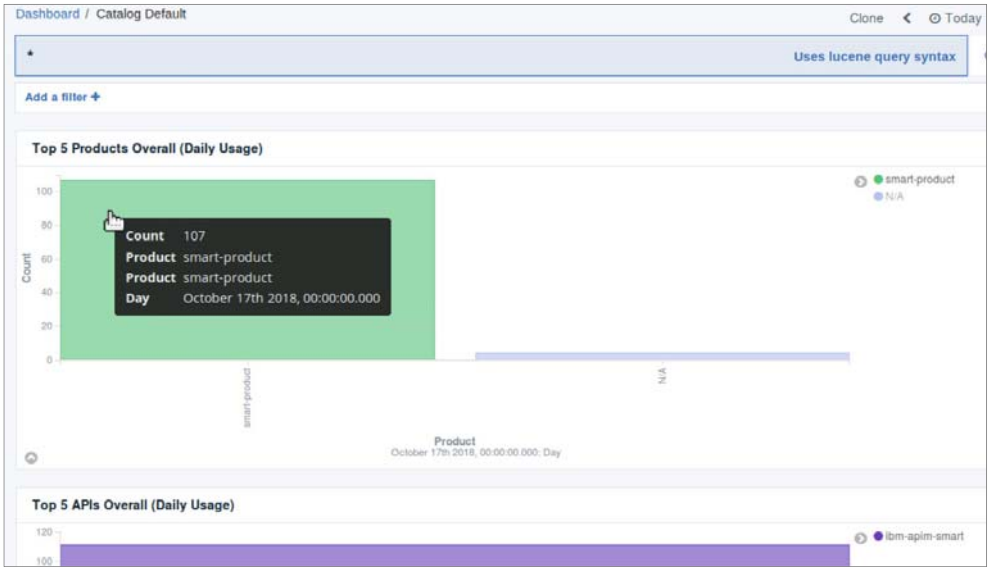

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Figure 7-9. Example dashboard: Catalog default

Global Knowledge®

The catalog default dashboard includes these visualizations:

- Top 5 Products overall (daily usage)
- Top 5 APIs overall (daily usage).

Dashboards are aggregations of visualizations.

Visualizations are described next.

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IBM Training

Visualizations

- Preconfigured visualizations provide some common ways to view analytics data

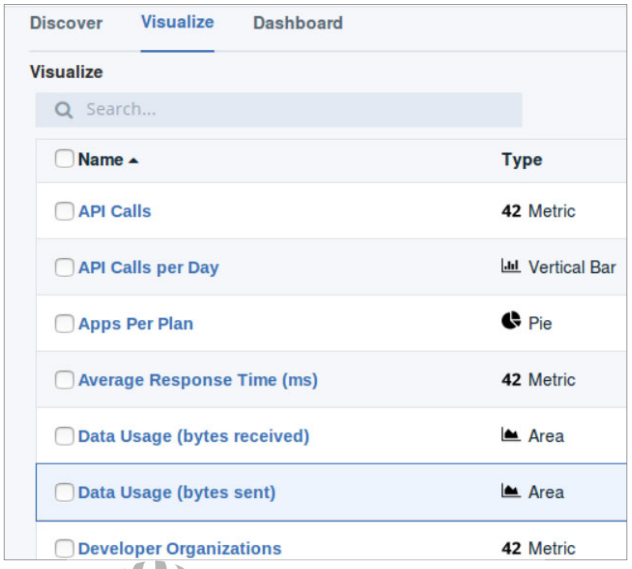

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Figure 7-10. Visualizations

Global Knowledge®

Visualizations apply a series of search criteria to the indexed data and then graphically present the results in a convenient format for analysis or review.

A list of visualizations is displayed when you open the visualization application page for the first time, or when you select Visualize in the application selector on the Analytics page.

For more information on the default visualizations, see the IBM Knowledge Center for API Connect 2018 at https://www.ibm.com/support/knowledgecenter/SSMNED_2018/com.ibm.apic.apionprem.doc/rapim_analytics_default_visualizations.html

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IBM Training

Example visualization: API calls

- Displays the list of API calls made filtered by time period

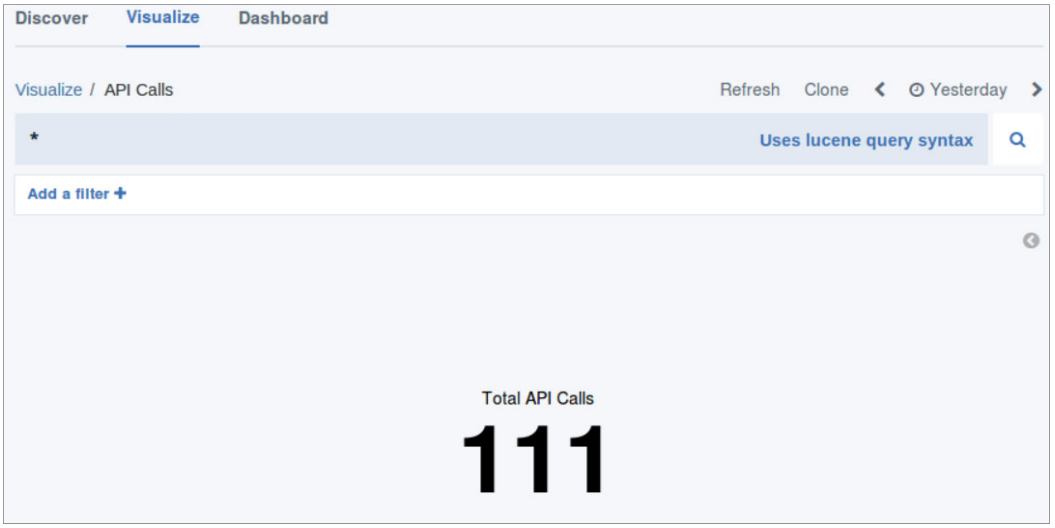

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Figure 7-11. Example visualization: API calls

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API calls is one of the default visualizations that is provided with API Connect analytics.

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IBM Training

Visualization filters

- Filter by time period

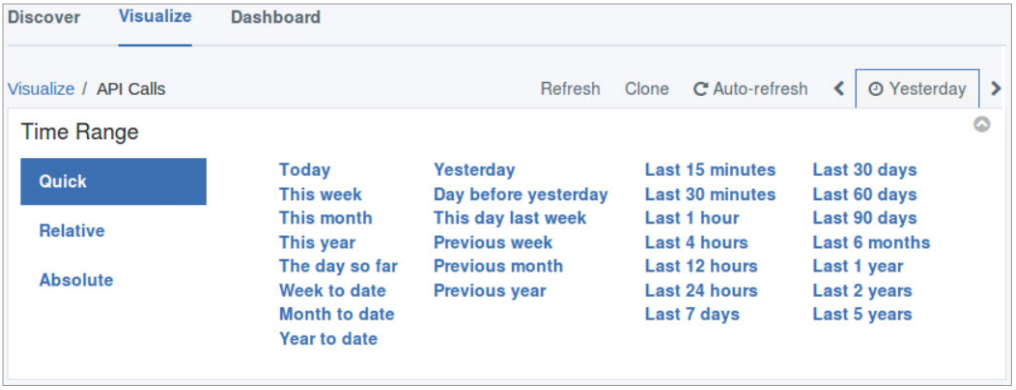

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Figure 7-12. Visualization filters

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Example visualization: Top 5 APIs overall daily usage

- Horizontal chart of top 5 API calls made filtered by time period

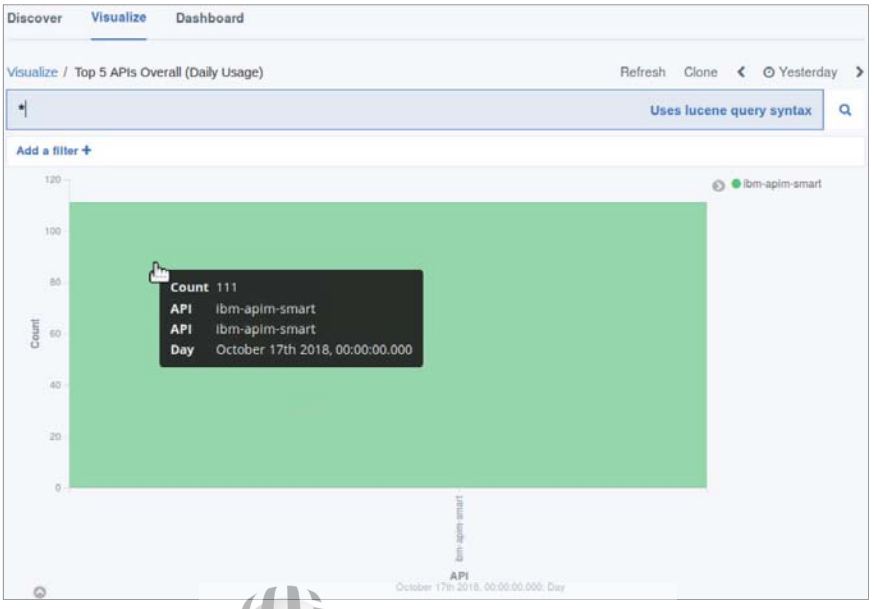

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Figure 7-13. Example visualization: Top 5 APIs overall daily usage

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The visualization of the top 5 APIs overall by daily usage displays a graph of the 5 APIs that get the most calls on a daily basis.

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IBM Training

Example visualization: Status codes (detailed)

- Pie chart of status codes for API calls made filtered by time period
- Hover of different areas of the chart to display detailed values

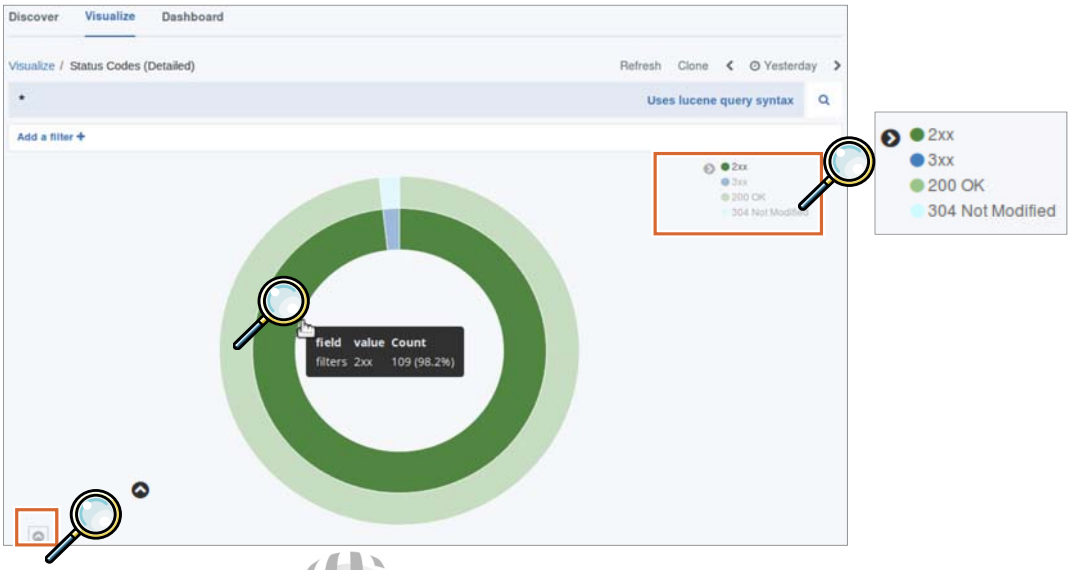

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Figure 7-14. Example visualization: Status codes (detailed)

Global Knowledge®

Status codes (detailed) lists the status codes for the API calls.

You can hover over the different areas of the pie chart to display the metrics for the different status codes.

The legend can be toggled to be displayed or hidden.

By clicking the selector at the bottom left on the page, you open the page to the table of the metrics for the pie chart. The table is shown on the next page.

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IBM Training

Example visualization: Status codes (detailed)

- Table with the different status codes
- Toggle at the lower left returns you to the pie chart

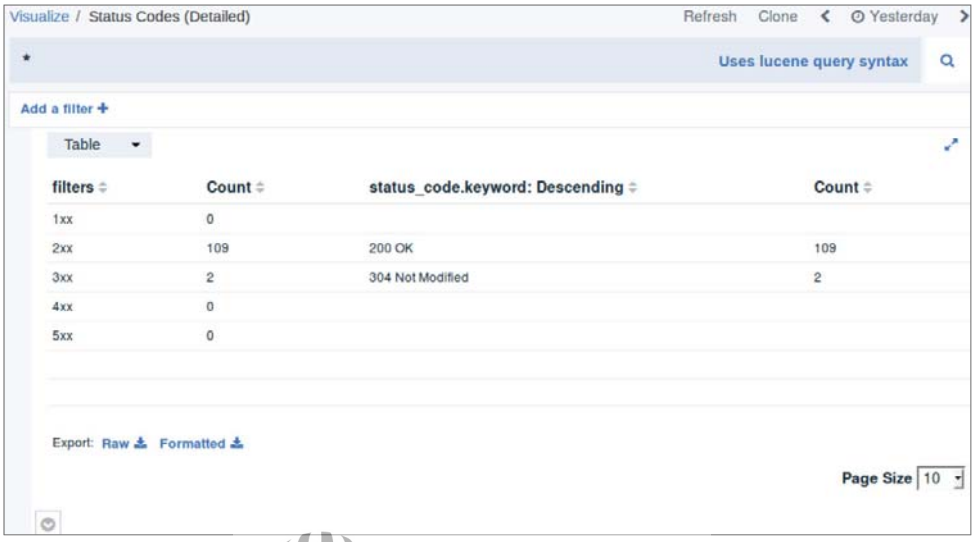

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Figure 7-15. Example visualization: Status codes (detailed)

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When the selector switch on the pie chart is clicked, the table with the different status codes and their count is displayed. Clicking the selector switch from the table returns you to the pie chart.

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IBM Training

Create visualizations (1 of 7)

- You can create visualizations from the default visualizations
  - Click **Create new visualization** from the Visualize page

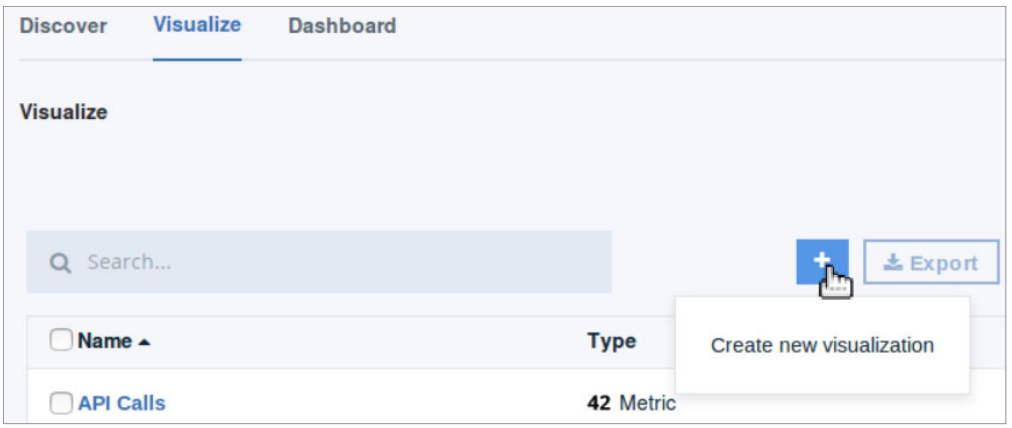

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Figure 7-16. Create visualizations (1 of 7)

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Create you own analytical graphs from the API Manager Analytics Visualize tab by clicking the Create new Visualization icon.

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Create visualizations (2 of 7)

- Select from one of the available visualization types

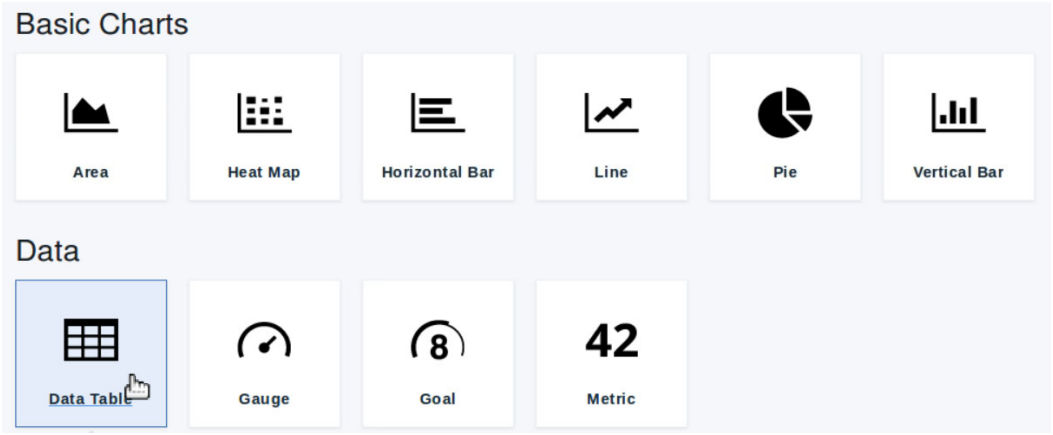

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Figure 7-17. Create visualizations (2 of 7)

Global Knowledge®

Select from one of the available visualization types, such as Data Table.

Information

Creating your own visualization from a visualization type such as Area chart or Line chart requires some knowledge of the underlying data indexes and the type of metrics and bucket types that you want to display on the X- and Y- axis.

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IBM Training

Create visualizations (3 of 7)

- Select the index for the search
  - The default API Connect search index is used in the example

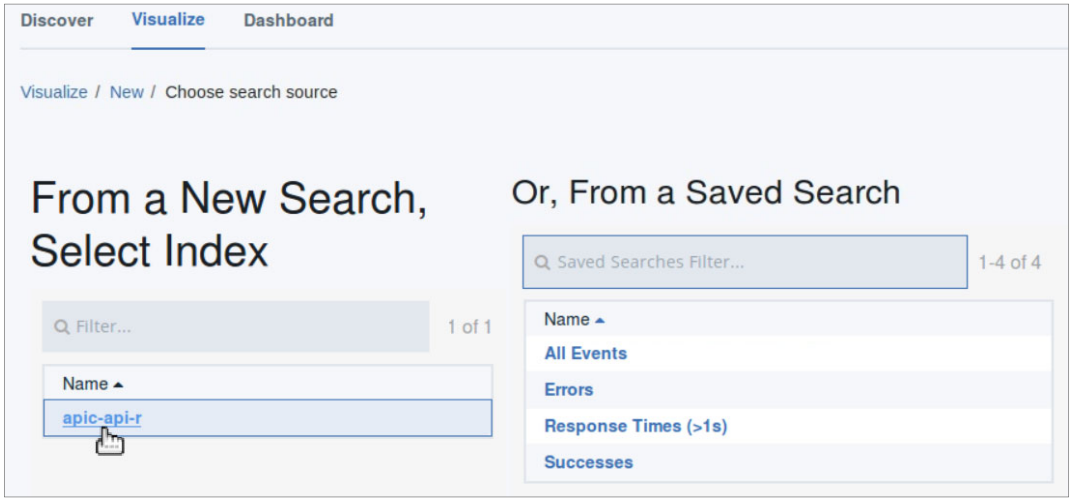

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Figure 7-18. Create visualizations (3 of 7)

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Choose the index that is used by the search. In the example, the default API Connect index is used.

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IBM Training

Create visualizations (4 of 7)

- Configure Data and Options

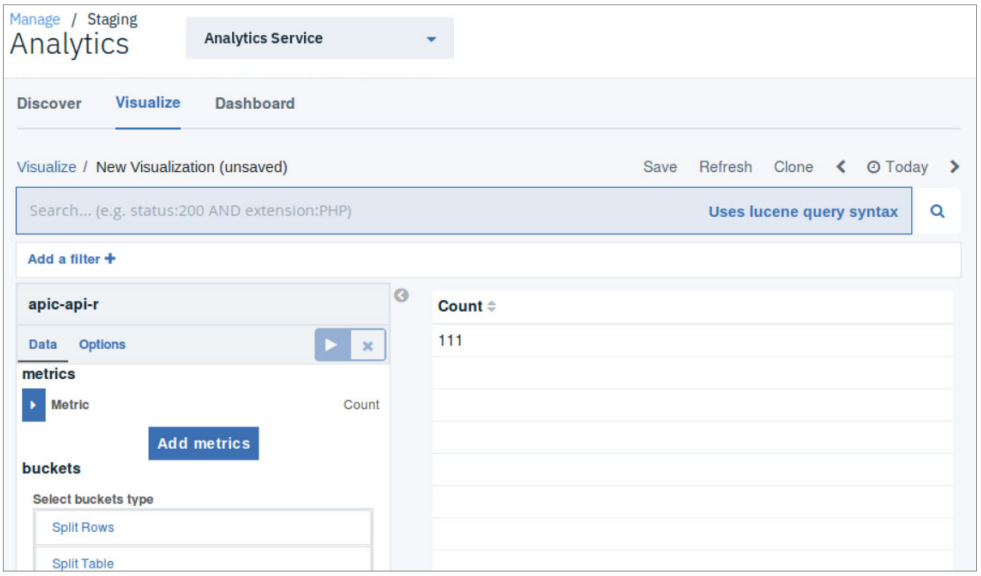

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Figure 7-19. Create visualizations (4 of 7)

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Configure any changes that you wish to make to the Data and Options for the visualization.

Then, click **Save**.

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Create visualizations (5 of 7)

- Give the visualization a title
- Then, save the configured visualization

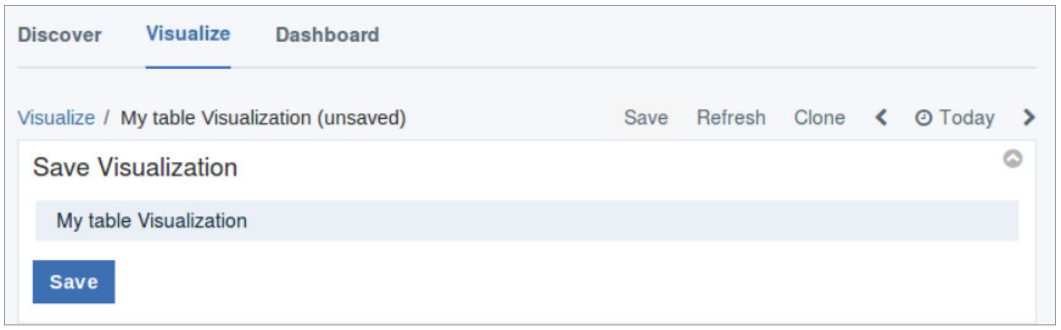

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Figure 7-20. Create visualizations (5 of 7)

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Give the visualization a title and save the new visualization.

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Create visualizations (6 of 7)

- The new visualization is displayed in the visualizations list
- Select the newly created visualization in the Visualization Filter

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Figure 7-21. Create visualizations (6 of 7)

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Select the newly-created visualization from the visualizations list.

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Create visualizations (7 of 7)

- The new visualization is displayed on the page

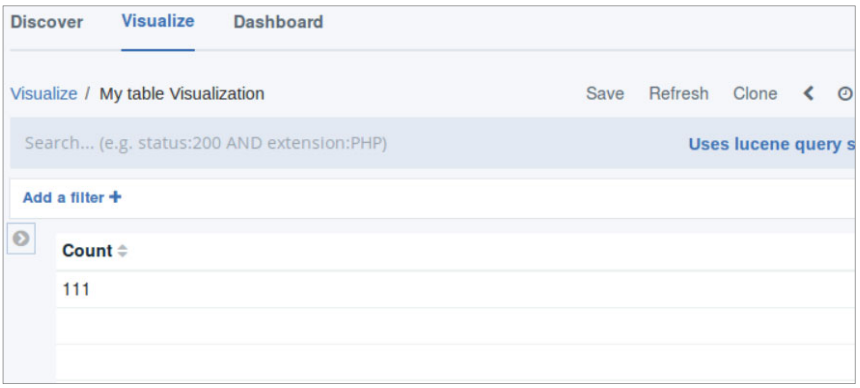

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Figure 7-22. Create visualizations (7 of 7)

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The visualization is displayed on the page.

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API events and records

- An *API event* is logged each time an API operation is called
- An *event record* is generated for each API event in the gateway server
  - Contains information about the API call
- When an analytics service is associated with a gateway, events are captured
- The captured event data can be viewed in the API Manager or offloaded to third-party systems

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Figure 7-23. API events and records

Global Knowledge®

An API event is logged each time an API operation is invoked, and an event record is generated for each API event in the gateway server.

The API event record contains information about the API call and the content of the record depends on the logging policy that is set for the operation.

The API event records are stored by the Analytics component of API Connect.

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Export data from visualizations (1 of 3)

- Export visualization event data
  - Select the visualization
  - Then, click Export

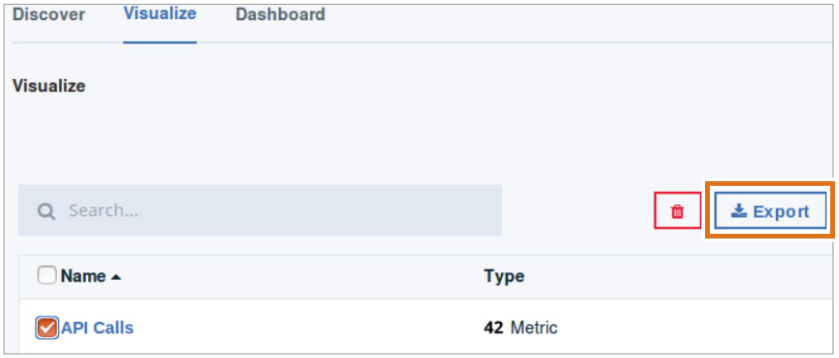

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Figure 7-24. Export data from visualizations (1 of 3)

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You can export visualizations so they can be imported by other IBM API Connect users, or into other catalogs on your system.

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Export data from visualizations (2 of 3)

- Choose to save the file, which is named `export.json` by default, or open it with an application that is configured for your browser

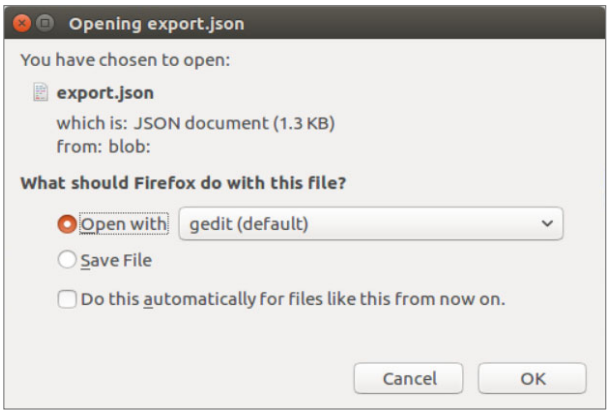

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Figure 7-25. Export data from visualizations (2 of 3)

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Choose to save the file, which is named `export.json` by default, or open it with an application that is configured for your browser.

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Export data from visualizations (3 of 3)

- The exported JSON file is displayed in the editor


```
[
  {
    "_type": "visualization",
    "_source": {
      "title": "API Calls",
      "visState": "{\"title\":\"API Calls\",\"type\":\"metric\",\"params\":{\"addTooltip\":true,\"addLegend\":false,\"type\":\"gauge\",\"gauge\":
{\"verticalSplit\":false,\"autoExtend\":false,\"percentageMode\":false,\"gaugeType\":\"Metric\",\"gaugeStyle\":\"Full\",\"backStyle\":\"Full\",
\"orientation\":\"vertical\",\"colorSchema\":\"Green to Red\",\"gaugeColorMode\":\"None\",\"useRange\":false,\"colorsRange\":[{\"from\":0,\"to
\":0}],\"invertColors\":false,\"labels\":{\"show\":true,\"color\":\"black\"},\"scale\":{\"show\":false,\"labels\":false,\"color\":\"#333\",\"width
\":2},\"type\":\"simple\",\"style\":{\"fontSize\":\"60\",\"bgFill\":\"#000000\",\"bgColor\":false,\"labelColor\":false,\"subText\":\"\"}}},\"aggs
\":[{\"id\":\"1\",\"enabled\":true,\"type\":\"count\",\"schema\":\"metric\",\"params\":{\"customLabel\":\"Total API Calls\"}}],\"listeners\":{}}",
      "uiStateJSON": "{\"vis\":{\"defaultColors\":{\"0 - 0\":\"rgb(0,104,55)\"},\"legendOpen\":false}}",
      "description": "",
      "version": 1,
      "kibanaSavedObjectMeta": {
        "searchSourceJSON": "{\"index\":\"apic-api-r\",\"query\":{\"query_string\":{\"query\":\"*\",\"analyze_wildcard\":true}},\"filter\":[]}"
      },
      "default": true
    }
  }
]
```


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Figure 7-26. Export data from visualizations (3 of 3)

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The example show the JSON file for API calls opened in the editor.

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Unit summary

- Describe what is API Connect analytics
- Describe the role of the Kibana open source platform in the API Connect API analytics feature
- Describe where analytics are configured and captured
- Identify which user interfaces in API Connect provide access to analytical data
- Review analytics in the Developer Portal
- Describe the purpose of default dashboards
- Review the features of default visualizations
- Create a visualization
- Describe API events and event records
- Describe how to export analytics and API event data

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Figure 7-27. Unit summary

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Review questions

1. True or False: The Portal service captures API events.

2. True or False: All visualizations that you create are added to a list of saved visualizations, and can be used in any dashboard.

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Figure 7-28. Review questions

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Write your answers here:

1.

2.

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IBM Training

Review answers

1. True or False: The Portal service captures API events.
   The answer is False.
   The Gateway service captures API events.

2. True or False: All visualizations that you create are added to a list of saved visualizations, and can be used in any dashboard.
   The answer is True.

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Figure 7-29. Review answers

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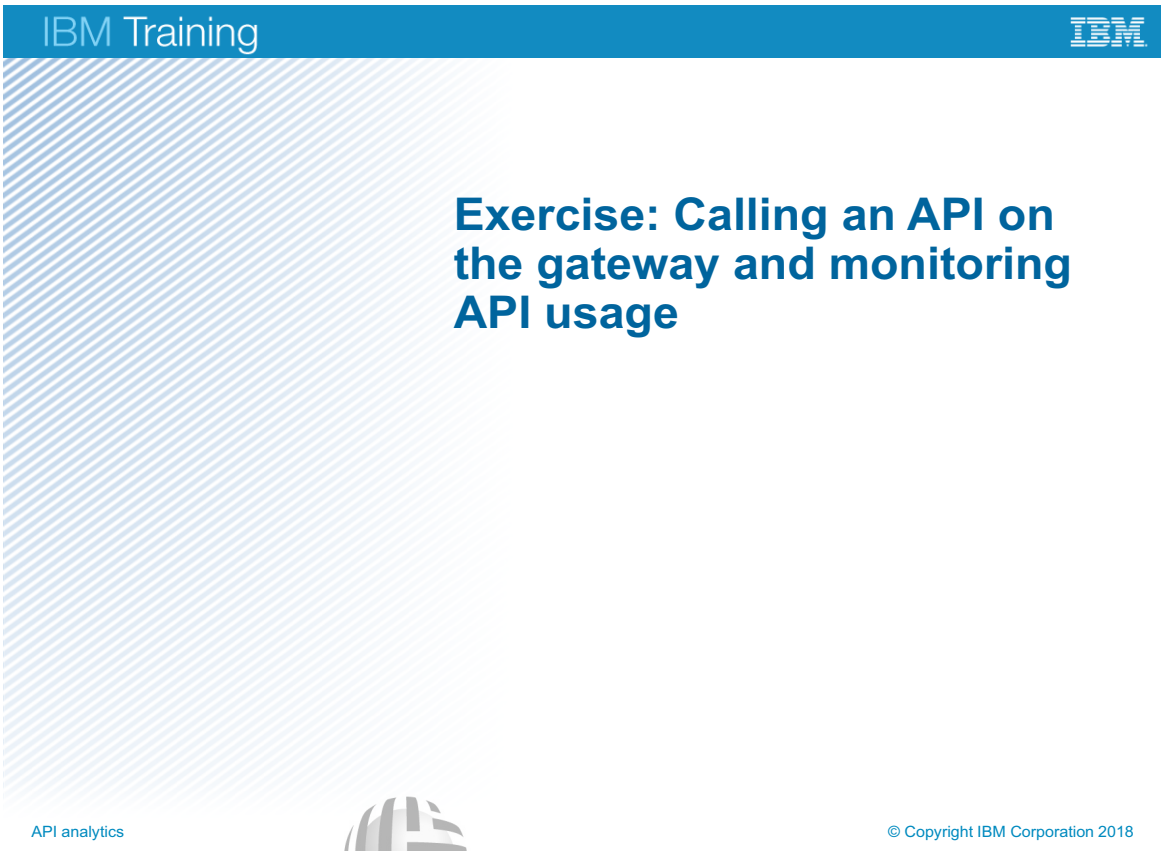

Figure 7-30. Exercise: Calling an API on the gateway and monitoring API usage

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Exercise objectives

- Run the test feature in the Developer Portal
- Identify the API endpoints in the gateway
- Run a script to generate multiple calls to the API gateway
- View the analytics dashboard for the catalog
- Change the time period filter for a visualization
- View API event data
- Export API event data

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Figure 7-31. Exercise objectives

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Unit 8. Course summary

Estimated time

00:05

Overview

This unit summarizes the course and provides information for future study.

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IBM Training

Unit objectives

- Explain how the course met its learning objectives
- Access the IBM Training website
- Identify other IBM Training courses that are related to this topic
- Locate appropriate resources for future study

Course summary

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Figure 8-1. Unit objectives

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IBM Training

Course objectives

- Configure services in Cloud Manager for an on-premises installation of API Connect V2018
- Identify the container runtime infrastructure that supports the API Connect services
- Create a catalog and Developer Portal
- Create a consumer organization
- Manage member roles and permissions in the Developer Portal
- Define APIs, Products, and plans in API Manager
- Identify the API lifecycle stages

Course summary

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Figure 8-2. Course objectives

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IBM Training

Course objectives

- Stage, publish, version, migrate, deprecate, and retire Products and APIs
- Review and approve API lifecycle requests
- Customize the Developer Portal
- Create an application and subscribe to a plan
- Review API analytics in the Developer Portal
- Review analytics dashboards and visualizations in API Manager

Course summary

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Figure 8-3. Course objectives

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IBM Training

References

- IBM API Connect 2018 IBM Knowledge Center
  - https://www.ibm.com/support/knowledgecenter/SSMNED_2018/
- API Connect: IBM Developer Center
  - https://developer.ibm.com/apiconnect/

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Figure 8-4. References

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IBM Training

Enhance your learning with IBM resources

Keep your IBM Cloud skills up-to-date

- IBM offers resources for:
  - Product information
  - Training and certification
  - Documentation
  - Support
  - Technical information

- To learn more, see the IBM Cloud Education Resource Guide:
  - www.ibm.biz/CloudEduResources

Course summary

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Figure 8-5. Enhance your learning with IBM resources

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IBM Training

Unit summary

- Explain how the course met its learning objectives
- Access the IBM Training website
- Identify other IBM Training courses that are related to this topic
- Locate appropriate resources for future study

Course summary

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Figure 8-6. Unit summary

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Course completion

You have completed this course:

API Lifecycle Governance with IBM API Connect V2018

Any questions?

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Figure 8-7. Course completion

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Appendix A. List of abbreviations

A

API	application programming interface

B

C

CA	certificate authority
CMS	Certificate Management System
CPU	central processing unit
CSS	Cascading Style Sheets
CSV	comma-separated variables

D

DB	database
DHCP	Dynamic Host Configuration Protocol
DMZ	demilitarized zone
DN	distinguished name
DNS	Domain Name System

Global Knowledge®

E

F

G

GB	gigabyte
GUI	graphical user interface

H

HA	high availability
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
HTTPS	HTTP over SSL

I

IBM	International Business Machines Corporation
IE	Internet Explorer

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I/O	input/output
IP	Internet Protocol
IPSEC	IP Security

J

K

L

LAMP	A software stack that consists of the Linux operating system, Apache web server, MySQL database, and the PHP scripting language
LDAP	Lightweight Directory Access Protocol

M

MB	megabyte

N

O

OS	operating system
OVA	Open Virtual Appliance

P

PaaS	Platform as a Service

Global Knowledge®

Q

R

RAM	random access memory
REST	Representational State Transfer
RSS	Rich Site Summary

S

SaaS	Software as a Service
SCIM	System for Cross-domain Identity Management
SDK	software development kit
SMTP	Simple Mail Transfer Protocol
SOAP	A lightweight, XML-based protocol for exchanging information in a decentralized, distributed environment. Usage note: SOAP is not an acronym; it is a word in itself (formerly an acronym for Simple Object Access Protocol)
SSH	Secure Shell

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SSL	Secure Sockets Layer

T

TCP	Transmission Control Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
TLS	Transport Layer Security

U

UI	user interface
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
UTF	Unicode Transformation Format

V

VM	virtual machine
VPN	virtual private network

W

WS	web services
WSDL	Web Services Description Language

X

XML	Extensible Markup Language

Y

Z

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