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API Lifecycle Governance with IBM API Connect v2018

Course Exercises Guide

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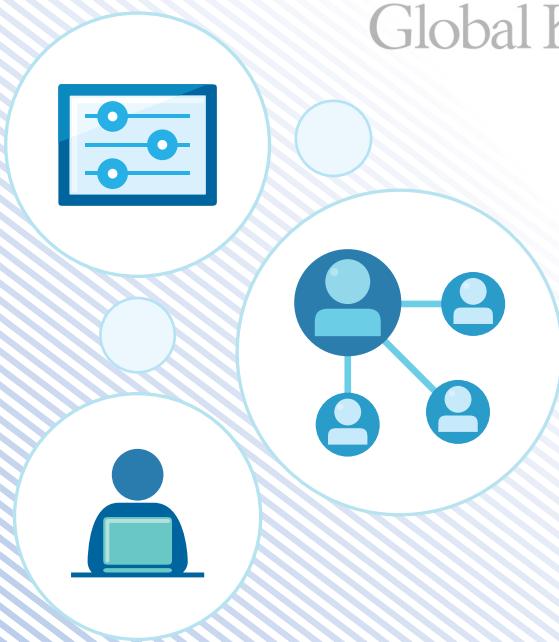


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Course Exercises Guide

API Lifecycle Governance with IBM API Connect v2018

Course code WD509 / ZD509 ERC 1.0



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Exercises description

This course includes the following exercises:

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

In the exercise instructions, you can check off the line before each step as you complete it to track your progress.

Most exercises include required sections, which should always be completed. It might be necessary to complete these sections before you can start later exercises. If you have sufficient time and want an extra challenge, some exercises might also include optional sections that you can complete.

Before you begin



You complete the instructions in this exercise on the remote lab environment. Before you begin your exercise, make sure that the virtual machine for the IBM API Connect cloud is running.

When you complete the exercise, you can suspend the lab environment to save your current state.

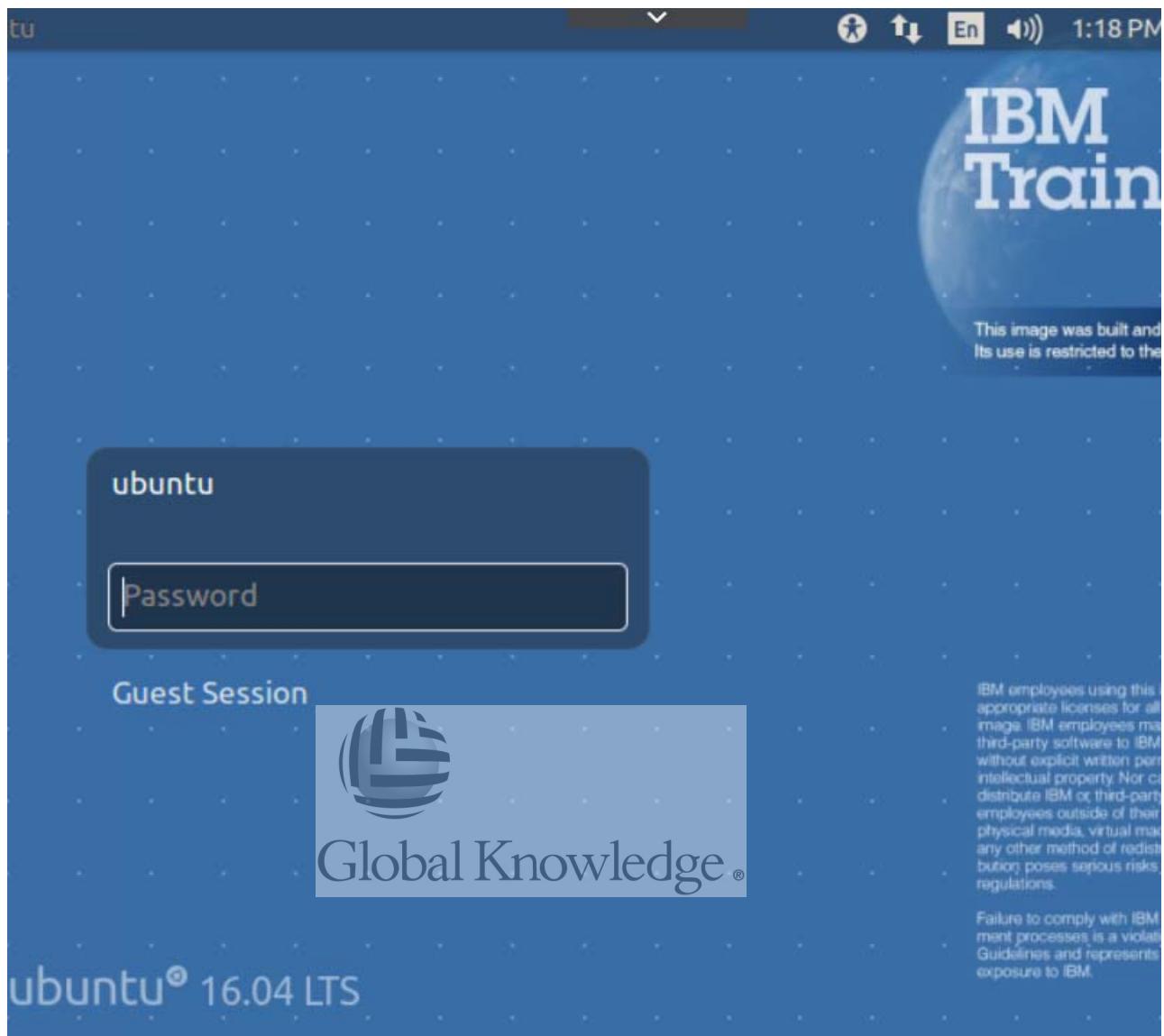
- 1. In the IBM Remote Lab Platform, make sure that the virtual machine is started.
 - a. Examine the console for the virtual machine that you use in this course.
 - b. If the course image virtual machine is not started, click the start arrow for the environment to start the virtual machine.

- ___ c. The background color changes to green and the status changes to “Running”.



- ___ 2. Open the student workstation on the Ubuntu Host virtual machine.
___ a. Click the picture of the desktop in the running course image pane.

- ___ b. A remote desktop connection opens in a web browser window. Wait until the connection opens.



Information

The Ubuntu student workstation opens to the desktop without you needing to sign on. If you need to sign on to the image, or if you shutdown and restart the Xubuntu server, you can sign on with the credentials:

- User: localuser
- Password: passw0rd

Exercise 1. Configuring the cloud topology

Estimated time

00:45

Overview

In the first part of the exercise, you test that you can access the internet and that your private domain name service is working. You review and validate the Kubernetes runtime environment and API Connect processes are running. In the next part, you sign on as the administrator to the Cloud Manager user interface. You register analytics, portal, and gateway services in the Cloud Manager. Review the provider organization that publishes the APIs.

Objectives

After completing this exercise, you should be able to:

- 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.

Requirements

This exercise requires a workstation with internet access. You can complete this exercise by using the Ubuntu course image that is supplied with the course.

The image on the IBM Remote Platform requires these resources:

- 8 CPUs
- 32 GB RAM
- 300 GB HDD

The image might have problems starting all the processes when these resources are not configured.



Exercise instructions

Preface

Follow the instructions that are provided under the heading "Before you begin" in the Exercises description at the start of this guide.



1.1. Review the network connectivity and domains

In this part, you validate your connectivity to the internet and the function of the private DNS.

The network on the student image is configured as a private DNS server on Ubuntu with the BIND package. In the exercises, you use the `think.ibm` domain that is configured on the primary DNS server, which is the student image itself (IP address 192.168.225.15).

- 1. The network connectivity and naming lookup.
 - a. Open a terminal from the desktop. In the terminal, type `nslookup google.com`.
The result is displayed.

```
localuser@ubuntu:~$ nslookup google.com
Server:192.168.225.15
Address:192.168.225.15#53
```

Non-authoritative answer:

```
Name:google.com
Address: 216.58.216.142
```

- b. In the terminal, type `nslookup cloud.think.ibm`.
The result is displayed.

```
localuser@ubuntu:~$ nslookup cloud.think.ibm
Server:192.168.225.15
Address:192.168.225.15#53
```



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Address: 192.168.225.15



If these queries do not work, check whether you can access the internet from the image. Restart the image by selecting shutdown from the menu. Then, select restart. When the image restarts, retest the connectivity and naming lookup.

1.2. Review the Kubernetes runtime environment

For this course, IBM API Connect runs on a Kubernetes environment, sometimes abbreviated as K8. The Kubernetes environment supports scalability and failover. For this course, Kubernetes is set up with a single master node with all the processes running on the same virtual machine. This configuration is not scalable and is used only for demonstration purposes. Kubernetes manages the Docker containers that provides the runtime environment. These components start automatically when the student image is started. You might need to wait up to 15 minutes for all the processes to start and for the API Connect environment to become fully operational.

- 1. Review the Helm charts that are defined on the image.

Helm is the Kubernetes package manager.

- a. Click the Terminal in the list of applications on the Ubuntu desktop.
- b. Type `helm list`.

The list of deployed released is displayed.

NAME	REVISION	UPDATED	STATUS	CHART
NAMESPACE				
ingress	1	Tue Jul 17 15:27:26 2018	DEPLOYED	nginx-ingress-0.23.0
apiconnect				
r2484482d491		Tue Jul 17 15:48:21 2018	DEPLOYED	apic-portal-2.0.0
apiconnect				
r674f0bc86d1		Tue Jul 17 15:34:34 2018	DEPLOYED	apiconnect-2.0.0
apiconnect				
r8e789c134d1		Tue Jul 17 15:34:28 2018	DEPLOYED	cassandra-operator-1.0.0
apiconnect				®
rde5615f28a1		Fri Jul 20 11:45:20 2018	DEPLOYED	dynamic-gateway-service-1.0.9
apiconnect				
re266d799751		Tue Jul 17 15:42:36 2018	DEPLOYED	apic-analytics-2.0.0
apiconnect				



Note

If you get a message: Error: could not find tiller

Type: `export TILLER_NAMESPACE=apiconnect`

In the terminal.

Retry the helm list command.

-
- 2. Display the pods that are running on the apiconnect namespace.

- a. In the Terminal type:

```
kubectl get pods -n apiconnect
```

b. The list of pods is displayed.

NAME	READY	STATUS
RESTARTS	AGE	
hostpath-provisioner-bb9cd947-txfns	1/1	Running 4
3d		
ingress-nginx-ingress-controller-rhd96	1/1	Running 7
3d		
ingress-nginx-ingress-default-backend-6f58fb5f56-b5nms	1/1	Running
5 3d		
r2484482d49-apic-portal-db-0	2/2	Running
10 3d		
r2484482d49-apic-portal-nginx-68bc898b9d-x5t9m	1/1	Running 5
3d		
r2484482d49-apic-portal-www-0	2/2	Running
10 3d		
r674f0bc86d-a7s-proxy-8678c9db79-9zd9s	1/1	Running 4
3d		
r674f0bc86d-apiconnect-cc-0	1/1	Running 6
3d		
r674f0bc86d-apiconnect-cc-cassandra-stats-1532014200-6l6tc	0/1	Error
0 1d		
r674f0bc86d-apiconnect-cc-cassandra-stats-1532014200-8shzw	0/1	Error
0 1d		
r674f0bc86d-apiconnect-cc-cassandra-stats-1532014200-f4qpc	0/1	Error
0 1d		
r674f0bc86d-apiconnect-cc-cassandra-stats-1532014200-lstvp	0/1	Error
0 1d		
r674f0bc86d-apiconnect-cc-cassandra-stats-1532014200-sqx72	0/1	Error
0 1d		
r674f0bc86d-apiconnect-cc-cassandra-stats-1532118600-cz97n	0/1	Completed
0 2h		
r674f0bc86d-apiconnect-cc-cassandra-stats-1532122200-wlg55	0/1	Completed
0 1h		
r674f0bc86d-apiconnect-cc-cassandra-stats-1532125800-kd7cr	0/1	Completed
0 19m		
r674f0bc86d-apiconnect-cc-repair-1531962000-jwrrn	0/1	Completed
0 1d		
r674f0bc86d-apim-schema-init-job-5rbs4	0/1	Completed
0 3d		
r674f0bc86d-apim-v2-74b7db9575-4zd28	1/1	Running 5
3d		
r674f0bc86d-client-d1-srv-db5fb94c4-vfmf8	1/1	Running 5
3d		
r674f0bc86d-juhu-7588dbcb9-m1415	1/1	Running 4
3d		
r674f0bc86d-ldap-5fb44b855d-8m5hx	1/1	Running 5
3d		
r674f0bc86d-lur-schema-init-job-q79kz	0/1	Completed

0	3d					
r674f0bc86d-lur-v2-7459477bbd-6qf7m		1/1	Running	5		
3d						
r674f0bc86d-ui-6659cb68d5-9zx7w		1/1	Running	5		
3d						
r8e789c134d-cassandra-operator-8b854495d-kjb6j		1/1	Running	5		
3d						
rde5615f28a-dynamic-gateway-service-0		1/1	Running	1		
7h						
re266d79975-analytics-client-5876d89b8-gbg22		1/1	Running	5		
3d						
re266d79975-analytics-cronjobs-rollover-1532126700-b2hrf		0/1	Completed			
0	4m					
re266d79975-analytics-ingestion-648d68bbfd-kd6j2		1/1	Running			
5	3d					
re266d79975-analytics-mtls-gw-66dd5c67fc-tmf5f		1/1	Running	5		
3d						
re266d79975-analytics-storage-coordinating-69fdd5647c-f6mzn		1/1	Running			
5	3d					
re266d79975-analytics-storage-data-0		1/1	Running	5		
3d						
re266d79975-analytics-storage-master-0		1/1	Running	5		
3d						
tiller-deploy-76cd8b887-14x6n		1/1	Running	5		
3d						

- ___ c. Most of the pods should have a status of "Running" or "Completed" as shown. Reissue the command if some of the pods are initializing. It is acceptable when some of the cassandra-stats pods have a status of error.
- ___ d. The system is ready to run API Connect.



Information

You can also run the command `docker ps`. The system can sometimes take more than 15 minutes to start all the docker containers.

Other commands that you can type to check the status of the Kubernetes runtime environment, are:

```
localuser@ubuntu:~$ kubectl get nodes
```

NAME	STATUS	ROLES	AGE	VERSION
ubuntu	Ready	master	89d	v1.10.3

```
localuser@ubuntu:~$ kubectl get pods -n kube-system
```

NAME	READY	STATUS	RESTARTS	AGE
calico-etcd-7g9rh	1/1	Running	7	89d

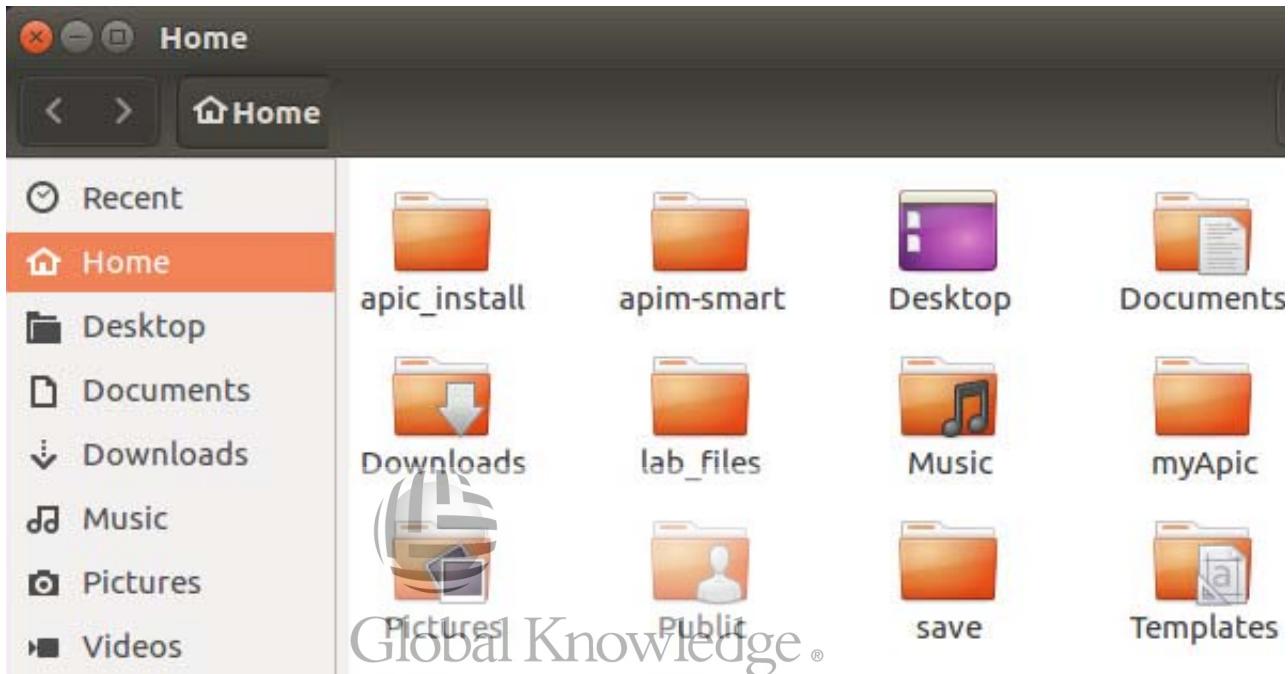
calico-kube-controllers-79dccdc4cc-wm6tk 89d	1/1	Running	18
calico-node-scpjk	2/2	Running	25
etcd-ubuntu	1/1	Running	11
kube-apiserver-ubuntu 89d	1/1	Running	27
kube-controller-manager-ubuntu 89d	1/1	Running	11
kube-dns-86f4d74b45-b2skh 89d	3/3	Running	18
kube-proxy-x6w8k	1/1	Running	7
kube-scheduler-ubuntu 89d	1/1	Running	11



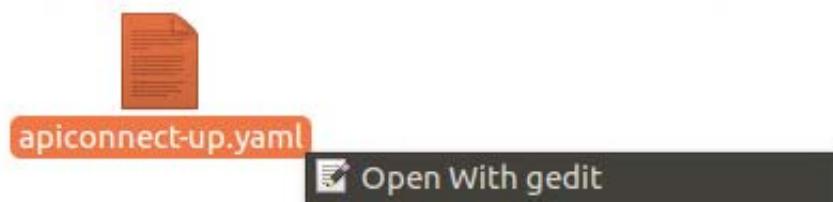
1.3. Review the API Connect installation file

API Connect V2018 uses the APICUP installation utility to create and install the required Kubernetes and API Connect components. Each command that is typed with the APICUP utility is written to a YAML file in the directory from where the commands are typed.

- ___ 1. Open the installation configuration file.
 - ___ a. Click the File Manager icon in the list of applications in the Ubuntu desktop.
 - ___ b. Open the myApic folder in the Home directory.



- ___ c. Right-click the file apiconnect-up.yaml. Then, select Open With gedit from the context menu.



The file opens in the editor.

- ___ d. The file displays some of the configuration values that were used during the installation of API Connect to the Kubernetes runtime environment. Notice some of the host names that are used for endpoints for the analytics, gateway, management, and portal servers. These endpoint values are referenced later when you register some 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
        name: api-gateway
      - hostname: gwd.think.ibm
        name: apic-gw-service
    kvs:
      enable-tms: "off"

```

- ___ e. Close the YAML file and File Manager when you are finished reviewing the file.

1.4. Configure resources in Cloud Manager Console

In this part, you configure the email server in the Cloud Manager web interface of API Connect.

- 1. Open the Cloud Manager in a browser.
 - a. In another tab of the Firefox browser, type `https://cloud.think.ibm/admin/` in the address area of the browser.



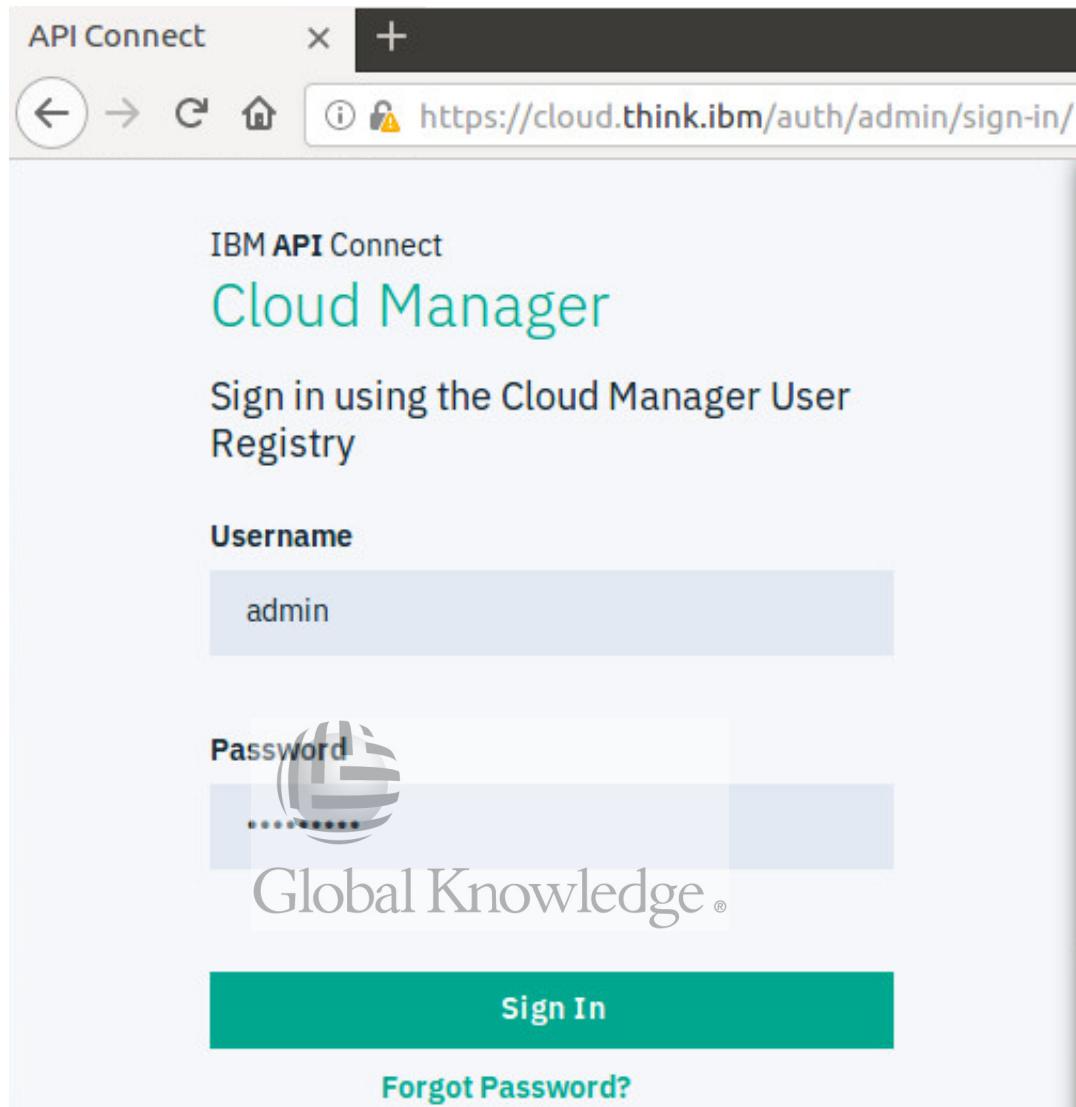
Note

If the Cloud Manager page returns an API Error, you might need to wait a while longer for the API Connect environment on Kubernetes to start. It might take as much as 15 minutes for the environment to properly initialize.



__ b. Sign on to Cloud Manager with the administrator credentials:

- User name: admin
- Password: Passw0rd!



The user is signed in to Cloud Manager.

- ___ 2. Review the email Servers that are defined.
- ___ a. Click **Resources** in the Navigation menu. Then, click **Notifications**. Notice that an email server is already defined for you.

Resources

The screenshot shows the 'Email Servers' section of the IBM API Connect Cloud Manager. On the left, there are navigation links: 'User Registries', 'TLS', 'OAuth Providers', and 'Notifications' (which is highlighted in blue). On the right, there is a 'Create' button. The main area displays a table with two columns: 'TITLE' and 'MAIL SERVER'. One row is visible, showing 'ThinkSMTPServer' in the TITLE column and '192.168.225.15' in the MAIL SERVER column. A vertical ellipsis icon is at the end of this row.

Email Servers	
TITLE	MAIL SERVER
ThinkSMTPServer	192.168.225.15

- ___ 3. Add the email server in the settings.
- ___ a. Click **Cloud Settings** in the Navigation menu.



- ___ b. Click **Notifications**.
- ___ c. Click **Edit**.
- ___ d. Type `admin@think.ibm` in the Address field.

- ___ e. Click the check box to select the email server.

Edit Sender & Email Server

Sender

Configure the name and email address to be used in the from field of emails

Name

APIC Administrator

Address

admin@think.ibm

TITLE	MAIL SERVER
<input checked="" type="checkbox"/>	Think SMTP Server 192.168.225.15

Can't find the one you want? [Configure Email Server](#)

[Cancel](#) [Save](#)

Click **Save**.

1.5. Configure services in Cloud Manager Console

In this part, you configure the analytics, portal, and gateway services in the Cloud Manager web interface of API Connect.

- 1. Configure the analytics service in Cloud Manager.
 - a. Click the Configure Topology tile or **Topology** from the navigation menu.

The screenshot shows the IBM API Connect Cloud Manager interface. The top navigation bar includes 'IBM API Connect' and 'Cloud Manager'. The left sidebar has links for 'Home', 'Provider Organizations', 'Resources', 'Topology' (which is highlighted with a cursor icon), 'Members', and 'Settings'. The main content area has a 'Get started' message and two main sections: 'Configure Cloud' (with a gear icon) and 'Configure Topology' (with a chart and gear icon). A large 'Global Knowledge' watermark is centered over the content.

The topology page is displayed. A Management service is already configured in the default availability zone when API Connect is installed.

- b. Click **Register Service**.

The screenshot shows the 'Topology' page under the 'Default Availability Zone' section. It includes a 'Create Availability Zone' button, a 'Management' tab, a 'Register Service' button, and a table for managing services. The table has columns for 'SERVICE', 'ASSOCIATED ANALYTICS SERVICE', and 'VISIBLE TO'. A note at the bottom states 'No services found' and encourages registering a gateway service.

SERVICE	ASSOCIATED ANALYTICS SERVICE	VISIBLE TO
No services found Get started by registering a gateway service. This will allow you to test endpoints when configuring other services. Once you register a service, you will see it here. Learn more		

- c. On the Configure Service page, select **Analytics**.

__ d. On the Configure Analytics Service type:

- Title: Analytics Service
- Name: analytics-service
- Summary: Analytics service for on-premises installation
- Endpoint: <https://ac.think.ibm>
- TLS Client Profile: Analytics TLS client profile

Title

Analytics Service

Name

analytics-service

Summary (optional)

Analytics service for on-premises installation

Management Endpoint

Endpoint Global Knowledge®
<https://ac.think.ibm>

TLS Client Profile (optional)

Analytics client TLS client profile ▾

Cancel **Save**

- e. Click **Save**.

The service is added and is displayed in the list of services.

Default Availability Zone Management Register Service ⋮

Register new services and manage existing services

SERVICE	ASSOCIATED ANALYTICS SERVICE	VISIBLE TO
 Analytics Service		⋮

- 2. Configure the portal service in Cloud Manager.
- a. From the Topology page, click **Register Service**.
- b. On the Configure Service page, select **Portal**.



__ c. On the Configure Analytics Service type:

- Title: Portal Service
- Name: portal-service
- Summary: Portal service for on-premises installation
- Management Endpoint: <https://padmin.think.ibm>
- TLS Client Profile: Portal Director TLS client profile
- Portal website URL: <https://portal.think.ibm>

Configure Portal Service

Summary (optional)

Portal service for on-premises installation

Management Endpoint

Endpoint  <https://padmin.think.ibm>

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TLS Client Profile (optional)

Portal Director TLS client profile ▾

Portal Website URL

<https://portal.think.ibm>

- ___ d. Click **Save**.

The service is added and is displayed in the list of services.

Default Availability Zone		Management	Register Service	⋮
Register new services and manage existing services				
SERVICE	ASSOCIATED ANALYTICS SERVICE	VISIBLE TO		
 Portal Service		Public	⋮	⋮
 Analytics Service			⋮	⋮

- ___ 3. Configure the gateway service in Cloud Manager.

- ___ a. From the Topology page, click **Register Service**.

- ___ b. On the Configure Service page, select **DataPower Gateway (Classic)**.



- c. On the Configure Gateway Service type:

- Title: Gateway Service Classic
- Name: gateway-service-classic
- Summary: Gateway service for on-premises installation
- Endpoint: <https://gwd.think.ibm>
- TLS Client Profile: Default TLS client profile
- API Endpoint Base: <https://gw.think.ibm>
- OAuth Shared Secret:

Configure DataPower Gateway Service

Management Endpoint

Endpoint

<https://gwd.think.ibm>

TLS Client Profile (optional)

[Default TLS client profile](#)

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API Invocation Endpoint

API Endpoint Base

<https://gw.think.ibm>

- 4. Click **Save**.

The service is added and displayed in the list of services.

- ___ 5. You now see all three services in the Topology page.

Default Availability Zone Management			
Register new services and manage existing services			
SERVICE	TYPE	ASSOCIATED ANALYTICS SERVICE	VISIBLE TO
 Gateway Service Classic	DataPower Gateway (Classic)	Associate Analytics Service	Public 
 Portal Service	Portal Service		Public 
 Analytics Service	Analytics Service		

- ___ 6. You can associate an analytics service with a gateway service.
- ___ a. On the Topology page, click **Associate Analytics Service** in the Gateway service row.
 - ___ b. On the Associate Analytics Service page, select the Default Availability Zone. Ensure that the check mark is displayed in the default availability zone.

Analytics Service

Select the analytics service you would like to associate with the gateway service



ANALYTICS	AVAILABILITY ZONE
<input checked="" type="checkbox"/> Analytics Service	Default Availability Zone

Cancel
Associate

- ___ c. Click **Associate**.

__ d. The Gateway is now associated with the analytics service.

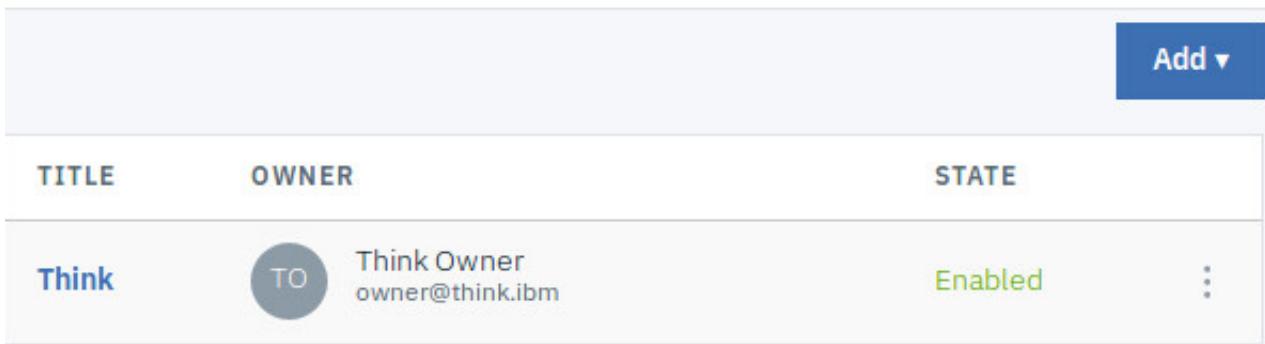
SERVICE	TYPE	ASSOCIATED ANALYTICS SERVICE	VISIBLE TO	
 Gateway Service Classic	DataPower Gateway (Classic)	Analytics-service	Public	:
 Portal Service	Portal Service		Public	:
 Analytics Service	Analytics Service			:



1.6. Review the provider and consumer organization settings and user registries

- ___ 1. Review the provider organization that is already defined.
 - ___ a. Click **Provider Organizations** in the left navigation bar.
 - ___ b. A provider organization that is named Think is displayed in the list of provider organizations. The owner of the provider organization is Think Owner.

Provider Organizations



The screenshot shows a table with three columns: TITLE, OWNER, and STATE. There is one row for the organization 'Think'. The 'OWNER' column shows 'Think Owner' and an email address 'owner@think.ibm'. The 'STATE' column shows 'Enabled'. There is a blue 'Add ▾' button in the top right corner.

TITLE	OWNER	STATE
Think	TO Think Owner owner@think.ibm	Enabled

In a later exercise, you sign on to the API Manager user interface with the credentials of Think Owner.

- ___ 2. Review the user registries.
 - ___ a. Click **Resources** in the left navigation bar.
 - ___ b. You see the two local user registries that are defined.



The screenshot shows a table with four columns: a checkbox column, TITLE, TYPE, and VISIBLE TO. There are two rows. The first row has a checkbox checked, and the title is 'API Manager Local User Registry'. The type is 'Local User Registry' and it is 'Visible To' 'Private'. The second row has an unchecked checkbox, and the title is 'Cloud Manager Local User Registry'. The type is 'Local User Registry' and it is 'Visible To' 'Private'. There is a 'Create' button in the top right and a three-dot menu icon.

<input type="checkbox"/>	TITLE	TYPE	VISIBLE TO
<input checked="" type="checkbox"/>	API Manager Local User Registry	Local User Registry	Private
<input type="checkbox"/>	Cloud Manager Local User Registry	Local User Registry	Private

- ___ c. You cannot directly open the local user registries to view the users. However, you can indirectly query members in the local user registries, as you see in a later exercise.
- ___ d. The admin user was created in the Cloud Manager local user registry during product installation.
- ___ e. The ThinkOwner user was created in the API Manager local user registry when the Think provider organization was added.

- 3. Review the Cloud Manager settings.
 - a. Click **Cloud Settings** in the left navigation bar.
 - b. On the Settings page, click **Role Defaults**. You see a list of the predefined roles for Provider Organizations in API Connect.

Provider Organization

Configure the set of roles to use by default when a provider organization is created

Add

ROLES
> Administrator
> API Administrator
> Community Manager
> Developer
> Member
> Owner
> Viewer

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- __ c. Expand **Owner** to see the permissions of the owner of the provider organization.

Owner	
Owns and administers the API provider organization	
Member	Settings
<ul style="list-style-type: none">• View• Manage	<ul style="list-style-type: none">• View• Manage
Topology	Org
<ul style="list-style-type: none">• View• Manage	<ul style="list-style-type: none">• View
Drafts	Product
<ul style="list-style-type: none">• View• Edit	<ul style="list-style-type: none">• View• Stage• Manage
 Product-approval	 Consumer-org
<ul style="list-style-type: none">• View• Stage• Publish• Supersede• Replace	<ul style="list-style-type: none">• View• Manage

The Owner has permissions for all functions in the Provider Organization.

- ___ d. Collapse the Owner and review the roles for Consumer Organizations in API Manager.

Consumer Organization

Configure the set of roles to use by default when a consumer organization is created

Add

ROLES
> Administrator
> Developer
> Member
> Owner
> Viewer

- ___ e. You mostly use the Owner role for the Provider Organization and Consumer Organization in the exercises, since the Owners have the permissions to perform all functions. You use a role with more restricted permissions in a later exercise. You need to review the role permissions again later.
- ___ 4. Sign out of Cloud Manager by selecting the **Sign Out** option from the drop-down menu.



End of exercise

Exercise review and wrap-up

In the exercise, you worked with the IBM API Connect Cloud Manager.

The Cloud Manager is used to define your API Connect topology and Provider Organizations.

In the first part, you reviewed the network connectivity and verified that the private DNS is working.

Next, you looked at some of the Kubernetes pods where API Connect is running.

Finally, you registered some services in Cloud Manager and you reviewed the Provider Organization and some of the default role settings in Cloud Manager.





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Exercise 2. Managing catalogs and consumer organizations

Estimated time

01:00

Overview

This exercise shows you how to manage consumer organizations through the API Manager and Developer Portal web interfaces. You review the role of the provider organization owner in creating a consumer organization. You also learn how to manage members and configure member roles and permissions in the Developer Portal.

Objectives

After completing this exercise, you should be able to:

- 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

Introduction

In this exercise, you first create a Staging catalog and configure the settings for the Developer Portal. You sign on to the Developer Portal with the admin user to validate the Portal installation.

You create a consumer organization and sign on to the Developer Portal as the owner of the consumer organization. Add a user in the Developer Portal.

Requirements

This exercise requires a workstation with Internet access. You can complete this exercise by using the Ubuntu Linux course image that is supplied with the course.

Exercise instructions

Preface

Follow the instructions that are provided under the heading "Before you begin" in the Exercises description at the start of this guide.



2.1. Sign in to API Manager

When the Think Provider Organization was created, a default Sandbox catalog is created.

You sign on to the API Manager user interface as the organization owner to view the existing catalog.

- ___ 1. Open the API Manager in a browser.
 - ___ a. Open the Firefox browser, type `https://manager.think.ibm/` in the address area of the browser.
 - ___ b. The API Manager sign in page is displayed.



2. Sign on to API Manager as the owner of the provider organization:

- User name: ThinkOwner
- Password: Passw0rd!

The screenshot shows a web browser window titled "API Connect". The address bar displays the URL <https://manager.think.ibm/auth/manager/sign-in/>. Below the address bar, there are links for "Most Visited" and "Getting Started". The main content area is titled "IBM API Connect API Manager" and features a large blue header with the text "Sign in using the API Manager User Registry". It contains two input fields: "Username" with the value "ThinkOwner" and "Password" with the value "Passw0rd!". Below the password field is a watermark logo for "Global Knowledge". A large blue "Sign In" button is at the bottom, and a "Forgot Password?" link is located just below it.

- ___ 3. You are signed on to API Manager as the owner of the Think organization.

The screenshot shows the IBM API Connect API Manager dashboard. At the top, it displays "IBM API Connect API Manager" and "Organization Think". The dashboard features a sidebar with icons for globe, file, square, triangle, document, and gear. The main area has four large tiles:

- Develop APIs**: Edit, assemble, secure and test APIs. Icon: A blue folder labeled "api".
- Develop Products**: Package APIs for publishing to consumers. Icon: A blue cube icon.
- Manage Catalogs**: Manage active APIs and consumers. Icon: A circular icon with overlapping shapes.
- Manage Resources**: Configure user registries, OAuth providers and TLS. Icon: Three stacked blue diamond shapes.

Below the tiles, a banner reads "Global Knowledge®".

- ___ 4. Review the existing catalog.
___ a. Click the **Manage Catalogs** tile on the page.

- __ b. You see that a Sandbox catalog exists for the organization.

Manage

A catalog hosts a collection of API products portal when published



Sandbox

Sandbox Catalog

Before you add a catalog, you must first start the email server that receives the notification.



2.2. Open the email server

You open the email server on the course image. Later, you respond to email messages to activate an account on the Developer Portal.

- ___ 1. Open the email server.

The email server runs as a Java application on the course image.

- ___ a. Open a terminal from the application list on the Ubuntu desktop.
Ensure that you are in the /home/localuser directory.

In the terminal type:

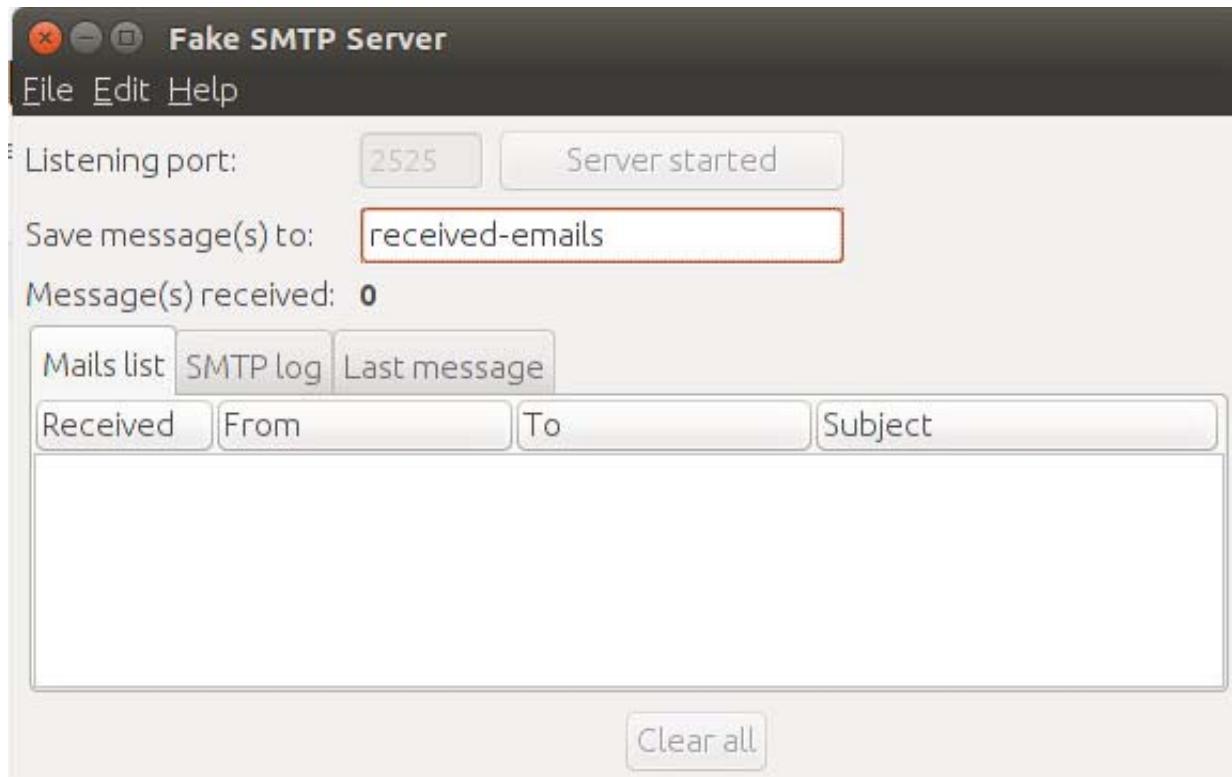
```
java -jar /usr/local/bin/fakeSMTP-2.0.jar -p 2525
```

- ___ b. The fakeSMTP application is displayed.



Click **Start Server**.

- __ c. Leave the email server open on the desktop.



Hint



When the Fake SMTP server is started, the icon is displayed in the application list of Ubuntu. Right-click the Fake SMTP server, then select **Lock to Launcher**.



Later on, when you need to start the Fake SMTP Server you can click the icon in the application list instead of typing the command.

When emails are sent when the email server is running, they are displayed in the Mails list in the Fake SMTP Server. However, if you exit from the SMTP Server and restart it, they are not displayed again. You need to check in the received-emails folder for previously sent messages.

2.3. Create a Staging catalog

In this part, you create a non-development catalog named Staging.

- 1. Create a Staging catalog.
 - a. Return to the API Manager in the browser.
 - b. If you are not already on the Manage page, click the Manage Catalogs tile.
 - c. Click **Add**. Then, select **Create catalog**.
 - d. Type **Staging** in the Title field. Leave the default name that is specified in the Name field.

Create Catalog

Enter the catalog summary details; you can fully configure the catalog after you create it

Catalog Owner

Think Owner

Title
Staging

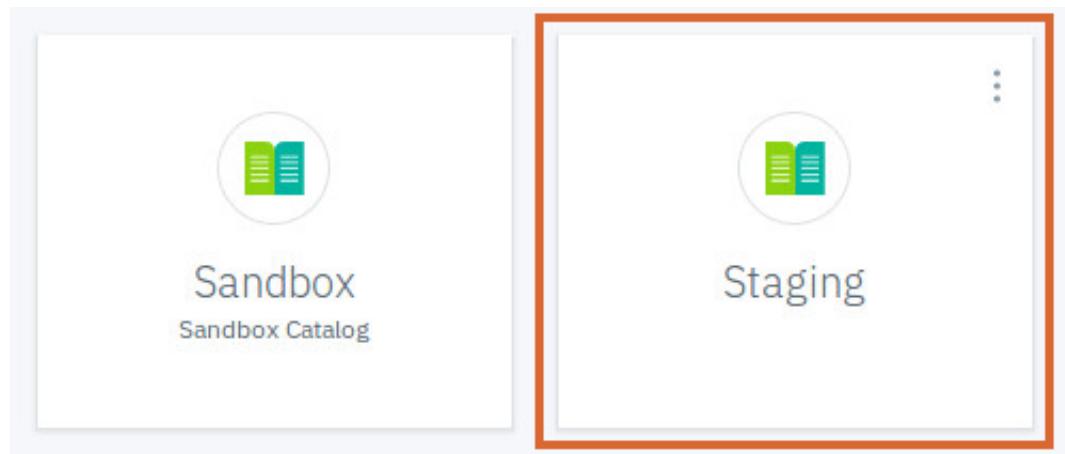
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Name
staging

Click **Create**.

The catalog is added.

- __ 2. Open the catalog and change the settings.
 - __ a. Click the **Staging catalog** tile to open the catalog.



- __ b. Click the **Settings** tab in the navigation menu.



- 3. Set and review the settings for the catalog.
- a. With the **Overview** tab selected, slide the toggle to enable **Application Lifecycle**. You are prompted to confirm your changes.

Manage / Staging Settings

Overview

- Gateway Services
- Lifecycle Approvals
- Roles
- Role Defaults
- Onboarding
- API User Registries
- OAuth Providers
- API Endpoints
- TLS Client Profiles
- Portal
- Properties

Catalog

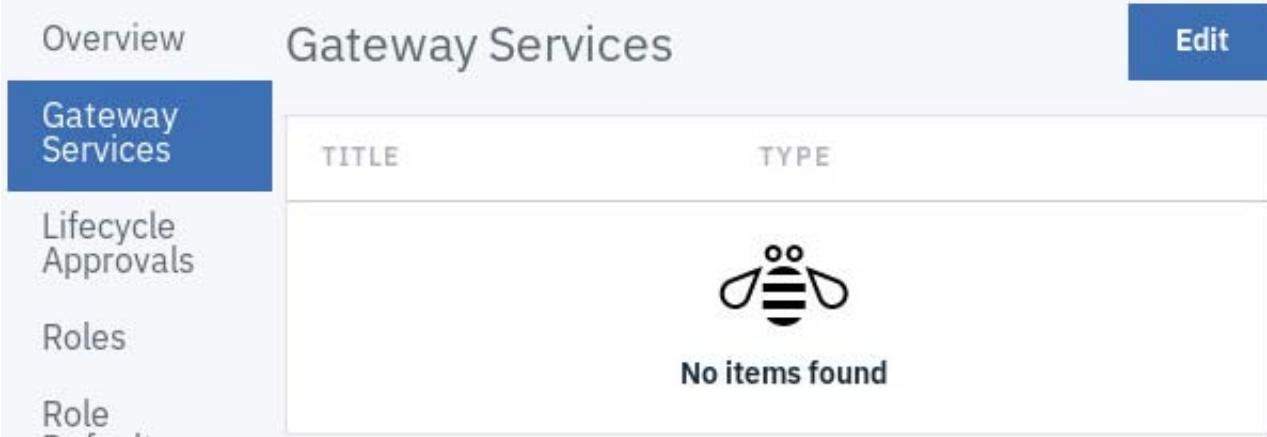
Edit

Title	Staging
Name	staging
	Production Mode <input type="checkbox"/> Off — <input checked="" type="checkbox"/> On
Global Knowledge®	
Spaces	<input type="checkbox"/> Off — <input checked="" type="checkbox"/> On
Application Lifecycle <input checked="" type="checkbox"/> On	

Information

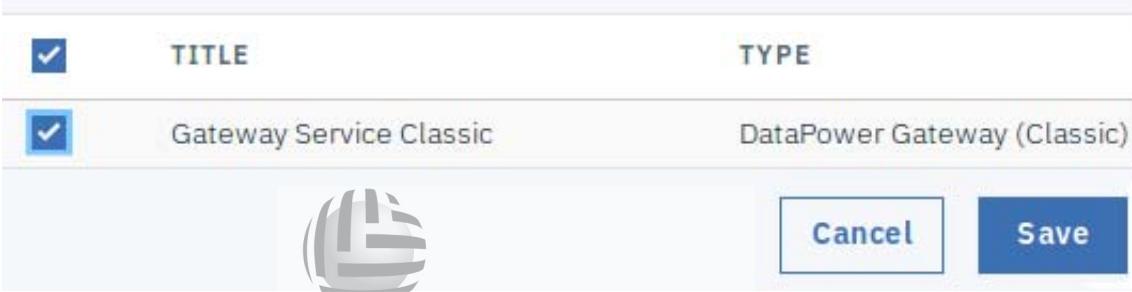
When installing the Management service on the Kubernetes runtime for this course, development mode was chosen in the apiconnect-up.yaml file. Development mode does not support production environments.

- __ b. Change the settings by clicking the **Gateway Services** tab. Click **Edit** to configure the gateway service.



The screenshot shows a navigation sidebar on the left with options: Overview, Gateway Services (selected), Lifecycle Approvals, Roles, and Role Defaults. The main area is titled "Gateway Services" with a large blue "Edit" button at the top right. A table header with columns "TITLE" and "TYPE" is shown, but the body contains no items, with a message "No items found" and a small icon of a person with hands up.

- __ c. On the Enable Gateway Service page, select the Gateway Service that was created earlier in Cloud manager. Then, select **Save**.



The screenshot shows a table with columns "TITLE" and "TYPE". A row for "Gateway Service Classic" (DataPower Gateway (Classic)) has a checked checkbox in the first column. At the bottom right are "Cancel" and "Save" buttons. There is also a small icon of a globe with horizontal stripes.

- __ d. The gateway service is added.

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Gateway Services

Edit

TITLE	TYPE	
Gateway Service Classic	DataPower Gateway (Classic)	⋮

- __ e. Click the **Portal** tab on the settings page. Click **Create**.

__ f. Configure the portal configuration settings:

- Portal Service: **Portal Service**
- URL: <https://portal.think.ibm/think/staging>

Manage / Staging

Create Portal

Portal Service

Configure the portal service for the catalog

Select the portal service to use for this catalog

Portal Service

URL (optional)

https://portal.think.ibm/think/staging

Cancel Create



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Click **Create**.

- __ g. You see a dialog that indicates that the portal is being provisioned.

Portal

Configure the developer portal that is used by application developers to access the APIs in this catalog

✓ Provisioning of the developer portal has been initiated. It will take a few minutes to complete. X

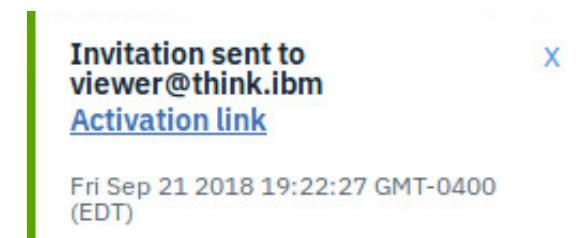
Once complete, you will receive an email containing a link to set the password for the portal admin account.

Portal Service	Portal Service
Portal URL	https://portal.think.ibm/think/staging
User Registries	Staging Catalog User Registry

 A Staging Catalog User Registry is automatically created.

Information

Leave the API Manager user interface running for a while. You might see a message that includes an Activation link similar to the one shown.



Also check the email server for an email message. It is better to use the Activation link than the email link, since the links in the email message have some formatting issues that require a workaround. Click the Activation link if it appears, then continue to [Step 2](#) on page 2-17. Otherwise, when you see the email message in the SMTP server, you can sign out of the API Manager user interface.

2.4. Sign on to the Developer Portal with the admin user

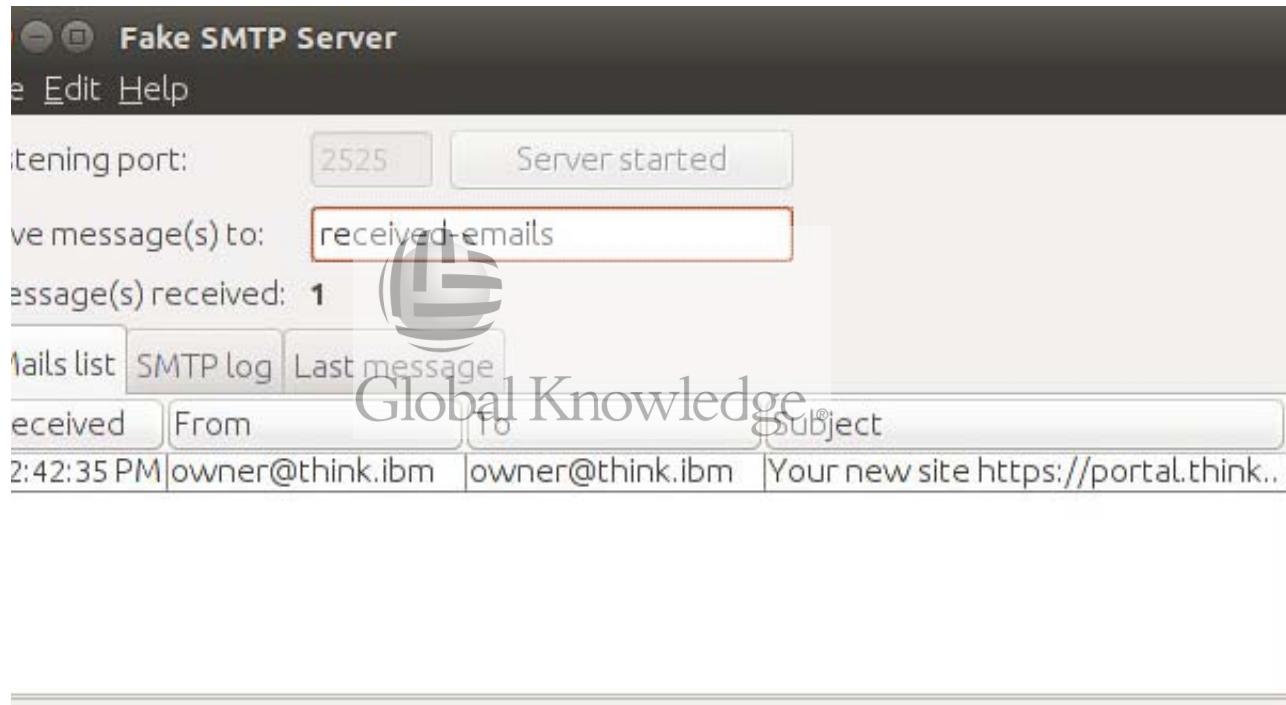
An email message is sent to the email server.



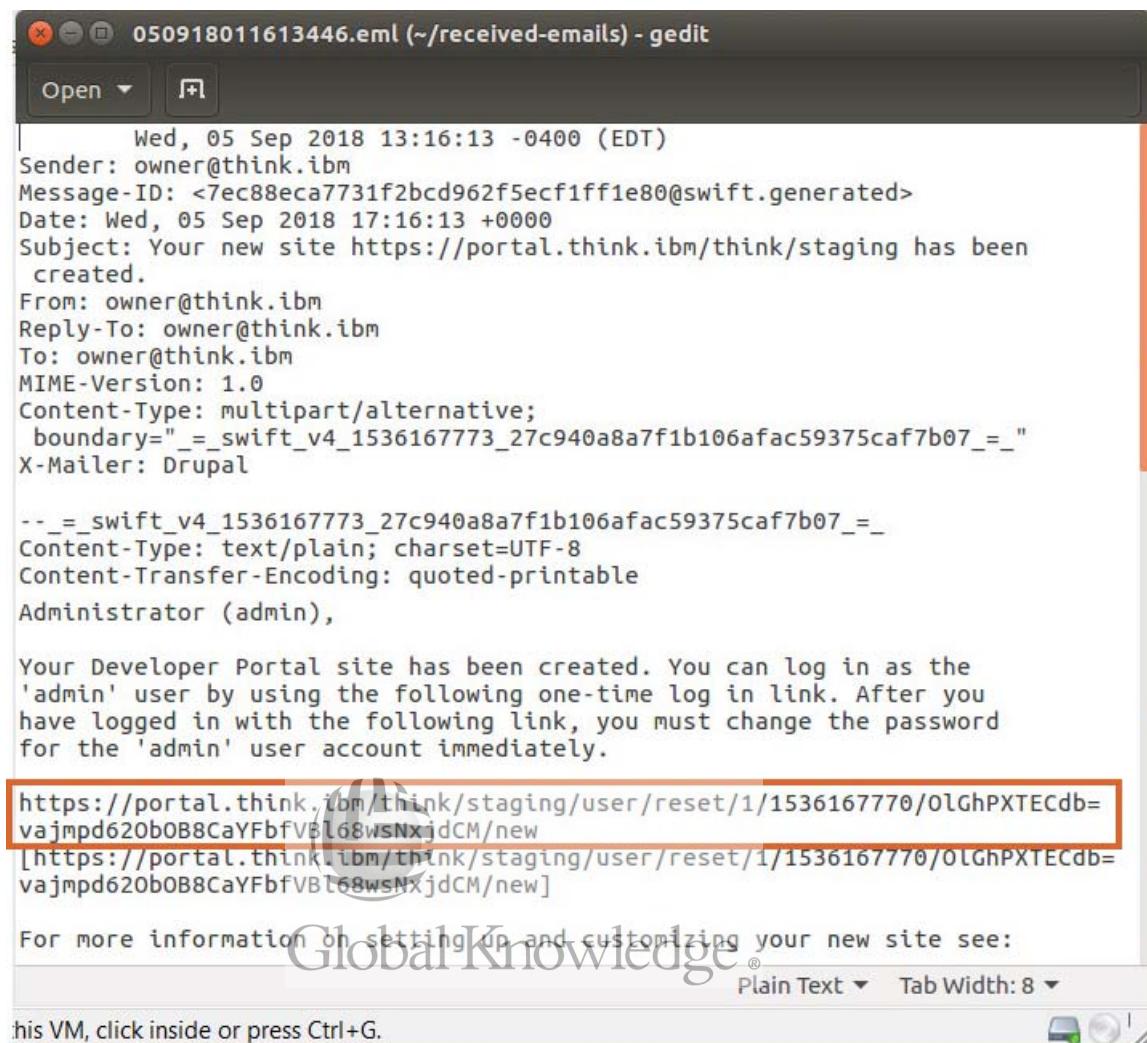
Note

It might take some time for the message to be displayed in the email list. The delay could be in the range of 5 minutes.

- ___ 1. Respond to the email message that API Manager sent.
 - ___ a. Go to the email server that is opened on the desktop.
 - ___ b. Double-click the most recently received message to open it.



- ___ c. Highlight and copy the URL that starts with `https://portal.think.ibm.` and ends with `/new` in the message.



```

Wed, 05 Sep 2018 13:16:13 -0400 (EDT)
Sender: owner@think.ibm
Message-ID: <7ec88eca7731f2bcd962f5ecf1ff1e80@swift.generated>
Date: Wed, 05 Sep 2018 17:16:13 +0000
Subject: Your new site https://portal.think.ibm/staging has been created.

From: owner@think.ibm
Reply-To: owner@think.ibm
To: owner@think.ibm
MIME-Version: 1.0
Content-Type: multipart/alternative;
boundary="=_swift_v4_1536167773_27c940a8a7f1b106afac59375caf7b07_=_
X-Mailer: Drupal

--=_swift_v4_1536167773_27c940a8a7f1b106afac59375caf7b07_=_
Content-Type: text/plain; charset=UTF-8
Content-Transfer-Encoding: quoted-printable
Administrator (admin),

Your Developer Portal site has been created. You can log in as the
'admin' user by using the following one-time log in link. After you
have logged in with the following link, you must change the password
for the 'admin' user account immediately.

https://portal.think.ibm/think/staging/user/reset/1/1536167770/0LGHpxTECdb= vajmpd620b0B8CaYFbfVBl68wsNxjdCM/new
[https://portal.think.ibm/think/staging/user/reset/1/1536167770/0LGHpxTECdb= vajmpd620b0B8CaYFbfVBl68wsNxjdCM/new]

For more information on setting up and customizing your new site see:

```



Important

The email link adds an extra character (=) at the end of the line. You need to perform this workaround to get the one-time login to work.

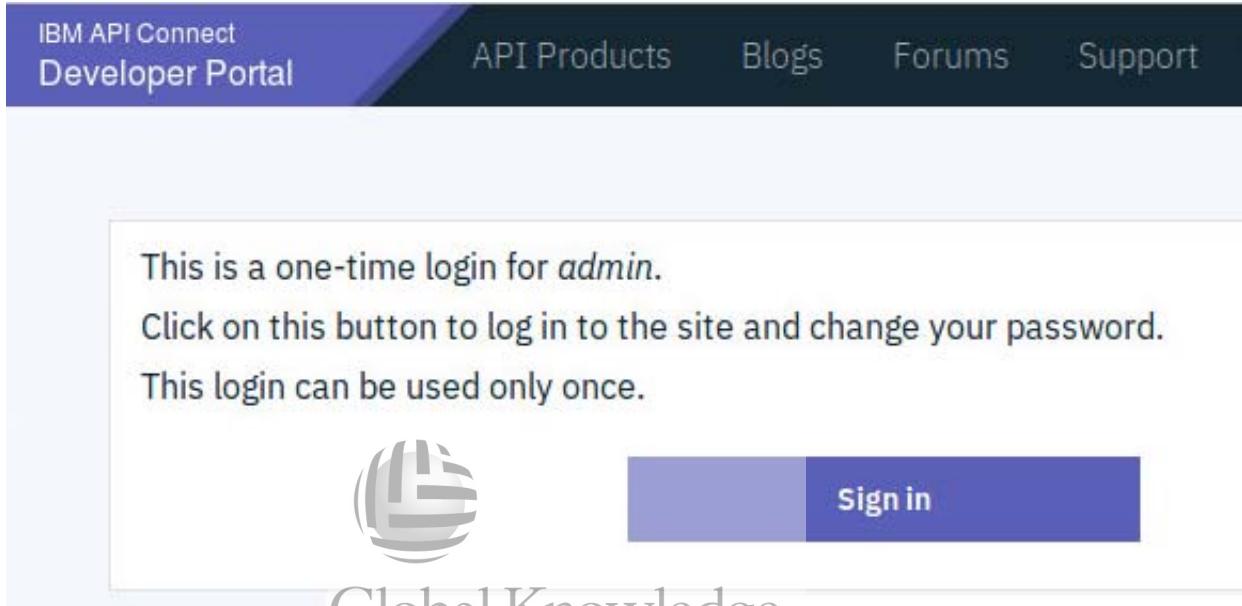
Open another gedit text document and copy and paste the lines from the eml document to the untitled document. Then, remove the offending = character.



*Untitled Document 1 - gedit	050918011613446.eml	*Untitled Document 1
Open		
		https://portal.think.ibm/think/staging/user/reset/1/1536167770/0LGHpxTECdbvajmpd620b0B8CaYFbfVBl68wsNxjdCM/new

Now select everything from the untitled document and copy the URL string into the address area of a new tab in the Firefox browser.

-
- ___ 2. Activate the admin user with the link that was generated by API Manager.
 - ___ a. The link is pasted into the Firefox browser address area.
 - ___ b. In the Firefox browser, you see a page that your connection is not secure. Click **Advanced**. Then, click **Add Exception**. Click **Confirm Security Exception**.
 - ___ c. The Developer Portal opens in the browser with a button for a one-time login to the admin user account.



- ___ d. Click **Sign in**.

- ___ e. You are prompted to change the password for the admin user.

 You have just used your one-time login link. It is no longer necessary to use this link in. Please change your password.

Change your password

Change your password.

Password *

.....

Confirm password *

.....|

 **Submit**

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- ___ f. Type the new password:

- Password: Passw0rd!

- ___ g. Click **Submit**.

- ___ h. You are signed on to the staging Developer Portal as the admin user.

- ___ 3. Sign out of the admin user.
 ___ a. Click the icon on the upper right side of the page. Then, select **Sign out**.

- ___ 4. Sign on to the Developer Portal again to verify the password you recently created.
 ___ b. From the Developer Portal page, click **Sign in**.
 ___ c. On the Sign-in Page, type:
 - User name: admin
 ___ d. Password: Passw0rd!

— e. Click **Sign in**.

You are signed on to the Developer Portal with the admin user with the password that you specified.



2.5. Disable the module in the Developer Portal that verifies real domain names

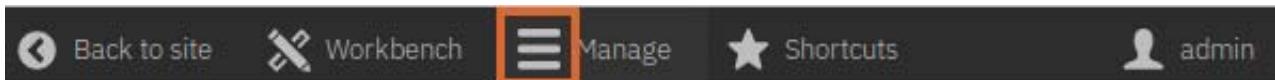
In this part, you uninstall the module that checks whether the email domain has a DNS record during user registration.



Information

In this course, you use simulated domain names and email addresses. You remove the module from the Developer Portal that prevents you from adding a user email address that includes an unrecognized domain name.

- 1. Navigate in the administration menu.
 - a. The Developer Portal administration menu is displayed in the black area above the IBM API Connect Developer Portal menu. The menu is responsive meaning that it changes according to the size of the browser window.



- b. Click the Manage icon to display the Manage submenu.
- c. Click Extend.



- 2. Uninstall the module that checks for a valid domain record.
 - a. Click the **Uninstall** tab on the page.

- __ b. Type check in the Filter by name or description field.

The screenshot shows the Drupal administration interface under the Extend tab. In the top navigation, 'Content', 'Structure', 'Appearance', 'Extend', 'Configuration', 'People', and 'Reports' are visible. Below the navigation, a banner says 'Uninstall' with a star icon. Below the banner are three buttons: 'List', 'Update', and 'Uninstall' (which is highlighted). The main content area shows the breadcrumb 'Home > Administration > Extend'. A red warning box contains the message: 'There is a security update available for your version of Drupal. To ensure the security of your server, you should update immediately! See the [available updates](#) page for more information and to install your missing updates.' Below the warning, a note states: 'The uninstall process removes all data related to a module.' A search bar contains the text 'check'. Below the search bar is a placeholder text: 'Enter a part of the module name or description'. A table lists modules:

UNINSTALL	NAME	DESCRIPTION
<input type="checkbox"/>	Better Exposed Filters	Provides advanced options (such as links, checkboxes, or jQuery) to expose fields from entities to users. The following reason prevents Better Exposed Filters from being uninstalled: • Required by: IBM APIC, Consumer organization, Application, Product, APIC Sub-theme Generator, Mail Subscribers
<input checked="" type="checkbox"/>	check_dns	Checks if email domain has DNS Record before user registration

Then, select the option to uninstall the `check_dns` module.

- __ c. Scroll down, then click **Uninstall**.
 __ d. On the Confirm uninstall page click **Uninstall**.

Confirm uninstall

Home > Administration > Extend > Uninstall

There is a security update available for your version of Drupal. To ensure the security of your server, you should update immediately! See the [available updates](#) page for more information and to install your missing updates.

The following modules will be completely uninstalled from your site, and *all data from these modules will be lost!*

- `check_dns`

Would you like to continue with uninstalling the above?

Uninstall

Cancel

- __ e. The module is uninstalled.



Home » Administration » Extend

The selected modules have been uninstalled.

You can now add users with non-standard email domains to the Developer Portal.



Note

The DNS record check is a security feature and should not be disabled in production environments.

- __ 3. Sign out of the Developer Portal.



Note

You might need to resize the browser window to see the sign-out option on the right side of the page.

- ___ 4. You see the public page for the Developer Portal of the Staging catalog.

The screenshot shows a web browser window with the URL <https://portal.think.ibm/think/staging/>. The page has a blue header with navigation links for 'Connect', 'API Products', 'Blogs', 'Forums', 'Support', and 'Create account'. A search bar is also present. The main content area features a large graphic of a bee and the text 'Brace yourselves. APIs are coming.' Below this, it says 'Explore, subscribe to and be creative with our APIs. We can't wait to see what you come up with!' and a 'Explore API Documentation' button.

- ___ 5. Close the opened email messages.
___ 6. Click **Clear all** in the email server to clear the incoming message list.
___ 7. Leave the email server running on the desktop.



2.6. Create a Developer Organization in API Manager

In this part, you assume the role of the owner of the provider organization. You create developer organizations that are given access to the Products and APIs that you publish to the Developer Portal.

- __ 1. Sign on to the API Manager.
 - __ a. In the browser address area, type the URL:

`https://manager.think.ibm/manager/`

Sign on to API Manager with the credentials of the owner of the Sales organization:

- User: ThinkOwner
- Password: Passw0rd!

With Home selected in the navigation menu, click **Manage Catalogs**.

Click the **Staging** catalog.

- __ 2. Add the Developer Organization.
 - __ a. Click the **Consumer Organizations** in the navigation menu.

TITLE	OWNER	STATE
		No items found

- __ b. Click **Add**. Then, click **Create Organization**.

__ c. In the Add organization dialog box, type or select:

- Title: Ordinal
- Name: ordinal
- User registry: Staging Catalog User Registry
- Specify Owner: **New User**
- User name: OrdinalOwner
- Email: ordinalowner@consumer.ibm
- First Name: Ordinal
- Last Name: Owner
- Password: Passw0rd!

Consumer Organization

Enter details of the consumer organization

Title

Ordinal

Name

ordinal



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Owner

Specify owner of the consumer organization

User registry

Staging Catalog User Registry



Existing New User

Username

OrdinalOwner

Click **Create**.

- ___ d. The organization is created and added to the list of consumer organizations.

Manage / Staging

Consumer Organizations

Consumer organization Ordinal created
OrdinalOwner has been assigned the owner
Thu Aug 02 2018 13:22:17 GMT-0400 (EDT)

TITLE	OWNER	STATE	⋮
Ordinal	Ordinal Owner ordinalowner@consumer.ibm	Enabled	⋮

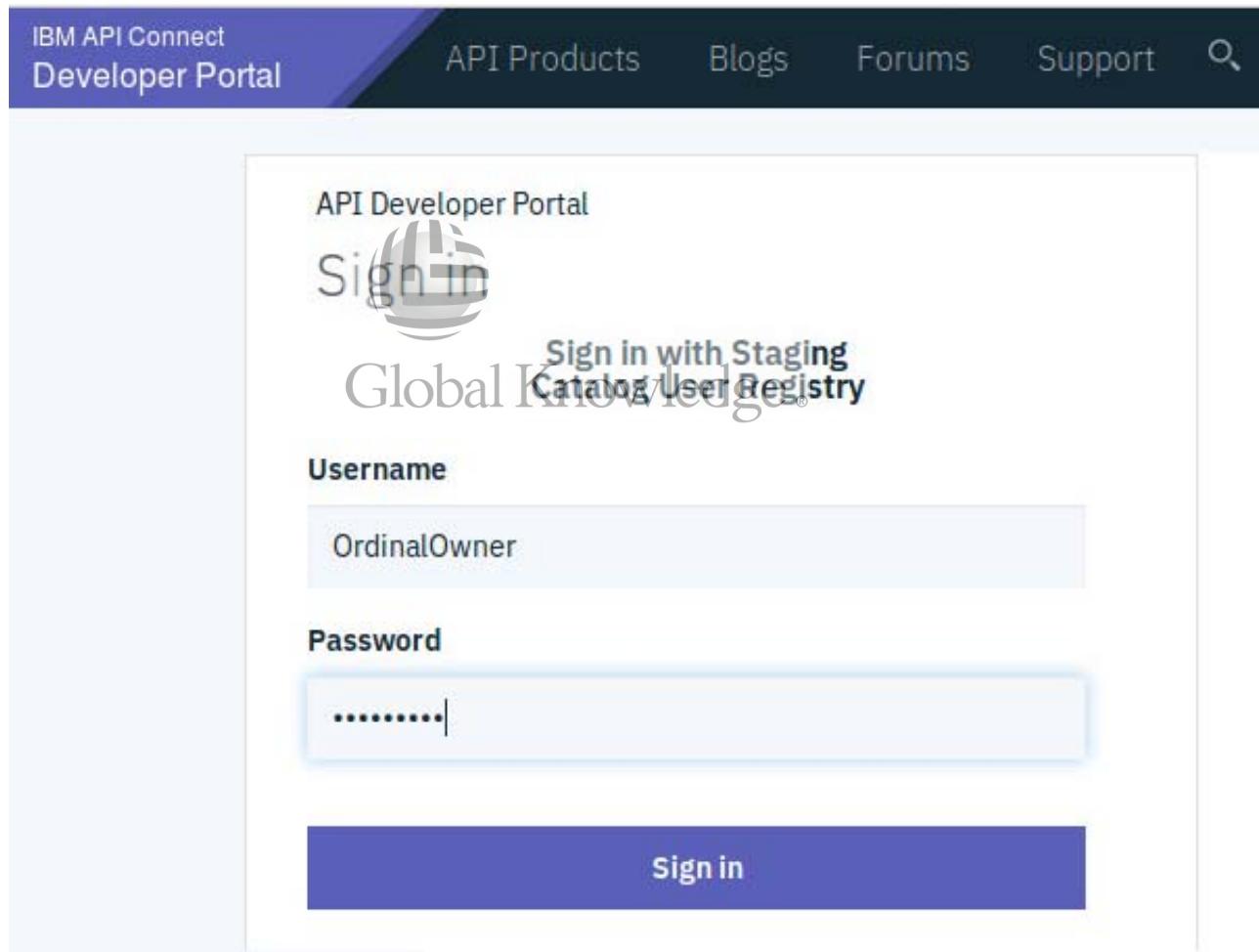
- ___ e. The OrdinalOwner user is added to the Staging Catalog user registry, and the user is able to sign on to the Staging catalog Developer Portal.



2.7. Sign on to the Consumer Organization in the Developer Portal

In this part, you sign on to the Developer Portal with the newly created owner of the Consumer Organization.

- __ 1. Sign on to the Developer Portal.
 - __ a. In another tab of the browser, type the URL for the staging Developer Portal in the address area:
`https://portal.think.ibm/think/staging/`
 - __ b. Click **Sign in**.
 - __ c. In the sign-in prompts, type:
 - User name: `OrdinalOwner`
 - Password: `Passw0rd!`

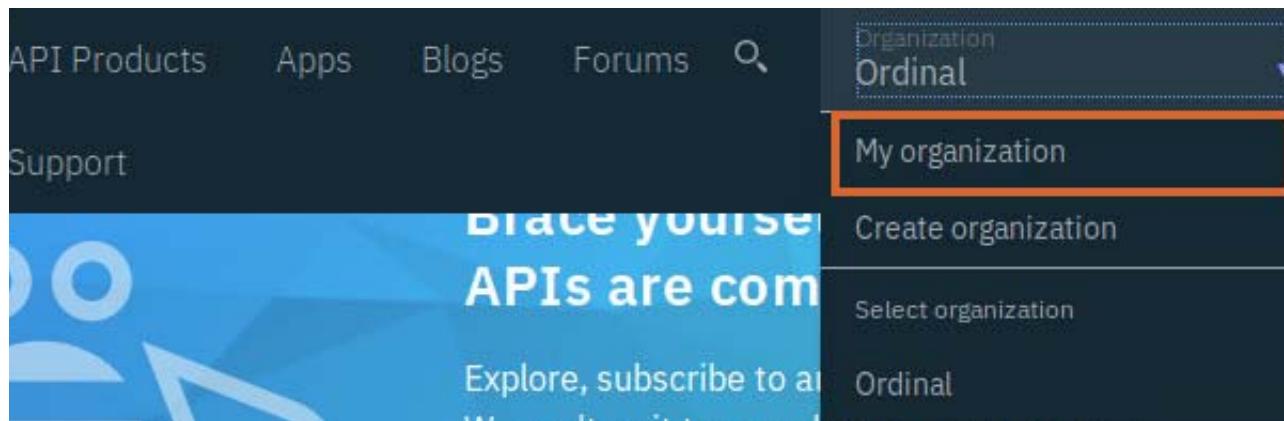


- __ d. Click **Sign in**.
- __ e. You are signed on to the Developer Portal as the owner of the Ordinal Organization.

2.8. Create a user in the Developer Portal

You are signed in on the Portal with the developer organization owner account. The organization Ordinal is displayed at the top of the page.

- 1. Open the settings for the organization.
- a. Click the drop-down list from the user account in the Developer Portal. Then, select **My organization**.



- 2. Ensure that the Fake SMTP Server is still running and that the Server is started.
- 3. Add a user.
- a. In the Manage dialog box, click **Invite**.

A screenshot of the 'Manage' dialog box. At the top, there are tabs for 'Manage' and 'Analytics'. Below the tabs, the 'Global Knowledge' logo is displayed. In the main area, there is a section titled 'Members' with a blue 'Invite' button. A placeholder message 'Members will be listed here' is shown below the table. The table has columns for 'NAME', 'ADMINISTRATOR', 'DEVELOPER', 'VIEWER', and 'STATUS'. There is one row in the table with a placeholder icon for the user profile.

NAME	ADMINISTRATOR	DEVELOPER	VIEWER	STATUS

Members will be listed here

___ b. Specify the properties for the user:

- Email address: appdeveloper@consumer.ibm
- Assign Roles: **Developer**

Invite a user to join your consumer organization

Email *

appdeveloper@consumer.ibm

Assign Roles

Administrator

Developer

Viewer



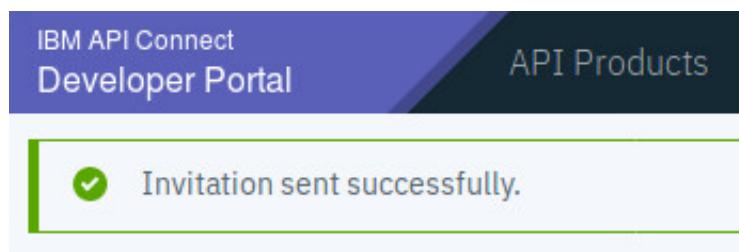
Cancel

Submit

Global Knowledge®

Click **Submit**.

___ c. You see a message that the invitation was successfully sent.



Ordinal

Manage Analytics

___ 4. Sign out the Ordinal Owner from the Developer Portal. This sign-out is necessary so that you can sign on with the new user.

- ___ 5. Open the email invitation in the email server. You might need to wait up to 5 minutes for the email to be displayed in the email list box.
 - ___ a. Double-Click the latest message in the email server to display the contents of the email.
 - ___ b. Highlight and copy the URL that starts with `https://portal.think` and ends with the end of the message.



Important

The email link adds an extra character (=) at the end of the line, and 3D line feed characters that need to be edited out. Do not remove the (=) before the 3D characters. The characters to be removed are highlighted. You need to perform this workaround to get the one-time login to work.

```

Thu, 06 Sep 2018 15:44:16 -0400 (EDT)
Content-Type: text/plain
From: APIC Administrator <admin@think.ibm>
To: appdeveloper@consumer.ibm
Subject: Invitation to an API consumer organization in the Staging
developer portal
Message-ID: <1309804c-5166-8ef2-87c4-e632f9b23ea4@think.ibm>
Content-Transfer-Encoding: quoted-printable
Date: Thu, 06 Sep 2018 19:44:16 +0000
MIME-Version: 1.0

Hello,

The administrator for the Ordinal API consumer organization in the =
Staging
developer portal has invited you to the organization.

To continue, please use the link below:



Open another gedit text document and copy and paste the lines from the eml document to the untitled document. Then, remove the offending characters. The edited document ends with two = characters.


```

060918034416461.eml	x	*Untitled Document 1
<code>tps://portal.think.ibm/think/staging/user/invitation?</code>		
<code>tivation=ZXlKaGJHY2lPaUpJVXpJMU5pSXNJbLI1Y0NjNkrcFhWQ0o5LmV5SnFkR2tpT2lJeE4ySxhPV0l5T0Mw</code>		

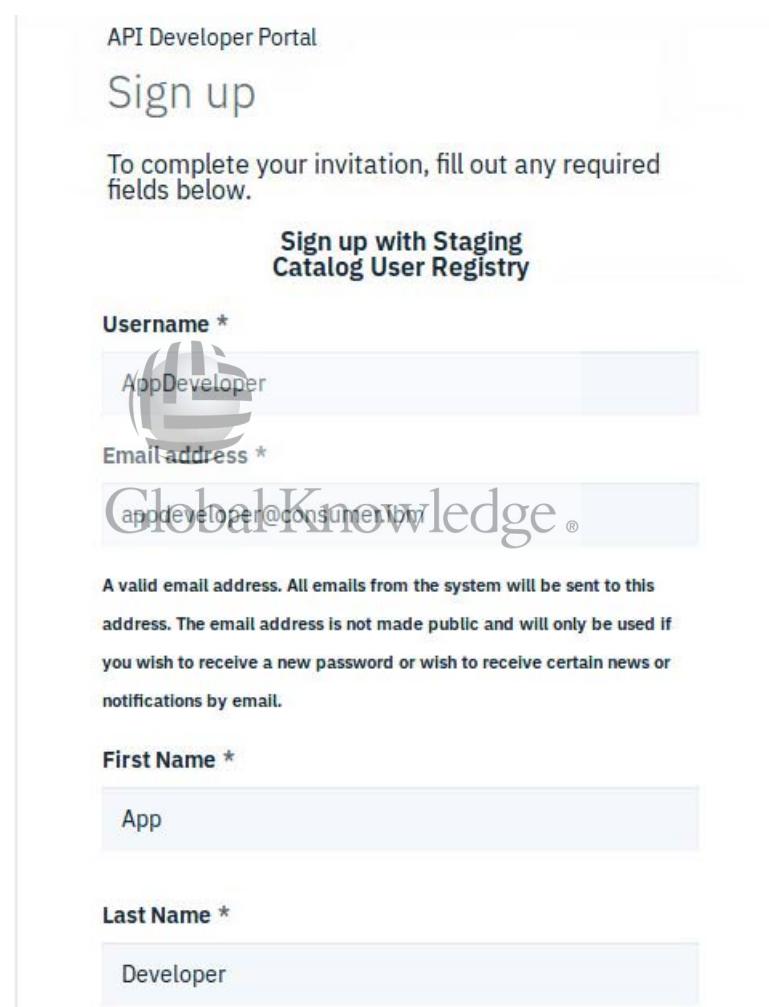
Now select everything from the untitled document and copy the URL string into the address area of a new tab in the Firefox browser.

The sign-up page to register the user is displayed in the browser.

6. Complete the user registration in the Developer Portal.

a. In the account activation form, type:

- User name: AppDeveloper
- Email address: appdeveloper@consumer.ibm
- First Name: App
- Last Name: Developer
- Password: Passw0rd!
- Confirm password: Passw0rd!



The screenshot shows the 'Sign up' page of the API Developer Portal. The title 'API Developer Portal' is at the top, followed by 'Sign up'. A sub-header says 'To complete your invitation, fill out any required fields below.' Below this is a button labeled 'Sign up with Staging Catalog User Registry'. The form has four fields: 'Username *' with 'AppDeveloper' entered, 'Email address *' with 'appdeveloper@consumer.ibm' entered, 'First Name *' with 'App' entered, and 'Last Name *' with 'Developer' entered. A note above the email field states: 'A valid email address. All emails from the system will be sent to this address. The email address is not made public and will only be used if you wish to receive a new password or wish to receive certain news or notifications by email.'

Type the required values for the captcha.

Password *

Password strength: Weak

Confirm password *

Your password meets the password policies required for this site



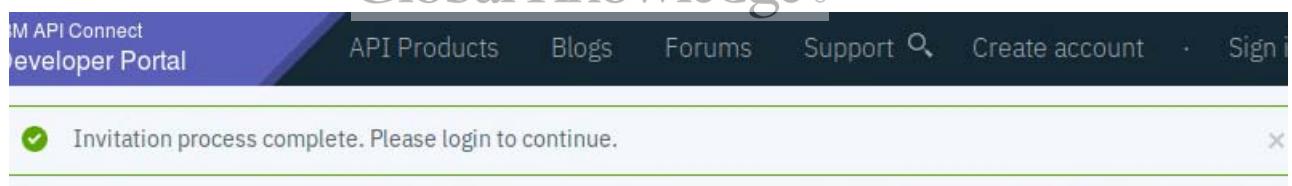
What code is in the image? *

Enter the characters shown in the image.

Sign up

Click **Sign up**.

The public Developer Portal page is displayed with message that the invitation process is complete.



7. Sign in to the Developer Portal with the newly created user.

- __ b. Click **Sign in**.
- __ c. In the Sign-in dialog box, type:
 - User name: AppDeveloper
 - Password: Passw0rd!

Click **Sign in**.

You are signed in on the Portal as a developer in the Ordinal Organization.

- ___ 8. Select **My account** from the AppDeveloper icon.

The screenshot shows the top navigation bar of the API Connect Developer Portal. On the left is the 'Developer Portal' logo. To the right are links for 'API Products', 'Apps', 'Blogs', 'Forums', and 'Support'. Further right is a dropdown labeled 'Organization Ordinal' with a blue 'A' icon. A vertical ellipsis menu is open, showing options like 'Take', 'My account' (which is highlighted in orange), and 'Sign out'.

- ___ 9. The user details are displayed.

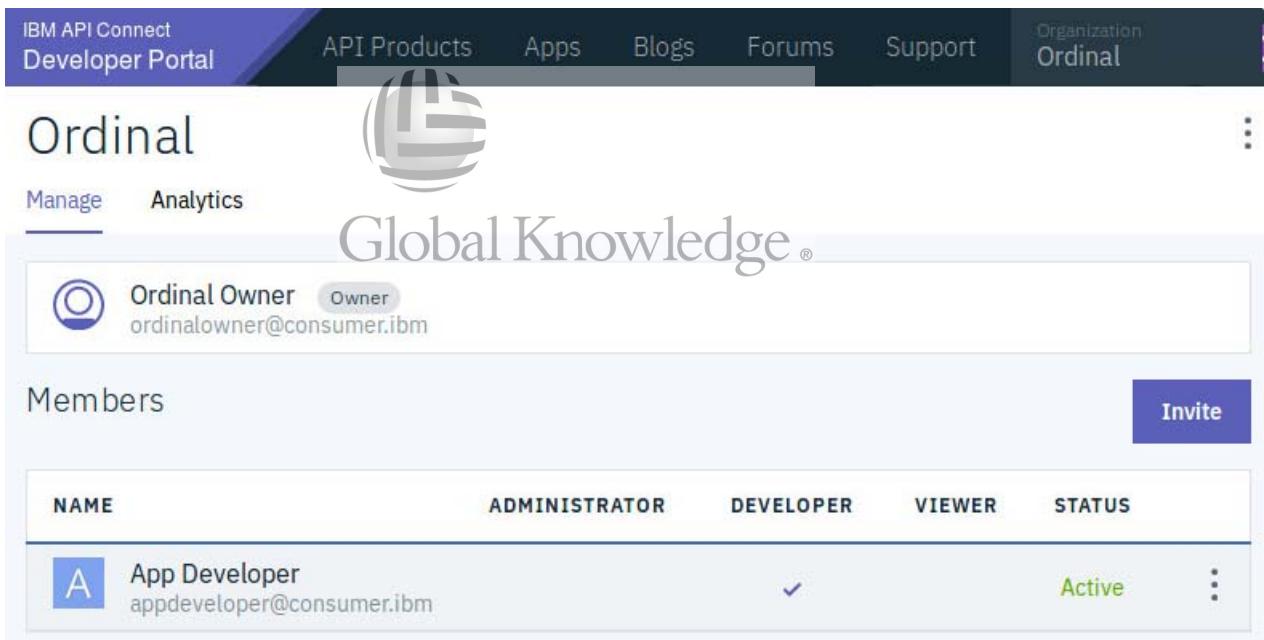
The screenshot shows the 'AppDeveloper' profile page. On the left, there's a sidebar with 'Edit', 'Change Password', and a large 'View' button (which is highlighted in blue). In the main area, the user's details are listed: 'First Name' (App), 'Last Name' (Developer), and 'Member for 10 minutes 43 seconds'. Below this is a 'Picture' section featuring a large blue square with a white stylized letter 'A' in the center. At the bottom left is the Global Knowledge logo.

- ___ 10. Sign out of the AppDeveloper on the Developer Portal.

2.9. Review the organization in the Developer Portal

Now that you have added a user in the Developer Portal you sign on as the owner of the consumer organization to review the list of users.

- 1. Sign on to the Developer Portal.
 - a. With the staging Developer Portal in the address area:
<https://portal.think.ibm/think/staging/>
 - b. Click **Sign in**.
 - c. In the sign-in prompts, type:
 - User name: OrdinalOwner
 - Password: Passw0rd!
 Click **Sign in**.
- 2. Click the drop-down list from the Ordinal Organization in the Developer Portal. Then, select **My organization**.
- 3. The page displays the owner of the organization and the members.



The screenshot shows the IBM API Connect Developer Portal interface. At the top, there's a navigation bar with links for 'API Products', 'Apps', 'Blogs', 'Forums', 'Support', and 'Organization Ordinal'. Below the header, the word 'Ordinal' is displayed next to a globe icon. A horizontal menu bar has 'Manage' underlined and 'Analytics'. The main content area is titled 'Global Knowledge'. It shows a card for 'Ordinal Owner' (owner, ordinalowner@consumer.ibm). Below this, a table lists a member named 'App Developer' (appdeveloper@consumer.ibm) with status 'Active'. The table columns are NAME, ADMINISTRATOR, DEVELOPER, VIEWER, and STATUS.

NAME	ADMINISTRATOR	DEVELOPER	VIEWER	STATUS
A App Developer appdeveloper@consumer.ibm	✓			Active

- 4. Sign out of the owner on the Developer Portal.



Information

The roles that you just viewed are API Connect defined roles for the Developer Portal. A Developer can register applications, subscribe to plans, and test APIs. A viewer can view applications and application activity.

The default roles for consumer organizations are defined in the Cloud Manager. You reviewed these roles in an earlier exercise. See the topic ["Review the provider and consumer organization settings and user registries"](#) on page 1-23.

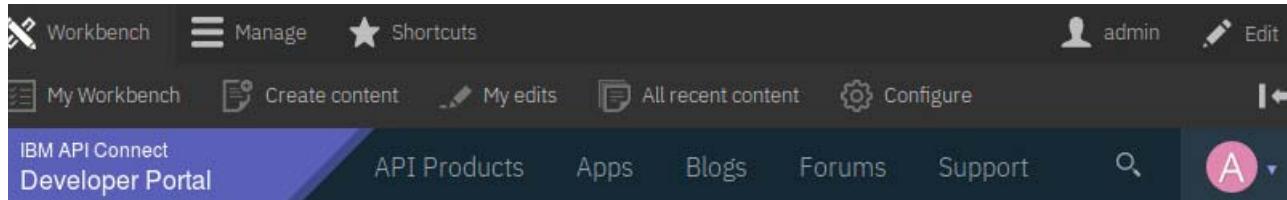
You can use more roles to fine-tune the administration and security of the Drupal components of the Developer Portal, and you can set them with the admin user of the Developer Portal. You review that next.



2.10. Manage user permissions in the Developer Portal

The admin user can manage the users, roles, and permissions for the Drupal components of the Developer Portal.

- ___ 1. Log in to the Staging Developer Portal <https://portal.think.ibm/think/staging/> with the *admin* user that was created earlier in the exercise.
- ___ 2. The black administration menu is displayed either as a drop-down menu, or expanded when the browser is maximized.



- ___ 3. List the users and permissions in the Developer Portal for the Staging catalog.
 - ___ a. From the administration menu, select the **Manage** collapsed icon. Then, select **People > Permissions**.



- __ b. Click the **List** tab to view the list of users.

People 

List **Permissions** **Roles** **Email**

Home » Administration

Name or email contains	Status	Role
<input type="text"/>	- Any - 	- Any - 

Permission
 - Any - 

Filter

Action
 Add the Administrator role to the selected user(s) 

Apply to selected items 

<input type="checkbox"/> USERNAME	STATUS	ROLES	MEMBER FOR
<input type="checkbox"/> AppDeveloper	Active		1 hour 40 minutes
<input type="checkbox"/> OrdinalOwner	Active		1 day 20 hours
<input type="checkbox"/> admin	Active	<ul style="list-style-type: none"> • Administrator • Superuser 	2 days

The users that were created earlier are displayed.

- __ 4. Currently, the AppDeveloper and OrdinalOwner have authenticated user permissions only for the Drupal components in the Developer Portal.
- __ 5. Add the forum moderator permissions to the AppDeveloper.
- __ a. With the **List** tab of the People option selected, select the **AppDeveloper** check box.

- ___ b. Then, from the Action list, select **Add the Forum Moderator role to the selected user(s)**.

Action

Add the Forum Moderator role to the selected user(s) ▾

Apply to selected items

<input type="checkbox"/>	USERNAME	STATUS	ROLES	MEMBER FOR
<input checked="" type="checkbox"/>	AppDeveloper	Active		1 hour 40 minutes
<input type="checkbox"/>	OrdinalOwner	Active		1 day 20 hours
<input type="checkbox"/>	admin	Active	<ul style="list-style-type: none"> • Administrator • Superuser 	2 days

Apply to selected items

Click **Apply to selected items**.
The forum moderator role is added to the user.

<input type="checkbox"/>	USERNAME	STATUS	ROLES	MEMBER FOR
<input type="checkbox"/>	AppDeveloper	Active	<ul style="list-style-type: none"> • Forum Moderator 	1 hour 53 minutes
<input type="checkbox"/>	OrdinalOwner	Active		1 day 20 hours
<input type="checkbox"/>	admin	Active	<ul style="list-style-type: none"> • Administrator • Superuser 	2 days

- ___ c. Sign out the admin user from the Developer Portal.

End of exercise

Exercise review and wrap-up

In the exercise, you worked with the API Manager and Developer Portal user interfaces.

First, you created a Staging catalog and configured the portal settings.

You activated the admin user for the Developer Portal of the Staging catalog.

Next, you added a Consumer Organization in API Manager. The owner of the Consumer Organization is automatically added to the Developer Portal, you signed on to the Developer Portal as the organization owner and you added an application developer user.

Finally, you added the forum moderator role to the user from the administration options in the Developer Portal.



Exercise 3. Defining an API and Product in API Manager

Estimated time

00:45

Overview

In this exercise, you work with the API Manager web user interface. You sign in to the API Manager web interface in the role of the organization owner for the API provider. You define an API interface by importing a set of API REST operations and data definitions in an OpenAPI (Swagger V2.0) document. You create a plan and a Product. You use the assembly feature in API Manager to define the operations that are made available on the gateway. You then test the assembly by publishing it to the Sandbox catalog.

Objectives

After completing this exercise, you should be able to:

- Sign in to API Manager
- Create an API by importing 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 server
- Specify the target URL for the operation
- Start the back-end NodeJS application
- Test the API in API Manager

Introduction

In many cases, an API Developer creates an API in the API Designer. In this exercise, you use the API Manager to create a draft API by importing an OpenAPI Swagger definition. You create a plan and a Product for the API. You test the API in the Sandbox catalog of API Manager.

Requirements

This exercise requires a workstation with internet access. You can complete this exercise by using the Ubuntu Linux course image that is supplied with the course.

Before doing this exercise, you must complete exercises 1 and 2.

Exercise instructions

Preface

Follow the instructions that are provided under the heading "Before you begin" in the Exercises description at the start of this guide.



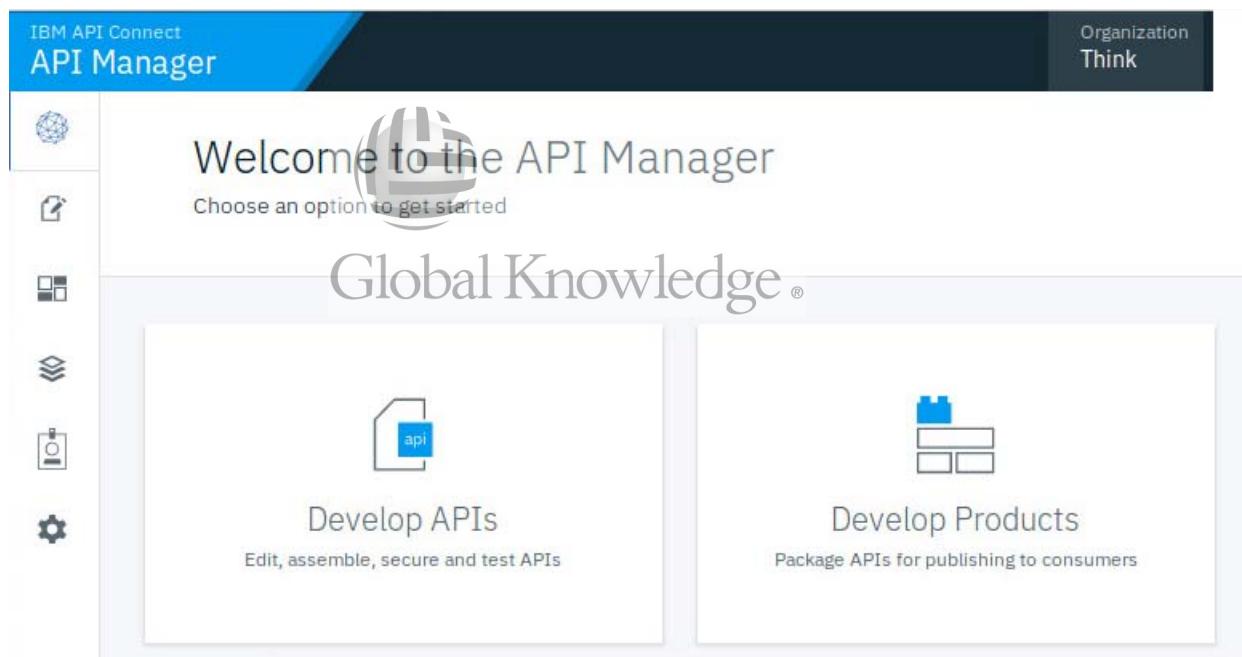
3.1. Create an API, Product, and plan in API Manager

You can create APIs by using the API Designer application, or by using the browser-based API Manager user interface. In this part, you create the API in API Manager by importing an OpenAPI (Swagger 2.0) file.

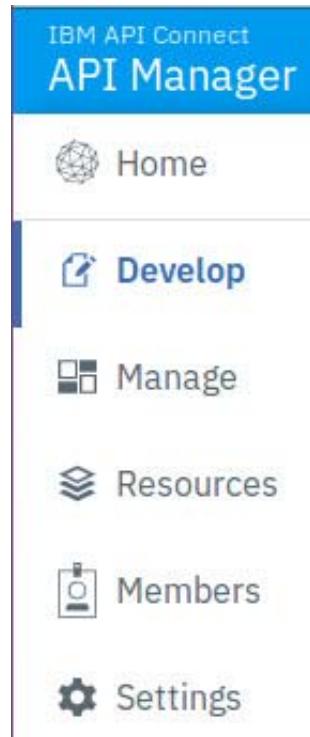
- 1. Open the API Manager web user interface.
 - a. Open a Firefox web Browser window.
 - b. Open API Manager with the URL:
`https://manager.think.ibm/`
 - c. Sign on to API Manager with the credentials of the owner of the Think organization:
 - User: ThinkOwner
 - Password: Passw0rd!

Click **Sign in**.

You are signed in to API Manager. The home page is displayed.



- ___ d. Click the **Develop** option from the navigation menu.

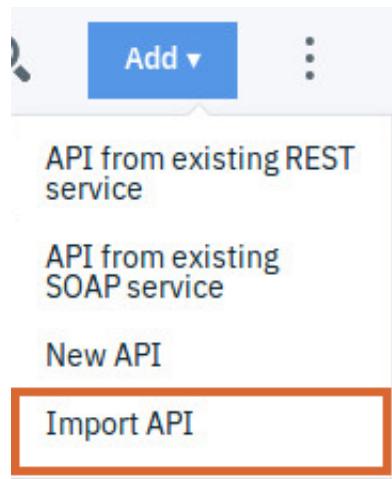


You see that currently no draft APIs or products are in API Manager.

A screenshot of the API Manager interface. At the top, there are tabs for "APIs" (selected) and "Products". To the right are icons for search, "Add", and more options. The main area shows a section titled "Global Knowledge" with a subtitle "LAST MODIFIED". Below this, there is a placeholder icon and the text "No items found".

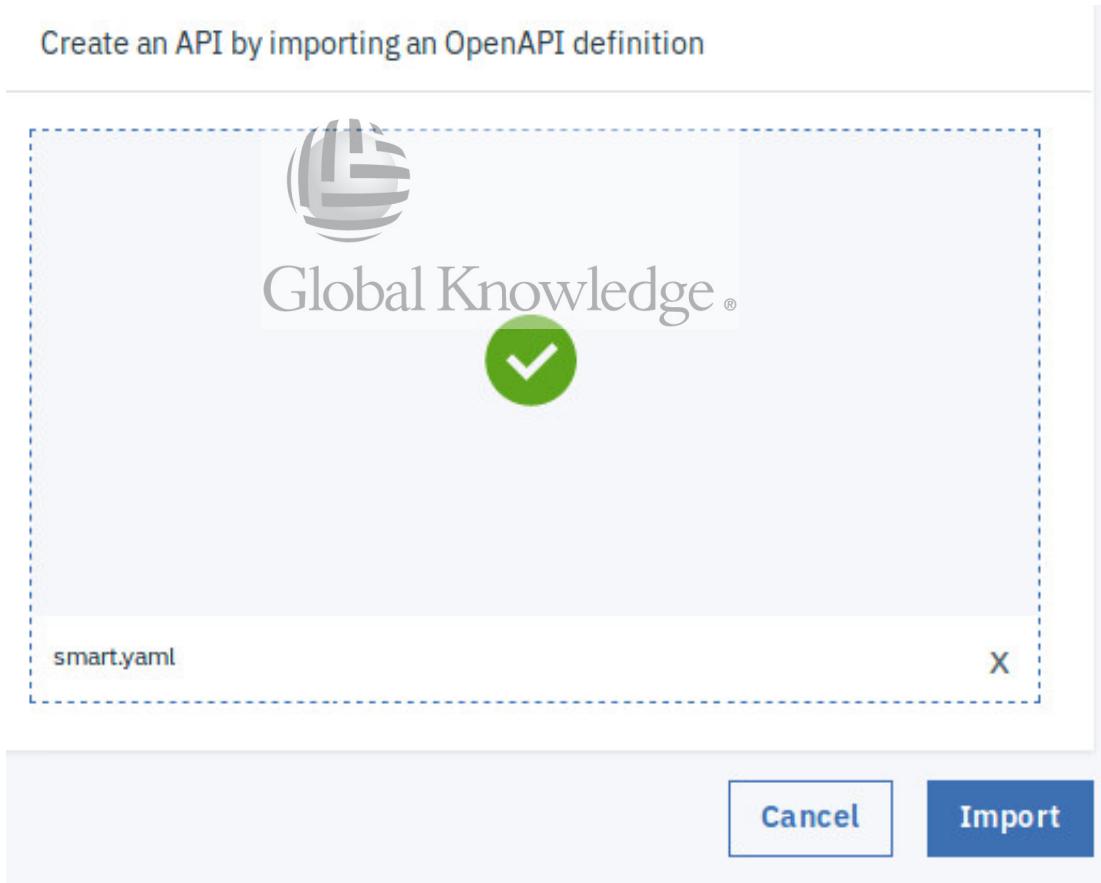
- ___ 2. Create an API by importing an OpenAPI file.
___ a. With the **APIs** tab selected, click the **Add** icon.

- ___ b. Select the **Import API** option from the menu.



- ___ c. In the Import API dialog box, click **Browse**.
___ d. Then, navigate to:
/home/localuser/lab_files/smart/smart.yaml
Click **Open**.

Create an API by importing an OpenAPI definition



- ___ e. Click **Import**.

___ f. The API is created and displayed in the Design tab on the page.

The screenshot shows the IBM APIM S-Mart interface. The top navigation bar includes 'Develop', 'IBM APIM S-Mart 1.0.0', 'Design' (which is selected), 'Source', and 'Assemble'. A network graph icon is also present. On the left, a sidebar titled 'API Setup' lists 'Security Definitions', 'Security', 'Paths', 'Definitions', 'Properties', 'Target Services', 'Categories', and 'Activity Log'. The main content area is titled 'Info' with the sub-instruction 'Enter the API summary details'. It contains fields for 'Title' (set to 'IBM APIM S-Mart'), 'Name' (set to 'ibm-apim-smart'), and 'Version' (set to '1.0.0'). Below these is a 'Description (optional)' section containing the text 'API resources related to the retail industry.' At the bottom, there is a link to download the 'Swagger JSON definition'.

- ___ 3. Review the properties of the imported API.
- ___ a. With the Design tab selected, scroll down to view the properties of the API. Notice that the **Base path** value is set to /smart/v1. Also, notice the **Lifecycle values**.

Develop

IBM APIM Smart 1.0.0

Design Source Assemble

API Setup

- Security Definitions
- Security
- Paths
- Definitions
- Properties
- Target Services
- Categories

Lifecycle

Lifecycle (optional)

Realized

Enforced
 Testable
 CORS
 Application authentication



Global Knowledge®

- ___ b. Scroll to the bottom of the page for the API Setup. You notice that the **Gateway Type** for this API defaults to DataPower Gateway (Classic).

Gateway Type

Select the gateway type for this API

- DataPower Gateway (Classic)
 DataPower API Gateway

Cancel

Save

- ___ 4. Change the security settings for the API.
- ___ a. Click **Security** in the list of API options.

- __ b. With the Security selected, click **Add**.

API Setup **Security**

Security Definitions Security definitions selected here apply across the API, but can be overridden for individual operations. [Learn more](#)

Add

SECURITY DEFINITIONS	ORDER	DELETE
Paths		

- __ c. Select the **clientIdHeader apiKey** in the security definitions.

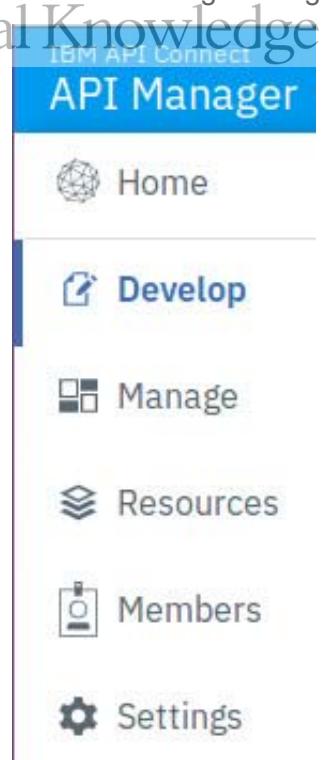
SECURITY DEFINITIONS	ORDER	DELETE
<input checked="" type="checkbox"/> clientIdHeader apiKey		

Save

- __ d. Click **Save** to save the changes to the imported API.

- __ 5. Create a Product and plan for the API.

- __ a. Click the Develop option in the API Manager navigation menu.



- ___ b. The list of APIs is displayed.

	TITLE
<input type="checkbox"/>	IBM APIM SMart 1.0.0

- ___ c. Click the **Products** tab.

	TITLE	LAST MODIFIED
No items found		

- ___ d. Click **Add** to add a Product. Then, click **New Product**.

- ___ e. Set the Product values:

- Title: Smart Product
- Name: smart-product
- Version: 1.0.0

Click **Create**.

The Product is created.

- __ f. With the Product open in the Design view, click **APIs**. Then, click **Edit**.

The screenshot shows the 'Smart Product' interface in the 'Design' view. At the top, there are tabs for 'Develop' and 'Design'. Below the tabs, the product name 'Smart Product' and version '1.0.0' are displayed. A navigation bar on the left includes 'Product Setup', 'APIs' (which is selected and highlighted in blue), 'Plans', and 'Categories'. On the right, there is an 'Edit' button. The main area is titled 'APIs' and contains a table with columns 'TITLE', 'SUMMARY', and 'VERSION'. The table is empty, showing a placeholder icon of a bee and the message 'No items found'.

- __ g. Check the box to add IBM APIM SSmart to the Product.

A modal dialog box titled 'Add APIs to Product' is shown. It features a logo for 'Global Knowledge'. Inside the dialog, there is a table with two rows. The first row has a checked checkbox next to 'IBM APIM SSmart' and a 'VERSION' column showing '1.0.0'. The second row has an unchecked checkbox next to 'IBM APIM SSmart' and a 'VERSION' column showing '1.0.0'. At the bottom of the dialog are 'Cancel' and 'Save' buttons.

Click **Save**.

The Product is updated.

- __ h. Click the **Plans** tab in the Smart Product. A Default Plan is already created.

- __ i. Click the ellipsis (three dots) in the Plans view. Then, click **Edit**.

The screenshot shows the 'Smart Product 1.0.0' interface. The 'Plans' tab is active and highlighted with a blue box. A context menu is open over the 'Default Plan' row, with the 'Edit' option highlighted and also enclosed in a red box.

- __ j. Notice the details for the Default Plan. The rate limits include 100 calls per hour.

The screenshot shows the 'Smart Product 1.0.0' interface with the 'Plans' tab selected and highlighted with a blue box. The 'Default Plan' details are displayed, including the name 'default', a placeholder description 'Global Knowledge', and rate limit settings of 100 calls per hour.

NAME	CALLS	PER	UNIT
default	100	1	hour

- __ k. Click **Cancel** to accept the default plan values.

You created a Product with a default plan, and added the API whose lifecycle you manage in a later exercise.

3.2. Create an assembly to control the processing of the API

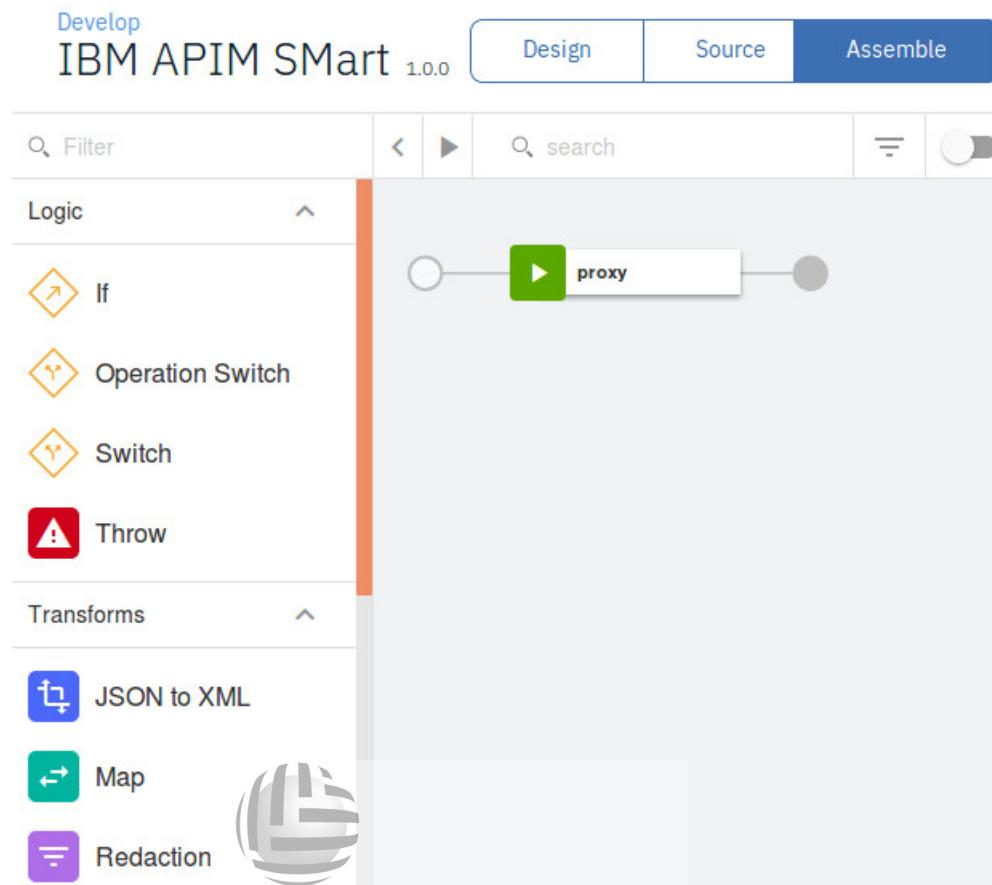
You created an API from an OpenAPI definition. In this part, you assemble the API operations to control aspects of processing in the gateway server.

You expose a subset of the REST operations for the API that was imported into API Manager by creating an assembly of these operations. The assembly includes logic constructs and calls to the back-end REST services.

- 1. Open the API definition in API Manager.
 - a. From the navigation menu, click the Develop icon.
 - b. Click the IBM APIM SSmart 1.0.0 link to open the API.
- 2. Create an assembly to control which API operations are callable from the gateway.
 - a. With the IBM APIM SSmart API opened on the Develop navigation item in API Manager, click the **Assemble** tab.



- ___ b. A default assembly flow opens on the **Assemble** tab with a start and end icon and a proxy policy.



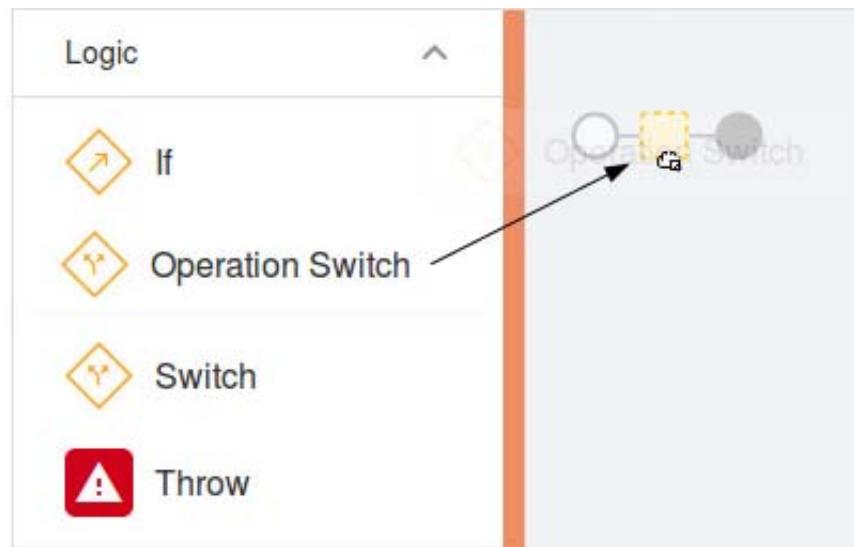
The policy palette is displayed on the left side of the page. The actual assembly is displayed in the free form area on the center of the page. The palette contains a list of DataPower policies.

- ___ c. Remove the proxy policy from the free-form area by hovering over the proxy policy. Then, click the trash icon.



Only the start and end icons remain.

- ___ d. Select operation-switch from the Logic policies drawer of the policies palette and drop it on the assembly diagram between the start and end icons.



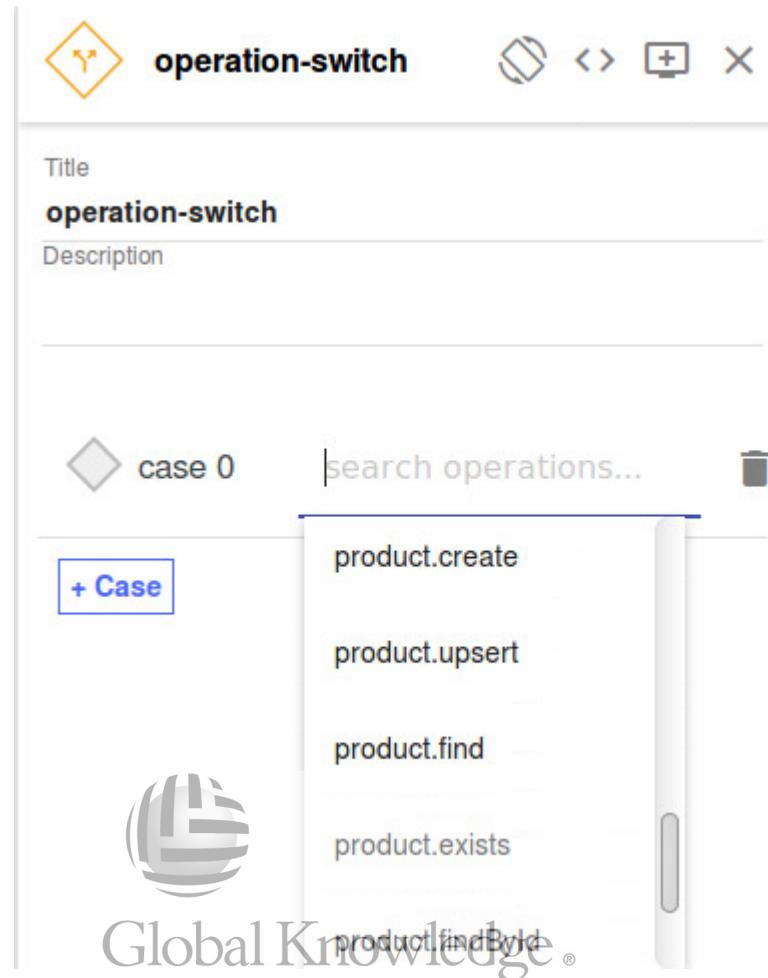
The pattern changes to a dotted box when you drag the policy over the assembly.

- ___ e. The operation-switch is added to the assembly and the properties window opens.

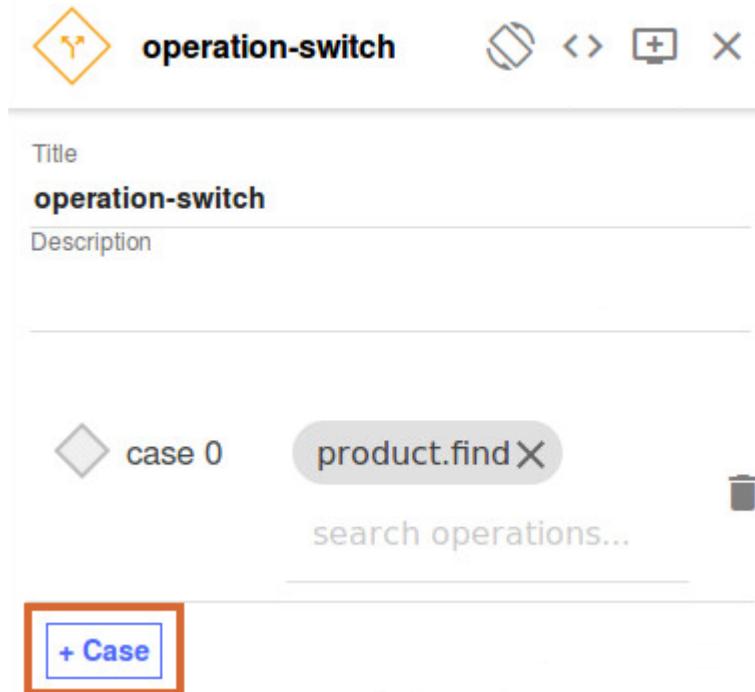


If the property pane on the right does not open, click the operation switch in the assembly diagram.

- f. In the properties pane, click **search operations** alongside case 0. Then, select **product.find** from the list.



- __ g. Click **+ Case** to add another case statement to the assembly.



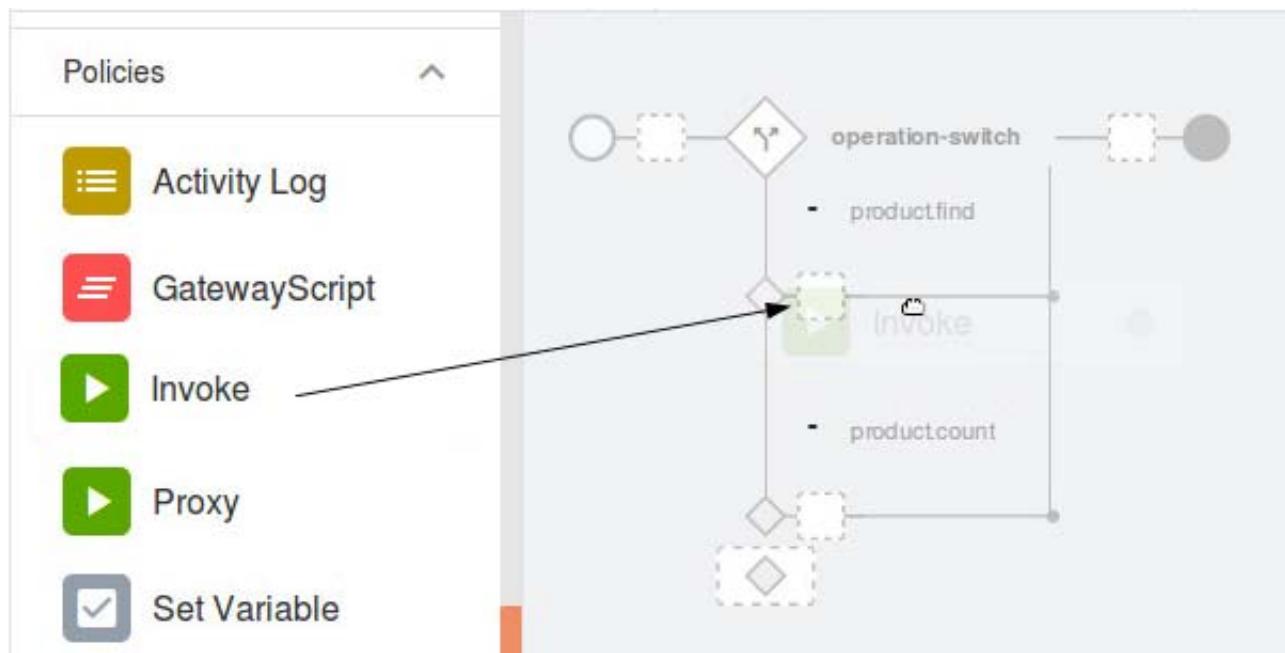
- __ h. Click **search operations** alongside case 1. Then, select **product.count** from the list.

- __ i. The properties dialog box now looks like the figure shown.



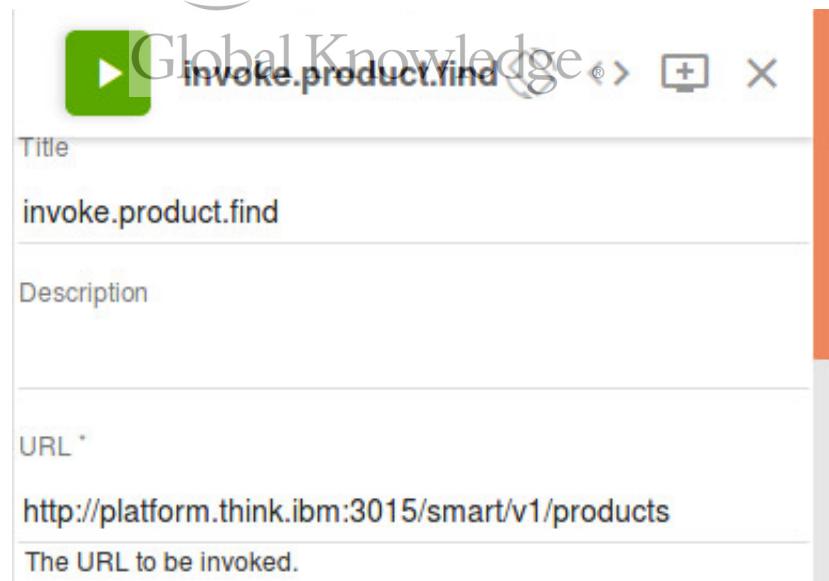
- __ j. Close the properties dialog box by clicking the "X" in the upper right of the dialog box.

- ___ k. Back in the assembly diagram, navigate to the policies palette. Then, select an **invoke** policy. Drop the invoke policy on the line below product.find in the assembly diagram.



- ___ l. The invoke property dialog box opens automatically.
 ___ m. Change the Title to: `invoke.product.find`
 ___ n. In the URL field of the property dialog box, type:

`http://platform.think.ibm:3015/smart/v1/products`



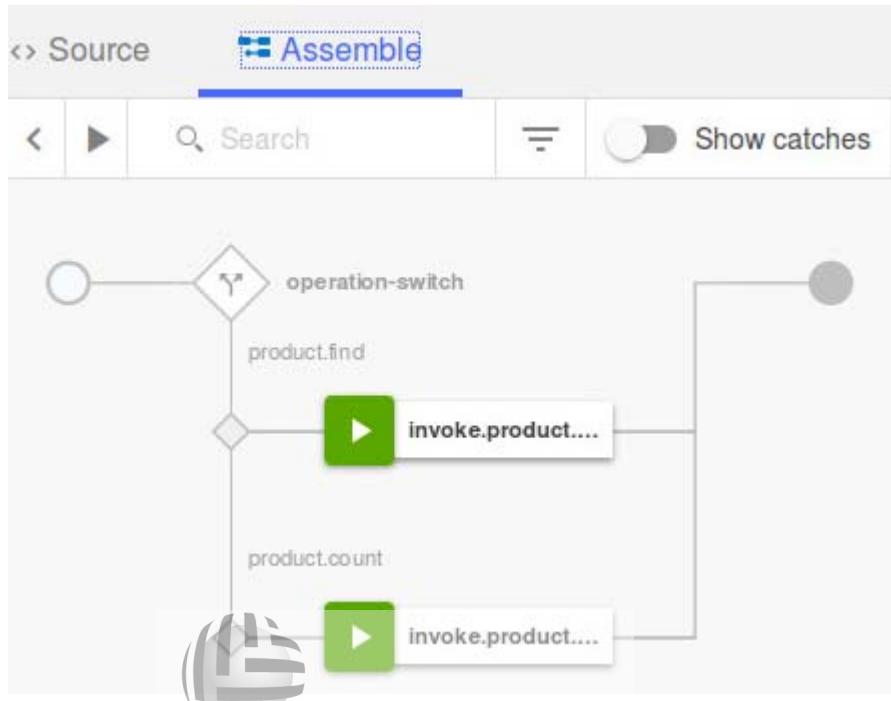
- ___ o. Close the property dialog box.
 ___ p. Drop another invoke policy on the line below product.count in the assembly diagram.

__ q. Set the properties:

- Title: invoke.product.count
- URL: http://platform.think.ibm:3015/smart/v1/products/count

__ r. Close the property dialog box.

__ s. The completed assembly diagram looks like the figure.



__ t. **Save** the changes.

The API is saved.

3.3. Start the back-end application

The back-end application that you call from the API assembly runs as a local Loopback application.

- __ 1. Open a terminal interface.
 - __ a. Click **Terminal** from the Ubuntu list of applications.
- __ 2. Run the apim-smart NodeJS application.
 - __ a. Change to the apim-smart directory in the terminal.
cd ~/apim-smart
 - __ b. Issue the command:
node .



Information

The command is **node** followed by a period. Alternatively, type **npm start**.



- ___ c. The application starts in the terminal.

```
localuser@ubuntu:~/apim-smart
luser@ubuntu:~$ cd ~/apim-smart
luser@ubuntu:~/apim-smart$ node .

user model "User" is attached to an application that does not specify a session invalidation strategy. Other sessions should be invalidated when a password or email has changed. Session invalidation is important for security reasons as it allows users to recover from various account breach situations.

I recommend turning this feature on by setting "logoutSessionsOnSensitiveChanges" to true in server/config.json (unless you have implemented your own solution for token invalidation).

Also recommend enabling "injectOptionsFromRemoteContext" in server's settings (typically via common/models/*.json file). This setting is required for the invalidation algorithm to keep current session valid.

For more information see https://loopback.io/doc/en/lb2/AccessToken-invalidation.html

Fileware allow-cors registered
server listening at: http://0.0.0.0:3015
use your REST API at http://0.0.0.0:3015/explorer
```

- ___ d. Leave the terminal running.

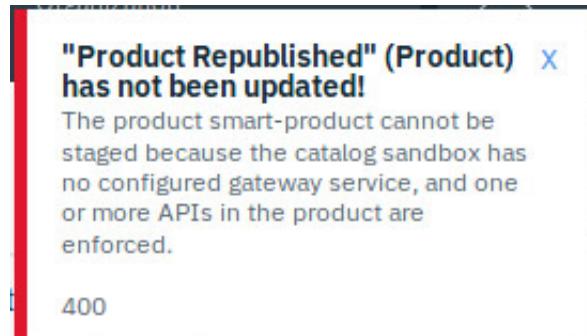
3.4. Add the gateway to the Sandbox catalog

In this part, you configure the gateway service for the Sandbox catalog.



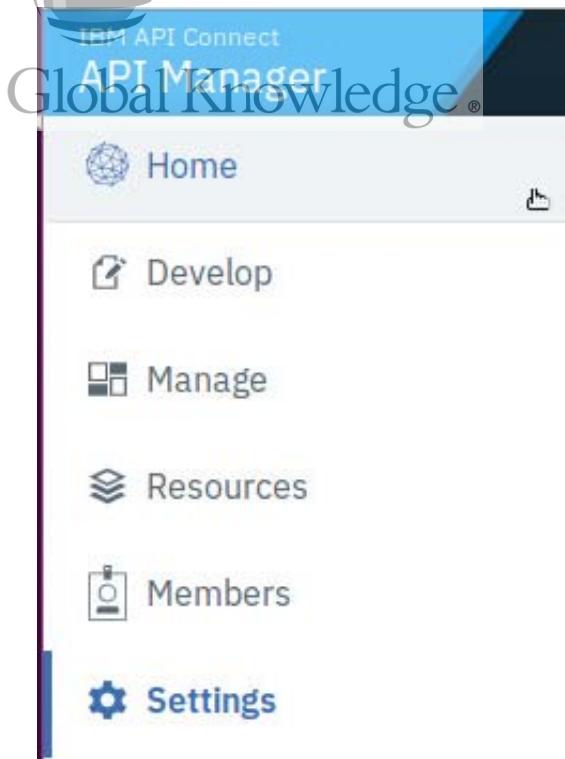
Information

If you try to test and publish the assembly that you created, you get a message that informs you that no gateway service is configured for the Sandbox catalog.



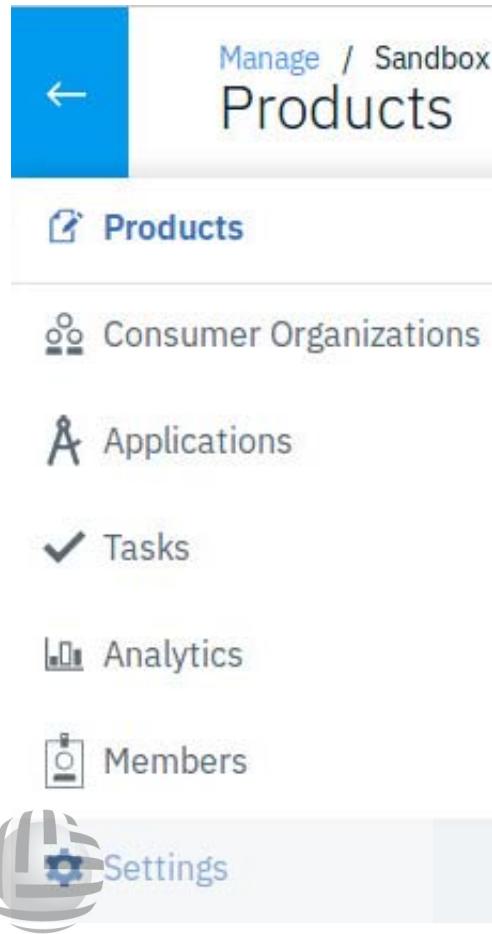
You configure the gateway service now.

- 1. Configure the gateway service for the Sandbox catalog in API Manager.
 - a. Click the **Home** icon in the API Manager navigation menu.



- b. In the Welcome page, click **Manage Catalogs**. Then, click the **Sandbox** tile.

- __ c. Click **Settings** from the Sandbox navigation menu.



- __ d. Click **Gateway Services** within the Settings page.

A screenshot of a user interface titled "Global Knowledge". The left sidebar has a dark blue header with "Overview" and a white body with "Gateway Services" (which is highlighted in blue), "Lifecycle Approvals", "Roles", "Role Defaults", and "Onboarding". The main content area has a light gray header with "Gateway Services" and an "Edit" button. Below the header is a table with two columns: "TITLE" and "TYPE". There is one row in the table with a small icon of a bee and the text "No items found".

Then, click **Edit**.

- __ e. Select the DataPower Gateway (Classic).

Manage / Sandbox

Enable Gateway Services

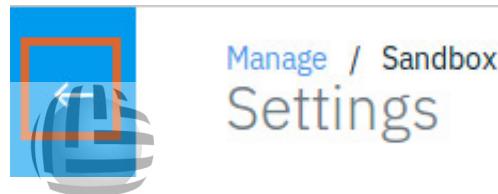
	TITLE	TYPE
<input checked="" type="checkbox"/>	Gateway Service Classic	DataPower Gateway (Classic)

Cancel **Save**

Then, click **Save**.

The Sandbox catalog is now configured to use the DataPower Classic Gateway.

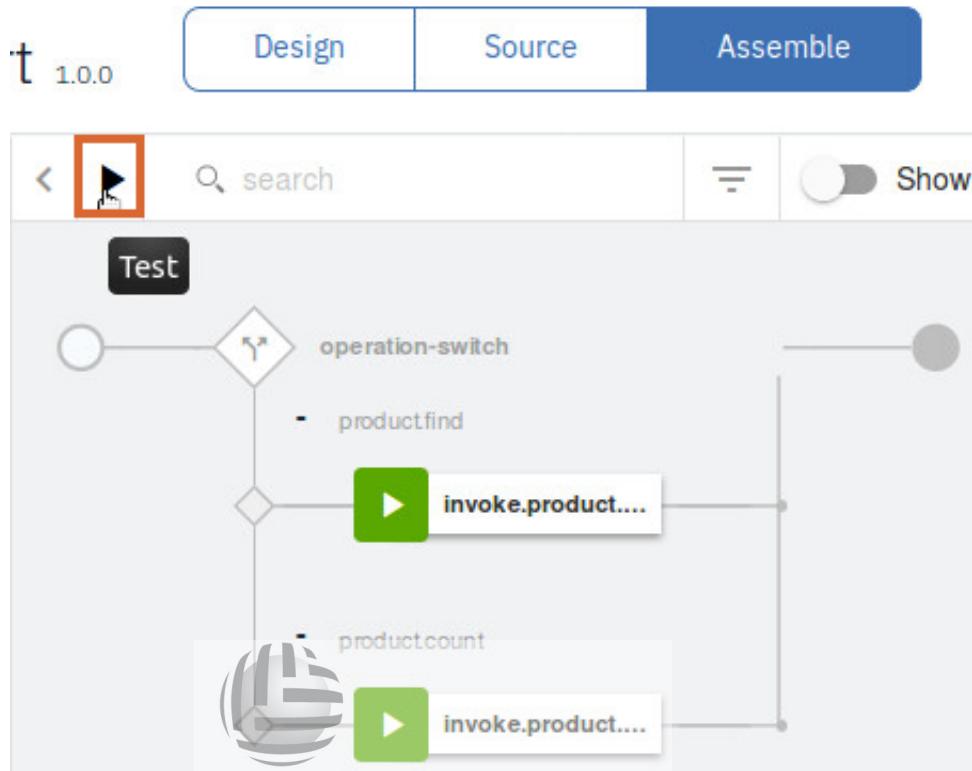
- __ 2. Click the arrow icon to return to the previous page.



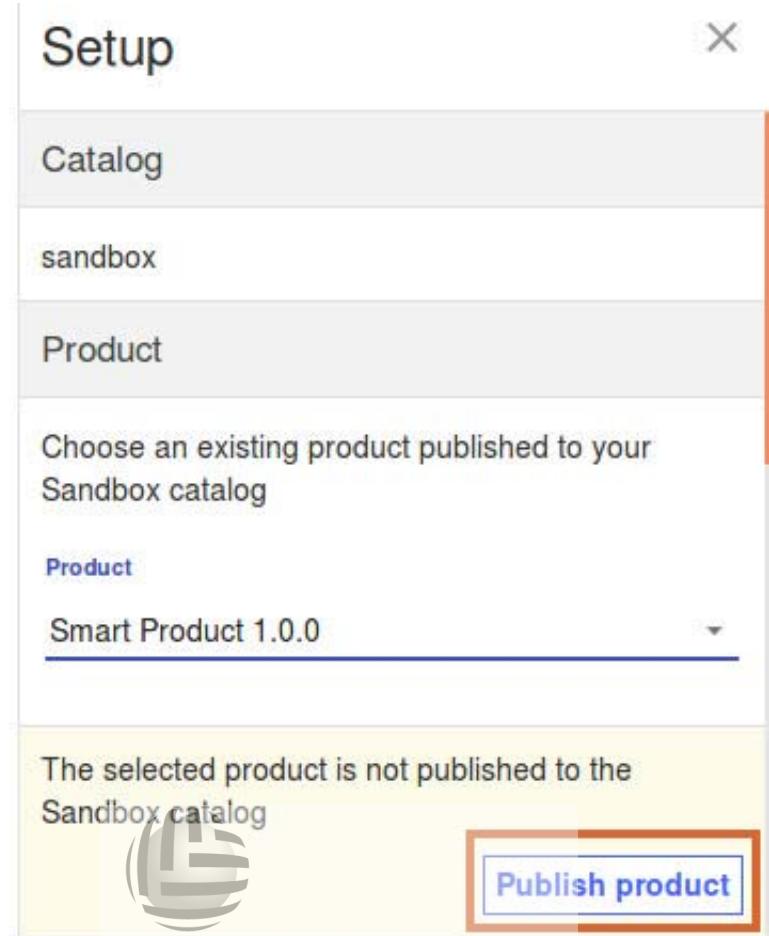
- __ 3. Open the API to the assembly.
- __ a. Click Develop icon from the navigation menu.
- __ b. Click **IBM APIM SMart 1.0.0**.
- __ c. Click the **Assemble** tab.

3.5. Test the API in API Manager

- 1. Test the API in API Manager.
 - a. Click the **Test** icon in the assembly diagram.



- b. The test setup dialog box opens in the left pane. Select these options:
 - Catalog: Sandbox
 - Product: Smart Product 1.0.0



- c. Click **Publish product**.
You see a dialog that displays that the product has been published.

- ___ d. Scroll down in the Setup dialog and select the `sandbox-test-app` in the Application drop-down list.

The screenshot shows the 'Setup' dialog with the following interface elements:

- Plan:** A section titled "Choose a plan against which to test:" with a dropdown menu set to "default".
- Application:** A section titled "Choose an application with which to test, or create a new one:" featuring a "Global Knowledge" logo and a "Choose an existing application" button.
- Sandbox Application Selection:** A dropdown menu containing "sandbox-test-app", which is highlighted with a red border.
- Subscribe Button:** A blue "Subscribe" button located at the bottom right of the application section, also highlighted with a red border.

Click **Subscribe**.
The subscription is added.

Information

You must manually subscribe the `sandbox-test-app` in this version of API Connect.

- ___ e. Click **Next**.

- ___ f. In the operation drop-down list, select **get /products**.

The screenshot shows the IBM API Manager interface. At the top, there are three tabs: "Setup", "Service", and "Operation". The "Operation" tab is currently selected. Below the tabs, there is a section titled "Choose an operation to invoke:" with a dropdown menu. The dropdown menu has a header "Operation" and a single option "get /products" which is underlined, indicating it is selected. There are also two buttons at the top of the "Operation" section: "Republish product" and "Change setup".

- ___ g. A client ID is generated for you.

- ___ h. Scroll down. Then, click **Invoke**.

- i. The first time that you call the operation, you might receive a response with a status code -1 that includes a message that indicates the lack of CORS support on the target server.

Invoke

Response

Status code:
-1

No response received. Causes include a lack of CORS support on the target server, the server being unavailable, or an untrusted certificate being encountered.

Clicking the link below will open the server in a new tab. If the browser displays a certificate issue, you may choose to accept it and return here to test again.
<https://gw.think.ibm/think/sandbox/smart/v1/products>

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Response time:
141ms

- j. Click the link in the Test area.

- __ k. The web page prompts that your connection is not secure, click **Advanced**. Then, click **Add Exception**.

Your connection is not secure

The owner of gw.think.ibm has configured their website improperly. To protect your information from being stolen, Firefox has not connected to this website.

[Learn more...](#)

Report errors like this to help Mozilla identify and block malicious sites

[Go Back](#)

[Advanced](#)

gw.think.ibm uses an invalid security certificate.

The certificate is not trusted because it is self-signed.
The certificate is only valid for .

Error code: [MOZILLA_PKIX_ERROR_SELF_SIGNED_CERT](#)

[Add Exception...](#)

- __ l. With the option to permanently store this exception selected, click **Confirm Security Exception**.



Add Security Exception

! You are about to override how Firefox identifies this site. Legitimate banks, stores, and other public sites will not ask you to do this.

Server
Location: <https://gw.think.ibm/think/sandbox/smart/v1/products> [Get Certificate](#)

Certificate Status
This site attempts to identify itself with invalid information. [View...](#)

Wrong Site
The certificate belongs to a different site, which could mean that someone is trying to impersonate this site.

Unknown Identity
The certificate is not trusted because it hasn't been verified as issued by a trusted authority using a secure signature.

Permanently store this exception

[Confirm Security Exception](#) [Cancel](#)

- __ m. The output response is displayed on the page.

The screenshot shows a browser window with the URL <https://gw.think.ibm/think/sandbox/smart/v1/products>. The page content is an XML error response:

```
- <errorResponse>
  <httpCode>401</httpCode>
  <httpMessage>Unauthorized</httpMessage>
  <moreInformation>Invalid client id or secret.</moreInformation>
</errorResponse>
```

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
- <errorResponse>
  <httpCode>401</httpCode>
  <httpMessage>Unauthorized</httpMessage>
  <moreInformation>Invalid client id or secret.</moreInformation>
</errorResponse>
```



Information

Since the call in the browser did not include the client ID header that is required as part of the security that was configured in the API definition, the browser displays some XML with the error. The test feature in API Manager supplies the client ID that you see in the next step.

The equivalent command in curl that includes the client ID header is:

```
curl -k --request GET --url
'https://gw.think.ibm/think/sandbox/smart/v1/products' --header
'x-ibm-client-id:<client ID copied from test facility>'
```

- __ n. Return to the **API Manager** tab and click **Invoke** to rerun the test.

- __ o. You see the result of the test.

Status code:

200 OK

Response time:

1440ms

Headers:

apim-debug-trans-id: -10cf4a40-68e3-4e6a-
98d3-639803862056
content-type: application/json
x-global-transaction-
id: 860398635ba2ae3d00000b00
x-ratelimit-limit: name=default,100;
x-ratelimit-remaining: name=default,99;

Body:

```
[  
  {  
    "product_id": "apples",  
    "name": "apples",  
    "category": "Fruit",  
    "description": "Red apples",  
    "price": 1.5,  
    "stock": 100  
  }]
```

- __ p. Rerun the test, and this time choose the `get /products/count` operation.

- ___ q. The result is displayed.

The screenshot shows the 'Test' pane of the IBM API Manager interface. It displays the following results from a recent API invocation:

- Status code: 200 OK
- Response time: 194ms
- Headers:
 - apim-debug-trans-id: -ef547cc2-e6f7-4928-bf9c-63980386d85e
 - content-type: application/json
 - x-global-transaction-id: 860398635ba2b2aa00000b10
 - x-ratelimit-limit: name=default,100;
 - x-ratelimit-remaining: name=default,98;
- Body:

```
{  
    "count": 10  
}
```

A large watermark for "Global Knowledge" is overlaid on the body content.



Note

If you get a status code 404 indicating that there is no such method, check that you typed the URL correctly in the invoke properties. Change the value to the correct value, save the API, and republish the product. Then, rerun the test.

- ___ r. Close the Test pane.
- ___ 2. Stop the NodeJS application.
- ___ a. In the terminal, press Ctrl+C to stop the back-end application.
You start it again when needed.

End of exercise

Exercise review and wrap-up

In this exercise, you defined an API interface by importing a set of API REST operations and data definitions from an OpenAPI file. You created a Product with a default plan. You created an API assembly in API Manager that controls aspects of processing in the gateway server.

You tested the assembly in the Sandbox catalog against a back-end Node application.

Developers usually do the initial testing of the APIs against the Sandbox catalog. When the APIs have been fully tested, the APIs, Products, and plans are published to other catalogs such as the Staging catalog that is defined earlier in this course. When the APIs are published, they are made available on the portal that is associated with that catalog.





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Exercise 4. Managing and approving API Products

Estimated time

01:00

Overview

This exercise shows you how the Product lifecycle is managed in API Manager. You review Product and API availability and visibility settings, and create and plans. You configure lifecycle settings and approval settings for a catalog. You examine how to define a user for the provider organization. You manage Product and API versions. You publish artifacts to the Staging catalog, and then review and approve the lifecycle stage for a published Product.

Objectives

After completing this exercise, you should be able to:

- Review product availability and visibility settings in API Manager
- 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

Introduction

Managing Products and APIs through their lifecycle states can be done by the owner of the provider organization or parts can be delegated to users in other roles. In the exercise, you assume the API Manager roles of owner and developer.

Requirements

This exercise requires a workstation with internet access. You can complete this exercise by using the Ubuntu Linux course image that is supplied with the course.

Before doing this exercise, you must complete the previous exercises.

Exercise instructions

Preface

Follow the instructions that are provided under the heading "Before you begin" in the Exercises description at the start of this guide.



4.1. Review availability settings and change the plans for a Product

In this part, you review the visibility and availability settings for the Product that was generated in an earlier exercise. You change the plan details for the Product.

- ___ 1. Open the API Manager web user interface.
 - ___ b. In the Firefox browser, open API Manager with the URL:
`https://manager.think.ibm/`
 - ___ c. Sign on to API Manager with the credentials of the owner of the Think organization:
 - User: ThinkOwner
 - Password: Passw0rd!Click **Sign In**.
- ___ 2. Select the Develop icon from the API Manager navigation menu.



- ___ 3. Select **Products**. Then, click **Smart Product 1.0.0**.
The Product opens in the Design view.

- ___ 4. Select **Visibility** in the left pane. The visibility options are displayed.

Visibility

- Public**
- Authenticated**
- Custom**

Subscribability

- Authenticated**
- Custom**

These options are used when you publish the Product to the Developer Portal.

- ___ 5. Open the plans for the Product.

- ___ a. Click the **Plans** option on the page.

Plans	Add
Add plans to product	

Default Plan

Default Plan

The Default Plan is displayed.

- ___ 6. Add a Silver plan.

- ___ a. With the Plans option selected, click **Add**.

- ___ b. When the plan detail opens, enter the following values:

- Title: Silver Plan
- Name: silver-plan
- Description: Rate limited plan

Title

Silver Plan

Name

silver-plan

Description (optional)

Rate limited plan

Approval

Hard limit

Rate Limits

NAME	CALLS	PER	UNIT
Default rate-limit	100	1	hour

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Leave the remaining fields to their default values.

Modify the Default burst-limit to 50 calls per second.

Burst Limits

NAME	CALLS	PER	UNIT
Default burst-limit	50	1	second

- ___ c. **Save** the changes to the Silver plan.

The plan is added to the list of plans.

- ___ 7. Add another plan to the Product.

- ___ a. Click the **Add** icon to add a plan.

___ b. Complete the plan detail options:

- Title: Gold Plan
- Name: gold-plan
- Description: Unlimited plan
- Approval: Checked
- Rate limits: Unlimited (Click the trash can icon)
- Burst limits: No burst limits defined (Click the trash can icon)

Title

Gold Plan

Name

gold-plan

Description (optional)

Unlimited plan

<input checked="" type="checkbox"/> Approval	<input type="checkbox"/> Hard limit			
				
Add				
Global Knowledge®				
NAME	CALLS	PER	UNIT	DELETE

Burst Limits

Add

NAME	CALLS	PER	UNIT	DELETE

___ c. **Save** the changes to the Gold plan.

- __ d. You should see a Silver Plan and a Gold Plan in the list of plans.

Product Setup **Plans** Add

Visibility Add plans to product

APIs ...

Plans Default Plan

Categories Default Plan

Silver Plan Rate limited plan

Gold Plan Unlimited plan



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4.2. Create a user and review API provider roles in API Manager

Currently, the owner of the provider organization that is named *Think* is the only user that is defined in the API Manager local user repository. The user ID of the organization owner is `ThinkOwner`.

You add another user with a developer role. Together, these two users and roles are going to manage the lifecycle of the Products and APIs in API Manager. The owner, who has all permissions, also fulfills the product-approval role in the exercise.



Important

The Fake SMTP email server should be started and be minimized or visible on the desktop. To start the SMTP server, ensure that you are in the `/home/localuser` directory.

In the terminal type:

```
java -jar /usr/local/bin/fakeSMTP-2.0.jar -s -p 2525
```

You can clear all previous messages from the mail list. You respond to an email message that gets sent when a user is created. Click **Clear all** in the Fake SMTP Server to clear out all previous messages.

1. Review the registries in API Manager.

a. From the navigation menu, select the **Resources** icon. The list of user registries is displayed.



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User Registries	User Registries		Create
	TITLE	TYPE	
TLS	Sandbox Catalog User Registry	Local User Registry	:
OAuth Providers	Staging Catalog User Registry	Local User Registry	:



Information

The Sandbox Catalog User Registry is created by default when the API Connect product is installed. When the Think provider organization was created, the ThinkOwner was added to the Sandbox user registry. For the purposes of the exercises in this course, the Sandbox user registry is used for the members of the provider organization that is named Think. The Staging user registry is used for members of the consumer organization named Ordinal.

- ___ 2. Review the roles in API Manager.
- ___ 3. From the navigation menu, select the **Settings** icon. Then, click the **Roles** option.

Settings

ROLES	
>  Administrator	⋮
> APIAdministrator	⋮
>  Community Manager	⋮
> Developer	⋮
> Member	⋮
> Owner	⋮
> Viewer	⋮

These are the roles for the provider organization.

- 4. Review the details for the Developer role.
- a. On the Roles page, expand the Developer role.

The screenshot shows the 'Developer' role expanded in a list-based interface. The 'Developer' section is collapsed at the top. Below it, under 'Authors API and product definitions', there are two main categories: 'Member' and 'Topology'. Under 'Member', there is a single item: 'View'. Under 'Topology', there is also a single item: 'View'. To the right of these, under 'Settings', there is another 'View' item. Further down, under 'Product', there are three items: 'View', 'Stage', and 'Manage'. To the right of these, under 'Org', there is a single 'View' item. Under 'Product-approval', there is a list of seven actions: 'View', 'Stage', 'Publish', 'Supersede', 'Replace', 'Deprecate', 'Retire', and 'Archive'. At the bottom left, there is a 'Consumer-org' section with a 'View' item. To the right of this, there is a 'Global Knowledge' logo with 'App' above it, followed by a list of 'View' and 'Manage' items. Finally, at the bottom left, there is an 'App-dev' section with a 'Manage' item, and to its right, an 'App-approval' section with a 'View' and 'Manage' item.

Authors API and product definitions	
Member	Settings
• View	• View
Topology	Org
• View	• View
Product	Product-approval
• View	• View
• Stage	• Stage
• Manage	• Publish
	• Supersede
	• Replace
	• Deprecate
	• Retire
	• Archive
Consumer-org	App
• View	• View
	• Manage
App-dev	App-approval
• Manage	• View
	• Manage

Notice that the Developer can only view Settings. Later, you must sign on again as the organization owner to change settings for lifecycle approvals.

- 5. Review the members in API Manager.
 - a. From the navigation menu, select the **Members** icon. Then, click the option to view owners.

Members

The screenshot shows the 'Members' page in the IBM API Manager interface. At the top left, there is a checkbox labeled 'View owners' which is checked. Below it, a card displays a user named 'Think Owner' with the role 'Org Owner' and the email 'owner@think.ibm'. A large blue button on the right says 'Invite member'. Below this, there is a table header with columns: NAME, ADMINISTRATOR, API-ADMINISTRATOR, COMMUNITY-MANAGER, DEVELOPER, VIEWER, and STATE. The main content area below the table header shows a bee icon and the text 'No items found'.

The organization owner is displayed. The owner is the only member currently in the Think provider organization.

- 6. Add a member to the Think organization with a role of developer.
 - a. Click **Invite member**.

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- b. In the Invite Member dialog box, type developer@think.ibm for the user email. Select the **Developer** check box.

Invite Member

Specify Email
Enter the email address of the user to invite as a member of the provider organization

developer@think.ibm

Assign Roles (optional)

Administrator
Administers the API provider organization

API Administrator
Manages the API product lifecycle

Community Manager
Manages application developer communities

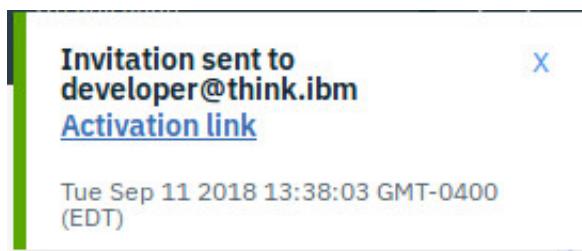
Developer
Authors API and product definitions

Viewer
Views the API provider organization

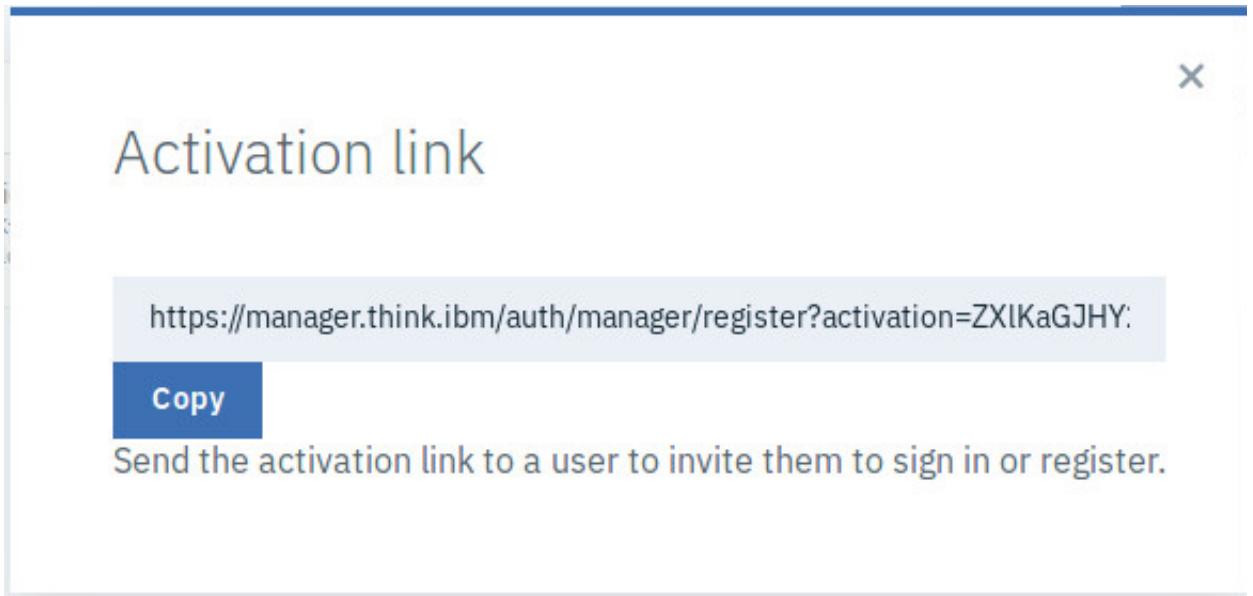
Cancel **Invite**

Click **Invite**.

- c. A dialog is displayed at the top of the page that shows that an invitation is sent to developer@think.ibm. Click the **Activation link** in the dialog.



- __ d. Another dialog is displayed with the activation link.



The image shows a screenshot of a web browser window titled "Activation link". Inside the window, there is a URL: <https://manager.think.ibm/auth/manager/register?activation=ZXIKaGJHY>. Below the URL is a blue "Copy" button. A message below the button says, "Send the activation link to a user to invite them to sign in or register." In the top right corner of the browser window is a close button (an 'X').

Click **Copy**.

- __ e. Close the dialogs and sign out of the owner in API Manager.



Note

You must sign out ThinkOwner from API Manager, since the browser does not allow two users to be signed on simultaneously to API Manager.

- __ f. Paste the copied activation link into the address area in the browser.

- __ g. The page to sign up with the API Manager user registry is displayed. Type the information:

- User name: ThinkDeveloper
- Email: developer@think.ibm
- First name: Think
- Last name: Developer
- Name: gold-plan
- Password: Passw0rd!
- Confirm password: Passw0rd!

API Manager

Sign up with API Manager User Registry

Username

ThinkDeveloper

Email

developer@think.ibm

First name

Think Global Knowledge ®

Last name

Developer

Password

Confirm password

Sign up

Click **Sign up**.

- h. The registration is completed successfully. Now you can sign in to validate the user and password that you created.

The screenshot shows the IBM API Connect API Manager interface. At the top, it says "IBM API Connect" and "API Manager". Below that, a large box displays the message "Registration completed successfully" and "Congratulations, you are now registered.". Underneath, a section titled "Next step" lists three options: "Log in with your credentials to work in the API Connect cloud.", "- Manage your organization", and "- Manage members for your organization". A watermark for "Global Knowledge" is visible in the background of this section. At the bottom, another box contains the instruction "Click the button below to login" and a blue "Sign In" button.

Click **Sign In**.

- i. Sign on to API Manager with the credentials as the developer that you created:
- User: ThinkDeveloper
 - Password: Passw0rd!

Click **Sign In**.

You are signed in as a developer in the Think provider organization.

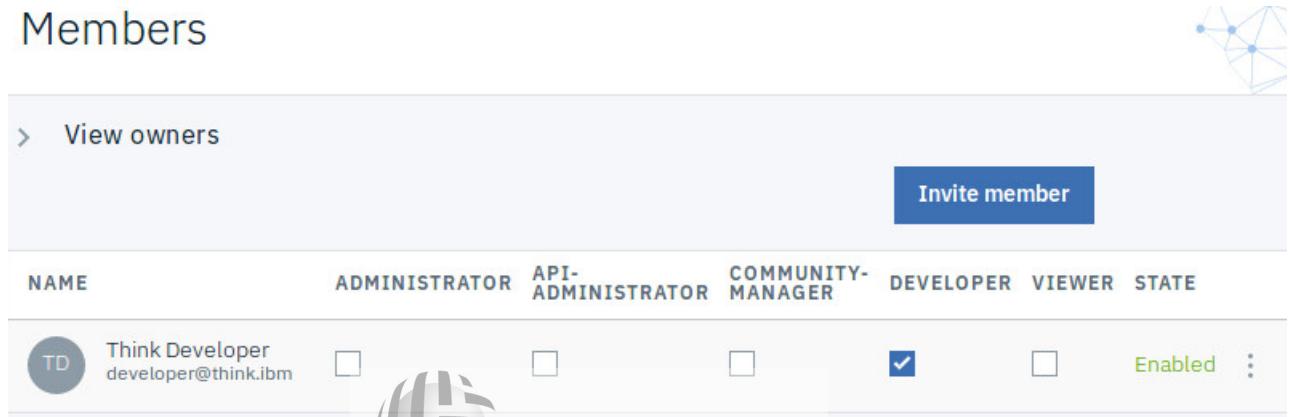
- 7. Sign out of the Developer in API Manager.

4.3. Configure lifecycle and approval settings in the Staging catalog

- ___ 1. Sign on to API Manager with the credentials of the owner of the Think organization:
 - User: ThinkOwner
 - Password: Passw0rd!

Click **Sign In**.
- ___ 2. From the navigation menu, select the **Members** icon.
 Notice that the member that is named ThinkDeveloper is added with a Developer role with a status of enabled.

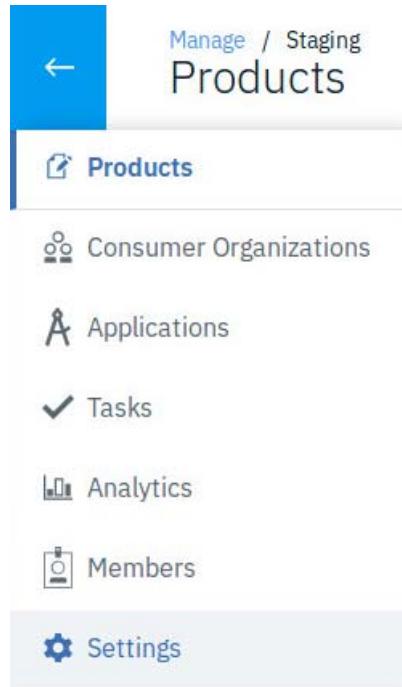
Members



NAME	ADMINISTRATOR	API-ADMINISTRATOR	COMMUNITY-MANAGER	DEVELOPER	VIEWER	STATE
Think Developer developer@think.ibm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Enabled

- ___ 3. Configure the lifecycle settings for the Staging catalog.
 - ___ a. Click the **Home** icon from the navigation menu.
 - ___ b. Click the **Manage Catalogs** tile. Then, click the **Staging** tile.

- __ c. With the Staging option selected, click the icon to open the **Settings** option.



- __ d. Click **Lifecycle approvals**.

Task self approval	
	Off <input type="radio"/> — <input checked="" type="radio"/> On

No lifecycle approvals are enabled.

- __ e. Click **Edit** on the lifecycle approvals page.

- ___ f. Enforce approvals for the publishing state change by selecting the **Publish** check box.

Lifecycle Approvals

The following lifecycle actions require approval

- Stage
- Publish
- Deprecate
- Retire
- Replace
- Supersede

Cancel

Save

Click **Save**.

By selecting the publish option, approval is required when anyone attempts to publish a Product. Leaving the other options cleared means that no approval is required for any of the other lifecycle state changes.

The organization owner must approve the publish state change when the developer publishes a Product.

- ___ g. Lifecycle updates are saved.

Lifecycle Approvals

Edit

The following lifecycle actions require approval

- Publish

Task self approval

Off — On

The Developer cannot self-approve the published Product.

- ___ 4. **Sign out** of the Owner in API Manager.

4.4. Publish the Product to the Staging catalog

In this part, you publish the Product and APIs as the developer of the provider organization. When you publish the Product, API Manager automatically stages the Product, and publishes the Product pending approval by the owner.

- 1. Sign on to API Manager with the credentials as the developer that you created:
 - User: ThinkDeveloper
 - Password: Passw0rd!

Click **Sign In**.
- 2. Publish the Product to the Staging catalog.
 - a. From the Navigation menu, click **Develop**.
 - b. From the Develop page, click the **Products** tab.
The Smart Product 1.0.0 is displayed in the list of Products.



Information

The default visibility values for the Product are:

- Visible to: Public
- Subscribable by: Authenticated



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- __ c. Click the list of options ellipsis icon (three dots). Then, select **Publish**.

Develop

	TITLE	LAST MODIFIED
<input type="checkbox"/>	Smart Product 1.0.0	a day ago

Publish

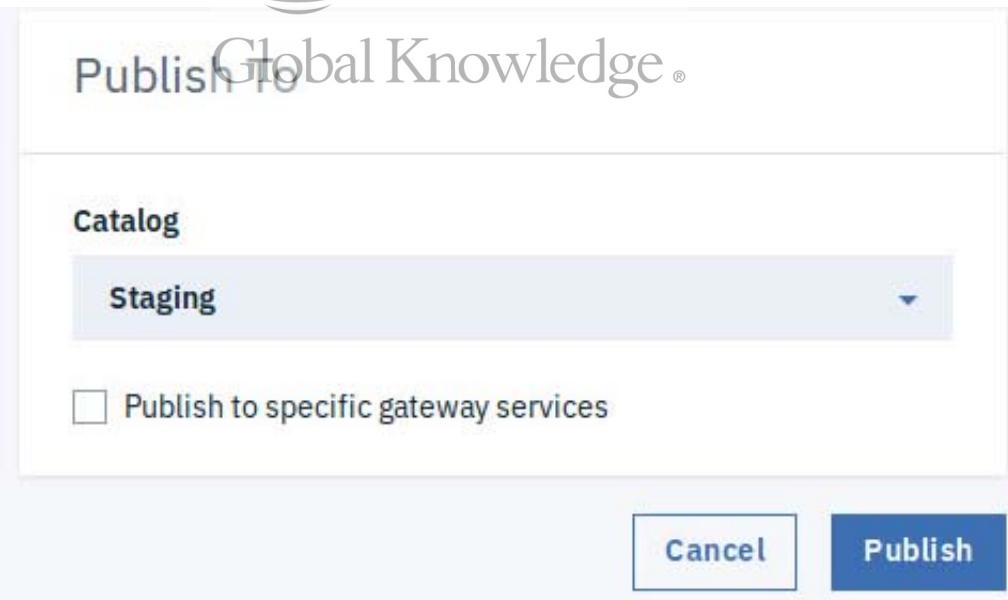
Stage

Save as a new version

Download

Delete

- __ d. Select the **Staging** catalog in the Publish To dialog.



Click **Publish**.

A dialog is displayed with the message that publishing is pending approval.

- __ e. **Sign out** of ThinkDeveloper.
- __ f. Next, you create a version and approve the Product and API from the owner of the producer organization.

- ___ 3. Review the email notification that is sent.
 - ___ a. Go to the fakeSMTP email server. Notice that an email is sent to the owner from the developer requesting approval of a published Product.
 - ___ b. When you open the email, the email contents displays the message.

```
|      Tue, 11 Sep 2018 17:27:13 -0400 (EDT)
Content-Type: text/plain
From: APIC Administrator <admin@think.ibm>
To: owner@think.ibm
Subject: Request for approval to published an API product in the Staging
catalog
Message-ID: <1badbf64-164d-5a3b-7a79-eb5d2e845f66@think.ibm>
Content-Transfer-Encoding: 7bit
Date: Tue, 11 Sep 2018 21:27:13 +0000
MIME-Version: 1.0

Hello Think,

User ThinkDeveloper has requested approval to published version 1.0.0
of the smart-product API product in the Staging catalog.

You can open the request in your task list using this link:
https://manager.think.ibm/manager/api/task
```



4.5. Version the API and the product

It is a suggested practice that you create versions of an API and product for developers to work on when you publish a product. You create these versions as the provider organization owner just before you approve the publishing of the product.

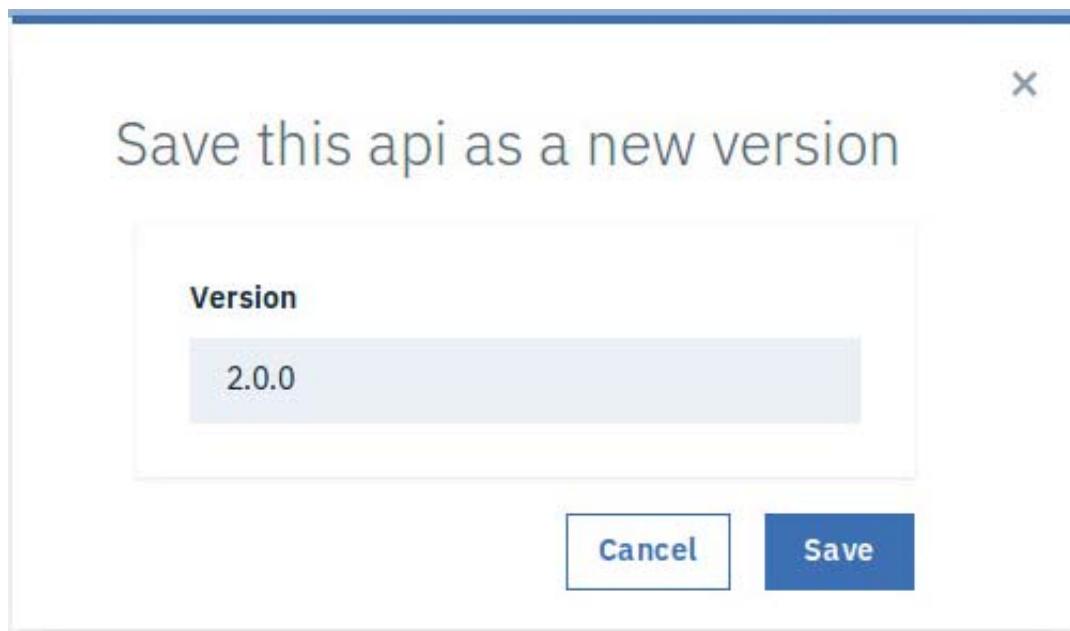
- 1. Sign on to API Manager as the owner of the provider organization.
 - User: ThinkOwner
 - Password: Passw0rd!
 Click **Sign In**.
- 2. From the Navigation menu, click **Develop**.
- 3. Create a version of the API.
 - a. Ensure that the **APIs** tab is selected on the Develop page.
The list of draft APIs is displayed.
 - b. Select **IBM APIM SMart 1.0.0**. Then, from the list options ellipsis, select **Save as a new version**.

APIs	APIs	Products	
<input checked="" type="checkbox"/>	TITLE	TYPE	LAST MODIFIED
<input checked="" type="checkbox"/>	IBM APIM SMart 1.0.0	REST	a day ago

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[Publish](#)
[Stage](#)
[Save as a new version](#)
[Download](#)
[Delete](#)

- __ c. In the Save this api as a new version dialog box, type 2.0.0 in the Version field.



Click **Save**.

You now see two API versions in the list of APIs.

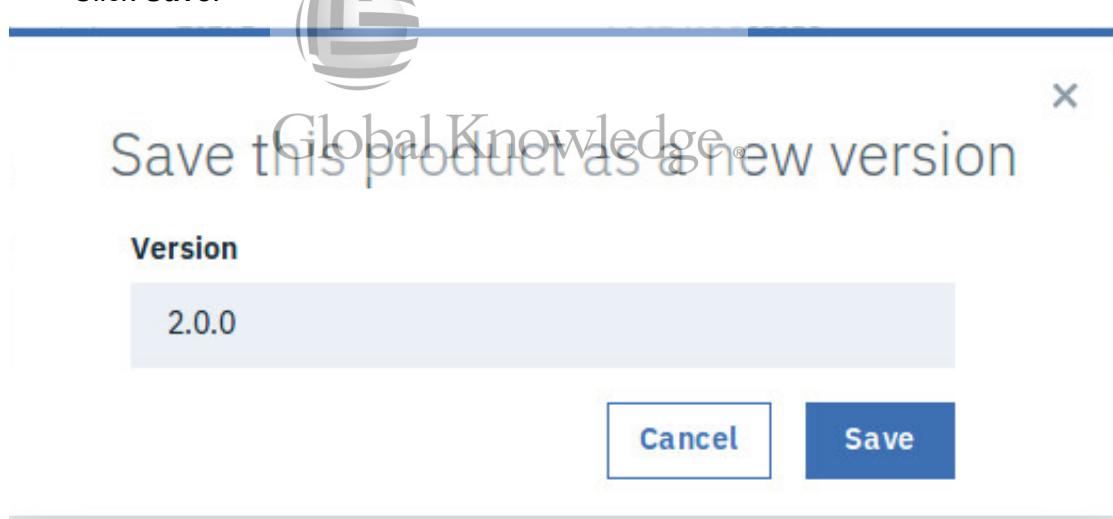
<input type="checkbox"/>	TITLE	TYPE	LAST MODIFIED	⋮
<input type="checkbox"/>	IBM APIM SMart 2.0.0	REST	a day ago	⋮
<input type="checkbox"/>	IBM APIM SMart 2.0.0	REST	a few seconds ago	⋮

- __ 4. Create a version of the Product.
- __ a. Click the **Products** tab.
- __ b. Select **Smart Product 1.0.0**. Then, from the list options ellipsis, select **Save as a new version**.

- ___ c. In the Design view of the Product, click the **More Actions** icon (three dots). Then, click **Save as a new version**.

The screenshot shows the 'Products' section of the IBM API Connect interface. A product titled 'Smart Product 1.0.0' is listed. A context menu is open, with the 'Save as a new version' option highlighted.

- ___ d. In the Save this product as a new version dialog box, type 2.0.0 in the Version field. Click **Save**.



A new version of the Product is saved.

- 5. Change the API version number in the new Product version to reflect the newer API version number.
- a. With the Products option selected, click the **Smart Product 2.0.0** link to open the details for the Product.

	TITLE	LAST MODIFIED
<input type="checkbox"/>	Smart Product 1.0.0	a day ago
<input type="checkbox"/>	Smart Product 2.0.0	a few seconds ago

- b. Click the **APIs** tab. Then, click **Edit**.

	TITLE	SUMMARY	VERSION
	IBM APIM SMart		1.0.0

- c. In the Add APIs to Product dialog box, clear the **IBM APIM SMart 1.0.0** check box, and select the **IBM APIM SMart 2.0.0** check box.

	TITLE	VERSION
<input type="checkbox"/>	IBM APIM SMart	1.0.0
<input checked="" type="checkbox"/>	IBM APIM SMart	2.0.0

Cancel **Save**

Click **Save**.

___ d. The Product is saved with the later version of the API.

Developers can be notified that a new version of the Product and API is available.



4.6. Approve the publishing of the Product to the Staging catalog

In this step, you approve the publishing task that the user in the developer role generated.

This step makes the Product and API available on the Developer Portal.

You are signed on to API Manager as the owner of the provider organization.

- ___ 1. Approve the published Product.
 - ___ a. From the Navigation menu, select the **Manage** icon.
 - ___ b. Click the **Staging** catalog tile.
 - ___ c. On the Staging page, you see the Smart Product in the list with the state of Staged with publish pending.
 - ___ d. Click the **Tasks** icon in the navigation menu.



- ___ e. You see the request for publishing approval that the user in the developer role submitted.

Manage / Staging

Tasks

Approval Tasks	Requested Approvals
Task to published product: smart-product:1.0.0 Product Lifecycle	Decline Approve
	an hour ago

Click **Approve**.

The approval tasks contain no approvals.

Approval Tasks	Requested Approvals
Task has been updated. Just now	
 There are no tasks to be displayed X	

- ___ 2. Click the **Products** icon in the navigation menu. Notice that the Smart Product now displayed as Published.

TITLE	NAME	STATE	⋮
> Smart Product	smart-product 1.0.0	Published	⋮

- ___ 3. View the published Product in the Developer Portal.

- ___ a. In another tab in the browser, type:

<https://portal.think.ibm/think/staging/>

- __ b. The Developer Portal for the Staging catalog is displayed.

The screenshot shows a web browser window for the URL <https://portal.think.ibm/think/staging/>. The browser interface includes standard navigation buttons (back, forward, search, home) and a lock icon indicating a secure connection. Below the address bar, there are links for "Most Visited" and "Getting Started". The main menu bar features "IBM API Connect Developer Portal" on the left and "API Products", "Blogs", "Forums", and "Support" on the right. The main content area has a blue background with a large white icon of a person's head and shoulders. To the right of the icon, the text "Brace yourselves APIs are coming." is displayed in bold blue letters, followed by "Explore, subscribe to and be c" and "We can't wait to see what you". A purple button labeled "Explore API Documentation" is visible. Below this section, the text "API Products" is shown in blue. A card-like box displays the "Smart Product 1.0.0" logo, which consists of a blue circle with three white squares and a grey circle with a grid pattern. The text "Smart Product 1.0.0" is next to the logo, and "Global Knowledge.®" is written below it in a smaller font.

Since the public interface of the Developer Portal is displayed and the visibility for the Smart Product 1.0.0 was set to public, you see the Smart Product (v1.0.0) that has been published.

In other words, you did not need to sign on to the Developer Portal to view the list of public APIs.

End of exercise

Exercise review and wrap-up

The owner of the provider organization can manage products and APIs through their lifecycle states, or parts can be delegated to users in other roles. In the exercise, you assumed the provider organization roles of owner and developer.

You created plans and staged and published a Product and API to a Staging catalog. You created new versions of an API and a Product. You reviewed the published Product in the Developer Portal.



Exercise 5. Customizing the Developer Portal

Estimated time

00:45

Overview

This exercise shows you the customization options in the Developer Portal. You sign in to the Developer Portal with a Portal administrator account, add and configure a Drupal sub-theme, and review some of the standard features of the Developer Portal.

Objectives

After completing this exercise, you should be able to:

- 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



Introduction

In this tutorial, the Think organization wants to create their own brand for the Developer Portal. You create this brand by installing a custom sub-theme on the Staging Developer Portal.

Requirements

This exercise requires a workstation with internet access. You can complete this exercise by using the Ubuntu Linux course image that is supplied with the course.

Before doing this exercise, you must complete all previous exercises.

Exercise instructions

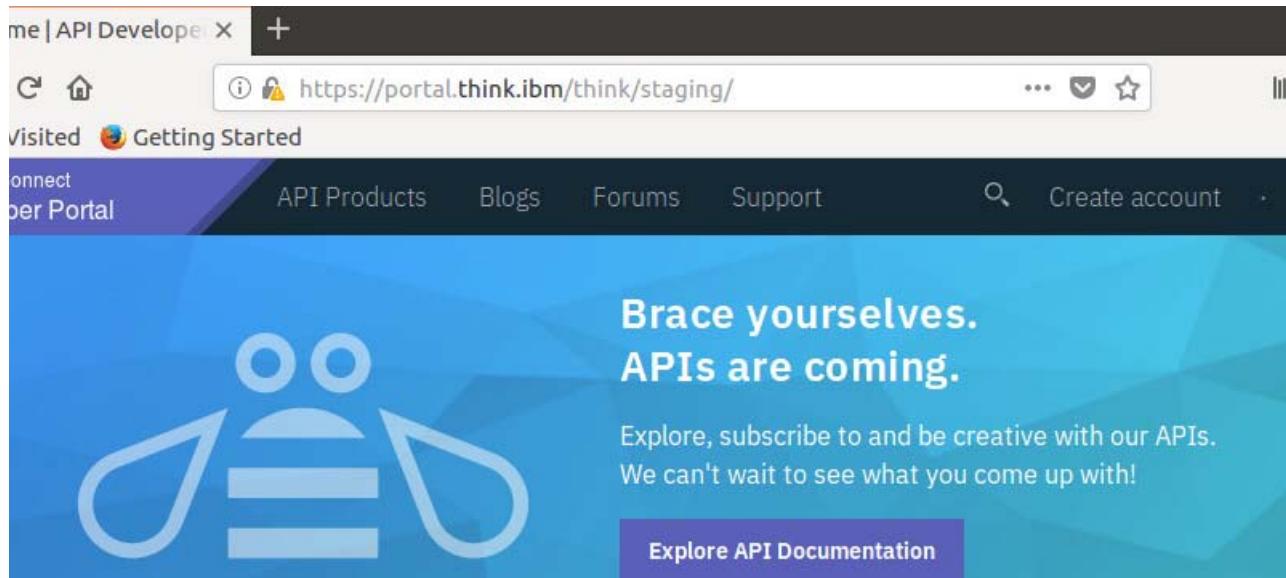
Preface

Follow the instructions that are provided under the heading "Before you begin" in the Exercises description at the start of this guide.



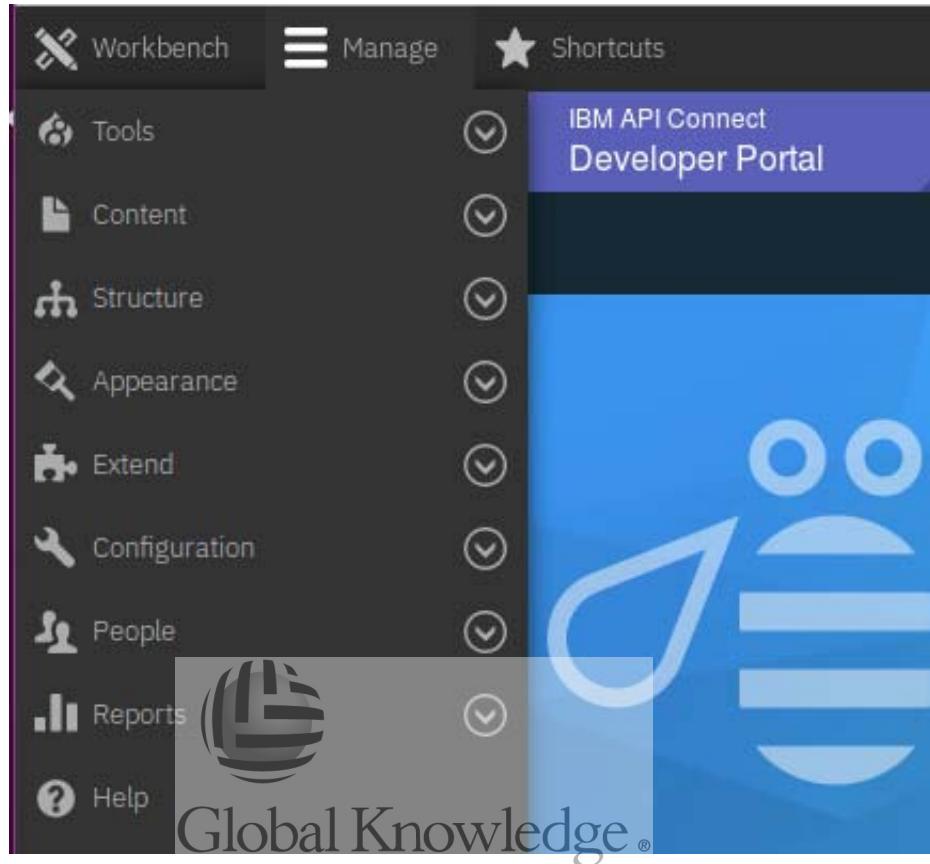
5.1. Sign on to the Developer Portal and review the administration menu

- ___ 1. Sign on to the Staging Developer Portal with the admin user.
 - ___ a. In a browser tab, type: <https://portal.think.ibm/think/staging/>

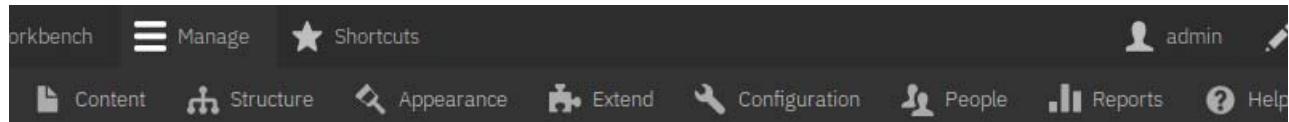


- You see the public page for the Developer Portal of the Staging catalog.
- ___ b. Click **Sign in** at the top of the page in the browser.
 - ___ c. Sign in to the Developer Portal with the credentials:
 - User name: admin
 - Password: Passw0rd!
 - ___ d. Click **Sign in**.

- ___ e. You are signed in to the Developer Portal with the admin user. The Developer Portal uses a responsive layout, so the administration might be displayed on the left side when the browser page width is smaller, or might be displayed along the top of the page when the browser is maximized. Here you see the administration menu when the browser width is reduced.



- ___ f. You can choose to resize or maximize the browser page so that the administration menu is displayed along the top of the page, or you can work with the vertically displayed administration menu.



- ___ g. The top of the administration menu contains the icons that are named Workbench, Manage, and Shortcuts. Click each of these icons in sequence to display their associated sub-menus.

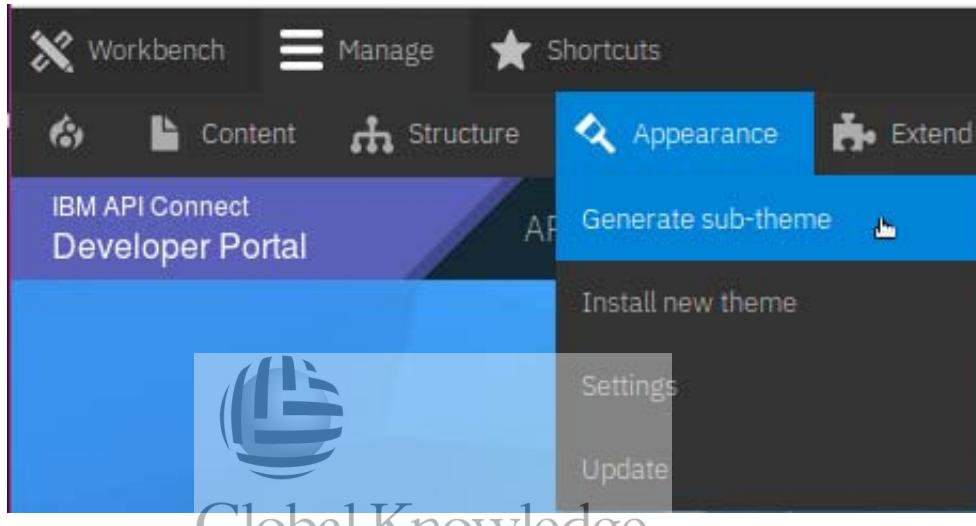
In the exercise, you use the Manage sub-menu items to create a sub-theme for the Developer Portal.

5.2. Create a sub-theme

You can create a custom theme for your Developer Portal site by generating and configuring a sub-theme. A sub-theme is a theme that inherits all the resources of a specified parent theme. You can then override specific resources to configure your required customizations.

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. Templates for different color schemes are provided on which the sub-theme can be based.

- 1. Generate a sub-theme.
 - a. From the administration menu, ensure that the Manage sub-menu is visible. Click **Appearance** and then select **Generate sub-theme**.



- ___ b. In the Generate sub-theme page, enter the following values:

- Sub-theme name: custom_think_theme
- Sub-theme type: CSS
- Template: Business Mono

The first step in customizing the branding of your Developer Portal is to create a custom sub-theme. The sub-theme inherits all of the resources of the parent theme, and you can then override specific resources. For more information, see: [Knowledge Center](#)

Complete the form below and you will be presented with a custom sub-theme to download.

Sub-theme name *

A custom theme name, for example: 'mycustom_theme' or 'banka_theme'. The name does not need to end in '_'.
Sub-theme type

CSS
 SCSS

Your sub-theme can be setup to use either CSS or SCSS. SCSS is an extension to CSS and is for more advanced themes.

Template

Default Connect Theme
 Business Mono

Click **Generate**.

- ___ c. The sub-theme can be downloaded from the link on the page.

Success. Your sub-theme can be downloaded here: [custom_think_theme.zip](#). This download will be available for 24 hours.

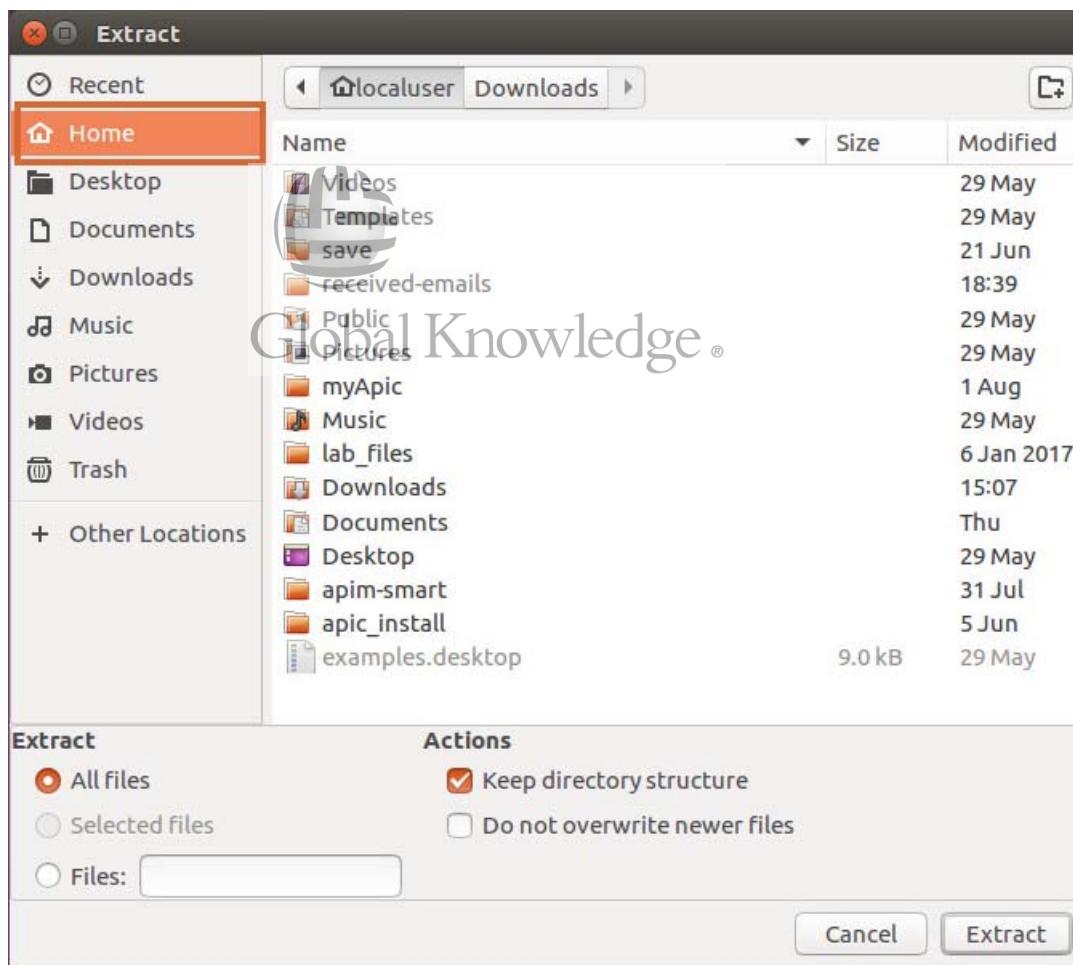
Click **custom_think_theme.zip**.

- ___ d. In the Opening custom_think_theme.zip dialog, select **Save File**. Then, click **OK**.
- ___ e. The file is saved to the /home/localuser/Downloads folder.
- ___ 2. Extract the resources from the sub-theme file to the Home directory.
- ___ a. Click the Files icon from the application list on the Ubuntu desktop.

- __ b. Go to the Downloads directory. Then, right-click **custom_think_theme.zip** and select **Open with Archive Manager**.



- __ c. With the Archive Manager open, click **Extract**.
__ d. In the Extract dialog, select the Home directory in the left column.



Then, select **Extract**.

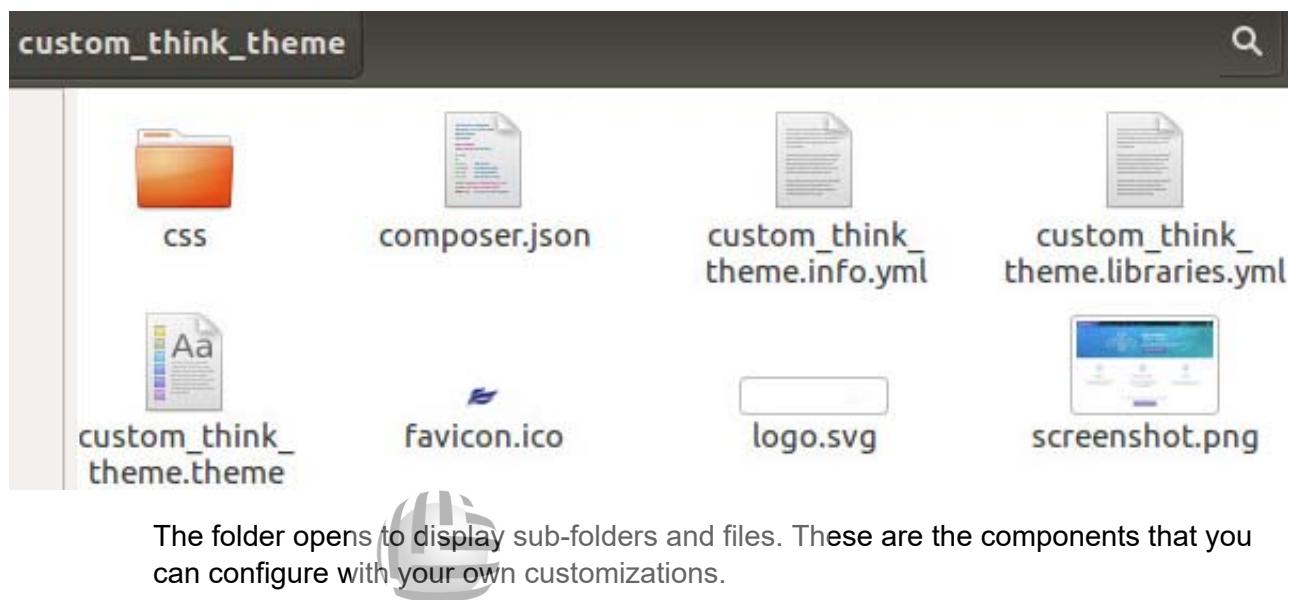
- e. The extraction completes successfully. In the dialog that is displayed, click **Show the Files**.
- f. A folder that is named `custom_think_theme` is displayed in the Home directory.



5.3. Review and customize the sub-theme

In this part, you review the resources that were extracted from the generated sub-theme file. In the exercise, you work through the method of customizing a sub-theme by making minor modifications to the sub-theme that is generated.

- 1. Review the contents of the sub-theme folder.
 - a. With the File Manager open in the Home directory, double-click the `custom_think_theme` folder.



The folder opens to display sub-folders and files. These are the components that you can configure with your own customizations.

Table 1. Sub-theme file properties

File name	Description
<code>overrides.css</code>	This file is located in the <code>css</code> folder in the sub-theme. This stylesheet overrides the fonts, colors, and other defaults from the inherited base IBM API Connect theme that is named <code>connect_theme</code> .
<code>screenshot.png</code>	The file contains a screen capture of the home page for the custom theme. It is used in the appearance settings so that you can easily find the theme that you want to enable and set as the default theme. When you are finishing completing the edits to the <code>overrides.css</code> file and the welcome banner is set up to your satisfaction, you should take a screen capture of the developer portal home page. Capture it with some screen capture tool and place the file in the top-level directory of the theme file. The name of this screen capture file is specified in the <code>theme.info</code> file.
<code>composer.json</code>	The <code>composer.json</code> file contains information about the API Connect Developer Portal repository on GitHub.

Table 1. Sub-theme file properties

File name	Description
<sub-theme-name>.info.yml	The info file is a static text file for defining and configuring a sub-theme. The file is in YAML format and contains the name of the base theme, the sub-theme name, and the regions and libraries that are defined in the sub-theme.
<sub-theme-name>.theme	Drupal themes get a number of configurable settings options for free. For example, most provide toggle switches for the search box, site slogans, and user pictures. Similarly, most provide widgets to upload files and add a custom logo or favicon. These settings are easy: Drupal adds them to the theme's configuration page by default, so it takes no extra work. However, you want to create your own custom setting: one that adds a hidden field that contains the current release information to the Theme configuration form. To do that, you need to add a file to the theme: <code>theme-settings.php</code> . The function name that is specified within this file needs to be prefixed with the theme name.
<sub-theme-name>.libraries.yml	This file contains a global-styling group. Include the names of the css and js that are used for customizing the sub-theme.
favicon.ico	In web development, you can provide a small logo for your site that appears near the address bar and in the bookmarks folder in a visitor's browser. This logo is called the favicon. Drupal provides a default one, which is the recognizable water drop logo. Using the Drupal logo as the favicon is fine but if you really want to make your site stand out, you should provide your own. Favicon files are in the <code>.ico</code> format and are small in dimensions. The default Drupal favicon is 32 pixels high by 32 pixels wide, many browsers use a 16 x 16 pixel version that can be included in the same file. This standard is used because the favicon is only an icon that shows up in the address bar and favorites (bookmarks) list and typically storage is limited there. Any favicon that you create should be as small.
logo.svg	The default logo that appears at the upper-left side of the developer portal page. In the generated theme, this logo includes the name Acme Bank.

— 2. Customize the cascading stylesheet.

- a. From the File Manager, double-click the `css` folder.
- b. Double-click the `overrides.css` file to open it with the default Gedit editor.

- ___ c. At the top of the file, locate the **footer.footer** element. Then, change the color from hex #fff to hex #df722e. Next, locate the **footer.footer ul.nav > li > a** element. Change the color from hex #777677 to hex #fff.

```
footer.footer
{
  color: #464646;
  background-color: #df722e; ←
  border-top: 2px solid #777677;
}

footer.footer ul.nav > li > a, footer.footer ul.nav > li > a:visit
{
  color: #fff; ←
}
```

- ___ d. **Save** the changes to the overrides.css file.
 ___ e. Close the editor.
-



Information

These changes should change the background color of the footer area of the Staging Developer Portal from white to a rust color, and the text from gray to white.

Original:

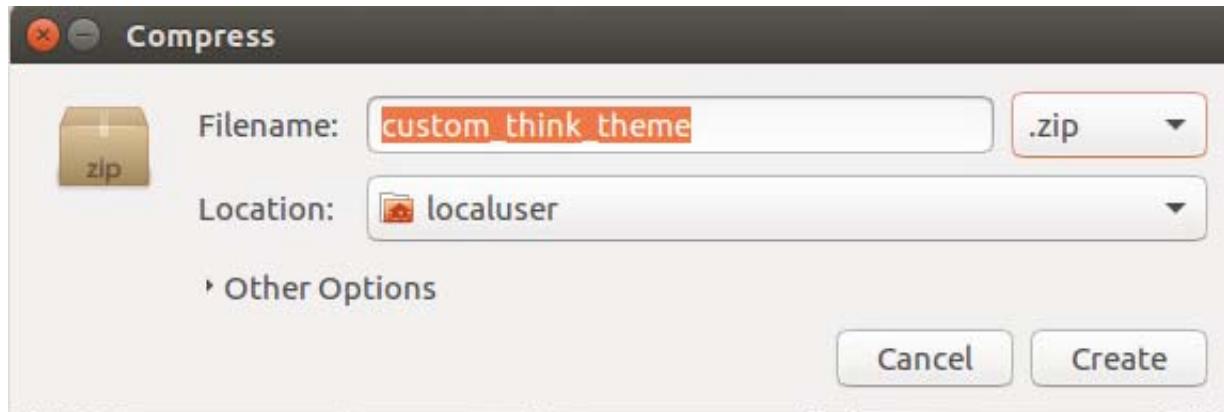


Modified:



-
- ___ 3. Compress all the sub-theme files back into a compressed file.
 ___ a. Go up one level in the File Manager to the Home directory.

- ___ b. Right-click the **custom_think_theme** folder. Then, select **Compress** from the pop-up menu. Select .zip as the output file type.



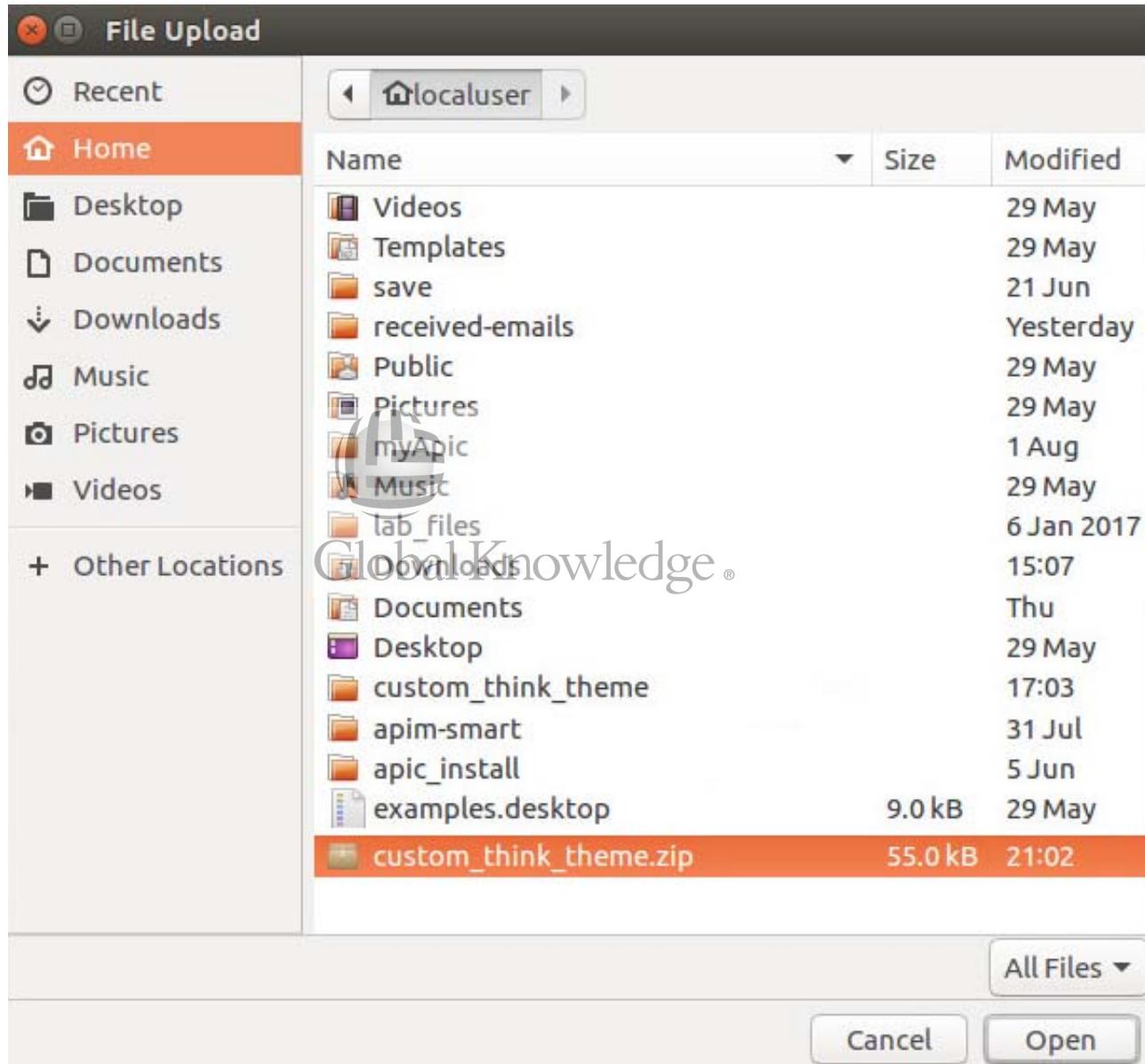
Click **Create**.

- ___ c. The file is created successfully in the Home directory.



5.4. Install the sub-theme on the Developer Portal

- 1. Install the sub-theme onto the Developer Portal.
 - a. From the administration menu, ensure that the Manage menu is selected. Click **Appearance** and then select **Install new theme**.
 - b. Click **Browse**. Then, go to the directory /home/localuser and select the `custom_think_theme.zip` file.



Click **Open**.

- ___ c. Click **Install** to install the theme.

Install new theme

[Home](#) » [Administration](#)

You can find **modules** and **themes** on [drupal.org](#). The following file extensions a

Install from a URL

For example: <https://ftp.drupal.org/files/projects/name.tar.gz>

Or

Upload a module or theme archive to install

[Browse...](#) custom_think_theme.zip

For example: *name.tar.gz* from your local computer

Install

The theme is installed.

- ___ d. Click **Enable newly added themes**.

API Developer Portal

Update manager

 Installation was completed successfully.

custom_think_theme

- Installed *custom_think_theme* successfully

Next steps

- [Enable newly added themes](#)
- [Administration pages](#)

- __ e. Scroll down the list of disabled themes to find the `custom_think_theme` theme.

Disabled themes



`custom_think_theme`
Sub-theme of `connect_theme`.

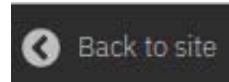
[Enable](#) | [Enable and set as default](#) |
[Uninstall](#)

Click **Enable and set default**.

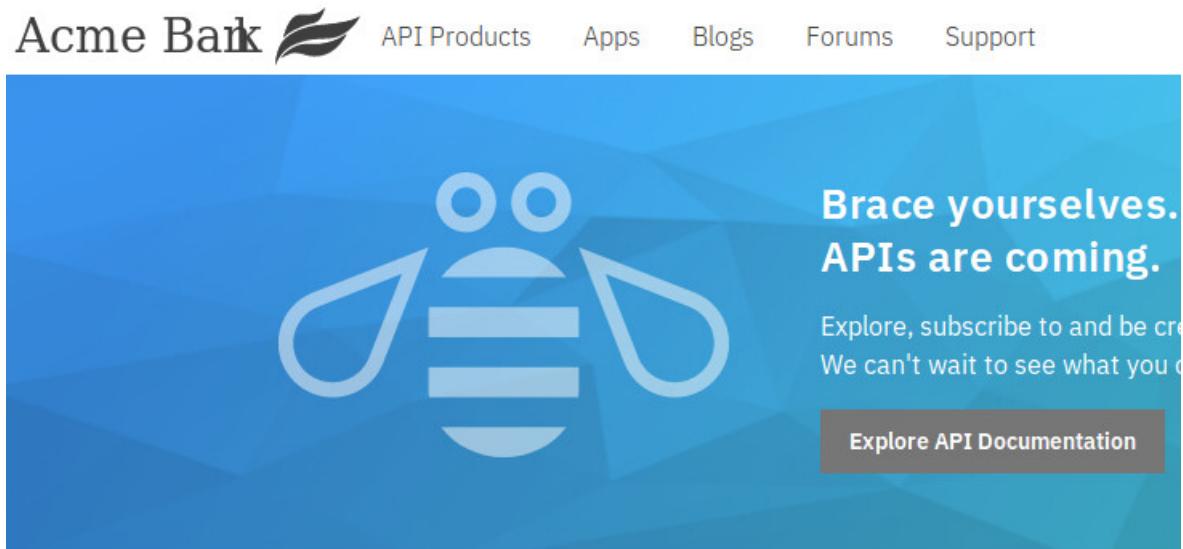
- __ f. The custom theme is now set as the default theme and is listed in the Enabled themes section.

The screenshot shows the 'Appearance' section of the Global Knowledge administration interface. The 'List' tab is selected. A green success message box contains the text: '✓ `custom_think_theme` is now the default theme.'

- __ 2. Click the Back to site icon in the upper left corner of the menu to return to the home page.



- 3. The custom theme is displayed in the Developer Portal.



5.5. Review the role of the forum moderator

In this part, you review the role of the forum moderator that was assigned to one of the Developer Portal developers in an earlier exercise.



Questions

Do you recall the members of the Staging Developer Portal that you created in earlier exercises? You can see the list of users and their roles from the **Manage > People** administration menu.

- ___ 1. Sign out of the admin user in the Developer Portal.
- ___ 2. Sign in to the Staging Developer Portal with the user in the forum moderator role.
 - ___ a. Click **Sign in** at the top of the page in the browser.
 - ___ b. Sign in to the Developer Portal with the credentials:
 - User name: AppDeveloper
 - Password: Passw0rd!
 - ___ c. Click **Sign in**.



- ___ d. You are signed in to the Developer Portal as the AppDeveloper who is also assigned the role of forum moderator.

Notice that the Smart Product 1.0.0 is visible in the list of API Products. The Product was published earlier.

API Products



Smart
Product
1.0.0

Global Knowledge®

- ___ 3. From the menu, click **Forums**.
- ___ 4. You see that two forums are created already. A forum is created for each published API and a general discussion forum is created by default in the Developer Portal.

Forums

[Add new Forum topic](#)

FORUM	TOPICS	POSTS
APIs Get help and advice on the use of our APIs.		
IBM APIM SMart API resources related to the retail industry. Download the swagger.json definition to use in your API Manager.	0	0
General discussion	0	0

- ___ 5. You see that no topics or posts are in either of these two forums.



5.6. Create a topic for the IBM APIM SMart forum (optional)

In this part, you create a topic in the IBM APIM SMart forum. You should already be signed on to the AppDeveloper and select Forums from the menu.

- 1. Click **IBM APIM SMart** to open the forum.
- 2. Add a topic to the forum.
 - a. Click **Add new Forum topic**.
 - b. Type some information. For example:
 - Subject: Troubleshooting
 - Body: This forum is created to discuss help and tips for troubleshooting issues with APIs in the APIM SMart Product.

Create Forum topic

Subject *

Troubleshooting

Forums *

-IBM APIM SMart



Body

B

I



Global Knowledge ®

This forum is created to discuss help and tips for troubleshooting issues with APIs in the APIM SMart Product.

- c. Scroll to the bottom of the page in the portal. Then, click **Save**.

- ___ d. The forum topic is created.



Forum topic *Troubleshooting* has been created.

Troubleshooting

[View](#)

[Edit](#)

[Delete](#)

A

Submitted by
AppDeveloper on Thu,
09/13/2018 - 23:07

Forums

IBM APIM SMart

This forum is created to discuss help and tips for troubleshooting issues with APIs

Add new comment



Global Knowledge®

Subject

- ___ 3. Click the **Forums** link. You see the IBM APIM SMart forum now contains one topic and one post.

FORUM

TOPICS

POSTS

LAST POST

APIs

Get help and advice on the use of our APIs.

IBM APIM SMart

API resources related to the retail industry. Download the swagger.json definition to use in your API Manager.

1

1

By AppDeveloper
seconds ago

End of exercise

Exercise review and wrap-up

In this exercise, you examined the customization options in the Developer Portal. You signed in to the Developer Portal with a Portal administrator account. You generated and customized a Drupal sub-theme. Finally, you reviewed some of the Developer Portal forum options that are available to members of the Developer Portal.



Exercise 6. Creating an application and subscribing to a plan

Estimated time

00:45

Overview

In this exercise, you learn how to create an application and subscribe to a plan in the Developer Portal. You see how an application is migrated from one version to another when the publisher supersedes the published Product on the Staging catalog. You also review the retire and archive actions in API Manager.

Objectives

After completing this exercise, you should be able to:

- Sign on to the Developer Portal as a developer of the consumer organization
- 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



Introduction

You assume the role of the application developer of the consumer organization when you register an application and subscribe to a plan in the first part of the exercise. In the latter part, you assume the role of the owner of the provider organization to make lifecycle changes in API Manager. These lifecycle changes affect the Product subscription that is created in the first part.

Requirements

This exercise requires a workstation with internet access. You can complete this exercise by using the Ubuntu Linux course image that is supplied with the course.

Before doing this exercise, you must complete exercises 1 - 4.

If you do not complete [Exercise 5, "Customizing the Developer Portal,"](#) on page 5-1, then some of the screen captures in this exercise and the following exercise might look slightly different. You should still be able to do the exercises.

Exercise instructions

Preface

Follow the instructions that are provided under the heading "Before you begin" in the Exercises description at the start of this guide.



6.1. Register an application and subscribe to a plan

In this part, you sign on to the Developer Portal as a user in the application developer role, then you register an application that calls the APIs.

- 1. Sign on to the Staging Developer Portal with the application developer role, if you are not already signed on.
 - a. In a browser tab, type `https://portal.think.ibm/think/staging`.
 - b. Click **Sign in** at the top of the page in the browser.
 - c. Sign in to the Developer Portal with the credentials:
 - User name: AppDeveloper
 - Password: Passw0rd!
 - d. Click **Sign in**.
You are signed in to the Developer Portal as an application developer.
- 2. Create an application.
 - a. Click the **Apps** link on the menu of the Developer Portal.



___ c. Type the information.

- Title: SMart Application
- Description: API resources for retail

Create a new application

Title *

Description

Application OAuth Redirect URL(s)

	Remove
--	--------

Add another item

Submit

Click **Submit**.

Global Knowledge®

- ___ d. The application is created successfully. Select the Show option alongside the Key to display the Client ID.

✓ Application created successfully. ×

API Key and Secret

The API Key and Secret have been generated for your application.

Key

a48eb57cef6ddfadece4e721cc06d871 Show

Secret

..... Show

The Secret will only be displayed here one time. Please copy your API Secret and keep it for your records.

 Continue





Information

In some cases, you might need to capture the Client ID and Client Secret in a text editor for later use in a client or web application. Select the **Show** check box next to Key and the **Show** check box next to Client Secret. In the case of the SMart application, only the Client ID (Key) is required to identify the application.

- ___ e. Highlight the Key value and select Copy. Then, open the File Manager in the Home directory. Right-click in the open area and select **New Document >Empty Document**.
- ___ f. Double-click the Untitled Document to open it in the editor. Then, type `Client ID:` on the first line and paste the copied Key value onto the second line in the editor.
- ___ g. Save the Untitled Document as **SmartAppClientID**. Click Save. Then, close the editor.
- ___ h. You see the file in the Home directory. Move the Untitled Document to trash.

- ___ i. Click **Continue**, if necessary.
The SMart application is added.

Applications

SMart Application DEVELOPMENT

[Dashboard](#) [Subscriptions](#)

Description
API resources for retail

___ j. From the application, click the **Subscriptions** tab.

___ k. Scroll down on the page to the Subscriptions area.
Click the link to browse the **available APIs**.

Client Secret

[Verify](#)

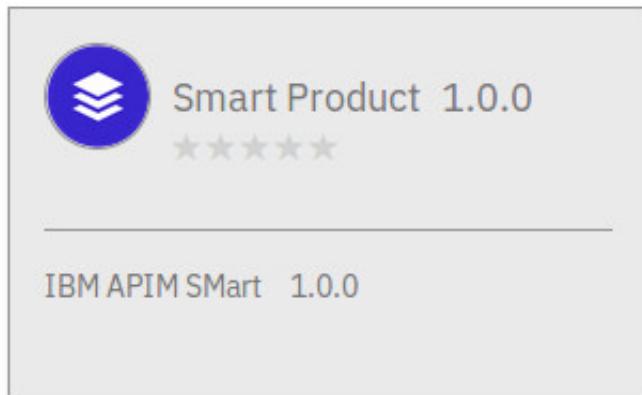


Subscriptions **Global Knowledge®**

PRODUCT	PLAN
No subscriptions found. Why not browse the available APIs?	

- __ I. The Smart Product (V1.0.0) is displayed.

API Products



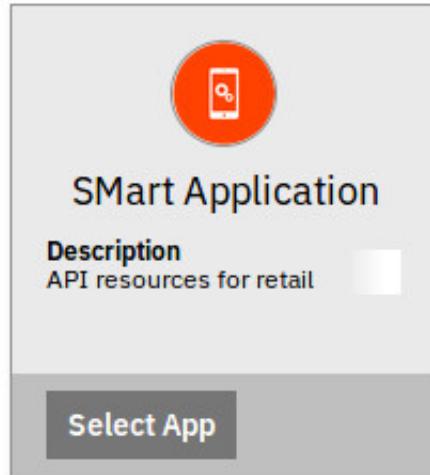
- __ 3. Subscribe to a Product plan.
- __ a. With the API Products menu option selected, click the **Smart Product (v1.0.0)** link.
The details of the Smart Product 1.0.0 is displayed on the page.
- __ b. Go to the Plans area on the page. Then, click the **Subscribe** icon under the Silver Plan.

A screenshot of a product details page for "Smart Product 1.0.0". At the top, there's a circular icon with three bars, the product name, its version "1.0.0", and a row of five gray stars. Below this, the text "Global Knowledge®" is displayed. Under the heading "APIs", there's a card for "IBM APIM SMart 1.0.0". In the "Plans" section, three plans are listed: "Default Plan", "Silver Plan", and "Gold Plan". The "Silver Plan" card has a "Subscribe" button, which is highlighted with a red box. Below the plans, a "View details" button is visible.

Plans

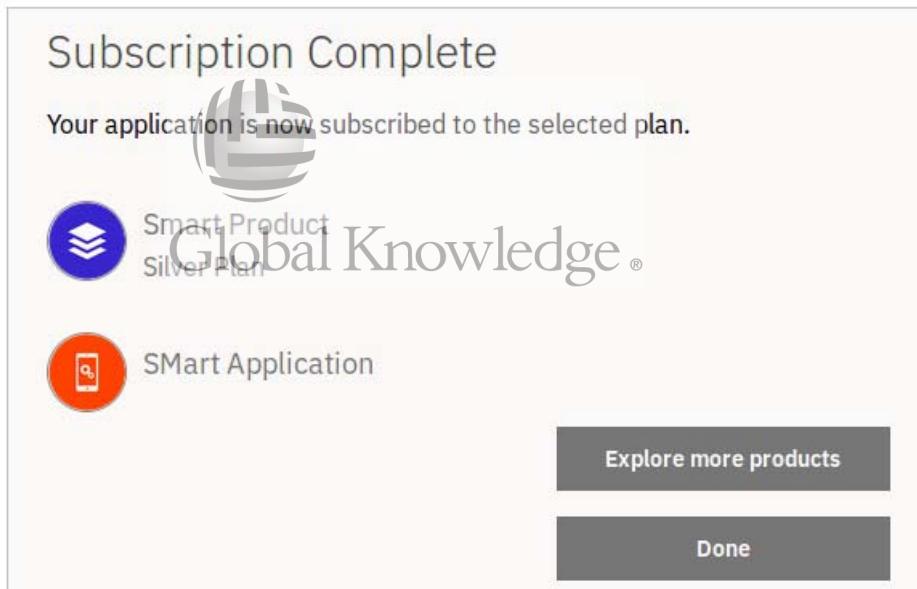
Default Plan	Silver Plan	Gold Plan
Subscribe	Subscribe	Subscribe
View details ▾		

- ___ c. In the Subscribe dialog box, select the **SMart Application** to subscribe the application to the plan.



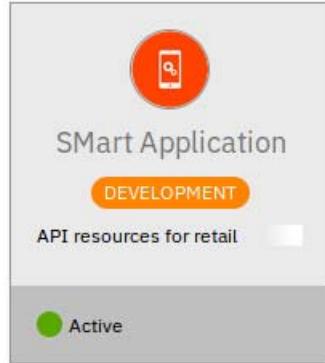
Click **Select App**.

- ___ d. Accept the defaults in the Confirm Subscription dialog. Then, click **Next**.
The application is successfully subscribed to the Silver plan.



- ___ e. Click **Done**.
- ___ 4. Validate that all the APIs in the Product are subscribed to the Silver plan.
- ___ a. On the Developer Portal menu, click the **Apps** link.

- ___ b. Click the **SMart Application** link.



The application details are displayed.

- ___ c. Click the **Subscriptions** tab. Then, navigate to the Subscriptions area on the page. Notice that the smart-product (v1.0.0) is subscribed to the silver plan.

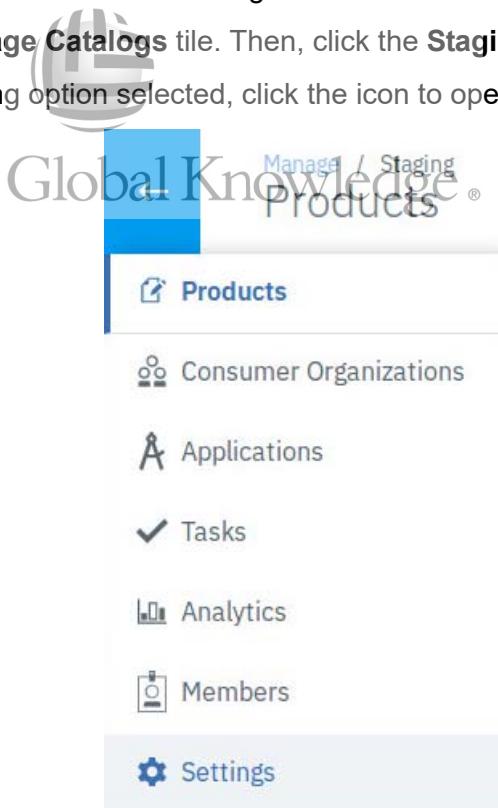
Subscriptions		
PRODUCT	PLAN	
Smart Product (1.0.0)	silver-plan	⋮

- ___ d. Sign out of the AppDeveloper on the Developer Portal.

6.2. Configure lifecycle actions for task self-approval

In this part, you sign on to API Manager as the owner of the provider organization. Recall that in an earlier exercise, the owner of the provider organization created versions of the APIs and Product. Also, recall that the owner in API Manager in this case study is granted permissions to perform all lifecycle changes and needs approval only when publishing a Product. You change the lifecycle approval settings for the Staging catalog so that the owner can self-approve the publishing action.

- 1. Open the API Manager web user interface.
 - a. In the Firefox browser, open API Manager with the URL:
`https://manager.think.ibm/`
 - b. Sign on to API Manager with the credentials of the owner of the Think organization:
 - User: ThinkOwner
 - Password: Passw0rd!
 - c. Click **Sign In**.
 You are signed in to API Manager.
- 2. Configure the lifecycle settings for the Staging catalog.
 - a. Click the **Home** icon from the navigation menu.
 - b. Click the **Manage Catalogs** tile. Then, click the **Staging** tile.
 - c. With the Staging option selected, click the icon to open the **Settings** option.



- ___ d. Click **Lifecycle approvals**.

Lifecycle Approvals

The following lifecycle actions require approval

✓ Publish

Task self approval Off — On

Notice that the publish action requires approval.

- ___ 3. Enable task self approval by sliding the toggle to the On position.
- ___ 4. Click **Confirm** to enable task self-approval.
Task self approval is enabled.

Lifecycle Approvals

The following lifecycle actions require approval

✓ Publish

Task self approval On

The provider organization owner can now self-approve the publishing action.

- ___ 5. Click the return icon from the Settings page.



Manage / Staging
Settings

6.3. Stage the latest version of the Product

In this part, you stage the latest version of the Product (smart-product 2.0.0) that was created in an earlier exercise. When the Product version is in the staged state, additional actions can be performed on the Product version, such as superseding or publishing the Product. Recall that smart-product 1.0.0 is already published.

- 1. Click the Develop option from the Navigation menu.
- 2. Click the **Products** tab.
The list of Products is displayed.

APIs	Products		Add ▾	⋮
Products				
	<input type="checkbox"/> TITLE	LAST MODIFIED		
	<input type="checkbox"/> Smart Product 1.0.0	4 days ago	⋮	
	<input type="checkbox"/> Smart Product 2.0.0	3 days ago	⋮	

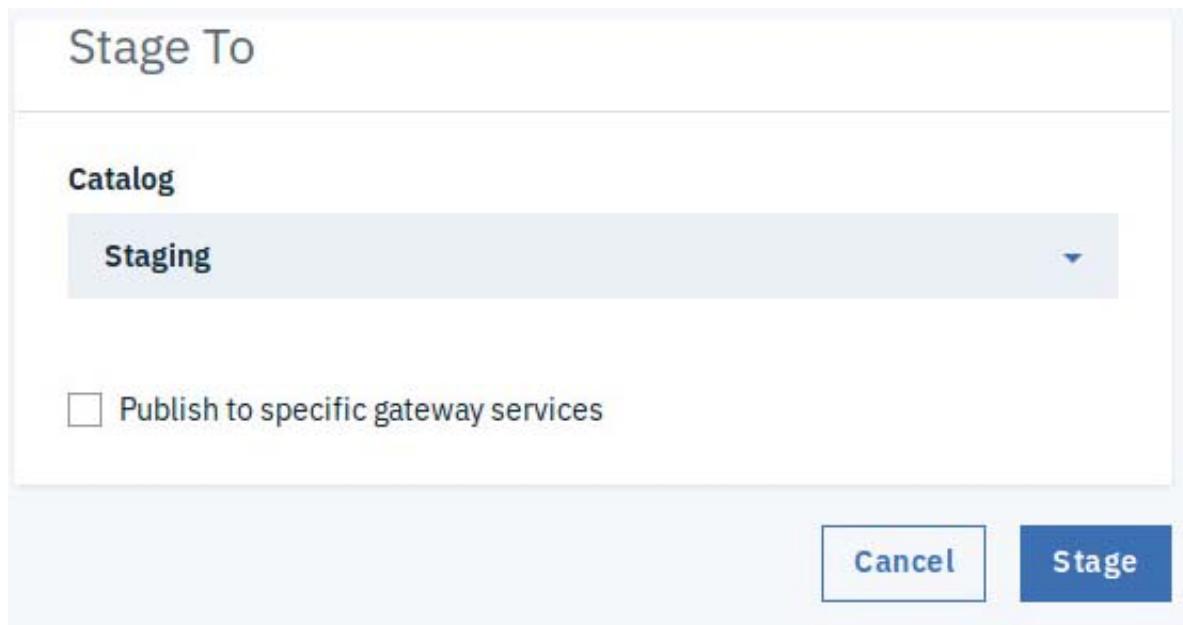
Smart Product 1.0.0 is already published.

Smart Product 2.0.0 exists as a draft version.

- 3. Stage the Smart Product 2.0.0.
- a. Click the list of options ellipsis in the Smart Product 2.0.0 row. Then, click **Stage**.



- ___ b. In the Stage To page, select **Staging** from the catalog drop-down list. Leave the Publish to specific gateway services cleared.



Then, click **Stage**.

The Product is staged.

- ___ 4. Verify that the Product is staged.
- ___ a. Click **Manage** from the navigation menu.
 - ___ b. Click the **Staging** tile.
 - ___ c. You see that the Smart Product version 2.0.0 is successfully staged to the Staging catalog.

TITLE	NAME	STATE	
> Smart Product	smart-product 1.0.0	Published	⋮
> Smart Product	smart-product 2.0.0	Staged	⋮

6.4. Start the email server

When you supersede a product, email notifications are sent to members who are subscribed to the Product.

- 1. Open the email server.

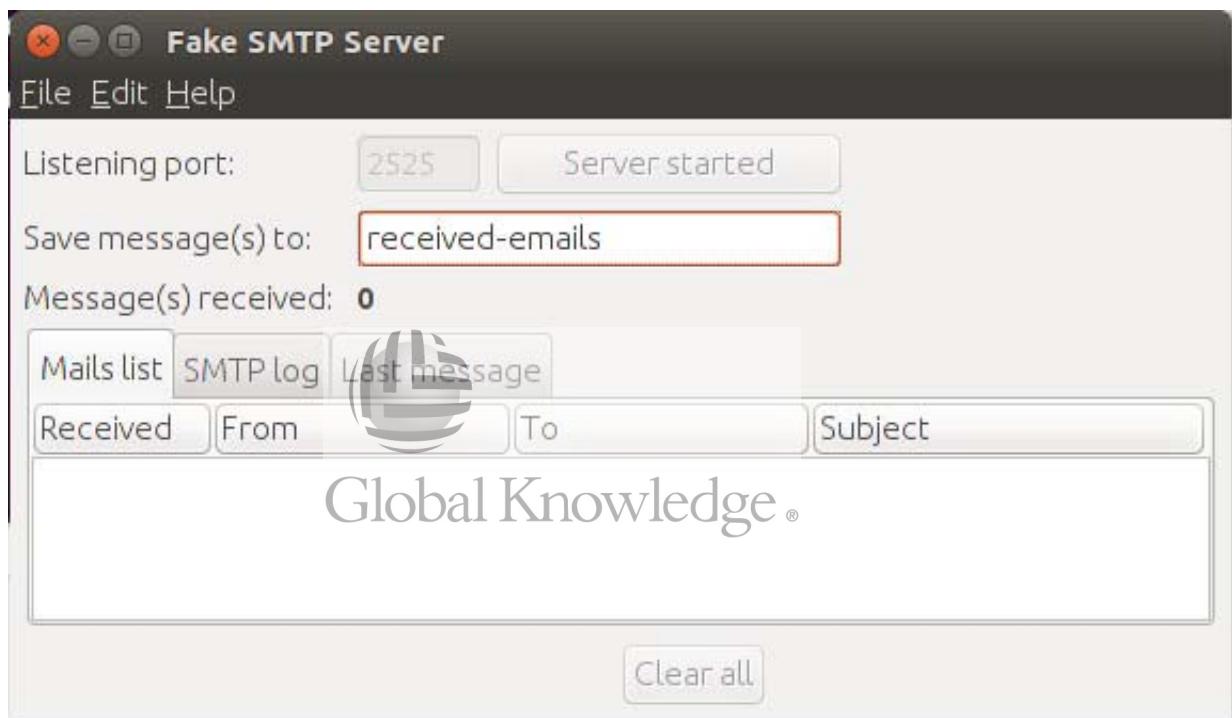
The email server runs as a Java application on the course image.

- a. Open a terminal from the application list on the Ubuntu desktop.
Ensure that you are in the /home/localuser directory.

In the terminal type:

```
java -jar /usr/local/bin/fakeSMTP-2.0.jar -s -p 2525
```

- b. The fakeSMTP application is displayed and the server is automatically started.



6.5. Supersede the published Product with the new version

Assume that Smart Product version 2.0.0 contains some fixes and new features that are not in Smart Product version 1.0.0. As the owner of the provider organization, you want to automatically migrate all applications that are subscribed to the Product to the later version.

You can choose to replace or supersede the currently published Product version with the new version of the Product. There are subtle differences as to what happens to the original Product version when one or the other of these actions are taken.

In this exercise, you choose to supersede the published Product version with the new version. The superseding Product must be in the staged or deprecated state, and the Product to be superseded must be in the published state.

- 1. You are signed In to API Manager as the owner of the provider organization and you are in the Manage Staging page with the list of Products displayed.
- 2. Supersede the published Product with the new version of the Product.
 - a. Click the list of options ellipsis alongside the Product that you want to supersede.

TITLE	NAME	STATE	
Smart Product	smart-product 1.0.0	Published	
Smart Product	smart-product 2.0.0	Staged	Deprecate Retire Replace Supersede

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- b. Select the Smart Product to supersede smart-product 1.0.0. You must click the smart-product 2.0.0 to highlight the row. The selected icon is displayed.

Select Product

Select a product to supersede smart-product 1.0.0:

Title	Name	State
<input checked="" type="checkbox"/> Smart Product	smart-product 2.0.0	Staged

Cancel **Next**

Then, click **Next**.



- ___ c. In the second page of the dialog box, review the options. Then, select both the Gold Plan and the Silver Plans from their corresponding drop-down lists.

Supersede

Smart Product (smart-product:1.0.0)

With

Smart Product (smart-product:2.0.0)

Migrate Plans

SOURCE	TARGET
default	Choose one...
silver-plan	silver-plan
gold-plan	gold-plan

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Cancel **Supersede**

Click **Supersede**.

- ___ d. Smart Product version 1.0.0 is superseded by Smart Product version 2.0.0 on the Staging catalog.
- ___ e. The Product list is displayed with the new states of the two Products.

TITLE	NAME	STATE	
> Smart Product	smart-product 1.0.0	Deprecated	:
> Smart Product	smart-product 2.0.0	Staged (Published pending)	:

Smart Product version 2.0.0 is now in the published pending state.
 Smart Product version 1.0.0 is in the deprecated state.

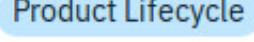
- ___ 3. Publish smart-product 2.0.0.

Earlier, the owner of the provider organization changed the settings to task self-approval.

- ___ a. From the navigation menu, select the Tasks icon.
- ___ b. The list of waiting approvals is displayed.

[Manage](#) / [Staging](#)

Tasks

Approval Tasks	Requested Approvals
<p>Task to published product: smart-product:2.0.0  12 minutes ago</p>	Decline Approve

Click **Approve**.

- ___ c. The task is approved and the smart-product 2.0.0 is published.
- ___ 4. Click the Products icon in the navigation menu. You see that the smart-product 2.0.0 is published.

TITLE	NAME	STATE	⋮
> Smart Product	smart-product 1.0.0	Deprecated	⋮
> Smart Product	smart-product 2.0.0	Published	⋮

- ___ 5. Email notifications are sent to the developer and owner of the Product.

Fake SMTP Server

File Edit Help

Listening port: 2525 Server started

Received message(s) to: received-emails

Message(s) received: 4

Mails list SMTP log Last message

Received	From	To	Subject
7:12:31 PM	admin@think.ibm	developer@think....	Request for approval to published ..
7:12:31 PM	admin@think.ibm	owner@think.ibm	Request for approval to published ..
7:12:32 PM	admin@think.ibm	owner@think.ibm	Request received to published API ..
7:27:32 PM	admin@think.ibm	owner@think.ibm	Request approved to published AP..

Clear all

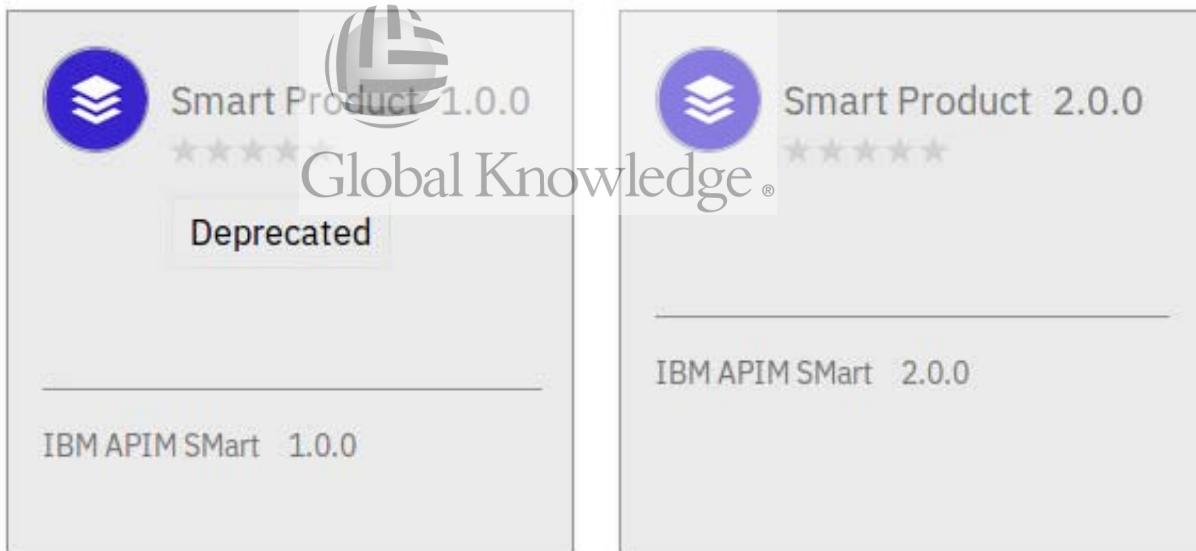
- ___ 6. Sign out of API Manager.



6.6. Review the status of the application on the Developer Portal

In this part, you sign on to the Developer Portal as the member `AppDeveloper` in the application developer role. You review how the lifecycle updates that were made in API Manager affects the application in the Developer Portal.

- 1. Sign on to the Staging Developer Portal with the application developer role.
 - a. In a browser tab, type `https://portal.think.ibm/think/staging`.
 - b. Click **Sign in** at the top of the page in the browser.
 - c. Sign in to the Developer Portal with the credentials:
 - User name: `AppDeveloper`
 - Password: `Passw0rd!`
 - d. Click **Sign in**.
You are signed in to the Developer Portal.
- 2. Review the status of the API Products.
 - a. Click **API Products** from the menu of the Developer Portal.
 - b. The two Smart Product versions are displayed.



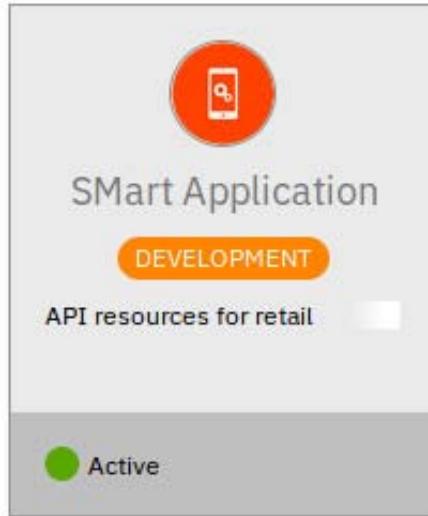
Smart Product (v1.0.0) is marked as Deprecated.



Information

It might take some time before you see the Deprecated message under Smart Product (v1.0.0) while the Management server updates the information on the Developer Portal. You do not need to wait to see this status change and you can verify it later.

- ___ 3. Review the status of the registered applications.
- ___ a. Click **Apps** from the menu of the Developer Portal.
- ___ b. Click the **SMart Application** link.



- ___ c. Click the Subscriptions tab on the page. Then, scroll down to the subscriptions area.

Subscriptions		
PRODUCT	PLAN	
Smart Product (1.0.0)	silver-plan	Migrate this subscription to plan 'silver-plan' in product 'Smart Product' at version '2.0.0'

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You see that the smart-product (v1.0.0) is still subscribed to the Silver plan. However, a message link prompts that a new version of this plan is published.
Click the message link.

- ___ d. You are prompted with another dialog box that asks whether you really want to migrate the application to the new version of the plan.

Migrate the subscription for *SMart Application*?

Are you sure you want to migrate this subscription? This action cannot be undone.

Click **Migrate subscription**.

- ___ e. You see a message that the application subscription migrated successfully.



Application subscription migrated successfully.

- ___ 4. Confirm that the SMart application is now subscribed to smart-product 2.0.0.
- ___ a. Scroll down to the Subscriptions area on the page.
You see that the application is subscribed to the smart-product (2.0.0) with the silver plan.

Subscriptions		
PRODUCT	PLAN	
Smart Product (2.0.0)	silver-plan	:

- ___ 5. The application developer has successfully subscribed the application to the new version of the Product plan.
- ___ 6. Sign out member AppDeveloper from the Developer Portal.
- ___ 7. Close the email server.



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End of exercise

Exercise review and wrap-up

In this exercise, you registered an application and subscribed to a plan in the Developer Portal. In the last part, you saw how an application is migrated from one version to another when the publisher supersedes the published Product on the Staging catalog.





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Exercise 7. Calling an API on the gateway and monitoring API usage

Estimated time

01:00

Overview

In this exercise, you test the operations for the APIs in Smart Product 2.0.0. The APIs that you are going to test are the APIs for which you created an assembly in an earlier exercise. You use the test feature in the Developer Portal. The operations call to the API endpoint on the gateway and then forwards the request to the back-end service. You run a script to generate API calls and review the API analytics capabilities for both the consumer and provider organizations.

Objectives

After completing this exercise, you should be able to:

- 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 analytical elements in the Visualize dashboard for a catalog
- Change the time period filter for a visualization
- View API event data
- Export the API event data for a specified time range

Introduction

Analytical data is captured in real time on the gateway in API Connect based on the calls that are made to the API endpoints that are published to the gateway. In the first part of the exercise, you use the Developer Portal test feature to determine the API endpoint request URI on the gateway. You run a script that simulates a number of calls to APIs on the gateway. Then, you review the analytics in the Developer Portal and API Manager.

Requirements

This exercise requires a workstation with internet access. You can complete this exercise by using the Ubuntu Linux course image that is supplied with the course.

Before doing this exercise, you must complete all previous exercises. The only exercise that is optional is [Exercise 5, "Customizing the Developer Portal,"](#) on page 5-1.



Exercise instructions

Preface

Follow the instructions that are provided under the heading "Before you begin" in the Exercises description at the start of this guide.



7.1. Start the back-end application

The back-end application that you call from the API assembly runs as a local Loopback application.

- __ 1. Open a terminal interface from the Ubuntu list of applications.
- __ 2. Run the apim-smart Node application.
 - __ a. Change to the apim-smart directory in the terminal.
cd ~/apim-smart
 - __ b. Issue the command:
node .

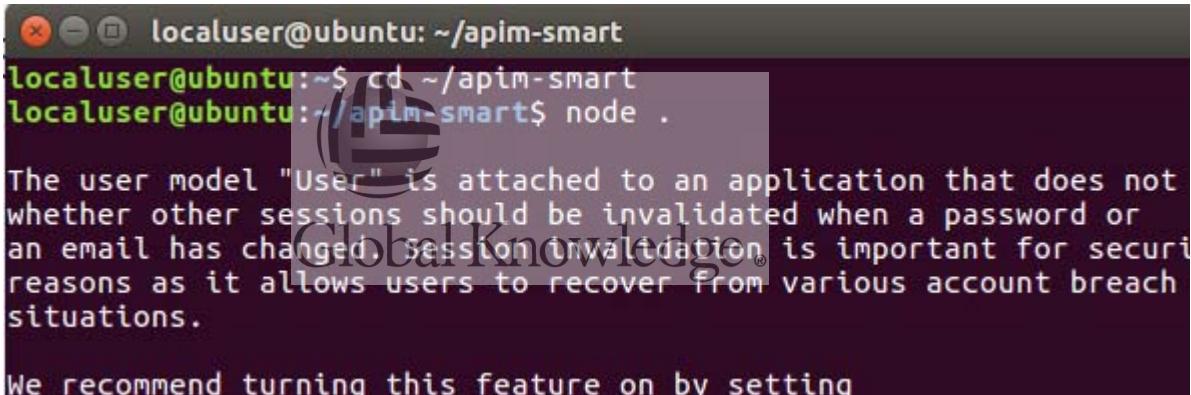


Information

The command is **node** followed by a period.

Alternatively, you can type the command **npm start**.

- __ c. The application starts in the terminal.



A screenshot of a terminal window on an Ubuntu system. The terminal window title is "localuser@ubuntu: ~/apim-smart". The user has run the command "cd ~/apim-smart" and then "node ." to start the application. A message is displayed: "The user model "User" is attached to an application that does not handle session invalidation. Session invalidation is important for security reasons as it allows users to recover from various account breach situations." Below this message, a note says "We recommend turning this feature on by setting".

- __ d. Leave the terminal running.

7.2. Review the API endpoint calls in the Developer Portal

In this part, you test the APIs in the Developer Portal. When you test the published API operations in the Developer Portal, you call the API on the gateway server. The gateway server routes the call to the back-end application.

- 1. Sign on to the Staging Developer Portal with the application developer role.
 - a. In a browser tab, type `https://portal.think.ibm/think/staging/`.
You see the public page for the Developer Portal of the Staging catalog.
 - b. Sign in to the Developer Portal with the credentials:
 - User name: AppDeveloper
 - Password: Passw0rd!
 - c. Click **Sign in**.
You are signed in to the Developer Portal as an application developer.
- 2. Click **API Products**.
Then, select Smart Product (2.0.0)
- 3. Click **IBM APIM SMart 2.0.0** in the list of APIs to open the API.
- 4. Test the GET /products API operation in the Developer Portal.

The screenshot shows the API details page for the GET /products operation. The page has a sidebar with various API endpoints like DELETE /stores/{id}, PUT /stores/{id}, etc. The main content area has a title "Find all instances of the model matched by filter from the data source." with a "product" tag. It shows the method as "GET", the URL as "Production, Development: https://gw.think.ibm/think/staging/smart/v1/products", and a security requirement "clientIdHeader" with "X-IBM-Client-Id" as the header value. A "Try it" button is also present.

Method	URL	Security
GET	https://gw.think.ibm/think/staging/smart/v1/products	clientIdHeader X-IBM-Client-Id

- ___ b. Scroll down with the Details tab selected until the cURL request for the GET /products operation is displayed.

Example
request

curl

```
curl --request GET \
--url 'https://gw.think.ibm/think/staging/smart/
v1/products?filter=REPLACE_THIS_VALUE' \
--header 'accept: application/json'
```

Notice the URL for the operation indicates that the call is made to the gateway.

- ___ c. Scroll back up in the page. Then, click the Try it tab.

Details **Try it**

GET	Production, Development:	https://gw.think.ibm/think /staging/smart/v1/products
Security	 Global Knowledge [®] Client ID	
	SMart Application	

Notice that the Client ID is automatically retrieved from the SMart Application.

__ d. Scroll down. Then, click **Send**.

The screenshot shows a user interface for a REST API testing tool. At the top, there's a header section labeled "Parameter". Below it, there are two expandable sections: "Header" and "Query". The "Header" section is expanded, showing an "Accept" field set to "application/json". The "Query" section is also expanded, showing a "filter" field with the placeholder text "Filter defining fields, where, include, order, ...". At the bottom right of the interface are three buttons: "Copy as cURL" (with a blue icon), "Reset" (grey button), and "Send" (dark grey button). To the right of the interface, there's a vertical orange bar.

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- __ e. The request is sent and the result is displayed.

Request

```
GET https://gw.think.ibm/think/staging/smart/v1/products
Headers:
Content-Type: application/json
Accept: application/json
X-IBM-Client-Id: a48eb57cef6ddfadec
e4e721cc06d871
```

Response

```
Code: 200 OK
Headers:
content-type: application/json
x-global-transaction-id: 860398635b
a2ecc6000108e3
x-ratelimit-limit: name=Default rate-limit,100;
x-ratelimit-remaining: name=Default
rate-limit,99;
[
{
  "product_id": "apples",
  "name": "apples®",
  "description": "A waxy fruit grown in Europe and Central Asia.",
```



- ___ f. Click one of the other operations. Then, return to the GET /products operation. Refresh the page. Then, from the Try it tab click **Copy as cURL**.

The screenshot shows the 'Try it' interface for a GET /products operation. It has three main sections: 'Header' (Accept: application/json), 'Content-Type' (application/json), and 'Query' (filter). At the bottom right are buttons for 'Copy as cURL', 'Reset', and 'Send'. The 'Copy as cURL' button is highlighted with a blue border.

- ___ g. Open a new terminal window. Leave the other terminal window that is running the back-end NodeJS application.
 ___ h. In the new terminal, use the Edit > Paste option to paste the curl command.

```
localuser@ubuntu:~/apim-smart
localuser@ubuntu:~/apim-smart$ curl --request GET \ --url 'https://gw.think.ibm/think/staging/smart/v1/products?filter=REPLACE_THIS_VALUE' \ --header 'accept: application/json'
```

- ___ i. Change the command to turn off certificate variation, remove the '\' characters, and include the X-IBM-Client-Id header. Replace the value of the X-IBM-Client-Id with the Key that was generated when you created the application.

```
curl -k --request GET --url
'https://gw.think.ibm/think/staging/smart/v1/products' --header 'accept:
application/json' --header 'X-IBM-Client-Id:
a48eb57cef6ddfadece4e721cc06d871'
```

- __ j. Run the command in the terminal and view the result.

```
localuser@ubuntu:~/apim-smart$ curl -k --request GET --url 'https://gw.think.ibm/think/staging/smart/v1/products' --header 'accept: application/json' --header 'X-IBM-Client-Id: a48eb57cef6ddfae4e721cc06d871' [{"product_id": "apples", "name": "apples", "description": "A waxy fruit grown in Europe and Central Asia.", "image": "/images/apples.png", "price": 1.49, "rating": 3}, {"p
```



Information

You will use the same cURL request that is used in the Developer Portal in the scripts to generate calls in the next part.

-
- __ 5. Test the GET /products/count operation in the Developer Portal.
- __ a. In the list of API operations, select **GET /products/count**
 - __ b. Scroll back up in the page. Then, click the **Try it** tab.
 - __ c. Then, click **Send**.



- ___ d. The request is sent to the gateway and the response is returned from the back-end application.

Request

```
GET https://gw.think.ibm/think/staging/smart/v1/products/count  
Headers:  
Content-Type: application/json  
Accept: application/json  
X-IBM-Client-Id: a48eb57cef6ddfadec  
e4e721cc06d871
```

Response

```
Code: 200 OK  
Headers:  
content-type: application/json  
x-global-transaction-id: 860398635b  
a3ca2e000342b1  
x-ratelimit-limit: name=Default ratelimit,100;  
x-ratelimit-remaining: name=Default rate-limit,97;
```

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{
"count": 10
}

Notice that the rate limit is counting down each time the API operation is called.

- ___ 6. Sign out of the Developer Portal.

7.3. Run the script that makes calls to the APIs

In this part of the exercise, you run a script that simulates a number of calls to APIs on the gateway.

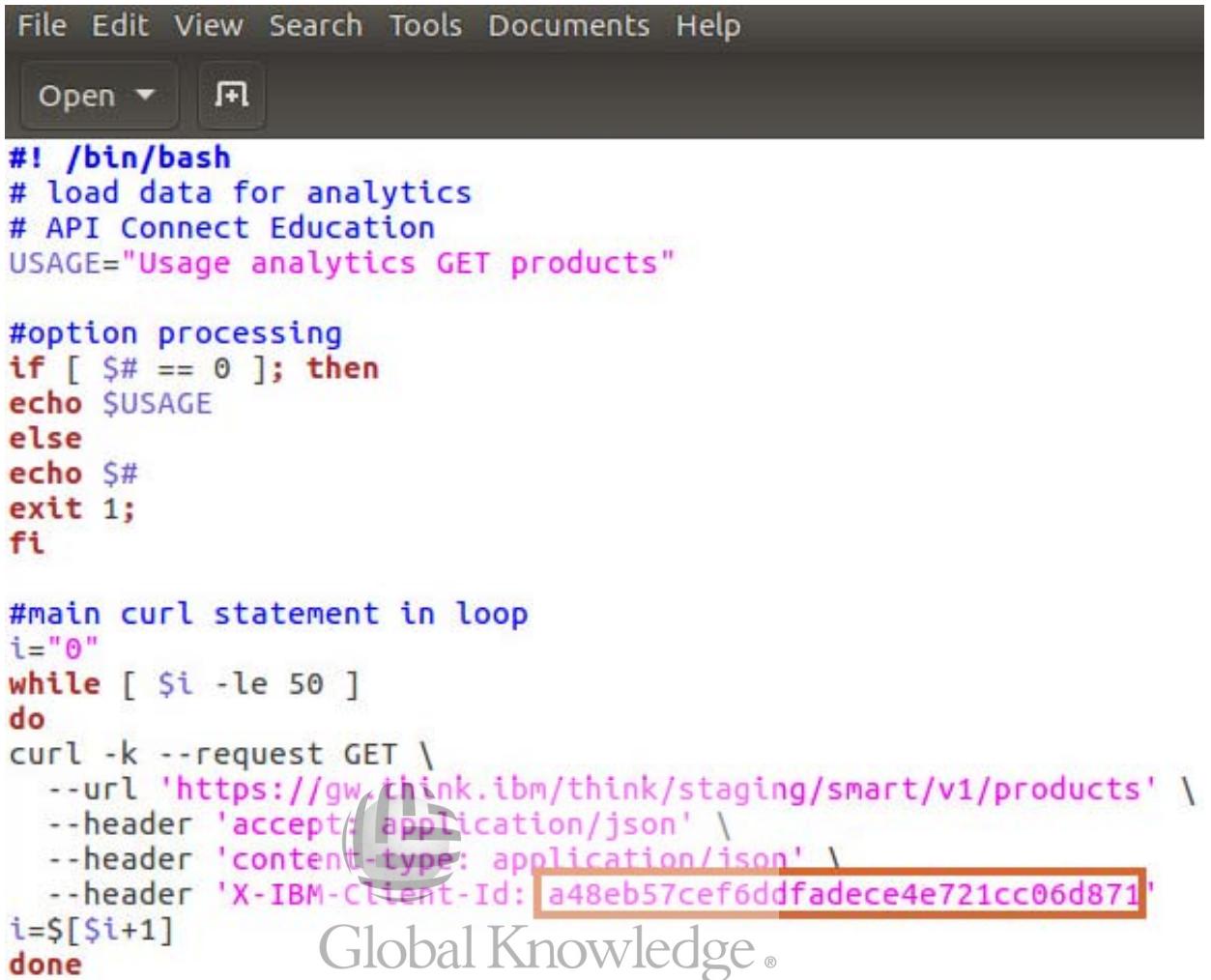
- __ 1. Review the script file for generating the analytics.
 - __ a. Open File Manager. Then, navigate to /home/lab_files/analytics.



You see the `analytics.sh` file.

- __ b. Double-click the `analytics.sh` file to open it with the editor.

- ___ c. The file opens in the editor.



```

File Edit View Search Tools Documents Help
Open ▾ + New

#!/bin/bash
# load data for analytics
# API Connect Education
USAGE="Usage analytics GET products"

#option processing
if [ $# == 0 ]; then
echo $USAGE
else
echo $#
exit 1;
fi

#main curl statement in loop
i="0"
while [ $i -le 50 ]
do
curl -k --request GET \
--url 'https://gw.think.ibm/think/staging/smart/v1/products' \
--header 'accept: application/json' \
--header 'content-type: application/json' \
--header 'X-IBM-Client-Id: a48eb57cef6ddfadece4e721cc06d871'
i=$[ $i+1 ]
done

```

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You see the same cURL statement that is used when testing the API in the Developer Portal.

- ___ d. Change the value in for the X-IBM-Client-Id to match the generated key value of your application.
- ___ e. Save and close the editor and the File Manager.
- ___ 2. Run the script from a terminal.
- ___ a. Open another terminal. Leave the other terminal window that is running the back-end NodeJS application. Then, change to the ~/lab_files/analytics directory.
- ```
cd ~/lab_files/analytics
```

b. Type ./analytics.sh in the terminal.

```
localuser@ubuntu: ~/lab_files/Analytics
er@ubuntu:~/lab_files/Analytics$./Analytics.sh
Analytics GET products
{"product_id": "apples", "name": "apples", "description": "A waxy fruit grown in Central Asia.", "image": "/images/apples.png", "price": 1.49, "rating": 4.5, "category": "Fruit"}, {"product_id": "asparagus", "name": "asparagus", "description": "A spring vegetable from Europe and Africa.", "image": "/images/asparagus.png", "price": 4.99, "rating": 4.0, "category": "Vegetable"}, {"product_id": "bananas", "name": "bananas", "description": "A source of potassium from the tropics.", "image": "/images/bananas.png", "price": 0.69, "rating": 2.5, "category": "Fruit"}, {"product_id": "carrots", "name": "carrots", "description": "A root vegetable found in many countries."}
```

The script calls the GET /products API operation 50 times. You see the responses in the terminal.

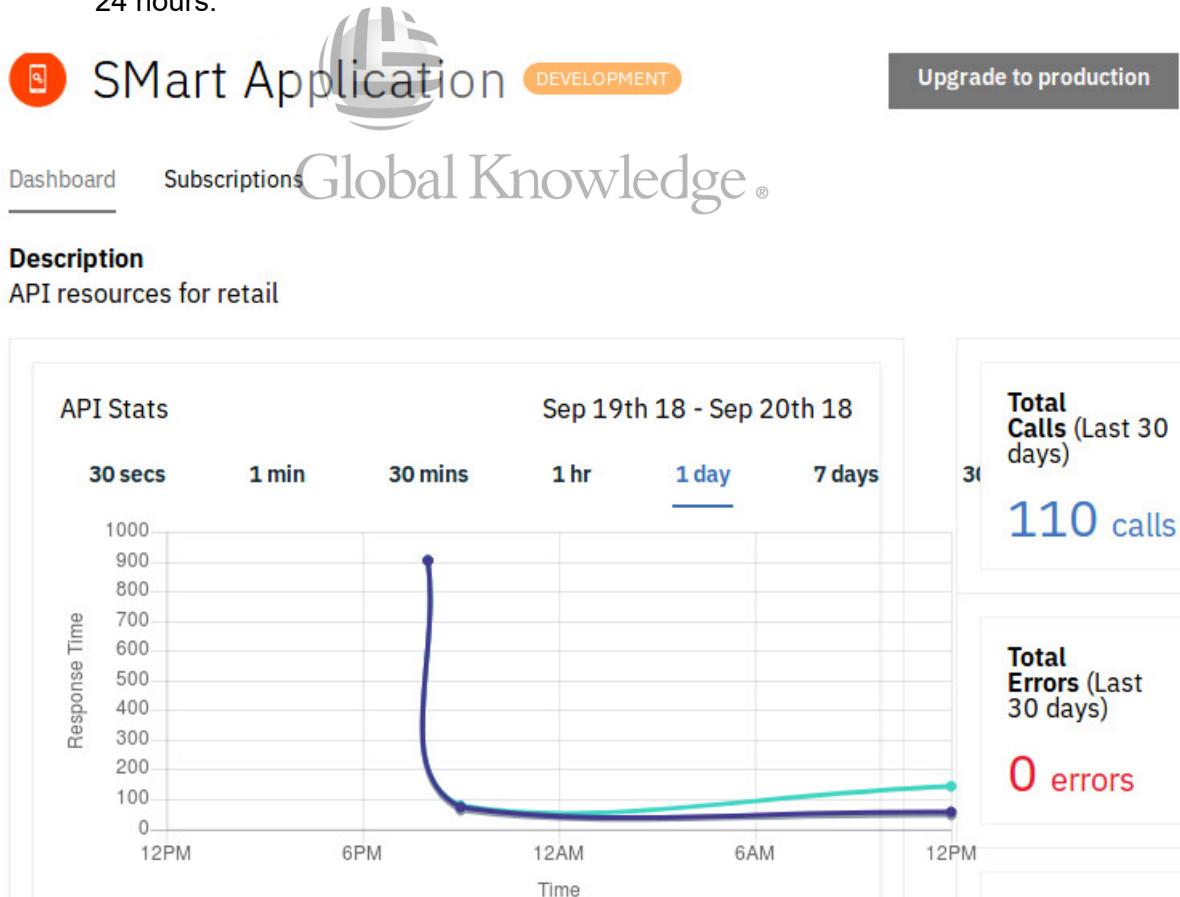
c. Run the script again.



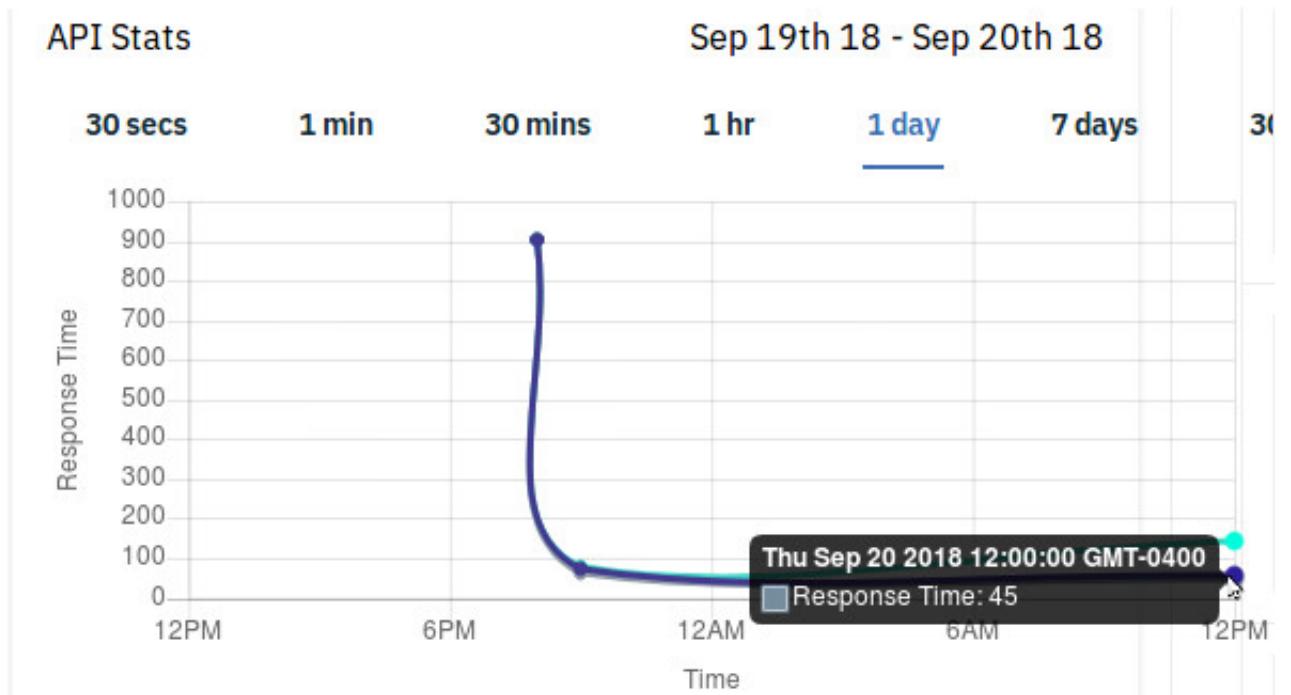
## 7.4. View the analytics data in the Developer Portal

You first review the Analytics as the AppDeveloper to see the usage of the application. Later, you sign on to the owner of the consumer organization to review the analytics for the organization.

- 1. Sign on to the Staging Developer Portal with the application developer role.
  - a. In a browser tab, type `https://portal.think.ibm/think/staging/`.  
You see the public page for the Developer Portal of the Staging catalog.
  - b. Sign in to the Developer Portal with the credentials:
    - User name: AppDeveloper
    - Password: Passw0rd!
  - c. Click **Sign in**.  
You are signed in to the Developer Portal as an application developer.
- 2. Click **Apps**.  
Then, select **Smart Application**.
- 3. Review the analytics for the application.
  - a. The Smart Application dashboard is displayed that shows the statistics for the previous 24 hours.



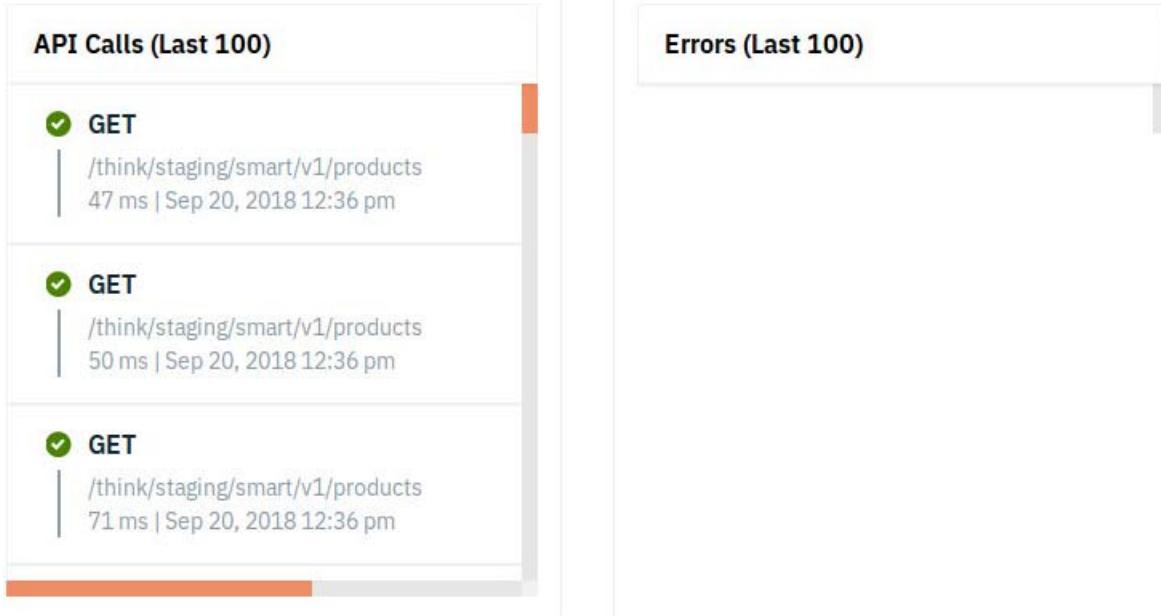
- \_\_\_ b. When you hover over the endpoints, the response time is displayed.



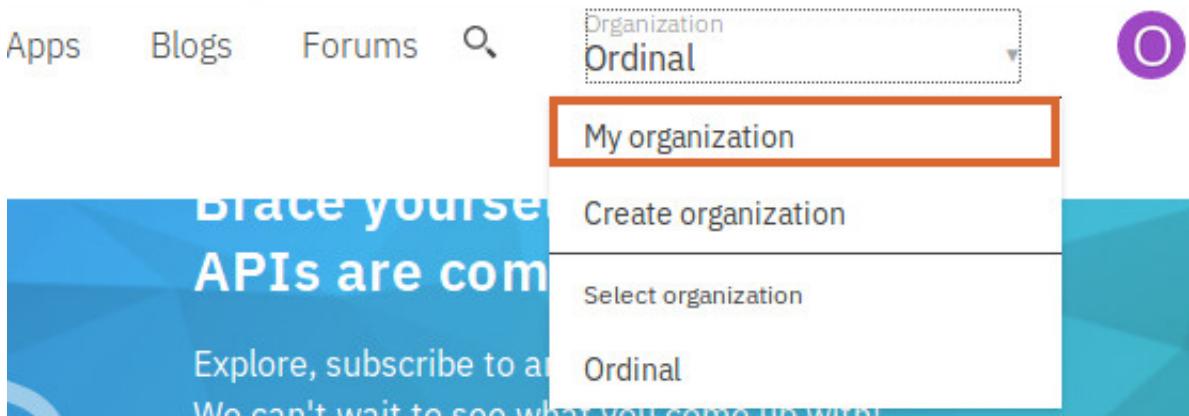
- \_\_\_ c. The application dashboard also contains a block with the average response time.



- \_\_\_ d. Other blocks in the dashboard display the last 100 API calls and last 100 errors.

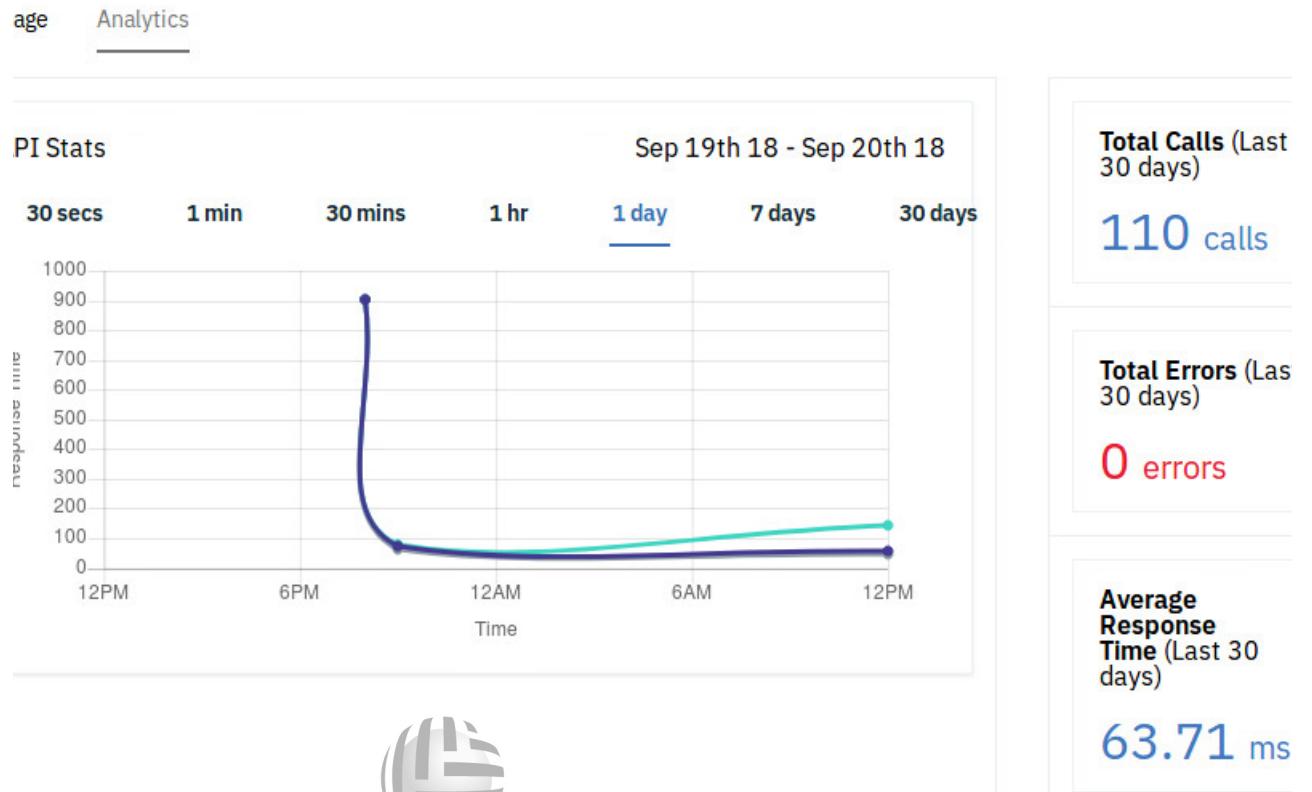


- \_\_\_ 4. Sign out of the AppDeveloper.
- \_\_\_ 5. Sign on to the Staging Developer Portal as the organization owner.
  - \_\_\_ a. Sign in to the Developer Portal with the credentials:
    - User name: OrdinalOwner
    - Password: Passw0rd!
  - \_\_\_ b. Click **Sign in**.  
You are signed in to the Developer Portal as the organization owner
- \_\_\_ 6. Review the analytics for the organization.
  - \_\_\_ a. From the Organization drop-down, select My organization.



- \_\_ b. The analytics for the Ordinal organization are displayed.

## Ordinal

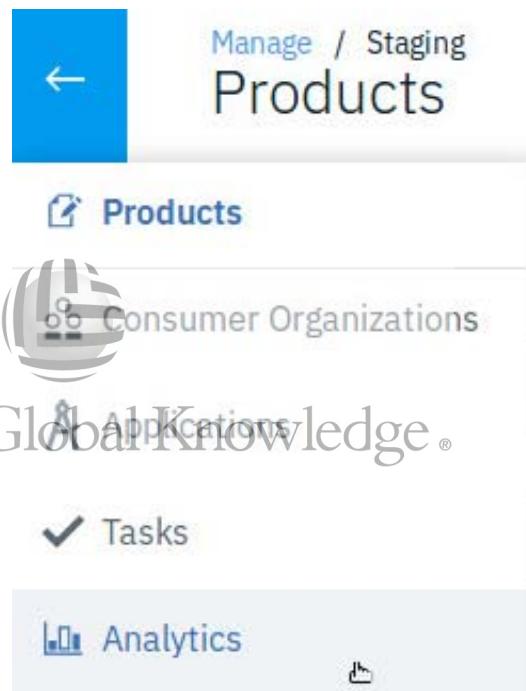


The statistics are identical to what you saw in the AppDeveloper.

- \_\_ 7. Sign out of the Developer Portal.

## 7.5. Browse the analytics data in API Manager

- \_\_\_ 1. Open the API Manager web user interface.
  - \_\_\_ a. In the Firefox browser, open API Manager with the URL:  
`https://manager.think.ibm/`
  - \_\_\_ b. Sign in to API Manager with the credentials of the owner of the Think organization:
    - User: ThinkOwner
    - Password: Passw0rd!
  - \_\_\_ c. Click **Sign In**.  
You are signed in to API Manager.
- \_\_\_ 2. Click Manage in the navigation menu. Then, click the Staging tile.
- \_\_\_ 3. Select **Analytics** from the Manage Staging navigation menu.



4. The Analytics Service dashboard is displayed.

The screenshot shows the Analytics Service dashboard interface. At the top, there are tabs for 'Discover', 'Visualize', and 'Dashboard', with 'Dashboard' being the active tab. Below the tabs is a search bar labeled 'Search...' and three buttons: '+', 'Export', and 'Import'. The main area displays a table of dashboards:

| <input type="checkbox"/> Name ▾             | Description                                            | Tags  |
|---------------------------------------------|--------------------------------------------------------|-------|
| <input type="checkbox"/> API Default        | replication of api_default from APIC v5                | ADMIN |
| <input type="checkbox"/> Catalog Default    | replication of catalog_default from APIC v5            | ADMIN |
| <input type="checkbox"/> Monitoring Latency | easy dashboard for monitoring the latency of your apis | ADMIN |
| <input type="checkbox"/> Monitoring Status  | easy dashboard for monitoring the status of your apis  | ADMIN |

Click the **Visualize** tab.



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5. The list of standard analytics is displayed.

Manage / Staging  
Analytics      Analytics Service ▾

Discover    Visualize    Dashboard

Visualize

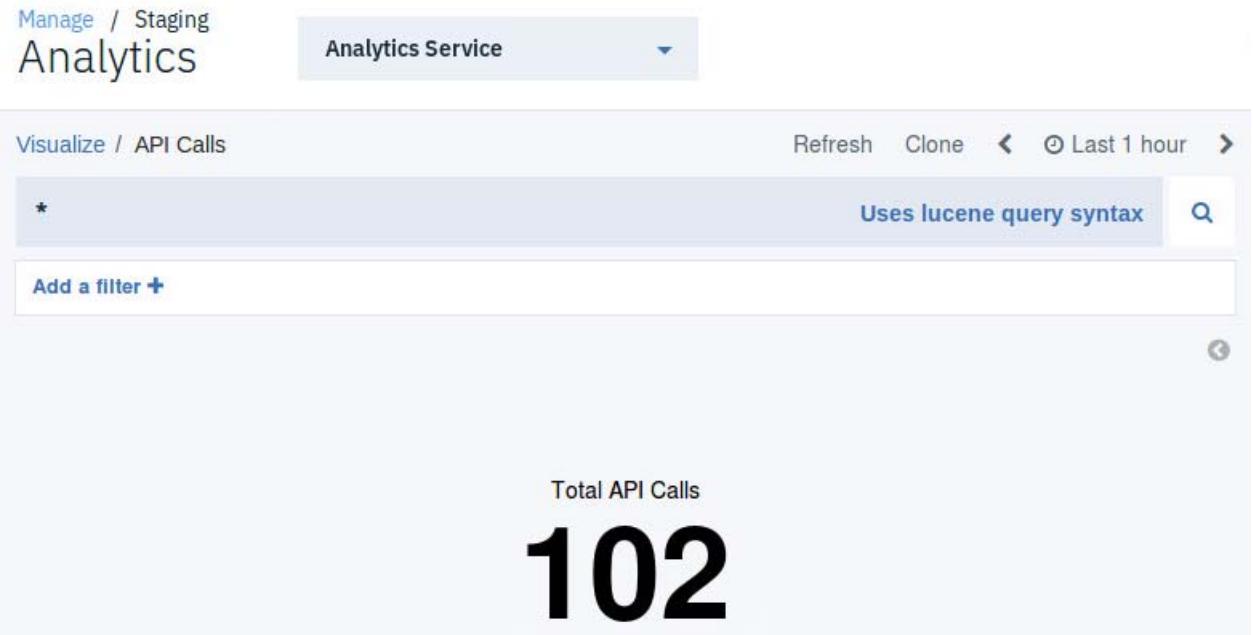
Search...    +    Export    Import    1–19 of 19

| Name                        | Type         | Tags  |
|-----------------------------|--------------|-------|
| API Calls                   | 42 Metric    | ADMIN |
| API Calls per Day           | Vertical Bar | ADMIN |
| Apps Per Plan               | Pie          | ADMIN |
| Average Response Time (ms)  | 42 Metric    | ADMIN |
| Data Usage (bytes received) | Area         | ADMIN |
| Data Usage (bytes sent)     | Area         | ADMIN |
| Developer Organizations     | 42 Metric    | ADMIN |

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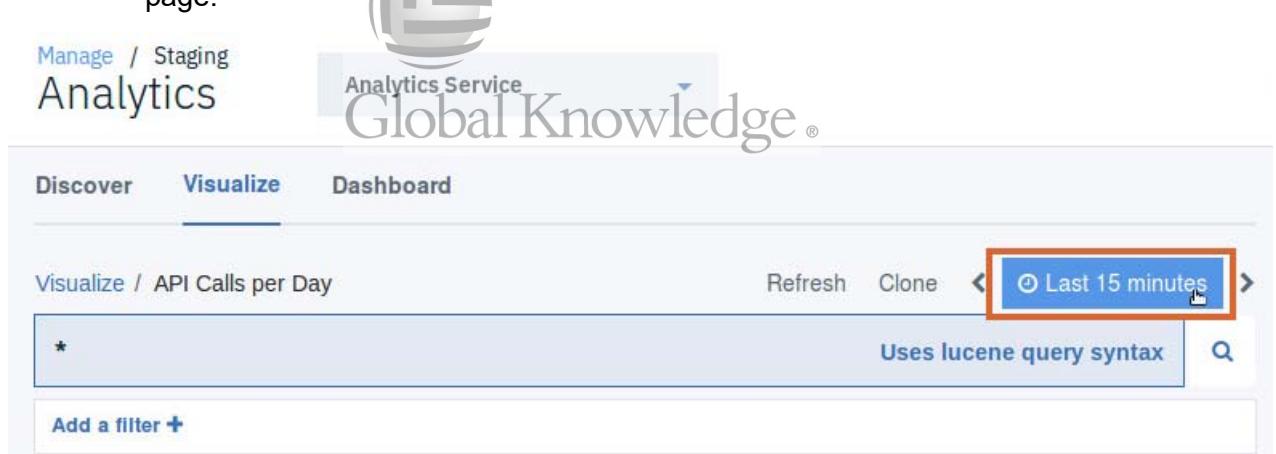
- \_\_\_ 6. Review the captured analytics for the Staging catalog.

- \_\_\_ a. Click the **API Calls** option from the list.



You see the number of calls that were made in the last hour.

- \_\_\_ b. Click the **API Calls per Day** option from the list. Then, click the time filter option on the page.



\_\_ c. Change the time range to **Last 1 hour**.

Manage / Staging  
Analytics

Analytics Service

Discover   Visualize   Dashboard

Visualize / API Calls per Day   Refresh   Clone   Auto-refresh   <    Last 15 minutes   >

Time Range

Quick

Relative

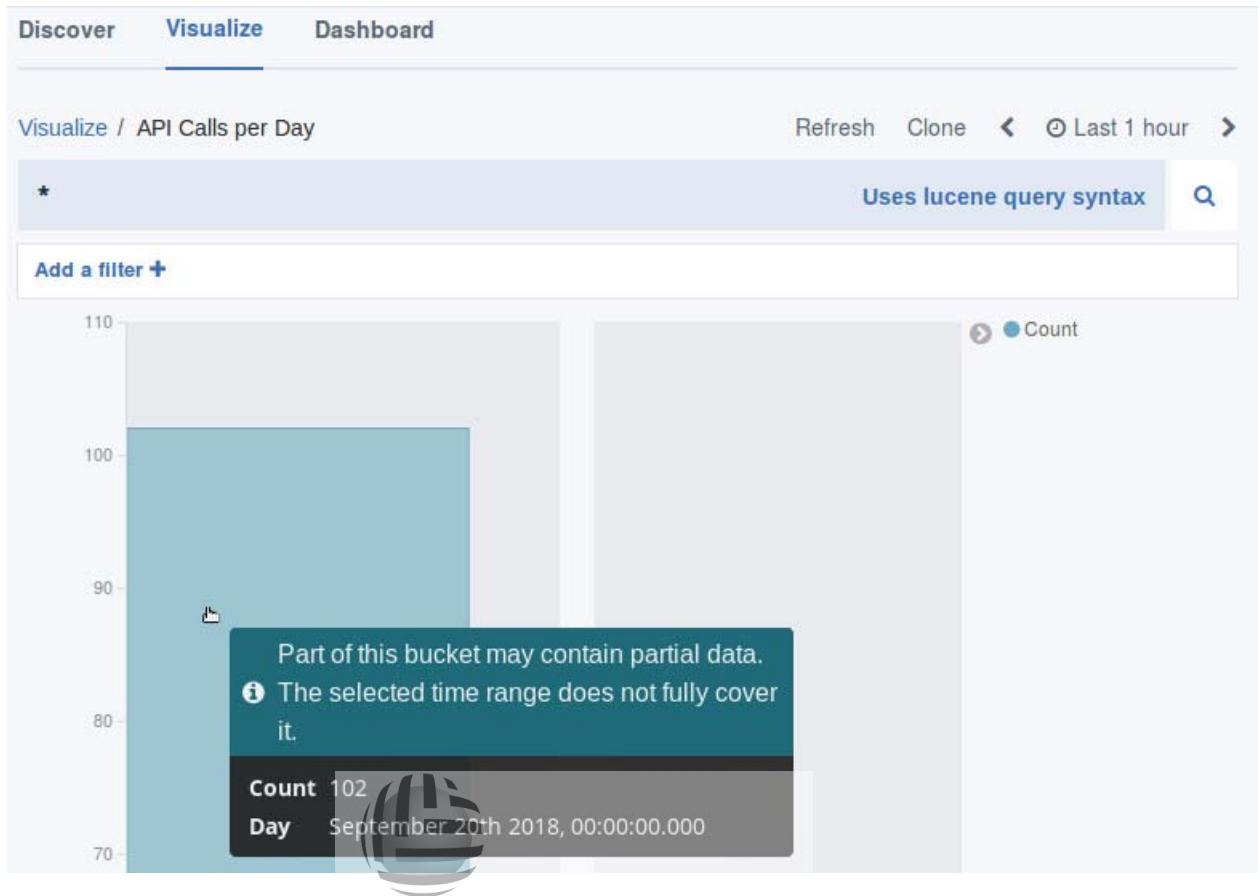
Absolute

|                |                      |                 |               |
|----------------|----------------------|-----------------|---------------|
| Today          | Yesterday            | Last 15 minutes | Last 30 days  |
| This week      | Day before yesterday | Last 30 minutes | Last 60 days  |
| This month     | This day last week   | Last 1 hour     | Last 90 days  |
| This year      | Previous week        | Last 4 hours    | Last 6 months |
| The day so far | Previous month       | Last 12 hours   | Last 1 year   |
| Week to date   | Previous year        | Last 24 hours   | Last 2 years  |
| Month to date  |                      | Last 7 days     | Last 5 years  |
| Year to date   |                      |                 |               |



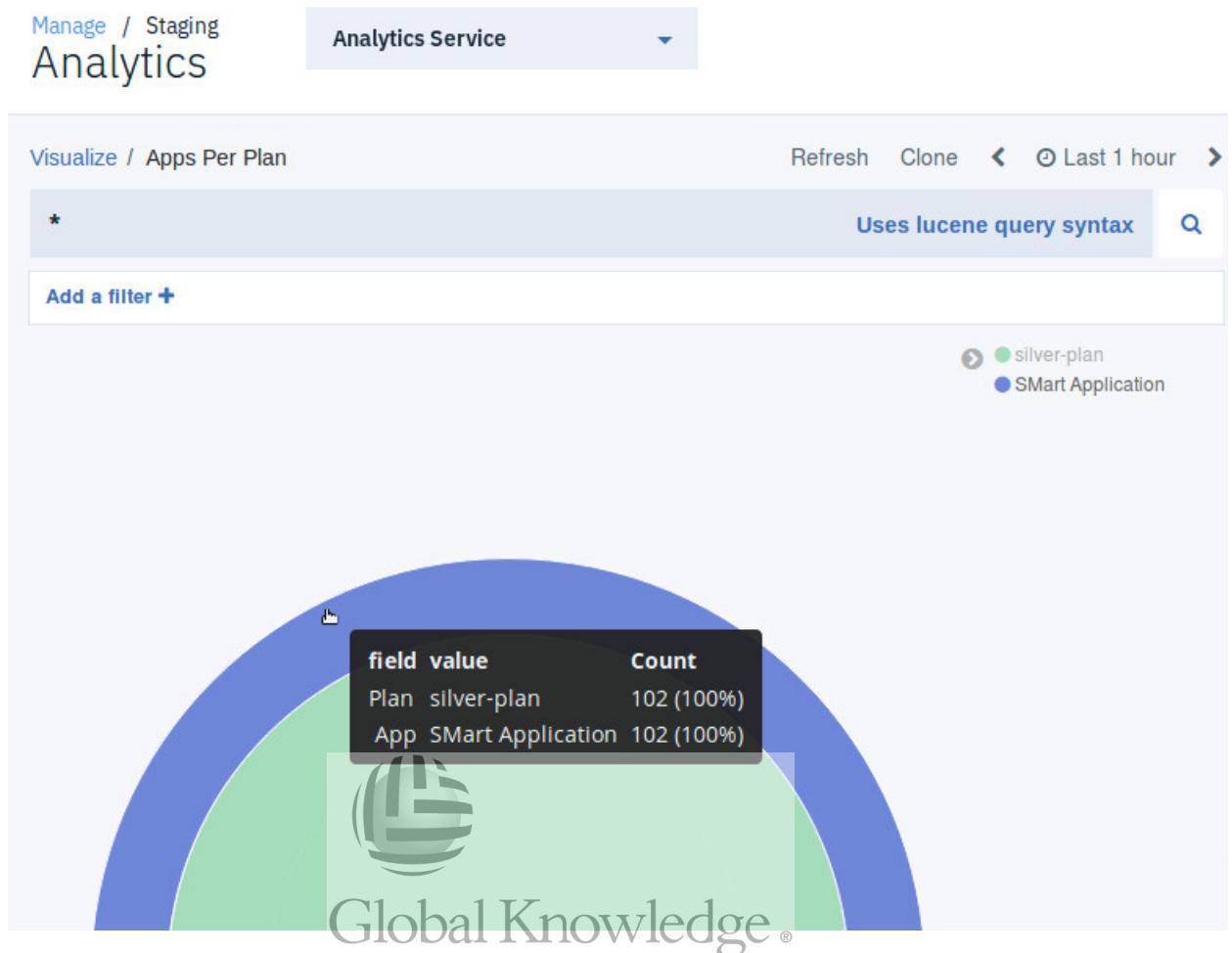
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- \_\_\_ d. A graph is displayed with the number of API Calls that were made in the last hour. Hover over the graph to display the actual values.

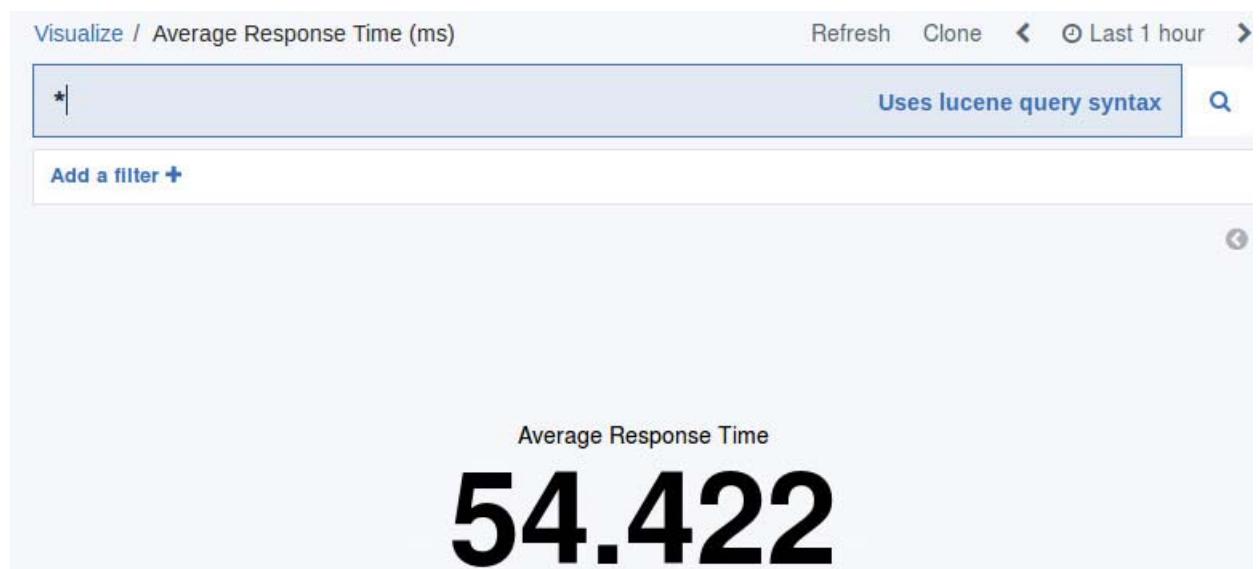


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- e. Click the **Apps Per Plan** option from the list. Hover over the graph to see the counts for the plan and the application.



- f. Click the **Average Response Time (ms)** option from the list. The metric is shown.

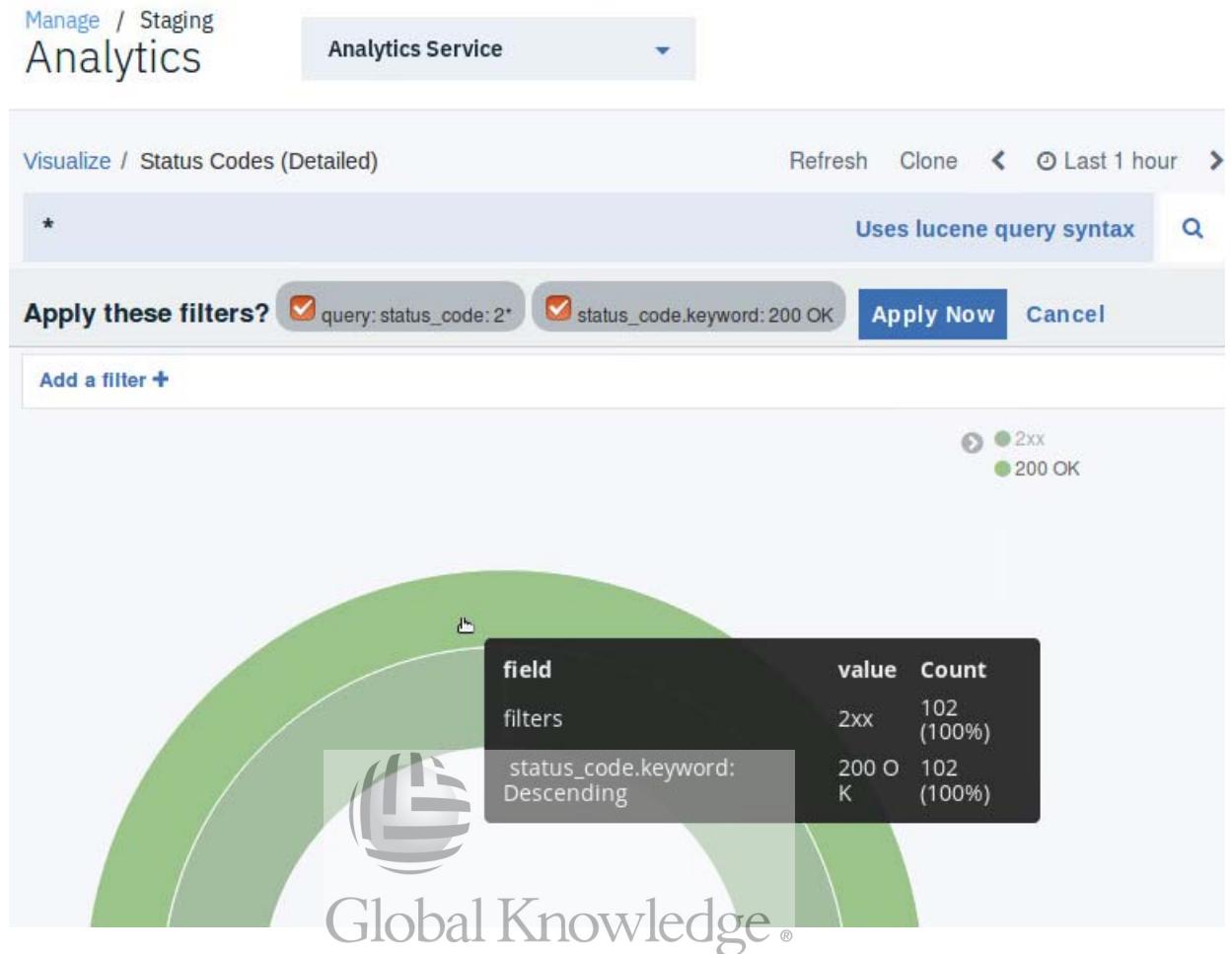


- \_\_ g. Click the **Developer Organizations** option from the list. The number of organizations that made API calls in the last hour is displayed.

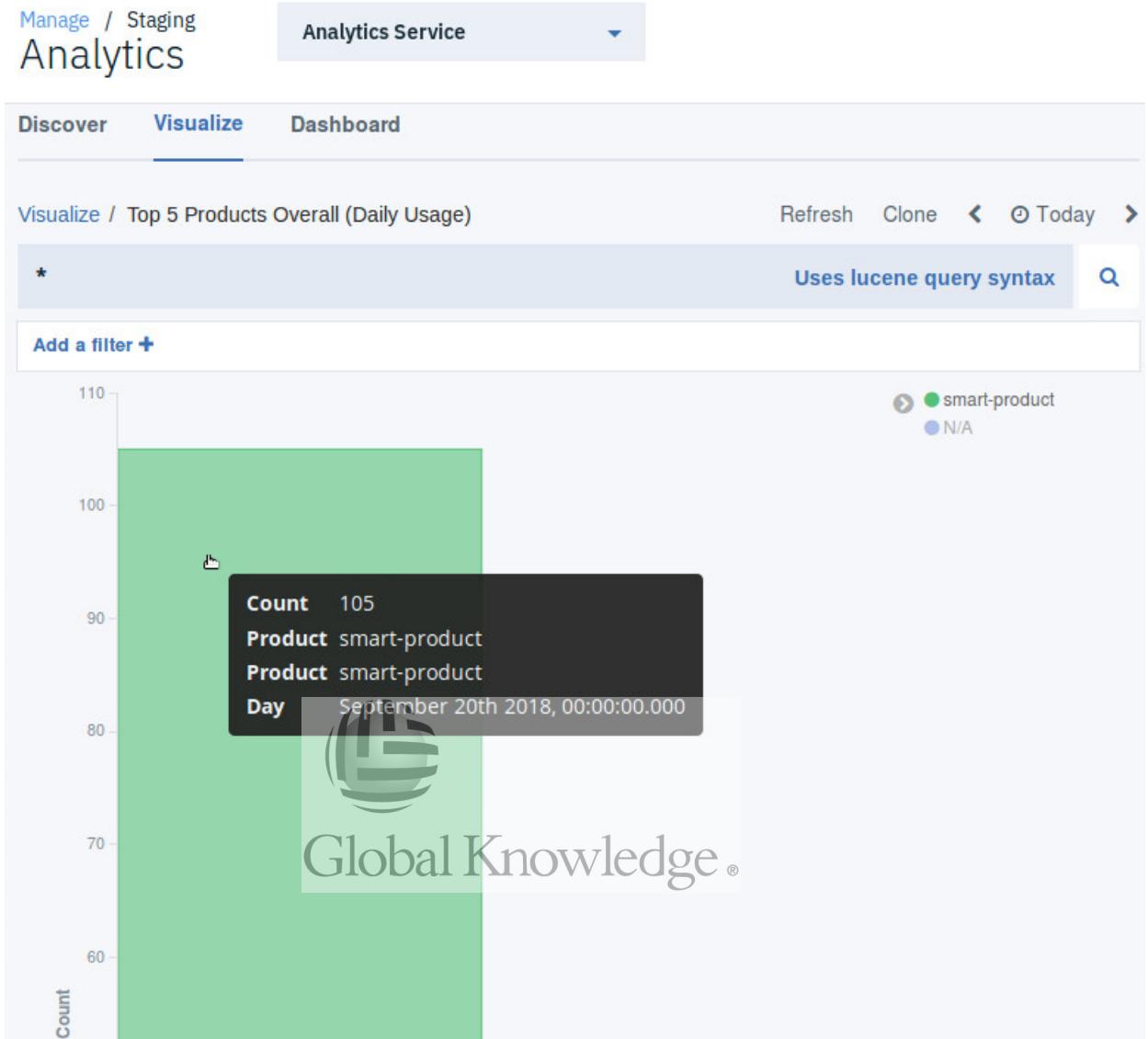
The screenshot shows the IBM Watson Analytics Service interface. At the top, there are navigation links for 'Manage / Staging' and 'Analytics Service'. Below this is a search bar with the placeholder 'Analytics'. The main area is titled 'Visualize / Developer Organizations'. On the right, there are buttons for 'Refresh', 'Clone', and a time range selector 'Last 1 hour'. A search bar contains the query '\*'. To the right of the search bar is a link 'Uses lucene query syntax' and a magnifying glass icon. Below the search bar is a button 'Add a filter +'. The central part of the screen displays a large number '1' with the text 'Total Developer Organizations' above it and '(making api calls)' below it. There is also a small circular icon with a question mark.



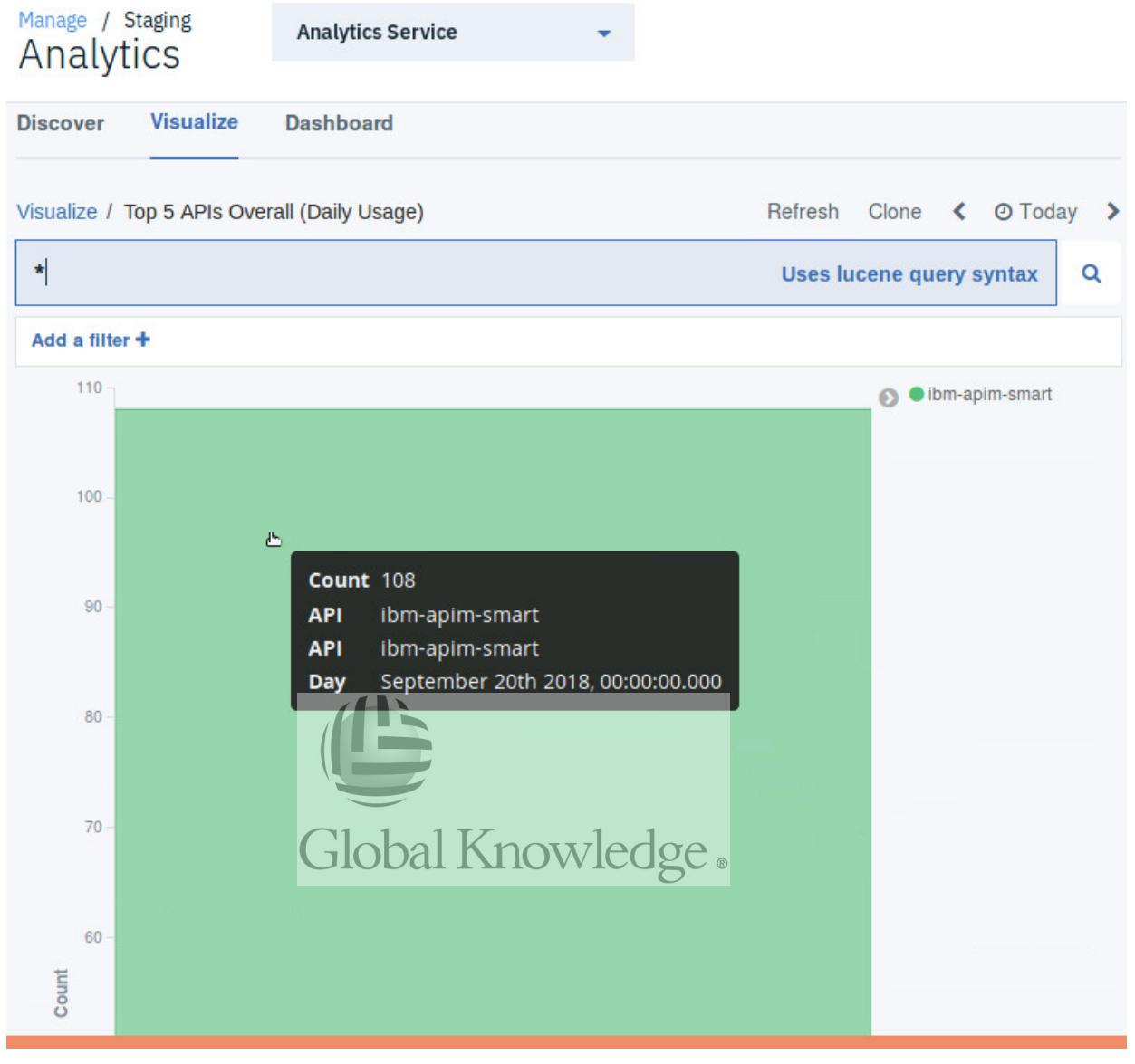
- \_\_ h. Click the **Status Codes (Detailed)** from the list. Then, hover over the pie chart. The result is displayed.



- i. Click the **Top 5 Products Overall (Daily Usage)** option from the list. Hover over the graph to display the results.



- \_\_ j. Click the **Top 5 APIs Overall (Daily Usage)** option from the list. Then, hover over the graph to display the results.



## 7.6. Export the analytics data in API Manager

You can export the API event data for all events in a dashboard across the defined time frame. Analytical events and visualizations are exported as JSON data.

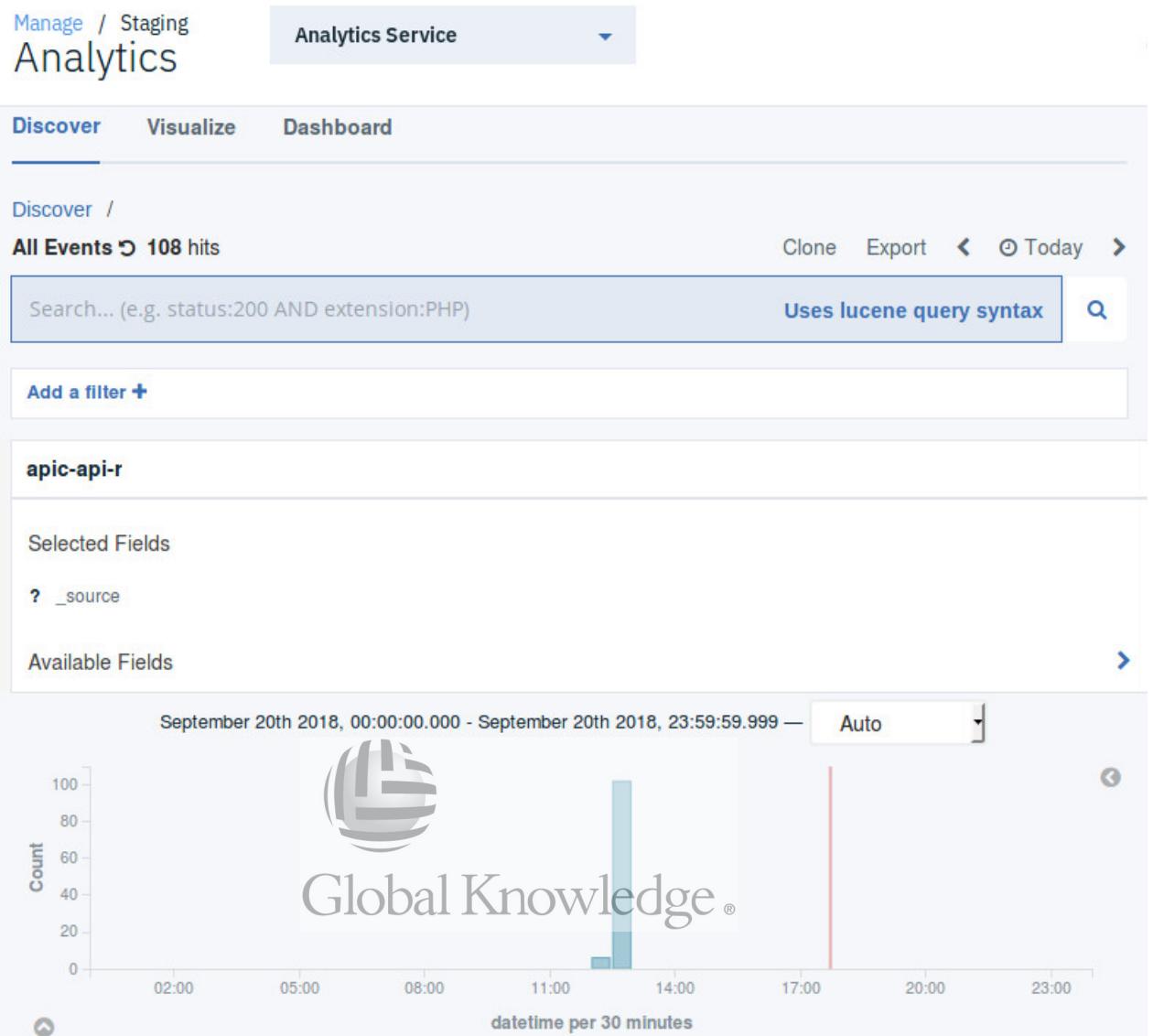
- 1. Review the data for all events.
  - a. From the Analytics page, select the **Discover** tab.  
A list is displayed.

The screenshot shows the 'Analytics' interface with the 'Discover' tab selected. At the top, there are tabs for 'Manage / Staging' and 'Analytics Service'. Below the tabs, there are buttons for 'Search...', '+', 'Export', and 'Import'. A table lists event types with checkboxes and tags. The table has columns for 'Name' and 'Tags'. The rows are:

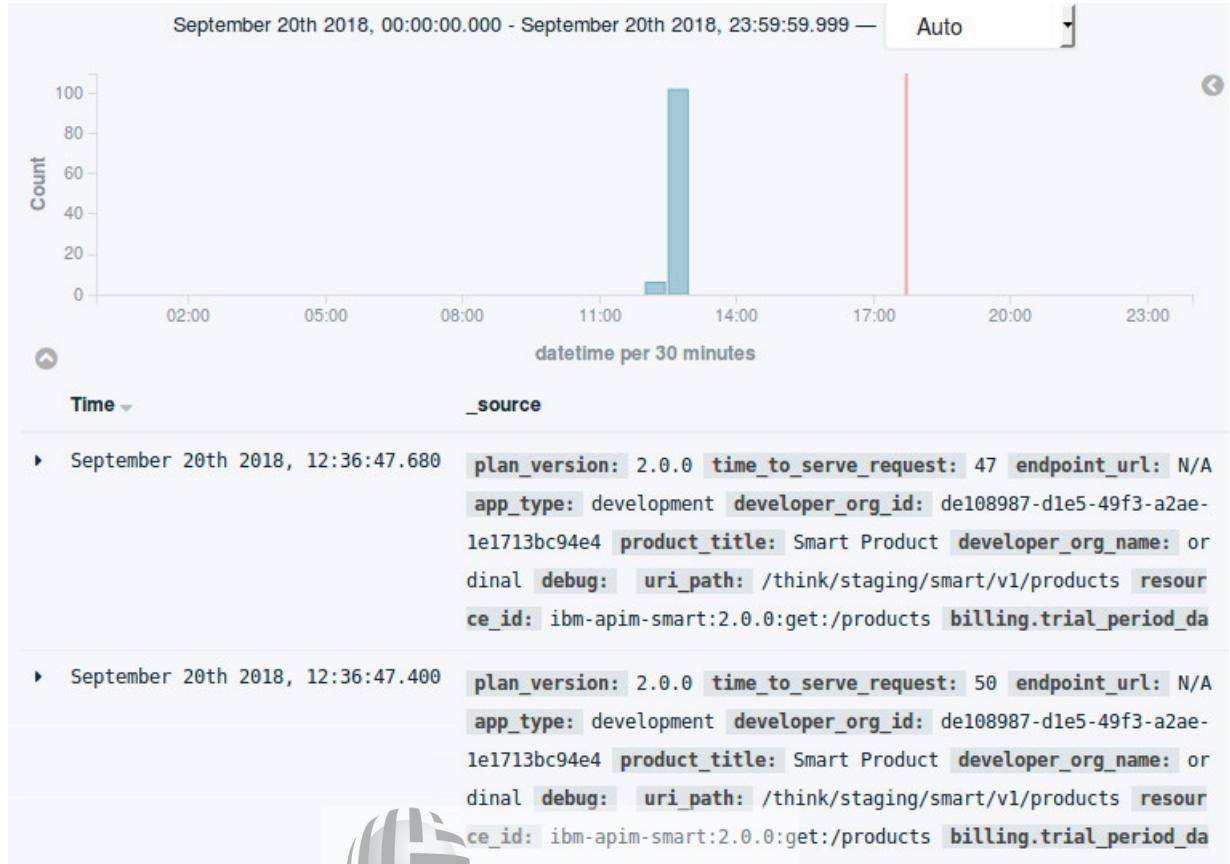
| Name                                          | Tags  |
|-----------------------------------------------|-------|
| <input type="checkbox"/> All Events           | ADMIN |
| <input type="checkbox"/> Errors               | ADMIN |
| <input type="checkbox"/> Response Times (>1s) | ADMIN |
| <input type="checkbox"/> Successes            | ADMIN |

- b. Click **All Events**.

- \_\_ c. The page shows the graph for all the events for the selected time filter.



- \_\_ d. Scroll down in All Events to see the data.



- \_\_ 2. Export the data for all events.

- \_\_ a. From the All Events page, click Export.

The screenshot shows the Kibana "Discover" tab selected. The main header reads "Global Knowledge". Below it, there are tabs for "Discover", "Visualize", and "Dashboard". The "Discover" tab has a sub-header "Discover /". Below this, it says "All Events 108 hits". To the right of the hits count are "Clone" and a large blue "Export" button. There is also a "Search... (e.g. status:200 AND extension:PHP)" input field and a "Uses lucene query" link. Below the search bar is a "Add a filter +". At the bottom of the screen, there is a search bar containing the text "apic-api-r".

- \_\_\_ b. Verify the time period and file type. Then, select **Export**.

This operation exports all the hits that fall under the current search, to the chosen file format. This is not a lightweight operation, so it may take some time to complete. It is recommended to narrow down the search to as far as your use case supports.

The file may be downloaded at any point after the export process has been started. Depending on the speed of download this data set may be incomplete. The file will download automatically when the export has finished. This will open a new window/tab to initiate the download, you may need to disable popup blockers to successfully download the file.

**Filetype**

JSON Lines (.txt)

**Export**

If the browser is configured to block pop-up windows, the file download might be blocked. You might then see a message that the browser is preventing the site from opening pop-up windows.

- \_\_\_ c. Allow browser pop-ups for the API Manager host address in the Firefox browser from the preferences for the Firefox browser.



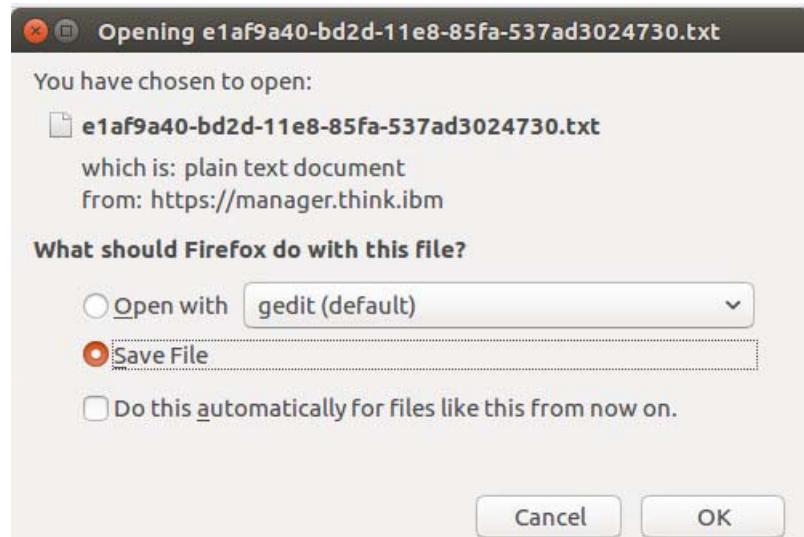
- \_\_\_ d. The page displays that the export has completed successfully.

The export has successfully started.  
Found 108 hits.

The export has completed successfully.  
Collected 108 of 108 hits.

**Download**   **Another?**   **More Info ▾**

- \_\_ e. The dialog box with the txt file is displayed. Select **Save File**.



Then, click **OK**.

\_\_ f. The file is downloaded to the Downloads directory on the course image.

\_\_ 3. Open the downloaded text file.

```

{
 "app_name": "N/A",
 "endpoint_url": "N/",
 "app_type": "PRODUCTION",
 "developer_org_id": "",
 "product_title": "",
 "developer_org_name": [],
 "uri_path": "/think/staging/smart/v1/products",
 "resource_id": "ibm-apim-smart:2.0.0:post-products",
 "billing": [
 {
 "trial_period_days": 0,
 "currency": "USD",
 "amount": 0,
 "model": "free",
 "provider": "none"
 }
],
 "req": [
 {
 "headers": {
 "http_host": "re266d79975-analytics-ingestion",
 "https": "https",
 "http_organization": "admin",
 "content_type": "application/json",
 "http_version": "HTTP/1.1",
 "x-globe-transaction_id": "860398635ba3c8ef00034051"
 },
 "request_id": "WAAAPcLC80-",
 "request_path": "/x2020/v1/events/_bulk",
 "request_uri": "/x2020/v1/events/_bulk",
 "content_length": "1144",
 "http_x_client_ip": "127.0.0.1"
 }
],
 "tags": [
 "apicapievent"
],
 "datetime": "2018-09-20T16:21:03.253Z",
 "status_code": 200
}

```

The file contains data in JSON format for the API events for the selected time period. You can extract and then import this JSON file into other IBM API Connect catalogs or other software tools to further analyze your API Connect usage.

## End of exercise

## Exercise review and wrap-up

Analytical information is captured in real time on the gateway in API Connect based on the calls that are made to the API endpoints that are published to the gateway. In the first part of the exercise, you used the Developer Portal test feature to determine the API endpoint request URI on the gateway. You ran a script that simulates a number of calls to APIs on the gateway. You reviewed the analytics in API Manager.

Finally, you exported the API event data from the Discover dashboard to a file that contains JSON event data.





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# Appendix A. Troubleshooting

This appendix provides some guidance on how to verify the status of API Connect containers that run as docker containers on the Kubernetes runtime on the course image.

Many containers are required to run for the API Connect environment to work properly. If any of these containers fail to start, you are not able to access the API Connect Cloud Manager and other user interfaces of API Connect.

Students might also experience issues when working through the exercises when errors are displayed in the user interfaces. An example of one of these types of errors is shown with the suggested workaround.



## A.7. Kubernetes pods not starting

When the course image is properly configured, the Kubernetes resources that support API Connect start within 15 minutes of the course image being started. You can test that the API Connect environment is working by opening the Cloud Manager or API Manager user interface in the browser.

If the API Connect environment is taking significantly longer to start, or some of the required apiconnect pods show that 0/2 instances started, then there might be an issue with the image resources or network configuration.

Check that the image is assigned the right amount of resources. The required values are:

- 32 GB RAM
- 8 CPUs
- 300 GB hard disk drive space

These resources should be assigned by default by the IBM Remote Lab Platform to each student image.

There might be a problem with networking on the image. The course image uses a static IP address 192.168.225.15 that must be assigned, and not use DHCP.

This static IP address should be configured by default on the IBM Remote Lab Platform.

Students should generally not experience these issues when the course image is properly set up.



## A.8. Errors that occur when working in one of the user interfaces

In this section, you see an example of an error that might occur when you try to enable the gateway service for a catalog in API Manager.

In some cases, you might see a 500 API error in one of the API Connect user interfaces when the user interface has timed out.

The solution is to sign out of the user interface and sign in again.

Another example is shown next.



### Troubleshooting

You try to enable the gateway for the catalog and you get a 500 API error when the change is saved.

|                          | TITLE                   | TYPE                          |
|--------------------------|-------------------------|-------------------------------|
| <input type="checkbox"/> | Gateway Service Classic | Cloud Power Gateway (Classic) |

[Cancel](#) [Save](#)

When you have selected the gateway and you get this error, try to sign off from API Manager and sign in again. Then, retry the operation.

If you still get the error, then sign on to the Cloud Manager user interface as described in the first exercise. Then, navigate to the Topology page.

Delete the Analytics association from the gateway. Then, delete and re-create the gateway service as described in the first exercise.

Return to API Manager and retry the enable the gateway for the catalog operation. This operation should now work.



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