

Enabling IBM API Connect on IBM Cloud Private Version 2.1.0.3

Introduction

This document provides guidance for installing **IBM API Connect v2018.2.9** on **IBM Cloud Private 2.1.0.3**. Also, it covers the topic of using all the components of IBM API Connect and tips for troubleshooting issues.

This document presumes that following two main pre-requisites are completed:

- [Install and Configure IBM Cloud Private on Redhat Linux systems](#)
- [Install and Configure GlusterFS on Redhat Linux systems](#)

This document can be used as a reference for setting up IBM API Connect non-production environment in IBM Cloud Private.

Note: When API Connect is run in demo mode only, **hostpath** can be used as an alternate storage provider instead of **GlusterFS**. Also, based on the customer requirement it is possible to use other storage providers like **ceph**.

Environment

A typical IBM Cloud Private Environment includes Boot/Master node, Management node, Proxy node and Worker Nodes. In addition to that IBM API Connect setup involves 3 additional nodes that providing dynamic storage.

The following set of systems are used in building an environment that runs IBM API Connect on IBM Cloud Private.

| Node type | Number of nodes | CPU | Memory (GB) | Disk (GB) |
|-------------|-----------------|-----|-------------|-----------|
| Boot/Master | 1 | 8 | 32 | 250 |
| Management | 1 | 8 | 32 | 300 |
| Proxy | 1 | 4 | 16 | 250 |

| | | | | |
|-----------|----|----|-----|----------|
| Worker | 4 | 8 | 32 | 250 |
| GlusterFS | 3 | 4 | 16 | 40 + 500 |
| Total | 10 | 64 | 256 | 3370 |

Note: It is very critical to have minimum 4 worker nodes having **8 cores** and **32 GB RAM** is made available running IBM API Connect in IBM Cloud Private.

Setup

The following tasks are performed for enabling IBM API Connect in IBM Cloud Private .

1. [Install IBM Cloud CLI](#)
2. [Install IBM Cloud Private CLI](#)
3. Start terminal session to deploy IBM API Connect
4. Create namespace and update roles for the default user
5. Update environment to use storage class
6. Create registry secret for IBM API Connect
7. Create helm tls secret for IBM API Connect
8. Download API Connect images
9. Load API Connect images
10. Install the API Connect Helm chart
11. Verify API Connect Install
12. Troubleshooting API Connect Install
13. Install and Configure SMTP
14. Login to the Cloud Manager
15. Login to the API Manager
16. Login to the Developer Portal

1. Install IBM Cloud CLI

The [Getting started with IBM Cloud CLI link](#) has details about installing IBM Cloud CLI. The installer can be downloaded for Linux and it can be kicked by extracting the package and running the *install_bluemix_cli* script on the Master Node.

The commands used are as follows:

```
tar -xf IBM_Cloud_CLI_amd64.tar
```

```
cd Bluemix_CLI  
./install_bluemix_cli
```

The screen shot having the output of the aforesaid commands is listed below.

```
[root@rsun-rhel-bootmaster01 downloads]# tar -xf IBM_Cloud_CLI_amd64.tar  
[root@rsun-rhel-bootmaster01 downloads]# cd Bluemix_CLI  
[root@rsun-rhel-bootmaster01 Bluemix_CLI]# ./install_bluemix_cli  
Copying files ...  
IBM Cloud Command Line Interface(IBM Cloud CLI) is installed successfully.  
To get started, open a terminal window and enter "bluemix help".  
  
IBM Cloud CLI has plug-in framework to extend its capability. Go to https://console.bluemix.net/docs/cli/reference/bluemix\_cli/extend\_cli.html for how to install plug-ins.  
  
IBM Cloud CLI automatically collects data for usage analysis and user experience improvement. No personally identifiable data is collected.  
To disable the collecting, run:  
    "bluemix config --usage-stats-collect false"  
[root@rsun-rhel-bootmaster01 Bluemix_CLI]# █
```

2. Install IBM Cloud Private CLI

The following steps can be followed to download and install the plugin for IBM Cloud Private CLI.

- Logon to <https://mycluster.icp:8443/console>
- Select the menu option "Command Line Tools" -> "Cloud Private CLI" from the Navigation bar on the left hand side
- Download the plugin for the Linux 64 bit platform to the folder `./downloads`
- Run the following commands to install the plugin on the Master Node.

```
bx plugin install ./icp-linux-amd64  
bx plugin show icp
```

Note It is critical for **IBM Cloud Private CLI** version to match the version used to install **IBM Cloud Private**.

The output of the aforesaid commands is listed below.

```
[root@rsun-rhel-bootmaster01 downloads]# bx plugin install ./icp-linux-amd64  
Installing binary...  
OK  
Plug-in 'icp 2.1.343' was successfully installed into /root/.bluemix/plugins/icp. █
```

```
[root@rsun-rhel-bootmaster01 downloads]# bx plugin show icp
```

| | |
|-------------------------------------|---------|
| Plugin | icp |
| Version | 2.1.343 |
| SDK Version | |
| Minimal CLI version required | 0.4.9 |

Commands:

| | |
|--------------------------------------|-----------------------------------------------------------------------------|
| pr api | View the API endpoint and API version for the service. |
| pr certificate-delete | Delete a user certificate. |
| pr certificates | List user certificates. |
| pr cluster-config | Download the Kubernetes configuration and configure |
| pr cluster-get | View details for a cluster . |
| pr clusters | List all the clusters in your account. |
| pr credentials-set | Set the infrastructure account credentials for the |
| pr credentials-set-openstack | Set the infrastructure account credentials for the |
| pr credentials-set-vmware | Set the infrastructure account credentials for the |
| pr credentials-unset | Remove cloud provider credentials. After you remove |
| pr delete-helm-chart | Deletes a Helm chart from the IBM Cloud Private int |
| pr init | Initialize the IBM Cloud Private plugin with the AP |
| pr load-helm-chart | Loads a Helm chart archive to an IBM Cloud Private |
| pr load-images | Loads Docker images in to an IBM Cloud Private inte |
| pr load-ppa-archive | Load Docker images and Helm charts compressed file |
| pr locations | List available locations. |
| pr login | Log user in . |
| pr logout | Log user out . |
| pr machine-type-add | Add a machine type . A machine type determines the n |
| pr machine-type-add-openstack | Add an openstack machine type . A machine type deter |
| pr machine-type-add-vmware | Add a vmware machine type . A machine type determine |
| pr machine-types | List available machine types for a location. A mach |
| pr master-get | View the details about a master node. |
| pr masters | List all master nodes in an existing cluster . |
| pr password-rule-rm | Remove a password rule for a cluster namespace. |
| pr password-rule-set | Set a password rule for a cluster namespace. |
| pr password-rules | List the password rules for a cluster namespace. |
| pr proxies | List all proxy nodes in an existing cluster . |
| pr proxy-add | Add a proxy node to a cluster . |
| pr proxy-get | View the details about a proxy node. |
| pr proxy-rm | Remove proxy nodes from an existing cluster . |
| pr registry-init | Initialize cluster image registry. |
| pr iam roles | List roles |
| pr iam service-api-key | List details of a service API key |
| pr iam service-api-key-create | Create a service API key |
| pr iam service-api-key-delete | Delete a service API key |
| pr iam service-api-key-update | Update a service API key |
| pr iam service-api-keys | List all API keys of a service |
| pr iam service-id | Display details of a service ID |
| pr iam service-id-create | Create a service ID |
| pr iam service-id-delete | Delete a service ID |
| pr iam service-id-update | Update a service ID |
| pr iam service-ids | List all service IDs. |
| pr iam service-policies | List all service policies of specified service |
| pr iam service-policy | Display details of a service policy |
| pr iam service-policy-create | Create a service policy |
| pr iam service-policy-delete | Delete a service policy |
| pr iam service-policy-update | Update a service policy |

| | |
|-------------------------------|----------------------------------------------------------------------------|
| <code>pr iam services</code> | List services |
| <code>pr target</code> | Set or view the targeted namespace. |
| <code>pr tokens</code> | Display the oauth tokens for the current session. |
| <code>pr update-secret</code> | Update a secret and restart deployments that use th |
| <code>pr worker-add</code> | Add a worker node to a cluster . |
| <code>pr worker-get</code> | View the details about a worker node. |
| <code>pr worker-rm</code> | Remove worker nodes from an existing cluster . |
| <code>pr workers</code> | List all worker nodes in an existing cluster . |

3. Start terminal session to deploy IBM API Connect

The following commands can be run to prepare the terminal session to deploy IBM API Connect.

NOTE The value `mycluster.icp` should be updated to match your environment.

```
bx pr login -a https://mycluster.icp:8443 --skip-ssl-validation
<<Provide username and password when prompted and select 1 to select the ICP account
docker login mycluster.icp:8500
```

The screen shot having the output of the aforesaid commands is listed below.

```
[[root@rsun-rhel-bootmaster01 downloads]]# bx pr login -a https://mycluster.icp:8443 --skip-ssl-validation
API endpoint: https://mycluster.icp:8443

[Username> admin

[Password>
Authenticating...
OK

Select an account:
1. mycluster Account (id-mycluster-account)
[Enter a number> 1
Targeted account mycluster Account \(id-mycluster-account\)

Configuring helm and kubectl...
Configuring kubectl: /root/.bluemix/plugins/icp/clusters/mycluster/kube-config
Property "clusters.mycluster" unset.
Property "users.mycluster-user" unset.
Property "contexts.mycluster-context" unset.
Cluster "mycluster" set.
User "mycluster-user" set.
Context "mycluster-context" created.
Switched to context "mycluster-context".

Cluster mycluster configured successfully.

Configuring helm: /root/.helm
Helm configured successfully

OK

[[root@rsun-rhel-bootmaster01 downloads]]# docker login mycluster.icp:8500
[Username (admin): admin
[Password:
Login Succeeded
```

Also, logon to the IBM Cloud Private console using the link <https://mycluster.icp:8443/console> and click on the user icon on the left and copy the configuration commands which would look like something similar to the following:

The screenshot shows the IBM Cloud Private dashboard with a 'Configure kubectl' modal open. The modal contains the following configuration commands:

```
kubectl config set-cluster mycluster.icp --server=https://172.16.248.35:8001 --insecure-skip-tls-verify=true
kubectl config set-context cluster.local-context --cluster=cluster.local
kubectl config set-credentials admin --token=eyJ0eXAiOiJKV1QiLCJhbGciOiJSUzI1NiJ9.e
kubectl config set-context cluster.local-context --user=admin --namespace=apiconnect
kubectl config use-context cluster.local-context
```

The screen shot having the output of the aforesaid commands is listed below.

```
[root@rsun-rhel-bootmaster01 downloads]# kubectl config set-cluster cluster.local --server=https://172.16.248.35:8001 --insecure-skip-tls-verify=true
[root@rsun-rhel-bootmaster01 downloads]# kubectl config set-context cluster.local-context --cluster=cluster.local
Context "cluster.local-context" modified.
[root@rsun-rhel-bootmaster01 downloads]# kubectl config set-credentials admin --token=eyJ0eXAiOiJKV1QiLCJhbGciOiJSUzI1NiJ9.eyJhdF9oYXNcIjoicThjajF6eGtnYXVlbXhsejZ5awMiLCJyZWFBsbSIsInVuaXF1ZVNlY3VyaXR5TmFtZSI6ImFkbWluIiwiaXNzIjoiHR0cHM6Ly9teWNsdXp0ZXJuawNw0jk0NDMvb2lkxy1bmRwb2ludC9PUClSmfZC16IjNinj0wOGM0ZTA0MTNiMWUzODFnM2U2NzVkmMy3NGM4IiwiZxhwIjoxNTI4MTY2ODk4LCUpYXQiOje1MjgxM2gwOTgsInY1i16ImFkbWluIiwidGVhbVJvbGVNYXBwaW5ncyI6W119.tw6BvkmS77kp8VWVtbdmzTNSgi8-3gRyb0zAWYCVuw7_BKy0Wm99WXppTpjnCjujfJ0lnm-FZuEtFdcBgZZBaCwQIp9L8YAAqHPL7scjDr6AOwfAxI-4-c3t_yOhyzh-fwtN5eLMK9THEPjm-n3D69xOZf5DOTHmiwfAhBW-6FvzKFDnaETH1ce6bm2_MdRkZVCC8u_8V-vsFnt_d0VBb1kkXo2afepozHftXsEGBFbbTo0XCGmkuvFw5PG7vf07tvKuDfzgku85Hr1NRbpPUKfx8zy4z4mC1zuJ6rlNpe0c1zcFGBh_nKs8msRgLxNtNXCrW3UXmr-gLgw
User "admin" set.
[root@rsun-rhel-bootmaster01 downloads]# kubectl config set-context cluster.local-context --user=admin --namespace=default
Context "cluster.local-context" modified.
[root@rsun-rhel-bootmaster01 downloads]# kubectl config use-context cluster.local-context
Switched to context "cluster.local-context".
```

4. Create namespace and update roles for the default user

The following commands can be used to create the namespace **apiconnect** in IBM Cloud Private and update the role for the default user.

```

kubectl create namespace apiconnect
cat <<EOF | kubectl apply -f -
apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRoleBinding
metadata:
  name: apiconnect-user
roleRef:
  apiGroup: rbac.authorization.k8s.io
  kind: ClusterRole
  name: cluster-admin
subjects:
- kind: ServiceAccount
  name: default
  namespace: apiconnect

EOF

```

The screen shot having the output of the aforesaid commands is listed below.

```

[root@rsun-rhel-bootmaster01 downloads]# kubectl create namespace apiconnect
namespace "apiconnect" created
[root@rsun-rhel-bootmaster01 downloads]# cat <<EOF | kubectl apply -f -
> apiVersion: rbac.authorization.k8s.io/v1
> kind: ClusterRoleBinding
> metadata:
>   name: apiconnect-user
> roleRef:
>   apiGroup: rbac.authorization.k8s.io
>   kind: ClusterRole
>   name: cluster-admin
> subjects:
> - kind: ServiceAccount
>   name: default
>   namespace: apiconnect
>
[> EOF
clusterrolebinding "apiconnect-user" created

```

5. Update environment to use storage class

API Connect requires storage to be configured so that it can persist data.

The storage provider options **hostpath** and **GlusterFS** are included as reference. Note that it is required to have only one storage provider configured.

5.1 Update environment to use hostpath storage class

The following commands can be used to create the resources required to provision storage provider using *hostport*.

Note: Before running the following commands, the directory **/apiconnect** should be created in all the worker node(s) with full access rights (*chmod 777 apiconnect*).

Note: The files required can be downloaded using the following link:

- [hostpath-storageclass.yaml](#)
- [hostpath-provisioner.yaml](#)
- [hostpath-rbac.yaml](#)

```
kubectl create -f hostpath-storageclass.yaml  
kubectl create -f hostpath-provisioner.yaml  
kubectl create -f hostpath-rbac.yaml
```

The output of the aforesaid commands is listed below.

```
# kubectl create -f hostpath-storageclass.yaml  
storageclass "hostpath" created  
# kubectl create -f hostpath-provisioner.yaml  
deployment "hostpath-provisioner" created  
# kubectl create -f hostpath-rbac.yaml  
clusterrole "hostpath-provisioner" created  
clusterrolebinding "hostpath-provisioner" created
```

5.2 Update environment to use GlusterFS storage class

The following command is run to create Heketi secret.

Note: The **user** and **key** should be changed to match your environment. It should be base64 encoding of username and password for accessing GlusterFS systems.

```
cat <<EOF | kubectl apply -f -  
apiVersion: v1  
kind: Secret  
metadata:  
  name: heketi-secret  
  namespace: apiconnect  
data:  
  user: YWRtaW4=  
  key: YWRtaW5hZG1pbg==  
type: kubernetes.io/glusterfs  
EOF
```

Note: The environment variables *HEKETI_CLI_SERVER*, *HEKETI_CLI_USER*, *HEKETI_CLI_KEY* shoud be updated to match your Heketi environment.

The following command to get the clusterID of glusterFS from the management node.

```
export HEKETI_CLI_SERVER=http://localhost:8081
export HEKETI_CLI_USER=admin
export HEKETI_CLI_KEY=adminadmin
heketi-cli cluster list
```

Note: The *CLUSTER_ID* can be set using the output of the command *heketi-cli cluster list*. Also, *resturl* should be updated to match your environment.

```
cat <<EOF | kubectl apply -f -
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: apic.shared.storage
  namespace: apiconnect
provisioner: kubernetes.io/glusterfs
parameters:
  resturl: "http://MASTER_NODE_IP:8081"
  clusterid: "CLUSTER_ID"
  restuser: "admin"
  secretNamespace: "apiconnect"
  secretName: "heketi-secret"
  volumetype: "replicate:3"
EOF
```

The following command is run to set the default storage class:

```
kubectl patch storageclass apic.shared.storage -p '{"metadata": {"annotations": {"st' 
```

The screen shot having the output of the aforesaid commands is listed below.

```
[root@rsun-rhel-bootmaster01 downloads]# cat <<EOF | kubectl apply -f -
> apiVersion: v1
> kind: Secret
> metadata:
>   name: heketi-secret
>   namespace: apiconnect
> data:
>   user: YWRtaW4=
>   key: YWRtaW5HZG1pbg==
> type: kubernetes.io/glusterfs
> EOF
secret "heketi-secret" created
[root@rsun-rhel-bootmaster01 downloads]# export HEKETI_CLI_SERVER=http://localhost:8081
[root@rsun-rhel-bootmaster01 downloads]# export HEKETI_CLI_USER=admin
[root@rsun-rhel-bootmaster01 downloads]# export HEKETI_CLI_KEY=adminadmin
[root@rsun-rhel-bootmaster01 downloads]# heketi-cli cluster list
Clusters:
Id:a12f29dfc42bce23bc5610e49d3192ed [file][block]
[root@rsun-rhel-bootmaster01 downloads]# cat <<EOF | kubectl apply -f -
> apiVersion: storage.k8s.io/v1
> kind: StorageClass
> metadata:
>   name: apic.shared.storage
>   namespace: apiconnect
>   provisioner: kubernetes.io/glusterfs
> parameters:
>   resturl: "http://172.16.248.35:8081"
>   clusterid: "a12f29dfc42bce23bc5610e49d3192ed"
>   restuser: "admin"
>   secretNamespace: "apiconnect"
>   secretName: "heketi-secret"
>   volumetype: "replicate:3"
> EOF
storageclass "apic.shared.storage" created
[[root@rsun-rhel-bootmaster01 downloads]# kubectl patch storageclass apic.shared.storage -p '{"metadata": {"annotations":{"storageclass.kubernetes.io/is-apiconnect-class":"true"}}}'
storageclass "apic.shared.storage" patched]
```

6. Create registry secret for IBM API Connect

The following command can be run to create the registry secret: **apiconnect-icp-secret**

NOTE The values *mycluster.icp*, *docker-username*, *docker-password* should be updated to match your environment.

```
kubectl create secret docker-registry apiconnect-icp-secret --docker-server=myclust
```

The screen shot having the output of the aforesaid commands is listed below.

```
[root@rsun-rhel-bootmaster01 downloads]# kubectl create secret docker-registry apiconnect-icp-secret --docker-server=mycluster.icp:8500
--docker-username=admin --docker-password=admin --docker-email=admin@admin.com --namespace apiconnect
secret "apiconnect-icp-secret" created
```

7. Create helm tls secret for IBM API Connect

This step is required for the release **IBM Connect v2018.2.9** or latter.

The following command can be run to create the registry secret: **helm-tls-secret**

```
bx pr clusters
bx pr cluster-config mycluster
cat <<EOF | kubectl apply -f -
```

```
apiVersion: v1
kind: Secret
metadata:
  name: helm-tls-secret
  namespace: apiconnect
data:
  ca.pem: $(cat ~/.helm/ca.pem | base64 --wrap=0)
  cert.pem: $(cat ~/.helm/cert.pem | base64 --wrap=0)
  key.pem: $(cat ~/.helm/key.pem | base64 --wrap=0)
EOF
```

The screen shot having the output of the aforesaid commands is listed below.

```
[root@rsun-rhel-bootmaster01 downloads]# bx pr clusters
OK
Name          ID                               State    Masters  Workers  Proxies
mycluster     00000000000000000000000000000001   deployed   1        5        1
[root@rsun-rhel-bootmaster01 downloads]# bx pr cluster-config mycluster
Configuring kubectl: /root/.bluemix/plugins/icp/clusters/mycluster/kube-config
Property "clusters.mycluster" unset.
Property "users.mycluster-user" unset.
Property "contexts.mycluster-context" unset.
Cluster "mycluster" set.
User "mycluster-user" set.
Context "mycluster-context" created.
Switched to context "mycluster-context".

Cluster mycluster configured successfully.

Configuring helm: /root/.helm
Helm configured successfully

OK

[root@rsun-rhel-bootmaster01 downloads]# cat <<EOF | kubectl apply -f -
> apiVersion: v1
> kind: Secret
> metadata:
>   name: helm-tls-secret
>   namespace: apiconnect
>   data:
>     ca.pem: $(cat ~/.helm/ca.pem | base64 --wrap=0)
>     cert.pem: $(cat ~/.helm/cert.pem | base64 --wrap=0)
>     key.pem: $(cat ~/.helm/key.pem | base64 --wrap=0)
> EOF
secret "helm-tls-secret" created
```

8. Download API Connect images

The link [IBM API Connect V2018.3.3 is available](#) has additional details of **IBM API Connect V2018.3.3**

The archive file **IBM_API_Connect_ICP_Enterprise_v2018.3.3.zip** is downloaded from the [Fix Central](#) and moved to the master node of the IBM Cloud Private environment.

The following is the list of IBM API Connect images included in the archive file
IBM_API_Connect_ICP_Enterprise_v2018.3.3.zip

- *analytics-images-icp.tgz*
- *gateway-images-icp.tgz*
- *ibm-apiconnect-ent.tgz*
- *management-images-icp.tgz*
- *portal-images-icp.tgz*

Note: The archive file **IBM_API_Connect_ICP_Enterprise_v2018.3.3.zip** can be unzipped to a directory say **/home/admin/downloads**

9. Load API Connect images

The following commands are run to load the API Connect images.

```
cd /home/admin/downloads
bx pr load-ppa-archive --archive analytics-images-icp.tgz --clusternamespace mycluster.icp
bx pr load-ppa-archive --archive gateway-images-icp.tgz --clusternamespace mycluster.icp
bx pr load-ppa-archive --archive ibm-apiconnect-ent.tgz --clusternamespace mycluster.icp
bx pr load-ppa-archive --archive management-images-icp.tgz --clusternamespace mycluster.icp
bx pr load-ppa-archive --archive portal-images-icp.tgz --clusternamespace mycluster.icp
```

The output of the aforesaid commands is listed below.

```
[root@rsun-rhel-bootmaster01 admin]# cd /home/admin/downloads
[root@rsun-rhel-bootmaster01 downloads]# bx pr load-ppa-archive --archive analytics
Expanding archive
OK

Importing docker images
Processing image: apiconnect/openresty:alpine
Loading Image
Tagging Image
Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/openresty:alpine
Pushing image mycluster.icp:8500/apiconnect/apiconnect/openresty:alpine
Processing image: apiconnect/analytics-ingestion:2018-07-17-09-35-08-7bab1b4b063a
Loading Image
Tagging Image
Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/analytics-ingestion:
Pushing image mycluster.icp:8500/apiconnect/apiconnect/analytics-ingestion:2018-07-
Processing image: apiconnect/analytics-mq-kafka:2018-06-25-21-55-05-5a40eb7c682b8
Loading Image
Tagging Image
Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/analytics-mq-kafka:2
Pushing image mycluster.icp:8500/apiconnect/apiconnect/analytics-mq-kafka:2018-06-2
Processing image: apiconnect/analytics-mq-zookeeper:2018-06-25-21-55-05-5a40eb7c6
Loading Image
```

```
Tagging Image
Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/analytics-mq-zookeeper
Pushing image mycluster.icp:8500/apiconnect/apiconnect/analytics-mq-zookeeper:2018-
Processing image: apiconnect/analytics-storage:2018-07-17-09-30-13-1ca8b7953e9ce2
    Loading Image
    Tagging Image
    Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/analytics-storage:20
Pushing image mycluster.icp:8500/apiconnect/apiconnect/analytics-storage:2018-07-17
    Processing image: apiconnect/analytics-cronjobs:2018-06-25-21-53-38-32c0717d88ef5
        Loading Image
        Tagging Image
        Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/analytics-cronjobs:2
Pushing image mycluster.icp:8500/apiconnect/apiconnect/analytics-cronjobs:2018-06-2
    Processing image: apiconnect/analytics-client:2018-07-17-10-20-19-ead606c012ec720
        Loading Image
        Tagging Image
        Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/analytics-client:201
Pushing image mycluster.icp:8500/apiconnect/apiconnect/analytics-client:2018-07-17-
OK

Uploading helm charts
    Processing chart: charts/ibm-apiconnect-ent-2.0.8.tgz
    Updating chart values.yaml
    Uploading chart
Loaded helm chart
OK

Synch charts
Synch started
OK

Archive finished processing
[root@rsun-rhel-bootmaster01 downloads]# bx pr load-ppa-archive --archive gateway-i
Expanding archive
OK

Importing docker images
    Processing image: apiconnect/datapower-api-gateway:7.7.1.1-300826-release
        Loading Image
        Tagging Image
        Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/datapower-api-gatewa
Pushing image mycluster.icp:8500/apiconnect/apiconnect/datapower-api-gateway:7.7.1.
OK

Uploading helm charts
    Processing chart: charts/ibm-apiconnect-ent-2.0.8.tgz
    Updating chart values.yaml
    Uploading chart
Loaded helm chart
OK

Synch charts
Synch started
OK

Archive finished processing
```

```
[root@rsun-rhel-bootmaster01 downloads]# bx pr load-ppa-archive --archive ibm-apico
Expanding archive
OK

Importing docker images
Processing image: apiconnect/apiconnect-operator:2018-07-19-09-55-55-1d0c43f772fd
    Loading Image
    Tagging Image
    Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/apiconnect-operator:
Pushing image mycluster.icp:8500/apiconnect/apiconnect/apiconnect-operator:2018-07-
OK

Uploading helm charts
Processing chart: charts/ibm-apiconnect-ent-2.0.8.tgz
Updating chart values.yaml
Uploading chart
Loaded helm chart
OK

Synch charts
Synch started
OK

Archive finished processing
[root@rsun-rhel-bootmaster01 downloads]# bx pr load-ppa-archive --archive managemen
Expanding archive
OK

Importing docker images
Processing image: apiconnect/lur:2018.3-42-453f476
    Loading Image
    Tagging Image
    Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/lur:2018.3-42-453f47
Pushing image mycluster.icp:8500/apiconnect/apiconnect/lur:2018.3-42-453f476
Processing image: apiconnect/cassandra-health-check:2018-03-20-00-46-39-master-0-
    Loading Image
    Tagging Image
    Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/cassandra-health-che
Pushing image mycluster.icp:8500/apiconnect/apiconnect/cassandra-health-check:2018-
Processing image: apiconnect/ui:2018-07-18-22-27-27-2d8cc82fc74955d96735b3a5eb7ec
    Loading Image
    Tagging Image
    Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/ui:2018-07-18-22-27-
Pushing image mycluster.icp:8500/apiconnect/apiconnect/ui:2018-07-18-22-27-27-2d8cc
Processing image: apiconnect/analytics-proxy:2018-06-21-18-40-34-2018.3-0-gb21ef5
    Loading Image
    Tagging Image
    Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/analytics-proxy:2018
Pushing image mycluster.icp:8500/apiconnect/apiconnect/analytics-proxy:2018-06-21-1
Processing image: apiconnect/apim:2018.3-68-d72d0fa
    Loading Image
    Tagging Image
    Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/apim:2018.3-68-d72d0
Pushing image mycluster.icp:8500/apiconnect/apiconnect/apim:2018.3-68-d72d0fa
Processing image: apiconnect/cassandra-health-check:2018-03-20-00-46-39-master-0-
    Loading Image
```

```
Tagging Image
Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/cassandra-health-check:2018-07-18-22-42-21-2018.3-0
Pushing image mycluster.icp:8500/apiconnect/apiconnect/cassandra-health-check:2018-07-18-22-42-21-2018.3-0
Processing image: apiconnect/client-downloads-server:2018-07-18-22-42-21-2018.3-0
Loading Image
Tagging Image
Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/client-downloads-server:2018-07-18-22-42-21-2018.3-0
Pushing image mycluster.icp:8500/apiconnect/apiconnect/client-downloads-server:2018-07-18-22-42-21-2018.3-0
Processing image: apiconnect/juhu:2018-07-17-18-25-23-2018.3-0-ga44bda5
Loading Image
Tagging Image
Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/juhu:2018-07-17-18-2
Pushing image mycluster.icp:8500/apiconnect/apiconnect/juhu:2018-07-17-18-25-23-201
Processing image: apiconnect/busybox:latest
Loading Image
Tagging Image
Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/busybox:latest
Pushing image mycluster.icp:8500/apiconnect/apiconnect/busybox:latest
Processing image: apiconnect/ldap:2018.3-7-9f27c35
Loading Image
Tagging Image
Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/ldap:2018.3-7-9f27c35
Pushing image mycluster.icp:8500/apiconnect/apiconnect/ldap:2018.3-7-9f27c35
Processing image: apiconnect/cassandra-operator:2018-07-16-14-28-13-296d0e2312159
Loading Image
Tagging Image
Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/cassandra-operator:2
Pushing image mycluster.icp:8500/apiconnect/apiconnect/cassandra-operator:2018-07-1
Processing image: apiconnect/cassandra:2018-07-16-14-28-13-296d0e231215976a3af6f5
Loading Image
Tagging Image
Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/cassandra:2018-07-16
Pushing image mycluster.icp:8500/apiconnect/apiconnect/cassandra:2018-07-16-14-28-1
OK

Uploading helm charts
Processing chart: charts/ibm-apiconnect-ent-2.0.8.tgz
Updating chart values.yaml
Uploading chart
Loaded helm chart
OK

Synch charts
Synch started
OK

Archive finished processing
[root@rsun-rhel-bootmaster01 downloads]# bx pr load-ppa-archive --archive portal-im
Expanding archive
OK

Importing docker images
Processing image: apiconnect/portal-db:2018.3-bf7f938738faabe4cc083599a0424a063a0
Loading Image
Tagging Image
Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/portal-db:2018.3-bf7
```

```
Pushing image mycluster.icp:8500/apiconnect/apiconnect/portal-db:2018.3-bf7f938738f
  Processing image: apiconnect/portal-dbproxy:2018.3-bf7f938738faabe4cc083599a0424a
    Loading Image
    Tagging Image
    Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/portal-dbproxy:2018.3-bf7f938738faabe4cc083599a0424a
Pushing image mycluster.icp:8500/apiconnect/apiconnect/portal-dbproxy:2018.3-bf7f938738faabe4cc083599a0424a
  Processing image: apiconnect/portal-admin:2018.3-5096b4cd43fd681098a6aaaf98ff2cae5
    Loading Image
    Tagging Image
    Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/portal-admin:2018.3-5096b4cd43fd681098a6aaaf98ff2cae5
Pushing image mycluster.icp:8500/apiconnect/apiconnect/portal-admin:2018.3-5096b4cd43fd681098a6aaaf98ff2cae5
  Processing image: apiconnect/portal-web:2018.3-5096b4cd43fd681098a6aaaf98ff2cae5
    Loading Image
    Tagging Image
    Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/portal-web:2018.3-5096b4cd43fd681098a6aaaf98ff2cae5
Pushing image mycluster.icp:8500/apiconnect/apiconnect/portal-web:2018.3-5096b4cd43fd681098a6aaaf98ff2cae5
  Processing image: apiconnect/openresty:alpine
    Loading Image
    Tagging Image
    Pushing image as: mycluster.icp:8500/apiconnect/apiconnect/openresty:alpine
Pushing image mycluster.icp:8500/apiconnect/apiconnect/openresty:alpine
OK

Uploading helm charts
  Processing chart: charts/ibm-apiconnect-ent-2.0.8.tgz
  Updating chart values.yaml
  Uploading chart
Loaded helm chart
OK

Synch charts
Synch started
OK

Archive finished processing
```

The following commands can be used to verify if the images are loaded correctly.

```
kubectl get images -n apiconnect
```

The screen shot having the output of the aforesaid commands is listed below.

```
[root@rsun-rhel-bootmaster01 downloads]# kubectl get images -n apiconnect
NAME                                AGE
apiconnect-s-analytics-client        3m
apiconnect-s-analytics-cronjobs     3m
apiconnect-s-analytics-ingestion    3m
apiconnect-s-analytics-proxy        2m
apiconnect-s-analytics-storage      3m
apiconnect-s-apiconnect-operator    2m
apiconnect-s-apim                  2m
apiconnect-s-apim-elasticsearch    1m
apiconnect-s-busybox               2m
apiconnect-s-cassandra             1m
apiconnect-s-cassandra-health-check 2m
apiconnect-s-cassandra-operator    1m
apiconnect-s-datapower-api-gateway 3m
apiconnect-s-juhu                  2m
apiconnect-s-ldap                  2m
apiconnect-s-lur                   2m
apiconnect-s-openresty              4m
apiconnect-s-portal-admin           1m
apiconnect-s-portal-db              1m
apiconnect-s-portal-dbproxy         1m
apiconnect-s-portal-web             1m
apiconnect-s-toolkit-downloads-server 2m
apiconnect-s-ui                   2m
```

If required, the following utility can be run to delete all the images within the namespace **apiconnect**.

[Delete All Images: deletelimages.sh](#)

10. Install the API Connect Helm chart

Perform the following steps to install API Connect Helm chart

10.1 Extract API Connect Helm Chart

Unarchive the file **downloads/ibm-apiconnect-ent.tgz** to the directory **downloads/apiconnect** to extract the Helm chart **ibm-apiconnect-ent**

Note: The value *ibm-apiconnect-ent-2.0.8.tgz* could change based on the version used for the installation.

```
cd ~/downloads
mkdir apiconnect
cd apiconnect
tar -xzf ../ibm-apiconnect-ent.tgz
cd charts
tar -xzf ./ibm-apiconnect-ent-2.0.8.tgz
```

10.2 Update values.yaml that suits your environment.

The attached excel document [APIC_Settings.xlsx](#) includes all the configuration parameters collected via `values.yaml`

The attached `values.yaml` can be used as reference. The following values needs to be updated to suit your environment and build.

- repository
- registry
- tag

Also, `INGRESS_CONTROLLER_IP` should be replaced with the IP address of the node where Ingres controller is running. It will be mostly Proxy node and/or the Master node.

Note The `mode` can be set to `standard` when there is a need to deploy typical development environment with high availability.

Note When the `mode` is set to `demo` it is possible to use hostpath as the storage provider. The `values.yaml` can be updated to include the value `hostpath` for `storageClass`.

```
global:
  registry: "mycluster.icp:8500/apiconnect/"
  registrySecret: "apiconnect-icp-secret"
  createCrd: true
  storageClass: "apic.shared.storage"
  mode: demo

# apiconnect-operator
operator:
  arch: amd64
  image: mycluster.icp:8500/apiconnect/apiconnect-apiconnect-operator
  tag: 2018-07-19-09-55-55-1d0c43f772fd3a1c9822260af3682794ed5d4c01
  pullPolicy: IfNotPresent
  helmTlsSecret: "helm-tls-secret"

# management subsystem
management:
  enabled: true
  platformApiEndpoint: "apicplatform.INGRESS_CONTROLLER_IP.nip.io"
  consumerApiEndpoint: "apiconsumer.INGRESS_CONTROLLER_IP.nip.io"
  cloudAdminUiEndpoint: "apiccloud.INGRESS_CONTROLLER_IP.nip.io"
  apiManagerUiEndpoint: "apicmanager.INGRESS_CONTROLLER_IP.nip.io"
  externalCassandraHost: ""
cassandra:
  cassandraClusterSize: "1"
  cassandraMaxMemoryGb: "8"
  cassandraVolumeSizeGb: "16"
cassandraBackup:
  cassandraBackupAuthSecret: ""
```

```

cassandraBackupHost: ""
cassandraBackupPath: /backups
cassandraBackupPort: "22"
cassandraBackupProtocol: sftp
cassandraBackupSchedule: 0 0 * * *
cassandraPostmortems:
  cassandraPostmortemsAuthSecret: ""
  cassandraPostmortemsHost: ""
  cassandraPostmortemsPath: /cassandra-postmortems
  cassandraPostmortemsPort: "22"
  cassandraPostmortemsProtocol: sftp

# portal subsystem
portal:
  enabled: true
  portalDirectorEndpoint: "apicpadmin.INGRESS_CONTROLLER_IP.nip.io"
  portalWebEndpoint: "apicportal.INGRESS_CONTROLLER_IP.nip.io"
  adminStorageSizeGb: "1"
  backupStorageSizeGb: "5"
  dbLogsStorageSizeGb: "2"
  dbRootPw: root
  dbStorageSizeGb: "12"
  wwwStorageSizeGb: "5"

# analytics subsystem
analytics:
  enabled: true
  analyticsIngestionEndpoint: "apicai.INGRESS_CONTROLLER_IP.nip.io"
  analyticsClientEndpoint: "apicac.INGRESS_CONTROLLER_IP.nip.io"
  coordinatingMaxMemoryGb: "3"
  dataMaxMemoryGb: "4"
  dataStorageSizeGb: "50"
  masterMaxMemoryGb: "8"
  masterStorageSizeGb: "1"

# gateway subsystem
gateway:
  enabled: true
  apiGatewayEndpoint: "apicapi-gateway.INGRESS_CONTROLLER_IP.nip.io"
  gatewayServiceEndpoint: "iapicapic-gateway-director.INGRESS_CONTROLLER_IP.nip.io"
  maxCpu: "2"
  maxMemoryGb: "6"
  v5CompatibilityMode: "on"
  enableTms: "off"
  imageRepository: ""
  imageTag: ""
  imagePullPolicy: IfNotPresent

```

10.3 Deploy the Helm chart

Run the following commands to install the API Connect Helm chart.

```
rm -fr ~/.helm  
helm init --client-only  
bx pr cluster-config mycluster  
helm version --tls  
helm install --name apic-v2018-3-3 --namespace apiconnect ibm-apiconnect-ent --tls
```

The output of the aforesaid commands is listed below.

```
[root@rsun-rhel-bootmaster01 charts]# rm -fr ~/.helm  
[root@rsun-rhel-bootmaster01 charts]# helm init --client-only  
Creating /root/.helm  
Creating /root/.helm/repository  
Creating /root/.helm/repository/cache  
Creating /root/.helm/repository/local  
Creating /root/.helm/plugins  
Creating /root/.helm/starters  
Creating /root/.helm/cache/archive  
Creating /root/.helm/repository/repositories.yaml  
Adding stable repo with URL: https://kubernetes-charts.storage.googleapis.com  
Adding local repo with URL: http://127.0.0.1:8879/charts  
$HELM_HOME has been configured at /root/.helm.  
Not installing Tiller due to 'client-only' flag having been set  
Happy Helming!  
[root@rsun-rhel-bootmaster01 charts]# bx pr cluster-config mycluster  
Configuring kubectl: /root/.bluemix/plugins/icp/clusters/mycluster/kube-config  
Property "clusters.mycluster" unset.  
Property "users.mycluster-user" unset.  
Property "contexts.mycluster-context" unset.  
Cluster "mycluster" set.  
User "mycluster-user" set.  
Context "mycluster-context" created.  
Switched to context "mycluster-context".  
  
Cluster mycluster configured successfully.  
  
Configuring helm: /root/.helm  
Helm configured successfully  
  
OK  
  
[root@rsun-rhel-bootmaster01 charts]# helm version --tls  
Client: &version.Version{SemVer:"v2.7.3+icp", GitCommit:"27442e4cf324d8f82f935fe0b  
Server: &version.Version{SemVer:"v2.7.3+icp", GitCommit:"27442e4cf324d8f82f935fe0b  
[root@rsun-rhel-bootmaster01 charts]# helm install --name apic-v2018-3-3 --namespac  
[debug] Created tunnel using local port: '40463'  
  
[debug] SERVER: "127.0.0.1:40463"  
  
[debug] Original chart version: ""  
[debug] Key="/root/.helm/key.pem", Cert="/root/.helm/cert.pem", CA="/root/.helm/ca.
```

```
[debug] CHART PATH: /home/admin/downloads/apic/apiconnect/charts(ibm-apiconnect-ent

NAME: apic-v2018-3-3
REVISION: 1
RELEASED: Wed Aug 1 22:09:00 2018
CHART: ibm-apiconnect-ent-2.0.8
USER-SUPPLIED VALUES:
{}

COMPUTED VALUES:
analytics:
  analyticsClientEndpoint: apicac.172.16.247.254.nip.io
  analyticsIngestionEndpoint: apicai.172.16.247.254.nip.io
  coordinatingMaxMemoryGb: "3"
  dataMaxMemoryGb: "4"
  dataStorageSizeGb: "50"
  enabled: true
  masterMaxMemoryGb: "8"
  masterStorageSizeGb: "1"
cassandra:
  cassandraClusterSize: "1"
  cassandraMaxMemoryGb: "8"
  cassandraVolumeSizeGb: "16"
cassandraBackup:
  cassandraBackupAuthSecret: ""
  cassandraBackupHost: ""
  cassandraBackupPath: /backups
  cassandraBackupPort: "22"
  cassandraBackupProtocol: sftp
  cassandraBackupSchedule: 0 0 * * *
cassandraPostmortems:
  cassandraPostmortemsAuthSecret: ""
  cassandraPostmortemsHost: ""
  cassandraPostmortemsPath: /cassandra-postmortems
  cassandraPostmortemsPort: "22"
  cassandraPostmortemsProtocol: sftp
gateway:
  apiGatewayEndpoint: apicapi-gateway.172.16.247.254.nip.io
  enableTms: "off"
  enabled: true
  gatewayServiceEndpoint: iapicapic-gateway-director.172.16.247.254.nip.io
  imagePullPolicy: IfNotPresent
  imageRepository: ""
  imageTag: ""
  maxCpu: "2"
  maxMemoryGb: "6"
  v5CompatibilityMode: "on"
global:
  createCrds: true
  mode: demo
  registry: mycluster.icp:8500/apiconnect/
  registrySecret: apiconnect-icp-secret
  storageClass: apic.shared.storage
management:
  apiManagerUiEndpoint: apicmanager.172.16.247.254.nip.io
```

```

cloudAdminUiEndpoint: apiccloud.172.16.247.254.nip.io
consumerApiEndpoint: apiconsumer.172.16.247.254.nip.io
enabled: true
externalCassandraHost: ""
platformApiEndpoint: apicplatform.172.16.247.254.nip.io
operator:
  arch: amd64
  helmTlsSecret: helm-tls-secret
  image: mycluster.icp:8500/apiconnect/apiconnect/apiconnect-operator
  pullPolicy: IfNotPresent
  tag: 2018-07-19-09-55-55-1d0c43f772fd3a1c9822260af3682794ed5d4c01
portal:
  adminStorageSizeGb: "1"
  backupStorageSizeGb: "5"
  dbLogsStorageSizeGb: "2"
  dbRootPw: root
  dbStorageSizeGb: "12"
  enabled: true
  portalDirectorEndpoint: apicadmin.172.16.247.254.nip.io
  portalWebEndpoint: apicportal.172.16.247.254.nip.io
  wwwStorageSizeGb: "5"

```

HOOKS:

```

----#
# apic-v2018-3-3-test
apiVersion: v1
kind: Pod
metadata:
  name: "apic-v2018-3-3-test"
  labels:
    heritage: Tiller
    release: apic-v2018-3-3
    chart: ibm-apiconnect-ent-2.0.8
    app: "apic-v2018-3-3-test"
  annotations:
    "helm.sh/hook": test-success
spec:
  containers:
    - name: "apic-v2018-3-3-test"
      image: alpine
      command: ["sh", "-c", 'apk --no-cache add openssl && wget --no-check-certific
  restartPolicy: Never
----#
# apic-v2018-3-3-ibm-apiconnect-ent-delete-cluster
apiVersion: batch/v1
kind: Job
metadata:
  name: apic-v2018-3-3-ibm-apiconnect-ent-delete-cluster
  labels:
    app: ibm-apiconnect-ent
    chart: ibm-apiconnect-ent-2.0.8
    release: apic-v2018-3-3
    heritage: Tiller
  annotations:
    "helm.sh/hook": pre-delete
    "helm.sh/hook-weight": "-5"

```

```

"helm.sh/hook-delete-policy": hook-succeeded
spec:
  template:
    metadata:
      labels:
        app: ibm-apiconnect-ent
        release: apic-v2018-3-3
      annotations:
        productName: "API Connect Enterprise"
        productID: "1575d1b24f8fef20747d1f85f9358500"
        productVersion: "2018.3.3"
    spec:
      serviceAccountName: apic-v2018-3-3-ibm-apiconnect-ent
      affinity:
        nodeAffinity:
          requiredDuringSchedulingIgnoredDuringExecution:
            nodeSelectorTerms:
              - matchExpressions:
                  - key: beta.kubernetes.io/arch
                    operator: In
                    values:
                      - amd64
      restartPolicy: Never
      imagePullSecrets:
        - name: "apiconnect-icp-secret"
      initContainers:
        - name: "apic-v2018-3-3-delete-cluster"
          image: "mycluster.icp:8500/apiconnect/mycluster.icp:8500/apiconnect/apico
          imagePullPolicy: IfNotPresent
          command: [ "/apicop/initApicOp.sh" ]
          args: [ "v1.10.0+icp-ee", "clean", "--debug", "--clusternamespace=apic-v2018-3
          env:
            - name: HELM_HOME
              value: "/home/apic/.helm"
            - name: POD_NAMESPACE
              valueFrom:
                fieldRef:
                  fieldPath: metadata.namespace
      volumeMounts:
        - name: helm-tls
          mountPath: "/home/apic/.helm"
      volumes:
        - name: helm-tls
          secret:
            secretName: helm-tls-secret
            defaultMode: 0644
            items:
              - key: cert.pem
                path: cert.pem
              - key: ca.pem
                path: ca.pem
              - key: key.pem
                path: key.pem
      containers:
        - name: "apic-v2018-3-3-delete-cluster-cr"
          image: "mycluster.icp:8500/apiconnect/mycluster.icp:8500/apiconnect/apico

```

```

        imagePullPolicy: IfNotPresent
        command:
          - 'bash'
          - '-c'
          - "kubectl delete apiconnectcluster apic-v2018-3-3-apic-cluster || true
MANIFEST:

---  

# Source: ibm-apiconnect-ent/templates/service-account.yaml
apiVersion: v1
kind: ServiceAccount
metadata:
  name: apic-v2018-3-3-ibm-apiconnect-ent
  labels:
    app: ibm-apiconnect-ent
    chart: ibm-apiconnect-ent-2.0.8
    release: apic-v2018-3-3
    heritage: Tiller
---  

# Source: ibm-apiconnect-ent/templates/rbac.yaml
apiVersion: rbac.authorization.k8s.io/v1beta1
kind: ClusterRole
metadata:
  name: apic-v2018-3-3-ibm-apiconnect-ent
  labels:
    chart: "ibm-apiconnect-ent-2.0.8"
    app: "apic-v2018-3-3-ibm-apiconnect-ent"
    heritage: "Tiller"
    release: "apic-v2018-3-3"
rules:
  - apiGroups:
      - apiextensions.k8s.io
    resources:
      - customresourcedefinitions
    verbs:
      - get
      - create

  - apiGroups:
      - ""
    resources:
      - pods
      - pods/portforward
    verbs:
      - "get"
      - "list"
      - "create"
---  

# Source: ibm-apiconnect-ent/templates/rbac.yaml
kind: ClusterRoleBinding
apiVersion: rbac.authorization.k8s.io/v1beta1
metadata:
  name: apic-v2018-3-3-ibm-apiconnect-ent-cluster-binding
  labels:
    chart: "ibm-apiconnect-ent-2.0.8"

```

```

    app: "apic-v2018-3-3-ibm-apiconnect-ent"
    heritage: "Tiller"
    release: "apic-v2018-3-3"
  subjects:
  - kind: ServiceAccount
    name: apic-v2018-3-3-ibm-apiconnect-ent
    namespace: apiconnect
  roleRef:
    apiGroup: rbac.authorization.k8s.io
    kind: ClusterRole
    name: apic-v2018-3-3-ibm-apiconnect-ent

  # Source: ibm-apiconnect-ent/templates/rbac.yaml
  apiVersion: rbac.authorization.k8s.io/v1beta1
  kind: Role
  metadata:
    name: apic-v2018-3-3-ibm-apiconnect-ent
    labels:
      app: ibm-apiconnect-ent
      chart: ibm-apiconnect-ent-2.0.8
      release: apic-v2018-3-3
      heritage: Tiller
  rules:
  - apiGroups:
    - apic.ibm.com
    resources:
    - apiconnectclusters
    - apiconnectclusters/finalizers
    verbs:
    - "*"
  - apiGroups:
    - ""
    - "batch"
    resources:
    - pods
    - services
    - jobs
    - endpoints
    - persistentvolumeclaims
    - events
    - secrets
    verbs:
    - "*"

  # Source: ibm-apiconnect-ent/templates/rbac.yaml
  kind: RoleBinding
  apiVersion: rbac.authorization.k8s.io/v1beta1
  metadata:
    name: apic-v2018-3-3-ibm-apiconnect-ent
    labels:
      app: ibm-apiconnect-ent
      chart: ibm-apiconnect-ent-2.0.8
      release: apic-v2018-3-3
      heritage: Tiller
  subjects:
  - kind: ServiceAccount

```

```

name: apic-v2018-3-3-ibm-apiconnect-ent
namespace: apiconnect
roleRef:
  apiGroup: rbac.authorization.k8s.io
  kind: Role
  name: apic-v2018-3-3-ibm-apiconnect-ent
---
# Source: ibm-apiconnect-ent/templates/apic-operator-deployment.yaml
apiVersion: apps/v1beta2
kind: Deployment
metadata:
  name: apic-v2018-3-3-ibm-apiconnect-ent-operator
  labels:
    app: ibm-apiconnect-ent
    chart: ibm-apiconnect-ent-2.0.8
    release: apic-v2018-3-3
    heritage: Tiller
    component: ibm-apiconnect-ent-operator
spec:
  replicas: 1
  selector:
    matchLabels:
      release: apic-v2018-3-3
  strategy:
    type: RollingUpdate
    rollingUpdate:
      maxSurge: 1
      maxUnavailable: 0
  template:
    metadata:
      labels:
        app: ibm-apiconnect-ent
        chart: ibm-apiconnect-ent-2.0.8
        release: apic-v2018-3-3
        heritage: Tiller
        component: ibm-apiconnect-ent-operator
    annotations:
      productName: "API Connect Enterprise"
      productID: "1575d1b24f8fef20747d1f85f9358500"
      productVersion: "2018.3.3"
  spec:
    serviceAccountName: apic-v2018-3-3-ibm-apiconnect-ent
    affinity:
      nodeAffinity:
        requiredDuringSchedulingIgnoredDuringExecution:
          nodeSelectorTerms:
            - matchExpressions:
              - key: beta.kubernetes.io/arch
                operator: In
                values:
                  - amd64
    imagePullSecrets:
      - name: "apiconnect-icp-secret"
    containers:
      - name: ibm-apiconnect-ent
        image: "mycluster.icp:8500/apiconnect/mycluster.icp:8500/apiconnect/apico

```

```

imagePullPolicy: IfNotPresent
command: [ "/apicop/initApicOp.sh" ]
args: [ "v1.10.0+icp-ee", "server", "--debug", "--create-crd=true" ]
env:
  - name: HELM_HOME
    value: "/home/apic/.helm"
  - name: POD_NAMESPACE
    valueFrom:
      fieldRef:
        fieldPath: metadata.namespace
ports:
  - containerPort: 1776
livenessProbe:
  httpGet:
    path: /
    port: 1777
readinessProbe:
  httpGet:
    path: /
    port: 1777
resources:
  limits:
    cpu: 100m
    memory: 128Mi
  requests:
    cpu: 100m
    memory: 128Mi
volumeMounts:
  - name: helm-tls
    mountPath: "/home/apic/.helm"
volumes:
  - name: helm-tls
    secret:
      secretName: helm-tls-secret
      defaultMode: 0644
      items:
        - key: cert.pem
          path: cert.pem
        - key: ca.pem
          path: ca.pem
        - key: key.pem
          path: key.pem
    securityContext:
      runAsNonRoot: true
      runAsUser: 1001
    supplementalGroups:
      - 1001

# Source: ibm-apiconnect-ent/templates/apic-cluster-create.yaml
apiVersion: batch/v1
kind: Job
metadata:
  name: "apic-v2018-3-3-ibm-apiconnect-ent-create-cluster"
  labels:
    app: ibm-apiconnect-ent
    chart: ibm-apiconnect-ent-2.0.8

```

```

release: apic-v2018-3-3
heritage: Tiller
spec:
  template:
    metadata:
      labels:
        app: ibm-apiconnect-ent
        release: apic-v2018-3-3
    annotations:
      productName: "API Connect Enterprise"
      productID: "1575d1b24f8fef20747d1f85f9358500"
      productVersion: "2018.3.3"
  spec:
    serviceAccountName: apic-v2018-3-3-ibm-apiconnect-ent
    affinity:
      nodeAffinity:
        requiredDuringSchedulingIgnoredDuringExecution:
          nodeSelectorTerms:
            - matchExpressions:
                - key: beta.kubernetes.io/arch
                  operator: In
                  values:
                    - amd64
    restartPolicy: Never
    imagePullSecrets:
      - name: "apiconnect-icp-secret"
    initContainers:
      - name: "apic-v2018-3-3-crd-wait"
        image: "mycluster.icp:8500/apiconnect/mycluster.icp:8500/apiconnect/apico
        imagePullPolicy: IfNotPresent
        command: ["bash", "-c", "until kubectl get crd apiconnectclusters.apic.ib
    containers:
      - name: "apic-v2018-3-3-create-cluster"
        image: "mycluster.icp:8500/apiconnect/mycluster.icp:8500/apiconnect/apico
        imagePullPolicy: IfNotPresent
        command:
          - 'bash'
          - '-c'
          - |
            cat <<EOF | kubectl apply -f -
            apiVersion: apic.ibm.com/v1
            kind: APIConnectCluster
            metadata:
              name: apic-v2018-3-3-apic-cluster
            spec:
              subsystems:
                analytics:
                  endpoints:
                    - hostname: "apicai.172.16.247.254.nip.io"
                      name: analytics-ingestion
                    - hostname: "apicac.172.16.247.254.nip.io"
                      name: analytics-client
                  kvs:
                    coordinating-max-memory-gb: "3"
                    data-max-memory-gb: "4"
                    data-storage-size-gb: "50"

```

```

enable-persistence: "true"
ingress-type: "ingress"
master-max-memory-gb: "8"
master-storage-size-gb: "1"
mode: dev
registry: "mycluster.icp:8500/apiconnect/"
registry-secret: "apiconnect-icp-secret"
storage-class: "apic.shared.storage"
extra-values:
  global: '{ productName: "API Connect Enterprise", productID:
gateway:
  endpoints:
    - hostname: "apicapi-gateway.172.16.247.254.nip.io"
      name: api-gateway
    - hostname: "iapicapic-gateway-director.172.16.247.254.nip.io"
      name: apic-gw-service
kvs:
  enable-tms: "off"
  image-pull-policy: "IfNotPresent"
  registry: "mycluster.icp:8500/apiconnect/"
  image-repository: ""
  image-tag: "latest"
  ingress-type: "ingress"
  max-cpu: "2"
  max-memory-gb: "6"
  registry-secret: "apiconnect-icp-secret"
  replica-count: "1"
  mode: dev
  storage-class: "apic.shared.storage"
  tms-peering-storage-size-gb: "10"
  v5-compatibility-mode: "on"
  extra-values: {}
management:
  endpoints:
    - hostname: "apicplatform.172.16.247.254.nip.io"
      name: platform-api
    - hostname: "apicconsumer.172.16.247.254.nip.io"
      name: consumer-api
    - hostname: "apiccloud.172.16.247.254.nip.io"
      name: cloud-admin-ui
    - hostname: "apicmanager.172.16.247.254.nip.io"
      name: api-manager-ui
kvs:
  cassandra-backup-auth-secret: ""
  cassandra-backup-host: ""
  cassandra-backup-path: "/backups"
  cassandra-backup-port: "22"
  cassandra-backup-protocol: "sftp"
  cassandra-backup-schedule: "0 0 * * *"
  cassandra-cluster-size: "1"
  cassandra-max-memory-gb: "8"
  cassandra-postmortems-auth-secret: ""
  cassandra-postmortems-host: ""
  cassandra-postmortems-path: "/cassandra-postmortems"
  cassandra-postmortems-port: "22"
  cassandra-postmortems-protocol: "sftp"

```

```

        cassandra-volume-size-gb: "16"
        create-crd: "true"
        enable-persistence: "true"
        external-cassandra-host: ""
        ingress-type: "ingress"
        migration-image-repository: ""
        migration-image-tag: ""
        migration-volume-size-gb: ""
        mode: dev
        portal-base-uri: ""
        registry: "mycluster.icp:8500/apiconnect/"
        registry-secret: "apiconnect-icp-secret"
        storage-class: "apic.shared.storage"
        extra-values: {
            global: '{ productName: "API Connect Enterprise", productID:}'
        }
    portal:
        endpoints:
        - hostname: "apicadmin.172.16.247.254.nip.io"
            name: portal-admin
        - hostname: "apicportal.172.16.247.254.nip.io"
            name: portal-www
    kvs:
        admin-storage-size-gb: "1"
        backup-storage-size-gb: "5"
        db-logs-storage-size-gb: "2"
        db-root-pw: "root"
        db-storage-size-gb: "12"
        enable-persistence: "true"
        ingress-type: "ingress"
        mode: dev
        registry: "mycluster.icp:8500/apiconnect/"
        registry-secret: "apiconnect-icp-secret"
        storage-class: "apic.shared.storage"
        www-storage-size-gb: "5"
        extra-values: {
            global: '{ productName: "API Connect Enterprise", productID:}'
        }
    EOF
LAST DEPLOYED: Wed Aug 1 22:09:00 2018
NAMESPACE: apiconnect
STATUS: DEPLOYED

RESOURCES:
==> v1beta2/Deployment
NAME                                     DESIRED   CURRENT   UP-TO-DATE   AVAILABLE
apic-v2018-3-3-ibm-apiconnect-ent-operator  1         1         1           0

==> v1/Job
NAME                                     DESIRED   SUCCESSFUL   AGE
apic-v2018-3-3-ibm-apiconnect-ent-create-cluster  1         0           0s

==> v1/Pod(related)
NAME                                     READY   STATUS    RESTARTS
apic-v2018-3-3-ibm-apiconnect-ent-create-cluster-lmbjd  0/1     Init:0/1   0

```

```

==> v1/ServiceAccount
NAME                      SECRETS  AGE
apic-v2018-3-3-ibm-apiconnect-ent  1        0s

==> v1beta1/ClusterRole
NAME                      AGE
apic-v2018-3-3-ibm-apiconnect-ent  0s

==> v1beta1/ClusterRoleBinding
NAME                      AGE
apic-v2018-3-3-ibm-apiconnect-ent-cluster-binding  0s

==> v1beta1/Role
NAME                      AGE
apic-v2018-3-3-ibm-apiconnect-ent  0s

==> v1beta1/RoleBinding
NAME                      AGE
apic-v2018-3-3-ibm-apiconnect-ent  0s

```

NOTES:

```

## API Connect Management subsystem ##

Platform API: https://apicplatform.172.16.247.254.nip.io/api
Consumer API: https://apicconsumer.172.16.247.254.nip.io/consumer-api
Cloud Admin UI: https://apiccloud.172.16.247.254.nip.io/admin
API Manager UI: https://apicmanager.172.16.247.254.nip.io/manager
## API Connect Portal subsystem ##

Portal Director API: https://apicpadmin.172.16.247.254.nip.io
Portal Web UI: https://apicportal.172.16.247.254.nip.io
## API Connect Analytics subsystem ##

Analytics Ingestion API: https://apicai.172.16.247.254.nip.io
Analytics Client API: https://apicac.172.16.247.254.nip.io
## API Connect Gateway subsystem ##

Gateway Service API: https://iapicapic-gateway-director.172.16.247.254.nip.io
API Gateway: https://apicapi-gateway.172.16.247.254.nip.io

```

11. Verify API Connect Install

The following command can be used to get all the pods and their states. It will be good to analyze the pods that are NOT in the Running state. If all the pods are not in the *Running* state, the [Troubleshooting tips section](#) can be referred.

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

| NAME | READY | STATUS | RESTARTS | AGE |
|-------------------------------------------------------------|-------|---------|----------|-----|
| apic-v2018.2.9-ibm-apiconnect-ent-operator-55985749f9-cmtsp | 1/1 | Running | 0 | 28m |
| r0f95cddeae-apic-portal-db-0 | 2/2 | Running | 0 | 27m |
| r0f95cddeae-apic-portal-nginx-6794dccfcf-z7ggf | 1/1 | Running | 0 | 27m |
| r0f95cddeae-apic-portal-www-0 | 2/2 | Running | 0 | 27m |
| r4ec1f68289-a7s-proxy-56df7fcc9-z9dgq | 1/1 | Running | 0 | 25m |
| r4ec1f68289-apiconnect-cc-0 | 1/1 | Running | 0 | 25m |
| r4ec1f68289-apim-9b5455c6-dcz55 | 1/1 | Running | 0 | 25m |
| r4ec1f68289-apim-elasticsearch-0 | 1/1 | Running | 0 | 16m |
| r4ec1f68289-juhu-659ddb666c-vlpgx | 1/1 | Running | 0 | 25m |
| r4ec1f68289-ldap-d77cfb79d-dwrfw | 1/1 | Running | 0 | 25m |
| r4ec1f68289-lur-59567bbdd7-q8xfs | 1/1 | Running | 0 | 25m |
| r4ec1f68289-tk-dnld-srv-779ddd8467-v6665 | 1/1 | Running | 0 | 25m |
| r4ec1f68289-ui-7998574fbb-8jzwd | 1/1 | Running | 0 | 25m |
| r608102c30a-analytics-client-586d6d9d48-wcd82 | 1/1 | Running | 0 | 26m |
| r608102c30a-analytics-ingestion-6d6d4df7d5-pfgfg | 1/1 | Running | 0 | 26m |
| r608102c30a-analytics-mtls-gw-7cf87f4fb-dql9d | 1/1 | Running | 0 | 26m |
| r608102c30a-analytics-storage-coordinating-556f7bd99b-scssb | 1/1 | Running | 0 | 26m |
| r608102c30a-analytics-storage-data-0 | 1/1 | Running | 0 | 26m |
| r608102c30a-analytics-storage-master-0 | 1/1 | Running | 6 | 26m |
| rdb-b46f65e-dynamic-gateway-service-0 | 1/1 | Running | 0 | 26m |
| re7f96fb7be-cassandra-operator-78d7fd66c7-bcxlw | 1/1 | Running | 0 | 25m |

The following command can be used to get the details of storage classes used in the system.

```
kubectl get sc -n apiconnect
```

| NAME | PROVISIONER |
|--------------------------|------------------------------|
| apic.shared.storage | kubernetes.io/glusterfs |
| image-manager-storage | kubernetes.io/no-provisioner |
| logging-storage-datanode | kubernetes.io/no-provisioner |
| mongodb-storage | kubernetes.io/no-provisioner |

The following command can be used to get the details of Persistant Storage Volumes used in the system.

```
kubectl get pvc -n apiconnect
```

| NAME | STATUS | VOLUME | CAPACITY | ACCESS MODES | STORAGECLASS | AGE |
|---------------------------------------------|--------|------------------------------------------|----------|--------------|---------------------|-----|
| admin-r0f95cddeae-apic-portal-www-0 | Bound | pvc-cdfab7e2-682f-11e8-9616-005056a5241f | 1Gi | RWO | apic.shared.storage | 28m |
| backup-r0f95cddeae-apic-portal-www-0 | Bound | pvc-cdf9fadd-682f-11e8-9616-005056a5241f | 5Gi | RWO | apic.shared.storage | 28m |
| data-r4ec1f68289-apim-elasticsearch-0 | Bound | pvc-0be6a615-6830-11e8-9616-005056a5241f | 50Gi | RWO | apic.shared.storage | 26m |
| data-r608102c30a-analytics-storage-data-0 | Bound | pvc-df2b8ba6-682f-11e8-9616-005056a5241f | 50Gi | RWO | apic.shared.storage | 27m |
| data-r608102c30a-analytics-storage-master-0 | Bound | pvc-df37ffdd-682f-11e8-9616-005056a5241f | 1Gi | RWO | apic.shared.storage | 27m |
| db-r0f95cddeae-apic-portal-db-0 | Bound | pvc-cdedf58c-682f-11e8-9616-005056a5241f | 12Gi | RWO | apic.shared.storage | 28m |
| dblogs-r0f95cddeae-apic-portal-db-0 | Bound | pvc-cdef45c3-682f-11e8-9616-005056a5241f | 2Gi | RWO | apic.shared.storage | 28m |
| pv-claim-r4ec1f68289-apiconnect-cc-0 | Bound | pvc-0e86f72e-6830-11e8-9616-005056a5241f | 16Gi | RWO | apic.shared.storage | 26m |
| web-r0f95cddeae-apic-portal-www-0 | Bound | pvc-cdf8b752-682f-11e8-9616-005056a5241f | 5Gi | RWO | apic.shared.storage | 28m |

The following commands can be used to get details of the current API Connect setup.

```
kubectl describe apiconnectclusters
kubectl get services -n apiconnect
```

| NAME | TYPE | CLUSTER-IP | EXTERNAL-IP | PORT(S) | AGE |
|---------------------------------------------------------------|-----------|------------|-------------|--------------------------------------------------|-----|
| glusterfs-dynamic-admin-r0f95cddeae-apic-portal-www-0 | ClusterIP | 10.0.0.110 | <none> | 1/TCP | 31m |
| glusterfs-dynamic-backup-r0f95cddeae-apic-portal-www-0 | ClusterIP | 10.0.0.111 | <none> | 1/TCP | 31m |
| glusterfs-dynamic-data-r4ec1f68289-apim-elasticsearch-0 | ClusterIP | 10.0.0.64 | <none> | 1/TCP | 29m |
| glusterfs-dynamic-data-r608102c30a-analytics-storage-data-0 | ClusterIP | 10.0.0.239 | <none> | 1/TCP | 30m |
| glusterfs-dynamic-data-r608102c30a-analytics-storage-master-0 | ClusterIP | 10.0.0.228 | <none> | 1/TCP | 30m |
| glusterfs-dynamic-db-r0f95cddeae-apic-portal-db-0 | ClusterIP | 10.0.0.227 | <none> | 1/TCP | 31m |
| glusterfs-dynamic-dblogs-r0f95cddeae-apic-portal-db-0 | ClusterIP | 10.0.0.74 | <none> | 1/TCP | 31m |
| glusterfs-dynamic-pv-claim-r4ec1f68289-apiconnect-cc-0 | ClusterIP | 10.0.0.22 | <none> | 1/TCP | 29m |
| glusterfs-dynamic-web-r0f95cddeae-apic-portal-www-0 | ClusterIP | 10.0.0.247 | <none> | 1/TCP | 31m |
| r0f95cddeae-apic-portal-admin-all | ClusterIP | None | <none> | 4443/TCP | 31m |
| r0f95cddeae-apic-portal-db | ClusterIP | None | <none> | 3010/TCP, 3307/TCP, 4567/TCP, 4568/TCP, 4444/TCP | 31m |
| r0f95cddeae-apic-portal-db-all | ClusterIP | None | <none> | 3306/TCP | 31m |
| r0f95cddeae-apic-portal-db-proxy | ClusterIP | None | <none> | 3306/TCP | 31m |
| r0f95cddeae-apic-portal-director | ClusterIP | None | <none> | 3009/TCP | 31m |
| r0f95cddeae-apic-portal-director-cluster | ClusterIP | 10.0.0.28 | <none> | 3009/TCP | 31m |
| r0f95cddeae-apic-portal-nginx | ClusterIP | 10.0.0.122 | <none> | 443/TCP | 31m |
| r0f95cddeae-apic-portal-web | ClusterIP | None | <none> | 4443/TCP | 31m |
| r0f95cddeae-apic-portal-web-cluster | ClusterIP | 10.0.0.156 | <none> | 4443/TCP | 31m |
| r4ec1f68289-a7s-proxy | ClusterIP | 10.0.0.15 | <none> | 8084/TCP | 29m |
| r4ec1f68289-apiconnect-cc | ClusterIP | None | <none> | 9042/TCP | 29m |
| r4ec1f68289-apim | ClusterIP | 10.0.0.52 | <none> | 3003/TCP, 3006/TCP | 29m |
| r4ec1f68289-apim-elasticsearch | ClusterIP | 10.0.0.154 | <none> | 8443/TCP, 9200/TCP | 29m |
| r4ec1f68289-apim-es-discovery | ClusterIP | None | <none> | 9300/TCP | 29m |
| r4ec1f68289-apim-es-sts | ClusterIP | None | <none> | 9300/TCP | 29m |
| r4ec1f68289-juju | ClusterIP | 10.0.0.152 | <none> | 2000/TCP, 2001/TCP | 29m |
| r4ec1f68289-ldap | ClusterIP | 10.0.0.58 | <none> | 3007/TCP | 29m |
| r4ec1f68289-lu5 | ClusterIP | 10.0.0.61 | <none> | 3004/TCP | 29m |
| r4ec1f68289-tk-dnld-srv | ClusterIP | 10.0.0.175 | <none> | 8443/TCP | 29m |
| r4ec1f68289-ui | ClusterIP | 10.0.0.190 | <none> | 8443/TCP | 29m |
| r608102c30a-analytics-client | ClusterIP | 10.0.0.29 | <none> | 8443/TCP | 30m |
| r608102c30a-analytics-ingestion | ClusterIP | 10.0.0.237 | <none> | 443/TCP, 8443/TCP | 30m |
| r608102c30a-analytics-mtls-gw | ClusterIP | 10.0.0.202 | <none> | 443/TCP | 30m |
| r608102c30a-analytics-storage | ClusterIP | 10.0.0.246 | <none> | 8443/TCP, 9200/TCP | 30m |
| r608102c30a-es-data-persistence | ClusterIP | None | <none> | 9300/TCP | 30m |
| r608102c30a-es-discovery | ClusterIP | None | <none> | 9300/TCP | 30m |
| r608102c30a-es-master-persistence | ClusterIP | None | <none> | 9300/TCP | 30m |
| rdb5b46f65e-dynamic-gateway-service | ClusterIP | None | <none> | 16380/TCP, 26380/TCP | 30m |
| rdb5b46f65e-dynamic-gateway-service-ingress | ClusterIP | 10.0.0.105 | <none> | 3000/TCP, 9443/TCP | 30m |
| re7f96fb7be-cassandra-operator | ClusterIP | 10.0.0.167 | <none> | 1770/TCP | 29m |

The following command can be used to get the list of installed Helm Charts. IBM API Connect should be listed if it was successfully installed.

```
helm list --tls
```

| NAME | REVISION | UPDATED | STATUS | CHART | NAMESPACE |
|------------------------|----------|-------------------------|----------|----------------------------------|-------------|
| apic-v2018.2.9 | 1 | Mon Jun 4 15:43:42 2018 | DEPLOYED | ibm-apiconnect-ent-2.0.3 | apiconnect |
| auth-apikeys | 1 | Mon Jun 4 14:25:04 2018 | DEPLOYED | auth-apikeys-1.0.0 | kube-system |
| auth-idp | 1 | Mon Jun 4 14:25:01 2018 | DEPLOYED | auth-idp-1.0.0 | kube-system |
| auth-pap | 1 | Mon Jun 4 14:25:05 2018 | DEPLOYED | auth-pap-1.0.0 | kube-system |
| auth-pdp | 1 | Mon Jun 4 14:25:06 2018 | DEPLOYED | auth-pdp-1.0.0 | kube-system |
| calico | 1 | Mon Jun 4 14:22:38 2018 | DEPLOYED | calico-1.0.0 | kube-system |
| catalog-ui | 1 | Mon Jun 4 14:29:50 2018 | DEPLOYED | icp-catalog-chart-0.1.2 | kube-system |
| custom-metrics-adapter | 1 | Mon Jun 4 14:29:26 2018 | DEPLOYED | ibm-custom-metrics-adapter-0.2.1 | kube-system |
| heapster | 1 | Mon Jun 4 14:29:22 2018 | DEPLOYED | heapster-1.4.0 | kube-system |
| helm-api | 1 | Mon Jun 4 14:29:51 2018 | DEPLOYED | helm-api-1.0.0 | kube-system |
| helm-repo | 1 | Mon Jun 4 14:29:23 2018 | DEPLOYED | helm-repo-1.0.0 | kube-system |
| icp-management-ingress | 1 | Mon Jun 4 14:25:08 2018 | DEPLOYED | icp-management-ingress-2.2.0 | kube-system |
| kube-dns | 1 | Mon Jun 4 14:22:40 2018 | DEPLOYED | kube-dns-1.0.0 | kube-system |
| logging | 1 | Mon Jun 4 14:29:48 2018 | DEPLOYED | ibm-icplogging-1.0.0 | kube-system |
| mariadb | 1 | Mon Jun 4 14:23:53 2018 | DEPLOYED | mariadb-10.1.16 | kube-system |
| metering | 1 | Mon Jun 4 14:29:24 2018 | DEPLOYED | metering-1.0.3 | kube-system |
| metrics-server | 1 | Mon Jun 4 14:23:56 2018 | DEPLOYED | metrics-server-0.2.1 | kube-system |
| mongodb | 1 | Mon Jun 4 14:23:47 2018 | DEPLOYED | icp-mongodb-2.2.1 | kube-system |
| monitoring | 1 | Mon Jun 4 14:29:29 2018 | DEPLOYED | ibm-icpmonitoring-1.1.0 | kube-system |
| nginx-ingress | 1 | Mon Jun 4 14:23:55 2018 | DEPLOYED | nginx-ingress-0.13.0 | kube-system |
| platform-api | 1 | Mon Jun 4 14:29:47 2018 | DEPLOYED | platform-api-0.1.0 | kube-system |
| platform-ui | 1 | Mon Jun 4 14:29:28 2018 | DEPLOYED | platform-ui-1.0.0 | kube-system |
| r0f95cddeae | 1 | Mon Jun 4 15:45:16 2018 | DEPLOYED | apic-portal-2.0.0 | apiconnect |
| r4ec1f68289 | 1 | Mon Jun 4 15:46:59 2018 | DEPLOYED | apiconnect-2.0.0 | apiconnect |
| r608102c30a | 1 | Mon Jun 4 15:45:44 2018 | DEPLOYED | apic-analytics-2.0.0 | apiconnect |
| rdb5b46f65e | 1 | Mon Jun 4 15:46:06 2018 | DEPLOYED | dynamic-gateway-service-1.0.6 | apiconnect |
| re7f96fb7be | 1 | Mon Jun 4 15:46:53 2018 | DEPLOYED | cassandra-operator-1.0.0 | apiconnect |
| rescheduler | 1 | Mon Jun 4 14:29:53 2018 | DEPLOYED | rescheduler-0.5.2 | kube-system |
| security-onboarding | 1 | Mon Jun 4 14:29:54 2018 | DEPLOYED | security-onboarding-0.1.0 | kube-system |
| service-catalog | 1 | Mon Jun 4 14:23:54 2018 | DEPLOYED | service-catalog-0.0.10 | kube-system |
| unified-router | 1 | Mon Jun 4 14:29:46 2018 | DEPLOYED | unified-router-2.2.0 | kube-system |

The following commands is used to get details about the API Connect cluster.

```
kubectl describe apiconnectclusters -n apiconnect
```

The output of the aforesaid commands is listed below.

```
[root@rsun-rhel-bootmaster01 charts]# kubectl describe apiconnectclusters -n apiconnect
Name:          apic-v2018.2.9-apic-cluster
Namespace:     apiconnect
Labels:        <none>
Annotations:   <none>
API Version:  apic.ibm.com/v1
Kind:          APIConnectCluster
Metadata:
  Cluster Name:
  Creation Timestamp: 2018-06-04T19:43:59Z
  Generation:         1
  Resource Version:  16079
  Self Link:          /apis/apic.ibm.com/v1/namespaces/apiconnect/apiconnectclusters/apic-v2018.2.9-apic-cluster
  UID:                a038a8fa-682f-11e8-9616-005056a5241f
Spec:
  Secrets:
  Subsystems:
    Analytics:
      Endpoints:
        Hostname: apicai.172.16.247.254.nip.io
        Name:     analytics-ingestion
        Hostname: apicac.172.16.247.254.nip.io
        Name:     analytics-client
    Extra - Values:
    Kvs:
      Coordinating - Max - Memory - Gb: 3
      Data - Max - Memory - Gb: 4
      Data - Storage - Size - Gb: 50
      Enable - Persistence: true
      Ingress - Type: ingress
      Master - Max - Memory - Gb: 8
      Master - Storage - Size - Gb: 1
      Mode: demo
      Registry: mycluster.icp:8500/apiconnect/
      Registry - Secret: apiconnect-icp-secret
      Storage - Class: apic.shared.storage
    Name:
    Gateway:
      Endpoints:
        Hostname: apicapi-gateway.172.16.247.254.nip.io
        Name:     gateway
        Hostname: iapicapic-gateway-director.172.16.247.254.nip.io
        Name:     gateway-director
    Extra - Values:
    Kvs:
      Ingress - Type: ingress
      Max - Cpu: 2
      Max - Memory - Gb: 6
      Mode: demo
      Registry: mycluster.icp:8500/apiconnect/
      Registry - Secret: apiconnect-icp-secret
      Replica - Count: 1
```

```

Storage - Class: apic.shared.storage
Name:
Management:
Endpoints:
  Hostname: apicplatform.172.16.247.254.nip.io
  Name: platform-api
  Hostname: apicconsumer.172.16.247.254.nip.io
  Name: consumer-api
  Hostname: apiccloud.172.16.247.254.nip.io
  Name: cloud-admin-ui
  Hostname: apicmanager.172.16.247.254.nip.io
  Name: api-manager-ui
Extra - Values:
Kvs:
  Cassandra - Backup - Auth - Secret:
  Cassandra - Backup - Host:
  Cassandra - Backup - Path: /backups
  Cassandra - Backup - Port: 22
  Cassandra - Backup - Protocol: sftp
  Cassandra - Backup - Schedule: 0 0 * * *
  Cassandra - Cluster - Size: 1
  Cassandra - Max - Memory - Gb: 8
  Cassandra - Postmortems - Auth - Secret:
  Cassandra - Postmortems - Host:
  Cassandra - Postmortems - Path: /cassandra-postmortems
  Cassandra - Postmortems - Port: 22
  Cassandra - Postmortems - Protocol: sftp
  Cassandra - Volume - Size - Gb: 16
  Create - Crd: true
  Enable - Persistence: true
  External - Cassandra - Host:
  Ingress - Type: ingress
  Mode:
    Portal - Base - Uri: mycluster.icp:8500/apiconnect/
  Registry:
    Registry - Secret: apiconnect-icp-secret
    Search - Max - Memory - Gb: 2
    Search - Volume - Size - Gb: 50
    Storage - Class: apic.shared.storage
  Name:
Portal:
Endpoints:
  Hostname: apicpadmin.172.16.247.254.nip.io
  Name: portal-admin
  Hostname: apicportal.172.16.247.254.nip.io
  Name: portal-www
Extra - Values:
Kvs:
  Admin - Storage - Size - Gb: 1
  Backup - Storage - Size - Gb: 5
  Db - Logs - Storage - Size - Gb: 2
  Db - Root - Pw: root
  Db - Storage - Size - Gb: 12
  Enable - Persistence: true
  Ingress - Type: ingress
  Mode: demo

```

```

Registry: mycluster.icp:8500/apiconnect/
Registry - Secret: apiconnect-icp-secret
Storage - Class: apic.shared.storage
Www - Storage - Size - Gb: 5
Name:
Status:
Ready: false
Applied Chart Hash:
  Apic - Analytics: 0aa80909653df1ca5e4ab574d530bda6014c80d06a49782e8
  Apic - Portal: f96513e50979e5d78cc05d906679d126aca5d52f80a496939
Apiconnect: 9eb713a85aedd0bdfe617d6ca24f0402387d1b2cd30c12949
  Cassandra - Operator: 85509e64d89eb377f4f9d9d4d19a03b1cf3f4837e37c432d1
  Dynamic - Gateway - Service: d33f88fe55e5bd0c19ddaac557e4100f9d7a26e285f9dd63e
Events: <none>

```

12. Troubleshooting API Connect Install

This section can be used as reference if there are issues when deploying IBM API Connect Helm chart.

12.1 Useful Commands

The following command can be used to get more details about the failing pod.

```
kubectl -n apiconnect describe pods <failing_pod_name>
kubectl -n apiconnect logs <failing_pod_name>
```

The following command can be used to get more details about the failing *Persistent Storage Volume* that are NOT bound.

```
kubectl -n apiconnect describe pvc <pending_pvc>
```

If required, the following command can be used to delete the Helm chart and reinstall the IBM API Connect.

```
helm delete --purge <old_helm_release>
```

12.2 GlusterFS Storage cleanup

If required, the following utilities can be run to cleanup the GlusterFS storage used so far within the namespace **apiconnect**.

- Delete all Persistent Volume Chains: [deletePVCs.sh](#)
- Delete all GlusterFS Volumes: [deleteGlusterFSVolumes.sh](#)

The Heketi environment must be set using the following commands before running the *deleteVolumes.sh* script.

Note: The environment variables *HEKETI_CLI_SERVER*, *HEKETI_CLI_USER*, *HEKETI_CLI_KEY* shoud be updated to match your Heketi environment.

```
export HEKETI_CLI_SERVER=http://localhost:8081
export HEKETI_CLI_USER=admin
export HEKETI_CLI_KEY=adminadmin
```

The following command can be run on all the GlusterFS servers to cleanup the disk (sdX) :

```
wipefs -a /dev/sdX
```

The Heketi database can be cleaned up using the following commands:

```
rm -fr /var/lib/heketi/*
systemctl enable --now heketi
heketi-cli topology load --json=topology.json
```

13. Install and Configure SMTP.

Note This task is NOT required if an SMTP server is already available.

If SMTP server is NOT available, the following steps can be executed on the Management node to enable **FakeSMTP** as the reference SMTP server.

The following link has details on the SMTP Server setup.

<http://nilhcem.com/FakeSMTP/download.html>

Also, the following commands can be run to download java and install on the Redhat systems.

```
yum install java-1.7.0-openjdk-devel
```

The following commands are run to enable FakeSMTP after the utility is downloaded.

```
mkdir /tmp/emails  
java -jar fakeSMTP-1.13.jar -s -b -p 2525 -o /tmp/emails &
```

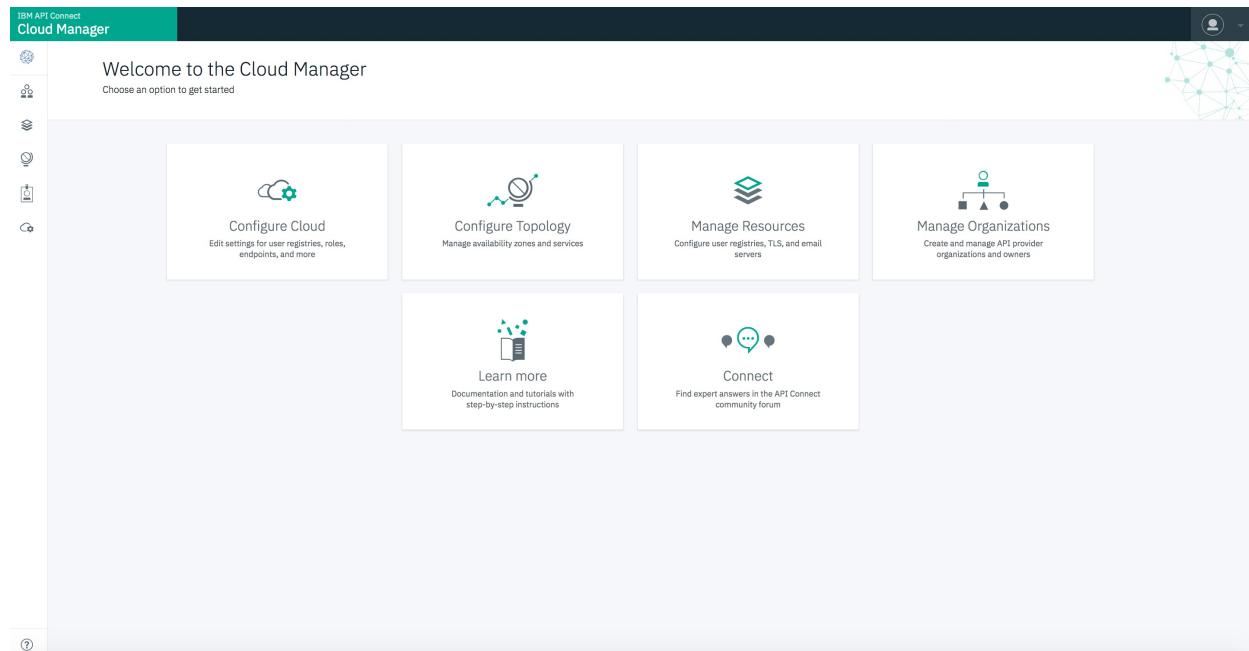
14. Login to the Cloud Manager

The login URL is:

https://apiccloud.INGRESS_CONTROLLER_IP.nip.io/admin/

The credentials user name `admin` and password `7iron-hide` can be used to login to API Connect cloud manager.

The screen shot of the home page after logging onto the IBM API Connect Cloud Manager is used is listed below.



14.1 Configure eMail server

The following link can be used as a reference to setup the eMail server:

- Configuring an email server for notifications

The screen shot having values used in the current setup is listed below.

← Edit Email Server

Email Server Configuration

Title
Fake SMTP

Name
fake-smtp

Address
172.16.248.3

Port
2525

Authenticate User (optional)

Authenticate Password (optional)

TLS Client Profile (optional)
Choose one...

Cancel Save

The following link can be used as reference to configure the *Notification*.

IBM API Connect Cloud Manager

Settings

Notifications

Sender & Email Server

Name
APIC Administrator

Address
admin@csplab.local

| TITLE | MAIL SERVER |
|-----------|--------------|
| Fake SMTP | 172.16.248.3 |

- Configuring notifications

14.2 Register Gateway service

The following link can be used as reference to set up Gateway Service:

- Registering a gateway service

The value of **API Endpoint Base** can be set to the value used in the parameter *apiGatewayEndpoint* of *values.yaml*.

The value of **Endpoint** can be set to the value "*https://..svc:3000*".

Note: DYNAMIC_GATEWAY_SERVICE_INGRESS_NAME can be retrieved using the output of the following command:

```
kubectl get services -n apiconnect | grep dynamic-gateway-service-ingress | awk -F '
```

The screen shot having values used in the current setup is listed below.

The screenshot shows the 'Edit Gateway Service' page with the following fields filled in:

- Domain Name:** apiconnect
- Title:** myGateway
- Name:** mygateway
- Summary (optional):** (empty)
- OAuth Shared Secret (optional):** *****
- API Endpoint Base:** https://apicapi-gateway.172.16.247.254.nip.io
- Endpoint:** https://rdb5b46f65e-dynamic-gateway-service-ingress.apiconnect.svc:3000
- TLS Client Profile:** Default TLS client profile
- Server Name Indication (SNI):** (empty)

14.3 Register Analytics service

The following link can be used as reference to set up Analytics Service:

- [Registering an analytics service](#)

The value of **Endpoint** can be set to the value used in the parameter *analyticsClientEndpoint* of *values.yaml*.

The default *TLS Analytics Client* profile can be chosen.

The screen shot having values used in the current setup is listed below.

Analytics Service

Title
myAnalyticsClient

Name
myanalyticsclient

Summary (optional)

Endpoint
https://apicac.172.16.247.254.nip.io

Please select a TLS Client Profile
Analytics client TLS client profile

[**Advanced Analytics Configuration**](#)

Cancel **Save**

14.4 Register Portal service

The following link can be used as reference to set up Portal Service:

- [Registering a portal service](#)

The value of **Web Endpoint** can be set to the value used in the parameter *portalWebEndpoint* of *values.yaml*.

The value of **Director Endpoint** can be set to the value used in the parameter *portalDirectorEndpoint* of *values.yaml*.

The screen shot having values used in the current setup is listed below.

← Configure Portal Service

Portal Service

| | |
|-------------------------------------------|------------------------------------------|
| Title | myPortal |
| Name | myportal |
| Summary (optional) | |
| Director Endpoint | https://apicadmin.172.16.247.254.nip.io |
| Web Endpoint | https://apicportal.172.16.247.254.nip.io |
| Please select a TLS Client Profile | Portal Director TLS client profile |

Cancel **Save**

14.5 Create Provider Organization

The following link can be used as a reference to setup a Provider Organization. Option #2 listed in the link can be used to invite the new Organization owner.

- Creating a provider organization account

The screen shot having activation link is listed below.

IBM API Connect
Cloud Manager

Provider Organizations

| TITLE | OWNER | STATE |
|--------------------------|---------------------------------------|---------|
| org-apiusr1-csplab-local | apiusr1@csplab.local | Pending |
| Sales | apiusr1.admin apiusr1@csplab.local | Enabled |

Activation link

https://apicmanager.172.16.247.254.nip.io/auth/manager/register?acti
Copy

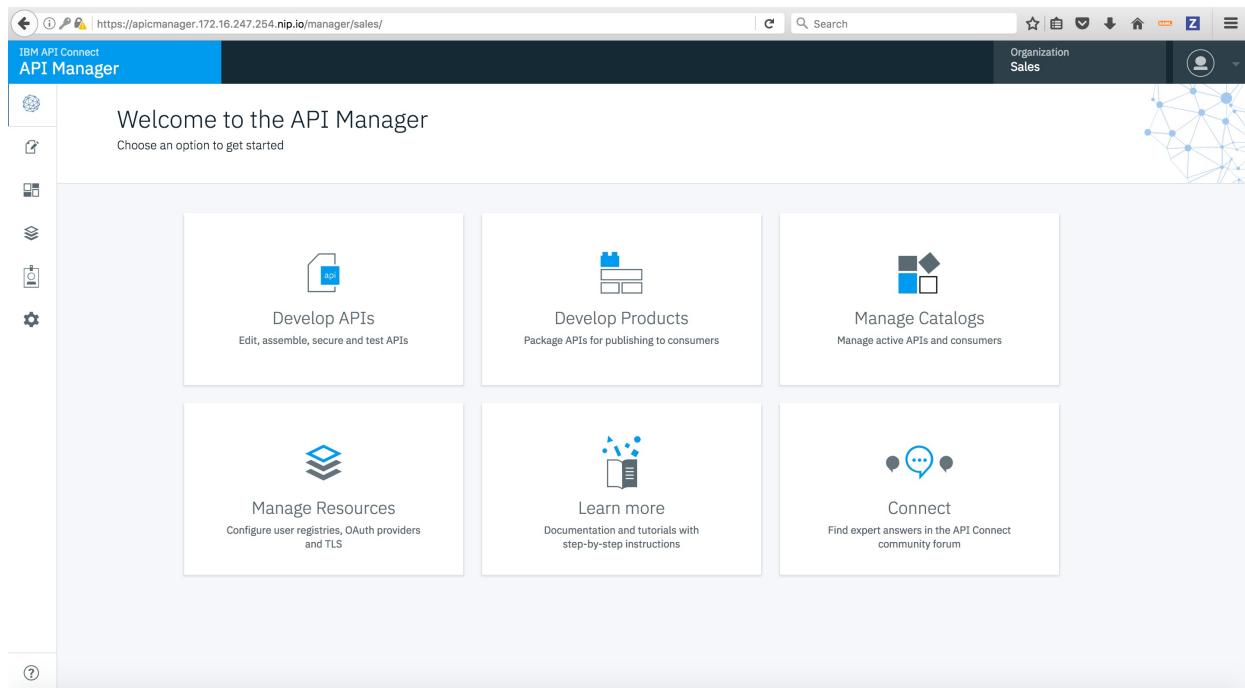
Send the activation link to a user to invite them to sign in or register.

Invitation sent to apiusr1@csplab.local
Activation link
Wed Jun 06 2018 17:41:38 GMT-0400 (EDT)

15. Login to the API Manager

The Activation link received in the previous section can be used to register the new Provider Organization and logon to API Manager.

The screen shot of the home page after the activation link is used is listed below.



15.1 Configure Default Gateway for the sandbox catalog

The following link can be used as a reference to configure the Gateway for the sandbox catalog.

- [Configuring default gateway services for catalogs](#)

The screen shot having default gateway is listed below.

The screenshot shows the 'Gateway Services' settings page in the IBM API Connect API Manager. The left sidebar has a tree view with nodes like 'Overview', 'Gateway Services' (which is selected and highlighted in blue), 'Lifecycle Approvals', 'Roles', 'Role Defaults', 'Onboarding', 'API User Registries', 'OAuth Providers', 'API Endpoints', 'TLS Client Profiles', 'Portal', and 'Properties'. The main content area is titled 'Gateway Services' and contains a 'TITLE' field with the value 'myGateway'. There is also an 'Edit' button.

15.2 Import API and Product

Note: Sample API [hello_1.0.1.yaml](#) and the Product [samples_1.0.1.yaml](#) can be used for the import.

The following link can be used as a reference to import API and Product.

- [Importing an API](#)
- [Importing an Product](#)

The screen shot after the import is listed below.

The image contains two screenshots of the 'Develop' section in the IBM API Connect API Manager. Both screenshots show the 'APIs' tab selected in the top navigation bar. The first screenshot shows the 'Products' section with a single entry: 'Hello 1.0.1' (Type: REST, Last Modified: 11 hours ago). The second screenshot shows the 'Products' section with a single entry: 'samples 1.0.1' (Last Modified: 11 hours ago).

15.3 Publish Product

The following links can be used as a reference to publish an API.

- [Publish a Product](#)

The screen shot after the publish is listed below.

The screenshot shows the 'Products' section of the API Manager. On the left is a sidebar with various icons. The main area has a header 'Manage / Sandbox Products'. Below the header is a search bar and a table. The table has columns: TITLE, NAME, and STATE. It contains one row: 'samples' under TITLE, 'samples 1.0.1' under NAME, and 'Published' under STATE. There is also a 'More' button (three dots) at the end of the row.

15.4 Test the APIs

After the API is published, the API can be tested from the Assembly and/or by invoking the URL directly.

Results are attached below.

The screenshot shows the 'Test' interface for the 'Hello' API. The top navigation bar includes 'IBM API Connect API Manager', 'Organization Sales', and a user icon. The main area has tabs 'Design', 'Source', and 'Assemble' (which is selected). A 'Test' panel on the left shows a 'Response' section with status code '200 OK' and response time '700ms'. Below that are sections for 'Headers' and 'Body'. The 'Headers' section lists several headers. The 'Body' section shows a JSON object: { "message": "Hello World!" }. At the bottom right is a 'Debug' button. The bottom of the screen shows a browser-like address bar with the URL 'https://apicapi-gateway.172.16.247.254.nip.io/sales/sandbox/v1/class/getData' and a status message ' {"message": "Hello World!" }'.

15.5 Create Portal Site

The following link can be used as a reference to create Developer Portal.

- [Creating and configuring Catalogs](#)

The screen shot after the creation of Portal is listed below.

The screenshot shows two pages from the ApicManager interface:

- Create Portal Page:** This page allows you to configure the portal service for a catalog. It includes fields for selecting the portal service (set to "myPortal"), a URL (set to "https://apicportal.172.16.247.254.nip.io/sales/sandbox"), and a "Create" button.
- Settings Page:** This page shows the configuration for the developer portal. It lists the "Portal Service" as "myPortal" and the "Portal URL" as "https://apicportal.172.16.247.254.nip.io/sales/sandbox". A message indicates that provisioning has been initiated and a password will be emailed. The "Portal" section also includes a note about the developer portal providing the consumer view of published API products.

15.6 Create Consumer Organization

The following link can be used as a reference to create Consumer Organization using the "Create Organization" flow.

- [Creating Consumer Organization](#)

The screen shot after the creation of Consumer Organization is listed below.

The screenshot shows the 'Consumer Organizations' page in the IBM API Connect Cloud Manager. The table displays the following data:

| TITLE | OWNER | STATE |
|---------------------------|--------------------------------|---------|
| My Consumer Organization | Pa portaladmin@csplab.local | Enabled |
| Sandbox Test Organization | TU Test User | Enabled |

A green success message box is present on the right side of the screen:

Consumer organization My Consumer Organization created
portalAdmin has been assigned the owner
Thu Jun 07 2018 09:59:59 GMT-0400 (EDIT)

16. Login to the Developer Portal

The login URL is:

https://apicportal.INGRESS_CONTROLLER_IP.nip.io/PROVIDER_ORG_SHORT_NAME/CATALOG_NAME

The credentials of the Consumer Org owner created in the previous section can be used to login to the Developer Portal.

The screen shot of the home page after logging onto the IBM API Connect Cloud Manager is used is listed below.

The screenshot shows the home page of the IBM API Connect Developer Portal. The top navigation bar includes links for 'API Products', 'Apps', 'Blogs', 'Forums', and 'Support'. The user's organization is listed as 'My Consumer Organization'. The main content area has two main sections:

- Explore API Products**: This section features a circular icon with a gear and a magnifying glass. Below it, the text reads: "Take a look at our API products and quickly find the APIs you need." A blue button labeled "Start Exploring" is at the bottom.
- Create a new App**: This section features a circular icon with a pencil and a document. Below it, the text reads: "Create an App so you can subscribe to our API Products and start building your application." A blue button labeled "Create an App" is at the bottom.

References

The following links can be used as reference:

- [Deploying in the IBM Cloud Private environment with the catalog](#)
- [Installing API Connect into a Kubernetes runtime environment](#)
- [Requirements for deploying API Connect into a Kubernetes runtime environment](#)