**Installing ANY IBM Cloud Pak ANYWHERE using the Pak Installer (a.k.a DAFFY)**

The IBM Software portfolio has evolved and modernised substantially in recent times. When customers modernise their traditional licenses into Cloud Paks (https://www.ibm.com/cloud-paks), they get the option to deploy the software in traditional virtual machines or in container-based environment platforms like Red Hat OpenShift (<https://www.redhat.com/en/technologies/cloud-computing/openshift>, <https://docs.openshift.com/>), in this way customers can modernise their existing business applications over time and take advantage of new products and technologies as they start new projects.

The products included in the IBM Cloud Paks can be deployed in traditional or container-based environments, on-premises or public clouds like AWS, Azure, Google or IBM. This is the key advantage of **Hybrid Cloud** (<https://www.ibm.com/hybrid-cloud>) and the focus from IBM on giving customers options to suit their needs.

Before customers deploy the Cloud Paks, they need to identify a platform. For modern container-based workloads, the recommended platform is Red Hat OpenShift, an Enterprise grade Kubernetes platform with advanced features that facilitate the Day1, and Day2 Operations activities.

By running workloads on the Cloud, business can get a lot of advantages, among others: flexibility, agility, redundancy, scalability, elasticity. There are plenty of articles and papers that cover at length the benefits of these new technologies, so I will not cover here. My intention is to "demystify" the IBM Cloud Paks and hopefully change the perception, get technical teams to realise that it is NOT too difficult to learn, implement and maintain. Like many other technologies adopted in the past, they key to success is with the good understanding of the technology (i.e., training/enablement) and good preparation (good architecture and best practices).

In this article I will cover the **Pak Installer, also called DAFFY**. It is a tool created by IBM Engineering and Automation teams in North America. It is provided **AS-IS** to IBMers, Business Partners and Customers. It is a great tool that can save a lot of time to teams that need to deploy Cloud Paks, the Pak Installer takes care of the provisioning of the platform (Red Hat OpenShift) and then the Cloud Pak, and it helps deploy them either on-premises or any public cloud.

1. **Getting the Pak Installer**

You can get full details about the Pak Installer in this link: <https://ibm.github.io/daffy/>

To use the Pak Installer, you will need:

* A bastion server (or jumpbox) running Linux, it can be Ubuntu or Red Hat Linux v8.x (version 7.x not supported).
* Download and install the Pak Installer in your bastion server.
* The IBM entitlement key <https://myibm.ibm.com/products-services/containerlibrary>

To get started, login to the box and execute the following command:

# curl http://get.daffy-installer.com/download-scripts/daffy-init.sh | bash

it will be downloaded and installed in the /data/daffy subdirectory.

If you already have it installed and would like to refresh to the latest version, just execute:

# cd /data/; /data/daffy/refresh.sh

The Pak Installer comes with several examples for the different Cloud Paks and also examples for each of public Cloud Providers, make sure you check the examples available in the directory:

/data/daffy/env/samples

The Pak Installer helps with the installation in the following way:

* Assist with the installation of Red Hat OpenShift
* Configure Dynamic Storage Provisioning (Red Hat OpenShift Data Foundation ODF)
* Install Cloud Pak – base
* Install Cloud Pak – components selected in the configuration file

1. **Configuring the deployment of the Container-Platform – Red Hat OpenShift**

When customers want to run the IBM Cloud Paks in a container-based platform, the Software License from IBM includes a limited version of Red Hat OpenShift, that is the recommended platform to run the Cloud Paks. OpenShift can be deployed and run on-premises or any of the major public cloud providers.

You can read about the specific settings for OpenShift in the different cloud providers in the following link:

<https://ibm.github.io/daffy/Deploying-OCP/>

1. **Configuring the deployment of the Cloud Pak**

There are multiple Cloud Paks available from IBM, at present, the Pak Installer supports deployment of the following:

* Cloud Pak for Business Automation
* Cloud Pak for Integration
* Cloud Pak for Security
* Cloud Pak for Watson AIOPs
* Cloud Pak for Data

You can read more about the specific settings for each of the Cloud Paks in the following link:

<https://ibm.github.io/daffy/Cloud-Paks>

1. **Preparing your configuration file before you run the Pak Installer**

In order to use the Pak Installer to deploy Red Hat OpenShift and your Cloud Pak, you just need to prepare ONE configuration file. In it you will need two sections, one with settings for OpenShift and a second section for the settings for the Cloud Pak in question.

Create your configuration file in the following location:

/data/daffy/env/yourclustername-env.sh

Let’s cover the variable for the first section, which relate to OpenShift, depending on the public cloud provider, you will need a different set of variables.

**4.1 Sample Settings for AWS**

BASE\_DOMAIN="yourdomain.com"

CLUSTER\_NAME="yourcluster"

OCP\_INSTALL\_TYPE="aws-ipi"

OCP\_RELEASE="4.10.32"

VM\_TSHIRT\_SIZE="Large“

AWS\_REGION="YOUR-AWS-REGION"

AWS\_ACCESS\_KEY\_ID="YOUR-AWS-ACCESS-KEY-ID"

AWS\_USER\_TAG1="ocpCluster: ${CLUSTER\_NAME}.${BASE\_DOMAIN}"

**4.2 Sample Settings for AZURE**

BASE\_DOMAIN="yourdomain.com"

CLUSTER\_NAME="yourcluster"

OCP\_INSTALL\_TYPE="azure-ipi"

#Azure Required Settings

AZURE\_SUBSCRIPTION\_ID="ZZZZZZZZ-ZZZZZZZZ-ZZZZZZZZ-ZZZZZZZZ-ZZZZZZZZ"

AZURE\_CLIENT\_ID="ZZZZZZZZ-ZZZZZZZZ-ZZZZZZZZ-ZZZZZZZZ-ZZZZZZZZ"

AZURE\_TENANT\_ID="ZZZZZZZZ-ZZZZZZZZ-ZZZZZZZZ-ZZZZZZZZ-ZZZZZZZZ"

AZURE\_BASE\_DOMAIN\_RESOURCE\_GROUP\_NAME="your-dns-zone-resource-group"

AZURE\_REGION="eastus"

AZURE\_RESOURCE\_GROUP\_NAME="${CLUSTER\_NAME}-rg" #Change this if you have an existing resource group

#Azure Overrides

#AZURE\_RESOURCE\_GROUP\_NAME\_CREATE\_MISSING=false #Set to true if you don't have an existing resource group

#AZURE\_GROUP\_ID=

#AZURE\_NETWORKING\_CLUSTER\_NETWORK\_CIDR=10.128.0.0/14

#AZURE\_NETWORKING\_CLUSTER\_NETWORK\_HOST\_PREFIX=23

#AZURE\_NETWORKING\_MACHINE\_NETWORK\_CIDR=10.0.0.0/16

#AZURE\_NETWORKING\_NETWORK\_TYPE=OpenShiftSDN

#AZURE\_NETWORKING\_SERVICE\_NETWORK=172.30.0.0/16

#AZURE\_OUTBOUND\_TYPE=Loadbalancer

#AZURE\_ZONE=

#AZURE\_NETWORK\_RESOURCE\_GROUP\_NAME=

#AZURE\_VIRTUAL\_NETWORK=

#AZURE\_CONTROL\_PLANE\_SUBNET=

#AZURE\_COMPUTE\_SUBNET=

#AZURE\_CLOUD\_NAME=

**4.3 Sample Settings for IBM Cloud**

OCP\_INSTALL\_TYPE="ibm-ipi"

CIS\_INSTANCE\_NAME="YOUR IBM CIS Instance"

IBMCLOUD\_REGION=us-south

**4.4 Sample Settings for Google Cloud**

OCP\_INSTALL\_TYPE="gcp-ipi"

#GCP info

GCP\_PROJECT\_ID="your-gcp-project-id"

GCP\_REGION="us-central1"

#GCP\_API\_ENABLE\_MISSING\_SERVICE=true

#GCP\_CREATE\_MISSING\_DNS\_ZONE=true

#GCP\_VPC\_NETWORK=ocp-vpc

#GCP\_CONTROL\_PLANE\_SUBNET=ocp-master-subnet1

#GCP\_COMPUTE\_SUBNET=ocp-worker-subnet2

#GCP\_INSTALL\_PUBLISH=Internal

#GCP\_NETWORKING\_CLUSTER\_NETWORK\_CIDR=10.128.0.0/17

#GCP\_NETWORKING\_CLUSTER\_NETWORK\_HOST\_PREFIX=19

#GCP\_NETWORKING\_MACHINE\_NETWORK\_CIDR=10.0.0.0/17

#GCP\_NETWORKING\_MACHINE\_NETWORK=OpenShiftSDN

#GCP\_NETWORKING\_SERVICE\_NETWORK=172.28.0.0/17

For the second section, review the sample files provided in the /data/daffy/env/samples directories and use that to guide you with the variables in the second section. In the example below we have selected variables for the Cloud Pak for Integration.

1. **Sample configuration for Cloud Pak for Integration on existing OpenShift Cluster (mycp4i-env.sh file)**

The following is an example of the variables required for the installation of Cloud Pak for Integration on an existing Red Hat OpenShift Cluster (which had been provisioned on VMWARE) and with the Dynamic Storage already configured (using OpenShift Data Foundation – ODF).

# OpenShift Info

DAFFY\_UNIQUE\_ID="someone@somewhere.com"

#####################################

#OpenShift Cluster info

BASE\_DOMAIN="cp.mydomain.com"

CLUSTER\_NAME="mycp4i"

#This is required - Values POC/Demo/Enablement

DAFFY\_DEPLOYMENT\_TYPE=Enablement

#This is required - Values aws-ipi/azure-ipi/gcp-ipi/vsphere-ipi/vsphere-upi/kvm-upi/roks-msp

OCP\_INSTALL\_TYPE="**vsphere-upi**"

OCP\_RELEASE="4.10.37"

BASTION\_HOST="api.mycp4i.cp.mydomain.com"

OCP\_HOST\_IP=${BASTION\_HOST}

OCP\_CREATE\_NFS\_STORAGE=false

OCP\_CREATE\_OPENSHIFT\_CONTAINER\_STORAGE="false"

# CP4I Specific Info – In this case we are installing API-Connect, part of CP4INT

#####################################

CP4I\_VERSION="2022.2.1"

VM\_TSHIRT\_SIZE="Large"

VM\_NUMBER\_OF\_WORKERS\_LARGE=3

#CP4I Services

#####################################

CP4I\_ENABLE\_SERVICE\_ACEDESIGN="false"

CP4I\_ENABLE\_SERVICE\_ACEDASH="false"

CP4I\_ENABLE\_SERVICE\_ASSETREPO="false"

CP4I\_ENABLE\_SERVICE\_TRACING="false"

CP4I\_ENABLE\_SERVICE\_MQSINGLE="true"

CP4I\_ENABLE\_SERVICE\_APIC="true"

CP4I\_ENABLE\_SERVICE\_MQHA="false"

CP4I\_ENABLE\_SERVICE\_EVENTSTREAMS="false"

1. **Sample Run, using the Pak Installer to install Cloud Pak for Integration**
   1. **Step One:**

(in this step you will be asked for the IBM entitlement key which you can get from<https://myibm.ibm.com/products-services/containerlibrary>)

# /data/daffy/cp4i/build.sh mycp4i

Validate OCP Access

################################################################

✔ PASSED Access to cluster via oc command

Prechecks

################################################################

Prepare host (LOG -> /data/daffy/log/mycp4i/cp4i/yum.log )

################################################################

✔ PASSED Your path has /usr/local/bin

yum -y update

yum -y upgrade

yum -y install net-tools bind-utils curl nano vim tree wget unzip jq expect httpd-tools git grepcidr dos2unix

Validation of Base Values

################################################################

✔ PASSED Valid DAFFY\_DEPLOYMENT\_TYPE of Enablement

✔ PASSED Valid OCP\_INSTALL\_TYPE of vsphere-upi for cp4i

Validate Version of OpenShift (LOG -> /data/daffy/log/mycp4i/cp4i/ocpVersionCheck.log)

################################################################

✔ PASSED Valid Version of OpenShift - 4.10.37

✔ PASSED Product cp4i is supported for 4.10

✔ PASSED Entitlement Key found!

✔ PASSED Valid version CP4I\_VERSION=2022.2.1

Validate Storage Class to be used with Cloud Pak

################################################################

✔ PASSED Storage class -> ocs-storagecluster-cephfs exist.

Validate OpenShift Storage Cluster to be used with Cloud Pak

################################################################

✔ PASSED Storage Cluster -> ocs-storagecluster is ready.

Validate Storage Class to be used with Cloud Pak

################################################################

✔ PASSED Storage class -> ocs-storagecluster-ceph-rbd exist.

Validate OCP Access

################################################################

✔ PASSED Access to cluster via oc command

✔ PASSED VM\_TSHIRT\_SIZE of Large for Cloud Paks

Validating Version of OpenShift matches your environment file

################################################################

✔ PASSED OCP Version installed matches environment file

Validating Cluster Name of OpenShift matches your environment file

################################################################

✔ PASSED OCP Cluster Name matches environment file

Validating the number of OpenShift workers match your environment file

################################################################

✔ PASSED OCP number of deployed workers matches environment file (Number of workers=3)

All prechecks passed, lets get to work.

Deploying Cloud Pak for Integration version 2022.2.1

################################################################

Updating PullSecret to add IBM Entitlement Key

################################################################

Checking to see if IBM Entitlement Key exists in cluster

Adding Your IBM Token to the existing Pull Secret

secret/pull-secret data updated

Not setting default storage class as its already set

Creating cp4i Namespace

################################################################

namespace/cp4i created

Creating CP4I CatalogSource

################################################################

catalogsource.operators.coreos.com/ibm-operator-catalog created

Creating CP4I OperatorGroup

################################################################

operatorgroup.operators.coreos.com/operatorgroup created

Creating Cloud Pak for Integration Platform Navigator Subscription

################################################################

subscription.operators.coreos.com/ibm-integration-platform-navigator created

Wait for platform Navigator Operator to complete

################################################################

Platform Navigator Operator is Ready

Operator was created in 3 minute(s) and 4 second(s)

Deploying Platform Navigator Instance

################################################################

platformnavigator.integration.ibm.com/platform-navigator created

Wait for platform Navigator Instance to complete

################################################################

**6.2 Step Two:**

# /data/daffy/cp4i/service.sh mycp4i

Validate OCP Access

################################################################

✔ PASSED Access to cluster via oc command

Prechecks

################################################################

Prepare host (LOG -> /data/daffy/log/mycp4i/cp4i/yum.log )

################################################################

✔ PASSED Your path has /usr/local/bin

yum -y update

yum -y upgrade

yum -y install net-tools bind-utils curl nano vim tree wget unzip jq expect httpd-tools git grepcidr dos2unix

Validation of Base Values

################################################################

✔ PASSED Valid DAFFY\_DEPLOYMENT\_TYPE of Enablement

✔ PASSED Valid OCP\_INSTALL\_TYPE of vsphere-upi for cp4i

✔ PASSED Entitlement Key found!

✔ PASSED Valid version CP4I\_VERSION=2022.2.1

Validate Storage Class to be used with Cloud Pak

################################################################

✔ PASSED Storage class -> ocs-storagecluster-cephfs exist.

Validate OpenShift Storage Cluster to be used with Cloud Pak

################################################################

✔ PASSED Storage Cluster -> ocs-storagecluster is ready.

Validate Storage Class to be used with Cloud Pak

################################################################

✔ PASSED Storage class -> ocs-storagecluster-ceph-rbd exist.

Validate OCP Access

################################################################

✔ PASSED Access to cluster via oc command

✔ PASSED VM\_TSHIRT\_SIZE of Large for Cloud Paks

Validating Version of OpenShift matches your environment file

################################################################

✔ PASSED OCP Version installed matches environment file

Validating Cluster Name of OpenShift matches your environment file

################################################################

✔ PASSED OCP Cluster Name matches environment file

Validating the number of OpenShift workers match your environment file

################################################################

✔ PASSED OCP number of deployed workers matches environment file (Number of workers=3)

All prechecks passed, lets get to work.

Valid version CP4I Version found=2022.2.1

Cloud Pak for Integration Service - API Connect Instance

################################################################

Enabling Subscription

COMPLETE APIC Operator installed

Continuing deployment of API Connect Instance without Tracing

COMPLETE APIC WebHook Ready

apiconnectcluster.apiconnect.ibm.com/apic-min created

Your request to install the service has been submitted. It can take up to 45 minutes.

To check on the status of your service, you can run the following command:

/data/daffy/cp4i/service.sh mycp4i --APICStatus

Platform Navigator Instance is Ready

Instance was created in 38 minute(s) and 27 second(s)

Here is the login info for the CP4I Navigator console:

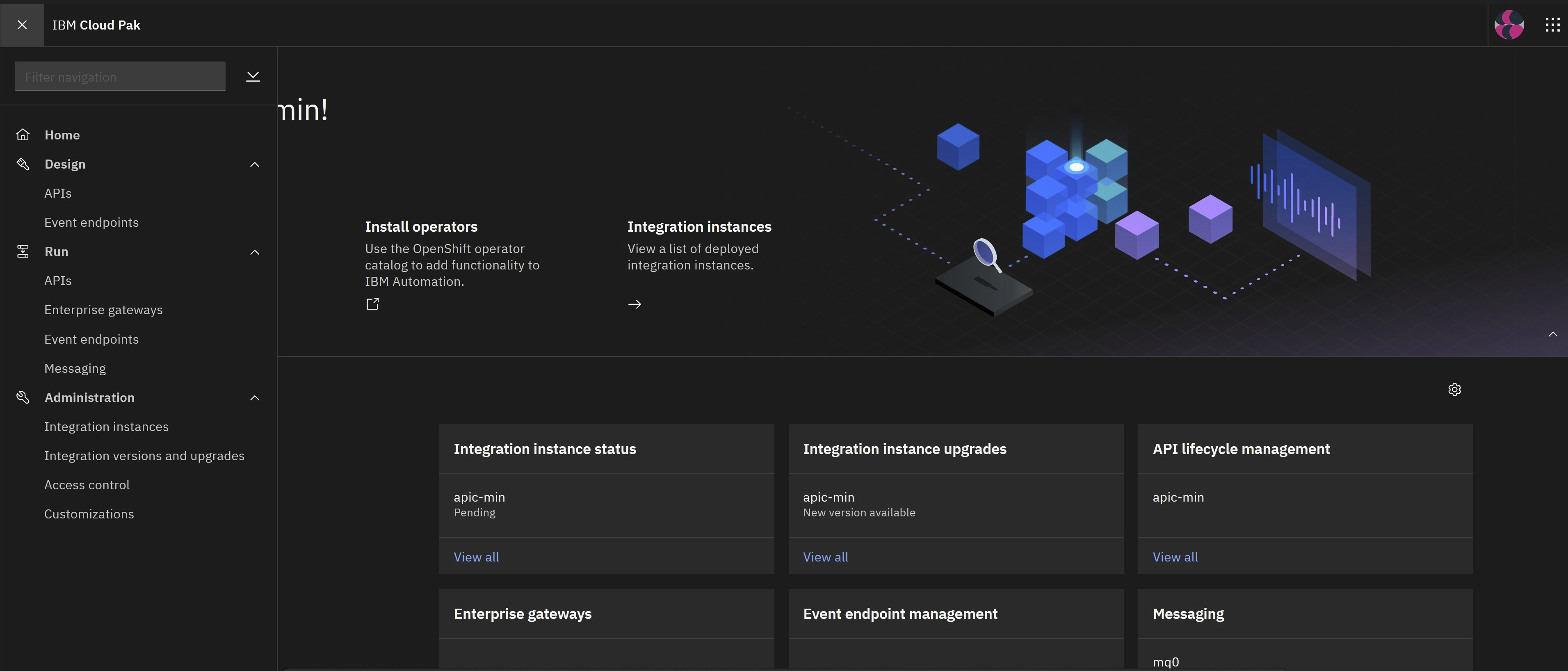
################################################################

Super User : admin

Password : Ela0xxxxxxxxxxxxxxxxFfDUcOYe

CP4I Web Console : <https://cpd-cp4i.apps.mycp4i.cp.mydomain.com>

Logon using the URL and the credentials provided, then at the top left corner, click on the burger menu and you will find the entries for API Connect and any other components you selected to install from the Cloud Pak for Integration.



The process will be similar for any of the other Cloud Paks available from IBM.

1. **Conclusion**

As customers are interested in solving business problems, they want to validate functionality and deploy quickly, so the Pak Installer is a great tool to help deploy Cloud Paks with focus on environments like POCs, Demo, Enablement/Training.

Best of all, the Pak Installer is free (provided AS-IS) <https://ibm.github.io/daffy/>

However, note that for a proper deployment to a production environment, it will require additional planning as well as following architecture best practices which include things like sizing, redundancy, HA and DR, security and authorisation, integration with other software across the wider enterprise as well as estimation of future growth, monitoring, backup and restore, license compliance, operational documentation, and handover to support. In other words, everything related to Day2 Operations.