SAP Digital Manufacturing Edge on SUSE

SUSE Linux Enterprise Micro 6.0
Rancher Kubernetes Engine 2
SUSE Storage (Longhorn)
SUSE Rancher Prime
SAP Digital Manufacturing Cloud

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SUSE® offers a complete stack for container workloads. This best practice document describeshow to use these offerings for installations of Digital Manufacturing Edge included with SAP Digital Manufacturing Cloud. This document does not cover operating SAP Digital Manufacturing Edge or SAP Digital Manufacturing Cloud.

Contents

1 Introduction

This document describes how to prepare your infrastructure to install Digital Manufacturing Edge on Rancher Kubernetes Engine 2 using SUSE Rancher Prime. It guides you through the following steps:

- Installing SUSE Rancher Prime
- Setting up Rancher Kubernetes Engine 2 clusters
- Deploying required components for Digital Manufacturing Edge

2 Supported and used versions

The following support matrix lists the software versions used in this guide.

Product	Version
SUSE Linux Micro	6.2
Rancher Kubernetes Engine 2	1.34
SUSE Rancher Prime	2.14.1
SUSE Storage	1.11.3
cert-manager	1.20.3
MetalLB	0.16.1
PostgreSQL	16.14
Istio	1.30.3
Dex	2.45.1
External Secrets Operator	2.8.0
Strimzi Kafka Operator	1.1.0

Important

You can use other versions, but they are not tested.

3 Prerequisites

- Get subscriptions for:
  - Rancher for SAP applications *
  - SUSE Linux Enterprise High Availability **

* The Rancher for SAP applications subscription contains support for all required components like SUSE Linux Micro, SUSE Rancher Prime and SUSE Storage.

** Only needed if you want to set up SUSE Rancher Prime in a high availability setup.

Additionally,

- check the storage requirements.
- get an SAP S-user ID to access software and documentation from SAP.
- read the relevant SAP documentation:
  - https://help.sap.com/docs/sap-digital-manufacturing/setup-and-operations-guide-for-sap-digital-manufacturing-for-edge-computing/
  - https://me.sap.com/notes/3513927

Important

SAP provides an overview of tested Kubernetes versions which need to be taken into account before deploying Digital Manufacturing Edge: https://help.sap.com/docs/sap-digital-manufacturing/setup-and-operations-guide-for-sap-digital-manufacturing-for-edge-computing/release-process-and-strategy?locale=en-US#tested-kubernetes-distributions-and-versions

The same applies for the databases known to work with Digital Manufacturing Edge: https://help.sap.com/docs/sap-digital-manufacturing/setup-and-operations-guide-for-sap-digital-manufacturing-for-edge-computing/postgresql-database?locale=en-US

Before installing the clusters, ensure that you meet all SAP requirements.

4 Installing SUSE Linux Micro 6.2

You can install SUSE Linux Micro 6.2 using several methods. This best practice guide uses the graphical installer. However, for cloud-native deployments, we recommend using infrastructure-as-code technologies to automate deployment and lifecycle management.

4.1 Installing and configuring SUSE Linux Enterprise Micro

On each server in your environment for Edge Integration Cell and SUSE Rancher Prime, install SUSE Linux Enterprise Micro 6.0 as the operating system. There are several methods to install SUSE Linux Enterprise Micro 6.0 on your hardware or virtual machine. A list of all possible solutions are available in our Documentation SLE Micro 6.0 (https://documentation.suse.com/sle-micro/6.0/).

At the end of the installation process, in the summary window, you need to verify that the following security settings are configured:

- The firewall will be disabled.
- The SSH service will be enabled.
- SELinux will be set in permissive mode.

Set SELinux to *permissive* mode, because otherwise, some components of the Edge Integration Cell will violate SELinux rules, and the application will not work.

Tip

If you have already set up all machines and the operating system, skip this chapter.

4.2 Registering your system

To get your system up-to-date, you need to register it with SUSE Manager, an RMT server, or directly with the SCC Portal. Find the registration process with a direct connection to SCC described in the instructions below. For more information, see the SUSE Linux Enterprise Micro documentation.

Registering the system is possible from the command line using the `transactional-update register` command. For information that goes beyond the scope of this section, refer to the inline documentation with **SUSEConnect --help**.

To register SUSE Linux Enterprise Micro with SUSE Customer Center, run `transactional-update register` as follows:

```
sudo transactional-update register -r REGISTRATION_CODE -e EMAIL_ADDRESS
```

To register with a local registration server, additionally specify the URL to the server:

```
sudo  transactional-update register -r REGISTRATION_CODE -e EMAIL_ADDRESS \
--url "https://suse_register.example.com/"
```

Do not forget to replace

- **REGISTRATION_CODE** with the registration code you received with your copy of SUSE Linux Enterprise Micro.
- **EMAIL_ADDRESS** with the e-mail address associated with the SUSE account you or your organization uses to manage subscriptions.

Reboot your system to switch to the latest snapshot. SUSE Linux Enterprise Micro is now registered.

Find more information about registering your system in the SUSE Linux Enterprise Micro 6.0 Deployment Guide section Deploying selfinstall images (https://documentation.suse.com/sle-micro/5.4/html/SLE-Micro-all/cha-selfinstal-procedure.html).

4.3 Updating your system

Log in to the system. After your system is registered, you can update it with the `transactional-update` command.

```
sudo transactional-update
```

4.4 Disabling automatic reboot

By default SUSE Linux Enterprise Micro runs a timer for `transactional-update` in the background which could automatically reboot your system. Disable it with the following command:

```
sudo systemctl --now disable transactional-update.timer
```

4.5 Preparing for SUSE Storage

For SUSE Storage, some preparation steps are required. First, install some additional packages on all worker nodes. Then, attach a second disk to the worker nodes, create a file system on top of it, and mount it to the default SUSE Storage location. The size of the second disk will depend on your use case.

Install some packages as a requirement for SUSE Storage and Logical Volume Management for adding a file system to SUSE Storage.

```
sudo transactional-update pkg install lvm2 jq nfs-client cryptsetup open-iscsi
```

After the required packages are installed, you need to reboot your machine.

```
sudo reboot
```

Now you can enable the `iscsid` server.

```
sudo systemctl enable iscsid  --now
```

4.5.1 Creating file system for SUSE Storage

The next step is to create a new logical volume with the Logical Volume Management.

First, you need to create a new physical volume. In our case, the second disk is called *vdb*. Use this as SUSE Storage volume.

```
sudo pvcreate /dev/vdb
```

After the physical volume is created, create a volume group called *vgdata*:

```
sudo vgcreate vgdata /dev/vdb
```

Now create the logical volume; use 100% of the disk.

```
sudo lvcreate -n lvlonghorn -l100%FREE vgdata
```

On the logical volume, create the XFS file system. You do not need to create a partition on top of it.

```
sudo mkfs.xfs /dev/vgdata/lvlonghorn
```

Before you can mount the device, you need to create the directory structure.

```
sudo mkdir -p /var/lib/longhorn
```

Add an entry to *fstab* to ensure that the mount of the file system is persistent:

```
sudo echo -e "/dev/vgdata/lvlonghorn /var/lib/longhorn xfs defaults 0 0" >> /etc/fstab
```

Finally, you can mount the file system as follows:

```
sudo mount -a
```

5 Installing SUSE Rancher Prime cluster

At this point, the operating system is installed on every Kubernetes node, and you are ready to install the SUSE Rancher Prime cluster.

5.1 Preparation

To provide a highly available SUSE Rancher Prime setup, you need a load balancer for your SUSE Rancher Prime nodes. If you already have a load balancer, you can use that to make SUSE Rancher Prime highly available.

If you do not plan to set up a highly available SUSE Rancher Prime cluster, you can skip this section.

5.1.1 Installing a `haproxy`-based load balancer

This section describes how to set up a custom load balancer using `haproxy`.

Set up a virtual machine or a bare metal server with SUSE Linux Enterprise Server and SUSE Linux Enterprise High Availability or use SUSE Linux Enterprise Server for SAP applications. Install the `haproxy` package.

```
sudo zypper in haproxy
```

Create the configuration for `haproxy`. Find an example configuration file for `haproxy` below and adapt for the actual environment.

```
sudo cat <<EOF > /etc/haproxy/haproxy.cfg
global
        log /dev/log    local0
        log /dev/log    local1 notice
        chroot /var/lib/haproxy
        # stats socket /run/haproxy/admin.sock mode 660 level admin
        stats timeout 30s
        user haproxy
        group haproxy
        daemon

        # general hardlimit for the process of connections to handle, this is separate to
 backend/listen
        # Added in 'global' AND 'defaults'!!! - global affects only system limits
 (ulimit/maxsock) and defaults affects only listen/backend-limits - hez
        maxconn 400000
```

```
        # Default SSL material locations
        ca-base /etc/ssl/certs
        crt-base /etc/ssl/private

        tune.ssl.default-dh-param 2048

        # Default ciphers to use on SSL-enabled listening sockets.
        # For more information, see ciphers(1SSL). This list is from:
        #  https://hynek.me/articles/hardening-your-web-servers-ssl-ciphers/
        ssl-default-bind-ciphers ECDH+AESGCM:DH+AESGCM:ECDH+AES256:DH+AES256:ECDH
+AES128:DH+AES:ECDH+3DES:DH+3DES:RSA+AESGCM:RSA+AES:RSA+3DES:!aNULL:!MD5:!DSS
        ssl-default-bind-options ssl-min-ver TLSv1.2 no-tls-tickets

defaults
        mode tcp
        log     global
        option  tcplog
        option  redispatch
        option  tcpka
        option  dontlognull
        retries 2
        timeout connect 5s
        timeout client  5s
        timeout server  5s
        timeout tunnel  86400s
        maxconn 400000

listen stats
        bind *:9000
        mode http
        stats hide-version
        stats uri /stats

listen rancher_apiserver
        bind my_lb_address:6443
        option httpchk GET /healthz
        http-check expect status 401
        server mynode1 mynode1.domain.local:6443 check check-ssl verify none
        server mynode2 mynode2.domain.local:6443 check check-ssl verify none
        server mynode3 mynode3.domain.local:6443 check check-ssl verify none
listen rancher_register
        bind my_lb_address:9345
        option httpchk GET /ping
        http-check expect status 200
        server mynode1 mynode1.domain.local:9345 check check-ssl verify none
        server mynode2 mynode2.domain.local:9345 check check-ssl verify none
        server mynode3 mynode3.domain.local:9345 check check-ssl verify none
```

```
listen rancher_ingress80
        bind my_lb_address:80
        option httpchk GET /
        http-check expect status 404
        server mynode1 mynode1.domain.local:80 check
        server mynode2 mynode2.domain.local:80 check
        server mynode3 mynode3.domain.local:80 check

listen rancher_ingress443
        bind my_lb_address:443
        option httpchk GET /
        http-check expect status 404
        server mynode1 mynode1.domain.local:443 check check-ssl verify none
        server mynode2 mynode2.domain.local:443 check check-ssl verify none
        server mynode3 mynode3.domain.local:443 check check-ssl verify none
EOF
```

Check the configuration file:

```
haproxy -f /path/to/your/haproxy.conf -c
```

Enable and start the `haproxy` load balancer:

```
sudo systemctl enable haproxy
sudo systemctl start haproxy
```

Do not forget to restart or reload `haproxy` if any changes are made to the haproxy configuration file.

5.2 Installing RKE2

To install RKE2, the script provided at https://get.rke2.io can be used as follows:

```
sudo curl -sfL https://get.rke2.io | INSTALL_RKE2_VERSION=v1.31.7+rke2r1 sh
```

For HA setups, you must create RKE2 cluster configuration files in advance. On the first master node, do the following:

```
sudo mkdir -p /etc/rancher/rke2
cat <<EOF > /etc/rancher/rke2/config.yaml
token: 'your cluster token'
system-default-registry: registry.rancher.com
tls-san:
  - FQDN of fixed registration address on load balancer
```

```
  - other hostname
  - IP v4 address
EOF
```

Create configuration files for additional cluster nodes:

```
cat <<EOF > /etc/rancher/rke2/config.yaml
server: https://"FQDN of registration address":9345
token: 'your cluster token'
system-default-registry: registry.rancher.com
tls-san:
  - FQDN of fixed registration address on load balancer
  - other hostname
  - IP v4 address
EOF
```

Important

You also need to consider taking etcd snapshots and perform backups of your Rancher instance. These topics are not covered in this document, but you can find more information in our official documentation. Helpful links are https://documentation.suse.com/cloudnative/rke2/latest/en/backup_restore.html and https://documentation.suse.com/cloudnative/rancher-manager/latest/en/rancher-admin/back-up-restore-and-disaster-recovery/back-up-restore-and-disaster-recovery.html.
IMPORTANT: For security reasons, we generally recommend activating the CIS profile when installing RKE2. This is currently still being validated and will be included in the documentation at a later date.

Now enable and start the RKE2 components and run the following command on each cluster node:

```
sudo systemctl enable rke2-server --now
```

To verify the installation, run the following command:

```
/var/lib/rancher/rke2/bin/kubectl --kubeconfig /etc/rancher/rke2/rke2.yaml get nodes
```

For convenience, you can add the `kubectl` binary to the **$PATH** and set the specified `kubeconfig` via an environment variable:

```
export PATH=$PATH:/var/lib/rancher/rke2/bin/
export KUBECONFIG=/etc/rancher/rke2/rke2.yaml
```

5.3 Installing Helm

To install SUSE Rancher Prime and some of its required components, you need to use Helm.

One way to install Helm is to run:

```
curl https://raw.githubusercontent.com/helm/helm/main/scripts/get-helm-3 | bash
```

5.4 Installing cert-manager

To install the `cert-manager` package, do the following:

```
kubectl create namespace cert-manager
```

To install `cert-manager` from the *application-collection*, you must create an imagePullSecret.

How to create the **imagePullSecret** is described in the *Section 10.1, "Creating an imagePullSecret for the Rancher Application Collection"*.

5.4.1 Installing the application

Before you can install the application, you need to login into the registry. You can find the instruction in *Section 10.2, "Logging in to the Application Collection Registry"*.

```
helm install cert-manager oci://dp.apps.rancher.io/charts/cert-manager \
    --set crds.enabled=true \
    --set-json 'global.imagePullSecrets=[{"name":"application-collection"}]' \
    --namespace=cert-manager \
    --version 1.15.2
```

5.5 Installing SUSE Rancher Prime

To install SUSE Rancher Prime, you need to add the related Helm repository. To achieve that, use the following command:

```
helm repo add rancher-prime https://charts.rancher.com/server-charts/prime
```

Next, create the `cattle-system` namespace in Kubernetes as follows:

```
kubectl create namespace cattle-system
```

The Kubernetes cluster is now ready for the installation of SUSE Rancher Prime:

```
helm install rancher rancher-prime/rancher \
    --namespace cattle-system \
    --set hostname=<your.domain.com> \
    --set replicas=3
```

During the rollout of SUSE Rancher Prime, you can monitor the progress using the following command:

```
kubectl -n cattle-system rollout status deploy/rancher
```

When the deployment is done, you can access the SUSE Rancher Prime cluster at https://<your.domain.com>[]. Here you will also find a description about how to log in for the first time.

6 Installing RKE2 using SUSE Rancher Prime

After having installed the SUSE Rancher Prime cluster, use it to create Rancher Kubernetes Engine 2 clusters for Digital Manufacturing Edge. SAP recommends setting up separate development and QA systems for Digital Manufacturing Edge in addition to a production landscape.

Creating new RKE2 clusters is straightforward when using SUSE Rancher Prime.

Navigate to the home menu of the SUSE Rancher Prime instance and click the **Create** button:

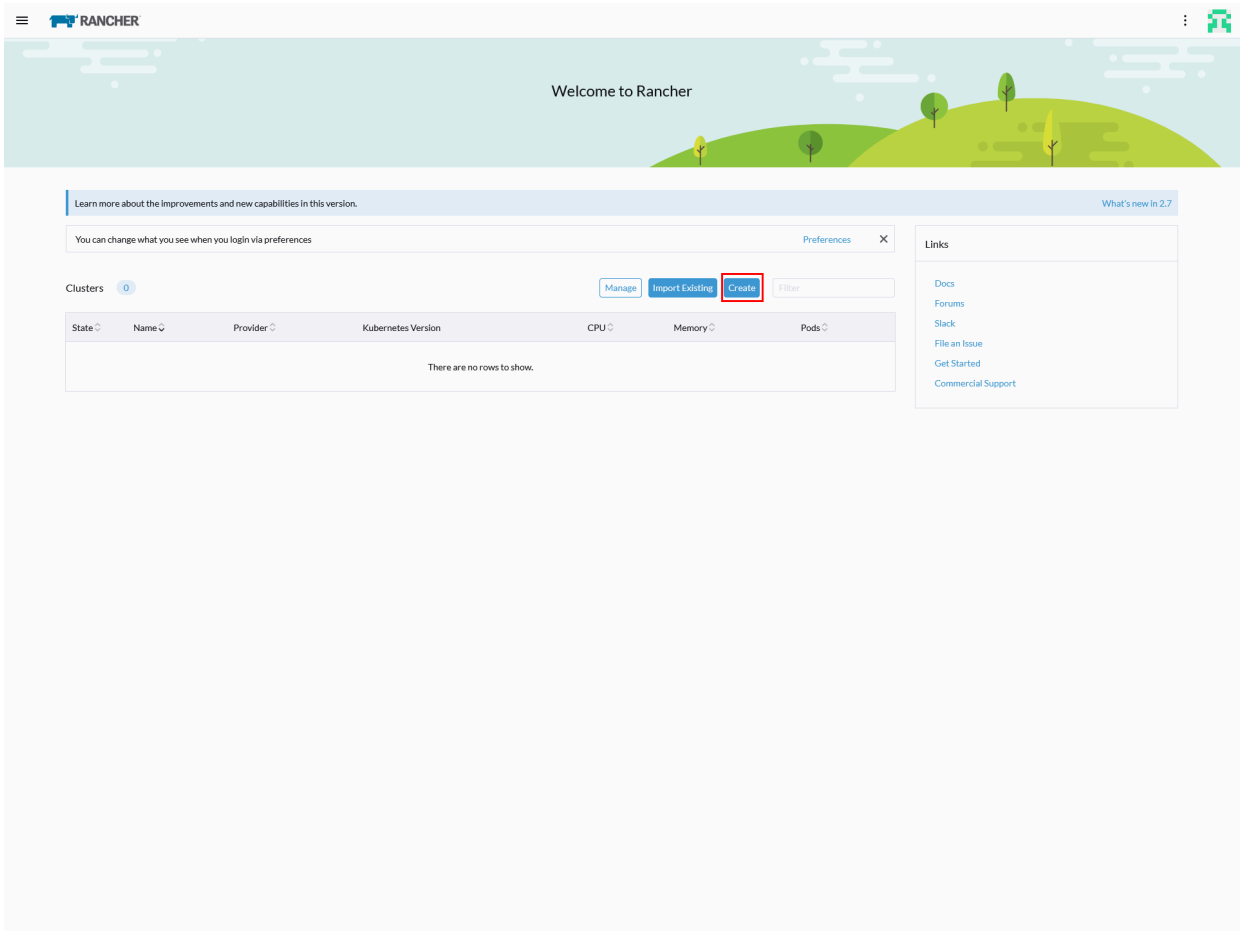

FIGURE 1: RANCHER HOME MENU

The window displays the available options for creating new Kubernetes clusters. Ensure the toggle button on the right side of the screen is set to **RKE2/K3s**:

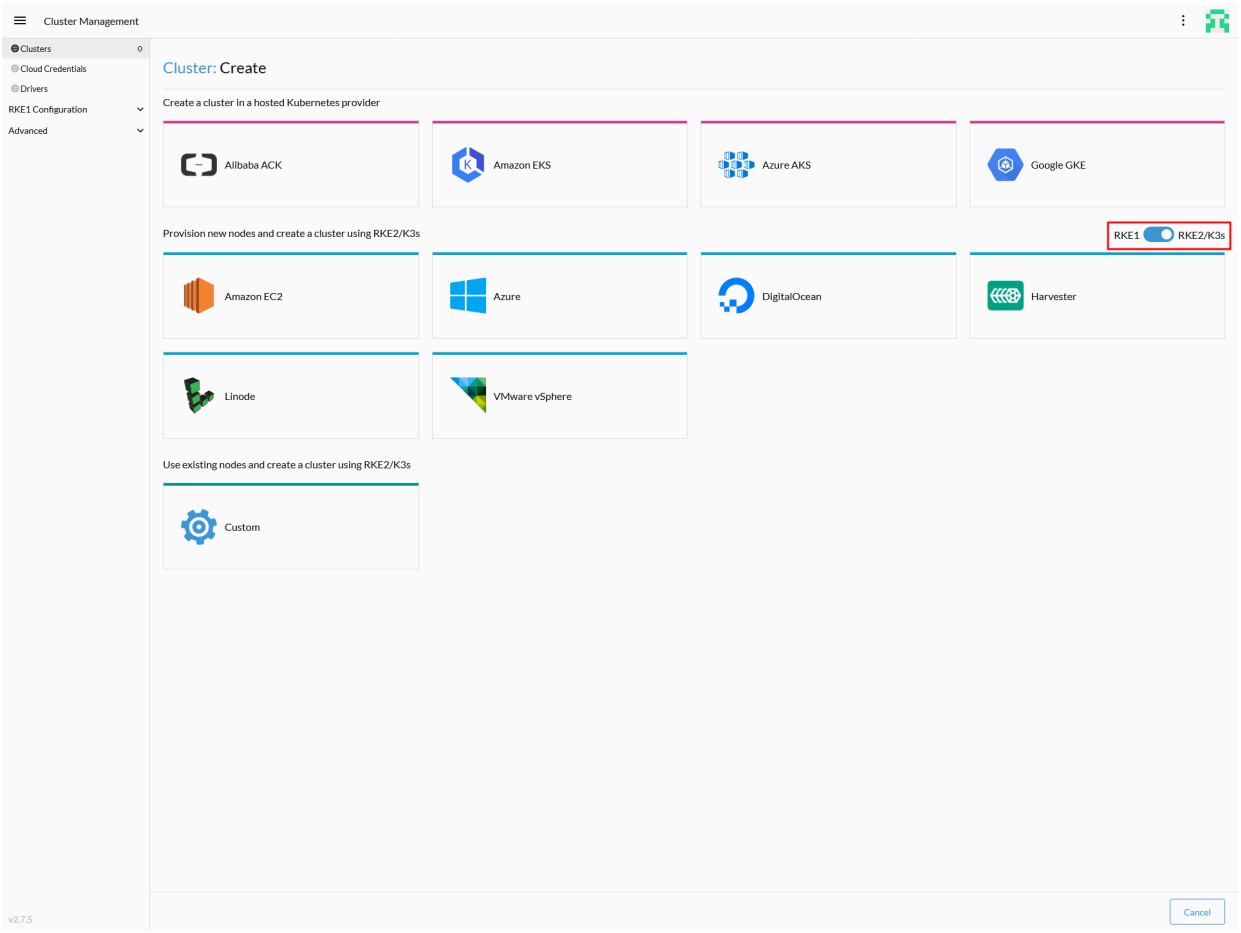

FIGURE 2: RANCHER RKE VERSION SELECTION

To create Kubernetes clusters on existing (virtual) machines, select the **Custom** option at the very bottom:

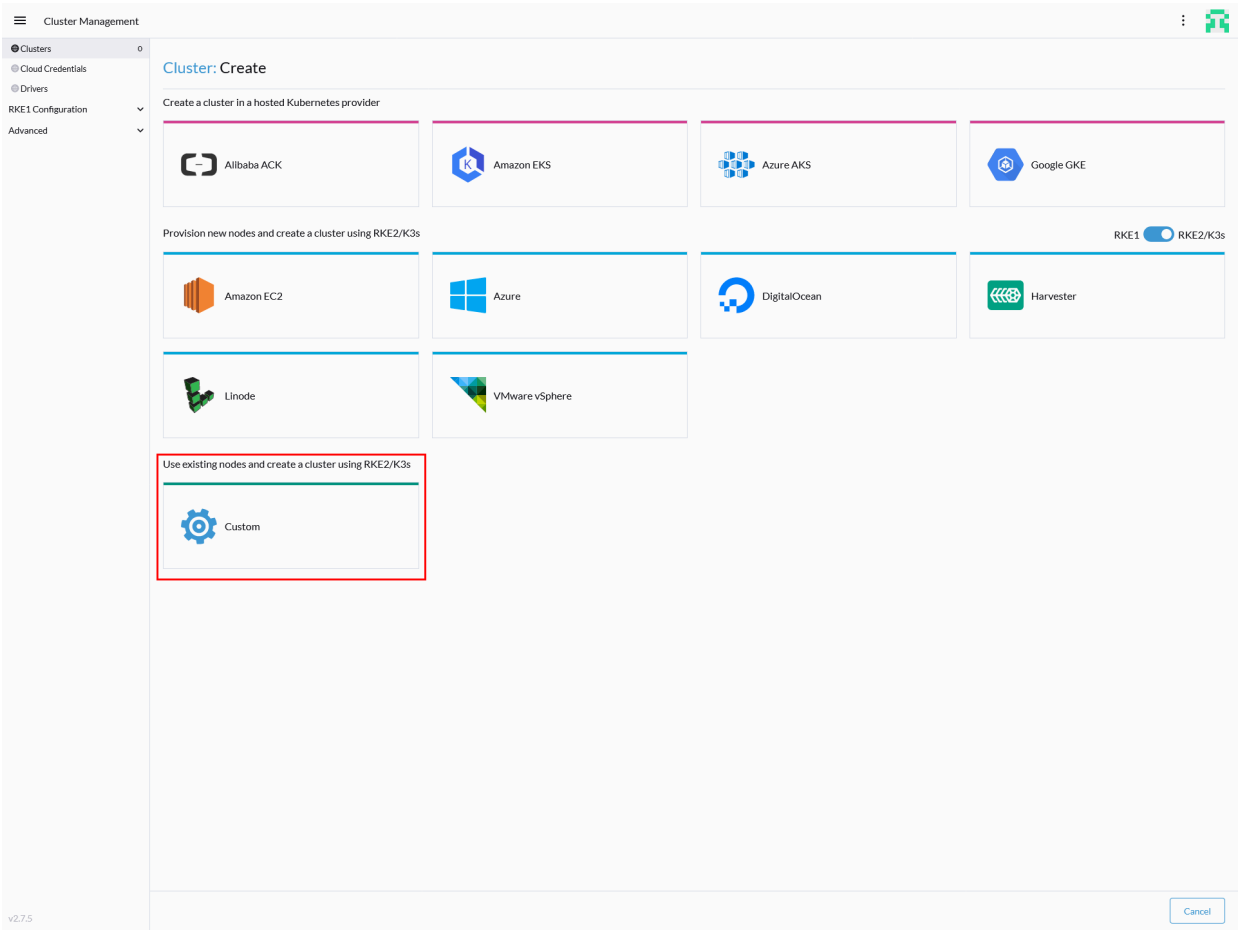

FIGURE 3: RANCHER CREATE CUSTOM CLUSTER

The Kubernetes cluster configuration window appears as shown in the following figure:

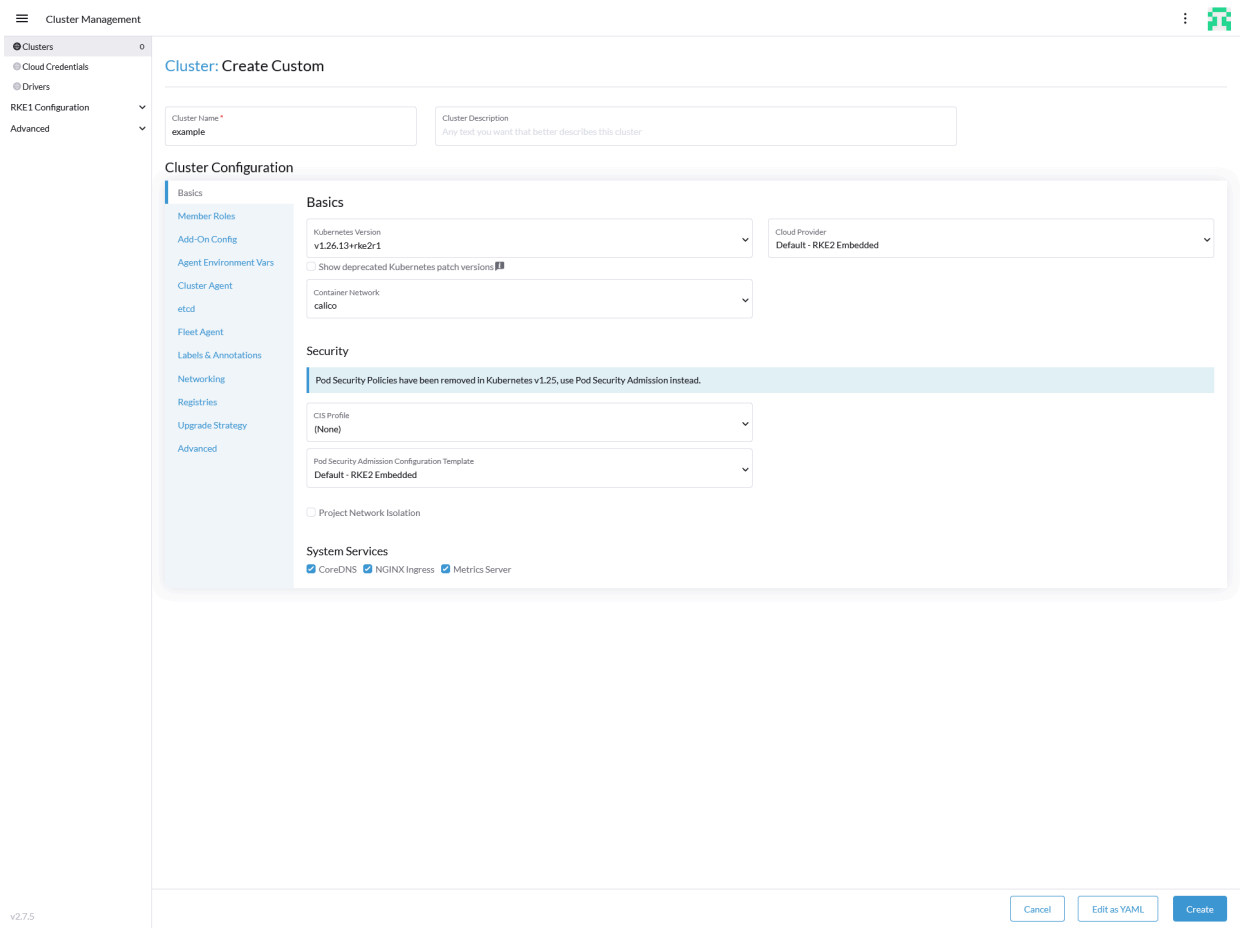

FIGURE 4: RANCHER CREATE CUSTOM CLUSTER CONFIG

Enter a cluster name. The name is used only within SUSE Rancher Prime and does not affect workloads. Next, select a Kubernetes version supported by the target workload.

If no additional Kubernetes requirements exist, click **Create** at the very bottom. Otherwise, consult your administrator before making changes.

After clicking **Create**, the cluster registration view appears as shown in the following figure:

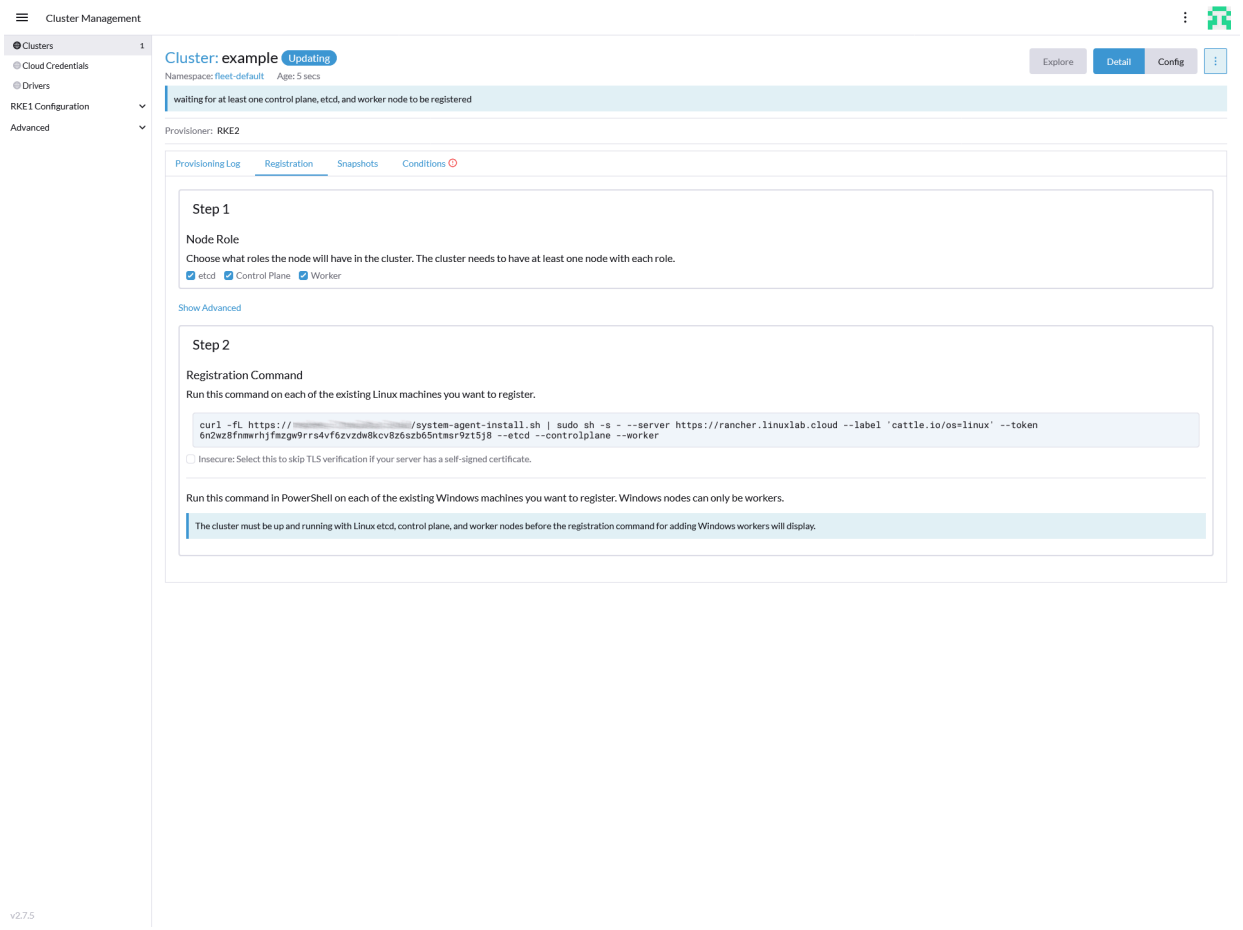

FIGURE 5: RANCHER CREATE REGISTRATION

Select the roles for the nodes. A typical high-availability setup consists of:

- Three etcd / control plane nodes
- Three worker nodes

Copy the registration command to the shell of each target machines and execute it. If the SUSE Rancher Prime instance uses a self-signed certificate, ensure to activate the check box for the text bar containing the registration command.

You can run the command on all nodes in parallel. When all nodes are registered, cluster status at the top changes from "updating" to "active". The Kubernetes cluster is now ready for use.

7 Preparing storage

To make storage available for Kubernetes workloads, prepare the selected storage solution. This chapter describes how to set up storage and prepare it for Digital Manufacturing Edge.

7.1 Installing SUSE Storage

To deploy the chart, create the related namespace and **imagePullSecret** first. To create the namespace, run:

```
kubectl create namespace longhorn-system
```

Find instructions how to create the **imagePullSecret** in *Section 10.1, "Creating an imagePullSecret for the Rancher Application Collection"*.

Before you can install the application, you need to log in to the registry. Find the instructions in *Section 10.2, "Logging in to the Application Collection Registry"*.

Create a `values.yaml` file with the following configuration:

```
global:
  imagePullSecrets:
    - name: application-collection
```

Then install the SUSE Storage application:

```
helm install longhorn oci://dp.apps.rancher.io/charts/suse-storage \
  -f values.yaml \
  --namespace longhorn-system \
  --version 1.11.3
```

For more details, visit https://documentation.suse.com/en-us/cloudnative/storage/.

7.1.1 Configuring SAP Digital Manufacturing Edge to use SUSE Storage

After successfully installing SUSE Storage, you must configure the SAP Digital Manufacturing Edge Helm chart to use it as the storage provider. Add the following storage configuration to the `values.yaml` file for SAP Digital Manufacturing Edge deployment:

```
global:
  storageClass: "longhorn"
```

8 Installing mandatory infrastructure components for Digital Manufacturing Edge

This chapter presents an example setup for MetalLB and SUSE Private Registry.

Note

Keep in mind that the following instructions might differ from the deployment required for your specific infrastructure and use cases.

8.1 Logging in to Rancher Application Collection

To access Rancher Application Collection, log in using the console and Helm client. The easiest way to do so is to use the built-in shell in SUSE Rancher Prime. To open the shell, navigate to the cluster and select **Kubectl Shell**:

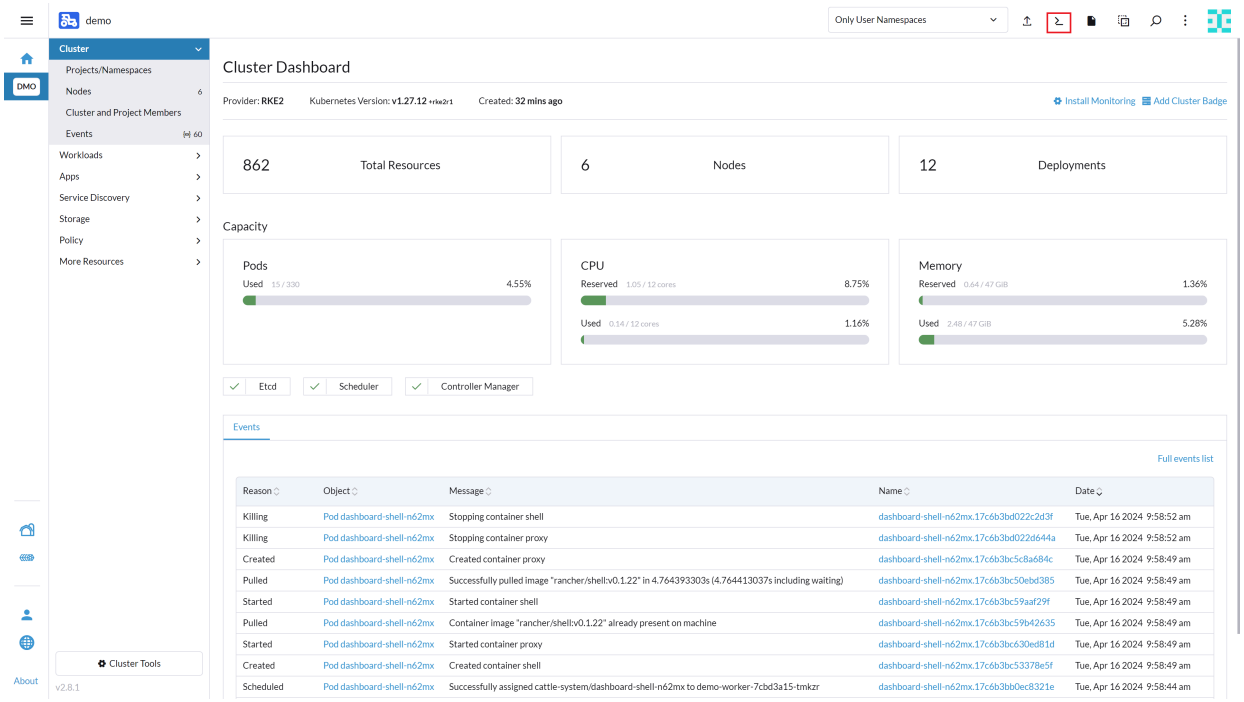

FIGURE 6: RANCHER SHELL ACCESS

A shell will open:

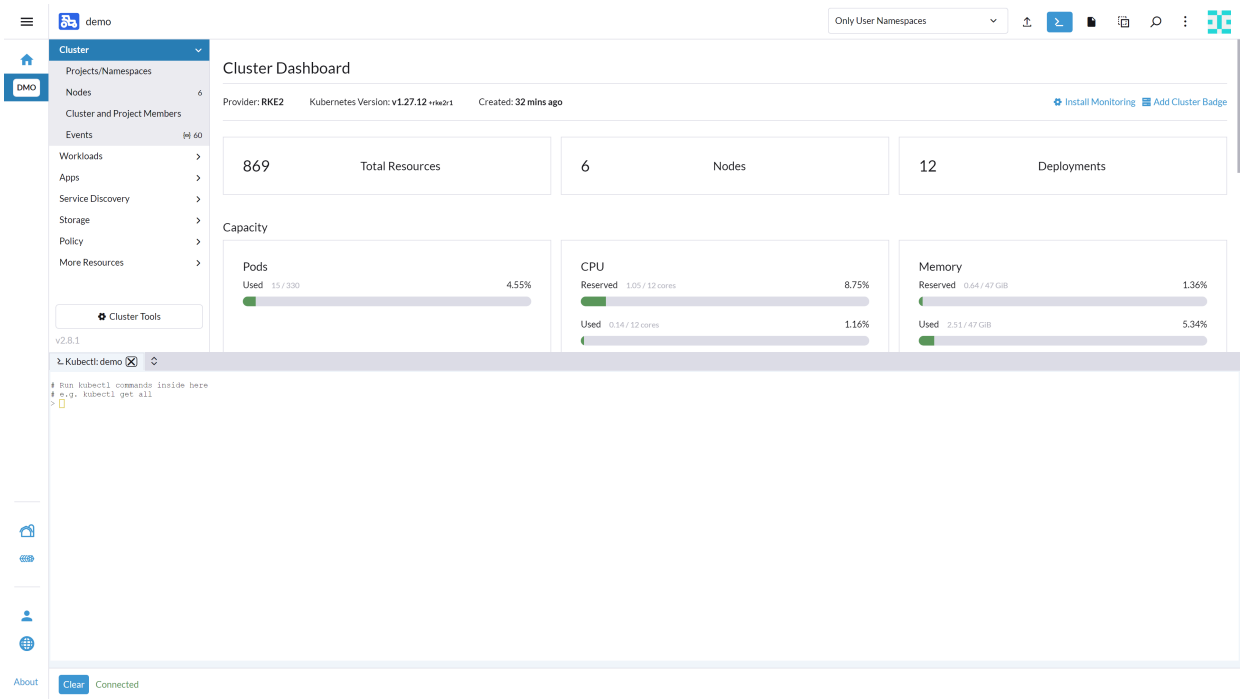

FIGURE 7: RANCHER SHELL OVERVIEW

To log in to Rancher Application Collection, proceed as follows:

```
helm registry login dp.apps.rancher.io/charts -u <yourUser> -p <your-token>
```

8.2 Preparing the Digital Manufacturing Edge name space

Several subsequent components, such as Istio, Dex, ESO, and Digital Manufacturing Edge, require the target name space to exist first.

Create the `dm-edge` name space:

```
kubectl create namespace dm-edge
```

Follow the instructions in *Section 10.1, "Creating an imagePullSecret for the Rancher Application Collection"* to ensure the `application-collection` secret is available in the `dm-edge` name space.

8.3 Installing MetalLB on Kubernetes cluster

The following chapter guides through the installation and configuration of MetalLB on a Kubernetes cluster used for Digital Manufacturing Edge.

Before proceeding, ensure that the following networking resources are available for configuration:

- A static IP address allocated for the MetalLB *IPAddressPool*. This address must be outside the DHCP pool range, but routable within the network cluster.
- A configured DNS record (A or AAAA) matching the desired domain name that points directly to the allocated IP address.

The DNS name is used later in this guide and is called **<LB-address>**.

Tip

If you do not control the DNS and are running a proof-of-concept setup, append *.sslip.io* to your IP address. **Do not use this approach in production environments.**

8.3.1 Installing and configuring MetalLB

There are multiple ways to install the MetalLB software. In this guide, we cover how to install MetalLB using `kubectl` or Helm. A complete overview and more details about MetalLB can be found at official website for MetalLB (https://metallb.universe.tf/).

8.3.1.1 Prerequisites

Before starting the installation, ensure that all requirements are met. In particular, you should pay attention to network add-on compatibility. If you are trying to run MetalLB on a cloud platform, you should also look at the cloud compatibility page and make sure your cloud platform works with MetalLB (note that most cloud platforms do **not**).

There are several ways to deploy MetalLB. In this guide, we describe how to use the Rancher Application Collection to deploy MetalLB.

Make sure to have one IP address available for configuring MetalLB.

Before you can deploy MetalLB from Rancher Application Collection, you need to create the namespace and an **imagePullSecret**. To create the related namespace, run:

```
kubectl create namespace metallb
```

Instructions how to create the **imagePullSecret** can be found in *Section 10.1, "Creating an imagePullSecret for the Rancher Application Collection"*.

8.3.1.2 Installing MetalLB

Before you can install the application, you need to log in to the registry. You can find the instructions in *Section 10.2, "Logging in to the Application Collection Registry"*.

Create a *values.yaml* file with the following configuration:

```
global:
  imagePullSecrets:
    - name: application-collection
```

Then install the metallb application.

```
helm install metallb oci://dp.apps.rancher.io/charts/metallb \
-f values.yaml \
--namespace=metallb \
--version 0.16.1
```

8.3.1.3 Configuring MetalLB

MetalLB needs two configurations to function properly:

- IP address pool
- L2 advertisement configuration

Create the configuration files for the MetalLB IP address pool:

```
cat <<EOF >iprange.yaml
apiVersion: metallb.io/v1beta1
kind: IPAddressPool
metadata:
  name: first-example-pool
  namespace: metallb
spec:
  addresses:
  - 192.168.1.240/32
EOF
```

Create the layer 2 network advertisement:

```
cat <<EOF > l2advertisement.yaml
apiVersion: metallb.io/v1beta1
kind: L2Advertisement
metadata:
  name: example
  namespace: metallb
```

```
EOF
```

Apply the configuration:

```
kubectl apply -f iprange.yaml
kubectl apply -f l2advertisement.yaml
```

8.4 Installing SUSE Private Registry (optional)

This chapter describes how to set up a SUSE Private Registry. Find more details about the SUSE Private Registry at https://documentation.suse.com/cloudnative/suse-private-registry/html/private-registry/pr-introduction.html

Note

Installing SUSE Private Registry is optional when deploying Digital Manufacturing Edge. To proceed without a SUSE Private Registry, skip to *Section 8.6, "Gateways"*.

8.4.1 Prerequisites

Before starting the deployment, ensure that all requirements for your selected environment are met:

- non-HA setups (https://documentation.suse.com/en-us/cloudnative/suse-private-registry/html/private-registry/pr-deployment.html#pr-deployment-prerequisites)
- HA setups (https://documentation.suse.com/en-us/cloudnative/suse-private-registry/html/private-registry/pr-deployment-ha.html#pr-deployment-ha-prerequisites)

As the referenced Persistent Volume (PV) provisioner, SUSE Storage can be used.

8.4.2 Deployment

This chapter describes how to deploy a basic SUSE Private Registry without high availability.

Warning

The example deployment uses self-signed certificates. Self-signed certificates present security risks in production environments. We recommend using certificates signed by a trusted certificate authority (CA) in production environments.

Before starting the deployment, create a Kubernetes secret that stores the login credentials as described in the documentation at https://documentation.suse.com/en-us/cloudnative/suse-private-registry/html/private-registry/pr-deployment.html#pr-deployment-kube-secrets

8.4.2.1 Gathering login information

Before deploying SUSE Private Registry, gather the login credentials for the official SUSE registry and save them in a Secret in the Kubernetes cluster.

Note

For the most up-to-date deployment guide, see https://documentation.suse.com/en-us/cloudnative/suse-private-registry/html/private-registry/pr-deployment.html#pr-deployment-kube-secrets.

To retrieve login credentials, log in to SUSE Customer Center and select the organization holding the Registry subscription. Click *Proxies* as shown in the image below:

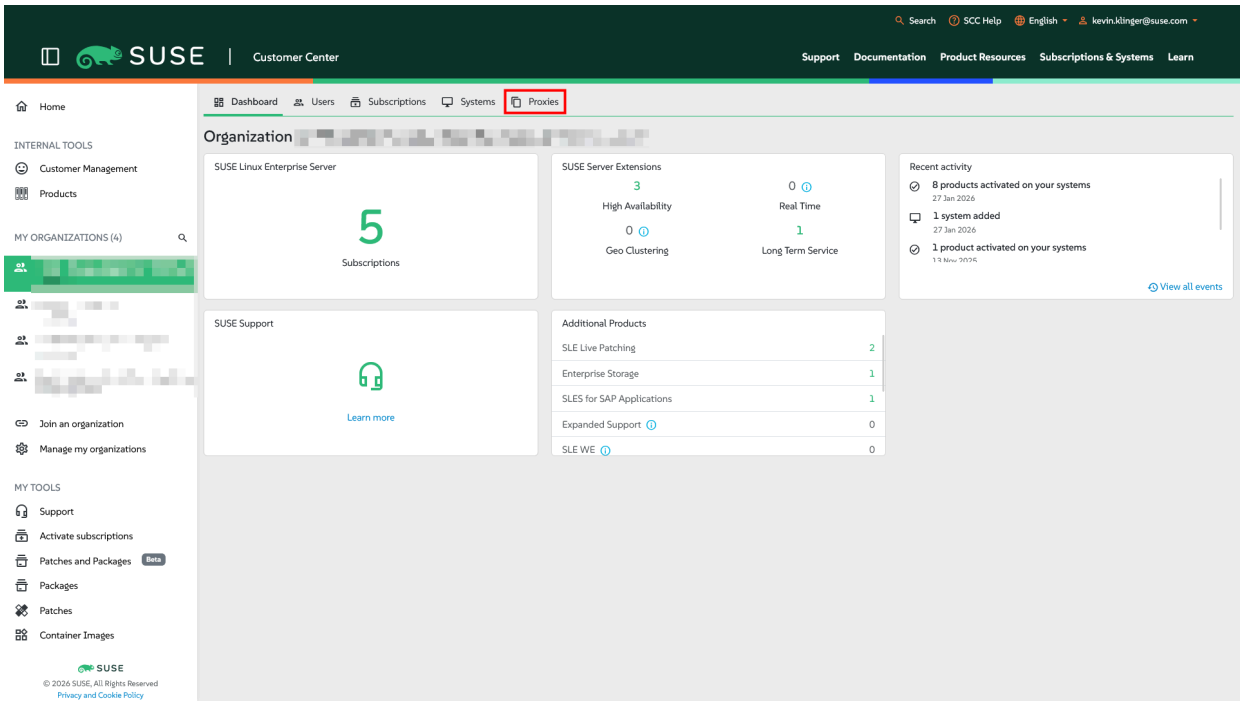

FIGURE 8: SCC PROXY

The *Mirroring credentials* section on the right discplays your user name and password:

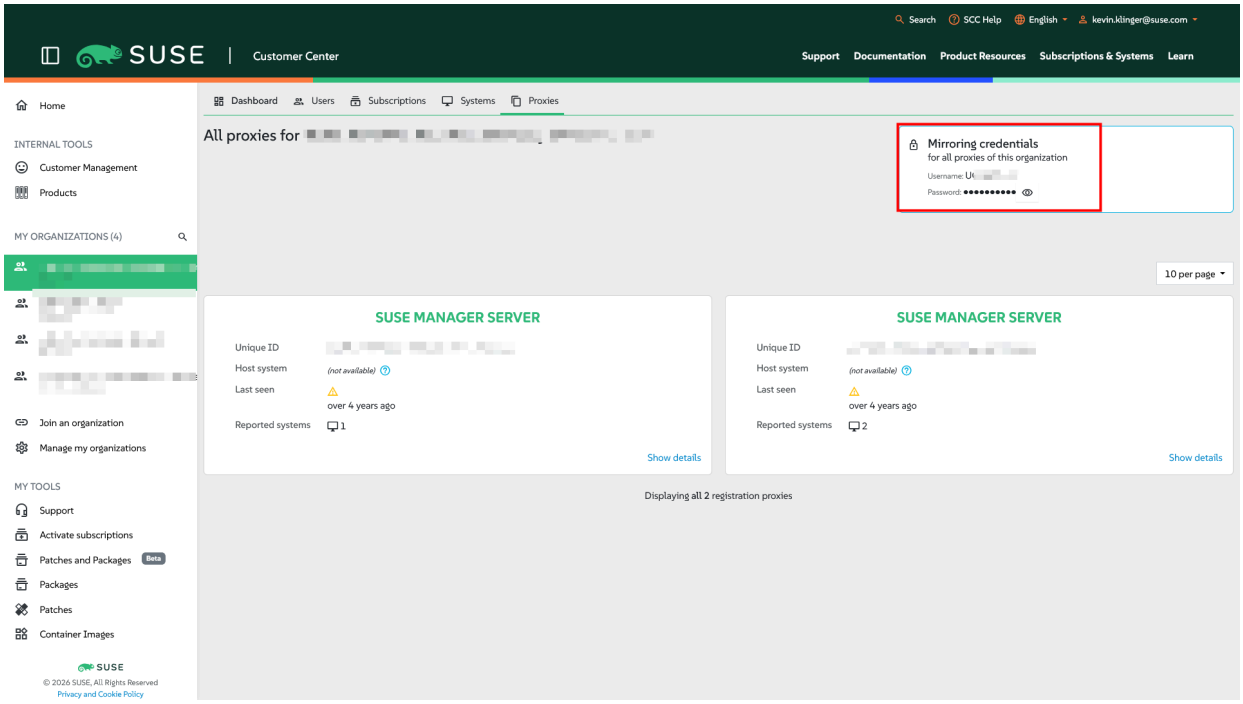

FIGURE 9: SCC PROXY CREDENTIALS

To reveal the password, click the eye icon. Ongoing, this guide refers to these credentials as *PRIVATE_REGISTRY_USERNAME* and *PRIVATE_REGISTRY_PASSWORD*.

Next, save the *PRIVATE_REGISTRY_PASSWORD* to a `password.txt` file. To log in and verify that your credentials work, run the following command:

```
head -1 ./password.txt | helm registry login registry.suse.com --username
 <PRIVATE_REGISTRY_USERNAME> --password-stdin
```

Create a namespace for the registry-related resources.

```
kubectl create namespace <PRIVATE_REGISTRY_NAMESPACE>
```

The deployment requires an **imagePullSecret** saved in the previously created namespace:

```
kubectl create secret docker-registry suse-registry \
  --namespace <PRIVATE_REGISTRY_NAMESPACE> \
  --docker-server=registry.suse.com \
  --docker-username=<PRIVATE_REGISTRY_USERNAME> \
  --docker-password=$(head -1 ./password.txt)
```

In this example, the secret is named *suse-registry*. The next chapter references this secret.

8.4.2.2 Deploying without high availability

Deploying without high availability is the most basic approach because it requires no keystore or database dependencies.

Important

By default, the SUSE Private Registry Helm chart allocates low storage capacity for the image registry volume, which can cause disk saturation. Before deployment, adjust this value based on application sizing requirements.

For more information about customizating storage sizes, see the official SUSE Private Registry Persistence Parameters Documentation (https://documentation.suse.com/cloudnative/suse-private-registry/html/private-registry/pr-helm-chart-override.html#helm-persistence-parameters).

The following configuration shows example values for deploying the registry with Helm using a *NodePort* service for exposure, including the persistence configuration parameter:

```
expose:
  type: nodePort
  nodePort:
    annotations: {}
    labels: {}
    name: harbor
    ports:
      http:
        nodePort: 30002
        port: 80
      https:
        nodePort: 30003
        port: 443
  tls:
    auto:
      commonName: <PRIVATE_REGISTRY_FQDN>
externalURL: https://<PRIVATE_REGISTRY_FQDN>
harborAdminPassword: "<MY_PASSWORD>"
imagePullPolicy: IfNotPresent
imagePullSecrets:
- name: suse-registry
```

```
persistence:
  persistentVolumeClaim:
    registry:
      size: "5Gi" # Adjust this size based on your requirements
```

Warning

The example configuration creates a self-signed TLS certificate. Self-signed certificates present security risks in production environments. In production environments, we recommend using certificates signed by a trusted certificate authority (CA).

To actually deploy, save the preceeding configuration to a `values.yaml`.

To deploy SUSE Private Registry, run the following command:

```
helm install suse-registry oci://registry.suse.com/private-registry/private-registry-helm
 -f values.yaml --namespace <PRIVATE_REGISTRY_NAMESPACE>
```

8.4.3 Configuring the Registry

This section describes how to configure the registry after deployment, including how to create a registry user and the corresponding project.

8.4.3.1 Create a registry user

We recommend creating a new registry user to share credentials with deployment tools or Kubernetes clusters.

If you already have an existing user or want to continue the deployment as admin, proceed to the project creation section below (see *Section 8.4.3.2, "Create a Proxy Cache Project"*).

To create a new user, log in with an account that has user creation permissions, for example, an administrator account.

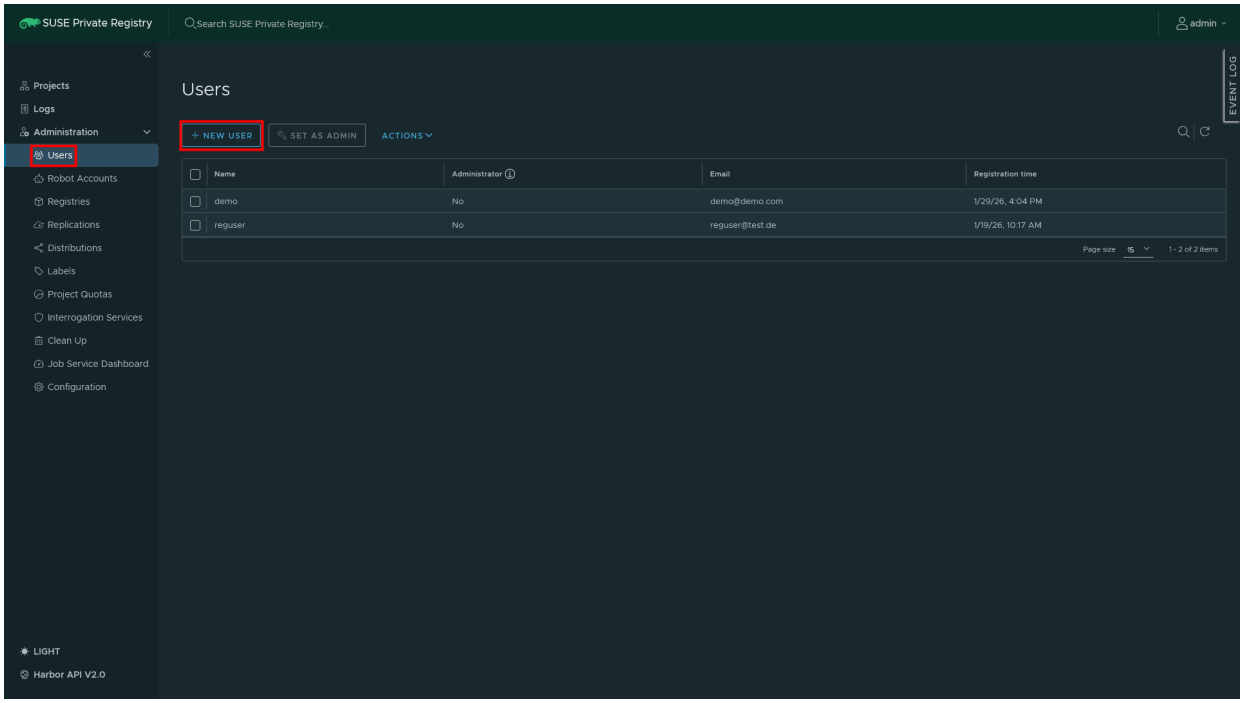

FIGURE 10: CREATE REGISTRY USER

8.4.3.2 Create a Proxy Cache Project

Configure the SUSE Private Registry as a transparent proxy cache. This eliminates the need to manually transfer images or maintain replication rules. When the cluster requests an image, SUSE Private Registry automatically fetches it from the source registry, caches it locally, and serves it seamlessly.

8.4.3.2.1 Create the Registry Endpoint

Before creating a Proxy Cache Project, define a Registry Endpoint that points to an external, upstream container registry. To do so, log in to your registry and perform the following steps:

1. Navigate to **Administration** → **Registries**.
2. Click **NEW ENDPOINT**.

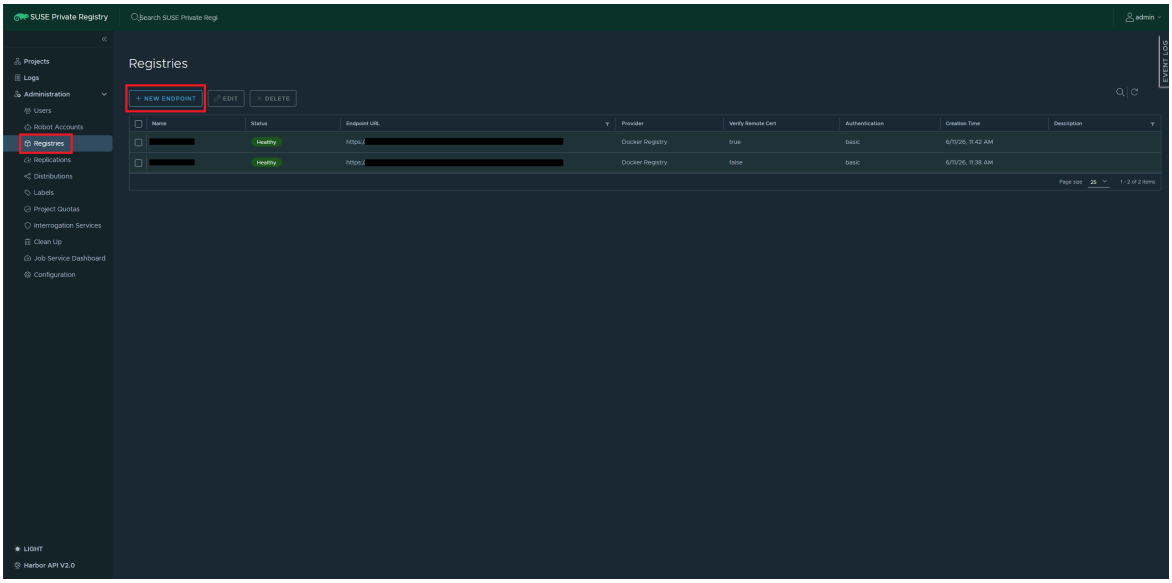

FIGURE 11: CREATE REGISTRY ENDPOINT

3. Configure the following parameters:

   - **Provider**: `Docker Registry`
   - **Name**: A generic name (for example, `source-registry-endpoint`).
   - **Endpoint URL**: The URL of the source registry where the images to be cached are located (for example, `https://<SOURCE_REGISTRY_URL>`).
   - **Access ID** / **Access Secret**: Your user credentials for the source registry.

4. Click **TEST CONNECTION** to validate, then click **OK**.

8.4.3.2.2 Create the Proxy Cache Project

After the Registry Endpoint is set up, create the Proxy Cache Project. To do so, perform the following steps:

1. Navigate to **Projects** and click **NEW PROJECT**.

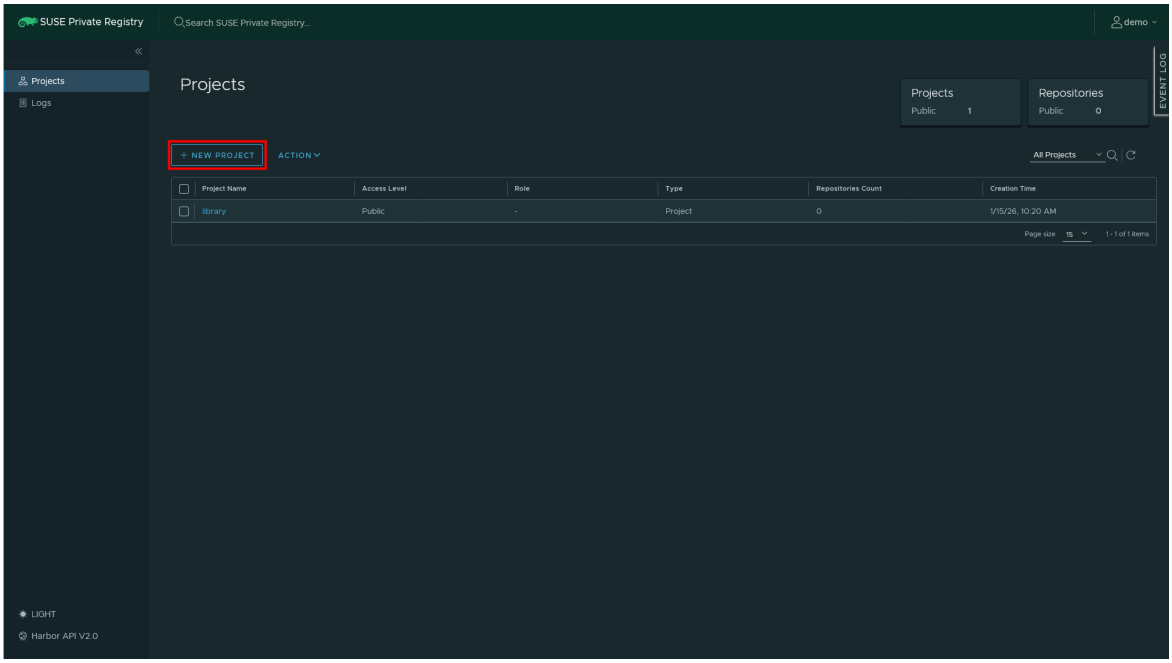

FIGURE 12: CREATE REGISTRY PROJECT

2. Enter a project name (for example, `proxy-cache-project`).

3. Enable the **Proxy Cache** toggle switch.

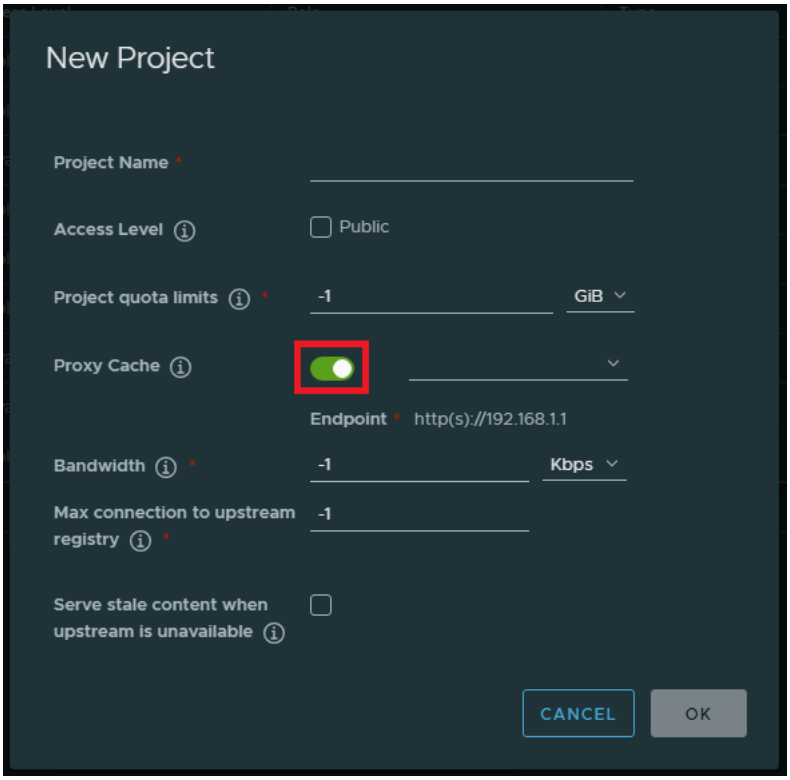

FIGURE 13: ENABLE PROXY CACHE CONFIGURATION

4. Select the previously created endpoint (for example, `source-registry-endpoint`) from the **Endpoint** drop-down menu.

5. Click **OK**.

Tip

Tag Retention Policy: When the project is created, navigate to **Configuration** > **Policy** to adjust retention rules (for example, to prevent deleting cached images or to apply custom criteria).

8.4.4 Updating Helm values for the Proxy Cache

To route image requests through the newly created SUSE Private Registry Proxy Cache (configured in *Section 8.4.3, "Configuring the Registry"*), you must update the SAP Digital Manufacturing Edge Helm `values.yaml` file.

Locate the `global.dockerRegistry` parameter in your custom `values.yaml` file and update it to point to your SUSE Private Registry FQDN and the specific proxy cache project name.

Modify your `values.yaml` file as follows:

```
global:
  dockerRegistry: "<PRIVATE_REGISTRY_FQDN>/<PROXY_PROJECT_NAME>"
  # Example: "suse-registry.example.com/proxy-cache-project"
  security:
    imageCredentials:
      username: "<SPR_USERNAME>"
      password: "<SPR_PASSWORD>"
```

Note

Ensure that the user name and password provided in the `imageCredentials` block correspond to a registry account that has at least read permissions (`Pull` role) assigned within the specified proxy project.

8.5 Installing Cert-Manager

This chapter describes how to install `cert-manager` and prepare it for the usage with other mandatory components like the Gateways or Dex.

8.5.1 Prerequisites

To deploy the chart, create the related namespace and **imagePullSecret** first. To create the namespace, run:

```
kubectl create namespace cert-manager
```

Find istructions how to create the **imagePullSecret** in *Section 10.1, "Creating an imagePullSecret for the Rancher Application Collection"*.

Before you can install the application, you need to log in to the registry. Find the instructions in *Section 10.2, "Logging in to the Application Collection Registry"*.

8.5.2 Deploying the chart

Create a `values.yaml` file to store configurations for the cert-manager Helm chart. The configuration looks like the following:

```
global:
```

```
    imagePullSecrets: ['application-collection']
installCRDs: true
```

To install the application, run:

```
helm install ingressgateway oci://dp.apps.rancher.io/charts/cert-manager \
-f values.yaml \
--namespace=cert-manager \
--version 1.20.3
```

8.5.3 Using self-signed certificates

8.5.3.1 Define self-signed Issuer

To bootstrap the certificate chain, create a self-signed Issuer. This component generates a temporary local signing authority. Save the content below into a `selfsigned-issuer.yaml` file:

```
apiVersion: cert-manager.io/v1
kind: Issuer
metadata:
  name: selfsigned-bootstrap-issuer
  namespace: cert-manager
spec:
  selfSigned: {}
```

8.5.3.2 Define root CA

Next, create the root certificate used by the final ClusterIssuer to sign other certificates. Save the following configuration to a `my-ca-cert.yaml` file:

```
apiVersion: cert-manager.io/v1
kind: Certificate
metadata:
  name: root-ca
  namespace: cert-manager
spec:
  isCA: true
  commonName: "self-signed-root-ca"
  secretName: ca-key-pair
  privateKey:
    algorithm: RSA
    size: 4096
```

```
  issuerRef:
    name: selfsigned-bootstrap-issuer
    kind: Issuer
```

Applying this configuration creates the **root-ca** secret in the `cert-manager` namespace.

8.5.3.3 Defining the global ClusterIssuer

Create a **ClusterIssuer** so that certificates issued by this resource are signed by the root CA. Using a **ClusterIssuer** allows issuing certificates across multiple namespaces. Save the following content to a `my-ca-issuer.yaml` file and ensure that the **secretName** matches the **secretName** of your root CA.

```
apiVersion: cert-manager.io/v1
kind: ClusterIssuer
metadata:
  name: my-cluster-ca-issuer
spec:
  ca:
    secretName: ca-key-pair
```

8.5.3.4 Apply the issuers

To apply the configurations you previously created, run:

```
kubectl apply -f selfsigned-issuer.yaml
kubectl apply -f my-ca-cert.yaml
kubectl apply -f my-ca-issuer.yaml
```

8.6 Gateways

Digital Manufacturing Edge requires a Kubernetes Ingress Controller to be installed in the cluster, which handles the traffic routing to Digital Manufacturing Edge components. As of today, there are two supported Gateways:

- Istio
- NGINX

This chapter describes how to deploy both of them and how to prepare them for Digital Manufacturing Edge.

8.6.1 Istio

8.6.2 Installing Istio

This chapter describes how to install Istio in an RKE2 cluster using Helm.

8.6.2.1 Prerequisites

To deploy the chart, create the related name space and **imagePullSecret** first. To create the name space, run:

```
kubectl create namespace istio-system
```

Find instructions how to create the **imagePullSecret** in *Section 10.1, "Creating an imagePullSecret for the Rancher Application Collection"*.

Before you can install the application, you need to log in to the registry. Find the instructions in *Section 10.2, "Logging in to the Application Collection Registry"*.

8.6.2.2 Deploying the chart

Create a `values.yaml` file to store the configuration for the Istio Helm chart. The file content can resemble the following example:

```
base:
  '*': null
  enabled: true
  profile: ''
cni:
  '*': null
  enabled: false
  profile: ''
gateway:
  '*': null
  enabled: true
  profile: ''
global:
  '*': null
  imagePullSecrets: ['application-collection']
  imageRegistry: ''
  platform: ''
```

```
istiod:
  '*': null
  enabled: true
  profile: ''
ztunnel:
  '*': null
  enabled: false
  profile: ''
```

Important

Because of a known bug in the chart, name the helm installation **ingressgateway**.

To install the application, run:

```
helm install ingressgateway oci://dp.apps.rancher.io/charts/istio \
-f values.yaml \
--namespace=istio-system \
--version 1.3.3
```

This deploys the Istio application, including a **LoadBalancer** Service that consumes the IP address configured in *Section 8.3.1.3, "Configuring MetalLB"*.

To allow Digital Manufacturing Edge to properly route traffic using the Istio service mesh, enable automatic sidecar injection on the target name space. To label the `dm-edge` name space, run the following command:

```
kubectl label namespace dm-edge istio-injection=enabled
```

For more information on installing and configuring Istio, check the Istio reference guide (https://docs.apps.rancher.io/reference-guides/istio/).

8.6.3 Certificates

To allow TLS encrypted traffic through the Istio gateway, configure the certificates.

8.6.3.1 Istio Gateway server certificate

The first certificate needed is the Istio server certificate. Its purpose is to terminate HTTPS traffic at the Istio Gateway and present the server identity for the *.<*LB-address*> domains to inbound connections.

Save the following configuration to an *istio-server-cert.yaml* file, and fill out the required fields:

```
apiVersion: cert-manager.io/v1
kind: Certificate
metadata:
  name: istio-server-cert
  namespace: istio-system
spec:
  secretName: tls-secret
  duration: 8760h
  renewBefore: 720h
  commonName: "<LB-address>"
  isCA: false
  privateKey:
    algorithm: RSA
    size: 4096
  usages:
    - server auth
  dnsNames:
    - "server.local"
    - "localhost"
    - "<LB-address>"
    - "*.<LB-address>"
  issuerRef:
    name: my-cluster-ca-issuer
    kind: ClusterIssuer
```

To apply it, run:

```
kubectl apply -f istio-server-cert.yaml
```

This creates a secret in the istio-system name space called **tls-secret**.

8.6.3.2 Client Certificate

The next required certificate is the client certificate. It serves as a client-side identity (`client.crt` and `client.key`) to authenticate requests to the cluster.

Save the following configuration to a `my-client-cert.yaml` file:

```
apiVersion: cert-manager.io/v1
kind: Certificate
metadata:
  name: my-client-cert
  namespace: istio-system
spec:
```

```
  secretName: client-tls-secret
  duration: 8760h
  renewBefore: 720h
  commonName: "dm-edge-services"
  isCA: false
  privateKey:
    algorithm: RSA
    size: 4096
  usages:
    - client auth
  issuerRef:
    name: my-cluster-ca-issuer
    kind: ClusterIssuer
```

To apply it, run:

```
kubectl apply -f my-client-cert.yaml
```

This creates a secret in the istio-system name space called **client-tls-secret**.

8.6.3.3 Istio CA Bundle

Finally, create a placeholder certificate to automate copying the root `ca.crt` into istio-system. This satisfies the hardcoded <ingressServerCertificate>-cacert naming requirement for SAP DM Edge.

Save the following configuration to a `my-client-cert.yaml` file:

```
apiVersion: cert-manager.io/v1
kind: Certificate
metadata:
  name: istio-ingress-ca-bundle
  namespace: istio-system
spec:
  secretName: tls-secret-cacert
  commonName: "dummy-istio-ca"
  duration: 8760h
  isCA: false
  issuerRef:
    name: my-cluster-ca-issuer
    kind: ClusterIssuer
```

To apply it, run:

```
kubectl apply -f my-client-cert.yaml
```

This creates a secret in the istio-system name space called **tls-secret-cacert**.

8.6.4 NGINX

Warning

Ingress NGINX reached end of life in March 2026. For more information, see https://kubernetes.io/blog/2025/11/11/ingress-nginx-retirement/. Thus, we recommend using Istio with Digital Manufacturing Edge.

By default, NGINX is deployed on Rancher Kubernetes Engine 2 for Rancher Kubernetes Engine 2 cluster versions earlier than 1.36. This means, unless you opt out in the SUSE Rancher Prime UI during cluster creation or use installation script suffixes when using the installation script, NGINX is deployed on those clusters.

For Rancher Kubernetes Engine 2 clusters after version 1.36, you can still select NGINX in the SUSE Rancher Prime UI during cluster creation.

8.7 Database

SAP Digital Manufacturing Edge requires a database to operate. While embedded databases can be used for PoC purposes, an external database is recommended for production environments.

8.7.1 Installing PostgreSQL

This chapter describes how to set up an external PostgreSQL database for the Digital Manufacturing Edge deployment.

IMPORTANT

SUSE does **not** offer 3rd level database support for PostgreSQL or CloudNativePG on Kubernetes. Find information about support options at The PostgreSQL Global Development Group (https://www.postgresql.org/support/).

IMPORTANT

The instructions below describe only one variant of installing a PostgreSQL database with the CloudNativePG operator. There are other possible ways to set up PostgreSQL which are not covered in this guide. It is also possible to install PostgreSQL as a single instance on the operating system. This section describes how to install PostgreSQL in a Kubernetes cluster using the CloudNativePG oper-

ator. Using the CloudNativePG operator requires a Rancher Prime for SAP applications subscription or Rancher Prime Suite. For more information, see https://docs.apps.rancher.io/get-started/subscriptions

8.7.1.1 Deploying PostgreSQL

We recommend using Rancher Application Collection, although CloudNativePG is available in SUSE Rancher Prime Apps. For the CloudNativePG chart, see https://apps.rancher.io/applications/cloudnative-pg.

8.7.1.1.1 Deploying the operator

To deploy the operator chart, create the related name space and an `imagePullSecret` first. To create the name space, run:

```
kubectl create namespace cnpg-system
```

Instructions how to create the `imagePullSecret` can be found in *Section 10.1, "Creating an imagePullSecret for the Rancher Application Collection"*.

Before installing the application, log in to the registry. Find the instructions in *Section 10.2, "Logging in to the Application Collection Registry"*.

Next, install the operator using Helm by running the following command. Make sure to replace `<your_pg_version>` with the actual version of PostgreSQL:

```
helm install cloudnative-pg oci://dp.apps.rancher.io/charts/cloudnative-pg \
  --namespace=cnpg-system \
  --set global.imagePullSecrets={application-collection} \
  --set images.postgresql.tag=<your_pg_version>
```

Note

To get a complete list of available PostgreSQL versions, visit https://apps.rancher.io/applications/postgresql/components

8.7.1.1.2 Deploying the database cluster

Create the name space where the database will be deployed:

```
kubectl create namespace edgedb
```

Like the operator, database pods also pull images from the registry. Ensure you create the `imagePullSecret` in this new name space as described in *Section 10.1, "Creating an imagePullSecret for the Rancher Application Collection"*.

8.7.1.1.2.1 Configuring database credentials

The CloudNativePG operator requires two separate credentials: one for the database superuser (which manages the PostgreSQL cluster) and one for the application user (which accesses the specific application database).

Create a file named `create_user_secret.yaml` to define these credentials:

```
apiVersion: v1
kind: Secret
metadata:
  name: cluster-pg-superuser
  namespace: edgedb
type: kubernetes.io/basic-auth
stringData:
  username: postgres
  password: "<your_password>"
---
apiVersion: v1
kind: Secret
metadata:
  name: cluster-pg-appuser
  namespace: edgedb
  annotations:
  labels:
type: kubernetes.io/basic-auth
stringData:
  username: appuser
  password: "<your_password>"
```

Apply the configuration to the cluster:

```
kubectl apply -f create_user_secret.yaml
```

8.7.1.1.2.2 Configuring TLS certificates

To secure internal and external database connections, create Kubernetes secrets containing the TLS certificates using `cert-manager`.

This example issues a server certificate with DNS names matching the CloudNativePG services and a client certificate required for PostgreSQL streaming replication. The global `my-cluster-ca-issuer` signs both certificates.

Create a file named `edgedb-certificate.yaml` with the following content:

```
apiVersion: cert-manager.io/v1
kind: Certificate
metadata:
  name: my-edgedb-server-cert
  namespace: edgedb
spec:
  secretName: my-edgedb-server-cert
  secretTemplate:
    labels:
      # CRITICAL: This label tells the CloudNativePG operator to
      # automatically reload the database when this cert renews.
      cnpg.io/reload: ""
  usages:
    - server auth
    - digital signature
  dnsNames:
    - postgres-rw
    - postgres-rw.edgedb
    - postgres-rw.edgedb.svc
    - postgres-ro
    - postgres-ro.edgedb
    - postgres-ro.edgedb.svc
    - postgres-r
    - postgres-r.edgedb
    - postgres-r.edgedb.svc
  issuerRef:
    name: my-cluster-ca-issuer
    kind: ClusterIssuer
---
apiVersion: cert-manager.io/v1
kind: Certificate
metadata:
  name: my-edgedb-client-cert
  namespace: edgedb
spec:
  secretName: my-edgedb-client-cert
```

```
  secretTemplate:
    labels:
      cnpg.io/reload: ""
  usages:
    - client auth
  commonName: streaming_replica
  issuerRef:
    name: my-cluster-ca-issuer
    kind: ClusterIssuer
```

Note

In this guide, the database is created on the same cluster running Digital Manufacturing Edge, using internal database service names. If in your setup PostgreSQL runs outside the cluster, change the `dnsNames` values.

Apply the certificate configuration to the cluster:

```
kubectl apply -f edgedb-certificate.yaml
```

8.7.1.1.2.3 Creating the database

Create a file named `postgres-values.yaml` with the following configuration for the PostgreSQL cluster database:

```
apiVersion: postgresql.cnpg.io/v1
kind: Cluster
metadata:
  name: postgres
  namespace: edgedb
spec:
  imageName: dp.apps.rancher.io/containers/postgresql:16.14-31.5
  instances: 3

  superuserSecret:
    name: cluster-pg-superuser

  bootstrap:
    initdb:
      database: edgedb   # The name of the application database to create
      owner: appuser               # The username (must match the 'username' key in the
 secret)
      secret:
```

```
        name: cluster-pg-appuser

  # Configure CNPG to use the cert-manager secrets (from previous steps)
  certificates:
    serverTLSSecret: my-edgedb-server-cert
    serverCASecret: my-edgedb-server-cert
    replicationTLSSecret: my-edgedb-client-cert
    clientCASecret: my-edgedb-client-cert

  storage:
    size: 50Gi
```

Apply the configuration to deploy the database cluster:

```
kubectl apply -f postgres-values.yaml
```

Verify the status of the cluster by using `kubectl`:

```
kubectl get clusters.postgresql.cnpg.io -A
NAMESPACE   NAME       AGE   INSTANCES   READY   STATUS                     PRIMARY
edgedb      postgres   10m   3           3       Cluster in healthy state   postgres-1
```

8.7.1.1.3 Configuring SAP Digital Manufacturing Edge to use the database

After successfully deploying the PostgreSQL cluster, configure the SAP Digital Manufacturing Edge Helm chart to connect to it instead of using the embedded database. Add the following database configuration to your `values.yaml` file for the SAP Digital Manufacturing Edge deployment:

```
global:
  database:
    useEmbedded: false
    type: postgresql
    auth:
      host: "postgres-rw.edgedb.svc.cluster.local"
      port: 5432
      database: "edgedb"
      username: "appuser"
      password: "<your_password>"
```

8.8 Installing Dex

This chapter covers the deployment of Dex for the usage with Digital Manufacturing Edge.

Important

Refer to official SAP documentation (https://help.sap.com/docs/sap-digital-manufacturing/setup-and-operations-guide-for-sap-digital-manufacturing-for-edge-computing/use-external-dex) to get latest information about the configuration of Dex.

For the purpose of this guide, the installation of Dex within a Kubernetes cluster and how to expose it through Istio or NGINX is described. For the Digital Manufacturing Edge setup, this can be the same cluster used for the Digital Manufacturing Edge workload.

8.8.1 Setup SUSE Rancher Prime as an OIDC provider

Important

Dex supports integration with various OIDC providers. For a list of supported connectors, see the Dex Connectors documentation (https://dexidp.io/docs/connectors/). This guide describes how to use Dex with SUSE Rancher Prime.

You can use SUSE Rancher Prime as the OIDC provider for Dex. For complete configuration instructions, see: Configure Rancher as an OIDC provider (https://documentation.suse.com/cloudnative/rancher-manager/v2.14/en/rancher-admin/users/authn-and-authz/configure-oidc-provider.html)

8.8.1.1 Using SUSE Rancher Prime

To set up SUSE Rancher Prime, open the application and select ***Users & Authentication*** in the left navigation panel, as shown below:

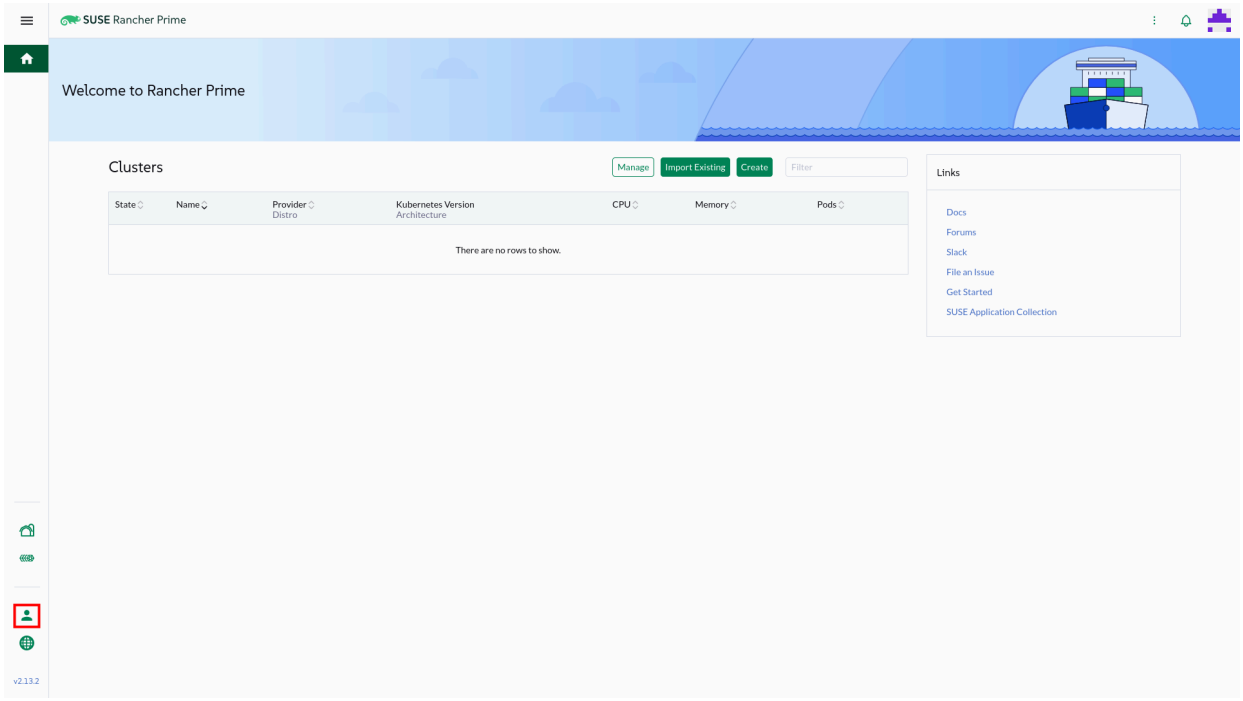

FIGURE 14: RANCHER DASHBOARD USER ICON

Next, In the left navigation panel, select **OIDC Apps**:

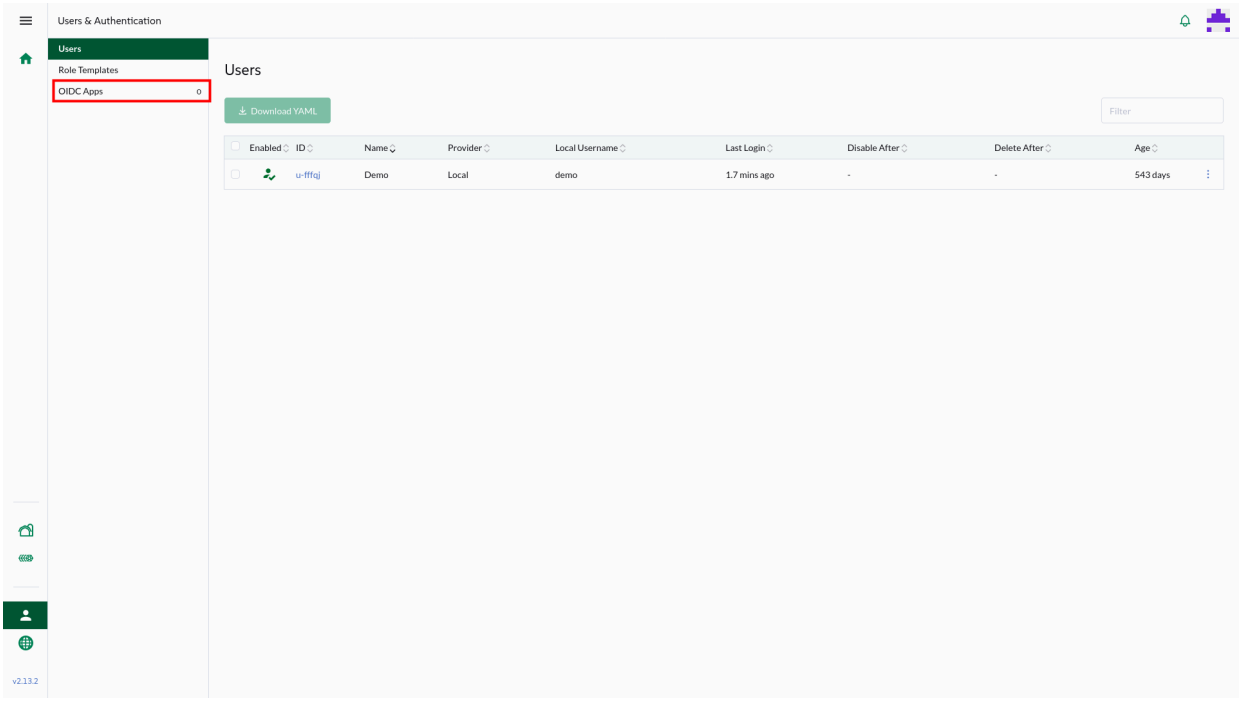

FIGURE 15: RANCHER USER OIDC TAB

Make a note of the **Issuer URL**, which is required when configuring Dex. To allow the SAP Digital Manufacturing Edge application to authenticate through Dex, create a new OIDC App. To do so, click **Add Application** in the upper right corner, as shown below:

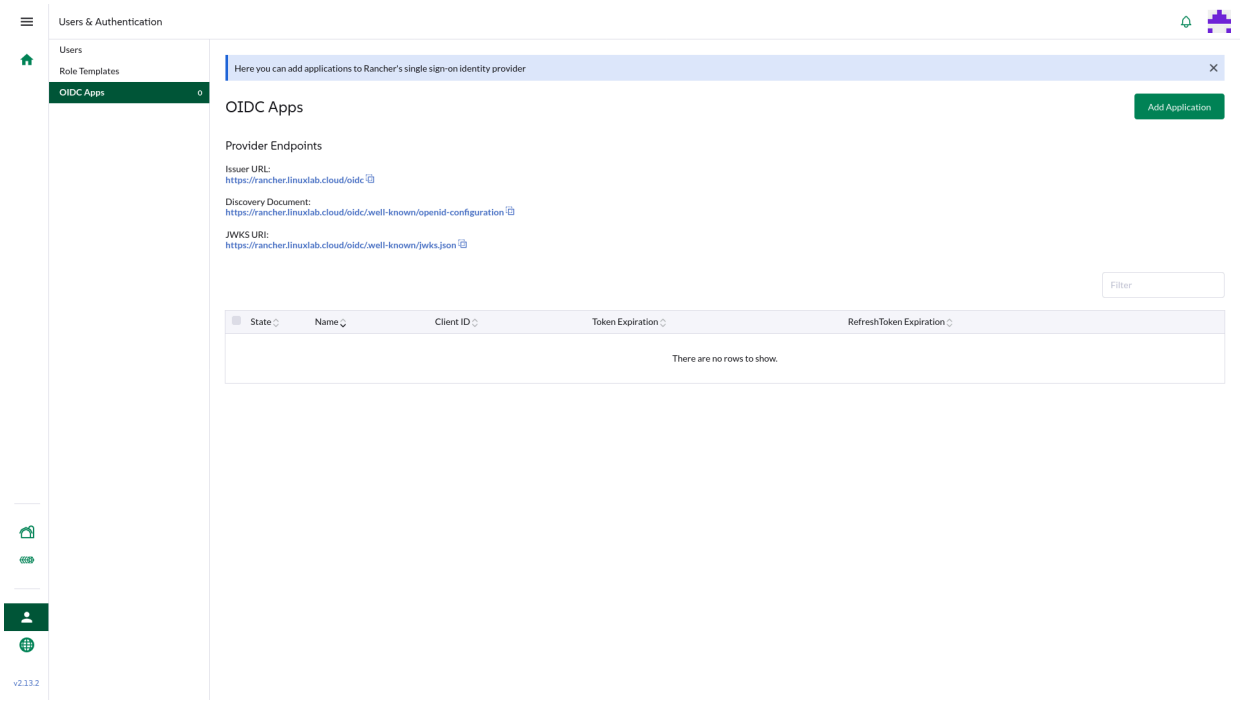

FIGURE 16: RANCHER USER MENU

The OIDC creation page opens:

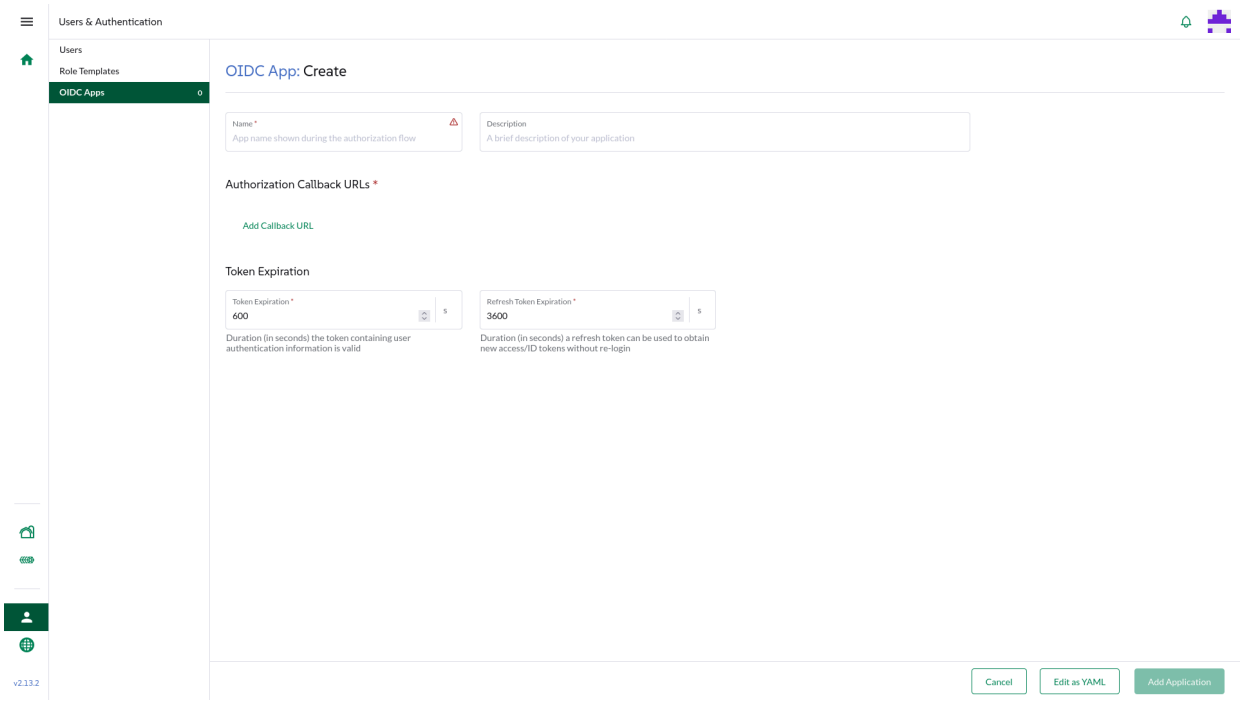

FIGURE 17: RANCHER USER MENU

Enter a name for the OIDC application and specify the callback URL which must be **<your-Dex-URL>/callback**. Use this callback URL as the **redirectURL** value in the Dex Helm chart.

After clicking the **Add Application** button, the overview page for the OIDC application opens, displaying the *Client ID* and the *Client Secrets*. These values are used to configure Dex and are referenced in this guide as <clientID> and <clientSecret>.

8.8.1.2 Using a manifest

You can also apply a manifest to the SUSE Rancher Prime local cluster to create a new OIDC application. Upload the following manifest using the SUSE Rancher Prime UI or save the content and apply it using `kubectl`:

```
apiVersion: management.cattle.io/v3
kind: OIDCClient
metadata:
  name: sap-dme-dex-client
spec:
  description: "OIDC Client für Digital Manufacturing Edge Dex"
```

```
  redirectURIs:
    - "https://<your-Dex-URL>/callback" # This must be used for the redirectURL later
  tokenExpirationSeconds: 3600
  refreshTokenExpirationSeconds: 86400
```

8.8.1.3 Gathering the client secret

SUSE Rancher Prime automatically generates a Kubernetes Secret in the `cattle-oidc-client-secrets` namespace for each `OIDCClient` resource. The Secret's name matches the `OIDCClient` client ID. Initially, the Secret contains a single client secret. To retrieve the client secret, query it using `kubectl` as follows:

```
kubectl get secret <client-name> -n cattle-oidc-client-secrets -o
 jsonpath="{.data.client-secret-1}" | base64 -d
```

8.8.2 Creating the Dex server certificate for Ingress (Only for `nginx`)

If you are using `nginx`, you need a certificate for incoming Ingress traffic.

```
apiVersion: cert-manager.io/v1
kind: Certificate
metadata:
  name: dex-server-cert
  namespace: auth
spec:
  secretName: dex-server-tls-secret # Put this name into your Helm values under
 `secretName`
  duration: 8760h
  renewBefore: 720h
  commonName: "dex-dex-idp.auth.svc.cluster.local"  # Match your Dex service name in
 Kubernetes
  isCA: false
  privateKey:
    algorithm: RSA
    size: 2048
  usages:
    - server auth
  dnsNames:
    - "dex-dex-idp.auth.svc.cluster.local"   # Match your Dex service name in Kubernetes
    - "<your-Dex-URL>"
  issuerRef:
    name: my-cluster-ca-issuer
    kind: ClusterIssuer
```

8.8.3 Prerequisites

To deploy the chart, create the related namespace and **imagePullSecret** first. To create the namespace, run:

```
kubectl create namespace auth
```

Instructions how to create the **imagePullSecret** can be found in *Section 10.1, "Creating an imagePullSecret for the Rancher Application Collection"*.

Before you can install the application, you need to log in to the registry. You can find the instructions in *Section 10.2, "Logging in to the Application Collection Registry"*.

8.8.4 Deploying Dex

You are now set to deploy Dex. Create a `values.yaml` file to store the configurations for the Dex Helm chart. The file content can resemble the following example:

```
config:
  issuer: https://<your-Dex-URL>/ # This must match your dex server address
  oauth2:
    skipApprovalScreen: true
  # Refer to https://dexidp.io/docs/configuration/storage/#kubernetes-custom-resource-
definitions-crds
  storage:
    type: kubernetes
    config:
      inCluster: true
  connectors:
  - config:
      clientID: <clientID>
      clientSecret: <clientSecret>
      issuer: https://<your-Rancher-URL>/oidc
      insecureSkipVerify: true
      redirectURI: https://<your-Dex-URL>/callback  # This must match your configured
 Callback URL for your OIDC app
      scopes:
      - openid
      - profile
      - email
      - groups
      userIDKey: sub
      userNameKey: email
      insecureEnableGroups: true  # Ensures that group information is included in the ID
 token for DM Edge access
    id: rancher-oidc
    name: Rancher Login
```

```
    type: oidc
    getUserInfo: true
  expiry:
    idTokens: 10m
    refreshTokens:
      validIfNotUsedFor: 15m # Define a value which is no shorter than 15 minutes (15m)
 and no longer than 24 hours (24h)
      absoluteLifetime: 24h
      disableRotation: false
      reuseInterval: 1m
  # Register a UI application (DM Edge or your own custom UI application) with dex as a
 client
  staticClients:
  - id: sap-dm-edge-client # Define an ID for the UI application
    secret: "super-secret-password-shared-with-sap-dm" # Define a secure secret for the
 UI application
    name: 'SAP Digital Manufacturing for Edge Computing' # Define a meaningful name for
 the UI application
    # Callback URL for Dex to redirect the user post authentication
    redirectURIs:
      - https://edge-ui.<your-Dex-URL>/callback
```

Important

Ensure the `clientID` and `clientSecret` match the configuration in *Section 8.8.1, "Setup SUSE Rancher Prime as an OIDC provider"*. Also, ensure that the <your-Dex-URL> matches the address where the Dex server is accessible.

To access Dex through an Ingress controller, add the following snippet to the `values.yaml` file. This will create and configure Ingress for Dex:

```
ingress:
  enabled: true
  className: nginx
  hosts:
    - host: <your-Dex-URL>
      paths:
        - path: /
          pathType: Prefix
  tls:
    - hosts:
        - <your-Dex-URL>
      # Specify the secret you created previously for the Dex server certificate
      secretName: dex-server-tls-secret
```

Important

Ensure the `secretName` matches the `secretName` value configured in *Section 8.8.2, "Creating the Dex server certificate for Ingress (Only for `nginx`)"*.

To install the application, run:

```
helm install dex oci://dp.apps.rancher.io/charts/dex-idp \
-f values.yaml \
--namespace=auth \
--version 0.24.1
```

8.8.5 Creating a secret for Dex

To deliver the root `ca.crt` into the `dme` namespace, create a placeholder certificate. SAP Digital Manufacturing Edge mounts this secret to mathematically verify that OIDC tokens issued by Dex are valid and signed by a trusted source.

```
apiVersion: cert-manager.io/v1
kind: Certificate
metadata:
  name: dex-ca-bundle
  namespace: dm-edge
spec:
  secretName: dex-ca-secret
  commonName: "dummy-dex-ca"
  duration: 8760h
  isCA: false
  issuerRef:
    name: my-cluster-ca-issuer
    kind: ClusterIssuer
```

8.8.6 Using Istio

To route traffic to Dex using Istio, configure the required Istio routes. A dedicated `Gateway` specifies the domain name and certificate, while a `VirtualService` routes incoming traffic through the gateway to the Dex service.

Save the following configuration in a `dex_istio.yaml` file:

```
apiVersion: networking.istio.io/v1
```

```
kind: Gateway
metadata:
  name: dex-gateway
  namespace: auth # Deploy in the same namespace as DEX
spec:
  selector:
    istio: ingressgateway # Must match the name of the Istio gateway pod
  servers:
    - hosts:
        - <your-Dex-URL>
      port:
        name: https
        number: 443
        protocol: HTTPS
      tls:
        credentialName: tls-secret
        mode: SIMPLE
---
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: dex-route
  namespace: auth # Deploy in the same namespace as DEX
spec:
  hosts:
    - "<your-Dex-URL>"
  gateways:
    - dex-gateway # Must match the gateway used by the wildcard service
  http:
    - match:
        - uri:
            prefix: /dex
      route:
        - destination:
            host: dex-dex-idp.auth.svc.cluster.local # Your actual internal DEX service
 K8s DNS
            port:
              number: 5556 # Your DEX service port
```

Note

If you followed the guide and configured MetalLB and Istio, the value of <your-Dex-URL> can be a subdomain of <LB-address>. For example, if <LB-address> is *192.168.1.66.sslip.io*, the <your-Dex-URL> can be *dex.192.168.1.66.sslip.io*.

Now apply the manifests to create the resources in the Kubernetes cluster:

```
kubectl apply -f dex_istio.yaml
```

8.8.6.1 Verifying reachability (optional)

To verify if your deployed Dex works as expected, use the following commands:

```
kubectl get secret dex-ca-secret -n dm-edge -o jsonpath='{.data.tls\.crt}' | base64 -d >
 client.crt
kubectl get secret dex-ca-secret -n dm-edge -o jsonpath='{.data.tls\.key}' | base64 -d >
 client.key
kubectl get secret dex-ca-secret -n dm-edge -o jsonpath='{.data.ca\.crt}' | base64 -d >
 ca.crt

curl -v -i \
  --cacert ca.crt \
  --cert client.crt \
  --key client.key \
  https://<your-Dex-URL>/.well-known/openid-configuration
```

The command produces output similar to the following example:

```
{
  "issuer": "https://{dex-server-URL}",
  "authorization_endpoint": "https://{dex-server-URL}/auth",
  "token_endpoint": "https://{dex-server-URL}/token",
  "jwks_uri": "https://{dex-server-URL}/keys",
  "userinfo_endpoint": "https://{dex-server-URL}/userinfo",
  "device_authorization_endpoint": "https://{dex-server-URL}/device/code",
  "introspection_endpoint": "https://{dex-server-URL}/token/introspect",
  "grant_types_supported": [
    "authorization_code",
    "refresh_token",
    "urn:ietf:params:oauth:grant-type:device_code",
    "urn:ietf:params:oauth:grant-type:token-exchange"
  ],
  "response_types_supported": [
    "code"
  ],
  "subject_types_supported": [
    "public"
  ],
  "id_token_signing_alg_values_supported": [
    "RS256"
```

```
  ],
  "code_challenge_methods_supported": [
    "S256",
    "plain"
  ],
  "scopes_supported": [
    "openid",
    "email",
    "groups",
    "profile",
    "offline_access"
  ],
  "token_endpoint_auth_methods_supported": [
    "client_secret_basic",
    "client_secret_post"
  ],
  "claims_supported": [
    "iss",
    "sub",
    "aud",
    "iat",
    "exp",
    "email",
    "email_verified",
    "locale",
    "name",
    "preferred_username",
    "at_hash"
  ]
}
```

When using a custom Dex instance, adjust the Helm values for the deployment of Digital Manufacturing Edge accordingly. When following this guide, the values can resemble the following example:

```
global:
    dex:
        useEmbedded: false
    dexIssuer: https://{dex-server-URL}
    dexCACertificate: dex-ca-secret
    dexClient:
        clientID: sap-dm-edge-client
        clientSecret: super-secret-password-shared-with-sap-dm
    idpLogoutUrl: https:/{rancher-URL}/oidc/logout
```

8.9 Installing Kafka

To configure Kafka for Digital Manufacturing Edge, use the Strimzi Kafka Operator. This operator natively handles the lifecycle, security, and scaling of the Kafka cluster on Rancher Kubernetes Engine 2.

For more information about configuring and connecting Strimzi Kafka to Digital Manufacturing Edge, see https://help.sap.com/docs/sap-digital-manufacturing/setup-and-operations-guide-for-sap-digital-manufacturing-for-edge-computing/appendix-4-set-up-and-connect-to-strimzi-kafka

8.9.1 Prerequisites

Before deploying the Strimzi Operator, create the related name space and **imagePullSecret**. To create the name space, run:

```
kubectl create namespace kafka
```

Find instructions on how to create the **imagePullSecret** in *Section 10.1, "Creating an imagePullSecret for the Rancher Application Collection"*.

Before you can install the application, you need to log in to the registry. Find the instructions in *Section 10.2, "Logging in to the Application Collection Registry"*.

8.9.2 Deploying the Strimzi Operator

Install the Strimzi Cluster Operator using Helm from the Rancher Application Collection:

```
helm install strimzi-cluster-operator oci://dp.apps.rancher.io/charts/strimzi-kafka-
operator \
  --namespace kafka \
  --set global.imagePullSecrets={application-collection} \
  --set replicas=3 \
  --version 1.1.0
```

8.9.3 Deploying the Kafka Cluster

When the Strimzi Operator pods are running, you can deploy a Kafka cluster. To deploy the cluster, create a file named `strimzi-kafka.yaml` with the following configuration:

```
apiVersion: kafka.strimzi.io/v1
kind: KafkaNodePool
metadata:
  name: controller
```

```
  namespace: kafka
  labels:
    strimzi.io/cluster: kafka-cluster
spec:
  replicas: 3
  roles:
    - controller
  storage:
    type: jbod
    volumes:
      - id: 0
        type: persistent-claim
        size: 5Gi
        kraftMetadata: shared
        deleteClaim: false
        class: longhorn
---
apiVersion: kafka.strimzi.io/v1
kind: KafkaNodePool
metadata:
  name: broker
  namespace: kafka
  labels:
    strimzi.io/cluster: kafka-cluster
spec:
  replicas: 3
  roles:
    - broker
  storage:
    type: jbod
    volumes:
      - id: 0
        type: persistent-claim
        size: 128Gi
        deleteClaim: false
        class: longhorn
---
apiVersion: kafka.strimzi.io/v1
kind: Kafka
metadata:
  name: kafka-cluster
  namespace: kafka
spec:
  kafka:
    version: "4.3.0"
    metadataVersion: "4.3"
    authorization:
```

```
      type: simple
    listeners:
      - name: plain
        port: 9092
        type: internal
        tls: false
        authentication:
          type: scram-sha-512
      - name: tls
        port: 9093
        type: internal
        tls: true
        authentication:
          type: scram-sha-512
    config:
      offsets.topic.replication.factor: 3
      transaction.state.log.replication.factor: 3
      transaction.state.log.min.isr: 2
      default.replication.factor: 3
      min.insync.replicas: 2
  entityOperator:
    topicOperator: {}
    userOperator: {}
```

NOTE

The configuration above creates a Kafka cluster with 3 brokers and 3 controllers, each with persistent storage. Adjust the sizes according to your environment.

Apply the configuration to the cluster:

```
kubectl apply -f strimzi-kafka.yaml
```

8.9.4 Creating the Kafka User and ACLs

After the Kafka cluster is deployed, create a Kafka user for Digital Manufacturing Edge and configure the necessary Access Control Lists (ACLs) to allow Digital Manufacturing Edge to read and write to its internal topics.

Create a file named `strimzi-kafka-user.yaml` with the following content:

```
apiVersion: kafka.strimzi.io/v1
kind: KafkaUser
metadata:
  name: kafka-user
```

```
  namespace: kafka
  labels:
    strimzi.io/cluster: kafka-cluster
spec:
  authentication:
    type: scram-sha-512
  authorization:
    type: simple
    acls:
      - resource:
          type: topic
          name: com.sap.dsc.dm.
          patternType: prefix
        operations:
          - Read
          - Write
          - Create
          - Describe
          - Delete
      - resource:
          type: group
          name: "*"
          patternType: literal
        operations:
          - Read
          - Describe
```

Apply the user configuration:

```
kubectl apply -f strimzi-kafka-user.yaml
```

The Strimzi operator automatically generates a Kubernetes Secret containing the user's credentials. Retrieve and decode the password, as you will need it for the Digital Manufacturing Edge installation (*Section 8.9.5, "Connecting SAP Digital Manufacturing Edge to Strimzi Kafka"*):

```
kubectl get secret kafka-user -n kafka -o jsonpath='{.data.password}' | base64 -d
```

8.9.5 Connecting SAP Digital Manufacturing Edge to Strimzi Kafka

When the Kafka cluster and user are ready, configure the SAP Digital Manufacturing Edge Helm `values.yaml` to disable the embedded Kafka and point to the external Strimzi deployment.

Note

The configuration example below uses the standard in-cluster Kubernetes DNS address (`kafka-cluster-kafka-bootstrap.kafka.svc.cluster.local:9092`). If your Kafka cluster uses a different name space, custom domain name, or DNS endpoint, make sure to update the `brokers` field with the actual server address and port.

Update the `values.yaml` file with the connection details and the decoded password retrieved in the previous step (*Section 8.9.4, "Creating the Kafka User and ACLs"*):

```
global:
  kafka:
    useEmbedded: false
    auth:
      brokers: 'kafka-cluster-kafka-bootstrap.kafka.svc.cluster.local:9092'
      username: 'kafka-user'
      password: '<your-kafka-password>'
```

8.10 External Secrets Operator (ESO)

External Secrets Operator allows you to manage sensitive information in a secure and centralized manner. It is a collection of custom API resources (such as `ExternalSecret` and `SecretStore`) that provide a user-friendly abstraction for an external API that stores and manages the lifecycle of secrets for you.

The operator reads information from external APIs and creates native Kubernetes secrets based on the retrieved information, updating them automatically when the external secret changes.

Note

Installing External Secrets Operator is optional when deploying Digital Manufacturing Edge. Without External Secrets Operator, you must manage passwords and credentials manually in the Helm values file. To proceed without External Secrets Operator, skip to *Section 9, "Deploying Digital Manufacturing Edge"*.

8.10.1 Prerequisites

Before installing the operator, ensure the target namespace exists.

```
kubectl create namespace external-secrets
```

Follow the instructions in *Section 10.1, "Creating an imagePullSecret for the Rancher Application Collection"* to create the **imagePullSecret** in the `external-secrets` namespace.

Before you can install the application, you need to log in to the registry. Find the instructions in *Section 10.2, "Logging in to the Application Collection Registry"*.

8.10.2 Installing External Secrets Operator

Install External Secrets Operator via Helm using the SUSE Application Collection repository. For more information on the available configuration options, refer to reference guide at https://docs.apps.rancher.io/reference-guides/external-secrets-operator.

```
helm install external-secrets-operator oci://dp.apps.rancher.io/charts/external-secrets-
operator \
  --namespace external-secrets \
  --set global.imagePullSecrets={application-collection} \
  --version 2.8.0
```

Important

The command above performs a standard deployment. Harden the operator's permissions (for example, by restricting global ServiceAccount token creation or disabling unused cluster-wide resources). Refer to the official Security Best Practices (https://external-secrets.io/latest/guides/security-best-practices/) to secure your setup.

8.10.3 Configuring the Kubernetes Provider

In this guide, External Secrets Operator is configured using the Kubernetes provider. This enables the operator to retrieve credentials directly from native Kubernetes secrets in the cluster.

Note

For a complete list of supported providers, refer to the official site https://external-secrets.io and navigate to the "Provider" tab.

Setting up the Kubernetes provider involves creating a `SecretStore` resource. This resource acts as the connection bridge, pointing the operator to the Kubernetes API and defining the authentication method. For detailed technical information and advanced settings, refer to the official Kubernetes provider documentation (https://external-secrets.io/latest/provider/kubernetes/).

8.10.3.1 Provisioning the ServiceAccount Token

To configure the Kubernetes provider, create a service account token that External Secrets Operator can use to authenticate with the Kubernetes API. This token is used to access secrets in the `dm-edge` namespace.

Execute the following command to create a service account token:

```
cat <<EOF | kubectl apply -f -
apiVersion: v1
kind: Secret
metadata:
  name: default-sa-token
  namespace: dm-edge
  annotations:
    kubernetes.io/service-account.name: default
type: kubernetes.io/service-account-token
EOF
```

Note

The `default` service account is used here for simplicity. In a production environment, consider creating a dedicated service account with limited permissions, or using a different authentication method. Refer to the official documentation at https://external-secrets.io/latest/provider/kubernetes/#authentication.

8.10.3.2 Applying RBAC Permissions

After generating the authentication token, you must grant the necessary permissions for External Secrets Operator to operate securely within the `dm-edge` namespace.

This step creates a `Role` and a `RoleBinding` that allow the `default` service account to read secrets (`get`, `list`, `watch`). This also enables the operator to validate its access through the `selfsubjectrulesreviews` API.

Execute the following command to apply the RBAC configuration:

```
cat <<EOF | kubectl apply -f -
apiVersion: rbac.authorization.k8s.io/v1
kind: Role
metadata:
  name: eso-secret-reader-role
  namespace: dm-edge
rules:
  - apiGroups: [""]
    resources: ["secrets"]
    verbs: ["get", "list", "watch"]
  - apiGroups: ["authorization.k8s.io"]
    resources: ["selfsubjectrulesreviews"]
    verbs: ["create"]
---
apiVersion: rbac.authorization.k8s.io/v1
kind: RoleBinding
metadata:
  name: eso-secret-reader-binding
  namespace: dm-edge
subjects:
  - kind: ServiceAccount
    name: default
    namespace: dm-edge
roleRef:
  kind: Role
  name: eso-secret-reader-role
  apiGroup: rbac.authorization.k8s.io
EOF
```

8.10.3.3 Provisioning Secrets

This step creates the source secrets in the `dm-edge` namespace. These secrets serve as the local vault for External Secrets Operator.

Digital Manufacturing Edge allows integrating external secrets for various components. Execute the following commands as needed for your specific deployment. Ensure you replace the placeholder values with your actual credentials.

```
# 1. Kafka Credentials
kubectl create secret generic kafka-credentials \
  --namespace dm-edge \
  --from-literal=KAFKA_USERNAME="kafka-user" \
  --from-literal=KAFKA_PASSWORD="<your-kafka-password>"
```

```
# 2. UAA Credentials
kubectl create secret generic uaa-credentials \
  --namespace dm-edge \
  --from-literal=CLIENT_ID='your-dm-uaa-client-id' \
  --from-literal=CLIENT_SECRET='your$strong$uaa$secret' \
  --from-literal=URL='https://<your-authentication-url>'

# 3. Database Credentials (Password only)
kubectl create secret generic database-credentials \
  --namespace dm-edge \
  --from-literal=DB_PASSWORD='SuperStrongDatabasePassword123$'

# 4. Docker Registry Credentials
kubectl create secret generic registry-credentials \
  --namespace dm-edge \
  --from-literal=DOCKER_REGISTRY_USERNAME='your-registry-username' \
  --from-literal=DOCKER_REGISTRY_PASSWORD='your$registry$password'
```

8.10.3.4 Creating the SecretStore

When the secrets are provisioned, establish the connection bridge. The `SecretStore` resource instructs External Secrets Operator about where to find the secrets and how to authenticate securely.

In this configuration, the operator connects to the internal Kubernetes API (`https://kubernetes.default.svc`). It validates the internal TLS connection using the cluster's default Certificate Authority (`kube-root-ca.crt`), and authenticates using the `default-sa-token` created in the previous steps (*Section 8.10.3.1, "Provisioning the ServiceAccount Token"*).

Note

Using an internal Kubernetes DNS route, such as `kubernetes.default.svc`, requires the referenced service to be deployed and accessible within the same Kubernetes cluster. If the deployment setup differs, update the `url` field accordingly.

Execute the following command to create the `SecretStore`:

```
cat <<EOF | kubectl apply -f -
apiVersion: external-secrets.io/v1
kind: SecretStore
metadata:
  name: dme-secret-store
  namespace: dm-edge
```

```
spec:
  provider:
    kubernetes:
      remoteNamespace: dm-edge
      server:
        url: "https://kubernetes.default.svc"
        caProvider:
          type: ConfigMap
          name: kube-root-ca.crt
          key: ca.crt
      auth:
        token:
          bearerToken:
            name: default-sa-token
            key: token
EOF
```

8.10.4 Configuring the Chart with External Secrets Operator

Finally, configure the Digital Manufacturing Edge Helm chart to consume the `SecretStore`.

By enabling this feature, the chart delegates credential management to External Secrets Operator by deploying `ExternalSecret` manifests. These manifests fetch the credentials provisioned earlier in *Section 8.10.3.3, "Provisioning Secrets"*.

Update the `values.yaml` file to map each application component to its corresponding remote secret key:

```
global:
  security:
    externalSecrets:
      enabled: true
      secretStoreRefKind: SecretStore
      secretStoreRefName: "dme-secret-store"

      database:
        enabled: true
        remoteRefKey: "database-credentials"

      dockerRegistry:
        enabled: true
        remoteRefKey: "registry-credentials"

      serviceKey:
        enabled: true
        remoteRefKey: "uaa-credentials"
```

```
    kafka:
      enabled: true
      remoteRefKey: "kafka-credentials"
```

Note

When `externalSecrets.enabled` is set to `true`, ensure that you **remove or leave empty** the corresponding plain-text passwords in other sections of your `values.yaml` (such as `global.uaaClientSecret`, `global.database.auth.password`, etc.) to prevent configuration conflicts.

9 Deploying Digital Manufacturing Edge

At this point, all mandatory components are installed and you are ready to deploy Digital Manufacturing Edge. First, create an edge device as described in https://help.sap.com/docs/sap-digital-manufacturing/setup-and-operations-guide-for-sap-digital-manufacturing-for-edge-computing/create-edge-device.

Afterward, follow the instructions at https://help.sap.com/docs/sap-digital-manufacturing/setup-and-operations-guide-for-sap-digital-manufacturing-for-edge-computing/install-with-helm. Skip the certificate creation, as certificates were created in previous chapters.

If you followed this entire guide, you can find an example of what the *values.yaml* looks like:

Important

The following excerpt shows an example using Istio, Dex, PostgreSQL and Kafka with values described in this guide. For clarity, it displays the values without the External Secrets option.

```
deviceId: '<your-device-id>'
connectionString: <your-connection-string>
global:
    tenantId: '<your-tenant>'
    dockerRegistry: '<RSBC-Repository-URL>'
    gateway:
        hostname: <LB-address>
    storageClass: longhorn
    uaaUrl: '<your-uaaURL>'
    uaaClientId: <your-uaaClient>
    uaaClientSecret: <your-uaaClient-Password>
    ingressType: istio
    istioNamespace: istio-system
    ingressCACertificate: tls-secret-cacert
    ingressServerCertificate: tls-secret
    dex:
        useEmbedded: false
    dexIssuer: https://<dex-server-URL>
    dexCACertificate: dex-ca-secret
    dexClient:
        clientID: sap-dm-edge-client
        clientSecret: super-secret-password-shared-with-sap-dm
    idpLogoutUrl: https://<your-Rancher-URL>/oidc/logout
    database:
        useEmbedded: false
        type: postgresql
```

```
        auth:
            host: "postgres-rw.edgedb.svc.cluster.local"
            port: 5432
            database: "edgedb"
            username: "appuser"
            password: "<your_password>"
    kafka:
        useEmbedded: false
        auth:
          brokers: 'kafka-cluster-kafka-bootstrap.kafka.svc.cluster.local:9092'
          username: 'kafka-user'
          password: '<YOUR_DECODED_KAFKA_PASSWORD>'
    security:
        imageCredentials:
            username: <RBSC-docker-registry-username>
            password: <RBSC-docker-registry-password>
        externalSecrets:
            enabled: false
    size: production
edge-object-store:
    storageClass: longhorn
    hasRWXSupport: true
```

To get a better understanding of the values, refer to https://help.sap.com/docs/sap-digital-manufacturing/setup-and-operations-guide-for-sap-digital-manufacturing-for-edge-computing/helm-values

When the `helm install` command succeeds, Digital Manufacturing Edge is deployed and ready to use. For subsequent steps, follow the official SAP documentation at https://help.sap.com/docs/sap-digital-manufacturing/setup-and-operations-guide-for-sap-digital-manufacturing-for-edge-computing/enable-and-trigger-initial-load?locale=en-US

10 Appendix

10.1 Creating an imagePullSecret for the Rancher Application Collection

To make the resources available for deployment, you need to create an **imagePullSecret**. In this guide, we use the name *application-collection* for it.

Note

For details on authenticating with the Rancher Application Collection, refer to the Rancher Application Collection (https://docs.apps.rancher.io/get-started/first-steps/#distribution-platform).

Note

If you do not want to create multiple imagePullSecrets, you can also add the application collection as a registry to your cluster. Therefore add **dp.apps.rancher.io** as a registry as described in *Section 10.4, "Adding a registry"* (page 79). If you do so, make sure to create an HTTP Basic Auth Secret with your access token or service account credentials.

10.1.1 Creating an imagePullSecret using kubectl

Using `kubectl` to create the imagePullSecret is quite easy. Get your user name and your access token for the Rancher Application Collection. Then run:

```
kubectl -n <namespace> create secret docker-registry application-collection --docker-
server=dp.apps.rancher.io --docker-username=<yourUser> --docker-password=<yourPassword>
```

As secrets are namespace-sensitive, you need to create this for every required namespace.

10.1.2 Creating an imagePullSecret using SUSE Rancher Prime

You can also create an imagePullSecret using SUSE Rancher Prime. To do so, open SUSE Rancher Prime and enter your cluster.

Navigate to **Storage** → **Secrets** as shown below:

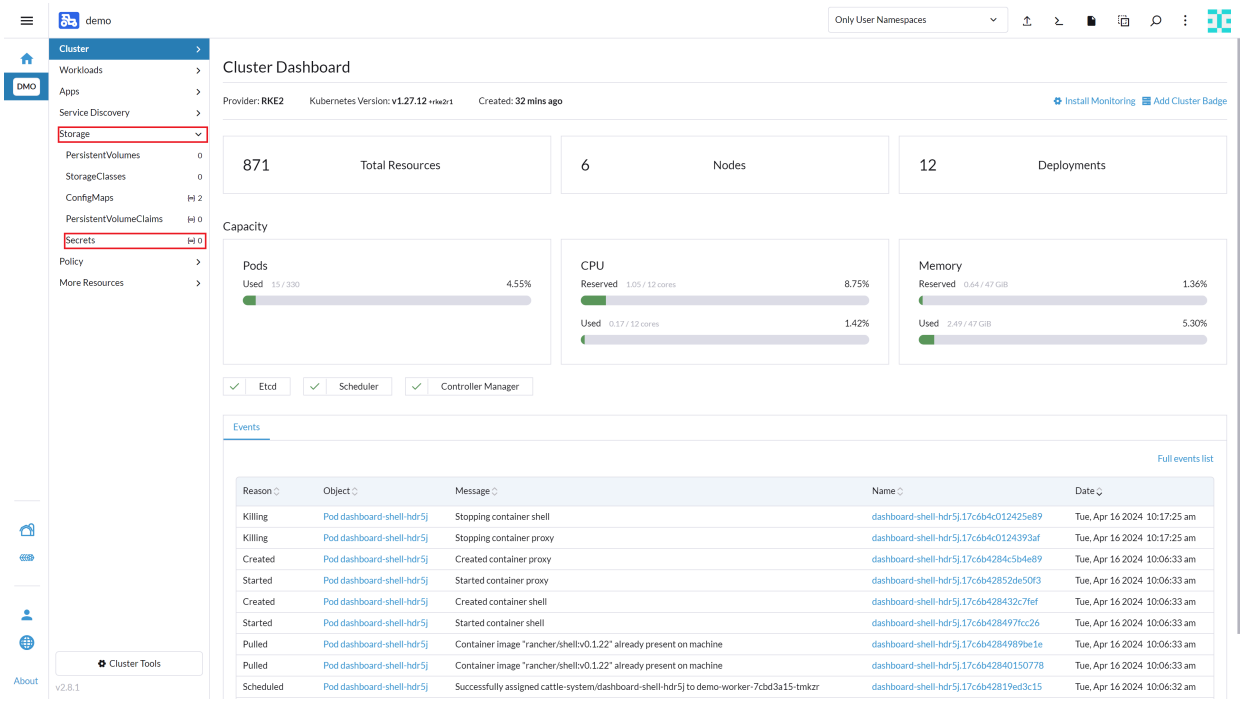

FIGURE 18: SECRETS MENU

Click the **Create** button in the top right corner.

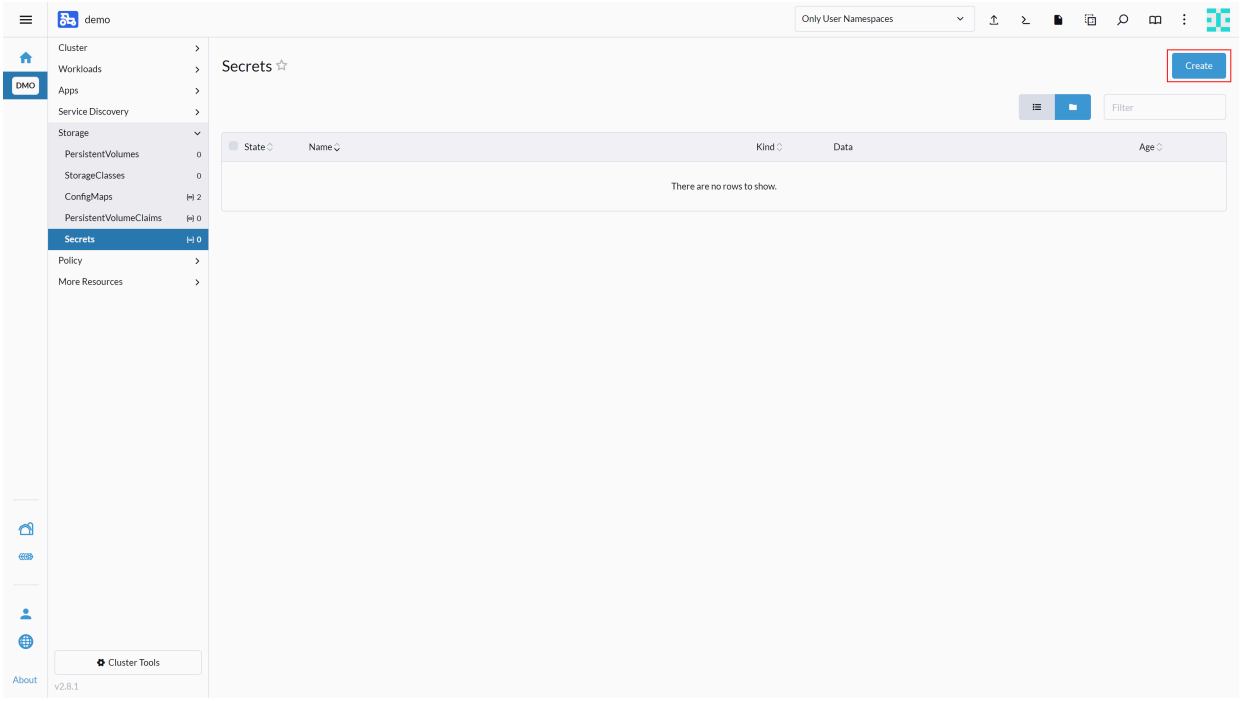

FIGURE 19: SECRETS OVERVIEW

A window will appear asking you to select the secret type. Select **Registry** as shown here:

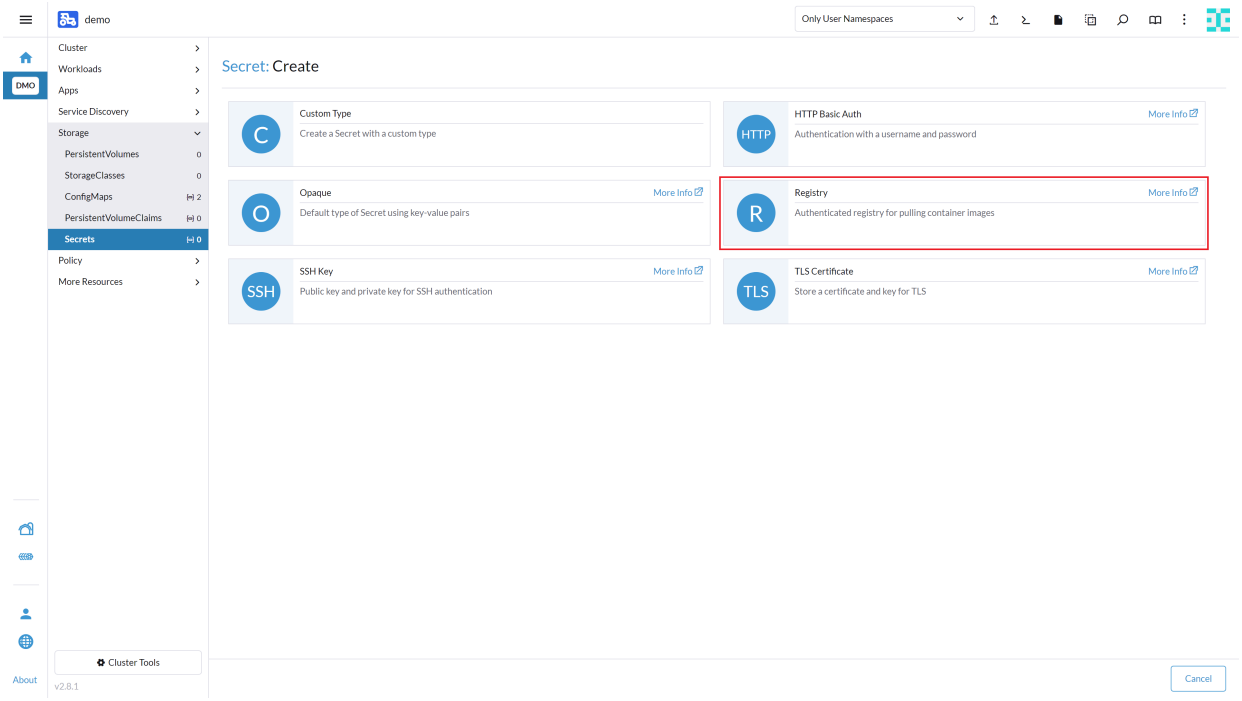

FIGURE 20: SECRETS TYPE SELECTION

Enter a name such as *application-collection* for the secret. In the text box **Registry Domain Name**, enter *dp.apps.rancher.io*. Enter your user name and password and click the **Create** button at the bottom right.

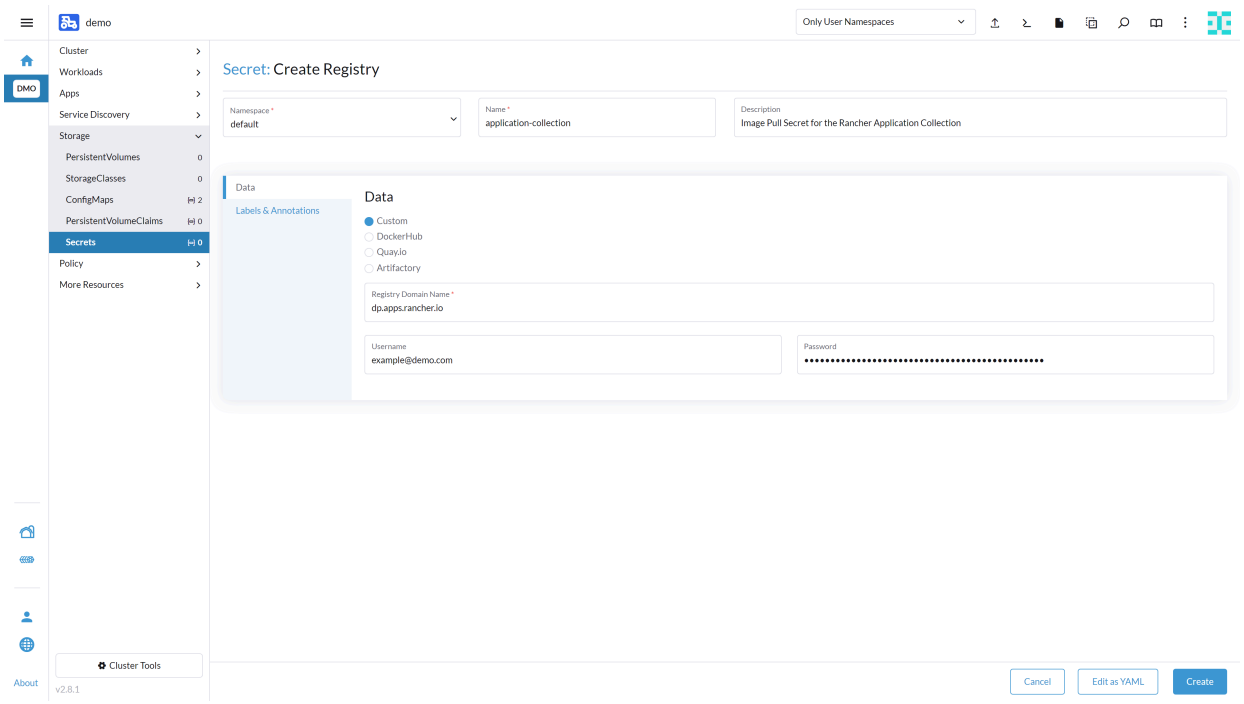

FIGURE 21: SECRETS CREATION STEP

10.2 Logging in to the Application Collection Registry

To install the Helm charts from the *application-collection*, you need to log in to the registry. This needs to be done with the Helm client.

To log in to the Rancher Application Collection, run:

```
helm registry login dp.apps.rancher.io/charts -u <yourUser> -p <your-token>
```

The login process is needed for the following application installations:

- Cert-Manager (*Section 5.4.1, "Installing the application"* (page 15))
- MetalLB (*Section 8.3.1.2, "Installing MetalLB"* (page 26))
- Kafka (*Section 8.9, "Installing Kafka"*)

10.3 Fully removing SUSE Rancher Prime

While **helm uninstall** triggers the removal of the SUSE Rancher Prime components, timeouts can occur, leaving residual components on your cluster. Therefore, we recommend to fully uninstall SUSE Rancher Prime from your Kubernetes cluster using the cleanup script found at https://github.com/rancher/rancher-cleanup .

To run the script without cloning the repository, use the following command:

```
kubectl create -f https://raw.githubusercontent.com/rancher/rancher-cleanup/refs/heads/
main/deploy/rancher-cleanup.yaml
```

To keep track of the deletion process, you can run:

```
kubectl  -n kube-system logs -l job-name=cleanup-job  -f
```

To verify the deletion was successful, run the following commands. You should receive an empty output:

```
kubectl create -f https://raw.githubusercontent.com/rancher/rancher-cleanup/refs/heads/
main/deploy/verify.yaml
kubectl  -n kube-system logs -l job-name=verify-job  -f | grep -v "is deprecated"
```

10.4 Adding a registry

To avoid creating identical imagePullSecrets in multiple namespaces, you can also introduce a registry in your cluster configuration. This can be configured in the Cluster Configuration at the tab *Registries* as shown below:

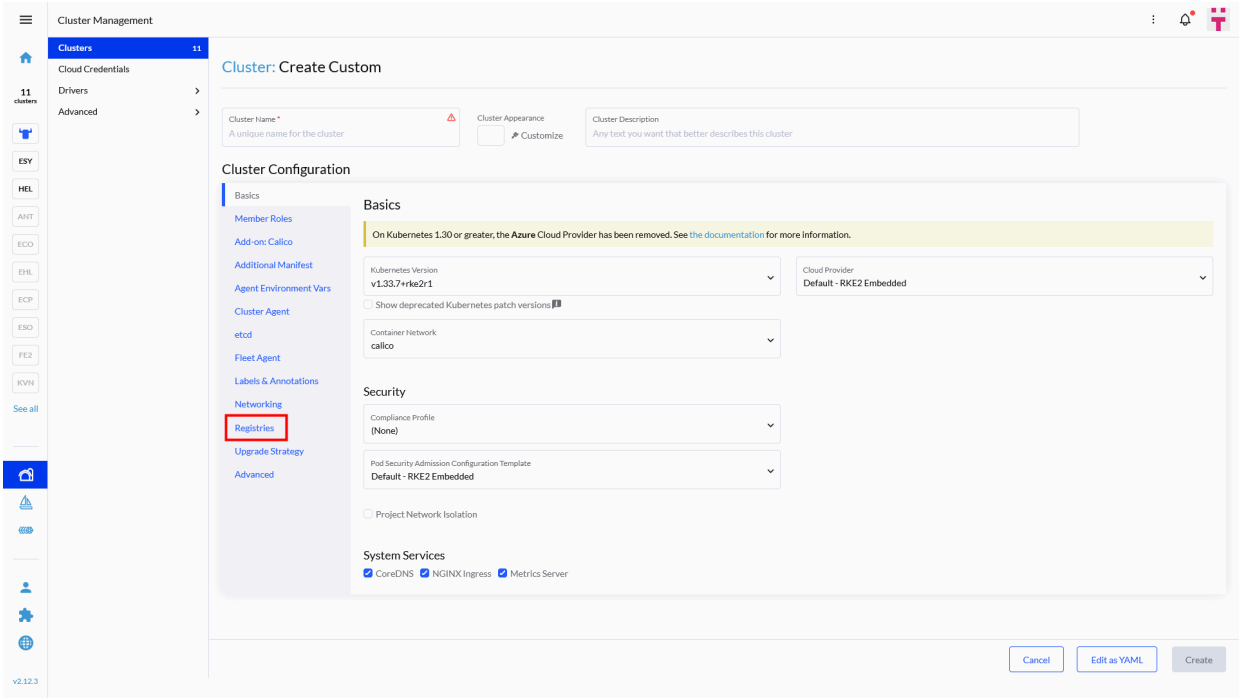

FIGURE 22: CLUSTER CONFIG REGISTRY

When opened, click *Show Advanced* as displayed in the picture below:

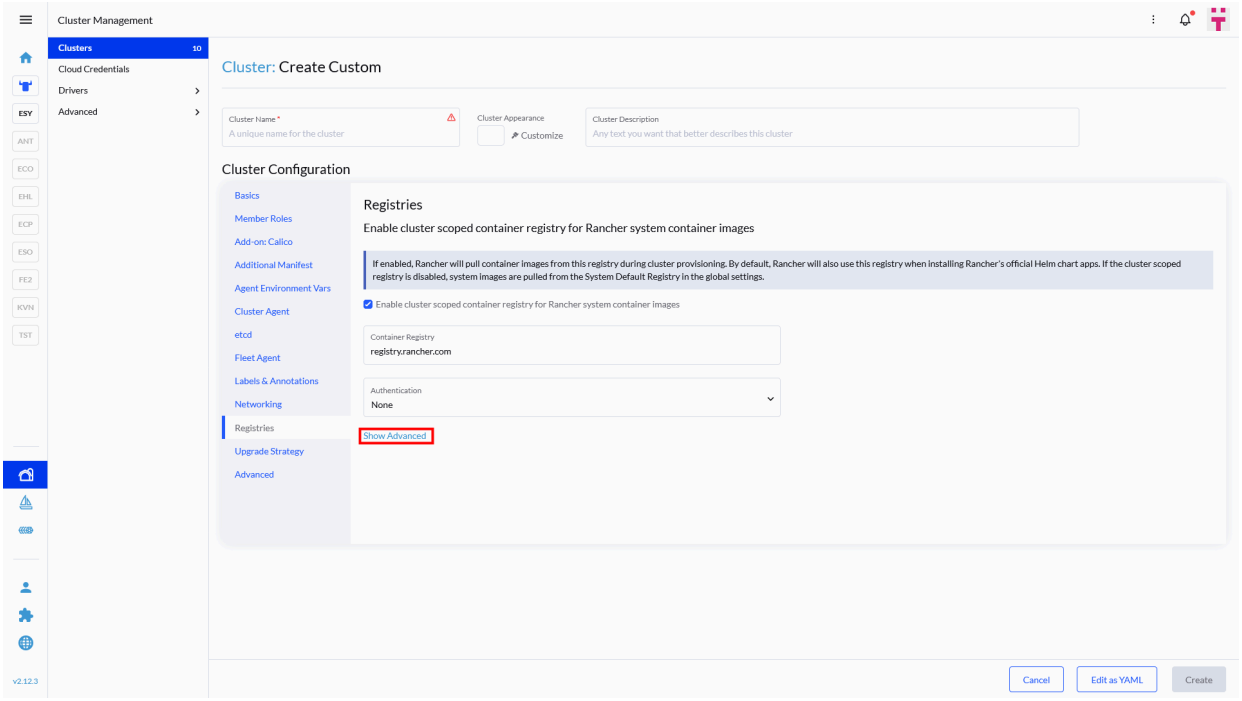

FIGURE 23: CLUSTER CONFIG REGISTRY ADVANCED

Scroll to the very bottom and enter your registry FQDN, as shown below:

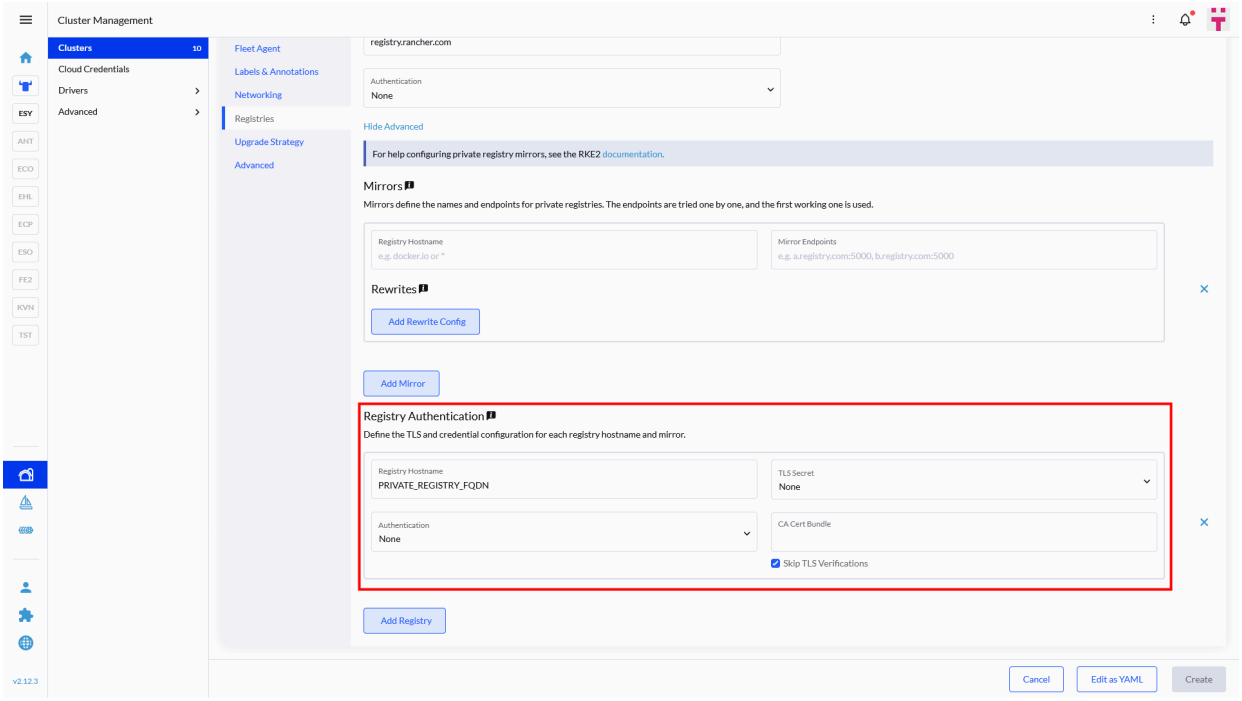

FIGURE 24: CONFIGURE REGISTRY AT CLUSTER CONFIG

There’s no need to start with http:// or https:// prefix, neither with the /project as a suffix. If you are using certificates from an unknown CA, make sure to enable **Skip TLS Verifications**.

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