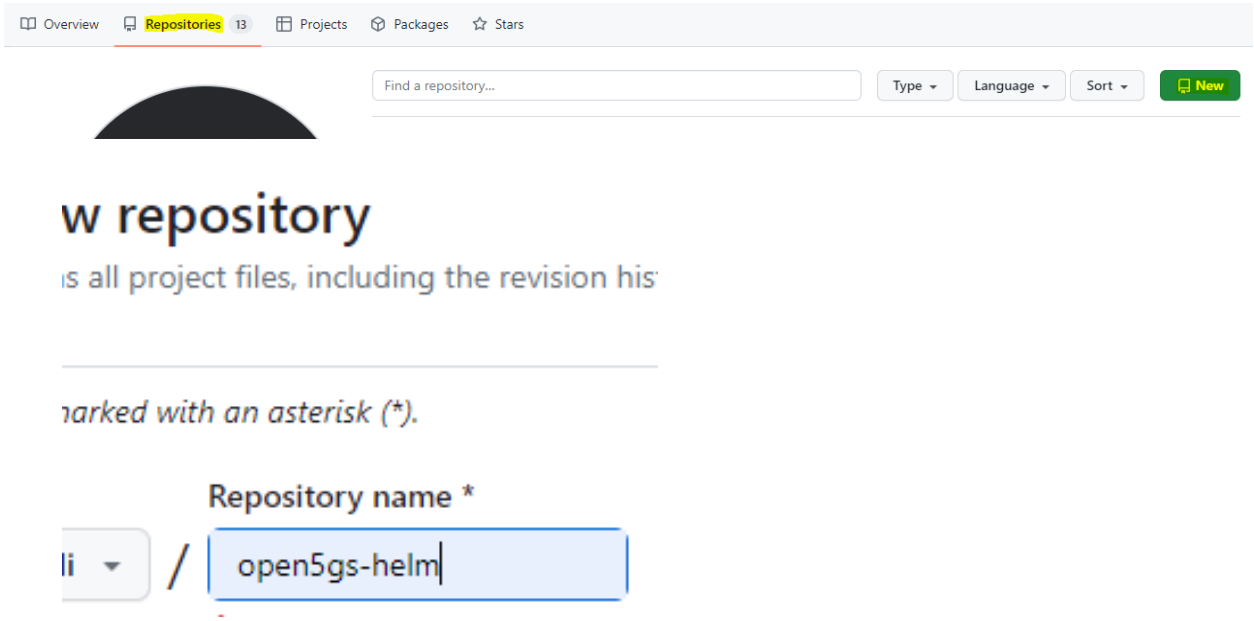
Deployment of Open5Gs Helm Chart from OSM

Step-1: Create Open5Gs helm chart and make it available over internet using github pages

1. Create a github repository. Eg:- name it as “open5gs-helm”



2. Clone the repository to your local system.

   # cd /home/<folder1>/

   # git clone https://github.com/<git-username>/open5gs-helm.git

   # cd open5gs-helm/

3. Create a new branch “gh-pages”

   # git checkout -b "gh-pages"

4. Copy the existing open5gs helm chart from the link below to the local folder “open5gs-helm/”

   Copy the folder “5g-helm-chart” from

   https://github.com/PoojithaVaddi/open5gs-helm/tree/gh-pages

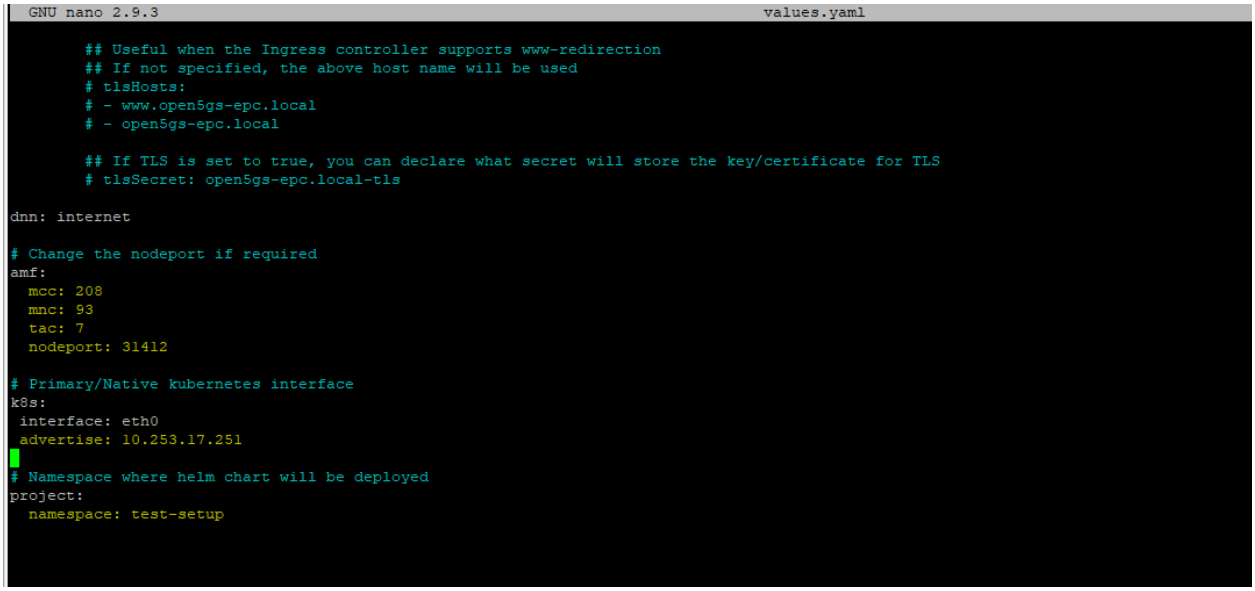
5. Delete the unwanted files

   # cd 5g-helm-chart/

rm index.yaml

rm open5gs-5gcore-helm-0.1.0.tgz

6. Make changes in values.yaml file. Change the highlighted values if required:



7. Package it after doing all the necessary changes in the folder “5g-helm-chart"

   # cd ..

   # helm package 5g-helm-chart/

8. Move the tar file to 5g-helm-chart folder

   # mv open5gs-5gcore-helm-0.1.0.tgz 5g-helm-chart/

9. Push the changes to your github repository

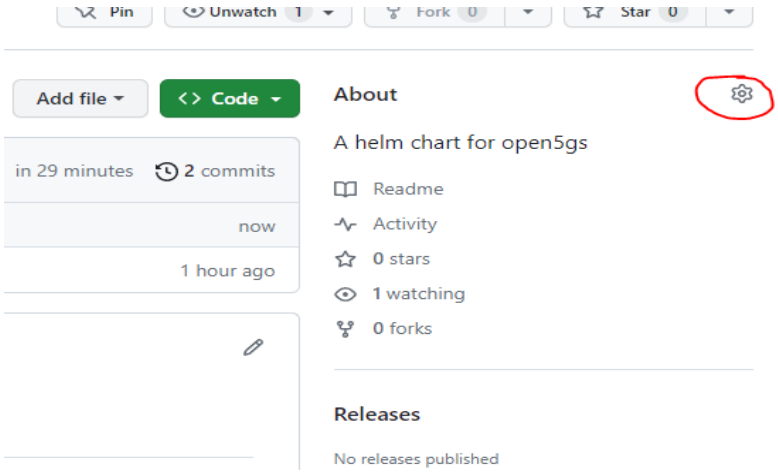
   # git add -A

   # git commit -m “First commit”

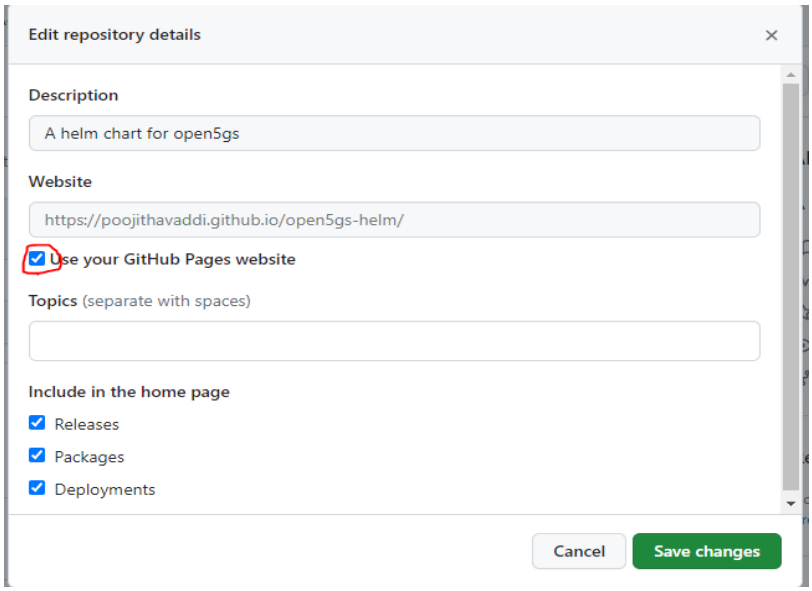
   # git push --set-upstream origin gh-pages

10. Create a personal github website:

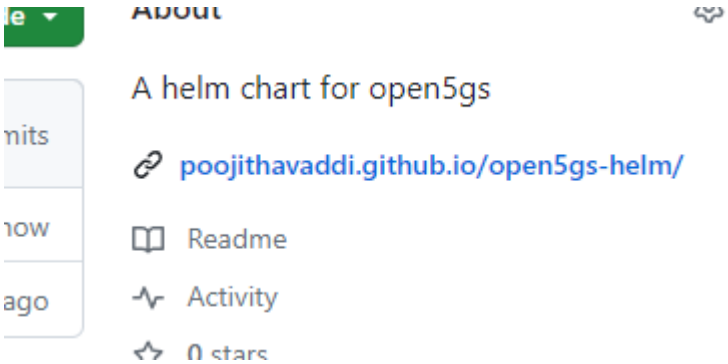
    Open your git repository. Switch branch to “gh-pages”. Click on the settings icon:



11. Select the checkbox and save the changes



12. It will create a link as shown



13. Generate index.yaml file

    # helm repo index 5g-helm-chart/ --url=<your_git_repo_url>

14. Push the changes to github

    # git add -A

    # git commit -m “Added index.yaml file”

    # git push

15. Access the repo URL and add “*/5g-helm-chart/index.yaml”* at the end of the URL. index.yaml file should be accessible as shown below.

    <git_repo_url> /5g-helm-chart/index.yaml

Step-2: Prepare the OCP setup to deploy Open5Gs from OSM

Note: Kindly do the following steps in the installer node of OCP

1. Create a namespace. It should match with the namespace mentioned in Step 1.6

   # oc new-project <project-name>

2. Add security context constraints to the project

   # oc adm policy add-scc-to-user anyuid -z default

   # oc adm policy add-scc-to-user hostaccess -z default

   # oc adm policy add-scc-to-user hostmount-anyuid -z default

   # oc adm policy add-scc-to-user privileged -z default

3. Create a StorageClass. Create the file below.

$ vi storage-class.yaml

```
apiVersion: storage.k8s.io/v1

kind: StorageClass

metadata:

  name: openebs-hostpath

  managedFields:

    - manager: Mozilla

      operation: Update

      apiVersion: storage.k8s.io/v1

      fieldsType: FieldsV1

      fieldsV1:

        'f:provisioner': {}

        'f:reclaimPolicy': {}

        'f:volumeBindingMode': {}

provisioner: openebs.io/local

reclaimPolicy: Delete

volumeBindingMode: Immediate
```

$ oc create -f storage-class.yaml

Verify if the storage class is created

```
[root@ocp412-manager ocp]# oc get storageclass
NAME               PROVISIONER        RECLAIMPOLICY   VOLUMEBINDINGMODE   ALLOWVOLUMEEXPANSION   AGE
openebs-hostpath   openebs.io/local   Delete          Immediate           false                  40d
[root@ocp412-manager ocp]#
```

Step-3: Deploy the chart from OSM

1. Install OSM

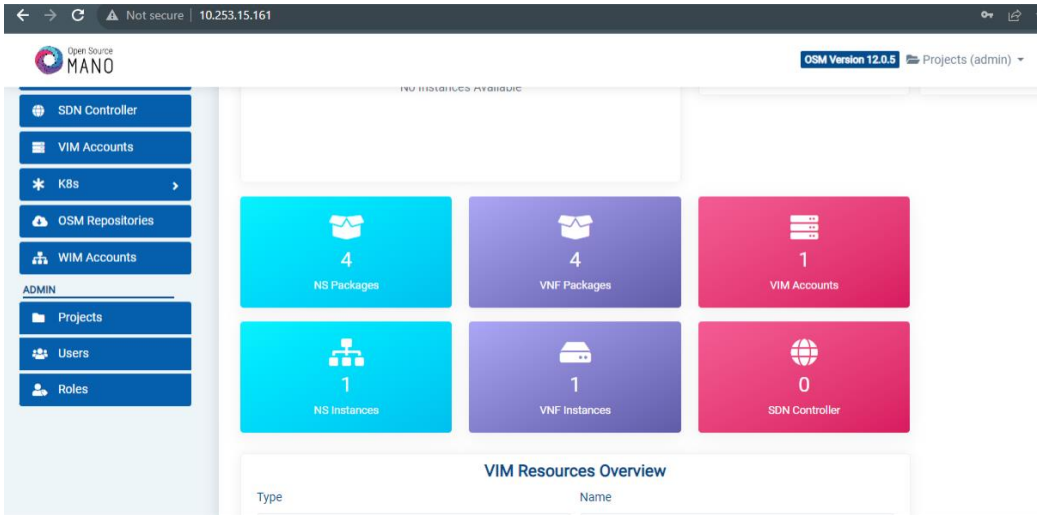
Run these commands to install OSM

```
$ wget https://osm-download.etsi.org/ftp/osm-12.0-twelve/install_osm.sh
$ chmod +x install_osm.sh
$ ./install_osm.sh
```

Access the OSM Dashboard using the IP address of the VM where OSM is installed.

Username: admin

Password: admin



2. Create a dummy VIM account

   $ osm vim-create --name mylocation1 --user u --password p --tenant p --account_type dummy --auth_url http://localhost/dummy

3. Add the OCP cluster to OSM
   a. Get the kubeconfig file of OCP cluster. It will be in the path *"install_dir/auth/kubeconfig"* of OCP's installer node.
   b. Create a new directory "cluster" and copy the kubeconfig file into it.

      $ mkdir cluster

      $ cp kubeconfig cluster/

   c. In the /etc/hosts file of lcm pod, add the api entry

      $ kubectl exec -it -n osm <lcm_pod> – bash

      $ vi /etc/hosts

Add the entry below in hosts file:

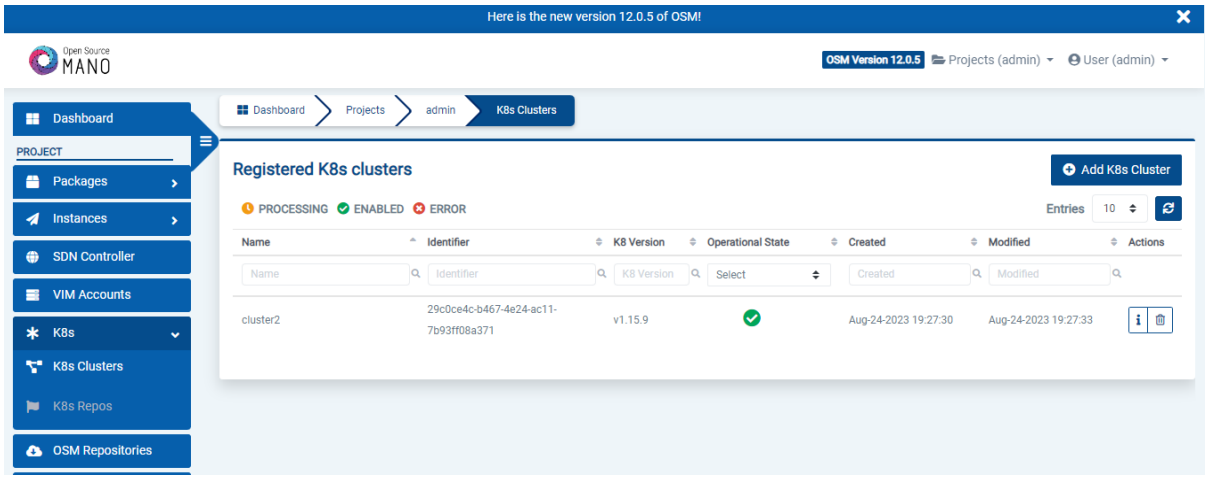
<k8s_API_IP_Address> api.<cluster_name>.<cluster_domain_name>

Example:

```
root@lcm-7c577f55db-s6dbj:/app/LCM# cat /etc/hosts
# Kubernetes-managed hosts file.
127.0.0.1       localhost
::1     localhost ip6-localhost ip6-loopback
fe00::0 ip6-localnet
fe00::0 ip6-mcastprefix
fe00::1 ip6-allnodes
fe00::2 ip6-allrouters
10.244.0.228    lcm-7c577f55db-s6dbj
10.253.17.42 api.ocp4.single.local
```

4. Run the command below to add the cluster to OSM

$ osm k8scluster-add cluster-new78 --creds cluster/kubeconfig --vim mylocation1 --k8s-nets '{k8s_net1: mgmtnet}' --version "v1.15.9" --description="Isolated K8s cluster in mylocation1"



5. Create KNFDs and NSD

Download KNFD and NSD packages from the OSM official website. A link is provided in the references section. Do the changes in both the yaml file according to your helm chart name.

For adding KNFD, create yaml file and run the below command:

----Knfd.yaml-----

```
vnfd:
   description: KNF with KDU using a helm-chart for Facebook magma orc8r
   df:
   -  id: default-df
   ext-cpd:
   -  id: mgmt-ext
      k8s-cluster-net: mgmtnet
   id: knf_nssf_oct_09
   k8s-cluster:
      nets:
      -  id: mgmtnet


   kdu:
   -  helm-chart: test-repo/open5gs-5gcore-helm
      name: open5gs-5gcore-helm

   mgmt-cp: mgmt-ext
   product-name: knf_nssf_oct_09
   version: '1.0'
```

$ **osm nfpkg-create knfd.yaml**

For adding NSD, create yaml file and run the below command:

-----nsd.yaml------

```
nsd:
  nsd:
  - description: NS consisting of a KNF fb_magma_knf connected to mgmt network
    df:
    - id: default-df
      vnf-profile:
      - id: open5gs-5gcore-helm
        virtual-link-connectivity:
        - constituent-cpd-id:
          - constituent-base-element-id: open5gs-5gcore-helm
            constituent-cpd-id: mgmt-ext
          virtual-link-profile-id: mgmtnet
        vnfd-id: knf_nssf_oct_09
    id: knf_nssf_oct_09
    name: knf_nssf_oct_09
    version: '1.0'
    virtual-link-desc:
    - id: mgmtnet
      mgmt-network: true
      vim-network-name: mgmt
    vnfd-id:
    - knf_nssf_oct_09
```

$ osm nspkg-create nsd.yaml

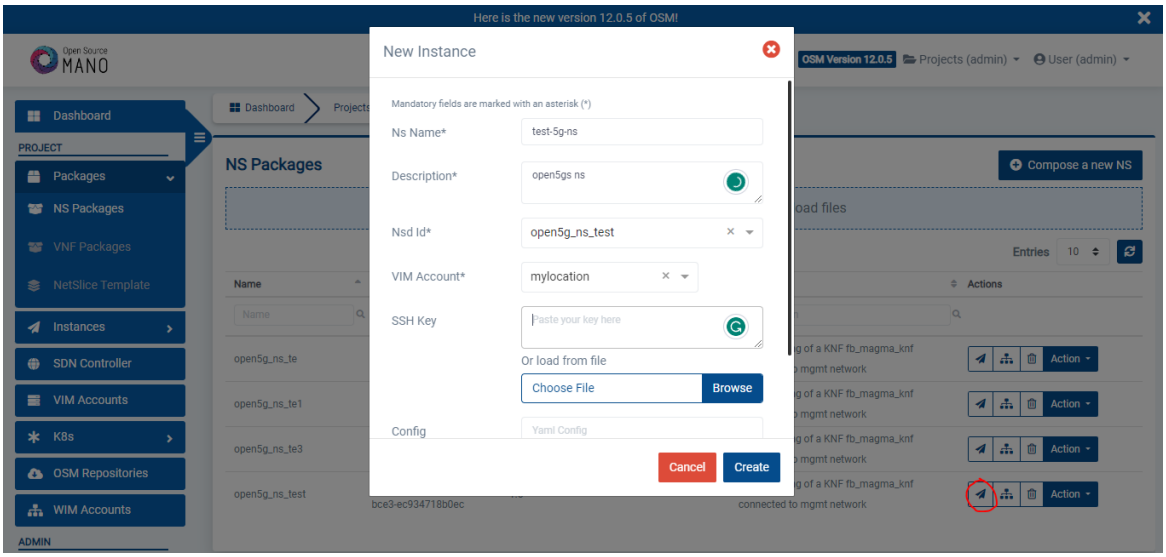
6. Add the helm chart

Add the helm chart to OSM by running the below command:

$ osm repo-add --type helm-chart --description "openshift helm Chart" system <your-git-repo-link-for-the-helm-chart>

7. For deploying open5Gs from OSM, instantiate the NSD which was referring to your KNFD

   From the OSM Dashboard, click on Packages -> NS Packages -> Click on instantiate NS icon against the preferred NS package -> Fill in the details and save.



8. Verify if the helm chart is deployed in the OpenShift cluster. Check if the pods are created in the namespace (namespace you have given in step 1.6).
9. If u get crashloop back off error for the pods in openshift cluster give permissions to the project where helm has been deployed as mentioned in step2.
10. If still few pods are in crashloop back off error after giving permission, check logs of respective pod it will be requesting for network attachment definition , apply below yaml file.

    apiVersion: k8s.cni.cncf.io/v1

    kind: NetworkAttachmentDefinition

    metadata:

     name: testuserplane2

     namespace: 1819b9d6-5381-45a6-bf4a-75c98e8c5a2a

```
spec:
  config: '{ "cniVersion": "0.3.1", "name": "testuplane", "type": "ipvlan", "master":
"ens3", "mode": "l2", "ipam": {"type": "static","addresses": [{"address":
"10.253.17.21/16"}] } }'
```

11.The helm chart can be deleted from OCP by deleting the above instantiated NS from OSM.

References:

https://osm.etsi.org/docs/user-guide/v12/03-installing-osm.html

https://www.learnhowtoprogram.com/introduction-to-programming/git-html-and-css/github-pages

Reference for Issues:

1.For permissions denied error while editing the etc/hosts file inside the LCM container we need to give below changes in lcm deployment : (edit the deployment of lcm)

```
securityContext:
   runAsUser: 0
```

2. While pushing the file to github, if we face any error in commiting the files do below changes (enter ur github account details)

```
git config --global user.email "abhilashasuresh@gmail.com"
git config --global user.name "Abhilasha"
git commit -am "commit changes"
```