- Installing K3s and Rancher

Introduction:

This tutorial will help you deploy K3s and Rancher. In this tutorial, we are using KVM, but any VM or other kind of computer will work as long it meets the minimum requirements.

While you can install K3s on a small computer like a Raspberry Pi, we do not suggest using one for this tutorial because Rancher is not yet ready for ARM based computers.

If you are new to virtual machines and need a little help installing VirtualBox, you can use this tutorial from WikiHow: **https://www.wikihow.com/Install-VirtualBox**.

Requirements for the Tutorial:

- VirtualBox VM or another VM or even your laptop or another computer Operating System: OpenSUSE Leap 15.3
- RAM: 1GB Minimum
- CPU: 2 CPU cores Minimum
- Disk: 40GB. Any filesystem can be used, but no swap.
- Network: Firewall should be disabled

Installing Kubernetes with K3s

Task 1: Prepare OpenSUSE for Kubernetes

The first thing that's needed is to make sure that your VM has the software needed to interact with Kubernetes. You will need to install Helm and Kubectl. Helm is like a package manager for Kubernetes. Kubectl is the application that is most used to communicate with a Kubernetes cluster.

1. Download kubectl and helm:

   ```
   sudo zypper ref
   sudo zypper -n in kubernetes1.20-client
   sudo zypper -n in helm
   ```

   The kubectl and helm packages should now be installed

2. Confirm that they are installed:

   ```
   helm version
   kubectl version
   ```

   You should see confirmation that they are installed and what versions they are running

Task 2: Install K3s

1. K3s is SUSE's minimal Kubernetes distribution. It is very easy to install. In a your terminal, run the following command:

   ```
   curl -sfL https://get.k3s.io | sudo sh -
   ```

   Kubernetes is now installed, but it is only available to root users. Since it isn't a good idea for everything to run as root in Linux, it's a good idea to make it available to a normal user

2. In your terminal run the following commands to copy the file that Kubernetes needs to talk to your new Kubernetes cluster to your home directory:

   ```
   mkdir -v ~/.kube
   ```

   This will make a new directory for your Kubernetes configuration.

3. Copy the configuration file to the new directory:

   ```
   sudo cp -v /etc/rancher/k3s/k3s.yaml ~/.kube/config
   ```

4. Make the file readable to normal users:

   ```
   sudo chown tux ~/.kube/config
   ```

   Here I am using my user "tux" in this command. Replace "tux" with the user that you are using. If you're not user about which user that you are using, run: `whoami`.

5. Test your new Kubernetes cluster!

   ```
   kubectl get nodes
   ```

   You should see a single new node that is ready to be used

You now have a real working Kubernetes cluster. There are hundreds of websites books, articles, etc. on working with Kubernetes. Setting up a new cluster isn't difficult but learning everything that you it can do for you can taken forever. However the first step is to set up your first cluster and begin exploying.

Because K3s is running in containers, your cluster can be deleted and recreated just as easy. Run `sudo k3s-uninstall.sh` any time you want to start over with a fresh cluster.

Installing Rancher

Once Kubernetes is up and running the next step is to have an easy way to work with it, install new applications, and expand what it can do for you. Rancher is SUSE's tool to provide this added functionality.

Rancher requires a dependency called Cert-Manager that must to be installed before Rancher. Neither are very difficult and Rancher can be ready to go in just a few minutes.

Task 3: Deploy Cert-Manager

1. In your terminal, enter the following commands to install the **CustomResourceDefinition** resources. This is a prerequisite for cert-manager and it will pre-configure Kubernetes to be able to use it.

   ```
   kubectl apply --validate=false -f \
     https://github.com/jetstack/cert-manager/releases/download/v1.0.4/
   cert-manager.crds.yaml
   ```

2. Create a namespace for cert-manager: A namespace is a little like a folder in Kubernetes.

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

3. Like packages in Linux, Helm charts are kept in repositories. In order for a repositoruy to be used by Helm, it must first be added. Add the **Jetstack** and **Rancher** Helm repositories here:

   ```
   helm repo add jetstack https://charts.jetstack.io
   helm repo add rancher-latest \
   https://releases.rancher.com/server-charts/latest
   ```

4. Refresh the helm repository:

   ```
   helm repo update
   ```

   You should see a series of messages like this:

   ```
   ...Successfully got an update from the "jetstack" chart repository
   ...Successfully got an update from the "rancher-latest" chart
   repository
   Update Complete. Happy Helming!
   ```

5. A helm chart is like a package in Linux. It contains everything needed to install an application into Kubernetes and then downloads the container image from an online repository. Install the Helm chart for cert-manager with the following command:

   ```
   helm install \
   ```

```
  cert-manager jetstack/cert-manager \
  --namespace cert-manager \
  --version v1.0.4
```

6. Confirm that the chart is installed:

   ```
   helm -n cert-manager list
   ```

   You should see cert-manager in a **deployed** status.

7. Check the status of cert-manager in Kubernetes:

   ```
   kubectl -n cert-manager get deployments
   ```

   This can take 2-3 minutes to finished. Run the command a few times until everything is finished. You should finally see 3 deployments that are ready and available:

   cert-manager
   cert-manager-cainjector
   cert-manager-webhook

Task 4: Deploy Rancher

1. Now that cert-manager is running, create a new namespace for Rancher:

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

2. In order to Rancher to work, you need to set a hostname for it. An easy way to go is to just use the IP address of the computer that you are on followed by **.nip.io**. You can install Rancher using its helm chart using the correct address:

   ```
   helm install rancher rancher-latest/rancher \
     --namespace cattle-system \
     --set hostname=172.99.1.10.nip.io
   ```

3. Check on the Rancher rollout status:

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

   The rollout command will automatically update when all replicas are available.

Task 5: Create Initial Account:

1. Open a web browser, then go to the Rancher hostname from the previous command:

   ```
   https://172.99.1.10.nip.io
   ```

   Ignore security risk, if necessary since we are using self-signed certificates.

2. The introductory screen will have a few options:

Set your password.
Click on: **I want to create or manage multiple clusters**
Click on: **I agree to the Terms and Conditions for using Rancher**
Click on: **Continue**:

3. The Rancher Server URL will be the hostname that you used to get here.
4. Click on **Save URL**:
5. Click **Close**:

   You should now be logged into Rancher.

Have a lot of fun!