With Rancher's virtualization management capabilities, you can import and manage multiple Harvester clusters. It provides a solution that unifies virtualization and container management from a single pane of glass.

Additionally, Harvester leverages Rancher's existing capabilities, such as authentication and RBAC control, to provide full multi-tenancy support.

Please refer to the Harvester & Rancher Support Matrix to find a desired Rancher version. You can use one of the following guides to deploy and provision Rancher and a Kubernetes cluster with the provider of your choice:

- AWS (uses Terraform)
- AWS Marketplace (uses Amazon EKS)
- Azure (uses Terraform)
- DigitalOcean (uses Terraform)
- GCP (uses Terraform)
- Hetzner Cloud (uses Terraform)
- Vagrant
- Equinix Metal
- Outscale (uses Terraform)
- Manual Install

Importing Harvester cluster

1. Check and prepare the container image.

   To facilitate the importing task, a new pod named `cattle-cluster-agent-***` will be created on the Harvester cluster. The container image used for this pod depends on the version of your Rancher server (for example, the image `rancher/rancher-agent:v2.7.9` is used if you are running Rancher v2.7.9). Moreover, this dynamic image is not packed into the Harvester ISO and is instead pulled from the repository during importing.

   If your Harvester cluster is not directly accessible from the internet, perform one of the following actions:

   - Configure a private registry for the cluster and add the image. Harvester will automatically pull the image from this registry.
   - If you configured an HTTP proxy for accessing external services, verify that it is working as expected. The DNS servers that you specified in the Harvester configuration should be able to resolve the domain name `docker.io`.
   - Download the image using the command `docker pull rancher/rancher-agent:v2.7.9 && docker save -o rancher-agent.tar rancher/rancher-agent:v2.7.9`. Next, create a copy of the downloaded image in each cluster node, and then import the image to containerd using the command `sudo -i ctr --namespace k8s.io image import rancher-agent.tar`. Finally, run `sudo -i crictl image ls | grep "rancher-agent"` on each node to ensure that the image is ready.

2. Once the Rancher server is up and running, log in and click the hamburger menu and choose the **Virtualization Management** tab. Select **Import Existing** to import the downstream Harvester cluster into the Rancher server.

3. Specify the `Cluster Name` and click **Create**. You will then see the registration guide; please open the dashboard of the target Harvester cluster and follow the guide accordingly.
4. Once the agent node is ready, you should be able to view and access the imported Harvester cluster from the Rancher server and manage your VMs accordingly.

Whenever the agent node becomes stuck, run the command `kubectl get pod cattle-cluster-agent-*** -n cattle-system -oyaml` on the Harvester cluster. If the following message is displayed, check the information in step 1, kill this pod and then a new pod will be created automatically to restart the importing process.

```
...
state:
  waiting:
    message: Back-off pulling image "rancher/rancher-agent:v2.7.9"
    reason: ImagePullBackOff
...
```

1. From the Harvester UI, you can click the hamburger menu to navigate back to the Rancher multi-cluster management page.
1. In the Rancher Kubernetes cluster, create a new `Cluster` resource.

Example:

```
apiVersion: provisioning.cattle.io/v1
kind: Cluster
metadata:
  name: harvester-cluster-name
  namespace: fleet-default
  labels:
    provider.cattle.io: harvester
  annotations:
    field.cattle.io/description: Human readable cluster description
spec:
  agentEnvVars: []
```

1. Once the status of the `Cluster` resource is updated, obtain the cluster ID (format: `c-m-foobar`) from the `.status.clusterName` property.
2. Create a `ClusterRegistrationToken` using the cluster ID in the namespace with the same name as the cluster ID. You must specify the cluster ID in the token's `.spec.clusterName` field.

Example:

```
apiVersion: management.cattle.io/v3
kind: ClusterRegistrationToken
metadata:
  name: default-token
  namespace: c-m-foobar
```

```
spec:
  clusterName: c-m-foobar
```

1. Once the status of the `ClusterRegistrationToken` is updated, obtain the value of the token's `.status.manifestUrl` property.
2. In the Harvester cluster, patch the setting `cluster-registration-url` and specify the URL obtained from the cluster registration token's `.status.manifestUrl` property in the `value` field.

Example:

```
apiVersion: harvesterhci.io/v1beta1
kind: Setting
metadata:
  name: cluster-registration-url
value: https://rancher.example.com/v3/import/abcdefghijkl1234567890-c-m-foobar.yaml
```

Troubleshooting

See Importing of Harvester Clusters into Rancher.

Multi-Tenancy

In Harvester, we have leveraged the existing Rancher RBAC authorization such that users can view and manage a set of resources based on their cluster and project role permissions.

Within Rancher, each person authenticates as a user, which is a login that grants a user access to Rancher. As mentioned in Authentication, users can either be local or external.

Once the user logs into Rancher, their authorization, also known as access rights, is determined by global permissions and cluster and project roles.

- **Global Permissions**:
  - Define user authorization outside the scope of any particular cluster.
- **Cluster and Project Roles**:
  - Define user authorization inside the specific cluster or project where users are assigned the role.

Both global permissions and cluster and project roles are implemented on top of Kubernetes RBAC. Therefore, enforcement of permissions and roles is performed by Kubernetes.

- A cluster owner has full control over the cluster and all resources inside it, e.g., hosts, VMs, volumes, images, networks, backups, and settings.
- A project user can be assigned to a specific project with permission to manage the resources inside the project.

:::info important

Managing user access using the built-in role templates and project-scoped RBAC is strongly recommended.

Harvester implements its own RBAC model on top of Kubernetes and KubeVirt, integrating with Rancher-style Projects and multi-tenancy logic. During upgrades or reconfiguration, custom `RoleBindings`

referencing only `kubevirt.io` roles may be lost, reset, or become inconsistent with Harvester's internal state.

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Multi-Tenancy Example

The following example provides a good explanation of how the multi-tenant feature works:

1. First, add new users via the Rancher `Users & Authentication` page. Then click `Create` to add two new separated users, such as `project-owner` and `project-readonly` respectively.
   - A `project-owner` is a user with permission to manage a list of resources of a particular project, e.g., the default project.
   - A `project-readonly` is a user with read-only permission of a particular project, e.g., the default project.
2. Click one of the imported Harvester clusters after navigating to the Harvester UI.
   - Click the `Projects/Namespaces` tab.
   - Select a project such as `default` and click the `Edit Config` menu to assign the users to this project with appropriate permissions. For example, the `project-owner` user will be assigned the project owner role.
3. Continue to add the `project-readonly` user to the same project with read-only permissions and click **Save**.
4. Open an incognito browser and log in as `project-owner` .
5. After logging in as the `project-owner` user, click the **Virtualization Management** tab. There you should be able to view the cluster and project to which you have been assigned.
6. Click the **Images** tab to view a list of images previously uploaded to the `harvester-public` namespace. You can also upload your own image if needed.
7. Create a VM with one of the images that you have uploaded.
8. Log in with another user, e.g., `project-readonly` , and this user will only have the read permission of the assigned project.

:::note

The `harvester-public` namespace is a predefined namespace accessible to all users assigned to this cluster.

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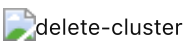
Delete Imported Harvester Cluster

Users can delete the imported Harvester cluster from the Rancher UI via **Virtualization Management > Harvester Clusters**. Select the cluster you want to remove and click the **Delete** button to delete the imported Harvester cluster.

You will also need to reset the `cluster-registration-url` setting on the associated Harvester cluster to clean up the Rancher cluster agent.



:::caution

Please do not run the `kubectl delete -f ...` command to delete the imported Harvester cluster as it will remove the entire `cattle-system` namespace which is required of the Harvester cluster.

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