Adding a new node to the Flow Enterprise cluster

If needed, add additional nodes to your cluster. This is usually done during the initial installation of Flow, or during an upgrade. If you need additional CPU or memory after installation, you can add additional nodes then.

**Important:** Flow Enterprise server 2021.1.1 and 2021.3.1 required a raw block device for the primary node and all worker nodes, in addition to existing storage requirements. Upgrades did not have this requirement. Beginning with 2022.1.1, all installations are required to have a raw block device on each node. This cannot be overridden. Read more about Flow Enterprise Server 2022.1.1 system requirements.

**Note:** Some of the commands below need to run as `sudo` or non-`sudo`, depending on the flags you’re using.

In this article

- Adding additional device filters for the worker node
- Joining a node with a raw block device

Adding additional device filters for the worker node

All nodes in the cluster should use the same operating system, Kernel version, and storage types for consistency. It is possible that the raw device name varies from primary to worker nodes. If so, update the Ceph cluster on the primary node to add the additional device filters for the worker nodes. This must happen before running the join command on the worker node.

**Note:** Filters must be compatible with golang regular expressions.

In this example, the primary node has a device filter of `'^xvd[b-f]'` but the worker node being added has a raw device of type `'^nvme[1-9]n1'`. To make sure Ceph uses the worker node storage correctly, update the primary node with the command `./flow-tools join -f '^nvme[1-9]n1'`.

Every platform and operating system may have variations of device names. Learn more about device names for instances running on Amazon Web services.
Below is an example output from the command.

```
[root@master bin]$ ./flow-tools join -f '^nvme[1-9]n1'

[INFO] Current ceph device filters are: xvdf

[INFO] Updated device filter for the cluster will be: xvdf|^nvme[1-9]n1

Warning: Updating Ceph filters for the cluster. Continue (Yy|Nn)? y

[INFO] Updating new filter to xvdf|^nvme[1-9]n1

cephcluster.ceph.rook.io/rook-ceph configured

[INFO] Ceph Filter updated to rook-ceph CRD: xvdf|^nvme[1-9]n1

[INFO] Restarting Ceph Operator

[INFO] Ceph Operator Pod = rook-ceph-operator-9c7456b5b-8gdrz

pod "rook-ceph-operator-9c7456b5b-8gdrz" deleted
```

Joining a node with a raw block device

**Note:** Join tokens and credentials expire after 24 hours. Generate a new token by using the `join` command again as required.

On the primary node, run `sudo ./flow-tools join -g`.

Copy the join command output. You may need to add additional flags to this command to reflect your proxy setup or other configurations. Use the `--help` option to see all available flags.

```
[root@host.domain bin]$ sudo ./flow-tools join -g

[INFO] Existing kots/containerd based Flow install detected

[INFO] Existing ceph disk found: /dev/xvdb

Kubernetes connection credentials for worker node. Expires in 24 hours

Kubernetes Connection String: kubernetes-master-address=192.168.1.40:6443 kubeadm-token=xthyba.hc61xn6c3gj959jo kubeadm-token-ca-
```
You may add additional command line options to the `flow-tools join` command.

Run `./flow-tools join --help` for all available flags and options like `[ -a|-f|-k|-n|--proxy ]` etc.

Default non-airgapped join command with ceph raw disks for this cluster is below, change device filter as needed:

For example: Red Hat, filters could be like `xvd[b-z]`, for amazon ami with nvme, `nvme[1-9]n`:

```
sudo ./flow-tools join kubernetes-master-address=192.168.1.40:6443 kubeadm-token=xthyba.hu61xn6c3gj959jo kubeadm-token-ca-hash=sha256:6edcbe66899406c173736e4e6e508da94220669a7c422f9bd9f0cfa84a8eaed5b kubernetes-version=1.19.7 docker-registry-ip=10.96.0.49
```

Default air-gapped node join command for this cluster is below:

```
sudo ./flow-tools join -a kubernetes-master-address=192.168.1.40:6443 kubeadm-token=xthyba.hu61xn6c3gj959jo kubeadm-token-ca-hash=sha256:6edcbe66899406c173736e4e6e508da94220669a7c422f9bd9f0cfa84a8eaed5b kubernetes-version=1.19.7 docker-registry-ip=10.96.0.49
```

Next, log in to the worker node(s) you’re adding to the cluster. Copy the `flow-enterprise-tools` package of the same version on the primary node to the worker node. Extract the file. Change the directory to the `bin` folder such as `./flow-enterprise-tools/bin`.

Run the join command output you copied above in the location where you installed `flow-enterprise-tools`. Change the raw disk volume name according to your Linux distribution.

```
$ cd ./flow-enterprise-tools/bin

$ sudo ./flow-tools join kubernetes-master-address=192.168.1.40:6443 kubeadm-token=xthyba.hu61xn6c3gj959jo kubeadm-token-ca-hash=sha256:6edcbe66899406c173736e4e6e508da94220669a7c422f9bd9f0cfa84a8eaed5b kubernetes-version=1.19.7 docker-registry-ip=10.96.0.49
```

```
[INFO] Verifying installation environment...
[INFO] HTTP command (curl): OK
[INFO] Archive command (tar): OK
[INFO] Swarm does not exist: OK
[INFO] Verifying system requirements...
[INFO] Checking networking...
```
INFO] sysctl command: OK

INFO] IPV6 Kernel module: LOADED

INFO] IPV6 Check: OK

INFO] IPv4 Forwarding: ENABLED

INFO] Check IPTable Rules: OK

INFO] Detecting proxy: NOT DETECTED

INFO] https://replicated.app site check: OK

INFO] Checking hardware...

INFO] CPU: OK

INFO] Memory: OK

INFO] Space check in /var/lib/docker: OK

INFO] Space check in /var/lib/kubelet: OK

INFO] Space check in /opt/replicated: OK

INFO] Space for Repo cache in /opt/flow: 499 GB

INFO] Disk Space Check: OK

INFO] Non SSD Disks: NOT DETECTED

INFO] Checking filesystem and permissions...

INFO] Login restrictions check: OK

INFO] Selinux Status: enabled

INFO] Selinux Current mode: permissive

[kubelet-start] Writing kubelet configuration to file "/var/lib/kubelet/config.yaml"

[kubelet-start] Writing kubelet environment file with flags to file "/var/lib/kubelet/kubeadm-flags.env"

[kubelet-start] Starting the kubelet

[kubelet-start] Waiting for the kubelet to perform the TLS Bootstrap...
This node has joined the cluster:

* Certificate signing request was sent to apiserver and a response was received.

* The Kubelet was informed of the new secure connection details.

Run `kubectl get nodes` on the control-plane to see this node join the cluster.

 nodo joined successfully

Installation

Complete ✔

[INFO] Additional configuration steps:

[INFO] Please run the following command on the primary node to set the proper labels for the Flow app:

  kubectl label nodes worker- --selector='node-role.kubernetes.io/master'

  kubectl label nodes worker= --selector='!node-role.kubernetes.io/master'

On the primary node, confirm the node was successfully joined by running  kubectl get nodes.

$  kubectl get nodes

[root@master ~]$ kubectl get nodes

<table>
<thead>
<tr>
<th>NAME</th>
<th>STATUS</th>
<th>ROLES</th>
<th>AGE</th>
<th>VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>master.domain.com</td>
<td>Ready</td>
<td>master</td>
<td>6d1h</td>
<td>v1.19.7</td>
</tr>
<tr>
<td>worker.domain.com</td>
<td>Ready</td>
<td>&lt;none&gt;</td>
<td>5d20h</td>
<td>v1.19.7</td>
</tr>
</tbody>
</table>

Restart the rook-ceph operator on the primary node using ./flow-tools join -r.

[root@master.domain.com bin]$ ./flow-tools join -r

[INFO] Deleting Ceph prepare pod jobs

pod "rook-ceph-osd-prepare-master.domain-opr7q1f" deleted

[INFO] Restarting Ceph Operator

[INFO] Ceph Operator Pod = rook-ceph-operator-9c7456b5b-f7hct

pod "rook-ceph-operator-9c7456b5b-f7hct" deleted

Checking OSD prepare jobs to complete..................OSD prepare completed
[INFO] Waiting on OSD to be configured on new node.

done

Confirm a new OSD storage node (external site, opens in new tab) was added to the Ceph cluster by running `kubectl -n rook-ceph get pods` on the primary node.

```
[root@master ~]$ kubectl -n rook-ceph get pods

NAME                                                              READY   STATUS      RESTARTS   AGE
rook-ceph-agent-b4nd6                                             1/1     Running     0          25m
rook-ceph-agent-n4zcn                                             1/1     Running     0          43h
rook-ceph-mgr-a-b594f79bf-wqfzr                                   1/1     Running     0          43h
rook-ceph-mon-a-848b69b66d-249dc                                  1/1     Running     0          43h
rook-ceph-operator-9c7456b5b-v2xqr                                1/1     Running     0          7m35s
rook-ceph-osd-0-66d47fb645-qsk52                                  1/1     Running     0          42h
rook-ceph-osd-1-54cd7fcca-cf8tb                                   1/1     Running     0          23m
rook-ceph-osd-prepare-master.domain-opzdtlv                       0/2     Completed   0          6m39s
rook-ceph-osd-prepare-worker.domain-skpgj                         0/2     Completed   0          6m37s
rook-ceph-rgw-rook-ceph-store-a-867496989f-jmdmw                  1/1     Running     0          42h
rook-discover-7ntfs                                               1/1     Running     0          43h
rook-discover-k78vd                                               1/1     Running     0          25m
```

Label the node for the worker using the command at the end of the latest join command output.

```
$ kubectl label node worker.domain.com label worker=

$ kubectl label node master.domain.com label worker-
```

Check to make sure the nodes are labeled appropriately by running `kubectl get nodes --show-labels`.

```
[root@master ~]$ kubectl get nodes --show-labels

NAME                                        STATUS   ROLES    AGE     VERSION   LABELS
master.domain.com   Ready    master   6d1h    v1.19.7

beta.kubernetes.io/arch=amd64, beta.kubernetes.io/os=linux, gui=, kubernetes.io/arch=amd64,
kubernetes.io/hostname=master.domain.com, kubernetes.io/os=linux, kurl.sh/cluster=true, node-
```
role.kubernetes.io/master=

worker.domain.com    Ready    <none>   5d20h   v1.19.7

beta.kubernetes.io/arch=amd64, beta.kubernetes.io/os=linux, kubernetes.io/arch=amd64, kubernetes.io/hostname=worker.domain.com, kubernetes.io/os=linux, kurl.sh/cluster=true, worker=

If you need help, please email support@pluralsight.com for 24/7 assistance.