

Bright Cluster Manager 8.0

Mesos Deployment Manual

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1

Mesos Introduction

1.1 Concepts

Mesos is a resource manager. A *Mesos cluster* consists of *master nodes* that manage *agent nodes*¹, and *Mesos frameworks* that run *tasks* on the agent nodes.

Mesos tasks can be run inside Docker containers.

Marathon is an orchestration framework for running tasks. Marathon is installed on Mesos agent nodes.

The Mesos-DNS is a DNS server for Mesos nodes and tasks. The Mesos-DNS is installed typically on the Bright Cluster Manager head node.

The Mesos Proxy is a server that proxies Mesos HTTP requests to the agent nodes via the Mesos master nodes. The Mesos Proxy itself is normally installed on Mesos master nodes.

1.2 Installation Notes

An odd number of master nodes must be used. Running with one master is possible, but in that case there is no high availability (HA).

The tasks are run on Mesos agent nodes, so the administrator should ensure that there are enough of these, and that they are powerful enough to suit the requirements.

After the installation process is completed, links to the Mesos and Marathon web interfaces become available via Bright View. Bright View is a GUI front end that runs from any modern web browser, and connects to a special webservice served from the cluster, typically at a URL of the form:

```
https://<head node address>:8081/bright-view/
```

1.3 Installation Options

Mesos can be installed with the following options:

- Marathon framework
- Docker
- Mesos-DNS
- Mesos Proxy

¹As the Apache Mesos documentation at <http://mesos.apache.org/documentation/latest/architecture/> says: "keyword 'slave' is deprecated in favor of 'agent', driver-based frameworks will still receive offers with slave ID, whereas frameworks using the v1 HTTP API receive offers with agent ID)."

2

Deploy, Scale, And Uninstall With `cm-mesos-setup`

The Ncurses-based `cm-mesos-setup` utility in Bright Cluster Manager can carry out:

- Mesos deployment
- Mesos masters scaling
- Mesos uninstallation

This utility is a part of the `cluster-tools` package that comes with a Bright Cluster Manager. When carrying out a deployment, if the Mesos packages are not installed, then the utility installs them.

The `cm-mesos-setup` utility is run as root from the head node.

2.1 Mesos Script Main Menu

When `cm-mesos-setup` is run, the main menu is displayed (figure 2.1):

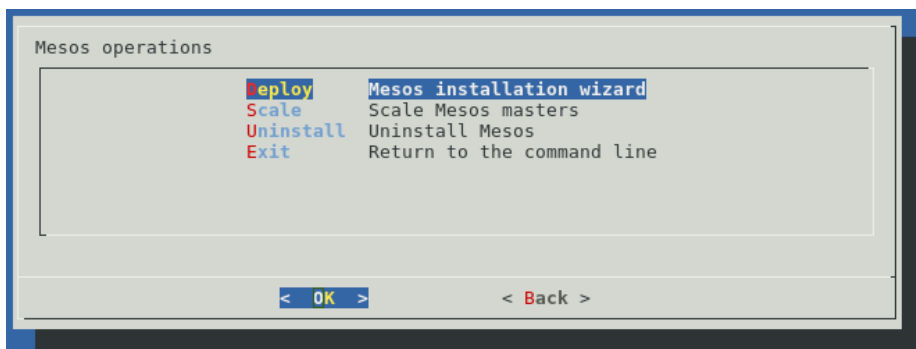


Figure 2.1: Mesos Script Main Menu

The main menu allows the administrator to:

- Deploy Mesos
- Scale Mesos masters
- Uninstall Mesos

2.2 Deployment Of Mesos

Choosing the `Deploy` option starts the deployment wizard (sections 2.2.1- 2.2.17).

2.2.1 Configuration Overlays

Names are requested for the Mesos configuration overlays (figure 2.2):

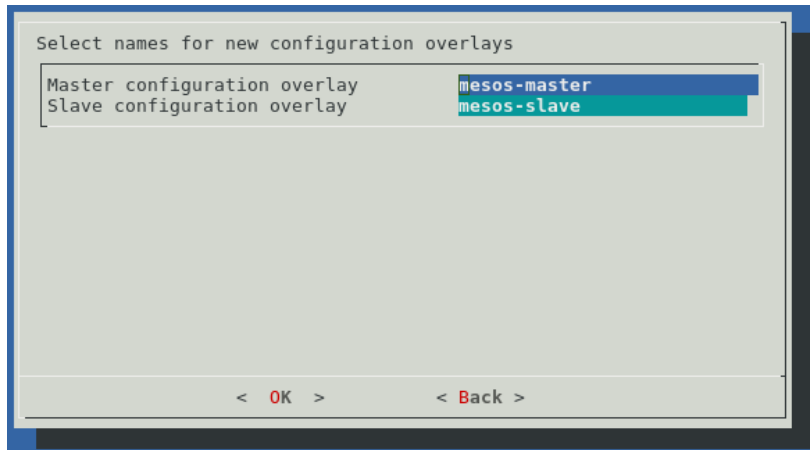


Figure 2.2: Configuration Overlays Creation

The configuration overlays are

- the Mesos master configuration overlay
- the Mesos agent configuration overlay

2.2.2 Mesos Master Nodes Selection

Nodes are then selected for the Mesos masters (figure 2.3):

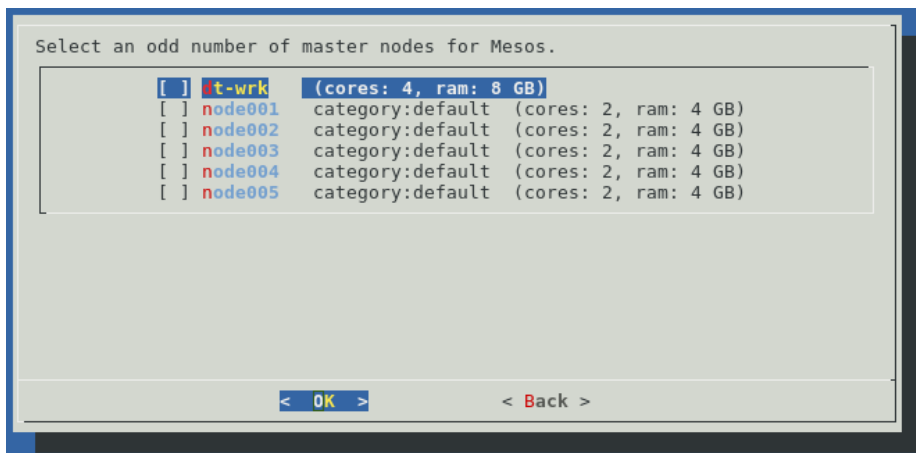


Figure 2.3: Mesos Master Nodes Selection

An odd number of nodes must be selected. If just one node is selected, then there is no high availability in the Mesos cluster.

All Mesos master nodes must be accessible from outside the Bright cluster in order to access the web management interfaces.

The Mesos Proxy (section 2.2.14), Mesos web interface (section 2.2.4), and Marathon web interface (section 2.2.10) ports are all opened on the head node automatically. If a firewall other than the Bright-managed Shorewall is used, then the ports must be opened manually.

2.2.3 Mesos Agent Nodes Selection

Nodes are then selected for the Mesos agents (figure 2.4):

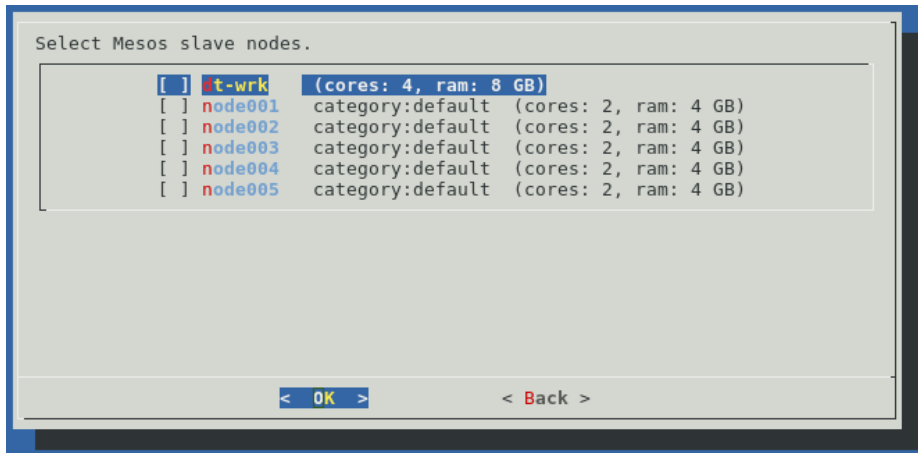


Figure 2.4: Mesos Agent Nodes Selection

For convenience, using Mesos Proxy (section 2.2.13) is strongly recommended.

If Mesos Proxy is not deployed, then the administrator must make sure that all Mesos agent nodes are accessible from outside the Bright cluster, in order to access the Mesos web management interface.

2.2.4 Mesos Cluster Configuration

Some Mesos cluster configuration parameters are then asked for (figure 2.5):

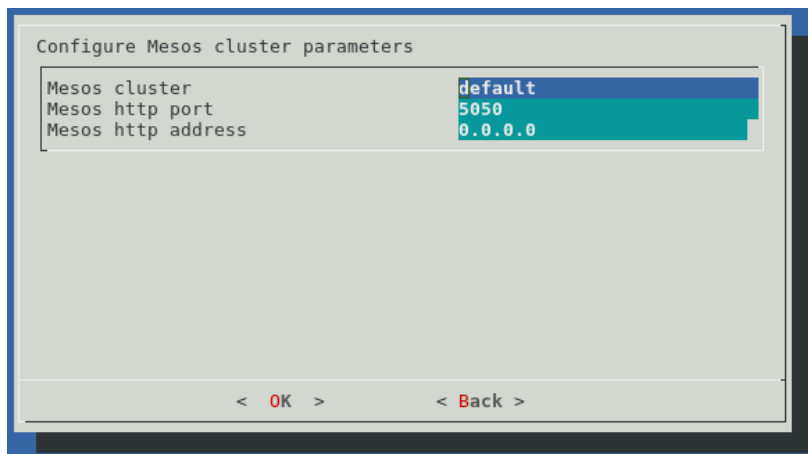


Figure 2.5: Mesos Cluster Configuration

The parameters are:

- The name of the Mesos cluster
- The HTTP(S) port for the Mesos web interface
- IP that the Mesos web server will listen on

If the Mesos Proxy (section 2.2.14) is deployed, then the Mesos web interface should be accessed from outside the cluster via its IP address.

2.2.5 Mesos Cluster Internal Network

An internal network should then be selected for the Mesos cluster (figure 2.6):

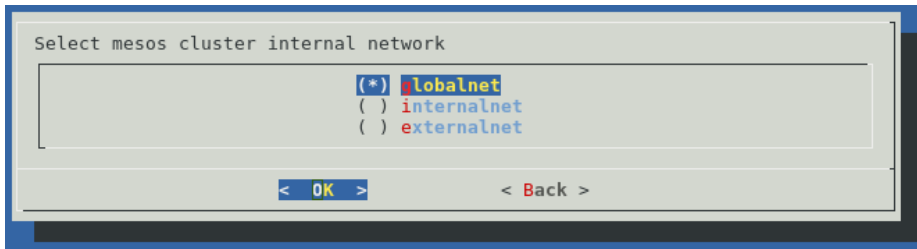


Figure 2.6: Mesos Cluster Internal Network

The Mesos cluster internal network is used for internal communications within the Mesos cluster.

2.2.6 ZooKeeper Cluster Deployment

If a ZooKeeper cluster already exists, then either the existing one can be used, or a new one can be created (figure 2.7):

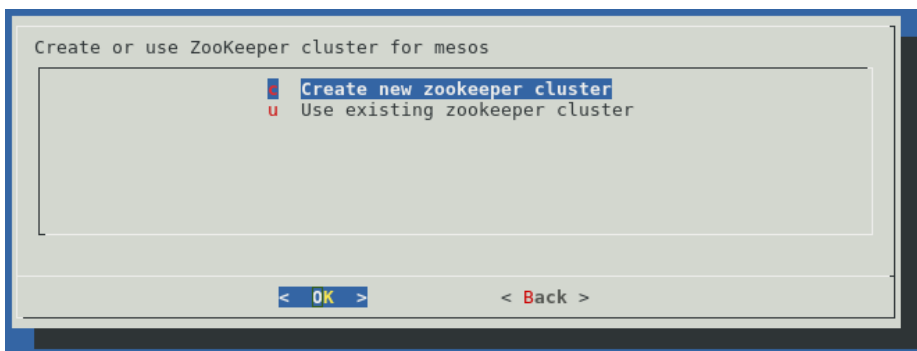


Figure 2.7: ZooKeeper Cluster Type Selection

2.2.7 ZooKeeper Cluster Selection

If using an existing ZooKeeper cluster, it should be selected (figure 2.8):

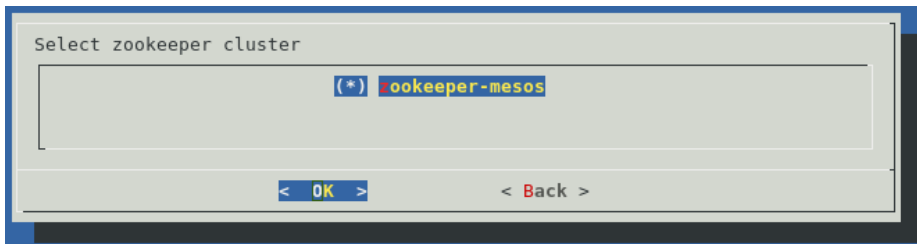


Figure 2.8: ZooKeeper Cluster Selection

2.2.8 ZooKeeper Cluster Configuration

If, instead, a new ZooKeeper cluster is created, or if there is no existing ZooKeeper cluster, then a new ZooKeeper cluster should be configured (figure 2.9):

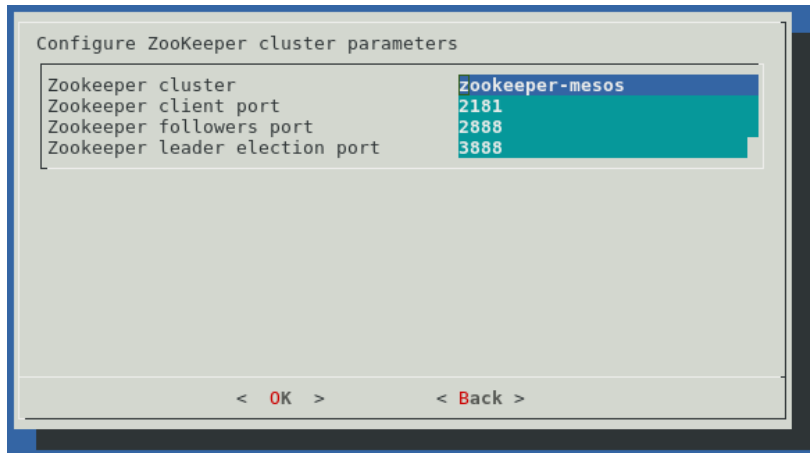


Figure 2.9: ZooKeeper Cluster Configuration

The parameters that need values are:

- The name of the ZooKeeper cluster
- The port for client connections
- The port for non-leaders connections to the leader
- The port for leader elections

2.2.9 Marathon Deployment

The Marathon framework can then be selected for deployment (figure 2.10):

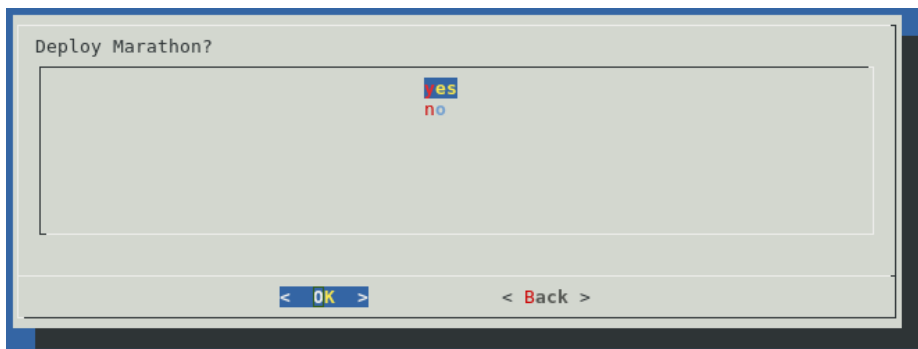


Figure 2.10: Marathon Deployment

Marathon is used to orchestrate long-living apps and other Mesos frameworks.

2.2.10 Marathon Configuration

If Marathon has been selected for deployment, then it needs to be configured (figure 2.11):

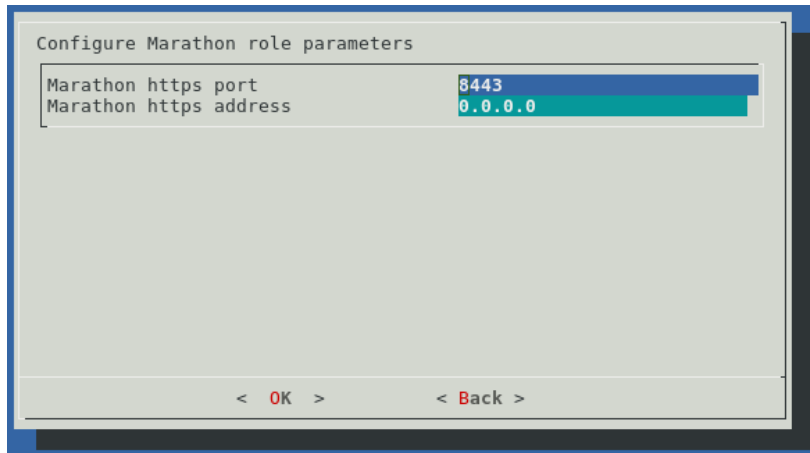


Figure 2.11: Marathon Configuration

The parameters that need values are:

- The HTTPS port for the Marathon web interface
- The IP address that the Marathon web server listens on

If the Mesos Proxy (section 2.2.14) is deployed, then the Mesos web interface should be accessed from outside the cluster via its IP address.

2.2.11 Mesos-DNS Deployment

Mesos-DNS can then be selected for deployment: (figure 2.12):

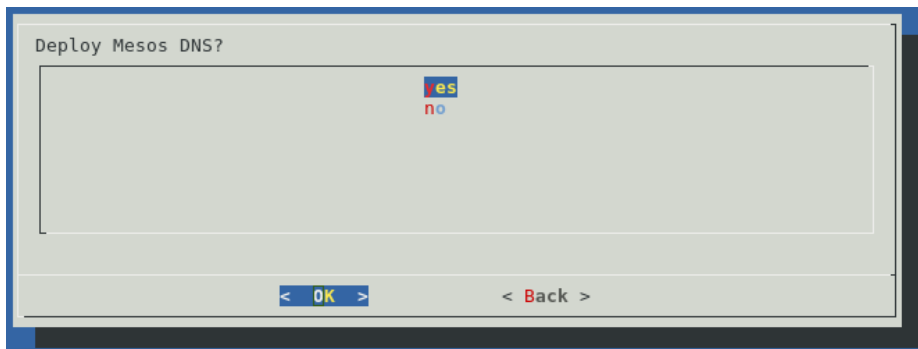


Figure 2.12: Mesos-DNS Deployment

Mesos-DNS is a DNS server for the Mesos cluster entities: nodes, frameworks, and tasks. It is integrated with the Bright Cluster Manager DNS server, which runs on the Bright head node.

2.2.12 Mesos-DNS Node Selection

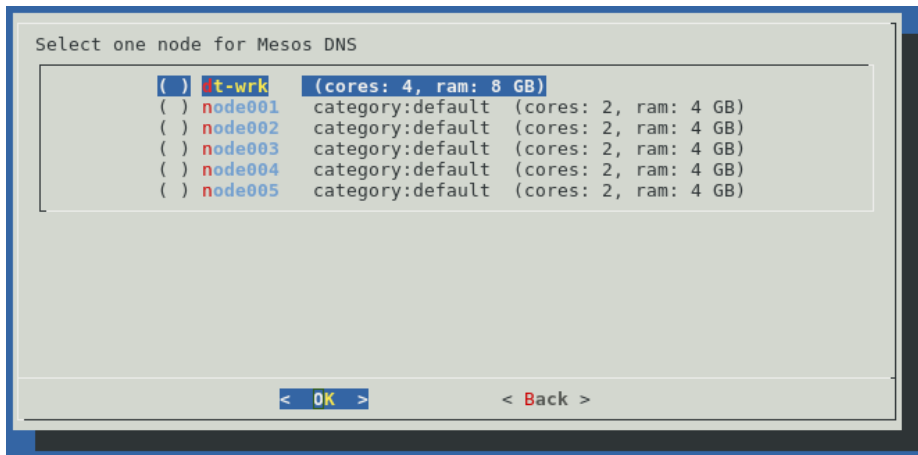


Figure 2.13: Mesos-DNS Node Selection

If Mesos-DNS has been selected for deployment, then a node must be selected for it (figure 2.13):

2.2.13 Mesos Proxy Deployment

The Mesos Proxy can then be selected for deployment (figure 2.14):

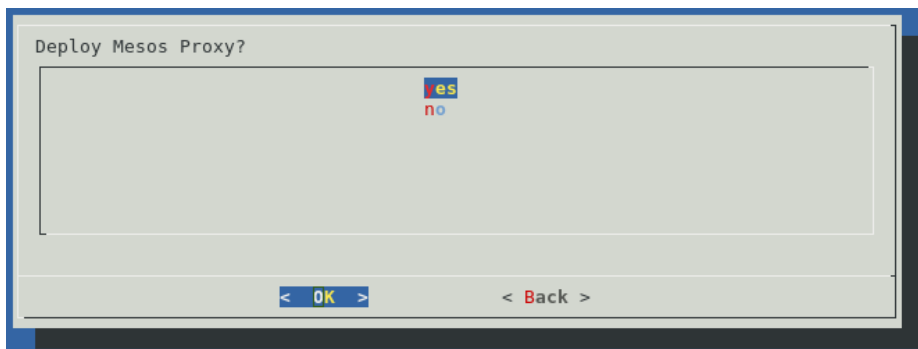


Figure 2.14: Mesos Proxy Deployment

Using Mesos Proxy proxies the Mesos agent nodes from the network, by proxying all HTTP requests. However, the Mesos master nodes still face the network directly.

2.2.14 Mesos Proxy Configuration

If Mesos Proxy has been selected for deployment, then it must be configured (figure 2.15):

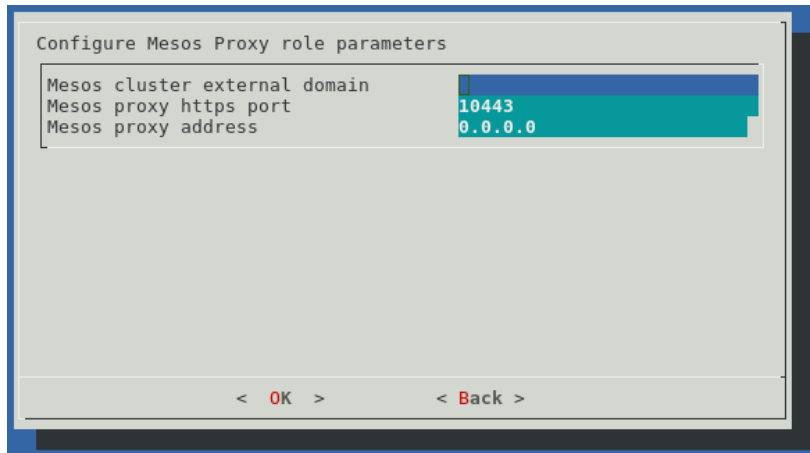


Figure 2.15: Mesos Proxy Configuration

The parameters that need values are:

- The external domain for the Mesos cluster. This is used to access Mesos master nodes. All master nodes must be within that domain.
- The HTTPS port for the Mesos Proxy.
- The IP address that the Mesos Proxy listens on.

For example, for:

an external domain: `<external-domain>`
 any master: `<any-mesos-master>`
 and the Mesos Proxy port: `<mesos-proxy-port>`

- The Mesos web interface is accessed via the URL:
`https://<any-mesos-master>.<external-domain>:<mesos-proxy-port>`
- The Marathon web interface is accessed via the URL:
`https://<any-mesos-master>.<external-domain>:<mesos-proxy-port>/marathon`

2.2.15 Docker Deployment

Docker can then be selected for deployment (figure 2.16):

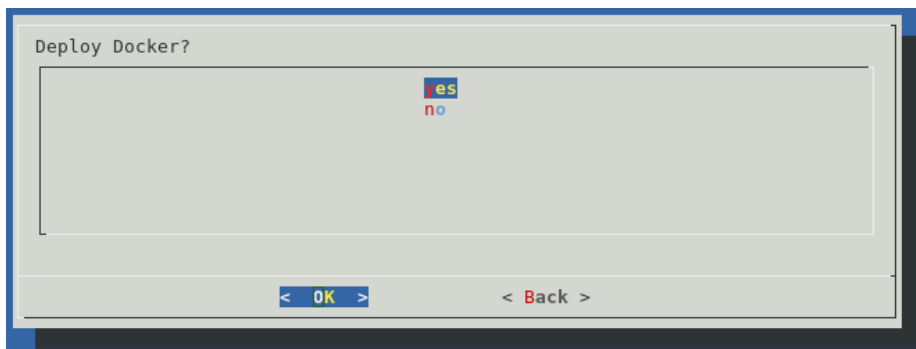


Figure 2.16: Docker Deployment

If Docker is deployed, then Mesos tasks are run within Docker containers.

2.2.16 Deployment Summary

The summary screen of the wizard allows the planned deployment configuration to be displayed, saved, deployed, or simply exited from (figure 2.17):

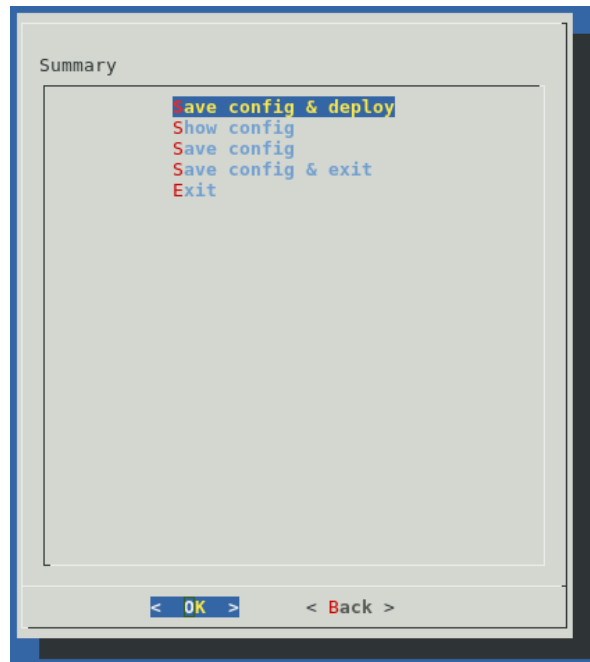


Figure 2.17: Deployment Summary

2.2.17 Command Line Installation

If a configuration file, `cm-mesos-setup.conf`, has been saved, then it can be used to install a Mesos cluster automatically as follows:

```
cm-mesos-setup -c cm-mesos-setup.conf
```

2.3 Uninstallation of Mesos

If the `Uninstall` option of the main menu (section 2.1) is chosen, a process to uninstall a Mesos cluster is started.

2.3.1 Uninstall Cluster Selection

After the administrator reconfirms that a Mesos cluster is to be removed, the wizard asks for a particular instance to be selected for removal (figure 2.18):

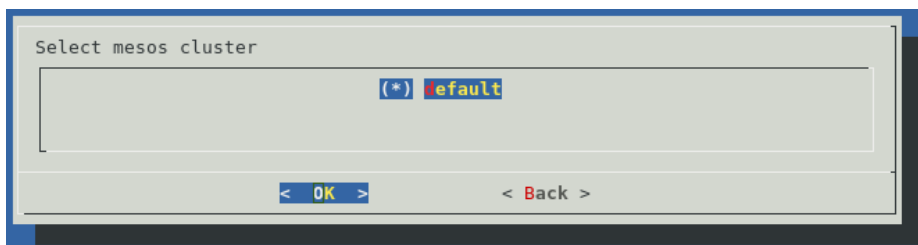


Figure 2.18: Uninstall Cluster Selection

The uninstallation process is then executed.

2.4 Masters Scaling

With the `Scale` option in the main menu (section 2.1), the number of master nodes in the Mesos cluster can be scaled up and down.

2.4.1 Scale Cluster Selection

A Mesos cluster is first selected for scaling (figure 2.19):

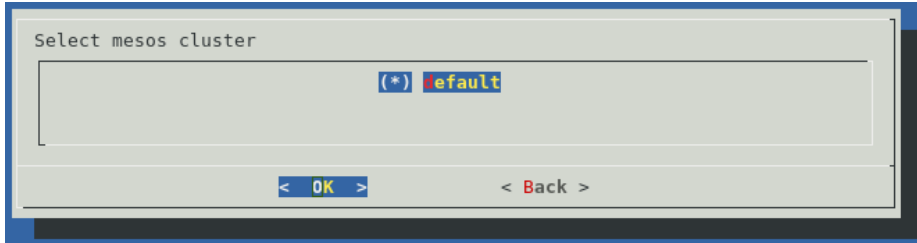


Figure 2.19: Scale Cluster Selection

2.4.2 Scale Master Nodes Selection

New master nodes must then be selected for the Mesos cluster (figure 2.20):

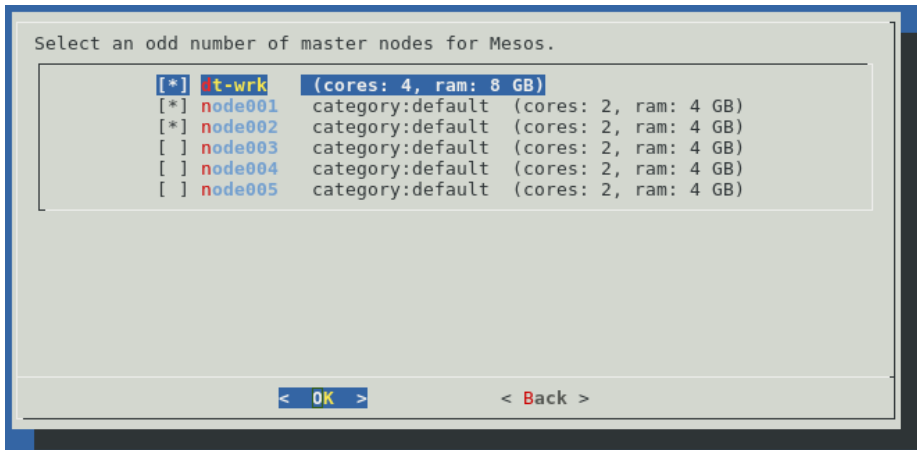


Figure 2.20: Scale Master Nodes Selection

The scaling process is then executed.

3

Managing Mesos With Bright View

The Bright View GUI (section 2.4 of the *Administrator Manual*) provides browser-based methods to deploy Mesos, and to manage Mesos settings for an already-deployed Mesos cluster.

3.1 Mesos Installation Wizard Using Bright View

Deployment can be carried out with the Mesos Wizard. The clickpath for this wizard in Bright View is Containers→Mesos→Mesos Wizard. This opens up an overview window for the wizard (figure 3.1):

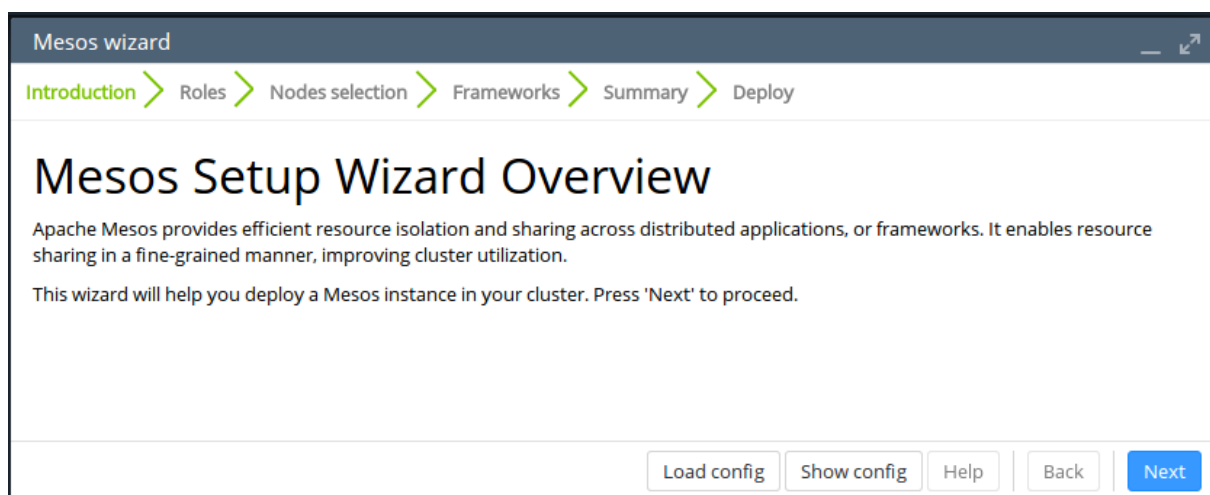


Figure 3.1: Mesos Installation Wizard With Bright View

To carry out the deployment, the fields in the GUI screens of the Bright View wizard can be followed. The options that are made available are very close to the set of options in the Ncurses wizard of section 2.2.

3.2 Mesos Settings Management With Bright View

Once a Mesos instance is deployed, the clickpath Containers→Mesos→Mesos cluster→<Mesos instance>→Overview opens up an overview screen of the Mesos instance (figure 3.2):

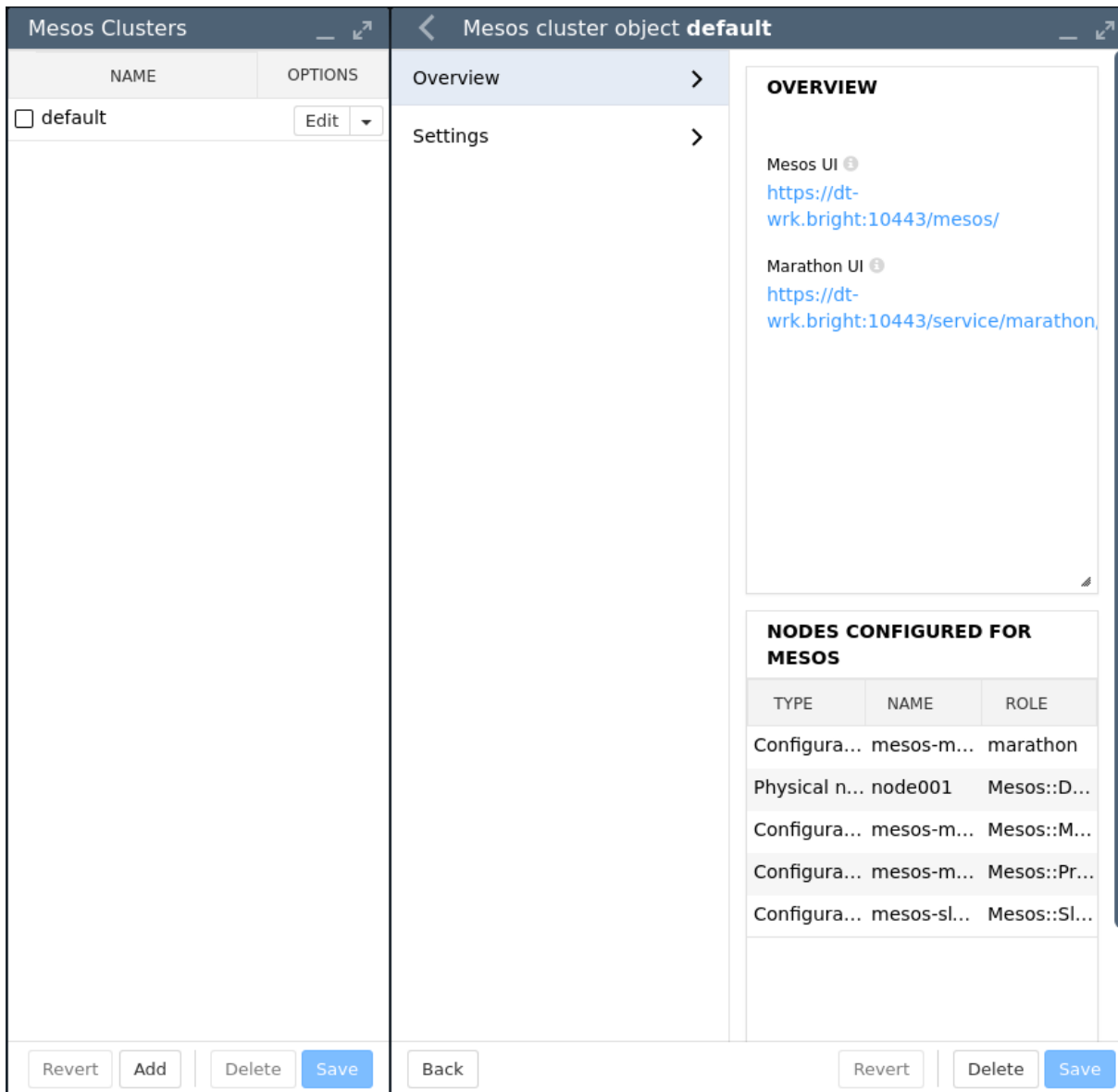


Figure 3.2: Mesos Cluster Overview With Bright View

The screen provides a general overview of the Mesos instance settings, and also provides web URLs that link to the Mesos-provided web interfaces for Mesos and Marathon.

For the same instance, the clickpath Containers→Mesos→Mesos cluster→<Mesos instance>→Settings opens up the Mesos cluster instance settings screen (figure 3.3):

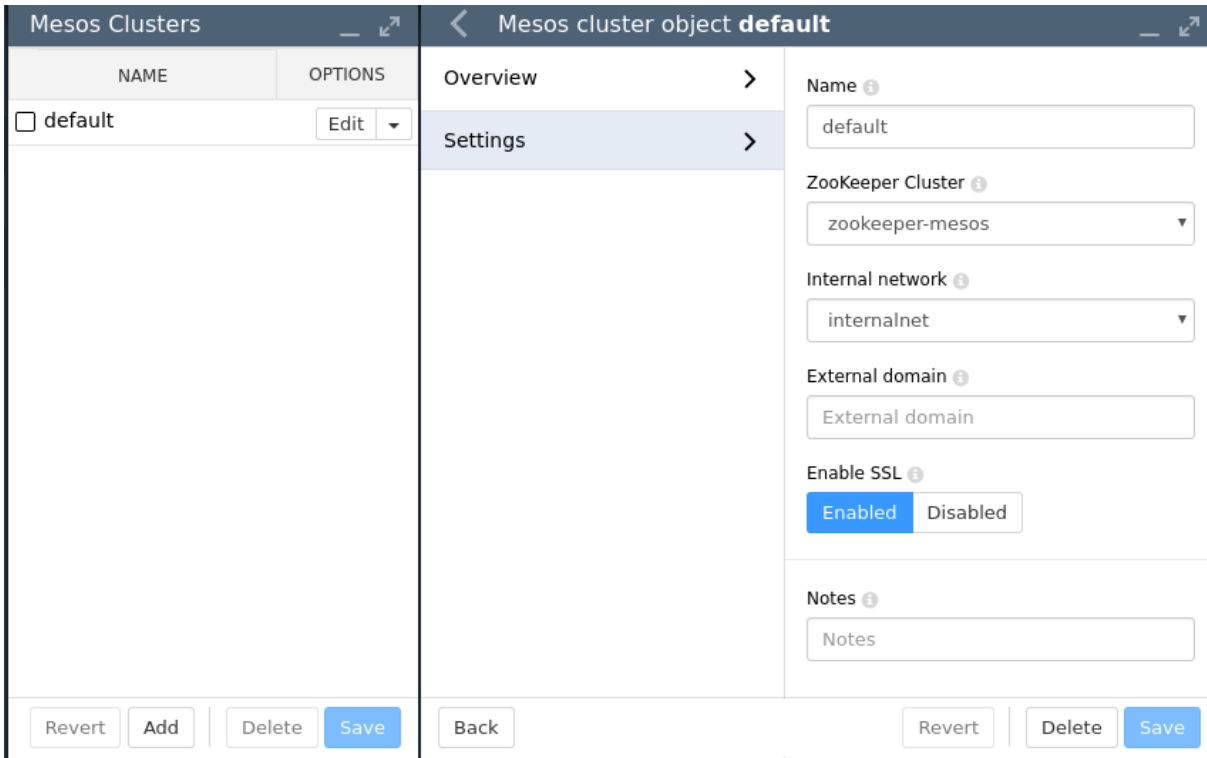


Figure 3.3: Mesos Cluster Options With Bright View

Some detailed settings for the Mesos instance can be viewed and managed from this screen.