# **NODUS Cloud OS** Quick Start Guide 5.2.0

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# **Chapter 1: NODUS Cloud OS Platform Installation**

This chapter provides information about the installer, which contains the entire NODUS Cloud Platform, along with dependencies to install it.

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## **1.1 Prerequisites**

This section contains the following information:

- Operating System
- Supported Browsers
- Linux Packages
- Traffic
- Obtaining Credentials from the Cloud Service Providers
- Stacks
- Site Availability

### **1.1.1 Operating System**

NODUS platform can be installed on many different Linux distributions and has been tested on these operating systems:

- CentOS 7
- Oracle 7.7
- Red Hat 7

**Note:** Refer to the chosen operating system's product specifications for minimum requirements.

### **1.1.2 Supported Browsers**

The NODUS UI supports these web browsers:

- Google Chromium (latest version)
- Google Chrome (latest version)
- Mozilla Firefox (latest version)
- Microsoft Edge (two latest major versions)
- Apple Safari (two latest major versions)

### **1.1.3 Linux Packages**

The following Linux packages must be installed on the NODUS platform server prior to the software installation:

- mongodb-server
- nginx

### 1.1.4 Traffic

To enable access to the NODUS platform server, the following ports need to be open with external access:

- 22 (SSH) user direct access / Moab job routing
- 80 (HTTP) connection to the NODUS UI
- 443 (HTTPS) optional, if you secure your HTTP connection
- 12001 (Cluster API) RESTful API that communicates with the clusters
- 12345 (NODUS-web-API) the NODUS Platform API server that communicates with your UI

**Note:** The NODUS platform server installation will enable these ports on the server. Ports 80 and 443 are used for the UI, but can be changed to reflect your requirements.

## **1.1.5 Obtaining Credentials from the Cloud Service Providers**

These are the supported cloud service providers:

- **\* amazon** Amazon Web Services (AWS)
- 🔿 Google Cloud
- Microsoft Azure
- ORACLE Oracle Cloud
- \\ Huawei Cloud
- 🍊 Open Telekom Cloud (OTC)

Refer to the providers' support pages for detailed information. **Note:** If you need a private IP address created within a provider or you cannot get provider credentials / correct admin level credentials, please contact us at nodus@adaptivecomputing.com.





Continue with the steps for your chosen provider below to obtain credentials:

- Google Cloud
- AWS
- Microsoft Azure
- Oracle Cloud
- Huawei Cloud
- Open Telekom Cloud

### **Google Cloud**

- **1.** Create a service account.
- 2. From the Service account list, select New service account.
- 3. In the Service account name field, enter a name.
- 4. From the Role list, select Project / Owner.
- 5. Click Create. A JSON file that contains your key downloads to your computer.

See https://cloud.google.com/docs/authentication/production for additional information.

#### AWS

AWS has two forms of credentials, both require admin privileges to set up:

- Programmatic access (access key, secret key) is a floating set of coupled values.
- EC2 roles only exist within AWS and are attached to AWS instances.

These accounts must have valid permissions associated in order to use NODUS. NODUS can deploy clusters using either programmatic access or EC2 roles. However, stack builds can only be done with Programmatic access.

NODUS requires Programmatic access to access the provider's resources. For example, if NODUS is outside of the AWS environment, access keys are required. If NODUS is running inside AWS, the best practice is to use IAM roles instead. An IAM role is a defined set of permissions. It is not associated with a specific user or group and any trusted entity can assume the role to perform a specific business task. NODUS supports both access methods.

When creating a cluster via **nodus cluster:aws:create**, the flag --role can be used to set the cluster to use EC2 role instead of Programmatic access. If the cluster entry already exists, then **nodus cluster:aws:update** can be used with flag --role or --no-role to switch on EC2 role use or turn it off, respectfully.

- 1. Sign in to the AWS Management Console and open the IAM console.
- 2. In the navigation pane, select Users.
- **3.** Select the name of the user whose access keys you want to create, and then select the **Security credentials** tab.
- 4. In the Access keys section, select Create access key.
- **5.** To view the new access key pair, select **Show**. You will not have access to the secret access key again after this dialog box closes.
- **6.** To download the key pair, select **Download .csv file**. Store the keys in a secure location. You will not have access to the secret access key again after this dialog box closes.
- 7. After you download the .csv file, select **Close**. When you create an access key, the key pair is active by default, and you can use the pair right away.

See https://docs.aws.amazon.com/general/latest/gr/aws-sec-cred-types.html for additional information.

#### **Microsoft Azure**

**1.** Run the script **account-scripts\_azure.sh**.

See https://docs.microsoft.com/en-us/azure/automation/shared-resources/credentials for additional information.

#### **Oracle Cloud**

- 1. On the Oracle account to be used, create a compartment.
- 2. Within that compartment, create a VPC (virtual private cloud) network.
- 3. Within that VPC, create at least one subnet.

See https://docs.cloud.oracle.com/iaas/Content/home.htm for additional information.

#### **Huawei** Cloud

- 1. On the Huawei account to be used, create a VPC.
- **2.** Within that VPC, create a subnet.

See https://support.huaweicloud.com/intl/en-us/vpc/index.html for additional information.

#### **Open Telekom Cloud**

- 1. On the Open Telekom Cloud (OTC) account to be used, create a VPC.
- 2. Within that VPC, create a subnet.

See https://open-telekom-cloud.com/en/products-services/virtual-private-cloud for additional information.

### 1.1.6 Stacks

To launch instances in the cloud, a stack must first be created using credentials with appropriate cloud permissions and policies.

The stack consists of the base OS (CentOS 7), services, libraries, applications, and any data that is needed so that once the instance starts up, it is ready to begin processing jobs. NODUS allows customization options to conform to cloud configurations (proxy, vpc, subnet, etc.).

Two images are generated from the stack build process: a base OS image and a prebuilt/configured image snapshot. You can use a stock image from the marketplace or account to build a private image. Cluster software used is Torque, Ansible, Maui, and Serf.

See the CLI Commands section Stacks for additional information.

### 1.1.7 Site Availability

Before building a stack or deploying a cluster, make sure that the site hashicorp.com (the supplier of Terraform) is not blocked by a firewall as this will prevent the Terraform process from completing.

## **1.2 Installation Steps**

- 1. In a browser, access the server via the IP or hostname (e.g., http://x.x.x/) to verify that nginx is started and the default port is available. If the site is unreachable, then the firewall may be enabled or the nginx server is not running.
  - A. Connect to the server via a command line and run sudo systemctl start nginx.
  - **B.** Access http://x.x.x.x/ once again:
    - If you get a Welcome to CentOS message, the default port number is available and you can proceed with the installation. Or if the site is still unreachable, then the firewall may be enabled and the NODUS install cannot proceed.
    - If any other data is displayed on the browser, the default port may be in use and your administrator should assign you another port number that will be used in step **6**.
- **2.** Log in to the installation user for the operating system where NODUS is to be installed to get a command line shell.
- **3.** Untar the NODUS distribution file with the command **tar xf Nodus\_Cloud\_OS-<version>.tgz**. This will produce a directory with the installation files needed to install NODUS.
  - A. Look at the files via ls. You should see a file called nodus-<version>.
  - B. Change to the installation directory with the command cd nodus-<version>.
- **4.** Because a license key is needed to install NODUS, save the license key in a file on the server. You will also need to provide a username that will be used to access the web server files. For security purposes, never use root as the username.
- 5. Install NODUS with the command ./install-nodus.sh <username> ense file>.

- **6.** (optional) If there is already a process using port 80 (from step 1), change the nginx port number with the command **sudo <edit> /etc/nginx/nginx.conf**.
  - **A.** Replace these lines:

listen 80 default\_server; listen [::] :80 default\_server; With these lines: listen <new port> default\_server; listen [::] :<new port> default server;

- 7. Restart the nginx server with the command sudo systemctl restart nginx.
- 8. The NODUS services use the file /NODUS/.nodusrc to modify the functionality of NODUS. This file contains the following parameters:

#### MONGO HOST=localhost

This parameter defines the Mongo DB server that is hosting the NODUS database. The default value is localhost.

#### MONGO PORT=27017

This parameter defines the port that the Mongo DB server is listening on. The default value is 27017.

MONGO DATABASE=nodus

This parameter defines the database in the Mongo DB and saves the NODUS information. The default value is nodus.

#### MONGO\_USER=

This REQUIRED parameter defines the user in the Mongo DB that is authorized to access the NODUS information. This value is configured at installation.

#### MONGO\_PASSWORD=

This REQUIRED parameter defines the password for the MONGO\_USER in the Mongo DB that is authorized to access the NODUS information. This value is configured at installation.

#### LICENSE\_PATH=/NODUS/.license

This parameter defines the location of the license key that is needed to use NODUS. The default value is /NODUS/.license.

#### BURST\_INTERVAL\_MS=60000

This parameter defines the number of milliseconds for NODUS to check all the clusters

that are set to Bursting. The default value is 60000 (1 minute).

```
PARALLEL TRANSACTIONS=10
```

This parameter defines the maximum parallel transaction for deploying/destroying nodes. The default value is 10.

Note: If a parameter does not exist in the file, the default value is used.

## **1.3 Verifying the Installation**

1. Check the UI configuration files by editing /NODUS/nodus4-ui-desktopapp/build/assets/config.json. This file tells the UI the address and port of the API, and which providers will be used. You can edit the providers to only show which ones you will supply licenses to. The file looks similar to this:

```
{
  "server": "http://<server Address>:12345",
  "providers": ["aws", "google", "azure", "oracle", "huawei",
  "otc"]
}
```

- 2. Verify the API in a browser by entering http://<server\_address>:12345/. The browser should display { "reason": "unknown", "message": "Not Found" }. If not, rerun step 1 and/or step 2.
- **3.** Verify the UI in a browser by entering **http://<server\_address>/**. You should be prompted to enter a license or to log in. If not, rerun step 1 and/or step 2.

## **1.4 Adding the Server License Key**

Follow one of the procedures below to add a license key.

- Adding the License Key via the NODUS GUI
- Adding the License Key from a Terminal

#### Adding the License Key via the NODUS GUI

1. Go to http://<web\_server\_address> and enter the license key that was provided. Note: web\_server\_address refers to the server where the NODUS platform is installed.

Thar	K you for choosing NODUS.	
License Key *		

#### Adding the License Key from a Terminal

- 1. Log in to the <user name>@<web\_server\_address> that you installed NODUS as in the section Installation Steps.
- 2. Add the license key that was provided to /NODUS/.license. Note: If the license type is Multi-User, then add the user license to ~/.nodus/.userKey.
- 3. Verify that the license is working by running command **nodus license**.

# **Chapter 2: Using the NODUS CLI**

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## 2.1 Stacks

This section contains the following commands:

- stack:aws:create NAME TYPE
- stack:aws:update STACK
- stack:azure:create NAME TYPE
- stack:azure:update STACK
- stack:build STACK
- stack:gcp:create NAME TYPE
- stack:gcp:update STACK
- stack:huawei:create NAME TYPE
- stack:huawei:update STACK
- stack:list
- stack:log CLUSTER TYPE
- stack:oracle:create NAME TYPE
- stack:oracle:update STACK
- stack:otc:create NAME TYPE
- stack:otc:create STACK
- stack:remove STACK
- stack:set STACK CREDENTIAL
- stack:share STACK USERNAME

- stack:show STACK
- stack:unshare STACK

#### stack:aws:create NAME TYPE

#### Description

Create new Amazon Web Services (AWS) stack configuration entry.

ige				
\$ nodus stack:aws:create NAME TYPE [CREDENTIAL] [OPTIONS]				
guments				
ME	Associated Name			
Ъ	(centos-7) Image Type			
EDENTIAL	Set Credential			
tions				
custom	Use Managed Image			
description=description	Description			
help	Show Help			
instance=instance	(required) [default: t2.micro] Instance Type			
prefix=prefix	(required) [default: nodus] Output Image Prefix			
region=region	(required) Region ID			
source=source	Source Image ID			
username=username	SSH Username			
private	Provision via Private IP			
proxy=proxy	HTTP(S) Proxy URL			
security=security	Security Group ID			
subnet=subnet	Subnet ID			
volume=volume	Storage Volume (GB)			
	age odus stack:aws:create NAME T ments ME ME DENTIAL EDENTIAL EDENTIAL custom description=description help instance=instance prefix=prefix region=region source=source username=username private private proxy=proxy security=security subnet=subnet volume=volume			

#### Examples

\$ nodus stack:aws:create myStack centos-7 myCred --region=us-east-2

\$ nodus stack:aws:create myStack centos-7 --prefix=myNodus --region=us-east-2 -instance=t2.large

\$ nodus stack:aws:create myStack centos-7 --region us-east-2 --proxy \$http\_proxy

\$ nodus stack:aws:create myStack centos-7 --region=us-east-2 --custom --source=ami-04152c3a27c49a944 --username=ec2-user --instance=t2.xlarge

stack:aws:update STACK				
Description				
date Google Cloud Plat	form (GCP) o	cluster configuration entry.		
ige				
odus stack:aws:update	e STACK [OP	TIONS]		
guments				
АСК	Stack Name	or ID		
tions				
custom		Use Managed Image		
description=descrip	otion	Description		
help		Show Help		
instance=instance		Instance Type		
name=name		Name Identifier		
prefix=prefix		Output Image Prefix		
region=region		Region ID		
source=source		Source Image ID		
type=centos-7		OS Type		
username=usernar	ne	SSH Username		
no-proxy		Remove HTTP(S) Proxy		
no-security		Remove Security Group		
no-subnet		Remove Subnet		
no-volume		Remove Extended Root Storage Volume		
[no-]private		Provision via Private IP		
proxy=proxy		HTTP(S) Proxy URL		
security=security		Security Group ID		
subnet=subnet		Subnet ID		
volume=volume		Extended Root Storage Volume (GB)		
imples				
	ki kaws:update STAC kaws:update STAC kaws:update STAC kaws:update STAC kaws:update kaws:upd	ki k		

\$ nodus stack:aws:update myStack --name newStack

\$ nodus stack:aws:update myStack --region=us-east-2

\$ nodus stack:aws:update myStack --prefix=myNodus --region=us-east-2 -instance=t2.large

\$ nodus stack:aws:update myStack --region us-east-2 --proxy \$http\_proxy

\$ nodus stack:aws:update myStack --region=us-east-2 --custom --source=ami-

04152c3a27c49a944 --username=ec2-user --instance=t2.xlarge

stack	stack:azure:create NAME TYPE				
Desci	Description				
Creat	te new Microsoft Azure stack	configuration entry.			
Usage	e				
\$ nod	lus stack:azure:create NAME	TYPE [CREDENTIAL] [OPTIONS]			
Argui	ments				
NAMI	Е	Associated Name			
TYPE		(centos-7) Image Type			
CRED	DENTIAL	Set Credential			
Optio	ons				
-cc	custom	Use Managed Image			
-dc	description=description	Description			
-hh	help	Show Help			
-ii	instance=instance	(required) [default: Standard_DS2_v2] Instance Type ID			
-pp	prefix=prefix	(required) [default: nodus] Output Image Prefix			
-ss	source=source	Source Image ID			
-uu	username=username	SSH Username			
(	offer=offer	Source Image Offer			
(	os-type=os-type	Source Image OS Type			
r	publisher=publisher	Source Image Publisher			
r	resource=resource	(required) Managed Resource Group Name			
s	sku=sku	Source Image SKU			
s re	source-resource=source- esource	Source Resource Group Name			
<b>P</b>	1				

\$ nodus stack:azure:create myStack centos-7 myCred --resource=myResourceGroup -instance=Standard\_DS2\_v2

\$ nodus stack:azure:create myStack centos-7 --prefix=myNodus -resource=myResourceGroup --instance=Standard\_DS2\_v2

#### stack:azure:update STACK

#### Description

Update Microsoft Azure stack configuration entry.

#### Usage

\$ nodus stack:azure:update STACK [OPTIONS]

Arg	Arguments			
STACK Stack Name		Stack Name	e or ID	
Op	tions			
-C	custom		Use Managed Image	
-d	description=descript	tion	Description	
-h	help		Show Help	
-i	instance=instance		(required) [default: Standard_DS2_v2] Instance Type ID	
-n	name=name		Name Identifier	
-p	prefix=prefix		(required) [default: nodus] Output Image Prefix	
-s	source=source		Source Image ID	
-t	type=centos-7		OS Type	
-u	username=usernam	e	SSH Username	
	os-type=os-type		Source Image OS Type	
	publisher=publisher		Source Image Publisher	
	resource=resource		(required) Managed Resource Group Name	
	sku=sku		Source Image SKU	
	source-resource=sou resource	urce-	Source Resource Group Name	

\$ nodus stack:azure:update myStack --name newStack

\$ nodus stack:azure:update myStack --resource=myResourceGroup --instance=Standard\_ DS2\_v2

\$ nodus stack:azure:update myStack --prefix=myNodus --resource=myResourceGroup -instance=Standard\_DS2\_v2

#### stack:build STACK

#### Description

Generates images compatible with NODUS clusters. Generate two images: 'nodus-server'; 'nodus-node'.

Usage					
\$ nodus stack:build STACK [OPTIONS]	\$ nodus stack:build STACK [OPTIONS]				
Argument					
STACK Stack Name or ID					
Options					
-Sslow Sequential Builds	,				

-h	help	Show Help		
-S	stack=server node	Sub-Stack		
Examples				
\$ nodus stack:build myStack				
\$ nodus stack:build myStackstack server				

#### stack:gcp:create NAME TYPE

Do	scription			
Des				
Cre	eate new Google Cloud Plat	orm (GCP) stack configuration entry.		
Usa	age			
\$ n	odus stack:gcp:create NAM	E TYPE [CREDENTIAL] [OPTIONS]		
Arg	guments			
NA	ME	Associated Name		
TYI	PE	(centos-7) Image Type		
CR	EDENTIAL	Set Credential		
Options				
-C	custom	Managed Image		
-d	disk=disk	Disk Size (GB)		
-h	help	Show Help		
-i	instance=instance	(required) [default: n1-standard-1] Instance Type ID		
-p	prefix=prefix	(required) [default: nodus] Output Image Prefix		
-S	source=source	Source AMI ID		
-u	username=username	SSH Username		
-Z	zone=zone	(required) Availability Zone ID		
	[no-]account	Auth via Service Account		
	disk=disk	Extended Root Disk Size (GB)		
	proxy=proxy	HTTP(S) Proxy URL		
	subnet=subnet	Subnet Self Link ID		

#### Examples

\$ nodus stack:gcp:create myStack centos-7 myCred --zone=us-east1-b --instance=n1standard-1

\$ nodus stack:gcp:create myStack centos-7 --prefix=myNodus --zone=us-east1-b -instance=n1-standard-1

stac	stack:gcp:update STACK				
Desc	Description				
Upda	ate Google Cloud Plat	form (GCP) stack co	onfiguration entry.		
Usag	ge				
\$ no	dus stack:gcp:update	STACK [OPTIONS]			
Argı	iments				
STA	СК	Stack Name or ID			
Opti	ions				
-с	custom		Managed Image		
-d	description=descri	ption	Description		
-h	help		Show Help		
-i	instance=instance		Instance Type ID		
-n	name=name		Name Identifier		
-p	prefix=prefix		Output Image Prefix		
-S	source=source		Source AMI ID		
-t	type=centos-7		OS Type		
-u	username=username		SSH Username		
-W	walltime=walltime		Job walltime		
-Z	zone=zone		Availability Zone ID		
	[no-]account		Auth via Service Account		
	disk=disk		Extended Root Disk Size (GB)		
	no-disk		Remove Disk		
	no-proxy		Remove HTTP(S) Proxy		
	no-subnet		Remove Subnet		
	proxy=proxy		HTTP(S) Proxy URL		
	subnet=subnet		Subnet Self Link ID		

\$ nodus stack:gcp:update myStack --name newStack

\$ nodus stack:gcp:update myStack --zone=us-east1-b --instance=n1-standard-1
\$ nodus stack:gcp:update myStack --prefix=myNodus --zone=us-east1-b --instance=n1standard-1

#### stack:huawei:create NAME TYPE

#### Description

Create new Huawei Cloud stack configuration entry.

Usa	age	
\$ n	odus stack:huawei:create NA	ME TYPE [CREDENTIAL] [OPTIONS]
Arg	guments	
NA	ME	Associated Name
TYI	PE	(centos-7) Image Type
CR	EDENTIAL	Set Credential
Op	tions	
-C	custom	Use Managed Image
-d	description=description	Description
-h	help	Show Help
-i	instance=instance	(required) [default: s2.medium.2] Instance Type ID
-p	prefix=prefix	(required) [default: nodus] Output Image Prefix
-r	region=region	(required) Region ID
-S	source=source	Source Image ID
-u	username=username	SSH Username
-Z	zone=zone	(required) Availability Zone ID
	security=security	Security Group ID
	subnet=subnet	(required) Subnet Network ID
	volume=volume	Storage Volume (GB)

\$ nodus stack:huawei:create myStack centos-7 myCred --region=ap-southeast-1 -zone=ap-southeast-1a --subnet=41dcc08c-b044-4af1-b298-8770a479d60a -instance=s2.medium.2

\$ nodus stack:huawei:create myStack centos-7 --prefix=myNodus --region=ap-southeast-1
--zone=ap-southeast-1a --subnet=41dcc08c-b044-4af1-b298-8770a479d60a -instance=s2.medium.2

#### stack:huawei:update STACK

#### Description

Update Huawei Cloud stack configuration entry.

#### Usage

\$ nodus stack:huawei:update STACK [OPTIONS]

#### Arguments

STACK	Stack Name or ID
-------	------------------

#### Options

-c --custom

Use Managed Image

Opt	tions	
-d	description=description	Description
-h	help	Show Help
-i	instance=instance	Instance Type ID
-n	name=name	Name Identifier
-p	prefix=prefix	Output Image Prefix
-r	region=region	Region ID
-S	source=source	Source Image ID
-t	type=centos-7	OS Type
-u	username=username	SSH Username
-Z	zone=zone	Availability Zone ID
	no-security	Remove Security Group
	no-volume	Remove Extended Root Storage Volume
	security=security	Security Group ID
	subnet=subnet	Subnet Network ID
	volume=volume	Extended Root Storage Volume (GB)
_	•	

\$ nodus stack:huawei:update myStack --name newStack

\$ nodus stack:huawei:update myStack --region=ap-southeast-1 --zone=ap-southeast-1a -subnet=41dcc08c-b044-4af1-b298-8770a479d60a --instance=s2.medium.2

\$ nodus stack:huawei:update myStack --prefix=myNodus --region=ap-southeast-1 -zone=ap-southeast-1a --subnet=41dcc08c-b044-4af1-b298-8770a479d60a -instance=s2.medium.2

stac	k:list		
Des	cription		
List	stack entries from database.		
Usa	ge		
\$ no	dus stack:list [OPTIONS]		
Opt	Options		
-f	format=text json	[default: text] Output Format	
-h	help	Show Help	
Examples			
\$ no	dus stack:list		
\$ no	\$ nodus stack:listformat json		

#### stack:log CLUSTER TYPE Description Display stack build logs. Usage \$ nodus stack:log CLUSTER TYPE [OPTIONS] Arguments STACK Stack Name or ID (master|build) [default: master] Log Type TYPE Options -d --debug **Debug Logs** Follow File Output Stream -f --follow -h --help Show Help -n --lines=lines Last N Lines --follow Follow File Output Stream Example

\$ nodus stack:log myCluster

#### stack:oracle:create NAME TYPE

#### Description

Create new Oracle Cloud stack configuration entry.

#### Usage

\$ nodus stack:oracle:create NAME TYPE [CREDENTIAL] [OPTIONS]

Arg	guments			
NAME		Associated Name		
TY	PE	(centos-7) Image Type		
CR	EDENTIAL	Set Credential		
Op	tions			
-C	custom	Use Managed Image		
-d	description=description	Description		
-h	help	Show Help		
-i	instance=instance	(required) [default: VM.Standard2.1] Instance Type ID		
-n	subnet=subnet	(required) Subnet OCID		
-p	prefix=prefix	(required) [default: nodus] Output Image Prefix		
-r	region=region	(required) Region ID		
-S	source=source	Source Image ID		
-u	username=username	SSH Username		

\$ nodus stack:oracle:create myStack centos-7 myCred --prefix=myNodus --region=usashburn-1 --

subnet=ocid1.subnet.oc1.iad.aaaaaaaa7v2znysxlclowk7rhgkgldvjaxmkkjpiktnahnusgknhw 5pcvi6q

stac	stack:oracle:update STACK			
Desc	ription			
Upda	ate Oracle Cloud stad	ck configuration entry.		
Usag	ze	<b>U</b>		
\$ no	dus stack:oracle:upd	ate STACK [OPTIONS]		
Argu	iments			
STA	CK	Stack Name or ID		
Opti	ons	_		
-C	custom		Use Managed Image	
-d	description=desc	ription	Description	
-h	help		Show Help	
-i	instance=instance		Instance Type ID	
-n	name=name		Name Identifier	
-n	subnet=subnet		(required) Subnet OCID	
-p	prefix=prefix		Output Image Prefix	
-r	region=region		Region ID	
-S	source=source		Source Image ID	
-t	type=centos-7		OS Type	
-u	username=usern	ame	SSH Username	
-	-			

#### Examples

\$ nodus stack:oracle:update myStack --name newStack

\$ nodus stack:oracle:update myStack --prefix=myNodus --region=us-ashburn-1 -subnet=ocid1.subnet.oc1.iad.aaaaaaaa7v2znysxlclowk7rhgkgldvjaxmkkjpiktnahnusgknhw 5pcvi6q

#### stack:otc:create NAME TYPE

#### Description

Create new OpenTelekom Cloud stack configuration entry.

#### Usage

\$ nodus stack:otc:create NAME TYPE [CREDENTIAL] [OPTIONS]

Arg	guments		
NAME		Associated Name	
TYF	PE	(centos-7) Image Type	
CRI	EDENTIAL	Set Credential	
Op	tions		
-C	custom	Use Managed Image	
-d	description=description	Description	
-h	help	Show Help	
-i	instance=instance	(required) [default: s2.medium.2] Instance Type ID	
-p	prefix=prefix	(required) [default: nodus] Output Image Prefix	
-S	source=source	Source Image ID	
-u	username=username	SSH Username	
	private	Provision via Private IP	
	proxy=proxy	HTTP(S) Proxy URL	
	security=security	Security Group ID	
	subnet=subnet	(required) Subnet Network ID	
	volume=volume	Extended Root Storage Volume (GB)	

\$ nodus stack:otc:create myStack centos-7 myCred --subnet 3bc69be8-3ebc-434c-b828-9aeb5a8ec78a --instance s2.medium.2

\$ nodus stack:otc:create myStack centos-7 --prefix myNodus --subnet 3bc69be8-3ebc-434c-b828-9aeb5a8ec78a --instance s2.medium.2

\$ nodus stack:otc:create myStack centos-7 --subnet 3bc69be8-3ebc-434c-b828-9aeb5a8ec78a --proxy \$http\_proxy

#### stack:otc:create STACK

Des	cription			
Crea	ate new OpenTelekom Cloud stack	configuration entry.		
Usa	ge			
\$ nc	odus stack:otc:create STACK [CRED	ENTIAL] [OPTIONS]		
Arg	Arguments			
STACK		Stack Name or ID		
CREDENTIAL		Set Credential		
Options				
-C	custom	Use Managed Image		
-d	description=description	Description		

-h	help	Show Help
-i	instance=instance	Instance Type ID
-n	name=name	Name Identifier
-p	prefix=prefix	Output Image Prefix
-S	source=source	Source Image ID
-t	type=centos-7	ОЅ Туре
-u	username=username	SSH Username
	no-proxy	Remove HTTP(S) Proxy
	no-security	Remove Security Group
	no-volume	Remove Extended Root Storage Volume
	[no-]private	Provision via Private IP
	proxy=proxy	HTTP(S) Proxy URL
	security=security	Security Group ID
	subnet=subnet	Subnet Network ID
	volume=volume	Extended Root Storage Volume (GB)

\$ nodus stack:otc:create myStack myCred --name newStack

\$ nodus stack:otc:create myStack --subnet 3bc69be8-3ebc-434c-b828-9aeb5a8ec78a -instance s2.medium.2

\$ nodus stack:otc:create myStack --prefix myNodus --subnet 3bc69be8-3ebc-434c-b828-9aeb5a8ec78a --instance s2.medium.2

\$ nodus stack:otc:create myStack --subnet 3bc69be8-3ebc-434c-b828-9aeb5a8ec78a -proxy \$http\_proxy

#### stack:remove STACK

Description			
Remove stack entries from	ı database.		
Usage			
\$ nodus stack:remove STA	.CK [OPTIONS]		
Argument			
STACK Stack Name or ID			
Options			
-hhelp	Show Help		
[no-]clean Remove Files Created for Cluster			
Examples			
\$ nodus stack:remove myS	Stack		

\$ nodus stack:remove myStack --no-clean

\$ nodus stack:remove myStack --force

#### stack:set STACK CREDENTIAL

#### Description

Associate stack entry with credential entry.

#### Usage

\$ nodus stack:set STACK CREDENTIAL [OPTIONS]

#### Arguments

STACK

CREDENTIAL

Stack Name or ID Credential Name or ID

#### Option

-h --help

Show Help

#### Example

\$ nodus stack:set myStack myCredential

#### stack:share STACK USERNAME

Description	Description				
Share your st	ack to another user.				
Usage					
\$ nodus stack	share STACK USERNA	ME			
Argument	Argument				
STACK		Stack Name or ID			
USERNAME	4E Linux Username				
Options					
-h	help	Show Help			
Examples					
¢ moduo ato al-	ah and my Ctall ath and	2011			

\$ nodus stack:share myStack otherUser

#### stack:show STACK

#### Description

Display details of a particular stack entry from the database.

#### Usage

\$ nodus stack:show STACK [OPTIONS]

Argu	ıment		
STACK Stack Name or II		Stack Name or II	D
Options			
-f	format=text json xml		[default: text] Output Format
-h	help		Show Help
Examples			
\$ nodus stack:show myStack			
\$ nodus stack:show myStackformat json			

#### stack:unshare STACK

Descrip	tion			
Unshare	your stack to an	other user.		
Usage				
\$ nodus	stack:unshare S	TACK [USER	NAME] [OPTIONS]	
Argume	nt			
STACK			Stack Name or ID	
USERNAME			Linux Username	
Options				
-h	help	Show Help		
	all	Remove all shared users		
Examples				
\$ nodus stack:unshare myStack otherUser				
\$ nodus stack:unshare myStackall				

# 2.2 Users

A NODUS user is just a registered Linux system user that enables using NODUS in various capacities, permissions, and NODUS license permitting.

# 2.3 Architecture



#### Typical Cloud Provider

# **Chapter 3: Using the NODUS GUI**

This chapter provides information about using the NODUS GUI to run your workloads in the cloud.

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## **3.1 Creating a NODUS Account**

You can have one of two different types of accounts, depending on how your server is set up: Site Account or Multi-User Account.

To create an account, go to http://<web\_server\_address> and click Create a NODUS account.
 Note: web\_server\_address refers to the server where the NODUS platform is installed

Note: web\_server\_address refers to the server where the NODUS platform is installed.

**2.** Follow the instructions and complete the registration process. Your username and password are required for future logins. The password must be at least 8 characters long, contain at least 1 lowercase, 1 uppercase, 1 numeric, and 1 special character such as !@#\$%^&\*.

#### **Site Account**

Upon successful registration, you will be logged in to http://<web\_server\_
address>.

#### **Multi-User Account**

This message appears: Account Creation Successful! In order to access NODUS you will need a USER KEY. If you do not already have one, please contact Adaptive Computing at license@adaptivecomputing.com!

## 3.2 Credentials Manager

Credentials are required by the cloud service providers in order to access their environment and resources. Adding and saving them now means that you can easily select them with just one click when creating a cluster.

- 1. To add credentials, log in to your NODUS Cloud OS user account at http://<web\_server\_address>. The Cluster Manager screen opens.
- 2. On the Applications menu, click Credentials Manager:

VODUS Cloud OS	≡ ≞					User Name Vuser
APPLICATIONS		Crede	ntials Manager	Q Search		·
Stack Manager     Credentials Manager     Job Manager		In Use	Name	Provider	Date/Time Created	Actions
🗅 File Manager		•	awscredentials	eroanazon Britaniosi-	May 12, 2020 3:50 PM	•••
		٠	googlecredentials	<b>O</b>	May 12, 2020 3:54 PM	•••
		٥	azurecredentials	Moseth Aser	May 12, 2020 3:55 PM	***
		٠	oraclecredentials		May 12, 2020 3:56 PM	
		٥	huaweicredentials	HUAWEI	May 12, 2020 3:57 PM	•••
		$\oslash$	otccredentials	<u> </u>	May 12, 2020 3:57 PM	
					Rows per page: 10 👻	1-6 of 6 < >

The **Credentials Manager** screen shows this information: In Use, Name, Provider, Date/Time Created, and Actions (···) Edit Collaborators, Set, & Delete. **Note:** For Edit Collaborators, the License Type must be Site.

**Note:** From the **Applications** menu, you can also create clusters, build stacks, submit jobs, and view a job's output file. See the sections Cluster Manager, Stack Manager, Job Manager, and File Manager for information.

- **3.** Select the appropriate cloud service provider and enter the desired name for the credentials.
- 4. Enter your account credentials. Alternatively, click Upload Credential.
- 5. Click Save to finish adding the credentials for this provider.

Note: Clicking the name of a credential shows information about it.

Repeat the steps in this section to add credentials for another provider if desired.

## 3.3 Stack Manager

This section contains the following information:

- Viewing Stacks
- Creating a Stack
- Building a Stack

### 3.3.1 Viewing Stacks

1. On the Applications menu, click Stack Manager:

Ċ									2	ser Name
⊙ st	ack Manage	r	٩	Search					(	
Built	Name	Provider	Instance Size	Prefix	Туре	Credential	Builder	Last Built	Actions	5
🕢 None	awsstack	amazon sebervões	t2.nano	core	centos- 7	awscredentials	market	N/A	•••	
							Rows per pa	ge: 10 🔻	1-1 of 1	< >
	Built	Stack Manager Built Name  None awsstack	Built       Name       Provider         Image: Constraint of the second se	Stack Manager     Q      Built     Name     Provider     Instance     Size      None     awsstack     t2.nano	Stack Manager       Q Search         Built       Name       Provider       Instance Size       Prefix         None       awsstack       Amount of the search       core	Stack Manager       Q Search         Built       Name       Provider       Instance Size       Prefix       Type         None       awsstack       Image: Controls - 7       core       Centos- 7	Built       Name       Provider       Instance Size       Prefix       Type       Credential         Image: Control of the state	Stack Manager     Built     None   awsstack     t2.nano   core   7   awssredentials   market   Builter	Stack Manager       Search         Built       Name       Provider       Instance Size       Prefix       Type       Credential       Builder       Last Built         None       awsstack       Image: Controls - 2       awscredentials       market       N/A	Image: Stack Manager       Search       Image: Stack Manager       Image: Stack

On the **Stack Manager** screen, you can create new stacks and see a list of all your current stacks and information such as: Built ( Success / Failed / None), Name, Provider, Instance Size, Prefix, Type, Builder, Last Built, and Actions (Edit Collaborators, Edit, Build, Logs, & Delete). **Note:** For Edit Collaborators, the License Type must be Site.

### **3.3.2 Creating a Stack**

**1.** To create a new stack, on the **Stack Manager** screen, click the add icon (•). The **New Stack** screen shows the cloud service providers that you have credentials for:

New Stack Provider					SAVE CLOSE
Amazon Web Services	Google Cloud	Microsoft Azure	Oracle Cloud	Huawei Cloud	Open Telekom Cloud
webservices**		Microsoft Azure		HUAWEI	
		Please select	a provider		

- **2.** Select the cloud service provider that you want to create a stack in.
- **3.** Enter the desired information for the new stack: Name, Type, Prefix, Credential, Head Node Size, Subnet Network, and Description. Clicking the **Advanced** button shows these additional fields: Private IP, Proxy, Source Image, SSH Username, Security, and Volume. **Note:** The available fields vary based on the provider.
- 4. Click Save. The state shows None until it is built.
- 5. Repeat the steps in this section to create additional clusters as desired.

### 3.3.3 Building a Stack

1. To build a stack, under Actions, click Build. The state changes to Success. If it fails, the state changes to Failed.

## 3.4 Cluster Manager

This section contains the following information:

- Viewing Clusters
- Creating a Cluster
- Deploying a Cluster
- Deleting a Cluster

### 3.4.1 Viewing Clusters

1. On the Applications menu, click Cluster Manager:

😢 NODUS Cloud OS 🛛 🚍 📩									User Name 🗸
APPLICATIONS  Cluster Manager  Stack Manager	📙 Cluster Manager		Q s	earch					<b>C</b> +
Credentials Manager  Job Manager  File Manager	E Cloud Providers	State	Name	Provider	Bursting	Nodes	Credential	Uptime	Actions
	All Cloud Providers	🔁 Down	aws	amazon webservices	N/A	0	awscredentials	N/A	····
	Google Cloud	🔁 Down	huawei	HUAWEI	N/A	0	huaweicredentials	N/A	····
	Oracle Cloud	🕢 Down	azure	Acrosoft Acrosoft	N/A	1	azurecredentials	N/A	····
	Open Telekom Cloud	Down	otc		N/A	1	otccredentials	N/A	····
		Available     Down	google		N/A	1	googlecredentials	3 hours	····
			Gidde	0.04	ne.		Rows	per page: 10 ♥ 1-6 c	d6 < > >

On the **Cluster Manager** screen, you can configure new clusters and see a list of all your current clusters and information such as their State ( Available / Down / Failed), Name, Provider, Bursting, Nodes, Credential, Uptime, and Actions (Information / Edit Collaborators, Edit, Deploy, Destroy, Logs, Delete & Cluster SSH Key). The Actions vary based on the State and License Type (see the notes below for additional information).

#### Notes:

- Clicking **User SSH Key** next to your user name will download a . pem file that can be used to access the head node of a cluster via SSH. This provides you full control over the cluster.
- Clicking the refresh icon (③) at the top right of the cluster list, refreshes the list.

- Clicking the add icon (•) at the top right opens the **New Cluster** screen.
- Clicking the name of a cluster shows this information:
  - Cluster Info Jobs Submitted (Total, Today, This Month, This Year, Blocked Jobs), Queue (Running, Queued, Total Jobs), Nodes (Available, Busy, Down, Offline, Total Nodes), and Activities Log (All, Job).
  - Queue ID, Name, State (I Queued, 
     <sup>A</sup> Running, 
     <sup>O</sup> Completed), Submitted, Cores, Nodes, and Actions (<sup>⊗</sup>).

  - **Configuration** Cluster ID, Head Node Size, Image Name, Cluster IP, SSH Username, Date/Time Created, Availability Zone, and Download Cluster SSH Key.
- Clicking the information icon (i) at the end of the row shows additional details about the cluster, including: Cluster ID, SSH Username, Manager, Created, Modified, Expected Deploy Time, Actual Deploy Time, Uptime, Head Node Public IP, Prefix, Region, Head Node Size, and Compute Node Sizes. The buttons **Deploy/Destroy** and **Logs** also show.
- Clicking the horizontal ellipsis (···) at the end of the cluster row shows actions that you can take regarding the cluster:
  - **Edit** Modifies the configuration of the cluster. **Note:** The cluster must be in a Down state to edit.
  - **Deploy** Deploys the cluster into an available state.
  - **Destroy** Destroys the head node and the linked compute nodes so that they are no longer in a state to do work. This also means that you will not be billed further for these cloud resources. After a cluster is destroyed, the state shows as Down.
  - Logs Shows information about the provisioning. A screen shows information in real-time about the cluster's state. Additionally, these logs contain information for deploy and destroy.
  - **Delete** Permanently deletes the cluster. **Note:** The cluster must be down before it can be deleted.
  - Cluster SSH Key Downloads the cluster SSH key.
  - Edit Collaborators Shares the cluster. Note: The License Type must be Site.

### 3.4.2 Creating a Cluster

If you have already added your cloud credentials for the chosen provider, follow the steps below to create a new cluster, which can then be deployed at any time. If you have not yet added your credentials, you must first follow the steps in the section Credentials Manager.

**1.** To create a new cluster, on the **Cluster Manager** screen, click the add icon (•). The **New Cluster** screen shows the cloud service providers that you have credentials for:



- 2. Select the cloud service provider that you want to deploy a cluster in.
- **3.** Enter the desired information for the new cluster, such as: Name, OS Type, Prefix, Credential, Head Node Size, Manager, Region, Availability Zone, Bursting Configuration, Compute Nodes, Size, Count, and Description.

Clicking the **Advanced** button shows these additional fields: Subnet, VPC, Security Group, Elastic IP Address, Private IP, Proxy, Server Volume (GB), Node Volume (GB), and Packages.

**Notes:** The available fields vary based on the provider. Multiple Compute Node Instances of different sizes can be added. The available Regions, Availability Zones, Server Instance Sizes, Compute Node Instance Sizes, and quantity of instances may vary based on your provider account status.

- 4. Click Save. The state shows Down until it is deployed.
- 5. Repeat the steps in this section to create additional clusters as desired.

### 3.4.3 Deploying a Cluster

**1.** To deploy a cluster, click the ellipsis and then click **Deploy**. The state changes to Available.

### 3.4.4 Deleting a Cluster

To delete a cluster, it must first be down.

- **1.** Click the ellipsis for the desired cluster and then click **Destroy**.
- 2. After the state changes to Down, click Delete.

## 3.5 Job Manager

You can add jobs and submit them to either an existing cluster or a temporary on demand cluster by using Job Manager.

This section contains the following information:

- Adding a New Job
- Adding a Temporary On Demand Job

## 3.5.1 Adding a New Job

**1.** To add a new job, on the **Applications** menu, click **Job Manager**. The **Job Manager** screen opens:

义 NODUS Cloud OS 🛛 🚍	Ċ						9	User Name 🗸 User
APPLICATIONS E Cluster Manager © Stack Manager	job	Manager	۹.	Search				+
Credentials Manager	Name	2	Nodes	Cores	Data Files	Walltime	Submit	Actions
Di File Manager	🗂 test-s	stdout-stderr	1	1		01:00:00	M	

This screen shows this information: Name, Nodes, Cores, Data Files, Walltime, Submit, and Actions (Edit, Copy, & Delete).

**2.** Click the add icon (•) at the top right to open the **New Job** screen.

- **3.** On the **Job Info** panel, enter the desired information for the new job: Name, Walltime, Number of Nodes, Number of Cores per Node, and Description. This can be edited after the job is saved by clicking the name of the job.
- **4.** On the **Script** panel, either edit the script for this job or click **Upload Script**. This can be edited after the job is saved by clicking the name of the job.
- **5.** On the **Data Files** panel, click **Upload Data** to upload any data files that the job may require. This can be edited after the job is saved by clicking the name of the job.
- **6.** After selecting a sample job, then select the cluster type: **Named Cluster**. If there are no created clusters or ones that meet the hardware requirements of the job, then certain named clusters may not appear.
- 7. Click **Save** to finish adding the job.
- **8.** Click **Submit**. The job is queued and runs on the selected cluster. The cluster details screen shows the submitted job information:
  - **Cluster Info** Jobs Submitted (Over All, Today, This Month, This Year), Queue (Running, Queued), Nodes (Available, Busy, Down, Offline), Activities Log (All, Job), and Nodes/Workload graph (see below).



This graph shows the status of Available Nodes, Busy Nodes, & Down Nodes, and the status of the Running Jobs, Queued Jobs, & Blocked Jobs. Click to deselect nodes and jobs to narrow the display results. Hover over the graph to see the number of nodes or jobs.

- **Queue** ID, Name, State, Time, Node Count, Executing Nodes, and Actions ((2)). **Note:** After a job completes, it only shows here temporarily, but can be viewed in File Manager.
- Nodes □ (Deploy, Destroy), Name, State ( All Nodes, ↓ Available, ↓ Busy, ↓ Offline, ↓ Down), Cores, Load Avg, and Actions (Deploy, Destroy).
- **Configuration** Cluster Information (Cluster ID, Head Node Size, Image Name, Cluster IP, SSH Username, Date/Time Created, Availability Zone, and Download Cluster SSH Key), Cluster Compute Nodes (Resize Cluster), and Bursting Service (View Logs, Burst Once & Enable Service / Disable Service). **Note:** See the sections Bursting Configurations and Bursting Service for information about bursting.

**Note:** Jobs can also quickly be run from any screen at any time by clicking the **Quick Launch / Briefcase** icon (i) near the top left of the screen.

### 3.5.2 Adding a Temporary On Demand Job

Follow one of the options below to add a temporary on demand job:

- Using the Add Icon
- Using the Quick Launch Icon
- Using the Submit Icon

#### Using the Add Icon

- 1. On the Applications menu, click Job Manager.
- **2.** Click the add icon (•) at the top right to open the **New Job** screen.
- **3.** On the **Job Info** panel, enter the desired information for the new job: Name, Walltime, Number of Nodes, Number of Cores per Node, and Description. This can be edited after the job is saved by clicking the name of the job.
- **4.** On the **Script** panel, either edit the script for this job or click **Upload Script**. This can be edited after the job is saved by clicking the name of the job.
- **5.** On the **Data Files** panel, click **Upload Data** to upload any data files that the job may require. This can be edited after the job is saved by clicking the name of the job.

6. To run an on demand job, select On Demand, which will add On Demand Configuration options:

			SAVE
Job Info	Script	Data Files	
- Name* mpi-test			Walltime 01:00:00
f of Nodes *1		Cores per Node *	On Demand
On Demand Configuration			
Provider *	•	Type *	Prefix *
Credential *	•	Head Node Size *	Manager *
Region *			~
Description			

**7.** Complete the required fields.

These are the **On Demand Types**:

- Destroy Full Cluster The full cluster is destroyed including the head node.
- **Destroy Compute Nodes** The head node stays active and the compute nodes are destroyed.
- **Offline Compute Nodes** The head node stays active and the compute nodes go offline.
- Persist Cluster The head and compute nodes stays active.
- **8.** Click **Save** to finish adding the job.

**9.** On the **Job Manager** screen, click the arrow on your newly created job to submit your job. NODUS will create a NODUS defined cluster name. **Note:** If you want to define your own cluster name, use the option just below before submitting your job, selecting your job defined here.

The defined cluster and node will be deployed, the job will run, and then your defined cluster will be destroyed based on your on demand type chosen.

#### Using the Quick Launch Icon

- 1. On the Applications menu, click Job Manager.
- **2.** On the **Job Manager** screen, click the **Quick Launch / Briefcase** icon () near the top left of the screen. The **Job Submit** dialog box opens:

Job Submit			
Please selected a Job and	l a Cluster		
Select Job	•	Select Cluster	
		В	ACK SUBMIT

- 3. Select your job from the drop-down list, select **On Demand** from the Select Cluster drop-down, and then click **Submit**.
- 4. Enter the cluster configuration options:

/ Cluster			
Name *	os Type* centos-7	Prefix*core	
Credential *	<ul> <li>Head Node Size *</li> <li>s1.large - vCPU: 2</li> </ul>	▼ Torque	Ŧ
Region *		wailability Zone *	•
Bursting Configuration: Perc			
Parsang connguration. Pers	sistent: Bursting Min Max		
Compute Nodes:	sistent: Bursting Min Max	⊂ Count *	•
Compute Nodes: ① Size* s1.large - vCPU: 2	sistent: Bursting Min Max	✓ O Count*	+
Compute Nodes: ① - 5/20 * S1.large - vCPU: 2 Description	sistent: Bursting Min Max	• Count * - 0	•

5. Click Save to finish adding the job and then click Submit.

The defined cluster and node will be deployed, the job will run, and then your defined cluster will be destroyed based on your on demand type chosen.

#### Using the Submit Icon

- 1. On the Applications menu, click Job Manager.
- **2.** Click the submit (>>) icon:

- Hi O		🗂 Job N	Nanager		Q Search				•
		Name		Nodes	Cores	Data Files	Walltime	Submit	Actions
	C	npi-tes	it	1	2		01:00:00	A	
								Rows per page: 10 🔻	< >

- **3.** Enter the cluster configuration options.
- 4. Click **Save** to finish adding the job and then click **Submit**.

The defined cluster and node will be deployed, the job will run, and then your defined cluster will be destroyed based on your on demand type chosen.

## 3.6 File Manager

You can view, download, and delete a job's standard output file or error file using **File Manager**.

**1.** On the **Applications** menu, click **File Manager**, and then from the **Select Cluster** dropdown list at the top right, select a cluster:

奖 NODUS Cloud OS 🛛 🚍	ĉ						2	User Name
APPLICATIONS								
🛢 Cluster Manager	D F	ile Manager	Q Search				Select Cluster oracle0	-
Stack Manager								
Credentials Manager	_							
🗂 Job Manager		Manager ID	Nodus ID	Name	Owner	Size(B)	Modified V	Actions
🗅 File Manager		0	0	test-stdout-stderr	aauser	4096	September 14, 2020 3:49 PM	
							Rows per page: 10 💌 1-1 of 1	< >

The **File Manager** screen shows this information: Manager ID, Nodus ID, Name, Owner, Size(B), Modified, and Actions.

**2.** Click the ellipsis at the end of a row and select the desired option: View STD-Out, Download STD-Out, View STD-Err, Download STD-Err, or Delete.

## 3.7 Bursting

This section contains the following information:

- Bursting Configurations
- Bursting Service

## 3.7.1 Bursting Configurations

The NODUS burst function detects what jobs are in the queue and automatically spins up, takes offline, or shuts down nodes depending on the total requirements for the queue. If there are not enough online nodes to run all jobs, bursting will bring on as many nodes as needed. If there are more nodes than needed, the excess nodes will be taken offline. If the job queue is empty, all nodes will be shut down after a specified period of time.

Min Burst spins up the minimum number of compute nodes required to complete all jobs in the queue, which is ideal for budgeting and controlling cloud costs.

Max Burst spins up enough compute nodes to complete all the jobs in the queue immediately; this gets results as fast as possible. Max Burst is limited by the size of the cluster and will not create new nodes.

Persistent bursting spins up all or a portion of the licensed instances in a cluster that remain persistent for a period of time and brings nodes online or shuts them down as needed.

On demand bursting spins up the number of nodes required to run one job now; this is an isolated cluster, not for sharing with other jobs. The on demand types are: Destroy Compute Nodes (the head node stays active and the compute nodes are destroyed), Offline Compute Nodes (the head node stays active and the compute nodes go offline), and Destroy Full Cluster (the full cluster is destroyed including the head node).



See the diagram below for details.

### 3.7.2 Bursting Service

To manage cluster cloud bursting configurations, on the **Cluster Manager** screen, select a cluster and click the **Configuration** tab. The **Cluster Information** screen displays:

Cluster Information	
Cluster ID: 5ed7bbc32331eb7ac268e616 Head Node Size: Standard_DS2_v2 - vCPU: 2, Mem (GB): 7 Image Name: core-server Cluster IP: 5:15:137140 SSH Username: centos	Cluster Compute Nodes
Dote/Time Created: June 3, 2020 11:03 AM DOWNLOAD CLUSTER SSH KEY	Size Count Standard_DS2_v2 - vCPU: 2, Mem (GB): 7 1 RESIZE CLUSTER
Bursting Service: Off Bursting Service Min : Max	
VIEW LOGS BURST ONCE	

Bursting Service (Off/On) - Disable or enable bursting functionality for a single cluster:

- 💵 (disabled) The cluster remains in its current state.
- (enabled) Jobs are run and compute nodes are provisioned to handle the jobs:
  - (Min) Min Burst spins up the minimum number of nodes required to complete all jobs in the queue. This is ideal for budgeting and controlling cloud costs.
  - (Max) Max Burst spins up enough nodes (as set from the jobs' node count) to complete all the jobs in the queue immediately. This gets results as fast as possible.

**Burst Once** - This spins up or tears down nodes as required to complete all the jobs in the queue. Select a one time bursting size - Min or Max.