

Nutanix Community Edition Deployment Guide

Version 1.0

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NUTANIX™



RS TECH SERVICES LLC

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Document Information

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Intended Audience: Technical personnel employed by RS Tech Services, LLC. The guidance provided in this document assumes knowledge of basic networking concepts, IT systems administration principles, and the Nutanix platform.

Revision History

This table provides a list of changes to this document since its release.

Date	Chapter	Revision	Author
1/29/2021	All	Original	R.Steele

Notes, Warnings and Cautions



Note

A note draws your attention to important details.



Warning

A warning indicates that system malfunction or data loss **may** occur if you do not follow the advice given.



Caution

A caution message indicates that system malfunction or data loss **will** occur if you do not follow the advice given.

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1 Overview

Nutanix Community Edition is a free version of Nutanix's Acropolis Operating System (AOS), which runs Nutanix's Hyperconverged Infrastructure (HCI) platform. Community Edition consists of the following components:

- The Acropolis Hypervisor (AHV), a type 1 hypervisor which runs user virtual machines (VMs) as well as the Nutanix Controller VM (CVM).
- The Prism Element web console, a redundant management interface that runs on each hardware node in the Nutanix cluster.

While the paid version of Nutanix comes installed on certified hardware guaranteed for production use in the enterprise, Community Edition is installed by the customer on bare metal servers they already have.

Community Edition is appropriate for customers who:

- would like to try Nutanix before committing to a major purchase.
- intend to use Nutanix in a test/dev environment.

Warning

Community Edition is NOT intended for production use! Ensure that customers understand that they will not get enterprise-level performance from Community Edition installed on their own hardware.

2 Hardware Requirements

The table below shows Nutanix hardware recommendations for Community Edition:

Table 2-1: Hardware Requirements

Component	Nutanix Recommendation	Notes
Central Processing Unit (CPU)	Intel CPUs with VT-x support	Four-core minimum because 2 cores are dedicated to the CVM
System memory	16 GB minimum; 32 GB or higher recommended	32 GB or greater recommended for AOS features such as deduplication, compression, or more user VMs
Network interface card (NIC)	Intel-based NIC	
Host bus adapter (HBA)	Community Edition supports Advanced Host Controller	

	Interface (AHCI) SATA, or LSI controller with: <ul style="list-style-type: none"> • IT mode • IR mode with pass-through • IR mode with RAID-0 	
Storage Devices (all drives)	Maximum number of SSD/HDD drives per node is four	
Storage Devices (cold tier)	500 GB or greater available; Maximum 18 TB (3 x 6 TB HDDs)	Hard disk drive (HDD) or Solid-state drive (SSD) for cold-tier storage
Storage Devices (hot tier flash)	Single 200 GB SSD or greater	Place SSD(s) before HDDs (commonly Bay 0 or Bay 1). The first bay number varies depending on manufacturer labeling; NVMe-based drives are not supported
Boot device	One 8 GB capacity device per node. It can be an external or internal device	Nutanix has successfully tested and used external USB drives and internal devices such as a SATA DOM. USB 3.0 media recommended
Firmware	Consider updating the firmware for any hardware you plan to use to the latest version recommended by the hardware vendor	

Source: Nutanix. (2020). "Getting Started with Nutanix Community Edition"

Caution

If you use a USB flash device as your boot drive, do not remove it while the server is running!

2.1 Cluster Sizing

Community Edition supports up to four (4) nodes in a single cluster. Nutanix recommends deploying a three-node cluster to reap the most benefit from the platform. If you deploy a single node cluster, you will not be able to take advantage of Nutanix's high-availability (HA) features.

Warning

It is not possible to extend a one or two node cluster. Moving from a one or two-node cluster requires destroying the existing cluster and all VMs.

Discuss these limitations with the customer before recommending a cluster size.

3 Network Requirements

This section outlines network-related requirements that must be addressed before proceeding with the install.

3.1 IP Address Considerations

Warning

Nutanix recommends using static IP addresses for all nodes and CVMs. If the customer uses a DHCP server, ensure the assigned IP addresses are excluded from the DHCP pool.

You need to reserve two (2) IP addresses for **each** node in the cluster. The first IP is for the node itself, and the second is for the CVM that will run on that node.

Nutanix recommends using the 10.x.x.x or 172.x.x.x IP address schemes. Use the Network Information Checklist in the appendix to record this information before the install.

Caution

Community Edition reserves the IP range 192.168.5.1 through 192.168.5.254 for internal communication between nodes. Ensure the customer is not using this range for any other device on the network!

3.2 Firewall Considerations

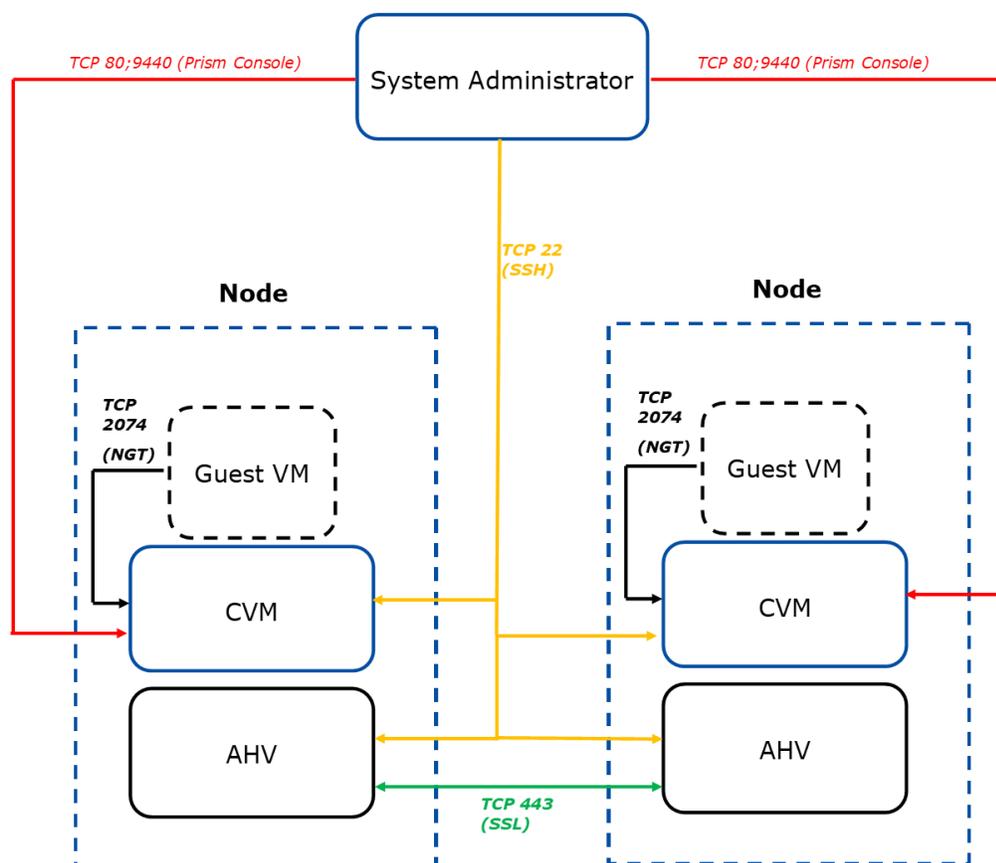
The following table outlines which firewall ports must be open for Community Edition to communicate properly.

Table 3-1: Firewall Port Requirements

Purpose	Port
SSH to both CVM and hypervisor	TCP 22
NTP Service	UDP 123
Prism Web Console	TCP 80; 9440
Cluster remote support	TCP 80; 443
Nutanix Pulse (a service which sends cluster alerts and usage statistics to Nutanix)	TCP 8443
Nutanix Guest Tools (NGT) communication between guest VM and CVM	TCP 2074

Source: Nutanix. (2020). "Recommendation on Firewall Ports Config, KB 1478", "Getting Started with Nutanix Community Edition"

Figure 3-1: Basic Communication Diagram



4 Software Requirements

The customer must have a valid account on the Next Community Edition forum (<https://www.nutanix.com/products/register>) to download the software, access most support resources, and activate the cluster.



Note

The email account used to set up the account must be a business address. Public accounts like Gmail and Yahoo cannot be used.

4.1 Licensing

Ask your customer to sign up for a Next Community Edition account and register for software access by visiting the following link:

<https://www.nutanix.com/products/register>.

4.2 Obtaining the Software

After registration, download the software from the Next forum post entitled “Nutanix Next Community Download Software” located here: <https://next.nutanix.com/discussion-forum-14>. The customer must be logged in to access this location (Nutanix, Inc., 2020).

4.3 Preparing the Boot Device

The boot device (USB stick or SATA DOM) must be at least 8 GB as mentioned previously. Flashing the boot device with Nutanix software will destroy all pre-existing data on that drive.

You will need one boot device for each cluster node.

4.3.1 Windows

You will need to use a third-party tool such as the open source [Win32DiskImager](#) to image your boot device(s) with the Nutanix ISO downloaded in Section 4.2.

4.3.2 Linux/Mac OS X

The following procedure was taken verbatim from Nutanix’s help article “Getting Started with Nutanix Community Edition:”

If you are using a Linux or Mac OS X environment, you can use the dd command to image the device:

```
dd if=ce.img of=/dev/sdX
```

where X is the USB drive letter.

- [Linux only] To find the USB drive letter, check the output of this command:

```
for i in /dev/sd?; do udevadm info --query=all --name=$i; done
```

- (OS X only) List any storage devices:

```
diskutil list
```

- (OS X only) Show information about a specific device:

```
diskutil info /dev/X
```

where X is the USB drive.

(OS X only) For improved performance when imaging, specify a block size of 1 MB.

For example:

```
dd if=ce.img of=/dev/rdisk2 bs=1m
```

(Nutanix, Inc., 2020)

Caution

Never remove a USB boot volume while the node is powered on!

5 Deployment

Before proceeding, ensure the node's boot device is set to USB in BIOS (if you are using a USB boot device). Typically, you will need to press a function key or the escape key to enter the BIOS settings. The hotkey needed typically displays during POST. If it does not, consult the hardware vendor instruction manual.

5.1 Installation Procedure

Caution

The deployment process destroys any pre-existing data on all drives!

1. Insert the USB stick and power on the node. The machine should boot to the image loaded on the USB drive.

2. When prompted, enter **install** as the username, and leave the password blank.
3. Select the appropriate keyboard layout using the arrow keys.
4. Read the warning about the destructive testing and use tab to select "Proceed."
5. Press "Enter" to proceed with installation.

Figure 5-1: Initial Install Screen

```

<< Nutanix Community Edition Installer >>

Please select your keyboard layout from the following list.

*****Keyboard Layout*****
| us-utf-8                               |
| us-us                                  |
| uk                                      |
| unicode                                 |
|* us *                                  |
| us-acentos                             |
| us-alt-intl                             |
| us-altgr-intl                           |
*****

WARNING: Destructive IO tests will be run on the following disks in order to confirm acceptable performance
If the disks listed below still have any data on them, please cancel and backup your data first.

***** Disks *****
| sda: Model [VMware Virtual S], Size [214.75] GB, Serial [None] |
| sdb: Model [VMware Virtual S], Size [536.87] GB, Serial [None] |
*****

Cancel   Proceed

```

Source: Nutanix. (2020). "Getting Started with Nutanix Community Edition"

6. Enter the IP address, subnet mask and gateway information for the node (host) and the CVM. Use the Tab or arrow keys to go to the next field.
7. Use the space bar to select "Create a Single Node Cluster" if applicable.

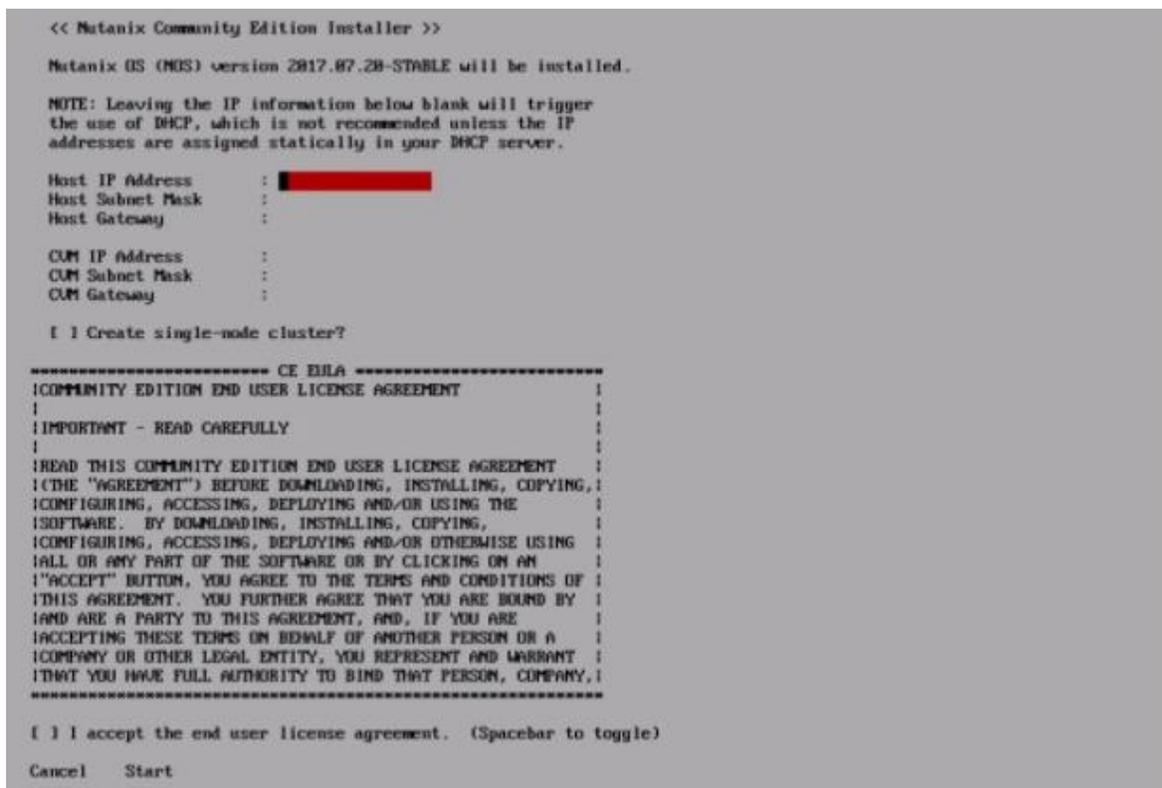


Note

If you are creating a single-node cluster, the installer will also prompt you to enter a Domain Name Service (DNS) server IP. If the customer does not have an internal DNS server, you can use an IP from a public DNS service such as Google Public DNS (8.8.8.8 or 8.8.4.4) (Google, LLC, n.d.)

8. Accept the End User License Agreement (EULA).
9. Use Tab to highlight "Start," and press "Enter."

Figure 5-2: Post-Install Configuration

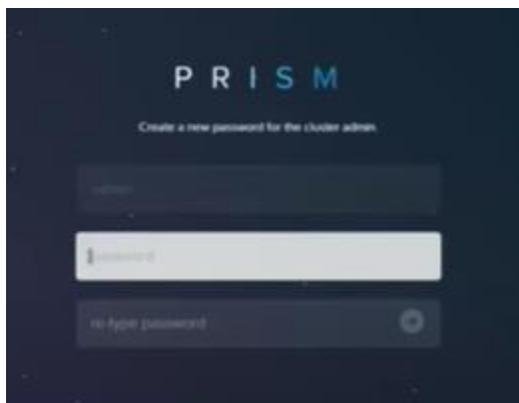


Source: Nutanix. (2020). "Getting Started with Nutanix Community Edition"

When the installation completes, you will see a "Imaging Process Completed Successfully" message. The CVM will then start. Please allow about 5 minutes for all CVM services to start.

10. Open a web browser and enter the IP of the CVM. The management console will display:

Figure 5-3: Prism Element Initial Login Screen



Source: Nutanix. (2020). "Getting Started with Nutanix Community Edition"

11. Enter the default password of **nutanix/4u**. The system will prompt you to change it. Have the customer enter a secure password of his/her choice.
12. Have the customer enter his/her NEXT credentials to finish registering the cluster. This is the account created in section 4.



Note

See [“Default Nutanix passwords”](#) in the appendix for a list of default passwords for various components of the Nutanix system. **All default passwords are well known and should be changed after deployment.** The appendix also contains instructions on [how to change these passwords.](#)

13. At the login prompt shown after installing Community Edition, log into the node. The username is **root** and the default password is **nutanix/4u**.
14. Log into the CVM via secure shell (SSH). The username is **nutanix**, and the default password is **nutanix/4u**.

5.2 Cluster Configuration

Use the procedure outlined in [Section 5-1 “Installation Procedure”](#) to deploy the Nutanix software to the remaining nodes in the intended cluster before proceeding with cluster configuration.



Note

If you are creating a multi-node cluster, skip to 5.2.2 [“Creating a Multi-Node Cluster.”](#)

5.2.1 Creating a Single-Node Cluster

1. Connect to the CVM using SSH.
2. Create the cluster by entering the following command, where **cvm_ip** is the CVM’s IP address:

```
cluster -s cvm_ip --redundancy_factor=1 create
```

A series of messages informs you that the cluster is being created and services are starting. When the process is finished, a “cluster created message” is displayed.

3. Configure one or more DNS servers by entering the following command, where **dns_server** is either a single IP, or a comma-separated list of multiple IPs:

```
ncli cluster add-to-name-servers servers="dns_server"
```

You can specify either internal DNS IP addresses, or use a public DNS service such as Google Public DNS (8.8.8.8 and 8.8.4.4).

4. Verify the configuration:

```
ncli cluster get-name-servers
```

(Nutanix, Inc., 2020)

5.2.2 Creating a Multi-Node Cluster



Note

You will need another IP address, which Nutanix calls the “external IP address,” to use as the cluster IP. This IP is used to access Prism, the management interface for the cluster. Nutanix recommends using a static IP for the external IP.

Despite its name, the external IP should be LAN-facing only, and NOT accessible from the internet.

1. Connect to a CVM using SSH.
2. Create the cluster by entering the following command, where **cvm_ip_addresses** is a comma-separated list of all the CVM IP addresses that will be part of the cluster:

```
cluster -s cvm_ip_addresses create
```

3. Start your new cluster:

```
cluster start
```

A series of messages should display, indicating a status of **UP** for each node in the cluster.

5.2.2.1 Configure Cluster

1. Define the name of the cluster by entering the following command, where **cluster_name** is the desired cluster name:

```
ncli cluster edit-params new-name=cluster_name
```

2. Configure one or more DNS servers using the following command, where **dns_server** is a single DNS server, or a comma-separated list of servers:

```
ncli cluster add-to-name-servers servers="dns_server"
```

3. Confirm the new DNS settings:

```
ncli cluster get-name-servers
```

4. Configure Network Time Protocol (NTP) servers, where **ntp_server** is a single NTP server, or a comma-separated list of servers. You can use the customer's internal NTP servers (if applicable), or external sources such as the time.nist.gov NTP server pool:

```
ncli cluster add-to-ntp-servers servers="ntp_server"
```

5. Configure the external IP (cluster IP), where **cluster_ip_address** is the cluster IP:

```
ncli cluster set-external-ip-address \ external-ip address="cluster_ip_address"
```

(Nutanix, Inc., 2020)

5.2.3 Destroying a Cluster

Destroying a cluster resets all nodes to the state they were in before the cluster was created. This process also destroys all guest VMs.

Cluster destruction is necessary if the customer wants to move from a single-node to a multi-node cluster, or if the customer is finished using Community Edition and wants to re-purpose the hardware for another application.

Caution

Destroying a cluster also destroys all guest VMs. Ensure the customer has backed up any needed VMs or data because this process is irreversible!

1. Connect to a CVM using SSH.

2. Stop the cluster by running the following command:

```
cluster stop
```

3. Wait until output like the following is displayed for every CVM:

Figure 5-10: Cluster Stop Output

```
CVM: 172.16.8.191 Up, ZeusLeader
    Zeus UP [3167, 3180, 3181, 3182, 3191, 3201]
    Scavenger UP [3334, 3351, 3352, 3353]
    ConnectionSplicer DOWN []
    Hyperint DOWN []
    Medusa DOWN []
    DynamicRingChanger DOWN []
    Pithos DOWN []
    Stargate DOWN []
    Cerebro DOWN []
    Chronos DOWN []
    Curator DOWN []
    Prism DOWN []
    AlertManager DOWN []
```

Source: Nutanix. (2020). "Getting Started with Nutanix Community Edition"

4. Destroy the cluster using the following command:

```
cluster -f destroy
```

6 References

- Google, LLC. (n.d.). *Google Public DNS: Home*. Retrieved 01 27, 2021, from Google Public DNS: <https://developers.google.com/speed/public-dns>
- Intel, Inc. (n.d.). *AHCI specification for Serial ATA*. Retrieved 02 01, 2021, from Intel | Data Center Solutions, IoT, and PC Innovation: <https://www.intel.com/content/www/us/en/io/serial-ata/ahci.html>
- National Institute of Standards and Technology. (n.d.). *NIST Internet Time Servers*. Retrieved 01 30, 2021, from <https://tf.nist.gov/tf-cgi/servers.cgi>
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- Poitras, S. (2021). *The Nutanix Bible*. Retrieved 02 01, 2021, from <https://nutanixbible.com/>

7 Appendix

7.1 Glossary and Acronyms

Term	Definition
AHCI	Advanced Host Controller Interface. A technical standard defined by Intel that specifies the operation of Serial ATA (SATA) host controllers in a non-implementation-specific manner in its motherboard chipsets (Intel, Inc., n.d.).
Boot volume	Refers to the partition on a hard disk containing the operating system and its dependent files.
CVM	Controller Virtual Machine - The Nutanix CVM is what runs the Nutanix software and serves all the I/O operations for the hypervisor and all VMs running on that host (Poitras, 2021).
Deduplication	A technique used for eliminating duplicate copies of data. Deduplication is used to ensure more efficient use of available storage.
HA	High-Availability. Used to improve uptime for a system. Nutanix HA is achieved with the use of redundant nodes that ensure continued uptime even in the event of a node failure.
HCI	Hyper-converged infrastructure. Software-defined IT infrastructure that abstracts away all elements of conventional systems, such as the hypervisor, storage, and networking. The end goal is a system that is simpler to operate and maintain.
Hypervisor	A piece of computer software that runs virtual machines.
Hypervisor, Type 1	A hypervisor that is installed directly onto a host server. A host server running a type 1 hypervisor is a dedicated virtualization host that cannot be used for any other purpose.
NVMe-based drives	Nonvolatile memory express. A storage access and transport protocol for flash and next-generation solid-state drives.

7.2 Network Information Checklist

Description	IP Address
Node IP	
Node Subnet Mask	
Node Default Gateway	
Controller VM IP address	
Controller VM subnet mask	

Controller VM Default Gateway	
External IP (If cluster > one node>	

Source: Nutanix. (2020). "Getting Started with Nutanix Community Edition"

7.3 Default Nutanix Passwords

Target	Username	Password
Controller VM (Nutanix Web Console)	admin	Nutanix/4u
Nutanix Node	root	nutanix/4u
Controller VM (SSH client)	nutanix	nutanix/4u

Source: Nutanix. (2020). "Getting Started with Nutanix Community Edition"

7.4 How to Change Nutanix Passwords

Use the commands in the table below to change the Nutanix passwords from their default:

Target	Username	Command	Note
Controller VM	nutanix	sudo passwd nutanix	
Controller VM	admin	(Changed during post-deployment configuration)	Can be changed in the Prism Console
Nutanix Node	root	<pre>echo -e "CHANGING ALL AHV HOST ROOT PASSWORDS. Note - This script cannot be used for passwords that contain special characters (\$ \ { } ^ &)\nPlease input new password: "; read -s password1; echo "Confirm new password: "; read -s password2; if ["\$password1" == "\$password2"] && [[! "\$password1" =~ [\\{\}\\$\^\&]]]; then hostssh "echo -e \"root:\${password1}\" chpasswd"; else echo "The passwords do not match or contain invalid characters (\ \$ { } ^ &)"; fi</pre>	This is a script that changes the node root password on all your nodes at once. Run this from any CVM in your cluster.

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