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Preface

This documentation presents information specific to Nexenta products. The information is for reference purposes and is subject to change.

Intended Audience

You can manage NexentaStor 5.x appliances with its Command Line Interface (CLI) and REST APIs, or with the NexentaFusion graphical user interface (GUI).

This document includes the instructions to install NexentaStor and covers the following tasks:

- Ensure that the NexentaStor installation requirements are met.
- Deploy NexentaStor appliance in any of the following ways:
  - Upgrade to the latest version from a previously installed version.
  - Perform a new installation.
- Activate the product license.

Document History

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nxs-5.1-installationguide-RevA</td>
<td>June, 2018</td>
<td>GA version</td>
</tr>
</tbody>
</table>
Installing NexentaStor 5.x

NexentaStor is a software-based storage appliance providing network-attached storage (NAS) and storage-attached network (SAN) solutions. NexentaStor supports file and block services and a variety of advanced storage features such as replication between various storage systems and unlimited snapshots.

System Requirements

You can install NexentaStor either on a bare-metal server or in a virtualized environment. This section covers supported hardware and software versions and configurations.

Bare-metal

Before installing NexentaStor 5.x on a bare-metal server, access the NexentaStor Hardware Certification List (HCL) to determine that you are using NexentaStor-compatible hardware.

VMware

- VMware ESXi 5.5 U2 and later
- VMware Workstation 10+
- VMware Fusion 6+
- vSphere 5.5+ and clients

VM Configuration

- Oracle Solaris 10+ 64-bit
- At least 4GB RAM; 8GB RAM is recommended
- Two NICs: Separate NICs for management and storage traffic
- One 10GB virtual disk for the OS installation
- Three or more virtual disks for pool creation
- Virtual CD setup for the NexentaStor installation
Reserved Ports

NexentaStor 5.x appliance uses the ports listed in Table 1. You must add these ports as exceptions when configuring your firewall to allow connections to the corresponding NexentaStor services.

Table 1: List of Network Ports for Firewall Rules

<table>
<thead>
<tr>
<th>Protocols and Services</th>
<th>Port Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Incoming to NexentaStor Management Interface</strong></td>
<td>TCP ports 22 (SSH), 6557, 5557, 8443 (REST API)</td>
</tr>
<tr>
<td><strong>Outgoing from NexentaStor appliance</strong></td>
<td>SNMP (UDP 161, 162), DNS (53 UDP/TCP), NTP (UDP 123), ICAP (port 1344)</td>
</tr>
</tbody>
</table>
| **Outgoing to Internet** | https://licensingservice.nexenta.com/ (443) (ssl)  
                          | https://logcollector.nexenta.com (443/20/21/7000-8000) (ssl/ftp)  
                          | https://prodpkg.nexenta.com (443) (ssl) |
| **Support Bundles** | TCP port 21 (FTP) |
| **Outgoing to the mail server** | TCP port 25 or 587 for relay only (SMTP) |
| **Between the interfaces with the hpr.dataAddress for Replication Data Protocol** | TCP port 6000 by default but can be changed |
| **Between NexentaStor Management Interfaces of the clustered nodes** | UDP and TCP port 1195 |
| **For data traffic on any data interfaces:** | |
| iSCSI Target | TCP port 3260 |
| SMB | UDP ports: 137, 138, TCP ports 137, 139 |
| CIFS | UDP and TCP port 445 |
| NFSv3 | UDP ports: 111, 2049, 4045, 32768:65535  
       | TCP ports: 111, 2049, 4045, 32768:65535 |
| NFSv4 | TCP port: 2049 |
Installing NexentaStor

If you have already installed an earlier NexentaStor 5.x version, upgrade to the latest version. Upgrading from NexentaStor 4.0.x to NexentaStor 5.x will be supported from next release. To upgrade from an earlier version of 5.x to the latest, see the section Upgrading to the Latest NexentaStor 5.x Version. To upgrade from 4.0 to the latest 5.x, see the doc “Upgrading from 4.0.x to 5.x” that will be published during the next release.

This section covers how to do a brand new installation of the NexentaStor software from the ISO.

Download

To download the image, do the following steps.

1. Download the 600MB ISO image from the URL provided in the email.
2. Store the ISO image somewhere that the appliance server or VMware ESXi server can access it.
Install

The sequence of steps to install the NexentaStor image is outlined below.

1. Boot the computer or VM from the ISO image.
2. Install the language to select the keyboard layout.
3. Read and accept the End User License Agreement (EULA).
4. Follow the screen prompts to complete installation.
5. Proceed with the manual installation that walks you through a small set of questions to select devices for the root pool, configure management network interfaces, set passwords, and so on.

6. To get the latest software fixes, proceed with the upgrade steps in the next section.

Profile Based Installation

Profile based installation provides a way to upload a pre-defined response file to skip the interactive questions during the installation of NexentaStor. Choose this method to fully automate the installation process. For more information on the format of the response file, please contact Nexenta support services.

Nexenta offers two types of profile for the root pool:
- Single disk – Choose this if you want the NexentaStor installed on a single disk.
- Mirror – Choose this option if you want the NexentaStor appliance to be mirrored on another disk.

Here is an example of the response file:

```json
{
   "nef": {
      "node": "atomic"
   },
   "networking": {
      "interfaces": [
         {
            "adapter": "e1000g0",
            "address": "172.27.10.32/255.255.255.0"
         }
      ],
      "gateway": "172.27.10.1",
      "server1": "172.27.10.2",
      "server2": "172.27.10.3"
   },
   "storage": {
      "target": ["mirror","c1t0d0","c1t1d0"]
   }
}
```
Note: Contact Nexenta Support service to customize this response file for your environment.
NexentaStor Post-Installation Steps

Activating the License

To use NexentaStor, you must activate a license. NexentaStor supports either online or offline license activation. The online activation process uses the activation key you received from Nexenta Systems.

Nexenta offers 2 main license types for NexentaStor 5.1.1:

- **Enterprise Edition.** This perpetual license is sold based on total raw capacity in the system and includes core storage features such as file service, iSCSI service, snaps, clones, inline data reduction and schedule replication. It also includes the right to use NexentaFusion as the Graphical User Interface for the licensed system. Additional options (e.g. HA cluster, MetroHA, FC support, etc.) are sold separately.

- **Community Edition.** This license is provided free of charge and can be used in non-production environments. It includes a limited set of features (no HA, no MetroHA, no replication for example) and limits how much capacity can be allocated on the system. All support issues must be handled through the Nexenta community forums.

To activate the license online:

Use online license installation if the deployment node has access to the Internet. You enter the activation key with the `license activate` command. `license activate` contacts the Nexenta license server, which uses the activation key to generate your license. This command downloads your license and installs it in the system.

1. To activate the license on each NexentaStor appliance, use the following command.

   `CLI@nexenta> license activate <Activation Token>`

2. Scroll to the end of the license agreement by using the scroll bar and type `y` to agree to the license agreement.

3. You can view the license attributes with the command below. Table 2 lists the significant license attributes.

   `CLI@nexenta> license show`

To activate the license offline using the REST API:

Use offline license installation if the deployment node does not have access to the Internet.

1. Log in to the NexentaStor deployment node.

2. Display the system GUID using the following command.

   `CLI@nexenta> config list | grep -irn guid`

3. From a system that has access to the internet log into the Nexenta self-service portal [https://portal.nexenta.com](https://portal.nexenta.com) to enter the System GUID to generate and download the license file.
4. Save the license as a text file in a location where it is accessible from the deployment node or load onto the deployment node.

5. Verify if the REST service is enabled.

   CLI@nexenta> config get all rest.useSwagger

6. Enable the REST service if it is not enabled.
   - Log in to the CLI as admin.
   - Run the following command:

   CLI@nexenta> config set rest.useSwagger=true

7. Open a browser and connect to the REST interface https://<management IP>:8443/docs.
8. Login as admin on the REST interface.
9. Navigate to the Settings section and click on post method settings/system license.
10. Click on Choose file and upload the license file.
11. Click on Try it out.
12. Successful application will return OK.
13. Check if license is activated by running CLI@nexenta> license show.

### Table 2: License Attributes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expiration date</td>
<td>The date when the license expires. The trial license is limited to 45 days from the activation date. When the license expires: ‘READ’ operations in CLI like the show or list commands will continue to work. However, you will be blocked from performing any configuration change to the system using the REST API or CLI. In the NexentaFusion GUI, the appliance will be greyed-out from the appliance list blocking any drill-down operations to view and modify configurations.</td>
</tr>
<tr>
<td>Capacity limit</td>
<td>Refers to the total licensed maximum capacity limit, including hot spares, log and cache devices. When you reach the limit, you will not be able to create or import new pools, or add devices to existing pools. However, IO will continue.</td>
</tr>
<tr>
<td>Subscription</td>
<td>Refers to the maintenance period when you are entitled to receive software upgrades and fixes from Nexenta.</td>
</tr>
<tr>
<td>Features</td>
<td>Lists the features enabled in the NexentaStor ISO. For example: highAvailability, fibrechannel, continuousReplication, allFlash Obtain the allFlash license if you want to configure an all-flash pool.</td>
</tr>
</tbody>
</table>
Upgrading to the Latest NexentaStor 5.x Version

You can upgrade to the latest version from an earlier NexentaStor 5.x version using the steps described here.

1. Check the current version of the NexentaStor by running the following command.
   
   CLI@nexenta> software version

   Note the current version number to validate later that the upgrade completed successfully.

2. Verify if there are any updates available.
   
   CLI@nexenta> software updates

   VERSION   PACKAGINGDATE
   5.2.0      Mar 8 03:50:34

Setting Up Proxy

3. Configure the proxy server if you need to use one to access the repositories for upgrading NexentaStor software packages.
   
   CLI@nexenta> config set system.webProxy = http://example.com:8443

   To view the proxy server that you set up:
   CLI@nexenta> config list system.webProxy

   If you need to unset the proxy:
   CLI@nexenta> config reset system.webProxy

With Internet Connection

The upgrade process grabs the images from the following locations, bypassing the need to download images. Make sure that you can reach the location specified here.

CLI@nexenta> publisher list

   PUBLISHER         STATUS  LOCATION
   nexenta           online  https://prodpkg.nexenta.com/nstor/pkg5/
   HighAvailability  online  https://prodpkg.nexenta.com/thirdparty/HAC/rsf/pkg5/

4. Upgrade to the latest version from an earlier NexentaStor 5.x version.

   CLI@nexenta> software upgrade

   By default, this allows you to upgrade to the latest version.

5. Reboot once the upgrade completes.
6. Or to reboot automatically once the upgrade has successfully completed, use the \(-y\) option along with the upgrade command.

   CLI@nexenta> software upgrade \(-y\)

   **Note: Upgrading from NexentaStor 4.0.x to 5.x is not supported.**

7. Verify that you have successfully upgraded to the latest version. The system output shows the expected version number as in the following example.

   CLI@nexenta> system status
   Host name       ANS5QA40-1
   Version         5.1.1
   Cluster name    Not clustered
   Management IP address  10.3.199.163:8443

8. Confirm that the upgrade version is activated and to see your boot environment list.

   CLI@nexenta> software list
   NAME        SPACE  ACTIVENOW  ACTIVEAFTERREBOOT  CREATIONTIME
   nexenta     6.3M   no         no                 Sep  6 16:29:04
   nexenta-1   2.77G  yes        yes                Sep 19 15:02:56

9. Reboot the appliance.

10. Validate the software version.

    CLI@nexenta> software version
    PUBLISHER  VERSION    PACKAGINGDATE
    nexenta    5.1.1      Mon May 6 08:49:24 2017

**Without Internet Connection**

Upgrading without an internet connection requires the use of a special dark site upgrade ISO, available from support@nexenta.com.

Once you have the dark site upgrade ISO, you can either:
- mount the ISO through IPMI management console, or
- create a loadable DVD to be used for the upgrade.

**Using Loadable Image into the DVD Slot**

1. Log in to the NexentaStor node that does not have internet connection.
2. Load the DVD you created from the loadable image into the DVD Slot. The ISO gets mounted automatically.

**Using IPMI Management Console**

1. Log in to the NexentaStor node that does not have internet connection.
2. Log in to the IPMI management console and mount the ISO file through virtual media.

**Verify Availability of Media**

   CLI@nexenta> publisher discover
   MEDIA    PUBLISHER         LOCATION
   NS_UpgradeCD   nexenta           /media/NS_UpgradeCD/nexenta
   NS_UpgradeCD   HighAvailability /media/NS_UpgradeCD/rsf
To upgrade the NexentaStor ISO:

1. From the CLI, update the publisher origin.
   Destroy the current publisher first.
   
   CLI@nexenta> publisher destroy <publisher of the repository to remove>
   Example:
   CLI@nexenta> publisher destroy nexenta
   CLI@nexenta> publisher destroy HighAvailability

2. Set the publisher to pick the ISO from the dark site DVD.
   
   CLI@nexenta> publisher create nexenta /media/NS_UpgradeCD/nexenta

3. Set the publisher to pick the HighAvailability image from the dark site DVD.
   
   CLI@nexenta> publisher create HighAvailability /media/NS_UpgradeCD/rsf

4. Verify the publisher list.
   
   CLI@nexenta> publisher list
   
   PUBLISHER         STATUS  LOCATION
   nexenta           online  file:////media/NS_UpgradeCD/nexenta
   HighAvailability  online  file:////media/NS_UpgradeCD/rsf

5. Now dry-run the upgrade.
   
   CLI@nexenta> software upgrade -n
   Would perform upgrade from version 5.0.0.43.1 to 5.1.1.

6. Validate that the upgrade is in place.

7. Now run the actual upgrade.
   
   CLI@nexenta> software upgrade
   By default, this allows you to upgrade to the latest version.

8. Reboot once the upgrade completes.

9. Or to reboot automatically once the upgrade has successfully completed, use the –y option along with the upgrade command.
   
   CLI@nexenta> software upgrade -y

10. Validate the software version.
    
    CLI@nexenta> software version
    
    PUBLISHER    VERSION    PACKAGINGDATE
    nexenta      5.1.1        Mon May 6 08:49:24 2017
Upgrading Clustered Nodes

This example shows one pool, PoolA on NodeA and a HA service (PoolA) running on NodeA.

The section covers the following steps:
1. Failover a HA service (PoolA) running on NodeA to NodeB.
2. Upgrade NodeA.
3. Failover the HA service (PoolA) back to NodeA after upgrading NodeA.
4. Now upgrade Node B.
5. Move the service back to its original configuration.

To upgrade the clustered nodes:

1. List the HA services running on the clustered nodes.

   CLI@NodeA> haservice list
   NAME    DESCRIPTION       NODES        RUNNING  STOPPED  BROKEN
   poolA   myclusterservice  NodeA,NodeB   NodeA     NodeB    -

2. Verify the existing pools on both the nodes.

   CLI@NodeA> pool list
   NAME   SIZE    ALLOC   FREE   AVAIL  DEDUP  EXPANDSZ  FRAG  HEALTH
   poolA  9.63G   100.2M  9.53G  99%    1.00x  -         0%    ONLINE
   rpool  12.47G  7.41G   5.06G  41%    1.00x  -         26%   ONLINE

   CLI@NodeB> pool list
   NAME   SIZE    ALLOC   FREE   AVAIL  DEDUP  EXPANDSZ  FRAG  HEALTH
   rpool  12.47G  7.41G   5.06G  41%    1.00x  -         26%   ONLINE

3. Failover the HA service running on NodeA to the other node (NodeB) in the cluster.

4. The example here shows only one cluster service running on NodeA. If you have more than one service on the node, when failing over all the services will fail over to the other node in the cluster.

   CLI@NodeA> haservice failover <from-node> <to-node>
   Example:
   CLI@NodeA> haservice failover NodeA NodeB
   System response:
   The following services can be moved:
   PoolA
   Move 1 service(s) from node 'NodeA' to node 'NodeB'? [y/N] y
   Moving service 'PoolA' ... OK
   All running services have been successfully moved.
   Now the HA Service failed over to NodeB and the poolA imported to NodeB.

5. From NodeA or NodeB, verify that the HA Service failed over to NodeB.

   CLI@NodeB> haservice status
   System response:
   service:  PoolA
   NODE  STATUS  MODE  UNBLOCKED
   NodeA  stopped  manual  yes
   NodeB  running  manual  yes
6. From NodeB, verify that the PoolA from NodeA imported to NodeB.

```bash
CLI@NodeB> pool list
NAME   SIZE    ALLOC   FREE   AVAIL  DEDUP  EXPANDSZ  FRAG  HEALTH
poolA  9.63G   100.2M  9.53G  99%    1.00x  -         0%    ONLINE
rpool  12.47G  7.41G   5.06G  41%    1.00x  -         26%   ONLINE
```

7. Now upgrade NodeA. Before the actual upgrade, do a dry run to ensure that you are upgrading to the intended version.

```bash
CLI@NodeA> software upgrade -n
System response:
Would perform upgrade from version 5.0.1.2 to 5.1.1.
```

8. Now run the actual upgrade.

```bash
CLI@NodeA> software upgrade
By default, this allows you to upgrade to the latest version.
```

9. Reboot once the upgrade completes by typing y when prompted.

10. Or to reboot automatically once the upgrade has successfully completed, use the –y option along with the upgrade command.

```bash
CLI@NodeA> software upgrade -y
```

11. Confirm that the upgrade version is activated and to see your boot environment list.

```bash
CLI@NodeA> software list
NAME           SPACE  ACTIVENOW  ACTIVEAFTERREBOOT  CREATIONTIME
nexenta        6.3M   no         no                 Feb  1 16:29:04
nexentastor-1  2.77G  no          yes                Feb  6 15:02:56
```

12. Validate the software version.

```bash
CLI@NodeB> software version
PUBLISHER  VERSION    PACKAGINGDATE
nexenta    5.1.1        Mon May 6 08:49:24 2017
```

13. From NodeB verify that the NodeA is listed in the cluster after upgrading NodeA.

```bash
CLI@NodeB> hacluster status
== Cluster status ==
NAME       STATUS  NODES  SERVICES  DESCRIPTION
GACluster  ok      2/2    1/1       5.1.1 HA Cluster

== Nodes ==
NODE      STATUS  SERVICES  ADDRESS    HostId    Release
NodeA     up  0/1       10.3.65.9  -         -
NodeB     up      1/1       10.3.65.8  808b556b  3.12.0
```
14. After NodeA is upgraded, failover the service back to NodeA from NodeB using the following command on NodeB:

```
CLI@NodeB> haservice failover NodeB NodeA
```

15. Now verify from NodeA that the HA Service (PoolA) is up and running on NodeA.

```
CLI@NodeA> haservice status
```

System response:
```
service: PoolA
NODE STATUS MODE UNBLOCKED
NodeA running manual yes
NodeB stopped manual yes
```

16. Also verify that the pools moved from NodeB to NodeA.

```
CLI@NodeA> pool list
```

```
NAME SIZE ALLOC FREE AVAIL DEDUP EXPANDSZ FRAG HEALTH
poolA 9.63G 100.2M 9.53G 99% 1.00x - 0% ONLINE
rpool 12.47G 7.41G 5.06G 41% 1.00x - 26% ONLINE
```

17. Now upgrade NodeB.

```
CLI@NodeB> software upgrade
```

By default, this allows you to upgrade to the latest version.

18. Reboot once the upgrade completes.

19. Or to reboot automatically once the upgrade has successfully completed, use the `--y` option along with the upgrade command.

```
CLI@NodeB> software upgrade --y
```

Upgrading system software...

Upgrade done.

On the next boot the Boot Environment NexentaStor-5.1.1 will be mounted on `/.`

20. Confirm that the upgrade version is activated and to see your boot environment list.

```
CLI@NodeB> software list
```

```
NAME SPACE ACTIVENOW ACTIVEAFTERREBOOT CREATIONTIME
nexenta 6.3M no no Sep 6 16:29:04
nexentastor-1 2.77G no yes Sep 19 15:02:56
```

21. From NodeA verify that the NodeB is back in the cluster after upgrading NodeB.

```
CLI@NodeA> hacluster status
```

```
== Nodes ==
NODE STATUS SERVICES ADDRESS HostId Release
NodeA up 1/1 10.3.65.9 - -
NodeB up 0/1 10.3.65.8 808b556b 3.12.0
```
22. Now verify from both the nodes that the HA service is up and running from their original configuration. Run the following commands from both the nodes.

CLI@NodeA> haservice status
CLI@NodeB> haservice status

CLI@NodeA> haservice list

<table>
<thead>
<tr>
<th>NAME</th>
<th>GUID</th>
<th>VIPs</th>
<th>NODES</th>
<th>RUNNING</th>
<th>STOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>poolA</td>
<td>14089758145006079395</td>
<td>Avip</td>
<td>NodeA,NodeB</td>
<td>NodeA</td>
<td>NodeB</td>
</tr>
</tbody>
</table>
Exploring CLI

To start executing the NexentaStor CLI commands:

1. Log in using admin and the password you set during installation.
2. Type help to see the list of available CLI commands and utilities.
3. Type man <command> to see the man page for a specific command.
4. Type <command> <subcommand> --help to see usage information on a specific subcommand.

Viewing Logs

The following commands will help you troubleshoot your NexentaStor deployment:

- CLI@nexenta> journal list –o name,file - to list installation and syslog message logs.
  
<table>
<thead>
<tr>
<th>NAME</th>
<th>FILE</th>
</tr>
</thead>
<tbody>
<tr>
<td>install/caiman</td>
<td>/var/log/install/install_log</td>
</tr>
<tr>
<td>install/nef</td>
<td>/var/log/install/nef_log</td>
</tr>
<tr>
<td>install/messages</td>
<td>/var/log/install/messages</td>
</tr>
<tr>
<td>messages</td>
<td>/var/adm/messages</td>
</tr>
</tbody>
</table>

- CLI@nexenta> config list - to view values for the system parameters
- CLI@nexenta> software version and software list - to query what version of NexentaStor was installed and whether it is activated
- CLI@nexenta> license show - to display license terms
- CLI@nexenta> system status - to get a summary of system metrics

Updating System Passwords and Profile

Following are the two system profiles available for enhancing performance on an appliance:

- Default: This is the default system profile for Hybrid and All-Disk configurations.
- allFlash: This profile is to be used for All-flash configurations.

Should you want to change the values for the following entities from the values you entered during installation, using these commands:

- CLI@nexenta> profile show Lists all the available appliance profiles.
  
<table>
<thead>
<tr>
<th>NAME</th>
<th>ACTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>allFlash</td>
<td>False</td>
</tr>
<tr>
<td>default</td>
<td>True</td>
</tr>
</tbody>
</table>

- CLI@nexenta> profile activate <profile name> Selects a different system profile. Values are Default for hybrid or all-HDD systems, or AllFlash to use preset kernel settings to optimize performance for an all-SSD appliance.

- CLI@nexenta> user passwd –p <passwd> <username> Resets the admin user password.

- CLI@nexenta> hpr password-set –password=<string> Resets the replication password. The replication password must be the same for all nodes in the replication group for the data protection feature to work.
Note: Passwords should be at least 9 characters long and contain at least 3 of the following classes of characters: lowercase, uppercase, numeric, and special (for example, !, @, CLI@nexenta>, $, %, ^). Passwords should not be based on English dictionary or slang words, nor English first names or surnames.
Exploring REST API

Once you successfully installed NexentaStor, you can get online access to the REST API documentation using the static IP address you set up during the NexentaStor installation.

Note: The API online documentation is a developmental tool and access is disabled by default. Enabling access in a production environment is not recommended.

If you must enable access to the detailed REST API documentation, follow these steps:

1. Run `config set rest.useSwagger=true` (case-sensitive parameter)
2. Point your browser to https://<NexentaStorStaticIpAddress>:8443/docs/
Additional Resources

After installing NexentaStor 5.1.x and NexentaFusion 1.1.x, use the documents posted in https://nexenta.com/products/documentation for more information.