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Contents

1. Introduction ................................................................. 1
   1.1 About Virtuozzo Storage ........................................... 1
   1.2 Virtuozzo Storage Deployment Overview ...................... 1

2. Preparing for Installation ................................................ 3
   2.1 Minimal Hardware Requirements .................................. 3
   2.2 Network Setup Recommendations ................................. 4

3. Installing Virtuozzo Storage ............................................. 5
   3.1 Installing Management Panel ..................................... 5
   3.2 Obtaining the Token ................................................ 6
   3.3 Installing Storage .................................................. 8

4. Creating the Cluster ..................................................... 10
   4.1 Creating the Cluster on the First Node ......................... 10
   4.2 Adding Nodes to the Cluster ...................................... 12
To support the growing demand for both high performance and high data availability, modern data centers need a fast, flexible storage solution. Existing solutions, however, are often difficult to manage and maintain, or not flexible enough (e.g., local RAID arrays), or too expensive (e.g., storage area networks).

Virtuozzo Storage is designed to solve these issues. It can run on commodity hardware, so no significant infrastructure investments are needed. It is also easy to set up and grow on demand.

1.1 About Virtuozzo Storage

Virtuozzo Storage is a software-defined storage solution that allows you to quickly and easily transform low-cost commodity hardware and network equipment into protected enterprise-grade storage like storage area networks (SAN) or network-attached storage (NAS).

Virtuozzo Storage is optimized for storing large amounts of data and provides data redundancy (replication and erasure coding), high availability, self-healing, and storage sharing.

In Virtuozzo Storage, user data is stored on organized clusters of servers in the form of fixed-size chunks. These chunks are automatically replicated and distributed across available servers in the cluster to ensure high availability of user data.

Cluster storage space can be exported through access points like iSCSI, S3, or Acronis Backup Gateway.

1.2 Virtuozzo Storage Deployment Overview

To deploy Virtuozzo Storage for evaluation purposes, you will need to do the following:
Chapter 1. Introduction

1. Install management panel, the web-based user interface for managing Virtuozzo Storage clusters, on one of the servers in your infrastructure.

2. Install Virtuozzo Storage on every other server in your infrastructure.

3. Create a cluster in Virtuozzo Storage.
CHAPTER 2
Preparing for Installation

This chapter lists the system requirements for Virtuozzo Storage 2 and recommendations on network setup.

2.1 Minimal Hardware Requirements

Virtuozzo Storage works on top of commodity hardware, so you can create a cluster from regular servers, disk, and network cards. At least five physical servers are required to evaluate all Virtuozzo Storage features.

The following table lists minimal hardware required for a single node in the cluster:

<table>
<thead>
<tr>
<th>CPU</th>
<th>Dual-core</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM</td>
<td>2GB</td>
</tr>
<tr>
<td>Disks</td>
<td>Three 100GB HDDs</td>
</tr>
<tr>
<td>Network</td>
<td>1 Gbps or faster network interface</td>
</tr>
</tbody>
</table>

Even though five physical servers are recommended for the minimal configuration, you can start evaluating Virtuozzo Storage with just one server and add more nodes later. At the very least, an Virtuozzo Storage can be run on a single server or virtual machine. However, such a configuration will have several limitations:

- No data redundancy and protection will be provided. Failure of any disk will result in data loss.
- No high availability. Just one server or virtual machine will be a single point of failure. If it fails or stops, the entire cluster will stop working.
2.2 Network Setup Recommendations

To make your first Virtuozo Storage experience easier:

- Do not use dynamic IP addresses or set up dynamic IP allocation via DHCP.
- Use the same network interface for both internal and external traffic. You will be able to configure secure networking later.
CHAPTER 3
Installing Virtuozzo Storage

Virtuozzo Storage is installed in a similar way on all required servers or virtual machines. One exception is the first server where you must also install the management panel (only one is allowed per cluster).

To install Virtuozzo Storage, perform the following steps:

1. Install the management panel and storage components on the first server in your infrastructure.

2. In the management panel, obtain a token needed for the installation of the storage component on other servers.

3. Install the storage component on all other servers.

3.1 Installing Management Panel

To start installing Virtuozzo Storage, do the following:

1. Burn the distribution ISO image onto a DVD disc.

2. Boot the server from the DVD drive.

3. On the welcome screen, choose Install Virtuozzo Storage. After the installation program loads, you will see the Installation Summary screen.

4. Open the INSTALLATION DESTINATION screen and select a device in the Device Selection section. Configure other options if required.

5. Open the VIRTUOZZO STORAGE screen, in the Component Installation section, choose Management Panel and Storage.
Chapter 3. Installing Virtuozzo Storage

Component Installation

- Management Panel. The web user interface for adding and managing storage nodes.
- Storage. Choose this option only if the Management Panel is already installed.
- Management Panel and Storage. Both components at once.

Important: Only one management panel is required, so choose this option for the first node only!

Management network

The Management Network is used by the management node to configure and manage storage nodes. It can also be used by storage administrators for accessing storage nodes directly via SSH. This network should be protected and inaccessible over WAN. It can be the same as the private Storage Network used for communication between storage nodes.

Management Panel network

The Management Control Panel Network is used by storage administrators to access the web control panel of Storage. In most cases, it can be the same as the Management Network. If, however, the Management Network is only accessible by storage nodes, choose another network for the control panel, one that can be accessed by storage administrators. For security reasons, the web control panel should not be accessible from public/WAN networks.

Create a password for the Management Panel

Confirm the password

6. Make sure that the appropriate network interface is selected in both Management Panel network and Management network drop-down lists.

7. Create a password for a superadmin account of the management panel, confirm it in the corresponding field, and memorize it.

8. Click Done and Begin Installation. While Virtuozzo Storage is installing, create a password for the root account. Installation will not finish until the password is created.

Once the installation is complete, the node will reboot automatically.

3.2 Obtaining the Token

To add more nodes to the environment, you will need to install the storage component only. Such servers will run services related to data storage and will be added to the Virtuozzo Storage infrastructure during
3.2. Obtaining the Token

For security reasons, you will need to provide a token that can only be obtained from the management panel you have installed on the first server. A single token can be used to install the storage component on multiple servers in parallel.

To obtain a token:

1. On any computer with access to the management panel network, open a web browser and visit the management node IP address on port 8888: http://<management_node_IP_address>:8888.

2. Log in to the management panel by specifying the admin username and the password for a superadmin account created during the installation of the management panel. You will see the NODES screen where the node will be shown in the UNASSIGNED list.

3. In the upper-right corner of the NODES screen, click ADD NODE.
4. On the **Add node** panel, obtain a token. You can generate a new one if needed. Generating a new token invalidates the previous one.

5. Save the token and proceed to installing the storage component on other servers.

### 3.3 Installing Storage

Having obtained the token, boot the next server from the same installation media and do the following on the **Virtuozzo Storage** screen:

1. Choose **Storage**.
3.3. Installing Storage

Component Installation

- **Management Panel**. The web user interface for adding and managing storage nodes.
- **Storage**. Choose this option only if the Management Panel is already installed.
- **Management Panel and Storage**. Both components at once.

<table>
<thead>
<tr>
<th>Management Node</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter the IP address or hostname of the node with the Management Panel</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Token</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter a token for the new storage node. To obtain a token, click 'ADD NODE' on the &quot;Nodes&quot; screen in the Management Panel.</td>
</tr>
</tbody>
</table>

2. In the **Management node** field, specify the IP address of the node with the management panel.

3. In the **Token** field, specify the acquired token. A single token can be used to install storage component on multiple nodes in parallel.

4. Click **Done**.

5. Open the **INSTALLATION DESTINATION** screen, select a device in the **Device Selection** section, and click **Done**. Configure other options if required.

6. Click **Begin Installation**. While Virtuozzo Storage is installing, create a password for the root account. To add more nodes to the infrastructure, repeat these installation steps.

If you installed the storage component on the last server, log in to the management panel and make sure that all the storage nodes are present in the **UNASSIGNED** list on the **NODES** screen. Then proceed to creating your first cluster.
CHAPTER 4
Creating the Cluster

With the management panel ready and with all the nodes present in the UNASSIGNED list, you can create your cluster.

To create an Virtuozzo Storage cluster means to create a cluster on one (first) node, then populate it with more nodes.

4.1 Creating the Cluster on the First Node

To create a cluster, do the following:

1. In the management panel, open the NODES screen and click a node in the UNASSIGNED list.

2. On the node overview screen, click Create cluster.

3. In the Cluster field, type a name for the cluster. The name may only contain Latin letters (a-z, A-Z),...
4.1. Creating the Cluster on the First Node

numbers (0-9), underscores (“_”) and dashes (“-”).

4. Click the cogwheel icon next to the Storage interface drop-down list.

5. On the Network Configuration screen, select a network interface and click Choose role.
8. Select all roles by checking **Internal** and **Public** and click **Done**.

9. Click X and, back on the **New cluster** screen, click **New Cluster** to have Virtuozzo Storage assign the roles to disks automatically.

You can monitor cluster creation progress in the **HEALTHY** list of the **NODES** screen. The creation might take some time depending on the number of disks to be configured. Once the automatic configuration is complete, the cluster is created.

### 4.2 Adding Nodes to the Cluster

To add an unassigned node to the cluster, do the following:

1. On the **NODES** screen, click an unassigned node.
4.2. Adding Nodes to the Cluster

2. On the node overview screen, click **Join cluster**.

3. Click the cogwheel icon next to the **Storage interface** drop-down list.

4. On the **Network Configuration** screen, select a network interface and click **Choose role**.
5. On the **Choose roles** panel, check **Storage**, and click **Done**.

6. Click x and, back on the **Join cluster** screen, click **Join cluster** to have Virtuozzo Storage assign the roles to disks automatically and add the node to the cluster.

To complete cluster deployment, add all the unassigned nodes to the cluster.

Once the cluster deployment is complete, you can proceed to configuring node network interfaces.