# Install

## ONTAP Select

NetApp
October 18, 2020

**NetApp**®

# Table of Contents

# Install

## Pre-installation checklist

### Host configuration and preparation checklist

Prepare each of the hypervisor hosts where an ONTAP Select node is deployed. As part of preparing the hosts, carefully assess the deployment environment to make sure that the hosts are properly configured and ready to support the deployment of an ONTAP Select cluster.

> ❗ The ONTAP Select Deploy administration utility does not perform the required network and storage configuration of the hypervisor hosts. You must manually prepare each host prior to deploying an ONTAP Select cluster.

**General hypervisor preparation**

You must prepare the hypervisor hosts.

Each host must be configured with the following:

- A pre-installed and supported hypervisor
- A VMware vSphere license

Also, the same vCenter server must be able to manage all the hosts where an ONTAP Select node is deployed within the cluster.

In addition, you should make sure that the firewall ports are configured to allow access to vSphere. These ports must be open to support serial port connectivity to the ONTAP Select virtual machines.

By default, VMware allows access on the following ports:

- Port 23 and ports 1024 – 65535 (inbound traffic)
- Ports 0 – 65535 (outbound traffic)

NetApp recommends that the following firewall ports are opened to allow access to vSphere:

- Ports 7200 – 7400 (both inbound and outbound traffic)

**ONTAP Select cluster network preparation**

You can deploy ONTAP Select as either a multi-node cluster or a single-node cluster. In many cases, a multi-node cluster is preferable because of the additional storage capacity and HA capability.

**Illustration of the ONTAP Select networks and nodes**

The figures below illustrate the networks used with a single-node cluster and four-node cluster.

**Single-node cluster showing one network**

The following figure illustrates a single-node cluster. The external network carries client, management, and cross-cluster replication traffic (SnapMirror/SnapVault).
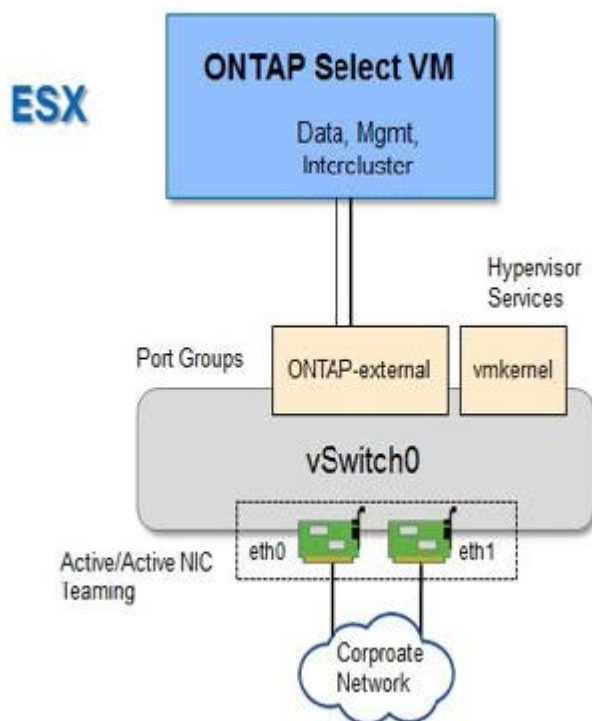


**Four-node cluster showing two networks**

The following figure illustrates a four-node cluster. The internal network enables communication among the nodes in support of the ONTAP cluster network services. The external network carries client, management, and cross-cluster replication traffic (SnapMirror/SnapVault).

**Single node within a four-node cluster**

The following figure illustrates the typical network configuration for a single ONTAP Select virtual machine within a four-node cluster. There are two separate networks: ONTAP-internal and ONTAP-external.
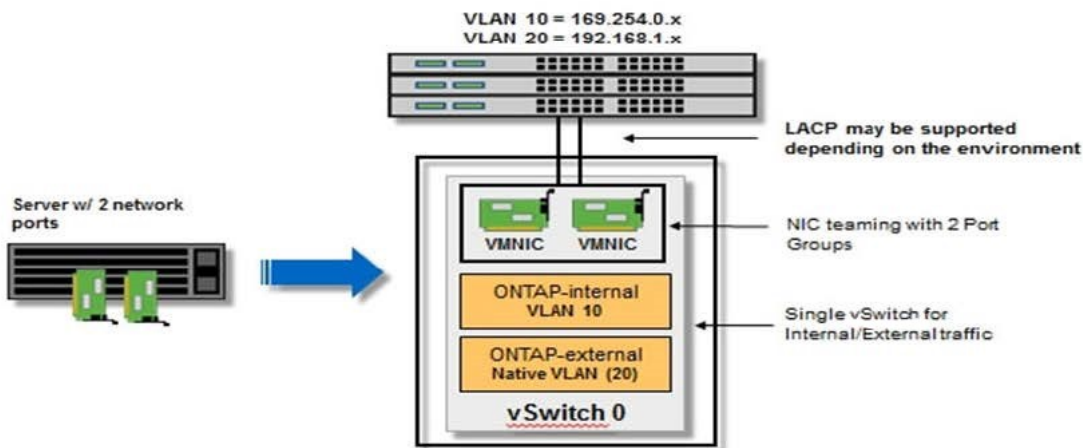


**vSwitch configuration on a hypervisor host**

The vSwitch is the core hypervisor component used to support the connectivity for the internal and external networks. There are several things you should consider as part of configuring each hypervisor vSwitch.

**vSwitch configuration for a host with two physical ports (2x10Gb)**

When each host includes two 10Gb ports, you should configure the vSwitch as follows:

- Configure a vSwitch and assign both the ports to the vSwitch. Create a NIC team using the two ports.

- Set the load balancing policy to "Route based on the originating virtual port ID".

- Mark both adapters as "active".

- Set the "Failback" setting to "Yes".
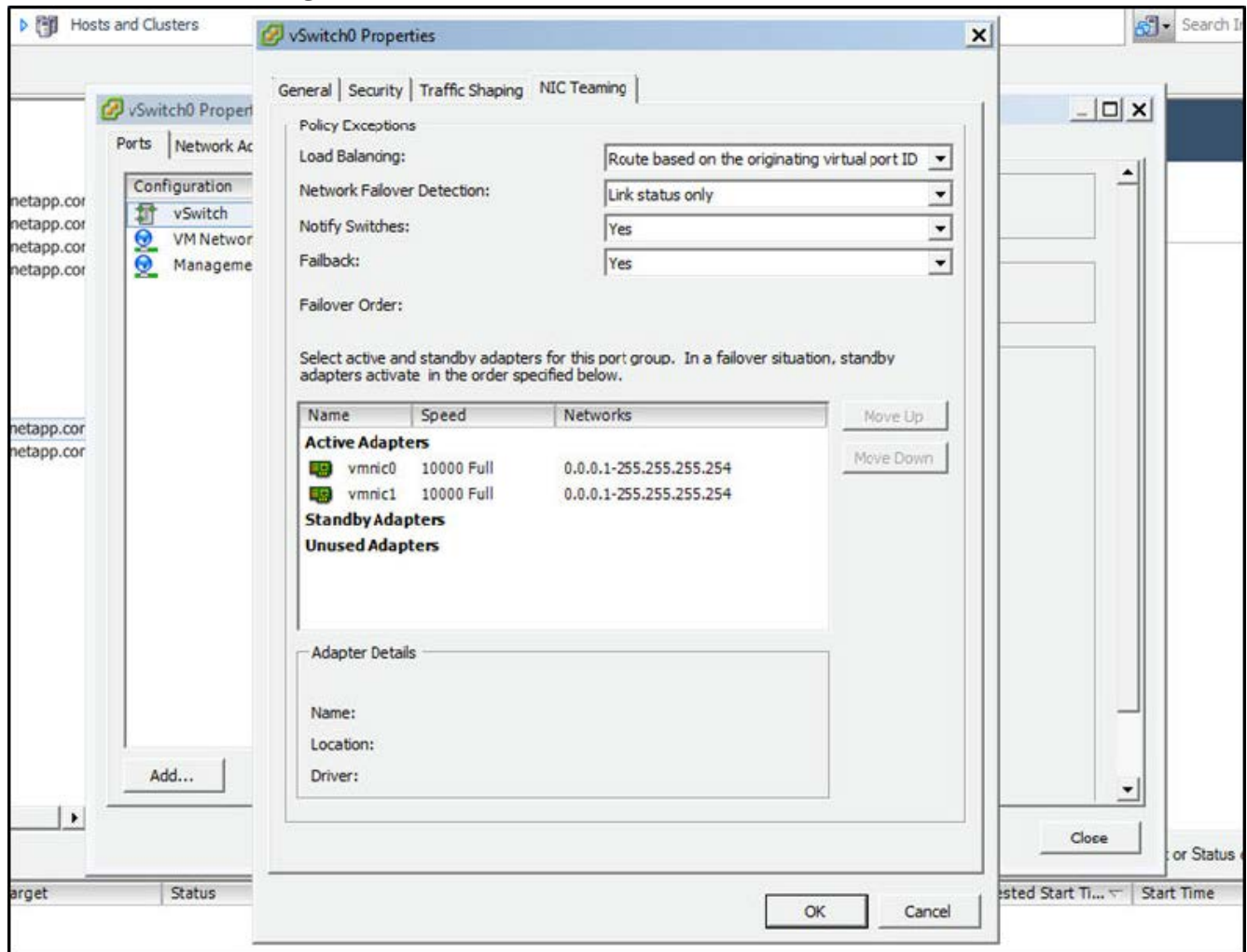


- Configure the vSwitch to use jumbo frames (9000 MTU).

- Configure a port group on the vSwitch for the internal traffic (ONTAP-internal):

  ◦ The port group is assigned to ONTAP Select virtual network adapters e0c-e0g used for the cluster, HA interconnect, and mirroring traffic.

  ◦ The port group should be on a non-routable VLAN because this network is expected to be private. You should add the appropriate VLAN tag to the port group to take this into account.

  ◦ The load balancing, failback, and failover order settings of the port group should be the same as the vSwitch.

- Configure a port group on the vSwitch for the external traffic (ONTAP-external):

  ◦ The port group is assigned to ONTAP Select virtual network adapters e0a-e0c used for data and management traffic.

  ◦ The port group can be on a routable VLAN. Also, depending on the network environment, you should add an appropriate VLAN tag or configure the port group for VLAN trunking.

  ◦ The load balancing, failback, and failover order settings of the port group should be same as vSwitch.

The above vSwitch configuration is for a host with 2x10Gb ports in a typical network environment.

## Required information for Deploy utility installation

Before installing the Deploy administration utility in a VMware environment, review the required configuration information and optional network configuration information to prepare for successful deployment.

### Required configuration information

As part of your deployment planning, you should determine the required configuration information before installing the ONTAP Select Deploy administration utility.

| Required information | Description |
| --- | --- |
| Name of the Deploy virtual machine | Identifier to use for the virtual machine. |
| Name of the ESXi host | Identifier for the VMware ESXi host where the Deploy utility is installed. |
| Name of the datastore | Identifier for the VMware datastore holding the virtual machine files (approximately 40 GB is required). |
| Network for the virtual machine | Identifier for the Network where the Deploy virtual machine is connected. |

### Optional network configuration information

The Deploy virtual machine is configured using DHCP by default. However, if needed, you can manually configure the network interface for the virtual machine.

| Network information | Description |
| --- | --- |
| Host name | Identifier of the host machine. |
| Host IP address | Static IPv4 address of the host machine. |
| Subnet mask | Subnetwork mask, based on the network the virtual machine is a part of. |

| Network information | Description |
| --- | --- |
| Gateway | Default gateway or router. |
| Primary DNS server | Primary Domain Name Server. |
| Secondary DNS server | Secondary Domain Name Server. |
| Search domains | List of the search domains to use. |

## Required information for ONTAP Select installation

As part of preparing to deploy an ONTAP Select cluster in a VMware environment, collect the information required when using the ONTAP Select Deploy administration utility to deploy and configure the cluster.

Some of the information you collect applies to the cluster itself, while other information applies to the individual nodes in the cluster.

### Cluster-level information

You must collect information related to the ONTAP Select cluster.

| Cluster information | Description |
| --- | --- |
| Name of the cluster | Unique identifier of the cluster. |
| Licensing mode | Evaluation or purchased licensing. |
| IP configuration for the cluster | IP configuration for the clusters and nodes, including:<br>* Management IP address of the cluster<br>* Subnet mask<br>* Default gateway |

### Host-level information

You must collect information related to each of the nodes in the ONTAP Select cluster.

| Cluster information | Description |
| --- | --- |
| Name of the host | Unique identifier of the host. |
| Domain name of the host | Fully qualified domain name of the host. |
| IP configuration for the nodes | Management IP address for each node in the cluster. |
| Mirror node | Name of the associated node in the HA pair (multi-node clusters only). |
| Storage pool | Name of the storage pool that is used. |
| Storage disks | List of disks if using software RAID. |

| Cluster information | Description |
| --- | --- |
| Serial number | If you are deploying with a purchased license, the unique nine-digit serial number provided by NetApp. |

## Configuring a host to use NVMe drives

If you plan to use NVMe drives with software RAID, you need to configure the host to recognize the drives.

Use VMDirectPath I/O Pass-through on the NVMe devices to maximize data efficiency. This setting exposes the drives to the ONTAP Select virtual machine, allowing ONTAP to have direct PCI access to the device.

*Before you begin*

Make sure your deployment environment meets the following minimum requirements:

- ONTAP Select 9.7 or later with the associated Deploy administration utility
- Premium XL platform license offering or a 90-day evaluation license
- VMware ESXi version 6.7 or later
- NVMe devices conforming to specification 1.0 or later

Follow the host preparation checklist, review the required information for Deploy utility installation, and the required information for ONTAP Select installation topics for more information.
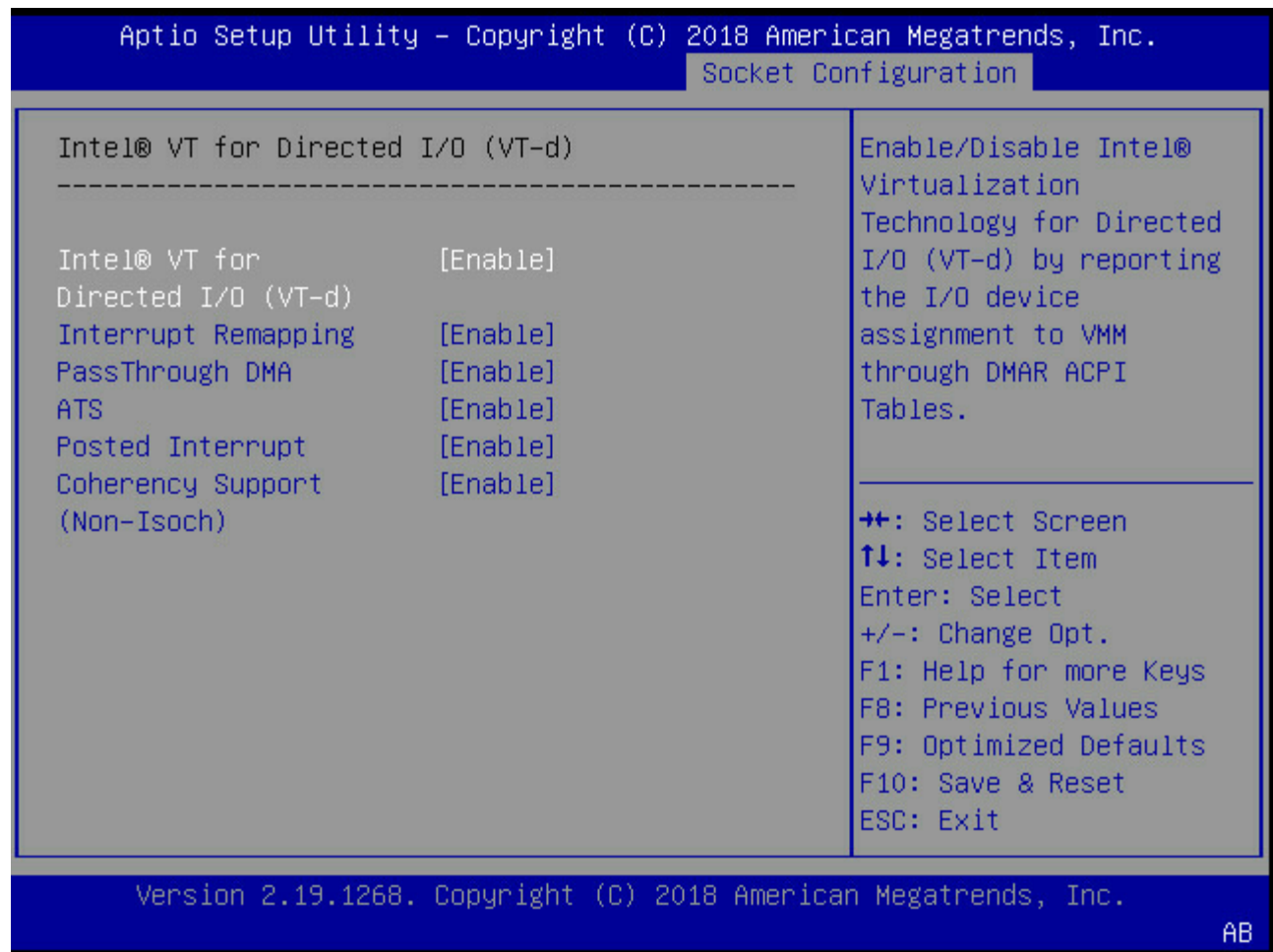
*About this task*

This procedure is designed to be performed before creating a new ONTAP Select cluster. You can also perform the procedure to configure additional NVMe drives for an existing SW-RAID NVMe cluster. In this case, after configuring the drives, you must add them through Deploy as you would additional SSD drives. The main difference is that Deploy detects the NVMe drives and reboots the nodes. When adding NVMe drives to an existing cluster, note the following about the reboot process:

- Deploy handles the reboot orchestration.
- HA takeover and giveback is performed in an orderly fashion, but it can be time consuming to resynchronize the aggregates.
- A single-node cluster will incur downtime.

See Increasing storage capacity for additional information.

*Steps*

1. Access the **BIOS configuration** menu on the host to enable support for I/O virtualization.
2. Enable the **Intel® VT for Directed I/O (VT-d)** setting.

```
         Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                                    Socket Configuration

    Intel® VT for Directed I/O (VT-d)             Enable/Disable Intel®
    ------------------------------------------    Virtualization
                                                  Technology for Directed
                                                  I/O (VT-d) by reporting
    Intel® VT for          [Enable]               the I/O device
    Directed I/O (VT-d)                           assignment to VMM
    Interrupt Remapping    [Enable]               through DMAR ACPI
    PassThrough DMA        [Enable]               Tables.
    ATS                    [Enable]
    Posted Interrupt       [Enable]
    Coherency Support      [Enable]
    (Non-Isoch)                                   ──────────────────────

                                                  ↔: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: Help for more Keys
                                                  F8: Previous Values
                                                  F9: Optimized Defaults
                                                  F10: Save & Reset
                                                  ESC: Exit

         Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                          AB
```

3. Some servers offer support for **Intel Volume Management Device (Intel VMD)**. When enabled, this makes the available NVMe devices invisible to the ESXi hypervisor; disable this option before proceeding.

4. Configure the NVMe drives for pass-through to virtual machines.

   a. In vSphere, open the host **Configure** view and click **Edit** under **Hardware: PCI devices**.

   b. Select the NVMe drives you want to use for ONTAP Select.

> You need a VMFS datastore that is also backed by an NVMe device to host the ONTAP Select VM system disks and virtual NVRAM. Leave at least one NVMe drive available for this purpose when configuring the others for PCI pass-through.

   c. Click **OK**. The selected devices indicate **Available (pending)**.

5. Click **Reboot The Host**.



*After you finish*

After the hosts are prepared, you can install the ONTAP Select Deploy utility. Deploy guides you through creating ONTAP Select storage clusters on your newly prepared hosts. During this process,

Deploy will detect the presence of the NVMe drives configured for pass-through and automatically select them for use as ONTAP data disks. You can adjust the default selection if needed.

> ℹ️  A maximum of 14 NVMe devices are supported for each ONTAP Select node.



After the cluster is successfully deployed, ONTAP System Manager allows you to provision the storage according to best practices. ONTAP will automatically enable flash-optimized storage efficiency features that make the best use of your NVMe storage.
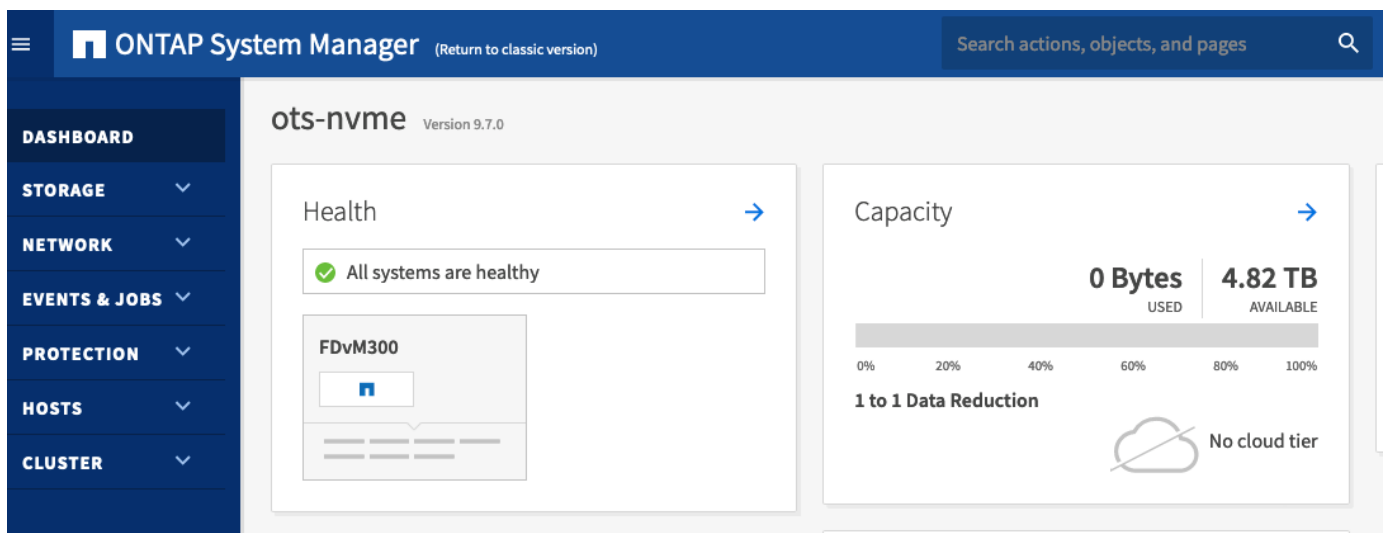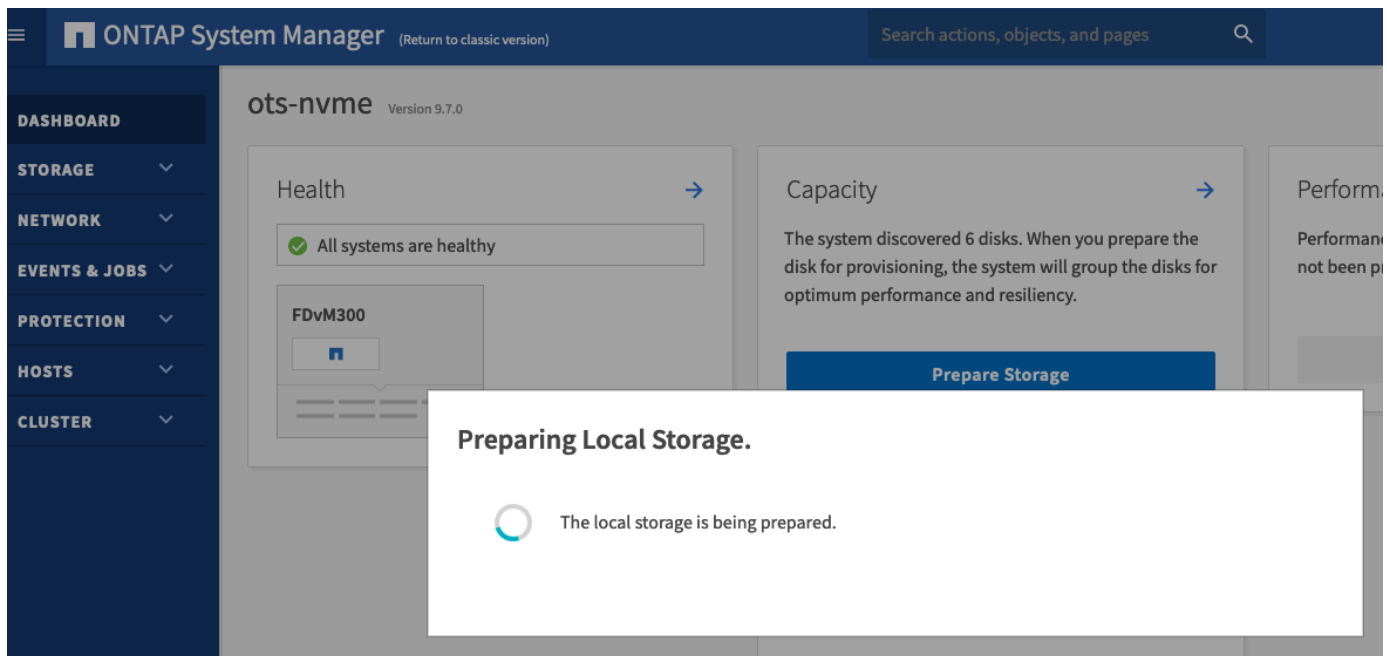
# Installing ONTAP Select Deploy

You need to install the ONTAP Select Deploy administration utility and use the utility to create an ONTAP Select cluster.

## Downloading the virtual machine image

You can download the ONTAP Select package from the NetApp support site.

*About this task*

The ONTAP Select Deploy administration utility is packaged as a virtual machine based on the Open Virtualization Format (OVF) standard. The single compressed file has the suffix ova.

*Steps*

1. Access the NetApp support site using a web browser and click **Support Quick Links**.

2. Click **Download Software** under **Top Tasks** and sign in.

3. Click **Find your product**.

4. Scroll down and click **ONTAP Select**.

5. Select the desired release of the package.

6. Review the End User License Agreement (EULA) and click **Accept & Continue**.

7. Select and download the appropriate package, responding to all prompts as needed.

## Deploying the virtual machine

You must install and start the ONTAP Select Deploy virtual machine using the OVF virtual machine image. As part of the installation process, you must configure the network interface to use DHCP or a static IP configuration.

*Before you begin*

You must prepare to deploy the ONTAP Select Deploy virtual machine:

- Enable the OVF functionality in your browser by installing the VMware Client Integration Plugin or performing similar configuration as needed

- Enabled DHCP in the VMware environment if you will dynamically assign an IP address to the Deploy virtual machine

You must have the configuration information to be used when creating the virtual machine, including the name of the virtual machine, external network, and host name. When defining a static network configuration, you need the following additional information:

- IP address of the Deploy virtual machine

- Netmask

- IP address of the gateway (router)

- IP address of the primary DNS server

- IP address of the second DNS server

- DNS search domains

*About this task*

If you use vSphere, the Deploy OVF template wizard includes a form to provide all of the Deploy configuration information, including the network configuration. However, if you choose not to use this form, you can use the console of the Deploy virtual machine to configure the network instead.

*Steps*

1. Access the vSphere client and sign in.

2. Navigate to the appropriate location in the hierarchy and select **Deploy OVF Template**.

3. Select the OVA file and complete the Deploy OVF Template wizard, selecting the options as appropriate for your environment.

   You must define the password for the administrator account. You need to provide this password when signing in to the Deploy utility.

4. After the virtual machine is deployed, select the new virtual machine and power it on if it is not already powered on based on your input to the deployment wizard.

5. If needed, you can configure the Deploy network using the virtual machine console:

   a. Click the **Console** tab to access the ESXi host setup shell and monitor the power on process.

   b. Wait for the following prompt:

      Host name :

   c. Type the host name and press **Enter**.

   d. Wait for the following prompt:

      Provide a password for the admin user:

   e. Type the password and press **Enter**.

   f. Wait for the following prompt:

      Use DHCP to set networking information? [n]:

   g. Type **n** to define a static IP configuration or y to use DHCP, and press **Enter**.

   h. If you choose a static configuration, provide all network configuration information as required.

## Signing in to the Deploy web interface

You should sign in to the web user interface to confirm the Deploy utility is available and perform initial configuration.

*Steps*

1. Point your browser to the Deploy utility using the IP address or domain name:

   `https://<ip_address>/`

2. Provide the administrator (admin) account name and password and sign in.

3. If the **Welcome to ONTAP Select** popup window is displayed, review the prerequisites and click **OK** to continue.

4. If this is the first time signing in and you did not install Deploy using the wizard available with vCenter, provide the following configuration information when prompted:

- New password for the administrator account (required)
  - AutoSupport (optional)
  - vCenter server with account credentials (optional)

*Related information*

[Signing in to Deploy using SSH](#)

# Deploying an ONTAP Select cluster

You can use the web user interface provided with the ONTAP Select Deploy administration utility to deploy a single-node or multi-node ONTAP Select cluster.

When you create an ONTAP Select cluster using the Deploy utility web interface, you are guided through a specific sequence of steps. The exact process varies depending on whether you deploy a single-node or multi-node cluster.

> You can also deploy ONTAP Select clusters using the Deploy utility CLI.

## Before you begin

You should prepare for the deployment to make sure it's successful.

**Initial planning**

Review the *Plan* and *License* sections of the documentation. Based on this, you can make decisions about the cluster, including:

- Hypervisor
- Number of nodes
- License type
- Platform size (instance type)
- ONTAP Select version

**Host preparation**

You must prepare the hypervisor hosts where the ONTAP Select nodes will run and have the needed storage license files based on your licensing model. To view the preparation requirements:

1. Sign in to the Deploy web user interface.
2. Click ⑦ at the top of the page.
3. Click **Prerequisites**.
4. Scroll down to review the requirements and click **OK**.

**License files**

If you plan to deploy the cluster in a production environment, you must acquire the storage license files based on your licensing model.

**Deploy installation and account credentials**

You must install the Deploy administration utility and perform initial configuration. See Installing ONTAP Select Deploy for more information. You need to have the password for the Deploy administrator account that was configured as part of the installation process.

**Installing earlier ONTAP Select node images**

By default, the Deploy administration utility contains the most current version of ONTAP Select at the time of release. If you want to deploy clusters using an earlier version of ONTAP Select, you need to add the ONTAP Select image to your Deploy instance. See Adding an ONTAP Select image to Deploy for more information.

**Getting started launch page**

The initial page **Getting Started with ONTAP Select Deploy** guides you through the multi-step process of creating a cluster. There are five major steps, including:

- Add licenses
- Add host to inventory
- Create a cluster
- Network precheck
- Deploy the cluster

> You can perform the same steps independently by clicking the tabs at the top of the page (Clusters, Hypervisor Hosts, Administration).

**Network checker**

If you will deploy a multi-node cluster, you should be familiar with the network checker.

**After deploying a cluster**

You should back up the ONTAP Select Deploy configuration data.

## Creating a single-node cluster

You can use the ONTAP Select Deploy web user interface to deploy a single-node ONTAP Select cluster.

*Before you begin*

See Before you begin to prepare to deploy the cluster. The Deploy administration must be installed and initially configured (password, AutoSupport, vCenter).

*About this task*

An ONTAP Select cluster with one node is created for a production deployment.

*Steps*

1. Sign in to the Deploy utility through the web interface using the administrator account (admin).

2. If the **Welcome to ONTAP Select** popup window is displayed, confirm you have met the configuration prerequisites and click **OK**.

3. If the **Getting Started** cluster launch page is not displayed, click  at the top of the page and click **Getting Started**.

4. On the **Getting Started** page, click **Upload** and select a license from your local workstation and click **Open** to upload the license.

5. Click **Refresh** and confirm the license has been added.

6. Click **Next** to add a hypervisor host and then click **Add**.

   You can add the ESXi host directly or by connecting to a vCenter server. Provide the appropriate host details and credentials as needed.

7. Click **Refresh** and confirm the **Type** value for the host is **ESX**.

   Any account credentials you provide are added to the Deploy credential database.

8. Click **Next** to begin the cluster creation process.

9. In the **Cluster Details** section, provide all the required information describing the cluster and click **Done**.

10. Under **Node Setup**, provide the node management IP address and select the license for the node; you can upload a new license if needed. You also can change the node name if needed.

11. Provide the **Hypervisor** and **Network** configuration.

    There are three node configurations which define the virtual machine size and available feature set. These instance types are supported by the standard, premium, and premium XL offerings of the purchased license, respectively. The license you select for the node must match or exceed the instance type.

    Select the hypervisor host as well as the management and data networks.

12. Provide the **Storage** configuration and click **Done**.

    You can select the drives based on your platform license level and host configuration.

13. Review and confirm the configuration of the cluster.

    You can change the configuration by clicking  in the applicable section.

14. Click **Next** and provide the ONTAP administrator password.

15. Click **Create Cluster** to begin the cluster creation process and then click **OK** in the popup window.

It can take up to 30 minutes for the cluster to be created.

16. Monitor the multi-step cluster creation process to confirm the cluster is created successfully.

    The page is automatically refreshed at regular intervals.

    > ❗ If the cluster creation operation is initiated but fails to complete, the ONTAP administrative password you define may not be registered. In this case, you can access the management interface for the ONTAP Select cluster using the password *changeme123* for the admin account.

*After you finish*

You should confirm the ONTAP Select AutoSupport feature is configured and back up the ONTAP Select Deploy configuration data.

# Initial state of the cluster after deployment

You should be aware of the initial state of a cluster after it has been deployed and configure the cluster as needed for your environment.

An ONTAP Select cluster has several characteristics after it is created.

**LIFs**

There are two types of customer-specified LIFs assigned:

- Cluster management (one per cluster)
- Node management (one per node)

**SVMs**

Two administrative SVMs are active:

- Default SVM
- Cluster SVM

**Aggregates**

The root aggregate is created.

**Features**

All features are licensed and available. Both SnapLock and FabricPool require separate licenses.

> There are no data SVMs created. Also, the multi-node cluster has an internal network with autogenerated LIFs.

*Related information*

- [ONTAP features enabled by default](#)