Upgrade and maintain the cluster

AFX

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Expand an AFX storage system cluster

You can expand the compute capacity of an AFX cluster independent of the storage capacity. The expansion is performed without disruption and increases performance linearly as volumes are rebalanced across the nodes. This feature is a significant benefit as you adjust to the ongoing needs of your AFX system users.

Prepare to expand a cluster

Before expanding an AFX cluster, you should be familiar with the basic requirements and general approach to troubleshooting.

Requirements

You need the credentials for a cluster administrator account and be able to connect to the ONTAP CLI using SSH. When expanding a cluster, you must add an even number of nodes and adhere to the size limitations of your AFX system based on the release.

Troubleshooting

There are a few concepts and troubleshooting scenarios you should be aware of as you perform the cluster expansion.

Automatic volume rebalancing

Automated Topology Management (ATM) is in internal AFX system component that detects allocation imbalances and rebalances volumes across the cluster nodes. It relies on the Zero Copy Volume Move (ZCVM) technology to relocate volumes using metadata updates instead of copying the data. ZCVM is the default volume move technology available with AFX storage systems.

Possible troubleshooting scenarios

There are several scenarios you might need to investigate during the volume moves associated with the expansion of an AFX cluster.

Volumes are not being moved by ATM
: This can occur when the cluster is already in balance or when there are no eligible volumes to move.

Confusion about how or when ATM should be active
: It may appear that volumes aren’t distributed as quickly as expected. ATM attempts to detect and respond to hardware events every five minutes. In the worst case, a rebalance operation is launched 40 minutes after the last one completed.

CLI commands

There are several commands you can use to monitor a cluster expansion operation.

- `volume move show`
- `volume move show -instance`

You should contact NetApp support for additional assistance as needed.

Add nodes to expand a cluster

This procedure describes how to add a pair of nodes to an existing cluster and can be adapted to other deployment environments. You'll need to use both the ONTAP CLI and System Manager administrative interfaces.

Steps

1. Connect to the ONTAP CLI and set advanced privilege level:

   ```
   afx> set advanced
   ```

2. Display the volume locations of the current nodes; note the number of volumes per node:

   ```
   afx> vol show -fields node,size,constituent-count -is-constituent true -node *
   ```

3. Display the cluster interconnect IP addresses and save for use in later steps:

   ```
   afx> net int show -role cluster
   ```

4. Log into the service processor of each node you wish to add to the cluster.
5. From the prompt, type **system console** to access the node's console.
6. Boot the node to display the boot menu prompt:

   ```
   LOADER> boot_ontap menu
   ```

   If the menu does not load, use the **Ctrl+C** technique to access the boot menu.

7. Select one of the boot options from the menu as appropriate; if prompted type **yes** to continue.

   If you get sent back to LOADER from here, type **boot_ontap** at the LOADER prompt.

8. Use the cluster setup wizard to configure a node management LIF, subnet, and gateway.

   This configuration will be used by System Manager to detect the node to be added to the cluster. Enter the values as prompted, including port, IP address, netmask, and default gateway.

9. Press **CTL+C** to access the CLI.
10. Modify the cluster interconnect addresses so they're routable in your network; use the configuration appropriate for your environment:

    ```
    afx> net int show -role cluster

    afx> net int modify -vserver Cluster -lif clus1 -address 192.168.100.201

    afx> net int modify -vserver Cluster -lif clus2 -address 192.168.100.202
    ```

    This step is only needed if the other interfaces do not use the 169.254.x.x addresses that ONTAP auto creates.

11. Repeat the above steps on the other AFX node controller.

12. Access the System Manager using the cluster management IP address.
13. In System Manager, select **Cluster** and then **Overview**; select the **Nodes** tab.
14. Locate the section **Not part of this cluster**; select + Add .
    - If the nodes were discovered before the cluster interconnect IP addresses are changed, you'll need to re-discover the nodes by exiting the window and navigating back.
    - You can optionally use the CLI to add the nodes instead of System Manager; see the command `cluster add-node`.
15. Provide the configuration details in the **Add nodes** menu; you can add management IP addresses manually or using a subnet.
16. Connect to the ONTAP CLI to monitor the status of the node add operation:

    ```
    afx> add-node-status
    ```

17. After the operations have completed, confirm the volume placement across all nodes; issue the command once for each node using the appropriate node name:

    ```
    afx> set advanced

    afx> vol show -fields node,size,constituent-count -is-constituent true -node
    NODE_NAME
    ```

Result

- Adding new nodes to the cluster is nondisruptive.
- Volume moves should happen automatically.
- Performance will scale linearly.

Related information

- Prepare to administer your AFX system
- FAQ for ONTAP AFX storage systems
- NetApp Support Site

Upgrade ONTAP on an AFX storage system

When you upgrade your ONTAP software on your AFX system, you can take advantage of new and enhanced ONTAP features that can help you reduce costs, accelerate critical workloads, improve security, and expand the scope of data protection available to your organization.

AFX storage systems do not support ONTAP revert operations.

ONTAP software upgrades for AFX storage systems follow the same process as upgrades for other ONTAP systems. If you have an active SupportEdge contract for Active IQ Digital Advisor (also known as Digital Advisor), you should prepare to upgrade with Upgrade Advisor. Upgrade Advisor provides intelligence that helps you minimize uncertainty and risk by assessing your cluster and creating an upgrade plan specific to your configuration. If you don't have an active SupportEdge contract for Active IQ Digital Advisor, you should

prepare to upgrade without Upgrade Advisor.

After you prepare for your upgrade, it is recommended that you perform upgrades using automated non-disruptive upgrade (ANDU) from System Manager. ANDU takes advantage of ONTAP's high-availability (HA) failover technology to ensure that clusters continue to serve data without interruption during the upgrade.

Related information

- Learn about ONTAP upgrade.

Update firmware on an AFX storage system

ONTAP automatically downloads and updates firmware and system files on your AFX storage system by default. If you want to view the recommended updates before they are downloaded and installed, you can disable automated updates. You can also edit update parameters to show you notifications of available updates before any action is performed.

Enable automatic updates

When you enable automatic updates for your AFX cluster, recommended updates for storage firmware, SP/BMC firmware and system files are automatically downloaded and installed by default.

Steps

1. In System Manager, select **Cluster** and then **Settings**.
2. Under **Software updates** select **Enable**.
3. Read the EULA.
4. Accept the defaults to **Show notification** of recommended updates. Optionally, select to **Automatically update** or to **Automatically dismiss** recommended updates.
5. Select to acknowledge that your update modifications will be applied to all current and future updates.
6. Select **Save**.

Result

Recommended updates are automatically downloaded and installed on your ONTAP AFX system based upon your update selections.

Disable automatic updates

Disable automatic updates if you want the flexibility to view recommended updates before they are installed. If you disable automatic updates, you need to perform firmware and system file updates manually.

Steps

1. In System Manager, select **Cluster > Settings**.
2. Under **Software updates**, select **Disable**.

Result

Automatic updates are disabled. You should regularly check for recommended updates and decide if you want to perform a manual installation.

View automatic updates

View a list of firmware and system file updates that have been downloaded to your cluster and are scheduled for automatic installation. Also view updates that have been previously automatically installed.

Steps

1. In System Manager, select **Cluster > Settings**.
2. Next to **Software updates** select →, then select **View all automatic updates**.

Edit automatic updates

You can select to have recommended updates for your storage firmware, SP/BMC firmware and your system files automatically downloaded and installed on your cluster, or you can select to have recommended updates automatically dismissed. If you want to manually control installation or dismissal of updates, select to be notified when a recommended update is available; then you can manually select to install or dismiss it.

Steps

1. In System Manager, select **Cluster > Settings**.
2. Next to **Software updates** select → and then select **All other updates**.
3. Update the selections for automatic updates.
4. Select **Save**.

Result

Automatic updates are modified based on your selections.

Update firmware manually

If you want the flexibility of viewing recommended updates before they are downloaded and installed, you can disable automated updates and update your firmware manually.

Steps

1. Download your firmware update file to a server or local client.
2. In System Manager, select **Cluster > Overview**, then select **All other updates**.
3. Under **Manual Updates**, select **Add firmware files**; then select **Download from the server** or **Upload from the local client**.
4. Install the firmware update file.

Result

Your firmware is updated.

ONTAP revert unsupported with AFX storage systems

Reverting an ONTAP cluster is the process of moving all the nodes to the previous major ONTAP release.

NetApp AFX storage systems do not support ONTAP revert. Attempting a revert operation with AFX can result in cluster instability and data loss. You should not attempt a revert operation on an AFX system.

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