Preparing to decommission grid nodes

StorageGRID 11.5

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Preparing to decommission grid nodes

You must review the considerations for removing grid nodes and confirm no repair jobs are active for erasure-coded data.

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Considerations for decommissioning grid nodes

Before you start this procedure to decommission one or more nodes, you must understand the implications of removing each type of node. Upon the successful decommissioning of a node, its services will be disabled and the node will be automatically shut down.

You cannot decommission a node if doing so will leave the StorageGRID in an invalid state. The following rules are enforced:

- You cannot decommission the primary Admin Node.
- You cannot decommission Archive Nodes.
- You cannot decommission an Admin Node or a Gateway Node if one of its network interfaces is part of a high availability (HA) group.
- You cannot decommission a Storage Node if its removal would affect the ADC quorum.
- You cannot decommission a Storage Node if it is required for the active ILM policy.
- You should not decommission more than 10 Storage Nodes in a single Decommission Node procedure.
- You cannot decommission a connected node if your grid includes any disconnected nodes (nodes whose health is Unknown or Administratively Down). You must decommission or recover the disconnected nodes first.
- If your grid contains multiple disconnected nodes, the software requires you to decommission them at all the same time, which increases the potential for unexpected results.
- If a disconnected node cannot be removed (for example, a Storage Node that is required for the ADC quorum), no other disconnected node can be removed.
- If you want to replace an older appliance with a newer appliance, consider using the appliance node cloning procedure instead of decommissioning the old node and adding the new node in an expansion.

  Appliance node cloning

> Do not remove a grid node's virtual machine or other resources until instructed to do so in decommission procedures.

Considerations for decommissioning Admin Nodes or a Gateway Nodes

Review the following considerations before decommissioning an Admin Node or a Gateway Node.

- The decommission procedure requires exclusive access to some system resources, so you must confirm that no other maintenance procedures are running.
- You cannot decommission the primary Admin Node.
- You cannot decommission an Admin Node or a Gateway Node if one of its network interfaces is part of a high availability (HA) group. You must first remove the network interfaces from the HA group. See the instructions for administering StorageGRID.
- As required, you can safely change the ILM policy while decommissioning a Gateway Node or an Admin Node.
- If you decommission an Admin Node and single sign-on (SSO) is enabled for your StorageGRID system, you must remember to remove the node's relying party trust from Active Directory Federation Services (AD FS).

Related information

Administer StorageGRID

Considerations for decommissioning Storage Nodes

If you plan to decommission a Storage Node, you must understand how StorageGRID manages the object data and metadata on that node.

The following considerations and restrictions apply when decommissioning Storage Nodes:

- The system must, at all times, include enough Storage Nodes to satisfy operational requirements, including the ADC quorum and the active ILM policy. To satisfy this restriction, you might need to add a new Storage Node in an expansion operation before you can decommission an existing Storage Node.
- If the Storage Node is disconnected when you decommission it, the system must reconstruct the data using data from the connected Storage Nodes, which can result in data loss.
- When you remove a Storage Node, large volumes of object data must be transferred over the network. Although these transfers should not affect normal system operations, they can have an impact on the total amount of network bandwidth consumed by the StorageGRID system.
- Tasks associated with Storage Node decommissioning are given a lower priority than tasks associated with normal system operations. This means that decommissioning does not interfere with normal StorageGRID system operations, and does not need to be scheduled for a period of system inactivity. Because decommissioning is performed in the background, it is difficult to estimate how long the process will take to complete. In general, decommissioning finishes more quickly when the system is quiet, or if only one Storage Node is being removed at a time.
- It might take days or weeks to decommission a Storage Node. Plan this procedure accordingly. While the decommission process is designed to not impact system operations, it can limit other procedures. In general, you should perform any planned system upgrades or expansions before you remove grid nodes.
- Decommission procedures that involve Storage Nodes can be paused during certain stages to allow other maintenance procedures to run if needed, and resumed once they are complete.
- You cannot run data repair operations on any grid nodes when a decommission task is running.
- You should not make any changes to the ILM policy while a Storage Node is being decommissioned.
- When you remove a Storage Node, data on the node is migrated to other grid nodes; however, this data is not completely removed from the decommissioned grid node. To permanently and securely remove data, you must wipe the decommissioned grid node's drives after the decommission procedure is complete.
- When you decommission a Storage Node, the following alerts and alarms might be raised and you might receive related email and SNMP notifications:

- **Unable to communicate with node** alert. This alert is triggered when you decommission a Storage Node that includes the ADC service. The alert is resolved when the decommission operation completes.
- VSTU (Object Verification Status) alarm. This notice-level alarm indicates that the Storage Node is going into maintenance mode during the decommission process.
- CASA (Data Store Status) alarm. This major-level alarm indicates that the Cassandra database is going down because services have stopped.

Related information

Restoring object data to a storage volume, if required

Understanding the ADC quorum

Reviewing the ILM policy and storage configuration

Decommissioning disconnected Storage Nodes

Consolidating Storage Nodes

Decommissioning multiple Storage Nodes

Understanding the ADC quorum

You might not be able to decommission certain Storage Nodes at a data center site if too few Administrative Domain Controller (ADC) services would remain after the decommissioning. This service, which is found on some Storage Nodes, maintains grid topology information and provides configuration services to the grid. The StorageGRID system requires a quorum of ADC services to be available at each site and at all times.

You cannot decommission a Storage Node if removing the node would cause the ADC quorum to no longer be met. To satisfy the ADC quorum during a decommissioning, a minimum of three Storage Nodes at each data center site must have the ADC service. If a data center site has more than three Storage Nodes with the ADC service, a simple majority of those nodes must remain available after the decommissioning ((0.5 * *`Storage Nodes with ADC`*) + 1).

For example, suppose a data center site currently includes six Storage Nodes with ADC services and you want to decommission three Storage Nodes. Because of the ADC quorum requirement, you must complete two decommission procedures, as follows:

- In the first decommission procedure, you must ensure that four Storage Nodes with ADC services remain available ((0.5 * 6) +1) . This means that you can only decommission two Storage Nodes initially.
- In the second decommission procedure, you can remove the third Storage Node because the ADC quorum now only requires three ADC services to remain available ((0.5 * 4) + 1).

If you need to decommission a Storage Node but are unable to because of the ADC quorum requirement, you must add a new Storage Node in an expansion and specify that it should have an ADC service. Then, you can decommission the existing Storage Node.

Related information

Expand your grid

Reviewing the ILM policy and storage configuration

If you plan to decommission a Storage Node, you should review your StorageGRID system's ILM policy before starting the decommissioning process.

During decommissioning, all object data is migrated from the decommissioned Storage Node to other Storage Nodes.

> The ILM policy you have *during* the decommission will be the one used *after* the decommission. You must ensure this policy meets your data requirements both before you start the decommission and after the decommission is complete.

You should review the rules in the active ILM policy to ensure that the StorageGRID system will continue to have enough capacity of the correct type and in the correct locations to accommodate the decommissioning of a Storage Node.

Consider the following:

- Will it be possible for ILM evaluation services to copy object data such that ILM rules are satisfied?
- What happens if a site becomes temporarily unavailable while decommissioning is in progress? Can additional copies be made in an alternate location?
- How will the decommissioning process affect the final distribution of content? As described in "Consolidating Storage Nodes," you should add new Storage Nodes before decommissioning old ones. If you add a larger replacement Storage Node after decommissioning a smaller Storage Node, the old Storage Nodes could be close to capacity and the new Storage Node could have almost no content. Most write operations for new object data would then be directed at the new Storage Node, reducing the overall efficiency of system operations.
- Will the system, at all times, include enough Storage Nodes to satisfy the active ILM policy?

> An ILM policy that cannot be satisfied will lead to backlogs and alarms, and can halt operation of the StorageGRID system.

Verify that the proposed topology that will result from the decommissioning process satisfies the ILM policy by assessing the factors listed in the table.

Area to assess	Notes
Available capacity	Will there be enough storage capacity to accommodate all of the object data stored in the StorageGRID system, including the permanent copies of object data currently stored on the Storage Node to be decommissioned?Will there be enough capacity to handle the anticipated growth in stored object data for a reasonable interval of time after decommissioning is complete?
Location of storage	If enough capacity remains in the StorageGRID system as a whole, is the capacity in the right locations to satisfy the StorageGRID system's business rules?

Area to assess	Notes
Storage type	Will there be enough storage of the appropriate type after decommissioning is complete? For example, ILM rules might dictate that content be moved from one type of storage to another as content ages. If so, you must ensure that enough storage of the appropriate type is available in the final configuration of the StorageGRID system.

Related information

Consolidating Storage Nodes

Manage objects with ILM

Expand your grid

Decommissioning disconnected Storage Nodes

You must understand what can happen if you decommission a Storage Node while it is disconnected (health is Unknown or Administratively Down).

When you decommission a Storage Node that is disconnected from the grid, StorageGRID uses data from other Storage Nodes to reconstruct the object data and metadata that was on the disconnected node. It does this by automatically starting data repair jobs at the end of the decommissioning process.

Before decommissioning a disconnected Storage Node, be aware of the following:

- You should never decommission a disconnected node unless you are sure it cannot be brought online or recovered.

  > Do not perform this procedure if you believe it might be possible to recover object data from the node. Instead, contact technical support to determine if node recovery is possible.

- If a disconnected Storage Node contains the only copy of an object, that object will be lost when you decommission the node. The data repair jobs can only reconstruct and recover objects if at least one replicated copy or enough erasure-coded fragments exist on Storage Nodes that are currently connected.
- When you decommission a disconnected Storage Node, the decommission procedure completes relatively quickly. However, the data repair jobs can take days or weeks to run and are not monitored by the decommission procedure. You must manually monitor these jobs and restart them as needed. See the instructions on monitoring data repair.

  Checking data repair jobs

- If you decommission more than one disconnected Storage Node at a time, data loss might occur. The system might not be able to reconstruct data if too few copies of object data, metadata, or erasure-coded fragments remain available.

  > If you have more than one disconnected Storage Node that you cannot recover, contact technical support to determine the best course of action.

Consolidating Storage Nodes

You can consolidate Storage Nodes to reduce the Storage Node count for a site or deployment while increasing storage capacity.

When you consolidate Storage Nodes, you expand the StorageGRID system to add new, larger capacity Storage Nodes and then decommission the old, smaller capacity Storage Nodes. During the decommission procedure, objects are migrated from the old Storage Nodes to the new Storage Nodes.

For example, you might add two new, larger capacity Storage Nodes to replace three older Storage Nodes. You would first use the expansion procedure to add the two new, larger Storage Nodes, and then use the decommission procedure to remove the three old, smaller capacity Storage Nodes.

By adding new capacity before removing existing Storage Nodes, you ensure a more balanced distribution of data across the StorageGRID system. You also reduce the possibility that an existing Storage Node might be pushed beyond the storage watermark level.

Related information

Expand your grid

Decommissioning multiple Storage Nodes

If you need to remove more than one Storage Node, you can decommission them either sequentially or in parallel.

- If you decommission Storage Nodes sequentially, you must wait for the first Storage Node to complete decommissioning before starting to decommission the next Storage Node.
- If you decommission Storage Nodes in parallel, the Storage Nodes simultaneously process decommission tasks for all Storage Nodes being decommissioned. This can result in a situation where all permanent copies of a file are marked as “read-only,” temporarily disabling deletion in grids where this functionality is enabled.

Checking data repair jobs

Before decommissioning a grid node, you must confirm that no data repair jobs are active. If any repairs have failed, you must restart them and allow them to complete before performing the decommission procedure.

If you need to decommission a disconnected Storage Node, you will also complete these steps after the decommission procedure completes in order to ensure the data repair job has completed successfully. You must ensure that any erasure-coded fragments that were on the removed node have been restored successfully.

These steps only apply to systems that have erasure-coded objects.

1. Log in to the primary Admin Node:
   a. Enter the following command: `ssh admin@grid_node_IP`

      When you are logged in as root, the prompt changes from `$` to `#`.

   b. Enter the password listed in the `Passwords.txt` file.

c. Enter the following command to switch to root: `su -`

d. Enter the password listed in the `Passwords.txt` file.

2. Check for running repairs: `repair-data show-ec-repair-status`

   - If you have never run a data repair job, the output is `No job found`. You do not need to restart any repair jobs.
   - If the data repair job was run previously or is running currently, the output lists information for the repair. Each repair has a unique repair ID. Go to the next step.

```
root@DC1-ADM1:~ # repair-data show-ec-repair-status

Repair ID Scope Start Time End Time State Est/Affected Bytes Repaired
Retry Repair
================================================================================
===========
949283 DC1-S-99-10(Volumes: 1,2) 2016-11-30T15:27:06.9 Success 17359
17359 No
949292 DC1-S-99-10(Volumes: 1,2) 2016-11-30T15:37:06.9 Failure 17359 0
Yes
949294 DC1-S-99-10(Volumes: 1,2) 2016-11-30T15:47:06.9 Failure 17359 0
Yes
949299 DC1-S-99-10(Volumes: 1,2) 2016-11-30T15:57:06.9 Failure 17359 0
Yes
```

3. If the State for all repairs is `Success`, you do not need to restart any repair jobs.
4. If the State for any repair is `Failure`, you must restart that repair.
   a. Obtain the repair ID for the failed repair from the output.
   b. Run the `repair-data start-ec-node-repair` command.

      Use the `--repair-id` option to specify the Repair ID. For example, if you want to retry a repair with repair ID 949292, run this command: `repair-data start-ec-node-repair --repair-id 949292`

   c. Continue to track the status of EC data repairs until the State for all repairs is `Success`.

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