Tiering policies

Enterprise applications

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Table of Contents

Tiering policies

Oracle database FabricPool tiering policies

Four policies are available in ONTAP which control how Oracle data on the performance tier become a candidate to be relocated to the capacity tier.

Snapshot-only

The `snapshot-only` `tiering-policy` applies only to blocks that are not shared with the active file system. It essentially results in tiering of database backups. Blocks become candidates for tiering after a snapshot is created and the block is then overwritten, resulting in a block that exists only within the snapshot. The delay before a `snapshot-only` block is considered cool is controlled by the `tiering-minimum-cooling-days` setting for the volume. The range as of ONTAP 9.8 is from 2 to 183 days.

Many datasets have low change rates, resulting in minimal savings from this policy. For example, a typical database observed on ONTAP has a change rate of less than 5% per week. Database archive logs can occupy extensive space, but they usually continue to exist in the active file system and thus would not be candidates for tiering under this policy.

Auto

The `auto` tiering policy extends tiering to both snapshot-specific blocks as well as blocks within the active file system. The delay before a block is considered cool is controlled by the `tiering-minimum-cooling-days` setting for the volume. The range as of ONTAP 9.8 is from 2 to 183 days.

This approach enables tiering options that are not available with the `snapshot-only` policy. For example, a data protection policy might require 90 days of certain log files to be retained. Setting a cooling period of 3 days results in any log files older than 3 days to be tiered out from the performance layer. This action frees up substantial space on the performance tier while still allowing you to view and manage the full 90 days of data..

None

The `none` tiering policy prevents any additional blocks from being tiered from the storage layer, but any data still in the capacity tier remains in the capacity tier until it is read. If the block is then read, it is pulled back and placed on the performance tier.

The primary reason to use the `none` tiering policy is to prevent blocks from being tiered, but it could become useful to change the policies over time. For example, let’s say that a specific dataset is extensively tiered to the capacity layer, but an unexpected need for full performance capabilities arises. The policy can be changed to prevent any additional tiering and to confirm that any blocks read back as IO increases remain in the performance tier.

All

The `all` tiering policy replaces the `backup` policy as of ONTAP 9.6. The `backup` policy applied only to data protection volumes, meaning a SnapMirror or NetApp SnapVault destination. The `all` policy functions the same, but is not restricted to data protection volumes.

With this policy, blocks are immediately considered cool and eligible to be tiered to the capacity layer immediately.

This policy is especially appropriate for long-term backups. It can also be used as a form of Hierarchical Storage Management (HSM). In the past, HSM was commonly used to tier the data blocks of a file to tape while keeping the file itself visible on the file system. A FabricPool volume with the `all` policy allows you to store files in a visible and manageable yet consuming nearly no space on the local storage tier.

Oracle databases and FabricPool retrieval policies

The tiering policies control which Oracle database blocks are tiered from the performance tier to the capacity tier. Retrieval policies control what happens when a block that has been tiered is read.

Default

All FabricPool volumes are initially set at `default`, which means the behavior is controlled by the `cloud-retrieval-policy. `The exact behavior depends on the tiering policy used.

- `auto`– only retrieve randomly read data
- `snapshot-only`– retrieve all sequentially or randomly read data
- `none`– retrieve all sequentially or randomly read data
- `all`– do not retrieve data from the capacity tier

On-read

Setting `cloud-retrieval-policy` to on-read overrides the default behavior so a read of any tiered data results in that data being returned to the performance tier.

For example, a volume might have been lightly used for a long time under the `auto` tiering policy and most of the blocks are now tiered out.

If an unexpected change in business needs required some of the data to be repeatedly scanned in order to prepare a certain report, it may be desirable to change the `cloud-retrieval-policy` to `on-read` to ensure that all data that is read is returned to the performance tier, including both sequentially and randomly read data. This would improve performance of sequential I/O against the volume.

Promote

The behavior of the promote policy depends on the tiering policy. If the tiering policy is `auto`, then setting the `cloud-retrieval-policy `to `promote` brings back all blocks from the capacity tier on the next tiering scan.

If the tiering policy is `snapshot-only`, then the only blocks that are returned are the blocks that are associated with the active file system. Normally this would not have any effect because the only blocks tiered under the `snapshot-only` policy would be blocks associated exclusively with snapshots. There would be no tiered blocks in the active file system.

If, however, data on a volume was restored by a volume SnapRestore or file-clone operation from a snapshot, some of the blocks that were tiered out because they were only associated with snapshots may now be required by the active file system. It may be desirable to temporarily change the `cloud-retrieval-policy` policy to `promote` to quickly retrieve all locally required blocks.

Never

Do not retrieve blocks from the capacity tier.

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