

Solution Brief

Storage Tiering with NetApp FabricPool

Deal with cold data by using the cloud

Key Benefits

Reclaim space on primary storage

- Tier inactive data to on-premises or public cloud storage without complex archive software or application rearchitecture.
- Reclaim high-performance solid-state drive (SSD) capacity transparently to applications while placing cold data in lower-cost storage.

Capture cloud economics without sacrificing performance

- Use cloud storage through a single view with management centralized in NetApp ONTAP® data management software.
- Reduce TCO by automating the tiering of data to the public or private cloud.

Abstract

This solution brief describes NetApp® FabricPool software, the growing issue of cold data, and how the NetApp FabricPool solution can help maximize customers' all-flash systems by using the cloud.

For more information about FabricPool software capabilities, requirements, implementation, and best practices, see [TR-4598: FabricPool Best Practices](#) and [TR-4695: Database Storage Tiering with NetApp FabricPool](#).

The Challenge

Inefficient use of flash storage

Industry-leading studies suggest that inactive data, or cold data, accounts for more than 50% of total storage capacity in many storage environments. Cold data is data that is infrequently used or accessed. In some cases, companies might need to retain data for archival purposes. Or they might need to keep point-in-time snapshot copies for essential data protection and disaster recovery. Although they are essential, snapshot copies are rarely used but can consume more than 10% of a typical storage environment. These use cases are prime examples of how cold data would be better served on a low-cost object store rather than a high-performance SSD.

In addition to snapshot copies, infrequently accessed data associated with productivity software, completed projects, and old datasets, also use high-performance SSDs inefficiently. Tiering this data to a low-cost object store is an easy way to reclaim existing SSD capacity and reduce the amount of SSD capacity required moving forward.

The Solution

NetApp FabricPool solution for cold data storage tiering

With the FabricPool data tiering solution, an enterprise's overall user experience of flash systems improves while avoiding the pain of rearchitecting applications for storage efficiency. FabricPool reduces the storage footprint and the associated costs of a system's environment. Active data remains on high-performance SSDs. Inactive data is tiered to low-cost object storage while preserving ONTAP data efficiencies.

For customers who want to reclaim capacity and consolidate more workloads on their existing high-performance flash aggregates, NetApp recommends the use of FabricPool. In the big picture, customers can implement software that requires minimal policy management, is transparent to existing applications, and results in TCO savings.

How does NetApp FabricPool work?

FabricPool was first made available in ONTAP 9.2. It works by associating an external object store, such as Amazon S3, Microsoft Azure Blob Storage, or NetApp StorageGRID®, with an aggregate in ONTAP, creating a composite aggregate, a FabricPool. Volumes in the composite aggregate can take advantage of the FabricPool by keeping active (hot) data on high-performing SSDs (the performance tier) and tiering inactivate (cold) data to the external object store (the capacity tier).

After a block has been identified as cold, it is marked for tiering. During this time, a background tiering scan looks for cold blocks. When enough 4KB blocks from the same volume have been collected, they are concatenated into a 4MB object and moved to the capacity tier based on the volume tiering policy. Tiering to the capacity tier occurs only if the performance tier aggregate is more than 50% full. There is little reason to tier cold data to an external capacity tier if the performance tier is being underused.

Tiering policies available at the volume level include Snapshot-Only, Auto, and Backup. The policies determine how a block on the performance tier becomes a candidate to be relocated to the capacity tier and what happens when a block currently on the capacity tier is read by an application. In both the Auto and Snapshot-Only tiering policies, cold blocks are moved to the capacity tier. The differences in the two policies are the block types that are tiered and the default setting for number of inactive days before a block is considered cold. In an Auto tiering policy, data blocks are considered cold after 31 days; in a Snapshot-Only tiering policy, snapshot blocks are considered cold after 2 days.

For the Backup tiering policy, all blocks that are transferred to a destination are immediately considered cold and eligible to be tiered to the capacity layer. (This applies to data protection volumes such as NetApp SnapMirror® destinations.)

With regard to FabricPool, the term “data” applies to the actual data blocks, not the metadata. Only data blocks are

tiered, while metadata remains local to the SSDs. In addition, the status of a block as hot or cool is affected only by reading the actual data block. Simply reading the name, timestamp, or ownership metadata of a file does not affect the location of the underlying data blocks. Additionally, storage efficiencies such as compression, deduplication, and compaction are preserved when moving data to the capacity tier.

Support

NetApp Fabric Pool supports the following configurations:

- NetApp AFF systems
- SSD aggregates on FAS systems
- ONTAP Select (NetApp recommends using all-SSD FabricPool aggregates)
- ONTAP Cloud with Amazon gp2 and st1 Elastic Block Store (EBS) volumes

Even though only a basic level of understanding is necessary to configure and use FabricPool, understanding how FabricPool determines block temperature, migrates data, and creates data objects is extremely useful when architecting storage solutions.

Conclusion

NetApp FabricPool is an optimal solution that allows customers to improve efficiency and manageability within their storage environments. FabricPool software allows a high-performance storage system to host frequently accessed critical data, while relocating the colder data to a capacity tier storage system. Manageability is unimpaired because the metadata is centralized, allowing visibility to all data as usual while ONTAP FabricPool automatically manages the location of the underlying data blocks. In addition, NetApp provides a free 10TB capacity FabricPool license with the purchase of any new ONTAP 9.2 or later cluster.

Learn More about NetApp Fabric Pool

To learn more about NetApp FabricPool software, visit the [NetApp ONTAP 9 Documentation Center](#).

About NetApp

NetApp is the data authority for hybrid cloud. We provide a full range of hybrid cloud data services that simplify management of applications and data across cloud and on-premises environments to accelerate digital transformation. Together with our partners, we empower global organizations to unleash the full potential of their data to expand customer touchpoints, foster greater innovation and optimize their operations. For more information, visit www.netapp.com. #DataDriven

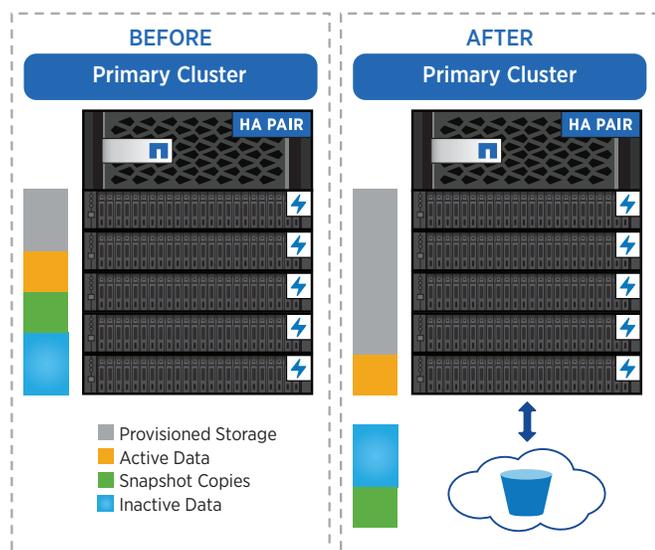


Figure 1) Tiered inactive and snapshot data.