Storage efficiency support

ONTAP Select

NetApp
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Table of Contents

Storage efficiency support 1

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ONTAP Select provides storage efficiency options that are similar to the storage efficiency options present on FAS and AFF arrays.

ONTAP Select virtual NAS (vNAS) deployments using all-flash VSAN or generic flash arrays should follow the best practices for ONTAP Select with non-SSD DAS storage.

An AFF-like personality is automatically enabled on new installations as long as you have DAS storage with SSD drives and a Premium license.

With an AFF-like personality, the following inline SE features are automatically enabled during installation:

- Inline zero pattern detection
- Volume inline deduplication
- Volume background deduplication
- Adaptive inline compression
- Inline data compaction
- Aggregate inline deduplication
- Aggregate background deduplication

To verify that ONTAP Select has enabled all the default storage efficiency policies, run the following command on a newly created volume:

```
<system name>::> set diag
Warning: These diagnostic commands are for use by NetApp personnel only.
Do you want to continue? {y|n}: y
twonode95IP15::*> sis config
Vserver:                                SVM1
Volume:                                 _export1_NFS_volume
Schedule                                -
Policy:                                 auto
Compression:                            true
Inline Compression:                     true
Compression Type:                       adaptive
Application IO Si                       8K
Compression Algorithm:                  lzopro
Inline Dedupe:                          true
Data Compaction:                        true
Cross Volume Inline Deduplication:      true
Cross Volume Background Deduplication:  true
```

For ONTAP Select upgrades from 9.4, you must install ONTAP Select 9.4 on DAS SSD storage with a Premium license. In addition, the **Enable Storage Efficiencies** check box must be checked during initial cluster installation with ONTAP Deploy. Enabling an AFF-like personality post-ONTAP upgrade when prior conditions have not been met requires the manual creation of a boot argument and a node reboot. Contact technical support for further details.

The following table summarizes the various storage efficiency options available, enabled by default, or not enabled by default but recommended, depending on the ONTAP Select version and media type.

ONTAP Select storage efficiency configurations

ONTAP Select Features	**9.6 / 9.5 Premium or Premium XL[4] (DAS SSD)**	**9.4[1] / 9.3[2] Premium (DAS SSD)**	**9.6 / 9.5 / 9.4[1] / 9.3[2] All Licenses (DAS HDD)**	**9.6 All Licenses (vNAS)**	**9.5 / 9.4[1] / 9.3[2] Premium or Standard (vNAS)[3]**
Inline zero detection	Yes (default)	Yes Enabled by user on a per-volume basis	Yes Enabled by user on a per-volume basis	Yes Enabled by user on a per-volume basis	Not supported
Volume inline deduplication	Yes (default)	Yes (recommended) Enabled by user on a per-volume basis	Not available	Not supported	Not supported
32K inline compression (secondary compression)	Yes Enabled by user on a per volume basis.	Yes Enabled by user on a per-volume basis	Yes Enabled by user on a per-volume basis	Not supported	Not supported
8K inline compression (adaptive compression)	Yes (default)	Yes (recommended) Enabled by user on a per-volume basis	Yes Enabled by user on a per volume basis	Not supported	Not supported
Background compression	Not supported	Not supported	Yes Enabled by user on a per volume basis	Yes Enabled by user on a per-volume basis	Not supported
Compression scanner	Yes	Yes Enabled by user on a per-volume basis	Yes	Yes Enabled by user on a per-volume basis	Not supported

ONTAP Select Features	9.6 / 9.5 Premium or Premium XL[4] (DAS SSD)	9.4[1] / 9.3[2] Premium (DAS SSD)	9.6 / 9.5 / 9.4[1] / 9.3[2] All Licenses (DAS HDD)	9.6 All Licenses (vNAS)	9.5 / 9.4[1] / 9.3[2] Premium or Standard (vNAS)[3]
Inline data compaction	Yes (default)	Yes (recommended) Enabled by user on a per-volume basis	Yes Enabled by user on a per volume basis	Not supported	Not supported
Compaction scanner	Yes	Yes Enabled by user on a per-volume basis	Yes	Not supported	Not supported
Aggregate inline deduplication	Yes (default)	Yes (recommended) Enabled by user on a per volume basis with space guarantee = none)	N/A	Not supported	Not supported
Volume background deduplication	Yes (default)	Yes (recommended)	Yes Enabled by user on a per volume basis	Yes Enabled by user on a per-volume basis	Not supported
Aggregate background deduplication	Yes (default)	Yes (recommended) Enabled by user on a per volume basis with space guarantee = none)	N/A	Not supported	Not supported

[1]ONTAP Select 9.4 on DAS SSDs (requires Premium license) allows existing data in an aggregate to be deduped using aggregate-level background cross volume scanners. This one-time operation is performed manually for volumes created before 9.4.

[2]ONTAP Select 9.3 on DAS SSDs (requires Premium license) supports aggregate-level background deduplication; however, this feature must be enabled after creating the aggregate.

[3]ONTAP Select 9.5 vNAS by default does not support any storage efficiency policies. Review the vNAS section for details on Single Instance Data Logging (SIDL).

[4]ONTAP Select 9.6 supports a new license (Premium XL) and a new VM size (large). However, the large VM is only supported for DAS configurations using software RAID. Hardware RAID and vNAS configurations are not supported with the large ONTAP Select VM in the current release.

Notes on upgrade behavior for DAS SSD configurations

After upgrading to ONTAP Select 9.5 or later, wait for the `system node upgrade-revert show` command to indicate that the upgrade has completed before verifying the storage efficiency values for existing volumes.

On a system upgraded to ONTAP Select 9.5 or later, a new volume created on an existing aggregate or a newly created aggregate has the same behavior as a volume created on a fresh deployment. Existing volumes that undergo the ONTAP Select code upgrade have most of the same storage efficiency policies as a newly created volume with some variations:

Scenario 1 If no storage efficiency policies were enabled on a volume prior to the upgrade, then:

- Volumes with `space guarantee = volume` do not have inline data-compaction, aggregate inline deduplication, and aggregate background deduplication enabled. These options can be enabled post-upgrade.
- Volumes with `space guarantee = none` do not have background compression enabled. This option can be enabled post upgrade.
- Storage efficiency policy on the existing volumes is set to auto after upgrade.

Scenario 2 If some storage efficiencies are already enabled on a volume prior to the upgrade, then:

- Volumes with `space guarantee = volume` do not see any difference after upgrade.
- Volumes with `space guarantee = none` have aggregate background deduplication turned on.
- Volumes with `storage policy inline-only` have their policy set to auto.
- Volumes with user defined storage efficiency policies have no change in policy, with the exception of volumes with `space guarantee = none`. These volumes have aggregate background deduplication enabled.

Notes on Upgrade Behavior for DAS HDD Configuration

Storage efficiency features enabled prior to the upgrade are retained after the upgrade to ONTAP Select 9.5 or later. If no storage efficiencies were enabled prior to the upgrade, no storage efficiencies are enabled post-upgrade.

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