Monitor volume usage with ONTAP File System Analytics

ONTAP 9

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File System Analytics overview

File System Analytics is a framework for collecting and displaying data about the contents of a FlexGroup or FlexVol volume.

File system analytics presents detailed information at each level of the volume's file system hierarchy, allowing you to:

- Assess capacity usage and trends
- Monitor file and directory counts
- Evaluate file activity and history
- Take corrective action based on displays (beginning with ONTAP 9.9.1)

In ONTAP 9.8 and later, file system analytics can be displayed using ONTAP System Manager. You can also use ONTAP REST APIs to access the data programmatically.

NOTE:
* Enabling file system analytics is expected to have a performance impact. Do not enable analytics if maximal performance is required in your environment. You can also disable analytics if your testing shows that the performance impact is unacceptable. When you disable analytics, previously collected data is no longer displayed for that volume.
* If you have enabled file system analytics on volumes whose containing SVM is in a protection relationship, the analytics data is not replicated to the destination SVM. If the source SVM must be resynchronized in a recovery operation, you must manually reenable analytics on desired volumes after recovery.
* Beginning with ONTAP 9.9.1, file system analytics is available for volumes transitioned from 7-mode systems. Nonetheless, because file system analytics can consume storage space, it should not be run on transitioned volumes that are close to maximum capacity.

File system analytics is not available for the following volume types:

- SnapMirror destination volumes
- SnapLock volumes
- Volumes containing LUNs
- Volumes used for SMB/CIFS audit
- Node root volumes (/mroot)

Enable File System Analytics

To collect and display usage data, you must enable file system analytics. You can do so using System Manager, the ONTAP CLI, or REST APIs.

You can enable file system analytics when you create a new volume, or when you upgrade a system with volumes to ONTAP 9.8 or later. After upgrading, be sure that all upgrade processes have completed before enabling analytics.

Depending on the size and contents of the volume, enabling analytics might take some time while ONTAP processes existing data in the volume. System Manager displays progress and presents analytics data when complete. If you need more precise information about initialization progress, you can use the ONTAP CLI command `volume analytics show`.

Steps

1. Click **Storage > Volumes**, then select the desired volume.
2. Click **Explorer**, then click **Enable Analytics** or **Disable Analytics**.

View file system activity

After File System Analytics is enabled, by default, you can view the root directory contents of a selected volume sorted by the spaced used in each subtree

Clicking on any file system object allows you to browse the file system and to display detailed information about each object in a directory. Information about directories can also be displayed graphically. Over time, historical data is displayed for each subtree. Space used is not sorted if there are more than 3000 directories.

The file system analytics **Explorer** screen consists of three areas:

- Tree view of directories and subdirectories; expandable list showing name, size, modify history, and access history.
- Files; showing name, size, and accessed time for the object selected in the directory list.
- Active and inactive data comparison for the object selected in the directory list.

  Beginning with ONTAP 9.9.1, you can customize the range to be reported. The default is one year. Based on these customizations, you can take corrective actions, such as moving volumes and modifying the tiering policy.

Accessed time is shown by default. However, if the volume default has been altered from the CLI, by setting the `-atime-update` option to `false` with the `volume modify` command, only last modified time is shown. For example:

- The tree view will not display the **access history**.
- The files view will be altered.
- The active/inactive data view will be based on modified time (`mtime`).

Using these displays, you can examine the following:

- File system locations consuming the most space
- Detailed information about a directory tree, including file and subdirectory count within directories and subdirectories
- File system locations that contain old data (for example, scratch, temp, or log trees)

Keep the following points in mind when interpreting file system analytics output:

- File system analytics show where and when your data is in use, not how much data is being processed. For example, large space consumption by recently accessed or modified files does not necessarily indicate high system processing loads.

- The way that the **Volume Explorer** tab calculates space consumption for file system analytics might differ from other tools. In particular, there could be significant differences compared to the consumption reported in the **Volume Overview** if the volume has storage efficiency features enabled. This is because the **Volume Explorer** tab does not include efficiency savings.
- Due to space limitations in the directory display, it is not possible to view a directory depth greater than 8 levels in the *List View*. To view directories more than 8 levels deep, you must switch to *Graphical View*, locate the desired directory, then switch back to *List View*. This will allow additional screen space in the display.

Step

1. Click **Storage > Volumes**, select the desired volume, then click **Explorer**.

Take corrective action based on analytics

Beginning with ONTAP 9.9.1, you can take corrective actions directly from File System Analytics displays based on current data and desired outcomes.

When analytics are enabled, you can take the following actions:

- delete directories and files

  In the Explorer display, you can select directories or individual files to delete. Directories are deleted with low-latency fast directory delete functionality. (Fast directory delete is also available beginning in ONTAP 9.9.1 without analytics enabled.)

- assign media cost in storage tiers to compare costs of inactive data storage locations

  Media cost is a value that you assign based on your evaluation of storage costs, represented as your choice of currency per GB. When set, ONTAP System Manager uses the assigned media cost to project estimated savings when you move volumes.

  The media cost you set is not persistent; it can only be set for a single browser session.

- move volumes to reduce storage costs
  Based on analytics displays and media cost comparisons, you can move volumes to less expensive storage in local tiers.

  Only one volume at a time can be compared and moved.

Table 1. Steps

To perform this action…	Take these steps…
Delete directories or files	1. Click **Storage > Volumes**, then click **Explorer**. When you hover over a file or folder, the option to delete appears. You can only delete one object at a time. **Note** When directories and files are deleted, the new storage capacity values are not displayed immediately.
Enable media cost comparison	1. Click **Storage > Tiers**, then click **Set Media Cost** in the desired local tier (aggregate) tiles. Be sure to select active and inactive tiers to enable comparison. 2. Enter a currency type and amount. When you enter or change the media cost, the change is made in all media types.
Move volumes to a less expensive tier	1. After enabling media cost display, click **Storage > Tiers**, then click **Volumes**. 2. To compare destination options for a volume, click ⋮ for the volume, then click **Move**. 3. In the **Select Destination Local Tier** display, select destination tiers to display the estimated cost difference. 4. After comparing options, select the desired tier and click **Move**.