



# **File System Analytics**

## **ONTAP 9**

NetApp

November 11, 2022

This PDF was generated from [https://docs.netapp.com/us-en/ontap/concept\\_nas\\_file\\_system\\_analytics\\_overview.html](https://docs.netapp.com/us-en/ontap/concept_nas_file_system_analytics_overview.html) on November 11, 2022. Always check docs.netapp.com for the latest.

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# File System Analytics

## File System Analytics overview

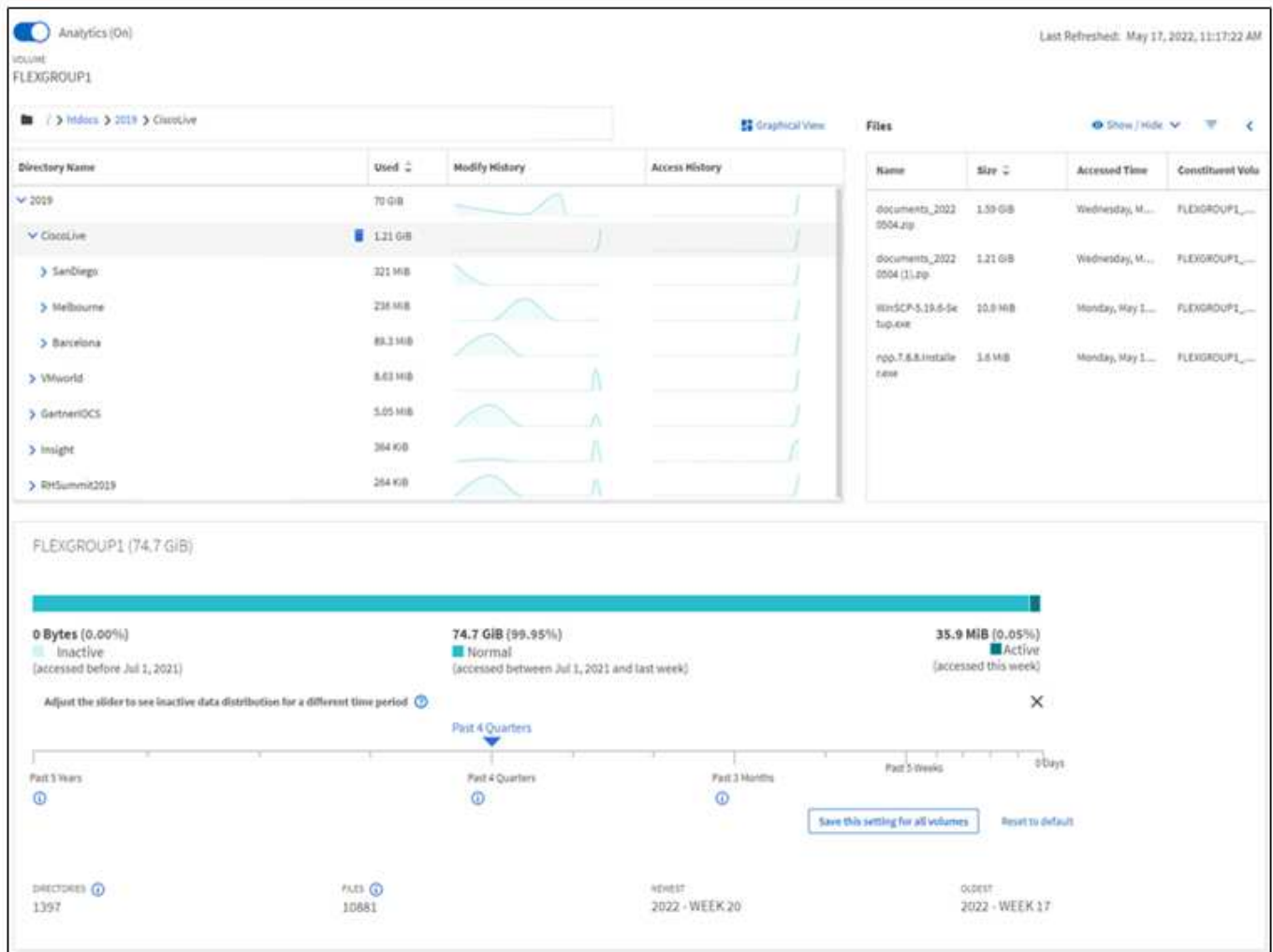
File System Analytics (FSA) was first introduced in ONTAP 9.8 to provide real-time visibility into file usage and storage capacity trends inside ONTAP FlexGroup or FlexVol volumes. This native capability eliminates the need for external tools and provides key insights into how your storage is utilized and whether there are opportunities to optimize the storage for your business needs.

With FSA, you have visibility at all levels of a volume's file system hierarchy in NAS. For example, you can gain usage and capacity insights at the Storage VM (SVM), volume, directory, and file levels. You can use FSA to answer questions like:

- What is filling up my storage, and are there any large files I can move to another storage location?
- Which are my most active volumes, directories, and files? Is my storage performance optimized for the needs of my users?
- How much data was added in the last month?
- Who are my most active or least active storage users?
- How much inactive or dormant data is on my primary storage? Can I move that data to a lower cost cold tier?
- Will my planned quality-of-service changes negatively impact access to critical, frequently accessed files?

File System Analytics is integrated into ONTAP System Manager. Views within System Manager provide:

- Real-time visibility for effective data management and operation
- Real-time data collection and aggregation
- Subdirectory and file sizes and counts, together with associated performance profiles
- File age histograms for modify and access histories



## Supported volume types

File System Analytics is designed to provide visibility on volumes with active NAS data, with the exception of FlexCache caches and SnapMirror destination volumes.

## File System Analytics feature availability

Each ONTAP release expands the analytic scope of File System Analytics.

### | Visualization in System Manager

- | X
- | X
- | X
- | X
- | X

### | Capacity analytics

- | X
- | X
- | X
- | X
- | X

| Inactive data information

| X  
| X  
| X  
| X  
| X

| Support for volumes transitioned from Data ONTAP 7-Mode

| X  
| X  
| X  
| X  
|

| Ability to customize inactive period in System Manager

| X  
| X  
| X  
| X  
|

| Volume-level Activity Tracking

| X  
| X  
| X  
|

| Download Activity Tracking data to CSV

| X  
| X  
| X  
|

| SVM-level Activity Tracking

| X  
| X  
|

| Timeline

| X  
| X  
|

| Top directories by size

| X  
|  
|  
|  
|

== Learn more about File System Analytics

video::0oRHfZlYurk[youtube, width=848, height=480]

.Further Reading

\* [TR 4687: Best-practice guidelines for ONTAP File System Analytics](#)

\* [Knowledge Base: High or fluctuating latency after turning on NetApp ONTAP File System Analytics](#)

= Enable File System Analytics

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[.lead]

To collect and display usage data such as capacity analytics, you need to enable File System Analytics on a volume.

Beginning with ONTAP 9.8, you can enable File System Analytics on a new or existing volume. If you upgrade a system to ONTAP 9.8 or later, ensure that all upgrade processes have completed before you enable File System Analytics.

.Steps

Depending on the size and contents of the volume, enabling analytics may take 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`.

You can enable File System Analytics with ONTAP System Manager or the CLI.

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.System Manager — [options="header"]

|In ONTAP 9.8 and 9.9.1 |Beginning in ONTAP 9.10.1

| 1. Select **Storage > Volumes**.

2. Select the desired volume, then select **Explorer**.

3. Select **Enable Analytics** or **Disable Analytics**.

| 1. Select **Storage > Volumes**.

2. Select the desired volume. From the individual volume menu, select **File System > Explorer**.

3. Select **Enable Analytics** or **Disable Analytics**.

—

.CLI — .To enable File System Analytics with the CLI:  
. Run the following command:  
`volume analytics on -vserver *svm\_name* -volume  
*volume\_name* [-foreground {true

false}}`

By default, the command runs in the foreground;  
ONTAP displays progress and presents analytics data  
when complete. If you need more precise information,  
you can run the command in the background by using  
the `-foreground false` option and then use the  
`volume analytics show` command to display  
initialization progress in the CLI.

. After successfully enabling File System Analytics,  
use ONTAP System Manager to display the analytic  
data. — ====

= View file system activity

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1ct68ec/source/./media/

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After File System Analytics (FSA) is enabled, you can  
view the root directory contents of a selected volume  
sorted by the space used in each subtree.

Select any file system object 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.

== Explorer

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 value is one year.  
Based on these customizations, you can take

|In ONTAP 9.8 and 9.9.1 |Beginning in ONTAP 9.10.1

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

|Select **Storage > Volumes**, select the desired volume. From the individual volume menu, select **File System > Explorer**.



= Enable Activity Tracking  
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Beginning with ONTAP 9.10.1, File System Analytics includes an Activity Tracking feature that allows you to identify hot objects and download them as a CSV file. Beginning with ONTAP 9.11.1, Activity Tracking is expanded to the SVM scope. Also beginning in ONTAP 9.11.1, System Manager features a timeline for Activity Tracking, allowing you to look through up to five minutes of Activity Tracking data.

Activity Tracking enables monitoring in four categories:

- \* Directories
- \* Files
- \* Clients
- \* Users

For each category monitored, Activity Tracking will display read IOPs, write IOPs, read throughputs, and write throughputs. Queries on Activity Tracking refresh every 10 to 15 seconds pertaining to hot spots seen in the system over the previous five-second interval.

Activity tracking information is approximate, and the accuracy of the data depends on the distribution of the incoming I/O traffic.

When viewing Activity Tracking in System Manager at the volume level, only the menu of the expanded volume will actively refresh. If the view of any volumes are collapsed, they will not refresh until the volume display is expanded. You can stop the refreshes with the **Pause Refresh** button. Activity data can be downloaded in a CSV format that will display all the point-in-time data captured for the selected volume.

With the timeline feature available beginning in ONTAP 9.11.1, you can keep a record of hotspot activity on a volume or SVM, continuously updating approximately every five seconds and retaining the previous five minutes of data. Timeline data is only retained for fields that are visible area of the page. If you collapse a tracking category or scroll so the timeline is out of view, the timeline will stop collecting data. By default, timelines are disabled and will automatically be disabled when you navigate away from the Activity tab.

== Enable Activity Tracking for a single volume

You can enable Activity Tracking with ONTAP System Manager or the ONTAP CLI.

.About this task

If you use RBAC with the ONTAP REST API or System Manager, you will need to create custom roles to manage access to Activity Tracking. See [\[Role-based access control \(RBAC\) and Activity Tracking\]](#) for this process.

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.System Manager — .Steps

. Select **Storage > Volumes**. Select the desired volume. From the individual volume menu, select File System and then select the Activity tab.

. Ensure **Activity Tracking** is turned on to view individual reports on top directories, files, clients, and users.

h| To perform this action... h| Take these steps...

a|

Delete directories or files

a|

. 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.



When directories and files are deleted, the new storage capacity values are not displayed immediately.

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Enable media cost comparison

a|

. 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.

. Enter a currency type and amount.

+


When you enter or change the media cost, the change is made in all media types.

a|

Move volumes to a less expensive tier

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. After enabling media cost display, click **Storage > Tiers**, then click **Volumes**.

. To compare destination options for a volume, click  for the volume, then click **Move**.

. In the **Select Destination Local Tier** display, select destination tiers to display the estimated cost difference.

. After comparing options, select the desired tier and click **Move**.

= Considerations for File System Analytics

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You should be aware of certain usage limits and potential performance impacts associated with implementing File System Analytics.

== SVM-protected relationships

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.

== Performance considerations

In some cases, enabling File System Analytics could negatively impact performance during the initial metadata collection. This is most typically seen on systems that are at maximum utilization. To avoid enabling analytics on such systems, you can use ONTAP System Manager performance monitoring tools.

If you experience a notable increase in latency, refer to the Knowledge Base article [High or fluctuating latency after turning on NetApp ONTAP File System Analytics](#).

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