Get started with XCP

XCP 1.6.2

NetApp
October 28, 2020

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Learn about XCP

NetApp XCP is a client-based software for any-to-NetApp and NetApp-to-NetApp data migrations and file analytics. XCP is designed to scale and achieve greater performance by utilizing all the available system resources to manage high-volume datasets and high-performance migrations. XCP helps you get complete visibility into the file system with the option to generate customer reports. Thanks to the matching and formatting capabilities, you can customize the reports to match any reporting needs.

Use XCP for NFS or SMB systems as one of the following solutions:

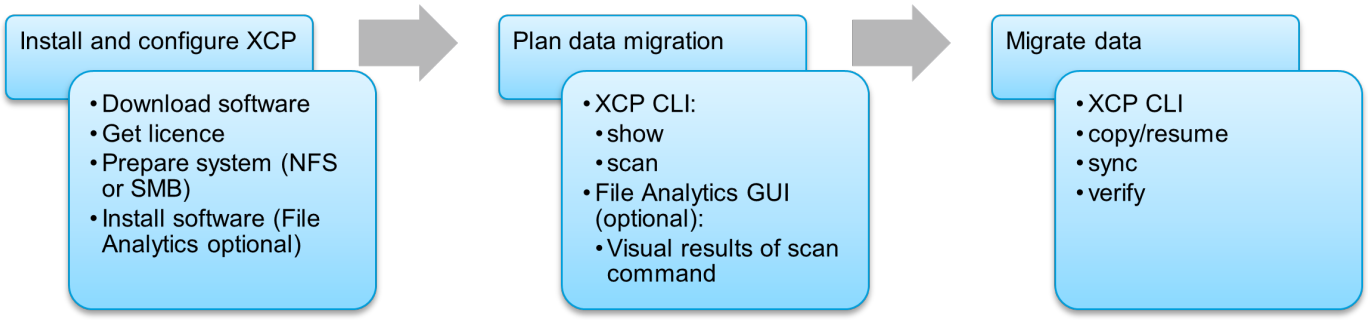
- Migration solution
- File Analytics solution

XCP is command-line software available in a single package supporting NFS and SMB protocols. XCP is available as a Linux binary for NFS datasets and is available as a Windows executable for SMB datasets.

XCP File Analytics is host-based software that detects file shares, runs scans on the file system, and provides a dashboard for file analytics. XCP file analytics works for both NetApp and third-party systems and runs on Linux or Windows hosts to provide analytics for NFS and SMB exported file systems. The binary for the file analytics GUI is included in the single package supporting NFS and SMB protocols.

The XCP CLI is robust. For more information, see the *XCP Reference*.

XCP workflow



Unsupported features

The following features are not supported on XCP NFS:

Feature Name	Description
IPv6	Does not support IP version 6 (IPv6)

Feature Name	Description
NFSv4 ACLS (third-party)	Does not support third-party to NetApp NFSv4 ACLs

The following features are not supported on XCP SMB:

Feature Name	Description
NFS symbolic link (symlink)	NFS symlink is not supported in XCP SMB
ACL option for scan	ACLs not supported for scan option
IPv6	Does not support IP version 6 (IPv6)
NTFS Alternate Data Streams	XCP does not currently support Alternate Data Streams

The following common features not available for XCP NFS and SMB

- **Active source support**: When data is active and continuously changing on the source volume. In such cases, use Snapshot for the data migration or perform the migration when there is no data changes happening on the source.
- **XCP multiple instance on same host**: When running multiple instances of XCP on same host you might get unpredictable results.
- **Time to complete migration**: XCP upfront does not provide the time to complete the migration or the time to complete any command used for migration. If you are doing final cutover confirm that data churn on the source volume is low.

Supported configurations

All the XCP supported configurations such as hosts, ONTAP versions, and supported browsers, are listed in the Interoperability Matrix Tool (IMT). For more information, see https://mysupport.netapp.com/matrix/.

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Learn about XCP

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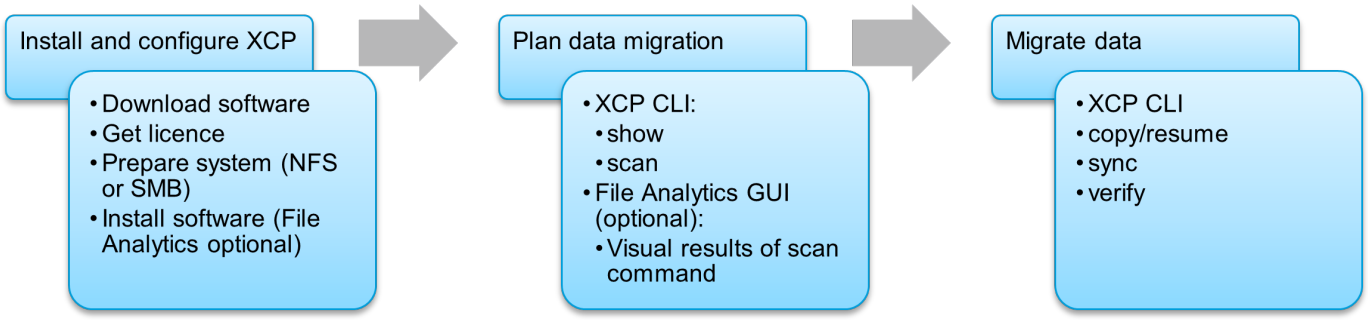

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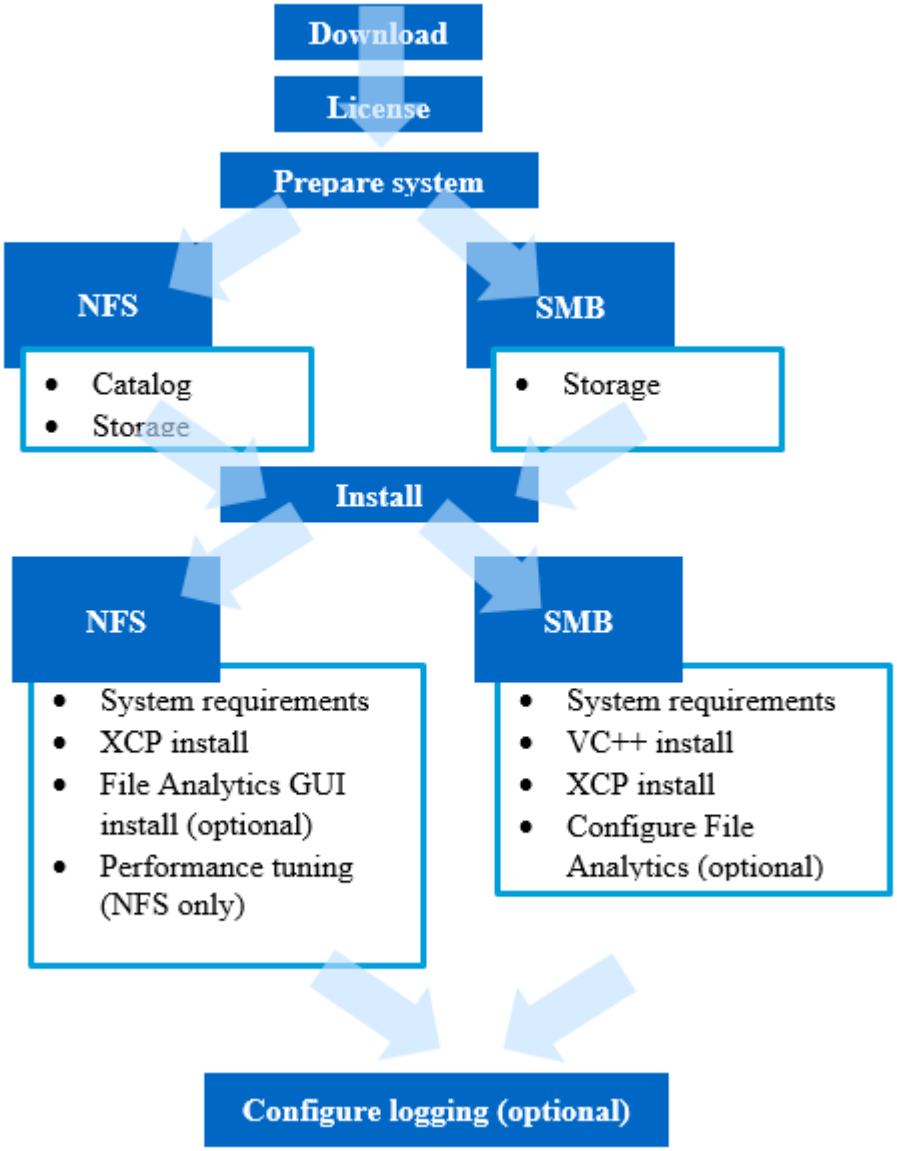
Install XCP

Install and configure workflow

This document provides an easy workflow for installing and setting up XCP on NFS and SMB systems.



Download XCP

Download XCP from the NetApp support site and obtain a license from the XCP site.

You can download XCP from the NetApp Support site.

License XCP

NetApp offers a free 90-day XCP license. You can obtain the license file from https://xcp.netapp.com. The licensing portal offers different licensing options. After 90 days you can renew the license for another 90 days using the same portal.

The XCP license is available as an offline or online license. If you want to send migration statistics use an online license. The online license requires an internet connection. The offline license does not require an internet connection.

Prepare your system

If you are using XCP NFS on a Linux system, you must prepare catalog and storage.

If you are using XCP SMB on a Microsoft Windows system, you must prepare storage.

Prepare Linux for XCP NFS

XCP NFS uses Linux client host systems to generate parallel I/O streams and fully use available network and storage performance.

Configure catalog

XCP saves operation reports and metadata in an NFSv3-accessible catalog directory. Provisioning the catalog is a one-time preinstallation task requiring the following:

- A NetApp NFSv3 export for security and reliability.
- At least ten disks or solid-state drives in the aggregate containing the export for performance.
- Storage configured to allow root access to the catalog export for the IP addresses of all Linux clients used to run XCP (multiple XCP clients can share a catalog location).
- Approximately 1 GB of space for every 10 million objects (directories plus files and hard links) to be indexed; each copy that can be resumed or synched and each offline-searchable scan requires an index.

You should store XCP catalogs separately. They should not be located on either the source or destination NFS export directory. XCP maintains metadata—reports in the catalog location specified during the initial setup. You must specify and update the location for storing the reports before you run any operation with XCP.

Configure storage

XCP NFS transitions and migrations have the following source and target storage requirements:

- Source and target servers must have NFSv3 protocol service enabled. For NFSv4 ACL migration,

you must enable NFSv4 protocol service and NFSv4 ACL on the destination server.

- Source and target volumes must be exported with `root` access to the XCP Linux client host.

Configure the source for NFSv3 and NFSv4 exports as read-only so administrators cannot accidentally modify it.

Prepare Windows for XCP SMB

XCP SMB uses Windows client host systems to generate parallel I/O streams and fully use available network and storage performance.

Configure storage

XCP SMB transitions and migrations have the following user login requirements:

- XCP host system: An XCP host user must have administrator privilege (the user must be part of "BUILTIN\Administrators" group on the XCP SMB host system).
- Add the migration or XCP host user to the audit and security log policy for Active Directory. To locate the 'Manage Auditing and Security Log' Policy on Windows 10, follow these steps:
  1. Open the Group Policy Editor dialog box.
  2. Go to: Computer Configuration > Windows Settings > Security Settings > Local Policies > User Rights Assignment.
  3. Click “Mange auditing and security log”.
  4. To add an XCP host user, select “Add User or Group”.

     For more information see: Manage auditing and security log.
- Target storage system: XCP host user must have read and write access.
- Source storage system:
  - If the user is part of the “Backup Operators” group in the source storage system, the members of this group can read files while bypassing the security rules, regardless of any permissions that protect those files.
  - If the user is not part of “Backup Operators” group in source system, the user must have read access.

Write permission is required in the source storage system for supporting the XCP option “- preserve-atime”.

Prepare File Analytics

File Analytics has the following two parts:

- File Analytics server running on Linux
- XCP SMB service running on Windows

File Analytics installation has the following requirements:

- Supported OS and system requirements are the same as given for NFS and SMB installation. Because the database will reside on a Linux box, you must make sure you have a minimum of 10 GB free space.
- The Linux machine where you install the File Analytics server must be connected to the internet or the yum repository. The installation script talks to the yum repository to download the required packages, such as PostgreSQL, HTTP and SSL.
- The File Analytics GUI can only be hosted on a Linux machine along with XCP services for Linux running on same box.
- For running SMB services, complete the following steps:
  - Verify that your Windows box can ping the Linux machine where the File Analytics server is running.
  - If you are inside a firewall, verify that ports 5030 and 5432 are open. Port 5030 is used to make the REST call to Windows. Port 5432 port is used for the PostgreSQL connection.

The XCP File Analytics server always runs on a Linux machine. There is no separate installation available for SMB File Analytics. If you are a Windows user and want to run File Analytics for SMB share, then you must install File Analytics for Linux and connect the Windows box to a Linux database.
If you only use XCP File Analytics, you do not need to configure the XCP Catalog for NFS.

Install XCP NFS

If you want to upgrade XCP, delete the current installation and replace it with a new installation of the latest version.
This section details the system requirements and the procedures for the initial setup of XCP on a Linux client and the INI file configuration.

System Requirements

	Requirement
System	64-bit Intel or AMD server, minimum 4 cores and 32 GB RAM
Operating System & Software	RHEL8. See the IMT for supported operating systems

	Requirement
Special Requirements	Network connectivity and root level access to source and destination NFSv3 exports No other active applications
Storage	20 MB of disk space for the XCP binary and at least 50 MB of disk space for the logs that are stored in the /opt/NetApp/xFiles/xcp/ directory
Supported Protocol Version	NFSv3 and NFSv4 (ACL only)
Supported browser (File Analytics only)	XCP File Analytics supports Google Chrome version 76 and later. See the IMT matrix for all the supported versions of the browser

Steps

1. Log in to the Linux machine as the root user and download and install the license:

```
[root@scspr1980872003 ~]# ls -l
total 36188
-rw-r--r--  1 root root 37043983 Oct  5 09:36 NETAPP_XCP_<version>.tgz
-rw-------. 1 root root     1994 Sep  4  2019 license
```

2. Untar XCP to extract the tool:

```
[root@scspr1980872003 ~]# tar -xvf NETAPP_XCP_<version>.tgz
[root@scspr1980872003 ~]# ls
NETAPP_XCP_<version>.tgz license xcp
[root@scspr1980872003 ~]# cd xcp/linux/
[root@scspr1980872003 linux]# ls
xcp
```

3. Verify that the `/opt/NetApp/xFiles/xcp` path is available on the system from a previous version of XCP.

   If `/opt/NetApp/xFiles/xcp` is available, activate the license by using the `xcp activate` command and proceed with data migration.

   If `/opt/NetApp/xFiles/xcp` is not available, the system creates the XCP host configuration directory and files at `/opt/NetApp/xFiles/xcp` when you run the `xcp activate` command is run for the first time.

   The `xcp activate` command fails as license is not installed.

```
[root@scspr1980872003 linux]# ./xcp activate
(c) 2020 NetApp, Inc.
xcp: Host config file not found. Creating sample at '/opt/NetApp/xFiles/xcp/xcp.ini'

xcp: ERROR: License file /opt/NetApp/xFiles/xcp/license not found.
Register for a license at https://xcp.netapp.com
```

4. Copy the license to `/opt/NetApp/xFiles/xcp/`:

```
[root@scspr1980872003 linux]# cp ~/license /opt/NetApp/xFiles/xcp/
```

5. Verify that the license file was copied to `/opt/NetApp/xFiles/xcp/`:

```
[root@ scspr1980872003 ~]# ls -altr /opt/NetApp/xFiles/xcp/
total 44
drwxr-xr-x 3 root root    17 Oct  1 06:07 ..
-rw-r--r-- 1 root root   304 Oct  1 06:07 license
drwxr-xr-x 2 root root     6 Oct  1 10:16 xcpfalogs
drwxr-xr-x 2 root root    21 Oct  1 10:16 xcplogs
-rw-r--r-- 1 root root   110 Oct  5 00:48 xcp.ini
drwxr-xr-x 4 root root    83 Oct  5 00:48 .
[root@scspr1978802001 ~]#
```

6. Activate XCP:

```
[root@scspr1980872003 linux]# ./xcp activate
XCP <version>; (c) 2020 NetApp, Inc.;
XCP already activated
```

Install XCP SMB

This section details the system requirements and the procedure for VC++ redistributable installation and the initial setup of XCP on a Windows client.

There is no option to upgrade, reinstall XCP (?) to replace any existing version.

System Requirements

	Requirement
System	64-bit Intel or AMD server, minimum 4 cores and 32GB RAM
Operating System & Software	Windows 2k12 R2 or above. See the IMT matrix for supported Microsoft OS versions Visual C++ 2017 redistributable must be installed on the XCP host.
Special Requirements	The source storage system, XCP host, and the target ONTAP system must be part of same Active Directory domain
Storage	20 MB of disk space for the XCP binary and at least 50 MB of disk space for the logs that are stored in the C:\NetApp\XCP directory
Supported Protocol Version	All SMB protocol versions
Supported browser (File Analytics only)	XCP File Analytics supports Google Chrome version 76 and later. See the IMT matrix for all the supported versions of the browser

XCP SMB Microsoft VC++ Redistributable installation

Follow these steps for the VC++ redistributable installation.

Steps

1. Go to https://go.microsoft.com/fwlink/?LinkId=746572 and download VC++ 2017 redistributable.
2. To start the installation, double click the installer. Accept the terms and conditions and click Install.
3. When the installation is complete, click Restart.

XCP SMB Initial Setup Procedure

Follow these steps to perform the initial setup of XCP SMB.

Steps

1. Copy the license and the XCP SMB binary `NETAPP_XCP_<version>.tgz` on a Windows host.
2. Create an `xcp` directory on your desktop.
   Verify that the `C:\NetApp\XCP` path is available on the system from a previous version of XCP.
   If `C:\NetApp\XCP` is available, activate XCP by using the `xcp activate` command and proceed with data migration.

   If `C:\NetApp\XCP` is not available, the system creates the XCP host configuration directory and files at

`C:\NetApp\XCP` when you run the `xcp activate` command for the first time. The `activate xcp` command fails and creates an error message asking for a new license.

```
C:\>xcp.exe activate
(c) 2020 NetApp, Inc.

License file C:\NetApp\XCP\license not found.
Register for a license at https://xcp.netapp.com
```

3. Copy the license to the newly created folder `C:\NetApp\XCP:`

```
C:\>copy license c:\NetApp\XCP
        1 file(s) copied.
```

4. Activate XCP:

```
C:\>xcp.exe activate
XCP SMB; (c) 2020 NetApp, Inc.;

XCP already activated

C:\>
```

Install File Analytics for NFS

For system requirements for NFS, see *Install XCP NFS*.
The `configure.sh` script installs and enables default configurations of HTTPD and PostgreSQL available for Linux server. You can change/update to a more recent version as needed and to adhere to security guidelines.

Before you begin

- You cannot run the XCP application and XCP as service simultaneously in the same host. If any XCP operations are running, complete the operations before you start configuration.
- Your Linux machine must be connected to the Yum repository server or the internet.

Steps

1. Go to your XCP folder and run the `./configure.sh script`.
   The script takes three to ten minutes to configure the Linux machine and complete the following tasks:
   a. Download PostgreSQL packages

b. Install the PostgreSQL server

c. Install the HTTPD

d. Use the open SSL to create a self-signed certificate (`server.key and server.crt`)

e. Create the XCP File Analytics database

2. Select option 1 Configure client system from the XCP configuration menu.
3. For a new install, update the password for the administrator and database users.
   For an upgrade, you are prompted to stop the XCP service. When done, select option 0.
4. Start the XCP service.
   Use the following command to check if the XCP service is running:
   service xcp status
5. Launch File Analytics in the browser: **https:// <ip address of linux>/xcp**.

Configure XCP

Configure the INI file for XCP NFS

Follow these steps to configure the INI file for XCP NFS.

Steps

1. Add the catalog location for the XCP server in the host configuration file using the `vi` editor.

Catalog location should be exported before modifying the details in the `xcp.ini` XCP configuration file. Catalog location (NFSv3) should be mountable by the XCP Linux host but not necessarily be mounted.

```
[root@localhost /]# vi /opt/NetApp/xFiles/xcp/xcp.ini
```

2. Verify that the XCP Linux client host configuration file entries for the catalog were modified.

```
[root@localhost /]# cat /opt/NetApp/xFiles/xcp/xcp.ini
# Sample xcp config
[xcp]
catalog = 10.61.82.210:/vol/xcpvol/
```

Performance tuning (NFS only)

For the optimal performance and reliability, NetApp recommends setting the following Linux kernel TCP performance parameters in `/etc/sysctl.conf` on the XCP Linux client host. Run `sysctl -p` or the reboot command to commit the changes:

```
net.core.rmem_default = 1342177
37Tnet.core.rmem_max = 16777216
37Tnet.core.rmem_max = 16777216
37Tnet.core.wmem_default = 1342177
37Tnet.core.wmem_max = 16777216
37Tnet.ipv4.tcp_rmem = 4096 1342177 16777216
37Tnet.ipv4.tcp_wmem = 4096 1342177 16777216
37Tnet.core.netdev_max_backlog = 300000
37Tnet.ipv4.tcp_fin_timeout = 10
```

Environment variable (NFS only)

The environment variable XCP_CONFIG_DIR overrides the default location, `/opt/NetApp/xFiles/xcp`. If set, the value should be an OS filesystem path, possibly to a mounted NFS directory. When a custom configuration directory is set, the log file is named `xcp.hostname.log` instead of the default, `xcp.log`.

```
[root@localhost /]# export XCP_CONFIG_DIR ='/tmp/xcp_config_dir_path'
```

The environment variable XCP_LOG_DIR overrides the default location that stores the XCP log in the configuration directory. If set, the value should be an OS filesystem path, possibly to a mounted NFS directory. When a custom log directory is set, the log file is named `xcp.hostname.log` instead of the default, `xcp.log`.

```
[root@localhost /]# export XCP_LOG_DIR='/tmp/xcp_log_dir_path'
```

The environment variable XCP_CATALOG_PATH overrides the setting in xcp.ini. If set, the value should be in the xcp path format, `server:export[:subdirectory]`.

```
[root@localhost /]# export XCP_CATALOG_PATH='10.61.82.210:/vol/xcpvol/'
```

Logging for NFS and SMB (optional)

XCP supports configuring multiple optional features by using the `xcpLogConfig.json` JSON configuration file. To enable only specific features, manually create the `xcpLogConfig.json` configuration file,
You can use the `xcpLogConfig.json` configuration file to enable:

- event log messages
- syslog client for XCP
- custom XCP logging

Event log messages and the syslog client are disabled in the default configuration. Configuration is common for both NFS and SMB.

Config JSON file location	**NFS**	**SMB**
Config file default location	/opt/NetApp/xFiles/xcp/	C:\NetApp\XCP\ConfigFile
Custom location requires the `XCP_CONFIG_DIR` environment variable	**Error! Reference source not found.**	NA

The JSON configuration file options are case sensitive. These options are the same for XCP NFS and XCP

SMB.

Sub Options Name	JSON Data Type	Default	Description
logConfig			Option to customize XCP logging.
“level”	String	INFO	Log message severity filter level. XCP log messages support five severity levels in order of decreasing severity: CRITICAL, ERROR, WARNING, INFO, DEBUG (NetApp strongly recommends using INFO or DEBUG)
“maxBytes”	Integer	52428800	Size of each rotating log file. Max supported rotation files are 10.
“name”	String	xcp.log	Option to set custom log file name.
eventlog			Option to configure event log message.
“isEnabled”	Boolean	false	This boolean option is used to enable event messaging. Setting it false will not generate any event messages and no event logs will be published to event log file.
“level”	String	INFO	Event message severity filter level. Event messaging support five severity levels in order of decreasing severity: CRITICAL, ERROR, WARNING, INFO, DEBUG

Sub Options Name	JSON Data Type	Default	Description
syslog			Option to configure syslog messaging.
“isEnabled”	Boolean	false	This boolean option is used to enable syslog client in XCP.
“level”	String	INFO	Message severity filter level. XCP event log messages support five severity levels in order of decreasing severity: CRITICAL, ERROR, WARNING, INFO, DEBUG
“serverIp”	String	None	Remote syslog server IP addresses or hostname.
“port”	Integer	514	Remote syslog receiver port. Syslog receivers accepting syslog datagrams on a different port can be configured with port option UDP port 514 but you can also configure to the desired port.

Sub Options Name	JSON Data Type	Default	Description
“sanitize”	Boolean	false	A common option for XCP support; setting its value to true will hide sensitive information (IP and username) in the messages going to support (logging, events, syslog, etc.) For example, with the sanitize option as false • 2020-07-17 03:10:23,779 - INFO - 12806 xcp xcp Paths: ['10.234.104.251:/cat_vol'] • 2020-07-17 03:10:23,778 - INFO - 12806 xcp xcp User Name: root With the sanitize option as true • 2020-07-17 03:13:51,596 - INFO - 12859 xcp xcp Paths: ['IP: XX.XX.XX.XX:/cat_vol'] • 2020-07-17 03:13:51,595 - INFO - 12859 xcp xcp User Name:

Create the JSON configuration file

If you want to enable event log messages, the syslog client, or customer logging, complete the following steps.

Steps

1. Open any text editor, such as notepad or vi.
2. Create a new file with the following JSON template.

```
{
  "logConfig": {
    "level": "INFO",
    "maxBytes": 52428800,
    "name": "xcp.log"
  },
  "eventlog": {
    "isEnabled": false,
    "level": "INFO"
  },
  "syslog": {
    "isEnabled": false,
    "level": "INFO",
    "serverIp": "10.234.219.87",
    "port": 514
  },
  "sanitize": false
}
```

3. For any features you want to enable, change the `isEnabled` value to `true`.
4. Name the file `xcpLogConfig.json` and sae it to the file location mentioned in **Error! Reference source not found.**

Default configuration	Example json configuration file

<pre>{
  "logConfig": {
    "level": "INFO",
    "maxBytes": 52428800,
    "name": "xcp.log"
  },
  "sanitize": false
}</pre>
	<pre>{
	  "logConfig": {
	    "level": "INFO",
	    "maxBytes": 52428800,
	    "name": "xcp.log"
	  },
	  "eventlog": {
	    "isEnabled": false,
	    "level": "INFO"
	  },
	  "syslog": {
	    "isEnabled": false,
	    "level": "INFO",
	    "serverIp": "10.234.219.87",
	    "port": 514
	  },
	  "sanitize": false
	}</pre>

Plan data migration

You can plan your migration using the CLI or the File Analytics GUI.
Use the following commands to plan your migration:

- Show
- Scan

Use File Analytics to visualize the statistics for exports and shares.

Plan NFS data migration

Show

The `show` command queries the RPC services and NFS exports of one or more storage servers. The command lists the available services and exports with the used and free capacity of each export, followed by the root attributes of each export.
Example:

- `xcp show <NFS file server IP/FQDN>`
- `xcp show nfs_server01.netapp.com`
  Run `xcp help show` for more details.

Scan

The scan command recursively scans the entire source NFSv3 exported paths and prints the statistics of file structure at the end of the scan. NetApp recommends putting the source NFS export mounts in read-only mode during the scan operation.
Example:

- `xcp scan NFS server:/export path`
- `xcp scan nfs_server01.netapp.com:/export1`

Run `xcp help scan` for more details.

Optionally, use File Analytics to view the results graphically.

Plan SMB data migration

Show:

The `show` command shows all SMB shares available on the server with the permissions and space available.
Example:

- `xcp show \\<SMB file server IP/FQDN>`
- `xcp show smb_server01.netapp.com`

Run `xcp help show` for more details.

Scan:

The scan command recursively scans the entire SMB share and lists all the files at the end of the scan.
Example :

- `xcp scan \\SMB server\share1`
- `xcp scan smb_server01.netapp.com:/share1`

Run `xcp help scan` for more details.
.
Optionally, use File Analytics to view the results graphically.

Plan using File Analytics

XCP is a CLI, whereas File Analytics has a GUI.

Overview

XCP File Analytics uses the XCP scan API to collect data from NFS or SMB hosts. This data is then displayed on XCP File Analytics GUI. There are three main components involved in XCP File Analytics:

- XCP service
- File Analytics database
- File Analytics GUI to manage and view data

The deployment the method for XCP File Analytics components depends on the solution required:

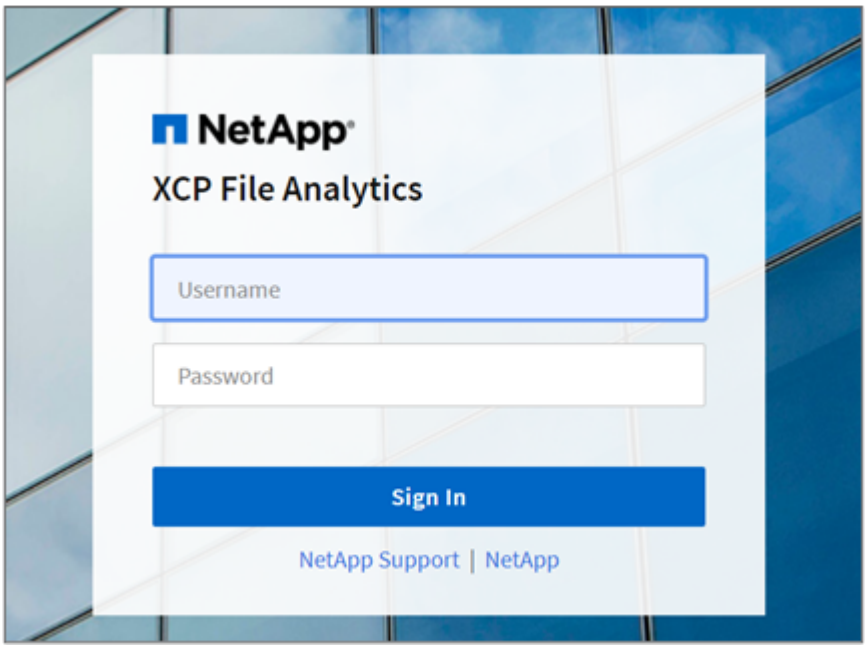
- Deploying XCP File Analytics solutions for NFS file systems:
  - You can deploy the File Analytics GUI, database, and XCP service in the same Linux host.
- Deploying XCP File Analytics solutions for SMB file systems:
  You must deploy the File Analytics GUI and database in a Linux host and deploy the XCP service on a Windows host.

Access File Analytics

XCP File Analytics GUI provides a dashboard with graphs for visualizing File Analytics.
The XCP File Analytics GUI is enabled when you configure XCP on a Linux machine.

See the NetApp IMT to check the supported browsers for accessing File Analytics.

1. Use the link `https: //<IP address of linux machine>/xcp` to access the File Analytics GUI. When prompted, accept the security certificate:
   a. Click Advanced below the privacy statement.
   b. Click the proceed to `<IP address of linux machine>` link.
2. Log in to the GUI using the username “admin” and the password you set during configuration

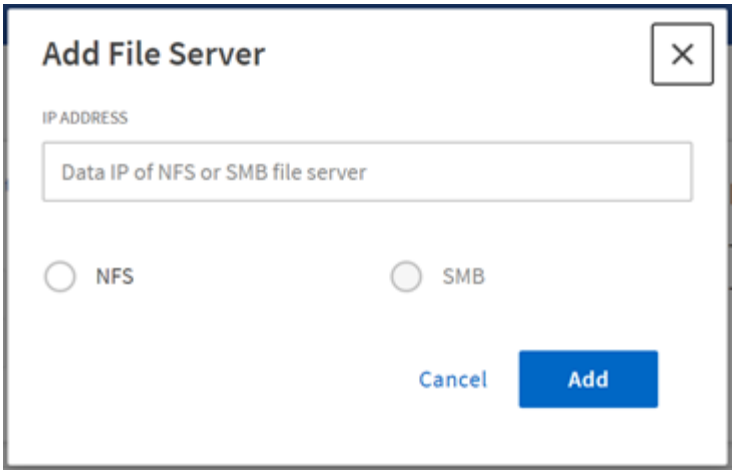


3. On login, you can see that the NFS agent is added: a green tick is present showing minimal system configuration of the Linux system and XCP version.
4. If you have configured an SMB agent, you can see the SMB agent added in the same agent card.

Add file servers

You can configure NFS and SMB exported file systems in the XCP File Analytics GUI. This enables XCP File Analytics to scan and analyze data on the file system. Use the following steps to add NFS or SMB file servers.

- To add file servers, click Add File Server.



Add the file server IP address, select the NFS or SMB option and click “Add”.

If an SMB agent is not visible in the GUI, you will not be able to add SMB server.

After adding the file server, XCP displays:

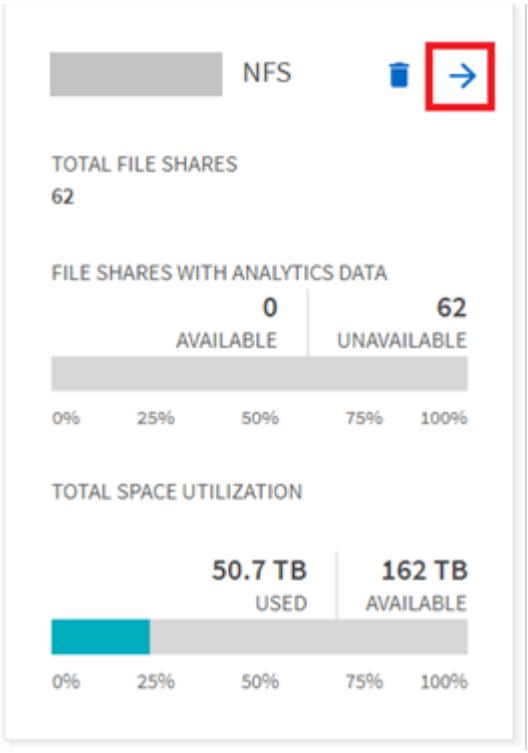
- Total file shares available
- File shares with analytics data
  (The initial count is “0”, this updates when you run a successful scan)
- Total space utilization – the sum of space utilized by all the exports
- The data for file shares and space utilization is real-time data direct from the NFS/SMB server. Collecting and processing the data takes several seconds.

Space available versus space used in File Analytics is calculated from each exported file system available over NFS. For example, if the volumes consist of qtrees and the exports are created over a qtree, the overall space is the cumulative space of the volume size and the qtree size.

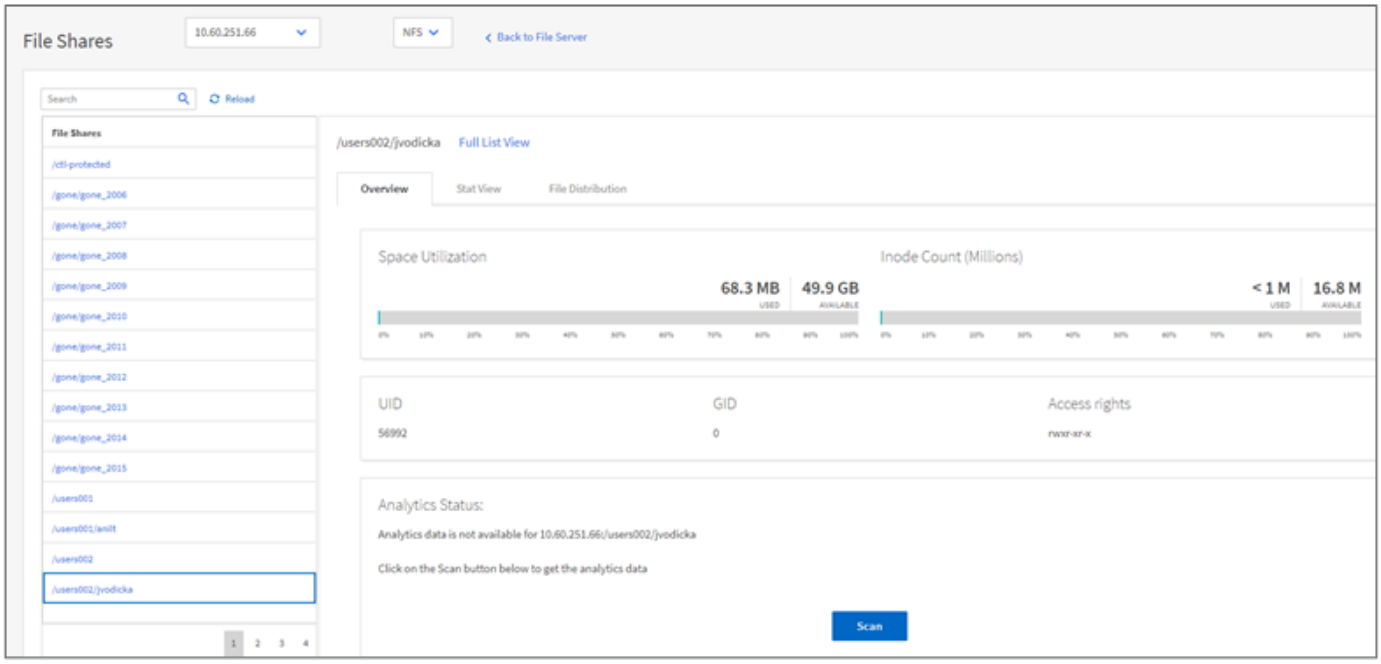
Run a scan

When the NFS/SMB files system is added to the XCP File Analytics GUI, you can start a file system scan to analyze and represent the data.

- Click the arrow on the added file server card to view the file shares on the file server.



- From the list of file shares, click the name of the file share to scan.
- Click Scan to start the scan.
- XCP displays a progress bar for the scan. On completion:
  - The “stat view” and “file distribution” tabs are enabled to allow you to view graphs.

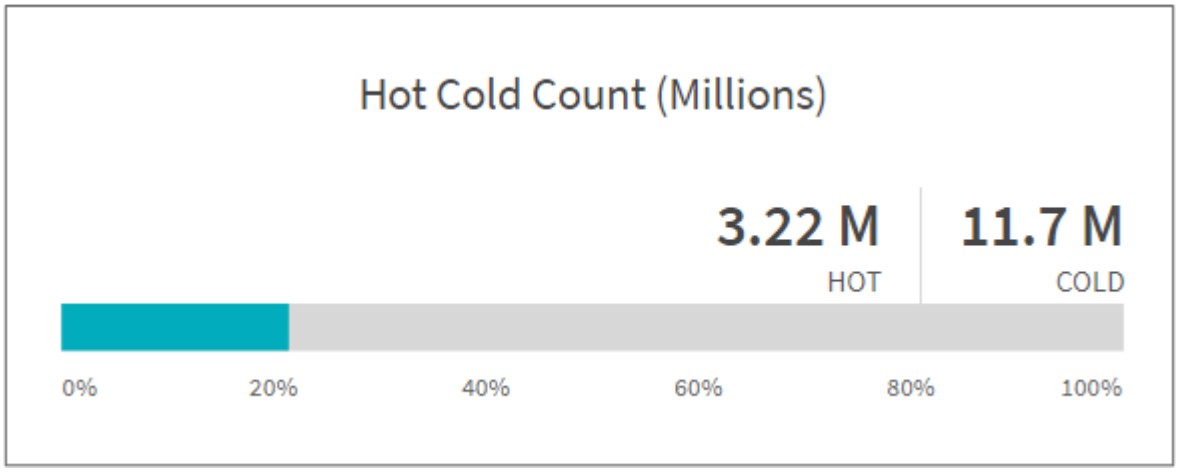


Learn about graphs

The File Analytics GUI dashboard displays multiple graphs for visualizing File Analytics.

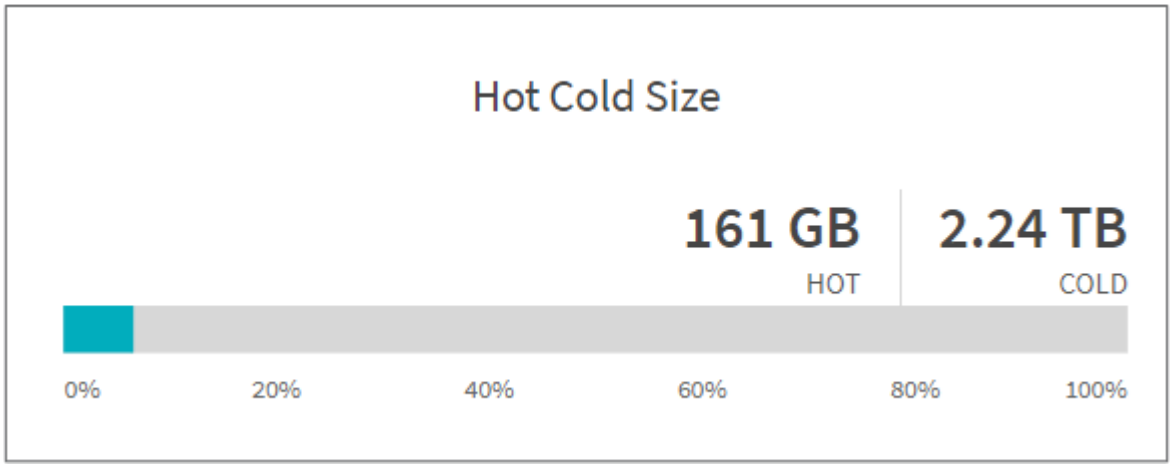
Hot Cold Count Graph

XCP File Analytics categorizes files not accessed for 90 days as cold data. Files accessed in the last 90 days are hot data. Criteria to define hot and cold data is based on access time only.



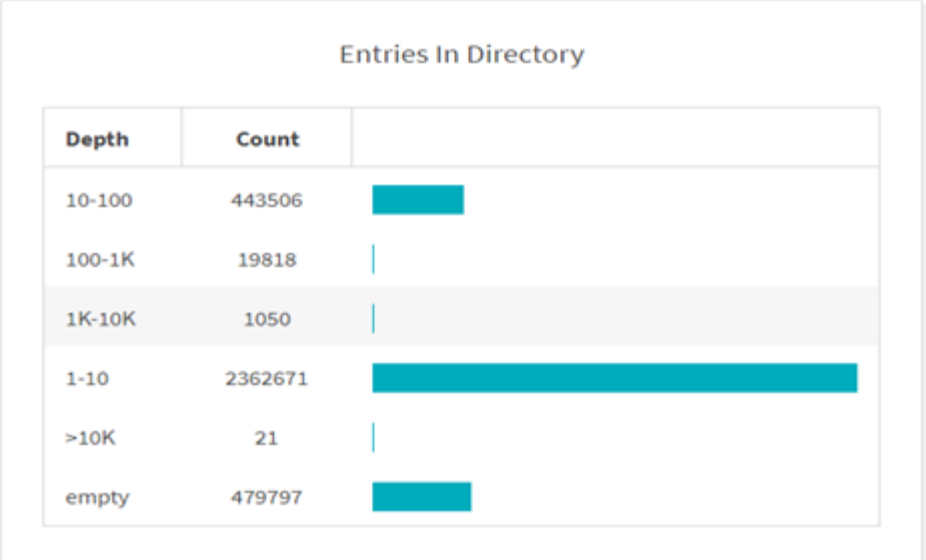
The Hot Cold Count graph displays the number of inodes (in millions) that are hot or cold in XCP NFS. In XCP SMB, this graph denotes the number of files that are hot or cold.
The colored bar represents the hot data and shows the percentage of files accessed within 90 days.

Hot Cold Size Graph



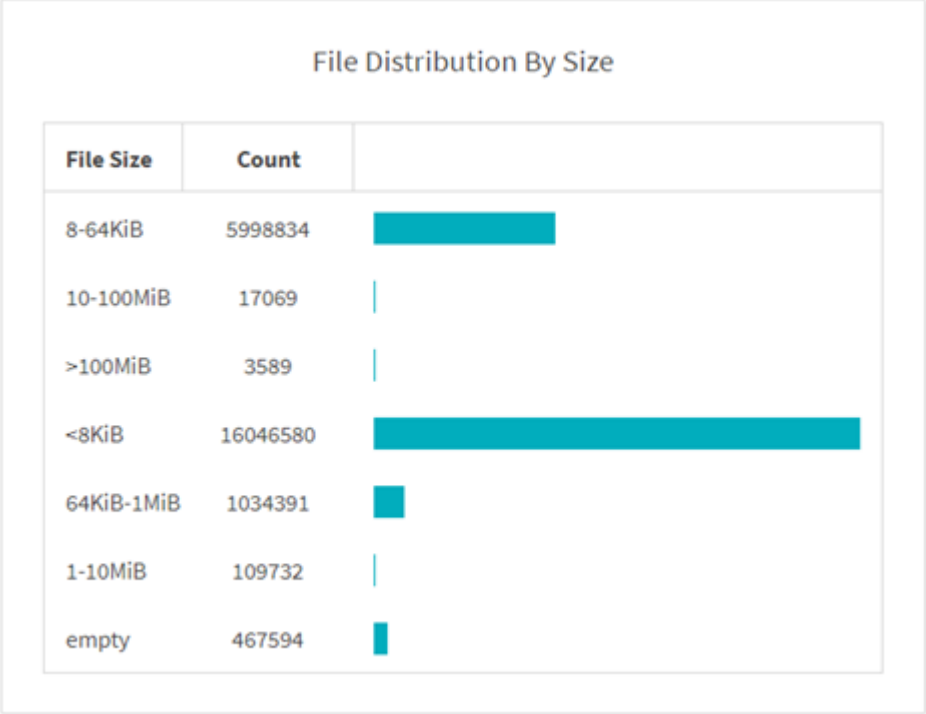
The Hot Cold Size graph displays the percentage of files that are hot and cold and the total size of the files in each category. The colored bar represents the hot data and the uncolored part represents the cold data. Criteria to define hot and cold data is based on access time only.

Entries in Directory Graph



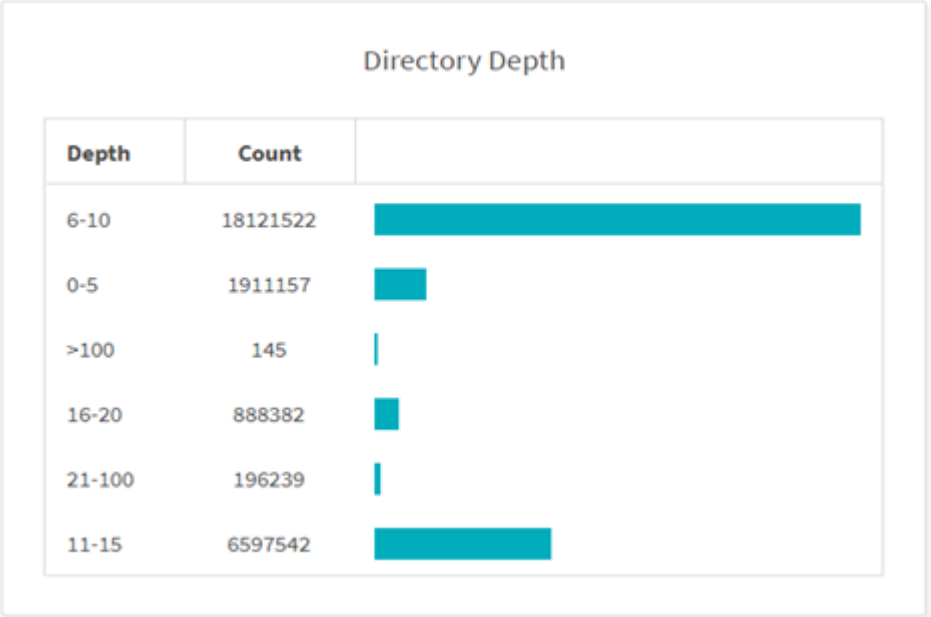
The Entries in Directories graph displays the number of entries in directories. The Depth column contains different directory sizes and the Count column indicates the number of entries in each directory depth.

File Distribution by Size Graph



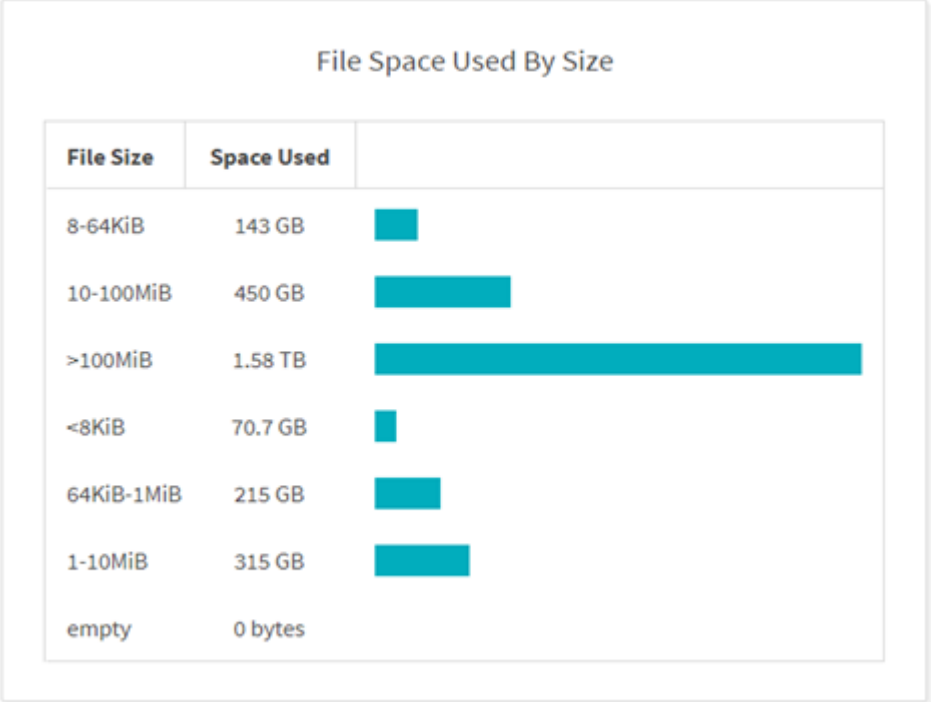
The File Distribution by Size graph displays the number of files that are under the given file sizes. The File Size column contains the categories of file size and the Count column indicates the distribution of the number of files.

Directory Depth Graph



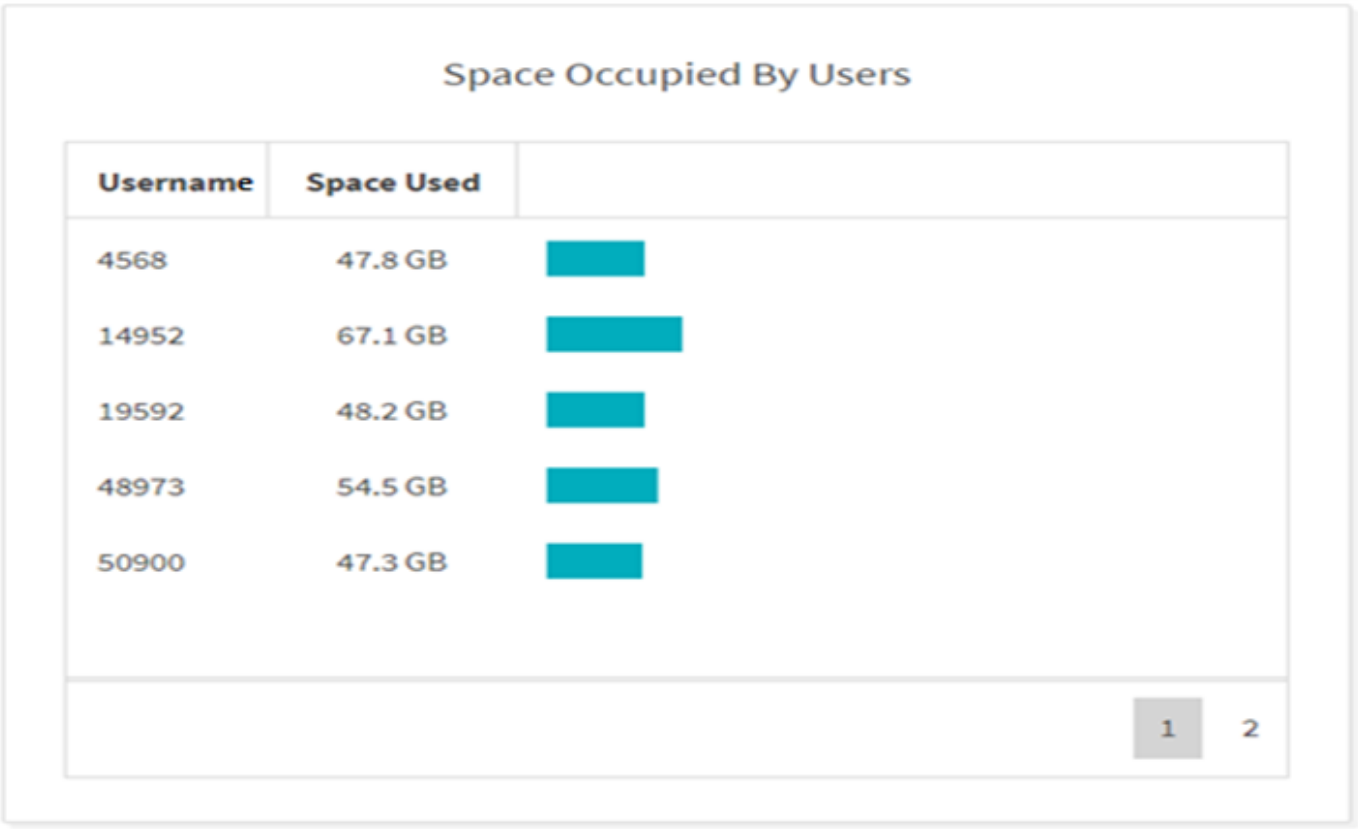
The Directory Depth graph represents the distribution of the number of directories in various directory depth ranges. The Depth column contains various directory depths and the Count column contains the count of each directory depth in the file share.

File Space Used by Size Graph



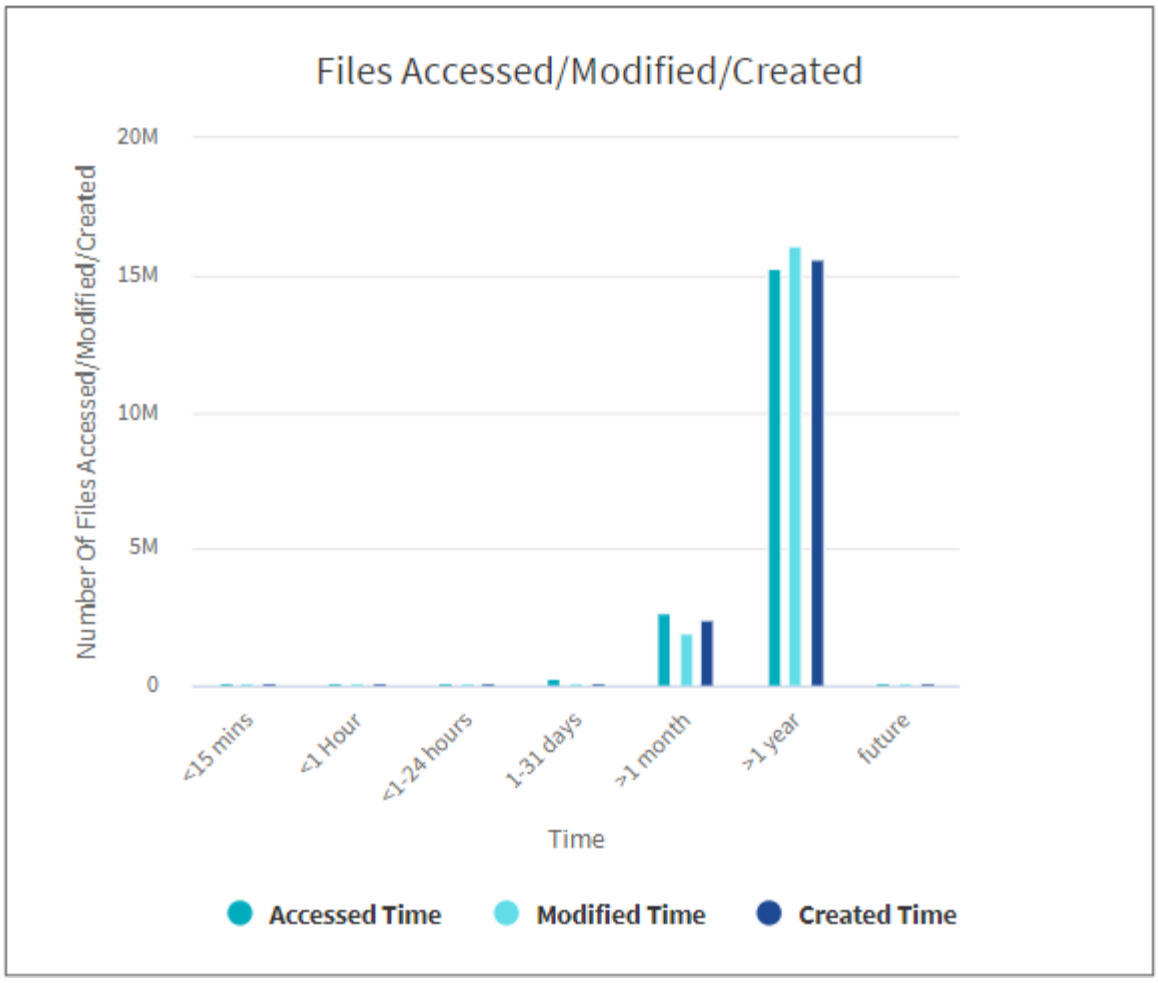
The File Space Used by Size graph displays the number of files in different file-size ranges. The File Size column contains different file size ranges and the Space Used column indicates the space used by each file size range.

Space Occupied by Users Graph



The Space Occupied by Users graph displays the space used by users. The Username column contains the names of users (UID when usernames cannot be retrieved) and the Space Used column indicates the space used by each username.

Files Accessed/Modified/Created Graph

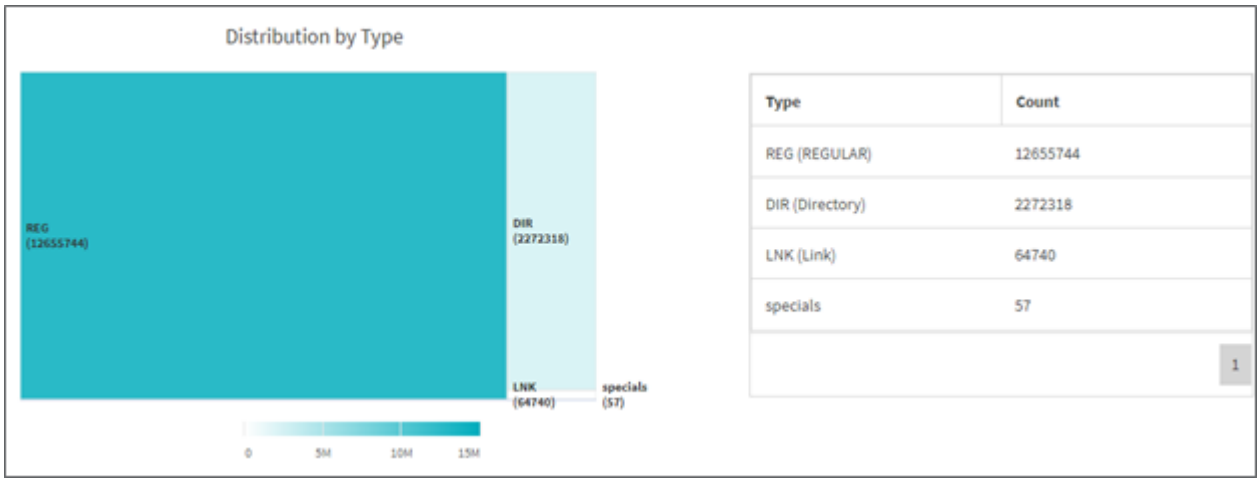


The Files Accessed/Modified/Created graph displays the count of files changed overtime. The X-axis represents the period of time within which changes were made and the y- axis represents the number of files changed.

To get the access time (atime) graph in SMB scans, check the box for preserving atime before running a scan.

File Distribution by Extension Graphic

The File Distribution by Extension graph represents the count of the different file extensions in a file share. The size of the divisions representing the extensions is based on the number of files with each extension.



File Distribution by Type Graph

The Distribution by Type graph represents the count of the following types of files:

- REG: Regular files
- LNK: Files with links
- Specials: Files with device files and character files.
- DIR: Files with directories
- Junction: Available in SMB only

Filters

XCP provides filter options that can be used in XCP operations. XCP uses filters for `-match` and `-exclude` (NFS only) options.

For NFS, run `xcp help info` and refer to the FILTERS section to see how to use `-match` and `-exclude` filters.

For SMB, run `xcp help -match` to get more details on match (`-exclude` is not available in SMB).

If you want to use filters in XCP commands, run `xcp help <command>` to see if they are supported options.

Migrate data

Migrate NFS data

After planning the migration with the show and scan commands, you can migrate data.

Copy

The `copy` command scans and copies the entire source directory structure to a destination NFSv3 export. The `copy` command requires having source and destination paths as variables. The scanned and copied files, throughput/speed, and elapsed time details are displayed at the end of the copy operation

Example:

```
xcp copy -newid <id> src_server:/src_export dst_server:/dst_export
```

See `xcp help copy` for more details.

Resume:

The `resume` command restarts a previously interrupted copy operation by specifying the catalog index name or number. The catalog index name or number of the previous copy operation is stored on the `<catalog path>:/catalog/indexes` directory.

Example:

```
xcp resume [options] -id <id used for copy>
```

See `xcp help resume` for more details.

Sync

The `sync` command scans for changes and modifications performed on a source NFS directory using a catalog index tag name or the number of a previous copy operation. Source incremental changes are copied and applied to the target directory. The old catalog index numbers are replaced with a new one after the sync operation.

Example:

```
xcp sync [options] -id <id used for copy>
```

See `xcp help sync` for more details.

Verify

The `verify` command uses a full byte-by-byte data comparison between source and target directories after the copy operation without using a catalog index number. The command checks for modification times and other file or directory attributes, including permissions. The command also reads the files on both sides and compares the data.

Example:

`xcp verify [options]`

```
src_server:/src_export
dst_server:/dst_export
```

See `xcp help verify` for more details.

Migrate SMB data

After planning the migration with the show and scan commands, you can migrate data.

Copy

The `copy` command scans and copies the entire source directory structure to a destination SMB share. The `copy` command requires having source and destination paths as variables. The scanned and copied files, throughput/speed, and elapsed time details are printed to the console once every five seconds.

Example:

```
C:\xcp>xcp copy \\<source SMB share> \\<destination SMB share>
```

See `xcp help copy` for more details.

Sync

The `sync` command scans for changes and modifications in the source and target shares in parallel, and applies the appropriate actions (remove, modify, rename, and so on) to the target to make sure that the target is identical to the source.

The sync command compares data content, time stamps, file attributes, ownership, and security information.

Example:

```
C:\xcp>xcp sync \\<source SMB share> \\<destination SMB share>
```

See `xcp help sync` for more details.

Verify

The `verify` command reads both source and target shares and compares them, providing information about what is different. You can use the command on any source and destination, regardless of the tool used to perform the copy or sync.

Example:

```
C:\xcp>xcp verify \\<source SMB share> \\<destination SMB share>
```

See `xcp help verify` for more details.

Troubleshoot errors

Troubleshoot XCP NFS errors

XCP issue	Solution
`xcp: ERROR`: must run as root	Execute XCP commands as root user
`xcp: ERROR`: License file `/opt/NetApp/xFiles/xcp/license` not found.	Download the license from https://xcp.netapp.com and copy to `/opt/NetApp/xFiles/xcp/`
`xcp: ERROR`: This license has expired	Renew or obtain the new XCP license from http://xcp.netapp.com.
`xcp: ERROR`: License unreadable	License file might be corrupted. Obtain the new XCP license from http://xcp.netapp.com.
`xcp: ERROR`: XCP not activated, run 'activate' first	Run the `xcp activate` command
This copy is not licensed	Obtain the appropriate XCP license file. Copy the XCP license to the `/opt/NetApp/xFiles/xcp/` directory on the XCP server. Run the `xcp activate` command to activate the license.
`xcp: ERROR`: Failed to activate license: Server unreachable	You are trying to activate the online license and your host system is not connected to internet. Make sure your system is connected internet.
`xcp: ERROR`: Failed to activate license: Server xcp.netapp.com unreachable `xcp: HINT`: Configure DNS on this host or return to the license page to request a private license Expected error: Failed to activate license: Server xcp.netapp.com unreachable	Make sure xcp.netapp.com is reachable from your host or request for the offline license
`xcp: ERROR`: Catalog inaccessible: Cannot mount `nfs_server:/export[:subdirectory]`	Open the editor on the XCP Linux client host and update the configuration file with the proper catalog location. The XCP configuration file is located at `/opt/NetApp/xFiles/xcp/xcp.ini`. Sample entries of configuration file: `[root@scspr1949387001 ~]# cat /opt/NetApp/xFiles/xcp/xcp.ini # Sample xcp config [xcp] catalog = 10.235.128.153:/catalog`
`nfs3 error 2`: no such file or directory	Operation did not find the source file(s) on the target NFS export. Run the `xcp sync` command to copy the incremental updates from source to destination

XCP issue	Solution
`xcp: ERROR`: Empty or invalid index	Previous copy operation was interrupted before indexing the files. Rerun `xcp copy` with the new index and make sure the system returns "indexed" before interrupting copy
`xcp: ERROR`: compare batches: child process failed (`exit code -9): recv <type 'exceptions.EOFError'>`:	Follow the instructions in the following KB article: Cannot allocate memory when synching NFS data
`xcp: ERROR`: For xcp to process ACLs, please mount `<path>` using the OS nfs4 client	Mount the source/target on the XCP host

Troubleshoot XCP SMB Errors

Issue	Solution
`xcp: ERROR`: This license has expired	Renew or obtain the new XCP license from http://xcp.netapp.com.
This copy is not licensed	Obtain the appropriate XCP license file. Copy the XCP license to the `c:\netapp\xcp` folder on the XCP host. Run the `xcp activate` command to activate the license
`xcp: ERROR`: XCP not activated, run 'activate' first	Download the XCP license from http://xcp.netapp.com. Copy the file on the XCP Linux client host at `c:\netapp\xcp` on the XCP host. Run the `xcp activate` command to activate the license.
`xcp: ERROR`: License file C:\NetApp\XCP\license not found	Register for the XCP license at http://xcp.netapp.com. Download and copy the license file to `C:\NetApp\XCP\` on the XCP Windows client host.
`xcp scan Error`: The network name cannot be found	Rerun the command with correct share name
`xcp copy Error`: ERROR failed to obtain fallback security principal Error message logged in xcp.log file: `pywintypes.error: (1722, 'LookupAccountName', 'The RPC server is unavailable.'`)	Add the destination box in the hosts file (**C:\Windows\System32\drivers\etc\hosts**). Netapp storage destination box entry must be in the below format: `` `<data vserver data interface ip>`` 1 or more white spaces `<cifs server name>`

Issue	Solution
`xcp copy: ERROR` failed to obtain fallback security principal (Post adding destination box entry in the hosts files) Error messaged logged in xcp.log file: `'No mapping between account names and security IDs was done'`	The fallback user/group does not exist at the target system (destination box) or active directory. Rerun the command with correct fallback user/group options
`xcp copy: ERROR` failed to obtain fallback security principal (Post adding destination box entry in the hosts files) Error messaged logged in xcp.log file: `pywintypes.error: (87, 'LookupAccountName', 'The parameter is incorrect.')`	Incorrect parameter for fallback user/group option. Rerun the command with the correct syntax for fallback user/group options
`xcp copy` with acl migration Erorr message logged in xcp.log file: `pywintypes.error: (1314, 'GetNamedSecurityInfo', 'A required privilege is not held by the client.')`	A user is facing an ssue related to security descriptors because with the privileges that the migrations user owns, XCP can only get owner, group, and DACL, but, it cannot get SACL. Add your migration user to "Manage Audit and Security Log" policy in your Active Directory. Reference: https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2012-r2-and-2012/dn221953(v%3Dws.11)

Troubleshoot XCP File Analytics errors

Issue	Solution

PostgreSQL installation or service failed	Run configure again and select the installation option. If the previous installation was successful, you can select the repair option. If you are still getting the error, try manual steps as follows:
	
	1. Run PostgreSQL on the Linux system
	
	`sudo yum -y install postgresql-serversudo systemctl start postgresq`
	
	2. Create a data directory for the PostgreSQL database:
	
	`sudo mkdir /var/lib/postgres/data`
	
	3. Initialize the database:
	
	`sudo -i -u postgres initdb -D '/var/lib/pgsql/data`
	
	4. Open the following file using an appropriate Linux file editor:
	
	`/var/lib/pgsql/data/pg_hba.conf`
	
	5. Remove the following entry:
	
	`` `# host all all 127.0.0.1/32 trust ``
	
	6. Add the following entry:
	
	`# host all all 0.0.0.0/0 password`
	
	7. Open the file `/var/lib/pgsql/data/postgresql.conf`
	
	8. Add the following entry:
	
	`# listen_addresses='*'`
	
	9. Start the PostgreSQL service:
	
	`sudo systemctl start postgresql.service`

Issue	Solution

HTTPD installation or service failed	Run configure again and select the installation option. If the previous installation was successful, you can select the repair option. If you are still getting the error, try manual steps as follows:
	
	1. Install HTTPD on the Linux system:
	
	`sudo yum -y install httpd`
	
	2. Open the following configuration file to rewrite the rules:
	
	`/etc/httpd/conf/httpd.conf`
	
	3. Add the following entries to the file:
	
	`RewriteEngine On`
	`RewriteOptions Inherit`
	`<Directory "/var/www/html/">`
	`AllowOverride None`
	`Require all granted`
	`RewriteCond %{REQUEST_FILENAME} -f [OR]`
	`RewriteCond %{REQUEST_FILENAME} -d`
	`RewriteRule ^ -`
	`RewriteRule ^ xcp/index.html [L]`
	`</Directory>`
	
	`4. Start the HTTPD services:`
	
	`sudo systemctl start httpd`

Issue	Solution

SSL installation failed	Run configure again and select the installation option. If the previous installation was successful, you can select the repair option. If you are still getting the error, try manual steps as follows:
	
	1. Install `mod_ssl`:
	
	`yum install mod_ssl -y`
	
	2. Generate the Secure Sockets Layer (SSL) certificate:
	
	`yum openssl req -x509 -nodes -days 365 -newkey rsa:2048 -keyout /etc/ssl/private/apache-selfsigned.key -out /etc/ssl/certs/apache-selfsigned.crt`
	
	3. Enable the HTTPS services:
	
	`yum openssl dhparam -out /etc/ssl/certs/dhparam.pem 2048`
	
	4. Restart the HTTPD services:
	
	`sudo systemctl restart httpd`
	
	5. Copy the SSL certificate to an appropriate location:
	
	`sudo cp -pr /etc/pki/tls/certs/localhost.crt /opt/NetApp/xFiles/xcp/server.crt`
	`sudo cp -pr /etc/pki/tls/private/localhost.key /opt/NetApp/xFiles/xcp/server.key`

Not able to open login page after successful install	Make sure your system is able to ping the Linux machine where XCP File Analytics is installed and HTTPD is running. If the services are not running, run `configure` and choose the repair option. Make sure that you are using supported version of browser. See the IMT: https://mysupport.netapp.com/matrix/

Issue	Solution
User login failed	• Make sure that you are using a supported version of the browser. See the IMT: https://mysupport.netapp.com/matrix/ • Check the user is “admin” and the password is correct • Make sure the XCP service is running by issuing “xcp service status” • Verify that port 5030 is open on Linux. Open the application at **https:// <linux ip> :5030/api/xcp**, and confirm that the messagereads msg: `Missing Authorization Header` • Check whether the `xcp.ini` file is present in the `/opt/NetApp/xFiles/xcp/` location. To reset the `xcp.ini` file, run the configuration script and select the **Repair** option. Next, select the menu option to **rebuild xcp.ini file**
XCP GUI is not showing updated pages.	Clear the cache and try again
XCP service is not starting	To run the `xcp` service, use the `sudo systectl start xcp` command. Alternatively, run the configuration script and select the **Repair** option to start the services that are stopped
Failed to scan file share	File share/volume might not be readable. Check manually whether the file share is accessible/readable by running the `xcp show` command
Could not load file servers	Try a page refresh. If the problem persists, manually run the `xcp show` command on the prompt and check whether you can scan the file server. If successful, raise a ticket with NetApp customer support. If unsuccessful, check manually to see if the file server is active Check whether the `xcp.ini` file and license files are in the correct location. To reset the `xcp.ini` file, run the configuration script and select the **Repair** option. Next, select the menu option to **rebuild xcp.ini file.** Check the xcpfalogs logs to see if the license needs renewal

Issue	Solution
XCP File Analytics page is not displayed after system reboot	XCP services might be down. Run the configuration script and select the option to **Repair**. This will restart all the services that are stopped
The total space for an exported file system on a given file server might show more space compared to the allocated physical storage.	This can happen when there are qtree level exports inside the volume. For example, if the volume size is 10 GB that is exported as `/vol1` and there is a qtree inside the volume `/vol1/qtree1`, then the `xcp show` command will show the `vol1` size as `10 GB` and the `qtree1` size as `10 GB`. XCP File Analytics sums the space of both exports and gives the total space, in this case, `20 GB`. It does not understand that `qtree1` is a logical space.