NetApp XCP 1.1 Quick Start Guide

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Abstract

This quick reference guide details how XCP can be leveraged by NetApp® Professional Services consultants for successful NetApp clustered Data ONTAP® storage adoption.

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1 What Is XCP?

XCP is a high-performance NFSv3 migration tool for fast and reliable migrations from third-party storage to NetApp and NetApp to NetApp transitions. The tool supports discovery, logging, and reporting and a wide variety of sources and targets.

1.1 Features

XCP runs on a Linux client as a command-line tool. XCP is packaged as a single binary file that is easy to deploy and use.

Table 1 lists the XCP supported features.

Table 1) Supported features.

Feature Name	Description
Core Engine Innovations	• Extreme performance (often ~25 times that of comparable tools) in high file count challenged environments • Multiple layers of granularity (qtrees, subdirectoriess, criteria-based filtering) • Easy deployment (64-bit Linux host-based software)
“show”	Discovery of servers and file systems
“scan”	Reports and listings to scope the directories, files, and data in the file systems
“copy”	Any to NetApp (third-party FSs, UNIX SAN/DAS/NAS to FAS, E-Series, the NetApp Mars® operating system FSs)—block third party as target
“verify”	Three levels of assurance: stats, structure, and full data bit by bit
“resume”	Fast log-based recovery of in-progress jobs
Resume (scan)	If a scan operation is interrupted, the user can resume it, provided the “-newid” option was used in the scan to enable logging
Resume (verify)	If a verify operation is interrupted, the user can resume it
“sync”	Differential incremental updates from source to target at the file level
“multiple syncs”	The `sync` command enables the user to perform multiple incremental updates from the migration source to the target
License Management Portal	Easy download of online and offline licenses at https://xcp.netapp.com
Logging and Reporting	Events, sources, targets, files, data, performance

1.2 Prerequisites

XCP runs on a Linux client host as a CLI tool. It is easy to use single file software and does not involve complex installation procedures. Users can download the binary from https://support.netapp.com/eservice/toolchest.

XCP is available for internal, partner, and customer use. Download and activate a free 90-day renewable license from https://xcp.netapp.com/.

The following are the minimum system requirements.

- 64-bit Intel or AMD server, minimum 4 cores and 8GB RAM
- 20MB of disk space for the xcp binary and at least 50MB for the logs
- Recent Linux distribution (RHEL 5.11 or later or kernel 2.6.18-404 or later)

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- No other active applications
- Access to log in as root or run sudo commands
- Network connectivity to source and destination NFS exports

1.3 XCP Catalog Location

XCP saves operation reports and metadata in an NFS 3–accessible catalog directory. Provisioning the catalog is a one-time preinstallation task requiring:

- A NetApp NFSv3 export for security and reliability.
- At least 10 disks or SSDs 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 1GB of space for every 10 million objects (directories + files + hard links) to be indexed. Each copy that can be resumed or synchronized and each scan that can be searched offline requires an index.

Note: Store XCP catalogs separately. The catalogs should not be on either the source or the destination NFS export directory. XCP maintains metadata and reports in the catalog location specified during initial setup. The location for storing the reports needs to be specified and updated before you run any operation with XCP. Edit the `xcp.ini` file using an appropriate Linux file editor at `/opt/NetApp/xFiles/xcp/`.

2 Getting Started

This chapter includes information about downloading and copying the license and binary files and activating and running XCP.

2.1 Download and Copy

A binary and a license are the only two files required to run XCP:

- Register and download your XCP license.
- Download the XCP archive containing the binary.
- On the Linux client, extract the archive and copy the binary, for example:

```
# tar zxvf ./xcp-1.1.tgz
# cp ./xcp-1.1/linux/xcp .
```

2.2 Activate

The license file must be located in the XCP local configuration directory, `/opt/Netapp/xFiles/xcp`:

- Run any `xcp` command to allow XCP to autocreate the configuration directory (the error "`License file /opt/NetApp/xFiles/xcp/license not found`" is expected).

```
# ./xcp show localhost
```

- Move the license file to `/opt/NetApp/xFiles/xcp` and activate XCP.

Note: The licenses allow XCP to connect to NetApp for host activations, statistics collection, and other functions. You can configure other license options for secure sites through xcp.netapp.com.

```
# mv ./license /opt/NetApp/xFiles/xcp
# ./xcp activate
```

2.3 Configure and Run

After activating XCP, configure the NFS 3 catalog location. XCP is then ready to run.

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- Edit or replace `xcp.ini` with the catalog location; for example, to use export `xcat` on server `atlas`:

```
# echo -e '[xcp]\ncatalog = atlas:/xcat' > /opt/NetApp/xFiles/xcp/xcp.ini
```

- For basic usage and a few examples, run `xcp` with no arguments:

Use

```
xcp [scan] [options] path
xcp show [options] servers
xcp copy/verify [options] source_path target_path
xcp sync/resume [options] -id name
```

Path Format

```
server:export[:subdirectory]
```

Multipath Format

```
server1addr1,server1addr2,...:export[:subdirectory]
```

Documentation

```
commands and options: xcp help [command]
features, performance tuning, examples: xcp help info
```

Examples

```
Query a server to see its RPC services and NFS exports;
print a human-readable tree report for one of the NFS exports;
and list all the files from the root of a subdirectory:

xcp show server.abc.com
xcp scan -stats server.abc.com:/tmp
xcp scan -l server.abc.com:/tmp:/test

Copy from a local SAN or DAS filesystem (requires local NFS service):

xcp copy localhost:/home/smith cdot:/target

Three-level verification: compare stats, attributes, and full data:
xcp verify -stats localhost:/home/smith cdot:/target
xcp verify -nodata localhost:/home/smith cdot:/target
xcp verify localhost:/home/smith cdot:/target

Please run "xcp help" to see the commands and options
Please run "xcp help info" to see the user guide, including more examples...
```

3 XCP Online Help

XCP provides built-in help for commands and use. Run `xcp help` to view the list of commands and their options. Run `xcp help info` for more details about and examples of use, performance tuning, and how to use features such as filters, incremental sync, and verification.

3.1 Use Cases

Standard NFSv3 to NetApp Migration

Scope the effort with the `show` and `scan` commands and measure the performance of `scan`, `copy`, and `verify`.

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Beside all the work normally required to scope a migration, the discovery/scoping phase should include a demonstration of XCP and collection of metrics. Run XCP to scan the sources to be migrated, generate metadata reports, and measure the performance in the environment. Premigration tests will confirm the technical fit and reveal any showstoppers up front. These tests will also provide key inputs to scoping and planning:

- The exact amount of data and number of files
- The change rate (if downtime is a concern, this value helps to predict outage windows)
- The performance rate of `scan`, `copy`, `verify`, and `sync`

XCP `show` provides access to the sources and targets so that scoping and migration can proceed.

XCP `scan` generates reports on the file count, data size, and file attribute metadata. With the `-newid` option, XCP saves the reports in the catalog and creates an index that can be searched offline for further analysis.

Scoping the change rate: Run a scan to get a report on what was modified in the last 24 hours:

```
# xcp scan -stats -id <name> -match 'modified < 24'
```

To run filtered reports without putting load on the source, run the initial full scans with `-newid` to save a metadata archive called the `index`. Run the change-rate report using `-id` to search the offline metadata archive instead of the source file system.

Scoping performance: XCP operations run at a steady and predictable rate so you can make a simple calculation to estimate the time for different phases of migration (copy, verify, incremental sync, incremental verify). However, the rates are different in every environment.

The metadata and performance metrics, the maintenance window tolerance, and any need for throttling need to be determined to plan and predict a migration.

Minimizing Cutovers

- Identify subsets that can be migrated independently.
- Use the sync feature and incremental verify (`verify -newdata`).

The outage time for the final sync and verification depends on the source storage performance and the number of source inodes that must be checked for changes and the data change rate. All can be estimated up front.

XCP sync has to check every single source file and source directory to see if it changed. The time to check for changes depends on the source server's performance capability. The time to apply the changes to the target depends on the performance of the target storage (number of disks and power of controllers) as well as the amount of change that needs to be synchronized.

The `verify -newdata` option validates that the entire source tree structure, names, attributes, and permissions are the same on the target. While Verify does that it checks that the data of the files copied in the last sync (that's the incremental part – `verify -newdata)` is a full tree verification that does not verify any data that was verified before).

If the source storage is snapshot capable, use the `xcp sync -snap` option and the `verify -newdata` to incrementally synchronize and verify forever. Following is an example of incremental synchronization from the next snapshot, incremental verifying to prep for another sync, and creating a new index. After the new index is created, you can delete snap2 and synchronize from a new snapshot:

```
# xcp sync -id xcp_snap1 -snap atlas02:/pete5:src/.snapshot/snap2
# xcp verify -newdata xcp_snap1 -newid xcp_snap2
```

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Searching and Reporting

- Use the `-match` option for filter-criteria-based reports and listings.
- Create an offline index for performance.

The XCP `index` is an archive that can be scanned fully with filters to generate reports or listings of files that match certain criteria. The filters can be any file attribute: `age`, `size`, `permissions`, `name`, `owner`, `mod time`, `access time`, and so on. Since XCP `scan` can put significant load on the source storage, use the index to run searches offline.

3.2 Feedback

For any XCP-related technical queries, e-mail ng-xcp-support@netapp.com.

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