



NetApp XCP 1.1 Migration Tool

Release Notes

NetApp
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Abstract

This document references updates for XCP 1.1 and how the new enhancements can be leveraged by NetApp® Professional Services consultants, partners, and customers for successful NetApp clustered Data ONTAP® storage adoption.

TABLE OF CONTENTS

1 What Is XCP 1.1? 3

1.1 New XCP 1.1 Features.....3

1.2 XCP 1.0 Features.....3

1.3 Prerequisites 4

1.4 XCP Catalog Location 4

2 Features Not Supported 4

2.1 Known Issues and Workarounds.....4

3 XCP Online Help 5

3.1 Examples of New Features 5

3.2 Feedback.....7

LIST OF TABLES

Table 1) New features..... 3

Table 2) XCP features. 3

Table 3) Features not supported..... 4

1 What Is XCP 1.1?

XCP 1.1 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. The XCP 1.1 version supports resume, multiple syncs, and online help and reporting enhancements.

1.1 New XCP 1.1 Features

XCP 1.1 has a number of new feature and enhancements.

Table 1 lists the major new XCP 1.1 features.

Table 1) New features.

Feature Name	Description
Multiple syncs	The <code>sync</code> command enables the user to perform multiple incremental updates from the migration source to the target.
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.

1.2 XCP 1.0 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 2 lists the XCP features.

Table 2) XCP 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, subdirectories, 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 from UNIX SAN/DAS/NAS to FAS, E-Series)
“verify”	Three levels of assurance: stats, structure, and full data bit by bit
“resume”	Fast log-based recovery of in-progress jobs
“sync”	Differential incremental updates from source to target at the file level
License management portal	Easy download of online and offline licenses at https://xcp.netapp.com
Logging and reporting	Events, sources, targets, files, data, performance

1.3 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)
- No other active applications
- Access to log in as root or run sudo commands
- Network connectivity to source and destination NFS exports

1.4 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 Features Not Supported

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 3 lists the XCP features not supported.

Table 3) Features not supported.

Feature Name	Description
CIFS ACLs	Does not support or grant access to CIFS ACLs
NFSv4	XCP runs on NFSv4 exports, but does not preserve ACLs
IPv6	Does not support Internet Protocol version 6 (IPv6)

2.1 Known Issues and Workarounds

Issue: In some edge cases, if hard-linked files are modified while a copy or sync operation is running, the copy or sync may not be successful, and the copy will be invalid and a new baseline will be required.

Workaround: Perform the full copy during a maintenance outage window.

Issue: Sync is not resumable after an outage or error or other interruption.

Workaround: Before a critical sync, always take a Snapshot® backup of the target in case of an outage or error.

Issue: In some edge cases, if live file systems are copied and files are removed midcopy, there are orphans on the target after the copy is resumed, and they are not cleaned up.

Workaround 1: For high-change rate source file systems, copy from a Snapshot copy and sync from a Snapshot copy until the final cutover.

Workaround 2: Perform the full copy during a maintenance outage window.

3 XCP Online Help

XCP provides built-in help for commands and usage. 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 Examples of New Features

Multiple Syncs Example

1. Make an initial baseline copy, which will be identified by the user-determined name “id1”:

```
xcp copy -newid id1 source-hostname:/vol-name target-hostname:/vol-name
```
2. Find all source changes since the copy and update the target to match the source again:

```
xcp sync -id id1
```
3. Find all source changes since the last sync and update the target again:

```
xcp sync -id id1
```

Sync from Snapshot Copies Example

1. Perform the initial baseline copy from a Snapshot copy, this time using id “abc”:

```
xcp copy -newid abc source-hostname:/vol-name/.snapshot/snap1 target-hostname:/vol-name
```
2. Find what changed in snap2 since the baseline and incrementally update the target to match snap2:

```
xcp sync -id abc -snap source-hostname:/vol-name/.snapshot/snap2
```
3. Find what changed in snap3 since the baseline and incrementally update the target:

```
xcp sync -id abc -snap source-hostname:/vol-name/.snapshot/snap3
```

Resume a Sync Example

1. Start a scan on source export:

```
xcp scan -newid rsid1 source-hostname:/vol-name
```
2. Resume last scan if it was interrupted for some reason:

```
./xcp resume -id rsidl
```

Resume a Verify Example

1. Start a verify:

```
xcp verify -newid rvid1 source-hostname:/vol-name target-hostname:/vol-name
```

2. Resume last verify if it was interrupted for some reason:

```
xcp resume -id rvid1
```

Standard NFSv3 to NetApp Migration

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

In addition to 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 copy 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 about 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 `verify -newdata` to incrementally synchronize and verify forever. Following is an example of incremental synchronization from the next Snapshot copy, 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 copy:

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

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. Because `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-partner-helpdesk@netapp.com or ng-xcp-support@netapp.com and [NetApp Customer Success Community](#).

Partner help desk phone numbers:

- North America: 877-NetApp-0 (877 638 2770)
- Outside North America: 801 638 2770

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