



NetApp XCP Migration Tool User Guide

Peter Schay, Harishankar Singh, NetApp
January 2016

TABLE OF CONTENTS

1	NetApp XCP Migration Tool Overview	4
1.1	System Requirements	4
2	XCP Installation	6
2.1	Register and Download	6
2.2	Initial Setup.....	6
3	Command Reference	8
4	show	9
	Syntax.....	9
	Example	9
	Parameters	9
5	help	10
	Syntax.....	10
	Example	10
	Parameters	11
6	activate	12
	Syntax.....	12
	Example	12
7	scan	13
	Syntax.....	13
	Example	13
	Parameters	13
8	copy	20
	Syntax.....	20
	Example	20
	Parameters	20
9	sync	23
	Syntax.....	23
	Example	23
	Parameters	23
10	sync dry-run.....	27
	Syntax.....	27
	Example	27
	Parameters	27
11	resume	30

Syntax	30
Example	30
Parameters	30
12 verify	33
Syntax	33
Example	33
13 Use Cases	38
How to Transition 7-Mode NFSv3 Storage to Clustered Data ONTAP	38
14 Appendix	44
Sample XCP Reports	44
Troubleshooting XCP Errors	45
Support	47

LIST OF TASK TABLES

Task Table 1) Download and register.	6
Task Table 2) XCP initial setup procedure.....	6
Task Table 3) Transitioning 7-Mode NFSv3 export to clustered Data ONTAP.	38

LIST OF TABLES

Table 1) Command reference.	8
----------------------------------	---

1 NetApp XCP Migration Tool Overview

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

XCP runs on a Linux client as a command-line tool. It is packaged as a single binary file that is easy to deploy and use. Users need to download and copy the binary on a supported Linux distribution.

XCP 1.0 has nine commands: `show`, `help`, `activate`, `scan`, `copy`, `verify`, `sync`, `sync dry-run`, and `resume`. Details on each command are provided in the “Command Reference” section.

1.1 System Requirements

This section outlines the minimum hardware and software requirements for installing XCP.

License

NetApp offers a free 90-day XCP license. You can obtain the license file from <https://xcp.netapp.com>. The NFS license should be installed on the source 7-Mode and target NetApp clustered Data ONTAP® systems.

Software Download

You can download XCP from the [NetApp Support site](#). NetApp employees can download the software using Single Sign-On (SSO) logins. Partners and customers need a valid NetApp Support ID with login credentials to download the software.

XCP Linux Client Host

XCP uses Linux client host systems to generate parallel I/O streams and fully utilize available network and storage performance. To support XCP, each Linux client host requires:

- 64-bit Intel or AMD server, minimum 4 cores and 8GB RAM
- Recent Linux distribution (RHEL 5.11 or later or kernel 2.6.18-404 or later)
- Network connectivity and `root` level access to source and destination NFSv3 exports
- No other active applications
- Access to log in as `root` or to run `sudo` commands
- 20MB of disk space for the XCP binary and at least 50MB of disk space for the logs that are stored in the `/opt/NetApp/xFiles/xcp/` directory.
- For 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
net.core.rmem_max = 16777216
net.core.rmem_max = 16777216
net.core.wmem_default = 1342177
net.core.wmem_max = 16777216
net.ipv4.tcp_rmem = 4096 1342177 16777216
net.ipv4.tcp_wmem = 4096 1342177 16777216
net.core.netdev_max_backlog = 300000
net.ipv4.tcp_fin_timeout = 10
```

XCP Catalog

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

- A NetApp NFS v3 export for security and reliability
- At least 10 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 1GB of space for every 10 million objects (directories + files + hard links) to be indexed; each copy that can be resumed or synched and each offline-searchable scan requires an index

Note: XCP catalogs should be stored 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. 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/`. For more information, refer to “XCP Installation.”

Supported Protocol

XCP 1.0 supports the NFSv3 protocol over TCP only.

Storage

This section provides source and target storage requirements for transitions and migrations using XCP.

- Source and target servers should have NFSv3 protocol service enabled.
- Source and target volumes should be exported with `root` access to the XCP Linux client host.
 - Configure the source NFSv3 exports as read-only so that administrators cannot accidentally modify it.
 - If the source file system is on SAN or DAS storage, add the file system to the Linux NFS exports giving `root` access and read-only permission to the host running XCP. For example, on RHEL/OEL/CentOS systems, the following commands enable XCP to scan and copy from the source:


```
#echo '/export 10.45.45.100(ro,no_root_squash)' >> /etc/exports
#sudo service nfs restart
```
 - If the target file system is on a NetApp LUN (FAS, E-Series, NetApp FlashRay® system), add the file system to the Linux NFS export giving `root` access and read-write permission to the host running XCP. Then add the `async` option for performance. For example, on RHEL/OEL/CentOS systems, the following commands enable XCP to scan and copy to target:


```
#echo '/export 10.45.45.100(rw,no_root_squash, async)' >>
/etc/exports
#sudo service nfs restart
```

2 XCP Installation

This chapter covers license registration, downloading the XCP binary and initial setup.

2.1 Register and Download

This section provides the steps to register and download the license and binaries for XCP 1.0.

Task Table 1) Download and register.

Step	Action
1.	Go to https://mysupport.netapp.com/tools/index.html and download the latest version of XCP.
2.	To generate the XCP license, go to https://xcp.netapp.com/ and log in through your NetApp Support ID or SSO. Note: For license, registrations, and software download assistance, contact XCP Support at xcp-support@netapp.com .

2.2 Initial Setup

This section details the procedure for initial setup of XCP on a Linux client.

Task Table 2) XCP initial setup procedure.

Step	Action
1.	Copy the XCP binary on a Linux client host. [root@localhost /]# cp ./xcp-1.0.tgz
2.	On the Linux client, extract the archive. [root@localhost /]# tar zxvf ./xcp-1.0.tgz
3.	After extracting the archive, change the working directory to /xcp-1.0/linux. [root@localhost /]# cd xcp-1.0/linux/ [root@localhost linux]#
4.	Display the list of files and subdirectories under the current working directory. Verify that the xcp file has read-write-execute permissions to the superuser (root). [root@localhost linux]# ls -alt total 13248 -rwxr-xr-x 1 pete wheel 13564704 May 27 17:12 xcp drwxr-xr-x 2 pete wheel 16 May 27 10:58 . drwxr-xr-x 3 pete wheel 18 May 27 10 Note: Modify the file permissions and make the file executable using the <code>chmod 755</code> command.
5.	Run the <code>xcp show</code> or <code>xcp help</code> command. An error message appears indicating that the license is not activated. [root@localhost /]# ./xcp show localhost This copy is not licensed. xcp: Host config directory not found. Creating at '/opt/NetApp/xFiles/xcp' xcp: Host config file not found. Creating sample at '/opt/NetApp/xFiles/xcp/xcp.ini' Command: show Paths: ['localhost'] xcp: ERROR: License file /opt/NetApp/xFiles/xcp/license not found. Register for a license at https://xcp.netapp.com/ [root@localhost /]#

Step	Action
	Note: The XCP host configuration directory and files are created at <code>/opt/NetApp/xFiles/xcp</code>, when the <code>xcp show</code> command is run for the first time.
6.	Copy the recently downloaded license file to the Linux host at <code>/opt/NetApp/xFiles/xcp/</code> .
7.	Verify that the license file was copied at <code>/opt/NetApp/xFiles/xcp/</code>. <pre>[root@localhost xcp]# ls -alt total 24 -rw-r--r-- 1 root root 8459 Jun 3 08:36 xcp.log drwxr-xr-x 2 root root 59 Jun 3 08:27 . -rw-r--r-- 1 root root 65 Jun 3 08:27 xcp.ini -rw-r--r-- 1 root root 128 Jun 3 04:12 host drwxr-xr-x 3 root root 16 Jun 3 04:09 .. -rw-r--r-- 1 root root 208 Jun 3 02:48 license</pre>
8.	Activate the XCP license on the Linux client. <pre>[root@localhost /]# ./xcp activate Command: activate Paths: [] XCP activated</pre>
9.	Verify that the license error has disappeared. <pre>[root@localhost /]# ./xcp show localhost Command: show Paths: ['localhost'] xcp: ERROR: Catalog inaccessible: Cannot mount nfs_server:/export[:subdirectory] Failed with 'socket connect to nfs_server tcp 111 pmap2 c0: [Errno -2] Name or service not known' xcp: HINT: Verify the settings in the host config file /opt/NetApp/xFiles/xcp/xcp.ini. Sending statistics...</pre>
10.	Add the catalog location for the XCP server in the host configuration file using the <code>vi</code> editor. Note: Catalog location should be exported before modifying the details in the <code>xcp.ini</code> XCP configuration file. Catalog location (NFSv3) should be mountable by the XCP Linux host but not necessarily be mounted. <pre>[root@localhost /]# vi /opt/NetApp/xFiles/xcp/xcp.ini</pre>
11.	Verify that the XCP Linux client host configuration file entries for the catalog were modified. <pre>[root@localhost /]# cat /opt/NetApp/xFiles/xcp/xcp.ini # Sample xcp config [xcp] catalog = 10.61.82.210:/vol/xcpvol/</pre>
12.	Run the <code>./xcp</code> command and verify that no errors were reported for license and catalog configuration. <pre>[root@localhost /]# ./xcp USAGE 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]</pre>

3 Command Reference

This section provides the list of available commands for the XCP tool. Each command has additional parameters and can be run with single or multiple parameters together to query the specific details.

Table 1) Command reference.

Feature	Description
Core Engine Innovations	• Supports Linux, CLI only • Extreme performance (~25x comparable tools) • Multiple layers of granularity (qtrees, subdirectories, criteria-based filtering) • Easy deployment (64-bit Linux host-based software)
“help”	Displays information about XCP commands and options to be used
“show”	Discovery of servers and file systems
“activate”	Activates XCP license on Linux client host systems
“scan”	Scoping and dashboarding of 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)
“verify”	Three levels of assurance: statistics, 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	Several types of renewable free licenses are available with options for connected and offline environments
Logging and Reporting	Operations, sources, targets, file count, data amount, performance

4 show

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

Syntax

The `show` command requires the host name or IP address of the NFSv3 exported system.

```
[root@localhost /]# ./xcp show <IP address or hostname of NFS server>
```

Example

```
[root@localhost /]# ./xcp show 10.61.82.215

Command: show
Paths: ['10.61.82.215']

== NFS Exports ==
Mounts  Errors  Server
      4      0  10.61.82.215

      Space      Files      Space      Files
      Free      Free      Used      Used Export
23.7 GiB  778,134   356 KiB      96 10.61.82.215:/vol/nfsvol1
17.5 GiB  622,463   1.46 GiB     117 10.61.82.215:/vol/nfsvol
328 GiB   10.8M   2.86 GiB    7,904 10.61.82.215:/vol/vol0/home
328 GiB   10.8M   2.86 GiB    7,904 10.61.82.215:/vol/vol0

== Attributes of NFS Exports ==
drwxr-xr-x --- root wheel 4KiB 4KiB 2d21h 10.61.82.215:/vol/nfsvol1
drwxr-xr-x --- root wheel 4KiB 4KiB 2d21h 10.61.82.215:/vol/nfsvol
drwxrwxrwx --t root wheel 4KiB 4KiB 9d22h 10.61.82.215:/vol/vol0/home
drwxr-xr-x --- root wheel 4KiB 4KiB 4d0h 10.61.82.215:/vol/vol0

3.89 KiB in (5.70 KiB/s), 7.96 KiB out (11.7 KiB/s), 0s.
```

Parameters

Feature	Description
<code>show -v</code>	Print verbose details about NFS servers using the IP address or host name.

5 help

The `help` command displays a list of commands, command parameters, and a brief description of each. The command is very useful for beginners who are new to the XCP data migration tool.

Syntax

```
[root@localhost /]# ./xcp help
```

Example

```
[root@localhost /]# ./xcp help
```

`help`: Display information about commands and options

`help info`: Display documentation, examples and tuning recommendations

`show`: Request information from hosts about NFS and other RPC services
-v: show more detailed information about servers

`scan`: Read all the directories in a file tree or a saved index
-l, -q, -json: File listing output formats
-stats, -csv, -html: Tree statistics report formats
-nonames: Do not look up user and group names for file listings or reports
-newid <name>: Catalog name for a new index
-id <name>: Catalog name of a previous copy or scan index
-match <filter>: Only process files and directories that match the filter
-du: Summarize space usage of each directory including subdirectories
-md5: Checksum the files (also save the checksums when indexing) (default: False)
-depth <n>: limit the search depth
-dircount <n[k]>: Request size for reading directories (default: 64k)
-edupe: Include dedupe estimate in reports (see documentation for details)
-bs <n[k]>: read/write blocksize for scans which read data with -md5 or -edupe (default: 64k)
-parallel <n>: Maximum concurrent batch processes (default: 7)

`copy`: Recursively copy everything from source to target
-newid <name>: Catalog name for a new index
-md5: Checksum the files (also save the checksums when indexing) (default: False)
-edupe: Include dedupe estimate in reports (see documentation for details)
-nonames: Do not look up user and group names for file listings or reports
-bs <n[k]>: read/write blocksize (default: 64k)
-dircount <n[k]>: Request size for reading directories (default: 64k)
-parallel <n>: Maximum concurrent batch processes (default: 7)

`verify`: Verify that the target is the same as the source
[no options]: Full verification of target structure, names, attributes and data
-stats, -csv: Scan source and target trees in parallel and compare tree statistics
-nodata: Do not check data
-noattrs: Do not check attributes
-nomods: Do not check file modification times
-newdata <id name>: Verify full structure + names + attributes plus new data from the last sync
-mtimewindow <s>: Acceptable modification time difference for verification
-newid <name>: Catalog name for a new index
-v, -l, -json: Output formats to list any differences found
-nonames: Do not look up user and group names for file listings or reports
-match <filter>: Only process files and directories that match the filter
-bs <n[k]>: read/write blocksize (default: 64k)
-parallel <n>: Maximum concurrent batch processes (default: 7)
-dircount <n[k]>: Request size for reading directories (default: 64k)

`sync`: Find all source changes and apply them to the target
-id <name>: Catalog name of a previous copy index
-snap <name or path>: Access a snapshot of the source tree
-stats, -csv, -html: Tree statistics report formats
-nonames: Do not look up user and group names for file listings or reports
-bs <n[k]>: read/write blocksize (default: 64k)
-dircount <n[k]>: Request size for reading directories (default: 64k)
-parallel <n>: Maximum concurrent batch processes (default: 7)

`sync dry-run`: Find source changes but don't apply them to the target
-id <name>: Catalog name of a previous copy index
-snap <name or path>: Access a snapshot of the source tree
-stats: deep scan the modified directories and report on everything that's new

```

-l: print details about files and directories that changed
-nonames: Do not look up user and group names for file listings or reports
-dircount <n[k]>: Request size for reading directories (default: 64k)
-parallel <n>: Maximum concurrent batch processes (default: 7)

resume: Restart an interrupted copy
-id <name>: Catalog name of a previous copy index
-bs <n[k]>: read/write blocksize (default: 64k)
-dircount <n[k]>: Request size for reading directories (default: 64k)
-parallel <n>: Maximum concurrent batch processes (default: 7)

activate: Activate a license on the current host

```

Parameters

The following table describes the help parameters.

Feature	Description
help info	Display documentation, examples, and tuning recommendations.

help info

Display documentation, examples, and tuning recommendations.

```

[root@localhost /]# ./xcp help info

USAGE
  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
  (no options): scan and list a file tree

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):

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

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

DESCRIPTION
  When run as "xcp <path>", without any options, xcp recursively scans the tree rooted at the
  path and prints the list of all the files. Options such as -l can change the format; option
  -md5 makes xcp read each file and print the checksums in the output. Filters (see below)
  can select which directories to enter and which files to process.

```

6 activate

The `activate` command activates the XCP license. Before running this command, verify that the license file is downloaded and copied on the `/opt/NetApp/xFiles/xcp/` directory on the XCP server.

Syntax

```
[root@localhost /]# ./xcp activate
```

Example

```
[root@localhost /]# ./xcp activate
Command: activate
Paths: []

XCP activated
```

7 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` command. NetApp recommends that you put the source NFS export mounts in read-only mode during the scan operation.

Syntax

```
[root@localhost /]# ./xcp scan <source NFS export path>
```

Example

```
[root@localhost /]# ./xcp scan 10.61.82.215:/vol/nfsvol
```

Command: scan

Paths: ['10.61.82.215:/vol/nfsvol']

nfsvol

```
nfsvol/n5000-uk9.5.2.1.N1.1.bin
nfsvol/821_q_image.tgz
nfsvol/822RC2_q_image.tgz
nfsvol/NX5010_l2_node_RCF_v1.3.txt
nfsvol/n5000-uk9-kickstart.5.2.1.N1.1.bin
nfsvol/NetApp_CN1610_1.1.0.5.stk
nfsvol/glibc-common-2.7-2.x86_64.rpm
nfsvol/glibc-2.7-2.x86_64.rpm
nfsvol/rhel-server-5.6-x86_64-dvd.iso.filepart
nfsvol/xcp
nfsvol/xcp_source
nfsvol/catalog
```

23 scanned, 7.79 KiB in (5.52 KiB/s), 1.51 KiB out (1.07 KiB/s), 1s.

Parameters

The following table lists `scan` parameters and their description.

Feature	Description
scan -l	File listing output formats
scan -q	File listing output formats
scan -json	File listing output formats
scan -stats	Tree statistics report formats
scan -csv	Tree statistics report formats
scan -html	Tree statistics report formats
scan -nonames	Do not look up user and group names for file listings or reports
scan -newid <name>	Catalog name for a new index
scan -id <name>	Catalog name of a previous copy or scan index
scan -match <filter>	Only process files and directories that match the filter
scan -du	Summarize space usage of each directory including subdirectories
scan -md5	Checksum the files (also save the checksums when indexing) (default: False)
scan -depth <n>	Limit the search depth

Feature	Description
scan -dircount <n[k]>	Request size for reading directories (default: 64k)
scan -edupe	Include dedupe estimate in reports (see documentation for details)
scan -bs <n[k]>	Read/write block size for scans that read data with -md5 or -edupe (default: 64k)
scan -parallel <n>	Maximum concurrent batch processes (default: 7)

scan -l

File listing output formats.

```
[root@localhost /]# ./xcp scan -l 10.61.82.215:/vol/nfsvol

Command: scan {'-l': True}
Paths: ['10.61.82.215:/vol/nfsvol']

rw-r--r-- --- root wheel 165MiB 166MiB 1y190d nfsvol/n5000-uk9.5.2.1.N1.1.bin
rw-r--r-- --- root wheel 397MiB 398MiB 1y57d nfsvol/821_q_image.tgz
rw-r--r-- --- root wheel 401MiB 403MiB 265d22h nfsvol/822RC2_q_image.tgz
rw-r--r-- --- root wheel 3.72KiB 4KiB 1y187d nfsvol/NX5010_12_node_RCF_v1.3.txt
rw-r--r-- --- root wheel 30.2MiB 30.3MiB 1y190d nfsvol/n5000-uk9-kickstart.5.2.1.N1.1.bin
rw-r--r-- --- root wheel 7.87MiB 7.91MiB 248d2h nfsvol/NetApp_CN1610_1.1.0.5.stk
rw-r--r-- --- root wheel 20.9MiB 21.0MiB 2y129d nfsvol/glibc-common-2.7-2.x86_64.rpm
rw-r--r-- --- root wheel 4.82MiB 4.84MiB 2y129d nfsvol/glibc-2.7-2.x86_64.rpm
rw-r--r-- --- root wheel 456MiB 458MiB 2d22h nfsvol/rhel-server-5.6-x86_64-dvd.iso.filepart
drwxr-xr-x --- root wheel 4KiB 4KiB 7d2h nfsvol/xcp
drwxr-xr-x --- root wheel 4KiB 4KiB 6d22h nfsvol/xcp_source
drwxr-xr-x --- root wheel 4KiB 4KiB 3d0h nfsvol/catalog
23 scanned, 7.79 KiB in (13.2 KiB/s), 1.51 KiB out (2.56 KiB/s), 0s.
```

scan -q

File listing output formats.

```
[root@localhost /]# ./xcp scan -q 10.61.82.215:/vol/nfsvol

Command: scan {'-q': True}
Paths: ['10.61.82.215:/vol/nfsvol']

23 scanned, 7.79 KiB in (8.73 KiB/s), 1.51 KiB out (1.69 KiB/s), 0s.
```

scan -json

File listing output formats.

```
[root@localhost /]# ./xcp scan -json 10.61.82.215:/vol/nfsvol

Command: scan {'-json': True}
Paths: ['10.61.82.215:/vol/nfsvol']

"10.61.82.215:/vol/nfsvol"
["d", "nfsvol", 493, 0, 0, 4096, 4096, 64, 4286062208, 6, "Mon Jun 1 10:29:09 2015", 150495000, "Fri May 29 11:14:36 2015", 543115000, "Fri May 29 11:14:36 2015", 543115000, "None"]

"10.61.82.215:/vol/nfsvol/catalog/servers"
["f", "attributes.localhost.json", 493, 0, 0, 929, 4096, 1008, 4286062208, 1, "Mon Jun 1 08:38:07 2015", 899899000, "Mon Jun 1 08:38:07 2015", 902900000, "Mon Jun 1 08:38:07 2015", 902900000, "None"]
["f", "attributes.10.236.205.110.json", 493, 0, 0, 929, 4096, 1009, 4286062208, 1, "Fri May 29 11:04:50 2015", 33264000, "Fri May 29 11:04:50 2015", 36266000, "Fri May 29 11:04:50 2015", 36266000, "None"]
["f", "attributes.10.61.82.215.json", 493, 0, 0, 4330, 8192, 1010, 4286062208, 1, "Mon Jun 1 10:25:44 2015", 952243000, "Mon Jun 1 10:25:44 2015", 955248000, "Mon Jun 1 10:25:44 2015", 955248000, "None"]
```

```
[{"f", "attributes.10.61.73.115.json", 493, 0, 0, 697, 4096, 1011, 4286062208, 1, "Mon Jun 1 08:53:08 2015", 622599000, "Mon Jun 1 08:53:08 2015", 624600000, "Mon Jun 1 08:53:08 2015", 624600000, "None"}]

"10.61.82.215:/vol/nfsvol"
[{"f", "n5000-uk9.5.2.1.N1.1.bin", 420, 0, 0, 173087826, 173772800, 632, 4286062208, 1, "Fri Nov 22 11:39:03 2013", 0, "Fri Nov 22 11:59:28 2013", 0, "Fri May 29 10:38:41 2015", 410012000, "None"}]

23 scanned, 7.79 KiB in (7.85 KiB/s), 1.51 KiB out (1.52 KiB/s), 0s.
```

scan -stats

Tree statistics report formats.

```
[root@localhost /]# ./xcp scan -stats 10.61.82.215:/vol/nfsvol

Command: scan {'-stats': True}
Paths: ['10.61.82.215:/vol/nfsvol']

Total count: 23
Directories: 9
Regular files: 14
Symbolic links: None
Special files: None
Hard links: None, multilink files: None, saved: 0
Zero data: N/A
Dedupe estimate: N/A
Total space for regular files: size: 1.45 GiB, used: 1.45 GiB
Total space for symlinks: size: 0, used: 0
Total space for directories: size: 36 KiB, used: 36 KiB
Total space used: 1.45 GiB

23 scanned, 7.79 KiB in (10.2 KiB/s), 1.51 KiB out (1.98 KiB/s), 0s.
```

scan -csv

Tree statistics report formats.

Note: XCP reports (.csv, .html) are saved in the catalog location specified in the xcp.ini file. The files are stored in the <catalog path>/catalog/indexes/1/reports folder. You can see sample reports in the appendix.

```
[root@localhost /]# ./xcp scan -csv 10.61.82.215:/vol/nfsvol

Command: scan {'-csv': True}
Paths: ['10.61.82.215:/vol/nfsvol']

Zero data,N/A
Dedupe estimate,N/A
Total space for regular files,size,1555441560,used,1561632768
Total space for symlinks,size,0,used,0
Total space for directories,size,36864,used,36864
Total space used,1561669632

23 scanned, 7.79 KiB in (6.51 KiB/s), 1.51 KiB out (1.26 KiB/s), 1s.
```

scan -html

Tree statistics report formats.

```
[root@localhost /]# ./xcp scan -html 10.61.82.215:/vol/nfsvol

Command: scan {'-html': True}
Paths: ['10.61.82.215:/vol/nfsvol']

138 scanned, 33.5 KiB in (2.43 KiB/s), 3.53 KiB out (263/s), 13s.
```

scan -nonames

Do not look up user and group names for file listings or reports.

Note: The `-nonames` option only applies to file listings with `-l` option in the scan command.

```
[root@localhost /]# ./xcp scan -nonames -l 10.61.82.215:/vol/nfsvol

Command: scan {'-l': True, '-nonames': True}
Paths: ['10.61.82.215:/vol/nfsvol']

rw-r--r-- --- 0 0 165MiB 166MiB 1y190d nfsvol/n5000-uk9.5.2.1.N1.1.bin
rw-r--r-- --- 0 0 397MiB 398MiB 1y57d nfsvol/821_q_image.tgz
rw-r--r-- --- 0 0 401MiB 403MiB 265d22h nfsvol/822RC2_q_image.tgz
rw-r--r-- --- 0 0 3.72KiB 4KiB 1y187d nfsvol/NX5010_12_node_RCF_v1.3.txt
rw-r--r-- --- 0 0 30.2MiB 30.3MiB 1y190d nfsvol/n5000-uk9-kickstart.5.2.1.N1.1.bin
rw-r--r-- --- 0 0 7.87MiB 7.91MiB 248d2h nfsvol/NetApp_CN1610_1.1.0.5.stk
rw-r--r-- --- 0 0 20.9MiB 21.0MiB 2y129d nfsvol/glibc-common-2.7-2.x86_64.rpm
rw-r--r-- --- 0 0 4.82MiB 4.84MiB 2y129d nfsvol/glibc-2.7-2.x86_64.rpm
rw-r--r-- --- 0 0 456MiB 458MiB 2d22h nfsvol/rhel-server-5.6-x86_64-dvd.iso.filepart
drwxr-xr-x --- 0 0 4KiB 4KiB 7d2h nfsvol/xcp
drwxr-xr-x --- 0 0 4KiB 4KiB 6d22h nfsvol/xcp_source
drwxr-xr-x --- 0 0 4KiB 4KiB 3d0h nfsvol/catalog

23 scanned, 7.79 KiB in (13.2 KiB/s), 1.51 KiB out (2.56 KiB/s), 0s.
```

scan -newid <name>

Catalog name for a new index.

```
[root@localhost /]# ./xcp scan -newid 2 10.61.82.215:/vol/nfsvol

Command: scan {'-newid': '2'}
Paths: ['10.61.82.215:/vol/nfsvol']

43 scanned, 43 indexed, 21.0 KiB in (25.6 KiB/s), 54.3 KiB out (66.3 KiB/s), 0s.
```

scan -id <name>

Catalog name of a previous copy or scan index.

```
[root@localhost /]# ./xcp scan -id 1

Command: scan {'-id': '1'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: 'None'}

nfsvol/n5000-uk9.5.2.1.N1.1.bin
nfsvol/821_q_image.tgz
nfsvol/822RC2_q_image.tgz
nfsvol/NX5010_12_node_RCF_v1.3.txt
nfsvol/n5000-uk9-kickstart.5.2.1.N1.1.bin
nfsvol/NetApp_CN1610_1.1.0.5.stk
nfsvol/glibc-common-2.7-2.x86_64.rpm
nfsvol/glibc-2.7-2.x86_64.rpm
nfsvol/rhel-server-5.6-x86_64-dvd.iso.filepart
nfsvol/xcp_source
nfsvol/xcp
nfsvol/catalog/logs
nfsvol/catalog/reports
nfsvol/catalog/stats

33 reviewed, 10.4 KiB in (18.9 KiB/s), 956 out (1.70 KiB/s), 0s.
```

scan -match <filter>

Only process files and directories that match the filter.

```
[root@localhost /]# ./xcp scan -match bin 10.61.82.215:/vol/nfsvol

Command: scan {'-match': 'bin'}
Paths: ['10.61.82.215:/vol/nfsvol']

nfsvol
nfsvol/n5000-uk9.5.2.1.N1.1.bin
nfsvol/821_q_image.tgz
nfsvol/822RC2_q_image.tgz
nfsvol/NX5010_12_node_RCF_v1.3.txt
nfsvol/n5000-uk9-kickstart.5.2.1.N1.1.bin
nfsvol/NetApp_CN1610_1.1.0.5.stk
nfsvol/glibc-common-2.7-2.x86_64.rpm
nfsvol/glibc-2.7-2.x86_64.rpm
nfsvol/rhel-server-5.6-x86_64-dvd.iso.filepart

Filtered: 0 not matched
138 scanned, 138 matched, 33.5 KiB in (28.8 KiB/s), 3.53 KiB out (3.04 KiB/s), 1s.
```

scan -du

Summarize space usage of each directory, including subdirectories.

```
[root@localhost /]# ./xcp scan -du 10.61.82.215:/vol/nfsvol

Command: scan {'-du': True}
Paths: ['10.61.82.215:/vol/nfsvol']

 4KiB nfsvol/xcp
 4KiB nfsvol/xcp_source
 4KiB nfsvol/catalog/logs
 4KiB nfsvol/catalog/reports
 4KiB nfsvol/catalog/stats
56KiB nfsvol/catalog/indexes/2/reports
24KiB nfsvol/catalog/servers
76KiB nfsvol/catalog/indexes/2
56KiB nfsvol/catalog/indexes/1/reports
76KiB nfsvol/catalog/indexes/1
156KiB nfsvol/catalog/indexes
200KiB nfsvol/catalog
1.45GiB nfsvol

43 scanned, 12.9 KiB in (20.2 KiB/s), 2.18 KiB out (3.40 KiB/s), 0s.
```

scan -md5

Checksum the files (also save the checksums when indexing) (default: False).

Note: The checksums are not used for file verification; they are used only for file listings during scan operations.

```
[root@localhost /]# ./xcp scan -l -md5 10.61.82.215:/vol/nfsvol

Command: scan {'-l': True, '-md5': True}
Paths: ['10.61.82.215:/vol/nfsvol']
a3a6cc2c32cfdclc272478ae25fe66fe rw-r--r-- --- root root 165MiB 166MiB 1y190d nfsvol/n5000-uk9.5.2.1.N1.1.bin
02ae09abae901fed0b7fa3331fd90650 rw-r--r-- --- root root 397MiB 398MiB 1y57d
nfsvol/821_q_image.tgz
b2dfd6e6e2458e30f196473325595b54 rw-r--r-- --- root root 401MiB 403MiB 265d22h
nfsvol/822RC2_q_image.tgz
a99562228b4b340aad187e44f5886f3c rw-r--r-- --- root root 3.72KiB 4KiB 1y187d
nfsvol/NX5010_12_node_RCF_v1.3.txt
f0b746cde0a84d748b76253905283ddb rw-r--r-- --- root root 30.2MiB 30.3MiB 1y190d nfsvol/n5000-uk9-kickstart.5.2.1.N1.1.bin
d006ad0d323c0c446652cc07fda4985a rw-r--r-- --- root root 7.87MiB 7.91MiB 248d2h
nfsvol/NetApp_CN1610_1.1.0.5.stk
c62ced9eb5abe4a766de3afb04ea6222 rw-r--r-- --- root root 20.9MiB 21.0MiB 2y129d nfsvol/glibc-common-2.7-2.x86_64.rpm
```

```

a355e3f518947ce1092c4c5edf1780cb rw-r--r-- --- root root 4.82MiB 4.84MiB 2y129d nfsvol/glibc-
2.7-2.x86_64.rpm
d41d8cd98f00b204e9800998ecf8427e rw-r--r-- --- root root 456MiB 458MiB 2d22h nfsvol/rhel-
server-5.6-x86_64-dvd.iso.filepart
drwxr-xr-x --- root root 4KiB 4KiB 7d2h nfsvol/xcp
drwxr-xr-x --- root root 4KiB 4KiB 6d22h nfsvol/xcp_source
drwxr-xr-x --- root root 4KiB 4KiB 3d0h nfsvol/catalog

```

23 scanned, 9 summed, 7.79KiB in (13.2KiBps), 1.51KiB out (2.56KiBps), 0sscan -depth <n>

Limit the search depth.

Note: This `-depth` option specifies how deep XCP can scan the files into the subdirectories.

```

[root@localhost]# ./xcp scan -depth 2 10.61.73.94:/vol/nfsvol1/

Command: scan {'-depth': 2}
Paths: ['10.61.73.94:/vol/nfsvol1/']

nfsvol1
nfsvol1/catalog/xFiles.json
nfsvol1/catalog/servers
nfsvol1/catalog/stats
nfsvol1/catalog/reports
nfsvol1/catalog/indexes
nfsvol1/catalog/logs
nfsvol1/catalog

8 scanned, 2.13 KiB in (7.69 KiB/s), 336 out (1.19 KiB/s), 0s.

```

scan -dircount <n[k]>

Request size for reading directories (default: 64k).

```

[root@localhost /]# ./xcp scan -dircount 64k 10.61.82.215:/vol/nfsvol

Command: scan {'-dircount': '64k'}
Paths: ['10.61.82.215:/vol/nfsvol']

nfsvol
nfsvol/n5000-uk9.5.2.1.N1.1.bin
nfsvol/821_q_image.tgz
nfsvol/822RC2_q_image.tgz
nfsvol/NX5010_12_node_RCF_v1.3.txt
nfsvol/n5000-uk9-kickstart.5.2.1.N1.1.bin
nfsvol/NetApp_CN1610_1.1.0.5.stk
nfsvol/glibc-common-2.7-2.x86_64.rpm
nfsvol/glibc-2.7-2.x86_64.rpm
nfsvol/rhel-server-5.6-x86_64-dvd.iso.filepart
nfsvol/xcp
nfsvol/xcp_source
nfsvol/catalog

43 scanned, 12.9 KiB in (20.0 KiB/s), 2.18 KiB out (3.38 KiB/s), 0s.

```

scan -edupe

Include dedupe estimate in reports (see documentation for details).

```

[root@localhost /]# ./xcp scan -edupe 10.61.82.215:/vol/nfsvol

Command: scan {'-edupe': True}
Paths: ['10.61.82.215:/vol/nfsvol']

43 scanned, 26 summed, 335 MiB in (66.1 MiB/s), 845 KiB out (167 KiB/s), 5s
43 scanned, 26 summed, 594 MiB in (51.7 MiB/s), 1.46 MiB out (129 KiB/s), 10s
43 scanned, 27 summed, 902 MiB in (61.6 MiB/s), 2.21 MiB out (154 KiB/s), 15s
43 scanned, 27 summed, 1.18 GiB in (60.5 MiB/s), 2.94 MiB out (151 KiB/s), 20s

```

11 3 16

```
Total count: 43
Directories: 13
Regular files: 30
Symbolic links: None
Special files: None
Hard links: None, multilink files: None, saved: 0
Zero data: 2.06 MiB
Dedupe estimate (using 64 KiB blocks and excluding zero blocks): at least 7.94 MiB (1% of the
1.45 GiB total used by regular files)
Total space for regular files: size: 1.45 GiB, used: 1.45 GiB
Total space for symlinks: size: 0, used: 0
Total space for directories: size: 52 KiB, used: 52 KiB
Total space used: 1.45 GiB
```

43 scanned, 30 summed, 1.45 GiB in (59.3 MiB/s), 3.63 MiB out (148 KiB/s), 25s.

scan -bs<n[k]>

Read/write block size for scans that read data with -md5 or -edupe (default: 64k).

```
[root@localhost /]# ./xcp scan -bs 32 10.61.82.215:/vol/nfsvol
```

```
Command: scan {'-bs': '32'}
Paths: ['10.61.82.215:/vol/nfsvol']
```

```
nfsvol/n5000-uk9.5.2.1.N1.1.bin
nfsvol/821_q_image.tgz
nfsvol/822RC2_q_image.tgz
nfsvol/NX5010_12_node_RCF_v1.3.txt
nfsvol/n5000-uk9-kickstart.5.2.1.N1.1.bin
nfsvol/NetApp_CN1610_1.1.0.5.stk
nfsvol/glibc-common-2.7-2.x86_64.rpm
nfsvol/glibc-2.7-2.x86_64.rpm
nfsvol/rhel-server-5.6-x86_64-dvd.iso.filepart
nfsvol/xcp
nfsvol/xcp_source
nfsvol/catalog
```

43 scanned, 12.9 KiB in (13.1 KiB/s), 2.18 KiB out (2.22 KiB/s), 0s.

scan -parallel

Maximum concurrent batch processes (default: 7).

```
[root@localhost /]# ./xcp scan -parallel 4 10.61.82.215:/vol/nfsvol
```

```
Command: scan {'-parallel': 4}
Paths: ['10.61.82.215:/vol/nfsvol']
```

```
nfsvol
nfsvol/n5000-uk9.5.2.1.N1.1.bin
nfsvol/821_q_image.tgz
nfsvol/822RC2_q_image.tgz
nfsvol/NX5010_12_node_RCF_v1.3.txt
nfsvol/n5000-uk9-kickstart.5.2.1.N1.1.bin
nfsvol/NetApp_CN1610_1.1.0.5.stk
nfsvol/glibc-common-2.7-2.x86_64.rpm
nfsvol/glibc-2.7-2.x86_64.rpm
nfsvol/rhel-server-5.6-x86_64-dvd.iso.filepart
nfsvol/xcp
nfsvol/xcp_source
nfsvol/catalog
```

43 scanned, 12.9 KiB in (10.1 KiB/s), 2.18 KiB out (1.71 KiB/s), 1s.

8 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.

Note: The run-time log file is stored under `/opt/NetApp/xFiles/xcp/xcp.log`. This path is configurable. Additional logging is stored in the catalog after each command is executed.

Syntax

```
[root@localhost /]# ./xcp copy <source NFS export path> <destination NFS export path>
```

Example

```
[root@localhost /]# ./xcp copy 10.61.82.215:/vol/nfsvol 10.61.73.115:/dest_nfs

Command: copy
Paths: ['10.61.82.215:/vol/nfsvol', '10.61.73.115:/dest_nfs']

44 scanned, 39 copied, 264 MiB in (51.9 MiB/s), 262 MiB out (51.5 MiB/s), 5s
44 scanned, 39 copied, 481 MiB in (43.3 MiB/s), 479 MiB out (43.4 MiB/s), 10s
44 scanned, 40 copied, 748 MiB in (51.2 MiB/s), 747 MiB out (51.3 MiB/s), 16s
44 scanned, 40 copied, 1.00 GiB in (55.9 MiB/s), 1.00 GiB out (55.9 MiB/s), 21s
44 scanned, 40 copied, 1.21 GiB in (42.8 MiB/s), 1.21 GiB out (42.8 MiB/s), 26s
44 scanned, 43 copied, 1.46 GiB in (47.6 MiB/s), 1.45 GiB out (47.6 MiB/s), 31s.
```

Parameters

The following table provides a list of `copy` parameters and their description.

Feature	Description
<code>copy -newid <name></code>	Catalog name for a new index.
<code>copy -md5</code>	Checksum the files (also save the checksums when indexing) (default: False).
<code>copy -edupe</code>	Include deduplication estimate in reports (see documentation for details).
<code>copy -nonames</code>	Do not look up user and group names for file listings or reports.
<code>copy -bs <n[k]></code>	Read/write block size (default: 64k).
<code>copy -dircount <n[k]></code>	Request size for reading directories (default: 64k).
<code>copy -parallel <n></code>	Maximum concurrent batch processes (default: 7).

`copy -newid <name>`

Catalog name for a new index.

```
[root@localhost /]# ./xcp copy -newid 3 10.61.82.215:/vol/nfsvol 10.61.73.115:/dest_nfs1

Command: copy {'-newid': '3'}
Paths: ['10.61.82.215:/vol/nfsvol', '10.61.73.115:/dest_nfs1']

64 scanned, 53 copied, 48 indexed, 142 MiB in (27.7 MiB/s), 142 MiB out (27.7 MiB/s), 5s
64 scanned, 57 copied, 48 indexed, 310 MiB in (33.4 MiB/s), 308 MiB out (33.1 MiB/s), 10s
64 scanned, 57 copied, 48 indexed, 530 MiB in (43.0 MiB/s), 528 MiB out (43.0 MiB/s), 16s
64 scanned, 58 copied, 48 indexed, 811 MiB in (56.2 MiB/s), 809 MiB out (56.3 MiB/s), 21s
64 scanned, 60 copied, 48 indexed, 1.06 GiB in (55.0 MiB/s), 1.06 GiB out (55.1 MiB/s), 26s
64 scanned, 60 copied, 48 indexed, 1.33 GiB in (55.5 MiB/s), 1.33 GiB out (55.5 MiB/s), 31s
64 scanned, 60 copied, 48 indexed, 1.61 GiB in (56.5 MiB/s), 1.61 GiB out (56.5 MiB/s), 36s
64 scanned, 63 copied, 64 indexed, 1.71 GiB in (45.0 MiB/s), 1.71 GiB out (45.0 MiB/s), 38s.
```

copy -md5

Checksum the files (also save the checksums when indexing) (default: False).

```
[root@localhost /]# ./xcp copy -md5 10.61.82.215:/vol/nfsvol 10.61.73.115:/dest_nfs1

Command: copy {'-md5': True}
Paths: ['10.61.82.215:/vol/nfsvol', '10.61.73.115:/dest_nfs1']

44 scanned, 27 summed, 39 copied, 239 MiB in (47.1 MiB/s), 237 MiB out (46.7 MiB/s), 6s
44 scanned, 27 summed, 39 copied, 467 MiB in (45.5 MiB/s), 465 MiB out (45.5 MiB/s), 11s
44 scanned, 27 summed, 39 copied, 648 MiB in (36.1 MiB/s), 646 MiB out (36.2 MiB/s), 16s
44 scanned, 28 summed, 40 copied, 879 MiB in (44.6 MiB/s), 878 MiB out (44.7 MiB/s), 21s
44 scanned, 28 summed, 40 copied, 981 MiB in (20.3 MiB/s), 980 MiB out (20.3 MiB/s), 26s
44 scanned, 28 summed, 40 copied, 1.09 GiB in (26.8 MiB/s), 1.09 GiB out (26.8 MiB/s), 31s
44 scanned, 28 summed, 40 copied, 1.27 GiB in (37.6 MiB/s), 1.27 GiB out (37.6 MiB/s), 36s
44 scanned, 31 summed, 43 copied, 1.46 GiB in (35.7 MiB/s), 1.45 GiB out (35.7 MiB/s), 41s.
```

copy -edupe

Include deduplication estimate in reports.

```
[root@localhost /]# ./xcp copy -edupe 10.61.82.215:/vol/nfsvol 10.61.73.115:/dest_nfs2

Command: copy {'-edupe': True}
Paths: ['10.61.82.215:/vol/nfsvol', '10.61.73.115:/dest_nfs2']

44 scanned, 27 summed, 39 copied, 282 MiB in (55.0 MiB/s), 280 MiB out (54.6 MiB/s), 5s
44 scanned, 27 summed, 39 copied, 565 MiB in (56.7 MiB/s), 564 MiB out (56.7 MiB/s), 10s
44 scanned, 28 summed, 40 copied, 800 MiB in (46.8 MiB/s), 798 MiB out (46.8 MiB/s), 15s
44 scanned, 28 summed, 40 copied, 1.12 GiB in (70.0 MiB/s), 1.12 GiB out (70.1 MiB/s), 20s
44 scanned, 29 summed, 41 copied, 1.39 GiB in (55.4 MiB/s), 1.39 GiB out (55.4 MiB/s), 25s

Total count: 44
Directories: 13
Regular files: 31
Symbolic links: None
Special files: None
Hard links: None, multilink files: None, saved: 0
Zero data: 2.06 MiB
Dedupe estimate (using 64 KiB blocks and excluding zero blocks): at least 7.94 MiB (1% of the
1.45 GiB total used by regular files)
Total space for regular files: size: 1.45 GiB, used: 1.45 GiB
Total space for symlinks: size: 0, used: 0
Total space for directories: size: 52 KiB, used: 52 KiB
Total space used: 1.45 GiB

44 scanned, 31 summed, 43 copied, 1.46 GiB in (54.8 MiB/s), 1.45 GiB out (54.8 MiB/s), 27s.
```

copy -nonames

Do not look up user and group names for file listings or reports.

```
[root@localhost /]# ./xcp copy -nonames 10.61.82.215:/vol/nfsvol 10.61.73.115:/dest_nfs3

Command: copy {'-nonames': True}
Paths: ['10.61.82.215:/vol/nfsvol', '10.61.73.115:/dest_nfs3']

44 scanned, 39 copied, 254 MiB in (49.9 MiB/s), 252 MiB out (49.5 MiB/s), 5s
44 scanned, 39 copied, 491 MiB in (47.5 MiB/s), 489 MiB out (47.6 MiB/s), 10s
44 scanned, 40 copied, 745 MiB in (42.2 MiB/s), 743 MiB out (42.2 MiB/s), 16s
44 scanned, 40 copied, 1018 MiB in (54.6 MiB/s), 1016 MiB out (54.7 MiB/s), 21s
44 scanned, 40 copied, 1.24 GiB in (50.4 MiB/s), 1.24 GiB out (50.5 MiB/s), 26s
44 scanned, 43 copied, 1.46 GiB in (48.2 MiB/s), 1.45 GiB out (48.2 MiB/s), 30s.
```

copy -bs <n[k]>

Read/write block size (default: 64k).

```
[root@localhost /]# ./xcp copy -bs 32k 10.61.82.215:/vol/nfsvol 10.61.73.115:/dest_nfs4

Command: copy {'-bs': '32k'}
```

```

Paths: ['10.61.82.215:/vol/nfsvol', '10.61.73.115:/dest_nfs4']

44 scanned, 39 copied, 284 MiB in (55.9 MiB/s), 282 MiB out (55.5 MiB/s), 5s
44 scanned, 39 copied, 593 MiB in (61.8 MiB/s), 591 MiB out (61.9 MiB/s), 10s
44 scanned, 40 copied, 908 MiB in (63.0 MiB/s), 907 MiB out (63.1 MiB/s), 15s
44 scanned, 40 copied, 1.20 GiB in (63.2 MiB/s), 1.19 GiB out (63.3 MiB/s), 20s

44 scanned, 43 copied, 1.46 GiB in (56.6 MiB/s), 1.46 GiB out (56.6 MiB/s), 26s.

```

copy -dircount <n[k]>

Request size for reading directories (default: 64k).

```

[root@localhost /]# ./xcp copy -dircount 32k 10.61.82.215:/vol/nfsvol 10.61.73.115:/dest_nfs5

Command: copy {'-dircount': '32k'}
Paths: ['10.61.82.215:/vol/nfsvol', '10.61.73.115:/dest_nfs5']

44 scanned, 39 copied, 241 MiB in (47.2 MiB/s), 239 MiB out (46.8 MiB/s), 5s
44 scanned, 39 copied, 510 MiB in (53.8 MiB/s), 508 MiB out (53.8 MiB/s), 10s
44 scanned, 40 copied, 735 MiB in (45.0 MiB/s), 733 MiB out (45.0 MiB/s), 15s
44 scanned, 40 copied, 978 MiB in (48.5 MiB/s), 976 MiB out (48.5 MiB/s), 20s
44 scanned, 40 copied, 1.21 GiB in (51.4 MiB/s), 1.20 GiB out (51.4 MiB/s), 25s

44 scanned, 43 copied, 1.46 GiB in (46.7 MiB/s), 1.45 GiB out (46.7 MiB/s), 31s.

```

copy -parallel <n>

Maximum concurrent batch processes (default: 7).

```

[root@localhost /]# ./xcp copy -parallel 4 10.61.82.215:/vol/nfsvol 10.61.73.115:/dest_nfs6

Command: copy {'-parallel': 4}
Paths: ['10.61.82.215:/vol/nfsvol', '10.61.73.115:/dest_nfs6']

44 scanned, 39 copied, 269 MiB in (53.0 MiB/s), 267 MiB out (52.6 MiB/s), 5s
44 scanned, 39 copied, 554 MiB in (57.1 MiB/s), 553 MiB out (57.2 MiB/s), 10s
44 scanned, 40 copied, 819 MiB in (52.9 MiB/s), 817 MiB out (52.9 MiB/s), 15s
44 scanned, 40 copied, 1.05 GiB in (52.0 MiB/s), 1.05 GiB out (52.0 MiB/s), 20s
44 scanned, 40 copied, 1.27 GiB in (43.8 MiB/s), 1.27 GiB out (43.8 MiB/s), 25s
44 scanned, 43 copied, 1.46 GiB in (50.7 MiB/s), 1.45 GiB out (50.7 MiB/s), 29s.

```

9 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.

Note: During the `sync` operation, modified files and directories are copied again to the destination NFSv3 export.

Syntax

```
[root@localhost /]# ./xcp sync -id <catalog index name>
```

Example

```
[root@localhost /]# ./xcp sync -id 3

Command: sync {'-id': '3'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}

64 reviewed, 64 checked at source, 6 changes, 6 modifications, 51.7 KiB in (62.5 KiB/s), 22.7 KiB
out (27.5 KiB/s), 0s.
xcp: sync '3': Starting search pass for 1 modified directory...
xcp: sync '3': Found 6 indexed files in the 1 changed directory
xcp: sync '3': Rereading the 1 modified directory to find what's new...
xcp: sync '3': Deep scanning the 1 directory that changed...

11 scanned, 11 copied, 12.6 KiB in (6.19 KiB/s), 9.50 KiB out (4.66 KiB/s), 2s.
```

Parameters

The following table lists the `sync` parameters and their description.

Feature	Description
<code>sync -id <name></code>	Catalog name of a previous copy index
<code>sync -stats</code>	Tree statistics report formats
<code>sync -csv</code>	Tree statistics report formats
<code>sync -html</code>	Tree statistics report formats
<code>sync -nonames</code>	Do not look up user and group names for file listings or reports
<code>sync -bs <n[k]></code>	Read/write block size (default: 64k)
<code>sync -dircount <n[k]></code>	Request size for reading directories (default: 64k)
<code>sync -parallel <n></code>	Maximum concurrent batch processes (default: 7)

sync -id and sync -stats

Tree statistics report formats.

```
[root@localhost /]# ./xcp sync -id 3 -stats

Command: sync {'-id': '3', '-stats': True}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}
```

```
xcp: new sync for id '3': WARNING: Catalog id 3-sync.1 already exists but the index
'10.61.82.215:/vol/nfsvol/catalog/indexes/3/3-sync.1/3-sync.1.index' is empty; removing and
proceeding...
64 reviewed, 64 checked at source, 6 changes, 6 modifications, 51.1 KiB in (55.2 KiB/s), 21.8 KiB
out (23.6 KiB/s), 0s.
xcp: sync '3': Starting search pass for 1 modified directory...
xcp: sync '3': Found 6 indexed files in the 1 changed directory
xcp: sync '3': Rereading the 1 modified directory to find what's new...
xcp: sync '3': Deep scanning the 1 directory that changed...

Total count: 15
Directories: 2
Regular files: 13
Symbolic links: None
Special files: None
Hard links: None, multilink files: None, saved: 0
Zero data: None
Dedupe estimate: N/A
Total space for regular files: size: 2.26 KiB, used: 12 KiB
Total space for symlinks: size: 0, used: 0
Total space for directories: size: 8 KiB, used: 8 KiB
Total space used: 20 KiB

15 scanned, 15 copied, 15.3 KiB in (13.4 KiB/s), 11.8 KiB out (10.3 KiB/s), 1s.
```

sync -id and sync -csv

Tree statistics report formats.

```
[root@localhost /]# ./xcp sync -id 3 -csv

Command: sync {'-csv': True, '-id': '3'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}

xcp: new sync for id '3': WARNING: Catalog id 3-sync.1 already exists but the index
'10.61.82.215:/vol/nfsvol/catalog/indexes/3/3-sync.1/3-sync.1.index' is empty; removing and
proceeding...
64 reviewed, 64 checked at source, 6 changes, 6 modifications, 51.1 KiB in (42.0 KiB/s), 21.8 KiB
out (17.9 KiB/s), 1s.
xcp: sync '3': Starting search pass for 1 modified directory...
xcp: sync '3': Found 6 indexed files in the 1 changed directory
xcp: sync '3': Rereading the 1 modified directory to find what's new...
xcp: sync '3': Deep scanning the 1 directory that changed...
xcp,1.0-c4ccf9c
date,08-Jun-2015 03:31 AM EDT
sync 10.61.82.215:/vol/nfsvol
options,"{'-id': '3', '-csv': True}"
summary,"19 scanned, 19 copied, 17.8 KiB in (12.3 KiB/s), 13.7 KiB out (9.47 KiB/s), 1s."

19 scanned, 19 copied, 17.8 KiB in (12.3 KiB/s), 13.7 KiB out (9.46 KiB/s), 1s.
```

sync -id and sync -html

Tree statistics report formats.

```
[root@localhost /]# ./xcp sync -id 3 -html

Command: sync {'-id': '3', '-html': True}
Paths: []
Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}
Sending statistics...

+

23 scanned, 23 copied, 20.2 KiB in (16.1 KiB/s), 15.6 KiB out (12.4 KiB/s), 1s.
```

sync -id and sync -nonames

Do not look up user and group names for file listings or reports.

```
[root@localhost /]# ./xcp sync -id 3 -nonames

Command: sync {'-id': '3', '-nonames': True}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}

xcp: new sync for id '3': WARNING: Catalog id 3-sync.1 already exists but the index
'10.61.82.215:/vol/nfsvol/catalog/indexes/3/3-sync.1/3-sync.1.index' is empty; removing and
proceeding...
64 reviewed, 64 checked at source, 6 changes, 6 modifications, 51.1 KiB in (94.2 KiB/s), 21.8 KiB
out (40.2 KiB/s), 0s.
xcp: sync '3': Starting search pass for 1 modified directory...
xcp: sync '3': Found 6 indexed files in the 1 changed directory
xcp: sync '3': Rereading the 1 modified directory to find what's new...
xcp: sync '3': Deep scanning the 1 directory that changed...
Sending statistics...

31 scanned, 31 copied, 25.2 KiB in (14.0 KiB/s), 19.4 KiB out (10.8 KiB/s), 1s.
```

sync -id and sync -bs

Read/write block size (default: 64k).

```
[root@localhost /]# ./xcp sync -id 3 -bs 32k

Command: sync {'-id': '3', '-bs': '32k'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}

xcp: new sync for id '3': WARNING: Catalog id 3-sync.1 already exists but the index
'10.61.82.215:/vol/nfsvol/catalog/indexes/3/3-sync.1/3-sync.1.index' is empty; removing and
proceeding...
64 reviewed, 64 checked at source, 6 changes, 6 modifications, 51.1 KiB in (29.1 KiB/s), 21.8 KiB
out (12.4 KiB/s), 1s.
xcp: sync '3': Starting search pass for 1 modified directory...
xcp: sync '3': Found 6 indexed files in the 1 changed directory
xcp: sync '3': Rereading the 1 modified directory to find what's new...
xcp: sync '3': Deep scanning the 1 directory that changed...
Sending statistics...

39 scanned, 39 copied, 30.1 KiB in (14.9 KiB/s), 23.2 KiB out (11.5 KiB/s), 2s.
```

sync -id and sync -dircount

Request size for reading directories (default: 64k).

```
[root@localhost /]# ./xcp sync -id 3 -dircount 32k

Command: sync {'-id': '3', '-dircount': '32k'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}

xcp: new sync for id '3': WARNING: Catalog id 3-sync.1 already exists but the index
'10.61.82.215:/vol/nfsvol/catalog/indexes/3/3-sync.1/3-sync.1.index' is empty; removing and
proceeding...
64 reviewed, 64 checked at source, 6 changes, 6 modifications, 51.1 KiB in (49.2 KiB/s), 21.8 KiB
out (21.0 KiB/s), 1s.
xcp: sync '3': Starting search pass for 1 modified directory...
xcp: sync '3': Found 6 indexed files in the 1 changed directory
xcp: sync '3': Rereading the 1 modified directory to find what's new...
xcp: sync '3': Deep scanning the 1 directory that changed...
Sending statistics...

43 scanned, 43 copied, 32.6 KiB in (13.9 KiB/s), 25.1 KiB out (10.7 KiB/s), 2s.
```

sync -id and sync-parallel

Maximum concurrent batch processes (default: 7).

```
[root@localhost /]# ./xcp sync -id 3 -parallel 4

Command: sync {'-parallel': 4, '-id': '3'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}

xcp: new sync for id '3': WARNING: Catalog id 3-sync.1 already exists but the index
'10.61.82.215:/vol/nfsvol/catalog/indexes/3/3-sync.1/3-sync.1.index' is empty; removing and
proceeding...
64 reviewed, 64 checked at source, 6 changes, 6 modifications, 51.1 KiB in (81.3 KiB/s), 21.8 KiB
out (34.7 KiB/s), 0s.
xcp: sync '3': Starting search pass for 1 modified directory...
xcp: sync '3': Found 6 indexed files in the 1 changed directory
xcp: sync '3': Rereading the 1 modified directory to find what's new...
xcp: sync '3': Deep scanning the 1 directory that changed...
Sending statistics...

47 scanned, 47 copied, 35 KiB in (18.8 KiB/s), 27.0 KiB out (14.5 KiB/s), 1s.
```

10 sync dry-run

The `sync dry-run` command looks for changes or modifications made to the source NFS directory using a previous catalog index number of copy operation. This command also detects files and directories that are new or moved, deleted, or renamed since the previous copy operation. The command reports the source changes but does not apply them to the target.

Syntax

```
[root@localhost /]# ./xcp sync dry-run -id <catalog index number>
```

Example

```
[root@localhost /]# ./xcp sync dry-run -id 3

Command: dry-run {'-id': '3'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}

64 reviewed, 64 checked at source, 6 changes, 6 modifications, 43.4 KiB in (83.3 KiB/s), 12.2 KiB out (23.4 KiB/s), 0s.
xcp: dry-run (dry run) '3': Starting search pass for 1 modified directory...
xcp: dry-run (dry run) '3': Found 6 indexed files in the 1 changed directory
xcp: dry-run (dry run) '3': Rereading the 1 modified directory to find what's new...

64 reviewed, 64 checked at source, 6 changes, 6 modifications, 64 re-reviewed, 1 new dir, 61.7 KiB in (112 KiB/s), 12.6 KiB out (22.9 KiB/s), 0s.
```

Parameters

The following table lists the `sync dry-run` parameters and their description.

Feature	Description
<code>sync dry-run -id <name></code>	Catalog name of a previous copy index
<code>sync dry-run -stats</code>	Deep scan the modified directories and report on everything that is new
<code>sync dry-run -l</code>	Print details about files and directories that changed
<code>sync -nonames</code>	Do not look up user and group names for file listings or reports
<code>sync -dircount <n[k]></code>	Request size for reading directories (default: 64k)
<code>sync -parallel <n></code>	Maximum concurrent batch processes (default: 7)

sync dry-run -id

Catalog name of a previous copy index.

```
[root@localhost /]# ./xcp sync dry-run -id 3

Command: dry-run {'-id': '3'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}

64 reviewed, 64 checked at source, 6 changes, 6 modifications, 43.4 KiB in (83.3 KiB/s), 12.2 KiB out (23.4 KiB/s), 0s.
xcp: dry-run (dry run) '3': Starting search pass for 1 modified directory...
xcp: dry-run (dry run) '3': Found 6 indexed files in the 1 changed directory
xcp: dry-run (dry run) '3': Rereading the 1 modified directory to find what's new...

64 reviewed, 64 checked at source, 6 changes, 6 modifications, 64 re-reviewed, 1 new dir, 61.7 KiB in (112 KiB/s), 12.6 KiB out (22.9 KiB/s), 0s.
```

sync dry-run -id and sync dry-run -stats

Deep scan the modified directories and report on everything that is new.

```
[root@localhost /]# ./xcp sync dry-run -id 3 -stats

Command: dry-run {'-id': '3', '-stats': True}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}

64 reviewed, 64 checked at source, 6 changes, 6 modifications, 43.4 KiB in (9.81 KiB/s), 12.2 KiB
out (2.75 KiB/s), 4s.
xcp: dry-run (dry run) '3': Starting search pass for 1 modified directory...
xcp: dry-run (dry run) '3': Found 6 indexed files in the 1 changed directory
xcp: dry-run (dry run) '3': Rereading the 1 modified directory to find what's new...
xcp: dry-run (dry run) '3': Deep scanning the 1 directory that changed...

Total count: 47
Directories: 2
Regular files: 45
Symbolic links: None
Special files: None
Hard links: None, multilink files: None, saved: 0
Zero data: N/A
Dedupe estimate: N/A
Total space for regular files: size: 2.26 KiB, used: 12 KiB
Total space for symlinks: size: 0, used: 0
Total space for directories: size: 8 KiB, used: 8 KiB
Total space used: 20 KiB

47 scanned, 11.1 KiB in (2.47 KiB/s), 516 out (115/s), 4s.
```

sync dry-run -id and sync dry-run -l

Print details about files and directories that changed.

```
[root@localhost /]# ./xcp sync dry-run -id 3 -l

Command: dry-run {'-l': True, '-id': '3'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}

64 reviewed, 64 checked at source, 6 changes, 6 modifications, 43.4 KiB in (38.4 KiB/s), 12.2 KiB
out (10.8 KiB/s), 1s.
xcp: dry-run (dry run) '3': Starting search pass for 1 modified directory...
xcp: dry-run (dry run) '3': Found 6 indexed files in the 1 changed directory
xcp: dry-run (dry run) '3': Rereading the 1 modified directory to find what's new...
+ d 10.61.82.215:/vol/nfsvol/catalog/indexes/3/3-sync.1

64 reviewed, 64 checked at source, 6 changes, 6 modifications, 64 re-reviewed, 1 new dir, 61.7
KiB in (53.1 KiB/s), 12.6 KiB out (10.9 KiB/s), 1s.
```

sync dry-run -id and sync dry-run -nonames

Do not look up user and group names for file listings or reports.

```
[root@localhost /]# ./xcp sync dry-run -id 3 -nonames

Command: dry-run {'-id': '3', '-nonames': True}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}

64 reviewed, 64 checked at source, 6 changes, 6 modifications, 43.4 KiB in (42.2 KiB/s), 12.2 KiB
out (11.8 KiB/s), 1s.
xcp: dry-run (dry run) '3': Starting search pass for 1 modified directory...
xcp: dry-run (dry run) '3': Found 6 indexed files in the 1 changed directory
xcp: dry-run (dry run) '3': Rereading the 1 modified directory to find what's new...
```

```
64 reviewed, 64 checked at source, 6 changes, 6 modifications, 64 re-reviewed, 1 new dir, 61.7 KiB in (58.1 KiB/s), 12.6 KiB out (11.9 KiB/s), 1s.
```

sync dry-run -id and sync dry-run -dircount

Request size for reading directories (default: 64k).

```
[root@localhost /]# ./xcp sync dry-run -id 3 -dircount 32k

Command: dry-run {'-id': '3', '-dircount': '32k'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}

64 reviewed, 64 checked at source, 6 changes, 6 modifications, 43.4 KiB in (53.1 KiB/s), 12.2 KiB out (14.9 KiB/s), 0s.
xcp: dry-run (dry run) '3': Starting search pass for 1 modified directory...
xcp: dry-run (dry run) '3': Found 6 indexed files in the 1 changed directory
xcp: dry-run (dry run) '3': Rereading the 1 modified directory to find what's new...

64 reviewed, 64 checked at source, 6 changes, 6 modifications, 64 re-reviewed, 1 new dir, 61.7 KiB in (73.3 KiB/s), 12.6 KiB out (15.0 KiB/s), 0s.
```

sync dry-run -id and sync dry-run -parallel

Maximum concurrent batch processes (default: 7).

```
[root@localhost /]# ./xcp sync dry-run -id 3 -parallel 4

Command: dry-run {'-parallel': 4, '-id': '3'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'}

64 reviewed, 64 checked at source, 6 changes, 6 modifications, 43.4 KiB in (31.3 KiB/s), 12.2 KiB out (8.78 KiB/s), 1s.
xcp: dry-run (dry run) '3': Starting search pass for 1 modified directory...
xcp: dry-run (dry run) '3': Found 6 indexed files in the 1 changed directory
xcp: dry-run (dry run) '3': Rereading the 1 modified directory to find what's new...

64 reviewed, 64 checked at source, 6 changes, 6 modifications, 64 re-reviewed, 1 new dir, 61.7 KiB in (43.5 KiB/s), 12.6 KiB out (8.91 KiB/s), 1s.
```

11 resume

The `resume` command is used for restarting 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 at the `<catalog path>:/catalog/indexes` directory.

Syntax

```
[root@localhost /]# ./xcp resume -id <catalog index number>
```

Example

```
[root@localhost /]# ./xcp resume -id 4

Command: resume {'-id': '4'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs7'}

xcp: resume '4': WARNING: Incomplete index.
xcp: resume '4': Found 18 completed directories and 1 in progress
106 reviewed, 24.2 KiB in (30.3 KiB/s), 7.23 KiB out (9.06 KiB/s), 0s.
xcp: resume '4': Starting second pass for the in-progress directory...
xcp: resume '4': Found 3 indexed directories and 0 indexed files in the 1 in-progress directory
xcp: resume '4': In progress dirs: unindexed 1, indexed 0
xcp: resume '4': Resuming the 1 in-progress directory...
 20 scanned, 7 copied, 205 MiB in (39.6 MiB/s), 205 MiB out (39.6 MiB/s), 5s
 20 scanned, 14 copied, 425 MiB in (42.1 MiB/s), 423 MiB out (41.8 MiB/s), 11s
 20 scanned, 14 copied, 540 MiB in (23.0 MiB/s), 538 MiB out (23.0 MiB/s), 16s
 20 scanned, 14 copied, 721 MiB in (35.6 MiB/s), 720 MiB out (35.6 MiB/s), 21s
 20 scanned, 15 copied, 835 MiB in (22.7 MiB/s), 833 MiB out (22.7 MiB/s), 26s
 20 scanned, 16 copied, 1007 MiB in (34.3 MiB/s), 1005 MiB out (34.3 MiB/s), 31s
 20 scanned, 17 copied, 1.15 GiB in (33.9 MiB/s), 1.15 GiB out (33.9 MiB/s), 36s
 20 scanned, 17 copied, 1.27 GiB in (25.5 MiB/s), 1.27 GiB out (25.5 MiB/s), 41s
 20 scanned, 17 copied, 1.45 GiB in (36.1 MiB/s), 1.45 GiB out (36.1 MiB/s), 46s
 20 scanned, 17 copied, 1.69 GiB in (48.7 MiB/s), 1.69 GiB out (48.7 MiB/s), 51s
Sending statistics...

20 scanned, 20 copied, 21 indexed, 1.77 GiB in (33.5 MiB/s), 1.77 GiB out (33.4 MiB/s), 54s.
```

Parameters

The following table lists the `resume` parameters and their description.

Feature	Description
<code>resume -id <name></code>	Catalog name of a previous copy index
<code>resume -bs <n[k]></code>	Read/write block size (default: 64k)
<code>resume -dircount <n[k]></code>	Request size for reading directories (default: 64k)
<code>resume -parallel <n></code>	Maximum concurrent batch processes (default: 7)
<code>resume -activate</code>	Activate a license on the current host

resume -id<name> and resume -bs

Read/write block size (default: 64k).

```
[root@localhost /]# ./xcp resume -id 5 -bs 32k

Command: resume {'-id': '5', '-bs': '32k'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs8'}

xcp: resume '5': WARNING: Incomplete index.
xcp: resume '5': Found 20 completed directories and 1 in progress
117 reviewed, 24.2 KiB in (25.4 KiB/s), 7.23 KiB out (7.59 KiB/s), 0s.
xcp: resume '5': Starting second pass for the in-progress directory...
xcp: resume '5': Found 3 indexed directories and 0 indexed files in the 1 in-progress directory
xcp: resume '5': In progress dirs: unindexed 1, indexed 0
xcp: resume '5': Resuming the 1 in-progress directory...
 20 scanned, 9 copied, 247 MiB in (47.8 MiB/s), 247 MiB out (47.8 MiB/s), 6s
 20 scanned, 14 copied, 547 MiB in (60.1 MiB/s), 546 MiB out (59.8 MiB/s), 11s
 20 scanned, 14 copied, 760 MiB in (42.4 MiB/s), 758 MiB out (42.4 MiB/s), 16s
 20 scanned, 15 copied, 890 MiB in (24.4 MiB/s), 889 MiB out (24.4 MiB/s), 21s
 20 scanned, 17 copied, 1.05 GiB in (34.6 MiB/s), 1.04 GiB out (34.6 MiB/s), 26s
 20 scanned, 17 copied, 1.31 GiB in (54.2 MiB/s), 1.31 GiB out (54.3 MiB/s), 31s
 20 scanned, 17 copied, 1.60 GiB in (59.5 MiB/s), 1.60 GiB out (59.6 MiB/s), 36s
Sending statistics...

20 scanned, 20 copied, 21 indexed, 1.78 GiB in (45.4 MiB/s), 1.78 GiB out (45.4 MiB/s), 40s
```

resume -id and resume -dircount

Request size for reading directories (default: 64k).

```
[root@localhost /]# ./xcp resume -id 6 -dircount 32k

Command: resume {'-id': '6', '-dircount': '32k'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs9'}

xcp: resume '6': WARNING: Incomplete index.
xcp: resume '6': Found 22 completed directories and 1 in progress
128 reviewed, 24.2 KiB in (17.8 KiB/s), 7.23 KiB out (5.33 KiB/s), 1s.
xcp: resume '6': Starting second pass for the in-progress directory...
xcp: resume '6': Found 3 indexed directories and 0 indexed files in the 1 in-progress directory
xcp: resume '6': In progress dirs: unindexed 1, indexed 0
xcp: resume '6': Resuming the 1 in-progress directory...
 20 scanned, 3 copied, 58.1 MiB in (10.6 MiB/s), 58.1 MiB out (10.6 MiB/s), 6s
 20 scanned, 7 copied, 159 MiB in (17.9 MiB/s), 159 MiB out (17.9 MiB/s), 12s
 20 scanned, 14 copied, 349 MiB in (34.7 MiB/s), 347 MiB out (34.3 MiB/s), 17s
 20 scanned, 14 copied, 424 MiB in (13.0 MiB/s), 422 MiB out (13.0 MiB/s), 23s
 20 scanned, 14 copied, 526 MiB in (19.2 MiB/s), 524 MiB out (19.2 MiB/s), 28s
 20 scanned, 14 copied, 636 MiB in (20.2 MiB/s), 634 MiB out (20.2 MiB/s), 34s
 20 scanned, 14 copied, 722 MiB in (16.7 MiB/s), 720 MiB out (16.7 MiB/s), 39s
 20 scanned, 15 copied, 787 MiB in (13.0 MiB/s), 786 MiB out (13.0 MiB/s), 44s
 20 scanned, 15 copied, 883 MiB in (17.9 MiB/s), 882 MiB out (17.9 MiB/s), 49s
 20 scanned, 16 copied, 975 MiB in (17.7 MiB/s), 973 MiB out (17.7 MiB/s), 55s
 20 scanned, 16 copied, 1.01 GiB in (11.2 MiB/s), 1.01 GiB out (11.2 MiB/s), 1m0s
 20 scanned, 17 copied, 1.16 GiB in (27.8 MiB/s), 1.16 GiB out (27.8 MiB/s), 1m5s
 20 scanned, 17 copied, 1.23 GiB in (13.2 MiB/s), 1.23 GiB out (13.2 MiB/s), 1m11s
 20 scanned, 17 copied, 1.30 GiB in (14.1 MiB/s), 1.30 GiB out (14.1 MiB/s), 1m16s
 20 scanned, 17 copied, 1.42 GiB in (22.3 MiB/s), 1.42 GiB out (22.3 MiB/s), 1m22s
 20 scanned, 17 copied, 1.48 GiB in (12.4 MiB/s), 1.48 GiB out (12.4 MiB/s), 1m27s
 20 scanned, 17 copied, 1.67 GiB in (33.2 MiB/s), 1.67 GiB out (33.2 MiB/s), 1m33s
Sending statistics...

20 scanned, 20 copied, 21 indexed, 1.77 GiB in (18.8 MiB/s), 1.77 GiB out (18.8 MiB/s), 1m36s.
```

resume -id and resume -parallel

Maximum concurrent batch processes (default: 7).

```
[root@localhost /]# ./xcp resume -id 7 -parallel 3

Command: resume {'-parallel': 3, '-id': '7'}
Paths: []

Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs9'}

xcp: resume '7': WARNING: Incomplete index.
xcp: resume '7': Found 24 completed directories and 1 in progress
139 reviewed, 32.2 KiB in (23.8 KiB/s), 7.23 KiB out (5.34 KiB/s), 1s.
xcp: resume '7': Starting second pass for the in-progress directory...
xcp: resume '7': Found 3 indexed directories and 0 indexed files in the 1 in-progress directory
xcp: resume '7': In progress dirs: unindexed 1, indexed 0
xcp: resume '7': Resuming the 1 in-progress directory...
 20 scanned, 3 copied, 83.0 MiB in (14.4 MiB/s), 83.0 MiB out (14.4 MiB/s), 6s
 20 scanned, 7 copied, 169 MiB in (15.5 MiB/s), 169 MiB out (15.5 MiB/s), 12s
 20 scanned, 7 copied, 207 MiB in (6.60 MiB/s), 207 MiB out (6.60 MiB/s), 18s
 20 scanned, 13 copied, 308 MiB in (19.3 MiB/s), 307 MiB out (19.0 MiB/s), 23s
 20 scanned, 14 copied, 363 MiB in (10.5 MiB/s), 362 MiB out (10.3 MiB/s), 28s
 20 scanned, 14 copied, 501 MiB in (26.1 MiB/s), 499 MiB out (26.1 MiB/s), 34s
 20 scanned, 14 copied, 663 MiB in (27.6 MiB/s), 661 MiB out (27.6 MiB/s), 39s
 20 scanned, 15 copied, 820 MiB in (26.7 MiB/s), 818 MiB out (26.7 MiB/s), 45s
 20 scanned, 16 copied, 963 MiB in (28.5 MiB/s), 961 MiB out (28.5 MiB/s), 50s
 20 scanned, 16 copied, 1.01 GiB in (13.7 MiB/s), 1.01 GiB out (13.7 MiB/s), 56s
 20 scanned, 17 copied, 1.06 GiB in (8.96 MiB/s), 1.06 GiB out (8.96 MiB/s), 1m1s
 20 scanned, 17 copied, 1.23 GiB in (30.8 MiB/s), 1.23 GiB out (30.9 MiB/s), 1m7s
 20 scanned, 17 copied, 1.41 GiB in (32.3 MiB/s), 1.41 GiB out (32.4 MiB/s), 1m13s
 20 scanned, 17 copied, 1.55 GiB in (24.8 MiB/s), 1.54 GiB out (24.8 MiB/s), 1m18s
 20 scanned, 17 copied, 1.64 GiB in (16.7 MiB/s), 1.64 GiB out (16.8 MiB/s), 1m24s
 20 scanned, 19 copied, 1.76 GiB in (21.3 MiB/s), 1.76 GiB out (21.3 MiB/s), 1m30s
Sending statistics...

20 scanned, 20 copied, 21 indexed, 1.77 GiB in (20.0 MiB/s), 1.77 GiB out (20.0 MiB/s), 1m30s.
```

12 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.

Note: The `verify` command is useful when source and target directory trees are identical. However, if a source directory is moved or renamed, `verify` will not find any files under that directory even though they are still in the target tree. In such a situation, a `sync dry-run` will be more effective.

Syntax

```
[root@localhost /]# ./xcp verify <source NFS export path> <destination NFS export path>
```

Example

```
[root@localhost]# ./xcp verify 10.61.73.90:/vol/s1 10.61.73.113:/target

Command: verify
Paths: ['10.61.73.90:/vol/s1', '10.61.73.113:/target']

 46,654 scanned, 35,884 found, 35,437 compared, 35,437 same data, 132 MiB in (26.3 MiB/s), 17.9
MiB out (3.57 MiB/s), 5s
 98,494 scanned, 79,292 found, 78,934 compared, 78,934 same data, 258 MiB in (25.1 MiB/s), 39.3
MiB out (4.28 MiB/s), 10s
104,464 scanned, 100% found (104,463 have data), 104,463 compared, 100% verified (data, attrs,
mods), 272 MiB in (17.4 MiB/s), 51.6 MiB out (3.29 MiB/s), 15sParameters
```

The following table lists the `verify` parameters and their description.

Feature	Description
<code>verify -stats</code>	Scan source and target trees in parallel and compare tree statistics.
<code>verify -csv</code>	Scan source and target trees in parallel and compare tree statistics.
<code>verify -nodata</code>	Do not check data.
<code>verify -noattrs</code>	Do not check attributes.
<code>verify -nomods</code>	Do not check file modification times.
<code>verify -mtimewindow <s></code>	Acceptable modification time difference for verification.
<code>verify -v</code>	Output formats to list any differences found.
<code>verify -l</code>	Output formats to list any differences found.
<code>verify -nonames</code>	Do not look up user and group names for file listings or reports.
<code>verify -match <filter></code>	Only process files and directories that match the filter.
<code>verify -bs <n[k]></code>	Read/write blocksize (default: 64k).
<code>verify -dircount <n[k]></code>	Request size for reading directories (default: 64k).
<code>verify -parallel <n></code>	Maximum concurrent batch processes (default: 7).

verify -stats

Scan source and target trees in parallel and compare tree statistics.

```
[root@localhost /]# ./xcp verify -stats 10.61.82.215:/vol/nfsvol 10.61.73.115:/dest_nfs
```

```
Command: verify {'-stats': True}
Paths: ['10.61.82.215:/vol/nfsvol', '10.61.73.115:/dest_nfs']
```

```
Total count: 44 / +1
Directories: 13 / same
Regular files: 31 / +1
Symbolic links: None / same
Special files: None / same
Hard links: None / same, Multilink files: None / same
```

verify -csv

Scan source and target trees in parallel and compare tree statistics.

```
[root@localhost /]# ./xcp verify -csv 10.61.82.215:/vol/nfsvol 10.61.73.115:/dest_nfs
```

```
Command: verify {'-csv': True}
Paths: ['10.61.82.215:/vol/nfsvol', '10.61.73.115:/dest_nfs']
```

```
Total count: 45 / same
Directories: 13 / same
Regular files: 32 / same
Symbolic links: None / same
Special files: None / same
Hard links: None / same, Multilink files: None / same
```

verify -stats and verify -csv

Scan source and target trees in parallel and compare tree statistics.

```
[root@localhost /]# ./xcp verify -stats -csv 10.61.82.215:/vol/nfsvol 10.61.73.115:/dest_nfs1
```

```
Command: verify {'-csv': True, '-stats': True}
Paths: ['10.61.82.215:/vol/nfsvol', '10.61.73.115:/dest_nfs1']
```

```
Total count: 46 / -1
Directories: 13 / same
Regular files: 33 / -1
Symbolic links: None / same
Special files: None / same
Hard links: None / same, Multilink files: None / same
```

verify -nodata

Do not check data.

```
[root@localhost]# ./xcp verify -nodata 10.61.73.90:/vol/s1 10.61.73.113:/target
```

```
Command: verify {'-nodata': True}
Paths: ['10.61.73.90:/vol/s1', '10.61.73.113:/target']
```

```
104,499 scanned, 100% found (104,463 have data), 100% verified (attrs, mods), 42.7 MiB in (8.63 MiB/s), 18.0 MiB out (3.64 MiB/s), 4s.
```

verify -noattrs

Do not check attributes.

```
[root@localhost]# ./xcp verify -noattrs 10.61.73.90:/vol/s1 10.61.73.113:/target
```

```
Command: verify {'-noattrs': True}
Paths: ['10.61.73.90:/vol/s1', '10.61.73.113:/target']
```

```
51,838 scanned, 37,119 found, 36,686 compared, 36,686 same data, 128 MiB in (25.4 MiB/s), 18.5 MiB out (3.67 MiB/s), 5s
104,499 scanned, 79,576 found, 79,398 compared, 79,398 same data, 259 MiB in (25.8 MiB/s), 39.5 MiB out (4.14 MiB/s), 10s
```

```
104,499 scanned, 100% found (104,463 have data), 104,463 compared, 100% verified (data, mods),
272 MiB in (17.5 MiB/s), 51.6 MiB out (3.33 MiB/s), 15s.verify -nomods
```

Do not check file modification times.

```
[root@localhost]# ./xcp verify -nomods 10.61.73.90:/vol/s1 10.61.73.113:/target

Command: verify {'-nomods': True}
Paths: ['10.61.73.90:/vol/s1', '10.61.73.113:/target']

 50,302 scanned, 36,039 found, 35,601 compared, 35,601 same data, 136 MiB in (27.3 MiB/s), 18.0
MiB out (3.59 MiB/s), 5s
 98,302 scanned, 79,535 found, 79,167 compared, 79,167 same data, 258 MiB in (24.2 MiB/s), 39.4
MiB out (4.30 MiB/s), 10s
104,499 scanned, 100% found (104,463 have data), 104,463 compared, 100% verified (data, attrs),
272 MiB in (17.8 MiB/s), 51.6 MiB out (3.38 MiB/s), 15s.
```

verify -mtimewindow <s>

Acceptable modification time difference for verification.

```
[root@localhost]# ./xcp verify -mtimewindow 2 10.61.73.90:/vol/s1 10.61.73.113:/target

Command: verify {'-mtimewindow': 2.0}
Paths: ['10.61.73.90:/vol/s1', '10.61.73.113:/target']

46,654 scanned, 35,630 found, 35,209 compared, 35,209 same data, 119 MiB in (23.6 MiB/s), 17.7
MiB out (3.51 MiB/s), 5s
 93,310 scanned, 77,426 found, 77,017 compared, 77,017 same data, 256 MiB in (27.4 MiB/s), 38.4
MiB out (4.14 MiB/s), 10s

104,499 scanned, 100% found (104,463 have data), 104,463 compared, 100% verified (data, attrs,
mods), 272 MiB in (17.8 MiB/s), 51.6 MiB out (3.39 MiB/s), 15s.
```

verify -v

Output formats to list any differences found.

```
[root@localhost linux]# ./xcp verify -v 10.61.73.90:/vol/s1 10.61.73.113:/target

Command: verify {'-v': True}
Paths: ['10.61.73.90:/vol/s1', '10.61.73.113:/target']

 47,038 scanned, 36,182 found, 35,619 compared, 35,619 same data, 127 MiB in (25.4 MiB/s), 18.0
MiB out (3.60 MiB/s), 5s
 99,646 scanned, 78,190 found, 77,910 compared, 77,910 same data, 257 MiB in (26.1 MiB/s), 38.8
MiB out (4.16 MiB/s), 10s

104,499 scanned, 100% found (104,463 have data), 104,463 compared, 100% verified (data, attrs,
mods), 272 MiB in (17.2 MiB/s), 51.6 MiB out (3.27 MiB/s), 15s.verify -l
```

Output formats to list any differences found.

```
[root@localhost]# ./xcp verify -l 10.61.73.90:/vol/s1 10.61.73.113:/target

Command: verify {'-l': True}
Paths: ['10.61.73.90:/vol/s1', '10.61.73.113:/target']

 46,654 scanned, 36,636 found, 36,283 compared, 36,283 same data, 165 MiB in (32.2 MiB/s), 18.3
MiB out (3.58 MiB/s), 5s
 88,126 scanned, 77,421 found, 76,822 compared, 76,822 same data, 255 MiB in (17.3 MiB/s), 38.4
MiB out (3.85 MiB/s), 11s
 104,499 scanned, 102,655 found, 102,375 compared, 102,375 same data, 271 MiB in (3.05 MiB/s),
50.7 MiB out (2.36 MiB/s), 16s

104,499 scanned, 100% found (104,463 have data), 104,463 compared, 100% verified (data, attrs,
mods), 272 MiB in (16.5 MiB/s), 51.6 MiB out (3.14 MiB/s), 16s.
```

verify -v and verify -l

Output formats to list any differences found.

```
[root@localhost]# ./xcp verify -v -l 10.61.73.90:/vol/s1 10.61.73.113:/target

Command: verify {'-l': True, '-v': True}
Paths: ['10.61.73.90:/vol/s1', '10.61.73.113:/target']

46,654 scanned, 36,220 found, 35,676 compared, 35,676 same data, 154 MiB in (30.1 MiB/s), 18.1
MiB out (3.54 MiB/s), 5s
88,126 scanned, 76,911 found, 76,710 compared, 76,710 same data, 255 MiB in (18.8 MiB/s), 38.2
MiB out (3.75 MiB/s), 11s
104,499 scanned, 103,331 found, 103,114 compared, 103,114 same data, 271 MiB in (3.17 MiB/s),
51.0 MiB out (2.48 MiB/s), 16s

104,499 scanned, 100% found (104,463 have data), 104,463 compared, 100% verified (data, attrs,
mods), 272 MiB in (16.6 MiB/s), 51.6 MiB out (3.14 MiB/s), 16s.
```

verify -nonames

Do not look up user and group names for file listings or reports.

```
[root@localhost]# ./xcp verify -nonames 10.61.73.90:/vol/s1 10.61.73.113:/target

Command: verify {'-nonames': True}
Paths: ['10.61.73.90:/vol/s1', '10.61.73.113:/target']

46,654 scanned, 36,094 found, 35,624 compared, 35,624 same data, 129 MiB in (25.8 MiB/s), 18.0
MiB out (3.59 MiB/s), 5s
93,310 scanned, 77,589 found, 77,112 compared, 77,112 same data, 256 MiB in (25.2 MiB/s), 38.5
MiB out (4.07 MiB/s), 10s

104,499 scanned, 100% found (104,463 have data), 104,463 compared, 100% verified (data, attrs,
mods), 272 MiB in (17.1 MiB/s), 51.6 MiB out (3.24 MiB/s), 15s.
```

verify -match <filter>

Only process files and directories that match the filter.

```
[root@localhost]# ./xcp verify -match bin 10.61.73.90:/vol/s1 10.61.73.113:/target

Command: verify {'-match': 'bin'}
Paths: ['10.61.73.90:/vol/s1', '10.61.73.113:/target']

46,654 scanned, 41,470 matched, 35,252 found, 34,925 compared, 34,925 same data, 125 MiB in
(24.7 MiB/s), 17.6 MiB out (3.47 MiB/s), 5s
93,310 scanned, 82,942 matched, 77,142 found, 76,714 compared, 76,714 same data, 256 MiB in
(26.1 MiB/s), 38.3 MiB out (4.14 MiB/s), 10s
104,499 scanned, 104,499 matched, 103,794 found, 103,681 compared, 103,681 same data, 271 MiB in
(3.15 MiB/s), 51.3 MiB out (2.59 MiB/s), 15s

104,499 scanned, 104,499 matched, 100% found (104,463 have data), 104,463 compared, 100% verified
(data, attrs, mods), 272 MiB in (17.8 MiB/s), 51.6 MiB out (3.39 MiB/s), 15s.
```

verify -bs <n[k]>

Read/write block size (default: 64k).

```
[root@localhost]# ./xcp verify -bs 32k 10.61.73.90:/vol/s1 10.61.73.113:/target

Command: verify {'-bs': '32k'}
Paths: ['10.61.73.90:/vol/s1', '10.61.73.113:/target']

46,654 scanned, 35,636 found, 35,216 compared, 35,216 same data, 77.8 MiB in (15.6 MiB/s), 17.7
MiB out (3.55 MiB/s), 5s
88,702 scanned, 76,354 found, 76,153 compared, 76,153 same data, 255 MiB in (35.4 MiB/s), 38.4
MiB out (4.14 MiB/s), 10s
104,499 scanned, 104,499 found, 104,463 compared, 104,463 same data, 272 MiB in (3.39 MiB/s),
52.1 MiB out (2.68 MiB/s), 15s

104,499 scanned, 100% found (104,463 have data), 104,463 compared, 100% verified (data, attrs,
mods), 272 MiB in (17.3 MiB/s), 52.1 MiB out (3.31 MiB/s), 15s.
```

verify -dircount <n[k]>

Request size for reading directories (default: 64k).

```
[root@localhost]# ./xcp verify -dircount 32k 10.61.73.90:/vol/s1 10.61.73.113:/target

Command: verify {'-dircount': '32k'}
Paths: ['10.61.73.90:/vol/s1', '10.61.73.113:/target']

 46,654 scanned, 36,044 found, 35,515 compared, 35,515 same data, 131 MiB in (25.9 MiB/s), 17.9
MiB out (3.55 MiB/s), 5s
 98,494 scanned, 78,222 found, 77,844 compared, 77,844 same data, 257 MiB in (25.2 MiB/s), 38.8
MiB out (4.16 MiB/s), 10s

104,499 scanned, 100% found (104,463 have data), 104,463 compared, 100% verified (data, attrs,
mods), 272 MiB in (17.7 MiB/s), 51.6 MiB out (3.36 MiB/s), 15s.
```

verify -parallel <n>

Maximum concurrent batch processes (default: 7).

```
[root@localhost]# ./xcp verify -parallel 2 10.61.73.90:/vol/s1 10.61.73.113:/target

Command: verify {'-parallel': 2}
Paths: ['10.61.73.90:/vol/s1', '10.61.73.113:/target']

 25,918 scanned, 13,944 found, 13,933 compared, 13,933 same data, 212 MiB in (41.9 MiB/s), 7.34
MiB out (1.45 MiB/s), 5s
 46,654 scanned, 31,102 found, 31,101 compared, 31,101 same data, 224 MiB in (2.24 MiB/s), 15.7
MiB out (1.53 MiB/s), 10s
 67,390 scanned, 48,912 found, 48,854 compared, 48,854 same data, 237 MiB in (2.51 MiB/s), 24.4
MiB out (1.73 MiB/s), 15s
 82,942 scanned, 65,654 found, 65,582 compared, 65,582 same data, 248 MiB in (2.09 MiB/s), 32.6
MiB out (1.52 MiB/s), 21s
 98,494 scanned, 84,659 found, 84,577 compared, 84,577 same data, 260 MiB in (2.15 MiB/s), 41.9
MiB out (1.61 MiB/s), 27s
104,499 scanned, 102,315 found, 102,214 compared, 102,214 same data, 271 MiB in (1.75 MiB/s),
50.5 MiB out (1.48 MiB/s), 32s

104,499 scanned, 100% found (104,463 have data), 104,463 compared, 100% verified (data, attrs,
mods), 272 MiB in (8.11 MiB/s), 51.6 MiB out (1.54 MiB/s), 33s.
```

13 Use Cases

This section provides the XCP migration use cases.

How to Transition 7-Mode NFSv3 Storage to Clustered Data ONTAP

This section covers the step-by-step procedure for transitioning a source 7-Mode NFSv3 export to a clustered Data ONTAP system.

Note: NetApp assumes that the source 7-Mode NFSv3 volume is exported and mounted on the client system and that XCP is already installed on a Linux system.

Task Table 3) Transitioning 7-Mode NFSv3 export to clustered Data ONTAP.

✓	Step	Description
	1.	Verify that the target clustered Data ONTAP system is healthy. <pre> CLUSTER::> cluster show Node Health Eligibility ----- CLUSTER-01 true true CLUSTER-02 true true 2 entries were displayed. CLUSTER::> node show Node Health Eligibility Uptime Model Owner Location ----- CLUSTER-01 true true 78 days 21:01 FAS8060 CLUSTER-02 true true 78 days 20:50 FAS8060 2 entries were displayed. CLUSTER::> storage failover show Node Partner Takeover ----- CLUSTER-01 CLUSTER-02 true Connected to CLUSTER-02 CLUSTER-02 CLUSTER-01 true Connected to CLUSTER-01 2 entries were displayed. </pre>
	2.	Verify that at least one non-root aggregate exists on the target system. The aggregate is normal. <pre> CLUSTER::> storage aggregate show Aggregate Size Available Used% State #Vols Nodes RAID Status ----- aggr0 368.4GB 17.85GB 95% online 1 CLUSTER-01 raid_dp, normal aggr0_CLUSTER_02_0 368.4GB 17.85GB 95% online 1 CLUSTER-02 raid_dp, normal source 1.23TB 1.10TB 11% online 6 CLUSTER-01 raid_dp, normal 3 entries were displayed. </pre> Note: If there is no data aggregate, create a new one using the <code>storage aggr create</code> command.
	3.	Create an SVM on the target cluster system. <pre> CLUSTER::> vserver create -vserver dest -rootvolume dest_root -aggregate poc - rootvolume-security-style mixed [Job 647] Job succeeded: Vserver creation completed Verify the security style and language settings of the source </pre> Verify the SVM was created

✓	Step	Description														
		<pre>CLUSTER::> vserver show -vserver dest Vserver: dest Vserver Type: data Vserver Subtype: default Vserver UUID: 91f6d786-0063-11e5-b114-00a09853a969 Root Volume: dest_root Aggregate: poc NIS Domain: - Root Volume Security Style: mixed LDAP Client: - Default Volume Language Code: C.UTF-8 Snapshot Policy: default Comment: Quota Policy: default List of Aggregates Assigned: - Limit on Maximum Number of Volumes allowed: unlimited Vserver Admin State: running Vserver Operational State: running Vserver Operational State Stopped Reason: - Allowed Protocols: nfs, cifs, fcp, iscsi, ndmp Disallowed Protocols: - Is Vserver with Infinite Volume: false QoS Policy Group: - Config Lock: false IPspace Name: Default</pre>														
	4.	Remove the fcp, iscsi, ndmp, and cifs protocols from the target SVM. <pre>CLUSTER::> vserver remove-protocols -vserver dest -protocols fcp,iscsi,ndmp,cifs</pre> Verify nfs is the allowed protocol for this SVM <pre>CLUSTER::> vserver show -vserver dest -fields allowed-protocols vserver allowed-protocols ----- dest nfs</pre>														
	5.	Create a new read-write data volume on the destination SVM. Verify that the security style, language settings, and capacity requirements match the source volume. <pre>CLUSTER::> vol create -vserver dest -volume dest_nfs -aggregate poc -size 150g - type RW -state online -security-style mixed [Job 648] Job succeeded: Successful</pre>														
	6.	Create a data LIF to serve NFS client requests. <pre>CLUSTER::> network interface create -vserver dest -lif dest_lif -address 10.61.73.115 -netmask 255.255.255.0 -role data -data-protocol nfs -home-node CLUSTER-01 -home-port e0l</pre> Verify the LIF is successfully created. <pre>CLUSTER::> network interface show -vserver dest</pre> <table><thead><tr><th>Vserver</th><th>Logical Interface</th><th>Status Admin/Oper</th><th>Network Address/Mask</th><th>Current Node</th><th>Current Port</th><th>Is Home</th></tr></thead><tbody><tr><td>dest</td><td>dest_lif</td><td>up/up</td><td>10.61.73.113/24</td><td>CLUSTER-01</td><td>e0i</td><td>true</td></tr></tbody></table>	Vserver	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Current Port	Is Home	dest	dest_lif	up/up	10.61.73.113/24	CLUSTER-01	e0i	true
Vserver	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Current Port	Is Home										
dest	dest_lif	up/up	10.61.73.113/24	CLUSTER-01	e0i	true										
	7.	Create a static route with the SVM if required <pre>CLUSTER::> network route create -vserver dest -destination 0.0.0.0/0 -gateway 192.168.100.111</pre> Verify the route is created <pre>CLUSTER::> network route show -vserver source</pre> <table><thead><tr><th>Vserver</th><th>Destination</th><th>Gateway</th><th>Metric</th></tr></thead><tbody><tr><td>dest</td><td>0.0.0.0/0</td><td>192.168.100.111</td><td>1</td></tr></tbody></table>	Vserver	Destination	Gateway	Metric	dest	0.0.0.0/0	192.168.100.111	1						
Vserver	Destination	Gateway	Metric													
dest	0.0.0.0/0	192.168.100.111	1													

✓	Step	Description
		<pre>dest 0.0.0.0/0 10.61.73.1 20</pre>
	8.	Mount the target NFS data volume in the SVM namespace. <pre>CLUSTER:> volume mount -vserver dest -volume dest_nfs -junction-path /dest_nfs - active true</pre> Verify the volume is successfully mounted <pre>CLUSTER:> volume show -vserver dest -fields junction-path vserver volume junction-path ----- dest dest_nfs /dest_nfs dest dest_root / 2 entries were displayed.</pre> Note: You can also specify volume mount options (junction path) with the <code>volume create</code> command.
	9.	Start the NFS service on the target SVM. <pre>CLUSTER:> vserver nfs start -vserver dest</pre> Verify the service is started and running <pre>CLUSTER:> vserver nfs status The NFS server is running on Vserver "dest". CLUSTER:> nfs show Vserver: dest General Access: true v3: enabled v4.0: disabled 4.1: disabled UDP: enabled TCP: enabled Default Windows User: - Default Windows Group: -</pre>
	10.	Check that the default NFS export policy is applied to the target SVM. <pre>CLUSTER:> vserver export-policy show -vserver dest Vserver Policy Name ----- dest default</pre>
	11.	If required, create a new custom export policy for the target SVM. <pre>CLUSTER:> vserver export-policy create -vserver dest -policyname xcpexportpolicy</pre> Verify the new custom export-policy is created <pre>CLUSTER:> vserver export-policy show -vserver dest Vserver Policy Name ----- dest default dest xcpexportpolicy 2 entries were displayed.</pre>
	12.	Modify the export policy rules to allow access to NFS client(s). <pre>CLUSTER:> export-policy rule modify -vserver dest -ruleindex 1 -policyname xcpexportpolicy -clientmatch 0.0.0.0/0 -rorule any -rwrule any -anon 0</pre> Verify the policy rules have modified <pre>CLUSTER:> export-policy rule show -instance</pre>

✓	Step	Description																		
		Vserver: dest Policy Name: xcpexportpolicy Rule Index: 1 Access Protocol: nfs3 Client Match Hostname, IP Address, Netgroup, or Domain: 0.0.0.0/0 RO Access Rule: none RW Access Rule: none User ID To Which Anonymous Users Are Mapped: 65534 Superuser Security Types: none Honor SetUID Bits in SETATTR: true Allow Creation of Devices: true																		
	13.	Verify that the client is allowed access to the volume. CLUSTER::> export-policy check-access -vserver dest -volume dest_nfs -client-ip 10.61.82.215 -authentication-method none -protocol nfs3 -access-type read-write <table><thead><tr><th>Path</th><th>Policy</th><th>Owner</th><th>Policy Owner Type</th><th>Rule Index</th><th>Access</th></tr></thead><tbody><tr><td>/</td><td>xcpexportpolicy</td><td>dest_root</td><td>volume</td><td>1</td><td>read</td></tr><tr><td>/dest_nfs</td><td>xcpexportpolicy</td><td>dest_nfs</td><td>volume</td><td>1</td><td>read-write</td></tr></tbody></table> 2 entries were displayed.	Path	Policy	Owner	Policy Owner Type	Rule Index	Access	/	xcpexportpolicy	dest_root	volume	1	read	/dest_nfs	xcpexportpolicy	dest_nfs	volume	1	read-write
Path	Policy	Owner	Policy Owner Type	Rule Index	Access															
/	xcpexportpolicy	dest_root	volume	1	read															
/dest_nfs	xcpexportpolicy	dest_nfs	volume	1	read-write															
	14.	Connect to the Linux NFS server. Create a mount point for the NFS exported volume. [root@localhost /]# cd /mnt [root@localhost mnt]# mkdir dest																		
	15.	Mount the target NFSv3 exported volume at this mount point. Note: The NFSv3 volumes should be exported but not necessarily be mounted by the NFS server. The XCP Linux host client mounts these volumes if they can be mounted. [root@localhost mnt]# mount -t nfs 10.61.73.115:/dest_nfs /mnt/dest Verify the mount point is successfully created. [root@localhost /]# mount grep nfs 10.61.73.115:/dest_nfs on /mnt/dest type nfs (rw,relatime,vers=3,rsize=65536,wsiz=65536,namlen=255,hard,proto=tcp,timeo=600,ret rans=2,sec=sys,mountaddr=10.61.82.215,mountvers=3,mountport=4046,mountproto=udp,loc al_lock=none,addr=10.61.73.115)																		
	16.	Create a test file on the NFS exported mount point to enable read-write access. [root@localhost dest]# touch test.txt Verify the file is created [root@localhost dest]# ls -l total 0 -rw-r--r-- 1 root bin 0 Jun 2 03:16 test.txt Note: Once the read-write test is complete, delete the file from the target NFS mount point.																		
	17.	Connect to the Linux client system in which XCP is installed. Browse to the XCP install path. [root@localhost ~]# cd /xcp-1.0/linux/ [root@localhost linux]#																		
	18.	Query the source 7-Mode NFSv3 exports by running the xcp show command on the XCP Linux client host system. [root@localhost]# ./xcp show 10.61.82.215 Command: show Paths: ['10.61.82.215']																		

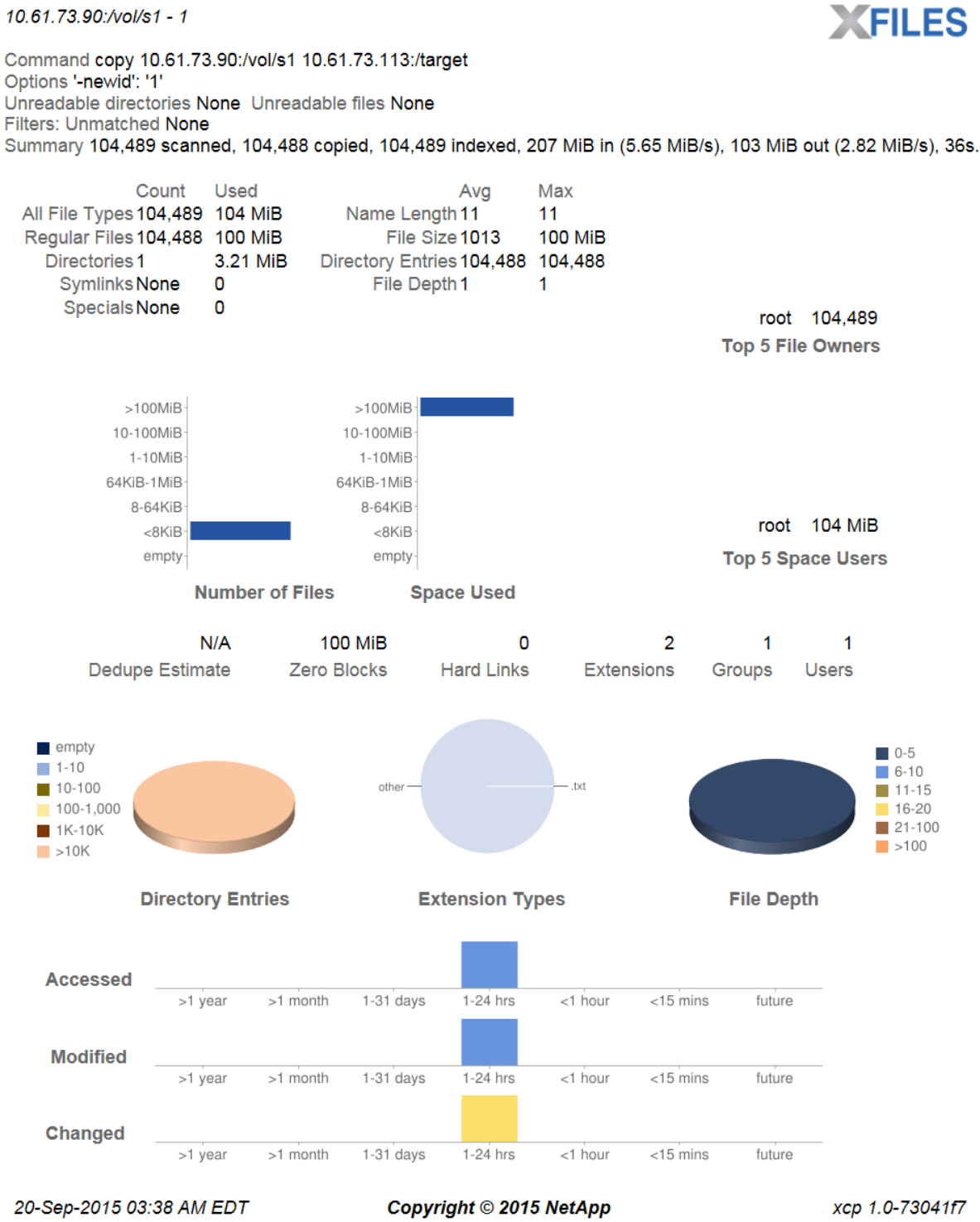
✓	Step	Description
		<pre> == NFS Exports == Mounts Errors Server 4 0 10.61.82.215 Space Files Space Files Free Free Used Used Export 23.7 GiB 778,134 356 KiB 96 10.61.82.215:/vol/nfsvol1 17.5 GiB 622,463 1.46 GiB 117 10.61.82.215:/vol/nfsvol 328 GiB 10.8M 2.86 GiB 7,904 10.61.82.215:/vol/vol0/home 328 GiB 10.8M 2.86 GiB 7,904 10.61.82.215:/vol/vol0 == Attributes of NFS Exports == drwxr-xr-x --- root wheel 4KiB 4KiB 2d21h 10.61.82.215:/vol/nfsvol1 drwxr-xr-x --- root wheel 4KiB 4KiB 2d21h 10.61.82.215:/vol/nfsvol drwxrwxrwx --t root wheel 4KiB 4KiB 9d22h 10.61.82.215:/vol/vol0/home drwxr-xr-x --- root wheel 4KiB 4KiB 4d0h 10.61.82.215:/vol/vol0 3.89 KiB in (5.70 KiB/s), 7.96 KiB out (11.7 KiB/s), 0s. </pre>
	19.	Scan the source NFSv3 exported paths and print the statistics of their file structure. Note: NetApp recommends putting the source NFSv3 exports in read-only mode during <code>xcp scan</code>, <code>xcp copy</code>, and <code>xcp sync</code> operations. <pre> [root@localhost /]# ./xcp scan 10.61.82.215:/vol/nfsvol Command: scan Paths: ['10.61.82.215:/vol/nfsvol'] nfsvol nfsvol/n5000-uk9.5.2.1.N1.1.bin nfsvol/821_q_image.tgz nfsvol/822RC2_q_image.tgz nfsvol/NX5010_12_node_RCF_v1.3.txt nfsvol/n5000-uk9-kickstart.5.2.1.N1.1.bin nfsvol/NetApp_CN1610_1.1.0.5.stk nfsvol/glibc-common-2.7-2.x86_64.rpm nfsvol/glibc-2.7-2.x86_64.rpm nfsvol/rhel-server-5.6-x86_64-dvd.iso.filepart nfsvol/xcp nfsvol/xcp_source nfsvol/catalog 23 scanned, 7.79 KiB in (5.52 KiB/s), 1.51 KiB out (1.07 KiB/s), 1s. </pre>
	20.	Copy source 7-Mode NFSv3 exports to NFSv3 exports on the target clustered Data ONTAP system. <pre> [root@localhost /]# ./xcp copy 10.61.82.215:/vol/nfsvol 10.61.73.115:/dest_nfs Command: copy Paths: ['10.61.82.215:/vol/nfsvol', '10.61.73.115:/dest_nfs'] 44 scanned, 39 copied, 264 MiB in (51.9 MiB/s), 262 MiB out (51.5 MiB/s), 5s 44 scanned, 39 copied, 481 MiB in (43.3 MiB/s), 479 MiB out (43.4 MiB/s), 10s 44 scanned, 40 copied, 748 MiB in (51.2 MiB/s), 747 MiB out (51.3 MiB/s), 16s 44 scanned, 40 copied, 1.00 GiB in (55.9 MiB/s), 1.00 GiB out (55.9 MiB/s), 21s 44 scanned, 40 copied, 1.21 GiB in (42.8 MiB/s), 1.21 GiB out (42.8 MiB/s), 26s Sending statistics... 44 scanned, 43 copied, 1.46 GiB in (47.6 MiB/s), 1.45 GiB out (47.6 MiB/s), 31s. </pre>
	21.	After copy is finished, verify that source and destination NFSv3 exports have identical data. Run the <code>xcp verify</code> command. <pre> [root@localhost /]# ./xcp verify 10.61.82.215:/vol/nfsvol 10.61.73.115:/dest_nfs Command: verify Paths: ['10.61.82.215:/vol/nfsvol', '10.61.73.115:/dest_nfs'] 44 scanned, 44 found, 28 compared, 27 same data, 2.41 GiB in (98.4 MiB/s), 6.25 MiB out (255 KiB/s), 26s </pre>

✓	Step	Description
		44 scanned, 44 found, 30 compared, 29 same data, 2.88 GiB in (96.4 MiB/s), 7.46 MiB out (249 KiB/s), 31s 44 scanned, 100% found (43 have data), 43 compared, 100% verified (data, attrs, mods), 2.90 GiB in (92.6 MiB/s), 7.53 MiB out (240 KiB/s), 32s. Note: If <code>verify</code> finds differences between source and destination data, then the error no such file or directory is reported in the summary. To fix that issue, run the <code>xcp sync</code> command to copy the source changes to the destination.
	22.	Before and during the cutover, run <code>verify</code> again. If the source has new or updated data, then perform incremental updates. Run the <code>xcp sync</code> command. Note: For this operation, the previous copy index name or number is required. <pre>[root@localhost /]# ./xcp sync -id 3</pre> Command: sync {'-id': '3'} Paths: [] Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs1'} 64 reviewed, 64 checked at source, 6 changes, 6 modifications, 51.7 KiB in (62.5 KiB/s), 22.7 KiB out (27.5 KiB/s), 0s. xcp: sync '3': Starting search pass for 1 modified directory... xcp: sync '3': Found 6 indexed files in the 1 changed directory xcp: sync '3': Rereading the 1 modified directory to find what's new... xcp: sync '3': Deep scanning the 1 directory that changed... 11 scanned, 11 copied, 12.6 KiB in (6.19 KiB/s), 9.50 KiB out (4.66 KiB/s), 2s.
	23.	To resume a previously interrupted copy operation, run the <code>xcp resume</code> command. <pre>[root@localhost /]# ./xcp resume -id 4</pre> Command: resume {'-id': '4'} Paths: [] Index: {source: '10.61.82.215:/vol/nfsvol', target: '10.61.73.115:/dest_nfs7'} xcp: resume '4': WARNING: Incomplete index. xcp: resume '4': Found 18 completed directories and 1 in progress 106 reviewed, 24.2 KiB in (30.3 KiB/s), 7.23 KiB out (9.06 KiB/s), 0s. xcp: resume '4': Starting second pass for the in-progress directory... xcp: resume '4': Found 3 indexed directories and 0 indexed files in the 1 in-progress directory xcp: resume '4': In progress dirs: unindexed 1, indexed 0 xcp: resume '4': Resuming the 1 in-progress directory... 20 scanned, 7 copied, 205 MiB in (39.6 MiB/s), 205 MiB out (39.6 MiB/s), 5s 20 scanned, 14 copied, 425 MiB in (42.1 MiB/s), 423 MiB out (41.8 MiB/s), 11s 20 scanned, 14 copied, 540 MiB in (23.0 MiB/s), 538 MiB out (23.0 MiB/s), 16s 20 scanned, 14 copied, 721 MiB in (35.6 MiB/s), 720 MiB out (35.6 MiB/s), 21s 20 scanned, 15 copied, 835 MiB in (22.7 MiB/s), 833 MiB out (22.7 MiB/s), 26s 20 scanned, 16 copied, 1007 MiB in (34.3 MiB/s), 1005 MiB out (34.3 MiB/s), 31s 20 scanned, 17 copied, 1.15 GiB in (33.9 MiB/s), 1.15 GiB out (33.9 MiB/s), 36s 20 scanned, 17 copied, 1.27 GiB in (25.5 MiB/s), 1.27 GiB out (25.5 MiB/s), 41s 20 scanned, 17 copied, 1.45 GiB in (36.1 MiB/s), 1.45 GiB out (36.1 MiB/s), 46s 20 scanned, 17 copied, 1.69 GiB in (48.7 MiB/s), 1.69 GiB out (48.7 MiB/s), 51s Sending statistics... 20 scanned, 20 copied, 21 indexed, 1.77 GiB in (33.5 MiB/s), 1.77 GiB out (33.4 MiB/s), 54s. Note: After <code>resume</code> finishes copying files, run <code>verify</code> again so that the source and destination storage have identical data.
	24.	The NFSv3 client host needs to unmount the source NFSv3 exports provisioned from the 7-Mode storage and mounts the target NFSv3 exports from clustered Data ONTAP. Cutover requires an outage.

14 Appendix

Sample XCP Reports

XCP is a powerful tool. This tool can generate .csv and .html reports for scoping migration projects. Sample .html and .csv reports are shown below.



Troubleshooting XCP Errors

XCP Error	Cause	Solution
-bash: ./xcp: Permission denied		Modify permissions using the <code>chmod 755</code> command.
xcp: ERROR: This license has expired	This error occurs if the free 90-day XCP evaluation license expired.	Renew or obtain the new XCP license from http://xcp.netapp.com .
This copy is not licensed	XCP license is not activated.	Obtain the appropriate XCP license file. Copy the XCP license to the <code>/opt/NetApp/xFiles/xcp/</code> directory on the XCP server. Run the <code>xcp activate</code> command to activate the license.
xcp: ERROR: XCP not activated, run 'activate' first	XCP license is not activated.	Download the XCP license from http://xcp.netapp.com . Copy the file on the XCP Linux client host at <code>/opt/NetApp/xFiles/xcp/</code> on the XCP server. Run the <code>xcp activate</code> command to activate the license.
xcp: ERROR: License file <code>/opt/NetApp/xFiles/xcp/license</code> not found	License file not found at <code>/opt/NetApp/xFiles/xcp/license</code> .	Register for the XCP license at http://xcp.netapp.com . Download and copy the license file to <code>/opt/NetApp/xFiles/xcp/license</code> on the XCP Linux client host.
xcp: ERROR: Failed to activate license: Server unreachable		
xcp usage error: show: requires at least one server	Incomplete parameter specified for the <code>xcp show</code> command.	Rerun the command with server name or IP address specified. Correct syntax <code>./xcp show abc.nfsserver.com</code> .
xcp: ERROR: show '10.61.73.94:/vol/nfsvol1': invalid hostname	Valid host name was not specified for the <code>xcp show</code> command.	Run the <code>./xcp show</code> command with the valid host name. Exact command syntax <code>./xcp show 10.61.73.94</code> or <code>./xcp show localhost</code> .
xcp usage error: scan: missing source path	Incomplete parameters specified for the <code>xcp scan</code> command.	To resolve this error, run the <code>xcp scan</code> command with the complete source NFSv3 export path. Correct syntax <code>xcp scan <source NFS export path></code> .

XCP Error	Cause	Solution
xcp usage error: scan: invalid path '10.61.73.94'	Incomplete parameter specified for the <code>xcp scan</code> command.	Run the same command again by specifying the complete NFSv3 source export path.
xcp: ERROR: Catalog inaccessible: Cannot mount nfs_server:/export[:subdirectory]	Catalog path is not specified in the <code>xcp.ini</code> configuration file.	Open the editor on the XCP Linux client host and update the configuration file with the proper catalog location. The XCP config file is located at <code>/opt/NetApp/xFiles/xcp/xcp.ini</code>. Sample entries of config file. <pre>[root@localhost linux]# cat /opt/NetApp/xFiles/xcp/xcp.ini # Sample xcp config [xcp] catalog = 10.61.73.94:/vol/nfsvol1</pre>
xcp: compare1 'n.txt': ERROR: nfs3 LOOKUP 'n.txt' in '10.61.73.113:/target': nfs3 error 2: no such file or directory	Verify operation did not find the source file(s) on the target NFS export.	Run the <code>xcp sync</code> command to copy the incremental updates from source to destination.
xcp: ERROR: Failed to open catalog id '3': nfs3 LOOKUP '3' in '10.61.73.94:/vol/nfsvol1/catalog/indexes': nfs3 error 2: no such file or directory	XCP could not locate the specified catalog index number.	Verify the index number of the previous operation. To determine the exact catalog path, run the <code>cat /opt/NetApp/xFiles/xcp/xcp.ini</code> command. Catalog indexes are located in the <code><catalog path>:/catalog/indexes</code> directory. After locating the index number, run the same command again by specifying the correct index number or name.

XCP Error	Cause	Solution
xcp: ERROR: Empty or invalid index '10.61.73.94:/vol/nfsvol1/catalog/ indexes/2/2.index'	Previous copy operation was interrupted before indexing the files.	Run the <code>xcp copy</code> operation again by specifying the <code>-newid</code> option. Interrupt the <code>copy</code> operation when you see the message "indexed on console session." 88,126 scanned, 42,058 copied, 41,469 indexed, 150MiB in (3.60 MiBps), 41.9MiB out (2.88MiBps), 16s

Support

If you have suggestions, technical queries, feedback, or product feature enhancements, send your comments to ng-xcp-support@netapp.com.

Copyright © 1994–2016 NetApp, Inc. All rights reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice.

NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

Trademark Information

NetApp, the NetApp logo, Go Further, Faster, AltaVault, ASUP, AutoSupport, Campaign Express, Cloud ONTAP, Clustered Data ONTAP, Customer Fitness, Data ONTAP, DataMotion, Fitness, Flash Accel, Flash Cache, Flash Pool, FlashRay, FlexArray, FlexCache, FlexClone, FlexPod, FlexScale, FlexShare, FlexVol, FPolicy, GetSuccessful, LockVault, Manage ONTAP, Mars, MetroCluster, MultiStore, NetApp Insight, OnCommand, ONTAP, ONTAPI, RAID DP, RAID-TEC, SANtricity, SecureShare, Simplicity, Simulate ONTAP, SnapCenter, Snap Creator, SnapCopy, SnapDrive, SnapIntegrator, SnapLock, SnapManager, SnapMirror, SnapMover, SnapProtect, SnapRestore, Snapshot, SnapValidator, SnapVault, StorageGRID, Tech OnTap, Unbound Cloud, WAFL, and other names are trademarks or registered trademarks of NetApp Inc., in the United States and/or other countries. All other brands or products are trademarks or registered trademarks of their respective holders and should be treated as such. A current list of NetApp trademarks is available on the web at <http://www.netapp.com/us/legal/netapptmlist.aspx>.