客戶案例

NetApp Solutions

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目錄

客戶案例

總覽

本節說明客戶案例及其架構。

資料湖到ONTAP SFC NFS

此使用案例是以我們所做的最大財務客戶概念驗證（CPOC）為基礎。過去、我們使用NetApp就地分析模組（NIPAM）將分析資料移至NetApp ONTAP AI。然而、由於NetApp XCP最近的增強功能與改善效能、以及獨特的NetApp資料移轉解決方案方法、我們使用NetApp XCP重新執行資料移轉。

客戶的挑戰與要求

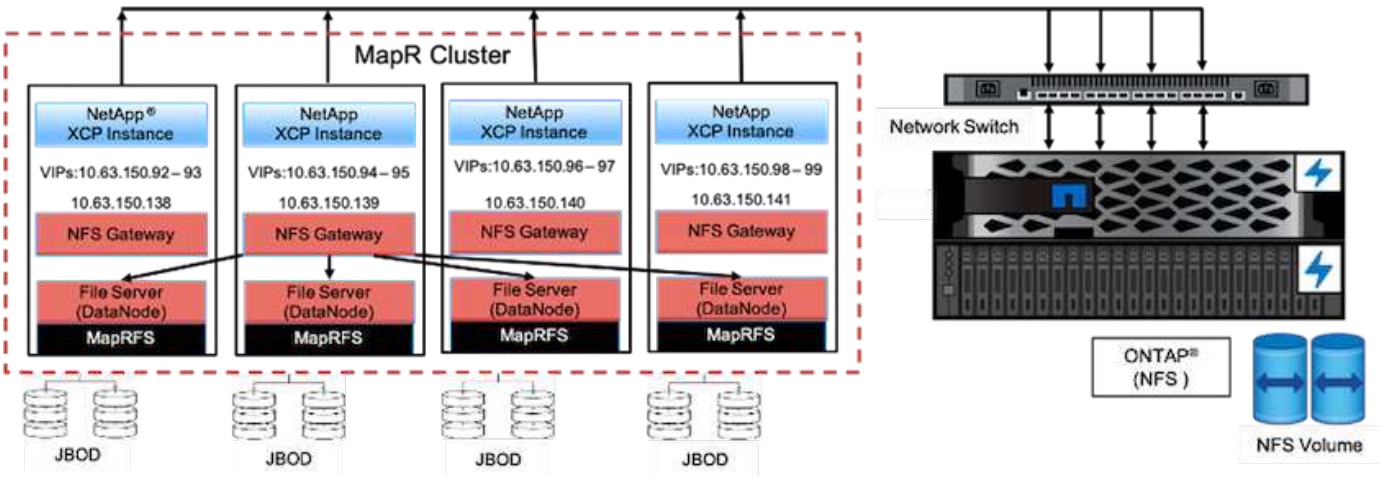
值得注意的客戶挑戰與要求包括：

- 客戶擁有不同類型的資料、包括結構化、非結構化及半結構化的資料、記錄、 以及資料湖中的機器對機器資料。AI系統需要所有這些類型的資料才能進行預測作業。當資料位於資料湖原生檔案系統中時、很難處理。
- 客戶的AI架構無法從Hadoop分散式檔案系統（HDFS）和Hadoop相容檔案系統（HCFS）存取資料、因此資料無法用於AI作業。AI要求資料採用可理解的檔案系統格式、例如NFS。
- 由於資料量大且處理量高、因此需要執行一些特殊程序來從資料湖移轉資料、因此必須採用具成本效益的方法、才能將資料移至AI系統。

資料移動機解決方案

在此解決方案中、MapR檔案系統（MapR-FS）是從MapR叢集中的本機磁碟建立。每個資料節點上的MapR NFS閘道都會設定虛擬IP。檔案伺服器服務會儲存及管理MapR-FS資料。NFS閘道可讓您透過虛擬IP從NFS用戶端存取Map-FS資料。每個MapR資料節點上都會執行XCP執行個體、以將資料從Map NFS閘道傳輸至NetApp ONTAP RsinNFS。每個XCP執行個體都會將一組特定的來源資料夾傳輸到目的地位置。

下圖說明使用XCP之MapR叢集的NetApp資料移動機解決方案。



如需詳細的客戶使用案例、錄製的示範和測試結果、請參閱 "使用XCP將資料從資料湖和高效能運算移至ONTAP支援NFS" 部落格：

如需ONTAP 使用NetApp XCP將MapR-FS資料移至Rse-NFS的詳細步驟、請參閱中的附錄B "TR-4732：Big Data Analytics Data to Artificial Intelligence"。

將高效能運算技術整ONTAP 合至VMware NFS

此使用案例是根據現場組織的要求而設計。部分NetApp客戶的資料位於高效能運算環境中、可針對訓練模式提供資料分析、讓研究組織深入瞭解並瞭解大量的數位資料。NetApp現場工程師需要詳細的程序、才能從IBM的GPFS擷取資料至NFS。我們使用NetApp XCP將資料從GPFS移轉至NFS、以便GPU處理資料。AI通常會處理來自網路檔案系統的資料。

如需ONTAP 有關高效能運算至Suse NFS的使用案例、錄製的示範和測試結果的詳細資訊、請參閱 "使用XCP將資料從資料湖和高效能運算移至ONTAP 支援NFS" 部落格：

如需ONTAP 使用NetApp XCP將MapR-FS資料移至Rse-NFS的詳細步驟、請參閱附錄A：GPFS移至NFS—中的詳細步驟 "TR-4732：Big Data Analytics Data to Artificial Intelligence"。

使用XCP Data Mover將數百萬個小型檔案移轉至彈性儲存設備

此使用案例是以最大的NetApp旅遊業客戶為基礎、用於內部部署至雲端資料移轉。由於COVID-19降低了旅遊業的需求、因此客戶想要在內部部署環境中為需求定價應用程式節省高階儲存設備的資本支出。這家客戶擁有緊密的SLA、可將數百萬個小型檔案移轉至雲端。

下圖說明Azure NetApp Files 小型檔案從內部部署移轉至原地的資料。

如需詳細資訊、請參閱 "NetApp XCP Data Mover解決方案：從內部部署到雲端" 部落格：

使用XCP Data Mover移轉大型檔案

此使用案例是以電視網路客戶為基礎。客戶想要將Oracle Recovery Manager（RMAN）備份檔案移轉至雲端、並使用Azure NetApp Files 含心臟起搏器軟體的功能、執行Oracle E-Business Suite（EBS）應用程式。客戶也想要將資料庫備份檔案移轉至隨需雲端儲存設備、並將大型檔案（每個範圍25 GB至50 GB）傳輸至Azure。

下圖說明Azure NetApp Files 大型檔案從內部部署移轉至原地的資料。

如需詳細資訊、請參閱 "NetApp XCP Data Mover解決方案：從內部部署到雲端" 部落格：

重複的檔案

NetApp收到從單一磁碟區或多個磁碟區尋找重複檔案的要求。NetApp提供下列解決方案：

對於單一Volume、請執行下列命令：

```
[root@mastr-51 linux]# ./xcp -md5 -match 'type==f and nlinks==1 and size
!= 0' 10.63.150.213:/common_volume/nfsconnector_hw_cert/ | sort | uniq -cd
--check-chars=32
XCP 1.5; (c) 2020 NetApp, Inc.; Licensed to Calin Salagean [NetApp Inc]
until Mon Dec 31 00:00:00 2029

176,380 scanned, 138,116 matched, 138,115 summed, 10 giants, 61.1 GiB in
(763 MiB/s), 172 MiB out (2.57 MiB/s), 1m5s

Filtered: 38264 did not match
176,380 scanned, 138,116 matched, 138,116 summed, 10 giants, 62.1 GiB in
(918 MiB/s), 174 MiB out (2.51 MiB/s), 1m9s.
      3 00004964ca155eca1a71d0949c82e37e
nfsconnector_hw_cert/grid_01082017_174316/0/hadoopqe/accumulo/shell/pom.xm
l
      2 000103fbed06d8071410c59047738389
nfsconnector_hw_cert/usr_hdp/2.5.3.0-37/hive2/doc/examples/files/dim-
data.txt
      2 000131053a46d67557d27bb678d5d4a1
nfsconnector_hw_cert/grid_01082017_174316/0/log/cluster/mahout_1/artifacts
/classifier/20news_reduceddata/20news-bydate-test/alt.atheism/53265
```

對於多個磁碟區、請執行下列命令：

```
[root@mastr-51 linux]# cat multiplevolume_duplicate.sh
#! /usr/bin/bash

#user input
JUNCTION_PATHS='/nc_volume1 /nc_volume2 /nc_volume3 /oplogarchivevolume'
NFS_DATA_LIF='10.63.150.213'

#xcp operation
for i in $JUNCTION_PATHS
do
echo "start - $i" >> /tmp/duplicate_results
/usr/src/xcp/linux/xcp -md5 -match 'type==f and nlinks==1 and size != 0'
${NFS_DATA_LIF}:$i | sort | uniq -cd --check-chars=32 | tee -a
/tmp/duplicate_results
echo "end - $i" >> /tmp/duplicate_results
done

[root@mastr-51 linux]# nohup bash +x multiplevolume_duplicate.sh &
[root@mastr-51 linux]#  cat /tmp/duplicate_results
```

資料的特定日期型掃描與複本

此解決方案是以需要根據特定日期複製資料的客戶為基礎。確認下列詳細資料：

```
Created a file in Y: and checked the scan command to list them.

c:\XCP>dir Y:\karthik_test
 Volume in drive Y is from
 Volume Serial Number is 80F1-E201

 Directory of Y:\karthik_test

05/26/2020  02:51 PM    <DIR>          .
05/26/2020  02:50 PM    <DIR>          ..
05/26/2020  02:51 PM             2,295 testfile.txt
               1 File(s)          2,295 bytes
               2 Dir(s)     658,747,392 bytes free

c:\XCP>

c:\XCP>xcp scan -match "strftime(ctime,'%Y-%m-%d')>'2020-05-01'" -fmt
"'{},{}'.format(iso(mtime),name)" Y:\
XCP SMB 1.6; (c) 2020 NetApp, Inc.; Licensed to Calin Salagean [NetApp
Inc] until Mon Dec 31 00:00:00 2029
```

```
It appears that you are not running XCP as Administrator. To avoid access
issues please run XCP as Administrator.

2020-05-26_14:51:13.132465,testfile.txt
2020-05-26_14:51:00.074216,karthik_test

xcp scan -match strftime(ctime,'%Y-%m-%d')>'2020-05-01' -fmt
'{},{}'.format(iso(mtime),name) Y:\ : PASSED
30,205 scanned, 2 matched, 0 errors
Total Time : 4s
STATUS : PASSED

Copy the files based on date (2020 YearMay month first date)  from Y:  to
Z:
c:\XCP>xcp copy -match "strftime(ctime,'%Y-%m-%d')>'2020-05-01'" Y:
Z:\dest_karthik
XCP SMB 1.6; (c) 2020 NetApp, Inc.; Licensed to Calin Salagean [NetApp
Inc] until Mon Dec 31 00:00:00 2029

It appears that you are not running XCP as Administrator. To avoid access
issues please run XCP as Administrator.

30,205 scanned, 3 matched, 0 copied, 0 errors, 5s
xcp copy -match strftime(ctime,'%Y-%m-%d')>'2020-05-01' Y: Z:\dest_karthik
: PASSED
30,205 scanned, 3 matched, 2 copied, 0 errors
Total Time : 6s
STATUS : PASSED

c:\XCP>

Check the destination Z:

c:\XCP>dir Z:\dest_karthik\karthik_test
 Volume in drive Z is to
 Volume Serial Number is 80F1-E202

 Directory of Z:\dest_karthik\karthik_test

05/26/2020  02:51 PM    <DIR>          .
05/26/2020  02:50 PM    <DIR>          ..
05/26/2020  02:51 PM             2,295 testfile.txt
               1 File(s)          2,295 bytes
               2 Dir(s)     659,316,736 bytes free
```

```
c:\XCP>
```

從SMB/CIFS共用區建立CSV檔案

下列命令會以CSV格式傾印資料。您可以加總「大小」欄、以取得資料的總大小。

```
xcp scan -match "((now-x.atime) / 3600) > 31*day" -fmt "'{}, {}, {},
{}'.format(relpath, name, strftime(x.atime, '%y-%m-%d-%H:%M:%S'),
humanize_size(size))" -preserve-atime  >file.csv
```

輸出應類似於以下範例：

```
erase\report_av_fp_cdot_crosstab.csvreport_av_fp_cdot_crosstab.csv20-01-
29-10:26:2449.6MiB
```

若要掃描三個子目錄的深度並依排序順序提供結果、請執行「XCP -du」命令、並將每個目錄層級的大小傾印至三個子目錄的深度。

```
./xcp  scan -du -depth 3 NFS_Server_IP:/source_vol
```

若要排序、請將資訊傾印至CSV檔案、然後排序資訊。

```
xcp scan -match “type == d” -depth 3 -fmt "'{}, {}, {}, {}'.format(name,
relpath, size)" NFS_Server_IP:/share > directory_report.csv
```

這是使用「-fmt」命令的自訂報告。它會掃描所有目錄、並將目錄的名稱、路徑和大小傾印到CSV檔案中。您可以從試算表應用程式排序「大小」欄。

資料從7-Mode移轉至ONTAP VMware

本節提供將Data ONTAP 資料從以7-Mode運作的NetApp功能移轉至ONTAP VMware的詳細步驟。

將7-Mode NFSv3儲存設備轉換為ONTAP 適用於NFS資料的功能

本節提供下表中的逐步程序、可將來源7-Mode NFSv3匯出移轉至ONTAP VMware系統。

NetApp假設來源7-Mode NFSv3 Volume已匯出並掛載到用戶端系統、而且XCP已安裝在Linux系統上。

1. 驗證目標ONTAP 系統是否健全。

```
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              RTP
CLUSTER-02
          true   true        78 days 20:50 FAS8060              RTP
2 entries were displayed.
CLUSTER::> storage failover show
                              Takeover
Node           Partner        Possible State Description
-------------- -------------- --------
-------------------------------------
CLUSTER-01     CLUSTER-02     true     Connected to CLUSTER-02
CLUSTER-02     CLUSTER-01     true     Connected to CLUSTER-01
2 entries were displayed.
```

2. 確認目標系統上至少存在一個非根Aggregate。Aggregate是正常的。

```
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.
```

如果沒有資料Aggregate、請使用「shorage aggr create」命令建立新的集合體。

3. 在目標叢集系統上建立儲存虛擬機器（SVM）。

```
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

Verify that the SVM was successfully created.
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
```

4. 從目標SVM移除FCP、iSCSI、NDMP及CIDS傳輸協定。

```
CLUSTER::> vserver remove-protocols -vserver dest -protocols
fcp,iscsi,ndmp,cifs
```

確認NFS是此SVM允許的傳輸協定。

```
CLUSTER::> vserver show -vserver dest -fields allowed-protocols
vserver allowed-protocols
------- -----------------
dest    nfs
```

5. 在目的地SVM上建立新的讀寫資料磁碟區。確認安全樣式、語言設定和容量需求符合來源Volume。

```
CLUSTER::> vol create -vserver dest -volume dest_nfs -aggregate poc
-size 150g -type RW -state online -security-style mixed
[Job 648] Job succeeded: Successful
```

6. 建立資料LIF以處理NFS用戶端要求。

```
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
```

確認LIF已成功建立。

```
CLUSTER::> network interface show -vserver dest
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
dest
            dest_lif
                         up/up    10.61.73.113/24    CLUSTER-01    e0i
true
```

7. 視需要使用SVM建立靜態路由。

```
CLUSTER::> network route create -vserver dest -destination 0.0.0.0/0
-gateway 192.168.100.111
```

確認路由已成功建立。

```
CLUSTER::> network route show -vserver source
Vserver             Destination     Gateway         Metric
------------------- --------------- --------------- ------
dest
                    0.0.0.0/0       10.61.73.1      20
```

8. 在SVM命名空間中掛載目標NFS資料磁碟區。

```
CLUSTER::> volume mount -vserver dest -volume dest_nfs -junction-path
/dest_nfs -active true
```

確認磁碟區已成功掛載。

```
CLUSTER::> volume show -vserver dest -fields junction-path
vserver volume   junction-path
------- -------- -------------
dest    dest_nfs /dest_nfs
dest    dest_root
                 /
2 entries were displayed.
```

您也可以使用「volume create」命令來指定Volume掛載選項（交會路徑）。

9. 在目標SVM上啟動NFS服務。

```
CLUSTER::> vserver nfs start -vserver dest
```

確認服務已啟動並正在執行。

```
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:  -
```

10. 確認預設的NFS匯出原則已套用至目標SVM。

```
CLUSTER::> vserver export-policy show -vserver dest
Vserver          Policy Name
---------------  -------------------
dest             default
```

11. 如有需要、請為目標SVM建立新的自訂匯出原則。

```
CLUSTER::> vserver export-policy create -vserver dest -policyname
xcpexportpolicy
```

確認已成功建立新的自訂匯出原則。

```
CLUSTER::> vserver export-policy show -vserver dest
Vserver          Policy Name
---------------  -------------------
dest             default
dest             xcpexportpolicy
2 entries were displayed.
```

12. 修改匯出原則規則、以允許存取NFS用戶端。

```
CLUSTER::> export-policy rule modify -vserver dest -ruleindex 1
-policyname xcpexportpolicy -clientmatch 0.0.0.0/0 -rorule any -rwrule
any -anon 0
Verify the policy rules have modified
CLUSTER::> export-policy rule show -instance
                                  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. 驗證是否允許用戶端存取磁碟區。

```
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
                                          Policy    Policy       Rule
Path                          Policy      Owner     Owner Type  Index
Access
----------------------------- ---------- --------- ---------- ------
----------
/                             xcpexportpolicy
                                          dest_root volume          1
read
/dest_nfs                     xcpexportpolicy
                                          dest_nfs  volume          1
read-write
2 entries were displayed.
```

14. 連線至Linux NFS伺服器。為NFS匯出的Volume建立掛載點。

```
[root@localhost /]# cd /mnt
[root@localhost mnt]# mkdir dest
```

15. 在此掛載點掛載目標NFSv3匯出的Volume。

> NFSv3磁碟區應匯出、但不一定要由NFS伺服器掛載。如果可以掛載、XCP Linux主機用戶端就會掛載這些磁碟區。

```
[root@localhost mnt]# mount -t nfs 10.61.73.115:/dest_nfs /mnt/dest
```

確認已成功建立掛載點。

```
[root@ localhost /]# mount | grep nfs
10.61.73.115:/dest_nfs on /mnt/dest type nfs
(rw,relatime,vers=3,rsize=65536,wsize=65536,namlen=255,hard,proto=tcp,ti
meo=600,retrans=2,sec=sys,mountaddr=10.61.82.215,mountvers=3,mountport=4
046,mountproto=udp,local_lock=none,addr=10.61.73.115)
```

16. 在NFS匯出的掛載點上建立測試檔案、以啟用讀寫存取。

```
[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
```

讀寫測試完成後、請從目標NFS掛載點刪除檔案。

17. 連線至安裝XCP的Linux用戶端系統。瀏覽至XCP安裝路徑。

```
[root@localhost ~]# cd /linux/
[root@localhost linux]#
```

18. 在XCP Linux用戶端主機系統上執行「XCP show」命令、查詢來源7-Mode NFSv3匯出。

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

19. 掃描來源NFSv3匯出路徑、並列印其檔案結構的統計資料。

NetApp建議在XCP「shcan」、「copy」和「sh同步」作業期間、將來源NFSv3匯出設定為唯讀模式。

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

20. 將來源7-Mode NFSv3匯出複製到目標ONTAP 系統上的NFSv3匯出。

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

21. 複本完成後、請確認來源與目的地NFSv3匯出的資料相同。執行「XCP VERIFY」命令。

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

如果「XCP VERIFY」發現來源與目的地資料之間有差異、則摘要中會報告錯誤「no then file or directory」（無此類檔案或目錄）。若要修正此問題、請執行「XCP sync」命令、將來源變更複製到目的地。

22. 在轉換之前和期間、再次執行「驗證」。如果來源有新的或更新的資料、請執行遞增更新。執行「XCP sync」命令。

```
For this operation, the previous copy index name or number is required.
[root@localhost /]# ./xcp sync -id 3
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, 12.6KiB in (6.19KiBps), 9.50 KiB out (4.66KiBps),
2s.
```

23. 若要恢復先前中斷的複製作業、請執行「XCP RESUME」命令。

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

在「假定」完成複製檔案之後、再次執行「驗證」、讓來源和目的地儲存設備擁有相同的資料。

24. NFSv3用戶端主機需要卸載從7-Mode儲存設備配置的來源NFSv3匯出、並掛載目標NFSv3從ONTAP VMware匯出。轉換需要中斷運作。

將7-Mode Volume Snapshot複本移轉至ONTAP VMware

本節說明將來源7-Mode Volume NetApp Snapshot複本轉換至ONTAP VMware的程序。

NetApp假設來源7-Mode磁碟區已匯出並掛載到用戶端系統、而且XCP已安裝在Linux系統上。Snapshot複本是磁碟區的時間點映像、記錄自上次Snapshot複本以來的遞增變更。使用7-Mode系統的「抓取」選項作為來源。

*警告：*保留基礎Snapshot複本。基準複本完成後、請勿刪除基礎Snapshot複本。需要基礎Snapshot複本才能進行進一步的同步作業。

1. 驗證目標ONTAP 系統是否健全。

```
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              RTP
CLUSTER-02
          true   true        78 days 20:50 FAS8060              RTP
2 entries were displayed.
CLUSTER::> storage failover show
                              Takeover
Node           Partner        Possible State Description
-------------- -------------- --------
-------------------------------------
CLUSTER-01     CLUSTER-02     true     Connected to CLUSTER-02
CLUSTER-02     CLUSTER-01     true     Connected to CLUSTER-01
2 entries were displayed.
```

2. 確認目標系統上至少存在一個非根Aggregate。Aggregate是正常的。

```
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.
```

如果沒有資料Aggregate、請使用「shorage aggr create」命令建立新的集合體。

3. 在目標叢集系統上建立SVM。

```
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

Verify that the SVM was successfully created.
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
```

4. 從目標SVM移除FCP、iSCSI、NDMP及CIFS傳輸協定。

```
CLUSTER::> vserver remove-protocols -vserver dest -protocols
fcp,iscsi,ndmp,cifs
Verify that NFS is the allowed protocol for this SVM.
CLUSTER::> vserver show -vserver dest -fields allowed-protocols
vserver allowed-protocols
------- -----------------
dest    nfs
```

5. 在目的地SVM上建立新的讀寫資料磁碟區。確認安全樣式、語言設定和容量需求符合來源Volume。

```
CLUSTER::> vol create -vserver dest -volume dest_nfs -aggregate poc
-size 150g -type RW -state online -security-style mixed
[Job 648] Job succeeded: Successful
```

6. 建立資料LIF以處理NFS用戶端要求。

```
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
```

確認LIF已成功建立。

```
CLUSTER::> network interface show -vserver dest
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
dest
            dest_lif
                         up/up    10.61.73.113/24    CLUSTER-01    e0i
true
```

7. 如有需要、請使用SVM建立靜態路由。

```
CLUSTER::> network route create -vserver dest -destination 0.0.0.0/0
-gateway 192.168.100.111
```

確認路由已成功建立。

```
CLUSTER::> network route show -vserver source
Vserver             Destination     Gateway         Metric
------------------- --------------- --------------- ------
dest
                    0.0.0.0/0       10.61.73.1      20
```

8. 在SVM命名空間中掛載目標NFS資料磁碟區。

```
CLUSTER::> volume mount -vserver dest -volume dest_nfs -junction-path
/dest_nfs -active true
```

確認磁碟區已成功掛載。

```
CLUSTER::> volume show -vserver dest -fields junction-path
vserver volume   junction-path
------- -------- -------------
dest    dest_nfs /dest_nfs
dest    dest_root
                 /
2 entries were displayed.
```

您也可以使用「volume create」命令來指定Volume掛載選項（交會路徑）。

9. 在目標SVM上啟動NFS服務。

```
CLUSTER::> vserver nfs start -vserver dest
```

確認服務已啟動並正在執行。

```
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:  -
```

10. 確認預設的NFS匯出原則已套用至目標SVM。

```
CLUSTER::> vserver export-policy show -vserver dest
Vserver          Policy Name
---------------  -------------------
dest             default
```

11. 如有需要、請為目標SVM建立新的自訂匯出原則。

```
CLUSTER::> vserver export-policy create -vserver dest -policyname
xcpexportpolicy
```

確認已成功建立新的自訂匯出原則。

```
CLUSTER::> vserver export-policy show -vserver dest
Vserver          Policy Name
---------------  -------------------
dest             default
dest             xcpexportpolicy
2 entries were displayed.
```

12. 修改匯出原則規則、以允許存取目標系統上的NFS用戶端。

```
CLUSTER::> export-policy rule modify -vserver dest -ruleindex 1
-policyname xcpexportpolicy -clientmatch 0.0.0.0/0 -rorule any -rwrule
any -anon 0
Verify the policy rules have modified
CLUSTER::> export-policy rule show -instance
                                   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. 確認用戶端可存取目標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
                                          Policy    Policy       Rule
Path                          Policy      Owner     Owner Type  Index
Access
----------------------------- ---------- --------- ---------- ------
----------
/                             xcpexportpolicy
                                          dest_root volume          1
read
/dest_nfs                     xcpexportpolicy
                                          dest_nfs  volume          1
read-write
2 entries were displayed.
```

14. 連線至Linux NFS伺服器。為NFS匯出的Volume建立掛載點。

```
[root@localhost /]# cd /mnt
[root@localhost mnt]# mkdir dest
```

15. 在此掛載點掛載目標NFSv3匯出的Volume。

> NFSv3磁碟區應匯出、但不一定要由NFS伺服器掛載。如果可以掛載、XCP Linux主機用戶端就會掛載這些磁碟區。

```
[root@localhost mnt]# mount -t nfs 10.61.73.115:/dest_nfs /mnt/dest
```

確認已成功建立掛載點。

```
[root@ localhost /]# mount | grep nfs
10.61.73.115:/dest_nfs on /mnt/dest type nfs
```

16. 在NFS匯出的掛載點上建立測試檔案、以啟用讀寫存取。

```
[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
```

讀寫測試完成後、請從目標NFS掛載點刪除檔案。

17. 連線至安裝XCP的Linux用戶端系統。瀏覽至XCP安裝路徑。

```
[root@localhost ~]# cd /linux/
[root@localhost linux]#
```

18. 在XCP Linux用戶端主機系統上執行「XCP show」命令、查詢來源7-Mode NFSv3匯出。

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

19. 掃描來源NFSv3匯出路徑、並列印其檔案結構的統計資料。

NetApp建議在執行「XCP掃描」、「複本」和「同步」作業時、將來源NFSv3匯出設定為唯讀模式。在「同步」作業中、您必須以對應的值傳遞「snap」選項。

```
[root@localhost /]# ./xcp scan 10.61.82.215:/vol/nfsvol/.snapshot/snap1
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/catalog
23 scanned, 7.79 KiB in (5.52 KiB/s), 1.51 KiB out (1.07 KiB/s), 1s.
[root@scspr1202780001 vol_acl4]# ./xcp  sync -id 7msnap1  -snap
10.236.66.199:/vol/nfsvol/.snapshot/snap10
(show scan and sync)
```

20. 將來源7-Mode NFSv3快照（基礎）複製到目標ONTAP 系統上的NFSv3匯出。

```
[root@localhost /]# /xcp copy 10.61.82.215:/vol/nfsvol/.snapshot/snap1
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.
```

請保留此基礎快照、以便進一步同步作業。

21. 複製完成後、請確認來源和目的地NFSv3匯出的資料相同。執行「XCP VERIFY」命令。

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

如果「驗證」發現來源與目的地資料之間有差異、則摘要中不會報告「沒有」這類檔案或目錄。若要修正此問題、請執行「XCP sync」命令、將來源變更複製到目的地。

22. 在轉換之前和期間、再次執行「驗證」。如果來源有新的或更新的資料、請執行遞增更新。如果有遞增變更、請為這些變更建立新的Snapshot複本、並使用「-snap」選項傳遞該Snapshot路徑以進行同步作業。

    使用「-snap」選項和快照路徑執行「XCP sync」命令。

```
 [root@localhost /]# ./xcp sync -id 3
Index: {source: '10.61.82.215:/vol/nfsvol/.snapshot/snap1', 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..
```

此作業需要基礎快照。

23. 若要恢復先前中斷的複製作業、請執行「XCP RESUME」命令。

```
[root@scspr1202780001 534h_dest_vol]# ./xcp resume -id 3
XCP <version>; (c) 2020 NetApp, Inc.; Licensed to xxxxx [NetApp Inc]
until Mon Dec 31 00:00:00 2029
xcp: Index: {source: '10.61.82.215:/vol/nfsvol',/.snapshot/snap1,
target: 10.237.160.55:/dest_vol}
xcp: resume '7msnap_res1': Reviewing the incomplete index...
xcp: diff '7msnap_res1': Found 143 completed directories and 230 in
progress
39,688 reviewed, 1.28 MiB in (1.84 MiB/s), 13.3 KiB out (19.1 KiB/s),
0s.
xcp: resume '7msnap_res1': Starting second pass for the in-progress
directories...
xcp: resume '7msnap_res1': Resuming the in-progress directories...
xcp: resume '7msnap_res1': Resumed command: copy {-newid:
u'7msnap_res1'}
xcp: resume '7msnap_res1': Current options: {-id: '7msnap_res1'}
xcp: resume '7msnap_res1': Merged options: {-id: '7msnap_res1', -newid:
u'7msnap_res1'}
xcp: resume '7msnap_res1': Values marked with a * include operations
before resume
 68,848 scanned*, 54,651 copied*, 39,688 indexed*, 35.6 MiB in (7.04
MiB/s), 28.1 MiB out (5.57 MiB/s), 5s
```

24. NFSv3用戶端主機必須卸載從7-Mode儲存設備配置的來源NFSv3匯出、然後掛載目標NFSv3匯出資料ONTAP 來自VMware。轉換作業需要中斷運作。

將ACLv4從NetApp 7-Mode移轉至NetApp儲存系統

本節說明將來源NFSv4匯出移轉至ONTAP 某個作業系統的逐步程序。

> NetApp假設來源NFSv4磁碟區已匯出並掛載到用戶端系統、而且XCP已安裝在Linux系統上。來源應為支援ACL的NetApp 7-Mode系統。ACL移轉僅支援從NetApp移轉至NetApp。若要複製名稱中含有特殊字元的檔案、請確定來源和目的地支援UTF-8編碼語言。

將來源**NFSv4**匯出移轉**ONTAP** 至**S**目的地 的先決條件

在將來源NFSv4匯出移轉ONTAP 至無法使用之前、必須符合下列先決條件：

- 目的地系統必須設定NFSv4。
- NFSv4來源和目標必須掛載於XCP主機上。選取NFS v4.0以符合來源和目標儲存設備、並確認來源和目標系統上已啟用ACL。
- XCP需要在XCP主機上掛載來源/目標路徑以進行ACL處理。在下列範例中、「vol1（10.63.5.56：/vol1）」會掛載於「/mnt/vol1」路徑：

```
 [root@localhost ~]# df -h
Filesystem                                                  Size  Used
Avail Use% Mounted on
10.63.5.56:/vol1                                            973M  4.2M
969M   1% /mnt/vol1
[root@localhost ~]# ./xcp scan -l -acl4 10.63.5.56:/vol1/
XCP <version>; (c) 2020 NetApp, Inc.; Licensed to XXX [NetApp Inc] until
Sun Mar 31 00:00:00 2029
drwxr-xr-x --- root root 4KiB 4KiB 23h42m vol1
rw-r--r-- --- root root    4    0 23h42m vol1/DIR1/FILE
drwxr-xr-x --- root root 4KiB 4KiB 23h42m vol1/DIR1/DIR11
drwxr-xr-x --- root root 4KiB 4KiB 23h42m vol1/DIR1
rw-r--r-- --- root root    4    0 23h42m vol1/DIR1/DIR11/FILE
drwxr-xr-x --- root root 4KiB 4KiB 23h42m vol1/DIR1/DIR11/DIR2
rw-r--r-- --- root root    4    0 23h42m vol1/DIR1/DIR11/DIR2/FILE
drwxr-xr-x --- root root 4KiB 4KiB 17m43s vol1/DIR1/DIR11/DIR2/DIR22
8 scanned, 8 getacls, 1 v3perm, 7 acls, 3.80 KiB in (3.86 KiB/s), 1.21 KiB
out (1.23 KiB/s), 0s.
```

子目錄選項

使用子目錄的兩個選項如下：

- 若要讓XCP在子目錄上運作、請在XCP主機上掛載完整路徑（「10.63.5.56：/vol1/dir1/DIR11」）。

  如果未掛載完整路徑、XCP會報告下列錯誤：

```
[root@localhost ~]# ./xcp scan -l -acl4 10.63.5.56:/vol1/DIR1/DIR11
XCP <version>; (c) 2020 NetApp, Inc.; Licensed to XXX [NetApp Inc] until
Sun Mar 31 00:00:00 2029
xcp: ERROR: For xcp to process ACLs, please mount
10.63.5.56:/vol1/DIR1/DIR11 using the OS nfs4 client.
```

- 使用子目錄語法（「mount: subnet/sqtree /.snapshot」）、如下例所示：

```
[root@localhost ~]# ./xcp scan -l -acl4 10.63.5.56:/vol1:/DIR1/DIR11
XCP <version>; (c) 2020 NetApp, Inc.; Licensed to XXX [NetApp Inc] until
Sun Mar 31 00:00:00 2029
drwxr-xr-x --- root root 4KiB 4KiB 23h51m DIR11
rw-r--r-- --- root root    4    0 23h51m DIR11/DIR2/FILE
drwxr-xr-x --- root root 4KiB 4KiB  26m9s DIR11/DIR2/DIR22
rw-r--r-- --- root root    4    0 23h51m DIR11/FILE
drwxr-xr-x --- root root 4KiB 4KiB 23h51m DIR11/DIR2
5 scanned, 5 getacls, 5 acls, 2.04 KiB in (3.22 KiB/s), 540 out (850/s),
0s.
```

完成下列步驟、將ACLv4從NetApp 7-Mode移轉至NetApp儲存系統。

1. 驗證目標ONTAP 系統是否健全。

```
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              RTP
CLUSTER-02
          true   true        78 days 20:50 FAS8060              RTP
2 entries were displayed.
CLUSTER::> storage failover show
                              Takeover
Node           Partner        Possible State Description
-------------- -------------- --------
-------------------------------------
CLUSTER-01     CLUSTER-02     true     Connected to CLUSTER-02
CLUSTER-02     CLUSTER-01     true     Connected to CLUSTER-01
2 entries were displayed.
```

2. 確認目標系統上至少存在一個非根Aggregate。Aggregate是正常的。

```
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.
```

如果沒有資料Aggregate、請使用「shorage aggr create」命令建立新的集合體。

3. 在目標叢集系統上建立SVM。

```
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
```

確認SVM已成功建立。

```
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
```

4. 從目標SVM移除FCP、iSCSI、NDMP及CIFS傳輸協定。

```
CLUSTER::> vserver remove-protocols -vserver dest -protocols
fcp,iscsi,ndmp,cifs
```

確認NFS是此SVM允許的傳輸協定。

```
CLUSTER::> vserver show -vserver dest -fields allowed-protocols
vserver allowed-protocols
------- -----------------
dest    nfs
```

5. 在目的地SVM上建立新的讀寫資料磁碟區。確認安全樣式、語言設定和容量需求符合來源Volume。

```
CLUSTER::> vol create -vserver dest -volume dest_nfs -aggregate poc
-size 150g -type RW -state online -security-style mixed
[Job 648] Job succeeded: Successful
```

6. 建立資料LIF以處理NFS用戶端要求。

```
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
```

確認LIF已成功建立。

```
CLUSTER::> network interface show -vserver dest
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
dest
            dest_lif
                         up/up    10.61.73.113/24    CLUSTER-01    e0i
true
```

7. 如有需要、請使用SVM建立靜態路由。

```
CLUSTER::> network route create -vserver dest -destination 0.0.0.0/0
-gateway 192.168.100.111
```

確認路由已成功建立。

```
CLUSTER::> network route show -vserver source
Vserver             Destination     Gateway         Metric
------------------- --------------- --------------- ------
dest
                    0.0.0.0/0       10.61.73.1      20
```

8. 在SVM命名空間中掛載目標NFS資料磁碟區。

```
CLUSTER::> volume mount -vserver dest -volume dest_nfs -junction-path
/dest_nfs -active true
```

確認磁碟區已成功掛載。

```
CLUSTER::> volume show -vserver dest -fields junction-path
vserver volume   junction-path
------- -------- -------------
dest    dest_nfs /dest_nfs
dest    dest_root
                 /
2 entries were displayed.
```

您也可以使用「volume create」命令來指定Volume掛載選項（交會路徑）。

9. 在目標SVM上啟動NFS服務。

```
CLUSTER::> vserver nfs start -vserver dest
```

確認服務已啟動並正在執行。

```
CLUSTER::> vserver nfs status
The NFS server is running on Vserver "dest".
CLUSTER::> nfs show
Vserver: dest
        General Access:  true
                    v3:  enabled
                  v4.0:  enabled
                   4.1:  disabled
                   UDP:  enabled
                   TCP:  enabled
  Default Windows User:  -
 Default Windows Group:  -
```

10. 檢查預設的NFS匯出原則是否已套用至目標SVM。

```
CLUSTER::> vserver export-policy show -vserver dest
Vserver          Policy Name
---------------  -------------------
dest             default
```

11. 如有需要、請為目標SVM建立新的自訂匯出原則。

```
CLUSTER::> vserver export-policy create -vserver dest -policyname
xcpexportpolicy
```

確認已成功建立新的自訂匯出原則。

```
CLUSTER::> vserver export-policy show -vserver dest
Vserver          Policy Name
---------------  -------------------
dest             default
dest             xcpexportpolicy
2 entries were displayed.
```

12. 修改匯出原則規則、以允許存取NFS用戶端。

```
CLUSTER::> export-policy rule modify -vserver dest -ruleindex 1
-policyname xcpexportpolicy -clientmatch 0.0.0.0/0 -rorule any -rwrule
any -anon 0
```

確認原則規則已修改。

```
CLUSTER::> export-policy rule show -instance
                                   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. 驗證是否允許用戶端存取磁碟區。

```
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
                                          Policy    Policy       Rule
Path                          Policy      Owner     Owner Type  Index
Access
----------------------------- ---------- --------- ---------- ------
----------
/                             xcpexportpolicy
                                          dest_root volume          1
read
/dest_nfs                     xcpexportpolicy
                                          dest_nfs  volume          1
read-write
2 entries were displayed.
```

14. 連線至Linux NFS伺服器。為NFS匯出的Volume建立掛載點。

```
[root@localhost /]# cd /mnt
[root@localhost mnt]# mkdir dest
```

15. 在此掛載點掛載目標NFSv4匯出的Volume。

> NFSv4磁碟區應匯出、但不一定要由NFS伺服器掛載。如果可以掛載、XCP Linux主機用戶端就會掛載這些磁碟區。

```
[root@localhost mnt]# mount -t nfs4 10.63.5.56:/vol1 /mnt/vol1
```

確認已成功建立掛載點。

```
[root@localhost mnt]# mount | grep nfs
10.63.5.56:/vol1 on /mnt/vol1 type nfs4
(rw,relatime,vers=4.0,rsize=65536,wsize=65536,namlen=255,hard,proto=tcp,
timeo=600,
retrans=2,sec=sys,clientaddr=10.234.152.84,local_lock=none,addr=10.63.5.
56)
```

16. 在NFS匯出的掛載點上建立測試檔案、以啟用讀寫存取。

```
[root@localhost dest]# touch test.txt
```

確認檔案已建立。

```
[root@localhost dest]# ls -l
total 0
-rw-r--r-- 1 root bin 0 Jun  2 03:16 test.txt
```

讀寫測試完成後、請從目標NFS掛載點刪除檔案。

17. 連線至安裝XCP的Linux用戶端系統。瀏覽至XCP安裝路徑。

```
[root@localhost ~]# cd /linux/
[root@localhost linux]#
```

18. 在XCP Linux用戶端主機系統上執行「XCP show」命令、查詢來源NFSv4匯出。

```
root@localhost]# ./xcp show 10.63.5.56
XCP <version>; (c) 2020 NetApp, Inc.; Licensed to xxx [NetApp Inc] until
Mon Dec 31 00:00:00 2029
getting pmap dump from 10.63.5.56 port 111...
getting export list from 10.63.5.56...
sending 6 mounts and 24 nfs requests to 10.63.5.56...
== RPC Services ==
'10.63.5.56': UDP rpc services: MNT v1/2/3, NFS v3, NLM v4, PMAP v2/3/4,
STATUS v1
'10.63.5.56': TCP rpc services: MNT v1/2/3, NFS v3/4, NLM v4, PMAP
v2/3/4, STATUS v1
== NFS Exports ==
 Mounts  Errors  Server
      6       0  10.63.5.56
     Space    Files      Space    Files
      Free     Free       Used     Used Export
  94.7 MiB   19,883    324 KiB      107 10.63.5.56:/
   971 MiB   31,023   2.19 MiB       99 10.63.5.56:/vol2
   970 MiB   31,024   2.83 MiB       98 10.63.5.56:/vol1
  9.33 GiB  310,697    172 MiB      590 10.63.5.56:/vol_005
  43.3 GiB    1.10M   4.17 GiB    1.00M 10.63.5.56:/vol3
  36.4 GiB    1.10M   11.1 GiB    1.00M 10.63.5.56:/vol4
== Attributes of NFS Exports ==
drwxr-xr-x --- root root 4KiB 4KiB 6d2h 10.63.5.56:/
drwxr-xr-x --- root root 4KiB 4KiB 3d2h 10.63.5.56:/vol2
drwxr-xr-x --- root root 4KiB 4KiB 3d2h 10.63.5.56:/vol1
drwxr-xr-x --- root root 4KiB 4KiB 9d2h 10.63.5.56:/vol_005
drwxr-xr-x --- root root 4KiB 4KiB 9d4h 10.63.5.56:/vol3
drwxr-xr-x --- root root 4KiB 4KiB 9d4h 10.63.5.56:/vol4
6.09 KiB in (9.19 KiB/s), 12.2 KiB out (18.3 KiB/s), 0s.
```

19. 掃描來源NFSv4匯出路徑、並列印其檔案結構的統計資料。

NetApp建議在執行「XCP掃描」、「複本」和「同步」作業時、將來源NFSv4匯出設定為唯讀模式。

```
[root@localhost]# ./xcp scan -acl4 10.63.5.56:/vol1
XCP <version>; (c) 2020 NetApp, Inc.; Licensed to xxx [NetApp Inc] until
Mon Dec 31 00:00:00 2029
vol1
vol1/test/f1
vol1/test
3 scanned, 3 getacls, 3 v3perms, 1.59 KiB in (1.72 KiB/s), 696 out
(753/s), 0s.
```

20. 將來源NFSv4匯出至目標ONTAP 系統上的NFSv4匯出。

```
[root@localhost]# ./xcp copy -acl4 -newid id1 10.63.5.56:/vol1
10.63.5.56:/vol2
XCP <version>; (c) 2020 NetApp, Inc.; Licensed to xxx [NetApp Inc] until
Mon Dec 31 00:00:00 2029
3 scanned, 2 copied, 3 indexed, 3 getacls, 3 v3perms, 1 setacl, 14.7 KiB
in (11.7 KiB/s), 61 KiB out (48.4 KiB/s), 1s..
```

21. 完成「複製」之後、請確認來源和目的地NFSv4匯出的資料相同。執行「XCP VERIFY」命令。

```
[root@localhost]# ./xcp verify -acl4 -noid 10.63.5.56:/vol1
10.63.5.56:/vol2
XCP <version>; (c) 2020 NetApp, Inc.; Licensed to xxx [NetApp Inc] until
Mon Dec 31 00:00:00 2029
3 scanned, 100% found (0 have data), 100% verified (data, attrs, mods,
acls), 6 getacls, 6 v3perms, 2.90 KiB in (4.16 KiB/s), 2.94 KiB out
(4.22 KiB/s), 0s.
```

如果「驗證」發現來源與目的地資料之間有差異、則摘要中會報告「沒有這類檔案或目錄」錯誤。若要修正此問題、請執行「XCP sync」命令、將來源變更複製到目的地。

22. 在轉換之前和期間、再次執行「驗證」。如果來源有新的或更新的資料、請執行遞增更新。執行「XCP sync」命令。

```
[root@ root@localhost]# ./xcp sync -id id1
XCP <version>; (c) 2020 NetApp, Inc.; Licensed to xxx [NetApp Inc] until
Mon Dec 31 00:00:00 2029
xcp: Index: {source: 10.63.5.56:/vol1, target: 10.63.5.56:/vol2}
3 reviewed, 3 checked at source, no changes, 3 reindexed, 25.6 KiB in
(32.3 KiB/s), 23.3 KiB out (29.5 KiB/s), 0s.
```

ⓘ 此作業需要先前的複本索引名稱或編號。

23. 若要恢復先前中斷的「複製」作業、請執行「XCP恢復」命令。

```
[root@localhost]# ./xcp resume -id id1
XCP <version>; (c) 2020 NetApp, Inc.; Licensed to xxx [NetApp Inc] until
Mon Dec 31 00:00:00 2029
xcp: Index: {source: 10.63.5.56:/vol3, target: 10.63.5.56:/vol4}
xcp: resume 'id1': Reviewing the incomplete index...
xcp: diff 'id1': Found 0 completed directories and 8 in progress
39,899 reviewed, 1.64 MiB in (1.03 MiB/s), 14.6 KiB out (9.23 KiB/s),
1s.
xcp: resume 'id1': Starting second pass for the in-progress
directories...
xcp: resume 'id1': Resuming the in-progress directories...
xcp: resume 'id1': Resumed command: copy {-acl4: True}
xcp: resume 'id1': Current options: {-id: 'id1'}
xcp: resume 'id1': Merged options: {-acl4: True, -id: 'id1'}
xcp: resume 'id1': Values marked with a * include operations before
resume
 86,404 scanned, 39,912 copied, 39,899 indexed, 13.0 MiB in (2.60
MiB/s), 78.4 KiB out (15.6 KiB/s), 5s 86,404 scanned, 39,912 copied,
39,899 indexed, 13.0 MiB in (0/s), 78.4 KiB out (0/s), 10s
1.00M scanned, 100% found (1M have data), 1M compared, 100% verified
(data, attrs, mods, acls), 2.00M getacls, 202 v3perms, 1.00M same acls,
2.56 GiB in (2.76 MiB/s), 485 MiB out (524 KiB/s), 15m48s.
```

在「假定」完成複製檔案之後、再次執行「驗證」、讓來源和目的地儲存設備擁有相同的資料。

將7-Mode SMB儲存設備移轉ONTAP 至支援CIFS資料的功能區

本節說明將來源7-Mode SMB共用區轉換為ONTAP VMware系統的逐步程序。

> NetApp假設7-Mode和ONTAP VMware系統是SMB授權的系統。系統會建立目的地SVM、匯出來源和目的地SMB共用、並安裝和授權XCP。

1. 掃描SMB共用區中的檔案和目錄。

```
C:\xcp>xcp scan -stats \\10.61.77.189\performance_SMB_home_dirs
XCP SMB 1.6; (c) 2020 NetApp, Inc.; Licensed to xxxx xxxx[NetApp Inc]
until Mon Dec 31 00:00:00 2029
== Maximum Values ==
Size Depth Namelen Dirsize
15.6MiB 2 8 200
== Average Values ==
Size Depth Namelen Dirsize
540KiB 2 7 81
== Top File Extensions ==
.txt .tmp
5601 2200
== Number of files ==
empty <8KiB 8-64KiB 64KiB-1MiB 1-10MiB 10-100MiB >100MiB
46 6301 700 302 200 252
== Space used ==
empty <8KiB 8-64KiB 64KiB-1MiB 1-10MiB 10-100MiB >100MiB
0 6.80MiB 8.04MiB 120MiB 251MiB 3.64GiB 0
== Directory entries ==
empty 1-10 10-100 100-1K 1K-10K >10k
18 1 77 1
== Depth ==
0-5 6-10 11-15 16-20 21-100 >100
7898
== Modified ==
>1 year >1 month 1-31 days 1-24 hrs <1 hour <15 mins future
2167 56 322 5353
== Created ==
>1 year >1 month 1-31 days 1-24 hrs <1 hour <15 mins future
2171 54 373 5300
Total count: 7898
Directories: 97
Regular files: 7801
Symbolic links:
Junctions:
Special files:
Total space for regular files: 4.02GiB
Total space for directories: 0
Total space used: 4.02GiB
7,898 scanned, 0 errors, 0s
```

2. 將檔案（含或不含ACL）從來源複製到目的地SMB共用區。以下範例顯示含有ACL的複本。

```
C:\xcp>xcp copy -acl -fallback-user "DOMAIN\gabi" -fallback-group
"DOMAIN\Group" \\10.61.77.189\performance_SMB_home_dirs
\\10.61.77.56\performance_SMB_home_dirs
XCP SMB 1.6; (c) 2020 NetApp, Inc.; Licensed to xxxx xxxx[NetApp Inc]
until Mon Dec 31 00:00:00 2029
7,898 scanned, 0 errors, 0 skipped, 184 copied, 96.1MiB (19.2MiB/s), 5s
7,898 scanned, 0 errors, 0 skipped, 333 copied, 519MiB (84.7MiB/s), 10s
7,898 scanned, 0 errors, 0 skipped, 366 copied, 969MiB (89.9MiB/s), 15s
7,898 scanned, 0 errors, 0 skipped, 422 copied, 1.43GiB (99.8MiB/s), 20s
7,898 scanned, 0 errors, 0 skipped, 1,100 copied, 1.69GiB (52.9MiB/s),
25s
7,898 scanned, 0 errors, 0 skipped, 1,834 copied, 1.94GiB (50.4MiB/s),
30s
7,898 scanned, 0 errors, 0 skipped, 1,906 copied, 2.43GiB (100MiB/s),
35s
7,898 scanned, 0 errors, 0 skipped, 2,937 copied, 2.61GiB (36.6MiB/s),
40s
7,898 scanned, 0 errors, 0 skipped, 2,969 copied, 3.09GiB (100.0MiB/s),
45s
7,898 scanned, 0 errors, 0 skipped, 3,001 copied, 3.58GiB (100.0MiB/s),
50s
7,898 scanned, 0 errors, 0 skipped, 3,298 copied, 4.01GiB (88.0MiB/s),
55s
7,898 scanned, 0 errors, 0 skipped, 5,614 copied, 4.01GiB (679KiB/s),
1m0s
7,898 scanned, 0 errors, 0 skipped, 7,879 copied, 4.02GiB (445KiB/s),
1m5s
7,898 scanned, 0 errors, 0 skipped, 7,897 copied, 4.02GiB (63.2MiB/s),
1m5s
```

如果沒有資料Aggregate、請使用storage「aggr create」命令建立新的集合體。

3. 同步來源和目的地上的檔案。

```
C:\xcp>xcp sync -acl -fallback-user "DOMAIN\gabi" -fallback-group
"DOMAIN\Group" \\10.61.77.189\performance_SMB_home_dirs
\\10.61.77.56\performance_SMB_home_dirs
XCP SMB 1.6; (c) 2020 NetApp, Inc.; Licensed to xxxx xxxx[NetApp Inc]
until Mon Dec 31 00:00:00 2029
10,796 scanned, 4,002 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 5s
15,796 scanned, 8,038 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 10s
15,796 scanned, 8,505 compared, 0 errors, 0 skipped, 0 copied, 0
```

```
removed, 15s
15,796 scanned, 8,707 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 20s
15,796 scanned, 8,730 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 25s
15,796 scanned, 8,749 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 30s
15,796 scanned, 8,765 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 35s
15,796 scanned, 8,786 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 40s
15,796 scanned, 8,956 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 45s
8 XCP v1.6 User Guide © 2020 NetApp, Inc. All rights reserved.
Step Description
15,796 scanned, 9,320 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 50s
15,796 scanned, 9,339 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 55s
15,796 scanned, 9,363 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 1m0s
15,796 scanned, 10,019 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 1m5s
15,796 scanned, 10,042 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 1m10s
15,796 scanned, 10,059 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 1m15s
15,796 scanned, 10,075 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 1m20s
15,796 scanned, 10,091 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 1m25s
15,796 scanned, 10,108 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 1m30s
15,796 scanned, 10,929 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 1m35s
15,796 scanned, 12,443 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 1m40s
15,796 scanned, 13,963 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 1m45s
15,796 scanned, 15,488 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 1m50s
15,796 scanned, 15,796 compared, 0 errors, 0 skipped, 0 copied, 0
removed, 1m51s
```

4. 確認檔案已正確複製。

```
C:\xcp> xcp verify \\10.61.77.189\performance_SMB_home_dirs
\\10.61.77.56\performance_SMB_home_dir
XCP SMB 1.6; (c) 2020 NetApp, Inc.; Licensed to xxxx xxxx[NetApp Inc]
until Mon Dec 31 00:00:00 2029
8 compared, 8 same, 0 different, 0 missing, 5s
24 compared, 24 same, 0 different, 0 missing, 10s
41 compared, 41 same, 0 different, 0 missing, 15s
63 compared, 63 same, 0 different, 0 missing, 20s
86 compared, 86 same, 0 different, 0 missing, 25s
423 compared, 423 same, 0 different, 0 missing, 30s
691 compared, 691 same, 0 different, 0 missing, 35s
1,226 compared, 1,226 same, 0 different, 0 missing, 40s
1,524 compared, 1,524 same, 0 different, 0 missing, 45s
1,547 compared, 1,547 same, 0 different, 0 missing, 50s
1,564 compared, 1,564 same, 0 different, 0 missing, 55s
2,026 compared, 2,026 same, 0 different, 0 missing, 1m0s
2,045 compared, 2,045 same, 0 different, 0 missing, 1m5s
2,061 compared, 2,061 same, 0 different, 0 missing, 1m10s
2,081 compared, 2,081 same, 0 different, 0 missing, 1m15s
2,098 compared, 2,098 same, 0 different, 0 missing, 1m20s
2,116 compared, 2,116 same, 0 different, 0 missing, 1m25s
3,232 compared, 3,232 same, 0 different, 0 missing, 1m30s
4,817 compared, 4,817 same, 0 different, 0 missing, 1m35s
6,267 compared, 6,267 same, 0 different, 0 missing, 1m40s
7,844 compared, 7,844 same, 0 different, 0 missing, 1m45s
7,898 compared, 7,898 same, 0 different, 0 missing, 1m45s,cifs
```

透過ACL從來源儲存箱移轉CIFS資料至ONTAP 功能區

本節說明將CIFS資料與安全資訊從來源移轉至目標ONTAP 系統的逐步程序。

1. 驗證目標ONTAP 系統是否健全。

```
C1_sti96-vsim-ucs540m_cluster::> cluster show
Node                  Health  Eligibility
--------------------- ------- ------------
sti96-vsim-ucs540m    true    true
sti96-vsim-ucs540n    true    true
2 entries were displayed.
C1_sti96-vsim-ucs540m_cluster::> node show
Node      Health Eligibility Uptime        Model       Owner    Location
--------- ------ ----------- ------------- ----------- --------
---------------
sti96-vsim-ucs540m
          true   true        15 days 21:17 SIMBOX      ahammed  sti
sti96-vsim-ucs540n
          true   true        15 days 21:17 SIMBOX      ahammed  sti
2 entries were displayed.
cluster::>  storage failover show
                              Takeover
Node           Partner        Possible State Description
-------------- -------------- --------
-------------------------------------
sti96-vsim-ucs540m
               sti96-vsim-    true     Connected to sti96-vsim-ucs540n
               ucs540n
sti96-vsim-ucs540n
               sti96-vsim-    true     Connected to sti96-vsim-ucs540m
               ucs540m
2 entries were displayed.
C1_sti96-vsim-ucs540m_cluster::>
```

2. 確認目標系統上至少存在一個非根Aggregate。Aggregate是正常的。

```
cluster::*> storage aggregate show
Aggregate     Size Available Used% State   #Vols  Nodes            RAID
Status
--------- -------- --------- ----- ------- ------ ----------------
------------
aggr0_sti96_vsim_ucs540o
            7.58GB   373.3MB   95% online       1 sti96-vsim-
raid_dp,
                                                  ucs540o
normal
aggr0_sti96_vsim_ucs540p
            7.58GB   373.3MB   95% online       1 sti96-vsim-
raid_dp,
                                                  ucs540p
normal
aggr_001   103.7GB   93.63GB   10% online       1 sti96-vsim-
raid_dp,
                                                  ucs540p
normal
sti96_vsim_ucs540o_aggr1
           23.93GB   23.83GB    0% online       1 sti96-vsim-
raid_dp,
                                                  ucs540o
normal
sti96_vsim_ucs540p_aggr1
           23.93GB   23.93GB    0% online       0 sti96-vsim-
raid_dp,
                                                  ucs540p
normal
5 entries were displayed.
```

如果沒有資料Aggregate、請使用「shorage aggr create」命令建立新的集合體。

3. 在目標叢集系統上建立SVM。

```
cluster::*> vserver create -vserver vs1 -rootvolume root_vs1 -aggregate
sti96_vsim_ucs540o_aggr1 -rootvolume-security-style mixed

Verify that the SVM was successfully created.
C2_sti96-vsim-ucs540o_cluster::*>  vserver show -vserver vs1
                                     Vserver: vs1
                                Vserver Type: data
                             Vserver Subtype: default
                                Vserver UUID: f8bc54be-d91b-11e9-b99c-
005056a7e57e
                                 Root Volume: root_vs1
                                   Aggregate: sti96_vsim_ucs540o_aggr1
                                  NIS Domain: NSQA-RTP-NIS1
                  Root Volume Security Style: mixed
                                 LDAP Client: esisconfig
                Default Volume Language Code: C.UTF-8
                             Snapshot Policy: default
                               Data Services: data-nfs, data-cifs,
                                              data-flexcache, data-iscsi
                                     Comment: vs1
                                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: -
                        Caching Policy Name: -
                                Config Lock: false
             Volume Delete Retention Period: 0
                                IPspace Name: Default
                          Foreground Process: -
                    Is Msid Preserved for DR: false
Force start required to start Destination in muliple IDP fan-out case:
false
                     Logical Space Reporting: false
                   Logical Space Enforcement: false
```

4. 在目的地SVM上建立新的讀寫資料磁碟區。確認安全樣式、語言設定和容量需求符合來源Volume。

```
CLUSTER CLUSTER::> vol create -vserver vs1 -volume dest_vol -aggregate
aggr_001 -size 150g type RW -state online -security-style ntfs
```

5. 建立資料LIF來處理SMB用戶端要求。

```
CLUSTER::> network interface create -vserver vs1 -lif sti96-vsim-
ucs540o_data1  -address 10.237.165.87 -netmask 255.255.240.0 -role data
-data-protocol nfs,cifs -home-node sti96-vsim-ucs540o  -home-port e0d
```

確認LIF已成功建立。

```
cluster::*>  network interface show -vserver vs1
            Logical    Status     Network            Current
Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port
Home
----------- ---------- ---------- ------------------ -------------
------- ----
vs1
            sti96-vsim-ucs540o_data1
                         up/up    10.237.165.87/20   sti96-vsim-ucs540o
                                                                   e0d
true
```

6. 如有需要、請使用SVM建立靜態路由。

```
Network route create -vserver dest -destination 0.0.0.0/0 -gateway
10.237.160.1
```

確認路由已成功建立。

```
cluster::*>  network route show -vserver vs1
Vserver             Destination     Gateway         Metric
------------------- --------------- --------------- ------
vs1
                    0.0.0.0/0       10.237.160.1    20
                    ::/0            fd20:8b1e:b255:9155::1
                                                    20
2 entries were displayed.
```

7. 在SVM命名空間中掛載目標資料Volume。

```
CLUSTER::> volume mount -vserver vs1 -volume dest_vol  -junction-path
/dest_vol -active true
```

確認磁碟區已成功掛載。

```
cluster::*> volume show -vserver vs1  -fields junction-path
vserver volume   junction-path
------- -------- -------------
vs1     dest_vol /dest_vol
vs1     root_vs1 /
2 entries were displayed.
Note: You can also specify the volume mount options (junction path) with
the volume create command.
```

8. 在目標SVM上啟動CIFS服務。

```
cluster::*> vserver cifs start -vserver vs1
Warning: The admin status of the CIFS server for Vserver "vs1" is
already "up".
```

確認服務已啟動並正在執行。

```
cluster::*>
Verify the service is started and running
C2_sti96-vsim-ucs540o_cluster::*> cifs show
            Server          Status    Domain/Workgroup Authentication
Vserver     Name            Admin     Name             Style
----------- --------------- --------- ---------------- --------------
vs1         D60AB15C2AFC4D6 up        CTL              domain
```

9. 確認預設匯出原則已套用至目標SVM。

```
CLUSTER::> vserver export-policy show -vserver dest
Vserver          Policy Name
---------------  -------------------
dest             default
```

如有需要、請為目標SVM建立新的自訂匯出原則。

```
CLUSTER::> vserver export-policy create -vserver vs1 -policyname
xcpexport
```

10. 修改匯出原則規則、以允許存取CIFS用戶端。

```
CLUSTER::> export-policy rule modify -vserver dest -ruleindex 1
-policyname xcpexportpolicy -clientmatch 0.0.0.0/0 -rorule any -rwrule
any -anon 0
```

確認原則規則已修改。

```
cluster::*> export-policy rule show -instance
                                    Vserver: vs1
                                Policy Name: default
                                 Rule Index: 1
                            Access Protocol: any
List of Client Match Hostnames, IP Addresses, Netgroups, or Domains:
0.0.0.0/0
                             RO Access Rule: any
                             RW Access Rule: any
User ID To Which Anonymous Users Are Mapped: 65534
                   Superuser Security Types: any
               Honor SetUID Bits in SETATTR: true
                  Allow Creation of Devices: true
                 NTFS Unix Security Options: fail
         Vserver NTFS Unix Security Options: use_export_policy
                     Change Ownership Mode: restricted
              Vserver Change Ownership Mode: use_export_policy
                                  Policy ID: 12884901889
                                    Vserver: vs1
                                Policy Name: default
                                 Rule Index: 2
                            Access Protocol: any
List of Client Match Hostnames, IP Addresses, Netgroups, or Domains:
0:0:0:0:0:0:0:0/0
                             RO Access Rule: any
                             RW Access Rule: any
User ID To Which Anonymous Users Are Mapped: 65534
                   Superuser Security Types: none
               Honor SetUID Bits in SETATTR: true
                  Allow Creation of Devices: true
                 NTFS Unix Security Options: fail
         Vserver NTFS Unix Security Options: use_export_policy
                     Change Ownership Mode: restricted
              Vserver Change Ownership Mode: use_export_policy
                                  Policy ID: 12884901889
2 entries were displayed.
```

11. 驗證是否允許用戶端存取磁碟區。

```
cluster::*> export-policy check-access -vserver vs1 -volume dest_vol
-client-ip 10.234.17.81 -authentication-method none -protocol cifs
-access-type read-write
                                          Policy    Policy       Rule
Path                          Policy      Owner     Owner Type  Index
Access
----------------------------- ---------- --------- ---------- ------
----------
/                             default    root_vs1  volume          1
read
/dest_vol                     default    dest_vol  volume          1
read-write
2 entries were displayed.
```

12. 連線至安裝XCP的Windows用戶端系統。瀏覽至XCP安裝路徑。

```
C:\WRSHDNT>dir c:\netapp\xcp
dir c:\netapp\xcp
 Volume in drive C has no label.
 Volume Serial Number is 5C04-C0C7
 Directory of c:\netapp\xcp
09/18/2019  09:30 AM    <DIR>          .
09/18/2019  09:30 AM    <DIR>          ..
06/25/2019  06:27 AM               304 license
09/18/2019  09:30 AM    <DIR>          Logs
09/29/2019  08:45 PM        12,143,105 xcp.exe
               2 File(s)     12,143,409 bytes
               3 Dir(s)  29,219,549,184 bytes free
```

13. 在XCP Windows用戶端主機系統上執行「XCP show」命令、查詢來源節點SMB匯出。

```
C:\WRSHDNT>c:\netapp\xcp\xcp show \\10.237.165.71
c:\netapp\xcp\xcp show \\10.237.165.71
XCP SMB 1.6; (c) 2020 NetApp, Inc.; Licensed to XXX [NetApp Inc] until
Mon Dec 31 00:00:00 2029
 Shares   Errors   Server
      6        0            10.237.165.71
== SMB Shares ==
 Space   Space   Current
 Free    Used    Connections Share Path                   Folder Path
 9.50GiB 4.57MiB 1           \\10.237.165.71\source_share C:\source_vol
 94.3MiB 716KiB  0           \\10.237.165.71\ROOTSHARE    C:\
 0       0       N/A         \\10.237.165.71\ipc$         N/A
 94.3MiB 716KiB  0           \\10.237.165.71\c$           C:\
== Attributes of SMB Shares ==
 Share                              Types
Remark
 source_share                       DISKTREE
 test share                         DISKTREE
 test_sh                            DISKTREE
 ROOTSHARE                          DISKTREE             \"Share mapped
to top of Vserver global namespace, created bydeux_init \"
 ipc$                               PRINTQ,SPECIAL,IPC,DEVICE
 c$                                 SPECIAL
== Permissions of SMB Shares ==
 Share                              Entity
Type
 source_share                       Everyone
Allow/Full Control
ROOTSHARE                          Everyone
Allow/Full Control
 ipc$                               Everyone
Allow/Full Control
 c$                                 Administrators
Allow/Full Control/
```

14. 執行「help」命令進行複製。

```
C:\WRSHDNT>c:\netapp\xcp\xcp help copy
c:\netapp\xcp\xcp help copy
XCP SMB 1.6; (c) 2020 NetApp, Inc.; Licensed to XXX [NetApp Inc] until
Mon Dec 31 00:00:00 2029
usage: xcp copy [-h] [-v] [-parallel <n>] [-match <filter>] [-preserve-
atime]
                [-acl] [-fallback-user FALLBACK_USER]
                [-fallback-group FALLBACK_GROUP] [-root]
                source target
positional arguments:
  source
  target
optional arguments:
  -h, --help            show this help message and exit
  -v                    increase debug verbosity
  -parallel <n>         number of concurrent processes (default: <cpu-
count>)
  -match <filter>       only process files and directories that match
the
                        filter (see `xcp help -match` for details)
  -preserve-atime       restore last accessed date on source
  -acl                  copy security information
  -fallback-user FALLBACK_USER
                        the name of the user on the target machine to
receive
                        the permissions of local (non-domain) source
machine
                        users (eg. domain\administrator)
  -fallback-group FALLBACK_GROUP
                        the name of the group on the target machine to
receive
                        the permissions of local (non-domain) source
machine
                        groups (eg. domain\administrators)
  -root                 copy acl for root directorytxt
```

15. 在目標ONTAP 系統上、取得您需要提供的本機使用者和本機群組名稱清單、作為「後援使用者」和「後援群組」引數路徑的值。

```
cluster::*> local-user show
  (vserver cifs users-and-groups local-user show)
Vserver      User Name                   Full Name
Description
------------ --------------------------- --------------------
-------------
vs1          D60AB15C2AFC4D6\Administrator
                                                                Built-in
administrator account
C2_sti96-vsim-ucs540o_cluster::*>  local-group show
  (vserver cifs users-and-groups local-group show)
Vserver        Group Name                       Description
-------------- --------------------------------
----------------------------
vs1            BUILTIN\Administrators           Built-in Administrators
group
vs1            BUILTIN\Backup Operators         Backup Operators group
vs1            BUILTIN\Guests                   Built-in Guests Group
vs1            BUILTIN\Power Users              Restricted
administrative privileges
vs1            BUILTIN\Users                    All users
5 entries were displayed
```

16. 若要將CIFS資料與ACL從來源移轉至目標、請使用「-ACL」和「-fallback-user/group」選項來執行「XCP copy」命令。

    對於「後援使用者/群組」選項、請指定Active Directory或本機使用者/群組中可找到的任何使用者或群組、以供目標系統使用。

```
C:\WRSHDNT>c:\netapp\xcp\xcp copy -acl -fallback-user
D60AB15C2AFC4D6\Administrator -fallback-group BUILTIN\Users
\\10.237.165.79\source_share \\10.237.165.89\dest_share
c:\netapp\xcp\xcp copy -acl -fallback-user D60AB15C2AFC4D6\Administrator
-fallback-group BUILTIN\Users  \\10.237.165.79\source_share
\\10.237.165.89\dest_share
XCP SMB 1.6; (c) 2020 NetApp, Inc.; Licensed to XXX [NetApp Inc] until
Mon Dec 31 00:00:00 2029
753 scanned, 0 errors, 0 skipped, 0 copied, 0 (0/s), 8s
753 scanned, 0 errors, 0 skipped, 0 copied, 0 (0/s), 13s
753 scanned, 0 errors, 0 skipped, 0 copied, 0 (0/s), 18s
ERROR failed to obtain fallback security principal "BUILTIN\Users".
Please check if the principal with the name "BUILTIN\Users" exists on
"D60AB15C2AFC4D6".
ERROR failed to obtain fallback security principal
"D60AB15C2AFC4D6\Administrator". Please check if the principal with the
name "D60AB15C2AFC4D6\Administrator" exists on "D60AB15C2AFC4D6".
ERROR failed to obtain fallback security principal "BUILTIN\Users".
Please check if the principal with the name "BUILTIN\Users" exists on
"D60AB15C2AFC4D6".
ERROR failed to obtain fallback security principal "BUILTIN\Users".
Please check if the principal with the name "BUILTIN\Users" exists on
"D60AB15C2AFC4D6".
ERROR failed to obtain fallback security principal "BUILTIN\Users".
Please check if the principal with the name "BUILTIN\Users" exists on
"D60AB15C2AFC4D6".
753 scanned, 0 errors, 0 skipped, 0 copied, 0 (0/s), 23s
ERROR failed to obtain fallback security principal
"D60AB15C2AFC4D6\Administrator". Please check if the principal with the
name "D60AB15C2AFC4D6\Administrator" exists on "D60AB15C2AFC4D6".
ERROR failed to obtain fallback security principal
"D60AB15C2AFC4D6\Administrator". Please check if the principal with the
name "D60AB15C2AFC4D6\Administrator" exists on "D60AB15C2AFC4D6".
ERROR failed to obtain fallback security principal
"D60AB15C2AFC4D6\Administrator". Please check if the principal with the
name "D60AB15C2AFC4D6\Administrator" exists on "D60AB15C2AFC4D6".
753 scanned, 0 errors, 0 skipped, 0 copied, 0 (0/s), 28s
753 scanned, 0 errors, 0 skipped, 249 copied, 24.0KiB (4.82KiB/s), 33s
753 scanned, 0 errors, 0 skipped, 744 copied, 54.4KiB (6.07KiB/s), 38s
753 scanned, 0 errors, 0 skipped, 746 copied, 54.5KiB (20/s), 43s
753 scanned, 0 errors, 0 skipped, 752 copied, 54.7KiB (1.23KiB/s), 44s
C:\WRSHDNT>
```

17. 如果「XCP copy」產生錯誤訊息「錯誤無法取得後援安全性主體」、請在hosts檔案（「C：\Windows\System32\drivers\etc\hosts」）中新增目的地方塊。

請使用下列格式輸入NetApp儲存目的地Box。

```
<data vserver data interface ip> 1 or more white spaces <cifs server
name>
```

```
cluster::*> cifs show
            Server          Status    Domain/Workgroup Authentication
Vserver     Name            Admin     Name             Style
----------- --------------- --------- ---------------- --------------
vs1         D60AB15C2AFC4D6 up        CTL              domain
C2_sti96-vsim-ucs540o_cluster::*> network interface show
            Logical    Status     Network            Current
Current Is
Cluster
            sti96-vsim-ucs540p_clus1
                         up/up    192.168.148.136/24 sti96-vsim-ucs540p
                                                                  e0a
true
            sti96-vsim-ucs540p_clus2
                         up/up    192.168.148.137/24 sti96-vsim-ucs540p
                                                                  e0b
true
vs1
            sti96-vsim-ucs540o_data1
                         up/up    10.237.165.87/20   sti96-vsim-ucs540o
                                                                  e0d
true
            sti96-vsim-ucs540o_data1_inet6
                         up/up    fd20:8b1e:b255:9155::583/64
                                                     sti96-vsim-ucs540o
                                                                  e0d
true
            sti96-vsim-ucs540o_data2
                         up/up    10.237.165.88/20   sti96-vsim-ucs540o
                                                                  e0e
true
10.237.165.87  D60AB15C2AFC4D6  -> destination box entry to be added in
hosts file.
```

18. 如果您在主機檔案中新增目的地方塊項目後仍收到「錯誤無法取得後援安全性主體」錯誤訊息、則目標系統中不存在使用者/群組。

```
C:\WRSHDNT>c:\netapp\xcp\xcp copy -acl -fallback-user
D60AB15C2AFC4D6\unknown_user -fallback-group BUILTIN\Users
\\10.237.165.79\source_share \\10.237.165.89\dest_share
c:\netapp\xcp\xcp copy -acl -fallback-user D60AB15C2AFC4D6\unknown_user
-fallback-group BUILTIN\Users  \\10.237.165.79\source_share
\\10.237.165.89\dest_share
XCP SMB 1.6; (c) 2020 NetApp, Inc.; Licensed to XXX [NetApp Inc] until
Mon Dec 31 00:00:00 2029
ERROR failed to obtain fallback security principal
"D60AB15C2AFC4D6\unknown_user". Please check if the principal with the
name "D60AB15C2AFC4D6\unknown_user" exists on "D60AB15C2AFC4D6".
ERROR failed to obtain fallback security principal
"D60AB15C2AFC4D6\unknown_user". Please check if the principal with the
name "D60AB15C2AFC4D6\unknown_user" exists on "D60AB15C2AFC4D6".
ERROR failed to obtain fallback security principal
"D60AB15C2AFC4D6\unknown_user". Please check if the principal with the
name "D60AB15C2AFC4D6\unknown_user" exists on "D60AB15C2AFC4D6".
ERROR failed to obtain fallback security principal
"D60AB15C2AFC4D6\unknown_user". Please check if the principal with the
name "D60AB15C2AFC4D6\unknown_user" exists on "D60AB15C2AFC4D6".
753 scanned, 0 errors, 0 skipped, 0 copied, 0 (0/s), 5s
753 scanned, 0 errors, 0 skipped, 0 copied, 0 (0/s), 10s
753 scanned, 0 errors, 0 skipped, 0 copied, 0 (0/s), 15s
753 scanned, 0 errors, 0 skipped, 284 copied, 27.6KiB (5.54KiB/s), 20s
753 scanned, 0 errors, 0 skipped, 752 copied, 54.7KiB (2.44KiB/s), 22s
C:\WRSHDNT>
```

19. 使用「XCP copy」（XCP複本）、以ACL移轉CIFS資料（無論是否使用根資料夾）。

    在沒有根資料夾的情況下、執行下列命令：

```
C:\WRSHDNT>c:\netapp\xcp\xcp copy -acl -fallback-user
D60AB15C2AFC4D6\Administrator -fallback-group BUILTIN\Users
\\10.237.165.79\source_share \\10.237.165.89\dest_share
c:\netapp\xcp\xcp copy -acl -fallback-user
D60AB15C2AFC4D6\Administrator -fallback-group BUILTIN\Users
\\10.237.165.79\source_share \\10.237.165.89\dest_share
XCP SMB 1.6; (c) 2020 NetApp, Inc.; Licensed to XXX [NetApp Inc] until
Mon Dec 31 00:00:00 2029
753 scanned, 0 errors, 0 skipped, 0 copied, 0 (0/s), 5s
753 scanned, 0 errors, 0 skipped, 0 copied, 0 (0/s), 10s
753 scanned, 0 errors, 0 skipped, 0 copied, 0 (0/s), 15s
753 scanned, 0 errors, 0 skipped, 210 copied, 20.4KiB (4.08KiB/s), 20s
753 scanned, 0 errors, 0 skipped, 752 copied, 54.7KiB (2.38KiB/s), 22s
C:\WRSHDNT>
```

使用root資料夾、執行下列命令：

```
C:\WRSHDNT>c:\netapp\xcp\xcp copy -acl -root  -fallback-user
D60AB15C2AFC4D6\Administrator -fallback-group BUILTIN\Users
\\10.237.165.79\source_share \\10.237.165.89\dest_share
c:\netapp\xcp\xcp copy -acl -root  -fallback-user
D60AB15C2AFC4D6\Administrator -fallback-group BUILTIN\Users
\\10.237.165.79\source_share \\10.237.165.89\dest_share
XCP SMB 1.6; (c) 2020 NetApp, Inc.; Licensed to XXX [NetApp Inc] until
Mon Dec 31 00:00:00 2029
753 scanned, 0 errors, 0 skipped, 0 copied, 0 (0/s), 5s
753 scanned, 0 errors, 0 skipped, 0 copied, 0 (0/s), 10s
753 scanned, 0 errors, 0 skipped, 0 copied, 0 (0/s), 15s
753 scanned, 0 errors, 0 skipped, 243 copied, 23.6KiB (4.73KiB/s), 20s
753 scanned, 0 errors, 0 skipped, 752 copied, 54.7KiB (6.21KiB/s), 25s
753 scanned, 0 errors, 0 skipped, 752 copied, 54.7KiB (0/s), 30s
753 scanned, 0 errors, 0 skipped, 752 copied, 54.7KiB (0/s), 35s
753 scanned, 0 errors, 0 skipped, 752 copied, 54.7KiB (0/s), 40s
753 scanned, 0 errors, 0 skipped, 752 copied, 54.7KiB (0/s), 45s
753 scanned, 0 errors, 0 skipped, 752 copied, 54.7KiB (0/s), 50s
753 scanned, 0 errors, 0 skipped, 752 copied, 54.7KiB (0/s), 55s
753 scanned, 0 errors, 0 skipped, 752 copied, 54.7KiB (0/s), 1m0s
753 scanned, 0 errors, 0 skipped, 752 copied, 54.7KiB (0/s), 1m5s
753 scanned, 0 errors, 0 skipped, 752 copied, 54.7KiB (817/s), 1m8s
C:\WRSHDNT>
```