Migrating to Azure NetApp Files using the migration assistant (API)

Private Preview

April 2025

Abstract

This document provides instructions to help you migrate your ONTAP storage or Cloud Volumes ONTAP (in GCP, AWS FSxN, Azure) to Azure NetApp Files through the migration assistant (API) leveraging NetApp® SnapMirror®.

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Contents

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A. OVERVIEW OF AZURE NETAPP FILES MIGRATION ASSISTANT (API)

The purpose of the private preview program is to provide users of Azure NetApp Files (ANF) with early access to the Azure NetApp Files migration assistant (API).

Contact your account team to request access to this private preview program.

B. TERMS FOR USING THIS PRIVATE PREVIEW FEATURE

This private preview program is offered under the Azure Preview supplemental terms of use.

This feature is controlled via Azure Feature Exposure Control (AFEC) at a subscription level. Your subscription(s) must be allow-listed by the Product Group to use this feature. Ask your account team to submit a request via Azure NetApp Files private preview feature registration form to request for allow-listing via the usual process. AFEC is ANFMigrationAssistant.

Please do not log support calls with Microsoft during the private preview period. Support during preview is via email: ng-anf-migration-assistant-customer@netapp.com

C. QUICK START GUIDES

Register for the preview AFEC	https://learn.microsoft.com/en-us/azure/azure-resource-manager/management/preview-features?tabs=azure-powershell
Calling ANF API with Postman	https://anfcommunity.com/2021/02/16/part-1-anf-api-101-with-postman/ https://anfcommunity.com/2021/04/29/part-2-anf-api-101-with-postman/
Azure API Authentication	https://learn.microsoft.com/en-us/azure/azure-netapp-files/azure-netapp-files-develop-with-rest-api#access-the-azure-netapp-files-rest-api
ANF Volume Creation via API reference	https://learn.microsoft.com/en-us/rest/api/netapp/volumes/create-or-update?view=rest-netapp-2023-07-01&tabs=HTTP
Snapmirror through a Firewall	https://docs.netapp.com/us-en/ontap/peering/prerequisites-cluster-peering-reference.html#port-requirements

D. KNOWN ISSUES

- Once the cluster peering request has been made, the peer request must be accepted within 60 minutes of making the request. If it is not accepted within 60 minutes, the request expires and there is **no retry** mechanism at this stage. You will need manual intervention from the Azure NetApp Files SRE team to perform another cluster peering request.

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E. CONSIDERATIONS AND REQUIREMENTS

- Before using this private preview feature, ensure your Azure subscription is registered for the private preview AFEC: ANFMigrationAssistant.
- You must be running ONTAP 9.10.0 or later, on your external storage cluster for compatibility with ANF.
- NetApp® SnapMirror© license entitlement needs to be obtained and applied to your external ONTAP cluster. If necessary, work with your account team so they can get an Azure Technology Specialist involved in getting this license applied to your cluster.
- Ensure your network topology is supported for Azure NetApp Files and that you have established connectivity from your external ONTAP cluster to Azure NetApp Files. See Guidelines for Azure NetApp Files network planning for support information. If you have questions about how to create and configure ExpressRoute circuits or VPNs with Azure NetApp Files, contact your Microsoft CSA.
- The delegated subnet address space for hosting the Azure NetApp Files volumes must have at least 7 free IP addresses: 6 for cluster peering and 1 for data access to the migrating volume(s). It is recommended that the delegated subnet address space is sized appropriately to accommodate additional ANF network interfaces. Review Guidelines for Azure NetApp Files network planning to ensure you meet the requirements for delegated subnet sizing.
- If this guide is being used for testing or proof of concept for migration, please make sure the SVM and volumes are created in the external cluster before running the migration steps.
- If using Azure RBAC to separate the role of ANF storage management across different security principles with the intention of separating volume management tasks where volumes may be resident on the same network sibling set, be aware that externally connected ONTAP systems that are peered to that sibling set do not adhere to these Azure defined roles. The external storage administrator may have limited visibility to all volumes in the sibling set showing storage level metadata details.
- During private preview there is limited traceability in the ANF service to capture commands performed from the external ONTAP system to ANF system over the cluster peering relationships when using the Migration Assistant feature.
- When creating each migration volume, the ANF volume placement algorithm attempts to re-use the same ANF storage system as any previously created volumes in the subscription to try to reduce the number of NICs/IPs consumed in the delegated subnet. If this is not possible, an additional 6+1 NICs will be consumed.

F. PREREQUISITES

- Customer must create Express Route or VPN resources to ensure network connectivity from the external NetApp ONTAP cluster to the target ANF cluster. This can be accomplished in many ways with the goal being that the source cluster has connectivity to the ANF delegated subnet. Connectivity includes this set of firewall rules (bidirectional for all):

  ICMP
  TCP 11104
  TCP 11105
  HTTPS

  The network connectivity must be in place for all 'intercluster' (IC) LIFs on the source cluster to all

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IC LIFs on the ANF endpoint.

G. HOW-TO GUIDE

Learn how to migrate your external ONTAP storage to Azure NetApp Files.

1. Create target migration volumes in Azure NetApp Files for each volume you plan to migrate.
   Important: Please ensure that the size and other volume properties on the target volumes match with the source, or the setup will have to be redone.
   To create the target volume, you need to issue a request to the Create Volume REST endpoint and input details for your external ONTAP Cluster in the “remotePath” name-value object. For example if your external host name is `"ntapcluster1dc1", server name is "ntapsvm1" and volume name is "volumeToMigrate"` you could use the following template:

```
PUT: https://southcentralus.management.azure.com/subscriptions/d78cbf3d-0d97-478c-9ee3-
2713d0d901a1/resourceGroups/suman-
RG/providers/Microsoft.NetApp/netAppAccounts/onpremtoanfNA/capacityPools/cp1/volumes/volumeToMigrate?api-
version=2025-01-01
Body: {
   "type":"Microsoft.NetApp/netAppAccounts/capacityPools/volumes",
   "location":"southcentralus",
   "properties":{
      "volumeType":"Migration",
      "dataProtection":{
         "replication":{
            "endpointType":"Dst",
            "replicationSchedule":"Hourly",
            "remotePath":{
               "externalHostName":"ntapcluster1dc1",
               "serverName":"ntapsvm1",
               "volumeName":"volumeToMigrate"
            }
         }
      },
      "serviceLevel":"Premium",
      "creationToken":"volumeToMigrate",
      "usageThreshold":107374182400,
      "exportPolicy":{
         "rules":[
            {
               "ruleIndex":1,
               "unixReadOnly":false,
               "unixReadWrite":true,
               "cifs":false,
               "nfsv3":true,
               "nfsv41":false,
               "allowedClients":"0.0.0.0/0",
               "kerberos5ReadOnly":false,
               "kerberos5ReadWrite":false,
               "kerberos5iReadOnly":false,
```

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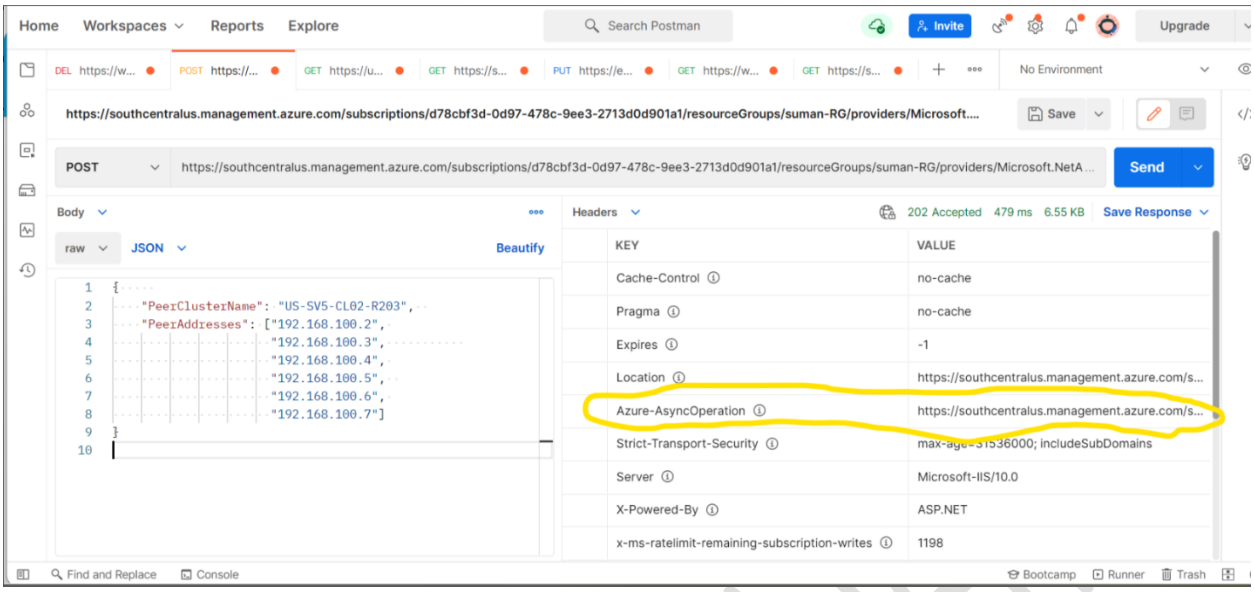
```
                "kerberos5iReadWrite":false,
                "kerberos5pReadOnly":false,
                "kerberos5pReadWrite":false,
                "hasRootAccess":true
             }
          ]
       },
       "protocolTypes":[
          "NFSv3"
       ],
       "subnetId":"/subscriptions/d78cbf3d-0d97-478c-9ee3-2713d0d901a1/resourceGroups/suman-
RG/providers/Microsoft.Network/virtualNetworks/OnPremToANFVNET/subnets/volsubnet",
       "networkFeatures":"Standard",
       "isLargeVolume":"false"
    }
}
```

2. Issue a cluster peer API request to target the migration volume in Step 1. Issue one API call for each migration volume. In this example your ONTAP cluster name would be " `ntapcluster1dc1",` and the peer IP Addresses need to match your ONTAP Intercluster interface (IC LIF) networking. Note: every node in your ONTAP systems needs an IC LIF and they all need to be listed here:

```
POST: https://southcentralus.management.azure.com/subscriptions/d78cbf3d-0d97-478c-9ee3-
2713d0d901a1/resourceGroups/suman-
RG/providers/Microsoft.NetApp/netAppAccounts/onpremtoanfNA/capacityPools/cp1/volumes/volmigration1/peerExt
ernalCluster?api-version=2025-01-01
Body: {
   "PeerClusterName":" ntapcluster1dc1",
   "PeerAddresses":[
      "192.168.100.2",
      "192.168.100.3",
      "192.168.100.4",
      "192.168.100.5",
      "192.168.100.6",
      "192.168.100.7"
   ]
}
   ]
}
```

3. After running this request, check the result header and copy the Azure-AsyncOperation ID, which you'll need for the following step.



4. Accept the Cluster Peer request from ANF on their external system. To get the ONTAP command to accept the peer request along with the passphrase you need to GET the Operations Result. This is done by using the Azure-AsyncOperation ID copied from the step before in a GET request (see example below). Since this is a long-running operation you will need to poll the request a few times until the status is "Succeeded".

Note: If the Azure-AsyncOperation does not respond with success after an hour or fails with an error the peerExternalCluster command will need to be run again. Ensure the network configuration between your external ONTAP system and your ANF delegated subnet is working before continuing.
Example:

```
GET : https://southcentralus.management.azure.com/subscriptions/d78cbf3d-0d97-478c-9ee3-
2713d0d901a1/providers/Microsoft.NetApp/locations/uksouth/operationResults/d2897183-72c8-4032-989a-
54a3cb306d2f?api-version=2025-01-01&t=638376395370620558&c=MIIHHjCCBgagAwIBAgITOgI9Ig-
plRDloSE8vgAEAj0iDzANBgkqhkiG9w0BAQsFADBEMRMwEQYKCZImiZPyLGQBGRYDR0JMMRMwEQYKCZImiZPyLGQBGRYDQU1FMRgwF
gYDVQQDEw9BTUUgSU5GUkEgQ0EgMDEwHhcNMjMxMTAxMjA0NDQwWhcNMjQxMDI2MjA0NDQwWjBAMT4wPAYDVQQDEzVhc3luY29wZXJ
hdGlvbnNpZ25pbmdjZXJ0aWZpY2F0ZS5tYW5hZ2VtZW50LmF6dXJlLmNvbTCCASIwDQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBA
Mb-UV-
VLkpVyCGTv07XQJggq35w_ljmxo2yw2cXID1iY_wnNJzz4XOXhcasH_3CTCm_x3FDY3Fn1y0xNNIXvkwBgxrOWt6gFJ396AIEq80H3
g8IXCwcgb7YCpg7rZ1NnapY3uMunsFKrDxtXz83_YMmXl7jJe1fUW-nQqJFXMARnoYpxMAmXHSDR-
ODglNrhS2DUdjOksTs6hIAapwEICiVUTgQhKM6jxhqAzr6VjO9WFjl9OELgnbJZGQ5Eyo1pE-8o_-
qSB_aCqEVodPjQo4N2tQSygSGLXMFvO0VfOtbMiealjfx7xVV3t4zw-g9-
kp04vAwyXefD9MiFft3sk0CAwEAAaOCBAswggQHMCcGCSsGAQQBgjcVCgQaMBgwCgYIKwYBBQUHAwEwCgYIKwYBBQUHAwIwPQYJKwY
BBAGCNxUHBDAwLgYmKwYBBAGCNxUIhpDjDYTVtHiE8Ys-
hZvyMENBJTIwMDEoNCkuY3J0MB0GA1UdDgQWBBTwBKBIZPGe4mdYHcMXhQi3_OkpTTAOBgNVHQ8BAf8EBAMCBaAwggE1BgNVHR8Egg
EsMIIBKDCCASSgggEgoIIBHIZCaHR0cDovL2NybC5taWNyb3NvZnQuY29tL3BraWluZnJhL0NSTC9BTUUlMjBJTkZSQSUyMENBJTIw
MDEoNCkuY3JshjRodHRwOi8vY3JsMS5hbWUuZ2JsL2NybC9BTUUlMjBJTkZSQSUyMENBJTIwMDEoNCkuY3JshjRodHRwOi8vY3JsMi
5hbWUuZ2JsL2NybC9BTUUlMjBJTkZSQSUyMENBJTIwMDEoNCkuY3JshjRodHRwOi8vY3JsMy5hbWUuZ2JsL2NybC9BTUUlMjBJTkZS
QSUyMENBJTIwMDEoNCkuY3JshjRodHRwOi8vY3JsNC5hbWUuZ2JsL2NybC9BTUUlMjBJTkZSQSUyMENBJTIwMDEoNCkuY3JsMBcGA1
```

```
UdIAQQMA4wDAYKKwYBBAGCN3sBATAfBgNVHSMEGDAWgBTl2Ztn_PjsurvwwKidileIud8-
YzAdBgNVHSUEFjAUBggrBgEFBQcDAQYIKwYBBQUHAwIwDQYJKoZIhvcNAQELBQADggEBAKx5I8zBHl5aYFpoUe5lb-
yCLJAd5iZStpJ90NJsD4jt4-JP0XnSup97AmUJxihgdIhF46U_6NIH53vH6ZPRQyeE2rng2i7BkAgFlm5DyLdFPvCIiNuA-
xBZZSKvxSdyaKD8eArFi6M0_O3_Vc6LZGPJrgTsn5CU8oVBxyTwhw5ghv5NwC5e9bzGGs6tuGTp3-
RxudxHE9HkS7cvmhzg9iKzHyYUuDLuEbLDg4_jaU8QEM62lK1KTVm4RDP_8Cco5lUhFsV8cKMD14lqtDNGI54TTR9gFJ4vU5H2JdPm
KcucDb1RmEkolUg19huASyLTfzJxSw4-
iVbRkmaWB811wkU&s=LslmttkogqEHkP4r1ge3AKg4C4nVTKgAELY0n8OBBfJ9cnRGkSdu7CjlyJUPeCkR0eNTK_aVwx15c9rZjp83
1FzncQGnYlZaw3TmL1ZYcwanvU-rQL4Fmmo3YykomcK1yhNPBJ6e3087xFz2JxzqZinE30ip1G7Q5uvgU_yMRl79S-
FQLDXsQh_LdcIUxAcfjMNdkjEs54rj0nzu1vQ1e1mklgHv-Rqp-
K1E2WYM0Eg04b8pwNmH_i0ASZ7UU7hGStfWetPoIDu2iumeQ9Atf43HURdxVaa9ZPhCg-
do7LdtU5YGfQ8oEhxQnehDX8ypPEgVWeqIkgHeJNeAKmNeww&h=B9J3NJmr2PSrQOeKfPdoIiGRWv8R0PmxH86yIalfcTY
```

Example Response


```
{
    "id": "/subscriptions/d78cbf3d-0d97-478c-9ee3-
2713d0d901a1/providers/Microsoft.NetApp/locations/southcentralus/operationResults/62215c87-50a9-455f-b3e3-
5162c31def52",
    "name": "62215c87-50a9-455f-b3e3-5162c31def52",
    "status": "Succeeded",
    "name": "37c9cca4-fd4a-452e-87fb-e01a55459989",
    "status": "Succeeded",
    "startTime": "2023-11-02T07:48:53.6563893Z",
    "endTime": "2023-11-02T07:53:25.3253982Z",
    "percentComplete": 100.0,
    "properties": {
        "peerAcceptCommand": "cluster peer create -ipspace <IP-SPACE-NAME> -encryption-protocol-proposed
tls-psk -peer-addrs 172.16.2.6,172.16.2.5,172.16.2.9,172.16.2.8,172.16.2.17,172.16.2.7",
        "passphrase": "Uv9oCgzlHQJoOOOFN6Y3blah"
    }
}
```


After receiving the response, you must copy-paste (and update) the contents of the "peerAcceptCommand" string into their ONTAP terminal, followed by the passphrase string.

Note: If the peerAcceptCommand string is empty in the response, this step can be skipped for the corresponding migration volume. The peering was already in place as the subsequent migration volume was placed on the same ANF system as the previous migration volume.

5. Issue an "authorizeExternalReplication" API request for the migration volumes (repeat this for each on-prem → target volume pair)

   Example:

```
POST: https://southcentralus.management.azure.com/subscriptions/d78cbf3d-0d97-478c-9ee3-
2713d0d901a1/resourceGroups/suman-
RG/providers/Microsoft.NetApp/netAppAccounts/onpremtoanfNA/capacityPools/cp1/volumes/volmigration1/authori
zeExternalReplication?api-version=2025-01-01
```

6. Accept the SVM Peer Request from ANF to their On-Prem system, by running the accept command on ONTAP. To get the ONTAP command to accept the SVM peer request you will need to GET the Operations Result.
   This is done by using the Azure-AsyncOperation ID copied from step 4. in a GET request (see example below). Since this is a long-running operation the customer needs to poll the request a few times until the status is "Succeeded". Example:

```
GET : https://southcentralus.management.azure.com/subscriptions/d78cbf3d-0d97-478c-9ee3-
2713d0d901a1/providers/Microsoft.NetApp/locations/uksouth/operationResults/d2897183-72c8-4032-989a-
54a3cb306d2f?api-version=2025-01-01&t=638376395370620558&c=MIIHHjCCBgagAwIBAgITOgI9Ig-
plRDloSE8vgAEAj0iDzANBgkqhkiG9w0BAQsFADBEMRMwEQYKCZImiZPyLGQBGRYDR0JMMRMwEQYKCZImiZPyLGQBGRYDQU1FMRgwFgYDV
QQDEw9BTUUgSU5GUkEgQ0EgMDEwHhcNMjMxMTAxMjA0NDQwWhcNMjQxMDI2MjA0NDQwWjBAMT4wPAYDVQQDEzVhc3luY29wZXJhdGlvbnN
pZ25pbmdjZXJ0aWZpY2F0ZS5tYW5hZ2VtZW50LmF6dXJlLmNvbTCCASIwDQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBAMb-UV-
VLkpVyCGTv07XQJggq35w_ljmxo2yw2cXID1iY_wnNJzz4XOXhcasH_3CTCm_x3FDY3Fn1y0xNNIXvkwBgxrOWt6gFJ396AIEq80H3g8IX
Cwcgb7YCpg7rZ1NnapY3uMunsFKrDxtXz83_YMmXl7jJe1fUW-nQqJFXMARnoYpxMAmXHSDR-
ODglNrhS2DUdjOksTs6hIAapwEICiVUTgQhKM6jxhqAzr6VjO9WFjl9OELgnbJZGQ5Eyo1pE-8o_-
qSB_aCqEVodPjQo4N2tQSygSGLXMFvO0VfOtbMiealjfx7xVV3t4zw-g9-
_OkHRwOi8vY3JsMS5hbWUuZ2JsL2NybC9BTUUlMjBJTkZSQSUyMENBJTIwMDEoNCkuY3JshjRodHRwOi8vY3JsMi5hbWUuZ2JsL2NybC9B
TUUlMjBJTkZSQSUyMENBJTIwMDEoNCkuY3JshjRodHRwOi8vY3JsMy5hbWUuZ2JsL2NybC9BTUUlMjBJTkZSQSUyMENBJTIwMDEoNCkuY3
JshjRodHRwOi8vY3JsNC5hbWUuZ2JsL2NybC9BTUUlMjBJTkZSQSUyMENBJTIwMDEoNCkuY3JsMBcGA1UdIAQQMA4wDAYKKwYBBAGCN3sB
ATAfBgNVHSMEGDAWgBTl2Ztn_PjsurvwwKidileIud8-
YzAdBgNVHSUEFjAUBggrBgEFBQcDAQYIKwYBBQUHAwIwDQYJKoZIhvcNAQELBQADggEBAKx5I8zBHl5aYFpoUe5lb-
yCLJAd5iZStpJ90NJsD4jt4-JP0XnSup97AmUJxihgdIhF46U_6NIH53vH6ZPRQyeE2rng2i7BkAgFlm5DyLdFPvCIiNuA-
xBZZSKvxSdyaKD8eArFi6M0_O3_Vc6LZGPJrgTsn5CU8oVBxyTwhw5ghv5NwC5e9bzGGs6tuGTp3-
RxudxHE9HkS7cvmhzg9iKzHyYUuDLuEbLDg4_jaU8QEM62lK1KTVm4RDP_8Cco5lUhFsV8cKMD14lqtDNGI54TTR9gFJ4vU5H2JdPmKcuc
Db1RmEkolUg19huASyLTfzJxSw4-
iVbRkmaWB811wkU&s=LslmttkogqEHkP4r1ge3AKg4C4nVTKgAELY0n8OBBfJ9cnRGkSdu7CjlyJUPeCkR0eNTK_aVwx15c9rZjp831Fzn
cQGnYlZaw3TmL1ZYcwanvU-rQL4Fmmo3YykomcK1yhNPBJ6e3087xFz2JxzqZinE30ip1G7Q5uvgU_yMRl79S-
FQLDXsQh_LdcIUxAcfjMNdkjEs54rj0nzu1vQ1e1mklgHv-Rqp-
K1E2WYM0Eg04b8pwNmH_i0ASZ7UU7hGStfWetPoIDu2iumeQ9Atf43HURdxVaa9ZPhCg-
do7LdtU5YGfQ8oEhxQnehDX8ypPEgVWeqIkgHeJNeAKmNeww&h=B9J3NJmr2PSrQOeKfPdoIiGRWv8R0PmxH86yIalfcTY
```

Example response:


```
{
    "id": "/subscriptions/d78cbf3d-0d97-478c-9ee3-
2713d0d901a1/providers/Microsoft.NetApp/locations/southcentralus/operationResults/62215c87-50a9-455f-b3e3-
5162c31def52",
    "name": "62215c87-50a9-455f-b3e3-5162c31def52",
    "status": "Succeeded",
    "name": "37c9cca4-fd4a-452e-87fb-e01a55459989",
    "status": "Succeeded",
    "startTime": "2023-11-02T07:48:53.6563893Z",
    "endTime": "2023-11-02T07:53:25.3253982Z",
    "percentComplete": 100.0,
    "properties": {
        "svmPeeringCommand": "vserver peer accept -vserver ntapsvm1 -peer-vserver anf-svm-name",
    }
}
```


   After receiving the response, the customer can copy-paste the contents of the "svmPeeringCommand" string into their ONTAP terminal.

7. When baseline transfers have completed from the on-prem volumes to the ANF migration volumes you may pick a time to offline the systems to prevent new data writes. There are no ANF actions for this step.

8. **If there have been changes in the data after the baseline transfer was completed, this step can be run as desired to make sure incremental changes have been migrated.**
   Issue an ad-hoc "Perform Replication Transfer" request to capture any incremental data written after the baseline transfer was completed. This is done once for each migration volume.

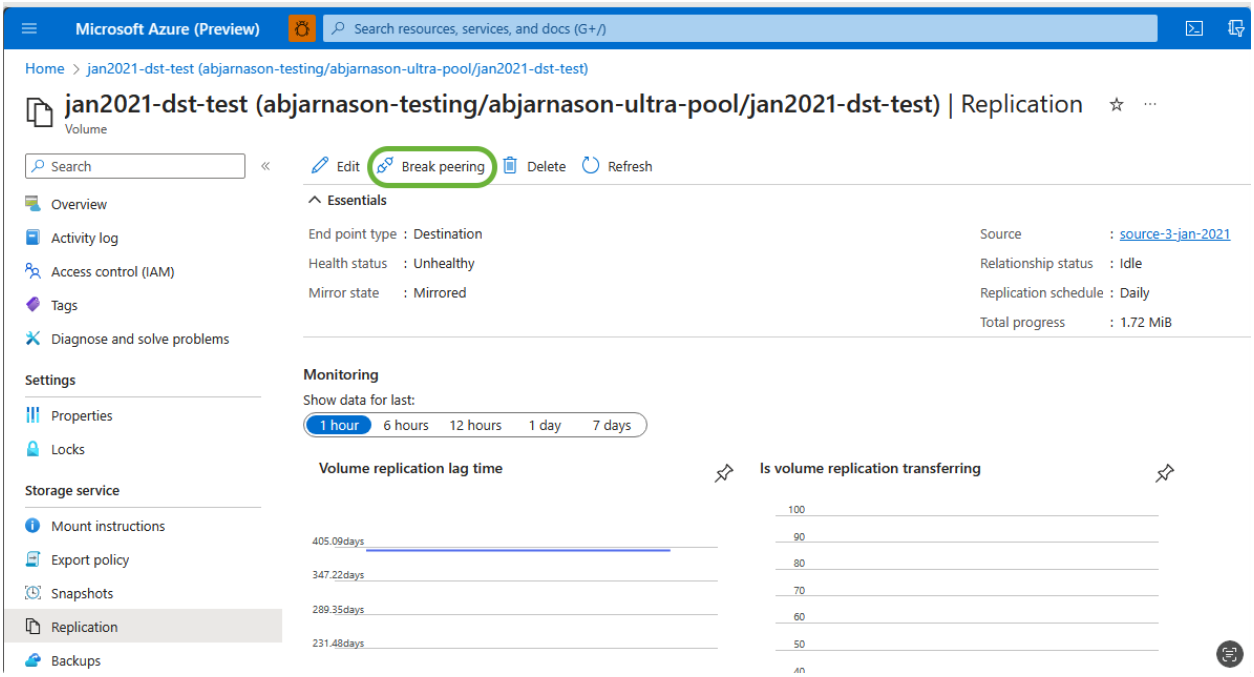
```
POST: https://southcentralus.management.azure.com/subscriptions/d78cbf3d-0d97-478c-9ee3-2713d0d901a1/resourceGroups/suman-RG/providers/Microsoft.NetApp/netAppAccounts/onpremtoanfNA/capacityPools/cp1/volumes/onpremdpvol23/performReplicationTransfer?api-version=2025-01-01
```

9. Break the replication either via the Portal "Break replication" button or by issuing an API call. Release the source volumes from the external storage then delete the migration replications from Azure NetApp Files.
   Examples:

API Break Replication:

POST: https://southcentralus.management.azure.com/subscriptions/d78cbf3d-0d97-478c-9ee3-2713d0d901a1/resourceGroups/suman-RG/providers/Microsoft.NetApp/netAppAccounts/onpremtoanfNA/capacityPools/cp1/volumes/onpremdpvol23/breakReplication?api-version=2025-01-01

Portal Break replication:



NOTE: from this point here, do not run any snapmirror related commands from your external related to this migration volume relationship. Do not run snapmirror delete or snapmirror release commands as these will leave the ANF volume in an unuable state. Use the following API to remove the relationship.

10. Perform a request to the "finalizeExternalReplication" API to delete the migration replication. If the deleted replication is the last migration replication associated with the subscription, then the associated cluster peer and IC-LIFs are deleted.

    API Finalize Migration:

```
POST: https://southcentralus.management.azure.com/subscriptions/d78cbf3d-0d97-478c-9ee3-2713d0d901a1/resourceGroups/suman-RG/providers/Microsoft.NetApp/netAppAccounts/onpremtoanfNA/capacityPools/cp1/volumes/onpremdpvol23/finalizeExternalReplication?api-version=2025-01-01
```

H. VERSION HISTORY

Version	Date	Document Version History
Version 1.0	November 2023	Initial release for private preview
Version 1.1	December 2023	Updated examples with more details
Version 1.2	December 2023	Updated consideration section
Version 1.3	October 2024	Updated 'How-to-guide' and 'Considerations and Requirements' sections.
Version 1.4	March 2025	Updated API examples to latest version
Version 1.5	April 2025	Updated considerations section

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