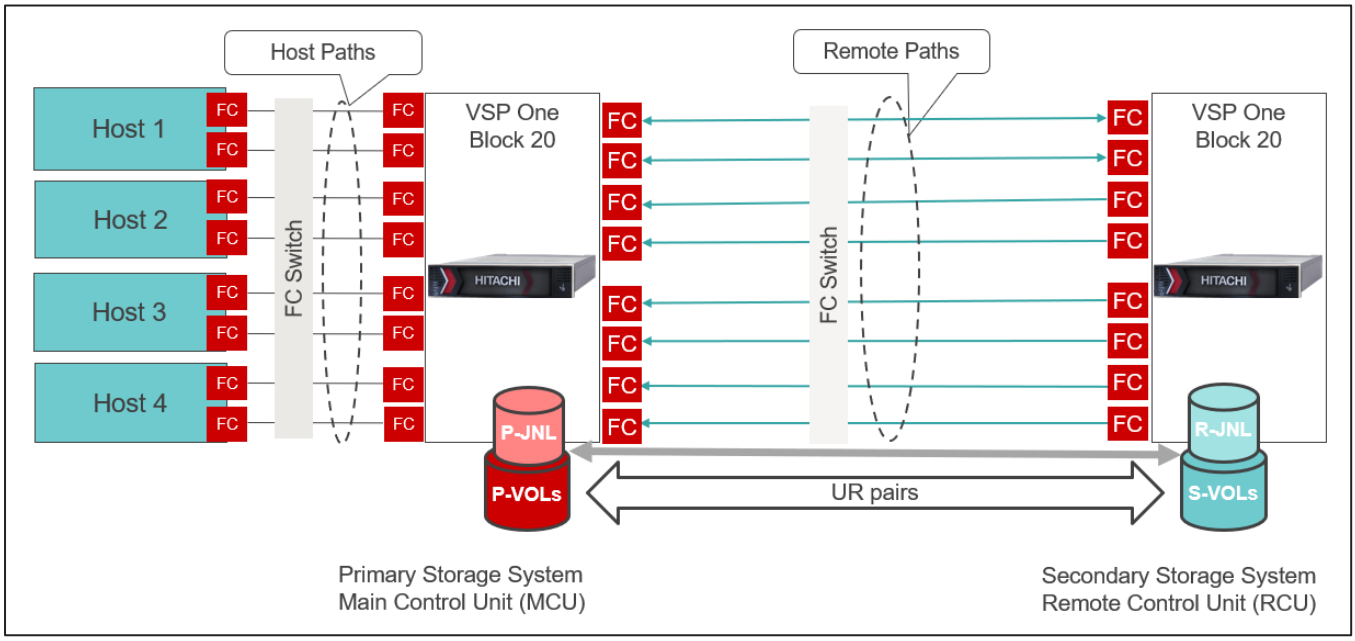
Deploy Universal Replicator using REST API

Universal Replicator (UR) is an asynchronous data replication solution for business continuity and disaster recovery across distances. Using disk-based journaling, the UR efficiently replicates changed data from the primary storage system to the secondary storage system, ensuring data consistency with minimal impact on primary system performance. The flexible design of UR supports various configurations, including long-distance setups and integration with other Hitachi data protection technologies.

Get started with these simple steps on how you can deploy UR using REST API:



Step 1: Complete the prerequisites

- Provision the data volumes and volumes for journals on the designated pools in both storage systems.
- Establish Fibre Channel (FC) zoning or IP network connectivity between the Main Control Unit (MCU) and Remote Control Unit (RCU).
- Make sure you have sufficient privileges to run replication REST API commands.

Data sample used in this guide:

Resource	Value
Primary storage system	Primary storage system serial number: *<primarySerialNumber>*
Secondary storage system	Secondary storage system serial number: *<remoteSerialNumber>*
Storage Type ID	For VSP One Block 20: M8
Replication ports	Primary storage system: CL7-A, CL8-A Secondary storage system: CL7-A, CL4-A
Journals in primary storage system.	Primary storage system ldev id for journal: 1102

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Resource	Value
	Primary storage system journal ID: 0
Journals in secondary storage system.	Secondary storage system ldev id for journal: 1102 Secondary storage system journal ID: 0
UR pair	copyGroupName: hur0 copyPairName: pair1 pvolLdevId: 1000 svolLdevId: 1000

Step 2: Authenticate the storage system

1. Authenticate to the primary storage system and generate a token for REST API requests.

   Command:

   ```
   curl -k -H "Accept:application/json" -H "Content-Type:application/json" -u
   maintenance: <maintenance-user-password> -X POST
   https://<Service_IP_Address_of_VSP_One_Block_20>/ConfigurationManager/v1/objects/se
   ssions/ -d ""
   ```

   Output:

   ```
   {
     "token" : "<32-character HEX string>",
     "sessionId" : 380
   }
   ```

2. Authenticate to the secondary storage system and generate a token for REST API requests.

   Command:

   ```
   curl -k -H "Accept:application/json" -H "Content-Type:application/json" -u
   maintenance: <maintenance-user-password> -X POST
   https://<Service_IP_Address_of_VSP_One_Block_20>/ConfigurationManager/v1/objects/se
   ssions/ -d ""
   ```

   Output:

   ```
   {
     "token" : "<32-character HEX string>”,
     "sessionId" : 381
   }
   ```

Step 3: Add remote connections

1. Define a remote path group with the initial path from the primary to the secondary storage system.

   Request line:

   ```
   POST base-URL/v1/objects/remotepath-groups
   ```

   Example:

   ```
   curl -v -H "Accept:application/json" -H "Content-Type:application/json" -H
   "Authorization:Session 38845b06f2e144dd9c1c8658a0047dde" -X POST --data-binary
   @./remote_path.json http://<Service_IP_Address_of_VSP_One_Block_20>/ConfigurationMa
   nager/v1/objects/remotepath-groups
   ```


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remote_path.json example:

```
{
 "remoteStorageDeviceId": <remoteSerialNumber>,
 "pathGroupId": 0,
 "localPortId": "CL7-A",
 "remotePortId": "CL7-A"
}
```

2. Add a secondary path for redundancy and load balancing to connect to the remote storage system.

   Request line:

   ```
   POST base-URL/v1/objects/remotepath-groups/<object-ID>/actions/add-
   remotepath/invoke
   ```

   Where *object-ID* is *remoteSerialNumber,remoteStorageTypeId,pathGroupId*

   Example:

   ```
   curl -v -H "Accept:application/json" -H "Content-Type:application/json" -H
   "Authorization:Session 26a83ef14030408581a8c1d88e18f1f5" -X PUT --data-binary
   @./remote_path_addition.json http://<Service_IP_Address_of_VSP_One_Block_20>/Config
   urationManager/v1/objects/remotepath-groups/<remoteSerialNumber>,M8,0/actions/add-
   remotepath/invoke
   ```

   remote_path_addition.json example:

   ```
   {
    "parameters": {
    "localPortId": "CL8-A",
    "remotePortId": "CL4-A"
    }
   }
   ```

3. Similarly, add a path from the secondary to the primary storage system.

   Request line:

   ```
   POST base-URL/v1/objects/remotepath-groups
   ```

   Example:

   ```
   curl -v -H "Accept:application/json" -H "Content-Type:application/json" -H
   "Authorization:Session 38845b06f2e144dd9c1c8658a0047dde" -X POST --data-binary
   @./remote_path.json http://<Service_IP_Address_of_VSP_One_Block_20>/ConfigurationMa
   nager/v1/objects/remotepath-groups
   ```

   remote_path.json example:

   ```
   {
    "remoteStorageDeviceId": <primarySerialNumber>,
    "pathGroupId": 0,
    "localPortId": "CL7-A",
    "remotePortId": "CL7-A"
   }
   ```

   Request line:

   ```
   POST base-URL/v1/objects/remotepath-groups/object-ID/actions/add-remotepath/invoke
   ```


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Where *object-ID* is *remoteSerialNumber,remoteStorageTypeId,pathGroupId*

Example:

```
curl -v -H "Accept:application/json" -H "Content-Type:application/json" -H
"Authorization:Session 26a83ef14030408581a8c1d88e18f1f5" -X PUT --data-binary
@./remote_path_addition.json http://<Service_IP_Address_of_VSP_One_Block_20>/Config
urationManager/v1/objects/remotepath-groups/<primarySerialNumber>,M8,0/actions/add-
remotepath/invoke
```

remote_path_addition.json example:

```
{
 "parameters": {
 "localPortId": "CL4-A",
 "remotePortId": "CL8-A"
 }
}
```

4. Verify the remote paths:

Request line:

```
GET base-URL/v1/objects/remotepath-groups/object-ID
```

Example:

```
curl -v -H "Accept:application/json" -H "Content-Type:application/json" -H
"Authorization:Session 26a83ef14030408581a8c1d88e18f1f5" -X GET http://
<Service_IP_Address_of_VSP_One_Block_20>/ConfigurationManager/v1/objects/remotepath
-groups/<remoteSerialNumber>,M8,0
```

Output:

```
{
    "remotepathGroupId": "810158,M8,0",
    "remoteStorageDeviceId": "A34000810158",
    "remoteSerialNumber": "810158",
    "remoteStorageModel": "VSP One B26",
    "remoteStorageTypeId": "M8",
    "pathGroupId": 0,
    "remotePaths": [
        {
            "cuType": "REMOTE",
            "portType": "FIBRE",
            "pathNumber": 0,
            "localPortId": "CL7-A",
            "remotePortId": "CL7-A",
            "pathStatus": "NML_01"
        },
        {
            "cuType": "REMOTE",
            "portType": "FIBRE",
            "pathNumber": 1,
            "localPortId": "CL8-A",
            "remotePortId": "CL8-A",
            "pathStatus": "NML_01"
        }
    ]
}
```


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Step 4: Create journals

1. Define journals on both storage systems.

   Request line:

   ```
   POST base-URL/v1/objects/journals
   ```

   Example:

   ```
   curl -v -H "Accept:application/json" -H "Content-Type:application/json" -H
   "Authorization:Session 26a83ef14030408581a8c1d88e18f1f5" -X POST --data-binary
   @./journal.json http://<Service_IP_Address_of_VSP_One_Block_20>/ConfigurationManage
   r/v1/objects/journals
   ```

   journal.json example:

   ```
   {
       "journalId": 0,
       "ldevIds": [1102]
   }
   ```

2. (Optional) Increase the journal copy speed to reduce copy time; however, it may affect I/O performance.

   Request line:

   ```
   PATCH base-URL/v1/objects/journals/object-ID
   ```

   Example:

   ```
   curl -v -H "Accept:application/json" -H "Content-Type:application/json" -H
   "Authorization:Session 26a83ef14030408581a8c1d88e18f1f5" -X PATCH --data-binary
   @./journal_speed.json http://<Service_IP_Address_of_VSP_One_Block_20>/Configuration
   Manager/v1/objects/journals/0
   ```

   Values for copy speed are:

   L: Low speed (default)
   M: Medium speed
   H: High speed

   journal_speed.json example:

   ```
   {
    "mirrorUnit": {
    "muNumber": 0,
    "copyPace": "M"
    }
   }
   ```

Step 5: Create a UR pair

1. Create a new copy group and add a pair to the copy group:

   Request line:

   ```
   POST base-URL/v1/objects/remote-mirror-copypairs
   ```

   Example:

   ```
   curl -v -H "Accept: application/json" -H "Content-Type: application/json" -H
   "Authorization:Session 69858185d3d44b20bc1ca0bea9e4cb6a" -H "Remote-
   Authorization:Session 59f14dc1ee424b5fb52779ba6d5f2827" --
   data- binary @./hur.json http://<Service_IP_Address_of_VSP_One_Block_20>/Configurat
   ionManager/v1/objects/remote-mirror-copypairs
   ```


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hur.json example:

```
{
 "copyGroupName": "hur0",
 "copyPairName": "pair1",
 "replicationType": "UR",
 "remoteStorageDeviceId": <remoteSerialNumber>,
 "pvolLdevId": 1000,
 "svolLdevId": 1000,
 "pvolJournalId": 0,
 "svolJournalId": 0,
 "pathGroupId": 0,
 "localDeviceGroupName": "hur0",
 "remoteDeviceGroupName": "hur0",
 "isNewGroupCreation": true,
 "fenceLevel": "ASYNC",
 "muNumber": 0,
 "consistencyGroupId": 0,
 "doInitialCopy": true,
 "doDeltaResyncSuspend": false,
 "isDataReductionForceCopy": true
}
```

2. (Optional) To add more volumes to the replication group, add the pair to an existing copy group:

   Request line:

   ```
   POST base-URL/v1/objects/remote-mirror-copypairs
   ```

   Example:

   ```
   curl -v -H "Accept:application/json" -H "Content-Type:application/json" -H
   "Authorization:Session fdfdf0d0e2604d24ba9ca4910b069853" -H "Remote-
   Authorization:Session 25e007a224a94edc9dfbdf1534fcea5a" --data-binary
   @./hur3.json http://<Service_IP_Address_of_VSP_One_Block_20>//ConfigurationManager/
   v1/objects/remote-mirror-copypairs
   ```

   hur3.json example:

   ```
   {
    "copyGroupName": "hur0",
    "copyPairName": "pair2",
    "replicationType": "UR",
    "remoteStorageDeviceId": <remoteSerialNumber>,
    "pvolLdevId": 1001,
    "svolLdevId": 1001,
    "localDeviceGroupName": "hur0",
    "remoteDeviceGroupName": "hur0",
    "isNewGroupCreation": false,
    "fenceLevel": "ASYNC",
    "consistencyGroupId": 0,
    "doInitialCopy": true,
    "doDeltaResyncSuspend": false,
    "isDataReductionForceCopy": true
   }
   ```

3. Verify the pair status of the remote copy group:

   Request line:

   ```
   GET base-URL/v1/objects/remote-mirror-copygroups/object-ID
   ```

   Where *Object-ID* is *remoteStorageDeviceId,copyGroupName,localDeviceGroupName,remoteDeviceGroupName*

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Example:

```
curl -v -H "Accept:application/json" -H "Content-Type:application/json" -H
"Authorization:Session 13794189cb294351b00849ad256e9fe2" -H "Remote-
Authorization:Session dbd832abb3c54cdba981bfdb09ff4718" -X GET
http://<Service_IP_Address_of_VSP_One_Block_20>/ConfigurationManager/v1/objects//re
mote-mirror-copygroups//<primarySerialNumber>,hur0,hur0,hur0
```

Summary

Universal Replicator helps recover processing operations during a disaster. It copies data asynchronously from primary volumes (P-VOLs) at the main data center to secondary volumes (S-VOLs) at a remote site.

References

- Universal Replicator User Guide
- REST API Reference Guide for VSP One Block Administrator
- Universal Replicator Best Practices

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