Replicating Data

Replication uses one of your snapshot schedules to automatically copy snapshots to a destination volume in a remote data center. The copies can be recovered in the remote site if a catastrophic event occurs or your data becomes corrupted.

Replication keeps your data in sync in two different locations. If you want to clone your volume and use it independently from the original volume, see [Creating a duplicate Block Volume](https://cloud.ibm.com/docs/BlockStorage?topic=BlockStorage-duplicatevolume).

Before you can replicate, you must create a snapshot schedule. The option to **Order Replica** does not appear unless this condition is met.

**Determining the remote data center for my replicated storage volume**

IBM Cloud®'s data centers are paired into primary and remote combinations worldwide. See Table 1 for the complete list of data center availability and replication targets.

Scroll for more

| **US 1** | **US 2** | **Latin America** | **Canada** | **Europe** | **Asia-Pacific** | **Australia** |
| --- | --- | --- | --- | --- | --- | --- |
| DAL05 DAL06 HOU02 SJC01 WDC01 | SJC03 SJC04 WDC04 WDC06 WDC07 DAL09 DAL10 DAL12 DAL13 | MEX01 SAO01 | TOR01 MON01 | AMS01 AMS03 FRA02 FRA04 FRA05 LON02 LON04 LON05 LON06 OSL01 PAR01 MIL01 | HKG02 TOK02 TOK04 TOK05 OSA21 OSA22 OSA23 SNG01 SEO01 CHE01 | SYD01 SYD04 SYD05 MEL01 |
| Table 1 - This table shows the complete list of data centers with enhanced capabilities in each region. Every region is a separate column. Some cities, such as Dallas, San Jose, Washington DC, Amsterdam, Frankfurt, London, and Sydney have multiple data centers. Data centers in US 1 region do NOT have enhanced storage. Hosts in data centers with enhanced storage capabilities can't start replication with replica targets in US 1 data centers. | | | | | | |

**Creating the initial replica**

Replications work based on a snapshot schedule. You must first have snapshot space and a snapshot schedule for the source volume before you can replicate. If you try to set up replication and one or the other isn't in place, you are going to be prompted to purchase more space or set up a schedule. Replications are managed under **Storage**, **Block Storage** in the [IBM Cloud® console](https://cloud.ibm.com/classic).

1. Click the name of your storage volume to display its details.
2. Click **Actions** and click **Order Replica**.
3. Select the existing snapshot schedule that you want your replication to follow. The list contains all of your active snapshot schedules.  
   You can select only one schedule even if you have a mix of hourly, daily, and weekly. All snapshots that were captured since the previous replication cycle, are replicated regardless of the schedule that originated them.  
   For more information, see [Working with Snapshots](https://cloud.ibm.com/docs/BlockStorage?topic=BlockStorage-snapshots).
4. Select a **Location** for the replica volume.
5. Click **Continue**.
6. Enter in a **Promo Code** if you have one, and click **Recalculate**. The other fields in the window are completed by default.

Discounts are applied when the order is processed.

1. Review your order, and click the **I have read the Master Service Agreement…** check box.
2. Click **Place Order**.

**Editing an existing replication**

You can edit your replication schedule, and change your replication space from either the **Primary** or **Replica** tab under **Storage**, **Block Storage** in the [IBM Cloud® console](https://cloud.ibm.com/classic).

**Editing the replication schedule**

The replication schedule is based on an existing snapshot schedule. To change the replica schedule from Hourly to Daily or Weekly or vice versa, you must cancel the replica volume and set up a new one.

However, if you want to change the time of day when your **Daily** replication occurs, you can adjust the existing schedule on the Primary or Replica tab.

1. Click **Actions** on either the **Primary** or **Replica** tab.
2. Select **Edit Snapshot Schedule**.
3. Look in the **Snapshot** frame under **Schedule** to determine which schedule you're using for replication. Change the schedule that you want.
4. Click **Save**.

**Changing the Replication space**

Your primary snapshot space and your replica space must be the same. If you change the space on the **Primary** or **Replica** tab, it automatically adds space to both your source and destination data centers. Increasing snapshot space triggers an immediate replication update also.

1. Click **Actions** on either the **Primary** or **Replica** tab.
2. Select **Change Snapshot Space**.
3. Select the storage size from the list and click **Continue**.
4. Enter in a **Promo Code** if you have one and click **Recalculate**. The other fields in the dialog box are completed by default.
5. Click the **I have read the Master Service Agreement…** check box and click **Place Order**.

**Viewing the replica volumes in the Block Storage List**

You can view your replication volumes on the Block Storage page under **Storage > Block Storage**. Original and Replica volumes are grouped. The **LUN Name** shows the primary volume's name followed by REP. The **Type** is Endurance or Performance – Replica.

**Viewing a replicated volume's details at the replica data center**

You can view the replica volume details by clicking the **Replica** tab when you're looking at details of the original volume. Another option is to select the replica volume from the **Block Storage** list, and click the **Replica** tab.

**Increasing the Snapshot space in the replica data center when Snapshot space is increased in the primary data center**

Your volume sizes must be the same for your primary and replica storage volumes. One can't be larger than the other. When you increase your snapshot space for your primary volume, the replica space is automatically increased. Increasing snapshot space triggers an immediate replication update. The increase to both volumes shows as line items on your invoice and is prorated as necessary.

For more information about increasing Snapshot space, see [Ordering Snapshots](https://cloud.ibm.com/docs/BlockStorage?topic=BlockStorage-orderingsnapshots).

**Viewing replication history**

Replication history can be viewed in the **Audit Log** on the **Account** tab under **Manage**. Both the primary and replica volumes display identical replication histories. The history includes the following items.

* The type for replication (failover or failback).
* The time the replication started.
* The snapshot that was used for the replication.
* The size of the replication.
* The time when the replication is completed.

**Creating a duplicate of a replica**

You can create a duplicate of an existing IBM Cloud® IBM Cloud™ Block Storage. The duplicate volume inherits the capacity and performance options of the original volume by default and has a copy of the data up to the point-in-time of a snapshot.

Duplicates can be created from both primary and replica volumes. The new duplicate is created in the same data center as the original volume. If you create a duplicate from a replica volume, the new volume is created in the same data center as the replica volume.

Duplicate volumes can be accessed by a host for read/write as soon as the storage is provisioned. However, snapshots and replication aren't allowed until the data copy from the original to the duplicate is complete.

For more information, see [Creating a duplicate Block Storage](https://cloud.ibm.com/docs/BlockStorage?topic=BlockStorage-duplicatevolume).

**Using replicas to failover when disaster strikes**

When you fail over, you’re "flipping the switch" from your storage volume in your primary data center to the destination volume in your remote data center. For example, your primary data center is London and your secondary data center is Amsterdam. If a failure event occurs, you’d fail over to Amsterdam – connecting to the now-primary volume from a compute instance in Amsterdam. After your volume in London is repaired, a snapshot is taken of the Amsterdam volume to fail back to London and the once-again primary volume from a compute instance in London.

* If the primary location is in imminent danger or severely impacted, see [Failover with an accessible Primary volume](https://cloud.ibm.com/docs/BlockStorage?topic=BlockStorage-dr-accessible).
* If the primary location is down, see [Failover with an inaccessible Primary volume](https://cloud.ibm.com/docs/BlockStorage?topic=BlockStorage-dr-inaccessible).

**Canceling an existing replication**

You can cancel replication either immediately or on the anniversary date, which causes billing to end. Replication can be canceled from either the **Primary** or the **Replica** tabs.

1. Click the volume on the **Block Storage** page.
2. Click **Actions** on either the **Primary** or **Replica** tab.
3. Select **Cancel Replica**.
4. Select when to cancel. Choose **Immediately** or **Anniversary Date**, and click **Continue**.
5. Click **I acknowledge that due to cancellation, data loss may occur**, and click **Cancel Replica**.

**Canceling replication when the primary volume is canceled**

When a primary volume is canceled, the replication schedule and the volume in the replica data center are deleted. Replicas are canceled from the Block Storage page.

1. Click the volume name on the **Block Storage** page.
2. On the **Block Storage** Detail page, click **Actions**, and select **Cancel Replica**.
3. Select when to cancel. Choose **Immediately** or **Anniversary Date**, and click **Continue**.
4. Confirm that you understand that data loss might occur when you cancel the volume by checking the box.
5. Click **Cancel Replica**.

You can expect the LUN to remain visible in your Storage list for at least 24 hours (immediate cancellation) or until the anniversary date. Certain features aren't going to be available any longer, but the volume remains visible until it's reclaimed. However, billing is stopped immediately after you click Delete/Cancel Replica.

Active replicas can block reclamation of the Storage volume. Make sure that the volume is no longer mounted, host authorizations are revoked, and replication is canceled before you attempt to cancel the original volume.

**Replication-related commands in SLCLI**

* List suitable replication datacenters for a specific volume.
* # slcli block replica-locations --help
* Usage: slcli block replica-locations [OPTIONS] VOLUME\_ID
* Options:
* --sortby TEXT Column to sort by
* --columns TEXT Columns to display. Options: ID, Long Name, Short Name
* -h, --help Show this message and exit.
* Order a Block Storage replica volume.
* # slcli block replica-order --help
* Usage: slcli block replica-order [OPTIONS] VOLUME\_ID
* Options:
* -s, --snapshot-schedule [INTERVAL|HOURLY|DAILY|WEEKLY]
* Snapshot schedule to use for replication,
* (INTERVAL | HOURLY | DAILY | WEEKLY)
* [required]
* -l, --location TEXT Short name of the data center for the
* replicant (e.g.: dal09) [required]
* --tier [0.25|2|4|10] Endurance Storage Tier (IOPS per GB) of the
* primary volume for which a replicant is
* ordered [optional]
* --os-type [HYPER\_V|LINUX|VMWARE|WINDOWS\_2008|WINDOWS\_GPT|WINDOWS|XEN]
* Operating System Type (e.g.: LINUX) of the
* primary volume for which a replica is
* ordered [optional]
* -h, --help Show this message and exit.
* List existing replicant volumes for a block volume.
* # slcli block replica-partners --help
* Usage: slcli block replica-partners [OPTIONS] VOLUME\_ID
* Options:
* --sortby TEXT Column to sort by
* --columns TEXT Columns to display. Options: ID, Username, Account ID,
* Capacity (GB), Hardware ID, Guest ID, Host ID
* -h, --help Show this message and exit.
* Fail a block volume over to a specific replicant volume.
* # slcli block replica-failover --help
* Usage: slcli block replica-failover [OPTIONS] VOLUME\_ID
* Options:
* --replicant-id TEXT ID of the replicant volume
* --immediate Failover to replicant immediately.
* -h, --help Show this message and exit.
* Failback a block volume from a specific replicant volume.
* # slcli block replica-failback --help
* Usage: slcli block replica-failback [OPTIONS] VOLUME\_ID
* Options:
* --replicant-id TEXT ID of the replicant volume

-h, --help Show this message and exit.