

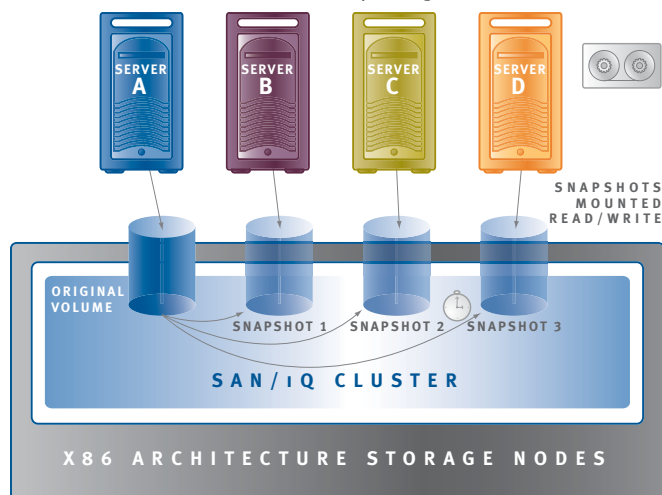
SAN/iQ[®] Snapshots

Point-in-time, space-efficient snapshots for backup, recovery and temporary use

INSTANT, POINT-IN-TIME BACKUPS

Up to 80 percent of data loss is due to user errors, and SAN/iQ[®] Snapshots provide help to protect against this type of loss. SAN/iQ Snapshots are instant, space-efficient, point-in-time volume copies that can be used for backup, recovery, and as volumes for temporary use including for development and testing. SAN/iQ Snapshots can be read, written, and mounted by other servers just like any other volume, opening up a range of new possibilities for IT organizations:

- The read/write nature of SAN/iQ Snapshots allows virtually any backup software to access them, including products that update backup times in the volume itself.
- Snapshots can be mounted read/write, and you can change the snapshot without affecting the live volume. This makes SAN/iQ Snapshots the perfect way to test out new software, validate patches, and run through upgrade procedures before attempting them on a production system.
- Clone virtual machines for temporary use using instant, space-efficient snapshots, and run them in virtualized environments such as VMware Virtual Infrastructure.
- Snapshots can be used as backups: to retrieve a previous version of a file, mount the snapshot and copy it to the current volume. Recover an entire volume instantly using volume rollback.



SAN/iQ Snapshots are instant, point-in-time images that can be mounted read/write and used just like any other volume.

KEY FEATURES AND BENEFITS

SAN/iQ Snapshots provide instant, point-in-time volume copies that are readable, writable, and can be mounted:

- Space efficient, thin-provisioned volume copies
- No reserve, allowing more efficient use of storage
- Can be mounted read/write and used temporarily just like any other volume
- Instant data recovery via volume rollback
- Can be created manually, scheduled, scripted, and through programmable APIs
- Snapshot consistency groups supported through Microsoft VSS provider

SPACE EFFICIENT WITH NO RESERVE

Traditional SANs make you reserve space on your storage system equal to the size of the volume that you wish to snapshot, increasing costs and lowering storage utilization. SAN/iQ Snapshots are always thin provisioned so there is no requirement for you to set aside space for snapshots. This lowers costs and increases storage utilization because you only need to purchase the storage that you actually need.

FLEXIBLE CREATION MECHANISMS

You can take volume snapshots in a number of ways, including coordinating snapshots with application state. You can create snapshots manually with a click of the mouse using the SAN/iQ graphical user interface. You can schedule them on a repeatable schedule for backup purposes (for example Server D in Figure 1). You can generate snapshots using command-line scripting and programmable APIs. If you initiate backups through LeftHand's VSS Provider for Windows, you can use consistency groups to snapshot multiple volumes at the same moment.

SAN/iQ SNAPSHOTS AT A GLANCE

SAN/iQ software takes snapshots by capturing a volume's state at a point in time. SAN/iQ Snapshots are time and space efficient because they don't actually copy the volume's blocks on the SAN.

The SAN/iQ cluster manages changes to the volume data following the snapshot using copy-on-write semantics that uses storage as efficiently as possible. The total space required for a volume and its snapshot is the number of allocated blocks in the volume plus the number of blocks changed since the snapshot was taken.

During a series of manual or scheduled backups of the same volume, each snapshot simply captures the changes since the last snapshot. Since SAN/iQ software maintains the state of the sequence of snapshots and the original volume, you can roll back a volume's state to any snapshot in a series.

INSTANTANEOUS BACKUP AND RECOVERY

SAN/iQ Snapshots are instant, a key feature for applications that must be quiescent in order to capture a consistent state of the business-critical data they manage.

INSTANT RECOVERY AND ROLLBACK

You can set up snapshots on multiple overlapping schedules to perform backups of data using a backup rotation that meets the data-retention policies of the business. Setting up overlapping schedules, each with different snapshot intervals and retention policies, creates backup-like rotations of business data, without the complexities and issues associated with typical backup applications.

If you need to recover a single file or a collection of files, you can simply mount a snapshot and retrieve them. If you need to recover an entire volume, you can use rollback to return the volume to a specific point in time.

TEMPORARY VOLUMES

The space efficiency of snapshots, combined with the ability to rollback volumes to previous states, makes SAN/iQ Snapshots the ideal mechanism for creating volumes for temporary use. You can create a snapshot and mount it on another server as a way to test new software, different configurations, or patches *before* you implement the changes on a production system.

This approach works extremely well in virtualized environments, where you can use SAN/iQ Snapshots to clone a volume and then bring up a new virtual machine using that volume clone. Because the new volume and the virtual machine take few resources, it's a very lightweight way to test, debug, and stage changes.

VSS PROVIDER FOR MICROSOFT WINDOWS

LeftHand's optional Solution Pack for Microsoft Windows enables serverless backup by getting application servers out of the backup path. The Solution Pack's VSS Provider for Windows works with the Microsoft Volume Shadow Copy Service (VSS) to coordinate the creation of snapshots for backups with the application, creating consistent, point-in-time copies of volumes. Consistency groups guarantee that multiple volumes are all captured at the same time so that application data spread across volumes is always backed up consistently.

The fact that SAN/iQ Snapshots are immediate means that backups coordinated through VSS have minimal effect on applications. The steps involved in the process are illustrated below:

1. Through the VSS Requester, backup software asks the application's VSS Writer to prepare for a backup.
2. The application's VSS Writer does whatever the application requires to prepare for a snapshot, including completing transactions, rolling logs, and flushing write buffers.
3. The LeftHand VSS Provider asks the SAN/iQ cluster to take an instant snapshot of the application's volumes.
4. The VSS Provider mounts the snapshot volume for use by the backup server.
5. The backup server writes the backup to tape, and the snapshot volume is released when the backup is complete.

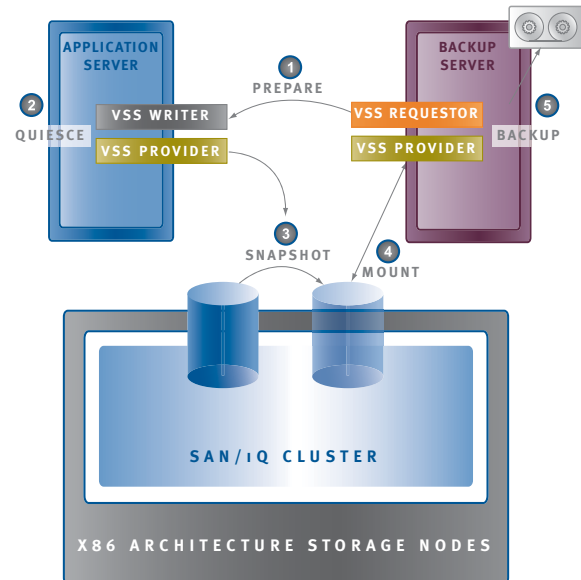


Figure 2: The LeftHand VSS Provider for Windows helps coordinate snapshots of consistent application data for backups.



ABOUT LEFTHAND NETWORKS

At LeftHand Networks, we deliver physical and virtual SANs that are easy-to-install, easy-to-manage and designed to perform optimally in today's global data centers. LeftHand Networks pioneered IP-based SANs in 2001, and its innovative SAN products are engineered to deliver the highest availability and scalable performance, with integrated enterprise-class features.

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