

SAN/iQ® Thin Provisioning

Raise storage utilization, increase return on investment, and reduce costs

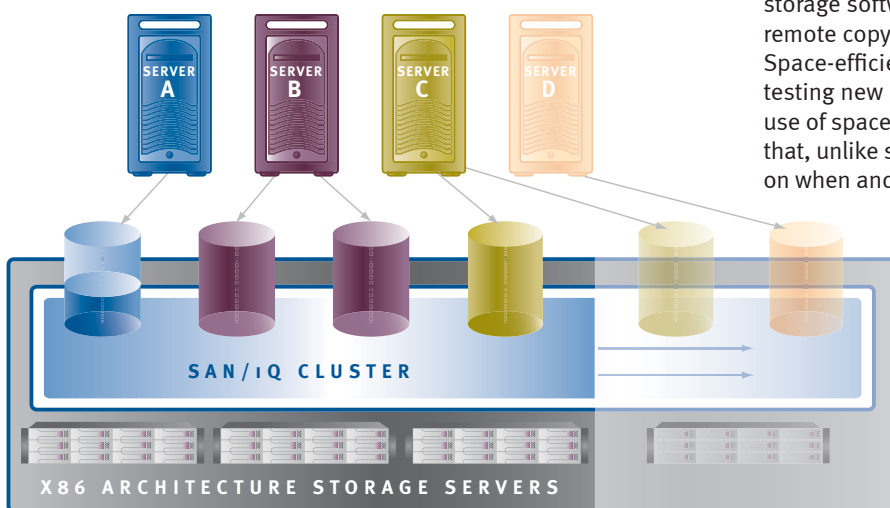
PROVISION ACTUAL STORAGE ONLY AS YOU NEED IT

When you purchase a SAN from a traditional storage vendor, you'll be asked a series of questions such as:

- How big will all of your volumes be?
- How many drives do you want to assign to each volume?
- How fast will the volumes grow?
- How much space will you need for snapshots?
- How many remote copies will you make?

Most customers cannot answer these questions, and the consequences for guessing wrong are high. Give a number that's too low, and you end up with insufficient storage to support unexpected growth. Guess too high and you purchase storage at today's prices that you won't use until some time in the future, when the price per gigabyte is lower.

SAN/iQ® Thin Provisioning, combined with the ability to scale storage clusters dynamically, allows you to purchase only the storage you need today, and add more storage to the cluster as application data grows. This allows you to raise storage utilization levels, increase return on investment, and make the constantly falling price of storage per gigabyte work to your advantage. Thin provisioning gives you the edge over your competitors because your IT organization has more flexibility and lower costs when you can purchase storage as needed.



SAN/iQ Thin Provisioning and non-disruptive scaling lets you create larger volumes than you need today, and let them fill with blocks as your application data grows.

KEY FEATURES AND BENEFITS

SAN/iQ Thin Provisioning helps you to use storage more efficiently and allocate only the space that you actually use:

- Never overprovision storage
- Purchase storage as you need it, not years in advance
- Take advantage of constantly falling prices per gigabyte
- Raise utilization, efficiency, and ROI
- Reduce energy consumption and carbon footprint
- Do more with less storage, increasing flexibility
- Supports all SAN/iQ features including snapshots, remote copy, and asynchronous replication

GIVE YOUR VOLUMES ROOM TO GROW

Thin Provisioning lets you size your volumes with room to grow. You can create a volume with the size you expect it to be in the future, create a file system in it, and allow your application data to grow to fill the volume over time. With SAN/iQ Thin Provisioning, your applications stay online while you non-disruptively scale your SAN because your volumes are continuously available.

SPACE-EFFICIENT SNAPSHOTS, REMOTE COPY, AND ASYNCHRONOUS REPLICATION

Thin Provisioning is implemented consistently throughout SAN/iQ storage software, and it's the mechanism that makes snapshots, remote copy, and asynchronous replication all space efficient. Space-efficient snapshots allow you to make temporary volumes for testing new software, configurations, and patches, all with minimal use of space. LeftHand Networks' consistent implementation means that, unlike some traditional SANs, there are no mysterious limitations on when and how you can thin provision a volume. Space efficiency also means power efficiency, helping you to 'green' your datacenter and reduce your carbon footprint.

SAFELY OVERPROVISION

SAN/iQ storage software incorporates advanced monitoring and alerting mechanisms that make overprovisioning safe for day-to-day use. Thin Provisioning is an attribute of each volume, so you can switch back and forth between thin and full-provisioning as you wish — it's as easy as a click of the mouse. This gives you greater flexibility, efficiency, and lower cost.

THIN PROVISIONING AT A GLANCE

SAN/iQ software is structured so that all storage blocks are allocated to volumes the first time they are written to by an application, with optimizations that allow blocks to be allocated without impacting write performance. Allocating blocks on demand allows the software to stripe and replicate blocks across the storage cluster in the best way possible at the time that blocks are allocated to a volume.

Thin provisioning dictates whether or not a volume's blocks are reserved ahead of time. A fully provisioned volume has its blocks reserved ahead of time, while a thin-provisioned volume has none. This makes it easy to change a volume back and forth between full and thin provisioning: what changes underneath is the storage cluster's accounting of how many blocks it has available, not the actual allocation of blocks which is always done on demand.

The SAN/iQ implementation of thin provisioning is consistent throughout the product, so there are no artificial limitations on how you can use it. Indeed, SAN/iQ software uses thin provisioning in many of its own features, making snapshots, remote copies, synchronous replication, and volume migration all time and space efficient.

NEVER OVER ALLOCATE STORAGE

SAN/iQ Thin Provisioning means that you never over-allocate storage. It gives you the power and flexibility to use the combination of fully and thin-provisioned volumes that best suits your needs. You can provision a set of volumes larger than you need today, and increase capacity by purchasing more storage as your application data grows. Delaying your storage purchases allows you to take advantage of the constantly falling price of storage per gigabyte. Compare that to traditional SANs where you must purchase storage years ahead of actual needs.

When you decide to thin provision a volume, it's as easy as clicking a radio button in the SAN/iQ administration interface. Thin provisioning helps to keep your volumes thin over time by automatically reclaiming zero-filled blocks and returning them to the free storage pool. Advanced users can use command-line tools to finely tune Thin Provisioning storage allocation parameters.

ADVANCED SPACE REPORTING, MONITORING, AND ALERTING

SAN/iQ Thin Provisioning takes the fear, guesswork, and risk out of thin provisioning, making it a highly useful tool for doing more with less storage. The feature's advanced space reporting, monitoring, and alerting capabilities gives administrators all of the information they need in order to effectively manage their storage capacity.

FEEDBACK ON STORAGE UTILIZATION

The SAN/iQ administration interface provides easy-to-interpret, actionable storage utilization data. It provides graphics that can be cut and pasted into reports when the time comes to justify new storage purchases to management.

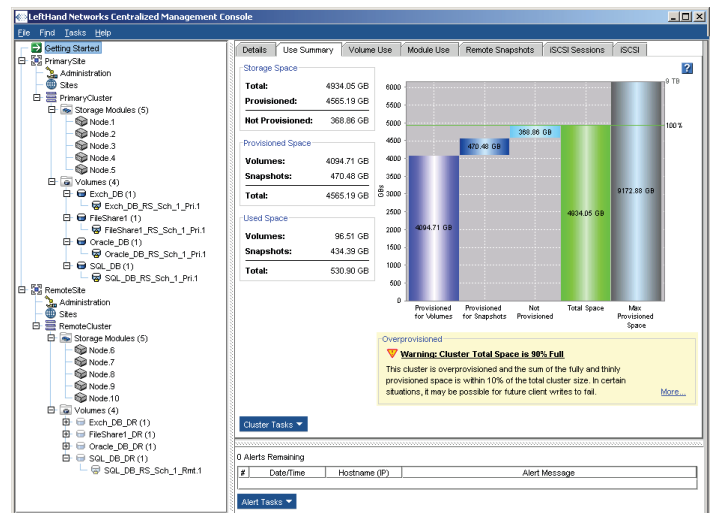
REAL-TIME MONITORING

SAN/iQ software makes it nearly impossible to ignore warnings that it's time to add storage to a cluster. It provides SNMP traps that are recognized by network management systems. It sends email when certain thresholds are crossed. And it provides alerts based on criteria that you configure ahead of time.

MONITOR CLUSTER AND VOLUME STORAGE UTILIZATION

The administration interface allows you to monitor storage utilization at both a cluster and a volume level:

- *Volume alerts* may or may not require any action, and they can be configured to sound at pre-defined utilization levels.
- *Cluster alerts* give you the chance to manage your overall storage pool better. When a cluster needs more storage, there are a number of appropriate responses, including adding more physical storage, deleting snapshots, deleting unused volumes, and migrating volumes to other clusters.



SAN/iQ Thin Provisioning allows you to safely overprovision storage and increase your actual storage only as you need it.



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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