# ISCSI SAN BOOT — SIMPLIFYING SERVER OPERATIONS ON SANS

Storage area networks (SANs) deliver consolidated storage and advanced storage management features. One advanced SAN configuration involves booting servers directly from the SAN, eliminating all locally attached storage and improving server operations. Several server boot options are available: 1) traditional boot from internal storage; 2) boot from a server on the network; and 3) boot from the iSCSI SAN. To select the right boot option for your environment, you should weigh the benefits and drawbacks of each.

## TRADITIONAL BOOT — SIMPLE OPERATION, SIMPLE FUNCTIONALITY

The conventional method of booting a server is from internal storage. At startup, the BIOS finds boot information on the local hard drive and the operating system launches. This simple, one-step process functions in a manner that administrators understand well.

There are drawbacks to internal storage however — all the common problems of direct attached storage. To add storage or service to a machine the administrator must shut down (interrupting business tasks) and physically open the system. A disk failure typically eliminates all server functions. Each server requires more space, power and cooling because of the disk drives. Storage management is labor-intensive as administrators individually configure, backup, and manage each server. Most important, needed storage management features are missing.
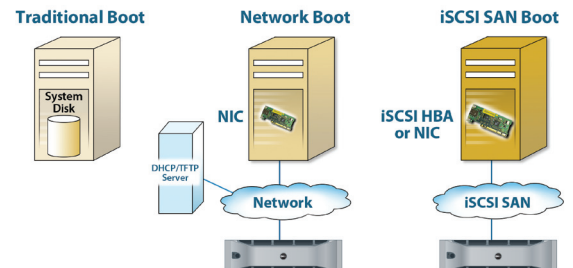
**Three server boot operations offer different benefits:**

- **Traditional boot: Easy to use, basic functionality**
- **Network boot: Complex to implement, scales well**
- **SAN boot: Simple process, advanced functionality, and scales well**

## NETWORK BOOT — MORE COMPLEX, USEFUL IN SERVER FARMS AND GRIDS

Some operating systems support boot from NICs called PXE or DHCP/TFTP (depending on operating system). In environments with many systems, management can be more efficient and affordable than using local devices. In addition, you can use servers without disks, which offer several benefits: 1) They cost less and take up less space, power and cooling; 2) Fewer components make them more reliable; and 3) Administrators can re-purpose servers, easily changing to meet application demands.



However, the network boot process is significantly different from typical boot operation. For example, to network boot 20 application servers, the administrator is burdened with more setup tasks, starting with the addition of a boot server on the network. Setup includes building a "gold" master image on a machine similar

to those you want to boot (on a local disk), copying that image to network storage, replicating system images, customizing replicas for each server, and configuring the boot server to deliver the right image to each application server.

Because this method takes much more infrastructure and effort, it is primarily used with large numbers of servers, as the extra work can be "amortized." However, there are other drawbacks. Because your application server's boot process depends on the boot server, the boot server must be clustered or otherwise made highly available, adding more management. Installing patches and software is more complicated, as each system alteration may also require updating the boot images and re-imaging.

**Booting from the SAN increases server reliability and performance, enables advanced storage management and data protection features, and maintains operational simplicity.**

### SAN BOOT — FAMILIAR EASY OPERATION, WITH ADVANCED MANAGEMENT FEATURES

You can also boot servers directly from the SAN. You gain the simple, natural operation of traditional boot, plus the hardware cost reductions and scaling benefits of network boot — without the pains of either. Most servers have this capability built onto the mother board, enabling SAN boot with any size server. SAN boot is operationally identical to traditional boot — just tell the BIOS that its system disk is on the SAN. This method is easy and efficient, whether you have a few servers or hundreds.

SAN boot enhances server reliability and performance by leveraging the SAN for improved RAID operations. SAN boot also delivers centralized storage management, and advanced features such as disk image cloning, snapshots for fast recovery,

and disaster replication. Now all of your data can be managed in a consistent and efficient manner. You can easily re-purpose servers, and improve business continuity — if a server malfunctions, you simply boot another server using the original boot image and continue working.

### CHOOSE YOUR BOOT METHOD WITH THE PS SERIES SAN

While Dell's EqualLogic™ PS Series arrays support all three boot methods, there are clear benefits to booting from the SAN. These include improved server uptime; online servicing and management of storage on the SAN; and automatic, online expansion and load balancing. You gain many needed storage management functions, snapshot capability that speeds recovery and eases backup and disaster replication. With all these features, your IT infrastructure functions more efficiently and productively.

| Boot Operation Comparison Table | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Requires internal disk? | Ease of setup and operation | Boot hardware | Dependent on other servers? | Efficient for managing a few servers? | Efficient for managing many servers? | Snapshots? | Disaster replication? |
| Traditional Boot | Yes | Simple | NIC | No | Yes | No | No | No |
| Network Boot | No | Complex | NIC | Yes | No | Yes | Yes | Yes |
| SAN Boot | No | Simple | HBA or NIC | No | Yes | Yes | Yes | Yes |