Array-based Snapshots and Disk-based Backup: It is Not “One or the Other” but “Better Together”

Enterprise backup has changed significantly in the last decade with disk-based backup and deduplication contributing largely to that shift. But as array-based snapshots emerge as the next big wave in how data protection is done, organizations should not assume that a choice between array-based snapshots and disk-based backup looms. Rather, array-based snapshots and disk-based backup are complementary technologies that change the decision from being “one or the other” to “how to make them work better together.”

Snapshots Becoming First Line of Defense in Data Protection

Array-based snapshots are becoming the first line of defense in a growing number of enterprise data protection schemes for five main reasons:

1. **Server virtualization.** Servers possess insufficient physical resources (memory, CPU, network bandwidth) to do traditional host-based agent backups on each virtual machine (VM). Array-based snapshots offload the overhead associated with backup to a storage array.

2. **Growing data stores.** Physical or virtual, server data stores are only getting larger that results in too much data to backup. Snapshots minimize data movement with usually only a copy of the pointers to the data being made on the storage array.

3. **Less application disruption as a result of shorter backup windows.** An application is paused for at most a few seconds or minutes while a snapshot occurs. Traditional backups may take hours or days to complete with application performance negatively impacted during
4. **Data change rates.** Data may change significantly between the time a backup begins and ends leaving data unprotected and the application potentially even unrecoverable. Snapshots have minimal impact on either application or server performance and may occur more frequently to heighten data protection levels.

5. **Shorter recovery windows.** Today users expect application recoveries to occur “instantaneously.” In practical terms, that usually means 30 minutes or less. Using snapshots, application or VM restores may occur in as quickly as a few minutes.

Reasons like this are why analyst firm Gartner recently opined, “By 2015 at least 25 percent of large enterprises will have given up on conventional backup/recovery software and have switched to snapshot/replication techniques.“

**Disk-based Backup Still a Viable Option**

While these use cases for snapshots would seem to suggest that disk-based backup’s demise is nigh, disk still remains a viable media for use as a backup target. However it is changing to complement array-based snapshots rather than function as a primary backup target for the following reasons.

- **No geographical diversity.** Array-based snapshots typically reside on the same disk as production data and reference the same data. So if the production storage system goes offline for whatever reason (catastrophic hardware failure, power outage, whatever) snapshots on that array become inaccessible. Using a disk-based backup system data remains accessible and recoverable.

- **Snapshots best suited for short retention periods.** Every snapshot technique (allocate-on-write, copy-on-write, split-mirror, etc.) consumes varying amounts of production disk storage capacity. While some techniques consume less capacity than others, none easily facilitate the long term retention of snapshots due to
the growing amount of disk space they consume over time. Solid state drives (SSDs) further aggravate the cost of retaining snapshots as SSDs may cost anywhere from two to ten times as much as regular hard drives.

- **Disk-based backup targets provide a cost-effective means to retain data on disk for a long period of time as they deduplicate data even as they free up production storage capacity.** While it makes sense to create and retain snapshots for hours or even days, it also makes sense to create and retain disk-based backups that are needed for weeks, month or even years.

- **Snapshots may not even be an option.** Before any organization may even consider using snapshots to protect their applications (physical or virtual), the following four variables should hold true:

  - The snapshot should ideally be application aware and at least create crash consistent snapshots
  - The application has to have all of its data reside on a single storage system
  - The storage array has to support snapshots
  - The snapshot software licensing (if required) must be in place

  *If any one of these variables is not in place, snapshots as a means of data protection are not an option.*

This is why companies are choosing to use array-based snapshots and disk-based backup to backup and recover their data.

**Array-based Snapshots and Disk-based Backup are Better Together**

**First Technology KZN**, a South African based hosting provider, is a prime example of a company who has found it needs both array-based snapshots and disk-based backup. It needed an economical solution that could provide non-disruptive, fast daily backups and restores for its clients. It also needed an option to cost-effectively retain client
backup data long term. Further, First Technology is like all growing companies with limited budgets: it needs solutions that can start small and then scale as their business demands dictate. To meet these requirements, First Technology used the Dell EqualLogic PS6100 as its storage system to store and protect its customer data. Four factors drove this decision.

- **Flexible, scale-out architecture.** The PS6100 offered a storage configuration that meet its immediate needs and which could scale as its business grew.
- **Snapshot functionality included.** The PS6100 includes the snapshot capabilities with its storage system, with no licensing at all, so there were no hidden costs associated with protecting data.
- **Windows application.** The EqualLogic storage systems tightly integrate with the many Windows applications through their Host Integration Tools for Microsoft, including Auto-Snapshot Manager/Microsoft. This ensures the creation of application consistent snapshots so applications such as Microsoft SQL Server or SharePoint could be fully recovered.
- **Backup software support.** First Technology wanted to use backup software to manage the scheduling and life cycle of its snapshots. The PS6100’s integration with major backup software solutions freed First Technology to use the one it wanted.

However First Technology also recognized some of the shortcomings associated with using snapshots for long term data retention. So to complement its use of snapshots on the EqualLogic PS6100, it also introduced the Dell DR4000 to cost-effectively store its client data long-term. First Technology would first use its backup software to schedule the movement of the data from the EqualLogic snapshots to the DR4000 backup target which would then deduplicate the data. Once safely stored on the DR4000, the backup software woul
d then instruct the PS6100 to return the storage capacity used by the snapshots to the PS6100’s available storage pool.

Yet what ultimately influenced First Technology’s Technical Director, Vaughan Gerson, to use the PS6100 and DR4000 was that the entire solution was supported by Dell. By acquiring both solutions from Dell, First Technology was able to work with a single supplier that was responsible for configuring these solutions and setting them up.

Gerson says, “Using Dell’s solutions we can confidently scale our backend data protection and storage infrastructures to align with the needs of our data center without needing to worry either about ripping and replacing them or how we will support them in the future.”

**Dell: A Single Provider with a Two-Tiered Data Protection Solution**

Snapshots are the wave of the future as organizations look for better, faster ways to protect and recover their data. But disk-based backup continues to play an important role in enterprises for a variety of reasons.

Dell’s two tiers of data protection available through its respective EqualLogic and DR4000 solutions backed by its enterprise support provide organizations the single solution they need. As First Technology and other companies are discovering, they need both snapshots and disk-based backup to first quickly protect their data and then economically retain it for a long period of time. Using Dell, it was able to deliver on its clients’ data recovery and retention expectations, drive down its overall data protection and storage costs, and get all of these features from a single provider who could support them.

*Editor: After publishing, Dell and Enterprise Systems Group (ESG) published a [Lab Validation for the DR4000](https://www.dell.com).*