

SGI Dynamic Disk Pools

Worry-free Storage

VALUE PROPOSITION

The Dynamic Disk Pools feature greatly simplified storage management for IT generalists. Simplification comes from the elimination of RAID and hot spare management and is more efficient than traditional RAID by allowing capacity to be added in single drive increments. These benefits of DDP lower CapEX and increase Data Protection as drive count increases and DDP recovers from failed drives in minutes while maintaining performance.

BENEFITS

Balanced Performance

- Consistent performance under all conditions and over time
- Self-healing Dynamic Rebalancing quickly returns file system to optimal state
- Active sparing, all disks do useful work

Data Protection

- Fastest return to optimal file system state
- Quickest return to high-availability state
- Best data protection during multiple faults

Ease of Deployment and Expansion

- Ease of configuration
- Easy expansion reduces need for over provisioning
- Flexible: ANY* number of drives is good – the system rebalances automatically.

Where To Utilize DDP vs. Traditional RAID

Dynamic Disk Pools	Traditional RAID 1	Traditional RAID 6
DDP is especially well suited for small block random IO environments typical in online transaction processing (OLTP) and Metadata storage.	RAID1 is primarily used for Metadata and scratchpad storage where quick data access is required.	RAID6 is well suited for large block sequential IO environments typical in parallel file systems.
Used where quick data access is as important as the cost of the storage.	Used where quick data access is more important than the cost of the storage.	Used where quick data access is as important as the cost of the storage.
Active Sparing protection is integral to DDP eliminating standby drives (Hot Spares).	Hot Spare protection requires stand-by drives (Hot Spares).	Hot Spare protection requiring stand-by drives (Hot Spares) is an option .
DDP provides the highest performance and highest data protection under single and multiple drive failures .	Provides the highest performance and reasonable data protection only under a single drive failure .	Provides limited performance and reasonable data protection under single or dual drive failures .
DDP enables simple, low risk capacity expansion (on the fly).	Environments where capacity expansion is not a critical issue.	Environments where capacity expansion is not a requirement.
Simplifies support and reduces the need for on-site personnel — failed drives can remain in place .	On-hand IT support has the capacity to replace failed drives immediately .	On-hand IT support has the capacity to replace failed drives immediately .
DDP enables Thin Provisioned volumes allowing the customer to start small and grow as needed .	Thin Provisioned volumes are not supported.	Thin Provisioned volumes are not supported.

Competitive Differentiators

Save money with an easy, worry-free system:

- Dynamic Disk Pools automatically rebalance missing drive data to other drives in the disk pool at the time of a drive failure
- 99.999%+ availability for continuous operations
- Easy single drive expansion automatically expands the disk pool capacity
- Efficient IT operations – no RAID or idle spares to manage
- Highest density option for space and power savings

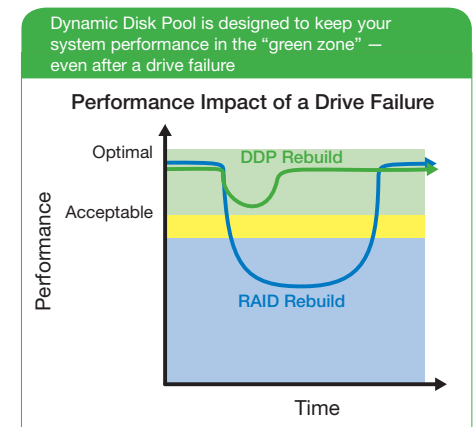
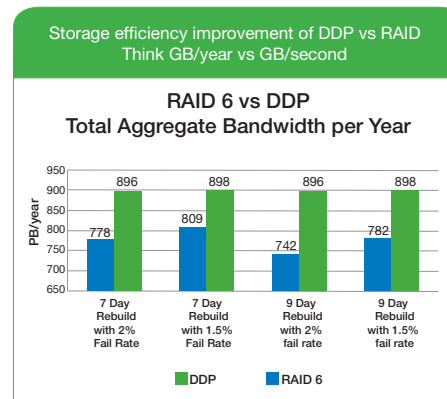
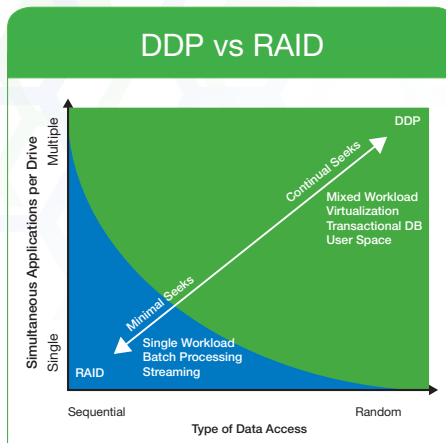
Use Case Example

- With DDP the file system can lose multiple disks during a 30-day run and still keep the file system up and running.
- Assume that a dual disk drive failure occurs within a DDP pool of 192 disk drives.
- The dual disk failure is now a non-event, as DDP includes spare capacity as part of the dynamic disk pool.
- The DDP pool would simply rebalance the data over the remaining disks utilizing the incorporated spare capacity.
- The critical data would be reconstructed in minutes, after which additional disk failures could be tolerated.
- A long-running job would not be affected by multiple sequential disk failures, as the file system would continue to run without interruption.
- Failed drives can remain in-place until it is convenient to remove them; for example, after all jobs have been completed.

DDP vs RAID – The Difference

	Traditional	DDP	End User Impact
RAID Groups and Volumes	• Typically optimized for enclosure utilization	• Data, protection information and spare capacity is spread across all drives in the disk pool	• Easier administration
Sparing	• Spare capacity is global or non-existent	• Spare capacity is available to all volumes in the pool	• Better utilization of purchased capacity
Data Protection	• Data is at risk until rebuild is complete	• Critical data segments are prioritized and reconstructed first	• Critical data segments are prioritized and reconstructed first
RAID Group Expansion	• All data is moved and restriped across expanded volume group	• Only data required to populate the new drive is moved to rebalance the pool.	• More efficient and safe way to expand capacity
Performance under Failure	• All volumes in the group are impacted (up to 40%)	• Minor impact to all volumes in disk pool (< 15%)	• Reduced impact following a drive failure
Drive Rebuild	• Single drive (hot spare) responsible for all rebuild writes (slow process)	• Not a function of DDP	• Rebuild is throttled by one single drive
Data Reconstruction	• Only members of the specific volume group participate in the reconstruction of the data to the hot spare	• All members of the pool participate in reconstruction of the data to active spare capacity	• Smaller data-loss window
Data Rebalance	• Not a function of traditional RAID	• Reconstructed data is balanced across drives in the DDP pool	• Data reconstruction occurs up to 8x faster

Both DDP and traditional RAID perform data reconstruction as a result of drive failure with traditional RAID writing data to a single hot spare and DDP rebalancing reconstruction of data across all members of the drive pool.



SGI Contacts

HQ	Americas
Floyd Christofferson floyd@csgi.com	Dan Staples staples@csgi.com
EMEA	APAC
Jason Coari jcoari@csgi.com	David Boulter dboulter@csgi.com

Where to go for more information

- www.sgi.com/ddp

Global Sales and Support: sgi.com/global