Making a Virtualized Storage System Into Storage for Virtual Platforms – One Company’s Journey

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Storage virtualization: How we got started

- EqualLogic (Circa 2002)
  - Virtualized RAID
  - Virtualized LUNs
  - Greatly simplified provisioning and management
  - Scale out architecture

- Customers could buy storage incrementally as their needs expanded
Happy coincidence: Compute virtualization

- Compute virtualization
  - Consolidate servers
  - Increase utilization
  - Easy high-availability story
  - Reduce power consumption
  - Reduce networking costs
  - Scale out

- Customers could buy compute resources incrementally on an as-needed basis.
Storage for your virtual data center

Physical Infrastructure

Virtualized Assets

Storage Fabric
Designing storage for virtualization

- Virtualization
- Intelligence
- Automation
- Utilization
The integration imperative

Needs to address:

- Relationships
- Dependencies
- Workflows

Integration

Virtualized Resource Pools

In order to:

- Offload
- Automate
- Optimize
The snapshot problem: An early example

- Both arrays and hypervisors perform snapshots
- Copy-on-write or journaling for snapshots can consume significant compute
  - Affects compute performance when run on hypervisor
  - Has little or no effect to compute when run on array
- How do we offload this to the storage array?
Another example: Disaster recovery

**Challenge:** simplify, automate

- SRA
- Automation
- Fast failback
Deeper integration: Performance

Challenge: optimize virtual server performance

- VAAI
  - SAN data copy offload
  - Block zeroing
  - Hardware assisted locking

- Multipath Extension Module

Note: Based on testing performed by Dell Labs in May 2010 comparing Dell EqualLogic Firmware v. 4.3 to Dell EqualLogic Firmware v. 5.0. Actual performance will vary based on configuration, usage and manufacturing variability.
A different approach to partnering

- The pace of innovation is accelerating!
  - Race to be first to market - both in storage and compute
  - Conventional standards bodies often don’t work at these speeds
  - Numerous examples of “build first, standardize later”

- Both sides need a commitment to enabling each other’s unique value
  - For engineering, this means actual features, API’s, etc being delivered
  - Frequent and deep interaction with key members of the development orgs
  - Roadmap synchronization
  - Ecosystem development programs

- In a nascent market, trust is easier to establish
Development process is affected

- Large chunks of new feature development have partner dependencies
  - Dedicated project/program management
  - Dedicated development resources
- Release cycles are skewed
  - Nearly every virtualization partner release now has a companion Dell software release
  - Firmware for arrays has settled on an annual summer release cadence.
  - When is the right time to release co-developed products? (Answer: August)
- Roadmap and related planning needs to be interlocked
  - Code for CY 2013 releases is being built as we speak
  - Was planned nearly 1 year ago
- Tough to be a startup here
What does the future hold?

- Ever deeper integration with host operating systems
  - Prolific activity in T10 for advanced SCSI functions in support of virtualization
  - API efforts to integrate flash, de-duplication, tiering, security, and more
  - Don’t forget the plugins for the management consoles

- Technology need is pushing traditional scaling boundaries for storage and compute
  - 10,000 LUNs is not enough
  - 2000 VM’s is “cute”

- Not a startup game anymore
  - Much harder to get close relationships with OS companies
  - Expensive and risky to drive programs on two year cycles
  - Many competitive risks
Thanks!