Software-defined Storage

The „big new thing“ in storage and storage management?

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Disclaimer

Please be aware, that...

• this session covers a fairly new topic in storage (at least with this name)
• things in this presentation are or were believed to be true by SOMEONE (at one time at least)
• there is a growing opinion, that the subject of „Software Defined Environments“ (SDE) and the role that storage needs to play in support of it (aka. Software Defined Storage - SDS) is likely to be a „Big New Thing“
• „Big New Things“ do not happen that frequent in storage (the last one was SAN).... so it might be worth a look.
Why Software Defined Storage?

- Top pain points are the „usual suspects“ from a storage-focussed perspective, dominated by
  - growth management
  - cost
  - complexity

- Problems seem even more severe for midsize enterprises compared to large enterprises

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**Top Seven Pain Points:**

What are your top storage-related pain points?

*Large Enterprise Sample: n=180; Midsize Enterprise Sample: n=69.*

- Managing Storage Growth: 53% (62%)
- Proper Capacity Forecasting and Storage Reporting: 28% (20%)
- Managing Costs: 25% (33%)
- Migrating Data and/or Volumes: 14% (9%)
- Managing Complexity: 12% (13%)
- Dealing With Storage Performance Problems: 11% (7%)
- Server Snapshot, Backup and Administration: 9% (17%)

The InfoPro Storage Study 1H12 – 451 Research
Why Software Defined Storage?

IT Development and Delivery must adapt to support this change with speed and efficiency!!

Transaction Systems
- Dedicated Systems
- Single Database
- Managed one Solution

Web, e-business and SOA
- Multiple Applications
- Some shared data
- Post Processing in Warehouses
- Batch Processing
- Time to Business Action

Transaction Systems
- New Era Analytics
- Interconnected Solutions
  - Action taken immediately at real time speeds
  - User Device capability & variety growing exponentially
  - Infrastructure stressed with volume and velocity of data
  - Open Innovation
  - Unpredictable workload patterns
  - Strategic and Tactical differentiator

Time
- 1960-
- 1990-
- 2010-
Why Software Defined Storage?

**Agility & Rapid Scale**

**Systems of Engagement** (Situational Need)
- **Orchestration** across compute/network/storage for provisioning, deployment and management of workloads (DevOps)
- **Dynamic** scalability as applications and data requirements grow
- **Cost-optimized** storage via disks embedded in servers
- **Multi-tenant security** at a fine-grained, highly scaled level
- **Open** support of industry standards and APIs

**Enabled for Cloud**
- **Orchestration** across compute/network/storage for provisioning, deployment, and management of workloads
- **Automation** of provisioning and configuration of storage based on application requirements, with ongoing adjustments based on policies/SLA
- **Programmable** adjustments to storage (via APIs) as application needs change
- **Heterogeneous** environment support
- **Efficient** management of data copies (backup/archive/compliance)

**Workload Optimized & Transaction Integrity**

**Systems of Record** (Traditional Operations)

**Value is shifting to software to provide the dynamic and agile storage environment required by these workloads**
What is Software Defined Storage? - Definition

• IDC Definition
  A software-defined data center is “...a loosely coupled set of software components that seek to virtualize and federate datacenter-wide hardware resources such as storage, compute, and network resources.... The goal for a software-defined datacenter is to....make the datacenter available in the form of an integrated service....“

• Key attributes
  – It is software
  – Offers a full suite of storage services
  – Federates physical storage capacity from multiple locations/technologies

Based on “IDC’s Worldwide Software-Based (Software-Defined) Storage Taxonomy, 2013“
What is Software Defined Storage? - Classification

Based on „IDC’s Worldwide Software-Based (Software-Defined) Storage Taxonomy, 2013”
What is needed for Software Defined Storage? Abstraction to allow virtualization and federation

Mapping
Business Requirements

Separation of concerns
to

Infrastructure Capabilities
What is needed for Software Defined Storage?
Abstraction to allow virtualization and federation

Mapping

Business Requirements

Separation of concerns

to

Infrastructure Capabilities

- Capacity
- Accessibility
- Availability
- Performance
- Security
- Retention/Compliance

- Disk technologies
- RAID levels
- Encryption
- Compression
- Thin Provisioning
- Copies
- Access latency
- Backup / Archive etc....
What is needed for Software Defined Storage? SDS in the context of SDE

**Software Defined view of Storage Virtualization…**
- Workload aware; tops down
- Server, storage and network integration
- Heterogeneous storage virtualization
- Managing pools of systems as a single system
- Using virtualization to manage IT
- Managed by advanced programmed automation (software)
- Start small and grow with seamless migration

**The client value…**
- Flexible and elastic storage (Responsiveness)
- Radically improved time to value (Responsiveness)
- Repeatability and consistency via automation (Resiliency, Stability)
- Higher utilization and efficiencies (Cost Reduction)
- Significantly reduced energy costs (Cost Reduction)
- Improved availability (Resiliency)
- Security isolation supporting multi-tenancy (Security)
What is needed for Software Defined Storage? Building blocks for SDS

Control Plane
(incl. resource abstraction)
- Management

Storage Service Management

- Storage Resource Management
- Business Continuity Management
- Data Protection Management

Data Plane
- I/O

Devices
- Block Storage Systems / Storage Arrays
- File Storage Systems / NAS Filers
- Object Storage Systems
- Tape Systems / Archive Systems
- Storage Virtualizers
- Storage Networks

Services
- Thin Provisioning
- De-Duplication
- Data Replication
- Encryption
- Compression
- ...
Has IBM created Software Defined Storage platform?

Key attributes check:
- Is it software?
- Does it offer a full suite of storage services?
- Does it federate physical storage capacity?

Be the judge!
Software Defined Storage - Outlook

SDS has the potential to be (and is likely to be) the „big new thing“

- Over time, SDS will become the de-facto mechanism for storage
- Datacenters of tomorrow will be built on benefits of SDS features:
  - Commoditized persistent data storage
  - Service-based infrastructure
  - Open standards and interfaces based platform
  - Focus on solution rather a technical platform
  - Scalability (capacity, throughout, performance)
  - Resilient
  - Workload-aware
  - Covering block, file and object storage
  - Cost-efficient and highly automated
Thank you!