White Paper – Modernized Approach to Data Storage

Storage demands continue to increase, with little predictability in account growth. There is a need to scale, tier, and provide on-demand capacity. Current challenges lie in proper charge backs, multi-tenancy, encryption, and managing data. Transparent reporting, real-time performance monitoring, ticketing and service desk integration capabilities are additional features that should be available to customers.

This paper will primarily focus on the advantages of On-Demand storage services through SLA driven requirements created for a service level approach.

Impacts

A modernized approach to data storage can have a significant impact in several areas:

- Large data sets
- Management
- Cost
- Utilization and cost reporting
- Storage volume availability
- Charge Back
- Hardware maintenance
- Provisioning
- Backup and recovery service levels
- Asset management
- System performance
- Procurement of storage
- Data encryption
- High availability and Disaster Recovery

Recommendations

- Carefully determine a full set of SLA requirements applicable to organizational needs, while considering future storage and recovery levels.
- Requirements for capacity/storage on demand should not focus on specific solutions, but more on the performance requirements.
- To help reduce costs, consider including parameters in the SLAs for replication, deduplication, availability, security, peak workloads, recovery time and latency.
- Consider the criticality of each storage service area to determine which SLA tier to place that service in, taking into account recovery time and availability. Selecting the appropriate tiers can dramatically affect monthly costs.
- Move towards a consumption-based model to free the user from having to make a significant, up-front investment, investments that typically have to be repeatedly made every three to five years.
- Use pay-per-use capability to deploy storage capacity ahead of need, matching cost to use. Scale storage capacity with speed and efficiency, and pay for capacity only when used.
- Utilize a secure module that allows data encryption and manages keys across all environments. It integrates with encrypted drives, providing multiple keys for each storage environment across a mixed load of storage.

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Service Catalog

Storage service levels within a catalog should depict typical workload types and typical applications (examples) along with connectivity, storage drive types, data protection and other available options that comprise each of the service levels.

Shared Virtual Unified Storage, SAN/NAS, with Non-Disruptive Volume Movement Between Service Levels					
Service Level	**SL5 – Capacity**	**SL 4 – Performance Value**	**SL 3 – Performance**	**SL 2 – High Performance**	**SL 1 – Extreme Performance**
Workload Type	Backup, Replication, Archive Target	High Capacity Applications	Database and Virtualized Applications	High Performance Applications with High Overwrite	Latency-sensitive Applications
Validated Applications	SnapVault, SnapProtect, SnapMirror	Exchange, SharePoint	Oracle, SAP, SQL, Citrix, VDI, VMWare	Oracle, SAP	Oracle, SAP
Underlying Technology	Largest inexpensive disks	Inexpensive disks and large read cache	Fast disks and large read cache	Hybrid solid state drives and fast disks	Solid State Drives
Connectivity Protocols	NFS, CIFS, ISCSI, FC	NFS, CIFS, ISCSI, FC	NFS, CIFS, ISCSI, FC	NFS, CIFS, ISCSI, FC	NFS, CIFS, ISCSI, FC
Storage Options	Encryption, Block Storage, Object Storage, File-level Storage	Encryption, Block Storage, Object Storage, File-level Storage	Encryption, Block Storage, Object Storage, File-level Storage	Encryption, Block Storage, Object Storage, File-level Storage	Encryption, Block Storage, Object Storage, File-level Storage
Non-Stop Availability					

Service Level Agreements

The table below outlines potential workload driven Service Levels, allowing the user to match functionalities and application/s to the appropriate service levels based on their requirements. This allows for a service oriented approach. Workloads should also be easily moved to a different service level if required.

Service Level Agreements (SLAs)					
Implementation Type	**SL 5 – Capacity**	**SL 4 – Performance Value**	**SL 3 - Performance**	**SL 2 – High Performance**	**SL 1 – Extreme Performance**
Public Cloud	Remote Backup / Archive	File Share & Dropbox Public Websites	Public Business Applications	N/A	N/A
Private Cloud	DR Backup/ Replication	Intranet and Collaboration File Shares	Operational and Administrative Business Apps	Workflow and Automated Data Processing	ERP and High Transactional Apps
GOGO/GOCO	Snapshots/ Local Backup	Intranet and Collaboration File Shares	Databases and Sensitive Apps VDI/Virtual Workspaces	Batch processing/ Data Interpretation, Modeling and Simulation	Business Intelligence (BI)/ Object Oriented Analytics
Hybrid Cloud	ALL ABOVE	ALL ABOVE	ALL ABOVE	ALL ABOVE	ALL ABOVE
Relative Cost	$	$$	$$$	$$$$	$$$$$
Storage Performance Matches Workload Requirements and Budget Constraints					

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For applications in test and development the service level approach will significantly reduce cost by assigning lower service levels for applications in those environments. Depending on preference or agency policy, this may be off-premise. Through cloning and other efficiencies, we can easily port those applications seamlessly into the production environment and to a higher service level. These workloads can move through these Service Level tiers non-disruptively.

The use of tools such as On Command Insight (OCI) enable end-users and vendors to monitor storage usage for each storage level and down to the application. Customized dashboards can be created for different levels of end users.

Note: The call out box to the right depicts costs associated with traditional storage solutions. Storage ondemand does not require hardware expendatures and requires significantly lower investments in software and personnel.

Analyze This: Gartner IT Key Metrics Data 2014

Gartner issued their latest benchmark analytics study on key metrics data, including high-level storage cost efficiency and support staff productivity ratios for organizations managing operations internally. Information provided was collected during 2013 from a global audience.

- The 2013 average Storage Cost per Raw Configured TB of capacity is $3,212.
- The 2013 average number of Raw Configured TB Supported per Storage FTE is 201.
- Average Storage Cost as a Percent of IT Cost: 6.5%
- Average Storage Utilization Rate: 61.3%
- Distribution of storage costs:
  - Hardware: 47%
  - Software: 13%
  - Personnel: 26%
  - Connectivity: 2%
  - Facilities/Occupancy: 7%
  - DR: 4%
  - Unallocated: 1%

Benefits

Numerous benefits are realized upon implementing a storage on demand solution.

- Customizable tiered storage solutions
- Partitioned SLOs
- Customizable SLAs for storage tiers
- Replication efficiencies
- Deduplication
- Automation
- Service-oriented approach
- Customized dashboards for storage/tier utilization
- Pay only for utilization
- Right sized data management platform
- Self-provisioning portal and auto provisioning
- Real-time reporting

As is common with most effective IT service management approaches, the ability to manage all aspects of storage performance through a single dashboard is a prerequisite for efficient storage administration. DYONYX has the experience and proven track record in creating, implementing and leveraging efficient storage management dashboards that can provide the customers with a global view of storage performance by exposing multiple view KPIs through a single pane. Examples of these performance indicators include IOPs, such as total IOPs vs total throughput, provisioned capacity versus utilized capacity, storage bottlenecks/storage contention events and peak versus average load as an example of just a few metrics contained in the dashboard. A snapshot of this dashboard is provided on the next page.

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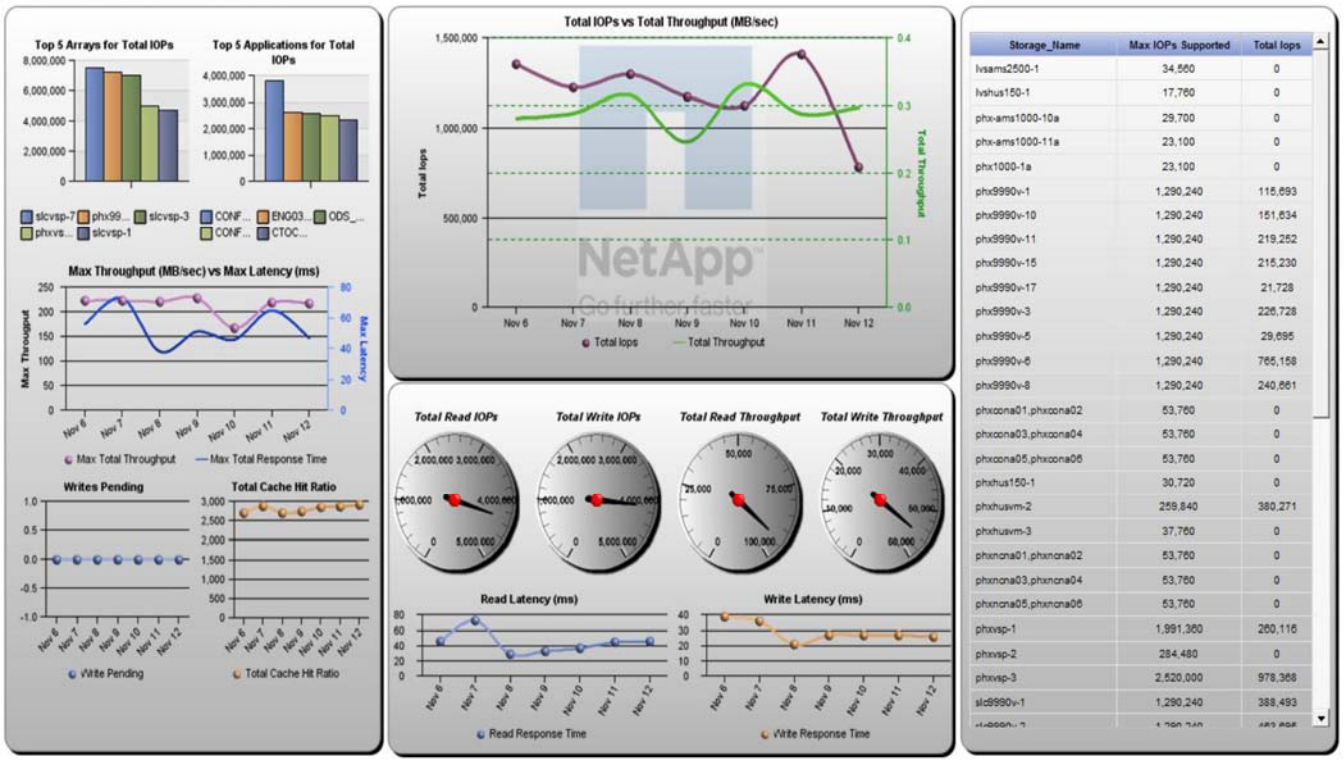
Global Performance Snapshot



Storage_Name	Max IOPs Supported	Total Iops
lvsams2500-1	34,560	0
lvshus150-1	17,760	0
phx-ams1000-10a	29,700	0
phx-ams1000-11a	23,100	0
phx1000-1a	23,100	0
phx9990v-1	1,290,240	115,693
phx9990v-10	1,290,240	151,634
phx9990v-11	1,290,240	219,252
phx9990v-15	1,290,240	215,230
phx9990v-17	1,290,240	21,728
phx9990v-3	1,290,240	226,728
phx9990v-5	1,290,240	29,695
phx9990v-6	1,290,240	765,158
phx9990v-8	1,290,240	240,661
phxcona01,phxcona02	53,760	0
phxcona03,phxcona04	53,760	0
phxcona05,phxcona06	53,760	0
phxhus150-1	30,720	0
phxhusvm-2	259,840	380,271
phxhusvm-3	37,760	0
phxncna01,phxncna02	53,760	0
phxncna03,phxncna04	53,760	0
phxncna05,phxncna06	53,760	0
phxvsp-1	1,991,360	260,116
phxvsp-2	284,480	0
phxvsp-3	2,520,000	978,368
slc9990v-1	1,290,240	388,493

Next Steps

- Utilize a right-sized data management platform
- Gather an inventory of workloads to be supported
- Map performance requirements for each workload once gathered
- Estimate the growth per workload
- Engage a DYONYX Cloud Consultant

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