

Figure 1 XYZ XX DC Results chart differentiating storage utilization (Usable, Allocated, Used)

Storage Maturity, and Mature Cost Control Areas

Before jumping into a tactical or strategic plan on utilization improvement, it is important to outline operational maturity levels that need to exist within XYZ to take advantage of activities and investments to improve utilization. Not every situation may benefit from advanced and innovative technology outlined in this paper, so an improvement campaign has to determine the relative economic and operational maturity of the target location or XYZ as a whole, to ensure that a strategic campaign can yield correct solutions, prices, total costs and defensible results.

The following diagram comes from SNIA, and defined levels of storage management maturity, and how IT organization should be progressing up these levels. The relative position of XYZ in this maturity diagram will strongly influence the investments and strategies necessary to improve utilization.

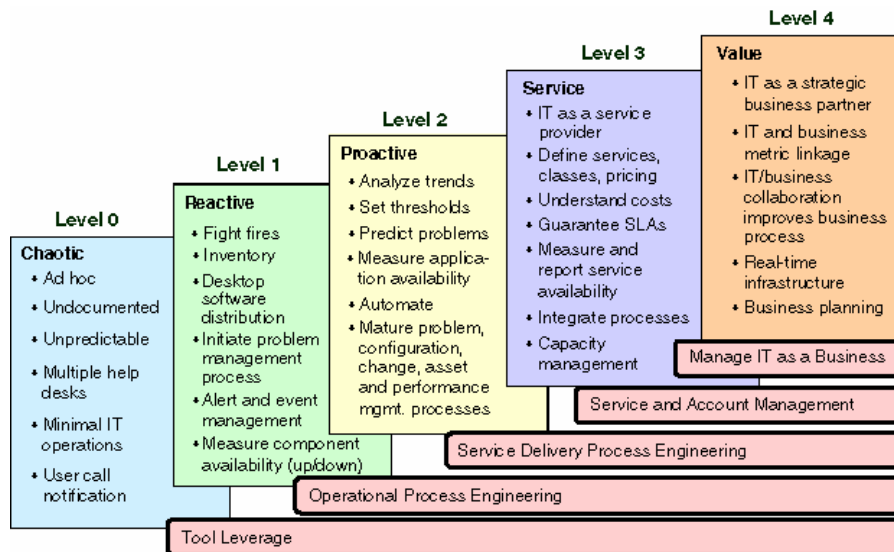


Figure 2 SNIA Storage Maturity Diagram

Discussion on overall maturity of XYZ storage operations

Personnel or attitude issues that you think will be a roadblock

Other non-technical points that need to be made

Root Cause of Poor Utilization

into paragraph, based on XYZ observed situations

General industry trends of why utilization is poor

- Stranded capacity between several different, disparate arrays
- Direct attach or server attached storage, storage not pooled
- Install once and forget mentality with the applications, project
- Project ownership of asset, not willing or able to share assets
- No central storage services organization that own and manage all storage assets
- Deliberate over-provisioning of volume at the beginning of the project so as to avoid any mid-project upgrade
- Poor or no capacity planning
- No ILM/DLM, limited or no ability to demote or remove old data
- Perception that pooled storage is too expensive (HBA, switch ports), keeping on DAS and SAS
- Security reasons, workload isolation cited as a reason not to be on shared resource
- Too many copies of data
- No monitoring or SRM tools to report on age, access and usage patterns of data
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Tactical Activities to Improve Aggregate Utilization

There are old, tired and proven methods to improve utilization. There are also new technologies that can be deployed to increase utilization and ROA. XYZ needs to decide what method is best, whether to invest in new tools, new systems, process improvement, people training, chargeback systems, rewards and penalty systems, etc.

- De-duplication
- Active archive
- Storage array consolidation
- Storage areas networking
- Capacity planning
- Storage Virtualization
- Tiered Storage (in fame)
- Tiered Storage out of frame
- Thin provisioning
- Integration of NAS and FC storage
- Unified storage management console
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What methods are best for XYZ given the staff, skills, operating environment

Given the age and type of storage, what are some of the work-arounds that need to be considered?

What attitude and non-technical reasons need to be outlined in this paper

Mapping Utilization Root Cause to a XYZ Solution

Root Cause	Recommendation
Stranded capacity between several different, disparate arrays	Consolidation Virtualization Integrated SAN and NAS Unified console
Direct attach or server attached storage	SAN expansion (FC or NAS) Consolidation
Install once and forget	SRM tools Monitoring tools Thin provisioning
Deliberate over provisioning of volume at the beginning of the project	Thin provisioning Chargeback systems Tiered storage
Poor or no capacity planning	ITIL process for cap planning
No ILM, ability to demote or remove old data	Active Archive
Perception that pooled storage is too expensive	Create TCO models for mgmt
Security reasons, workload isolation	Virtual private pools, vSAN
Too many copies of data	De-duplication Archive Tiered Storage
No SRM tools to report on age, access & usage patterns	SRM Tools Tiered Storage

Measurements and Predictions of Investment Activities

Here is what is to be done, and the projected impact on XX Data Center utilization rates

2007	2008	2009	2010	2011
Extend the SAN	Consolidation Ph 2	Thin provision	Policy Provision	
Tech refresh	Tiered storage	Measurement	Apps provision	
ITIL processes	Storage virtualize	Dashboard		
Consolidation Ph 1	Capacity Mgmt	Auto provision		
	SRM tools	Capacity on demand		
	Measurement			

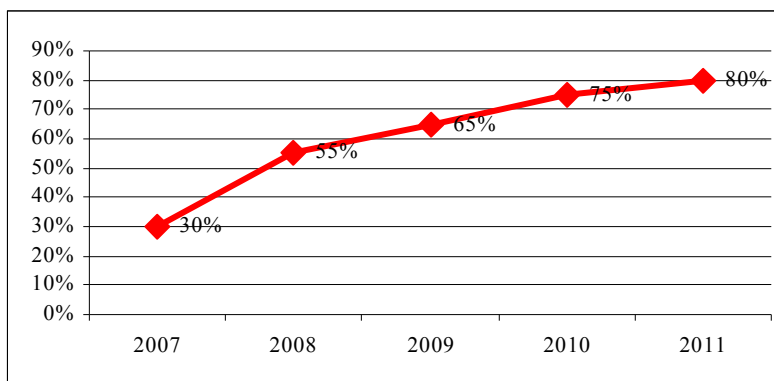


Figure 3 Projection of Aggregate Utilization at the XX DC

Roadmap for Incremental and Strategic Improvement

- People
 - Skills and training to react and resolve
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- Process
 - ITIL best practices and process
 - Provisioning rules, policies
 - Capacity planning
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- Technology
 - Virtualization
 - Active archive
 - De-duplication
 - Monitoring and management tools
 - Tiered storage
 - Thin provisioning
 - Quotas
 - SRM tools
 -
- Business Models
 - Chargeback
 - Approval process
 - Standard pooled and tiered offerings
 - Incentives, rewards, rebate, penalties

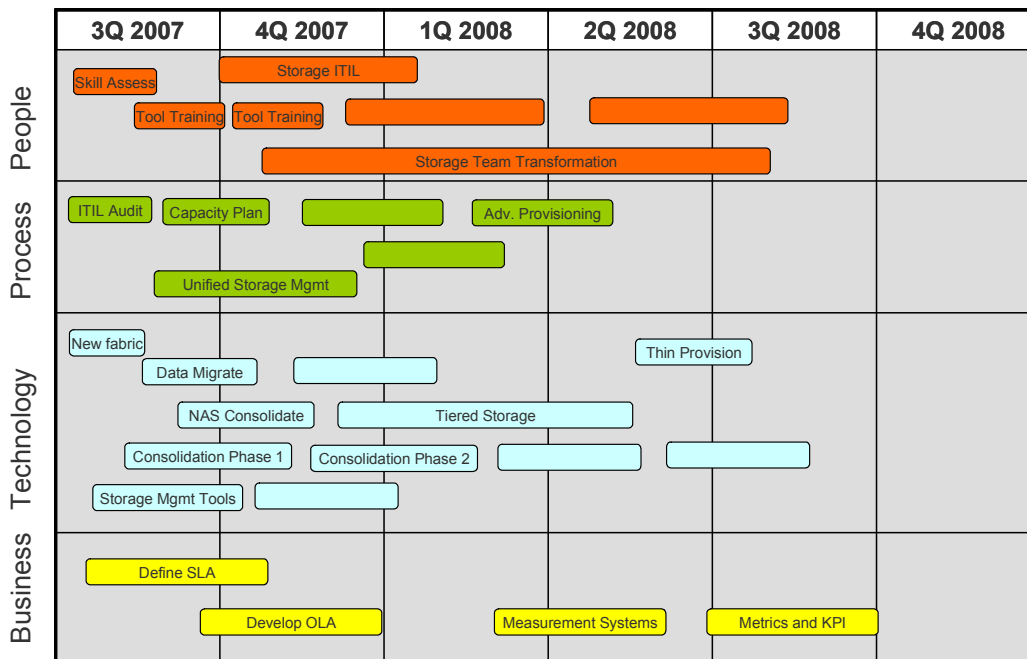


Figure 4 XYZ Roadmap for Utilization Improvement

Conclusions

So therefore what.....

What are the easy things to do first

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What are the best investments given measurable improvement, good ROI

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What are the strategic an long-term things to do

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Where does XYZ need help in planning, executing, managing, reporting

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