





Tiered Storage School

Lesson Three

Creating a Tiered Storage Strategy



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Tiered Storage in 4 Lessons

Lesson 1 – Introduction & Business Requirements
Lesson 2 – Data Classification for Tiered Storage
Lesson 3 – Creating a Tiered Storage Strategy
Lesson 4 – Justifying the Strategy to Management

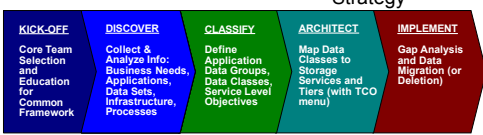
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Tiered Storage Project Steps

Strategy



- Establish a common conceptual framework for the core team: Tiered Storage School is a good start!
- Understand the business needs before focusing on the storage architecture
- Define data classes and service level objectives, then provision storage services and tiers to meet those requirements

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Creating Storage Services

- Storage service configurations must meet minimum service level objectives (SLO) defined by data classes from lesson 2
- Focus on reducing the cost of meeting SLOs of the data class
- Offer a menu of 4 to 6 storage service configurations to meet all the created data classes, at distinct cost points – a cost factor of 1.5x or 2x between classes is recommended
- Existing storage tiers may provide many of the desired service configurations
- New technology should be added only when desired storage service configurations are not cost effective with existing storage tiers, typically this will mean focusing on emerging lower cost storage architectures

Real World Example: Storage Tiers

Company XYZ had two storage tiers at time of creating their storage strategy

High-end SAN	Internal or Direct Attached Storage
Raid 5 (6+2), 0, 0+1	Raid 5
Snapshot	No Snapshot
Local & Remote Replication	No Replication
Fibre Channel Connection	SCSI/FC Connections
72 GB FC Disks	36, 72, 144 GB Disks
Tape Backup or Remote Replication	Tape Backup Only

Real World Example: Storage Tiers

Company XYZ added 1 new storage tier to meet their needs

Midrange SAN
Raid 5 (7 +1)
No Snapshot
Local & Remote Replication
Fibre Channel Connection
144 GB FC Disks
400 GB SATA Disks
Tape Backup or Virtual Tape
Nearline Backup

Real World Example: Storage Service Configurations

Company XYZ created 6 Storage Service Configurations using the 3 tiers in their strategy

Description	Disk Tier	Disk Type	Service Level Capabilities						Availability			Cost estimates			Reference Architecture (Configured Tiers)
			Avail	Recov	Ret	Comp	Trans	Acct	Min	RPO	RTO	Logar	Storage	\$/TB/yr	
1 High-end SAN RAID, replicated to same, 1 snap	ENT	Fast	H	H	H	H	H	H	4	4	\$40	\$40	\$50	\$50	Enterprise RAID-5 (R+2), 1 snapshot, 150rpm disks, replicated to same class
2 High-end SAN RAID, not replicated	ENT	Fast	M	M	H	H	H	M	24	24	\$34	\$34	\$34	Enterprise RAID-5 (R+2), 1 snapshot, 150rpm disks, not replicated	
3 Midrange SAN RAID, replicated	MED	Med	M	H	M	H	M	M	24	24	\$15	\$15	\$15	Midrange RAID-5 (R+1), 140GB FC disks, replicated to the same class	
4 Midrange SAN RAID, not replicated	MED	Med	M	M	M	H	M	M	24	48	\$15	0	\$15	Midrange RAID-5 (R+1), 140GB FC disks, not replicated	
5 Midrange SAN RAID, slow disk, Not replicated	MED	Med	M	M	M	M	M	M	24	72	\$1	\$1	\$1	Midrange RAID-5 (R+1), 250GB SATA disks, not replicated	
6 Internal or direct attached disk, Not replicated	INT	Slow	L	L	L	L	L	H	48	120	\$3	0	\$3	Internal / DAS	

Storage service configurations are built on underlying storage tiers, including disk, tape, SAN, NAS, CAS, etc.

Real World Example: Gap Analysis

Storage Variables	Business Requirements		OLTP Critical		Mail Messaging Systems		OLTP High		Data Warehousing and Analytics		Mobile Servers		OLTP Low		File and Print Servers		Services with Infrastructure High	
	BI	OC/MT	MAIL	CR/DR	OLTP	BU	OL/OW	FFS	SH/DR									
High-end SAN RAID, replicated to same, 1 snap	+	+	+	+														
High-end SAN RAID, not replicated			+															
Midrange SAN RAID, replicated					+	+												
Midrange SAN RAID, not replicated							+	+										
Midrange SAN RAID, slow disk, Not replicated									+	+	+	+	+				+	+
Internal or direct attached disk, Not replicated	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Yellow Boxes indicate current infrastructure

Green Boxes indicate new storage strategy infrastructure

Real World Example: Action Plan

Issues: Storage infrastructure is not aligned with business needs for cost or performance

Result: Optimal storage performance for each application at the appropriate cost

Actions:

- * Determine total storage capacity needed for each class including 1 year of growth
- * Create "to be" architecture based on capacity requirements, storage classes, physical location and service levels
- * Implement architecture, beginning with direct attached migration to mid-tier storage
- * Separate development and production data

Conclusions

- Create storage service configurations that meet the service level objectives of your data classes
- Utilize existing storage tiers to create your storage service configurations, add new tiers in the mid to low range for cost savings
- Create a gap analysis between your current architecture and your new storage strategy
- Define tiered storage provisioning and migration strategies to implement your plan, start with a tactical win
- Next step: [Justify your strategy to management](#)
