The End of Storage as you Know It

Craig Nunes

HP Storage Marketing Worldwide

Hewlett-Packard

CLOUD: NOT 'IF' BUT 'WHEN'

MASSIVE
POTENTIAL MARKET

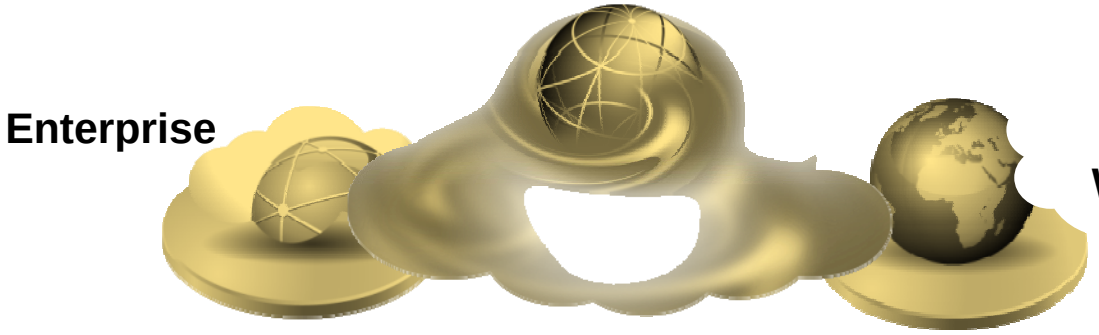
Cloud Services Market
$59B in 2009,
$149B in 2014(1)

POTENTIALLY
DISRUPTIVE

Traditional infrastructure addressable market could be reduced by 20% in 2012(2)

(1) Gartner
(2) IDC Survey, Cloud Computing Attitudes, Doc.#223077, April 2010

SHIFT TO IT AS A SERVICE



Utility Infrastructure

Utility Storage	Server Virtualization	Converged Network

Internal Virtualization | Automation | Clustering

STRATEGIC ROLE OF IT IS CHANGING

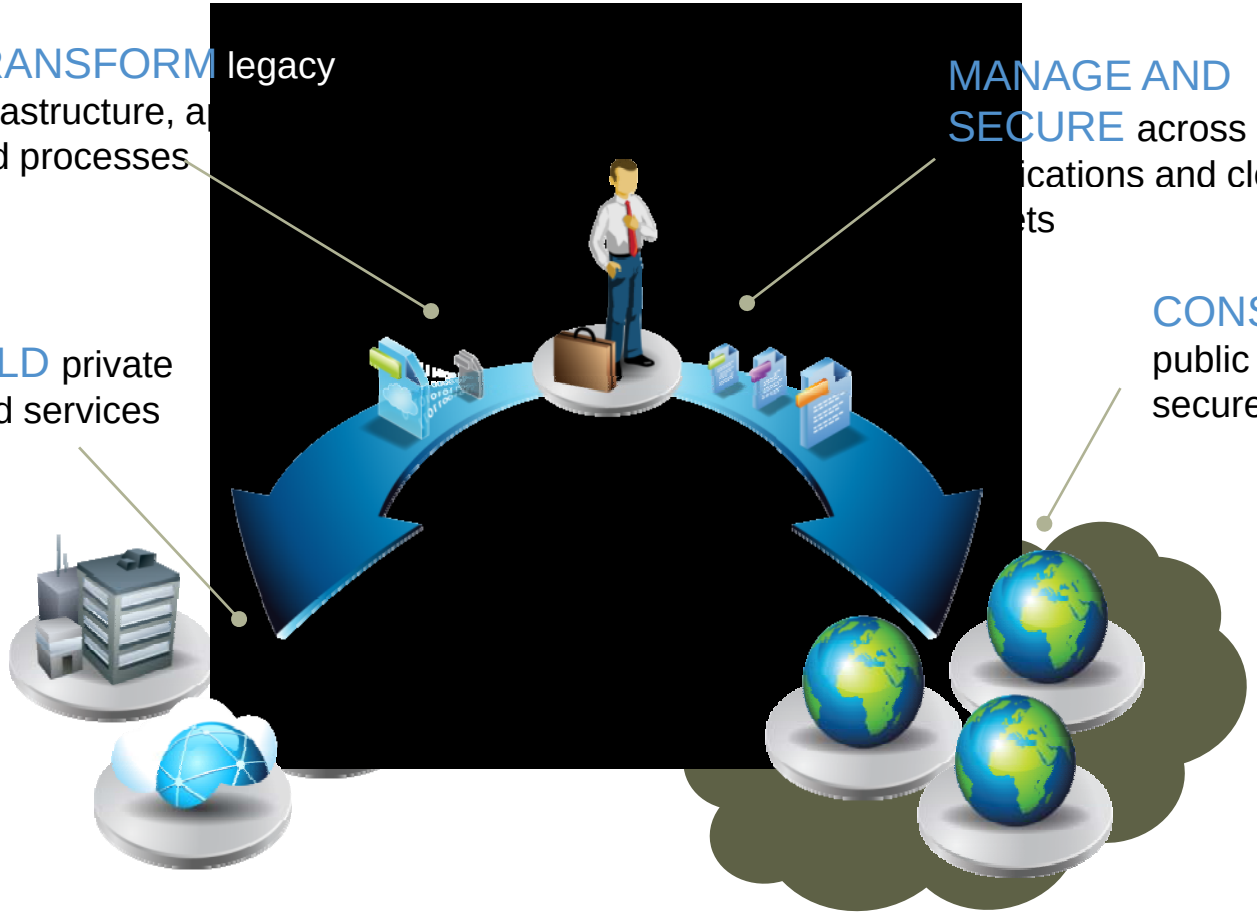
IT becomes the builder and broker of services

TRANSFORM legacy infrastructure, a and processes

MANAGE AND SECURE across legacy ications and cloud ts

BUILD private cloud services

CONSUME public services securely



ITaaS SHIFTS DRIVE NEW INFRASTRUCTURE REQUIREMENTS

- Provision rapidly
- Handle diverse and unpredictable workloads
- Support appropriate, dynamic service levels

Agility

- Deliver high resource utilization
- Offer low operational overhead

Efficiency

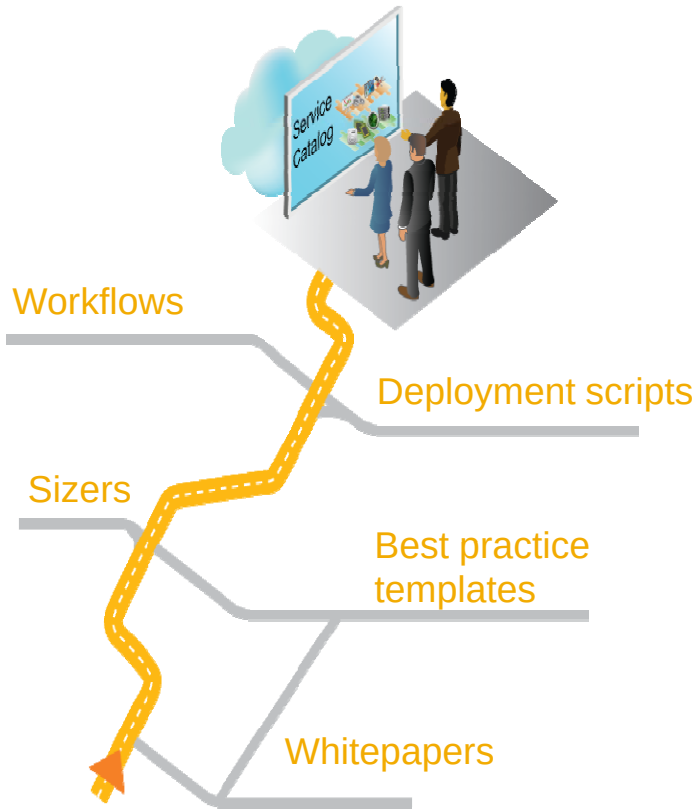
Delivered on a Multi-tenant Infrastructure

ELEMENTS OF AN ITaaS DATA CENTER

- Application **Templates**
  - Simplified deployment of critical apps
- Unified Service **Catalog**
  - For private and public cloud environments.
- Resource **Orchestration**
  - Ongoing monitoring & lifecycle management of these resources
- **Utility** Infrastructure**:** compute, storage and networking
  - Efficient, agile, built for IaaS

ACCELERATE APPLICATION DEPLOYMENT

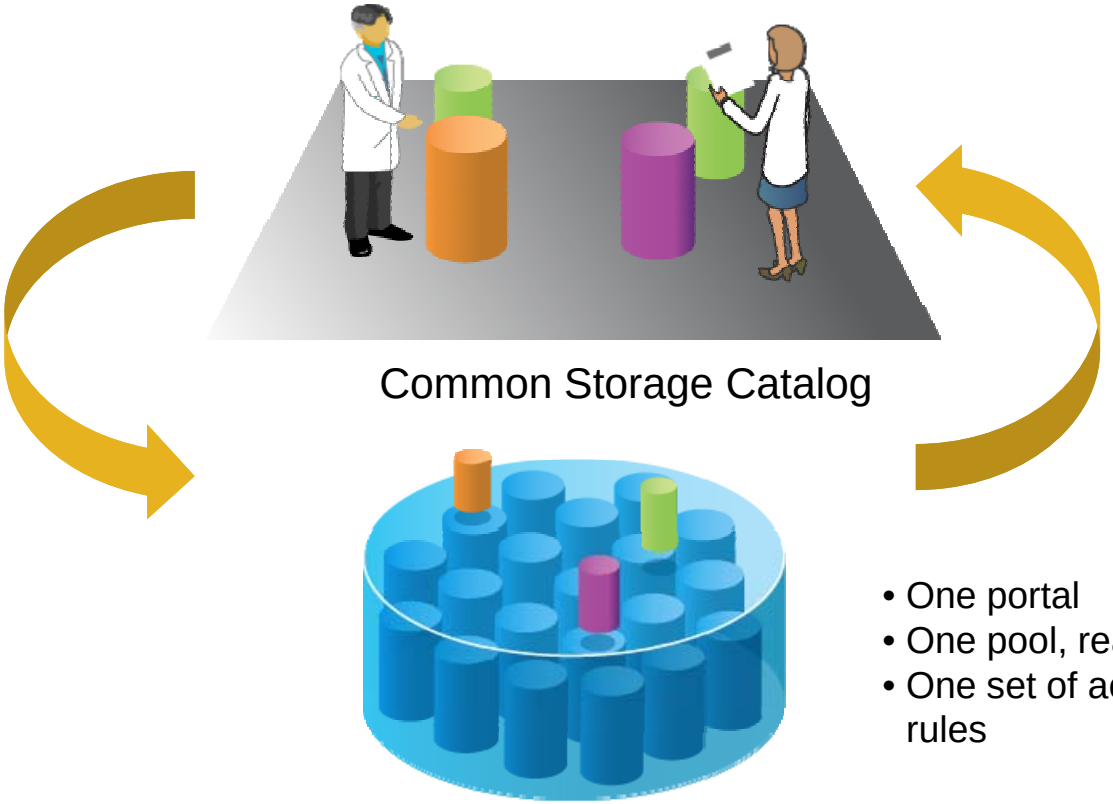
- Fast track cloud service catalog creation
- Pre-defined templates for key business apps



SERVICE CATALOG SETS UP PORTAL-BASED RESOURCES

Storage Manager pre-provisions thin storage with varying QoS

Server Manager selects storage as needed

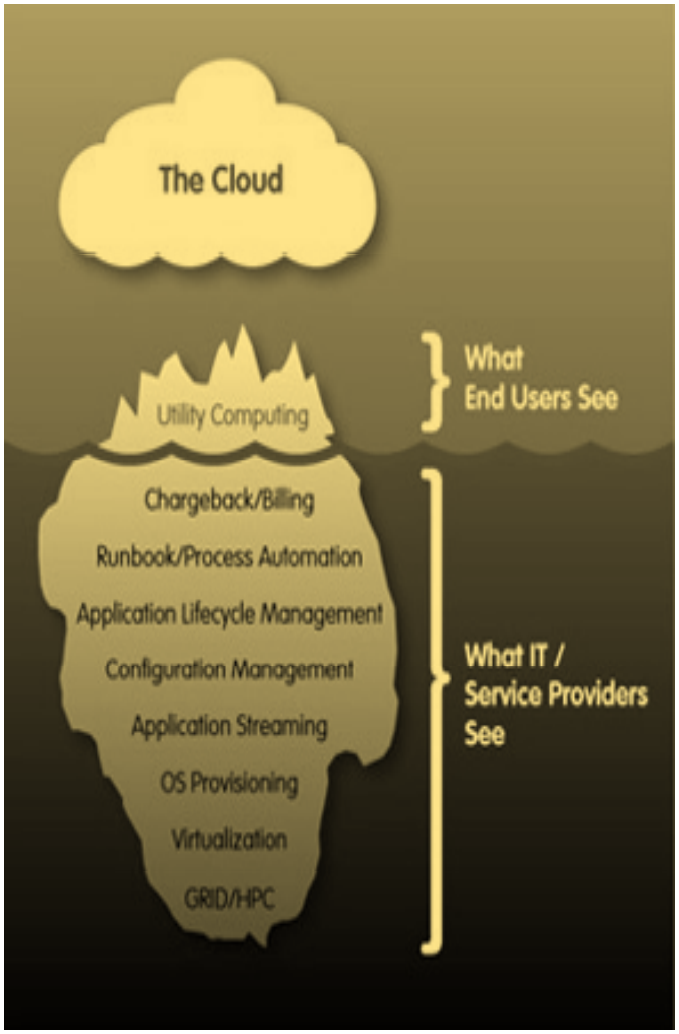


- One portal
- One pool, ready to go
- One set of access control rules

ORCHESTRATION DELIVERS AGILITY

- Dynamically monitor & provision
  - Server, storage, network and application elements
- Integrated extensions
  - Service provider aggregation
- Automatically grow, shrink allocated resources
  - Associated with QoS targets
- Single portal
  - Manage private, public and hybrid cloud services

STORAGE CONSIDERATIONS FOR UTILITY INFRASTRUCTURE



- Enables efficiencies of consolidation *while* maximizing flexibility
- Optimized for specific requirements of virtualized computing

CONSOLIDATION EFFICIENCIES WITH MAXIMUM FLEXIBILITY

MULTI-TENANT CLUSTERING

- Performance & capacity scale for multiple apps
- Handle diverse, unpredictable workloads
- Security among tenants
- Resilient
- Acceptable service levels with a major component failure

EFFICIENCY TECHNOLOGIES

- High utilization with high performance
- Eliminate capacity reservations
- Fat to thin volume migrations
- Continual, intelligent re-thinning
- Fast implementations of low overhead RAID levels

AUTONOMIC MANAGEMENT

- Autonomic configuration (including clusters) and provisioning
- Autonomic performance optimization and load balancing
- Autonomic cost, performance optimization and service-level mgmt

CLOUD REQUIRES SECURE MULTI-TENANCY

Consolidation at Global Cloud Hosting Firm, DataPipe

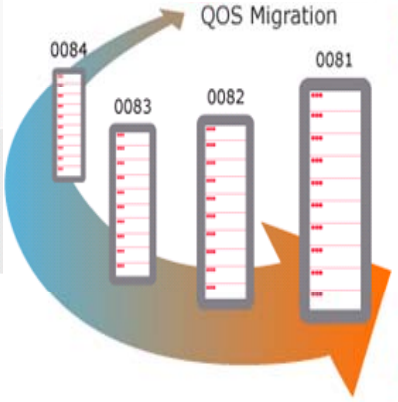
300 → 10

UNPREDICTABLE WORKLOADS DEMAND AUTONOMIC MANAGEMENT

Dynamic QoS services at a Global Cloud Service Provider

Utility Storage QoS Levels

QoS Level	RAID Protection	Relative Performance	Price	I/O Intensive Applications	Recommended Uses
QoS 1	FC DISK, RAID 10 (Mirrored)	******	$$$$$	Yes	Provides write-intensive applications
QoS 2	FC DISK, RAID 50 (3D+1P)	*****	$$$$	Yes	Provides balance of performance and protection
QoS 3	FC DISK, RAID 50 (7D+1P)				
QoS 4	SATA DISK, RAID 50 (7D+1P)				

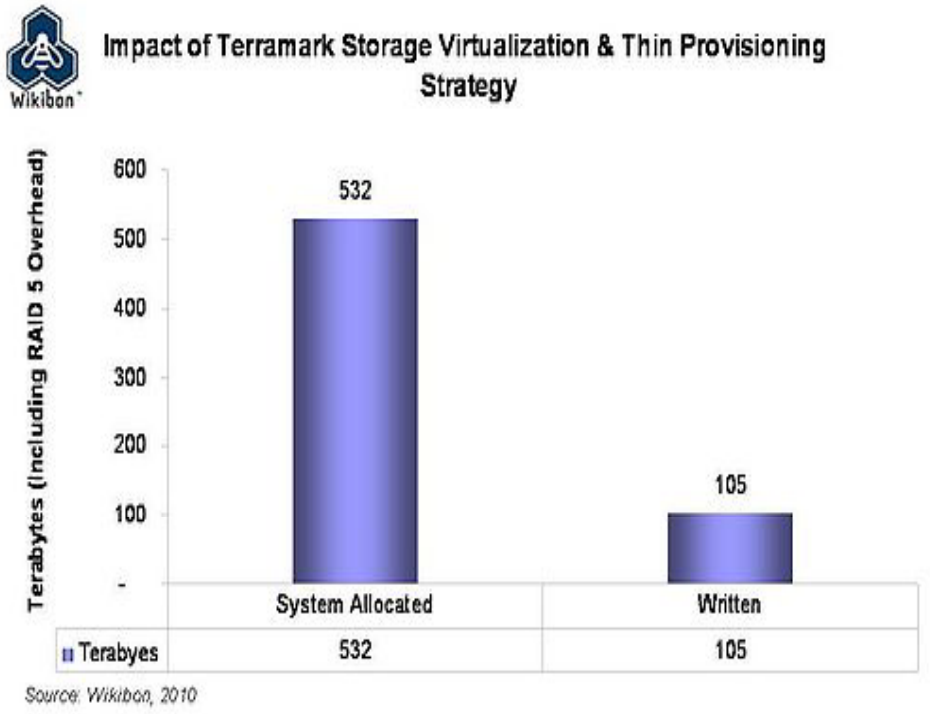


Features / Standard Offering

- No disruption migration between QoS levels
- One-time charge to migrate between QoS levels.
- Migration occurs online without service disruption to the LUN
- Notification at migration commencement and completion
- 24/7 monitoring, management and customer support
- Monitor migration process

THIN TECHNOLOGIES KEEP COST AND POWER DOWN

Power and Cooling Savings at Terremark



Source: Wikibon, 2010

Example system "savings in storage capacity realized by thin technologies… 532 versus 105 TBs"

Terremark Data Center Cloud Storage Virtualization Power & Cooling Savings

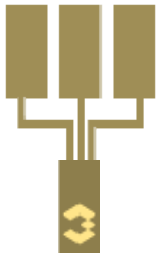
a	b = a x 10	c	d	e = b x d x .025 / 1000	f = a x d x .025 / 1000	g = e - f	h = e x 1000 x 365 x 24	j = f x 1000 x 365 x 24	k = h - j
# Virtualized Storage Drives (25 Watts / Drive)	# Traditional Physical Drives (25 Watts / Drive)	Cost of Power / kWhr	Original PUE	Cloud Storage Power without non-Virtualized (MW)	Cloud Storage Power Virtualized (MW)	Cloud Storage Virtualization Power Savings (MW)	Annual Power Budget for Cloud Storage non-Virtualized	Annual Power Budget for Cloud Storage Virtualized	Annual Power Budget Savings
2,613	13,287	$0.10	2.16	0.718	0.141	0.577	$ 628,761	$ 123,643	$ 505,119
% Annual Budget Saving = 80%					Four Year Net Present Value (NPV, 5%) = $1,791,126				

"Projected power savings for a full implementation of thin provisioning..the four year NPV is $1.8million. This project is expected to be completed in 2011."

ONE MORE THING…

BENEFITS OF STORAGE OPTIMIZED FOR VIRTUALIZED COMPUTING

Increase Consolidation



Double VM Density

Buy 50% fewer physical servers

Simplify Administration

Simplify Provisioning

Spend 90% less time managing storage

Maximize Savings

Lower Storage Cost

Cut storage capacity requirements by 50%

OPTIMIZED FOR VIRTUAL SERVER ENVIRONMENTS

Global Enterprise Cloud Service Provider

100% of storage behind VMware premium cloud offering is on Utility Storage

- 7 minutes to a usable VM with enterprise storage
- Differentiated services delivered by a single platform

RECAP: THE END OF STORAGE AS YOU KNOW IT MEANS…

- Deploying a unified service catalog / portal for users
- Orchestration and monitoring of all resources
- Application templates to speed deployment
- Multi-tenant, efficient, autonomic “Utility” infrastructure optimized for virtual computing

ONE MORE THING…
TRACK RECORD

4 out of 5 of the world's largest search engines

3 most popular social media properties in the U.S.

7 out of 10 of the world's largest cloud service providers

8 out of 10 of the world's most trafficked web sites

Questions?

COMPUTERWORLD SNIA

SNW

Driving Innovation Through the Information Infrastructure

SPRING 2011