



Education

Data Center Transformation

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➤ Data Center Transformation

- ◆ The data center of the future is possible today for IT environments that are willing to create an architecture that leverages technology where appropriate. This session is designed for storage administrators and storage architects. We will explore how to use existing infrastructure with new technologies to transform your data center. Virtualization, Data de-duplication, Network Consolidation, Green Data-centers and Cloud Storage are all components of future data centers. The most successful organizations will use these technologies and concepts synergistically to lower costs, while meeting service and availability needs. This session will help you create an architecture that leverages technologies to transform your data-center, without risking your IT operations, your company or your job.

The Problem with Data Centers

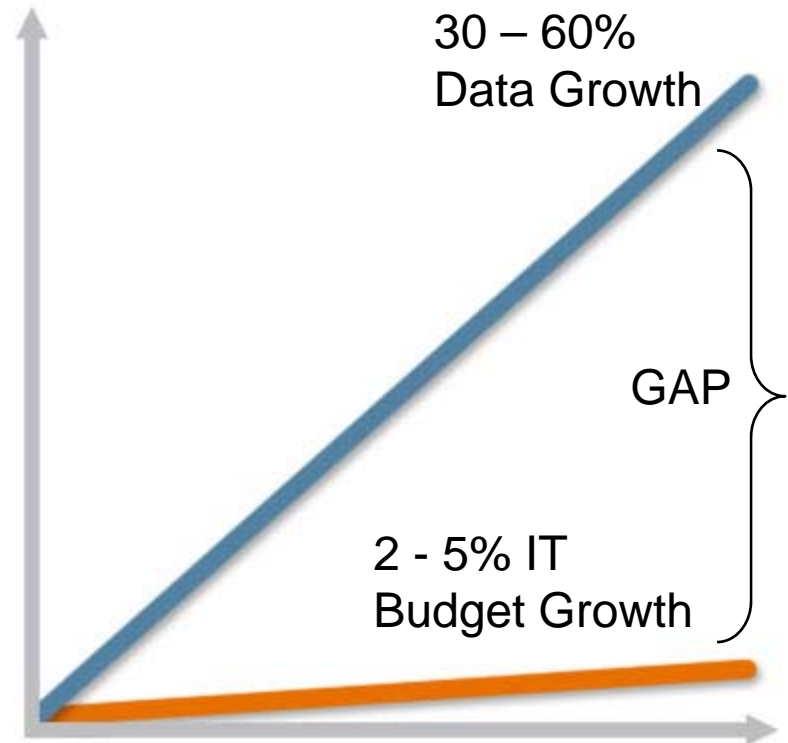
- Limited Resources and Increasing Complexity
- Systems tend to get more complex
- Complex systems cost more to operate than “efficient” systems
 - ◆ More administration & Opportunity for errors
 - ◆ Limits ability to implement new technology
- “Efficiency” requires planning & strategy



- 11.8 million servers in data centers
- Servers are used at only 15% of their capacity
- 800 billion dollars spent yearly on purchasing and maintaining enterprise software
- 80% of enterprise software expenditure is on installation and maintenance of software
- Data centers typically consume up to 100 times more per square foot than a typical office building
- Average power consumption per server quadrupled from 2001 to 2006.
- Number of servers doubled from 2001 to 2006

Gap between Data and Budgets

- Data has grown between 30 to 60% per year*
- IT budgets grow at the rate of the economy – about 3%
- How to accommodate growth with budgets?



* Growth values from Evaluator Group Model, using Market and Financial Data from 2002 - 2008

- What are the best architectures, technologies and practices?
 - ◆ DAS, SAN, NAS, iSCSI, IB, FICON, all six?
 - ◆ Consolidated, segmented, departmentalized
 - ◆ Single vendor, multiple vendors, best of breed?
 - ◆ IT as a service/ cost center vs. IT as a business / P&L center

How Did We Get Here?

- Lack of clear IT strategy
- Technology for technologies sake
- Lack of Business alignment
- Single solutions
- Too few and too many standards
- Deploying a “Solution” often leads to components that aren’t flexible, interchangeable or reusable



Where do we go?

WHAT'S NEXT?

Simplify – Then Virtualize

➤ Simplify

- ◆ IT doesn't mean complexity
- ◆ Resist complex solutions
- ◆ Architect to be simple / flexible
- ◆ Reusable / standard components

➤ Virtualize

- ◆ Physical limitations can't apply
- ◆ Interchangeable hardware
- ◆ Delivering virtual systems
- ◆ Able to provide IT as a Service

➤ ITaaS – IT as a Service

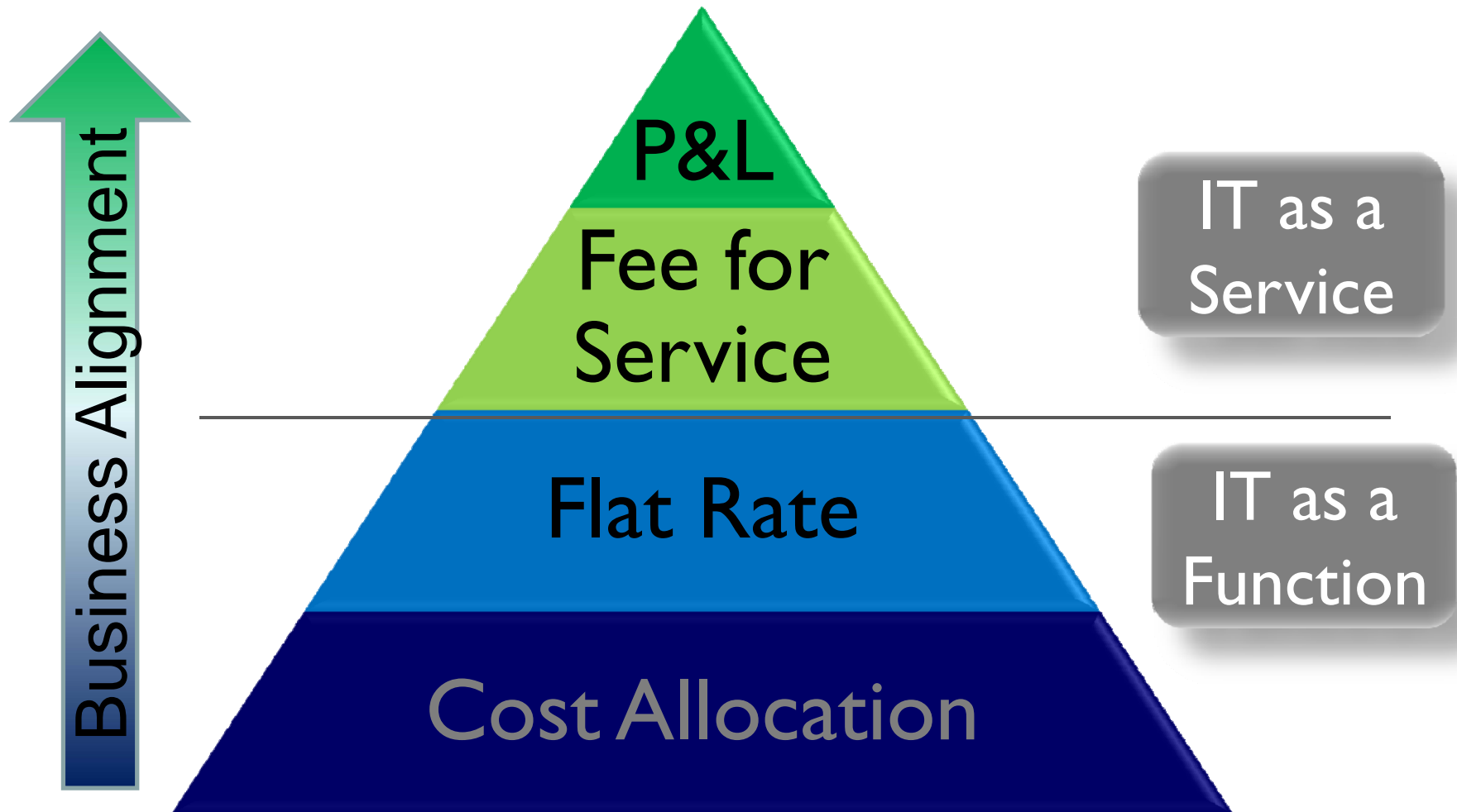
- ◆ Many models including Infrastructure, Platform and Software as a service
- ◆ Includes Internal, External and Hybrid models

➤ Seeks to Align IT with Business,

➤ Transforms internal IT into a Service

➤ Cost Savings from Several Areas

- ◆ Standardization, lower cost of management
- ◆ Increased utilization through standardization and flexibility
- ◆ Deliver only what Business requires and pays for



- Businesses are demanding that IT costs be justified by business requirements
- Will drive the need for more visible cost models
- As a result IT departments will have to operate as P&L centers

TRANSFORMING THE BUSINESS MODEL

Steps for Transformation

1. Understand the new Business and Operational Models
2. Asses Current Architecture and Technologies
3. Identify new Technologies
4. Design a Flexible, Extensible, Reproducible Architecture
5. Create a Transition Plan
6. Execute and Refine

Delivering SLA's

- Part I of the Equation
 - ◆ Delivering the required Service – Profitably
- Provide only what the SLA requires
 - ◆ If customers receive Platinum service at Gold price, they don't need to upgrade
- SLA provides “What, When, Where and How much” specifics
- SLA is a Business Contract
- Technology is the “How”
- A “One size fits all” approach will not succeed

Managing Costs

- Part II of the Equation
- CAPEX and OPEX are equally important
 - ◆ Easy to use and manage costs less even if it costs more
- Optimize resources
 - ◆ Over provisioning is not an option
- Example:
 - ◆ Maintaining all data on tier I storage is not cost effective for a “free” email service
 - ◆ Data management more important than ever
 - DLM, ILM, HSM, whatever the term, move the data

➤ Virtualization

- ◆ Breaks bonds between equipment and service offering
- ◆ Missing during the last wave (SSP, Grid, Utility, whatever)

➤ Security

- ◆ Absolutely required

➤ Management

- ◆ Includes service level management
- ◆ Must have in order to ensure SLA's are met

➤ Metering, Monitoring and Billing

- ◆ This is the forgotten element
- ◆ Without these, there is no service

SaaS

PaaS

IaaS

Core IT

A
p
p
1

A
p
p
2

API

GUI

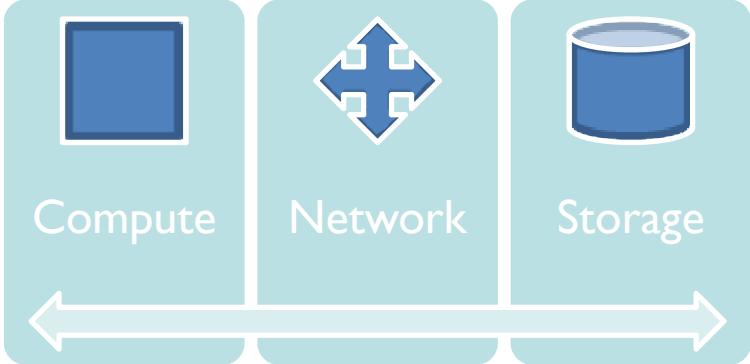
GUI

Virtualization

Security

Management

Billing & Chargeback



➤ How are Clouds Different from Past xSP models?

- ◆ Most prior efforts at service provider models failed
- ◆ They lacked the 4 Tenants outlined

➤ Is the Cloud model Viable?

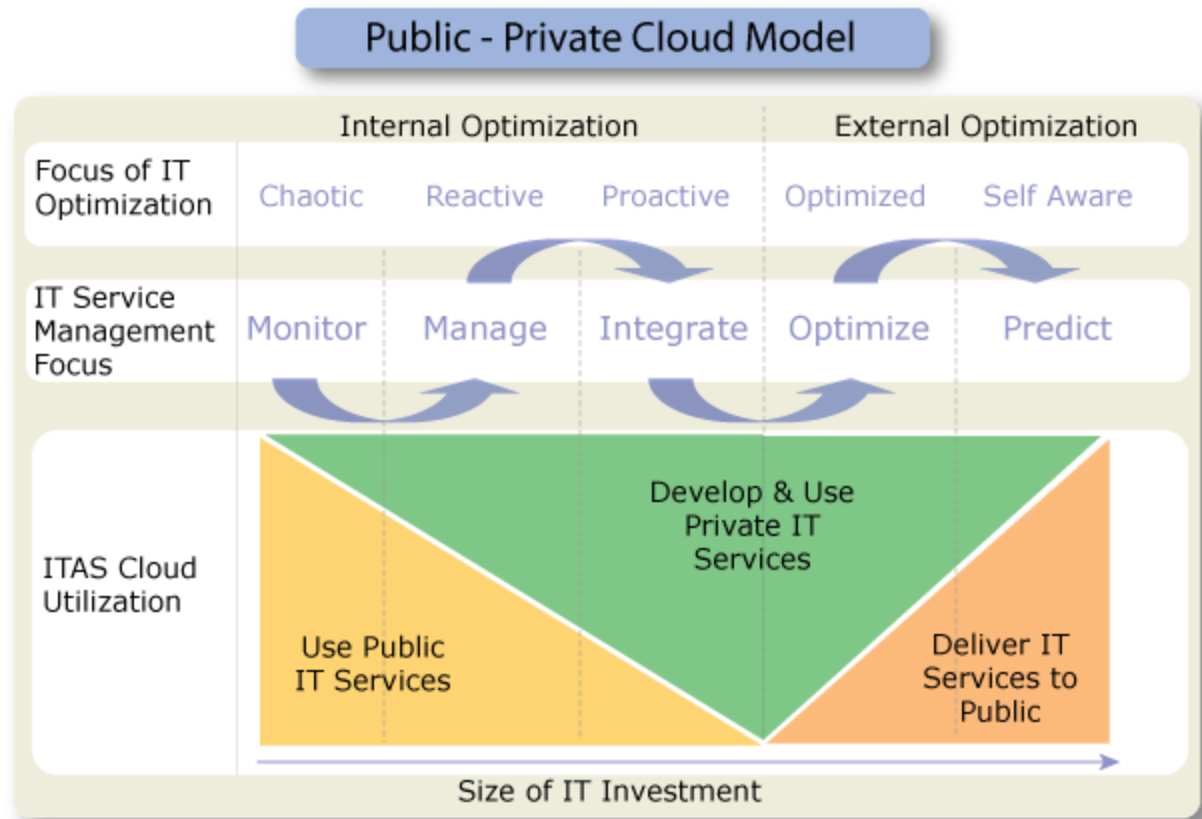
- ◆ In limited forms, yes
- ◆ Each aspect has been greatly enhanced over past decade
- ◆ Virtualization, security and management are greatly improved

➤ Clouds are a Delivery Mechanism for ITaaS

- ◆ Internal, External and Hybrid Cloud models

The Role of Cloud Computing

- Data Centers will include Public & Private Clouds
- Proportion depends upon IT Investment
- Highly Specialized Companies will become IT service providers



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Paths for Cloud Adoption

➤ Use public clouds

- ◆ Option 1: as is with multi-tenancy
- ◆ Option 2: no multi-tenancy of servers or storage + enhanced organization defined security

➤ Develop private clouds

- ◆ Procure an external private cloud
- ◆ Migrate data centers to be private clouds (fully virtualized)

➤ Use hybrid-cloud technology

- ◆ Leverage a private and public cloud architectures
- ◆ Workload portability between private and public clouds

➤ Build or procure community clouds

TECHNOLOGIES FOR TRANSFORMATION

- Use flexible re-usable, virtual components
- Interchangeable components
- Must be able to mesh internal resources with external
- IT will be competing on Cost and SLA
 - ◆ SLA's are about delivering only the required Service
 - ◆ Cost is about being more efficient

- Internal IT as a Service requires the same technologies as ITaaS providers
- Core Technologies:
 - ◆ Infrastructure: Flexible, standardized components
 - ◆ Virtualization: Server, Storage, Networks and Mgmt.
 - ◆ Security: Multi-layer, providing multi-tenancy
 - ◆ Management: Device and service level management
 - ◆ Billing & Chargeback: Required for all services
- Cost Reduction
 - ◆ Tiering and ILM: Needed to reduce costs

➤ Utilize Flexible Infrastructure

- ◆ FC SAN networks are highly manageable and deterministic, but inflexible
- ◆ iSCSI SAN networks more flexible, limited management
- ◆ IB is too esoteric

➤ Ethernet is becoming the layer 2 network of choice

- ◆ New DCB/CEE will support multiple protocols
- ◆ Data Center Bridging, and Converged Enhanced Ethernet are part of a new 802.3 standard for Ethernet
- ◆ Will support FCoE, iSCSI, NFS, CIFS and others

System & Storage Choices

- Systems should provide multi-protocol access
- Must have build in multi-tenancy
- Virtualization for scale down, scale up and scale out
- Security capability for secure multi-tenancy
- Simplified management
- Must provide metering, and chargeback capabilities

- Can be the most challenging aspect
- Private Cloud, and Internal IT has an advantage
- Leverage emerging Key Management Standards
 - ◆ OASIS KMIP / IEEE P1619.3
- Encrypt all data transmitted over public networks
- Encrypt all data stored in public access locations
 - ◆ Includes Iron Mountain Vaults, Co-lo data-centers, etc

- Green – Power Efficient
 - ◆ Only if the power efficiencies save \$\$\$
- SSD
 - ◆ If the SLA calls for it – can be cost effective
- Point products, dubbed “Cloud”
 - ◆ Maybe – only if features meet needs
- Bottom Line – Only implement a product or feature if it is proven, and is the most cost effective way of meeting an SLA

- Use the right mix of Internal vs. External services
- Transform the IT Business Model for Internal services
 - ◆ IT values and costs must be aligned with business
 - ◆ IT should not be viewed as a cost center
 - ◆ Must be able to provide competitive services at competitive prices
 - ◆ Understand your Organizational and Corporate maturity



Recommendations – Part 2

➤ Transform The Infrastructure

- ◆ Use standardized components
- ◆ Leverage technologies that provide flexibility
- ◆ Create building blocks that can be redeployed
- ◆ Look for automated management
- ◆ Implement Billing & Chargeback mechanisms

➤ Leverage External Resources when Possible

➤ Benchmark Against Leaders

- ◆ You are competing with public IaaS, PaaS and SaaS providers
- ◆ Understand their SLA's and cost structures

Summary – Why Transform?

- What is the strategic importance of IT to your organization
- Survival – the current model is being “Outsourced” and “Right Shored” to death
- IT will continue to be out-sourced in various formats if internal IT is viewed as a cost
- IT must show it delivers value through superior Service Levels
- Internal IT must match costs of other options

Is Transformation Realistic?

- Yes, but it will be difficult
- The Business issues are likely to be the hardest
 - ◆ Transforming the business model of IT
 - ◆ Understanding the right mix of internal vs. external
 - ◆ Learning how to manage to the lowest cost SLA will take time
- The Technology will be difficult, but it is possible
 - ◆ Most of the technology required currently exists
 - ◆ Delivering mash-ups between internal and external services will take time

- Please send any questions or comments on this presentation to SNIA: trackvirtualizationapplication@snia.org

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