COMPUTERWORLD

SNIA

SNW

April 12-15, 2010 | Rosen Shingle Creek Resort | Orlando, Florida

# Well-Grounded Approach to the Cloud:
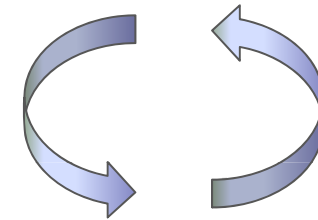## *Defining and Delivering on the Promise of an Enterprise Cloud*



**Val Bercovici**  *Cloud Czar, NetApp*
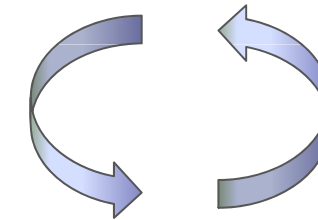*Chair, SNIA Cloud Storage Initiative*

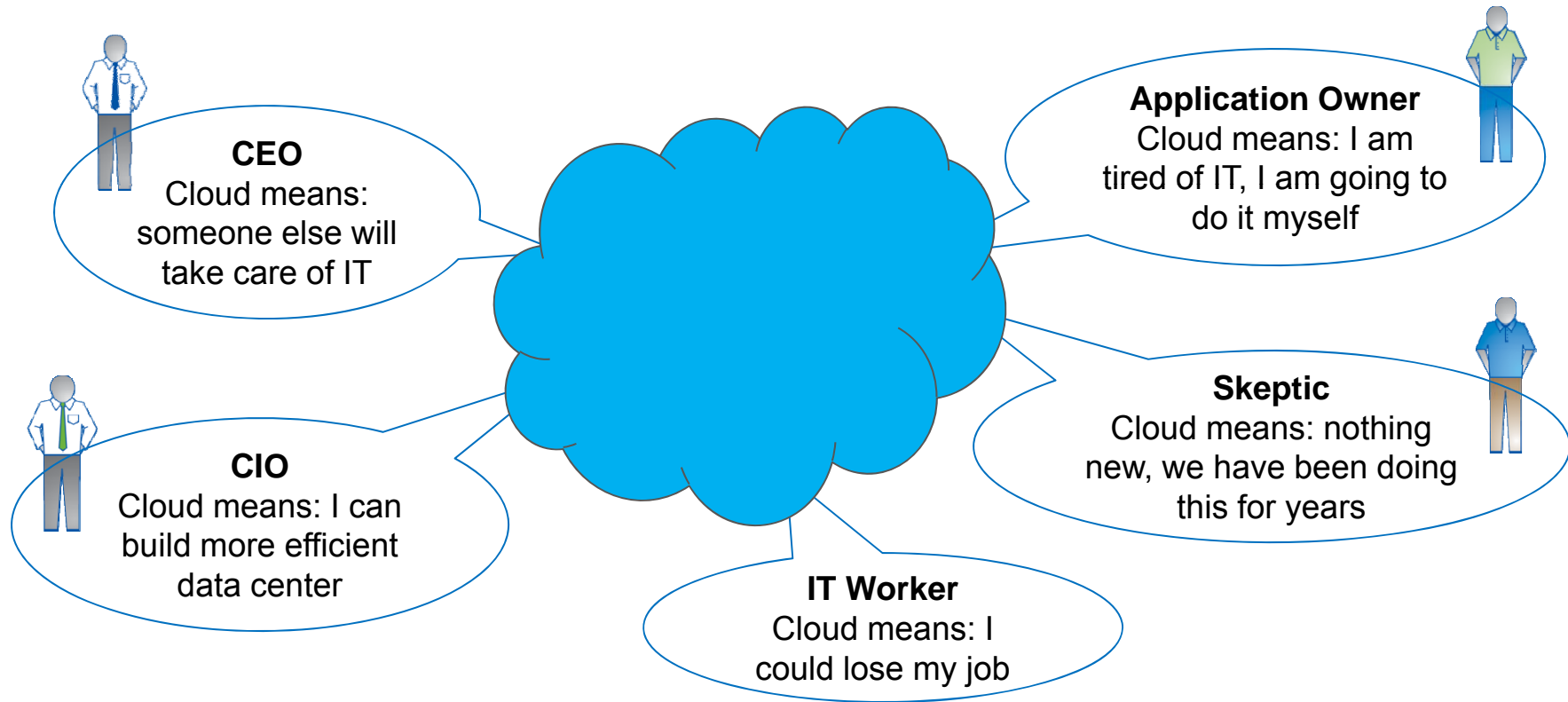# Cloud Computing Industrial Revolution Era



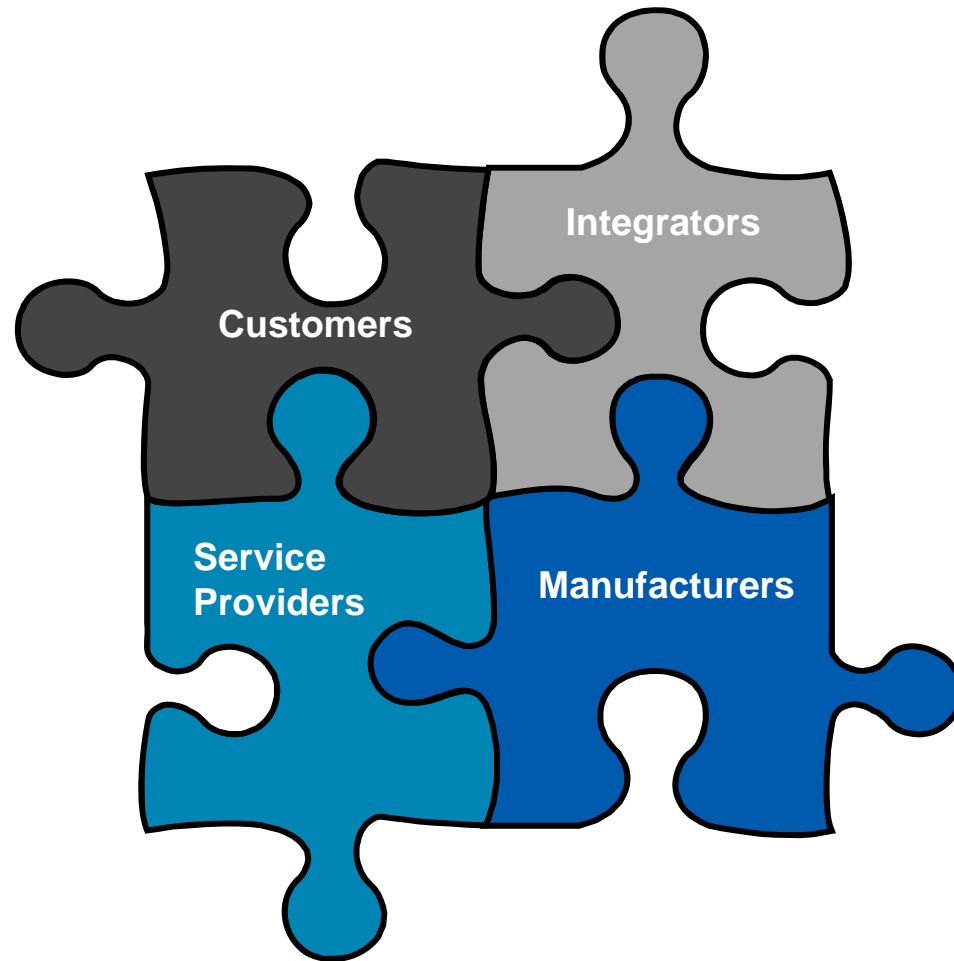Technological Change

Social Change

New Markets

# Applying a well-rounded Perspective

Some topics are hard to define because people bring different perspectives to the conversation

**CEO**
Cloud means: someone else will take care of IT

**CIO**
Cloud means: I can build more efficient data center

**Application Owner**
Cloud means: I am tired of IT, I am going to do it myself

**Skeptic**
Cloud means: nothing new, we have been doing this for years

**IT Worker**
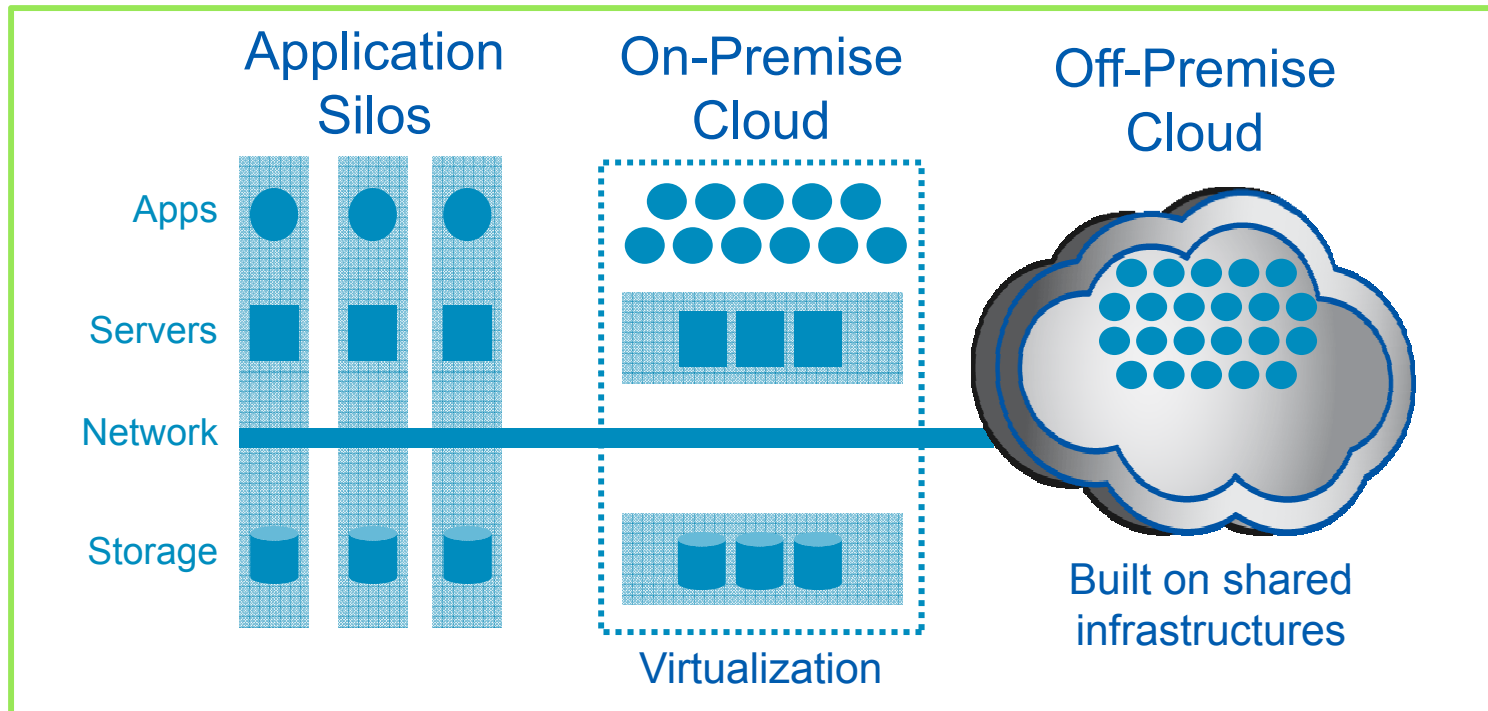Cloud means: I could lose my job

What matters most is understanding business problems your people are trying to solve

# (Not your father's) Cloud Ecosystem

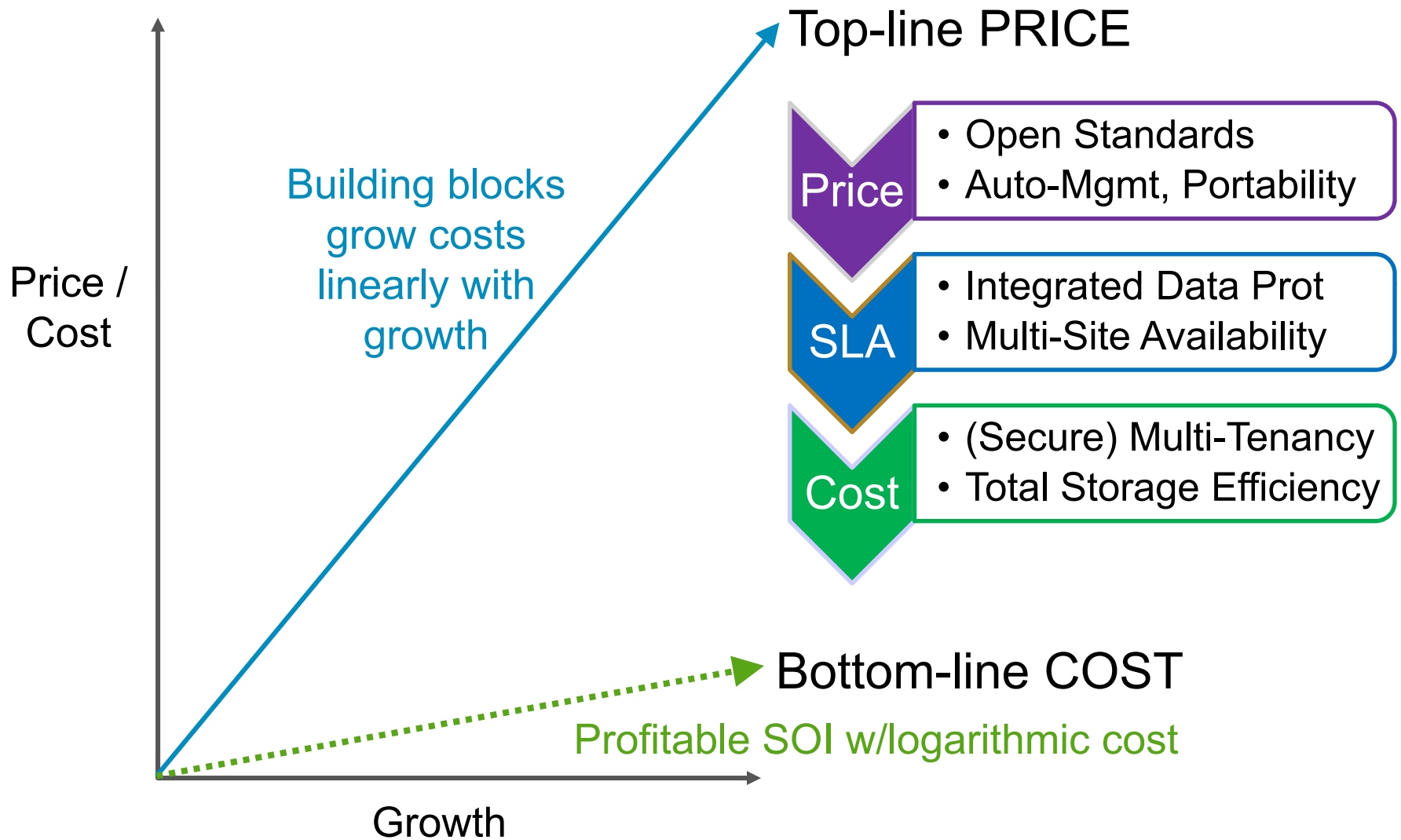# Where does cloud fit in my world?
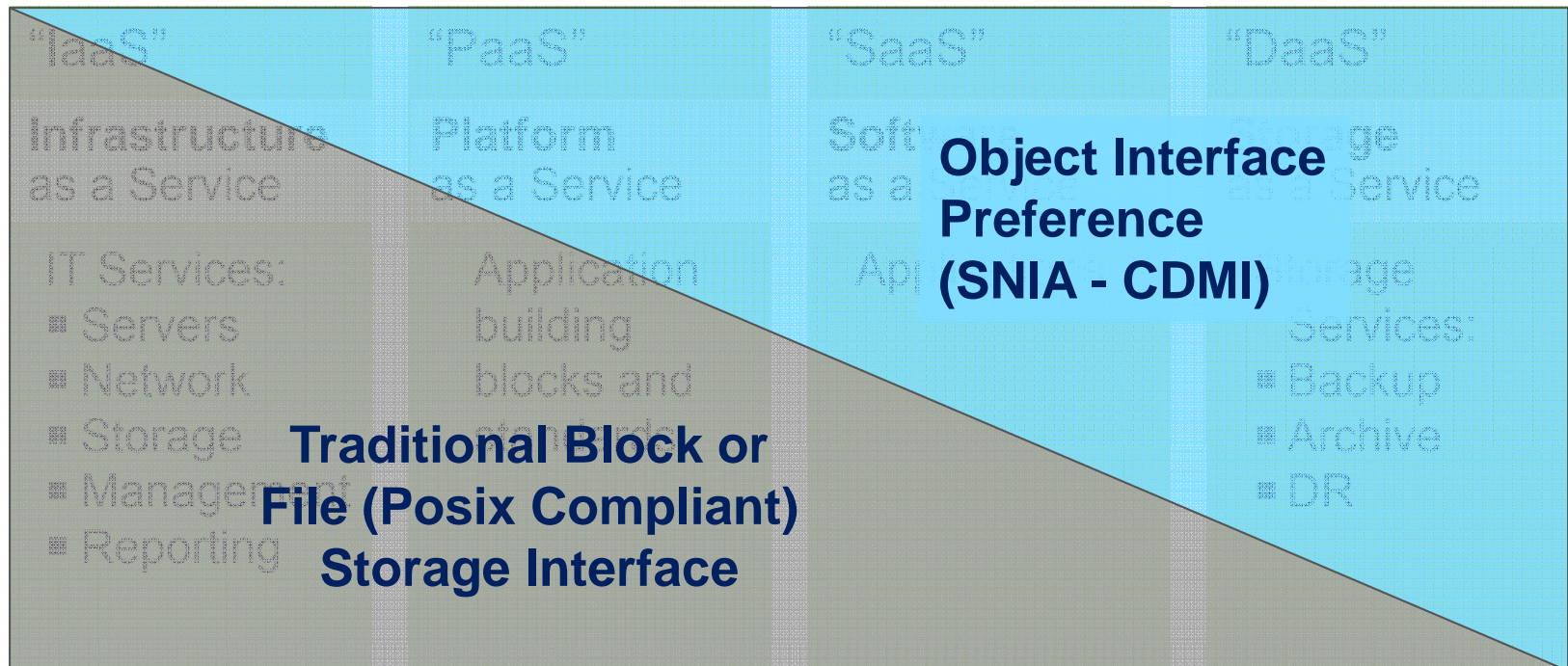## The Emerging Hybrid Data Center



**Application Silos**

Apps

Servers

Network

Storage

**On-Premise Cloud**

Virtualization

**Off-Premise Cloud**

Built on shared infrastructures

- Virtualization enables shared, service-oriented infrastructures
  – For your own use (private) or use by others (public)
  – Virtualization does not equal cloud, but cloud infrastructures are virtualized
- The more characteristics, the more likely you could call it cloud
  – Service-based, scalable and elastic, shared, metered by use, uses the Internet
  – The "skeptic" might want to call it something else – great!

# SOI – Economies of Cloud Scale



Price / Cost (vertical axis)

Growth (horizontal axis)

Top-line PRICE

Building blocks grow costs linearly with growth

**Price**
- Open Standards
- Auto-Mgmt, Portability

**SLA**
- Integrated Data Prot
- Multi-Site Availability

**Cost**
- (Secure) Multi-Tenancy
- Total Storage Efficiency

Bottom-line COST

Profitable SOI w/logarithmic cost

# Cloud Storage Interface Preferences

| Cloud – IT as a Service | | | |
|---|---|---|---|
| "IaaS" | "PaaS" | "SaaS" | "DaaS" |
| Infrastructure as a Service | Platform as a Service | Software as a Service | Storage as a Service |

**Object Interface Preference (SNIA - CDMI)**

**Traditional Block or File (Posix Compliant) Storage Interface**

IT Services:
- Servers
- Network
- Storage
- Management
- Reporting

Application building blocks and standards

Storage Services:
- Backup
- Archive
- DR

Examples:
Amazon EC2
BT
RackSpace
T-Systems

Examples:
Force.com
Google Apps
MS Azure
Oracle OnDmnd

Examples:
Google Docs
SalesForce.com
Twitter
Yahoo! Email

Examples:
Amazon S3
Nirvanix
Mosso

# First Open Cloud Standard (SNIA CDMI)
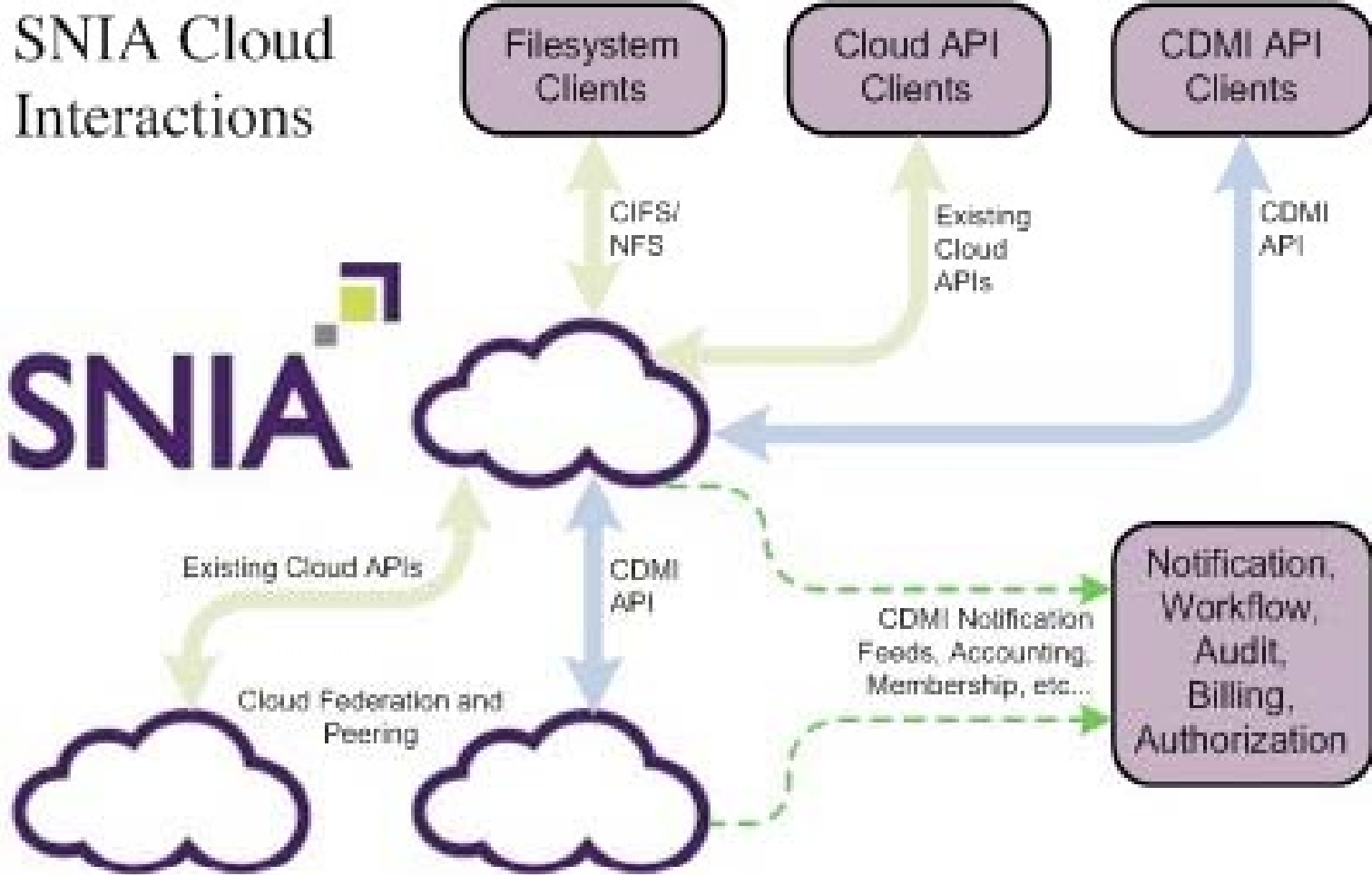
# What we announced yesterday

- ## Industry's First Cloud Standard: Cloud Data Management Interface (CDMI)
  - Now a SNIA Architecture (standard)

- ## Completed in record time
  - Cloud Storage TWG formed at last Spring's SNW

- ## Participation from a broad group of industry players
  - 175 participants from over 50 organizations

- ## Widely Applicable:
- Public Storage Cloud
- Private Storage Cloud
  - Storage Vendors
- Cloud Computing

**Industry's first Cloud Standard to be used for interoperable Cloud Storage**

*SNIA announces Cloud Data Management Interface standard*

**Orlando, Fla. (Apr. 12, 2010)** – The Storage Networking Industry Association (SNIA) announced today at Storage Networking World Spring 2010, the formal approval of the Cloud Data Management Interface (CDMI) as a SNIA Architecture standard. This milestone marks the first industry-developed open standard for cloud and will allow for interoperable cloud storage implementations from cloud service providers and storage vendors.

# SNIA CDMI / CSI Value Proposition

- **Standards Development, Implementation, & adoption**
  - Making Cloud Storage (a) Easier to understand, (b) Simpler to implement, & (c) Easier to manage

**SNIA**
Cloud Storage Initiative

### Standards Development
- CDMI (Cloud Data Management Interface) v 1.0

### Implementation
- Cloud Reference Implementation (CRI)
- Developer's Guide
- Joint CDMI/OCCI Demo at OGF29

### Adoption
- Storage Multi-tenancy – White Paper (04/10)
- Security white paper (06/10)

# Integrated Data Protection

## Comprehensive Data Protection

- Policy-based data management
- Application-specific data protection
- Full coverage for third-party data

## Broad SLA Support

- 24x7 continuous data availability
- Extend to compliance (Sec 17a-4 and others)
- Adjustable RPO for backup and DR

## Efficiency

- Up to 75% capex and opex savings
- Up to 95% smaller footprint and less network traffic
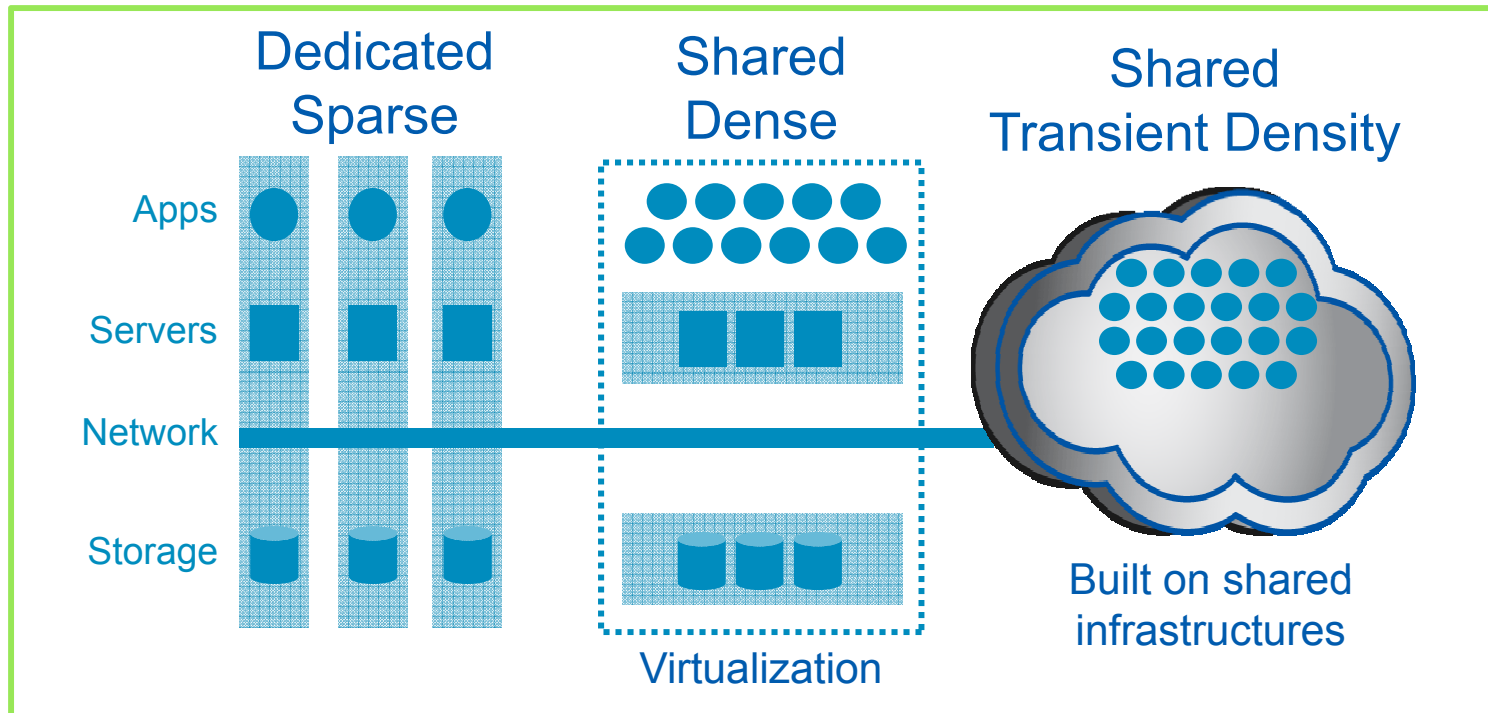- Shrink backup from hours or days to minutes

**App Integration**

**Continuous Availability**

**Local Snapshot™ Copies**

**Backup**

**DR/Dev/Test Clones**

**Disaster Recovery**

**Compliance**
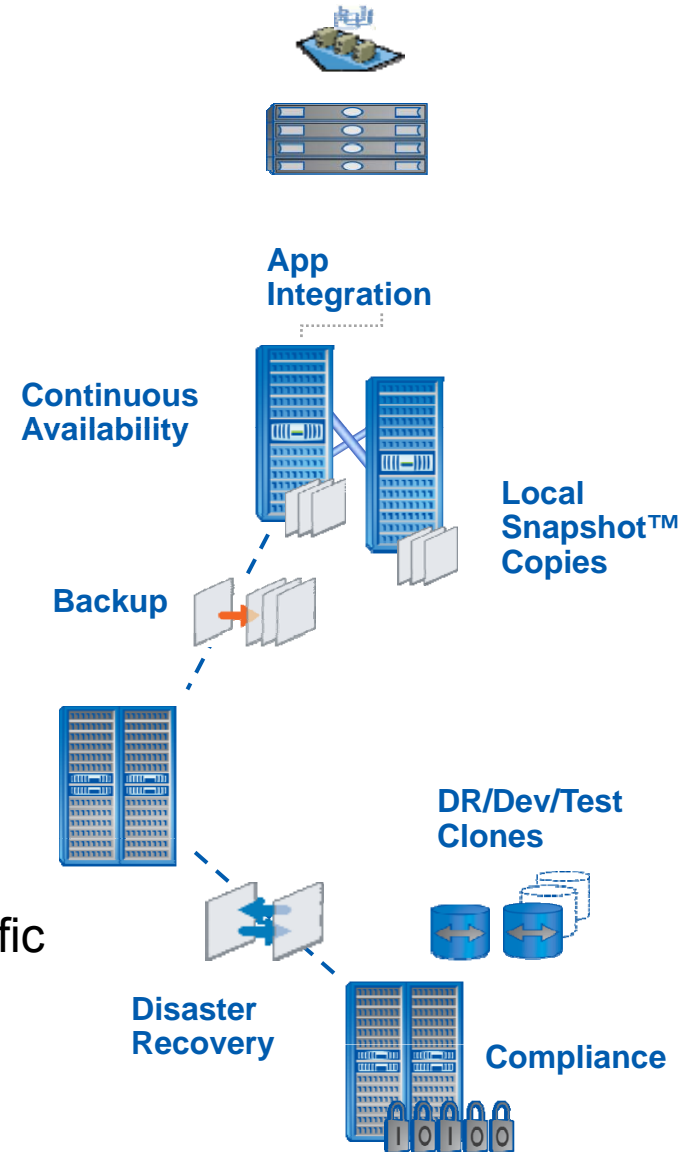
# Data Availability & Protection Services



Customer A Data Center

Customer B Data Center

Customer C Data Center

Cloud DPaaS Site

VPN isolation

Virtual Storage Partitions

Dedicated Storage
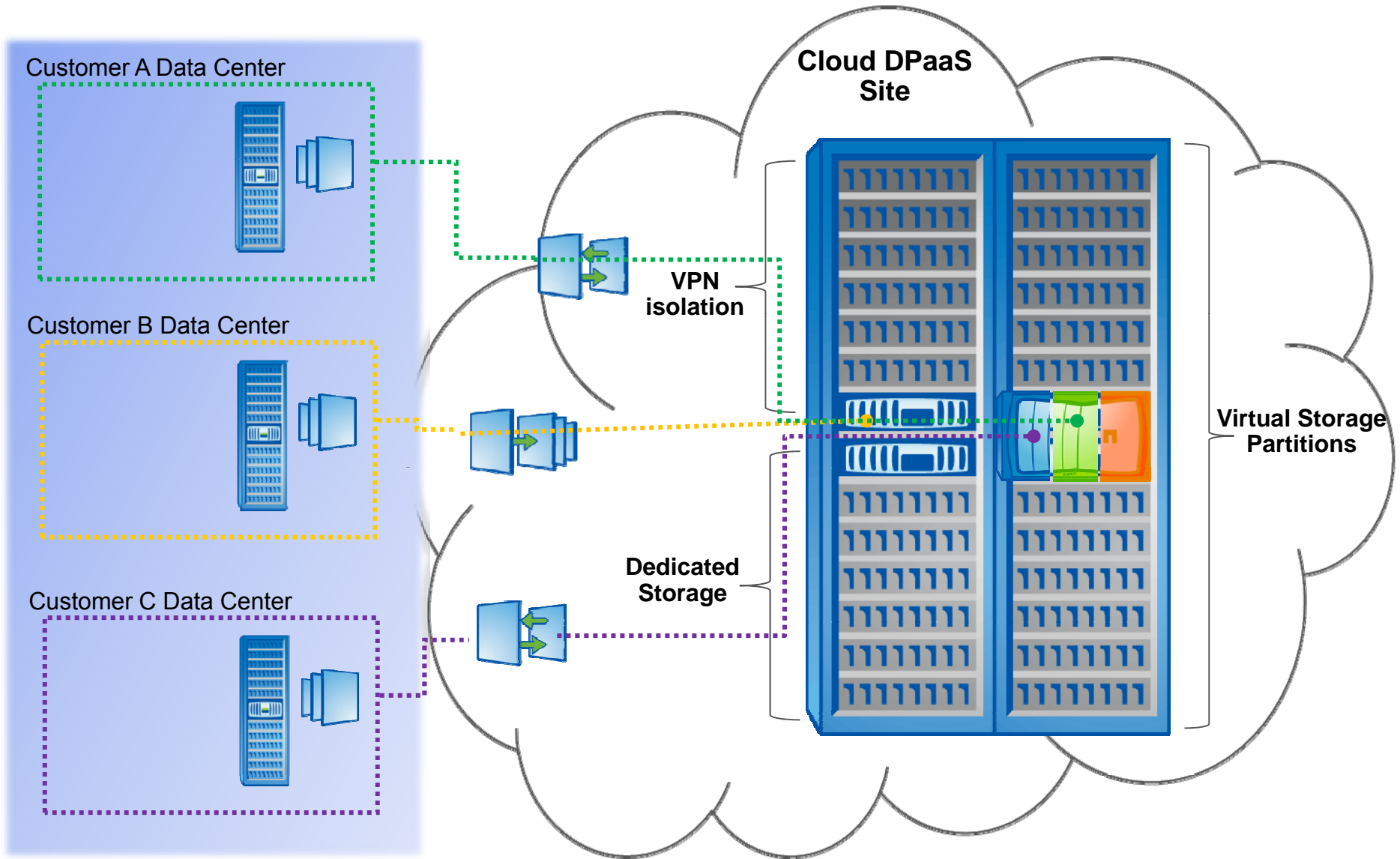
# Degrees of Multi-Tenancy

**A layman's Analogy**



Dedicated Sparse | Shared Dense | Shared Transient Density

Apps

Servers

Network

Storage

Virtualization

Built on shared infrastructures

# Secure Multi-Tenancy
## Three Companies, One Architecture
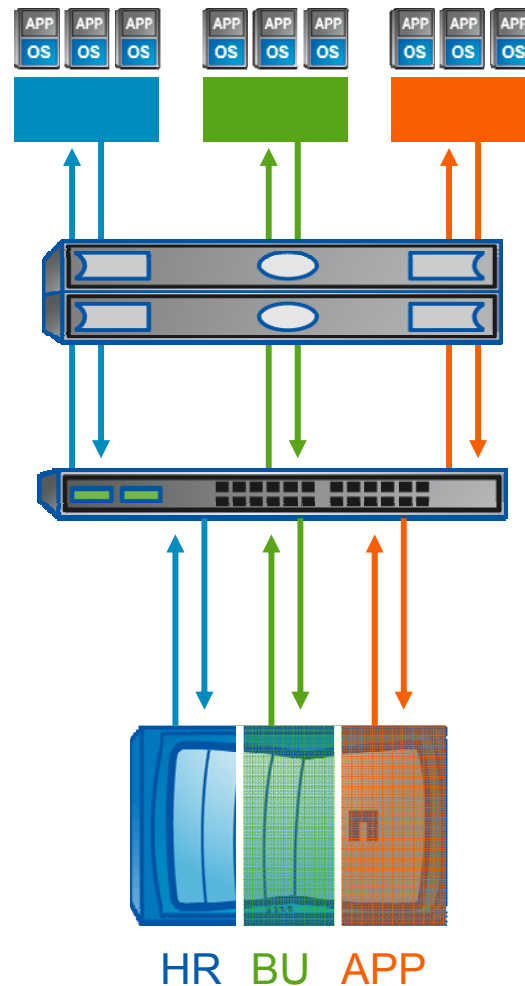
### Overview

- The only validated design for end-to-end secure multi-tenancy
- Data is securely isolated from virtual server, network, to storage

### Benefits

- Integrated solution "out of box" means less risk and faster deployments
- Address end user security concerns
- Meet regulatory and compliance requirements
- Gain economies of scale, higher utilization, and better SLAs
- Integrated solution "out of box" means less risk and faster deployments

HR  BU  APP

# FIRST, FAST & LAST
## Fully Integrated Realtime Storage Tiering

NAND Flash covers most hot data

Solid State media stores / caches metadata
as well as just-in-time "hot" blocks of active data

**Flash Cache v3
1024GB**

**PAM v2
512GB**

**PAM v1
16GB**

Entire Dataset

**<= 80TB
Flash Cache
(Auto-Tiered)**

Active
Data
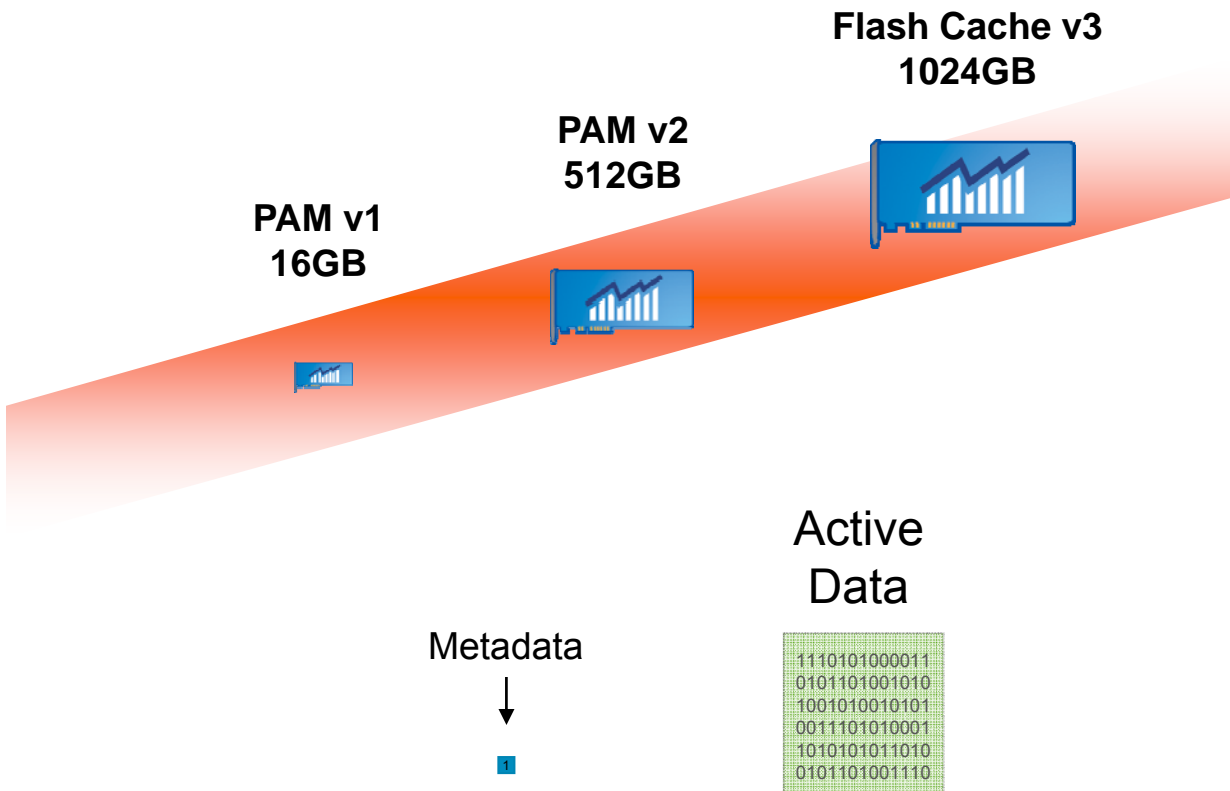
1110101000011
0101101001010
1001010010101
0011101010001
1010101011010
0101101001110

Metadata

1

# Virtualized Tier-less Storage

Old Model:
Tier = Hardware Architecture
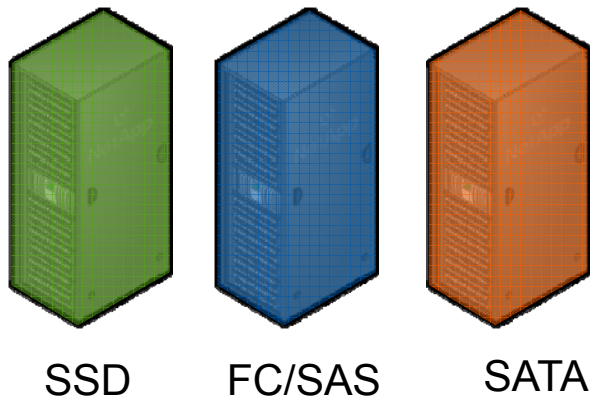
New Model:
Tier = Quality of Service (QoS)



SSD     FC/SAS     SATA

10%
SSD

10%
FC/SAS

80%
SATA
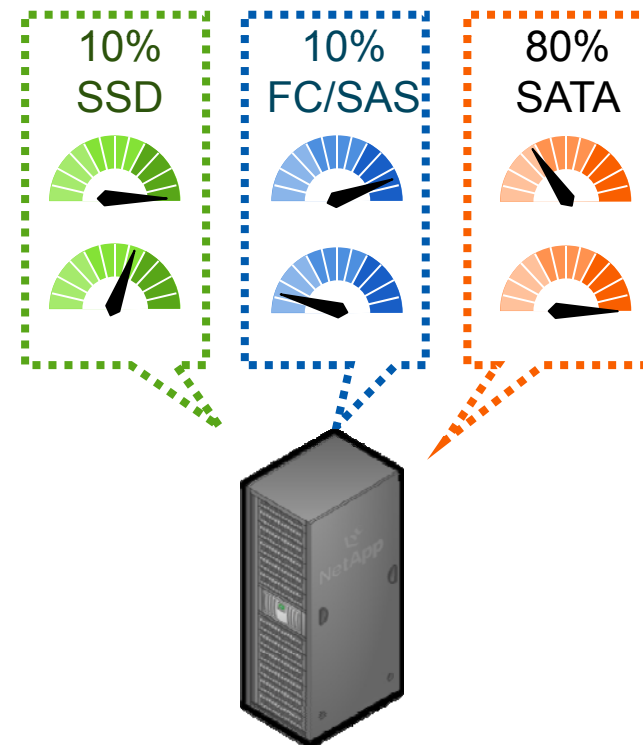
# Compounding Effect of Storage Efficiency



Storage Costs

Capacity Requirements

Unchecked Data Growth

Snapshot™ Technology

SATA Drives

RAID-DP®

Thin Provisioning

Virtual Cloning

Thin Replication

Deduplication

The Effect of Storage Efficiency
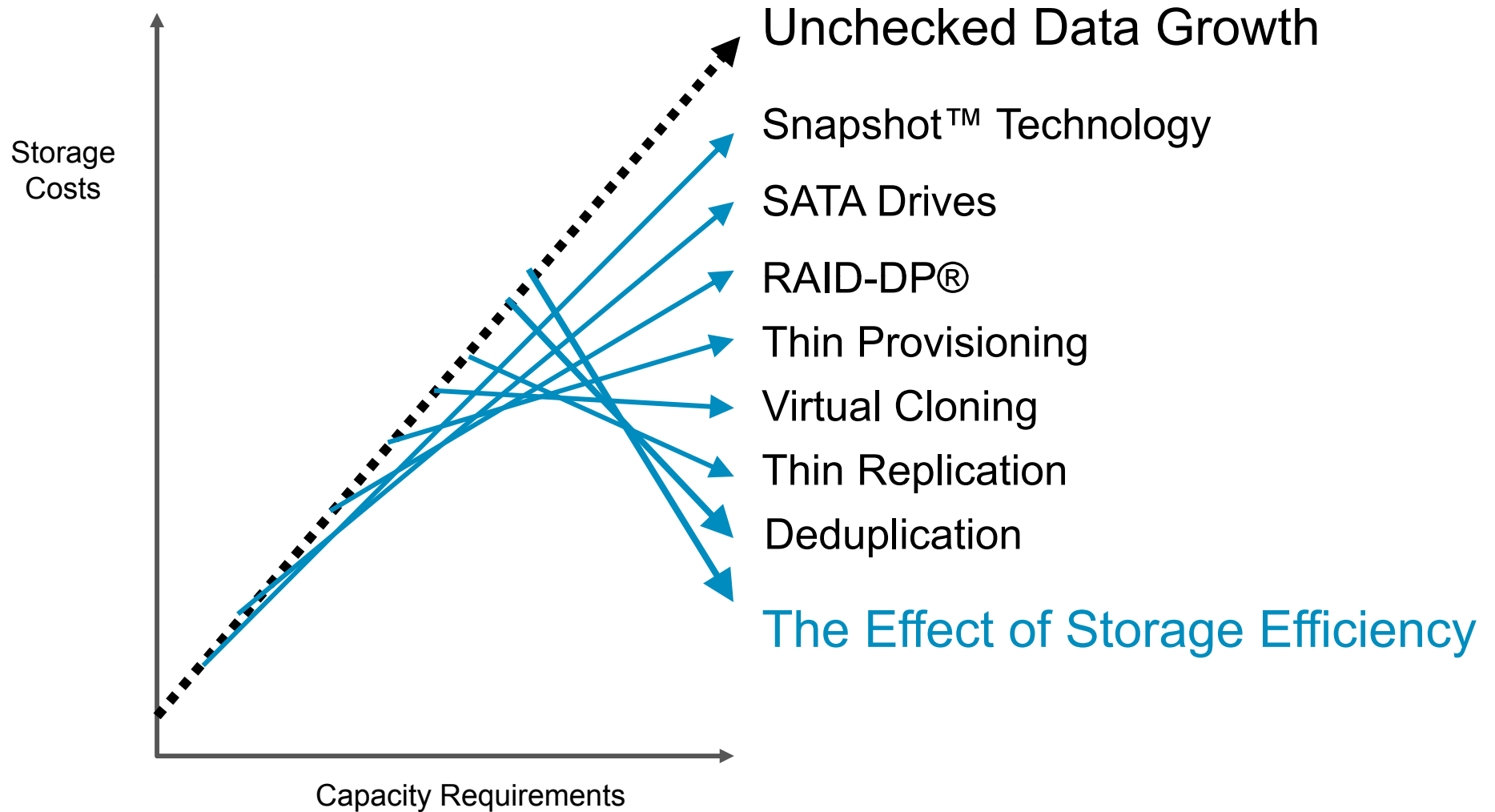
# Service Providers by Cloud Category

| Cloud Services | | |
|---|---|---|
| DaaS | IaaS | SaaS/PaaS |

**DaaS:** photobucket, IRON MOUNTAIN DIGITAL, perotsystems, EDS an HP company

**IaaS:** T··Systems, at&t, france telecom, IBM, UNISYS, terremark, BT, Joyent Cloud Computing, rackspace, CSC, TATA, Telstra

**SaaS/PaaS:** YAHOO! MAIL, SAP, intuit, ORACLE ON DEMAND, azaleos, NAVITAIRE

# Cloud-Scale ERP for 500,000+ users

**T··Systems** **+** **SAP**

**Private Clouds**

Shell  PHILIPS  BMW

MARCH 25, 2010 @ 2:30pm PT (45 mins)

Track 3 - Panel Discussion: Cloud-scale ERP on-demand supporting 500,000 users with SAP, T-Systems, and NetApp

# New Rules

- You'll need a new mindset:

| | | |
|---|---|---|
| Physical | → | **Virtual** |
| Procure | → | **Provision** |
| Architecture | → | **Composition** |
| Operations | → | **Orchestration** |



Scalable     Pay-as-you-go     ~~Commitment~~

# Visit Today, Stay in Touch Tomorrow

**SNW:**

❖ Cloud HoL

❖ Cloud Pavillion

❖ Cloud BoF

– http://sniacloud.com

– http://groups.google.com/group/snia-cloud

– http://twitter.com/SNIAcloud  (@SNIAcloud)

– http://www.google.com/profiles/SNIAcloud

# Follow-up Resources

- ## Cloud-Standards
  - http://cloud-standards.org/wiki/index.php?title=Main_Page

- ## SNIA Cloud
  - http://www.snia.org/cloud/

- ## NetApp Cloud Community
  - http://communities.netapp.com/community/technology_at_netapp/cloud_computing

- ## Secure Multi-Tenancy
  - http://www.cisco.com/en/US/docs/solutions/Enterprise/Data_Center/Virtualization/securecldg.html

# Thank You!

## Questions?

April 12-15, 2010  |  Rosen Shingle Creek Resort  |  Orlando, Florida