Go further, faster™

SNIA Cloud Burst Summit

Economies of Cloud-Scale Storage
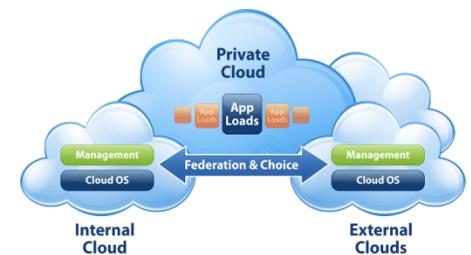
Val Bercovici
NetApp Cloud Czar
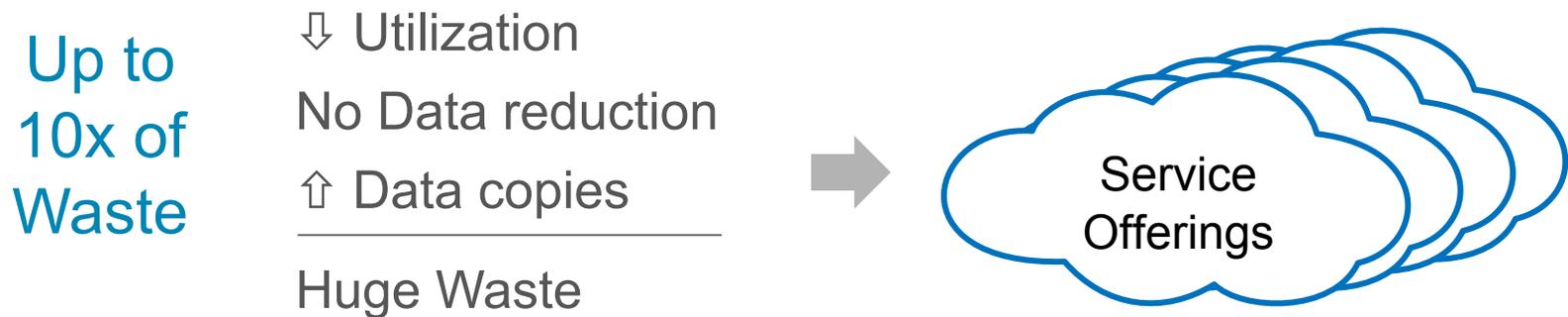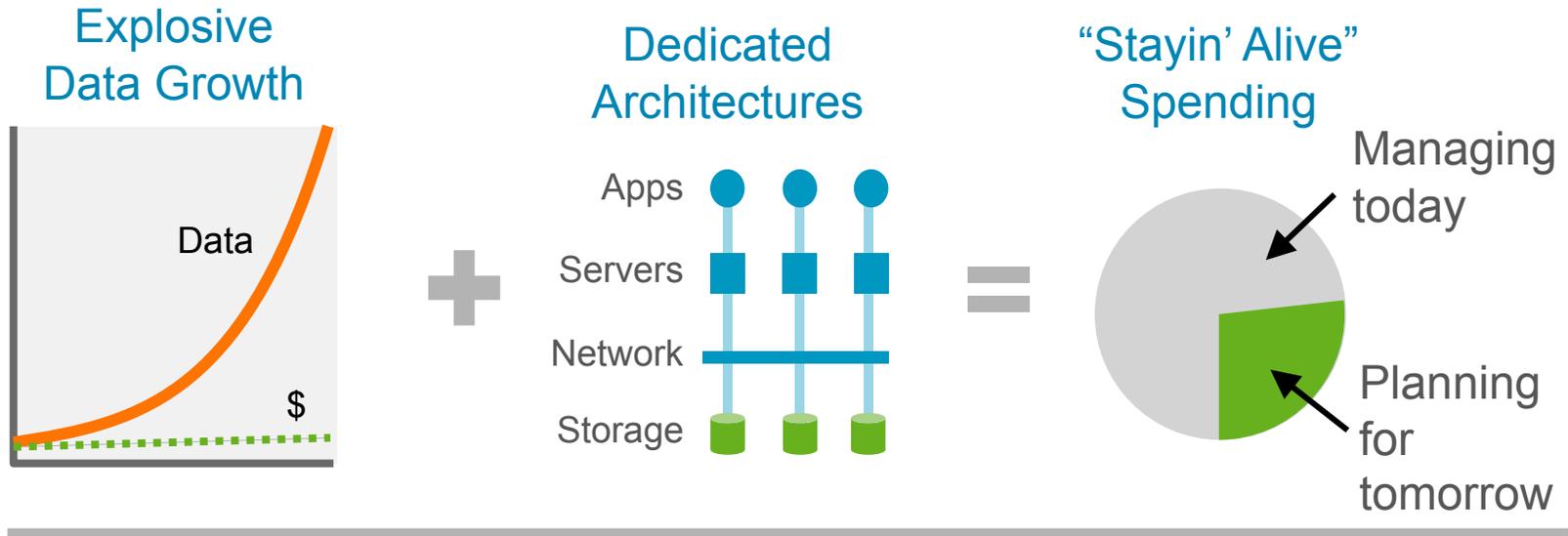*Chair, SNIA Cloud Storage Initiative*

Agenda

- Business drivers for cloud services

- Framework for scalable, cost-effective Clouds

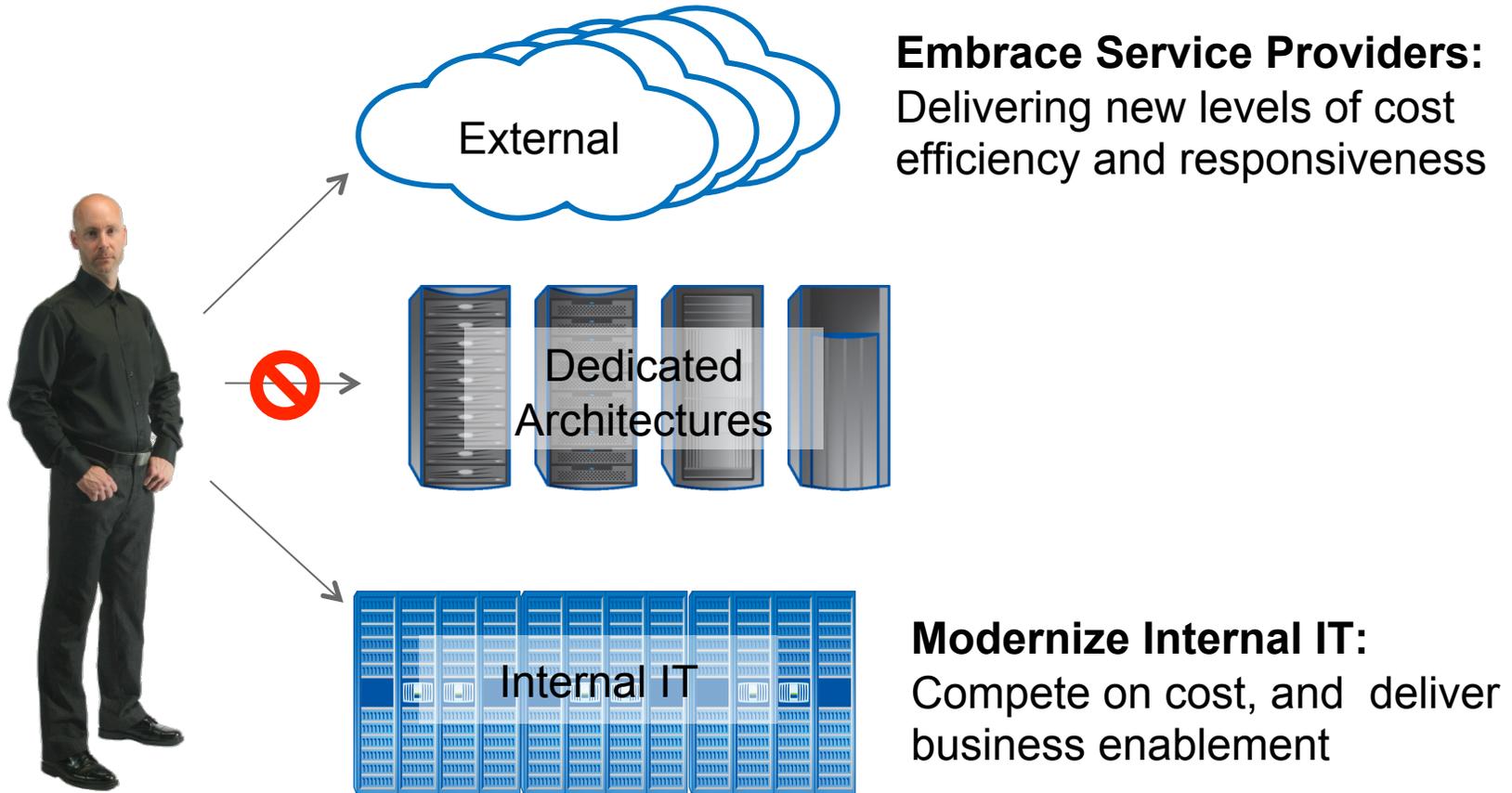- The need for Unified Cloud Infrastructure

Rising temperature in the data center

Explosive Data Growth

Data

$

+

Dedicated Architectures

Apps

Servers

Network

Storage

=

"Stayin' Alive" Spending

Managing today

Planning for tomorrow

Up to 10x of Waste

⇩ Utilization

No Data reduction

⇧ Data copies

Huge Waste

➡

Service Offerings

IT organizations need to escape the tactical spending treadmill

CIOs forced to explore alternatives

External

Embrace Service Providers:
Delivering new levels of cost efficiency and responsiveness

Dedicated Architectures

Internal IT

Modernize Internal IT:
Compete on cost, and deliver business enablement

Status quo isn't an option

Multiple perspectives when you say "cloud"

CEO
Cloud means: someone else will take care of IT

CIO
Cloud means: I can build more efficient data center

IT Worker
Cloud means: I could lose my job!

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

Skeptic
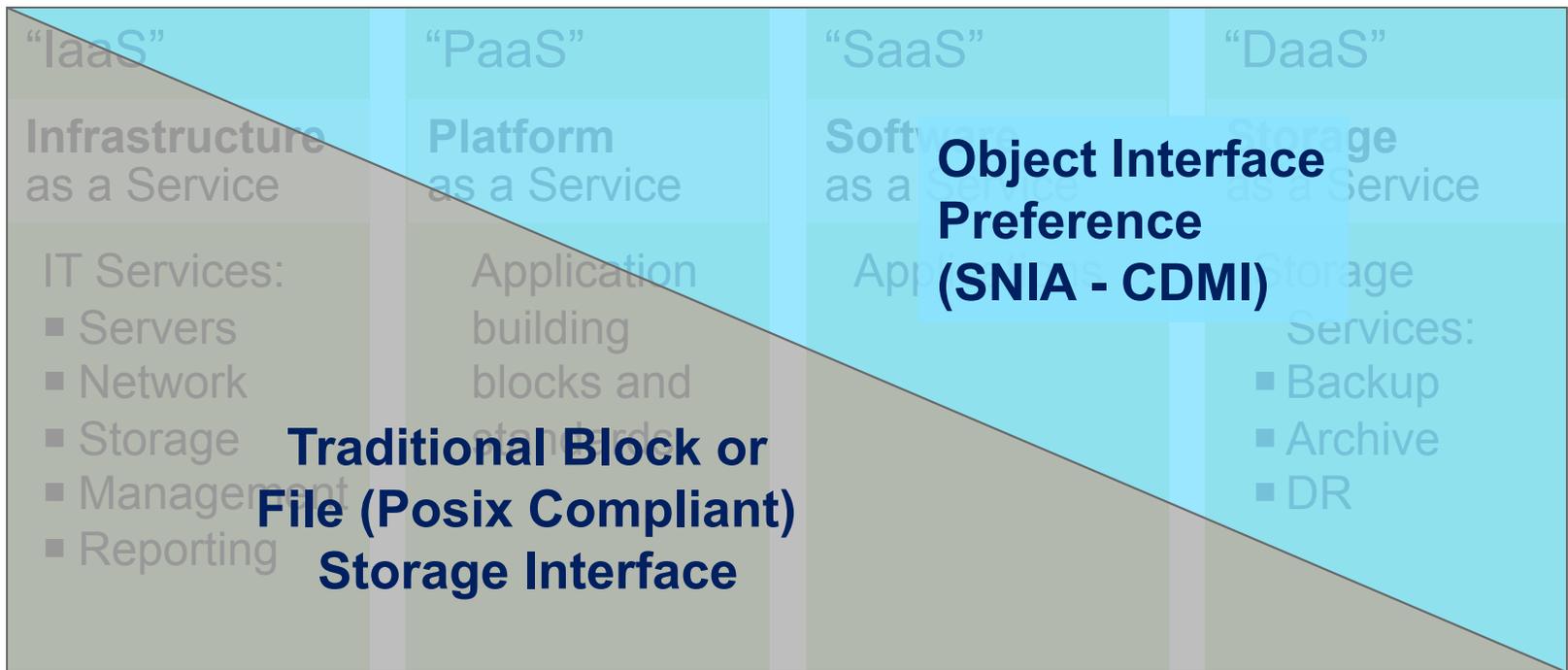Cloud means: nothing new, we have been doing this for years
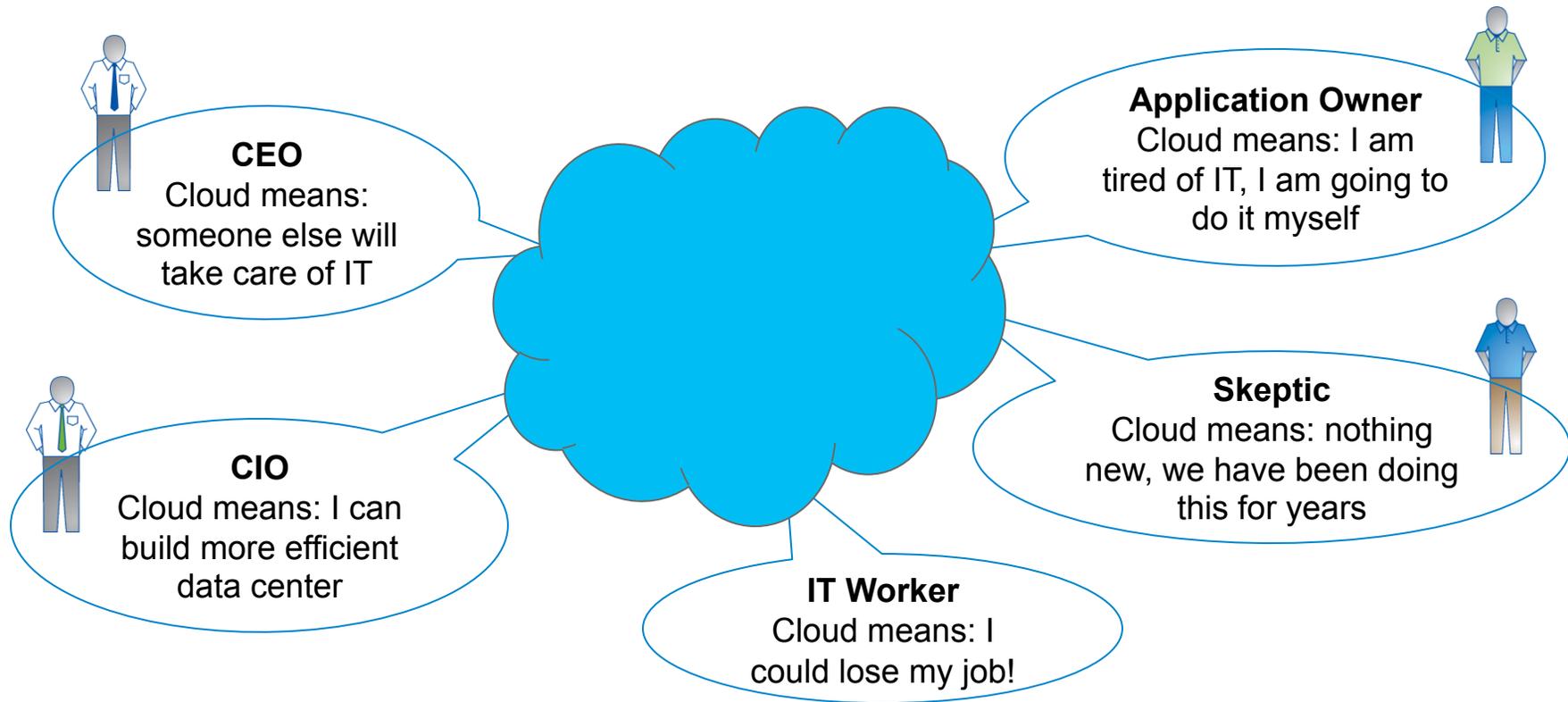
What matters most is understanding the business problems you are trying to solve !

Cloud Storage Interface Preferences

Cloud – IT as a Service

"IaaS"

Infrastructure as a Service

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

"PaaS"

Platform as a Service

Application building blocks and standards

"SaaS"

Software as a Service

Application

"DaaS"

Storage as a Service

Storage Services:
- Backup
- Archive
- DR

Object Interface Preference (SNIA - CDMI)

Traditional Block or File (Posix Compliant) Storage Interface

Examples:
Amazon EC2
BT
RackSpace
T-Systems

Examples:
Force.com
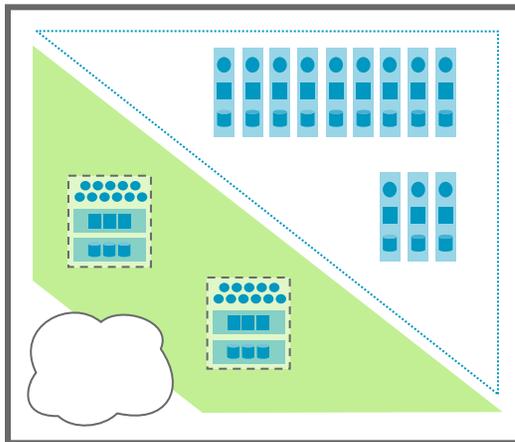Google Apps
MS Azure
Oracle OnDmnd

Examples:
Google Docs
SalesForce.com
Twitter
Yahoo! Email
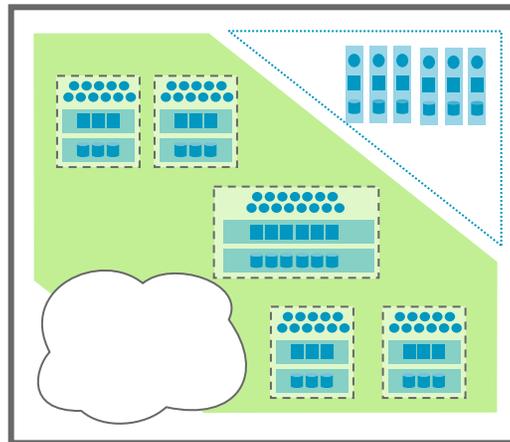
Examples:
Amazon S3
Nirvanix
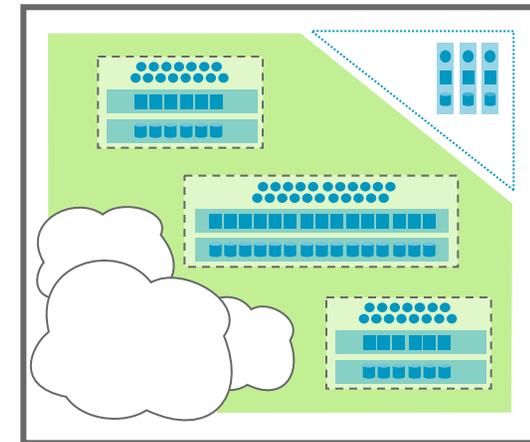Mosso

A mix of IT architectures will evolve
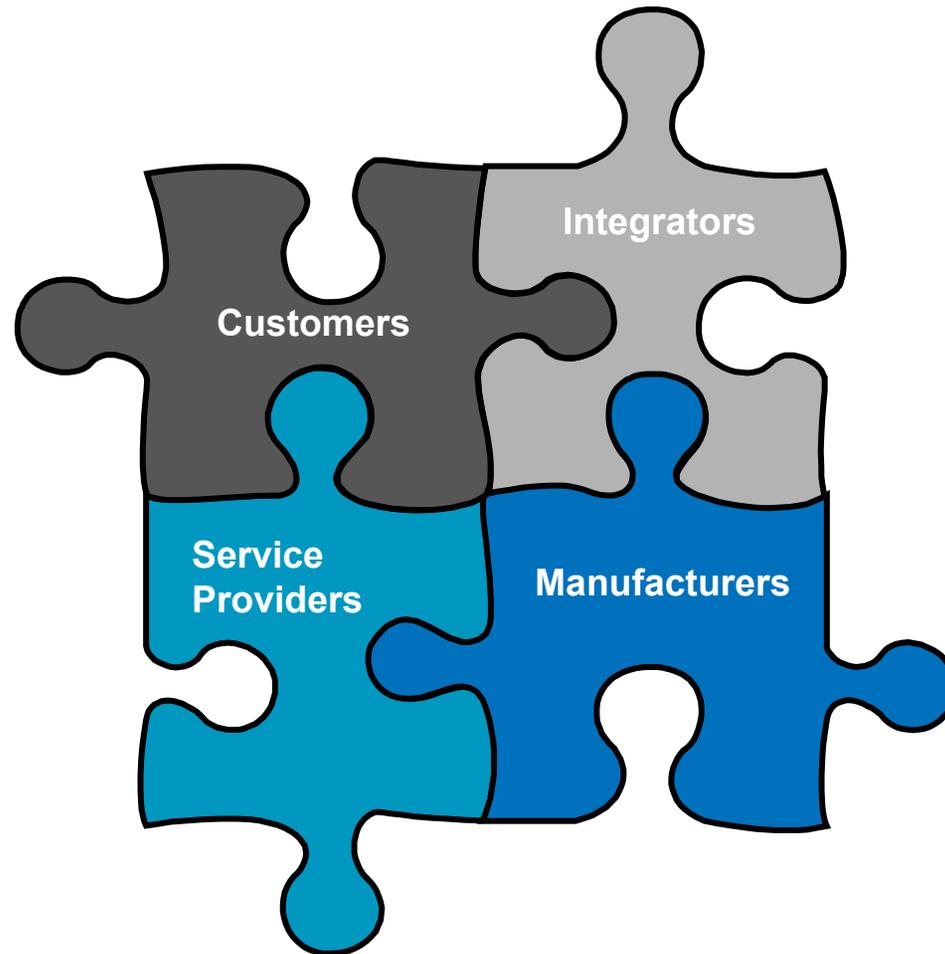
Today

3-5 Years

5-10 Years

- Virtualized infrastructures dominate
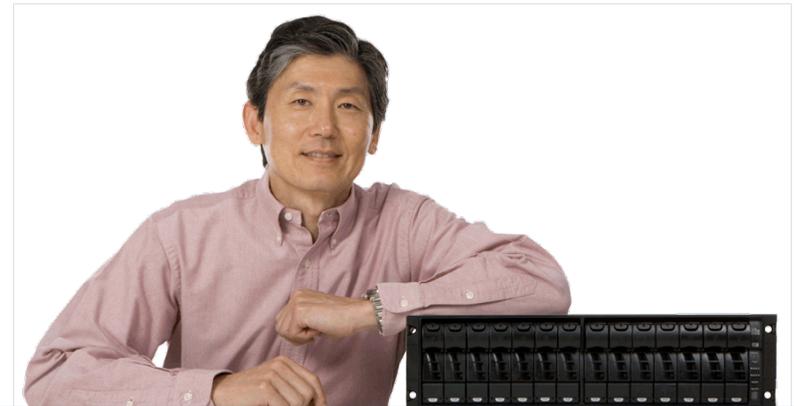- External cloud gets bigger
- Silos become legacy
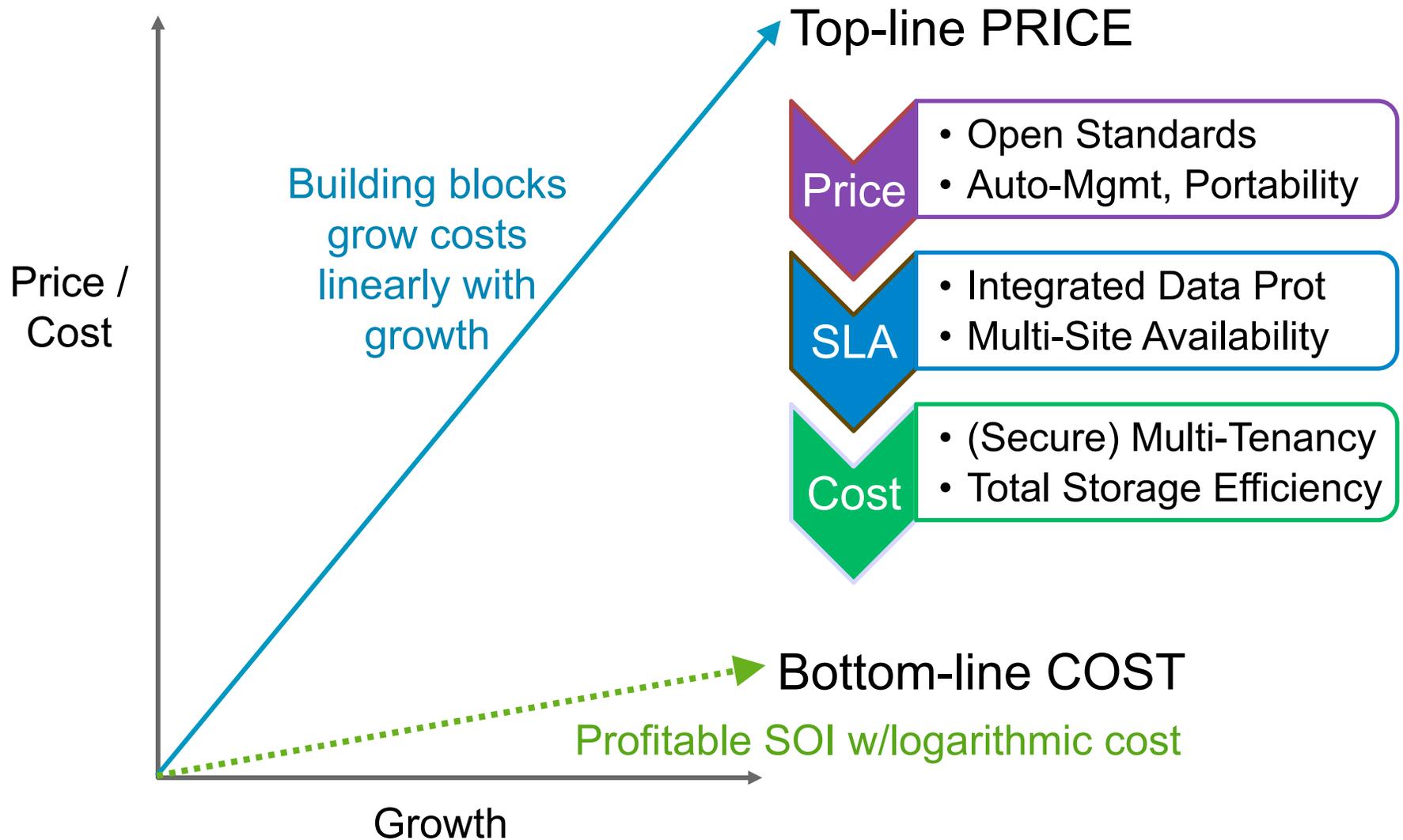
(Not your father's) Cloud Ecosystem

Framework for scalable, cost-effective Clouds
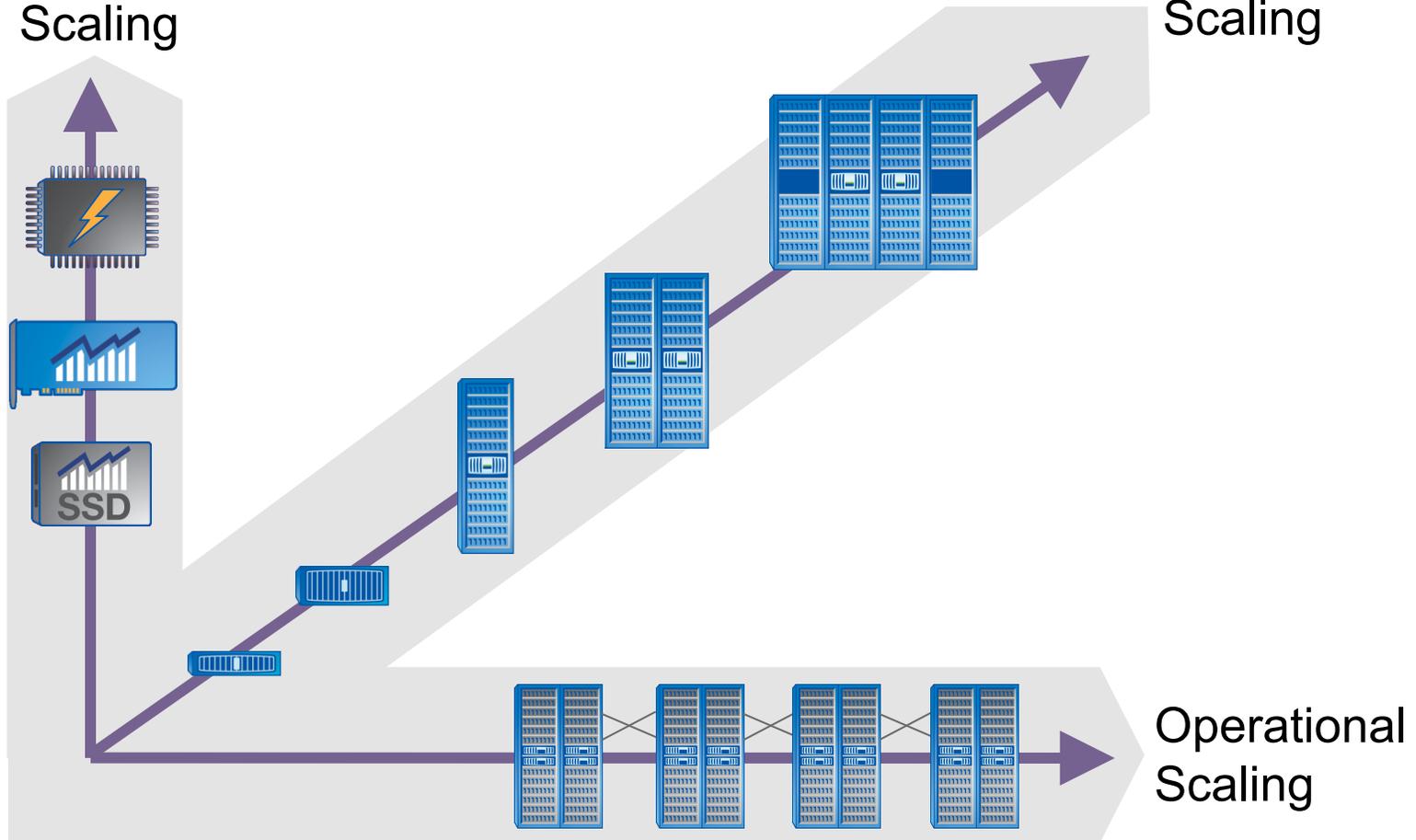
Cloud infrastructure and economy of scale

Top-line PRICE

Building blocks grow costs linearly with growth

Price /
Cost

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

Growth

Scaling: required on three dimensions

Performance Scaling

Capacity Scaling

Operational Scaling

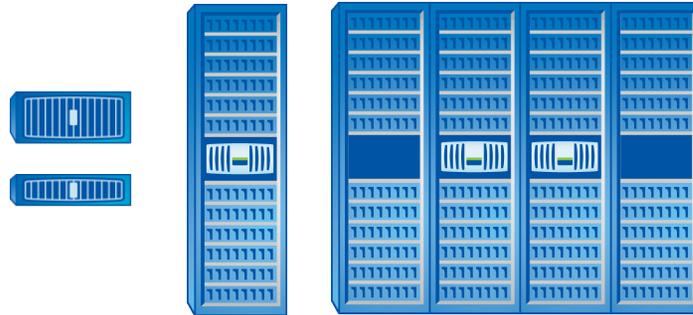**3-D scaling requires a unified architecture**

Unified: much more than multi-protocol
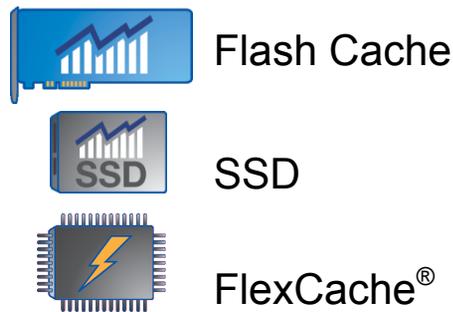
Protocols

- FC
- FCoE
- iSCSI
- NAS
- HTTP

Low-to-High Scalability

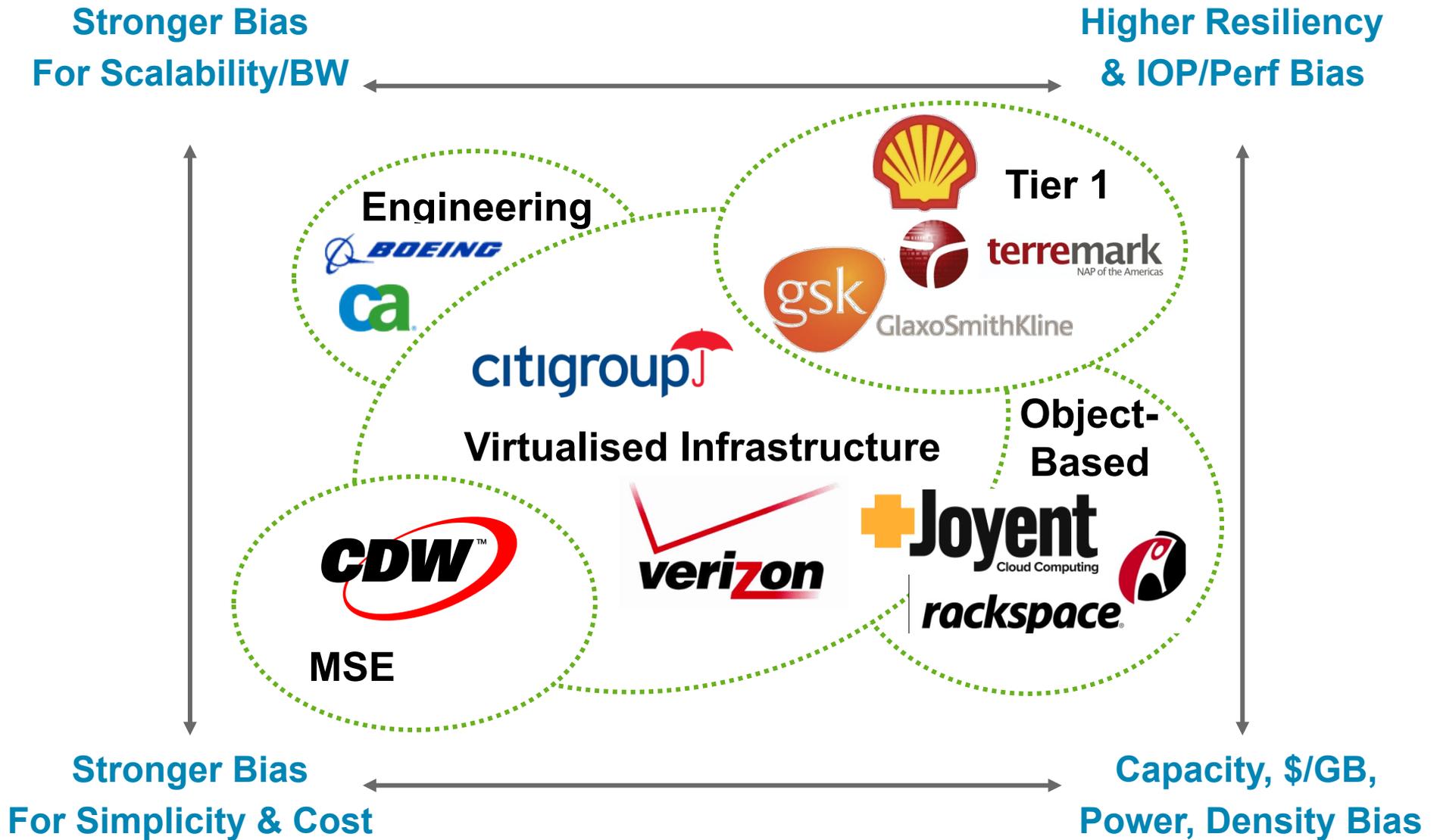## Multi-Vendor Virtualisation

Cost/Performance

Flash Cache

SSD

FlexCache®

Unified Management

- Same tools & processes: learn once, run everywhere
- Integrated data management
- Integrated data protection

One Architecture, One O/S

One Architecture for many Workloads

Stronger Bias For Scalability/BW

Higher Resiliency & IOP/Perf Bias

Engineering

Tier 1

Virtualised Infrastructure

Object-Based

MSE

Stronger Bias For Simplicity & Cost

Capacity, $/GB, Power, Density Bias

Cloud-Scale ERP for 500,000+ users

Private Clouds

Degrees of Multi-Tenancy
A layman's Analogy

Dedicated Sparse

Shared Dense

Shared Transient Density

Apps

Servers

Network

Storage

Virtualization

Built on shared infrastructures
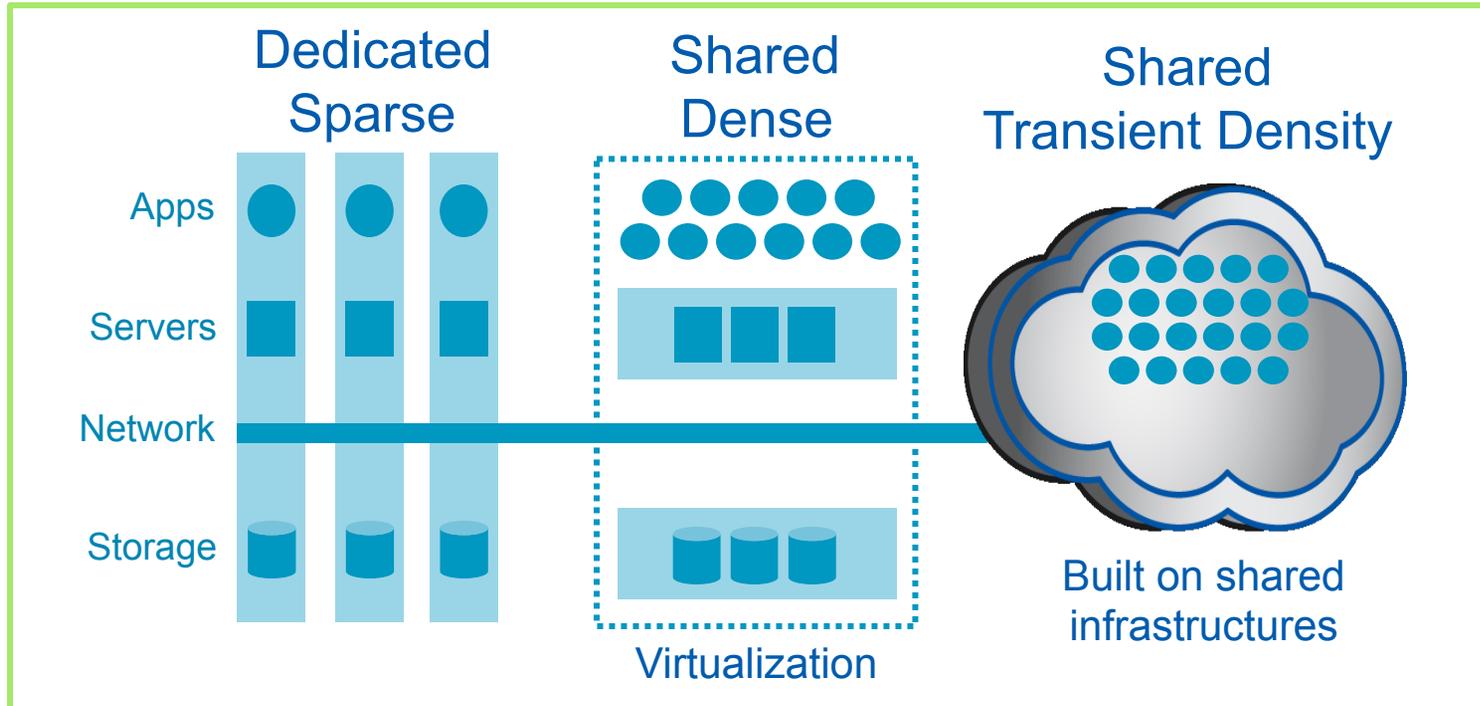
Secure Multi-Tenancy: Cisco, NetApp, VMware
Reference Architectures

Compute

APP OS APP OS APP OS APP OS APP OS APP OS

VMware vShield — VMware® vShield

Cisco Nexus™ 1000V
VMware vSphere

VMware vSphere

Cisco® UCS 5100 Blade Server

Cisco UCS 6100 Fabric Interconnect

Network

Cisco Nexus 5000

Cisco Nexus 7000

SAN

Cisco MDS

Storage

0101 1010

NetApp® MultiStore®
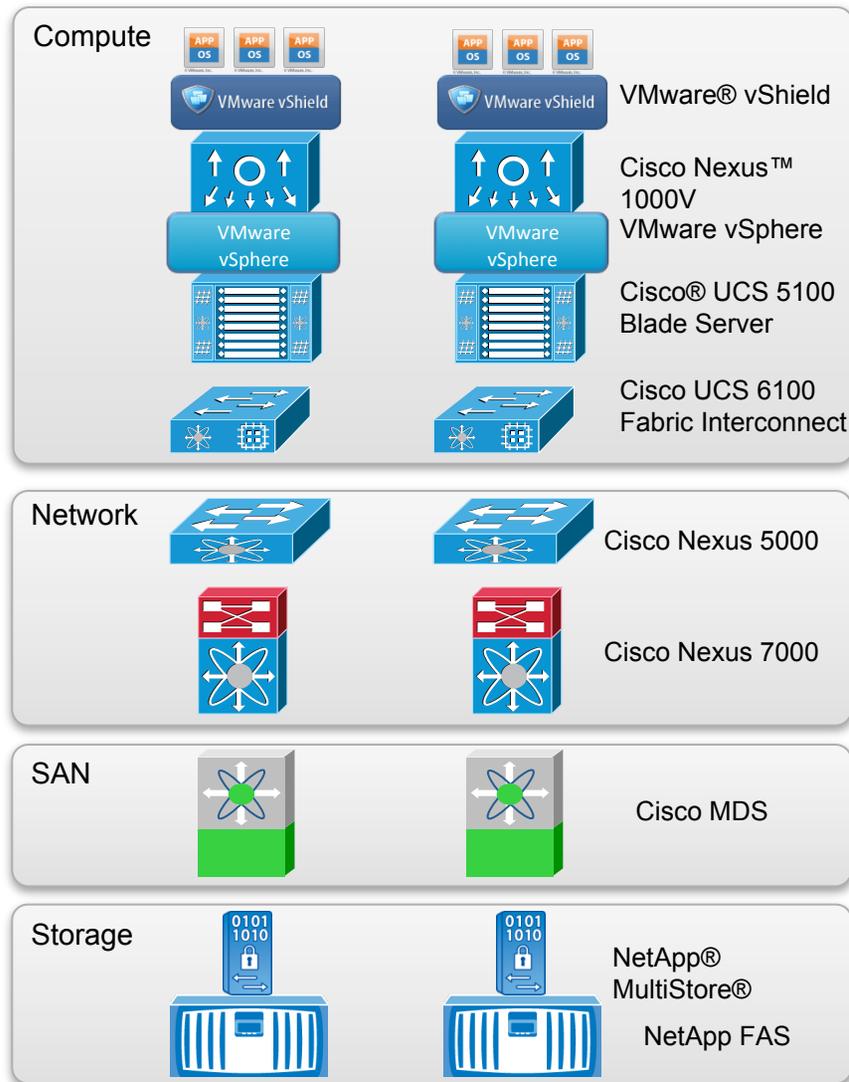
NetApp FAS

VMware vShield Manager

VMware vCenter

NetApp SnapManager®

Cisco UCS Manager

Cisco Data Center Network Manager

NetApp SANscreen

NetApp FilerView®
NetApp Provisioning Manager
NetApp Protection Manager
NetApp Operations Manager

Compute
- VMware vCloud Director
- VMware vShield
- Cisco Unified Computing System

Network
- Cisco Nexus 1000V
- Cisco Nexus 5000
- Cisco Nexus 7000
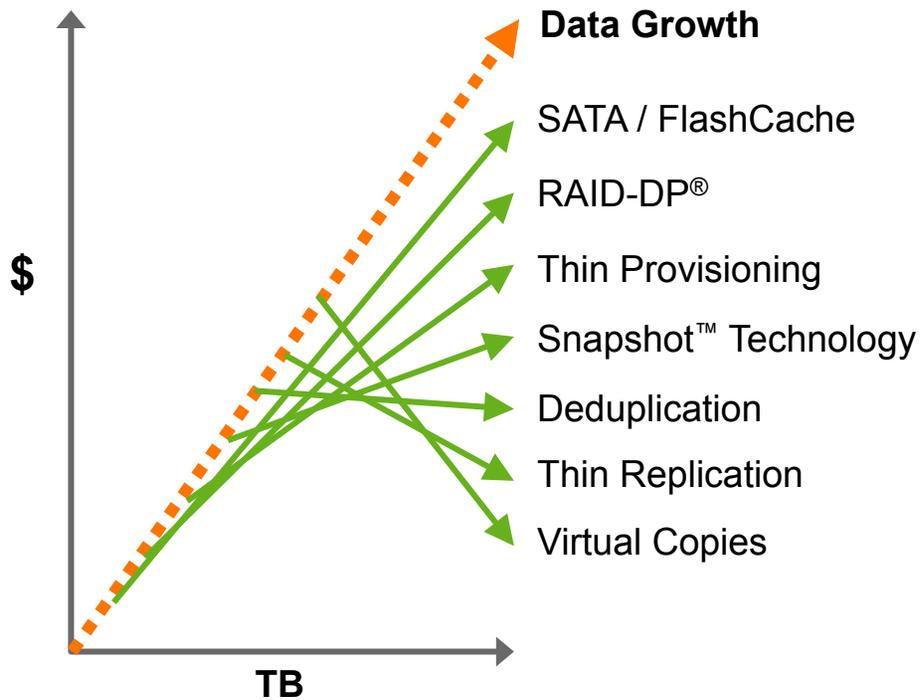- Cisco MDS

Storage
- NetApp FAS
- NetApp MultiStore

Management
- VMware vShield Manager
- VMware vCenter
- Cisco UCS Manager
- Cisco DC Network Manager
- NetApp Operations Manager
- NetApp Provisioning Manager
- NetApp SANscreen® and SnapManager®

Industry leading efficiency portfolio

Storage Efficiency Technologies

Data Growth

SATA / FlashCache

RAID-DP®

Thin Provisioning

Snapshot™ Technology

Deduplication

Thin Replication

Virtual Copies

$

TB

People Efficiency Technologies

- Service automation
- Application integration
- Storage management automation
- Integrated data protection
- Cloning

Efficiency: it's about doing more with le$$.

Integrated data protection

Application Integration

Continuous Data Availability

Snapshots

Backups

Disaster Recovery

Compliance
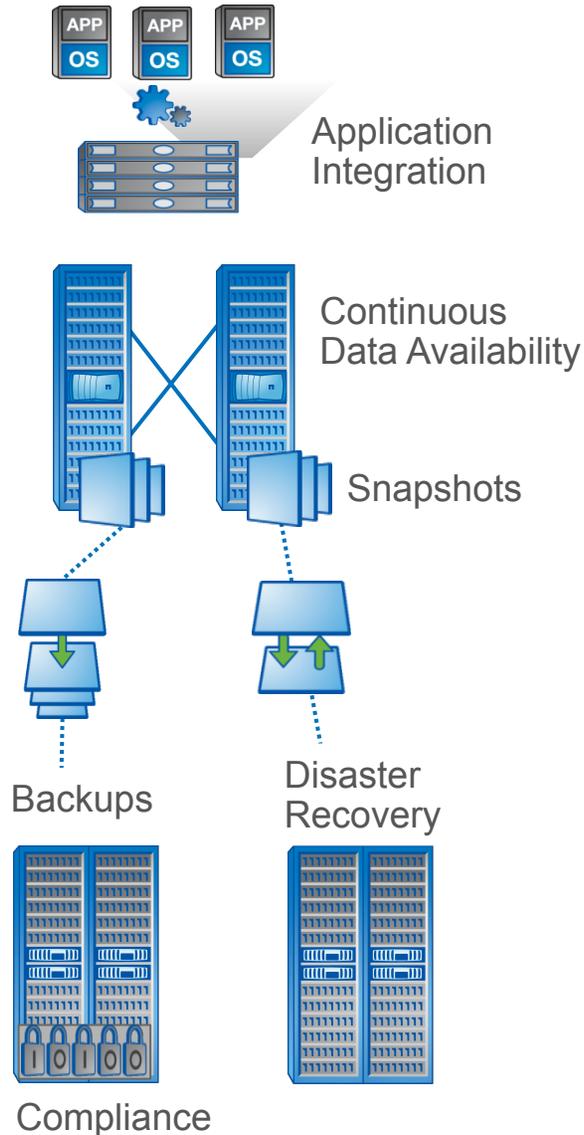
- Instant, agentless backups

- Fast & easy recovery

- Continuous data availability

- Protection spans HA, Backup and DR

- Network & space efficient

"Set it and forget it" protection

The Supplier of Choice for Service Providers

Cloud Services

| DaaS | IaaS | SaaS/PaaS |

These are just a few of the services built on NetApp®

Thank you!

NetApp™

Go further, faster™