



# Flash + Software-Defined Storage = Path To The Hybrid Cloud

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## Agenda



- The Hybrid Cloud Vision
- Storage Requirements
- Flash-Native SDS



# Industry Buzz



Hybrid cloud is the future, even if executives don't quite know what to make of it

Microsoft: Saving lives through Hybrid Cloud | #OpenStackSV

ForbesBrandW  
AUG 1, 2016 @ 09:00

by Betsy Amy-Vogt | Aug 10, 2016 | 0 comments

The Little Black Book of Billionaire S

Why Hybrid Cloud Is Becoming The Destination For Business Transformation

Private or public... why not both? The Hybrid Cloud Is here

JULY 14, 2016 8AM ASHTON YOUNG

Guest Column | July 18, 2016

3 Reasons Hybrid Cloud Solutions Make The Most Sense For Financial Institutions

APAC digital transformation won't succeed without hybrid cloud

Businesses in Asia-Pacific will likely fail in their digital transformation efforts if they do so without a hybrid cloud infrastructure, which is necessary to deliver enterprise agility and efficiency.

DATA CENTER SOFTWARE NETWORKS SECURITY INFR

Data Center ▶ Virtualization

Hybrid Cloud: The new IT service platform?

Cisco unveils new data center for hybrid cloud

MANAMA, 3 days ago

“A cloud computing environment which uses a **mix of on-premises, private cloud and third-party public cloud services with orchestration between the two platforms**”



Source: TechTarget



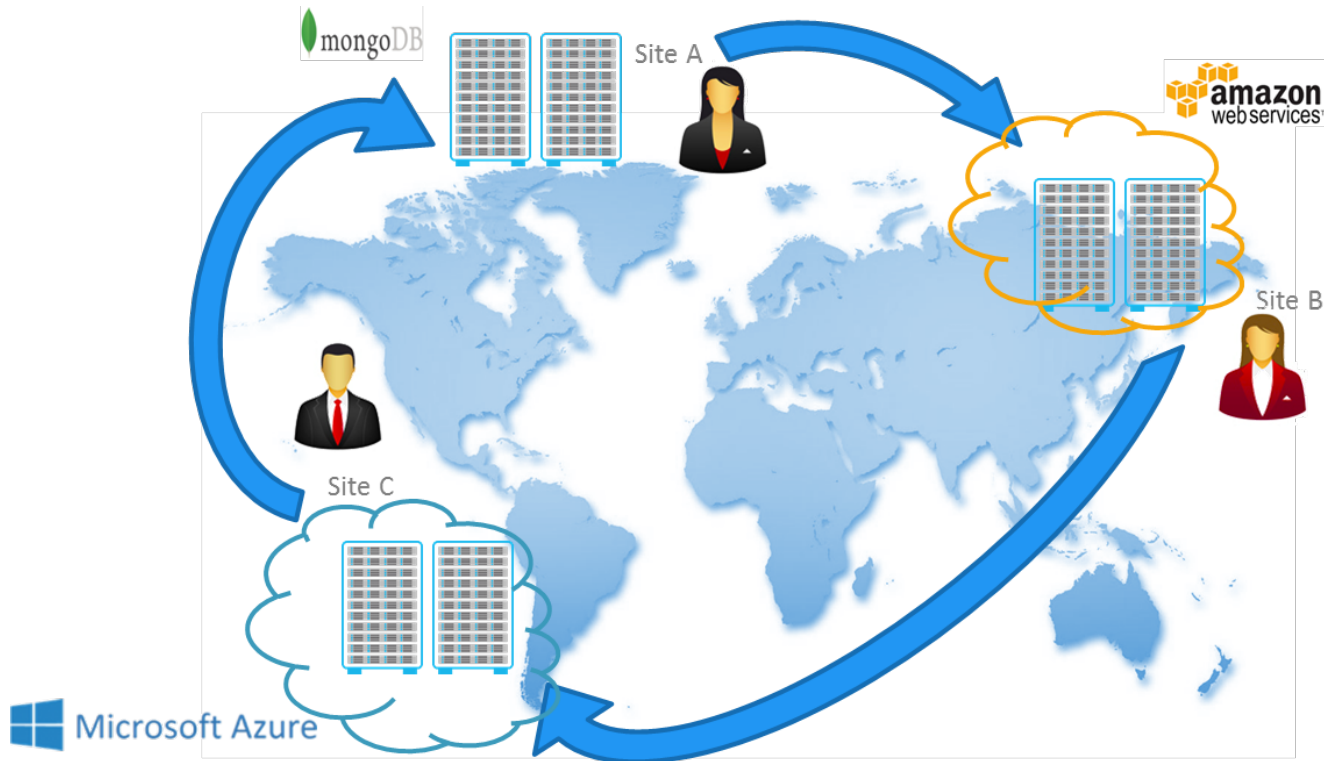
# Why All The Hype?



## Natural culmination of multiple trends

- Data explosion
- Virtualization
- Infrastructure as a Service (IaaS)
- Flash storage

# The Vision





Sounds great...

...so what's holding us back?



## Requires true application and data mobility

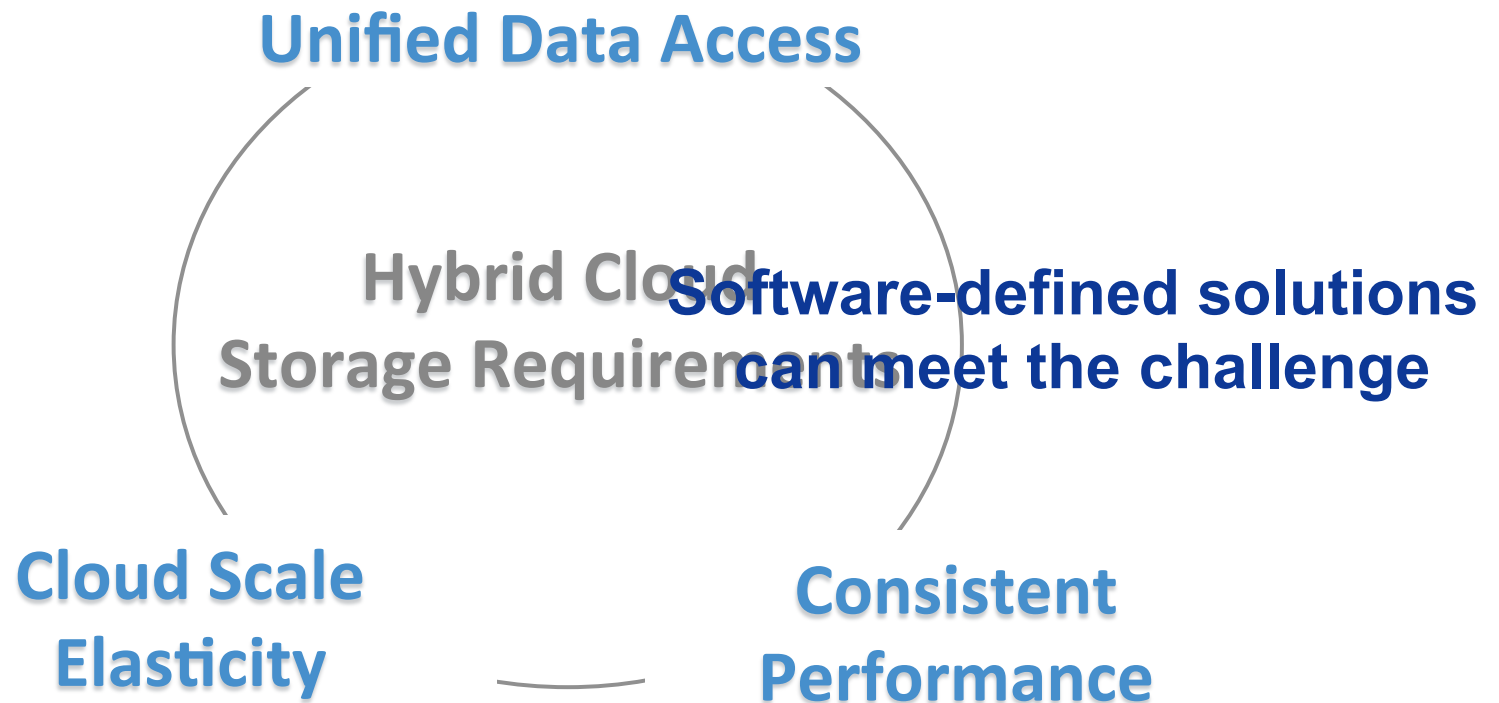
- Apps and data accessed where needed...for example:
  - Big data processing = public cloud
  - Final review and analysis = on-premises

**Application mobility has emerged...**

**...but data mobility is still lacking**



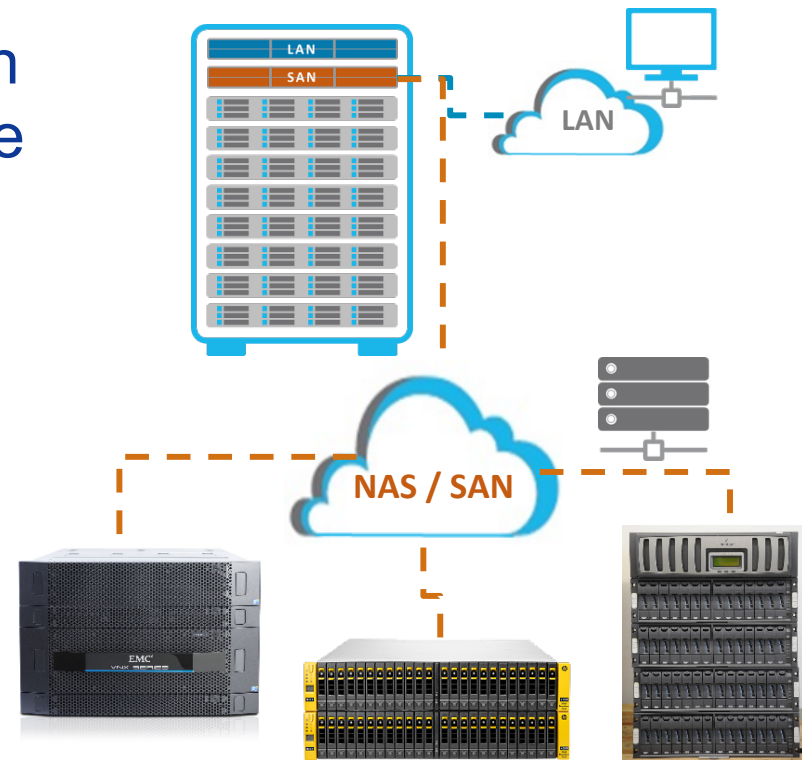
# Storage Needs to Evolve





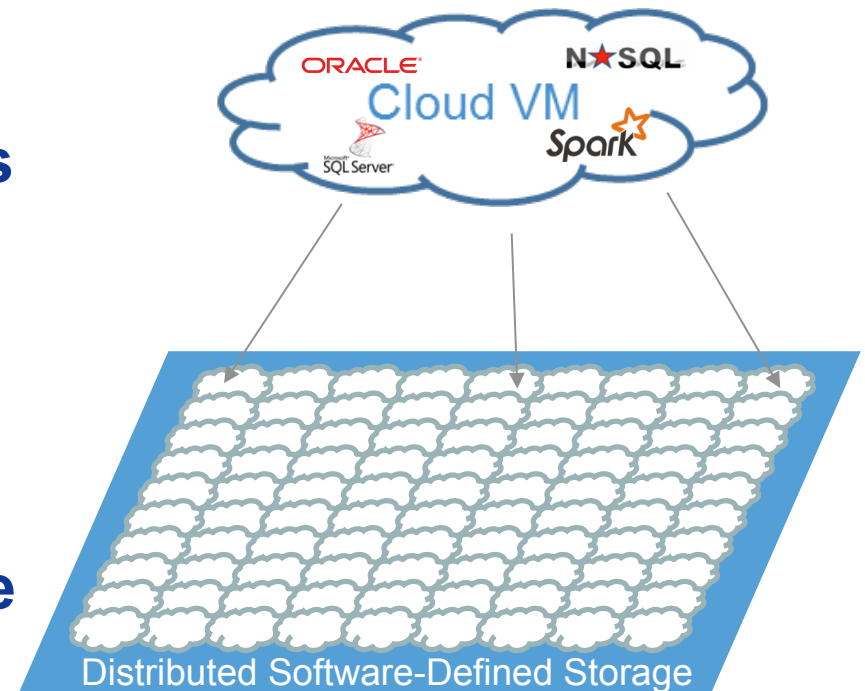
# Unified Data Access

- Today, most data resides in siloed, proprietary hardware
  - “Data type”-specific
  - Environment-specific
  - Geo-specific
- SDS can provide a **flexible** framework to achieve unified access



# Cloud Scale Elasticity

- Cloud deployments can incorporate **1000s of nodes**
- **Fully distributed SDS** can scale accordingly
- SDS can **scale out** or **scale in** as needed





## Consistent Performance



- Hybrid cloud environments must support a mix of workloads
- Usability at scale requires high, consistent Quality of Service
- SDS can deliver **optimized performance** for varying environments and workloads...*but requires supporting HW*

# SDS Media Options: Flash vs HDD



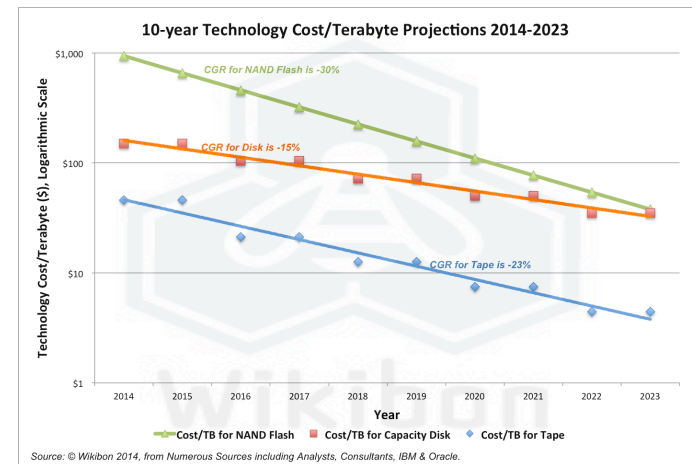
Feature	HDD	FLASH
Performance	x1	x1000
Latency	x100	x1
Cost	x1	x5



# There's Good News



- Flash storage is becoming increasingly **affordable and accessible**
  - Higher capacities (3D, TLC)
  - Streamlined interface for performance efficiency (NVMe)
  - Decreasing NAND cost (Better \$/GB & IOPS/\$)
  - Standardized form factors (2.5")



Source: Wikibon

## Flash is the focus of modern SDS



## 1<sup>st</sup>-Generation SDS



- Leveraging flash...but not effectively
- Flash bolted onto legacy architectures
  - HDD replacement
  - Cache
  - Metadata store

**Not aligned with hybrid cloud requirements**



# SDS Architecture For The Hybrid Cloud



- **All-Flash**
  - Provides consistent performance to support consolidation of mixed-workloads
- **Flash-Native**
  - Purpose-built to most effectively leverage flash



## Key Attributes of A Flash-Native SDS Design



- **Eliminates legacy stack overhead**
  - Most 1st-generation SDS designs leverage flash as a caching layer
  - All-flash SDS = no cache management required





## Key Attributes of A Flash-Native SDS Design



- **Aligned with flash performance characteristics**
  - 1st-gen SDS solutions assume HDD as primary media
    - Not optimized for highly-parallel data transfer
    - Not optimized for low latency
  - All-Flash SDS can be designed to fully leverage flash parallelism and latency (e.g. via NVMe)



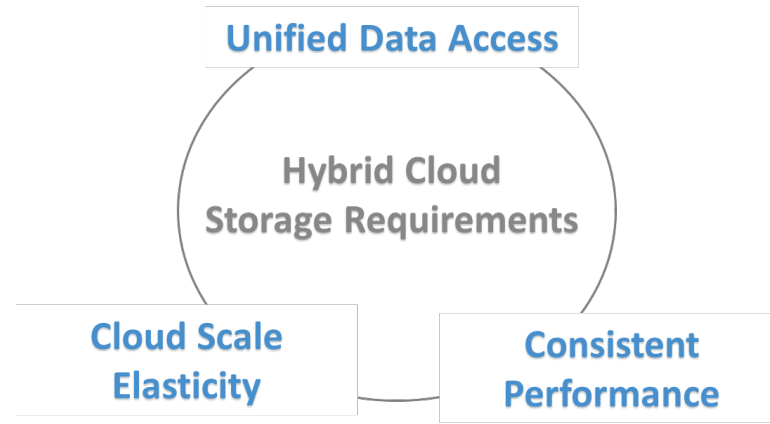
## Key Attributes of A Flash-Native SDS Design



- **Intelligently manages flash**
  - Enable use of heterogeneous SSD hardware
    - Multiple Vendors = Lower cost
    - Latest technology = Better \$/GB
  - Provide intelligent data tiering between SSD types
    - High performance/endurance SSDs for low latency / frequent writes
    - High capacity SSDs to minimize cost



# Bringing It All Together



Spans Environments and Data Types



Truly Distributed with Seamless Scale Out/In



All-Flash, Flash-Native Architecture



**Data Mobility To Support Hybrid Clouds**



## The Time Is Now



- As IaaS evolves (see Amazon EFS), the interest in hybrid cloud deployments is intensifying
- Storage is the key bottleneck, but...
- ...flash-native, distributed SDS solutions are already in the works

**...stay tuned**



Thank You