

# Next Generation Data Center : Future Trends and Technologies

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# Agenda

- 1) About NetApp
- 2) Next Generation Data Center-trends
- 3) Trend Assessment
- 4) Future of Data Management

# Who is NetApp?

**\$5.55 B**

FY16 Revenue

**1+ Exabyte-Qtr**

FY15 Average Storage Shipped

**#2**

Open Networked Storage  
Market Share <sup>(1)</sup>

**#1**

ONTAP, the world's #1 branded storage  
operating system <sup>(2)</sup>

(1) DC Q4 2014 Storage Hardware Market Share March 2015: Open Networked Market Share Branded – Open Networked = combined NAS and SAN - Revenue and Capacity for 2014

(2) IDC Worldwide Quarterly Enterprise Storage Systems Tracker 2016 Q1, June 2016 (Open Networked Enterprise Storage Systems revenue)

# NetApp Named a Leader

## 2016 Gartner Magic Quadrant for Solid-State Arrays, General Purpose Disk Arrays & Integrated Systems

Figure 1. Magic Quadrant for Solid-State Arrays



Source: Gartner (August 2016)

Figure 1. Magic Quadrant for Integrated Systems



Source: Gartner (August 2015)

# NetApp: leadership in Flash solutions

**200+**

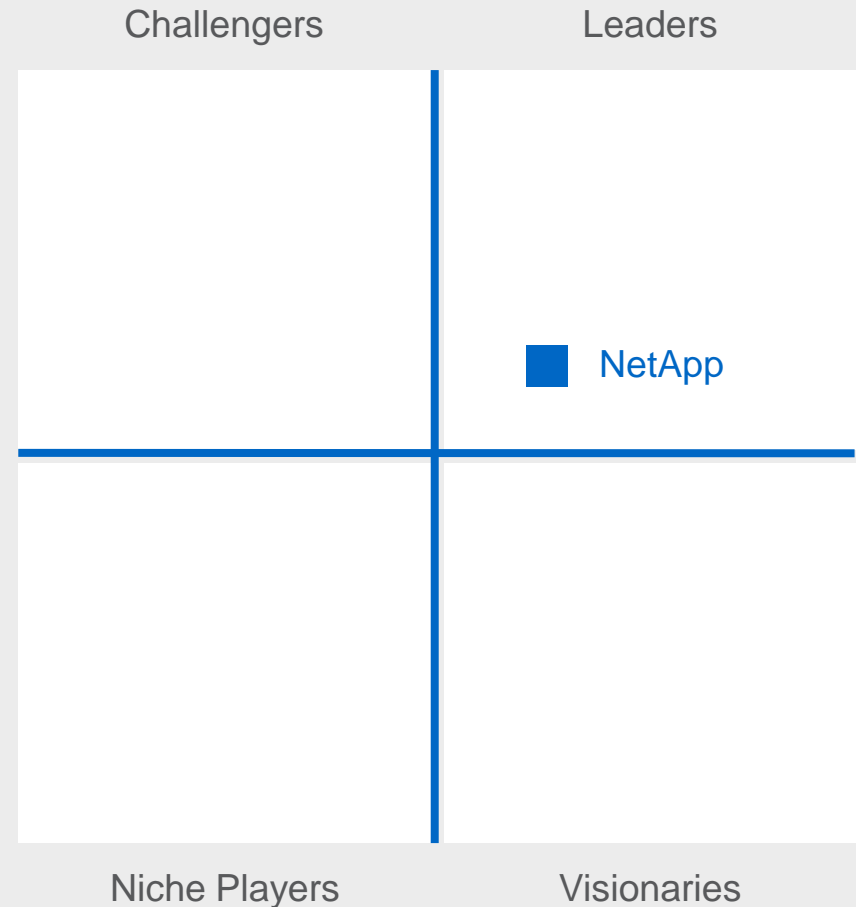
PB of Flash shipped Q2 FY17

**~200**

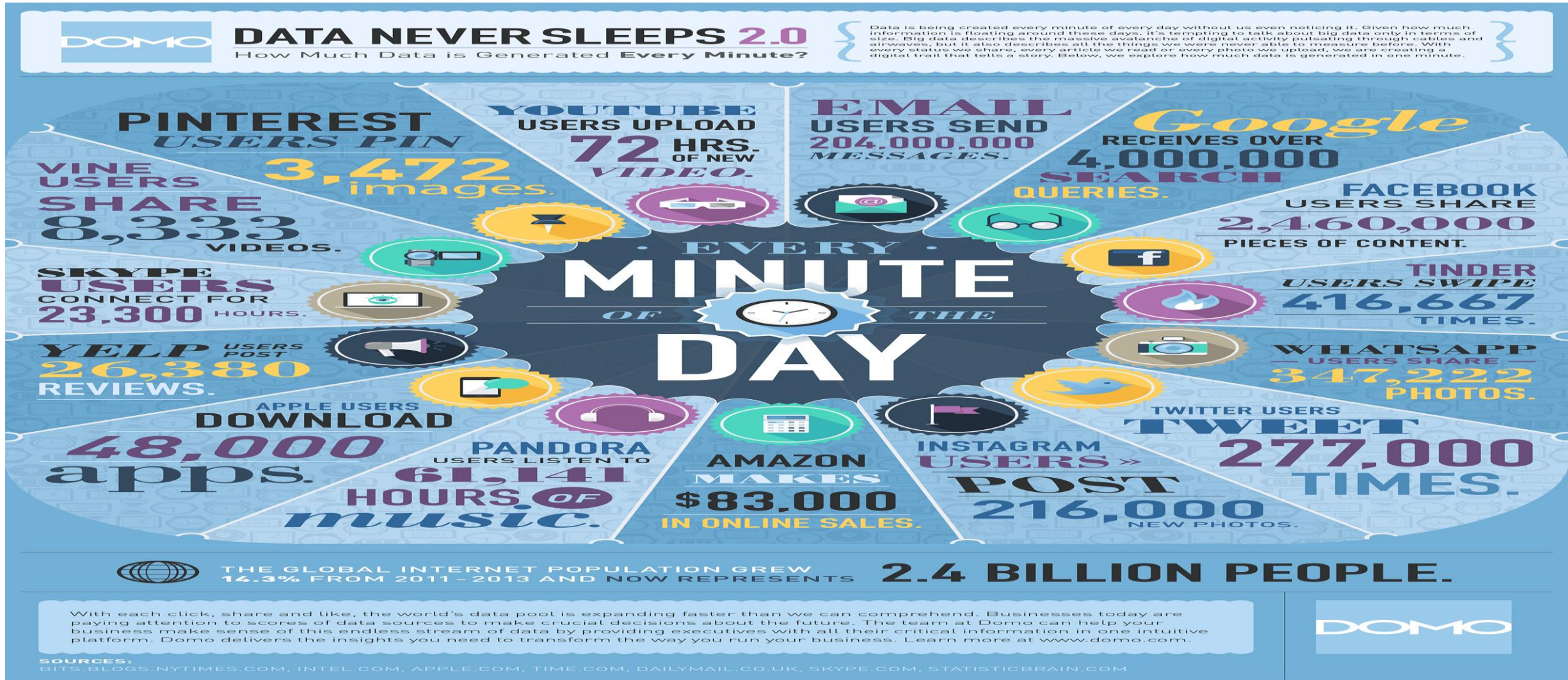
Flash-related patents

**4:1**

Efficiencies, guaranteed



# Data Explosion



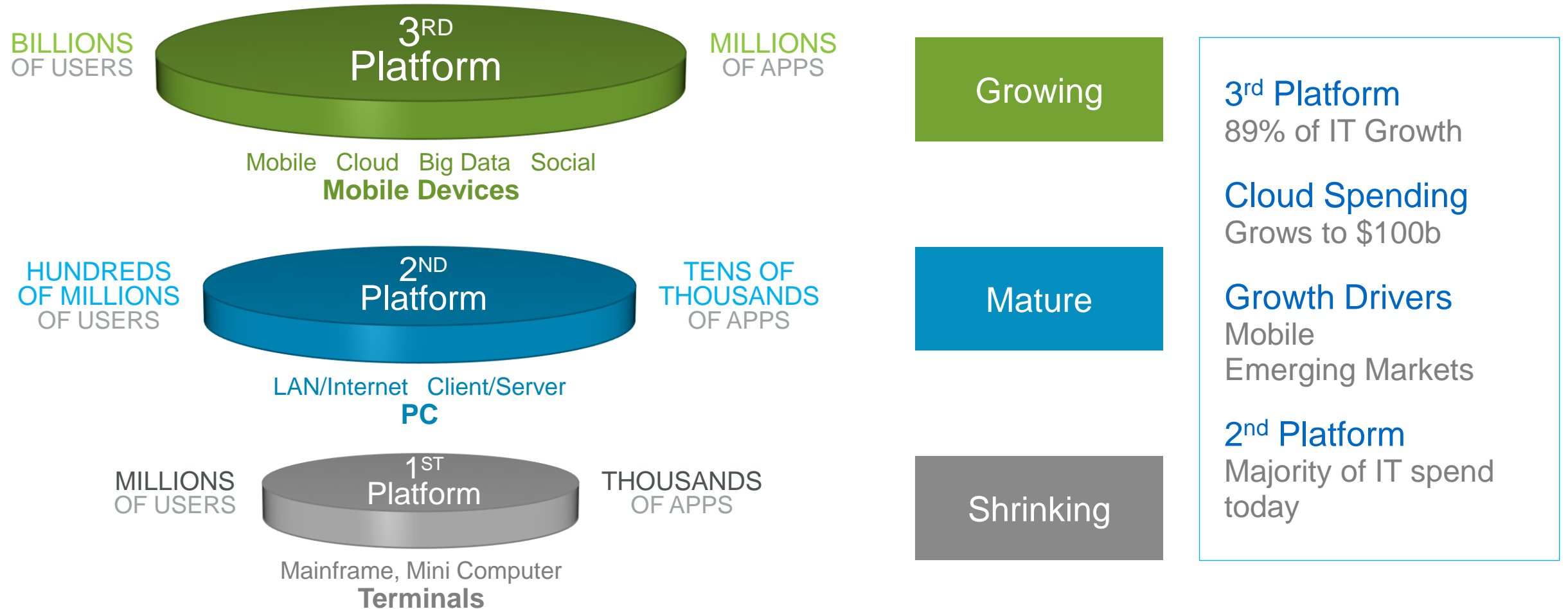
# Data Center Growth: Think beyond 2016



Arales, IDC

# IDC's Three Platforms of IT

Evolution of IT infrastructure and application architecture



Source: IDC



# The new IT digital environment

## Social



25%

productivity increase

## Mobile



75%

of the world's population  
have a mobile device

## Analytics



63%

Competitive advantage

## Cloud



60%

of CIOs indicate that cloud  
is one of their top 5 priorities

Source: The Digital CIO

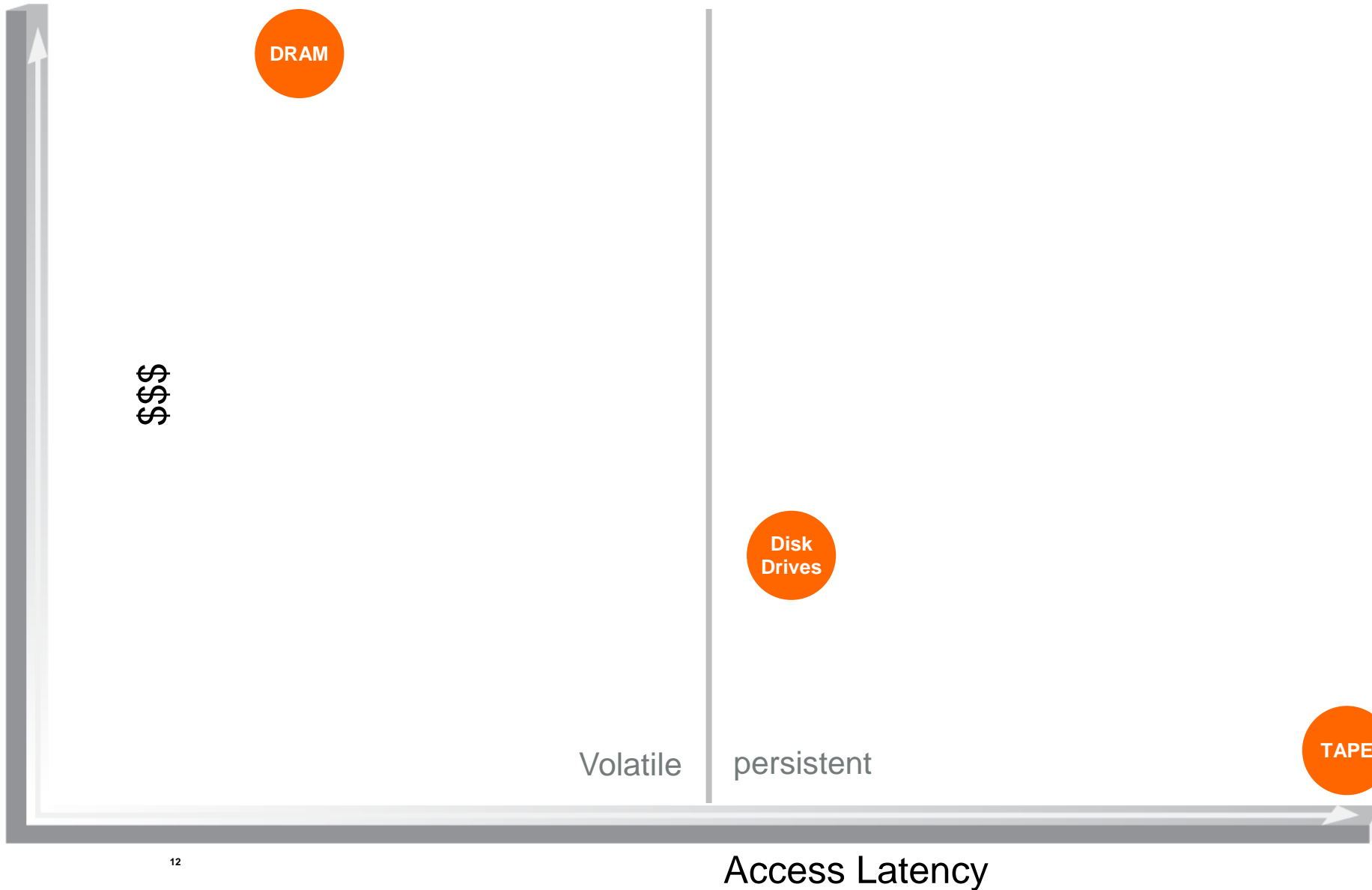
# Next Generation Data Center Trends

- Modular Data Center
- Software defined infrastructure
- Hybrid Cloud Adoption
- Energy efficiency
- Automation of Operations

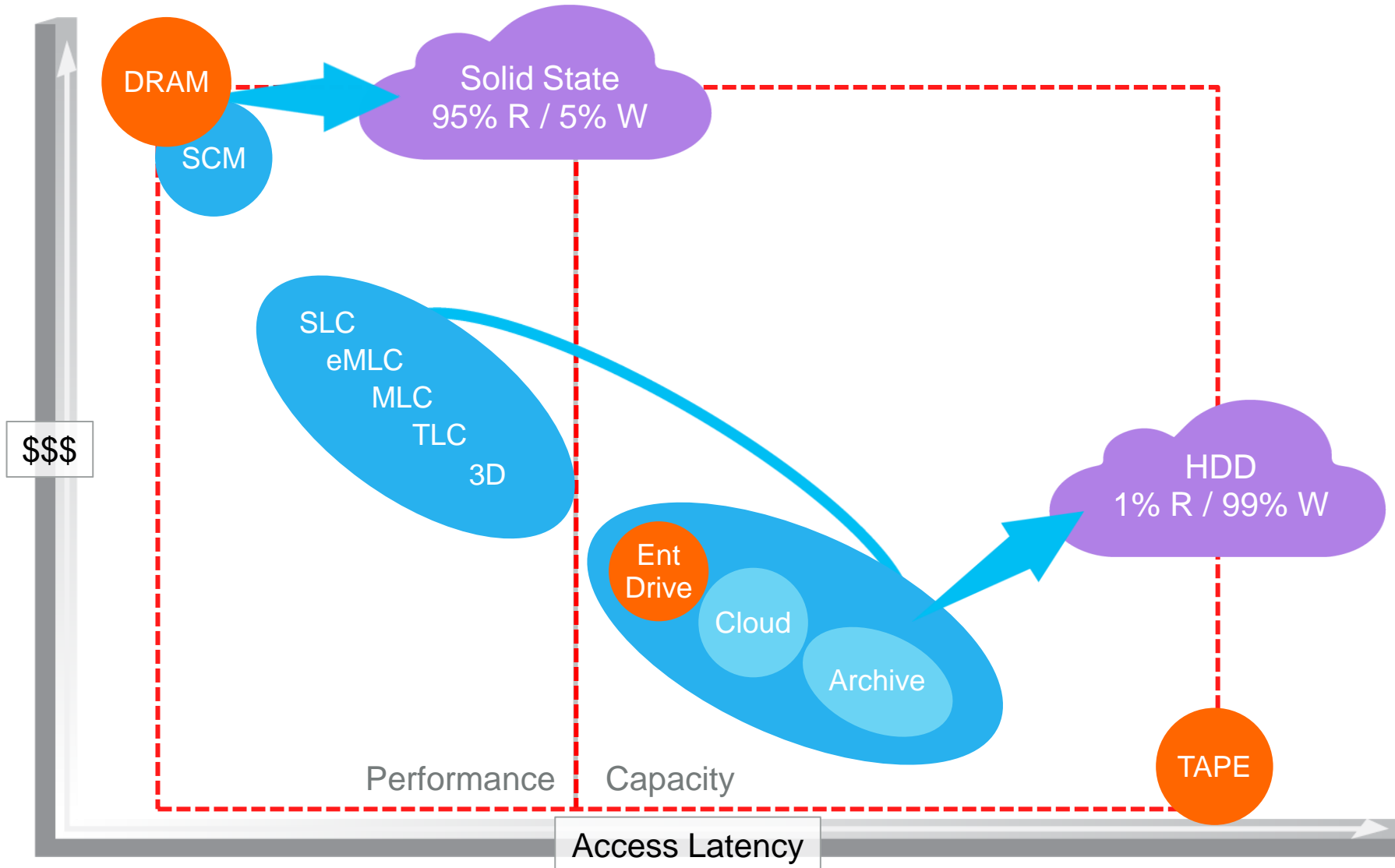
# Storage Technology Trends

- SSDs continue to gain share as performance, price and density improves
  - All Flash Array systems gaining broad adoption for Tier 1 applications
  - Hybrid SSD + HDD configurations enable lower latency with higher capacity
  - VNAND and NVMe technologies driving further transitions
- HDDs continue to offer an option for the primary storage for capacity
  - 2.5" 10K RPM SAS for hybrid workloads
  - 3.5" Capacity class drives will drive the lowest \$/GB for colder data
  - Density continues to improve with sealed drives and added disks
- SAS-3 Infrastructure in strong transition
  - 12Gb bandwidth extends connection performance
  - Integrated SAS to Fibre Channel bridging
  - Optical SAS cables for up-to 100m connectivity
- Encryption security mission critical
  - Increasing demand for encrypted data at rest

# Storage Used to Be Simple



# Economics Driving Polarization of Storage



# Trend Assessment

## Key technology changes driving the 2020 IT environment

### Application Architectures

- 2<sup>nd</sup> Platform (client/server) applications became virtualized
- 3<sup>rd</sup> Platform (new apps, webscale) highest growth area in IT
- The end of POSIX
- Containers, micro services
- 2<sup>nd</sup> and 3<sup>rd</sup> platforms co-exist long past 2020
- DevOps model is common

### Infrastructure On-prem, SaaS, IaaS

- IT supports apps on IaaS and PaaS from owned infrastructure or leased from SPs or through SaaS
- PaaS provides rich purpose-built data and Information services
- Application Services are defined by Service Level Objectives (SLOs)
- Complex data mgmt considerations for security, stewardship, inventory

### Data Evolving Types and Sizes

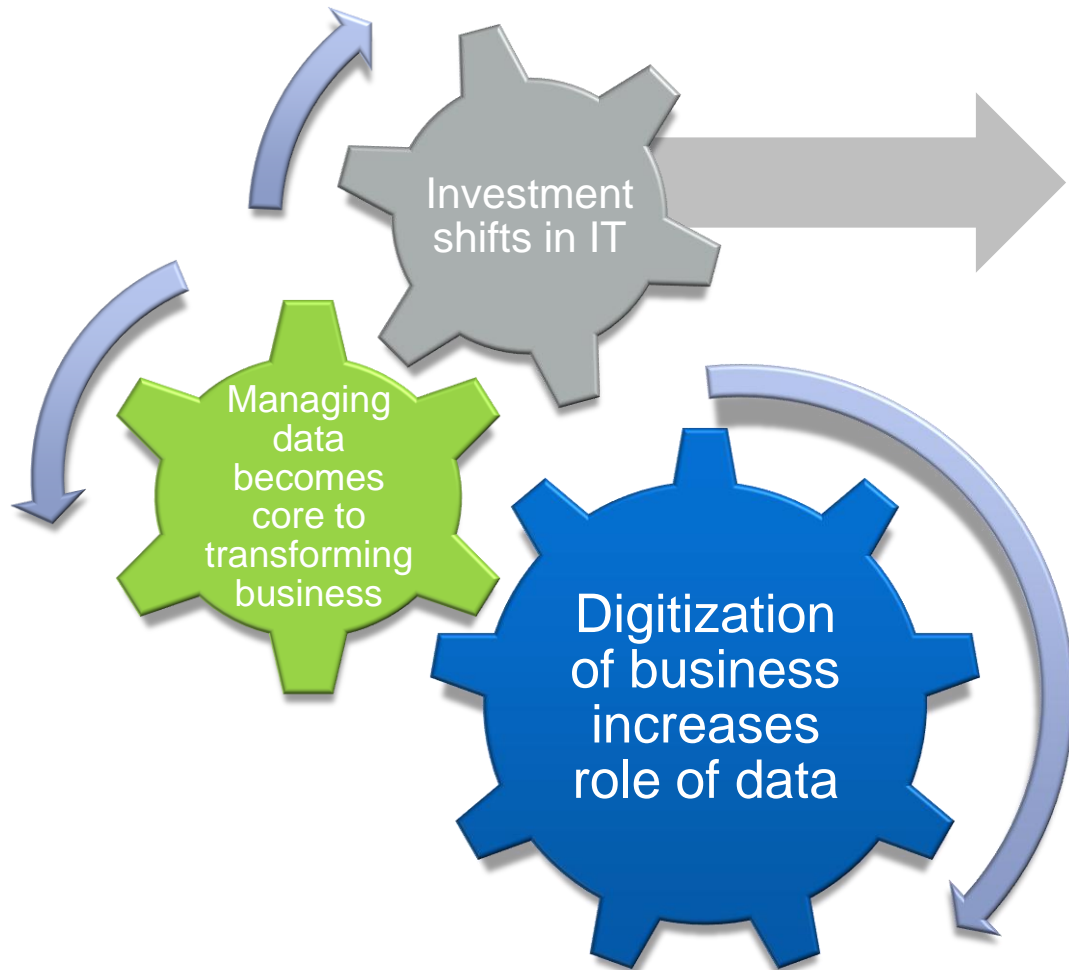
- IoT, webscale drive tremendous data growth
- File, block, mp3, jpg, JSON, KV, graph...
- Data moves to its optimal storage location  
Lowest cost storage that delivers the required SLO
- Data has density, gravity, heat

### Technology Hardware Evolution

- Compute  
Moore's law ending  
DRAM + SCM
- Network / Interconnect  
100Gb ethernet wins  
L2, L3 Virtualization
- Wide range of storage media  
Primary data in solid state (DRAM, NVMe, NAND)  
Cold data in HDDs (SMR, HAMR)

# The future of data management

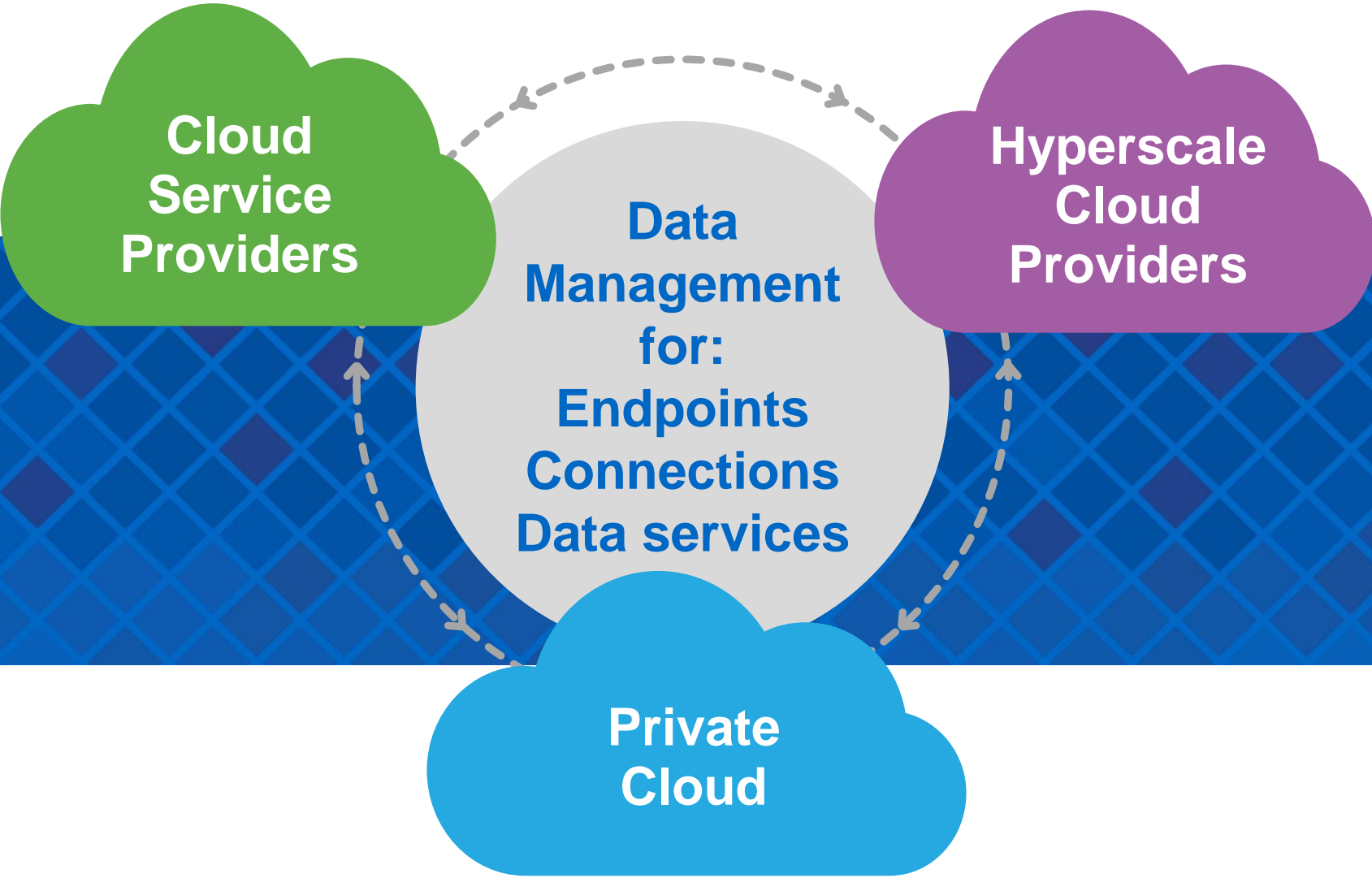
From the industry's data management leader



## Getting to seamless data

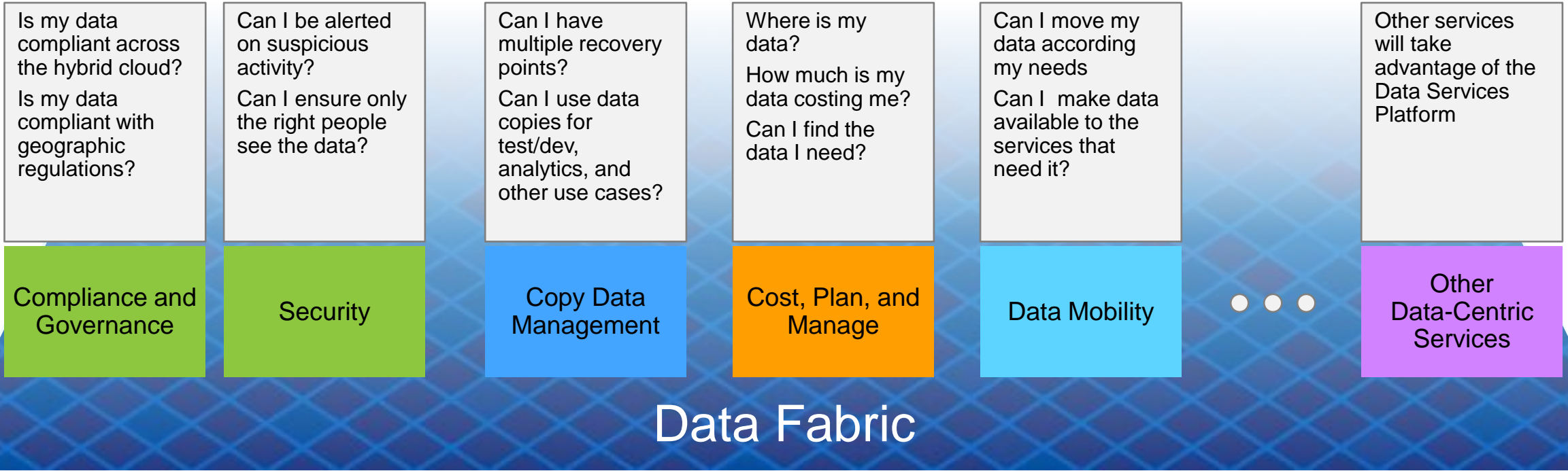
- Digital transformations require unleashing data to provide impact
- Critical data needs to come from any device or endpoint
- Data needs consistency regardless of being on premises, off premises
- Data needs cloud independence
- Data security and availability must remain intact regardless of where the data goes

# This requires a Data Fabric



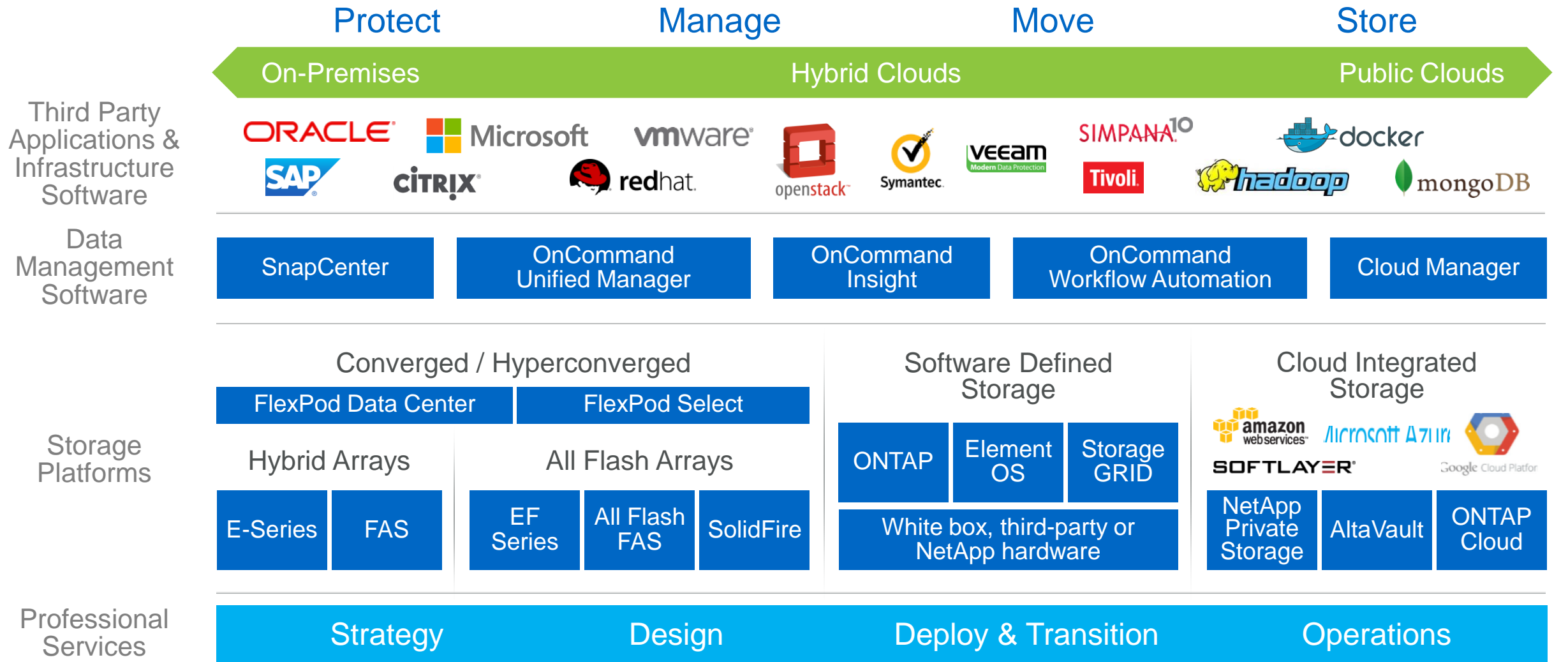


# Investing in Data Fabric Futures



amazon web services, Office 365, salesforce, E-Series, FAS, SolidFire, ONTAP, box, google Drive, google Cloud Pla, Dropbox, AVA, AltaVault, StorageGRID, Webscale, NETSUITE, Microsoft Azure, workday, Other Vendors, NetApp®

# NetApp Product and Solutions Portfolio



# Thank You

