



**Hewlett Packard**  
Enterprise

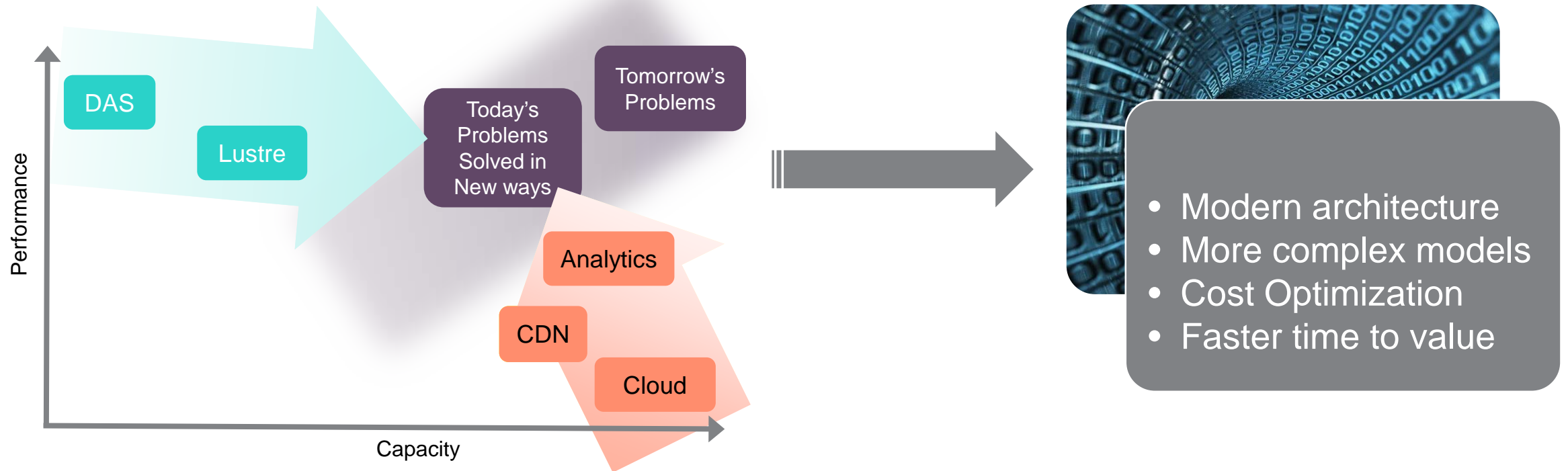
# Performance Optimized FSI Solutions

Lacee McGee

Sr. Product Manager, Hewlett Packard Enterprise

Twitter: lacee\_mcgee

# Where Big Data Meets HPC



**Compliance**



**Security**



**Privacy**

# 2016 FSI Trends



## Business trends

- **Omni-engagement levels** will become a barometer of customer profitability
- Evolution of the **mobile banking** channel
- FSI will begin to **monetize** risk and compliance investments
- WW **mobile payments** will approach \$1 Trillion, majority being online purchases through mobile devices



## Technology trends

- Double workloads being put into **cloud technologies**
- **Packaged IoT** SW platforms for the insurance industry
- Total investment in IT resources reaching \$500B by 2017
- Implementation of cognitive systems will create 20% improvement in IT efficiency
- By 2018, \$300M annual SW investment to begin transforming **internal payment technology**
- Strategic investment in **advanced analytics**



## Performance



## Lower TCO



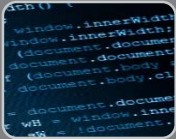
## Workload Optimized

# How is HPE addressing these needs?

## Innovation



Purpose Built Infrastructure



Open Source Contribution



Roadmap Alignment

## Strategic Partnerships



End-2-End Solutions

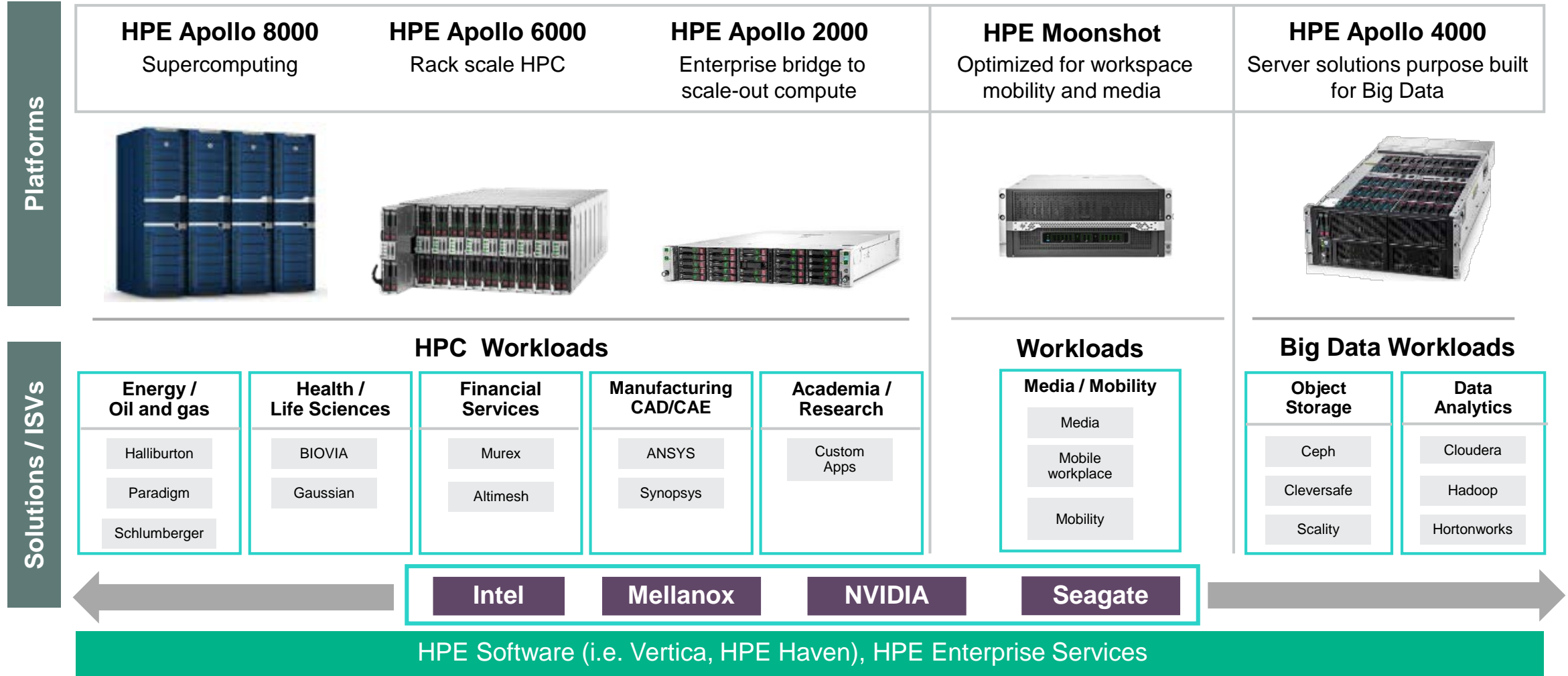


Center of Excellence



Workload Optimized

# HPE Apollo platforms and solutions optimized for HPC and Big Data



# Optimized performance targeting Financial Services Industry



**Optimized performance**  
by HPE Apollo / Moonshot Systems



★ Risk Compliant  
Archive Solution



HPC for Trader Workstation



HPE Trade and Match  
Server Solution

## HPE Innovation delivering optimized performance

- **Optimize HFT workload performance with HPE Trade and Match Server using Apollo 2000 running at maximized frequency**
- **Regulatory compliance of enterprise-wide data archive made easy** with HPE Risk Compliant Archive; iTernity iCAS for compliance, Scality RING for efficient data archive, density optimized HPE Apollo 4000 server family
- **Maximize trader productivity** and enhance customer experience with superior compute and graphics performance of HPE Trader Workstation powered by HPE Moonshot Solution.

Performance optimized solutions that address today's Financial Services Industry challenges and fuel innovation



# **HPE Apollo 2000 Trade and Match Server Solution**

# High Frequency Trading Market

## Trade and Match Server Solution

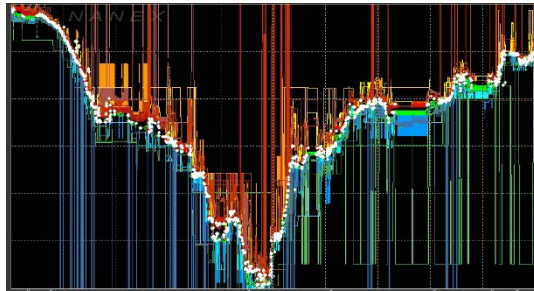
### Market

- Single digit tick-to-trade in microseconds is the bar for competitive HFT firms
- Improve proximity to trading exchange to **minimize latency**
- Faster processing through **high performance computing architectures**
- **2 Key needs:**
  - Need a rapid response
  - Transaction time length similarity



### Why 1P?

- Assembly line mentality
- Single threaded applications
- Rapid Response to transaction
- More predictable memory latency
- **Use Cases:**
  - Trading Engine
  - Matching Engine
  - Reservoir Simulation
  - Board Design



### HPE's Answer

- Apollo 2000 HFT Optimized Server
- Single Socket Configuration
- E5-1600 Series Processor
- Overclocking Capability
- Price/Performance

Front view



Rear view





# Maximize Performance and Agility for High Frequency Trading

## Trade and Match Server Solution Highlights

### Key Differentiators

– Overclocking capability: tune and optimize for improved frequency

save  
time

– Optimized for applications that perform better at high frequency and with lower core count

save  
costs

– Workstation processor as opposed to competitive offerings using consumer processors

Reliability  
including ECC  
memory

– Solution offerings optimized for easy co-location data center deployments

ease of  
deployment

### Proven Benefits

#### E5-1680v3 Specs

# of Cores	8
# of Threads	16
Base Frequency	3.2 GHz
All Core Max Turbo Freq.	3.5 GHz
Overclock Frequency	<b>Up to 4.6 GHz</b>
Overclock Frequency Ratio	+21-37%
Black Scholes Speedup	+17-26%
Monte Carlo Speedup	+11-28%



Tuned for FSI  
workloads



Plug and play



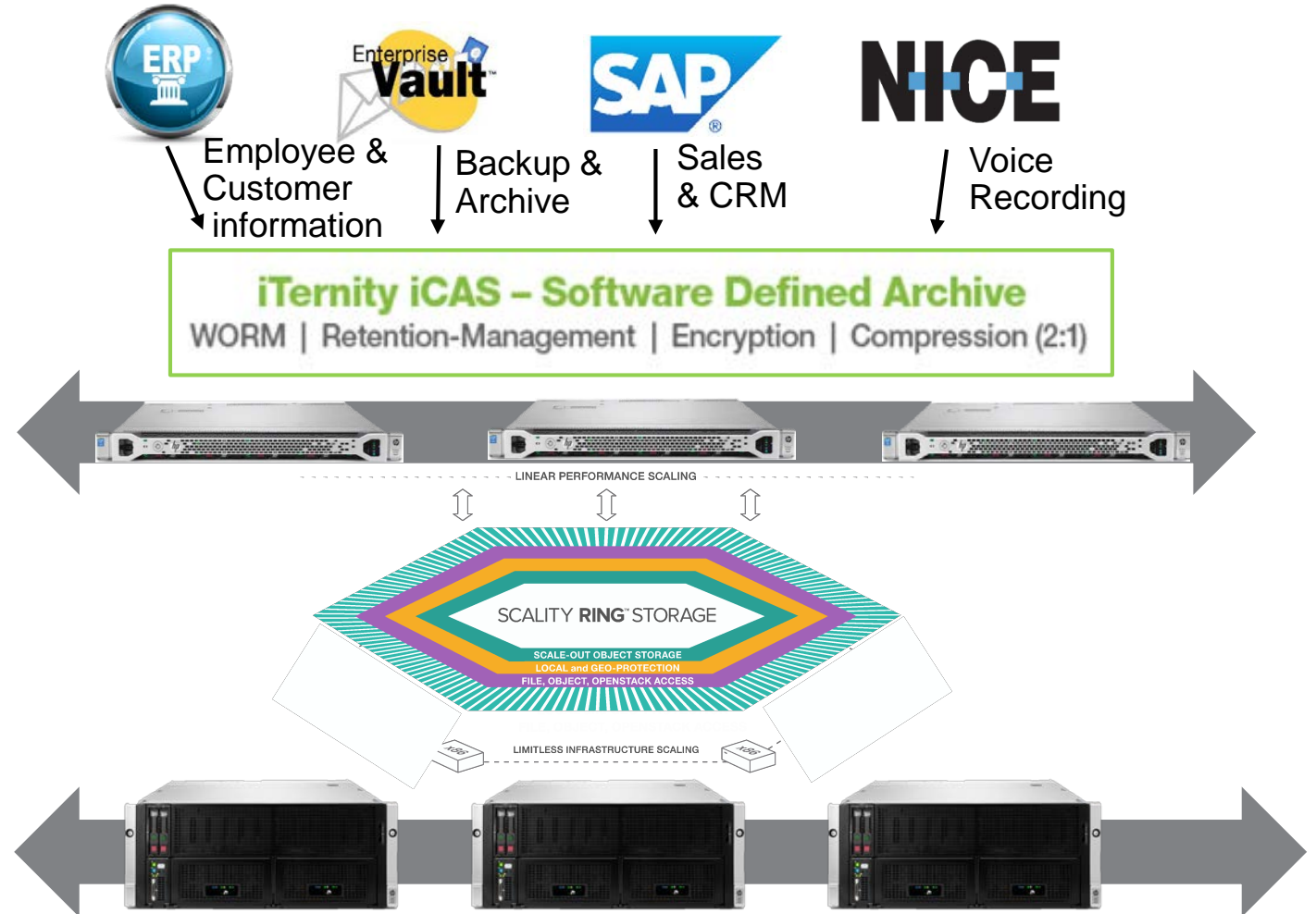


# **HPE Apollo 4000 Risk Compliant Archive Solution**

# Simple, Lower TCO for Regulatory Compliance

## Risk Compliant Archive - Reference Architecture

- **FSI segment deals with various data types**
  - Voice
  - Documents
  - Employee information
  - Sales & CRM data
  - Broker/loan transactions
  - Backup & Archive
- **Data compliance is a solution requirement**
- **Risk Compliant Archive Solution:**
  - Meet grueling regulations while lowering TCO with an enterprise wide storage architecture
  - Verified by Cohasset Associates and KPMG Certification



# Hardware flexibility to optimize solution for your workloads



**Apollo 4200**

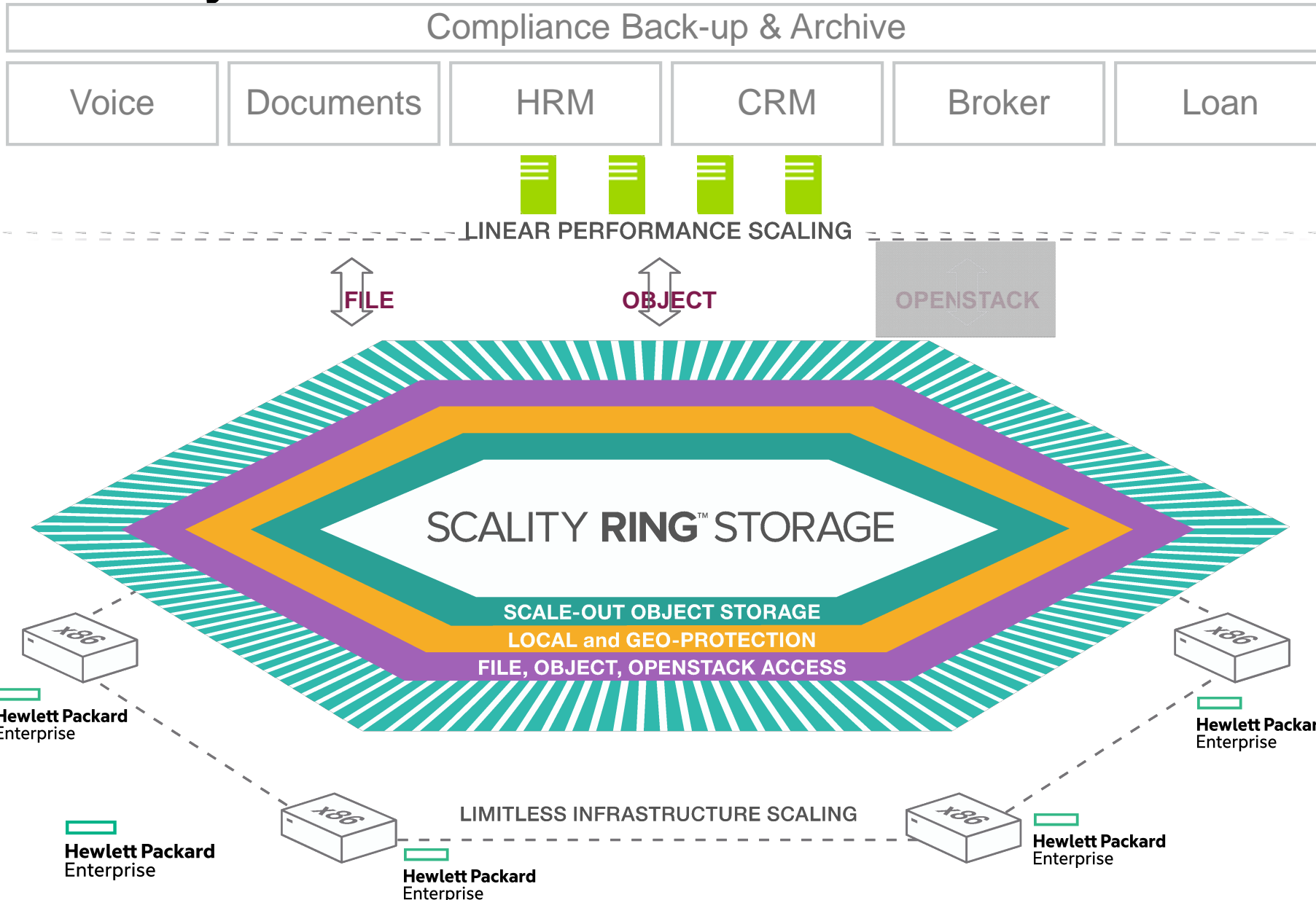
- Familiar 2 U Form Factor & Standard Rack depth
- Mainly smaller files
- World's densest 2U server
- Medium Scale Deployments: Up to 1.4 PB's
- Lower Capex



**Apollo 4500**

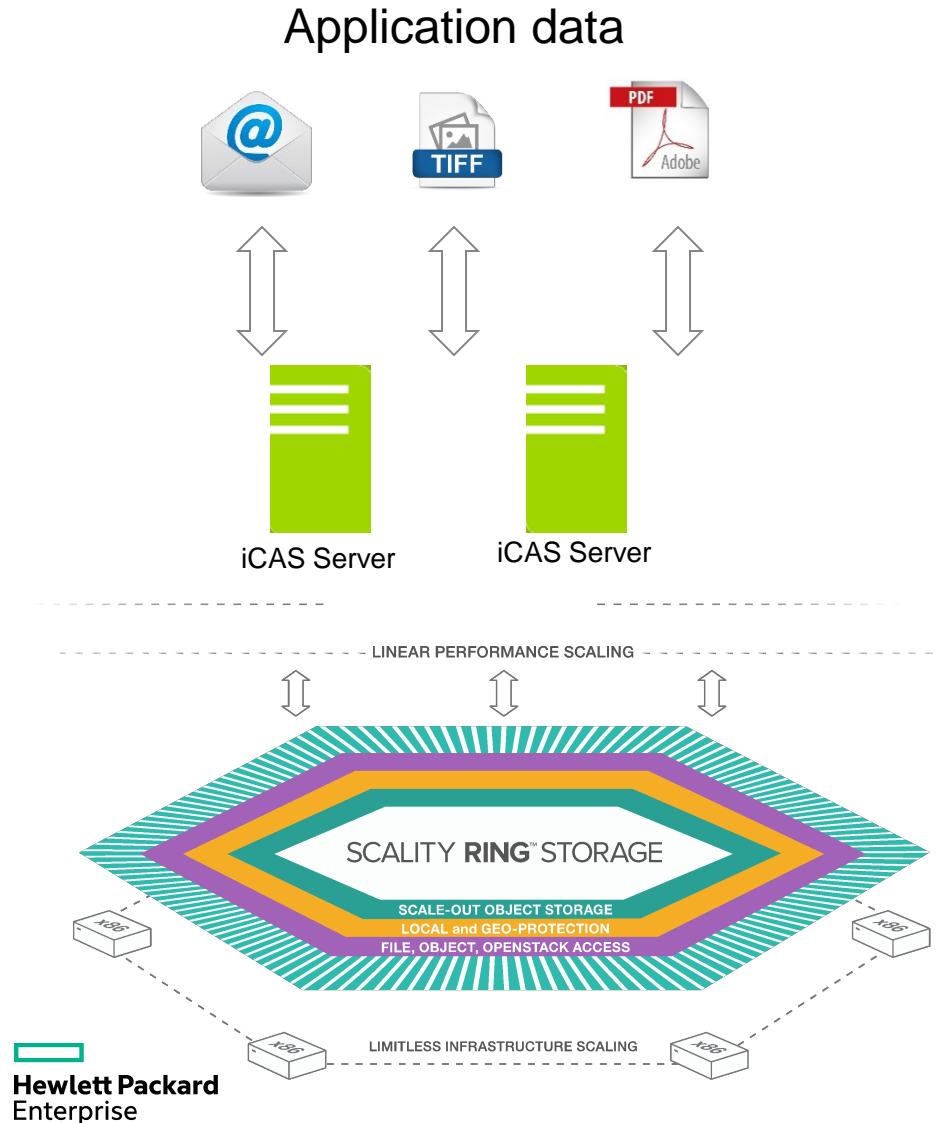
- Extreme Density & Lowest \$/GB
- Mainly larger files
- Workload Optimized for Archive Storage
- Large Scale Deployments: +1.5 PB's
- Lower Opex = Lower TCO

# Scality RING: 3 levels of software-defined flexibility



- Consolidate storage by supporting **mixed applications & workloads**
- High-performance access to the storage pool through the widest choice of **file and object protocols**
- Enables **100% reliability** through a variety of data protection mechanisms and the ability to build geo-distributed storage infrastructures
- Leverages **object storage** to abstract the underlying hardware and create a single pool of storage
- A proven software storage solution that enables customers to build petabyte scale storage infrastructures **leveraging any HPE servers**

# iCAS Architecture



## Business application

ERP, CRM, ECM, E-Mail, custom applications e.g. OpenText, Symantec EV, Nice Voice Recording etc.

iTernity

Archive-Protection (iCAS Software)

WORM Function / Retention Management / Encryption/ Compression

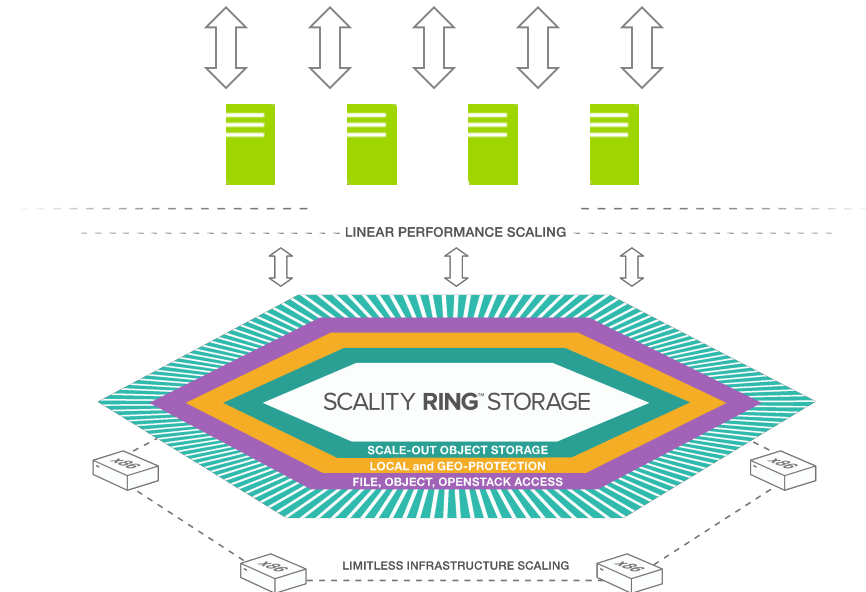


by:



## Scality RING on HP Apollo

# 100+ ISVs have certified iCAS as a compliant archive backend





**Hewlett Packard  
Enterprise**

# Setting IT Trends on Wall Street

**April, 2016**

**Tom Bradicich, PhD  
VP and GM  
Servers and IoT Systems**

[twitter.com/tombradicichphd](https://twitter.com/tombradicichphd)

[linkedin.com/in/tombradicichphd](https://www.linkedin.com/in/tombradicichphd)

[tombradicichphd.tumblr.com](https://tombradicichphd.tumblr.com)



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*“A good company aggressively follows the trends.  
A great company sets the trends.”*

<http://tombradicichphd.tumblr.com>

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## ***Setting IT Trends in Financial Services:***

- Remote Desktops / Mobile Workspace***
- HPC***
- Big Data***

# Setting Trends with Remote Desktops / Mobile Workspace

... with top global Financial Institutions:

Never before seen:

Price / Performance

Energy / Performance



**HPE Moonshot**



# Setting Trends with Remote Desktops / Mobile Workspace

... with top global Financial Institutions:

## Jan 2016 – Largest HPE Moonshot deployment

- Top global bank
- Remote **hosted desktop app delivery**
- Remote **developer workstations**
- Cut cost/per watt per user in half
- Saving the bank \$12M

## Traders live with Moonshot Trader Workstation

- Remote **hosted trader workstation**
- Americas, EMEA, Asia Pacific

## Baloise Group - customer testimonial video:

- 7000 happy FSI end-users

<https://www.youtube.com/watch?v=QRlod9cPNHk>



**HPE Moonshot**



**CITRIX®**



# Setting Trends with Remote Desktops / Mobile Workspace

... with top global Financial Institutions:

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“... And with the Moonshot technology... we met all our objectives concerning security, compliance, and carbon footprint.

Our staff will be able to work more productively.”

Head of Infrastructure and CTO



# Setting Trends with Remote Desktops / Mobile Workspace

CITRIX  
XenApp

## Application Delivery

Hosted applications accessed by multiple users

CITRIX  
XenDesktop *with Hypervisor*

## Virtual Desktop Infrastructure (VDI)

Hosted desktops as virtual machines

CITRIX  
XenDesktop

## Hosted Desktop Infrastructure (HDI)

Hosted physical desktops

All 3 mobile workspace environments in a *single part number to learn and manage*

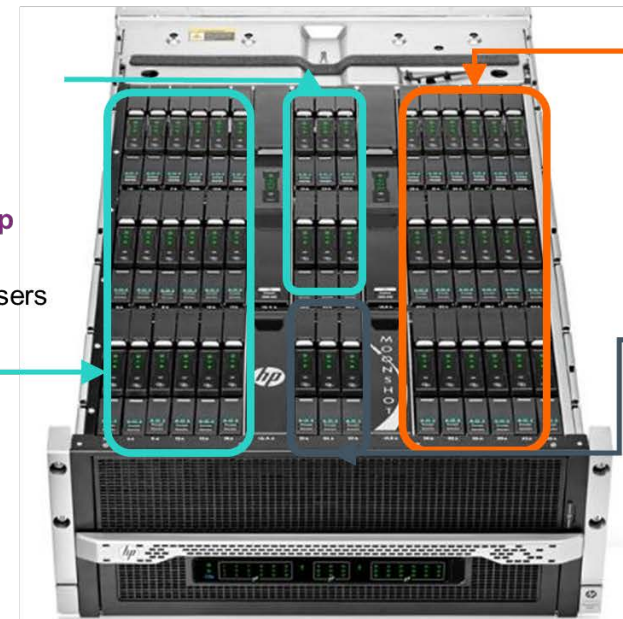


### 6 x m710p servers

High HDX XenApp graphics users or XenDesktop

### 18 x m710p XenApp servers

900 HDX XenApp users



### 18 x m700 servers

72 XenDesktop business graphics users

### 3 x m300 servers

Infrastructure running HyperV and VMs for Citrix components: controller, PVS, XenMobile, Netscaler

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*“A good company aggressively follows the trends.  
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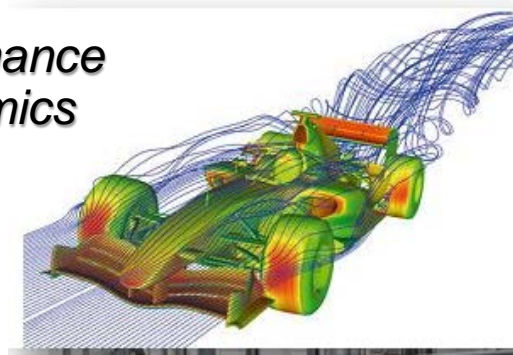
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## ***Setting IT Trends in Financial Services:***

- *Remote Desktops / Mobile Workspace*
- **HPC**
- *Big Data*

# Setting Trends in HPC

*High Performance  
Fluid Dynamics*



*“... a high performance computer which is based on the most innovative technologies of Hewlett-Packard.*

*This will improve our performance ...”*

***IT Team Principal Team***

- *Moonshot's Cluster Management Utility deployed 1000 servers in 15 minutes*
- *HPE Moonshot Discovery Lab helped enable advanced performance analysis*





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## ***Setting IT Trends in Financial Services:***

- *Remote Desktops / Mobile Workspace*
- *HPC*
- ***Big Data***

# Setting Trends in Big Data

## HPE Moonshot for NoSQL Apache Cassandra with DataStax

**DATASTAX**

NoSQL Apache  
Cassandra™ with  
Enterprise Features

- Enterprise level security
- Massively scalable
- Predictable scalability
- Fast, powerful integrated analytics



- Right sized processors
- 10Gb networking
- Integrated (SSD) storage
- High density



### Performance

Increase transaction throughput by up to **more OPS per RU<sup>1</sup>**



### Economics

Drive down costs with **improvement in TCO<sup>1</sup>** across variable workloads



### Efficient expand and contract

Scale out quickly and efficiently reducing time-to-market and competitiveness



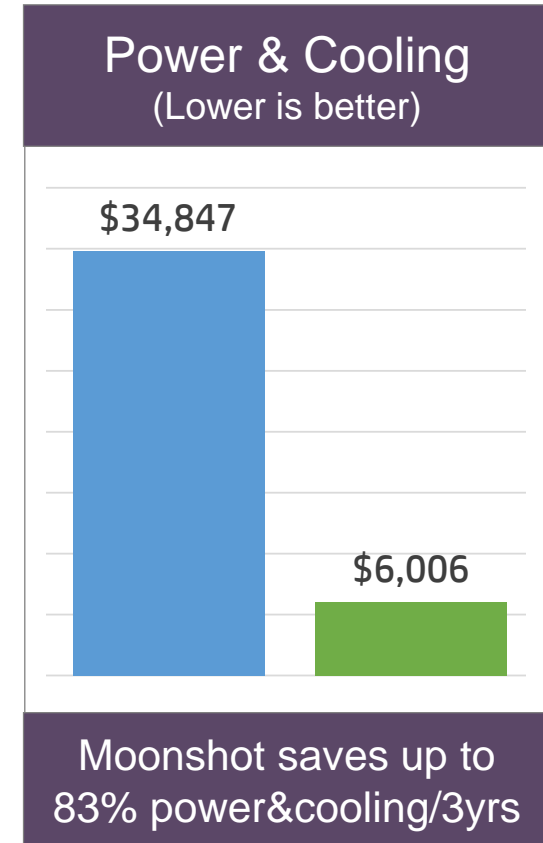
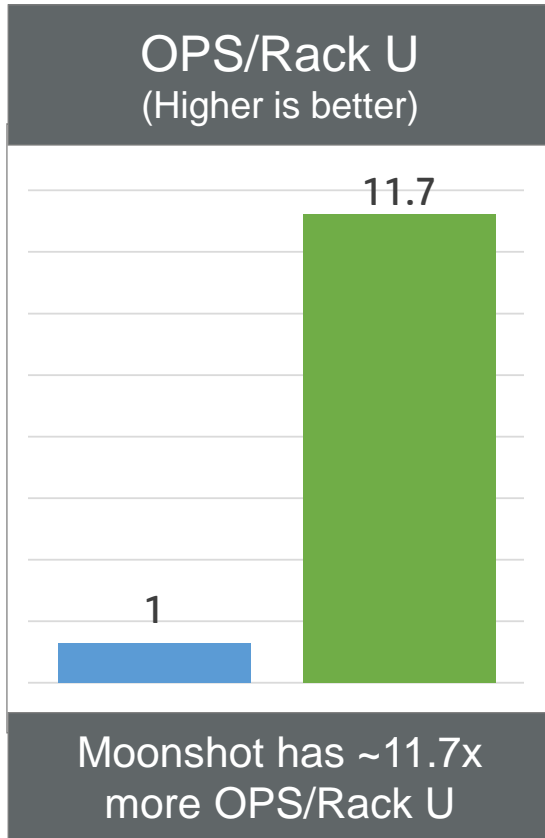
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*“All interesting benchmarks are incredulous.  
And all credible benchmarks are uninteresting.”*

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# Setting Trends in Big Data

## HPE Moonshot with NoSQL Apache Cassandra

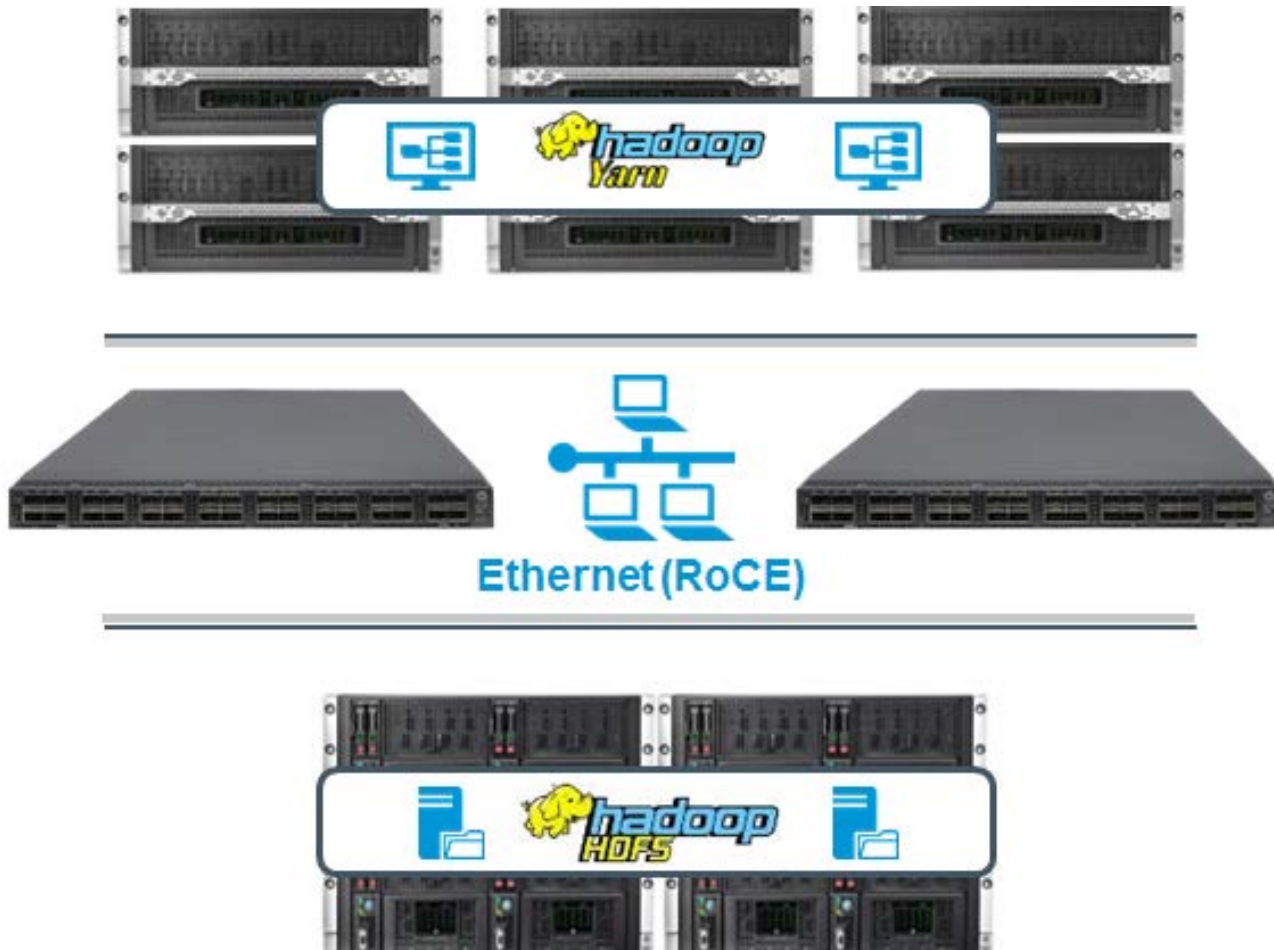


■ Dual E5 v3 2U HPE Server

■ Moonshot m710p E3 Server Blades

# Setting Trends in Big Data

## HPE Big Data – Formal Reference Architecture (code name “Minotaur”)



### Performance

Cluster consolidation with multiple big data environments directly accessing a shared pool of data



### Economics

**2.5X the density at half the power** for the equivalent performance of the traditional approach



### Innovation

**Flexibility to scale compute and storage independently**, Rapidly provision compute without affecting storage



# What system and technology are setting these trends?

## HPE's reinvented Moonshot systems

Super dense,  
converged system



Moonshot System 1500  
45 server blades,  
Up to 180 server nodes

Integrated NW switches

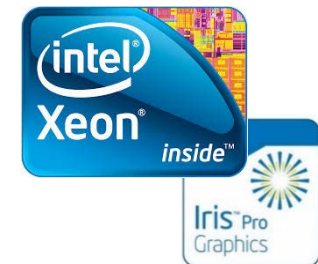


Simple cable management



*Rear View*

High Performance, small footprint, energy efficient server blades



# What system and technology are setting these trends?

## HPE's **reinvented** Moonshot systems

### 1) *Intel Xeon Processors*

- Intel's premier processor brand
- Integrated caches and GPUs with Intel E3



### 2) *World Class HPE Systems Management*

- New management HW & SW
- Industry leading HPE iLO



### 3) *New Moonshot Global Collaborations*

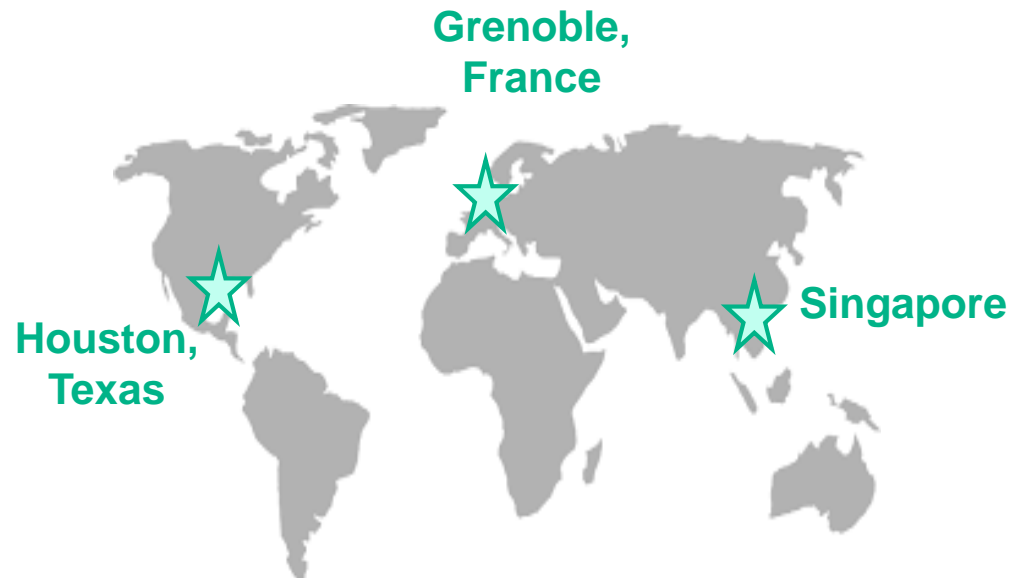
- Intel Alliances
- Expanded Citrix Mobile Workspace solutions
- Virtualization with VMware
- DataStax for new Big Data workloads
- Altair for new HPC workloads
- SI partnership with Accenture



# HPE Moonshot Global Discovery Labs

**Free Engineering Services offer:**  
**Mention offer code: “*Dr. Tom’s Most Awesome Free Offer*”**

- *Test and pre-validation of Moonshots system and end-to-end solutions*
- *On-site access or secure remote access*



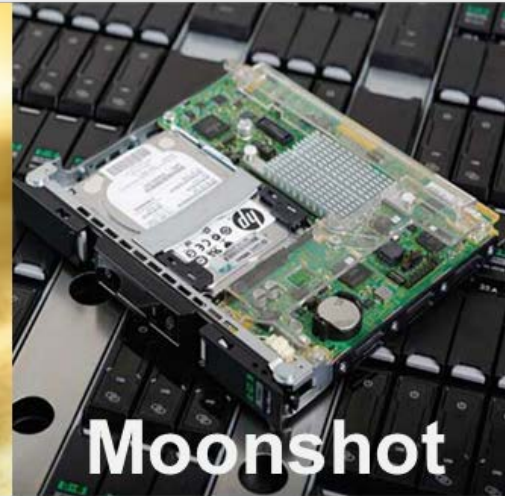


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*“If you’re not executing on your company’s vision,  
then you’re just peddling imagination. And  
ultimately customers don’t buy imagination.”*

<http://tombradicichphd.tumblr.com>

# Trendsetting with the reinvented Moonshot systems family



2016  
HPE Moonshot

