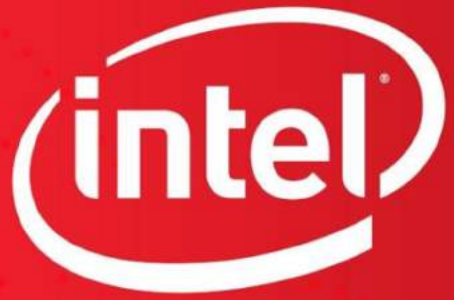


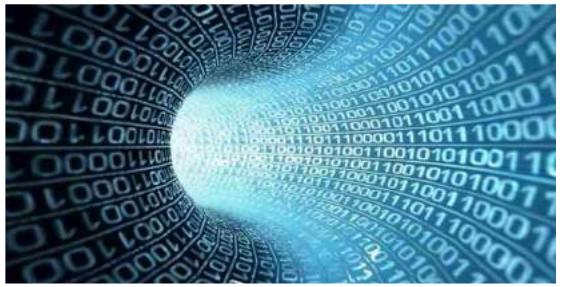
Open hybrid cloud connection roadshow

Storage relevance and evolution in Hybrid Cloud model

Alberto Fidanza
Storage Sales Lead – Italy & Israel

Red Hat

How much is a Quintillion?



2.5 quintillion bytes of data per day

90% in last 2 years

It’s a 1 with 30 zero
1' 000' 000' 000' 000' 000' 000' 000' 000' 000' 000

This is worth re-reading!
2.5 quintillion bytes of data created each day at our current pace, but that pace is only accelerating with the growth of the Internet of Things (IoT).

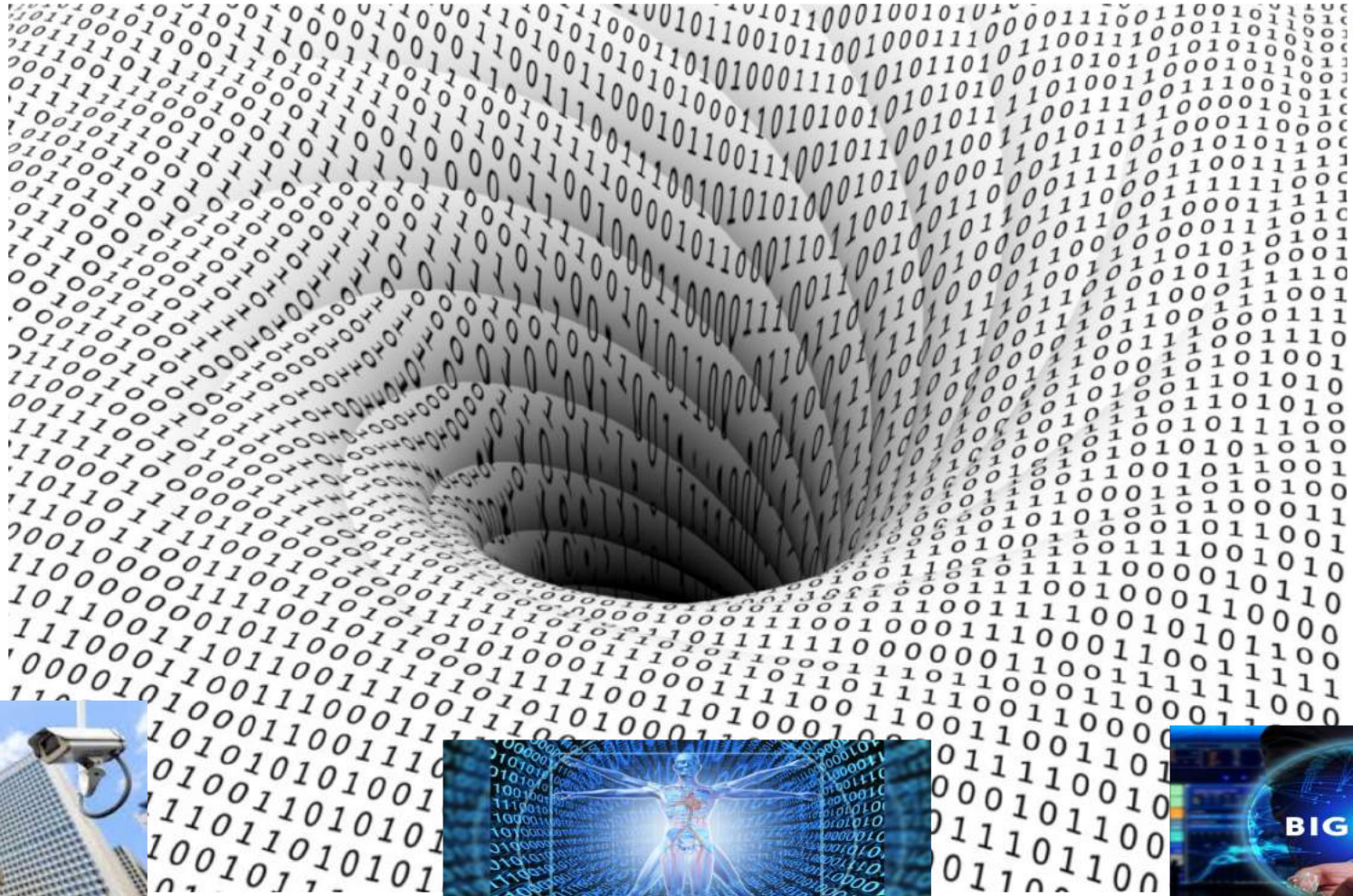
Over the last two years alone 90 percent of the data in the world was generated.*

*source: Forbes - May 2018

Customers facing unexpected Data Growth!

Media and entertainment
Films, music, images,..

Social media
Posts, profiles, photos,videos,…



Digital preservation
Digitalization of cultural artifacts, historic and legal documents,…

The modern enterprise
Emails, training, compliance, marketing content,…

Video surveillance
Body, traffic and security camera feeds…

Healthcare Imaging
MRI, ultrasounds, CAT scans,…

Big Data – IoT
Sensor data, location data, log data, simulation,..

Source: Forbes - May 2018

Red Hat

Software-defined Everything

DEVELOPMENT MODEL	ARCHITECTURE	DEPLOYMENT	INFRASTRUCTURE	STORAGE
Waterfall	Monolithic	Bare Metal	Data Center	Scale Up
Agile	N-Tier	Virtual Services	Hosted	Scale Out
DEVOPS	MICROSERVICES	CONTAINERS	HYBRID CLOUD	?

Software-defined Everything

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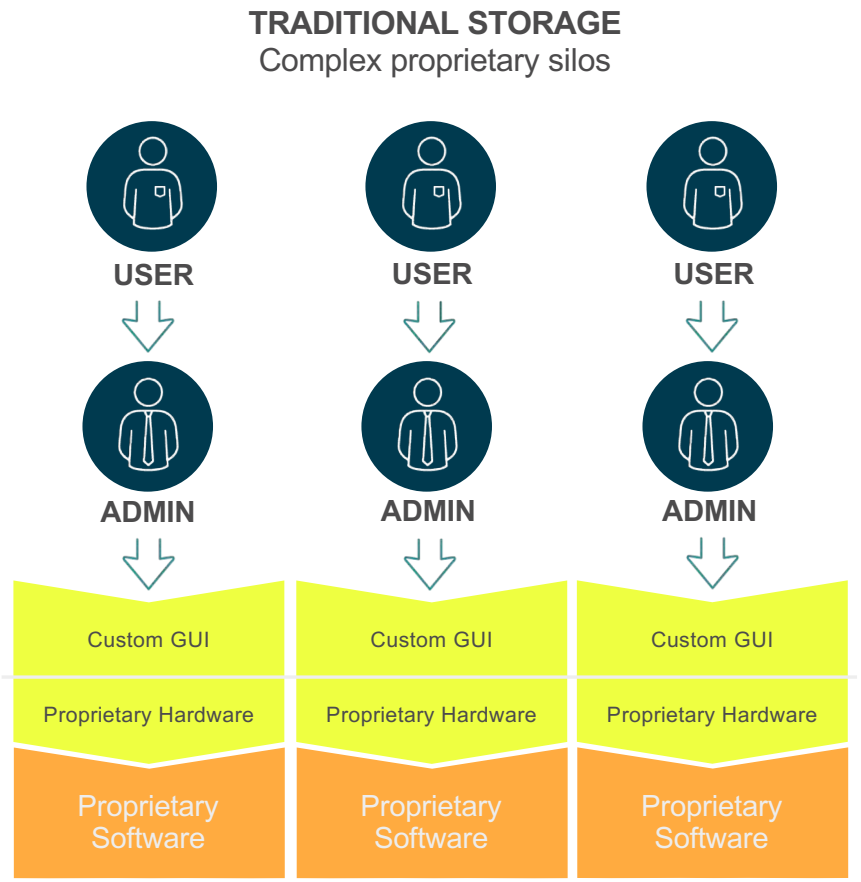
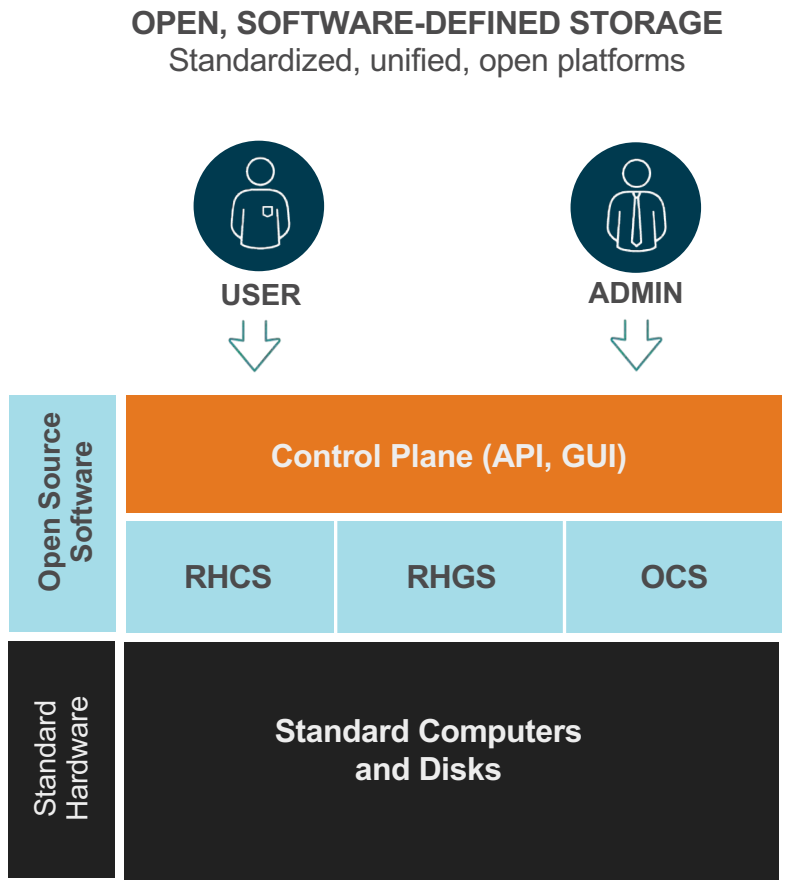
DEVOPS	MICROSERVICES	CONTAINERS	HYBRID CLOUD	SOFTWARE-DEFINED STORAGE

Red Hat

The Future of Storage





Red Hat

The Traditional Storage Appliance Is Rapidly Losing Relevance

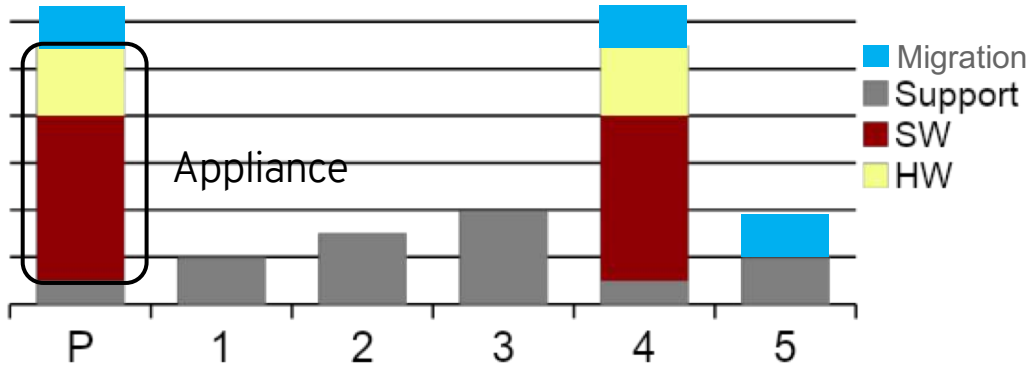
SOFTWARE-DEFINED STORAGE

PUBLIC CLOUD STORAGE

Red Hat

Traditional Appliance Vs Sds Economic Models

APPLIANCE-BASED STORAGE



Purchase Appliance every 3-5 years

Proprietary HW + SW

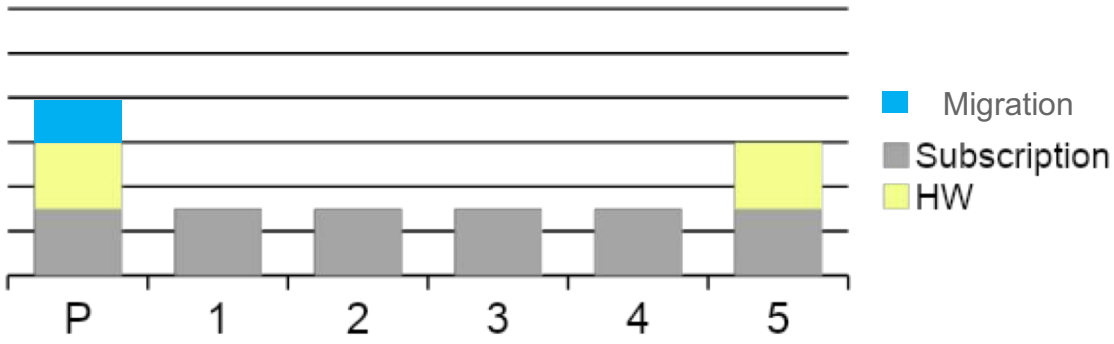
Software is basically *repurchased* with refresh

Appreciating Support YoY

To incent HW+SW refresh

Proprietary HW

SOFTWARE-DEFINED STORAGE



Decoupled SW & HW

Software Transfer

Single Subscription

Consistent Subscription payments

Year 1 = Year 3 = Year 5

Best of Breed HW

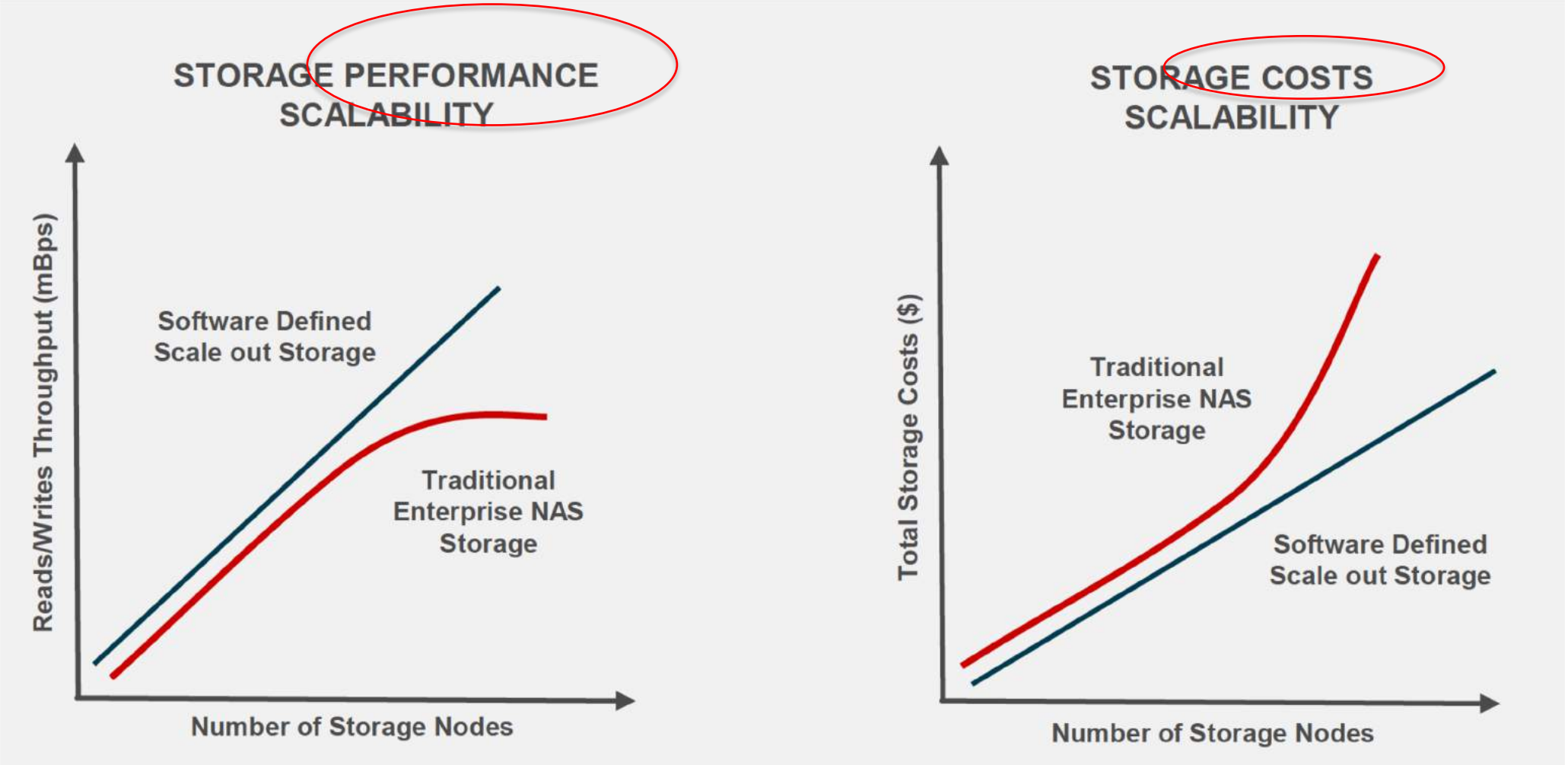
Purchase HW only as needed

SDS gives huge savings (50%+) in TCO due to no migration, no HW lock-in and less admin

Red Hat

Significant Advantage Over Traditional Storage

Half the cost for comparable features and performance



Red Hat

Gartner Names Red Hat a Storage Visionary

Three Years In a Row

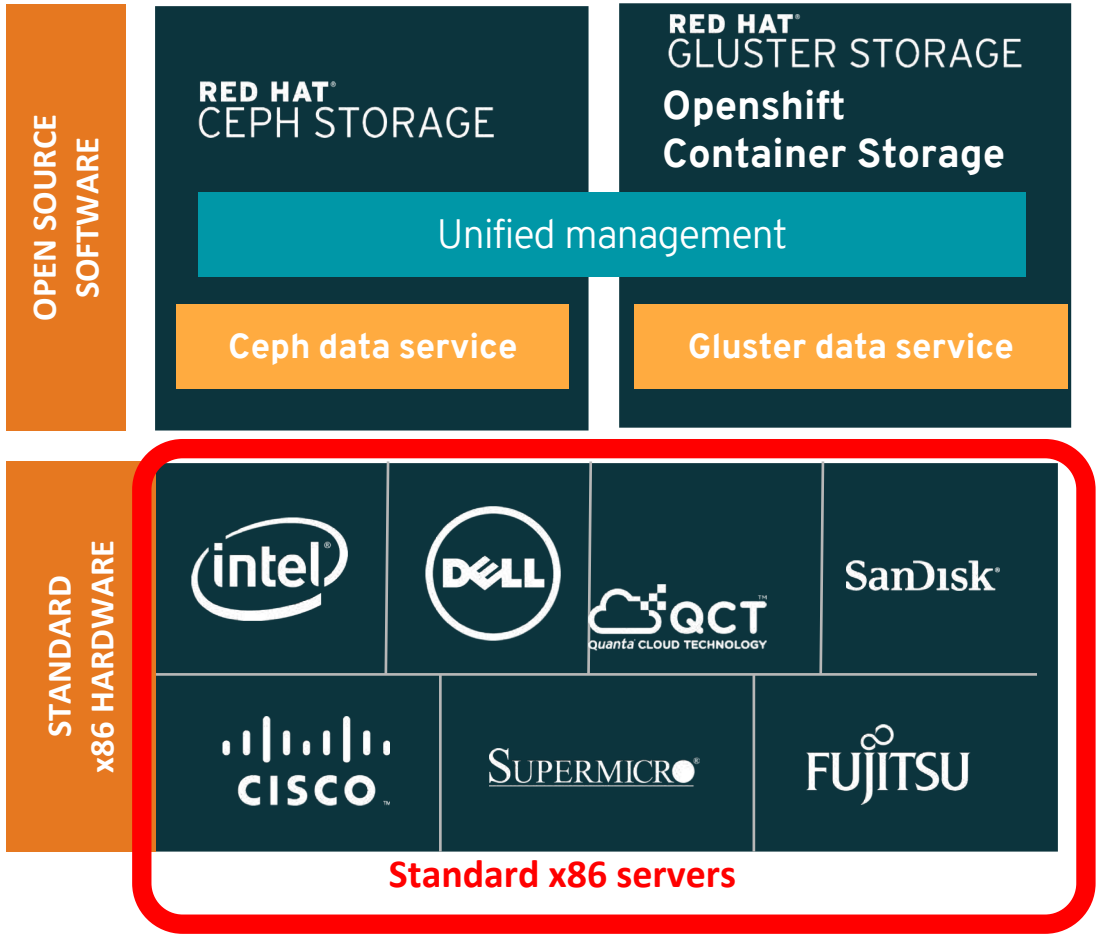
Gartner on the Red Hat Storage Portfolio

- Hardware independence and open-source model, full-stack infrastructure solutions
- Versatile and tightly integrated with Red Hat Platforms and Kubernetes, in hyperconverged and disaggregated form factors
- Certified across a broad spectrum of server hardware, with reference architectures available from leading server OEMs

This graphic was published by Gartner, Inc. as part of a larger research document and should be evaluated in the context of the entire document. The Gartner document is available upon request from https://www.gartner.com/doc/3891780/magic-quadrant-distributed-file-systems

Red Hat

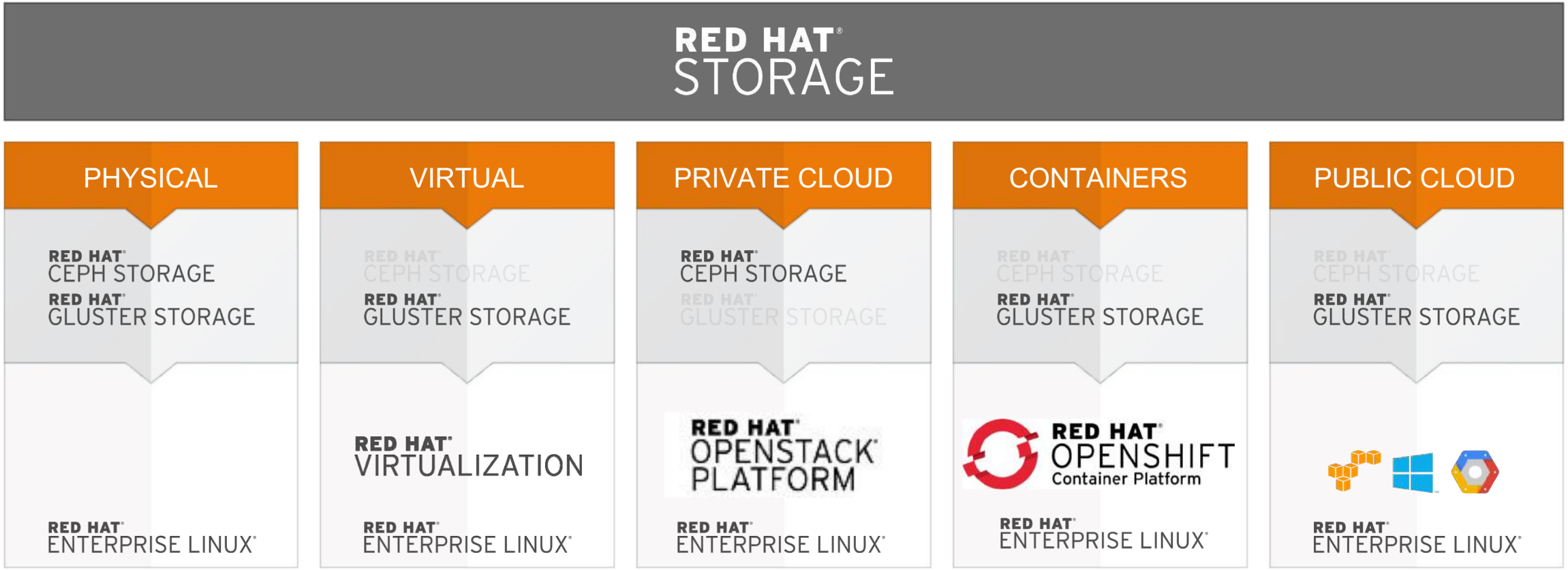
The Red Hat Storage Portfolio



- Shared-nothing, scale-out architecture provides durability and adapts to changing demands
- Self-managing and self-healing features reduce operational overhead
- Standards-based interfaces and full APIs ease integration with applications and systems
- Supported by the experts at Red Hat

Red Hat

Storage & The Open Hybrid Cloud



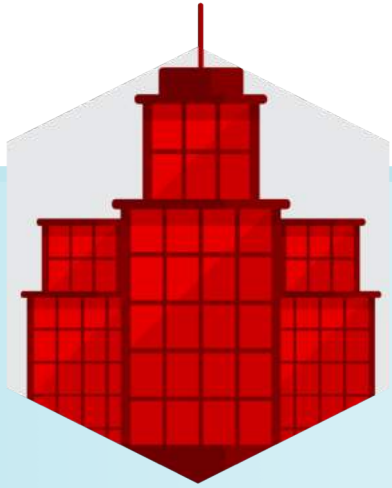
Red Hat

The Three Pillars Of The Storage Business

STORAGE FOR KUBERNETES

COMPLETE DATA PORTABILITY

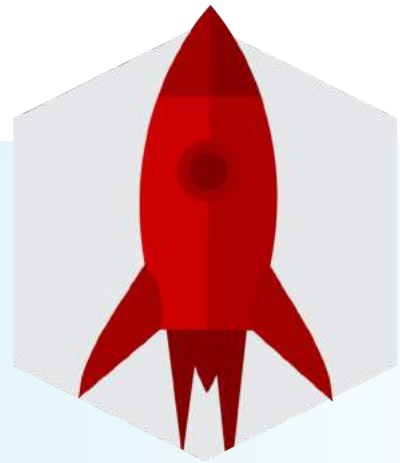
For OpenShift Across the Hybrid Cloud



EXASCALE STORAGE

MOST SCALABLE DATA PLATFORM

For Data Analytics, AI/ML, and emerging workloads



HYPERCONVERGENCE

THE IDEAL ON-PREMISE INFRASTRUCTURE

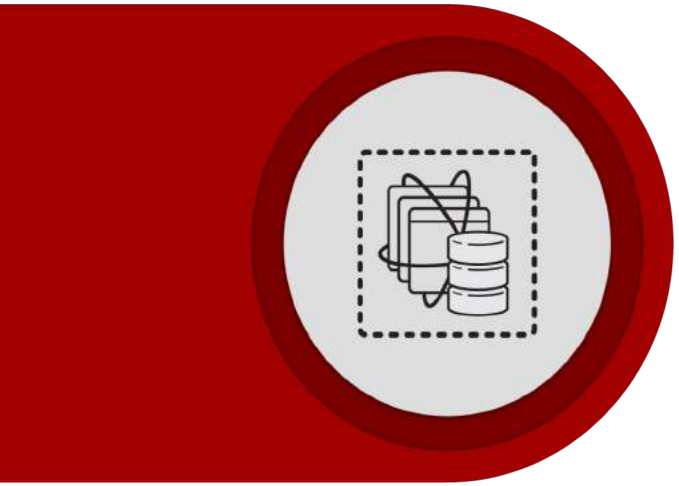
Built to enable flexibility and ease of use

Openshift Container Storage

RED HAT®
OPENSHIFT
Container Storage

What is it ?

Add-On for OpenShift for running stateful apps



Highly scalable, production-grade persistent storage

For stateful applications running in Red Hat® OpenShift

Optimized for Red Hat OpenShift Cluster services (Registry. Logging, Metrics)

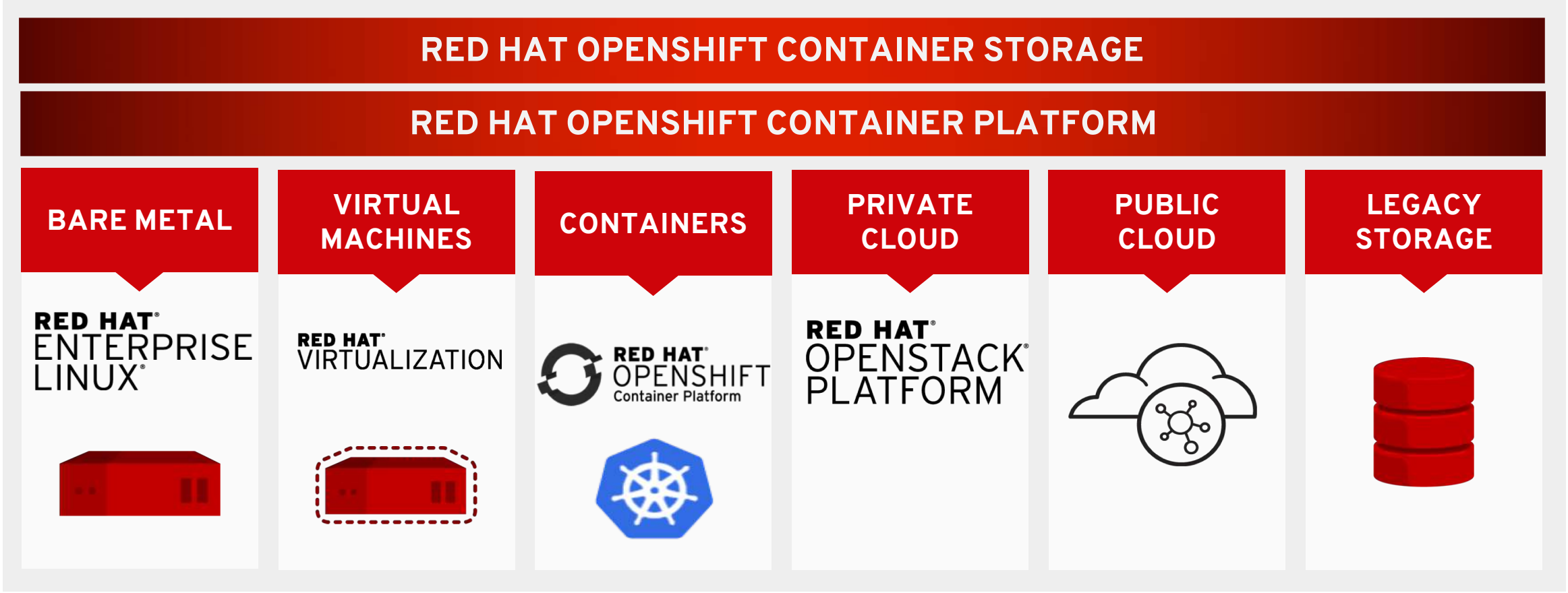
Unified deployment, management and upgrade with OCP

Developed, maintained, released and deployed in synch with Red Hat OpenShift Supported via a single contract with Red Hat

Red Hat

Consistent Storage Experience Across The Hybrid Cloud

Application Portability And Lower Costs

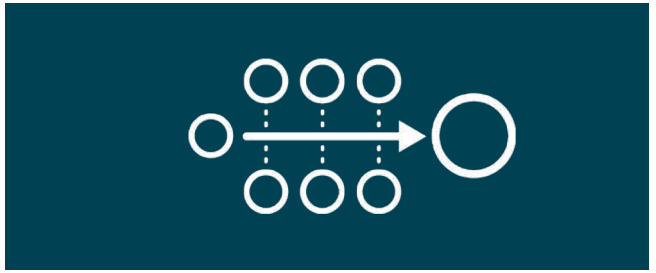


Scale Out Storage

Where customers start at a petabyte

Use Cases

PRIVATE CLOUD



DATA LAKES

BACKUPS

ACTIVE ARCHIVES

Storage most used for Openstack

According to latest annual survey done by Openstack Foundation to Openstack users:

Ceph is most used storage for Openstack in production: 48% compared against next proprietary solution with 10%

https://www.openstack.org/assets/survey/April2017SurveyReport.pdf

Which OpenStack block storage (Cinder) drivers are in use?

Cinder drivers also remained relatively constant, with Ceph RDB up 8 points and both LVM and NetApp up 3 points.

Just a handful of respondents indicated IBM Storwize, Huawei, HDS, IBM GPFS, Dell EqualLogic, IBM XIV/DS800, Windows Server 2012, Nexenta, SAN/Solaris, HP LeftHand, XenAPI Storage Manager, Sheepdog and IBM NAS.

Among the largest clouds with 1,000 or more cores, Ceph RDB is still dominant, but not used by the majority, while other block storage drivers were also popular.

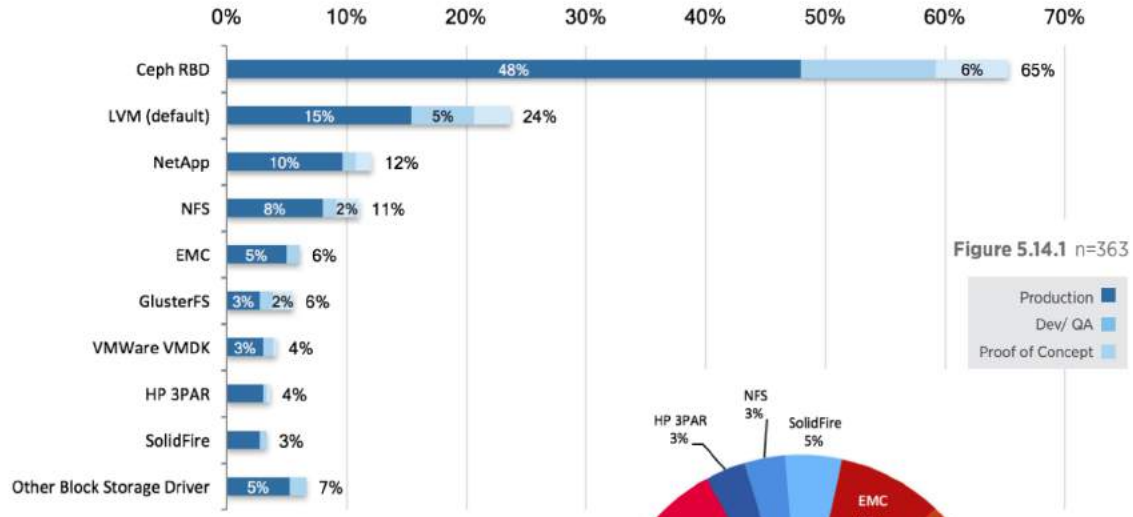


Figure 5.14.1 n=363

Among the largest clouds with 1,000 or more cores, Ceph RDB is still dominant, but not used by the majority, while other block storage drivers were also popular.

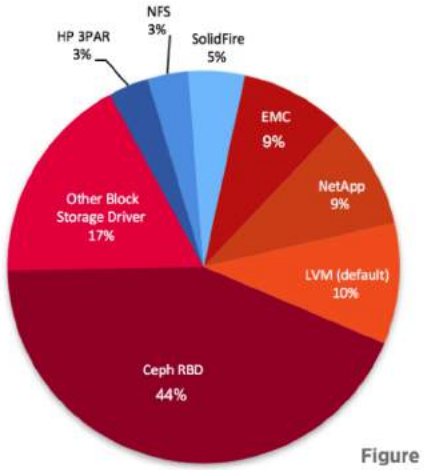
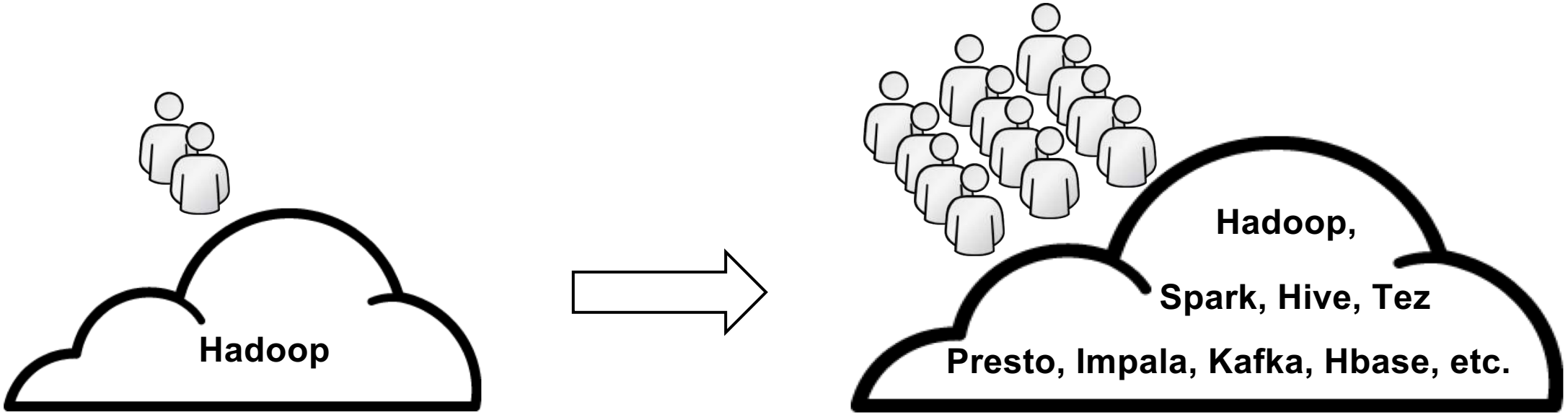


Figure 5.14.2 n=88

Elastic Shared Data Lakes

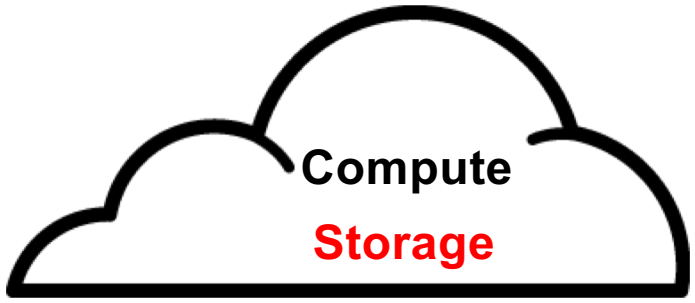
Discontinuity in Big Data Infrastructure - Why ?



- **Congestion** in busy analytic clusters causing missed SLAs
- **Multiple teams competing** sharing and competing for the same big data resources

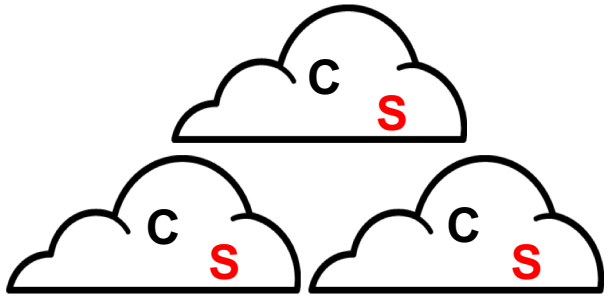
Causing Customers to Pick a Solution

#1



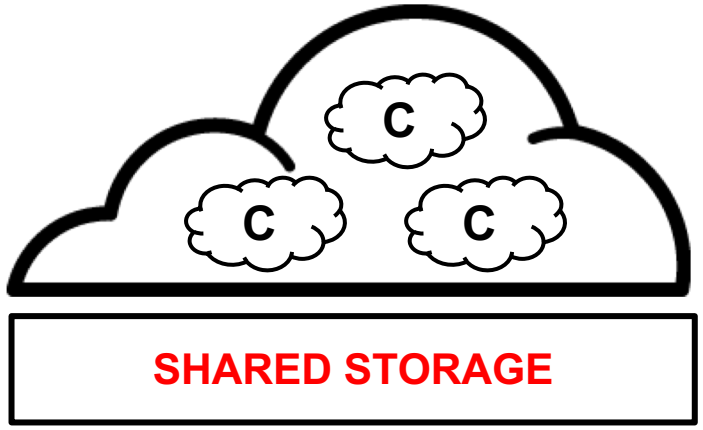
Get a bigger cluster for many teams to share

#2



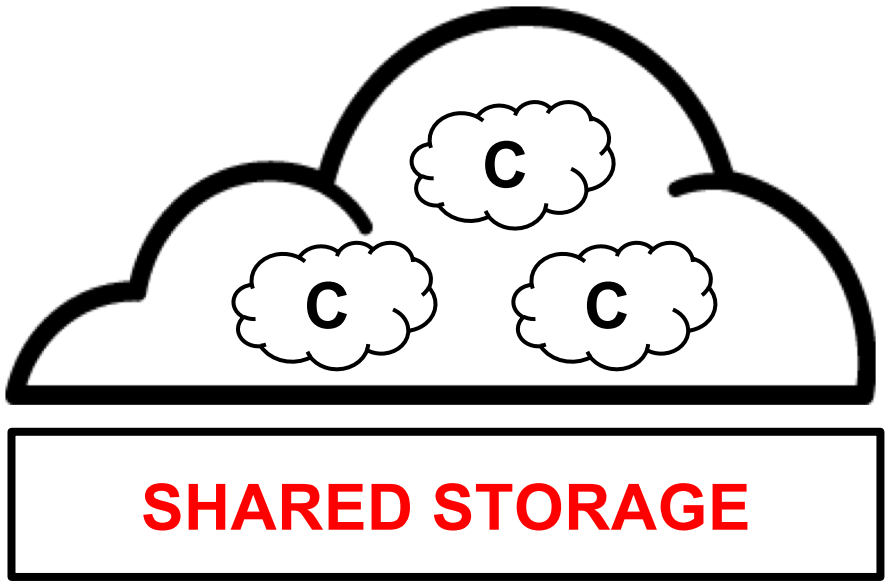
Give each team their own dedicated cluster, each with a copy of PBs of data

#3



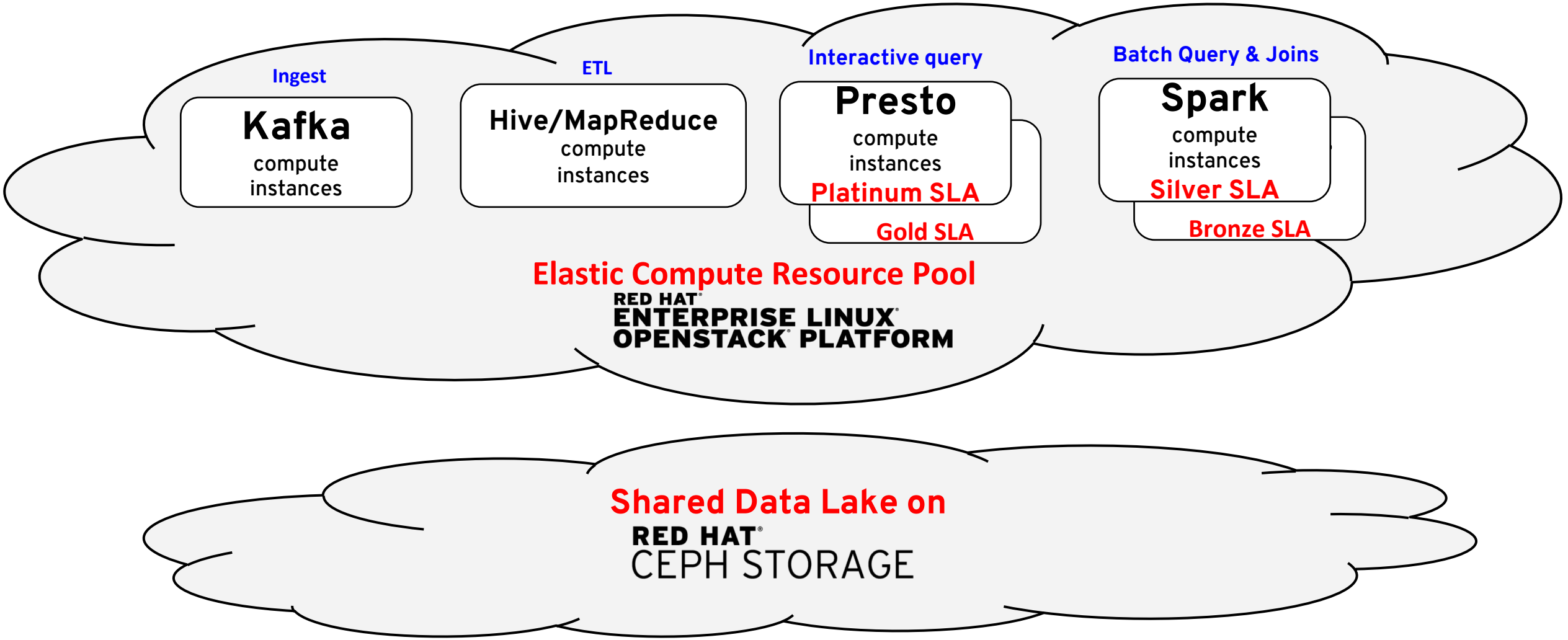
Give teams ability to spin-up/spin-down clusters which can share data sets

Red Hat Solution Value Prop



- Give teams their own compute clusters to hit SLAs
- Shared data lake = buying 10s PBs instead of 100s PB
- De-coupled compute/store eliminates idle resources
- Spin-up/spin-down clusters increases agility

Red Hat Elastic Infrastructure

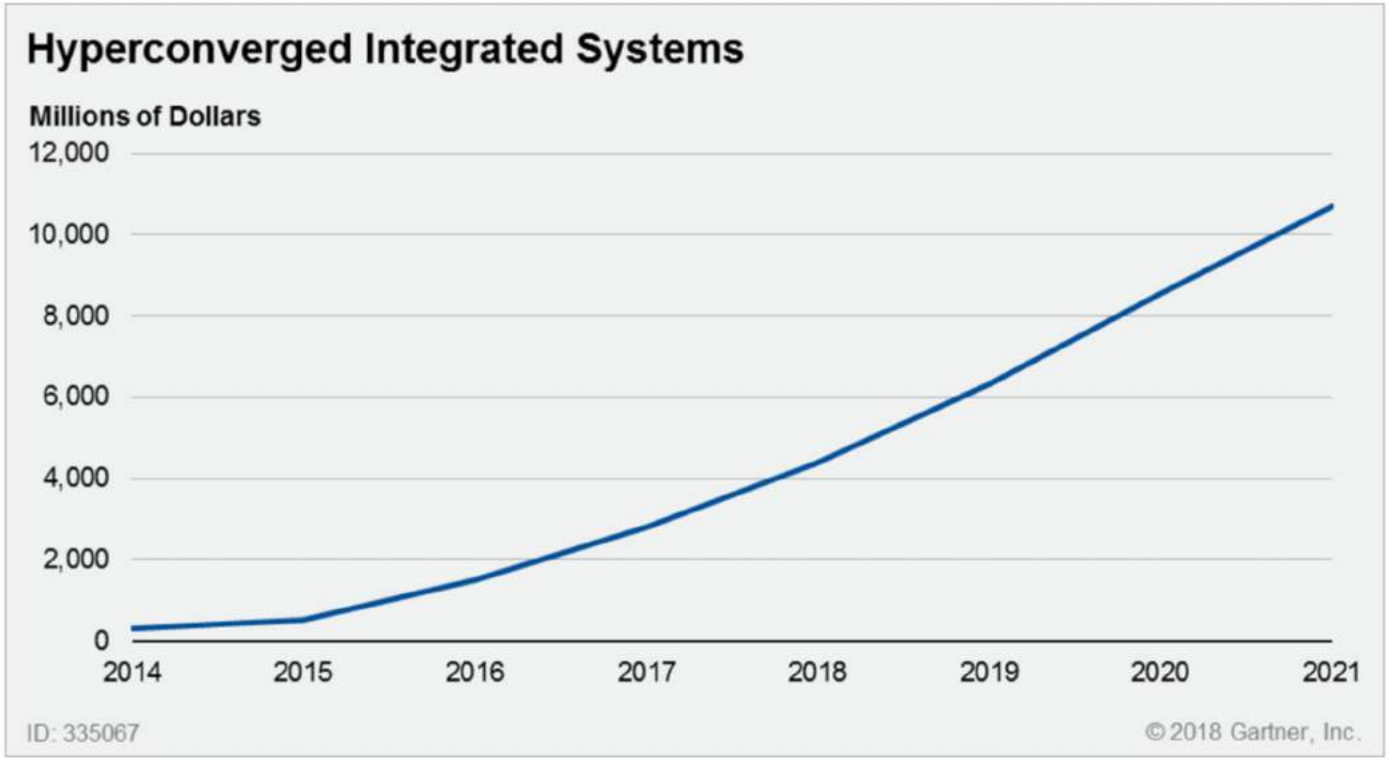


Red Hat

Hyperconverged Storage

The growth model for on-prem infrastructure

Market Overview



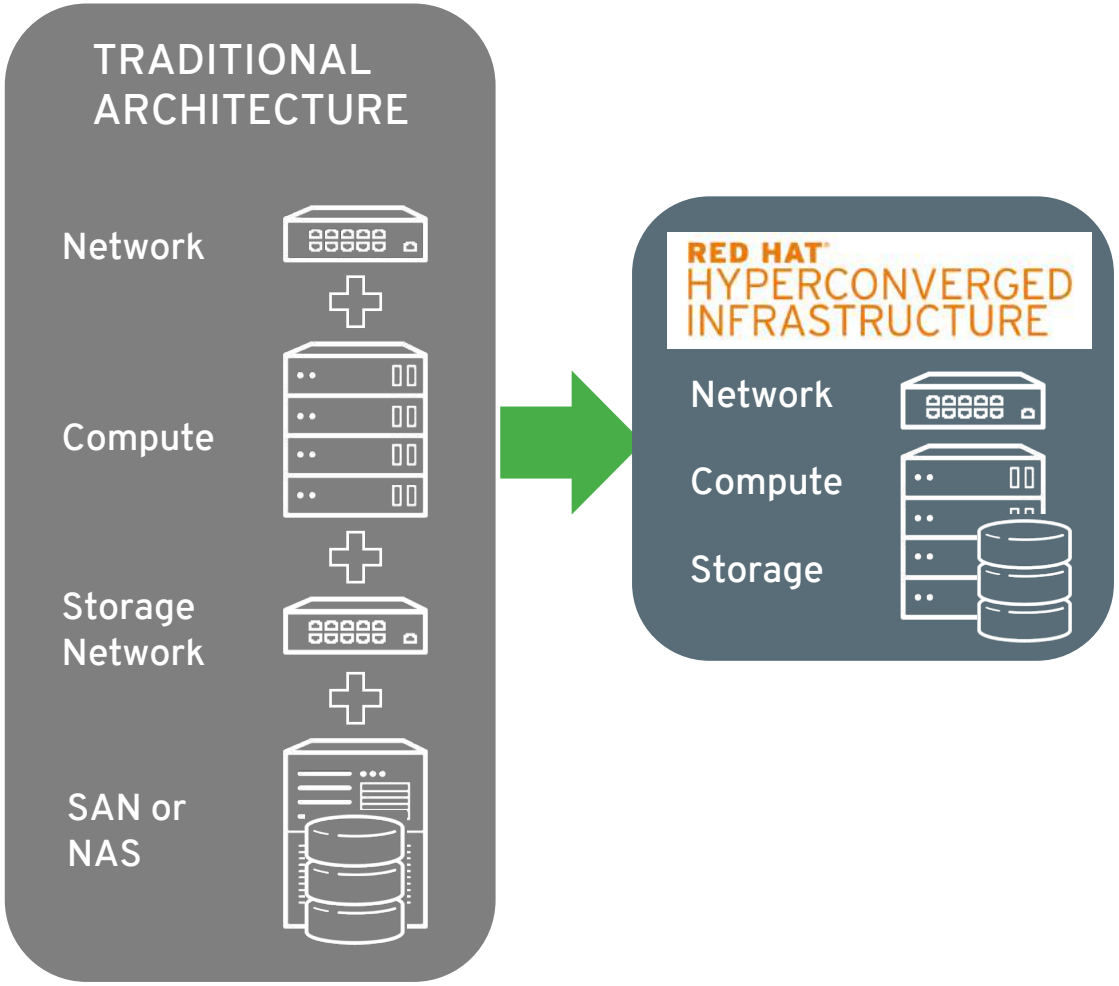
Source: Gartner (January 2018)

48% CAGR (2016-2021)

55% growth from 2017 to 2018

Red Hat

INFRASTRUCTURE CONSOLIDATION & OPERATIONAL EFFICIENCY



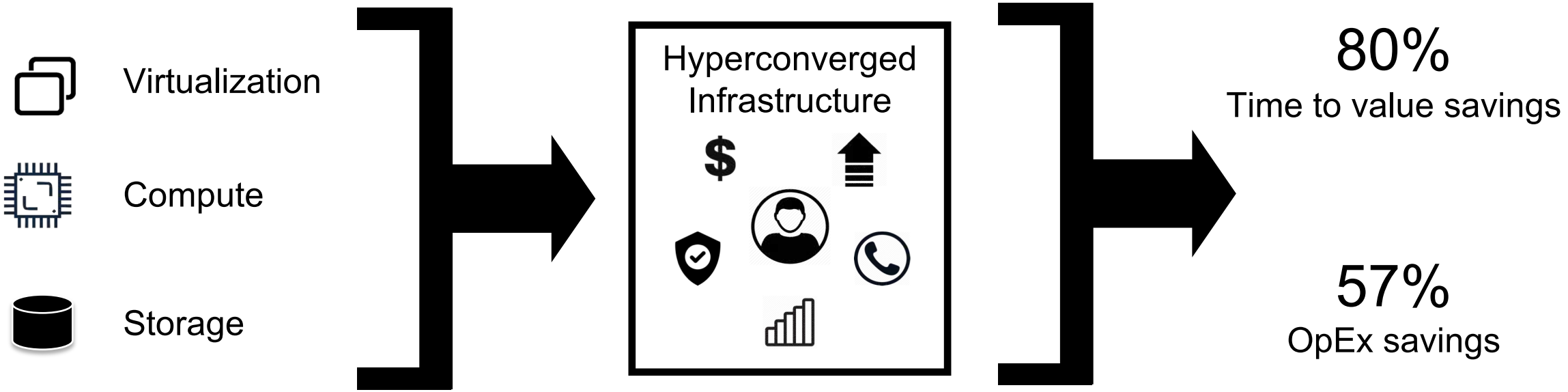
- **Eliminate** storage as a discrete tier
- **Easily virtualize** business applications, maximizing resource utilization
- **Single budget** for compute & storage
- **Single** team managing infrastructure
- **Simplified** planning & procurement
- **Streamlined** deployment & management
- **Single support** stack for compute & storage

Why Do Our Customers Care About Storage?

HYPERCONVERGED INFRASTRUCTURE

RED HAT HYPERCONVERGED INFRASTRUCTURE

Increased flexibility and operational efficiency by converging Compute, Network and Storage and breaking siloed IT Infrastructure



Red Hat

Why Red Hat's HCI is different

Completely based on opensource software and standards

No vendor lock-in, free choice of hardware

Software-defined everything approach gives more flexible deployment options

3 different options (roads) for classic workloads, cloud-oriented workloads and the dev-ops approach

All are based on standard x86 servers with local/builtin-disks and shared-nothing architecture

What about supporting the customer in this journey?

...on application modernization

...on infrastructure evolution

...on process and skill transformation

Red Hat

Thank you

Red Hat is the world's leading provider of enterprise open source software solutions. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500.

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