

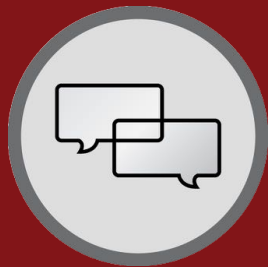
# WHY SOFTWARE DEFINED STORAGE MATTERS

Red Hat Storage  
September 2016

# Red Hat Solution: Red Hat Storage



# THE DATA EXPLOSION



## Web, mobile, social media, cloud

Our digital assets have grown due to web scale services like Facebook, YouTube, and Netflix.



## Video on-demand services

Rapid growth of video on-demand has resulted in 50% of households using this service.



## Media and entertainment

A staggering amount of content is created during today's optimized production processes.



## Medical industry

Medical imaging needs are vast, and regulatory requirements can be demanding.

# DATA GROWTH CHALLENGES

1

Exponential growth in digital content increases pressure on **capacity, scalability, and cost.**

2

The need for access to data from anywhere, anytime, on any device requires **unprecedented agility.**

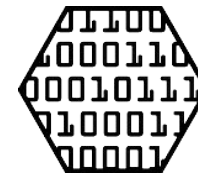
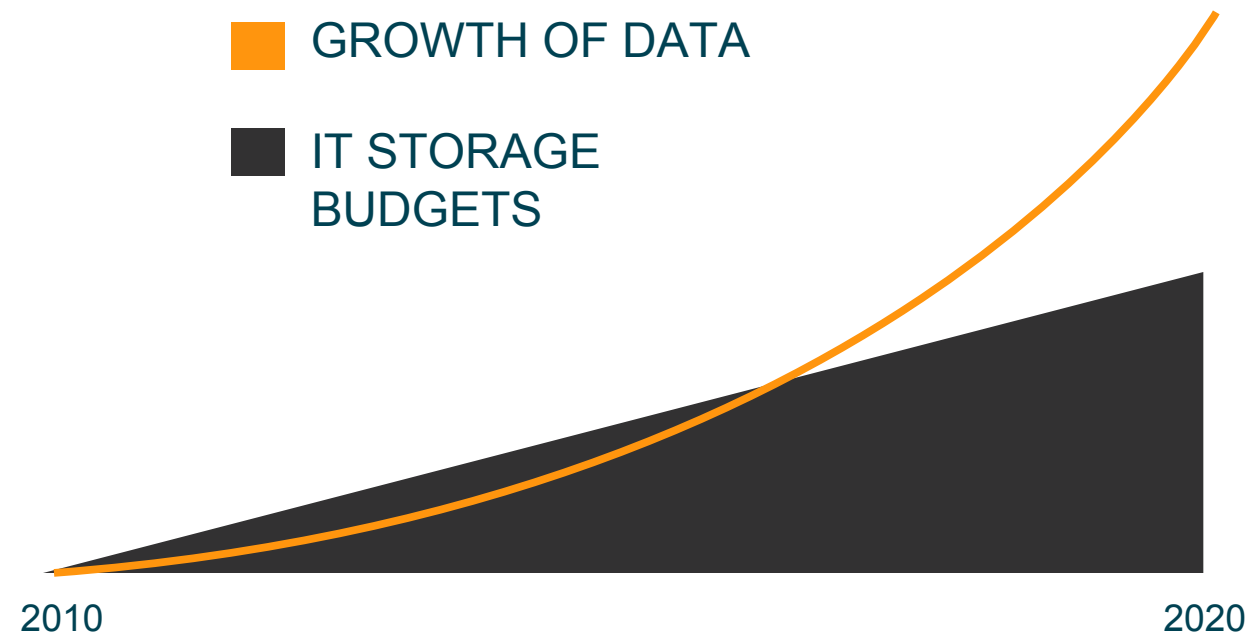
3

Modern services require the **flexibility** to store data on-premises or in the cloud.

4

Growing content requires **advanced data protection** that ensures integrity & high availability at very large scale.

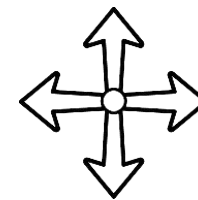
# THE DATA STORAGE “SHORTFALL”



Data stores are growing exponentially, while IT budgets are not



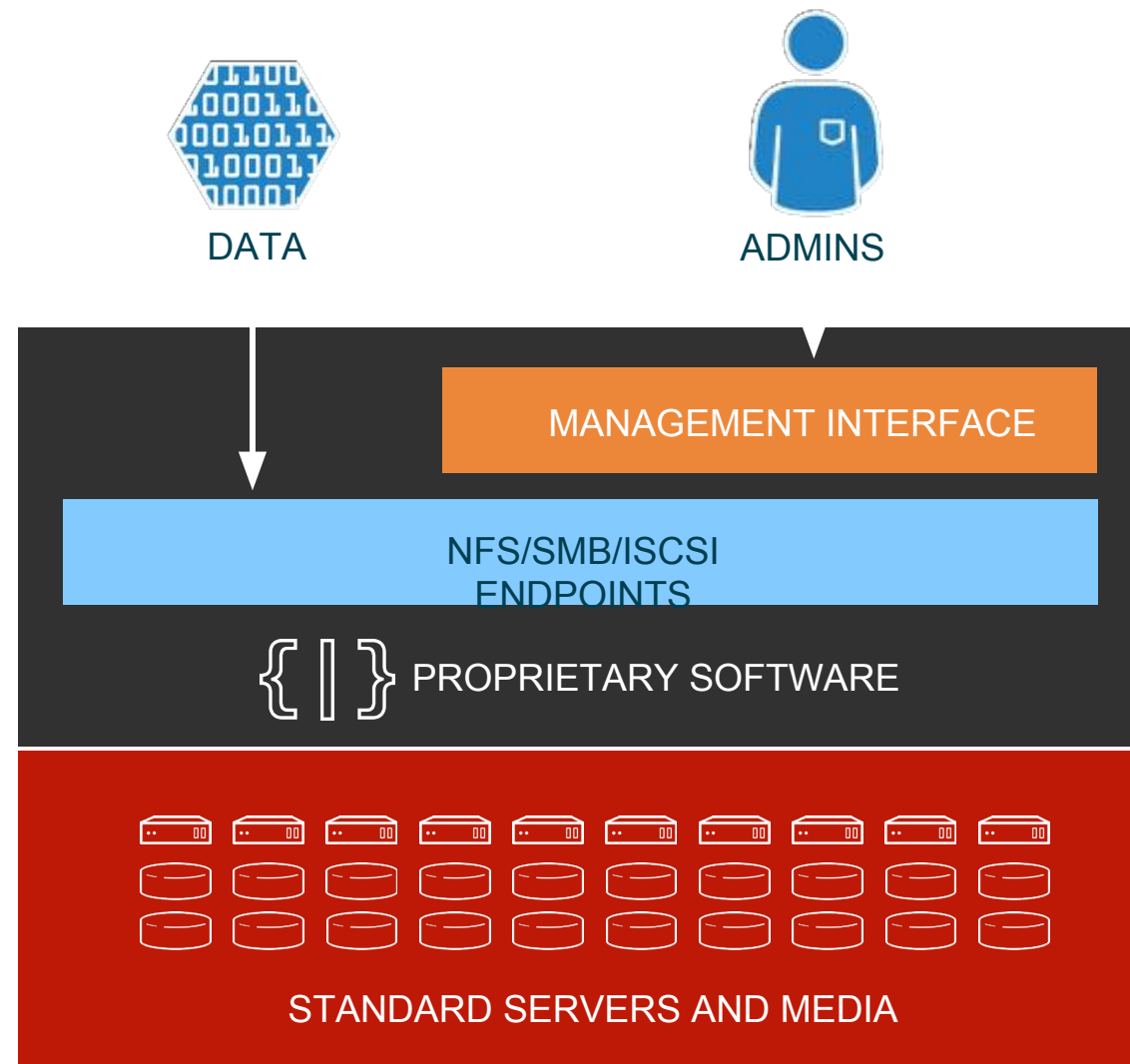
HDDs are becoming more dense, but \$/GB decline is slowing



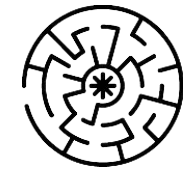
Software and hardware advances are needed to close the gap

# WHAT DO WE DO WITH ALL THE DATA TODAY?

# PROPRIETARY APPLIANCES



## THE TRADITIONAL APPROACH TO STORAGE



Complexity hidden from end users, along with flexibility



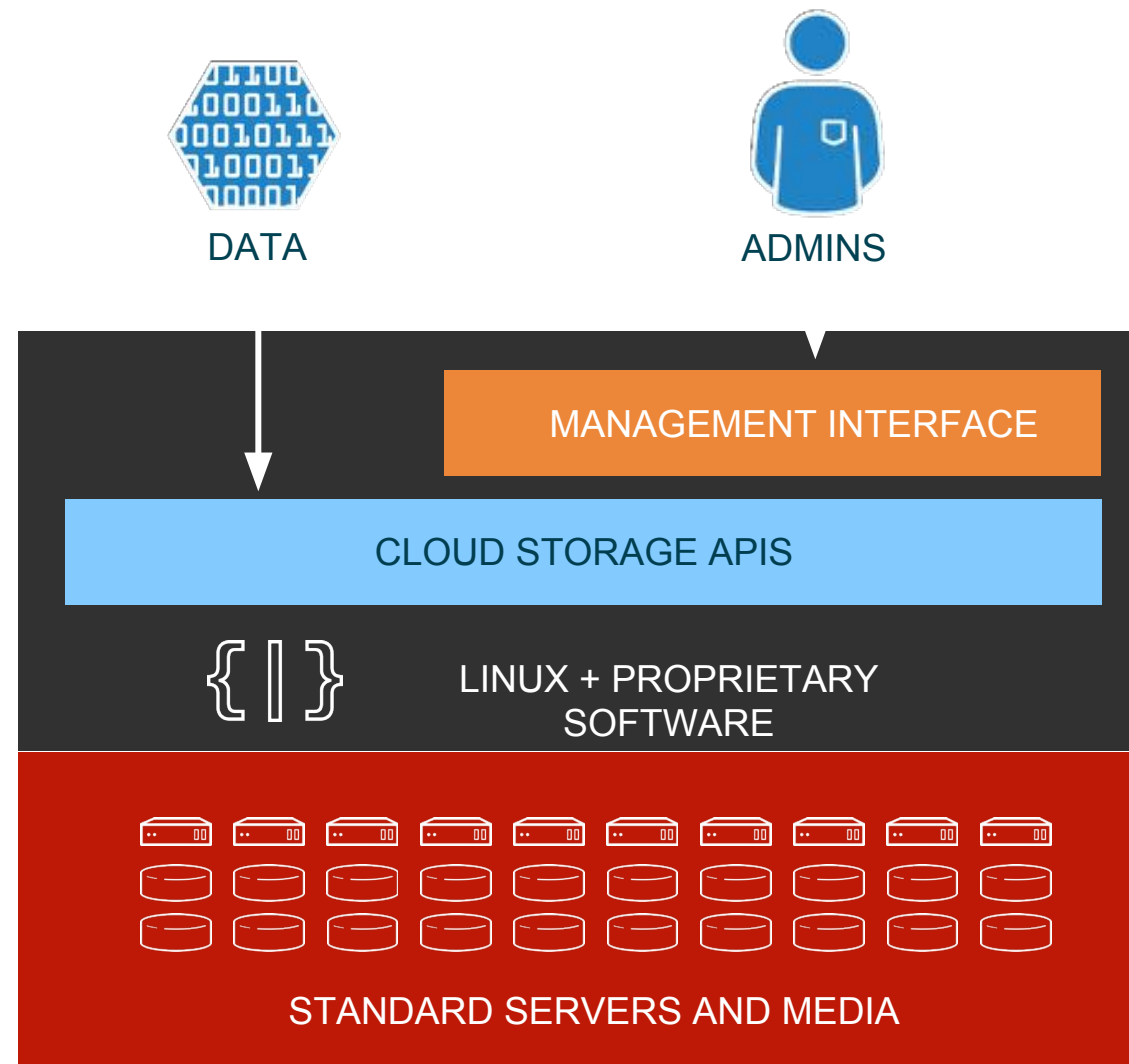
Vendor lock-in leads to pricing premium



Price premium over constituent components is difficult to sustain



# PUBLIC CLOUD STORAGE



## CONVENIENT STORAGE AS A SERVICE



Complexity still hidden from end users, pay-as-you-go pricing



Fastest-growing segment of IT storage budgets



Mostly built with proprietary software (Linux below, “secret sauce” above)



# FLEXIBILITY IS EVERYTHING



# RETHINKING STORAGE



New storage  
platforms



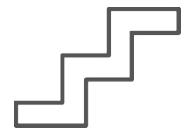
More efficient use of  
hardware



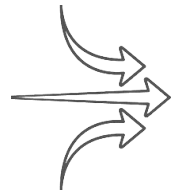
Flexible utilization of  
services

# THE DATACENTER IS EVOLVING

## Development Model



Waterfall

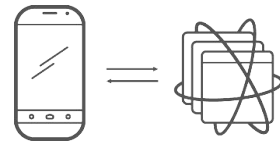


Agile

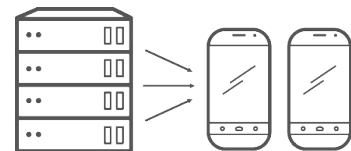


DevOps

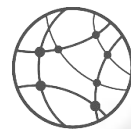
## Application Architecture



Monolithic



N-tier

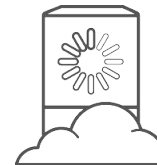


Microservices

## Deployment & Packaging



Bare Metal

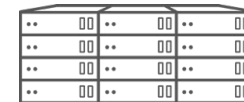


Virtual Services

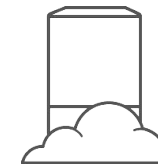


Containers

## Application Infrastructure



Data Center

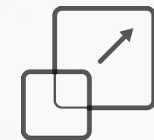


Hosted

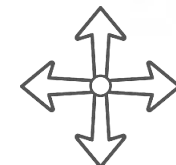


Hybrid Cloud

## Storage



Scale Up



Scale Out



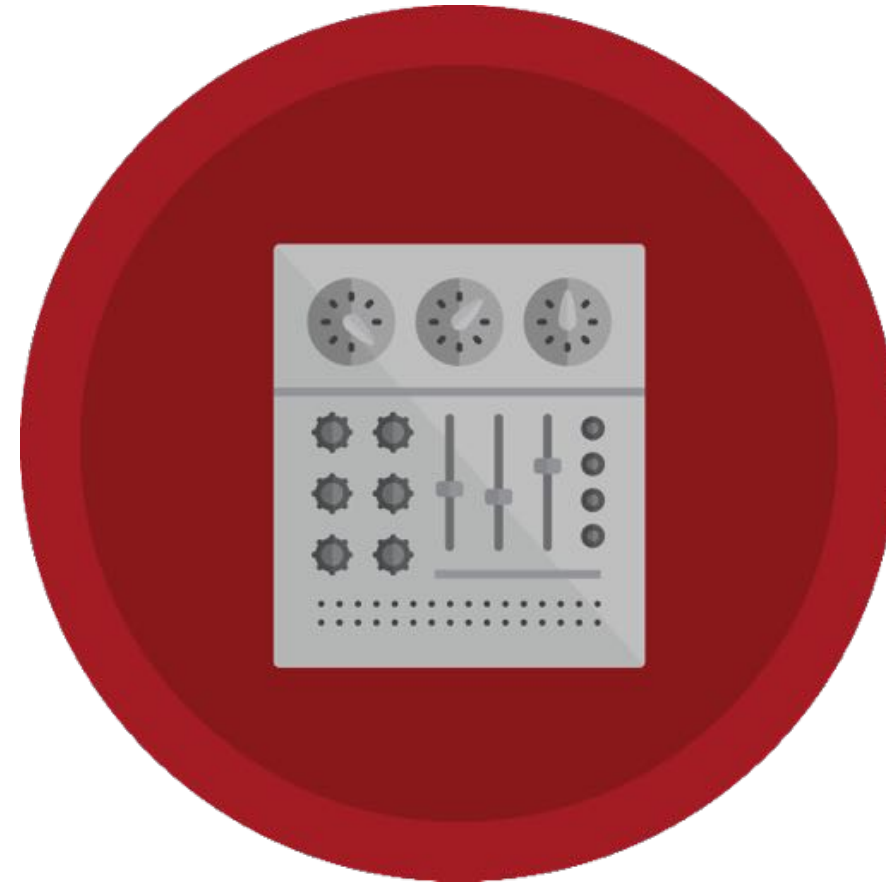
Software-Defined Storage

# WHAT IS SOFTWARE-DEFINED STORAGE?

# WHAT IS SOFTWARE-DEFINED STORAGE?



**Server-Based Storage**



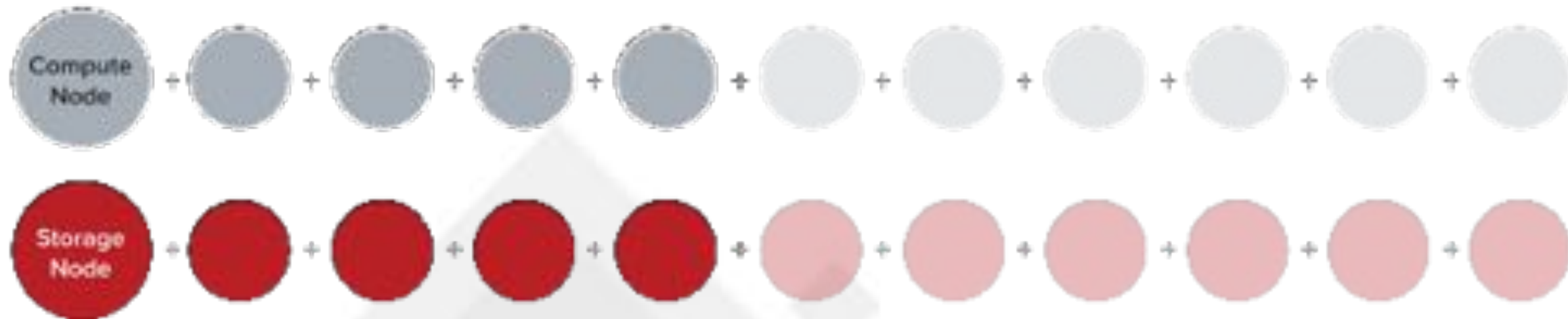
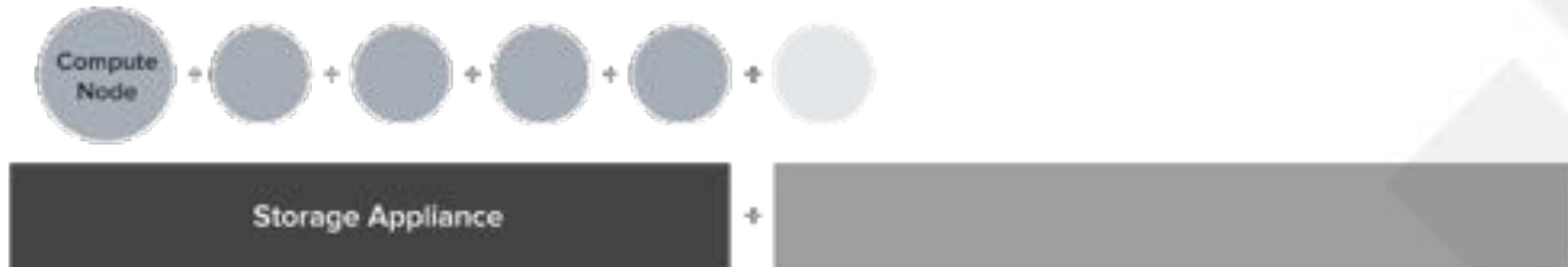
**Storage Orchestration**

# SERVER-BASED STORAGE

Server-based storage is the use of software and standard hardware to provide services traditionally provided by single-purpose storage systems.



# VIRTUALIZED STORAGE SCALES BETTER



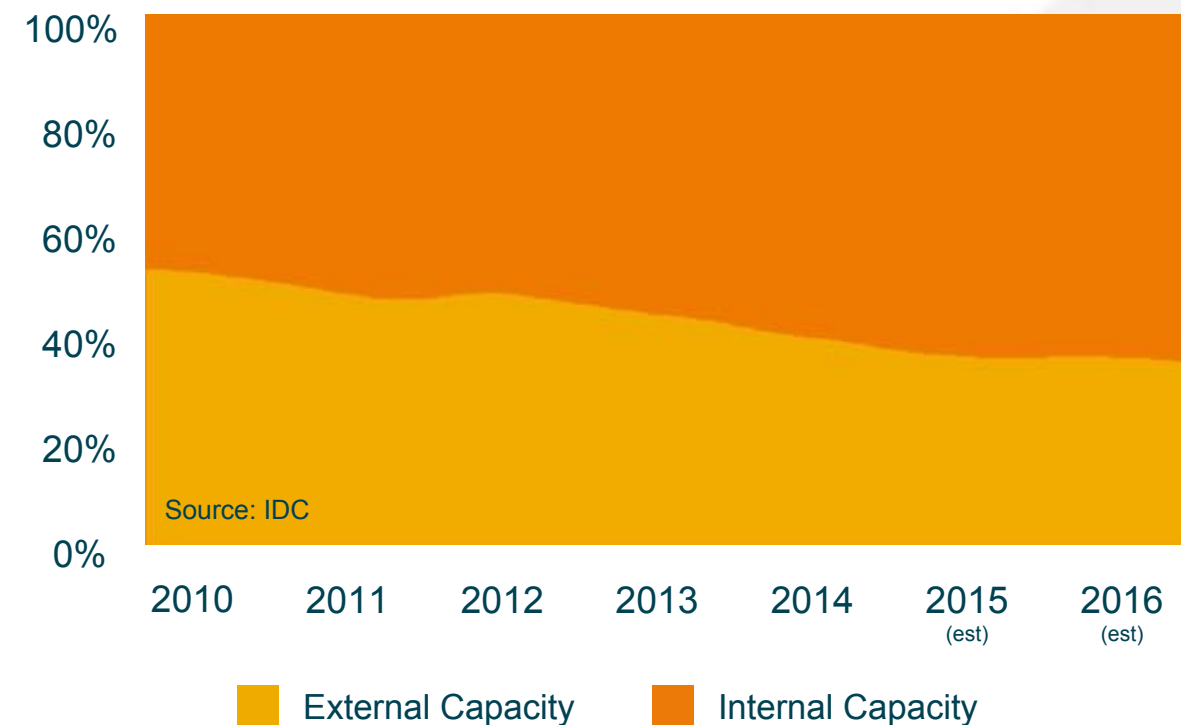


# SAN/NAS IS ON THE DECLINE

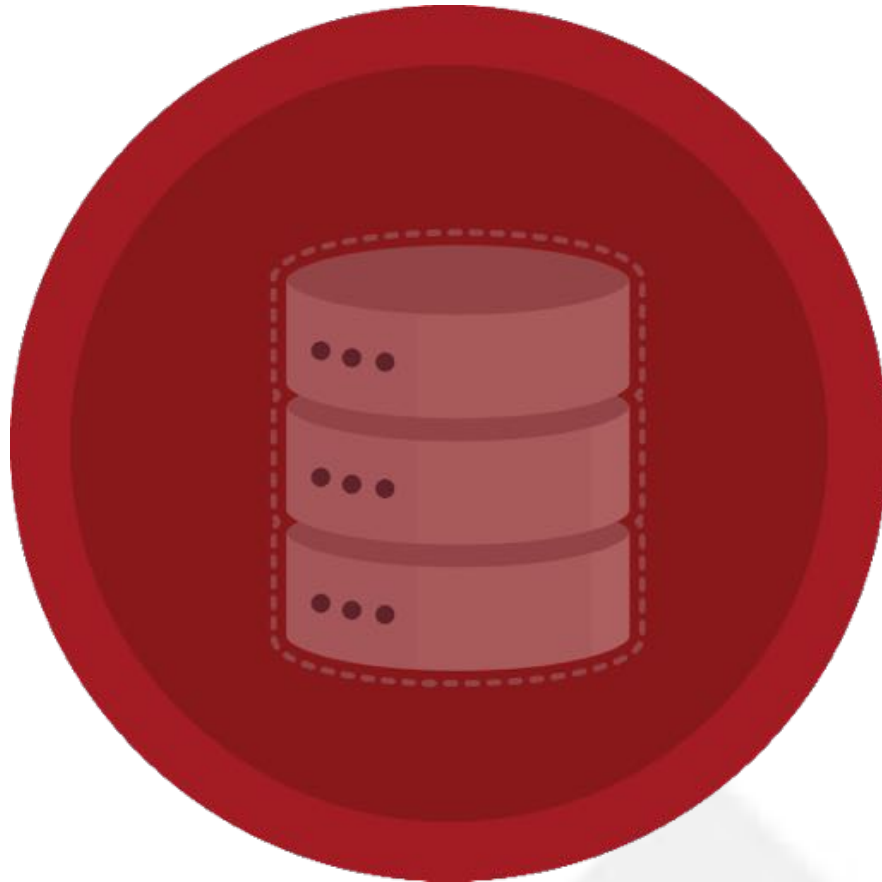
**Changing workloads drive the need for flexible server-based storage.**

- Storage in the enterprise has been growing at 40%+ per year.
- Share of storage deployed in servers grew 20%+ between 2010 and 2016.

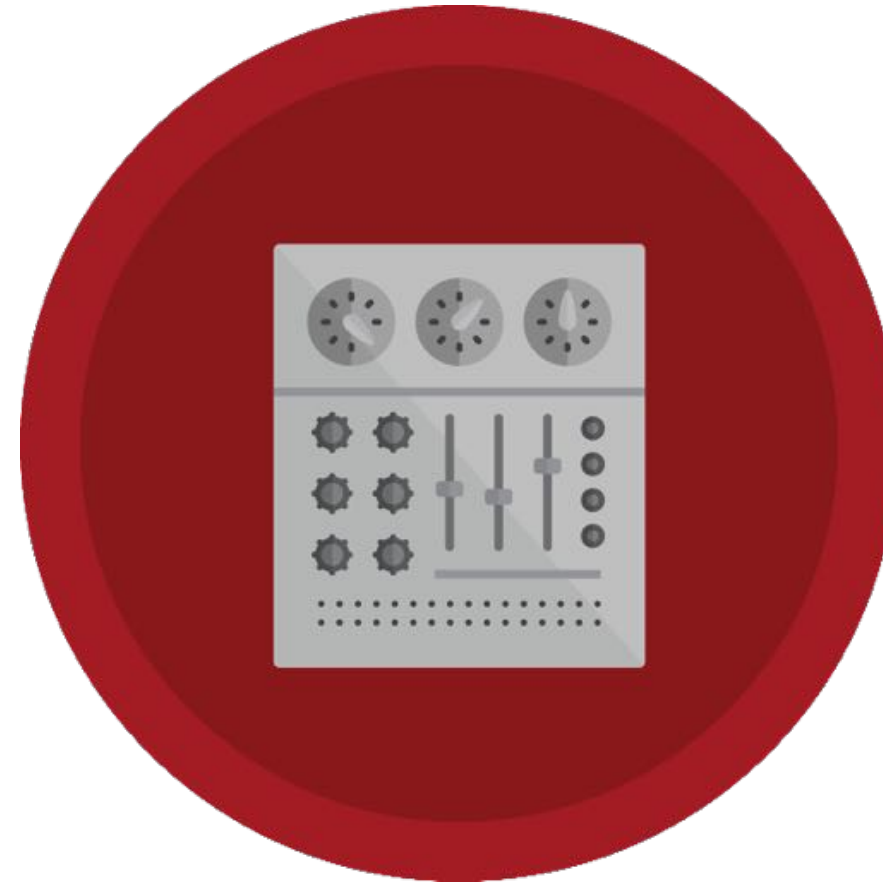
**WW DEPLOYED CAPACITY (TB)**



# WHAT IS SOFTWARE-DEFINED STORAGE?



**Server-Based Storage**



**Storage Orchestration**

# STORAGE ORCHESTRATION

Storage orchestration is the ability to provision, grow, shrink, and decommission storage resources on-demand and programmatically.

## Web Console

A browser interface designed for managing distributed storage

## API

A full API for automation and integration with outside systems

## Command Line

A robust, scripable command-line interface for expert operators

Provision

Install

Configure

Tune

Monitor

Full lifecycle management for distributed, software-defined data services

# A RISING TIDE

**Software-defined storage is leading a shift in the infrastructure industry.**

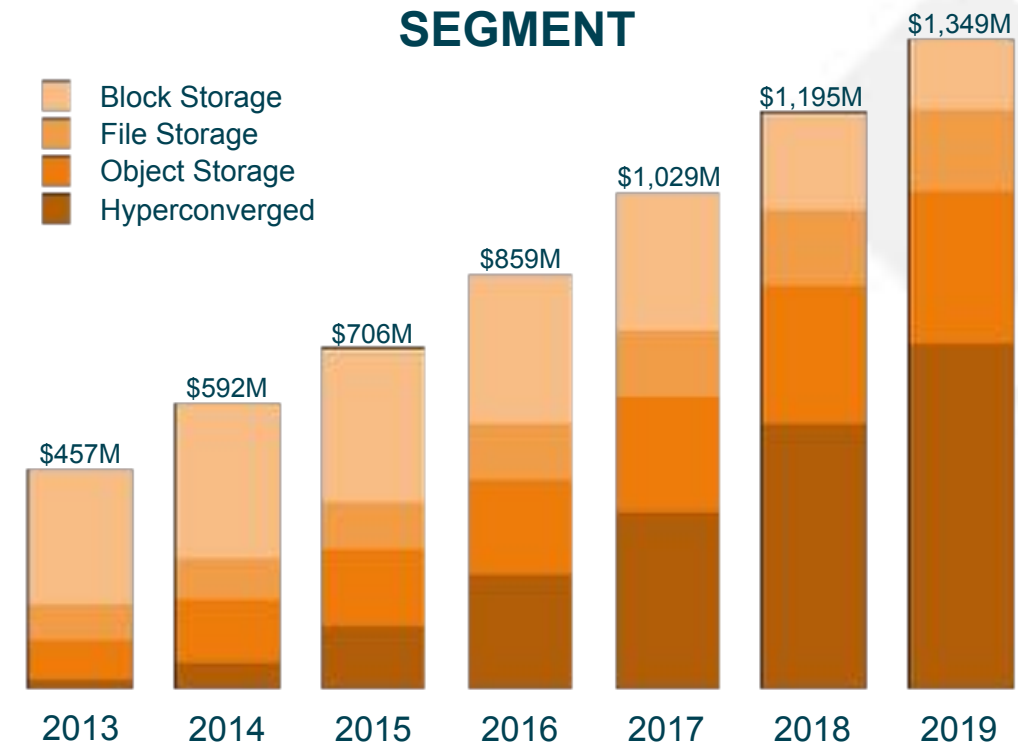
- “By 2020, between 70%-80% of unstructured data will be held on lower-cost storage managed by SDS.”

*Innovation Insight: Separating Hype From Hope for Software-Defined Storage*

- “By 2019, 70% of existing storage array products will also be available as software only versions.”

*Innovation Insight: Separating Hype From Hope for Software-Defined Storage*  
Gartner

**SDS-P MARKET SIZE BY SEGMENT**



Source: IDC

# WHY DOES SOFTWARE-DEFINED STORAGE MATTER?

# FOUR IMPORTANT DIFFERENCES

**PROPRIETARY  
HARDWARE**

**Common,  
off-the-shelf hardware**

Lower cost, standardized supply chain

**SCALE-UP  
ARCHITECTURE**

**Scale-out  
architecture**

Increased operational flexibility

**HARDWARE-BASED  
INTELLIGENCE**

**Software-based  
intelligence**

More programmability, agility,  
and control

**CLOSED DEVELOPMENT  
PROCESS**

**Open development  
process**

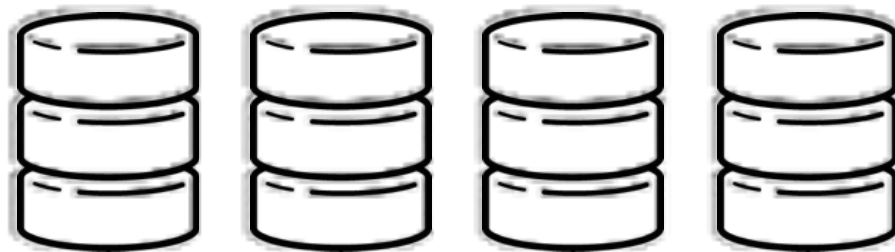
More flexible, well-integrated  
technology

# THE RIGHT TOOL FOR THE JOB

## Appliances

are suitable for small-scale, workloads, but they do not scale economically.

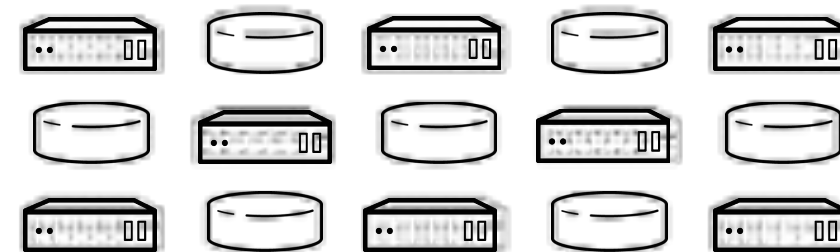
Durable, inflexible, convenient, expensive at large scale



## Software-defined storage

has a learning curve, but bring performance and economy at petabyte scale.

Durable, powerful, flexible, economical at large scale

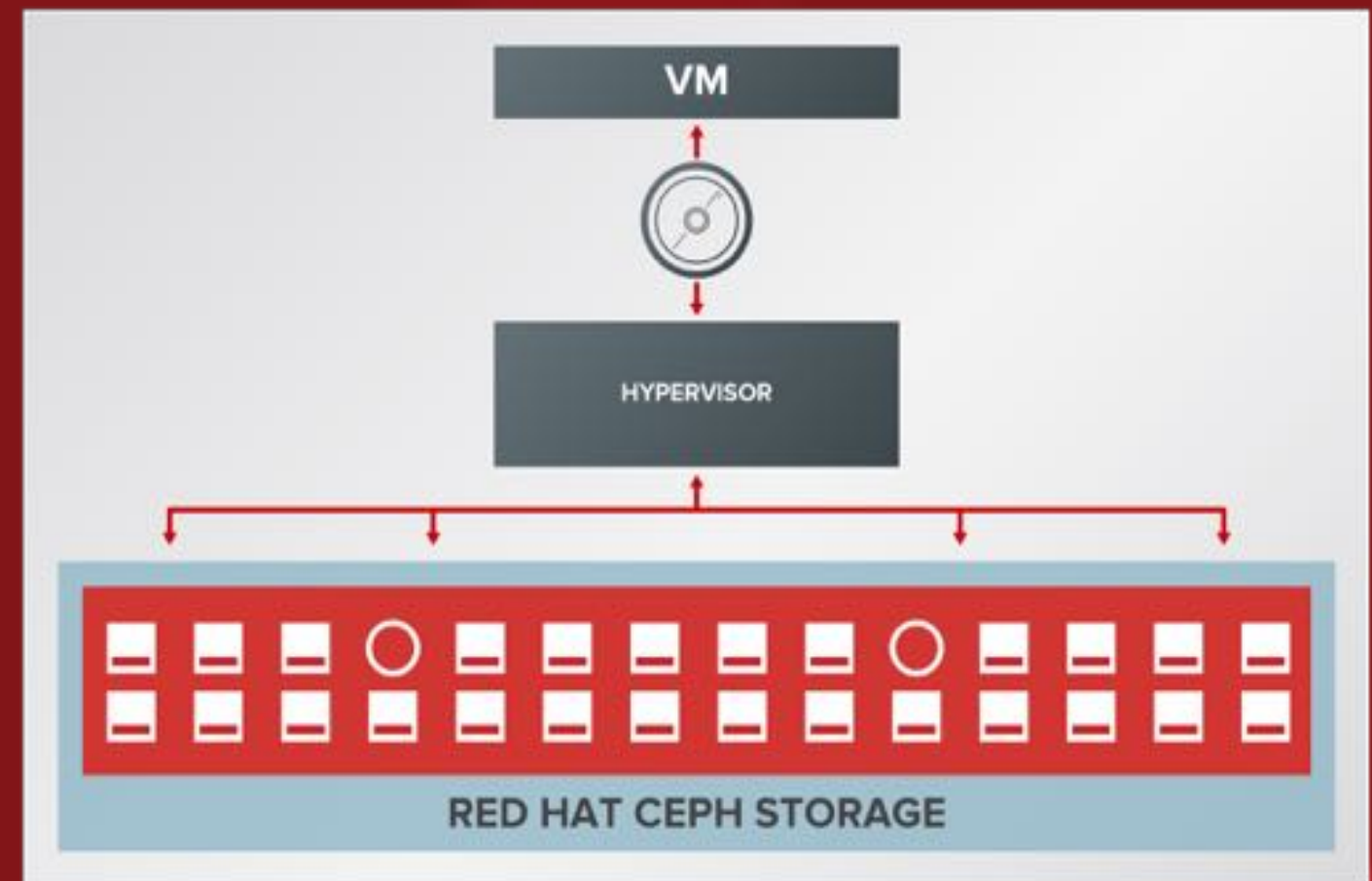




# WHAT CAN IT BE USED FOR?

# SOLUTION: PRIVATE CLOUD (OPENSTACK)

- Allows for instantaneous parallel creation of VMs at massive scale
- Integrates easily and tightly with OpenStack Cinder, Glance, Nova, Keystone, and Manila
- Offers instant backup capabilities
- Provides persistent object, file, and database storage for applications



# PRIVATE CLOUD INFRASTRUCTURE

**CUSTOMER:** **Produban (Grupo Santander)**

## CUSTOMER BUSINESS PROBLEM

- Spiraling OpEx due to security issues and inconsistent use of platforms
- Problematic requisition and provisioning time lines for new infrastructure (bare-metal and virtual machines)
- Complicated, non-standardized infrastructure and management across regions due to multiple acquisitions and silo-ed projects
- Traditional IT approaches hindered desired move toward hardware convergence across compute and storage worlds

## SOLUTION DESCRIPTION

- A standardized and efficient infrastructure as a service environment with consistent management and deployment across private and public (AWS, Azure) cloud services globally including dedicated availability zones by region
- Accelerated provisioning via a comprehensive service catalog allowing automated, self-service provisioning to one or more cloud services

## SOLUTION BENEFITS

- A secure and controlled IaaS environment for agile computing
- Improved reliability using a high-availability architecture design
- Smaller technology footprint and much improved elasticity
- Structured approach to integrating private and public IaaS
- Reduced CapEx and OpEx via improved hardware utilization and optimization

**GO LIVE DATE:** JANUARY 27, 2015

**INDUSTRY:** IT division for commercial banking group

**REGION:** Spain

## PRODUCTS USED

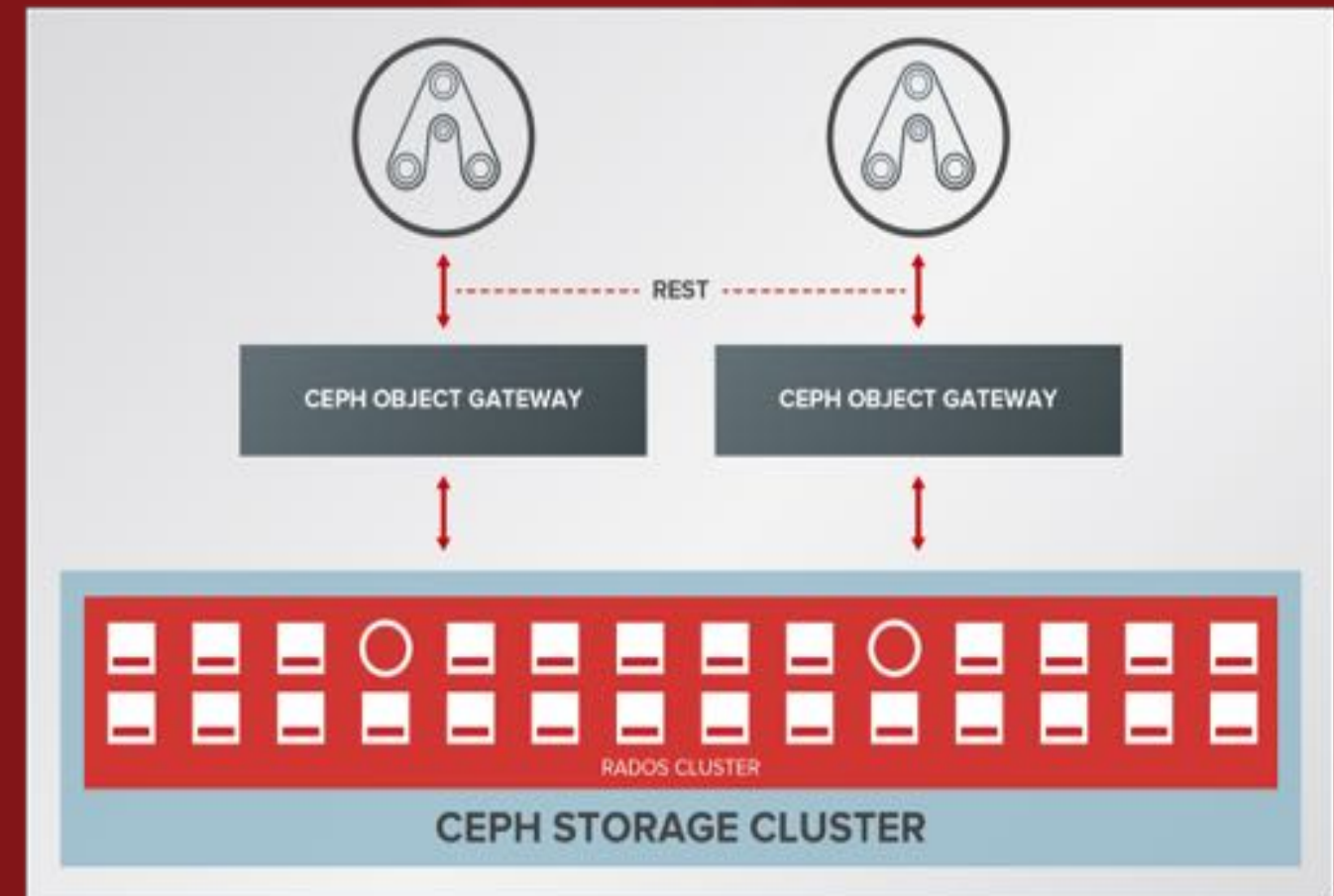
- RHEL OpenStack Platform 6, RHEL 7, Red Hat High Availability add-on, Red Hat Inktank Ceph Enterprise 1.2.2, Red Hat Satellite 6 and Red Hat Satellite 6 capsule, Red Hat CloudForms 3.1, VMware vSphere 5 as a virtualization platform for basic infrastructure services, Nuage Networks' SDN solution

## SERVICES DELIVERED

- Defined Standard Operating Environment and centralized life-cycle management using across bare-metal, VM, and VMware provisioning
- Defined standardized practices for configuration, system and life-cycle management to meet security and regulatory requirements
- Designed hyper-converged (dual purpose compute/storage nodes) architecture for OpenStack and Ceph to deliver best hardware utilization
- Extensive tuning-analysis for OpenStack and Ceph reliability and performance using hyper-converged mode

# SOLUTION: OBJECT STORAGE

- Stores unstructured data at web scale, using standard hardware
- Works with industry-standard APIs for a wide range of application compatibility
- Spans multiple geographical regions with no single point of failure
- Matches the distributed architecture of software-defined storage





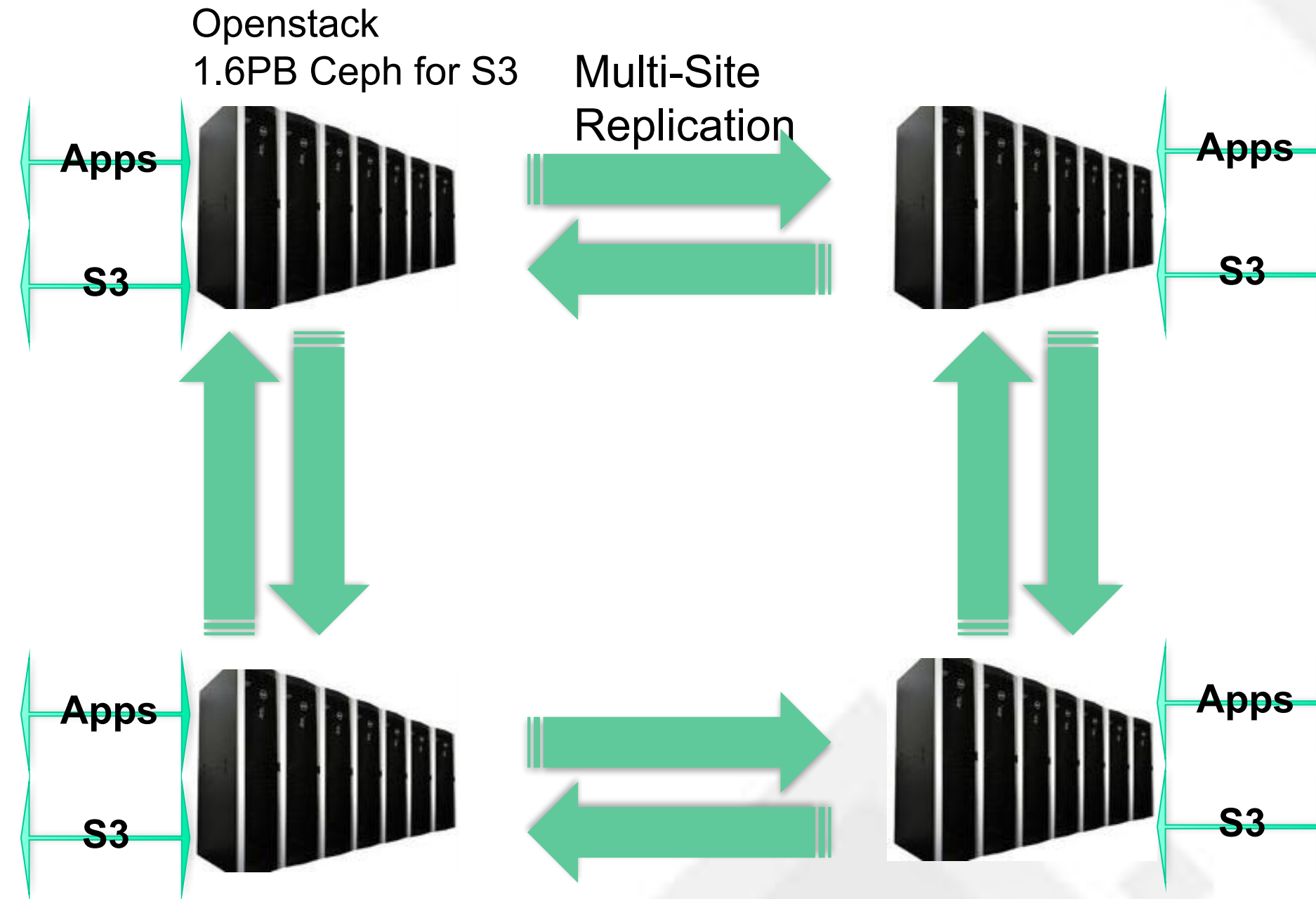
# OBJECT STORAGE EXAMPLE: CLIMB UK

Inconsistent data management across research teams hampers productivity



- Growing data sets challenged available resources
- Research data distributed across laptops, USB drives, local servers, HPC clusters
- Transferring datasets to HPC clusters took too much time and clogged shared networks
- Distributed data management reduced researcher productivity and put data at risk

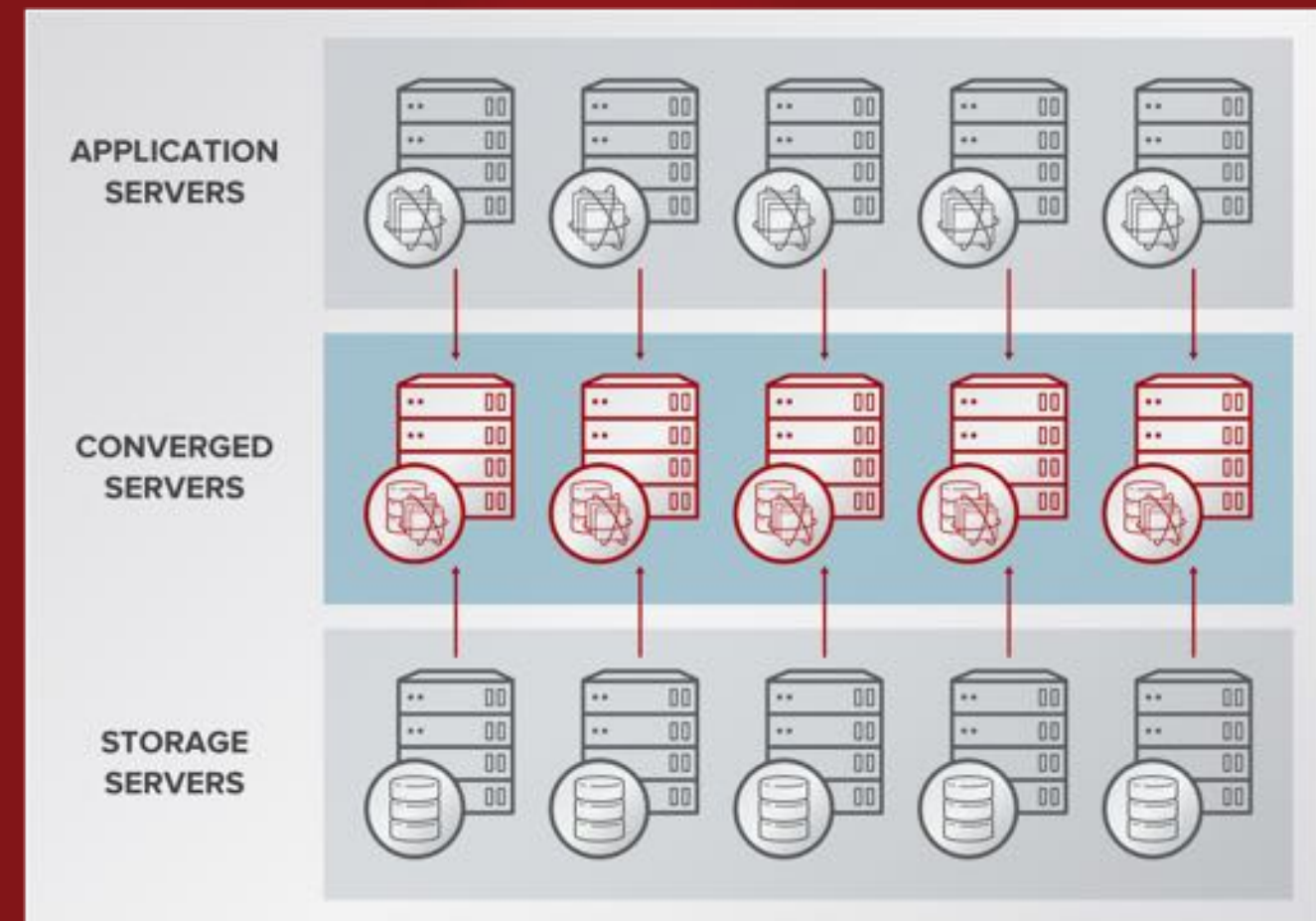
# CLOUD INFRASTRUCTURE SOLUTION OVERVIEW



- Opensource was a design goal
- Openstack chosen for research applications
- Ceph as an S3-Object Store
- All data is distributed to each other site
- Self Service Portal for VMs
- Users are research scientists and students

# SOLUTION: CONTAINERS

- Offers persistent storage to applications running in containers
- Applications and storage can co-exist on the same hardware
- Allows for higher server utilization and lowers operational costs
- Storage generates only 3%–10% overhead on converged servers





# CONTAINERS EXAMPLE: CAPITAL ONE



## Business Challenge:

- A leading diversified bank with 65 million customers
- Fast growing business and customer base
- Need to be disruptive and different
- Analytics plays a big role in growth strategy

## Solution Description:

- Predefined docker images with a wide variety of analytics tools
- Self-service Portal for developers to pick and instantiate
- Integrated monitoring and metrics
- Automated lifecycle management of containers
- High availability through MESOS
- Shared and consolidated Storage Platform with Gluster

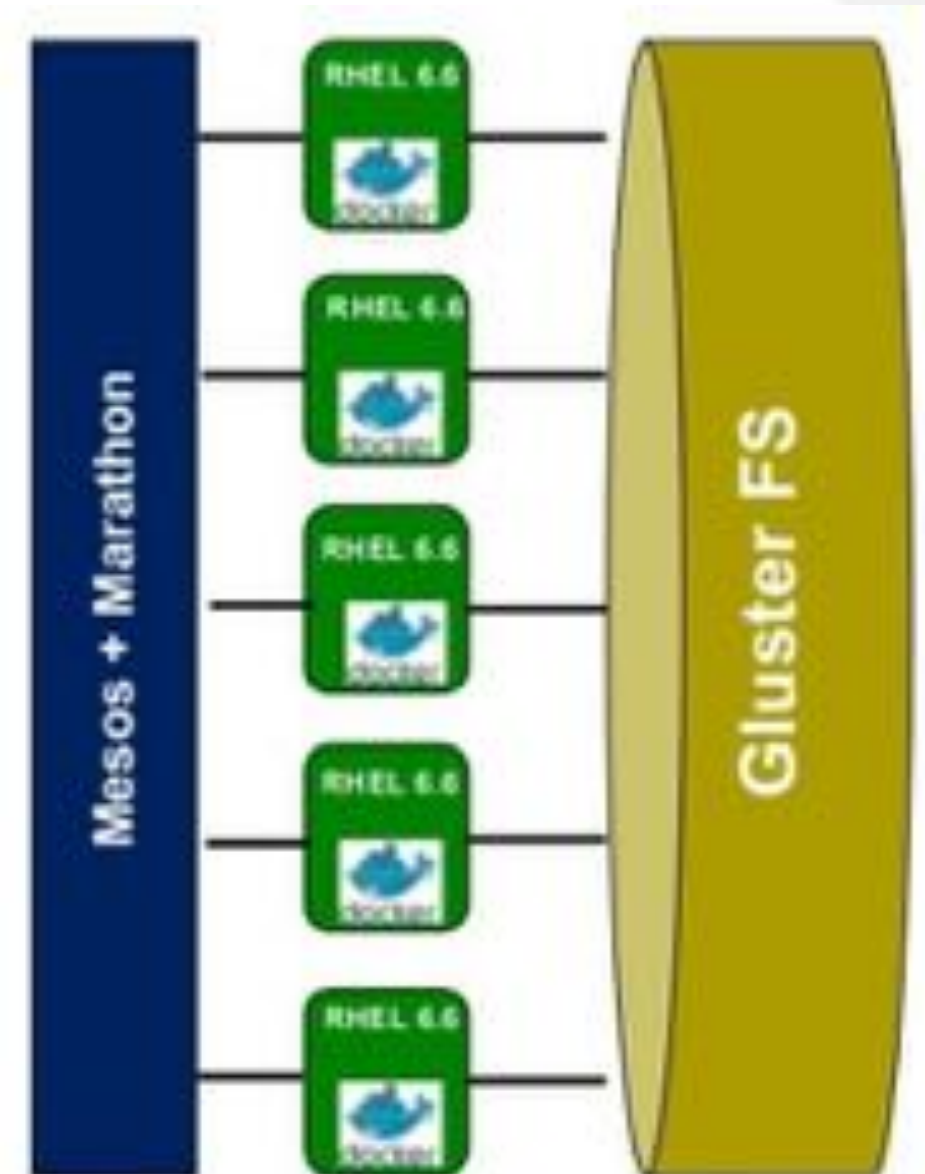
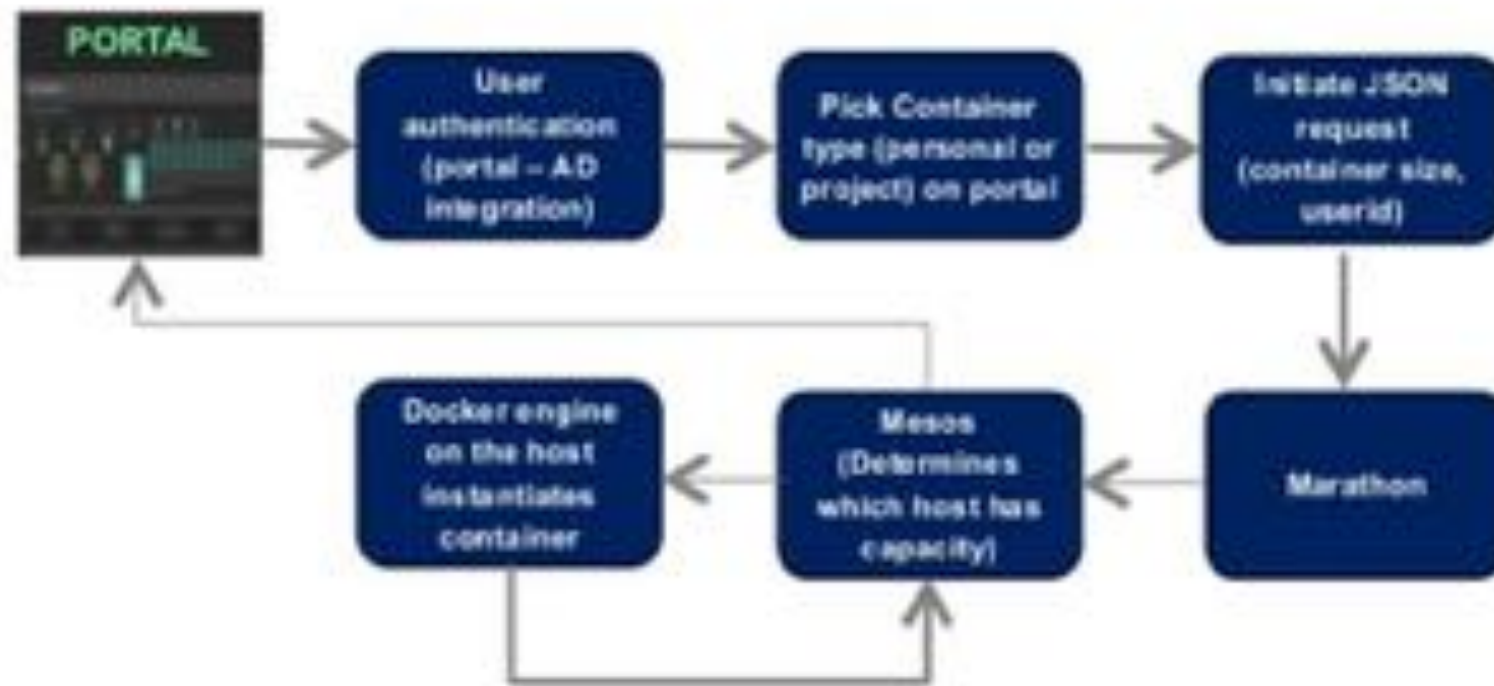


## Solution Benefits:

- More agile application development
- Larger choice of technologies
- Optimal resource usage and performance

# CONTAINERS EXAMPLE: CAPITAL ONE

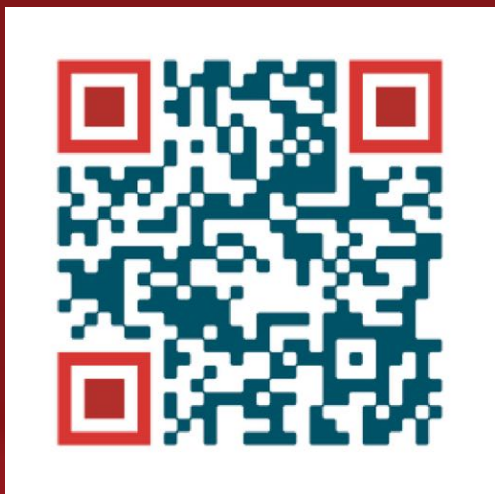
## New analytic container workflow



# TEST DRIVES

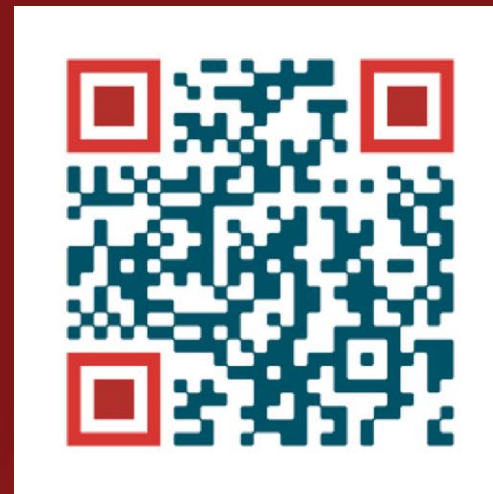
## RED HAT® CEPH STORAGE

[bit.ly/cephtestdrive](https://bit.ly/cephtestdrive)



## RED HAT® GLUSTER STORAGE

[bit.ly/glustertestdrive](https://bit.ly/glustertestdrive)



# Monthly TechTalk Series

**October 26th**      **An introduction to 3Scale and API Management.**

**November 23rd**   **EAP 7 and A-MQ 7. JEE and core**

**December 13th**   **RHEL, RHEV, Atomic and OpenStack.**

**January 25th**      **Software Defined Storage, Gluster, Ceph.**

**February 22nd**    **Hybrid Cloud Architectures and Cloudforms**

**All @ Red Hat Monument Office – Morning and Evening sessions**





redhat.®