OPENSOURCE SOFTWARE-DEFINED STORAGE

for Financial Service Industry

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Emerging Solutions BDM – Red Hat

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FINANCIAL SERVICE INDUSTRY TRENDS

**FSI SECTOR
UNDER HUGE
PRESSURE**

Increased Regulatory Compliance
Mifid I, Mifid II, Basel I, Basel II, Basel III, SOX, SEPA, AML, SolvV, WpHG

Consolidation
Number of Banks decreasing, Banks cut Jobs, M&A

Legacy Technology
Project, Application and Organization Silos. Mainframe.

Changing in Customer Behaviour
Generation Y, New Channels, New Devices
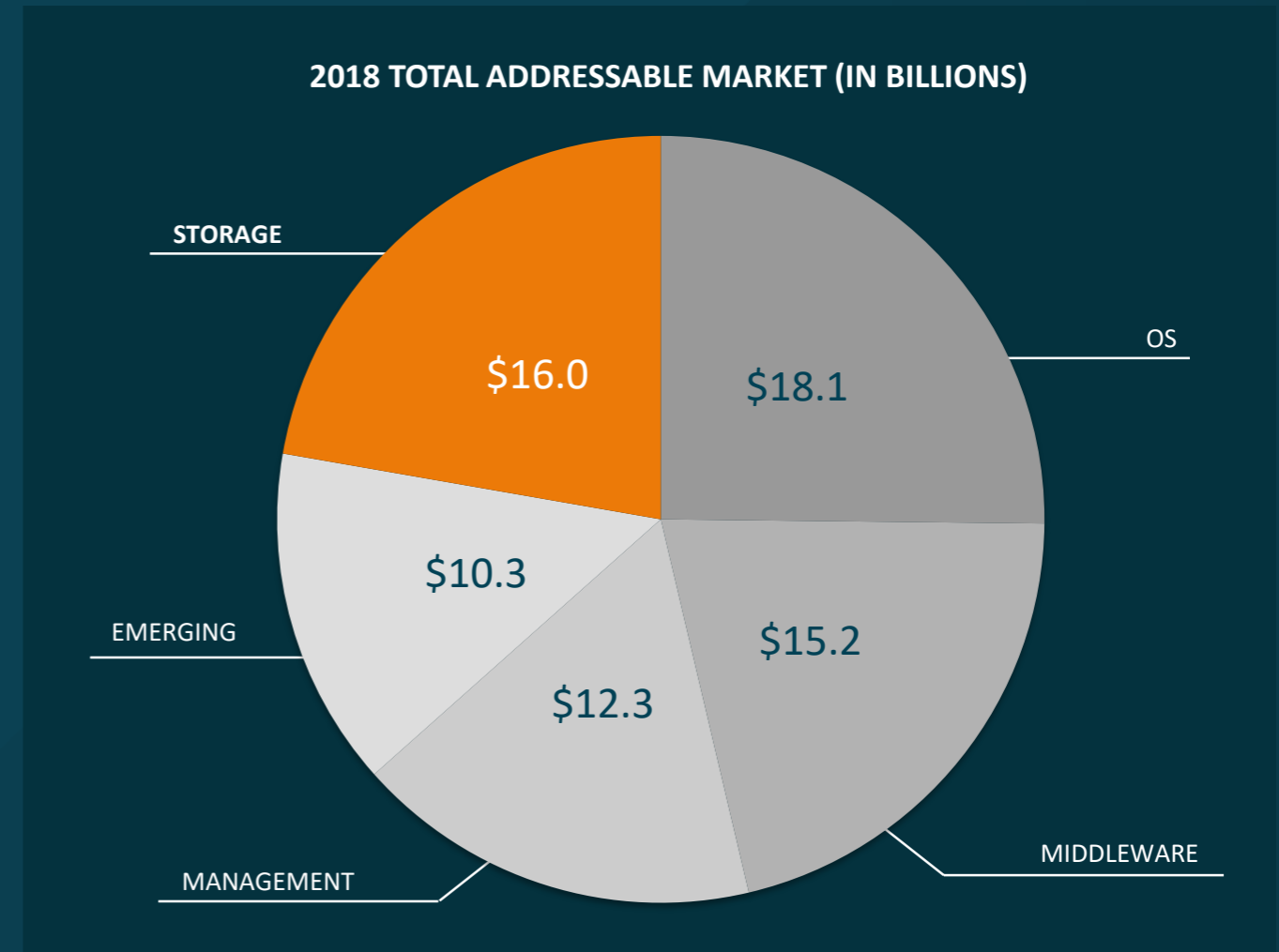
STORAGE IS A BIG PART OF IT BUDGETS

A very large share of IT budgets is spent on storage solutions.

Storage in the enterprise has been growing at 40%+ per year, and there is no sign this growth trend is slowing.

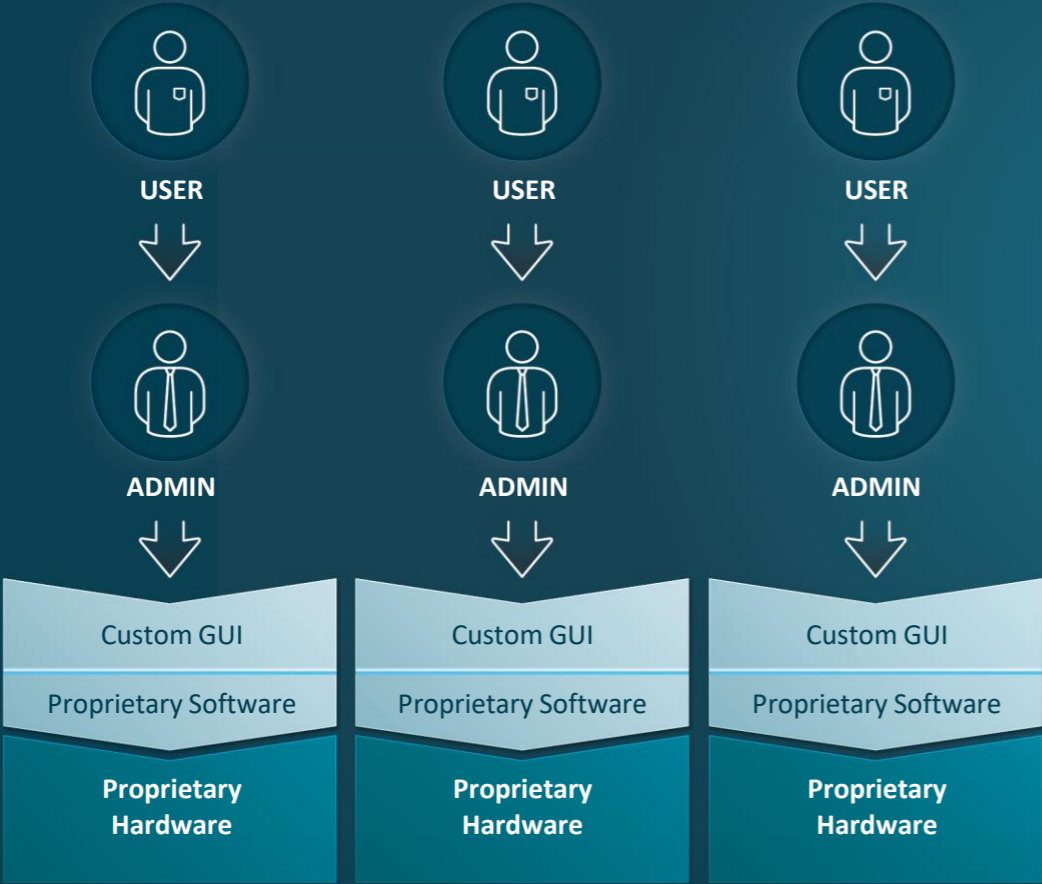Storage is a top 3 spending category in any large infrastructure project, alongside servers and networking.

2018 TOTAL ADDRESSABLE MARKET (IN BILLIONS)

- STORAGE — $16.0
- OS — $18.1
- MIDDLEWARE — $15.2
- MANAGEMENT — $12.3
- EMERGING — $10.3
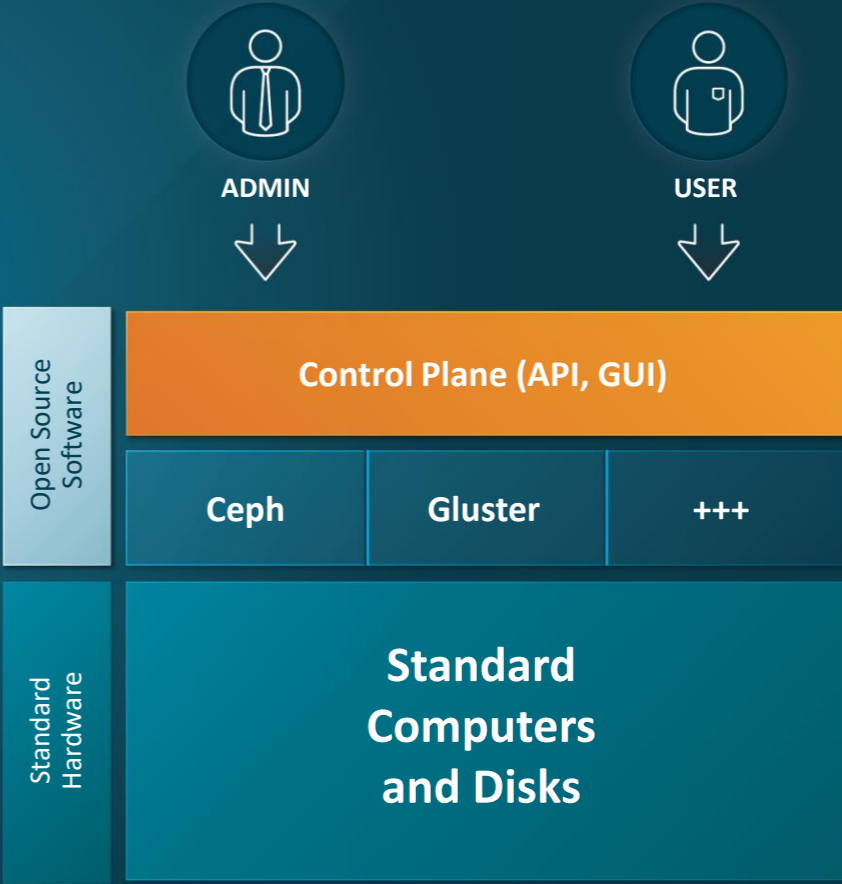
MODERN STORAGE WORKLOADS

Open Software-Defined Storage is a fundamental reimagining of **how storage infrastructure works**

???

???

Containers

Hyper-Convergence

Analytics

Object Storage

Cloud

TODAY

EMERGING

FUTURE

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STORAGE VIRTUALIZATION

Storage virtualization is the use of software and standard hardware to provide services traditionally provided by single-purpose storage appliances (similar to server virtualization, which uses software to emulate servers), providing increased agility and efficiency.

FLEXIBILITY IS CRUCIAL

VIRTUALIZED STORAGE SCALES BETTER

STANDARD SAN/NAS IS ON THE DECLINE

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

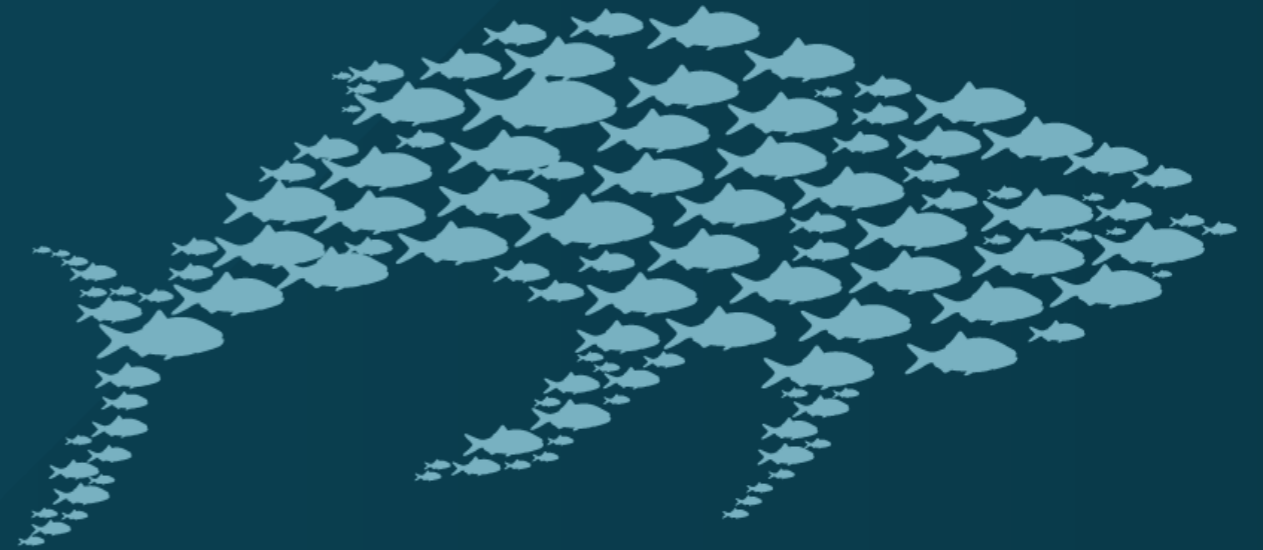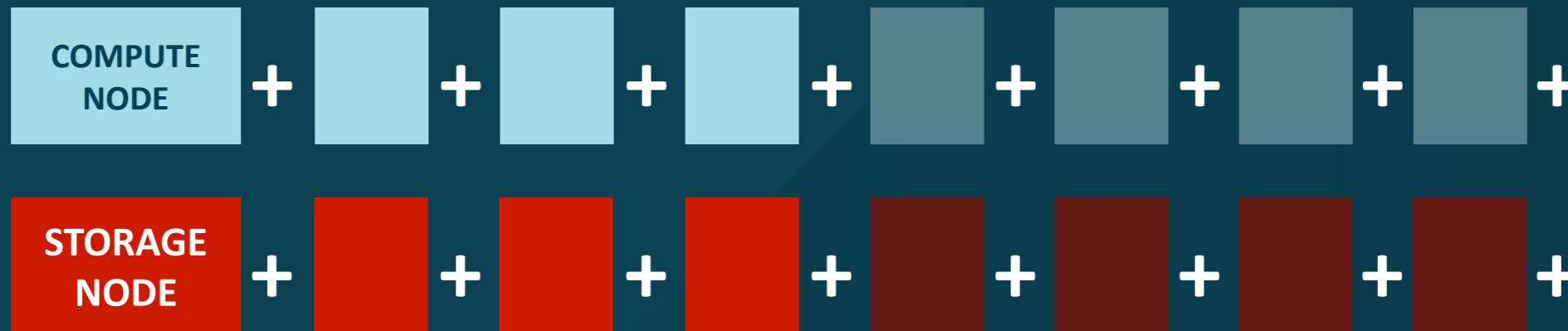"By 2016, server-based storage solutions will lower storage hardware costs by 50% or more."

Gartner: "IT Leaders Can Benefit From Disruptive Innovation in the Storage Industry"

Server-based storage is "will account for over 60% of shipments long term."

Credit Suisse Storage Update, September 3, 2015

WW DEPLOYED CAPACITY (TB)

Legend: External Capacity, Internal Capacity
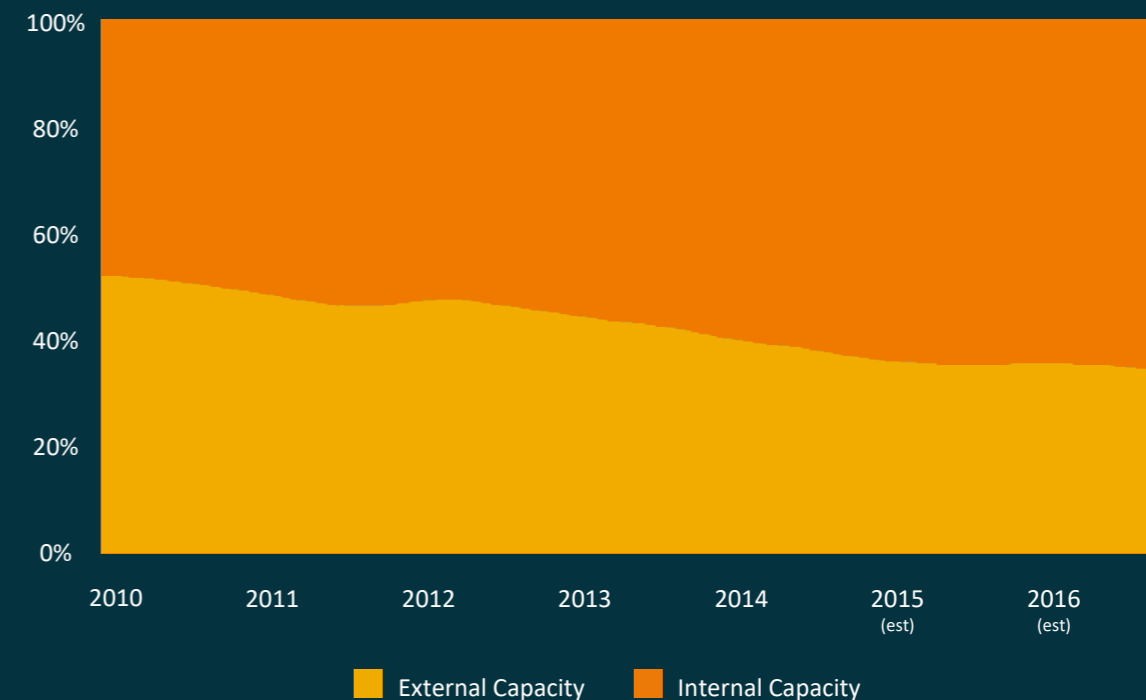
Source: IDC

WHAT IS SOFTWARE-DEFINED STORAGE?

STORAGE VIRTUALIZATION
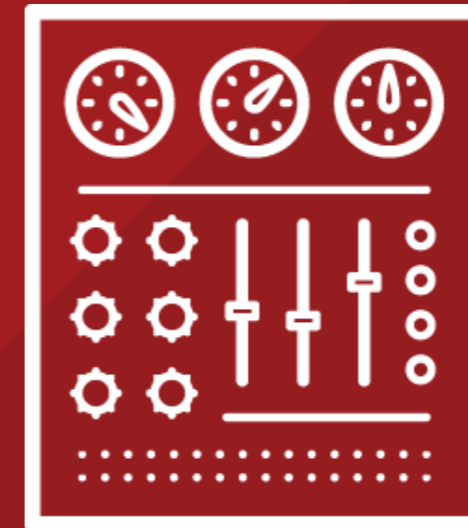
STORAGE ORCHESTRATION

STORAGE ORCHESTRATION

Storage orchestration is the ability to provision, grow, shrink, and decommission storage resources **on-demand** and **programmatically**, providing increased **control** and **integration** of storage into a software-defined data center.

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, scriptable command-line interface for expert operators

PROVISION → INSTALL → CONFIGURE → TUNE → MONITOR

Full lifecycle management for distributed, software-defined data services
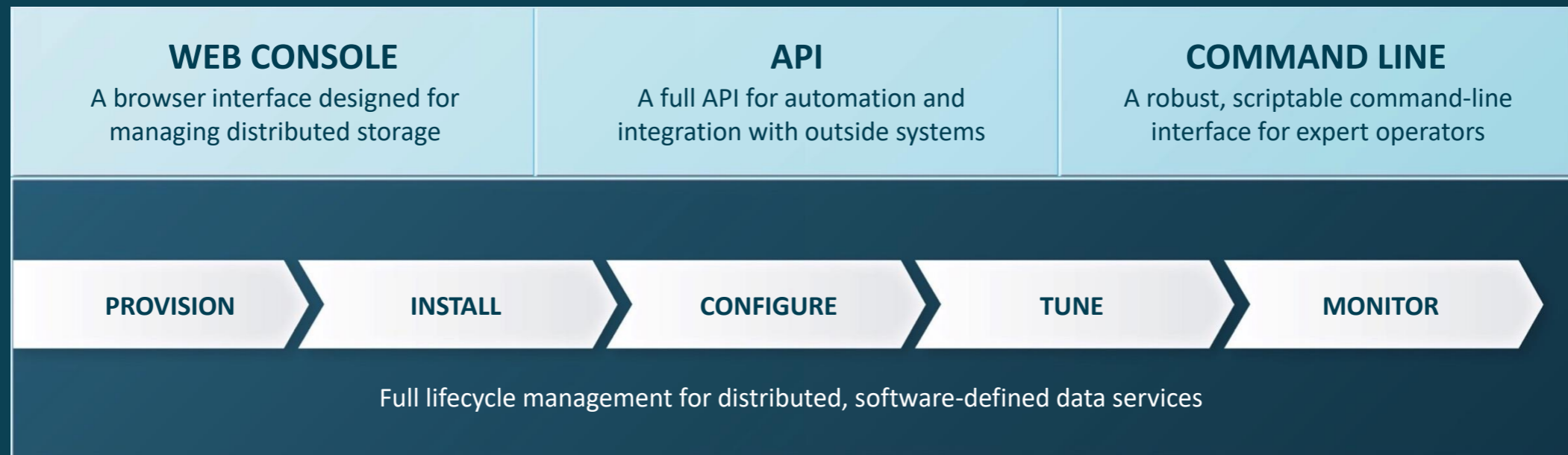
RED HAT STORAGE CONSOLE V2
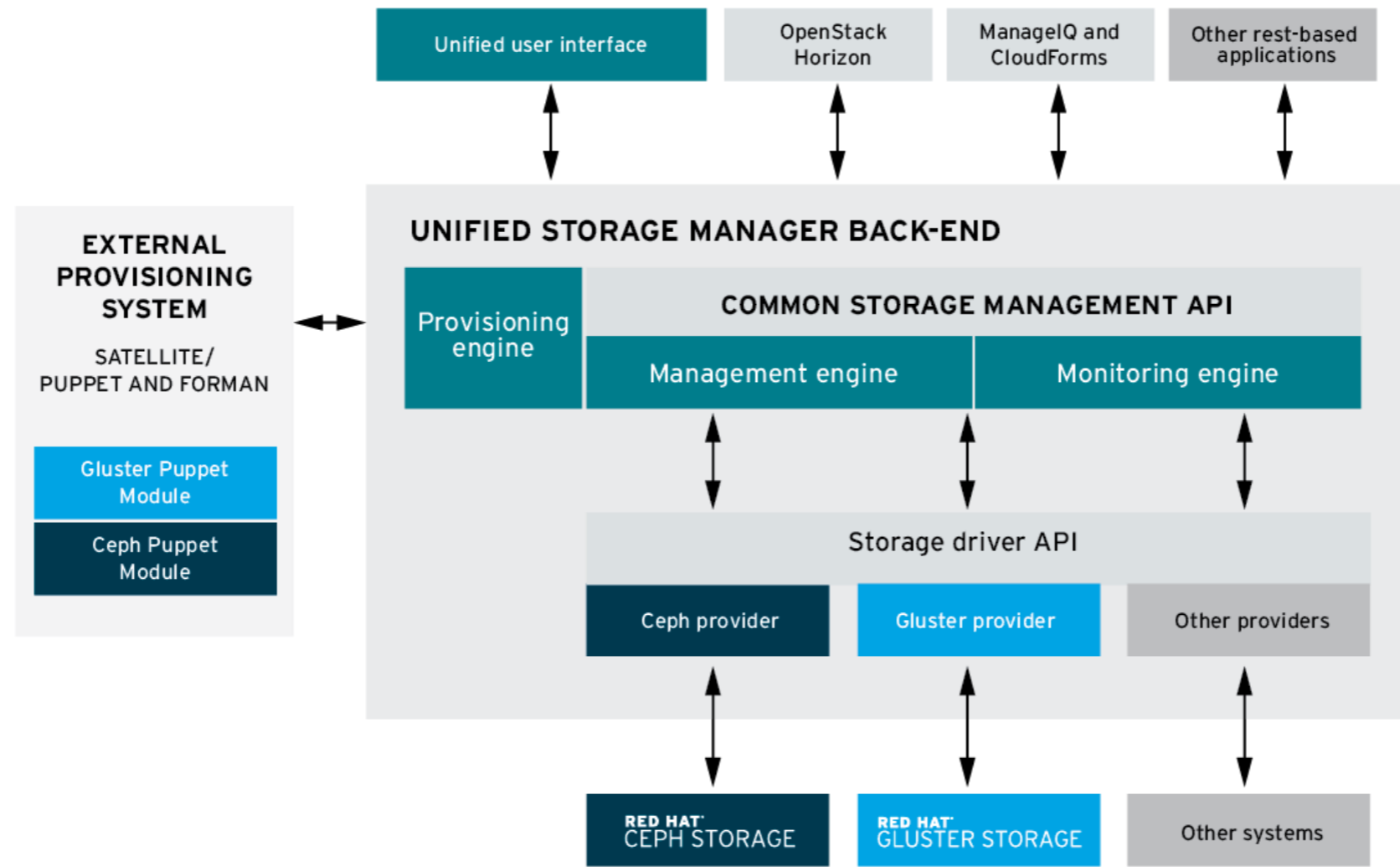
THE BALANCE

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

Software-defined storage has a learning curve, but bring performance and economy at petabyte scale.

Durable

Convenient

Inflexible

Expensive at large scale

Durable

Powerful

Flexible

Economical at large scale

WHY BOTHER?

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 RED HAT STORAGE PORTFOLIO

OPEN SOURCE SOFTWARE

RED HAT® CEPH STORAGE

Ceph management

Ceph data services

RED HAT® GLUSTER STORAGE

Gluster management

Gluster data services

STANDARD HARDWARE

intel®

DELL

hp

CISCO™

SUPERMICRO®

FUJITSU

Share-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

redhat

RHS TARGET WORKLOADS

CONTAINERS	Container-ready storage Container-converged storage
CLOUD	OpenStack VM storage OpenStack database storage
OBJECT STORAGE	Rich media / active archives Storage-as-a-service
HYPER-CONVERGENCE	RHGS/RHV solution for ROBO

RED HAT GLUSTER STORAGE

An effortlessly scalable file store for tomorrow's storage needs

Purpose-built as a scale-out file store with a straightforward architecture suitable for public, private, and hybrid cloud

Simple to install and configure, with a minimal hardware footprint

Offers mature NFS, SMB and S3 interfaces for enterprise use

Customer Highlight: Intuit
Intuit uses Red Hat Gluster Storage to provide flexible, cost-effective storage for their industry-leading financial offerings.

INTUIT®

RED HAT® GLUSTER STORAGE

TARGET USE CASES

Analytics
- Machine analytics with Splunk
- Big data analytics with Hadoop

Enterprise File Sharing
- Media Streaming
- Active Archives

Enterprise Virtualization
- VM storage with Red Hat Virtualization

ENTERPRISE FILE SHARING

Massively scalable and cost-effective file store for active archives, content repositories, media streaming, VM images, and generic file shares

ADMIN — Red Hat Storage CLI

USER — NFS, CIFS, FUSE, OpenStack Swift

VIRTUAL

Cloud Volume Manager (glusterd) — brick (glusterfsd), brick (glusterfsd), brick (glusterfsd)

Cloud Volume Manager (glusterd) — brick (glusterfsd), brick (glusterfsd), brick (glusterfsd)

Red Hat Storage Pool

PHYSICAL

FEATURES	BENEFITS
• Support snapshots, quota, replication	• Delivers high performance and cost-effective scale-out storage for files
• Multiple protocol support including NFS, FUSE, SMB, OpenStack Swift and HDFS compatibility	• Allows on-demand capacity expansion/reduction
• Flexible deployment options	• Provides maximum interoperability through industry standard access protocols
• UI based monitoring and management with SNMP support	• Flexibly deployed on bare-metal, virtual machines, or in the cloud
	• Managed with a single "pane of glass"
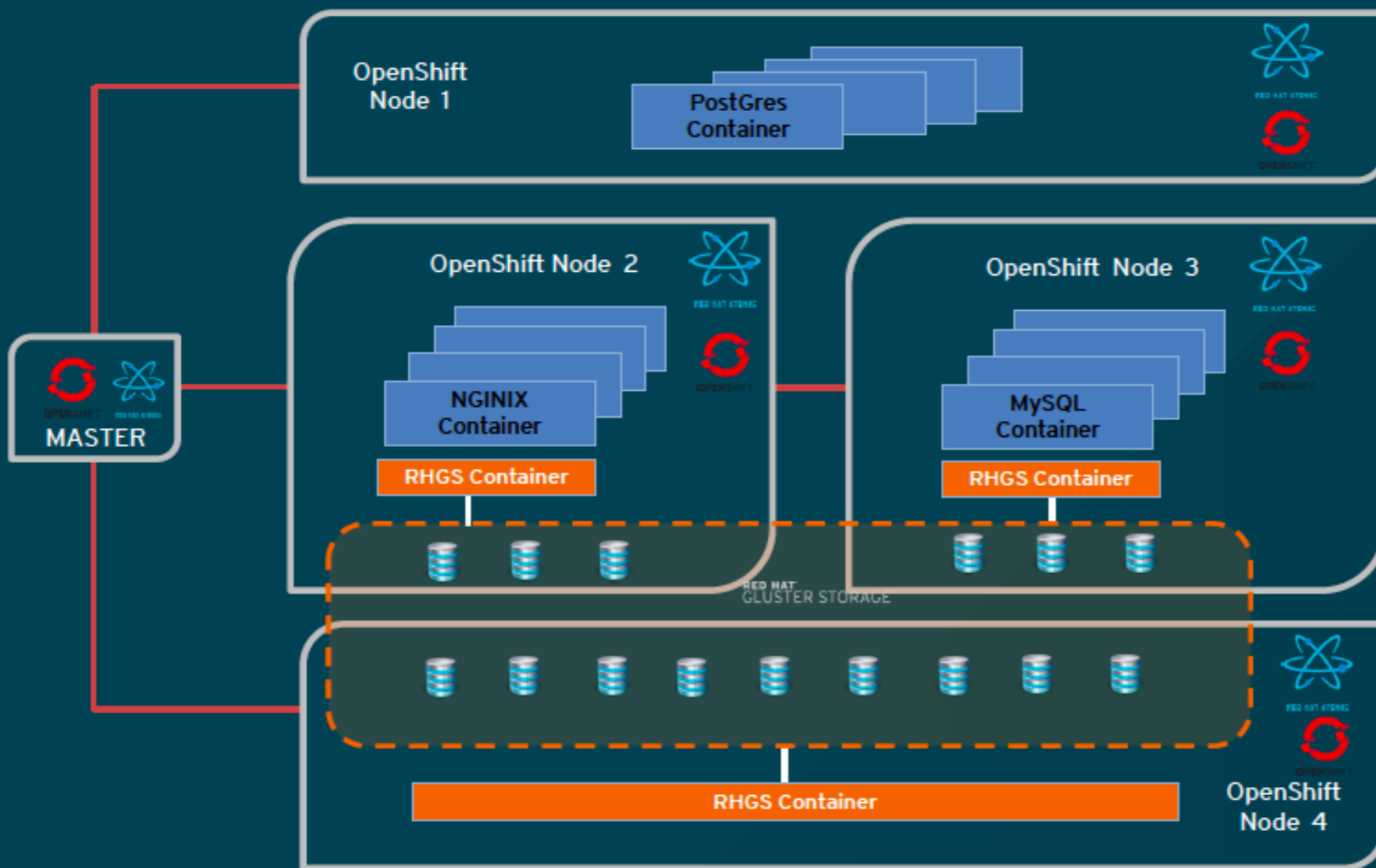
HYPER-CONVERGED SOLUTION

HCI Architecture
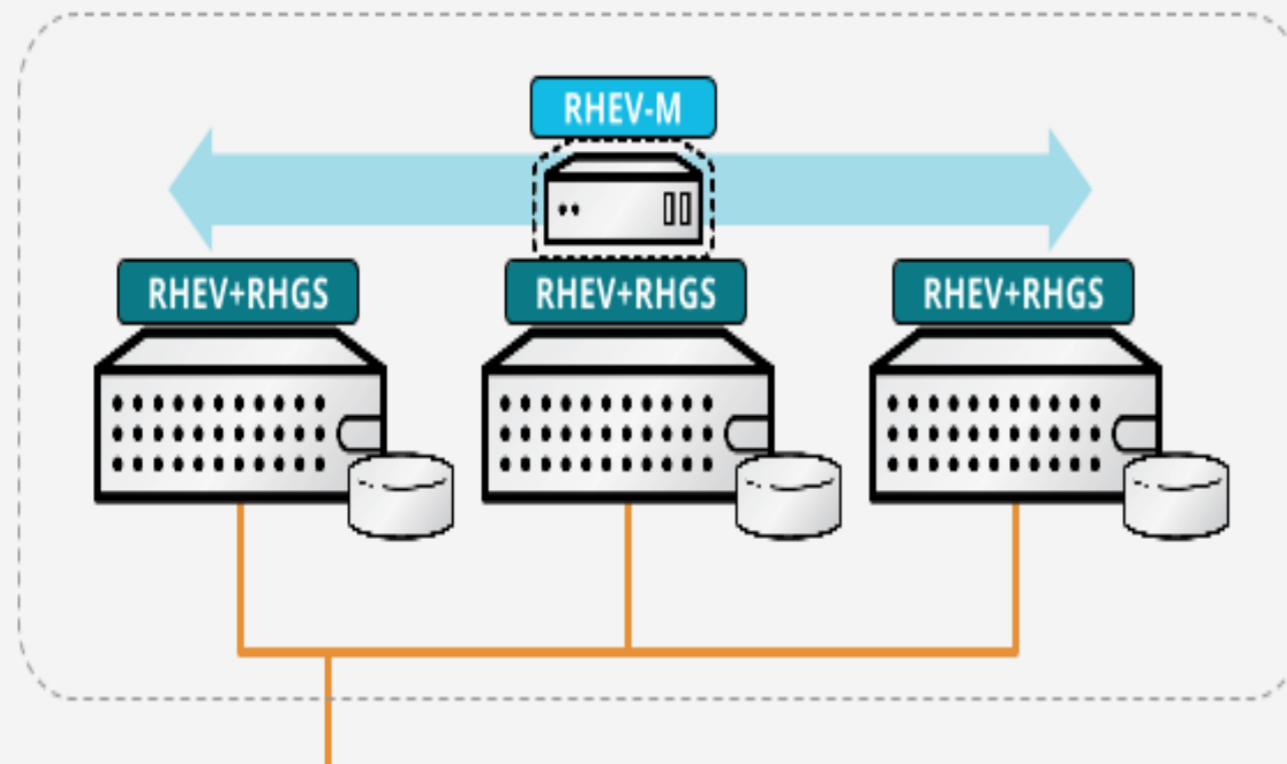
- Planned storage/compute offering, currently under development, integrating RHEL, RHGS, & RHEV-M

- Simplified acquisition, deployment, and management experience

- H1 2017 release target

RED HAT CEPH STORAGE

Powerful distributed storage for the cloud and beyond

Built from the ground up as a next-generation storage system, based on years of research and suitable for powering infrastructure platforms

Highly tunable, extensible, and configurable

Offers mature interfaces for block and object storage for the enterprise

RED HAT® CEPH STORAGE

TARGET USE CASES

OpenStack
- Cinder, Glance & Nova
- Object storage for tenant apps

Object Storage for Applications
- S3-compatible API

CISCO™

Customer Highlight: Cisco
Cisco uses Red Hat Ceph Storage to deliver storage for next-generation cloud services

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STORAGE FOR OPENSTACK

The most widely deployed[1] technology for OpenStack storage

OPENSTACK

Keystone API	Swift API	Cinder API	Glance API	Nova API

Hypervisor

CEPH OBJECT GATEWAY
(RGW)

CEPH BLOCK DEVICE
(RBD)

CEPH STORAGE CLUSTER
(RADOS)
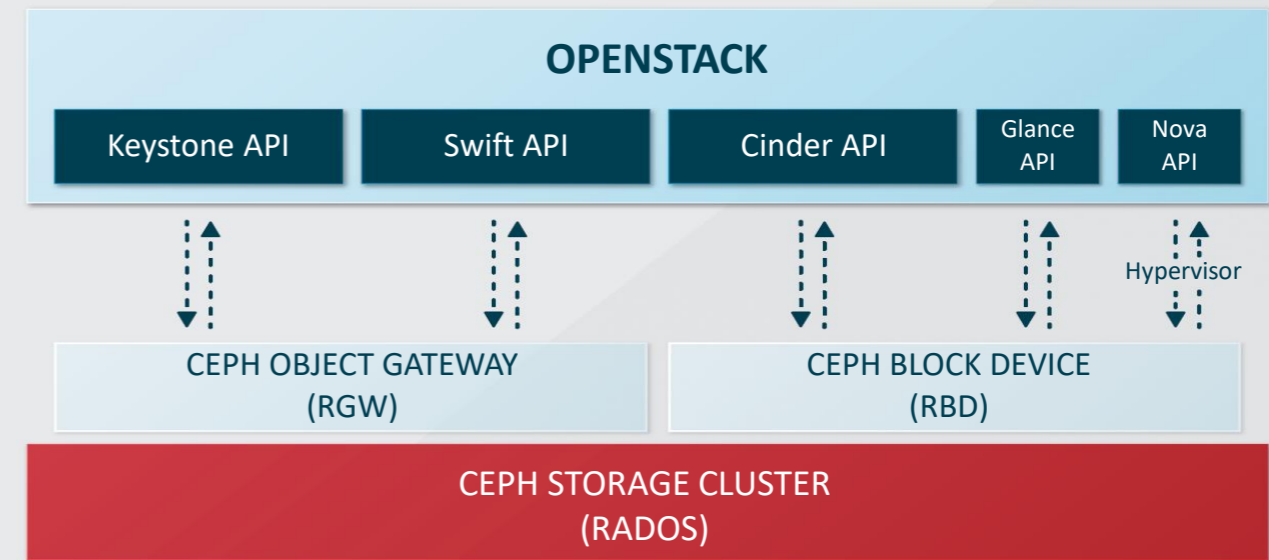
FEATURES	BENEFITS
• Full integration with Nova, Cinder and Glance • Single storage for images and ephemeral and persistent volumes • Copy-on-write provisioning • Swift-compatible object storage gateway • Full integration with Red Hat OpenStack Platform	• Provides both volume storage and object storage for tenant applications • Reduces provisioning time for new virtual machines • No data transfer of images between storage and compute nodes required • Unified installation experience with Red Hat OpenStack Platform

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GROWING INNOVATION COMMUNITIES

ceph

Contributions from **Intel, SanDisk, CERN, and Yahoo**.
Presenting Ceph Days in cities around the world and
quarterly virtual Ceph Developer Summit events.

78 AUTHORS/mo

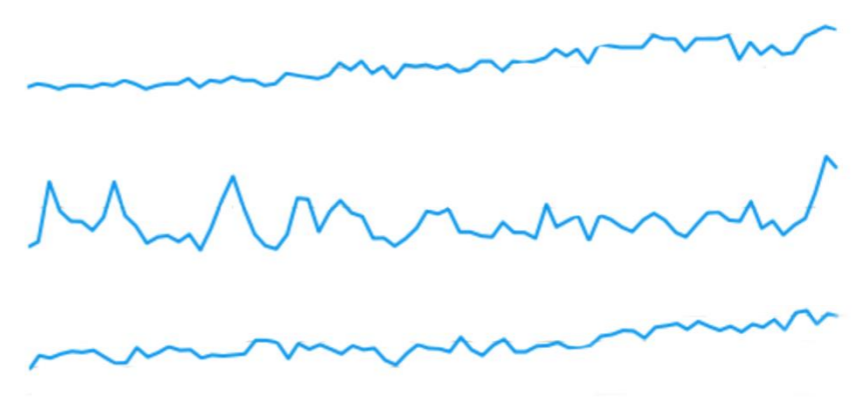**1500** COMMITS/mo

258 POSTERS/mo

GLUSTER COMMUNITY
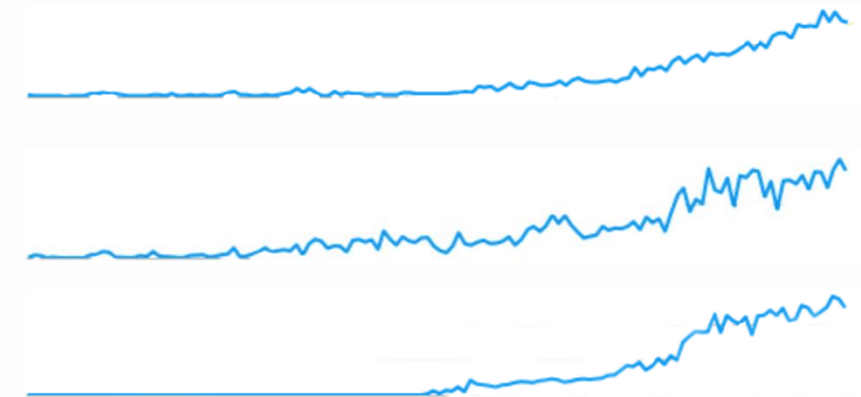
Over **11M downloads** in the last 12 months
Increased development velocity, authorship, and discussion
has resulted in rapid feature expansion.
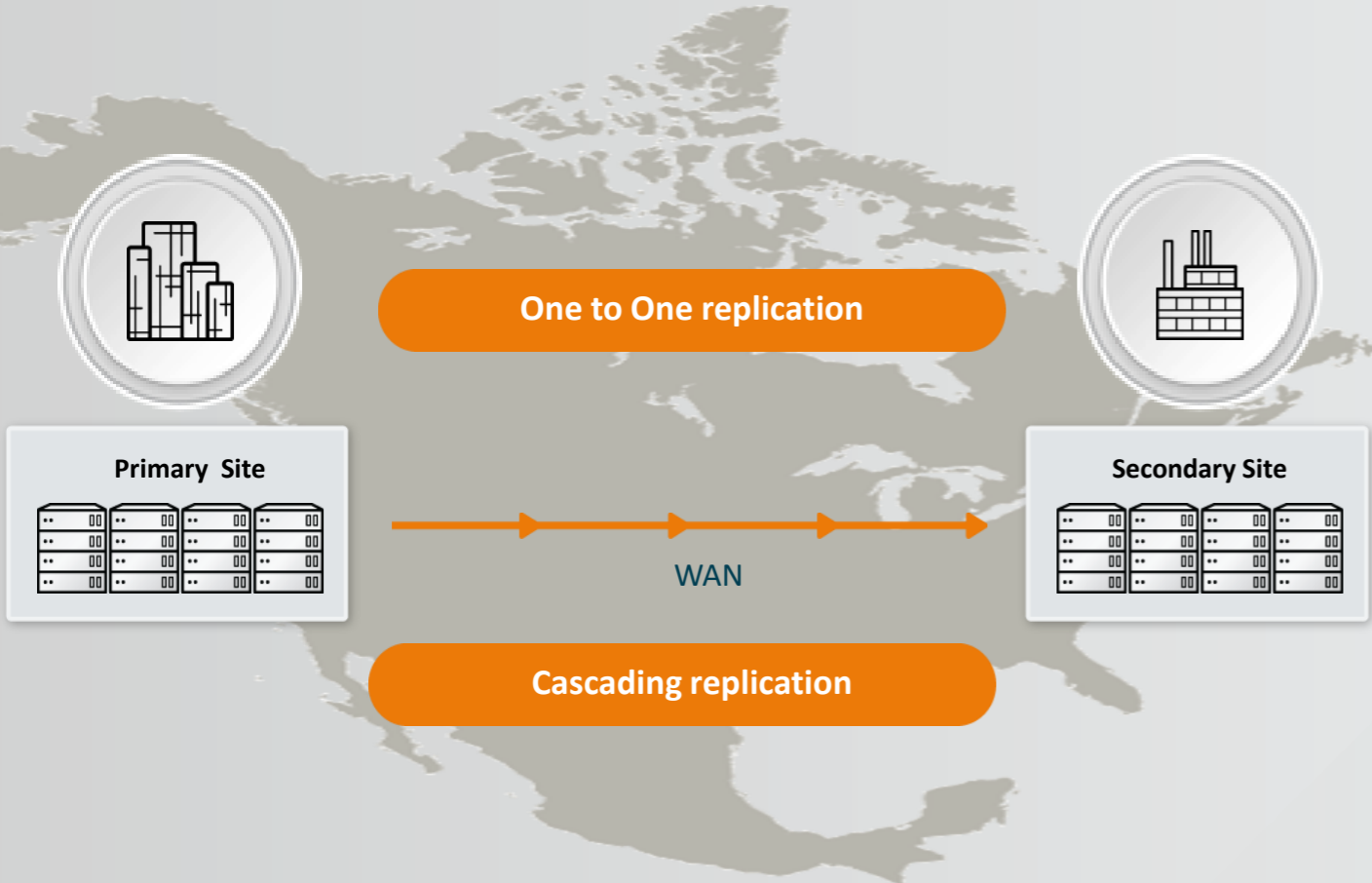
41 AUTHORS/mo

259 COMMITS/mo

166 POSTERS/mo

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FSI CUSTOMER CASES

Customer : A Bank in North America

One to One replication

Primary Site

WAN

Secondary Site

Cascading replication

High performance and cost effective file storage for financial services

BUSINESS CHALLENGE

- Needed an alternative to aging, expensive to support traditional storage system for Historical Tick Database (tick data – log on the sale or purchase of a stock, either up or down)

SOLUTION

- Red Hat Gluster Storage
- Primary site would comprise with a distributed replicated volume,
- Secondary site would comprise with an erasure coded volume.

BENEFITS

- Lower CAPEX and OPEX
- Ease-of-use
- Geo-replication feature to copy and protect data asynchronously at the secondary site

FSI CUSTOMER CASES

Customer : A Multi-national Mutual Fund and Financial Service Corporation

RGW
A web services gateway for object storage, compatible with S3 and Swift

RBD
A reliable, fully distributed block device with cloud platform integration

LIBRADOS
A library allowing apps to directly access RADOS (C, C++, Java, Python, Ruby

RADOS
A software-based reliable, autonomous, distributed object store comprised of self-healing, self-managing, intelligent storage nodes and lightweight monitors

Building a cost-effective storage platform for a major financial services platform

BUSINESS CHALLENGE

- Create infrastructure platform "Click 2 compute (C2C)" which would serve in house applications less expensively than that provided by traditional tier 1 storage vendors
- C2C would be based on open software and commodity hardware to prevent vendor lock in
- Provide users both block & object store repository
- Utilize standard HW components in line with OCP guidelines

SOLUTION

- Red Hat Ceph Storage
- Plans to scale up to 3-4PB in deployment on OCP hardware

BENEFITS

- Ability to migrate to multiple vendors seamlessly and avoid vendor lock-in
- Reduced costs using Penguin as an OEM and Ceph as storage
- Reduced administrative overhead over previous storage solutions
- Lowered charge backs due to lower equipment and licensing costs
- Different SLAs than their current tier 1 solutions