RED HAT
STORAGE

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RED HAT CEPH STORAGE

An open, massively scalable, unified storage platform for today's workloads

DATASHEET

74% of IT decision makers are worried about their organization's ability to cope with an increasing volume of data, and **70%** believe that their current storage systems will not be able to handle next generation workloads.[1]

Inadequate storage infrastructure is considered **fourth out of the top ten** pain points that IT decision makers experience on a weekly basis. **98%** believe there are benefits in moving their organization to a more agile storage solution.[1]

OpenStack users consistently and overwhelmingly favor Ceph over storage alternatives.[2]

PRODUCT OVERVIEW

Enterprises today struggle to manage the explosive growth of data while remaining agile and cost competitive. To manage petabytes of data at the speed and with the flexibility required by today's business, enterprises are increasingly turning to Red Hat® Ceph® Storage. As a self-healing, self-managing platform with no single point of failure, Red Hat Ceph Storage significantly lowers the cost of storing enterprise data and helps companies manage exponential data growth in an automated fashion.

Red Hat Ceph Storage is a robust, software-defined storage solution that:

- Provides an award-winning, web-scale object store for modern use cases.[3]
- Supports block, object, and file storage to serve as a single, efficient, unified storage platform.
- Decouples software from hardware to run cost-effectively on industry-standard servers and disks.
- Scales flexibly and massively to support multipetabyte deployments.
- Combines the most stable version of Ceph Storage from the open source community with a monitoring dashboard, easy-to-use deployment tools, and Red Hat support.

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1 *Vanson Bourne Ltd. "Storage: Limitations, frustrations, and coping with future needs." June 2016.*

2 *OpenStack User Survey, October 2015, April 2016, April 2017.*

3 *Red Hat Ceph Storage captures throne, December 2015. http://redhatstorage.redhat.com/2015/12/17/red-hat-ceph-storage-captures-throne/*

Specifically, Red Hat Ceph Storage consists of:

Ceph 12.2 (Luminous)	• Object, block, and file storage with flexible storage policies • Compatibility with Amazon S3 object application programming interface (API), OpenStack® Swift, network file system (NFS) v4, and native API protocols • Block storage integrated with OpenStack, Linux®, and Kernel-based Virtual Machine (KVM) hypervisor • Validated with Apache Hadoop S3A filesystem client • Multisite and disaster recovery options • Data durability via erasure coding or replication
Management and security	• Red Hat Ansible® Automation-based deployment • Advanced Ceph monitoring and diagnostic information with integrated on-premise monitoring dashboard • Graphical visualization of the entire cluster or single components—with cluster and per-node usage and performance statistics • Red Hat Enterprise Linux (included with subscription) and the backing of a global open source community
Support services	• Streamlined product and hot-fix patch access • Service level agreement (SLA)-backed technical support • Deployment resources and Red Hat subscription benefits • Consulting, service, and training options from the company with the most Ceph experience in the industry[4]

OBJECT STORAGE

Red Hat Ceph Storage is a production-ready implementation of Ceph, the open source storage platform that manages data on a distributed computer cluster and provides interfaces for object-, block-, and file-level storage. Proven at web scale, Red Hat Ceph Storage offers the data protection, reliability, and availability required by demanding object storage workloads. It was designed for modern workloads, like cloud infrastructure and data analytics. Industry-standard APIs allow seamless migration of, and integration with, your applications. It is accessible via Amazon S3, OpenStack Swift, or native API protocols and provides options for containerized deployment for reliable performance and decreased configuration footprint. Unlike traditional storage, it is optimized for large installations—typically a petabyte or greater—and overcomes the shortcomings of traditional storage products.

4 Bitergia analytics show that Red Hat provides the most Ceph bug fixes and code contributions by a factor of nearly 10 to 1. metrics.ceph.com

Red Hat Ceph Storage offers numerous options for award-winning support—both in person and online—focusing on the overall user experience.[5] These options continue throughout the life cycle, which includes a consistent release schedule, supported upgrades, and deployment resources. Red Hat offers an immense Knowledgebase of materials, including reference architectures, performance and sizing guides, and technical briefs, all designed to help customers deploy Red Hat Ceph Storage with greater success. Users also benefit from the security of Red Hat's quality assurance programs and technology certifications with a broad ecosystem of partners, such as Intel, Dell, Cisco, Micron, Supermicro, QCT, Mellanox, and Western Digital.

OPENSTACK AND CEPH

OpenStack remains today's largest and fastest-growing open source cloud infrastructure project.[6] Overwhelmingly preferred by OpenStack users, Ceph scales the way OpenStack does—out, not up—and its extensible architecture allows it to integrate more tightly with OpenStack than traditional, proprietary solutions.[2] Red Hat Ceph Storage serves as a single, efficient platform to support all storage needs—block (persistent and ephemeral), object, and file—on standard servers and disks. It is tightly integrated with OpenStack services, including Nova, Cinder, Manila, Glance, Keystone, Ceilometer, and Swift, and offers user-driven storage life-cycle management with 100% API coverage.

RED HAT OPENSTACK PLATFORM INTEGRATION

Storage and high-performing cloud infrastructures rely significantly on the Linux environments beneath them. With Red Hat OpenStack Platform, users get all the enterprise benefits of Red Hat Enterprise Linux, the world's most trusted enterprise Linux operating system, along with a hardened and fully supported version of OpenStack.[7] Red Hat Ceph Storage is tightly integrated with Red Hat OpenStack Platform, as well as the OpenStack director tool for installation, upgrades, and even hyperconverged deployment of storage and compute on the same hardware. Those seeking an out-of-the-box hyperconverged solution can employ Red Hat Hyperconverged Infrastructure for Cloud. It combines Red Hat OpenStack Platform and Red Hat Ceph Storage in a single SKU, supported under a single, common life cycle, with a single, prescriptive installation experience based on Red Hat OpenStack Platform director.

5 *Red Hat awards and recognition, https://access.redhat.com/recognition*

6 *www.openstack.org*

7 *www.redhat.com/en/about/trusted*

RED HAT CEPH STORAGE FEATURES AND BENEFITS

FEATURE	BENEFIT
EXABYTE SCALABILITY	
Scale-out architecture	Ability to grow cluster from one to thousands of nodes without forklift upgrades and data migration projects.
Automatic rebalancing	Peer-to-peer architecture that seamlessly handles failures and ensures data distribution throughout the cluster.
Rolling software upgrades	Clusters upgraded in phases with no or minimal downtime.
API AND PROTOCOL SUPPORT	
S3 and Swift	Seamless cloud integration with protocols used by Amazon Web Services (AWS) and the OpenStack Object Storage project.
RESTful	Ability to manage all cluster and object storage functions programmatically for independence and speed by not having to manually provision storage.
Multiprotocol with NFS, iSCSI, and object support	Ability to build a common storage platform for multiple workloads and applications.
CephFS	Portable operating system interface (POSIX)—a compatible, highly available, scale-out shared filesystem delivered by the same cluster supporting object and block storage.
SECURITY	
Authentication and authorization	Integration with Active Directory, lightweight directory access protocol (LDAP), AWS Auth v4, and KeyStone v3.
Policies	Limited access at pool, user, bucket, or data levels.
Encryption	Implementation of cluster-wide, at-rest, or user-managed inline object encryption.
Red Hat Enterprise Linux	Deployment on an enterprise-standard, mature operating system recognized for its high security and backed by a collaborative, open source community.
GEO-REPLICATION SUPPORT AND DISASTER RECOVERY	
Zones and regions	Object storage topologies of AWS S3.
Global clusters	Global namespace for object users with read and write affinity to local clusters.
Disaster recovery	Enablement of multisite replication for disaster recovery, data distribution, or archiving.
RELIABILITY AND AVAILABILITY	
Striping, erasure coding, or replication across nodes	Data durability, high availability, and high performance.
Dynamic block resizing	Ability to expand or shrink Ceph block devices with no downtime.

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Storage policies	Configurable data placement to reflect service-level agreements, performance requirements, and failure domains using the CRUSH algorithm (Controlled Replication Under Scalable Hashing).
Snapshots	Snapshots of an entire pool or individual block devices.

PERFORMANCE	
Client-cluster data path	Clients share their input/output (I/O) load across the entire cluster.
Copy-on-write cloning	Instant provisioning of virtual machine instances from the same image.
In-memory client-side caching	Enhanced client I/O using a hypervisor cache.
Server-side journaling	Accelerated data write performance with serialized writes.

COST-EFFECTIVENESS	
Industry-standard hardware	Optimal price and performance mix of standard servers and disks tailored to each workload.
Thin provisioning	Sparse block images enabled over-provisioning of cluster and immediate instance creation.
Heterogeneity	Not having to replace older hardware as newer nodes are added.
Erasure coding	Cost-effective data durability option.
Containerized Storage Daemons	Reliable performance, better utilization of cluster hardware, and decreased configuration footprint, with the ability to co-locate daemons on the same machine without resource conflicts.

TECHNICAL SPECIFICATIONS

Red Hat Ceph Storage is supported on:

Host operating systems	• Red Hat Enterprise Linux 7.4 and higher • Ubuntu 16.04
Hardware requirements	• Minimum 2 core 64-bit x86 processors per host, minimum of 2GB of RAM per OSD process, 16GB RAM per monitor host. Minimum three storage hosts, with 10 recommended.

ABOUT RED HAT

Red Hat is the world's leading provider of open source software solutions, using a community-powered approach to provide reliable and high-performing cloud, Linux, middleware, storage, and virtualization technologies. Red Hat also offers award-winning support, training, and consulting services. As a connective hub in a global network of enterprises, partners, and open source communities, Red Hat helps create relevant, innovative technologies that liberate resources for growth and prepare customers for the future of IT.

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