# 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 explosive data growth while remaining agile and cost competitive. To manage data with the speed and flexibility required by today's business, companies are increasingly turning to Red Hat® Ceph Storage, a robust, software-defined storage solution. As a self-healing, self-managing, unified storage platform with no single point of failure, Red Hat Ceph Storage decouples software from hardware to support block, object, and file storage on standard servers and disks, significantly lowering the cost of storing enterprise data. Red Hat Ceph Storage is an award-winning, web-scale object store for modern use cases with the ability to scale flexibly and massively to support multipetabyte deployments.

Specifically, Red Hat Ceph Storage consists of:

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

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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/

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

## OBJECT STORAGE

Red Hat Ceph Storage is a production-ready implementation of Ceph, the open source storage plat-form 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, reli-ability, 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.

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, perfor-mance 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 hard-ened 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. Every unique Red Hat OpenStack Platform account also receives a one-time entitlement of 64TB of Red Hat Ceph Storage with its subscription for evaluation and prototyping purposes.
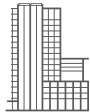
5   Red Hat awards and recognition, *https://access.redhat.com/recognition*

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 | Grow clusters 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 clusters. |
| 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 | 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 | Build a common storage platform for multiple workloads and apps. |
| CephFS | Portable operating system interface (POSIX)—a highly available, scale-out shared filesystem delivered by the object and block storage cluster. |
| **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 | 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 | Multisite replication for disaster recovery, data distribution, or archiving. |

## 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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### RELIABILITY AND AVAILABILITY

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| Striping, erasure coding, or replication across nodes | Data durability, high availability, and high performance. |
| Dynamic block resizing | Expand or shrink Ceph block devices with no downtime. |
| 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

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|---|---|
| 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

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| Industry-standard hardware | Optimal price and performance mix of standard servers and disks tailored to each workload. |
| Thin provisioning | Sparse block images enable cluster over-provisioning and immediate instance creation. |
| Heterogeneity | Support for older hardware as newer nodes are added. |
| Erasure coding | Cost-effective data durability option. |
| Containerized Storage Daemons | Reliable performance, better cluster hardware utilization, decreased configuration footprint with ability to co-locate daemons. |

## TECHNICAL SPECIFICATIONS

Red Hat Ceph Storage is supported on:

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| Host operating systems | • Red Hat Enterprise Linux 7.4 and higher<br>• Ubuntu 16.04 |
| Hardware requirements | • Minimum two 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. |