

# ORockCloud Features

## FUNCTIONALITY

The ORockCloud provides its customers with scalable FedRAMP authorized cloud infrastructure architected on the Red Hat OpenStack Platform that allows them to deploy and configure cloud-based environments to meet their organization's information technology needs. The ORockCloud provides virtualized compute and storage infrastructure that can be managed by ORock or the customer. For customers who want to manage their own cloud environments, ORock provides a management portal for elastic, on-demand configuration of their services. Customers connect to their ORockCloud environment only over Hyper Text Transfer Protocol Secure (HTTPS)/Secure Sockets Layer (SSL) or a direct connection from a customer environment/cloud.

To get started and use the ORockCloud:

- A project with initial allocations and quotas will be established and the designated customer representative(s) will be provided the credentials for access to their environment to configure as desired and add additional users. Once customers access their environment, they will quickly see a vast array of tools and resources available to them.
- Customers can select a pre-configured image for immediate operations or can custom create their own image containing desired applications, libraries, data and associated configuration settings.
- Configure network access and security features desired.
- Choose which instance type(s) you want using the web service APIs or the variety of management tools provided.
- Continue with the setup of the environment by incorporating requirements such as adding in multiple locations if needed, apply static IP endpoints or attach persistent block storage to the instances.
- Customers are provided flexible and predictable billing options including a usage-based pay-as-you-go model that allows resources to be consumed hourly and billed monthly. Reserved annual resource plans are also available to provide customers with greater cost savings and options to be billed monthly, quarterly or annually.

## FEATURES

The ORockCloud is based on secure, enterprise-grade opensource solutions and provides a variety of powerful features for building scalable, failure resilient, enterprise-class applications and mission-critical workloads.

### Datacenter Locations

ORockCloud maintains multiple geographical regions across the U.S. and provides its customers with options to select data center regions for primary and backup needs.

A dedicated private fiber optic backbone network connects ORock's multiple datacenters.

### Availability and Service Level Agreement (SLA)

Cloud compute and storage solutions are deployed on the latest HPE hardware and datacenter components ensuring an SLA commitment of 99.9%.

### VM Resource Quota Limits and VM Sizes

Customers are provided API and dashboard access to a rich set of tools to manage their compute and storage resources. ORock defines each customer's quota during their onboarding process and works with each customer to determine total available resources to be allocated per domain and project so customers can stay within their allocated budgets.

Increases to available resources are simply requested by submitting a support ticket specifying the resource and amount to be increased.

## Storage Offerings

Storage offerings also include block and object storage options that are priced based on performance requirements.

Block storage is available on high-speed SSDs providing high IOPs for performance-based computing.

Object storage is available in multiple tiers and is a cost-effective option for readily available data sets in a S3-compatible environment.

## ORockCloud Instance Types

ORock offers multiple VM flavors that support application and workloads requiring general purpose, memory optimized, compute optimized, and GPU optimized configurations. Customers are free to select VM configurations across multiple instance types for greatest deployment flexibility.

All ORock VM instance types are deployed on the latest HPE servers with industry-leading specifications on security, performance and reliability.

### Features Include:

- HPE servers running Intel Xeon powered 64-bit processors
- HPE servers have Silicon Root of Trust and Trusted Platform Module (TPM) 2.0
- Support for networking with up to 10 Gbps of network bandwidth
- All data is secured and encrypted at rest
- Infrastructure is actively maintained and secured to the highest FedRAMP standards

### General Purpose:

ORockCloud provides a balance of compute, memory and networking resources that can be used for a variety of diverse workloads. These instances are ideal for applications that use these resources in equal proportions.

- Each vCPU is a thread of an Intel Xeon Gold 6152, the highest core count Xeon Gold 6100 series CPU in the Skylake-SP generation with 2.1GHz.

Instance	vCPU	Mem (GiB)
t1.micro	1	1
t1.small	1	2
t1.medium	2	4
t1.large	2	8
t1.xlarge	4	16
t1.2xlarge	8	32
t1.4xlarge	16	64
t1.8xlarge	32	128

Network connections available in increments from 100MB to 10GB

## Memory Optimized

Instances are designed to deliver fast performance for workloads that process large data sets in memory.

- Each vCPU is a thread of an Intel Xeon Gold 6152, the highest core count Xeon Gold 6100 series CPU in the Skylake-SP generation with 2.1GHz.

Instance	vCPU	Mem (GiB)
m1.medium	1	8
m1.large	2	16
m1.xlarge	4	32
m1.2xlarge	8	64
m1.4xlarge	16	128

Network connections available in increments from 100MB to 10GB

## Compute Optimized

- Instances are ideal for compute-bound applications that benefit from high-performance processors. Compute optimized instances are well-suited for batch processing workloads, media transcoding, high performance web servers, high performance computing (HPC), scientific modeling, dedicated gaming servers and ad server engines, machine learning inference and other compute intensive applications.
- Each vCPU is a thread of an Intel Xeon Gold 6152, the highest core count Xeon Gold 6100 series CPU in the Skylake-SP generation with 2.1GHz.

Instance	vCPU	Mem (GiB)
c1.xlarge	4	8
c1.2xlarge	8	16
c1.4xlarge	16	32
c1.8xlarge	32	64

Network connections available in increments from 100MB to 10GB

## GPU Optimized

These instances are intended for general-purpose GPU compute applications.

Features:

- High frequency Intel Xeon Silver processors
- High-performance Tesla K80 GPUs, each with 2,496 parallel processing cores and 16GiB of GPU memory

Instance	vGPU	vCPU	Mem (GiB)
g1.2xlarge	1	2	16
g1.4xlarge	1	2	32
g1.8xlarge	2	8	64
g1.16xlarge	2	16	128

Network connections available in increments from 100MB to 10GB

## ORockCloud Storage Types

To offer customers storage options to meet their diverse application and workload requirements, ORockCloud offers high performance block and object storage choices of using either solid state or magnetic disk storage options.

Block Storage Premium Block	Object Storage Hot Object
Ideal when requiring the best possible performance such as databases and high-volume transactions	Provides a balanced performance with cost savings and ideal for workloads that perform random I/O operations
Max Throughput 2500Mb/s	
Max IOPS 100K per instance	Durability = 9.999999 based on the encoding methods and types of storage used
Volume size 1GB-16TB	Encrypted at rest IAW FedRAMP requirements
Snapshots - standard	Support Custom Metadata
Backups - standard	
Features like cloning, detaching/attach a volume, moving block volume, change the volume type, extend the volumes, launch as an instance, upload as an image, transfer are all standard	Access via S3-compatible or Swift API
	Features include managing buckets/objects, replication, versioning, lifecycle management, S3 Compatibility

## Floating IP Addresses

Floating IP addresses are static IP addresses designed for dynamic cloud computing. An elastic IP address is associated with your account not a particular instance, and you control that address until you choose to explicitly release it. Unlike traditional static IP addresses, however, elastic IP addresses allow you to mask instance or availability zone failures by programmatically remapping your public IP addresses to any instance in your account.

## Network Capacity

Each data center supports a private DWDM fiber network transport up to 88 lambdas per fiber pair. Each lambda can support a maximum of 100 Gb/s which equates to 8.8 Tb/s of transport. ORock Technologies has access to additional fiber pairs as needed.

## Network Connectivity Options

The ORockCloud operates in data centers that reside on key government backbone infrastructure. Our interconnectivity operates from within our data centers that supports over 1,500 U.S. locations to most telecommunication providers. Our connectivity supports FedRAMP and NIST guidelines for redundancy.

## Connectivity Options

Customers connect to their ORockCloud environment only over Hyper Text Transfer Protocol Secure (HTTPS)/Secure Sockets Layer (SSL) or an agency provided direct connection from a customer environment/cloud, each of which requires the use of multi-factor authentication (MFA). ORockCloud also supports access through our horizon console and incorporate VPN as a Service.

## PLATFORM AS A SERVICE SOLUTIONS

### Red Hat OpenShift Container Platform

Within OpenShift Container Platform, Kubernetes manages containerized applications across a set of CP or hosts and provides mechanisms for deployment, maintenance, and application scaling. The Docker service provides the ability to package, instantiate and run containerized applications.

### HPE Ezmeral Container Platform

A unified container platform built on open source Kubernetes and designed for both cloud-native applications and non-cloud-native applications running on any infrastructure.

### ORockCloud infrastructure

Our infrastructure is built on a combination of Cisco network device for routing/switching, Palo Alto for firewalls/VPNs, and HPE systems for the cloud infrastructure and storage. The entire infrastructure and all devices within it are FIPS 140.2 compliant and all data in the storage system is encrypted at rest. All of our APIs are likewise secured and encrypted so that disaster recovery software would talk to a TLS S3 API that would allow for a customer to have a secure connection to back up their data.

## HPE GEN 10 SERVERS

- All servers incorporate HPE Silicon Root of Trust on HPE's designed silicon and firmware and are manufactured from the HPE Trusted Supply Chain, thereby reducing the risk of compromise due to supply chain to a minimum.
- This process binds all essential firmware into the silicon before the server is built.
  - The silicon level has a "fingerprint".
  - At each stage of booting a server, the firmware of that stage validates against the silicon "fingerprint".
  - If "fingerprints" do not match, the server will not boot.
- Only HPE protects at run time (not just boot) and can recover the entire system (not just part of it).
- UEFI provides a higher level of security by reliably protecting the system from unauthorized access and malicious rootkits. Permission is granted only for ROMs, applications and OS loaders with a digital signature.
  - Secure start hardware root of trust.
  - Versions of all UEFI drivers, OS loaders and UEFI applications are digitally signed, and binary code files are protected by a built-in set of trusted keys. Only approved and safe components are permitted.
  - Security checks prevent unwanted blocking of the safe boot function in case of failures. Reporting helps to fix all security breaches and conduct further analysis
  - HPE ProLiant Gen10 servers support optional Trusted Platform Module (TPM) modules. The TPM 2.0 module is supported if the platform is in UEFI boot mode and can be used by the operating system to increase security.

## RED HAT OPENSTACK PLATFORM

The ORockCloud is built up the Red Hat OpenStack platform that includes the following services:

- **Horizon** – provides administrators and users with a graphical interface to access, provision and automate deployment of cloud-based resources.
- **Heat** – is an orchestration engine used to launch multiple composite cloud applications based on templates.
- **Keystone** – is the identity service used by OpenStack for authentication and authorization across the cloud operating system and is integrated with IPA and LDAP.
- **Barbican** – is the key management service that is API driven and allows for storage and retrieval of keys.
- **Neutron** – is a system for managing networks and IP addresses. Neutron manages all networking facets for the Virtual Networking Infrastructure (VNI) and the access layer aspects of the Physical Networking Infrastructure (PNI).
- **Cinder** – virtualizes the management of block storage devices and provides end users with a self-service API to request and consume those resources without requiring any knowledge of where their storage is actually deployed or on what type of device.
- **Swift** – provides object storage within the cloud accessible via its API and backed by Ceph.
- **Nova** – is a cloud computing fabric controller designed to manage and automate pools of computer resources.
- **Glance** – provides discovery, registration and delivery services for disk and server images. It can also be used to store and catalog backups.
- **Ceph** – is a unified, distributed storage system designed for performance, reliability and scalability. CEPH replicates data and makes it fault-tolerant. Ceph storage is offered and is provided by Red Hat and SUSE.

## OPERATING SYSTEMS

The ORockCloud supports numerous types of cloud-ready images with several of the most popular ones preloaded. We work with our partners and community to provide customers with the choices needed and will continue to evolve to support their needs when possible. If one is needed that is not currently available, we can work to quickly make one available.