Open Source

Software Platform for Private Cloud

Dr. Manish T I
Professor
Dept of CSE
SCMS School of Engineering and Technology, Kerala
manish@scmsgroup.org, manishti2004@gmail.com


openstack™


cloudstack
open source cloud computing


NIMBUS
beyond the cloud


EUCALYPTUS


Open
Nebula

OpenStack

OpenStack is a cloud operating system that controls large pools of compute, storage, and networking resources throughout a datacenter, all managed through a dashboard that gives administrators control while empowering their users to provision resources through a web interface.

OpenStack is a free, open standard cloud computing platform. It is mostly deployed as infrastructure-as-a-service (IaaS) in both public and private clouds where virtual servers and other resources are made available to users.

The software platform consists of interrelated components that control diverse, multi-vendor hardware pools of processing, storage, and networking resources throughout a data center.

Users manage it either through a web-based dashboard, through command-line tools, or through RESTful web services.

OpenStack began in 2010 as a joint project of Rackspace Hosting and NASA. As of 2012, it was managed by the OpenStack Foundation, a non-profit corporate entity established in September 2012 to promote OpenStack software and its community.

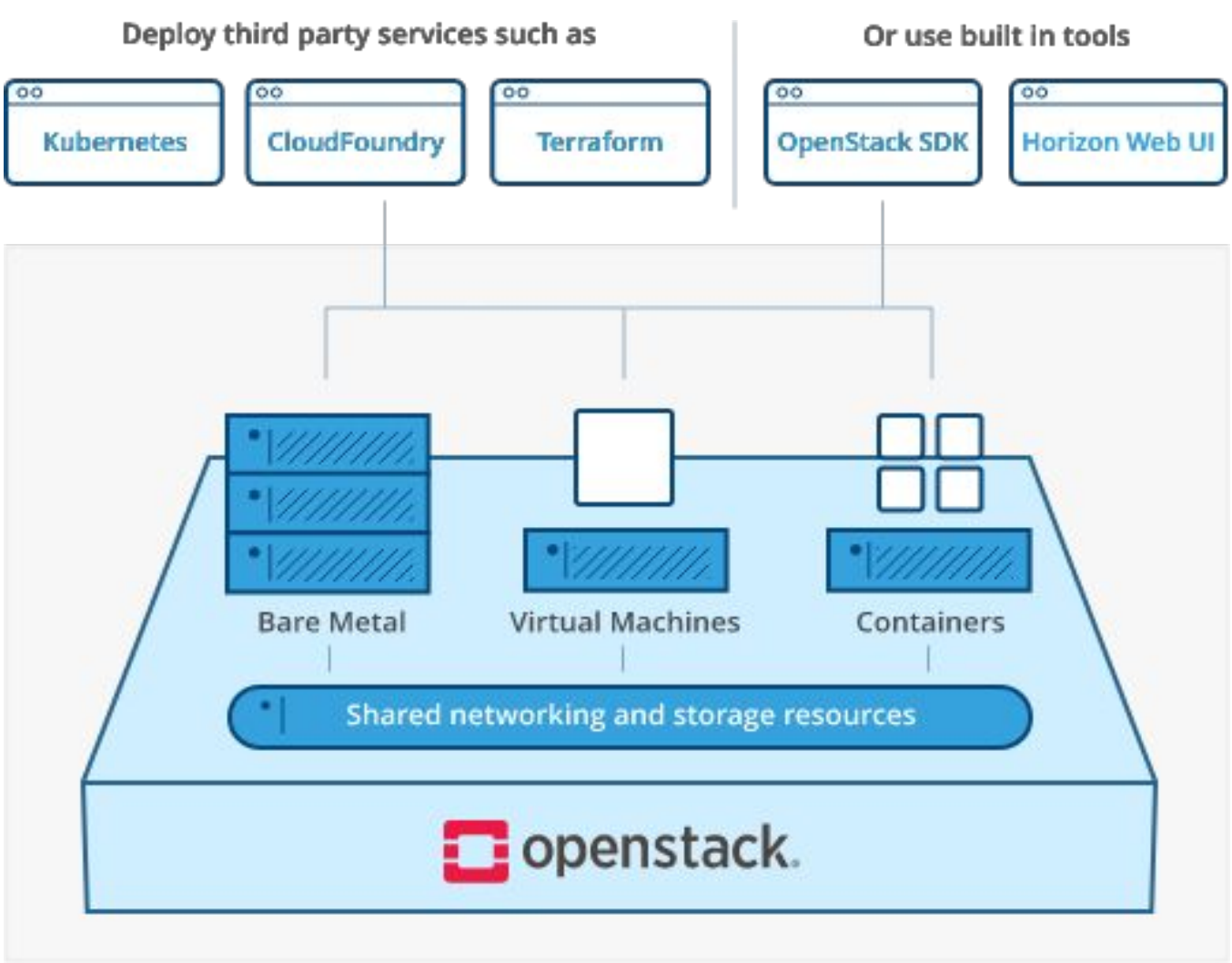
By 2018, more than 500 companies had joined the project. In 2020 the foundation announced it would be renamed the Open Infrastructure Foundation in 2021.

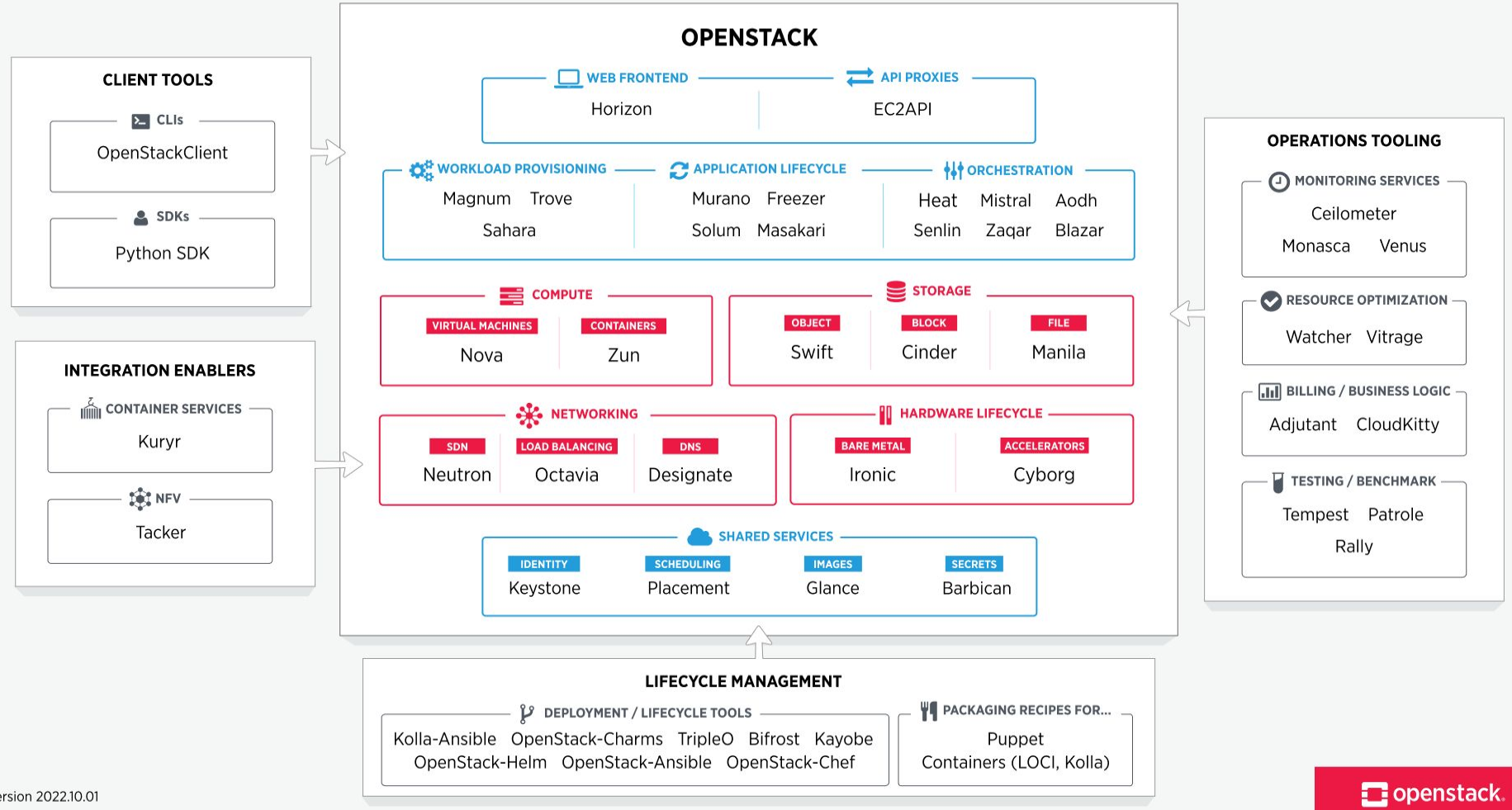
Release history

Release name	Release date
Yoga	30 March 2022

Included Component code names

Adjutant, Aodh, Barbican, Blazar, Ceilometer, Cinder, Cloudkitty, Cyborg, Designate, Ec2-api, Freezer, Glance, Heat, Horizon, Ironic, Keystone, Magnum, Manila, Masakari, Mistral, Monasca-api, Monasca-events-api, Murano, Neutron, Nova, Octavia, Placement, Sahara, Senlin, Solum, Storlets, Swift, Tacker, Trove, Vitrage, Watcher, Zaqar, Zun (38 services)


Deploy third party services such as
Or use built in tools
Kubernetes
CloudFoundry
Terraform
OpenStack SDK
Horizon Web UI
Bare Metal
Virtual Machines
Containers
Shared networking and storage resources
openstack.



Version 2022.10.01

Apache CloudStack

Apache CloudStack is open source software designed to deploy and manage large networks of virtual machines, as a highly available, highly scalable Infrastructure as a Service (IaaS) cloud computing platform.

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CloudStack's History

VMOps in 2008.

Cloud.com 2010 under the GNU General Public License version 3 (GPLv3).

CloudStack to the Apache Incubator 2012.

Apache CloudStack graduated from the Incubator on March 20, 2013, and the announcement was released on March 25, 2013.

Multiple Hypervisor Support

CloudStack works with a variety of hypervisors and hypervisor-like technologies. A single cloud can contain multiple hypervisor implementations. As of the current release CloudStack supports:

- BareMetal (via IPMI)
- Hyper-V
- KVM
- LXC
- vSphere (via vCenter)
- Xenserver
- Xen Project

Massively Scalable Infrastructure Management

CloudStack can manage tens of thousands of physical servers installed in geographically distributed datacenters.

The management server scales near-linearly eliminating the need for cluster-level management servers.

Maintenance or other outages of the management server can occur without affecting the virtual machines running in the cloud.

Eucalyptus

Eucalyptus is open source software for building AWS-compatible private and hybrid clouds.

As an Infrastructure as a Service (IaaS) product, Eucalyptus allows your users to provision your compute and storage resources on-demand.

Features

AWS API compatibility

Eucalyptus provides API compatibility with Amazon Web Services, to allow you to use familiar tools and commands to provision your cloud.

Block- and bucket-based storage abstractions

Eucalyptus provides storage options compatible with Amazon's EBS (block-based) and S3 (bucket-based) storage products.

Self-service capabilities

Eucalyptus offers a Management Console, allowing your users to request the resources they need, and automatically provisioning those resources where available.

Web-based Interface

The Eucalyptus Management Console is accessible from any device via a browser. The Console initial page provides a Dashboard view of components available to you to manage, configure, provision, and generate various reports.

Resource Management

Eucalyptus offers tools to seamlessly manage a variety of virtual resources. The following is an overview of the types of resources your cloud platform.

SSH Key Management

Eucalyptus employs public and private keypairs to validate your identity when you log into VMs using SSH. You can add, describe, and delete keypairs.

Image Management

Before running instances, someone must prepare VM images for use in the cloud. This can be an administrator or a user. Eucalyptus allows you to bundle, upload, register, describe, download, unbundle, and deregister VM images.

Linux Guest OS Support

Eucalyptus lets you run your own VMs in the cloud. You can run, describe, terminate, and reboot a wide variety of Linux-based VMs that were prepared using image management commands.

IP Address Management

Eucalyptus can allocate, associate, disassociate, describe, and release IP addresses. Depending on the networking mode, you might have access to public IP addresses that are not statically associated with a VM (Elastic IPs). Eucalyptus provides tools to allow users to reserve and dynamically associate these elastic IPs with virtual machines.

Security Group Management

Security groups are sets of firewall rules applied to VMs associated with the group. Eucalyptus lets you create, describe, delete, authorize, and revoke security groups. How much of these things can a typical user actually do?

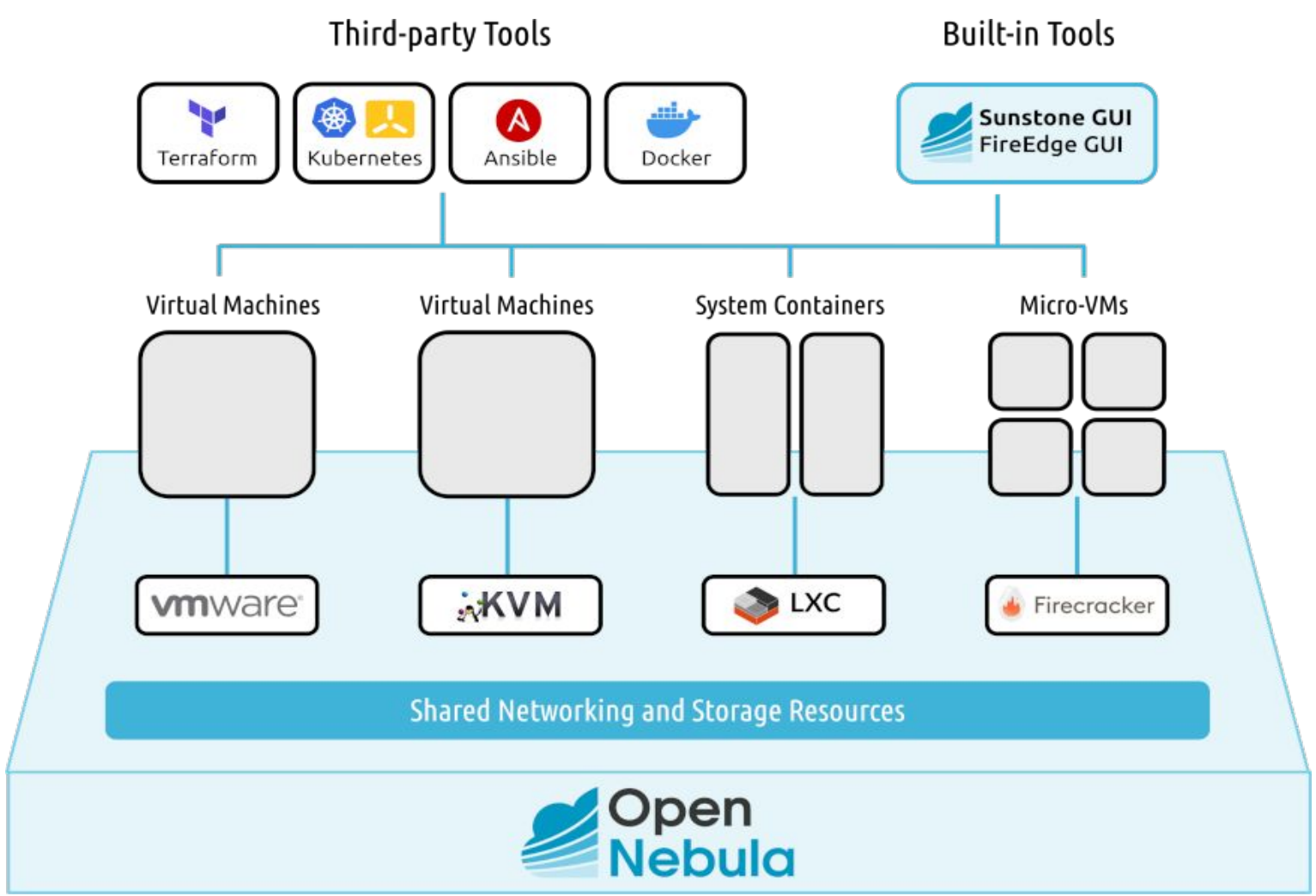
Volume and Snapshot Management

Eucalyptus allows you to create dynamic block volumes. A dynamic block volume is similar to a raw block storage device that can be used with virtual machines. You can create, attach, detach, describe, bundle, and delete volumes.

OpenNebula

OpenNebula is a powerful, but easy-to-use, open source platform to build and manage Enterprise Clouds.

OpenNebula provides unified management of IT infrastructure and applications, avoiding vendor lock-in and reducing complexity, resource consumption and operational costs.


Third-party Tools
Built-in Tools
Terraform
Kubernetes
Ansible
Docker
Sunstone GUI
FireEdge GUI
Virtual Machines
Virtual Machines
System Containers
Micro-VMs
vmware
KVM
LXC
Firecracker
Shared Networking and Storage Resources
Open Nebula

OpenNebula combines virtualization and container technologies with multi-tenancy, automatic provision and elasticity to offer on-demand applications and services.

It supports both containers with virtual machines in a common shared environment to get the best of both worlds.

It integrates multiple virtualization technologies, from VMware and KVM for fully virtualized clouds to LXC and Firecracker for containerized and serverless deployments.

It can easily deploy hybrid and edge environments with infrastructure resources from AWS, Google and Equinix.

Distributed Cloud Architecture

A standard OpenNebula Cloud Architecture consists of the Cloud Management Cluster, with the Front-end node(s), and the Cloud Infrastructure, made of one or several workload Clusters. These can be located at multiple geographical locations, with different configurations and technologies to better meet your needs:

Edge Clusters that can be automatically deployed both on premise and on public cloud or edge providers to enable true hybrid environments.

Open Cloud Clusters based on certified combinations of open source hypervisors, storage and networking technologies.

VMware Clusters that use existing VMware infrastructure.

Nimbus: Cloud Computing for Science

Nimbus Infrastructure was one of the first open source implementations of the concept of Infrastructure-as-a-Service (IaaS) with the production release of the first component, the Workspace Service, released in mid-2005.

Nimbus team transitioned to become an OpenStack contributor, always advocating the needs of the scientific community, and significantly contributing to OpenStack services such as Blazar reflecting our community's requirements.

Nimbus team leads the operation of the Chameleon research cloud, an OpenStack-based testbed for computer science systems research.

https://www.scienceclouds.org/