

Cloud Computing Service Provider Companies in 2019

1) Amazon Web Services

AWS is Amazon's cloud web hosting platform which offers fast, flexible, reliable and cost effective solutions. It offers a service in the form of building block which can be used to create and deploy any kind of application in the cloud. It is the most popular as it was the first to enter the cloud computing space.

Features:

- Easy sign-up process
- Fast Deployments
- Allows easy management of add or remove capacity
- Access to effectively limitless capacity
- Centralized Billing and management
- Offers Hybrid Capabilities and per hour billing

Download link:<https://aws.amazon.com/>

2) Microsoft Azure

Azure is a cloud computing platform which is launched by Microsoft in February 2010. This open source and flexible cloud platform which helps in development, data storage, service management & hosting solutions.

Features:

- Windows Azure offers the most effective solution for your data needs
- Provides scalability, flexibility, and cost-effectiveness
- Offers consistency across clouds with familiar tools and resources
- Allow you to scale your IT resources up and down according to your business needs

Download link:<https://azure.microsoft.com/en-in/>

3) Google Cloud Platform

Google Cloud is a set of solution and products which includes GCP & G suite. It helps you to solve all kind of business challenges with ease.

Features:

- Allows you to scale with open, flexible technology
- Solve issues with accessible AI & data analytics
- Eliminate the need for installing costly servers
- Allows you to transform your business with a full suite of cloud-based services

Download link:<https://cloud.google.com/>

4) VMware

VMware is a comprehensive cloud management platform. It helps you to manage a hybrid environment running anything from traditional to container workloads. The tools also allow you to maximize the profits of your organization.

Features:

- Enterprise-ready Hybrid Cloud Management Platform

- Offers Private & Public Clouds
- Comprehensive reporting and analytics which improve the capacity of forecasting & planning
- Offers additional integrations with 3rd parties and custom applications, and tools.
- Provides flexible, Agile services

Download link:<https://www.vmware.com/in/cloud-services/infrastructure.html>

Oracle Cloud

Oracle Cloud offers innovative and integrated cloud services. It helps you to build, deploy, and

manage workloads in the cloud or on premises. Oracle Cloud also helps companies to transform

their business and reduce complexity.

Features:

- Oracle offers more options for where and how you make your journey to the cloud
- Oracle helps you realize the importance of modern technologies including Artificial intelligence, chatbots, machine learning, and more
- Offers Next-generation mission-critical data management in the cloud
- Oracle provides better visibility to unsanctioned apps and protects against sophisticated cyber attacks

Download link:<https://www.oracle.com/cloud/>

5) IBM Cloud

IBM cloud is a full stack cloud platform which spans public, private and hybrid environments. It is built with a robust suite of advanced and AI tools.

Features:

- IBM cloud offers infrastructure as a service (IaaS), software as a service (SaaS) and platform as a service (PaaS)
- IBM Cloud is used to build pioneering which helps you to gain value for your businesses
- It offers high performing cloud communications and services into your IT environment

Download link:<https://www.ibm.com/cloud/>

Tips for selecting a Cloud Service Provider

There "best" Cloud Service cannot be defined. You need to choose a cloud service "best" for your project. Following checklist will help:

- Is your desired region supported?
- Cost for the service and your budget
 - For an outsourcing company, Customer/Client Preference of service provider needs to be factored in
- Cost involved in training employees on the Cloud Service Platform
- Customer support
- The provider should have a successful track record of stability/uptime/reliability
- Reviews of the company

Here is a list of Top 21 Cloud Service Providers for Quick Reference

- Amazon Web Services

Alibaba Cloud

- Microsoft Azure

Google Cloud Platform

- VMware

Rackspace

- Salesforce

Oracle Cloud

- Verizon Cloud

Navisite

- IBM Cloud

OpenNebula

- Pivotal

DigitalOceanCloudSigma

Dell Cloud

- LiquidWeb

LimeStone

MassiveGridQuadranet

Kamatera

Eucalyptus

- Eucalyptus is an acronym for **Elastic Utility Computing Architecture for Linking Your Programs To Useful Systems**.

- Eucalyptus is a paid and open-source computer software for building Amazon Web Services (AWS)-compatible private and hybrid cloud computing environments, originally developed by the company Eucalyptus Systems.

- Eucalyptus enables pooling compute, storage, and network resources that can be dynamically scaled up or down as application workloads change Eucalyptus has six components:

1. The **Cloud Controller** (CLC) is a Java program that offers EC2-compatible interfaces, as well as a web interface to the outside world.

- In addition to handling incoming requests, the CLC acts as the administrative interface for cloud management and performs high-level resource scheduling and system accounting.

- The CLC accepts user API requests from command-line interfaces like euca2ools or GUI-based tools like the Eucalyptus User Console and manages the underlying compute, storage, and network resources.

- Only one CLC can exist per cloud and it handles authentication, accounting, reporting, and quota management.

2. **Walrus**, also written in Java, is the Eucalyptus equivalent to AWS Simple Storage Service (S3).

- Walrus offers persistent storage to all of the virtual machines in the Eucalyptus cloud and can be used as a simple HTTP put/get storage as a service solution.

- There are no data type restrictions for Walrus, and it can contain images (i.e., the building blocks used to launch virtual machines), volume snapshots (i.e., point-in-time copies),

and application data. Only one Walrus can exist per cloud.

3. The **Cluster Controller** (CC) is written in C and acts as the front end for a cluster within a Eucalyptus cloud and communicates with the Storage Controller and Node Controller.

- It manages instance (i.e., virtual machines) execution and Service Level Agreements (SLAs) per cluster.

4. The **Storage Controller** (SC) is written in Java and is the Eucalyptus equivalent to AWS EBS. It communicates with the Cluster Controller and Node Controller and manages Eucalyptus block volumes and snapshots to the instances within its specific cluster.

- If an instance requires writing persistent data to memory outside of the cluster, it would need to write to Walrus, which is available to any instance in any cluster.

5. The **Node Controller** (NC) is written in C and hosts the virtual machine instances and manages the virtual network endpoints.

- It downloads and caches images from Walrus as well as creates and caches instances.

- While there is no theoretical limit to the number of Node Controllers per cluster, performance limits do exist.

6. The **VMware Broker** is an optional component that provides an AWS-compatible interface for VMware environments and physically runs on the Cluster Controller.

- The VMware Broker overlays existing ESX/ESXi hosts and transforms Eucalyptus Machine Images (EMIs) to VMware virtual disks.

- The VMware Broker mediates interactions between the Cluster Controller and VMware and can connect directly to either ESX/ESXi hosts or to vCenter Server.

Nimbus

- Nimbus is a set of open source tools that together provide an "Infrastructure-as-a Service" (IaaS) cloud computing solution.

- Mission is to evolve the infrastructure with emphasis on the needs of science, but many non-scientific use cases are supported as well.

- Nimbus allows a client to lease remote resources by deploying virtual machines (VMs) on those resources and configuring them to represent an environment desired by the user.

- It was formerly known as the "Virtual Workspace Service" (VWS) but the "workspace service" is technically just one the components in the software .

- Nimbus is a toolkit that, once installed on a cluster, provides an infrastructure as a service cloud to its client via WSRF-based or Amazon EC2 WSDL web service APIs.

- Nimbus is free and open-source software, subject to the requirements of the Apache License, version 2.

- Nimbus supports both the hypervisors Xen and KVM and virtual machine schedulers Portable Batch System and Oracle Grid Engine.

- It allows deployment of self-configured virtual clusters via contextualization.

- It is configurable with respect to scheduling, networking leases, and usage accounting.

- Nimbus is comprised of two products:

Nimbus Infrastructure

Nimbus Platform

- **Nimbus Infrastructure** is an open source EC2/S3-compatible Infrastructure-as-a

Service implementation specifically targeting features of interest to the scientific community such as support for proxy credentials, batch schedulers, best-effort allocations and others.

- **Nimbus Platform** is an integrated set of tools, operating in a multi-cloud environment, that deliver the power and versatility of infrastructure clouds to scientific users. Nimbus Platform allows you to reliably deploy, scale, and manage cloud resources.

System Architecture & Design

- The design of nimbus which consists of a number of components based on the web service technology.

1. **Workspace service**

Allows clients to manage and administer VMs by providing to two interfaces:

- A) One interface is based on the web service resource framework (WSRF)
- B) The other is based on EC2 WSDL

2. **Workspace resource manager**

implements VM instance creation on a site management.

3. **Workspace pilot**

- Provides virtualization with significant changes to the site configurations.

4. **workspace control**

- Implements VM instance management such as start, stop and pause VM. It also provides image management and set up networks and provides IP assignment.

5. **context Broker**

- Allows clients coordinate large virtual cluster launches automatically and repeatedly.

6. **Workspace client**

- A complex client that provides full access to the workspace service functionality.

7. **Cloud client**

- A simpler client providing access to selected functionalities in the workspace service.

8. **Storage service**

- cumulus is a web service providing users with storage capabilities to store images and works in conjunction with GridFTP.

Open Nebula

- Open Nebula- is an open source cloud computing platform for managing heterogeneous distributed data centre infrastructures.

- Manages a data centre's virtual infrastructure to build private, public and hybrid implementations of IaaS.

- Two primary uses of open nebula platform are:

data center virtualization

- Many of our users use OpenNebula to manage data center virtualization, consolidate servers, and integrate existing IT assets for computing, storage, and networking.

- In this deployment model, OpenNebula directly integrates with hypervisors (like KVM, Xen or VMware ESX) and has complete control over virtual and physical resources, providing advanced features for capacity management, resource optimization, high availability and business continuity.

- Some of these users also enjoy OpenNebula's cloud management and provisioning

features when they additionally want to federate data centers, implement cloud bursting, or offer self-service portals for users.

Cloud infrastructure solutions

- We also have users that use OpenNebula to provide a multitenant, cloud-like provisioning layer on top of an existing infrastructure management solution (like VMware vCenter).
- These users are looking for provisioning, elasticity and multi-tenancy cloud features like virtual data centers provisioning, datacenter federation or hybrid cloud computing to connect in-house infrastructures with public clouds, while the infrastructure is managed by already familiar tools for infrastructure management and operation

Image Repository: Any storage medium for the VM images (usually a high performing SAN).

Cluster Storage : OpenNebula supports multiple back-ends (e.g. LVM for fast cloning)

VM Directory: The home of the VM in the cluster node

- Stores checkpoints, description files and VM disks
- Actual operations over the VM directory depends on the storage medium
- Should be shared for live-migrations
- You can go on without a shared FS and use the SSH back-end

Master node: A single gateway or front-end machine, sometimes also called the master node, is

responsible for queuing, scheduling and submitting jobs to the machines in the cluster. It runs several other OpenNebula services mentioned below:

- Provides an interface to the user to submit virtual machines and monitor their status.
- Manages and monitors all virtual machines running on different nodes in the cluster.
- It hosts the virtual machine repository and also runs a transfer service to manage the transfer of virtual machine images to the concerned worker nodes.
- Provides an easy-to-use mechanism to set up virtual networks in the cloud.
- Finally, the front-end allows you to add new machines to your cluster.

Worker node: The other machines in the cluster, known as 'worker nodes', provide raw computing power for processing the jobs submitted to the cluster. The worker nodes in an OpenNebula cluster are machines that deploy a virtualisation hypervisor, such as VMware, Xen or KVM.