Infrastructure As A Service (IaaS)

Infrastructure As A Service (IaaS) is apart of the cloud computing triad namely Software As A Service(SaaS), Platform As A Service (PaaS) and IaaS itself. It is the probably the most used and profitable type of cloud computing service, though SaaS might have a thing or two to say about that. IaaS is a cloud computing service where a user can access virtualized computing resources that is hosted on a third-party server infrastructure and not the users own on-premise servers. IaaS is a type of public cloud, where servers are shared between users. A IaaS provider hosts all the components needed for a proper functioning server such as storage, server software, networking software and hardware in their own data center. They then grant assess to their virtual resources for an hourly fee. All the user need assess a public cloud is a web browser and they do not have to worry about maintaining the servers or any other technical details.

There are many players in IaaS, but they can be placed in groups easily. The groups will be Main Players, Mass Scale Without the Market Share and The Innovators. The top three IaaS companies control nearly 50% of the sector and their shares are only growing. There are a few other companies with the scale to challenge them, but they lack the competitive edge when compared to them. The Innovators have the competitive edge, but they lack the scale. It is hard to see anyone beyond Amazon Web Service, Azure or Google Cloud winning the IaaS race, but it is still worth examining the important players.

Main Players

These are the three horsemen of the on-premise server “cloudpocalypse”. They have the biggest scale and they are very innovative even at a large scale. Their respective parent companies have made the ownership of the public cloud one of their primary objectives.

Amazon Web Services (AWS)

AWS was started in March 2006 when Amazon realized it had excess data center capacity as it was building them out its online shopping juggernaut Amazon.com. What started out as an unplanned business has become a vital part of the planning stage of many start-ups. Some of AWS most note worthy consumers are: Spotify, Netflix, Federal Drugs Administration, Apple, Comcast, Dow Jones and Adobe. AWS has a wide range of products that are too much to be mentioned. However, they main services that AWS is access for include Storage, Compute, Database, Migration, Networking and Content Delivery, Game Development, Mobile Services, Internet of Things, and Machine Learning.

Although it is not advertised boldly, AWS and many other IaaS platforms operate in a kind of freemium model, where certain features are always free if you are a consumer. Meaning if you are only using $10 per month of Elastic Compute Cloud, you will still get all the free services. They also offer a free-tier for 12 months, which comes with all you would need to run your application or website for free. The IaaS field is dominated by scale, allowing the bigger players to give away a lot of free services and products in order to hook the consumer in for life or into more pricey services. All pricings are based on a number of factors, but a company only ever pay for what they use.

These are some of the perpetually free services that AWS offers. This list is by no means exhaustive.

**Amazon DynamoDB**

* 25 GB of Storage, 25 Units of Read Capacity and 25 Units of Write Capacity – enough to handle up to 200M requests per month with Amazon DynamoDB.

**Amazon Cognito**

* The Your User Pool feature has a free tier of 50,000 MAUs each month.
* The Federated Identities feature for authenticating users and generating unique identifiers is always free with Amazon Cognito.

**AWS CodeCommit**

* 5 active users per month.
* 50 GB-month of storage per month.
* 10,000 Git requests per month.

**Amazon CloudWatch**

* 10 Amazon Cloudwatch custom metrics, 10 alarms, and 1,000,000 API requests.
* 5 GB of Log Data Ingestion.
* 5 GB of Log Data Archive.
* 3 Dashboards with up to 50 metrics each per month.

**AWS X-Ray**

* 100,000 traces recorded per month.
* 1,000,000 traces scanned or retrieved per month.

**Amazon Mobile Analytics**

* 100 million free events per month.

The one year free-tier includes, but is not limited to the following features:

Elastic Compute Cloud (EC2)

* 750 hours of Amazon EC2 Linux t2.micro instance usage (1 GiB of memory and 32-bit and 64-bit platform support.
* 750 hours of Amazon EC2 Microsoft Windows Server† t2.micro instance usage (1 GiB of memory and 32-bit and 64-bit platform support.
* 750 hours of an Elastic Load Balancer shared between Classic and Application load balancers, 15 GB data processing for Classic load balancers, and 15 LCUs for Application load balancers.
* 30 GB of Amazon Elastic Block Storage in any combination of General Purpose (SSD) or Magnetic, plus 2 million I/Os (with EBS Magnetic) and 1 GB of snapshot storage.
* 500 MB-month of Amazon Elastic Container Registry storage for new customers.

Amazon Simple Storage Service (S3)

* 5 GB of Amazon S3 standard storage, 20,000 Get Requests, and 2,000 Put Requests

Amazon Elastic File System (EFS)

* 5 GB per month of Amazon EFS capacity free

Amazon Relational Database Service (RDS)

* 750 hours of Amazon RDS Single-AZ db.t2.micro Instances,for running MySQL, PostgreSQL, MariaDB, Oracle BYOL or SQL Server (running SQL Server Express Edition.
* 20 GB of database storage, in any combination of RDS General Purpose (SSD) or Magnetic storage.
* 10 million I/Os.
* 20 GB of backup storage for your automated database backups and any user-initiated DB Snapshots.

In the last quarterly report, Amazon.com announced that AWS had revenue of $4,584 billion and operating income of $1,171 billion. It is by far the biggest IaaS player in the game.

Microsoft Azure

Microsoft Azure, that started out as Windows Azure, was starred in 2010, ten years after AWS. It was renamed to Microsoft Azure in 2014 after Microsoft became a cloud and mobile company. Azure is apart of Microsoft Cloud platform that grossed $5 billion in revenue. However, Office 365, the SaaS part of the Cloud Platform is responsible for the bulk of the revenue. Microsoft is probable the number one IaaS provider for large enterprises. It boosts of having 90% of all Fortune 500 companies using it services.

One of Microsoft’s biggest advantages is its true hydrid implications through Azure Stack, which is important for many enterprises and mission crictical sernario. Stack is an extension of Azure, bringing the agility and fast-paced innovation of cloud computing to on-premises environments. Azure Stack allows a consumer to deliver Azure services from their own datacenter, while balancing the right amount of flexibility and control. Another advantage Azure has is its cloud regions. It has the most regions of all IaaS providers. This is important if you are going to get government, mission critical, data sensitive contracts. Some of its consumers include Abode, Honeywell, General Electric Healthcare, City of Hope, Docusign and Kinetisense.

Like AWS, Azure offers a one year free trial, which virtually allows a company to be fully operational on it.

The free services for the one year trial according to the Azure website are:

Linux Virtual Machines

COMPUTE

750 Hours

B1S VM

Create Linux virtual machines with on-demand capacity in seconds.

Windows Virtual Machines

COMPUTE

750 Hours

B1S VM

Create Windows virtual machines with on-demand capacity in seconds.

Managed Disks

STORAGE

64 GB X 2

2 P6 SDDs

Get premium, secured disk storage for Azure Virtual Machines with simplified management.

Blob Storage

STORAGE

5 GB

LRS hot block

Use massively scalable object storage for any type of unstructured data.

File Storage

STORAGE

5 GB

LRS File Storage

Migrate to simple, distributed, cross-platform file storage without changing code.

SQL Database

DATABASES

250 GB

Create an Azure SQL Database that delivers intelligence built-in.

Cosmos DB

DATABASES

5 GB

400 requests units

Build and scale your application with a globally distributed, multi-model database service.

Bandwidth (Data Transfer)

NETWORKING

15 GB

outbound

Transfer data inbound and outbound through our robust network of global data cent

As with its bigger rival, Azure also offers forever free services that include, but not limited to:

App Service

10 Web, mobile or API apps, which allows a user to quickly create powerful apps for any platform or device using their choice of tools including Node.js and PHP.

Functions

1,000,000 requests per month with a serverless code architecture.

Container Service

Deploy and manage containers using a choice of tools for free.

Active Directory

Enable one-click sign-in to any cloud or on-premises web app for secured identity and access management through 500,000 objects

Active Directory B2C

Enable 50,000 monthly stored users, which allows for identification and access management in the cloud.

Service Fabric

Build and operate always-on, scalable, distributed apps for free.

Visual Studio Team Services

Build apps in any language using our DevOps service - git repos, CI/CD, build and release automation with up to 5 users with unlimited private Git repos.

Application Insights

Monitor the use and performance of live apps running on an unlimited number of hosts or devices.

DevTest Labs

Enable fast, easy, and lean dev-test environments for free.

Machine Learning Studio

Build powerful, cloud-based machine learning applications with 100 modules per experiment.

Security Center

Prevent, detect, and respond to threats with increased visibility and control over the security of Azure resources.

Microsoft IoT Hub

Connect, monitor, and manage billions of IoT assets with 8,000 messages per day.

According to Microsoft’s fiscal year 2018 first quarter report, Azure had revenue growth of 90%.

Google Cloud Platform

The third biggest cloud player, at least in terms of mindshare if not market share. One of Google’s biggest advantage is its own services that runs on its own cloud platform. These services such YouTube, Gmail, and Google.com have managed to achieve great scale with the help of Google Cloud Platform. Some of the companies that use its services are Coca-Cola, Snapchat, Wix.com, Phillips, and Cocoda. Although Google Cloud platform has been regarded as the third biggest IaaS around, the latest report from Gartner has indicated that the are fourth behind Alibaba Cloud in terms of revenue. However, given Google’s scale and they finances, it would be pertinent for Google to be considered the third of the three IaaS horsemen.

Some of Google Cloud Platform most popular services include;

Google Compute Engine

These are Google’s virtual machines.

Bigtable

This is a massively scalable NoSQL database.

BigQuery

SaaS large scale database analytics.

Google Cloud Functions

Provides serverless functions to be triggered by cloud events.

Google Cloud Datastore

DBaaS providing a document-oriented database.

Cloud Pub/Sub

A service for publishing and subscribing to data streams and messages.

Google Storage

This service provides RESTful online file and object storage.

Google also offers a standard one-year free plan that is good enough to run a business such as enough free virtual machine time to run a site fulltime for 12 months on the free. It also offers always free products includes, but not limited:

Google App Engine

Platform for building scalable web applications and mobile backends with 28

Instance hours per day and 5 GB of cloud storage. It also offers 1000 search operations per day, 10 MB search indexing, and 100 emails per day.

Google Cloud Datastore

Highly-scalable NoSQL database with 1 GB storage and 50,000 reads, 20,000 writes, 20,000 deletes per day.

Google Compute Engine

One (1) f1-micro instance per month with 30 GB/months HDD, 5 GB/months snapshot, and 1 GB network egress from North America to all region destinations per month.

Google Cloud Storage

Best in class performance, reliability, and pricing for all your storage needs, which comes with 5 GB/months of regional storage per month, 5000 Class A Operations per month, 50000 Class B Operations per month and 1 GB network egress from North America to all region destinations per month.

Google Cloud Pub/Sub

A global service for real-time and reliable messaging and streaming data with 10 GB

Messages per month

Google Cloud Functions

A serverless environment to build and connect cloud services with code with 2 million invocations per month (includes both background and HTTP invocations), 400,000 GB-seconds memory, 200,000 GHz-seconds of compute time, and 5 GB network egress per month.

Google Kubernetes Engine

One-click container orchestration via Kubernetes clusters, managed by Google that gives No cluster management fee for clusters of all sizes.

Google Cloud Speech API

60 minutes per month.

Google Cloud Natural Language

Derive insights from unstructured text using Google machine learning with 5000

Units per month.

Mass Scale Without the Market Share

These IaaS players have the scale to challenge the big three, however, despite being in the game, they have not been able to gain sufficient market or mind share.

International Business Machine (IBM) Cloud

IBM main IaaS platform was created when they bought Softlayer. IBM Cloud allows a company to select delivery models, locations, services, tools and data to meet its specific workload needs. IBM allows for an Hybrid approach by connecting applications across all types of cloud with on-premises systems. The IBM Cloud also allows a consumer to leverage their existing skills and technology investments. The IBM Cloud platform offers a rich assortment of infrastructure, cognitive, software and services.

Oracle

Oracle Cloud the latest technologies like Skylake, Tesla GPUs, and NVMe solid state storage to build scalable services, offered that offers flexibility, simple pricing. Oracle Cloud Infrastructure provides the performance, governance, and versatility enterprises need. Oracle Cloud Infrastructure has solutions tailored to a consumer’s application needs, across both existing and new workloads. Oracle provides the proven reliability of Oracle RAC and Exadata in the cloud for the most demanding applications, and the market's most powerful compute for performance-intensive workloads like High Performance Computing (HPC), Big Data, and Container-Native. Oracle helps extend legacy technology investments, tools, and processes.

The Innovators

VMware

VMware is one of the biggest name is on-premise datacenters, however, they have been making progress towards the public cloud. Some of the services offered by VMware cloud includes:

VMware Cloud on AWS, which is an on-demand service for running apps across vSphere-based cloud environments.

Wavefront by VMware for the monitoring and analytics platform for modern cloud-native applications.

Hybrid Cloud Extension, which provides app mobility and infrastructure hybridity across any vSphere clouds.

NSX Cloud that gives consistent networking and security for applications running in public clouds​.

Horizon Cloud is a service that enables the delivery of cloud-hosted virtual desktops and apps to any device, anywhere.

AirWatch is an enterprise mobility management platform to centrally manage every device and every app.

Workspace ONE is digital workspace platform that delivers and manages any app on any device.

Cloud Foundation is a unified SDDC platform that delivers enterprise-ready cloud infrastructure for the private and public cloud.

Realize Suite is cloud management platform for delivery and management of IT services in multi-cloud environments.

CenturyLink Cloud

This cloud service is provided by the CenturyLink, which is the third biggest telecommunication company in the USA. Some of its features includes:

Dedicated Cloud Compute – Foundation

Delivers a proven Private Cloud solution with a new converged architecture: a software-defined data center based on the VMware Cloud Foundation standard, enabling dynamic allocation of resources across network, security, compute and storage for enterprise IT workloads.

Website & App Hosting

High-performing, secure, reliable and scalable solution for delivering websites and applications. Eliminate the cost and effort of investing and maintaining infrastructure, so you can focus on delivering value.

Enterprise IT

Take your cloud strategy to the next level with cloud services that are secure, reliable and scalable. Ideal for hosting mission-critical enterprise applications, and you only pay for the infrastructure you need, when you need it.

Big Data

Solve Big Data challenges by leveraging Cloudera Hadoop Managed Services on Bare Metal Servers, combined with our Data & Advanced Analytics consultation, delivered over our secure infrastructure and network.

Business Applications

Run line of business applications in the cloud, with instant access to resources and powerful orchestration and management tools, including [Cloud Application Manager](https://www.ctl.io/cloud-application-manager).

Development & Test

Remove resource constraints and quickly spin up and tear down development and test environments. [Cloud Application Manager](https://www.ctl.io/cloud-application-manager/) features powerful ALM capabilities.

The Biggest Treat to the Big Three

Alibaba Cloud

Alibaba Cloud is the public cloud arm of Alibaba Group, the Chinese e-commerce giant. In its September 2017 financial results, it reported a revenue from cloud computing increase of 99% year-over-year to RMB2,975 million (US$447 million). It is actually the third biggest cloud player after Azure and AWS in terms of revenue and it is going faster than them. It offers $300 of free credit for 60 months and many always free products like all other cloud players. Alibaba has a wide variety of products and services, including fix price products that all in one prices and limits. Some of these products are:

SSD Cloud Server ECS

Starter Package Plan

IOPS: 20000 | Throughput: 256 MBps | Capacity: 32768 GiB

High-performance Elastic Compute Service (ECS) at low cost

Region: Worldwide Hong Kong Mainland China Worldwide: Singapore, Sydney, Frankfurt, Virginia, Silicon Valley

Operating System:

Linux Windows

$4.50 USD/month

1 Core CPU 1GB Memory 40GB SSD Cloud Disk 1TB Data Transfer

$10 USD/month 1 Core CPU 1GB Memory 40GB SSD Cloud Disk 2TB Data Transfer

$19 USD/month 1 Core CPU 2GB Memory 40GB SSD Cloud Disk 3TB Data Transfer

$39 USD/month 2 Core CPU 4GB Memory 60GB SSD Cloud Disk 4TB Data Transfer

$79 USD/month 2 Core CPU 8GB Memory 80GB SSD Cloud Disk 5TB Data Transfer

All these plans include all these benefits for free:

99.95% service availability

Free snapshots

Solid-state drives

Tier 3+ data centers

Triplicated data backup

Static IP address

Simple management

Access to 30+ products

Choose From 12 Regions

Storage & Application Service

Object Storage Service

Table Store

Attach additional SSD storage

Message Service

Networking & Domains

Server Load Balancer

CDN

Virtual Private Cloud

Domains

Database Service

ApsaraDB for RDS (MySQL, PostgreSQL)

ApsaraDB for Redis

ApsaraDB for MongoDB

Data Transmission Service

It has many cloud regions that span the world. They include:

North America

US West 1 (Silicon Valley)

US East 1 (Virginia)

Asia

Hong Kong

Asia Pacific SE 1 (Singapore)

Australia

Asia Pacific SE 2 (Sydney)

Europe

EU Central 1 (Frankfurt)

Mainland China

China East 1 (Hangzhou)

China East 2 (Shanghai)

China North 1 (Qingdao)

China North 2 (Beijing)

China North 3 (Zhangjiakou)

China South 1 (Shenzhen)

It offers many Linux and Windows versions including:

CentOS

Debian

OpenSUSE

FreeBSD

CoreOS

Ubuntu

SUSE Linux

Aliyun Linux

Windows Server

It also offers many one click applications including:

WordPress

LAMP

Drupal

Joomla

Redis

NodeJS

GitLab

Ghost

Chyrp

Opencart

Magento

Jenkins

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Rackspace Managed Cloud

Rackspace comes at the cloud in a different way; it is a middle man whose mission is to get consumers to the cloud in a headache-free way.

<https://aws.amazon.com/free/>

<https://azure.microsoft.com/en-us/free/>

<https://azure.microsoft.com/en-us/overview/azure-stack/>

https://www.ibm.com/cloud/why-ibm