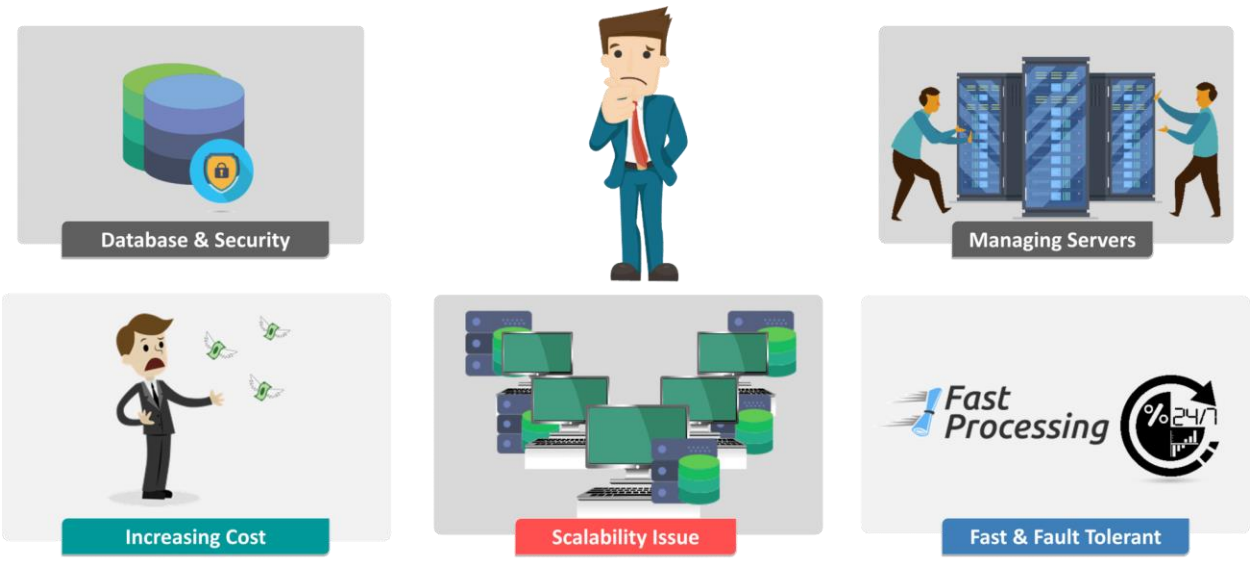
Why Cloud?

Shortcomings Of The Pre-Cloud Era:

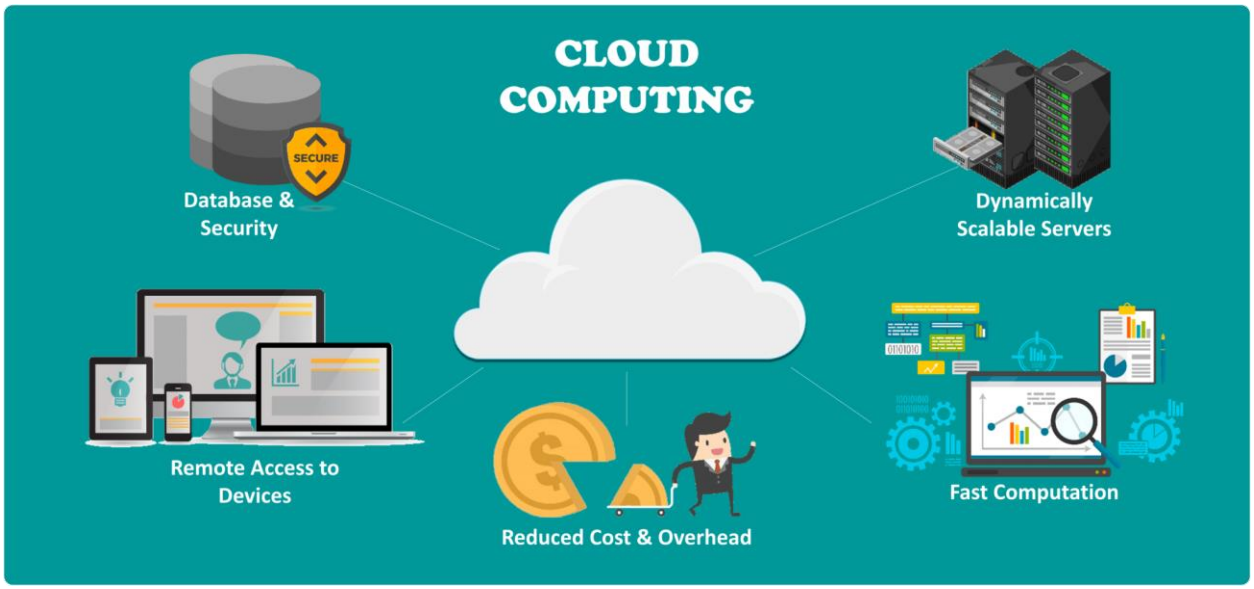
Let us start by taking a look at this image which illustrates some of the issues that existed before **Cloud** came into existence.



From the above image it is evident that the **Pre-Cloud** World was marred by problems like:

- Inability to Secure Databases properly
- Cost Optimization
- Incapability to scale and manage your servers
- Producing robust and fault tolerant devices

Did **Cloud** solve these problems? Definitely yes.



Now, "***Cloud*** *is a collection of* ***servers*** *and* ***computers*** *connected by a network which is owned by a third party vendor somewhere on the globe*"

Cloud made sure following things were taken care of:

- Utmost care of **Data Security** by implementing stringent policies
- Ensures use of **Dynamically Scalable Servers**
- Provide you with **Fast Computation** and **Remote Access** to devices
- **Flexible Pricing** ensures high **Cost Optimization**

Thus **Cloud** emerged as a saviour and with it we saw different Cloud Service Providers like **Google Cloud Platform**, Amazon Web Services, Microsoft Azure etc make their mark in the **Cloud** domain.

Next in this Google Cloud Platform Tutorial you would understand Why **GCP** came to the forefront:

Why Google Cloud Platform?

As I have just mentioned that there are various Cloud service providers in the market, so what makes **Google Cloud Platform** different? Following image will give you some of the major reasons why one should opt for it:

- **Pricing: GCP** leaves all the competition way behind with its highly flexible pricing and is rightly a leader here
- **Scalability:** Scaling down can always be an issue with cloud services. **GCP** lets you scale up and down with extreme ease
- **Custom Machines:** With Custom Machine Types you can easily create a machine type customized to your needs with discount implications up to 50% off
- **Integrations:** Easily use various API's, practice Internet of Things and Cloud Artificial Intelligence
- **Big Data Analytics:** Use Big Query and **Big Data Analytics** to carry out plethora of analytical practices
- **Serverless:** Serverless is a new paradigm of computing that abstracts away the complexity associated with managing servers for mobile and API back-ends, ETL, data processing jobs, databases, and more.

In case you wish to know more about Google Cloud Platform and also get introduced to its practical aspect then the following video is highly recommended.

Google offers a wide range of Services. In case you wish to know more about Google Cloud Platform Services this ***blog*** talks about it in detail.

What Is Google Cloud Platform?

You can think of it as collection of **Cloud Services** offered by **Google**. The platform hosts a wide range of services like comprising of

- Compute
- Storage

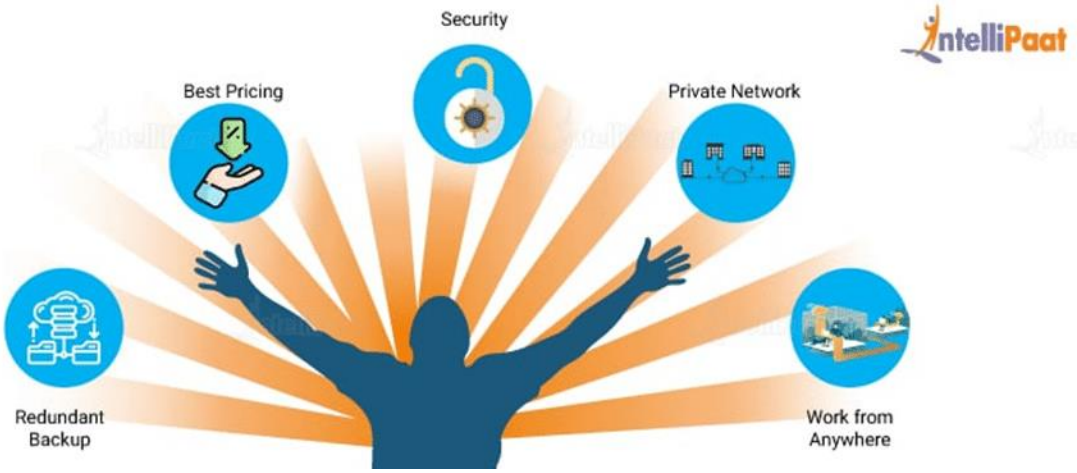
- Application development

Now who can access these services? Well these can be accessed by developers, cloud administrators and other enterprise IT professionals. This can be done through the public internet or through a dedicated network connection.

Next I will putforth some of the core functionalities and services of GCP:

- **Google Compute Engine:** Google Compute Engine helps you deliver VM that runs in Google's innovative data centers and worldwide fiber network. It lets you **scale from single instances to global and implement** load-balanced cloud computing.
- **App Engine:** This PaaS offering lets developers access Google's scalable hosting. Developers are also free to access software SDK's to develop software products that run on App Engine.
- **Cloud Storage:** Google Cloud Storage platform enables you to store large, unstructured data sets. Well, Google also offers database storage options such as Cloud Datastore for NoSQL non relational storage, Cloud SQL for MySQL fully relational storage and Google's native **Cloud Big table** database.
- **Google Container Engine:** It is a management and orchestration system for Docker containers that runs within Google's public cloud. Google Container Engine is based on the Google Kubernetes container orchestration engine.

Let's look into a few benefits that Google Cloud has to offer to its users:

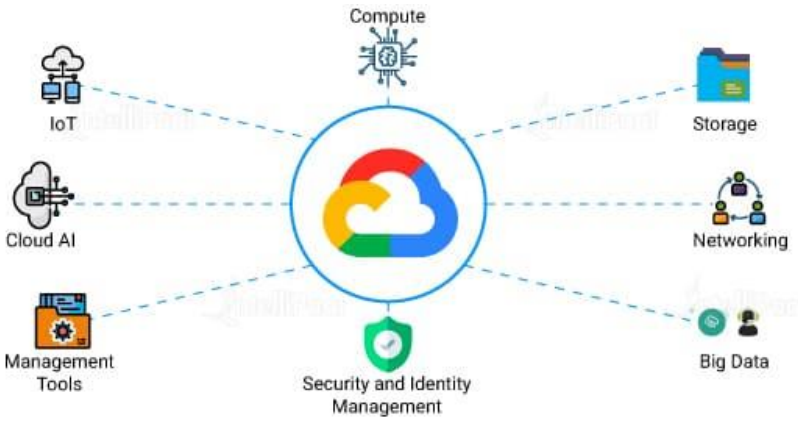


Google Cloud Services

Google Cloud has been expanding across the globe. The reason is the wide array of services it offers to its users:

- Google Cloud Compute Services
- Google Cloud Storage Services
- Networking
- Big Data Services
- Security and Identity Management
- Management Tools
- Cloud AI
- IoT

Let's get a brief information on each:



Compute Services

- **Google App Engine:** Platform as a Service to deploy Java, PHP, and other applications. It is a Cloud Computing platform for developing and hosting web applications in Google-managed data centers. It offers the automatic scaling feature, i.e., as the number of requests for an application increases, the App

Engine automatically allocates more resources for the application to handle additional demand.

- **Compute Engine:** Infrastructure as a Service to run Microsoft Windows and Linux virtual machines. It is a component of the Google Cloud platform which is built on the same infrastructure that runs Google's search engine, YouTube, and other services.
- **Kubernetes Engine:** It aims at providing a platform for automating deployment, scaling, and operations of application containers across clusters of hosts. It works with a wide range of container tools including docker.

Storage Services

- **Google Cloud Storage:** An online file storage web service for storing and accessing data on a Google Cloud platform infrastructure. The service combines the performance and scalability of Google Cloud with advanced security and sharing capabilities.
- **Cloud SQL**: A web service that allows you to create, configure, and use relational databases that live in Google Cloud. It maintains, manages, and administers your databases allowing you to focus on your applications and services.
- **Cloud Bigtable:** A fast, fully managed, and a highly scalable NoSQL database service. It is designed for the collection and retention of data from 1 TB to hundreds of PB.

Networking

- **VPC**: Virtual Private Cloud provides a private network with IP allocation, routing, and network firewall policies to create a secure environment for your deployments.

- **Cloud Load Balancing**: It is a process of distributing workloads across multiple computing resources. This reduces the cost and maximizes the availability of the resources.
- **Content Delivery Network:** A geographically distributed network of proxy servers and their data centers. The goal here is to provide high availability and high performance by spatially distributing the service relating to end users.

Big Data

- **BigQuery:** Google BigQuery Service is a fully managed data analysis service that enables businesses to analyse Big Data. It features highly scalable data storage, the ability to perform ad-hoc queries, and the ability to share data insights via the web.
- **Google Cloud Datastore:** A fully managed, schema less, non-relational datastore. It supports atomic transactions and a rich set of query capabilities and can automatically scale up and down depending on the load.
- **Google Cloud Dataproc**: A fast, easy-to-use and manage Spark and Hadoop service for distributed data processing. With Cloud Dataproc, you can create Spark or Hadoop clusters, sized for your workloads precisely when you need them.

Cloud AI

- **Cloud Machine Learning Engine:** A managed service that will enable you to build Machine Learning models based on mainstream frameworks.
- **Cloud AutoML:** A Machine Learning product that enables developers to provide their data sets and obtain access to quality trained models by Google's transfer learning and Neural Architecture Search.

Management Tools

- **Google Stackdriver**: Provides performance and diagnostics data in the form of monitoring, logging, tracing, error reporting, and alerting it to public cloud users.
- **Google Cloud Console App**: A GCP console is a native mobile application that enables customers to manage the key Google Cloud services. It provides monitoring, altering, and the ability to take actions on resources.

Identity and Security

- **Cloud Data Loss Prevention API:** It helps you manage sensitive data. It provides a fast and scalable classification for sensitive data elements like credit card numbers, names, passport numbers, and more.
- **Cloud IAM**: Cloud Identity and Access Management refers to a framework of policies and technologies for ensuring that proper people in an enterprise have the appropriate access to technology resources. It is also called identity management (IdM).

Google Cloud Platform Pros and Cons

Let's quickly take a look at some of the pros and cons of the Google Cloud Platform (GCP).

GCP Pros

Each service in the GCP has its own use case and was designed to work specifically with the next service and their well-defined rules of engagement.

- The GCP documentation is unparalleled when it comes to strengths. Everyone loves how Google incorporates the actions into GCP's documents. It's divided into an overview section, followed by a hands-on section, and guides the reader through the implementation of the feature or service.
- GCP's global backbone network uses advanced software-defined networking and edge-caching services for fast, scalable, and consistent performance delivery.

> Despite the premium-tier global network being a bit expensive, the ability to design architectures using a virtual private cloud (VPC) automatically routing traffic on a global network is definitely worth the investment.

GCP Cons

- Google Cloud Platform offers far fewer services than those by its leading competitors viz. AWS and Azure.
- GCP's opinionated model on how their cloud services should be used is only catering to software developers.

Google Cloud Platform Infrastructure, Regions, and Zones

There are currently 24 locations around the world for Google's global infrastructure where its resources are offered.

Locations within a region have availability zones that are isolated from a single point of failure. Some resources such as the HTTP global load balancer are global. This means they can receive requests from any Google edge location and region.

Resources, like storage, can be regional and are distributed across multiple zones within a region for redundancy. Zonal resources, including computing instances, only exist in one specific zone within one specific region.

> During the deployment of applications on GCP, the locations must be selected based on the performance, scalability, security needs, and reliability.

Google Cloud Free Tier

Google Cloud Tier gives you free resources to learn about Google Cloud Platform (GCP) services by trying them on your own. Whether you're a fresher to this platform and do not know the basics, or you're an established customer and want to experiment with new solutions, the GCP Free Tier has you covered.

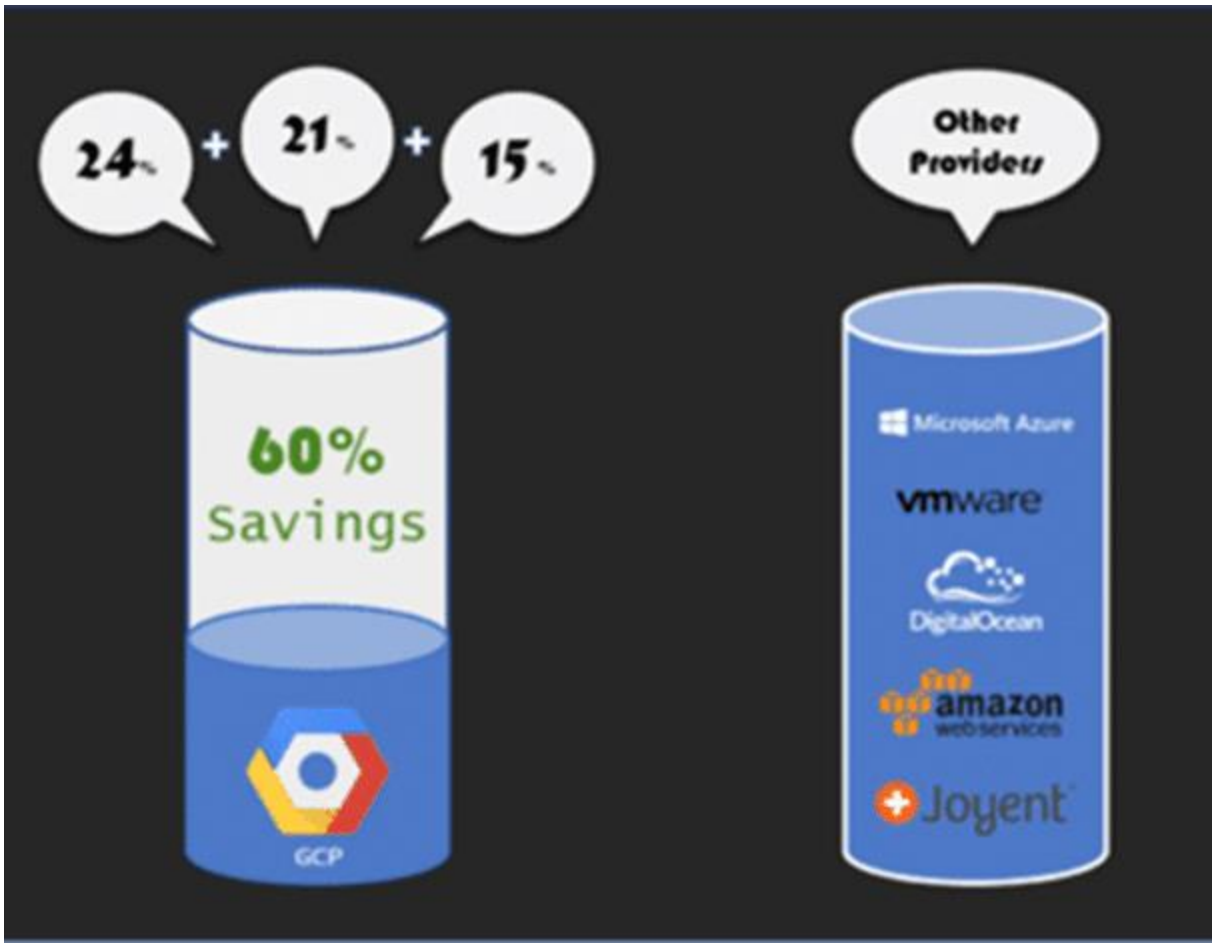
Google provides a 12-month free trial period worth $300 of credit and on top of that it also offers a free trial option which has no time limit

Google Cloud Pricing

Every GCP service consumes fundamental resources of cloud computing like processor power, data storage, memory, and connectivity. While customers are typically charged for the resources that these services consume. So, whatever you choose to do with GCP, you pay for the resources they consume, BigQuery and BigTable can incur some significant expenses in data storage consumption.

There is a separate pricing model, particularly for GCP's automated workload deployment mechanism called the Cloud Run.

GCP is not only cheaper but they offer other benefits too. Let's have a look at a few:



Compared to other cloud providers, Google offers a massive 60 percent savings which consist of:

- 24 percent sustained usage discounts
- 21 percent list price differences
- 15 percent rightsizing recommendation

1. **Pay-as-you-go:** Google Cloud offers the ‘use now, pay later’ policy. Users have to pay only for the services they use.
2. **No Termination Fee:** The moment you stop using the services, you stop paying for them.