

Topics (<https://cloud.google.com/learn/>) > What is Cloud Computing?

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Understanding the types of cloud computing resources can be time-consuming and costly. Enterprises need to buy physical servers and other infrastructure through procurement processes that can take months, and support the architecture of cloud computing. The acquired systems require a physical space, typically a specialized room with sufficient power and cooling. After configuring and deploying the systems, enterprises need expert personnel to manage them.

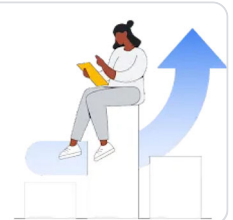
This long process is difficult to scale when demand spikes or business expands. Enterprises can acquire more computing resources than needed, ending up with low utilization numbers.

Cloud computing addresses these issues by offering computing resources as scalable, on-demand services. Learn more about [Google Cloud](https://cloud.google.com/why-google-cloud) (<https://cloud.google.com/why-google-cloud>), a suite of cloud computing service models offered by Google.

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Learning path

Google Cloud Computing Foundations



(<https://www.cloudskillsboost.google/paths/36>)

Cloud computing defined

Cloud computing is the on-demand availability of computing resources as services over the internet. It eliminates the need for enterprises to procure, configure, or manage resources themselves, and they only pay for what they use.

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<https://cloud.google.com/learn/what-is-iac>, offers compute and storage services, platform as a service offers a develop-and-deploy environment to build cloud apps, and software as a service delivers apps as services.

Understanding how cloud computing works

Cloud computing service models are based on the concept of sharing on-demand computing resources, software, and information over the internet. Companies or individuals pay to access a virtual pool of shared resources, including compute, storage, and networking services, which are located on remote servers that are owned and managed by service providers.

One of the many advantages of cloud computing is that you only pay for what you use. This allows organizations to scale faster and more efficiently without the burden of having to buy and maintain their own physical data centers and servers.

In simpler terms, cloud computing uses a network (most often, the internet) to connect users to a cloud platform where they request and access rented computing services. A central server handles all the communication between client devices and servers to facilitate the exchange of data. Security and privacy features are common components to keep this information secure and safe.

When adopting cloud computing architecture, there is no one-size-fits-all. What works for another company may not suit you and your business needs. In

fact, this flexibility and versatility is one of the hallmarks of cloud, allowing enterprises to quickly adapt to changing markets or metrics.

There are three different cloud computing deployment models: public cloud, private cloud, and hybrid cloud.

- **Public clouds** (<https://cloud.google.com/learn/what-is-public-cloud>) are run by third-party cloud service providers. They offer compute, storage, and network

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goals.

- **Private clouds** are built, managed, and owned by a single organization and privately hosted in their own data centers, commonly known as “on-premises” or “on-prem.” They provide greater control, security, and management of data while still enabling internal users to benefit from a shared pool of compute, storage, and network resources.
- **Hybrid clouds** (<https://cloud.google.com/learn/what-is-hybrid-cloud>) combine public and private cloud models, allowing companies to leverage public cloud services and maintain the security and compliance capabilities commonly found in private cloud architectures.

What are the benefits of cloud computing?

It's flexible

Due to the architecture of cloud computing, enterprises and their users can access cloud services from anywhere with an internet connection, scaling services up or down as needed.

It's efficient

Enterprises can develop new applications and rapidly get them into production—without worrying about the underlying infrastructure.

It offers strategic value

Because cloud providers stay on top of the latest innovations and offer them as services to customers, enterprises can get more competitive advantages—and a higher return on investment—than if they'd invested in soon-to-be obsolete technologies.

It's secure

Enterprises often ask, "What are the security risks of cloud computing?" They are

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mechanisms cloud providers put into place. Plus, cloud providers' security teams are known as top experts in the field.

It's cost-effective

Whatever cloud computing service model is used, enterprises only pay for the computing resources they use. They don't need to overbuild data center capacity to handle unexpected spikes in demand or business growth, and they can deploy IT staff to work on more strategic initiatives.

Types of cloud computing

There are three main types of cloud computing service models that you can select based on the level of control, flexibility, and management your business needs:

- **Infrastructure as a service** (<https://cloud.google.com/learn/what-is-iaas>) (**IaaS**) offers on-demand access to IT infrastructure services, including compute, storage, networking, and virtualization. It provides the highest level of control over your IT resources and most closely resembles traditional on-premises IT resources.
- **Platform as a service** (<https://cloud.google.com/learn/what-is-paas>) (**PaaS**) offers all the hardware and software resources needed for cloud application development. With PaaS, companies can focus fully on application development without the burden of managing and maintaining the underlying infrastructure.

- **Software as a service (SaaS)** delivers a full application stack as a service, from underlying infrastructure to maintenance and updates to the app software itself. A SaaS solution is often an end-user application, where both the service and the infrastructure is managed and maintained by the cloud service provider.

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Do you need cloud computing?

The pace of innovation—and the need for advanced computing to accelerate this growth—makes cloud computing a viable option to advance research and speed up new product development. Cloud computing can give enterprises access to scalable resources and the latest technologies without needing to worry about capital expenditures or limited fixed infrastructure. What is the future of cloud computing? It's expected to become the dominant enterprise IT environment.

If your organization experiences any of the following, you're probably a good candidate for cloud computing:

- High business growth that outpaces infrastructure capabilities
- Low utilization of existing infrastructure resources

- Large volumes of data that are overwhelming your on-premises data storage resources
- Slow response times with on-premises infrastructure
- Delayed product development cycles due to infrastructure constraints
- Cash flow challenges due to high computing infrastructure expenses
- Highly mobile or distributed user population

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What is cloud computing used for?

Cloud computing offers a broad range of possible applications that can benefit organizations. Here are some common use cases:

Infrastructure scaling

Many organizations, including those in retail, have wildly varying needs for compute capacity. Cloud computing easily accommodates these fluctuations.

Disaster recovery

Rather than building more data centers to ensure continuity during disasters, businesses use cloud computing to safely back up their digital assets.

Data storage

Cloud computing helps overloaded data centers by storing large volumes of data, making it more accessible, easing analysis, and making backup easier.

Application development

Cloud computing offers enterprise developers quick access to tools and platforms for building and testing applications, speeding up time to market.

Big data analytics

Cloud computing offers almost unlimited resources to process large volumes of data to speed research and reduce time to insights.

Related products and services

Google Cloud is a suite of cloud computing services that runs on the same infrastructure that Google uses internally for their own consumer products, such as Google Search, Gmail, and YouTube.

The [list of available Google Cloud services](https://cloud.google.com/products) (https://cloud.google.com/products) is long—and it keeps growing. When developing applications or running workloads on Google Cloud, enterprises can mix and match these services into combinations that provide the

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Compute Engine

Computing infrastructure in predefined or custom machine sizes to accelerate your cloud transformation.



Cloud Storage

Globally unified, scalable, and highly durable object storage for developers and enterprises.



BigQuery

Serverless, highly scalable, and cost-effective cloud data warehouse designed for business agility.



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Cloud SQL

Fully managed relational database service for MySQL, PostgreSQL, and SQL Server.



Google Kubernetes Engine

Secured and managed Kubernetes service with four-way auto scaling and multi-cluster support.



Cloud CDN

Fast, reliable web and video content delivery with global scale and reach.



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