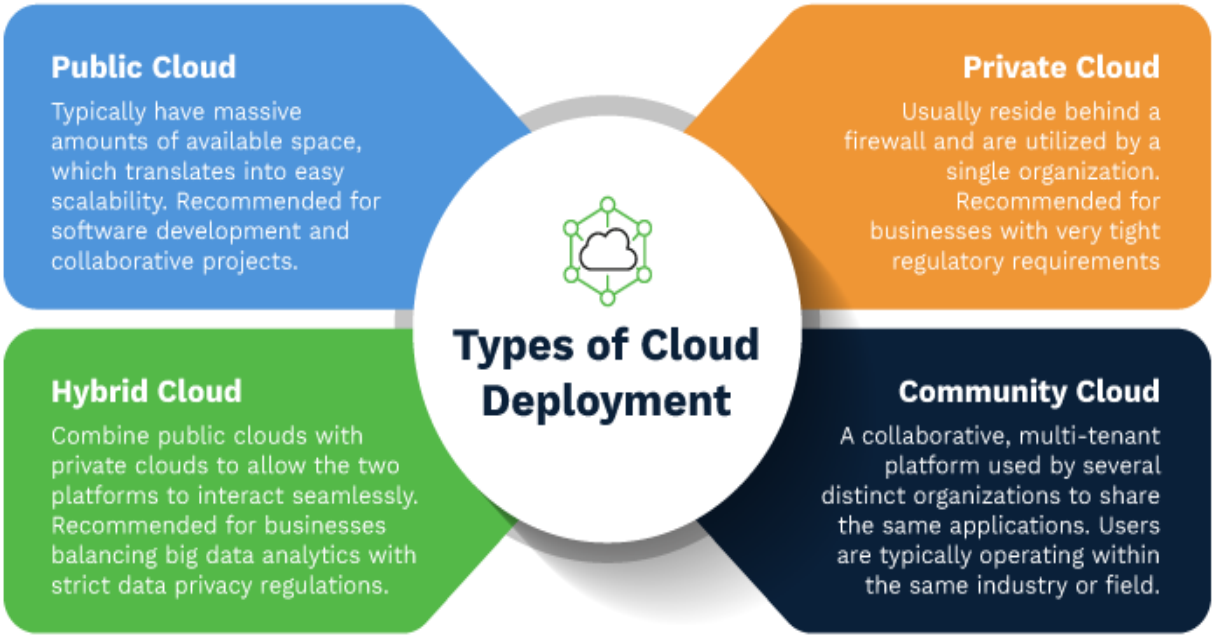
Cloud computing has become a common term over the last decade, but the service sometimes creates confusion. With all the new cloud options and the phrase "as a service" seemingly tacked onto everything imaginable, it's helpful to take a step back and look at the differences between the main types of cloud deployment and the different types of cloud computing services.

Types of Cloud Deployment



Cloud deployment describes the way a cloud platform is implemented, how it's hosted, and who has access to it. All cloud computing deployments operate on the same principle by virtualizing the computing power of servers into segmented, software-driven applications that provide processing and storage capabilities.

Public Cloud

Some public cloud examples include those offered by Amazon, Microsoft, or Google. These companies provide both services and infrastructure, which are shared by all customers. Public clouds typically have massive amounts of available space, which translates into easy scalability. A public cloud is often recommended for software development and collaborative projects. Companies can design their applications to be portable, so that a project that's tested in the public cloud can be moved to the private cloud for production. Most cloud providers package their computing resources as part of a service. Public cloud examples range from access to a completely virtualized infrastructure that provides little more than raw processing power and

storage (Infrastructure as a Service, or IaaS) to specialized software programs that are easy to implement and use (Software as a Service, or SaaS).

The great advantage of a public cloud is its versatility and "pay as you go" structure that allows customers to provision more capacity on demand. On the downside, the essential infrastructure and operating system of the public cloud remain under full control of the cloud provider. Customers may continue to use the platform under the terms and conditions laid out by the provider, but they may have difficulty repatriating their assets if they want to change providers. Should the provider go out of business or make significant changes to the platform, customers could be forced to make significant infrastructure changes on short notice. There's also the risk of an unpatched security vulnerability in the cloud architecture exposing customers to risk.

Private Cloud

Private clouds usually reside behind a firewall and are utilized by a single organization. A completely on-premises cloud may be the preferred solution for businesses with very tight regulatory requirements, though private clouds implemented through a colocation provider are gaining in popularity. Authorized users can access, utilize, and store data in the private cloud from anywhere, just like they could with a public cloud. The difference is that no one else can access or utilize those computing resources. Private cloud solutions offer both security and control, but these benefits come at a cost. The company that owns the cloud is responsible for both software and infrastructure, making this a less economical model than the public cloud.

The additional control offered by a private cloud makes it easier to restrict access to valuable assets and ensures that a company will be able to move its data and applications where it wants, whenever it wants. Furthermore, since the private cloud isn't controlled by an outside vendor, there's no risk of sudden changes disrupting the company's entire infrastructure. A private cloud solution will also not be affected by a public cloud provider's system downtime. But private clouds also lack the versatility of public clouds. They can only be expanded by adding more physical compute and storage capacity, making it difficult to scale operations quickly should the business need arise.

Hybrid Cloud

Hybrid clouds combine public clouds with private clouds. They are designed to allow the two platforms to interact seamlessly, with data and applications moving smoothly from one to the other.

The primary advantage of a hybrid cloud model is its ability to provide the scalable computing power of a public cloud with the security and control of a private cloud. Data can be stored safely behind the firewalls and encryption protocols of the private cloud, then moved securely into a public cloud environment when needed. This is especially helpful in the age of big data analytics, when industries like healthcare must adhere to strict data privacy regulations

while also using sophisticated algorithms powered by artificial intelligence (AI) to derive actionable insights from huge masses of unstructured data.

There are two commonly used types of hybrid cloud architecture. Cloudbursting uses a private cloud as its primary cloud, storing data and housing proprietary applications in a secure environment. When service demands increase, however, the private cloud's infrastructure may not have the capacity to keep up. That's where the public cloud comes in. A cloudbursting model uses the public cloud's computing resources to supplement the private cloud, allowing the company to handle increased traffic without having to purchase new servers or other infrastructure.

The second type of hybrid cloud model also runs most applications and houses data in a private cloud environment, but outsources non-critical applications to a public cloud provider. This arrangement is common for organizations that need to access specialized development tools (like Adobe Creative Cloud), basic productivity software (like Microsoft Office 365), or CRM platforms (like Salesforce). Multi-cloud architecture is often deployed here, incorporating multiple cloud service providers to meet a variety of unique organizational needs.

Community Cloud

Although not as commonly used as the other three models, community clouds are a collaborative, multi-tenant platform used by several distinct organizations to share the same applications. The users are typically operating within the same industry or field and share common concerns in terms of security, compliance, and performance.

In essence, a community cloud is a private cloud that functions much like a public cloud. The platform itself is managed privately, either in a data center or on-premises. Authorized users are then segmented within that environment. These deployments are commonly used by government agencies, healthcare organizations, financial services firms, and other professional communities.

4 Different Types of Cloud Computing Services

All public cloud computing services are built upon the same conceptual framework of remote infrastructure powered by servers housed in a data center. Since there are so many similarities between them, it's helpful to think of cloud computing as a pyramid comprised of three layers. Each layer is more specialized than the one below it, but it's built upon the same basic structure. The lower layers are much broader, representing their versatility, customizability, and wide range of applications, while the upper layers are narrower because they're purpose-built for a specific task.

Infrastructure as a Service (IaaS)

As the foundation of the cloud computing pyramid, IaaS is the most comprehensive and flexible type of cloud service available. Essentially, it provides a completely virtualized computing infrastructure that is provisioned and managed over the internet. An IaaS provider manages the physical end of the infrastructure (servers, data storage space, etc) in a data center, but allows customers to fully customize those virtualized resources to suit their specific needs. With IaaS, the customer can purchase, install, configure, and manage any software they need to use, including things like operating systems, middleware, applications, business analytics, and development tools. Highly scalable, companies only pay for the infrastructure they use, allowing them to scale their computing needs as needed without having to build out additional capacity.

IaaS eliminates the capital expense of building up in-house infrastructure. It's a great option for small companies and startups that don't have the resources to purchase the hardware and software needed to create their own network internally. It also takes the day-to-day burdens of managing computing infrastructure off the hands of IT departments, freeing them to focus on core business drivers instead of troubleshooting. Since the IaaS provider continuously updates their system with the latest software and update patches, it's easier to get new programs and applications up and running. IaaS provides the latest in security protections and usually offers services like disaster recovery to go along with their uptime reliability SLAs.

- **Examples of IaaS:** Microsoft Azure, Amazon Web Services (AWS), Cisco Metacloud, Google Compute Engine (GCE).

Platform as a Service (PaaS)

Situated a bit higher up the cloud computing pyramid is PaaS. Whereas IaaS delivers all the tools available through the cloud and leaves it to customers to build whatever suits their needs, PaaS is a bit more specialized. Rather than pure infrastructure, PaaS provides the framework needed to build, test, deploy, manage, and update software products. It utilizes the same basic infrastructure as IaaS, but it also includes the operating systems, middleware, development tools, and database management systems needed to create software applications.

PaaS is extremely helpful for any company that develops software and web-based applications. Many of the tools needed to develop for multiple platforms (computers, mobile devices, browsers, etc) can be quite expensive. By using PaaS, customers can access the development tools they need, when they need them, without having to purchase them outright. Since the platform is accessible over the internet, remote development teams can all access the same assets to speed up product development. Most PaaS tools provide extensive pre-coded applications built into the platform, which can greatly reduce coding time and help companies get their products to market faster.

- **Examples of PaaS:** AWS Elastic Beanstalk, Apache Stratos, Google App Engine, Microsoft Azure.

Software as a Service (SaaS)

For most people, SaaS is the most familiar form of cloud computing. Situated at the top of the pyramid, SaaS is a fully-developed software solution ready for purchase and use over the internet on a subscription basis. The SaaS provider manages the infrastructure, operating systems, middleware, and data necessary to deliver the program, ensuring that the software is available whenever and wherever customers need it. Many SaaS applications run directly through web browsers, eliminating the need for downloads or installations. This greatly reduces software management issues for internal IT teams and allows companies to streamline their operations with hybrid and multi-cloud deployments.

SaaS applications allow companies to get up and running very quickly as well as scale operations rapidly. There's no need to purchase or deploy the hardware and software used to deliver their business services. Even sophisticated enterprise-level applications, such as customer relationship management (CRM) or enterprise resource planning (ERP) programs, can be easily accessed by the smallest organizations, providing them with tools that allow them to grow their businesses more effectively than ever.

- **Examples of SaaS:** Microsoft Office 365, Salesforce, Cisco WebEx, Google Apps.

Function-as-a-Service (FaaS)

Often known as serverless computing, FaaS allows customers to execute code responsively without having to allocate processing resources ahead of time. The cloud provider handles the infrastructure, allowing the customer to focus strictly on deploying application code. Functions scale automatically, making them an excellent fit for dynamic workloads that fluctuate in terms of resource consumption. Customers only pay for the resources they use, making FaaS the truest form of "pay-as-you-go" cloud computing.

Most FaaS applications are quite simple and can be deployed very quickly. The cloud customer just needs to upload the complied function code and tell the platform how to provision resources when it executes. New instances of the function can be scaled on demand, and when the function is at rest, it doesn't consume any resources. The primary drawback to FaaS is execution time. Since functions need to provision resources each time they run, there can be slight performance lags if the application requires a lot of computing power or executes during peak usage times. Applications also have to be stateless, so they can't store data locally. Most FaaS services are available through major cloud providers like AWS and Azure, which can result in vendor lock-in.

- **Examples of FaaS:** AWS Lambdas, Azure Functions.

What are the different types of cloud computing services?

Cloud computing types are service deployment models that let you choose the level of control over your information and types of services you need to provide. There are three main types of cloud computing services, sometimes called the cloud computing stack because they build on top of one another.

The first cloud computing type is infrastructure-as-a-service (IaaS), which is used for Internet-based access to storage and computing power. The most basic category of cloud computing types, IaaS lets you rent IT infrastructure - servers and virtual machines, storage, networks, and operating systems - from a cloud provider on a pay-as-you-go basis.

The second cloud computing type is platform-as-a-service (PaaS) that gives developers the tools to build and host web applications. PaaS is designed to give users access to the components they require to quickly develop and operate web or mobile applications over the Internet, without worrying about setting up or managing the underlying infrastructure of servers, storage, networks, and databases.

The third cloud computing type is software-as-a-service (SaaS) which is used for web-based applications. SaaS is a method for delivering software applications over the Internet where cloud providers host and manage the software applications making it easier to have the same application on all of your devices at once by accessing it in the cloud.

Cloud Models