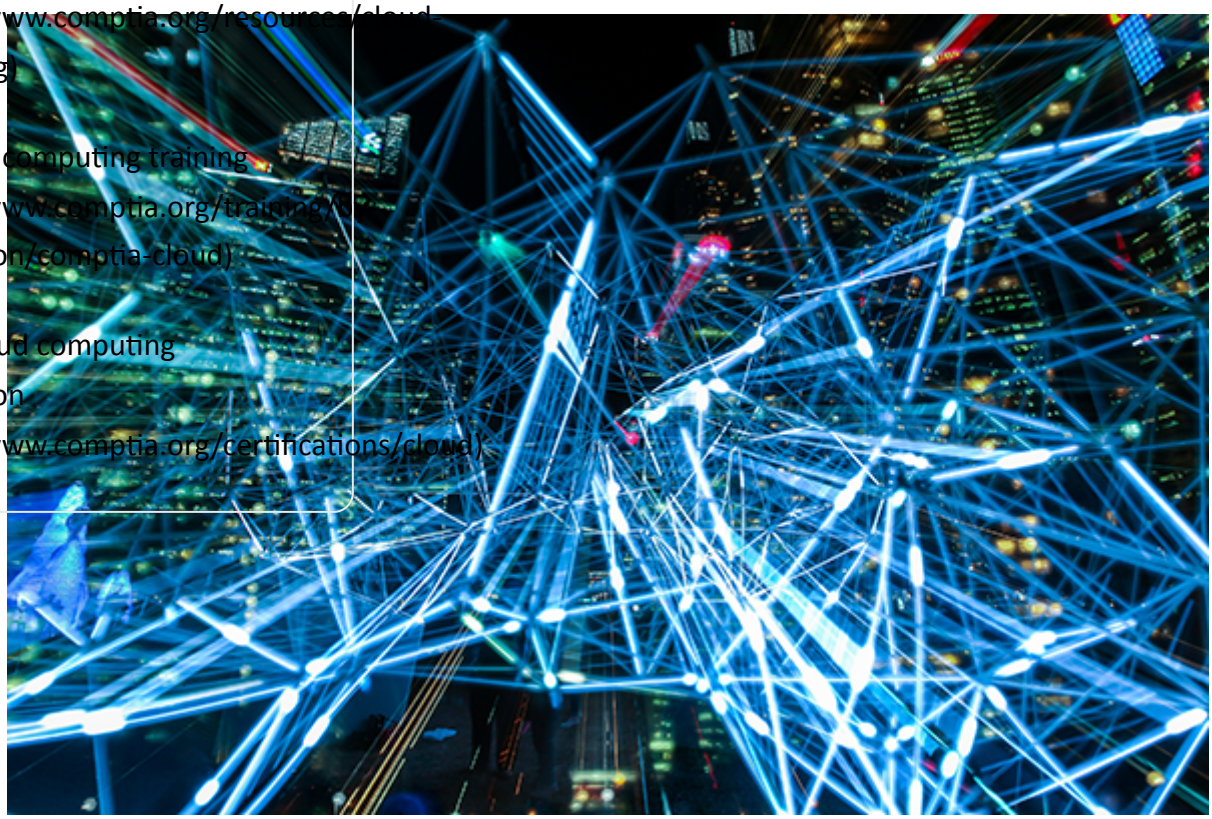
What Is IaaS?



Do you really know what the cloud is? To most of us, the cloud is a magical place where our data lives safely and securely. But obviously, it's a bit more complicated than that. Cloud service is important to organizations that house data about their customers and their inventory, and it can be overwhelming – not to mention, expensive.

Maintaining on-premises IT infrastructure can be both costly and labor intensive. That's why customer demand for cloud infrastructure as a service (IaaS) is accelerating as organizations continue to pursue digital strategies. However, top talent with cloud computing skills and experience is still hard to find.

Learning how to analyze, evaluate and design cloud service solutions requires a fundamental understanding of the different components that are commonly used.

Common types of cloud computing services (/content/articles/cloud-types-solutions-and-vendors) include the following:

- Infrastructure as a service (IaaS)
- Software as a service (SaaS) (/content/articles/what-is-saas)

- Platform as a service (PaaS) (/content/articles/what-is-paas)

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Infrastructure as a service can be a game changer, as it promises on-demand access to computing resources. Read on to learn about IaaS in cloud computing, the benefits it offers an organization, the challenges it may present and examples of IaaS.

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Infrastructure as a Service (IaaS) Defined

The official IaaS definition is as follows: Infrastructure as a service (IaaS) provides compute, memory, storage, networking and related software, such as operating systems and databases, as a cloud service to replace traditional on-premises data center infrastructure.

Simplified, what does IaaS is essentially virtual servers that the customer rents from another company that owns a data center. Essentially, IaaS promotes access versus ownership.

This solution provides the end user with flexibility when it comes to hosting custom-built apps or standard software while also providing a general data center for storage.

Customers can deploy IaaS in one of three different service models defined by the National Institute of Standards Technology (NIST):

- **Private Cloud:** Infrastructure services are provisioned for exclusive use by a single organization. The physical infrastructure may be owned, managed and operated by the organization, a third party or some combination, and it may exist on or off premises.
- **Public Cloud:** Infrastructure services are provisioned for use by multiple organizations (also known as a multi-tenant model). The physical infrastructure may be owned, managed and operated by a business, academic or government organization, or some combination. It exists on the premises of the cloud provider.
- **Hybrid Cloud:** A company chooses to leverage both public cloud and private cloud for applications or overall architecture. The two cloud models remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability.

A Brief History of Cloud Computing

Amazon Web Services (AWS) was the pioneer of cloud computing as we know it. According to Jeff Bezos, the mission of AWS was to provide the “application developers a set of dependable tools and a reliable infrastructure that they could build products on top of.” Microsoft (Azure) Google (Google Cloud), IBM (IBM Smart Cloud) and Oracle (Oracle Cloud) quickly followed suit. Today the range of cloud computing services is quite broad. Learn more about cloud computing types, solutions and vendors. (/content/articles/cloud-types-solutions-and-vendors)

Advantages of IaaS

IaaS is advantageous to companies in scenarios where scalability and quick provisioning are key. In other words, organizations experiencing rapid growth but lacking the capital to invest in hardware are great candidates for IaaS models. IaaS can also be beneficial to companies with steady application workloads

that simply want to offload some of the routine operations and maintenance involved in managing

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Other advantages may include the following:

- **Pay for What You Use:** Fees are computed via usage-based metrics
- **Reduce Capital Expenditures:** IaaS is typically a monthly operational expense
- **Dynamically Scale:** Rapidly add capacity in peak times and scale down as needed
- **Increase Security:** IaaS providers invest heavily in security technology and expertise
- **Future-Proof:** Access to state-of-the-art data center, hardware and operating systems
- **Self-Service Provisioning:** Access via simple internet connection
- **Reallocate IT Resources:** Free up IT staff for higher value projects
- **Reduce Downtime:** IaaS enables instant recovery from outages
- **Boost Speed:** Developers can begin projects once IaaS machines are provisioned
- **Enable Innovation:** Add new capabilities and leverage APIs
- **Level the Playing Field:** SMBs can compete with much larger firms

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Challenges of IaaS

There are many benefits to using IaaS in an organization, but there are also challenges. Some of these hurdles can be overcome with advanced preparation, but others present risks that a customer should weigh in on before deployment.

Challenges may include the following:

- **Unexpected Costs:** Monthly fees can add up, or peak usage may be more than expected
- **Process Changes:** IaaS may require changes to processes and workflows
- **Runaway Inventory:** Instances may be deployed, but not taken down
- **Security Risks:** While IaaS providers secure the infrastructure, businesses are responsible for anything they host
- **Lack of Support:** Live help is sometimes hard to come by
- **Complex Integration:** Challenges with interaction with existing systems
- **Security Risks:** New vulnerabilities may emerge around the loss of direct control
- **Limited Customization:** Public cloud users may have limited control and ability to customize
- **Vendor Lock-In:** Moving from one IaaS provider to another can be challenging
- **Broadband Dependency:** Only as good as the reliability of the internet connection
- **Providers Not Created Equally:** Vendor vetting (https://www.comptia.org/blog/all-ahead-cloud-speed-how-to-choose-a-cloud-vendor) and selection can be challenging
- **Managing Availability:** Even the largest service providers experience downtime
- **Confusing SLAs:** Service level agreements (SLAs) can be difficult to understand
- **Regulatory Uncertainty:** Evolving federal and state laws can impact some industries' use of IaaS, especially across country borders
- **Vendor Consolidation:** Providers may be acquired or go out of business

- **Third-Party Expertise:** Lack of mature service providers, guidance or ecosystem support

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Examples of IaaS

Cloud business is booming. In fact, Gartner (https://www.gartner.com/doc/reprints?id=1-2G2O5FC&ct=150519) projects revenue in the cloud IaaS market to increase to $81.5 billion by 2022, up from $41.4 billion in 2019. Businesses are using IaaS in a variety of ways:

- Software development
- Software testing
- Hosting websites
- Supporting web apps
- High performance computing (HPC)
- Big data analysis

One example of scaling up and back on IaaS can be seen in retail. Many retailers expect traffic to increase in November and December, around the holidays. Having the ability to quickly add capacity during this peak time is important. The elastic nature of IaaS allows companies to ramp up when needed.

Another example of leveraging cloud infrastructure is storing security video files. Since video files consume a large amount of data, a management application is needed to store these files with easy access. IaaS cloud storage is an ideal solution for managing these files.

Companies in every stage of the business lifecycle are using IaaS solutions. From global enterprises to startups, the flexibility, scalability and cost savings are hard to beat.

Popular IaaS providers include Microsoft Azure, Amazon Web Services, Rackspace and Google Compute Engine.

- Microsoft Azure (https://azure.microsoft.com/en-us/) is a cloud computing service created by Microsoft for building, testing, deploying and managing applications and services through Microsoft-managed data centers.
- Amazon Web Services (https://aws.amazon.com/ec2/) is a secure cloud services platform, offering compute power, database storage, content delivery and other functionality to help businesses scale and grow.
- Rackspace (https://www.rackspace.com/) is a managed cloud computing company that aims to make it easy to manage private and public cloud deployments. The company is the largest managed cloud provider, offering expertise across cloud platforms such as AWS, Microsoft Azure and OpenStack.
- Google Compute Engine (https://cloud.google.com/compute) is Google's IaaS virtual machine offering. It allows customers to use powerful virtual machines in the cloud as server resources instead of acquiring and managing server hardware.

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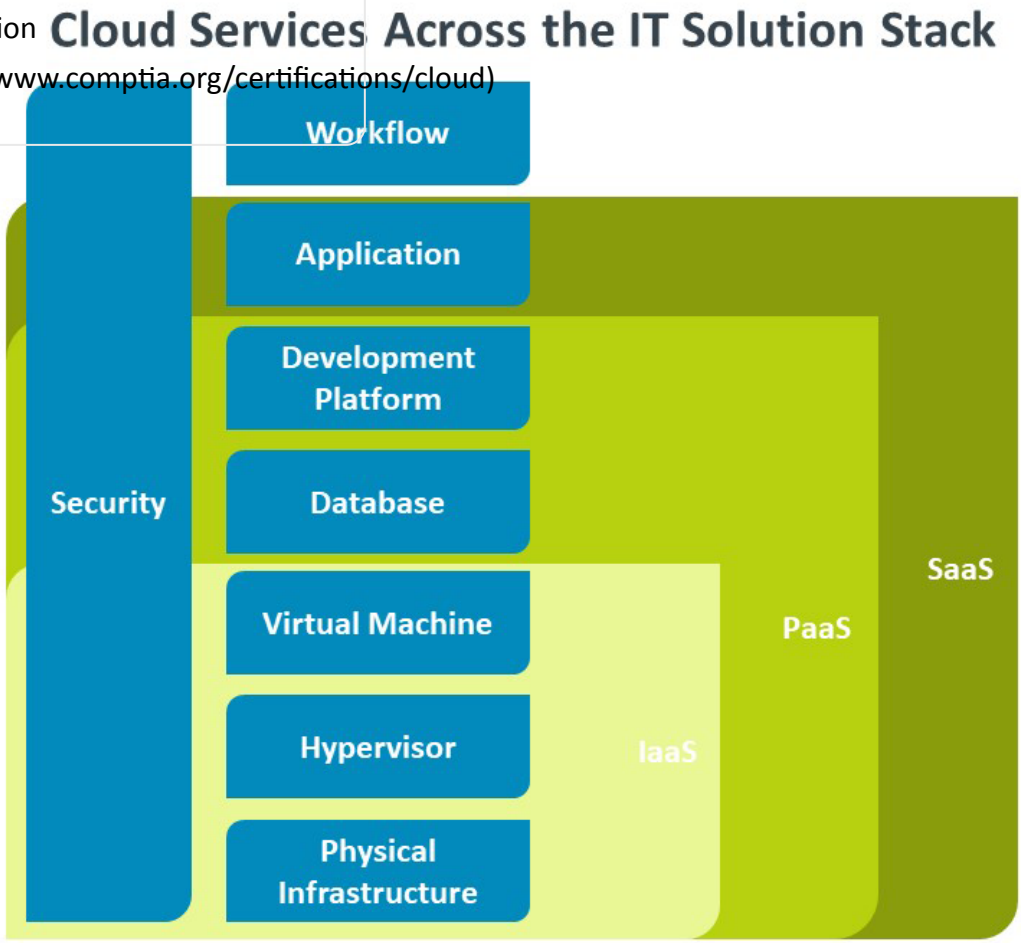
What's the Difference Between SaaS vs. PaaS vs. IaaS?

Infrastructure as a Service (IaaS) is one of the three most common cloud computing services. IaaS is a pay-as-you-go service that often includes services, storage, networking and virtualization. But how does IaaS compare to its fellow service models?

Platform as a service (PaaS) (/content/articles/what-is-paas) consists of hardware and software tools built on top of an IaaS platform. It reduces the need for system administration (https://www.comptia.org/blog/your-next-move-systems-administrator) and allows end users to focus on app development instead of infrastructure management.

Meanwhile, software as a service (SaaS) (/content/articles/what-is-saas) is ready-to-use software that's available via a third party over the internet. Most modern SaaS applications are built on IaaS or PaaS platforms.



It's not surprising that newer cloud models are entering the space that work alongside IaaS. Containers and serverless architecture are two such service models giving companies new options for how to run their applications. At this point, simple IaaS solutions continue to be the most mature option, but trend spotters are keeping their eye on containers and serverless architecture as new and emerging technology.

While the range of services offered by IaaS providers is massive and always evolving, the needs of the business should always be evaluated and prioritized before selecting a cloud service provider. Companies (/resources/cloud-computing) require qualified IT professionals who have the ability to analyze, evaluate and design cloud computing solutions that fit their current and future needs.

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