If you believe that the difference between virtualization vs cloud computing is just a matter of semantics, you’re far from alone.

While two terms are closely connected and often work together to provide a variety of services, they’re far from interchangeable.

Where virtualization is a technology that transforms physical hardware into virtual resources, the cloud is an environment that delivers virtualized resources on-demand through the internet.

Virtualization technology changes how physical infrastructure behaves, allowing multiple applications and operating systems to run on one system by creating simulated environments that operate in isolation

Additionally, cloud computing uses virtualization technology to deliver services that allow end-users to access virtualized servers, apps, etc. without purchasing that equipment themselves.

Below, we’ll further break down the core differences between the two terms and the unique relationship they share.

**What is virtualization?**

Virtualization is a process that uses software to create computer-generated versions of servers, applications, data centers, and other types of hardware that behave just like their physical counterparts.

Virtualization software uses a thin layer of software, known as a “hypervisor,” which allows one computer to host multiple virtual machines (VMs). VMs are software containers that run their own operating systems and behave like independent computers–despite running on a small share of the underlying hardware.

The hypervisor also allocates computing power to each VM as needed for more efficient hardware utilization.

Virtualization technology allows companies to apply a cloud-like delivery model to their on-site infrastructure to improve internal workflows, security, and performance. Companies can also virtualize their infrastructure, software or platforms to deliver a range of services to their end-users.

**Characteristics of virtualization**

**Resource Sharing.**

Virtualization enables users to create separate computing environments from one host machine–be it a single computer or a network of connected servers. This allows users to limit the number of active servers, reduce power consumption, and manage.

**Isolation**

Virtualization software’s self-contained VMs provide guest users (a designation that includes not only people but applications, OSs, and devices) with an isolated online environment. That separation protects sensitive information while also allowing guests to stay connected.

**Availability**

Virtualization software offers several features you won’t get with physical servers that help increase uptime, availability, fault tolerance, and more–helping users avoid downtime that undermines user productivity and introduces security threats and safety hazards.

**Aggregation**

While virtualization allows multiple devices to share resources from a single machine, it can also be used to combine several devices into one powerful host. Aggregation requires cluster management software, which connects a homogeneous group of computers or servers together to create a unified resource center.

**Reliability**

These days, virtualization platforms ensure constant uptime via automated load balancing, which runs redundant servers on different host machines to prevent outages. That way, hardware failures are little more than a minor inconvenience. Do note that if downtime is a major concern, you might need to invest in some backup hardware to act as a fail-safe.

**Use cases and examples of virtualization**

At its core, virtualization is about getting the most value possible from the resources you have. While virtualization covers an endless stream of use cases, here’s a quick look at some of the more common applications.

**Server virtualization**

One of the biggest benefits offered by virtualization is server consolidation. In this case, virtualization allows companies to use one server to support multiple functions that might otherwise be spread across several single-use servers. Server virtualization allows users to consolidate and redistribute resources for more efficient resource utilization.

**Data Virtualization**

Data virtualization allows users to easily manipulate data using an abstraction that exists independent of actual data structure and database systems. The abstraction serves as a sort of “scratch paper" where users can check their work for errors before saving it “for real."

**Software virtualization**

Software virtualization is designed to separate applications from the host machine’s underlying hardware and OS. You might use software or application virtualization to see how a new application interacts with your existing stack, before integrating with your real-life toolkit.

Either way, software virtualization allows you to create a copy of your current configuration and its data you can use to test new applications, software updates, and all kinds of hypothetical scenarios without putting your actual installation and original datasets at risk.

**Desktop virtualization**

Desktop virtualization allows users to run multiple desktop operating systems from a single computer and fall into two main categories. There’s locally hosted desktop virtualization, which uses a hypervisor to run multiple operating systems from one computer.

There’s also virtual desktop infrastructure, or VDI, which runs multiple VMs from a centralized host and delivers streamed desktop environments to users. VDIs allow organizations to provide services like remote security monitoring or cloud-based applications to end-users, as well as support distributed teams and outsourced employees, as well as multi-location companies.

**Storage virtualization**

Storage virtualization combines multiple network storage resources into a single storage device that users can access from various locations. This allows connected servers, devices, and applications to access information from a centralized dashboard, without needing to know where, exactly, that information is stored. Virtualized storage also makes it easy to back up your systems and move data around as needed.

**What is cloud computing?**

As mentioned, clouds are environments that abstract, combine, and share virtual resources over a network. Cloud computing is a computing model tasked with running workloads in that environment.

Virtualization in [cloud computing](https://v2cloud.com/blog/deployment-models-of-cloud-computing) is used to replace physical files, servers, networks, files, applications, devices, and infrastructure with computer-generated versions, which are hosted and managed by a service provider.

Providers use management software to automate repeatable processes to enable on-demand self-service via URL or mobile app, and control the data, security features, storage capacity, and computing power required to transmit data between user devices and the cloud.

Cloud computing services typically fall into one of the following three categories:

* **Software as a Service (SaaS)**  
  SaaS is the most common type of [cloud-based service](https://itrate.co/it-consulting/cloud), designed to provide access to software through a browser or app without any hardware installation or maintenance requirements. While some services are free, many require a monthly or annual subscription. A good example here is Elementor. A [SaaS platform](http://www.codica.com/blog/how-to-build-saas-product/), the website builder offers [cloud hosting for WordPress](https://elementor.com/features/cloud/)
* **Infrastructure as a Service (IaaS)**  
  IaaS providers take SaaS a step further and manage the customer’s software, hardware, servers, storage, and any other essential requirements. Unlike the typical [SaaS plan](https://outreachmonks.com/saas-seo-strategy/), IaaS users pay only for what they use on a weekly or monthly basis. Some vendors even offer the option to pay by the hour. While it may not always be the most cost-effective solution, IaaS supports frequent, rapid scaling in both directions.
* **Platform as a Service (PaaS)**  
  PaaS is a cloud environment designed to support application development and deployment. In this case, vendors provide everything a company needs to support the entire development lifecycle–from building and testing to deployments and updates–from one central hub. If a company needs an address for them to showcase their work, they only need a domain name with a desired [domain extensions](https://www.hostinger.com/tld) for that matter.

**Cloud computing characteristics**

[National Institute of Standards and Technology’s (NIST) guidelines](https://timesofcloud.com/cloud-tutorial/characteristics-of-cloud-computing-as-per-nist/), cloud computing is defined by five main characteristics.

* [Dedicated internet access](https://lightyear.ai/blogs/telecom-procurement-checklist-dedicated-internet-access-dia).
* Measured service.
* Shared resource pooling
* On-demand self-serve access. Customers must be able to perform all actions required to carry out a specific task like generating a report, sharing a document, or sending an email without any assistance from an IT pro or data analyst.
* Rapid elasticity.

**Use cases and example of cloud computing**

Cloud computing examples cover a lot of ground, though most of it is probably familiar territory. Here are some of the more common examples:

* **Streaming services**  
  Think entertainment platforms like Netflix, Hulu, and Spotify, as well as platforms that manage real-time data logs or surveillance footage.
* **Data analytics and business intelligence**  
  Examples include Facebook’s Audience Insights, Google Analytics, as well as more sophisticated platforms with baked in AI and [machine learning capabilities](https://youngandtheinvested.com/machine-learning-statistics/) for taking on the challenges of big data.
* **Business tools**  
  Business applications include CRMs like [Salesforce](https://theventurer.co/reasons-why-salesforce-is-the-best-crm/), [customer service platforms](https://www.zendesk.com/blog/customer-service-skills/) like Zendesk, email marketing platforms [like MailChimp](https://www.demandsage.com/mailchimp-alternatives/), [mobile marketing](https://peertopeermarketing.co/mobile-marketing-agencies) strategies,and [accounting tools](https://www.deskera.com/blog/what-is-accounting-software/) like Quickbooks. This category includes a wide range of tools from [social listening platforms](https://www.meltwater.com/en/blog/top-social-listening-tools) to inventory planning and expense reporting apps. These days, many cloud-based solutions integrate with one another, allowing users to build a custom stack with minimal tech savvy. When you need to integrate non-Salesforce solutions you need to know why and how to hire a [Salesforce commerce cloud consultant](https://elogic.co/services/salesforce-commerce-cloud-development/). Salesforce allows integration with various platforms and tools, but you need a skilled engineer to make it all work smoothly.
* **Collaboration & communication tools**  
  Examples include Google Drive, like [cloud storage for photos](https://fixthephoto.com/best-cloud-storage-for-photos.html) and documents, Slack, Dropbox, and Zoom.

**Virtualization vs. cloud computing**

Again, *“virtualization vs. cloud computing”* isn’t a perfect comparison.

The real question is, whether to virtualize an entire IT ecosystem of owned assets or subscribe to the cloud-based services that address key needs.

Here, we’ve included a side-by-side of both options across eight critical areas.

**Benefits of virtualization**

Virtualization recreates the best aspects of physical hardware and makes several improvements aimed at helping organizations get better results from their machines, allowing organizations to consolidate their hardware and the resources needed to manage it.

Ultimately, virtualization works best for larger organizations with complex IT architectures or companies that sell cloud-based solutions.

**Benefits of cloud computing**

Cloud computing is both easier to implement and more affordable than virtualization technologies.

Users can easily access resources through a browser from anywhere with an internet connection, and month-to-month subscriptions and free trials allow users to shop around for the best-fit solutions.

For small companies with limited resources, this option makes the most sense–unless you’re a service provider or require advanced features like real-time data streaming or constant uptime.