

This article is about the containerization software. For the company, see [Docker, Inc.](#)

Docker is a set of [platform as a service](#) (PaaS) products that uses [operating-system-level virtualization](#) to deliver software in packages called [containers](#). Docker automates the deployment of [applications](#) within lightweight containers, enabling them to run consistently across different computing environments.

The core software that runs and manages these containers is called **Docker Engine**. Docker was first released in 2013 and continues to be developed by [Docker, Inc.](#). The platform includes both free and paid tiers.

Background

Containers are isolated from one another and bundle their own software, [libraries](#) and configuration files; they can communicate with each other through well-defined channels.^[5] Because all of the containers share the services of a single [operating system kernel](#), they use fewer resources than [virtual machines](#).^[6]

Operation

Docker can use different interfaces to access virtualization features of the Linux kernel.^[7]

Docker can package an application and its dependencies in a virtual container that can run on any [Linux](#), [Windows](#), or [macOS](#) computer. This enables the application to run in a variety of locations, such as [on-premises](#), in [public](#) (see [decentralized computing](#), [distributed computing](#), and [cloud computing](#)) or [private cloud](#).^[8] When running on Linux, Docker uses the resource isolation features of the [Linux kernel](#) (such as [cgroups](#) and kernel [namespaces](#)) and a [union-capable file system](#) (such as [OverlayFS](#))^[9] to allow containers to run within a single Linux instance, avoiding the overhead of starting and maintaining [virtual machines](#). Docker on macOS uses a Linux [virtual machine](#) to run the containers.^[10]

Because Docker containers are [lightweight](#), a single server or virtual machine can run several containers simultaneously.^[11] A 2018 analysis found that a typical Docker use case involves running eight containers per host, and that a quarter of analyzed organizations run 18 or more per host.^[12] It can also be installed on a single board computer like the [Raspberry Pi](#).^[13]

The Linux kernel's support for namespaces mostly^[14] isolates an application's view of the operating environment, including process trees, network, user IDs and mounted file systems, while the kernel's cgroups provide resource limiting for memory and CPU.^[15] Since version 0.9, Docker includes its own component (called libcontainer) to use virtualization facilities provided directly by the Linux kernel, in addition to using abstracted virtualization interfaces via [libvirt](#), [LXC](#) and [systemd-nspawn](#).^{[16][7][8][17]}

Docker implements a high-level [API](#) to provide lightweight containers that run processes in isolation.