1. Set up your Docker environment (on this page)
2. [Build an image and run it as one container](https://docs.docker.com/get-started/part2/)
3. [Scale your app to run multiple containers](https://docs.docker.com/get-started/part3/)
4. [Distribute your app across a cluster](https://docs.docker.com/get-started/part4/)
5. [Stack services by adding a backend database](https://docs.docker.com/get-started/part5/)
6. [Deploy your app to production](https://docs.docker.com/get-started/part6/)

Docker concepts

Docker is a platform for developers and sysadmins to **develop, deploy, and run** applications with containers. The use of Linux containers to deploy applications is called *containerization*. Containers are not new, but their use for easily deploying applications is.

Containerization is increasingly popular because containers are:

* Flexible: Even the most complex applications can be containerized.
* Lightweight: Containers leverage and share the host kernel.
* Interchangeable: You can deploy updates and upgrades on-the-fly.
* Portable: You can build locally, deploy to the cloud, and run anywhere.
* Scalable: You can increase and automatically distribute container replicas.
* Stackable: You can stack services vertically and on-the-fly.

### Images and containers

A container is launched by running an image. An **image** is an executable package that includes everything needed to run an application--the code, a runtime, libraries, environment variables, and configuration files.

A **container** is a runtime instance of an image--what the image becomes in memory when executed (that is, an image with state, or a user process). You can see a list of your running containers with the command, docker ps, just as you would in Linux.

### What are containers?

The industry standard today is to use Virtual Machines (VMs) to run software applications. VMs run applications inside a guest Operating System, which runs on virtual hardware powered by the server’s host OS.

VMs are great at providing full process isolation for applications: there are very few ways a problem in the host operating system can affect the software running in the guest operating system, and vice-versa. But this isolation comes at great cost — the computational overhead spent virtualizing hardware for a guest OS to use is substantial.

Containers take a different approach: by leveraging the low-level mechanics of the host operating system, containers provide most of the isolation of virtual machines at a fraction of the computing power.

### Containers and virtual machines

A **container** runs natively on Linux and shares the kernel of the host machine with other containers. It runs a discrete process, taking no more memory than any other executable, making it lightweight.

By contrast, a **virtual machine** (VM) runs a full-blown “guest” operating system with virtual access to host resources through a hypervisor. In general, VMs provide an environment with more resources than most applications need.

|  |  |
| --- | --- |
| Container stack example | Virtual machine stack example |

## List Docker CLI commands

docker

docker container --help

## Display Docker version and info

docker --version

docker version

docker info

## Execute Docker image

docker run hello-world

## List Docker images

docker image ls

## List Docker containers (running, all, all in quiet mode)

docker container ls

docker container ls --all

docker container ls -aq

# Example output

$ docker run hello-world

Hello from Docker!

This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:

1. The Docker client contacted the Docker daemon.

2. The Docker daemon pulled the "hello-world" image from the Docker Hub.

(amd64)

3. The Docker daemon created a new container from that image which runs the

executable that produces the output you are currently reading.

4. The Docker daemon streamed that output to the Docker client, which sent it

to your terminal.

To try something more ambitious, you can run an Ubuntu container with:

$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:

https://cloud.docker.com/

For more examples and ideas, visit:

https://docs.docker.com/engine/userguide/

$ docker images hello-world

REPOSITORY TAG IMAGE ID SIZE

hello-world latest f2a91732366c 1.85kB