Kubernetes Workshop

Part 2: Building blocks

What is Kubernetes

Kubernetes, is developed by **Google**, and is a system for managing containerized **Docker** applications across a **cluster** of nodes.

Why not just use Docker?

Using Docker brings a lot of benefits to your application, but with Docker alone it is hard to deploy on a Cluster. For example:

- Mounting storage systems
- Horizontal (auto) scaling
- Locating the Docker containers / Discovery
- Load balancing
- Log access
- Health checking and monitoring
- Identity and authorization

Kubernetes misconceptions

- Kubernetes does **not restrict** the **type** of application supported. Everything that runs in Docker, runs in Kubernetes.

- Kubernetes does **not** provide any **middleware** (no message bus, no databases etc.). These things usually run on Kubernetes.

- Kubernetes also does not provide:
    - A click-to-deploy service / marketplace
    - A complex language (everything works with JSON or YAML)
    - A continuous integration workflow that builds source code to binary. (You have to provide a working docker image)

Kubernetes Feature overview

- Deploying + Scheduling - Deploy & Decide where to run the containers
- Scaling - Run multiple containers, or add more resources to the containers
- Lifecycle + health - Keep the containers running despite of failure
- Naming + discovering - Find where my containers are now
- Load balancing - Distribute traffic across a set of containers
- Storage volumes - Provide data to the containers
- Logging + Monitoring - Track what's happening with my containers
- Debugging + Introspection - knowing the state of the system
- Identity + Authorization - Control who can do things in the cluster
- And more:
  - Rolling updates, auto-scaling, application secrets, batch processing, scheduling, workflows, plugins.

How to install Kubernetes

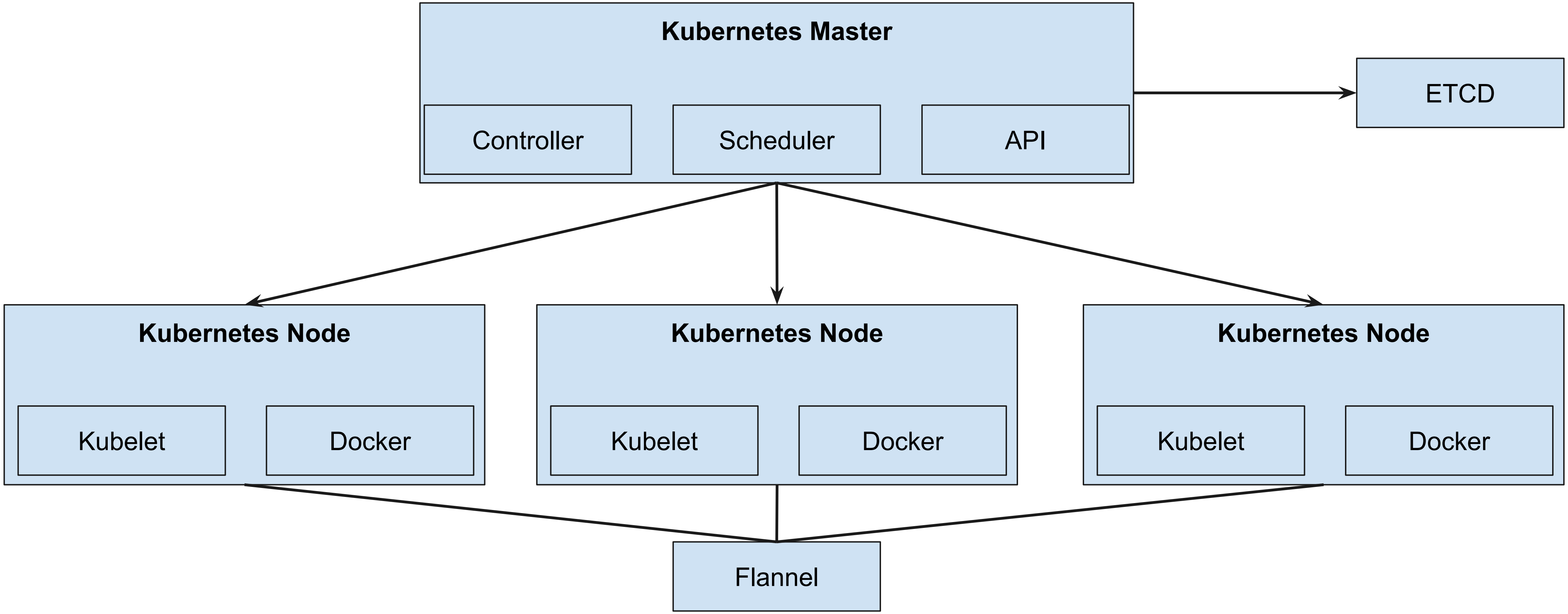
There are many ways to install Kubernetes, for example:

- Local machine, through a virtual machine or Docker.
- Turn-key solution - works for: GCM, AWS or Azure.
- Getting the binaries and run it - works for most linux distributions.
- Compiling the source and run it.

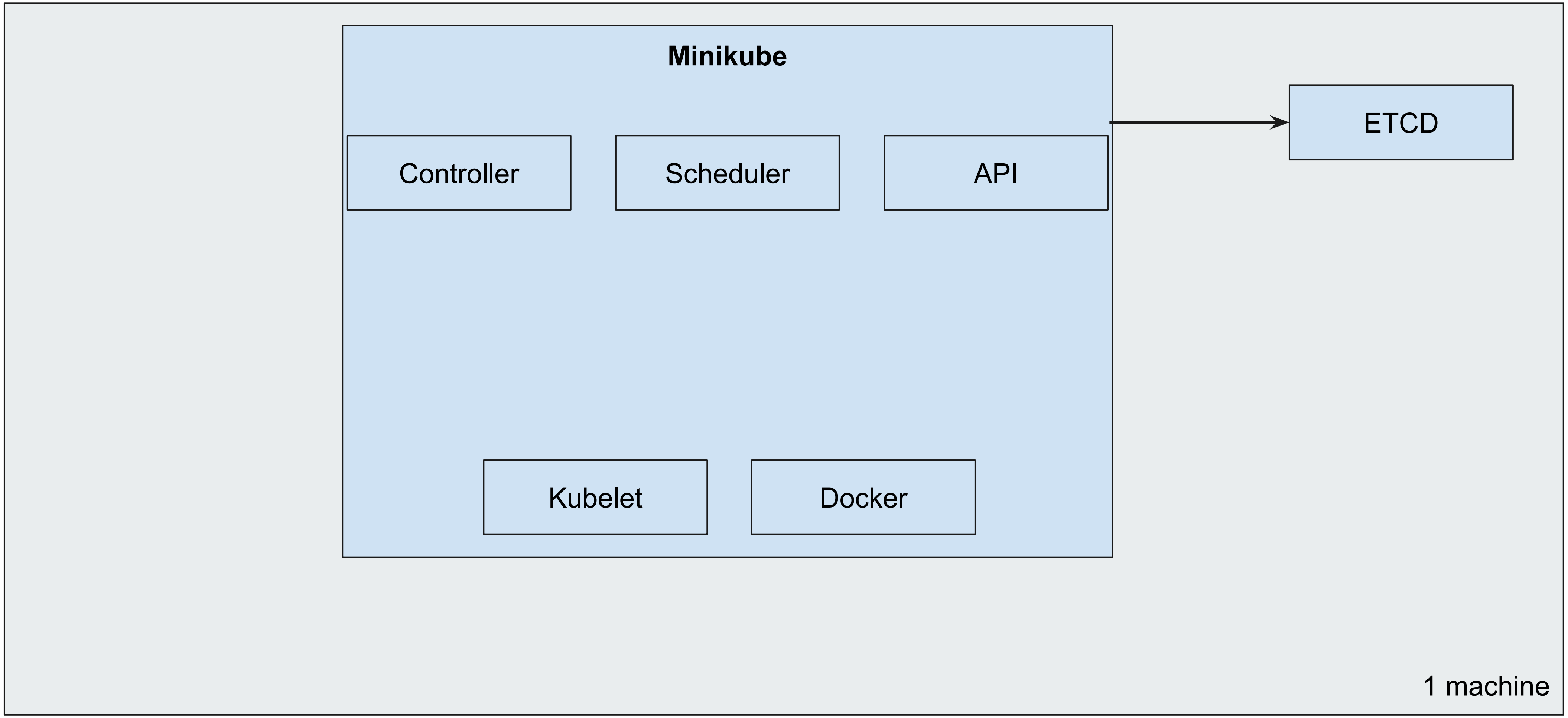
There are also PaaS solutions available:

- Openshift
- Deis
- Gondor
- Google Container Engine

A Typical Kubernetes cluster



Our minikube environment


Minikube
Controller
Scheduler
API
ETCD
Kubelet
Docker
1 machine