Konténerek orkesztrálása - Kubernetes

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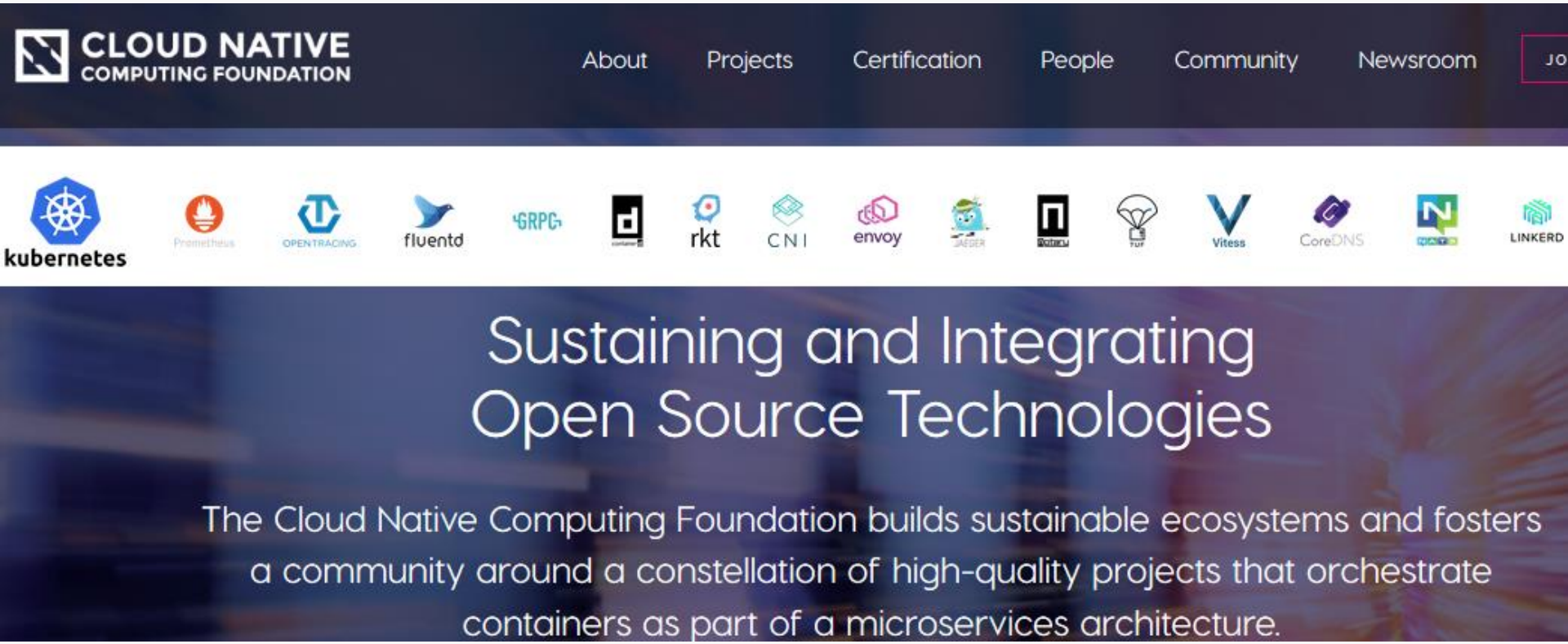
MOTIVÁCIÓ

Motiváció - orkesztráció

- Mi hiányzik egy teljes Docker rendszerhez?
  - Orkesztráció
  - Amit a felhők nyújtanak
  - Cél: automatizált konténer telepítés és menedzsment multi-host környezetben (incl. skálázódás vezérlése)
- Egyik megoldás: nyilvános felhőkben Docker
  - Amazon Web Services, Google Cloud, Microsoft Azure
- Másik megoldás: Docker + OpenStack
  - OpenStack Magnum
- Harmadik megoldás: Docker orkesztráció
  - Apache Mesos (2010)
  - Google Kubernetes (2014)
  - Docker Swarm Mode (2016)

Cloud Native Computing Foundation

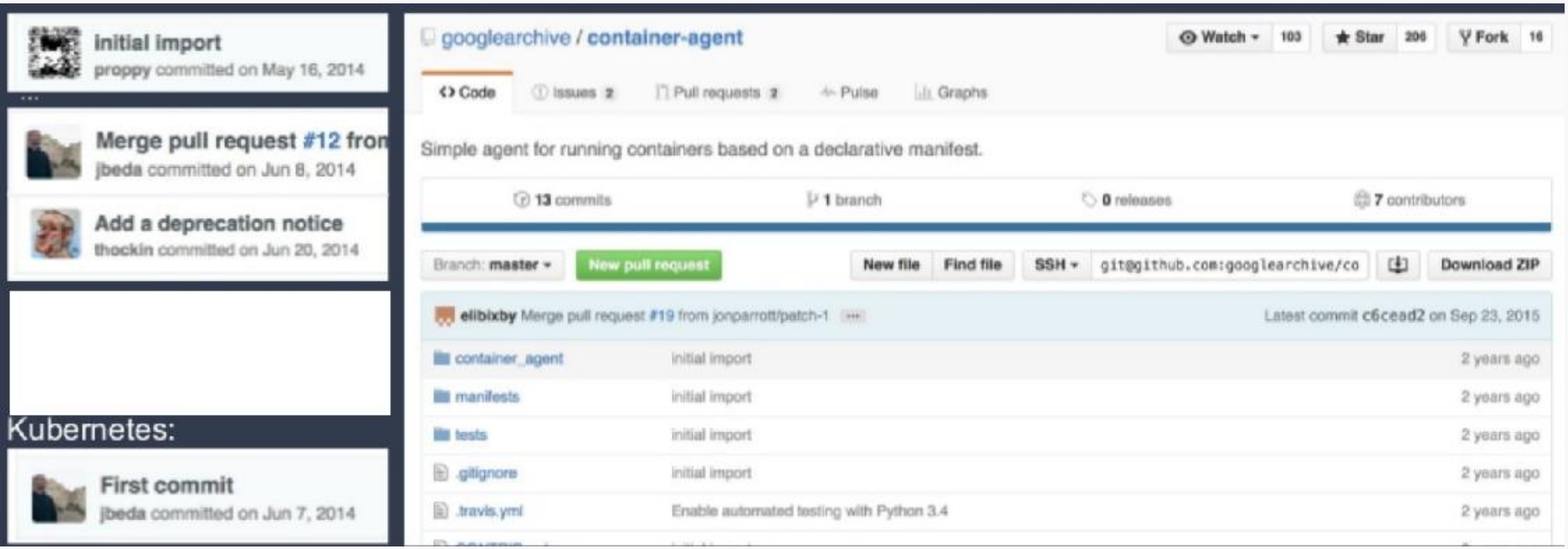
- Mikroszervíz ökoszisztéma
  - Konténerek orkesztrálásával
  - Google támogatja
  - rkt-t javasolják a Docker helyett



KUBERNETES

Kubernetes - kezdetek

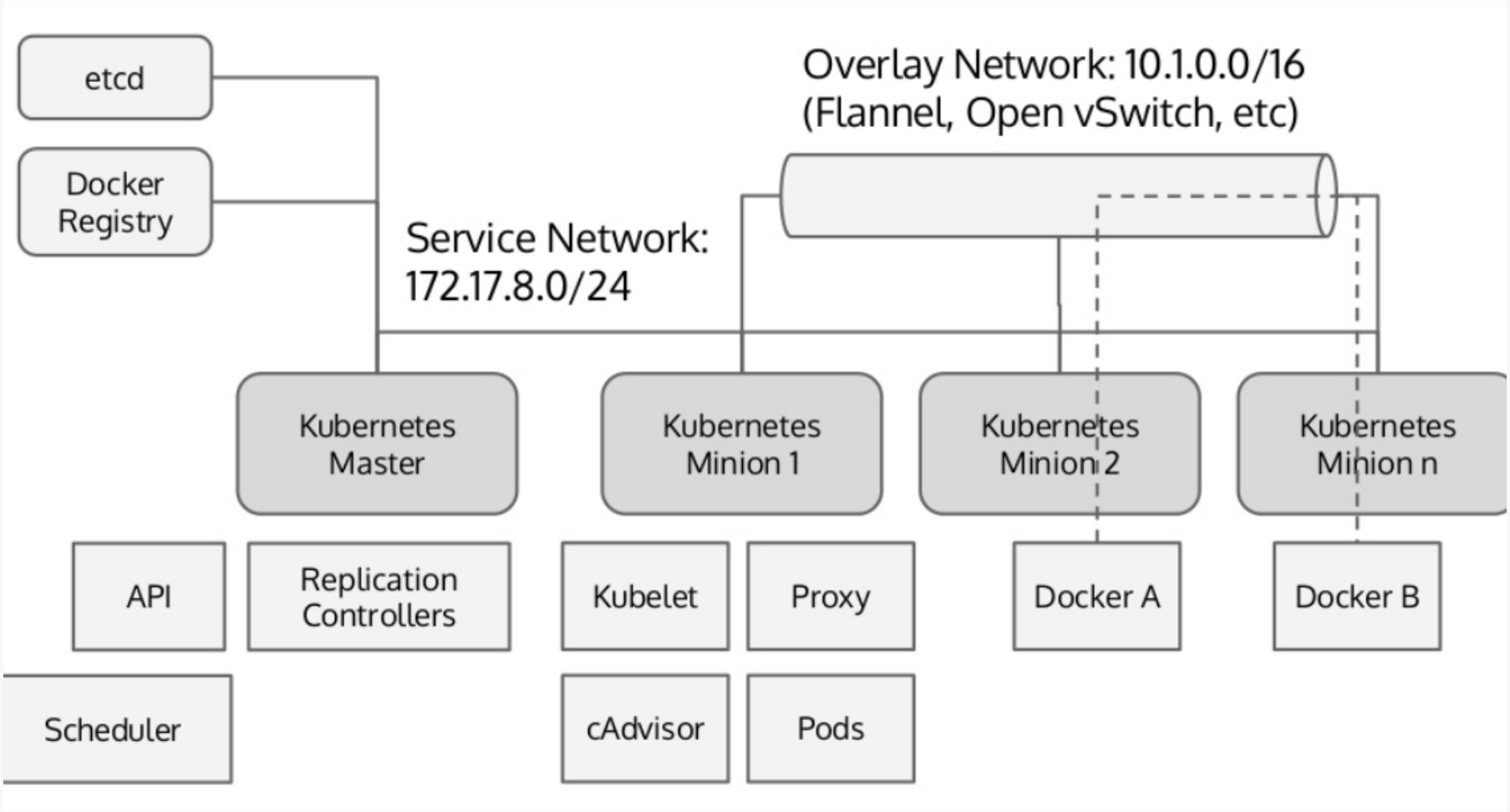
- Deklaratív konténer csoport kezelés @ google
- Konténer csoport: ugyanaz a hálózati névtér és kötetek (volume)



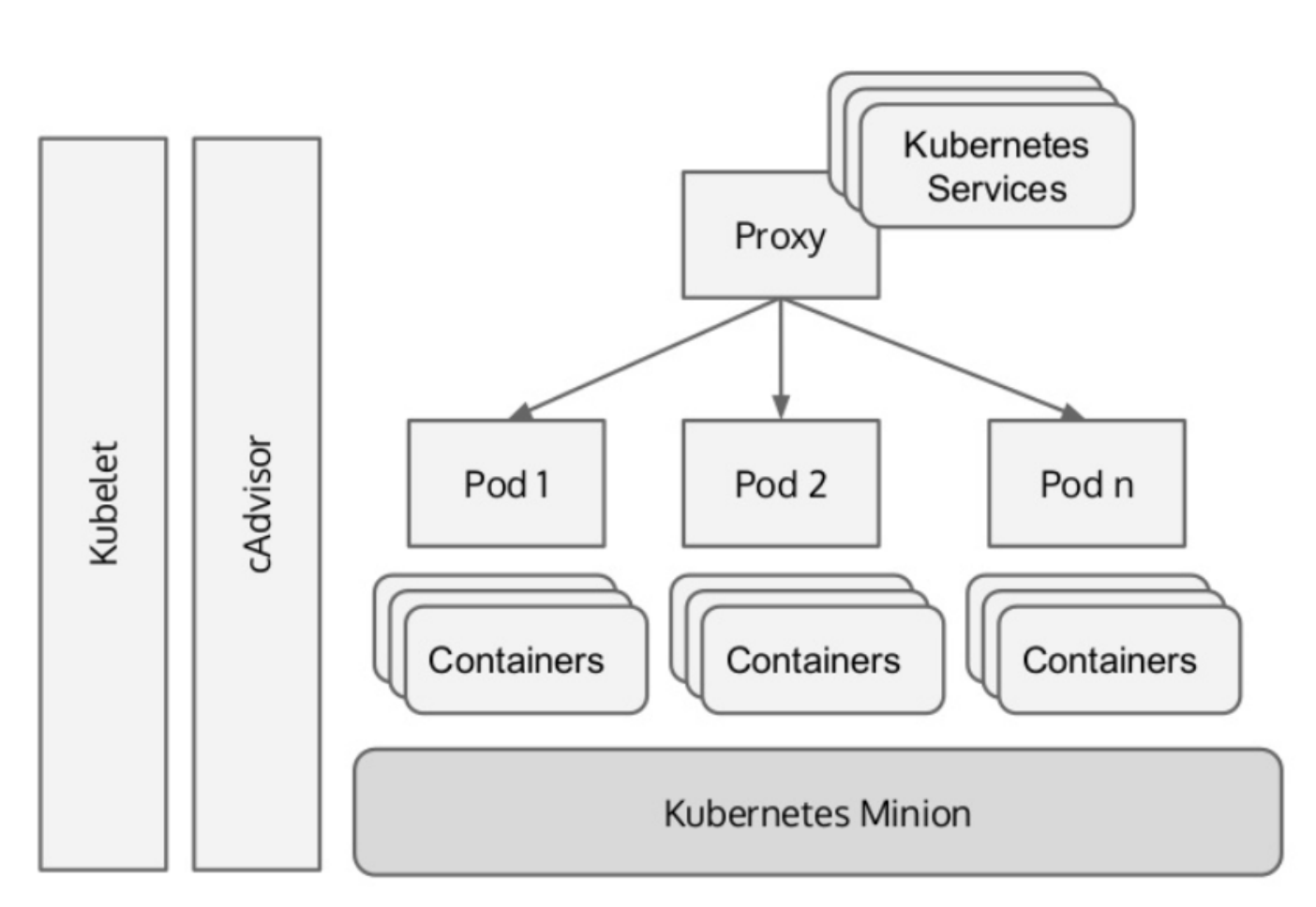
Kubernetes – main components

- **Pod** - A group of Containers
- **Labels** - Labels for identifying pods
- **Kubelet** - Container Agent
- **Proxy** - A load balancer for Pods
- **etcd** - A metadata service
- **cAdvisor** - Container Advisor provides resource usage/performance statistics
- **Replication Controller** - Manages replication of pods
- **Scheduler** - Schedules pods in worker nodes
- **API Server** - Kubernetes API server

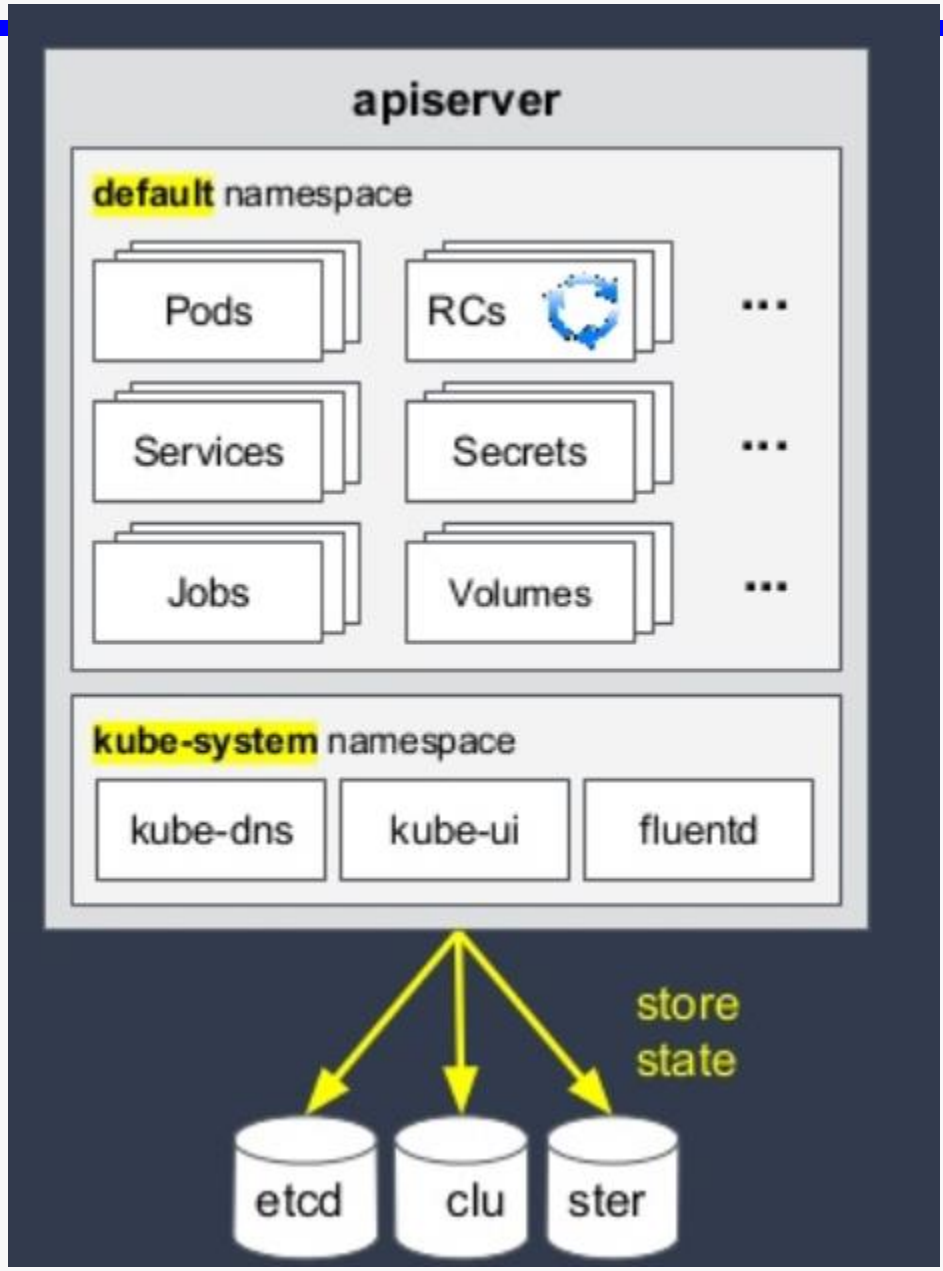
Kubernetes deployment



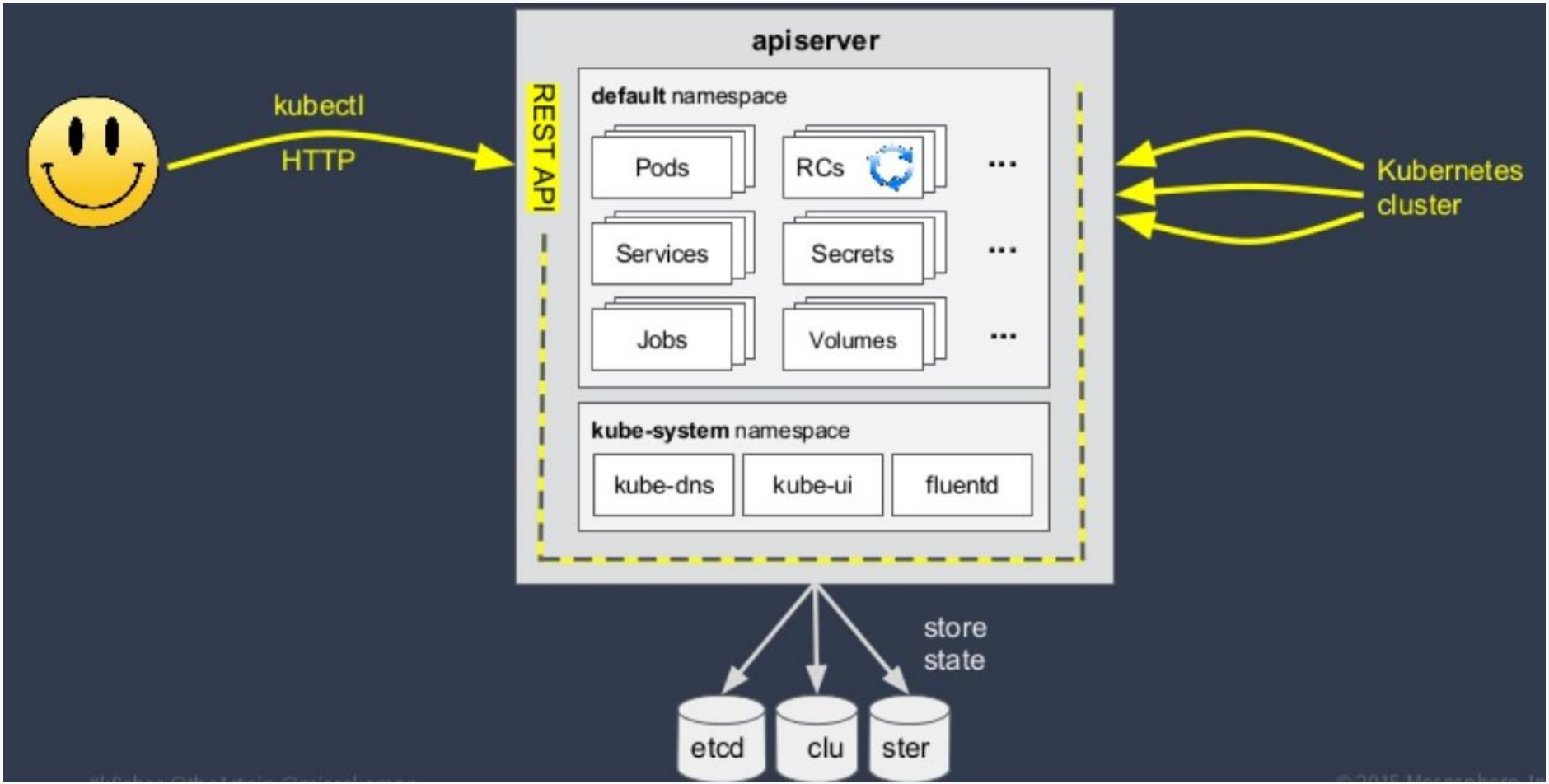
Worker node = minion



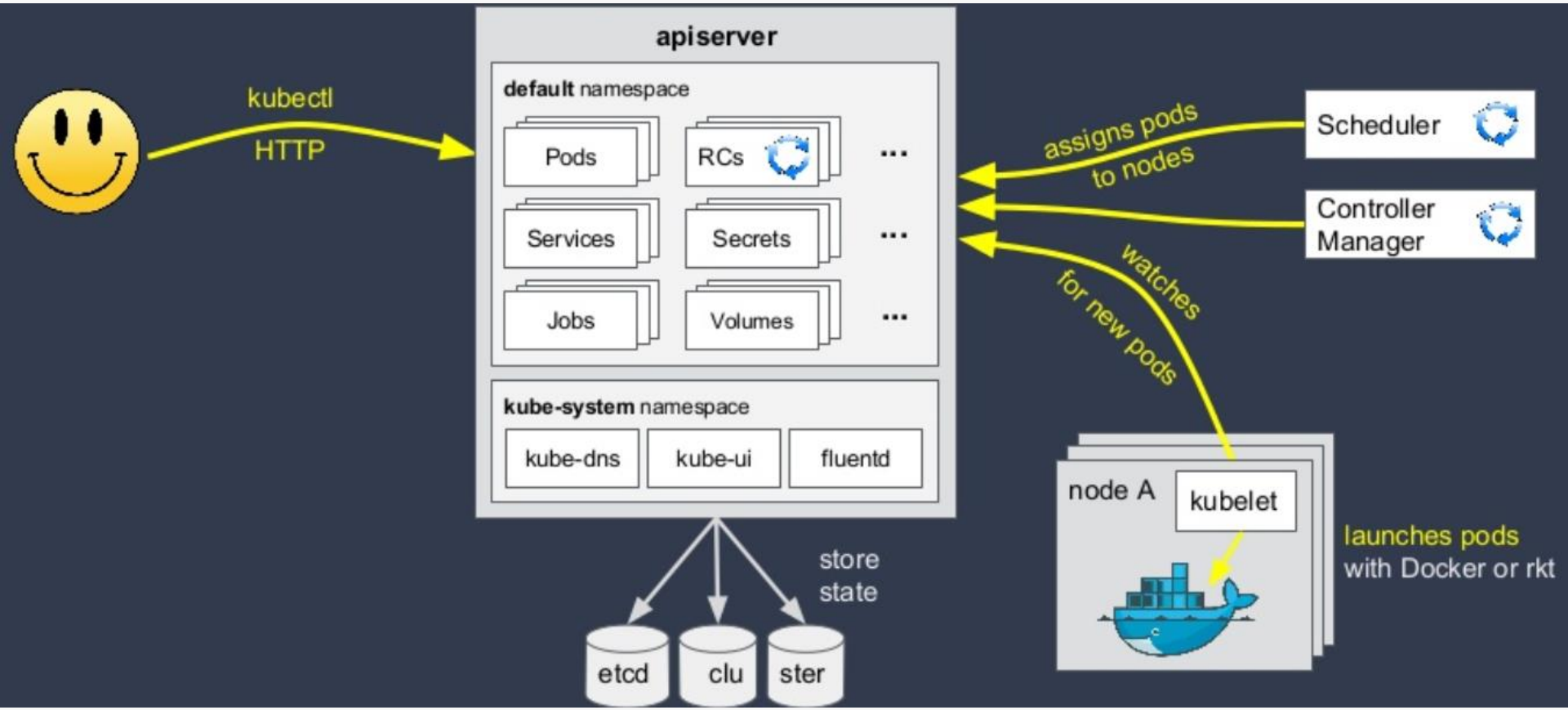
API szerver


apiserver
default namespace
Pods
RCs
Services
Secrets
Jobs
Volumes
kube-system namespace
kube-dns
kube-ui
fluentd
store
state
etcd
clu
ster

API szerver kapcsolatai



A kube-system szolgáltatásai



Kubernetes network

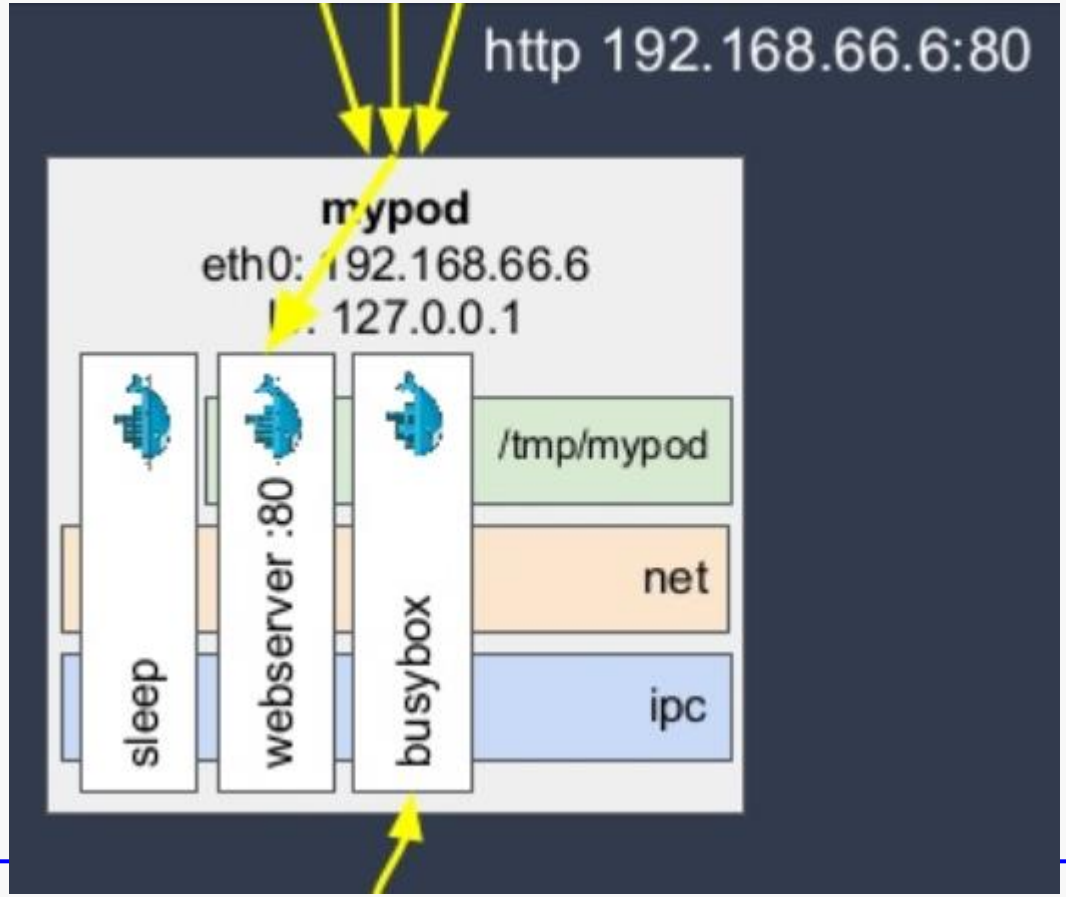
- At Pod level every container is in the same namespace
  - Pro: can reach each other via localhost
  - Consequence: mind the port assigment within a Pod (2 containers cannot use the same port)
- Hosts must communicate with containers without NATs

- Typical solutions:
  - Flannel: own solution, flat overlay
  - OVS: Open VSwitch – generic solution, widely used in the industry
  - Lots of alternatives:

https://kubernetes.io/docs/concepts/cluster-administration/networking/#how-to-achieve-this

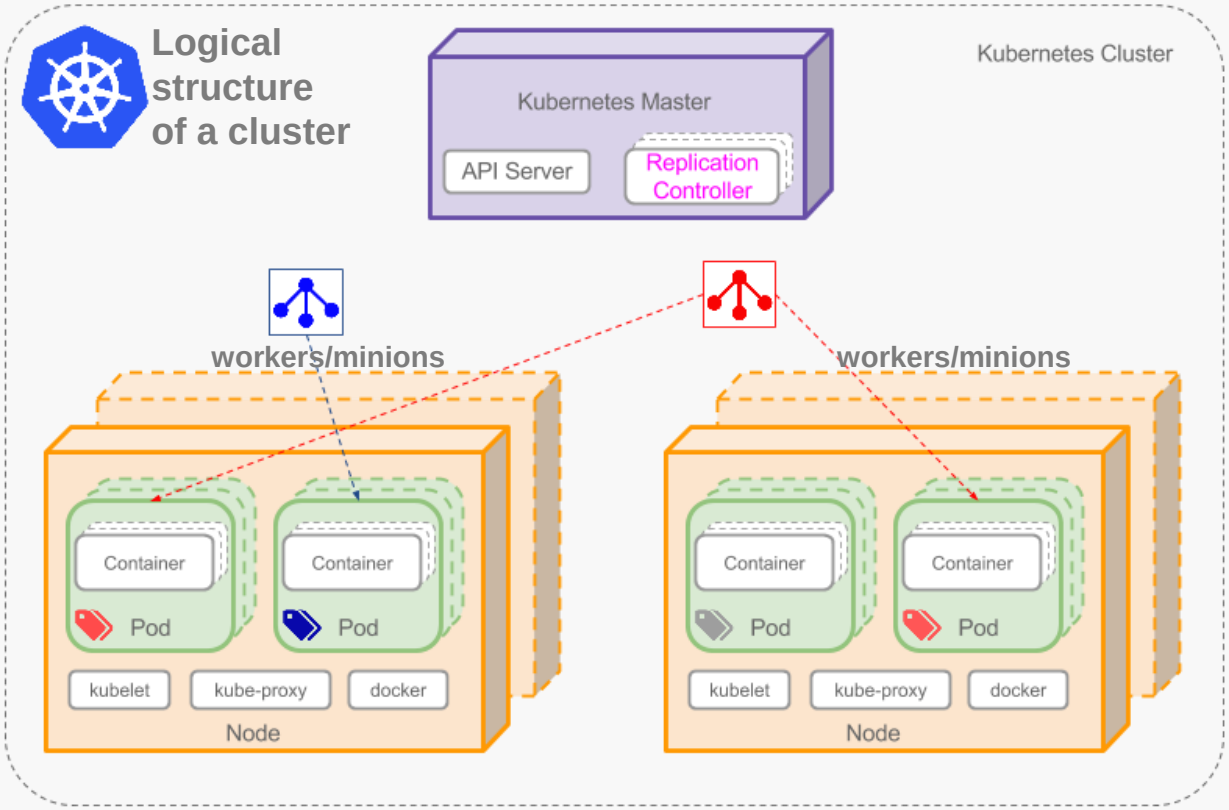
Ha én (csak) Docker volnék…

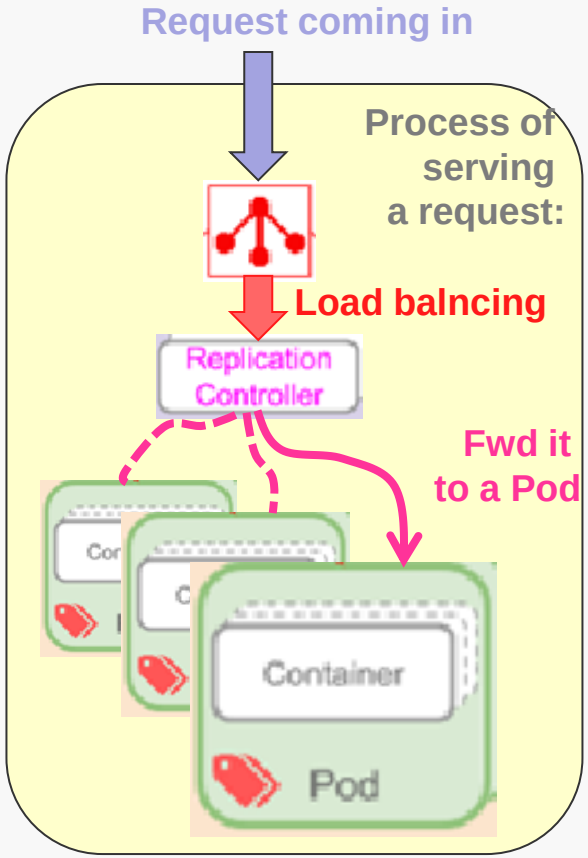
» Elvileg docker konténerekkel is meg lehet valósítani, azt, amit egy Kubernetes pod tud…



Logical structure of a Kubernetes cluster

- Control by the master
- Service offers access to users
  - Handled by a load balancer (the Replication Controller)
  - The request is answered by one Pod





= Labels = Service