Kubernetes

cloud native application orchestration

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AGENDA

Why: Habits of sucessfull cloud native applications

What: Kubernetes platform - the building blocks

How: Deploying applications on Kubernetes (demo)

WHO AM I

Catalin Jora (Engineer @ Container Solutions)
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WHY: HABITS OF SUCESSFULL CLOUD NATIVE APPLICATIONS

What: Kubernetes platform - the building blocks

How: Deploying applications on Kubernetes (demo)

DESIRED HABITS FOR SOFTWARE IN 2017

Speed

Scale

Costs

SPEED OF RELEASE

Release cycle of software will only acelerate, will (probably) never slow down.

SCALE

Software should be able to grow with user/business demand

COSTS

Reduce infrastructure costs by moving from pay in advance to pay per use

CLOUD NATIVE SYSTEMS

distributed systems environments capable of scaling to tens of thousands of self healing multi-tenant nodes | cncf

CLOUD NATIVE APPLICATIONS PATTERNS

Packed in containers

Dinamically managed

Micro-service oriented

Why: Habits of sucessfull cloud native applications

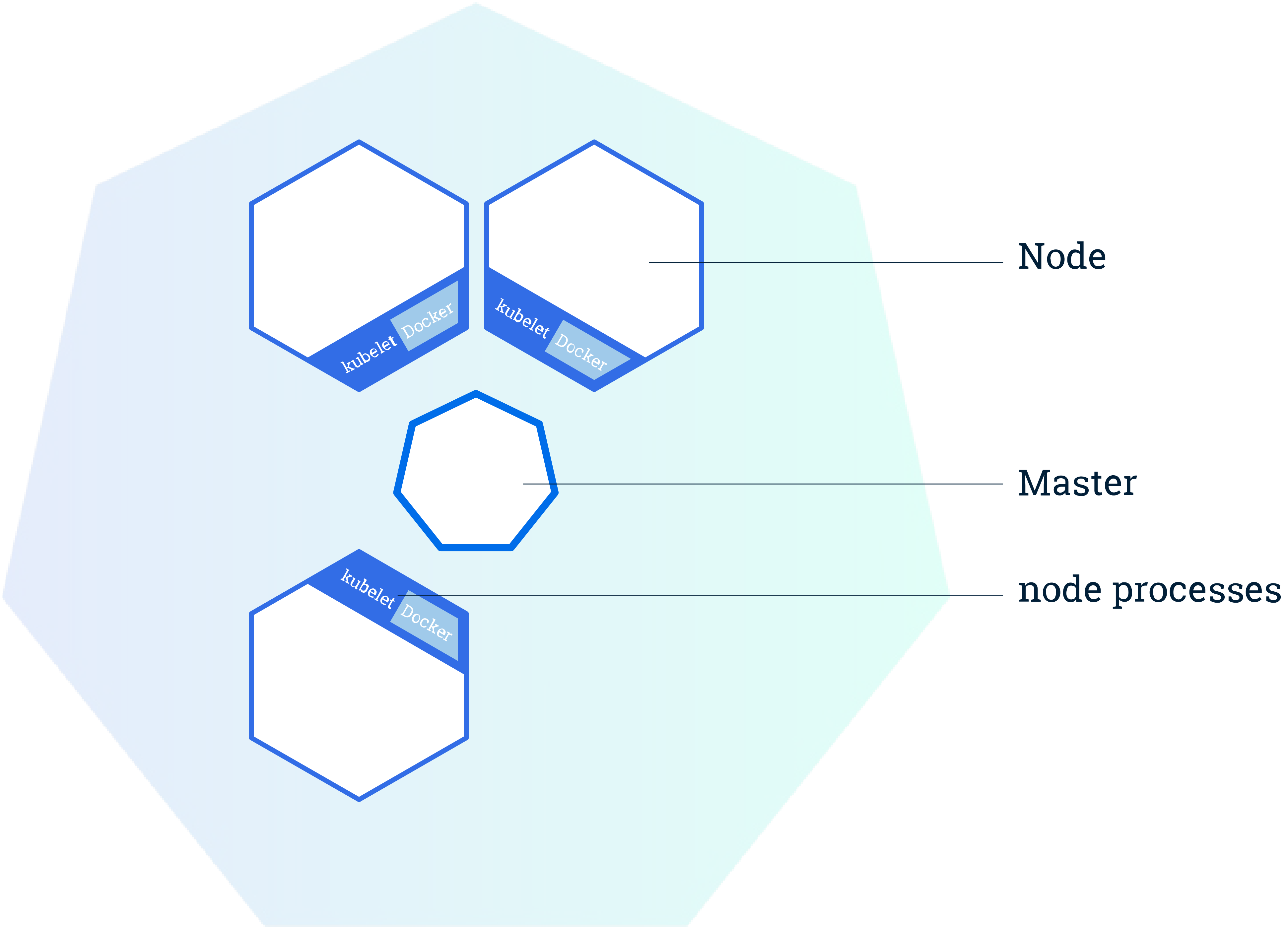
WHAT: KUBERNETES PLATFORM - THE BUILDING BLOCKS

How: Deploying applications on Kubernetes (demo)

WHAT IS KUBERNETES

Kubernetes is a open-source platform that orchestrates the placement (scheduling) and execution of containers across a clusters

KUBERNETES ARCHITECTURE



KUBERNETES COMPONENTS

MASTER

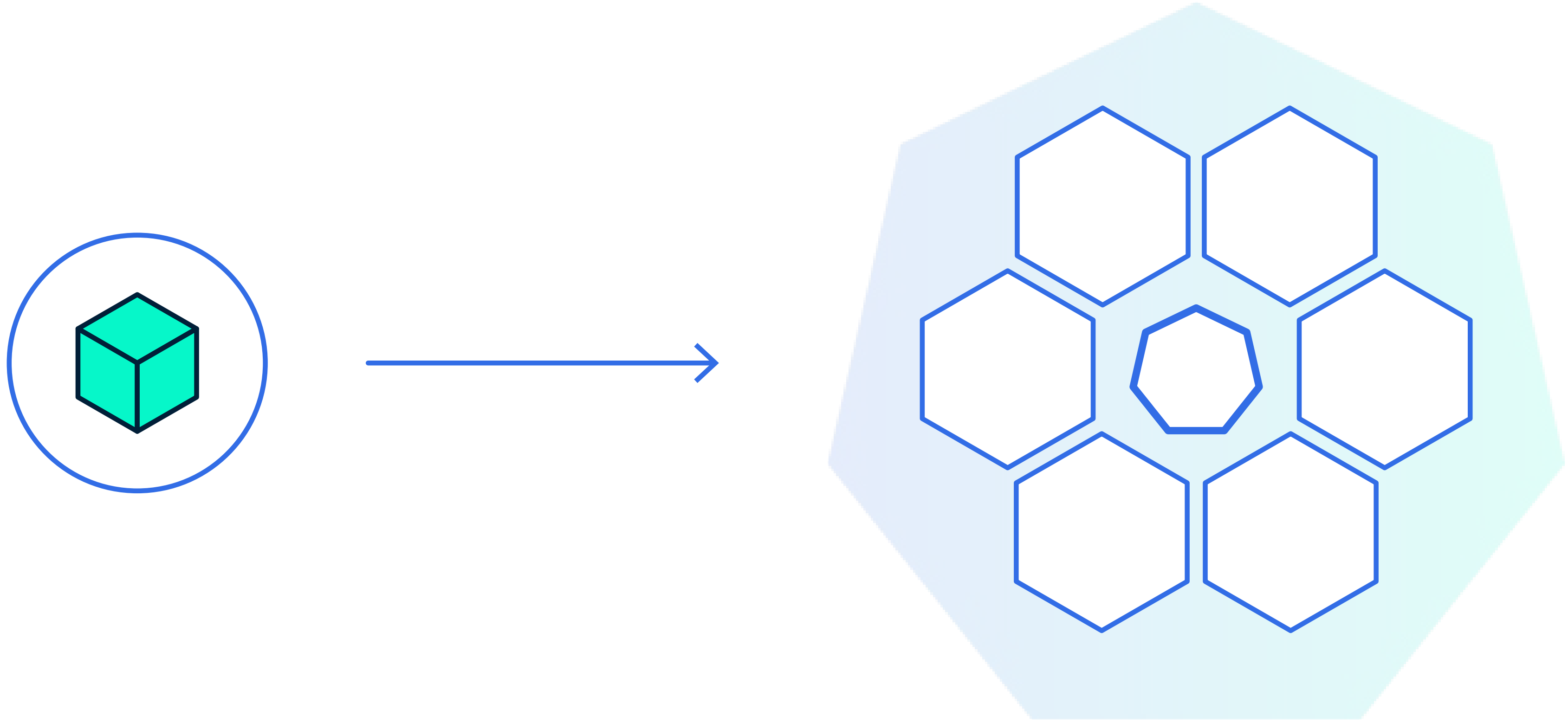
etcd, API server, controller manager, scheduler, kubelet

NODES

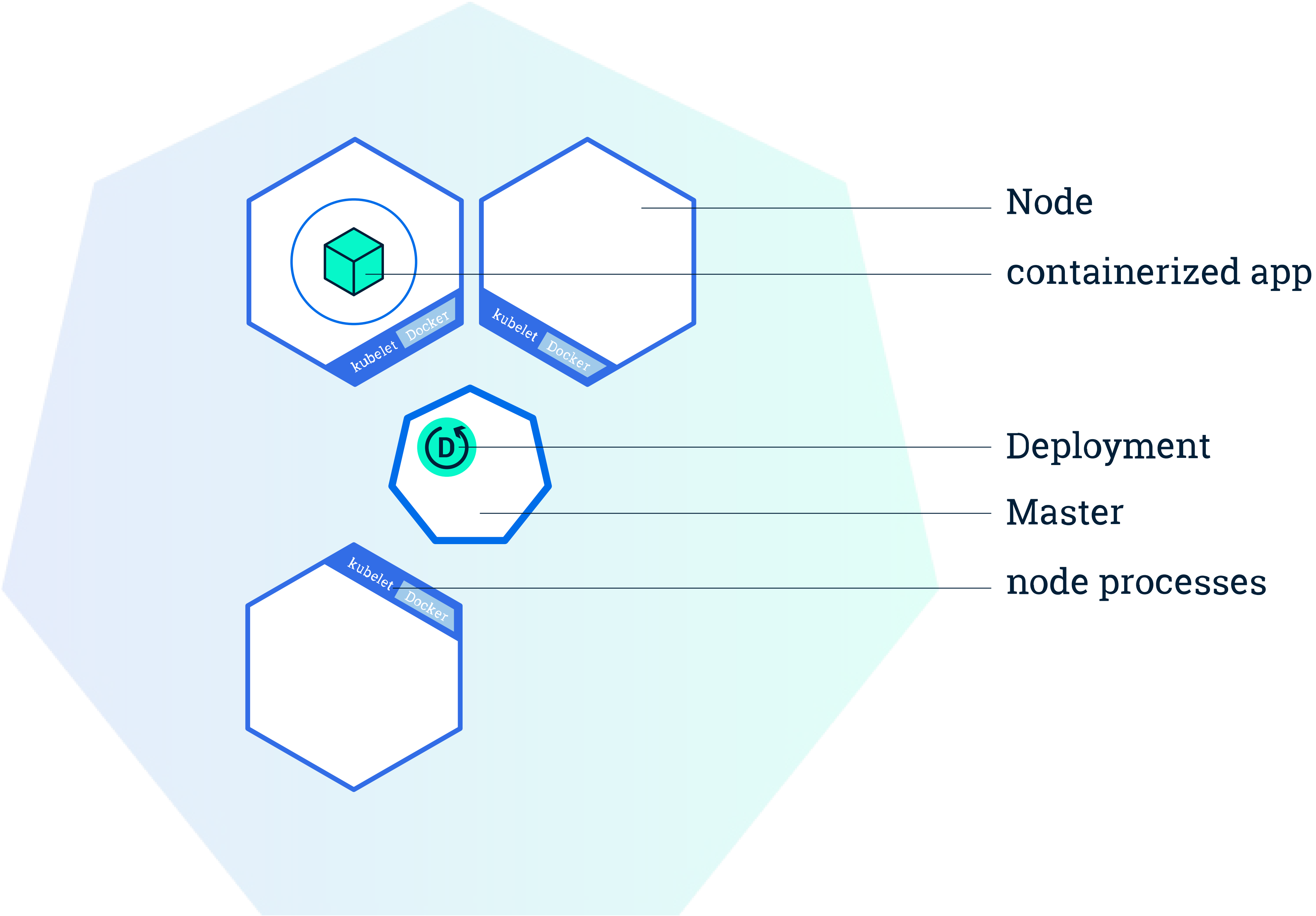
kubelet, docker

KUBERNETES DEPLOYMENT

- responsible for creating and updating the instances of your applications
- provide a self-healing mechanism



KUBERNETES DEPLOYMENT



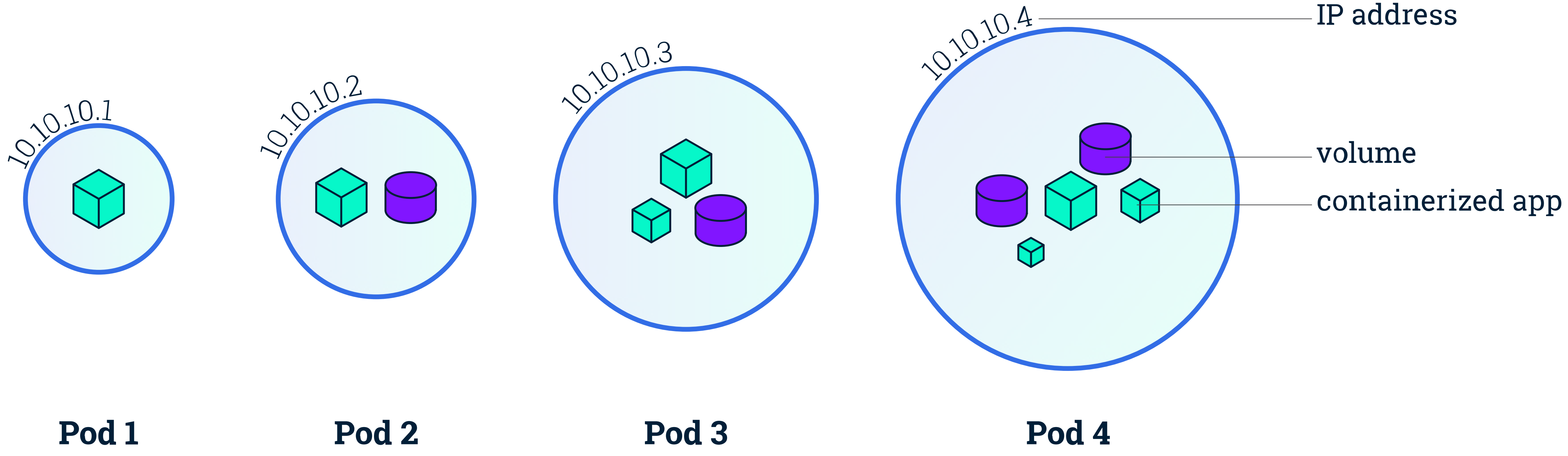
KUBERNETES POD

- a group of one or more containers (e.g. Docker)
- shared storage & unique cluster level IP
- info about container image, ports, resources (CPU,RAM)

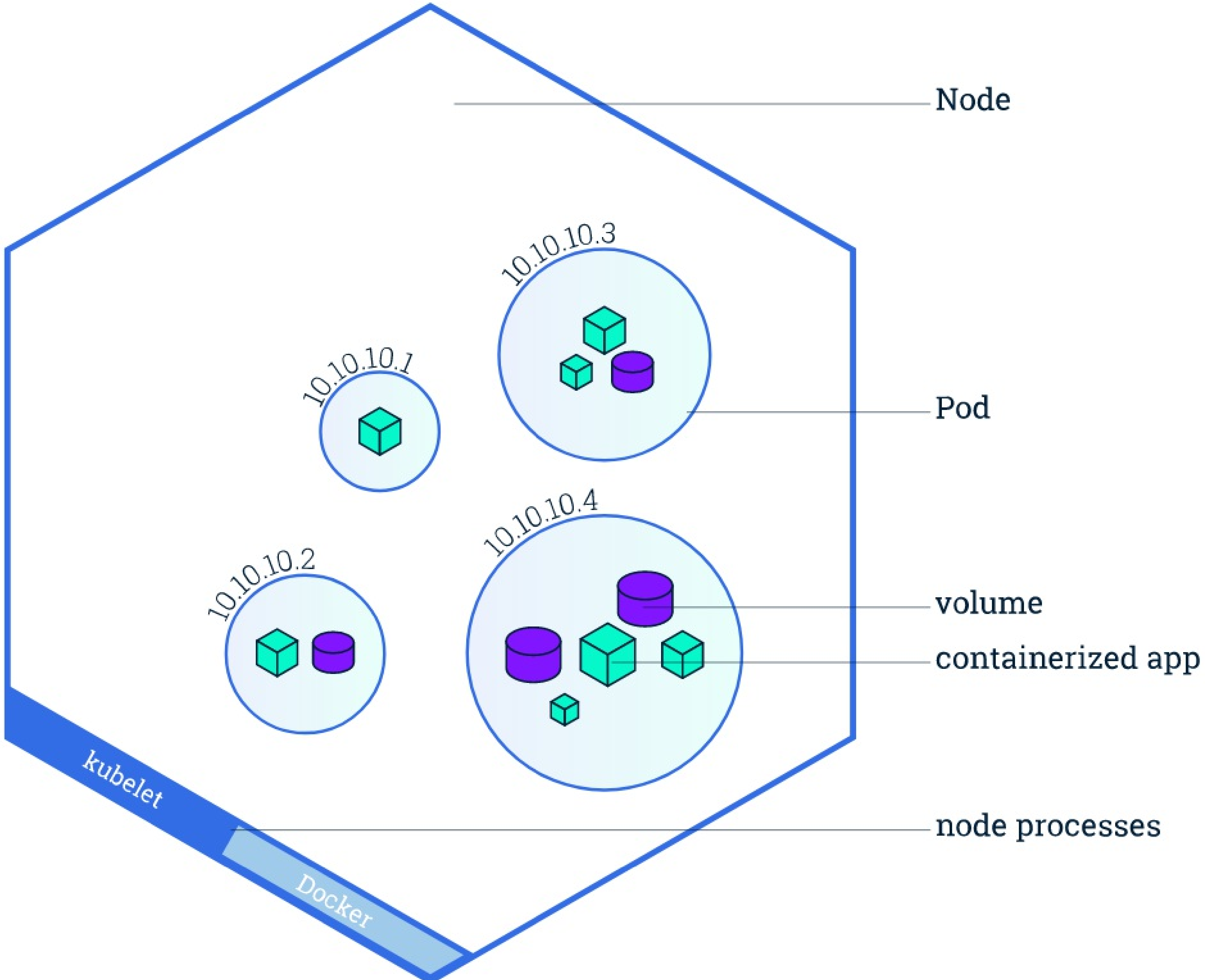
KUBERNETES POD

- are mortal
- are the atomic unit on Kubernetes
- deployments are creating pods with containers inside them

KUBERNETES POD



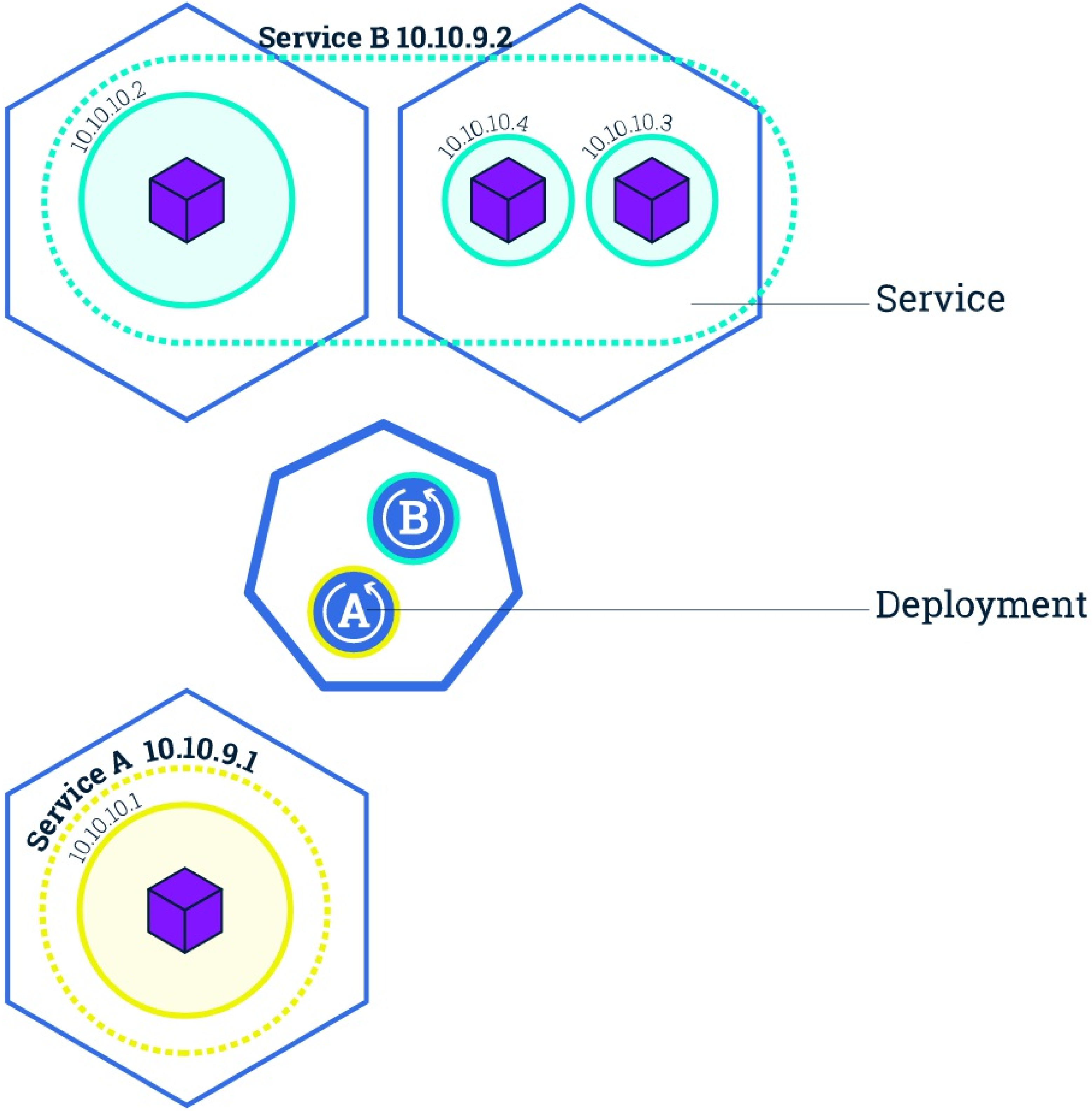
KUBERNETES NODE



KUBERNETES SERVICE

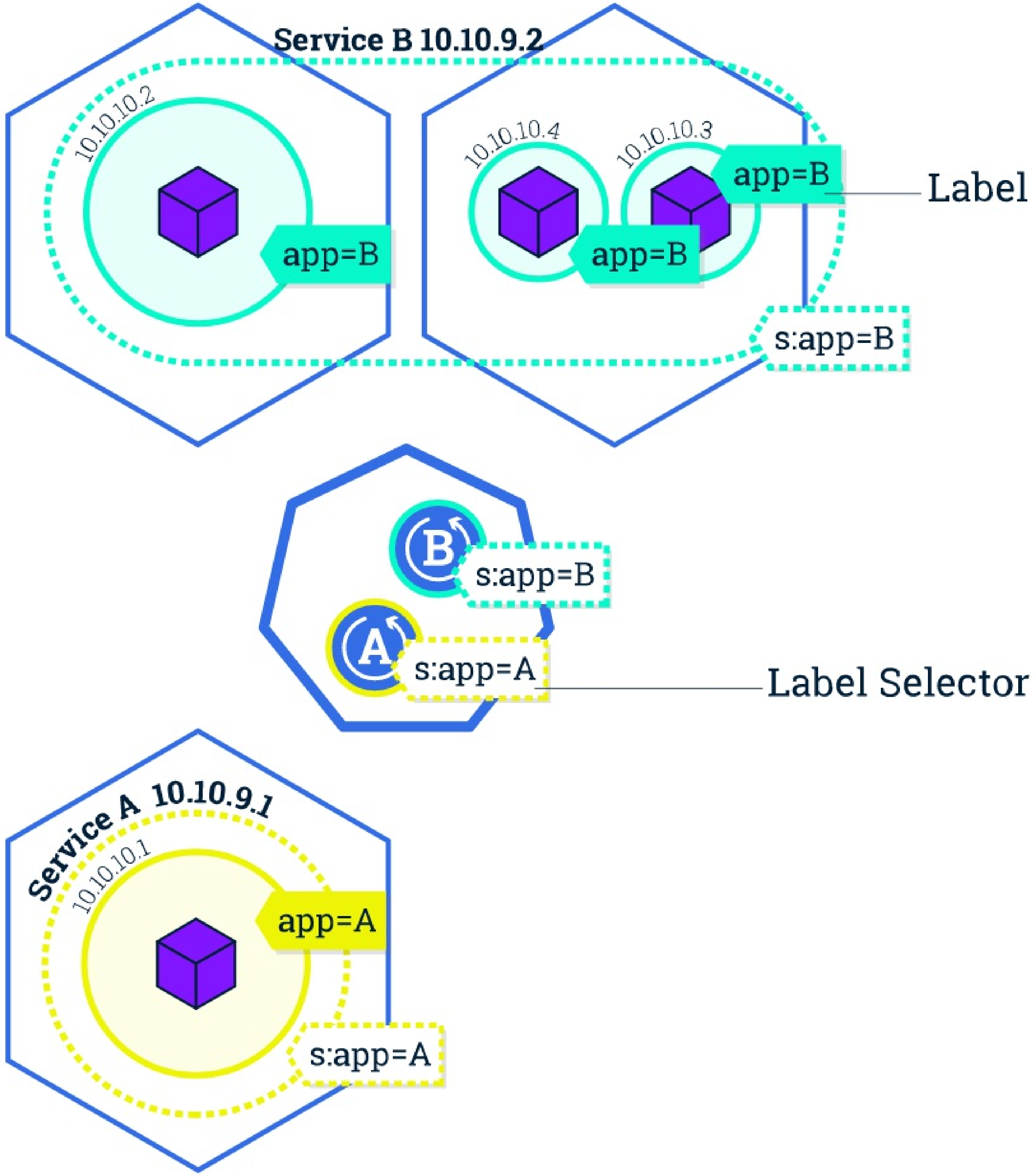
abstraction layer which defines a logical set of Pods

- enables external traffic exposure
- load balancing
- service discovery for pods


Service B 10.10.9.2
10.10.10.2
10.10.10.4
10.10.10.3
Service
B
A
Deployment
Service A 10.10.9.1
10.10.10.1

KUBERNETES LABEL

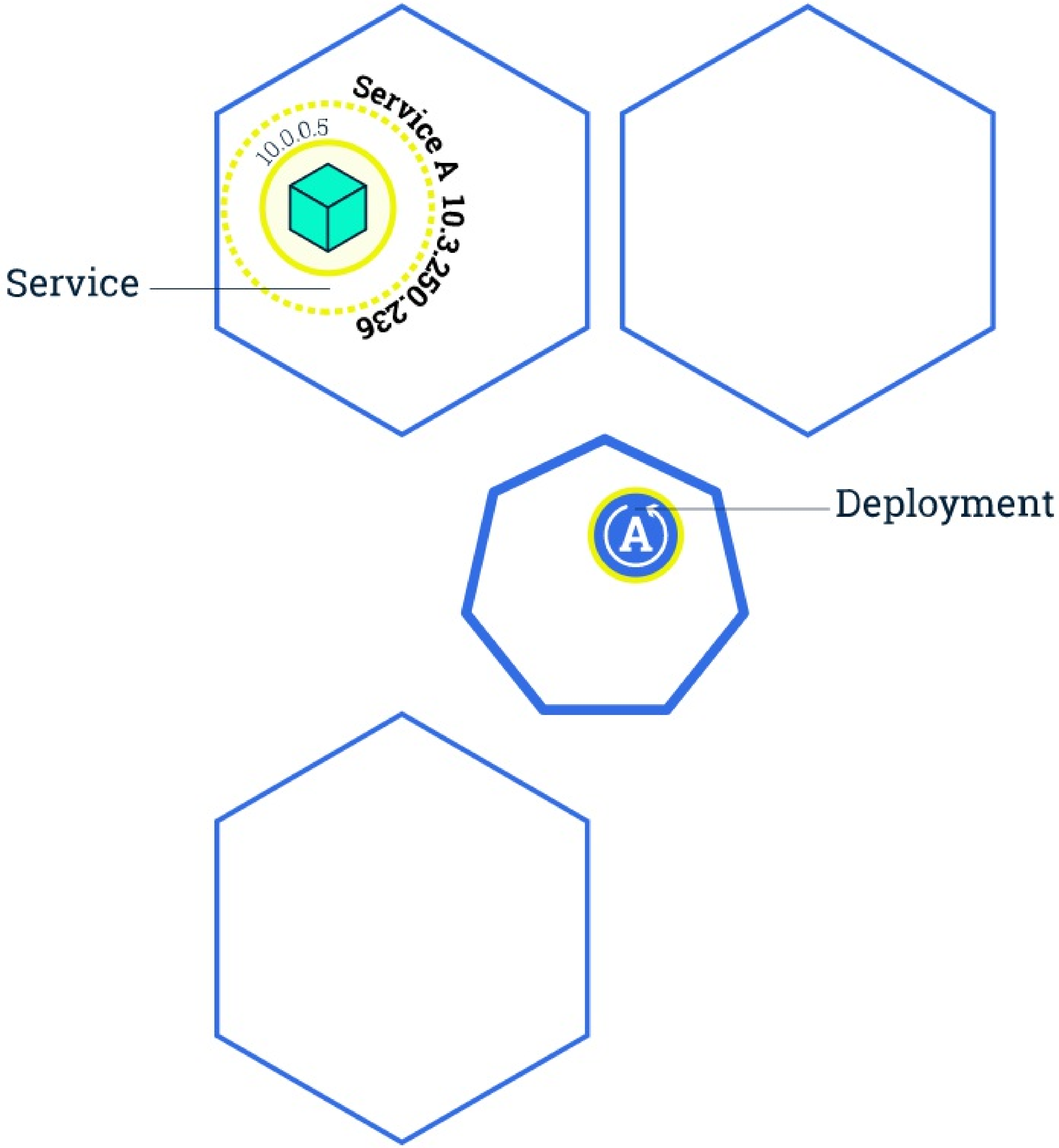
- key/value pairs attached to objects (E.g Pods)
- help organizing objects
- can be changed anytime

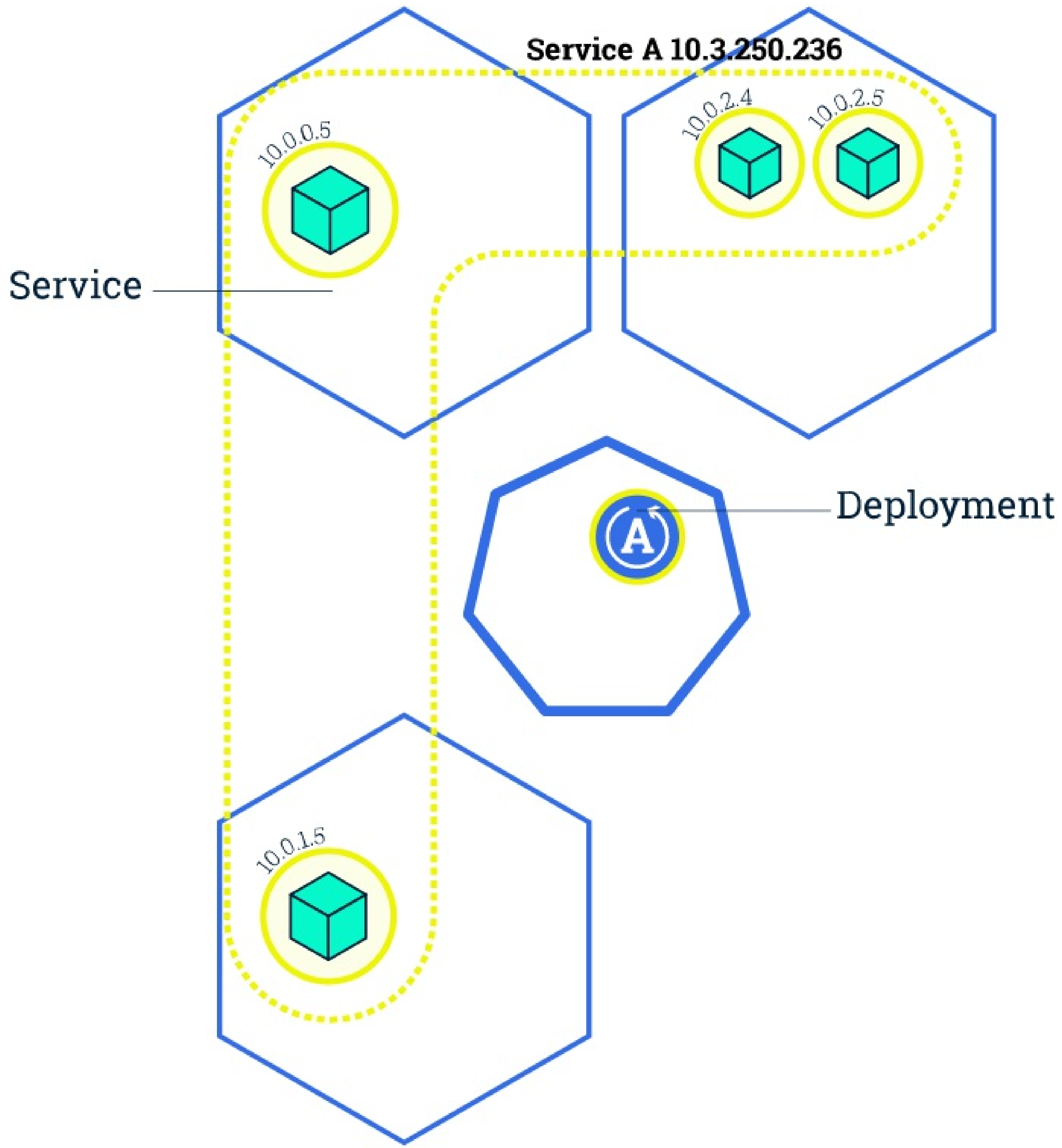

Service B 10.10.9.2
10.10.10.2
app=B
10.10.10.4
10.10.10.3
app=B
app=B
Label
s:app=B
B
s:app=B
A
s:app=A
Label Selector
Service A 10.10.9.1
10.10.10.1
app=A
s:app=A

SCALLING APPLICATIONS

Changing the number of replicas in a deployment

- traffic is sent only to up & running pods
- new pods are created on nodes with available resources
- running multiple pod replicas allow zero-downtime updates

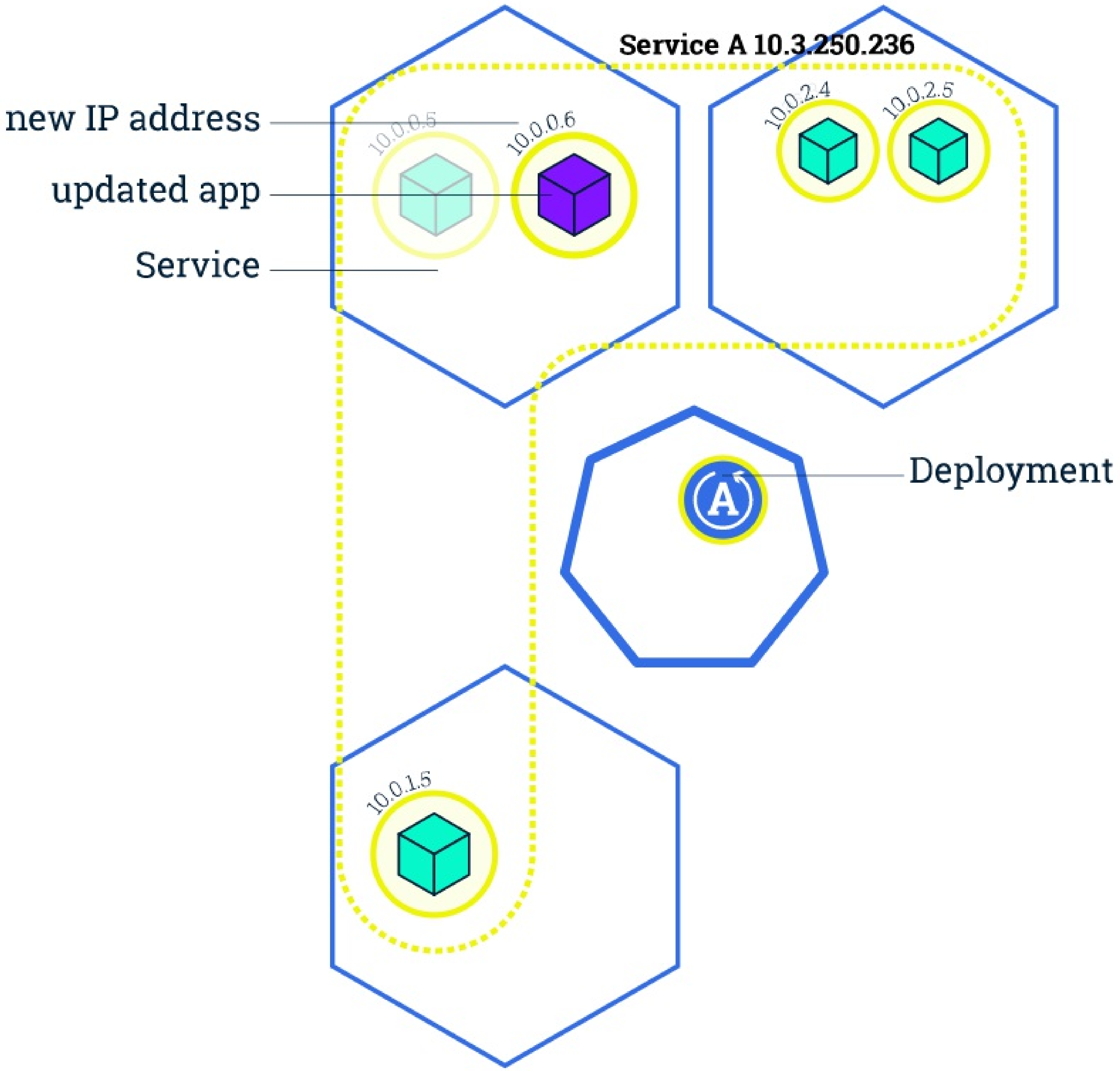

Service A 10.3.250.236
10.0.0.5
Service
Deployment
A

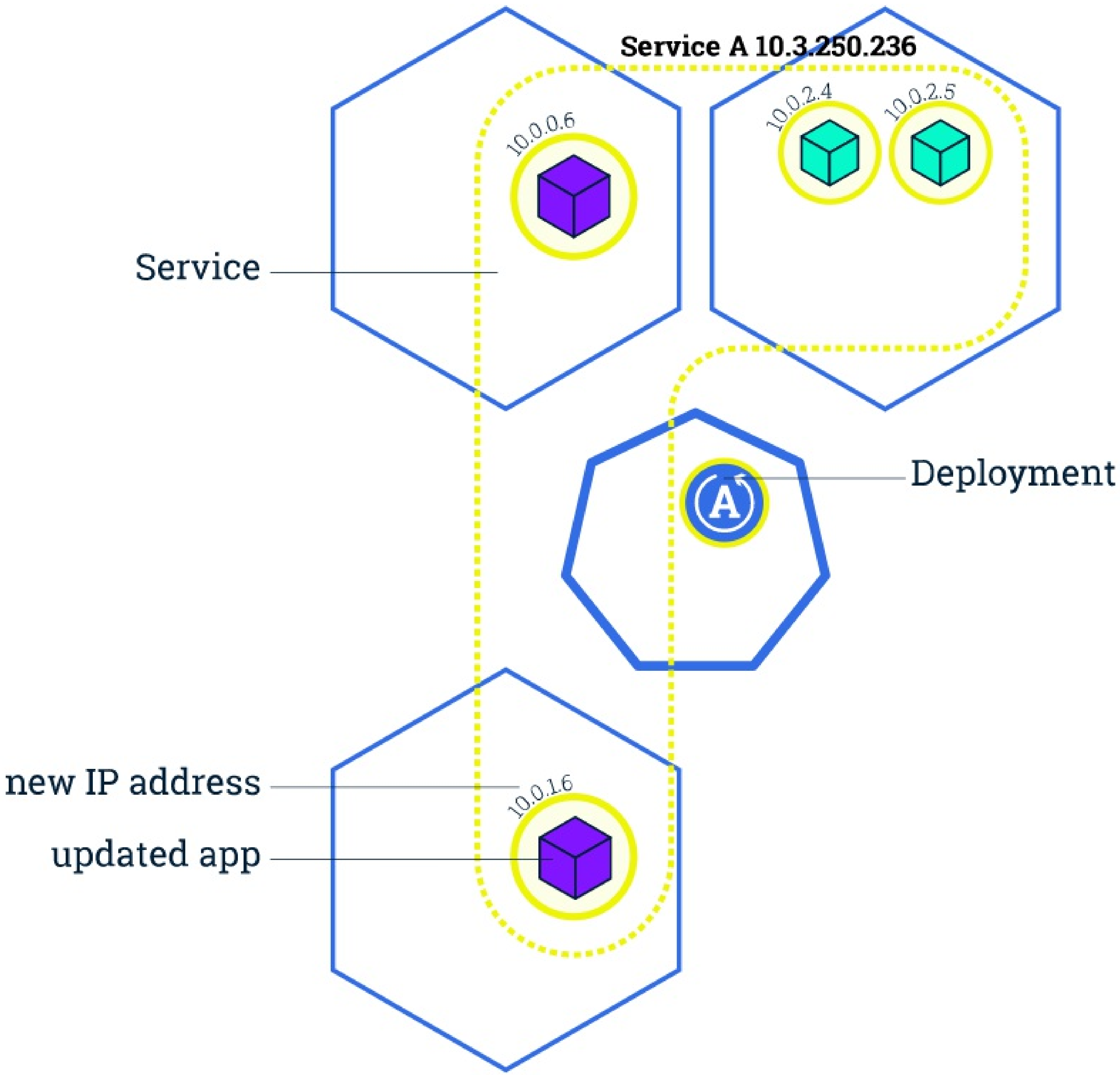

Service A 10.3.250.236
10.0.0.5
10.0.2.4
10.0.2.5
Service
Deployment
A
10.0.1.5

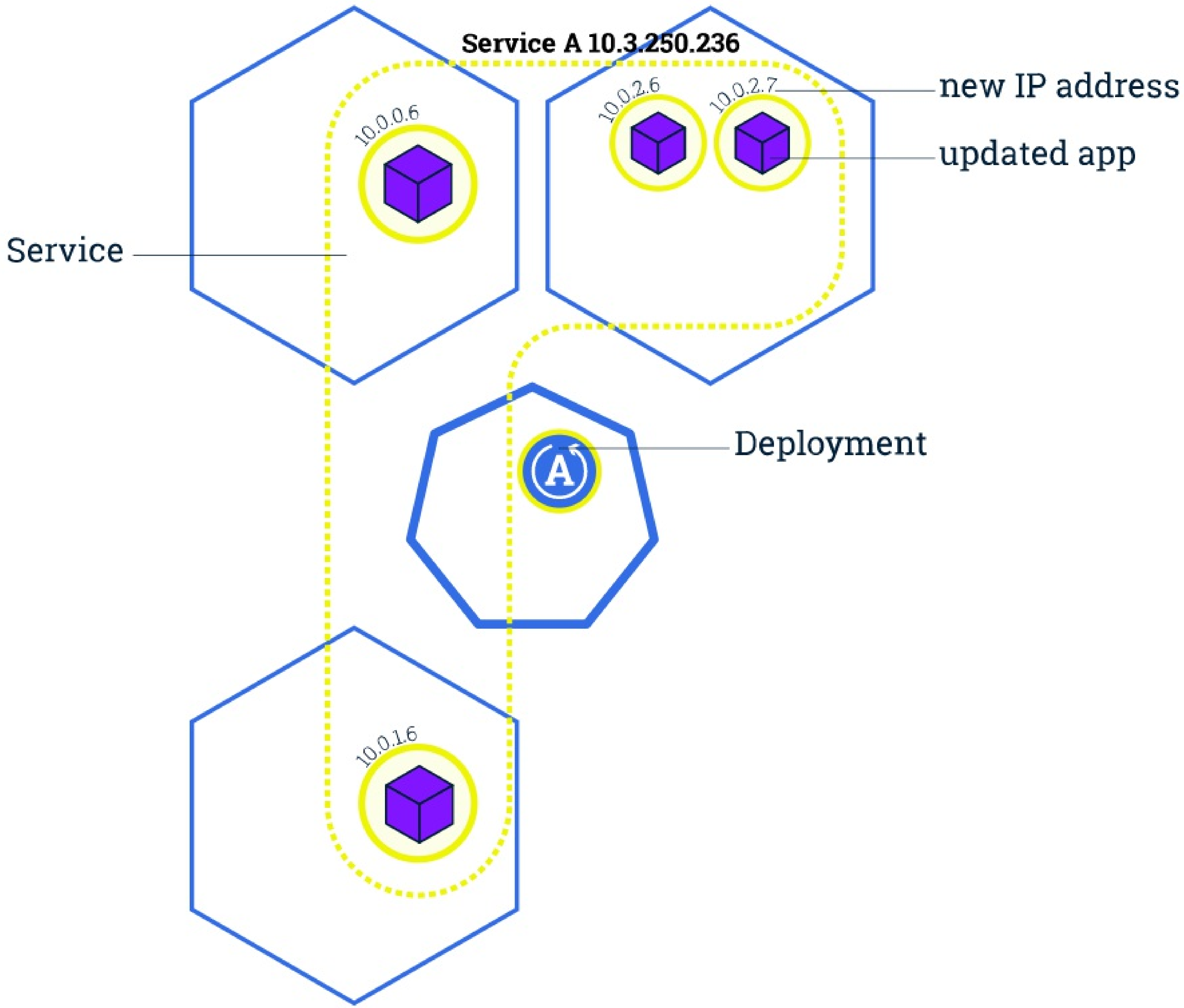
ROLLING UPDATES

Incremental pods update for deployments

- CI/CD with zero downtime


Service A 10.3.250.236
new IP address
updated app
Service
10.0.0.5
10.0.0.6
10.0.2.4
10.0.2.5
Deployment
A
10.0.1.5


Service A 10.3.250.236
10.0.0.6
10.0.2.4
10.0.2.5
Service
Deployment
A
new IP address
10.0.1.6
updated app


Service A 10.3.250.236
new IP address
updated app
10.0.0.6
10.0.2.6
10.0.2.7
Service
Deployment
A
10.0.1.6

WHERE CAN YOU RUN KUBERNETES

laptop (minikube)

public cloud (Google cloud , Azure, AWS, etc)

on-premises

HOW TO RUN KUBERNETES

vanilla (you will do the maintenance)

managed (as a service: ACS - Azure, GKE - Google cloud, Tectonic - CoreOS)

Why: Habits of sucessfull cloud native applications

What: Kubernetes platform - the building blocks

HOW: DEPLOYING APPLICATIONS ON KUBERNETES (DEMO)

DEMO

```
docker image for this presentation: jocatalin/itcamp:2017
```

LEARN KUBERNETES

- Beginer: https://katacoda.com/courses/kubernetes https://kubernetes.io/docs/tutorials/kubernetes-basics/
- Advanced: https://github.com/kelseyhightower/kubernetes-the-hard-way
- https://container-solutions.com/blog
- https://cncf.io

KUBERNETES TAKE AWAYS

- Works only with containers
- Scale with demand
- Make inteligent use of available resources
- Deploy apps fast with zero-downtime
- Programmable infrastructure

MULTUMESC!

Questions?