

Cracking the container scale problem with the Datacenter Operating System

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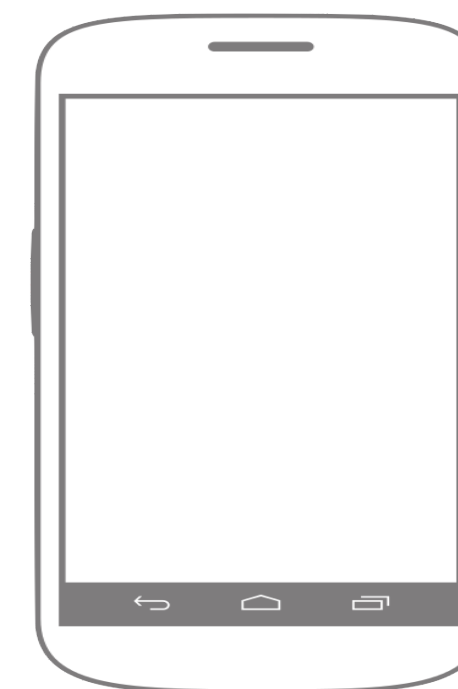
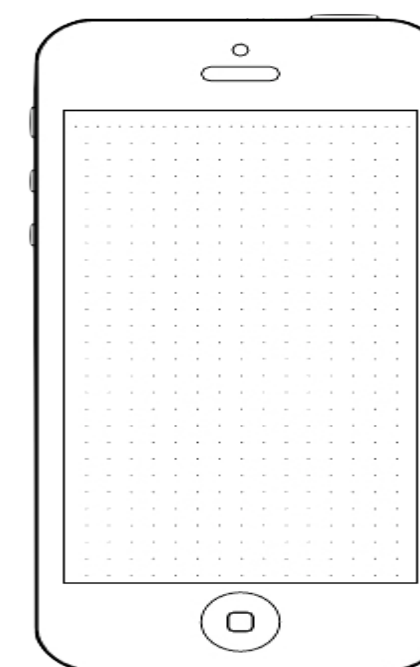
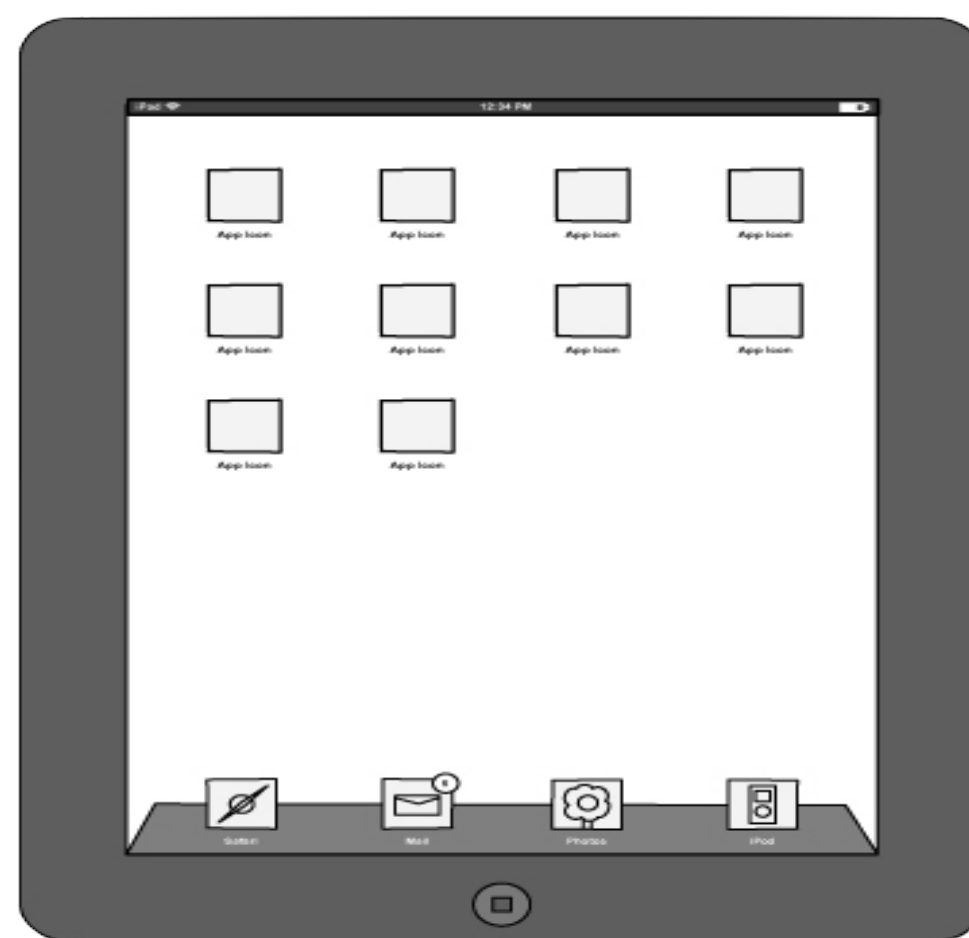
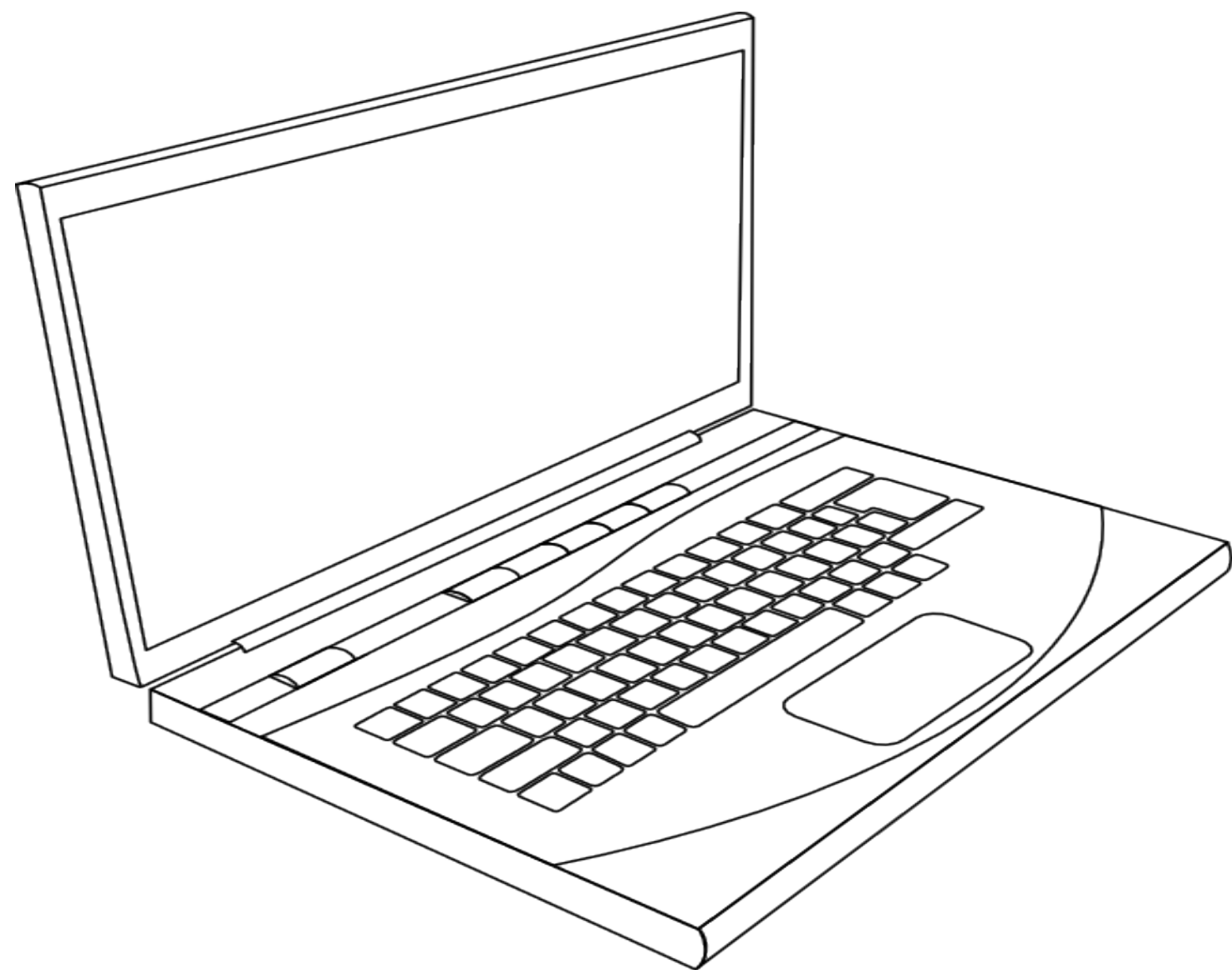


<http://tinyurl.com/velocity-dcos>

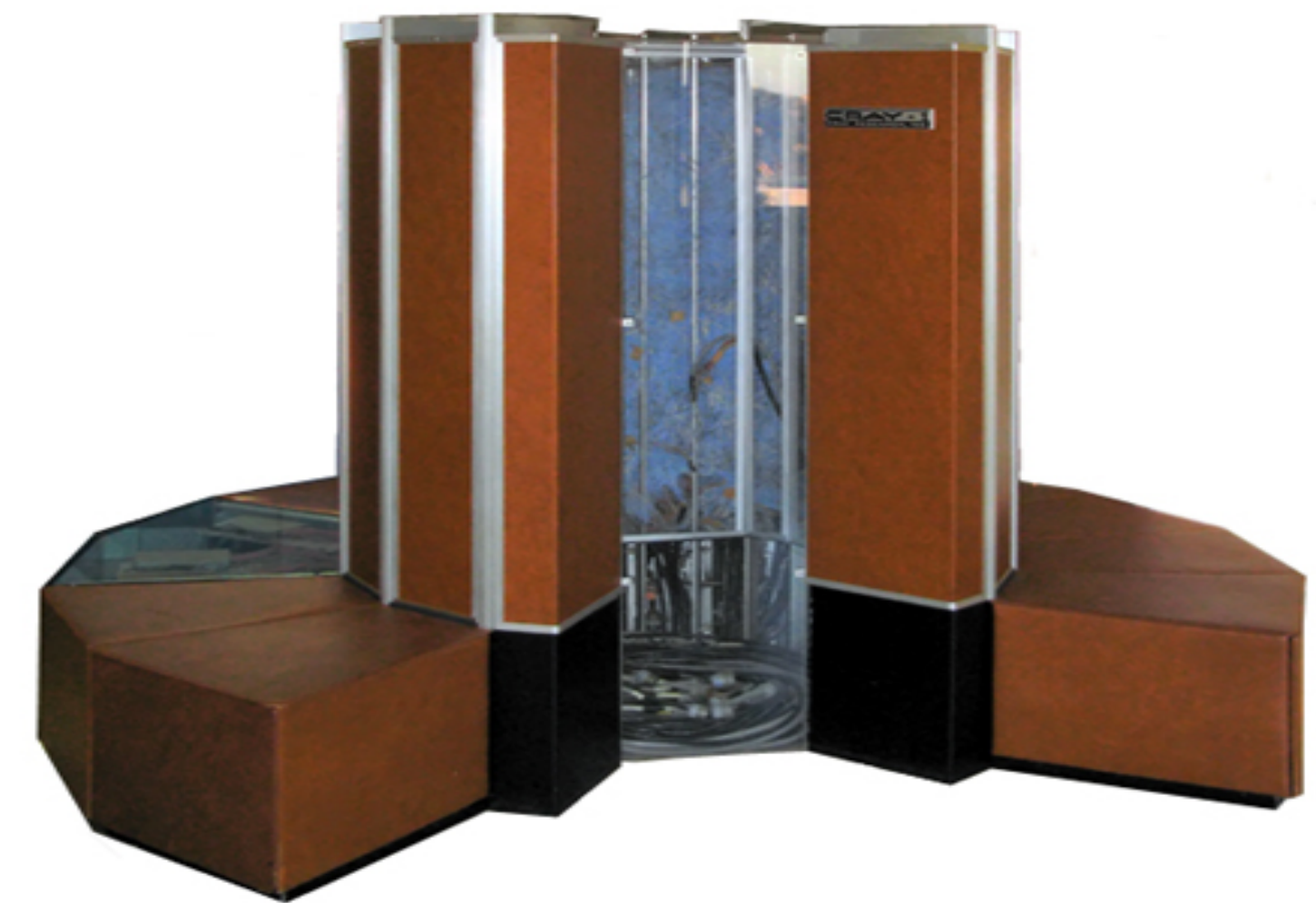
What is the container scale problem?



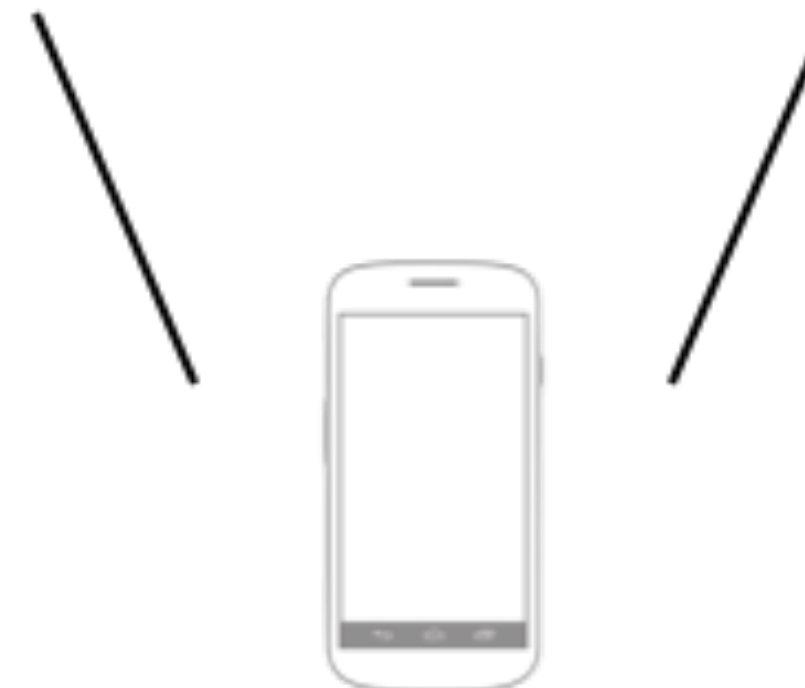
The datacenter as a form factor



The datacenter is just another form factor



Why can't we run applications on our datacenters just like we run applications on our mobile phones?



Applications don't fit on a single machine anymore

Applications don't fit on a single machine anymore

1. Lots of data

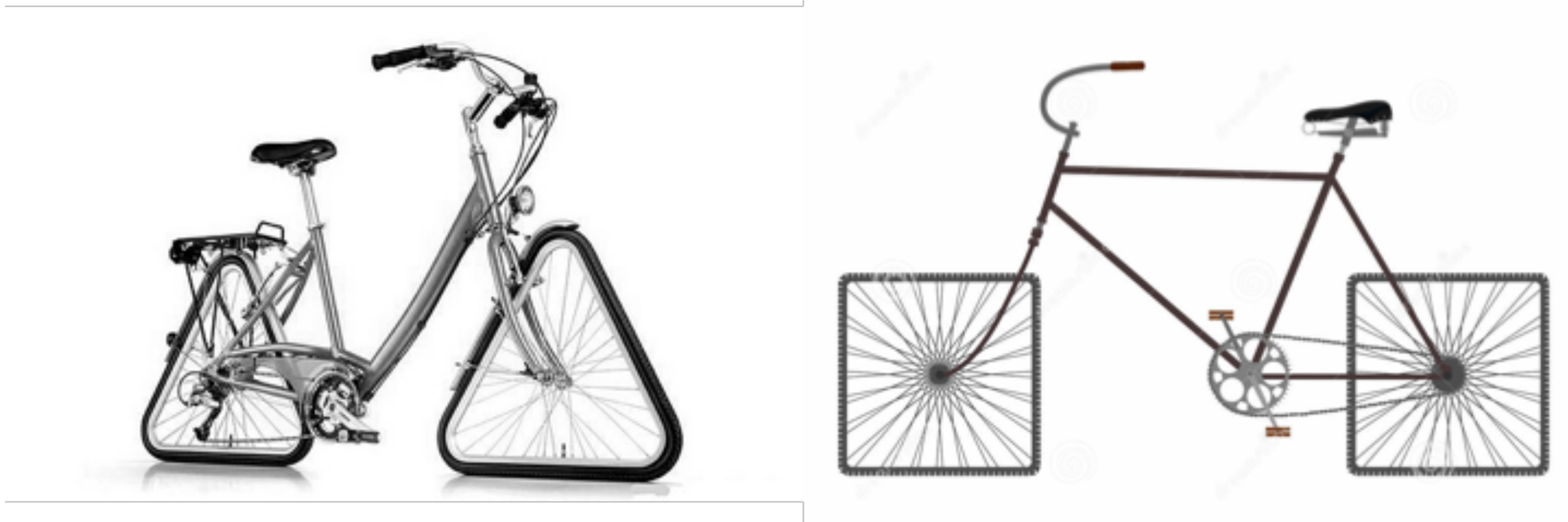
2. Lots of users

Applications don't fit on a single machine anymore

1. Lots of data
2. Lots of users

Today's applications need lots of resources (CPU, memory, disk)

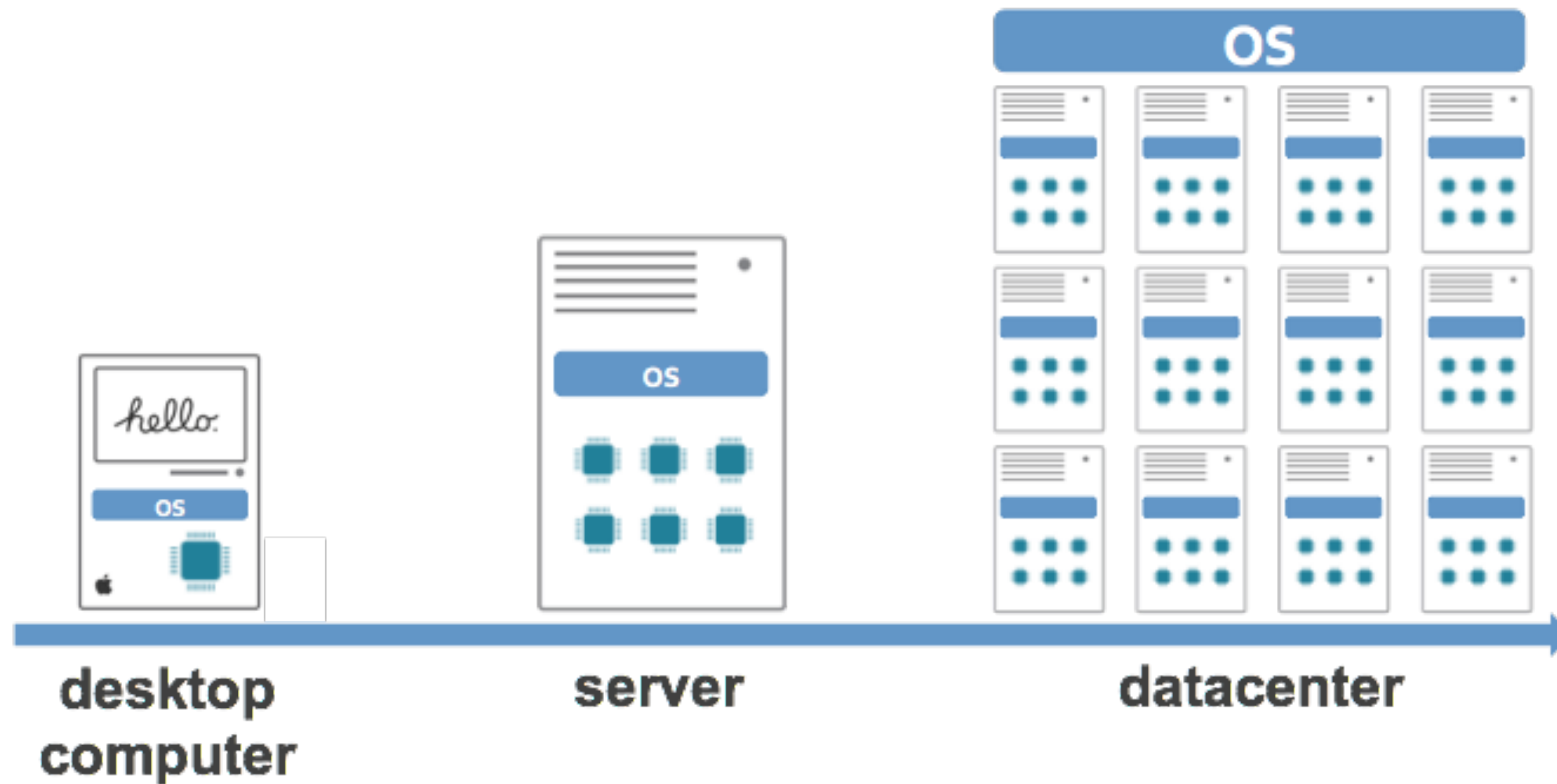
We're all building distributed systems!



operating system (as per Wikipedia)

“a collection of software that manages the computer hardware resources and provides common services for computer programs”

The datacenter needs an operating system



Introducing the datacenter operating system

Mesosphere

DCOS

DCOS CLI

DCOS GUI

Repository

Frameworks

Marathon

Chronos

...

Kernel

Mesos

Modules

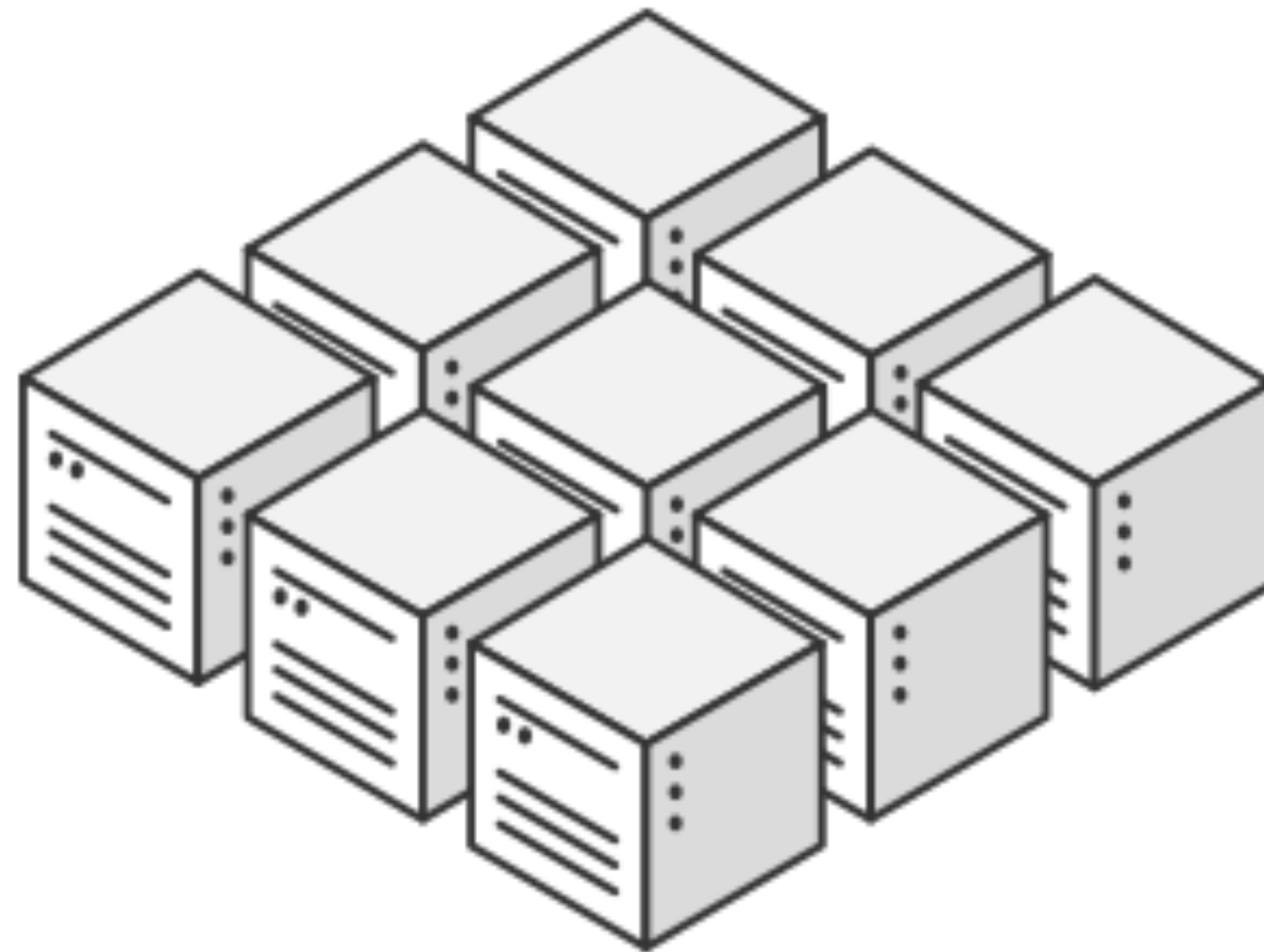
mesos-dns

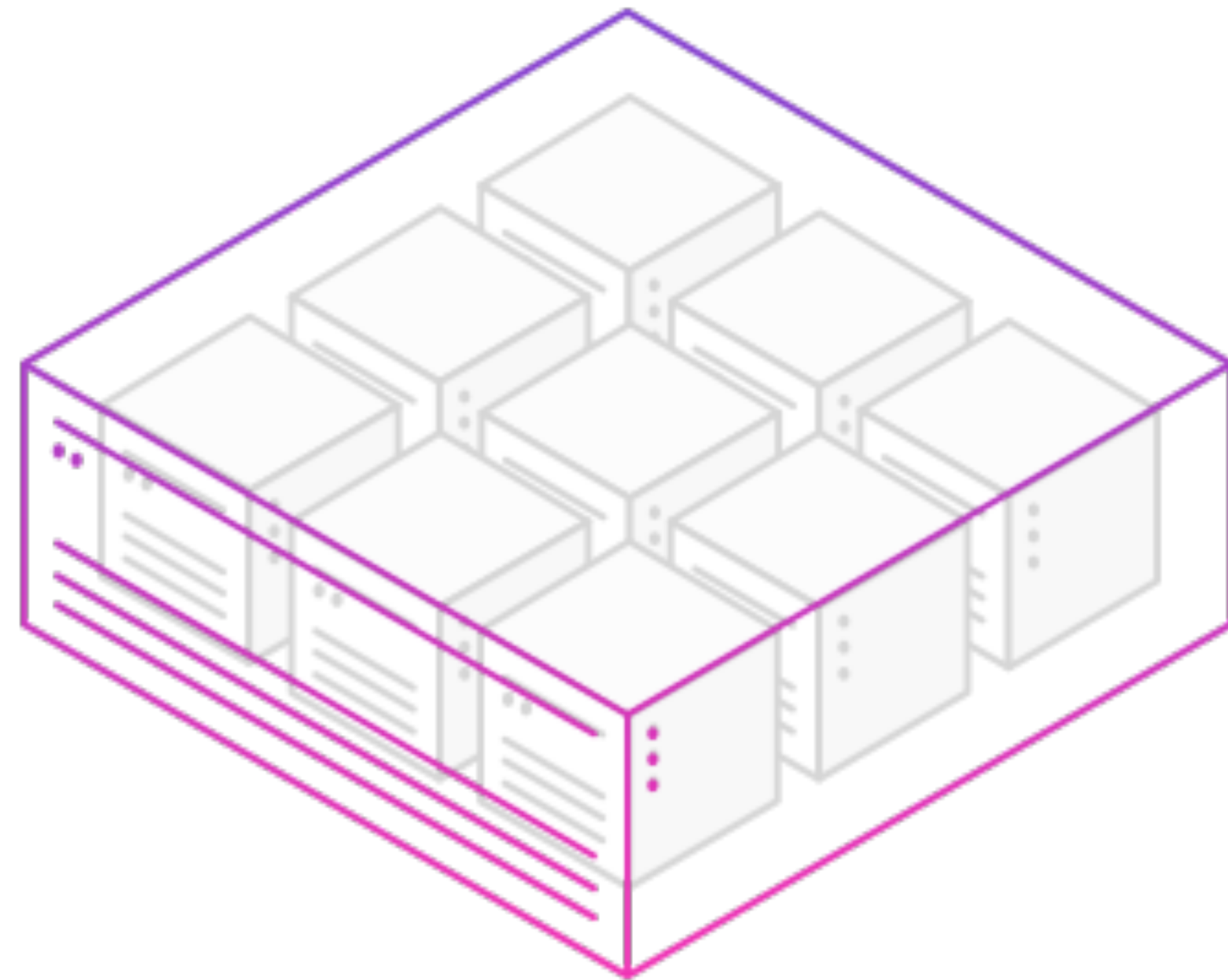
The CLI for the datacenter: dcos

- open source, Apache licensed
- tight integration with the Mesosphere universe, a package repository
- easy, Unix-consistent commands to manage running applications, services and the underlying Mesos
- extensible (e.g. `dcos spark`, `dcos kafka`, etc.)

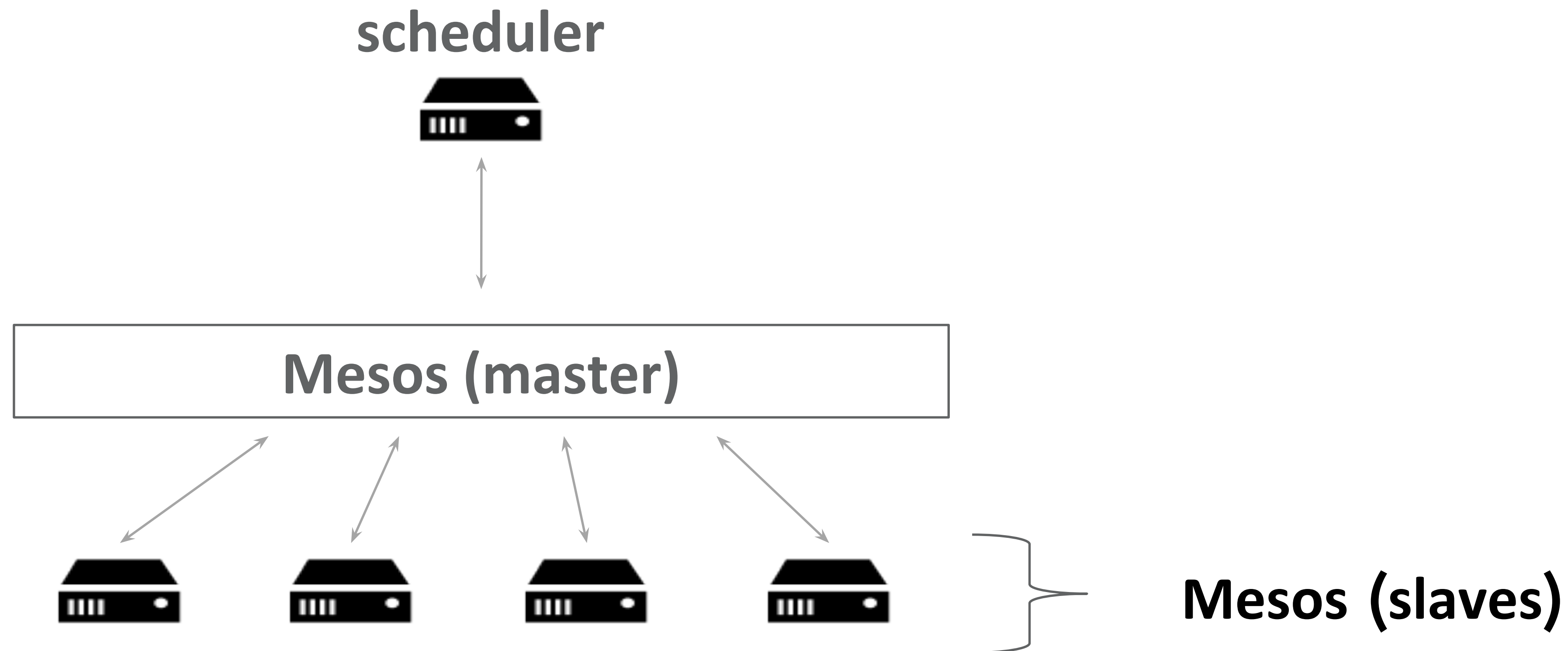
Apache Mesos



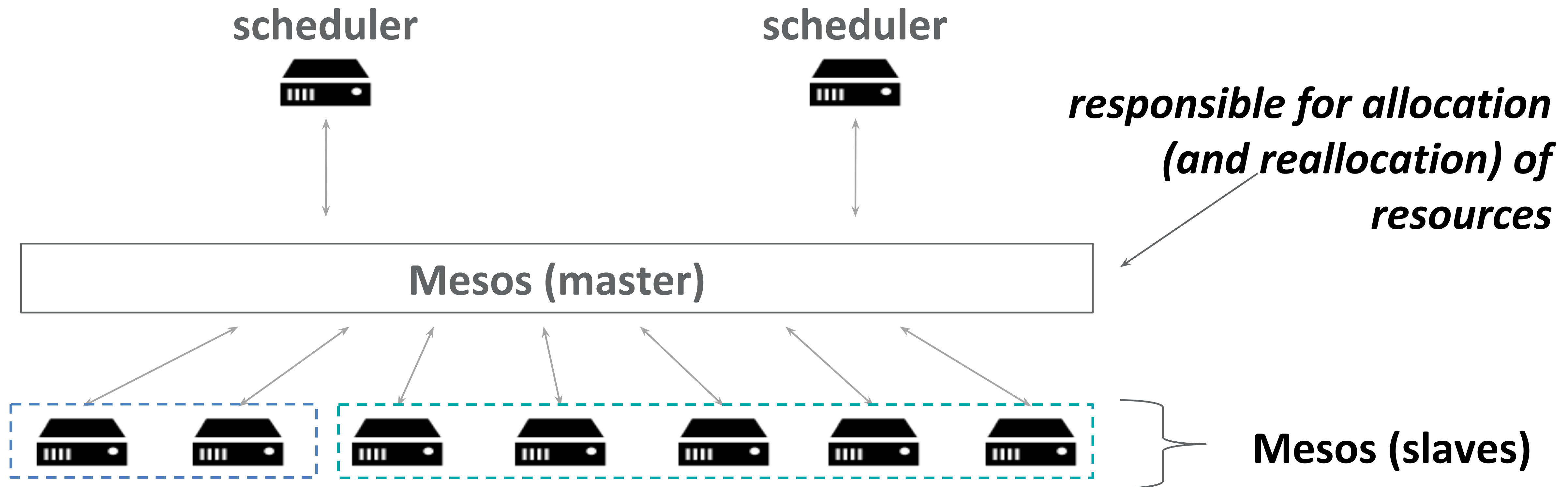




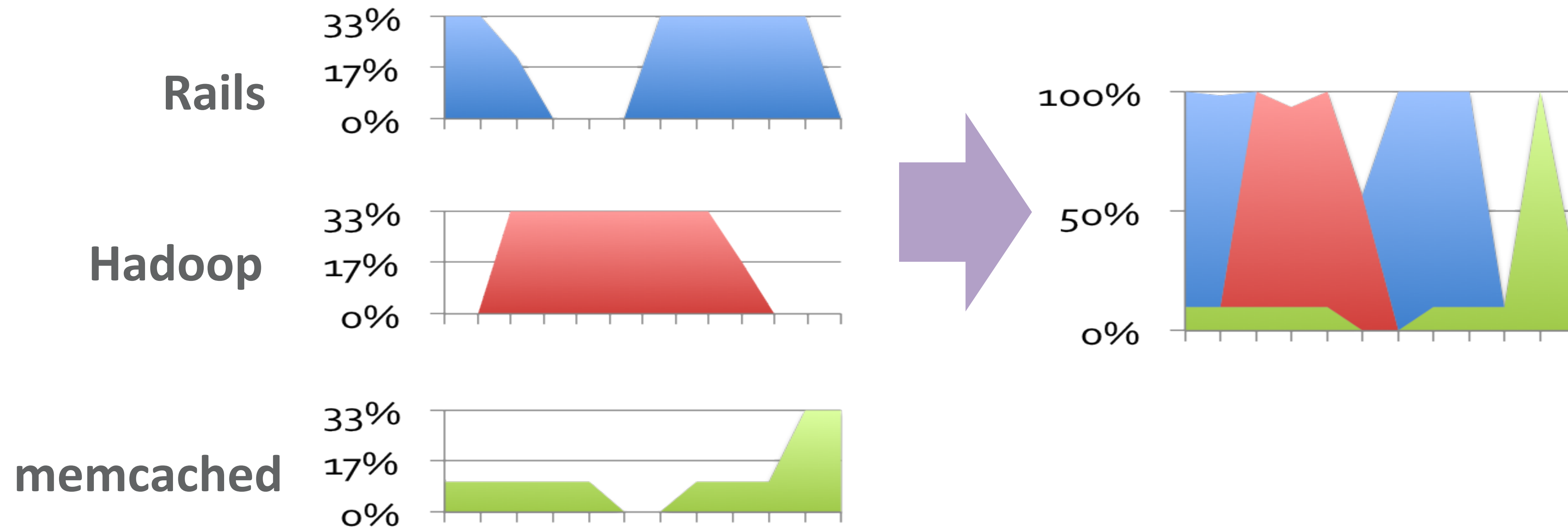
Mesos: level of indirection



Mesos: level of indirection



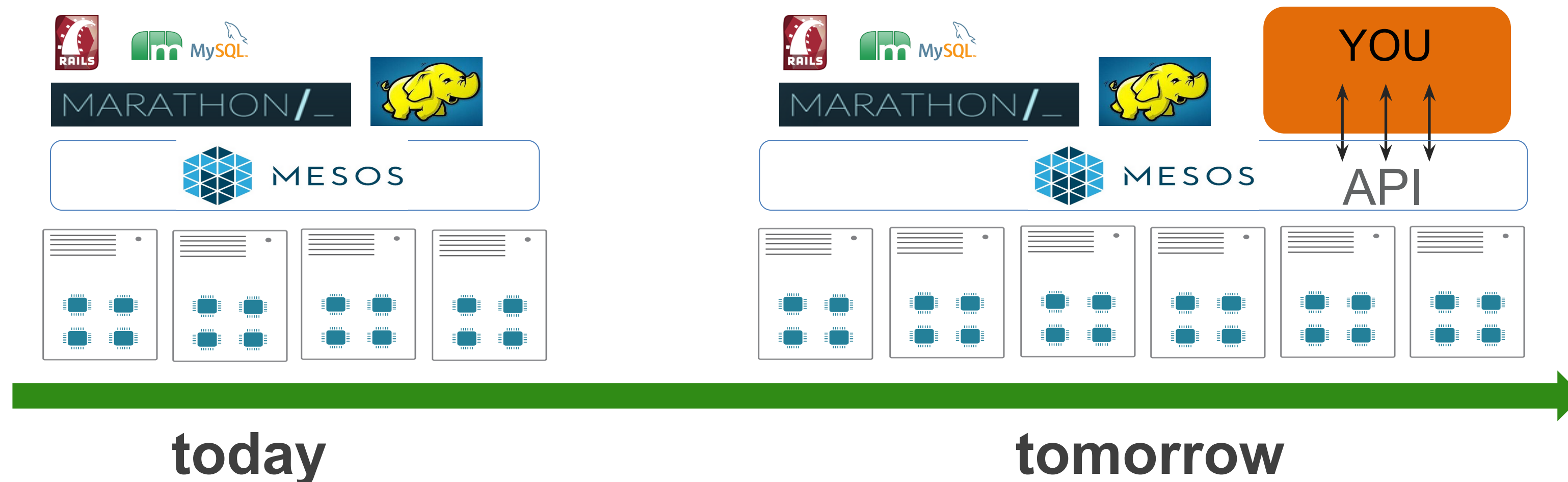
Mesos helps utilization

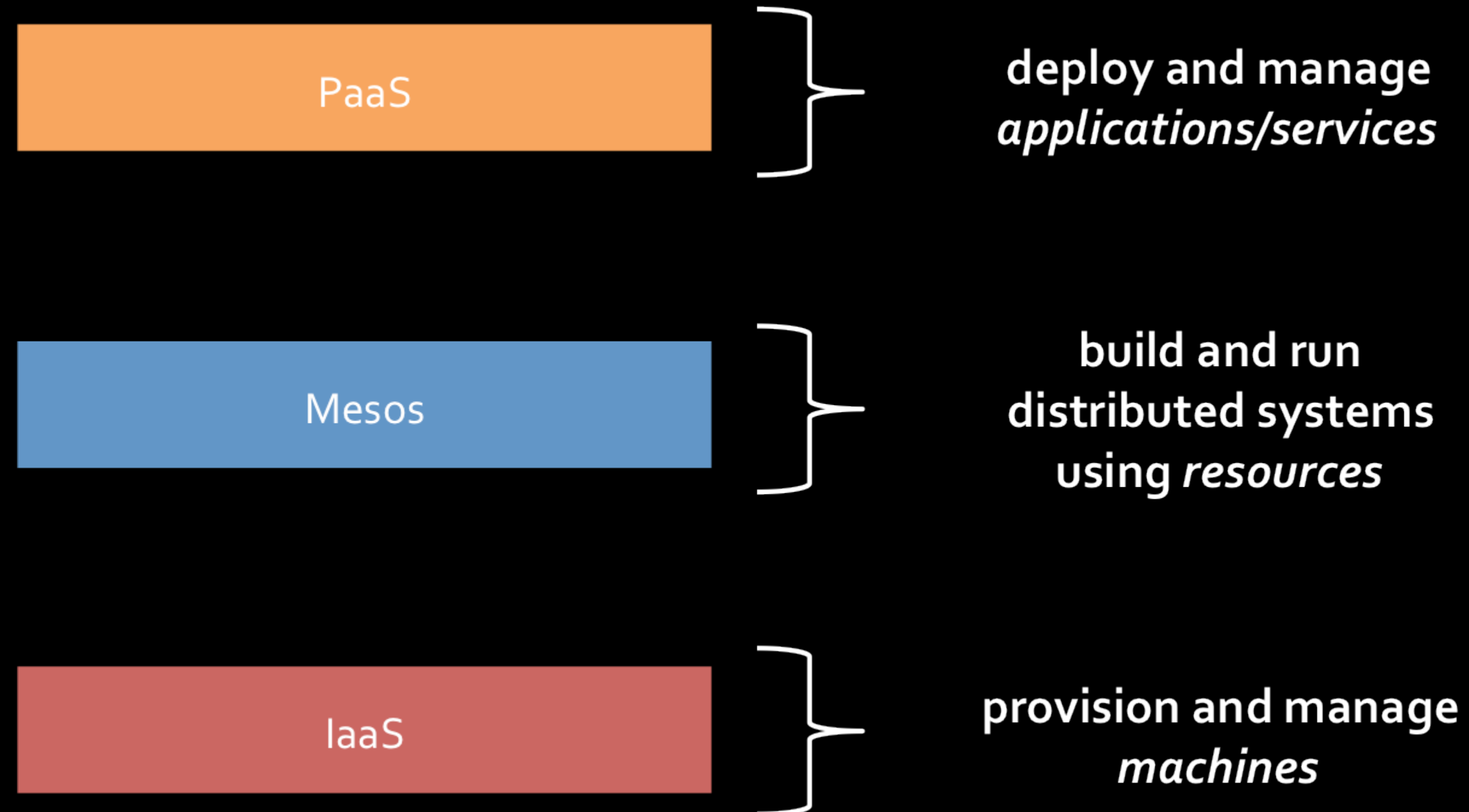


Mesos: datacenter kernel

provides common functionality every new distributed system *re-implements*:

- failure detection
- package distribution
- task starting
- resource isolation
- resource monitoring
- task killing, cleanup
- ...



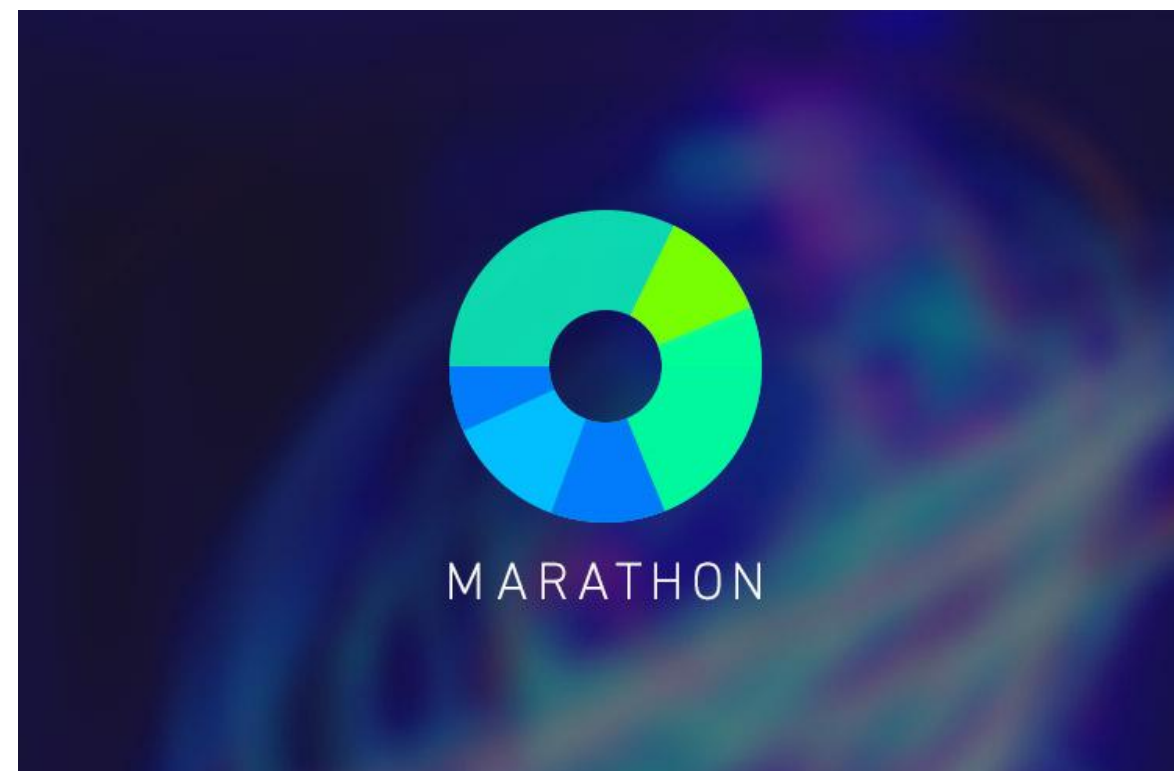



- A top-level Apache project
- A cluster resource negotiator
- Scalable to 10,000s of nodes
- Fault-tolerant, battle-tested
- An SDK for distributed apps





Marathon





MARATHON

Apps

Deployments

About

Docs

+ New App

ID	Memory (MB)	CPUs	Tasks / Instances	Health	Status
/chronos	512	0.5	1 / 1	<div></div>	Running
/cpu-waster	16	0.5	0 / 0	<div></div>	Suspended
/dcos/service/history	512	0.5	0 / 0	<div></div>	Suspended
/dispatch	128	0.5	1 / 1	<div></div>	Running
/em/apollo	1024	1	0 / 0	<div></div>	Suspended
/em/artemis	1024	1	0 / 0	<div></div>	Suspended
/em/iseardown	16	0.1	1 / 1	<div></div>	Running
/gollumwiki	256	0.01	0 / 0	<div></div>	Suspended
/hdfs	512	1	1 / 1	<div></div>	Running
/history	256	0.1	1 / 1	<div></div>	Running
/jenkins	1024	1	1 / 1	<div></div>	Running

Marathon

[←](#)
[→](#)
[↻](#)
<https://marathon.mesosphere.com/#apps/%2Fmom-alex-state-explosion-01%2Fd2bce8ce-7edc-48a1-7157-83420e87fb48%2Fslave>

MARATHON

Apps

Deployments

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Apps > /mom-alex-state-explosion-01/d2bce8ce-7edc-48a1-7157-83420e87fb48/slave

/mom-alex-state-explosion-01/d2bce8ce-7edc-48a1-7157-83420e87fb48/slave

Running

Suspend

Scale

Restart App

Destroy App

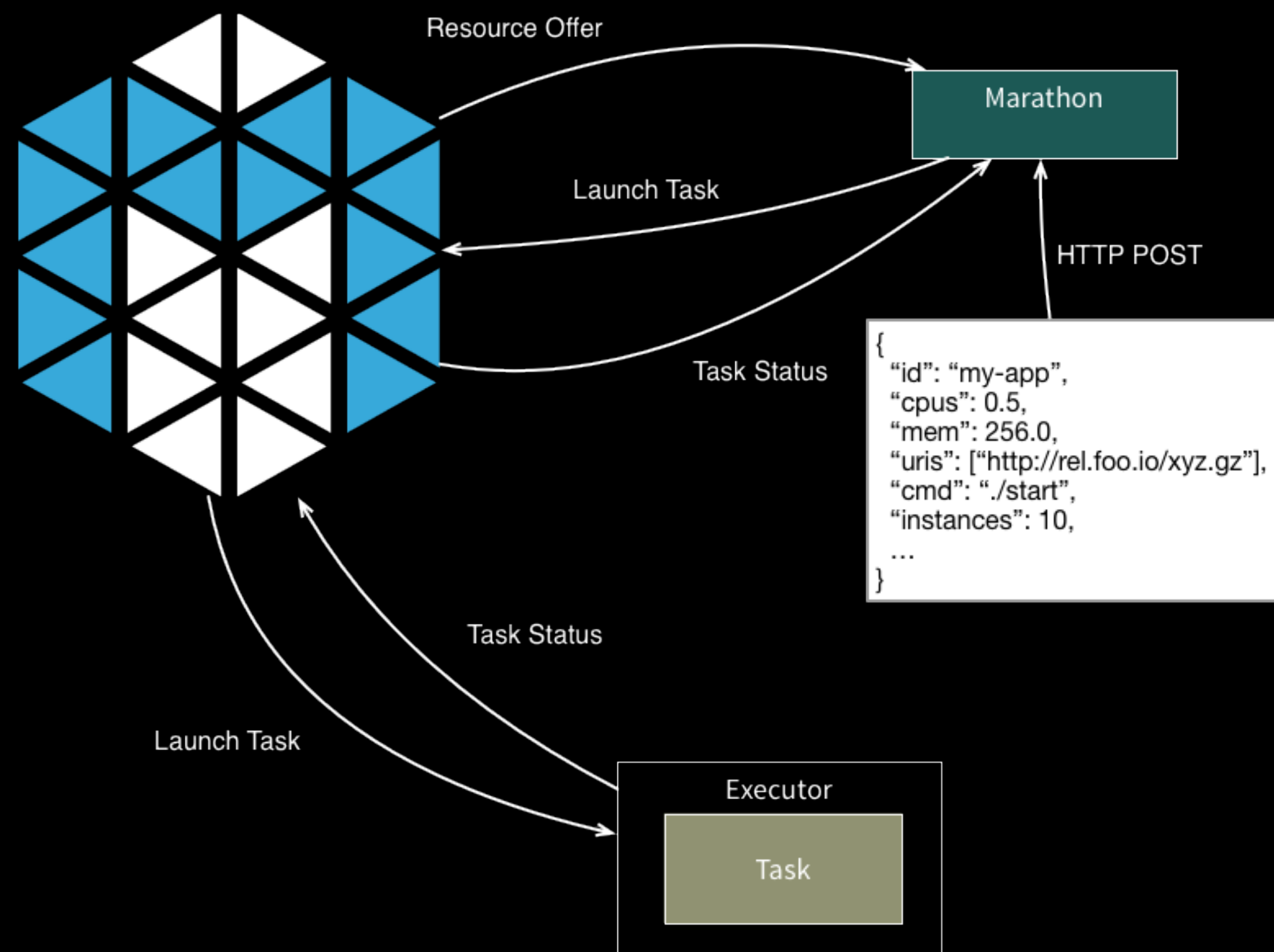
Tasks

Configuration

↻ Refresh

1-8 of 10

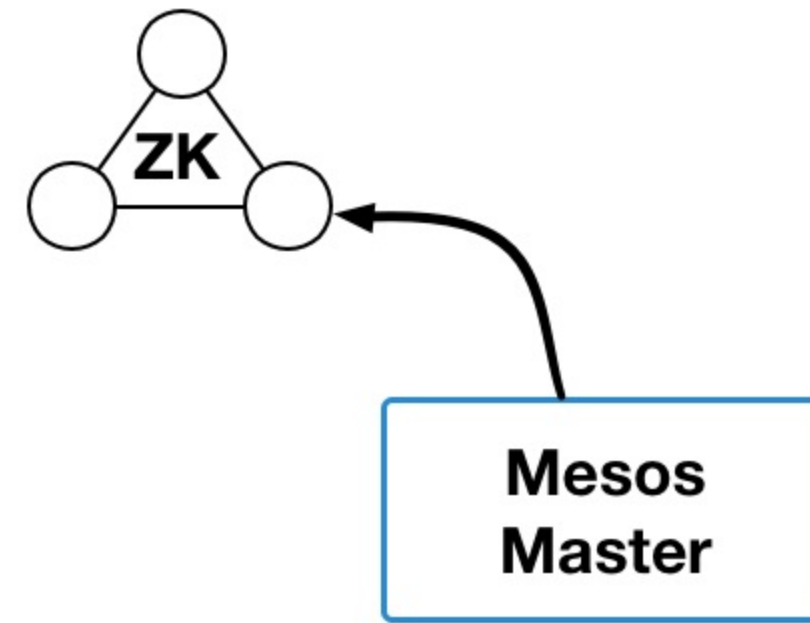
ID	Status	Version	Updated
<div>■</div> <div>mom-alex-state-explosion-01_d2bce8ce-7edc-48a1-7157-83420e87fb48_slave.f4638b76-e074-11e4-91df-fe54009f9367</div> <div>srv5.hw.ca1.mesosphere.com:31887</div>	Started	4 days ago	4/11/2015, 11:02:45 AM
<div>■</div> <div>mom-alex-state-explosion-01_d2bce8ce-7edc-48a1-7157-83420e87fb48_slave.ca6ebfd0-df0a-11e4-9bec-da578fc6adbb</div> <div>srv6.hw.ca1.mesosphere.com:31199</div>	Started	4 days ago	4/9/2015, 3:50:17 PM
<div>■</div> <div>mom-alex-state-explosion-01_d2bce8ce-7edc-48a1-7157-83420e87fb48_slave.c9d69e7f-df0a-11e4-9bec-da578fc6adbb</div> <div>srv4.hw.ca1.mesosphere.com:31135</div>	Started	4 days ago	4/9/2015, 3:50:17 PM
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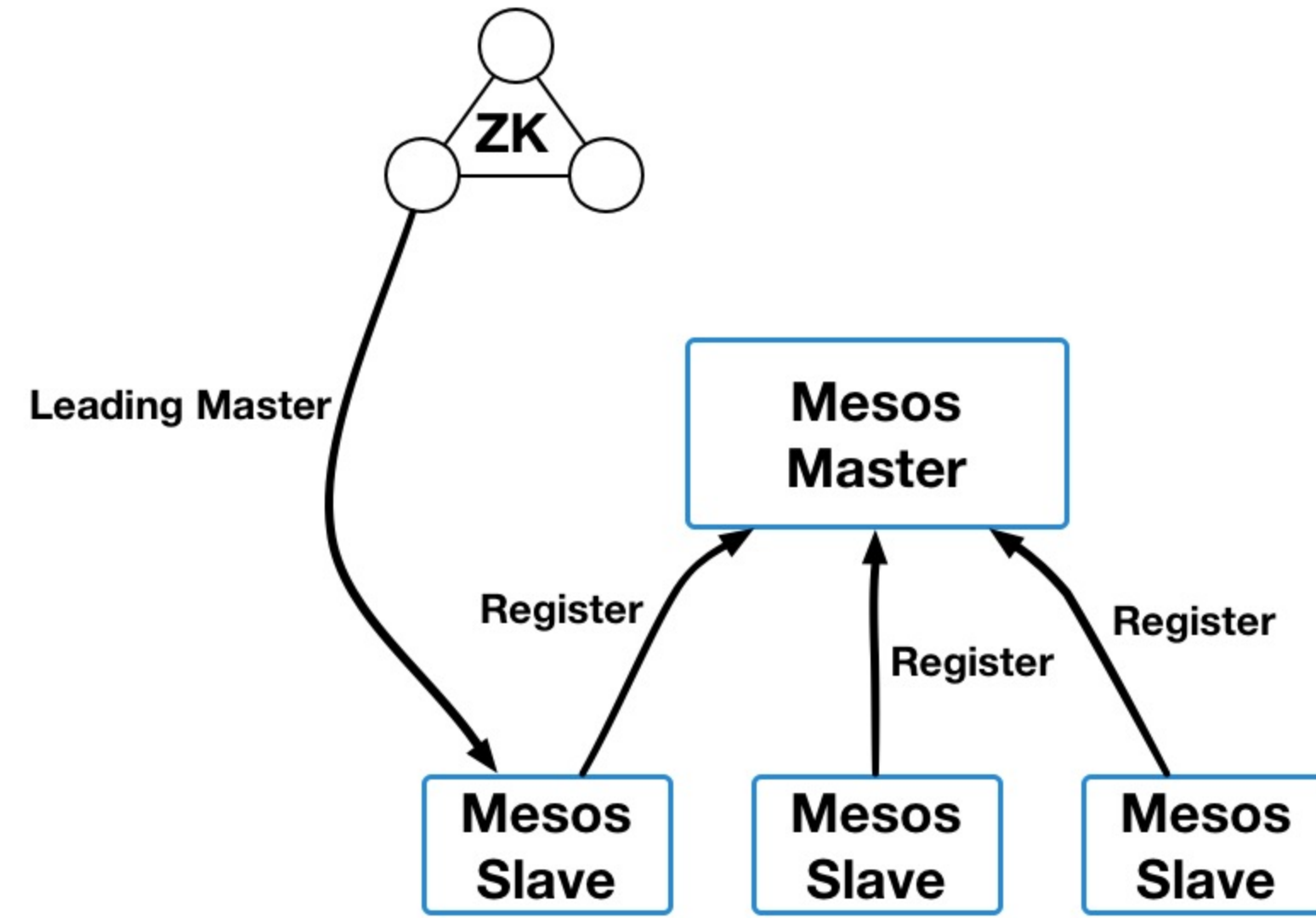


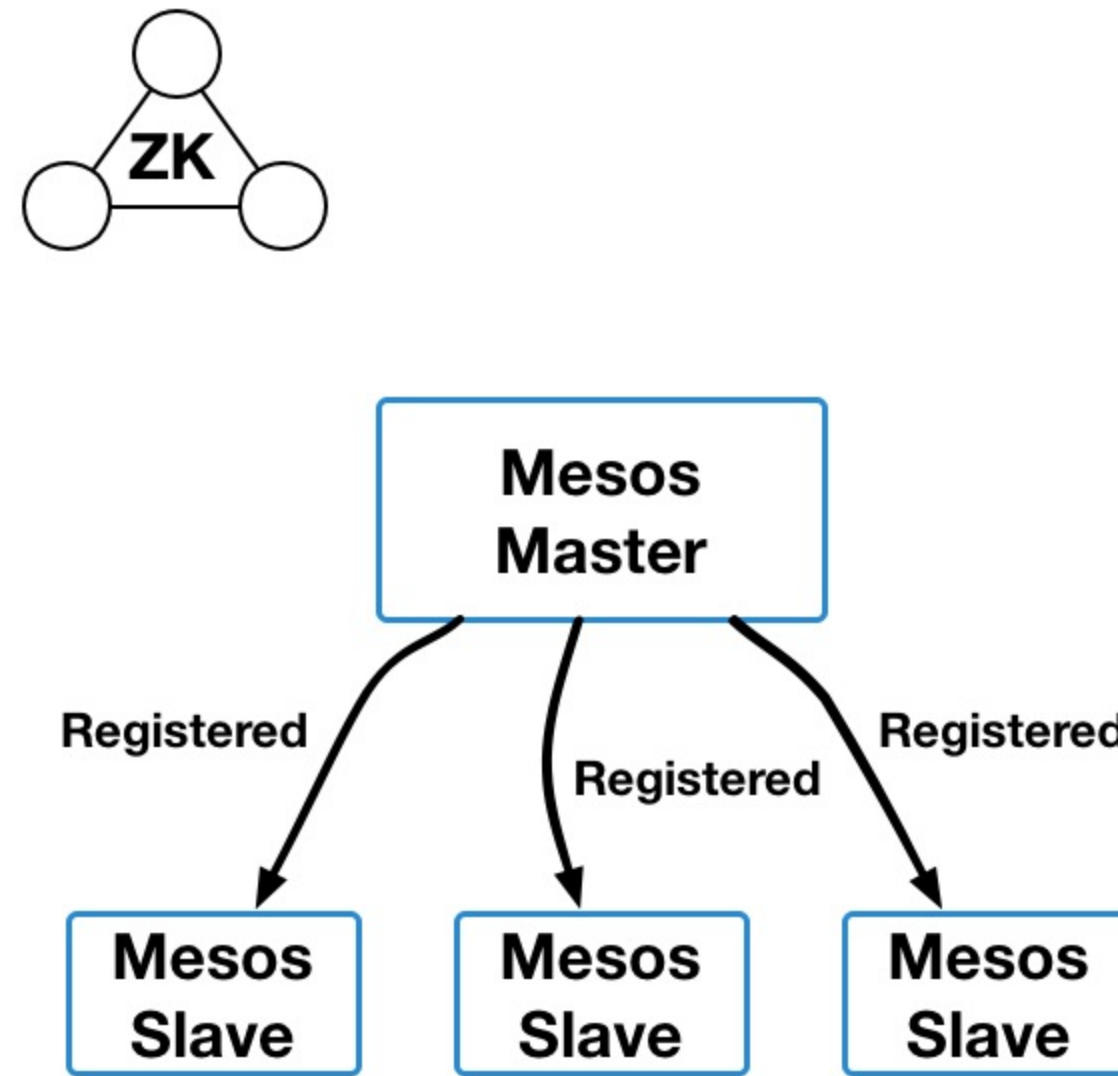
- Start, stop, scale, update apps
- Nice web interface, API
- Highly available, no SPoF
- Native Docker support
- Fully featured REST API
- Pluggable event bus

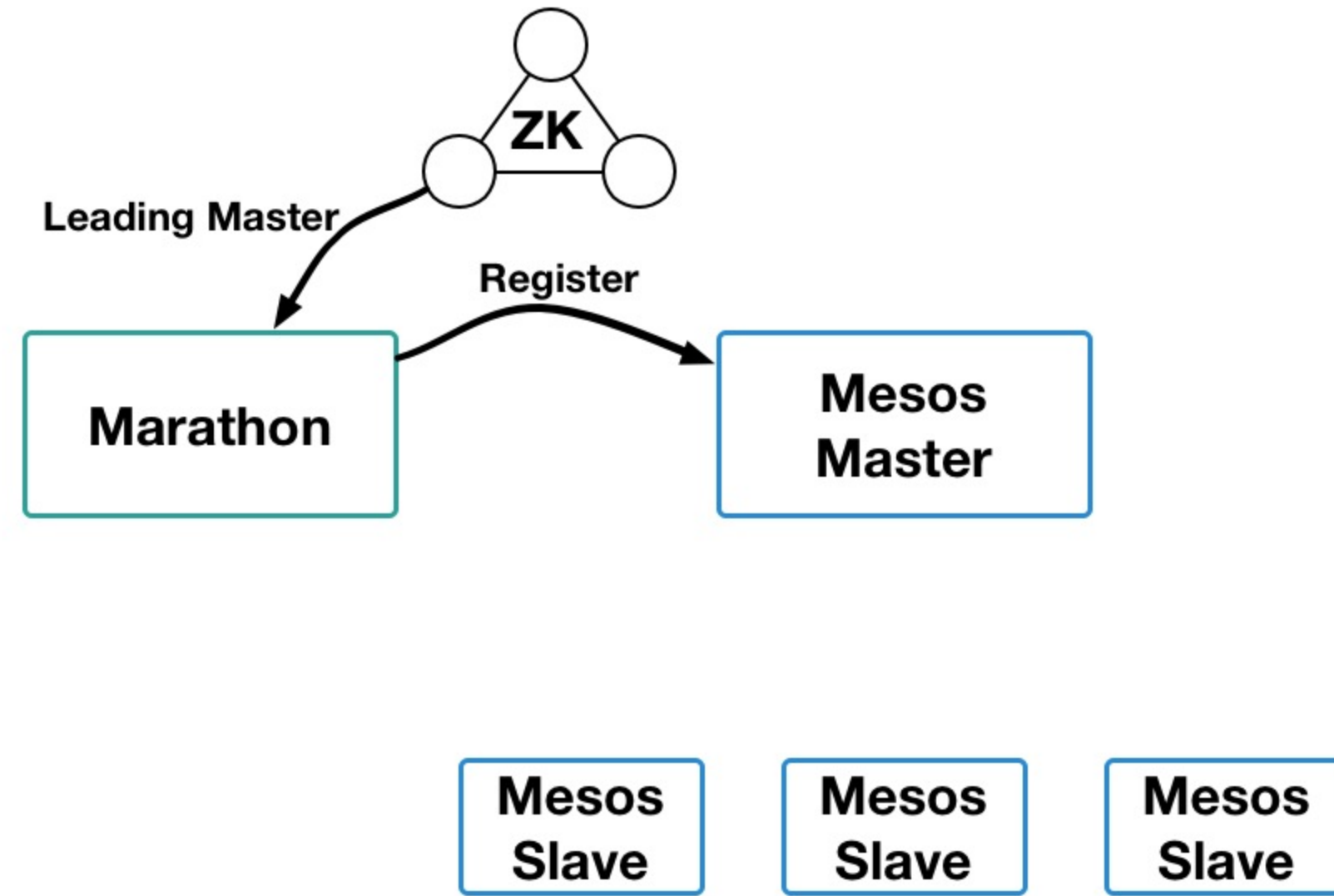
- Rolling deploy / restart
- Application health checks
- Artifact staging

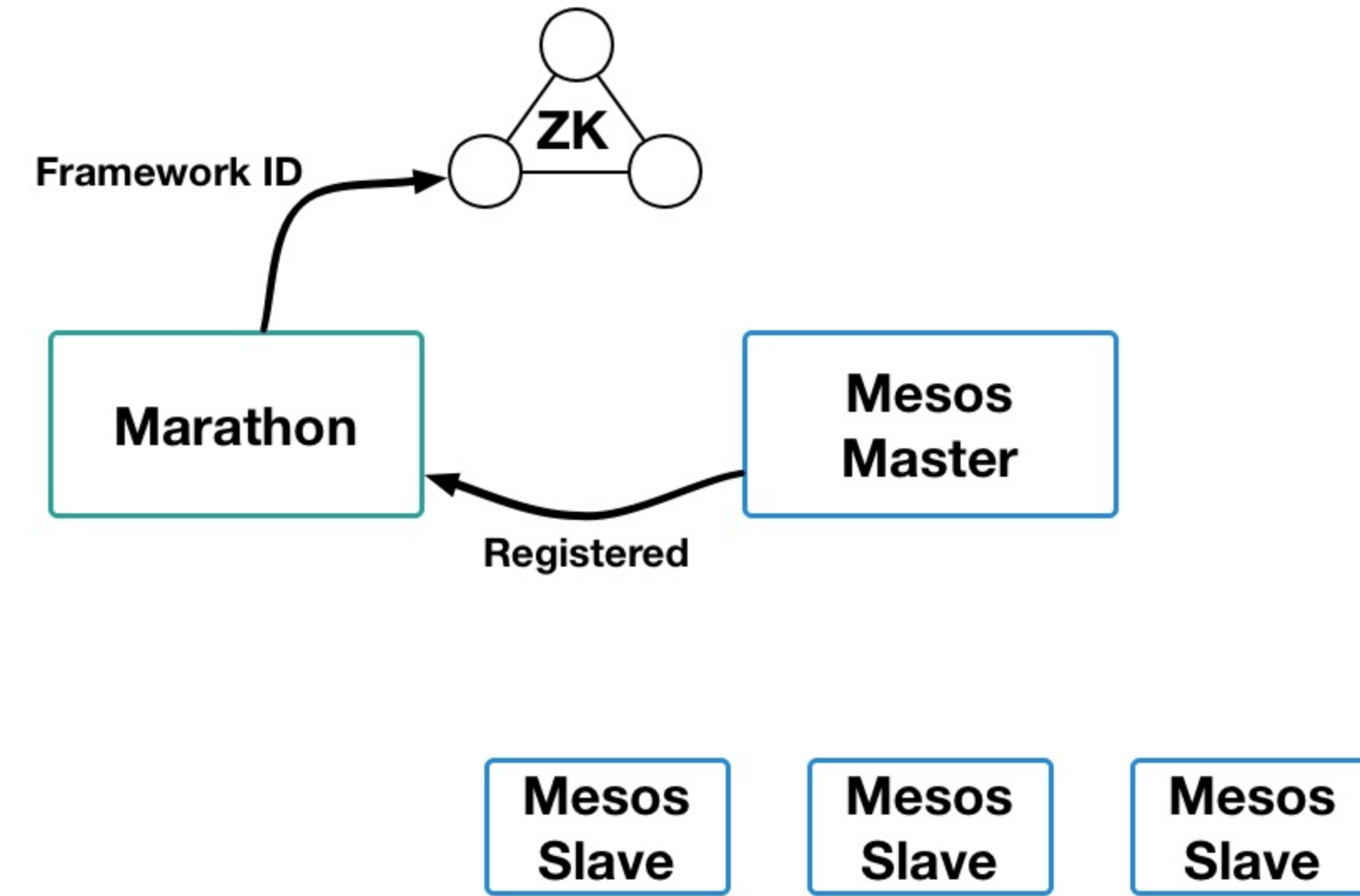
Mesos & Marathon in action

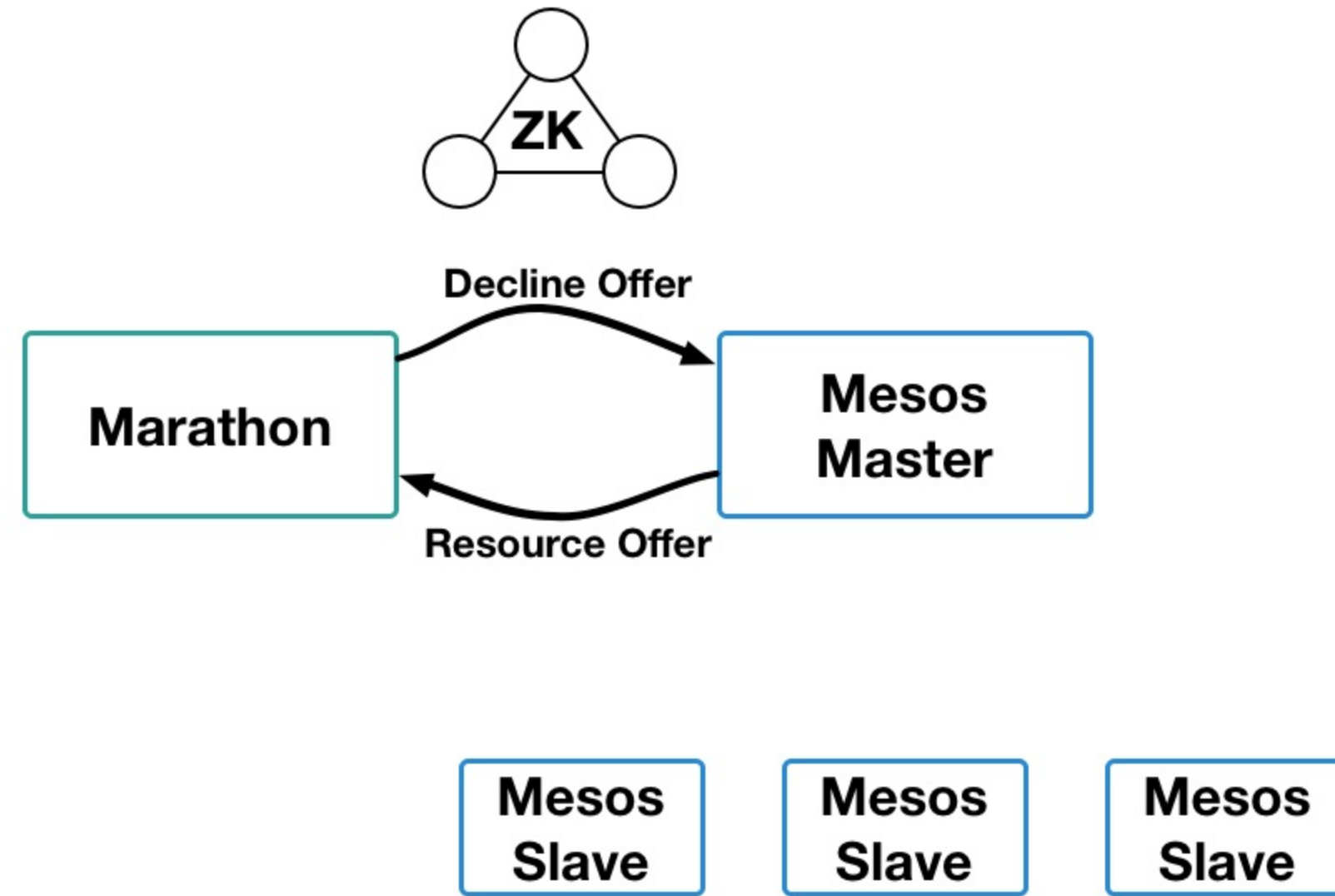


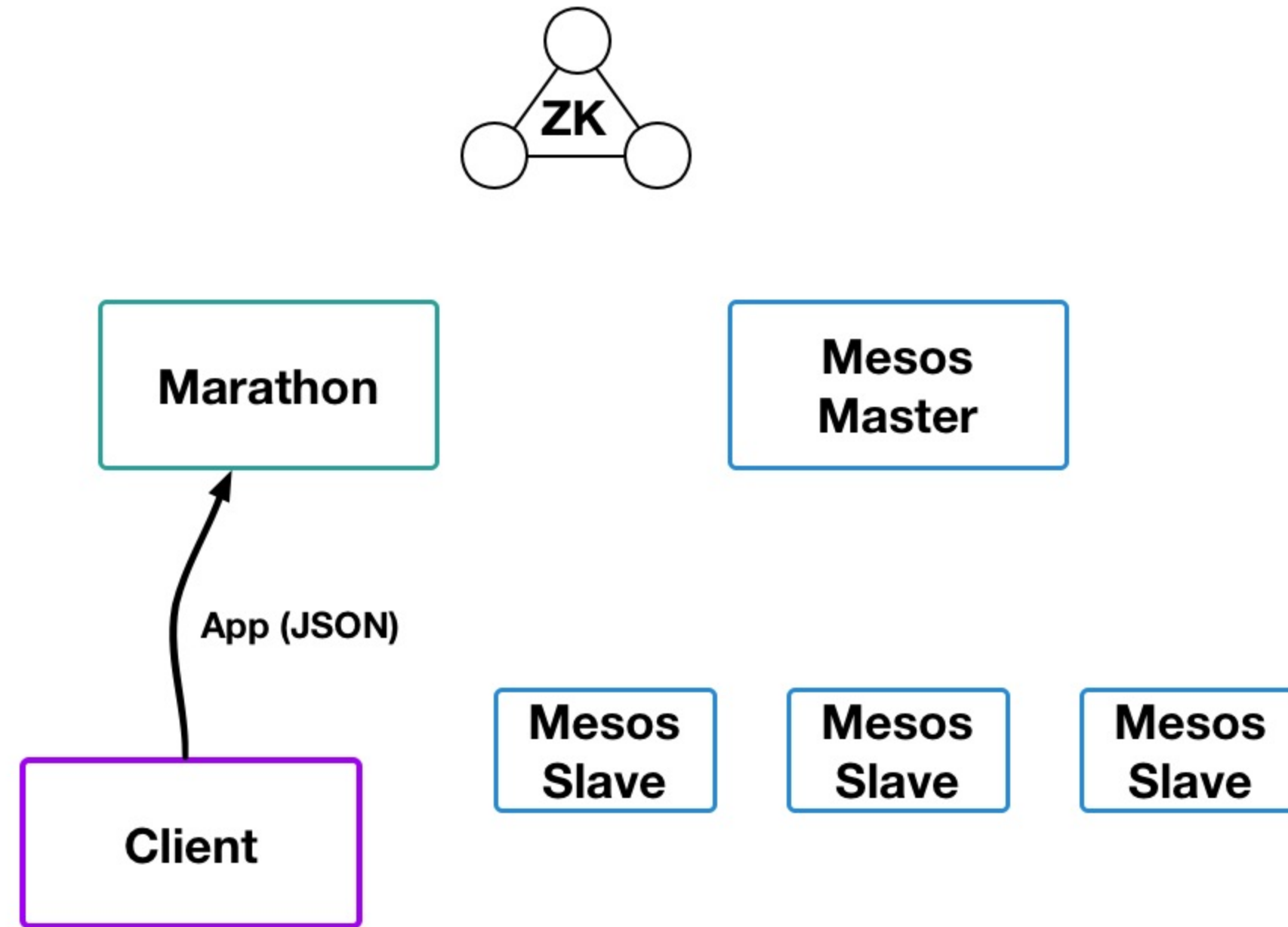


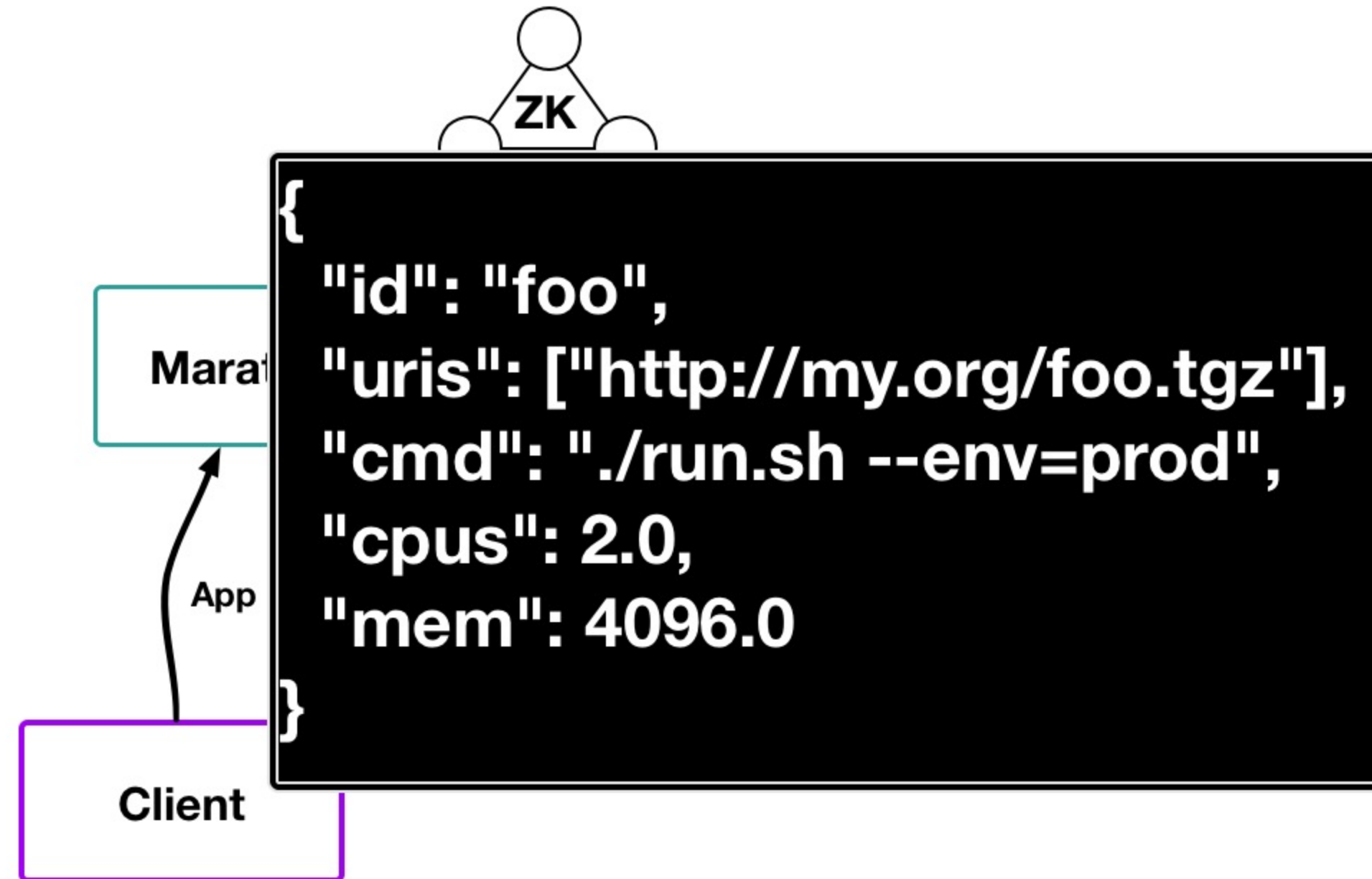


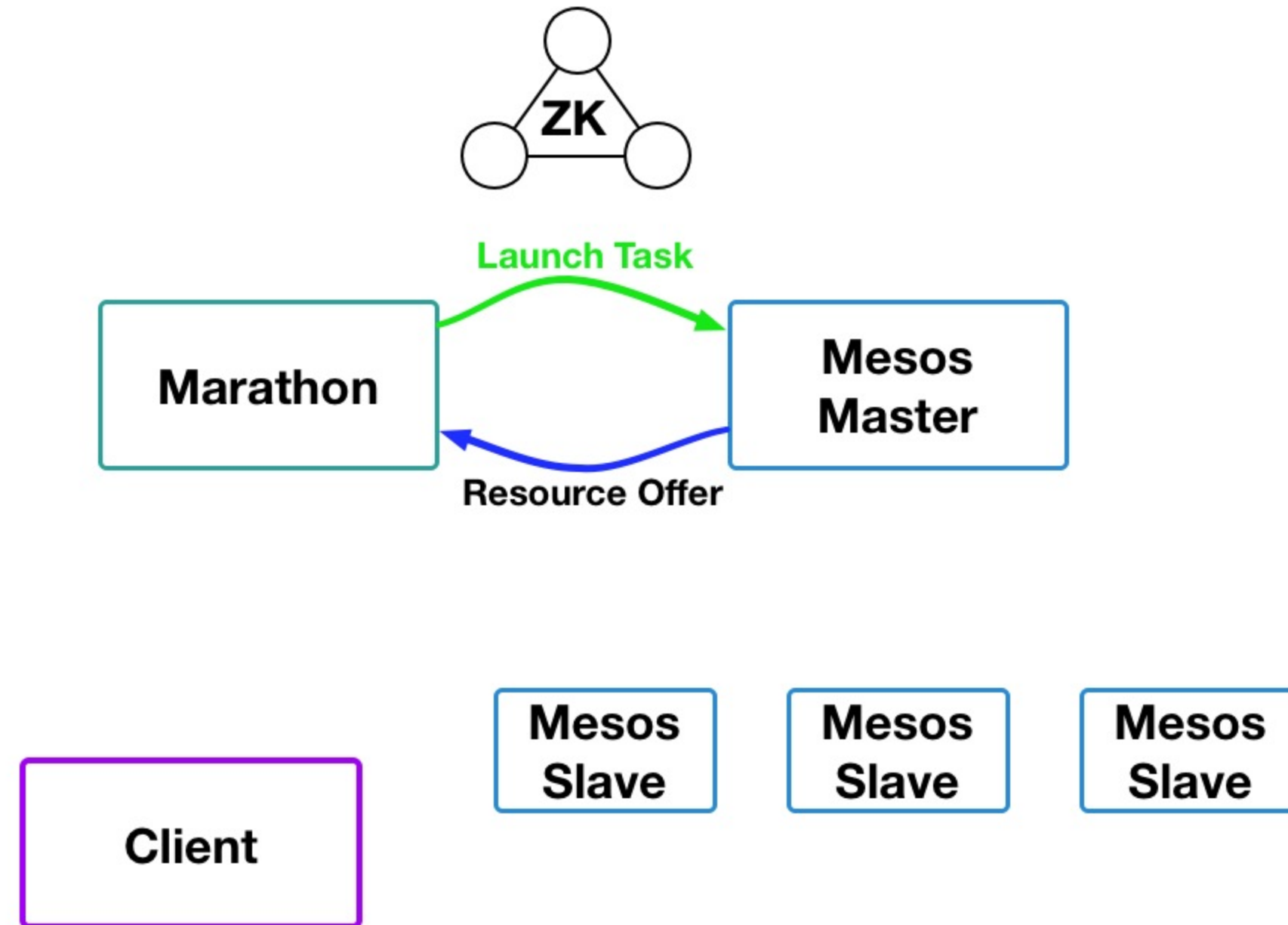


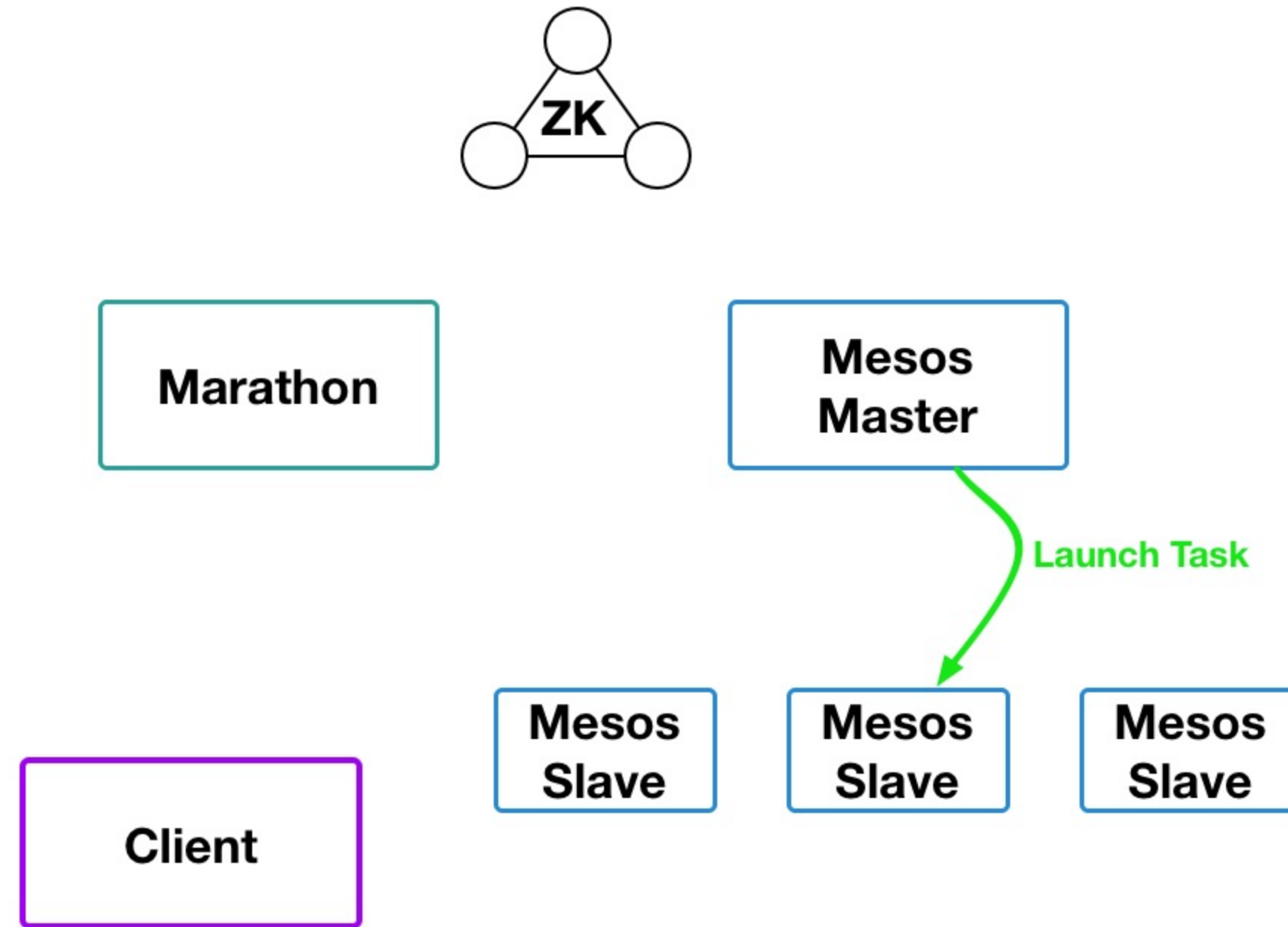


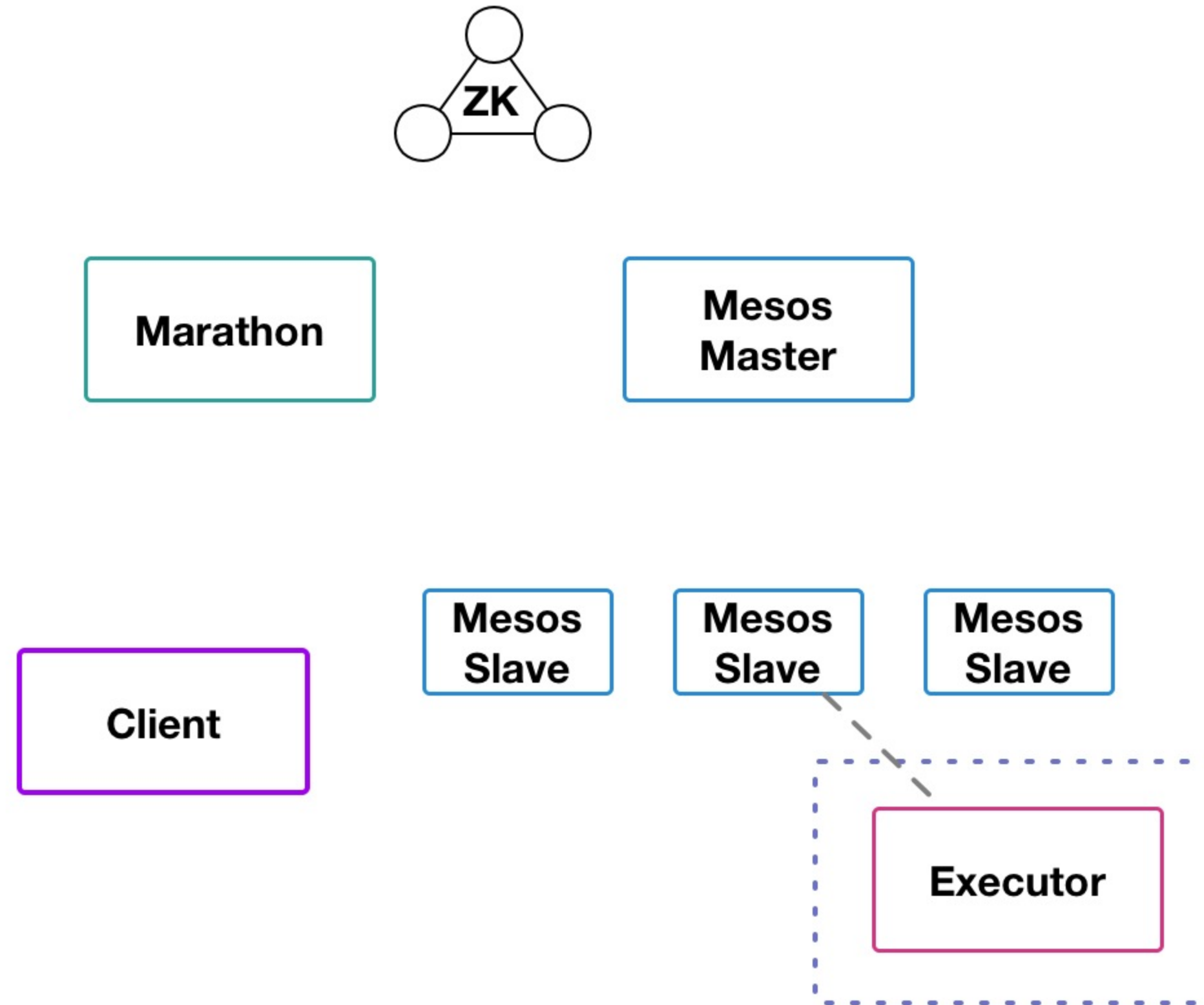


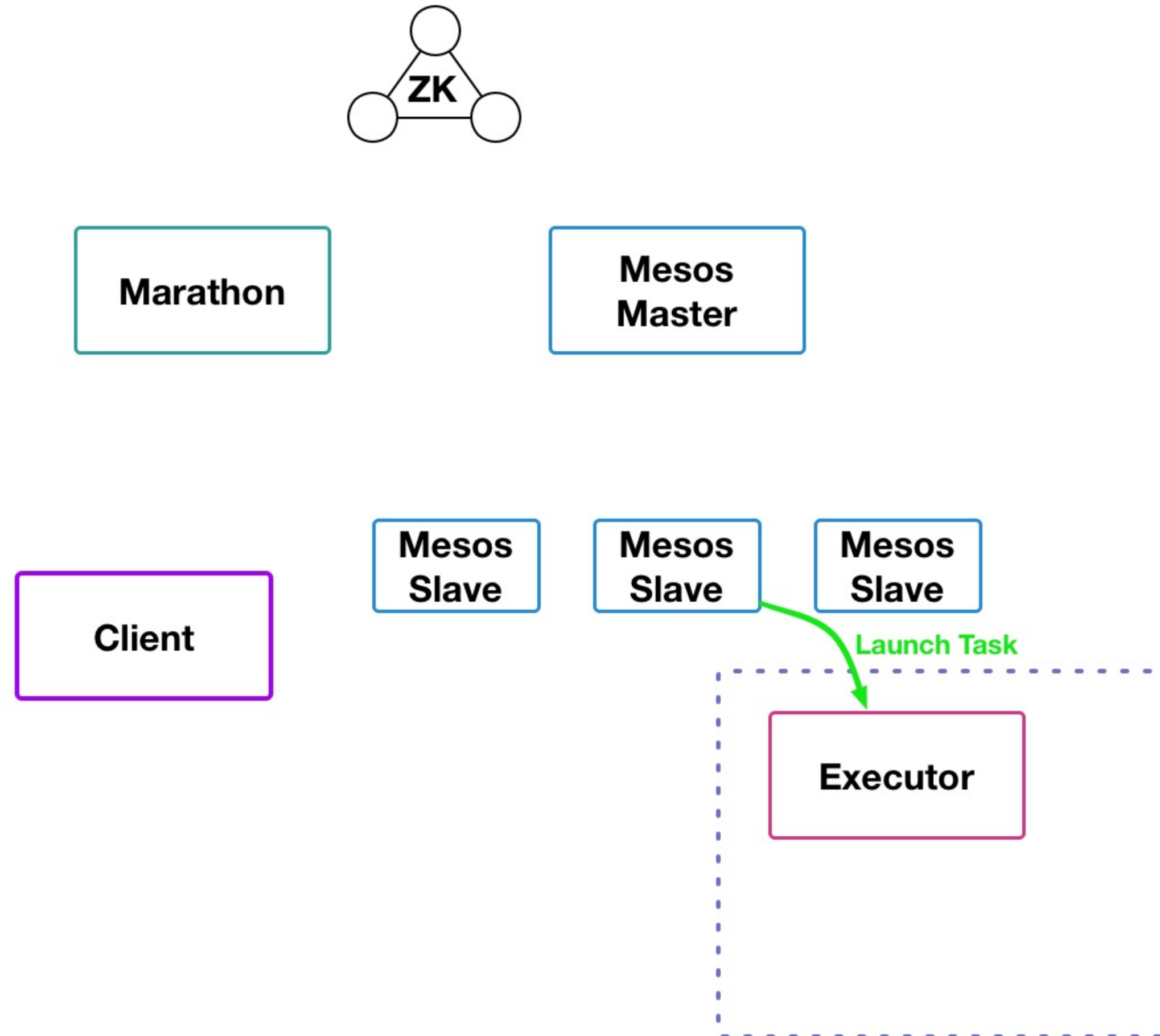


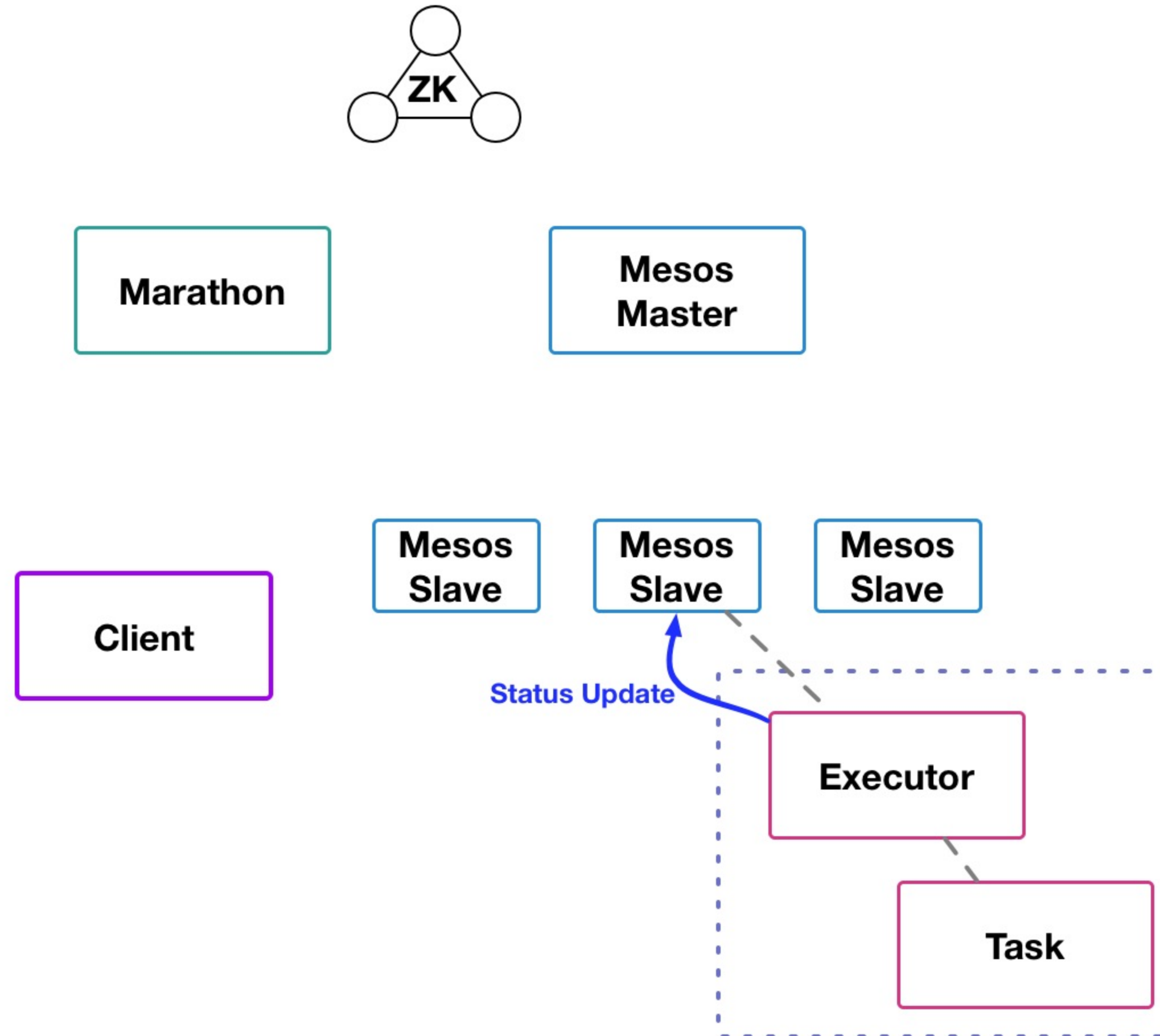


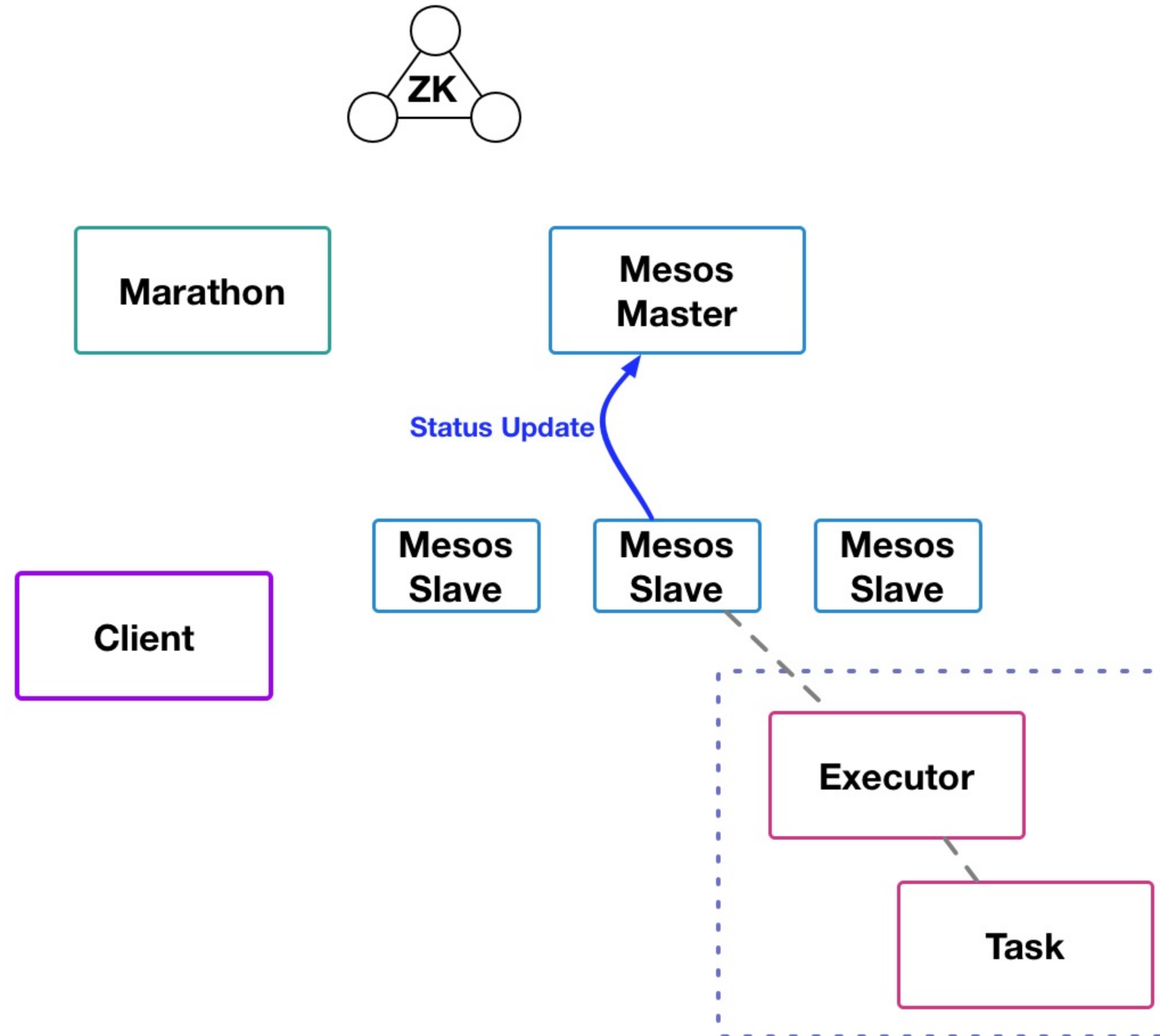


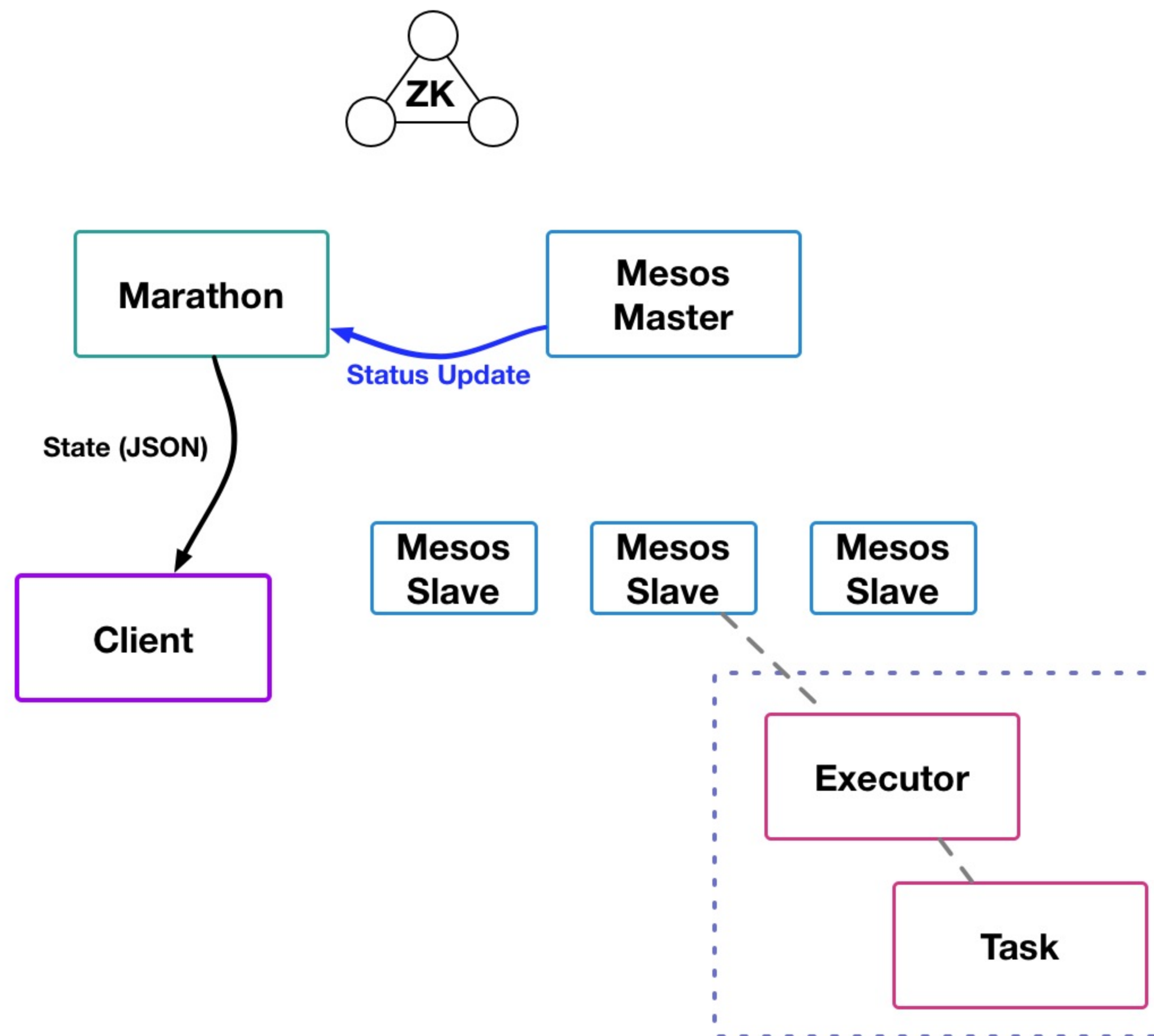


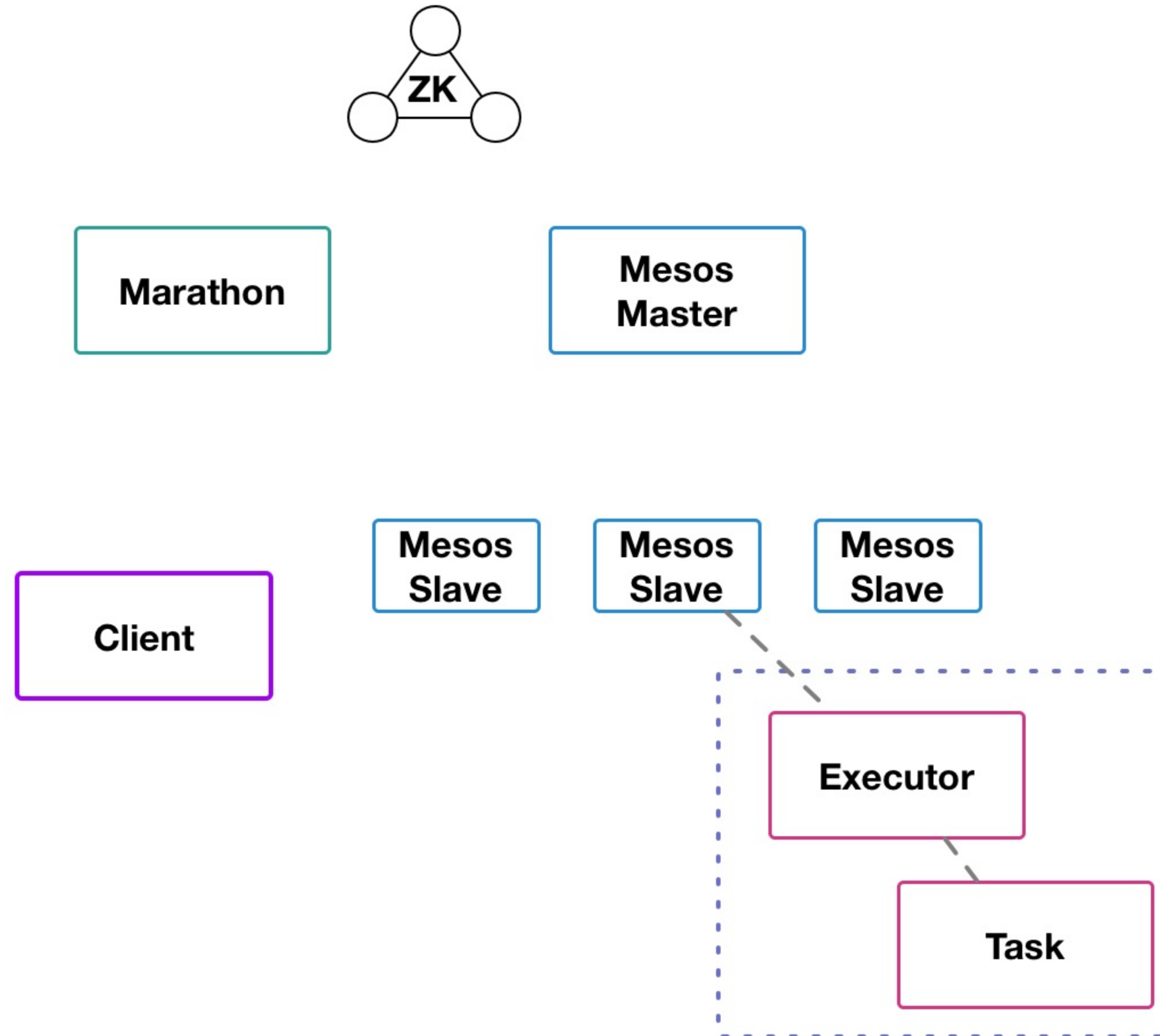




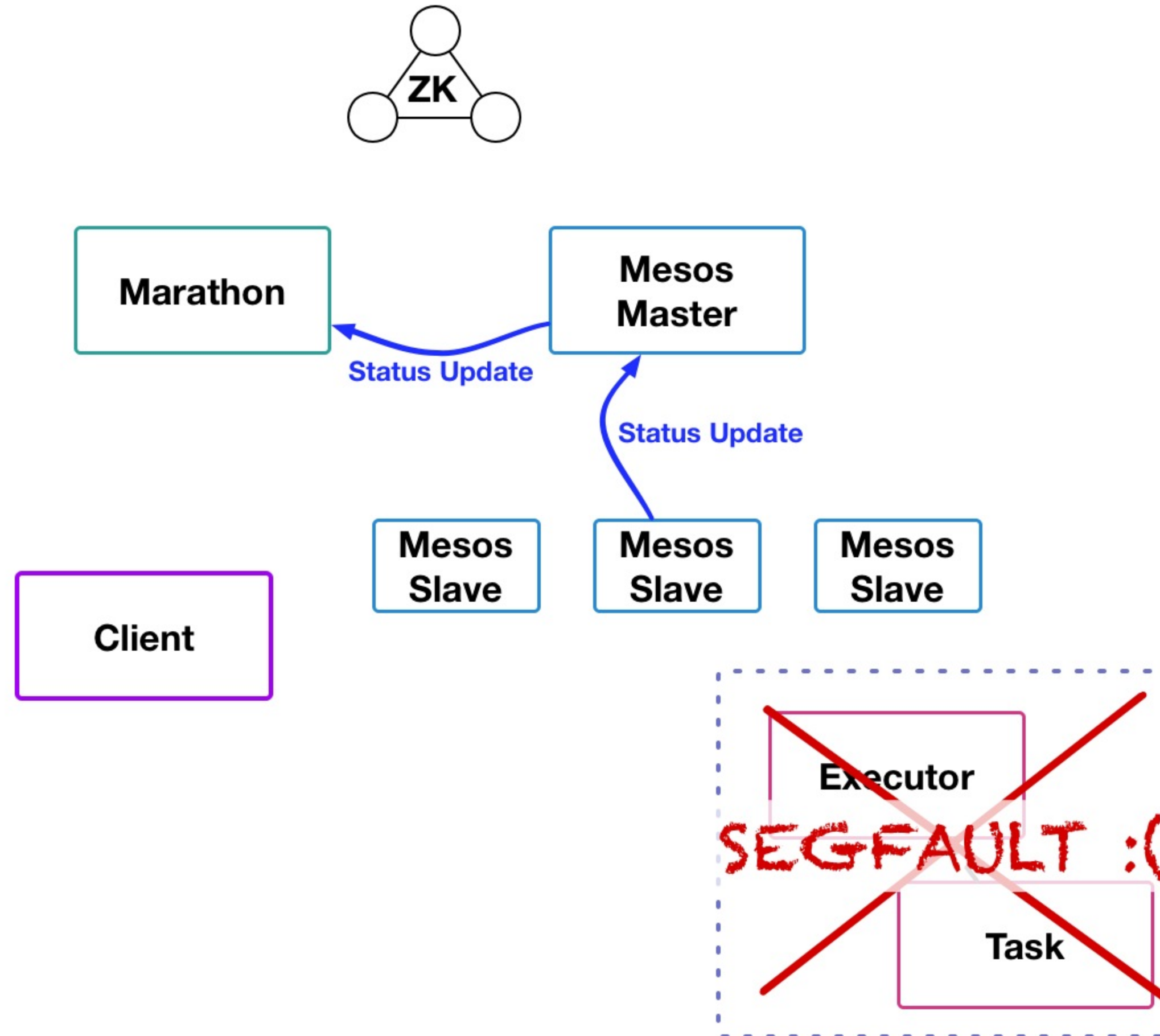


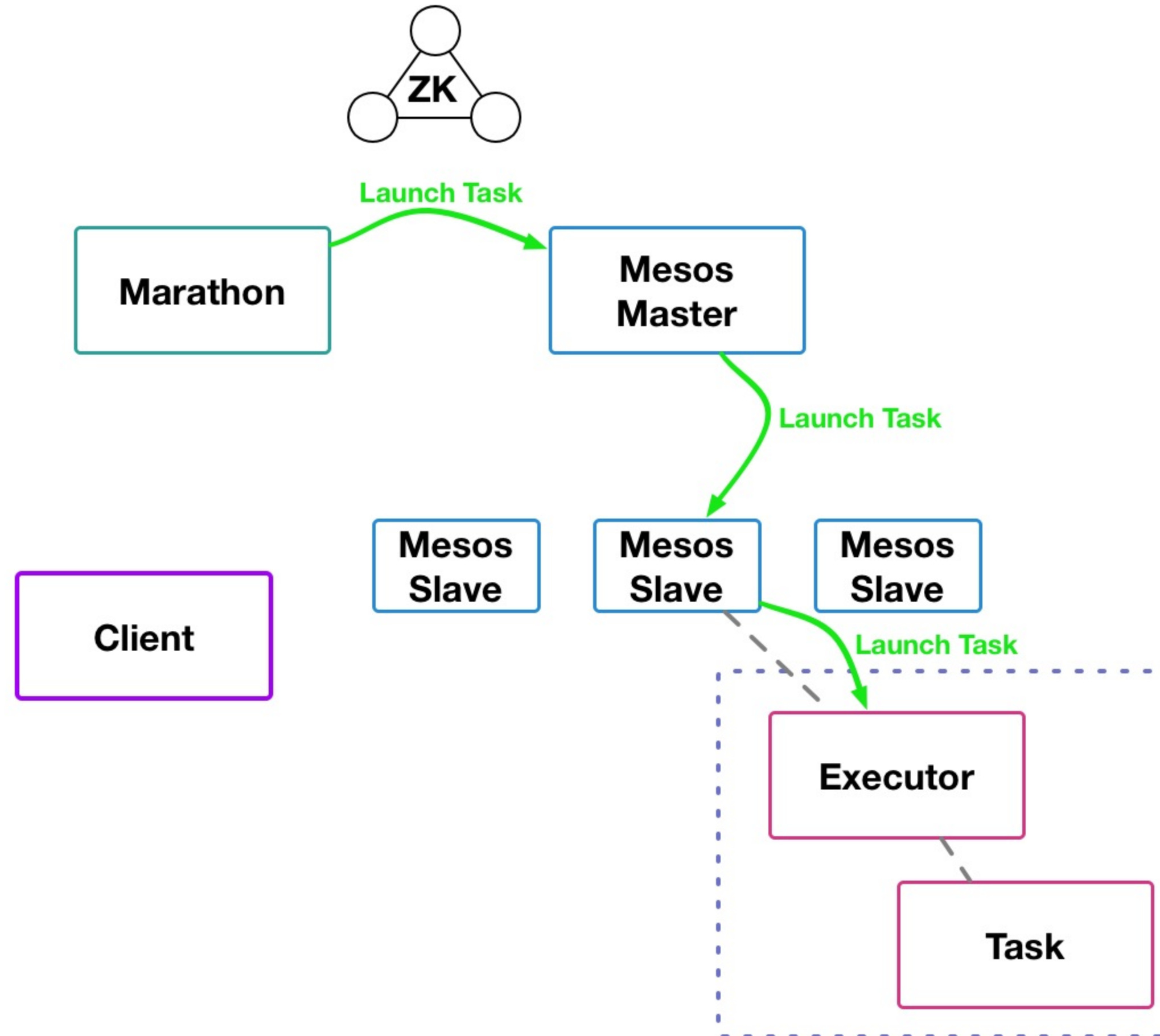


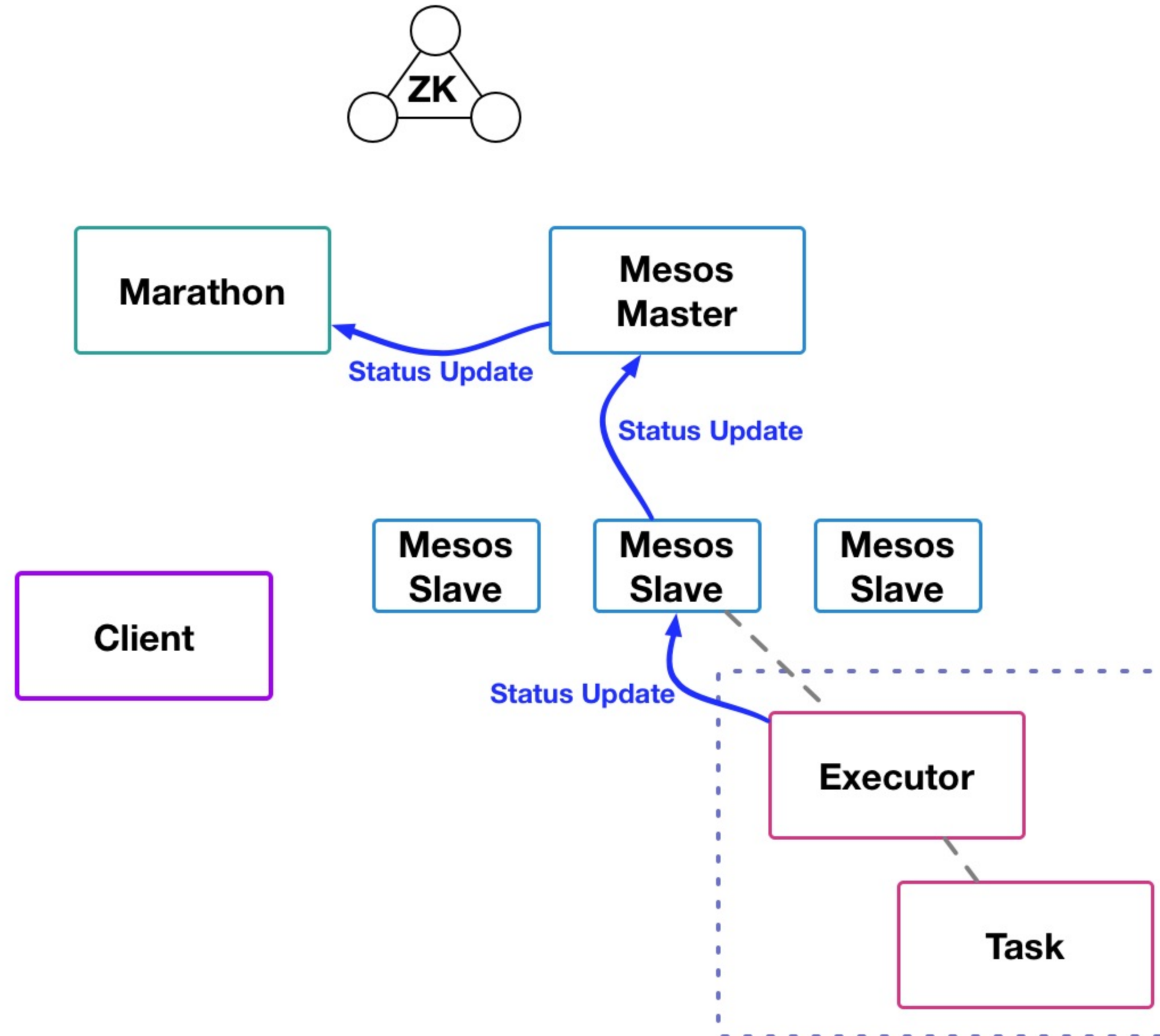


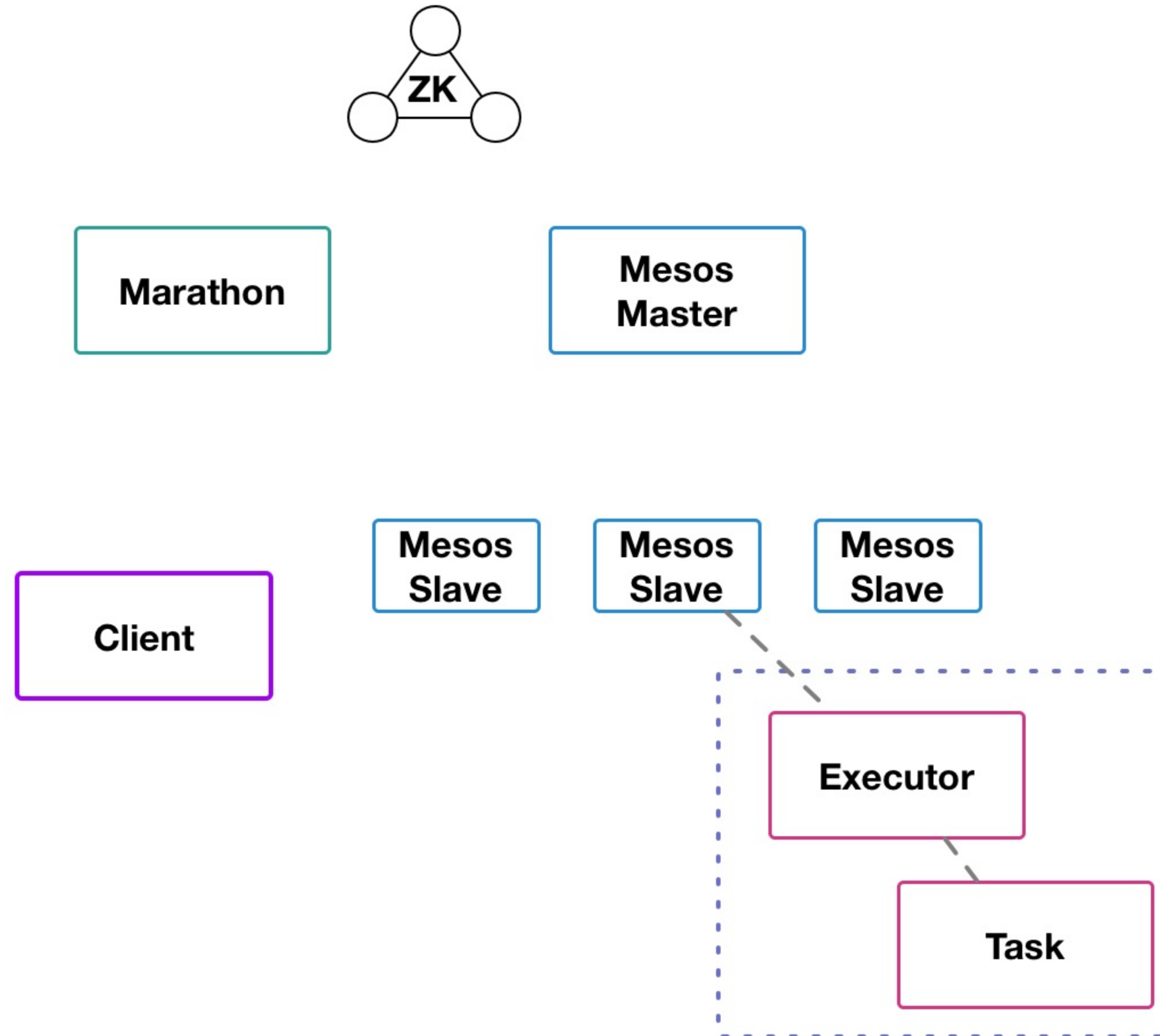


Task failure

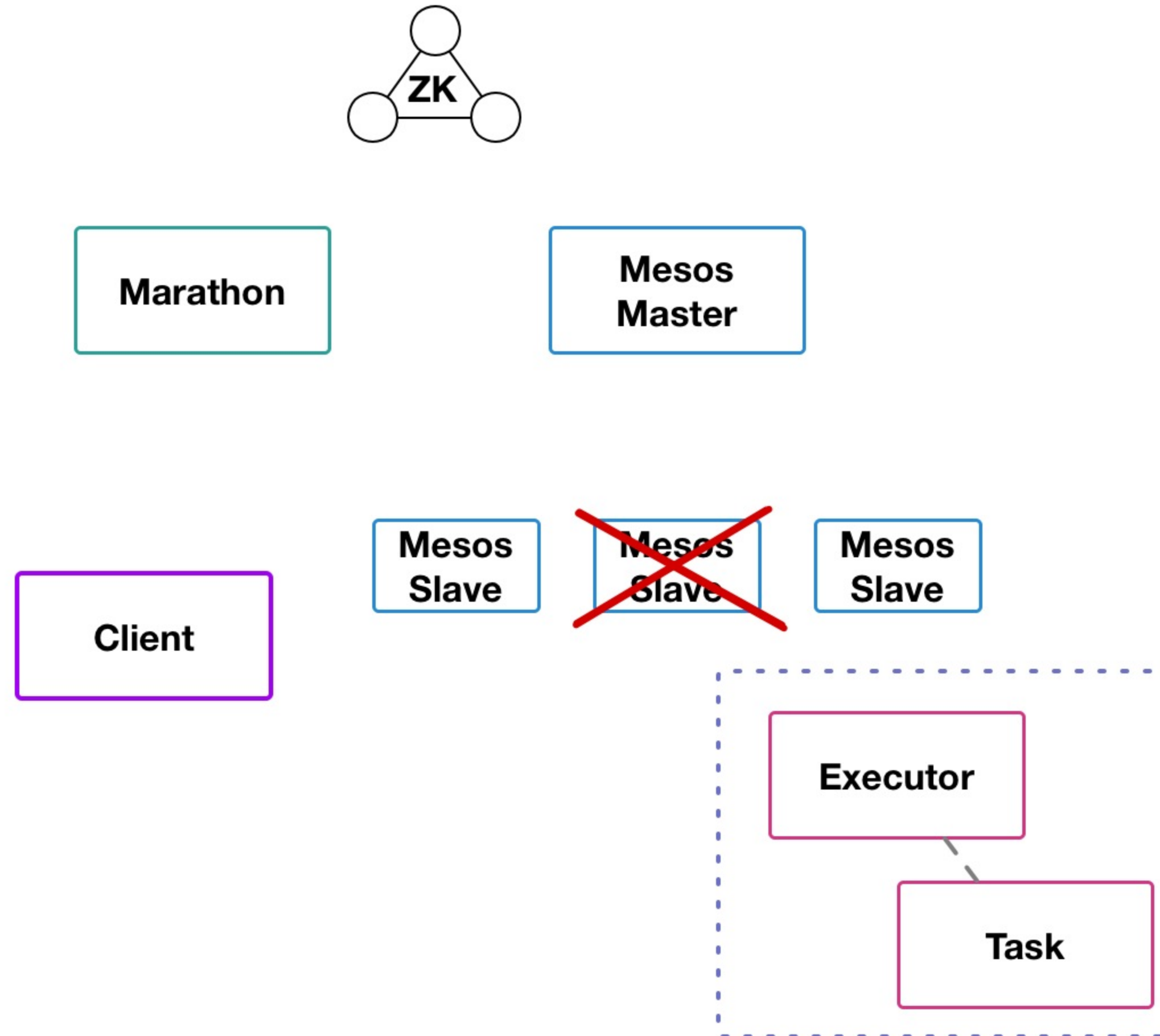


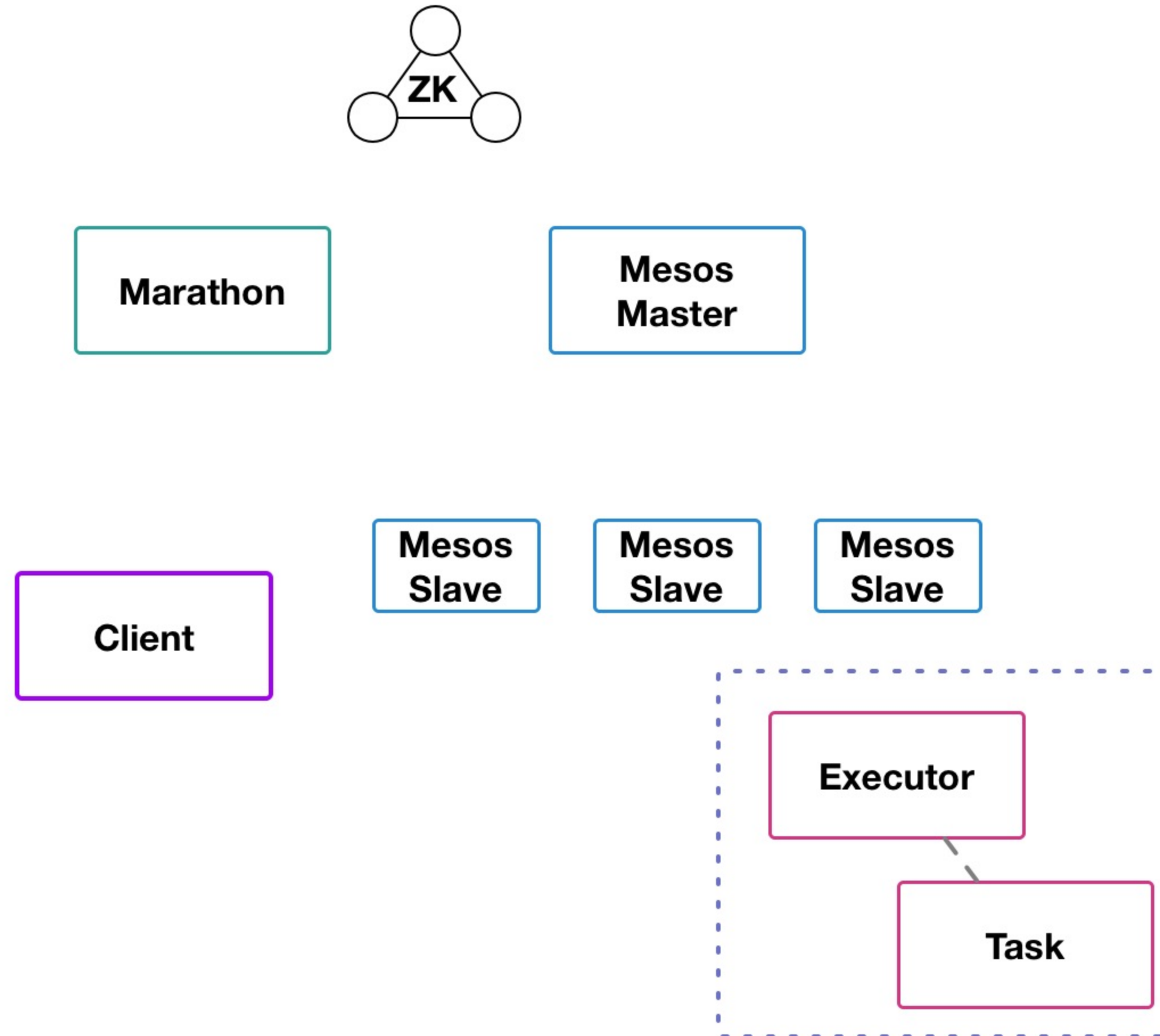


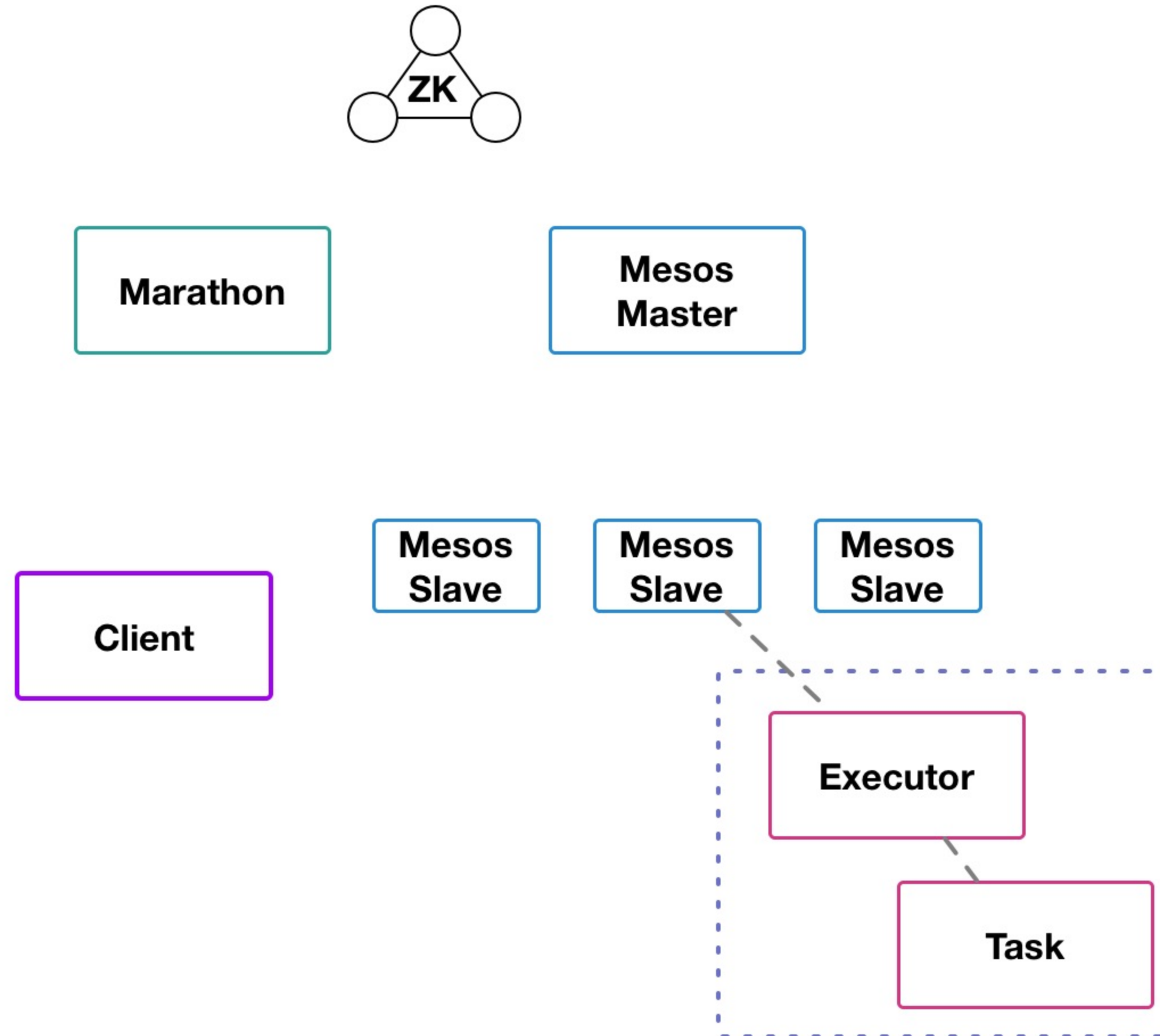


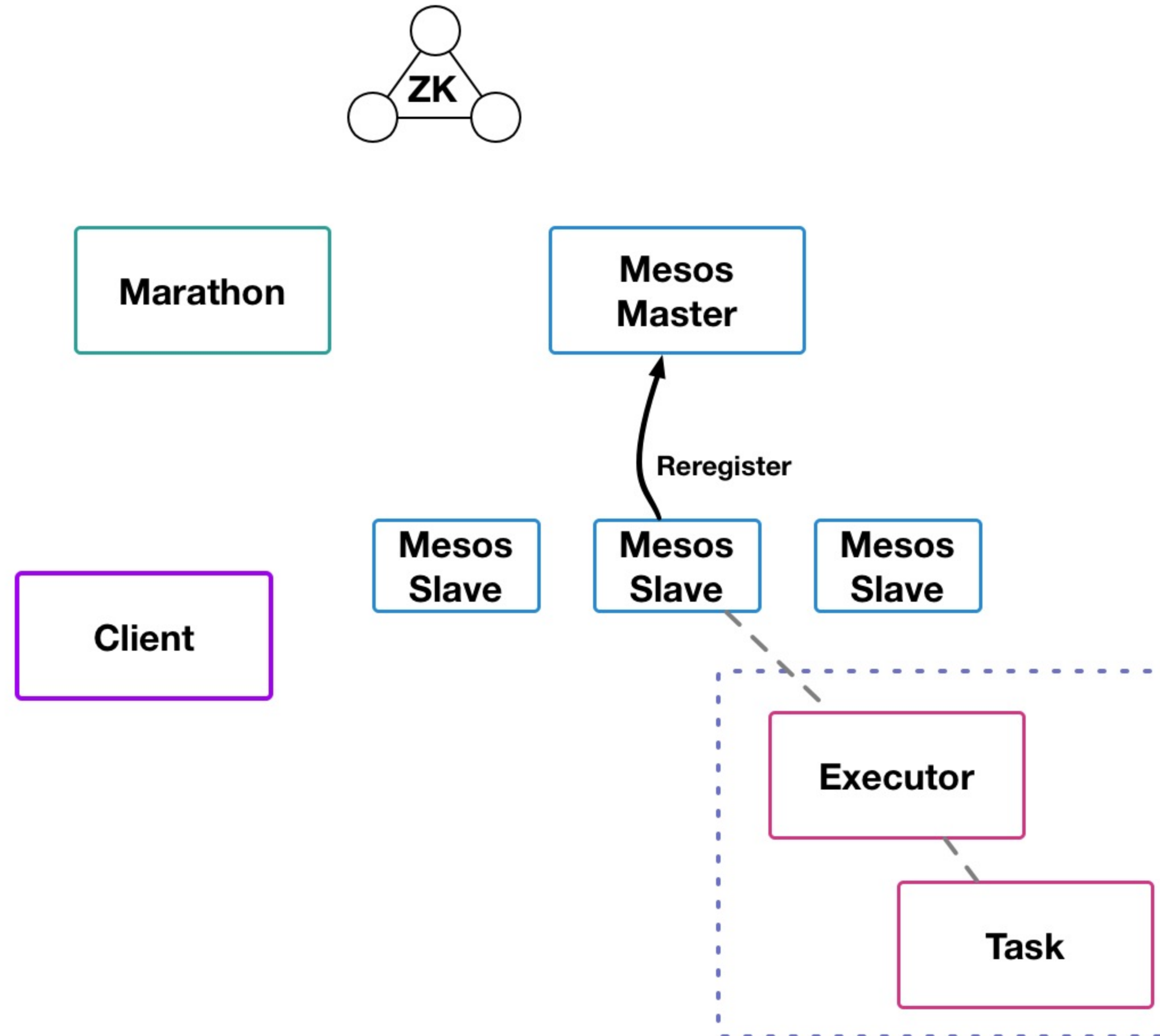


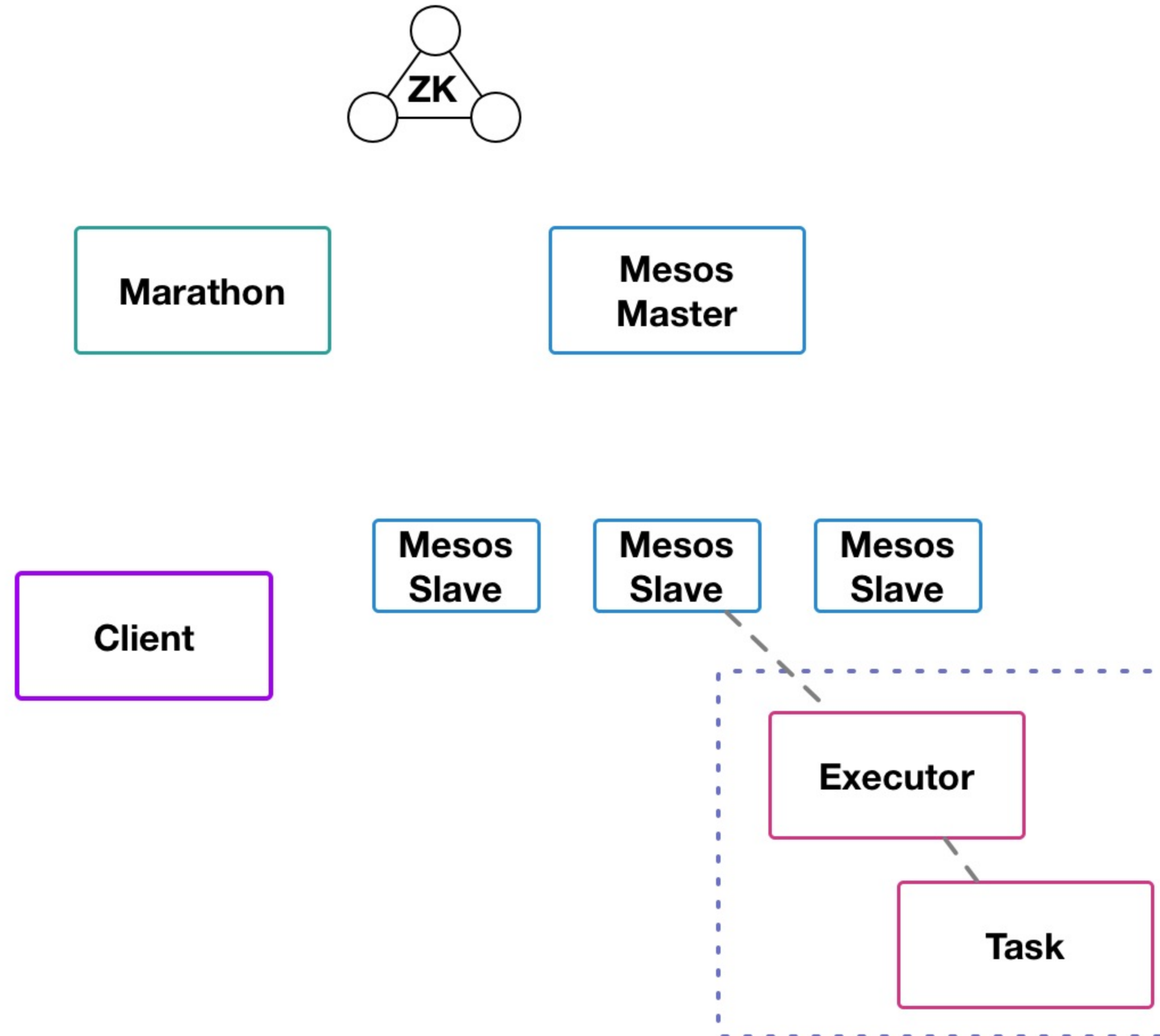
Agent process failure



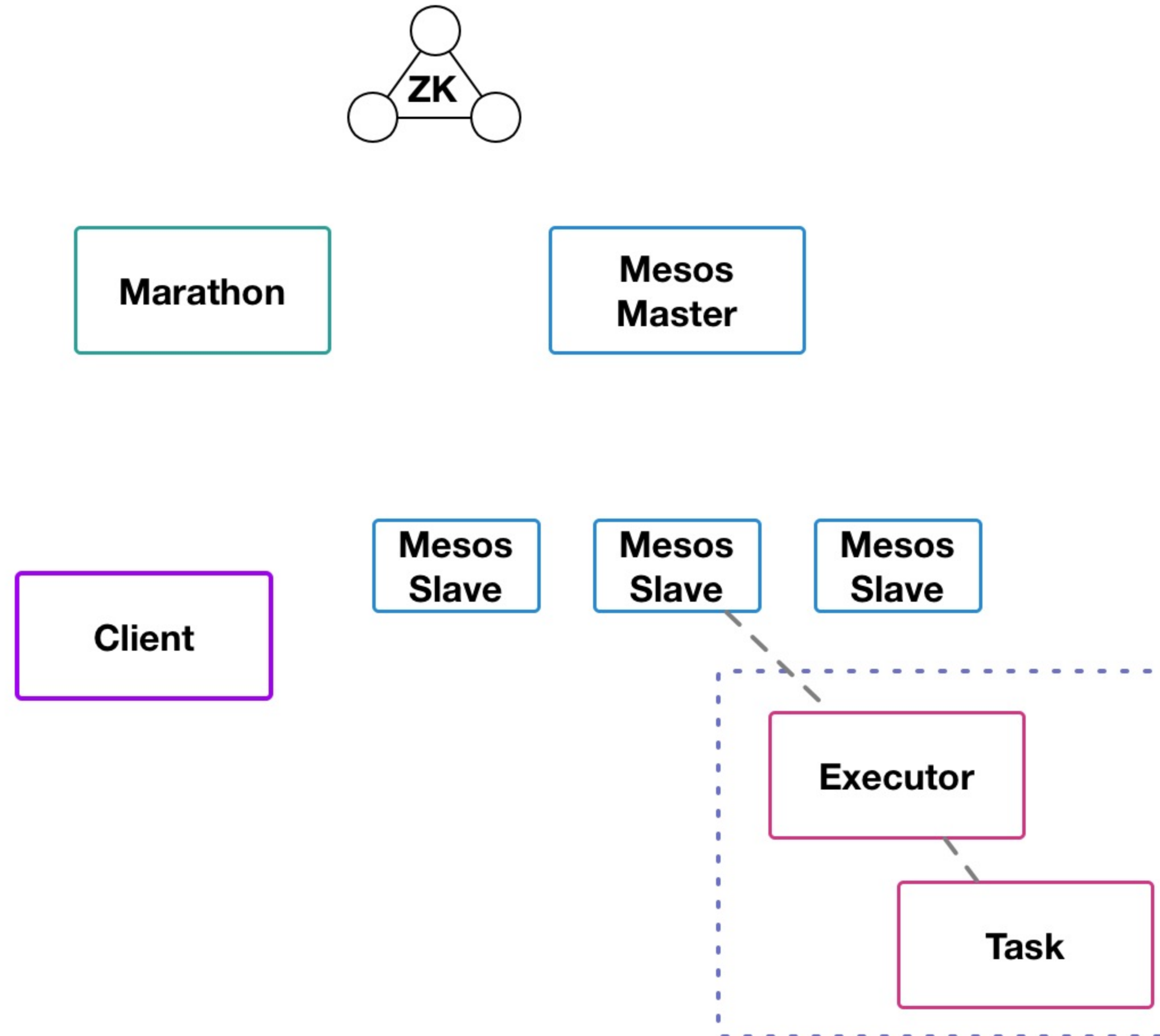


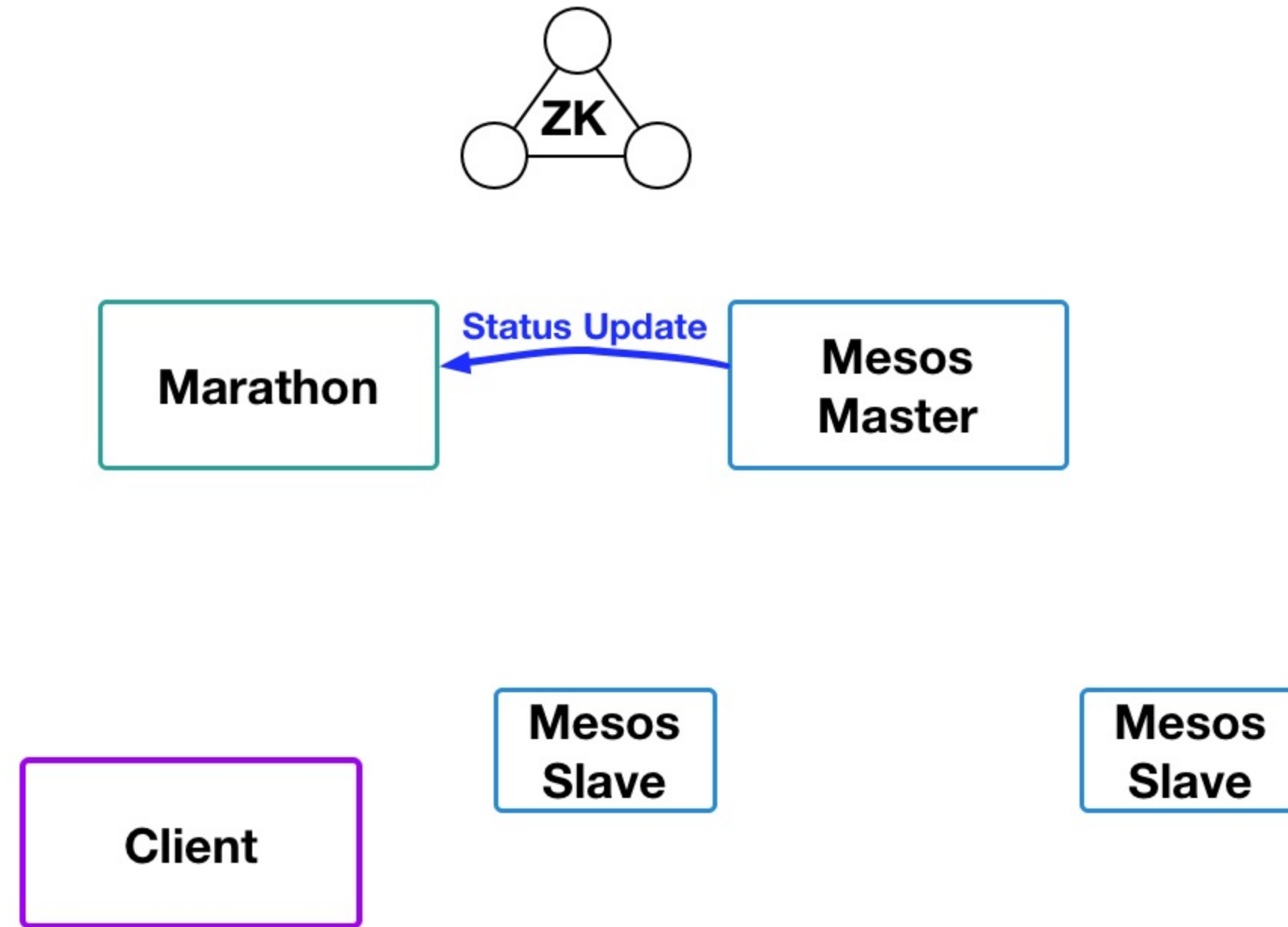


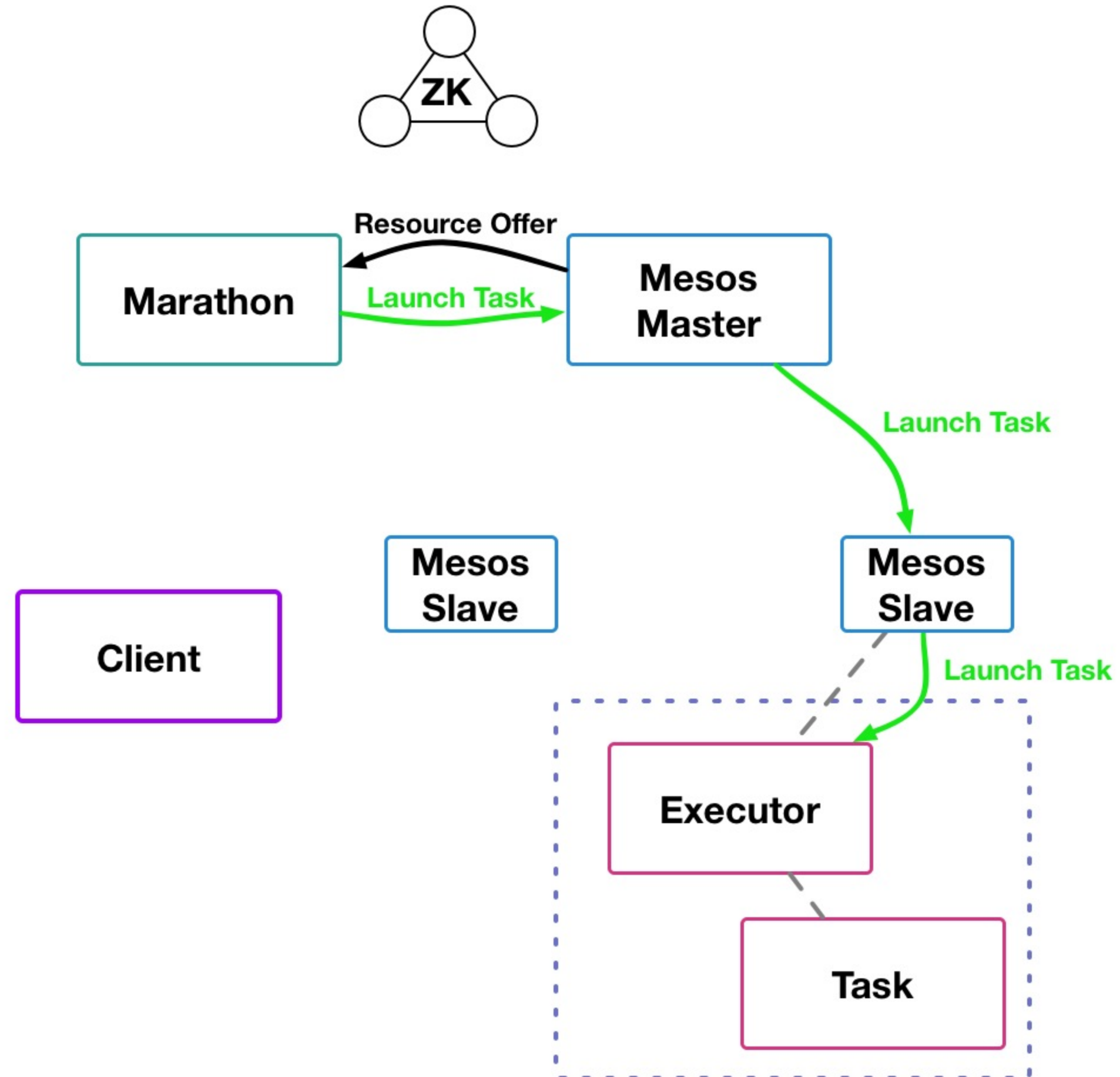


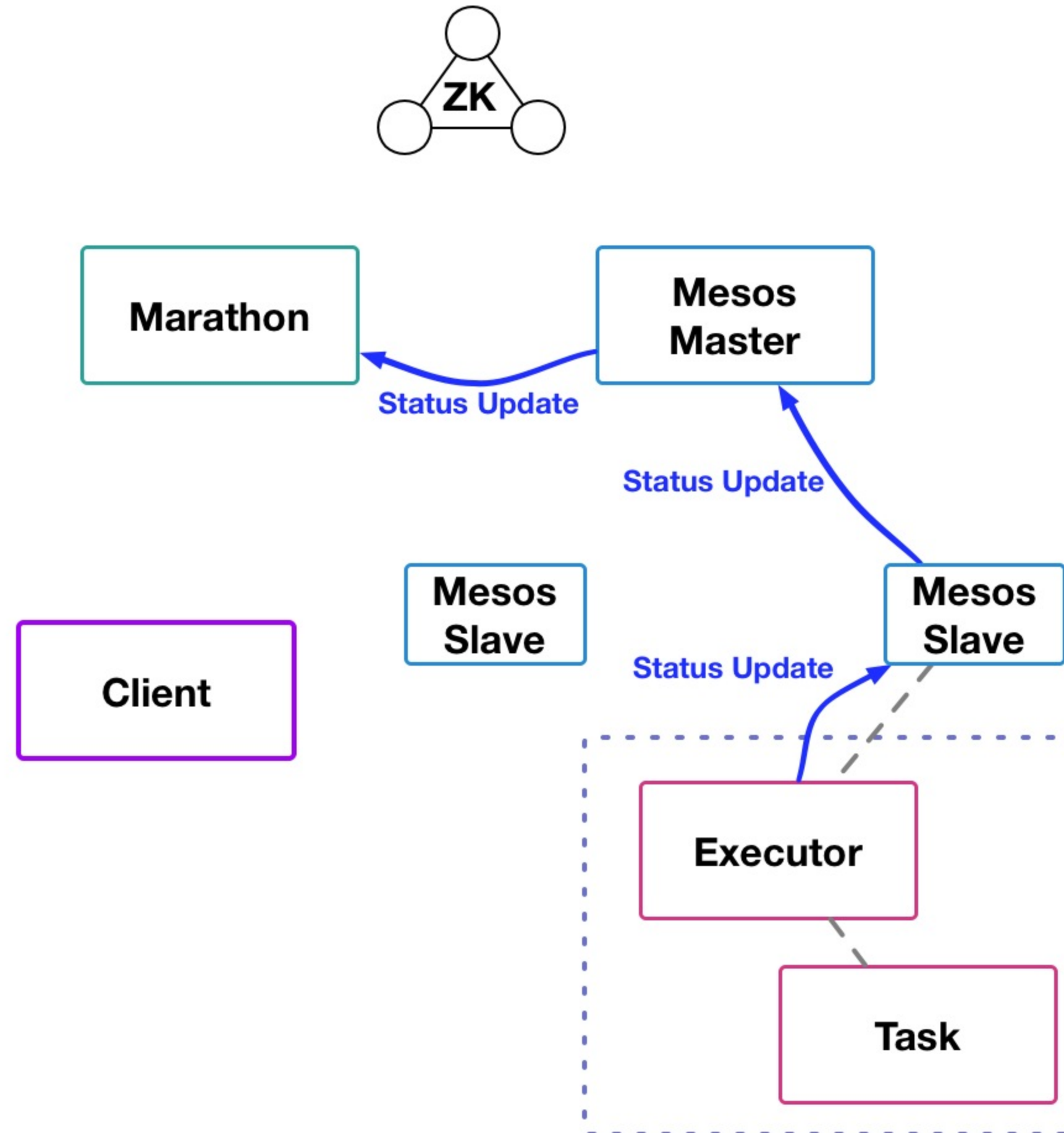


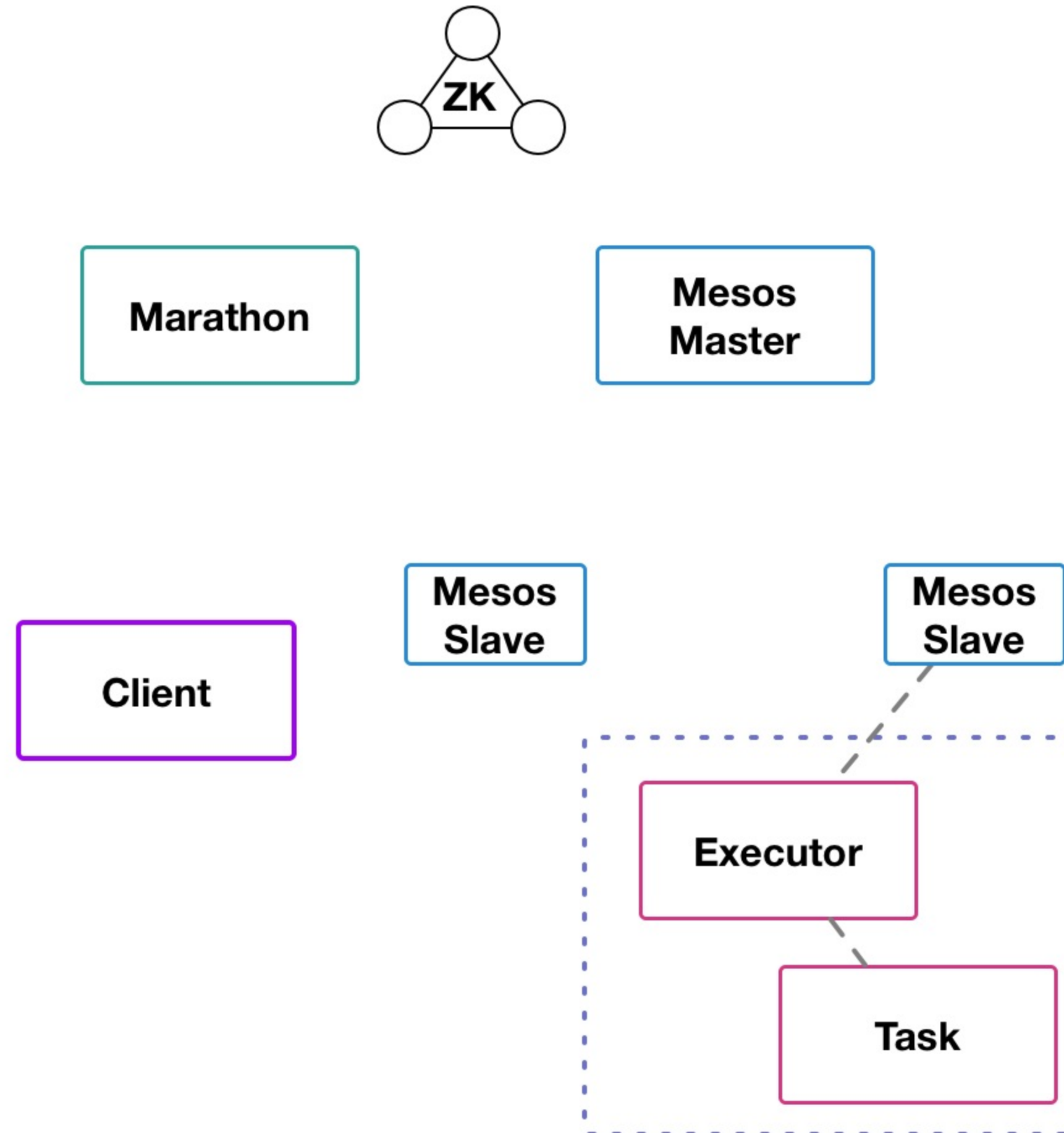
Worker node failure



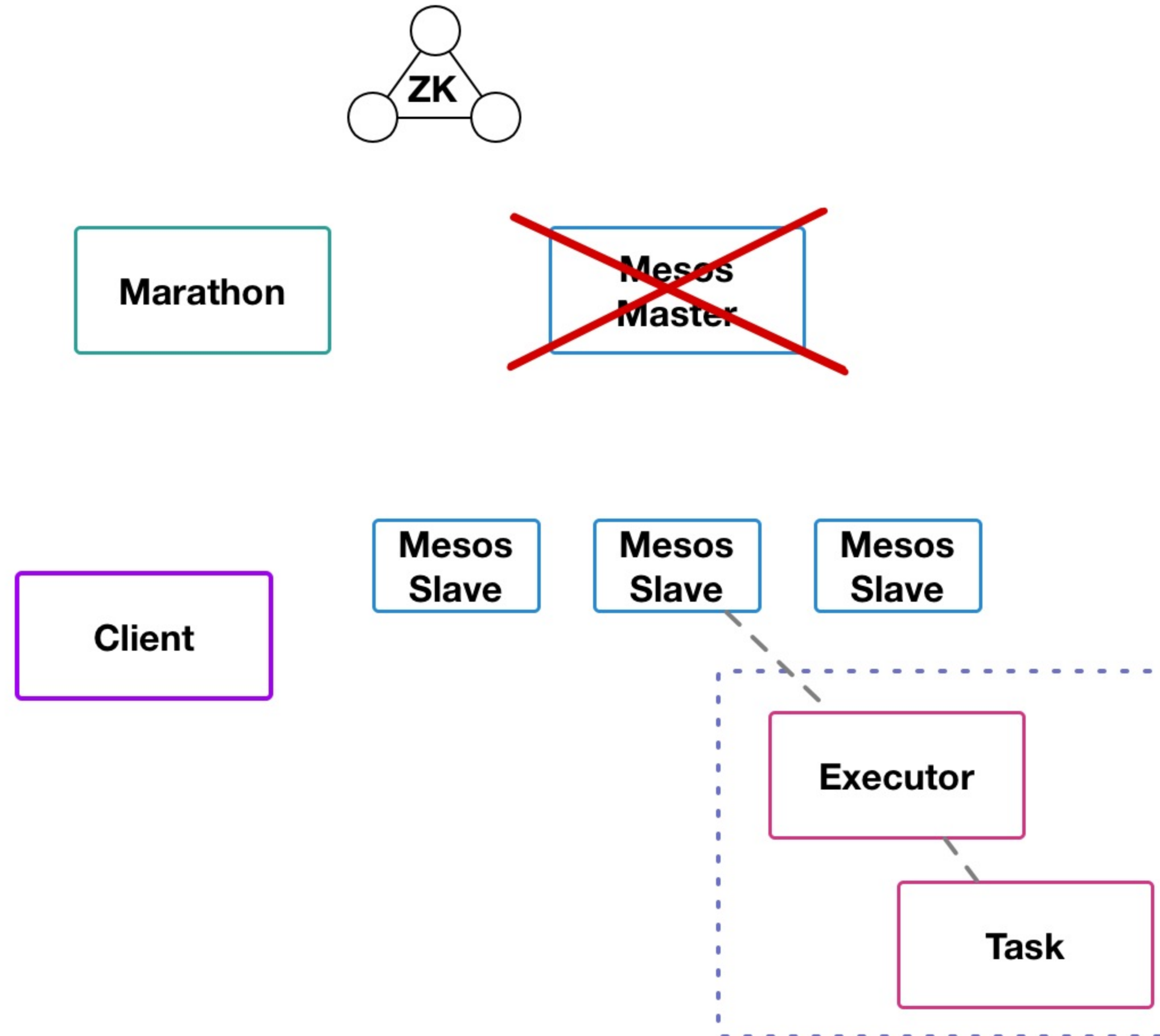


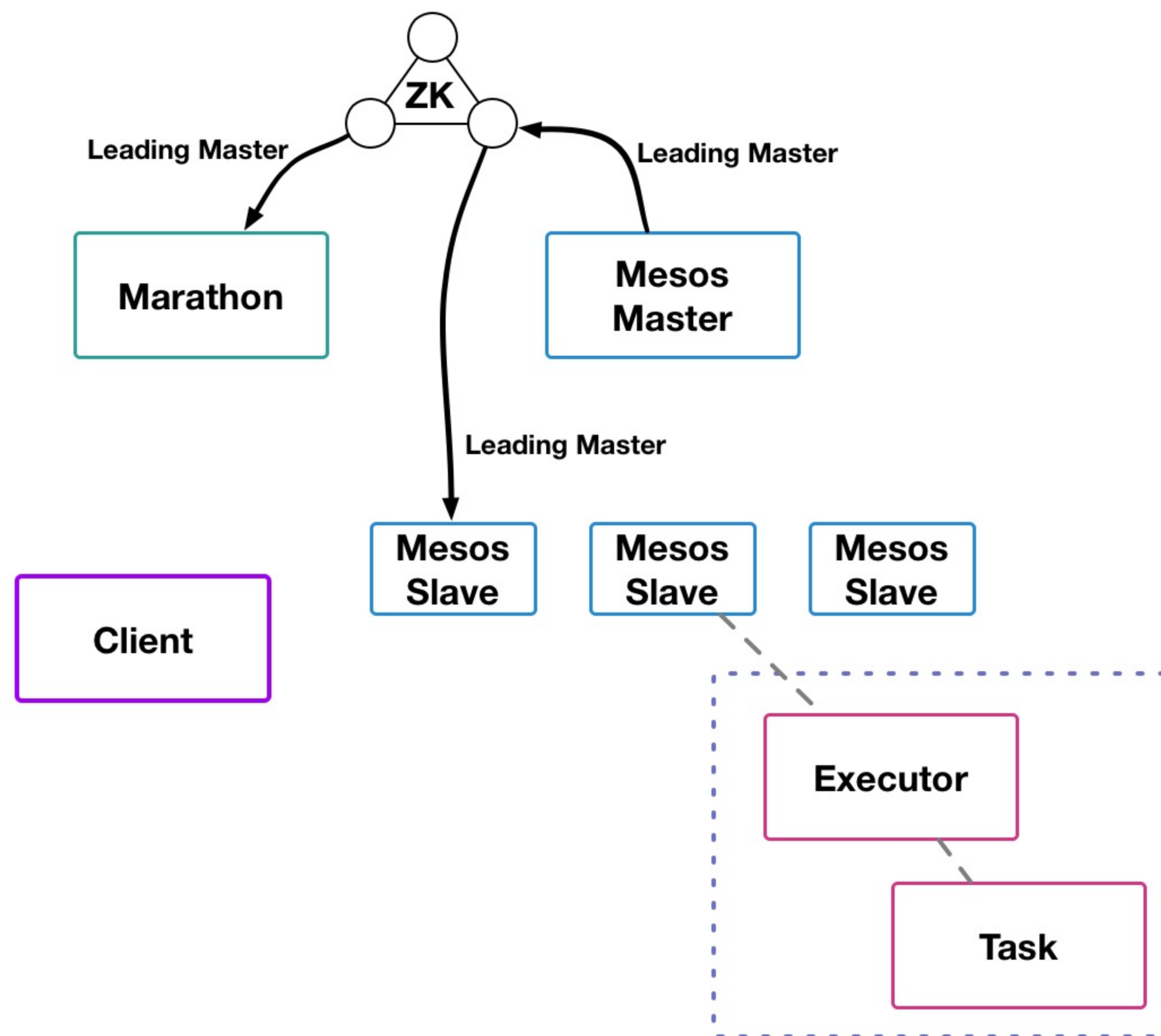


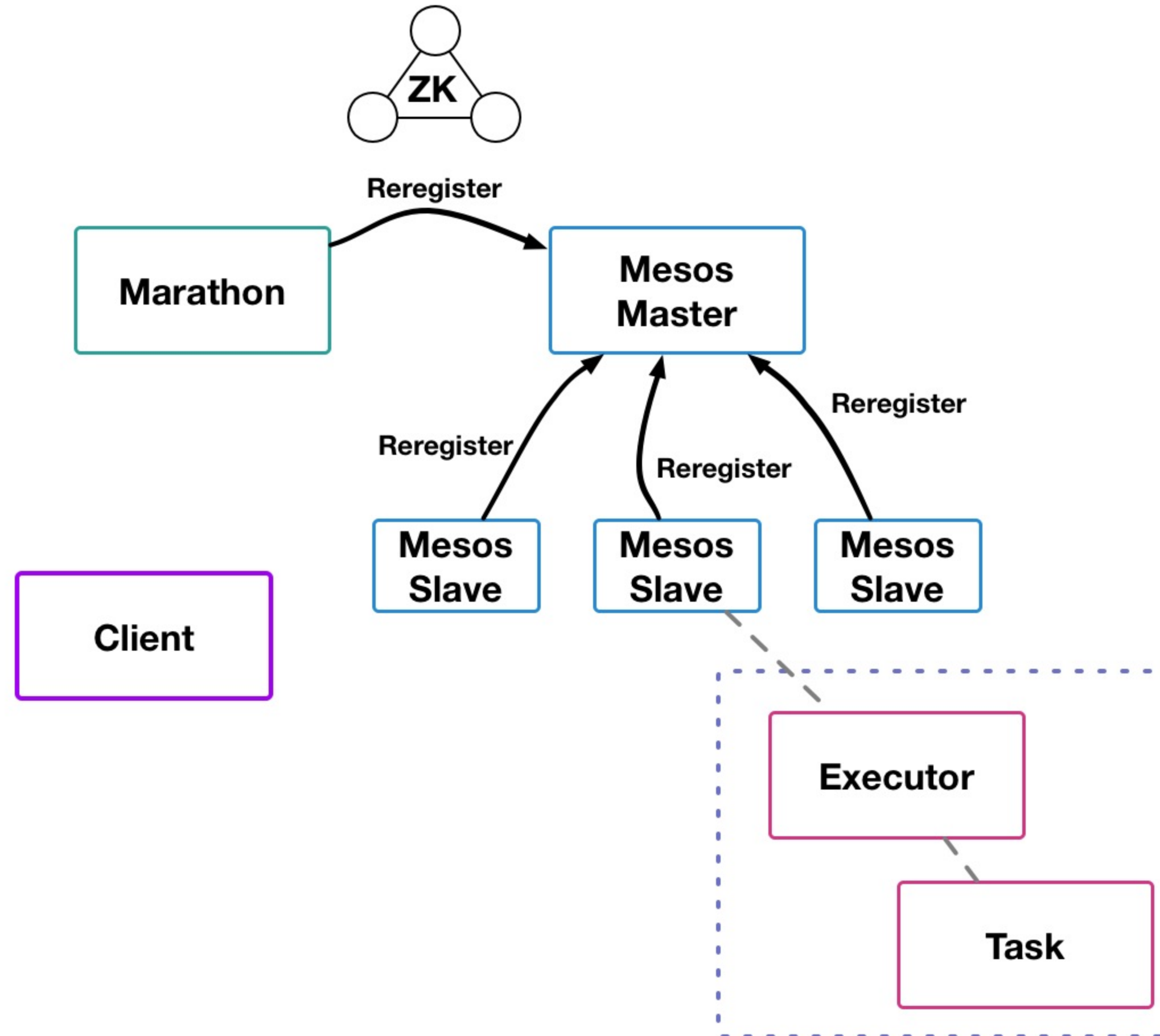


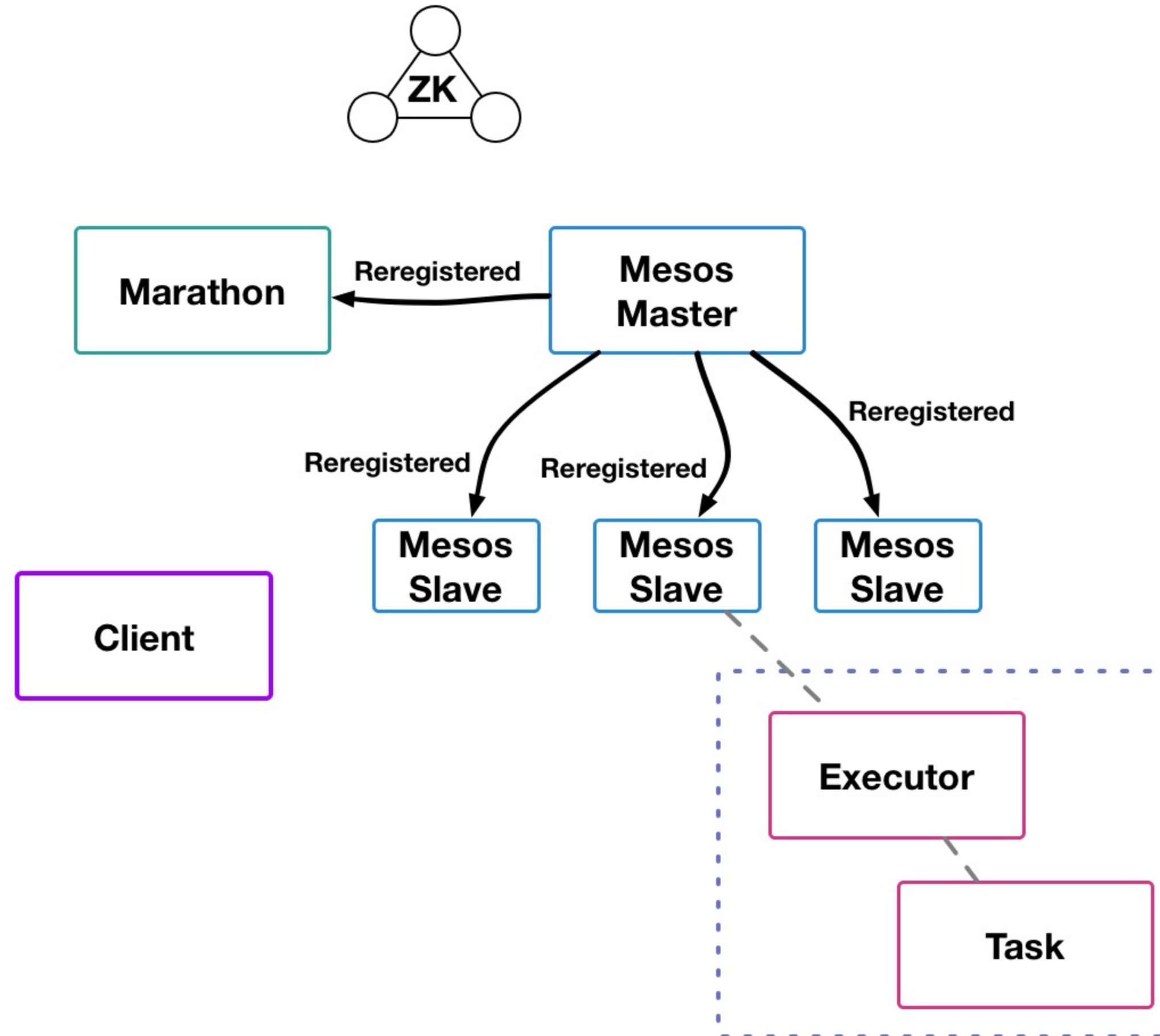


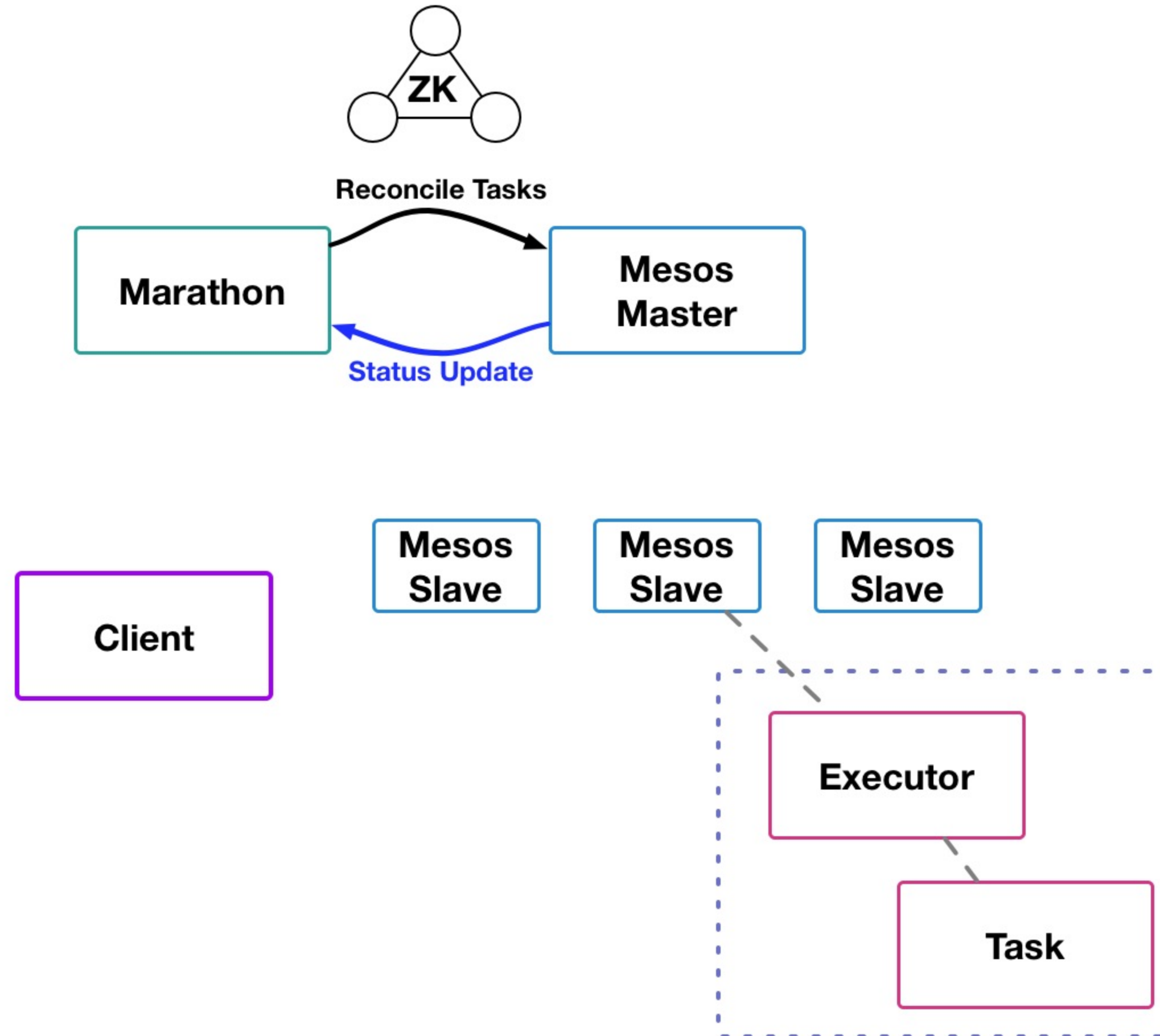
Master failure

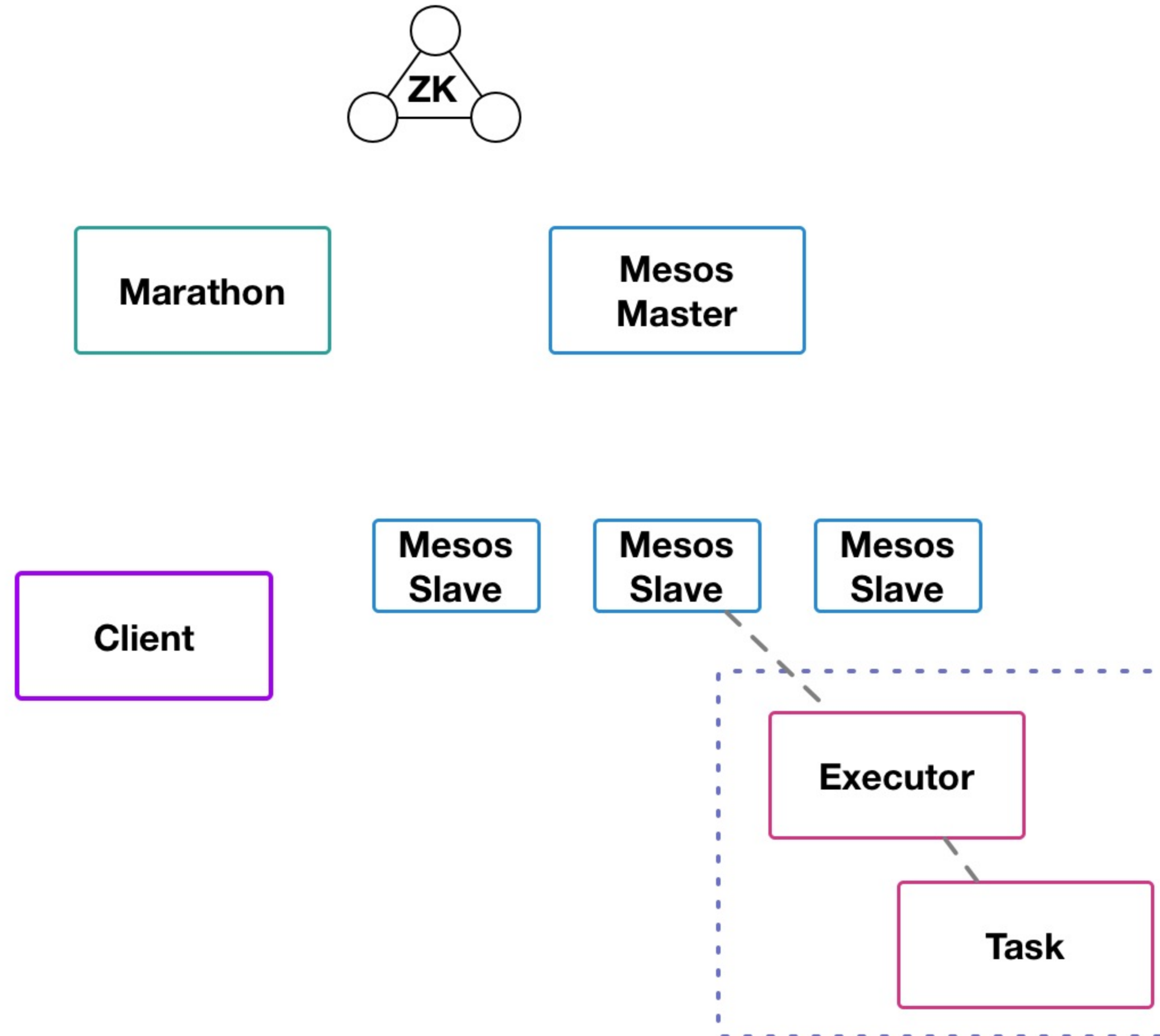




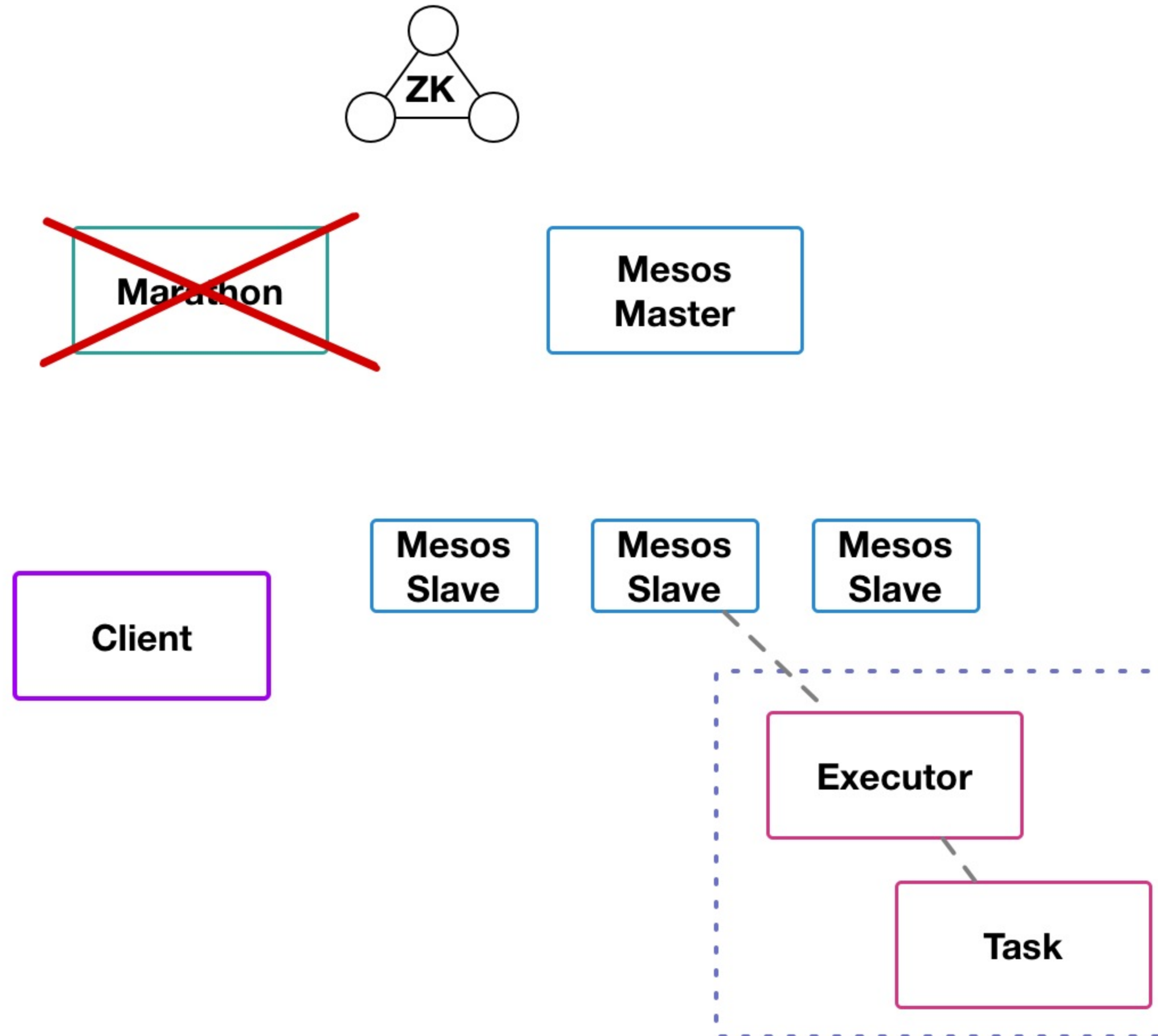


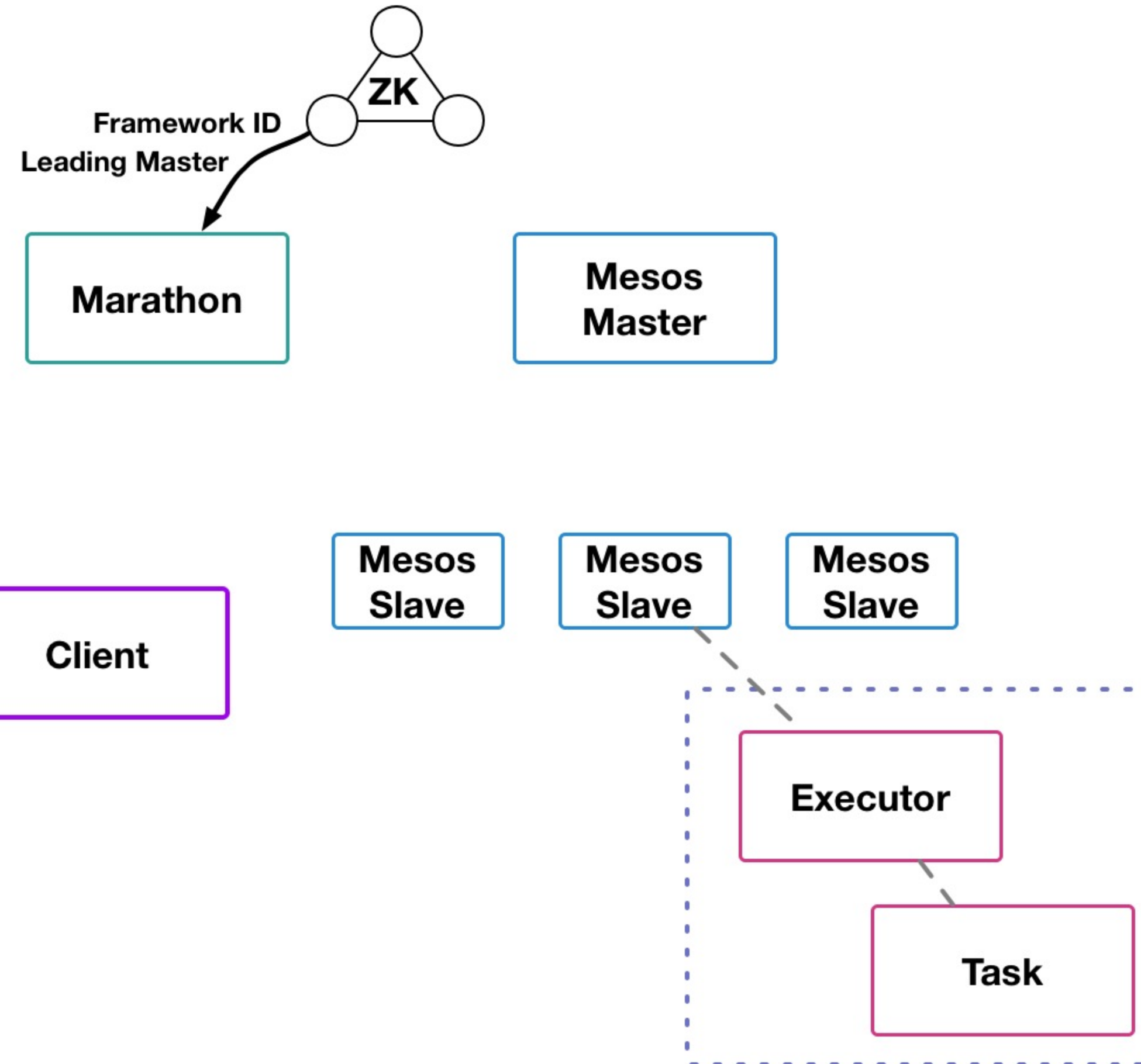


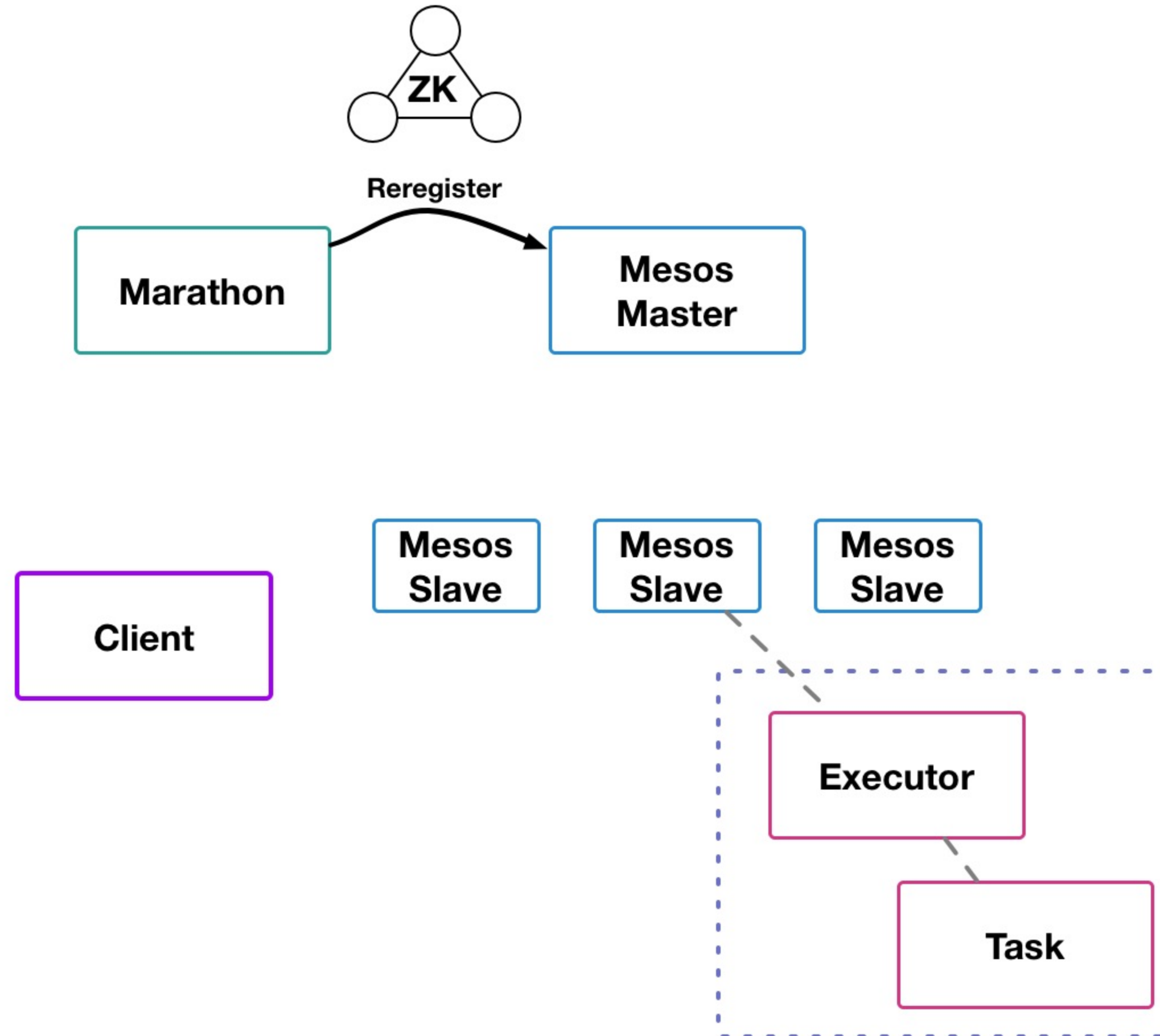


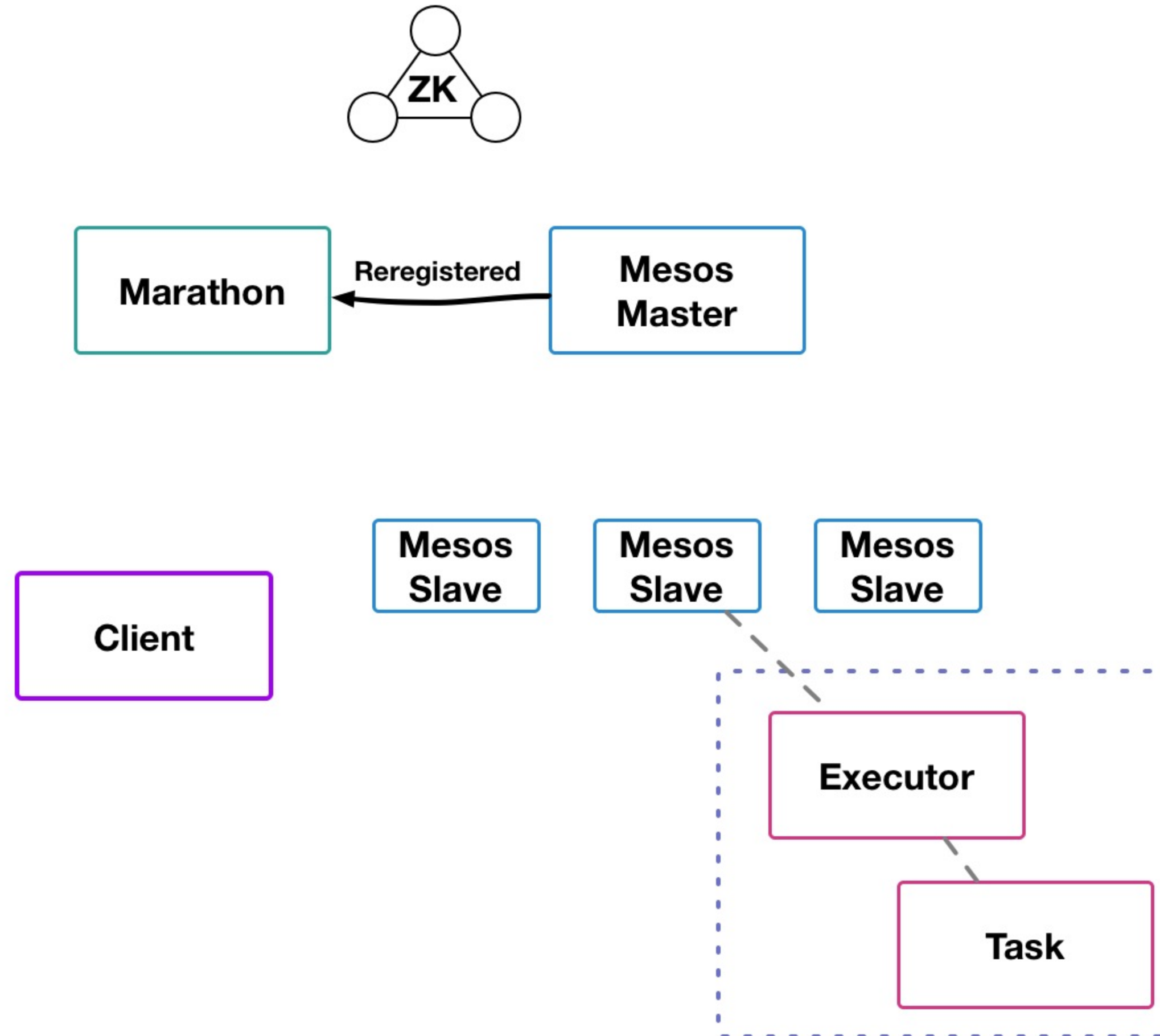


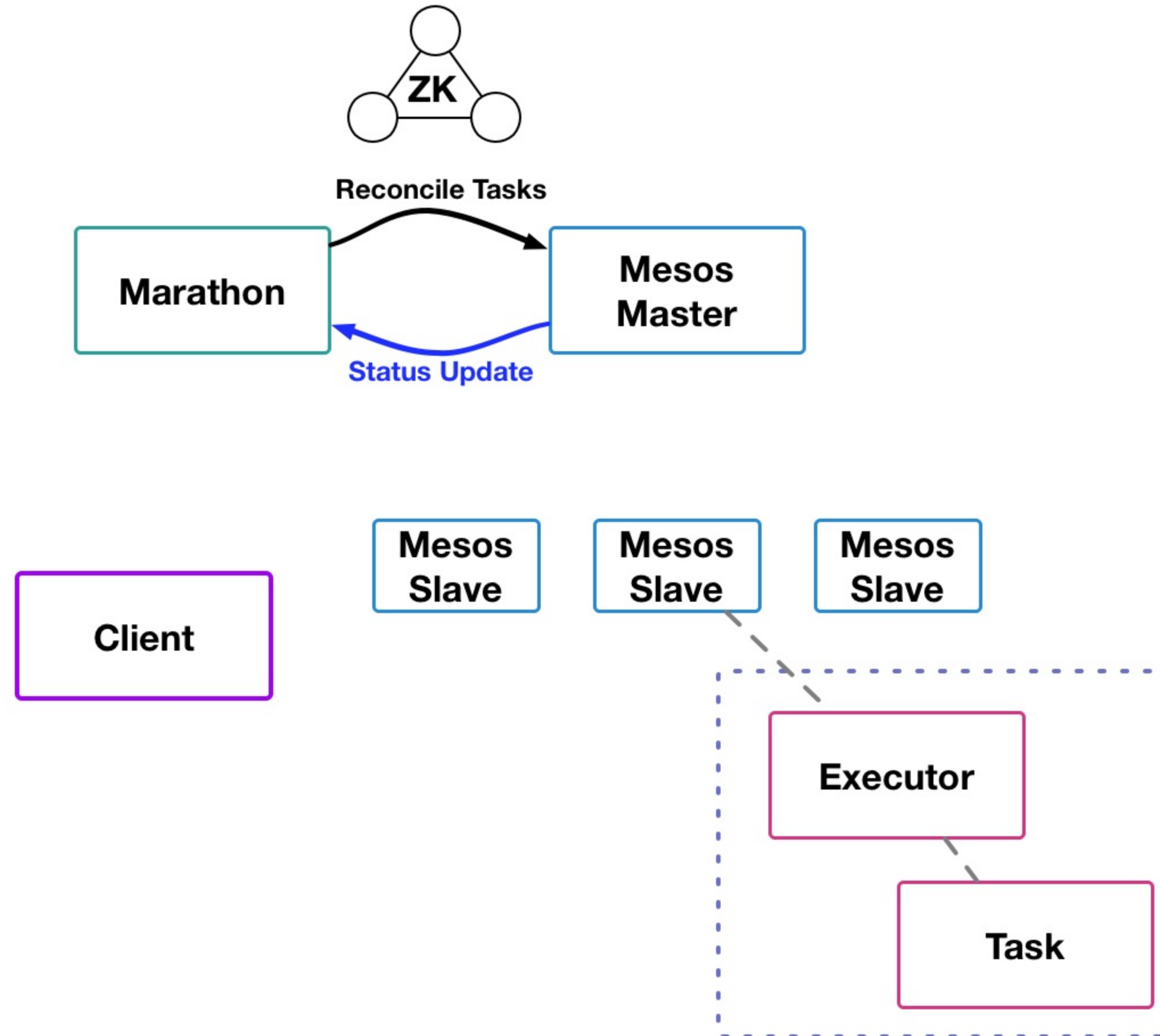
Framework failure

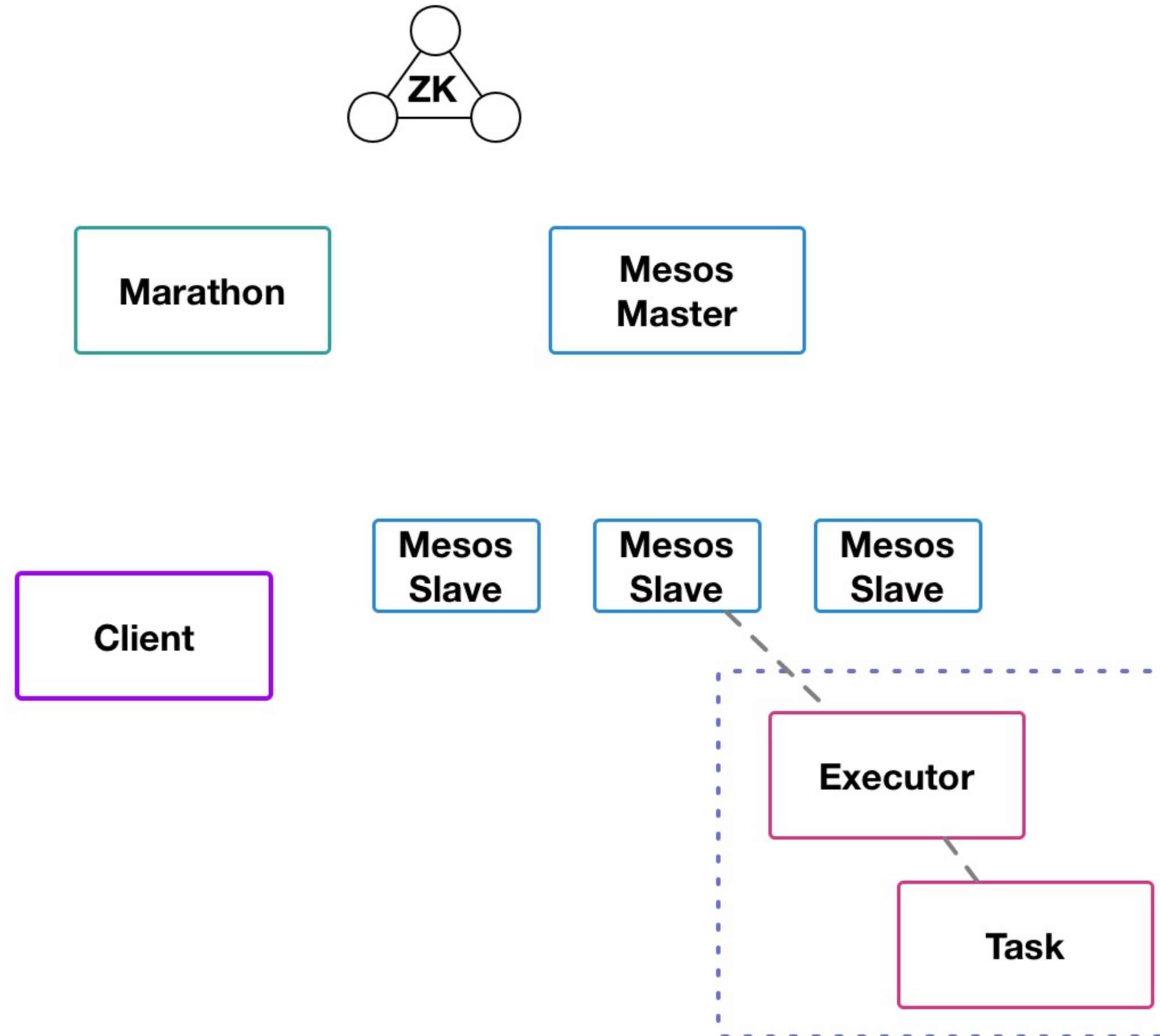










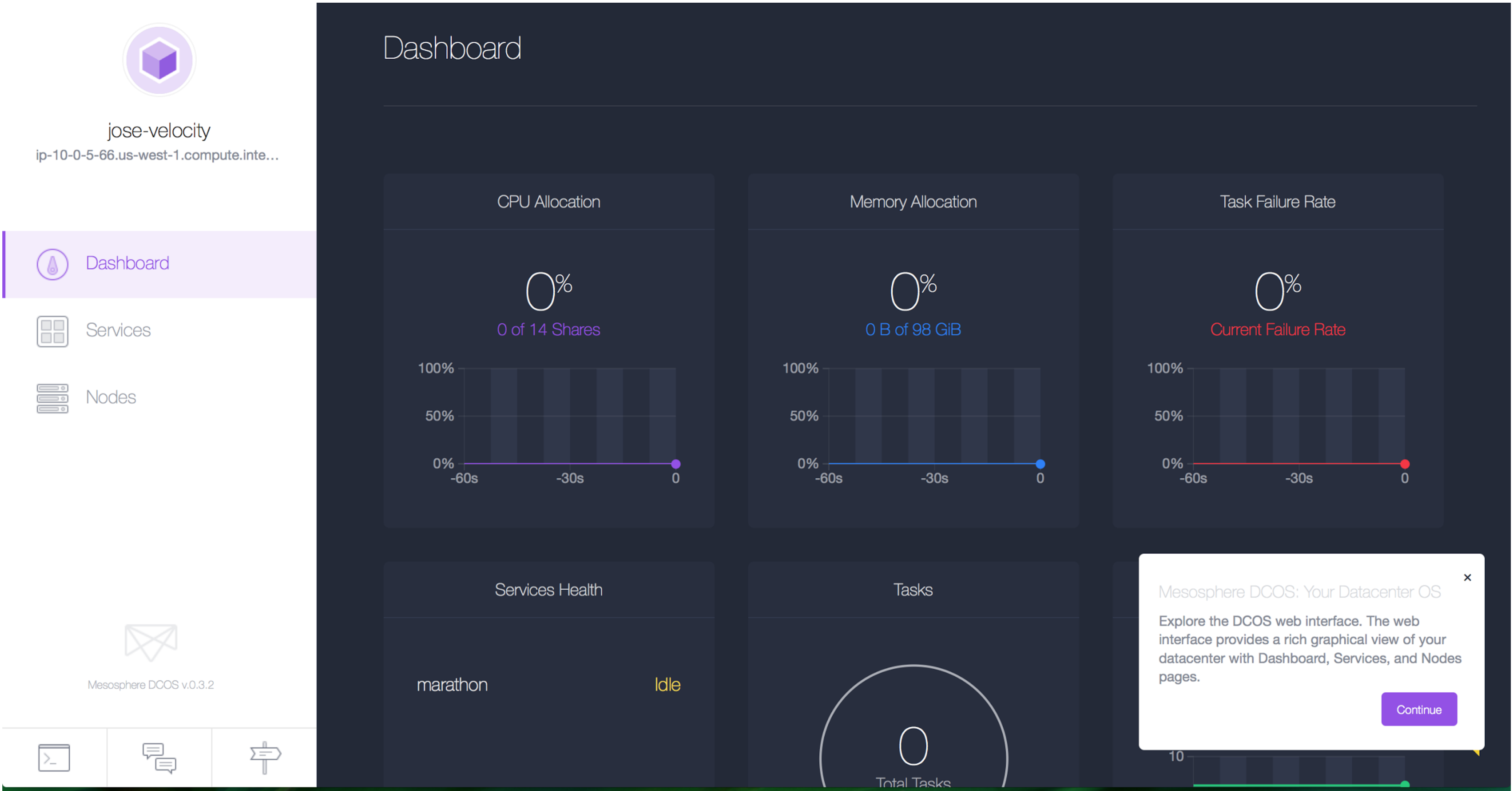


Demo'ing the DCOS

Get early access to the Mesosphere DCOS

Sign up at <http://mesosphere.com/product> and Mesosphere will send you an email with instructions

DCOS UI



Install and Configure the DCOS CLI

```
mkdir -p dcos && \  
cd dcos && \  
curl -O https://downloads.mesosphere.io/dcos-cli/install.sh && \  
bash ./install.sh . http://<dcos-hostname> && \  
source ./bin/env-setup
```

Install the Cassandra DCOS Service

```
dcos package install cassandra
```

Install Spark and extend the CLI

```
dcos package install spark
```

```
dcos spark --help
```

List all install package and running tasks

```
dcos package list-installed | jq '.[].name'
```

```
dcos tasks
```


Increase the number of instances

```
dcos package install helloworld
```

```
dcos marathon app update helloworld instances=5
```

<http://tinyurl.com/velocity-dcos>

Hands on with Mesos & Marathon

Copy USB data to local hard drive

```
cp -R mesos-usb ~/workspace/mesos-usb
```

Start VM

```
cd ~/workspace/mesos-usb  
vagrant box add mesos mesos.box  
vagrant up
```

Access the [local Mesos console](#)

Access the [local Marathon console](#)

Download the install script:

```
wget https://downloads.mesosphere.io/dcos-cli/install.sh
```


Create an empty directory and install into it:

```
mkdir dcos-cli
```

```
bash install.sh dcos-cli http://10.141.141.10:8080
```

Set OSS Mesos & Marathon configuration:

```
dcos config set core.mesos_master_url http://10.141.141.10:5050
```

```
dcos config set marathon.url http://10.141.141.10:8080
```

Thanks!

Come and talk to us!
P.S., we're hiring!

