MODERN CONTAINER ORCHESTRATION

(WITHOUT BREAKING THE BANK)

MESOSPHERE

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WAIT, WHO ARE YOU?

Engineer at Mesosphere

DC/OS Contributor

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RUNNING NON-TRIVIAL APPLICATIONS AT SCALE IS *REALLY* COMPLICATED

A non-trivial app might well need all the following:

- multiple app servers
- load balancing
- message queues
- HA datastores
- analytics

Bring cluster computing to non-experts: One of the most exciting things about datacenter technology is that it is increasingly being applied to "big data" problems in the sciences. With cloud computing, scientists can readily acquire the hardware to run large parallel computations; the main thing missing is the right software.

These non-expert cluster users have very different needs from those in large corporations: they are not backed by an operations team that will configure their systems and tune their programs. Instead, they need cluster software that configures itself correctly out of the box, rarely fails, and can be debugged without intimate knowledge of several interacting distributed systems. These are difficult but worthwhile challenges for the community to pursue.

-The Datacenter Needs an Operating System

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APACHE MESOS

THE KERNEL OF THE DC/OS

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APACHE MESOS

THE BIRTH OF MESOS

Spring 2009

CS262B

Ben Hindman, Andy Konwinski and Matei Zaharia create “Nexus” as their CS262B class project.

March 2010

TWITTER TECH TALK

The grad students working on Mesos give a tech talk at Twitter.

September 2010

MESOS PUBLISHED

Mesos: A Platform for Fine-Grained Resource Sharing in the Data Center is published as a technical report.

December 2010

APACHE INCUBATION

Mesos enters the Apache Incubator.

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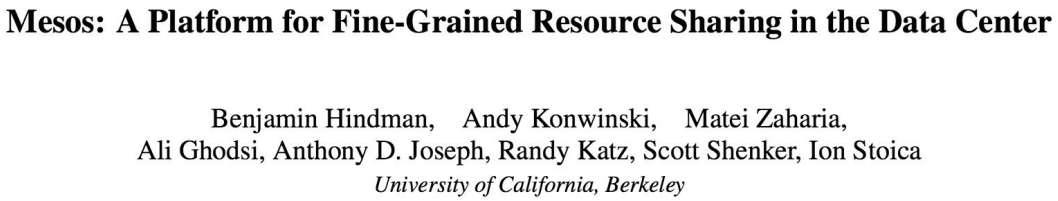
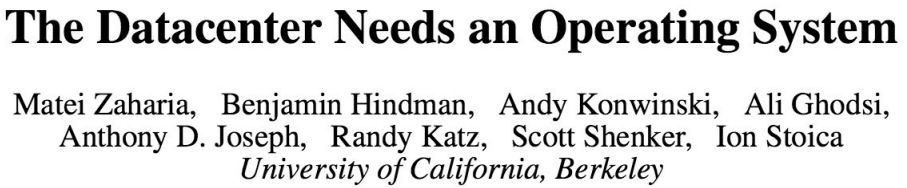
APACHE MESOS

GRAD STUDENTS LEARNED HOW TO SHARE



Mesos: A Platform for Fine-Grained Resource Sharing in the Data Center

Benjamin Hindman, Andy Konwinski, Matei Zaharia,
Ali Ghodsi, Anthony D. Joseph, Randy Katz, Scott Shenker, Ion Stoica
University of California, Berkeley



The Datacenter Needs an Operating System

Matei Zaharia, Benjamin Hindman, Andy Konwinski, Ali Ghodsi,
Anthony D. Joseph, Randy Katz, Scott Shenker, Ion Stoica
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Sharing resources between batch processing frameworks:

- Hadoop
- MPI
- Spark

What does an operating system provide?

- Resource management
- Programming abstractions
- Security
- Monitoring, debugging, logging

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APACHE MESOS

CLUSTERING YOUR RESOURCES FOR YOU

Apache Mesos is a **cluster resource manager**.

It handles:

- **Aggregating resources** and **offering them to schedulers**
- **Launching tasks** (i.e. processes) on those resources
- **Communicating the state of those tasks** back to schedulers
- Tasks can be:
  - Long running services
  - Ephemeral / batch jobs

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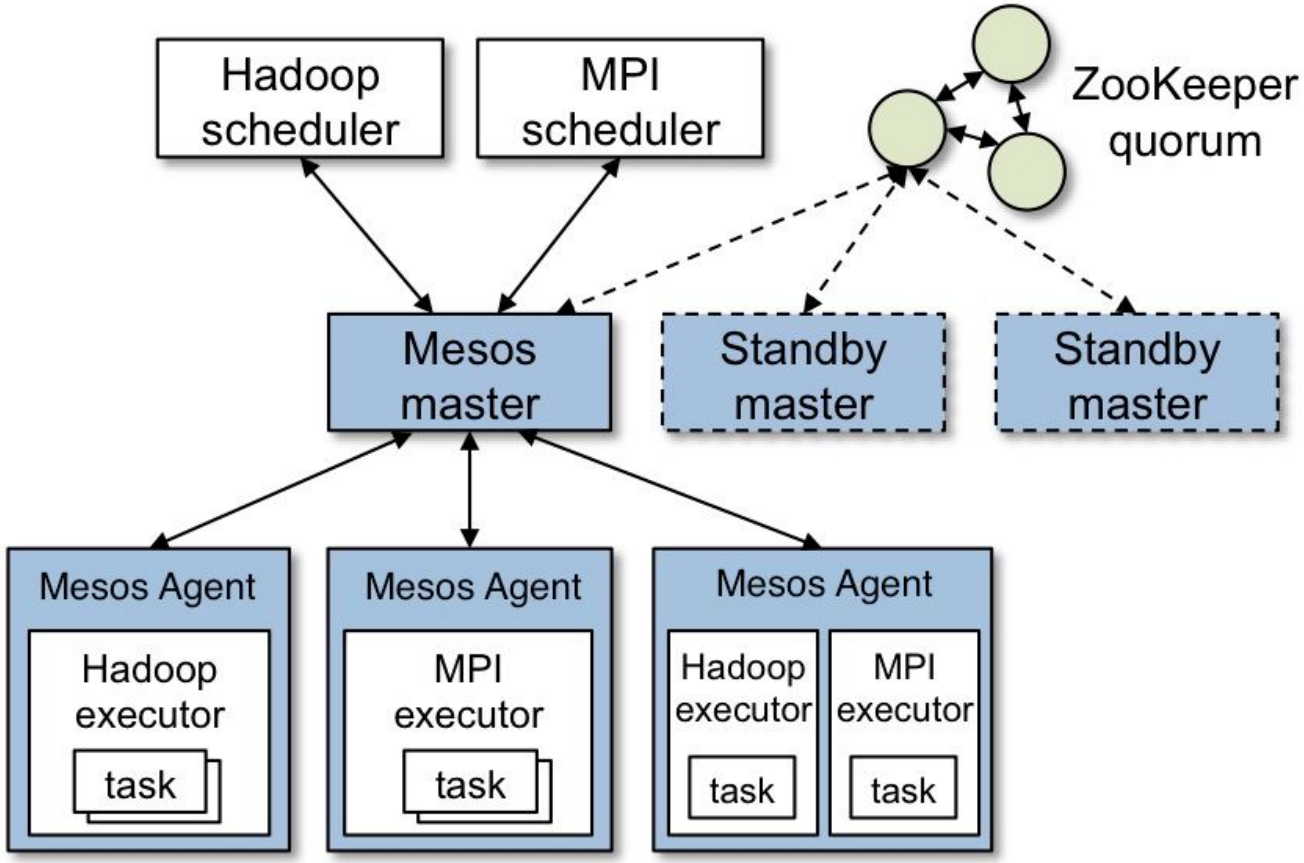
APACHE MESOS

SCHEDULERS AND TASKS



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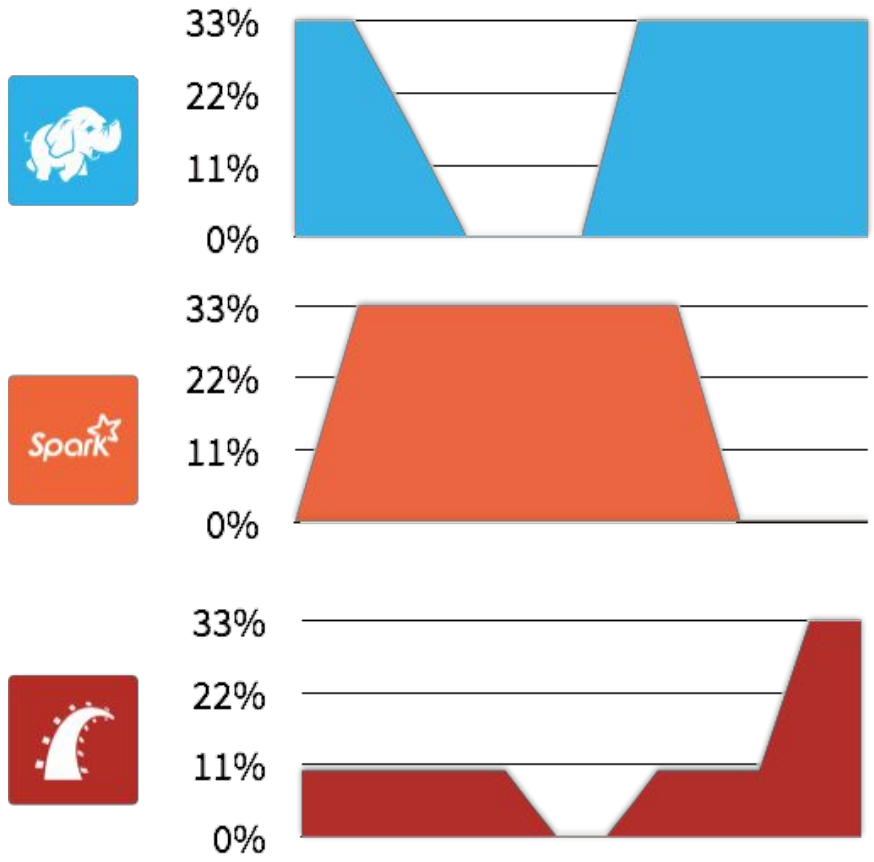
SHARING RESOURCES FOR EFFICIENCY

A naive approach to handling varied app requirements: **static partitioning**.

This can cope with heterogeneity, but is very expensive.



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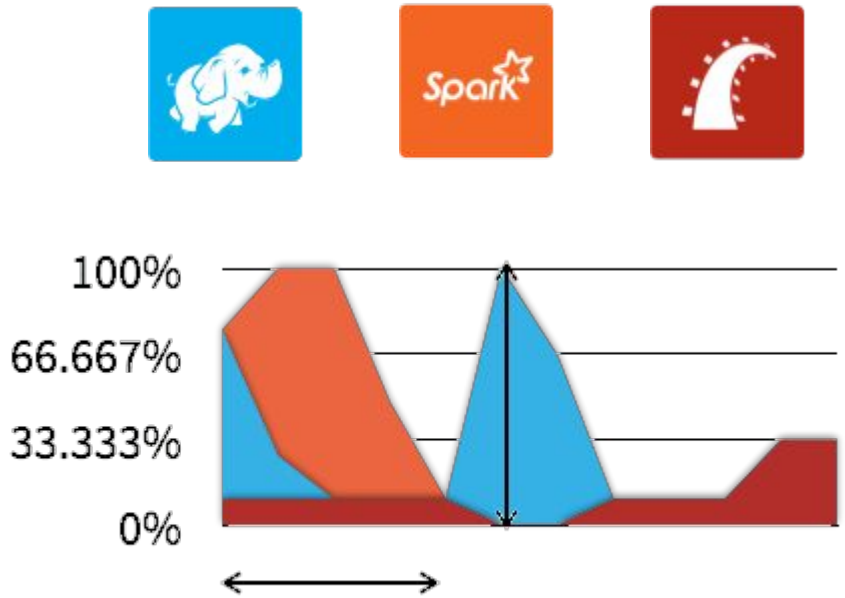
SHARING RESOURCES FOR EFFICIENCY

Multiple frameworks can use the same cluster resources, with their share adjusting dynamically.



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DC/OS IN ACTION

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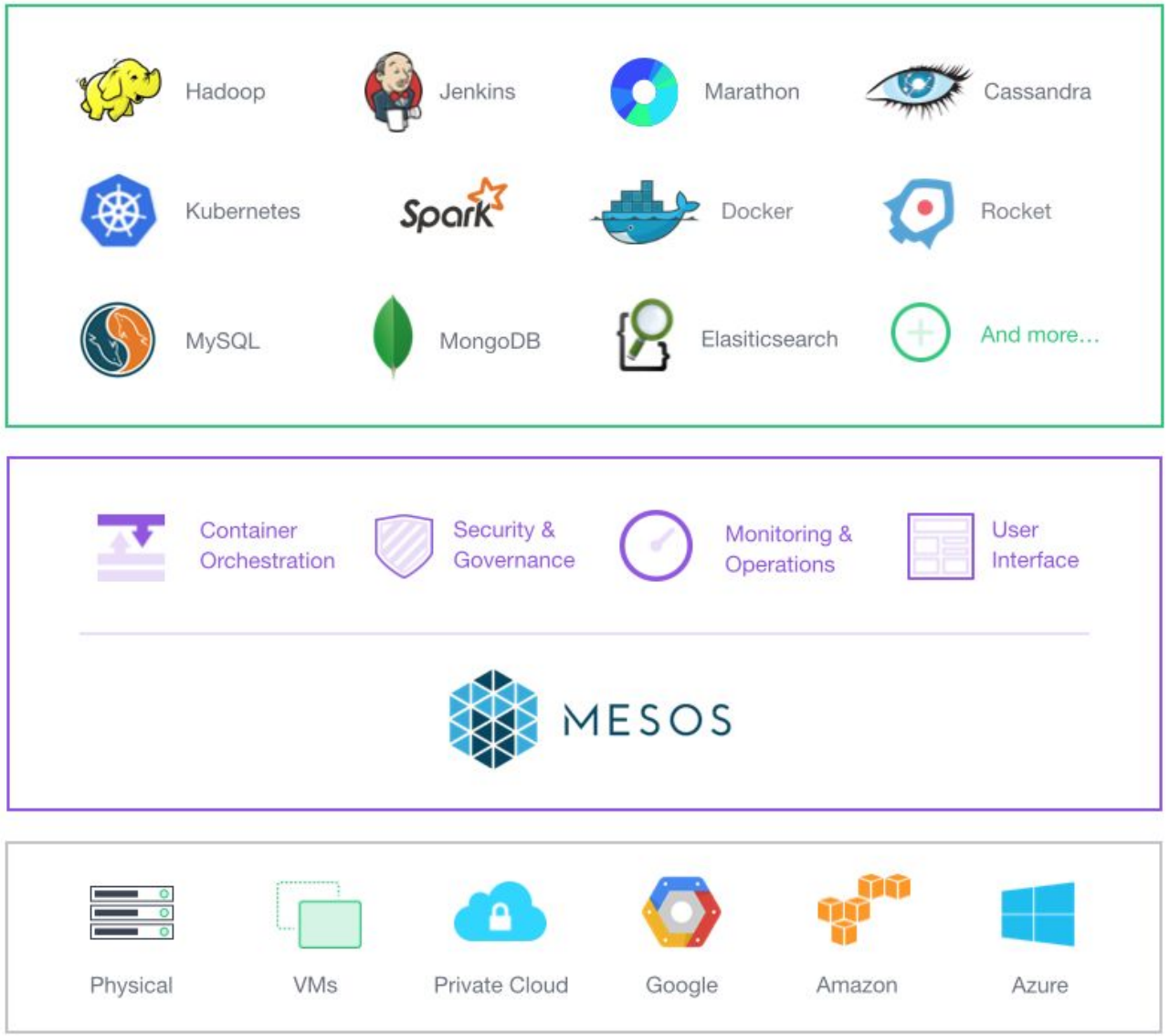
THE DC/OS "STACK"



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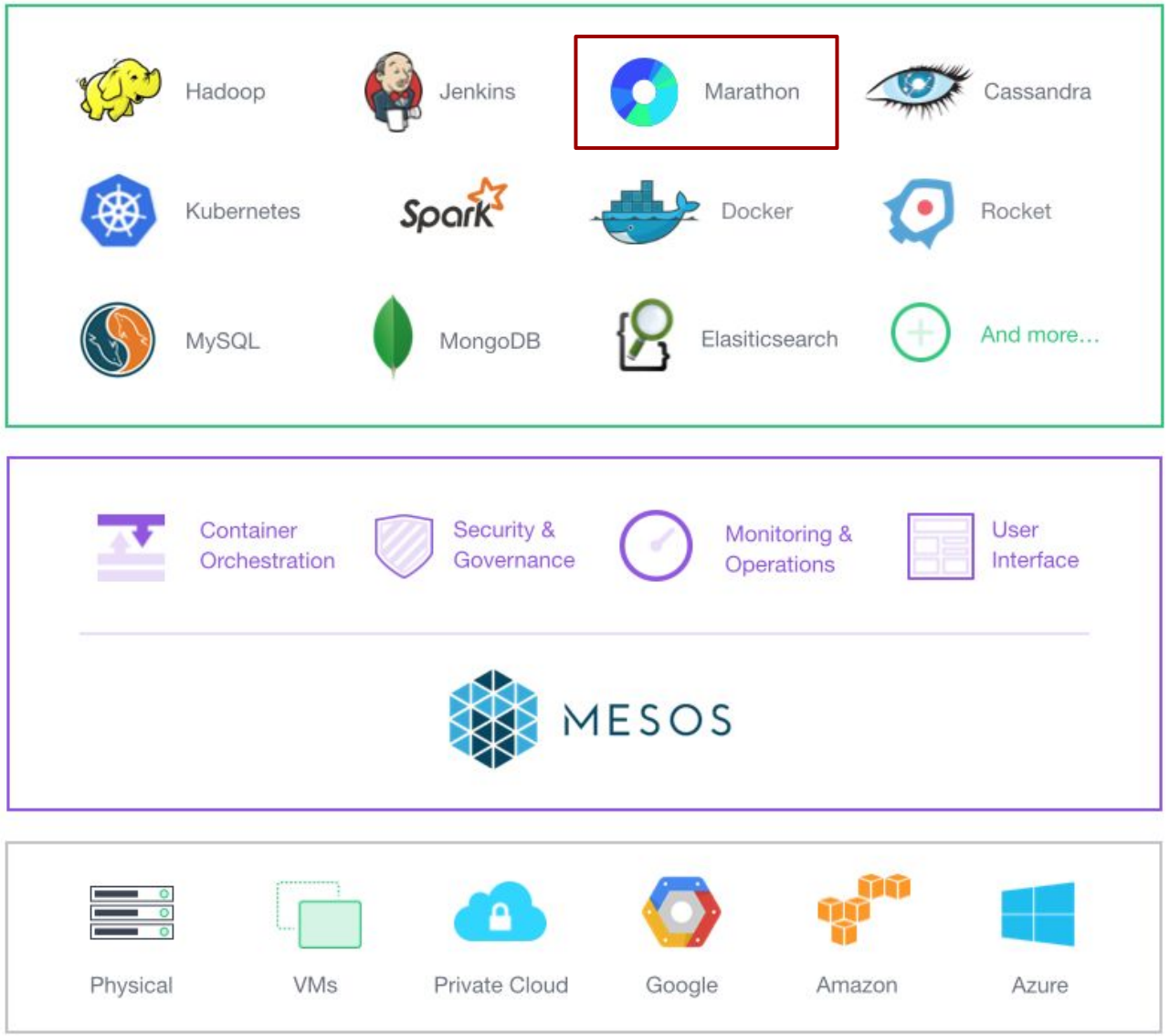

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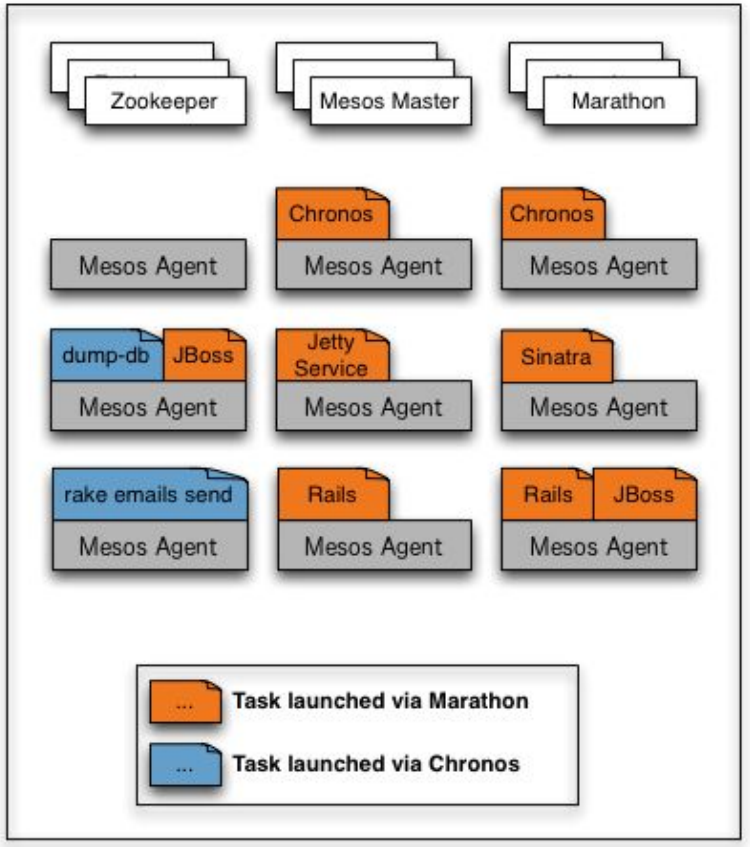
DC/OS, MARATHON, AND LONG-RUNNING SERVICES

Marathon is:

- a scheduler for long-running services
- a core component of DC/OS
- a meta-scheduler



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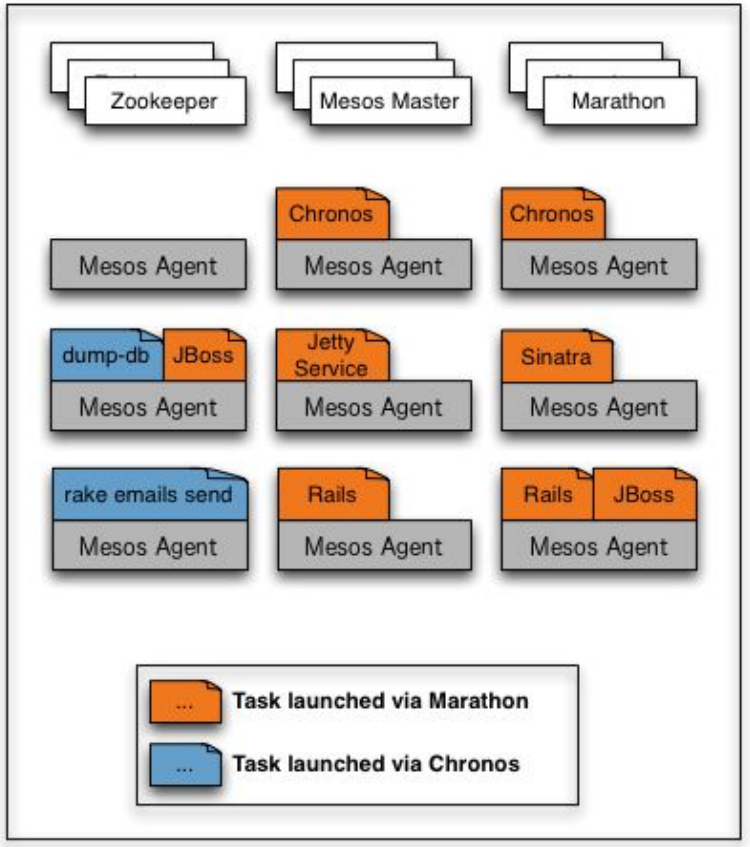
DC/OS, MARATHON, AND LONG-RUNNING SERVICES

Marathon provides:

- monitoring and health-checks
- resilience for your services
- upgrades and deployments



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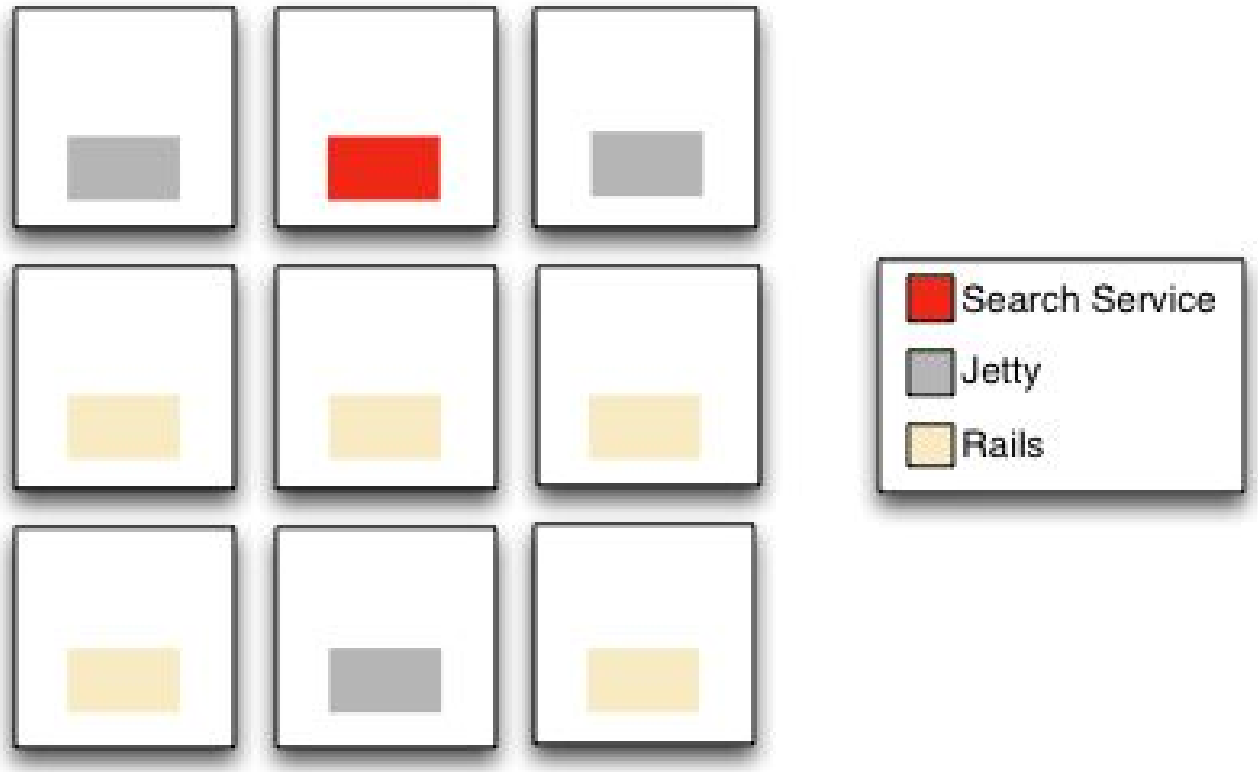
RESILIENCE IN ACTION



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RESILIENCE IN ACTION

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RESILIENCE IN ACTION

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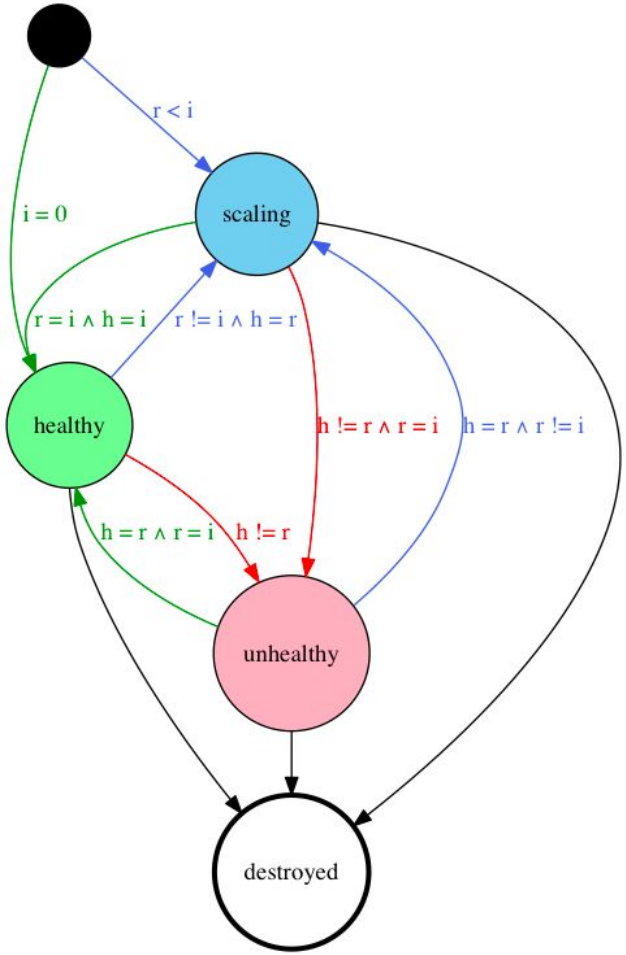
THE ANATOMY OF A DEPLOYMENT

A deployment:

- EITHER deploys a new application
  OR replaces an existing application
  OR changes the number of running instances
- can be rolled back if unsuccesful
- can trigger more deployments



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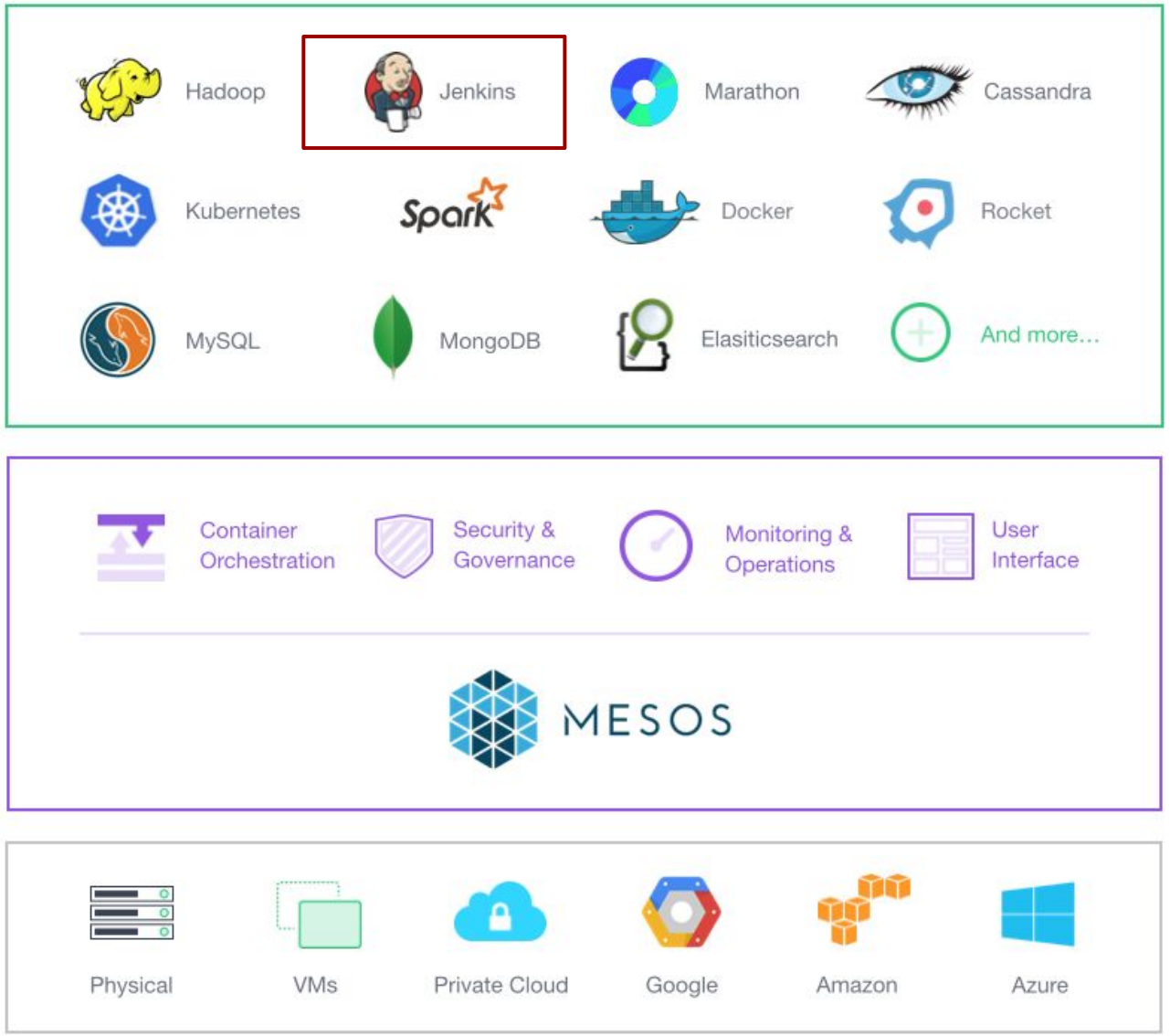

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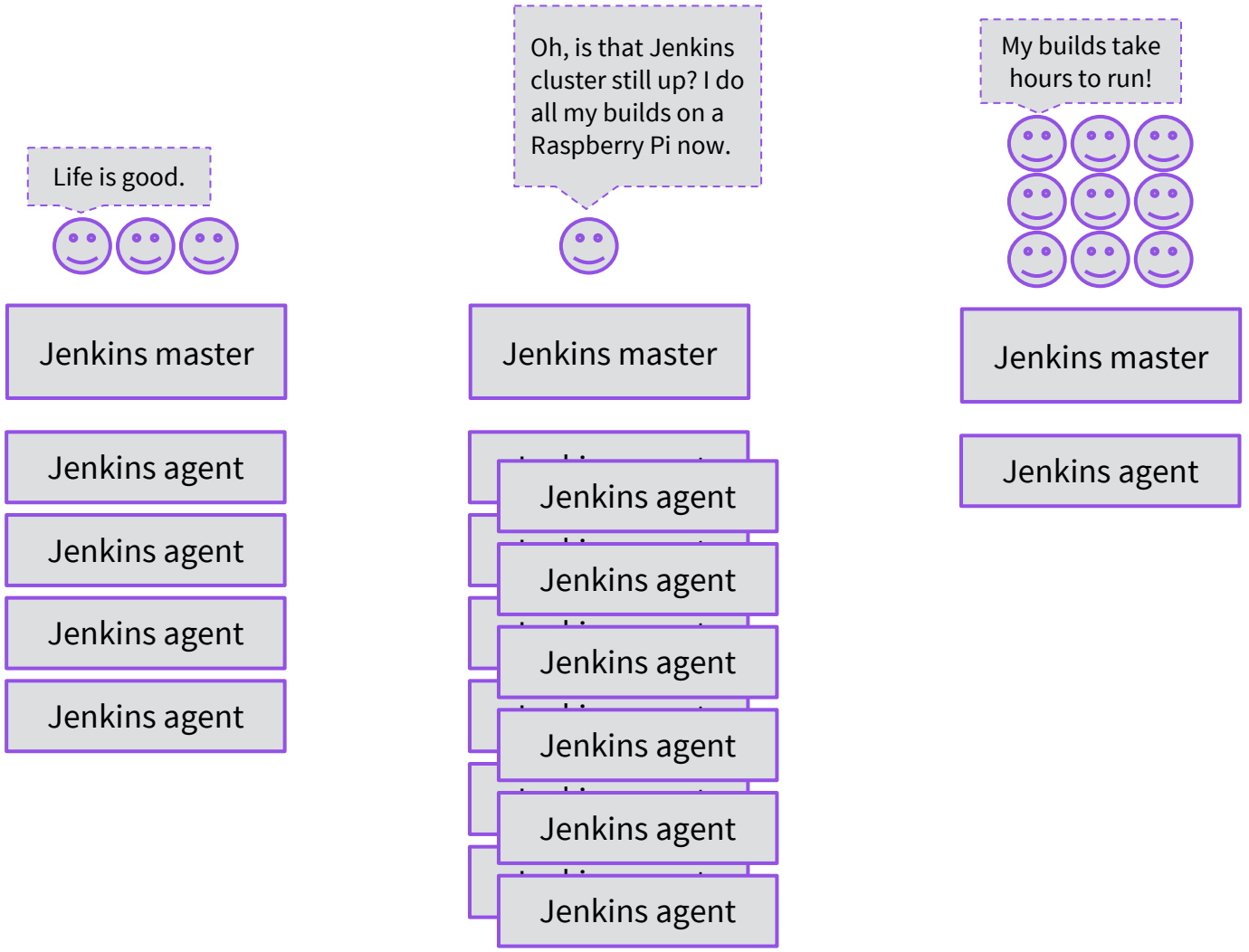
THE OLD WORLD



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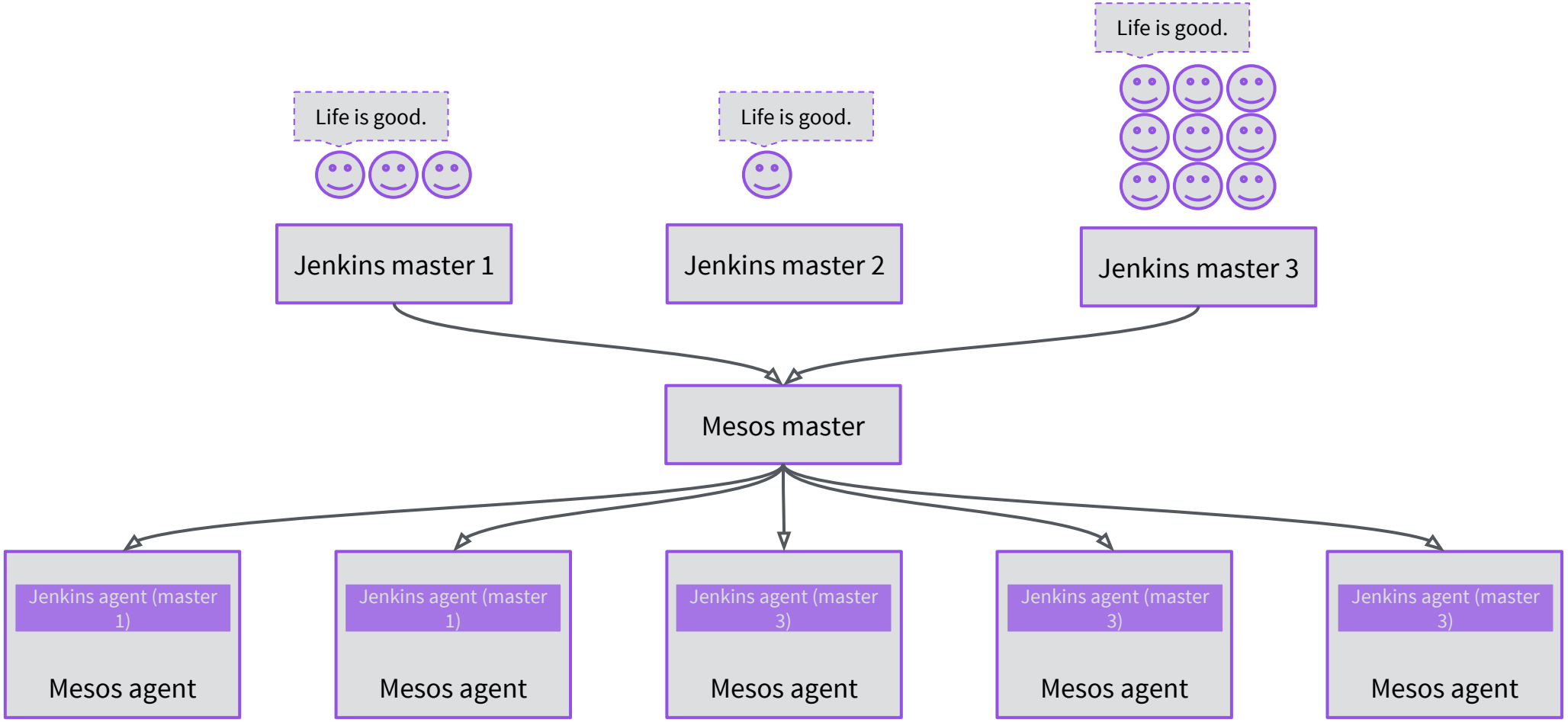
JUST USE WHAT YOU NEED, WHEN YOU NEED IT AND SHARE THE ~~LOVE~~ RESOURCES



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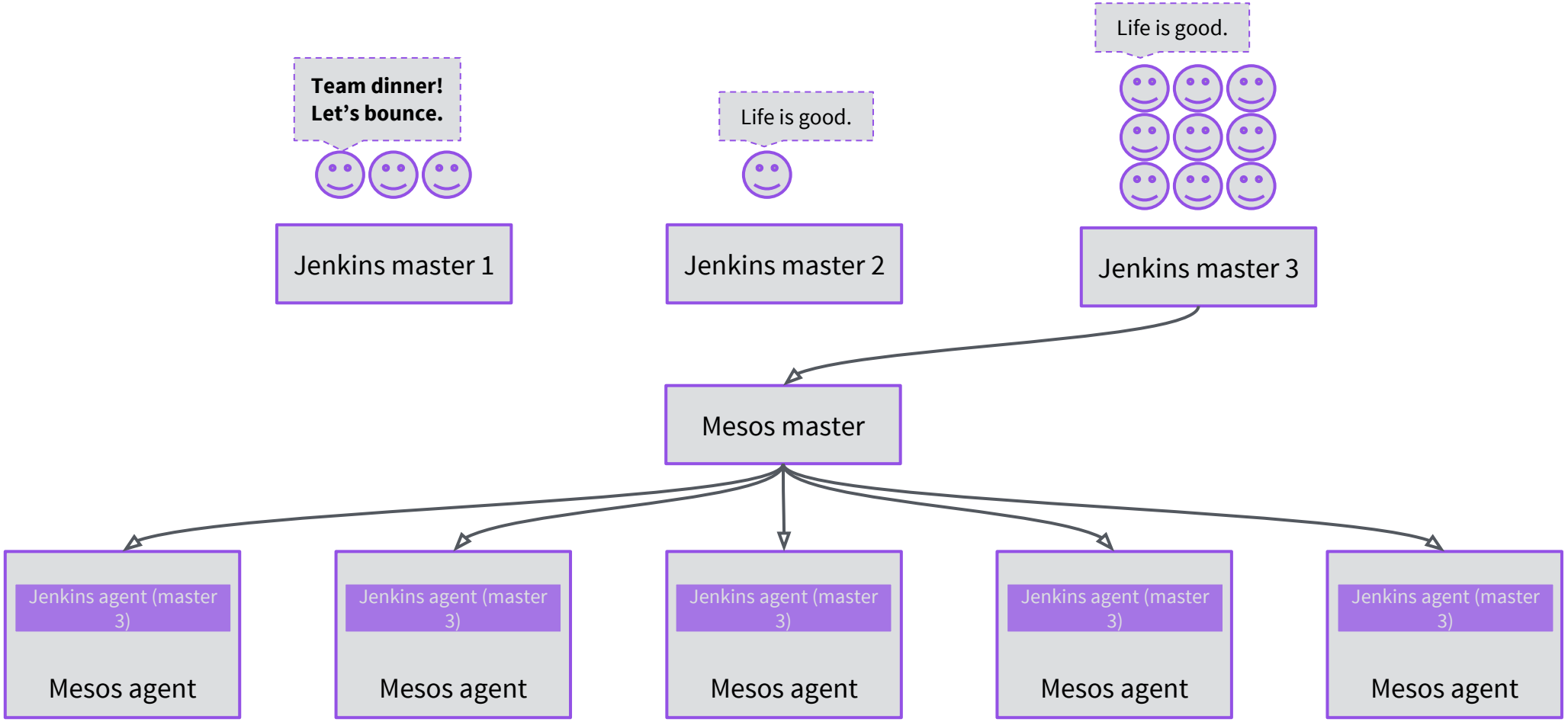

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LIVE DEMO

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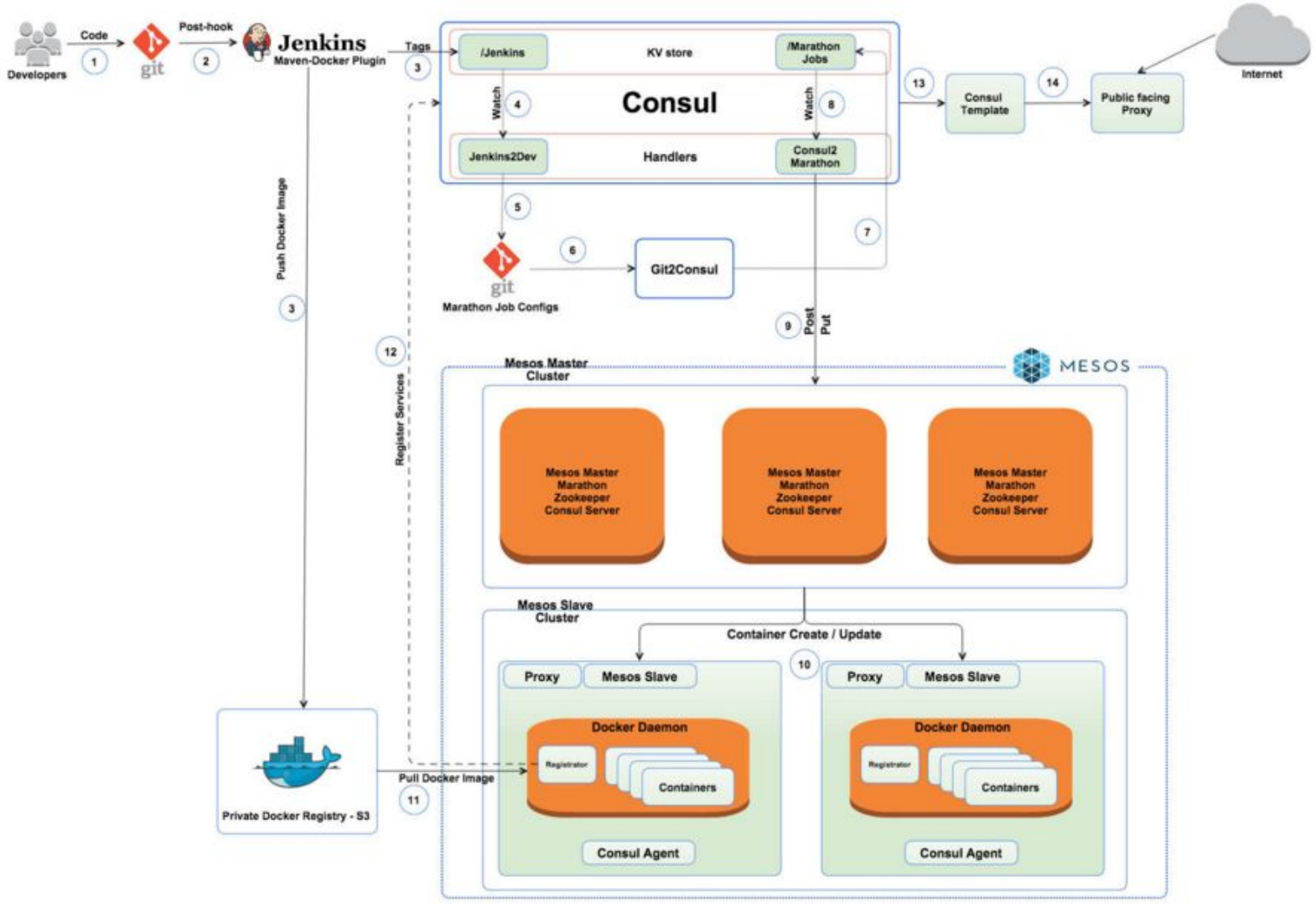
A MESOS CLUSTER IN THE WILD



A general diagram deployment workflow for internal SAMI developers. Credit: Samsung

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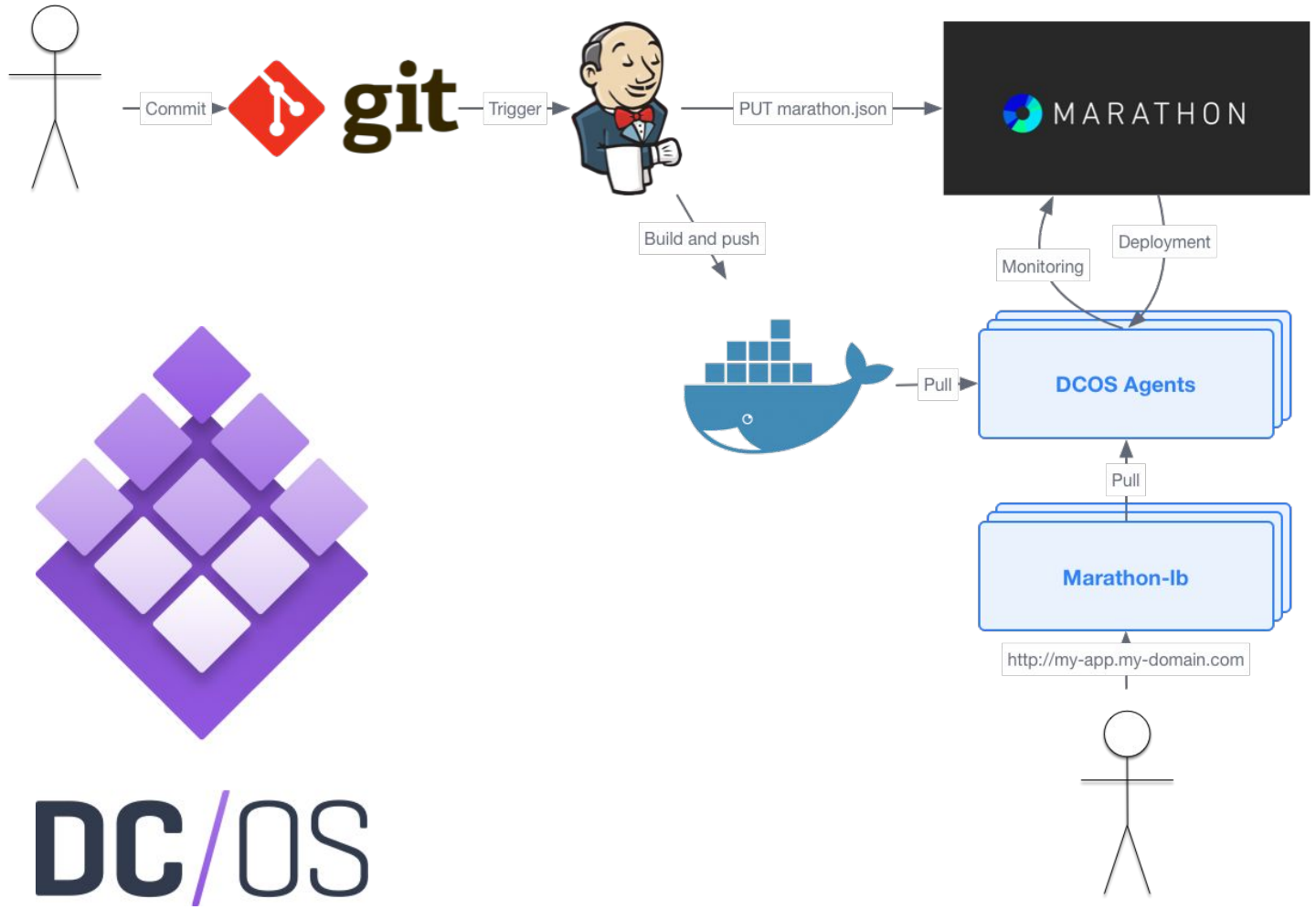
CI/CD WITH JENKINS AND MARATHON IN DC/OS



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QUESTIONS?

DC/OS docs:
http://dcos.io

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THANK YOU!

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