

M E S O S
Elastically
Scalable
Operations,
Simplified.

Adam Bordelon and Niklas Nielsen
ApacheCon 2014



Launch an Apache Mesos Cluster in 3 2 1

3 Choose a cluster size

6 instances

12 vCPUs
45 GiB memory

\$1.44 per hour¹

Perfect for trying out Apache Mesos

18 instances

36 vCPUs
135 GiB memory

\$4.32 per hour¹

Unleash the data-cruncher

2 Enter your credentials

1 Choose where to receive notifications

Launch

<https://elastic.mesosphere.io>

We are Mesospheroids



mesosphere





Our Mesos story



Our Mesos story

- Mesos is a distributed system to build and run distributed systems.
- Mesos provides fine-grained resource sharing and isolation.
- Mesos enables high-availability and fault-tolerance for your cluster.



Our Mesos story



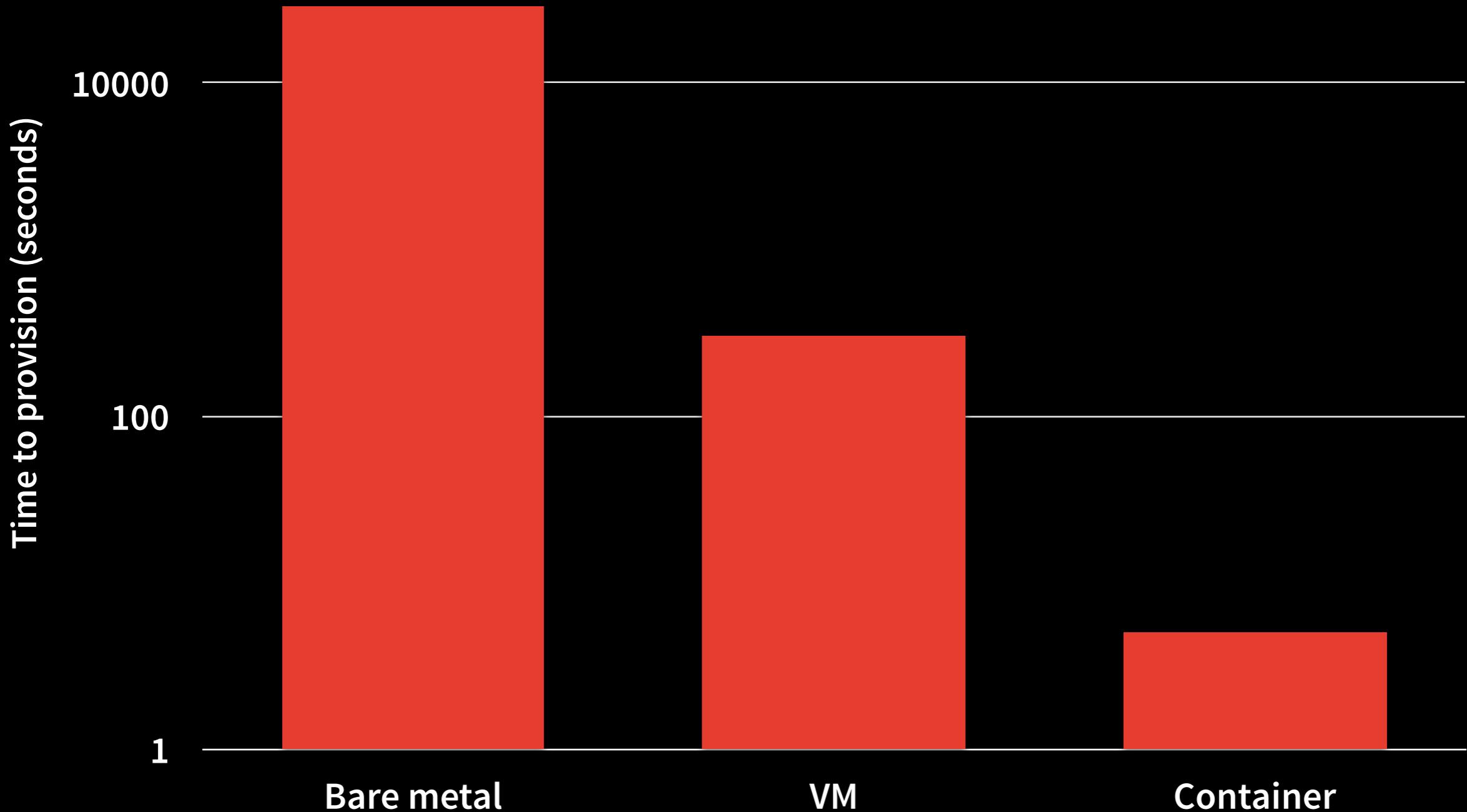
Wait a second, I have seen this before



Cluster scheduling is the secret sauce of the biggest players



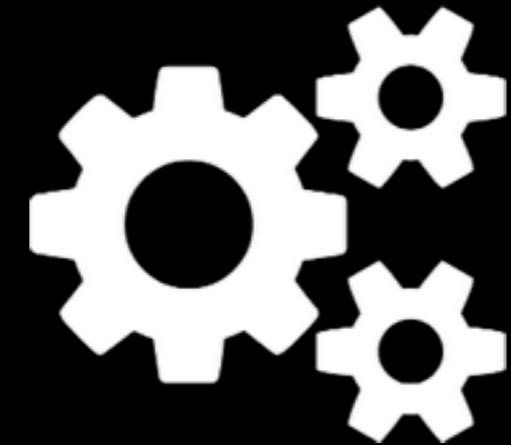
Response times and overhead are significantly different



Inspired by Tomas Barton's Mesos talk at InstallFest in Prague

Where will you be when you get paged?



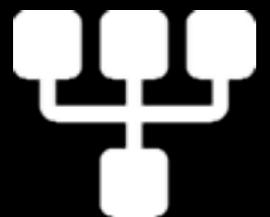
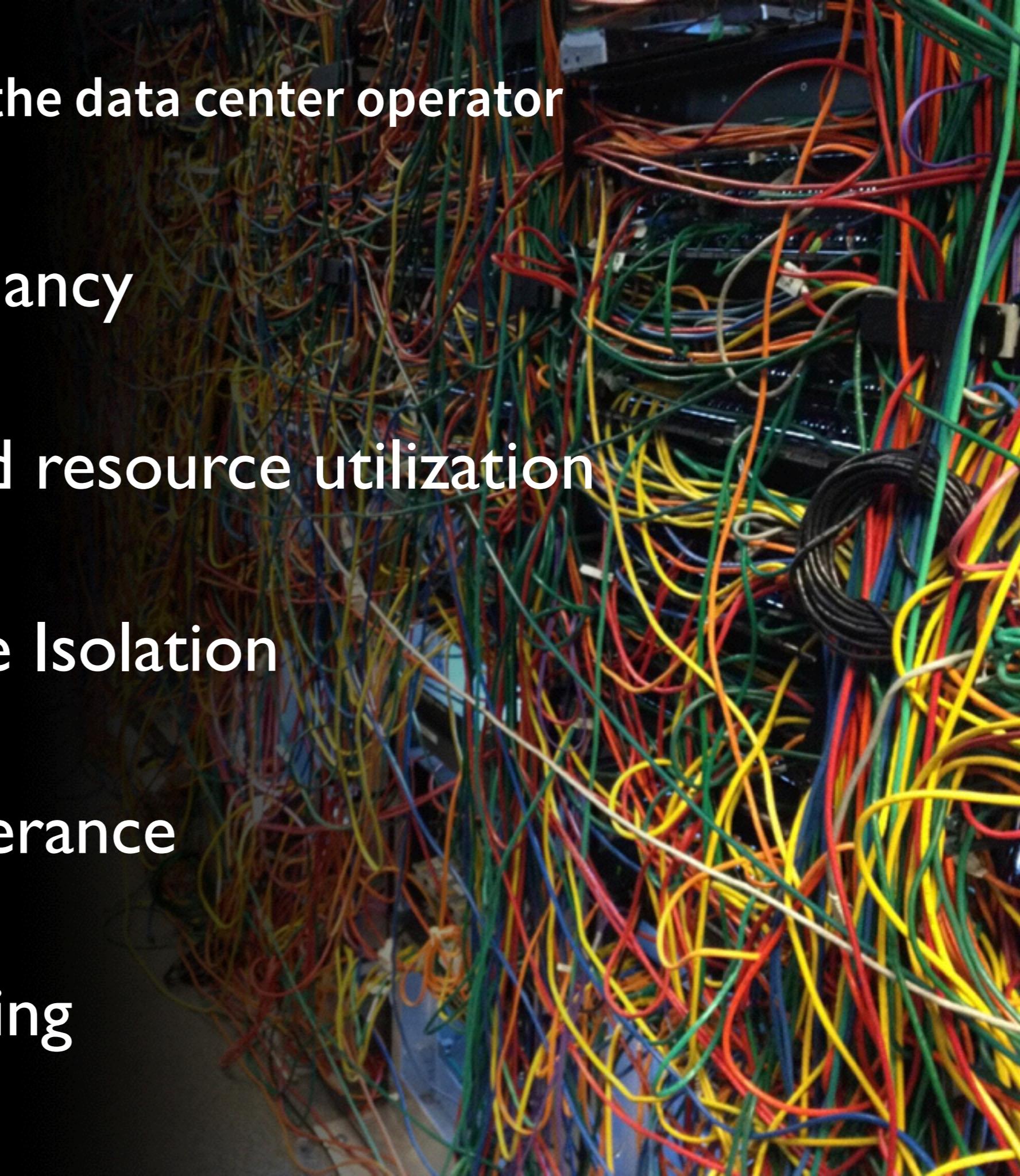


The Mesos Approach

*We wanted people to be able to program
for the datacenter just like they program
for their laptop*

Benjamin Hindman, Apache Mesos PMC Chair

Make life easier for the data center operator



Multi-tenancy



Improved resource utilization



Resource Isolation

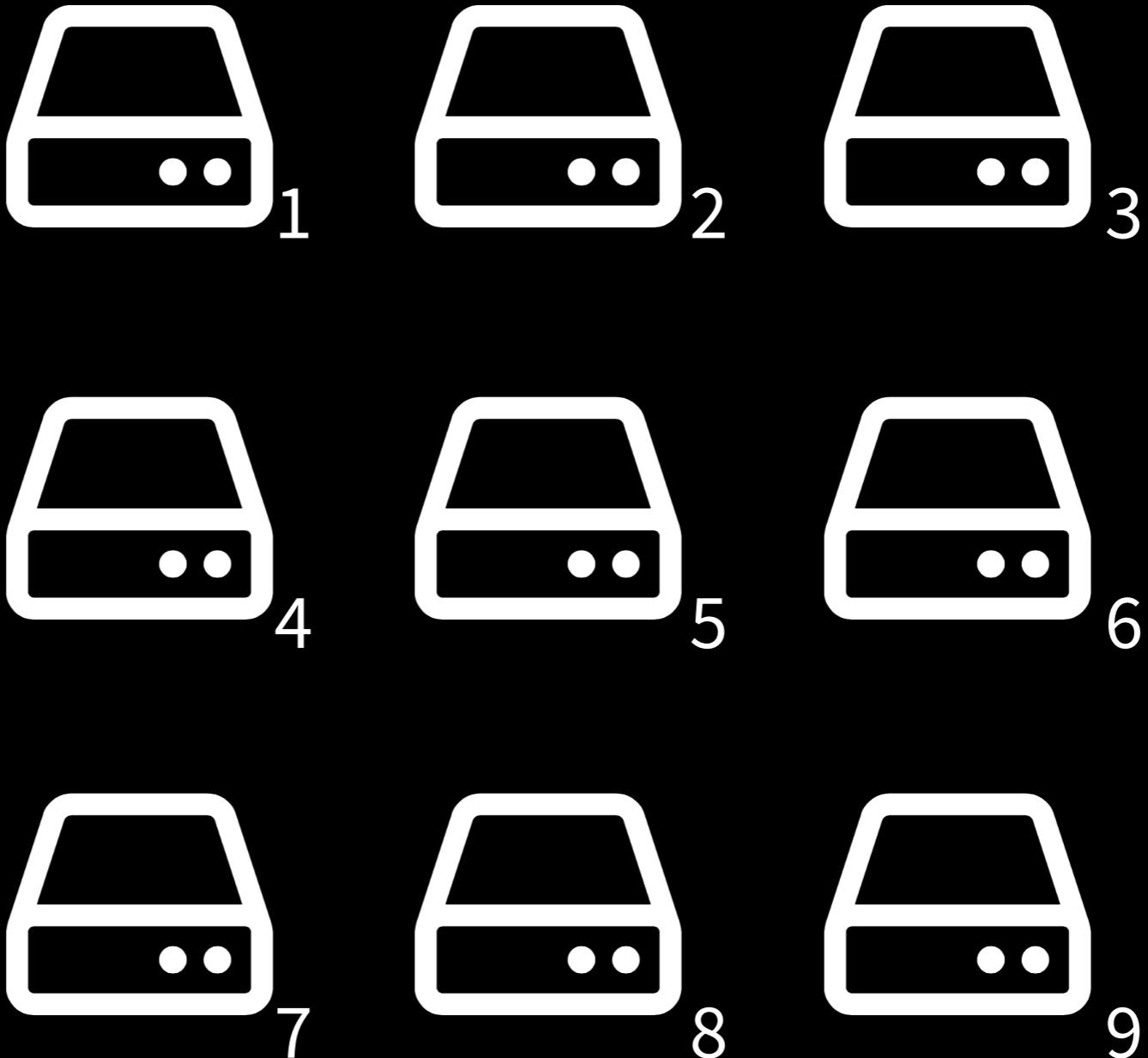


Fault-tolerance



Easy scaling

This is your data center



This is your data center with apps. Any questions?



http://www.microsoft.com/windows/products/winfamily/default.mspx

Internet Explorer Home... Microsoft Corporation United States Change | All Microsoft Sites

Windows Products Buy Downloads Help and How-to

Windows Internet Explorer

IE8 -- Choose a CPU to run on

Which CPU do you want to use?

CPU 1 CPU 3
 CPU 2 CPU 4

OK **Cancel**

Plant a tree in the carbon grove
Internet Explorer has partnered with a carbon reduction reminder service to help increase awareness around one of Earth's most precious resources. Browse three endangered forests and plant your own virtual tree while learning how to become a better steward of the environment.

- Visit www.carbongrove.com, take a quiz on reducing your carbon footprint, and then plant your own tree!
- Share the site with others so that together we can plant the earth positively.

Get the Quick Reference Guide
View or download this guide to learn quick keyboard shortcuts for Internet Explorer 7.

More links

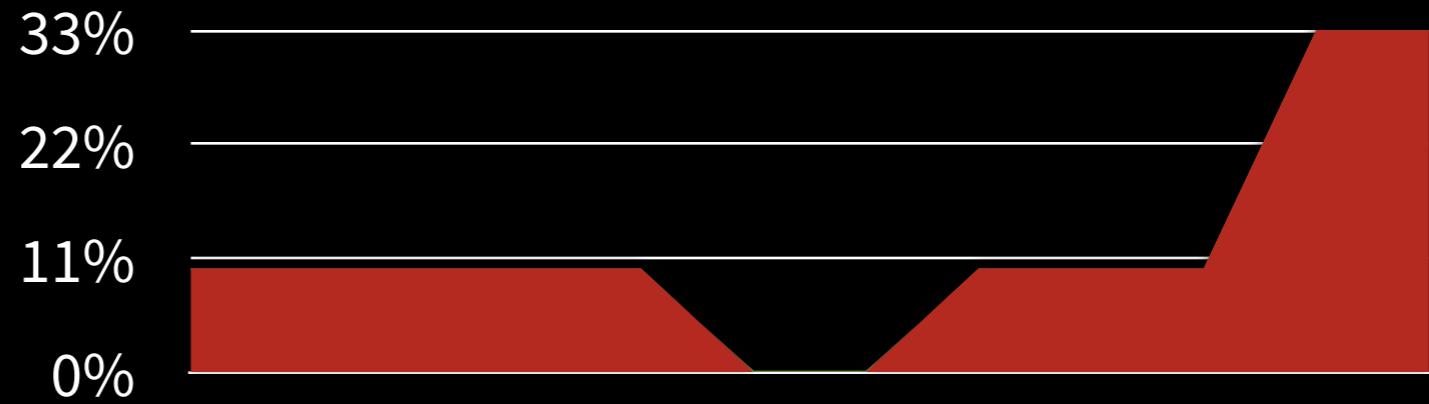
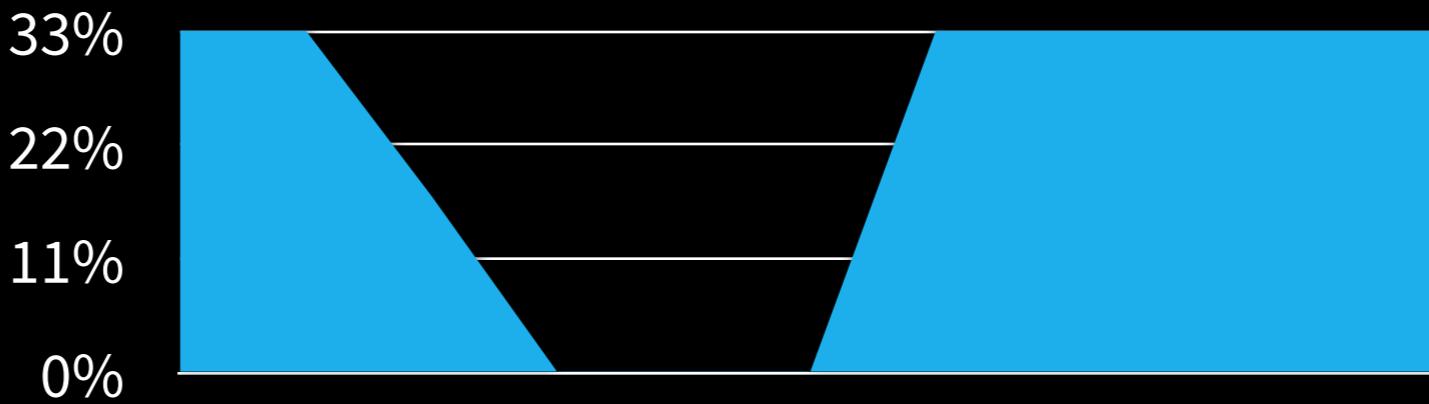
- Internet Explorer 8 Beta 2
- Learn more about Internet Explorer 8 Beta 2.
- Checklist

Get Office 2007 direct from Microsoft

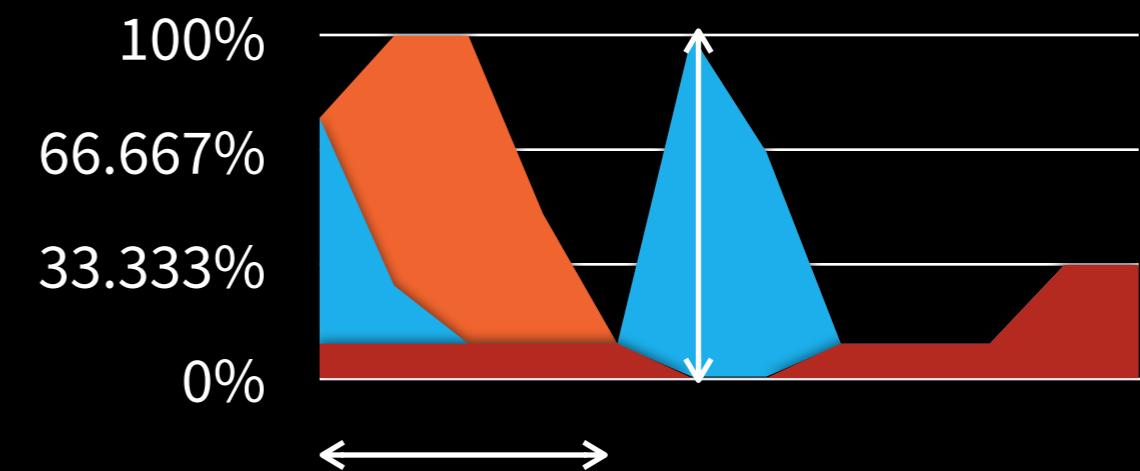
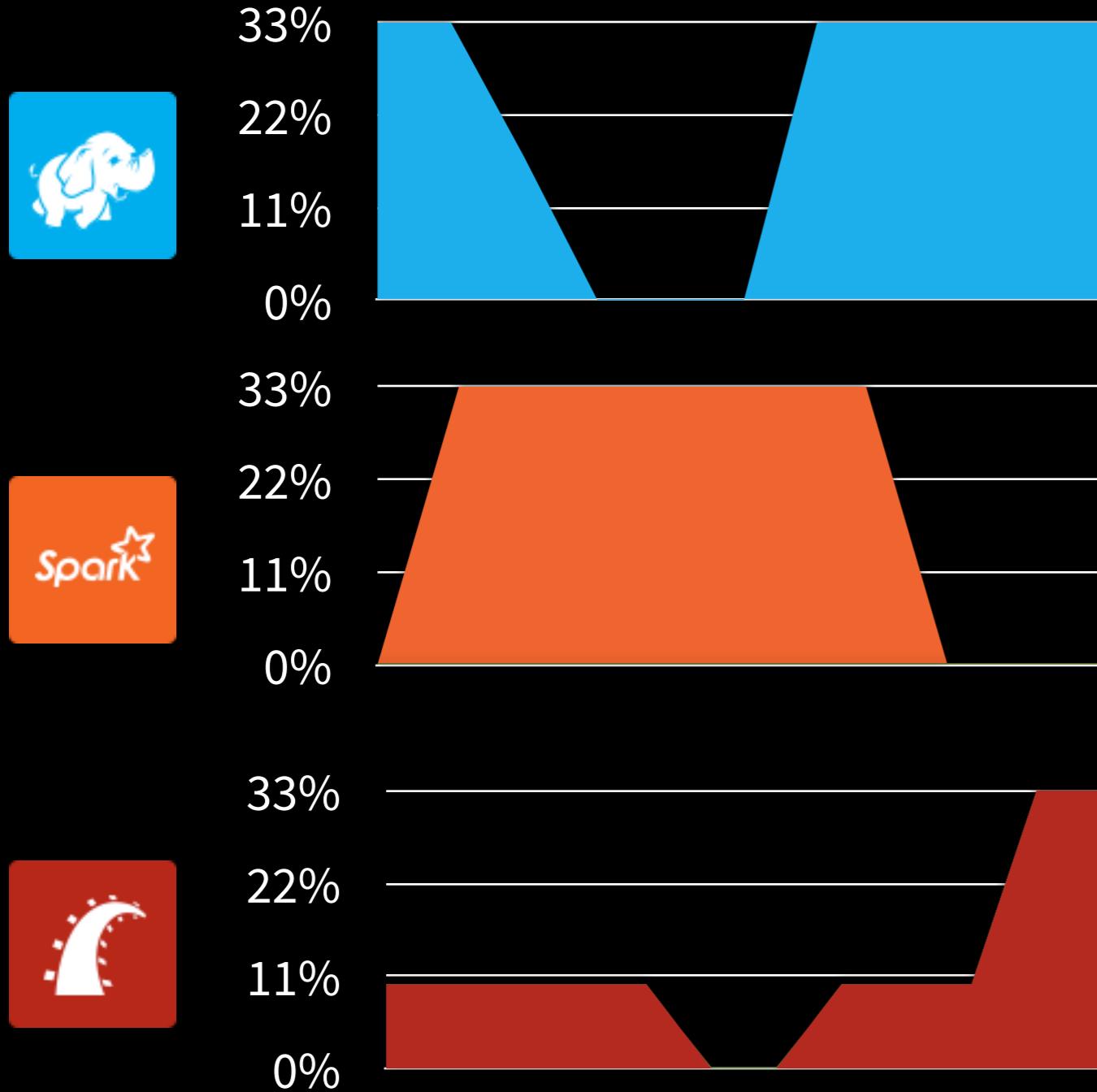
Buy it now →

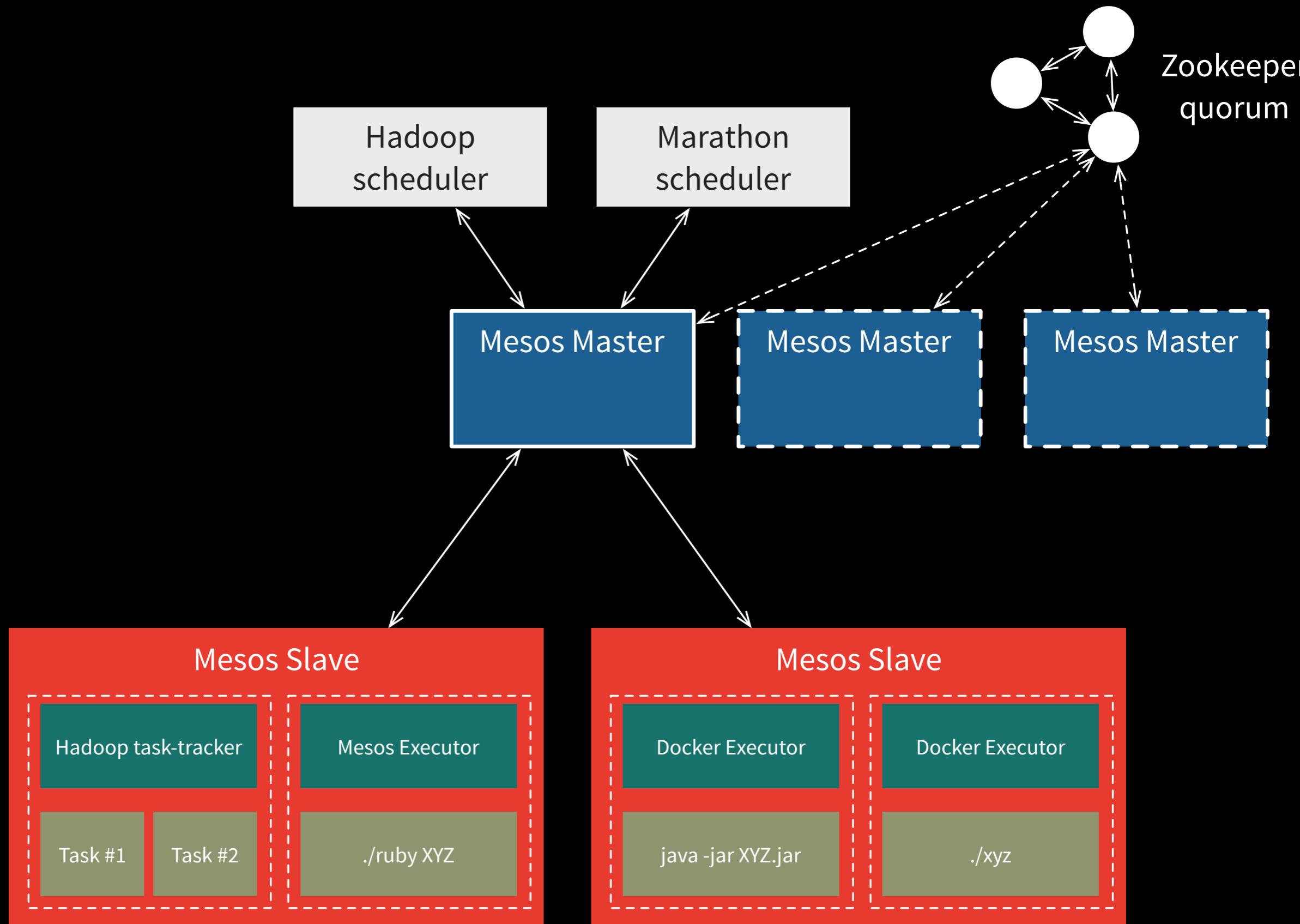
Office Home and Student 2007
Retail price: \$49.99

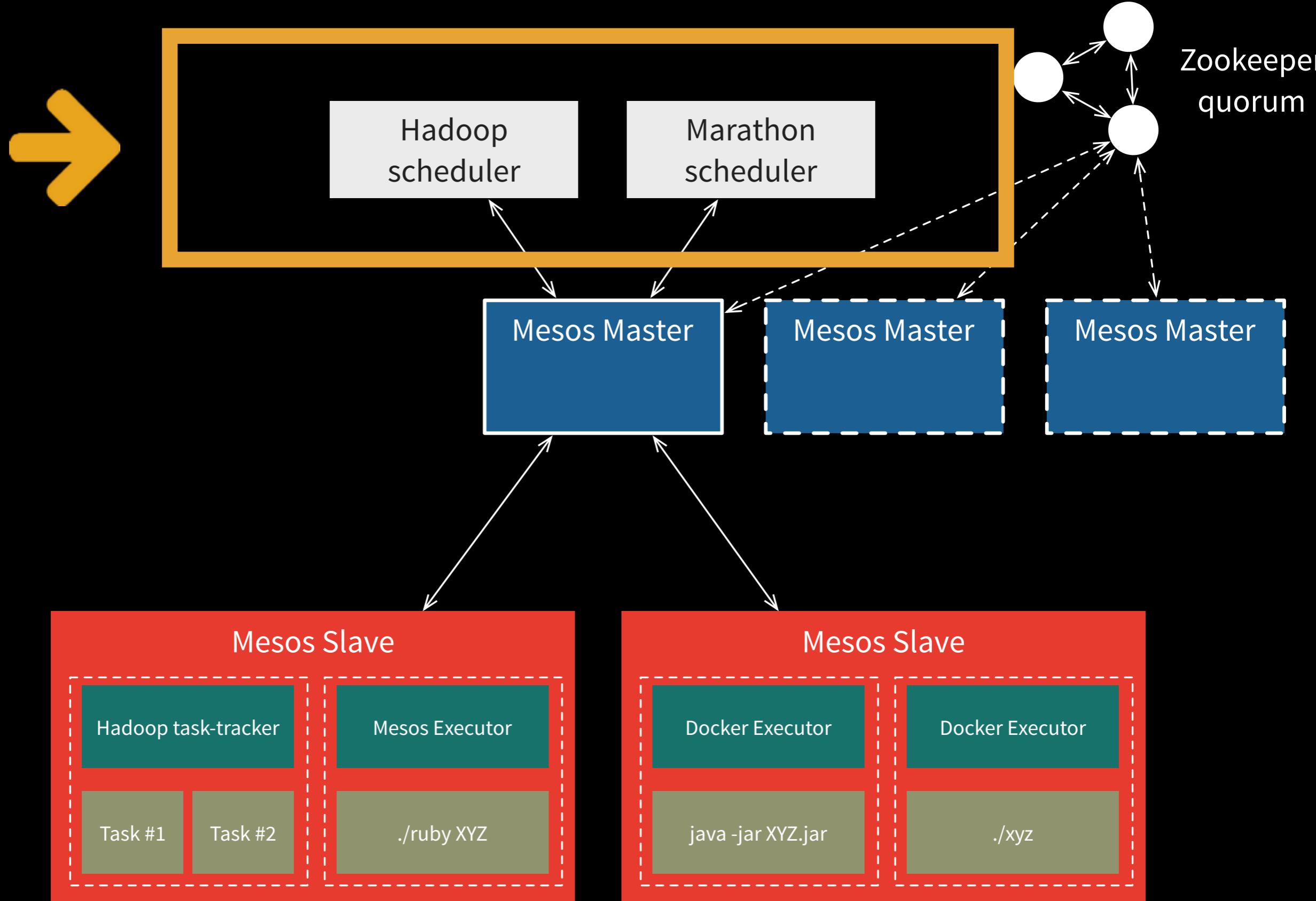
Not sharing wastes resource

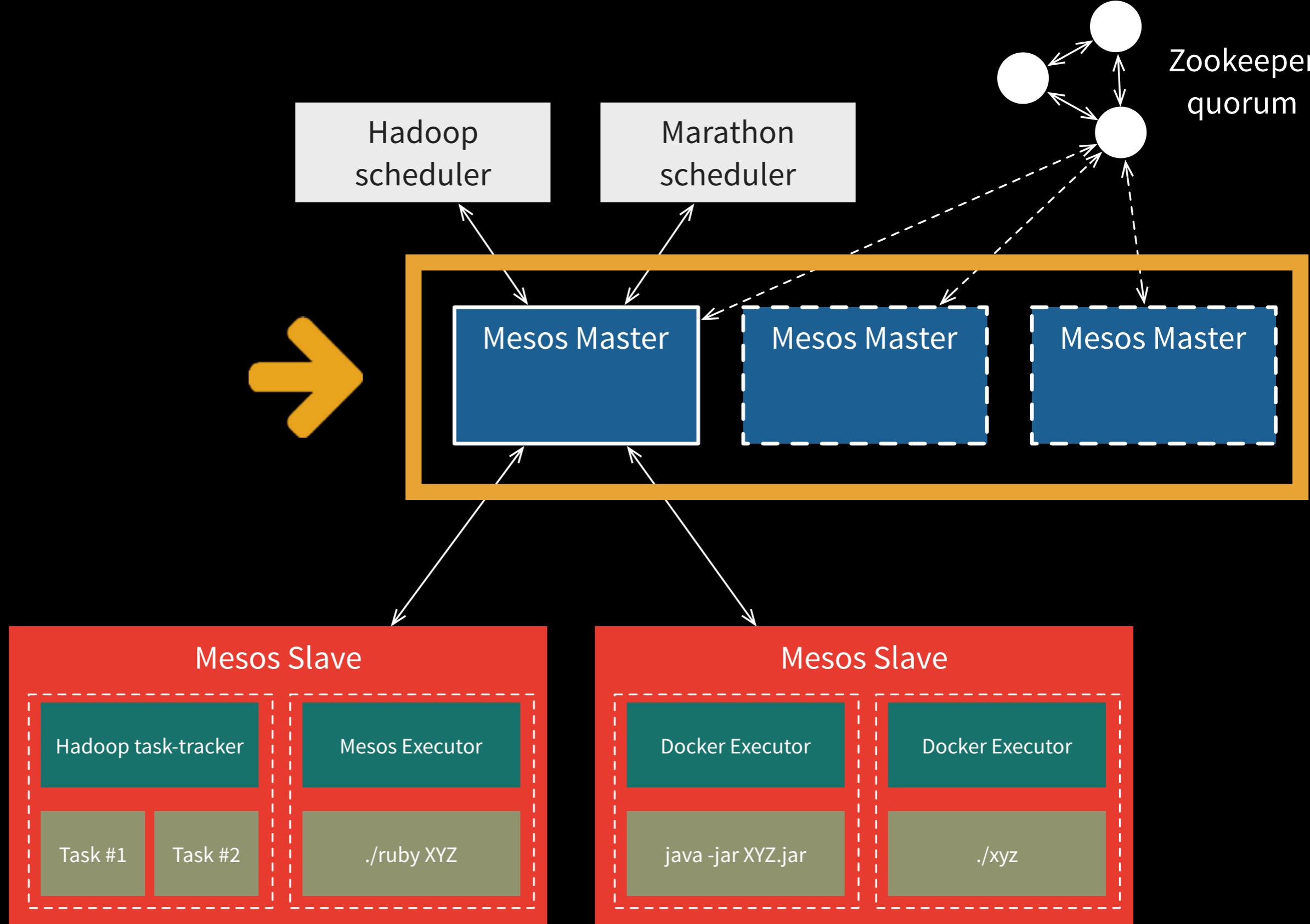


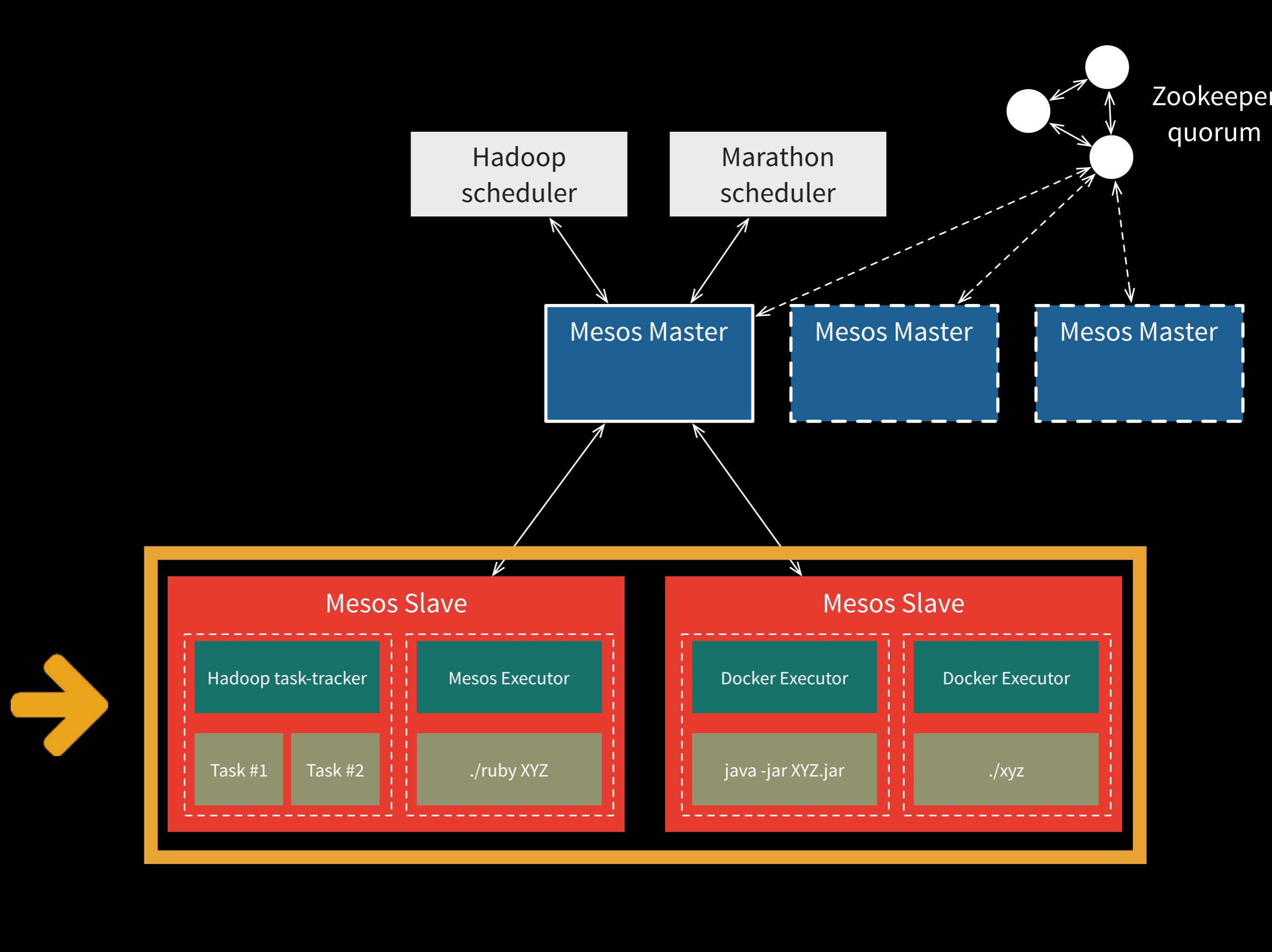
Resource sharing increases throughput and utilization



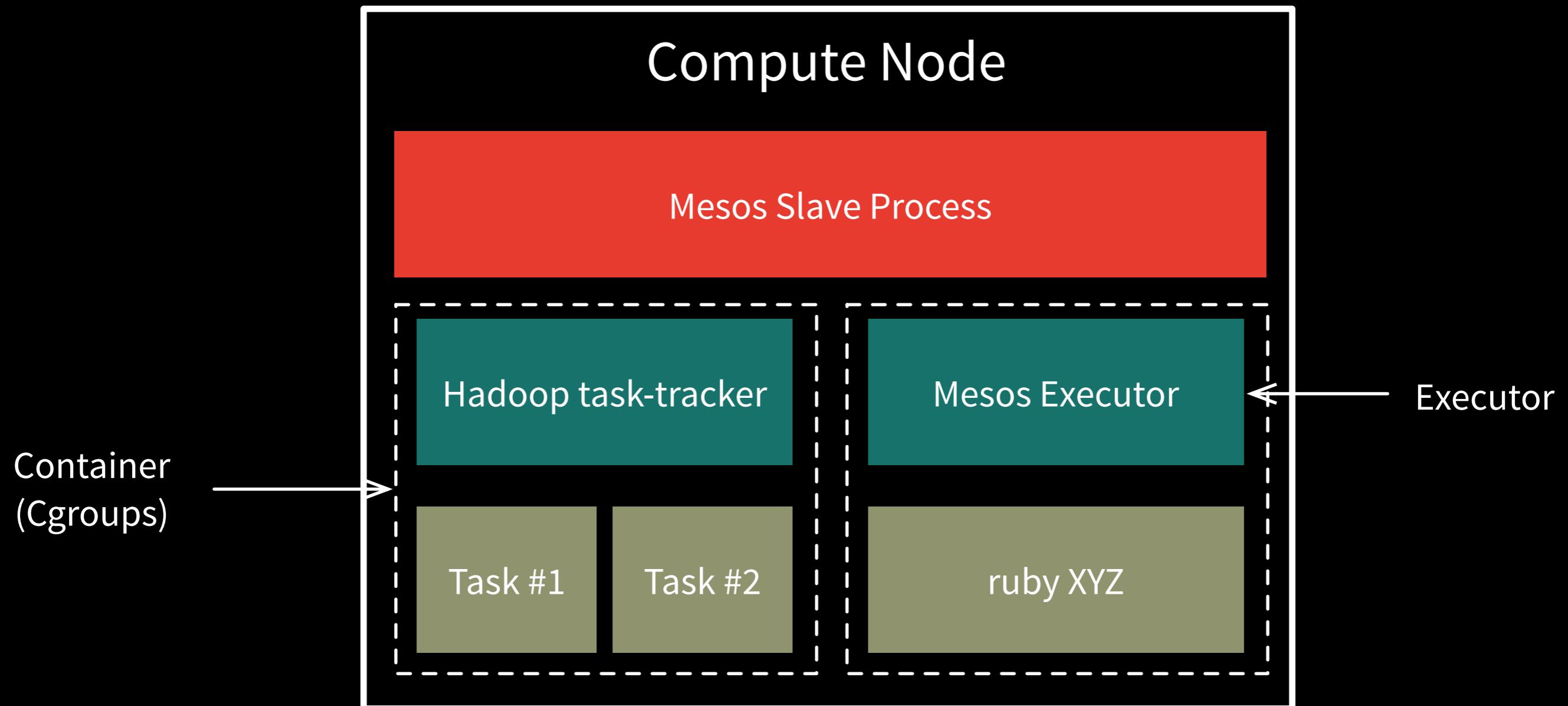




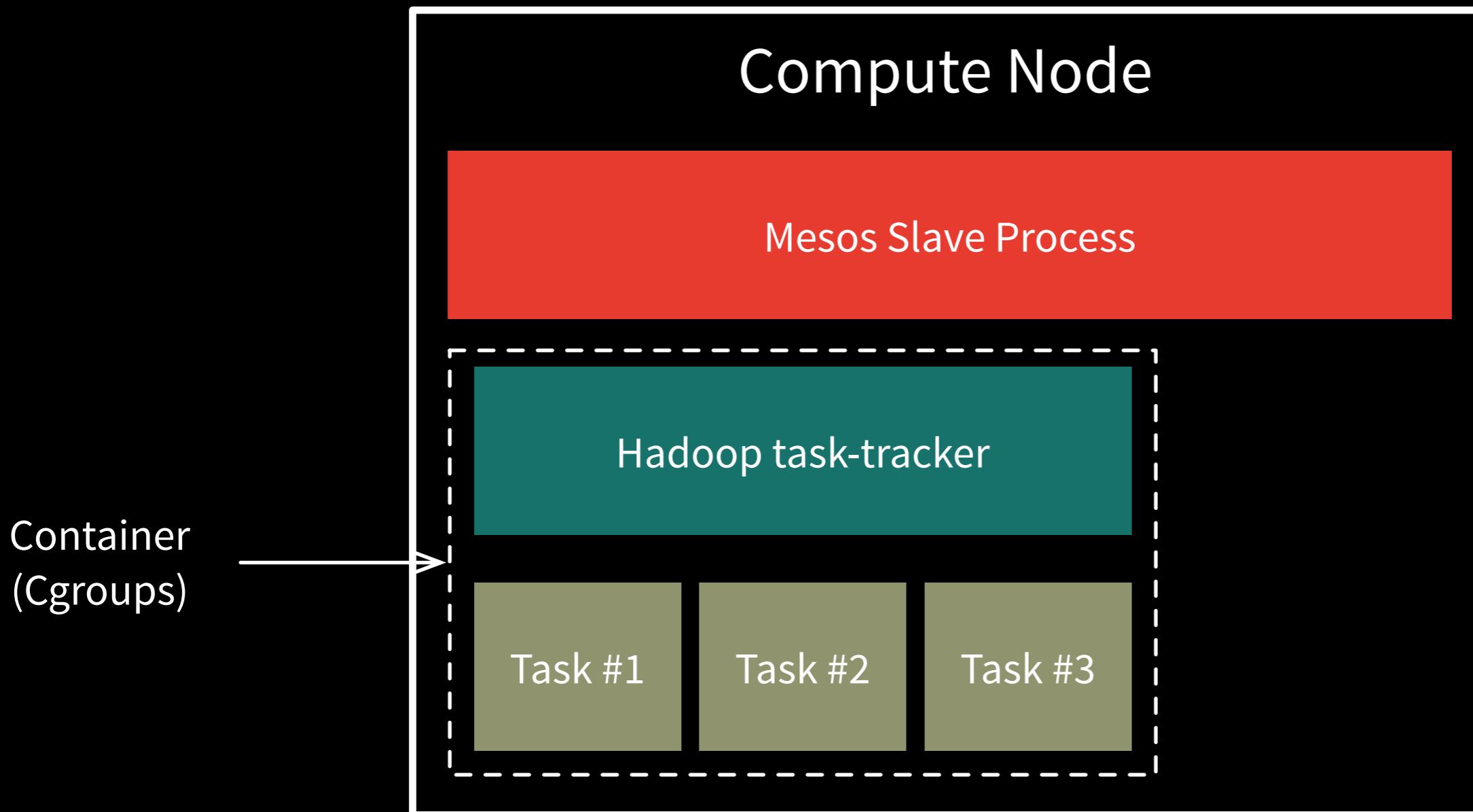




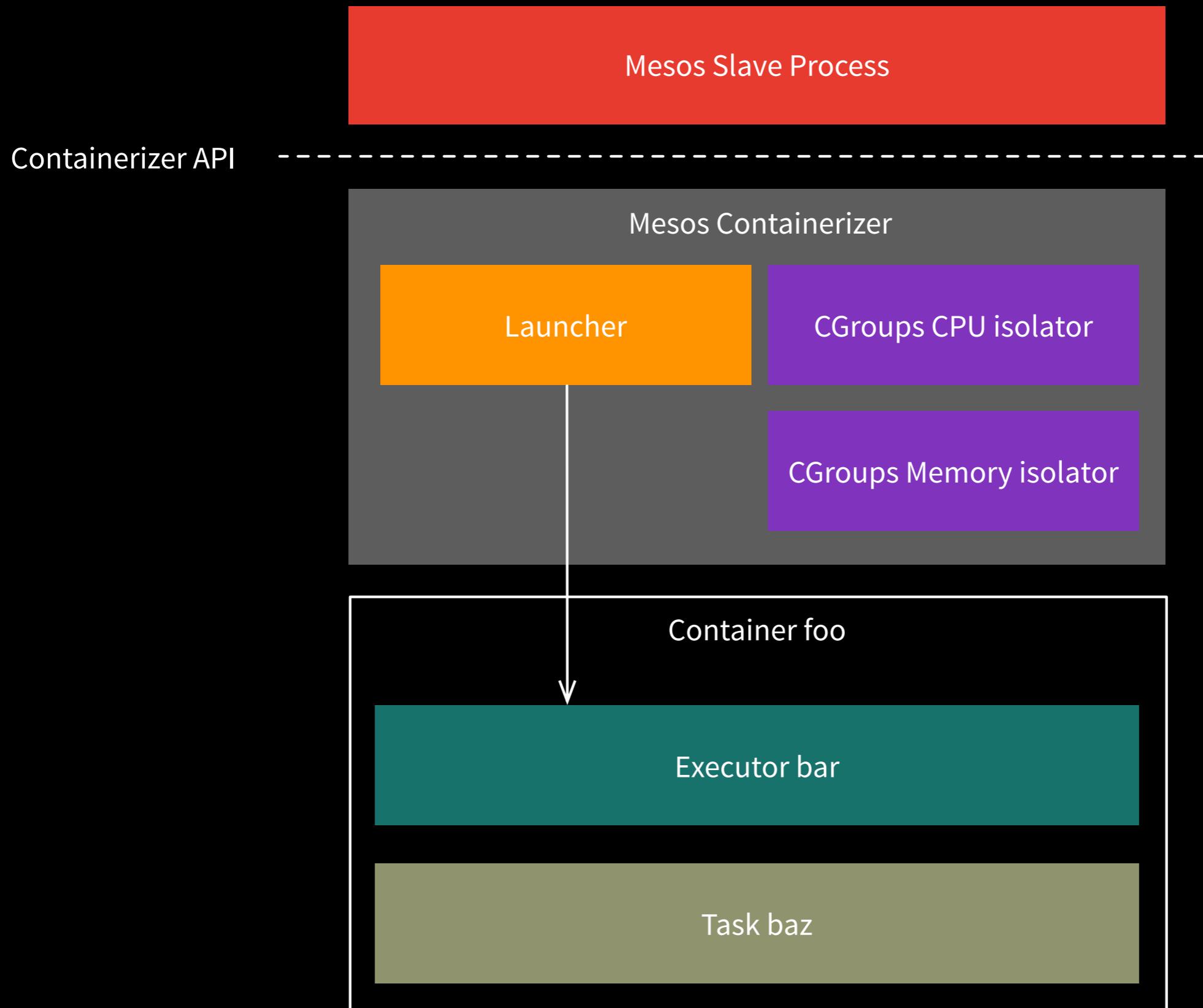
Mesos provides fine-grained resource *isolation*



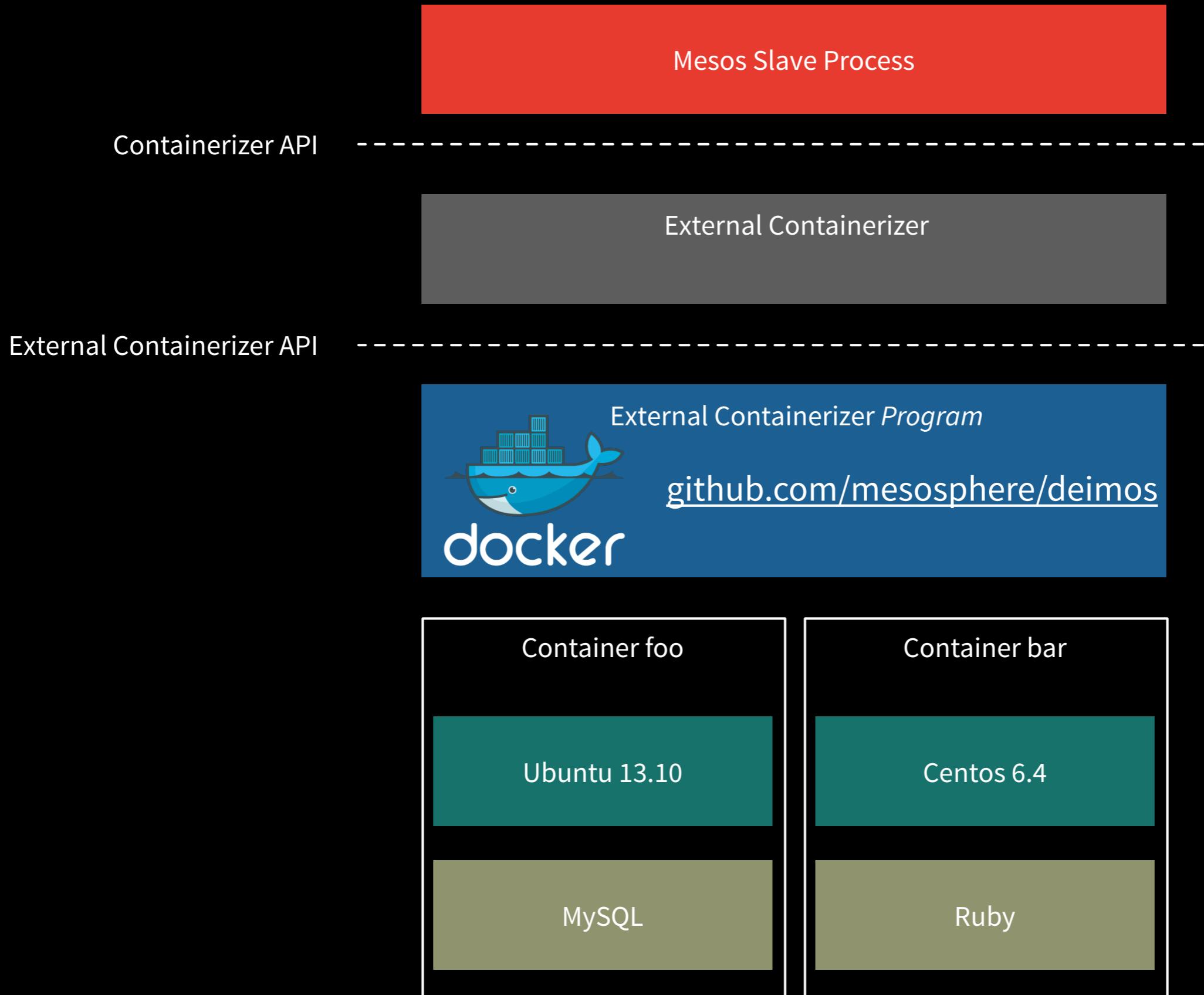
Mesos provides fine-grained resource *isolation*



Mesos provides componentized resource *isolation*



Mesos provides *pluggable resource isolation*



Mememememememe!?!#\$/%



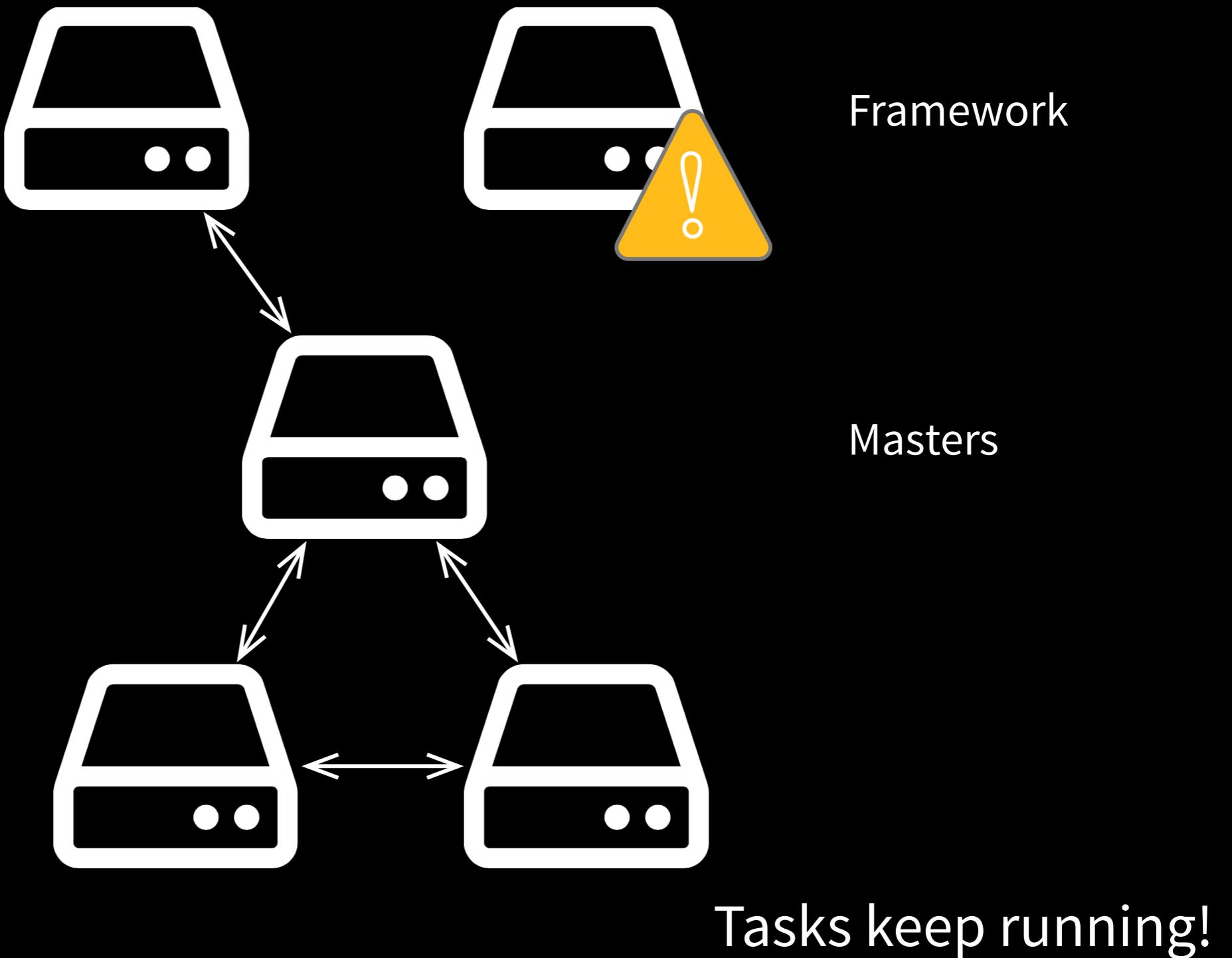
“

Everything fails all the time

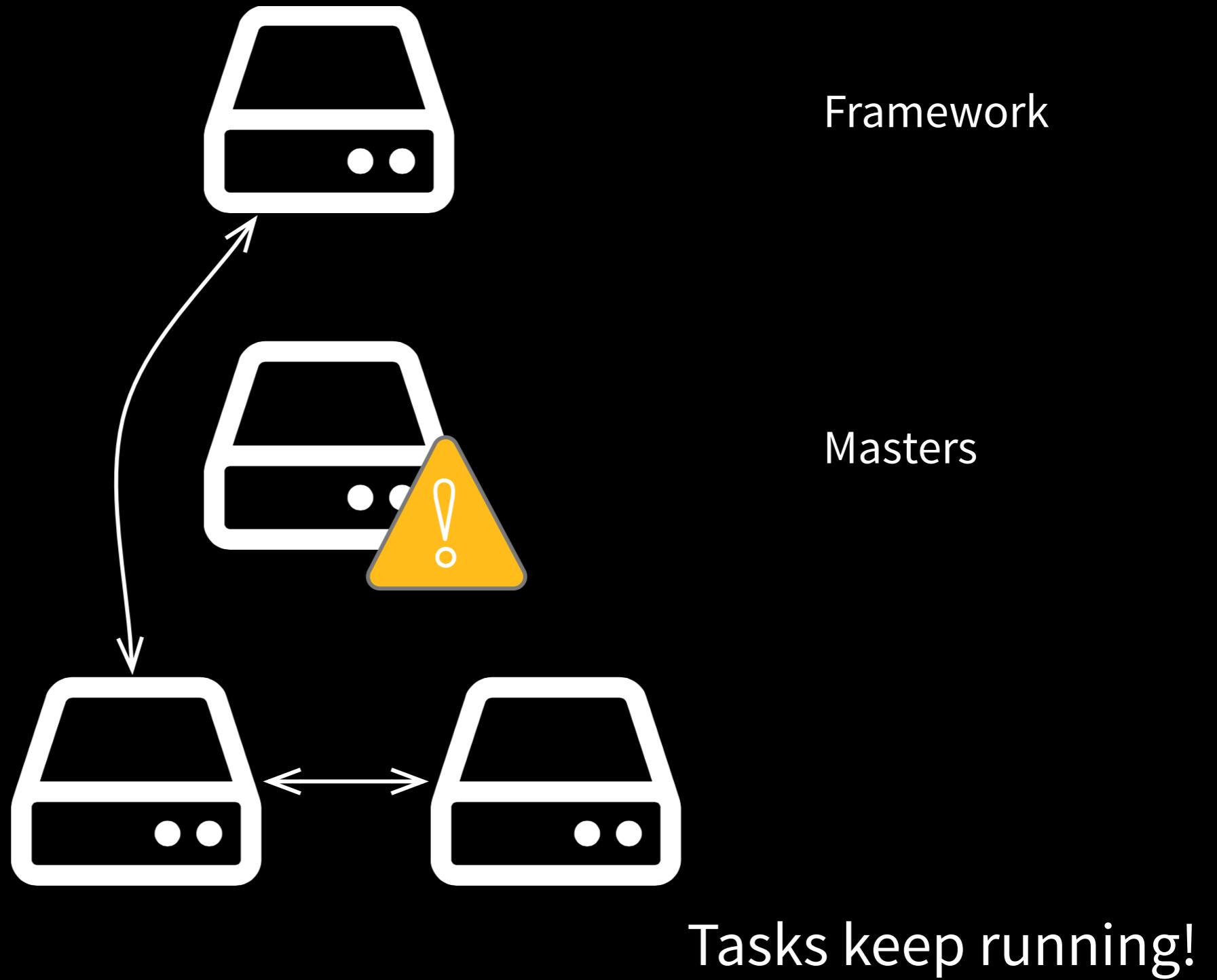
Werner Vogels (Amazon CTO)

”

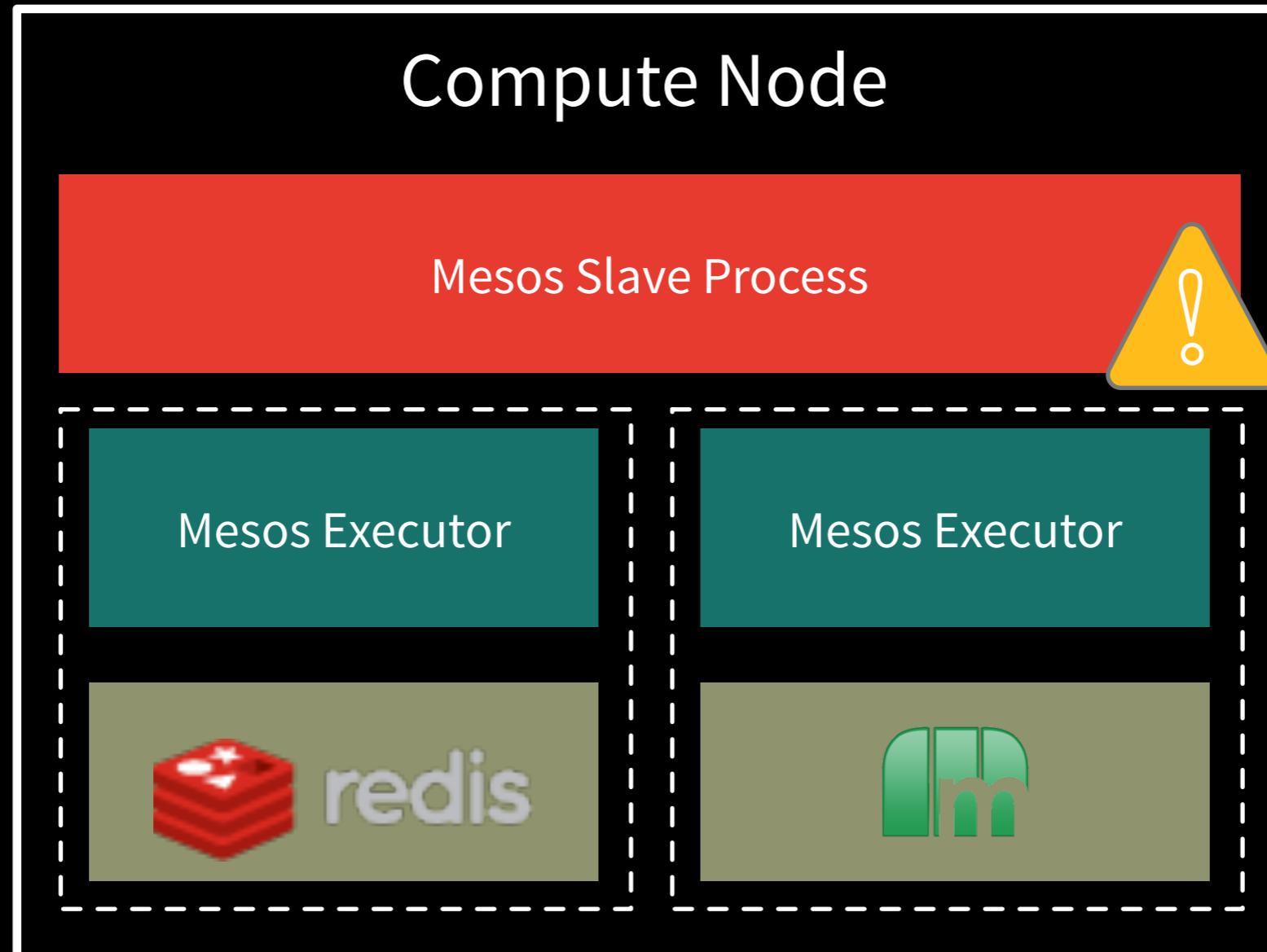
Mesos has no single point of failure



Master node can fail-over



Slave processes can fail-over



Tasks keep running!

The Mesos ecosystem is growing

Au Aurora	Cc Cray Chapel	Dp Dpark	Ch Chronos	Jk Jenkins	
Ma Marathon	Ex Exelixi	Ha Hadoop	Tq Torque	Ca Cassandra	
Sp SSSP	Mi MPI	Sk Spark	St Storm	Es ElasticSearch	Ht Hypertable
Mesos					

Chronos: Distributed cron with dependencies

CHRONOS

hostings

256 TOTAL JOBS

16 FAILED JOBS

[Dependency Graph](#)

[+ New Job](#)

NAME	GRAPH	LAST
create_airbed_dump_table_hostings		success
create_airbed3_dump_table-hostings_first...		success
create_airbed_dump_table_hostings_with_...		success
create_airbed_dump_table_collection_host...		success
create.omg_table-affiliate_events_hostings		success
hostings_summary		success
daily_gibson-import_airbed3_hostings		success
db_export-airbed_hostings		success
hostings_summary_2_quality_score		success
hostings_summary_1_pre		success
hostings_impressions_normalize		success
hostings_impressions_normalize_prepare		success
daily-update_hostings_summary_history		success
hostings_earnings_summary#async		success
daily-create_hostings_history		success
daily-update_hostings_history		success
daily-create_hostings_summary_history		success

Create Cancel

NAME
Steve_Jobs

COMMAND
echo 'FOO' >> /tmp/steve.txt

PARENTS
Choose parents...

OWNER
ateam@airbnb.com

SCHEDULE
R / 2013-03-15 T 11:44:03 Z/ P T24H

EPSILON
PT15M

EXECUTOR
/custom/execut...

March 2013

Sun	Mon	Tue	Wed	Thu	Fri	Sat
24	25	26	27	28	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

NAME
daily_gibson-default_data_cooked_table_import

COMMAND

Marathon: init.d for your data center

MARATHON /

+ NEW

ID	CPUs	Instances
New Application		
ID	Hello	
COMMAND	/Hello-* /bin/hello -Dhttp.port=\$PORT	
CPUS	1	
MEMORY (MB)	512	
INSTANCES	1	
URIS	http://downloads.mesosphere.io/tutorials/PlayHello.zip	

CANCEL CREATE

The screenshot shows the Marathon web interface. At the top, there's a header with 'MARATHON /' and a '+ NEW' button. Below the header is a table with columns for ID, CPUs, and Instances. A modal window titled 'New Application' is open over the table. The modal contains fields for ID (set to 'Hello'), COMMAND (set to '/Hello-* /bin/hello -Dhttp.port=\$PORT'), CPUS (set to '1'), MEMORY (MB) (set to '512'), INSTANCES (set to '1'), and URIS (set to a download link for 'PlayHello.zip'). At the bottom of the modal are 'CANCEL' and 'CREATE' buttons.

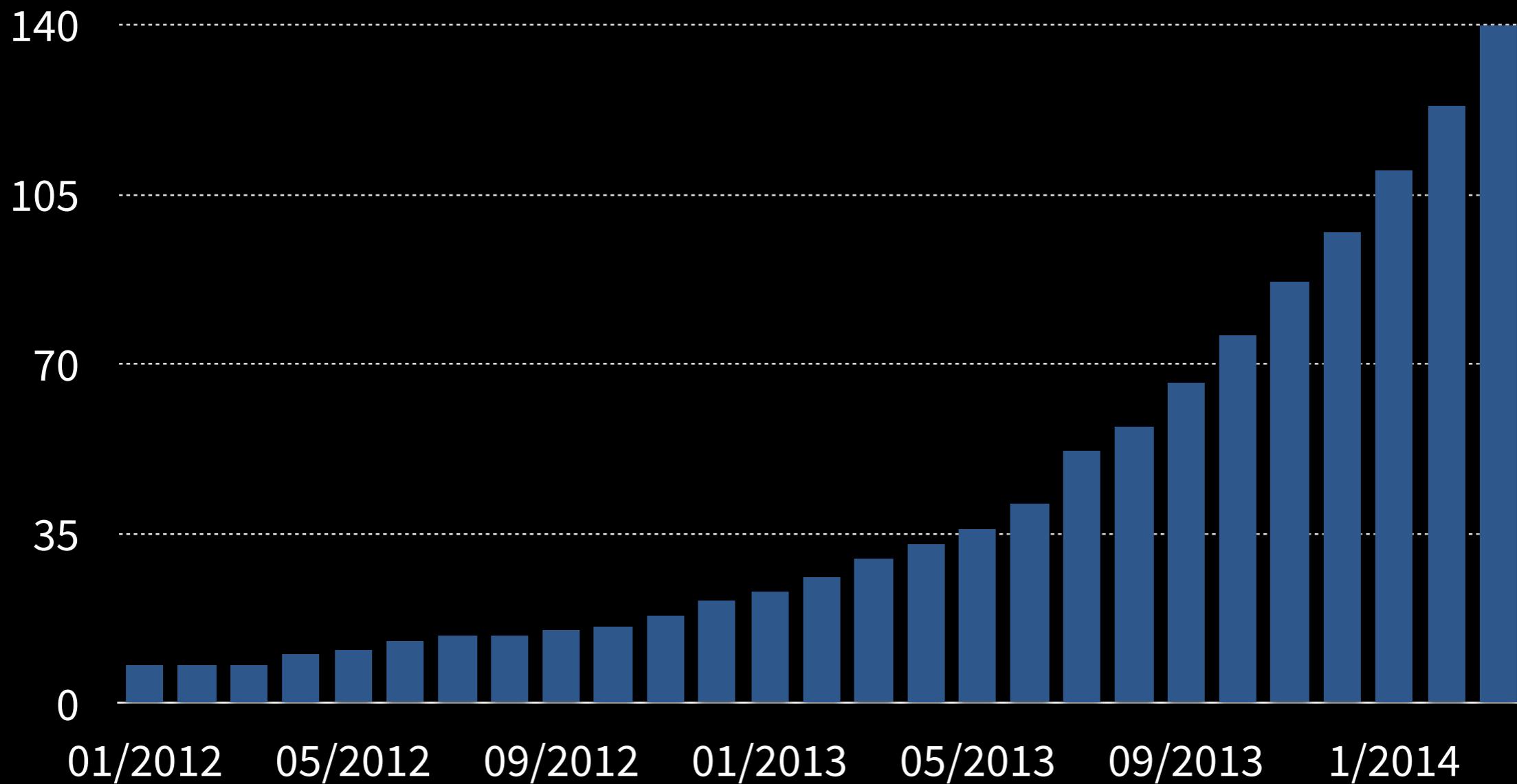
Build your own framework



STANDARD



Mesos-related Github projects





**Great, but who is
using Mesos?**



airbnb™

ebay

vimeo

OpenTable™

HubSpot



xogito
...radical thinking...

PayPal™

ignidata
igniting business with data

Atlassian

CLOUD
PHYSICS

DueDil

device
scape

mesosphere

HubSpot

The logo for HubSpot features the company name "HubSpot" in a bold, dark blue sans-serif font. The letter "o" in "Spot" is replaced by an orange icon consisting of three orange circles connected by lines, forming a triangular shape.



“

HubSpot deploys 300 times a day on a minimal number of server instances by using Apache Mesos.

Elias Torres, HubSpot VP of Engineering

”



Developers get immediate access to cluster resources



Hardware failures are more transparent



Scheduled tasks are not tied to a single server



Improved utilization



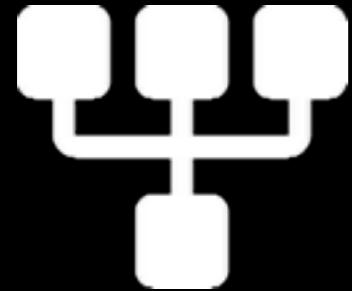


“

Ideally, [the idea is to] make it so a smaller number of engineers can have higher impact through automation on Mesos

Mike Curtis, Airbnb VP Engineering

”



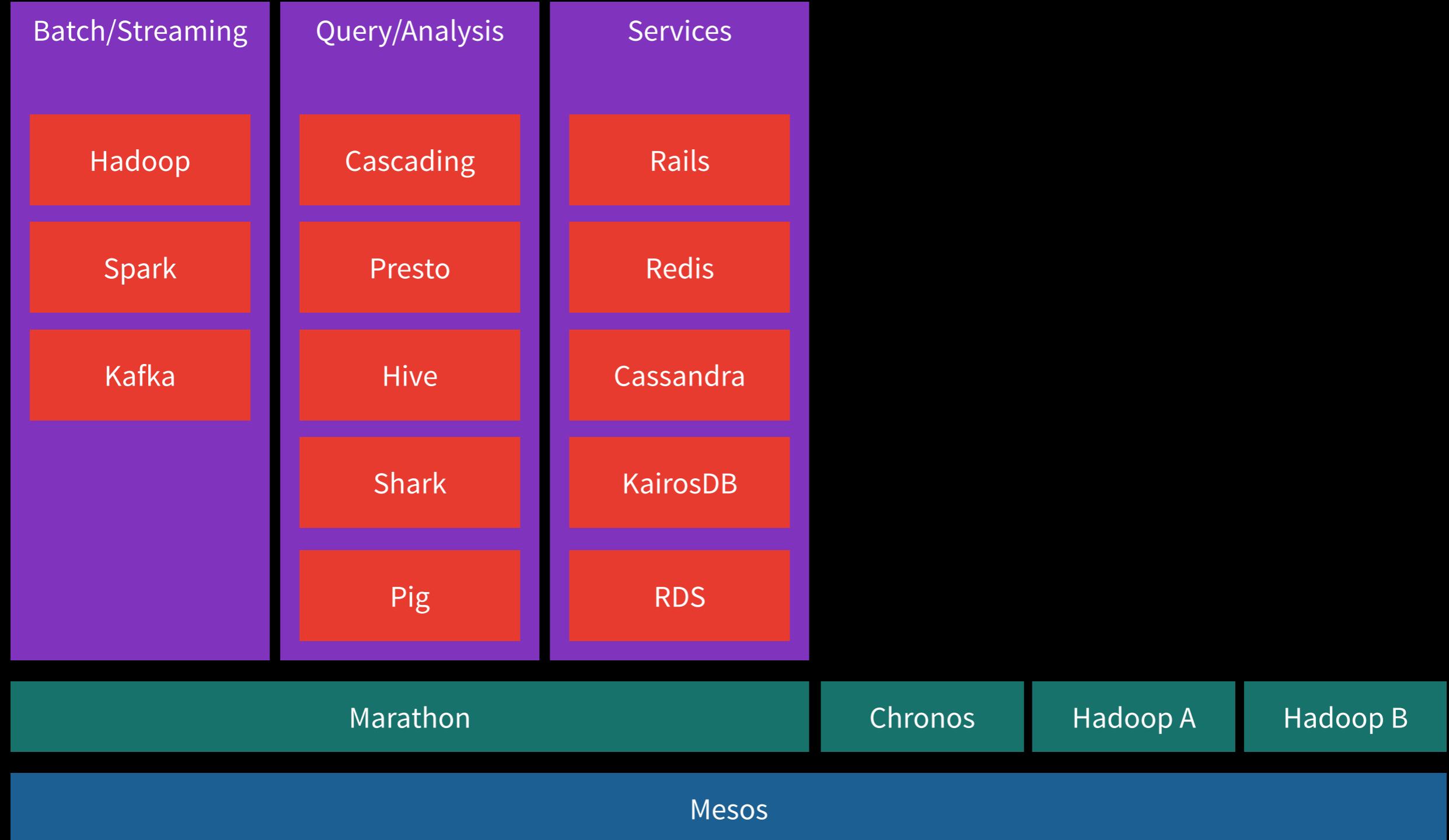
Mesos enables multi-tenant clusters

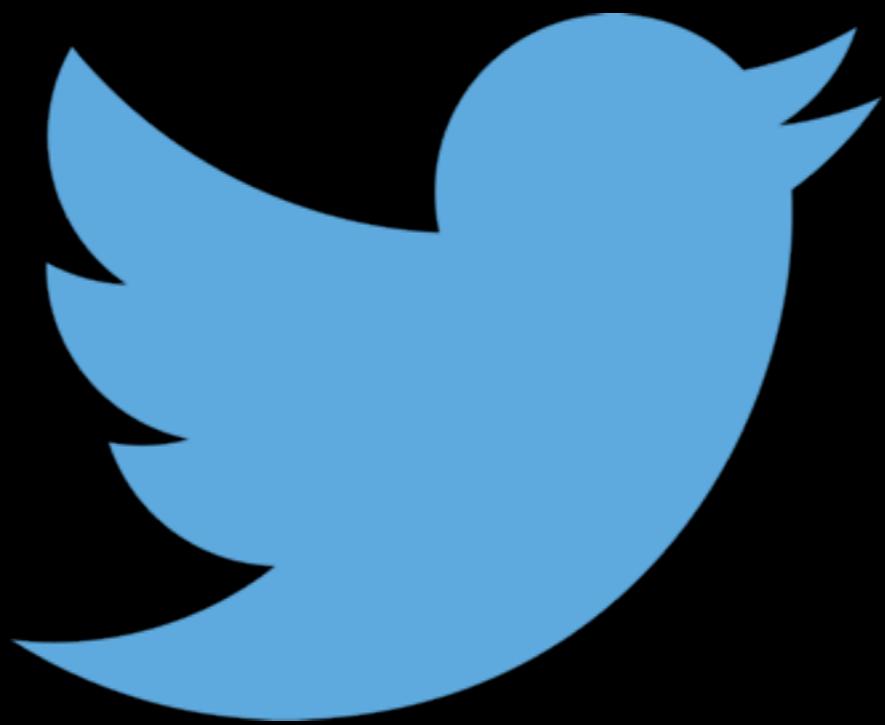


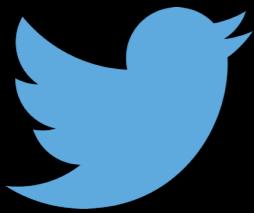
Small teams can move fast



AWS-based infrastructure
beyond just Hadoop





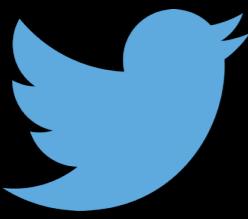


240 million monthly active users

500 million tweets per day

Up to 150k tweets per second

More than 100TB per day of compressed data

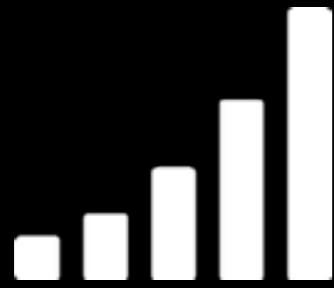
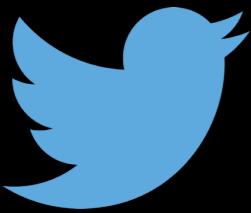


“

Mesos is the cornerstone of our elastic compute infrastructure -- it's how we build all our new services and is critical for Twitter's continued success at scale. It's one of the primary keys to our data center efficiency.

Chris Fry, SVP of Engineering at Twitter

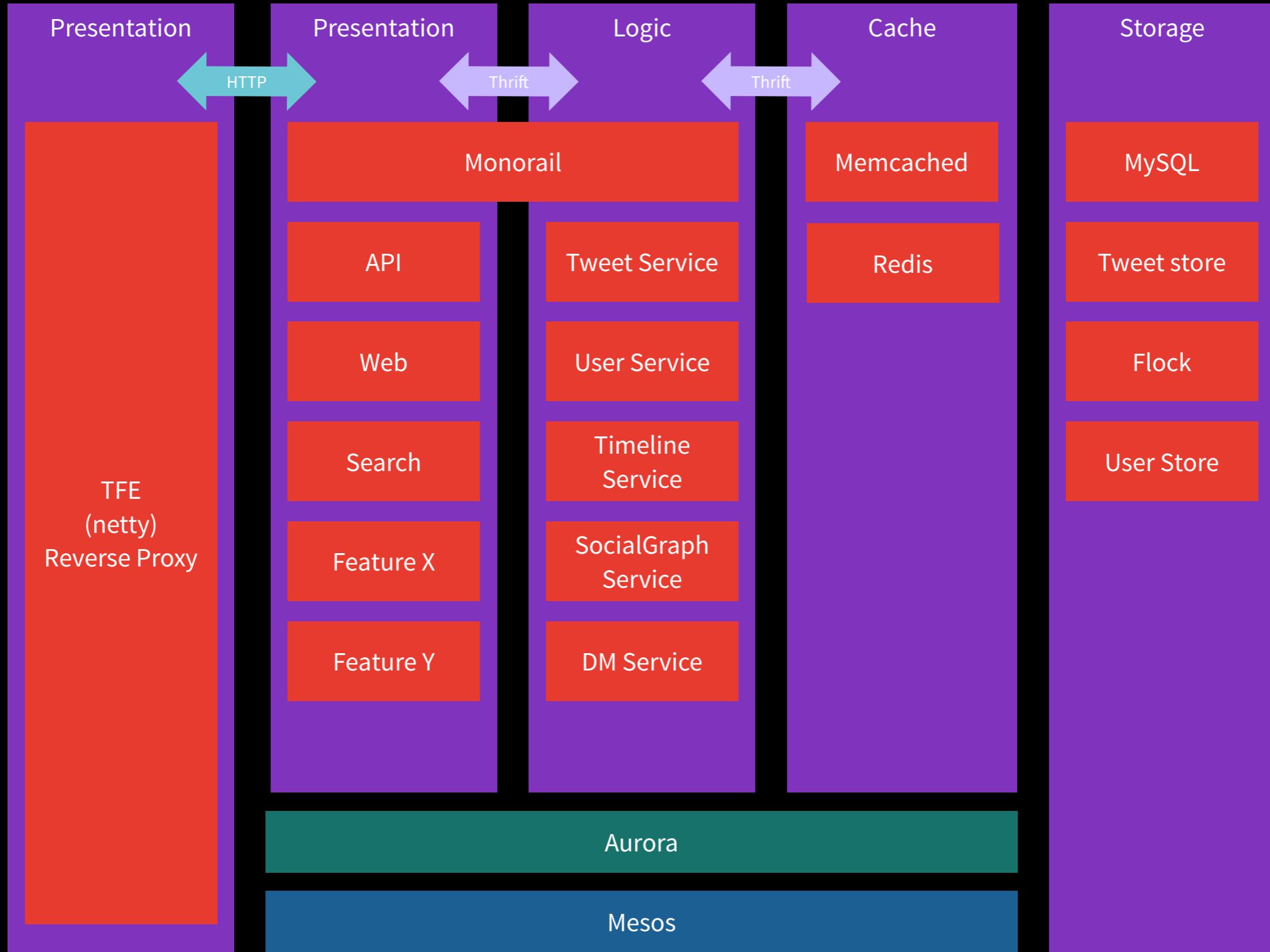
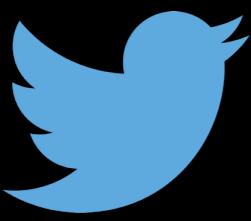
”



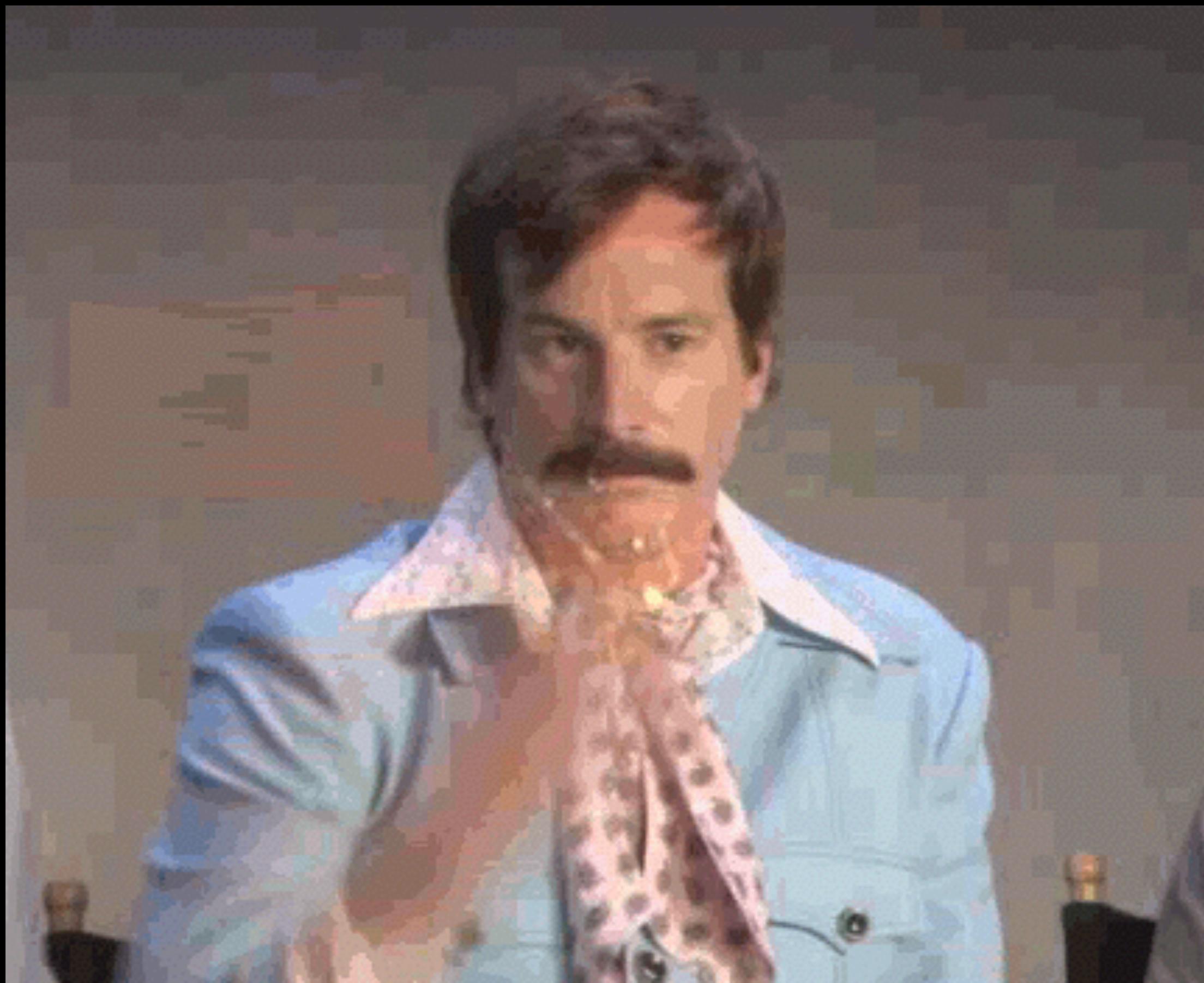
Mesos allow services to scale



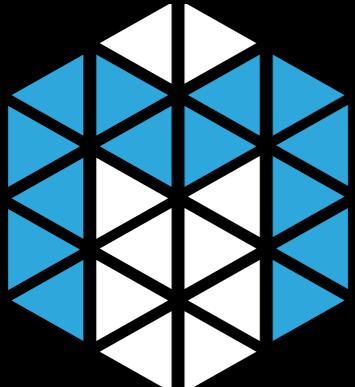
Engineers think about resources, not machines



Fin



Come talk to us!



<http://mesos.apache.org>

user@, dev@mesos.apache.org

<https://github.com/apache/mesos/>

Get Mesos packages: <http://mesosphere.io/downloads>



<http://mesosphere.io/learn>

Get Started

Tutorials

Apps

Tools

Developer Resources

Start using Apache Mesos

1. Install pre-reqs



2. Install Mesos Package



3. Reboot!

Choose an OS



Get Started

A screenshot of the Mesos web interface. At the top, there's a navigation bar with links for 'Mesos', 'Dashboard', 'Frameworks', and 'Slaves'. Below the navigation bar, a banner displays the 'Master' ID: '201311011754-1593144330-5050-787'. On the left, a sidebar shows cluster details: 'Cluster: (Unnamed)', 'Server: 10.116.245.94:5050', 'Built: a week ago by root', and 'Started: 38 minutes ago'. A 'LOG' link is also present. The main content area is titled 'Active Frameworks' with a 'see all' link. It includes a table header with columns 'ID', 'User', 'Name', and 'Active Tasks'. Below the table, another section is titled 'Terminated Frameworks'.



Apache Spark on Mesos

⌚ 30 minutes

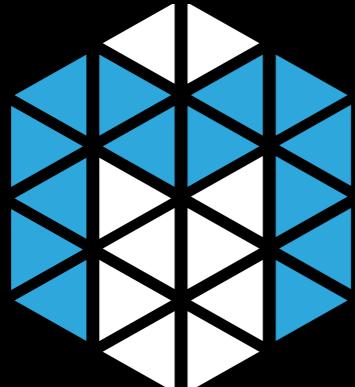
≡ 17 steps

Spark is a fast and general-purpose cluster computing system which makes parallel jobs easy to write. This tutorial shows you how to run Spark on Mesos.

You'll need:

[A Mesos Cluster](#) [Spark](#) [Apache Mesos](#)

Come talk to us!



<http://mesos.apache.org>

user@, dev@mesos.apache.org

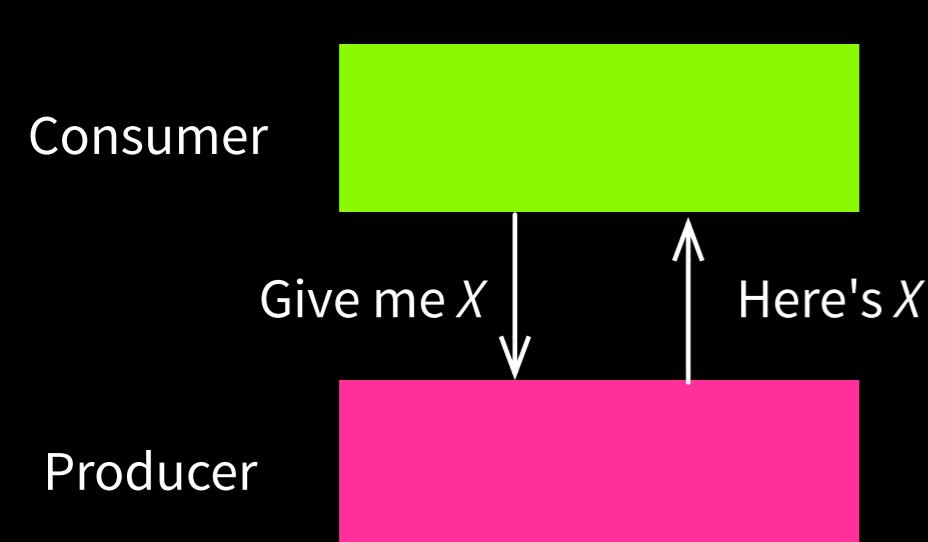
<https://github.com/apache/mesos/>

Get Mesos packages: <http://mesosphere.io/downloads>



Mesos provides resource sharing with *resource offers*

Request based allocation



2-step allocation

