
QCon SF | November 11, 2016

Building Your First App with Apache Mesos & DC/OS



MESOSPHERE

WHO WE ARE



AARON WILLIAMS

Global Community
@_arw_



SUNIL SHAH

Product Manager at Mesosphere
@ssk2

AGENDA

Lecture (45 min)

- What Apache Mesos is, and how it manages the resources of a datacenter
- How the open source DC/OS project combines everything you need into an easy-to-install and easy-to-use distribution

Break (15 min)

Demos & Lab (90 min)

- How to install DC/OS in the cloud or on-prem
- How to get your containerized application running on DC/OS, and how to scale it up
- How to run the big data and analytics frameworks along with your applications

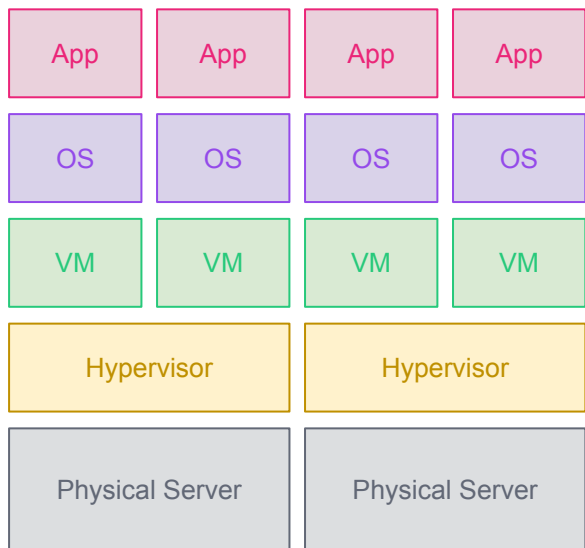
Wrap Up (15 min)

- Additional resources you can rely on as you work on your applications after the workshop

INTRO TO APACHE MESOS AND DC/OS

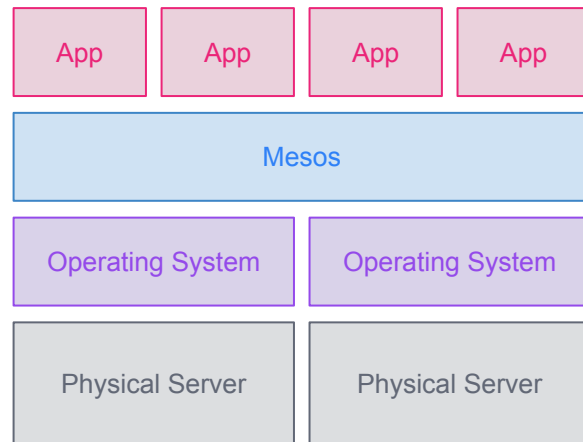
A QUICK PRIMER ON CONTAINERS

Virtual Machine–Based Application Deployment



Isolate apps by running multiple VMs per physical server; still need to manage each guest OS!

Container–Based Application Deployment



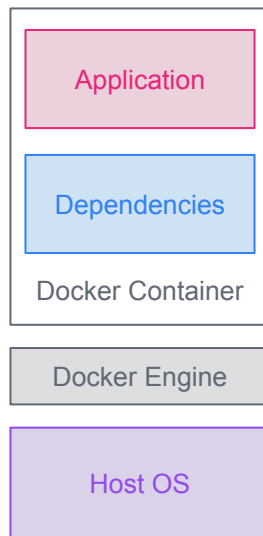
Isolate apps using features of the host OS, such as Linux cgroups.

A QUICK PRIMER ON CONTAINERS

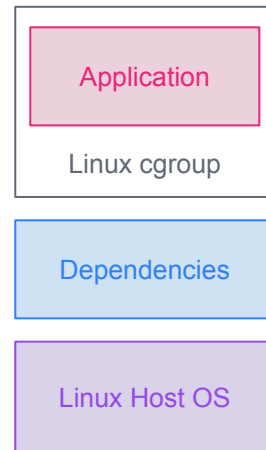
Virtual Machines



Docker Containers

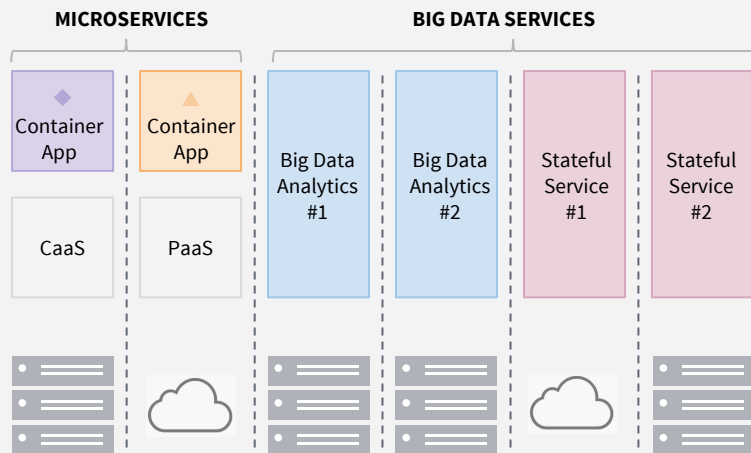


Linux cgroups



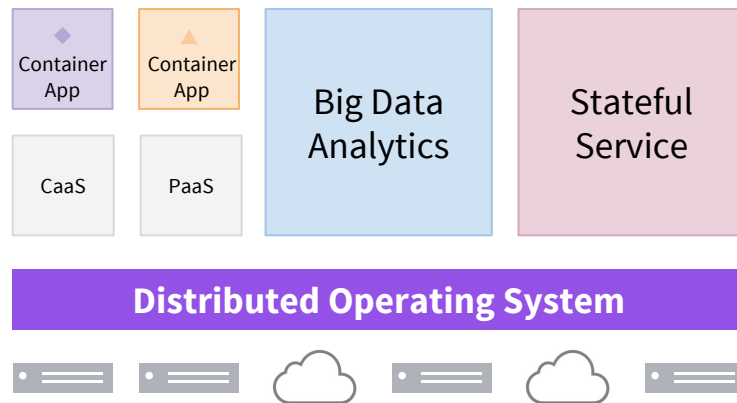
DC/OS MODEL FOR IT OPERATIONS

Traditional Approach



- Inefficient resource utilization & limited scalability
- Siloed infrastructure and teams
- Complex to monitor & operate
- Cloud Lock-in

Modern Approach

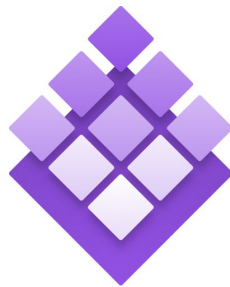


- Uses 66% less infrastructure
- Simplified operations
- Turnkey install of datacenter-wide services
- Easier to experiment with new tech (e.g., Spark)

A BIT OF CLARIFICATION



Apache
MESOS™



DC/OS

<https://mesos.apache.org>

<https://dcos.io>

APACHE MESOS



MESOS

Represents a cluster of servers as a single pool of resources

Why Mesos?

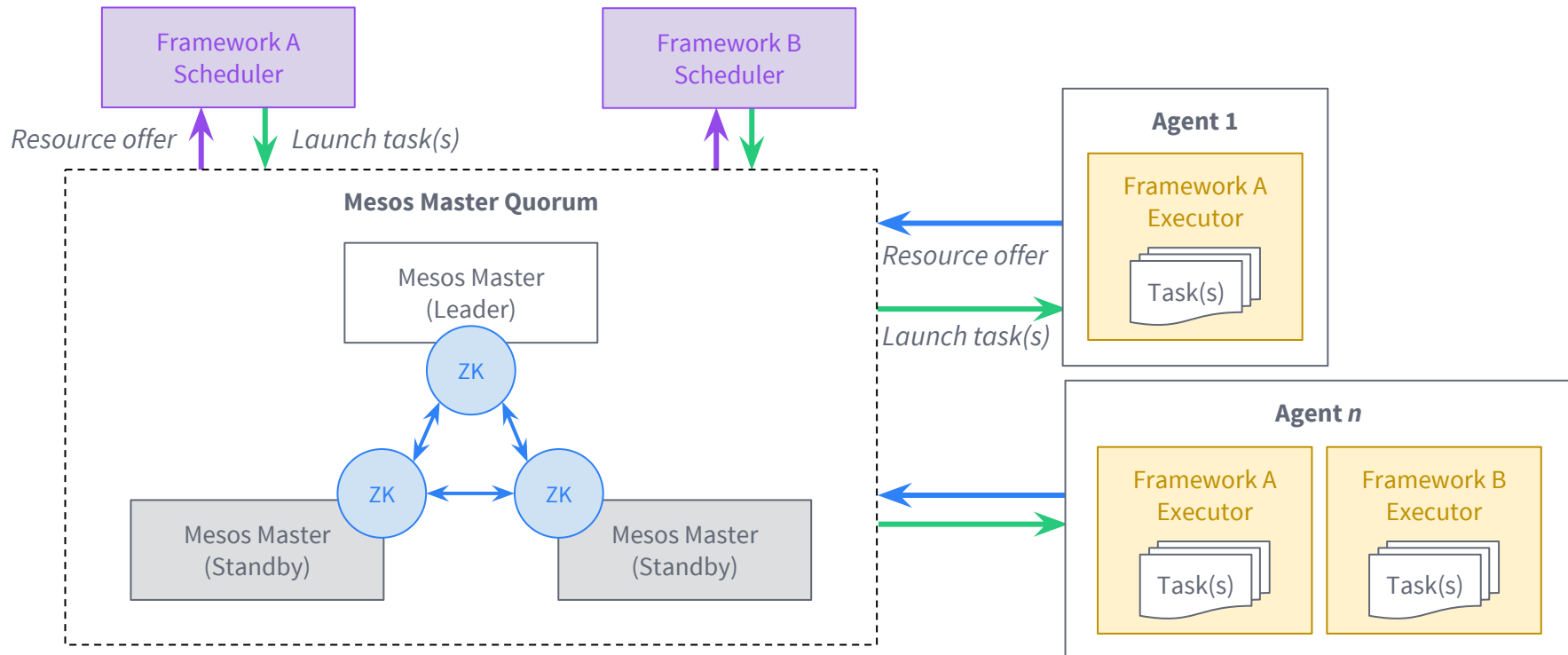
- 2-level scheduling
- Fault-tolerant, battle-tested
- Scalable to 10,000+ nodes
- Created by Mesosphere founder @ UC Berkeley; used in production by 100+ web-scale companies [1]

[1] <http://mesos.apache.org/documentation/latest/powered-by-mesos/>

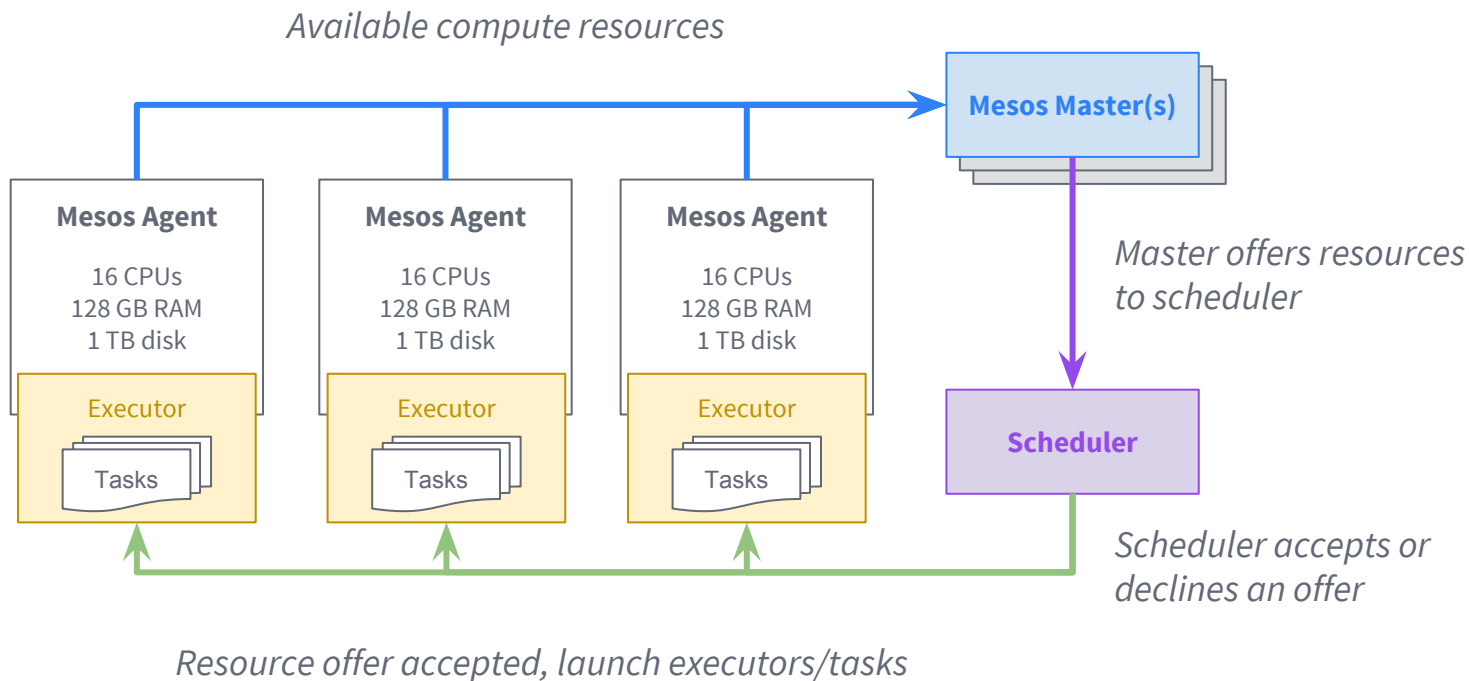
WHAT IS MESOS? (CONTINUED)

- Two-tier scheduling across resource types
 - cpus, mem, disk, and ports by default
- Masters are highly available, agents are fault tolerant
 - *Checkpointing, agent recovery*
- Resource isolation between processes
 - Linux cgroups, Docker, ...
- Language bindings: C++, Java, Python, Go, ...

MESOS ARCHITECTURE



ANATOMY OF A RESOURCE OFFER (TWO-TIER SCHEDULING)



NEW (OLD) PROBLEMS

- Service discovery and load balancing
 - BIND, Mesos-DNS, Consul-Mesos, Marathon-LB

NEW (OLD) PROBLEMS

- Service discovery and load balancing
 - BIND, Mesos-DNS, Consul-Mesos, Marathon-LB
- Monitoring and metrics collection
 - Collectd, Nagios, Prometheus, Snap

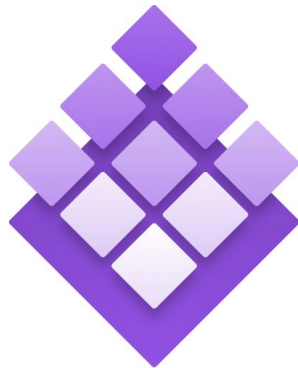
NEW (OLD) PROBLEMS

- Service discovery and load balancing
 - BIND, Mesos-DNS, Consul-Mesos, Marathon-LB
- Monitoring and metrics collection
 - Collectd, Nagios, Prometheus, Snap
- Persistent storage (filesystems, databases, etc)
 - Ceph, HDFS, Amazon EBS / EFS / S3, NFS, Cassandra

NEW (OLD) PROBLEMS

- Service discovery and load balancing
 - BIND, Mesos-DNS, Consul-Mesos, Marathon-LB
- Monitoring and metrics collection
 - Collectd, Nagios, Prometheus, Snap
- Persistent storage (filesystems, databases, etc)
 - Ceph, HDFS, Amazon EBS / EFS / S3, NFS, Cassandra
- Administration: named URIs vs. ports, IPAM
 - Nginx, HAProxy, Mesos-DNS, dnsmasq, Minuteman

DC/OS: BUILT ON MESOS



DC/OS

<https://dcos.io>

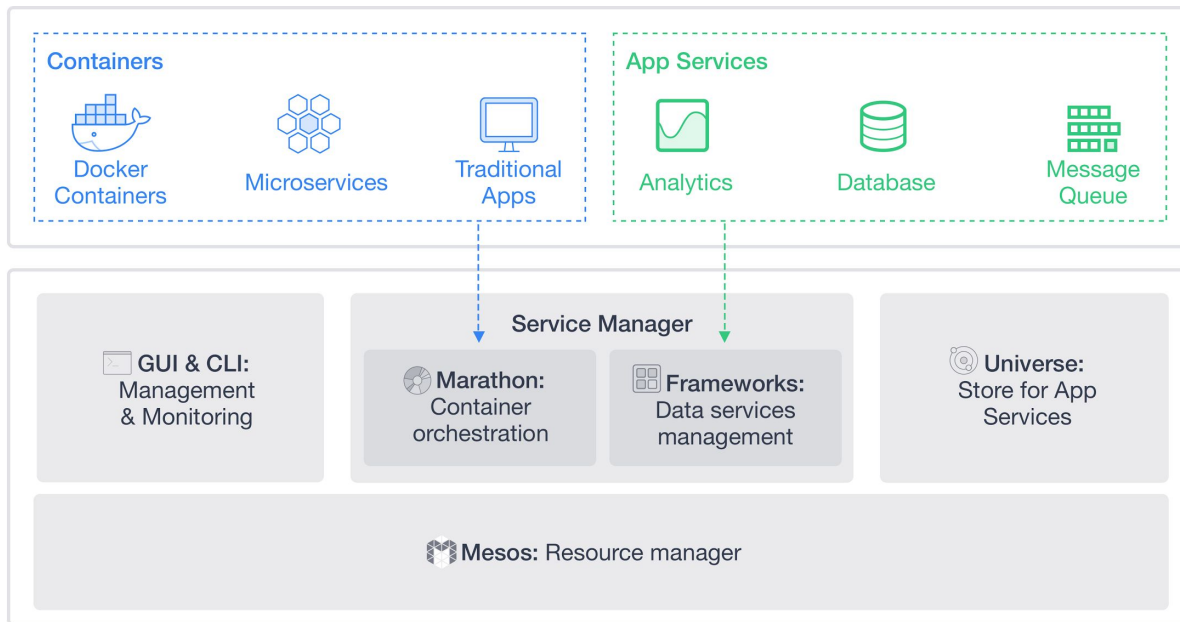
<https://github.com/dcos>

DC/OS ARCHITECTURE

MODERN
APPS



DC/OS



```
~ $ dcos
Command line utility for the Mesosphere Datacenter Operating
System (DCOS). The Mesosphere DCOS is a distributed operating
system built around Apache Mesos. This utility provides tools
for easy management of a DCOS installation.
```

Available DCOS commands:

```
auth
config
help
marathon
node
package
service
task
```

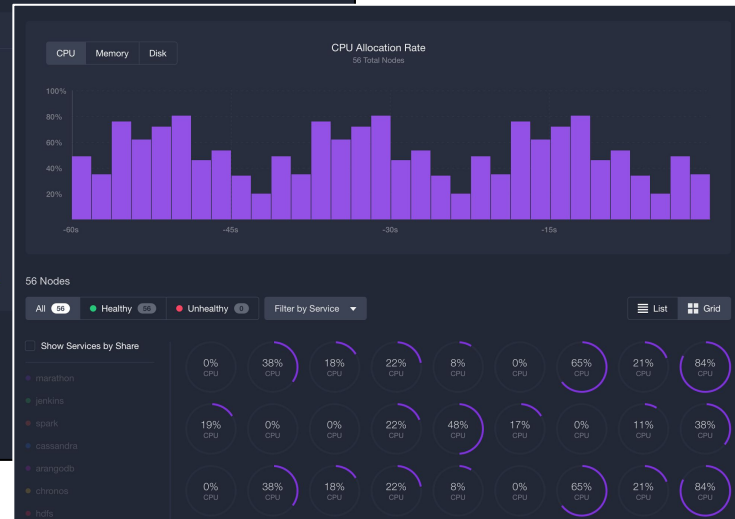
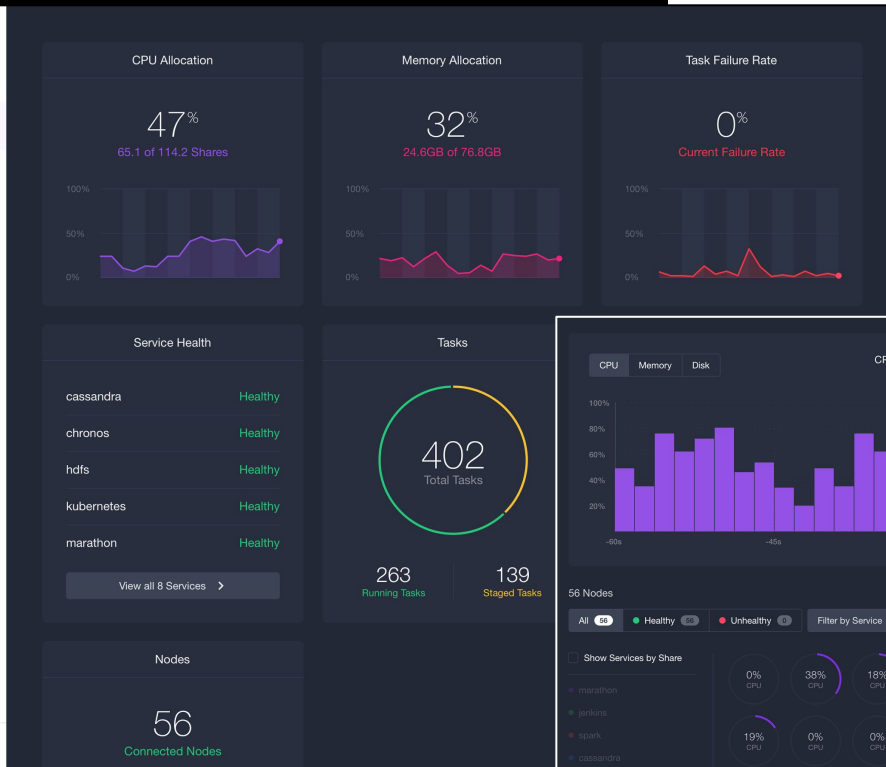
```
Get detailed command descr
~ $ _
```

prod-datacenter
172.03.12.1

- Dashboard
- Services
- Nodes
- Network
- Universe
- Settings

Mesosphere Enterprise
DCOS v1.8.0

User's Name















A COMPLETE CLI & GUI

THE UNIVERSE


Packages Installed


Community Packages


-  crate
0.1.0
-  datadog
5.4.3
-  elasticsearch
0.7.0
-  etcd
0.0.2
-  exhibitor
0.8.1
-  hdfs
0.1.8
-  hue
0.0.1
-  kubernetes
v0.7.2-v1.1.5-alpha
-  marathon-lb
0.0.5-0.1
-  memsql
0.0.1
-  mr-redis
0.0.1
-  openvpn


Packages Installed


Selected Packages



arangodb
0.3.0
[Install Package](#)



cassandra
0.2.0-2
[Install Package](#)


chronos
2.4.0
[Install Package](#)


jenkins
0.2.3
[Install Package](#)


kafka
0.9.4.0
[Install Package](#)


marathon
0.15.3
[Install Package](#)


spark
1.6.0
[Install Package](#)

MESOS AND DC/OS: BETTER TOGETHER

All of the benefits of Mesos, plus

- Built-in service discovery and load balancing
- Support for stateful services
- Turn-key installation of distributed systems
- Cloud-agnostic installer
- Web and command-line interfaces
- All components are integration tested and supported by Mesosphere, Inc.



DEMOS & LAB

 **mesosphere/qcon**

WRAP UP

Join the DC/OS Community

Connect with our community of users and browse the latest DC/OS news.



GitHub

Are you interested in helping us make DC/OS even better? Let's work together! Check out our source code on GitHub.

[View repositories →](#)



Slack

Have any questions? Our Slack channel is the best place to get help. Just send us a request to automatically receive your invitation.

[Join chat →](#)



Mailing List

Want to stay in the loop and connect with other community members? Our public mailing list has all the latest updates. Join the discussion.

[Join users@dcos.io →](#)



@dcos



chat.dcos.io



users@dcos.io



/groups/8295652



/dcos
/dcos/examples
/dcos/demos

THANK YOU!

ANY MORE QUESTIONS?