
CSDN

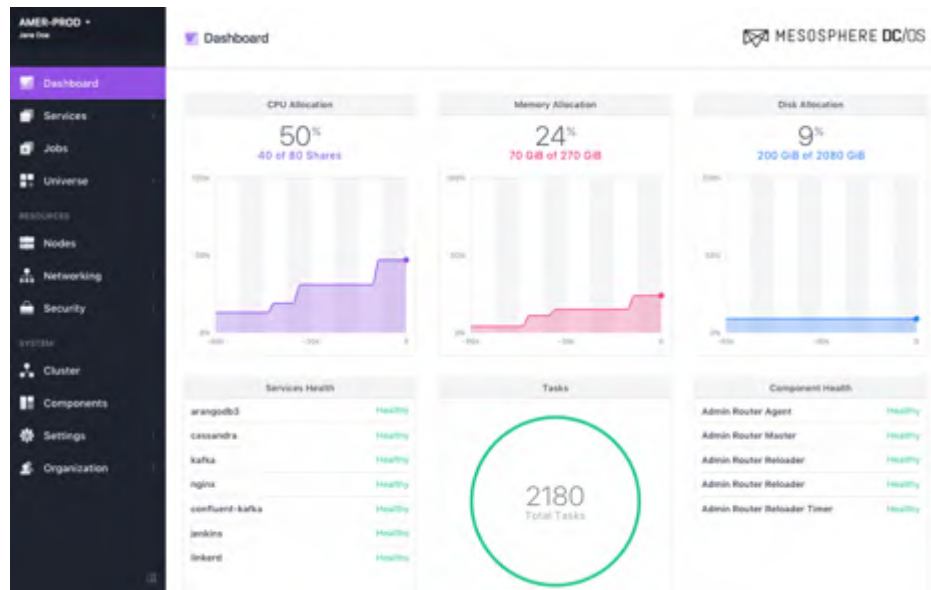
DC/OS 1.9 DEEP DIVE



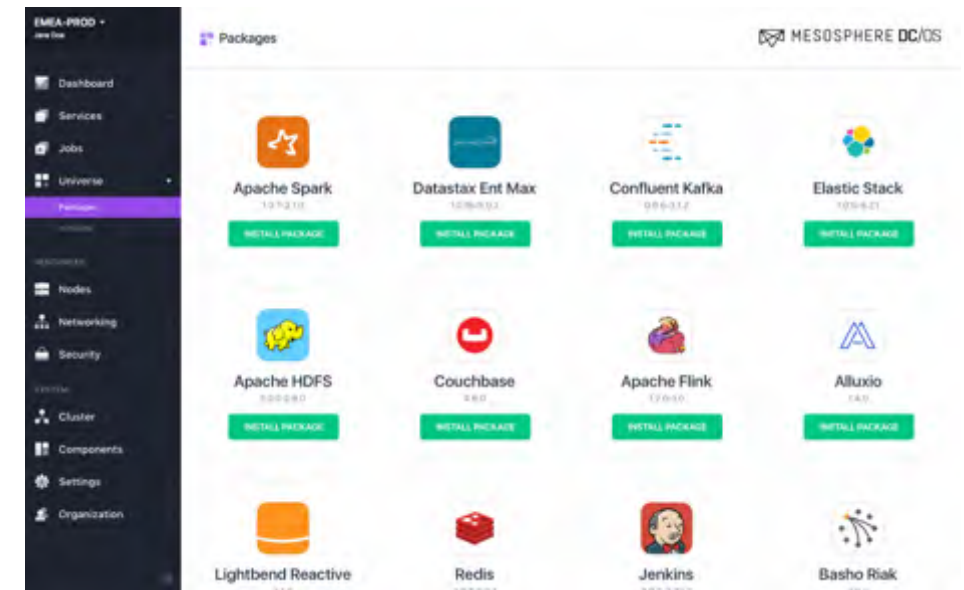
AGENDA

- Data Services Ecosystem
- Operations
- Workloads
- Compliance Reports

MESOSPHERE DC/OS: RUN YOUR DATACENTER AS A GIANT COMPUTER

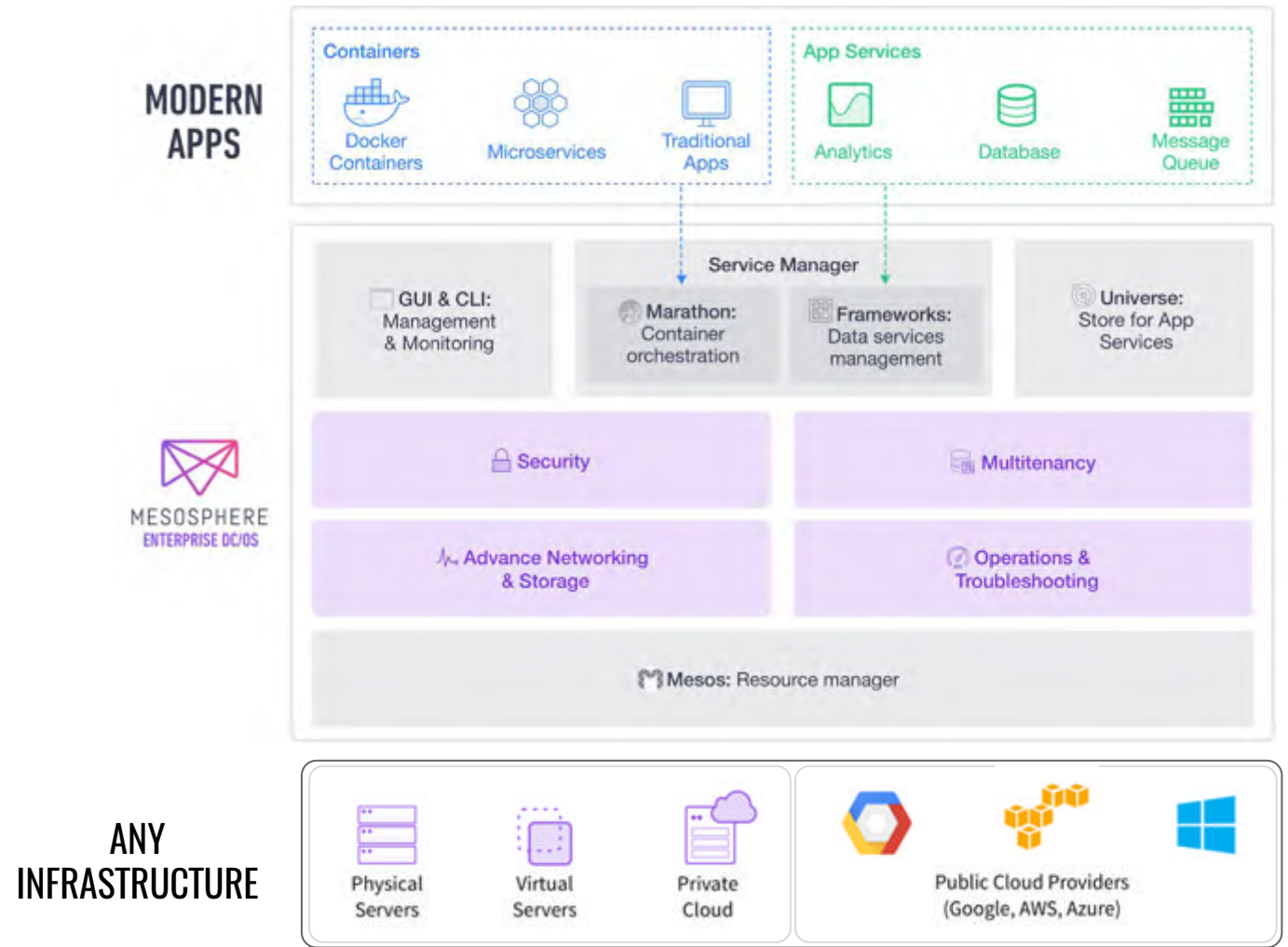


Manage your infrastructure as a single giant computing pool

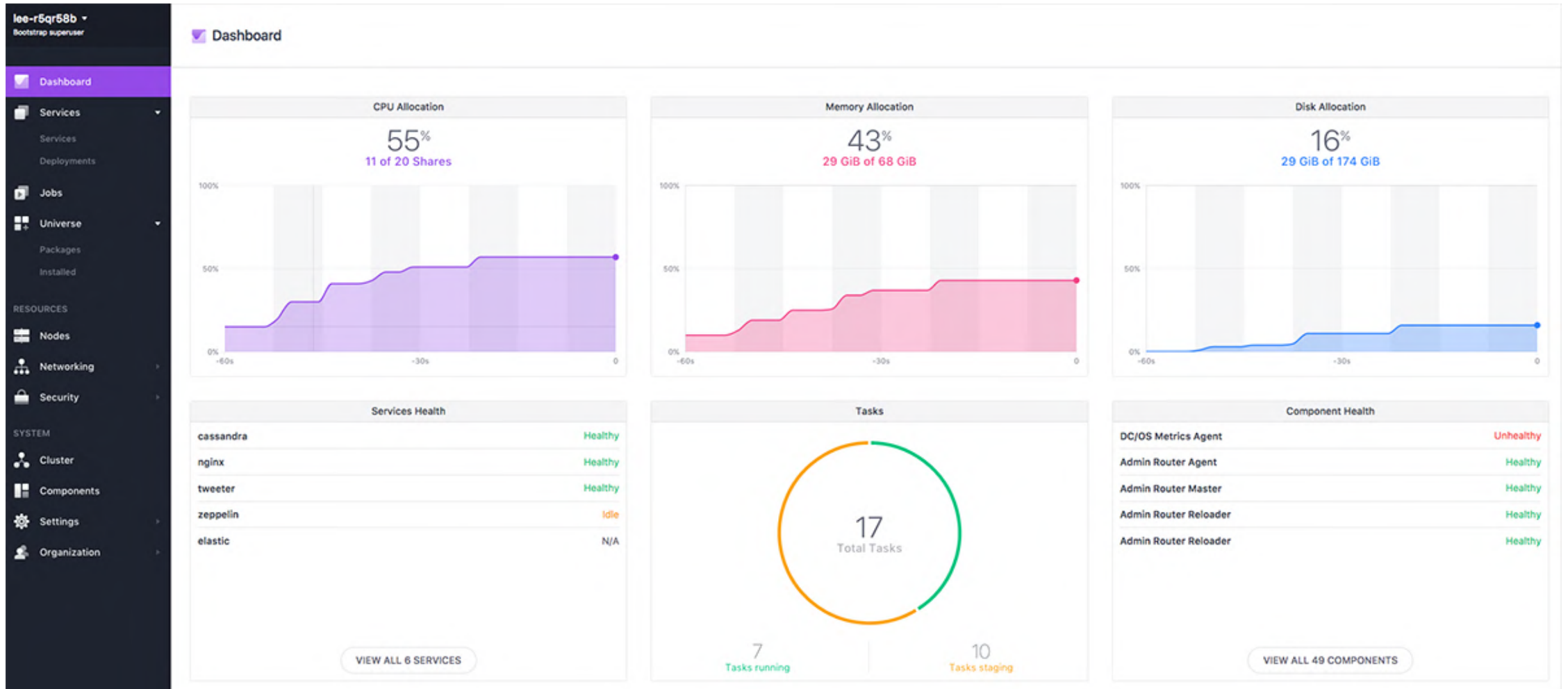


Deploy & run complex services with an app store like experience

MESOSPHERE DC/OS: - GOING A LITTLE DEEPER



DC/OS NEW UI



NEW CREATE SERVICE FLOW

BACK Run a Service JSON EDITOR REVIEW & RUN

Services

- nginx
- memcached

Networking

Volumes

Health Checks

Environment

Networking

Configure the networking for your service.

NETWORK TYPE

Virtual Network: dcos

Service Endpoints

DC/OS can automatically generate a Service Address to connect to each of your load balanced endpoints.

nginx

CONTAINER PORT	SERVICE ENDPOINT NAME
8080	web

HOST PORT

\$PORT0

ASSIGN AUTOMATICALLY

UDP

TCP

LOAD BALANCED SERVICE ADDRESS

Load balances the service internally (layer 4), and creates a service address. For external (layer 7) load balancing, create an external load balancer and attach this service.

ENABLED app.marathon.14lb.thisdcos.directory:8080

+ ADD SERVICE ENDPOINT

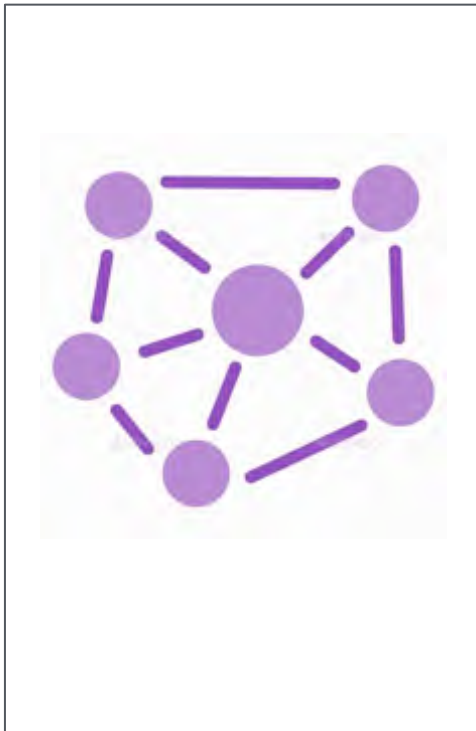
memcached

+ ADD SERVICE ENDPOINT

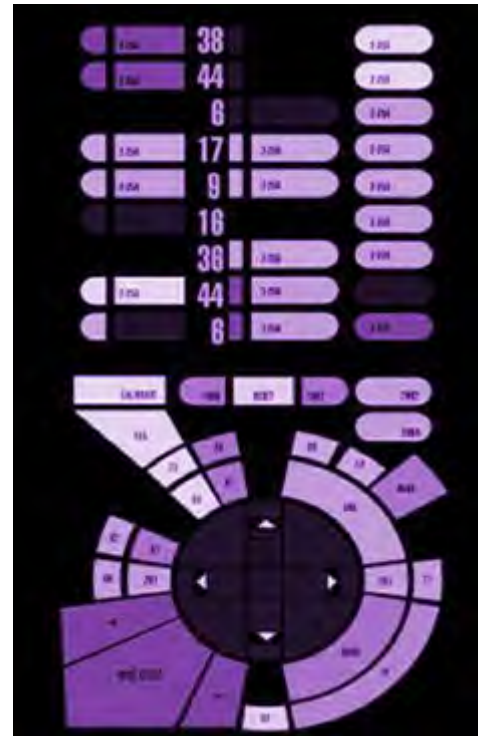
```
1 {
2   "id": "/app",
3   "containers": [
4     {
5       "name": "nginx",
6       "resources": {
7         "cpus": 0.1,
8         "mem": 128
9       },
10      "endpoints": [
11        {
12          "name": "web",
13          "containerPort": 8080,
14          "hostPort": 0,
15          "protocol": [
16            "tcp"
17          ],
18          "labels": {
19            "VIP_0": "/app:8080"
20          }
21        }
22      ],
23      "image": {
24        "id": "nginx",
25        "kind": "DOCKER"
26      }
27    },
28    {
29      "name": "memcached",
30      "resources": {
31        "cpus": 0.1,
32        "mem": 128
33      }
34    }
35  ],
36  "scaling": {
37    "kind": "fixed",
38    "instances": 1
39  },
40  "networks": [
41    {
42      "name": "dcos",
43      "mode": "container"
44    }
45  ]
46 }
```

KEY THEMES - DC/OS 1.9

DATA SERVICES ECOSYSTEM



OPERATIONS



WORKLOADS



COMPLIANCE REPORTS



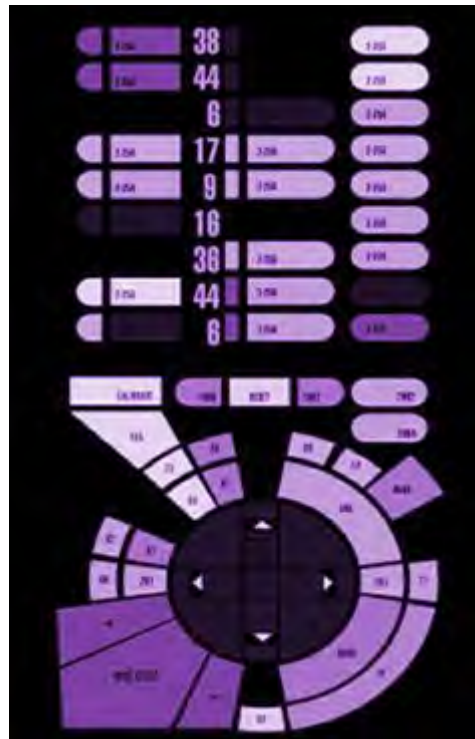
KEY THEMES - DC/OS 1.9

DATA SERVICES ECOSYSTEM



- *Alluxio*
- *Couchbase*
- *Datastax DSE*
- *Elastic (ELK)*
- *Redis*
- *Apache Flink*

OPERATIONS



WORKLOADS



COMPLIANCE REPORTS



DATA INFRASTRUCTURE CHALLENGES



Deploying each data service is time consuming



Operating data services is manual and error-prone



Infrastructure silos with low utilization

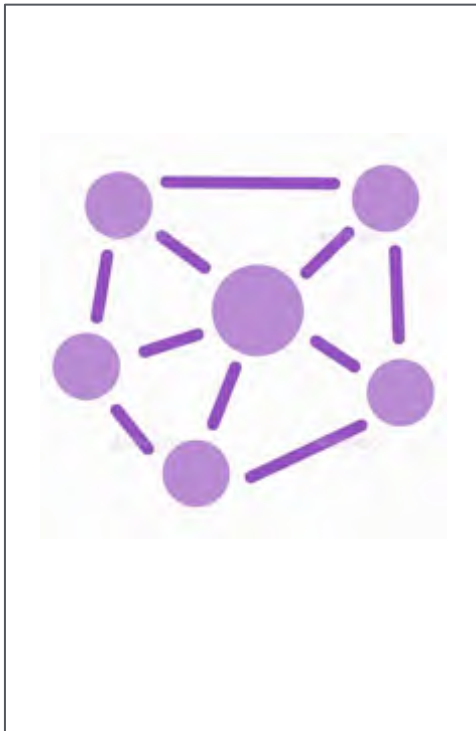
NEW SERVICES PARTNERSHIPS IN DC/OS 1.9



And more than +100 Services available in our service catalog “DC/OS Universe”

KEY THEMES - DC/OS 1.9

DATA SERVICES ECOSYSTEM



OPERATIONS



- Remote Container Shell
- Unified Metrics
- Unified Logging
- Deployment Failure Debugging
- Upgrades & Configuration updates

WORKLOADS



COMPLIANCE REPORTS



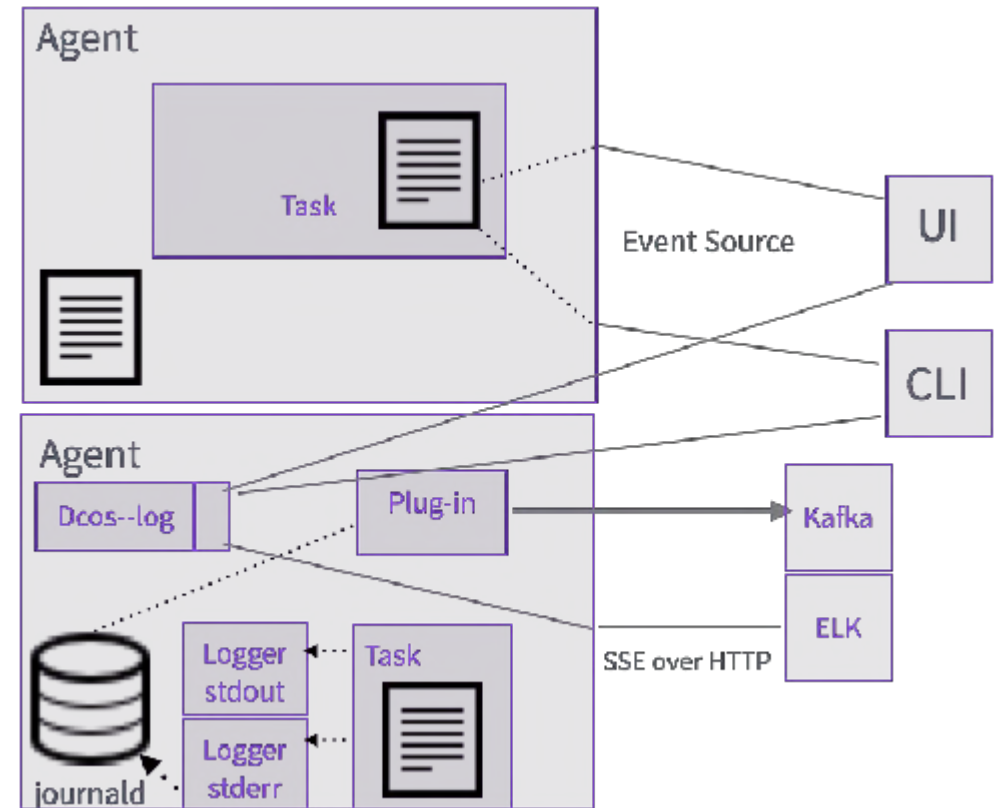
REMOTE CONTAINER SHELL

- Open encrypted, interactive, remote session to your containers
- Remotely execute commands for real time app troubleshooting
- Provide developers access to their own applications, not the entire host or cluster
- Restrict access to specific applications with Access Control Lists [Enterprise DC/OS only]

```
my-laptop$ dcos task exec my-task /bin/bash
Starting /bin/bash in my-task ...
Connecting to remote my-task ...
```

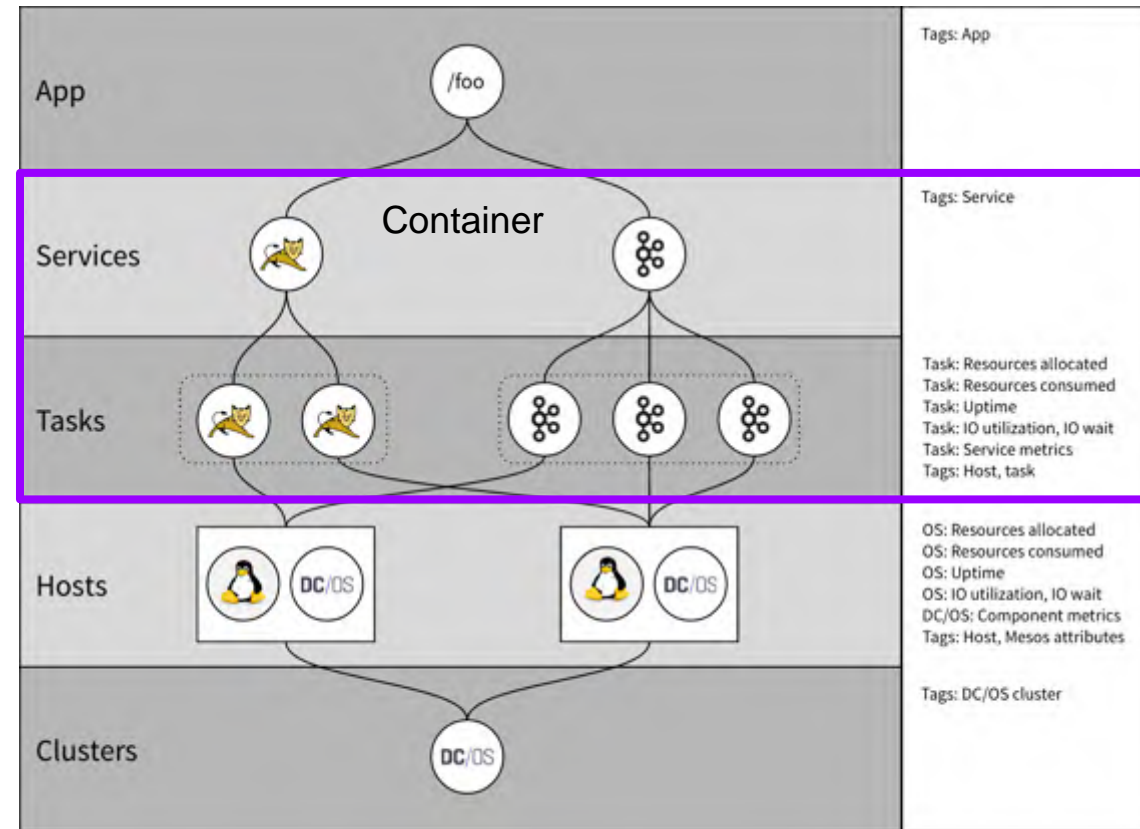
UNIFIED LOGGING

- Access application, DC/OS and OS logs
- Easily troubleshoot applications with critical metadata such as container id and app id
- Integrate easily with existing logging systems
- Restrict access to specific app logs with Access Control Lists [Enterprise DC/OS only]



UNIFIED METRICS

- Single API for system, container and application metrics
- Metadata such as host id and container id are automatically added to assist in debugging
- Integrate easily with existing metrics systems
- Restrict access to specific app metrics with Access Control Lists [Enterprise DC/OS only]



DEPLOYMENT FAILURE DEBUGGING

- Understand why your application is not deploying
- Understand which nodes in the cluster can accommodate the role, constraints, cpu, mem, disk and port requirements for your app

Recent Resource Offers (5)

When you attempt to deploy a service, DC/OS waits for offers to match the resources your service requires. If the offer does not satisfy the requirement, it is declined and DC/OS retries. [Learn more.](#)

Summary



Details

HOST	ROLE	CONSTRAINT	CPU	MEM	DISK	PORT	RECEIVED
10.0.1.155	✓	✓	✓	✗	✓	✓	2 minutes ago
10.0.3.205	✓	✓	✓	✗	✓	✓	2 minutes ago
10.0.3.241	✓	✓	✓	✗	✓	✓	2 minutes ago
10.0.4.213	✗	✓	✗	✗	✓	✓	2 minutes ago

UPGRADES AND CONFIG UPDATES

- Generate new config for cluster nodes

```
$ dcos_generate_config.sh --generate-node-upgrade-script  
<installed_cluster_version>
```

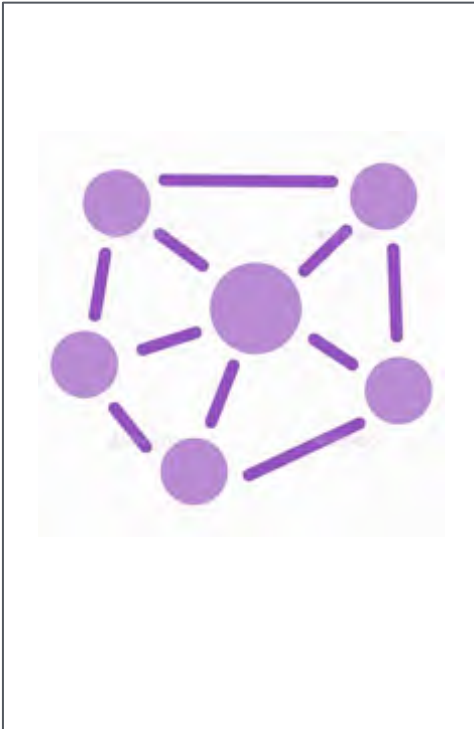
- Single command upgrade script for individual nodes

```
$ curl -O <Node upgrade script URL>  
$ sudo bash ./dcos_node_upgrade.sh
```

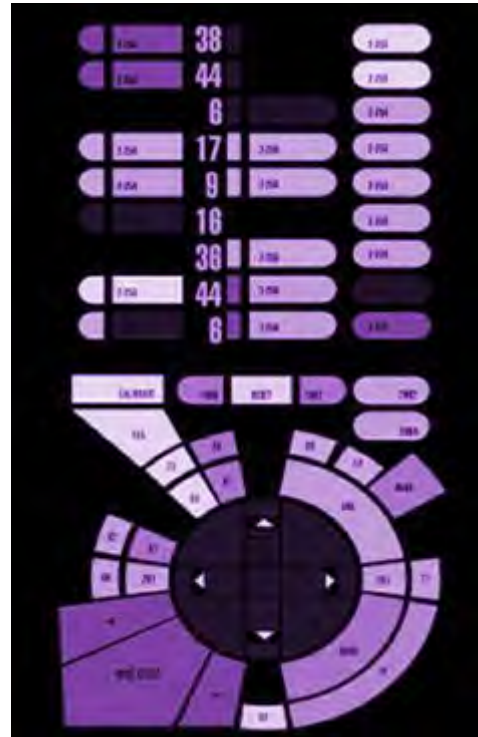


KEY THEMES - DC/OS 1.9

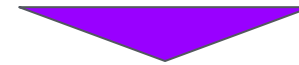
DATA SERVICES ECOSYSTEM



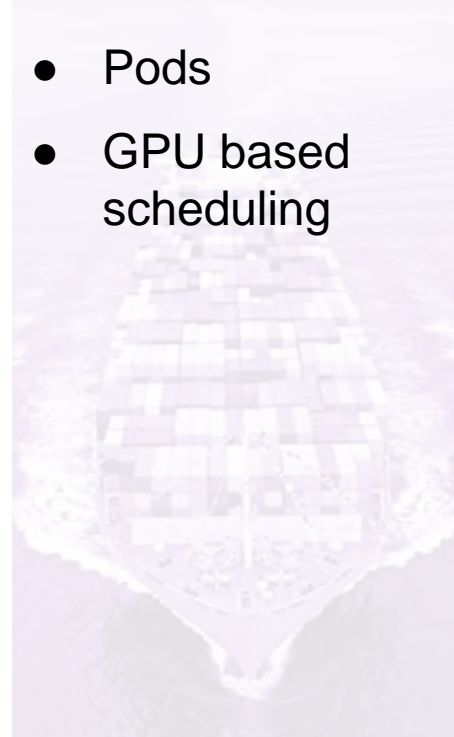
OPERATIONS



WORKLOADS



- Pods
- GPU based scheduling

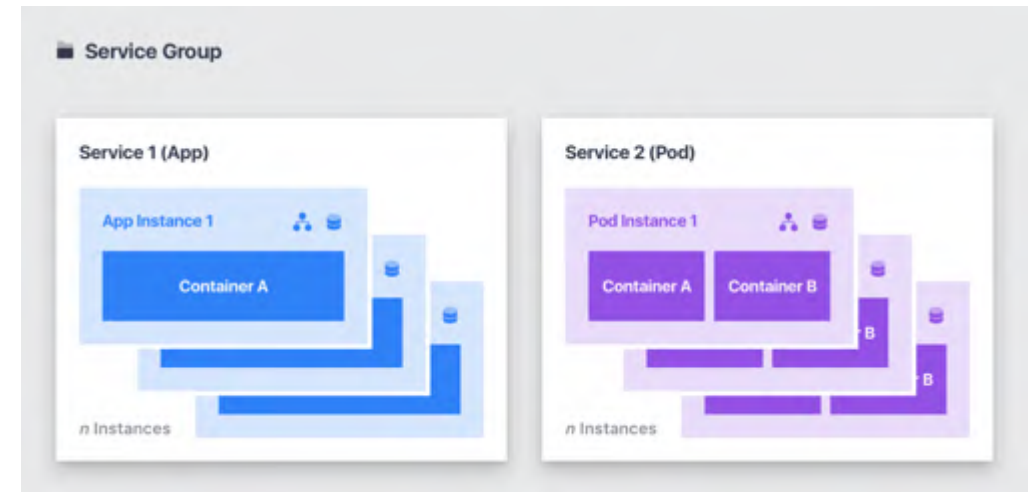


COMPLIANCE REPORTS



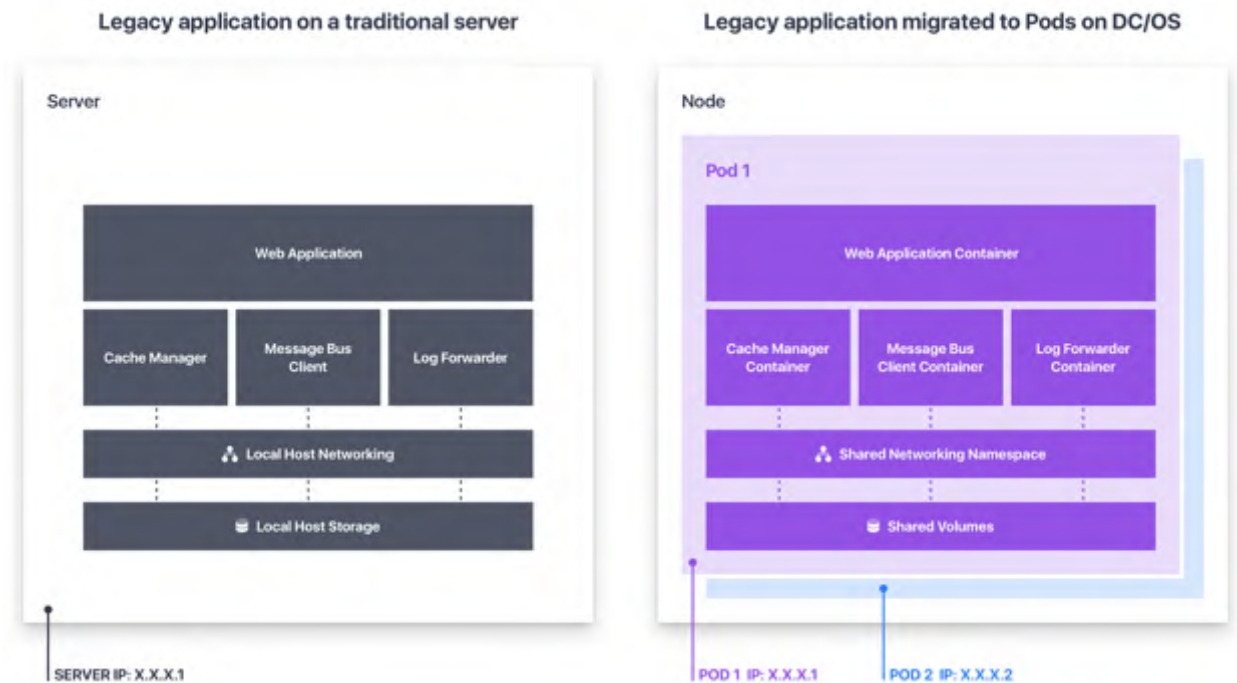
PODS

- Schedule, deploy and scale multiple containers on the same host(s) while sharing IP address and storage volumes
- All containers in a pod instance run as if they are running on a single host in pre-container world
- Useful for migrating legacy applications or building advanced micro services (side car containers)



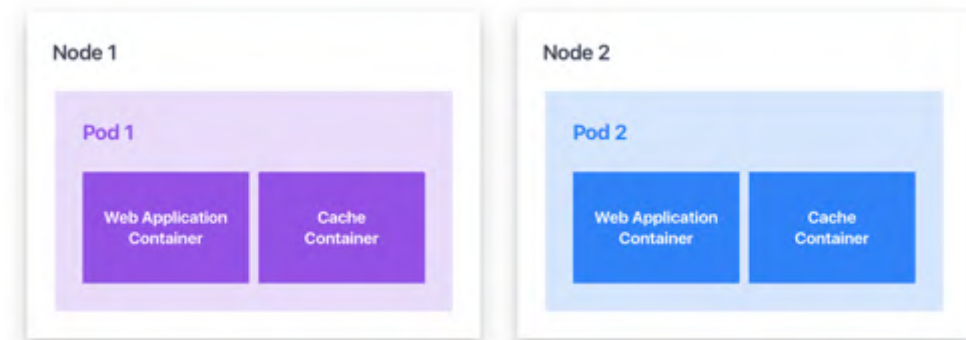
PODS: MIGRATING LEGACY APPS TO CONTAINERS

- Traditional monolithic apps on VMs usually have support services such as log shipper, message queuing clients
- Many support services assume collocation on same host, and local-host access to networking and storage
- Pods simplify moving legacy monolithic apps to containers, reducing risk and accelerating migrations



PODS: SUPPORT SERVICES (SIDE-CAR CONTAINERS)

- Advanced Micro Services patterns require colocating containers together
- Support services include for example:
 - Logging or monitoring agents,
 - Backup tooling & Proxies
 - Data change watchers & Event publishers
- Pods simplify the building and maintenance of complex such microservices



GPU: WHY GPU?

- GPUs are needed for many machine learning and deep learning applications
- GPUs are essential for real-time or near real time machine learning models
- GPUs deliver from 10X to 100X performance for some applications, resulting lower \$\$\$/IOPS and more productivity to data science teams
- GPU applications include real time fraud detection, genome sequencing, cohort analysis and many others

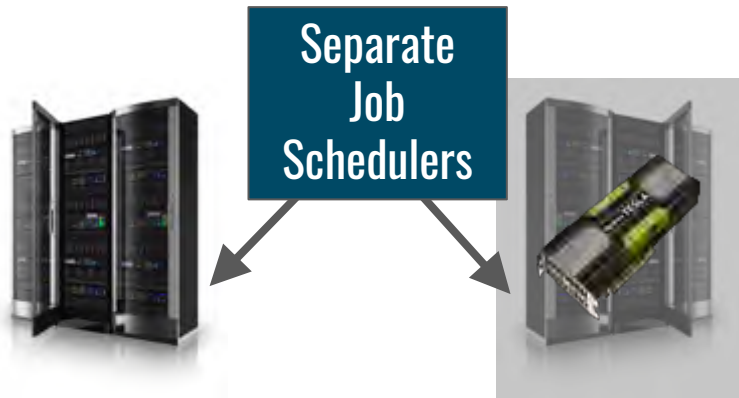
GPU ACCELERATION

Training A Deep, Convolutional Neural Network

Batch Size	Training Time CPU	Training Time GPU	GPU Speed Up
64 images	64 s	7.5 s	8.5X
128 images	124 s	14.5 s	8.5X
256 images	257 s	28.5 s	9.0X

- ILSVRC12 winning model: "Supersession"
- 7 layers
- 5 convolutional layers + 2 fully-connected
- ReLU, pooling, drop-out, response normalization
- Implemented with Caffe
- Dual 10-core Ivy Bridge CPUs
- 1 Tesla K40 GPU
- CPU times utilized Intel MKL BLAS library
- GPU acceleration from CUDA matrix libraries (cuBLAS)

CHALLENGES WITH GPU CLUSTERS



SILOS



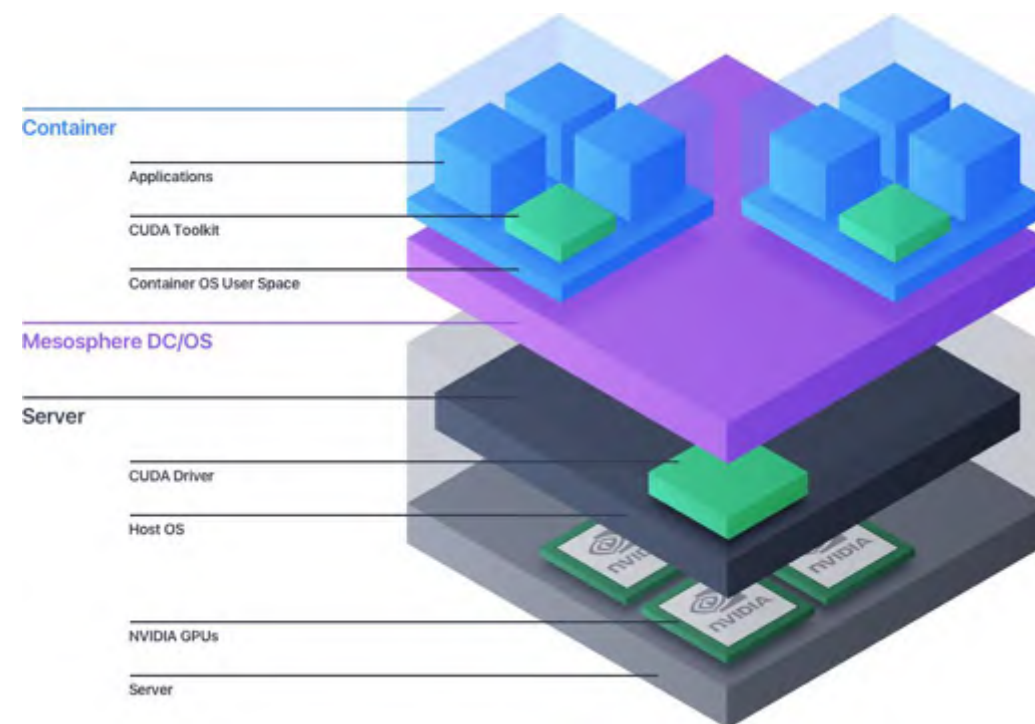
NO ISOLATION



NO PORTABILITY

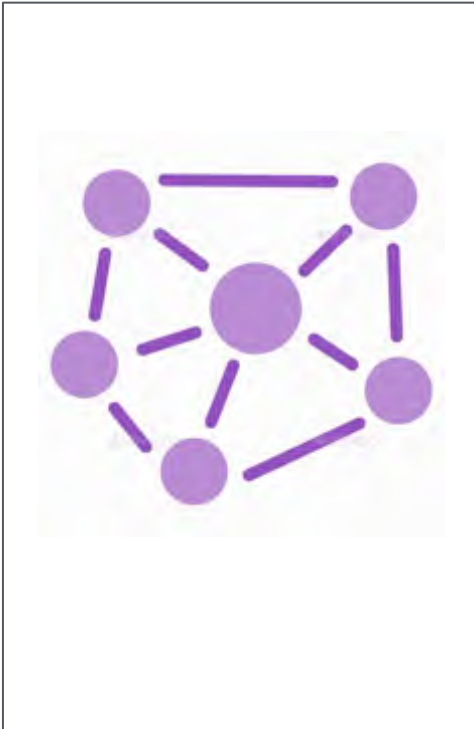
GPU BASED SCHEDULING

- Simplify migrating machine learning models across from dev to production, and across clouds
- Test locally with Nvidia-Docker, deploy to production with DC/OS
- Isolate GPU instances and schedule workloads just like CPU and memory, guaranteeing performance
- Efficiently share GPU resources across data science team

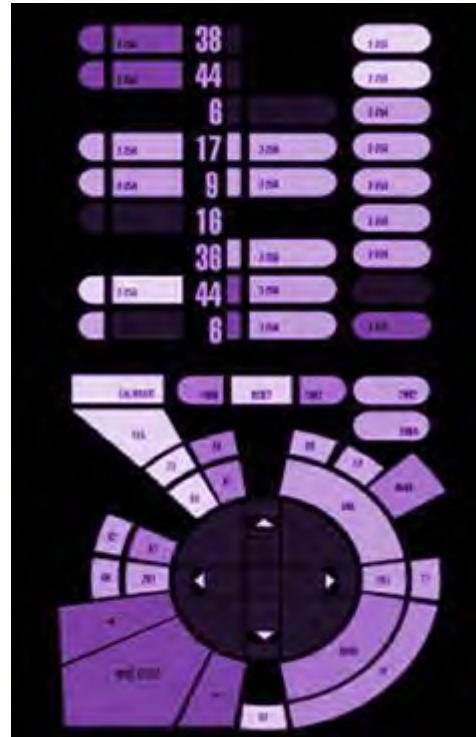


KEY THEMES - DC/OS 1.9

DATA SERVICES ECOSYSTEM



OPERATIONS



WORKLOADS



COMPLIANCE REPORTS

- NIST-800/53
- ISO 27001
- FISMA-Mod.
- SOC-2
- HIPAA

WHICH CERTIFICATION FOR WHAT?

FISMA-Moderate

- **Top Level Federal/DoD Controls report**
- **Superset of**
 - NIST-800
 - Specific STIGs
 - FIPS 140-2 controls

ISO-27001

- *International Standard around Information Security Risk procedures.*
- *Widely accepted by non-US GEOs*

SOC-2

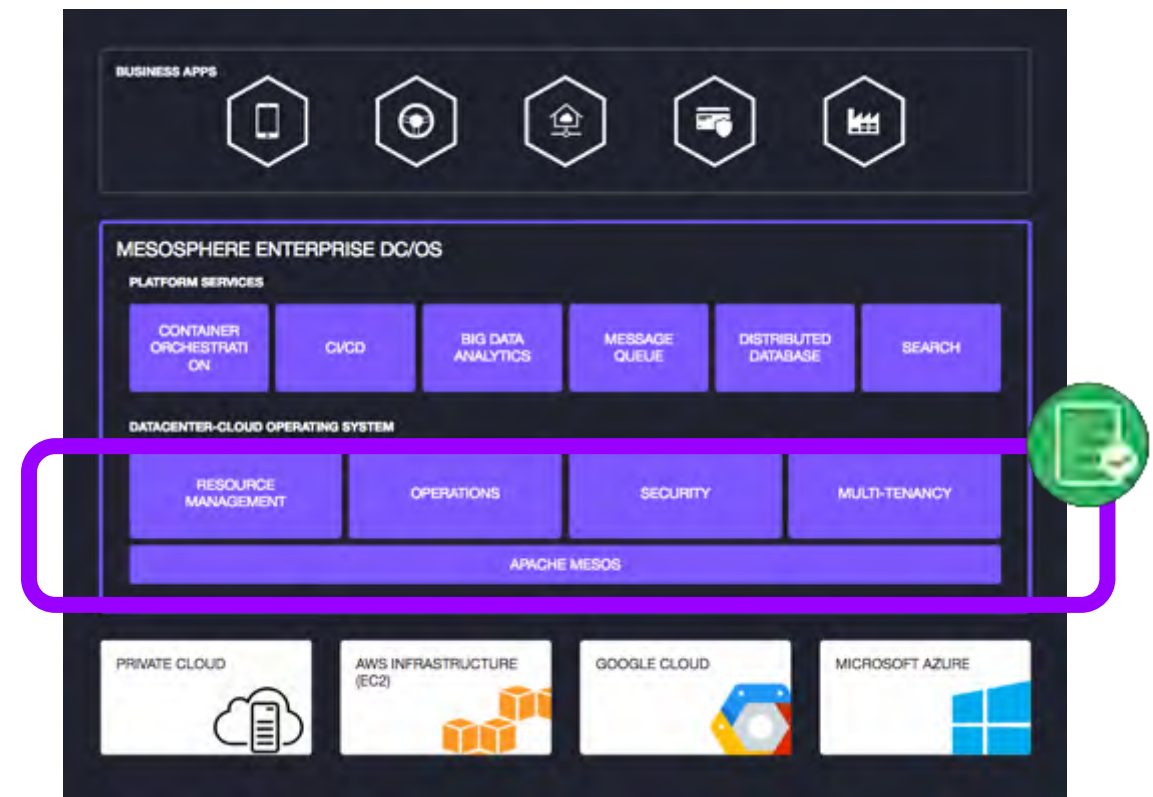
- *Required by anyone who stores or processes any kind of business financial data*

HIPPA

- *Required by any organization that processes or stores healthcare data.*

ACCELERATE CERTIFICATION WITH DC/OS COMPLIANCE REPORTS

- Jump Start Complete installation compliance audit process.
- Understand how DC/OS meets various compliance controls.
- Understand where to put workaround or human controls
- Identify any high value gaps and possible remediation plans
- Accelerate time to on-boarding business critical applications.



OTHER IMPROVEMENTS

Mesos 1.2

Marathon 1.4

Docker 1.12 and 1.13 (17.03-ce) support

Centos 7.3 and CoreOS 1235.12.0 support

Performance improvements across all networking features.

CNI support for 3rd party CNI plugins.

100s of additional bugfixes and tests

MESOSPHERE DC/OS: THE PLATFORM FOR MODERN DATA-RICH APPS

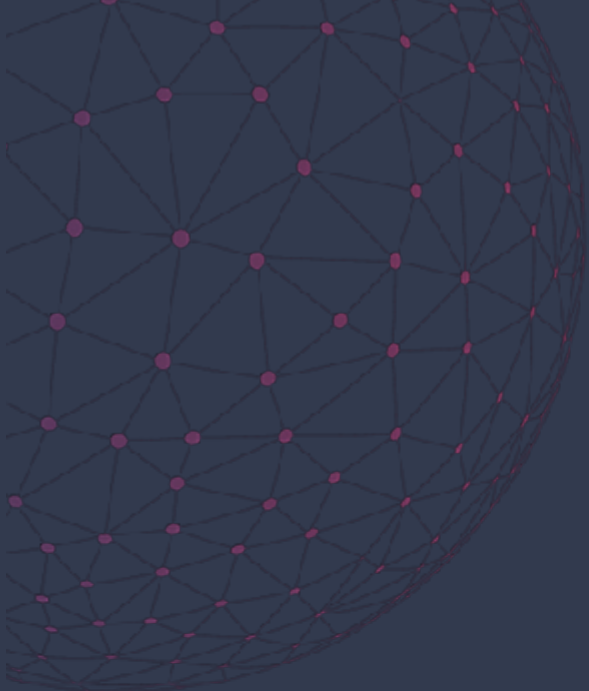
Mesosphere DC/OS provides the power of AWS-like platform services and the freedom to run on any infrastructure

New with Mesosphere DC/OS 1.9:

- **Fast-growing data services ecosystem with:** Alluxio, Couchbase, Datastax DSE, Elastic (ELK), Apache Flink, Redis; (Now 100+ services available)
- Simplified operations with **remote container shell, unified metrics and logging**
- Migrate legacy workloads with **Pods** and accelerate machine learning applications with **GPU based scheduling**
- Accelerate mission critical apps with **compliance reports**



MESOSPHERE



MESOSCON ASIA '17 BEIJING 6/20-22

Learn more by visiting

<http://events.linuxfoundation.org/events/mesoscon-asia>