Day 2 Operations of Cloud-Native Systems

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MESOSPHERE

Elizabeth K. Joseph, Developer Advocate

- ❏ 15+ years working in open source communities
- ❏ 10+ years in Linux systems administration and engineering roles
- ❏ Founder of OpenSourceInfra.org
- ❏ Author of The Official Ubuntu Book and Common OpenStack Deployments

Day 2 Operations

Anyone can write a deployment tool.

What’s next?

Cloud-Native Systems

You no longer have a single server with everything running on it.

It’s now a multi-tier system with various owners down the stack:

- ❏ Network
- ❏ Hardware
- ❏ Resource abstraction
- ❏ Scheduler
- ❏ Container
- ❏ Virtual network
- ❏ Application
- ❏ ...

Unification of tooling

This gets out of hand very quickly

Unification of operations and tracking becomes important

- Reduces resource consumption (multiple monitoring & logging agents, etc)
- Simplifies troubleshooting (tracing a problem through the stack)
- Consolidates view for all parties (from operations to app developers)

DAY 2 OPERATIONS

Metrics and Monitoring

- Collecting metrics
- Downstream processing
    - Alerting
    - Dashboards
    - Storage (long-term retention)

Logging

- Scopes
- Local vs. centralized
- Security considerations

DAY 2 OPERATIONS

Maintenance

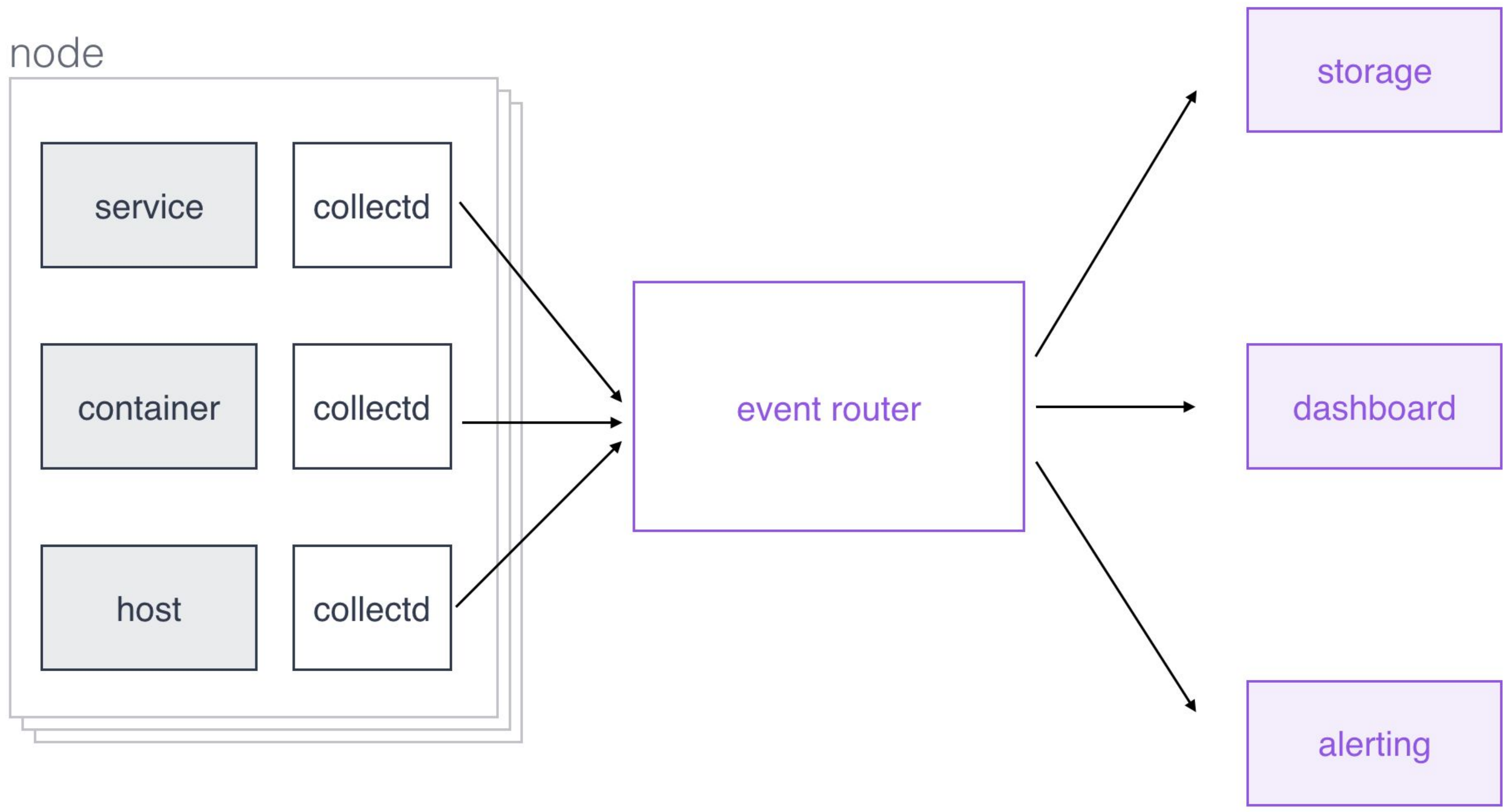
- Cluster Upgrades
- Cluster Resizing
- Capacity Planning
- User & Package Management
- Networking Policies
- Auditing
- Backups & Disaster Recovery

Troubleshooting

- Debugging
  - Services
  - System
- Tracing
- Chaos engineering

METRICS & MONITORING

METRICS CONCEPTS



METRICS TOOLCHAIN

- local scraping:
  a. collectd
  b. cAdvisor
- event router:
  a. fluentd
  b. Flume
  c. Kafka
  d. logstash
  e. Riemann

METRICS TOOLCHAIN

- storage:
  a. Elasticsearch
  b. Graphite
  c. InfluxDB
  d. KairosDB/Cassandra
  e. OpenTSDB/HBase
  f. others such a local filesystem, Ceph FS, HDFS, etc.

METRICS TOOLCHAIN

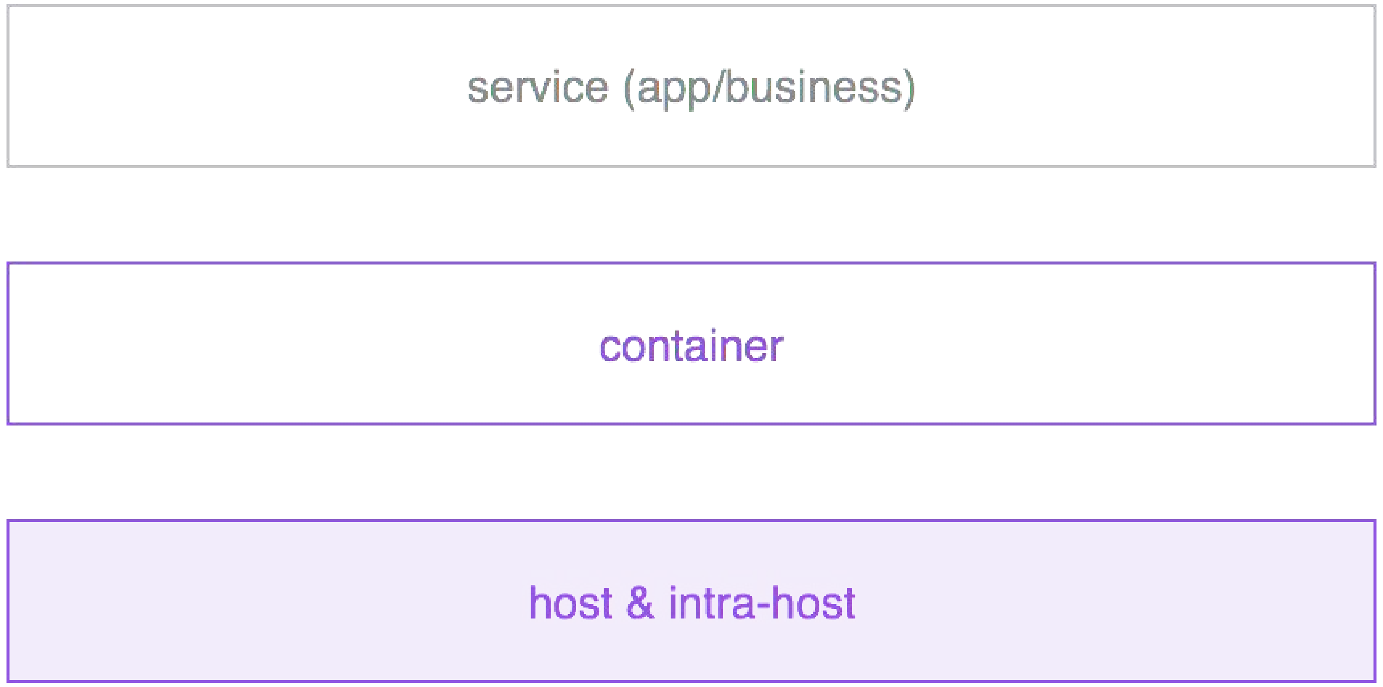
- dashboard:
  a. D3
  b. Grafana
  c. signal fx
- alerting:
  a. BigPanda
  b. PagerDuty
  c. signal fx
  d. VictorOps

INTEGRATED METRICS TOOLCHAIN

- Amazon CloudWatch
- AppDynamics
- Azure Monitor
- Circonus
- DataDog
- dcos/metrics
- Ganglia
- Google Stackdriver
- Hawkular
- Icinga
- Librato
- Nagios
- New Relic
- OpsGenie
- Pingdom
- Prometheus
- Ruxit Dynatrace
- Sensu
- Sysdig
- Zabbix

LOGGING

LOGGING SCOPES



LOGGING TOOLING EXAMPLES (PRIMITIVES)

- DC/OS logging overview
- Docker logging drivers
- systemd's journalctl

LOGGING TOOLING EXAMPLES (INTEGRATED)

- Centralized app logging with fluentd
- DC/OS
  a. ELK stack log shipping
  b. Splunk
- Graylog
- Loggly
- Papertrail
- Sumo Logic

TROUBLESHOOTING

Incl. examples with DC/OS

Effective troubleshooting

A high level view to discover where the error or failure has occurred (preferably a unified view)

Tooling for tracing an error through the stack (systems, networks, etc)

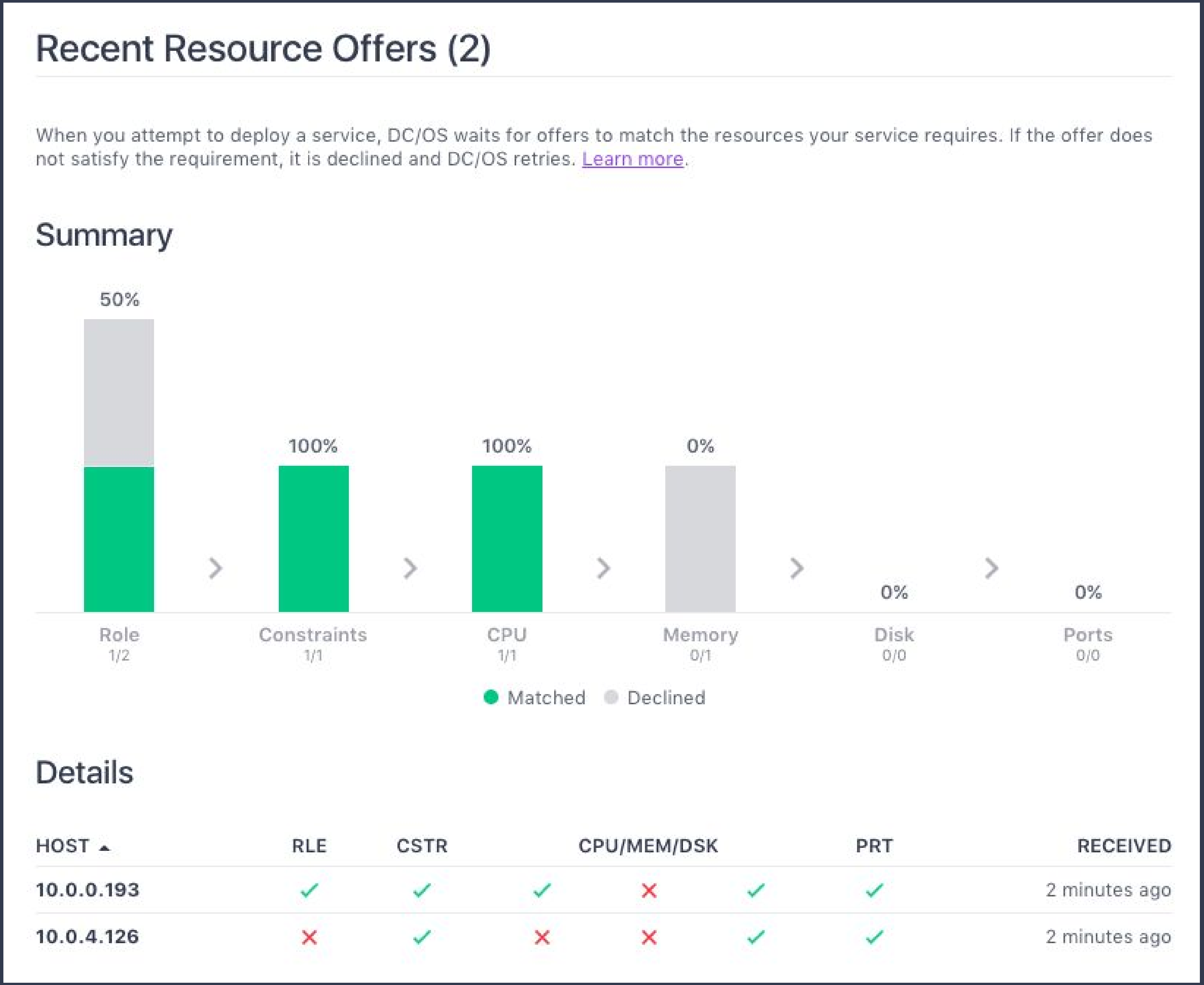
Team communication and tooling for delegating solutions responsibility

DEBUGGING 101

- *Services*: typically specific to service, use logging (for example, `dcos task log`) and `dcos node ssh` or `dcos task exec` for per-node investigations

- *System*:
    - Simple [diagnostics]() via `dcos node diagnostics`
    - Comprehensive dump via [clump]()
    - Services deployment troubleshooting dashboard

Debugging Dashboard



Recent Resource Offers (2)

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 ▲	RLE	CSTR	CPU/MEM/DSK			PRT	RECEIVED
10.0.0.193	✓	✓	✓	✗	✓	✓	2 minutes ago
10.0.4.126	✗	✓	✗	✗	✓	✓	2 minutes ago

OTHER TROUBLESHOOTING TECHNIQUES

- Tracing
  - Idea: identify latency issues and perform root-cause analysis in a distributed setup
  - OpenTracing

- Chaos Engineering
  - Idea: proactively break (parts of) the system to understand how it reacts
  - Chaos Monkey
  - DRAX

MAINTENANCE & BEYOND

Overview

Upgrades

Sizing

User and package management

- How to install a new version of X?
- When to scale what (service-level vs. nodes)
- Who gets to access/install which services in what way?

Networking

Auditing

Disaster Recovery

- Is everything getting where it needs to be? Does some traffic need priority?
- What services can talk to each other and in which way?
- Who accessed what, when and how?
- How is the continuous operation of the cluster and the services accomplished? What happens when cluster (or critical infra components like ZK) go down?

To conclude

Properly managing cloud-native systems is complicated!

- ❏ Ask the right questions
- ❏ Have a checklist of considerations and plan in time to accomplish everything
- ❏ Unify as much as you can

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Questions?
Feedback?

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