Container Federation Use Cases

Ricardo Rocha <ricardo.rocha@cern.ch>

CERN IT-CM-RPS

Motivation for Federation

Periodic Load Spikes

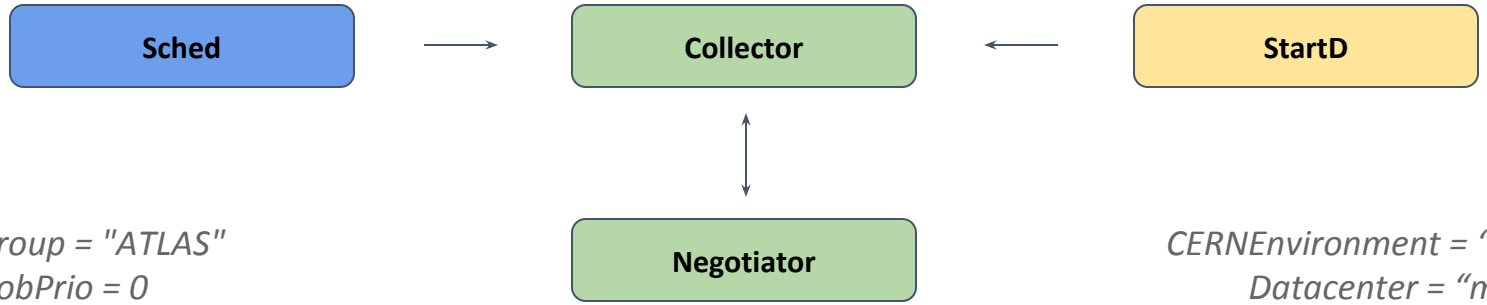
International Conferences, Reconstruction Campaigns

Simplification

Monitoring, Lifecycle, Alarms

Deployment

Uniform API, Replication, Load Balancing



AcctGroup = "ATLAS"
JobPrio = 0
RequestCpus = 2
RequestMemory = 4260
...

CERNEnvironment = “production”
Datacenter = “meyrin”
HasMPI = true
TotalCpus = 8
TotalMemory = 22500
...

Matchmaking with ClassAds

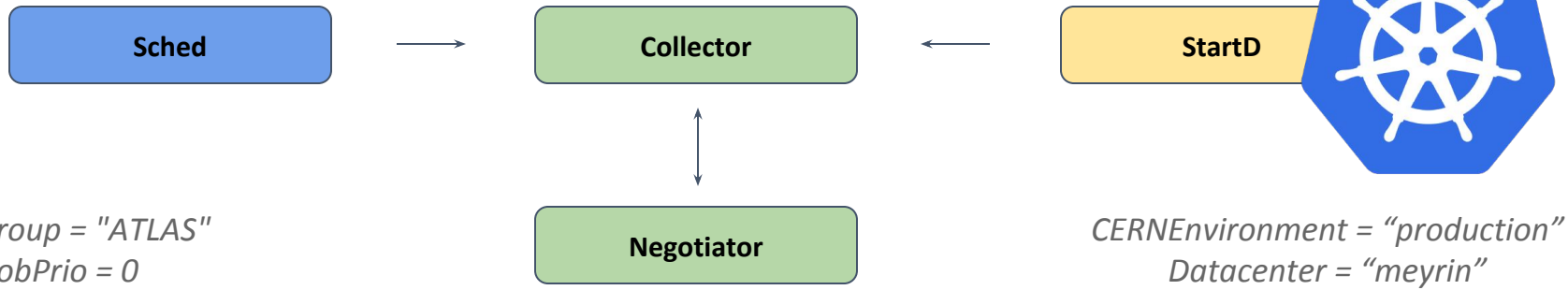
Fair Share

Preemption

Extensive Experience in HEP

Running Virtualized

External Storage and Networking



Matchmaking with ClassAds

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Host

Sched

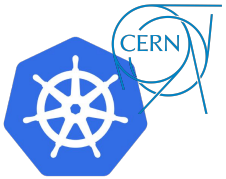
Collector

Negotiator

kubefed init fed --host-cluster-context=condor-host ...

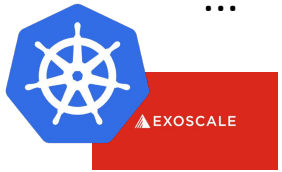
StartD

...



StartD

...



StartD

...

```
kind: DaemonSet
...
  hostNetwork: true
  containers:
    - name: condor-startd
      image: .../cloud/condor-startd
      command: ["/usr/sbin/condor_startd", "-f"]
      securityContext:
        privileged: true
      livenessProbe:
          exec:
            command:
            - condor_who
```

Host

Sched

Collector

Negotiator

```
kubefed init fed --host-cluster-context=condor-host ...

kubefed  join --context fed tsystems \
      --host-cluster-context condor-host --cluster-context tsystems
```

REANA / RECAST

Reusable Analysis Platform

Workflow Engine (Yadage)

Each step a Kubernetes Job

Integrated Monitoring & Logging

Centralized Log Collection

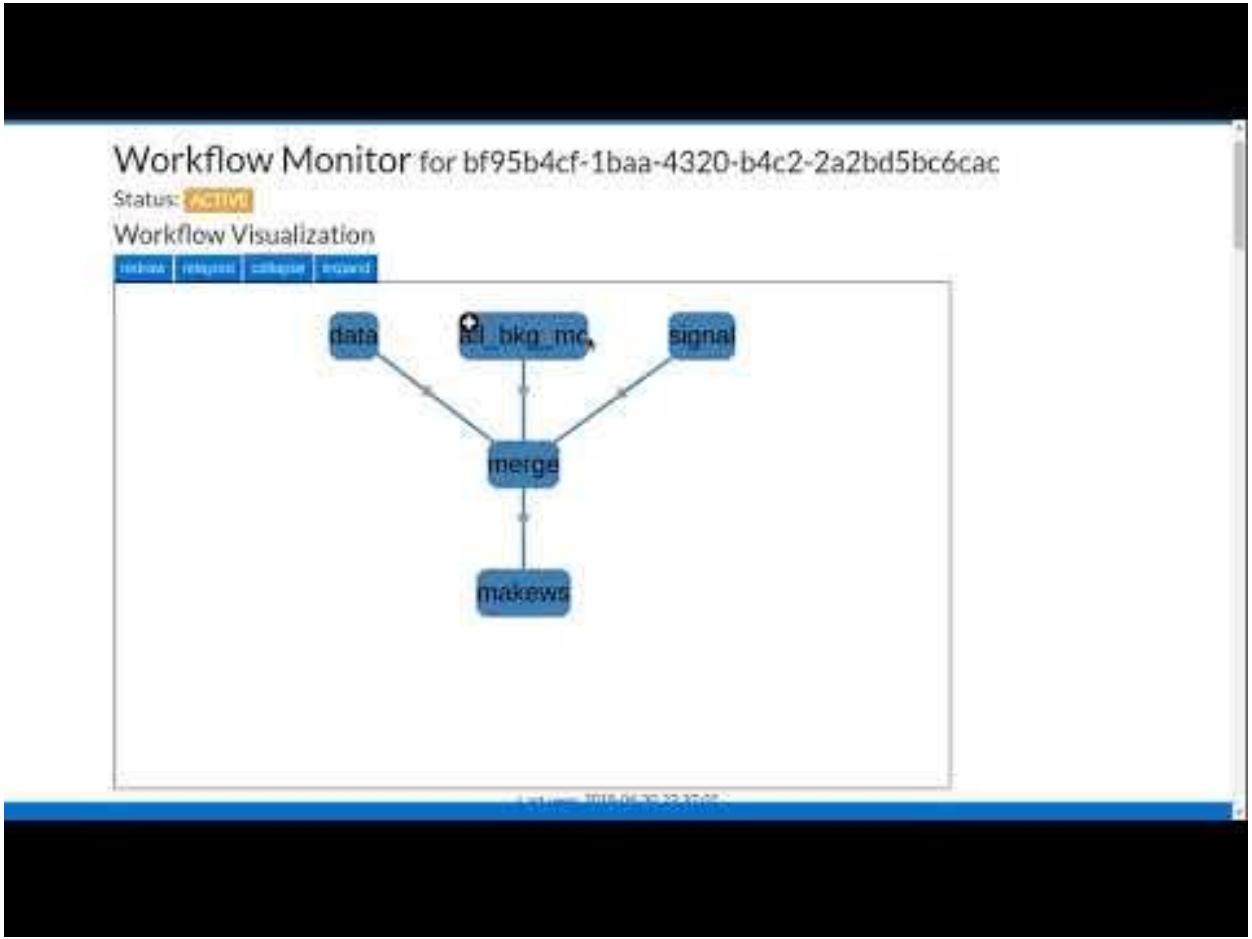
https://github.com/recast-hep https://github.com/diana-hep/yadage https://github.com/reanahub

Summary

- Federation support in Kubernetes is ready
  - Ongoing development for the v2 API, with significant changes
  - Work with the community to have our use case taken into account

- Initial use cases
  - Started with a legacy application, limited integration
  - Expanded to a *cloud native* implementation, with great results

- Ongoing work to expand its usage
  - Use built-in “Kubernetes As a Service” capabilities
  - Investigations on how to best handle data distribution



https://www.youtube.com/watch?v=jNyd97LiTXk