Kubernetes as a batch scheduler (and more...)
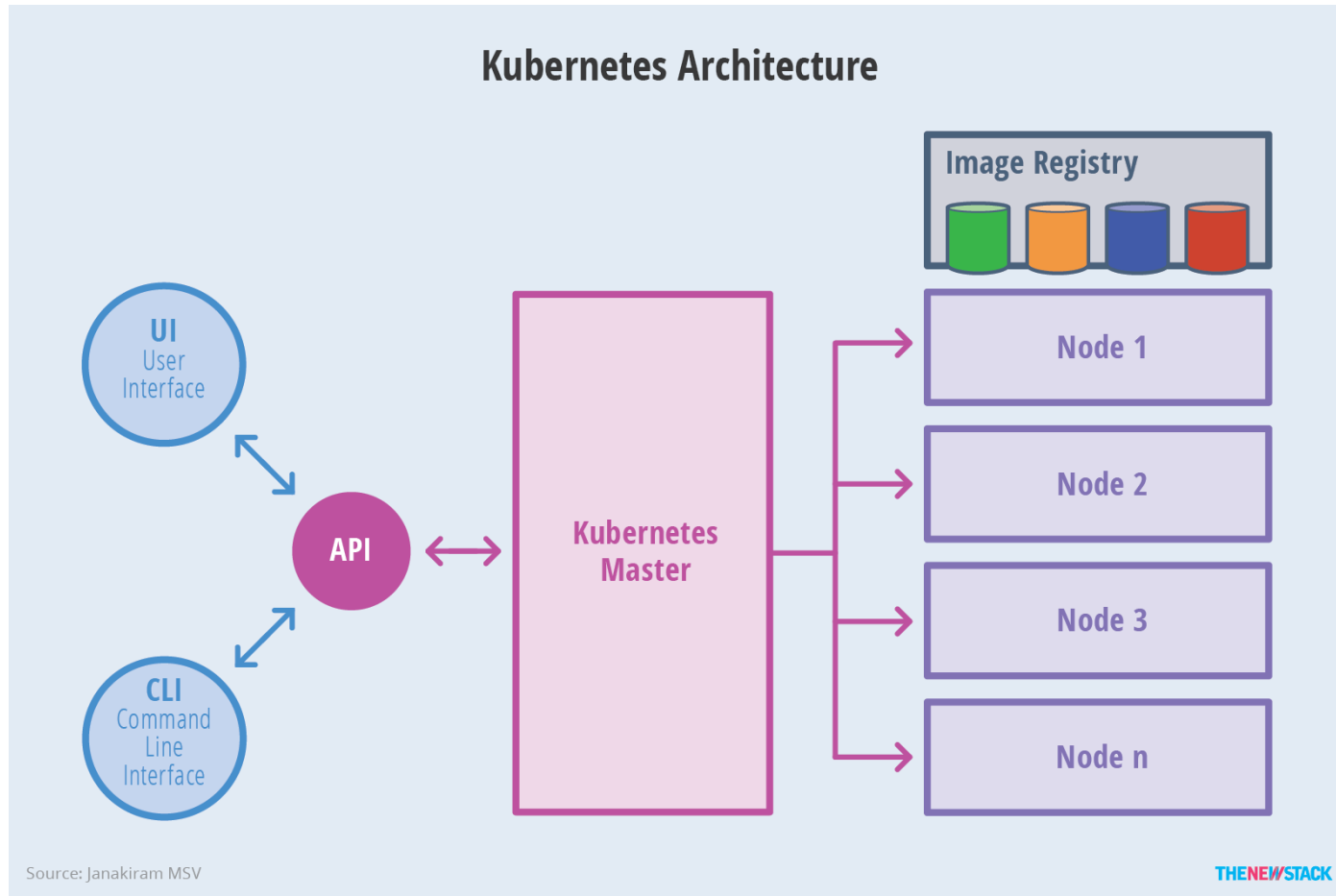
Clenimar Filemon – Aug/2017

Kubernetes

An introduction

- We love containers

- Logical infrastructure instead of physical infrastructure

  – Application-centric

  – Single entry point: all nodes behave as one single machine
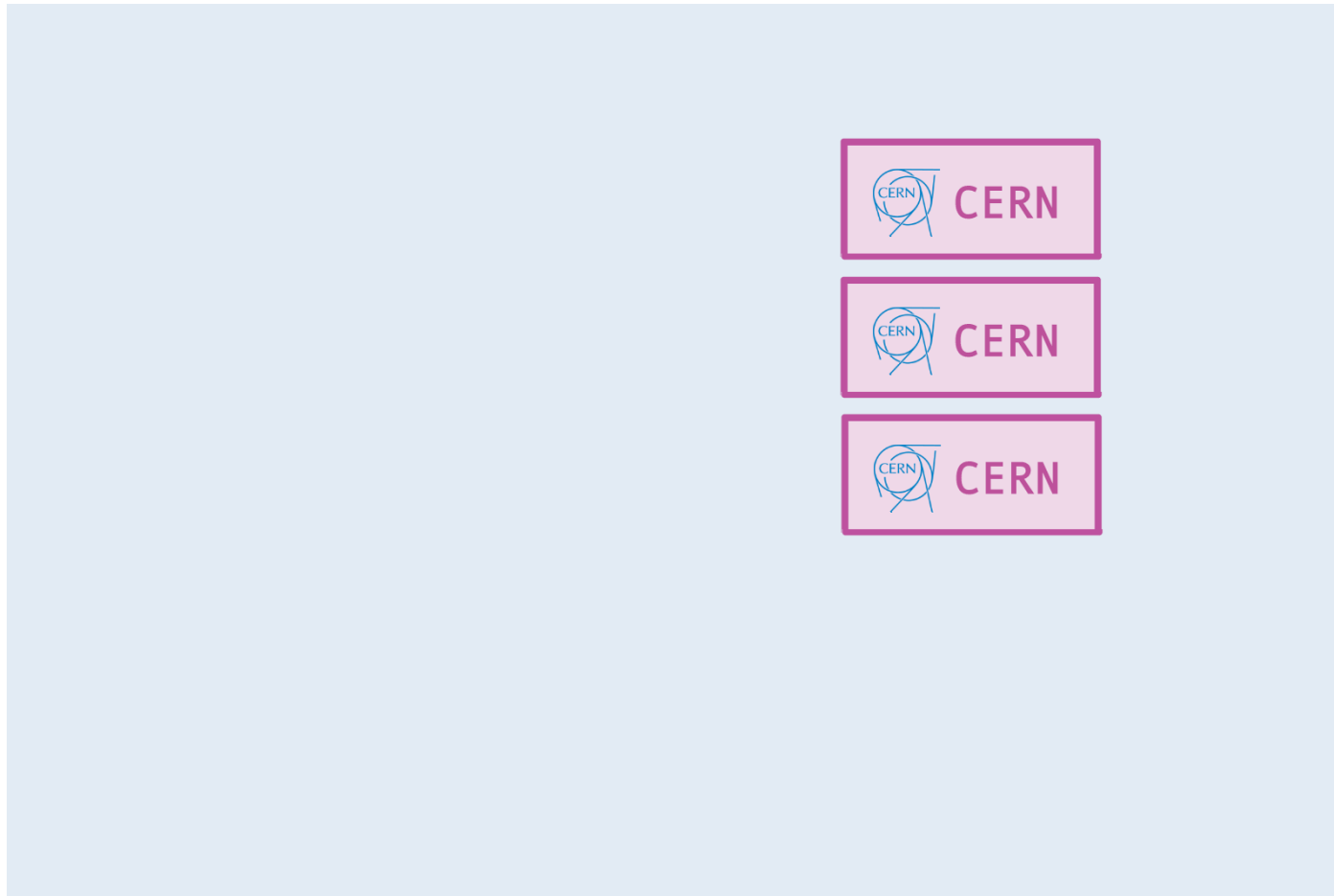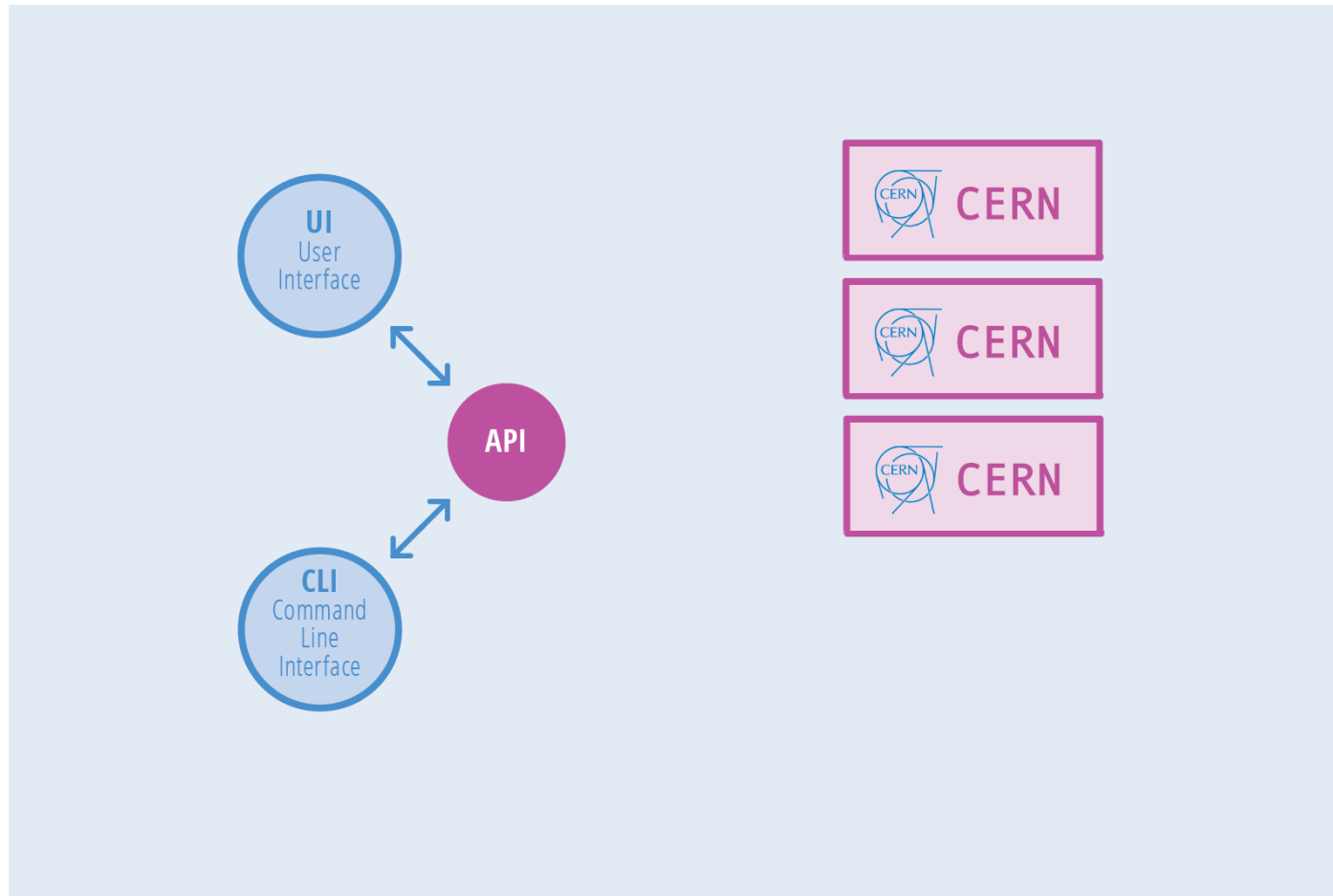
Kubernetes

An introduction
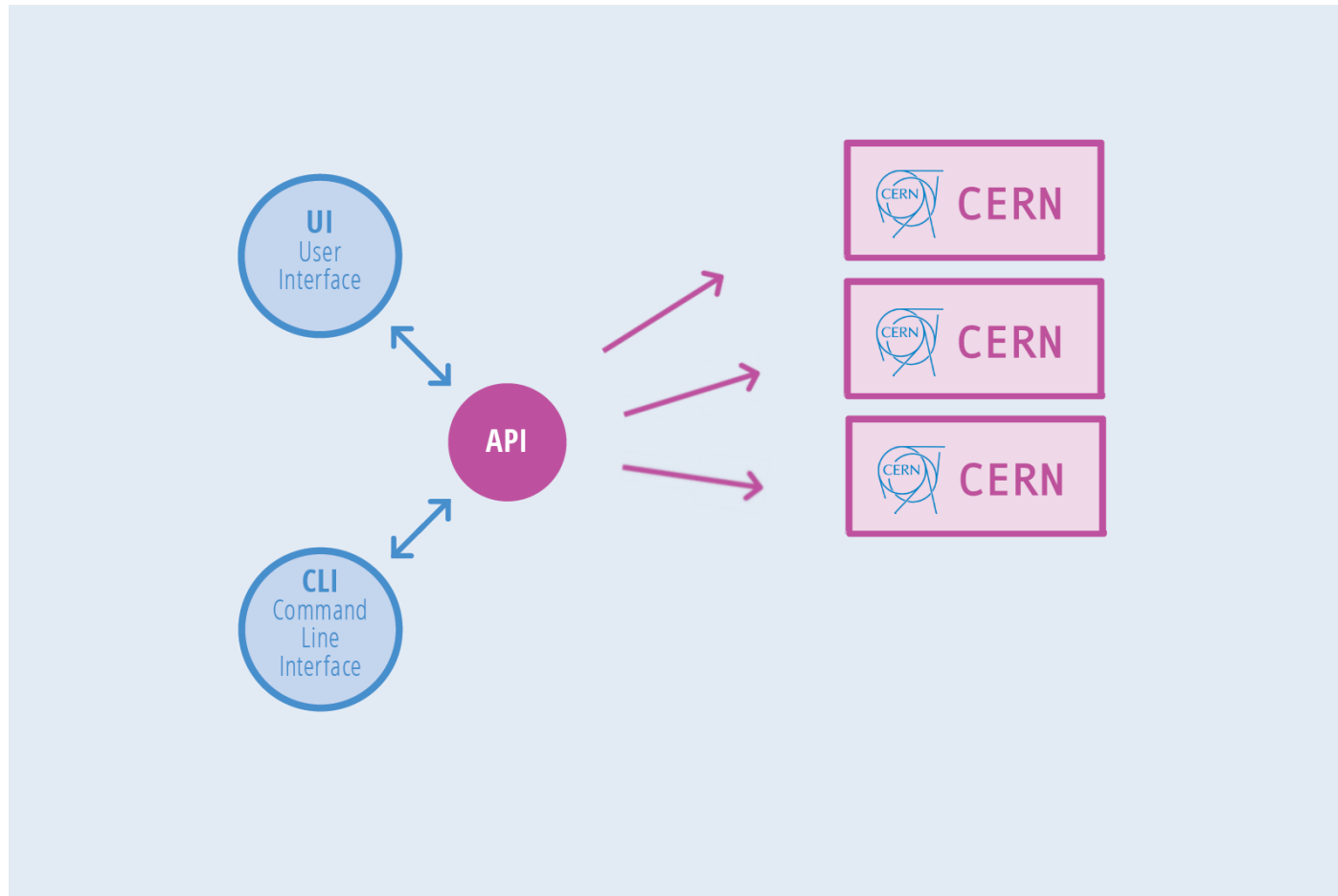
Cluster federation with Kubernetes

Goals

Cluster federation with Kubernetes

Goals
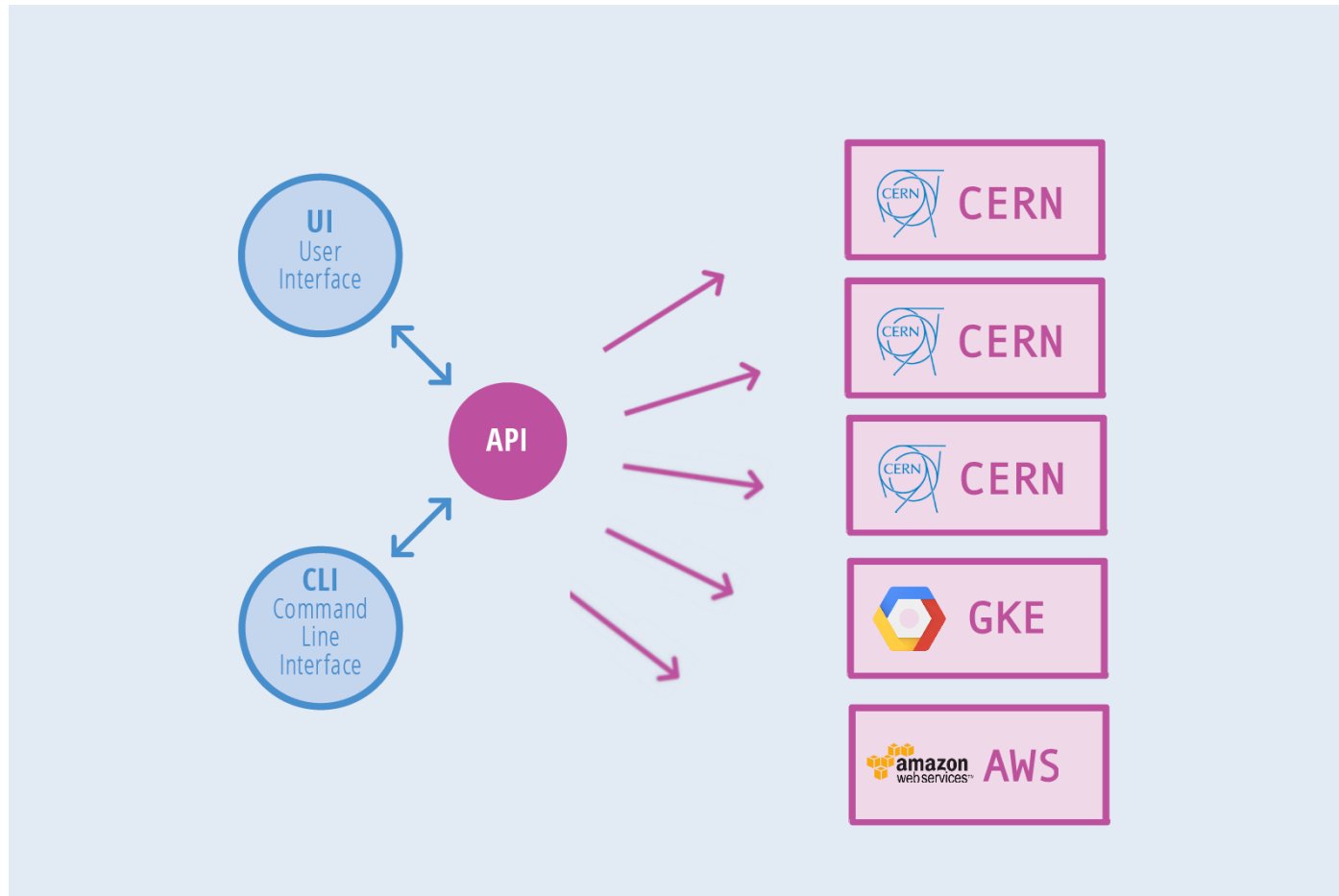
Cluster federation with Kubernetes

Goals

Cluster federation with Kubernetes

Goals

Cluster federation with Kubernetes

Goals

- Federate!

- Spread workloads to multiple clusters, to the public cloud...

- Cloud-bursting scenarios

Cluster federation with Kubernetes

Current status

- Federation with CERN clusters running

- Introducing HF (a.k.a. Hybrid Federation):

    - CERN, GKE and Oracle

    - Up and running!

    - ```
      $ kubectl get clusters --context=fed
      NAME                        STATUS      AGE
      cern-c1                     Ready       5d
      cern-c2                     Ready       5d
      gke-c1                      Ready       5d
      oracle-c1                   Ready       5d
      ```

Cluster federation with Kubernetes

Future steps

- Bring LHF (Large Hybrid Federation) to life

    - CERN, GKE, Oracle, AWS and Azure: up and running!

    - Run a distributed batch workload on it

    - See what's possible, what's missing…

- Run a real ATLAS use case!

    - What are the advantages? And downsides?

Magnum Federation API

Goals

- Add federation support to Magnum

  - Magnum Federation API

  - Command line interface commands

  - Make it easier (and painless) to manage Kubernetes federations!

Magnum Federation API

Goals

```
$ openstack coe federation create myfederation –master cluster1

$ openstack coe federation join myfederation cluster2 cluster3

$ openstack coe federation show myfederation

+------------------------+------------------------------------------+
| Property               | Value                                    |
+------------------------+------------------------------------------+
| uuid                   | 5b2ee3b5-2f85-4917-be7c-11a2c82031ad     |
| name                   | myfederation                             |
| master                 | <uuid-cluster1>                          |
| members                | ['<uuid-cluster2>', '<uuid-cluster3>']   |
| project_id             | ae72a4f3-30cf-4406-83b4-40b16bb480d6     |
| properties             | dns=cluster.local                        |
| status                 | UPDATE_COMPLETE                          |
| status_reason          | Federation UPDATE completed successfully |
+------------------------+------------------------------------------+
```

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Magnum Federation API

Current status

- Magnum Federation API on the way

    - API spec submitted for review:

        - https://review.openstack.org/#/c/489609/

    - Initial phases implemented (DB tables, data model, entities, controllers…)

Magnum Federation API

Future steps

- Push Magnum Federation API forward

  – Get the spec merged

  – Push the implementation upstream (at least the initial phases)

CERN
openlab

Thank you!

Questions?

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