Containers at Scale

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Leverage Containers

in High Energy Physics and elsewhere

- Improve agility in deploying and rolling new software releases
- Isolation with kernel control groups and namespaces
- Faster than virtual machine, shared kernel
  - Non virtualization overhead
- Ease of use, microservices, container images, declarative deployments
- Integrate containers in the CERN cloud
  - Shared identity, networking integration, storage access, …
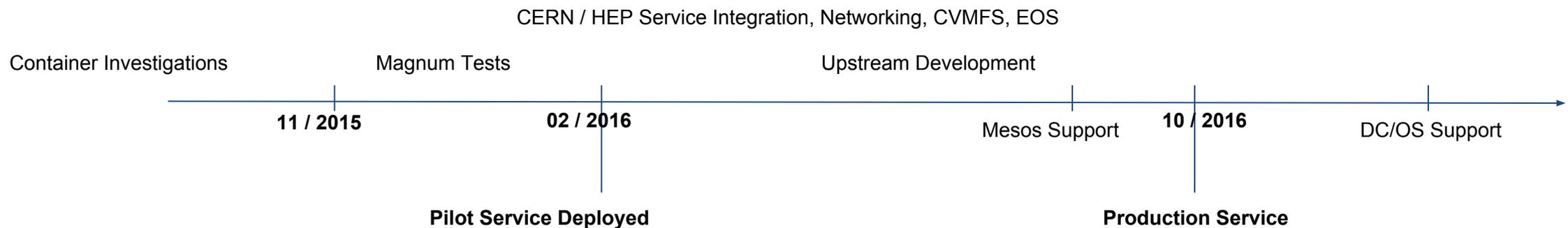- Immutable Infrastructure

CERN Container Service

And upstream contributions

- Based on OpenStack/Magnum
- Add Docker Swarm Mode support
- Run Kubernetes in containers
- Stabilize the project (more community friendly)
- Add security configurations
- Add more volume configuration options
- Lead the project for the next cycle
- Add Magnum tests to Rally

MAGNUM

an OpenStack Community Project

CERN / HEP Service Integration, Networking, CVMFS, EOS

Container Investigations   Magnum Tests   Upstream Development

11 / 2015   **02 / 2016**   Mesos Support   **10 / 2016**   DC/OS Support

Pilot Service Deployed   **Production Service**

Container Use Cases

- Batch Processing
- End user analysis / Jupyter Notebooks
- Machine Learning / TensorFlow / Keras
- Infrastructure Management
- Data Movement, Web servers, PaaS …
- Continuous Integration / Deployment
- Run OpenStack :-)
- And many others
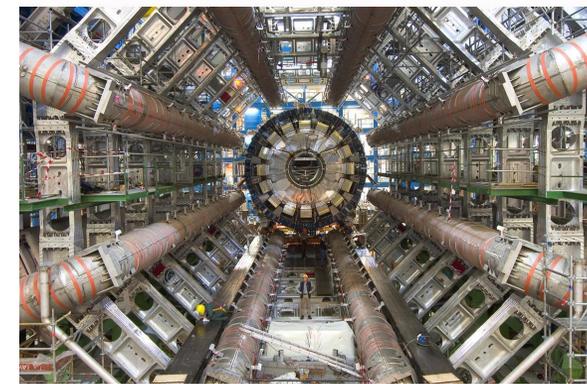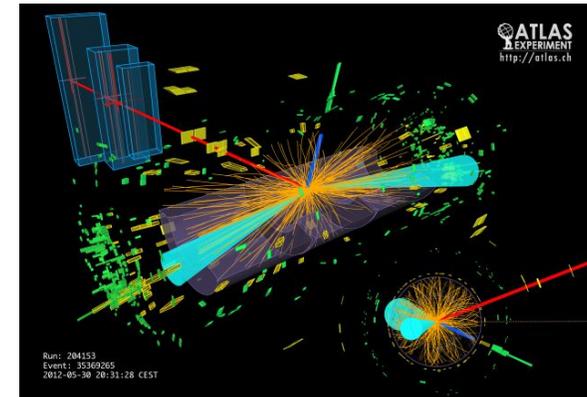
Next Steps

- Add cluster upgrades
  - Allow user to perform a cluster upgrade with one API call
  - Treat cluster node as immutable resources
- Add cluster federation
  - Allow multi-cloud deployments (AWS, GCP, Azure, Oracle cloud etc)
- Add more options for kuberentes
  - Kuryr integration
  - Different container backends CRI-O, Clear Containers
- Improve the OpenStack Cloud provider
- Improve CephFS support

QUESTIONS?

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