Outline

• CERN Control and Monitoring platform (C2MON)
• Why deploy a SCADA platform in the cloud?
• Cloud and containers at CERN
• What to look out for when moving to container-based deployments
Views showing the access status to the LHC tunnel and a CERN water Monitoring station (SPS Accelerator).
C2MON Design

Client layer (Web UI, RogueWave JViews)

Scalable messaging (ActiveMQ)

Data acquisition
Moving C2MON to the cloud
In the last four years, the cloud has changed drastically:

• Heavyweight virtual machines now host small containers.
• Containers are grouped into small private networks.
• All interaction points are self-documented (services, storage, ports).
• Continuous integration is part and parcel with deployment.
Intro to the CERN cloud

- Docker Swarm
- Kubernetes
- Openstack Magnum
- Red Hat OpenShift

OpenStack

- Kubernetes
- HAProxy
Containers and interfaces

- Network Ports
- Storage
- Configuration
- Service dependencies
Containers for C2MON

Being cloud-ready is not a given:

• Location, location, location
• Configuration and secrets
• Storage claims
• Outgoing connectivity
• Dependencies on other containers
C2MON container

- Network Ports
  - Fixed ports
  - No HA HTTP support

- Storage
  - Expects decent I/O
  - World writeable flush folders

- Configuration
  - Env variables only
  - No cloud configuration support

- Service dependencies
  - Requires multicast support
C2MON on the Cloud

Diagram showing the integration of C2MON with OpenStack and OpenShift, with services such as C2MON Service, Publishing Layer, Archiving Layer, and C2MON Atmosphere Service.
Conclusions

- Containers promise a run-anywhere, scalable platform independent experience:
  - Yes but mostly if you start from zero.
  - Knowing what to look out for before you get started:
    - It may be worth upgrading part of your technology stack rather than spend time containerizing it.
    - It will depend significantly on your target cloud platform.
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