Evaluation of a new visualization and analytics solution for slow control data for large scale experiments

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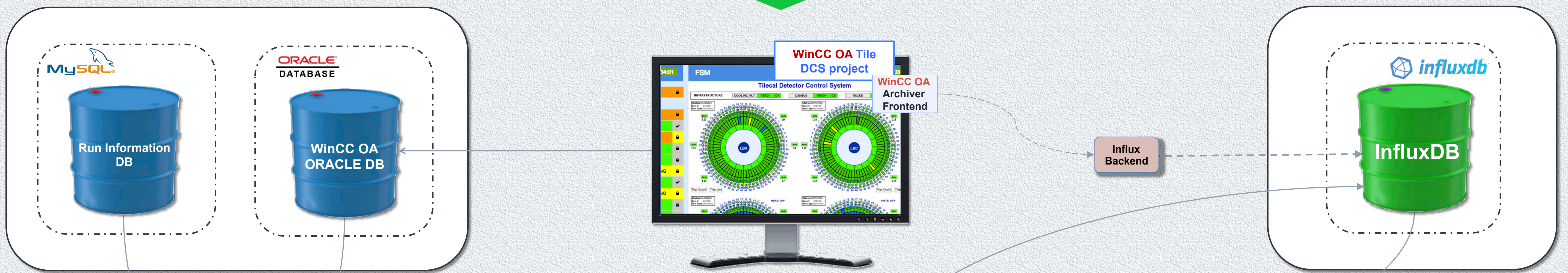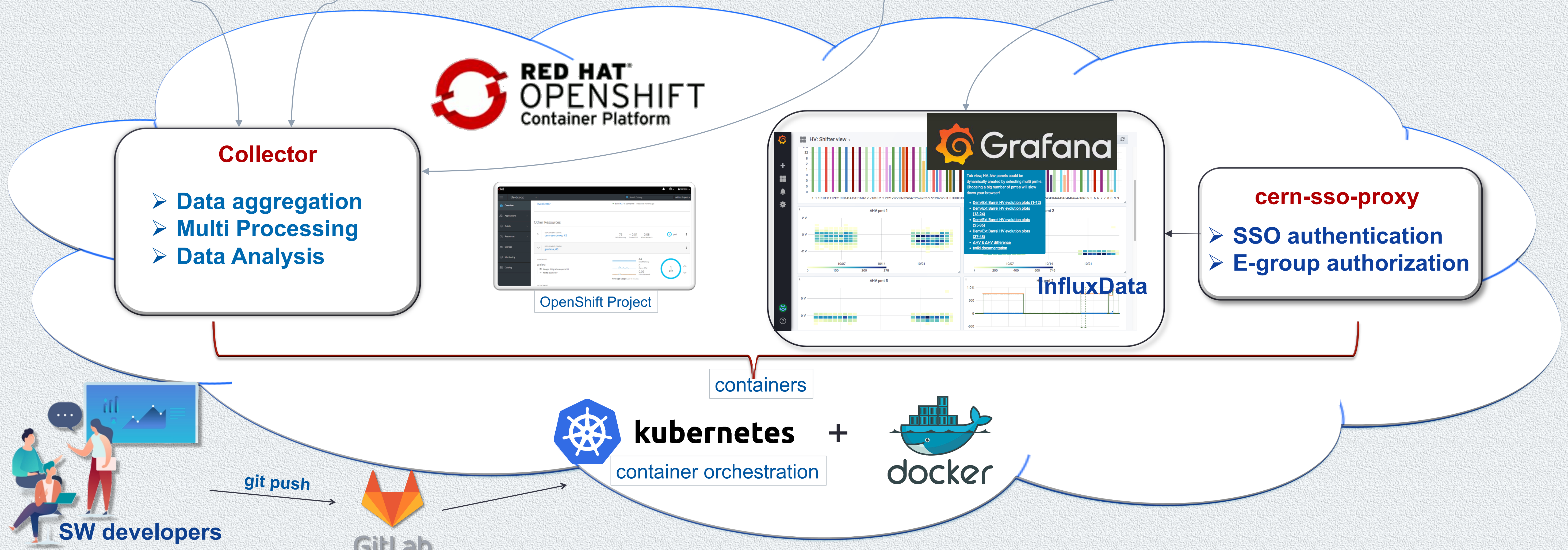
Large experiments in high energy physics require efficient and scalable monitoring solutions to digest data of the detector control system. Plotting multiple graphs in the slow control system and extracting historical data for long time periods are resource intensive tasks. The proposed solution leverages the new virtualization, data analytics and visualization technologies such as InfluxDB time-series database for faster access large scale data, Grafana to visualize time-series data and an OpenShift container platform to automate build, deployment, and management of application. The monitoring service runs separately from the control system thus reduces a workload on the control system computing resources. As an example, a test version of the new monitoring was applied to the ATLAS Tile Calorimeter using the CERN Cloud Process as a Service platform. Many dashboards in Grafana have been created to monitor and analyze behavior of the High Voltage distribution system. They visualize not only values measured by the control system, but also run information and analytics data (difference, deviation, etc.). The new monitoring with a feature-rich visualization, filtering possibilities and analytics tools allows to extend detector control and monitoring capabilities and can help experts working on large scale experiments.

DATA SOURCE

STORAGE & SEARCH

CERN Platform as a Service Cloud Computing model

RED HAT OPENSHIFT Container Platform

TRANSPORT

DATA ACCESS

Collector
- Data aggregation
- Multi Processing
- Data Analysis

OpenShift Project

Grafana

InfluxData

cern-sso-proxy
- SSO authentication
- E-group authorization

containers

kubernetes container orchestration + **docker**

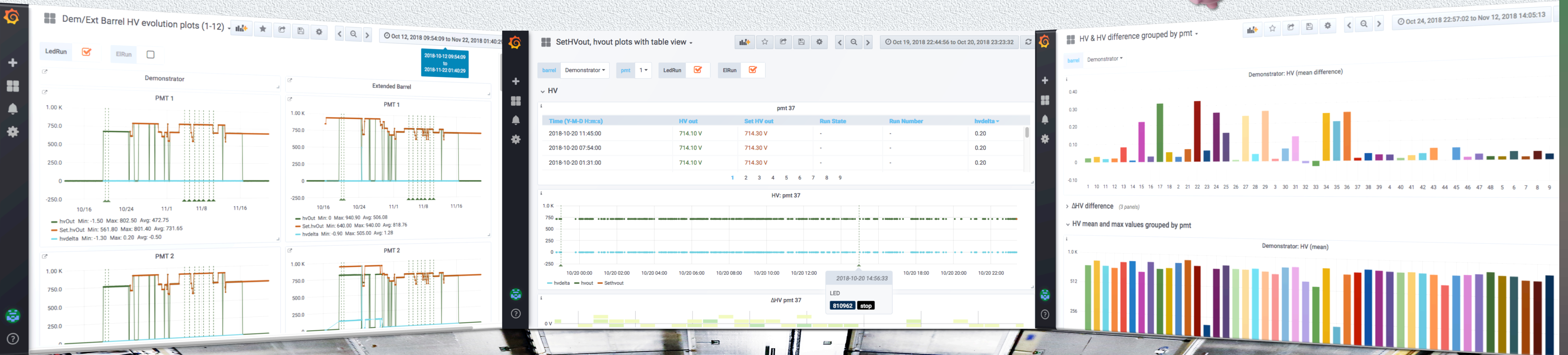SW developers — git push → GitLab

METRICS
- view hardware metrics, create dynamic panels within seconds

ANALYTICS
- get data measured by the control system, run annotations, aggregated and calculated data (difference, deviation, etc.) in one view

RUN ANNOTATIONS
- create custom dashboards according to your needs - minimal training is required

HISTORICAL DATA
- navigate into current and historical data and operate more efficiently, effectively

VISUALIZATION

https://tile-dcs-op.web.cern.ch

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