



# Evaluation of Monitoring System at the Belle DIRAC

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# Introducing



Budker Institute of Nuclear Physics, Novosibirsk,  
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Includes two active colliders:

- VEPP-4 (up to 12 GeV)
- VEPP-2000 (0.4 – 2 GeV)

Master Student (I)

Major: Elementary Particles Physics

Previous works on Belle (II):

- ECL luminosity online monitor
- Analysis of  $\Upsilon(5S)$  decays



# Internship project

The Belle DIRAC system store its data in a SQL (mySQL) database that is a bit old and do not provide with comfortable application to work with logs.

- Strict structure
- Not optimised for monitoring system and slow (10 min for one-month plot)

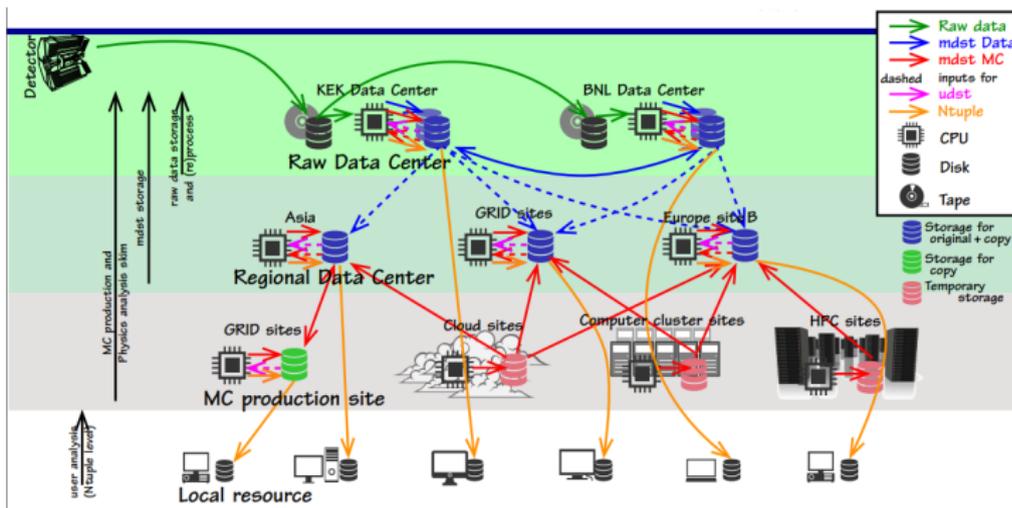
The goal of the present project is to evaluate NoSQL database (ElasticSearch and related apps) at the DIRAC as a Monitoring System and to optimise it.

- No strict structure, allow to analyse in real-time a large number of observables.
- Includes cute web-interface (Kibana)



# The DIRAC system

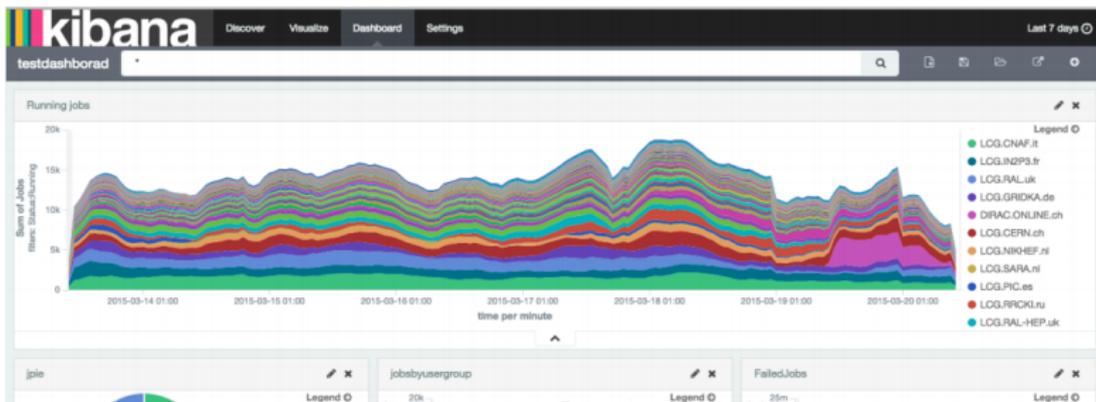
- The DIRAC is a framework for distributed computing system used in Belle2, LHCb and other experiments
- Builds a layer between users and resources
- Open-source and flexible





# ES and Kibana

- Elastic Search is a NoSQL (Non Structured Query Language) database
- Scales horizontally
- Kibana enables to interactively explore, visualise data
- Includes machine learning for detecting anomalies
- DIRAC communities started evaluation of the ES but not at Belle II





## Current Status

There were issues with compatibility of ES with OS (now CentOS 7).

Installation of the DIRAC system occurred to be not so trivial and took more than a week due to working on private machine without static ip.

For today:

- Elasticsearch v6.8.0 is **installed**
- Kibana v6.8.0 is **installed**
- Belle DIRAC v4r6p2 is **installed**
- There is **connection** between the DIRAC and ES



# Plans

Next steps:

- To install job execution environment (minimal GRID)
- To collect logfiles and store them into ES
- To evaluate and extract useful info from logs via Kibana
- To implement Kibana interface into development DIRAC