The ATLAS Wide-Range Database & Application Monitoring

Petya Vasileva (CERN), Andrea Formica (Université Paris-Saclay, IRFU (FR)), Gancho Dimitrov (CERN) on behalf of the ATLAS Collaboration

Introduction

In HEP experiments at LHC the database applications often become complex by reflecting the ever demanding requirements of the researchers. The ATLAS experiment has several Oracle DB clusters with over 216 database schemas each with its own set of database objects. To effectively monitor them, we designed a modern and portable application with exceptionally good characteristics. Some of them include: concise view of the most important DB metrics; top SQL statements based on CPU, executions, block reads, etc.; volume growth plots per schema and DB object type; database jobs section with signaling for problematic ones; in-depth analysis in case of contention on data or processes.

A tool that allows developers to explore and tune application’s database performance

See execution plans for each query

Get historical plots of database activity

Monitor the top resource consumers

Notice increased values for basic DB metrics

Check database jobs’ state

Track # active/inactive sessions per DB user

Spot significant variations in SQL execution parameters

Detect blocking/blocked sessions

Review DB volume growth per schema

And more...

Implementation

The project can be separated into three independent layers. The first layer consists in highly-optimized database objects hiding all complicated calculations in PL/SQL functions and procedures. The second layer represents a Java application providing REST access to the underlying database backend. The third layer is a JavaScript/AngularJS web interface visualizing the data in a descriptive manner.

The monitoring uses gitlab-ci pipelines for basic testing, containerization and deployment on the CERN Openshift infrastructure.