

Development of Data Visualization System for the Baikal-GVD Experiment

Dmitrii Shpotya¹, Timur Elzhov², Maxim Sorokovikov², Nikita Balashov¹

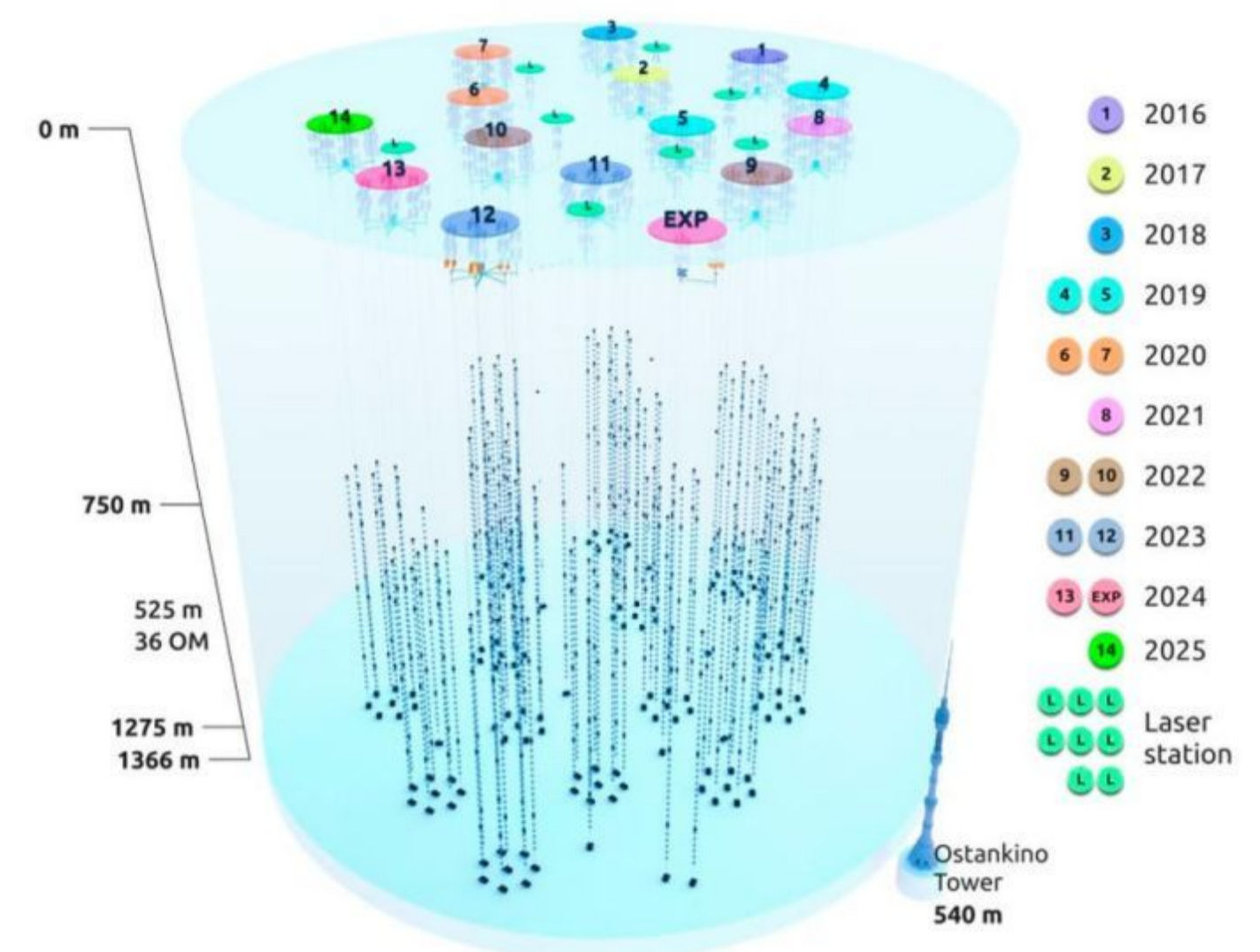
¹Joint Institute for Nuclear Research, Mescheryakov Laboratory of Information Technologies

²Joint Institute for Nuclear Research, Dzheleпов Laboratory of Nuclear Problems

Introduction

The Baikal-GVD is a large-scale deep-underwater neutrino telescope located in Lake Baikal. It is designed to detect high-energy astrophysical neutrinos and study their sources, making it an important instrument for neutrino astronomy and multi-messenger astrophysics.

To support detector operation and data analysis, a new data visualization system for Baikal-GVD is being developed. The system provides a centralized web-based interface for visual inspection of detector data, monitoring information and data quality parameters.

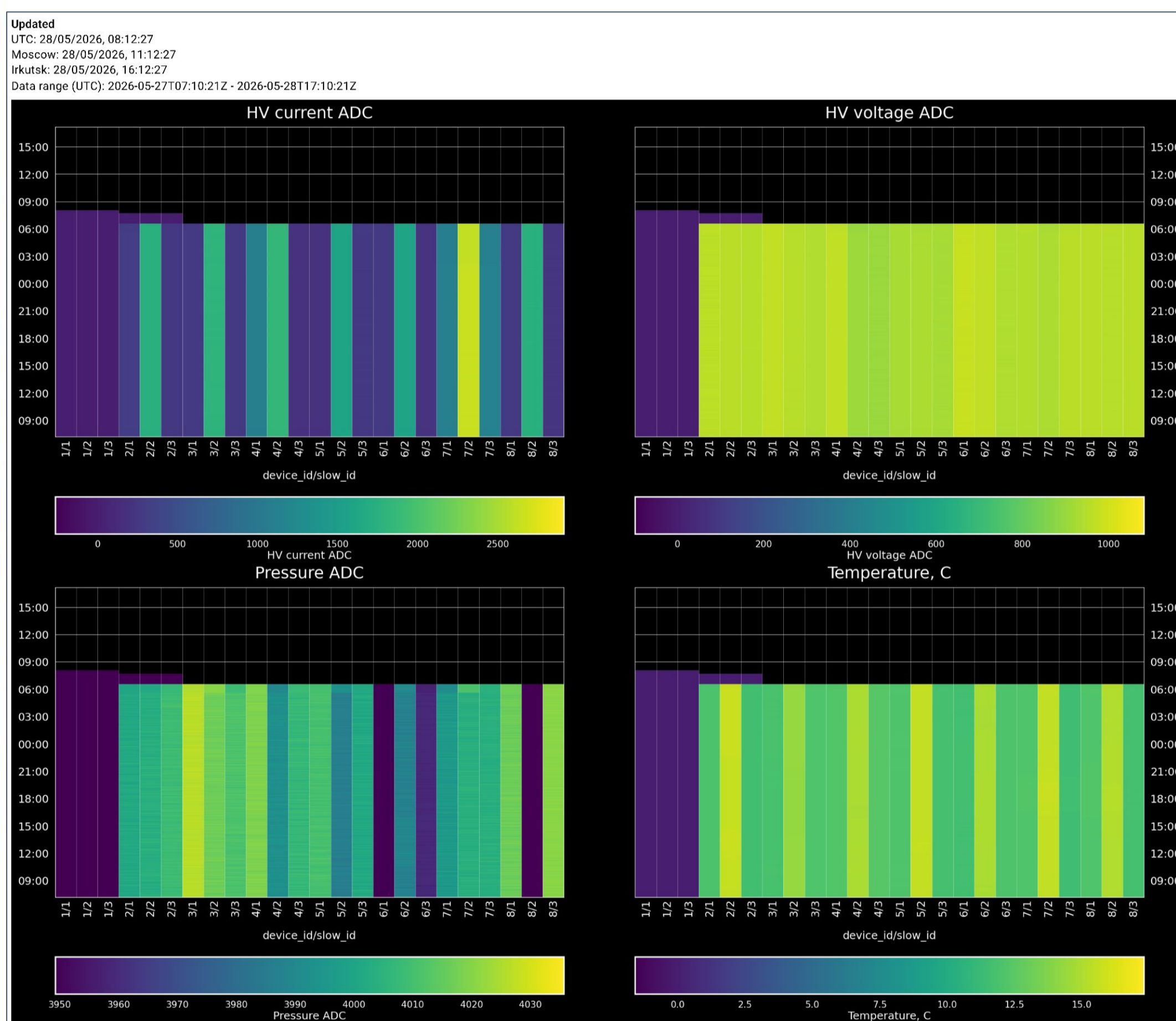


System Objectives

- Create the primary monitoring tool for shore shifters
- Simplify access to experimental data
- Centralize visualization of monitoring and detector data
- Integrate existing legacy monitoring services into a unified platform

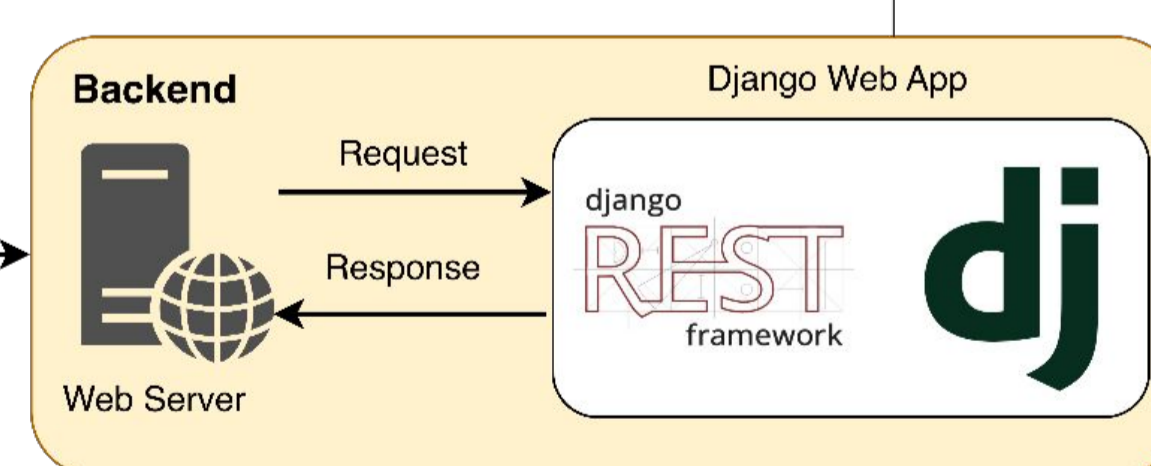
Implemented Features

- Migrated the Run Info Dashboard and count rate visualization for Clusters 1-16
- Added monitoring data visualization for Cluster 99, Hunt-2, and Hunt-4
- Added JINR SSO authentication

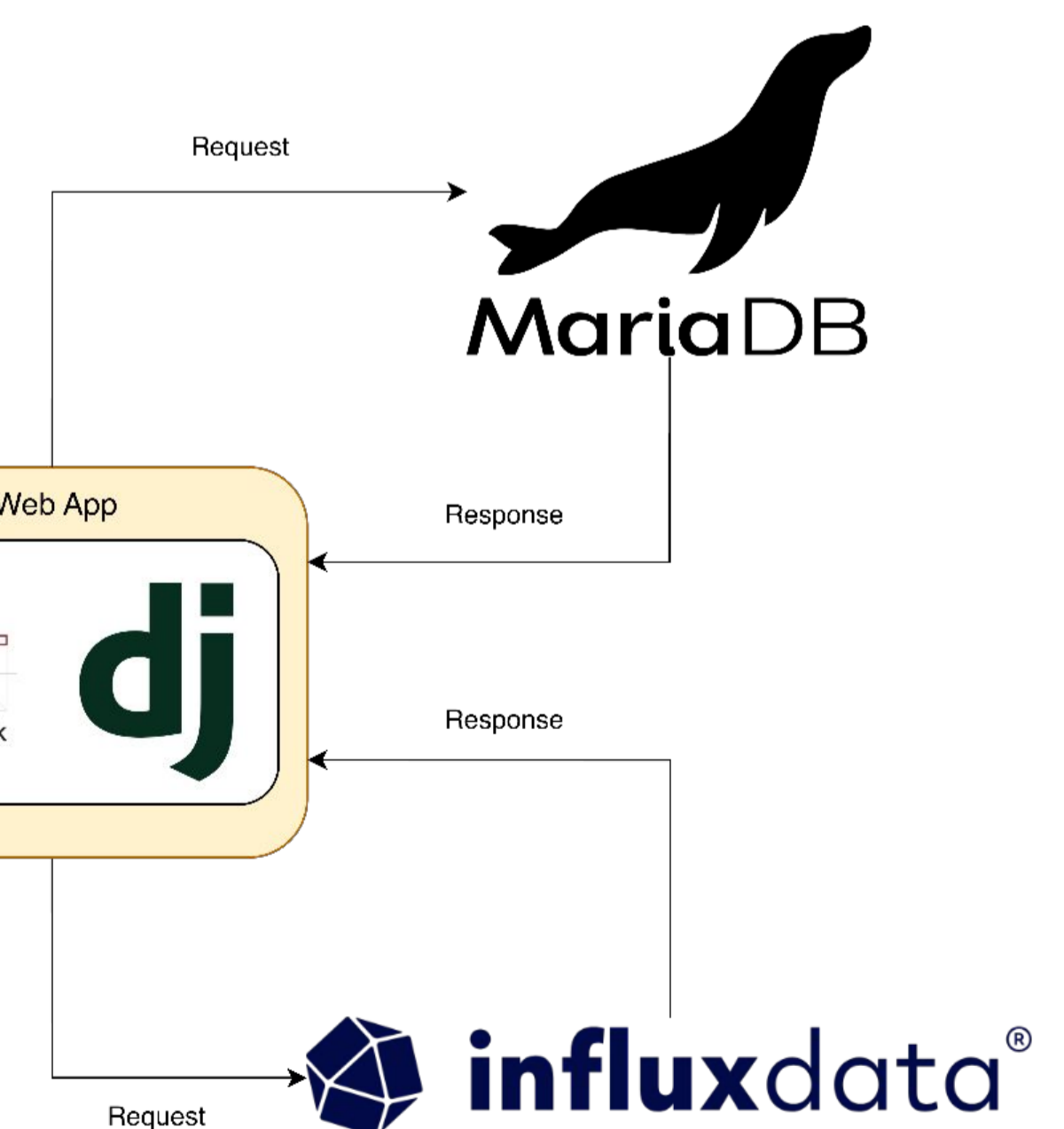


Project Architecture

- Frontend
 - Framework – Vue 3
 - UI-components – Quasar
 - API – Axios
- Backend
 - Web Server – NGINX
 - Framework – Django
 - API – Django Rest Framework



- Databases
 - Application DB – MariaDB
 - Experiment Source Data – InfluxDB



Future Plans

1. Introduce role-based access control
2. Add visualization for Data Quality parameters
3. Replace static plot images with interactive charts

Conclusions

The project is currently under active development, with many additional features planned for future implementation. However, the system already provides a unified web interface that integrates information from several existing services.

