


System for visualizing resource usage statistics of a computing cluster

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HybriLIT Platform & Govorun Supercomputer

HybriLIT

HybriLIT is a hybrid computing platform providing infrastructure for high-performance computing and is part of the Multifunctional Information and Computing Complex (MICC) of the Laboratory of Information Technologies.

Govorun

Govorun Supercomputer is located at JINR and is designed to solve tasks in scientific research.

Relevance of the System

The availability of a specialized statistics system will make it possible to conduct detailed performance analysis and use historical data for optimization of computing cluster, which reduces resource costs and allows to anticipate possible problems in advance.

The project should close the existing needs for visualization of statistics and improve the quality of analysis of computing processes, which is extremely important in conditions of highly loaded computing centers.

Salsa

Grafana

Goal and Objectives of the System

GOAL

Creation an effective system for analyzing and visualizing statistical data collected by the HybriLIT computing node monitoring system using the Yandex DataLens BI platform.

OBJECTIVES

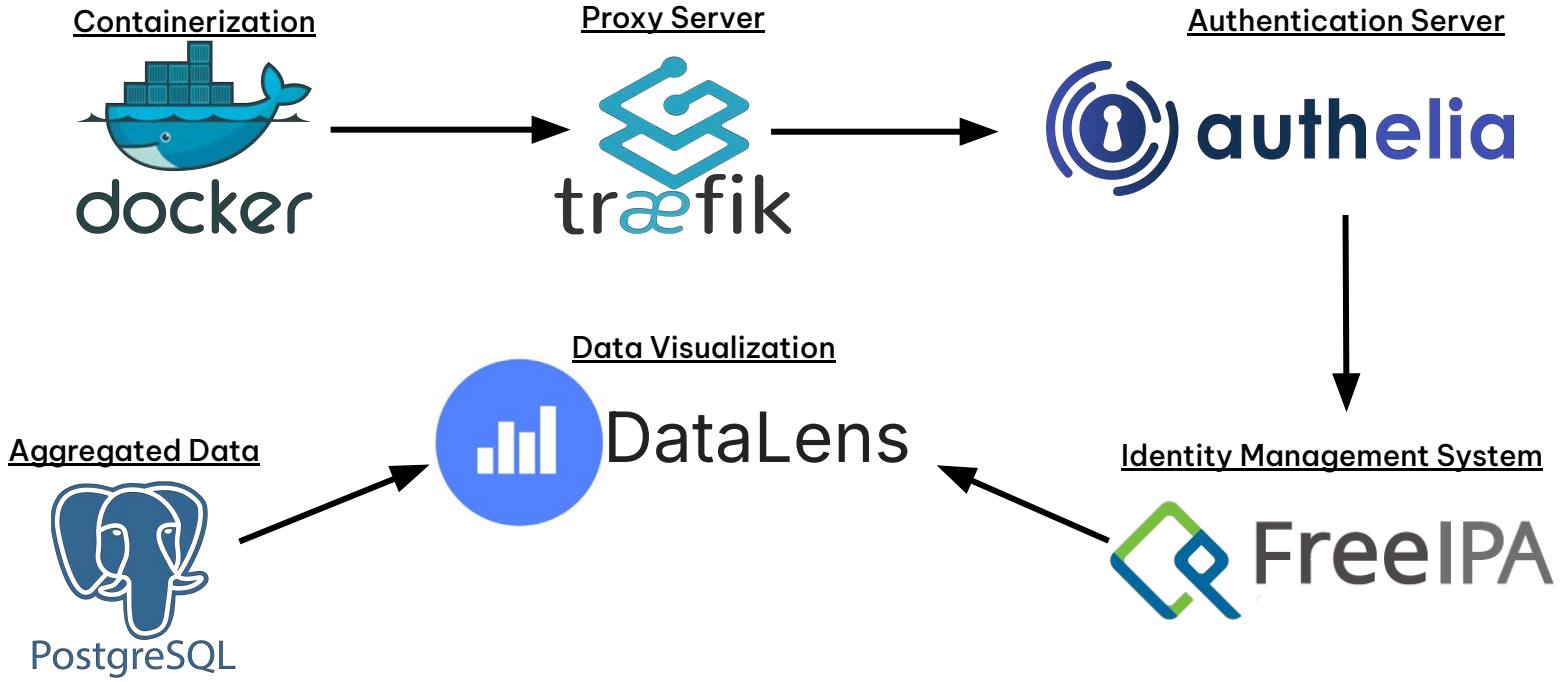
- Deployment of the Yandex DataLens BI platform for access from the JINR local network
- Organization of user authorization using FreeIPA and Authelia
- Aggregation of data obtained by the monitoring system
- Building informative dashboards for statistical research

Yandex DataLens

Yandex DataLens is a Business Intelligence tool from Yandex that allows to visualize data and build reports in real time.

The main functions of DataLens are aimed at analyzing data from various sources, creating visual visualizations and simplifying the decision-making process.

System Architecture

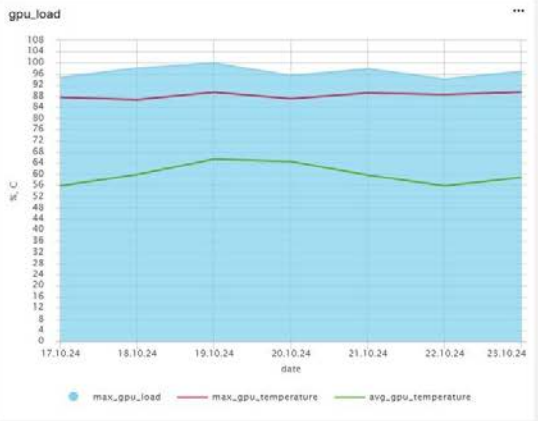


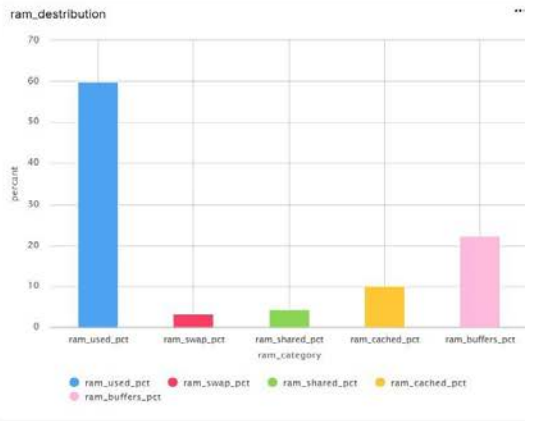
Interaction with the Resource Monitoring System Database

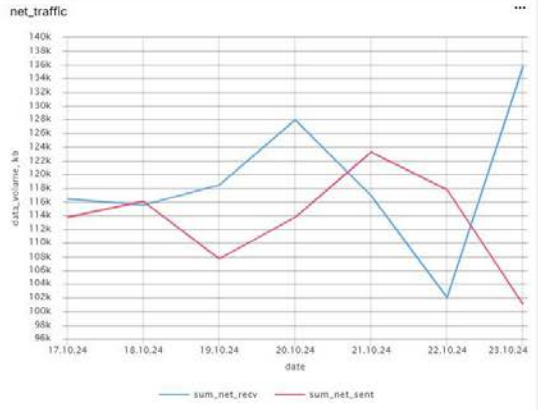
ALGORITHM FOR COLLECTING DATA

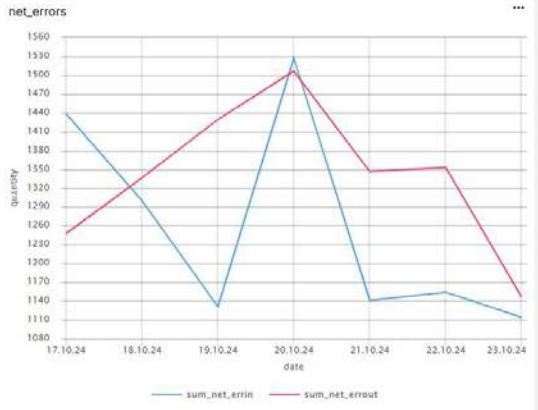
For each node of the computing cluster, data with different periods are regularly taken from the TimescaleDB: for the last week, month and year. This data is then written to PostgreSQL at 5-minute intervals. After that, they are unloaded from PostgreSQL and sent to DataLens for visualization.

Resource Usage Visualization System: Dashboards









parameters_description

chart	parameter	description
ram_destribution	ram_used_pct	The weekly average percentage of RAM that is ac
ram_destribution	ram_swap_pct	The weekly average percentage of memory used
ram_destribution	ram_shared_pct	The weekly average percentage of memory share
ram_destribution	ram_cached_pct	The weekly average percentage of RAM used for
ram_destribution	ram_buffers_pct	The weekly average percentage of memory that h
net_traffic	sum_net_errout	The total volume of outgoing traffic (in kilobytes)
net_traffic	sum_net_errin	The total volume of incoming traffic (in kilobytes)
net_errors	sum_net_errout	The total number of errors in sending data over th
net_errors	sum_net_errin	The total number of errors in receiving data over t
gpu_load	max_gpu_temperature	The maximum GPU temperature per day
gpu_load	max_gpu_load	The maximum GPU load per day
gpu_load	avg_gpu_temperature	The average GPU temperature per day
cpu_temperature	min_cpu_temperature	The minimum CPU temperature for a node per da
cpu_temperature	max_cpu_temperature	The maximum CPU temperature for a node per da

Results / Current Advantages

ACHIEVED RESULTS

- Specialized system for collecting and analyzing of statistics for HybriLIT Platform was developed
- It was deployed on the Heterogeneous platform HybriLIT

ADVANTAGES

- Detailed historical analysis
- Flexibility and adaptability
- Decision-making process
- Convenient data visualization

Further System Improvement Plans

- Adding authentication
- Importing real data
- Adding a user manual
- Adding of charts at the request of members of the HybriLIT group

Thank you for attention!

Special thanks
HybriLIT heterogeneous group
University Center, JINR