

Ad-hoc мониторинг в режиме реального времени

Инструмент для сбора, хранения,
визуализации и анализа данных
в режиме реального времени

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*Осенний пейзаж:
холст, масло, мастихин*

О себе



Tech lead в Real Time Intelligence LLC (с 2022 г.)



Java lead в разработке (~ 3 года)



Oracle lead в SRE (~ 15 лет)



Free software and open-source (с 2009 г.)

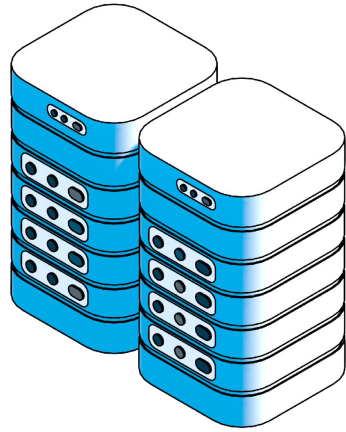


НИОКР в сфере ИТ (с 2002)

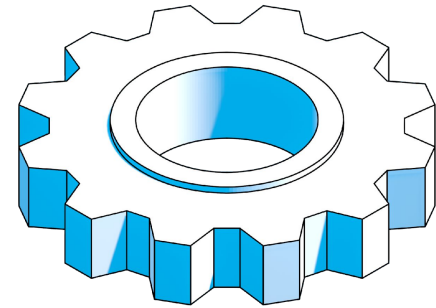
Проблема



Real-time

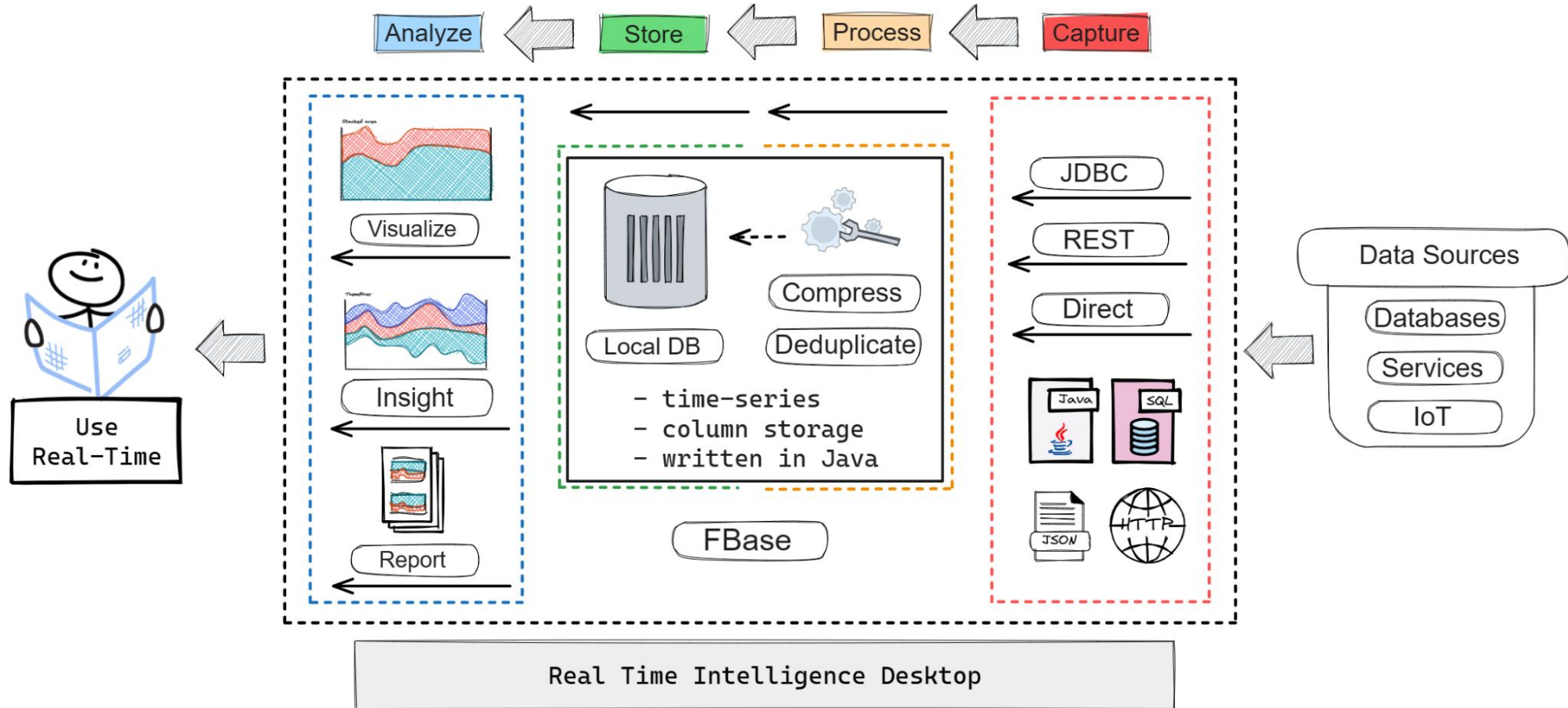


Big Data

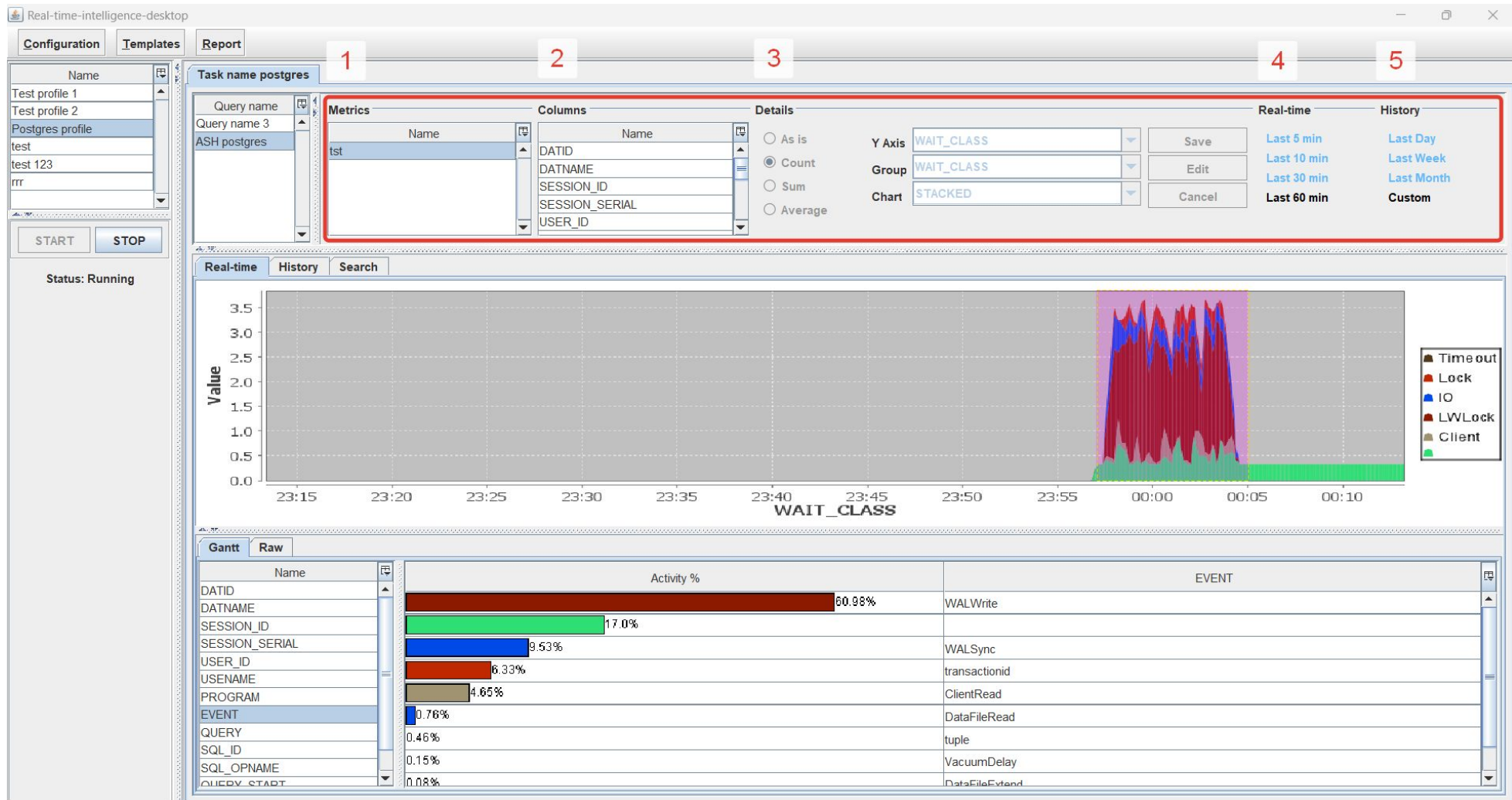


Complexity

Решение



Решение — Real Time Intelligence Desktop



Решение — Capture

The screenshot shows the 'Configuration' window of a monitoring tool. The window is divided into several sections. At the top, there is a checkbox labeled 'View the hierarchy' which is checked. Below this, there are four columns: 'Profile', 'Task', 'Connection', and 'Query'. The 'Profile' column contains 'Postgres profile', 'Test profile 1', and 'Test profile 2'. The 'Task' column contains 'Task name postgres'. The 'Connection' column contains 'Postgres'. The 'Query' column contains 'Query name 3' and 'ASH postgres'. Below these columns are tabs for 'Profile', 'Task', 'Connection', and 'Query', with 'Query' selected. Under the 'Query' tab, there are sub-tabs for 'Main', 'Metadata', and 'Metrics', with 'Main' selected. Below the sub-tabs are buttons for 'New', 'Copy', 'Delete', 'Edit', 'Save', and 'Cancel'. The main configuration area contains the following fields:

- Name: ASH postgres
- Description: Active session history
- Gather data SQL: BY_CLIENT
- Load data mode: JDBC_REAL_TIME
- Text:

```
SELECT current_timestamp as SAMPLE_TIME, datid, datname, pid AS SESSION_ID, pid AS SESSION_SERIAL, usesysid AS USER_ID, coalesce(usename, 'unknown') as username, concat(application_name, ':', backend_type, ':', coalesce(client_hostname, client_addr::text, 'localhost')) AS PROGRAM, wait_event_type AS WAIT_CLASS, wait_event AS EVENT, query, substring(md5(query) from 0 for 15) AS SQL_ID, left(query, strpos(query, ' ')) AS SQL_OPNAME, coalesce(query_start, xact_start, backend_start) as query_start, 1000 * EXTRACT(EPOCH FROM (clock_timestamp()-coalesce(query_start, xact_start, backend_start))) as duration from pg_stat_activity where state='active'
```

Решение — Process & store

Configuration

View the hierarchy

Profile: Postgres profile, Test profile 1, Test profile 2

Task: Task name postgres

Connection: Postgres

Query: Query name 3, ASH postgres

Profile Task Connection Query

Main Metadata Metrics

Load Postgres Edit Save Cancel

Table Compression

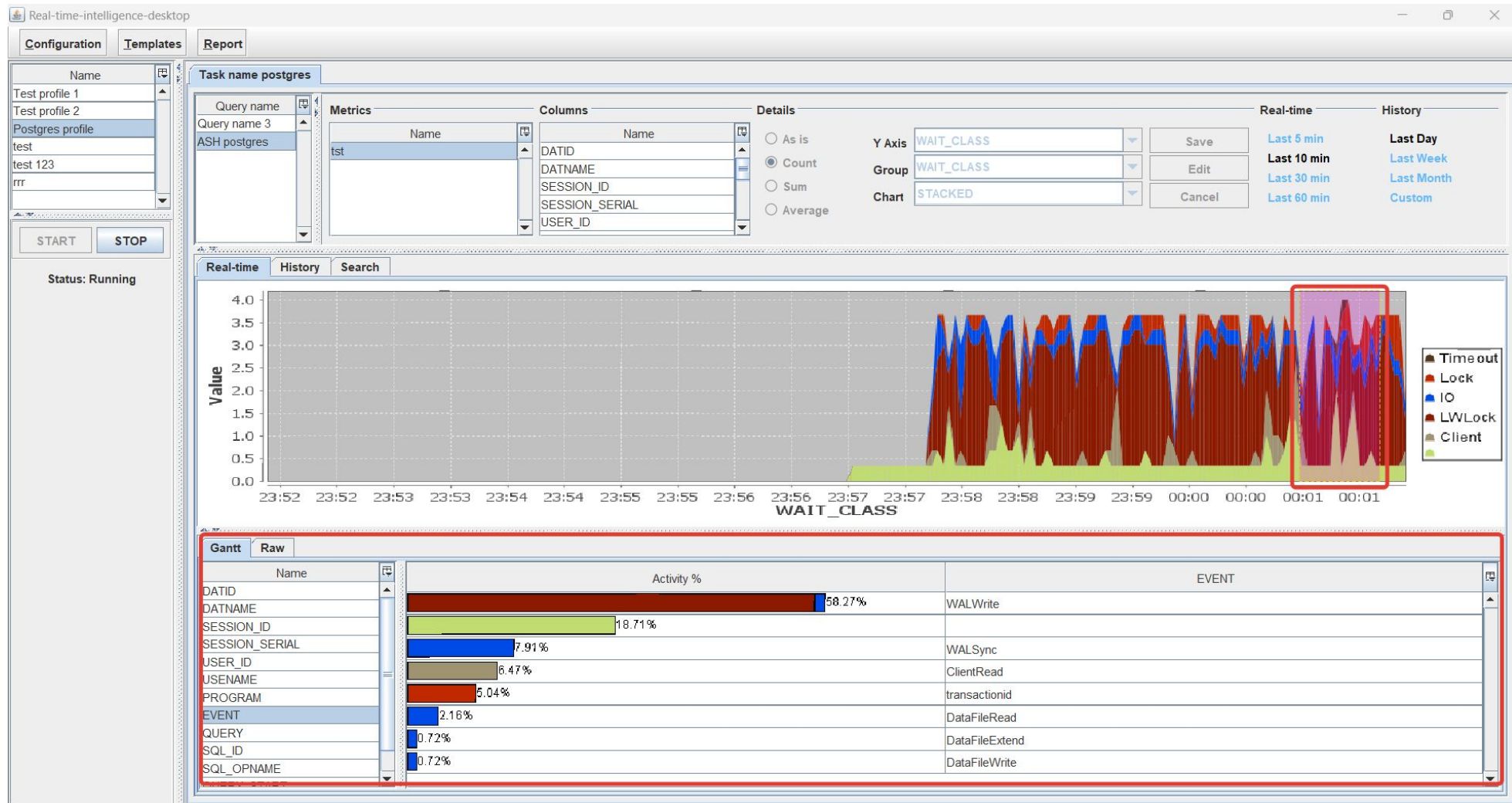
Name: ASH postgres

Type: TIME_SERIES Index: LOCAL Timestamp: SAMPLE_TIME

Name	DB type	Storage type	Local type
DATID	OID	RAW	LONG
DATNAME	NAME	RAW	STRING
SESSION_ID	INT4	RAW	INT
SESSION_SERIAL	INT4	RAW	INT
USER_ID	OID	RAW	LONG
USERNAME	NAME	RAW	STRING
PROGRAM	TEXT	RAW	STRING
WAIT_CLASS	TEXT	RAW	STRING
EVENT	TEXT	RAW	STRING
QUERY	TEXT	RAW	STRING
SQL_ID	TEXT	RAW	STRING
SQL_OPNAME	TEXT	RAW	STRING
QUERY_START	TIMESTAMPZ	RAW	LONG
DURATION	FLOAT8	RAW	INT

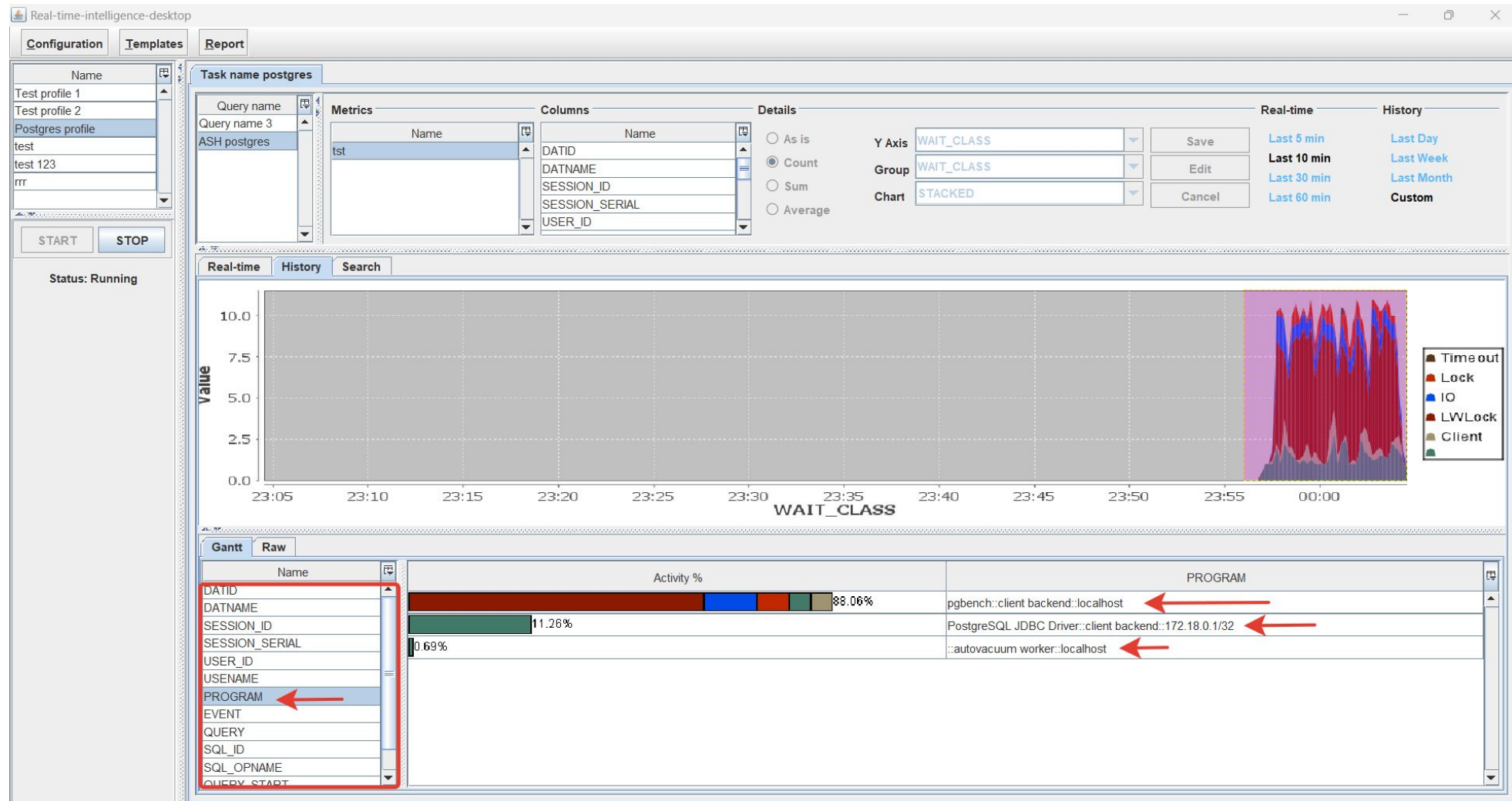
Решение → Analyze → Real-Time

Анализ истории активных сессий в БД Postgres



Решение → Analyze → History

Анализ истории активных сессий в БД Postgres



Решение → Analyze → Search

Анализ истории активных сессий в БД Postgres

The screenshot displays the 'Real-time-intelligence-desktop' application interface. The main window is titled 'Task name postgres' and is divided into several sections:

- Configuration:** Includes a list of test profiles (Test profile 1, Test profile 2, Postgres profile, test, test 123, rrr) and 'START'/'STOP' buttons. The status is 'Running'.
- Task name postgres:** Contains configuration for the current task, including 'Query name 3', 'ASH postgres', and a list of columns (DATID, DATNAME, SESSION_ID, SESSION_SERIAL, USER_ID).
- Search:** A search bar with the text 'vacuum' and a 'Go' button.
- Real-time:** A chart showing 'Value' on the Y-axis (0.00 to 1.25) and time on the X-axis (23:58 to 00:08). The chart displays several peaks, with a legend on the right identifying 'PROGRAM' (green), 'EVENT' (blue), 'SQL_OPNAME' (purple), and 'QUERY' (red).
- Raw:** A section for viewing raw data. It shows 'Selected Items' with 'Rows: 668' and a search bar containing 'vacuu'. Below this, a list of SQL queries is displayed, with the following query highlighted in a red box:

```
SELECT current_timestamp as SAMPLE_TIME, datid, datname, pid AS SESSION_ID, pid AS SESSION_SERIAL, usesysid AS USER_ID, coalesce(username, 'unknown') as username, concat(application_name, ':', backend_type, ':', coalesce(client
```

Решение → Report

Анализ истории активных сессий в БД Postgres

The screenshot displays the 'Report' window of a database monitoring tool. The interface is divided into several sections:

- Profile:** A list of profiles including 'Postgres profile', 'rrr', 'test', 'test 123', 'Test profile 1', and 'Test profile 2'. 'Postgres profile' is selected.
- Task:** A list of tasks including 'Task name postgres', which is selected.
- Query:** A list of queries including 'Query name 3' and 'ASH postgres', both of which are checked.
- Design / Report:** A tabbed interface with 'Report' selected. It includes a time range filter from '29-09-2023 20:56:30' to '30-09-2023 00:56:00' and buttons for 'Show', 'Clear', 'Report', and 'Files'.
- Session Selection:** Three panels on the left allow selecting specific sessions and columns:
 - ASH postgres:** 'tst' is selected.
 - Query name 3:** 'VALUE_HISTOG...', 'VALUE_ENUM', and 'VALUE_RAW' are selected.
- Summary:** A central area showing the selected profile, task, and query: 'Profile: Postgres profile', 'Task: Task name postgres', and 'Query: ASH postgres'.
- Wait Class Histogram:** A chart showing 'Value' (0.0 to 3.0) on the y-axis and 'WAIT_CLASS' (21:00 to 00:45) on the x-axis. A legend identifies wait classes: Timeout (grey), Lock (red), IO (blue), LWLock (purple), and Client (green). A significant spike in activity is visible at 00:00.
- Activity Table:** A table showing activity percentages for various session attributes:

Name	Activity %	USERNAME
DATID	99.33%	postgres
DATNAME		
SESSION_ID	0.67%	unknown
SESSION_SERIAL		
USER_ID		
USERNAME		
PROGRAM		
EVENT		
QUERY		
SQL_ID		

Решение → Report

Анализ истории активных сессий в БД Postgres

The screenshot shows a 'Report' window with the following configuration:

- Profile:** Postgres profile
- Task:** Task name postgres
- Query:** Query name 3, ASH postgres

The report content includes:

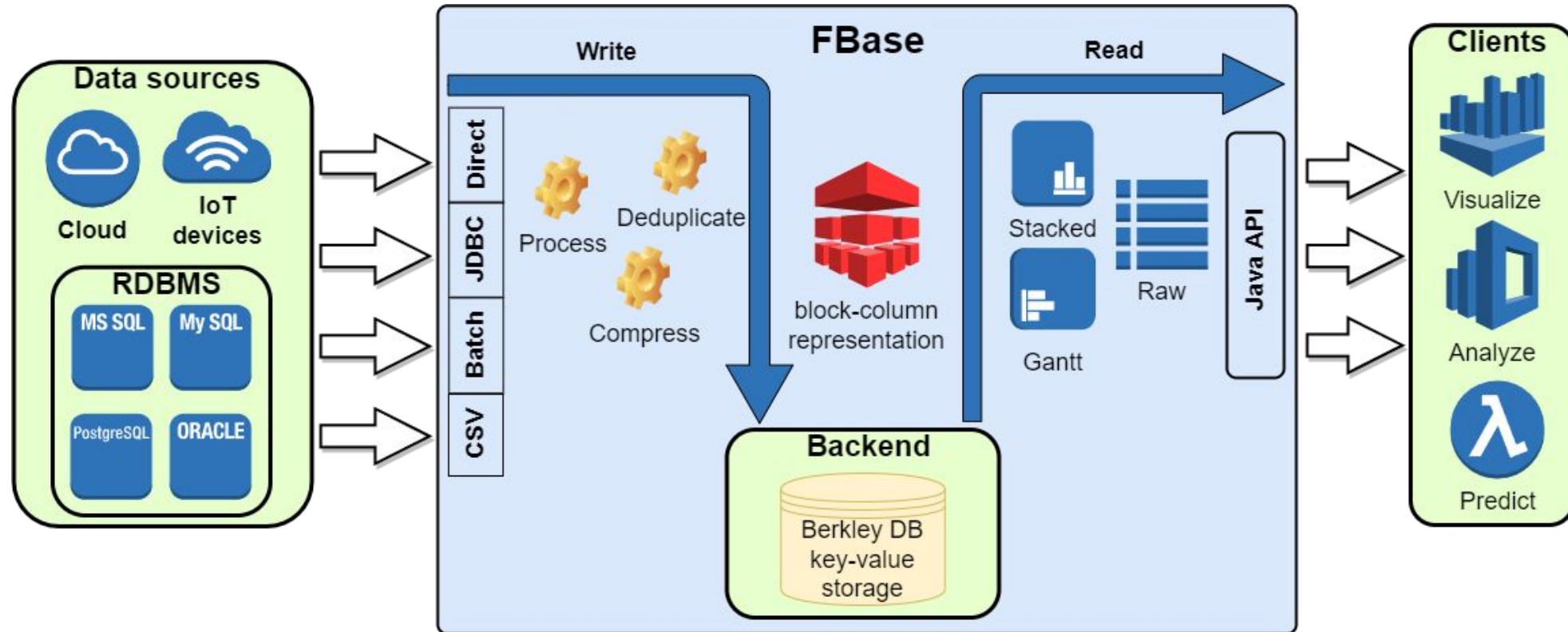
- Report for the period:** 29-09-2023 20:56:30 - 30-09-2023 00:56:00
- Configuration:**

Profile	Postgres profile
Task	Task name postgres
Query	ASH postgres
- Metric:** tst
- Comment:** comment test
- Graph:** A line graph showing activity over time. The Y-axis is labeled 'VALS' and ranges from 0.0 to 3.0. The X-axis is labeled 'WAIT_CLASS' and shows a time range from 21:00 to 00:45. A legend indicates: Timerock (red), Lock (blue), IO (green), LWLock (yellow), Client (purple).
- Table:**

Name	Activity %	USERNAME
DATIO		
DATNAME		
SESSION_ID		
SESSION_USERNAME		
USER_ID		
USERNAME		
PROGRAM		
EVENT		
QUERY		
SQL_ID		

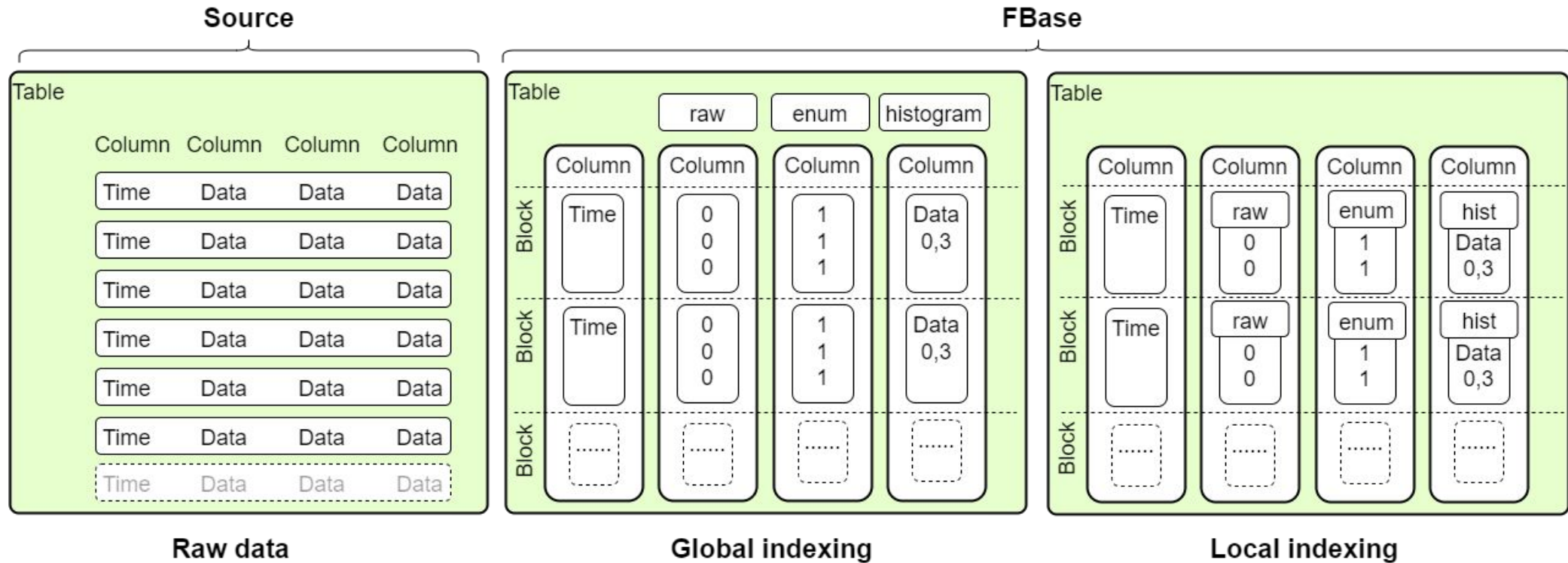
Инженерные вызовы

Колоночная БД для хранения данных временных рядов → Общая схема



Инженерные вызовы

Колоночная БД для хранения данных временных рядов → Формат блока



Инженерные вызовы

Колоночная БД для хранения данных временных рядов → Summary

№	Задача/Проблема	Решение
1	Ошибки в ПО	Тесты, тесты, тесты
2	Производительность	Column store, дедупликация, сжатие
3	Корректность	Интеграционные тесты
4	Гибкость	SOLID, DRY etc.
5	Развитие	Apache 2.0, с декабря 2022 г.

Технологическая карта

1. Java как язык программирования и как экосистема
2. Java Swing для построения интерфейсов
3. Колоночная БД на Java в качестве backend
4. JFreeChart для визуализаций
5. Dagger 2 для DI, CI/CD на базе Gitea Actions, тесты
6. Использование компонентов open-source
7. Open-source Apache 2.0

Варианты использования

1. Мониторинг различных систем real-time
2. Визуализация нагрузочного, стресс-тестирования систем
3. Отслеживание параметров датчиков Интернет вещей (IoT)
4. Мониторинг информационной безопасности
5. Предиктивная аналитика, поиск закономерностей и взаимосвязей в данных

Команда



Кардаполов
Александр

Senior



Комар
Ольга

Middle



Кардаполов
Иван

Junior

Ad-hoc monitoring real-time

Инструмент для сбора, хранения, визуализации и анализа данных в режиме реального времени

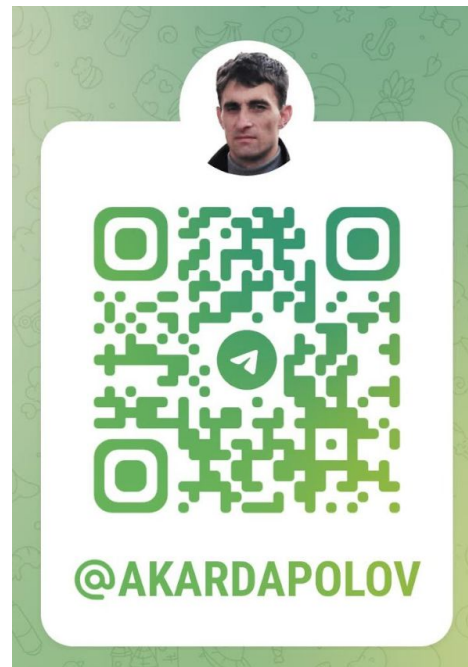
<https://github.com/real-time-intelligence/real-time-intelligence-desktop>

<https://github.com/real-time-intelligence/fbase>

<https://github.com/akardapolov/ASH-Viewer>

Разработано при поддержке

ФОНД СОДЕЙСТВИЯ
ИННОВАЦИЯМ



Telegram @akardapolov

GitHub @akardapolov

Habr @akardapolov