

Power BI as a solution for k6 reporting challenges



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Executive summary

In today's times, software development demands quick insights into outcomes or results of performance testing along with reports to ensure stable, scalable applications. While organizations using Grafana Cloud with k6 gain deep performance insights, they face a critical reporting gap: k6 dashboards cannot be shared beyond project members.

This whitepaper shows how to bridge that gap by integrating k6 data into Power BI via SQL Server, enabling continuous, secure, and organization-wide access to performance metrics. The approach delivers faster decision-making, reduced manual reporting, and improved cross-team visibility, serving as an effective interim solution until Grafana supports public k6 dashboards.



1. Introduction

Performance testing plays a very important role in ensuring that software applications meet the expected SLAs under specified loads. Organizations have begun to increasingly adopt k6 as an open-source load testing tool because of its developer-friendly scripting and for its continuous integration with Grafana Cloud for visualizing results.

Despite all these advantages, there's still a significant gap: Grafana Cloud restricts the scope of k6 data sources as private to projects. Currently, teams cannot share dashboard links publicly unless they give full project-level access. This means that developers, managers, and business teams often need to wait for performance engineers to share reports before they can see any trends. Clearly, this slows things down and creates unnecessary delays. This whitepaper explains how integrating k6 results into Power BI can solve that problem by creating flexible reports that are easy to share with anyone, anytime.





2. Problem statement

Grafana Cloud and k6 integration

Testing using k6 Cloud includes monitoring performance metrics such as response times, throughput, error rate and other performance-related metrics. These metrics can be visualized easily, using Grafana Cloud dashboards.

Challenges with Grafana:

Data privacy in the Grafana Cloud

Grafana Cloud k6 dashboards cannot be accessed easily outside the associated project. Grafana Cloud does not allow the k6 data source to be used as public.

Restricted dashboard sharing

Sharing the dashboard reports with other team members requires granting them access to the entire Grafana project, which could be restricted due to security reasons, licensing costs or data segregation to handle sensitive data.

Manual reporting overheads

Performance engineers often need to export these reports manually and share them via email or other channels. This results in a lot of delays and increased overhead time. Analyzing the results, compiling them manually, and calculating metrics in spreadsheets typically takes more than 4 hours. This number can also increase, based on the number of tests conducted during the day.



3. Solution overview: Power BI integration

To overcome the challenges mentioned above, a workaround is to integrate the k6 performance results using k6 APIs into an SQL Server database and use Power BI as a reporting tool. Power BI offers flexible dashboarding capabilities to share reports across the organization without exposing the underlying Grafana Cloud project.

How it works

- After every regression test, scheduled batch jobs run to retrieve the test result metrics using k6 APIs. Test metrics include response time, hits per second, throughput and other related metrics.
- These metrics are then written to the SQL Server database.
- Power BI service is scheduled to run every day which connects Power BI to SQL Server and refreshes the dashboard automatically.
- Stakeholders use the shared link to access reports via Power BI.

Why Power BI?

It's a practical workaround deployed to counter a specific limitation:

- Currently, Grafana's k6 data source cannot be made public. A Feature request is submitted to Grafana Cloud to implement it.
- Power BI enables controlled sharing of performance results.
- Many enterprises already have Power BI licensing and governance frameworks in place.

It must be noted that the goal is not to replace Grafana but to bridge the test report-sharing gap until Grafana supports public dashboards for k6 Cloud.



4.1 Existing Grafana Cloud setup

- The screenshot displays the JMeter GUI during a performance test. The top panel, 'Steady State - Drag panel', shows a line graph of VUS (Virtual Users) over time, indicating a ramp-up to 100 VUS. The bottom panel shows 'Total Virtual Users' (100 VUS), 'Total Passed Requests' (18816), and 'Total Failed Requests' (No data). The 'Performance Test Summary' table at the bottom lists test scenarios and their results.

Scenario	Method	Status	Count	Avg	P95	P99	URLs
default	POST	200	1	509 ms	509 ms	509 ms	
default	POST	200	2	530 ms	679 ms	893 ms	
DTA_SQLFDPayLoad_T01_8	POST	200	2.01 K	428 ms	655 ms	908 ms	
DTA_SQLFDPayLoad_T02	GET	200	939	611 ms	960 ms	1.40 s	
DTA_SQLFDPayLoad_T03	POST	201	8.24 K	1.22 s	1.62 s	1.75 s	

4.2 Power BI integration pipeline

- The k6 APIs provide access to performance test metrics such as response times, percentiles, errors, throughput, and hits per second.
- SQL Server stores structured test run data for querying and reporting.
- Power BI Service connects to SQL Server and generates dashboards with automated refresh schedules.
- Stakeholders can access reports via controlled Power BI sharing links.



Architecture flow overview:

k6 test runs (via Grafana Cloud) → k6 APIs → SQL Server → Power BI Service → Shared reports.

The following figure (Figure 2) shows the dashboard flow diagram of the Power BI integration pipeline.

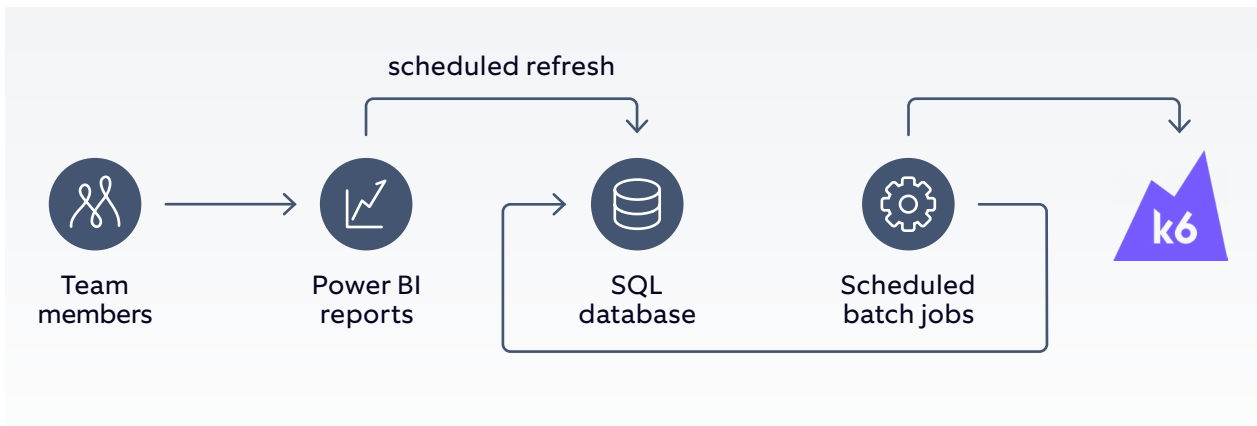


Figure 2: Bravo PA - Power BI dashboard flow

Figure 3 displays a dashboard of the performance test results.



Figure 3: Performance dashboard



4.3 Technical details

Here are some technical details across different parameters along with their descriptions.

Batch job

- It is scheduled daily.
- It fetches the results from k6 APIs.
- This requires minimal maintenance unless failures occur.

APIs used

- Test run details.
- Metrics data (e.g. response times, percentiles, errors. Throughput, number of hits).

Note: Not all KPIs are available via k6 APIs.

SQL Server database

- Holds all the tests run results based on the respective test metrics.

Power BI

- Connected to SQL Server via Power BI Service.
- Automatic refresh schedules.
- Transformations and calculations implemented in Power BI.
- Only one data source is used.





5. Implementation details

This section outlines the operational setup, configurations, and processes for deploying the Power BI reporting solution.

5.1 Data extraction from k6

- Authentication with k6 APIs (API token).
- Storing the results in a standardized format for a better understanding.

5.2 Writing to SQL Server

- Data is inserted into predefined tables.
- Minimal transformations during ingestion.
- Ensures a consistent schema for Power BI queries.

5.3 Power BI reporting

Power BI dashboards include

- Recent test run summaries which queries for only the last 5 test runs.
- Graphs for response times, errors, and thresholds.
- KPI indicators.

Power BI handles

- Data transformations (e.g. aggregations, calculated columns).
- Visualizations for easier interpretation.

5.4 Maintenance considerations

- Minimal effort unless API calls fail or the database writes encounter errors or Power BI refresh fails.
- No ETL tools or custom middleware required.
- Fully automated once deployed.



6. Benefits and business impact

Let's assess the business value and technical benefits of using Power BI as a solution for k6 reporting challenges.

6.1 Business value

Improved access

Developers and stakeholders can independently review the performance results.

Reduced bottlenecks

No need to wait explicitly for performance teams to generate and share manual reports. Previously, teams had to wait 3 to 4 hours or sometimes, even until the next day, for performance reports to be shared. With automated scheduled refresh, reports are now available immediately almost within an hour's time after the run.

Faster analysis

Enables a quicker root cause analysis and solution of performance issues, reducing analysis time from over 3 hours to just 1 hour.

Enhanced transparency

Business stakeholders gain visibility into performance risks.

6.2 Technical benefits

- Leverages the existing Power BI infrastructure and licensing effectively.
- Flexible report customization without changes to Grafana dashboards.
- Avoids full project sharing in Grafana, preserving data security and access boundaries.



7. Challenges and limitations

Just as each approach comes with its own pros and cons, here's a look at the limitations of using Power BI in the given scenarios:

API limitations

Not all k6 KPIs are exposed via the public API.

Power BI volume limits

Since Power BI has capacity constraints, only around five of the recent test runs can be stored to avoid performance issues.

Maintenance requirements

Occasional failures may require manual intervention.

Long-term dependency

This remains a workaround until Grafana offers public dashboards for k6 data source.





8. Future considerations

The following considerations can be relevant in future for using Power BI for k6 reporting:

Grafana enhancements

Organizations should monitor progress on Grafana's roadmap for public k6 dashboards. They should evaluate the feasibility of adopting these features as soon as they become available. It is also important to stay updated on Grafana's roadmap for public k6 dashboards to leverage new reporting capabilities.



Potential improvements

- Expanding the solution to real-time streaming instead of daily batch jobs.
- Developing standardized templates for Power BI dashboards to ensure consistency.
- Ensuing that all teams follow the same visualization and reporting standards for consistency.

Long-term goal

Consolidate reporting fully into Grafana once the public dashboard sharing becomes available.

Next steps for teams

- Evaluate feasibility of enabling real-time streaming for performance metrics.
- Define ownership for creating and maintaining reusable dashboard templates in power Bi.
- Setup monitoring for Grafana's feature release and align internal reporting practices with upcoming enhancements.

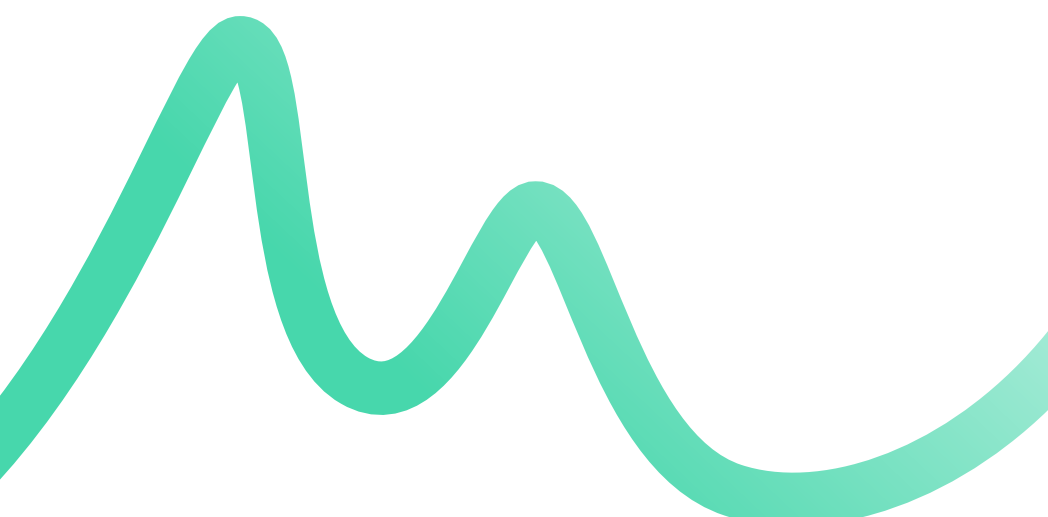


9. Conclusion

Organizations using the Grafana Cloud and k6 for performance testing face significant reporting limitations due to private k6 data source restrictions. This whitepaper has deliberated over its practical usage and applicability as a solution that can integrate k6 data with Power BI via the SQL Server.

Such an approach provides developers and stakeholders with independent and shared access to performance results while maintaining security and operational efficiency. Although this solution introduces additional infrastructure and maintenance considerations, it does offer immediate business value until Grafana evolves to support public dashboards for k6.

It also serves as a foundation for other performance testing reporting scenarios, beyond k6.





10. References

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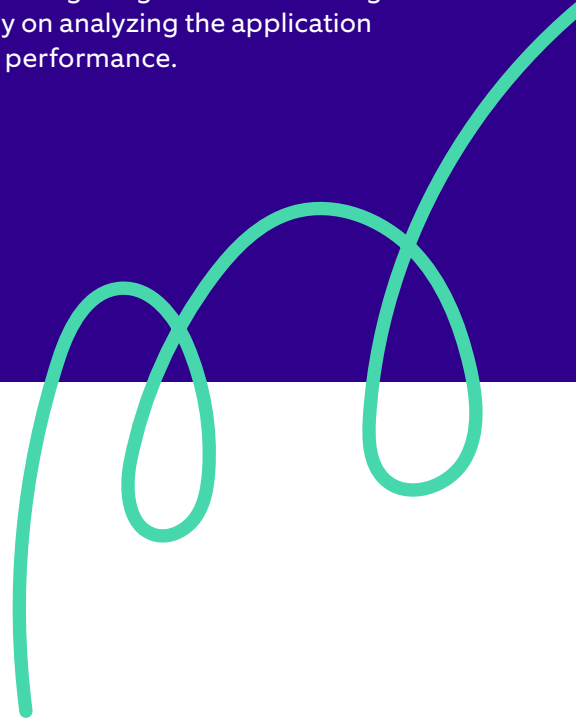




About the author

Pratheepa Thankachan is a Senior Staff Engineer (Performance Engineer) with over a decade of experience in performance testing and engineering. Her core expertise lies in end-to-end performance testing, test strategy, and performance tuning using various monitoring tools. She has also worked extensively on analyzing the application behavior and optimizing application performance.

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