EBOOK

UNSUNG IT HEROES: EMPOWERING MAINFRAME DBAS

Samantha Buhler

Broadcom

Chris Muncan

Sun Life

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Imagine going to an ATM to withdraw cash for an evening out and being told your **transaction could not be processed** ...

... or, handing your credit card to the waitress at a restaurant and having the transaction hang. Luckily, few, if any, of us have had to face that embarrassing scenario because most of these business-critical transactions are backed by the mainframe. It's the platform that never sleeps and one that we tend to take for granted because it just works.

Yet, behind the scenes, database administrators, application developers, and system engineers, among others, work hard to enable this seamless experience at the point of interaction. Another comparison can be made to air traffic controllers, who do critical work behind the scenes. We give little thought to air traffic controllers when we fly, but without their fastidious work, our landing would be a lot less smooth. They are among those unsung heroes that do their jobs so well that the economy continues to seamlessly hum.

In this paper, we intend to pull back the curtains to shine light on those heroes, starting with a spotlight on the database administrator (DBA).

A Day in the Life of a DBA

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Steen Rasmussen, an esteemed colleague and friend, had a great analogy for the DBA. He calls the DBA the Swiss army knife of an enterprise and that is especially true for those working on the mainframe. Just like the multi-tool used to describe them, DBAs have their hands on everything, playing many different roles and performing a variety of tasks. In most mainframe shops, Db2 for z/OS is the database engine and the beating heart of the operation, feeding information to and receiving data from applications that are fundamental to success of the business.

They look at individual subsystems and go through log files, reviewing statistics and performance reports, while also addressing any batch issues from the day before. Underpinning the database is the overall physical system with a lot of moving parts, so the DBA's entire day could be spent looking at the health of the system.

DBAs start off their day like many ordinary people, perhaps with their caffeinated drink of choice. They do this, however, as they power on their laptops and check on the system environment for any issues to ensure overall health.

… on top of what they do to keep Db2 for z/OS humming in support of mission-critical workloads, they act as security gatekeepers. They need to understand auditing requirements and help determine who needs access and the type of access to be granted.

On an ongoing basis, DBAs perform regular baseline and performance reviews to understand the minimum requirements for a system or application to run. If performance degrades, they go into troubleshooting mode until the issue has been identified and fixed. On the mainframe, Db2 for z/OS tends to support large busy applications the business simply can't afford to have go down. If Db2 does falter, the heroic DBAs don't just need to restore the database, they need to restore the data up to the correct point in time and in the appropriate order. That's where having well-established and regularly tested back-up and recovery procedures are critical.

DBAs could also be part of a larger team that supports an application where they are responsible for both development and production environments. They run tests and verify any database changes as well as other related code changes in development before deploying to production. They may need to oversee Db2 for z/OS version and maintenance upgrades as part of their day-to-day tasks …

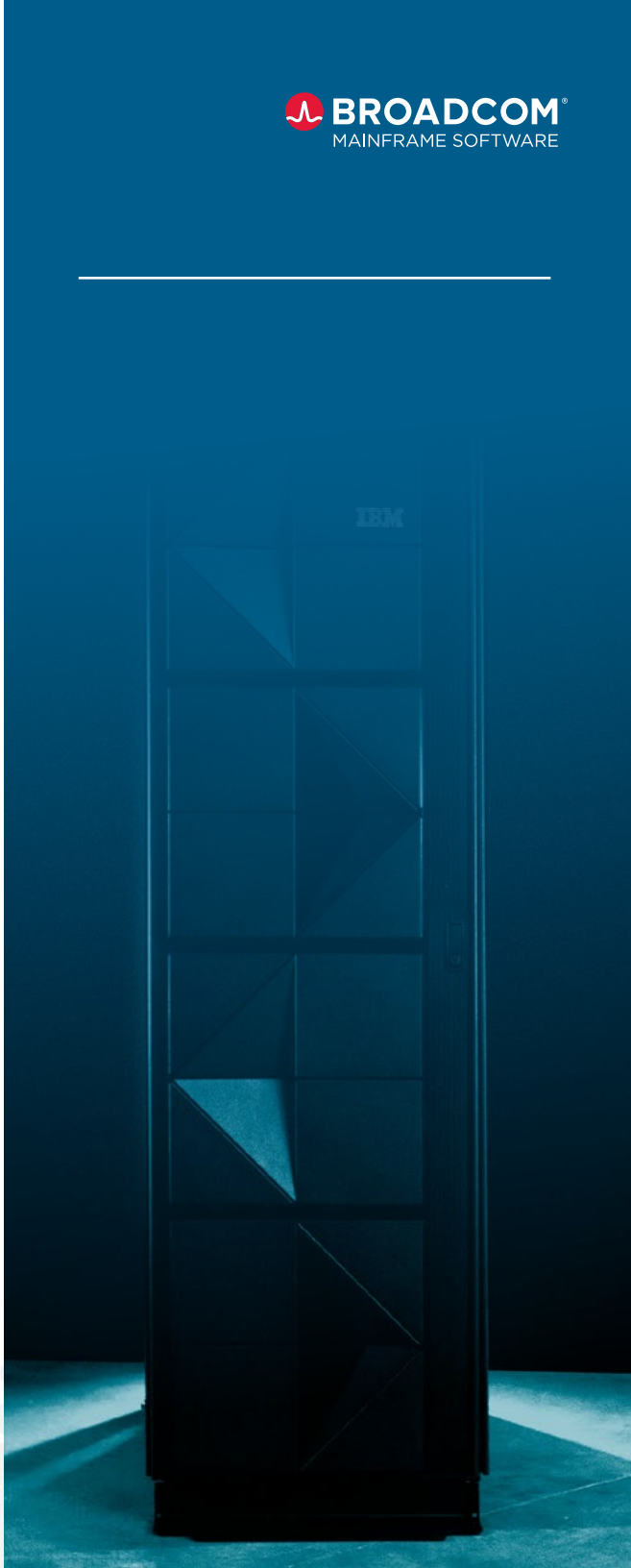
All this is done today through powerful capabilities from 3270 terminals. Great for the experienced mainframe DBA, but certainly not what the newcomer is accustomed to using, which makes the learning curve that much steeper.

As the baton gets handed off from one generation of DBAs to the next, however, the tools they need to succeed also must evolve ...

... fortunately, major players in the mainframe ecosystem, including IBM and Broadcom, came together on the **Open Mainframe Project** to collectively deliver **Zowe** as a common approach to modernizing the mainframe for the future.

To demonstrate the power of modern tooling, let's look at an example of what is possible today through consuming services delivered via APIs.

These APIs, provided by IBM and Broadcom among other vendors, could be surfaced through your own dashboards or open-source software like Prometheus and Grafana.



Leveraging Performance Dashboards

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Today's digital economy requires businesses to operate 24-7.

They cannot afford long batch windows or downtime for maintenance and problem diagnostics ...

... with the proliferation of new tools underpinned by services built from existing solutions that have withstood the test of time, the DBA, with their domain expertise and application knowledge, can stagger jobs and adjust batch windows based on surges and spikes to meet target service level agreements (SLAs).

Most DBAs today work off raw data and metrics from monitoring solutions like SYSVIEW™ for Db2 drilling down to Detector for deeper performance analyses of Db2 for z/OS (both SYSVIEW for Db2 and Detector are part of Broadcom's Performance Suite for Db2 for z/OS).

Broadcom has created REST APIs to serve up these metrics so they can be surfaced through the DBA's choice of graphical representation. The technology allows the DBA to quickly identify problem areas from trends in the visualizations and then move further to assess the raw numbers by reviewing the metrics and looking at correlations that define an event.

How Modern Tools Boost DBA Productivity

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With modern tooling, gone are the days of solely navigating through multiple 3270 green screen panels. DBAs today can now gauge the system's overall health, prioritize tasks, and act based on key metrics available through a single pane of glass on a visual dashboard (see Figure 1).

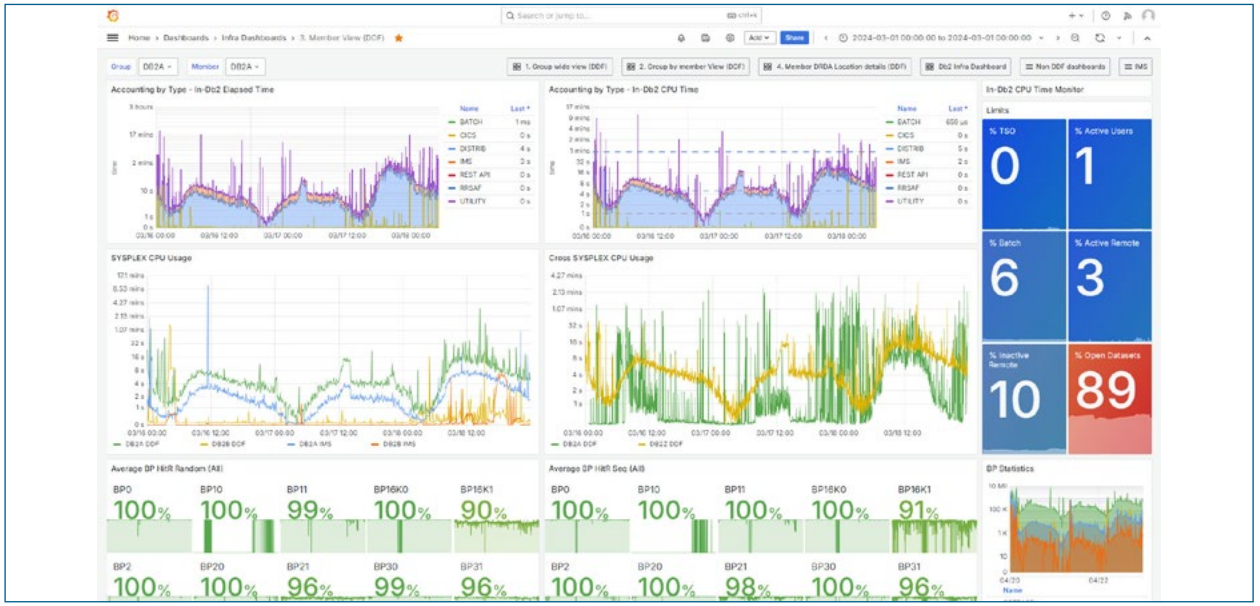

Figure 1. Overall Db2 health

All this is made possible through the adoption of API enabled JSON services to display key performance metrics in real-time on Grafana dashboards. As more APIs for managing the mainframe become available, we expect to see not only an increase in metrics covered, but also improvements in performance, scalability, and availability. Ultimately, modern tooling will likely evolve to include some injection of intelligence from this wealth of data to help DBAs grapple with all the moving parts that keep the heart of business beating at a steady pace.

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Equipped with intuitive modern tools, DBAs can streamline routine housekeeping tasks for Db2, freeing up their time for higher level strategic initiatives.

How Has Modern Tooling Helped Sun Life?

A recent experience at Sun Life brings the benefits of modern tooling–specifically Db2 performance metrics from SYSVIEW for Db2 and Detector leveraging Broadcom's DBM Data Service solution–to the forefront.

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In this instance, Sun Life used metrics from performance dashboards, built with help from their technology partners at Broadcom, to identify and remediate the problem before it impacted the environment. A routine test was scheduled by the application team to validate performance and system stability following a change.
The database team received an alert notification from Grafana indicating a test had started.

Subsequent notifications are triggered when specific thresholds, established by the DBAs, are reached.

DBAs at Sun Life had manually set thresholds for resource utilization of their subsystems within Grafana. Grafana allows users to set alert rules and parameters (see example in Figure 2).

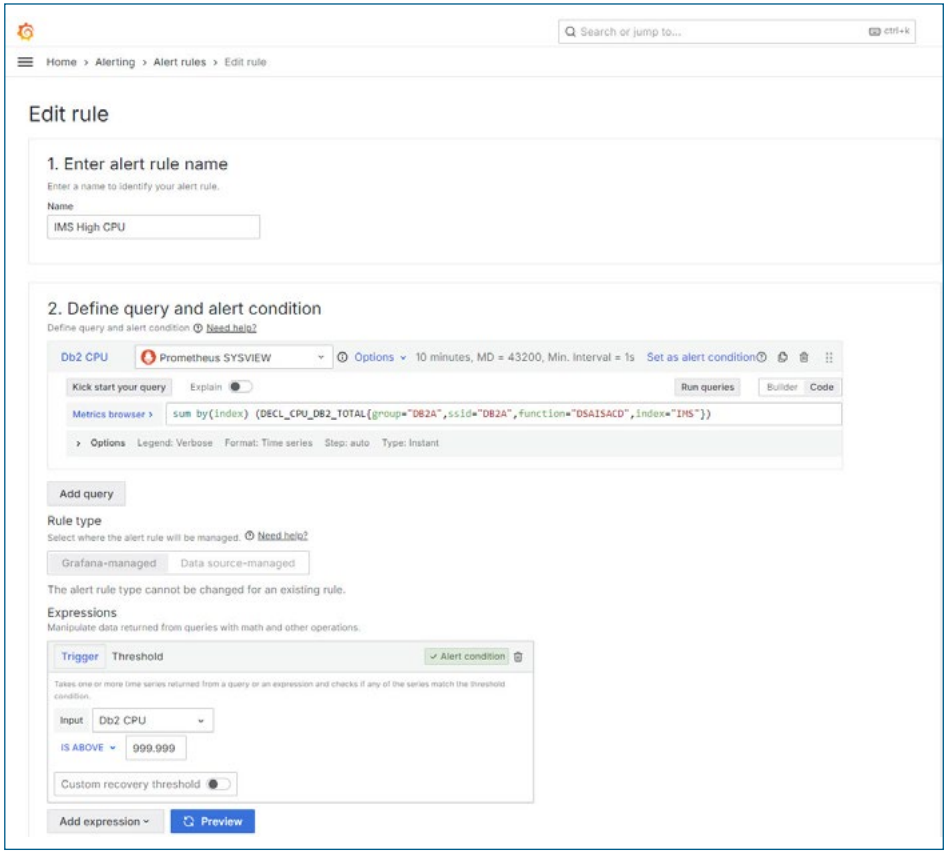

Figure 2. Grafana alert rules

Resources that hit DBA defined thresholds will trigger alerts to be generated (see Figure 3 for an example of annotations from Grafana).

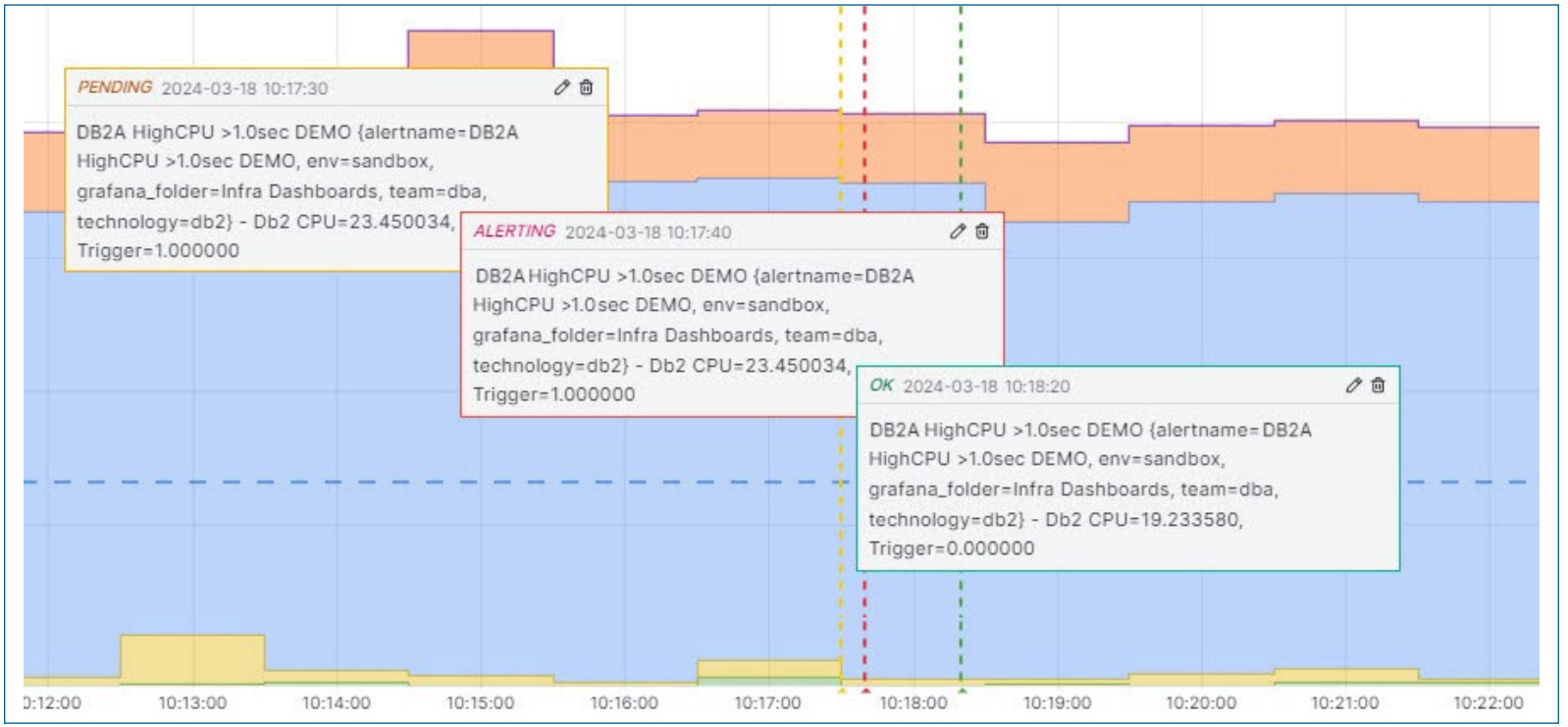

Figure 3. Grafana annotations

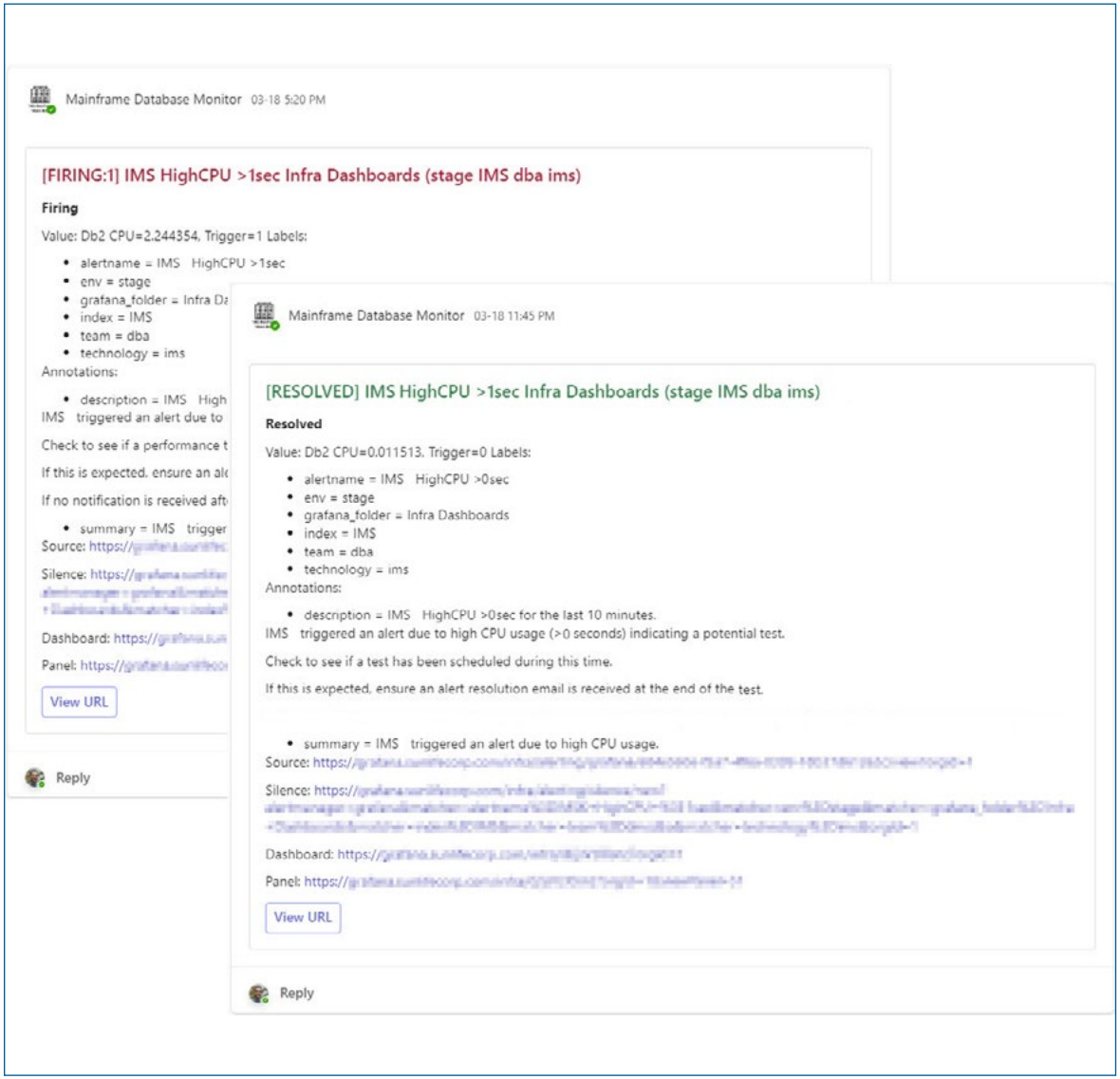

Figure 4. Grafana notifications

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A notification, such as the one from Figure 4, will then be sent off to the DBA for resolution.

A process continued to run after the test completed, kicking off transactions and driving up resource consumption. Fortunately, the DBAs noticed this anomaly from their performance dashboards. Upon review of these readily available alerts and dashboards, it was evident this test exceeded the predetermined thresholds and further remediation may be needed.

Armed with the knowledge that

1. A routine process had been running, and
2. Dashboards showing real-time trends in resource consumption, the issue was identified much earlier than it otherwise would have been.

As a result, DBAs at Sun Life were able to shut down the test and return stability to the environment, preventing any further impact to the system.

Enable Your Mainframe DBAs

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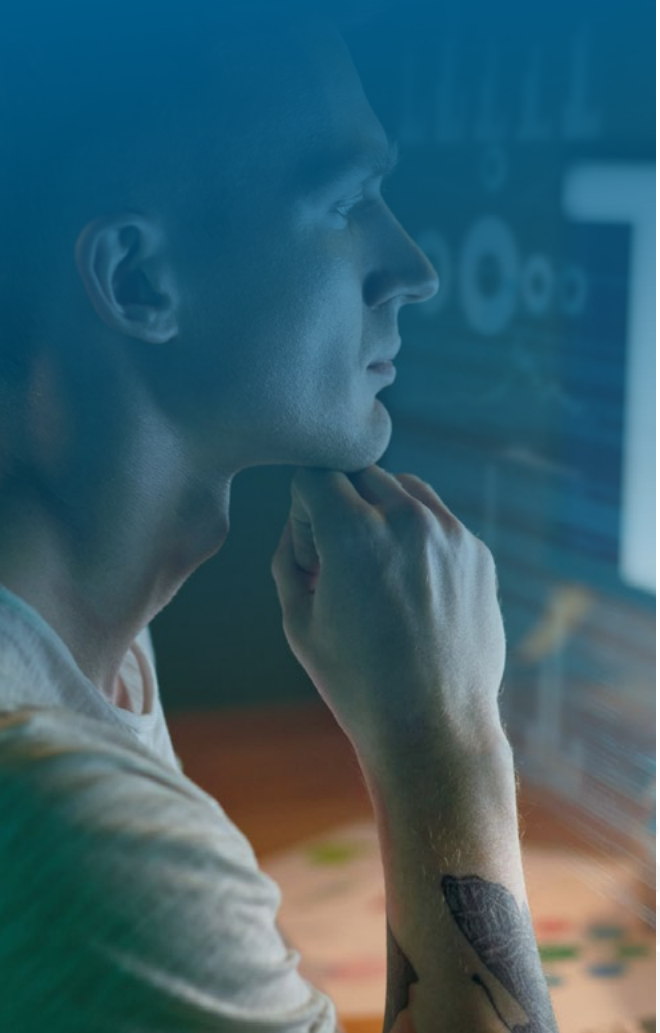
Partner with Broadcom today to enable your DBAs for success.



Perhaps these strategic tools will finally bring our heroes out of the shadows and into the light so they can be recognized for the tremendous work they do in support of the business.

DBAs do their jobs not for the recognition, but because they are indeed the Swiss army knife of their organization. For their selfless acts–at times fighting multiple fires from different directions–it's important to thank our DBAs and make sure we are enabling them by leveraging modern tooling, performance dashboards, and more.

Partner with Broadcom today to enable your DBAs for success.

Reference: Technical Detail for Prometheus and Grafana Integration

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Grafana Prometheus

Db2 performance metrics are surfaced from SYSVIEW for Db2 and Detector leveraging Broadcom's Database Management Data Service (DBM-DS) solution. The architecture uses the Zowe API mediation layer to ensure a better overall experience for API developers and consumers. Broadcom intends to deliver APIs for other mainframe databases, including Datacom and IDMS (see Figure 5 for the architecture overview).

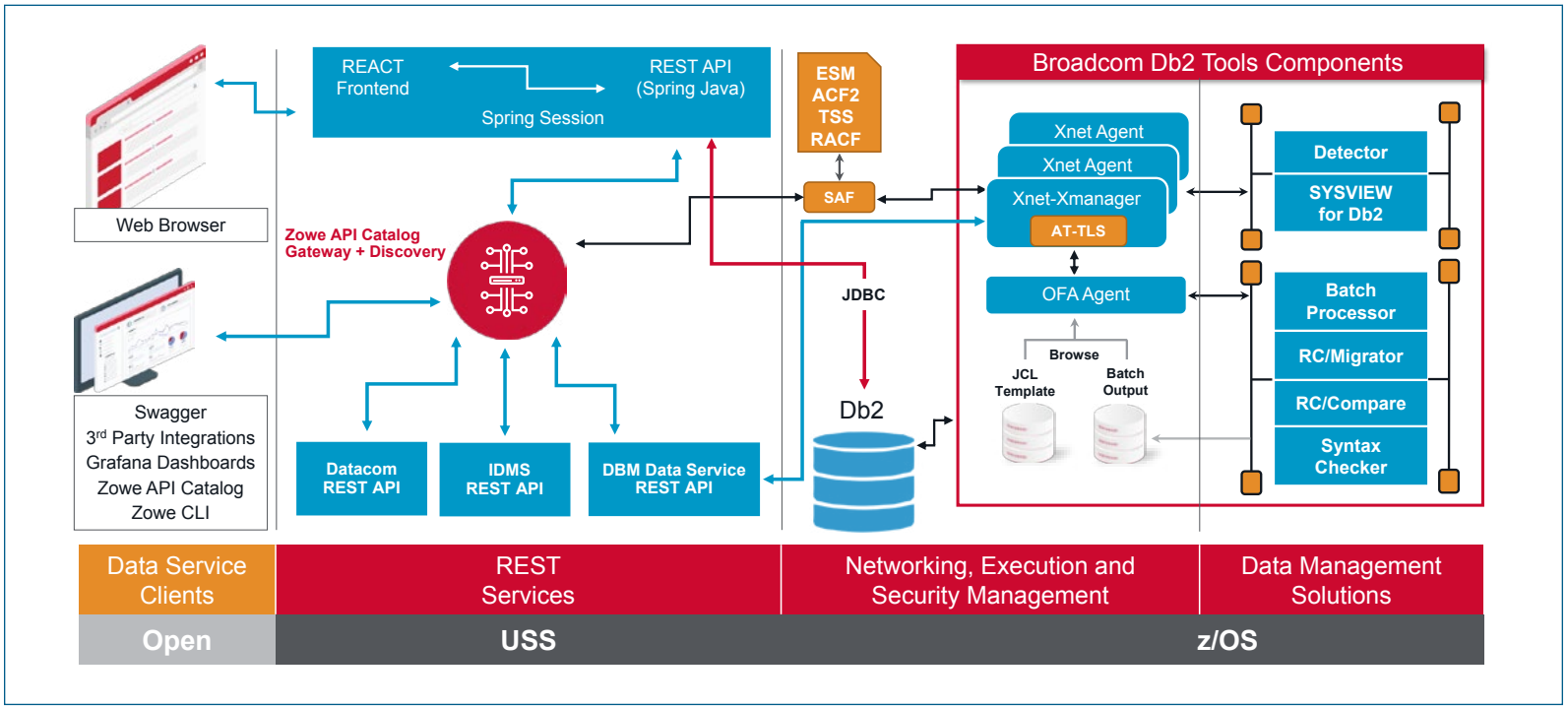

Figure 5. DBM Data Service Architecture

SYSVIEW for Db2 provides integration with Prometheus through [Broadcom's Database Manager (DBM) Data Service REST API endpoint /idb2/prometheus/generic]. Prometheus provides the ability to scrape the SYSVIEW for Db2 data through this endpoint and using Grafana, can visualize these metrics (see Figure 6 below).

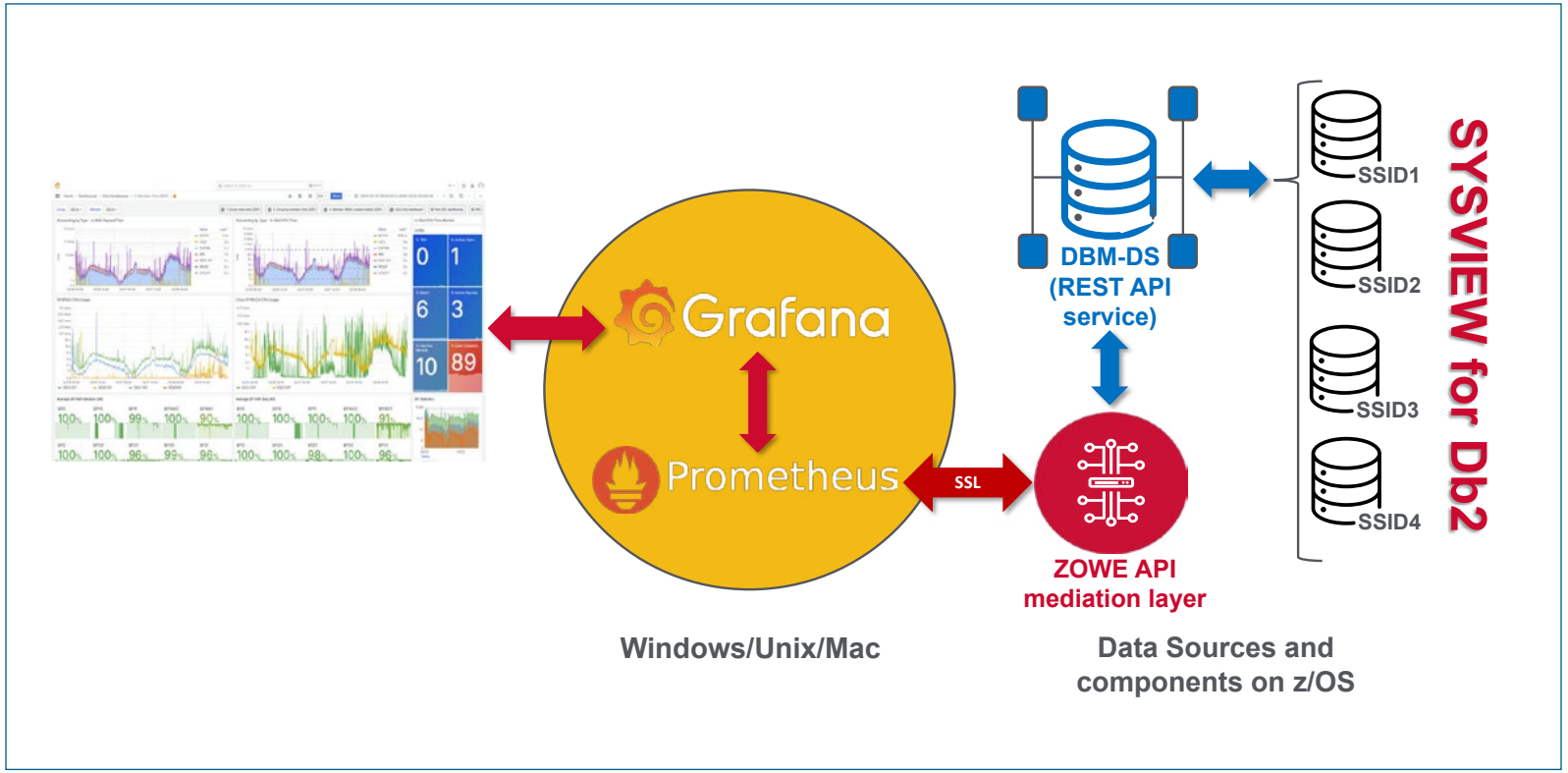

Figure 6. Overall solution architecture

After the DBM Data Service is setup, follow Broadcom's Guide to install Prometheus & Grafana integration to setup Prometheus' configuration file (see Figure 7), verify scraping (see Figure 8) and integrate with Grafana (see Figure 9).

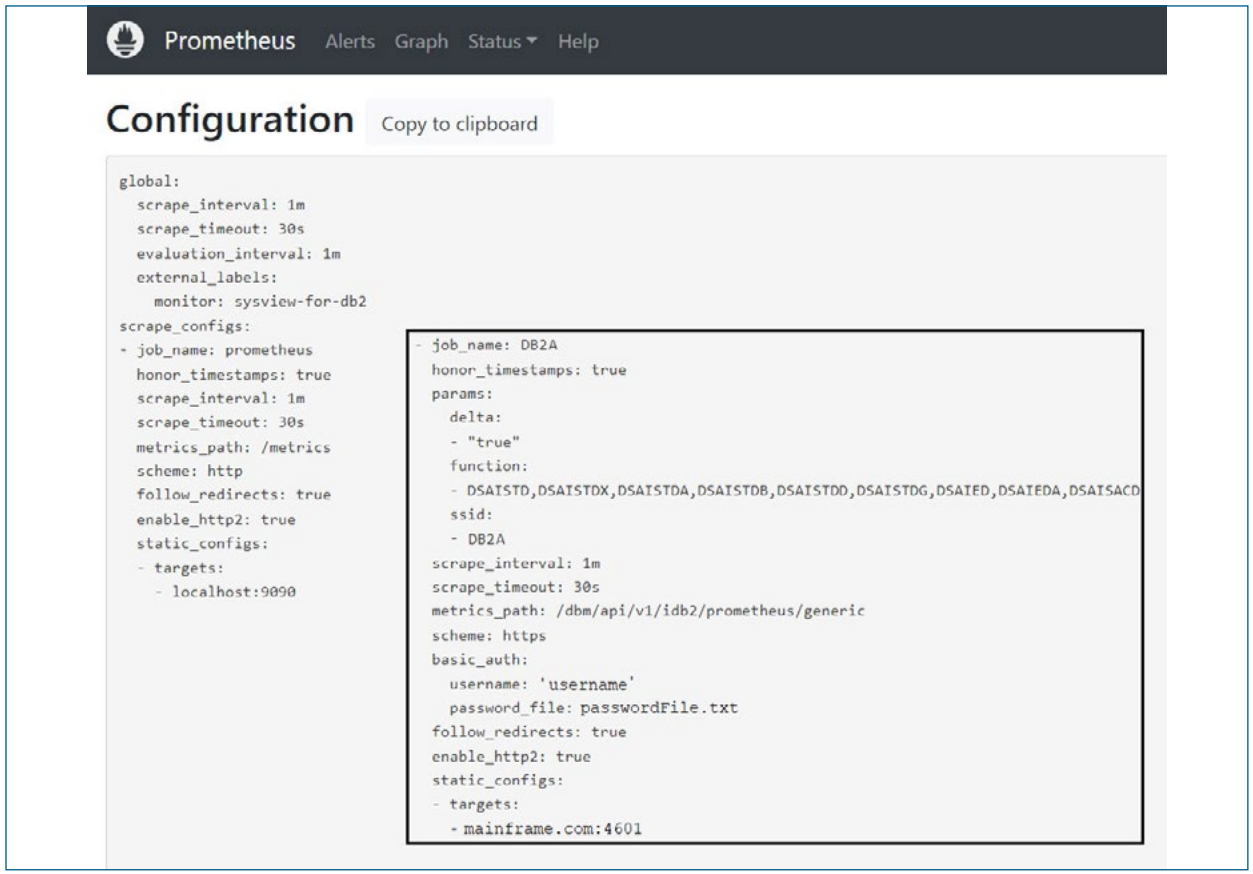

Figure 9. Prometheus Configuration & Service Discovery

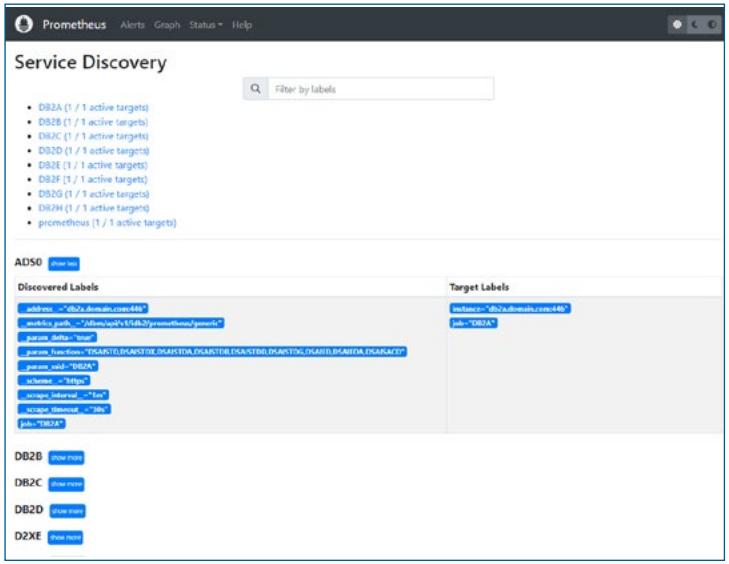

Figure 8. Prometheus Service Discovery

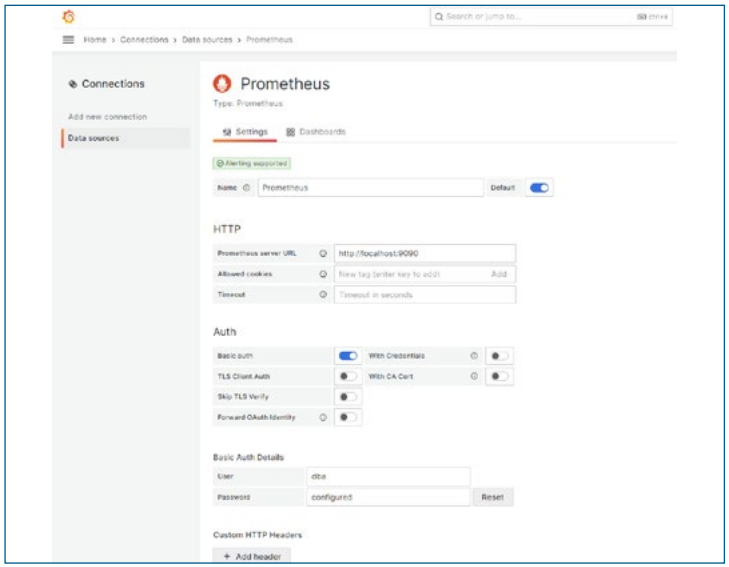

Figure 9. Grafana data source

After the DBM Data Service is setup, follow **Broadcom's Guide to install Prometheus & Grafana integration** to setup Prometheus' configuration file (see Figure 7), verify scraping (see Figure 8) and integrate with Grafana (see Figure 9).

To enable faster time to value out of the box, Broadcom provides a series of pre-built dashboards as part of the program. These templates can easily be imported into your Grafana environment to begin visualizing your SYSVIEW metrics.

After following these guides, the result is a beautiful visual representation of your SYSVIEW for Db2 metrics, which you can customize (see Figure 10).

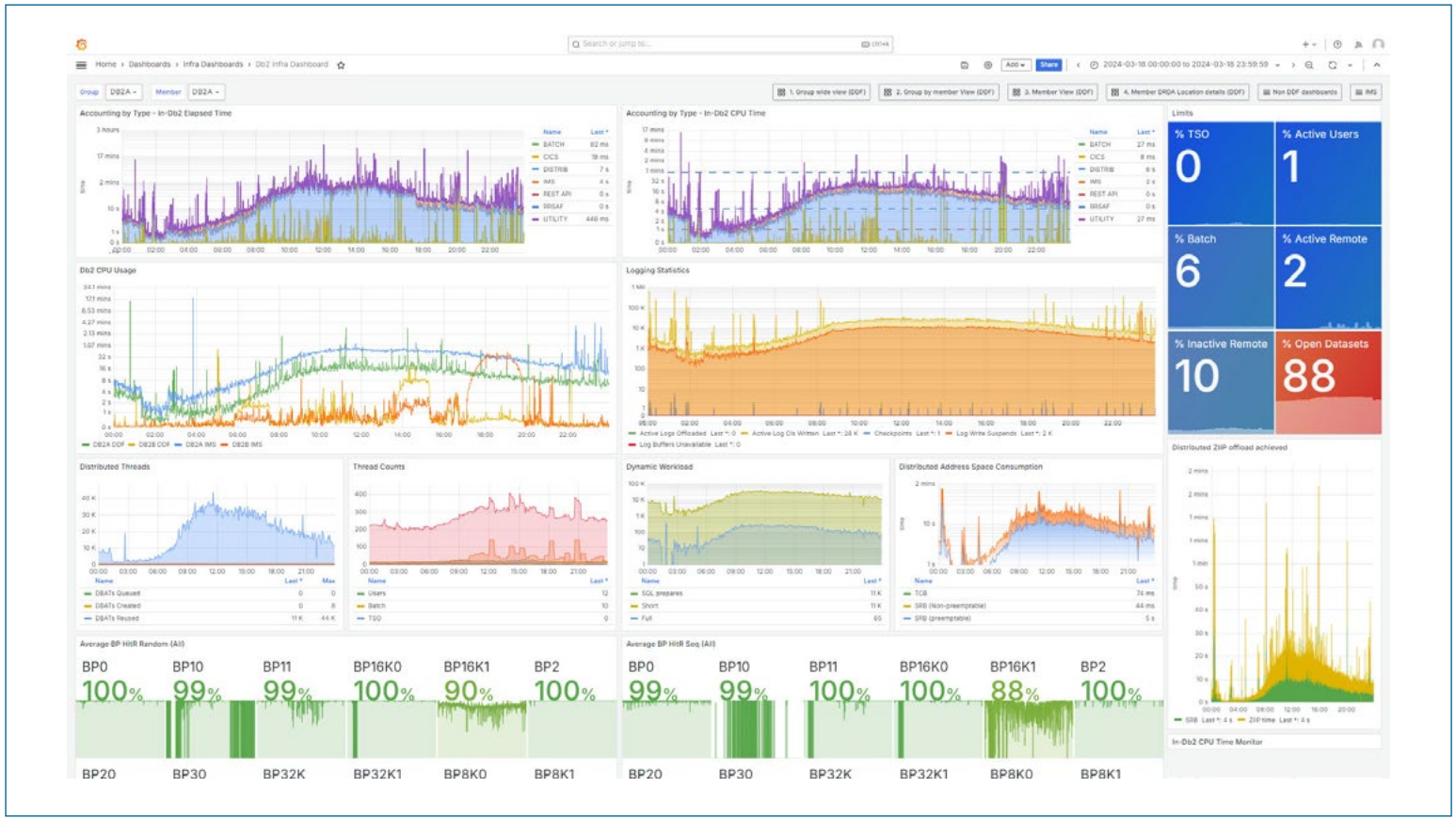

Figure 10. Grafana SYSVIEW dashboard

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