



Metrics: Tell Me About It

By Jeff Ash

BBj is a full-featured ecosystem encompassing a variety of components, including the BBx language interpreters, a database management system (DBMS), system administration and deployment components such as servers for serving applications via a web browser or thin client, database drivers for accessing data via third-party tools, a built-in Jetty web server and much more. BBjServices is at the heart of BBj and it consists of a number of services or servers each designed for a specific role. Since BBj is used in both smaller “mom & pop shops” and large distributed enterprises, it may be helpful for administrators and managers to obtain a deeper insight into the activity occurring inside BBjServices. BBj 18.00 optionally provides a powerful feature that exposes a variety of metrics.

Overview

BBj uses the open-source Prometheus Client Library (see <http://prometheus.io> for more information) to instrument (collect) and export various collected metrics for analysis. Use of this format provides the ability to use a combination of the open-source systems monitoring and alerting package, Prometheus, together with an open-source visualization tool such as Grafana (see <http://grafana.com> for more information) to generate beautiful, browser-based, interactive, and highly-customizable visualizations of BBjServices metrics. Note that the BBj metrics are independent of any specific version of Prometheus or Grafana, making it easy to upgrade to later releases of these products without regard for the current version of BBj installed.

Example

The best way to understand metrics is to look at a simple example of one particular type of metric in BBj: active SQL connections. At any point in time, BBjServices knows how many active SQL connections it currently has open. It might be helpful for an administrator to be able to analyze the number of connections open at different points throughout the day, or an even more detailed view, such as the change in the number of open connections every so often. Using

Prometheus in conjunction with BBJ metrics, these various data points can be collected and then analyzed in any number of ways depending on the needs of the administrator. Using our SQL connections example, these data points consist of a timestamp and number of active connections at that specific point in time. The graph in **Figure 1** below (a visualization created within Grafana using the Prometheus data acquired from BBJ) shows the number of active connections at 30-second intervals.

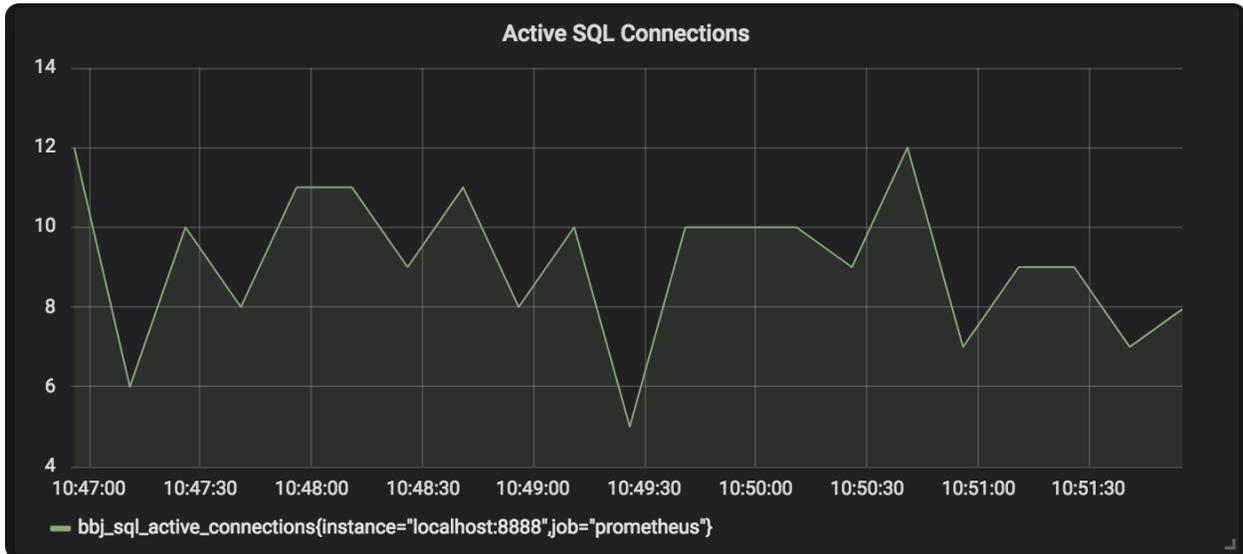


Figure 1. A visualization of the number of active BBJ SQL connections over time

We won't go into the details of configuring Prometheus and/or Grafana (see <http://prometheus.io> and <http://grafana.com>), but understand that you have the flexibility to tell it how often to check the metrics within BBJ for as much granularity as necessary. Since these collected data points are generic in nature (timestamp and a number), you also have the ability to change up the visualizations. For instance, instead of viewing the number of active connections at a point in time, it might be more interesting to see the number of connections made over the course of a particular length of time (e.g. the number of connections made during various 2-hour intervals throughout the day). Both can be derived from the same set of data points!

Enabling/Disabling Metrics

In many cases, it might not be necessary to gather all available metrics, so it is up to the administrator to determine which metrics to expose. By default, all metrics are disabled. Upon installation, metrics are easily enabled using the Enterprise Manager "Metrics" configuration page opened via the EM navigator at MyServer > BBJServices > Metrics as shown in **Figure 2**.

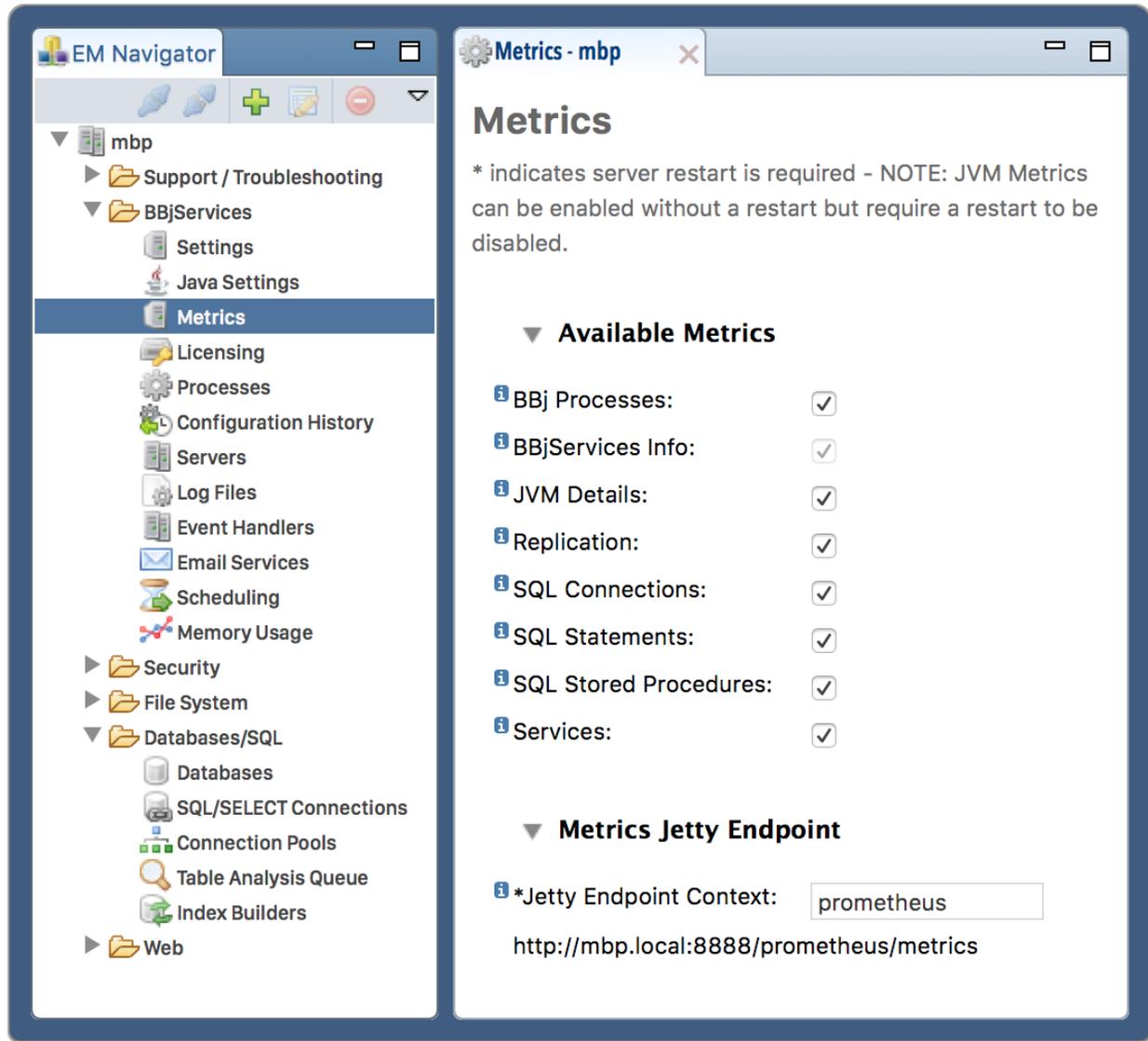


Figure 2. Enabling metrics in Enterprise Manager

Metrics can be enabled and disabled without restarting BBJServices, so feel free to play with that functionality. The endpoint URL is important when configuring Prometheus to collect the data, but can also be used to view the raw metrics via a web browser. Simply navigate to the URL to see a plain-text page containing the data. Refreshing the page over and over will show how the metrics change over time. For a complete description of each of the available metrics in BBJ as well as complete documentation on this feature, please see [BBJ Metrics](#) in the BASIS documentation.

Securing Your Metrics

While most metrics data is generally security agnostic (e.g. the number of processes, JVM stats, etc.), some metrics include data that could be considered a security risk, such as the username

with SQL connections. To prevent security breaches and unintended eyes from viewing the data, BBj secures the metrics endpoint URL using HTTP basic authentication. By default, only the admin user has access to this page. To open access to additional users, simply add the “View Metrics Results” permission to the user or group profile in the EM at Security > Users or Security > Users/Groups.

Installing Prometheus/Grafana

The details of installing and configuring Prometheus and Grafana are beyond the scope of this article. However, both are very well-documented and supported through their forums, and the process is quite simple. Learning to create dashboards in Grafana does have a somewhat steeper learning curve; however, BASIS provides some useful dashboards to get you started at the [BASIS Grafana dashboard site](#). See <http://prometheus.io> and <http://grafana.com> for complete information regarding each product.

Applying Metrics

The list of metrics shown previously in **Figure 2** provides a high-level overview of the various metric categories that BBjServices makes available. Each group typically provides several counters and/or gauges that describe low-level specifics. For example, after selecting the JVM Details checkbox, BBj monitors more than 30 different metrics characterizing all aspects of the JVM’s memory usage. This data is then selectable in Grafana so that you can create a variety of charts and information panels to build your own BBjServices dashboard. **Figure 3** shows a dashboard that incorporates a variety of both built-in and custom metrics to give an instant overview of several data points. The graphs are even interactive, providing animated hover effects and customized reporting ranges.

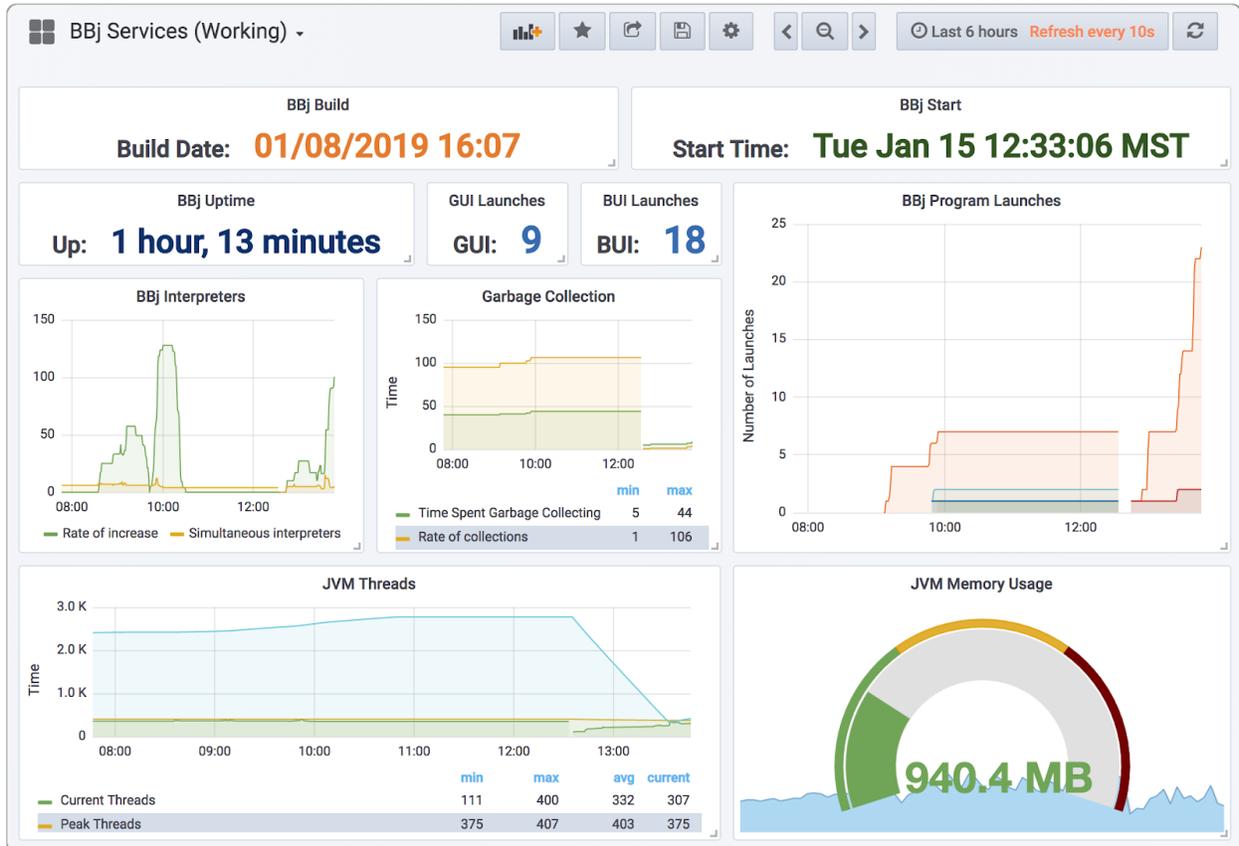


Figure 3. A Grafana dashboard reporting on BBJ metrics

Conclusion

Inevitably the time will come when an administrator or manager would like to know a bit more detail about the activity occurring within BBJ, whether that be for optimization, troubleshooting, or auditing purposes. The BBJ Metrics feature is an excellent tool to make this task quick, easy, robust, and available in real-time. By tying into the Prometheus Client Library, BBJ metrics can be incorporated into the best-in-class Prometheus and Grafana systems to provide world-class analysis and processing of that data. Keep an eye out for additional metrics in future releases of BBJ as BASIS is always looking for additional ways to provide administrators with the best possible information and tools necessary to successfully manage their BBJ installations.

More Information



A variety of material for Prometheus and Grafana is available online. See the following sites for more official information on the products. In addition to the resources linked below, there are numerous tutorials and YouTube videos available for both products.

- [Prometheus site](#)
- [Prometheus Getting Started Guide](#)
- [Grafana site](#)

- [Grafana Getting Started Guide](#)
- [BASIS Grafana dashboard site](#)