



White Paper

Early Warning, Power Troubleshooting and Optimization for TIBCO[®] ActiveMatrix[®] BusinessWorks[™]

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Abstract:

Users of TIBCO ActiveMatrix BusinessWorks (BW) face numerous challenges resulting from the lack of information regarding their BW infrastructure. Fundamental requirements for monitoring, troubleshooting and optimization are difficult to meet.

In particular, two key BW metrics must be carefully managed: memory consumption and process execution times. However, to do so, users need to have:

- early warning of issues
- visibility into the performance of the activities that comprise a process
- an understanding of memory consumption
- insight into resource allocation and capacity
- access to correlated information and historical trends for troubleshooting, change management and optimization

SL's RTView[®] for APM | BW Monitor[®] is a powerful monitoring and management solution that enables TIBCO BusinessWorks users to gain early warning of problems, provide deep analytics and troubleshooting to quickly and fully resolve issues relating to their BW implementations, and ultimately save money through the optimization of their BW services.

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Background: BusinessWorks Use Cases

If you are a BusinessWorks user, you are either managing applications in a SOA environment leveraging the broader ActiveMatrix service platform, or in a non-SOA environment where you are using BusinessWorks stand-alone.

In the former scenario, you are likely using TIBCO's ActiveMatrix BusinessWorks Service Engine to provide an ActiveMatrix container to deploy ActiveMatrix BusinessWorks projects. This is the standard approach for using BW in an ActiveMatrix environment. In the latter scenario, you are likely using "classic BW," not the ActiveMatrix BusinessWorks Service Engine, which means you typically are not exposing BW processes with a service interface. Each of these use cases presents certain challenges to effective monitoring.

Challenges of Service Performance and Reliability Monitoring in a SOA Environment

The primary challenge for companies managing applications in a SOA environment is to reliably provide business-critical services at acceptable performance levels in as cost-effective a manner as possible. The focus is on service management and adherence to service level agreements (SLAs). You need to be able to add new services, modify existing services, and replace or retire outdated ones. They need to provide legacy services to new consumers and new services to legacy consumers, as well as expand the range of available services.

But more importantly, you need to see the level of usage of a service in order to monitor SLAs, manage service loads, determine chargebacks, perform dynamic provisioning or assist in manual provisioning.

These requirements pose the following challenges:

- Accommodating heterogeneous software assets that support multiple service development languages and deployment platforms
- Achieving service-consumer compatibility with respect to transport protocols (HTTP and JMS), interaction protocols like SOAP, data structure and formats, and data content
- Reusing services and common features of services such as logging and fault management
- Managing different versions of services based on, for example, locale, authorization, time of day, contents of a request, or versions of client software
- Minimizing the disruption of transitions from one version of a service to another
- Updating numerous clients with the location of a new service
- Easing of development and maintenance of services

In an ActiveMatrix environment, these challenges can be best addressed through monitoring and optimization of the services themselves using TIBCO Service Performance Monitor (SPM).

In a non-SOA environment, where you are leveraging “classic BW” (not ActiveMatrix) and have not exposed any BW processes as service requests, these challenges of monitoring services and SLAs are the same. However, it is not possible to address them using SPM. As such, the lack of information available to the solution further complicates the monitoring and optimization of classic BW environments.

Challenges of Monitoring BusinessWorks

Regardless of whether the primary objective of your project is to monitor and manage services and SLAs, it is critical to monitor the performance of the underlying BW implementation.

There are many use cases where the focus is not on monitoring and managing services and SLAs, but on monitoring the performance of the BW implementation itself. In such scenarios, additional hurdles remain, including:

- Determining how much memory is required to run the BW engines, without over-provisioning
- Optimizing BW services based on historical usage
- Troubleshooting and resolving issues with a BW engine rather than simply restarting the service
- Determining the usage rates for a version of the service
- Correlating information across multiple BW engines to determine the overall health of a specific application

These objectives drive additional challenges for IT groups responsible for the monitoring and optimization of the BW engines and servers, including:

- Gathering and aggregating metrics across multiple Hawk domains
- Monitoring processes not exposed as services, as well as every activity that a process performs
- Defining personalized summary views relevant to a service, application or domain
- Providing drill down into the steps of a service request to determine the exact point of failure
- Persisting and compressing metrics in an efficient manner so that analysis can be done over an extended period of time
- Addressing the above challenges in real-time, without compromising the performance of the overall system

Product Overview

SL's RTView for APM | BW Monitor makes fast troubleshooting and problem resolution possible by providing early warning of issues; comparison of real-time performance information across multiple BW engines, servers, processes and activities; and ready access to deep analytics.

SL's BW Monitor also tracks historical trend information for more efficient troubleshooting, provisioning, capacity planning and overall optimization. For example, users are able to view time-interval-related trends regarding server memory, CPU usage, BW engine memory, thread counts and process execution times. Or they can view service usage rates to help determine whether to decommission a BW service when a new version is implemented.

BW Monitor Deployments

BW Monitor can be deployed via a desktop or a browser. Figure 1 shows us the flow of a desktop deployment.

BusinessWorks users generally have a number of BW host systems or platforms that have BW installed using TIBCO EMS or RV as a transport, and Hawk as a standard alerting microagent that provides metrics regarding the status of BW.

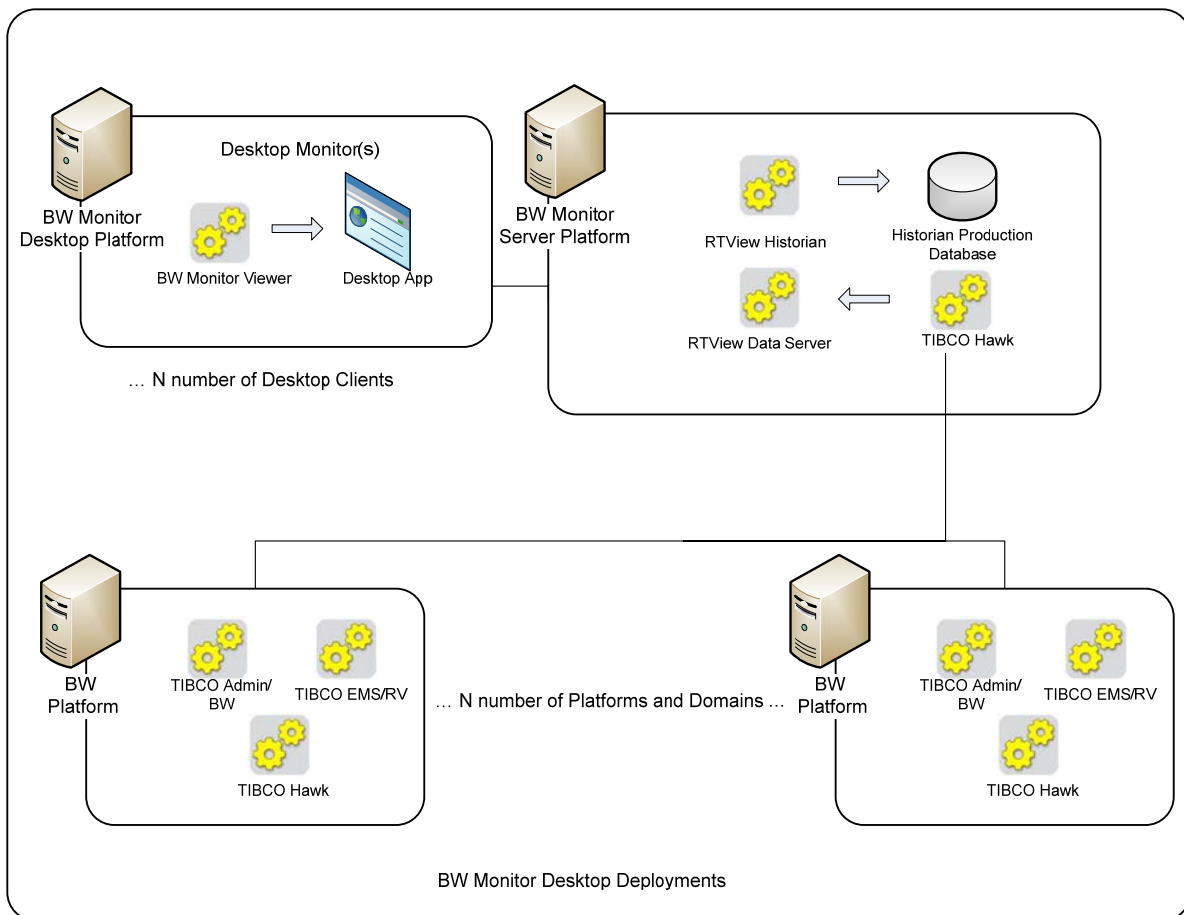


Figure 1: BW Monitor Desktop Deployments

The BW engines can be on a variety of disparate machines and different applications sets and services, as well as Hawk domains (domains of servers that all recognize each other under the same container – servers that have a common usage). Via Hawk, BW Monitor brings in the information through a Hawk data adapter to RTView.

The data server is collecting the information. The data server then also communicates with the Historian so that metrics can be put into the Historian database. The real-time information is then communicated from the display server directly to the BW Monitor application and to the desktop application, which then presents all of the BW Monitor metrics and provides a vehicle for users to navigate and inspect the real-time and historical data.

For the browser-based deployment (Figure 2), BW Monitor adds an RTView display server and an application server to provide multiple web- and browser-based deployments.

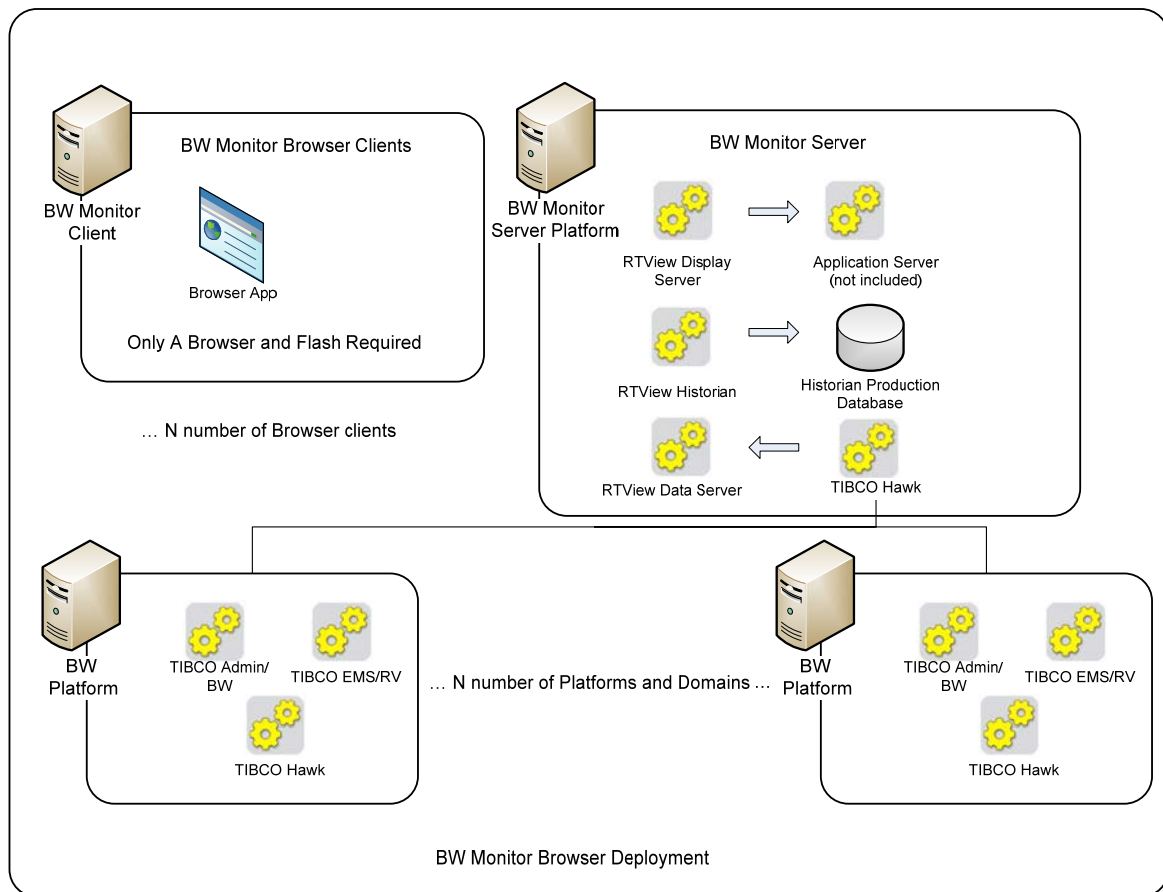


Figure 2: BW Monitor Browser Deployments

While BW Monitor takes advantage of the metrics available through the standard BW microagent, SL has enhanced the solution by providing a custom Hawk agent that allows users to access additional important metrics to effectively monitor and optimize BusinessWorks. For example, SL’s custom Hawk agent allows users to see engines that are deployed but not running, providing a complete picture of the state of their entire BW environment. Moreover, BW Monitor users are able to view how much memory was allocated to a JVM application for processes when the processes were deployed, a metric that is not available through the standard microagent.

How BW Monitor Solves the Problem

Two primary indicators that a BusinessWorks implementation is degrading are an increase in memory consumption and slow process execution times. In order to effectively manage these two metrics, as well as the overall performance of your BusinessWorks infrastructure, you need to:

- Gain early warning of issues through fine-tuned thresholds and trusted alerts
- Determine how much of a given resource is required without over-provisioning
- Decide whether it is necessary to increase capacity to meet the demands on an BW service
- More effectively troubleshoot an issue by assessing whether the current level of a key metric is consistent with historical trends for the same period
- Reduce risks associated with changes and upgrades to BW services or related applications by putting all necessary troubleshooting information at your fingertips
- Optimize your BusinessWorks infrastructure based on historical data

BW Monitor makes it possible to address all five of these points.

Early Warning Based on Fine-Tuned Thresholds and Trusted Alerts

The ability to base alerts on whether the real-time status of, say, memory consumption or process execution time is consistent with the historical trends of these metrics for a given day or time is critical. This information can be used to fine-tune alert thresholds, ensuring that only the most trusted alerts are put forward.

Managing Memory Consumption and Capacity Planning in a BusinessWorks Environment

Because BW Monitor can provide visibility at both the individual engine or service level, as well as the aggregated application level, the solution becomes highly useful – even critical – for managing memory consumption and capacity planning in a BusinessWorks environment.

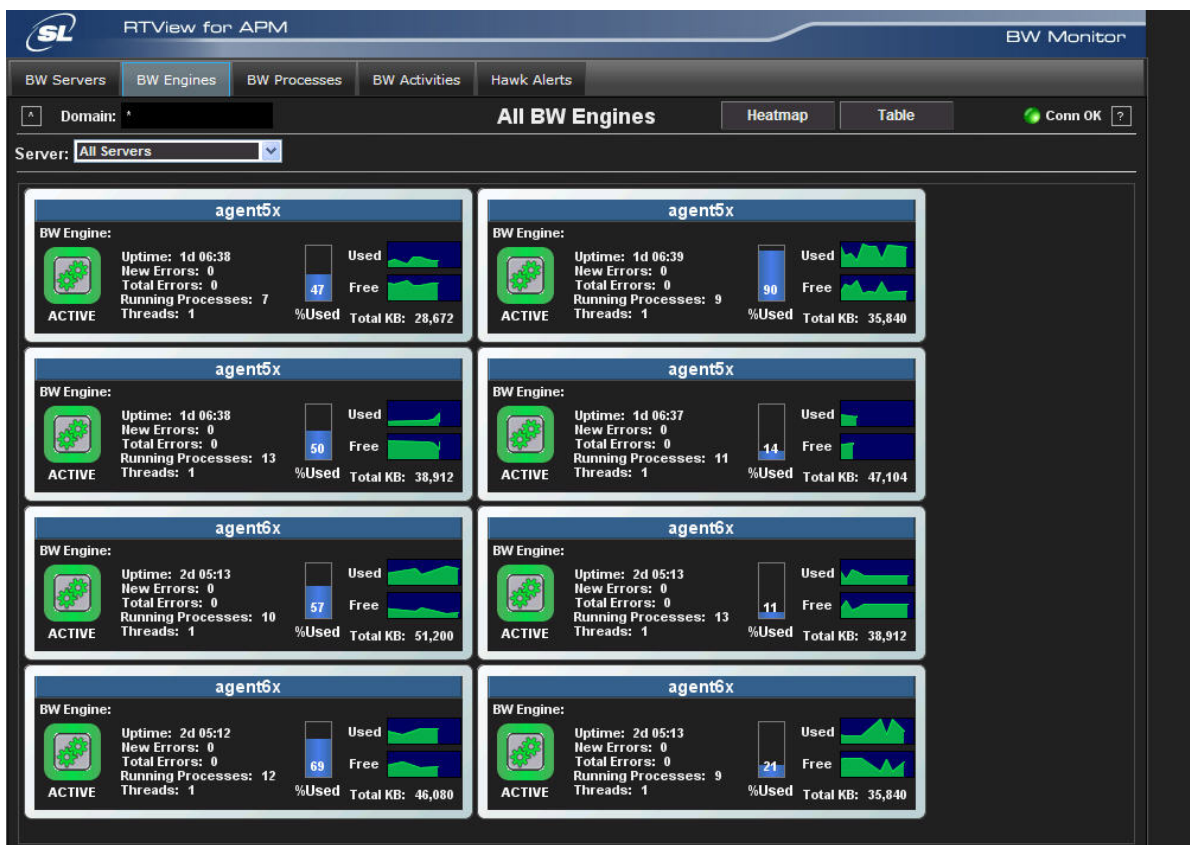
In deploying a BW Engine, you would normally allocate memory through the configuration screen. While this fundamental piece of information – how much memory was allocated to each engine – is available, accessing it for troubleshooting purposes is tedious and time-consuming. The only means of seeing how much memory was allocated to each BW Engine is to log into each BW Server and view the configuration.

You can also obtain the total memory usage from a host or box perspective. However, this does not provide memory allocated to each JVM for each BW Engine.

As such, there are three challenges to effectively manage memory consumption:

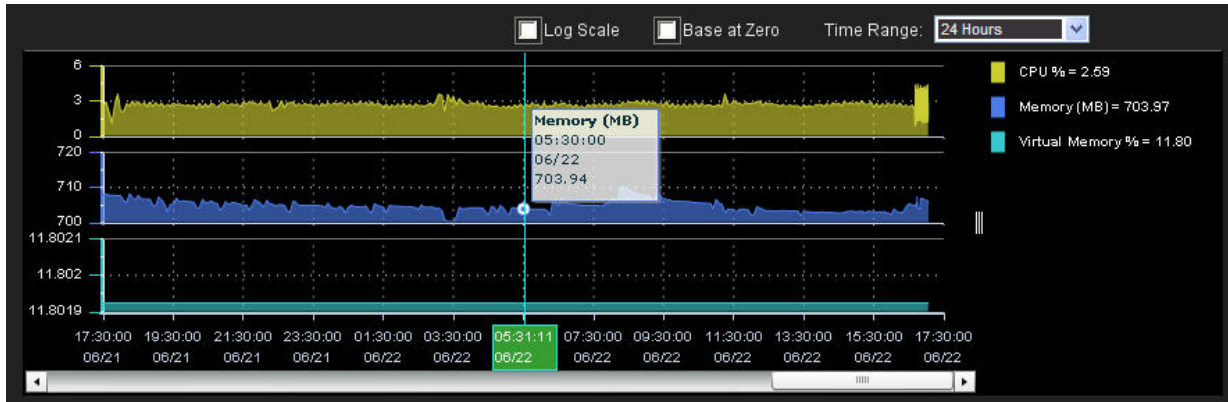
- It takes too much time and effort to understand memory consumption at the individual engine level.
- If you are load balancing services across multiple engines, you do not have the visibility to balance memory consumption at the service-level.
- You are not able to aggregate the metrics on memory consumption for the individual engines and servers in order to understand the memory consumption of an overall application, one that may be comprised of hundreds of BW engines in the form of containers that, combined, provide the broad functionality of the application.

SL's BW Monitor not only provides memory allocation and consumption information at the lowest level for each engine, but also aggregates this information across all engines associated with a given service, or an overall application. You are able to view instantly how much memory was allocated to each individual engine, the memory consumption across a load-balanced service, and the memory requirements for the highest level application. With this information, users are able to cost out, for example, exactly how much hardware Application A requires.



Summary showing the status and memory consumption of all BusinessWorks engines

Moreover, BW Monitor allows you to monitor memory allocation and consumption in both real-time (ie, right now) and over time using historical trend analysis. Is the current real-time consumption of memory consistent with previous trends, or is it a spike? This information enables better-informed assumptions as to what is required capacity-wise at the engine, service and application level.



Memory consumption over a 24-hour period

Usage Rates of Services

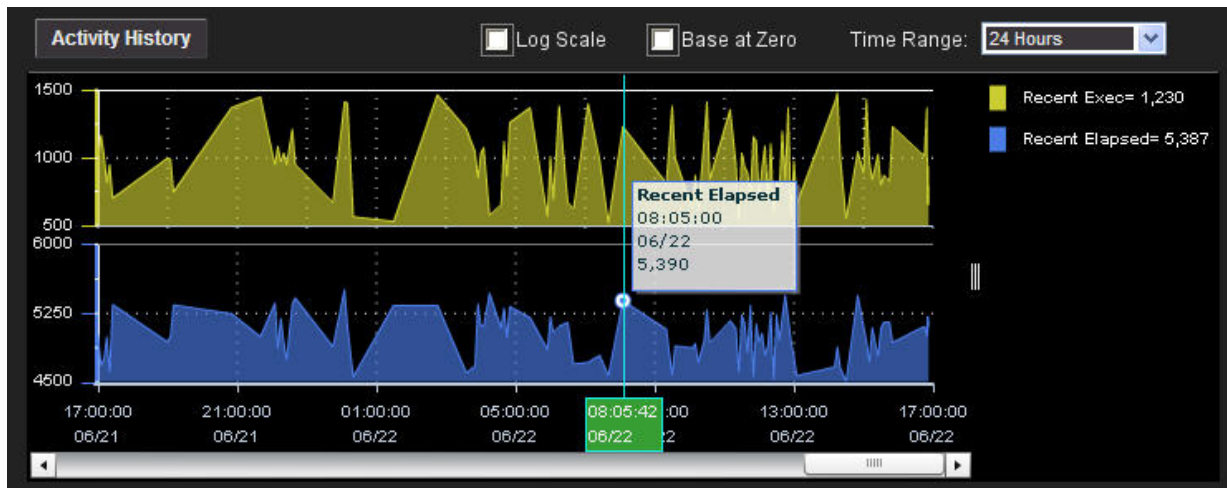
BW Monitor is able to tie usage rates to historical trends. Usage rates are used to determine whether to decommission a service – either no one is using it, or it’s a service that has been provisioned but has not been set up correctly, so it is effectively dead. BW Monitor enables you to look at usage rates in terms of how many times a process is requested over a period of hours, days or months.

Troubleshooting With Historical Context

BW Monitor’s true value becomes most clear when an application running on BusinessWorks degrades, and you have a limited amount of time to troubleshoot and resolve the problem. With BW Monitor, you are no longer in a position where your only option for resolving the problem in an acceptable timeframe is to reboot the BW engines involved. Now, you can quickly troubleshoot and potentially solve the problem in that timeframe, ensuring it does not bubble up again.

BW Monitor is particularly useful for troubleshooting related to memory consumption. You can look back through the history and see if there is a peak time when the service is using more memory. Is it tied to a particular box? Is it correlated to a particular process?

From a process perspective, if a process is too slow, oftentimes you would want to drill down and determine what part of the process – what activity – is slowing the response. BW Monitor enables you to determine exactly what step in the process is causing slow execution time. Again, this enables you to troubleshoot the problem rather than just restarting the process and assuming it will return to a stable state. You can actually know why the process was slowing down and address the issue.



Process Execution Time Over a 24-Hour Period

Reducing Risks Associated With Changes and Upgrades

The immediate availability of both drill-down and historical information is most critical when changes are being made. In most production environments, the most risky situations relate to when services or applications are being upgraded. Although the upgrades may work perfectly in the test environment, there is always risk when the changes go live. In these moments, it is too risky and too time consuming to rely on log files to troubleshoot. It is critical to have all of the necessary information correlated and right at your fingertips so that, if a problem arises, it can be resolved immediately. BW Monitor provides the detail, correlation of information, and historical context required to quickly address issues arising during the deployment of changes and upgrades.

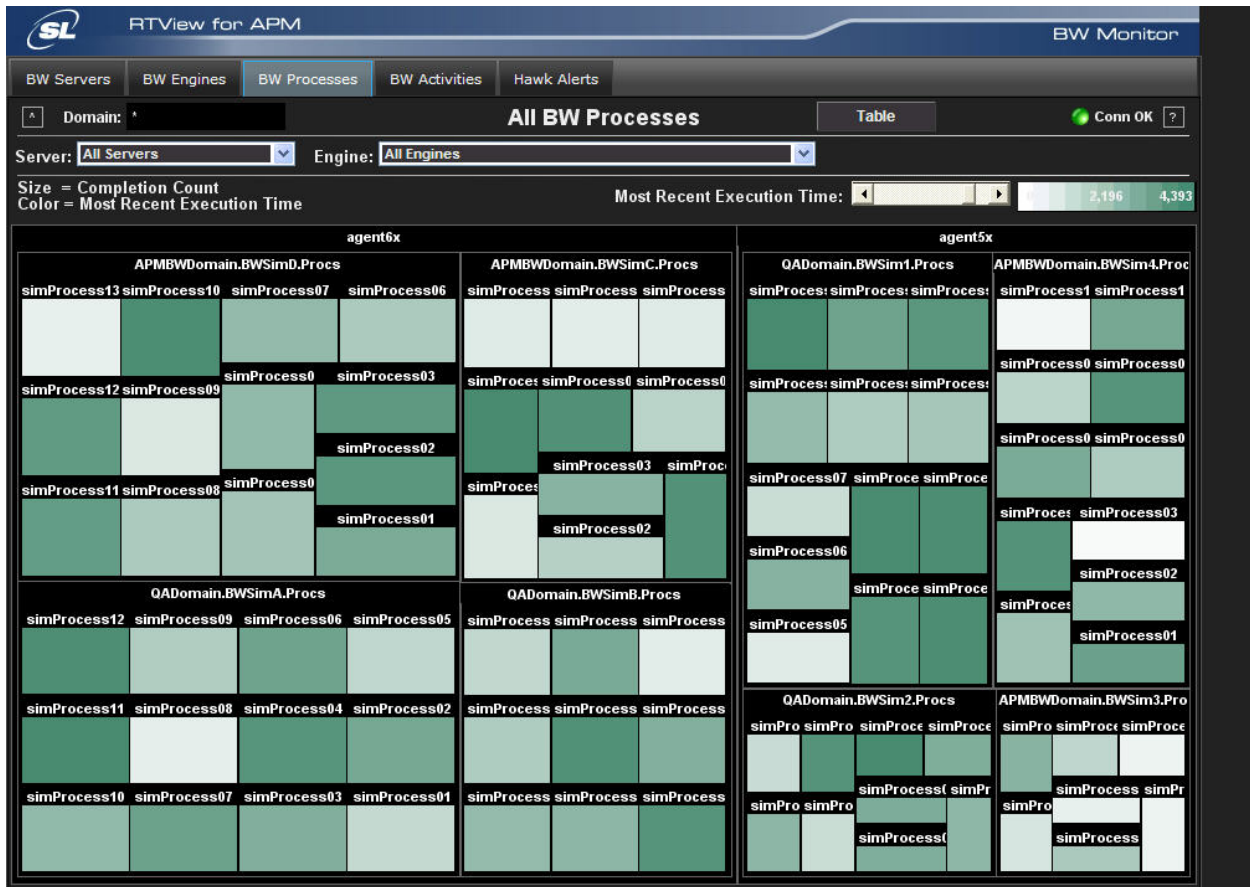
Optimizing BusinessWorks Services

There are two primary goals in optimizing a BW service: 1) understanding the consumption of hardware resources to determine whether you're over- or under-allocated for the services, and 2) understanding usage rates to determine possible causes for slow process execution times. These metrics are indicators as to whether you need to optimize, or go back to the drawing board and code the engine differently.

BW Monitor is able to monitor both the real-time consumption of resources, as well as historical consumption tied to day and time. With this information, you can determine whether a change in the consumption represents an overall trend, extending beyond historical averages, or simply represents a spike in consumption due to a peak period of usage. This ultimately saves money – no more guessing how much hardware is required because there is a limited understanding of consumption.

One of the top indicators of a possible degradation in an application environment is slow process execution time. This may be tied to the BW engine. Even if you haven't service-enabled the engine as an official web service, engines are often created in a SOA-type mindset, where an engine serves as a container with a set of functionality that multiple applications might use.

When you design an engine, you're exposing different processes like, "Do a credit check." Whatever business process you're putting together is exposed in its entirety as far as its execution time. A process might have a number of steps it needs to do to finally get the result.



Heatmap summary of BusinessWorks processes showing completion counts vs. execution time

The Hawk agent exposes metrics such as the longest time it took and the average time it took to execute that request. However, it does not show how utilization has changed over time. This additional information is key to optimizing a BW engine as a service. Only by understanding the number of calls to a service request and whether that volume is adversely affecting process execution latency can you determine whether another instance of the service is necessary to maintain acceptable performance levels. BW Monitor provides this information.

Finally, many companies require correlation of information across services in order to optimize an application. For example, it is often necessary to understand process execution times for a given process across multiple servers. Is it load-balanced correctly? Are the metrics you're getting back regarding execution time really valid? If they're all slow, is the problem so extensive that you need to recode?

With BW Monitor, you can also look at correlations across engines from an application perspective. This would otherwise be very difficult to do even though the process execution metrics are exposed from the BW microagent.

Conclusion

BW Monitor provides critical visibility into and across any application infrastructure based on BusinessWorks classic or ActiveMatrix BusinessWorks, with a powerful out-of-the-box and customizable monitoring solution. It addresses the two key indicators of application issues – increases in memory consumption and slow process execution times – by enabling users to:

- Gain early warning of issues through fine-tuned thresholds and trusted alerts
- Determine how much of a given resource is required without over-provisioning
- Decide whether it is necessary to increase capacity to meet the demands on a BW service
- More effectively troubleshoot an issue by assessing whether the current level of a key metric is consistent with historical trends for the same period
- Reduce risks associated with changes and upgrades to BW services or related applications by putting all necessary troubleshooting information at your fingertips
- Optimize your BusinessWorks infrastructure based on historical data

For more information on RTView for APM | BW Monitor, or to download a free evaluation, please visit www.sl.com.

About SL Corporation

Over the past 24 years, SL Corporation has become the most knowledgeable and responsive provider of real-time monitoring, analytics, and visibility solutions. SL's flagship product, RTView, addresses a broad spectrum of operational visibility challenges spanning 360° application performance management (APM), business activity monitoring (BAM), and component-level infrastructure monitoring. RTView also has become the de facto standard for extending the visualization of complex event processing (CEP) engines, TIBCO messaging middleware, Oracle Coherence data grids, and custom applications. SL's exclusive focus on real-time visibility solutions, commitment to customer success, and partner-centric culture are why thousands of industry leaders have chosen to work with SL to support their most critical applications and businesses.



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