



CLABBY ANALYTICS

Research Report

IBM OMEGAMON and System Automation: Proactive, Automated Problem Resolution

Executive Summary

Today's complex applications require a complete, integrated, efficient management environment that can proactively identify problems before they occur – and that can correct problems without manual intervention. By linking the wealth of monitoring data with policy-based automation, IBM's OMEGAMON monitoring environment can identify performance problems before outages occur; and these problems can be automatically resolved using IBM's System Automation Suite (for policy-based automation).

In this *Research Report*, *Clabby Analytics* looks more closely at the integration of IBM's monitoring and systems/workload automation portfolios, and we consider the benefits of using these solutions in tandem.

The Situation: Increased Complexity and a Siloed Infrastructure

Today's composite applications span multiple layers of infrastructure with transactions that travel across both mainframe and distributed systems silos. These silos make it difficult for IT administrators to identify the source of problem as applications and data make their way through these systems – and thus, identifying the source of performance problems becomes a challenge. Furthermore, without automation, manual errors are common, and correlating information from multiple monitoring tools while looking at application/database/system interdependencies in order to locate the source of an application performance problem can be quite complex.

To overcome this complexity, enterprises are looking to link IT siloes through common management and by sharing of monitoring and performance information across systems, storage, networks. This means that management systems must be capable of monitoring and correlating performance metrics across these infrastructure layers to provide an unified view of application behavior, as well as the ability to — from a single management screen — drill down to individual components for root cause analysis.

In addition to linking silos and sharing monitoring/performance information, enterprises are also looking to speed time-to-resolution and improve availability through automated problem resolution. Many of today's monitoring tools only indicate whether an application is up or down — rather than indicating application performance degradation so that a problem can be fixed proactively before causing an outage or breaching service level agreements (SLAs). Outages can result in lost revenue and negatively impact a company's reputation. In order to resolve performance problems, IT administrators need to understand performance values such as “what is good and what is bad?”, or “what is the correct threshold?” Once administrators qualify and quantify performance values, policies and thresholds can be set – replacing manual problem correlation across applications with automated alerts and alarms that are triggered when a

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predetermined threshold is reached. At this juncture, automated fixes and recovery mechanisms can be launched.

This process of automatic problem identification and automated response enables proactive management to take place, allowing problems to be identified and corrected before they impact end-users, reducing outages and enabling continuous operation while also increasing administrator productivity.

Background

In a March 2012 review of OMEGAMON V5 (IBM's mainframe management environment), *Clabby Analytics* highlighted several new features that improve the efficiency and productivity of mainframe managers (including faster problem identification, automation and integrated management). More specifically, we found a greatly improved 3270 interface (better grouping and the introduction of a new color interface), unified management, simplified packaging, role-based views, built-in problem-solving scenarios, and faster installation and configuration.

According to IBM, OMEGAMON V.5.1 has enabled mainframe administrators to save up to 75% of the time needed to find problems; it has helped offload up to 73% of CICS SLA processing; and it has reduced fix times(in some cases, from 90 minutes to as few as 2 minutes).

Since our 2012 review, IBM has taken integration and efficiency a step further ***with improved integration and automation across the entire monitoring and systems/workload automation portfolio*** — providing an integrated system management environment across mainframe z/OS and distributed environments. An updated version of OMEGAMON V.5.1 offers:

- New packaging: IBM Tivoli OMEGAMON Performance Management Suite for z/OS including includes all eight OMEGAMON modules as well as IBM's Tivoli Composite Application Manager;
- IBM Tivoli OMEGAMON and IBM Tivoli Monitoring (ITM) for performance and availability monitoring;
- IBM Tivoli System Automation (SA) family for policy-based automation to improve efficiency and availability of systems and applications; and,
- IBM Tivoli Workload Scheduler (TWS) automates, monitors and schedules workflow throughout the enterprise IT infrastructure. Integration with Tivoli Workload Scheduler enables pre-defined business policies to generate alerts based on workload, application or system events reducing manual errors and simplifying operations. Automated recovery processes and built-in redundancies enable workloads to continue to execute even during unplanned outages for continuous operation.

IBM's OMEGAMON, Tivoli System Automation, and Tivoli Workload Scheduler: Working in Tandem to Identify and Solve IT Performance Problems

IBM's cross-platform systems management solutions have evolved in parallel – creating an integrated environment that can identify performance problems and automatically take corrective action. This integration of OMEGAMON, IBM Tivoli System Automation family and Tivoli Workload Scheduler provides information technology (IT) managers and administrators with greater visibility across IT infrastructure – as well as with tools to find and resolve performance problems automatically, minimizing outages and maximizing availability .

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IBM Tivoli OMEGAMON – A Closer Look

IBM Tivoli OMEGAMON provides a single monitoring and management environment that spans infrastructure including mainframe, distributed systems, mobile and cloud. It detects bottlenecks and other potential problems, identifies the root cause to proactively address performance issues. By integrating z/OS management functions and alerts across systems, networks, storage and messaging environments, efficiency and productivity are improved.

OMEGAMON V5 is available as integrated product suite designed to provide unified, centralized management across heterogeneous IT infrastructure as well, as ease of ordering and installation. The enhanced 3270 GUI provides an enterprise view of information supported across the entire OMEGAMON family. Through this interface, transactions can be linked across multiple Sysplexes, and there is no need to move between multiple screens and monitors. Launch in context capabilities make it easier to find problems that span multiple subsystems. The enhanced graphical user interface (GUI) also addresses the changing face of the mainframe IT manager. While traditional mainframe managers embrace command line driven interfaces, the new generation of IT talent finds them cryptic and complex — affecting efficiency and productivity.

IBM Tivoli OMEGAMON Performance Management Suite for z/OS includes all eight OMEGAMON modules and IBM Tivoli Composite Application Manager for Web resources. This solution monitors performance and availability for IBM z/OS operating system, networks, storage subsystems, IBM DB2, IBM CICS, IBM IMS, IBM WebSphere MQ for z/OS, and IBM WebSphere Application Server for z/OS from a single user interface, and provides a foundation offering for analytics and automation.

IBM Tivoli System Automation Family

The IBM System Automation family provides advanced policy-based end-to-end cross-platform automation to improve the efficiency and availability of critical systems and applications. Automation is linked to predefined rules and policies based on best practices such as automated application group stop and restart providing continuous availability for IT resources (Figure 1, next page).

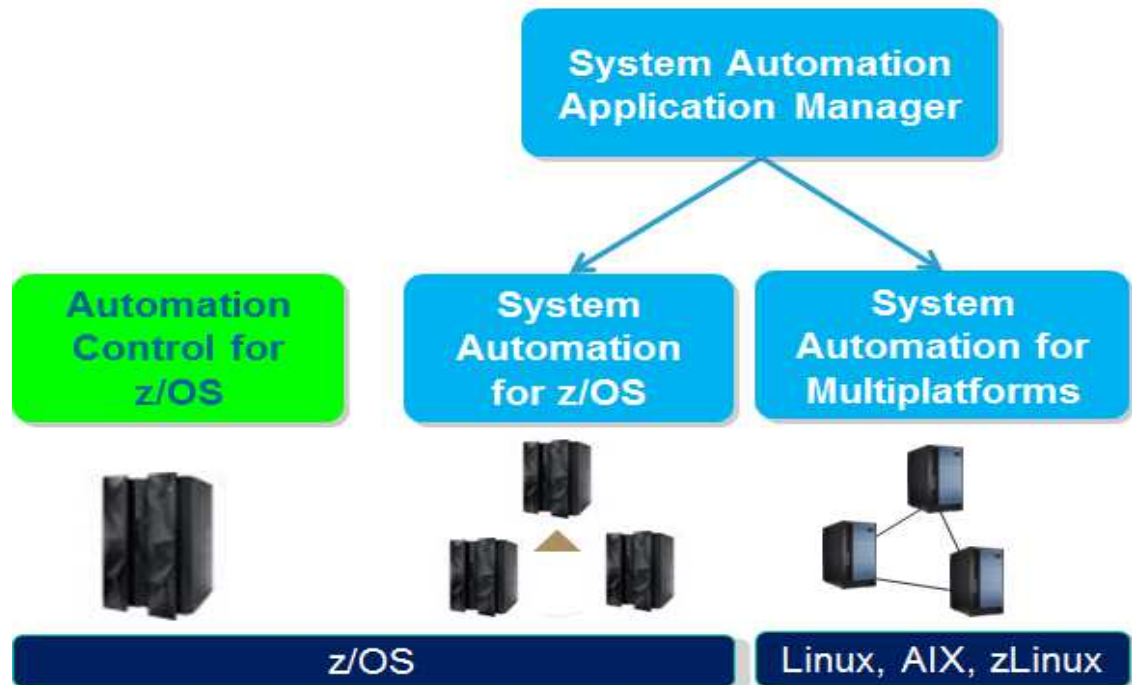
The IBM System Automation Family includes:

- *IBM Tivoli System Automation for z/OS (SA z/OS)* is an IBM Tivoli NetView for z/OS-based application that provides a policy-based, self-healing, high-availability solution to maximize efficiency and availability of critical systems and applications on System z. When used with IBM Geographically Dispersed Parallel Sysplex (GDPS), it provides application disaster recovery capabilities incorporating remote copy and failure recovery;
- *IBM Tivoli System Automation Application Manager (SA AppMan)* offers a single web-based management console for managing composite applications providing graphical views of applications and their relationships to other infrastructure components with drill-down to root cause. Policy-based automation enables modeling of application behavior and provides automatic recovery when applications, systems or systems fail, reducing outages and improving availability. Integration with GDPS provides cross-platform disaster recovery functionality for heterogeneous workloads;

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- *IBM Tivoli System Automation for Multiplatforms* offers high availability and policy-based automation for applications and services across heterogeneous environments. It reduces frequency and duration of service disruptions for critical applications and middleware running on heterogeneous platforms and virtualization technologies; and,
- *IBM Automation Control for z/OS* is targeted to mid-market companies and single System z environments to provide policy-based and goal-driven automation in a single easy-to-install and configure product.

Figure 1- IBM Systems Automation Family



Source: IBM , April 2014

Integration with IBM System Automation– Extending the Capabilities of IBM OMEGAMON

Through the IBM Tivoli Monitoring (ITM) framework, OMEGAMON agents gather and send performance data, trigger alerts when thresholds are reached, and perform actions in response to these alerts. OMEGAMON provides resource and exception-based monitoring and exception-based automation (action occurs when monitoring indicates a threshold has been exceeded or a behavior falls outside certain parameters). In an exception situation, the exception is detected and is resolved, or is diagnosed and an alert is sent to the default event receiver or the specified owner of a resource.

System Automation can correlate information from multiple monitors and translate this into an application health status (based on thresholds and metrics) that is propagated to monitored resources and aggregated into their compound status to allow easy detection of performance problems. When a performance issue is detected, System Automation can automatically implement a solution to the problem (if it is a common problem and there is a documented solution). By automating the fix based on pre-set policies (rather than requiring scripts), the risk of human error is decreased and the problem can be fixed before it becomes a critical situation. Policy-based automation triggers automated alerts and notifications and makes resource modifications to maximize uptime and prevent outages.

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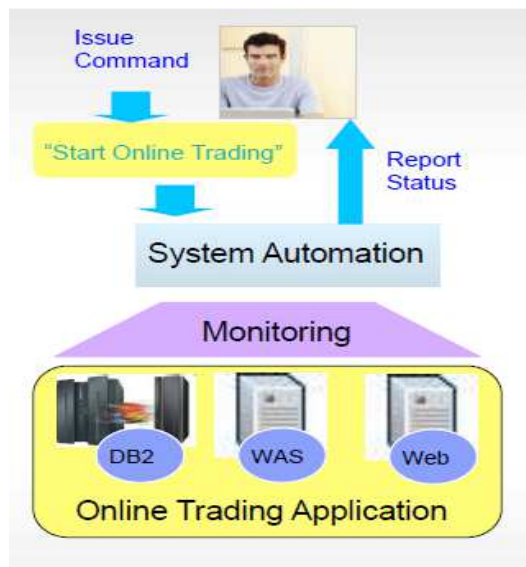
Problems detected by OMEGAMON can lead to automated responses such as:

- Elimination of a detected bottlenecks;
- Stopping or recycling applications to solve issues like memory leakage;
- Starting expensive traces only when specific situations or error conditions are detected;
- Killing transactions or thread;
- Provisioning of additional resources; and/or
- Escalation of issues to SME if no automated solution exists.

These tools can also be used to plan for a proactive application move or prepare for a planned outage. By using OMEGAMON and System Automation, customers can automatically escalate issues based on monitoring information collected by OMEGAMON, correlate problems across applications to identify root cause and reduce application downtime and maintain SLA's. This automation also helps to streamline administrative and operational tasks, improving productivity and reducing errors.

As an example of how OMEGAMON and System Automation work together, consider Figure 2. In Figure 2, an operator issues a command to start an on-line trading application. OMEGAMON monitoring agents report on-line status of various components. IBM System Automation automatically sets aggregated state of the application to “online” and provides a single view of the application across both System z and distributed systems. Agents monitor the application based on ITM agent status information and report back to IBM System Automation. And, finally, issues are addressed using automated recovery actions across the entire application.

Figure 2 –On-line Trading Application Scenario



Source: IBM, April 2014

IBM System Automation provides a single view of the entire application as it spans both distributed and mainframe environments. OMEGAMON agents monitor the application based on KPIs and status information is automatically reported back to IBM System Automation enabling proactive management which minimizes outages and improves availability.

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As IBM describes it, OMEGAMON provides “eyes” and “ears”. System Automation provides “hands” and “feet”

IBM Tivoli Workload Scheduler – A Closer Look

Today’s businesses continue to become more complex, integrating legacy systems with web-based and mobile applications, supporting new types of workloads, and the need to exploit “big data” and analytics – all contribute to this complexity. In these heterogeneous environments, a traditional job scheduler cannot start/stop composite applications as required by a production plan nor is it able to monitor and manage multiple workloads across virtual physical and cloud environments. This can impact performance and efficiency.

TWS is a workload automation tool that automates plan and control processing of enterprise production workloads, and supports both calendar-based and event-based workload automation. TWS plans the start and stop of an application group in a TWS jobstream. From a single management interface, this tool can dynamically manage hundreds of thousands of composite workloads a day to optimize performance and handle exceptions. Based on defined business policies, alerts can be generated based on workload, application or system events. Built-in redundancies enable workloads to continue to execute even during unplanned outages.

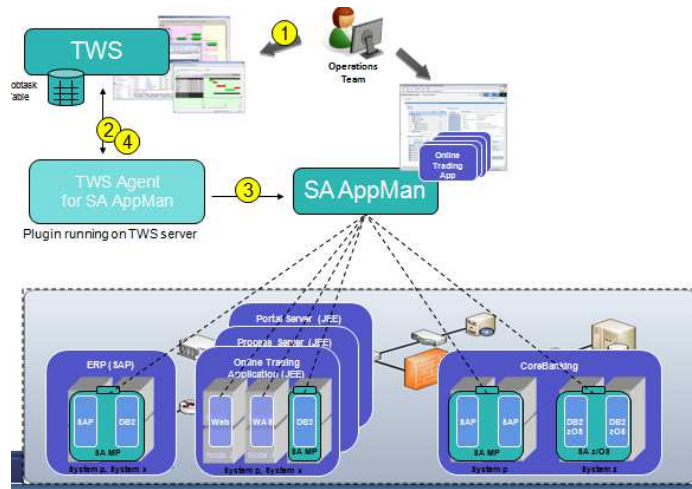
IBM TWS and IBM System Automation Integration

TWS plans, schedules and submits applications that are composed of jobs on a regular calendar or event-driven basis, and is designed to handle large numbers of jobs on any given day. The scheduler alone is unable to start/stop complex applications as required by a production plan, leading to errors and requiring manual intervention. TWS manages complex workload schedules while IBM System Automation for z/OS (SA z/OS) does application starting and stopping with predefined start/stop command sequences. TWS can use SA AppMan to request synchronous start/stops of complex business applications with no scripting required, improving productivity and providing higher availability for applications. IBM System Automation for Multiplatform used with TWS also improves availability by monitoring status of all components (hardware and software) across platforms, taking into account relationships between components to enable automatic switching of components to other nodes in the network in the event of a problem.

IBM System Automation manages dependencies, configurations, sets thresholds and provides automated recovery. By linking the solutions, TWS can request IBM System Automation to start or stop a complex set of components and applications based on these logical dependencies and policies. With this integration, system management is proactive, enabling problems to be fixed before they cause outages and downtime, increasing productivity and availability.

Figure 3 (next page) provides a scenario that describes how TWS and SA AppMan work together. It shows how an operator defines scheduled start/stop actions for a (set of) components managed by System Automation Application Manager (SA AppMan). It also shows how TWS uses agent for SA AppMan to issue start/stop request for composite business application controlled by SA AppMan. This agent uses SA AppMan Web Service to issue synchronous or asynchronous request to SA AppMan to start/stop a component. And finally, for synchronous requests the agent waits for the request completion and returns the result. The waiting job-step can now continue.

Figure 3 : Scheduled start/stop of Composite Business Applications



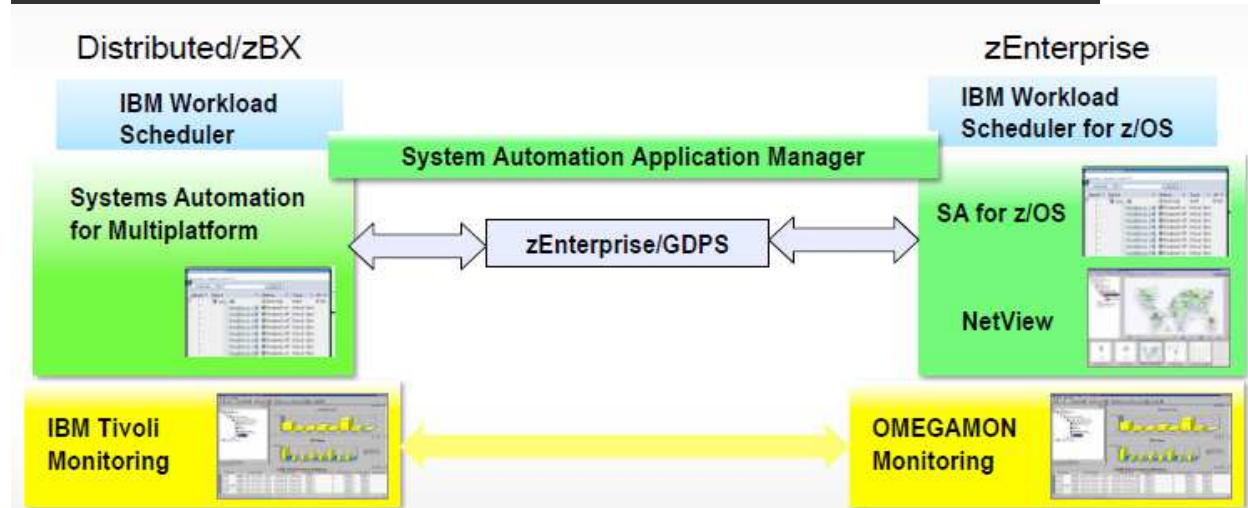
Source: IBM, April 2014

The Big Picture

IBM’s monitoring and systems/workload automation portfolio offers a set of integrated solutions for monitoring, proactive performance management, root cause analysis, workload scheduling, and disaster recovery to ensure high availability for applications and infrastructure from-end-to-end across the entire enterprise, including cloud. A common unified interface across applications, distributed, cloud and mainframe systems links IT siloes and speeds problem identification and resolution. When performance problems are identified, automated procedures resolve those problems proactively, enabling applications, tasks and workloads to operate continuously, without interruption. This enables IT administrators to meet SLA’s and avoid costly downtime. Automation also reduces human errors and eliminates manual intervention for improved productivity and lower costs, as well as enabling correlation of monitoring data from multiple sources for more accurate analysis.

For an illustration of how these portfolios work together, see Figure 4.

Figure 4 – OMEGAMON, IBM System Automation and IBM Workload Scheduler



Source: IBM, April 2014

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Summary Observations

IT complexity and siloed infrastructures create big management problems for large enterprises. IBM recognizes these problems and is focused on cross platform management integration as well as ease-of-use. In addition, IBM is also focused on streamlined packaging for easier ordering and configuration (many IBM systems management offerings being made available in both on premise and as SaaS (Software-as-a-Service) offerings).

At IBM's Pulse conference in Las Vegas this year, we saw how OMEGAMON and IBM System Automation work together to enable the collection of monitoring information from multiple sources, and using pre-set policies and thresholds, automated actions can be triggered when a potential problem is detected. For example, additional resources can be automatically provisioned if a certain capacity threshold is reached— enabling proactive management and eliminating problems before users are impacted. We also saw how Tivoli Workload Scheduler and IBM System Automation integrate composite workloads across multiple platforms and applications, start or stop a complex set of components and applications based on dependencies and policies, and automate activity scheduling and management tasks. Reading our review of these products tells you what to look for – but seeing these products working together in an integrated fashion is truly impressive.

By replacing manual tasks with automation, system manager and administrator efficiency and productivity are improved and errors are reduced. And customers see higher availability with fewer outages and less downtime.

Back in 2012, Clabby Analytics wrote that OMEGAMON (5.1) is “*the ideal product for performing performance and availability monitoring on the mainframe*”. And it still is. Enhancements in OMEGAMON 5.1 including the 3270 GUI, built-in problem solving scenarios, and efficiency features (such as the new find command) have dramatically reduced the time it takes to fix and resolve problems. When used with other products in the IBM systems management portfolio including the IBM Tivoli System Automation suite and the IBM Tivoli Workload Scheduler, OMEGAMON becomes an even more powerful problem identification and resolution tool, maximizing uptime and application and workload availability by solving issues proactively through automation.

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