Enterprise Harmony:
Immediate, Automated Application Tuning

White Paper

Prepared exclusively for BMC Software by
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The Need for Automated Application Performance Tuning

Rapid advances in hardware and software, combined with corporate downsizing and the distribution of business systems throughout the extended enterprise had made it increasingly difficult for organizations to effectively manage application performance. The traditionally time-consuming and complex job of performance tuning grows increasingly difficult with each passing day.

Throughout the industry, these factors translate into a shortage of performance analysts---especially those with mainframe skills. And, a diminishing knowledge base, in many situations, has caused performance tuning to become a low priority where measurement activities are rarely conducted. However, the ramifications of "untuned" software applications cost companies millions of dollars annually in unnecessary processing resulting in costly hardware upgrades due to excess CPU utilization, increased batch processing time, or unacceptable response times. Untuned applications disrupt business operations as latent performance problems appear at the worst possible time: during peak business periods when mission-critical information systems become overtaxed. The ultimate result is an undermining of mission-critical business practices and the ability to sell or deliver core products or services.

In addition, although mainframe prices continue to drop, upgrades are expensive and, without effective performance enhancements, the opportunity costs associated with sub-optimal performance will continue to affect day-to-day business transactions. For example, as desktop computers attain record processing speeds, the responsibility for superior web response times often falls on the integrated application running on the mainframe. The costs of poor attention to performance are overlooked because application performance tuning appears unrelated to real expense. The problem threatens to increase substantially with increased application complexity in a response to the delivery of web-based and e-commerce business systems that integrate with legacy systems.

Automated Application Performance and Tuning

This situation has motivated the development of a new generation of software: Automated Application Performance and Tuning Systems. These tools cut costs by reducing pressure on CPU capacity and forestalling hardware upgrades, thereby making computer processing more manageable. Moreover, automated application performance tuning leverages investments in existing technologies and transforms reporting from static to dynamic notification.

Automated application performance tuning consists of four steps:

- Detection
- Diagnosis.
  - Problem Isolation
    - When do problems occur?
    - Where do the problems arise?
    - Who is affected?
    - What resources are involved?
  - Cause Identification
- Action
- Evaluation

One of the central challenges of performance management is that in information systems, there are many different jobs and therefore specialization is crucial to ensure effective support of the business. A major division exists between those whose focus is applications and those whose job is to manage systems. Both groups influence performance but neither has an explicit focus on application performance. Moreover, the division of skills among business analysts, application

developers, database administrators and system analysts, although inevitable, makes organizations less efficient in tackling performance issues. Systems specialists have tools that capture details of an application's behavior but lack the functional knowledge to fix in-depth application performance problems. Further, performance tuning tools have traditionally remained "static", brought into use only after a problem was detected. On the other hand, the application developers who understand the function find performance tools incomprehensible. Those IT professionals who are more involved with diagnosing performance issues will be inclined to require performance tuning. Examples of such technology professionals are system programmers, technical support and help desk personnel.

Why are performance problems still so common?

No Senior Management Sponsor Exists.
It is hard to demonstrate the benefits of application performance management, as more responsible management practices are adopted only after a performance crisis.

Performance Management Requires Commitment and Coordination.
A key difficulty in effective performance management is that no one person can do the whole job. Effectiveness requires an array of skills across several departments.

Communication Barriers Abound.
Whenever people with different skills and backgrounds need to cooperate, communication is a challenge.

Those Responsible Adopt Reactive Management Styles.
Traditionally, IT departments have created new application solutions in response to business demands. The CIO's reactive approach trickles down to lower-level managers and affects the response to performance management issues.

There is No Immediately Visible Return on Systems Performance Management.
Systems managers are governed by what is most urgent. It is difficult for systems managers to assign skilled staff to track the performance of application software that is not visibly causing a problem. More urgent and visible problems demand immediate attention, as performance management can wait.

There Is Little Focus on Performance During Development.
Many performance problems arise because of developer inexperience or lack of tools. The designers of failed applications built them in good faith, believing they were workable. Performance problems, unfortunately, often remain unnoticed until after users, customers or business partners are impacted in a detrimental manner.

Development Managers See No Visible Return on Application Performance Management.
A major obstacle to application performance management is that development managers are asked to invest time and resources early on, with no visible return on the investment.

For Developers, Performance Is Not Exciting.
Many developers want to use the latest tools and techniques. In the rush to embrace new technologies, application performance concerns can be overlooked.

Developers Regard Performance as a "Systems" Issue.
Many developers act as if performance is unrelated to functional design. While an enterprising programmer may notice inefficiency and take the initiative to do tuning work, others assume that performance issues are the responsibility of the database administrator or systems specialist.

There Are Too Many Programs to Track Manually.
Systems specialists often work on performance-related issues, but applications receive scant attention. There are so many programs in a production environment that only the largest, most frequently run, most poorly performing programs, are tracked on a regular basis.

Eliminating the Off-Key, Former State of Legacy Tuning

The need for proactive and automated application performance management is in demand more than ever. According to a recent META Group research study, in today's $610 billion worldwide IT market, nearly $76 billion is wasted, severely underutilized, poorly implemented, or ineffectively deployed---and this figure is predicted to surpass $90 billion.

Automated performance tuning eliminates the severity of processing bottlenecks---bottlenecks that usually surface at the most inconvenient time. Early identification of latent performance problems reduces the chance of acute, increased degradation during peak business periods when data volumes increase. It is vital to identify and correct the problem as soon as possible to meet the service levels required by the business.

In today's world of increased customer demand and burdened technology staff, few spare resources are available to accommodate new initiatives. Mainframe computing remains fundamental to many business processes and the ever-expanding number of Web-based and e-commerce applications (that require access to mainframe information) means the performance of these systems can create or destroy customer satisfaction. Significant perceived barriers to using automated application performance management tools exist but automating the application performance management process does not have to be overly complex and taxing.

But automated tuning can quickly reveal latent performance problems and provide many benefits:

Improved Performance Reduces Operating Costs
Unnecessary processing can result in costs of 25-50% of the total IT computing budget. Automating tuning identified opportunities for improved application practices that can cut IT costs, lengthen the life of mainframe hardware while averting expensive CPU upgrades. Additional savings comes from reduced software costs that are tied to mainframe MIPS (million instructions per second) levels.

Avoid Development Disasters
New systems run into performance problems so often that nearly every company has experienced a performance disaster. Most disasters are quietly buried and soon forgotten, except perhaps by the CFO and those executives unlucky enough to be blamed. Armed with the ability to tune applications prior to a production implementation increases the quality of the business systems. Automated tuning further helps to reduce "across-the-board" degradation where one business system consumes more resources than necessary, forcing other applications to slow. Untuned applications become the real "performance disaster" story. A large enterprise depends on thousands of programs. Only a few programs are important enough to get the attention of busy systems staff. The remainder simply continues to operate "normally" while invisibly draining valuable computing resources.

Increased Customer Satisfaction
Fast responding systems keep customers happy while unresponsive business systems lead to loss of business. Companies aim to have all the right information resources and services available promptly to support interactions with customers. When vital information processing applications run inefficiently, customers are directly affected. Automated tuning helps improve customer satisfaction by providing the means to keep applications running smoothly.

Knowledge Base Preservation for Legacy Environment
A flexible comprehensive database of intelligent performance information represents the new knowledge base for performance information in the legacy environment. Combined with automated tuning capabilities, intelligent performance monitoring preserves legacy knowledge in an accessible format and frees IT professionals to implement additional improvements in the increasingly complex, inter-connected enterprise.

Eliminate Danger of Manual Procedures
Manual procedures are time consuming and inefficient. In order to solve systems problems, one must know where they are. Manual procedures are a "hunt and peck" process and isolating and addressing performance problems can be similar to finding a needle in a haystack. Automated tuning eliminates manual procedures and automatically improves processing efficiency. Further, automated tuning helps companies ensure the proper implementation of a solution and avoid errors of manual procedures.

Business Benefits: Dynamic from Static Performance Tuning
An early investment in performance planning will maximize return on technology resources and deliver the performance users need to meet their business requirements. Needless to say, numerous barriers to improved application performance management exist. However, if these barriers are recognized and removed, the results will be substantial cost reductions, improved service levels, improved batch performance, reduced customer complaints and increased customer satisfaction.

Specifically, by applying automated tools to existing application performance measurement software, companies have found that:

- Jobs can be analyzed in the background with limited staff effort.
- Hard-to-find tuning opportunities are easily identified.
- A dedicated, full-time staff is not needed.
- If the performance problems are addressed, a mainframe upgrade can be pushed back or eliminated.
- If the tools are used in a proactive manner, overall IT quality increases.

In addition to the clear cost-cutting advantages, a proactive application performance tuning effort can help circumvent factors that hurt a company's IT competitiveness, such as degraded service levels, customer complaints and frustrated IT staff who are distracted from more productive tasks.

Automated application performance management and tuning software tools provide non-disruptive, automatic identification of problems; dramatic improvement in the number of online transactions; reduction of analysis time for problematic jobs and online transactions; and a common framework and terminology, which improves internal communications needed to resolve application performance problems. In addition, performance management software will minimize performance surprises, track and control the performance of production applications and remove inefficiencies in pre-production applications.

Product Review from The Tech Rehearsal Lab at Quality Product Marketing

Transforming Performance Tuning From Static to Dynamic

APC for InTune from CPT Software Increases the Power and Value of BMC's InTune

Transforming Performance Tuning From Static to Dynamic
Most of us install smoke alarms to provide warnings in the event of a fire. Unfortunately, traditional application performance tuning procedures have been dangerously like mounting a heat sensor on the wall above a raging inferno---active monitoring and tuning activities typically don't start until performance degradation becomes noticeable.

Technology constraints have locked IT professionals responsible for system and application performance into these types of fire fighting procedures for years.

Until now, that is.

The convergence of APC for InTune™ from CPT Software and BMC Software's InTune delivers a dynamic and practical tuning solution that automatically delivers performance alerts and provides technicians with the ability to proactively correct problems long before application or transaction performance slows to a crawl. While APC for InTune simplifies and automates the task of identifying application performance bottlenecks, InTune is one of the most intuitive products for analyzing and tuning business applications running on IBM OS/390 and z/OS mainframes.

Installed in our Tech Rehearsal lab, the combined functions of InTune and APC for InTune identified the jobs and programs that needed to be monitored while keeping track of any environmental changes (such as load modules or critical paths) that would have impacted performance. The automated tuning capabilities of these blended technologies provide a comparative baseline created from SMF records to perform a comparative analysis of current processing. When processing exceeds the normal parameters of the baseline, then a measurement is launched automatically. A performance alert is generated at this time to precisely pinpoint the problem.

We were immediately able to receive a detailed analysis of any job or online program in question. Additionally, we had the ability to group modules for tracking and reporting and, were provided with a series of online application performance tips---an ideal addition that proved enormously beneficial for some of our team members with limited mainframe experience.

InTune Power and Value Increased By APC for InTune
Prior to APC for InTune, InTune was typically used in a "static" manner, that is, launched whenever an application was suspected of (or obviously) experiencing a performance problem. With its interactive working environment, InTune allowed for the quick creation of monitor definitions and provided the ability to conduct an interactive analysis for batch jobs and online programs. For example, transaction level analysis was performed specifically by transaction ID, user ID or terminal ID as well as any combination of IDs. InTune reports revealed data delays by transaction, code activity by transaction, and database activity by transaction---ideal for effectively pinpointing the cause of a problem.

Too often though, problems went unnoticed and InTune went unused until an end-user registered a report with the help desk. And typically, the problem reported was performance related. Wouldn't in be better to

discover and correct the problems before they caused an impact on users and effected service level agreements?

In our opinion, APC for InTune substantially increases the value of an InTune investment.

APC for InTune builds a database of performance information acquired from SMF type-30 records. Using the past 30 days of these records, we built a baseline of our environment. This baseline enables APC for InTune to automatically launch InTune measurements for comparative analysis on current processing for batch. For CICS, APC for InTune provides two levels of alerts. The first is a "top scope" where the top number of consuming transactions is listed while the second is alerts based on transactions exceeding average transaction times.

For example, in one instance, average CP time for CICS transaction GTLI during the past 30 days stood at 2.4 seconds. We established a criteria to automatically issue an alert to our CICS panel if CP time should increase by 10-percent.

APC for InTune looks for jobs and transactions to be measured. It tracks performance information in real-time, comparing current processing to the historical data, established thresholds and user parameters.

So far, so good. Right? It gets better:

The best part is that when APC for InTune noticed a performance problem, it automatically launched InTune, providing it with the exact information needed to perform a comprehensive analysis. Upon completion, InTune delivered all information back to APC for InTune where, based on site-established rules, it prioritized performance opportunities and issued alerts when necessary.

In batch, APC for InTune noticed when the CP time for a program exceeded 10-percent and issued an alert. Additionally, based on some of our installed administrative options, it issued another automatic alert when overall CP time exceeded its average by a standard deviation of 2.2.1!

APC for InTune also provides a data mining function that allows analysts to clearly delineate historically crucial jobs from the ones that are not as important. In addition to identifying high-consuming programs, DBRMs and subsystems that require tuning, the data mining function calculates annual CPU consumption based on previous measurement and frequency of execution for the related job steps. In effect, this function allowed us to prioritize performance tuning activities based on frequency of job activity.

Business Side: Increasing Need For Automation

Today's increasingly complex, interwoven enterprise has seen core legacy business functions interactively deliver cross-platform, cross-operating system and cross-network to users employing a vast array of interfaces. With so much more to keep track of, it's obvious that legacy performance monitoring and tuning must be automated. Automated application performance monitoring and tuning by APC for InTune and InTune ensures that the reliability and stability expected by core legacy systems can be delivered throughout the enterprise. It enables organizations to immediately and interactively pinpoint application delays, gain an understanding on exactly what needs to be measured and establish the criteria necessary for automated alerts on a program, job and environmental basis such as test, quality assurance and production.

Conclusion

Any company that wants to cut costs, improve IT competitiveness, leverage existing technologies and improve delivery of legacy applications, should employ automated application performance management and tuning software. The key decision is how much of a dedicated staff effort to apply to the process. The politics and organizational nuances of application performance management are often problematic. To reduce their impact, IT management should stress the following:

- Focus on saving money by avoiding upgrades as an initial justification.
- Consider the corollary impacts on software costs.
- Identify a champion within the organization to oversee performance management efforts.
- Ensure the champion has the authority to implement change.

The convergence of APC for inTune from CPT Software and InTune from BMC Software provides a dynamic and proactive tuning solution that automatically delivers alerts and provides technicians with the ability to proactively correct problems long before application or transaction performance slows down. While APC for InTune simplifies and automates the task of identifying application performance bottlenecks, InTune is the easiest-to-use product for analyzing and tuning business applications. APC for InTune makes the InTune product more powerful and cost-effective. Other product capabilities are:

- Automatic identification of tuning opportunities across the mainframe environment.
- Focused tuning efforts on jobs with the greatest CPU and runtime savings potential.
- Rapid analysis to maximize improvements to application quality and performance.

In summary, automated application performance monitoring and tuning by APC for InTune and InTune ensures that the reliability and stability expected by core legacy systems can be delivered throughout the enterprise. It enables organizations to immediately and interactively pinpoint application delays, gain an understanding on exactly what needs to be measured, and establish the criteria necessary for automated alerts on a program.

About BMC Software

BMC Software is one of the world's largest independent software vendors and is the leading provider of enterprise management solutions. Through its Assuring Business Availability® approach, BMC Software delivers control over infrastructure management costs, control of market advantage and differentiation via service management, and growth of business value with solutions for business optimization.

BMC Software is a member of the S&P 500, with fiscal year 2001 revenues exceeding $1.5 billion. The company is headquartered in Houston, Texas, with offices worldwide. **On the web: http://www.bmcsoftware.com.**

About CPT Software

CPT Software & Consulting is the leading provider of Application Quality Management (AQM) software and professional services. Our mission is to help Fortune 1000 companies implement automated AQM systems to improve IT performance, quality, and profitability. CPT Software customers defer expensive mainframe upgrades and reduce IT costs using APC for InTune an automation system developed to simplify the task of identifying application performance bottlenecks. APC for InTune allows global corporations to turn the application tuning function into a strategic advantage. CPT Software & Consulting has offices in Boston and Fort Myers, and is a subsidiary of TRILOG expert, an AQM software and consulting company with offices in Munich and Zurich. On the web: http://www.cptsoftware.com

About The Tech Rehearsal Labs at Quality Product Marketing, Inc.

Quality Product Marketing, Inc. is comprised of experts versed in the delivery of technology solutions with diverse experience in technology development, product management, technical journalism, corporate marketing and sales.

The Tech Rehearsal solution helps ensure the public success of a product through a private validation of features and functions. A confidential product review, our Tech Rehearsal goes through the same steps as any reviewer, editor or analyst by installing, deploying and operating products with an eye toward usability and functionality. All aspects of the product are analyzed to determine tangible, intangible or non-existent shortcomings and benefits. Documentation, online help and tutorials are reviewed for content, continuity and accuracy. Reports are analyzed to determine advantages and value. Equally important, marketing messages and product positioning are reviewed to ensure the product is accurately depicted and positioned.