



## Modernizing IT: Strategies for Improving Service Quality and Reducing IT Costs

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## EXECUTIVE SUMMARY

Do you feel that you're on a treadmill that keeps going faster and faster? Just trying to maintain agreed-upon levels of performance and availability for the services you are already delivering presents a daunting challenge. But you have to do more than maintain the status quo to keep up with the increasing demands of the business. If your organization is like most, the business units are demanding more services as technology becomes even more deeply embedded in the business. Your IT environment is growing more complex as you adopt technologies, such as virtualization, and integration methodologies, such as service-oriented architecture (SOA). And there is always growing pressure to improve service and reduce costs. It seems like you'll never catch up.

What can you do? According to Gartner,<sup>1</sup> "The question to ask is, 'Can IT delivery organizations close the gap on business expectations by working harder in the way they have done in the past?' The answer must be a resounding 'No.' To meet business demands for higher levels of performance and availability while adding services and reducing costs, IT has to modernize."

Gartner describes IT *modernization* as "a complete overhaul of the culture of IT with the specific goal of developing a portfolio of processes that will enable IT delivery teams to close the gap on increasing business demands."<sup>2</sup> An important set of processes to develop should support *service assurance*, or as it is sometimes called, *service awareness*.

Business Service Management (BSM) solutions are available today that help you modernize IT through more effective service assurance. BSM is a comprehensive approach and unified platform for running IT that reduces cost and maximizes business value. BSM solutions support service assurance — a core BSM discipline — by empowering IT with several important capabilities, such as the ability to anticipate events, predict their impact, and respond automatically before the events result in degradation or interruption to business services. With these solutions, you'll reduce the number of manual processes, proactively manage operations, and avoid incidents that can negatively impact revenue.

This paper discusses the pressing need for IT modernization. It describes how a strong service assurance capability enabled by available BSM solutions can help you meet this need and deliver compelling business benefits. These benefits include greater IT staff efficiency, improved service delivery to the business, less risk, and lower costs.

## DO MORE WITH LESS

The IT infrastructure for most organizations is rapidly growing in complexity, driven by SOA and virtualization. IT also has to comply with a myriad of strict regulatory requirements and demonstrate this compliance to the satisfaction of auditors. In addition, the business continues to ask IT to add more services.

So how do you catch up and deliver more services for less? The answer is to work smarter by “modernizing” your approach to service assurance. That requires making a number of improvements, including consolidating service assurance processes, automating wherever possible, moving from a reactive to a predictive mode of operation, facilitating problem diagnosis, prioritizing work based on business impact, and enhancing your communication with the business.

### CONSOLIDATE AND STANDARDIZE PROCESSES

Many IT organizations are fragmented into technical silos and teams. This often results in fragmented and inconsistent processes and information across siloed groups, causing service quality degradation. For example, it’s common industry knowledge that the vast majority of performance and availability issues are reported by end users. In many cases, these users are customers. Consequently, these service quality issues have high external visibility and potentially serious business impact. Siloed groups do not typically monitor performance and availability from the overall business service (end-user) perspective. Each group monitors only those IT infrastructure components for which it is responsible. Due to this limited visibility, many problems go undetected by IT.

You need to modernize your approach to service assurance by consolidating and standardizing processes, integrating them across groups, and ensuring their proper governance. In addition, the processes you implement should be based on best practices to maximize their effectiveness and efficiency. Many organizations are turning to process and control frameworks, such as the IT Infrastructure Library® (ITIL®) and Control Objectives for Information and related Technology (COBIT), for guidance in best-practice process and governance implementation.

### AUTOMATE WHEREVER POSSIBLE

Today’s IT staffs are burdened with far too many manual processes. To improve efficiency and cut costs, you need to automate processes wherever possible. First, you need to automate routine administrative tasks, such as provisioning and updating software in servers and in desktop and laptop computers. You also need to automate routine remediation tasks, such as automatically restarting failed applications or recovering a failed database. Automating routine tasks ensures that best practice processes are consistently followed, reduces errors, and frees up a considerable amount of IT staff time for more strategic endeavors.

It’s important to look beyond automating routine tasks. IT organizations in all industries face continual change in several areas, such as changes to the IT infrastructure and changes in workload profiles. Keeping up with these changes by using manual processes has become impractical due to the increasingly dynamic nature of the IT environment. Consequently, it’s important to strive to automate manual adaptive processes to increase your agility in adapting to change.

### MOVE FROM REACTION TO PREDICTION

Many IT organizations tend to address performance and availability issues reactively. As a result, many issues result in service degradation. A far better approach is to anticipate problems and deal with them before they impact service quality. With a predictive approach, you can analyze events and trends, assess both their short-term and long-term impact on service quality, and deal with problematic events before they impact service quality. This requires both a short-term and a long-term prediction capability.

Short-term prediction requires the ability to analyze IT infrastructure events, such as workload spikes, as they occur, determine in near real time whether they pose an immediate threat to service quality, and alert the IT operations staff accordingly. It is important, however, not to add to the torrent of alarms that typically flood today’s data centers by reporting events that do not pose a threat to service quality. Through intelligent event handling and analysis, you can distinguish between normal and abnormal operating variances. This capability enables you to react quickly to problematic events without unnecessarily alarming the IT staff.

Long-term prediction involves being able to detect issues that could present a threat to service quality in the future. These issues are usually related to capacity. For example, if the current usage growth trend continues, a particular server will exceed its processing capacity within the next four months, and performance will suffer. To head off this degradation, it will be necessary to add server capacity before that time.

Long-term prediction requires the ability to analyze usage trends, predict impending capacity shortfalls, and act before they result in service degradation. Through intelligent capacity planning, you can eliminate the unnecessary expense of over buying IT resources, while still ensuring that the required capacity will be there when needed. You'll also maximize resource utilization to derive maximum return on your investment in IT resources.

Some organizations are already enjoying the benefits of more effective capacity management. A global pharmaceutical company eliminated server hardware purchases for 24 months, saved \$7M in projected hardware and software purchases, and increased virtual machine density by a factor of three. A financial services company saved \$2.2M over a two-year period by avoiding the purchase of 400 servers.

### **FACILITATE PROBLEM DIAGNOSIS**

As IT infrastructures grow in complexity and become more dynamic — driven by virtualization and SOA — problem diagnosis becomes more difficult, especially with intermittent problems. Services are scattered across multiple resources, and virtual servers continually move among physical servers. This greatly complicates root-cause analysis, increasing mean time to repair (MTTR) and driving up costs.

You can simplify and speed root-cause analysis by providing the IT staff with tools and information that help technicians quickly and intelligently analyze issues to determine their probable causes. The tools must leverage and consolidate information gathered by the system and guide the staff in analyzing that information to zero-in on causes. This guidance shrinks MTTR and reduces required staff skill levels.

### **PRIORITIZE WORK BASED ON BUSINESS IMPACT**

To maximize efficiency and ensure close alignment with the business, be sure to prioritize work based on business impact. Here's an example:

A server running an application used by graphics designers in the marketing department goes down. A few minutes later, a web server running a customer-facing order application drops below the agreed-upon performance level. A down server is considered to be a higher-severity problem than a performance slowdown.

Typically, the IT staff would address the two problems on a first-in, first-out basis, or on a severity level basis. In either case, this would result in addressing the problem in the graphics server first. However, the business importance of the customer-facing application certainly trumps that of the graphics application. The IT staff, therefore, should first address the problem in the server supporting the customer-facing application.

To prioritize based on business impact, the staff needs to understand the relationships of the IT infrastructure components to the services they support and the business priorities of those services. This requires providing the staff with a view of the infrastructure that shows the mapping of components to services and the business priorities of the services.

Prioritization pays off. Through incident prioritization, CARFAX, a major provider of vehicle history information, protected over \$4.4M in revenue per year through an 82 percent reduction in monthly error rate and a 74.6 percent per month reduction in downtime.

### **ENHANCE COMMUNICATION WITH THE BUSINESS**

Communicate service quality information to your business users in a language they understand by using metrics that are meaningful to them. Traditional metrics such as server availability, input/output speeds, or processor utilization are meaningless to the average business user. Instead, use metrics that indicate service quality from the end-user perspective, such as the overall availability of an enterprise resource planning application, or the average elapsed time from receipt of a customer online order to sending an email order confirmation.

It's also important to establish service level agreements (SLAs) using metrics that are meaningful to business users and to manage service quality based on these agreements. In this way, you can set meaningful expectations and communicate to the business your success in meeting these expectations.

## CHOOSE A MODERN BSM SOLUTION SET

BSM technology enables you to meet the challenge of IT modernization with respect to service assurance. Look for a modern BSM solution set that provides you with the capabilities you need. This section presents a number of specific criteria that the solution set should meet.

### SHOW THE BIG PICTURE

Process consolidation requires a solution that maintains a single, comprehensive, and accurate view of the entire enterprise IT infrastructure. This view must show the physical topology; the logical topology, such as which databases support which applications; and the service topology that indicates which components support which services. The view must include both physical and virtual resources and maintain real-time mapping of virtual to physical resources, showing which virtual servers are currently running on which physical servers. A configuration management database (CMDB) provides a proven, centralized repository for maintaining the information necessary for this view.

The information in the CMDB is shared by all IT groups, enabling them to work with comprehensive and consistent information. By enabling information sharing, the CMDB brings previously siloed groups together. It also gives each group a complete rather than limited picture of the IT environment, so they gain greater insight into the scope and impact of availability and performance issues.

Look for a CMDB built on a federated architecture that allows access to information scattered across the enterprise without having to move this information to or replicate it in the CMDB. The architecture should permit the scaling of the CMDB to meet the needs of even the largest organizations.

### STEM THE EVENT FLOOD

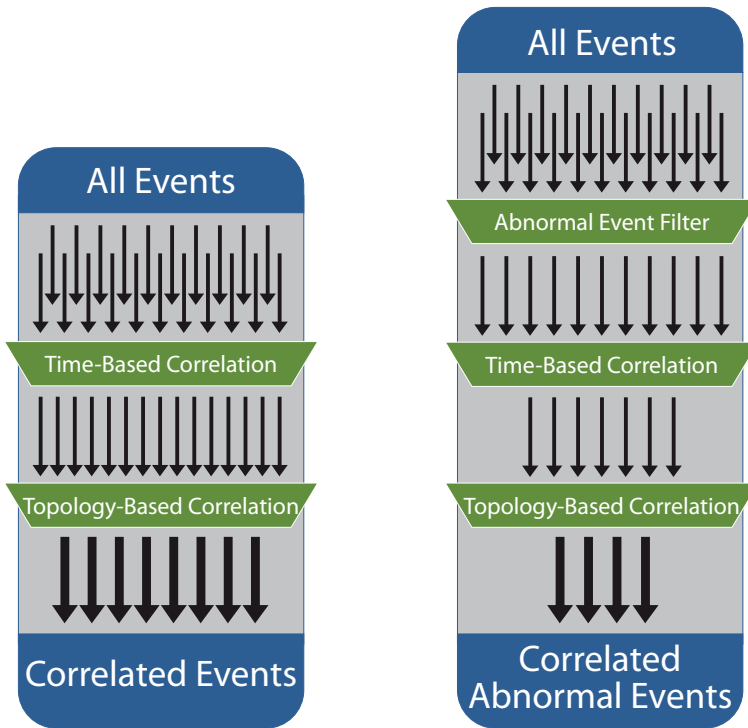
A major problem faced by most IT organizations is sifting through the many alarms and events flooding the data center, ferreting out those events that require attention, and then addressing them based on business priority. Traditional event management solutions reduce the flood somewhat by correlating events based on two types of correlation. The first is time-based. Here, only those events that occurred at approximately the same time are correlated. The second type is topology-based, which is based on the physical and logical topology of IT resources. Physical topology correlation considers events that are generated by physically interdependent IT resources (such as servers and network devices) to be correlated. Logical topology correlation considers those events generated by logically interdependent IT resources (such as applications and databases) to be correlated.

Some solutions provide an additional level of topology-based correlation that shows a relationship of events based on services. Service topology correlation considers those events generated by the IT infrastructure components that support a particular business service to be correlated.

Time-based and topology-based correlations can be viewed as a two-stage filter that consolidates events to allow the IT staff to better understand their relationships. Two-stage filtering does reduce the flood of events somewhat. However, it still requires the IT staff to respond to events that, although they may be time-related or topology-related, may be within an acceptable operating band and not problematic.

BSM event management solutions are now available that employ a more advanced approach to event processing. These solutions precede the time-based and topology-based correlation filters with an additional level of filtering that distinguishes between normal and abnormal behavior. This primary filter passes only those events that indicate conditions outside the normal operating band.

Figure 1 shows a comparison of two-level and three-level event filtering. As the figure illustrates, the number of events to which the IT staff must respond is greatly reduced by preceding the two-stage filter with a higher-level normal/abnormal event filter. The benefits of normal/abnormal filtering are significant. For example, a major insurance company reduced incident alarms by 90 percent, and the alarms that were reported were more meaningful.



**Traditional Event Correlation      Add Abnormal Event Filterin**

Figure 1. Two-level and three-level event filtering

The problem is that the normal operating band may vary over time. For example, the normal workload on a particular server may increase over time due to the introduction of a new company product. This increase, however, does not pose a threat to service quality and can be considered to be within a new, higher operating band. These variations in normal behavior require continual readjustment of the baseline. Some abnormal event filters require manual readjustment, a labor-intensive and error-prone process. What’s required is an abnormal event filter that automatically analyzes workload trends over time and readjusts baselines accordingly.

**ANALYZE AND GUIDE**

With the growing complexity and the increasingly dynamic nature of today’s IT infrastructures, problem diagnosis has become exceedingly difficult. Consequently, in addition to reducing the number of events to which IT must respond, the solution should facilitate root-cause analysis. This creates three important requirements:

1. Enhance abnormal events with rich forensic data relevant to the problem at hand. This should include the intelligent capture of data at the time a problem occurs. Time-of-occurrence data capture is especially useful in diagnosing intermittent performance problems in the highly dynamic IT environment.
2. Employ sophisticated techniques to analyze abnormal events and forensic data to determine probable causes. Ideally, the solution would create a short list of probable causes of an abnormal event, ranked by probability.
3. Draw on the service topology information maintained in the CMDB to prioritize abnormal events by business impact. This focuses the IT staff on those problems that have the highest business importance.

This advanced approach to root-cause analysis greatly shrinks MTTR, speeding remediation of problems that negatively impact service quality. It also lowers required staff skill levels and increases staff efficiency. Using this approach, a large hospital group reduced the time-to-resolution for critical incidents by 68 percent and realized \$1.2M of annualized IT labor savings.

### **LEARN, AUTOMATE, AND ADAPT**

As previously discussed, automation is a key requirement. The solution you select should certainly automate routine administrative tasks, but it should go well beyond that to include the following capabilities.

The CMDB should include an automatic discovery capability that periodically scans the IT infrastructure looking for assets and asset changes, such as moves, additions, deletions, and configuration changes. Automatic discovery initially populates the CMDB to speed implementation. It also continually updates the information, automatically adapting to infrastructure changes.

The BSM event management solution should be capable of automatically learning and adapting to the IT environment in which it resides. Upon installation, the solution should initiate an automatic learning process that analyzes workload profiles and determines the normal operating behavior of the environment. It should use this information to automatically set baselines for normal/abnormal event filtering. In addition, the solution should automatically and continually readjust these baselines to accommodate normal workload variations over time.

### **LEVERAGE AND INTEGRATE**

It is important to address the heterogeneity typically found in today's IT infrastructures, many of which include mainframes as well as distributed system components. The solution should provide vendor-agnostic data collection across both physical and virtual environments, and integrate with the tools and solutions you already have in place. For example, it should integrate with your existing data-gathering tools and leverage the data provided by them to extract more value, such as by linking the data to end-user experience. The solution should also integrate with your existing enterprise management consoles.

Look for a solution that is built on a unified architecture that accommodates BSM solutions that support other IT disciplines, such as incident and problem management, and change management. With a unified architecture, you can easily add other BSM solutions and extend processes across functional groups. In this way, you add value by bringing previously siloed groups together for greater effectiveness and efficiency. Here are two examples:

By integrating the solution that supports service assurance with one that supports incident and problem management, you can eliminate the barrier between IT operations and the service desk. This permits the service desk to get involved as early as possible and move proactively to address issues before they result in degradation of service quality. For example, the solution that supports service assurance can automatically create incident tickets when it detects abnormal events and attach rich forensic information as well as indication of the most likely causes.

By integrating the BSM solution that supports service assurance with one that supports change management, you'll ensure that the changes made to mitigate service problems do not create other problems that could negatively impact service quality. The change management solution enforces the use of best practice processes in implementing changes to remediate problems. It ensures that all required approvals are in place before making a change, that only authorized people make the change, and that the change is documented in adherence to regulatory requirements.

### **REAP THE BENEFITS**

Many organizations are already reaping the benefits of IT modernization in the area of service assurance. A major financial services organization cut business service downtime by 50 percent and achieved a return of 268 percent on its investment in a BSM solution set. CARFAX realized a payback on its investment in just two months. A large insurance firm reduced business application downtime by 66 percent, decreased customer-impact problem tickets by 70 percent, and saved \$4M through productivity gains. A global airline improved critical systems availability, improved operational performance, and reduced the number of full time equivalents (FTEs) devoted to reactive operational activities.

## LESS BUSINESS DISRUPTION

Your business will run more smoothly because you'll reduce the frequency, severity, and duration of IT outages. Issues will be proactively addressed and resolved before they impact service and before users are aware of them. In addition, you can shrink MTTR and restore service quickly when outages do occur.

## IMPROVED SERVICE DELIVERY

You'll define service level goals based on metrics that are linked with business objectives and defined in a language the business understands. Through more advanced event handling, IT becomes more proactive and more efficient. You'll find problems sooner, fix them faster, and prevent many problems from occurring. With more advanced capacity planning, you'll deliver accurate resource and capacity plans, preventing outages related to performance and capacity, while increasing overall resource utilization. In addition, by understanding the relationships of business services to IT infrastructure components, you'll fix the right problems first.

## INCREASED EFFICIENCY AND REDUCED COSTS

With better understanding of the business impact of issues, you'll optimize the cost and service delivery to meet service level agreements. Implementing a best-practice approach to service delivery, such as those outlined in ITIL, helps to maintain consistency and improve efficiency. Through more intelligent capacity planning, you'll put an end to over-provisioning resources, providing only as much infrastructure as required to meet business demands. In addition, through automation and self-learning systems, you'll eliminate manual labor and reduce skill level requirements, driving down costs.

## CONCLUSION

By modernizing your approach to service assurance through the implementation of the right BSM solution, you can *do more with less*. You'll do more by reducing service disruptions, improving service delivery, increasing IT's agility, and enhancing your ability to maintain security and regulatory compliance. You'll do it with less by reducing IT staff workload, increasing staff efficiency, and lowering required staff skill levels. As a result, you'll meet the demands of the business for improved service quality, more services, and reduced IT costs.

For more information about BMC solutions for service assurance, visit [www.bmc.com](http://www.bmc.com).

## END NOTES

1. *IT Modernization: The Changing of the Guard*, Dale Vecchio, Gartner Research ID Number: G00158431, May 2008.
2. *Ibid.*

## About the Author

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Ajay Singh is responsible for BMC's Service Assurance products. He came to BMC as part of the ProactiveNet acquisition, where he was the founder, president, and CEO. Singh has more than 25 years of experience in application and system management, professional services, and marketing. Before cofounding ProactiveNet, he held key upper-level management positions at Sun Microsystems. Prior to Sun, he worked in the technology strategy practice at Booz-Allen and Hamilton, a management-consulting firm where he advised clients such as IBM, GE, GM, and Boeing. Singh has an MBA from Stanford Graduate School of Business, an MS in Computer Engineering from Carnegie Mellon University, and a B-Tech from the Indian Institute of Technology, Kanpur.

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