

BMC ProactiveNet Performance Management:

Delivering on the Promise of Predictive Control
Across the Total IT Environment

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EXECUTIVE OVERVIEW

BMC ProactiveNet Performance Management brings automated predictive analytics to data center management of components, applications, and user experiences. The solution proactively detects performance aberrations and sub-optimal configurations based on learned behavior and uses this information to predict impending issues. It determines their potential business impacts, identifies their root causes, and enables them to be rectified *before* they compromise performance and availability. BMC ProactiveNet Performance Management uniquely integrates dynamic behavior learning and real-time predictive analytics with multiple data sources, change information, and service modeling to offer the earliest, most accurate detection, diagnosis, prioritization, and resolution of service impacts possible.

Proactive management relies on expectations of future conditions and events. Yet, predicting the future is a Holy Grail of human experience, whether it is foretelling business cycles, earthquakes, or tomorrow's lottery numbers. Predicting the behavior of complex systems, such as climate or global financial markets, with their seemingly infinite variables, is particularly challenging, often demanding supercomputers.

A data center's IT services, however, are more finite, like *local* weather. Accurate long-term predictions may be elusive, but short-term predictions can be quite accurate. Just as meteorologists forecast local weather for the next 24 hours, BMC ProactiveNet Performance Management demonstrates that with the right tools and data, it is possible to accurately predict the behavior of systems for the next 2–4 hours, despite the complexities of today's data centers. Whereas little can be done to alter tomorrow's weather, foreknowledge of performance and availability issues allows IT problems to be resolved *before* they disrupt services, users, and business processes.

Banking on BMC ProactiveNet Performance Management's unprecedented levels of predictive awareness and proactive control, administrators are no longer bound to identify, diagnose, and address issues reactively after users and services are impacted. They no longer must scrutinize a myriad of alerts that are only symptomatic of an issue. They can optimize performance and reliability and make changes with the confidence afforded by knowledge and control.

When an enterprise has granular, proactive awareness of its complete IT environment, it avoids revenue-sapping downtime while offering the availability and competitive service delivery that increases customer loyalty and market share. It can roll-out or extend services more effectively and respond to opportunities and market conditions with greater agility.

True predictive analytics is not a marketing promise. It is a market reality, and BMC customers worldwide today are realizing its many advantages.

MANAGING INCREASING COMPLEXITY

Today's enterprise infrastructures are dynamic and in constant motion. Virtualization allows applications and storage pools to move fluidly about physical devices, and hardware can be added and removed without disrupting services. Cloud computing allows for rapid provisioning of compute and storage resources. Emergent service delivery models, such as software-, platform-, and infrastructure-as-a-service, mean that IT resources may no longer reside in the data center. Applications themselves are more dynamic and complex, and are often delivered from multiple data centers.

IT staff must manage systems that are moving targets and growing in complexity. It is no longer possible to manually evaluate all the data, alerts, and events a modern data center can generate. Nor is it any longer practical to manually write rules.

BEYOND DYNAMIC BASELINING

Some performance management solutions rely on dynamic baselining to monitor components. They watch key performance indicators (KPIs), set high and low thresholds for alerting, and adapt these thresholds over time. Behavior learning tools advance dynamic baselining by monitoring performance metrics as interdependencies, setting multiple baselines and thresholds, and factoring in temporal fluctuations, such as increases in seasonal demand. They issue fewer — but more intelligent — alerts.

Products that rely on behavior learning are sometimes touted as proactive. Yet, the only way to be proactive is with predictive capabilities. Knowing an issue *is occurring* is a far cry from knowing an issue *will occur*. Behavior learning engines generate alerts when they detect abnormal behavior, but these views are descriptive, not predictive. These solutions lack the comprehensive insights that forewarn when a service is in jeopardy.

BMC ProactiveNet Performance Management, on the other hand, analyzes behavior holistically to project future performance. It builds upon behavior learning by collecting and analyzing much more data, enabling it to determine in real-time when a threshold for a service level agreement (SLA) or a service level objective (SLO) will soon be violated. It discovers all the constituent components of each service (including users, transactions, applications, and infrastructure), continually learns their performance parameters, and processes this data along with change information, data, and events from third-party monitoring solutions, manual settings, and SLOs. Its advanced algorithms detect resources that are stressed or performing questionably, and identify those that will likely impact users and business services. It then filters out all symptomatic alerts and events to identify the root cause of problems.

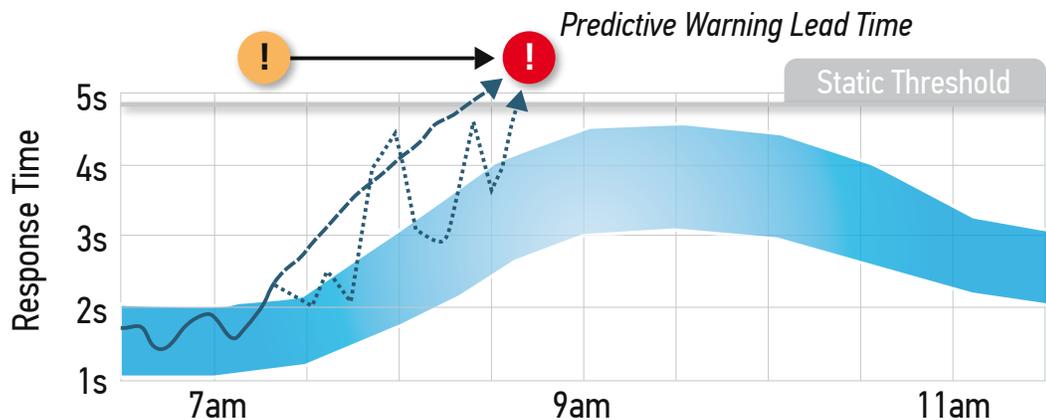


Figure 1. BMC ProactiveNet Performance Management enables corrective actions based on a combination of proactive and predictive alerts.

In effect, what BMC ProactiveNet Performance Management does is similar to what meteorologists do to make short-term, local weather forecasts. Its predictive engine looks at a wide set of current data in context of historical information and issues *proactive* alerts if performance parameters are outside of normal ranges. It detects subtle changes in behavior that might be missed by simple baselining solutions, enabling administrators to prevent any further degradation. It then extrapolates forward based on prevailing conditions to predict if violations of thresholds might impact a service in the next 2–4 hours. If so, it issues a *predictive* alert, enabling administrators to take preventative measures.

It is important to note that BMC ProactiveNet Performance Management analyzes service behavior in real-time. It is not a data warehousing or capacity planning solution that runs in the background and demands extensive system resources. Like a good meteorologist, the solution continuously scrutinizes the data as conditions change over the course of every hour, every day.

BMC ProactiveNet Performance Management's automated and real-time oversight is particularly vital in cloud environments in which services are dynamic, application delivery is dispersed, and workloads are mixed. The management of IT services must encompass disparate, yet interdependent, networks, components, and resources, but data warehousing is ineffective in such service delivery infrastructures. BMC ProactiveNet Performance Management provides proactive visibility and root cause analyses to address issues and potential outages even in the most distributed, virtualized, and complex environments.

LEARNING THE SYSTEM

Predicting behavior starts with learning behavior. By knowing how components should perform, BMC ProactiveNet Performance Management can identify when they begin to falter. Using dynamic baselining and advanced behavior learning, BMC ProactiveNet Performance Management's patented predictive analytics automatically learn the range of normal operating behavior for every monitored component in physical, virtual, cloud, and mainframe environments. Unlike conventional straight-line trending techniques, it applies trending algorithms over this detailed baseline knowledge. Moreover, because there are conditions when a static threshold is required, BMC ProactiveNet Performance Management supports both dynamic baselines and static thresholds on key performance metrics. By uniquely correlating and analyzing both detailed metrics continuously collected from devices, and events that occur only when a particular situation occurs, BMC ProactiveNet Performance Management can better localize the developing issues and more accurately identify the root cause as well as the potentially impacted IT infrastructure components and business services.

Any performance metric that moves outside its normal state, even subtly, is considered abnormal, and can trigger a real-time proactive alert. Detecting and assessing minor changes in behavior provide the earliest possible alerts — before users experience a problem and report it to the service desk, or worse, simply give up or take their business elsewhere. For even greater accuracy, BMC ProactiveNet Performance Management continuously adapts this learned behavior to changes over time, creating baselines that also account for variations in system usage by the hour, day, or week. Additionally, in virtual and cloud environments, BMC ProactiveNet Performance Management retains learned behavior when virtual machines move, eliminating false alerts due to delays for re-learning system behavior and gaps in root cause due to missing historical data.

By automatically learning and adapting to changing system behavior, BMC ProactiveNet Performance Management:

- » Eliminates the time and cost required to manage thousands, if not tens of thousands, of traditional, static thresholds for event generation
- » Reduces the number of false alarms/events, as well as any associated incidents, by up to 90 percent
- » Streamlines administration by minimizing the need to manually define, configure, and maintain correlation rules, policies, and scripts
- » Provides automated predictive analysis that makes it possible to effectively manage service delivery in increasingly complex and dynamic environments

THE BETTER THE DATA, THE BETTER THE PREDICTIONS

Predictions demand data, and the more data sets that are analyzed, the more accurate the forecasts can be. BMC ProactiveNet Performance Management greatly augments behavior learning by applying its analytics to performance data it collects directly, along with events and data collected from configuration and change management tools (e.g., BMC BladeLogic Automation Suite and BMC Change Management), third-party monitoring and event management tools, and from service models, SLOs, and business information. Only BMC ProactiveNet Performance Management takes such a holistic approach to predictive analytics, which is why it delivers superior root cause analysis and predictive results.

Performance management tools that aspire to be predictive are often silos that analyze only the specific data sets that they collect. This limits their visibility into the performance and dependencies across all components of key applications and services. BMC ProactiveNet Performance Management, on the other hand, eliminates these silos by serving as a manager of managers. Platform and vendor agnostic, the solution features a statistical correlation engine with rules and policies that can ingest events — and data — from various tools to effectively determine root causes by correlating and suppressing events that are only symptoms of a problem. Slow user response times may trigger a flurry of alerts, for example, but only comprehensive, data-rich analytics can identify an upstream database server as the cause.

To further accuracy, BMC ProactiveNet Performance Management leverages configuration change events by gathering data from any change control system, such as the BMC BladeLogic Automation Suite, BMC Change Management, or third-party products. Up to 80 percent of outages occur because of changes, and even those that are authorized can produce unwanted behavior. By factoring in continually updated change data, the analytics engine automatically determines if a change contributed to a problem, increasing the precision, relevance, and speed with which you can respond to proactive alerts.

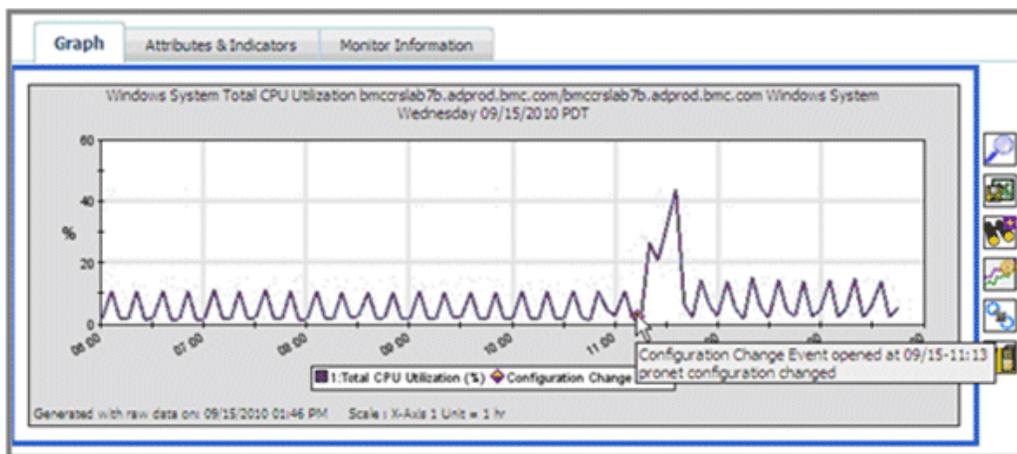


Figure 2. By factoring in change data, BMC ProactiveNet Performance Management automatically determines if a recent change contributed to a problem.

BMC ProactiveNet Performance Management can pull in service model information from configuration management databases (CMDBs), such as the BMC Atrium CMDB or other solutions. Should a CMDB be unavailable or poorly populated, the solution supports manual creation of simple service models. Service models define all the components that deliver a service — hardware, applications, network, and middleware — and their relationships to each other.

BMC ProactiveNet Performance Management also supports the creation of service impact models, which are dynamically updated to reflect real-time information collected by the BMC Atrium Discovery and Dependency Mapping solution or by BMC ProactiveNet Performance Management virtual monitoring components. This ensures that the service models always reflect the current state of the IT infrastructure, including the relationships between IT infrastructure components, as well as those within and between business services. For example, virtual relationships are discovered and tracked when changes occur. BMC ProactiveNet Performance Management's analytics engine leverages best-practice logic and service models to determine links between performance variables and eliminate abnormalities and events that are temporally and statistically correlated, but are unlikely causes of the event being evaluated.

BMC ProactiveNet Performance Management measures the real-time performance of business applications and provides insight into the overall end-user experience for distributed, mainframe, and cloud-based applications and services. Through its out-of-the-box integration with BMC End User Experience Management, BMC ProactiveNet Performance Management supports real user and synthetic transaction monitoring. Administrators can assess transaction flows across the enterprise by monitoring real users and/or recording and then executing key business transactions from various locations to determine application response times and availability. By collecting and correlating end-user transactions, you can pinpoint the specific steps of a transaction flow that are degrading performance.

BMC ProactiveNet Performance Management delivers these capabilities in both virtualized and non-virtualized environments. It includes awareness of the topological relationships and dependencies between physical servers, virtual servers, and the application elements residing on virtual machines (VMs). BMC ProactiveNet Performance Management automatically maps and tracks virtual and physical relationships when configuration changes are made to VMs or when VMs move between physical servers. All relationships and baselines are dynamically adjusted without requiring staff intervention or rule modification. This functionality ensures no gaps in root cause analyses and avoids false alerts that would occur when a new VM appears on a host.

GETTING TO THE ROOT OF EVERY PROBLEM

Foreknowledge that something undesirable will soon occur permits proactive, preventative measures only if the cause of the problem is also known. When a component starts to perform outside its norms, its behavior can ripple downstream to impact other components that depend on it. A poorly performing database server, for example, will affect the performance of the web server that relies on it, which in turn degrades user response times. Or an impaired log-in authentication application will handicap all the services that share it. Thousands of alerts may be issued, but only a handful address the core problem. Without knowledge of an issue's underlying cause, it is difficult to identify and correct a problem before it deteriorates a business-critical service.

BMC ProactiveNet Performance Management analyzes and correlates millions of performance metrics and events, data points, and change information — from both BMC and third-party tools — to determine a causal hierarchy and isolate the root of an impending issue. The ability to factor in changes is essential because some 80 percent of mean time to repair (MTTR) is consumed by determining what has changed in the service delivery infrastructure. BMC ProactiveNet Performance Management also makes correlations based on the service model, time information, and known or learned relationships. Its proactive root cause analytics use scoring and categorization algorithms to evaluate the severity of abnormalities, organize them from the least to most significant, and group them based on their associated devices. Operators are then presented a prioritized list of abnormalities and alarms/events that are highly likely to be at the root cause of any given issue.

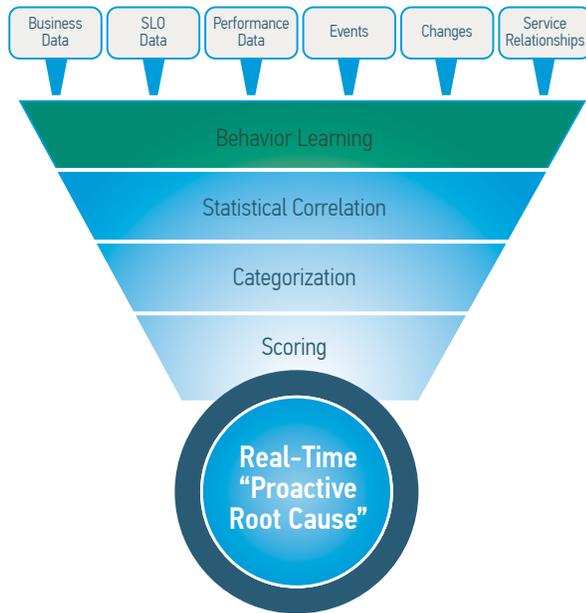


Figure 3. BMC ProactiveNet Performance Management analyzes and correlates millions of performance metrics and events, data points, and change information to isolate the cause of problems in real-time.

As soon as an abnormality is identified, BMC ProactiveNet Performance Management’s predictive analytics engine can trigger a drill-down into the application logic with unmatched visibility to capture additional diagnostics. For example, when the solution detects abnormal end-user transaction response times, it automatically triggers deep application diagnostics associated with the degraded transactions. Captured diagnostics can include system, database, application, middleware, and mainframe details — and more — related to the problem. This unique integration of proactive deep diagnostics with root cause analytics dramatically accelerates and simplifies problem isolation.

Based on this analysis, actionable trouble tickets can be either automatically or manually opened in the service desk, with attached links to run books, detailed diagnostics, service impact information, and other contextual information necessary for rapid incident resolution.

Root causes can be identified regardless of where they reside, even in mainframe systems. Using BMC ProactiveNet Performance Management, administrators can reduce the number of service outages and minimize customer impact by preventing problems from occurring, as opposed to the traditional react-to-failures approach. You can slash the time needed to resolve problems, as well as reduce downtime by 75 percent or more.

PRIORITIZING WHAT’S IMPORTANT TO THE BUSINESS

Aberrant behavior can trigger many alerts, but not all are important events. A server in a cluster, for example, might be faltering while the cluster’s other servers still routinely deliver applications. Addressing the issues with this server may not be critical because no services are in jeopardy. Administrators must focus on those alerts that signify a threat to SLAs and processes. They need to know which services will be impacted and their value to the enterprise. Then problems can be prioritized by their likely costs to the business.

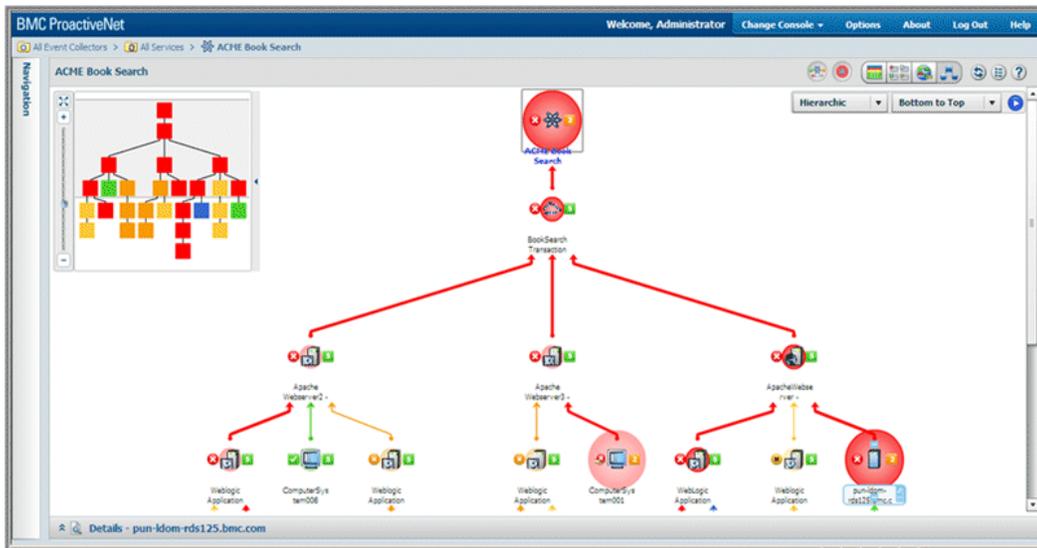


Figure 4. When a component begins performing outside its established norms, administrators can quickly identify their impact on key services, and prioritize what to fix first.

BMC ProactiveNet Performance Management’s predictive analytics use service models to determine the impact of any service by correlating all processed events, alarms, data, and business information. When a component begins performing outside its established norms, the solution identifies how this issue will propagate to other components and, consequently, affect services. When business data are provided, the solution can even project the degree to which lost services will impact revenues. Moreover, when detailed relationship and dependency data are discovered by BMC Atrium Discovery and Dependency Mapping and stored in the BMC Atrium CMDB, BMC ProactiveNet Performance Management can consume this information to achieve the most precise service impact analysis.

When staff know the business impact and cost implications of any issue, they can focus on problems posing the greatest threats to the business, decreasing outages and guaranteeing a higher quality of services. Rather than fixing a server that is hardly in use, they will remedy the server that brought down the web site or the SQL query that is causing slow performance and leading customers to abandon their carts and leave the web site. Such efficiencies and productivity contribute to the business value of predictive analytics.

SERVICE DELIVERY AS A COMPETITIVE ADVANTAGE

BMC ProactiveNet Performance Management demonstrates that predictive analytics can be effective for proactively managing modern data centers. The solution informs staff automatically and in real-time that there is a problem, what the problem is, and the problem’s projected business impact. It uniquely combines advanced behavior learning and statistical correlation, and leverages configuration change information, SLO data, and service model relationships to deliver on the promise of real-time, proactive root cause and service impact analyses. It can use data from a range of monitoring tools to serve as a manager of managers. No other solution integrates these functionalities to learn behavior and generate alerts both predictively and proactively for on-premise, off-premise, and cloud-based applications and services.

Administrators can shift from passively monitoring infrastructures, responding only when services have degraded and users are complaining, to focusing proactively on KPIs, application and end-user response times, and SLOs. They will streamline management by quickly identifying and resolving their most pressing problems.

The core business value of BMC ProactiveNet Performance Management’s predictive analytics is advanced risk mitigation, enabling enterprises to anticipate and remedy issues before they disturb essential processes. Using BMC ProactiveNet Performance Management, you will avoid the costly erosion of business that comes from less than optimal service performance and availability, and position your service delivery to win in today’s increasingly competitive marketplace.

BUSINESS RUNS ON IT. IT RUNS ON BMC SOFTWARE.

Business thrives when IT runs smarter, faster and stronger. That's why the most demanding IT organizations in the world rely on BMC Software across distributed, mainframe, virtual and cloud environments. Recognized as the leader in Business Service Management, BMC offers a comprehensive approach and unified platform that helps IT organizations cut cost, reduce risk and drive business profit. For the four fiscal quarters ended June 30, 2011, BMC revenue was approximately \$2.1 billion.

