



Change and Configuration Management Route to Value™
A Path to Effective Business Service Management

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TABLE OF CONTENTS

Executive Summary	1
Section 1: The Need for a Change and Configuration Management Solution	2
- Failed or mismanaged changes result in penalties	2
- Change management is difficult	3
- A solution is required	3
Section 2: Criteria for a Change and Configuration Management Solution	4
- Integrate with a comprehensive and accurate configuration management database	4
- Provide automatic discovery	4
- Establish and enforce standardized change management processes	4
- Automate change implementation	5
- Provide tight integration of all solution components	5
Section 3: BMC Software's Change and Configuration Management	
Route to Value: A Solution that Meets the Criteria	6
- Automated discovery and detection	6
- Comprehensive, open configuration management database	8
- Process-based change management	8
- Policy-based configuration automation	9
Section 4: Leveraging Change and Configuration Management across the other Routes to Value	10
Conclusion	12

Executive Summary

In the world of business, change is a competitive advantage and success often depends on adaptability. For a business to adapt successfully, however, it must evolve and adapt its infrastructure and support systems at the same pace it evolves other critical components. This fact, combined with the ever-quickenning, evolving nature of technology, makes managing change in the IT world a growing priority. The grand paradox, however, is that business also demands the reliability and predictability that comes from a stable IT environment.

The reality is that the IT environment is fragile and increasingly complex, and therefore, it has become harder to know which IT components support which critical business services and what will happen to one if a change is made in another. These factors can make change intimidating. But changes in IT can be a positive force if properly managed and controlled. Companies need a change and configuration management solution that leverages best-practice processes to streamline and automate the key activities that identify, respond to, and control changes to the IT environment, thereby eliminating the risk and cost associated with IT change.

This paper explores the need for a Change and Configuration Management solution and the criteria needed for that solution to operate effectively while contributing to an organization's ability to achieve Business Service Management (BSM). BMC Software's Change and Configuration Management Route to Value™ provides a solution that fits those criteria. This paper is one in a series that individually describe each of the BSM Routes to Value by focusing on a specific business problem, in this case, the need to effectively respond to change—and proactively anticipate the effects of change—in a way that minimizes downtime and reduces overall IT costs.

BMC Software's Change and Configuration Management Route to Value provides a comprehensive and flexible solution for managing change through the effective identification of IT assets, including their configurations and relationships, and the tracking and management of the change process from request and planning through implementation and verification. In fact, one of the most important advantages of the Change and Configuration Management Route to Value is the tight integration of its components, highlighted by an enterprise Configuration Management Database (CMDB) that keeps a current accounting of the configuration of every IT asset and enables a unified, holistic approach to managing change in this complex world.

What's more, these shared technologies deliver an important advantage across all BSM Routes to Value by providing the tight integration that extends across all BMC Software products, permitting the Routes to Value to work together and leverage each other's capabilities. As a result, once Change and Configuration Management is in place, organizations can augment its capabilities with other Routes to Value, making the transition from IT infrastructure management to Business Service Management, and in the process become key contributors to profit.

The Need for a Change and Configuration Management Solution

The IT world and the business world are both highly dynamic and in a state of continual change. IT technology is continually evolving, and security threats are increasing. On the business side, markets and customer demands are continually shifting. To respond to these changes, the IT staff has to make rapid and continual changes to the IT infrastructure, including changes to hardware, software, and communications/network components.

The requirement for continual change puts enormous pressure on the IT organizations in most enterprises. That's because IT infrastructures have become increasingly complex and fragile, greatly increasing the difficulty in implementing changes quickly and successfully. Moreover, business dependency on IT infrastructures has grown dramatically in just about all industries, meaning that any problems caused by mismanaged changes to the IT infrastructure can have serious consequences to the business.

FAILED OR MISMANAGED CHANGES RESULT IN PENALTIES

Unless properly managed, changes to the IT infrastructure are fraught with risk. According to leading analysts, up to 80 percent of systems failures are caused by unmanaged

changes. Even when properly managed, 20 percent of planned changes cause system outages due to lack of visibility to dependencies.

There are three types of actions that change the IT infrastructure: the installation of new components, such as hardware, operating systems, drivers, and applications; the update of existing components; and the retiring of components. These actions all introduce sources of risk. Here are just a few examples. The installation of a new Web server may fail, taking the server down. The planned installation of a security patch on five servers may unknowingly be accomplished successfully on only four, leaving the fifth server unprotected. A change to a server may create an unanticipated conflict with another interdependent server, bringing down both servers. The change staff may intentionally bring a server down for a known period of time to implement a change, not knowing that particular time is a peak period for the server. The list of potential pitfalls is nearly endless.

Failed or improperly managed changes can disrupt the delivery of business-critical services or access to business-critical systems. The business impact can be serious and include lost revenue, lost employee productivity, increased support costs, missed business opportunities, and tainted company image in the eyes of customers and business partners.

CHANGE MANAGEMENT IS DIFFICULT

The IT infrastructure is made up of a complex and fragile web of interdependent components. Making changes in this environment is difficult and risky for a number of reasons, including:

- > A change to one component can have a cascading effect on several other components.
- > The change process itself is complex and usually involves multiple, interdependent tasks, many of which are performed manually.
- > The change process can involve different people in different organizations across the enterprise, making it difficult to coordinate.
- > Because of the dynamic nature of the business environment, the IT staff has to address a large and growing number of change requests with limited staff resources.
- > Changes must typically be tested prior to production release to ensure they have been correctly implemented and don't negatively impact other IT elements, and this increases the load on the IT staff. Unfortunately, for a number of reasons, test environments are often not exact copies of their production counterparts – further adding to the time and effort required to test.

Another major problem is that the change management staff may not have configuration information on the IT infrastructure or the information they do have may be inaccurate. Lack of accurate configuration information can result in failed changes. For example, unknown to the change management staff, a particular server may not

have adequate hardware to accommodate a new software installation or update, causing the installation to fail. Moreover, without appropriate configuration information at their disposal, the staff has to spend much time manually assessing the impact of implementing change requests, resulting in long delays and costly errors.

A SOLUTION IS REQUIRED

To address the challenge of change requires a change and configuration management solution that enables the change management staff to:

- > Know exactly what is in the IT environment and how it is configured.
- > Access a single view of the IT infrastructure configuration across the enterprise and leverage that information in multiple places.
- > Establish repeatable and enforceable processes, based on best practices, for managing the complete change lifecycle and enforcing the appropriate investigation, planning, risk mitigation, checks and balances, and links with business needs.
- > Automate change management processes where possible to reduce the time and cost of changes, as well as the errors inherent in manual processes.

Criteria for a Change and Configuration Management Solution

To provide the needed capabilities requires a change and configuration management solution that meets several important criteria.

INTEGRATE WITH A COMPREHENSIVE AND ACCURATE CONFIGURATION MANAGEMENT DATABASE

A comprehensive change and configuration management solution should integrate with a single configuration management database (CMDB) that maintains accurate, comprehensive and up-to-date data on all six types of Configuration Items (CIs) across the enterprise:

- > Hardware
- > Software
- > Communications/networks
- > Locations
- > Documentation
- > People (including internal staff and contractors)

The data should include information in all three dimensions of the IT environment:

- > Assets (What is the total inventory?)
- > Configurations (What are the assets' components and settings?)
- > Relationships (What are the assets' interdependencies with other assets?)

By maintaining rich information on all IT elements, the CMDB enables the IT staff to perform more informed change planning to reduce the risk of failed changes. In addition, the CMDB should provide information on the relationships among IT elements and the business services they support, such as indicating that a particular Web server is used for online order entry. By knowing what business services IT elements support, the change management staff can assess and prioritize changes based on their business impact.

Many organizations have already deployed tools that gather and maintain asset data. Often times, due to different organization divisions or through merger and acquisition activities, they often have more than one technology in place to support those tools. In most cases, these tools maintain separate asset repositories. The CMDB should be capable of consolidating data from multiple information sources and reconcile the information to ensure the accuracy and integrity of the richer, consolidated information.

PROVIDE AUTOMATIC DISCOVERY

A change and configuration management solution should include discovery tools that automatically populate and update the CMDB with an inventory of hardware and software configurations. Discovery tools should gather information in sufficient detail to allow effective IT asset management, including rich configuration information, such as components and settings, and the physical and logical relationships and interdependencies between hardware and software assets. The tools should be capable of discovering assets across multiple, diverse platforms.

ESTABLISH AND ENFORCE STANDARDIZED CHANGE MANAGEMENT PROCESSES

Key to effective change and configuration management is the automation of the four-phase, process-based change lifecycle—request, planning, implementation, and verification. Automation of change request and approval workflow fosters consistency in the review and approval processes across all change requests; improves responsiveness; and helps reduce the time required to plan approved changes. Automation of change implementation permits policy-based configuration by maintaining and enforcing standard configurations based on policies—limiting and controlling configuration variations, and detecting and resolving non-standard configurations.

BUSINESS SERVICE MANAGEMENT

Business Service Management (BSM) does more than just align IT practices to the goals of the business, tool the environment to merge business with IT information, and ensure that IT is able to support business goals. BSM helps IT managers to develop an understanding of the business requirements for IT services and business managers to develop an understanding of how business impacts IT services. Certainly BSM empowers IT organizations to manage technology from a business perspective, but ultimately BSM enables IT organizations to improve business performance, simplify complexity of the IT infrastructure across the enterprise, and reduce costs.

BSM requires the integration of IT management processes across both mainframe and distributed systems and across a variety of separate disciplines. Organizations differ greatly in their needs for BSM, depending on current business problems and resulting pain points. Consequently, organizations differ as to which IT disciplines they need to focus upon to gain competitive advantages. Focusing on disciplines that maximize immediate returns on investments sustains short-term gains, but over time, any IT discipline can deliver value and eventually lead to BSM.

Enterprises also differ in the maturity of their IT management processes. In a recent survey, Gartner observed that most IT organizations hover around the lower levels of maturity, noting that "The IT management process maturity levels of IS organizations are improving, driven by increasing business and revenue dependence on the quality of service provided by the IT infrastructure."¹

IT organizations can take different approaches toward a BSM goal. For example, organizations may approach BSM in an incremental manner, addressing their most pressing problems first, and then building capabilities and expanding scope across additional IT disciplines. In any case, journeys to BSM must start from current maturity levels and leverage existing processes and tools across all the platforms that run the enterprise: from mainframes to distributed systems to desktops to the web.

AUTOMATE CHANGE IMPLEMENTATION

The solution should provide tools that facilitate the change management lifecycle and automate change implementation. These tools should automate the packaging, configuration, provisioning, patching, and repair of software in compliance with the organization's change management policies. The tools should also report on the progress of change implementation, verify that changes have been executed successfully, and update the CMDB on the changes successfully completed. Automated change implementation reduces the time and effort required to make changes, freeing up the change management staff for more strategic tasks.

PROVIDE TIGHT INTEGRATION OF ALL SOLUTION COMPONENTS

One of the major problems facing organizations is lack of integration across their current change and configuration management tools. Many have deployed different tools for different purposes from different vendors, making it very challenging to gain a unified view of the IT infrastructure across the enterprise, which results in a fragmented approach to change and configuration management. That's why the change and configuration management solution should provide tight integration and share a common CMDB across all solution components. It should also permit tight integration with other Business Service Management (BSM) processes, such as incident and problem management, asset management and discovery, and service impact and event management. This integration delivers synergy that helps organizations move up the maturity level ladder.

BMC Software's Change and Configuration Management Route to Value: a Solution that Meets the Criteria

BMC Software's Change and Configuration Management Route to Value helps IT become more responsive to change, and at the same time stabilize and protect the IT environment. It implements consistent processes based on best practices, helping the organization accelerate the implementation of ITIL® best practice processes in Change Management, Configuration Management, and Release Management.

Figure 1 shows the components of the BSM Change and Configuration Management Route to Value. An important feature is the tight integration of the components, such as the sharing of the BMC Atrium™ CMDB and other enabling technologies. The solution also consolidates the existing change and configuration management infrastructure. Through the BMC Atrium CMDB, the solution works with existing discovery tools, preserves and consolidates existing configuration data stores, and integrates with existing directories.

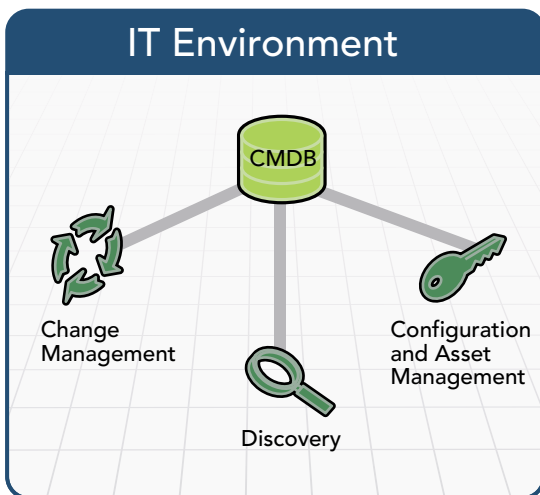


Figure 1. BSM Change and Configuration Management Route to Value

With the Change and Configuration Management Route to Value, the IT staff can take a unified, holistic approach to change and configuration management, working from a single, unified view of the IT infrastructure.

AUTOMATED DISCOVERY AND DETECTION

The BMC IT Discovery Suite populates the BMC Atrium CMDB and updates it whenever changes are made. This improves visibility and control of the IT infrastructure through the automated inventory of hardware and software configurations. In addition, by quickly detecting changes in the infrastructure, automatic discovery reduces risk by identifying rogue or unauthorized application usage.

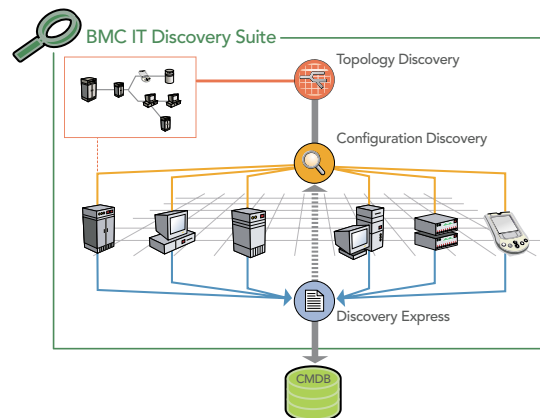


Figure 2: BMC IT Discovery Suite

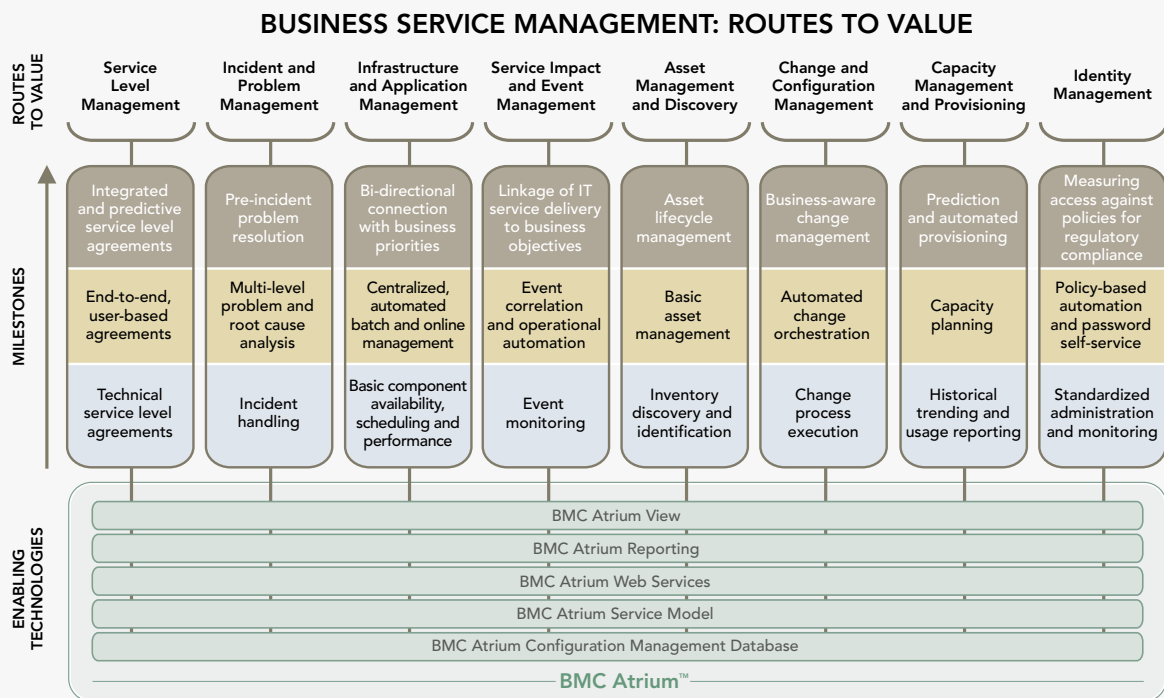
- The suite comprises three BMC Software discovery tools:
- > **BMC Discovery Express.** Provides the fundamental data needed for basic asset management initiatives.
 - > **Marimba Configuration Discovery.** Goes beyond asset identification to provide rich detail on components, settings, and the current state of each device for proactive asset tracking and management.
 - > **BMC Topology Discovery.** Completely maps network components as well as infrastructure application dependencies for internally developed applications, J2EE applications, and enterprise applications such as SAP and Siebel Systems

The BMC IT Discovery Suite provides rich hardware and software configuration data on servers, clients, and intermittently-connected (mobile) devices, improving the modeling of the IT environment.

BMC ROUTES TO VALUE: PATHS TO EFFECTIVE BUSINESS SERVICE MANAGEMENT

To meet the unique needs of each business, BMC Software has developed Routes to Value: a coordinated, incremental approach to BSM. Routes to Value are field-proven solutions that can be implemented independently, but ultimately leverage one another to interconnect the related disciplines within BSM. This inter-connection is facilitated by BMC Atrium™, an open-architected foundation that enables information sharing and centralized management across BMC Software and third-party solutions.

Routes to Value are designed to quickly generate tangible business value by solving a particular set of business problems across the enterprise computing environment. Routes to Value allow enterprises to focus on one route or a combination of routes to address their most pressing problems, important initiatives and critical gaps, as well as to deliver fast return on investment. What's more, each Route to Value contains discrete steps along a path to greater maturity and value. This enables each organization to match the right technologies and best practices to their existing competencies and investments while providing a clear path toward greater efficiency and value within each Route to Value.



The eight Routes to Value, with discrete milestones along the way, move you from IT-focused service management to BSM.

Finally, the data captured by the tools and processes in one Route to Value can be shared and enriched by the others through BMC Atrium. In this way, Routes to Value form re-usable and extensible building blocks that help organizations reduce redundancy and streamline processes to progress toward the ultimate goal of BSM.

COMPREHENSIVE, OPEN CONFIGURATION MANAGEMENT DATABASE

The BMC Atrium CMDB is an intelligent data repository that creates and dynamically maintains a logical model of the IT environment. It can consolidate data from external data stores and present it as part of a single, logical, and scalable data repository, so the IT staff can gain a single enterprise view of the IT environment without having to move all data to a single physical data store. This permits a level of scalability that would otherwise not be possible if all data had to be housed in a single, physical database.

The BMC Atrium CMDB provides a comprehensive common data model that covers most major Configuration Item (CI) classes, sub-classes and configurations.² It includes a rich modeling capability for modeling relationships among the CIs. The data model permits granular depiction of relationships among assets, with more than 80 different relationships specified out-of-box. While based on industry standards, such as the Desktop Management Taskforce (DMTF) Common Information Model (CIM), the data model is extensible to accommodate specialized CIs.

To facilitate integration, the BMC Atrium CMDB has open and published APIs that permit connection with existing applications and data, enabling all related BSM and infrastructure management tools and processes to share data. For example, the Remedy Enterprise Integration Engine (EIE) and Web Services can be used to access data within the BMC Atrium CMDB.

The Reconciliation Engine provides efficient and intelligent reconciling of BMC Atrium CMDB data, consolidating datasets from different data sources into a single, rich, consolidated view of the IT infrastructure. The engine employs business rules-based automatic resolution of discrepancies among data sets and exception handling workflow. The rules are provided out-of-box for BMC Software discovery tools and are easily configured to permit refinement and customization to meet unique and evolving needs. Reconciliation improves data accuracy and makes data validation far more efficient and scalable. Reconciliation can also be used to determine which data must reside within the BMC Atrium CMDB proper and which can remain in other data repositories and linked to the primary data stored in the BMC Atrium CMDB. The ability to create a federated repository permits support for individual customer/applications needs while maintaining the scalability of the BMC Atrium CMDB.

The advanced consolidation and reconciliation capability of the BMC Atrium CMDB permits the organization to leverage existing investments in management tools, discovery tools, and data repositories, and to preserve current authoritative data sources. With reconciliation, the BMC Atrium CMDB can provide a single view of the IT infrastructure, enhanced by the rich information contributed by multiple tools.

PROCESS-BASED CHANGE MANAGEMENT

Remedy Change Management gives organizations the ability to develop a standardized, orderly, process-driven approach to controlling change and automating change lifecycle management, from request and planning through implementation and verification. This brings consistency and repeatability to the change management process, and it helps ensure orderly deployment of approved change requests. With its advanced capabilities, Remedy Change Management helps reduce the overall IT support and business downtime costs typically associated with changes.

Remedy Change Management facilitates orderly change planning. It enables the change management staff to assess the risk of requested changes by identifying the potential impact of the proposed changes on the business prior to implementing the changes. It permits the staff to assign the proper people to implement changes to help ensure timely and successful completion. It also allows the staff to perform cost analysis prior to implementing changes. In addition, Remedy Change Management can require the change management staff to create contingency and back out plans to be executed in the case of failed changes.

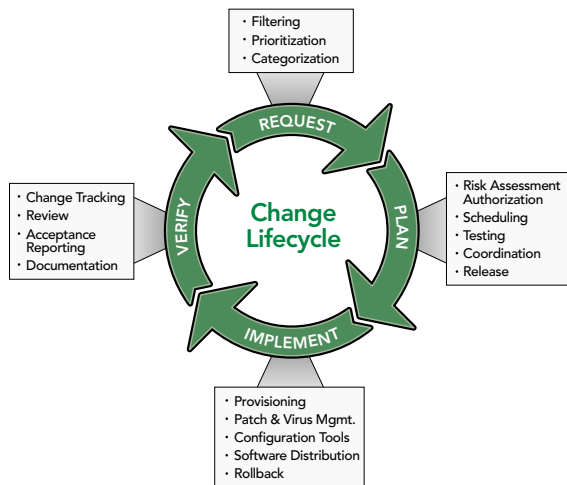


Figure 3: Remedy Change Management

Remedy Change Management leverages business rules for routing and managing change requests and tasks according to approved, standardized processes. It permits tasks to be sequenced, tied to dependencies, and configured to trigger automatically when prerequisite tasks are completed. It automates approval processes for faster decision-making, greater support and more comprehensive audit trails. In addition, it permits the management of changes based on their relationships to the organization's business service model, and that's essential for effective BSM.

POLICY-BASED, AUTOMATED CONFIGURATION MANAGEMENT

Marimba Configuration Management tools automate the execution of IT software changes by identifying and managing the IT environment through continuous enforcement of desired system states. With their extensive cross-platform and cross-device support, the tools can manage the software assets on virtually all end-points and platforms in the IT infrastructure, both inside and outside the firewall.

Marimba Configuration Management tools control the environment by enforcing desired state through flexible policies for managing and patching clients and servers. The tools enforce deployment, maintenance, and removal rules for users, machines, user groups, and machine groups. Automated enforcement of standard configurations ensures conformity while reducing the need for human interaction. It also helps reduce the frequency of incorrectly configured or incorrectly targeted software. Plus, it ensures that once a change is applied, it stays applied.

The configuration management tools interact in near real-time with existing directories, domain listings, and database structures to enforce deployment, maintenance, and removal "rules" for users, machines, or groups of users and groups of machines. Policies help to reduce the frequency of mis-configured or mis-targeted software, keeping users online and productive. Policy Management is made continuous through the concept of Policy Compliance, which provides a dynamic dashboard showing the current state of the IT environment and how it conforms to stated policy. The IT staff can drill-down into the data and determine the non-compliant friction points via diagnostics for easy problem correlation, and quickly take corrective action.

Leveraging Change and Configuration Management across the other Routes to Value

An important advantage of the BSM Route to Value concept is that each RTV shares common components with other Routes to Value, allowing for companies to begin with one route, and then quickly leverage common components to address other business challenges. (See Figure 4.) The Routes to Value share the BMC Atrium CMDB, ensuring that they are all operating with consistent, complete and up-to-date information, and providing a common view of the IT environment across all tools and processes. The Routes to Value also interact with each other at the workflow level to augment and leverage each other's contributions to effective BSM. In addition, the Routes to Value share common services and user interfaces, increasing efficiency, reducing implementation complexity, and simplifying use.

Change and Configuration Management populates and maintains the BMC Atrium CMDB with consistent and up-to-date configuration information, and automatically updates the BMC Atrium CMDB when changes are made. It maintains change history in the BMC Atrium CMDB on all IT elements. And it keeps the other Routes to Value informed on change events through alerts and notifications of planned changes (schedules, planned downtime and IT resources affected), change status, and successful change completion.

Table 1 (page 11) shows some of the many ways that Change and Configuration Management works with the other Routes to Value, augmenting each other's capabilities and accelerating the path to achieving enterprise BSM.

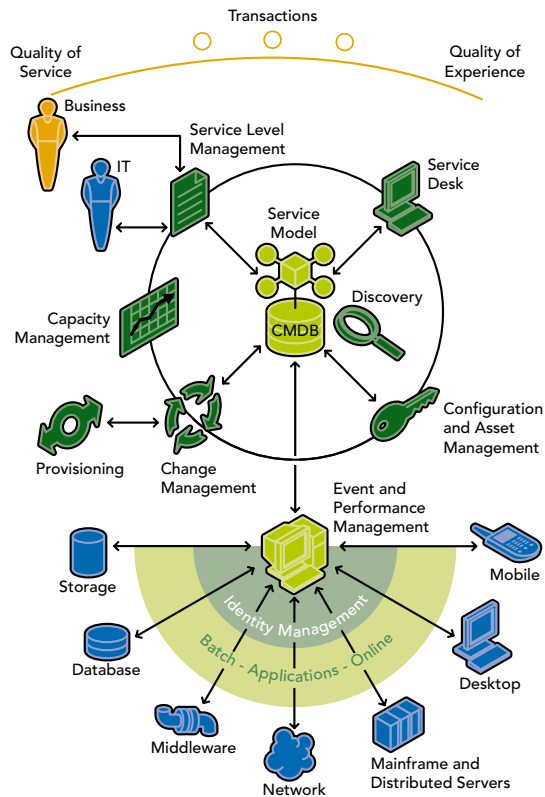


Figure 4. Change and Configuration Management works with other Routes to Value to accelerate the path to BSM.

Route to Value	Interaction
<p>Incident and Problem Management</p>	<ul style="list-style-type: none"> > The help desk can use the configuration data in the BMC Atrium CMDB to determine the exact configuration and status of the user's equipment, speeding problem resolution. > Change and Configuration Management can send notifications of change events, keeping the help desk informed of change activity. > The help desk can submit change requests directly to Change and Configuration Management solutions to initiate the change process. > Incident and Problem Management augments the BMC Atrium CMDB data with the time spent to support IT elements, enabling the change management team to make more informed decisions on changes. > Incident and Problem Management links configuration information and related change history to incident and problem tickets, allowing the change management team to better assess the impact of changes on support.
<p>Asset Management and Discovery</p>	<ul style="list-style-type: none"> > Change and Configuration Management maintains change histories and associated costs on all IT assets, permitting the asset management team to gain insight into the cost impact of changes for more informed update/replace decisions. > Change and Configuration Management can update the CI information on all assets, ensuring that the asset tracking application is always up to date. > Upon arrival at the shipping dock, the receipt of an asset into Asset Management and Discovery can automatically spawn a change request in Change and Configuration Management to have the asset deployed. > At scheduled maintenance times, Asset Management and Discovery can issue required maintenance actions as change requests.
<p>Service Impact and Event Management</p>	<ul style="list-style-type: none"> > Service Impact and Event Management maintains the relationships between IT assets and business services in the BMC Atrium CMDB, helping the change management team assess the potential business impact of planned changes. > Changes to the BMC Atrium CMDB made by Change and Configuration Management can automatically trigger updates to the service model maintained by Service Impact and Event Management.

Table 1. Synergies between Change and Configuration Management and the other Routes to Value

Conclusion

With the BSM Change and Configuration Management Route to Value, the change management staff can:

- > Manage the IT environment through automated software distribution.
- > Introduce consistency and repeatability in the management process.
- > Control the environment by enforcing desired state through policies.
- > View and manage compliance and drift against policies.

These capabilities permit the organization to become faster on its feet in responding to changes in the business environment and the IT environment. Moreover, with Change and Configuration Management in place, organizations can then augment its capabilities with other Routes to Value, advancing IT maturity and adding value with each step. With BSM Routes to Value, IT organizations can make the transition from IT infrastructure management to Business Service Management, and in the process become key contributors to profit.

1 "Data Center Poll Results Confirm Improved Process Maturity,"
D. Curtis/D. Scott, Gartner Research Note, April 22, 2004

2 ITIL defines a Configuration Item as a "component of an Infrastructure, or an item, that is (or is to be) under the control of Configuration Management. CIs may vary widely in complexity, size and type, from an entire system (including all hardware, software and documentation) to a single module or minor hardware component."



About BMC Software

BMC Software, Inc. [NYSE:BMC], is a leading provider of enterprise management solutions that empower companies to manage their IT infrastructure from a business perspective. Delivering Business Service Management, BMC Software solutions span enterprise systems, applications, databases and service management. Founded in 1980, BMC Software has offices worldwide and fiscal 2004 revenues of more than \$1.4 billion. For more information about BMC Software, visit www.bmc.com.

