



Realizing the Value of Standardized and Automated Database Management

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THE CHALLENGE OF MANAGING TODAY'S DATABASES

Databases are the repository of an organization's most critical and sensitive information. They're also a key component of nearly every enterprise and web application in use today, which means they're constantly deployed, upgraded, and patched by teams of DBAs.

The database is typically the most complex part of the application — vendors have piled on endless features, all of which add to the complexity of installation and management. Features that were previously the realm of operating systems or third-party applications, such as high availability, disaster recovery, storage management, and security, are now part of the database. The huge number of “knobs and dials” to control these features means there are more ways than ever for databases to be deployed in non-standard ways, which can jeopardize the stability, performance, and security of business applications.

AUTOMATING YOUR DATABASE OPERATIONS

While the number of databases has grown, the number of staff to provision, patch, and upgrade them has been shrinking. The need for speed to market of new revenue-generating applications means that organizations can't wait days or weeks for the database component to be deployed, even when there are fewer DBAs to do the work. IT managers must find ways to become more efficient or risk missing their SLAs with the business and impeding the rollout of critical new applications.

The database configurations that support business applications are highly complex, but once they're designed, they tend to be duplicated many times with minimal variation. This means that automation can be applied to database provisioning, upgrading, and patching processes, resulting in a lower DBA:server ratio, faster time to market, and significant cost savings.

LATHER, RINSE, REPEAT – STANDARDIZING THE PROCESS

The key to consistent database management is *standardization*. Once a database configuration or deployment process is developed to meet specific performance, reliability, and security goals, it must be applied consistently. This is the only way to ensure the long-term stability and manageability of the application.

Traditionally, enterprises have relied on manual processes and run books to enforce standardization. However, it's difficult to enforce run-book-based standards when they're being implemented manually. A single DBA can't be counted on to execute multiple deployments identically. With tens or hundreds of DBAs, the situation rapidly becomes worse. In addition, separate run books for each variation of the database are needed, and they all need to be kept up to date.

Automation is the key enabler of standardization. The most senior DBAs can develop the configurations and workflows, which then can be instantiated in the automation process. This allows more junior staff to manage large numbers of database tasks, with the assurance that they're being carried out according to standards. The senior staff can then focus on more critical tasks, such as performance tuning, storage optimization, and more.

THE BMC SOLUTION

BMC Database Automation provides the ability to automate database tasks according to defined standards, thereby reducing risk, improving consistency, and lowering costs. As part of the BMC BladeLogic Automation Suite, BMC Database Automation provides these capabilities:

- » Discovery and asset management – Automatically capture database configurations
- » Environment-aware management – Account for complex interdependencies
- » Policy-based provisioning – Enable anyone to expertly provision databases
- » Pre-flight checks – Determine if an environment is configured correctly
- » Patching automation – Automatically maintain patching levels for compliance and availability
- » User-defined operations – Extend capabilities beyond core provisioning and patching
- » Access control and logging – Apply role-based security to user-defined domain hierarchies
- » Support for cloud databases – Provision, patch, and manage databases in virtual environments

Let's look at each of the capabilities in more detail.

DISCOVERY AND ASSET MANAGEMENT

With the proliferation of databases across the enterprise, understanding exactly what assets are deployed has become more difficult. BMC Database Automation, through the use of its lightweight agent technology, discovers databases from major vendors, and provides visibility into versions, patch levels, and configuration settings. It also supports high-availability cluster configurations, which are becoming the norm for today's mission-critical databases. Advanced reporting features allow users to see at-a-glance the makeup of the database environment, as well as the underlying servers, thus helping managers improve the planning process and track license compliance.

While traditional vendor tools only provide visibility into their own products, BMC Database Automation provides a consistent, central view of your database environment across all supported vendor platforms.

ENVIRONMENT-AWARE MANAGEMENT

In order for true automation to be achieved, management tools need to be *environment-aware*. All of the subtle differences between product versions, as well as dependencies between applications, patches, operating systems, networks, storage, clusters, and more, need to be fully understood, captured in a knowledgebase, and used when automating tasks. This is especially true for databases, where dependencies are highly complex and product vendors are known to make major, difficult-to-track changes to functionality between releases.

BMC Database Automation has built-in environmental awareness and automatically applies it in workflows so that operators don't have to be experts in product variations and dependencies. This helps to eliminate errors and deliver more consistent database deployments.

POLICY-BASED PROVISIONING

Standardization for databases is enforced through the use of *policies*. Policies dictate the best-practice configuration settings, components, user accounts, and installation options that go into the database provisioning process for specific applications. Policies are typically developed by the most skilled, senior database administrators based on many years of experience.

In BMC Database Automation, the component for enforcing policies is the *template*. The completely customizable template drives the provisioning process, while also limiting the user's degrees of freedom. It allows management to control what settings are fixed (non-editable) and which can be changed by a user; it can even keep users from seeing settings altogether, if necessary. This allows less-skilled junior staff to quickly provision databases from many different vendors that conform to policy for development, QA, or production use, reducing provisioning time from weeks to hours, eliminating the need for specialized teams to support each vendor product, and freeing the senior DBAs to focus on more critical tasks.

Administrators can insert their own custom steps into a BMC Database Automation provisioning workflow through the use of pre- and post-provisioning scripts. These scripts allow administrators to add steps, such as:

- » Automatically back-up a database before a provisioning activity, such as an upgrade
- » Create application-specific database user accounts after a new database is provisioned
- » Deploy a database schema after a new database is provisioned
- » Modify database permissions
- » Open or close a service desk ticket

BMC Database Automation has built-in intelligence for provisioning the most popular vendor database products, including Oracle®, SQL Server and Sybase (both Dataservers and Replication Servers) on multiple operating systems, including Windows, Linux®, HP-UX, AIX®, and Solaris¹.

In addition, comprehensive support is provided for clustered configurations, including Oracle RAC, a feature-rich, high availability solution that can be complex and hard to implement. BMC Database Automation has built-in knowledge of RAC requirements and dependencies, and can provision complex RAC configurations involving ASM, CRS/Clusterware, and Restart. RAC clusters can easily be scaled by adding or removing nodes and instances using BMC Database Automation.

PRE-FLIGHT CHECKS

When provisioning or patching a database, there are always prerequisites and dependencies that need to be checked to ensure the operation goes smoothly. For each provisioning and patching operation, BMC Database Automation includes a set of automated *Pre-Flight Checks* that determine if the environment is configured correctly before starting the operation.

There are more than 1,000 vendor and version-specific Pre-Flight Checks in BMC Database Automation. A few examples of items checked include:

- » Disk space and memory
- » Required files and directories
- » User accounts and groups
- » File ownership and permissions
- » Required binaries installed
- » Network connectivity
- » Kernel parameters
- » Operating system patches
- » IP addresses
- » ASM diskgroups

Administrators have complete control over these checks; individual checks can be selectively skipped if necessary for certain configurations. If one or more checks fail, the user has the option of correcting the problem and re-running the checks before proceeding with the operation.

The Pre-Flight Checks allow DBAs to confirm that the operating system environment (typically set up by another group) is compliant to standards *before* the database provisioning is attempted. This saves time because the DBA can simply tell the system administrator about all of the changes required, rather than discovering issues one at a time and having to go back and forth to have them resolved.

¹ Please see the User Guide for complete information on supported products and operating systems

PATCHING AUTOMATION

Database vendors produce a continuous stream of patches, some that address defects and many that plug security holes. Keeping up with security patches is particularly important because the database is the primary home of the valuable data that hackers most want to access.

Keeping up with patches has traditionally been a tremendous chore. In multi-vendor environments, the problem is multiplied, and different patches for each operating system must also be applied, frequently using different methods. Vendors have even been known to change their patching methodology from one patch to the next. In addition, keeping track of which systems have and haven't been patched can be difficult.

BMC Database Automation tackles the challenge of patching head-on. The patch level of each database is discovered, even for systems that were patched manually. Once this patch information is known, BMC Database Automation automatically determines which patches need to be applied to each target database and allows operators to easily patch targets on an immediate or scheduled basis. The solution's knowledgebase includes known patch conflicts and dependencies, so users don't have to track these manually.

BMC Database Automation can deploy patches to multiple databases in one operation, and each patch's workflow can be customized with extra steps for operations, such as stopping/starting application services, checking application-specific properties to decide if a patch should be applied, disabling monitoring services before the patch begins, or any other user-defined activity.

BMC Database Automation also supports rolling patching to minimize downtime in cluster configurations, as well as "in-line patching" (which allows the provisioning of a new database to automatically include installation of patches) and rollback of patches.

The result is fewer errors, improved consistency, and reduced downtime because the database is offline only as long as it needs to be (it doesn't have to be down while a DBA is reading instructions or getting help, which can happen when patching manually). BMC Database Automation also helps organizations maintain compliance with the many regulatory standards that require patching be kept up to date.

USER-DEFINED OPERATIONS

In addition to the core provisioning and patching capabilities of BMC Database Automation, users can extend the product's capabilities to support automation of nearly any kind of database administration task using *Actions*. Actions are user-defined operations that can handle very simple or highly complex tasks. Typical examples include:

- » Changing database passwords
- » Changing database configuration parameters
- » Activating/deactivating user accounts
- » Creating backups
- » Deploying a PL/SQL package
- » Performing migrations
- » Deploying or upgrading security agents
- » Setting permissions
- » Controlling replication processes
- » Checking for compliance

Actions can be applied to one or more nodes, databases, or instances on a real-time, scheduled, or recurring basis and are provided with the context necessary for database tasks, such as the home, SID, and other database-related parameters. Actions are fully logged, which makes them easy to troubleshoot and audit.

ACCESS CONTROL AND LOGGING

BMC Database Automation employs a comprehensive role-based access control system to ensure that only authorized users are making changes to databases. The database environment can be segregated into hierarchical *domains* based on business organization, geography, vendor, or any other user-defined criteria, and granular control of all BMC Database Automation features can be enforced down to the individual domain level. All activities are logged for audit purposes.

SUPPORT FOR CLOUD DATABASES

Database automation is a critical component in a complete cloud solution. BMC Database Automation extends BMC Cloud Lifecycle Management to instantiate, patch, configure, and maintain database servers per user specifications and comply with enterprise policies — from initial provisioning to service retirement.

By enabling self-service full-stack provisioning, the integration of BMC Cloud Lifecycle Management and BMC Database Automation lets business units focus on defining their particular standard for cloud database services. Because BMC Database Automation has the know-how to successfully execute the user request, enterprises can maximize their return on investment in cloud automation.

CONCLUSION

Automation is the key to maintaining predictable and repeatable processes for database administration. BMC Database Automation supports the full database lifecycle — provisioning, patching, upgrading, and de-provisioning — giving you complete control over standards for configuration and process along the way.

Major corporations in data-intensive industries, such as financial services, pharmaceuticals, energy, and telecom, rely on BMC Database Automation to automate cross-platform provisioning and patching of their business-critical databases, lowering costs and improving time to market for database-dependent applications.

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. Visit www.bmc.com for more information.

