Automating and standardizing cross-domain IT processes

By Hal Clark

The combination of Dell™ Advanced Infrastructure Manager (AIM) and BMC Atrium® Orchestrator enables the creation of automated, standardized processes while facilitating communication and consistency across specialized IT teams.

Dell Advanced Infrastructure Manager (AIM) enables the rapid, flexible deployment of OS instances on servers, storage, and hypervisors. In IT, just as in Formula One racing, an increase in speed usually necessitates an increase in control. As Dell AIM enhances the ability to deploy operating systems to help meet the needs of the business, integration with BMC Atrium Orchestrator offers control over configuration of those operating systems as well as the applications deployed on them—helping organizations to overcome the challenges of IT silos by automating and standardizing processes across the infrastructure.

Addressing the challenges of IT silos

When IT departments reach a point where specialization becomes necessary, the resulting teams can often become siloed. Skills are concentrated, and because tasks are no longer shared, each team develops its own unique processes and procedures. The goal of a well-run IT department should be to bring these silos back together and leverage the skills that exist in other teams. IT maturity initiatives like IT Infrastructure Library (ITIL) provide guidelines that make consistent communication across silos possible, but implementing these best practices can be challenging.

One of the most significant IT trends over the past several years has been utility computing—also referred to as grid computing, on-demand computing, adaptive enterprise, and agile IT. Regardless of the specific term, the goal that characterizes these initiatives is “lights out” data center automation, in which IT resources are...
dynamically linked and delivered in a real-time, as-needed fashion, with higher-priority services receiving a higher preference.

Technological innovations like Dell AIM have brought this idea closer to reality. But despite the promise of dramatic operating efficiencies, the final goal has not yet been realized. The key question is not so much why this is the case—but rather whether this is a technology problem at all.

The implementation of a data center automation technology is necessarily a new project, entering an environment replete with existing automation solutions of various scopes. IT is, by definition, the realm of tool builders and tool users. Bringing a new tool—a new automation solution—into this environment precipitates a series of scoping and integration activities. Regardless of how capable the new automation solution may be, there will always be another piece of the puzzle, another domain, that is beyond the scope of this new tool.

The challenge and opportunity of utility computing is therefore to maintain proper procedural control and operational integrity within this web of tools and the processes that link them. In other words, the real question is not whether utility computing can be implemented, but rather whether it should be implemented—and, if so, how and under what circumstances. Because a significant source of service failure relates to change activity, both planned and unplanned, it’s no wonder that so many organizations have been reluctant to pursue the potential benefits of a dynamic computing infrastructure.

**Connecting people, processes, and technology**

In conjunction with Dell AIM, BMC Atrium Orchestrator can help organizations take the next step toward making these benefits a reality. It is a flexible, programmable distributed rules engine that coordinates work across different IT domains—connecting people, processes, and technology and encompassing the “paperwork process” of business workflows like change management and approval, technical processes like server and storage management, and even scripted tasks. It automates the interaction of discrete IT configuration tasks with enterprise process management frameworks like incident ticketing or change control processes.

The workflows of connected people, processes, and technology in BMC Atrium Orchestrator are called run books. Run books are executed and managed within the BMC Atrium Orchestrator scalable grid architecture. The grid provides load balancing and high availability for the sequencing and execution of run book processes over disparate networks, and also serves as a repository and revision tracking system for run books.

Administrators can create and manage run books through the BMC Atrium Orchestrator Development Studio application. Instead of writing code or maintaining scripts to automate IT activities, run book developers can use Development Studio to manipulate processes in a graphical paradigm that uses icons to represent external systems, tasks, or decision points (see Figure 1). They can drag and drop process elements into the appropriate order and then manipulate the process flow in detail with the simplicity of a visual flowcharting exercise.

BMC Atrium Orchestrator can also quickly import existing scripts and incorporate them into a workflow, enabling reuse, a high level of change control, and quick integration of each team’s scripts into a library of actions that can then be used throughout the IT environment. IT teams...
can share their domain-specific skills in a common library of reusable components and still link their activities to incident and problem management systems, change management systems, and other service management systems. Included prebuilt adapters for leading service desk solutions like the BMC® Remedy® suite enable IT organizations to automate routine, labor-intensive, error-prone tasks by leveraging systems, applications, and tools across silos in the operations environment—from trouble ticket and fault management to performance monitoring to virtualization management and more.

**Understanding the BMC Atrium Orchestrator architecture**

Architecturally, BMC Atrium Orchestrator is a distributed rules engine (see Figure 2). Each peer is a node in a distributed grid, and peers can be distributed across the enterprise or around the world. Multiple types of peers are available, depending on infrastructure or process requirements:

- **Activity Peer (AP):** The AP is the workhorse of the grid, handling workflow processing load distribution. It accepts and executes workflows and hosts external application adapters, providing both the core workflow engine and a Web container. An AP joins a grid on startup to communicate with the other peers.

- **Configuration Distribution Peer (CDP):** The CDP is the overall configuration manager for the grid, housing the Grid Manager application and managing overall distribution of software components to the peers across one or multiple grids. The CDP provides the same types of services and capabilities as the AP, and provides a central point of administrative control and content distribution for the distributed grid components. The CDP also centralizes, stores, and distributes configuration information and content. When a fault affects a CDP, the grid automatically selects another AP to take over the CDP role within the grid—a form of standby failover in a multi-peer grid.

- **High-Availability Configuration Distribution Peer (HACDP):** Although it is possible to deploy multiple CDPs, the usual approach is to deploy them in a high-availability configuration in which the peers mirror each other. The HACDP is not idle and participates in workflow execution, so it provides high availability and load distribution for the grid in which it participates.

- **Lightweight Activity Peer (LAP):** The LAP is installed on a third-party system server and extends the grid communication to that system, which is useful when a third-party system requires an adapter to execute locally, or when the adapter requires libraries in a third-party application whose libraries cannot be installed outside of that application. Unlike the other peer types, the LAP does not execute workflows.

- **Access Manager:** Access Manager is an identity manager that provides single

![Figure 2. BMC Atrium Orchestrator architecture](image-url)
sign-on services as well as authorization policy administration and enforcement. It also provides an interface to manage configurations with external Lightweight Directory Access Protocol (LDAP) directories.

- **Repository:** The repository stores content such as adapters and modules, which is then available to multiple users through either Grid Manager or Development Studio. It also maintains revisions of workflows throughout the development process.

- **Grid Manager:** Grid Manager resides on the CDP and provides a user interface to add and maintain grids, peers, adapters, and process schedules. It also enables administrators to manage module deployment and activation. Multiple databases can be configured to store audit records, grid metrics, process metrics, and business metrics.

- **Development Studio:** Development Studio is a stand-alone application supported on Microsoft® Windows® and Apple Mac OS X operating systems in which administrators can design, develop, and test workflows as well as manage workflow rules, schedules, and configuration. It can use the grid repository to access and store content. It also supports source code management systems like Subversion and Concurrent Version System (CVS), including integrated check-in, check-out, and authentication.

- **Operator Control Panel:** The Operator Control Panel provides an interface for monitoring workflow operation or manually initiating a workflow. It is often launched in context by applications initiating workflow actions to visually show the workflow execution progress. An inherent capability of workflow execution in the BMC Atrium Orchestrator architecture is the ability to operate the same workflow semiautomatically or fully automatically; administrators can use the Operator Control Panel to interact with the workflow at decision points where the workflow suspends in semiautomatic operation awaiting operator input.

Workflows in BMC Atrium Orchestrator consist of processes bound by conditional logic and connected to external systems. Processes can be complex or simple. A simple process can involve converting a date or sending an e-mail message. A complex process can contain several different types of processes:

- **Nested or called processes:** These processes reuse the functions of another process, and are used when one process is inserted as a set of functions within another process. A process within one module can call processes from other modules.

- **Processes exposed as Simple Object Access Protocol (SOAP):** These processes are used to service requests to execute processes. Web services are a core component of BMC Atrium Orchestrator, and any process can be exposed as a SOAP Web service; administrators can then use Development Studio to automatically create processes based on a Web service’s Web Services Description Language (WSDL) document.

- **Operator processes:** These processes run at the Operator Control Panel and require interaction with an operator.

Because BMC Atrium Orchestrator is designed to bridge technologies, it also comes with a library of adapters—pieces of code that run on the grid and can be called by workflows to interact with external systems. Monitor adapters make a passive connection to an external system to receive stimulus inputs that can then automatically initiate workflows based on selective criteria. Actor adapters enable workflows to execute actions in external systems and retrieve responses from directed actions.

Base adapters for Simple Network Management Protocol (SNMP), Secure Shell (SSH), command-line interfaces, Web services, Simple Mail Transfer Protocol (SMTP), Java Message Service (JMS), and other connective technologies are also available to meet specific integration requirements. Application adapters are more complex components that link to higher-level systems like BMC Remedy Service Desk™.
Microsoft Active Directory® or VMware® vCenter™ software. Application adapters are built from base adapters, but include the programmatic logic necessary to abstract the complex tasks that exist within an application platform into a common set of processes that can be called within a workflow. For example, the application adapters for VMware vCenter and Solaris Zones expose operations specific to each environment for the abstract "Create VM" actions called within a workflow. An IT team that supports a virtual infrastructure based on Solaris Zones could codify their virtual machine provisioning processes into a workflow. Then, rather than creating a new workflow to perform the same tasks in their VMware environment, they could simply connect the same workflow actions to the vCenter adapter for specific configuration items that utilize this interface.

Integrating Dell AIM with BMC Atrium Orchestrator

Dell AIM offers rapid reprovisioning and sophisticated disaster recovery capabilities on physical or virtual infrastructures. It manages pools of compute, storage, and network resources that can be assigned to operating systems and application images to create personas—server environments that are captured on disk, including the OS, the optional AIM agent software, the application software, and the network and other settings required to run an application on a server in the AIM environment. Personas are typically stored in a central repository and are not tied to a particular piece of infrastructure, which enables them to be easily reassigned to another server resource through retargeting. This process includes stopping the persona, assigning another server to run the persona, booting the reassigned server into the OS image corresponding to the persona, and reconfiguring the persona and its connectivity.

Although AIM can offer significant immediate value to server administrators, storage and network teams may have processes and procedures in place that hamper them from taking advantage of these new capabilities without significant change. The more specialized each group becomes, the more difficult it is to take advantage of tools that bridge the gaps between IT silos without integrated processes.

BMC Atrium Orchestrator workflows can be modified to incorporate calls to the AIM application programming interface (API) to perform AIM operator tasks such as creating, deleting, and retargeting personas to perform storage and network configurations when called from change management systems like BMC Remedy. Change management represents the “people-to-people” workflows that help ensure that IT operations run smoothly. Server, application, storage, network, and even business stakeholders can be made to participate in these workflows.

Moving toward holistic utility computing

Properly implemented, automation can help eliminate repetitive, manual, error-prone tasks and help ensure the consistency and repeatability of complex, cross-domain processes. As enterprises adopt IT maturity initiatives like ITIL, the processes that drive businesses become clearer and the necessity for cross-domain cooperation becomes more pressing than ever. The imagined future of a “lights out” data center may still be possible—but people will still play a big part in that future. Solutions like Dell AIM and BMC Atrium Orchestrator can help organizations make the next step toward a holistic utility computing model.

Hal Clark is a senior solutions marketing manager for process automation at BMC Software, and has many years of experience in defining IT processes and organizational transformation for effective use of automation.

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BMC Software: bmc.com