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white paper

REINVENTING WORKLOAD AUTOMATION WITH SOA





REINVENTING WORKLOAD AUTOMATION WITH SOA

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Abstract

Although typically thought of as an artifact of legacy computing, batch processes remain vital to today's real-time enterprises. Behind the real time systems that power the real time enterprise, such as customer order fulfillment, account management, supply chain scheduling and optimization, or financial trading systems, are regularly-updated back office business systems. Over the years, batch technology has evolved from script-based automation to rules or policy-driven workload automation. By leveraging Service-Oriented Architecture (SOA), enterprises can evolve batch workloads from standalone data center operations to components that are intrinsic to composite, Service-Oriented Business Applications. CA's move to extend their AutoSys workload automation product by embracing SOA best practices and Web Services is an important step in transforming workload automation from its roots as an IT operations scheduling aid to a dynamic, business-driven process.

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I. Batch Processes and the Real Time Enterprise

During the height of the dot.com bubble, the conventional wisdom was that the Internet was supposed to change everything in business. Although the Internet helped enterprises forge new connections to business partners and customers alike, it did not change the fundamentals of conducting business or managing IT systems. Similarly, today's ascendance of the real time enterprise has not eliminated the need for effective batch processing.

Behind the real time systems that power the real time enterprise, such as customer order fulfillment, account management, supply chain scheduling and optimization, or financial trading systems, are regularly-updated back office business systems. Today, batch processes remain essential for one key reason: it is simply not efficient to regenerate a complete forecast or business plan every time the business processes a single event such as an incoming customer order. Real time enterprises do require systems that can support dynamic processes; however, it is best to reserve that capacity for aspects of data or processes for the most volatile high-velocity markets.

Nonetheless, while the need for batch processes hasn't changed, the nature of batch processing today has certainly evolved. For instance, while scheduled batch processes remain relevant for time-related processes such as end-of-period reporting, real time enterprises may require more flexibility for adapting to temporary or permanent market fluctuations, or to planned or unplanned changes in underlying IT infrastructure. New requirements for managing compliance with increasingly stringent regulatory mandates may dictate the need for policy-driven workflows with the capability for dynamically triggering batch processes when specific scenarios arise. For instance, a Sarbanes Oxley violation might trigger a rollback and new round of updating core financial systems outside of the normal schedule.

Service-Oriented Architecture (SOA) presents enterprises with the opportunity to expose information and processes as self-contained Services that can communicate and interoperate with each other in a standard, loosely coupled fashion. Although the common impression is that Services expose business processes, data processes, or application functionality, they are also well-suited for exposing the very processes that drive batch-oriented workloads. SOA enables the business to build flexible compositions of Services that implement either business or IT processes in a loosely coupled manner, which has important ramifications for IT service delivery, and the batch processes that are part of it.

In the real time enterprise, today's batch operation is morphing from a static, often standalone process to a dynamic component of an application or composite business process. Ultimately, SOA provides the architectural underpinnings that bring this vision to fruition: By invoking batch processes as a

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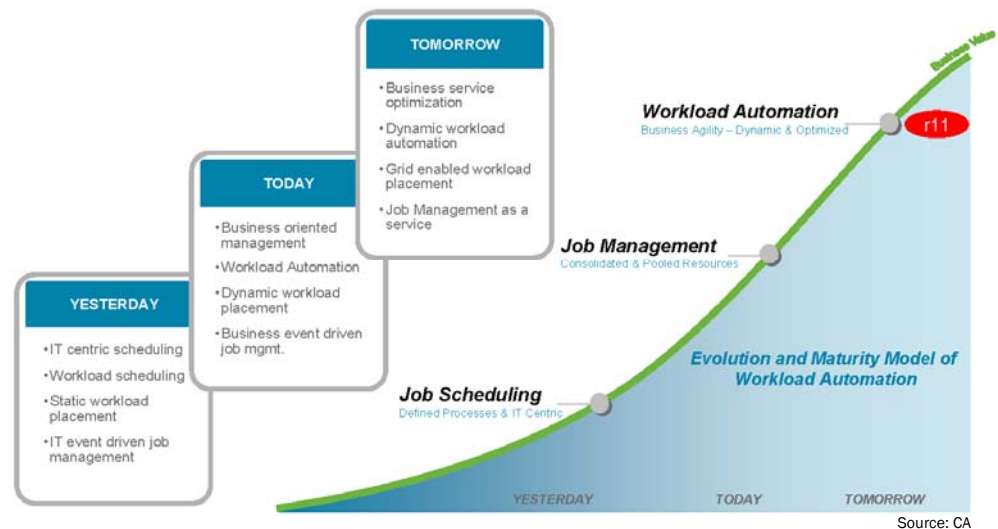
Workload automation is the culmination of innovations in job automation, adapting it to the needs of the real time enterprise with policy-driven, configurable workflows.

Service, they become ingrained components of the composable business processes that power the real time enterprise.

The Batch Evolution

Although not highly visible, batch jobs have remained the lifeblood of large enterprises, automating the execution of high-volume, I/O intensive processes such as running payroll, regenerating MRP, or performing end-of-period financial consolidation. IT has long sought to automate the running of batch jobs, initially with tools that automatically chained them together in a schedule. As batch windows shrunk, IT organizations embraced *job management* technologies enabling them to optimize their use of limited resources over shorter timeframes. As shown in the figure below, *Workload automation* is the culmination of innovations in job automation, adapting it to the needs of the real time enterprise with policy-driven, configurable workflows. Compared to traditional job automation methods, configurable workflows are far more flexible and maintainable.

The Evolution of Workload Automation



Workload automation is the key to making the batch window a first class citizen of the real time enterprise, which dictates expanding the role of workflow automation from an IT to a business-driven tool. Consequently, the goal of workload automation changes as well. Instead of IT optimizing its own data center update workflows, applications or business processes are now in the driver's seat, triggering workloads when specific business events or scenarios occur. This requires a business process-focused workflow engine for job automation, and a business rules engine for enabling policy-based workflow management.

In a business-driven workflow, requests from applications, database stored procedures, or business processes trigger workloads (which may consist of one or more batch jobs) as a result of explicit business rules or policies. For instance, when order activity for a particular product SKU occurs, the following rules could be used to automatically trigger new workloads:

- If a handful of unexpected orders arrive, alter shipment schedules, but do not change supply chain plans.
- If there is an unexpected run on the product, generate a new demand forecast.
- If the run causes actual or potential product shortages, regenerate inventory, procurement, distribution, and demand plans.

Under these scenarios, workloads no longer strictly focus on optimizing database updates in the data center. Instead, they have become intrinsic components of demand-driven supply chain business processes. Here, use of a rules-based approach that triggers event-driven workloads enables the manufacturer to execute on its strategy to satisfy customer demand and eliminate potential openings for rivals without expending unnecessary compute and I/O cycles.

The increasing embrace of virtualization further extends the power of workload automation. Hypervisors are enabling organizations to allocate compute cycles where needed, while virtualization of networked storage enables organizations to commandeer available capacity. For the supply chain example cited above, organizations could carve additional capacity from existing resources by creating or expanding virtual server containers and storage resources whenever demand spikes for a strategic product introduction, such as the recent rollout of the Apple iPhone.

Impact on IT Service Management and Compliance

There is little secret that IT is under greater pressure to demonstrate the value that it delivers to the organization. Increasingly, IT organizations are expressing that value through the ability to meet service level agreements (SLAs). IT Service Management (ITSM) is an emerging discipline that IT organizations are applying to standardize best practices in delivering IT service to the business. Increasingly, IT organizations are mapping their service management and service delivery processes to the ITIL framework.

Workload automation is one of the tasks that enable IT to meet its service commitments. For instance, because workload automation can help ensure that IT utilizes batch windows in a consistent and efficient manner, it can enable IT to successfully complete jobs, in spite of competitive pressures for maintaining 24 x 7, always-on strategies that compress windows for batch operations. Workload automation also helps IT organizations meet key governance and compliance mandates focusing on data freshness. By consistently executing data refreshes and documenting that it occurs at prescribed intervals, organizations can prove that they are always working with current, reliable data.

The Contribution of SOA

SOA is all about exposing information and processes as self-contained Services that can communicate and interoperate with each other in a standard, loosely coupled manner, enabling the business to build flexible compositions of Services that implement business processes. Ultimately, SOA enables IT to more effectively align with the business, because it changes the way IT delivers the solutions. The self-contained nature of Services and the standard connectivity empowers IT to rapidly compose solutions by reusing existing Services, resulting in faster time-to-benefit compared to traditional ways of developing, modifying, and integrating conventional, monolithic software applications.

Although typically associated with functionality that is exposed from software applications and/or composed business processes, SOA can also expose IT

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SOA enables IT to more effectively align with the business

SOA can expose IT infrastructure processes such as workload automation as Services.

infrastructure processes such as workload automation as Services. Using SOA, business events trigger specific job types. In effect, the job becomes part of a composite, Service-Oriented Business Application. The SOA infrastructure coupled with the standards used in implementing SOA facilitate a true loose coupling where business logic, business, rules, and job specifications can each change without impacting the other components. For instance, the workload automation system could invoke a batch update Service as a result of BI system triggering a scheduled ETL (extract/transform/loading) operation to a data warehouse. If the user changes their ETL system itself or some of the transformation routines, that change is kept internal to the ETL Service and should not impact the Workload Service.

II. CA AutoSys Workload Automation Solution

CA AutoSys automates workloads in distributed environments with an advanced, policy-driven engine that can incorporate them as part of a larger business process. CA AutoSys is part of CA's Enterprise IT Management (EITM) vision for higher-level management control, which integrates control of all facets of IT infrastructure to optimize business Services. Key capabilities of CA AutoSys include:

- A Web-based visualization & administration portal that provides views of business processes across multiple platforms
- Configurable real time views
- Business, rather than machine-centric job flows, providing views of batch jobs that are mapped to specific business processes
- Dynamic job control, where administrators can manage and schedule event and calendar-based scheduling, and group related tasks into a single job stream that simplifies management
- Dynamic workload orchestration, providing support of critical path analyses and closed-loop automated monitoring
- Role-based access, based on embedded technology originally developed for CA's Identity and Access Management Suite (IAM)
- Integration with SAP, Oracle, and PeopleSoft enterprise applications, enabling jobs to be managed as part of specific application processes, and operators to manage ERP workloads from a central point.

Key Capability: Service-Oriented Solution

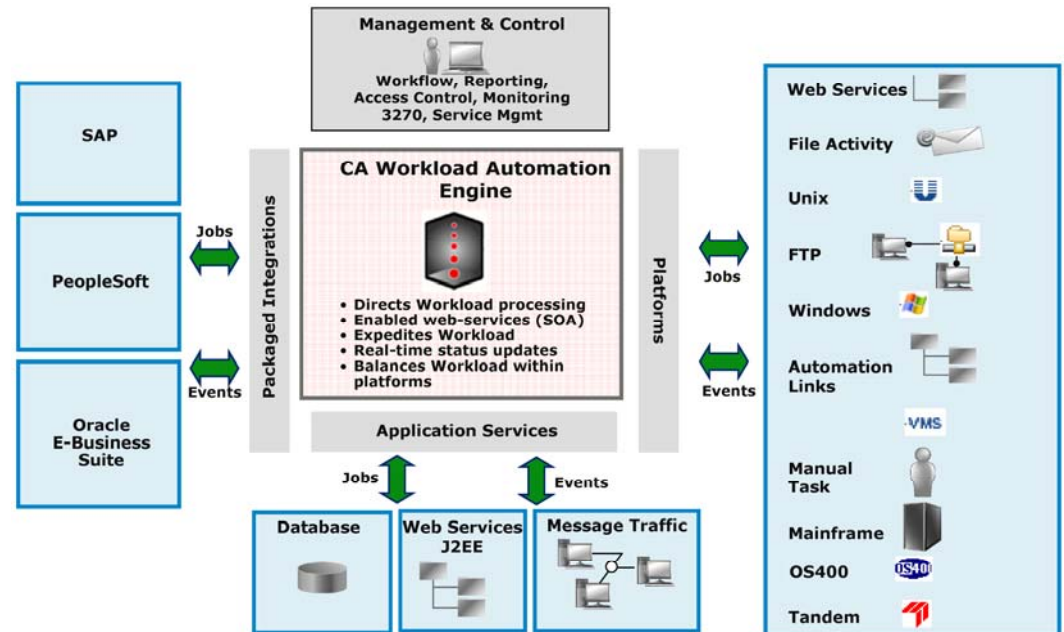
CA AutoSys supports Service-Oriented Automation by exposing workload management as a Service. Specifically, it exposes workload processes as Web Services that external systems can invoke through Service requests, and in turn, can also invoke external Services. By supporting SOA at its customers, CA AutoSys can interoperate with any third party Service-oriented application without need for development or maintenance of custom APIs.

The CA Workflow Automation engine forms the heart and brains of AutoSys. Directing all workload processing, the automation engine directs and balances workload processing across targeted platforms, and provides real-time updates regarding job and workload status. It supports SOA in several ways, by exposing batch workflows as Services and, in turn, with its ability to submit Service requests to external sources. Service requests for workload processes may originate from a variety of sources, some of which include databases, enterprise

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applications, or middle-tier servers, FTP requests, or other automation links. CA's Workload Automation Architecture is shown in the figure below.

CA Workload Automation Architecture



Source: CA

CA's Service-oriented automation adds significant flexibility to the management and execution of batch workflows. Some scenarios could include:

- *AutoSys invokes a Web Service from an external application.* For instance, if an SAP update exceeds the allotted batch window, AutoSys can request a Service from an IT service-level management system to register an exception, and depending on severity or frequency of occurrence, request that the service desk open a trouble ticket.
- *External applications request a batch workflow.* Enterprise applications such as PeopleSoft or Oracle can request that AutoSys initiate a batch workflow, where the entire workflow is wrapped as a Service.
- *Executing conditional workflows.* AutoSys can expose an entire batch workflow, or individual or groups of steps within it, as individual Services. For instance, a rule can specify different AutoSys Services, based on whether specific steps in a job succeed. If a step fails, AutoSys could request Services for utilities that transmit notifications, migrate data to alternate targets, restart the batch update, and then dispatch acknowledgements of job completion. Or, depending on the severity of the failure, it could send a request to a Service Desk to open a trouble ticket as part of an ITIL formal service management strategy.

The result is that support of Services that customers can incorporate in their SOA initiatives yields several valuable benefits. For instance, it enhances the ability to handle branching logic. Although branching such as the pass/fail scenarios can be hard-coded, exposing conditional logic as distinct, loosely-coupled Services makes the logic far more modular, and as a result, more maintainable and

Support of SOA enables AutoSys to embed workflows within third party applications and vice versa.

reusable. For instance, when the criteria for operation failure changes, revisions only occur inside event definitions, rather than the entire batch process or workflow program. Furthermore, if the organization adds new severity levels to failure, those changes only change event definitions, but do not impact related Services such as event notification. Finally, support of SOA enables AutoSys to embed workflows within third party applications and vice versa more seamlessly, compared to traditional APIs that involve exchange of data and acknowledgements through rigid command line interfaces.

III. The ZapThink Take

Batch processes, associated with the dawn of enterprise computing, remain just as relevant to the present-day real time enterprise—clearly not your father’s job scheduling. Yet the objective has changed. Instead of optimizing time windows or resource consumption in the data center, today the mission of batch processing has broadened its support of the business. The goals could include accelerating responsiveness, improving corporate transparency, and enabling IT to adopt a more business-centric and compliance-driven approach to managing its own operations.

The key to achieving these goals is consistency and agility. With traditional, hard-coded or manual approaches, ensuring uniformity of batch processes was often a hit or miss proposition. Batch, and its successor workload automation, has evolved over time, with the latest innovations adding policy or rules-driven workflows that transform batch jobs into repeatable workflows. With SOA-centric capabilities, CA AutoSys has brought batch automation to the next level, providing the ability for organizations to weave batch workflows directly into their business applications and ITIL processes with the degree of flexibility not otherwise possible with traditional hard-coded approaches. For instance, via Service enablement, workload automation can become extensions of applications ranging from supply chain management to IT service desk. Long a stepchild of data center operations, workload automation transforms into a first class citizen of the real time enterprise.

Embedding workload automation as a Service could also encourage cultural changes that bring together IT operations, software development, and the business. Typically, batch jobs are either scheduled or “thrown over the wall” from the business to operations. When batch workloads or workflows exposed as Services become extensions of the application, developers who design or configure the application can now factor in the demand on IT infrastructure by specifying the logic or rules under which enterprise systems can request batch Services.

CA’s move to extend AutoSys by embracing SOA is an important step in transforming workload automation as a dynamic, business-driven process from its roots as an IT operations scheduling aid.

CA’s move to extend AutoSys by embracing SOA is an important step in transforming workload automation as a dynamic, business-driven process from its roots as an IT operations scheduling aid. CA AutoSys’s current support of SOA best practices, including support of Web Services standards SOAP and WSDL, are the first steps in the binding of the batch process aspect of IT operations into the business. Future steps, including incorporation of a full-blown rules management engine and enhanced federated identity and entitlements will enable customers to embed workload management as an intrinsic part of their business processes.

Today, rules can drive specific AutoSys workloads. On the horizon, CA plans to extend that capability to drive workflows, and to embed a full rules management engine that will enable customers to apply business rules and policies for driving batch workflows. Similarly, CA AutoSys currently supports role-based access and

entitlements through embedded capabilities that originated from CA's IAM technology. In each instance, Service-orientation could increase agility and the ability for stakeholders, inside or outside the enterprise, to collaborate.

For example, enterprises that play in extended, virtual supply chains that employ practices such as vendor-managed inventory could use a Service-enabled policy engine to drive AutoSys workflows when scenarios, such as sharp, unexpected spikes in product demand, dictate regeneration of forecasts. Support of Service orchestration could further enhance flexibility and agility. For instance, should an organization face compliance questions, policy-driven orchestrations could drive the degree to which specific batch operations are executed and in which sequence, including rollbacks to a specified mix of transaction systems and updates to auditing systems.

Finally, Service enablement of CA AutoSys is wholly consistent with CA's EITM strategy. Seeking to align IT infrastructure management with the business through integration and sharing of management processes, CA's EITM vision is to eliminate the functional silos that divide IT operations and isolate it from the rest of the enterprise. SOA is essential to liberating batch operations from their functional silos, and intertwining them as components of the enterprise applications and business processes that they are intended to support.

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ZapThink provides market intelligence to IT vendors and professional services firms that offer XML and Web Services-based products and services in order to help them understand their competitive landscape, plan their product roadmaps, and communicate their value proposition to their customers within the context of Service Orientation.

ZapThink provides guidance and expertise to professional services firms to help them grow and innovate their services as well as promote their capabilities to end-users and vendors looking to grow their businesses.

ZapThink also provides implementation intelligence to IT users who are seeking guidance and clarity into the best practices for planning and implementing SOA, including how to assemble the available products and services into a coherent plan.

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