

STRATEGY PAPER

Workload Automation and Job Management for Mainframe

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Product direction

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Introduction

We hear it all the time: Do more with less! It has become the mantra of the past decade, particularly in Information Technology. We are constantly falling victim to budget cuts and restraints; meanwhile, business continues to grow, new applications are being added all the time, technology continues to change and we find it increasingly difficult to keep pace with it all.

At CA Technologies, not only do we hear you, but we understand how this can adversely impact your day-to-day activities. We also understand that this is an opportunity for us to provide you with the right tools and solutions to help you address these challenges.

The Workload Automation solution from CA Technologies automates and controls complex workloads, in real time, across multi-platform environments to initiate data processing as well as help provide that appropriate resources are available. All Workload Automation products can provide enterprise capabilities from a single point of monitoring as well as management. The benefits of a single product are many, including an end-to-end view of a business application, regardless of the operating systems and ERPs it may span. You also gain benefits from enterprise critical path analysis, enterprise reporting and forecasting, single security and access control, and a single, simple-to-use scheduling repository to maintain and train personnel on. This all translates to simplifying your workload automation environment, saving money on hardware needs, and more consistently meeting your service level agreements by using the advanced features and automation methods in CA Workload Automation.

The intent of this document is to identify the strategic direction for the mainframe-hosted enterprise solution as CA Technologies moves forward in our commitment to the workload automation discipline and the support of new technologies. It will discuss how our solutions can help you simplify your environment and use your workload product to streamline your application lifecycle.

Strategic direction

CA Technologies distributes, supports and enhances four products that assist customers in achieving their enterprise goals: CA Workload Automation SE, CA ESP Workload Automation, CA Jobtrac™ Job Management (CA Jobtrac JM) and CA Scheduler® Job Management (CA Scheduler JM). As part of the strategy, a distinction has been made between Workload Automation and Job Management solutions from CA Technologies. As the product names imply, CA Jobtrac JM and CA Scheduler JM are being identified as Job Management solutions and CA Workload Automation SE (formerly CA 7 Workload

Automation) and CA Workload Automaton EE (formerly CA ESP Workload Automation) are being developed as Workload Automation solutions and will be referred to as simply CA Workload Automation, with customers choosing to run either the CA 7 engine or the ESP engine. Roadmaps and product strategy will describe how these solutions sets will be enhanced in the future.

The following table describes the differences between the Job Management and Workload Automation solutions from CA Technologies.

Job Management	Workload Automation
Primarily date/time driven	Business-event-drive at granular levels – changes in database values, Java messages, SAP events, file arrival, etc.
“Schedule Load” concept	Extensive resource management, both real and abstract resources
Limited dataset triggering	Wide array of workload object types to manage executable and validate environmental conditions
Minimal resource management	Mature critical path/SLA management
Traditional job types and “executables”	Application automation capabilities in emerging technology types; i.e. cloud

Choice of automation engine for a single enterprise solution

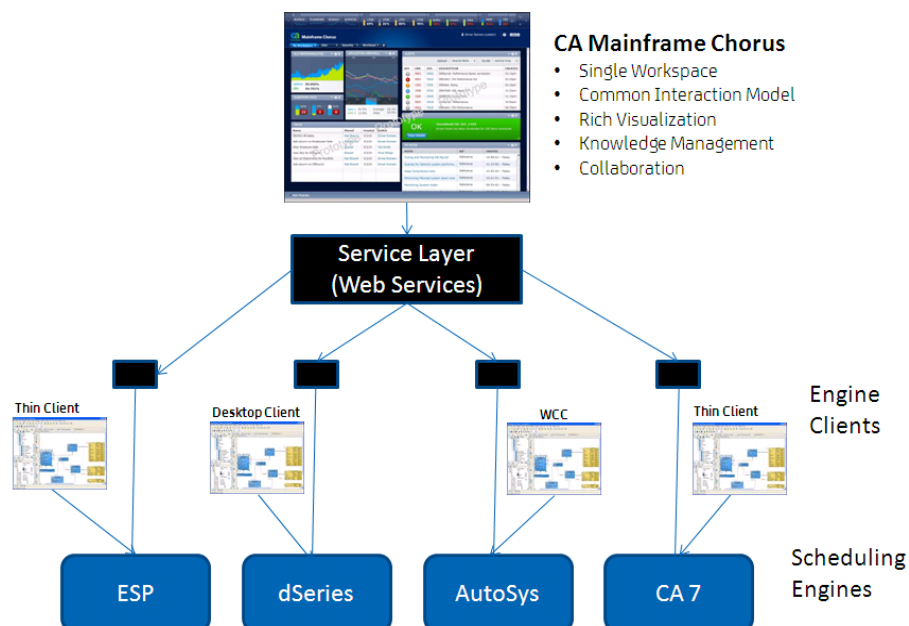
Both CA Workload Automation SE and CA ESP Workload Automation are strategic to the CA Technologies workload automation vision. These two products have different approaches to managing workload and have unique characteristics that bring different benefits to different customers. Although these two scheduling engines will remain as two unique products, the capabilities that they offer will become more similar as we continue to move forward in the realm of workload automation. Many of the components that make up CA Workload Automation will be shared by these two products as CA Technologies continues to develop the solution set. Although the method for building and storing schedules is different with each product, they will share many aspects including a common graphical user interface, the CA Workload Automation Agents, and common SOA component and integrations with other automation tools like CA JCLCheck™ Workload Automation (CA JCLCheck WA) and CA Workload Automation Restart Option for z/OS Schedulers (formerly CA 11).

A common user interface for the enterprise

In May 2010 CA Technologies announced the beta version of CA Mainframe Chorus—the new role-based workspace for the future of mainframe management. A workload automation role for CA Mainframe Chorus that will support both CA ESP Workload Automation and CA Workload Automation SE customers is strategic not only for the workload products but also for CA Mainframe Chorus itself.

FIGURE A.

Mainframe 2.0
initiative



In addition to the CA Mainframe Chorus integration, CA Technologies also will be delivering both a thin and thick client user interface for CA Workload Automation (CA 7 Edition) that will be similar to the GUI offering provided by CA Workload Automation (ESP Edition). These graphical tools, along with the support for the CA Workload Automation Agents which were added in the CA Workload Automation 11.3 release, strengthen the enterprise solution—allowing CA Workload Automation (CA 7 Edition) customers to further reap the benefits of a single enterprise solution without having to commit to lengthy, risky and costly conversions.

Continuous processing in a multi-sysplex environment

CA Workload Automation offers operational resilience and redundancy of workload processing throughout the enterprise. Today, automated failure awareness and notification orchestrate the failover of scheduling processes within the sysplex and help provide the continuous availability of business critical systems. As the costs increase for maintaining isolated Disaster Recovery (DR) systems, the demand to utilize the latent capacity in these environments becomes a financial requirement. Extending the failover capabilities of the CA Workload Automation engines to geographically-dispersed remote sysplex environments leverages this processing capacity and provides an additional and higher level availability for enterprise workload data.

Today, CA Technologies offers a very robust solution to provide continuous processing in a sysplex configuration. Our future direction entails a solution that allows the same robust capabilities to span across sysplexes. Part of this can be delivered today when it is part of the data center disaster recovery planning, but CA Technologies is looking to be able to do this in real-time, outside of the DR process, to eliminate the current lag time.

Real-time application integration – expanding beyond the data center

Traditionally designed and implemented to address the batch requirements in a data center, job schedulers were limited to date and time scheduling. With the evolution of data processing and the introduction of new applications based upon modern programming languages and facilities, the traditional job scheduler has evolved into a workload automation tool that supports not only real-time activities but also the ability to provide interoperability between legacy applications and the modern service-based applications that are now prevalent in the modern data center. CA Workload Automation provides this capability in multiple ways. The specific implementation depends upon what the end users need to achieve and how immediately they need to process the business data.

One approach is with the Service Oriented Architecture (SOA) component that is being introduced across all CA Technologies mainframe Workload Automation and Job Management products. This SOA-based implementation allows for interoperability across disparate applications by providing a set of common standards for communications and data exchange. For example, a user may have a new Web-based application for an online ordering system that ultimately requires interacting with a legacy application on the mainframe. This SOA component can be used to trigger workload on the mainframe from the Web-based application. This provides interoperability between the Web platform and the mainframe-hosted workload automation tool, providing integration between the modern day application and the legacy application.

Another approach for achieving real-time interoperability is through the use of the CA Workload Automation Application Services Agent and the CA Workload Automation Web Services Agents. The Web Services Agent allows for the invocation of a standard Web service as part of a managed workflow stream. Supporting the SOA platform as described above, this agent can achieve the same level of interoperability, but with dataflow in the opposite direction, going from the mainframe-hosted manager to a Web-based platform. The Application Services Agent allows for the managing of a business application with new job types including HTTP, EJB Session Bean, EJB Entity Bean, J2EE, JMS, JMX, MBean, Web services and database. An example includes invoking a JMX operation to Start/Stop a service in an application server. When designing a new business application, many times the application developer will be using technology such as J2EE (JMS Messages) to invoke activity. Exposing the application development team to the agent capabilities shows them that they can simplify processes through the use of CA Workload Automation to integrate with existing legacy workload. This will eliminate the amount of custom code that has to be created and reduce the amount of scripts that need to be executed and maintained.

The CA Workload Automation Web Services Agent offers a common set of services that provide access to standard workload management features. These Web services are based on industry standards and are only loosely coupled to the operating system, programming languages, or any specific platform technology. This essentially abstracts the application data and eliminates the need to know the underlying platform implementation. The Web services agent also facilitates the adoption and consumption of these services by an application as necessary within your business logic.

The introduction of the CA Workload Automation Database Agent provided direct integration with database activity that allows you to eliminate the creation of scripts, files or other custom code in order to trigger workload processing. When a specific update has been detected, the agent can **immediately** trigger a job or stream of jobs. This removes the requirement of periodic polling for changes in database tables, eliminating operational and application delays, as well as unnecessary resource consumption. In addition to table changes, this agent can execute SQL queries, database monitors and database triggers and invoke stored procedures. Once again, showing the application developers the capabilities of the agent will reduce the time and effort they will have to spend on creating custom code and scripts. The CA Workload Automation Database Agent supports Oracle, Microsoft SQL and IBM DB2 for z/OS databases.

Enhanced enterprise capabilities

CA Workload Automation now has the richest array of job types and event sensors to expand the use of the underlying scheduling engine as a business-driven workload automation broker. This is largely accomplished through the use of the CA Workload Automation Agents. The workload automation integration strategy calls for these base agents to become the standard solution for enterprise workload automation across all CA Workload Automation products. Work has been done to integrate these with each WA Engine, eventually replacing the current Unicenter Universal Job Management Agents and CA Job Management Adapters, expanding the capabilities of CA Workload Automation across all solution sets.

In addition to managing the basic requirements, such as running scripts and issuing commands, the CA Workload Automation Agents introduce an abundance of new job and monitoring types that extend the reach and capability across platforms and environments. For example, these new agents introduce features that can monitor resources in real time to identify if the appropriate amounts of memory, disk, or CPU resources are available before allowing a job or string of jobs to kick off. Being able to verify that required resources are available beforehand prevents failures and potential cleanup activities later on.

Other examples include:

- Checking if a Windows Service is active before running workload that is dependent on the Windows Service
- Initiating workload immediately, based upon business activity in MQSeries, using JMS publish/subscribe
- IP monitoring can be done to determine if a server is up or if a port is active

The built-in FTP capabilities introduced with the CA Workload Automation Agent allow the managing of both secure and non-secure FTP transfers, where the agent can be configured as an FTP client of server. The advantage of this feature is that the FTP process becomes just another type of job, embedded directly into the business applications. This increases the visibility and manageability of the file transfer activity and allows for the user to track the arrival and establish due-out times, incorporating it into critical path processes and SLA management. It also gives operations the ability to know that not only did the processing execute successfully, but that the critical outbound data reached its destination successfully, something many data centers can't track effectively today. Agent-to-agent FTP activity also supports different levels of compression and check sum processing to validate delivery which is frequently an overlooked step in the workload process flow.

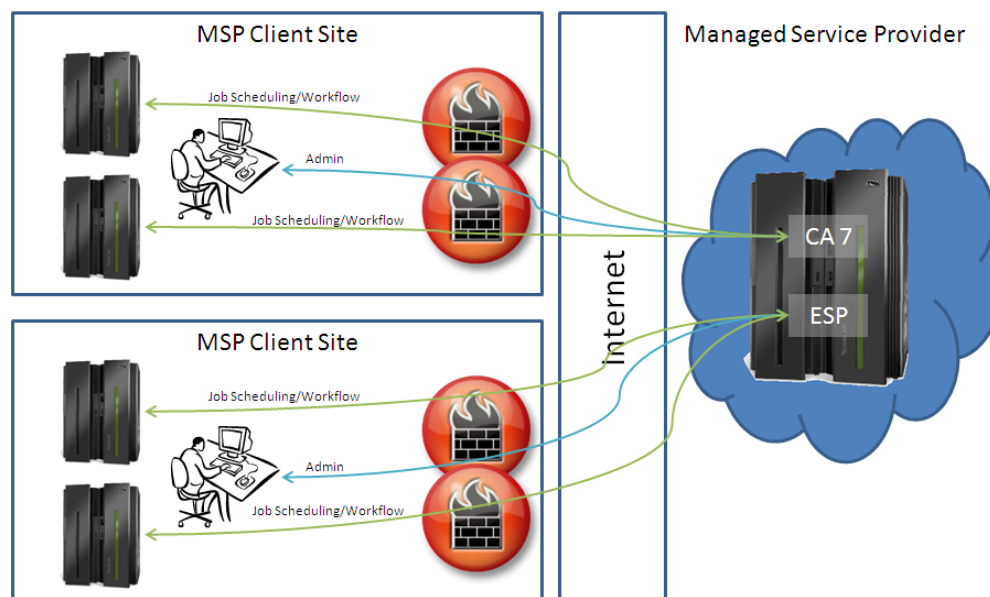
The agent technology in CA Workload Automation is enabling a new business-driven workload processing model that can reduce the overhead of scanning for data changes to occur. The business-event sensors can be passively defined to the managing engine, and sit in the background, only reacting when and IF

the data change or business activity occurs. Using this passive methodology that is enabled by the architecture of the workload automation engines, CA Technologies is reducing the overhead and resource consumption that happens today when frequent scanning occurs to detect and data change in the environment. Customers have told us that this is a significant business benefit to IT as well as the end business customer who now receives the output of the processing almost immediately.

Virtualization and cloud computing

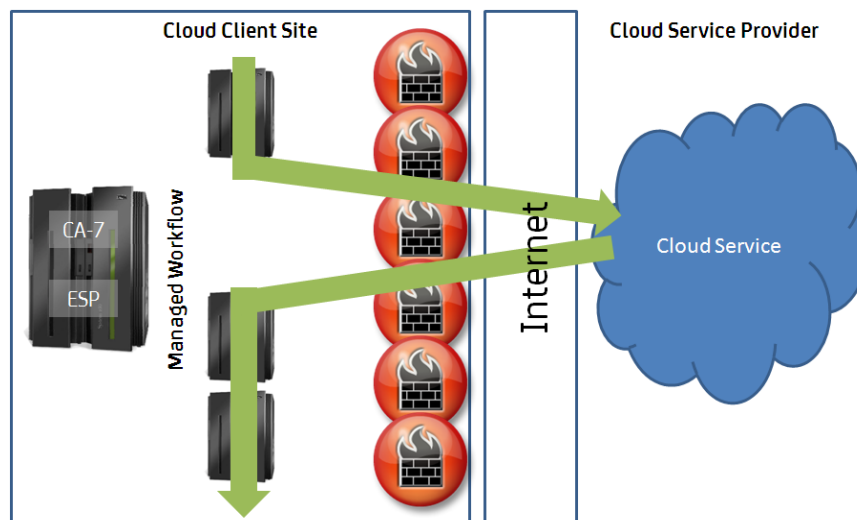
Businesses that once depended entirely on IT to deliver services now look to a mix of internal IT and external service providers to meet their needs. CA Technologies is taking this challenge head on with the development of a new product offering—a cloud-connected management suite—to make it faster and easier for businesses to manage their ever more complex “IT Supply Chain”. As cloud computing becomes more real and adoption in earnest begins, Workload Automation from CA Technologies will accommodate two separate but important capabilities. They include the ability to enable “cloud providers” to perform workload scheduling from an “off-premises” location. For example, a service provider could offer a cloud-based or SaaS version of CA Workload Automation (CA 7 Edition) or CA Workload Automation (ESP Edition) and schedule the work over the internet/VPN on a customer system(s).

FIGURE B.
Workload
Automation
as a service



Another enhancement will enable our current workload tools to schedule work outside of an organization's private cloud—in other words, a given set of workload is run outside of an organization's firewall. For example, a given workload flow leaves the “on-premise” data center and executes elsewhere (a partner, Google, Amazon, IBM, etc.) and remains synchronized as part of the local workload.

FIGURE B.
Workload
Automation –
into the cloud



By accommodating workload automation in the cloud (above), CA Technologies will enable customers to avail themselves of cloud-based capabilities as a part of their existing activities, aligning with the corporate strategy of cloud-enabled orchestration and seamless cloud integration/interoperation.

Currently, the workload engines from CA Technologies can be hosted on the mainframe, distributed or even virtual servers and are uniquely positioned to capitalize on the cloud opportunity. Some engines already support multi-tenancy in a single instance.

Mainframe 2.0 – Changing the way the mainframe is managed forever

Mainframe 2.0 is a CA Technologies initiative that combines across-the-board enhancements to our leading mainframe management solutions with new turnkey mainframe management services. This enables customers to leverage their IBM mainframes to more effectively satisfy continually growing business computing demands as they face limited technology and human resource budgets, an aging mainframe workforce, and intensifying pressure to control energy consumption.

Mainframe 2.0 capabilities are being delivered in multiple phases, spanning multiple years. The first two phases focused on delivering features that make it possible for less experienced staff to install and manage the mainframe software stack and enable mainframe sites to fully exploit the functionality of the CA Technologies software, addressing the problem of a rapidly retiring mainframe workforce. These deliverables include Electronic Software Delivery (ESD), IBM Health Checker support, a common manager for acquiring, installing, deploying and maintaining CA Technologies software, a best practices publication and support for the CA Technologies common licensing model.

In addition, maintenance for products is available through CA Recommended Service, which allows customers to obtain and install PTFs that have been validated, as a package, by CA Technologies in a real-world testing environment that includes the IBM z/OS software stack. Combining the CA Recommended Service with IBM's RSU enables the customer to have a simple and consistent preventive maintenance strategy for the platform.

Workload Automation will continue to support Mainframe 2.0, and with the next phase will provide additional functionality such as:

- CA Mainframe Chorus continues the focus on controlling costs, sustaining critical mainframe skills and leveraging the mainframe to increase IT agility. The new workspace provides an intuitive design and embedded intelligence to appeal to the next generation mainframe staff while also offering significant productivity improvements to today's mainframe experts. CA Mainframe Chorus is based on immersive research with customers to understand how they get their work done. It is designed to go far beyond the benefits of graphical user interfaces by integrating back-end products and introducing a set of features and capabilities to radically simplify management, increase staff productivity and facilitate collaboration and knowledge.
- A Software Configuration Manager that enables simpler product configuration, as well as automatic adjustments based on real-time health checks and dynamic configuration methods.
- CA Technologies plans to deliver additional CA Mainframe Chorus roles delivering incremental capabilities to address the specific functions in our customers' IT enterprises. Each role will leverage the workspace and greatly improve the efficiency of experienced and novice staff, allowing customers to leverage their entire IT staff to manage the mainframe.

Supporting new platform technologies

Keeping our solutions current in supporting new platform technologies is an important strategy for CA Technologies in order to keep products relevant as your environment embraces new technology advances. Earlier this year, IBM announced the zEnterprise mainframe server and a new systems design that allows workloads on mainframe, POWER7 and System x servers to share resources and be managed as a single, virtualized system.

One of the key capabilities that must be exploited in the zEnterprise space is around system topology management. The CA Technologies workload engines will:

- Use the capabilities provided by zEnterprise to understand the configured topology of the “zEnterprise Ensemble” and react to changes dynamically (e.g., new system is provisioned, system starts, system fails, system is de-provisioned).
- React automatically to changes in the topology. Today, there may be manual interventions required to tell the workload engine that an outboard system has failed, or that a new system has been provisioned. Since the zEnterprise firmware will maintain comprehensive knowledge of the topology and state of the systems within that topology, the workload engine should exploit that knowledge.
- Place the agents on systems as a result of them being started, rather than through some customer-initiated manual process, or enable the workload engine to schedule work on systems via some method that doesn’t require deployment of an engine-specific agent.

Another enhancement is for our solutions to leverage and exploit the IBM specialty processors zIIP and zAAP as they find tremendous benefit in offloading processing to the specialty engines, essentially freeing up MIPS on the general processor to reduce overall capacity or to delay the need for a capacity upgrade. It is important that our workload engines continue to identify opportunities to exploit this technology to continue to bring value to our customers.

Continuing to lead the marketplace

CA Technologies is committed to the future development and support of CA Workload Automation SE (CA 7 Edition), CA Workload Automation (ESP Edition), CA Scheduler Job Management and CA Jobtrac Job Management. As previously explained, certain products will be developed more aggressively, making them more feature and function rich as a workload automation solution. As a leading workload automation provider, CA Technologies will continue to work with customers to meet their changing needs. We understand how challenging and cost prohibitive it can be to have to replace scheduling and workload automation tools. CA Technologies is committed to addressing this issue and will provide tools that will help automate, simplify and reduce the risk and cost of migration to a new workload

environment. These new features will be in addition to the conversion process and migration facilities that are currently available through CA Services. Customers tell us that converting to an alternate scheduling tool has to provide significant and measurable value that is much greater than the cost, effort, and risk of converting to the new tool. No one has greater knowledge of how these tools work, and the differences between them, than CA Technologies.

CA Technologies is aware that some organizations have a degree of uncertainty surrounding the future of their mainframe environments and/or mainframe applications. While the platform continues to be of critical importance in larger enterprises, some IT organizations have a desire to migrate workloads off of the mainframe or are directing their investments in new IT infrastructure to the distributed environment. These organizations may also be evaluating re-hosting mainframe applications in distributed environments. CA Technologies is uniquely capable of supporting customers' mainframe strategy with workload automation solutions that meet the needs of those whose strategy includes transition plans. Our distributed-hosted Workload Automation solution set supports the management of mainframe workloads if you are transitioning applications and workloads to distributed platforms. The distributed products support both a stand-alone agent on the mainframe and integration with mainframe job schedulers to manage workload. We also support vendor technologies that exist for the purpose of migrating to and hosting mainframe applications on distributed platforms, such as the Micro Focus Application Migration and Modernization offering.

Conclusion

CA Technologies offers our customers a best-of-breed solution, in any configuration, that addresses operational and business needs. CA Technologies is committed to the future support and enhancement of both Job Management and Workload Automation solutions. Some products will be developed as state-of-the-art Workload Automation solutions and others will be targeted as Job Management solutions. Strategic areas continue to be the development of common UIs, exploiting new technologies, support for Mainframe 2.0 initiatives, and continuous processing in multi-sysplex environments.

The integration objectives for the Workload Automation solutions from CA Technologies are paramount in creating a cohesive end-to-end solution for IT workload management and also provide for a more common solution set across the products. This will strengthen all solution sets, providing customers with greater functionality and ease of use. With the migration programs that will be offered, customers will have the option to upgrade to the Workload Automation solution if and when they choose.

The CA Technologies advantage

CA Technologies has 30 years of recognized expertise in robust, reliable, scalable, and secure enterprise-class IT management software. Workload Automation is a key component of the Mainframe 2.0 initiative from CA Technologies to change the way the mainframe is managed forever by helping you maximize the value of our mainframe products and by providing a simplified experience and innovative solutions that deliver value quickly and flexibly.

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