A Forrester Consulting Thought Leadership Paper Commissioned By BMC Software

Industrializing IT Workload Automation

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FORRESTER®

Headquarters | Forrester Research, Inc.
60 Acorn Park Drive, Cambridge, MA 02140 USA
Tel: +1 617.613.6000 | www.forrester.com

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Executive Summary

Business and IT are interdependent and closely tied together. The use of IT business services, themselves a form of business process automation, has dramatically increased business productivity. In turn, the business side of the enterprise wants to see similar progress on the IT side: a more efficient operation and an increased ability to serve business needs. In the meantime, the IT professionals have seen their tasks become increasingly complex and susceptible to human error. This is a direct consequence of the sheer volume and diversity of business services and underlying IT infrastructure components. By masking IT's diversity and automating highly repetitive tasks, workload automation may be the key to industrializing IT operations and improving productivity while reducing costs.

Workload automation provides a single point of control and a new level of efficiency to the new constraints of planning, executing and monitoring asynchronous applications in a distributed, diverse, and complex IT environment.

BMC Software commissioned Forrester Consulting to evaluate the benefits of workload automation. To further explore this subject matter, Forrester developed a hypothesis that tested the need for automation, the issues raised by a tactical and punctual deployment of job scheduling solutions, and the benefits of a more strategic usage of enterprisewide workload automation.

In conducting an in-depth survey with 472 IT professionals worldwide, Forrester found that these companies achieved significant savings in IT operating costs by reducing manual rework and human errors, a better use of computing and storage resources by optimizing the execution of jobs, a far better service to the business by reducing application downtime and improved on-time delivery of critical data, and more agility by providing self service capabilities to the business users.

Key Findings

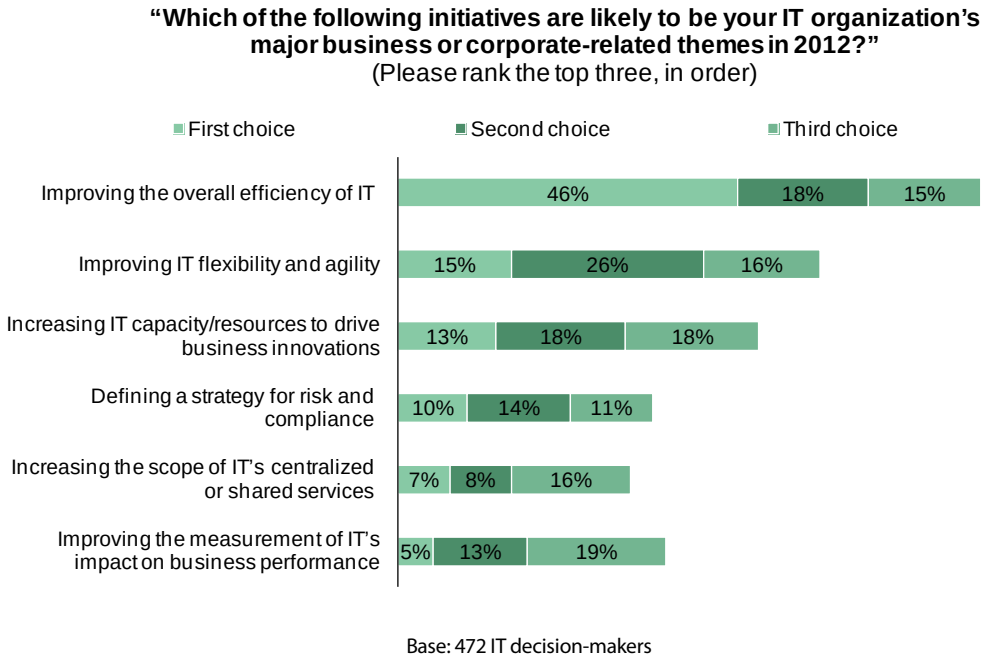
Forrester's study yielded the following key findings:

- **A majority of enterprises want a more efficient IT department.** They see automation in general and workload automation in particular as a solution to reach this objective.
- **Scattered efforts using ad hoc or embedded job scheduling solutions lead to problems.** While providing some degree of automation, the use of multiple scheduling approaches results in multiple issues: proprietary and undocumented scripts, lack of synchronization between jobs leading to errors, and an inefficient use of resources resulting from a lack of centralized control.
- **Workload automation, on the other hand, provides centralized control.** Workload controls all execution, optimizes computing storage and network resources, delivers the right data to the right user on time, and increases IT operations productivity by reducing errors and the need for manual rework.

Automation Is The Key To An Efficient IT

The omnipresence of IT services in business activities means that IT organizations are increasingly expected to perform as a trusted partner or at least as an internal service provider, with the accompanying constraints in service quality and costs expected in this type of relationship. It is then not surprising that improving efficiency is the top initiative that IT organizations are expected to tackle. Going further down into the definition of IT efficiency, there is a strong accent on agility improvement and innovation to serve the business, which requires increased IT resources (see Figure 1).

Figure 1
Improving IT Efficiency Is The Major IT Initiative In 2012



Source: A commissioned study conducted by Forrester Consulting on behalf of BMC Software, February 2012

IT organizations' answer to these initiatives is to improve productivity and implement new technologies. Actually, we believe that the two go together and that the implementation of new technologies will also help IT reach its productivity improvement goal (see Figure 2).

Figure 2
Improving Productivity Is A Major IT Objective

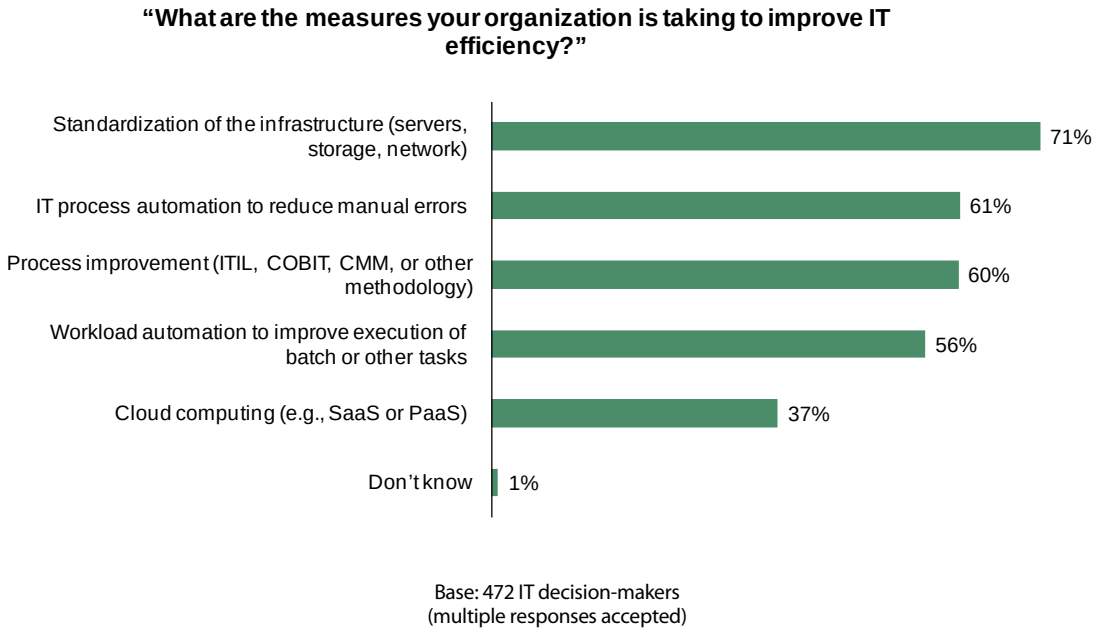
Source: A commissioned study conducted by Forrester Consulting on behalf of BMC Software, February 2012

Among the technologies selected for productivity improvement, automation, either as IT process automation for all the routine IT tasks or as workload automation to insure the successful execution of batch and asynchronous applications, is the key technology that will lead to a better efficiency of IT through better productivity. Moreover, because automation abstracts complexity, it also allows for an easier deployment of new technologies, driving new and better business services (see Figure 3).

The notion of business service has changed the batch and asynchronous processing landscape. Originally confined to running at night and at specific times to maximize the use of computing resources, batch processing has now given way to asynchronous processing. Long running tasks that are not suitable as transactions but must nevertheless be processed as soon as possible have replaced pure batch. This, of course, has some consequences on how early forms of automation such as job scheduling must be transformed into a more suitable form of automation: workload automation.

Workload automation is now triggered by events or by self-service requests rather than by time. The consequence is that computing resources have to be found in the data center to run in parallel with other services. Interfaces with systems management to understand resources is now of prime importance, as is a centralized control to coordinate and prioritize all asynchronous tasks running on the infrastructure. Workload automation must also take advantage of the capacity elasticity provided by virtual environments and eventually by the public or private cloud.

Figure 3
Automation Is The Key To IT Productivity



Source: A commissioned study conducted by Forrester Consulting on behalf of BMC Software, February 2012

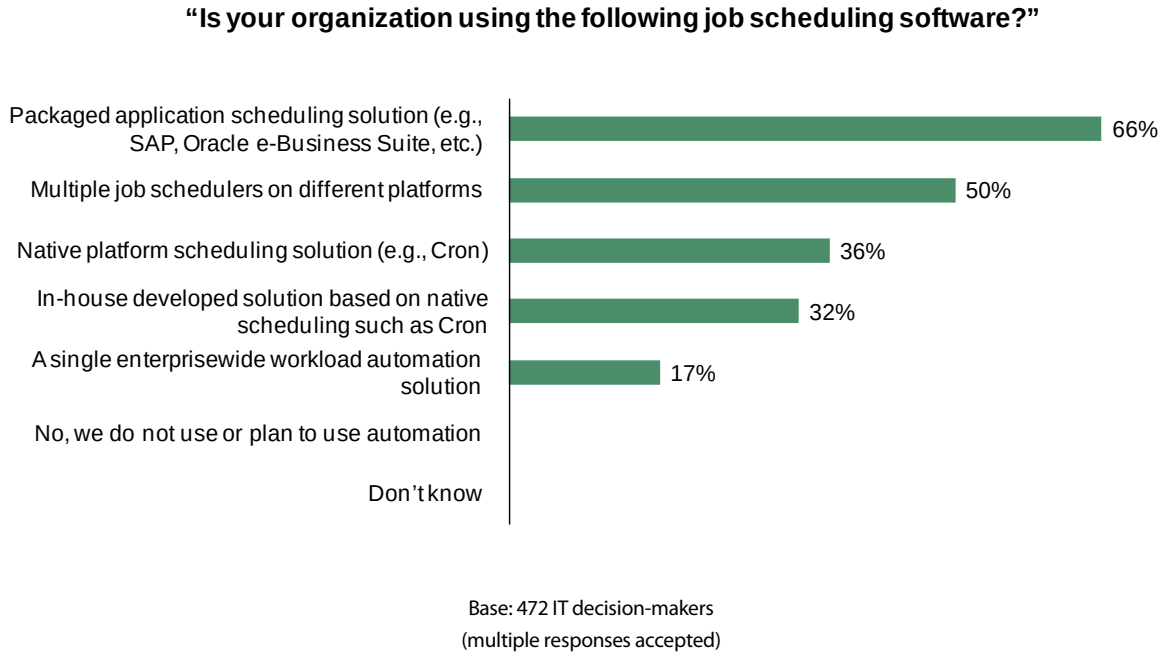
Challenge In Implementing Automation Technologies

The concept of batch or asynchronous processing has its roots in the manufacturing world. Making batches of parts that will converge in an assembly line to form a complete product is the best way to optimize production. This of course raises the issue of optimizing machine usage and consequently of scheduling tasks to be accomplished on a given machine, in a given order, in a given time frame, with the required consistency and quality. Resolving this problem in industrial job scheduling has generated a lot of literature, studies, and algorithms. IT-specific applications are not different. It's essentially a way to run large processes divided into jobs, in a specific sequence on one or several synchronized machines. What makes it extraordinarily complex is the number of different schedules or plans that have to be processed through a set of machines and the scheduling, synchronizing, monitoring, and troubleshooting needed to achieve the desired results. The consequences of bank accounts not being reconciled in time; of inventory, orders, and invoices not being sent in time; or simply of backups not being run in time can be extraordinarily expensive for many enterprises, large and small.

Many software products on the market come with built-in scheduling mechanisms. Operating systems (Cron for Unix, for example) or other packaged applications such as enterprise resource planning (ERP) have their own scheduling mechanisms. In a majority of cases, IT organizations, especially those operating on distributed servers, will turn to these embedded solutions as a first foray into automation. Other organizations will not coordinate across divisions and

adopt multiple job scheduling solutions as they see fit. Finally, many of these ad hoc solutions will not have the capacity, scalability, and controls needed to work at the enterprise level (see Figure 4).

Figure 4
Automation Efforts Often Use Simple Solutions

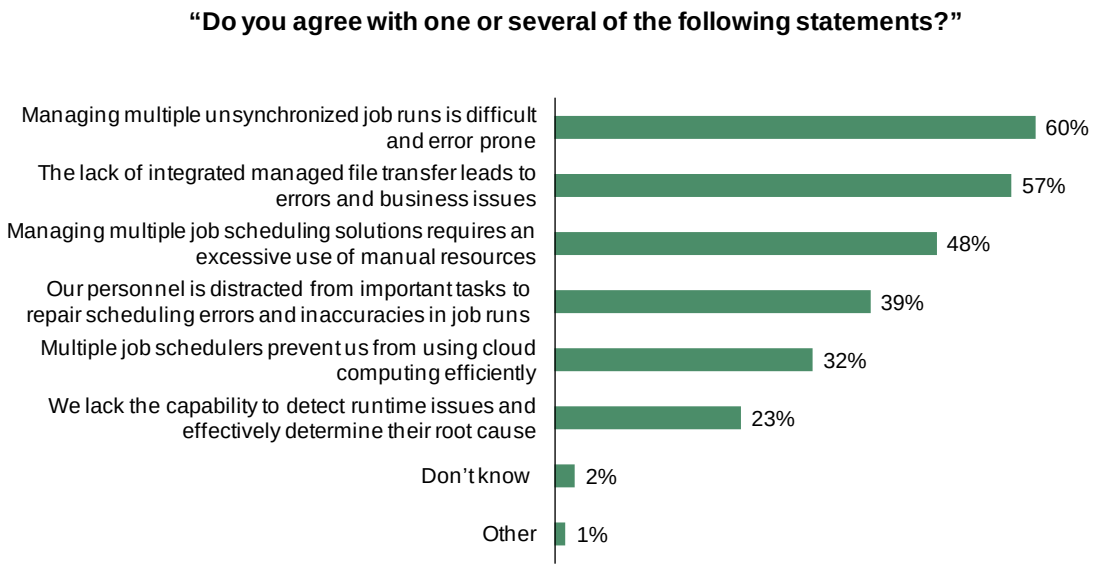


Source: A commissioned study conducted by Forrester Consulting on behalf of BMC Software, February 2012

Typically, firms use the different job scheduling solutions to serve the immediate needs of a given and closed solution such as a packaged application, a business unit, or an IT division such as application development. In a world of complex business services involving multiple tiers and a diversity of applications, the desired asynchronous processes will need to cross specific application boundaries and work on data coming from different sources. The lack of a complete, holistic automation concept allows independent schedules to run unsynchronized and unmanaged. This pushes the burden of synchronization, monitoring, and repair to the administrators in IT. The task will not only be enormous but also prone to errors (see Figure 5).

IT can certainly improve its productivity by reducing the amount of manual work needed to repair errors and manually synchronize different activities such as transactional and asynchronous applications. At some point, the burden of managing all these tasks by hand inflates the resources used by job scheduling. Automation should make IT more efficient; but this appears to be an elusive objective for many organizations, essentially due to the diversity of job schedulers and the lack of enterprise-level coordination (see Figure 6).

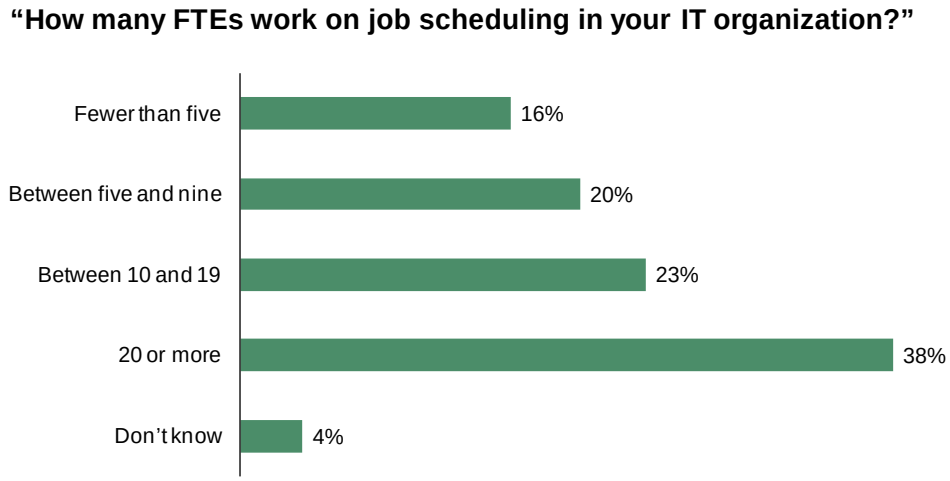
Figure 5
The Problems Of Unmanaged Multiple Job Scheduling



Base: 448 IT decision-makers who are using job scheduling software
(multiple responses accepted)

Source: A commissioned study conducted by Forrester Consulting on behalf of BMC Software, February 2012

Figure 6
Costs Increase Due To Multiple Job Scheduling Solutions

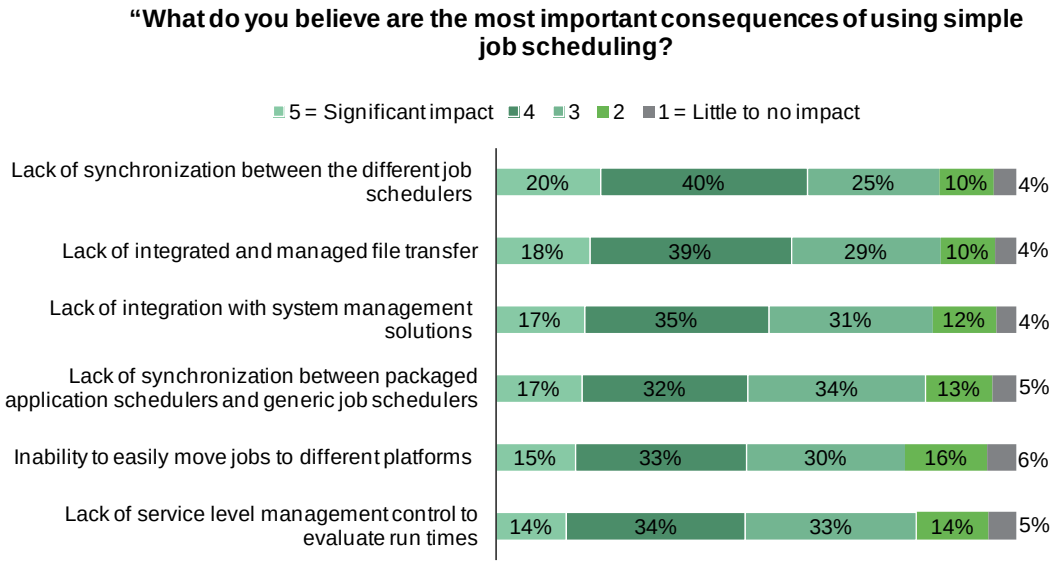


Base: 448 IT decision-makers who are using job scheduling software

Source: A commissioned study conducted by Forrester Consulting on behalf of BMC Software, February 2012

Complexity is the consequence of IT's spectacular growth. With this complexity, the computing world has changed; it is no longer a matter of running transactions by day and batch by night. Batch is now asynchronous computing that complements the synchronous or transactional computing and shares the same computing, storage, and network resources. This clearly means that automation, and specifically workload automation, must bring not only the capability to control the running of tasks, but also the capability to understand the availability and the usage of resources in order to create a global controlled environment. This is unfortunately not achieved by using separate and uncoordinated solutions (see Figure 7).

Figure 7
The Major Issues With Simple Job Scheduling



Base: 448 IT decision-makers who are using job scheduling software

Source: A commissioned study conducted by Forrester Consulting on behalf of BMC Software, February 2012

The Benefits Of Workload Automation

Industrial and manufacturing production analogies have been used in IT for quite some time. Moving forward and looking at the ubiquitous presence of IT, not only in business but also in social activities, we may even say that we have

to jump to industrial mass production to align IT costs to its potential productivity gains. A key element of this efficiency improvement lies in the reduction of waste in data center and human resources. At the operational level, waste is best addressed through a global approach to IT automation.

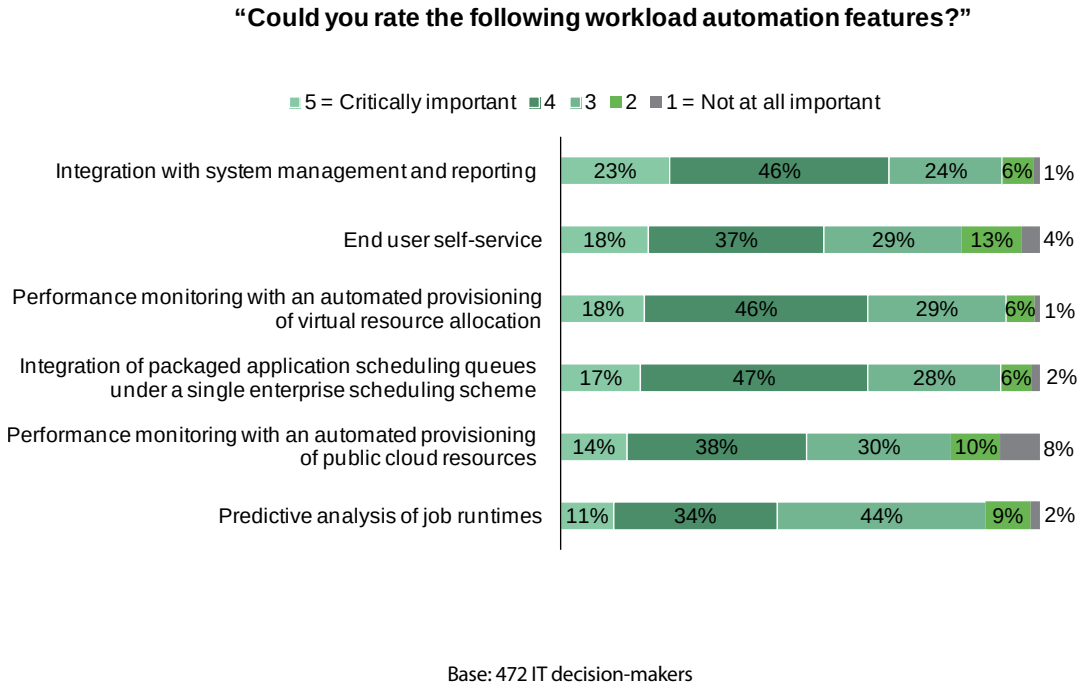
In recent years, business services have been granted more capacity and capabilities through technology evolution. This means that business services have moved beyond the concept of application and from traditional, back-end and transaction-focused systems to more complex, multi-tier and multi-dependency services that encompass multiple technologies, databases, files, and applications that enable greater workforce mobility and business flexibility.

In these types of complex infrastructures, even minor issues can have repercussions across multiple areas. Planning job schedules by hand is a complex problem given the time and resource constraints of each task, and multiple servers in a distributed environment are prone to high error rates. Coordinating multiple schedules conflicting on common resources, errors in execution that are not detected resulting in corrupted information, and tasks and jobs not done on time result in important cost consequences for the business.

Centralized management becomes necessary. It appears clearly that scheduling jobs at the machine level is impractical and error prone: Each operating system, application, and database speaks its own language. Shared data and interdependencies between systems make the need for a centralized management obvious. The result: Distributed job scheduling of yesterday transforms into what we now know today as workload automation. This solution presents the following features (see Figure 8):

- A scheduling solution that provides a unified interface regardless of technology platform and specifically a graphical user interface that abstracts platform diversity.
- A centralized control for all scheduling needs, making sure that all jobs are synchronized and all resources managed.
- A self-service interface.
- A unified interface to system management packages and resource management.
- A tight link to virtual resources provisioning to insure that jobs are completed in time.

Figure 8
Workload Automation Features

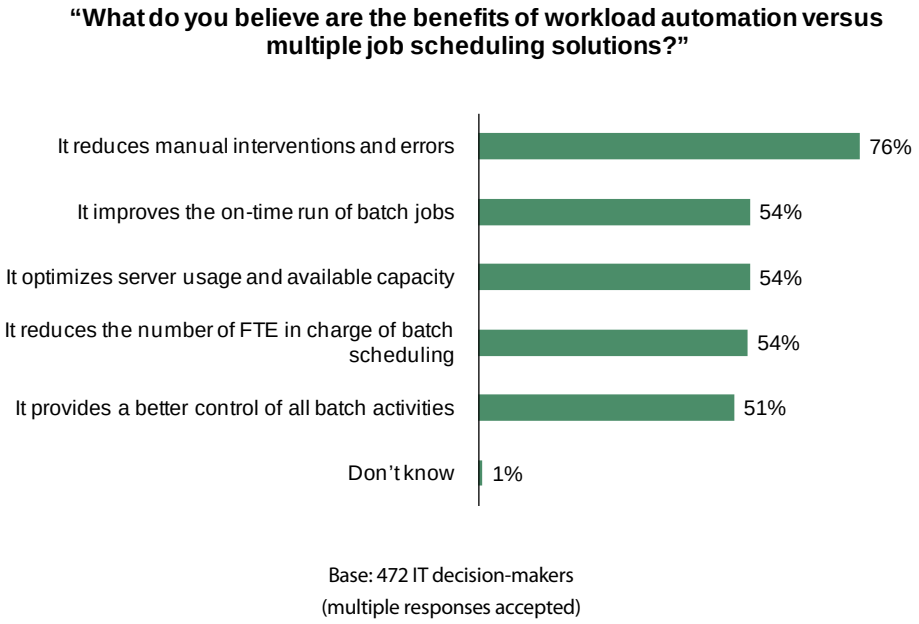


Base: 472 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of BMC Software, February 2012

With workload automation, IT can benefit from several capabilities, such as integration with infrastructure management, service-level agreement (SLA) management, and the elasticity provided by resource virtualization that can be provisioned as needed to achieve these service levels. Administrators can now create policies to monitor performance thresholds for certain services. They can look across all events and see when metrics are below acceptable levels and automate corrective responses to those events. Our survey shows that respondents are aware of the benefits of workload automation (see Figure 9).

Figure 9
Benefits Of Workload Automation

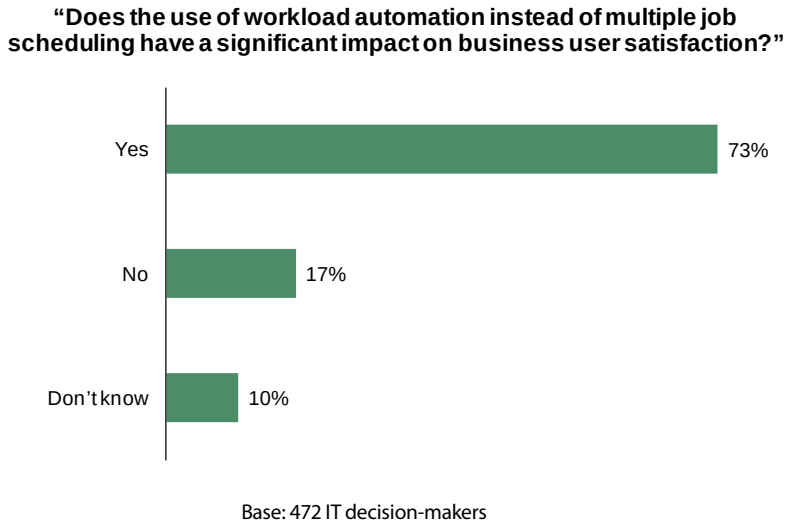


Source: A commissioned study conducted by Forrester Consulting on behalf of BMC Software, February 2012

If workload automation presents multiple benefits in the control and effectiveness of business service processing, it also presents multiple economic advantages both for the business units and the IT organization. A clear increase in user satisfaction means that business users are more productive, as IT is an important part of their processes (see Figure 10).

At the IT level, improved productivity through the reduction of manual rework and error correction is also clear, as 38% of the survey respondents show savings of up to five FTEs and 17% show savings of 10 or more (see Figure 11). Using a single workload automation product to support all the scheduling needs of the enterprise with a single solution also results in savings on software license costs by removing redundant software packages (see Figure 12).

Figure 10
Increase In User Satisfaction Due To Workload Automation



Base: 472 IT decision-makers

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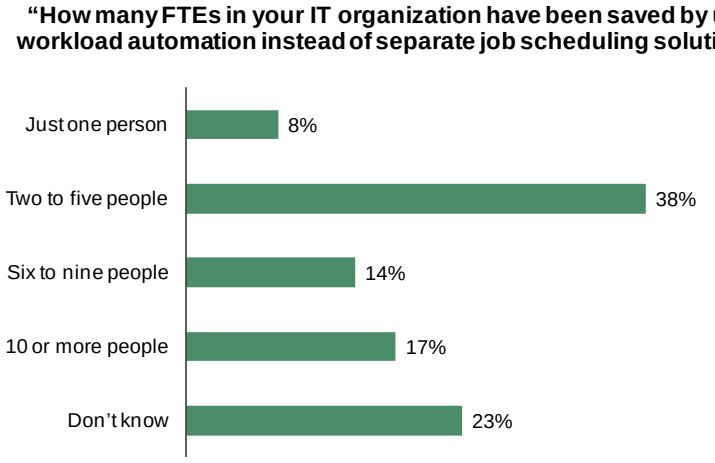
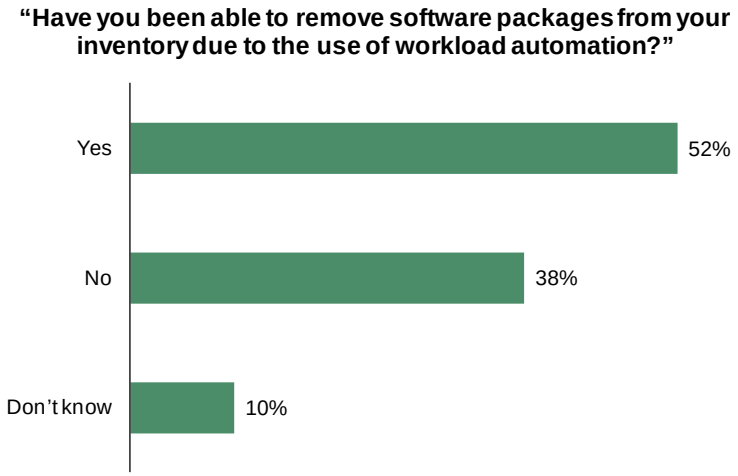
Figure 11
Reduction In FTEs Due To Workload Automation Adoption



Base: 472 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of BMC Software, February 2012

Figure 12
Savings On Software Licenses



Base: 472 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of BMC Software, February 2012

CONCLUSION

Multiple job scheduling solutions based on multiple job schedulers, embedded schedulers, or ad hoc scripts have shown their limits in the enterprise. The diversity of platforms makes this effort labor intensive while the uncoordinated execution is error prone, leading to a waste of resources and business. We found that:

- **Automation is the key to increased IT productivity.** This is an objective that a majority of enterprises aim to achieve.
- **Using dispersed and separate automation solutions leads to chaos.** Primitive job scheduling products or embedded solutions in packaged applications lead to failed jobs and lost files and individual, undocumented setups that require lots of manual intervention.
- **All of this can be avoided by using a single workload automation solution.** Workload automation abstracts all platforms under a single user interface. The benefits? Reduced number of resources, a single training program, and no more specialists allocated to each platform.
- **Workload automation provides a single interface.** Systems management, resource allocation, an understanding of available capacity, and a dynamic reallocation of jobs are some of the key benefits of workload automation.
- **It is the start of business process automation.** Because it offers a self-service feature, users can run their activities directly, in sync with other jobs, without disturbing production.
- **Workload automation combines with process automation.** Because it understands service levels and estimates execution times, a workload automation solution can dynamically provision and decommission virtual resources as needed to complete a job in time.

Sixty-eight percent of the respondents to our survey have or will implement a workload automation solution.

Appendix A: Methodology

In this study, Forrester conducted an online survey of 472 IT organizations in the US, Canada, the UK, Japan, China, India, France, and Germany to evaluate the benefits of workload automation. Survey participants included decision-makers in IT. Questions provided to the participants asked about major business or corporate related themes for their IT organization, measures for improving efficiency, and about scheduling software. Respondents were offered e-rewards credit as a thank you for time spent on the survey. The study began in [January 2012] and was completed in [May 2012].

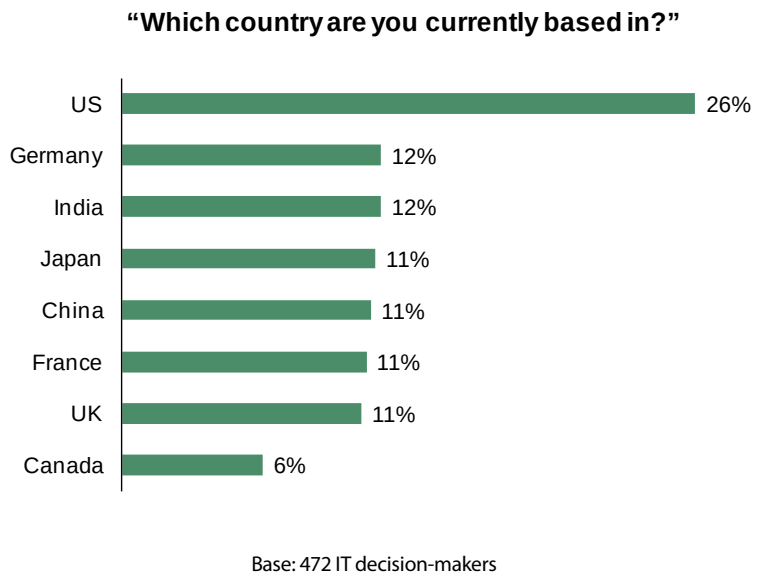
Appendix B: Supplemental Material

Related Forrester Research

"Market Overview: IT Process Automation, Q3 2011," Forrester Research, Inc., August 23, 2011

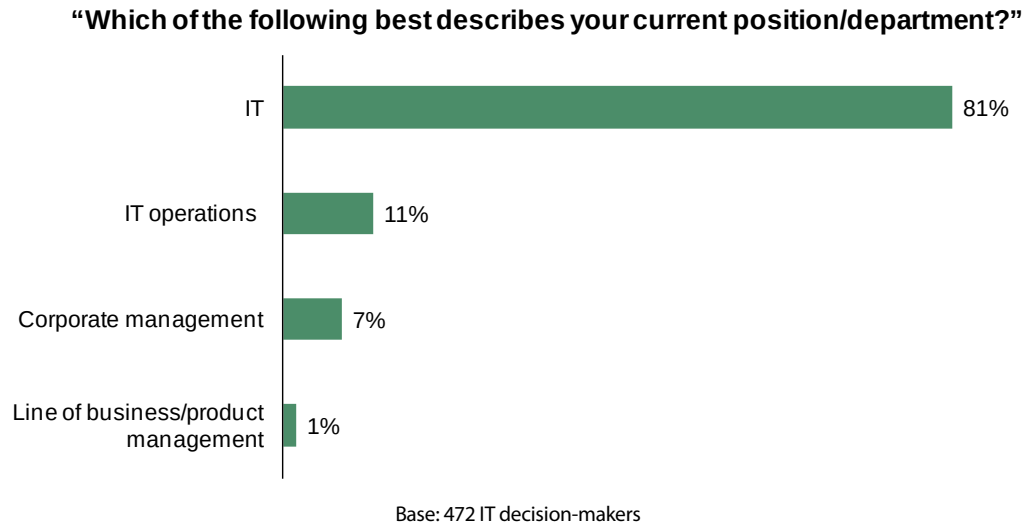
Appendix C: Demographics/Data

Figure 13
Company Headquarters



Source: A commissioned study conducted by Forrester Consulting on behalf of BMC Software, February 2012

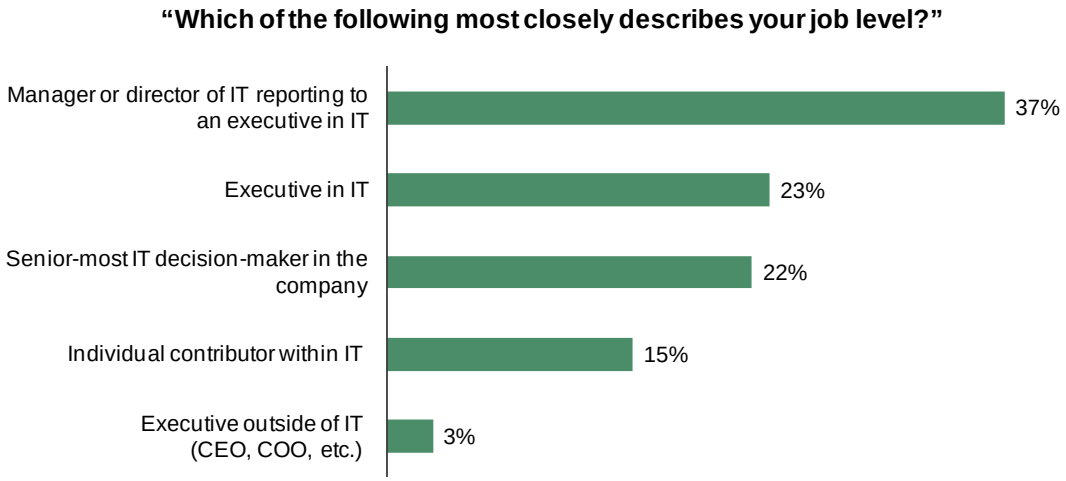
Figure 14
Current Position/Department



Base: 472 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of BMC Software, February 2012

Figure 15
Job Level



Base: 472 IT decision-makers

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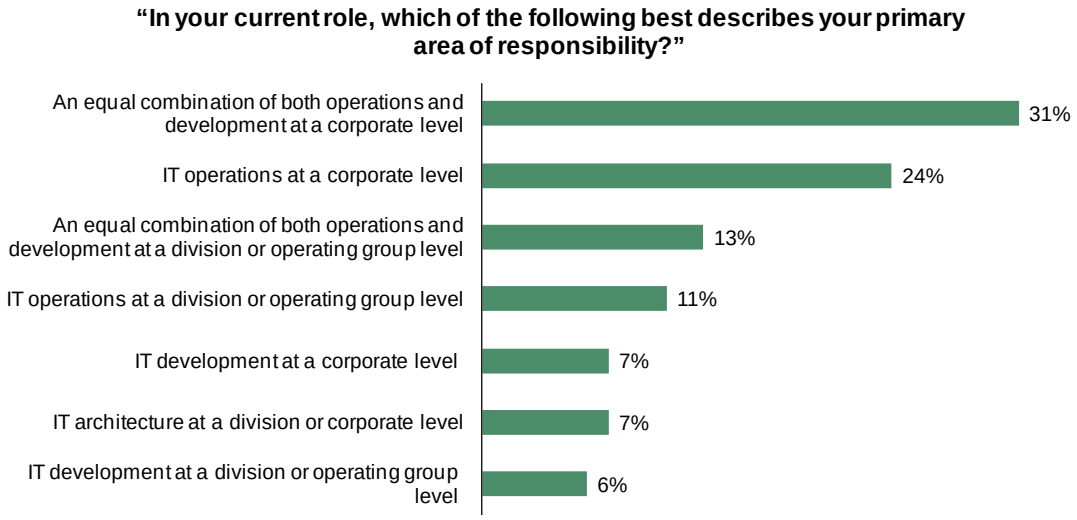
Figure 16
Primary Area Of Responsibility



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