

Demonstrated Benefits of Software Delivery Automation – an Analyst Study

Solution focus: IBM Rational Build Forge and IBM Rational Automation Framework for WebSphere (RAFW)

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Introduction

Software is a strategic asset that helps companies differentiate themselves from competitors, improve service, and optimize performance results. Business applications are pivotal in determining a company's ability to grow and change in light of competitive threats and opportunities. Successful organizations have the infrastructure in place to automate processes that ensure consistency, predictability, and manageability of their applications environments. Consider that, only a few years ago, a typical application was changed no more than a few times a year. In contrast, software development, deployment, and operations are now in a constant state of change. It is now quite common for organizations to require weekly or even daily modification to software releases in order to remain competitive. Additionally, development and delivery groups are being asked to deliver new software at an increasing rate.

The change imperative

What is causing this new pace of change? Businesses are reacting to a dramatically transformed set of expectations on the part of customers and partners for improved quality and faster delivery and response times. In addition, regulatory and government requirements are placing increased demands on businesses for faster and more secure transfer of information both internally and externally. Many companies are increasingly implementing web-based services in order to meet market demands for speed and agility or including software in their products as the competitive differentiator. The result is that software is more dynamic than in the past and there is an increasing need to integrate these applications with other applications from business partners. Understanding configuration and dependencies across software and products becomes critical for maintenance and auditability. Outsourcing development has also become more prevalent as companies look for ways to drive down costs. Another key business imperative to help improve software quality and agility is the move to agile software development. Companies who practice agile development processes demand a faster pace in their development environments by implementing continuous software builds and continuous integration. The result of this pace of change is that software teams are under pressure to deliver more complex software in less time. This goal is complicated by the fact that the development and operations teams are often organizationally and/or geographically distributed. In fact, many organizations run one software development team across the globe requiring a sophisticated level of communications and coordination.

All of these changes have impacted IT departments that develop applications for the business as well as Systems companies that make software like Independent Software Vendors (ISVs) or others that embed software as part of their products. Increasingly, a wide range of consumer and business products incorporate sophisticated software as features and functions inside their products. For example, there are cars that include as many as 20 million lines of code and account for 40% of the cost of the car. A sophisticated gaming console may include as much as 5 million lines of code. This code is componentized into

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software libraries that need to be tracked and managed across multiple product lines. There are thousands of similar examples in every industry. In order to optimize product quality while maintaining costs and governance, it is essential that these organizations have a reliable and consistent method to manage the software development, assembly and delivery of these software applications. Managers need a high level of control to ensure that all the right software components are integrated and included in the right product.

To achieve success, the development and delivery personnel in these companies must support a seamless environment that ensures they work together across the software life cycle. This coordination must be done in a way that guarantees repeatable software builds with minimal error. Standardization, consistency, and reliability of the software life cycle are key to success. It is no longer realistic for software development, deployment and delivery to act as independent organizations each with their individual tasks. For these groups to be able to collaborate in a cost-effective manner requires a sophisticated level of automation.

Software delivery automation increases the reliability and predictability of the deployment of complicated applications without the overhead of a large team that would be needed for oversight. Without software delivery automation, management cannot possibly meet the demands of the business for rapidly changing software. To compete, business demands effective, uniform, and standardized processes to drive down costs while improving quality and increasing productivity. By implementing automated solutions, organizations are able to codify best practices, reduce the burden on expensive engineering talent, and increase the effectiveness of the development and delivery teams.

The Rational Build Forge/Rational Automation Framework for WebSphere Study

In order to provide insight into the requirements and importance of automating the development and delivery of software, Hurwitz & Associates interviewed fourteen IBM customers who had implemented IBM Rational Build Forge and six IBM customers who had also implemented IBM Rational Automation Framework for WebSphere (RAFW).

IBM Rational Build Forge

IBM Rational Build Forge is a process execution framework that helps software development teams automate development processes and activities. It enables teams to orchestrate, manage, and track all the processes involved in assembling software components, from initial coding through deployment. The product can help teams keep track of what has changed and when it changed. It can be used to completely document processes. Rational Build Forge is designed to integrate with an organization's existing development environment and support the creation of process automation within that environment.

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IBM Rational Automation Framework for WebSphere (RAFW)

The IBM Rational Automation Framework for WebSphere (RAFW) is an automated process for installation, patching, configuration change management, and deployment of WebSphere and other middleware environments. It includes a collection of hundreds of standard actions that help WebSphere administrators automate best practices for managing application configuration changes during development, test, staging, and production in WebSphere environments. RAFW can help to automate the software installation process and deployment of applications once they are built. One of the major benefits of RAFW is to minimize configuration drift - the difference between the runtime environment and the gold standard master configuration - in WebSphere environments.

The managers interviewed by Hurwitz & Associates for this study were asked to assess why they needed automation and to describe the benefits they received from implementing Build Forge and RAFW. The results of the study demonstrated that companies indeed are changing their approach to the build and deployment process in order to remain competitive. Implementing automated processes with Build Forge and RAFW helped these companies experience improvements in productivity, the reliability of the development and delivery process, and governance, while driving down costs. One of the key elements supporting these benefits is the role of automation in enabling companies to easily reproduce tasks that have been established as best practices.

Why automate the development and delivery process?

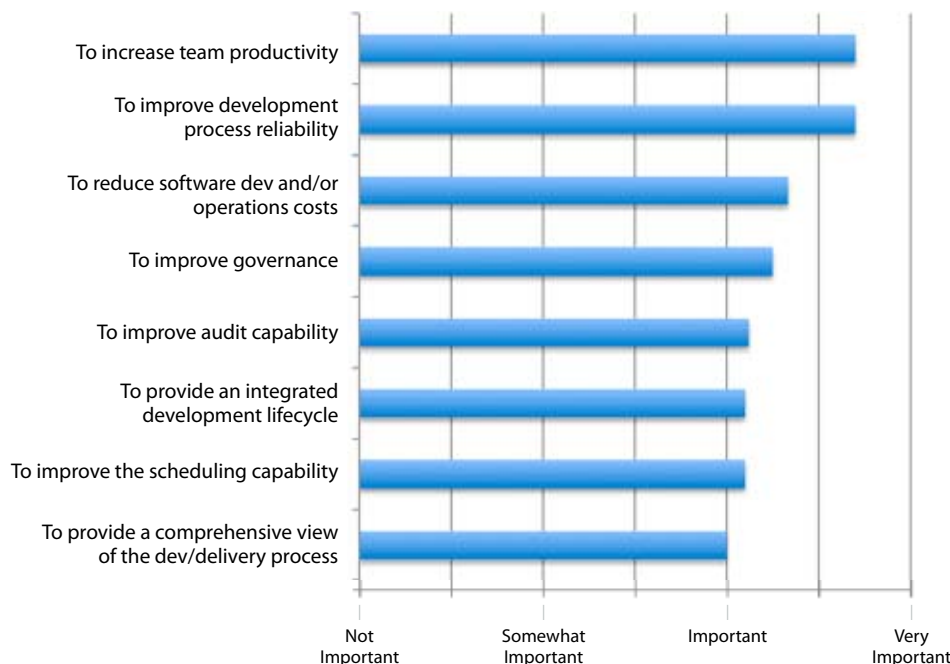
Organizations will not be able to help the business achieve its goals if time-consuming and error-prone manual processes are prevalent in the software development and delivery process. Large companies with complex and distributed IT environments typically have layers upon layers of existing IT applications and processes that require manual intervention to ensure successful outcomes. The software engineers and IT operations and configuration managers in this study all had first hand experience with the inefficiency of manual processes. With their anonymity assured, they spoke candidly about wasteful spending as their operations and development staff dealt with recurring crises. Faced with increasing demands from the business to support requirements for new applications and services, the companies decided to automate the development and delivery process to increase team productivity, improve process reliability, and drive down costs. Automation also served to improve governance, accountability, and auditability for these companies.

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Figure 1, below, illustrates these reasons. Respondents were asked to rate each reason as “Not Important,” “Somewhat Important,” “Important,” or “Very Important.”

Figure 1: Why Automate the Development Process?

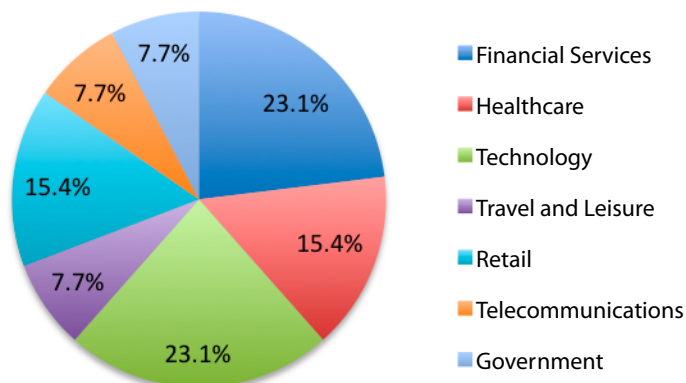


(Source: Hurwitz & Associates, 2011)

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By implementing best practices and repeatable processes, all the companies we interviewed are striving to create more productive environments and improve the overall level of service provided to the business. This productivity focus is consistent across all the industries represented in this study including companies in the technology, financial services, and healthcare sectors (Figure 2, below). Their business requirements and competitive environments varied, but all the

Figure 2: Percent Respondents by Industry



(Source: Hurwitz & Associates, 2011)

companies found that process inconsistencies and lack of standardization were inhibiting their success. With development and operations team sizes ranging from 100 to as many as 2000 staff members, even minor problems could quickly become difficult to manage.

The following three scenarios, based on our customer interviews, provide insight into the specific challenges behind the move to automate the software development and delivery process. In addition, each scenario summarizes how the implementation of IBM Build Forge and/or IBM RAFW helped these companies meet their goals:

Challenge #1: Homegrown solutions drain team productivity.

The director of enterprise configuration management took responsibility for her team at a time when the speed of application development began showing a sharp upward trend. The executive leadership of this fast-growing company in the travel industry sought to increase its competitive advantage by deepening relationships with customers. Anticipating the growth in new innovative customer-facing applications as management executed its business strategy, the director made it a priority to increase the automation of software development and delivery. She knew her team's reliance on manual processes for creating builds would be unsustainable if the company was to reach its goals for time to market and improving customer satisfaction.

One of the key inhibitors to meeting software development productivity goals was the use of manually developed scripts. Over time, as the quantity and speed of software builds increased, the development teams wrote more frequent and more complicated configuration scripts, often creating layers or "scripts-within-scripts." Typically, there was only one person on a team with the specialized knowledge to manage these non-standardized scripts. The director was determined to use automation to help improve productivity and reduce errors when she recognized that "some team members were idle while one person with the expertise to handle the scripts was busy all day." Making matters worse, the budget was held constant while the number of software builds increased dramatically from 50 to 350 per day.

Without hiring additional staff, the director oversaw a successful move to continuous integration and used IBM Build Forge to automate the build process. Productivity increased by 75%. According to the director, "With Build Forge I have a better way to manage my team. Every day I can pull information on the build process and identify trends. I can anticipate when there is increased demand from the application team side and make adjustments to team work flow. We are now sending better quality software to QA and we are doing it faster."

Challenge #2: Manual processes constrain process predictability and repeatability. Similar to the travel industry, banks are increasingly using enhanced customer web experiences to differentiate themselves from the competition. The bank's RAFW project manager we spoke with is one of the leaders of the behind-the-scenes teams who ensure that customers of this

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large US-based financial services organization receive the level of service they demand from online and mobile banking applications. The bank's middleware team receives approximately three requests per month for new custom-built applications or to add integrations with new vendors. The project manager told us that manual handoffs and lack of standardized operations tasks across the team made it hard to provide the business with the results they demanded.

The manager's three goals for automation were ensuring predictability of results, repeatability of process, and auditability. One factor impacting the predictability of results was the inconsistency in skill level of developers and system administrators. With the teams geographically distributed across different time zones, it was hard to trace poor outcomes back to the source. After establishing an automated process with Build Forge and RAFW, all team resources were able to perform at an elevated skill level with a predictable rate of success.

In addition, the complex nature of the bank's IT infrastructure required that many applications be deployed across multiple environments. In order to meet expectations for speed, the bank's middleware team used RAFW to develop a standardized approach for repeating the same process in additional environments.

The third major challenge was the inability to audit or track how many environments had been built out, who set up the servers, and how long it took them. The project manager now receives this information in a log and uses RAFW to monitor daily activity by individual. The results have been impressive. According to the project manager, "Now we have metrics to provide insight into planning and training requirements. Earlier, we would not know if someone was making a lot of mistakes until we had a big problem on our hands. With improved traceability of processes and meaningful alerts, we can now intervene early and make corrections."

Challenge #3: Maintaining quality and predictability while decreasing costs. Healthcare organizations, like many other industries, are under a great deal of pressure to minimize costs. The production services manager at a major healthcare insurance company was concerned because, in an effort to decrease costs, his organization had started to outsource much of its application development. Many of the developers were new and the amount of institutional knowledge regarding scripting and environments had decreased. With over 400 applications to manage within a complex IT environment, the production services manager knew that there was going to be problems with manual processes and lack of consistency when applications moved from one part of the life cycle to the next. For example, the development team built applications in their own load and test environment using a set of process scripts that differed from those used in the Quality Assurance (QA) and operations environments.

Without automation, the manager found his team impeded by slow-downs due to miscommunication, a lack of standardized scripts, and lack of well-defined processes. The lack of standardized scripts across environments led to wasted

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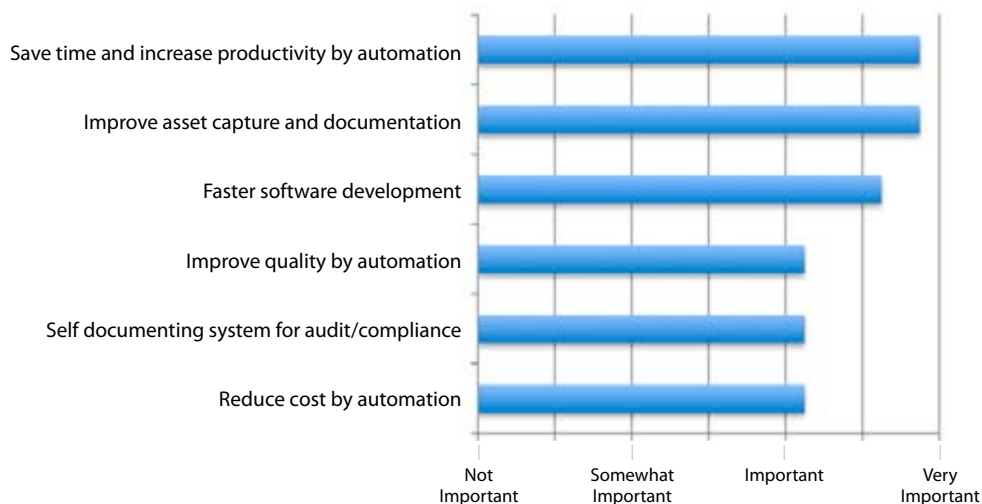
time and build errors. As the business demanded more frequent software updates and the size of the development and deployment teams remained constant, these challenges became more pronounced due to increasing cost constraints. The production manager knew that an automation tool was needed in order to put a standard environment in place between development and operations. Without this standardization there were, “more errors and the environment was more extensive to manage.” This clearly was causing the company time and money.

With the standardized process enforced by IBM Build Forge, the difference between the development and deployment environments is now minimized. The same processes are used whether by a front-end developer or someone deploying the application into production. This has increased productivity as well as decreased development costs. It has, according to the production manager, “reduced errors and made the development and deployment process easier and less expensive to manage.”

Reasons for deploying IBM Build Forge and RAFW

In addition to asking participants in this study about their goals for automating the development and delivery process, we asked a series of questions to assess why they deployed Build Forge and RAFW. For Build Forge (Figure 3, below), companies again pointed to increasing productivity as a primary driver.

Figure 3: Reasons for Deploying IBM Build Forge



(Source: Hurwitz & Associates, 2011)

Additionally, companies were looking to Build Forge to improve asset capture and documentation and to increase development speed. Many of the companies we interviewed said that they were looking to Build Forge to provide “self-service” capabilities to developers or other members of the delivery team. For example, some companies wanted their developers to use Build Forge to do their own local builds, but in a standardized way in order to keep track

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of assets and as a way to document their systems. Other companies viewed Build Forge as a way for developers not to have to depend on release teams for their builds since the information would be captured in the tool. Additionally, companies said that automating the build via a self-service interface would allow developers to perform “just-in-time” builds, reducing their dependency on external teams and allowing them to get their applications more quickly to QA to test them. The QA team could then take that same build and promote it into production environment, enabling faster software development and improved productivity.

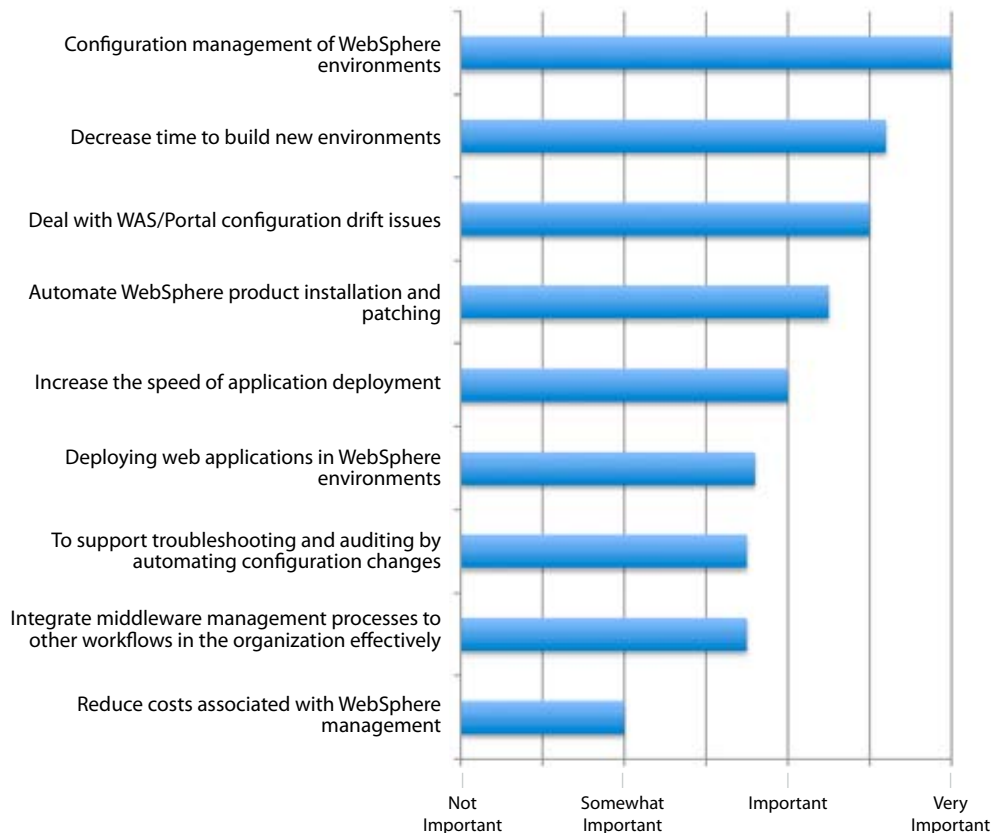
Finally, some companies leveraged Build Forge to help componentize the build process. This is especially true for ISVs and other companies building products for external customers. For instance, a technical director at a retail media company was concerned about the company’s exposure to intellectual property (IP) risk based on their reliance on outsourced software development teams. After implementing Build Forge, the company was able to standardize and control the development process so that each member of a large, distributed team of developers has appropriate access rights and visibility to work on his portion of the software code, but does not have insight into the total project. Build Forge has helped this company to protect its IP assets as well as ensuring repeatability, and increasing productivity and reliability.

Customers who purchased IBM RAFW (Figure 4, next page) needed help in supporting the increasingly rapid software deployment process and dealing with WebSphere environment configuration management issues. These WebSphere customers were looking for assistance in easier administration and in handling issues such as configuration drift resulting from small, incremental changes to an existing functional environment.

They required support to automate the deployment of these applications so that they could be promoted from one environment to another predictably and with fewer errors. For example, the director of development at a Web retailer was concerned when his teams were unable to maintain uniformity across WebSphere platforms in development, test and production environments. This occurred because, as different WebSphere middleware platforms were set up, something might be changed. For instance, a piece of code might be named a certain way in one environment, but this change never trickled down to the production environment. The director needed “all platforms to be consistent and have the same characteristics as the golden copy.” However, this was not possible due to their inability to document how the production version looked at a specific point in time. This lack of uniformity led to configuration drift between the IT environments making development and testing difficult throughout the system’s development life cycle.

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Figure 4: Reasons for Deploying IBM RAFW

(Source: Hurwitz & Associates, 2011)

With RAFW installed, the company is now “getting time back” ...

With RAFW installed, the company is now “getting time back” because the platform is now consistent with the golden copy and the promotion of an application from one environment to the next has been cut in half because there are fewer problems with configuration drift and fewer debugging cycles.

Benefits of Deploying IBM Build Forge and IBM RAFW

The IBM customers in this study realized significant improvements in productivity, cost control, and compliance of their software development and delivery environments as a result of implementing Build Forge and RAFW. The majority of companies interviewed experienced overall productivity improvements and time-savings ranging from 20–60%. More importantly, they increased productivity without increasing operational costs. In fact, many customers found that there was a dramatic decrease in operational costs because of the automation of the development and deployment processes. Out of those who could quantify a payback, many put it in the range of 20–40%. The benefits achieved by Build Forge and RAFW customers in this study are illustrated in Tables 1 and 2, on the following pages.



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Table 1: IBM Rational Build Forge Benefits Achieved by Respondents

IBM Build Forge Benefit	Average Improvement	Maximum Improvement
Increase speed of builds	80%	>140%
Increase in frequency software builds	87%	>140%
Increase in frequency of software releases	60%	>140%
Reduction in software errors	25%	40-60%
Increase in ability to meet compliance requirements	63%	>140%
Increase in ability to meet deadlines	40%	60-80%
Increase in developer productivity	30%	40-60%
Decrease in hardware or resources	88%	100-120
Development cost savings	25%	60-80%
Increase in developer job satisfaction	38%	60-80%

(Source: Hurwitz & Associates, 2011)

According to IBM customers interviewed for this study, Build Forge helped to improve software development life cycle productivity by using standardization and automation to: increase the speed and frequency of builds, increase the frequency of software releases, and reduce errors. As the development manager at a large healthcare organization explained, "A tool like Build Forge strings everything together. Each project step can be woven into one orchestrated end-to-end process." In fact, companies were able to increase the frequency of software releases by an average of 60% with a 25% decrease in software errors. According to an automation manager for a travel company, "Build Forge allowed us to minimize all the repeatability and reliability errors." Build Forge also increased a team's ability to meet deadlines by an average of 40%. And, several of the customers interviewed discovered that they had costs savings of between 60–80% in their development process.

In addition to realizing benefits related to the direct cost of development, several customers indicated that Build Forge automation enabled them to meet compliance requirements much more easily without a lot of manual intervention. For example, one company pointed out that, "Build Forge enables auditors and others to understand who, what, and when things were done." Finally, Build Forge helped to improve job satisfaction. As another company executive put it, "The greatest benefit is keeping staff sane."

Customers who were using RAFW during our survey experienced a similar increase in productivity when deploying applications to a WebSphere environment. Another important benefit of RAFW was that it made it much easier for deployment managers to update and manage WebSphere environments and meet compliance requirements.

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Table 2: IBM RAFW Benefits Achieved by Respondents

IBM RAFW Benefit	Average Improvement	Maximum Improvement
Ability to support increase in frequency of environment/configuration changes	30%	40-60%
Ability to support increase in frequency of application deployments	46%	60-80%
Increase in productivity in managing WebSphere environments	43%	60-80%
Reduction in configuration drift	37%	60-80%
Reduction in configuration/deployment errors	40%	40-60%
Increased Ability to meet deadlines	30%	60-80%
Increase in WebSphere operations team productivity overall	30%	40-60%
Change in hardware and resource requirements	30%	40-60%
Increased ability to meet compliance requirements	48%	60-80%
WebSphere operations team job satisfaction	26%	40-60%

(Source: Hurwitz & Associates, 2011)

In general, deployment management found that they were in a much stronger position to support frequent application deployments and changes in configurations. Automating installations of WebSphere middleware and administrative tasks led to a dramatic reduction in configuration errors and configuration drift. For example, one company described a situation where there was a “fire drill” every time a configuration error occurred. Typically, this would require 5 or 6 people from across the development and delivery process to spend a lot of time figuring out what went wrong. With RAFW, “The number of fire drills has changed from once a week to once every couple of months.” Creating a more stable and automated configuration management process enabled the company to increase productivity and save money by keeping staff on task rather than pulling them away from their responsibilities to solve the latest crisis.

Automating installations of WebSphere middleware and administrative tasks led to a dramatic reduction in configuration errors and configuration drift.



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Conclusion

Development and delivery teams are increasingly required to support an ever-changing application environment. Increasingly, businesses are finding success by automating as much of the development and delivery process as possible. The result of these efforts is better quality of outcomes and more cost savings. Our analysis of the companies included in the study revealed the following:

- Automation allows managers to anticipate how to adjust their teams work patterns to increase productivity and quality.
- Automation of build processes improves asset capture, support reuse, and shortens release times.
- Automation of processes can elevate the skill level of all team members by allowing them to ensure predictable results
- Using a standardized approach for repetitive processes can reduce errors and decrease the time to results.
- By being able to monitor the performance of teams, companies have improved planning, training, and overall quality of the applications being deployed.

Companies that are able to keep pace with the needs of the business for rapid turnaround of applications, development, and deployment are better positioned in an increasingly competitive world.

Automation allows managers to anticipate how to adjust their teams work patterns to increase productivity and quality.



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