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Transforming the Application Development Assembly Line: A BuildForge Case Study

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Executive Summary

Development organizations face a convergence of industry trends that compel them to increase the efficiency and quality of their products while accelerating the pace at which they bring these offerings to market. Most notably, these trends include:

- The emergence of web services and service oriented architectures to create sophisticated and customizable technical and business application ecosystems;
- Regulatory and internal requirements for product reproducibility and compliance;
- Vigorous market competition and accelerating technology adoption curves which force rapid and timely product delivery;
- Increasingly complex applications, both in size and graphics intensity, along with broad requirements for multi-platform support;
- The proliferation of global development teams, whether staffed internally or outsourced locally and offshore.

All of these factors necessitate that development organizations become more agile, efficient, and quality conscious in order to sustain their competitive edge. Similar to a manufacturing production line, the software development lifecycle must be automated, integrated, and repeatable throughout the product assembly process. BuildForge's build and release process management solution was created to help development teams address these challenges.

Hurwitz & Associates conducted an in-depth online study of 18 BuildForge customers, composed of large and small development teams across a variety of industries. We wanted to understand the motivations that caused these companies to examine BuildForge, and quantify the business and technical benefits these companies had achieved from implementing their products.

The results were quite compelling. Most notably, customers expressed significant benefits in the following areas:

Benefit	Average Improvement	Highest Improvement
Speed of builds and releases	110%	500-2,000% (or 5-20x)
CM team productivity	42%	90% or greater
Release frequency	40%	90% or greater
Error reduction	30%	70-80%
Developer productivity	28%	81-90%
Development cost savings	25%	50-70%

Even though these results are substantial, we feel they may be understated because the survey included many customers in the early stages of product use (i.e. less than six months). These new customers indicated significant benefits in many of the same areas as more mature customers, but felt it was too soon to quantify their results. In fact, the survey responses indicate that the longer BuildForge products are used and the broader they are deployed, the greater the benefit achieved by the organization. Many customers have deployed the product widely in their company or division, but plan additional roll-outs in 2006.

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BuildForge customers are highly satisfied with the company's products. 76% of customers surveyed said that BuildForge met or exceeded their expectations, with 18% stating it was too soon to tell. Only one respondent indicated the product did not meet their expectations.

The study identified emerging benefits in the areas of faster time-to-market, compliance, improved team communication, and decision support. We expect these are advanced benefits that will materialize as customers mature. For example, as teams begin to see the long-term impact of their increased agility and faster development cycles, we expect future target release dates to become more aggressive. In addition, as development starts analyzing the wealth of data the BuildForge system collects, we believe this information will be used to identify process bottlenecks, improve product planning, and provide an important audit trail for legislative, regulatory, and internal compliance requirements. Finally, respondents indicated that BuildForge plays an integral role in helping them maintain customer relationships and gain competitive advantage by enhancing their ability to provide timely releases of high-quality software.

By helping industry leaders increase team productivity, improve product quality, accelerate product cycles, and reduce cost, BuildForge is making the software development factory a reality.

1. Introduction

FullControl from BuildForge is a relatively recent innovation among software products. It delivers flexibility, governance and efficiency to the development, build, test, and deployment phases of the application lifecycle. While specific disciplines within software development have been automated as the software industry has matured (such as source control, testing, defect tracking, etc.), the ability to automate, standardize, and accelerate software builds and releases is very recent.

Transforming the Application Development Assembly Line: A BuildForge Case Study

BuildForge was founded in 2001 and its first commercial version, BuildForge 1.0, was launched in 2002. The product hit the market at an opportune time when the build and release process was becoming a source of significant production problems in large software shops. Software had grown in sophistication and complexity and consequently software builds were becoming more difficult to stage, manage and coordinate. The builds themselves were taking longer to execute and errors were harder to identify until they caused the integrated build to fail. As development teams grew larger and more distributed, coordination of software development and communication across the development team also became more inefficient and difficult to manage.

The product hit the market at an opportune time, when the build and release process was becoming a source of significant production problems in large software shops.

The entry of BuildForge's solution occurred at the crossroads of the following development trends:

- An iterative approach to software development with frequent software builds (like Agile Development and Extreme Programming) was becoming increasingly common as a means to improve software quality and accelerate the speed of product releases;
- Software development teams were collaborating on development projects in multiple locations;
- Development organizations were implementing 24x7 follow-the-sun operations either through outsourcing or with globally dispersed teams;
- To reduce costs, outsourcing application development tasks to inexpensive foreign skill pools in India, China, Eastern Europe, and elsewhere was becoming an established practice;
- The software industry was becoming increasingly competitive, necessitating rapid time to market in order to lock in the highest profits;
- Graphics-intensive applications were emerging and becoming cumbersome to produce, impacting software teams in industries such as computer software and interactive games;
- Software was becoming increasingly more complex, and requirements for multi-platform application support were proliferating;
- The advent of web services and service oriented architectures that integrate multiple software applications heralded in larger and more sophisticated technical and business applications;
- Regulatory and legislative compliance was becoming a new area of concern, necessitating detailed audit records of development activity from initial product concept through to production;
- Individual groups within development teams (developers, QA, and production) were selecting their preferred tools for their specific tasks, which created gaps in their development processes and communication between groups.

Collectively, these trends were causing widespread problems throughout the software industry, and these pressures are even more prevalent today. The inability to produce consistent, accurate, and repeatable software builds creates a significant development bottleneck that makes development teams ill prepared to manage these complexities without adding additional resources. Additionally, when development functions operate in process silos and cannot readily share information throughout the development lifecycle, unforeseen errors and unwelcome project delays often result. BuildForge FullControl was created specifically to resolve these issues.

The inability to produce consistent, accurate, and repeatable software builds creates a significant development bottleneck that makes development teams ill prepared to manage these complexities without adding additional resources.

FullControl provides a development process management solution that enables companies to standardize and automate their end-to-end build and release processes from initial code checkout through to deployment. Through this automation, discrete application silos are integrated to create a single, unified development process. BuildForge's companion product, FullThrottle, leverages FullControl's process tasks to distribute them in parallel across a pool of hardware resources for faster development cycles. In this paper, we will discuss how BuildForge's products have helped their customers create a more efficient, high quality software factory.

2. Respondent Demographics and Usage Patterns

In August, 2005 Hurwitz & Associates conducted in-depth online survey of 18 of BuildForge's customers and three in-depth phone interviews to identify the impact FullControl was having in organizations struggling with the challenges identified in the previous section. We also wanted to understand and quantify the business, technical, and process benefits BuildForge's customers were experiencing.

All customer data was treated in the aggregate so that customer information could be used without having to disclose company names and proprietary customer data.

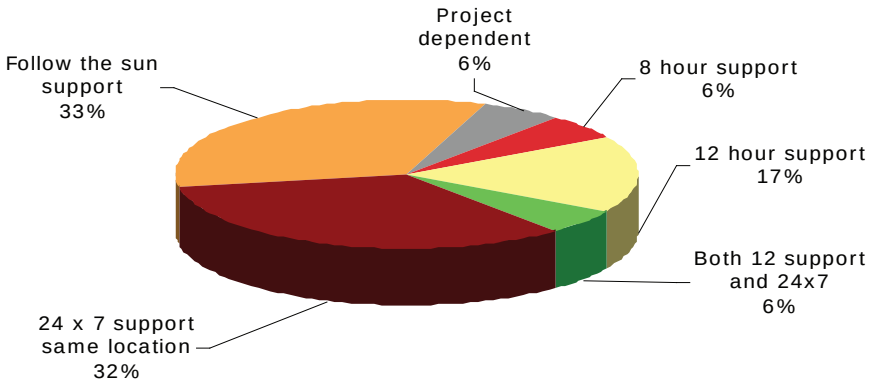
Primarily, survey respondents were either independent software vendors – companies whose livelihood depends on software quality and timely software releases – or commercial firms who had large software projects and viewed software as an integral, strategic aspect of their business. All of BuildForge's customers were invited to participate, no matter how long they had been using FullControl. Thus, we can conclude that the survey results convey the typical experience of BuildForge customers.

Rigorous Support Requirements for Development Organizations

Figure 1 depicts the high level of support (24 x 7 or follow-the-sun) provided by 71% of the respondents. The requirement to deliver this level of support demands high quality and timely delivery of software, making BuildForge an essential technology for the majority of respondents.

71% of customers surveyed provide 24x7 or follow-the-sun support. This demands high quality and timely delivery of software, making BuildForge an essential technology for the majority of respondents.

Figure 1: Development Support Policies of Respondents



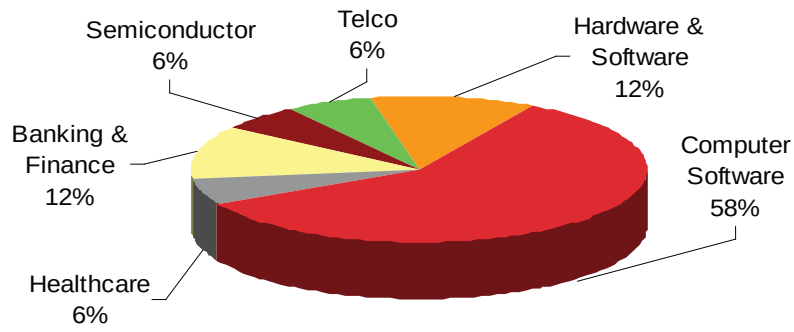
It also underscores the importance of faster development cycles since cross-team handoffs are often required at the end of each group's work day for projects to progress.

Benefits Achieved Across Many Industries

Figure 2 on the following page characterizes the seven industries represented by the respondents in the survey. While a little more than half of the respondents were software companies (i.e. Independent Software Vendors), the remaining percentage is evenly distributed across healthcare, banking/finance, telecommunications, and hardware companies, illustrating that BuildForge provides benefits to software development projects across a wide variety of industries.

In comparison with BuildForge's current customer base, the financial services and healthcare sectors are underrepresented in this survey because they view this technology as a critical part of their competitive advantage.

Figure 2: Type of Industries of the Respondent Organizations

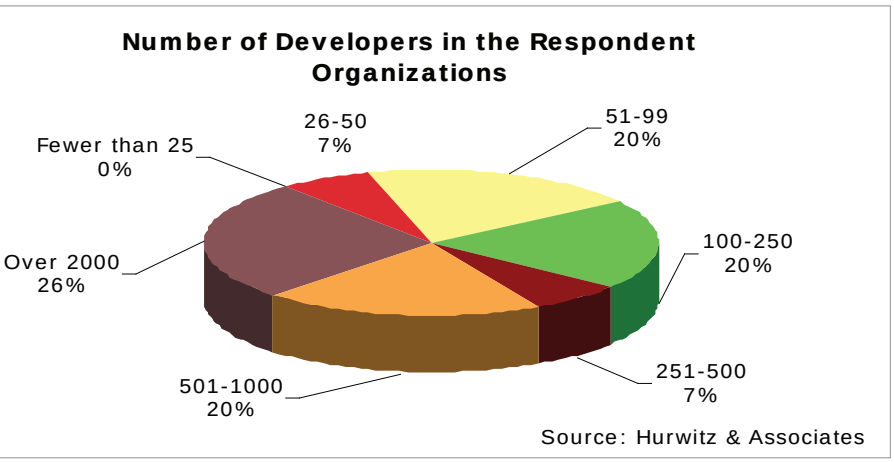


BuildForge provides benefits to software development projects across a wide variety of industries.

Improvements Achieved by Large and Small Teams

Figure 3 summarizes the number of developers within the respondent organizations. BuildForge's build and release management solution is predictably useful for large development teams where product complexity is high and team communication is difficult.

Figure 3: The Number of Developers in the Respondent Organizations



Interestingly, small teams achieved similar benefits to the large organizations in the areas of productivity and efficiency. Just under a third of all respondents reported more than 2000 developers in their organization. The number of developers using BuildForge in the four largest companies who responded to the survey varied from 250-2000 developers, with 23% of BuildForge's customer base having development teams as small as 26-99 developers.

BuildForge Customers Have Globally Distributed Development and Often Use Outsourced or Offshore Teams

The survey also gleaned meaningful results about the distributed nature of development teams. Among the survey respondents:

- None of the companies developed software from a single geographical location;
- Only two organizations developed software entirely in the United States;
- 89% of respondents had development teams in Europe, the Asia Pacific region or elsewhere in the world. In fact, 22% of the companies had the majority of their developers outside the US.

Respondents reported that BuildForge provides real-time access to information that is essential for distributed development teams to collaborate and work together efficiently. While it is not one of the primary benefits cited in this study, many respondents noted that BuildForge assists with communication and facilitates smooth team handoffs.

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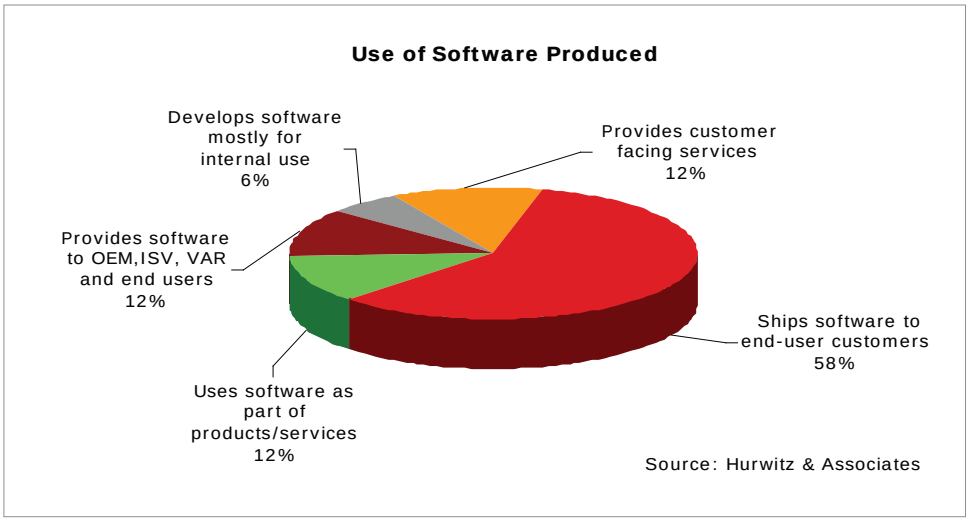
BuildForge Supports Internal Products, Web Services, and Packaged Offerings

Survey responses indicate that BuildForge is used to manage a diverse range of software projects, including: packaged products shipped directly to end users; web-based applications provided as services to third parties; and products intended for internal use. Figure 4 details the types of software offerings produced by survey respondents.

Figure 4: Types of Distribution for Respondents' Software



BuildForge Improves Customer Relationships and Competitive Advantage

With a large percentage of software going to customers as commercial products and customer-facing services (71%), the benefits that BuildForge provides by increasing the number of builds, reducing errors, improving product quality, and reducing development time have a direct impact on the companies' sources of revenue. Many respondents cited exceptional improvement in their ability to maintain or improve customer relationships and gain competitive advantage as a result of using BuildForge.

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Replacement of Home Grown Tools Enable Greater Focus on Core Competencies

The survey revealed a trend among development organizations to abandon internally developed and open source build systems for more robust commercial build products. Most respondents had previously managed the application build and release process using proprietary built solutions or customized open source offerings that were generally created from a combination of scripts and standard utilities. The process of maintaining their in-house build and release capability was becoming onerous for many respondents which increased the appeal of a commercial product.

Many customers commented that implementing BuildForge allowed them to focus more in two areas: 1) bringing their products and services to market faster (i.e. succeeding at the company's core competency), and 2) enabling CM teams to devote more time to improving efficiency and quality with less time spent on repetitive, administrative tasks.

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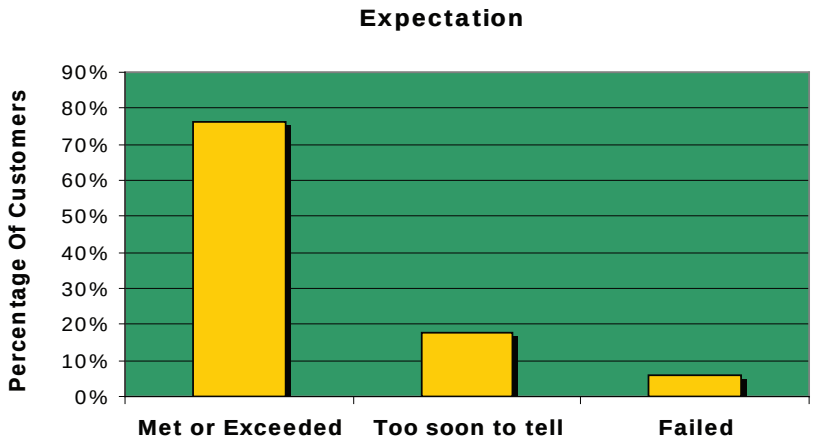
3. Product Selection and Expectations

Customers Express High Satisfaction with BuildForge Purchase

Based on the survey responses, customers agree that BuildForge products have lived up to their promises. Figure 5 on the following page summarizes the level of customer satisfaction with BuildForge. The majority of customers (76%) reported that BuildForge met or exceeded their expectations, with 18% stating they were too early in their implementation to tell. Only one customer who had experienced a turnover of management and lost their BuildForge administrator reported that the product had not met their expectations to date.

Figure 5: Overall Level of Satisfaction with BuildForge Capabilities



Source: Hurwitz & Associates

Implementing BuildForge allowed companies to focus in two areas: achieving their core competencies and improving development processes for higher efficiency and quality.

ROI Validated Through On-Site Product Trials

Respondents surveyed clearly did not select BuildForge on impulse. Half of the respondents performed formal ROI calculations to justify the purchase of FullControl, and the majority of the others conducted in-house trials to validate the products' capabilities in their own environment. While only 30% of respondents provided specific ROI figures, almost all stated that they performed some type of ROI analysis justifying the purchase of BuildForge. Figure 6 illustrates the methods used by the respondents to justify their purchase.

Figure 6: Methods Used to Justify the BuildForge Purchase

Method Used for Purchase Justification	Percentage of Responses
IRR	6%
Cross development support	6%
Own use case - Product Trial	22%
ROI	50%

Documented ROI by BuildForge Customers in the First Six Months

Respondents confirmed they have received a significant return on investment from using BuildForge. In general, the more experienced the respondents were with using BuildForge, the greater the ROI results they reported. The largest, most experienced organizations reaped the largest ROI in terms of increased

productivity and overall time savings achieved. Figure 7 shows specific customer findings across financial, productivity, and time savings, depicting the measurements that were important for each of their respective companies. Many of the companies surveyed indicated cost reductions in excess of $1 million annually, with one large ISV estimating their savings at $25 million annually. ROI was typically obtained in the first three to six months of use.

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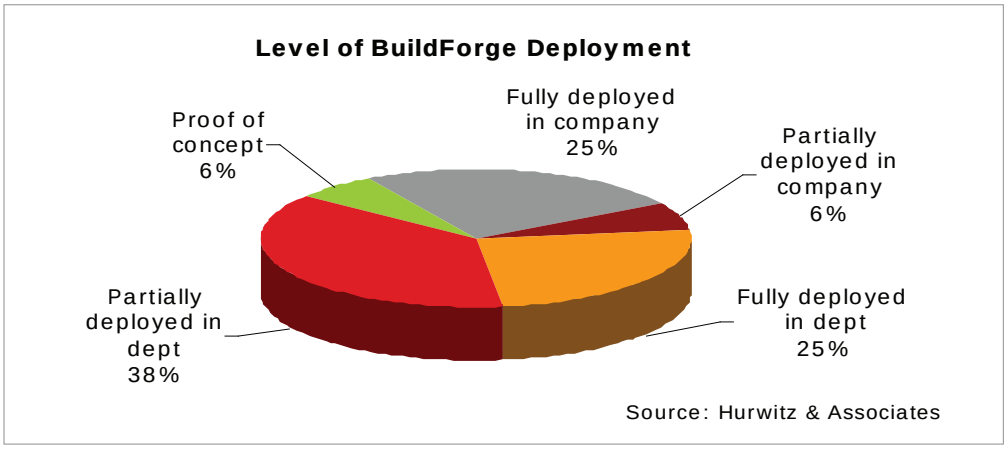
Figure 7: Methods Used to Justify the BuildForge Purchase

ROI Calculations					
Customer	Payback on Investment	Increased Productivity	Overall Time Savings	1 Year Accumulated Savings	3 Year Accumulated Savings
1	Over 200%				
2	1-20%	60-80%	Over 200%		
3		40-60%			
4	101-200%				Over 200%
5		101-200%			
6	1-20%	40-60%	20-40%		40-60%
7	20-40%	40-60%	1-20%	60-80%	

Deployments Are Growing – Expanded Use Planned for 2006

Many of the BuildForge customers surveyed have conducted extensive deployments of the product, although most still see additional ways they can leverage FullControl within their organizations. Figure 8 shows that 47% of respondents have rolled out the product broadly within their company or division, while the remaining respondents have implemented the product for their configuration management team and are still in the process of rolling it out to the development team as a whole.

Figure 8: Scope of BuildForge Deployment



Many of the companies surveyed plan to reap further benefits by extending their deployment to other products, groups, and members of the development team in 2006. Based on this information, we expect the ROI figures reported by customers to increase accordingly.

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Increasing Customer Benefits Over Time

The survey suggests that the more widely BuildForge is deployed, the more advantageous it is to development teams. BuildForge customers who had deployed the product to large numbers of developers and had more experience with the product derived significantly greater benefit from BuildForge tools.

As impressive as the survey results are, the overall figures from the survey may understate the benefits that the product can deliver because the survey was given to both new and established respondents. Several of the respondents in their first six months of deployment indicated significant benefits in many of these areas, but felt it was too soon to quantify their results.

The following case study illustrates how one of BuildForge's mature customers was able to increase efficiency in a heterogeneous, multi-platform development environment:

Case Study:

BuildForge enables global telco to eliminate islands of technology and create more efficient and timely builds in a multi-platform environment

The CRM division of a global telecommunications company was experiencing serious build-related issues. The lack of any standardized, repeatable build processes prevented them from creating timely builds and made it difficult to locate essential information about the status of releases. This team had many critical applications in its charge, including back-end systems for VOIP, email, and the web as well as several customer front ends to support their telecommunications services.

The team was also experiencing change management issues, including a lack of coordination between their source control system (Rational ClearCase) and their internally created build system which made it difficult to reproduce builds accurately. Disparate build processes abounded within the division, creating a series of technology and information islands across their Solaris, Linux, Windows, and AIX platforms.

More concerning was the realization that there was little to no documentation for any of these processes. In addition, the five CM teams – including an offshore location in India – had no common way to share best practices or communicate critical build information. The team set out to find a solution to address these issues.

The team needed a system that would standardize build processes across different languages, operating systems, and platforms. It required a single, high level entry point suitable for all members of the development organization – including developers, project managers, and production managers – where individuals could easily start a build and receive real-time metrics on its progress. They also needed a solution that would give the CM team the ability to define development best practices that would be practiced consistently for all projects, and could be easily extended to additional teams and projects as needed. In essence the team needed a more manageable, reliable environment.

The company became an early adopter of FullControl and a Beta test site, and is now one of BuildForge's most mature users. We spoke with one of the company's configuration management team leads who had been active in evaluating and purchasing BuildForge.

He was particularly impressed with the difference BuildForge made to the efficiency of their development processes. Before BuildForge, the development timelines were always gated by a lengthy build process. The team had a hard time scheduling things because it always had to work around the builds. The team leader said, "Once we automated the process with BuildForge the whole situation turned around. Tasks that used to take our developers 12 hours could now be accomplished through an automated process in far less time."

He further noted that BuildForge helped increase the visibility of the CM team to the rest of the development organization in a positive way. "Shortly after installing BuildForge, the department received a lot of attention initially because of the difference it made. Once the product had been implemented for a longer time, the attention went away because builds just weren't a problem area any longer," he said.

The team needed a system that would standardize build processes across different languages, operating systems, and platforms. It required a single, high level entry point suitable for all members of the development organization....

The team leader was also struck by the return on investment that the product delivered. In a relatively short amount of time, the team doubled its efficiency. BuildForge gave it the power to handle twice as many projects without adding more people. BuildForge created a common interface and a centralized control point that eliminated bottlenecks, made it easier to manage builds, and delivered a considerable improvement over their previous in-house system.

Most importantly, the team was able to integrate BuildForge seamlessly into the organization's existing development environment which increased their efficiency and shortened release times with minimal implementation time.

The leader said, "With this product you get more than direct ROI; it also gives the CM team better metrics to improve their processes." BuildForge provides everyone involved in the development process with better data. The company estimated a $1 million dollar annual ROI for one project alone. Based on the results achieved, other groups in the organization are considering using BuildForge."

In a relatively short amount of time, the team doubled its efficiency. BuildForge gave it the power to handle twice as many projects without adding more people. The company estimated a $1 million annual ROI for one project alone.

4. Respondent Customer Experiences

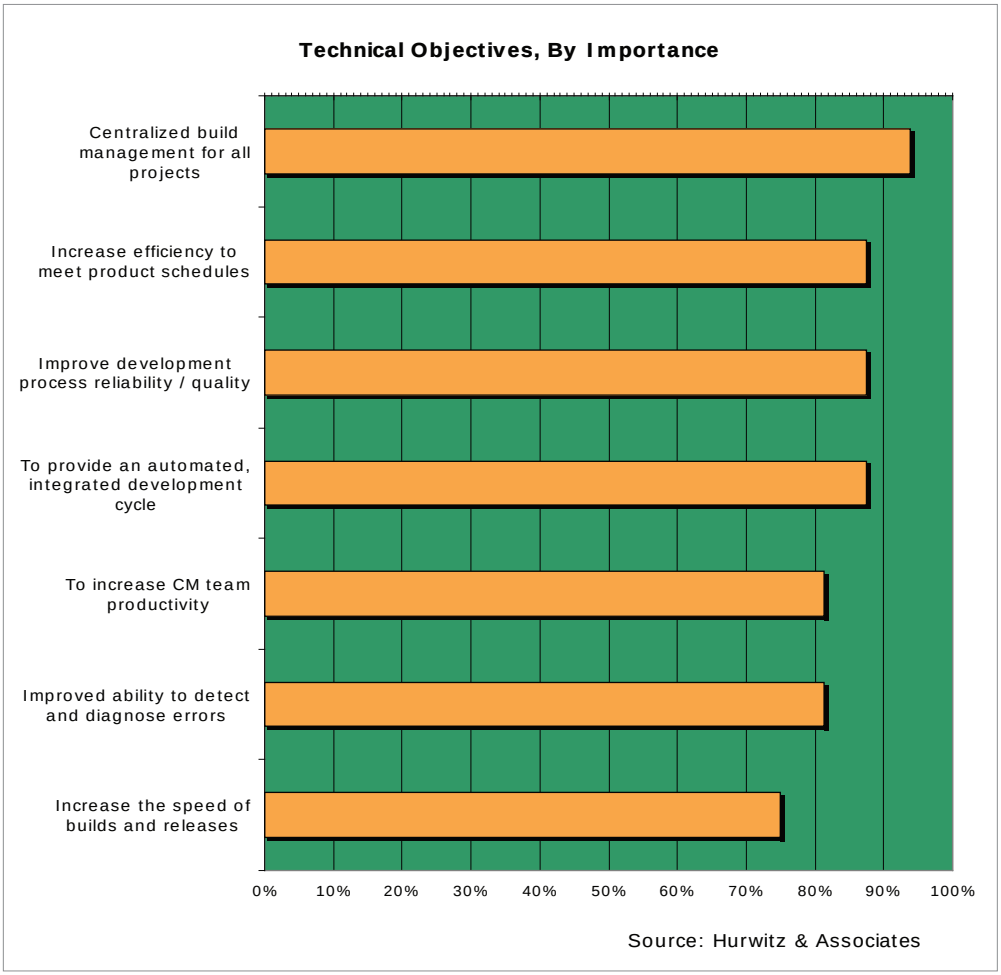
A Desire for Centralization, Efficiency, and Improved Reliability

Respondents were very consistent in their objectives for BuildForge. Figure 9 on the following page illustrates the technical objectives that BuildForge customers rated as "important" or "very important."

Centralized build management for all projects was ranked as the most significant of these objectives – given by 93% of respondents. This was closely followed by the ability to increase overall efficiency to meet product schedules, the need for improved quality, and the ability to integrate end-to-end development cycles. Also rated highly was team productivity, the ability to quickly identify and diagnose errors, and increasing development speed.

When analyzed together, these objectives convey a desire for the majority of respondents to improve the efficiency and reliability of their development cycles. We infer from this data that internally developed solutions were showing signs of strain – resulting in missed production schedules and delays in delivering products and solutions to customers.

Figure 9: Objectives Ranked by Importance



The following additional objectives were cited by the respondents as being important to their organizations:

- providing developer self-service to improve individual productivity;
- having and open framework to support and integrate existing development tools and platforms;
- enabling agile development (i.e. implementing continuous integration for faster development cycles);
- the ability to have more visibility into bottlenecks in the development process;
- establishing a common system for geographically distributed teams; and
- the ability to maintain security and customize access for specific team roles.

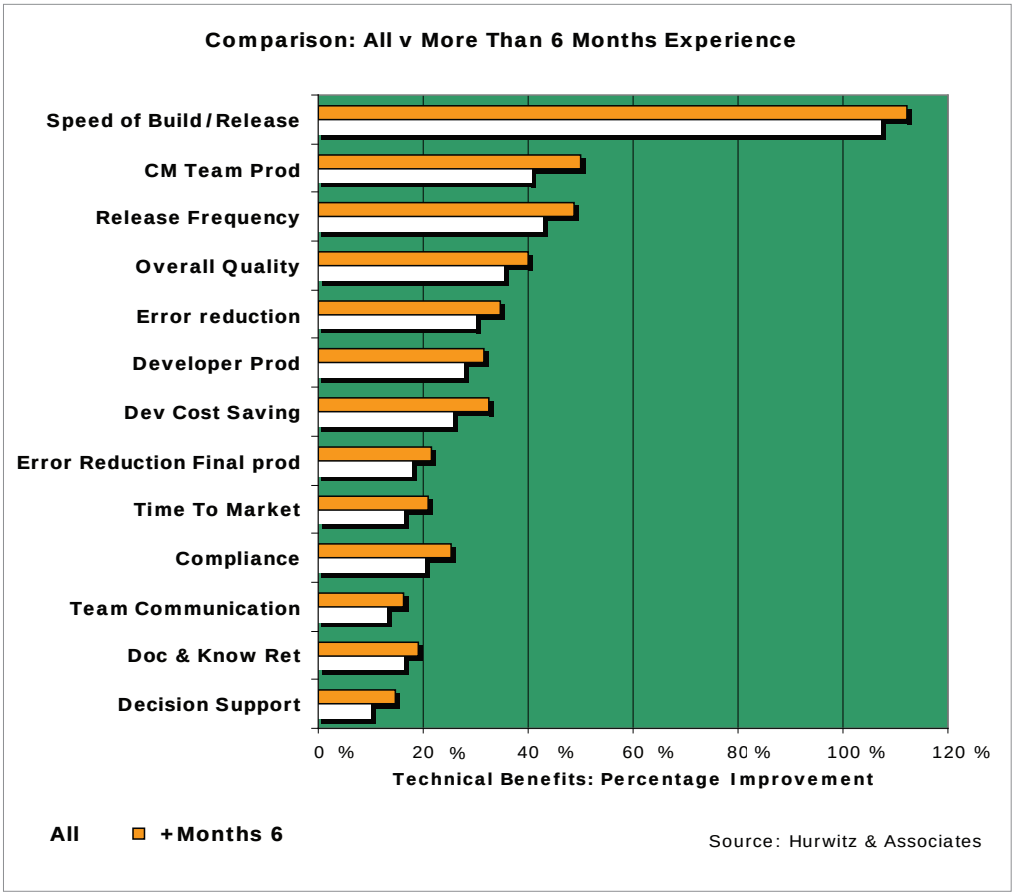
5. Technical Benefits Derived With BuildForge

The survey asked respondents to provide both qualitative and quantitative estimates on the impact of using FullControl within their organization. As mentioned earlier, survey respondents included new customers (who had used FullControl for less than six months) as well as more seasoned customers, and we wanted to determine if there was a significant difference in the benefits obtained between these groups.

We discovered that new customers were able to achieve results similar to long-time customers. This validates BuildForge's claims that the product can be implemented and deployed in a relatively short period of time. From this data, we can infer that customers experience a rapid time to value when using BuildForge. The results also suggest that benefits continue to increase over time. Figure 10 provides a summary of the technical benefits derived for new and mature BuildForge customers.

...customers experience a rapid time to value when using BuildForge. The results also suggest that benefits continue to increase over time.

Figure 10: Comparison All Respondents to Those with More than 6 Months Experience Using FullControl



Dramatic Acceleration of Product Builds

Far and away the dominant benefit reported by the respondents was the ability to increase the speed of development cycles very significantly. On average, the improvement was 110%, but many customers cited performance improvements of 5 to 20 times that of previous levels. While it is not unprecedented that a fully automated capability can deliver such a level of improvement when it replaces a semi-automated capability, these results are certainly substantial.

Faster development cycles are a dominant benefit of FullControl. On average, the improvement was 110%, but many customers cited performance improvements of 5 to 20 times that of previous levels.

Significant Improvements in Team Productivity, Release Frequency, Product Quality, and Cost Savings

The following six additional benefits were cited with significant improvements ranging from 20 to 40 percent over previous solutions employed by the respondents:

- **Increased CM Team Productivity:** FullControl's automation increased the productivity of the configuration management team significantly (over 40%), although several responses were 90% or higher. Respondents commented that FullControl removes the support burden of home-grown systems from the CM team and allows them to concentrate on more important tasks.
- **Release Frequency:** 40% of respondents commented that BuildForge improved their ability to deliver releases more frequently, with some responses as high as 90%. The significance of this benefit will vary based on whether development teams choose to ramp up the number of releases, but it certainly indicates that teams are able to conduct more iterative code-build-test cycles as prescribed in Agile Development and Extreme Programming methodologies.
- **Overall Quality and Error Reduction in the Build Process:** These two factors relate to each other in that error reduction is a major factor in overall quality. Both factors show similar percentage improvements ranging between 30% and 40%, with responses as high as 70-80%. We can conclude that FullControl eliminates many build errors and brings to light product errors, and thus significantly improves the quality of the development process.
- **Developer Productivity:** Customers stated that FullControl made developers 30% more productive, in some cases as high as 81-90%. The product makes developers more efficient in the following ways: providing an automated way to test their code against the production environment, providing automated feedback about the build results, and rapidly directing

Customers stated that FullControl made developers 30% more productive, in some cases as high as 81-90%.

them to the source of errors. Admittedly, this is a smaller aspect of a developer's daily activity, but even small improvements such as 10-15% can result in substantial cost savings across large development teams.

- **Development Cost Savings:** Respondents reported an average 26% reduction in development costs, with some responses as high as 50-70%. Cost savings were attributed to productivity gains for the CM and development teams and fewer hardware purchases due to more efficient use of hardware resources.

Emerging Benefits in Strategic Areas such as Time to Market, Compliance, Team Communication, and Decision Support

The remaining benefits detailed in Figure 10 are also important even though they were reported by fewer respondents than the previous items. Some respondents reported FullControl delivered significant improvements while others indicated only marginal improvements. This data could be interpreted in two ways: either seasoned BuildForge respondents are embracing more advanced uses of the product, or these areas represent new trends for development organizations and BuildForge's technology is being used to address them.

These emerging trends include:

- **Improved Time to Market:** While most respondents noted their development cycles were getting shorter, only 20% indicated this resulted in faster time to market. This may be because releases are scheduled for specific target dates and are rarely pulled forward. However, shorter cycles help catch and correct more errors before they can become serious problems and often enable teams to avoid common project delays and deliver releases on time. As respondents increase their experience with BuildForge and incorporate the product's detailed trend analysis into their product planning, we anticipate customers will experience faster time to market in their future releases.
- **Compliance Audit Trails:** The survey queried respondents about the role development is playing in their company's compliance and governance strategies. While the ability to generate compliance audit trails was not rated as critical as quality and efficiency benefits, we expect it will become more urgent in 2006. We did see early indications that development teams are becoming concerned about traceability, reproducibility, and end-to-end auditing of their development activities from initial coding through to production to satisfy compliance requirements.

While the ability to generate compliance audit trails was not rated as critical as quality and efficiency benefits, we expect it will become more urgent in 2006.

- **Better Team Communication, Documentation and Knowledge Retention and Decision Support:** These final three benefits were noted by several companies, indicating the importance of team coordination, automated documentation, and retained process knowledge to manage organizational risk and increase development efficiency.

The following case study illustrates how one customer deployed BuildForge to connect their disparate tools into an end-to-end Application Lifecycle Management (ALM) solution and significantly improved the productivity of their teams.

"The ESG team is able to support hundreds of users including development, QA, project management, release engineering, and executive management without adding additional headcount."

Case Study:

BuildForge integration and process automation yields substantial productivity gains throughout large global software company

A large, global commercial software solutions company realized it needed to change way it was developing products. The release engineering function was in disarray. All build processes were internally developed and were evolving in an uncontrolled way. To address these challenges, the company established an Engineering Services Group (ESG) whose charter was to establish best practices and standards to bring quality and efficiency to build and release processes for 50 of their product teams. After carefully considering different commercial products and scoping an in-house development project, the company selected BuildForge because of its flexibility and scalability.

We spoke to a Senior Computer Scientist who was instrumental in the decision. He said, "We really needed to change the way we were doing things. The build processes we were using were ad hoc." Each team was reinventing the wheel, and there was no commonality or standardization between products. Releases were difficult to reproduce. The company determined that it could quickly implement a solution that would empower teams by giving them better processes without forcing them to change their tools. BuildForge allowed the company to plug-in and integrate all its existing tools – including source control (Perforce), defect tracking, test automation suites, a localization framework, CD manufacturing, and other proprietary systems – to create automated processes across the application development process. After running a pilot to validate the approach, the company purchased the product.

The company's experience with BuildForge was very positive, and consequently it was quickly and widely implemented. In 12 months, the company has deployed the solution to include all 50 product groups across 7 business units. The company has approximately 100 active projects across hundreds of servers. The ESG team is able to support hundreds of users including development, QA, project management, release engineering, and executive management without adding additional headcount. The company is generating a large user community of BuildForge users and currently 75% of the company's development, quality, and production teams are using BuildForge.

BuildForge made it possible to turn point products into more creative, productive (and profitable) product suites by eliminating disjointed and inconsistent development processes. It has become easier to assemble the company's product suites since BuildForge has enabled a more normalized build process. All the products can now be released synchronously using BuildForge.

The company was also looking to accelerate its development cycles by adopting Agile Development principles, but knew its processes wouldn't scale. For example, it used to implement various language versions of its products one at a time. Now all the translations fire off at once across a pool of servers. The company originally did 18 builds a month using four people. Now it does 360 build per month with only two people. This is a 20 fold improvement with half the staff. The Senior Computer Scientist said, "We couldn't operate at this level of efficiency without BuildForge."

He also said, "Software companies seem to put the least emphasis on build systems and installers - both of which are vitally important. Installers are important, because the first thing the customer sees is the install process. The build process has even wider impact. It affects many other parts of a software organization, affecting quality and speed. It is a critical part of the development process, and many corporations don't realize it."

BuildForge enabled this well recognized software company to change its fundamental business process and improve its quality. The team estimates the efficiency and quality gains provided by BuildForge will save the company $25 million dollars annually.

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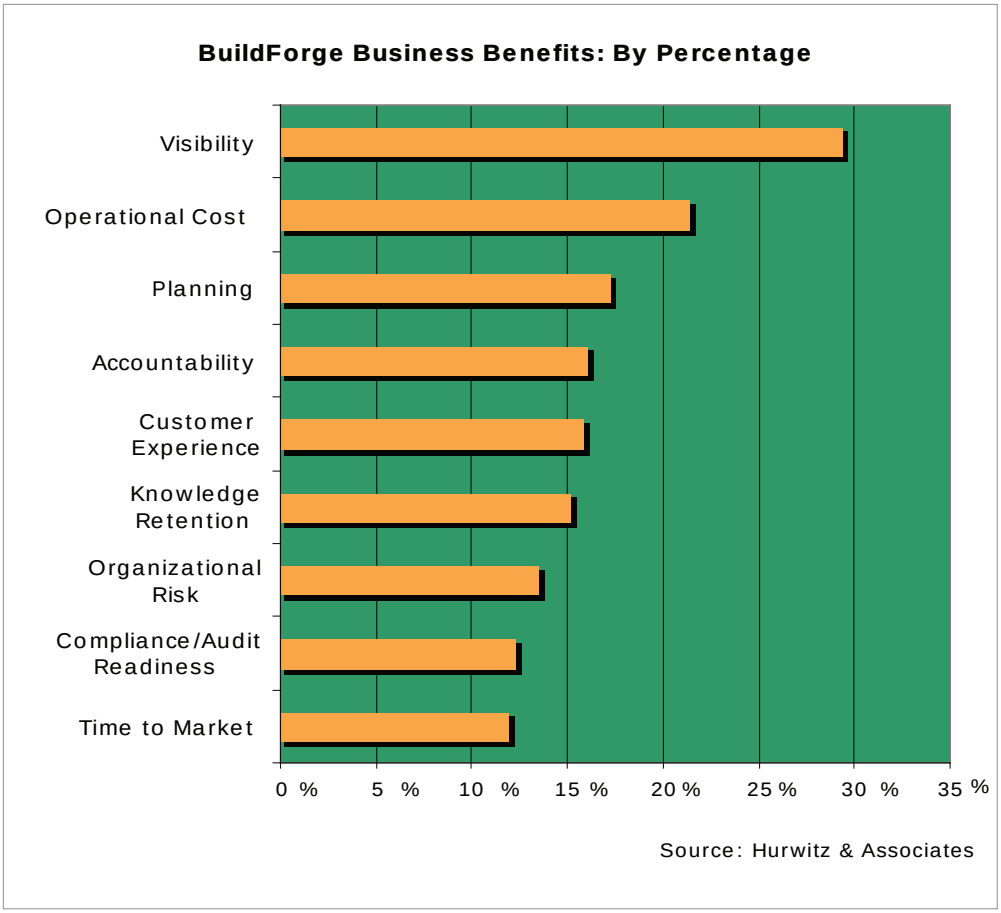
6. The Customer Experience: Business Benefits

For the final part of the survey, respondents were asked to consider the business – rather than technical – benefits of BuildForge. The major business benefits derived by the respondents are identified in Figure 11.

Figure 11: Top Business Benefits BuildForge Respondents Reported (estimated percentage improvement)



Most respondents replied that FullControl's effectiveness significantly increased the visibility of the CM team's value within the organization, and enhanced their own understanding of their development processes.

Most respondents replied that FullControl's effectiveness significantly increased the visibility of the CM team's value within the organization, and enhanced their own understanding of their development processes. As detailed "before and after" statistics are captured by the system, teams are able to demonstrate the positive impact they have on quality and productivity to the rest of the development organization.

Reducing operational costs was the second most significant benefit that FullControl provided. The average improvement was 22 percent but varied throughout the survey replies. One mature customer reported an improvement of over 70 percent.

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The remainder of the business benefits reported by respondents varied from planning and knowledge retention through to compliance and time to market. The pattern in the statistics was noteworthy since some customers reported significant benefits while others reported a lower impact. This was the case for compliance, time to market and customer experience which highlights the wide variety of companies that deploy FullControl. For example, financial services, healthcare, and other IT groups emphasize the need for compliance, while ISV's may view it with less importance. Similarly, an ISV's product or service is often entirely software based and thus both customer satisfaction and time to market are of critical importance.

Although faster product cycles have not yet been adopted by all of BuildForge's customers, there are some notable and remarkable exceptions where product cycles are critical. The following case study details how BuildForge FullThrottle enabled a large entertainment software company to rapidly bring products to market to increase its revenues.

Case Study:
BuildForge's distributed capability and scalability reap financial rewards for large interactive entertainment software company

Interactive game software companies face an escalating development dilemma. The consumer products they produce are getting larger and more complex and so are the software development teams that build them. Teams currently consist of 200 or more developers and because games consoles are getting more sophisticated, teams are expected to grow to as many as 400 developers per game in the next two years. In such teams there will be over 100 programmers and over 200 artists and graphic designers on a single project. In the case of this BuildForge customer, product development is highly distributed with multiple global locations across the organization.

The production costs of sophisticated interactive games are in the tens of millions and the revenues for successful games can rival those of a

Hollywood blockbuster movie. The release of these games is often timed in conjunction with other major events (movie releases, holiday buying seasons, etc), so schedule slips can result in devastating revenue consequences that can threaten the very life of the organization.

We spoke to the company's Director of Configuration Management, who was part of the team that selected BuildForge. When they purchased FullControl, the company's internally developed build environment was stretched beyond reason. Improving it would have required significant development effort to accomplish distributed builds across their vast server pools. FullControl and FullThrottle were selected for their distributed capability, scalability, and the ability to discontinue support for the company's in-house system.

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He said, "Quality control of the development process is crucial for interactive games, simply because of the size of the teams. If a build fails in a 200 man project and you lose 2 hours, that's 400 total man hours lost. Games need to evolve to adopt more mature software development practices. All companies I look at from a configuration management perspective have this problem. Games have it even more. Games often have pre-set release times – they may need to be released at the same time as a movie or when a new games console is brought to market. A game that misses a deadline could lose millions of dollars of revenue."

He also said, "Games are approaching costs of $80 million to make. You are rivaling movies. And you only get so many chances at an $80 million game. You can't make too many flops. Eventually, someone's going to figure out how to make the $80 million game for $40 million. And the way you do that is through scalable process. One of the things that BuildForge enables is a highly scalable process."

FullControl and FullThrottle have proved extremely valuable to this company. FullControl has significantly enhanced the ability of hundreds of developers to collaborate and coordinate their efforts on highly distributed interactive projects that operate on a 24x7 basis. The product has performed with nearly 100% up time. Improved build speed was another huge benefit of using BuildForge products. Through FullThrottle's distributed processing

Through FullThrottle's distributed processing capabilities, the team was able to reduce a 60 hour build to only 3 hours - a 20 fold improvement.

capabilities, the team was able to reduce a 60 hour build to only 3 hours – a 20 fold improvement. BuildForge has made it much easier to support all of the game platforms and allowed the company to focus game development on a single reference platform and automatically build for other target platforms. This has saved thousands of dollars in hardware costs for test environments as well as considerable developer time. Most importantly, BuildForge helps the development team stay focused on what it does best. Before BuildForge, the team spent too much time maintaining and troubleshooting the internal build system which distracted the team from its core competency. Now everyone's focused on a single goal – delivering exceptional games.

BuildForge has created a reliable environment where software applications, upgrades, and bug fixes can be addressed accurately, efficiently, and cost effectively.

7. Conclusion

Few would argue that to maintain profitability and a sustainable competitive advantage it is crucial for development organizations to establish efficient, cost-effective processes that deliver timely, high-quality products. With all of the complexities today's teams face, this is often easier said than done. One of the first steps towards achieving these goals is to examine weaknesses in a company's development process and remove productivity bottlenecks and manual processes that create poor product quality and release delays. Automation, auditability, and information sharing are critical aspects of this pursuit.

Hurwitz & Associates' research reveals that many organizations have significantly benefited from using BuildForge products to improve their development automation and organizational effectiveness. For these customers, BuildForge has reduced or eliminated the number of process and communication related errors that plague software projects, and has created a reliable environment where software applications, upgrades, and bug fixes can be addressed accurately, efficiently, and cost effectively. These organizations have improved the reliability and reproducibility of their development projects while providing a central location to manage software releases across multiple teams, locations, tools, and platforms. This has enabled their teams to accomplish more with fewer staff. No less important to these organizations is the desire to increase development speed and team efficiency so that project schedules can be met and products can be delivered on time.

Why Are Customers Choosing BuildForge?

Our survey of BuildForge customers reflects that organizations were dissatisfied with the status quo, and realized their existing processes and internally developed tools created a drain on the organization and defocused the company from its core competencies.

Our survey further showed that after these organizations deployed BuildForge FullControl and FullThrottle, the products enabled them to achieve significant improvements in speed, quality, and efficiency that reduced operational cost and improved their ability to accelerate development cycles. These improvements were recognized across a diverse mix of vertical industries, and were experienced by small and large development organizations alike. It will be interesting to revisit these customers in another year to see the longer-term impacts of BuildForge on ROI and time to market.

From conducting this study, we believe BuildForge is paving new ground in build and release process management to help companies create a highly efficient and predictable software factory.