As you enter the Houston headquarters of BMC Software and proceed across a peaceful, zen-like courtyard, you notice something that seems out of place in this manicured setting – a dozen cruiser bikes are scattered in front of the building. They provide a practical and simple solution to getting around on a large campus, and they are also the first indication that there is something a little different going on here.

Delivering Faster with Higher Quality than Previously Possible

Sure, agile development works well for small teams. But what happens when you apply agile practices to a program that involves 300+ developers and testers spread from India to Houston to Israel? In less than a year, with the help of coaching services and agile lifecycle management applications from Rally Software Development, BMC Software's Infrastructure Management Group (IMG) transformed their development organization using agile development practices to deliver a major product to the market in less time and with higher quality than previously possible.

Enhancing a Successful Product

IMG is responsible for the Patrol® product line which monitors the applications, networks and infrastructure of data centers at the largest Fortune 1000 companies. Patrol Express provides agentless monitoring of the performance and availability of servers, applications, storage and network devices. Classic Patrol monitors enterprise infrastructure and applications through agents placed on the managed nodes. In late 2004, the IMG decided to make an aggressive move to maintain and grow their revenue. They would enhance their two existing Patrol product lines with a single new architecture that would have the features and benefits of both, while simultaneously increasing scalability and performance. In simple terms, BMC decided to introduce a new generation of their own successful products before any competitors could.

This Ain't No Skunkworks Project

The challenge for Israel Gat, Vice President, Infrastructure Management, was to enhance a highly visible and successful product, and do it quickly. The IMG needed to merge two different product architectures, expand flexibility and substantially increase the solution's performance and scalability. Target delivery of the first release was less than a year away and the teams were split across three countries and 5 locations spanning 11 time zones. In a bold move, they decided that the only way to meet the challenge was to adopt an agile development methodology. BMC chose the Scrum method for planning and managing development activities, and picked Rally Software Development Corp. to provide software and services to accelerate that effort.

> **"If you accept the premise that market needs change faster than the software industry's traditional ability to develop solutions, you're left with the question 'what can we do about it?'**
>
> **For me the answer is Agile."**
>
> **Israel Gat**, *Vice President, Infrastructure Management*

Company and Industry
- [NYSE:BMC] Leading provider of enterprise IT infrastructure management solutions with over 15,000 customers and 2005 revenues of over $1.46B

Development Environment
- Over 300 developers and testers, geographically dispersed with 11 teams in 5 locations: Austin, Houston, Santa Clara, Israel and India

Challenges
- Testing taking 2-3 months per •
- Combine three individual architectures into one infrastructure, all within an extremely short timeframe of 10 months
- Scale Agile development practices up to effectively manage hundreds of personnel across a worldwide workforce
- Matrixed in responsibilities with team members regularly pulled away to fight fires

Solution
- Rally's Coaches traveled to all BMC sites, working with executives, management and engineers to guide the adoption of a formal Agile development process
- Rally's on-demand lifecycle management solution enables BMC to manage multi-team Agile development efforts

Results
- Delivering high-quality releases in a fraction of the time
- Nominated for an ADT Innovat- or's award in the Application Engineering category
- Employees are more engaged and empowered
- Individual team productivity is up by 20-50%
- Better alignment with customer needs
- Higher ROI through Lean Requirements practices
- Customers receive critical functionality sooner through more frequent releases

Scaling Software Agility

Something Ventured, Something Gained

Despite a myriad of challenges and lessons learned, BMC feels the end result is well worth the effort. The most telling measure of their success is that *the organization can not imagine going back to their old way of developing software.* Agile is at BMC to stay. Already their agile development has improved key metrics that drive business growth:

- Development teams are more engaged, empowered and highly supportive of the new development process.
- Individual developer and team productivity is up by an estimated 20-50%.
- Teamwork between product management and development is significantly improved – giving developers better insight into customer needs.
- BMC improved returns by reducing investments and waste associated with unfinished or unshipped requirements, designs and development work.
- BMC increased their ability to incorporate new requirements quickly – making them more responsive to market changes and customer demands.
- Customers are receiving critical functionality sooner through more frequent releases.

> "The benefits of Agile are multi-dimensional. But the most important change is that it focuses the entire organization on meaningful delivery to the customer. Instead of relying on indirect metrics describing degrees of our software's quality and progress, or whether we simply released by a certain date, we ask *'what percent of critical functionality is included in this release?'* This emphasis on customer-perceived value impacts our entire project life cycle pretty significantly. How we plan projects, how we drive them and set priorities, how we change and update our code, etc. all undergo a transformation."
>
> **Israel Gat,**
> *Vice President, Infrastructure Management*

From Pilots to Programs – Adopting Agile in the Large

As in any significant organizational shift, adopting Agile brings its own set of challenges. There were several areas where BMC was able to successfully overcome those challenges and gain significant benefits.

Transforming a Traditional Organization to Agile-Ready

If you look at the best practice recommendations for an agile team – small, co-located, cross-functional with dedicated personnel – BMC's Infrastructure Management teams initially met none of these recommendations and a massive relocation and restructuring program was not an option.

> "When we started with agile, I was concerned it might be a less disciplined method for development.
>
> In reality, it's more disciplined, and provides more accountability. Using agile with Rally's solutions is giving us stronger, more tangible metrics and better visibility into our progress."
>
> **Paul Beavers,**
> *Director, R&D*

At the beginning of the transition to agile, the development teams were:

- Geographically dispersed across 5 locations – Austin, Houston, Silicon Valley, India and Israel.
- Often large, containing as many as 30 engineers
- Matrixed in responsibilities with team members constantly pulled away to fight fires
- Thin in product managers to provide the "voice of the customer" on a daily just-in-time basis
- A large team in India performed most testing and QA activities. But the typical cycle of ship › test › report defects back › rework › check was simply taking too long to complete.
- System integration was laborious, slow, and error prone. There was no "continuous integration" environment for this large, complex and network-dependant application suite.

As they adopted agile development practices, BMC needed to work within some constraints – such as distributed development resources - while addressing the issues under their control. Rally's coaching services helped BMC to identify problem areas and suggest effective solutions. Because Israel Gat had responsibility for the entire development organization, he was able to provide executive level support for the necessary changes.

Designating an Agile Evangelist

This position was responsible for coordinating the training and rollout process; helping to resolve issues and facilitate communications. She also acted as ScrumMaster for the "scrum of scrums" as the need to coordinate multiple, fast-moving component teams became obvious.

Reorganizing Around Agile Teams and Components

As they got more familiar with agile development, BMC re-organized the development teams around the agile process by assigning full accountability for the successful implementation of components to specific teams. Each team includes a ScrumMaster, developers, product manager, test/QA and documentation resources. The teams had responsibility and accountability for delivering tested, quality components into the integration environment.
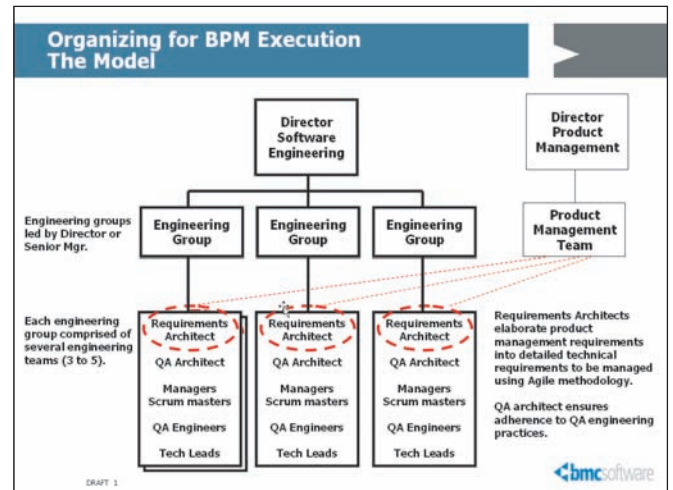
> "Agile development is an empowering methodology for the development organization. With coaching help from Rally we were able to generate a level of enthusiasm and energy in the team beyond what I'd ever seen. We especially like our culture of retrospectives because it encourages us to continuously improve our organization."
>
> **Becky Strauss,**
> *Director Product Management and Development;*
> *Agile Evangelist*

Continuous Integration is Critical to System Quality

Over a period of many months, the teams built a continuous integration and test environment that reduced the time it took to produce a system level build and smoke test from two months to one hour. While continually incorporating code changes from all component teams in a daily build was a substantial challenge that resisted the team's initial efforts, BMC achieved this objective by applying management focus and talented resources. Now the component teams regularly know if new code they delivered to the integration test bed is working systemically, rather than waiting months to discover how their changes impact the whole.

Coordinating Distributed Teams for Round-the-Clock Development

BMC needed to continue leveraging QA resources in India while adopting agile methodologies. Their solution was to create blended QA teams that matched one Lead QA engineer co-located with the US-based development organization with several QA engineers located in India. The co-located Lead QA engineer provides the necessary coordination and communication at daily US stand-ups, and then communicates back to the India-based QA resources on progress and priorities. The result is that BMC is able to gain the benefits of a round-the-clock QA cycle. Unit testing and acceptance testing of new functionality is done overnight with feedback available to the developers when they arrived at work the next day. While this required a substantial political realignment that crossed organizational boundaries, the India resources are now empowered to become more directly engaged in the development and quality activities and create new bonds with their overseas team members.

## A New Role: The Requirements Architect

As BMC went through their initial iterations, they realized there was often a gap between the level of detail in their system level features and the detail needed for iteration planning and execution. The use of simple "throw away stories" was insufficient to their current challenge. To bridge this gap, BMC created a role of requirements architect as part of each development team. Their responsibility is to take the high-level features defined by product management and decompose these, on a just-in-time basis, into the more detailed requirements and stories needed to drive iteration planning and development. This new role increased the accuracy of development estimates and improved the collaboration between the development team and product management. Development efficiency also increased by eliminating efforts formerly wasted on detailing requirements up front that became moot by the time of implementation.

Scaling Agile Practices Across a Large Organization

In BMC's first year of agile development, they rolled out agile processes and tools to over 300 people. Along the way, they learned some key lessons about successfully scaling agile practices.

Accelerate Successful Adoption with Expert Coaching

While the principles of agility are not complex, and Scrum is a lightweight software project management method, implementing agility takes a substantial commitment to training in the philosophies and practices of this new model. BMC engaged team coaches from Rally Software to help train the initial teams and to "train the trainers" for wider adoption and rollout. BMC also engaged Rally's executive coaches to help prepare the organization for the changes ahead and identify and eliminate potential impediments to adopting and scaling Agile.
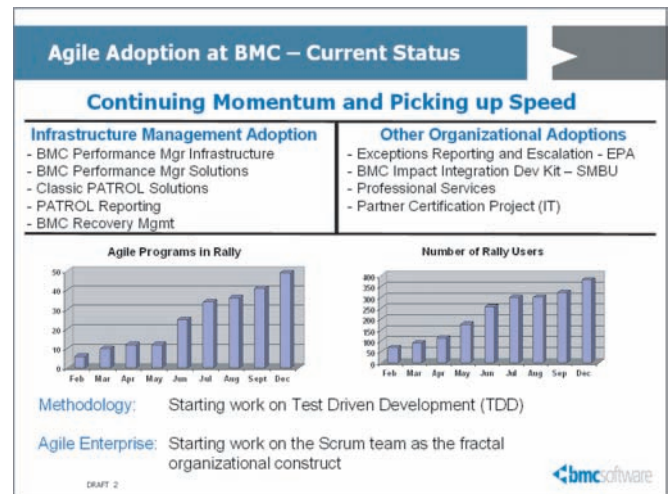
Pilots Identify Impediments and Build Support for Change

BMC kicked off their Agile transition with two self-selected pilot teams. Within the first two iterations, the pilot teams saw every common impediment to producing fully-tested software in rapid iterations – team members were pulled off project to fight fires; architectural blocks arose due to multiplexed resources; there was inadequate access to product owners; and development teams were spread across 3-4 cities. Despite these challenges, the pilot teams could see the value of agile development and were excited to continue. With support from executive management and coaching from Rally the teams were able to get their agile efforts on track and word quickly spread – creating a groundswell of support for the initiative.

Tooling for Coordinating Multi-Team Development

As individual component teams began to get successful, the challenge shifted to coordinating across teams. Although iterations were humming along at the team level, it was initially difficult for managers to get a complete picture of how the release was progressing. They were unable to tell when particular features were complete as their requirements crossed team boundaries.
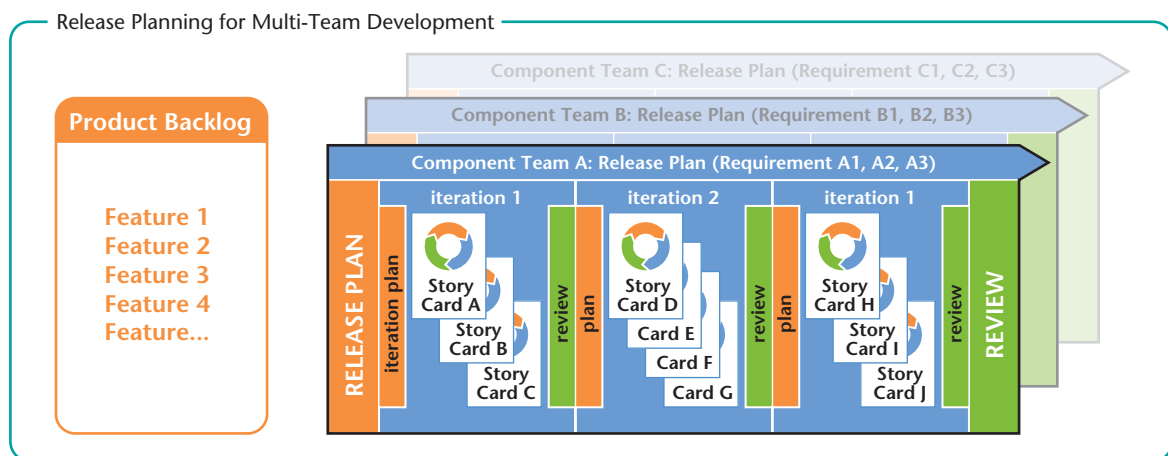
Using Rally's application for managing the development lifecycle, BMC is now able to guide the overall release objectives with themes and high-level features. Features are prioritized with rough estimates in a product backlog and then decomposed into requirements that get scheduled into the component projects where they are implemented with story cards. Rally enables each component team to see how their commitments relate to the whole program, while allowing BMC to track progress at the feature level as each team works through their iterations.

Creating a Highly Responsive Development Organization

The final measure any development process is in how it delivers value to customers. The move to Agile enables BMC to create products in a way that is much more responsive to changing customer needs. Israel Gat summarizes it like this:

> *"Agile really promotes a holistic cycle that ties us closer to our customers. Instead of working very hard, heads-down for nine months, developers led by Director or Senior Managers get much quicker feedback on the usefulness of the features they're creating. But even more importantly, we are acquiring a very deep understanding of our customer's situation. After all, building domain knowledge in the problems you solve is always central to creating successful applications, and this expertise becomes critical when we are developing system management solutions for the next-generation IT infrastructures."*

Accelerating Time to Value
Like most enterprise software companies, the IMG group of BMC had historically delivered major new releases to customers every 12-18 months. With agile development, BMC's IMG can now offer customers new releases 3-4 times per year. Instead of waiting to get needed capabilities, customers have access to new functionality earlier than was ever before possible. Customers that request new features can now see those needs met in a matter of months instead of years.

Embracing Fast-Changing Customer Needs
In their traditional 12-18 month development cycle, defining requirements often occurred many months in advance of the start of development, sometimes resulting in a 2 year lag from customer need to delivered product. This delay often produced stale requirements that were out of sync with the latest user needs and market opportunities.

By dramatically reducing the time between releases BMC is now able to define requirements just ahead of implementation, enabling the business to quickly adapt to changing market realities and take advantage of new opportunities.

> "Frequent releases can help drive top line revenue and bottom line profits. Using agile practices and Rally's solution, we can deliver customer value sooner and avoid a lot of the waste associated with long development cycles."
>
> Dave Hardy,
> *Manager BMC Product Management*

After the First Year of Agile Success: Next Steps

After their first twelve months of agile development, BMC has mastered many of the core practices for agility. With organizational and process improvements in place along with appropriate training and tooling, BMC's IMG has already seen significant benefits from implementing agile practices.

Agile development's built-in retrospectives lead to continuous improvement as teams identify and remove impediments to lowering the cost of iterating. There are several major areas BMC has targeted for improvement to maximize the value they receive from agile.

Stay Releasable Throughout the Cycle
One of the most difficult challenges is staying releasable throughout the development cycle. There are several causes – including late defect discovery and the deferral of major bugs due in part to lack of a continuous build environment. In turn, these issues cause the need for multiple hardening iterations spent on pure test and fix activities. Going forward, BMC will address these issues with two initiatives:

1) Maintaining and improving the continuous integration environment.
2) A focus on pulling testing forward in the cycle using test-driven development (TDD) practices at both the unit test and acceptance test levels, and increasing the investment in test automation.

Build Some "Requirements Runway"
One of the challenges BMC faces is defining the right level of requirement detail at the right time in the life cycle. BMC is now using Rally Software to manage a prioritized feature backlog and to elaborate the requirements and stories for each component that will likely be needed to implement the feature. These expanded requirements improve release-level estimating and planning and more accurately communicate the intent and details of the release to all team members and business stakeholders. Thereafter, the Requirements Architects provide details on each requirement on a just-in-time basis just prior to when the requirement is planned into a specific iteration.

Requirements Runway, continued

Becky Strauss describes the concept like this:

> "The idea of a requirements runway is to plan ahead just enough to keep the project moving as fast as possible, without investing too much time and effort elaborating requirements that change or may not get implemented. There needs to be some advance planning and design so that there is always work to provide to the team. For BMC, we sometimes need more requirements runway, and it works well for when we have some very fixed requirements that must be delivered in a fixed time, but we are able to expand or limit our runway as needed."

New Test Team Incorporates Proven Engineering Practices into the Agile Model
It is easy to overlook standard engineering best practices when focusing on the new planning, development and testing behaviors of the Agile paradigm. Sometimes standard BMC practices like performance testing, load testing and monitoring memory usage weren't executed until late in the development cycle. Pulling these activities forward in the release cycle and maintaining an integration test bed is the responsibility of a newly-formed integration test team that insures that cross-team functionality is performing properly throughout the release cycle.

Expanding Agile to the Company and Market

Like many organizations, BMC's decision to adopt Agile practices started in the development organization. These changes inevitably impact the rest of the company as all departments adapt to this new pace of incremental value delivery. Product managers must re-think how they define releases and work with development. Marketing must adjust how it takes products to market, and sales must re-set customer expectations on how frequently they have access to new functionality.

As they gain experience with agile, BMC is changing the way they make commitments to customers. Discussions with customers are centered more on requirement priorities and how those priorities can be delivered earlier across more frequent releases.

Value of the Rally Relationship

Israel Gat describes the benefits of working with Rally like this:

> "The value Rally provides BMC is experienced in several ways. First is that Rally is staffed with top-notch professionals who provide mentoring and guidance in all the right areas. They are very responsive to our needs, but it goes beyond this. Because I feel the Rally staff sincerely cares about our success, we have formed a partnership that is becoming a strategic advantage in our drive to expand our Agile initiatives throughout our organization.

> "We are getting great traction with our Agile initiatives because Rally's consultants are helping us with the three major requirements for successful deployment in a large organization: 1) an academic framework that provides a solid base for our proposals, 2) consultation and mentoring from experts that have seen these situations before, and 3) on-the-job experience where we can deploy and adapt Agile techniques to our unique environment.

> "Next, Rally's software is helping our teams look at software development in a fresh way. By virtue of supporting this emphasis on meaningfulness to the customer, it helps us move away from old paradigms where documented requirements become months old before implementation and few people understand what they mean or how important they are today. The secret to Rally is that it's optimized for iterative development so it meets little resistance and helps people move in the right direction."

"Rally is your one-stop-shop for succeeding with Agile development."

Skip Angel
CTO, VP Development
Integrated Services, Inc

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