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Environmentally Aware Software Investment Yields Smarter Products and Business Operations

A Stratecast Whitepaper

Environmental conservation initiatives have moved from esoteric thinking to commonplace consumer and business consciousness. Hardly a day goes by that we do not see packaging, advertising and informational displays exhorting a more environmentally sound way of living. Going 'green' is more than a slogan; for many it is a commitment to creating a better world. In business, these initiatives represent a statement of Corporate Social Responsibility and an opportunity to improve operating efficiency and effectiveness. As our approach to environmental stewardship evolves from conscious committed action to cultural norm, our systems and products will become more energy efficient and sustainable by design. And on the journey to a more conservation-minded future, we have an opportunity to make day-by-day shifts toward this goal. In particular, simple changes in software investments and practices can have the dual effect of reduced energy consumption and improved team productivity.

Environmental Stewardship is Now Mainstream Thinking

For the past forty-plus years, dedicated leagues of energy-conscious activists have prodded the larger society to adopt environmental stewardship as a philosophy of daily life. Their mantra of "reduce, reuse, recycle" gave us a convenient handle on the approach and spurred awareness of the effects of our behaviors on the world's finite resource stores.

More recently, business has embraced the realities that resources are, indeed, finite; that reduction in resource consumption is a shared accountability - with a larger goal of reducing our collective carbon footprint[1] and its impact on climate change. Today, making business "green" is more than environmental populism limited to small groups of concerned citizens. It is the wholesale recognition that "doing good" for the environment and "doing well" in business are not mutually exclusive goals – that altruism and capitalism not only coexist, but may be mutually beneficial.

Turning On the Green Light

44% of the world's CO_2 emissions come from travel-related fossil fuel consumption. Individuals are taking steps such as riding their bicycles, and businesses are enabling employees to work from home. The American Electronics Association reports that in the U.S. alone, more than a billion gallons of gasoline could be saved if we all worked from home just 1.6 days per week[2].

A major printer and ink manufacturer estimates as many as 53 trillion pages will be printed annually by 2010[3]. Applying a conservative estimate, this has the potential to require the destruction of more than 125 million trees. Individuals are making efforts to reduce print volumes and recycle paper. Businesses are fostering reduced paper consumption by promoting the use of Web 2.0 enablers such as blogs, wikis and other electronic tools that allow people to review, comment and collaborate on deliverables without printing.

36% of the CO_2 in our environment comes from electricity usage. Individuals are conserving energy by turning off lights and switching to compact fluorescent bulbs. Companies are seeking ways to make data centers and business operations more energy efficient by modernizing equipment and systems, eliminating application overlap and distributing workloads more effectively.

1. 'Carbon Footprint' is a popular term to illustrate the impact of our behaviors on the production of greenhouse gases. It measures tons of carbon dioxide released into the atmosphere from daily activities such as cooking, travel, manufacturing and the like. Source: www.carbonfootprint.com.
2. Source: www.aeanet.org
3. HP's Imaging and Printing Group Annual Analyst Conference, October 7-9, 2008.

Environmentally Efficient Software – Easier Than You May Think

Managing your investment and practices for developing software is one way to meet business objectives. It presents opportunities to reduce carbon footprint, reduce costs and improve resource efficiency in the future. In software engineering, environmental improvements can be fostered by reducing travel, reducing paper consumption, improving energy efficiency and by 'thinking green' when designing new products. IBM® Rational® software supports these improvement initiatives. Consider the following:

Reductions in Travel – Today's development teams are frequently geographically dispersed. Some are scattered across the globe in different technology centers, while others take advantage of the opportunity to work from their homes. But they need not work in isolation. Collaboration platforms provide an interactive, real-time project environment, allowing a team to think and act in unison. Team members have a "web 2.0" experience in these platforms, because features are always-on, customizable to team work styles and provide selectable levels of automation, making telecommuting a practical alternative to reduce travel's costs and environmental burdens.

IBM Rational Team Concert™ is one such travel reduction alternative. Based on the Rational Jazz™ collaboration platform, Rational Team Concert allows geographically distributed teams to collaborate on, share and track progress on deliverables from requirements through test cases. The team can maintain consistent, real-time communication and up-to-date views of requirements, software builds and project status, taking teamwork and collaboration to the next level of productivity.

Reductions in Paper Consumption – The business of software delivery no longer requires reams of "binderware" that consume costly paper and office supply resources. IBM Rational software enables artifacts to be "born digital" and remain in this state throughout their useful life. A few examples include:

- IBM Rational Requirements Composer provides teams with the electronic ability to visually capture requirements for a project using sketches, storyboards, comment threads and rich-text editors. This allows requirements to be kept up-to-date, more visually compact and require less text
- IBM Rational ClearQuest® and IBM Telelogic® Synergy Change™ process signatures electronically, aiding the management of contracts, requirements and development review gate approvals. Change requests are traceable and can be handled electronically
- IBM Rational Software Analyzer facilitates paperless code review with online error identification and suggested changes.

More Efficient Use of Power and Resources – Consider that more than 40 percent of the cost of data center ownership is attributable to cooling and electrical costs. Further, industry estimates suggest that for every watt of application computing power in a data center, 30 or more watts of power are required for servers, fans, drives and other supporting technology[4]. Imagine, then, how wasteful it can be to maintain inefficient, outdated code, particularly in light of the skyrocketing demand for data center power, which in some cases goes beyond the limits of available supply. Clearly, businesses need to gain understanding of their current energy consumption and find ways to reduce it.

One approach to the energy use challenge is a renewed focus on Enterprise Architecture (EA). A likely result of a comprehensive and ongoing Enterprise Architecture initiative is a smaller carbon footprint because the primary focus of EA is on improving efficiency and productivity. IBM Telelogic System Architect® helps companies to establish a blueprint for energy impact analysis and streamlined processes, leading to more

4· Source: Springboard Research

energy-efficient and cost-effective business operations. New capabilities provide identification, visualization and analysis of power consumption by factors such as location, application, data, processes and strategy. Real-time queries answer questions such as "Which applications consume the most power to make processes happen?", "Which location uses the most power?" or "Where can we have the greatest short-term impact in reducing energy costs?" The answers aid decision-making on future initiatives and link them to the organization's key goals, strategies and objectives.

Just as production data center resources need to be optimized for peak energy efficiency, test lab resources require the same scrutiny. Rational software helps teams deliver enduring quality and help quality management teams use servers, computers and human resources more efficiently through automation of testing. IBM Rational Test Lab Manager automatically constructs complete testing environments and then removes the environments once test cycles are completed. This helps minimize the number of servers (and server hours) needed for testing, while automation reduces human workload.

Another approach to more cost- and energy-conserving business operations is Enterprise Modernization. Companies are evaluating workload improvements in their core, mainframe-based systems, while some are considering a move back to mainframes for certain functions. These workhorses of the data center are inherently energy efficient because they are designed to handle multiple large workloads of varying types at high rates of speed with a single power and cooling facility. IBM Rational Enterprise Modernization solutions can extend the value of current systems while moving them to today's modern, flexible architectures and technologies, including IBM System z® and System i®. IBM Rational Asset Manager helps development leaders locate and assess software assets for reuse opportunities, while Rational Transformation Workbench accelerates the change to more modular, reusable components.

Building Intelligent Products and Services - "You can't make a product greener…without making it smarter"[5]. Adopting a "smart systems" approach in designing energy efficient products is key to creating opportunities for better operations. Consider for example, a utility company where monitoring systems alert and allow them to switch energy sources based on the real-time availability of the most environmentally friendly energy sources. Also, consider the intelligence needed to manage fuel consumption in a hybrid car or the complex system of sensors needed to optimize heating and cooling in commercial office buildings. It is the software that enables "smart" innovations to succeed.

IBM Rational helps customers deliver low environmental impact products and systems by enabling innovation and lowering the cost and risk of development. Requirements management solutions, anchored by IBM Telelogic DOORS®, help clients gain (and maintain) consensus on product plans, and understand the impact of energy-conscious requirements on market demand and system design. Engineering process guidance and software change management solutions improve productivity and increase quality of low environmental impact systems by automating system engineering best practices and enabling consistent development team collaboration throughout the life of the project. Finally, solutions supporting model-driven development such as IBM Telelogic Rhapsody®, speed "smart" systems innovation in even the most intricate embedded systems through rapid prototyping, visualization and simulation capabilities.

5· Friedman, Thomas. "The Green Road Less Traveled." *The New York Times*, July 15, 2007.

Environmental Conservation Efforts Yield Commercial Dividends

Achieving environmental objectives while bringing smarter products to market, improving business operations and enhancing team productivity is more than just some vision of a future state. It is a bottom-line reality for firms across a wide range of industries including energy, telecommunications, and healthcare, to name just a few. For these companies, the unifying element is a commitment to advanced software engineering methods aided by leading edge architecture, collaboration, design and delivery technologies. IBM Rational solutions feature prominently in many of these success stories, as they help companies create a more energy-efficient future.

A European energy company developed a smarter utility network by installing remote monitoring and control devices for up-to-the-minute status. IBM Rational Software Architect helped the initiative by providing a model-driven development approach for creating well-designed applications and services in the network. The result? Fault search time was reduced by a third, along with the potential to reduce service outage minutes as much as 50 percent. Read more about: DONG Energy: Making the most of the intelligent electrical grid.

A large US state tax department put its paper forms into electronic format and enabled taxpayers to file them via a Web by leveraging IBM Rational Application Developer with IBM SOA solutions. Read more: Large State Tax department enables paperless filings with IBM SOA solution.

A medical technology company used IBM Telelogic Synergy® and IBM Telelogic Change™ to create a product that provides immediate, secure, browser-agnostic access to patient images over an Internet connection to any laptop, PDA, iPhone, physician portal or other web-based solution. This product provides the means to reduce waste from the use of paper and film in traditional records management settings. Read more: IBM and Merge Healthcare Join Force for Better Development of Advanced Medical Imaging Technology.

A diversified power management company used IBM Telelogic Rhapsody to design a hybrid hydraulic transmission. Trucks using the transmission have the promise to consume up to 50% less fuel and reduce CO_2 emissions by a third. Read more: Eaton Taps IBM for Vehicles Driven by Fluid Power

Companies see environmental stewardship as good brand building, good business and the right approach to our environmental accountability. Conserving resources while improving revenues, reducing costs and enhancing productivity is now well-rooted in mainstream business thinking. Our business models have evolved to the point where we can see the intersection of environmental altruism with the bottom-line focus of capitalism. At this nexus lies software, with solutions that foster greener, less costly and more easily sustained product development and automation.

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