THE YANKEE GROUP

THE YANKEE GROUP REPORT

Creating and Delivering Value with Collaborative Software Development Tools

Executive Summary

New collaborative applications are redefining the way companies create and deliver intellectual property to the market. Collaborative software development (CSD) solutions enable engineers, marketers, manufacturers, and service providers to share information and coordinate activities without compromising the integrity or security of the engineering process. New CSD technologies help companies navigate complex market forces, including the drive toward multisite development environments, the diffusion of product development resources, and the proliferation of software.

Current collaborative technologies can be segmented into three environments: free-form interaction, process collaboration, and structured data exchange (see Exhibit 1). CSD solutions deliver process collaboration capabilities. Enabling stakeholders, including internal staff and external service providers, to collaborate in the software development process will determine how quickly and efficiently companies can build customized corporate systems and bring software-dependent (both software-only and hardware with embedded systems) products to market.

Exhibit 1.
Collaborative Technology Segmentation
Source: the Yankee Group, 2003

Collaborative Category	Delivery Model	Environment	Duration	Business Function
Free-Form Interaction	Free-Form Collaboration	- Open - Process Poor - Free Form	- Undefined	- Create - Negotiate - Question
Process Collaboration	Collaborative Networks	- Defined Processes - Standards - Clear Objectives	- Ongoing - Iterative	- Develop - Design - Produce - Sourcing
Structured Data Exchange	Enterprise Applications	- Structure - Standards - Rigidity	- Rapid Exchange - One-off Exchange	- Accuracy - Interoper-ability

CSD Solutions

Table of Contents

I. Collaborative Technology Market Drivers

Three powerful market drivers are challenging the business practices and information system strategies of companies that make and sell software or products that rely on embedded systems:

- The diffusion of software development talent and capacity
- Time-to-market pressures
- Software proliferation

These market drivers encourage companies to rethink the way they develop and deploy internal IT systems and the way they create and deliver standalone and embedded software to the market. As the BGI case study in Section III demonstrates, companies are leveraging CSD applications to effectively respond to market drivers, take cost out of the business, and deliver powerful intellectual property to the organization.

Diffused Talent and Capacity

The people, companies, and assets involved in creating software used to run the internal IT shop or software sold as a product or within an embedded system have become increasingly diffused over the past several years. This trend is expected to continue into the foreseeable future. The monolithic production company with the ability to conceive, design, engineer, manufacture, and distribute products is a thing of the past. The monolithic IT shop, creating, testing, and delivering new proprietary applications from a single site, also has been retired.

Software development has always required detailed, technical knowledge that spans geographic and organizational boundaries. In addition to the growing diffusion of specialized knowledge, firms also must deal with the increasingly complex technologies on which software is based, including hardware, middleware, and distributed tools.

It is imperative that companies carefully and effectively manage distributed development resources. This is because such extended business models bring a higher level of risk since firms must rely on partnerships with external contractors and vendors. The success of projects large and small depends on the ability of companies to securely collaborate with partners and align distributed development with corporate goals.

The ongoing need for software process improvement also means that companies must address the challenge of reusing software. Duplicated and misaligned development efforts are not uncommon. Streamlining software development processes will become even more critical as companies shift away from building software from scratch toward assembling software and systems by integrating components.

"Throwing code over the wall" to meet integration needs is not an effective development strategy. Single-site development environments are disappearing quickly. Unifying multiple-site software development resources, working with cross-functional teams in parallel, and integrating components is becoming the norm.

Offshore development has exploded over the past 3 years as the IT outsourcing trend becomes pervasive. Enterprise software leaders such as SAP and i2 currently depend on offshore software development to deliver products quickly to market. SAP relies on development resources spread across North America, EMEA, and Asia. Sixty percent of i2's software development activities are completed in India. Today, Accenture has two new development facilities in the Czech Republic and India in addition to more than 20 delivery centers worldwide. Its India location concentrates on providing enterprise application development services including UNIX, Microsoft, and SAP applications. Accenture is just one among many in the crowded offshore development industry.

Offshore development is not just about leveraging lower costs; it is about gaining access to rare technical skills and future technical developments. Multinational firms that have aggressively sought new markets for their existing products and services will continue to rely on globally distributed development resources. As the offshore sourcing industry rapidly evolves into centers of excellence based on global best practices, successful software development will increasingly rely on collaboration with global partners.

The diffusion of software development talent and resources creates business challenges for both the internal IT shop and the product development team. Companies are becoming increasingly specialized, focusing on areas of competence and outsourcing as many non-essential functions as possible. This specialization creates narrowly focused but highly effective corporate entities (high-tech contract manufacturers, outsourced semiconductor design shops, electronics distributors). The effect also creates increasingly potent corporate interdependence.

Developing a new application in the IT shop or moving software products (including embedded systems) from conception to production requires coordination across division, corporate, cultural, and system boundaries. Companies that can successfully manage dispersed but highly effective specialists will be best positioned to deliver killer proprietary applications to internal corporate users or best-in-class software (including embedded systems) to the marketplace.

Time-to-Market Pressure

Increased corporate agility, easy access to product information, and demand for mass customization create intense time-to-market pressures. New hardware and software product introductions require more efficient internal corporate systems and more powerful overt and embedded code. Effective CSD applications can help companies develop internal IT systems or create marketable software products more quickly by wringing maximum value from distributed development resources.

The corporate world grows more efficient by the day. New technologies and new business theories allow companies to quickly and cost-effectively adapt to changing market conditions. New automobile models are released in ever-increasing numbers. Communications and high-tech products are evolving at an incredible pace. The diversity of plastics, pharmaceuticals, and industrial chemicals available in the market today far exceeds the diversity of products available 25 years ago. These new systems, business theories, and products have one important trait in common: software powers all of them.

Another historic phenomenon changing the way companies make and sell products is the massive creation and proliferation of digital information. A recent study titled *How Much Information?* published by the School of Information Management and Systems (SIMS) at the University of California at Berkeley, found that 12 exabytes (1 exabyte = 1 billion gigabytes, or 1,000,000,000,000,000,000 bytes) of unique information were generated over the past 300,000 years. The study projected the total of new information in 1999 alone to be 1.5 exabytes.

Information proliferation is altering the way individuals and companies function. Most of the new information is generated electronically and, as a quick search for the word "cars" on Yahoo! indicates, electronic information is shockingly easy to store, access, and disseminate. The ease-of-use of electronic information has fundamentally altered buying processes, placing a tremendous burden on the seller. Complexities associated with reviewing products, gathering competitive information, sharing opinions, and understanding market conditions have declined dramatically in most product categories. And informed customers, although valuable, are also very demanding.

Demand for mass customization is another powerful force changing the face of the corporate world. Henry Ford's famous "any color, as long as it's black" adage is a thing of the past. Configuration technologies enable companies to more easily tailor a product to a customer's needs, without breaking the bank. Lean manufacturing strategies enable companies to quickly alter the production process to meet changing market conditions. Companies that have outsourced manufacturing capabilities can adapt quickly to customer needs by simply finding new partners instead of investing in new capacity or retooling a shop floor. But, as many companies are discovering, catering to a customization request is quickly becoming a requirement for doing business.

Software Proliferation

Software has become more common and more important to effective organizations. It is becoming the distinguishing characteristic in many of today's most popular products, including mobile phones, medical equipment, automobiles, and manufacturing equipment. Applications, including internally developed solutions and commercially available packaged software, play a critical role in the success of modern corporations such as Boeing, Wal-

Mart, HP, and Cisco. Leveraging distributed development resources to deliver unique intellectual property used to power both products and the internal IT shop will be a key success factor over the next 5 to 10 years.

Software is becoming the key distinguishing value for many companies. Companies such as Sun, EMC, and Cisco all depend on delivering their intellectual property via software as a means to combat hardware commoditization. Delivering customized solution bundles enables companies to offer higher valued goods. Embedding specialized software into hardware products enables a company to stand out from the competition.

Software is now the competitive battleground. For mobile telephone technology providers, it's no longer about the form factor and making mobile phones smaller. Wireless software capabilities represent the competitive distinction and selling point as much as, if not more than, a phone's style or quality of engineering. A leading handset manufacturer reorganized its manufacturing operations by standardizing on components and diverting its focus to working with partners to deliver innovative design, style, and software.

As the demand for embedded software proliferates, demand for composite applications also is rising. Developing composite applications requires breaking out application development cycles and delivering smaller components to market faster. Software providers will have to develop components of larger suites while lowering integration and customization costs. Emerging Web-services technology and componentized software require more frequent integration and reuse of software throughout the development life cycle. This trend will continue over the next 3 to 5 years and push the need for collaborative software development.

Creating and maintaining effective back-office systems also has become a key requirement for large, successful organizations. Whether a project team is extending a packaged application by customizing it or deploying a proprietary solution, CSD applications help companies make the most of their internal software development assets and external partnerships.

II. Leveraging Collaborative Software Development Technology

Companies can no longer rely on collocated and single-site software development environments to react effectively to time-to-market and cost pressures and meet increasing software development demands. Software projects must adhere to the new rules. Today, successful development teams take advantage of global resources, with little regard for geographic or corporate boundaries. Managing distributed development teams and capitalizing on talent and resources wherever they are located is no longer an option—it is a competitive necessity.

The emergence of the Internet has combined with advances in application functionality to create a new collaborative medium, which has begun to fundamentally change the way companies interact. The Internet provides a standardized information exchange platform and application technologies add features such as security, authentication, collaborative rules of engagement, process structure, workflow, and information management.

As a communications platform, the Internet provides a host of collaborative opportunities, including software development. Collaborative applications tools can be used to add

question-and-answer sessions, document sharing of any software development artifact, schematic collaboration, and other important capabilities. Companies can employ collaborative applications to help manage projects either across divisions or across companies. Basic information access (forecasting data, inventory availability, engineering plans, or production plans) across enterprises can generate tremendous value. Joint product design, engineering, and change-management tools can help disparate partners bring products to market more quickly.

Managing software design resources in a collaborative environment is one way companies can create a competitive advantage. Collaborative software development technologies add structure, velocity, and processing power to the exchange of corporate information, thereby improving the quality, timeliness, and usability of that information. More effective software development resource management enables product creation, delivery, and support stakeholders to react more effectively to customer, supplier, and market dynamics. Collaborative development solutions orchestrate how companies, individuals, and systems can best use development resources both within and between companies.

III. BGI Case Study: Using Collaborative Development to Deliver Innovative Investment Management

Barclays Global Investors (BGI), one of the world's largest asset managers, offers investment strategies including indexing, tactical asset allocation, and quantitative risk-controlled active strategies. The company is an innovator when it comes to investment management, bringing science and technology to the investment process.

BGI is challenged by development pressures similar to those described in this report. Its software development resources are distributed across divisions, geographies, and business relationships. It faces time-to-market pressures to deliver innovative financial products and software systems, requiring speedy group development and project completion. Finally, BGI's overall business increasingly relies on the importance of software and its proliferation throughout the organization. These three collaborative technology market drivers have had a significant impact on BGI, prompting the company to restructure how it creates and delivers innovative investment products.

The Problem

BGI manages more than $897 billion in assets (as of June 30, 2003) and more than 2,000 funds in 39 countries. The company was driven to look for a cohesive global solution for collaborative software development. BGI faced three major challenges:

- **Managing distributed development resources.** BGI maintained 400 developers based in 5 locations around the world, often working on both local and global systems. The company lacked a single global standard development environment and required a framework that would enable collaboration among its developers as well as its business users dispersed across different geographies. BGI had problems managing a centralized code base for reuse or internal auditing because of its distributed development resources. Faced with regulatory pressures to actively manage its code base, and

problems with low productivity due to distributed resources, BGI wanted more control over its distributed network of developers and business teams.

- **Managing time-to-market pressures.** BGI continues to face a growing need to move faster while delivering leading technology-based solutions for investment management. Compounded by competitive pressures, BGI wanted to reach out to its global developers and business teams and actively bring them into a unified development process, driving greater efficiency and quicker time-to-market.
- **Managing software proliferation.** As an innovative, leading fund manager, BGI was engaged in projects to deliver such offerings as high-end equity trading systems and Web-based client order systems. BGI had high software development, infrastructure, and support costs. The legacy software configuration management tools it had in place were either too complex or overly simple. BGI recognized an opportunity to consolidate its infrastructure and facilitate code reuse and shared expertise among its technical and business teams.

The Solution

BGI launched its Software Management Project (SMP), a corporate-wide initiative aimed at unifying project managers, developers, and business users on a single global software development collaboration platform. BGI had high expectations for increasing time-to-market, managing software development costs, and improving its ability to enhance software development functions.

BGI considered traditional development tools that it was already using internally. The tools were not globally scalable, nor did they offer capabilities beyond version control.

The company required a software development solution capable of handling its complex requirements for scalability, security, and collaborative functionality. Specifically, BGI considered the following criteria when selecting a technical solution:

- A cost-effective, scalable, and easy-to-administer solution that supports rapid adoption by both business and technical users
- A solution that integrates with existing development tools and across multiple technologies BGI already used on its projects
- A set of Web-based, flexible, collaborative capabilities to support software development including support for software configuration management and issue-tracking functionality
- A centralized repository for projects with strong project administration and change-management functionality
- A secure, role-based permissions model to ensure intellectual property could not be compromised
- A solution that is simple and could be easily and rapidly deployed across BGI's operations worldwide

BGI selected CollabNet, Inc. as its partner to deliver the business application and infrastructure required to address the collaborative needs of its teams. The CollabNet SourceCast environment is designed to help companies respond to resource distribution, software proliferation, and time-to-market forces.

CollabNet's integration solution proved to be the best technology to support BGI's global collaborative development needs. Its software supports BGI's needs by allowing virtual software development teams to communicate, co-develop, share knowledge, track issues and defects, and work with third parties in a Web-based collaborative environment.

The initial implementation of the CollabNet SourceCast environment was a success. Adoption ramped up very rapidly; developers became self-supporting within 1 to 2 days of using SourceCast, compared to a learning curve of several weeks for previous solutions. During the initial 15-day launch, BGI had 40 projects and 150 users ramped up. By the end of 2003, BGI expects to have more than 250 projects and 600 users—both business and technical—using SourceCast.

With the CollabNet SourceCast environment, BGI has been able to easily and securely engage external parties in the development process for the first time. SourceCast also has enabled process improvements through toolset standardization and by improving knowledge capture and reuse. Collaboration tools help developers and project managers communicate more efficiently, resulting in quicker turnaround of projects.

Another benefit is BGI's ability to gain visibility into the status of projects. Business users are more actively involved in managing the product development process, collaborating with IT and monitoring specifications, configuration files, checklists, and standards.

The Value

The CollabNet solution provided the following value to BGI:

- **Reduced time-to-market.** The length of internal software development cycles decreased. Project schedules were cut by 50 percent on at least three projects due to code reuse and sharing. BGI increased developer productivity and reduced software development tool training time for technical and business users by 80 to 90 percent.
- **Improved customer satisfaction and enabled new activity.** Bringing on third parties more efficiently and enabling partner integration has allowed BGI to expand its business relationships with partners. BGI reduced third-party integration time by at least 50 percent and increased its integration success rate. Also, the software development system was easily accessible from home or while traveling.
- **Streamlined internal cost structure.** BGI reduced the cost of supporting its internal development infrastructure by 50 percent when it realized one technical administrator working half time could maintain its infrastructure. Overall, BGI reduced administrative overhead by 85 percent and saved $200,000 in hardware expenses. The collaborative solution also saved $240,000 in travel expenses.

IV. Conclusions

Current market conditions demand new software development strategies. The talent and capacity required to create and deliver valuable intellectual property no longer resides within the four walls of the corporate headquarters. Because of growing corporate agility, buyer access to digital information, and demand for mass customization, time-to-market pressures are increasing. Software has become the distinguishing characteristic of effective Global 2000 organizations, enabling them to successfully introduce new products.

Companies must effectively manage diffused software development resources (both people and IP) to deliver effective products to markets and to develop competitive corporate systems. New collaborative applications help companies create and deliver intellectual property to market. Collaborative software development solutions enable engineers, marketers, manufacturers, and service providers to share information and coordinate activities without compromising the integrity or security of the engineering process. New CSD technologies help companies navigate complex market forces, including the drive toward multisite development environments, the diffusion of product development resources, and the proliferation of software.