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By Michael A. Fontaine, Salvatore Parise and David Miller

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Collaborative environments: An effective tool for transforming business processes

In times of crisis or catastrophe, managers have regretted not having more efficient, responsive communication systems. Collaborative environments, which enable company-wide global teams to identify the source of the problem and develop a response, are an excellent antidote to a lack of preparedness. These authors describe how collaborative environments can do nothing less than save an organization from disaster.

By Michael A. Fontaine, Salvatore Parise and David Miller

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What is driving the use of Collaborative Environments?

In this era of global connectivity, organizations are increasingly adopting and applying Collaborative Environments (CEs) to tap into the knowledge and expertise of their employees, customers and business partners. Collaborative Environments allow two or more participants to

communicate, coordinate and collaborate to accomplish a shared objective. They are constructed from a range of computer and communications technologies, such as instant messaging, e-mail, chat rooms, discussion databases, mobile communicators, shared whiteboards, media spaces/cybercafes, and audio, video or web conferences. Collaborative Environments are not only playing a bigger role in normal business operations, they are becoming more important as organizations move toward global work teams and extended-enterprise partnerships.

Perhaps of greater significance, the use of Collaborative Environments is growing in response to reduced travel budgets, international terrorism, world health epidemics such as SARS, and disruptive events such as "the Great Blackout of 2003" that paralyzed over 50 million people in the eastern United States and Canada. At IBM, for example, even though e-mail and Internet servers were purposely taken down on that afternoon (to conserve power in the Greater New York area), employees were able to fall back on IBM's Sametime™ instant messaging technology to communicate and collaborate with their colleagues. As long as crippling events such as these continue to disrupt normal business operations, CEs will be essential for organizations that hope to maintain channels of communication during times of crisis. As John Kelly and David Stark learned from their research into the preparedness and response immediately following the September 11 attacks:

From the times the planes hit, until the

restoration weeks later of stable telecommunications services and working environments, new communications technologies played an especially large role. E-mail, the web, virtual private networks (VPNs), instant messaging, mobile communicators (like BlackBerrys), on-line chat rooms, cybercafes and other technologies we have adopted over the last decade were essential to many of those struggling to weather the crisis." (Kelly, J. and Stark, D. Crisis, Recovery, Innovation: Responsive Organization After September 11. *Environment and Planning*, Vol. 34, No 9, September 2002, pp. 1523-1533.)

While the use and importance of these new communication media are growing, many business technology executives report that they do not have a plan in place for how their organizations will use collaborative tools. For example, in a recent study of business technology executives, only 38% reported that they had a formal plan in place for deploying collaborative technologies (*InformationWeek/Optimize Research* Return on Collaboration Study of 250 Business-Technology Executives, Feb 2003). For those that do have a plan and have CE initiatives under way, we found that CEs are often *superimposed* on existing business processes without considering how they could shorten, revamp or otherwise impact those processes. In some cases, the selection of a specific CE technology dictates often-unforeseen process changes. This is surprising, given that the business process reengineering (BPR) movement of the early 1990s was built on the decree that, "Instead of embedding outdated processes in silicon and software, we should obliterate them and start over." (Hammer, M. "Reengineering Work: Don't Automate, Obliterate," *Harvard Business Review*, July/August 1990)

In the early 1990s a number of management gurus and academic thought leaders highlighted the pitfalls of simply automating existing processes. Two noteworthy articles published

months apart in 1994 - by Teng et al. in *California Management Review*, and Venkatraman in *Sloan Management Review* - exposed these risks and offered frameworks for using IT not only to automate but also to redefine business processes, collaboration networks and business scope. (Teng, J.T.C., Grover, V. and Fiedler, K.D. Business Process Reengineering: Charting a Path for the Information Age. *California Management Review*, Spring 1994; Venkatraman, N. IT-Enabled Business Transformation: From Automation to Business Scope Redefinition. *Sloan Management Review*. Winter 1994. pp. 73-87). Given today's economic climate, we believe this presents an opportunity for companies to rethink how CEs can impact their business.

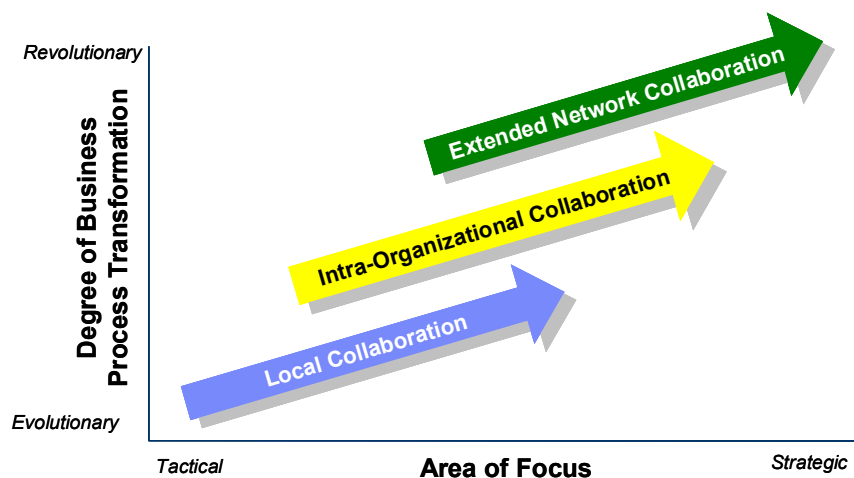
Understanding the impact of CEs on business processes

To understand how some organizations are already using CEs to improve their business processes, we studied Collaborative Environments in seven organizations (see sidebar for more information). This research led us to suggest a framework for using CEs, and this framework is described in this article. Real-world examples, drawn from our interviews with project and process managers, illustrate the framework. Further, we outline recommendations that organizations should consider when assessing, adopting or implementing Collaborative Environments.

We adapted Venkatraman's "Five Levels of IT-Enabled Business Transformation Framework" (op. cit., p. 74) to provide a model of how collaborative technologies are being used to achieve business value. Venkatraman's framework categorizes IT-enabled changes in business processes according to five different levels that increase in both range of benefits and degree of transformation to the business. Based on our interviews and analysis of CEs, we propose a model that categorizes "CE-enabled" changes in

business processes on three levels. Our framework has two dimensions (*degree of business process transformation and area of focus*), and within this two-dimensional space we map three levels of collaboration (*local, cross-organizational and extended network*). Figure 1 is a graphical representation of the framework.

Figure 1: Three Levels of Collaborative Environment-Enabled Business Process Transformation



Adapted from: Venkatraman, N. IT-Enabled Business Transformation: From Automation to Business Scope Redefinition. *Sloan Management Review*. Winter 1994. pp. 73-87.

The degree of business process transformation

The vertical axis, *degree of business process transformation*, is a continuum that runs from evolutionary to revolutionary. We define an evolutionary transformation as one in which there is a limited alteration to an existing process or practice. Business processes may be automated or sped-up, but there is no dramatic change in how the work is done. In a revolutionary transformation, new work activities are added or deleted or the work is shifted to elsewhere in the organization.

For example, consider a retailer that automates some of its call centre operations by routing calls to a voice response system, resulting in customer self-service. Reducing the number of human operators may cut costs, but it results in no radical change in the process itself, or in how information regarding product problems is used within the company. A more radical change might involve constant feedback from the customer, through initiatives such as web-based customer discussion forums or communities of practices centred on a particular product theme. CE technologies, such as instant messaging, could be used for real-time

interaction with the customer. But, what may make this change revolutionary is how this information is used. A process could be established in which this information is routinely analyzed and fed directly into the marketing and product development

decision-making processes. There will therefore not only be cost savings, but also changes in the cross-company business processes.

Area of focus

The framework's other dimension examines the CE's area of focus, and ranges from the tactical to the strategic. A tactical focus is one in which CE technologies are used to solve a specific challenge fuelled by cost savings or improved efficiencies. For example, one project manager we interviewed implemented virtual meeting technology so his team of 10

consultants could save travel costs and share information more effectively. A strategic focus is one in which the company leverages its CE in a critical area of its business. For example, a biotechnology company that regarded drug development as critical to its success implemented a firm-wide CE where scientists could collaborate on projects and share insights and documents on a real-time basis.

Our framework's underlying thesis is that *tactical* (pinpointed) deployments of CEs create only *evolutionary* degrees of process transformation, while more *strategic* deployments have the potential for a higher level of impact and can drive *revolutionary* changes in an organization's business processes. Thus, if an organization leverages a CE technology to collaborate with external business partners or customers, while eliminating or streamlining processes to be more flexible and responsive, the level of impact is far more strategic and the process transformation is more revolutionary.

Local collaboration

In many firms, CEs are first deployed to leverage local collaboration to support a specific business unit's or distributed work team's processes. At this level, we saw that there were minimal changes in the organization's larger business processes, but did see some changes at a local level. Here, the decisions to deploy CEs are typically decentralized, and the technology is purchased by the business unit or work team. Therefore, the reason for deployment is tactical.

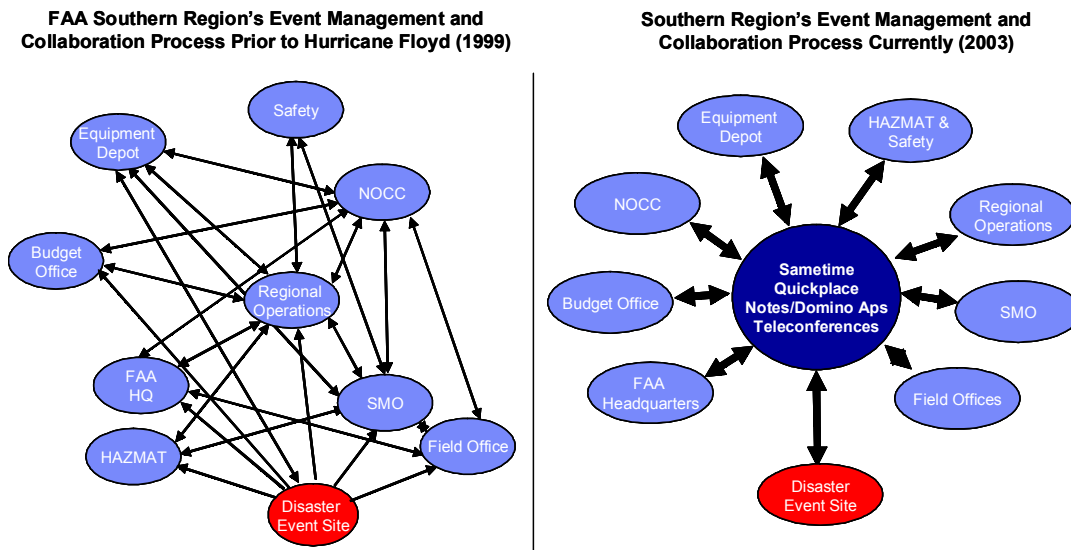
One local collaboration initiative we studied was the Federal Aviation Administration's (FAA) Southern Region Disaster Management Team. This team is responsible for keeping 1,600 airport facilities up and running by

managing macro events, such as storms, terrorism or plane crashes, and micro events such as mechanical malfunctions of radar equipment or birds nesting in a radio tower. On average, the team deals with 12 major storms (tropical and hurricane) each year in a region that encompasses eight states (Kentucky, Tennessee, North Carolina, South Carolina, Mississippi, Alabama, Georgia, Florida) and the Caribbean.

Given the scope of its operations and the field personnel needed to handle such events, the Southern Region Disaster Management Team began, in the mid-1990s, to use IBM's QuickPlace™ (discussion database) and Sametime™ (instant messaging) to respond to disaster events. As key personnel recognized that event management could be improved with web-based tools, the Southern Region began to lay a foundation for using these tools to connect experts, gather documents, photos, videos, and manage schedules, resources, events and equipment. It became fully operational when Hurricane Floyd struck in 1999.

Prior to adopting CEs, each disaster team would send sporadic updates to the regional coordinator. Since personnel communicated by open-mike conference calls and fax relays, it was difficult for the coordinator to see the overall status of the mission and to reallocate resources as needed. Likewise, seeking out needed information often required multiple phone calls to multiple sources, hampering response time. Now, disaster management teams can send instantly accessible field data (which can now be in the form of voice, photos, videos and reports) to the regional field offices. With all event managers on one page, rapid decision-making has dramatically improved response time while lowering the use of human resources (see Figure 2).

Figure 2: Change in FAA Southern Region's Event Management and Collaborative Processes



internal communication resulting from the adoption of new collaborative tools allows globally dispersed teams to collaborate across time, space and distance.

This is exactly how work is being conducted at Montgomery-Watson Harza (MWH). As one of the world's top three experts on power, water and wastewater issues, MWH designs, builds, finances and manages many of the world's largest and technologically

advanced distribution, drainage, flood control, wastewater treatment, water remediation, and power plant projects. At MWH, design/build project teams use CEs such as Microsoft NetMeeting™, QuickPlace, Sametime, Maw's internal global knowledge portal Kent and collaboration-enhanced CAD tools to manage client work and share project knowledge. Like other cross-organization collaboration efforts, MWH rolled out these technologies globally, enabling the entire company to benefit from increased collaboration and streamlined business processes.

Intra-organizational collaboration

At the intra-organizational level, CEs are commonly deployed company-wide and often managed and implemented by a centralized IT group. While some systems expand from local to intra-organizational systems, in most cases the corporate IT function makes a decision to adopt a specific (or set of) collaborative software technology(ies).

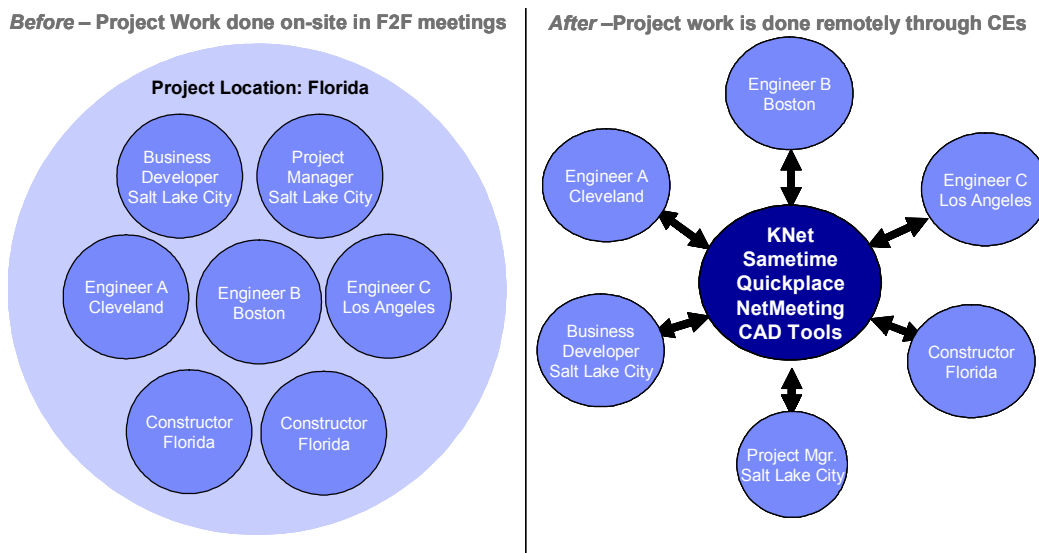
These intra-organizational initiatives are designed to streamline business processes on a larger scale, achieving greater efficiencies and increased productivity due, in large part, to easier access to company-wide information and knowledge. More integrated cross-organizational processes allow the organization to exploit CEs to better deliver customer service or shorten project completion cycles. Also, the improved

Prior to using CEs, build/design projects at MWH typically relied on face-to-face meetings. Design teams had to meet where the design work was to be carried out for both key business development and project management tasks (see Figure 3). On average, project proposals were researched for three weeks in one of four physical MWH project libraries. It was difficult to receive design feedback and comments in real-time, which

resulted in design changes occurring "late in the game." This method not only required significant travel, but much effort to coordinate and manage projects. Project designs took months to complete.

Now, using Maw's CE tools, project teams can work collaboratively, yet independently, and often from home. Design teams have the ability to review and edit 3D design models in real-time using Sametime and NetMeeting-allowing both designers and builders to communicate and coordinate projects better. In fact, MWH reports that decision-making and design quality have improved since questions, comments and feedback on project work can be delivered in real-time. Designers we interviewed also pointed out that since project documents (which were previously stored in physical libraries) can now be accessed through KNet, the completion of project designs has been shortened. Overall, exploiting intra-organization collaboration has enabled MWH to shorten its design-to-delivery cycle and improve the quality of service to clients.

Figure 3: Change in Project Management Task at MWH as a Result of CEs



Extended network collaboration

While both the FAA and MWH have made significant local and cross-organizational improvements in business processes as a result of enhanced collaboration, they have yet to exploit the potential of Collaborative Environments for *extended network collaboration*. In the third level of our framework, organizations leverage CEs to collaborate with their extended business network of suppliers, partners and/or customers. At this level, organizations exploit CE functionality to coordinate and control their virtual value chain with other business partners. CEs can improve both effectiveness and efficiency by connecting partners along the value chain through the integration of a full range of processes, such as supply chain management or customer demand forecasting. Working together and frequently exchanging data, information and knowledge leads to mutual cost savings, process optimization and better decision-making capabilities-benefits that each partner could probably not achieve on its own. According to a recent study, companies that use collaborative technologies to enable cross-enterprise business processes and information exchange are as much as 70% more profitable than

those who do not integrate their trading partners (Deloitte Research, Directions in Collaborative Commerce: Managing the Extended Enterprise (http://www.dc.com/obox/pages/php?Name=dr_cc_managing. 3/27/2003).

The PulseNet alliance, sponsored by the Atlanta-based Center for Disease Control (CDC), is a good example of the use of collaborative technologies to enable communication and information-sharing across different organizations. PulseNet's participants include various U.S. federal and state entities whose purpose is the early detection and prevention of food-borne disease outbreaks. Collecting, analyzing and distributing critical information on food-borne illnesses in a timely manner is a major function of the alliance. Communication among the state labs, epidemiologists and the CDC is critical to the success of PulseNet.

One of the major advances of PulseNet has been the application of a Collaborative Environment to communicate information instantaneously to a large number of participants. This environment connects PulseNet participants to a national database that contains the DNA fingerprints of several types of disease pathogens. This allows state labs to determine if the DNA pattern they just produced matches anything in the database. If several labs suddenly produce matches to the same fingerprint, it could indicate an outbreak. The CE also connects PulseNet participants to each other. Real-time messages notify participants when a new pattern has been discovered. If states have discovered similar patterns, then further communication can be conducted through on-line, telephone or face-to-face discussions. Thirty-seven state, local and county laboratories can now post their patterns to the national database and make queries directly. Twenty additional laboratories submit their patterns through CDC.

PulseNet's use of collaborative technologies has evolved since the creation of the alliance in the mid-1990s. E-mail was the first technology used. Early in the PulseNet program, the DNA fingerprint was attached to an e-mail and sent to the labs belonging to the network. The labs would check their previous few months of data to look for a match, and respond within 48 hours. In 1997,

a ListServ was created, and a Web Board followed shortly after that. These enabled more real-time exchange of information and ideas. The Web Board, currently with over 300 subscribers, is used to inform others of test results, pose technical questions concerning lab tests and help solve procurement issues regarding lab equipment, exchanging data files and supporting on-line discussions.

The Web Board was instrumental in controlling a recent outbreak affecting Minnesota and Los Angeles County. In Minnesota, local authorities traced the bacteria to two or three restaurants. The state posted information on the Web Board, and Los Angeles County replied that it had seen the same pattern there. This collaboration traced the source to food that had been shipped from a single farm in Mexico. Without the CE to enable real-time information-sharing across different state health organizations, it would likely have taken much longer to detect that there was a common source - and hence to take action to help prevent a wider disease outbreak.

Another benefit of extended network collaboration is the ability to build richer relationships with business partners. Through more frequent communications and real-time information exchanges, partners can move beyond transactional efficiencies to more value-added activities, such as joint product planning and idea generation. This benefit is also illustrated in the PulseNet example. Prior to the PulseNet alliance, communication across state health labs with regard to food-borne disease outbreaks could be described as infrequent. Now, through the combination of yearly face-to-face meetings and communication through CE technologies, richer relationships have been formed across state boundaries. These deepened relationships among the state labs and the CDC have resulted in joint planning on the future direction of PulseNet, in addition to discussions on improving its day-to-day operations.

Getting the most out of Collaborative Environments

We found that firms began their CE initiatives on different levels of our three-tiered framework. For instance, MWH launched its CE initiative at an intra-organizational level to exploit the efficiencies gained from local (project team) collaboration and to lay the groundwork for reaching across the firewall to working with their extended network partners and customers.

We believe that our framework is helpful for organizations to assess their CE initiatives relative to the three levels of collaboration and to understand opportunities for further leveraging CEs. To build a solid foundation for incorporating CEs into successful business process transformation in your organization, we suggest using the following steps:

Step 1: Determine where and how CEs have impacted your organization. For example, have the benefits been mostly tactical, or have strategic areas of the business been improved?

Step 2: Determine the degree of business process transformation achieved or desired. For example, does your organization want to use CE to integrate and redesign one or more business processes? Does your organization want to collaborate with business partners through the use of collaborative technologies?

Step 3: Understand the gaps in your CE program. In other words, understand where you are now with your CE initiatives, versus where you want to be.

After deciding where your organization lies in our framework, consider the recommendations listed in Figure 4 as you look for opportunities for CEs to have greater strategic impact within a particular level or transform a business process to

the next level.

Collaborative technologies promise to play an important role in how people within organizations communicate, reach decisions and accomplish their work. Global operations, geographically dispersed team members, and the need to rapidly share knowledge among employees will make Collaborative Environments a critical business enabler. Nevertheless, most companies lack a strategy for adopting Collaborative Environments.

We have provided a framework to help others gain insight into the potential impact of CEs on business processes. Collaborative Environments can impact both tactical and strategic areas of the company, and support evolutionary and revolutionary process changes across departments, organizations and business partners. This is why managers today should understand the implications of Collaborative Environments for their business, and develop strategies to use them effectively. ■

Figure 4 cont'd: Recommendations for Using Collaborative Environments

Organization	Business Processes/Functions Analyzed	Collaborative Environment	Level of CE Transformation	Area of Focus
FAA	Regional Airway Facilities HAZMAT/Disaster Operations, Operational Evolution Planners	Notes/Domino, QuickPlace, Sametime	Local	Tactical
Montgomery Watson Harza	Sales/Marketing, Build & Design, Project Management	KNet (Notes/Domino), QuickPlace, Sametime	Intra- Organizational	Tactical
PulseNet	Food-borne disease detection and prevention	E-mail, ListServ, Web Board	Extended-Network	Strategic
Major Pharmaceutical	Alliance Management, IT Project Management	NetMeeting, Centra, Notes TeamRoom, eRoom	Local	Tactical
Technology Company	E-learning for Manufacturing, Finance/HR, CRM	eRoom, WebEx, Sharepoint, Vantive, PeopleSoft, NetMeeting,	Intra- Organizational	Strategic
Major Pharmaceutical	Worldwide Knowledge Networking	Notes/Domino	Intra- Organizational	Tactical
Foreign Government	Office of Electronic Government, Government Legal Services, Secretary of State	Notes/Domino, Sametime (pilot)	Local	Tactical