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An Introduction to Collaborative Systems

Software to Promote Team Work

Today, many businesses are redefining the way they do business. This transformation involves breaking down old structures by building responsive cross-functional teams to meet customers' needs and face competitive threats. For these teams to operate effectively they need software that allows them to work together. The old method of an individual interacting only with the computer and its programs is gone forever. What is needed is software that allows team members to share ideas, information and tasks to help them complete business processes as efficiently as possible.

The software to bring about this new way of working is collaborative software. This has become one of the key enablers in restructuring the enterprise as part of *business process reengineering* (BPR), continuous improvement or total quality management programs. BPR is the radical redevelopment of the way a company operates. Existing processes are thrown out and new ones created. As Michael Hammer wrote in the early 1990s, "Don't automate, obliterate." By business processes we mean any activities performed by people or machines which transform inputs into outputs, in the form of goods or services.

This book looks in detail at the two key types of collaborative software application—*groupware* and *workflow software*—and explains what they are, what benefits they give and how to bring them into your company. The increasingly important role played by the Internet and internal company Internet facilities, known as *intranets*, in providing collaborative facilities is also included.

Why This Book?

Despite the great promise of BPR and the use of collaborative systems in process management, many projects have failed to deliver what the business users wanted or failed to complete within time and budget. A recent survey put the amount lost in failed U.S. systems development projects at $80 billion!

Given these sobering statistics, the intention of this book is to go beyond a description of the types of groupware and workflow systems that are available and to explain how the development and deployment of these systems can be managed to ensure the potential is delivered. To achieve this, practical guidelines for managers are given in areas of:

- incorporating group functions into reengineering efforts
- evaluating where collaborative functions can be best used
- selecting the right software tool
- managing the stages of process analysis, design and implementation

This book covers groupware, workflow and intranet technologies together since there is increasing overlap between them. Today these technologies are often implemented together rather than separately. For companies seeking to reengineer or improve their processes both groupware and workflow software is commonly used, since they enable the people performing the processes to work together more effectively.

In This Chapter

Groupware, workflow and intranets are introduced in this chapter. We review why they are proving so popular, what their key functions are and the differences between them. A roadmap for the remaining chapters is provided at the end of the chapter.

What Is Groupware?

Groupware is software for enabling collaboration within and between companies. It spans a wide range of software that enables teams of people to work together efficiently. These teams may be "tight-knit" teams working on a new product launch or more loosely coupled teams made up of individuals from different parts of the business. You are probably familiar with one groupware function through using e-mail where people exchange information in an unstructured way. You may also have heard of groupware packages such as Lotus Notes or Microsoft Exchange, but what other functions beyond e-mail do these packages have to help you in your work?

Groupware provides functions to promote team work and improve efficiency through:

- increasing information sharing
- reducing communications overheads

- providing coordination

As such, *groupware* is software to enable group working or *computer supported cooperative work* (CSCW) which is the term used by academics researching this area. CSCW was first used in 1984 by Irene Greif, of the Massachusetts Institute of Technology, and David Cashman, of Digital Equipment Corporation, as the title for a workshop they were arranging. The term groupware covers a diverse range of products with varying functions and applications. The Gartner Group prefers the term *workgroup systems* (WGS) to define collaborative systems. They describe the properties of WGS as "a cohesive architecture based on distributed-logic client/server technology and inter-enterprise-capable, enterprise-class platforms for communications, collaboration, coordination and knowledge reuse."

Groupware is a big industry; a February 1997 survey by research firm Input of Mountain View, California, estimated that by the year 2000 there will be 40 million groupware users worldwide. Major groupware products such as Lotus Notes boast over 14 million users. The annual groupware market is measured in billions; it is estimated at $4 billion for 1998 by the New York research and banking firm First Albany Corporation.

Groupware Enables Teamwork in the Global Enterprise

One of the reasons groupware has become an essential business tool is that it can be used for collaboration in the global enterprise even when face-to-face contact is impossible. Employees can continue to communicate and work on joint projects even when they are in different locations or in different time zones. The *asynchronous* use of groupware is one of its key benefits. When considering the benefits of collaborative systems it is useful to categorize them according to which quadrant they lie in a grid showing how people can work together in time and space (Table 1.1). Chapter 3 considers these functions in more detail and also looks at options for synchronous groupware such as desktop video-conferencing and whiteboarding for remote meetings.

Table 1.1 *Different uses of collaborative systems classified in time and space*

	Synchronous	*Asynchronous*
Same location	Same time, same place Example: meeting support software	Different time, same place Example: workflow systems
Different location	Same time, different place Example: video-conferencing	Different time, different place Example: e-mail and discussion groups

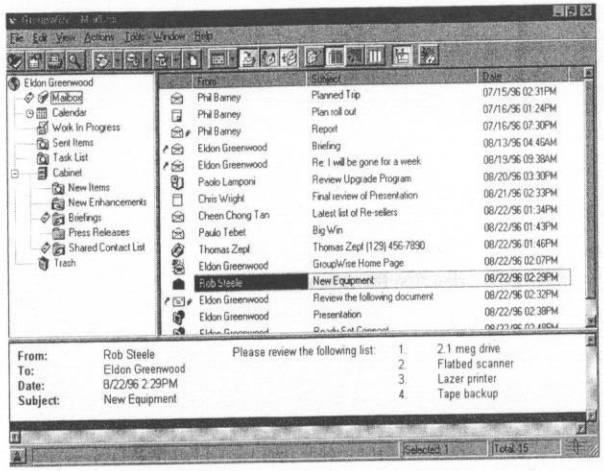

Figure 1.1
Novell Groupwise showing universal in-box in left pane, mail items in right pane and mail contents in bottom pane

What Functions Are Provided by Groupware?

Groupware packages such as Microsoft Exchange, Novell Groupwise and Lotus Notes all provide a universal in-box in which all sorts of electronic information such as voice and e-mail, documents, spreadsheet data, graphics or animations are deposited for your attention by other team members. Figure 1.1 shows the in-box for Novell Groupwise, one of the well established groupware products.

The types of groupware function provided to create, access and share this information include:

- e-mail
- group discussions (threaded text based conferences)
- document sharing for joint authoring of reports
- electronic meetings software such as video-conferencing
- group decision support
- group coordination software for time management and scheduling

To enable access to the in-box, client software runs on the PC on each coworker's desk and is connected to a groupware server using a company network, intranet or the Internet.

From Groupware to Intranets

Since groupware means many things to many people, a brief history may be useful to highlight where its origins lie and help explain why it has so many

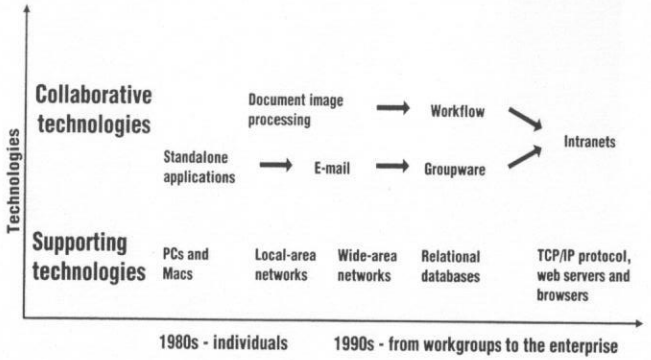

Figure 1.2
The evolution of collaborative and supporting technologies

different functions. Figure 1.2 shows how groupware has evolved from the introduction of the first PC. When the PC was first introduced it was used in a standalone mode with users finding the PC an easy way to organize their own personal information with limited sharing with others.

With the growth of local-area networks (LANs) it became possible to share information stored on file servers and to communicate directly via e-mail. These facilities, available years earlier in mainframe and UNIX systems, laid the foundation for PC based groupware products. As groupware has developed it has moved from a tool to help individuals communicate by e-mail through a workgroup based product to become an enterprise-wide method of communication, collaboration and communication.

Currently groupware is itself facing transformation as information sharing occurs through *intranets* which are based on well-known Internet technologies. These "private Internets" use low cost, easy to use web browsers such as Netscape Navigator to share information placed on a web server and accessed over the company LAN. The use of such intranets in Fortune 500 companies has reached over 90% in only a few years.

Such is the growth in use of corporate intranets for information sharing that the term *intranet* is now almost synonymous with groupware. The growth in use of intranets makes this an excellent time to introduce or extend groupware functions in your company since the cost of providing groupware functionality is falling rapidly.

What Is Workflow?

If your company struggles with processing and tracking information such as invoices, purchase orders or processing customer applications, then workflow can help. Workflow systems are a distinct class of software which automate

business processes by providing a *structured* framework to support a process. Workflow systems help manage business processes by ensuring that tasks are prioritized to be performed:

⇨ as soon as possible

⇨ by the right people

⇨ in the right order.

This gives a consistent, uniform approach for improved efficiency and better customer service. For example, a standard method of dealing with purchase orders or processing insurance claims can be achieved using workflow systems. Workflow usually involves coworkers performing tasks sequentially as part of an overall process, so it is another important means of aiding collaboration. Workflow software provides functions to:

- assign tasks to people
- remind people about their tasks which are part of a workflow queue
- allow collaboration between people sharing tasks
- retrieve information needed to complete the task, such as a customer's personal details
- provide an overview for supervisors of the status of each task and the team's performance

A workflow application is used to structure a business process by specifying the order in which tasks need to occur. Figure 1.3 shows a process map of

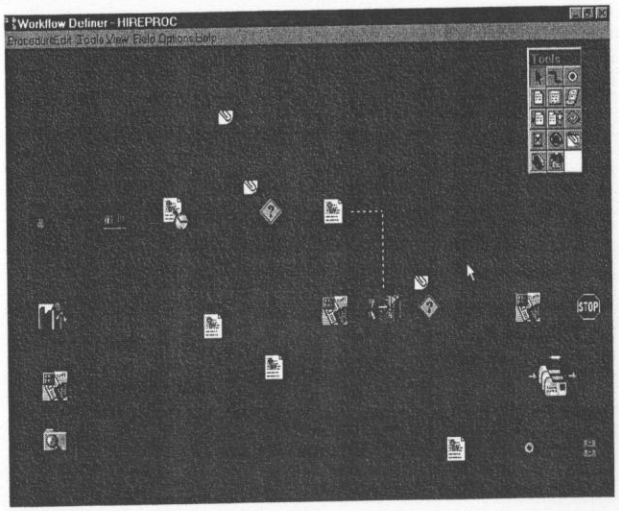

Figure 1.3 *Workflow definition for an employee hiring process displayed in the Staffware Workflow Definer*

the workflow involved when hiring a new employee. The case is initiated when an application is received and the workflow ensures that a well-defined, repeatable review occurs. As each review marked by a "?" occurs, there is a decision point of continuing to the next stage or sending out a rejection letter. In this example the workflow application is integrated with imaging, with the application letter being scanned for later review.

The Growth of Workflow

Workflow did not originate as a method of group working, but rather as a way of reducing the time and cost of performing business processes and ensuring that tasks are performed consistently to improve quality. As Figure 1.2 shows, the growth in use of workflow was, like groupware, supported by the introduction of LAN and e-mail. Early attempts to automate office tasks through storing digital copies of documents such as customer letters or invoices led to the development of workflow. For example, sharing out processing of insurance claims between a group of staff is natural once these claims are stored in a digital form.

Document imaging processing is often an important part of a workflow system in these types of application. Workflow systems are also often integrated with *electronic document management systems* (EDMS) which are used to provide the corporation with all the procedures, guidelines and standards necessary for it to operate. EDMS are used to create, distribute and maintain this type of documentation.

The best way to understand workflow is through an example. Figure 1.4 illustrates some of the typical functions of a workflow system for processing an insurance claim. Processing a new claim starts with the claim form being scanned into the system so it is easily available as an image for future reference. The workflow system will then prompt the user to associate the image with a particular customer. This may involve automatically accessing information necessary to perform the task, for example, the customer policy details. These details are often stored on a separate existing or legacy system integrated with the workflow system.

The main workflow system function is to provide reminders to staff to do the right tasks at the right time. This is achieved through a workflow engine that manages a queue of tasks which need to be performed according to the task priority and who is available to complete it.

In this example, reminders are issued to check different aspects of the validity of the claim and contact the customer and other insurers when appropriate. Finally, the system will also provide status information for managers of the workgroup to show the status of individual tasks and the big picture such as the number of cases outstanding and average customer response time.

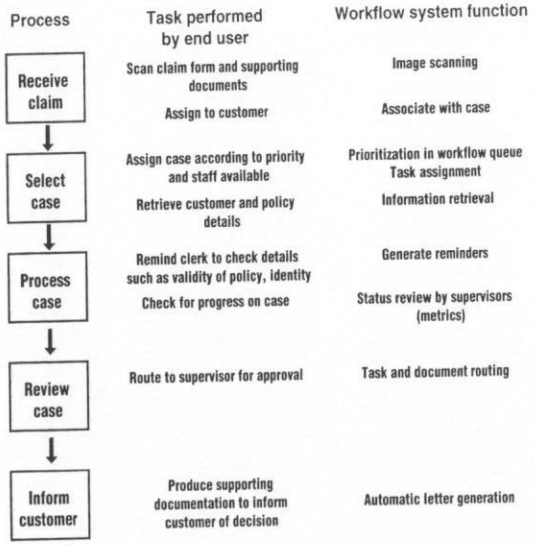

Figure 1.4 *Workflow functions occurring as part of an insurance claims system*

When selecting workflow software two main alternatives are available to you:

- *ad hoc* or *unstructured workflow*, where users must perform tasks as they see fit, with limited prompting by the software. Collaboration on a product design is an example of this.
- *structured workflow* includes production workflow systems where the software is instrumental in managing the tasks and instructing the human operators what they are required to do. The insurance claims example is in this category.

These alternatives represent two extremes and in reality there is a continuum between structured and unstructured with so-called administrative systems lying between the two. Some products offer a combination of types, but usually their strength lies in one area. Chapter 4 examines the different types of workflow in more detail. To reflect the different roles between the computer and the business users in these types of situation the first type is often referred to as "pull" and the second as "push" workflow. Workflow systems are now often linked with other technologies such as computer telephone integration in call centers. Simple workflow routing functions are now being provided in groupware and intranet tools, and as this occurs they become more widespread. Chapter 4 describes the different varieties of workflow system and how they are constructed in more detail.

Groupware and Workflow—What Is the Difference?

Confusion abounds when distinguishing between groupware and workflow. This arises since workflow is often considered to be a function or subset of groupware. This is true in that a simple workflow function such as routing of business forms between staff can be achieved using groupware. However, a large, mission critical workflow system such as that used by a bank to process loan requests is quite different in the way it is designed, built and used. For this reason, I believe the two must be considered as distinct products and they are described separately in Chapters 3 and 4. However, since many of the issues involved with their design and implementation are shared, these aspects are considered jointly in Chapters 6 through 9.

The two technologies are also treated separately by most academics and vendors, but the distinction is often made in an artificial way. Strictly defined, all types of groupware must involve an element of collaboration. This is not necessary for workflow systems—these are *sometimes* used by individuals undertaking tasks who are not directly collaborating with colleagues. However, I would argue that workflow systems are also collaborative in the majority of cases. When seen from a wider organizational perspective, the individuals are collaborating as they sequentially perform the activities of a business.

To summarize, workflow systems and groupware are both commonly used for collaboration. They are best considered as separate types of product since groupware is usually used in an ad hoc way while workflow imposes a more strict, structured way of working.

A Hardware Architecture for Collaborative Systems

The infrastructure needed to bring in workflow and groupware systems to your company is described in Chapter 8, which explains the hardware architecture required to support the systems. Chapter 6 explains the best method of selecting software to meet your business requirements. The main components of a collaborative system are:

- Client software. This is the interface by which the end user accesses the software. Increasingly web based browsers are being used as groupware and workflow clients on a company intranet.

- Server software used to store group information, administer the system and provide links to other company systems. Again, this may be a web server or a database server.
- The infrastructure or plumbing of the system. This is based on local- and wide-area networking techniques.
- The application development environment which provides interactive programming tools to develop applications through the Application Programming Interface (API) of the package, which gives access to the middleware or intermediate software layers which enable different applications to interoperate.

Collaborative systems have grown in importance alongside the introduction of local-area networks and the client/server model of computing. The growth of client/server was closely linked with the trend to downsize from monolithic mainframes with arrays of user terminals with limited functionality. Cost savings were originally used to drive the introduction of these technologies. However, there is much debate about the high cost of ownership of client/server systems. The empowerment of the end user to develop their own applications and to use and share the data as they see fit is now considered to be the main benefit of client/server.

The client/server model involves a series of clients, typically desktop PCs, which are the access point for end user applications. The clients are connected to a server computer via a local-area network at one site of a company or use a wide-area network connecting different sites and/or companies. The server is a more powerful computer which is usually used to store the application and the data used by the user or shared with other users. When using PCs the application normally executes on the processor of the client.

There are many alternatives when deploying client/server. You can distribute data, processing or logic across both servers and client computers. This is only a thumbnail sketch of what client/server means. The advantages of the different varieties of client/server such as two-tier and three-tier and system management issues are covered further in Chapter 8.

Roadmap—How to Find the Information You Need

The book splits into two parts. In the first part, different types of collaborative systems are described plus the key terms and standards that are required to integrate the products. In the second part, practical guidance on building collaborative systems is given by looking in detail at each stage of their development.

Introduction to Collaborative Systems and Intranets

Chapter 2 provides the business background to the use of collaborative systems. The different functions provided by groupware and workflow and their applications are introduced in Chapters 3 and 4. Chapter 5 describes the latest use of intranets as a platform for providing groupware and workflow functions.

Chapter 2. Reengineering and Process Improvement Using Collaborative Software

- Business benefits and the different types of reengineering
- How do groupware and workflow support reengineering?
- Collecting metrics using collaborative systems
- Different methods of business reengineering
- Stages in reengineering

Chapter 3. Groupware Functions and Applications

- Key groupware functions: e-mail and messaging, text and video-conferencing, electronic meeting support, joint authoring and scheduling
- Applications of groupware
- Standards for integrating groupware products

Chapter 4. Workflow Management Systems

- Components making up a workflow system
- Different types of workflow systems
- Standards to integrate workflow products
- Applications of workflow systems

Chapter 5. Intranets and Internet based Groupware and Workflow

- Introduction to intranets—essential terms
- Setting up an intranet
- Groupware applications
- Workflow applications
- Problems of intranets