

# Workflow Technology: Tradeoffs for Business Process Re-engineering

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*The relationship is examined between Business Process Re-engineering (BPR), a significant new management trend across all industries, and Workflow Technology a new and rapidly expanding sector of the software market. Since Workflow is a market driven technology, in order to make a meaningful analysis, we start by presenting the current state of the art in workflow technology, as uncovered by our work within the Workflow Management Coalition. Some aspects of workflow are found to be well suited to support BPR, as long as the process being supported meets one of three criteria. Yet other aspects result in serious drawbacks that limit the benefit gained. Some conclusions are made about how workflow technology will have to evolve in order to more fully support the needs of BPR.*

## INTRODUCTION

Visions of the automated office range from the “push-button office”, where workers arrive, are informed of situations, and a few keystrokes or mouse clicks is all it takes to implement the decision. The other extreme could be termed a “white-collar sweat shop,” where tasks are meted out to all employees, even up to the executive level, by a centralized system which makes all the decisions, records precisely how efficiently the employee handles the tasks, and uses this as input to adjust compensation. While the inevitable automated office will surely be somewhere between these two extremes, we are still far from it in spite of all the billions of dollars of installed computer equipment. The MIT90s study[11] found that in order to see significant gains in performance, companies must fundamentally rethink how they run their business, which subsequently ushered in Business Process Re-engineering (BPR)[10] as we know it today.

If marketing material is anything to go by, workflow technology certainly promises a lot in the direction of automating the office. The dramatic popularity of workflow technology is grounded in the confluence of three separate factors. First, the relative ubiquity of good networking infrastructure makes workflow possible from a technological point of view. Second, the recession of the first half of the 90’s left managers desperately

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looking for ways to do more with fewer people. And third, the

process orientation promoted for the most part by BPR. This last factor is the most dubious; many BPR professionals strongly believe that workflow is useful only for certain special cases. Therefore, this paper examines this question in detail.

Before we can analyze the applicability of workflow technology to BPR, we need to agree on what we mean by workflow technology, which is advancing at a astounding pace. We draw from our experience of developing a new workflow technology, known as Regatta Technology[12][13][14], and our experience with the Workflow Management Coalition (WfMC), to paint as accurately as possible a picture of the state of the art in workflow. From this we find that some of the disapproval of workflow technology is rooted in an outdated understanding of the current technology. Yet, we find some arguments against applying workflow to BPR are, in many cases, well founded. We use these in the conclusion to outline gaps that must be filled by new tools before workflow will be useful for the broadest range of BPR support.

## WORKFLOW ORIGINS

Clarence Ellis breaks the groupware field into 4 categories: keepers, synchronizers, communicators, and agents.[5] Like most groupware, workflow technology has aspects of all four of these, but remove the synchronizer/coordination aspect and it would cease to be workflow. The synchronizer aspect is also most important for implementing BPR, so this paper will concentrate exclusively on synchronization and coordination aspects.

Workflow as it is today has been shaped more by trial and error in the marketplace than by the result of research on how work should be supported. Workflow can be seen as the logical outcome of the Office Automation movement which had significant academic support in the 1970’s. Pioneering work by Zisman on SCOOP[15], Ellis & Nutt on OfficeTalk[6], and BDL from IBM[7], can be seen as laying the groundwork for what we now know as workflow.

Office automation lost momentum in the early 1980’s, possibly because researchers began to realize how complex a social network the office environment really is. The day to day routines of the office are not as easy to formalize as they might seem. The term “workflow” was coined by industry. The first actual systems were developed and sold by companies that were primarily interested in promoting and selling document scanners, printers, and other computer equipment. Early workflow systems embodied simplistic assumptions about work habits, generally adopting a document centric view of the office. While simple in

design, these systems fill a very large need for document routing and distribution.

Programs to coordinate worker's activities are not new. Large systems have been developed to support hospitals, customer support centers, and other custom vertical applications. In these systems the process rules are built into the application. The unique aspect of workflow systems comes from the separation of the process rules from the applications. This development mirrors that of database servers. In the 1980's database systems were developed so that data storage could be separated from the application program, with the resulting benefit that the same data could be easily shared by a number of different applications effectively integrating a suite of applications. The advantage of separating out the process rules from applications is that this will allow integration of numerous different applications into a single work process. A dedicated application to support all stages of a process is no longer sufficient in the face of all the extremely specialized tools that are available today. A business process might involve people in many different parts of the company, each of whom have application software specialized for the task they perform. The workflow must not replace these applications, but rather it must knit them together into a coordinated process.

Document routing is a very limited special case of group communications. The lack of generality of these systems may have been the reason that so little serious research has been done on workflow systems. Recently there has been an increase in the research of workflow, and at the same time the workflow products themselves have rapidly increased in capability. Since the workflow industry did not anticipated BPR, it is reasonable to ask the question: "Can workflow support the BPR activity, and what must be improved to improve this support."

### **Classification of Workflow**

All workflow systems today go well beyond the document routing that typified early systems, yet they seem to have gone in as many directions as there are companies implementing them. There is a surprising amount of variability in different systems. As yet, the workflow industry defies any single concrete classification scheme that tells much about the model that is the basis for the workflow system.

There are, however, several dimensions typically used by industry analysts to compare different systems. These dimensions can be used only to compare the implementation of the workflow. For example, most systems are compared as being either email-oriented or database-oriented. Email oriented workflow implemented on some form of store and forward messaging mechanism is very attractive for organizations that lack strong network connectivity across a typical work group. For those organizations that have good network connectivity, the database oriented approach holds some significant benefits. While the features of the workflow might be then tuned in order to make best use of the architecture, this classification says little about the underlying model. In fact, many new systems are hybrid offering both a central database, as well as email connectivity, so it is difficult sometimes to tell which category the product should fall into. The decision to use one category over the other is based more on existing infrastructure than on the requirement of the business process.

Another category used to classify workflow systems is whether it is designed for production processes as opposed to ad-hoc processes. This indicates more about how you implement the workflow system than it does about the underlying methodology. Production workflow systems are designed to be implemented by programmers, and contain a wide variety of options to allow precise specification of behaviors in specific situations. Ad-hoc workflow products offer a narrower range of options designed to be used by less technically oriented users. Again, we are beginning to see ad-hoc systems with sophisticated and powerful programmer interfaces, as well as production systems with ad-hoc capabilities as extensions.

To answer the question of the applicability of workflow to BPR, workflow systems should be analyzed on the basis of the underlying model, not according to the features that exist in the current implementation, so the traditional classifications are not useful. Instead, we consider workflow as a single category, and concentrate on the commonalities that are found across the industry.

### **The Workflow Management Coalition**

The WfMC is a coalition of about 75 organizations for the purpose of developing standards for interaction between workflow systems and other software. The membership represents a good cross section of the workflow industry and a majority of the workflow products on the market. The first activity for the coalition is to develop a reference model and associated terminology to provide a framework within which to discuss the various specific implementations. In order for different workflow systems to operate together there must be a common understanding of the meaning of the parts of the system, and how to translate from one system in order to preserve these meanings. From the common features that workflow vendors agree are available across systems we can learn quite a bit about the state of the art in workflow systems. For this reason we expand here on the WfMC reference model.

Members of the WfMC have come to agreement that the fundamental building blocks of a process are called "activities". Roles are associated with activities, and people are associated with roles. The activities and roles together form process definitions. Processes are enacted by creating process instances. During the enactment, activities that are ready cause a work-list item to appear on an individual's work-list. Generation of work-lists then becomes a fundamental aspect of workflow systems.

While workflow vendors seem to agree that completion of one activity causes the initiation of other activities, the exact mechanism by which this happens varies significantly from vendor to vendor. In many cases, the exact "process logic" mechanism is viewed as a key differentiator between systems, and thereby a key advantage of the system. Some systems allow only a single activity to be enabled at a time, thereby resembling a dataflow system. Others have no limitation on the number of simultaneous activities. While still others allow parallel routes if the data is split into separate packets at the point of divergence.

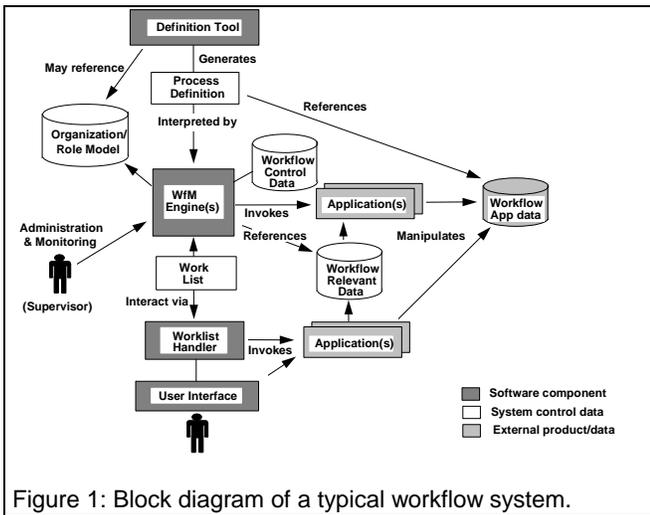


Figure 1: Block diagram of a typical workflow system.

Some systems are like PERT charts with defined start/complete relationships between activities. In some systems activities are enabled whenever the right preconditions exist in the data. Other systems are like petri nets in that activities are enabled by the passing of a token. The way that people get mapped to roles also varies quite a lot from system to system. These differences cannot be reconciled at this time because the industry is immature, and there is no clear indication of which approach is best. Nevertheless, these systems can be made to inter-operate in well defined ways.

### WfMC Reference Model

Workflow systems are implemented on a wide variety of platforms and communications infrastructures. The key to operating together is a common interface through which information can be exchanged. The result will be that programs that are written to use this interface will be able to access information from any workflow system. Five different modes of interaction are identified with five primary interfaces.

Interface 1 is for process definition tools. The WfMC anticipates that tools will be developed whose primary purpose is to aid in displaying, editing, and analyzing process descriptions. This interface, which allows all forms of access to the process descriptions, is also useful for simulation programs. In order for a process definition template to be moved from one system to another it would be retrieved from interface 1 on one system, and inserted through interface 1 on the destination system, therefore interface 1 has aspects of a process interchange format. Interface 1 is of primary interest to BPR professionals. As specialized tools are developed to help BPR teams design optimal processes, it is anticipated that these tools will subsequently be able to insert the finished process into the actual workflow system for use.

Interface 2 and 3 work together to allow the workflow process to control and to be controlled by end user applications. As workflow becomes more accepted in the workplace, specialized end-user applications will increasingly be “workflow-aware” through the use of these interfaces, so that the work performed on these applications can be made to be a step in a business process. It is through interface 2 that lists of tasks are retrieved.

Interface 4, known best as the server-to-server API, allows workflow systems to interact with other workflow systems such that a single business process might be implemented across multiple heterogeneous servers. The main interest that interface 4 holds for BPR practitioners is that it allows processes to be developed without requiring that all the users of the process are all on the same kind of system.

Interface 5 will allow third party programs to be developed to monitor and analyze actual process instances. It is through interface 5 that BPR teams will gather performance data to determine how well existing processes are running. Through analysis one will be able to find areas of the process that are in need of improvement.

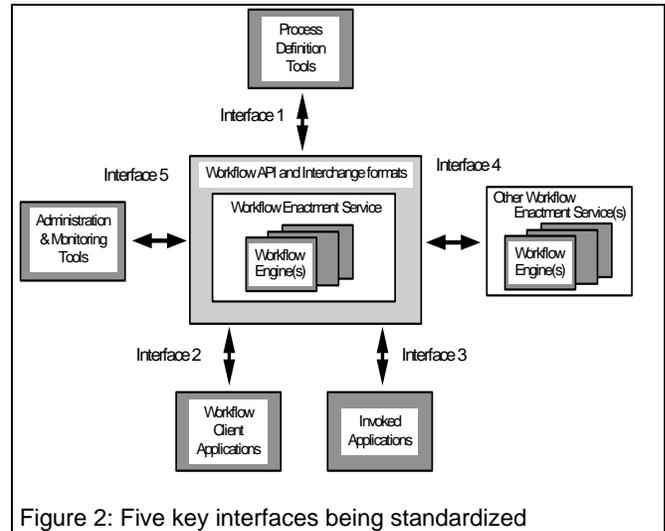


Figure 2: Five key interfaces being standardized

One difficulty in discovering common elements of workflow systems was that the same words were often used to mean very different things, as well as different words that mean the same thing. Being such a new field there did not exist a common vocabulary. To facilitate discussions of workflow systems, a glossary of terms was developed, and is included at the end of this paper.

## OVERVIEW OF BPR

The central concept behind Business Process Re-engineering is that while information technology offers us new ways to increase efficiency of office workers, we should not simply apply computer technology to automate the procedures of working, but that fundamentally new ways of working can be supported. Business processes need to be reexamined from a fresh perspective in order to realize the full promise of information technology. Readers not familiar with BPR are referred to a number of fine references on the subject.[3][9][10] Presented here is only a brief overview of BPR as might be important in a discussion of workflow.

### Misconceptions about BPR

BPR has gotten a bad reputation with much of the public at large because of the use of the term as a euphemism for down-sizing or layoffs. Since the purpose of BPR is to make individuals more

effective, it is undeniable that management will see this, at least in the short term, as a way to do the same job with less people. (In the long term, a more efficient company should be more able to grow than its competitors.) While BPR may be associated with layoffs, layoffs do not necessarily count as BPR. Without the restructuring of the company along the lines of customer driven processes, you do not have BPR.

Many analysts point out that BPR is similar to TQM (Total Quality Management), or to Kaizen, the Japanese term for continual improvement of processes. BPR is not simply a new name for these well known techniques; the unique aspect of BPR is that the presence of Information Technology (IT) deployed in the last decade fundamentally changes the way we do work. Information can now be said to be location independent. No longer must the customer come to the company, but instead in a very real and dramatic way, the company can come to the customer. This, more than anything else, demands that we take a fresh look at how businesses are run.

### **Evolutionary vs. Revolutionary Issue**

BPR's dramatic redesign of processes does not replace the continual change of process recommended by TQM and Kaizen. The necessity for both kinds of change is outlined best by Thomas Davenport, who defines two terms: process innovation for major shifts, and process improvement for minor shifts. The exact dividing line to differentiate innovation from improvement is never specified.

We propose that the difference between a major and a minor change depends upon whether the part of the organization taking part in the change loses its identity as a result of the change. A good measure for this is whether people actually change job titles. For example, a writer may participate in many improvements in processes; as long as the writer remains a writer the changes can be viewed as process improvement. But as soon as a change involves job titles, for example the writers become editors, proof-readers, or something yet more exotic, then we see change that qualifies as process innovation. The same is true with organizations; if a department changes its purpose, it is process innovation. This way of distinguishing the two cases is useful in discussions of BPR, but it has particular significance to how the workflow might be used.

### **Change from without or within**

If we examine the difference between innovation and improvement further, we discover that while improvements might be motivated from within the organization in a bottom-up fashion, process innovation almost always must be motivated from the very top or outside of the organization in a top-down fashion. This follows from basic human nature: redefinition of job identity is very uncomfortable for the people involved, and is highly unlikely to happen in a bottom-up fashion.

In spite of the stark differences of these two kinds of change, it is quite possible, maybe even common, for a given change to be viewed as both innovation and improvement. It depends upon your point of view. Consider the case of a single department that completely redefines how it handles a particular request. Within the department there may be a complete change of job functions and processes, but as long as the department responds to the same

requests with the same results, these changes will be viewed by those above the department and those in other departments as being an incremental improvement.

For example, a product manager may rely upon the accounting department for purchasing materials for a product. From the point of view of the product manager, the accounting department performs a single step in the process of completing a product. The accounting department might discover a dramatic way to re-engineer the purchasing process such that it can be done faster with fewer people by redefining the jobs within the department. That change within the department clearly qualifies as process innovation, but as long as they provide the same service to the product manager, the product manager sees the increased performance as simply an incremental improvement in the same basic process of building a product. The president of this company would see this improvement as being initiated in a bottom-up manner, because the executives did not need to be involved. The fact that your point of view determines whether a change is viewed as evolutionary or revolutionary, as bottom-up or top-down, has some important design considerations for the technology to support this change.

## **APPLYING WORKFLOW TO BPR**

The biggest change brought about by BPR is the orientation toward processes. Workflow, by its very nature, is process oriented. This makes workflow in general an excellent candidate for implementing the results of BPR. As more and better software tools are developed to support functionally oriented work, it becomes increasingly important for workflow to link these tools together into a process.

### **Processes which are Good Candidates for Implementation on Workflow**

Not all processes are appropriate for workflow support. The best candidates for enacting by workflow are processes that are either copious, risky, or lengthy. A copious process is one for which there are a very large number of very similar instances active at the same time with respect to the number of people handling them, such as customer support or order fulfillment. A risky process is one where any deviation from the proscribed path is either very expensive or dangerous, such as legal processes, airline maintenance, or hazardous materials handling. For lengthy processes which extend over a very long time, the workflow system provides a sort of memory so that when the same or different people come back to the process after weeks or months they can be reminded of what has happened and what needs to happen.

Processes with any of these qualities are more likely to have a greater benefit than cost. The purchase price of the workflow system is only a small part of the total cost of implementing a process. The implementation cost comes mainly from the manpower needed to configure the system for the specific process, along with the cost of training the users. Implementation cost forms a barrier against the implementation of lower valued processes. It follows, therefore, that reduction in the cost and trouble of implementation will increase the number and variety of processes that can be supported with workflow.

## Infrastructure Considerations

An important question when determining whether to implement a process as workflow is simply whether sufficient equipment infrastructure is present. Every participant of the workflow must have access to a suitable computer.

The authors are involved in a project to implement workflow in a major Japanese financial firm. The Japanese written language is such that mechanical typewriters were never widely adopted in Japan. In western countries, computers were able to slip into use as electronic equivalents of the typewriter because the essential skill, typewriting, was widely available in the workplace, allowing for relatively rapid adoption of computers in the office. The Japanese firm is faced with not only purchasing the equipment not yet widely deployed, but also what amounts to teaching the office workers to type. While this forms a significant barrier to the introduction of workflow, being a financial firm with a large number of formal processes, they anticipate that the benefits will still exceed the cost of workflow automation.

## Process Uniformity

One way to improve the return on investment for workflow implementation is to share the cost of implementation across a large organization or a number of organizations. This can come about either by a central authority implementing a common process and making it available to all, or by means of a market where process implementations are bought, sold or traded. There is at least one university project devoted to developing a handbook of common processes to serve as starting points which remove a great deal of the implementation cost.[8]

Yet there is a hidden danger that BPR practitioners should be wary of. Different people and different group often accomplish the same goal through very different processes. This should not be viewed as a failure of the organization to be uniform, but rather a success in allowing the various parts to optimize their own activities. A central authority which imposes a single process across a large organization may at the same time destroy the organization's ability to fine tune team behavior.

One of the advantages of BPR is that the methodology works at every level. Clearly the big wins are found most easily at the company wide level, but the principles work just as well in the small team for re-engineering processes. But this property of scaling is not the same in workflow technology because the mechanical nature of the implementation can be much more rigid than a manual system. Those that gamble on the payback of an expensive implementation through widespread adoption should remember that a system designed for the average team may result in being usable by no team.

## Distortion of Process

The BPR community knows well that there is a difference between a process and a workflow process. The WfMC went to a lot of trouble to define different terms for process, workflow process, and manual process. Not everything can be supported by the workflow system.

If the goal of the BPR team is to produce a workflow implementation, then they have two tasks: first to find the optimal

process, and second to encode that process in the workflow system. Every workflow system has limitations to expressibility. Different systems work better in different situations, but all systems require that the process be coded in ways particular to that system. The workflow system will embody a close approximation of the optimal process, but never the exact process. There is always some distortion of the process due to the representation.

Some workflow systems require the process to be described in terms of documents flowing from person to person; in fact it was this orientation that led to the name "workflow". A data flow orientation might be useful for implementing traditional formal processes, but it will be quite limiting for the BPR team. If documents flow from location to location, then this means that the document has a location; a user either has the document or does not have it. The very purpose of BPR is to redesign work processes to make use of the new capabilities provided by IT, the most important being the location independence of information. Most BPR teams will find no sense in using a workflow system that reestablishes location dependence of information.

## Fixing Process in Stone

The biggest single drawback of implementing a process in a workflow system is that the process is fixed. If the needs of the organization change, then you are faced with a cost to modify the workflow implementation to match the new requirements. It has been pointed out that business goals are moving targets, and there is every reason to believe that this will be increasingly more so in the future. Most workflow systems are designed to support static process descriptions; some even require recompiling of the server in order to make a change in the process.

BPR at its fundamental level means change. Thomas Davenport points out that process improvement and process innovation go hand in hand.[3] The job of the BPR team is in a certain sense never done, and should instead be looked upon as a continual effort of evaluating success of the last improvements and looking for new areas to improve. If workflow is to truly support BPR, then it must support this aspect of continual improvement of the implemented processes. Once again, the cost/benefit issue enters the picture. If the cost and trouble of making a small change to the process is more than the benefit from that small change, then the organization will be stuck with a process as it goes out of date.

## Separation of Planner and User

BPR teams should be composed of experts in the area being re-engineered, especially broad representation from the people involved in the task on a daily basis; only they can know the subtle details that make the difference. The same might be true for implementing the process on workflow, but this may not be possible if the workflow system requires special technical expertise to perform the implementation. If a programmer is required in order to make a change to the implemented process, then an extra person must be involved in every change, no matter how small, raising again the cost of the change, and forming a barrier against small incremental improvements in the process. In order to accommodate this, most workflow systems are implementing graphical process descriptions so that end users can modify the process description directly without involving a programmer. There is still more capability needed in this area.

## BPR ORIENTED WORKFLOW

In summary, we have found three key areas where state of the art workflow systems fall short in their support for BPR practitioners.

### Support For Individualism

One of the key advantages of BPR is that it makes use of people within the organization to find the best process for that organization. There is a built in assumption that the optimal process for one organization is not necessarily optimal process for a different organization. Workflow systems that incorporate into their design the assumption that different groups may have slightly different processes to reach the same goal will allow greater organizational performance.

### Support Process Evolution

Most management experts realize that in order to stay on top an organization must be constantly evolving[2]. Coding a process into a computer system can have the effect of freezing the process at one instance, and may make it costly to change. Clearly, workflow systems need to have specific features to support process evolution. The first requirement is that the process must be easy to modify without the aid of a programmer, so that the barrier to change is diminished. Workflow systems are evolving in this direction with the introduction of graphical process descriptions.

The workflow system might include explicit support for change in the form of template locking and versioning, along with support for migration of improved templates. Allowing change is a start, but to control change such a system should have explicit representation of template authors, and should include authorization and access control to the process templates.

### Support the Process of BPR

Workflow systems should recognize that the process of BPR is a collaborative effort. Capturing the process description, documenting it, supporting discussion on how to implement processes, and communicating the results are all activities which could be greatly aided by proper features in the workflow systems. A BPR oriented workflow system should support:

- process capture, the action of discovering what the existing processes are in the first place.
- process documentation, probably with a graphical process editor, but it must also include the details of the process that will be necessary for proper documentation.
- simulations of the process description.
- collaborative aspects of coming to consensus within the BPR team.
- comparing and trading of process descriptions so as to promote the sharing of effort where appropriate.

It is safe to say that no workflow system exists today with all the above features. But the trend is rapidly moving in that direction, and with any luck, before long specialized BPR tools will support these activities, and will also be able to interface to a workflow system through WfMC interface 1.

## Collaborative Planning

We use the term planning to mean the activity of drawing up process templates, which are in fact plans for activities. We can summarize the shortcomings of workflow technology by saying that the average workflow system today lacks collaborative planning support -- the specific support for multiple people to be involved in the design of process templates.

Regatta Technology, developed by Fujitsu, has been designed to incorporate collaborative planning from the start.[12][13][14] By making it easier to design process templates, Regatta lowers the cost barrier to workflow automation. Regatta is not the only workflow system with collaborative planning capabilities, and there are a number of third party process design tools that can be used to add collaborative planning capabilities to any workflow system supporting the WfMC standard interfaces.

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## APPENDIX - WfMC TERMINOLOGY

- AND-Join:** When two or more parallel executing activities converge into a single thread of control.
- AND-Split:** When a single thread of control splits into two of more threads in order to execute activities in parallel.
- Application Data:** Data that is application specific and not accessible by the workflow management system.
- Audit Trail:** A historical record of the state transitions of a workflow process instance from start to completion or termination.
- Business Process:** A kind of process that supports and/or is relevant to business organizational structure and policy for the purpose of achieving business objectives.
- Iteration:** A workflow process activity cycle involving the repetitive execution of workflow process activity(s) until a condition is met.
- Manual Process Activity:** The manual process steps that contribute toward the completion of a process.
- Manual Process Definition:** The component of a process definition that cannot be automated using a workflow management system.
- Manual Process Execution:** The duration in time when a human participant and/or some non-computer means executes the manual process instance.
- Manual Process Instance:** Represents an instance of a manual process definition which includes all manual or non-computerized activities of a process instance.
- Organizational Role:** A synergistic collection of defined attributes, qualifications and/or skills that can be assumed and performed by a workflow participant for the purpose of achieving organizational objectives.
- OR\_Join:** When two or more workflow process activities physically connect or converge to a single activity. In this case there is no synchronization of the threads of control from each of the two or more workflow process activities to the single activity.
- OR\_Split:** When a single thread of control makes a decision upon which branch to take when encountered with multiple branch(es) to workflow process activities.
- Parallel Routing:** A segment of a workflow process instance where workflow process activity instances are executing in parallel and there are multiple threads of control.
- Process:** A coordinated (parallel and/or serial) set of process activities that are connected in order to achieve a common goal. A process activity may be a manual process activity and/or a workflow process activity.
- Process Activity:** A logical step or description of a piece of work that contributes toward the accomplishment of a process. A process activity may be a manual process activity and/or an automate workflow process activity.
- Process Activity Instance:** An instance of a process activity that is defined as a part of a process instance. Such an instance may be a manual process activity instance and/or a workflow process activity instance.
- Process Definition:** A computerized representation or model of a process that defines both the manual process and the automatable workflow process.
- Process Definition More:** The time period when manual process and/or automated (workflow process) descriptions of a process are defined and/or modified electronically using a process definition tool.
- Process Execution:** The duration in time when manual process and workflow process execution takes place in support of a process.
- Process Instance:** Represents an instance of a process definition which includes the manual process and the automated (workflow process).
- Process Role:** A synergistic collection of workflow process activities that can be assumed and performed by a workflow participant for the purpose of achieving process objectives.
- Sequential Routing:** A segment of a workflow process instance where workflow process activities are executed in sequence.
- Sub Process Definition:** A process that is called from another process or sub process that includes the manual process and the automated (workflow process) components of the process.
- Tool:** A workflow application that interfaces to or is invoked by the workflow management system via the workflow application programming interchange/interface.
- Transition Condition:** Criteria for moving, or state transitioning, from the current workflow process activity to the next workflow process activities in a workflow process.
- WAPI:** The application programming interface/interchange for client workflow applications and tools in order to be able to interface to the Workflow Enactment System. WAPI is the acronym for Workflow Application Programming Interface/Interchange.
- Work Item:** Representation of work to be processed in the context of a workflow process activity in a workflow process instance.

**Work Item Pool:** A space that represents all accessible work items.

**Workflow Application:** A software program that will either completely or partially support the processing of work items in order to accomplish the objective of workflow process activity instances.

**Workflow Enactment Service:** A software service that may consist of one or more workflow process engines in order to create, manage, and execute workflow process instances. Client workflow applications/tools interface to this service through the WAPI.

**Workflow Interoperability:** The ability for two or more workflow engines to communicate and interoperate in order to coordinate and execute workflow process instances across those engines.

**Workflow Management System:** A system that completely defines, manages, and executes workflow processes through the execution of software whose order of execution is driven by a computer representation of the workflow process logic.

**Workflow Participant:** A resource which performs partial or in full the work represented by a workflow process activity instance.

**Workflow Process:** The computerized facilitation of an automated component of a process.

**Workflow Process Activity:** The computer automation of a logical step that contributes toward the completion of a workflow process.

**Workflow Process Activity Instance:** An instance of a workflow process activity that is defined as part of a workflow process instance.

**Workflow Process Control Data:** Data that is managed by the Workflow Management System.

**Workflow Process Definition:** The component of a process definition that can be automated using a workflow management system.

**Workflow Process Engine:** A software service of "engine" that provides part of all of the run time execution environment for a workflow process instance.

**Workflow Process Execution:** The duration in time when a workflow process instance is created and managed by a Workflow Management System based on a workflow process definition.

**Workflow Process Instance:** Represents an instance of a workflow process definition which includes the automated aspects of a process instance.

**Workflow process Monitoring:** The ability to track workflow process events during workflow process execution.

**Workflow Process Relevant Data:** Data that is used by a Workflow Management System to determine the state transition of a workflow process instance.

**Worklist:** A list of work items retrieved from a workflow management system.

**Worklist Handler:** A software component that manages and formulates a request to the workflow management system in order to obtain a list of work items.