IDENTIFICATION OF PROCESS LEVEL IN RELATION TO UTILIZATION IN WORKFLOW MANAGEMENT

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ABSTRACT

This paper deals with identification of process level in software development companies, but application in other areas is possible. Main proposals correspond with ISO standard specifications (especially series ISO/IEC 15504). When the right level of every process is set, then it is possible more effective utilization of automated process execution – the workflow management.

1 INTRODUCTION

Process management as entire new paradigm was created by Michael Hammer in the early 90's in a book "Reengineering the Corporation". As one of the predecessors, can be consider Frederick Taylor with his article "The Principles of Scientific Management". It was published at the beginning of 20th century. But the root of all of these approaches can be seen the work of "the first real economist", Adam Smith in 17th century.

As well great development in information technologies is presumption for real application of many techniques of process management. Especially in case of workflow management system (WFMS), it is possible to execute many processes only with assistance of computer based systems. From a research perspective DARPA has identified workflow as one of its key "must have" technologies and is investing heavily in developing the next generation workflow systems for the military. However, the impact of such systems will go well beyond the military and will be of great interest to the general business community.

Many researchers have established standards for interoperability of workflow systems, opening the door to enterprise-level and inter-enterprise process automation. Such standards will promote the development of specialized workflow systems and components incorporating AI functionality. Conventional workflow management systems use explicit models and representations of process, along with automated tools that support the activation and ongoing management of a process instance. This technology has to found application only in areas characterized by simple administrative type processes. The benefits enumerated are highly desirable and the workflow research community has set the agenda of developing techniques that enable these benefits to be achieved in applications characterized by complex tasks

performed in dynamic and uncertain environments. There is a strong need of precise splitting the classes of tasks and environments in the context of controlling computational entities.

2 TYPES OF PROCESSES

There is many types of structuring processes. In [5] authors categorize processes in an organization into:

- material processes,
- information processes,
- business processes.

2.1 MATERIAL PROCESSES

The scope of a material process is to assemble physical components and deliver physical products. That is, material processes relate human tasks that are rooted in the physical world. Such tasks include, moving, storing, transforming, measuring, and assembling physical objects.

2.2 INFORMATION PROCESSES

Information processes relate to automated tasks (i.e., tasks performed by programs) and partially automated tasks (i.e., tasks performed by humans interacting with computers) that create, process, manage, and provide information. Typically an information process is rooted in an organization's structure and/or the existing environment of information systems. Database, transaction processing, and distributed systems technologies provide the basic infrastructure for supporting information processes.

2.3 BUSINESS PROCESSES

Business processes are market-centred descriptions of an organization's activities, implemented as information processes and/or material processes. That is, a business process is engineered to fulfil a business contract or satisfy a specific customer need. Thus, the notion of a business process is conceptually at a higher level than the notion of information or material process.

Once an organization captures its business in terms of business processes, it can reengineer each process to improve it or adapt it to changing requirements. Reasons for business process redesign include improving efficiency of business operations, increasing quality of products, etc. by changing existing services or introducing new ones. Business process reengineering involves explicit reconsideration and redesign of the business process. It is performed before information systems and computers are used for automating these processes. Information process reengineering is a complementary activity of business process reengineering. It involves determining how to use legacy and new information systems and computers to automate the reengineered business processes.

The two activities can be performed iteratively to provide mutual feedback. While business process redesign can explicitly address the issues of customer satisfaction, the information process reengineering can address the issues of information system efficiency and cost, and take advantage of advancements in technology.

3 TYPES OF WORKFLOW SYSTEMS

There is three kinds of workflow (this characterization was first given in [4]):

- ad hoc,
- administrative,
- production.

The dimensions along which these kinds of workflow are often described include:

- repetitiveness and predictability of workflows and tasks
- how the workflow is initiated and controlled, e.g., from human-controlled to automated
- requirements for workflow management system functionality.

3.1 AD HOC WORKFLOWS

Ad hoc workflows perform office processes, such as product documentation or sales proposals, where there is no set pattern for moving information among people. Ad hoc workflow tasks typically involve human coordination, collaboration, or co-decision. Thus, the ordering and coordination of tasks in an ad hoc workflow are not automated but are instead controlled by humans. Furthermore, the task ordering and coordination decisions are made while the workflow is performed. Ad hoc workflows typically involve small teams of professionals and are intended to support short term activities which require a rapid workflow solution, e.g., supporting the process of putting together the program of a professional conference.

WFMS that support ad hoc workflows must provide functionality for facilitating human coordination, collaboration, and co-decision. Functionality for controlling task ordering is typically not provided in such WFMS. Users of an ad hoc workflow need to access the WFMS to determine if work was completed. Also, ad hoc WFMSs are not mission critical, i.e., periodic failure of such workflows does not significantly interfere with the overall business process. The infrastructure technology currently used by ad hoc WFMSs ranges from “enhanced” electronic mail to group calendaring and conferencing systems. Ad hoc WFMSs usually use a database to store shared information (e.g., documents such as conference review forms or papers). WFMSs that support ad hoc workflow are also called groupware.

3.2 ADMINISTRATIVE WORKFLOWS

Administrative workflows involve repetitive, predictable processes with simple task coordination rules, such as routing an expense report or travel request through an authorization process. The ordering and coordination of tasks in administrative workflows can be automated. WFMS that support administrative workflow handle simple information routing and document approval functions, such as those found in travel planning and purchase requests. Administrative workflows do not incorporate a complex information process and do not require accesses to multiple information system used for supporting production and customer services. Administrative WFMS are generally non-mission critical. The infrastructure technology they currently use is typically based on electronic mail.

3.3 PRODUCTION WORKFLOW

Production workflows involve repetitive and predictable business processes, such as loan applications or insurance claims. Unlike administrative workflow, production workflows typically encompass a complex information process involving access to multiple information systems. The ordering and coordination of tasks in such workflows can be automated. However, automation of production workflows is complicated due to:

- information process complexity,
- accesses to multiple information systems to perform work and retrieve data for making decisions (administrative workflows rely on humans for most of the decisions and work performed).

WFMSs that support production workflow must provide facilities to define task dependencies and control task execution with little or no human intervention. Production WFMSs are often mission critical and must deal with the integration and interoperability of heterogeneous, autonomous, and/or distributed (HAD) information systems.

The significant differences between production workflow and either the ad hoc or administrative workflow are:

- the interaction of information systems with the business process
- the use of automated (non-human) task performers.

Workflow with little structure may involve a linear path of tasks to be followed, whereas highly structured workflow may involve a graph-like organization of tasks where some tasks may be executed in parallel or multiple tasks must complete before others can start. Complexity can be determined by the kinds of coordination rules or constraints applied to task execution. For example, one aspect of complexity could be a requirement that a task begins execution only after a set of events has occurred. Complexity is also reflected by the kinds of HAD systems that must be integrated to produce a task implementation, e.g., office applications, DBMSs, or legacy information systems.

Other characterizations of workflows have appeared in the trade press. One of them divides workflows into:

- ad hoc workgroup support,
- task automation,
- document flow,
- process automation.

Other divides workflows into three categories:

- mail-centric,
- document-centric,
- process-centric.

These characterizations do not separate workflow semantics from the commercial WFMS that support them, and the infrastructure technology they are currently using. Furthermore, trade press workflow characterizations typically do not distinguish between production workflows accessing a small number of homogeneous information systems and

highly automated workflows accessing many shared HAD information systems.

4 LEVEL OF CAPABILITY OF PROCESSES

There is a series of ISO/IEC 15504 norms, which specify a framework for managing processes in software development companies. Processes are divided into 6 levels, where every higher level contains the same attributes as his predecessor (or more precisely: attribute of predecessor is fully monitoring) plus some new:

- Level 0 – This level is a basic level. There is no description of processes available or the description is incomplete
- Level 1 – The performance attribute is monitoring significantly or fully.
- Level 2 – The managing of efficiency and managing of work outcome attributes are monitoring significantly or fully.
- Level 3 – Process is determinate and established significantly or fully.
- Level 4 – Measuring and checking of processes are provided at significant level.
- Level 5 – The innovation and optimization become significant part of managing of processes.

It is obvious, that higher level is more suitable for implementing WFMS. But for some organization there is no need for production workflow. Especially small development groups usually need WFMS corresponding to ad hoc or administrative workflow. Then the right identification of process level is very useful for right decision about future WFMS. It is very useful to set real expectation on future WFMS as well.

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