LATEST PROGRAMMING LANGUAGE TOOLS FOR BUSINESS PROCESS MODELLING

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Abstract

The purpose of this paper is to highlight what business process modelling is, the different methodologies used and the new programming language tools used for it. The paper covers both old process modelling methodologies and the new ones. Some examples of present business modelling software in the market are quoted along with their features.

Keywords **-** Business process modelling methodologies, business process modelling programming tools, Business process modelling software

1. INTRODUCTION

Business process modelling (BPM) in systems engineering and software engineering is the process in which various steps and activities of an enterprise are analysed and improved. BPM is typically performed by business analysts and managers who are seeking to improve process efficiency and quality. Business process models describe how a business works, or more specifically, how they accomplish missions, activities, or tasks. A single model shows how a business accomplished a single task. It would take many process models to fully detail most of real world enterprises.

A real world process is more complicated. It can consist of many units (people, organizations, systems) performing many tasks and involving many sub processes

too. In order to complete the process, the units must get involved to break down the main process into many sub processes and complete their dedicated sub processes. Sometimes, these sub-tasks can be performed in parallel and sometimes they are sequential while some processes require repetition of sub-tasks. Most processes have decision points where process flow can branch depending on either the condition of the system or the particular process execution. They are some other kinds of processes like co-operative processes in which the units must co-ordinate among each other to complete the sub tasks and the whole system of sub tasks are interlinked. Now in this whole process there is some information transfer that is required. This information transfer can be the trigger for a unit to begin a sub-task. Other triggers are possible, such as time or interrupts. Some processes are ad-hoc. A business process modelling methodology needs to be able to represent these different aspects of a process description. A good methodology will present the representation in a manner that is easily transferred into the tacit knowledge of the viewer. There are many potential uses of process models [Browning 2002]:

(a) Program planning

(b) Baseline for continuous improvement

(c) Knowledge retention and learning

(d) Process visualization

(e) Training

(f) Framework for metrics

(g) Compliance, audit, and assessments

(h) Program execution

Business process Modelling is generally one among the critical stages of process execution. But the importance is generally not given because of various reasons. The process models that do exist are often not well integrated and leave out key information that would fully describe the process which finally in the end brings out some overall efficiency issues. There is a need for better tools and techniques for modelling business processes and keeping them in synch with actual business activities. Many companies have made efforts to document their processes, but very few have "built (and committed to improve and learn from) useful process models."

2. PROCESS MODELLING METHODOLGIES

The increasing demand for business process models can be attributed to the growing need to integrate disparate applications, people, processes, and information. In addition to having many uses, process models can be created or

presented using many different methodologies. Many have a different way of looking at processes based upon the purpose they were originally created for.

FLOWCHART: It is a diagram that represents an algorithm or process, where the steps are shown as boxes and their order by connecting them with arrows. This diagrammatic representation can give a step-by-step solution to a given problem. Process operations are represented in these boxes, and arrows connecting them represent flow of control.

CONTROL FLOW DIAGRAM: It is a diagram to describe the control flow of a business process or program. A control flow diagram can consist of a subdivision to show sequential steps, with if-then-else conditions, repetition, and/or case conditions.

FUNCTION FLOW BLOCK DIAGRAM: It is a multi-tier, time-sequenced, step-by-step flow diagram of a system's functional flow.

GANTT CHART: It is a type of bar chart that illustrates a project schedule. Gantt charts illustrate the start and finish dates. Some Gantt charts also show the dependency (i.e., precedence network) relationships between activities.

PERT: The Program (or Project) Evaluation and Review Technique (PERT) is a model for project management designed to analyze and represent the tasks involved in completing a given project, especially the time needed to complete each task, and identifying the minimum time needed to complete the total project.

IDEF: An abbreviation of Integration Definition refers to a family of modelling languages in the field of systems and software engineering. They cover a wide range of uses, from functional modelling to data, simulation, object-oriented analysis/design and knowledge acquisition.

MODERN METHODS

UML DIAGRAMS: Unified Modelling Language (UML) is a standardized general-purpose modelling language in the field of object-oriented software engineering. UML includes a set of graphic notation techniques to create visual models of object-oriented software-intensive systems.

UML offers a standard way to visualize a system's architectural blueprints, including elements such as activities, actors, business processes, database schemas, (logical) components, programming language statements, reusable software components etc. UML combines techniques from data modelling (entity relationship diagrams), business modelling (work flows), object modelling, and component modelling.

BPMN: The Business Process Modelling Notation (BPMN) is a standard for business process modelling, and provides a graphical notation for specifying business processes in a Business Process Diagram (BPD), based on a flowcharting technique very similar to activity diagrams from Unified Modelling Language (UML). The objective of BPMN is to support business process management for both technical users and business users by providing a notation that is intuitive to business users yet able to represent complex process semantics. The primary goal of BPMN is to provide a standard notation that is readily understandable by all business stakeholders. These business stakeholders include the business analysts who create and refine the processes, the technical developers responsible for implementing the processes, and the business managers who monitor and manage the processes. Consequently, BPMN is intended to serve as common language to bridge the communication gap that frequently occurs between business process design and implementation.

3. PROGRAMMING LANGUAGE TOOLS FOR BPM

BPEL: Web service interactions can be described in two ways: executable business processes and abstract business processes. Executable business processes model actual behaviour of a participant in a business interaction. Abstract business processes are partially specified processes that are not intended to be executed. An Abstract Process may hide some of the required concrete operational details. Abstract Processes serve a descriptive role, with more than one possible use case, including observable behaviour and/or process template. WS-BPEL is meant to be used to model the behaviour of both Executable and Abstract Processes. WS-BPEL provides a language for the specification of Executable and Abstract business processes. By doing so, it extends the Web Services interaction model and enables it to support business transactions. WS-BPEL defines an interoperable integration model that should facilitate the expansion of automated process integration both within and between businesses. A BPEL Abstract Process represents a set of publicly observable behaviours in a standardized fashion. An Abstract Process includes information such as when to wait for messages, when to send messages, when to compensate for failed transactions, etc. Programming in the small, in contrast, deals with short-lived programmatic behaviour, often executed as a single transaction and involving access to local logic and resources such as files, databases, etc. BPEL's development came out of the notion that

programming in the large and programming in the small required different types of languages.

WS-CDL: The Web Services Choreography Description Language (WS-CDL) is a W3C candidate recommendation. It is a language for describing how peer-to-peer participants collaborate. The language uses XML, and some aspects are inspired by the pi-calculus.

XPDL: The XML Process Definition Language (XPDL) is a format standardized by the Workflow Management Coalition (WfMC) to interchange business process definitions between different workflow products, i.e. between different modelling tools and management suites. XPDL defines an XML schema for specifying the declarative part of workflow / business process. XPDL is designed to exchange the process definition, both the graphics and the semantics of a workflow business process. XPDL is currently the best file format for exchange of BPMN diagrams; it has been designed specifically to store all aspects of a BPMN diagram. XPDL contains elements to hold graphical information as well as executable aspects which would be used to run a process. This distinguishes XPDL from BPEL which focuses exclusively on the executable aspects of the process. BPEL does not contain elements to represent the graphical aspects of a process diagram.

Other technologies related to business process modelling include:

ARIS: Architecture of Integrated Information Systems (ARIS) is an approach to enterprise modelling. It offers methods for analyzing processes and taking a holistic view of process design, management, work flow, and application processing. The ARIS-approach not only provides a generic and well documented methodological framework but also a powerful business process modelling tool. ARIS varies three main perspectives of techniques. ARIS uses a modelling language known as Event-driven Process Chains (EPC), which is an important aspect of the ARIS-model. EPC is the center of the House of ARIS and connects all other views, as well as describes the dynamics of the process. It differs from swimlane because it is process oriented and swimlane is function oriented. On the other hand, based on the conceptual description, ARIS can model and structure Business Process Models. Furthermore, ARIS House has been developed to implement business models in information system.

MODEL-DRIVEN ARCHITECTURE: This approach defines system functionality using a platform-independent model (PIM) using an appropriate domain-specific language (DSL) .Then, given a platform definition model (PDM) corresponding to CORBA, .NET, the Web, etc., the PIM is translated to one or more platform-specific models (PSMs) that computers can run. This requires mappings and transformations and should be modeled too. The PSM may use different Domain Specific Languages (DSLs), or a General Purpose Language (GPL) like Java, C#, PHP, Python, etc. Automated tools generally perform this translation.

SERVICE-ORIENTED ARCHITECTURE: It is a flexible set of design principles used during the phases of systems development and integration in computing. A system based on a SOA will package functionality as a suite of interoperable services that can be used within multiple separate systems from several business domains.

SOA defines how to integrate widely disparate applications for a Web-based environment and uses multiple implementation platforms. Rather than defining an API, SOA defines the interface in terms of protocols and functionality. An endpoint is the entry point for such a SOA implementation.

Service-orientation requires loose coupling of services with operating systems, and other technologies that underlies applications. SOA separates functions into distinct units, or services,[1] which developers make accessible over a network in order to allow users to combine and reuse them in the production of applications. These services and their corresponding consumers communicate with each other by passing data in a well-defined, shared format, or by coordinating an activity between two or more services.[2]

4. EXAMPLES OF BPM SOFTWARES

QUANTRIX

Quantrix delivers business modelling and analytics solutions and services to the world's most successful companies. Quantrix Modeler sets the standard for business modelling & analytics. It's a single solution for all of an organization's multi-dimensional modelling & analytics needs - from forecasting, budgeting, and strategic planning to financial modelling, risk modelling, data modelling, visual analytics and more. Quantrix Modeler offers unmatched capability for forecasting, planning, budgeting, risk modelling, visual analytics and more. Quantrix addresses the limitations and risks inherent to spreadsheets when developing business-critical models. It allows you to tap into the collective expertise of your team without the business risks associated with sharing spreadsheets. It also enables the business user to create interactive presentations, reports and dashboards. But Quantrix doesn't stop there - it allows you to develop "what if" scenarios and model the financial and operational impact of the business decisions you might take.

SIMULA 8 CORPORATON

It is business simulation software. SIMUL8 Business solutions let you test changes to your process in a risk free environment. It finds and resolves process bottlenecks. Application areas:

- Lean and Six Sigma
- Shared Services
- Business Transformation

POWERSIM SOFTWARE

Business simulation with Powersim Studio 8 enables your company to develop and explore future scenarios. It investigates your different strategic directions in a controlled way by reducing the risk of implementing projects or change processes. The company will get an advantage in tactical and strategic decision-making. A business simulation model created using Studio 8 can describe several aspects of a company, incorporate physical factors as well as human.

MBAWARE

It is Business Modelling Software which offers three alternatives for business modelling depending on the type of modelling being performed:

- Financial Genome for modelling a company's pro-forma financial statement projections
- AllClear Flowcharter and AllClear Analyzer for modelling business processes
- Decision Pro Professional for modelling business problems and analyses

5. CONCLUSION

Process modelling has been into topics from a very long time. Many years ago it was mainly used for manufacturing process flows. Later it was used for computer programming. Recently it started to be used for describing a "business process. Earlier the methodologies used were restricted to human handling which was also prone to error and consumed loads of time.

The advent of Information Technology revolutionized this area too extending its features in developing new methodologies for formulation of business process

modelling. It has paved the way for emergence of many companies oriented to develop many softwares and other programming tools for business process modelling, thereby giving a bloom to this area.

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