Model of continuous IT-based Business Process Development

Humboldt University of Berlin
Department of Economics and Business Administration
Institute of Information Systems, Spandauer Str. 1, 10178 Berlin

Arnold, Andreas (e-mail: Andreas.Arnold@rz.hu-berlin.de),
Kalledat, Tobias (e-mail: Tobias@kalledat.de, Phone +49+30+2093-5734),
Viehweger, Bernd (e-mail: bv@wiwi.hu-berlin.de, Phone: +49+30+2093-5716)

Abstract

The process management in the enterprise can be supported by the use of business process modelling tools (Build Time phase) and Workflow Management Systems (Run Time phase) dp-technically with respect to an optimization and both - a high open-endedness and administerability. CASE tools represent a development environment for integrated applications, rather expert-oriented. A prerequisite for a continuous dp-supported business process development and evaluation is the exchange of process definition data between the modelling tool and the Workflow engine in both directions.

Berlin, February 29th 2000

1. Introduction

In the context of the organization of enterprises process orientation means the optimal adjustment of enterprise processes to the needs of the market. Workflow Management Systems (WfMS) embody the conversion of the process orientation in the area of the Information Technology (IT). Their meaning for the competitiveness of an enterprise has risen rapidly in recent years. In addition, global modelling tools for the constant implementation of the enterprise's strategies on all levels must be used. The visualization of management decision data and the ability of a quick implementation of changes in the processes become therefore of crucial importance.

In 1999 at the Department of Economics and Business Administration of the Humboldt University of Berlin, a continuous business process model was analyzed in a practice-oriented investigation. Target of the investigation was the realization gain to methodical questions of a computer-aided modelling of enterprise processes as well as for the application of heterogeneous software systems in its cooperating with the organization of executable Workflow solutions. Leadership of the project fell to Prof. Dr. H. Gernert.

Detailed business process modelling is a crucial prerequisite for the development and introduction of WfMS. The principal purpose of WfMS is the data processing (dp) - technical control and support of business processes. For the implementation of this function the system needs the appropriate data about the business process to be supported. As shown in figure 1, these can be composed directly in the WfMS, with or without the previous generation of a business process model.

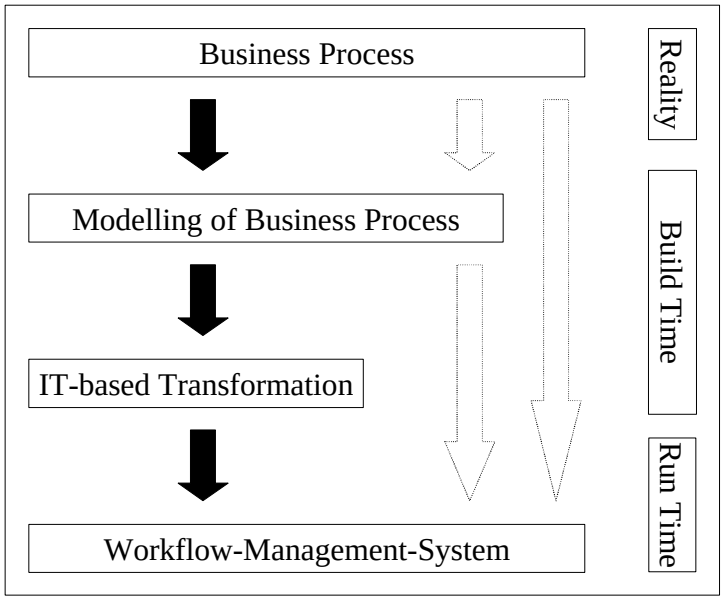

Figure 1: Transfer possibilities of process information from BP modelling tools to WfMS

A further possibility is the transfer of the data from an existing information system. The correct compilation of all process data without previous modelling may succeed only with small complexity processes. By the creation of a business process model and the renewed compilation of same data in the WfMS resources are not efficiently used and the potential possibilities of the IT are not fully exhausted. The IT-supported transformation of the data into the selected WfMS would offer the possibility to improve this undesirable situation. The core function of this project was the creation of a process design to the Build Time as the basis for such an IT-supported transformation into an executable Run Time system.

2. IT-supported Optimization of Business Processes

A BP (Business Process) can be understood as a consequence of transactions between operational objects. It is related to a final, purposeful combination of several handling steps in connection with the operational performance creation. As a result of this sequence of transactions a measurable, direct use develops - for a customer interacting with this enterprise.

During the conversion of their goals enterprises are confronted with various exogenous and endogenous influences. The competition requires the exhaustion of all rationalisation opportunities for an efficiency increase. Usually, from the enterprise's view the exogenous influences have to be regarded as fixed given. The potential courses of action of the management for efficiency increase thus predominantly refer to the in-plant influence factors. Classical organization measures possess often only a decreasing marginal product[1]. Newer concepts are particularly characterized by the optimal adjustment of the business processes by reorganization of the in-plant organization (structure and sequence organisation) in connection with the application of appropriate information and communication systems.

Such reorganization measures should be based on the application of suitable procedural models. These were divided into several phases, which are connected by differently marked links among themselves. Partly returns into pre-aged phases are possible. Typical models essentially cover the phases actual state inventory, analysis, target concept design, application implementation and the use of the information system. Supporting IT systems are available for conversion. BP modelling software is usually used for the representation and analysis of business processes on the Build Time level. Function of WfMS is the control and support of business processes. The emphasis is not situated in their modelling. A system break emerges here which makes it more difficult to combine the advantages of both applications meaningfully. The detailed shown business processes using the BP modelling tools can not be transferred to WfMS so easily. Standardized interfaces are able to solve this problem. It is to be noted that such interfaces can implement only the data transfer of an intersection of the proc-

ess description design between the used systems. Therefore, a restriction of the available design supply in the modelling tool for description of process results as retroactive consequence.

The WfMC (Workflow Management Coalition), a non-commercial international organization of Workflow product developers, users, analysts as well as academic organizations, developed a Workflow reference model. Figure 2 shows the components and the interfaces, for which separate in each case standards were defined.

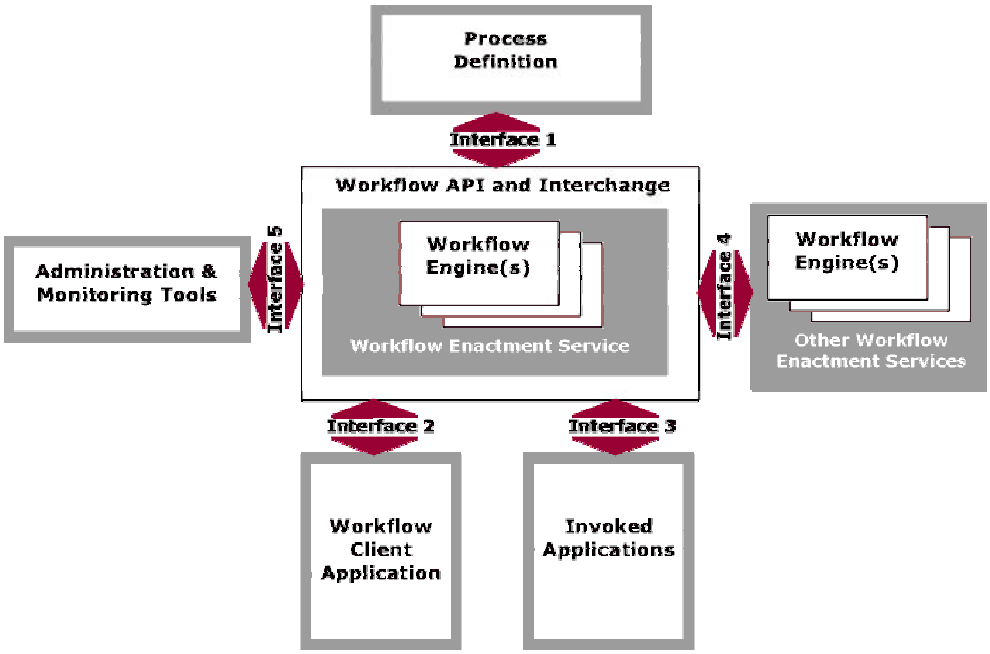

Figure 2: WfMC Metamodel[2]

For the exchange of process data between modelling tools and WfMS the interface 1 of the WfMC was created. It defines a common data exchange format, which facilitates the exchange of process definitions between different products. The conversion of functionalities is made by a newly created metamodel for the description of the process definition in connection with a Workflow Process Definition Language (WPDL) and Application Programming Interfaces (API) for the modification of the process definition data[3].

A concrete implementation of an interface for the transformation of process data between the ARIS-Toolset[4] and Staffware[5] the company SMS[6] makes available. In relation to the specification by the WfMC it only implements an unidirectional process data communication of the modelling to the WfMS.

The concept of the architecture of integrated information systems (ARIS concept) represents a methodical beginning for the extensive description of information systems. Based on this concept the ARIS-Toolset, which is the dp-technical conversion, was developed. It is to be used here for supporting the modelling of business processes. The concept differentiates between different description sighting of an information system, this dismantling is to reduce

the complexity of the regarded enterprise processes[7]. Figure 3 shows the different description sightings.

Figure 3: The ARIS-Architecture[8]

A Workflow is a - by a WfMS partially or completely - automated BP. The WfMC characterizes this term additionally by the fact that documents, information or functions between the involved ones according to certain rules for handling are exchanged. A possible classification of Workflows differentiates strongly structured business processes of the type production Workflow, which is characterized by a firmly given operational sequence of the handling steps among other things. In contrast to it are the ad-hoc Workflows[9].

Staffware is a WfMS that was conceived for the support of the first mentioned Workflow category. The product contains a graphic Build Time component for the description of the process cycle, the actual Workflow engine as Run Time component as well as administration and monitoring tools.

3. Realisation of the Workflow Application

Within this project the coaction of beforehand described applications was analyzed on the basis of a section business process from the credit request handling of a credit institute. In the process the phase pattern represented in figure 4 was sketched, which visualizes the activities for the conversion of the project function. By the strongly iterative characteristic of the Workflow application development parallels are available to the prototyping.

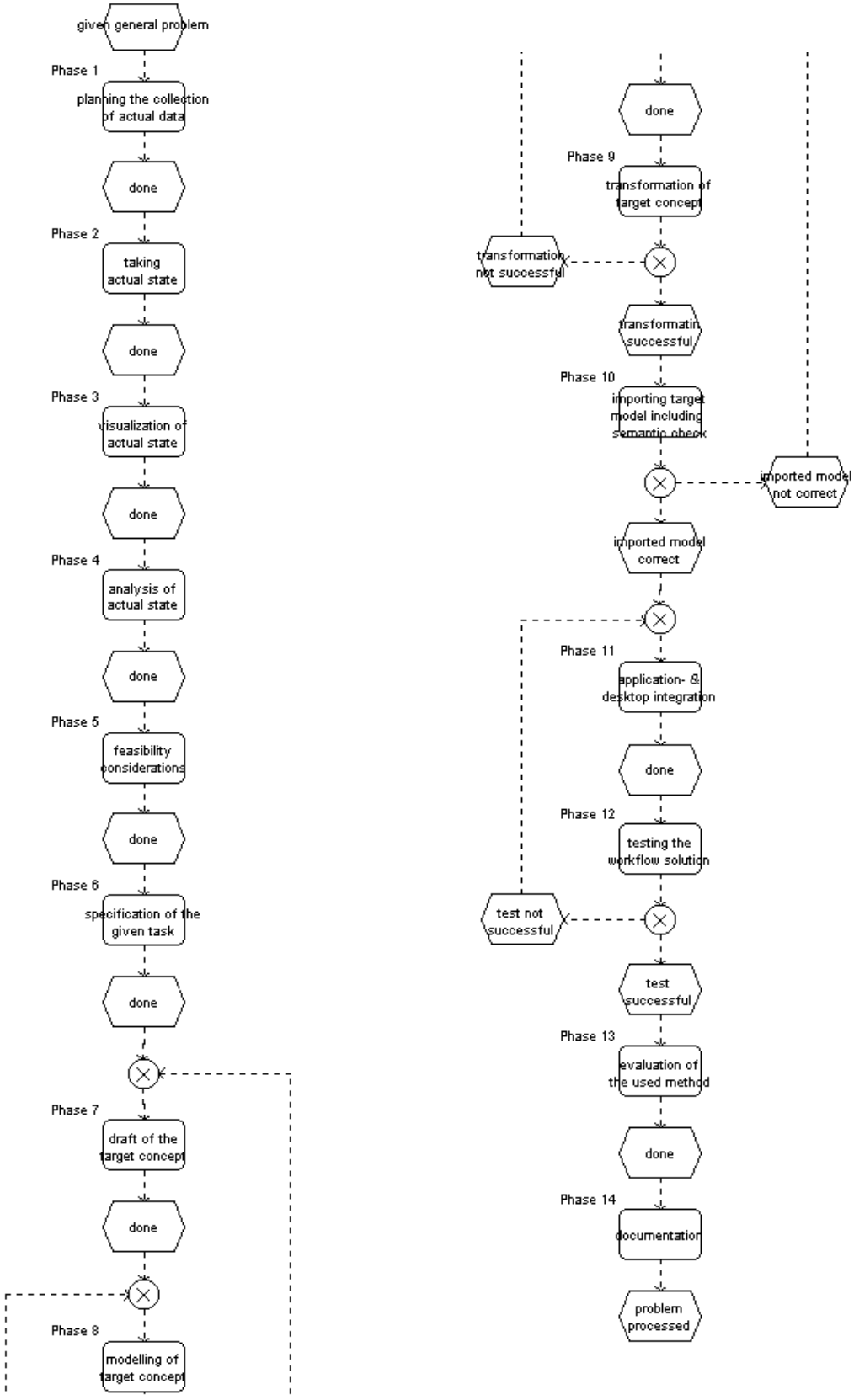

Figure 4: Phase Pattern

From the abstraction level view of the modelling of systems[10] the selected business process on the level of the application classes was to be modelled. It is also called type level and represents the most important level of the business process modelling. During later testing of the

developed Workflow application, the level of developments (items and instances) was regarded.

In the project the business process which was to be transformed was again modelled using a method filter, provided by the interface for the modelling tool. This limited the supply of methodical model design to the intersection of the description possibilities available in ARIS and Staffware. Workflow specific designs were partly only insufficiently modelable therefore. At the same time this approach guarantees the optimum consideration of the restrictions. From figure 5 it is evident that process transformations in WfMS also without the previous (new -) modelling are conceivable.

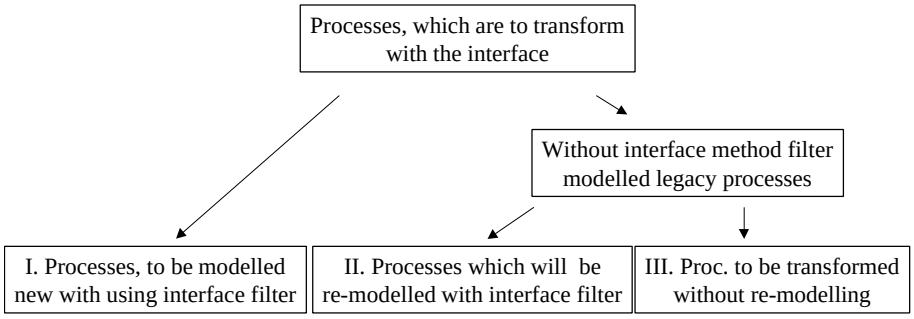

Figure 5: Request classes of the process transfer

In the course of the project only class I was explicitly examined. The conversion of ARIS sighting into the WfMS is partly represented in figure 6.

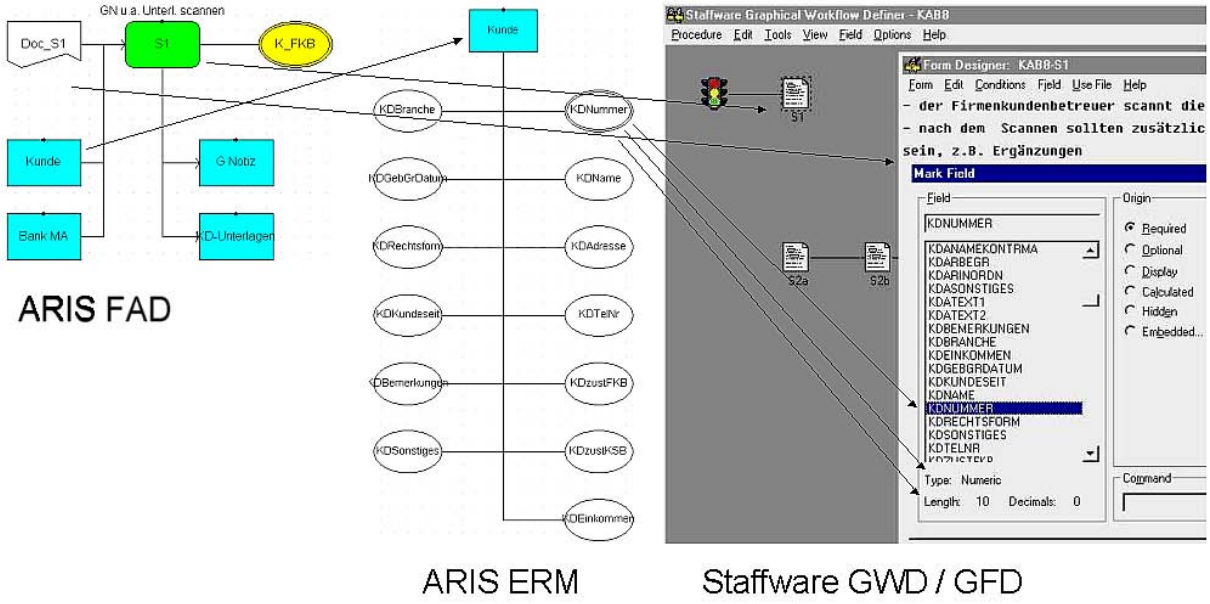

Figure 6: Transformation of Control- and Data View from ARIS to Staffware

The following substantial problem areas were identified[11]:

- in the ARIS Toolset designs which are primely generated in the WfMS at Run Time (e.g. sw_starter), can only be insufficiently represented.
- the field validating, reduced implemented in the interface, during the transformation only partly permitted the import of illegal fields (special characters) or field lengths (>80 character). This negatively affected the stability of the WfMS.
- a modelled description of the process according to the ARIS concept did not lead inevitably to a correct representation in Staffware. Relevant are certain combinations of XOR and AND connectors in the modelling as well as the conversion are to be called of hierarchies.

On basis of the project results conclusions can be pulled on other conceivable - not explicitly examined - starting situations. Therefore problems are to be expected concerning the transformation for processes of the class II and above all the class III. It is conceivable that descriptions of process can be revised by modifications or supplements interface-suited. This procedure is meaningful only if on the relevant point in time the present value exceeds the revision expenditure.

Integral process management, i.e. a continuous process of the adjustment of the process with constant evaluation on the basis of the requests of enterprise practice and the optimization of cooperating IT applications involved, requires the inverse transformation of the description of the process into the modelling tool.

Another appendage is examining the use of CASE (Computer Aided Software Engineering) tools for integrated applications. In addition the case/4/0 of the company microTool was used, since it provides a constant visualization of the business functions, information data flows, status diagrams up to an integrated entity relationship modelling. The exchange of process definition data can take place through data bases which can be integrated or through the module structure of the software package, whose production is substantially facilitated by the use of this CASE tool. However, the disadvantage in opposite to the appendage placed in front is the fact that the result can easily be adapted using the constant visualization in the diagrams and changed using the software, but altogether it represents a more rigid integrated software solution

4. Result and perspective

The transfer of business process information of modelling tools into Workflow Management Systems is a meaningful appendage for the creation of Workflow solutions. Thus the advantages of both system categories can be precisely interconnected. It was shown in the project

that it is possible to implement executable Workflow applications in this way. A substantial initial condition was that the business process which can be transferred was again modelled before with the objective of the transformation under use of the method filter of the interface. Theoretical conclusions on other possible starting situations were made.

The process of the application development can be indicated as iterative and fed back. Despite a lot of commonness, the use of software systems with basically heterogeneous objectives to consider were numerous and by the concepts of the used programs determined restrictions. To emphasize is also the high co-ordination requirement between the responsible persons for the business process modelling and system administration of the WfMS.

In order to arrange a cycle of constant development, revision and implementation of business processes efficient, a back transfer possibility of process data is regarded as indispensable. To that extent the specification of the interface 1 of the Workflow Management Coalition for the examined case was transferred only in one direction. The resulting method illustrates the revised figure 7, which represents a development of figure 1 in the introduction.

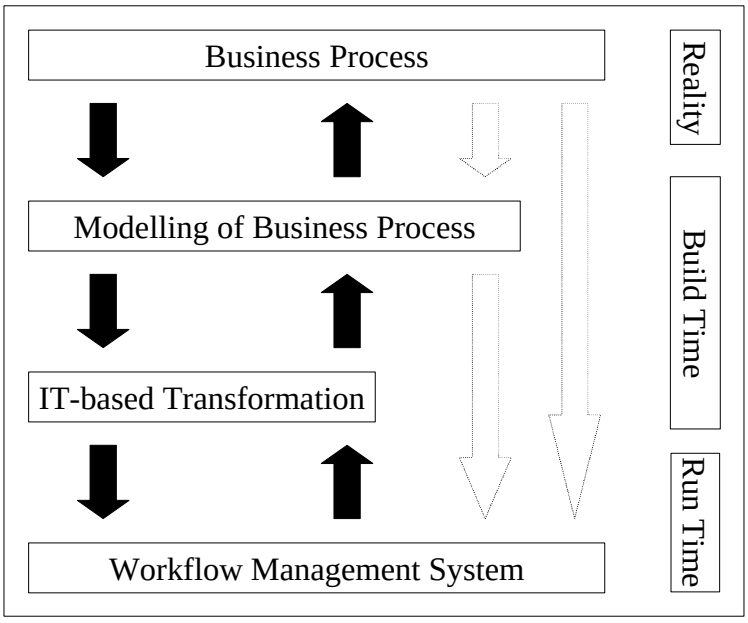

Figure 7: Model of continuous IT-based Business Process Development

Current market tendencies show a convergent development of the system categories modelling tool and Workflow Management System. In practice wide-spread standard software packages, like Lotus Notes and SAP, integrate Workflow functionalities increasingly. In what respect solutions from this area are able to support the “Model of continuous IT-based Business Process Development”, still remains a question which can be analyzed in the future.

[1] Compare [Varian 1989], p. 300 f
[2] Compare [WfMC TC00-1003], p. 20
[3] Compare [WfMC TC00-1003]
[4] Used became the ARIS-Toolset 3.2 of the IDS Prof. Scheer GmbH.
[5] As WfMS Staffware'97 (english version) of theStaffware GmbH was used.
[6] The Interface "process@work" of the SMS DV-Beratungs GmbH was used in the version 1.0.
[7] Compare [Scheer 98], p. 33 – 37
[8] The graphic originates from the help - function of the used ARIS-Toolset.
[9] Compare [Halter 96], p. 177
[10] Compare [Scheer 98], p. 29
[11] For a comprehensive description see [Arnold 2000] and [Kalledat 2000].

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