

The Administrative Process Life-Cycle

Abstract. We present an outline of an administrative process management (APM) methodology providing a solid base for execution of large scale APM projects. The project participant role model underlying our approach is discussed in the context of an APM project life-cycle. The project life-cycle workflow models the interdependencies of distinct project phases and activities. We explore and discuss the conceptual design phase of an APM project due to its impact on the overall project success. We conclude indicating the current and future research and development activities related to our OfficeObjects® platform.

Keywords. Administrative process management (APM), Process design and change

Track. Conceptual design and frame for eGovernment: Administrative process design and change, collaborative activities, legal interpretation

Introduction

Information technology has been one of the principal enablers of the fast growing administrative process management (APM) field. Yet the process orientation has its roots in the management science field and administrative process re-engineering is the principal driver of the organizational change in a modern government organisation. Consequences of an APM project are reaching far beyond the responsibility of the IT department and often they affect directly the mission and the strategy of the organisation by providing support for the underlying critical success factors (CPF). Hence, a new multi-disciplinary approach to project methodology is an indispensable ingredient of any successful APM project. The situation is best illustrated by a new buzzword “invasive IT” highlighting the role of the process-oriented information systems in creating government agencies capable to fulfil citizen satisfaction and to increase productivity at the same time.

The multi-disciplinary APM flexible project teams with role involvement varying over time are the pre-requisite of any successful APM project. The strategic project phases dealing with identification and framing the key administrative processes of an organization require knowledge and experience far beyond typical capacities of an IT consultant. Yet, on the other hand, the methodological knowledge, the technological erudition, and proficiency with the software tools supporting the design process are the principal enablers of a successful APM project. We are invariably in the situation where all project team members must deal with new issues, often remote from their professional experience, in the course of the project. Therefore, all techniques that may steepen the learning curves of the project team members are beneficial to the quality of the project results.

Worthy of our process orientation, we look at the APM project life-cycle from a development process perspective highlighting the project team member roles, the project activities and their relationships (i.e. the project graph), and the project deliverables. Consistently with the classical process re-engineering loop, we view any APM project as a continuous loop initiated by the “big bang” radical change of inventing the “new” brave reality enabled by the “to be” administrative processes, and then steadily going through the continuous step-wise process improvement cycle resulting in less radical, yet steady, administrative process refinement. Although our methodology provides guidelines for an APM project supported by any standard BPM software tools, we tend, in particular while discussing project deliverables, to concentrate on those issues that can satisfactorily be dealt with in the OfficeObjects[®] WorkFlow environment [12]. Our methodology is a generalisation of over 10 year experience in design and development of process-oriented administrative information systems. The practical use of our methodology is exemplified by an advanced IT system supporting the European legislative processes within the Polish Government presented in [4]. There also exists a host of good books, one may say classics, that provide important information sources discussing many of the issues raised here in much greater detail. We recommend [5], [8], [11], [16] for the early APM project phases and [1] for the execution level design of workflow processes.

The Ongoing APM Research

Importance of administrative process management in eGovernment IT solutions has stimulated intensive research and development activities. Major research directions include such areas as process design and improvement, interoperability and integration and organisational impact.

The *process design and improvement* research concentrated on such issues as organisation change enabled by APM systems and in particular by new process modelling techniques [7], [3], process modelling requirements and tools [14], [15], [19], and on the APM strategy and organisation change management [2]. The impact of the APM field on government organisations has been presented in [6], [3], [14], [2]. Requirements pertaining to administrative knowledge processes have been discussed in [17]. The process flexibility requirements in the context of administrative information systems have been introduced in [9], [7]. The role of weakly structured processes in administrative decision making and the related role models have been presented in [9]. The *interoperability and integration* issues in the context of the process management technology have been introduced in [6], [9], whereas the inter-organisation administrative processes and their integration features have been amply presented in [10], [14]. The *organisational impact* of the APM technology including such issues as organisational learning, performance metrics, and governance has been discussed in [7], [17].

Our contribution has been the development and practical verification and refinement of a complete administrative process design methodology spanning all phases of the APM project life-cycle. For space reasons we present the principal features of our approach referring the interested readers to [12].

The APM Project Team Member Roles

A multi-disciplinary project team dealing with such critical issues as administrative processes must comprise actors competent to resolve all design problems throughout the entire APM project life-cycle. The focus of APM projects is on enabling an initial radical change of such critical areas of an enterprise as its core administrative process, often cutting deep into the organisational tissue. Existing administrative process may be abandoned, followed by drastic modification of the organisational structure, and new ones are created to provide support for a more effective and efficient organisation. Instituting such change requires sufficient power in an organisation to at least cover the functional areas undergoing the radical change. To design administrative processes cutting across the “functional silos” one requires assembling knowledge corresponding to all functional areas involved. Yet the task at hand calls for good communication among the APM project team members to exploit synergies to be derived from the wealth of tacit knowledge to be potentially shared by all participants of the project team.

The broad division of expertise usually required in APM projects is the non-IT/IT line categorising the team members into the application domain vs. the technological categories. Although the enabling role of IT is beyond question, the primary role in

administrative process design, step-wise refinement, and change management is played by the application domain experts. The specific role of the APM Project Sponsor falls on the lap of the executive management and the respective manager power must correspond to the scope of administrative processes within the terms of reference established for the project. We consider the project sponsor role to be external to the APM project, in fact she acts as the principal client of the project, although the support and motivation stemming from sufficiently powerful position is one of the critical success factors.

The Application Domain Participants

Importance of the domain knowledge, either specific for a given organisation, or general pertaining to the domain “best practices”, is the mantra of APM projects. The application domain participants of an APM project comprise the following distinct roles: domain expert, management consultant, process owner, process participant.

The *Domain Expert* role encompassing representative knowledge from all functional areas affected by the administrative process is usually played by employees carefully selected on the basis of their professional position and esteem among peers. The latter is indispensable for gaining user acceptance (sell in) during the enactment phases of the APM project. The usual problem is that the best candidates for the role are usually the most busy ones, therefore, it is critically important to explicitly define and assign sufficient resources, in terms of time and number, to cover this role. Domain experts provide insight into the existing situation and are in the position to best explain the reason for change and the intricacies of the existing “As-Is” processes. They are also in best position to generate and validate ideas leading to new “To-Be” process in the context of their respective functional areas.

The *Management Consultant* role should be filled in by individuals expert in the APM field, with application domain experience, although advisable, if not indispensable, whose principal contribution to the project is the APM methodology knowledge and the team building and mentoring skills. Experience in APM projects should provide knowledge of best practices pertaining to the application domain. Note that the emerging APM field, exploiting the notorious lessons learned of the BPR (business process re-engineering) era, reconciles, often contrasted by management scientists, approaches of the radical change (BPR) and the continuous process improvement (TQM). The past experience shows, that the management consultants should have sufficient technological knowledge to foster good communication among the not-IT and the IT categories of an APM project team members.

The *Process Owner* is an individual responsible for the administrative process enactment, supervision, and maintenance. Usually such an individual is a middle level manager of an organisation using the administrative process responsible for meeting the business metrics and constraints established for the process, as well as providing the first level support and supervision to the process participants acting within the predefined roles. Continuous monitoring of the administrative process enables the process owner to evaluate improvement claims proposed by the work participants and process clients (external or internal). Apart from the usual coordination responsibilities a process owner acts as a coach stimulating the desirable behaviour of

all process participants. Additionally the process owner should be sufficiently trained to change the administrative process behaviour by modifying such process parameters as the routing predicates, the work participant assignment predicates, as well as other business rules declaratively specified in the process definition.

The *Process Participant* is an actor of administrative process instances allocated to selected process activities via the role model specification mechanism. In fact, coordination of work participants is the primary rationale for the APM technology. The participant behaviour within an administrative process is largely determined by the administrative process specification, and sometimes by the prior behaviour of a process instance. Although, the process participant focus is on performing administrative tasks established for the process activities, she may be an important originator of the process improvement claims.

Other administrative process stakeholders, such as the customers receiving services implemented by administrative process (i.e. citizens), or organisation management monitoring the administrative-oriented key performance indicators (KPI's), are not directly involved in the mechanics of the respective administrative processes. Although, they may voice important opinions and claim process improvements, we do not consider their roles to be directly involved in an administrative process life-cycle.

The IT Expert

The APM field would not grow to its current importance and dimension if not for the information system technologies jointly providing the enabling APM platform. Hence, the IT expert roles are indispensable in an APM multi-disciplinary project team. Some of the roles are specific to the workflow management technology, some other are always required regardless of the information system architecture. Naturally, we concentrate on the former ones, due to their impact on the administrative process life-cycle. The IT roles directly relevant to the APM projects are: information system architect, information system implementer, quality assurance auditor, information system administrator.

The *Information System Architect* is responsible for the conceptual design of the entire IT infrastructure supporting the administrative process. The information system architect is the principal intermediary between the IT experts responsible for design and implementation of information systems underlying the administrative process, thus her participation in the early phases of the administrative process life-cycle is mandatory. In fact, the information system architect is involved, in varying capacity, in all phases of the APM project life-cycle. The conceptual design of the information system infrastructure includes definition of the conceptual data model and the workflow process data container, as well as mapping of the administrative process graph specification onto the specific workflow management system representation. Typically, administrative processes are supported by data and user-visible functions of the pre-existing information systems. Hence, the enterprise application integration (EAI) techniques are an important ingredient of the required information system architect's skills.

The *Information System Implementer* takes over the administrative process conceptual design to perform all technical design and implementation steps including

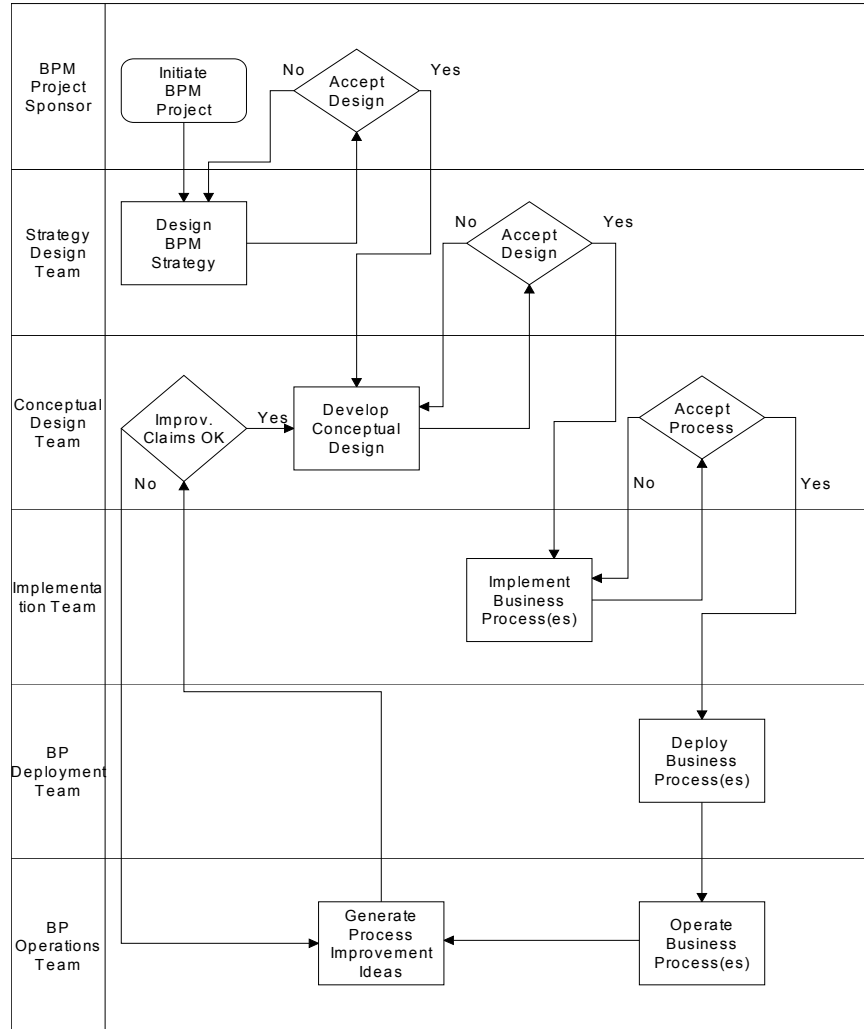


Fig. 1. The APM project life-cycle

Although, the early phases of an APM project may be governed by methodologies supporting the APM conceptual design tools, we present the complete life-cycle, in order to highlight the minimal design modelling requirements underlying the interaction of distinct APM project development teams. An important aspect of our approach is the consistent use of modelling techniques and formalisms during all project phases supporting the step-wise refinement of design deliverables to achieve the detail level required by the respective phases. An overview of the APM project life-cycle is shown in Fig. 1.

Introduction of the APM Operations Team comprising almost all roles defined for the APM project life-cycle is to provide a representation of the continuous administrative process improvement initiatives inherent in the administrative process operations phase. Note, that the domain expert and process participant roles are not necessarily disjoint, in fact, in most practical situations domain experts (i.e. opinion leaders), instrumental in the project sell-in in the target organisation, are also the process participants.

Consistently with the “continuous process improvement” paradigm, we believe that the APM project life-cycle spans the entire period of the process operations. Hence, the project life-cycle is a closed loop very similar to the information system maintenance activities. An important difference is, that, due to the declarative nature of the administrative process specification, an important part of the process improvement decisions may be independently implemented by the non-IT staff (i.e. by the process owner).

The APM Strategy Design

A fundamental problem of introducing the APM approach into an organisation is abandoning the traditional functional view of the universe of discourse, usually exemplified by a hierarchical view of the organisational chart, in favour of a process-oriented view. Processes, if identified properly, always span organisation chart boundaries serving external or internal customers and involving different members of the organisation. One commonly refers to processes serving external customers as to core administrative processes serving a mission and implementing the mission of an organisation.

Process identification is what causes most problems at the initial phase of an APM project and a common mistake is to refer rather to a work activity underlying a process than to its result and the triggering event. The “Event-tasks-result” framework is fundamental for proper process identification and it is duly reflected in our administrative process definition. The *work tasks* inter-related within a *process* by causal relationships are commonly executed within different parts of an organisation by *process participants*, who are required to have appropriate skills and decision prerogatives. A well-defined administrative process always initiates in response to an *event* and it produces a measurable and countable *result* for the process *customer*. Other stakeholders who may take interest in the process are its participants, organisation management, and actors external to the organisation participating in the process.

A *process* is a collection of interrelated *work tasks*, initiated in response to an *event*, achieving specific result for the *customer* and other *stakeholders* of the process.

The APM strategy should answer other vital questions, other than the process identification, such as *Why* we should occupy ourselves with this particular administrative process, and *What* we want to achieve by introducing its new, re-engineered version. The strategic assessment of administrative processes produces a set of candidates for an APM project qualified with their relative priorities reflecting the cause for action with respect to a particular process. The process-oriented

perspectives adopted by the strategy design team are the process stakeholders, the APM enablers, and the administrative process metrics.

The APM enablers collectively determining the behaviour of an administrative process, introduced and discussed in [16] include the following areas: Process workflow design, Application of information technology, Motivation and measurement, Human resources, Policies and rules, Facilities design.

The Administrative Process Conceptual Design

The APM conceptual design phase is performed for an application domain comprising a collection of related administrative processes or for an individual administrative process. The principal objectives of the conceptual design phase are to communicate the “change” resulting from the modified or new administrative processes to the organisation management responsible for the APM strategy, as shown in Fig. 1, and to provide sufficient design information to enable the ensuing process implementation phase. The conceptual design life-cycle is shown in Fig. 2. .

Some roles may involve the same individuals wearing different role “hats” at distinct times of the design life-cycle. A typical situation would be to have an individual of the Process Owner role play the Domain Expert role, or vice versa, and the Information Systems Architect role participant perform as the Management Consultant. Depending on the conceptual design area several individuals performing respective roles may participate in the design team.

Usually an individual designated to play the Process Owner role would be responsible for presenting the conceptual design to the APM strategy team and to the potential administrative process participant community. Gaining acceptance of the latter category is an important part of the administrative process “sell in” activities indispensable for success of the process deployment phase. Empowerment of the Process Owner role to represent the conceptual design team requires building up sufficient conceptual design expertise, in particular with respect to the administrative process graph specification. Such expertise proves beneficial during the administrative process operations phase enabling the Process Owner to manage process maintenance and change control duties.

The APM conceptual design phase entails use of the formal modelling notations at the matching abstraction level to be further refined during the ensuing phases of the design life-cycle. The modelling techniques and their use in the conceptual design phase are summarised in Table 2.

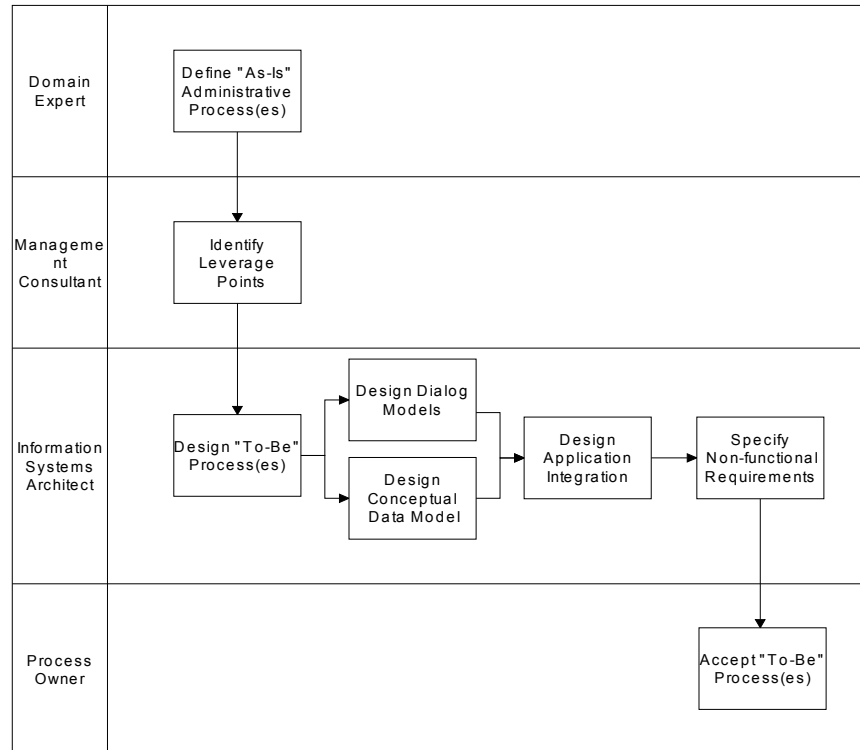


Fig. 2. The administrative process conceptual design life-cycle

The conceptual design modelling techniques should be used to develop a complete design specification regardless of the conceptual tool environment selected for the task. The “To-Be” process information provided by the conceptual design phase deliverables should be sufficient to perform the implementation phase without recourse to additional information.

An important characteristic of our process modelling approach is the use of the BPMN notation [12] throughout the entire process design and implementation life-cycle augmented by an extensible process meta-model compatible with the WfMC guidelines [20] and the functional business process query language (BPQL). The OfficeObjects® WorkFlow [12] BPQL defines process execution rules such as the work participant assignment rules, the routing predicates, and the process constraints (time constraints, activity pre- and post-conditions, process event predicates).

Table 2. Modelling techniques used in the conceptual design phase

Modelling Technique	Use
BPMN Process Model	The administrative process model is to be specified on several abstraction levels following the step-wise refinement character of the “As-Is” process assessment and of the “To-Be” process design.
BPMN Handoff Diagram	The handoff diagram presents involvement of each participant role in a process. All process participant roles must be specified at this level.
BPMN Milestone Diagram	The milestone diagram is to present the key steps that determine flow or impact overall performance. It refines the handoff diagram with steps illustrating achievement of milestones, decisions affecting flow in a significant way, handoff tasks introducing delay or expense, significant iterations.
BPMN Logical Diagram	This diagram level refines the what happens information of the preceding modelling levels with information how the process is to be implemented. Abstract process graph nodes are expanded with detailed task and decision nodes presenting the complete process flow.
Use Case Diagram	The Use Cases are shown to illustrate the information system functionalities supporting execution of an administrative process activity. It is a good practice to present a related collection of application functions, usually implemented by a distinct module of the underlying software architecture, as a single use case. Collectively the use cases pertaining to a specific process task represent its dialog model.
Sequence Diagram	Sequence diagrams may optionally be used to graphically illustrate the dialog model scenarios. Time dependencies modelled by the sequence diagram are to be refined in the subsequent development phase to implement required controls constraining the use of application functions within the dialog models.
Class Diagram	Specification of the conceptual data model representing the administrative process view of its own and the pre-existing data resources. All persistent object classes required by the process should be specified. In the case of an application domain comprising many processes, the partial conceptual data models defined for individual processes should subsequently be integrated.
Object Diagram	The Object Diagram notation should also be used to model the process Data Container structure.

Conclusions

The “invasive” character of APM projects calls for development of a sound design methodology spanning the entire spectrum of management science and information technology fields. Design methodologies must be enabled by respective features of APM software platforms, in particular in the area of process modelling tools, process rule engines, and process metrics. Our experience of large scale APM project developed with the use of the OfficeObjects® WorkFlow platform that compliance with the government agencies standards is a mandatory requirement.

Our research and development work goes in two principal directions; (1) development of an advanced workflow management platform meeting the principal industry standard specification, such as those published in [12], [20], and (2) development of a comprehensive administrative process design methodology supporting all identified APM project life-cycle phases [13]. In particular we concentrate on the weakly structured process requirements calling for extension of the BPMN process model, and on the flexible business process metrics formalism extending the BPQL.

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