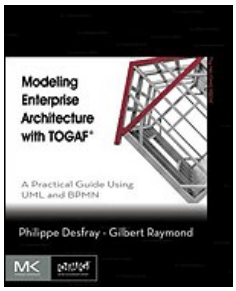
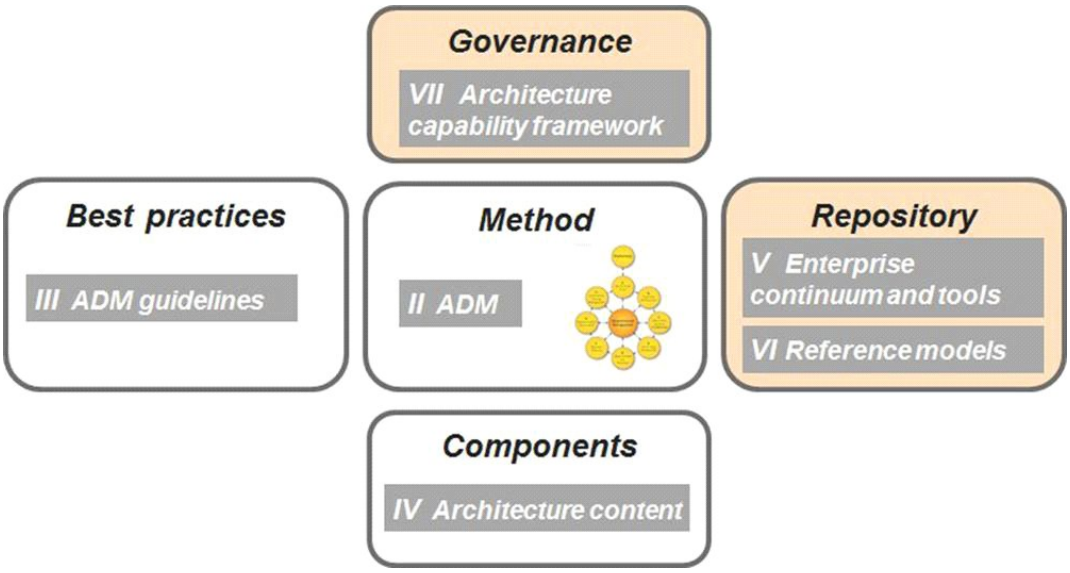


Modeling Enterprise Architecture with TOGAF: A Practical Guide Using UML and BPMN

by Philippe Desfray and Gilbert Raymond

Chapter 4: The Repository and Governance

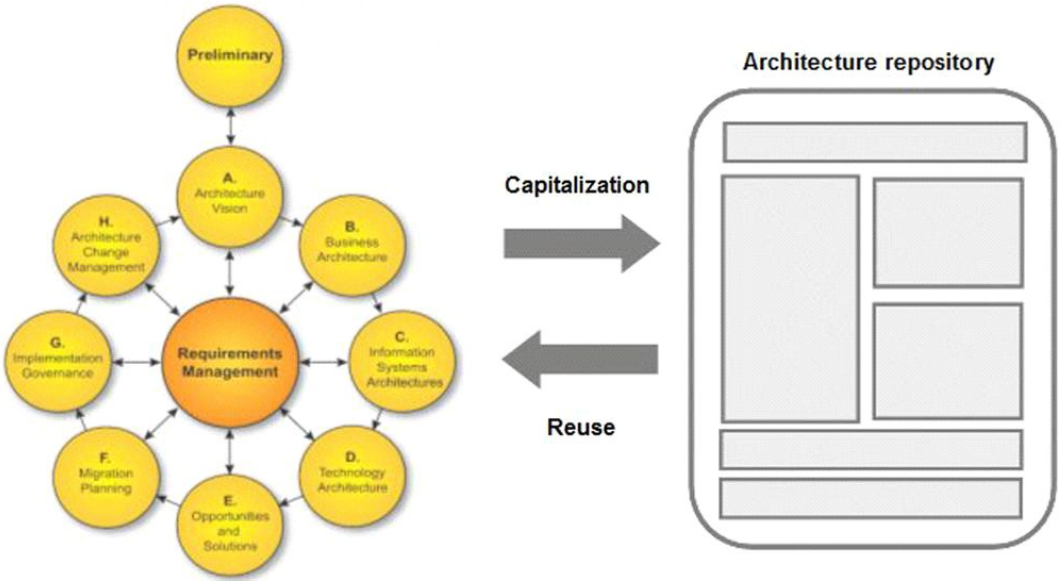
This chapter deals with both the architecture repository and with governance (parts V and VI and part VII of TOGAF, respectively). First, we specify the relationships between the architecture repository and the ADM cycle and the dynamic structure of its content. Second, we then deal with the governance of the architecture, which includes repository management and the organization of the monitoring and checking of architecture work.



4.1 THE ARCHITECTURE REPOSITORY

4.1.1 The Repository and the ADM

The architecture repository occupies a central position in TOGAF as a tool for capitalizing, reusing, and structuring information. The goal consists of finding practices accumulated during previous ADM cycles to progressively constitute an asset available to the entire enterprise. From this point of view, the TOGAF ADM cycle can be considered in two ways: as a provider of information that feeds the repository during its construction or as a consumer that draws elements from the repository according to its needs (Figure 4.1).



Source: © 2008, The Open Group.

Figure 4.1: ADM and architecture repository

In practical terms, certain elements are selected to feed the repository at the end of each phase. This virtuous cycle enriches the enterprise's know-how and contributes to the minimization of risks and costs through the reuse of architectural practices and structures.

4.1.2 The Structure of the Repository

The repository contains various elements such as models, patterns, architecture descriptions, or deliverables resulting from earlier work and also external elements from standards or other organizations. TOGAF proposes that the repository be partitioned in the following way:

- The *metamodel*, which establishes architecture elements and the relationships[1] between them.
- The "*architecture landscape*," which describes the existing architecture.
- The *reference library*, in which templates, patterns, guides, and all elements already implemented and available for reuse are located.
- The *standard information base*, containing international norms, tools, and services that must be conformed to.
- Two parts related to the *governance* of the repository itself: the governance log and the architecture capability (Figure 4.2).

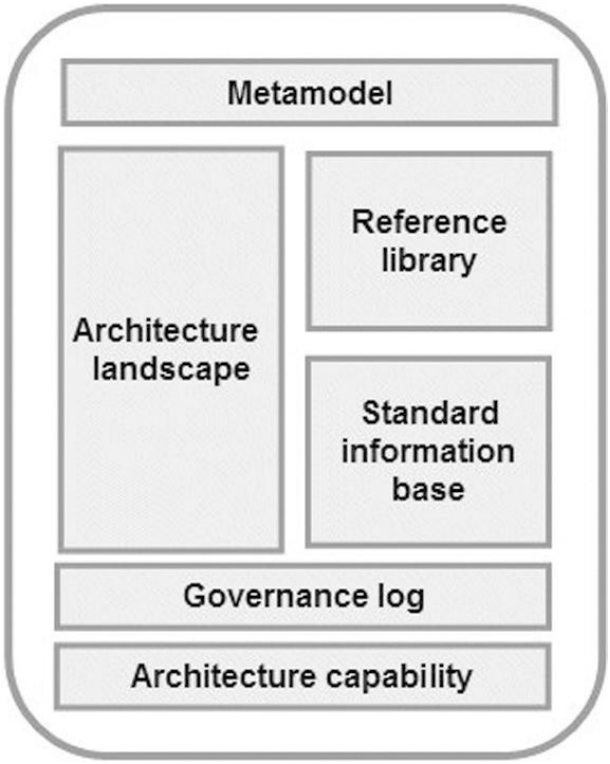


Figure 4.2: Structure of the architecture repository

4.1.3 The Landscape

The landscape contains models of the existing architecture across the entire enterprise. Its content varies from one enterprise to the next. The models found here most frequently deal with business processes, applications, and data.

This view of the architectural landscape is found in some enterprise architecture approaches that have developed over the past few years.[2] For example, the application mapping includes all applications and their links (interapplication flows). This model is essential to the overall understanding of the system and constitutes a major tool for driving its evolution. Naturally, its content is constantly evolving as architectural transformations take place.

4.1.4 Classification Plan: Architecture Continuum

The role of the architecture continuum (part V of the TOGAF document) is to provide a classification plan of the enterprise repository, focusing more particularly on the "reference library" part. This part plays a major role as both a storage area and a basis for reuse in the context of the execution of an ADM cycle.

This classification plan includes four types of elements in order of decreasing abstraction: foundation architecture, common system architectures, industry architectures, and organization-specific architectures.

- *Foundation architecture*: Deals with the foundations of generic architectures, in which we find high-level specifications and architecture patterns that can be applied to all types of enterprises. TOGAF provides an example of foundation architecture, the TRM (*technical reference model*).

- *Common systems architectures*: Represent high reusable systems dedicated to very cross-organizational services, such as security, network, and communication. The III-RM (Section 4.1.5) included in TOGAF is an example of a common system.
- *Industry architectures*: Here we find structures destined for a particular industry, such as telecommunications, banking, or insurance.[3] These structures range from data models to information system frameworks, or any other structure dedicated to a given domain.
- *Organization-specific architectures*: Dedicated to content that is specific to the enterprise or a part of the enterprise. It is typically here that we will find different elements of all different types resulting from the execution of ADM phases, elements that we want to capitalize on and potentially reuse.

The term architecture "continuum" characterizes the type of breakdown used, which partitions elements from the most general to the most specific (from foundation architecture to organization-specific architecture, respectively).

As with building blocks, two types of elements coexist within this classification: the "architecture" part and the "solution" part, with the latter being the physical translation of the former. For example, the specification of a workflow tool will be positioned in the "architecture" part, which describes the functions, use modes, and components that a tool of this category must provide. Conversely, a marketplace tool recommended by the enterprise will be found in the "solution" part. In this way, we end up with a double classification plan, illustrated in Figure 4.3.

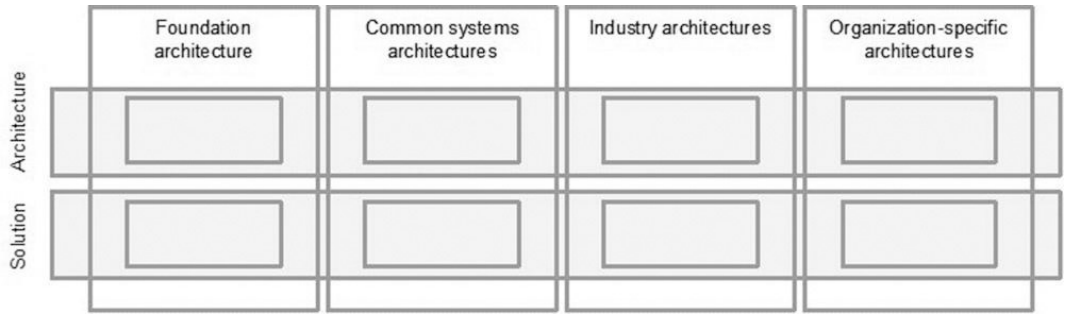


Figure 4.3: Architecture continuum

4.1.5 TOGAF Reference Models

In part VI of the TOGAF document (TOGAF reference models), TOGAF presents two detailed examples of architecture continuum elements: the *technical reference model* and the III-RM (*integrated information infrastructure reference model*).

The Technical Reference Model

The TRM is positioned as a foundation architecture within the architecture continuum. It defines the components of an information system infrastructure by providing terminology, structure, and rules for interconnection between different components. Figure 4.4 presents this structure.

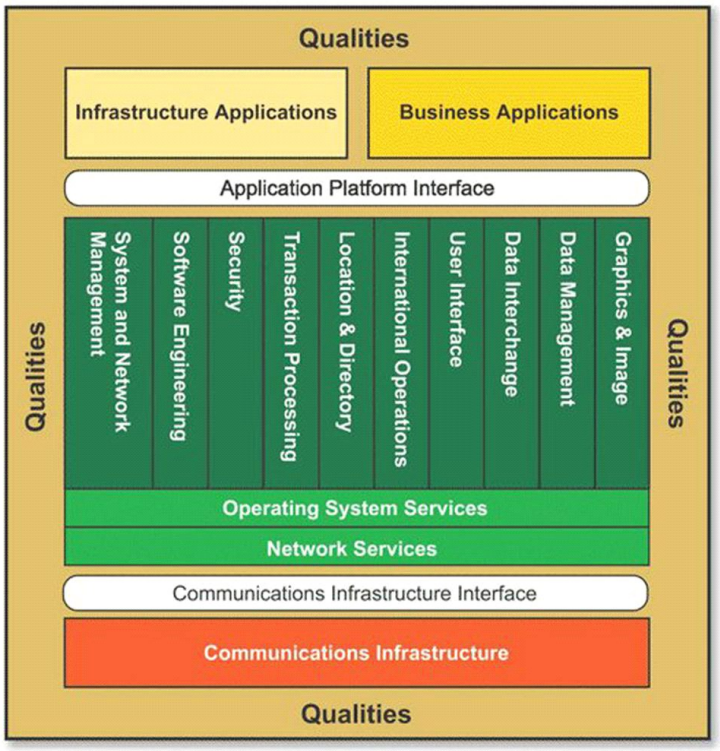


Figure 4.4: Structure of the TRM (technical reference model)—TOGAF9

The TRM breaks down into several levels, from the communications infrastructure to applications. Applications use a dedicated interface, the Application Platform Interface, which provides a collection of common services used by all the system's applications (graphical user interface, security, transaction, etc.). These common services are built on two lower-level layers: network services and operating system services.

The Integrated Information Infrastructure Reference Model

This second reference model can be considered a subset of the first (the TRM), focusing on applications by describing the following elements:

- Business applications
- Infrastructure applications, such as utilities or development tools
- The application platform, which handles application management services, including access, deployment, or location
- Interfaces between components, with details on protocols, exchanges, and programming interfaces
- Service quality

The emphasis here is on pooling and information sharing through the implementation of interfaces between service providers and service consumers, which is similar to the SOA (service-oriented architecture) view.

These two reference models are above all examples of what can be found in the "reference library" part of the architecture repository.

When first looking at TOGAF, they can simply be looked over, before being used later when real architecture work begins, or when an architecture repository is constituted.

4.1.6 Repository Tooling

It is difficult to imagine an architecture repository without thinking about its tooling. The choice of this tooling is one of the actions planned during the preliminary phase of the ADM (if it is not already in place), and a chapter of the TOGAF document is dedicated to this subject.[4]

In this type of context, the choice between an "all in one" solution or a suite of tools remains a common question.

If the repository is to take into account all the expected functions, it will be difficult to find a single tool that will efficiently meet all needs, since the repository must include everything from structured models to documents, from software components to follow-up or communication elements.

Moreover, we must distinguish between the two facets of the repository: the "construction" facet and the "communication" facet. There is no guarantee that the tool used to build the repository will be perfectly adapted to the distribution of information. As far as models are concerned, we often see different tools being chosen for development and for communication. Models are built using modeling tools, which are able to provide designers and architects with an adapted interface; however, models are consulted via intranets, which provide a homogeneous

framework for browsing, one that is simpler to use and that is workstation-independent. In this scenario, we must make sure that the modeling tool allows models to be available from a web[5]-type environment.

[1]For example, this is the metamodel described in Section 2 in Chapter 3.

[2]L'Architecture d'Entreprise, CIGREF, 2008.

[3]For example, Etom for telecommunications (www.energistics.org), ACORD for insurance (www.acord.org).

[4]TOGAF9, chapter 42.

[5]This type of export is now available in most modeling tools, even if they have to be adapted using scripts or a programming language.

4.2 ARCHITECTURE GOVERNANCE

4.2.1 Architecture Management

Like any enterprise activity, enterprise architecture management requires the setup of a particular organization: governance rules, processes, roles and responsibilities, and tools. This subject is dealt with in part VII of the TOGAF document, "Architecture Capability Framework," which describes the capabilities necessary to enterprise architecture management. The main points discussed are as follows:

- Architecture board
- Architecture contracts
- Compliance management
- Architecture governance
- Maturity models

On a fundamental level, architecture governance has two facets:

- The strategic facet, which handles repository management and the overall view of the enterprise architecture in the long term.
- The operational facet, which manages particular transformations, provides assistance to entities, and ensures the compliance and consistency of the solutions implemented.

This double facet is a well-known difficulty: How can general goals be translated to different transformation stakeholder entities? Complex organizations naturally establish entities that must attain specific objectives, objectives that are sometimes perceived as being paradoxical with regard to strategic goals.

In view of this fact, several types of responses are necessary: the establishment of a dedicated, centralized organization (the architecture board); a contractualized mode of governance; and an awareness of what is happening on the ground. In any case, the use of a collaborative mode (through web tools) will involve more stakeholders and can facilitate the management of architecture.

4.2.2 The Architecture Board

By its very nature, enterprise architecture requires centralized organization. This does not rule out operational delegations or a certain degree of federalism, but it does mean that a decision center is essential. This is the role of the architecture board, who reports back to the executive management on the compliance of implemented solutions with regard to enterprise architecture principles and decisions. The architecture board also manages the architecture repository, guaranteeing its consistency and the quality of its content.

> **Note** How many people should be on the architecture board? It is recommended that this number should be limited (fewer than 10 people) in order to safeguard the efficiency and reactivity of the architecture board. A certain level of rotation will encourage the board to be dynamic, but a stable core is important for the durability of long-term actions.

As a cross-organizational organism reporting to the executive management, the main functions of the architecture board are as follows:

- Creating and managing architecture projects, responsible for driving ADM cycles
- Controlling and validating implemented solutions
- Guaranteeing the consistency and convergence of the architecture
- Managing conflicts
- Developing and communicating norms, references, and guidelines

- Managing the architecture repository
- Organizing work to reduce divergence with regard to principles and goals
- Ensuring regular follow-up of activities and reporting to the executive management

Who participates in the architecture board? Experienced architects, of course. Also, the inclusion of high-level managers can make it easier to obtain consensus, which remains a major goal. Moreover, depending on the nature of the work, the architecture board can request assistance on particular subjects.

4.2.3 The Architecture Contract

Architecture contracts establish the relationships between the architecture board and all the stakeholders involved in an architecture project. They formalize expectations, constraints, goals, and appropriate means of measurement.

Architecture contracts are used at several points in the ADM cycle:

- During phase A, between the sponsor and the architecture board, who define the schedule and the goals of the ADM cycle: deliverables, organization, milestones, and key indicators. The content of the "Statement of Architecture Work" deliverable is found here.
- During phase F, with the elaboration of architecture contracts concluded with implementation projects.
- During phase G, with the validation and signature of these contracts.

4.2.4 Compliance Reviews

As one of the main activities of the architecture board, compliance reviews evaluate whether or not solutions are appropriate, with regard to general rules and contracts included with implementation projects. Reviews are carried out using precise checklists in order to objectify results.

TOGAF provides an example of a detailed checklist with nearly 200 typical questions organized into eight major themes[6]:

- Hardware and operating system checklist
- Software services and middleware checklist
- Applications checklists
- Information management checklists
- Security checklist
- Information system management checklist
- System engineering/overall architecture checklists
- System engineering/methods and tools checklist

The organization of these reviews is also described in the form of a dedicated process, which explains the approach and the role of each participant.

4.2.5 "Good" Governance

All the points that we have just discussed constitute a working base for the implementation of enterprise architecture governance. However, when put into practice, this governance comes up against certain difficulties. Earlier we discussed the main difficulty, namely the dichotomy between the strategic view and the reality of teams on the ground. An inaccessible and "disembodied" organization cut off from organizational units will only encourage this tendency.

A more pragmatic approach will encourage closer collaboration between the architecture board and teams. For example, the active participation of enterprise architects in the elaboration of choices, without limiting themselves to a validation role after the event. This participation can go as far as the temporary integration of enterprise architects within teams. This organization has two advantages: first, for the project manager, whose team is strengthened at no extra cost, and, second, feedback to the architecture board, which can adapt and react to what is happening on the ground in real time.

Efficient communication is the other area of work on which to concentrate. Particular attention must be paid when distributing strategic elements in the architecture repository. The quality of the information (legibility, availability, pertinence, etc.) will condition the efficiency of its use. Patterns, guides, methods, and examples will be that much more easily accepted if they provide real added value and concrete help to operational teams.

More generally, finding practical means of bringing viewpoints closer together is essential, if convincing results are to be attained. Real commitment to operational projects on the part of enterprise architects contributes significantly to this: it is a question of switching from a

purely contractual mode to a more dynamic collaboration.[7]

[6]TOGAF9, chapter 48.5.

[7]Governance of Enterprise Transformation and Different Faces of Enterprise Architecture Management, Daniel Simon, Journal of Enterprise Architecture, May 2011.

4.3 FUNDAMENTAL CONCEPTS

The following fundamental concepts were introduced in this chapter:

- Architecture repository: System that contains and manages all the enterprise information that is useful to enterprise architecture (processes, data, components, deliverables, artifacts, patterns, norms, etc.). The repository saves and manages all model elements and their links, in particular traceability links between model elements. It also saves diagrams and manages the connection between diagrams and the model elements represented.
- Architecture board: Cross-organizational instance of the enterprise responsible for its entire architecture. Responsible for controlling architecture, managing the architecture repository, and launching new architecture transformation cycles.
- Architecture contract: Establishes the relationships between the architecture board and all the stakeholders involved in an architecture project. They formalize expectations, constraints, goals, and appropriate means of measurement.