

The Open Group Architectural Framework

Background

TOGAF is a step-by-step method for developing an enterprise architecture, using a set of prescribed tools. It is freely available on the Open Group website for use by organisations wishing to develop an enterprise architecture. The first version was developed in 1995, which was based upon the the Technical Architecture Framework for Information Management (TAFIM), developed by the US Department of Defense. The current version is version 8.1.

Goals

TOGAF seeks to be an approach to “rapid” architectural development and effective governance. It does not prescribe the models that should be used to represent the architecture, it guides the process when creating an architecture. Due to its scalability, it can be used for government organisations, large enterprises and even small or medium sizes companies. When looking at the different levels of architecture a framework could support, TOGAF seeks to support all levels, ranging from business architecture, to data and technology architecture. Main benefits of TOGAF are:

- It's a proven method with year of research as a background and developed by world leading architects
- It uses common vocabulary, so that everyone in an organisation can read and understand the information provided by the resulting architecture.

The Framework

TOGAF consists of the following tools:

- An architectural development method (ADM)
- A theoretical base (The enterprise continuum)
- A technical reference model (TRM)
- Standards information base (SIB)

The above will be covered in the following chapters.

Architectural Development Method

The architectural development method is a detailed, step-by-step method on how to build, maintain, and implement an enterprise architecture. It consists out of 8 different steps in the design cycle (see illustration 1).

Phase A. Architecture Vision

During Phase A and the Preliminary work, the key questions about the architecture are answered. In this phase the scope, assumptions and methodologies are defined,

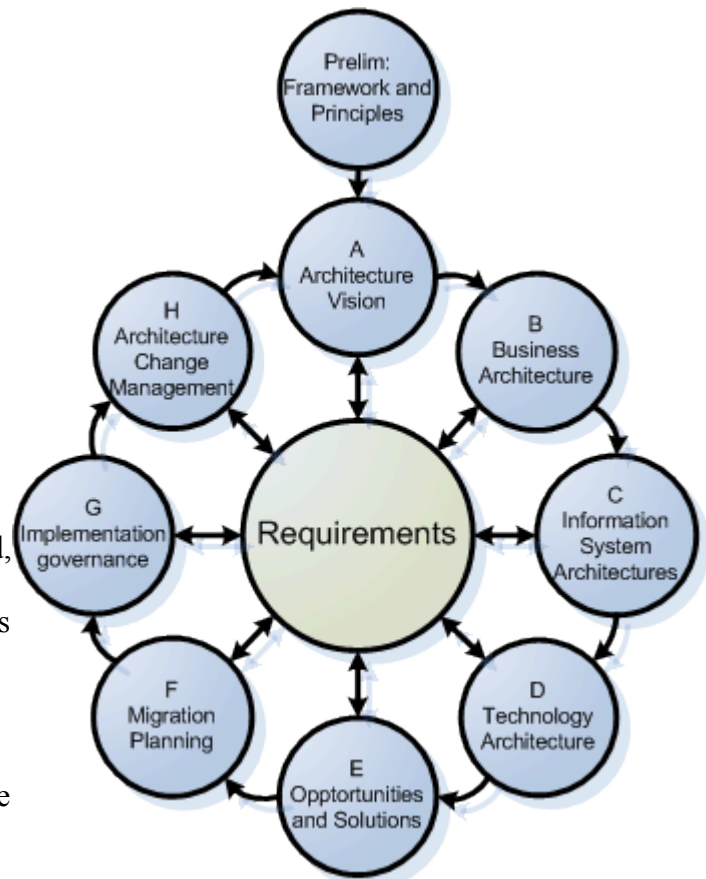


Illustration 1: ADM Cycle

as are the evaluation criteria. Afterwards, the key stakeholders and their concerns / objectives and the key business requirements that are to be addressed by the architecture are identified. With this information Business Scenario's are created which are used to define the requirements.

Phase B. Business architecture

The output of this phase are the the Baseline and Target Business Architectures. These can be defined using, for instance, UML or IDEF-0. The choice of the used modelling method is based upon the required views. The relevant viewpoints are too identified in this phase.

Phase C. Information System Architectures

The goal of this phase is to create the Data and Application Architecture. This phase is again divided into smaller steps. The created views in this phase are again modelled in the modelling method of choice. For databases this can, for example, be relational data modelling.

Phase D. Technology Architecture

The objective of this phase is to develop a Technology Architecture that will form the basis of the following implementation work. Within this development, the Technical Reference Model (which will be described in more detail later on) is used to identify the relevant Technology Architecture building blocks. TOGAF uses eight steps within this phase to construct the Technology Architecture.

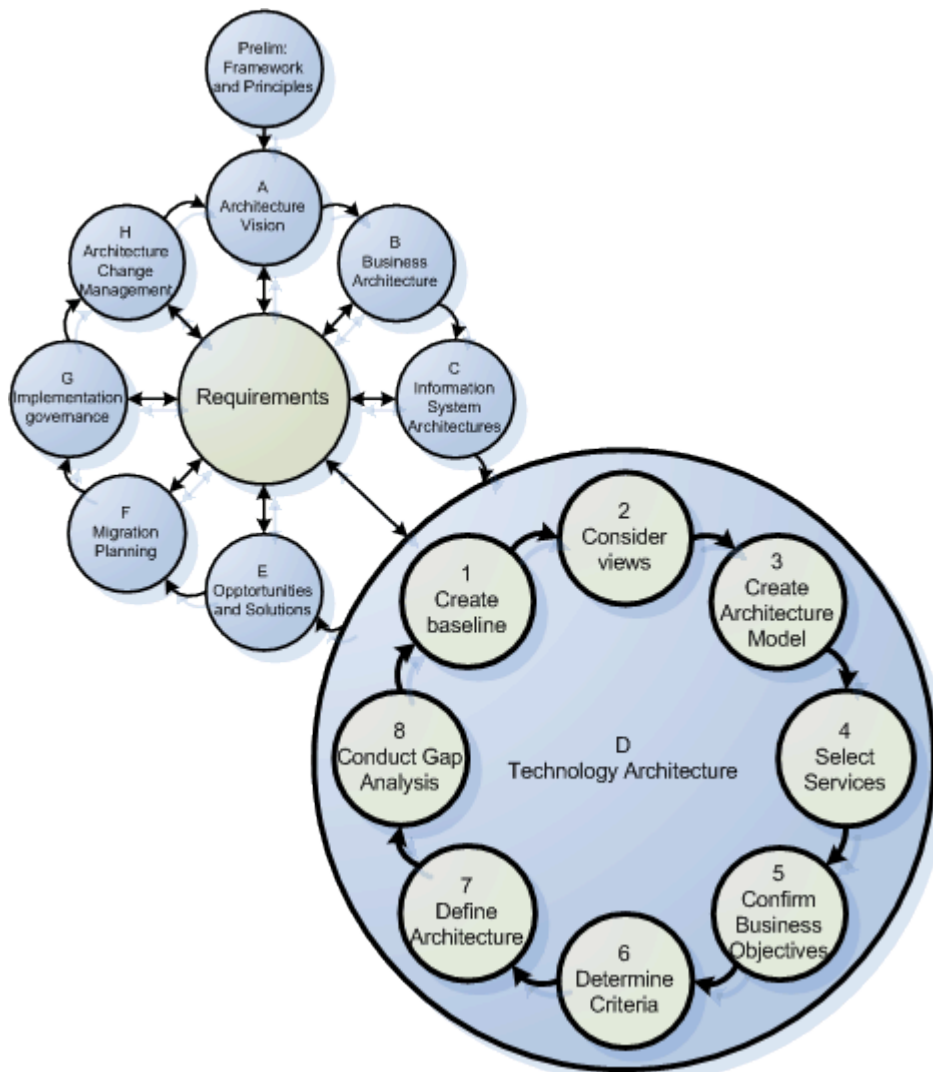


Illustration 2: Phase D. Technology Architecture

These eight steps are depicted in illustration 2. The first three steps are concerned with the development of an Architectural model of building blocks, based upon the most relevant views selected in step two.

An important step is the selection of services from the TRM which should satisfy the building blocks created in the third step. After selection of the services, these are compared to the Business Objectives, to verify all objectives are met, for each building block.

To verify whether the final architecture meets all its objectives, step six focusses on the determination of criteria to evaluate this. Then the full Technology Architecture is defined and the Technology Architecture Report is written.

The resulting Technology Architecture Report summarizes what was done and presents the key findings.

Phase E. Opportunities and Solutions

This phase identifies the parameters of change, the major phases along the way and the top-level projects to be undertaken in moving from the current environment to the target. The output of this phase will form the basis of the Implementation Plan required to move to the target architecture. This phase also attempts to identify new business opportunities arising from the architecture work in previous phases.

Phase F. Migration Planning

This phase focusses on the prioritization of the projects within the Technology Architecture and costs are estimated for the migration of the various projects. The final result is a detailed implementation roadmap, including timeline, referenced to as the Impact Analysis.

Phase G. Implementation Governance

For each of the implementation projects, a corresponding implementation organisation is assigned. The project details (e.g. description, objectives, scope, deliverables) are further developed and communicated to the implementation organisation. Parallel to this phase, the actual development finds place. During this phase the Architecture Contract is also created, containing a signature of all developing partners and the sponsoring organisation.

At the end of this phase the system is fully developed and implemented, compliant to the architecture.

Phase H. Architecture Change Management

After the implementation of the system, the development of the architecture does not end. The goal of this phase is to manage changes to the architecture in a cohesive and architected way. Changes in technology or business environment should be rapidly integrated in the architecture. This is what keeps the architecture flexible and dynamic.

During this phase, for each change request, the decision is made whether it is necessary to initiate the ADM cycle again, in order to redesign the architecture. This decision should be made by selection of criteria on which to judge, deciding whether a request for change requires only an update of the current architecture, or that it requires the cycle to be initiated again. These criteria are not presented by Togaf, since companies differ too much in their acceptance of risk. They become more clear however, as the ADM is exercised.

Requirements

The central circle inside the ADM cycle shows us that the different phases of the ADM are fed by requirements. Togaf does not prescribe a specific way of gathering and managing of these requirements, it only specifies what an effective Requirements Management process should achieve. Togaf does however contain one technique to collect and describe requirements, called Business Scenario's, which will be described in the next chapter.

Inputs for the Requirements Management process are supplied by the different phases of the ADM cycle. In a ten step guideline, a Structured Requirement Statement is created which contains the phases that need to be revisited in order to address the requirements.

Business scenario's

In order to describe a system in business taxonomy, Togaf uses Business scenario's. Business scenario's link the architecture to the business requirements, thus supporting business objectives. A Business scenario describes a business process that contributes to a significant need or problem. It also includes a description of the actors involved and the desired outcome of the business process. This business scenario is useful for Requirement Management, when it can contribute to the intended architecture. In order to link the technical requirements to the business requirements, the scenario also needs to describe the relation between these two.

The Enterprise Continuum

Where the ADM describes the process to create an organisation-specific architecture, the Enterprise Continuum is an aid to communication and understanding of the organisations architecture, by providing a consistent language, so that people with different views can discuss the architecture on an equal level. Besides aiding in communication, the Enterprise Continuum enables the re-use of architectural elements and assets.

The Architecture Continuum

The Enterprise Continuum is the collection of the Architecture- and Solutions Continua. The Architecture Continuum contains the relationships between different architectures. In Illustration 3. four different types of architectures are given, belonging to the Architecture Continuum. Each of the different types contains architectural assets and building blocks, thus also belonging to the architectural Continuum.

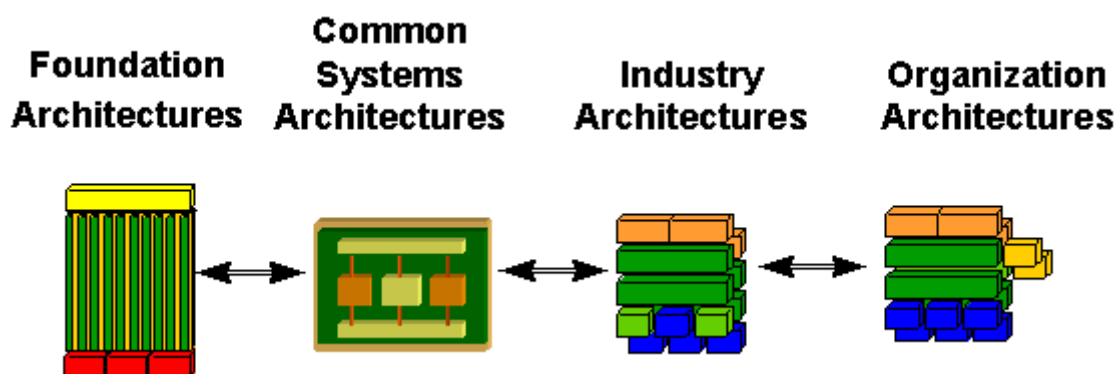


Illustration 3: The Architecture Continuum (Source: opengroup.org)

The first item, the Foundation Architectures, consists of building blocks that support all Common Systems Architectures (2nd item in the illustration). For Togaf, this is the Technical Reference Model (TRM) and Standards Information Base (SIB). When we relate to the ADM, we see that the ADM is used to get from the Foundation Architectures to a specific Organisation Architecture. The

steps in between contain more and more detail. An example of a Common Systems Architecture would be a Security Architecture, which describes a certain problem domain, but it is incomplete in terms of defining the complete information system. In the Industry Architecture domain, an architecture would consist of an architecture building blocks on how to address industry-specific problems.

The Solutions Continuum

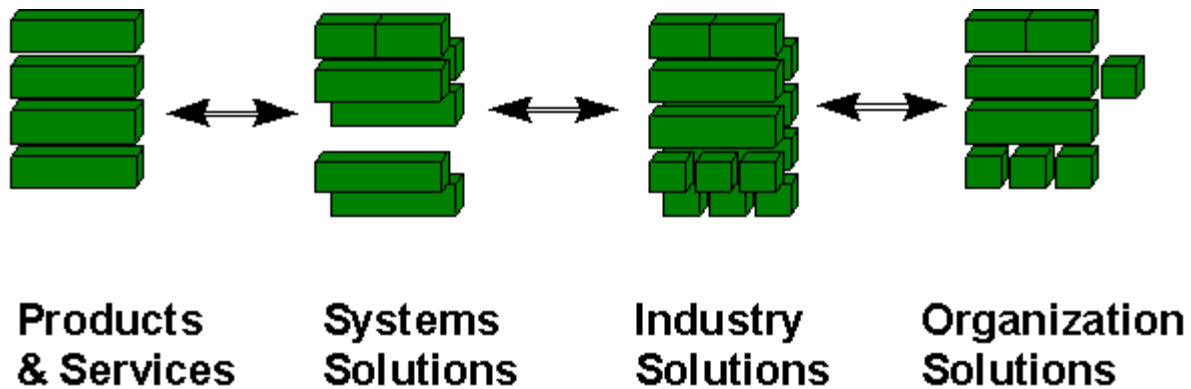


Illustration 4: The Solutions Continuum (Source: opengroup.org)

Parallel to the Architecture Continuum lies the Solutions Continuum. The different stages represent the implementations of the corresponding stage in the Architecture Continuum. Where Products & Services speak for themselves, Systems Solutions consist out of sets of Products or Services. These are again the components for the Industry Solutions, the sets together form a solution to a specific industry. The fourth step from the left is the total set of products and services an organisation needs to implement their Organisational Architecture.

When we combine the two Continua, Illustration 5 is created, showing the interactions and relations between the Architecture Continuum and the Solutions Continuum. These relations should not be seen as strict relations, the relations depicted in the illustration are a best case scenario. It could however be very well possible that there is an Enterprise Architecture which contains elements from a Common Systems Architecture.

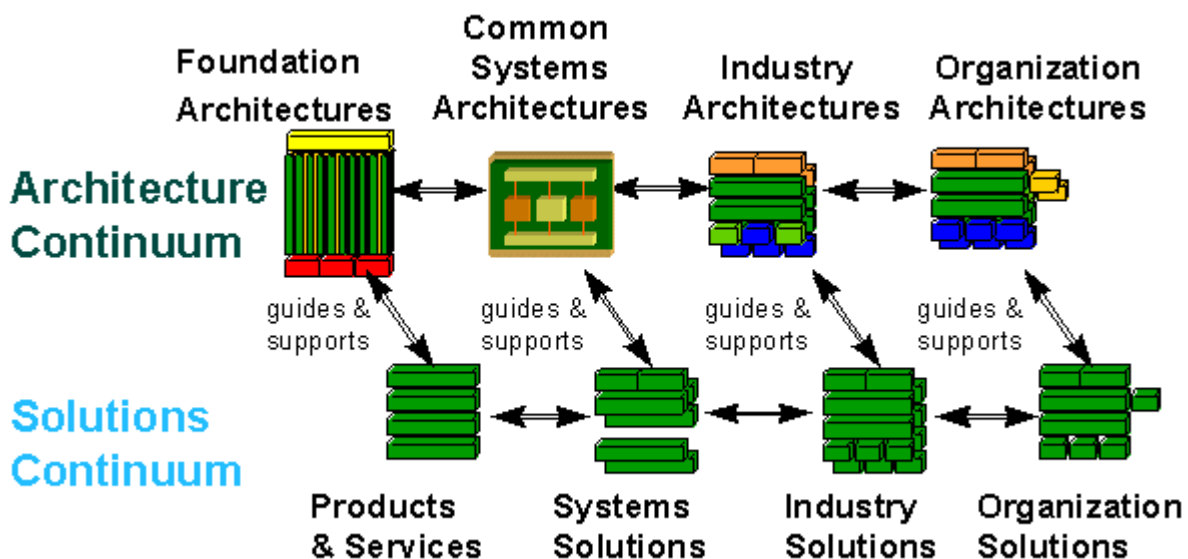


Illustration 5: The Enterprise Continuum (Source: opengroup.org)

Technical Reference Model (TRM)

The Togaf Foundation Architecture, described within the Architecture Continuum, is an architecture of generic services and functions that provides a foundation on which more specific architectures (e.g. Common Systems Architectures) and architectural components can be built. This Foundation Architecture consists out of two parts, the Technical Reference Model and the Standards Information Base.

The Togaf Technical Reference Model consists of a taxonomy for Architecture and a graphical representation of this taxonomy, depicted in illustration 6.

The illustration shows three layers, the Application Software, Application Platform and a Communication Infrastructure, connected with two interfaces.

Inside the Application Software layer, the difference between Business and Infrastructure Applications is that Business Applications are specific to a industry or even a particular enterprise (tailor-made software), where Infrastructure Applications are often “off-the-shelf” software packages, like Microsoft Office.

This software must of course be supported by a platform containing all necessary services to run the software. Therefore, this is often a set of services, like a File Server, Database Server, Web Server, etc. These services are often bundled, like Microsoft Small Business Server. These bundles are again used in the Technology Architecture phase as building blocks.

The communication infrastructure provides mean to interconnect systems. This could be on the same system, but could also be through the internet. This connection then transports the data between applications. This layer could be just one cross cable between two computers, it could also be the complete description of a system with network cables, switches, servers and internet providers, depending on the physical complexity of the situation.

Quality shown in the illustration concerns, for example the security of the system, or the manageability.

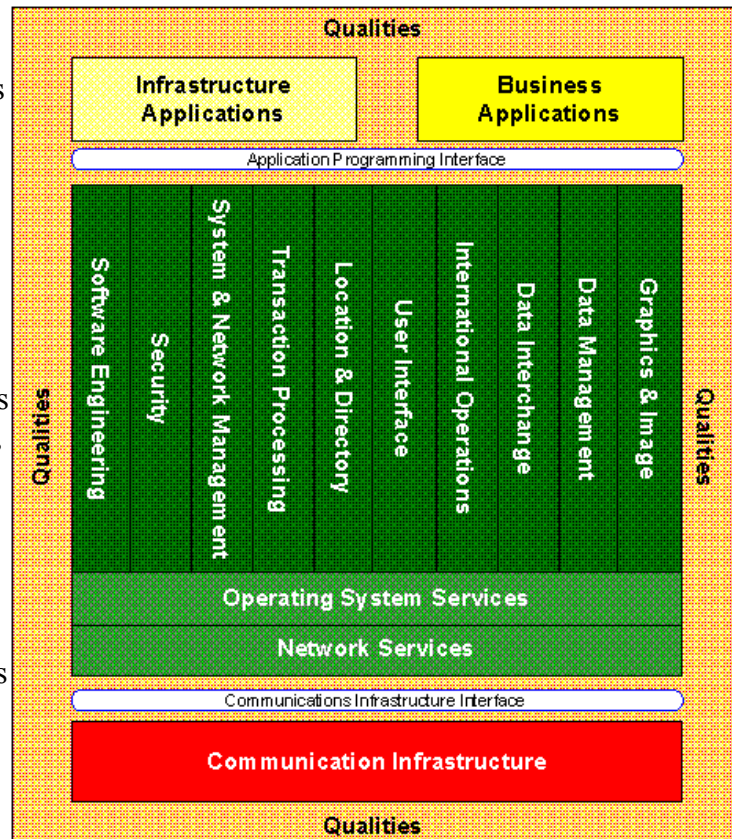


Illustration 6: Technical Reference Model (source: opengroup.org)

Standards Information Base (SIB)

Besides the TRM, the Foundation Architecture, described in the Architecture Continuum, also consists of the Standards Information Base.

The SIB is a list of standards on information systems, developed by the Open Group and is therefore not really part of Togaf, but it can be useful when developing architectures. It can easily be accessed through the website of the Open Group¹. It contains a list of standards, developed by

¹ <http://www.opengroup.org/sib.htm>

various organisations. An example of a standard would be: “HTML 4.0 Reference Specification”. This is a recommendation made by the W3C on how to write a webpage for a website.

The main advantages of the use of these standards is that they are “proven technology” and are supported by most of the industry, preventing vendor lock-in.

Final results

When using Togaf as a framework to create an architecture, still many companies don't benefit as much as planned. This is often due to the fact that an architecture is often implemented bottom-up, where the senior management doesn't take enough effort to match the business objectives with the architectural objectives, making it impossible to achieve the intended business objective though the leverage of the architecture. This problem occurs however, within every framework used to create an architecture. It is therefore critical that the strategic plan, used in Phase A, is agreed upon throughout the entire organisation.

References

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