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TOGAF™ and ArchiMate®: A Future Together

A Vision for Convergence & Co-Existence

A White Paper by:

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This White Paper is an informational document and does not form part of the TOGAF documentation set. Readers should note that this document has not been approved through the formal Open Group Standards Process and does not represent the formal consensus of The Open Group Architecture Forum.

TOGAF™ and ArchiMate®: A Future Together

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Boundaryless Information Flow™
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Executive Summary

This White Paper discusses the TOGAF and ArchiMate specifications, providing a model of integration that would support long-term convergence and interoperation. The recommendations of this paper are as follows:

- TOGAF should be divided into a base "framework of frameworks", supported by a library of domain-specific architecture frameworks, such as security architecture and information architecture. Concepts in the ArchiMate generic metamodel should be used to provide a consistent structure and alignment between domain-specific architecture frameworks.
- TOGAF should be enhanced to feature a comprehensive definition of the scope, goals, and objectives of architecture.
- TOGAF should adopt the ArchiMate approach of using generic and specialized metamodels. The current ArchiMate generic metamodel should be enhanced and transitioned to TOGAF.
- Architectural artifacts (or viewpoints) should be identified and discussed in TOGAF domain-specific frameworks. Their representation should be addressed in ArchiMate. Specific artifacts should not be discussed in the base TOGAF framework.
- ArchiMate should maintain an independent metamodel, which can be expressed as a partial (because we might not want to include non-modeling aspects of the TOGAF metamodel) extension of the TOGAF metamodel.

This White Paper supports Boundaryless Information Flow by discussing better integration between Open Group specifications.

Introduction

TOGAF and ArchiMate are two standards managed by The Open Group that address the discipline of enterprise architecture. Although originating from different backgrounds and with different objectives, the two standards may well be on a path towards closer alignment and convergence.

It is the belief of the authors that ArchiMate and TOGAF will continue to be separate specifications – there are clear scenarios where both ArchiMate and TOGAF may be used in isolation, or with alternative standards. However, even though it is possible for TOGAF and ArchiMate to be used independently, there are strong advantages associated with using the two standards in conjunction.

This White Paper provides a vision of how TOGAF and ArchiMate might come together in the longer term so that:

- They are in full conceptual alignment.
- They do not both aim to address the same topics.
- Where ArchiMate provides extension and specialization, this is traceable back to the general approach applied in TOGAF.

The purpose of this paper is two-fold. Firstly, it is intended as a starting point for discussion within The Open Group membership on how to evolve the TOGAF and ArchiMate specifications. Secondly, this paper can be consulted by organizations that wish to adopt TOGAF and ArchiMate, as a guide to integrating the two existing specifications (particularly with a view to long-term sustainability).

Overview of the TOGAF Specification

The Open Group Architecture Framework (TOGAF) is a framework – a detailed method and a set of supporting tools – for developing an enterprise architecture. It may be used freely by any organization wishing to develop an enterprise architecture for use within that organization.

There are seven main parts to the TOGAF document:

- **PART I: Introduction**
  This part provides a high-level introduction to the key concepts of enterprise architecture and in particular the TOGAF approach. It contains the definitions of terms used throughout TOGAF and release notes detailing the changes between this version and the previous version of TOGAF.
- **PART II: Architecture Development Method**
  This part is the core of TOGAF. It describes the TOGAF Architecture Development Method (ADM) (see Figure 1) – a step-by-step approach to developing an enterprise architecture.
- **PART III: ADM Guidelines and Techniques**
  This part contains a collection of guidelines and techniques available for use in applying TOGAF and the TOGAF ADM.
- **PART IV: Architecture Content Framework**
  This part describes the TOGAF content framework (see Figure 2), including a structured metamodel for architectural artifacts, the use of re-usable architecture building blocks, and an overview of typical architecture deliverables.

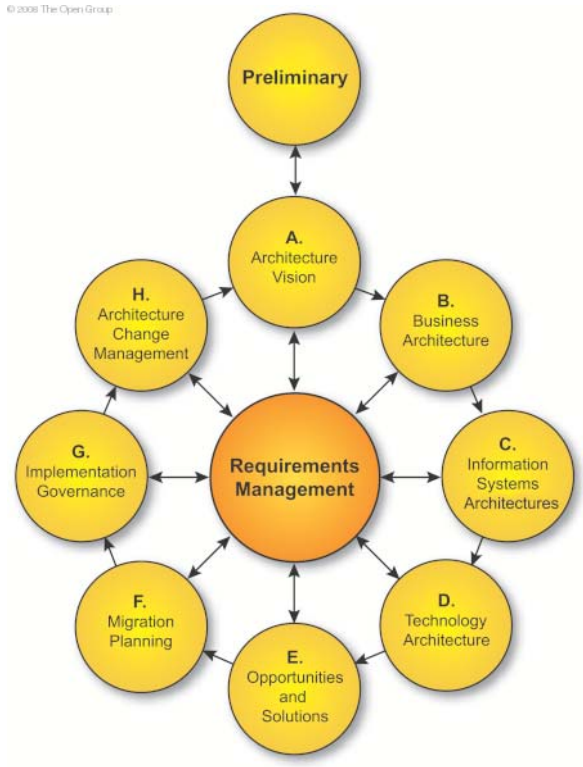

Figure 1: The TOGAF Architecture Development Method (ADM)

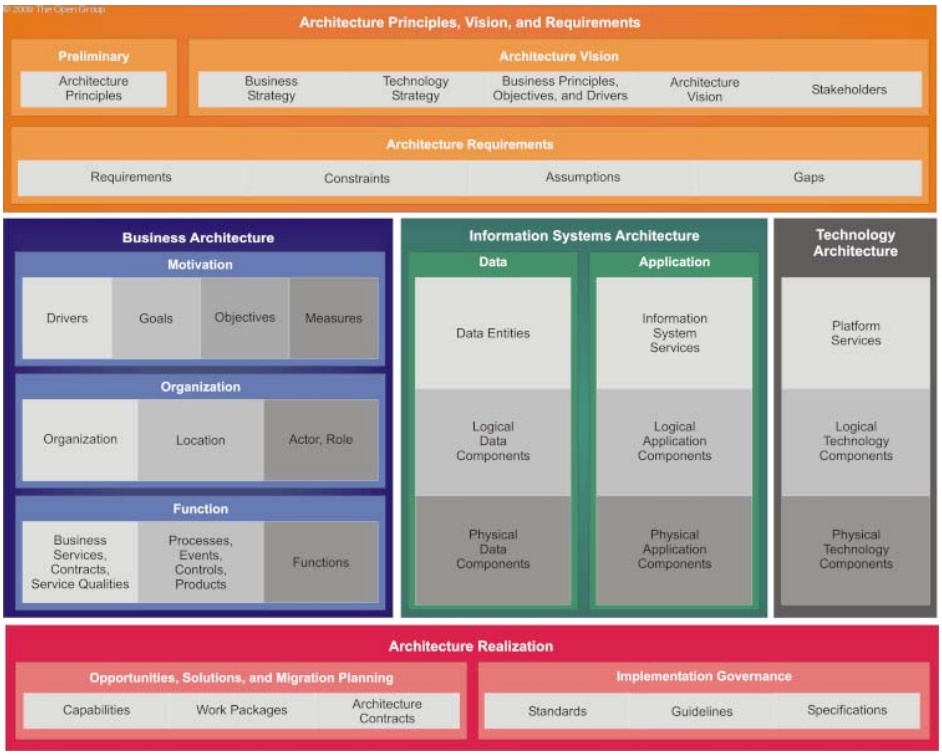

Figure 2: The TOGAF Architecture Content Framework

- **PART V: Enterprise Continuum & Tools**
  This part discusses appropriate taxonomies and tools to categorize and store the outputs of architecture activity within an enterprise.
- **PART VI: TOGAF Reference Models**
  This part provides a selection of architectural reference models, which includes the TOGAF Foundation Architecture, and the Integrated Information Infrastructure Reference Model (III-RM).
- **PART VII: Architecture Capability Framework**
  This part discusses the organization, processes, skills, roles, and responsibilities required to establish and operate an architecture function within an enterprise.

Overview of the ArchiMate Specification

The ArchiMate enterprise architecture modeling language has been developed to provide a uniform representation for architecture descriptions. It offers an integrated architectural approach that describes and visualizes the different architecture domains and their underlying relations and dependencies.

In a short time, ArchiMate has become the open standard for architecture modeling in the Netherlands, it is also becoming well known in the international enterprise architecture community, and recently it has been brought under the aegis of The Open Group.

The ArchiMate standard is structured as follows:

- **Chapter 1: Introduction**
- **Chapter 2: Enterprise Architecture**
  This chapter makes the case for enterprise architecture and for the necessity of a modeling standard for enterprise architecture.
- **Chapter 3: Language Structure**
  This chapter presents some general ideas, principles, and assumptions underlying the development of the ArchiMate metamodel and introduces the ArchiMate framework. This chapter describes generic and specific metamodels (see Figure 3) and provides a model of architecture domains and layers (see Figure 4)

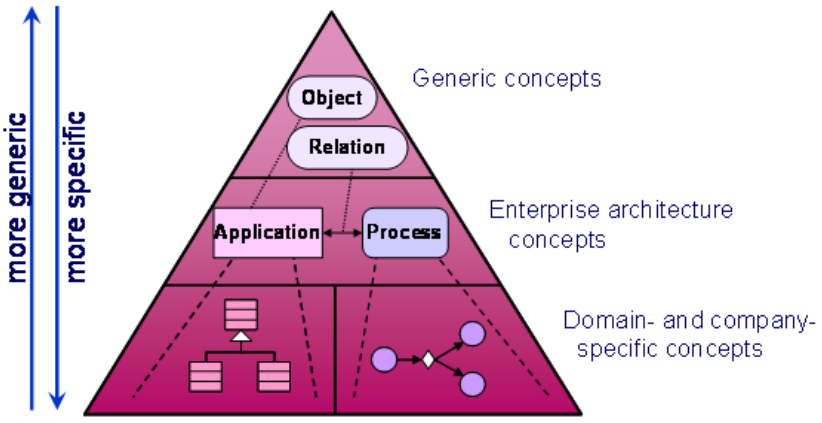

Figure 3: Generic and Specific Metamodels are used to Structure the ArchiMate Language

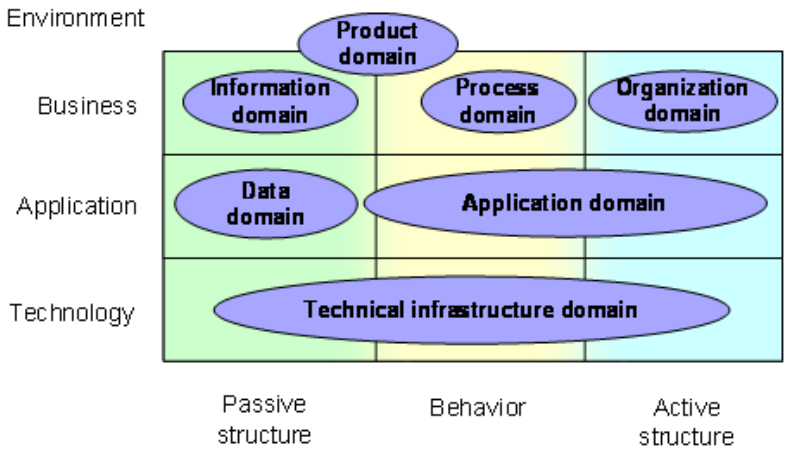

Figure 4: Architecture Layers and Domains within the ArchiMate Specification

- **Chapter 4: Business Layer**
  This chapter covers the definition and usage of the business layer modeling concept, together with examples.
- **Chapter 5: Application Layer**
  This chapter covers the definition and usage of the application layer modeling concept, together with examples.
- **Chapter 6: Technology Layer**
  This chapter covers the definition and usage of the technical infrastructure layer modeling concept, together with examples.
- **Chapter 7: Cross-Layer Dependencies and Chapter 8: Relationships**
  These chapters cover the definition of relationship concepts in a similar way.
- **Chapter 9: Architecture Viewpoints**
  This chapter presents and clarifies a set of architecture viewpoints, developed in ArchiMate based on practical experience. All ArchiMate viewpoints are described in detail. For each viewpoint the comprised concepts and relations, the guidelines for the viewpoint use, and the goal and target group and of the viewpoint are specified. Furthermore, each viewpoint description contains example models.
- **Chapter 10: Language Extension Mechanisms**
  This chapter handles extending and/or specializing the ArchiMate core language for specialized or domain-specific purposes.
- **Chapter 11: Future Directions**
  This chapter identifies extensions and directions for developments in the next versions of the language.

Achieving a Long-Term Model of Convergence and Co-existence

A number of key principles have been applied to generate the proposed model of ArchiMate and TOGAF integration:

- TOGAF will provide an umbrella framework for the discipline of enterprise architecture. The proposed vision for TOGAF is one where the base TOGAF specification acts as a “framework of frameworks”.

TOGAF should provide broad, shallow, and open coverage of the enterprise architecture discipline, allowing a library of TOGAF domain architecture frameworks (or other frameworks from outside The Open Group) to go into detail in particular areas. In practice, this will require the removal of domain-specific content from the base TOGAF specification and then creation of a TOGAF domain library to cover architecture specializations such as process architecture, information architecture, application architecture, data architecture, technology architecture, security architecture, etc.

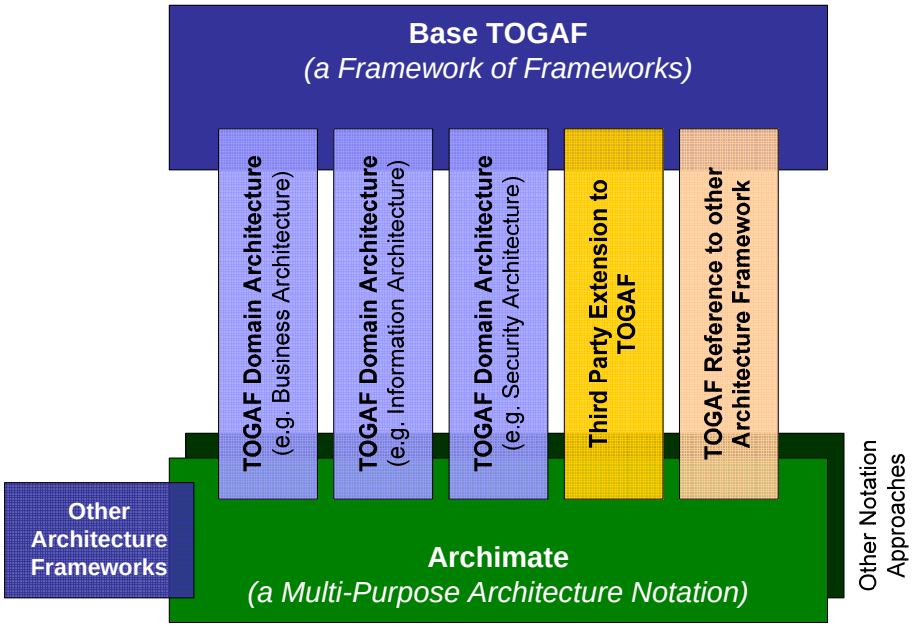

Figure 5: Base TOGAF as an Umbrella Framework, supported by a library of domain architecture frameworks and underpinned by the ArchiMate notation

- TOGAF will support a variety of modeling approaches and notations, including informal modeling techniques. As a broad, shallow, and open framework, TOGAF should be applicable as an approach when used in conjunction with different modeling techniques. In particular, TOGAF should be general enough so that it can be applied to both formal (such as ArchiMate) and informal modeling approaches.
- ArchiMate will conform to the TOGAF approach to enterprise architecture. As a modeling standard maintained by The Open Group, it is natural for the ArchiMate standard to share a direction and philosophy for enterprise architecture that is consistent with TOGAF. Although ArchiMate could be used with other architecture frameworks, it is reasonable to expect that ArchiMate and TOGAF can be used together with no major issues.
- ArchiMate will provide specific extensions to TOGAF that address enterprise architecture scenarios where formal modeling notation is required. With TOGAF acting as a "framework of frameworks", ArchiMate should plug in as a framework to address specific concerns related to formal architecture modeling notation.

Future versions of ArchiMate will address backwards compatibility. This specifically means that when a new version of the standard includes a new version of the ArchiMate metamodel, it should also contain a precise specification of how models according to the previous metamodel fit within the new version. Tool certification will then include the ability to translate older ArchiMate models into the new metamodel automatically.

With the potential integration of TOGAF and ArchiMate in the future and the ongoing evolution of TOGAF, it would be wise to consider ensuring that TOGAF fully respects the need for this backward compatibility, in particular in the light of the already significant installed base of ArchiMate models within the community of users as well as the tools of different tool vendors already available.

Addressing the Scope, Goals, and Objectives of Enterprise Architecture

Baseline

As a maturing discipline, a definitive definition of the scope, goals, and objectives of enterprise architecture does not exist. In their current forms, both TOGAF and ArchiMate provide an overview of the enterprise architecture discipline and its benefits.

The current definitions in TOGAF and ArchiMate are broadly aligned, but do duplicate content to a degree.

Proposed Target State

In future, as an umbrella framework, TOGAF should potentially feature a rigorous and structured examination of the scope, goals, and objectives of enterprise architecture. This model should be fit-for-purpose to measure the effectiveness of enterprise architecture practice and to guide evolution of enterprise architecture as a professional discipline.

Future versions of ArchiMate should adopt the TOGAF view of enterprise architecture scope, goals, and objectives. As an elaboration of the TOGAF model, ArchiMate should provide a more detailed commentary on the subset of scope, goals, and objectives that ArchiMate is able to address. As the scope, goals, and objectives of TOGAF are further refined, lessons learned by ArchiMate might be taken on board in the TOGAF specification.

- TOGAF defines the scope, goals, and objectives.
- ArchiMate describes its purpose with reference to the TOGAF definition.

Addressing the Capabilities Required to Practice Enterprise Architecture

Baseline

TOGAF currently provides a module that discusses the capabilities required to practice enterprise architecture. Although immature, efforts are currently underway within the Architecture Forum to enhance this model.

ArchiMate does not currently discuss the capabilities required to practice enterprise architecture. It also does not discuss the organizational impacts of adopting ArchiMate as a framework.

Proposed Target State

The TOGAF Capability Framework is likely to see significant development in future versions of TOGAF. It would also be useful if future versions of the TOGAF Capability Framework addressed the topic of

architecture modeling approach and generally described the communications and skills concerns that need to be addressed when adopting a formal architecture notation approach.

ArchiMate should not address the topic of architecture capability within the core specification. Supplementary white paper materials may discuss an approach to successfully adopting the ArchiMate framework. At the same time, future versions of TOGAF should take on board the lessons learned by the project team creating ArchiMate as well as the experiences in the ArchiMate usage community.

- TOGAF defines the capabilities required to practice enterprise architecture.

Addressing the Method for Developing Enterprise Architectures

Baseline

TOGAF features the Architecture Development Method (ADM), which is a comprehensive method for architecture. The ADM is a core component of the current version of TOGAF.

ArchiMate provides a commentary on the usage of ArchiMate at each phase of the TOGAF ADM.

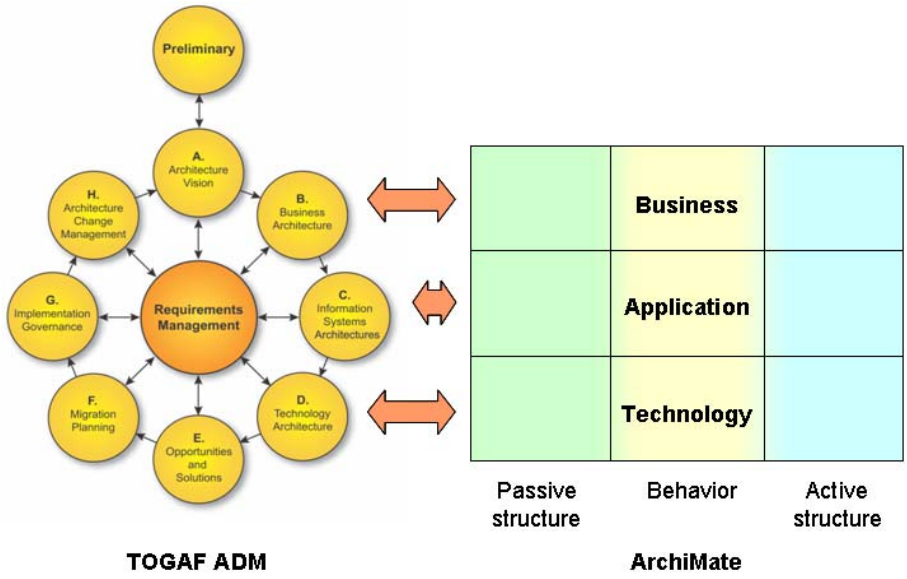

Figure 6: ArchiMate Commentary on the TOGAF ADM

ArchiMate provides a commentary on the use of different parts of the ArchiMate specification at different stages within the TOGAF ADM.

Proposed Target State

The description of architecture method should continue along current lines. ArchiMate should reference to the current version of TOGAF, at the time of publication, and potentially *vice versa*.

- TOGAF describes a method for developing enterprise architectures.
- ArchiMate describes its applicability with reference to the TOGAF ADM.

Addressing the Structure of Content within Enterprise Architectures

Baseline

TOGAF features an Architecture Content Framework that defines a content metamodel, a set of architectural artifacts, a set of architectural deliverables, and the concept of building blocks.

Additionally, TOGAF discusses the organization, scoping, and relationships between architectures using the concepts of the Enterprise Continuum, Architecture Partitioning, and the Architecture Repository.

ArchiMate features a metamodel, a set of architecture viewpoints, and a notation for representing architectures.

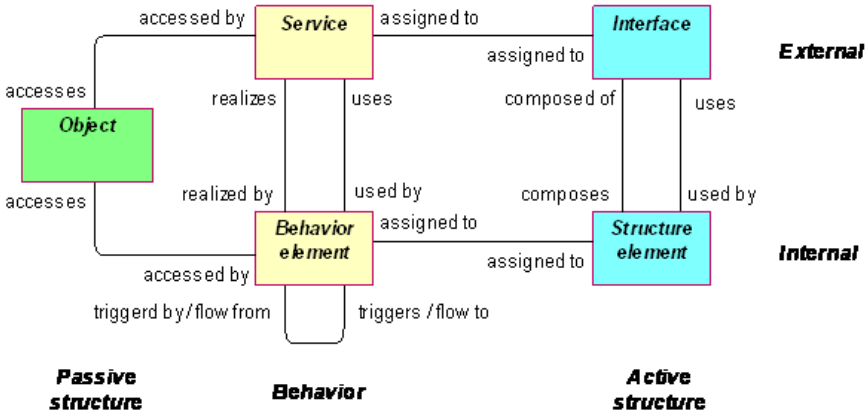

Figure 7: The ArchiMate Generic Metamodel

The overlap and relationship between the concepts in TOGAF and in ArchiMate are as follows:

- Both TOGAF and ArchiMate define a content metamodel. There are strong similarities between the two metamodels.
- Both TOGAF and ArchiMate define a set of templates for representing architecture models. In TOGAF these are called architectural artifacts; in ArchiMate they are referred to as architecture viewpoints. There is a strong alignment between the ArchiMate and TOGAF viewpoints. However, ArchiMate provides much greater detail about architecture viewpoints, including a detailed description and example. TOGAF lists a set of artifacts and their purpose, but the precise nature of each artifact is left open to interpretation by the reader.
- Deliverables, Enterprise Continuum, Architecture Partitioning, and Architecture Repository are concepts that are discussed in TOGAF alone.

Proposed Target State

There is a role for both TOGAF and ArchiMate to describe content structures for architecture.

- Within TOGAF, content structures need to be defined in order to specifically describe the outputs of enterprise architecture practice to a level of detail that supports professional practice with deliverables that are consistent and can be integrated.
- ArchiMate requires a content structure to act as a foundation for notation description and support

techniques for analysis and support view(point) creation.

Because the needs are different, it is unlikely that ArchiMate and TOGAF will ever share 100% identical models for content structure. In particular, the fact that ArchiMate is a formal modeling notation and TOGAF is intended to be used within both formal and informal modeling scenarios means that the approaches will be divergent.

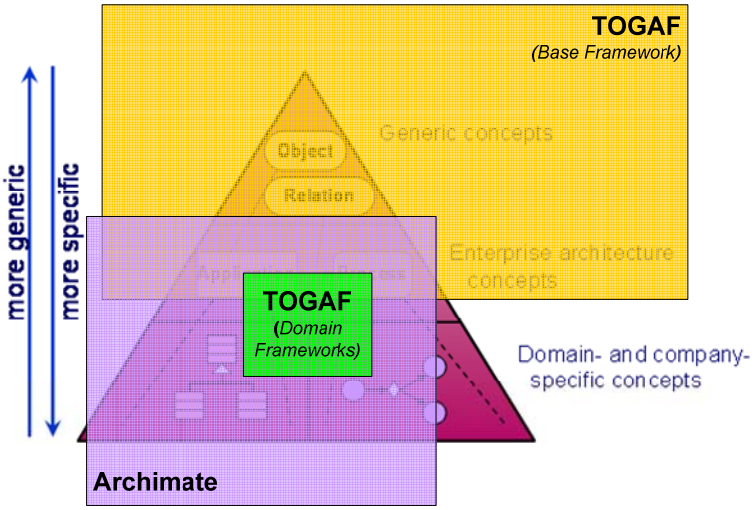

Figure 8: Relative Positioning of TOGAF and ArchiMate Metamodels

Assuming a restructured TOGAF, split into a "framework of frameworks" and a library of domain architecture frameworks, the following model is proposed:

- TOGAF might adopt the ArchiMate model of defining a metamodel at different levels of specialization. The generic metamodel within ArchiMate should be extended to encompass the full set of concepts within TOGAF (notably, concepts relating to value and motivation) and then be transitioned to TOGAF.
- TOGAF could continue to specify a high-level content framework, including a metamodel. Artifacts/viewpoints should be removed. Where appropriate, a library of ArchiMate-based viewpoints should be developed to compliment domain-specific frameworks. TOGAF-only concepts – such as deliverables, architecture repository, etc. – should be retained.
- TOGAF domain architecture frameworks can specify appropriate metamodel specializations and may define artifacts/viewpoints that relate to the domain. A standard approach should exist for creating domain architectures that reference back to TOGAF.
- ArchiMate should reference the generic metamodel defined in TOGAF (currently residing in the ArchiMate specification). ArchiMate should define a metamodel that supports the ArchiMate notation. The ArchiMate metamodel should be traceable back to the TOGAF metamodel and potentially to some of the TOGAF domain architecture extensions.

In order to achieve this model of integration, the current TOGAF and ArchiMate metamodels would need to be re-factored to maximize the level of consistency between different specifications.

- The TOGAF base framework provides a generic metamodel, based on an extension of the current ArchiMate generic metamodel.
- The TOGAF base framework provides a content metamodel along similar lines to the current TOGAF content metamodel.

- Discussion of architectural artifacts is removed from the TOGAF base framework.
- A library of TOGAF domain architecture frameworks discuss content and process specialization of the TOGAF base framework. Domain architecture frameworks provide a library of artifacts/viewpoints.
- ArchiMate provides a content metamodel along similar lines to the current ArchiMate content metamodel, which can be traced to the TOGAF metamodel.
- ArchiMate provides a notation to represent artifacts/viewpoints that are discussed in TOGAF domain architectures.

About the Authors

Henk Jonkers is a Senior Research Consultant at BiZZdesign. In this capacity, he is involved in the company's new developments in the areas of business process engineering and enterprise architecture. He participates in multi-party research projects, as well as in consultancy for customers. Henk was one of the main developers of ArchiMate and an author of the ArchiMate 1.0 Specification. He is TOGAF 8 and 9 certified.

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Mike Turner is an Enterprise Architect at Capgemini and has been focusing exclusively on enterprise architecture for the past six years. Mike spends his time helping organizations to grow enterprise architecture capabilities and assisting organizations in the realization of strategic change through the use of enterprise architecture. Mike has a deep understanding of enterprise architecture frameworks, leading Capgemini's development effort on TOGAF Version 9 and also working in the core team that developed the SAP Enterprise Architecture Framework (a joint initiative between Capgemini and SAP).

About The Open Group

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