TOGAF® Version 9.1 Enterprise Edition

An Introduction

A White Paper by:

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An Introduction to TOGAF 9.1

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Executive Summary

This document provides an introduction to TOGAF 9.1. Topics addressed include:

- An Introduction to TOGAF, an Open Group Standard
- TOGAF, its structure and content
- The kinds of architecture that TOGAF addresses
- What's new in TOGAF 9.1
- TOGAF 9.1 and Certification

Introduction to TOGAF, an Open Group Standard

TOGAF®, an Open Group Standard, is a proven enterprise architecture methodology and framework used by the world's leading organizations to improve business efficiency. It is the most prominent and reliable enterprise architecture standard, ensuring consistent standards, methods, and communication among enterprise architecture professionals. Enterprise architecture professionals fluent in TOGAF standards enjoy greater industry credibility, job effectiveness, and career opportunities. TOGAF helps practitioners avoid being locked into proprietary methods, utilize resources more efficiently and effectively, and realize a greater return on investment.

First developed in 1995, TOGAF was based on the US Department of Defense Technical Architecture Framework for Information Management (TAFIM). From this sound foundation, The Open Group Architecture Forum has developed successive versions of TOGAF at regular intervals and published them on The Open Group public web site.

This document provides an introduction to TOGAF Version 9.1, referred to simply as "TOGAF" within the main text of this document. TOGAF 9.1 was first published in December 2011, and is the first maintenance update to TOGAF 9. It is an upwards-compatible evolution from TOGAF 9, addressing usage feedback and comments raised. A description of the changes is provided in "What's New in TOGAF Version 9.1?".

TOGAF 9.1 can be used for developing a broad range of different enterprise architectures. TOGAF complements, and can be used in conjunction with, other frameworks that are more focused on specific deliverables for particular vertical sectors such as Government, Telecommunications, Manufacturing, Defense, and Finance. The key to TOGAF is the method – the TOGAF Architecture Development Method (ADM) – for developing an enterprise architecture that addresses business needs.

The TOGAF 9 Certification for People Program

TOGAF provides a clear path for professional development and credibility to employers through its certification program, which to date has enabled more than 20,000 enterprise architects and trainers around the globe to demonstrate their knowledge of the TOGAF standard. TOGAF 9 Certification is achieved through a two-part examination, following a course of self-study or an Accredited TOGAF 9 Training Course.

The Open Group TOGAF 9 Certification for People Program is:

- Used by the world's leading enterprises to certify a common body of core knowledge about the methodology and framework
- A trusted, vendor-neutral, globally recognized, and portable credential
- Valuable in demonstrating to employers and peers your commitment to enterprise architecture as a discipline
- An outstanding career move and a foundational certification in the career of any enterprise architect

What is Architecture in the context of TOGAF?

ISO/IEC 42010:2007[1] defines "architecture" as:

"*The fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution.*"

TOGAF embraces and extends this definition. In TOGAF, "architecture" has two meanings depending upon the context:

1. A formal description of a system, or a detailed plan of the system at a component level to guide its implementation
2. The structure of components, their inter-relationships, and the principles and guidelines governing their design and evolution over time

What kinds of Architecture does TOGAF deal with?

TOGAF covers the development of four related types of architecture. These four types of architecture are commonly accepted as subsets of an overall enterprise architecture, all of which TOGAF is designed to support. They are shown in Table 1.

Table 1: Architecture Types Supported by TOGAF

Architecture Type	Description
Business Architecture	The business strategy, governance, organization, and key business processes.
Data Architecture	The structure of an organization's logical and physical data assets and data management resources.
Application Architecture	A blueprint for the individual applications to be deployed, their interactions, and their relationships to the core business processes of the organization.
Technology Architecture	The logical software and hardware capabilities that are required to support the deployment of business, data, and application services. This includes IT infrastructure, middleware, networks, communications, processing, and standards.

Structure of the TOGAF Standard

The TOGAF standard is divided into seven parts, as summarized in Table 2.

Table 2: Structure of the TOGAF Standard

TOGAF Part	Description
Part I: Introduction	This part provides a high-level introduction to the key concepts of enterprise architecture and, in particular, to 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.

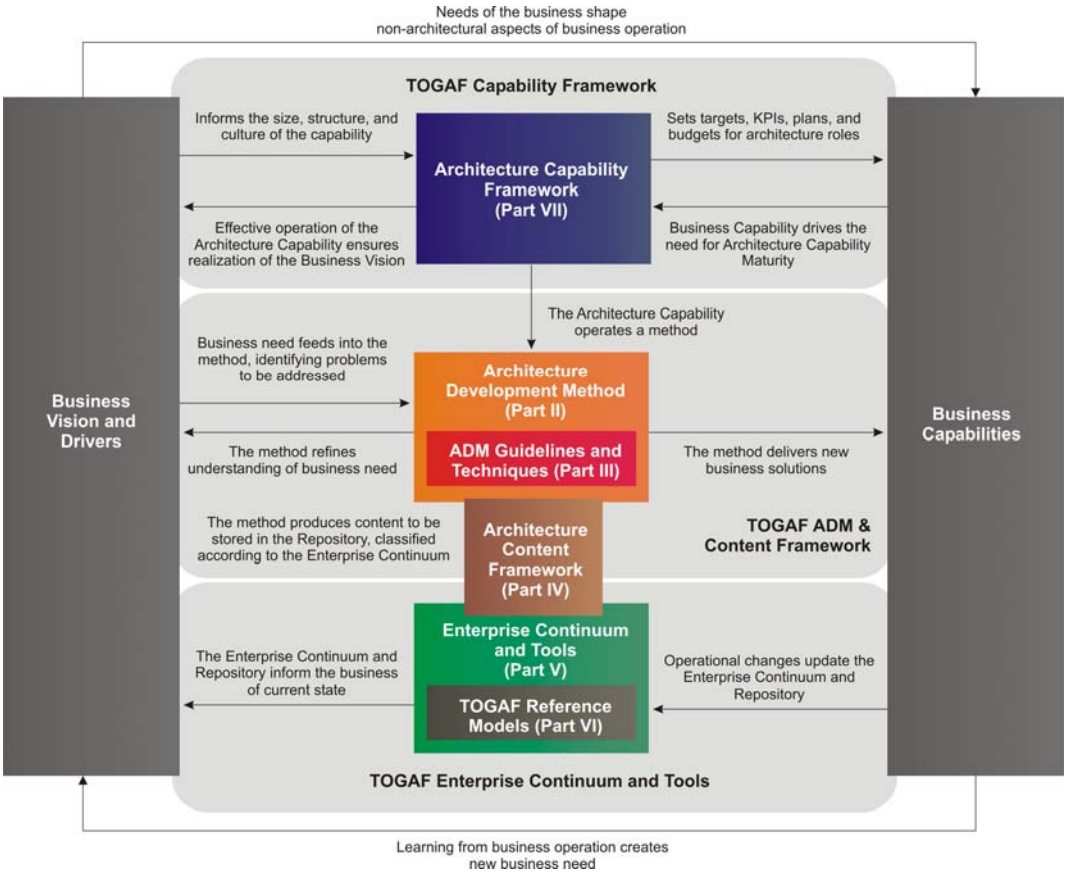
[1] ISO/IEC 42010:2007, Systems and Software Engineering – Recommended Practice for Architectural Description of Software-Intensive Systems, Edition 1 (technically identical to ANSI/IEEE Std 1471-2000).

TOGAF Part	Description
Part II: Architecture Development Method	This part is the core of TOGAF. It describes the TOGAF Architecture Development Method (ADM) – 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 the ADM.
Part IV: Architecture Content Framework	This part describes the TOGAF content framework, including a structured metamodel for architectural artifacts, the use of re-usable Architecture Building Blocks (ABBs), and an overview of typical architecture deliverables.
Part V: Enterprise Continuum and 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 two architectural reference models, namely the TOGAF Technical Reference Model (TRM), 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 practice within an enterprise.

What does TOGAF Contain?

TOGAF reflects the structure and content of an architecture capability within an enterprise, as shown in Figure 1.

Figure 1: TOGAF Content Overview



Central to TOGAF is the Architecture Development Method (ADM), documented in TOGAF, Part II. The architecture capability (documented in TOGAF, Part VII) operates the method. The method is supported by a number of guidelines and techniques (documented in TOGAF, Part III). This produces content to be stored in the repository (documented in TOGAF, Part IV), which is classified according to the Enterprise Continuum (documented in TOGAF, Part V). The repository is initially populated with the TOGAF Reference Models (documented in TOGAF, Part VI).

Architecture Development Method (ADM)

The **ADM** describes how to derive an organization-specific enterprise architecture that addresses business requirements.

The ADM is the major component of TOGAF and provides guidance for architects on a number of levels:

- It provides a number of **architecture development phases** (Business Architecture, Information

Systems Architectures, Technology Architecture) in a cycle, as an overall process template for architecture development activity.

- It provides a **narrative of each architecture phase**, describing the phase in terms of objectives, approach, inputs, steps, and outputs. The inputs and outputs sections provide a definition of the architecture content structure and deliverables (a detailed description of the phase inputs and phase outputs is given in the Architecture Content Framework).
- It provides cross-phase summaries that cover requirements management.

ADM Guidelines and Techniques

ADM Guidelines and Techniques provides a number of guidelines and techniques to support the application of the ADM. The guidelines address adapting the ADM to deal with a number of usage scenarios, including different process styles (e.g., the use of iteration) and also specific specialty architectures (such as security). The techniques support specific tasks within the ADM (such as defining principles, business scenarios, gap analysis, migration planning, risk management, etc.).

Architecture Content Framework

The **Architecture Content Framework** provides a detailed model of architectural work products, including deliverables, artifacts within deliverables, and the Architecture Building Blocks (ABBs) that deliverables represent.

Enterprise Continuum

The **Enterprise Continuum** provides a model for structuring a virtual repository and provides methods for classifying architecture and solution artifacts, showing how the different types of artifacts evolve, and how they can be leveraged and re-used. This is based on architectures and solutions (models, patterns, architecture descriptions, etc.) that exist within the enterprise and in the industry at large, and which the enterprise has collected for use in the development of its architectures.

TOGAF Reference Models

TOGAF provides two reference models for possible inclusion in an enterprise's own Enterprise Continuum, namely the **Technical Reference Model** (TRM) and the **Integrated Information Infrastructure Model** (III-RM).

Architecture Capability Framework

The **Architecture Capability Framework** is a set of resources, guidelines, templates, background information, etc. provided to help the architect establish an architecture practice within an organization.

What's New in TOGAF Version 9.1?

TOGAF 9.1 includes a set of maintenance updates based on feedback received on the 2009 publication of TOGAF 9. As such, the changes are upwards-compatible adding clarification, consistency, and additional details where needed. A separate document describing the changes including rationale is available as TOGAF 9 Technical Corrigendum 1 (Document U112).[2]

A summary highlighting key changes follows:

- The Document Categorization Model has been removed (Section 2.8).
- Definitions of terms where usage by TOGAF is not distinctive from the common dictionary definition have been removed (Chapter 3).
- The usage of the terms "application" *versus* "system" have been reviewed and made consistent (global change).
- The "Objectives" sections of the phases have been reworked to focus on actual objectives rather than techniques or a list of steps (Chapters 6-17).
- The possible artifacts (viewpoints) for each phase are now listed in the description of that phase, not just in Part IV, Chapter 35: Architectural Artifacts (Chapters 6-17).
- Duplicate text in several places has been replaced with an appropriate reference:
    - Gap Analysis in Phases B, C, and D now references Part III, Chapter 27: Gap Analysis (Chapters 8,10,11,12).
    - Requirements Management in several phases now references Part II, Section 17.2.2: Requirements Development in the Requirements Management phase (Chapters 8,10,11,12).
- The Phase E and F descriptions have been reworked to match the level of detail in other phases (Chapters 13,14).
- The uses of terminology for Transition Architecture/Roadmap/Implementation Strategy have been clarified and made consistent (Chapters 13,14).
- The concepts of levels/iterations/partitions have been clarified and made consistent. This includes a reorganization of material in Part III, Chapter 19: Applying Iteration to the ADM, Chapter 20: Applying the ADM across the Architecture Landscape, and Part V, Chapter 40: Architecture Partitioning (Chapters 5,19,20,40).
- Additional introductory text on architectural styles has been added in Part III, Chapter 18: Introduction (Chapter 18).
- Minor changes have been made to the Security Architecture chapter (Part III, Chapter 21: Security Architecture and the ADM) for consistency with the ADM (Chapter 21).
- The SOA chapter (Part III, Chapter 22: Using TOGAF to Define & Govern SOAs) has been updated to describe the latest SOA Work Group output (Chapter 22).

[2] TOGAF 9 Technical Corrigendum 1 can be obtained from www.opengroup.org/bookstore/catalog/u112.htm.

- The description of Architecture Principles now divides them into two types only – Enterprise and Architecture – whereas before they called out IT Principles separately. IT Principles are now seen as just part of Enterprise Principles (Chapter 23).
- The Stakeholder Map included in the Stakeholder Management chapter (Part III, Chapter 24: Stakeholder Management) is now explicitly referred to as an example, the table has been highlighted to refer to Stakeholder Concerns, and the list of artifacts for each stakeholder updated (Chapter 24).
- The Business Scenarios chapter (Part III, Chapter 26: Business Scenarios and Business Goals) has been renamed to Business Scenarios and Business Goals to better reflect the contents of the chapter (Chapter 26).
- Corrections have been made to metamodel diagrams (Chapter 34).
- Corrections have been applied to aspects of the metamodel (Chapter 34).
- The terms "artifact" *versus* "viewpoint" have been clarified and made consistent. This includes a restructuring of Part IV, Chapter 35: Architectural Artifacts (Chapter 35).
- Some of the artifacts have been renamed to better reflect their usage (Chapter 35):
    - System/Data matrix becomes Application/Data matrix
    - Class diagram has been replaced with Conceptual Data diagram and Logical Data diagram
    - System/Organization matrix becomes Application/Organization matrix
    - Role/System matrix becomes Role/Application matrix
    - System/Function matrix becomes Application/Function matrix
    - Process/System Realization diagram becomes Process/Application Realization diagram
    - System Use-Case diagram becomes Application Use-Case diagram
    - System/Technology matrix becomes Application/Technology matrix
- The Building Blocks example has been removed (Chapter 37).
- The relationship of the Enterprise Repository to the Architecture Repository is clarified in Part V, Chapter 41: Architecture Repository (Chapter 41).
- The Evaluation Criteria and Guidelines have been removed from Part V, Chapter 42: Tools for Architecture Development (Chapter 42).
- The chapter on Architecture Maturity Models (Part VII, Chapter 51: Architecture Maturity Models) has been editorially revised for consistency and clarity (Chapter 51).

TOGAF 9.1 and Certification

The TOGAF 9 Certification for People Program has been designed to accommodate maintenance updates to the TOGAF 9 standard such as TOGAF 9.1. The impacts on certification are as follows:

- The two levels of certification remain as TOGAF 9 Foundation and TOGAF 9 Certified.
- Individuals who are currently certified in the TOGAF 9 People Certification program remain certified.
- The Conformance Requirements for TOGAF 9 Certification have been updated and will become mandatory on June 1, 2012.[3]
- In the period between December 1, 2011 and June 1, 2012 candidates can study either to the original Conformance Requirements or the revised Conformance Requirements, and the examinations have been designed to accommodate both up to June 2013.[4]
- The reference text provided with the Open Book examinations will remain TOGAF 9 until June 1, 2012 and will then switch to TOGAF 9.1 after that date.
- All Accredited TOGAF 9 Training Courses will be updated to the revised Conformance Requirements by June 1, 2012.

[3] The revised set of Conformance Requirements are available as document number X111 (www.opengroup.org/bookstore/catalog/x111.htm).
[4] The extended period is to allow for candidates who have 12 months in which to use an examination voucher.

Further Reading

TOGAF 9.1 is available for online reading at http://pubs.opengroup.org/architecture/togaf9-doc/arch/ and available in The Open Group Bookstore at www.opengroup.org/bookstore/catalog/g116.htm.

Consult the TOGAF web site at www.opengroup.org/togaf for the latest information on publications and white papers.

About the Author

Andrew Josey is Director of Standards within The Open Group. He is currently managing the standards process for The Open Group, and has recently led the standards development projects for TOGAF 9.1, ArchiMate 2.0, IEEE Std 1003.1-2008 (POSIX), and the core specifications of the Single UNIX Specification, Version 4. Previously, he has led the development and operation of many of The Open Group certification development projects, including industry-wide certification programs for the UNIX system, the Linux Standard Base, TOGAF, and IEEE POSIX. He is a member of the IEEE, USENIX, UKUUG, and the Association of Enterprise Architects.

About The Open Group

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- Capture, understand, and address current and emerging requirements, and establish policies and share best practices
- Facilitate interoperability, develop consensus, and evolve and integrate specifications and open source technologies
- Offer a comprehensive set of services to enhance the operational efficiency of consortia
- Operate the industry's premier certification service

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