

TOGAF® 9 Certified Study Guide

Preparation for the TOGAF 9 Part 2 or TOGAF 8-9 Advanced Bridge
Section 2 Examinations

2nd Edition



Rachel Harrison

THE *Open* GROUP

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Certified

Study Guide

2nd Edition

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Preface

This Document

This document is a Study Guide for TOGAF® 9 Certified. This second edition is based on Version 2 of the TOGAF Certification for People Conformance Requirements, published in December 2011. This edition is aligned to TOGAF Version 9.1, which was published in December 2011.

It gives an overview of every learning objective for the TOGAF 9 Certified Syllabus beyond the Foundation level, and is specifically designed to help individuals prepare for certification.

The audience for this Study Guide is:

- Individuals who require a deeper understanding of TOGAF 9
- Professionals who are working in an organization where TOGAF 9 has been adopted and who need to participate in architecture projects and initiatives
- Architects who will be responsible for developing architecture artifacts
- Architects who wish to introduce TOGAF 9 into an architecture practice
- Architects who want to achieve a recognized qualification to demonstrate their detailed knowledge of TOGAF 9
- Architects who have achieved certification to TOGAF 8 Certified and who wish to upgrade their certification

This Study Guide assumes a prior knowledge equivalent to TOGAF 9 Foundation.

While reading this Study Guide, the reader should also refer to the TOGAF documentation¹ available online at www.opengroup.org/architecture/togaf9-doc/arch and also available as a hardcopy book.

The Study Guide is structured as follows:

- Chapter 1 (Introduction) provides a brief introduction to TOGAF certification and the TOGAF 9 examinations that lead to TOGAF 9 Certified, as well as how to use this Study Guide.

¹ TOGAF Version 9.1 (ISBN:978 90 8753 679 4, G116), available at www.opengroup.org/bookstore/catalog/g116.htm.

- Part 1: TOGAF 9 Architecture Development Method (ADM) comprises Chapters 2 through 13 and consists of a tour of the ADM phases:
 - Chapter 2 describes the Preliminary Phase within the ADM. This chapter covers the preparation and initiation activities required to create an Architecture Capability.
 - Chapter 3 describes Phase A: Architecture Vision. This chapter covers the initial phase of an Architecture Development Cycle. It includes information about defining the scope, identifying the stakeholders, creating the Architecture Vision, and obtaining approvals.
 - Chapter 4 describes Phase B: Business Architecture. This chapter covers the development of a Business Architecture to support an agreed Architecture Vision.
 - Chapter 5 provides an introduction to Phase C: Information Systems Architectures. The next two chapters describe the details of the two parts of Phase C.
 - Chapter 6 describes the development of the Data Architecture within Phase C.
 - Chapter 7 describes the development of the Application Architecture within Phase C.
 - Chapter 8 describes Phase D: Technology Architecture. The Technology Architecture is used as the basis of the following implementation work.
 - Chapter 9 describes Phase E: Opportunities and Solutions. This phase identifies major implementation projects and groups them into work packages that deliver the Target Architecture defined in the previous phases.
 - Chapter 10 describes Phase F: Migration Planning. This phase develops a detailed Implementation and Migration Plan addressing how to move from the Baseline to the Target Architecture.
 - Chapter 11 describes Phase G: Implementation Governance. This phase ensures that the implementation projects conform to the architecture.
 - Chapter 12 describes Phase H: Architecture Change Management. This phase ensures that the architecture capability can respond to the needs of the enterprise as changes arise.
 - Chapter 13 describes ADM Architecture Requirements Management, a process that applies throughout the ADM.

- Part 2: Guidelines for Adapting the ADM consists of three chapters:
 - Chapter 14 describes how to apply iteration to the ADM, and how to apply the ADM at different enterprise levels.
 - Chapter 15 describes security considerations during the application of the ADM.
 - Chapter 16 describes SOA as an architectural style.
- Part 3: The Architecture Content Framework consists of a single chapter:
 - Chapter 17 describes the Architecture Content Framework and the TOGAF Content Metamodel.
- Part 4: The Enterprise Continuum consists of two chapters:
 - Chapter 18 describes Architecture Partitioning.
 - Chapter 19 describes the Architecture Repository, which is a model for a physical instance of the Enterprise Continuum.
- Part 5: TOGAF Reference Models consists of two chapters:
 - Chapter 20 describes the Technical Reference Model (TRM).
 - Chapter 21 describes the Integrated Information Infrastructure Reference Model (III-RM).
- Part 6: Architecture Capability consists of three chapters:
 - Chapter 22 describes the relationship between Architecture Governance and the ADM. It also describes how to establish and operate an Architecture Board.
 - Chapter 23 describes Architecture Maturity Models.
 - Chapter 24 describes the Architecture Skills Framework.
- Part 7: Bridging from TOGAF 8 Certified to TOGAF 9 Certified consists of a single chapter:
 - Chapter 25 describes the differences between TOGAF 8 and TOGAF 9. This chapter is primarily for individuals who have achieved the TOGAF 8 Certified qualification, and who intend taking the TOGAF 8 – 9 Advanced Bridge Examination.
- Appendix A provides a Practice Test for Section 1 of the TOGAF 8 – 9 Advanced Bridge Examination.
- Appendix B provides a Practice Test for TOGAF 9 Part 2/Section 2 of the TOGAF 8 – 9 Advanced Bridge Examination.
- Appendix C provides the answers to the examination in Appendix A.
- Appendix D provides the answers to the examination in Appendix B.
- Appendix E provides the TOGAF 9 Certified Syllabus.

How to Use this Study Guide

The chapters in this Study Guide should be read in order. However, you may wish to use this Study Guide to study topics with which you are already familiar, and it is certainly possible to select topics for review in any order. Where a topic requires further information from a later part in the syllabus, a cross-reference is provided.

Within each chapter are “Key Learning Points” and “Summary” sections that help you to easily identify what you need to know for each topic. Where applicable, a chapter has an “Exercises” section that will help you reinforce key learning points in the chapter.

Each chapter also has a “Recommended Reading” section that indicates relevant, additional sections of the TOGAF document and other sources that should be read to obtain a full understanding of the subject material.

Finally, at the end of this Study Guide are two “Test Yourself” examination papers that can be used to test your readiness to take the official TOGAF examination. Two papers are provided so that this guide covers both the TOGAF 9 Part 2 Examination as well as the TOGAF 8 – 9 Advanced Bridge Examination.

Conventions Used in this Study Guide

The following conventions are used throughout this Study Guide in order to help identify important information and avoid confusion over the intended meaning.

- **Ellipsis (...)**
Indicates a continuation; such as an incomplete list of example items, or a continuation from preceding text.
- **Bold**
Used to highlight specific terms.
- *Italics*
Used for emphasis. May also refer to other external documents.
- *(Syllabus Reference Unit X, Learning Outcome Y: Statement)*
Used at the start of a text block to identify the associated TOGAF 9 Certified Syllabus learning outcome.

In addition to typographical conventions, the following conventions are used to highlight segments of text:



A Note box is used to highlight useful or interesting information.



A Tip box is used to provide key information that can save you time or that may not be entirely obvious.

About TOGAF

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.

TOGAF is developed and maintained by The Open Group Architecture Forum. The first version of TOGAF, developed in 1995, was based on the US Department of Defense Technical Architecture Framework for Information Management (TAFIM). Starting from this sound foundation, The Open Group Architecture Forum has developed successive versions of TOGAF at regular intervals and published each one on The Open Group public web site.

This second edition of this document covers TOGAF Version 9.1, referred to as “TOGAF 9” within the text of this document. TOGAF 9.1 is a maintenance update to TOGAF 9, addressing comments raised since the introduction of TOGAF 9 in 2009.

TOGAF 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.

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- Offer a comprehensive set of services to enhance the operational efficiency of consortia
- Operate the industry's premier certification service

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References

The following documents are referenced in this Study Guide:

- TOGAF Version 9.1, available online at www.opengroup.org/architecture/togaf9-doc/arch, and also available as a book at (ISBN: 978 90 8753 679 4, G116) at www.opengroup.org/bookstore/catalog/g116.htm.
- TOGAF 9 Foundation Study Guide, 2nd Edition (ISBN: 978 90 8753 6817, B111) available at www.opengroup.org/bookstore/catalog/b111.htm.
- The Open Group Architecture Principles, Case Study by Darren Hawley on behalf of The Open Group Internal Architecture Board, October 2008 (Y082), published by The Open Group (www.opengroup.org/bookstore/catalog/y082.htm).
- SOA Source Book, April 2009 (G093), published by The Open Group (www.opengroup.org/bookstore/catalog/g093.htm).
- 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 Certification for People: Program Summary Datasheet, February 2009, published by The Open Group (www.opengroup.org/togaf9/cert/docs/togaf9_cert_summary.pdf).
- TOGAF 9 Certified Datasheet, February 2009, published by The Open Group (www.opengroup.org/togaf9/cert/docs/togaf9_foundation.pdf).
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- TOGAF Certification for People: Certification Policy, February 2009 (X091), published by The Open Group (www.opengroup.org/bookstore/catalog/x091.htm).
- TOGAF Certification for People: Conformance Requirements (Multi-Level), Version 2, December 2011 (X111), published by The Open Group (www.opengroup.org/bookstore/catalog/x111.htm).
- Zachman Framework, Zachman Institute for Framework Advancement (ZIFA) (www.zifa.com).
- Bill Estrem, “TOGAF to the Rescue” (www.opengroup.org/downloads)

- Enterprise Architecture Planning (EAP): Developing a Blueprint for Data, Applications, and Technology, Steven H. Spewak & Steven C. Hill, ISBN: 0-47-159985-9, John Wiley & Sons, 1993.
- US Department of Commerce Enterprise Architecture Capability Maturity Model (ACMM), Version 1.2 (http://ocio.os.doc.gov/ITPolicyandPrograms/Enterprise_Architecture/PROD01_004935).
- ArchiMate 1.0 Specification, Technical Standard, February 2009 (C091), published by The Open Group (www.opengroup.org/bookstore/catalog/c091.htm).
- Mapping of TOGAF 8.1 With COBIT 4.0 by the IT Governance Institute (ITGI), White Paper, July 2007 (W072), published by The Open Group (www.opengroup.org/bookstore/catalog/w072.htm)
- Guide to Security Architecture in TOGAF ADM, White Paper developed by The Open Group Security Forum and Members of The Open Group Architecture Forum, December 2005 (W055), published by The Open Group (www.opengroup.org/bookstore/catalog/w055.htm)

The following web links are referenced in this Study Guide:

- The Open Group TOGAF 9 Certification web site: www.opengroup.org/togaf9/cert
- The TOGAF information web site: www.togaf.info
- TOGAF 9 People Certification Overview presentation: www.togaf.info/sg01
- Introduction to the ADM presentation: www.togaf.info/sg02
- Sample Catalogs, Matrices, and Diagrams presentation: www.togaf.info/sg03
- TOGAF 9 Architecture Content Metamodel Overview presentation: www.togaf.info/sg04

Chapter 1

Introduction

1.1 Key Learning Points

This document is a Study Guide for TOGAF Version 9 for students planning to qualify as TOGAF 9 Certified. This document is a companion document to the TOGAF 9 Foundation Study Guide, and focuses on the learning outcomes beyond the Foundation level.



Prerequisite Knowledge

This Study Guide assumes a prior knowledge equivalent to TOGAF 9 Foundation. This can be obtained by reading the TOGAF 9 Foundation Study Guide (see References).

This first chapter will familiarize you with the TOGAF 9 certification program, as well as give you important information about the structure of the TOGAF 9 examinations.

The objectives of this chapter are as follows:

- To provide an understanding of TOGAF certification
- To learn key facts about the TOGAF 9 examinations

1.2 The TOGAF Certification for People Program

Certification is available to individuals who wish to demonstrate they have attained the required knowledge and understanding of TOGAF Version 9.

There are two levels defined for TOGAF 9 “people certification”, denoted *TOGAF 9 Foundation* and *TOGAF 9 Certified*, respectively. This Study Guide covers the second of these – TOGAF 9 Certified. Studying for TOGAF 9 Certified includes all the learning outcomes for TOGAF 9 Foundation, which are covered in a separate companion document (see References).

1.2.1 Certification Document Structure

The documents available to support the program are as shown in Figure 1:

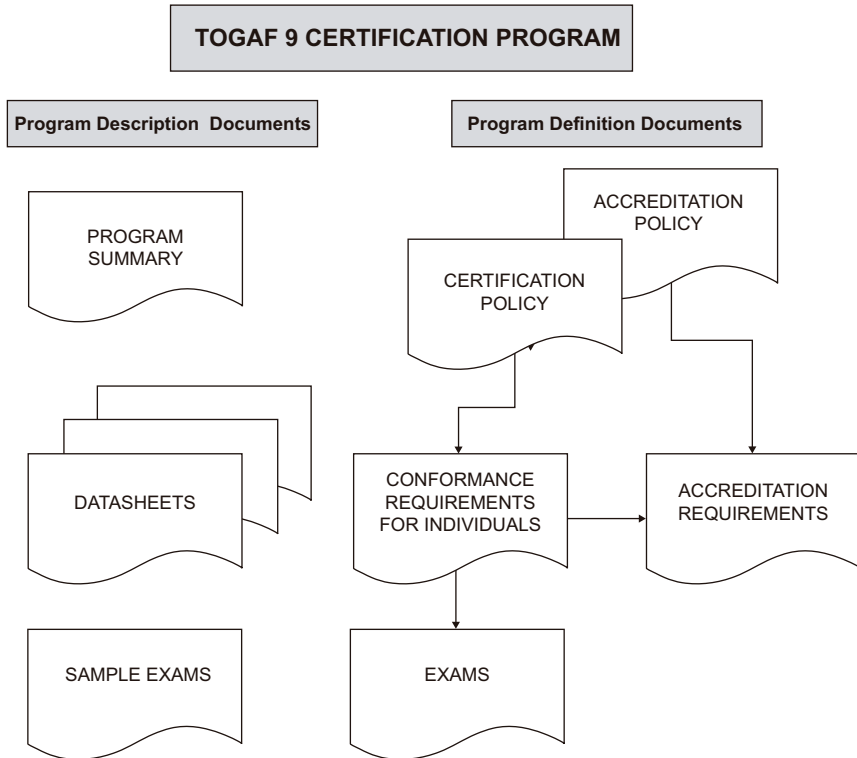


Figure 1: Certification Document Structure

Program description documents, such as this Study Guide, are intended for an end-user audience including those interested in becoming certified. The Program definition documents are intended for trainers, examination developers, and the Certification Authority. All these documents are available from The Open Group web site.²

1.2.2 TOGAF 9 Foundation

The purpose of certification to TOGAF 9 Foundation is to provide validation that the Candidate has gained knowledge of the terminology, structure,

² Available at the TOGAF 9 certification web site (www.opengroup.org/togaf9/cert), or The Open Group bookstore (www.opengroup.org/bookstore).

and basic concepts of TOGAF 9, and understands the core principles of Enterprise Architecture and TOGAF. The learning objectives at this level focus on knowledge and comprehension. More information is provided in the TOGAF 9 Foundation Study Guide (see References).

1.2.3 TOGAF 9 Certified

The purpose of certification to TOGAF 9 Certified is to provide validation that, in addition to the knowledge and comprehension of TOGAF 9 Foundation, the Candidate is able to analyze and apply this knowledge. The learning objectives at this level therefore focus on application and analysis in addition to knowledge and comprehension.

Individuals certified at this level, in addition to the knowledge required for TOGAF 9 Foundation, will have demonstrated their understanding of:

- How to apply the ADM phases in development of an enterprise architecture
- How to apply Architecture Governance in development of an enterprise architecture
- How to apply the TOGAF Architecture Content Framework
- How to apply the concept of building blocks
- How to apply the Stakeholder Management Technique
- How to apply the TOGAF Content Metamodel
- How to apply TOGAF recommended techniques when developing an enterprise architecture
- The TOGAF Technical Reference Model (TRM) and how to customize it to meet an organization's needs
- The Integrated Information Infrastructure Reference Model (III-RM)
- The content of the key deliverables of the ADM cycle
- How an enterprise architecture can be partitioned to meet the specific needs of an organization
- The purpose of the Architecture Repository
- How to apply iteration and different levels of architecture with the ADM
- How to adapt the ADM for security
- SOA as a style of architecture
- The role of architecture maturity models in developing an enterprise architecture
- The purpose of the Architecture Skills Framework and how to apply it within an organization

Self-Study Paths

The self-study paths³ to achieve certification for TOGAF 9 Certified are summarized in Figure 2. The chosen path depends on existing qualifications, such as whether you are TOGAF 8 Certified, and whether you want to first become certified to TOGAF 9 Foundation or proceed direct to TOGAF 9 Certified.

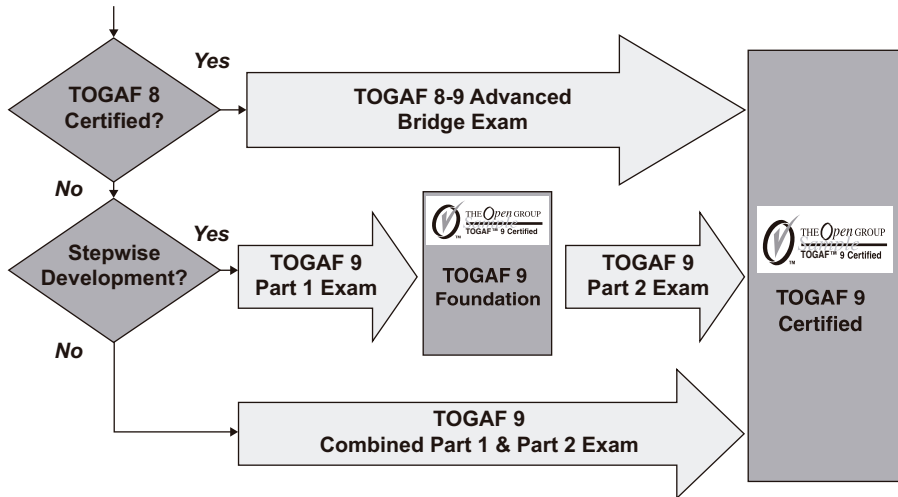


Figure 2: Paths to Achieving TOGAF 9 Certified



What is the Relationship between TOGAF 9 Foundation and TOGAF 9 Certified?

Candidates are able to choose whether they wish to become certified in a stepwise manner by starting with TOGAF 9 Foundation and then at a later date TOGAF 9 Certified, or bypass TOGAF 9 Foundation and go directly to TOGAF 9 Certified. For those going directly to TOGAF 9 Certified there is a choice of taking the two examinations separately or a Combined examination. The advantage of taking the two examinations over the single Combined examination is that if you pass Part 1 but fail Part 2 you can still qualify for TOGAF 9 Foundation.

³ The latest information on the TOGAF 9 certification program can be obtained from the TOGAF 9 Certification web site at www.opengroup.org/togaf9/cert.

1.2.4 The Certification Process

The TOGAF 9 Certified Syllabus is contained in Appendix E.

Readers are assumed to be already familiar with the syllabus for TOGAF 9 Foundation and its accompanying TOGAF 9 Part 1 Examination. Detailed information is provided in the TOGAF 9 Foundation Study Guide (see References).

The TOGAF 9 Part 2 Examination

The syllabus for the TOGAF 9 Part 2 Examination consists of all the learning outcomes defined in both Level 1 and Level 2 of the Conformance Requirements document. At the time of writing this document, the examination topics are drawn from the learning outcomes with eight scenario-based questions.

The eight scenarios are drawn from the following major topic areas:

- ADM Phases: Project Establishment (Phases Preliminary, A, Requirements Management)
- ADM Phases: Architecture Definition (Phases B, C, D)
- ADM Phases: Transition Planning (Phases E and F)
- ADM Phases: Governance (Phases G and H)
- Adapting the ADM
- Architecture Content Framework
- TOGAF Reference Models
- Architecture Capability Framework

The TOGAF 8 – 9 Advanced Bridge Examination

Candidates who have previously qualified to TOGAF 8 Certified can take a single examination known as the TOGAF 8 – 9 Advanced Bridge Examination.

This contains two sections as follows:

- Section 1: Twenty simple multiple-choice questions drawn from the TOGAF 9 Level 1 Syllabus. This is a subset of the TOGAF 9 Part 1 Examination
- Section 2: Eight scenario-based questions as per the TOGAF 9 Part 2 Examination

1.2.4.1 *Format of the Examination Questions*

The questions for Section 1 of the Advanced Bridge Examination are simple multiple-choice questions as described in the TOGAF 9 Foundation Study Guide. Examples of these questions are provided in Appendix A.

The questions for the TOGAF 9 Part 2 Examination and Section 2 of the Advanced Bridge Examination consist of eight complex scenario questions. Candidates must read a scenario describing a situation where TOGAF is being applied. The question will then ask how TOGAF would be used to address a particular point, and provide four possible answers. The answers are graded. One answer is more correct than two of the others, and one is incorrect for the situation. The aim is to select the best answer according to TOGAF 9. The correct answer scores five points, the second best answer three points, and the third best answer one point. The incorrect answer (or distracter) scores zero points. You may need to refer to the TOGAF specification during the examination and a copy is provided with the examination (see below for more details).

The exact display format is test center-specific and will be made clear on the screens when taking the examination. Examples of these questions are provided in Appendix B.

1.2.4.2 *What do I need to bring with me to take the examination?*

You should consult with the test center regarding the forms of picture ID needed to verify your identification.

1.2.4.3 *If I fail, how soon can I retake the examination?*

You are expected to be familiar with the current policy on The Open Group web site. At the time of writing, the policy states that individuals who have failed the examination are not allowed to retake the examination within one month of the first sitting.

1.2.5 **Preparing for the Examination**

You can prepare for the examination by working through this Study Guide section-by-section. After completing each section you should complete the exercises and read the referenced sections from the TOGAF documentation. Once you have completed all the sections in this Study Guide, you can then attempt the appropriate Test Yourself examination paper(s) in the appendices.

This is designed as a thorough test of your knowledge. If you have completed all the prescribed preparation and can attain a pass mark for the Test Yourself examination paper(s), then you may be ready to sit the examination.



Open-Book Examinations

Both the TOGAF 9 Part 2 Examination and the TOGAF 8 – 9 Advanced Bridge Examinations are open-book. The test center will provide access to the TOGAF 9 specification. At Prometric test centers, the TOGAF specification is provided as part of the examination itself.

1.3 Summary

The TOGAF 9 People certification program is a knowledge-based certification program. It has two levels, leading to certification for TOGAF 9 Foundation and TOGAF 9 Certified, respectively.

The topic for this Study Guide is preparation for the TOGAF 9 Part 2 Examination or Section 2 of the TOGAF 8 – 9 Advanced Bridge Examination, leading to TOGAF 9 Certified. The TOGAF 9 Part 2 Examination comprises eight scenario-based questions to be completed in 90 minutes. The Bridge examination also includes twenty multiple-choice questions and has a time limit of two hours.⁴

Preparing for the examination includes the following steps:

- You should work through this Study Guide step-by-step.
- At the end of each chapter, you should complete the exercises (where provided) and read the sections of the TOGAF documentation listed under Recommended Reading.
- Once you have completed all the chapters in this Study Guide, you should attempt the applicable Test Yourself examination paper in the appendices.
- If you can attain the target score for the paper, then you have completed your preparation.

⁴ Additional time is allowed for candidates for whom English is a second language where the examination is not available in the local language. For further information see the advice to candidates sheet on The Open Group TOGAF 9 certification web site.

1.4 Recommended Reading

The following are recommended sources of further information for this chapter:

- TOGAF Certification for People: Program Summary Datasheet
- TOGAF 9 Certified Datasheet
- TOGAF Certification for People: Certification Policy)
- TOGAF Certification for People: Conformance Requirements (Multi-level)
- The Open Group TOGAF 9 Certification web site: www.opengroup.org/togaf9/cert
- The TOGAF information web site: www.togaf.info
- TOGAF 9 People Certification Overview presentation: www.togaf.info/sg01