TOGAF™ 9 Certified Study Guide

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

Rachel Harrison
Other publications by Van Haren Publishing

Van Haren Publishing (VHP) specializes in titles on Best Practices, methods and standards within four domains:
- IT management
- Architecture (Enterprise and IT)
- Business management and
- Project management

Van Haren Publishing offers a wide collection of whitepapers, templates, free e-books, trainer material etc. in the VHP Freezone: freezone.vanharen.net

VHP is also publisher on behalf of leading organizations and companies:
ASLBiSL Foundation, CA, Centre Henri Tudor, Gaming Works, Getronics, IACCMM, IAOP, IPMA-NL, ITScq, NAF, Ngj, PMI-NL, PON, Quint, The Open Group, The Sox Institute

Topics are (per domain):

<table>
<thead>
<tr>
<th>IT (Service) Management / IT Governance</th>
<th>Architecture (Enterprise and IT)</th>
<th>Project/Programme/ Risk Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC of ICT</td>
<td>Archimate®</td>
<td>A4-Projectmanagement</td>
</tr>
<tr>
<td>ASL</td>
<td>GEA®</td>
<td>ICB / NCB</td>
</tr>
<tr>
<td>BiSL</td>
<td>SOA</td>
<td>MINCE®</td>
</tr>
<tr>
<td>CATS</td>
<td>TOGAF™</td>
<td>M_o_R®</td>
</tr>
<tr>
<td>CMMI</td>
<td></td>
<td>MSP™</td>
</tr>
<tr>
<td>CoBIT</td>
<td></td>
<td>P3O</td>
</tr>
<tr>
<td>ISO 17799</td>
<td></td>
<td>PMBOK® Guide</td>
</tr>
<tr>
<td>ISO 27001</td>
<td></td>
<td>PRINCE2™</td>
</tr>
<tr>
<td>ISO 27002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO/IEC 20000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISPL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT Service CMM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITIL® V3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITSM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SABSA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO 9000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO 9001:2000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPBOK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outsourcing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SixSigma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SqEME®</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For the latest information on VHP publications, visit our website: www.vanharen.net, or freezone.vanharen.net for free whitepapers, templates and e-books.
# Contents

Preface .................................................................................................................. XV
About the Author .................................................................................................. XXI
Trademarks .......................................................................................................... XXII
Acknowledgements ............................................................................................. XXIII
References ........................................................................................................... XXIV

## Chapter 1  Introduction ............................................................................... 1
1.1 Key Learning Points ................................................................................... 1
1.2 The TOGAF Certification for People Program ........................................ 1
1.3 Summary ..................................................................................................... 7
1.4 Recommended Reading ............................................................................. 8

## PART 1  TOGAF 9 ARCHITECTURE DEVELOPMENT METHOD (ADM)

## Chapter 2  Preliminary Phase ................................................................. 11
2.1 Key Learning Points ................................................................................... 11
2.2 Objectives .................................................................................................. 12
2.3 Inputs ......................................................................................................... 13
2.4 Steps .......................................................................................................... 14
2.5 Outputs ..................................................................................................... 23
2.6 Summary .................................................................................................. 26
2.7 Exercises .................................................................................................. 27
2.8 Recommended Reading ............................................................................. 27

## Chapter 3  Phase A: Architecture Vision .............................................. 29
3.1 Key Learning Points ................................................................................... 29
3.2 Objectives .................................................................................................. 30
3.3 Inputs ......................................................................................................... 31
3.4 Steps .......................................................................................................... 31
3.5 Outputs ..................................................................................................... 43
3.6 Summary .................................................................................................. 47
3.7 Exercises .................................................................................................. 48
3.8 Recommended Reading ............................................................................. 50
Chapter 8  Phase D: Technology Architecture ................................. 91
  8.1  Key Learning Points ................................................................. 91
  8.2  Objectives ................................................................................. 92
  8.3  Inputs .......................................................................................... 92
  8.4  Steps ........................................................................................... 93
  8.5  Outputs ....................................................................................... 99
  8.6  Summary .................................................................................... 101
  8.7  Exercises ................................................................................... 101
  8.8  Recommended Reading ............................................................... 101

Chapter 9  Phase E: Opportunities & Solutions .............................. 103
  9.1  Key Learning Points ................................................................. 103
  9.2  Objectives ................................................................................ 104
  9.3  Inputs ........................................................................................ 105
  9.4  Steps ......................................................................................... 105
  9.5  Outputs ..................................................................................... 113
  9.6  Summary .................................................................................. 114
  9.7  Exercises .................................................................................. 114
  9.8  Recommended Reading .............................................................. 114

Chapter 10  Phase F: Migration Planning ......................................... 115
  10.1  Key Learning Points .............................................................. 115
  10.2  Objectives ................................................................................. 116
  10.3  Inputs ......................................................................................... 117
  10.4  Steps ......................................................................................... 117
  10.5  Outputs ..................................................................................... 125
  10.6  Summary .................................................................................. 128
  10.7  Exercises .................................................................................. 128
  10.8  Recommended Reading .............................................................. 128

Chapter 11  Phase G: Implementation Governance .......................... 129
  11.1  Key Learning Points .............................................................. 129
  11.2  Objectives ................................................................................. 130
  11.3  Inputs ......................................................................................... 131
  11.4  Steps ......................................................................................... 131
14.10 Exercises ........................................................................................................ 170
14.11 Recommended Reading ................................................................................ 171

Chapter 15  Security .............................................................................................. 173
15.1 Key Learning Points ....................................................................................... 173
15.2 Introduction .................................................................................................... 173
15.3 Adapting the ADM for Security ..................................................................... 175
15.4 Security Input/Output Summary ..................................................................... 179
15.5 Summary .......................................................................................................... 181
15.6 Exercises .......................................................................................................... 181
15.7 Recommended Reading .................................................................................... 181

Chapter 16  SOA ..................................................................................................... 183
16.1 Key Learning Points ....................................................................................... 183
16.2 SOA as an Architectural Style ........................................................................ 183
16.3 SOA and the TOGAF Metamodel .................................................................... 184
16.4 Enterprise Architecture and SOA .................................................................... 185
16.5 Summary .......................................................................................................... 185
16.6 Recommended Reading .................................................................................... 185

PART 3  THE ARCHITECTURE CONTENT FRAMEWORK

Chapter 17  Architecture Content Framework ...................................................... 189
17.1 Key Learning Points ....................................................................................... 189
17.2 Introduction ..................................................................................................... 189
17.3 The Content Framework and the TOGAF ADM ........................................... 190
17.4 Why do we Need a Metamodel? ..................................................................... 190
17.5 Components of the Content Metamodel ....................................................... 191
17.6 Core Metamodel Concepts ............................................................................ 193
17.7 Summary .......................................................................................................... 198
17.8 Exercises .......................................................................................................... 199
17.9 Recommended Reading .................................................................................... 199

PART 4  THE ENTERPRISE CONTINUUM

Chapter 18  Architecture Partitioning ................................................................. 203
18.1 Key Learning Points ....................................................................................... 203
18.2 Introduction ..................................................................................................... 203
### Chapter 18  Architecture Partitioning

18.3 The Need for Architecture Partitioning .................................................. 204  
18.4 Characteristics of Architectures ................................................................ 204  
18.5 Characteristics of Solutions ..................................................................... 205  
18.6 Tiers of Architecture in the Architecture Landscape ............................... 206  
18.7 Partitioning Best Practices and Re-Use.................................................... 206  
18.8 Applying Partitioning to the ADM .......................................................... 207  
18.9 Summary .................................................................................................. 211  
18.10 Recommended Reading .......................................................................... 211  

### Chapter 19  Architecture Repository

19.1 Key Learning Points .................................................................................. 213  
19.2 Introduction ................................................................................................ 213  
19.3 The Repository in Detail .......................................................................... 214  
19.4 Relationship to Other Parts of TOGAF .................................................... 217  
19.5 Summary .................................................................................................. 217  
19.6 Recommended Reading .......................................................................... 217  

### PART 5  TOGAF REFERENCE MODELS

### Chapter 20  The Technical Reference Model (TRM)

20.1 Key Learning Points .................................................................................. 221  
20.3 The TRM in Detail .................................................................................... 223  
20.4 Taxonomy of Application Platform Services ............................................ 226  
20.5 Taxonomy of Application Platform Service Qualities .............................. 228  
20.6 Using the TRM ....................................................................................... 229  
20.7 Summary .................................................................................................. 230  
20.8 Exercises .................................................................................................. 230  
20.9 Recommended Reading .......................................................................... 230  

### Chapter 12  Integrated Information Infrastructure Reference Model (III-RM)

21.1 Key Learning Points .................................................................................. 231  
21.2 Drivers for Boundaryless Information Flow .............................................. 231  
21.3 How the III-RM Fulfills the Solution Space ............................................ 232  
21.4 The High-Level Structure of the III-RM .................................................. 232  
21.5 Components of the III-RM ..................................................................... 234  
21.6 Summary .................................................................................................. 237  
21.7 Recommended Reading .......................................................................... 237
PART 6  ARCHITECTURE CAPABILITY

Chapter 22  Architecture Governance ........................................ 241
22.1  Key Learning Points ............................................................ 241
22.2  Architecture Governance and the ADM ............................ 241
22.3  Key Success Factors ............................................................ 242
22.4  Setting up the Architecture Board .................................... 243
22.5  Operating an Architecture Board ...................................... 244
22.6  Summary ........................................................................... 247
22.7  Exercises .......................................................................... 247
22.8  Recommended Reading ..................................................... 248

Chapter 23  Architecture Maturity Models .............................. 249
23.1  Key Learning Points ............................................................ 249
23.2  Capability Maturity Models ............................................... 249
23.3  Capability Maturity Model Integration (CMMI) .................... 250
23.4  ACMM ............................................................................. 251
23.5  Maturity Assessments and the ADM ............................... 252
23.6  Summary .......................................................................... 253
23.7  Exercises .......................................................................... 253
23.8  Recommended Reading ..................................................... 253

Chapter 24  Architecture Skills Framework ............................. 255
24.1  Key Learning Points ............................................................ 255
24.2  Purpose .............................................................................. 255
24.3  Benefits ............................................................................. 256
24.4  EA Roles, Skills Categories, and Proficiency Levels .......... 257
24.5  Summary .......................................................................... 259
24.6  Exercises .......................................................................... 259
24.7  Recommended Reading ..................................................... 260

PART 7  BRIDGING FROM TOGAF 8 CERTIFIED TO TOGAF 9 CERTIFIED

Differences between TOGAF 8 and TOGAF 9 .......................... 263
25.1  Key Learning Points ............................................................ 263
25.2  New Features and Benefits of TOGAF 9 .............................. 263
25.3  Key Differences between TOGAF 8.1.1 and TOGAF 9 .......... 265
25.4  Approaches for Migration .................................................. 274

Copyright protected. Use is for Single Users only via a VHP Approved License.
For information and printed versions please see www.vanharen.net
25.5 Exercises ................................................................. 274
25.6 Recommended Reading .............................................. 274

Appendix A  Test Yourself Examination
Paper – Section 1 .......................................................... 275
A.1 Introduction .................................................................. 275
A.2 Instructions .................................................................. 275
A.3 Examination – Section 1 ............................................... 275

Appendix B  Test Yourself Examination Paper – Section 2 .... 283
B.1 Introduction .................................................................. 283
B.2 Instructions .................................................................. 283
B.3 Questions .................................................................... 283

Appendix C  Test Yourself Examination Answers – Section 1 ...... 301

Appendix D  Test Yourself Examination Answers – Section 2 ......... 305
D.1 Question 1 .................................................................... 305
D.2 Question 2 .................................................................... 306
D.3 Question 3 .................................................................... 307
D.4 Question 4 .................................................................... 308
D.5 Question 5 .................................................................... 309
D.6 Question 6 .................................................................... 310
D.7 Question 7 .................................................................... 311
D.8 Question 8 .................................................................... 312

Appendix E  TOGAF 9 Certified Syllabus .......................... 313
E.1 Preliminary Phase .......................................................... 313
E.2 Architecture Governance (Level 2) ................................. 314
E.3 Business Scenarios Technique ........................................ 314
E.4 Phase A: Architecture Vision .......................................... 315
E.5 Architecture Content Framework .................................... 315
E.6 Stakeholder Management ............................................. 316
E.7 TOGAF Content Metamodel .......................................... 316
E.8 Architecture Implementation Support Techniques ............ 317
E.9 Phase B: Business Architecture ...................................... 318
E.10  Phase C: Information Systems Architectures – Data Architecture.....319
E.11  Phase C: Information Systems Architectures – Application  
      Architecture ...........................................................................................................320
E.12  TOGAF Foundation Architecture: Technical Reference Model  
      (Level 2) .................................................................................................................321
E.13  Integrated Information Infrastructure Reference Model (Level 2) ....322
E.14  Phase D: Technology Architecture .................................................................323
E.15  Migration Planning Techniques ........................................................................324
E.16  Phase E: Opportunities & Solutions ...............................................................324
E.17  Phase F: Migration Planning ............................................................................325
E.18  Phase G: Implementation Governance .........................................................325
E.19  Phase H: Architecture Change Management .................................................326
E.20  ADM Architecture Requirements Management ...........................................326
E.21  Architecture Partitioning ................................................................................327
E.22  Architecture Repository ..................................................................................327
E.23  Guidelines for Adapting the ADM: Iteration and Levels ............................328
E.24  Guidelines for Adapting the ADM: Security ..................................................328
E.25  Guidelines for Adapting the ADM: SOA ..........................................................329
E.26  Architecture Maturity Models .........................................................................329
E.27  Architecture Skills Framework ........................................................................330
E.28  Syllabus for Bridging from TOGAF 8 Certified to Level 2 ...........................330

Index ..............................................................................................................................331
Preface

This Document
This document is a Study Guide for TOGAF™ 9 Certified.

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 Version 9 documentation¹ available online at www.opengroup.org/architecture/togaf9-doc/arch and also available as TOGAF Version 9 “The 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.
• 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 meet the business directive for a new enterprise architecture.

— 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 conducts initial implementation planning and the identification of delivery vehicles for the architecture defined in the previous phases.

— Chapter 10 describes Phase F: Migration Planning. This phase finalizes a detailed sequence of Transition Architectures with a supporting Implementation and Migration Plan.

— Chapter 11 describes Phase G: Implementation Governance. This phase ensures that the implementation project conforms to the architecture.

— Chapter 12 describes Phase H: Architecture Change Management. This phase ensures that the architecture 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 9 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 is an architecture framework – The Open Group Architecture Framework. TOGAF is a tool for assisting in the acceptance, production, use, and maintenance of enterprise architectures. It is based on an iterative process model supported by best practices and a re-usable set of existing architectural assets.

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 document covers TOGAF Version 9, referred to as “TOGAF 9” within the text of this document. TOGAF 9 was first published in January 2009. TOGAF 9 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.

**About The Open Group**

The Open Group is a vendor-neutral and technology-neutral consortium, whose vision of Boundaryless Information Flow™ will enable access to
integrated information within and between enterprises based on open standards and global interoperability. The Open Group works with customers, suppliers, consortia, and other standards bodies. Its role is to capture, understand, and address current and emerging requirements, establish policies, and share best practices; to facilitate interoperability, develop consensus, and evolve and integrate specifications and Open Source technologies; to offer a comprehensive set of services to enhance the operational efficiency of consortia; and to operate the industry's premier certification service.

Further information on The Open Group is available at www.opengroup.org.

The Open Group has over 15 years experience in developing and operating certification programs and has extensive experience developing and facilitating industry adoption of test suites used to validate conformance to an open standard or specification.

The Open Group publishes a wide range of technical documentation, the main part of which is focused on development of Technical and Product Standards and Guides, but which also includes White Papers, Technical Studies, and Business Titles.

A catalog is available at www.opengroup.org/bookstore.
About the Author

Rachel Harrison is Managing Director of Stratton Edge Consulting and a Visiting Professor of Computer Science at the University of Reading. Previously, she was Professor of Computer Science at the University of Reading, Head of the Department of Computer Science, Director of Research for the School of Systems Engineering, and Co-Founder and Director of the Reading e-Science Centre and of the Informatics Research Centre. She is Editor-in-Chief of the Software Quality Journal, which is published by Springer. Her research interests include software metrics, requirements engineering, systems evolution, and software testing. She has published over 80 refereed papers and consulted widely with industry, working with organizations such as IBM, the DRA, Philips Research Labs, Praxis Critical Systems, and The Open Group.

Prof. Harrison holds an MA in Mathematics from Oxford University, an MSc in Computer Science from University College London, and a PhD in Computer Science from the University of Southampton. She is a Member of the British Computer Society, an Affiliate Member of the IEEE-CS, a Member of the Association of Computing Machinery, and is a Chartered Engineer.
Trademarks

Boundaryless Information Flow™ and TOGAF® are trademarks and ArcheMate®, Making Standards Work®, The Open Group®, and UNIX® are registered trademarks of The Open Group in the United States and other countries.

BPMN® and Business Process Modeling Notation® are trademarks of the Object Management Group (OMG).

All other brand, company, and product names are used for identification purposes only and may be trademarks that are the sole property of their respective owners.
Acknowledgements

The Open Group gratefully acknowledges The Open Group Architecture Forum for developing The Open Group Architecture Framework (TOGAF).

The Open Group gratefully acknowledges the following reviewers who participated in the review of this Study Guide:

- Beryl Bellman
- Geoff Burke
- Jörgen Dahlberg
- Steve Else
- Bill Estrem
- Howard Gottlieb
- Joop Hoefnagels
- Paul Homan
- Andrew Josey
- Graham Neal
- Marleen Olde Hartman
- Simon Parker
- Mona Pomraning
- Felix Rausch
- Brian Selves
References

The following documents are referenced in this Study Guide:

- 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).
- 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 (Multilevel), February 2009 (X092), published by The Open Group (www.opengroup.org/bookstore/catalog/x092.htm).
- Bill Estrem, “TOGAF to the Rescue” (www.opengroup.org/downloads)

• 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)


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:

![Certification Document Structure Diagram]

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.\(^2\)

---

\(^2\) Available at the TOGAF 9 certification web site (www.opengroup.org/togaf9/cert), or The Open Group bookstore (www.opengroup.org/bookstore).
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, 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 paths\(^3\) 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.

---

\(^3\) The latest information on the TOGAF 9 certification program can be obtained from the TOGAF 9 Certification webpage at www.opengroup.org/togaf9/cert.

---

Copyright protected. Use is for Single Users only via a VHP Approved License.
For information and printed versions please see www.vanharen.net
What is the Relationship between TOGAF 9 Foundation and TOGAF 9 Certified?

The learning outcomes for TOGAF 9 Certified are a superset of those for TOGAF 9 Foundation. Candidates are able to choose whether they wish to learn in a stepwise manner by becoming certified to TOGAF 9 Foundation and then at a later date TOGAF 9 Certified, or bypass TOGAF 9 Foundation and go directly to TOGAF 9 Certified in one session.

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.

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

Copyright protected. Use is for Single Users only via a VHP Approved License.
For information and printed versions please see www.vanharen.net
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 scores three points, and the third best answer one point. The incorrect answer (or distracter) scores zero points.

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 9 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.5

---

5 Additional time is allowed for candidates for whom English is a second language where the examination is not available in the local language.
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.

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