

TOGAF® Version 9.1

A Pocket Guide



Andrew Josey et al

TOGAF® VERSION 9.1 – A POCKET GUIDE

The Open Group Publications available from Van Haren Publishing

The TOGAF Series:

TOGAF® Version 9.1

TOGAF® Version 9.1 – A Pocket Guide

TOGAF® 9 Foundation Study Guide, 2nd Edition

TOGAF® 9 Certified Study Guide, 2nd Edition

The Open Group Series:

Cloud Computing for Business – The Open Group Guide

Archimate® 2.0 Specification (Publishes 2012)

The Open Group Security Series:

Open Information Security Management Maturity Model (O-ISM3)

Open Enterprise Security Architecture (O-ESA)

Risk Management – The Open Group Guide

All titles are available to purchase from:

www.opengroup.org

www.vanharen.net

and also many international and online distributors.

TOGAF® Version 9.1

A P O C K E T G U I D E

THE
Open
GROUP



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

Title: TOGAF® Version 9.1 – A Pocket Guide
A publication of: The Open Group
Authors: Andrew Josey
Rachel Harrison
Paul Homan
Matthew F. Rouse
Tom van Sante
Mike Turner
Paul van der Merwe
Publisher: Van Haren Publishing, Zaltbommel, www.vanharen.net
ISBN: 978 90 8753 678 7
Edition: First edition, first impression December 2011
Layout and Cover design: CO2 Premedia, Amersfoort-NL
Print: Wilco, Amersfoort – NL
Copyright: © 2008 - 2011 The Open Group
All rights reserved

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior permission of the copyright owner.

The views expressed in this document are not necessarily those of any particular member of The Open Group.

In the event of any discrepancy between text in this document and the official TOGAF documentation, the TOGAF documentation remains the authoritative version for certification, testing by examination, and other purposes. The official TOGAF documentation can be obtained online at www.opengroup.org/togaf.

TOGAF® Version 9.1

A Pocket Guide

Document Number: G117

Comments relating to the material contained in this document may be submitted to:

The Open Group
Apex Plaza, Forbury Road
Reading
Berkshire, RG1 1AX
United Kingdom

Contents

Preface	9
Trademarks	14
About the Authors	15
Acknowledgements	18
1 Introduction	19
1.1 Introduction to TOGAF	19
1.2 Structure of the TOGAF Document	20
1.3 What is Architecture in the Context of TOGAF?	21
1.4 What kinds of Architecture does TOGAF deal with?	21
1.5 What does TOGAF Contain?	22
1.5.1 The Architecture Development Method (ADM)	23
1.5.2 ADM Guidelines and Techniques	23
1.5.3 Architecture Content Framework	24
1.5.4 The Enterprise Continuum	24
1.5.5 TOGAF Reference Models	24
1.5.6 The Architecture Capability Framework	25
2 The Architecture Development Method	27
2.1 What is the ADM?	27
2.2 What are the Phases of the ADM?	28
2.3 The ADM in Detail	31
2.3.1 Preliminary Phase	31
2.3.2 Phase A: Architecture Vision	32
2.3.3 Phase B: Business Architecture	34
2.3.4 Phase C: Information Systems Architectures	35
2.3.5 Phase D: Technology Architecture	38
2.3.6 Phase E: Opportunities and Solutions	39
2.3.7 Phase F: Migration Planning	40

2.3.8	Phase G: Implementation Governance	41
2.3.9	Phase H: Architecture Change Management	42
2.3.10	Requirements Management	43
2.4	Scoping the Architecture Activity	44
3	Key Techniques and Deliverables of the ADM Cycle	47
3.1	Tailored Architecture Framework	49
3.2	Organizational Model for Enterprise Architecture	50
3.3	Architecture Principles	51
3.3.1	Developing Architecture Principles	51
3.3.2	Defining Architecture Principles	52
3.3.3	Qualities of Principles	53
3.3.4	Applying Architecture Principles	54
3.4	Business Principles, Business Goals, and Business Drivers	56
3.5	Architecture Repository	56
3.6	Architecture Tools	57
3.7	Request for Architecture Work	57
3.8	Statement of Architecture Work	58
3.9	Architecture Vision	58
3.10	Stakeholder Management	59
3.10.1	Steps in the Stakeholder Management Process	60
3.11	Communications Plan	62
3.12	Business Transformation Readiness Assessment	63
3.13	Capability Assessment	63
3.14	Risk Management	65
3.15	Architecture Definition Document	66
3.15.1	Business Architecture	67
3.15.2	Information Systems Architectures	68
3.15.3	Technology Architecture	69
3.16	Architecture Requirements Specification	69
3.16.1	Business Architecture Requirements	70
3.16.2	Information Systems Architectures Requirements	71
3.16.3	Technology Architecture Requirements	71

3.16.4	Interoperability Requirements	71
3.17	Architecture Roadmap	71
3.18	Business Scenarios	73
3.19	Gap Analysis	74
3.20	Architecture Viewpoints	76
3.21	Architecture Views	78
3.21.1	Developing Views in the ADM	79
3.22	Architecture Building Blocks	79
3.23	Solution Building Blocks	80
3.24	Capability-Based Planning	81
3.25	Migration Planning Techniques	82
3.25.1	Implementation Factor Assessment and Deduction Matrix	82
3.25.2	Consolidated Gaps, Solutions, and Dependencies Matrix	83
3.25.3	Architecture Definition Increments Table	83
3.25.4	Transition Architecture State Evolution Table	84
3.25.5	Business Value Assessment Technique	85
3.26	Implementation and Migration Plan	86
3.27	Transition Architecture	87
3.28	Implementation Governance Model	88
3.29	Architecture Contracts	88
3.30	Change Request	90
3.31	Compliance Assessment	91
3.32	Requirements Impact Assessment	92
4	Guidelines for Adapting the ADM	93
4.1	Introduction	93
4.2	Applying Iteration to the ADM	95
4.3	Applying the ADM across the Architecture Landscape	101
4.4	Security Architecture and the ADM	102
4.5	Using TOGAF to Define and Govern SOAs	104
4.5.1	Using TOGAF for SOA	105

5	Architecture Content Framework	107
5.1	Architecture Content Framework Overview	107
5.2	Content Metamodel	108
5.2.1	Core and Extensions	110
5.2.2	Catalogs, Matrices, and Diagrams	110
5.3	Architectural Artifacts	112
5.4	Architecture Deliverables	116
5.5	Building Blocks	116
6	The Enterprise Continuum	119
6.1	Overview of the Enterprise Continuum	119
6.1.1	The Enterprise Continuum and Architecture Re-Use	121
6.1.2	Using the Enterprise Continuum within the ADM	121
6.2	Architecture Partitioning	122
6.3	Architecture Repository	123
6.3.1	The Enterprise Repository	125
7	TOGAF Reference Models	127
7.1	TOGAF Foundation Architecture	127
7.1.1	Technical Reference Model (TRM)	127
7.2	Integrated Information Infrastructure Reference Model (III-RM)	127
8	Architecture Capability Framework	129
8.1	Establishing an Architecture Capability	131
8.2	Architecture Governance	131
8.3	Architecture Board	132
8.4	Architecture Compliance	133
8.5	Architecture Skills Framework	133
	Appendix A Migration Summary	137
	Glossary	151
	Index	157

Preface

This Document

This is the Pocket Guide to TOGAF®, an Open Group Standard, Version 9.1. It is intended to help architects focus on the efficient and effective operations of their organization and senior managers understand the basics of TOGAF. It is organized as follows:

- Chapter 1 provides a high-level view of TOGAF, enterprise architecture, and the contents and key concepts of TOGAF.
- Chapter 2 provides an introduction to the Architecture Development Method (ADM), the method that TOGAF provides to develop enterprise architectures.
- Chapter 3 provides an overview of key techniques and deliverables of the ADM cycle.
- Chapter 4 provides an overview of the guidelines for adapting the ADM.
- Chapter 5 provides an introduction to the Architecture Content Framework, a structured metamodel for architectural artifacts.
- Chapter 6 provides an introduction to the Enterprise Continuum, a high-level concept that can be used with the ADM to develop an enterprise architecture.
- Chapter 7 provides an introduction to the TOGAF Reference Models, including the TOGAF Foundation Architecture and the Integrated Information Infrastructure Reference Model (III-RM).
- Chapter 8 provides an introduction to the Architecture Capability Framework, a set of resources provided for establishment and operation of an architecture function within an enterprise.
- Appendix A provides an overview of the differences between TOGAF 9.1 and TOGAF 8.1.1, and also a summary of the changes between TOGAF 9 and 9.1.

The audience for this document is:

- Enterprise architects, business architects, IT architects, data architects, systems architects, solutions architects, and senior managers seeking a first introduction to TOGAF

A prior knowledge of enterprise architecture is not required. After reading this document, the reader seeking further information should refer to the TOGAF documentation¹ available online at www.opengroup.org/architecture/togaf9-doc/arch and also available as a hardcopy book.

About TOGAF Version 9.1

TOGAF 9.1 is a maintenance update to TOGAF 9, addressing comments raised since the introduction of TOGAF 9 in 2009. It retains the major features and structure of TOGAF 9 including:

Modular Structure: TOGAF 9 has a modular structure. The modular structure supports:

- Greater usability – defined purpose for each part; can be used in isolation as a standalone set of guidelines
- Incremental adoption of the TOGAF specification

Content Framework: TOGAF 9 includes a content framework to drive greater consistency in the outputs that are created when following the Architecture Development Method (ADM). The TOGAF content framework provides a detailed model of architectural work products.

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

Extended Guidance: TOGAF 9 features an extended set of concepts and guidelines to support the establishment of an integrated hierarchy of architectures being developed by teams within larger organizations that operate within an overarching architectural governance model. In particular, the following concepts are introduced:

- **Partitioning:** A number of techniques and considerations on how to partition the various architectures within an enterprise.
- **Architecture Repository:** A logical information model for an Architecture Repository which can be used as an integrated store for all outputs created by executing the ADM.
- **Capability Framework:** A structured definition of the organization, skills, roles, and responsibilities required to operate an effective enterprise architecture capability. TOGAF also provides guidance on a process that can be followed to identify and establish an appropriate architecture capability.

Architectural Styles: TOGAF 9, in Part III: ADM Guidelines & Techniques, brings together a set of supporting materials that show in detail how the ADM can be applied to specific situations:

- The varying uses of iteration that are possible within the ADM and when each technique should be applied
- The linkages between the TOGAF ADM and Service Oriented Architecture (SOA)
- The specific considerations required to address security architecture within the ADM
- The various types of architecture development required within an enterprise and how these relate to one another

Additional ADM Detail: TOGAF 9 includes additional detailed information over earlier versions of TOGAF for supporting the execution of the ADM. Particular areas of enhancement are:

- The Preliminary phase features extended guidance on establishing an enterprise architecture capability and planning for architecture development.
- The Opportunities & Solutions and Migration Planning phases feature a detailed and robust method for defining and planning enterprise transformation.

Conventions Used in this Document

The following conventions are used throughout this document 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.

About The Open Group

The Open Group is a global consortium that enables the achievement of business objectives through IT standards. With more than 375 member organizations, The Open Group has a diverse membership that spans all sectors of the IT community – customers, systems and solutions suppliers, tool vendors, integrators, and consultants, as well as academics and researchers – to:

- 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

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

The Open Group publishes a wide range of technical documentation, most of which is focused on development of Open Group Standards and Guides, but which also includes white papers, technical studies, certification and testing documentation, and business titles. Full details and a catalog are available at www.opengroup.org/bookstore.

Readers should note that updates – in the form of Corrigenda – may apply to any publication. This information is published at www.opengroup.org/corrigenda.

Trademarks

Boundaryless Information Flow™ is a trademark and ArchiMate®, Jericho Forum®, Making Standards Work®, Motif®, OSF/1®, The Open Group®, TOGAF®, UNIX®, and the “X” device are registered trademarks of The Open Group in the United States and other countries.

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.

About the Authors

Andrew Josey, The Open Group

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 and 9.1, 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's 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.

Professor Rachel Harrison, Oxford Brookes University

Rachel Harrison is a Professor of Computer Science in the Department of Computing and Communication Technologies at Oxford Brookes University. Previously she was Professor of Computer Science, Head of the Department of Computer Science, and Director of Research for the School of Systems Engineering at the University of Reading. Her research interests include systems evolution, software metrics, requirements engineering, software architecture, usability and software testing. She has published over 100 refereed papers and consulted widely with industry, working with organizations such as IBM, the DERA, Philips Research Labs, Praxis Critical Systems, and The Open Group. She is Editor-in-Chief of the Software Quality Journal, published by Springer. She is the author of the study guides for the TOGAF 9 certification program.

Paul Homan, IBM

Paul Homan is a Technology Strategy Consultant within IBM's Global Business Services. He is a Certified Master IT Architect, specializing in enterprise architecture with over 20 years' experience in IT. Highly

passionate and practically experienced in architecture, strategy, design authority, and governance areas, Paul is particularly interested in enterprise architecture leadership, requirements management, and business architecture. He joined IBM from end-user environments, having worked as Chief Architect in both the UK Post Office and Royal Mail. He has not only established enterprise architecture practices, but has also lived with the results! Since joining IBM, Paul has dedicated his time to both advising clients on architecture capability as well as actively leading Architecture efforts on large client programmes. Paul has also been a leader in building IBM's capability around Enterprise Architecture and TOGAF.

Matthew F. Rouse, Hewlett-Packard

Matthew Rouse is an Enterprise Architect at HP Enterprise Services. Matthew has over 20 years' IS/IT experience in applications development, system architecture, IS/IT strategy, and enterprise architecture. He brings expertise in strategic IS/IT planning and architecture to ensure that enterprises align their IS/IT investments with their business objectives. Matthew is a Chartered IT Professional member of the British Computer Society, a Master Certified IT Architect, and a member of the IEEE Computer Society.

Tom van Sante, KPN/Getronics

Tom van Sante is Principal Consultant and program director for KPN/Getronics. He started his career in IT over 30 years ago after studying architecture at the Technical University in Delft. Working in a variety of functions, from operations to management, he has always operated on the borders between business and IT. He was involved in the introduction and development of ITIL/ASL/BiSL in the Netherlands. Tom van Sante has worked in numerous appointments for Government and Industry advising on the use of IT in modern society. He was responsible for the introduction and development of TOGAF within KPN/Getronics.

Mike Turner, Nokia

Mike Turner led Capgemini's development effort on TOGAF Version 9 and also worked in the core team that developed the SAP Enterprise Architecture Framework (a joint initiative between Capgemini and SAP). He is currently working as an Enterprise Architect at Nokia.

Paul van der Merwe, Business Connexion

Paul van der Merwe, Business Unit Manager at Business Connexion, is one of South Africa's most dynamic and insightful enterprise architecture practitioners. A conceptual thinker, he has driven a number of advances in the fields in which he has specialized, among them software development, business intelligence, ICT management, and enterprise architecture. The fundamental approach to enterprise architecture advocated by him is repository-based enterprise architecture that should be established within organizations as an ongoing practice that enables business and technology capabilities. He consults and trains on the implementation of TOGAF and frequently presents on enterprise architecture at industry events.

Acknowledgements

The Open Group gratefully acknowledges the following:

- Past and present members of The Open Group Architecture Forum for developing TOGAF
- Capgemini and SAP for contributed materials
- The following reviewers of this document:
 - Dave Hornford
 - Bill Estrem
 - Henry Franken
 - Judith Jones
 - Henk Jonkers
 - Mike Lambert
 - Kiichiro Onishi
 - Roger Reading
 - Saverio Rinaldi
 - John Rogers
 - Robert Weisman
 - Nicholas Yakoubovsky

Chapter 1

Introduction

This chapter provides an introduction to TOGAF, an Open Group Standard.

Topics addressed in this chapter include:

- An Introduction to TOGAF
- TOGAF, its structure and content
- The kinds of architecture that TOGAF addresses

1.1 Introduction to TOGAF

TOGAF is an architecture framework. Put simply, TOGAF is a tool for assisting in the acceptance, production, use, and maintenance of 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 9.1, referred to as “TOGAF” within the text of this document. TOGAF 9.1 was first published in December 2011, and is a maintenance update to TOGAF 9 that was published in January 2009. This latest version is an evolution from TOGAF 8.1.1 and a description of the changes is provided in Appendix A.

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. The key to TOGAF is the method – the TOGAF Architecture Development Method (ADM) – for developing an enterprise architecture that addresses business needs.

1.2 Structure of the TOGAF Document

The TOGAF document is divided into seven parts, as summarized in Table 1.

Table 1: Structure of the TOGAF Document

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.
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.

1.3 What is Architecture in the Context of TOGAF?

ISO/IEC 42010:2007² 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

1.4 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 2.

Table 2: Architecture Types Supported by TOGAF

Architecture Type	Description
Business Architecture	The business strategy, governance, organization, and key business processes.
Data Architecture ³	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.

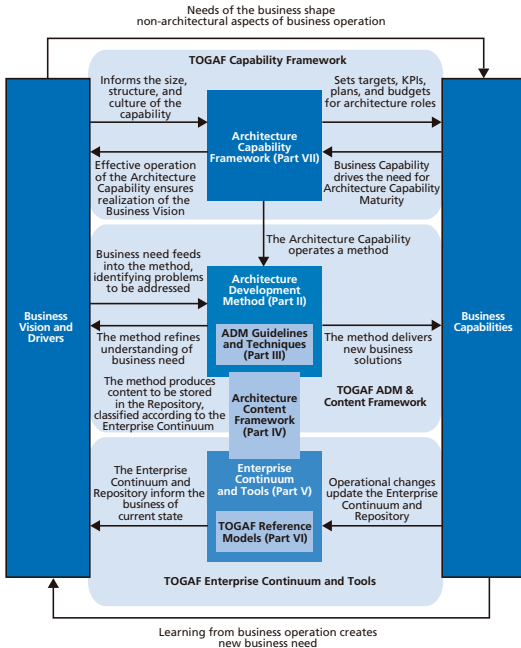
² ISO/IEC 42010:2007, Systems and Software Engineering – Recommended Practice for Architectural Description of Software-Intensive Systems, Edition 1 (technically identical to ANSI/IEEE Std 1471-2000).

³ Data Architecture is called Information Architecture in some organizations.

Architecture Type	Description
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.

1.5 What does TOGAF Contain?

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



Central to TOGAF is the Architecture Development Method (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).

1.5.1 The 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.

The ADM is described further in Chapter 2.

1.5.2 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 speciality

architectures (such as security). The techniques support specific tasks within the ADM (such as defining principles, business scenarios, business goals, gap analysis, migration planning, risk management, etc).

ADM Guidelines are described further in Chapter 4. ADM Techniques are described in detail in Chapter 3, together with key deliverables.

1.5.3 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.

The Architecture Content Framework is described further in Chapter 5.

1.5.4 The 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.

The Enterprise Continuum is described further in Chapter 6.

1.5.5 TOGAF Reference Models

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

The TOGAF Reference Models are described further in Chapter 7.

1.5.6 The 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.

The Architecture Capability Framework is described further in Chapter 8.

