An Introduction to TOGAF™
(The Open Group Architecture Framework)

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Self Introduction

- Fellow, The Open Group
  - Director, The Open Group Messaging Forum

- Lecturer, University of Reading
  - School of Systems Engineering

- Associate Consultant, Architecting-the-Enterprise
  - Principal, The AtE Institute
Agenda

- The Open Group
- The Architecture Forum
- TOGAF Background
- TOGAF 8 “Enterprise Edition”
- Summary
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About The Open Group

Global Operation
Cross-Industry
Vendor Neutral
Technology Neutral

Brings the key constituencies together in an open process

Industry Consortium
Not-for-profit operations
Established ~25 years
~300 member organizations

San Francisco,
Boston, UK, Tokyo
Regional chapters
50+ staff

Operates the industry’s premier certification service
Mission

The mission of The Open Group is to drive the creation of Boundaryless Information Flow achieved by:

- Working with customers to capture, understand and address current and emerging requirements, establish policies and share best practices;
- Working with vendors, consortia and standards bodies to develop consensus and facilitate interoperability, to evolve and integrate open specifications and open source technologies;
- Offering a comprehensive set of services to enhance the operational efficiency of consortia; and
- Developing and operating the industry’s premier certification service and encouraging procurement of certified products.
Activities

- Certification Services
  - For specifications of The Open Group and other consortia
- Conferences
  - Quarterly member meetings
  - Architecture Practitioners Conferences
    - San Diego, January 2007
    - Mumbai, February 2007
    - Cape Town, March 2007
    - Paris, April 2007
    - Austin, July 2007
    - Europe, October 2007
- Member Forums and Working Groups
Forums and Working Groups of The Open Group

- Architecture Forum
- Enterprise Management Forum
- Grid Enterprise Services Forum
- Identity Management Forum
- Jericho Forum
- Messaging Forum
- Platform Forum
- Real Time & Embedded Systems Forum
- Security Forum
- Universal Data Element Framework (UDEF) Forum

- Service Oriented Architectures WG
- Semantic Interoperability WG
- Homeland Security WG
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Architecture Forum - Focus

- Original (and continuing) focus:
  - TOGAF

- Extended focus:
  - Architecture as a Professional discipline
  - Architecture Tools
Architecture Forum Members

Accenture (US)
act! Consulting (Germany)
ADP, Inc. (US)
American Express (US)
Allied Irish Bank (Ireland)
APL, Limited (US)
Architecting-the Enterprise Ltd (UK)
Arismore (France)
Armscor (South Africa)
Armstrong Process Group, Inc. (US)
Austin Energy (US)
Bank of Montreal Financial Group (Canada)
Boeing Corporation (US)
C & C Technology (UK)
CAP Gemini Limited (France)
Capita IT Services (UK)
CC and C Solutions (Australia)
Celestial Consulting Ltd (UK)
Centre For Open Systems (Aus)
CGI (Canada)
ChiSurf (Hong Kong)
Cisco Systems, Inc. (US)
Citigroup (US)
Companhia Vale do Rio Doce (Brazil)
Computer Associates (US)
Data Access Technologies (US)
Dept for Works and Pensions (UK)
Desktop Management Task Force (US)
Detecon International GmbH (Germany)
Enbridge, Inc. (Canada)
Eskom Holdings (South Africa)
Fannie Mae (US)
Frietuna Consultants (UK)
Fujitsu (Japan)
Fundani Computer Systems (South Africa)
Future Tech Systems (US)
glue: Limited (UK)
Grant MacEwan College (Canada)
GTECH Corporation (US)
Heck Consulting (Germany)
Hewlett-Packard (US)
Hitachi (Japan)
Hornford Associates (Canada)
IBM (US)
Identiun (UK)
Infosys (India)
Infovide (Poland)
Innenministerium NordRhein-Westfalen (Germany)
Integration Consortium
Investec (South Africa)
Itochu Techno-Science Corporation (Japan)
Johnson & Johnson (US)
Kansas State University (US)
LetSemia Consulting (South Africa)
Lockheed Martin (US)
Marathon Oil (US)
Marriott International (US)
MEGA International (Fra)
Metaplexity Associates (US)
Ministry of Science Technology & Innovation (Denmark)
MIT Lincoln Laboratory (US)
MITRE Corporation (US)
Mitsubishi Corporation (Japan)
Mizuho Information and Research Institute, Inc. (Japan)
Monash University (Australia)
NASA Jet Propulsion Labs (US)
NASA Scientific, & Engineering Workstation Procurement (SEWP) (US)
National Computerization Agency (Korea)
National E-health Transition Authority (Australia)
National University of Singapore
NEC (Japan)
Norwegian University of Science and Technology (Norway)
Object Management Group (US)
Open GIS Consortium, Inc. (US)
Penn State University / App. Research Lab (US)
Portland General Electric (US)
POSC (US)
PricewaterhouseCoopers (UK)
ProForma Corporation (US)
Qualiware ApS (Denmark)
Quick Response Systems, Inc. (Canada)
Raytheon (US)
Real IRM Solutions (South Africa)
ReGIS (Japan)
Rococo Company Limited (Japan)
Rolls Royce (UK)
Royal Institute of Technology, Stockholm
SAP (Germany)
SCC (UK)
Serono International SA (Switzerland)
Standard Bank Group (South Africa)
Swiss Federal Department of Finance (Switzerland)
Systems Flow, Inc. (US)

117 current members
All Members – by Geography

38%

US

UK

Europe

Japan

South Africa

Australia

Asia/ Pacific

India
All Members – by Industry Sector

- Manufacturing: 52%
- Transportation & Public Utilities: 14%
- Finance, Insurance, Real Estate: 8%
- Services: 4%
- Public Administration: 9%
- Computer Industry: 7%
- Academic: 6%
Stakeholders and Value

- **Customer Architects**: Reduced time, cost, risk
  - procuring effective IT architecture tools
  - developing an IT architecture
  - procuring products to implement an IT architecture

- **Tools Vendors**: Bigger market, bigger market share
  - supporting open methods for architecture

- **IT Solution Vendors**: Greater cost-efficiency
  - reduced cost of bidding, greater share of procurements

- **Integrators**: Greater cost-efficiency, better service
  - better service delivery to clients
  - more effective use / re-use of own architecture assets

- **Academic / Research Organizations**: Funding support
  - demonstrated relevance to market, route to standardization
  - “technology transfer” important in bids for funding
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Why Enterprise Architecture?

- Effective management and exploitation of information through IT is key to business success
- Good information management = competitive advantage
- Current IT systems do not really meet the needs of business
  - Fragmented, duplicated
  - Poorly understood
  - Not responsive to change
- Investment in Information Technology
  - Focussed on system maintenance
  - Tactical developments rather than a strategic plan
Enterprise Architecture Drivers

- Laws and regulations
  - EU Directives on the Award of Public Contracts
  - Sarbanes-Oxley
- More extended enterprises
- More co-operative IT operations
- Greater publicity to failures
- Increase in litigation
- Audit requirements
What is an Enterprise?

- Collection of organizations that share a common set of goals
  - Government agency
  - Part of a corporation
  - Corporation

- Large corporations may comprise multiple enterprises

- May be an “extended enterprise” including partners, suppliers and customers
What is an Architecture?

- An Architecture is the fundamental organization of something, embodied in
  - its components,
  - their relationships to each other and the environment,
  - and the principles governing its design and evolution.

Adapted from ANSI/IEEE Standard 1471-2000
What is an Architecture Framework?

- An architecture framework is a toolkit which can be used for developing a broad range of different architectures.

- It should describe a method for designing an information system in terms of a set of building blocks, and for showing how the building blocks fit together.

- It should contain a set of tools and provide a common vocabulary.

- It should also include a list of recommended standards and compliant products that can be used to implement the building blocks.
The Value of a Framework

- Provides a practical starting point for an Architecture Project
  - Avoids the initial panic when the scale of the task becomes apparent
  - Systematic – “Codified common sense”
  - Captures what others have found to work in real life
  - Baseline set of resources
  - Foundation architecture in the Enterprise Continuum
TOGAF Origins

- A customer initiative
- A framework, not an architecture
  - A generic framework for developing architectures to meet different business needs
  - Not a “one-size-fits-all” architecture
- Originally based on TAFIM (U.S. DoD)
## TOGAF Development

- **TOGAF’s evolution has been driven by the members of The Open Group’s Architecture Forum over a period of more than 14 years**

<table>
<thead>
<tr>
<th>Year</th>
<th>Version</th>
<th>Changes</th>
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<tbody>
<tr>
<td>1994</td>
<td>TOGAF – Version 1</td>
<td></td>
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<tr>
<td>2001</td>
<td>TOGAF – Version 7</td>
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| 2002       | TOGAF – Version 8 | - New Enterprise Architecture Framework  
- New Business Scenarios section  
- Architecture Contracts  
- Extensive Resource facilities including initial Requirements Management |
- New Governance Section  
- Basis of TOGAF 8 Certification |
| 2006       | TOGAF – Version 8.1.1 | - No substantive changes |
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TOGAF 8 Scope

- TOGAF 8 covers the development of four related types of architecture:
  - Business architecture
  - Data or information architecture
  - Application architecture
  - Technology architecture
TOGAF 8 Goals

- **Long-term:**
  - An industry standard, generic enterprise architecture method.
  - ...usable in conjunction with frameworks having products relevant / specific to particular sectors.
    - Several frameworks have mindshare:
      - Zachman, Spewak, DoD Framework, FEAF, TEAF, ...
    - Almost all focus on products, not method
    - TOGAF and... (not TOGAF or...)

- **Version 8:**
  - An overall structure and core method for enterprise architecture that can be filled out in future years.
The Components of TOGAF

- Business Requirements
- Technical Reference Model
- Standards Information Base
- Building Block Information Base
- Foundation Architecture
- Target Architectures
- Architecture Development Method
The “Enterprise Continuum”

Architecture Continuum

Foundation Architectures
Common Systems Architectures
Industry Architectures
Organisation Architectures

Guides & Supports
Products & Services
Systems Solutions
Industry Solutions
Organisation Solutions

Solutions Continuum
Foundation Architecture: Technical Reference Model (TRM)

- Associated with detailed taxonomy of services
  - defines scope of each service category
- Identifies system-wide capabilities or "qualities"; e.g.:
  - Internationalization
  - Security
  - Management
Foundation Architecture: Standards Information Base (SIB)

- A database of open industry standards
- Content determined by Open Group consensus process
- Structured according to TOGAF Technical Reference Model taxonomy
- Available for public web access
  - http://www.db.opengroup.org/sib.htm
- Gateway to many linked resources
Integrated Information Infrastructure Reference Model

- A model of the key components for developing, managing, and operating an integrated information infrastructure.
  - Supporting “Boundaryless Information Flow”
- A model of a set of applications that sit on top of an application platform.
- An expanded subset of the TOGAF Technical Reference Model, using different orientation.
Integrated Information Infrastructure Reference Model – Detailed Model

**Application Platform**

**Information Consumer Applications**
- Desktop Video Conference
- Information Access
- Mail
- Phone / Fax

**Development Tools**
- Business modeling tools
- Design tools
- Construction tools
- Languages and Libraries

**Information Provider Applications**
- Web Portal
- Streaming audio / video

**Information Brokering Applications**
- Information Brokers
- Application Integrators

**Management Utilities**
- Monitors
- Executory Utilities
- Copy Managers

**Security**
- Digital Signature
- Intrusion Detection
- Key Management
- Firewall
- Encryption
- AAAAC
- SSO

**Qualities**
- Performance
- Manageability

**Mobility**
- Presentation Transformation
- Browser services
- Portal and personalization
- Meta indices

**Languages Libraries Registries**
- Directory
- Referencing/Dereferencing
- Naming
- Registration
- Publish
- Subscribe
- Discovery

**Application Message Format**
- Application Messaging
- Application to application communications services
- Enterprise Appl Integration

**Information Access**
- Transformation Mapping
- Query distribution
- Aggregation
- Search
- File services
- Web services

**Transformation**
- Info Format
- eForm services
- Instant messaging services

**Messaging/Event Brokering**
- Messaging/Event Brokering

**Process/Workflow Control**
- Process/Workflow Control
Enterprise Architecture Development Method

- An iterative method
- Each iteration = new decisions:
  - Enterprise coverage
  - Level of detail
  - Time horizon
  - Architecture asset re-use:
    - previous ADM iterations
    - other frameworks, system models, industry models,…
- Decisions based on:
  - Competence / resource availability
  - Value accruing to the enterprise.
Preliminary: Framework & Principles

- This phase prepares the organisation for a successful Enterprise Architecture project
  - Understand business environment
  - High level management commitment
  - Agreement on scope of architecture activities
  - Establish principles
  - Establish governance structure
  - Agree method to be adopted
Phase A: Architecture Vision

- Initiates one iteration of the architecture process
  - Sets scope, constraints, expectations for this project
  - Required at the start of every architecture cycle
- Validates business context
- Creates Statement of Architecture work
Phase B: Business Architecture

- The fundamental organization of a business, embodied in:
  - its business processes and people,
  - their relationships to each other and the environment,
  - and the principles governing its design and evolution

- Shows how the organization meets its business goals
Business Architecture

Contents

- Organization structure
- Business goals and objectives
- Business functions
- Business Services
- Business processes
- Business roles
- Correlation of organization and functions.
Business Architecture Steps

- Confirm context
- Define baseline
- Define target
  - Views are important
- Validate
  - Requirements
  - Concerns
- Gap analysis
- Produce report
Phase C: Info. Systems Architectures

- The fundamental organization of an IT system, embodied in:
  - the major types of information and the application systems that process them
  - their relationships
    - to each other and the environment,
  - and the principles governing its design and evolution
- Shows how the IT systems meets the business goals of the enterprise
Data or Applications first?

- It is usually necessary to address both
  - Not always the case, depending on project scope and constraints
- May be developed in either order, or in parallel
  - Theory suggests Data Architecture comes first
  - Practical considerations may mean that starting with Application Systems may be more efficient
- There will need to be some iteration to ensure consistency
Phase D: Technology Architecture

- The fundamental organization of an IT System, embodied in:
  - its hardware, software and communications technology
  - their relationships
    - to each other and the environment,
  - and the principles governing its design and evolution
Technology Architecture Steps

Analyse the existing system in consistent terms, using a Technical Reference Model

Explicit requirements
Implicit concerns from views

Define models in terms of functionality
Validate against requirements

Define interface standards

Build list of possible projects
Phase E: Opportunities & Solutions

- Decide on approach
  - Make v Buy v Re-Use
  - Outsource
  - COTS
  - Open Source

- Assess priorities

- Identify dependencies
Phase F: Migration Planning

- Cost/benefit analysis
- Risk assessment
- Technology road-map
Phase G: Implementation Governance

- Defines architecture constraints on implementation projects
  - Architecture contract
- Monitors implementation work for conformance
Phase H: Architecture Change Management

- Ensures that changes to the architecture are managed in a cohesive and architected way
- Establishes and supports the Enterprise Architecture to provide flexibility to evolve rapidly in response to changes in the technology or business environment
Resource Base

- **Architecture Board**: Guidelines for establishing and operating an Enterprise Architecture Board
- **Architecture Compliance**: Guidelines and checklists for ensuring project compliance to architecture
- **Architecture Contracts**: Guidelines for architecture contracts
- **Architecture Governance**: Arrangements for effective control of IT Architecture by enterprise management
- **Architecture Patterns**: Guidelines on architecture patterns
- **Architecture Principles**: Guidelines on developing Architecture Principles; and a generic set of Architecture Principles
- **Architecture Views**: Guidelines for developing viewpoints and views in architecture models
- **Building Blocks Example**: Example illustrating use of building blocks in architecture
Resource Base  (continued)

- **Business Process Domain Views**: A set of function views aligned with the business process structure of the enterprise
- **Business Scenarios**: A method for deriving business requirements for architecture and the implied technical requirements
- **Case Studies**: Real-life examples of TOGAF in use
- **Glossary**: Definitions of key terms
- **Other Architectures / Frameworks**: and relationship to TOGAF
- **Tools for Architecture Development**: Generic evaluation criteria for architecture tools
- **Zachman Framework mapping**: Mapping the TOGAF ADM to the Zachman Framework
TOGAF 8 - Recent Developments

- Hewlett-Packard's internal IT used TOGAF8 in successful merger with Compaq
- Raytheon integrating TOGAF8 into its REAP methodology
- Sun Microsystems incorporating TOGAF8 into a composite best-of-breed of EA frameworks
- TOGAF8 supported in 4 architecture tools
  - Troux (Metis),
  - ProVision,
  - Telelogic (Popkin),
  - ITatlas (Flashmap Systems)
- TOGAF8 Certification Program launched February 2004
  - 2,163 TOGAF certified individuals to 25th Feb 2007
TOGAF 8 Certification

- A vendor-neutral, global basis of certification to impose standards for TOGAF 8 within the industry

- Architects trained in the use of TOGAF 8

- Training courses which instruct in TOGAF 8

- Architecture tools which support TOGAF 8

- Professional services offered to support TOGAF 8
TOGAF 8 global, online testing

Thomson Prometric now live……
TOGAF 8 Study Guide

Available from Certified Trainers & Franchises
TOGAF 8 Core Training Materials

- Licensed from The Open Group
- 4-day & 1-day versions

Personal Certification Course
A four-day taught course for:
- IT Architecture students and practitioners
A single-day course for:
- Senior managers (needing an overview)
TOGAF and Other Frameworks / Bodies of Knowledge

- TOGAF8 already contains mapping to Zachman Framework
- Recent White Paper maps TOGAF to OMG’s MDA modeling standards:
  - http://www.opengroup.org/architecture/wp/
- Near completion: White Paper mapping TOGAF8 and DODAF (collaboration including Raytheon and MITRE Corporation)
- Near completion: White Paper mapping TOGAF8 and COBIT4 (Real IRM)
- Agreement in principle to map TOGAF and ITIL
TOGAF 8 “The Book”

- Published September 2005
- Professional graphics
- New “Look & Feel”
- 8.1.1 Corrigendum September 2006
  - No technical changes
  - Look & Feel of online document now aligned with “The Book”
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TOGAF 8 Summary

- An effective, industry standard framework and method for enterprise architecture.
- Complementary to, not competing with, other enterprise frameworks.
- A repository of best practice
  - “Demystifies” architecture development.
- A framework and method for achieving the “Boundaryless Information Flow” vision.
Conclusions

- Adopt and use TOGAF
  - An effective, industry standard framework and method for enterprise architecture.
  - Vendor, tool, and technology neutral
  - Complementary to, not competing with, other frameworks

- Join and participate in the Architecture Forum
  - Worldwide forum for Architecture practitioners
  - Network with peers and industry experts
  - Contribute to / leverage work in progress
  - Help further development of Enterprise Architecture as a discipline and a profession
For More Information . . .

- The Architecture Forum:
  - http://www.opengroup.org/architecture/

- Viewing TOGAF Version 8 on-line:
  - http://www.opengroup.org/architecture/togaf8-doc/arch/

- TOGAF Version 8 licensing and downloads:
  - http://www.opengroup.org/togaf/