TOGAF - The Open Group
Architecture Framework

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Agenda

- The Open Group Architecture Forum
- TOGAF
  - background
  - components
- TOGAF Architecture Development Method
- Plans for the Future
- Documentation overview
- Summary
The Open Group Architecture Forum
The Open Group Value

- Address the “more for less” issue
  - Membership model based on leverage
  - Get more done cheaper, better, faster
- Access to people with similar problems
  - At CIO level and architecture level
- Access to tools and people to help solve the problems
  - TOGAF ADM, reusable architecture artifacts and other resources
  - Network with other architecture practitioners
Architecture Forum – Vision

- An effective open framework and method
- Architecture as a professional discipline
- Adequate “Commercial Off-The-Shelf” tools
Architecture Forum membership

- Architecture-the Enterprise (UK)
- BMC Software Inc. (US)
- Booz Allen & Hamilton (US)
- Boeing Corporation (US)
- Brandeis University (US)
- C and C Technology (UK)
- Capita IT Services (UK)
- Capital Health Authority (Canada)
- CC and C Solutions (Australia)
- Centre For Open Systems (Australia)
- ChiSurf (Hong Kong)
- Computacenter (UK)
- Computas (Nor)
- Computer Associates (US)
- Conclusive Logic (US)
- Dept for Works & Pensions (UK)
- Dept of Defense / DISA (US)
- Desktop Management Task Force (US)
- Frietuna Consultants (UK)
- Fujitsu (Japan)
- Hewlett-Packard (US)
- Hitachi (Japan)
- IBM (US)
- Innenministerium NordRhein-Westfalen (Germany)
- Jet Propulsion Labs (US)
- Lockheed Martin (US)
- MEGA International (Fra)
- Ministry of Defence (UK)
- MITRE Corporation (US)
- Monash University (Australia)
- NASA Goddard Space Flight Center (US)
- National Computerization Agency (Korea)
- NeTraverse, Inc. (US)
- Nexor, Inc. (US)
- Open GIS Consortium, Inc. (US)
- Popkin Software (US/UK)
- POSC (US)
- Predictive Systems (Germany)
- Primeur (Italy)
- QA Consulting (UK)
- Raytheon Corporation (US)
- Real IRM Solutions (South Africa)
- ReGIS (Japan)
- Rococo Company (Japan)
- SCO (US)
- Sun Microsystems (US)
- Teamcall (Belgium)
- Telemanagement Forum (US)
- Toyota InfoTechnology Center (Japan)
- TRON Association (Japan)
- University of Plymouth (UK)
- University of Reading (UK)
- University of Kyoto (Japan)
- US Army Weapon Systems Technical WG (US)
- Veriserve Corporation (US)
- Weblayers, Inc. (US)
- Westpac Banking Corporation (Australia)

57 current members
Membership: Geography

- US/Can
- EU
- Japan
- Australasia
- South Africa
Membership: Stakeholders

- **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
Membership: Organizations

- Academic/Research Organizations
- Smaller Integrators/Consultancies
- Larger Integrators/Consultancies
- Large IT Customers
- Small IT Customers
- Tools Vendors
- Systems/Solutions Vendors
TOGAF Background
TOGAF Origins

- A customer initiative
- A framework, not an architecture
  - A 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

- 1994: Requirement → Proof of need
- 1995: TOGAF Version 1 → Proof of concept
- 1996: TOGAF Version 2 → Proof of application
- 1997: TOGAF Version 3 → Relevance to practical architectures (building blocks)
- 1999: TOGAF Version 5 → Business Scenarios (architecture requirements)
- 2001: TOGAF Version 7 → Architecture Principles; Compliance Reviews
- 2002: TOGAF Version 8 → Extension to Enterprise Architecture
TOGAF Scope

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

TOGAF 7 “Technical Edition”
TOGAF 8 “Enterprise Edition”
TOGAF Version 7 ("Technical Edition")

- An industry consensus framework and method for Technical Architecture
  - Successful customer / vendor collaboration
- Vendor-, technology-, tool- neutral
- Proven in practice
  - 8 years continuous development & evolution
  - Used successfully in major projects / procurements around the world
- Publicly available
- Supported by a certification program....
TOGAF 7 Certification

- A vendor-neutral, global basis of certification to impose standards for Technical Architecture within our profession

- Architecture tools which support TOGAF 7

- Training courses which instruct in TOGAF 7

- Architects trained in the use of TOGAF 7

- Professional services offered to support TOGAF 7

- Certification will be extended to TOGAF Version 8 as soon as appropriate
TOGAF Version 8: Market Motivations

- Increasing interest in Enterprise Architecture
  - Key focus: enterprise applications architecture / integration
  - Closer to the business = clearer RoI for architecture
  - Strong interest among US Federal Government
- Several enterprise frameworks with mindshare:
  - Zachman, Spewak, DoD Framework, FEAFF, TEAF, …
  - Most focus on deliverables, not method
- No industry standard method for enterprise architecture

➢ Adapt TOGAF and its ADM as basis of an industry standard enterprise architecture framework and method
TOGAF Version 8: Internal Motivations

- The Boundaryless Information Flow vision
  - Integrated access to integrated information across the extended enterprise
  - A problem space shared by many Open Group customer members

- Enterprise Architecture a key enabler for achieving the Boundaryless Information Flow vision
TOGAF Version 8 ("Enterprise Edition"):
Goals

- Long-term: to make TOGAF...
  - an effective, industry standard framework and method for enterprise architecture
  - usable in conjunction with other frameworks, whose deliverables may be more relevant / specific to particular sectors.
    - TOGAF and ....
  - a framework and method for achieving the “Boundaryless Information Flow” vision

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

- Architecture Development Method (ADM)
- Reference Architectures
  - Foundation Architecture
    - Technical Reference Model
    - Standards Information Base
  - Boundaryless Information Flow Reference Model (TOGAF Version 8)
  - Enterprise Continuum
- Resource Base
TOGAF ADM Overview

- Open, industry consensus method for IT architecture
- Developing an organization-specific architecture to address business needs
- Architecture views to ensure that all stakeholder concerns are adequately addressed
- Quick-start foundation
- Practical, experience based guidance
- Adaptable to specific needs of a project
“Enterprise” ADM – Key Points

- 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

- **Inputs**
  - TOGAF ADM
  - Other architecture framework(s), if required
  - Business Strategy, Business Principles, Business Goals, Business Drivers
  - IT Governance Strategy
  - Architecture Principles

- **Steps**
  - TOGAF ADM a generic method -- not practical to define specific steps for adapting.
  - ADM Introduction discusses issues involved and gives general guidelines.

- **Outputs**
  - Framework Definition
  - Architecture Principles
  - Restatement of Business Strategy, Principles, Goals, Drivers
Phase A: Architecture Vision

- **Inputs**
  - Request for Architecture Work
  - Business Strategy, Principles, Goals, Drivers
  - Architecture Principles
  - Enterprise Continuum - existing arch. documentation

- **Steps**
  - Project Establishment
  - Business Principles, Goals and Drivers
  - Architecture Principles
  - Project Scope
  - Constraints
  - Stakeholders and concerns, Business Requirements, and Architecture Vision
  - Statement of Architecture Work and Approval

- **Outputs**
  - Statement of Architecture Work
  - Refined statements of Principles, Goals, Drivers
  - Architecture Vision
  - Business Scenario
Phase B: Business Architecture

- **Inputs**
  - Request for Architecture Work
  - Approved Statement of Architecture Work
  - Refined Business Principles, Goals, Drivers
  - Enterprise Continuum
  - Architecture Vision / Business Scenario

- **Steps**
  - Detailed steps given separately

- **Outputs**
  - Statement of Architecture Work (updated)
  - Validated Business Principles, goals, drivers
  - Target Business Architecture (detailed)
  - Business Baseline (detailed)
  - Views addressing key stakeholder concerns
  - Gap analysis results
  - Technical requirements (drivers for Technical Architecture)
  - Business Architecture Report
  - Updated business requirements
Phase B – Business Architecture (Steps)

1. Create business baseline
2. Consider principles, reference models, viewpoints, tools
3. Create architecture model(s)
4. Select Business Architecture building blocks
5. Conduct checkpoint review
6. Review qualitative criteria
7. Complete Business Architecture definition
8. Conduct gap analysis
Business Scenarios

- Used in ADM Phase A (Architecture Vision), and iteratively in Phase B (Business Architecture)
- A Business Scenario describes
  - a business process, application, or set of applications that can be enabled by the proposed solution
  - the business and technology environment
  - the people and computing components ("actors")
  - the desired outcome of proper execution
- A good Business Scenario
  - enables the supply side to understand the value to the buy side of a developed solution
  - is “SMART” (Specific, Measurable, Actionable, Realistic, Time-bound)
- TOGAF ADM defines a method for developing Business Scenarios
Developing a Business Scenario

1 - Identify, document and rank the problem driving the scenario
2 - Identify business and technical environment where situation is occurring, and document in scenario models
3 - Identify and document desired objectives - the results of handling the problems successfully - get SMART
4 - Identify human actors, their roles, their place in the business model
5 - Identify computer actors (computing elements), their roles, their place in the technology model
6 - Identify and document roles, responsibilities, measures of success per actor
7 - Check for “fitness for purpose” and refine only if necessary
Phase C: Info. System Architectures

- **Inputs**
  - Applications and Data Principles
  - Request for Architecture Work
  - Statement of Architecture Work
  - Architecture Vision
  - Business Baseline
  - Target Business Architecture
  - Relevant technical requirements
  - Gap analysis (from Business Architecture)
  - Re-usable building blocks

- **Steps**
  - Detailed steps for Data and Applications Arch.

- **Outputs**
  - Statement of Architecture Work (updated)
  - Target Data and Applications Architectures
  - Data and Applications Architecture Views
  - Data and Applications Architecture Reports
  - Gap analyses
  - Impact Analyses
  - Updated business requirements
Phase C – Data Architecture (Steps)

1. Create data baseline
2. Consider principles, reference models, viewpoints, tools
3. Create architecture model(s)
4. Select Data Architecture building blocks
5. Conduct checkpoint review
6. Review qualitative criteria
7. Complete Data Architecture definition
8. Conduct gap analysis
Phase C – Applications Architecture (Steps)

1. Create applications baseline
2. Consider principles, reference models, viewpoints, tools
3. Create architecture model(s)
4. Identify candidate application systems
5. Conduct checkpoint review
6. Review qualitative criteria
7. Complete Applications Architecture definition
8. Conduct gap analysis
Phase D:
Technology Architecture

- **Inputs**
  - Technical Principles
  - Request for Architecture Work
  - Statement of Architecture Work
  - Architecture Vision
  - Relevant technical requirements (previous phases)
  - Gap analyses
  - Business, Data and Applications Baselines
  - Target Business, Data, Applications Architectures
  - Re-usable building blocks

- **Steps**
  - Detailed steps for Technology Architecture

- **Outputs**
  - Statement of Architecture Work (updated)
  - Technology Baseline
  - Technology Principles
  - Technology Architecture Report
  - Target Technology Architecture
  - Technology Architecture - gap report
  - Viewpoints / views addressing stakeholder concerns.
Phase D – Technology Architecture (Steps)

1. Create technology baseline
2. Consider principles, reference models, viewpoints, tools
3. Create Technology Architecture model(s)
4. Select services per building block
5. Confirm business objectives
6. Determine criteria for spec. selection
7. Complete Technology Architecture definition
8. Conduct gap analysis
Phase E: Opportunities & Solutions

- **Inputs**
  - Request for Architecture Work
  - Statement of Architecture Work
  - Business, Data, Applications, Technology Architectures
  - Re-usable architecture building blocks
  - Product information

- **Steps**
  - Identify business drivers constraining implementation sequence (cost reduction; service consolidation; etc.)
  - Review gap analysis generated in Phase D.
  - Brainstorm technical requirements
  - Brainstorm co-existence, interoperability requirements
  - Architecture assessment and gap analysis
  - Identify major work packages; classify as new development, purchase opportunity, reuse of existing system.

- **Outputs**
  - Impact Analysis - Project list
Phase F: Migration Planning

- **Inputs**
  - Request for Architecture Work
  - Statement of Architecture Work
  - Business Architecture
  - Data Architecture
  - Applications Architecture
  - Technology Architecture
  - Impact Analysis - Project list

- **Steps**
  - Prioritize projects
  - Estimate resource requirements and availability
  - Perform cost / benefit assessment of migration projects
  - Perform risk assessment
  - Generate implementation roadmap (time-lined)
  - Document the Migration Plan

- **Outputs**
  - Impact Analysis - Migration Plan

Diagram:
- Prelim: Framework and Principles
- A Architecture Vision
- B Business Architecture
- C Information System Architectures
- D Technology Architecture
- E Opportunities and Solutions
- F Migration Planning
- G Implementation Governance
- H Architecture Change Management
- Requirements
Phase G: Implementation Governance

- **Inputs**
  - Request for Architecture Work
  - Statement of Architecture Work
  - Re-usable solutions building blocks
  - Impact Analysis - Migration Plan

- **Steps**
  - Formulate project recommendations; for each implementation project, document:
    - scope
    - strategic requirements (from architectural perspective)
    - change requests
    - rules for conformance
    - time-line requirements from roadmap
  - Architecture Contract – document, obtain developing and sponsoring organization signatures
  - On-going implementation governance and architecture compliance review.

- **Outputs**
  - Impact Analysis - Migration Plan
Phase H: Architecture Change Management

- Inputs
  - Request for Architecture Change - technology
  - New technology reports
  - Request for Architecture Change - business

- Steps
  - Ongoing monitoring of technology changes
  - Ongoing monitoring of business changes
  - Assessment of changes and development of position to act
  - Meeting of Architecture Board (or other governing council) to decide on handling changes

- Outputs
  - Architecture updates
  - Changes to Architecture Framework and Principles
  - New Request for Architecture Work (to move to another cycle)
TOGAF “Enterprise Edition” – Reference Models
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
  - The complete set of Open Group endorsed 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
Boundaryless Information Flow Reference Model

- A model of the major component categories for developing, managing, and operating an integrated information infrastructure.

- 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.
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
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 Version 8 Summary

- An effective, industry standard framework and method for enterprise architecture.
- Complementary to, not competing with, other enterprise frameworks
  - Use in conjunction with frameworks with deliverables specific to particular sectors.
    - TOGAF and....
- A repository of best practice
  - “Demystifies” architecture development
- Emphasizes business goals as architecture drivers
- A framework and method for achieving the “Boundaryless Information Flow” vision
Recent Developments

- Sun Microsystems is incorporating TOGAF into a composite best-of-breed of EA frameworks
- Raytheon is integrating TOGAF into its REAP methodology
- HP's internal IT is using TOGAF
- TOGAF is supported in the Popkin and Metis architecture tools
Plans for the Future
Plans for the Future - TOGAF 8.1

- Architecture Governance
  - New, structured section on Architecture Governance, comprising three subsections:
    - Introduction to Architecture Governance
    - Architecture Governance Framework
    - Architecture Governance in Practice

- Architecture Maturity Models
  - New section on Architecture Maturity Models

- Architecture Skills
  - New section on TOGAF Architecture Skills Framework

- Requirements management
  - New section describing Requirements Management process at center of ADM lifecycle diagram
Plans for the Future - TOGAF 9+

- Building on 8.1 additions
- Boundaryless Information Flow
- Enterprise Continuum
- Integrating TOGAF with DSDM: Architecture Implementation
- Integrating TOGAF with OMG-MDA
- IT Architect Certification
- TOGAF Development Lifecycle

- ADM Workshop Thursday p.m.
Summary

- **Adopt and use TOGAF**
  - “Demystifies” and speeds up architecture development
  - Faster response to evolving business needs
  - More flexibility to introduce new technology
  - Faster, simpler, cheaper procurement
  - Faster time-to-market
  - Vendor, tool, and technology neutral

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

- The Architecture Forum:
  - [http://www.opengroup.org/architecture/](http://www.opengroup.org/architecture/)

- Viewing TOGAF on-line:
  - TOGAF Version 8:
    - [http://www.opengroup.org/architecture/togaf8-doc/arch/](http://www.opengroup.org/architecture/togaf8-doc/arch/)
  - TOGAF Version 7:
    - [http://www.opengroup.org/architecture/togaf7-doc/arch/](http://www.opengroup.org/architecture/togaf7-doc/arch/)

- TOGAF licensing and downloads:
  - TOGAF Version 8:
    - [http://www.opengroup.org/architecture/togaf8/index8.htm](http://www.opengroup.org/architecture/togaf8/index8.htm)
  - TOGAF Version 7: