



ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

Enterprise Architecture

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Solutions for business and IT alignment

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The question

- **Optimization of company IT resources / gain in agility**
 - Example: RATP
 - Example: Michelin
- **Managing mergers**
 - Example: Air-France / KLM
 - Example: Crédit Agricole

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Example RATP (1)

- 12'000 km² served
- 15% of French population
- 14 metro lines
- 300 bus lines
- two regional trains
- 2 airports
- Operate also in 11 other countries
- 50K employee
- 20% employee in maintenance
- 2% employee in IT (half in IT department)

http://www.ratp.fr/en/ratp/c_5007/presentation/

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Example RATP (2)

- Approx. 1000 people in IT and 500 in IT departments (500 others in overall organization)
- Approx. 200 business processes, 400 activities, 900 tasks
- Approx. 1K applications and 14 large systems
- **Question: how do you coordinate development ?**

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Enterprise Architecture

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Clinger-Cohen Act (1996)

- Goal: improve IT management in US Federal Agencies
- Means:
 - Definitions
 - Management structure
 - Expected performance and results
 - Processes



W. Cohen



W. Clinger

http://en.wikipedia.org/wiki/Clinger–Cohen_Act

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Information Systems Architecture

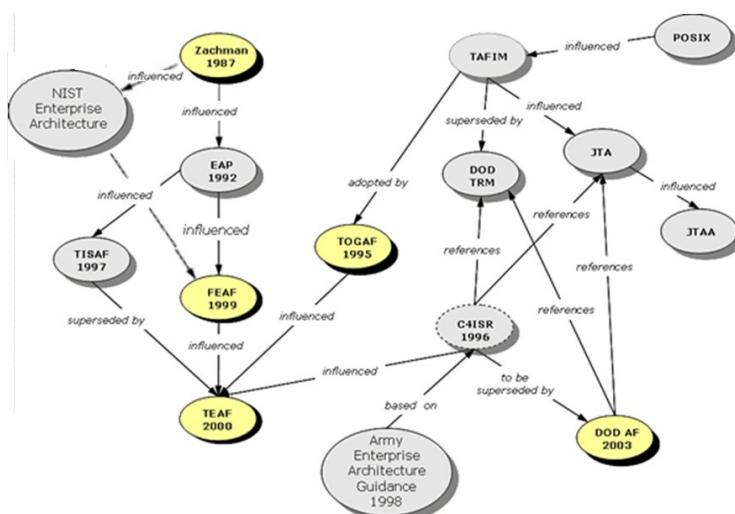
- A framework for information systems architecture

John A. Zachman
1987



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Enterprise Architecture - History



Source: http://en.wikipedia.org/wiki/Enterprise_Architecture_framework

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Enterprise Architecture

- EA fundamental for 21st century enterprises.
 - EA establishes a **basis for changes**
-
- EA **advances enterprise design**
 - EA **manages the knowledge-base** of the enterprise
 - EA **integrates the technology** (automated and/or non-automated) into the enterprise
 - EA is **universal and cross-disciplinary**

Source: www.zifa.com

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Three Frameworks

- Zachman – the “classic” (but rarely used)
- TOGAF – the “standard”, widely used
- URBA – the “practical one”, used in France

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Zachman Framework

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Zachman ISA Framework

What, How, Where, Who, When, Why

Planner
Owner
Designer
Builder
Sub-contractor

	WHAT	HOW	WHERE	WHO	WHEN	WHY
SCOPE (contextual)	DATA	FUNCTION	NETWORK	PEOPLE	TIME	MOTIVATION
Planner	Set of Things Required to Be Known or Understood e.g. Business Plan	Set of Requirements Policy or Rule e.g. Business Policy	Set of Relationships Between People e.g. Business Stakeholders	People + Their Interactions e.g. Business Stakeholders	Time + Events e.g. Business Events	Set of Reasons Why Things Happen e.g. Business Motivations
Owner	e.g. Smart Model Info = Business Activities Motivation = Business Activity	e.g. Device Power Model Info = Business Activities Motivation = Business Activity	e.g. Business System Info = Business Activities Motivation = Business Activity	e.g. WorkFlow Model Info = Business Activities Motivation = Work Product	e.g. Rules Model Info = Business Activities Motivation = Business Rules	e.g. Business Plan Info = Business Activities Motivation = Business Strategy
Designer	e.g. Application Model Info = Business Activities Motivation = Design Model	e.g. Infrastructure Model Info = Business Activities Motivation = Design Model	e.g. Distributed System Info = Business Activities Motivation = Design Model	e.g. Network Model Info = Business Activities Motivation = Design Model	e.g. Processing Model Info = Business Activities Motivation = Design Model	e.g. Business Model Info = Business Activities Motivation = Business Model
Builder	e.g. Physical Data Model Info = Application Model Motivation = Application Model	e.g. System Design Info = System Model Motivation = System Model	e.g. Technology Model Info = System Model Motivation = System Model	e.g. Process Model Info = User Model Motivation = System Model	e.g. Control Services Info = System Model Motivation = System Model	e.g. Rule Design Info = System Model Motivation = Rules
Sub-contractor	e.g. Spin Induction Info = Rule Motivation Motivation = Address	e.g. Project Info = System Model Motivation = System Model	e.g. Network Model Info = Address Motivation = Address	e.g. Supply Model Info = System Model Motivation = Address	e.g. Timing Model Info = System Model Motivation = System Model	e.g. Rule Motivation Info = System Model Motivation = Rule
DETAILED REPRESENTATIONS (set-of-contexts)						

Source: www.zifa.com

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5 lines x 6 columns

- Planner (scope)
- Owner (business model)
- Designer (system model)
- Builder (technology model)
- Sub-contractor
(detailed representation)
- What (data)
- How (function)
- Where (network)
- Who (people)
- When (time)
- Why (motivation)

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Cicero's system of circumstance

quis quid cur ubi quando quem ad modum quibus adminiculis
| | | | | | |
persona factum causa locus tempus modus facultas

http://en.wikipedia.org/wiki/Five_Ws

Quis, *quid,* *quando,* *ubi,* *cur,* *quem ad modum,* *quibus adminiculis*
(Who, what, when, where, why, in what way, by what means)

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Designing w/ Zachman Framework

Source: www.zifa.com

Business / IT alignment

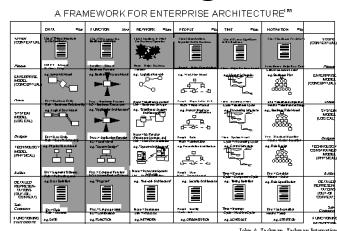


Figure 2: Robust Top Down Methodology and Tool Support

Application development

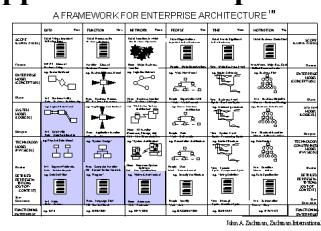


Figure 1: State of the Art - Methods and Tools

Quick start in EA

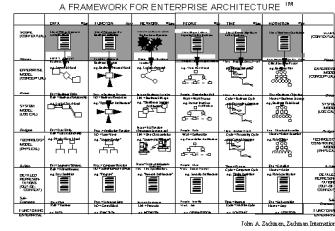


Figure 4: Architecture Project 2 - Architecture Quick Start

Complete EA project

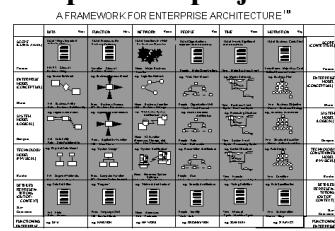


Figure 5: Architecture Project 1 - Architecture Process for Entire Enterprise

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Relation SEAM / Zachman

- Augmenting the Zachman Enterprise Architecture Framework with a Systemic Conceptualization

Wegmann, Alain ; Kotsalainen, Anders ; Matthey, Lionel ; Regev, Gil et al.

Presented at: The 12th IEEE International EDOC Conference (EDOC 2008), Muenchen, September 15-19, 2008.

- <http://infoscience.epfl.ch/record/126293>

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SEAM / ISA Matrix

ISA	Data	Function	Network	People
Planner Row (row 1)	- Employee_Info (data, rights)	- Manage_Employee_Info	- Employee_Mgt [w]	- Employee
Owner Row (row 2)	- Employee_Data - Employee_Rights	- Manage_Employee	- HR_Dept [w] - Security_Dept [w]	
Designer Row (row 3)	- Address - Name - Rights	- Manage_Data - Manage_Rights	- HR_IT_System [W] - Security_IT_System [W]	- HR_SecurityOfficer
Builder Row (row 4)	- Address - Name - Rights	- Process_Data - Read_Name - Process_Rights	- EMA [W] - PMD [W] - SMA [W] - UDB [W]	

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TOGAF Framework

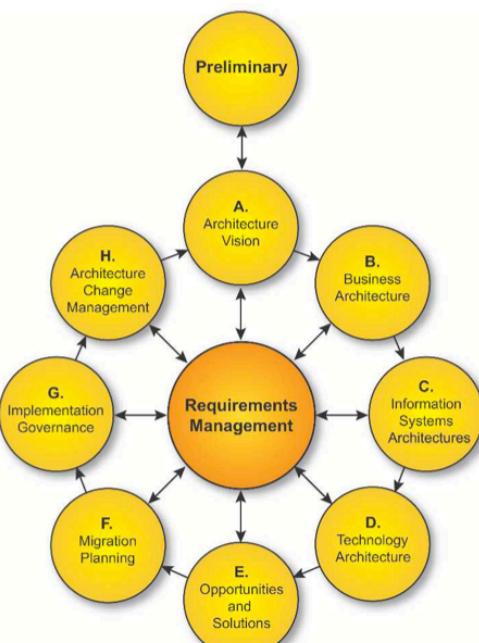
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TOGAF

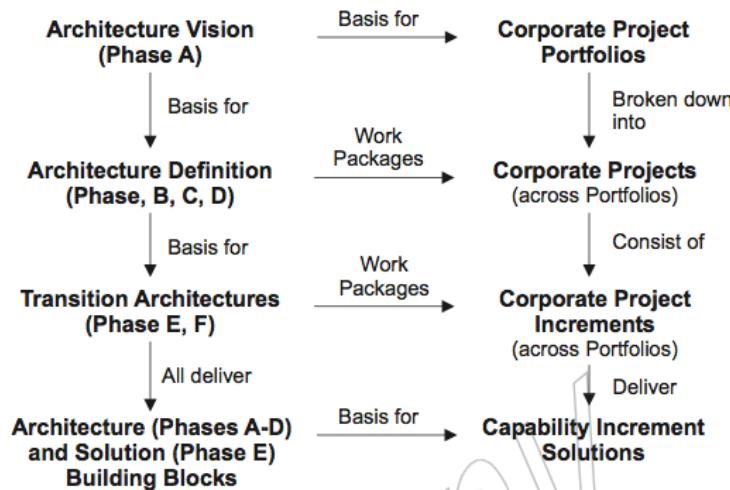
- Created by **The Open Group**
- Versions 1995 (version 1) .. 2009 (version 9)
- Includes:
 - An enterprise architecture domains (model)
 - An enterprise architecture method
 - An enterprise continuum (i.e. repository of knowledge)
- More on: <http://www.opengroup.org/togaf/>

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TOGAF Architecture Development Framework

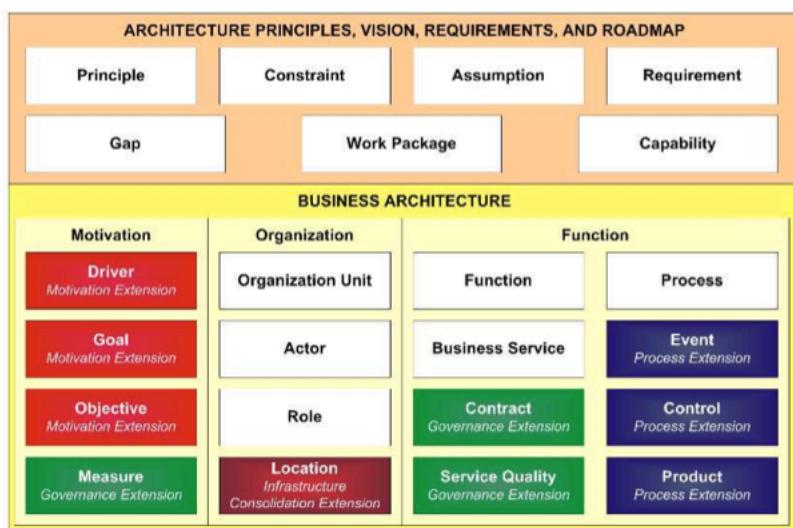


From TOGAF to Management



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TOGAF Meta-Model

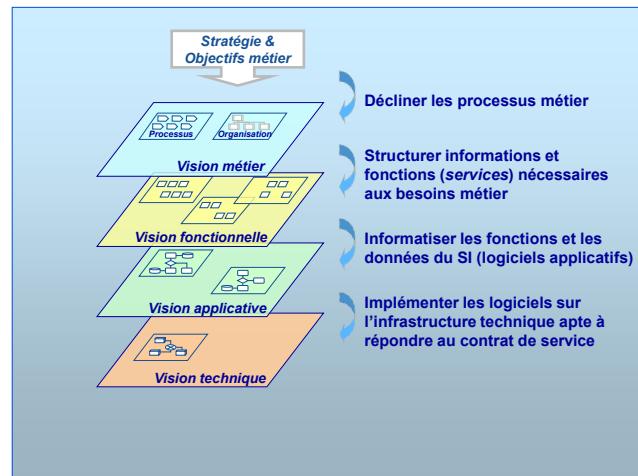


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Urba

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Urba Framework



<http://www.urba-ea.org/>

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Urba Process

