Enterprise architecture
Enterprise architecture

• a “tool” of enterprises for constantly changing market demands and technological evolution
• many enterprises are developing their enterprise architecture
Enterprise architecture

• In enterprise architecture, the following four interdependent architectural dimensions are usually identified:
  – Business architectures
  – Information architectures
  – Application architectures
  – Technology architectures
Architecture domains

- **Business Architecture**: Business processes, organization, people
- **Application Architecture**: Applications, Services
- **Information Architecture**: Data, information
- **Technology Architecture**: Hardware, software, network
Enterprise architecture - history

• 1982 John Zachman's article in the IBM Systems Journal:
  – business system planning and information architecture developing exceeded the boarders of the automatic data processing and reached into the area of the strategic business planning and management.
Enterprise architecture - history

- 1987 John Zachman’s article “A framework for information system architecture” in IBM Systems Journal
- Zachman Framework
Enterprise architecture - history

• 1984 ESPRIT (European Strategic Programme for Research in Information Technology) programme started a CIMOSA project (Computer Integrated Manufacturing Open System Architecture), which launched first and foremost the enterprise architect concept

• 198x European research projects of enterprise engineering: GRAI/GIM, PERA, ...
Enterprise architecture - history

• In the 1990s GERAM (Generalised Enterprise Reference Architecture and Methodology) was developed in an EU project
Enterprise architecture - history

• GERAM framework for analysing and modeling of enterprise integration and engineering:
Enterprise architecture - history

• 1986 began DoD (United States Department of Defense) to develop TAFIM (Technical Architecture Framework for Information Management)

• DoD gave TAFIM to The Open Group for creating TOGAF (The Open Group Architecture Framework)

• TOGAF version 1 was published in 1995.
Enterprise architecture - history

- Zachman Framework
Enterprise architecture

• Enterprise Architecture is the continuous practice of describing the essential elements of a sociotechnical organization, their relationships to each other and to the environment, in order to understand complexity and manage change. (Dr. Sam Vaknin)

• ~ Enterprise architecture describes relationships between business and ICT
Enterprise architecture

• A definition of enterprise architecture joins both software engineering and information systems aspects (Kaisler et al., 2005):

• "Enterprise architecture (EA) identifies the main components of the organization, its information systems, the ways in which these components work together in order to achieve defined business objectives, and the way in which the information systems support the business processes of the organization ...
Enterprise architecture

• ... The components include staff, business processes, technology, information, financial and other resources, etc. Enterprise architecting is the set of processes, tools, and structures necessary to implement an enterprise-wide coherent and consistent IT architecture for supporting the enterprise's business operations. It takes a holistic view of the enterprise's IT resources rather than an application-by-application view." (Kaisler et al., 2005)
Enterprise architecture

• Enterprise architecture (EA) is a strategic planning process that translates an enterprise's business vision and strategy into effective enterprise change. (Gartner)

• An effective EA program will help align IT investments with long-term strategy, reduce risk, deliver higher-quality information, and engineer adaptive solutions and technical services. (Gartner)
TOGAF

• The Open Group Architecture Framework (TOGAF) is a framework for developing an enterprise architecture.
  – framework = methods and tools

• TOGAF is developed and maintained by The Open Group (www.opengroup.org)

• free for any organization for developing an enterprise organization within that organization (see the licence)
The Open Group

• The Open Group is a vendor-neutral and technology-neutral consortium

• Over 300 enterprise and academic members (e.g. IBM, SAP, Shenzhen (China), Nokia, Tieto, Aalto, ...)

• Vision: **Boundaryless Information Flow** will enable access to integrated information, within and among enterprises, based on open standards and global interoperability.
TOGAF development

• TOGAF version 1 in 1995
  – Based on the TAFIM framework developed by US Departement of Defense(DoD)

• TOGAF 2, in 1996

• TOGAF 8, in 2002

• TOGAF 9, in 2009, the newest version
TOGAF Architecture domains

- Business Architecture: Business processes, organization, people
- Application Architecture: Services
- Data Architecture: Data, information
- Technology Architecture: Hardware, software, network
TOGAF Architecture domains

• Business architecture
  – business strategy, governance, organization, and key business processes.

• Data architecture
  – structure of an organization’s logical and physical data assets and data management resources
TOGAF Architecture domains

• Application architecture
  – blueprint for the individual application systems to be deployed, their interactions, and their relationships to the core business processes of the organization.

• Technology architecture
  – describes the logical software and hardware capabilities required to support the deployment of business, data, and application services
  – IT infrastructure, middleware, networks, communications, processing, standards, etc.
Components of TOGAF
Architecture Development Method (ADM)

- ADM describes a repeatable process with 9 phases for developing an enterprise architecture:
ADM phases

- **Preliminary phase**
  - preparation and initiation activities to meet the business directive for a new enterprise architecture
  - definition of an organization-specific architecture framework and the definition of principles.

- **Architecture Vision**
  - defining the scope, identifying the stakeholders, creating the Architecture Vision and obtaining approvals
ADM phases

• **Business Architecture**
  – describes the development of a Business Architecture to support an agreed Architecture Vision.

• **Information System Architecture**
  – describes the development of Information Systems Architectures for an architecture project, including the development of Data and Application Architectures.

• **Technology Architecture**
  – describes the development of the Technology Architecture for an architecture project
ADM phases

• **Opportunities & Solutions**
  – conducts initial implementation planning and the identification of delivery tools for the architecture defined in the previous phases.

• **Migration Planning**
  – addresses the formulation of a set of detailed sequence of transition architectures with a supporting Implementation and Migration Plan.

• **Implementation Governance**
  – architectural oversight of the implementation.

• **Architecture Change Management**
  – establishes procedures for managing change to the new architecture.
TOGAF ADM phases
Results of architectural work

- Every ADM phases has input and output
- Outputs are for example:
  - process flows, architectural requirements, project plans, models, diagrams, descriptions, lists, matrix
- TOGAF uses three categories to describe the type of architectural work products:
  - deliverable (output of project)
  - artifact (description of architecture from a viewpoint)
  - building block (a component of business, IT or architectural capability)
Results of architectural work

• Building blocks can be defined at various level of details

• Building block can be:
  – Architecture Building Block (ABB) or
  – Solution Building Block (SBB)
Scoping of Architectural work

- Architectural work must be limited by some dimension, for example:
  - Enterprise scope or focus
    - corporation, company, unit, department, extended enterprise, ...
  - Architecture domain
    - business, data, application, technology, ...
  - Vertical scope or level of detail
  - Time period
    - projects
Scope of architecture

- Example scope of architecture: enterprise scope, time period and level of detail
The content metamodel provides a definition of all the types of building blocks that may exist within an architecture.
TOGAF – Content metamodel
Content metamodell more details