

***LECTURE 1.1:* Enterprise Architecture**

What is Enterprise?

- **Enterprise** is any collection of corporate or institutional task-supporting functional entities that have a set of common goals or a single mandate. (Minoli, 2008)

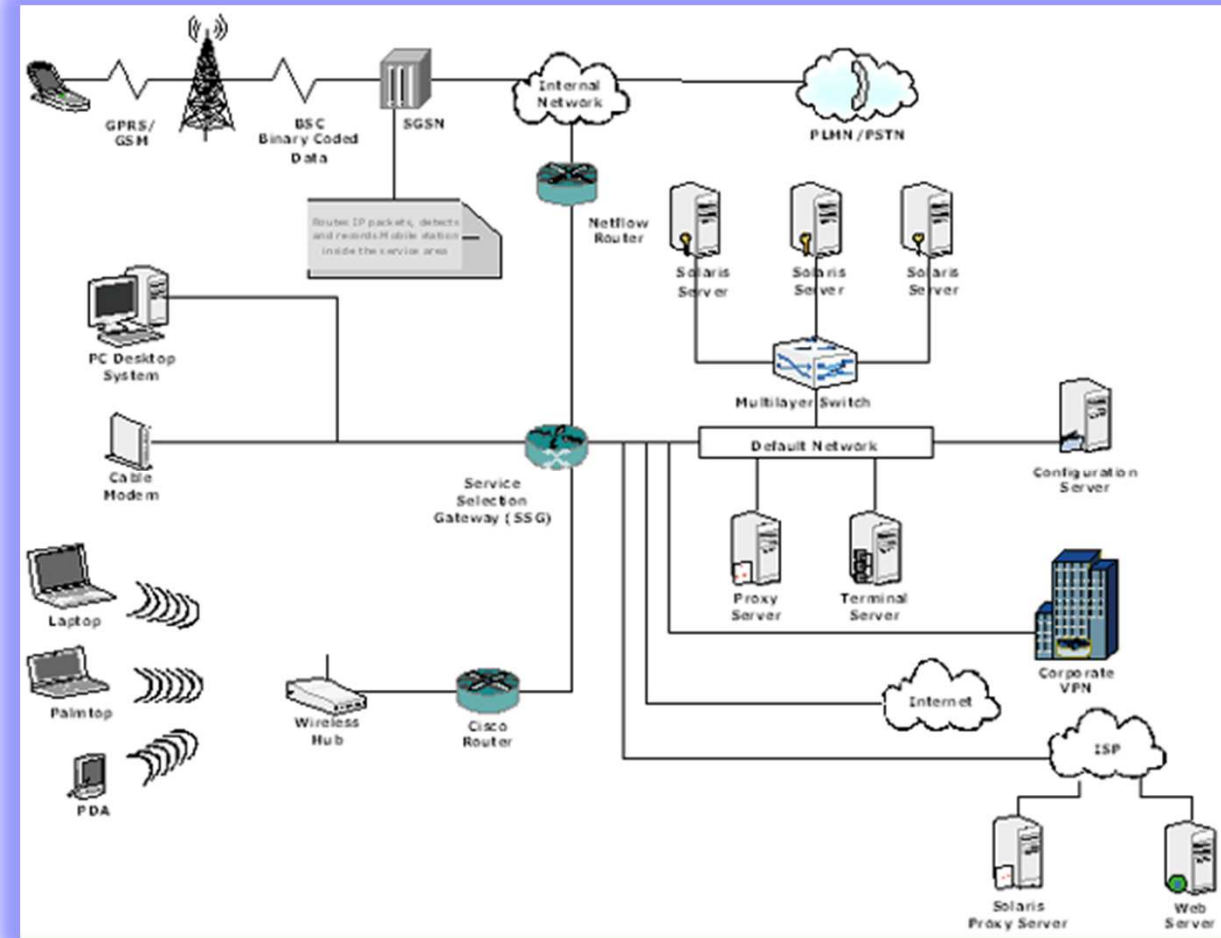


What is Enterprise Architecture

An **Enterprise Architecture** is a blueprint of :

- permitted structure;
- Configuration;
- functional groupings;
- interfaces, data, protocols;
- logical functionality;
- Integration, technology of IT resources;

to support a corporate or organizational business function or mission (Minoli, 2008).



What is Enterprise Architecture

- **Enterprise Architecture** focus is on the human element, and the way to “**architect**” and **plan** the enterprise to have the **best human performance and output**, Booch (2010).



What is Enterprise Architecture

- Over the years, many EA frameworks, modelling concepts, and tools were proposed, including:

- **Zachman Framework (Zachman 1987)**
- Extended Enterprise Architecture Framework (**E2AF**)
- Enterprise Architecture Planning (**EAP**)
- Federal Enterprise Architecture Framework (**FEAF**)
- **Architecture of Integrated Information Systems (ARIS)**
- Treasury Enterprise Architecture Framework (**TEAF**)
- Department of Defense Architecture Framework (**DoDAF**)
- **The Open Group Architecture Framework (TOGAF) (The Open Group 2011)**

Zachman Framework

- The Zachman Framework has been a widely used approach for **developing or documenting an enterprise** wide architecture.
- It is broadly accepted that the **origins** of the modern Enterprise Architecture (EA) lie with the publication of “A Framework for information systems architecture” by Zachman (1987).
- The main goal for this framework was to **use logical constructs** to address the **management of** ever-increasing **complexity of information systems** within the organisations.


























Zachman Framework

Zachman (1987) framework was a:

- two dimensional matrix representing the **viewpoints** on the Y axis; and
- the **views** on the X axis.

In this framework viewpoints are represented by:

- **different stakeholders;** and
- clearly defined **deliverables;**

	Motivation (Why)	People (Who)	Function (How)	Data (What)	Time (When)	Network (Where)
Scope View	 Vision/Needs	 Vision/ Stakeholders	 Vision/ Features	 Business entities	 Business workflows	
Owner's View	 Business rules	 Actors	 Use cases	 Business object model	 Use case flow of events	 Network configurations
Designer's View	Constraints, multiplicities, workflow activities	 Boundary classes	 Use case realizations	 Persistent classes	 Interaction diagrams	 Deployment model
Builder's View		 End user support material	 Components	 Data model	 Process model	 Process-to-node mapping
Detailed View		 UI design classes	 Design classes	 Columns, types, keys, indexes	 State machines	

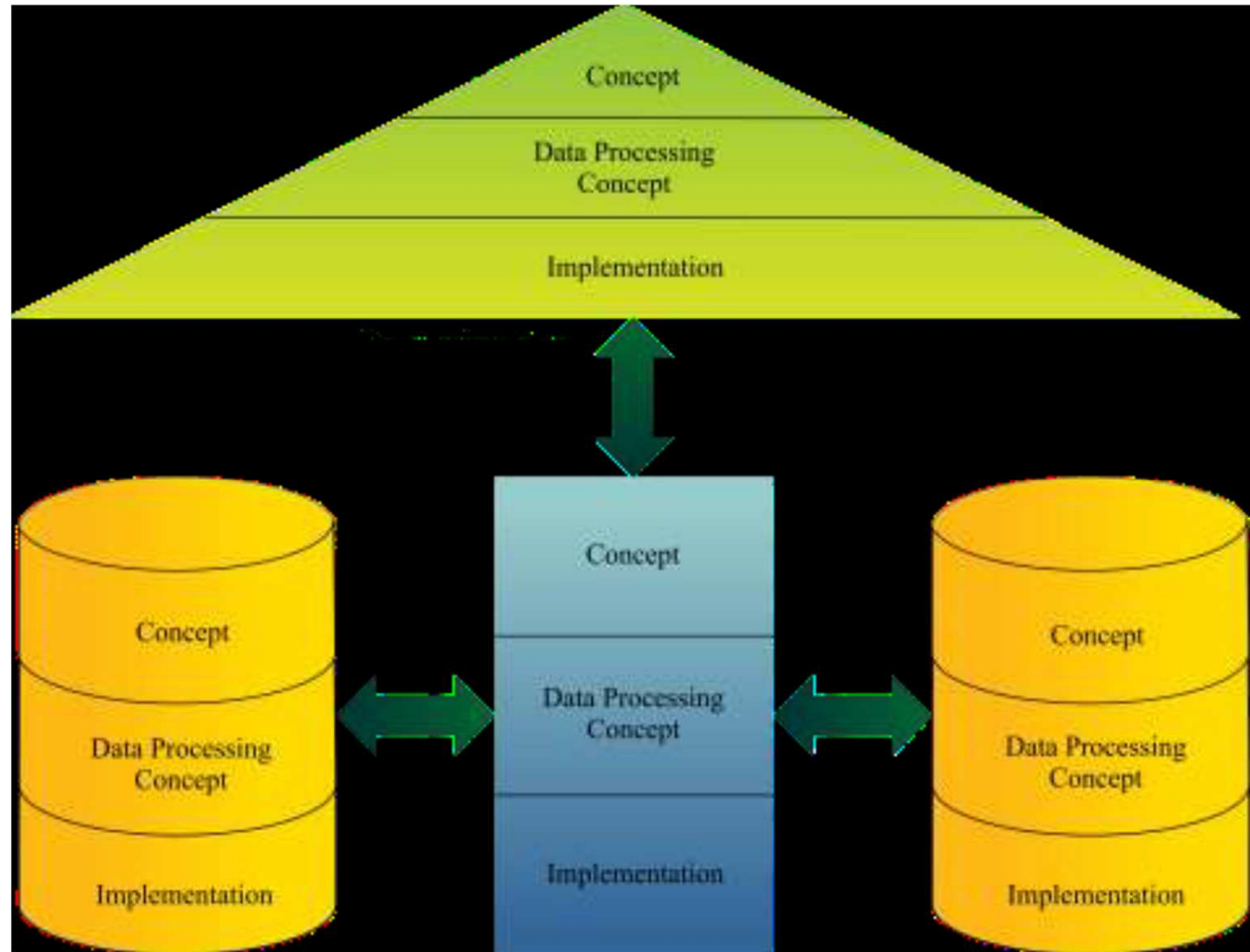
Example

- **Why:** Motivation for developing an integrated system in DCU;
- **How:** Imagine that how this integration may work;
- **Where:** The areas that this system may work;

ARIS Framework

The ARIS house is an architecture that describes:

- business processes;
- modelling methods;
- meta-structures; and
- suggestions for modelling techniques.

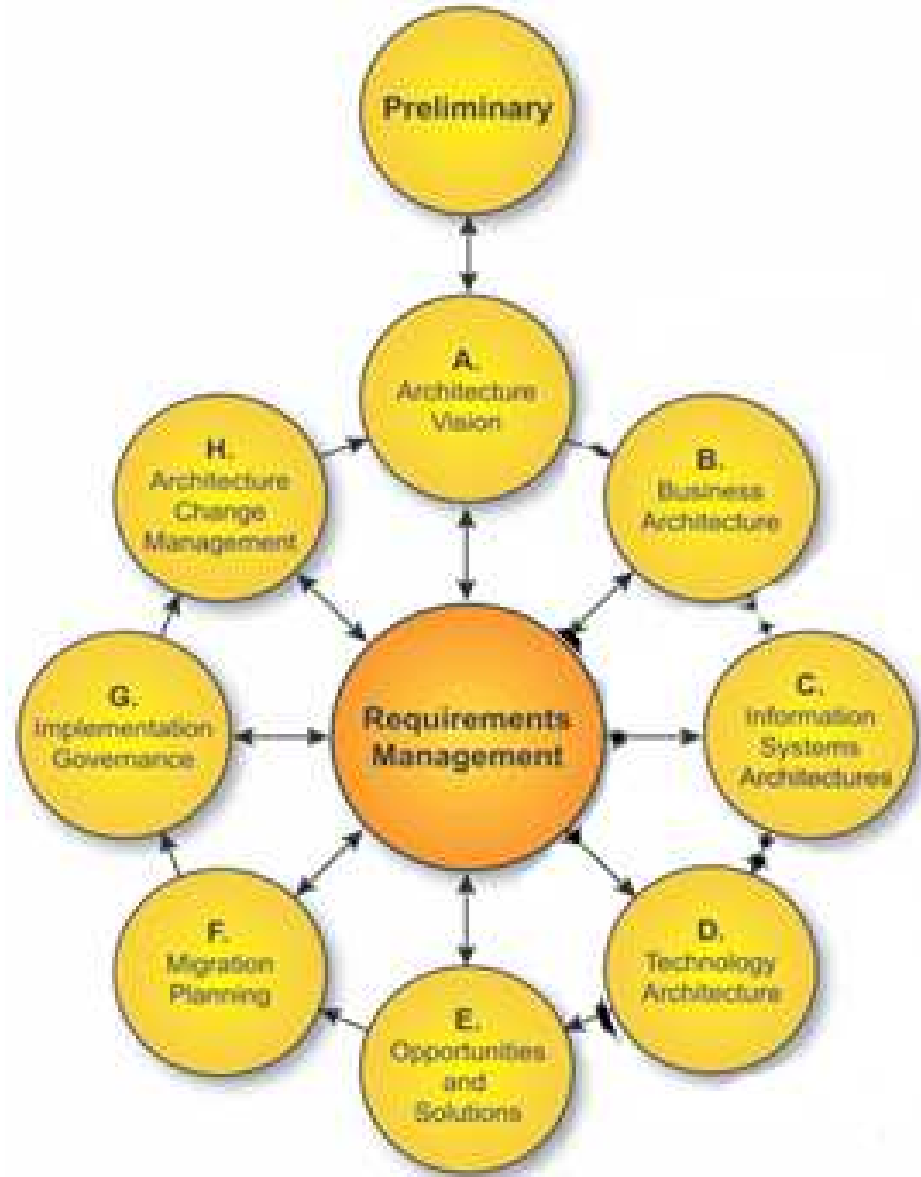


ARIS House (according to Scheer 1992)

The Open Group Architecture Framework

The Open Group Architecture Framework:

- is a **comprehensive methodology**, including a set of tools to develop an EA;
- **offers** clear **definitions** for various terms, (i.e. views, and stakeholders);
- Architecture Development Method (ADM) is a **generic method** used to **realize an EA** in accord with business requirements.



Architecture Development Method (ADM), Adapted from TOGAF (2011)

EA Tools

- EA tools help enterprise architects and other stakeholders plan, model, develop, and monitor architectures. Most EA tools offer:
 - EA planning
 - EA modelling
 - EA simulation and improvement
 - EA monitoring and reporting
 - Shared artefact repository
 - Reusability support

Sample Architecture Tools

- ADONIS (by BOC Group)
- Archimate
- Telelogic System Architect 15
- Microsoft Visio (Not a true tool)
- ARIS Process Platform 5
- Casewise Modeler 2
- MEGA Architecture Tools 2
- Ptech Enterprise Framework 1

Required Steps to Develop an Enterprise Architecture

1. Analyze the enterprise (or Segment) to identify the requirements;
2. Documenting the current business services and associated IT sources that might be replaced or modified;
3. Developing plausible business and technology solution (scenario planning exercise) that meet requirements;
4. Identifying strategic goals related to enterprise requirements;
5. Risk analysis;
6. Select a **methodology**;
7. Developing future operation scenarios (after getting current views), and identifying planning assumptions.

Methodology to Develop an Enterprise Architecture

Methodology is a step by step description of how the EA program is to be:

- Established;
- Run;

And how the documentation of EA is to be:

- Developed;
- Maintain; and
- Used.

***LECTURE 1.2:* Introduction to TOGAF**

The Open Group

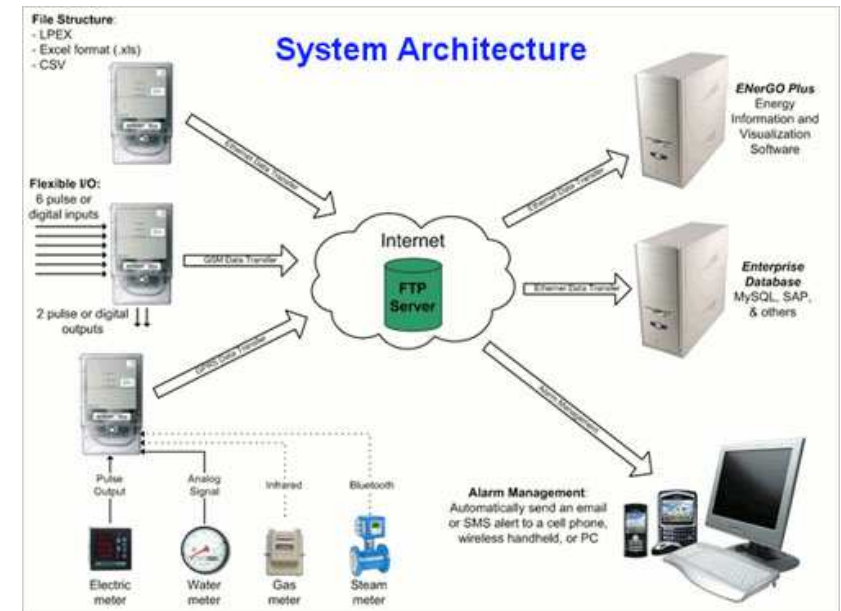
- The Open Group is a vendor-neutral and technology-neutral consortium seeking to enable **access to integrated information**, within and among enterprises, based on open standards and global interoperability.
- The Open Group had developed an **architectural framework** known as The Open Group Architecture Framework (TOGAF).
- **TOGAF** is described in a **set of documentation** and may be used freely by any organization wishing to develop an enterprise architecture for use within that organization.

Basic TOGAF Concepts

- **System:** A collection of components organized to accomplish a specific function or set of functions.

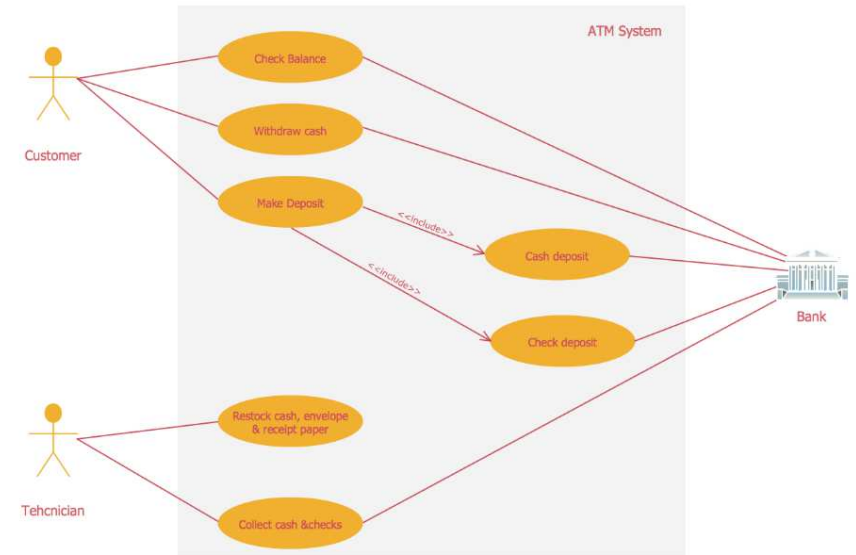


- **Architecture:** The system's fundamental organization, embodied in its components, their relationships to each other and to the environment, and the principles guiding its design and evolution.



Basic TOGAF Concepts

- **Architecture description:** Is composed of one or more of stakeholders, concerns, viewpoints, views, and models.



- **Stakeholders:** People who have key roles in, or concerns about, the system, for example, as users, developers, or managers.



Basic TOGAF Concepts

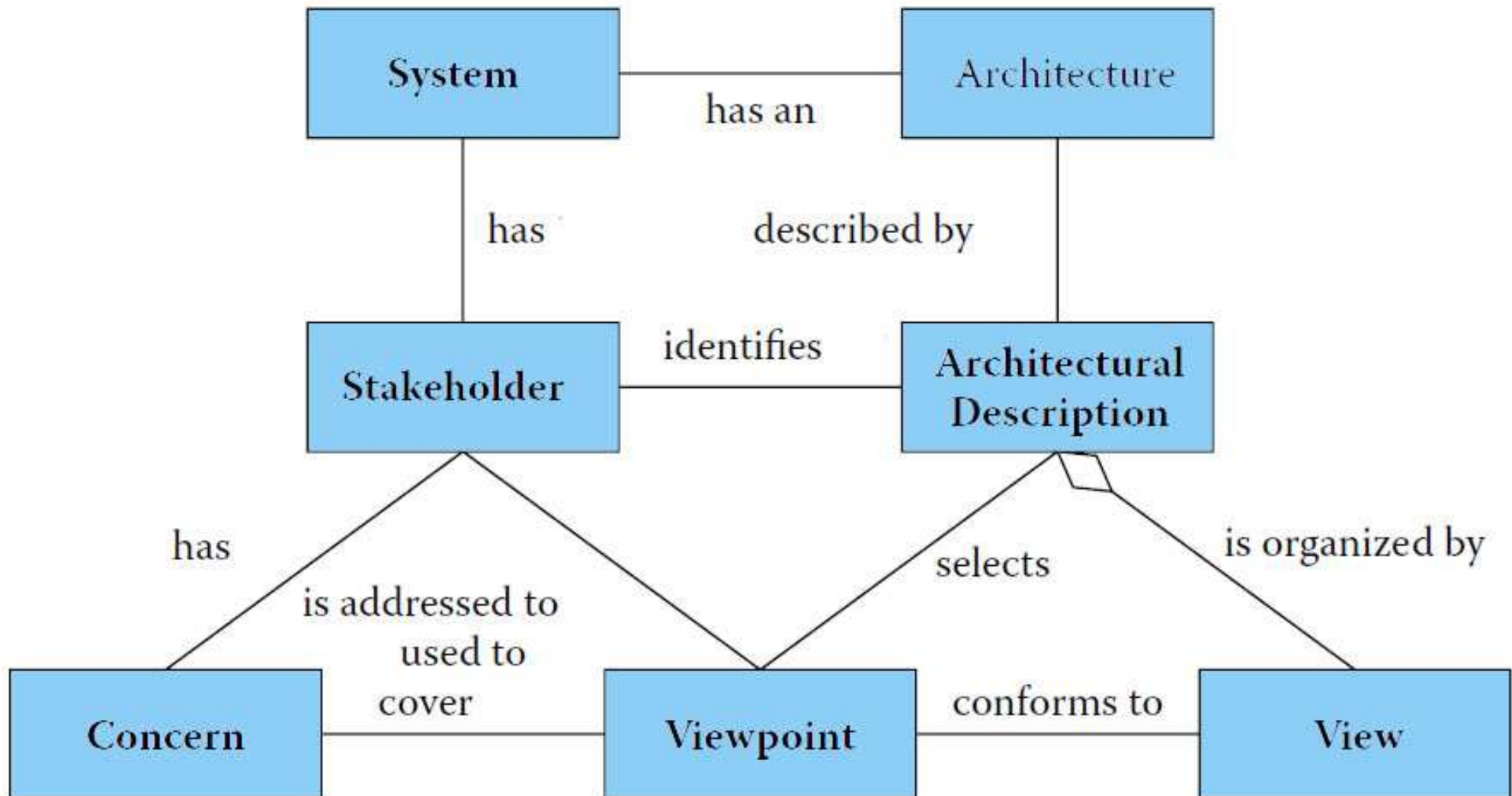
- **Concerns:** Key interests that are crucially important to the stakeholders in the system, and determine the acceptability of the system.



- **View:** A representation of a whole system from the perspective of a related set of concerns.



Basic TOGAF Concepts



Conceptual framework of IEEE 1471 (partial view)

TOGAF Architectural Principles

Architecture principles define the underlying general rules and guidelines for the use and deployment of all IT resources and assets across the enterprise.

- ***Business Principles***
- ***Data Principles***
- ***Application Principles***
- ***Technical Principles***

TOGAF **Business** Principles-1

- 1. Primacy of principles :** These principles of information management apply to all organizations within the enterprise.
- 2. Maximize benefit to the enterprise :** Statement: Information management decisions are made to provide maximum benefit to the enterprise as a whole.
- 3. Information management is everybody's business :** All organizations in the enterprise participate information management decisions needed to accomplish business objectives.
- 4. Business continuity :** Enterprise operations are maintained in spite of system interruptions.

TOGAF **Business** Principles-2

5. Common-use applications : Development of applications used across the enterprise is preferred over the development of similar or duplicative applications that are only provided to a particular organization.

6. Compliance with law : Enterprise information management processes comply with all relevant laws, policies, and regulations.

7. IT responsibility : The IT organization is responsible for owning and implementing IT processes and infrastructure that enable solutions to meet user-defined requirements for functionality, service levels, cost, and delivery timing.

8. Protection of intellectual property : The enterprise's intellectual property must be protected. This protection must be reflected in the IT architecture, implementation, and governance processes.

TOGAF Data Principles

9. Data is an asset : Data is an asset that has value to the enterprise and is managed accordingly.

10. Data is shared : Users have access to the data necessary to perform their duties; therefore, data is shared across enterprise functions and organizations.

11. Data is accessible : Data is accessible for users to perform their functions.

12. Data trustee : Each data element has a trustee accountable for data quality.

13. Common vocabulary and data definitions : Data is defined consistently throughout the enterprise, and the definitions are understandable and available to all users.

14. Data security : Data is protected from unauthorized use and disclosure. In addition to the traditional aspects of national security classification, this includes, but is not limited to, protection of pre-decisional, sensitive, source selection sensitive, and proprietary information.

TOGAF **Application** Principles-1

15. Technology independence : Applications are independent of specific technology choices and therefore can operate on a variety of technology platforms.

16. Ease of use : Applications are easy to use. The underlying technology is transparent to users, so they can concentrate on tasks at hand.

17. Requirements-based change : Only in response to business needs are changes to applications and technology made.

TOGAF **Technical** Principles-2

18. Responsive change management : Changes to the enterprise information environment are implemented in a timely manner.

19. Control technical diversity : Technological diversity is controlled to minimize the nontrivial cost of maintaining expertise in and connectivity between multiple processing environments.

20. Interoperability : Software and hardware should conform to defined standards that promote interoperability for data, applications, and technology.