Enterprise Architecture – Dealing with Complexity and Change

The Zachman Framework

Zachman Framework

- Regarded the origin of enterprise architecture frameworks (originally called "Framework for Information Systems Architecture")
- First version published in 1987 by John Zachman
- It is still further developed by Zachman International (http://www.zachman.com)
- Often referenced as a standard approach for expressing the basic elements of enterprise architecture

Zachman, J.A., 1987. A framework for information systems architecture. *IBM Systems Journal*, 26(3).

Rationale of the Zachman Architecture

- There is not a single descriptive representation for a complex object ... there is a SET of descriptive representations.
- Descriptive representations (of anything) typically include:
  - ♦ Perspectives
  - ♦ Abstractions

Abstractions

Perspectives

(Zachman 2012)

Dimension 1 – Perspectives

Zachman originally used the analogy of classical architecture

For the different stakeholders different aspects of a building are relevant - models of the building from different perspectives

Bubble charts: conceptual representation delivered by the architect

Architect's drawing: transcription of the owner's perceptual requirements – *owner's perspective*

Architect's plans: translation of the owner's requirements into a product – *designer's perspective*

Contractor's plans: phases of operation, architect's plans contrained by nature and technology – *builder's perspective*

Shop plans: parts/sections/components of building details (out-of-context specification) – *subcontractor's perspective*

The building: physical building itself

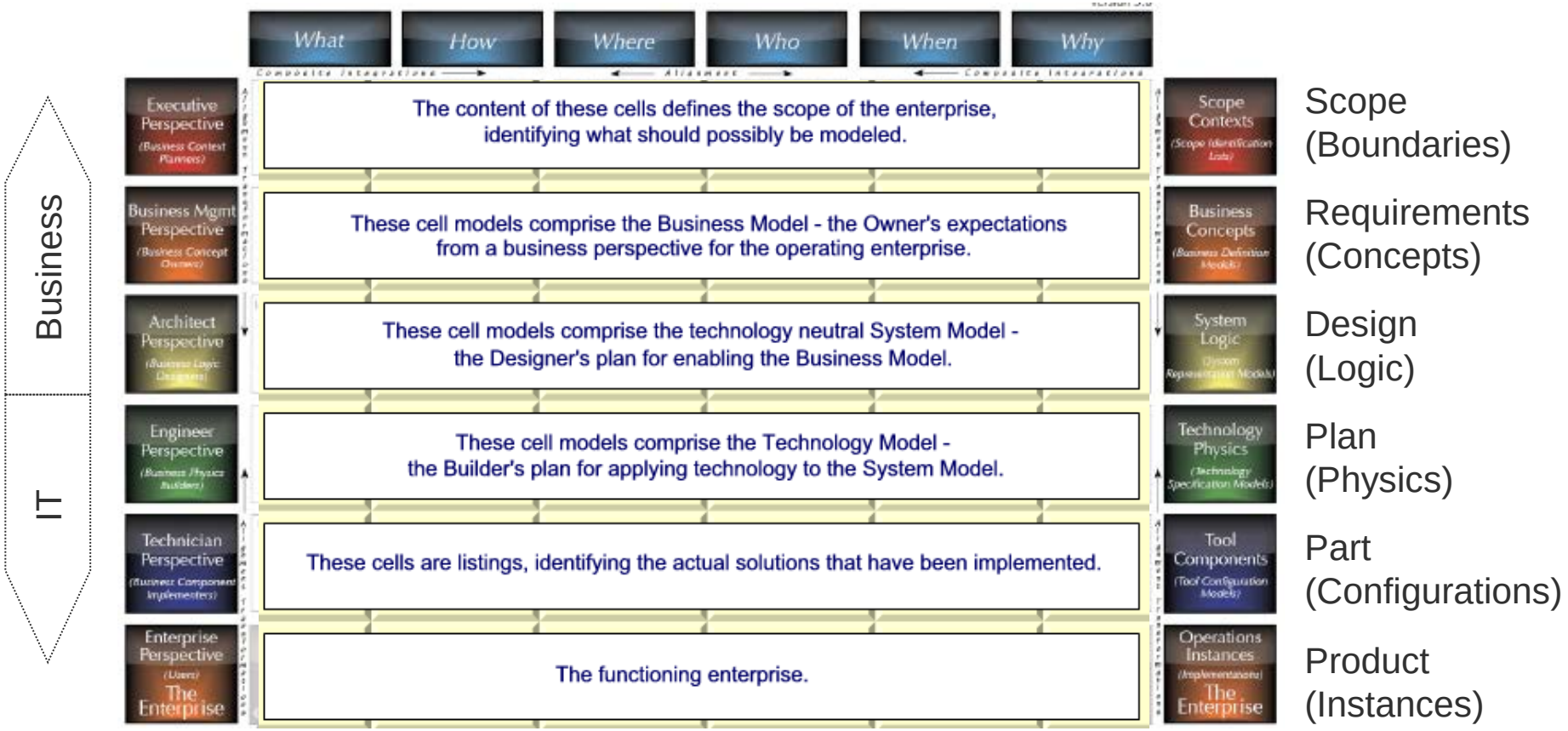
(Zachman 1987)

Dimension 1: Architectural Representations with analogies in Building and Information Systems

Generic	Buildings	Information Systems
Ballpark	Bubble charts	Scope/objectives
Owner's representation	Architect's drawings	Model of the business (or business description)
Designer's representation	Architect's plans	Model of the information system (or information system description)
Builder's representation	Contractor's plans	Technology model (or technology-constrained description)
Out-of-context representation	Shop plans	Detailed description
Machine language representation	—	Machine language description (or object code)
Product	Building	Information system

(Zachman 1987)

Perspectives



- Each row is different in nature, in content, in semantics from the others – representing different perspectives
- Representations do not correspond to different levels of details – level of detail is an independent variable, varying within one representation

Dimension 2: Aspects of an Architecture

- There exist different types of descriptions oriented to different aspects
- Zachman associates each aspect with a question word

WHAT	inventory models
HOW	functional/process models
WHERE	location/distribution models
WHO	organisation models
WHEN	timing models
WHY	motivation models

(Zachman 1987)

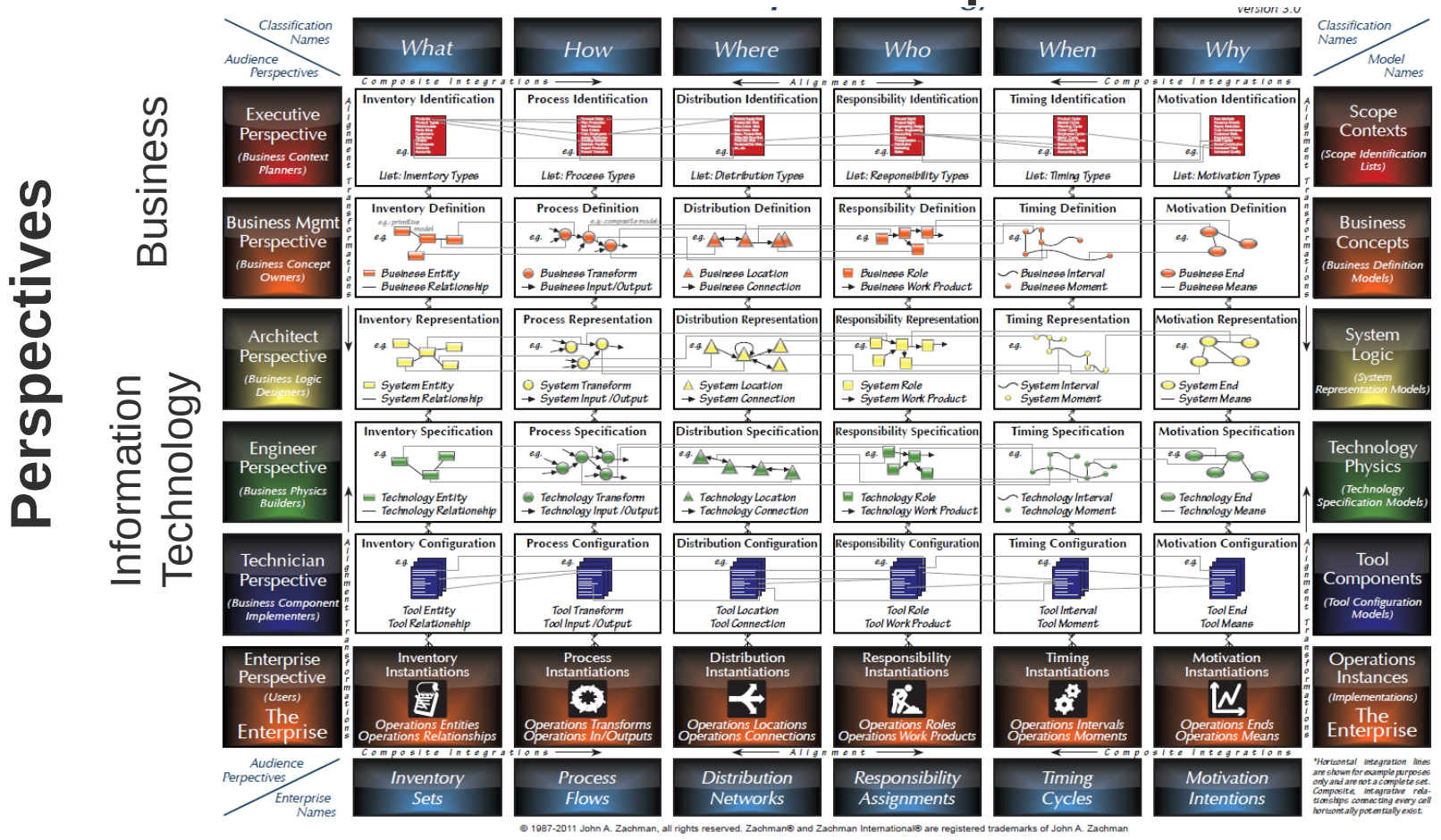
Abstractions for Manufacturing

(Zachman 2012)

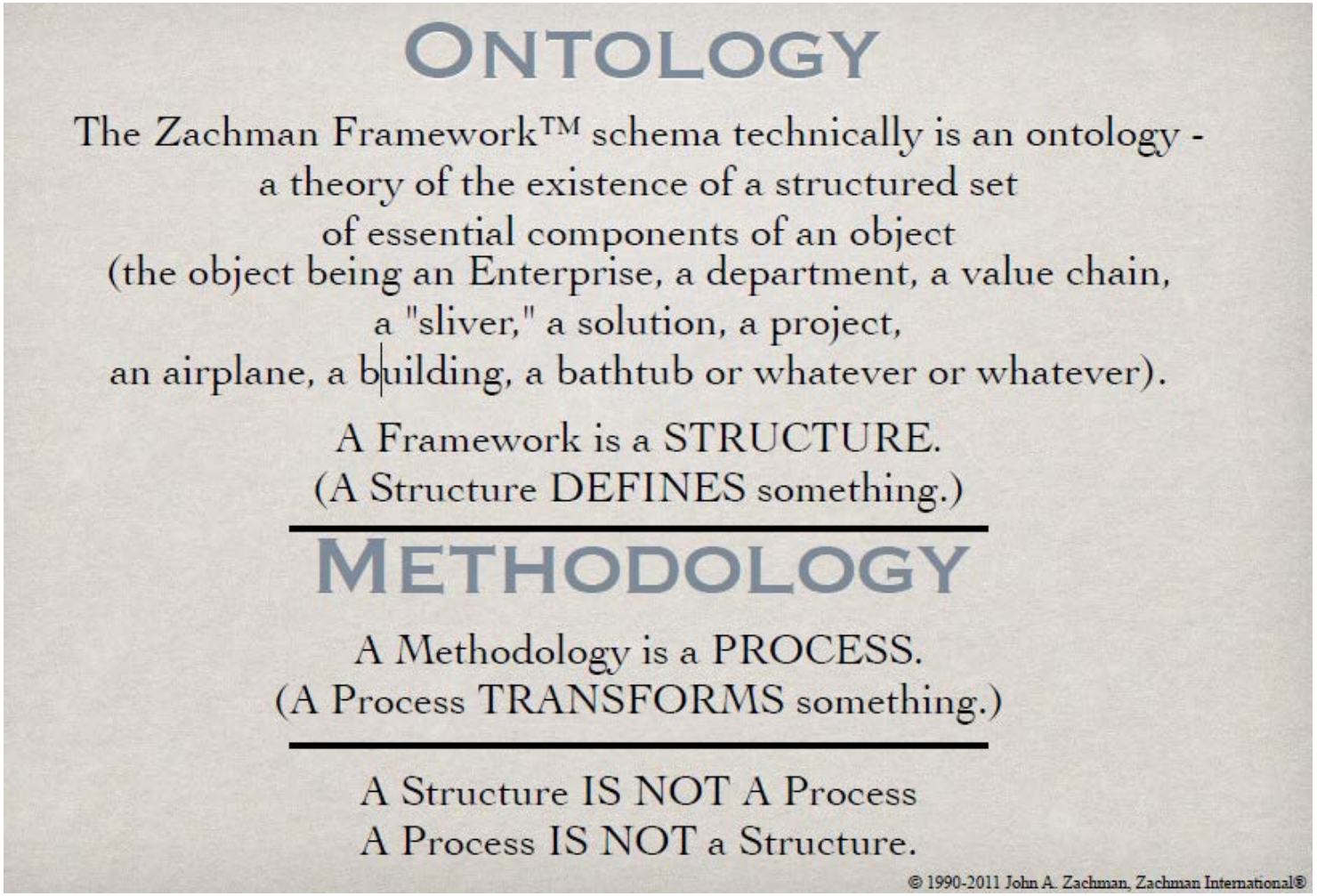
The Zachman Framework for Enterprise Architecture – Enterprise Ontology

Each cell contains models

Abstractions/Aspects



The Zachman Framework is not a Methodology

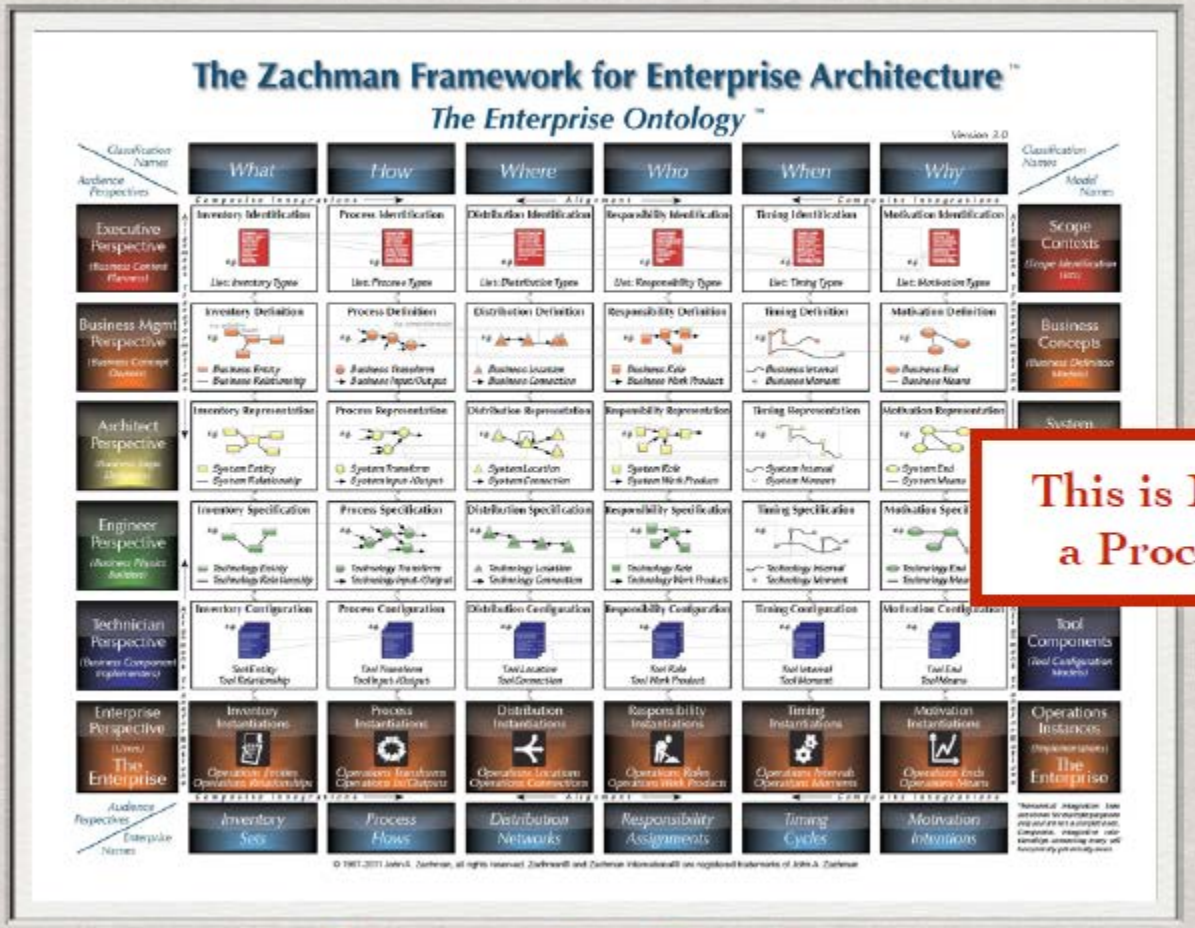


Ontology vs Methodology

An Ontology is the classification of the total set of "**Primitive**" (elemental) components that exist and that are relevant to the existence of an object.

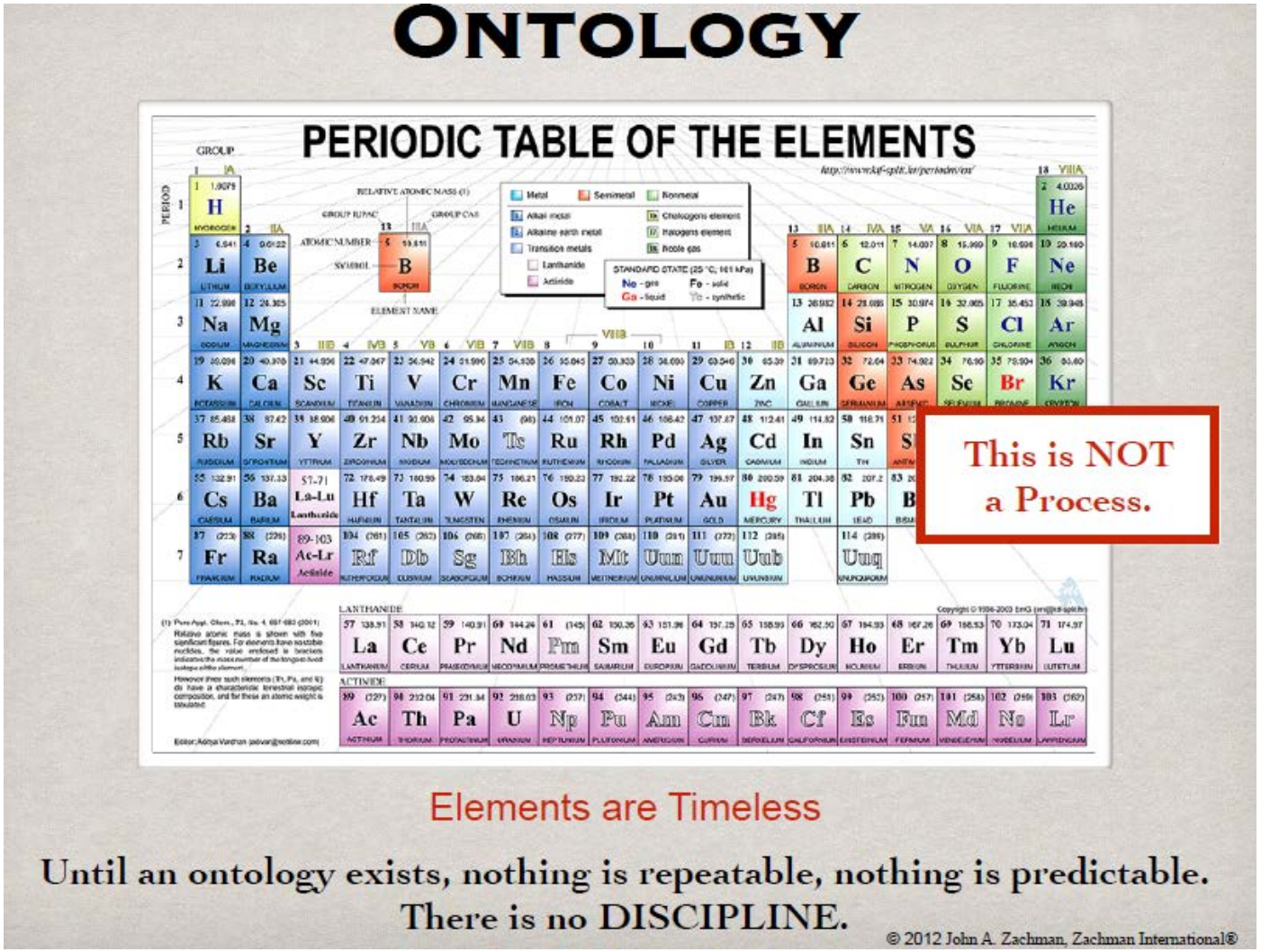
A Methodology produces "**Composite**" (compound) implementations of the Primitives.

Ontology



"Primitives" are Timeless.

Analogy: Chemistry



Analogy: Chemistry

PROCESS

(METHODOLOGY)

Add Bleach to an Alkali and
it is transformed into Saltwater.

$$HCl + NaOH \rightarrow NaCl + H_2O$$

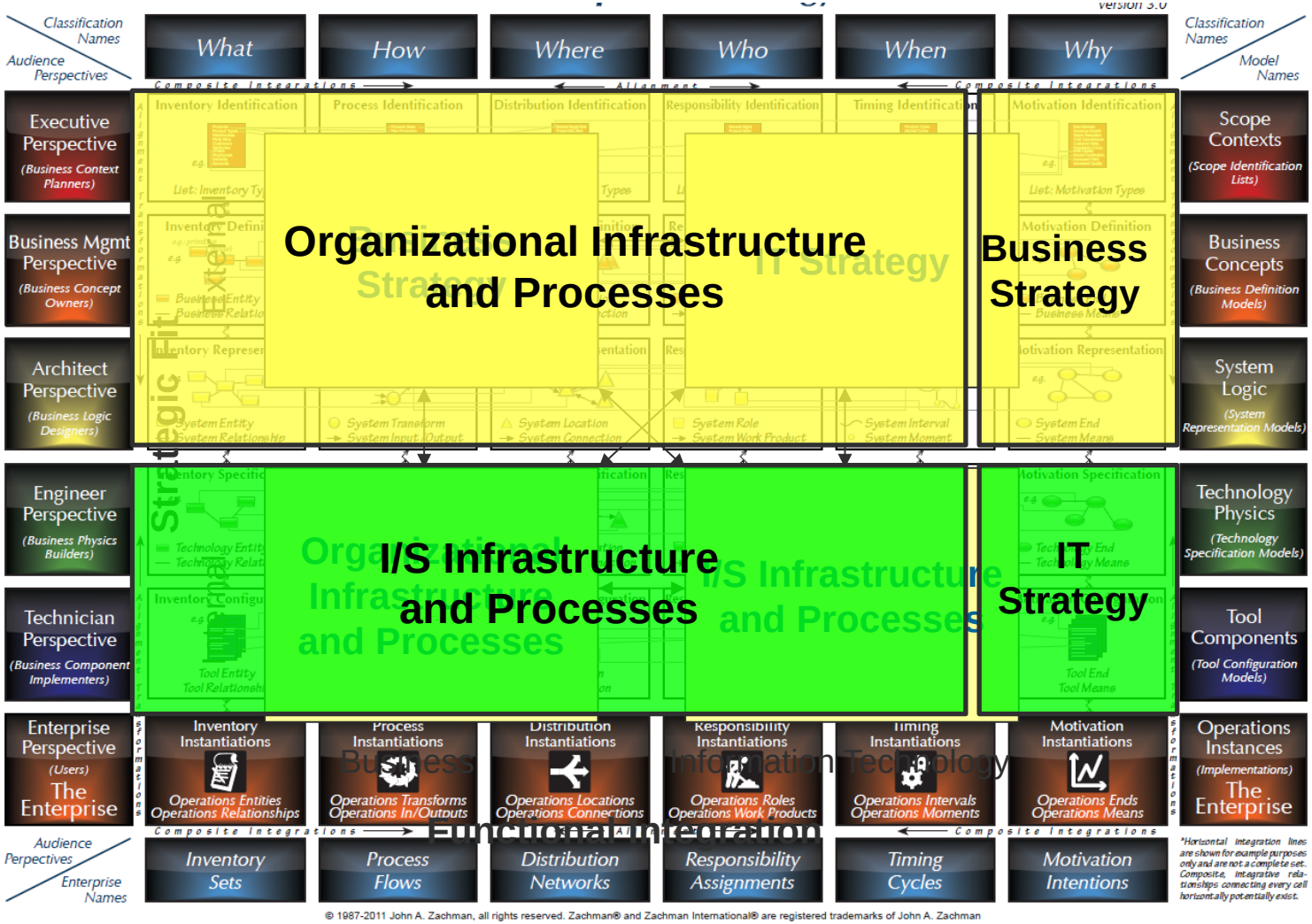
COMPOUNDS

Salt	NaCl
Aspirin	$C_9H_8O_4$
Vicodin	$C_{18}H_{21}NO_3$
Naproxen	$C_{14}H_{14}O_3$
Ibuprophen	$C_{13}H_{18}O_2$
Viagra	$C_{22}H_{30}N_6O_4S$
Sulphuric Acid	H_2SO_4
Water	H_2O

etc., etc., etc.

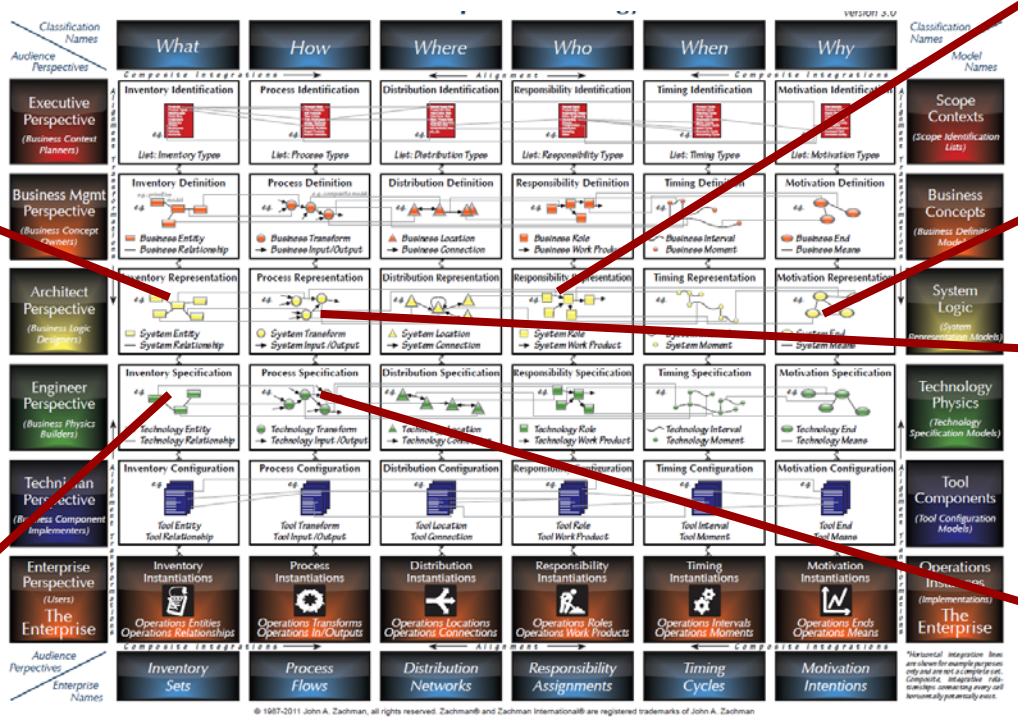
This is NOT an Ontology.

Strategic Alignment Model and Zachman Framework



Models and the Zachman Framework

- Concepts for modelling are related to cells.
- Models are composites, they can roughly be assigned to cells, if they are composed of elements (concepts) of this cell.
- The elements of models can (roughly) be assigned to cells, but often cover



Organisation model

Logical data model

Motivation Model

Process model

Physical data model

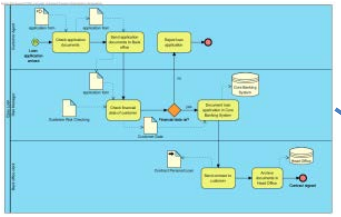
Workflow model

Relations between Models and Model Elements

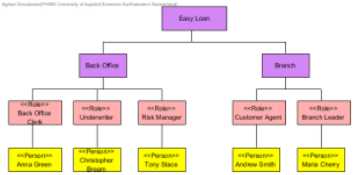
- There are relations between (elements of) the models
- Horizontal Relations: In same perspective, e.g.
  - Data used in a process
  - Application implementing a process activitiy
- Vertical relations: Between different perspectives
  - Implementation of an application
  - Database model for an entity relationship model

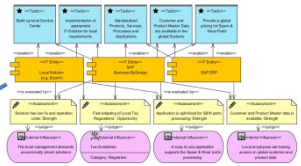
Enterprise Architecture Modeling – Examples of Models Kinds

Process Model

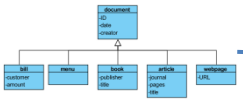


Organisation Model



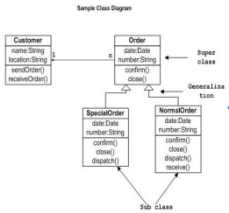


Business Motivation

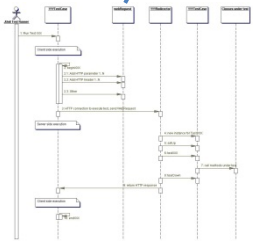


Data/Documents

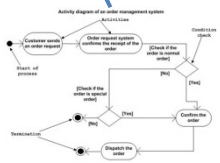
Fact Type Model



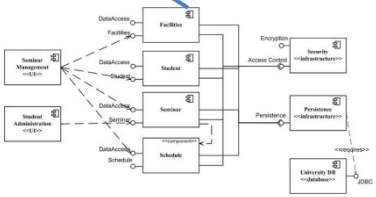
UML class diagram



UML sequence diagram



UML activity diagram



UML component diagram

Southwest Airlines

- For the Southwest Airlines…

…what information can you find to describe the enterprise architecture according to the Zachman Framework

…from the enterprise perspective (scope contexts)