

# The quest to apply the concept of “Architecture” holistically

An attempt to describe how architecture can  
support a wide range of  
concerns and scopes

# Content

- Uses and meanings of the term “architecture”
- A model of “Enterprise” and concerns inside
- Linking Architecture with Enterprise
- The concept of holistic Enterprise Architecture
- Next steps

# Meanings (1)

- **Architecture** – a concept that can be adapted and used for many concerns
  - Architecture is used by many professions
  - Multiple definitions for “architecture” exist
  - Architecture will be discussed from multiple perspectives in this presentation

# Examples of architectural work

(Registered disciplines and colloquial uses)

- **Buildings:** Architectural services, regulations, urban design, studies, models, drawings, documentations, supervision, ...
- **Landscape:** Research & advice, planning, design, stewardship of environment, conservation, sustainability, ...
- **Naval:** Research, production, maintenance, operation, technical research, modeling, probability of failure, ...
- **Planning:** Development, preservation, environment, mobility, growth, economy, ...
- **Colloquial uses:** Architecture of: Brand, Regulation, Treaty ...
- **Summary:** Architecture is practiced in a wide range of disciplines, each requiring synthesis of advice that includes many aspects

# Definitions by publicly registered disciplines

- **Buildings:** “The practice of architecture consists of the provision of professional services in connection with town planning and the design, construction, enlargement, conservation, restoration, or alteration of a building or group of buildings.”
- **Landscape:** ” Landscape Architects conduct research and advise on planning, design and stewardship of the outdoor environment and spaces, both within and beyond the built environment, and its conservation and sustainability of development.”
- **Naval, Planning:** No published definition
- **Observation:** These definitions focus on activities, leadership in alignment of multiple concerns, enablement of adaptability

# Definition in IEEE 1471

- **SW-intensive Systems (IEEE):** “The fundamental organization of a system embodied in its components, their relationships to each other and to the environment and the principles guiding its design and evolution. ”
- **IEEE FAQ:** “Broadly speaking, an architecture is that which is essential or unifying about a system. It is that set of things about a system which largely determine the system's value, cost, and risk.”
- **Observations:**
  - In contrast to IEEE’s definition of architecture the FAQ adds a more open description, balancing the perception that 1471 is focused on structure
  - While disciplines publish definitions of activities and deliverables, IEEE 1471 is about architecture itself and its documentation

# Three aspects of Architecture:

- **Architecture as a concept**
  - The description of Architecture and its meaning
- **Architecture as a profession**
  - Means a discipline, including qualities like knowledge, skills, certification
- **Architecture as a document**
  - Means what is recorded in (and excluded from) documentation of an architecture

# Conclusions for the term “Architecture”

- Architecture has a wide range of uses and meanings
- Overall, no single definition for architecture is prevalent
- IEEE’s definition is popular in the Open Group’s context
- If architecture is to be considered holistically, i.e.
  - across multiple concerns in an entity
  - across multiple entities
  - across different types of entities

it is useful to first look at entities themselves



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# Meanings (2)

- If the concept of architecture is used holistically
  - **what is included?**
  - 1. The “thing” architecture is applied to
  - 2. All concerns related to the “thing”
- The “thing” will be called “**enterprise**” in this presentation
  - “Enterprise” can scale from simple to complex
  - “Enterprise” implies activity and evolution

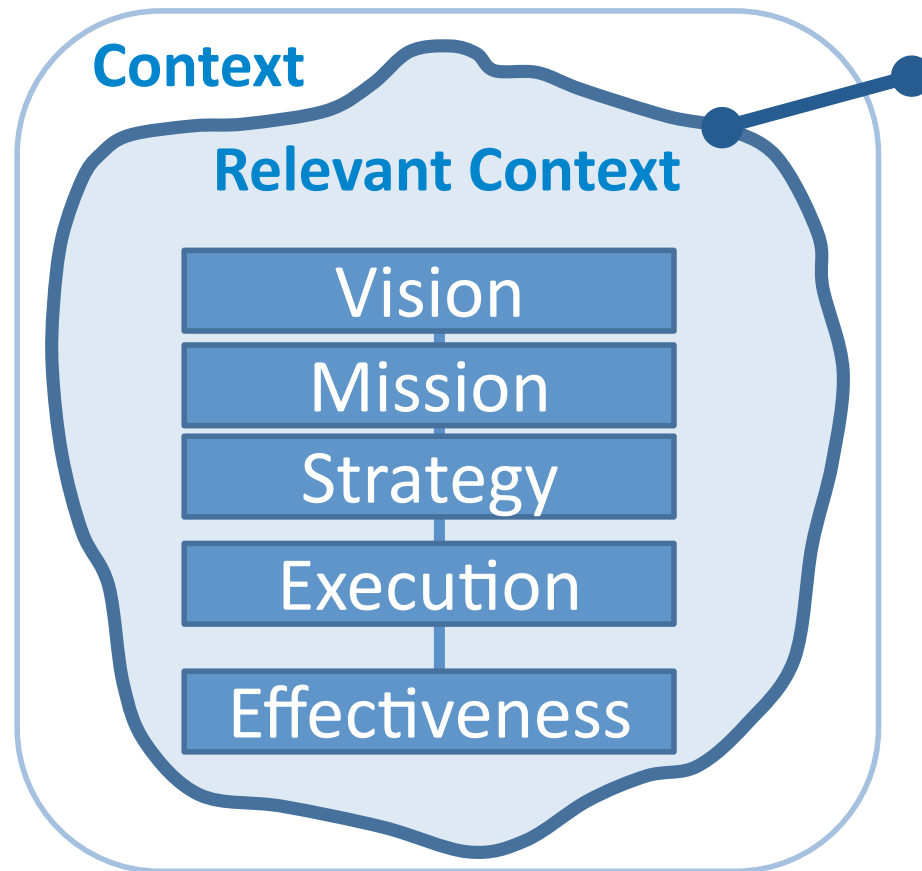
# About Meanings (3)

- Definition of “**Enterprise**” that will be used:
  - “A group of people and/or enterprises working together within a framework of regulations, rules or other agreements to achieve one or more common objectives.”
  - Examples:
    - A MacDonald's franchise
    - A coalition of NGOs lobbying for higher fuel efficiency
    - The Open Group for Boundaryless Information Flow

# About Meanings (4)

- **Business** – a term with many meanings:
  - “My business”:
    - What I do – The company I work at – The company I own
  - “The car business”
  - Commercial activities in general
- “Business” needs to be qualified in discussions
- A meaning of “business” in architecture  
will be discussed later

# Model of an Enterprise



**“Enterprise”** comprises:

Its relevant context,  
vision, mission and strategy,  
and their execution

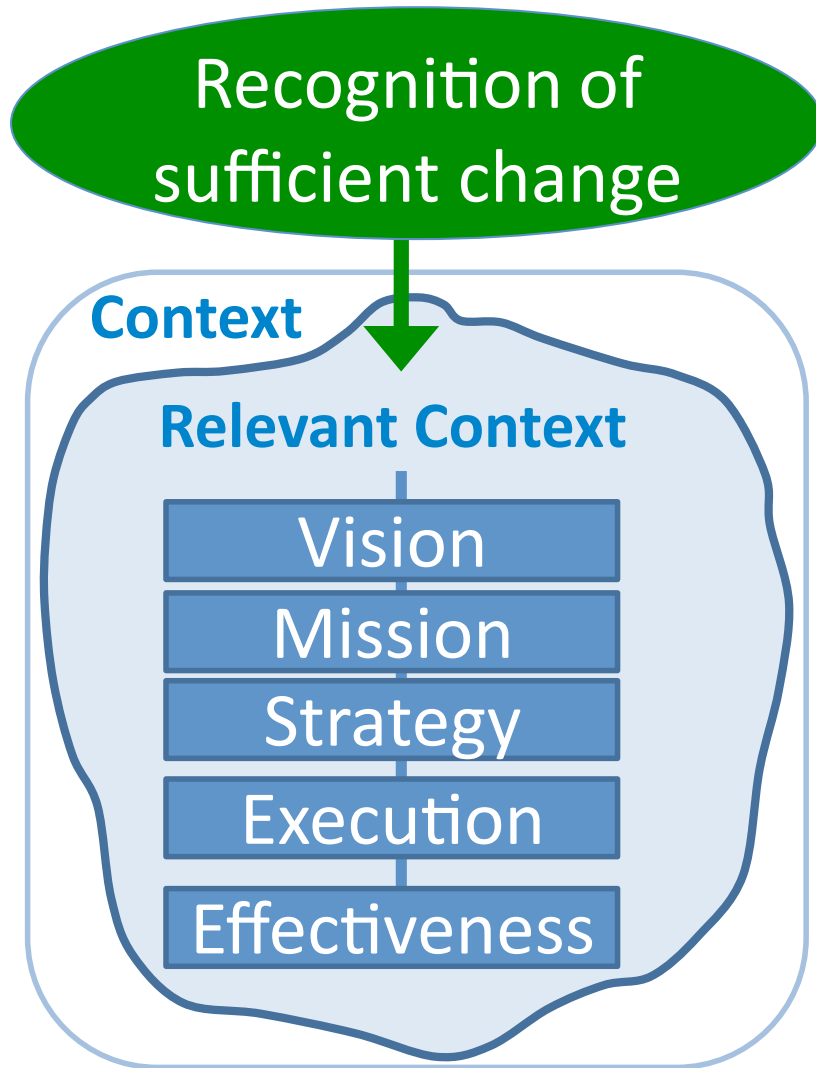
(i.e. realization of  
Vision/Mission/Strategy)

with effectiveness

(i.e. continued optimal operation)

*Based on Mohamed El-Erian, Financial Times, p. 28., Nov. 4, 2008: About the mistake to break the  
“Recognition–design\*–execution–effectiveness chain” (design = vision/mission/strategy)*

# Model of an Enterprise's Evolution

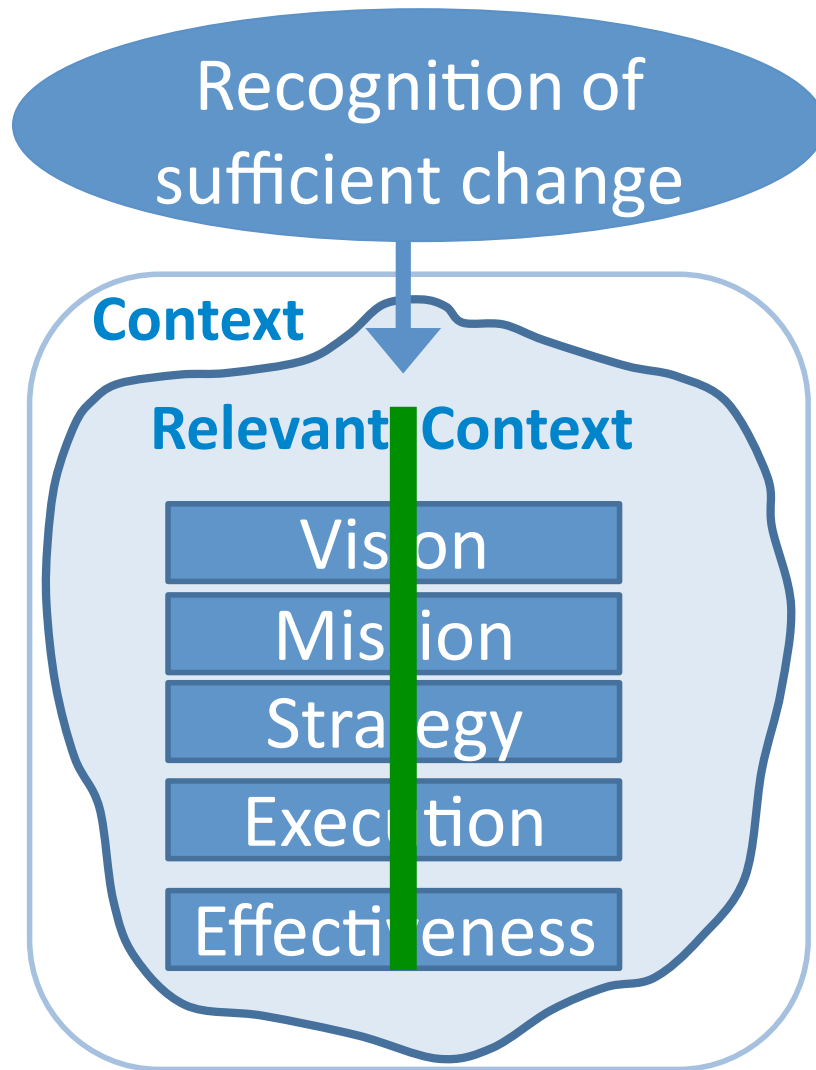


Recognition of  
sufficient change\* causes  
consideration of:

relevant context,  
vision, mission and strategy  
to be executed  
with sustained effectiveness

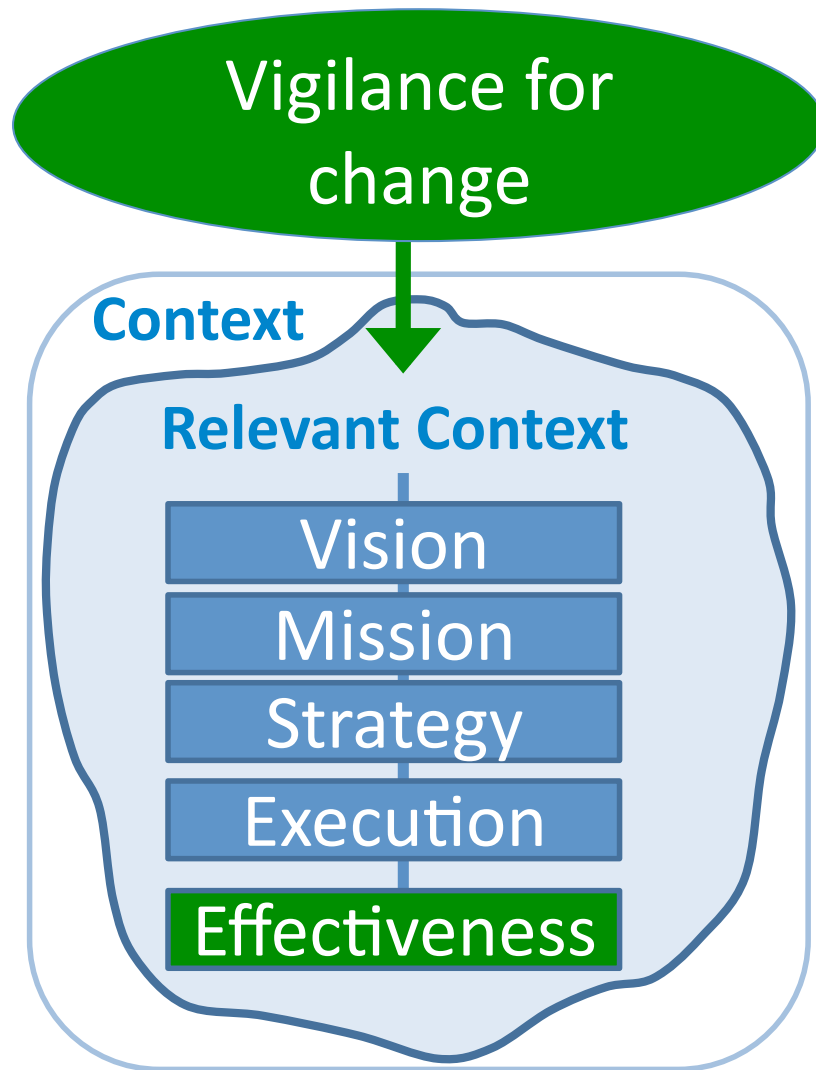
*\* Change in all aspects of the enterprise,  
from context to operations*

# “Transformation Continuum”



- Chain of concerns with bi-directional dependencies
- A range of skills is required, such as strategic consulting, business modeling, solution design, execution of design, operational excellence
- **Goals: Alignment of concerns, enabling effectiveness**

# Operational View



- Operation is focused on effectiveness of all concerns
- Continued vigilance ensures recognition of variations that go beyond the built-in tolerance for change
- **Goals: Preserving alignment, signal transformation need**



# Inside “Execution” & “Effectiveness”



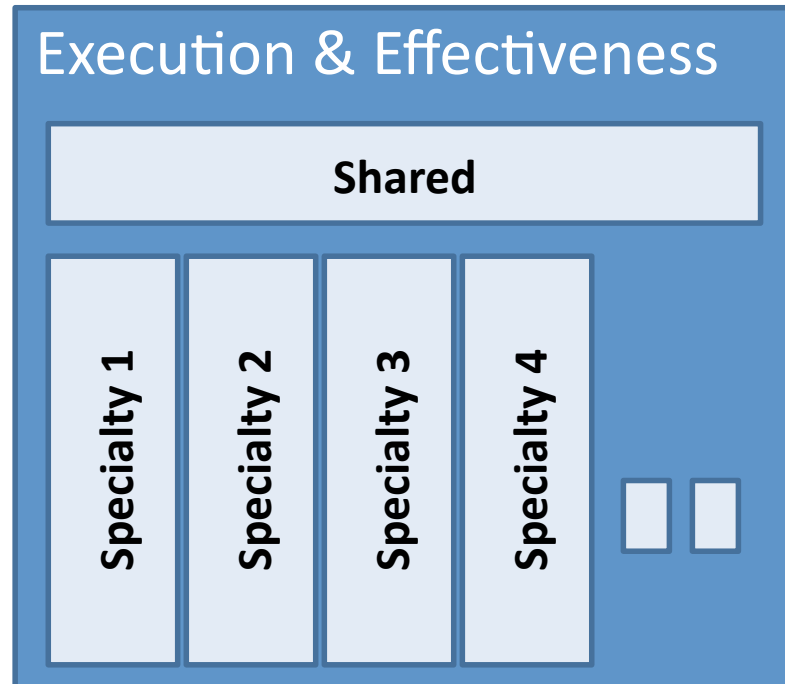
Execution and Effectiveness have a common scope, although with different tasks:

Transformation and Operation

Defining **subset concerns** manages complexity and provides for depth

Number and names of **subset concerns** depend on type, scope and complexity of the enterprise

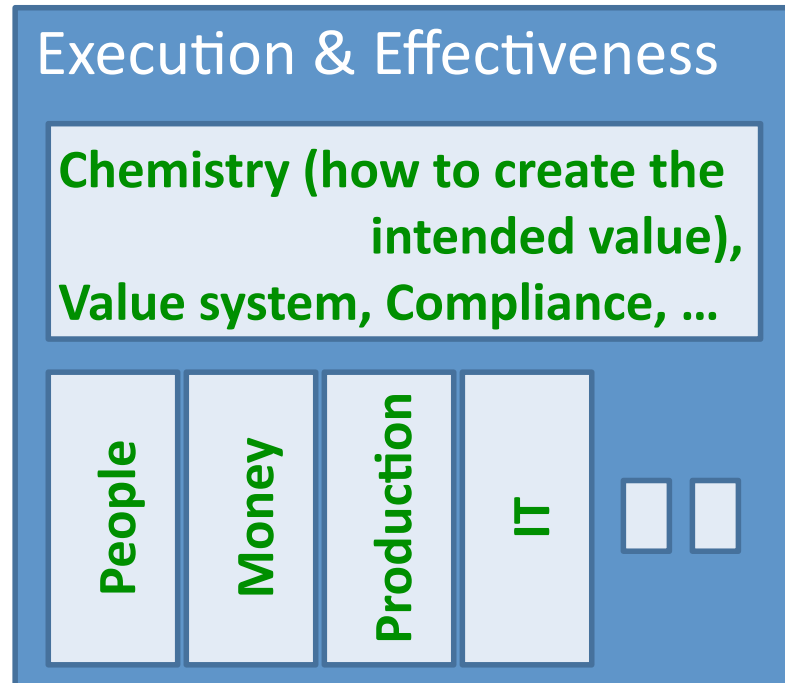
# Subsets in “Execution” & “Effectiveness”



Differentiation in subset concerns:

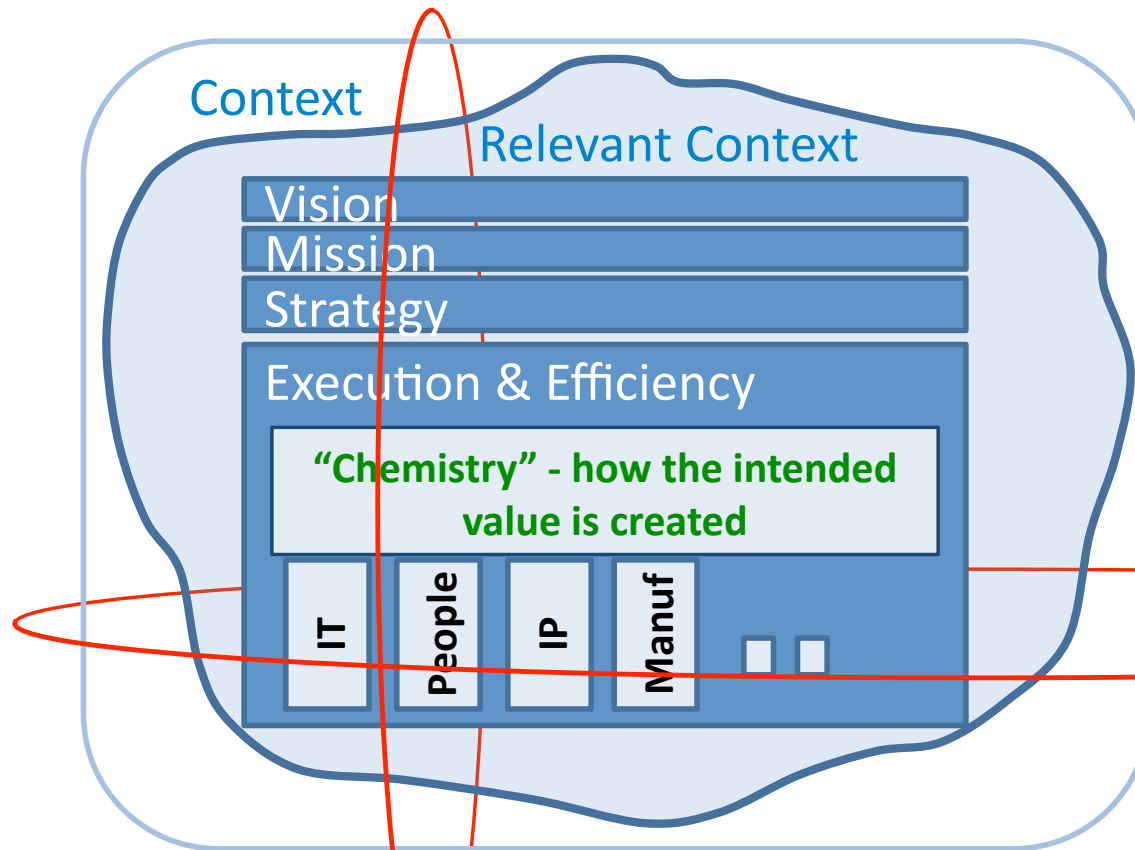
- Shared concerns  
(focus: Coordination of concerns, allocation, ...)
- Specialized concerns  
(focus: Specialty itself, its requirements on other concerns)

# Example of Subsets



- Shared concern: Chemistry - how to create the intended value defined by vision/mission/strategy through synergistic and tailored allocation of resources
- Specialized concerns: Delivering their allocated value across the enterprise:  
e.g. People: Range and profile of skills & potential, motivation, compensation, stability, ...

# Alignment in the Enterprise



Operation:  
Alignment between  
shared concerns and  
subset concerns to  
achieve efficiency

Transformation: Alignment along the  
Transformation Continuum to adapt to changes

# Conclusions on “Enterprise”

- The Transformation Continuum serves as model for evolution of an enterprise
- Transformation develops and defines a new alignment of the concerns in the Transformation Continuum
  - Defining a suitable set of concerns in the Transformation Continuum facilitates alignment of vision/mission/strategy
- Operation maintains alignment and signals change
  - Defining a suitable set of shared and specialized concerns facilitates alignment in support of efficiency

# Content

- Meanings and uses of the term “architecture”
- A model of “Enterprise” and concerns inside
- **Linking Architecture with Enterprise**
- The concept of holistic Enterprise Architecture
- Next steps

# Pattern of the next slides

- Examples:
  - The following examples are made up, although connected to real cases
  - The intent is to illustrate linking the model of Enterprise with Architecture
- Architecture:
  - Which concerns architecture addresses
  - What architects are supposed to deliver

# Linking Architecture with Enterprise (1)

## Buildings

Millau Viaduct



*Pictures from Wikipedia*



# Buildings: Millau viaduct in France

*Note: The points below are invented*

## The enterprise: **Building and operating the Viaduct**

- **Vision:** An elegant, very high elevation bridge
- **Mission:** To realize this novelty
- **Strategy:** Few pylons, optimized distribution of dynamic loads between pylons and bridge
- **Execution** (sample points): Understanding dynamic loads, method to push bridge over the high pylons, method to predict and test fitness
- **Effectiveness:** Maintenance, cost, vigilance on risks

# Buildings: Millau viaduct in France

*Note: The points below are invented*

## Architecture of the Whole (Enterprise Architecture)

- **Scope:**
  - Context / Vision / Mission / Strategy / Execution / Effectiveness
- **Concerns (samples):**
  - Viability (ability to model, confidence in implementability, cost, consensus of stakeholders, ...)
  - Ability to build and reach effectiveness in time
  - Elements (Pylons, Top part, technique of assembly, ...)
  - Skills (consensus, design, prefabrication, assembly, PR, ...)
  - Acceptance, Testing (key stakeholders, public, press)
  - Funding
  - Liability

# Architect's deliverables for Viaduct

*Note: The points below are invented*

## Essential Properties of Context

Stakeholders' Agreement on Vision / Mission / Strategy

Execution of Vision / Mission / Strategy:

Essential properties of solutions to defined concerns:

Shared  
concerns

How agreement is reached on viability

How acceptance is achieved/ maintained

Specialized  
Concerns:  
Essentials of:

Properties of  
Elements,  
maintenance

Definition &  
provision  
of Skills

Acceptance  
Criteria

Funding  
process

Construct to  
contain  
Liability

...

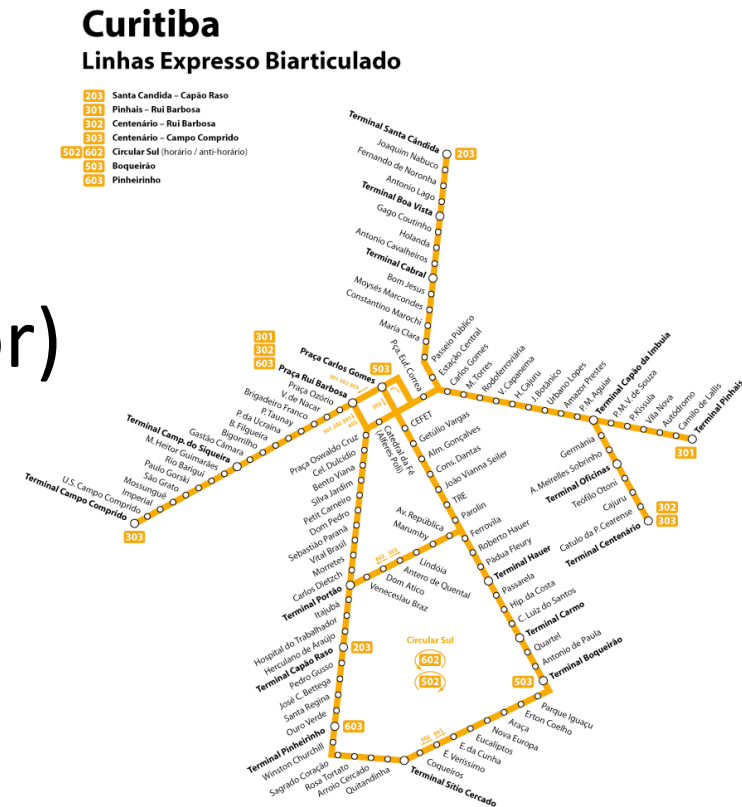
...

Effectiveness

Essential properties of operation and maintenance

# Linking Architecture with Enterprise (2): Planning

Curitiba:  
Transport initiative,  
team started 1970,  
(member became 3\* mayor)



*Pictures from Wikipedia, urbanhabitat*

# Planning: Curitiba Transport

*Note: The points below are invented*

## **The enterprise: Curitiba's Transportation System**

- Vision: Higher capacity & better environment
- Mission: Sustained acceptance by citizens
- Strategy: Highlight danger, shift land use from cars to buses, sell vision
- Execution (key points): Integrated bus systems, efficient boarding, contiguous real estate for buses
- Effectiveness: Acceptance by public, enforcement, cost, continued evolution

# Planning: Curitiba Transport

*Note: The points below are invented*

## Architecture of the Whole (Enterprise Architecture)

- **Scope:**
  - Context / Vision / Mission / Strategy / Execution / Effectiveness
- **Concerns:**
  - Acceptance by public
  - Alignment with city's other concerns, state level planning
  - Prediction of transport volume and patterns
  - Funding
  - Ability to prove benefits continuously
  - Evolution to maintain benefits
  - Building pride

# Architect's deliverables for Transport System

*Note: The points below are invented*

## Essential Properties of Context

Stakeholders' Agreement on Vision / Mission / Strategy

Execution of Vision / Mission / Strategy:

Essential properties of solutions to defined concerns:

Shared  
concerns

Process for alignment with city & state planning

Program for monitoring /maintaining acceptance

Specialized  
Concerns:  
Essentials of:

Program to  
extrapolate  
transport

Process for  
budget  
planning

Performance  
reporting

Forward plan

Visibility  
program

...

...

Effectiveness

Essential properties of operation, evolution of system

# Observations from linking Architecture with Enterprise

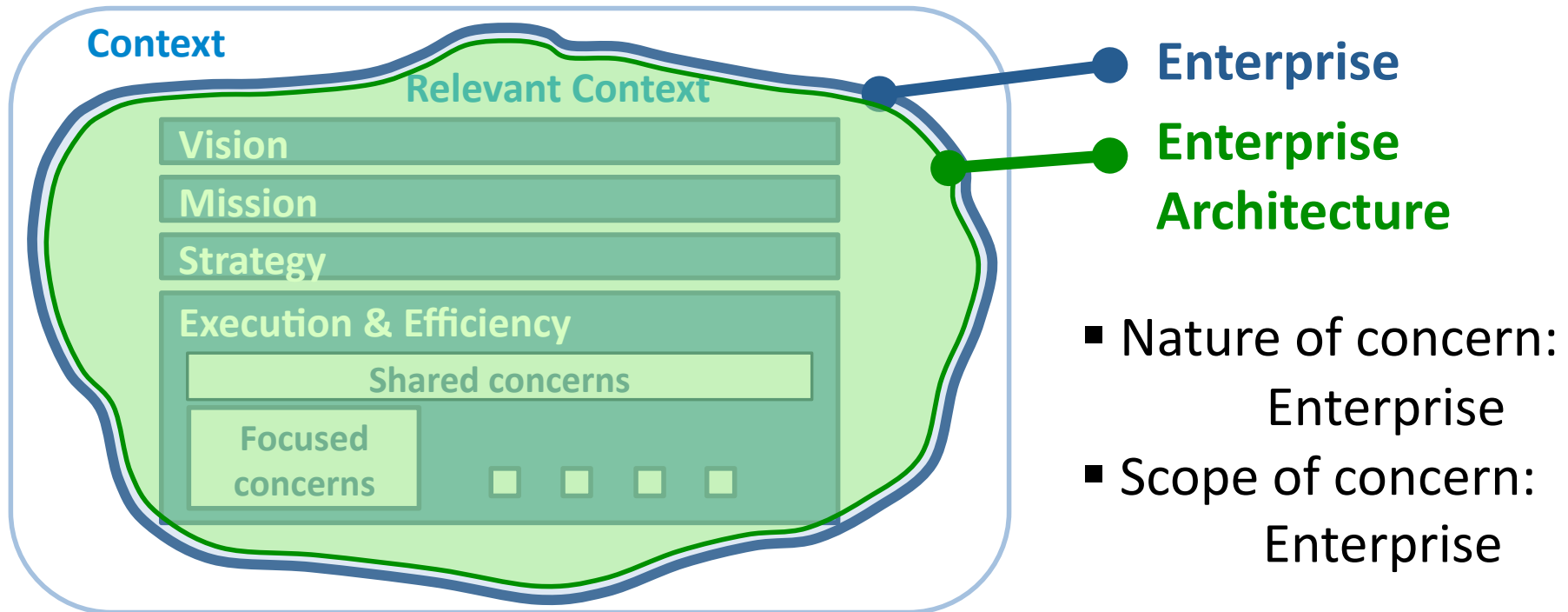
- Architectural work appears to be useful at all levels of the enterprise (*although not all people doing such work call themselves “architect”*)
- The model of “Enterprise” appears to be useful as model of architectural work
- The pattern of architectural work appears to repeat over different types of enterprises
- Architectural work is focused on essential stuff, while implementation covers all details



# Content

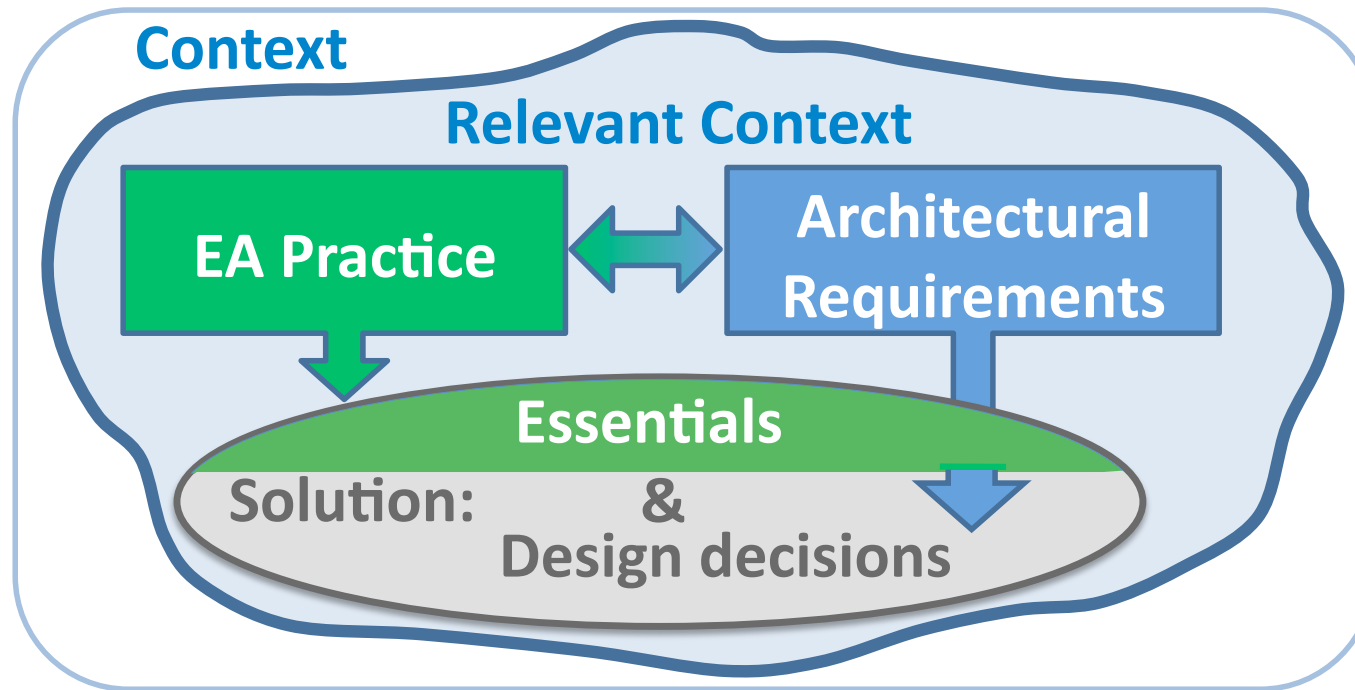
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# Scope of Enterprise Architecture



This scope of EA is derived from the observation that architectural work is performed on all aspects of an enterprise

# Positioning Enterprise Architecture



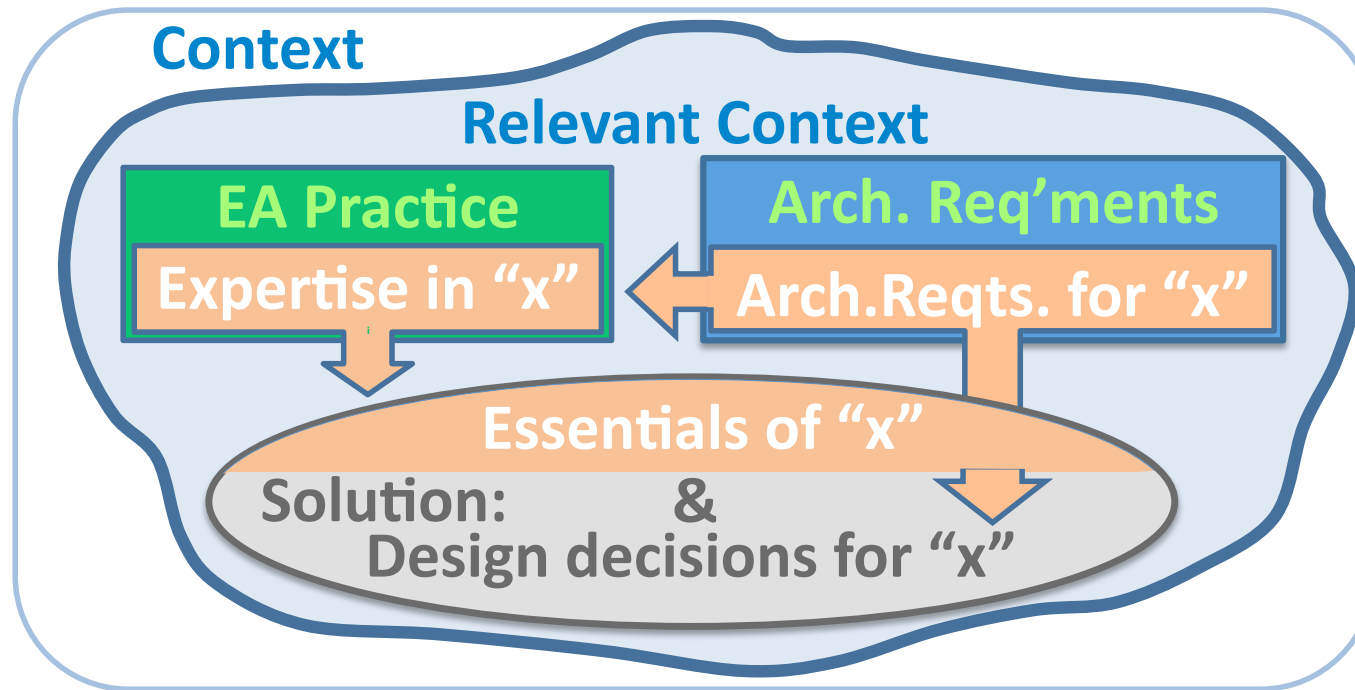
Architecture's manifestation in an Enterprise:

- As a **practice** (covering all concerns, may be outsourced)
- As **record of essentials** guiding transformation and operation

Architecture **holds essentials, bounds choices** in solutions

EA = **union of architectures** in an enterprise

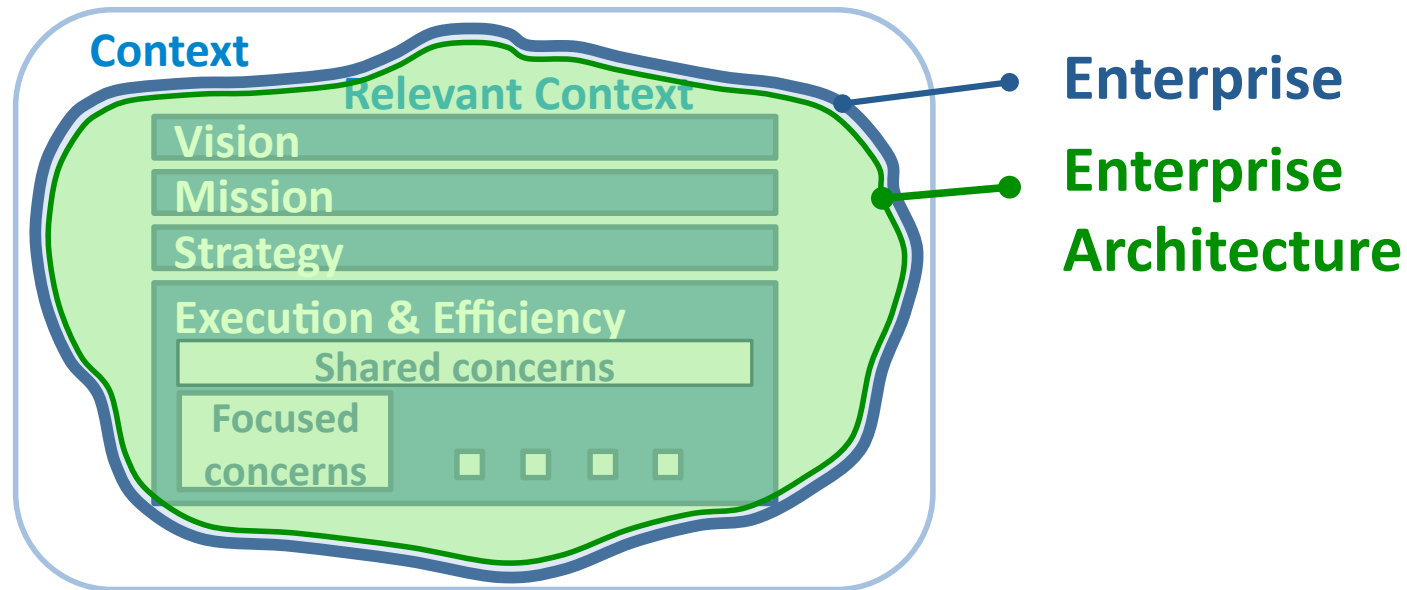
# Architecture of a specific concern “x”



Architecture of a specific concern in an Enterprise:

- Practice:
- Draws on EA Practice (Skills, relevant artifacts, tools, etc.)
  - Bounds architectural decisions by those in superset scopes
  - Drives alignment of stakeholder interests in “x”
- Record:
- Records stakeholders’ agreements on “x”

# Enterprise Architecture: Summary



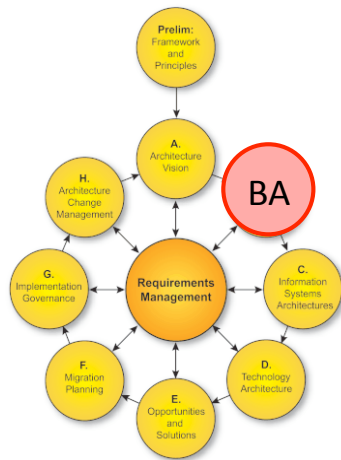
- Architecture is practiced in all concerns of an Enterprise
- Enterprise Architecture is the union of all architectures in an Enterprise
- The proposed model includes Vision, Mission, Strategy, Execution and Efficiency
- Execution and Efficiency include Shared and Focused Concerns

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# A look at TOGAF

Currently TOGAF is optimized for an architectural view of the total Enterprise **from the inside**:



- ▶ Nature of concern: IT

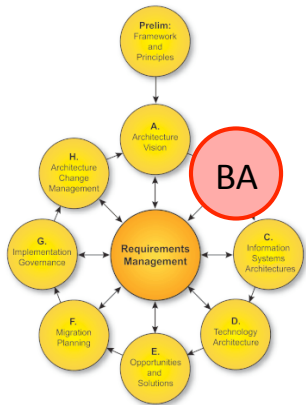
- ▶ Scope of concern: Enterprise

- BA** Requirements from all concerns in the Enterprise (outside IT) that are relevant to IT

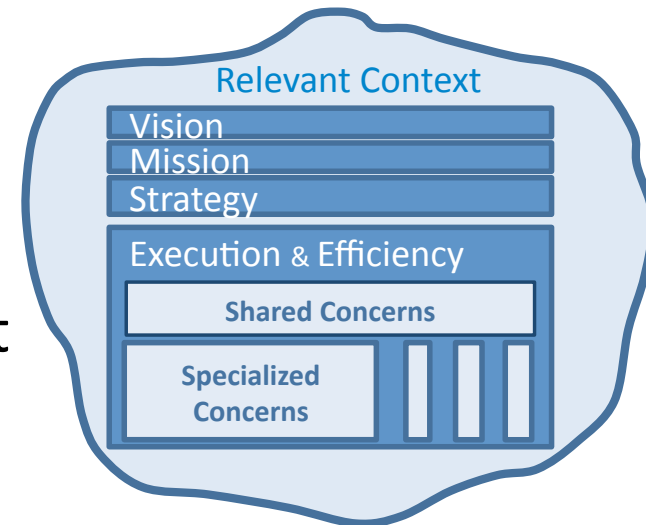
- ▶ Nested subset concerns (IT-SW, IT-HW\*, ...), are handled by suitable parts of TOGAF

\* There is non-IT HW, e.g. in production

# How to leverage TOGAF into holistic Enterprise Architecture



Different natures of concern  
in an Enterprise  
lead to substantially different  
architectural models



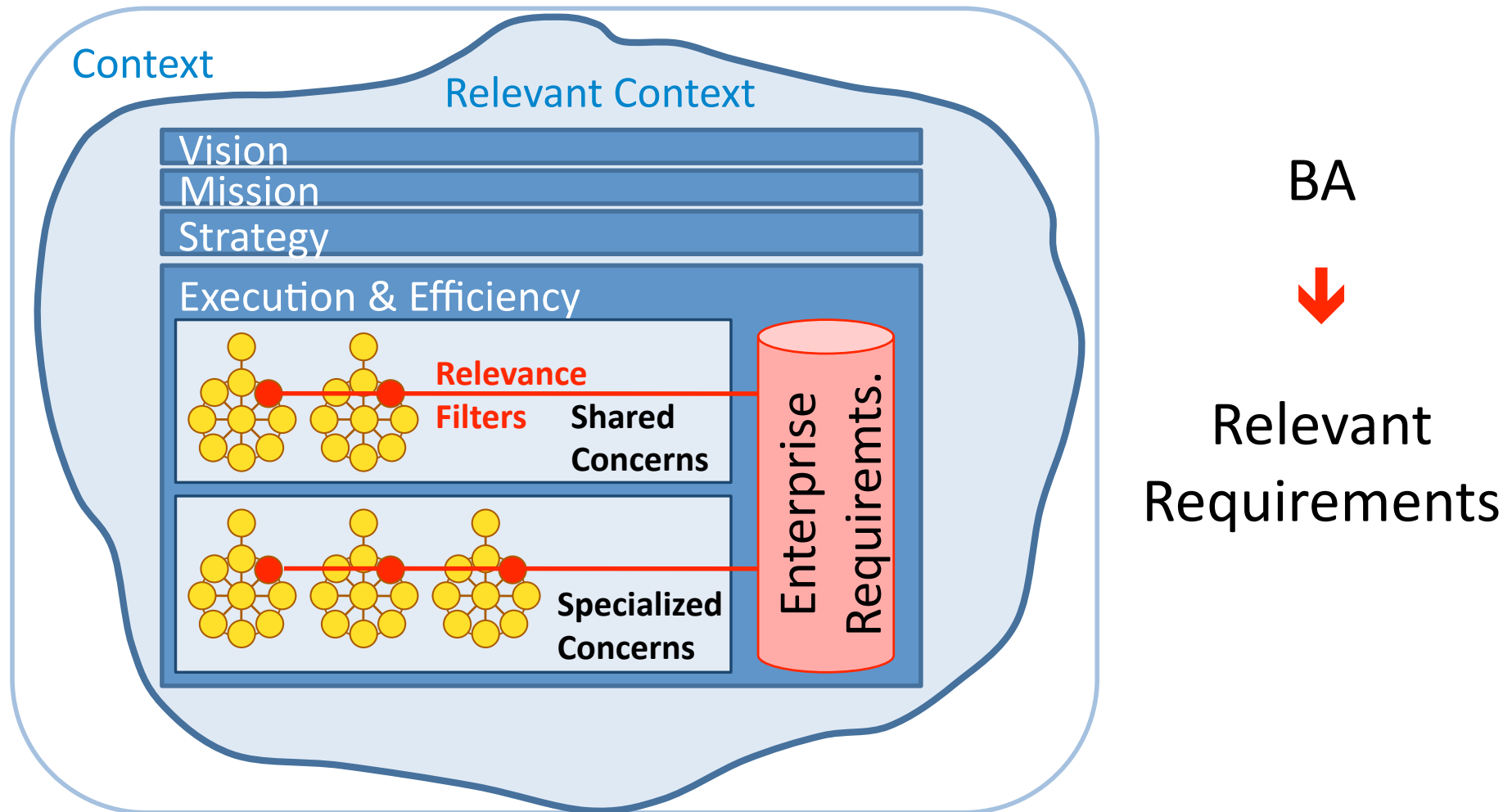
Different natures of concern are **already worked on** today

An approach of **reconciliation** is recommended:

- Accept **multiple pairings** of meaning/term
- Taking an approach of **“and”** instead of “right/wrong”
- Work on harmonization and simplification over time

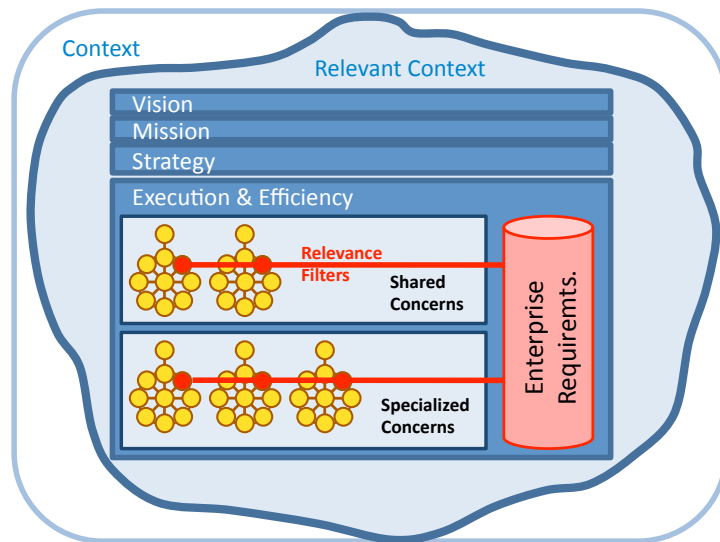


# Attempt to reconcile the models of TOGAF and Holistic Enterprise (1)



# Attempt to reconcile the models of TOGAF and Holistic Enterprise (2)

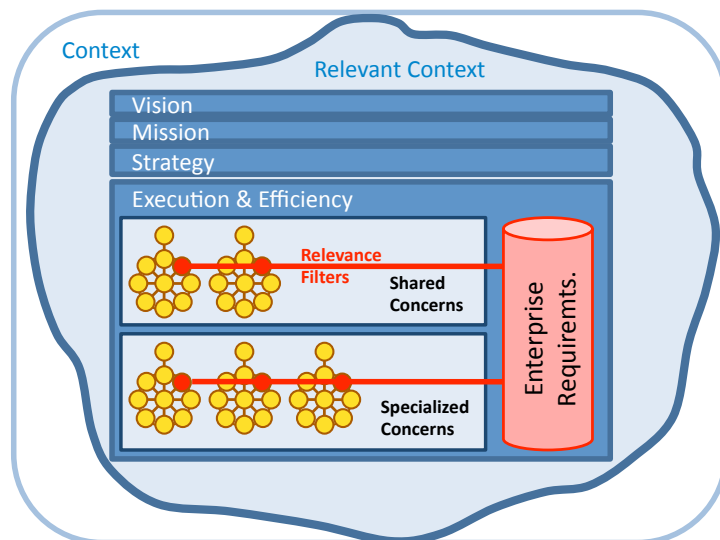
Using the Crop Circle for IT, People, etc. leads to  
different meanings and properties for  
“Business Architecture”



# Attempt to reconcile the models of TOGAF and Holistic Enterprise (3)

Repurpose “Business Architecture”  
into a specific shared concern:

**“Chemistry” - how the intended value defined by vision / mission / strategy is created from the enterprise’s assets**



# Conclusions

- This is a proposal to start reconciling the holistic approach to Enterprise Architecture and the TOGAF ecosystem
- The Open Group can add substantial value to Enterprise Architecture by progressing:
  - TOGAF as a model for specialized concerns
  - Holistic Architecture as a platform for integration
  - Partnerships with architectural efforts addressing other concerns (e.g. supply chain, people, ...)