



Overview of the Revised Standard on Architecture Description – ISO/IEC 42010 (2022)

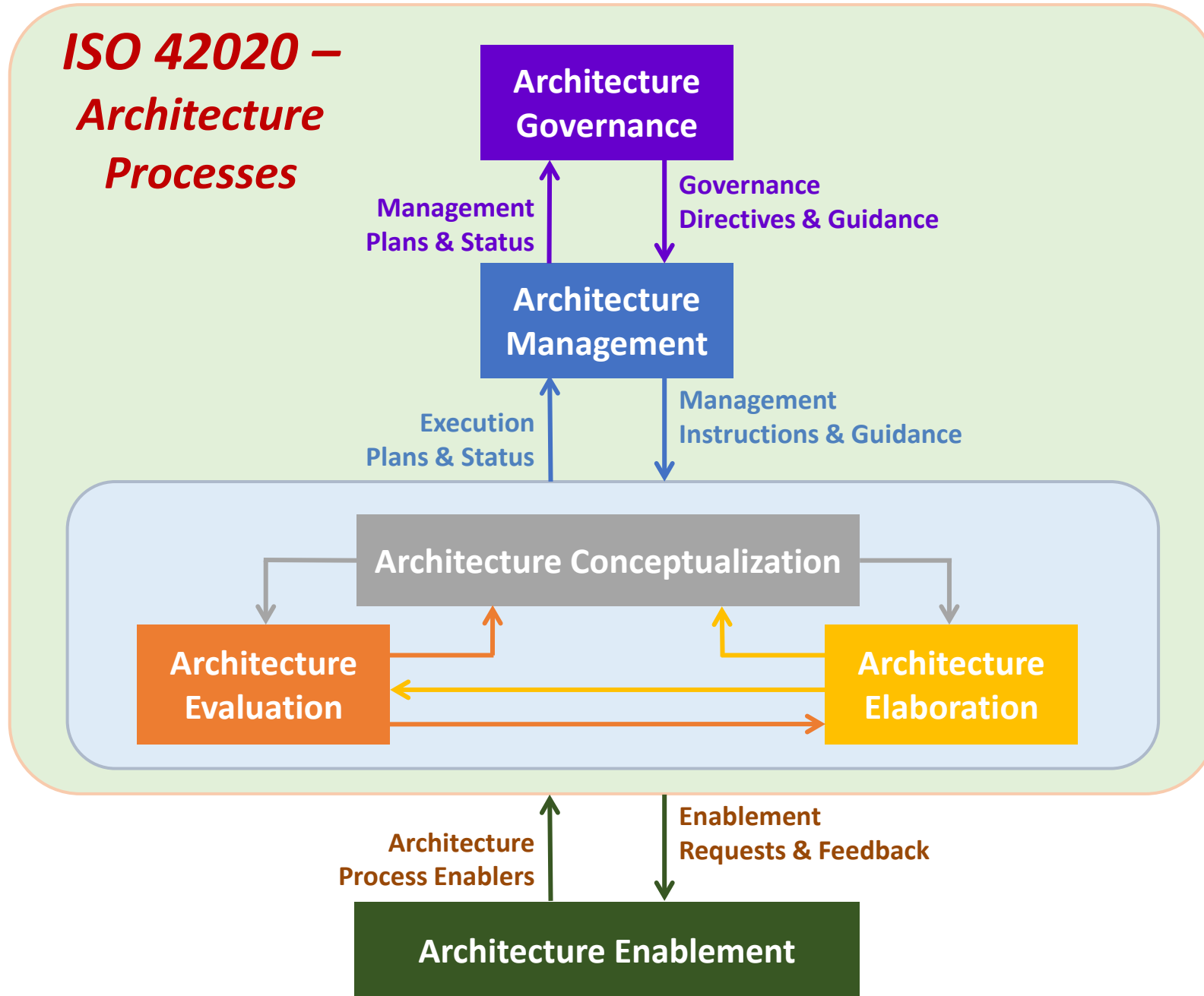
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***MBSE Standards Update
28 January 2023***

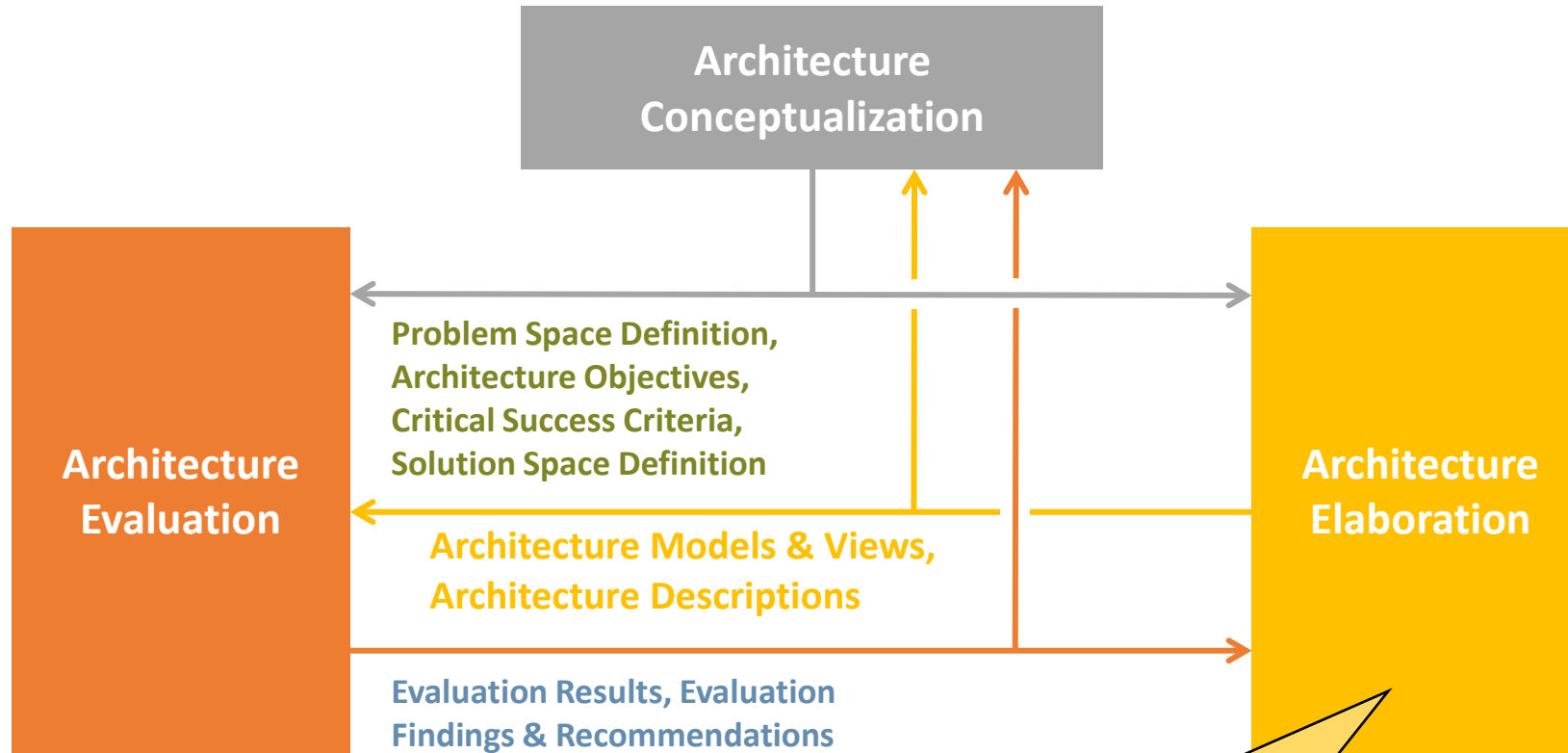


2023
Annual **INCOSE**
international workshop
HYBRID EVENT
Torrance, CA, USA
January 28 - 31, 2023

**ISO 42020 –
Architecture
Processes**

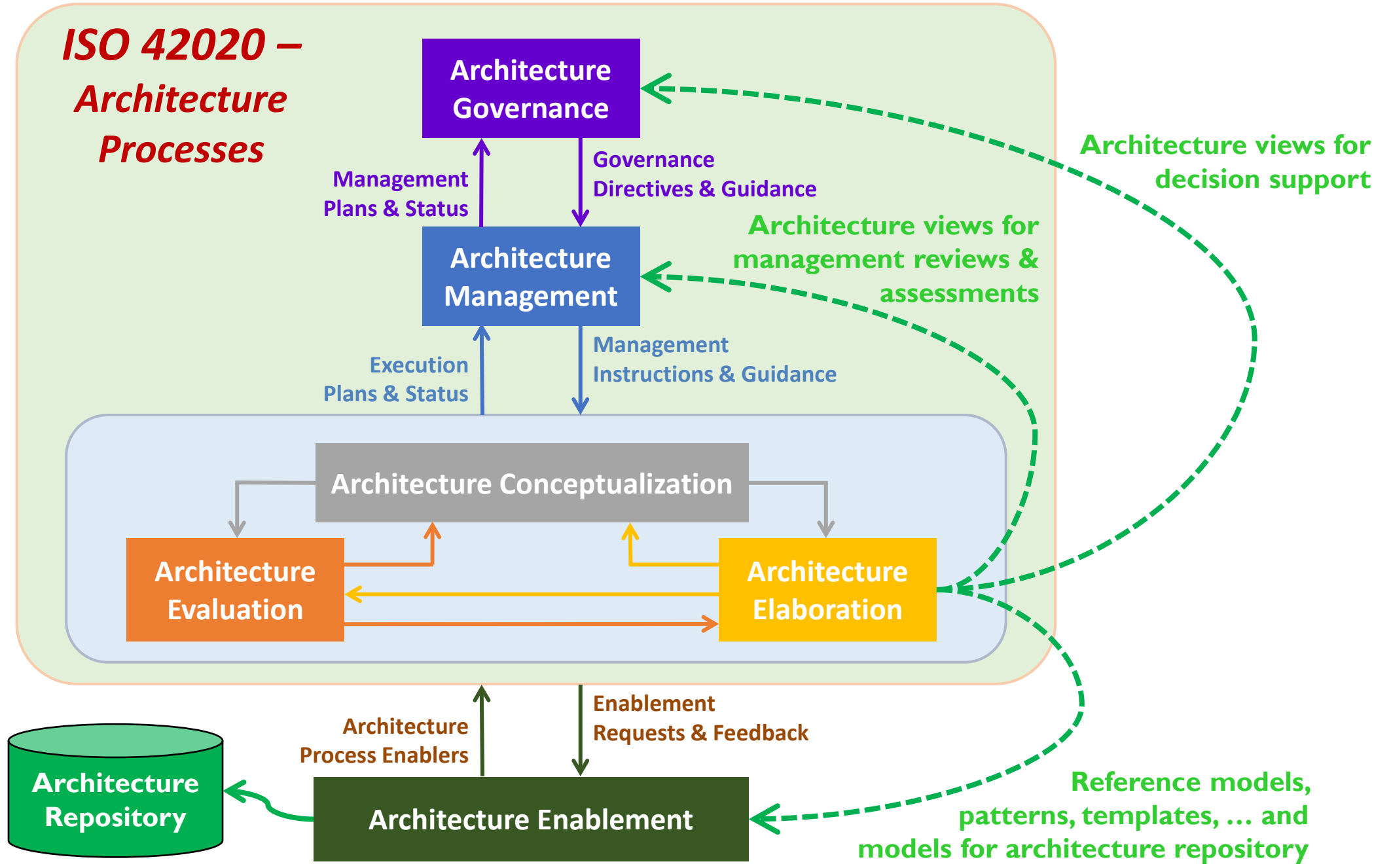


Interactions Between the Core Architecture Processes in ISO 42020 (2019)



**Where ISO 42010
Mainly Applies**

ISO 42020 – Architecture Processes



Key architectural description concepts

concerns

42010 [2nd edition] Viewpoint

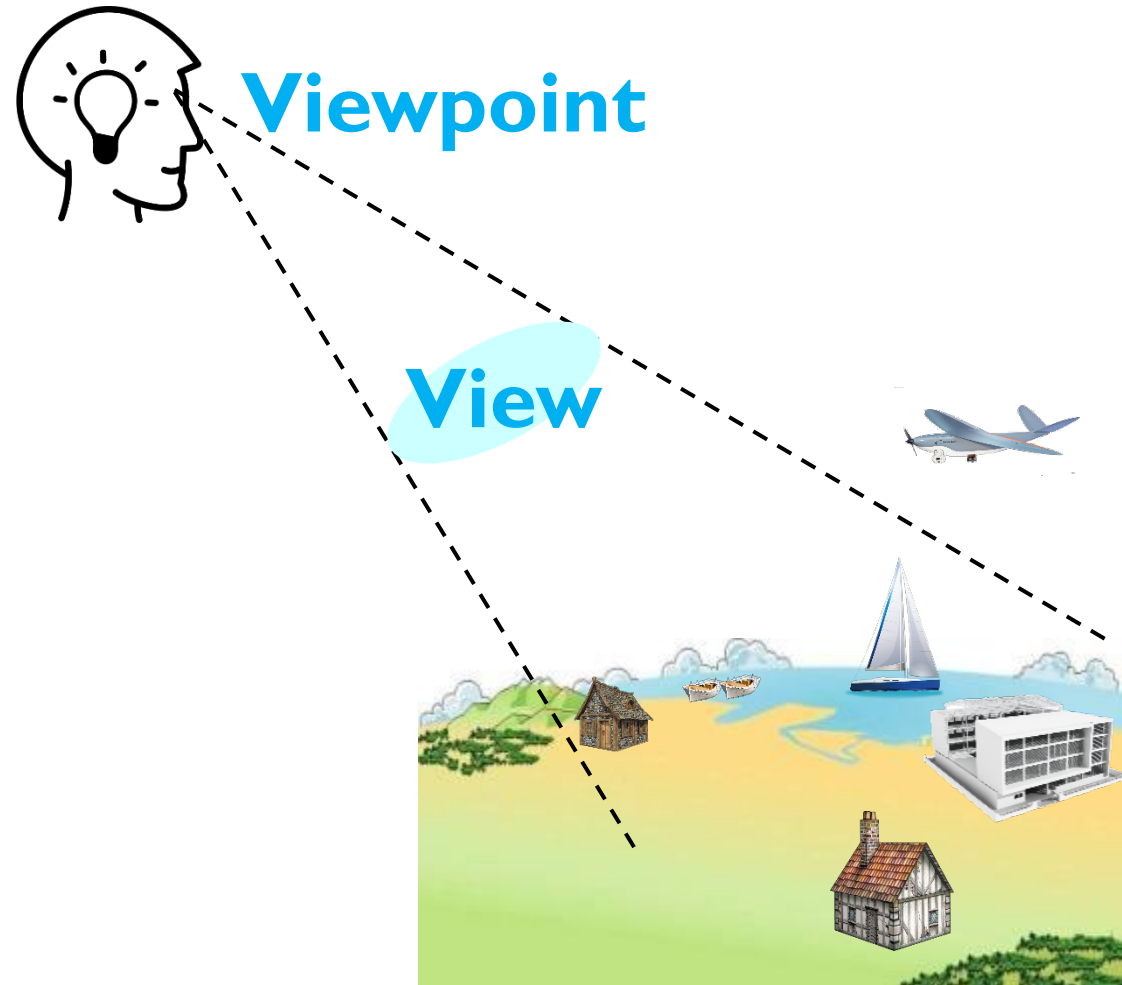
conventions for the creation, interpretation and use of an architecture view to frame one or more concerns

Examples: buyer viewpoint, builder viewpoint, user viewpoint

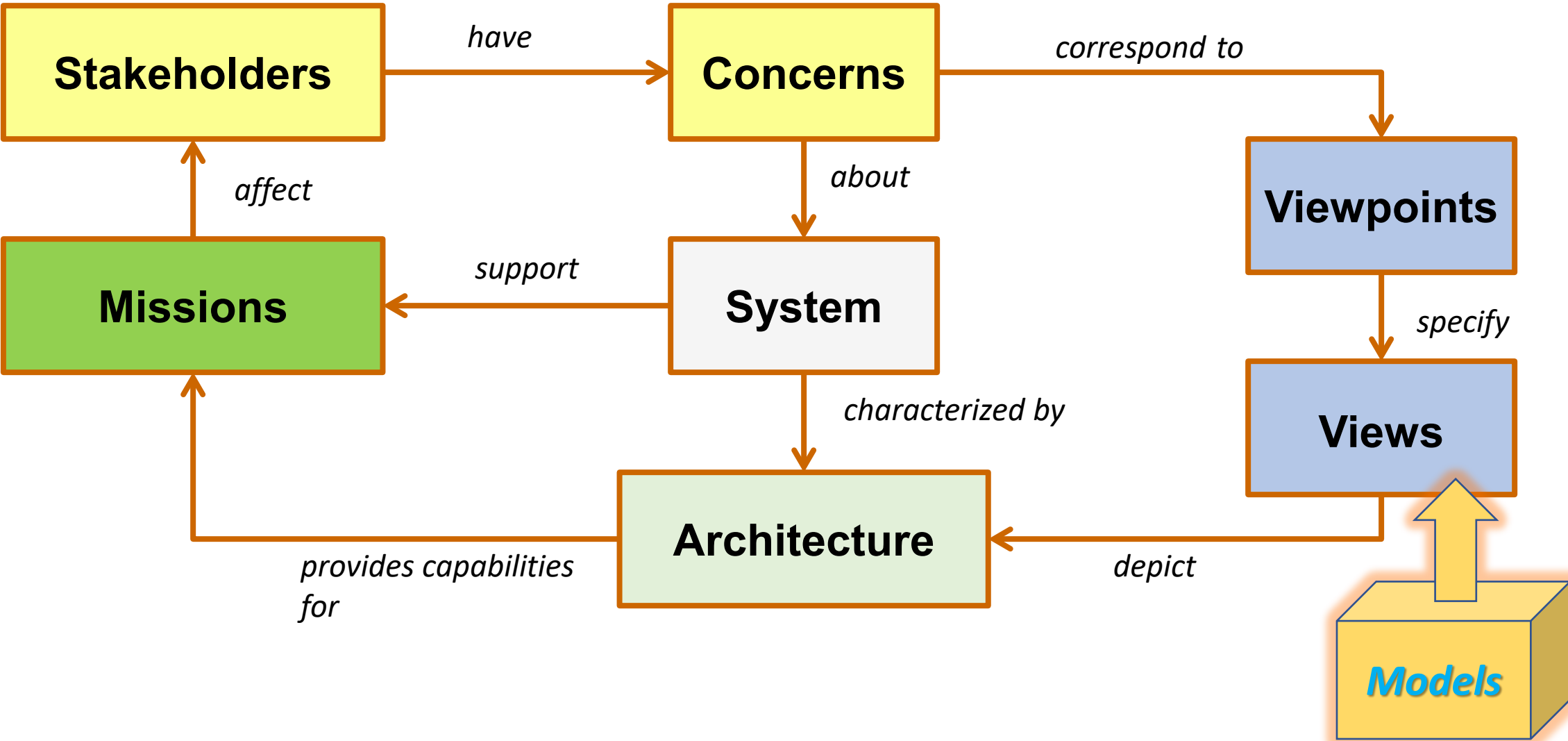
42010 [2nd edition] View

information item comprising part of an architecture description that expresses the architecture of an entity of interest and that is governed by an architecture viewpoint

Note: *Viewpoint Specification is the set of requirements for the conventions of a viewpoint*



Stakeholders and Their Concerns should Drive the Architecture



Key architectural description concepts

42010 [2nd edition] Stakeholder **Perspective**

way of thinking about an entity, especially as it relates to concerns

Examples: Viability, cost, risk, usability or operability, legal compliance, ease of maintenance, market acceptability, market share, ease of implementation

42010 [2nd edition] Architecture **Aspect**

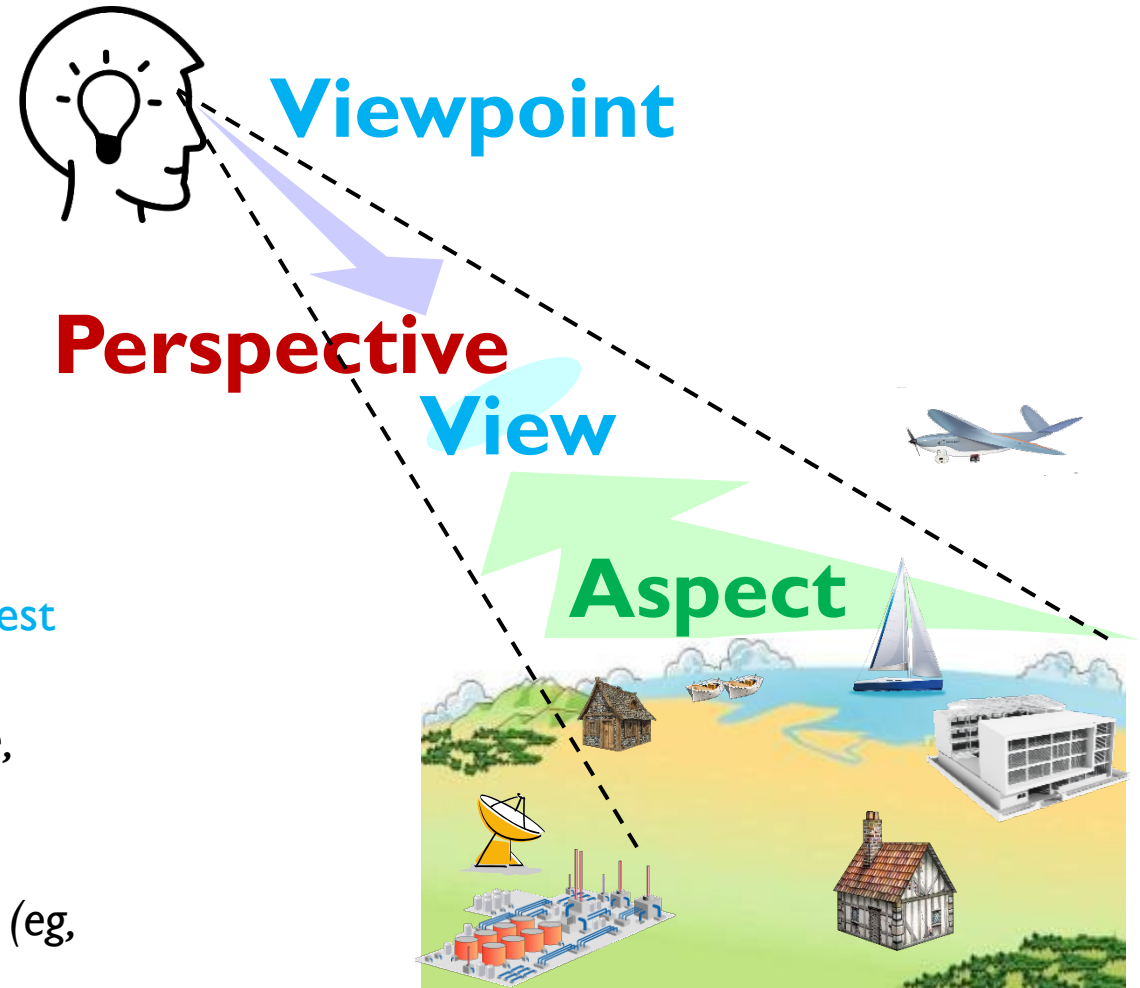
part of an entity's character or nature

...that deals with particular concerns within an architecture, capturing key characteristics or features of the entity of interest



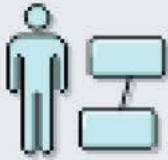
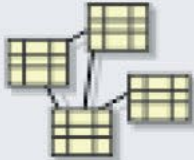
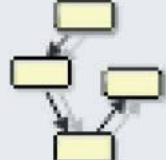
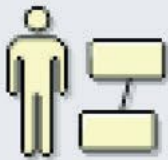

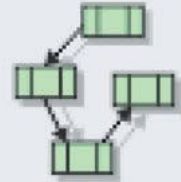

Examples: Functional & Structural aspects of an Architecture, Informational & Parametric aspects

Also, Connectivity, Evolution, Traceability, Taxonomy, Motivation (eg, Requirements, Policy), Location, Timelines

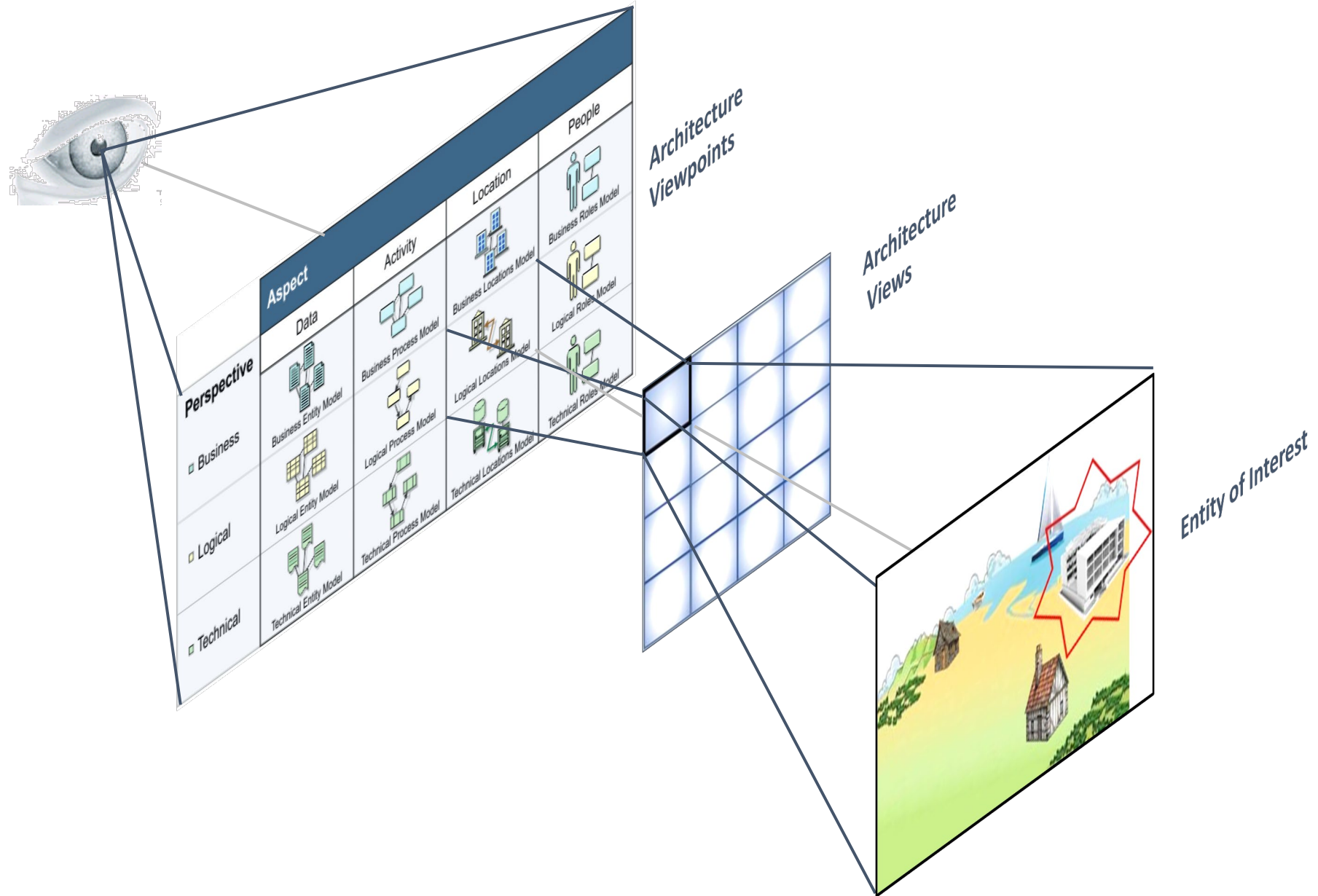
concerns



Example – Unified Architecture Method (UAM)

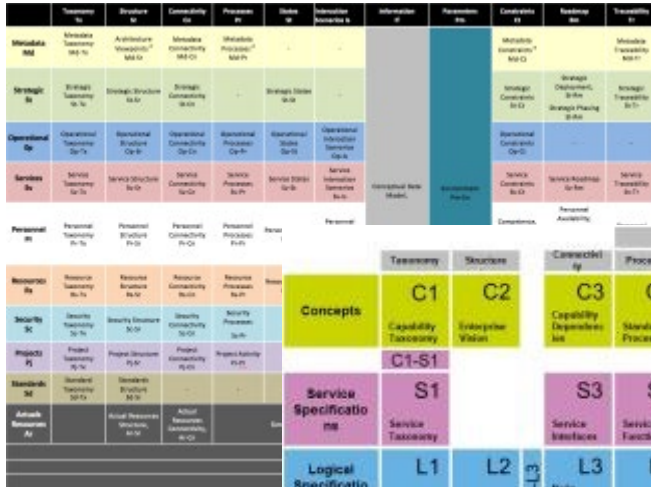
		Aspect			
Perspective		Data	Activity	Location	People
Business		Business Entity Model		Business Locations Model	
Logical		Logical Entity Model		Logical Locations Model	
Technical		Technical Entity Model		Technical Locations Model	

Summary of the 42010 concepts



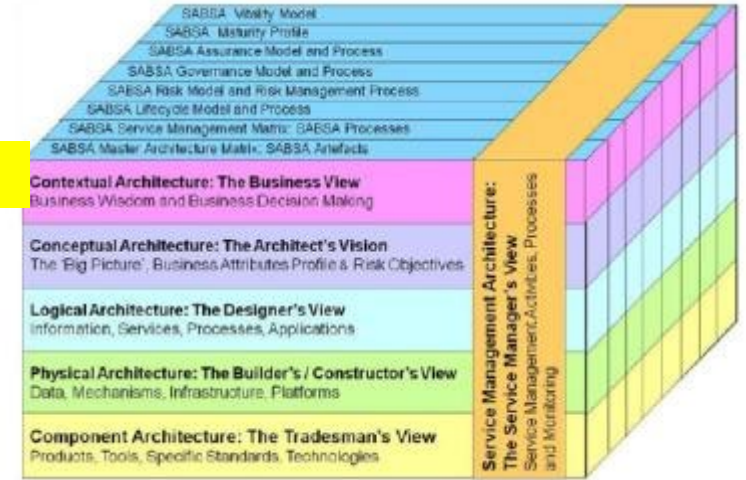
Architecture Frameworks with multi-dimensional approaches

2D: (Source: *OMG/Unified Architecture Framework (UAF)*)

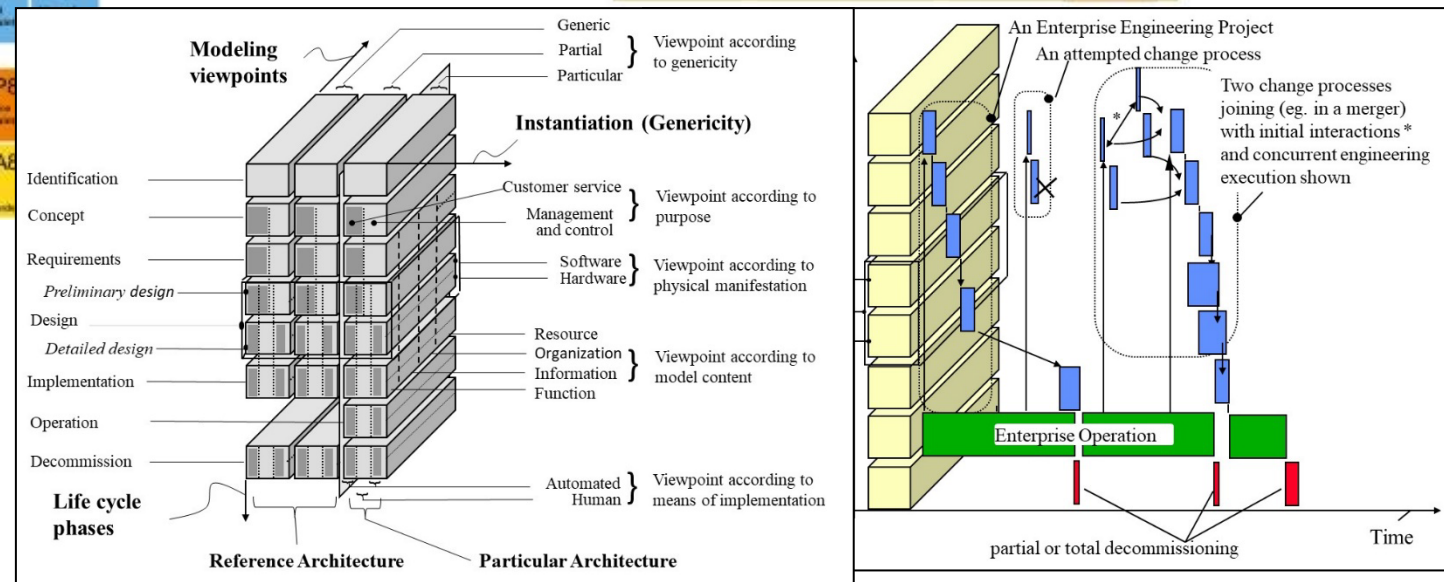


2D: (Source: *NATO Architecture Framework*)

3D: (Source: *Sherwood Applied Business Security Architecture (SABSA) institute*)



2D: (Source: *Zachman Framework*)



4D: (Source: *ISO 15704 Ed2 (Generalized Enterprise Reference Architecture and Methodology)*)

	Taxonomy Tx	Structure Sr	Connectivity Cn	Processes Pr	States St	Interaction Scenarios Is	Information ^c If	Parameters ^d Pm	Constraints Ct	Roadmap Rm	Traceability Tr
Metadata^a Md	Metadata Taxonomy Md-Tx ^f	Metadata Structure Md-Sr	Metadata Connectivity Md-Cn	Metadata Processes Md-Pr	Metadata States Md-St	-	Conceptual Data Model, Logical Data Model, Physical schema ^e , Measurements	Environment Pm-En	Metadata Constraints Md-Ct	Metadata Roadmap Md-Rm	Metadata Traceability Md-Tr
Strategic St	Strategic Taxonomy St-Tx	Strategic Structure St-Sr	Strategic Connectivity St-Cn	-	Strategic States St-St	-			Strategic Constraints St-Ct	Strategic Deployment, St-Rm Strategic Phasing St-Rm	Strategic Traceability St-Tr
Operational Op	Operational Taxonomy Op-Tx	Operational Structure Op-Sr	Operational Connectivity Op-Cn	Operational Processes Op-Pr	Operational States Op-St	Operational Interaction Scenarios Op-Is			Operational Constraints Op-Ct	-	Operational Traceability Op-Tr
Services Sv	Service Taxonomy Sv-Tx	Service Structure Sv-Sr	Service Connectivity Sv-Cn	Service Processes Sv-Pr	Service States Sv-St	Service Interaction Scenarios Sv-Is			Service Constraints Sv-Ct	Service Roadmap Sv-Rm	Service Traceability Sv-Tr
Personnel Pr	Personnel Taxonomy Pr-Tx	Personnel Structure Pr-Sr	Personnel Connectivity Pr-Cn	Personnel Processes Pr-Pr	Personnel States Pr-St	Personnel Interaction Scenarios Pr-Is			Personnel Constraints Pr-Ct	Personnel Availability, Personnel Evolution, Personnel Forecast Pr-Rm	Personnel Traceability Pr-Tr
Resources Rs	Resource Taxonomy Rs-Tx	Resource Structure Rs-Sr	Resource Connectivity Rs-Cn	Resource Processes Rs-Pr	Resource States Rs-St	Resource Interaction Scenarios Rs-Is			Resource Constraints Rs-Ct	Resource evolution, Resource forecast Rs-Rm	Resource Traceability Rs-Tr
Security Sc	Security Taxonomy Sc-Tx	Security Structure Sc-Sr	Security Connectivity Sc-Cn	Security Processes Sc-Pr	-	-			Security Constraints Sc-Ct	-	Security Traceability Sc-Tr
Projects Pj	Project Taxonomy Pj-Tx	Project Structure Pj-Sr	Project Connectivity Pj-Cn	Project Processes Pj-Pr	-	-			-	Project Roadmap Pj-Rm	Project Traceability Pj-Tr
Standards Sd	Standard Taxonomy Sd-Tx	Standards Structure Sd-Sr	-	-	-	-			-	Standards Roadmap Sd-Rm	Standards Traceability Sd-Tr
Actual Resources Ar	-	Actual Resources Structure Ar-Sr	Actual Resources Connectivity Ar-Cn	-	Simulation ^b				-	Parametric Execution/ Evaluation ^b	-
Dictionary Dc											
Summary & Overview Sm-Ov											
Requirements Req											

Unified Architecture Framework



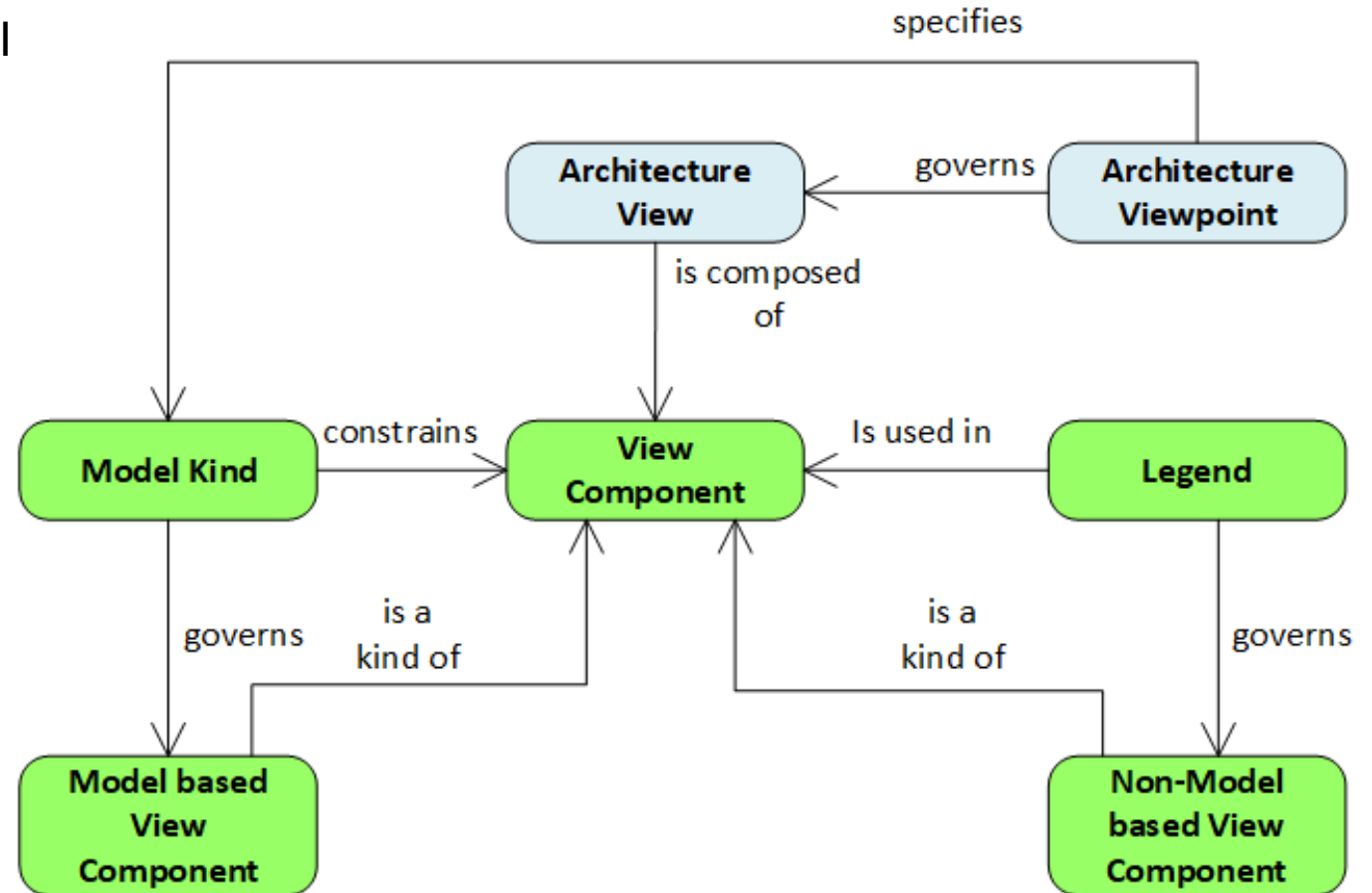
Architecture Views

Composed of Model-Based & Non-Model Based Components

42010 [2nd edition] does not prescribe the level of formality of view components to be used in an AD. While **model-based view components** that have a formal specification of semantics and syntax may be less ambiguous, **non-model based view components** can also be used effectively.

Non-model based View examples:

- Narrative that goes with a behavior diagram
- Use Case template filled in
- List of responsibilities
- List of locations



Key concepts and definitions (1/2)

42010 [2nd edition] Architecture

fundamental **concepts** or **properties** related to an entity in its environment and governing **principles** for the realization and evolution of this entity and its related life cycle processes

42010 [2nd edition] Architecting

conceiving, defining, expressing, documenting, communicating, certifying proper implementation of, maintaining and improving an architecture throughout the life cycle of an entity of interest



Stakeholders

Entity of Interest

...has an Architecture



Key concepts and definitions (2/2)

42010 [2nd edition] Stakeholder

role, position, individual, organization or classes thereof, having an interest, right, share, or claim, in an entity or its architecture



Stakeholders

... have interest in

Entity of Interest

42010 [2nd edition] Concern

matter of relevance or importance regarding an entity of interest to a stakeholder

Examples: How is the system maintained?

What system behaviors are safety-critical?

Can the entity of interest achieve compliance with national regulations?

42010 [2nd edition] Architecture Description

work product used to express an architecture



Other relationships

42010 [2nd edition] View Component

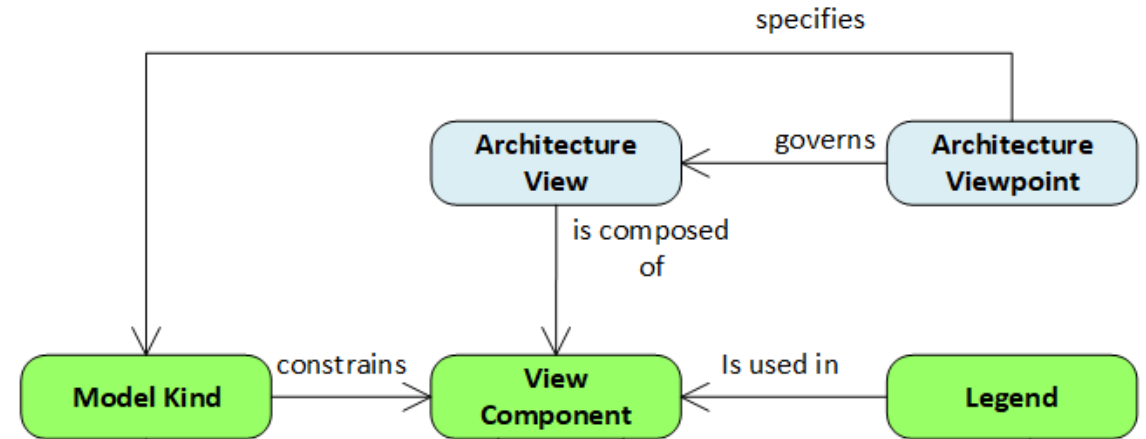
separable portion of one or more architecture views that is governed by the applicable model kind or legend

Example: an architecture view component describing an activity can be used in several views of an architecture description to explain functional flows, behaviors and security features of an entity.

42010 [2nd edition] Model Kind

category of model distinguished by its key characteristics and modeling conventions

Examples: Functional models, structural models, performance models, geopolitical models, cost models, and economic models.



42010 [2nd edition] : A legend denotes the category of explanations or interpretations.

Correspondences

42010 [2nd edition] Correspondence

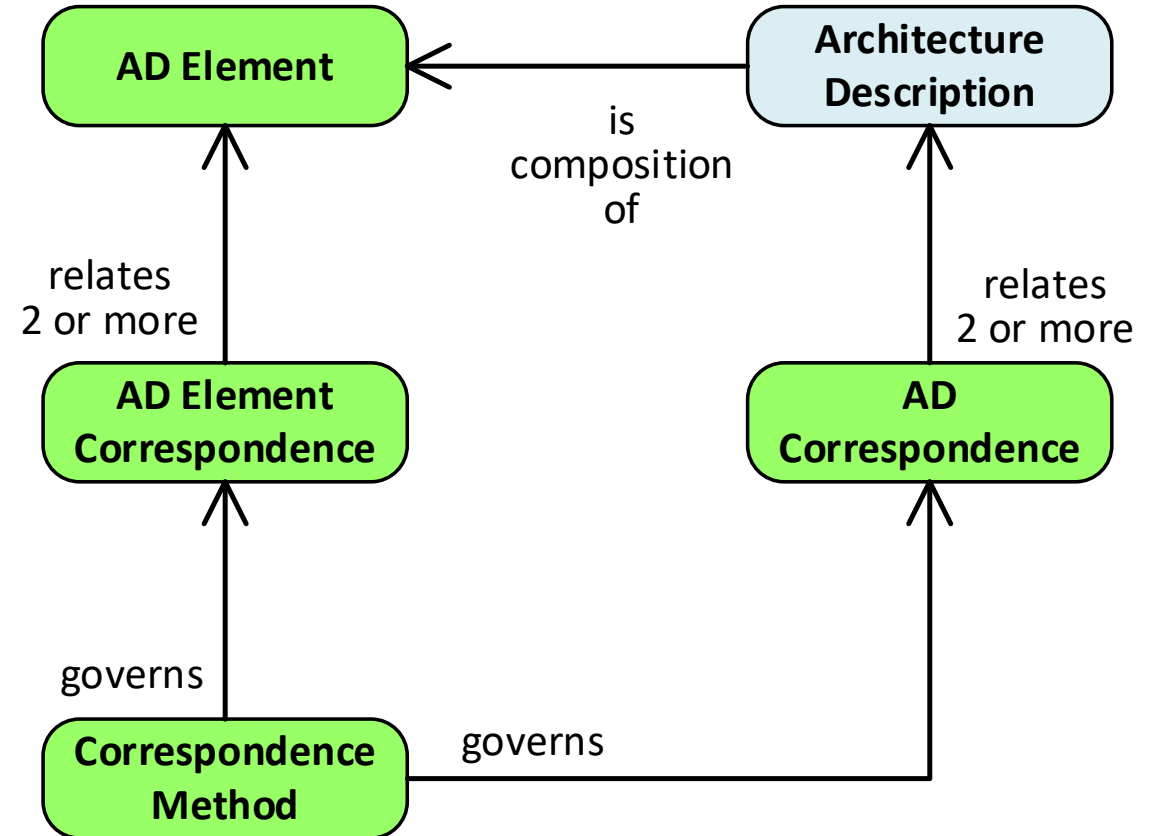
relationship between architecture description elements or between architecture descriptions

Examples: Correspondences can include a wide range or relationship types, such as equivalence, composition, refinement, consistency, traceability, dependency, constraint, satisfaction, and obligation.

42010 [2nd edition] AD element

part of an architecture description that expresses concepts or properties of the architecture

Note to entry: AD elements include stakeholders, concerns, perspectives, aspects, identified in an AD and views, view components, viewpoints and model kinds included in an AD

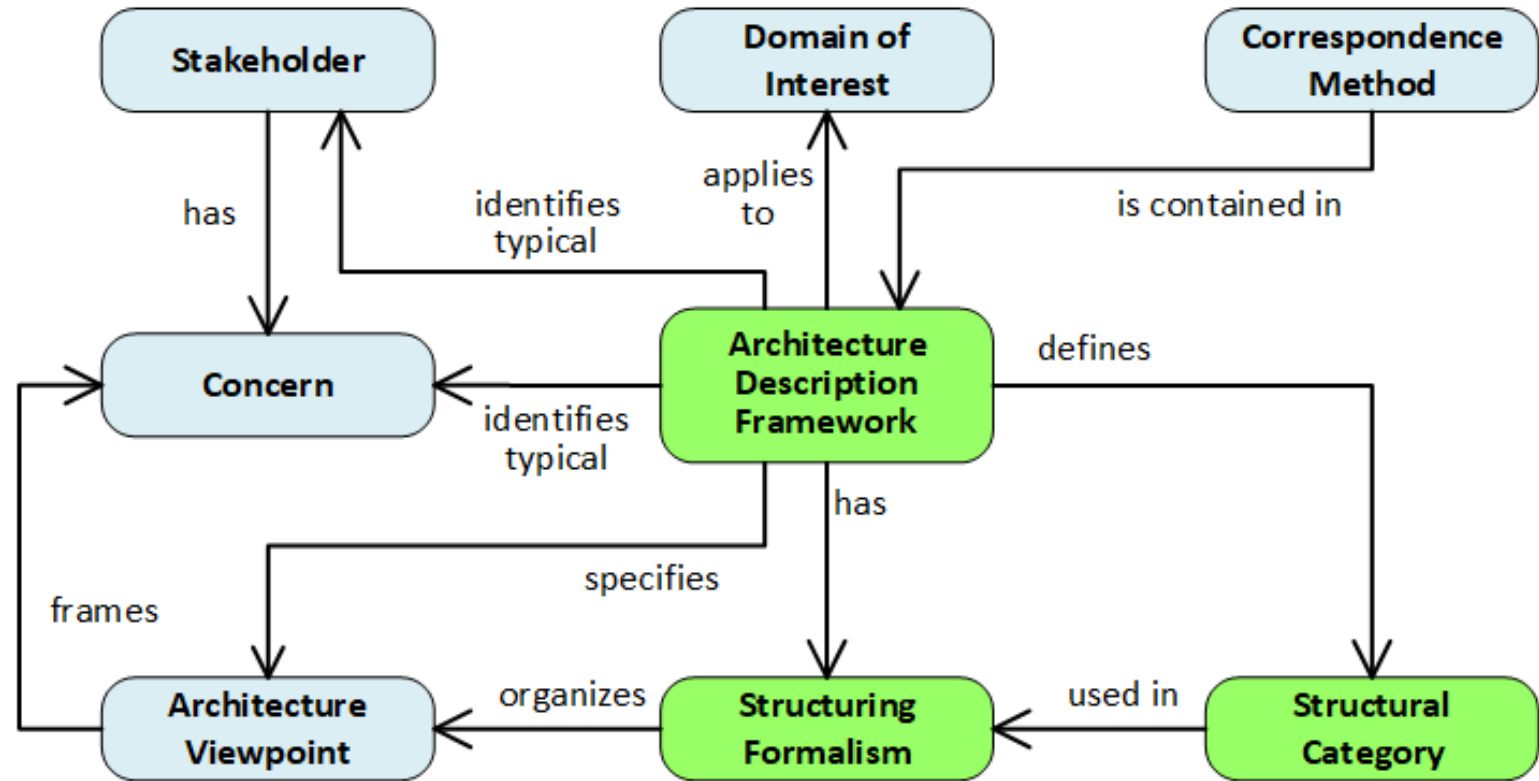


An AD can be an AD element in another architecture.

Architecture Description (AD) Frameworks

42010 [2nd edition] AD Framework
conventions, principles and practices for the description of architectures established within a specific domain of application or community of stakeholders

Examples: GERAM Framework, RM-ODP, UAF, DODAF, NAF



42010 [2nd edition]

- **Structuring formalism** is a set of rules for using architecture considerations and correspondences between them, to organize the architecture viewpoints used to generate associated views, e.g. a grid framework
- An ADF can define **structural categories** used in the structuring formalism. Sometimes these categories are represented by “dimensions” in a graphic portrayal, such as the rows and columns used in several frameworks, e.g. Zachman, UAF and NAF.

Architecture Description (AD) Languages

42010 [2nd edition] AD Language

means of expression, with syntax and semantics, consisting of a set of representations, conventions, and associated rules intended to be used to describe an architecture

Examples: AADL, ArchiMate, SysML, UML, UAF Profile

42010 [2nd edition]

- **Viewing conventions** can include languages, notations, specifications of model kinds, metamodel classes and relationships, and view construction methods expressing design rules, modeling methods, analysis techniques and other operations on views.

