Architecture description template

for use with ISO/IEC/IEEE 42010:2011

Architecture Description of

Layered archiecture for

Web based platform

“Bare bones” edition version: 2.2

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# Contents

Contents 2

Using the template 4

License 5

Version history 5

Editions 6

Comments or questions 6

1 Introduction 7

1.1 Identifying information 7

1.2 Supplementary information 7

1.3 Other information 7

1.3.1 Overview (optional) 7

1.3.2 Architecture evaluations 7

1.3.3 Rationale for key decisions 8

2 Stakeholders and concerns 9

2.1 Stakeholders 9

2.2 Concerns 9

2.3 Concern–Stakeholder Traceability 10

3 Viewpoints+ 11

3.1 <Viewpoint Name> 11

3.2 Overview 11

3.3 Framed concerns and typical stakeholders 11

3.3.1 Concerns 11

3.3.2 Typical stakeholders 12

3.3.3 “Anti-concerns” (optional) 13

3.4 Model kinds+ 13

3.5.2 <Model-Kind-Name> operations (optional) 14

3.5.3 <Model-Kind-Name> correspondence rules 14

3.6 Operations on views 14

3.7 Correspondence rules 15

3.8 Examples (optional) 15

3.9 Notes (optional) 15

3.10 Sources 15

4 Views+ 16

4.1 View: <View-Name> 16

4.1.1 Models+ 16

4.1.2 <Model-Name> 16

4.1.3 Known Issues with View 16

5 Consistency and correspondences 18

5.1 Known inconsistencies 18

5.2 Correspondences in the AD 18

5.3 Correspondence rules 18

A Architecture decisions and rationale 19

A.1 Decisions 19

Bibliography 20

# Using the template

ISO/IEC/IEEE 42010, *Systems and software engineering — Architecture description*, defines the contents of an architecture description (AD) [4].

Figure 1 depicts that contents in terms of a UML class diagram. The AD template in this document defines places for all required information and offers the user some additional guidance on preparing an AD.

An AD may take many forms, not prescribed by the Standard: it could be presented as a document, a set of documents, a collection of models, a model repository, or in some other form – as long as the required content is accessible in some manner. In particular, organization and ordering of required information is not defined by the Standard. Thus, headings and subheadings in this template are merely suggestive – not required.

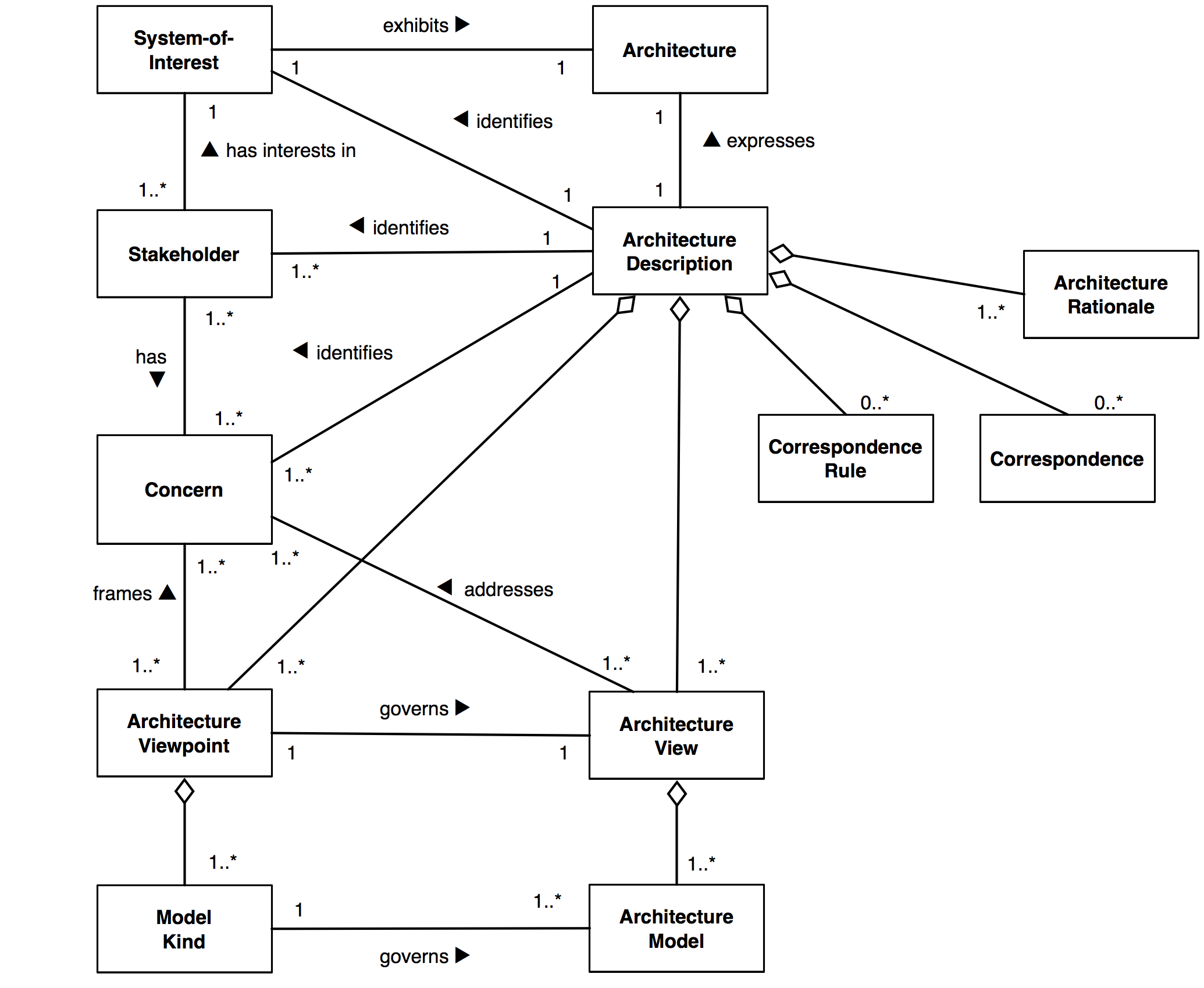
The template uses a few conventions, as follows.

\* “Musts” are items which must be present to satisfy the Standard. Musts are marked like this.

∆ “Shoulds” are items recommended to be present, but not required by the Standard. Shoulds are marked like this.

Optional items are marked with this: (optional). Guidance that defines, explains or otherwise amplifies upon the required items, or terms used therein, looks like this.

<Items> like <this> signal names to be filled-in by a user of the template and used throughout the resulting AD.



Figure

Figure 1: Content model of an architecture description

## License

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http://www.iso-architecture.org/42010/templates/.

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http://www.iso-architecture.org/42010/.

## Version history

This template is based on one originally designed for use with IEEE std 1471:2000 [3] and now updated for ISO/IEC/IEEE 42010:2011. The present document is an enhanced version of the earlier template, with additional guidance, clarifications and examples for readers.

**rev 2.2 7** October 2014, Moved bibliography from bibtex to biblatex. Released revision with minor formatting fixes.

**rev 2.1a** June 2012, Initial release on 42010 website.

## Editions

This is the “bare bones” edition – it contains exactly only information items required by the Standard. Other editions meet the requirements of the Standard and contain additional information used in various documentation approaches (such as [6, 1]).

## Comments or questions

Contact the author Rich Hilliard ⟨r.hilliard@computer.org⟩ with comments, suggestions, improvements or questions.

For more information on ISO/IEC/IEEE 42010, visit the website:   
http://www.iso-architecture.org/42010/.

The template begins here (next page) . . .

# 1 Introduction

.

## 1.1 Identifying information

**Name :** Layered Architecture for java based learning management system(LMS)

**System of Interest:**

1. **User Management:** admin , instructor and student and their roles of each user type with is different from one to another
2. **Course Management:** that have course creation , enrollment management, attendance Management and each with its specific task
3. **Assessment and Grading:** that have quiz creation, assignment submission, Grading and Feedback
4. **Performance Tracking:** have student progress tracking, monitoring progress
5. **Notification** : have to send notification to each student in enrollment confirmation , grading assignment , course related updates

## 1.2 Supplementary information

**1.2.1 Data of Issue and statues:**

The document was issued on November 25, 2024

**Statues:** the current statues of this document is Draft and still development

**1.2.2 Authors , Reviewers and Approving Authority:**

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**This document is issued by :**

**University Name:** cairo University

**Department:** Information system

**Course:** Advanced Software engineering

**Project Team :** Layered Management System Development Team

**1.2.4 Change History:**

|  |  |  |  |
| --- | --- | --- | --- |
| Version | Date | Changes | Reviewed /Approved by |
| 1.0 | November 25, 2024 | Initial creation of architecture document  Add introduction section  Identifying section | Still Not |
|  |  |  |  |
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**1.2.5 Scope:**

This Architecture Description addresses the design and implementation of the Learning Management System for university Project and cover the following areas:

System Components: the document include the details of the main components of the LMS including the User Management system , assessment System ,Notification System

**Functional Features:** the architecture covers features like enrollment, course creation , grading and performance tracking

**Technical Design**: the architecture outline the using of java with spring boot for backend and MySQL for data storage

**Security :** the design includes role based access for different user typers and ensure of system authentication and authorization by using Spring security

**Deployment:** the architecture make on integration with notification system , email for best practices

**1.2.6 context:**

The LMS is developed for university setting system for help of instructors ,students and administrators mange educational content , assessments, and student performance also provide centralized platform where courses can be created , assignments can be submitted , and student progress can be tracked.

**System Interaction:**

Users of system are three user types : admins,instructor, student.

**Admin**: Manages overall system settings, creates users, and manages courses.

**Instructor**: Creates courses, manages course content, adds assignments and quizzes,

grades students, removes students from courses.

**Student**: Enrolls in courses, accesses course materials, take quizzes, hand in

assignments, view assignments and quiz grades.

**External systems** :the LMS will integtate with email services like in course enrollment confirmations, feedback on assignments

**Technological Environment:**

**Backend :** the backend will be developed by java with spring boot to create APIs that handle course data and user interaction

**Database:** it will use the MySQL to store data about courses ,students ,instructors , grades and attendance

**Security:** role based access control will be implemented using spring security to ensure proper authentication and authorization

**Deployment environment:**

The system will be hosted in web server and will be accessible to users via web browser and may deployed on cloud infrastructure for scalability and high availability

**Constraints:**

The project will focus on backend and leave the front end design out side the scope of this document

Integration with third party will be limited

**Security :** the design includes role based access for different user typers and ensure of system authentication and authorization by using Spring security

**Deployment:** the architecture make on integration with notification system , email for best practices

**1.2.7 Glossary:**

This glossary will define key terms of this document architecture

**Admin**: User Role that Manages overall system settings, creates users, and manages courses and students enrollments.

**Instructor**: User role that Creates courses, manages course content, adds assignments and quizzes,

grades students, removes students from courses.

**Student**: User role that Enrolls in courses, accesses course materials, take quizzes, hand in

assignments, view assignments and quiz grades.

**course** :set of education materials and lessons designed by instructors to teach students a specific subject

**Enrollment :** the process that from it the students sign up to take courses

**One time password:** unique code used by students to confirm their attendance the the lesson

**quiz:** test that check the student knowledge through multiple choice ,true or false of short answer questions

**Assignments:** task that given to students that requires then to complete it and submit work

**Grading :**

Process where instructors evaluate student performance and assign scores to quizzes and assignments

**Spring Security :** framework in spring boot that provides the security features for authentication and authorization for users

**Role based access control RBAC:** used to manage user permissions based on role assigned to each user

**1.2.8 Summary:**

This architecture is description for the design for Learning Management system intended to manage courses , assessments, student progress in university environments.

It focuses on backend architecture the includes components for user management , course management, assessment and grading and performance tracking , notifications.

Its use spring boot for backend framework , relational database for data storage and spring security for role based access.

**1.2.9 Version Control Information :**

**Version control system**: Git

**Repository Hosting Platform** Git Hub

**Repository URL**: <https://github.com/tasneem821/advanceds.git>

**Branching Strategy:**

**(Main Branch)** :the primary development branch used for stable release

**1.2.10 Configuration Management Information:**

**Configuration management Tools:**

**Spring Profiles** : used for managing different environments

**Configuration files**:

**Application.properties:** contains application specific configurations

**Dependency Management:**

**Version control:** ensure all dependencies are specified with version numbers to prevent issues;

**Deployment Configuration:**

**Docker:** Used to containerize the application for deployment consistency across the environment

**1.2.11 references:**

**ISO/IEC/IEEE 42010:2011** – Systems and Software Engineering – Architecture Description. International Standard, ISO, 2011. https://ieeexplore.ieee.org/document/6129467

**Spring Boot Documentation** – Official documentation for Spring

Boot. <https://spring.io/projects/spring-boot>

**MySQL Documentation** – Official guide to MySQL database.: <https://dev.mysql.com/doc/>

## 1.3 Other information

### **1.3.1 Overview (optional)**

**Purpose:**

The purpose of the LMS(Learning Management System) to provide

An integrated platform for managing university courses. Assessments, student performance . it supports three user types which are students , instructors and administrators by offering lots of tools like course creation, enrollment management , attendance tracking , grading and performance tracking .

This architecture is designed to be scalabe,secure and user-friendly to meet the wide range of stakeholders

**Scope:**

**User Management:** Admin , students and instructors roles , manage features for registration like login , profile management and role based access control

**Course Management:** Creation of courses , enrollments tracking , lesson management, attendance tracking using one time passwords

**Assessment and grading :**the creation of quizzes and assignments , grading automatically for quizzes , manual grading of assignments , performance tracking

**Notification:** real time notification for students and instructors including update of course enrollments , assignments grading

The architecture will not include front end but it will include backend

**Context:**

It will serve a core component of university’s digital learning infrastructure . the system will integrate with existing systems , like student information system and will scale to support large numbers of students and instructors . it designed to flexible and allowance for future enhancements

The stakeholders of this architecture is :

**Administrators:** its responsible for managing the system , creating students account and ensure that good operation of the platform

**instructor:** create and manage courses , grade assignments, track students performance

**students :**interact with it to enroll in courses access course material submit assignment and track their grades

**Notification:** real time notification for students and instructors including update of course enrollments , assignments grading

**Reader’s Guide :**

**1.Introduction:**This section includes essential identifying information about the system and architecture. It defines the purpose, scope, and context of the architecture description, providing the reader with a high-level overview of the LMS.

**1.1Identifying information :** Contains project-specific information, such as the system of interest and the architecture style.

**1. 2 supplementary information :** Includes details such as date of issue, version control, configuration management, and references

**1.3 other information:** Provides additional context, including the system overview, evaluations, and rationale for key decisions

**2.Archiecture Views:** This section presents different views of the architecture. Views are organized based on the stakeholder concerns

**2.1 functional view :** Describes the key features and functionality of the system

**2. 2 static view :** Illustrates the static structure of the system, including components, classes, and relationships.

**2.3 dynamic view:** Shows how components interact during runtime, covering use cases, interactions, and behaviors.

**3.supplemetary information:** This section offers detailed technical information

**3.1 version control information :** Tracks changes made to the architecture over time, ensuring consistency and traceability

**3. 2 configuration management information :** Describes how the system configurations are controlled and maintained

**3.3 references:** Lists key resources, standards, and literature that informed the design decisions

**4.Other Information:** The final section includes any additional information that supports the architecture description

**4.1** **Architecture Evaluations:** create and manage courses , grade assignments, track students performance

**4. 2 Rationale for Key Decisions :** Explains why certain architectural decisions were made, including trade-offs and alternatives considered

**5 Appendix:** Any supporting documents, diagrams, or additional clarifications can be found in the appendix, which provides a more in-depth exploration of the system’s components.

### 1.3.2 Architecture evaluations

\* Include results from any evaluations of the <Architecture Name> being documented.

### 1.3.3 Rationale for key decisions

\* An architecture description shall include rationale for each decision considered to be a key architecture decision (per ISO/IEC/IEEE 42010, 5.8.2).

See §A for further guidance about decisions and rationale.

# 2 Stakeholders and concerns

This chapter contains information items for stakeholders of the architecture, the stakeholders’ concerns for that architecture, and the traceability of concerns to stakeholders. See also: ISO/IEC/IEEE 42010, 5.3

## 2.1 Stakeholders

\* Identify and describe the stakeholders for the architecture.

Stakeholders may be individuals (e.g., “Joe the CEO”), groups (e.g., “power users of our product”), organizations (e.g., “the Quality Assurance Department” or “the NSA”) as well as classes of same.

The stakeholders have areas of interest, called concerns, that are considered fundamental to the architecture of the system-of-interest. See §2.2.

\* The following stakeholders must be considered when preparing an AD. When applicable to the <System of Interest>, they must be identified in the architecture description: users, operators, acquirers, owners, suppliers, developers, builders and maintainers.

These names are not required to be used; stakeholder names should be chosen as appropriate to the <System of Interest>, the project and/or organization.

## 2.2 Concerns

\* Identify the concerns considered fundamental to the architecture of <System of Interest>.

\* Consider the following concerns, and include them in the AD when applicable:

* What are the purpose(s) of the system-of-interest?
* What is the suitability of the architecture for achieving the system-of-interest’s purpose(s)?
* How feasible is it to construct and deploy the system-of-interest?
* What are the potential risks and impacts of the system-of-interest to its stakeholders throughout its life cycle?
* How is the system-of-interest to be maintained and evolved?

These concern statements are not required to be used; concern statements should be chosen as appropriate to the <System of Interest>, the project and/or organization.

For further guidance on concerns, see §3.3.1.

## 2.3 Concern–Stakeholder Traceability

\* Associate each identified concern from §2.2 with the identified stakeholders from §2.1 having that concern.

This association can be recorded via a simple table or other depiction.

Table 2.1: Example showing association of stakeholders to concerns in an AD

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Stakeholder 1 | Stakeholder 2 | Stakeholder 3 | . . . |
| Concern 1 | – | X | X |  |
| Concern 2 | X | – | X |  |
| Concern 3 | X | X | – |  |
| ... |  |  |  |  |

# 3 Viewpoints+

An AD contains multiple architecture views; each view adheres to the conventions of an *architecture viewpoint*. This chapter describes the requirements on documenting viewpoints for an AD.

\* Include a specification for each architecture viewpoint used in this AD.

\* Viewpoints must be chosen for the AD such that each identified concern from §2.2 is framed by at least one viewpoint.

\* Provide a rationale for each viewpoint used.

Rationale could include discussion in terms of its stakeholders, the concerns framed by the viewpoint, relevance of its model kinds and modeling conventions.

\* Each architecture viewpoint used in the AD must be specified in accordance with the provisions of ISO/IEC/IEEE 42010, 7.

A detailed template for specifying viewpoints in accordance with the Standard is included in §3.1 below.

NOTE: The latest version of the viewpoint template can be found at   
http://www.iso-architecture.org/42010/templates/.

Repeat and fill-in viewpoint template as needed for each viewpoint used in the AD.

An AD contains one or more architecture views and an architecture viewpoint definition for each view. There is no required ordering of the views or viewpoints within an AD. Readers of the AD will need to refer to the viewpoint specifications to understand the subject of a view, its notations, models and the modeling conventions used. Given a set of views (Vi) and their viewpoints (VPi), the architect might consider the following possible arrangements:

* Viewpoints, first: VPi, followed by the views: Vi
* Interleaved views with their viewpoints: Vi, VPi, Vj, VPj, ...
* Views up front: Vi with the viewpoints deferred to appendices: VPi

## 3.1 <Viewpoint Name>

\* Provide the name for the viewpoint.

If there are any synonyms or other common names by which this viewpoint is known or used, record them here.

## 3.2 Overview

Provide an abstract or brief overview of the viewpoint. Describe the viewpoint’s key features.

## 3.3 Concerns and stakeholders

Architects looking for an architecture viewpoint suitable for their purposes often use the identified concerns and typical stakeholders to guide them in their search. Therefore it is important (and required by the Standard) to document the concerns and stakeholders for which a viewpoint is intended.

### 3.3.1 Concerns

\* Provide a listing of architecture-relevant concerns to be framed by this architecture viewpoint per ISO/IEC/IEEE 42010, 7a.

Describe each concern.

Concerns name “areas of interest” in a system.

NOTE: Following ISO/IEC/IEEE 42010, **system** is a shorthand for any number of things including man-made systems, software products and services, and software-intensive systems such as “individual applications, systems in the traditional sense, subsystems, systems of systems, product lines, product families, whole enterprises, and other aggregations of interest”.

Concerns may be very general (e.g., Reliability) or quite specific (e.g., How does the system handle network latency?).

Concerns identified in this section are critical information for an architect because they help her decide when this viewpoint will be useful.

When used in an architecture description, the viewpoint becomes a “contract” between the architect and stakeholders that these concerns will be addressed in the view resulting from this viewpoint.

It can be helpful to express concerns in the form of questions that views resulting from that viewpoint will be able to answer. E.g.,

* How does the system manage faults?
* What services does the system provide?

NOTE: “In the form of a question” is inspired by the television quiz show, *Jeopardy!*

ISO/IEC/IEEE 42010, 5.3 contains a candidate list of concerns that must be considered when producing an architecture description. These can be considered here for their relevance to the viewpoint being specified:

* What are the purpose(s) of the system-of-interest?
* What is the suitability of the architecture for achieving the system-of-interest’s purpose(s)?
* How feasible is it to construct and deploy the system-of-interest?
* What are the potential risks and impacts of the system-of-interest to its stakeholders throughout its life cycle?
* How is the system-of-interest to be maintained and evolved? See also: ISO 42010 4.2.3.

### 3.3.2 Typical stakeholders

\* Provide a listing of the typical stakeholders of a system who are in the potential audience for views of this kind, per ISO/IEC/IEEE 42010, 7b.

Typical stakeholders would include those likely to read such views and/or those who need to use the results of this view for another task.

Stakeholders to consider include:

* users of a system;
* operators of a system;
* acquirers of a system;
* owners of a system;
* suppliers of a system;
* developers of a system;
* builders of a system;
* maintainers of a system.

### 3.3.3 “Anti-concerns” (optional)

It may be helpful to architects and stakeholders to document the kinds of issues for which this viewpoint is *not appropriate or not particularly useful*. Identifying the “anti-concerns” of a given notation or approach may be a good antidote for certain overly used models and notations.

## 3.4 Model kinds+

\* Identify each model kind used in the viewpoint per ISO/IEC/IEEE 42010, 7c.

In the Standard, each architecture view consists of multiple architecture models. Each model is governed by a model kind which establishes the notations, conventions and rules for models of that type. See: ISO/IEC/IEEE 42010, 4.2.5, 5.5 and 5.6.

Repeat the next section for each model kind listed here the viewpoint being specified.

3.5 <Model Kind Name>

\* Identify the model kind.

3.5.1 <Model Kind Name> conventions

\* Describe the conventions for models of this kind.

Conventions include languages, notations, modeling techniques, analytical methods and other operations. These are key modelling resources that the model kind makes available to architects and determine the vocabularies for constructing models of the kind and therefore, how those models are interpreted and used.

It can be useful to separate these conventions into a *language part*: in terms of a metamodel or specification of notation to be used and a *process part*: to describe modeling techniques used to create the models and methods which can be used on the models that result. These include operations on models of the model kind.

The remainder of this section focuses on the language part. The next section focuses on the process part.

The Standard does not prescribe how modeling conventions are to be documented. The conventions could be defined:

I) by reference to an existing notation or language (such as SADT, UML or an architecture description language such as ArchiMate or SysML) or to an existing technique (such as M/M/4 queues);

II) by presenting a metamodel defining its core constructs;

III) via a template for users to fill in;

IV) by some combination of these methods or in some other manner.

Further guidance on methods I) through III) is provided below.

Sometimes conventions are applicable across more than one model kind – it is not necessary to provide a separate set of conventions, a metamodel, notations, or operations for each, when a single specification is adequate.

#### I) Model kind languages or notations (optional)

Identify or define the notation used in models of the kind.

Identify an existing notation or model language or define one that can be used for models of this model kind. Describe its syntax, semantics, tool support, as needed.

#### II) Model kind metamodel (optional)

A metamodel presents the AD elements that constitute the vocabulary of a model kind, and their rules of combination. There are different ways of representing metamodels (such as UML class diagrams, OWL, eCore). The metamodel should present:

* entities: What are the major sorts of conceptual elements that are present in models of this kind?
* attributes: What properties do entities possess in models of this kind?
* relationships: What relations are defined among entities in models of this kind?
* constraints: What constraints are there on entities, attributes and/or relationships and their combinations in models of this kind?

NOTE: Metamodel constraints should not be confused with architecture constraints that apply to the subject being modeled, not the notations used.

In the terms of the Standard, entities, attributes, relationships are AD elements per ISO/ISO/IEC 42010, 3.4, 4.2.5 and 5.7.

In the Views-and-Beyond approach [1], each viewtype (which is similar to a viewpoint) is specified by a set of elements, properties, and relations (which correspond to entities, attributes and relationships here, respectively).

When a viewpoint specifies multiple model kinds it can be useful to specify a single viewpoint metamodel unifying the definition of the model kinds and the expression of correspondence rules. When defining an architecture framework, it may be helpful to use a single metamodel to express multiple, related viewpoints and model kinds.

#### III) Model kind templates (optional)

Provide a template or form specifying the format and/or content of models of this model kind.

### 3.5.2 <Model Kind Name> operations (optional)

Specify operations defined on models of this kind.

See §3.6 for further guidance.

### 3.5.3 <Model Kind Name> correspondence rules

\* Document any correspondence rules associated with the model kind. See §3.7 for further guidance.

## 3.6 Operations on views

Operations define the methods to be applied to views and their models. Types of operations include:

* **construction methods** are the means by which views are constructed under this viewpoint. These operations could be in the form of process guidance (how to start, what to do next); or work product guidance (templates for views of this type). Construction techniques may also be heuristic: identifying styles, patterns, or other idioms to apply in the synthesis of the view.
* **interpretation methods** which guide readers to understanding and interpreting architecture views and their models.
* **analysis methods** are used to check, reason about, transform, predict, and evaluate architectural results from this view, including operations which refer to model correspondence rules.
* **implementation methods** are the means by which to design and build systems using this view.

Another approach to categorizing operations is from Finkelstein et al. [2]. The work plan for a viewpoint defines 4 kinds of actions (on the view representations): *assembly actions* which contains the actions available to the developer to build a specification; *check actions* which contains the actions available to the developer to check the consistency of the specification; *viewpoint actions* which create new viewpoints as development proceeds; *guide actions* which provide the developer with guidance on what to do and when.

## 3.7 Correspondence rules

\* Document any correspondence rules defined by this viewpoint or its model kinds.

Usually, these rules will be across models or across views since, constraints within a model kind will have been specified as part of the conventions of that model kind. See: ISO/IEC/IEEE 42010 4.2.6 and 5.7.

## 3.8 Examples (optional)

Provide helpful examples of use of the viewpoint for the reader (architects and other stakeholders).

## 3.9 Notes (optional)

Provide any additional information that users of the viewpoint may need or find helpful.

## 3.10 Sources

\* Identify sources for this architecture viewpoint, if any, including author, history, bibliographic references, prior art, per ISO/IEC/IEEE 42010, 7e.

# 4 Views+

Much of the material in an AD is presented through its architecture views. Each view follows the conventions of its governing viewpoint. A view is made up of architecture models.

\* Include an architecture view for each viewpoint selected in §3.

Repeat and complete the following section for each architecture view in the AD.

## 4.1 View: <View Name>

\* Give the architecture view a <View Name>.

\* Provide any identifying and supplementary information about <View Name>.

The details of this information will be as specified by the organization and/or project. See §1 for examples of identifying and supplementary information.

Views have their own identifying and supplementary information distinct from ADs because they may be developed and evolve separately over the lifetime of a project.

\* Identify the viewpoint governing this view from among those identified in §3.

See also: ISO/IEC/IEEE 42010, 5.5

### 4.1.1 Models+

An architecture view is composed of one or more architecture models.

\* Provide one or more architecture models adhering to the governing viewpoint.

\* The models must address all of the concerns framed by the view’s governing viewpoint and cover the whole system from that viewpoint.

Repeat the section below for each model.

### 4.1.2 <Model Name>

\* Each architecture model shall include version identification as specified by the organization and/or project.

\* Each architecture model shall identify its governing model kind and adhere to the conventions of that model kind from §3.5.

See ISO/IEC/IEEE 42010, 5.4.

An architecture model may be a part of more than one architecture view. This enables sharing of details and addressing distinct but related concerns without redundancy. Other uses of multiple models: aspect-oriented style of architecture description: architecture models shared across architecture views can be used to express architectural perspectives [6] and architecture textures [5]. Architecture models can be used as containers for applying architecture patterns or architecture styles to express fundamental schemes (such as layers, three-tier, peer-to-peer, model-view-controller) within architecture views.

### 4.1.3 Known Issues with View

\* Document any discrepancies between the view and its viewpoint conventions.

Each architecture view must adhere to the conventions of its governing architecture viewpoint.

Known issues could include: inconsistencies, items to be completed, open or unresolved issues, exceptions and deviations from the conventions established by the viewpoint. Open issues can lead to decisions to be made. Exceptions and deviations can be documented as decision outcomes and rationale.

# 5 Consistency and correspondences

This chapter describes consistency requirements, recording of known inconsistencies in an AD, and the use and documentation of correspondences and correspondence rules.

## 5.1 Known inconsistencies

\* Record any known inconsistencies in the AD.

Although consistent ADs obviously are to be preferred, it is sometimes infeasible or impractical to resolve all inconsistencies for reasons of time, effort, or insufficient information.

∆ An architecture description should include an analysis of consistency of its architecture models and its views.

## 5.2 Correspondences in the AD

\* Identify each correspondence in the AD and its participating AD elements. Identify any correspondence rules governing

Correspondences are used to express, record, enforce and analyze consistency between models, views and other AD elements within an architecture description, between ADs, or between an AD and other forms of documentation.

AD elements include instances of stakeholders, concerns, viewpoints and views, model kinds and models, decisions and rationales. Constructs introduced by viewpoints and model kinds are also AD elements.

Correspondences are n-ary mathematical relations. Correspondences can be depicted via tables, via links, or via other forms of association (such as in UML).

## 5.3 Correspondence rules

\* Identify each correspondence rule applying to the AD.

Correspondence rules can be introduced by the AD, by one of its viewpoints, or from an architecture framework or architecture description language being used.

\* For each identified correspondence rule, record whether the rule holds (is satisfied) or otherwise record all known violations.

# A Architecture decisions and rationale

It is not required by the Standard to capture architecture decisions. This section describes recommendations (“shoulds”) for their recording.

## A.1 Decisions

∆ Provide evidence of consideration of alternatives and the rationale for the choices made.

∆ Record architecture decisions considered to be key to the architecture of <System of Interest>.

Areas to consider to selecting key decisions include those:

* affecting key stakeholders or many stakeholders
* essential to project planning and management
* expensive to enforce or implement
* highly sensitive to changes or costly to change
* involving intricate or non-obvious reasoning
* pertaining to architecturally significant requirements
* requiring major expenditures of time or effort to make
* resulting in capital expenditures or indirect costs

∆ When recording decisions, the following information items should be considered:

* unique identifier for the decision
* statement of the decision
* correspondences or linkages concerns to which it pertains
* owner of the decision
* correspondences or linkages to affected AD elements
* rationale linked to the decision
* forces and constraints on the decision
* assumptions influencing the decision
* considered alternatives and their potential consequences

See [7] and references there for various approaches to documenting decisions compatible with the Standard.

The template ends here!

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