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Rule-Based Assessment of Solution Architecture Alignment

SWC Software Construction | RWTH AACHEN UNIVERSITY

Agenda

- Introduction
  - Problem Statement
  - Research Goal
  - Research Questions
- Related Work
- Solution Concept
- Live - Demonstration
- Evaluation & Discussion
- Threats to Validity & Future Work

Introduction

Problem Statement

- Enterprise Architecture has multiple aspects
  - Provide a prescriptive framework to guide the development of the organisation's IT systems
    - Use prescriptions as guidelines & constraints for local projects
  - Prescriptions help to manage IT resources effectively
    - Ensure the quality of the architecture

Problem Statement

- Defining prescriptions is not sufficient
  - Conformance will not occur automatically
    - Especially in larger organisations
  - Rises the need for a compliance assessment framework
- Compliance assessments: Tests that ensure the solution architecture conforms with the prescriptions
  - Local projects are tested for conformance

Problem Statement

- There have been frameworks proposed
  - Compliance Assessments of Projects Adhering to Enterprise Architecture by Foorthuis et al.
  - TOGAF Architecture Compliance Review
- Current frameworks involve a lot of personal influence
  - Causes assessments to be inconsistent and non-reproducible

Research Goal

- Improve consistency of compliance assessments
  - By reducing subjectivity of assessments
- Develop Rule-Based framework to perform assessments
- Implement the framework in form of a software prototype

Research Questions

- Which data points are relevant during the compliance assessment process?
- How can the assessment of solution architecture alignment with the enterprise architecture be supported by a tool?
- How can the assessment of solution architecture alignment be made more consistent and reproducible?
- Which insights can be gained from the assessment of the solution architecture alignment?

Related Work

Related Work

- Two categories of Enterprise Architecture Compliance literature:
  - Automatic Compliance Checking
    - Focuses on automating the compliance check process
  - Frameworks for Expert-based compliance checks
    - Support enterprise architects to perform compliance assessments

Automatic Compliance Checks

- The proposed frameworks usually translate EA-Compliance into a *formal-system* that is used check the compliance of EA-Artefacts
- This approach helps to perform Compliance Assessments on a regular basis
- Foorthuis et al. state that EA might not be suited for automatic compliance tests
  - They are likely to yield irrelevant outcomes

Expert-based EA Compliance Assessments

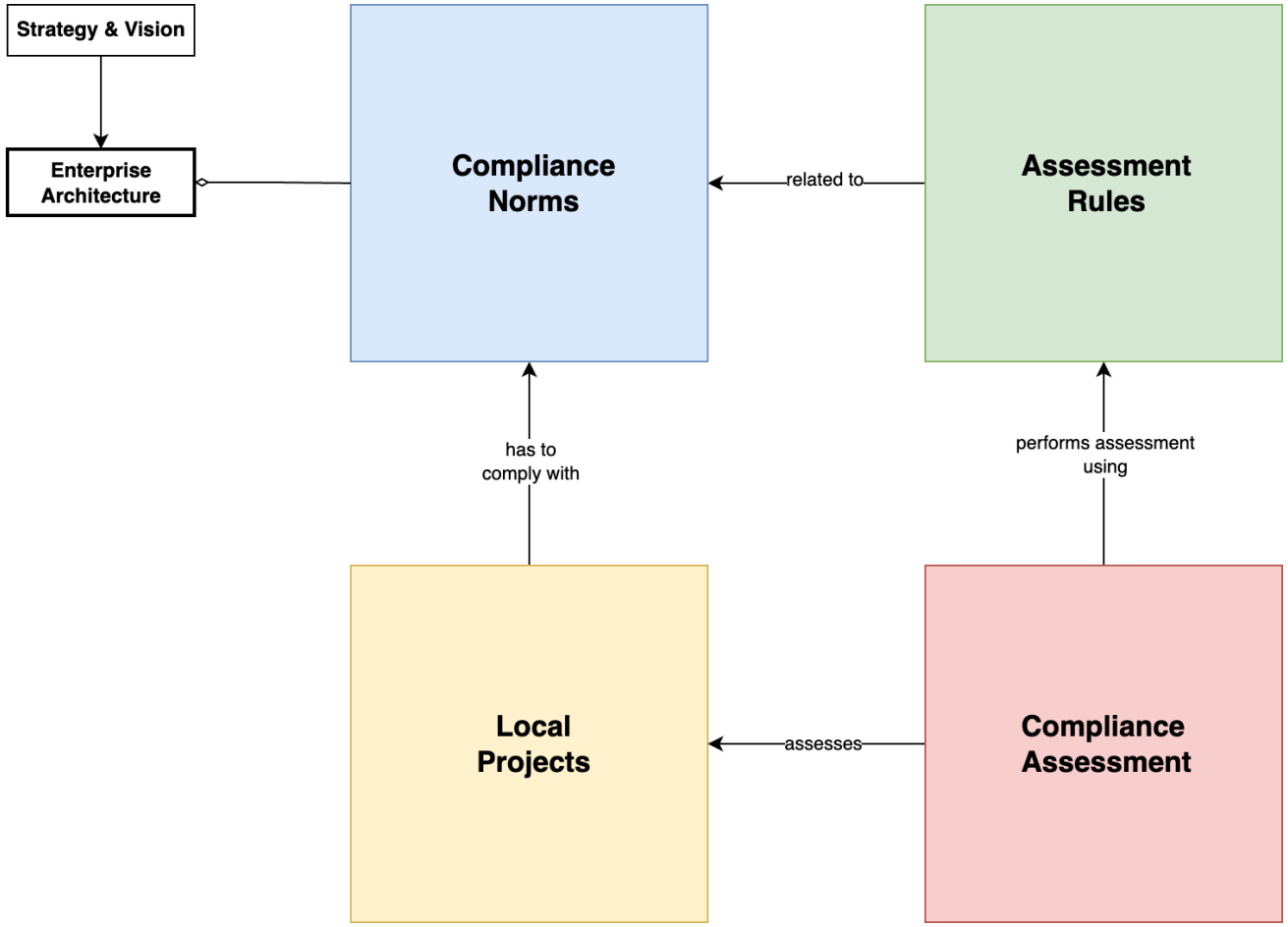
- Goal is to support enterprise architects in the compliance assessment process using a framework
- Enable in-depth/ domain-knowledge compliance checks
- Proposed frameworks often lack consistency
- Prone to personal influence

Solution Concept

Scope of the framework

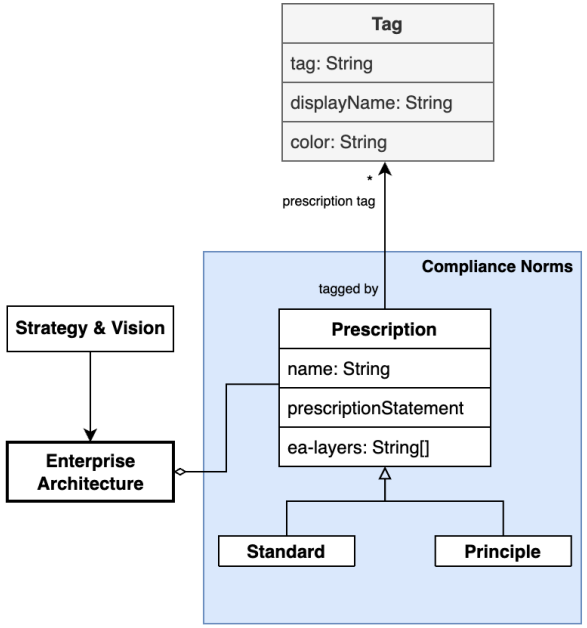
- Scope defines boundaries and requirements
- The framework focuses on compliance assessments
  - Not on other overlying management processes
- Expects certain information to be present:
  - EA-Prescriptions
  - Projects

Compliance Model



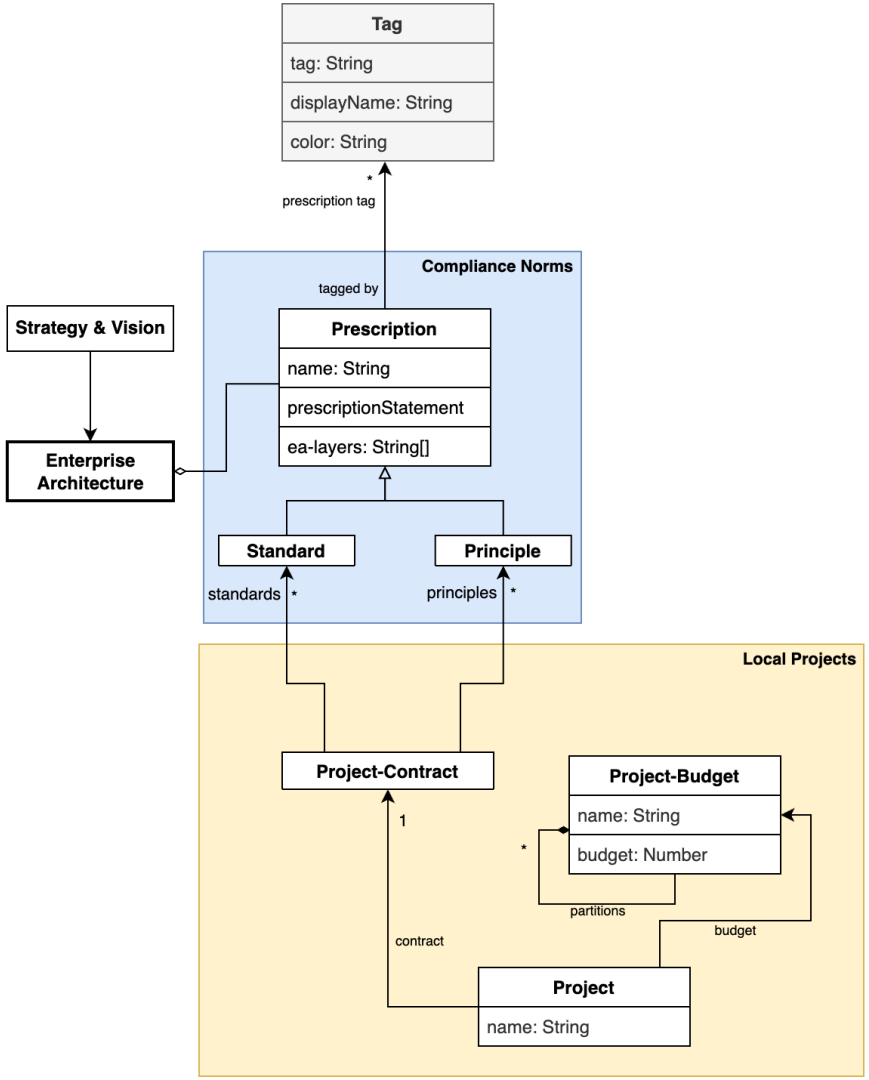
- **Compliance Norms**: Manage Prescriptions
- **Local Projects**: Manage Projects
- **Compliance Assessments**: Used to perform the compliance assessments
- **Assessment Rules**: Intermediate step in assessment to ensure consistency

Compliance Norms



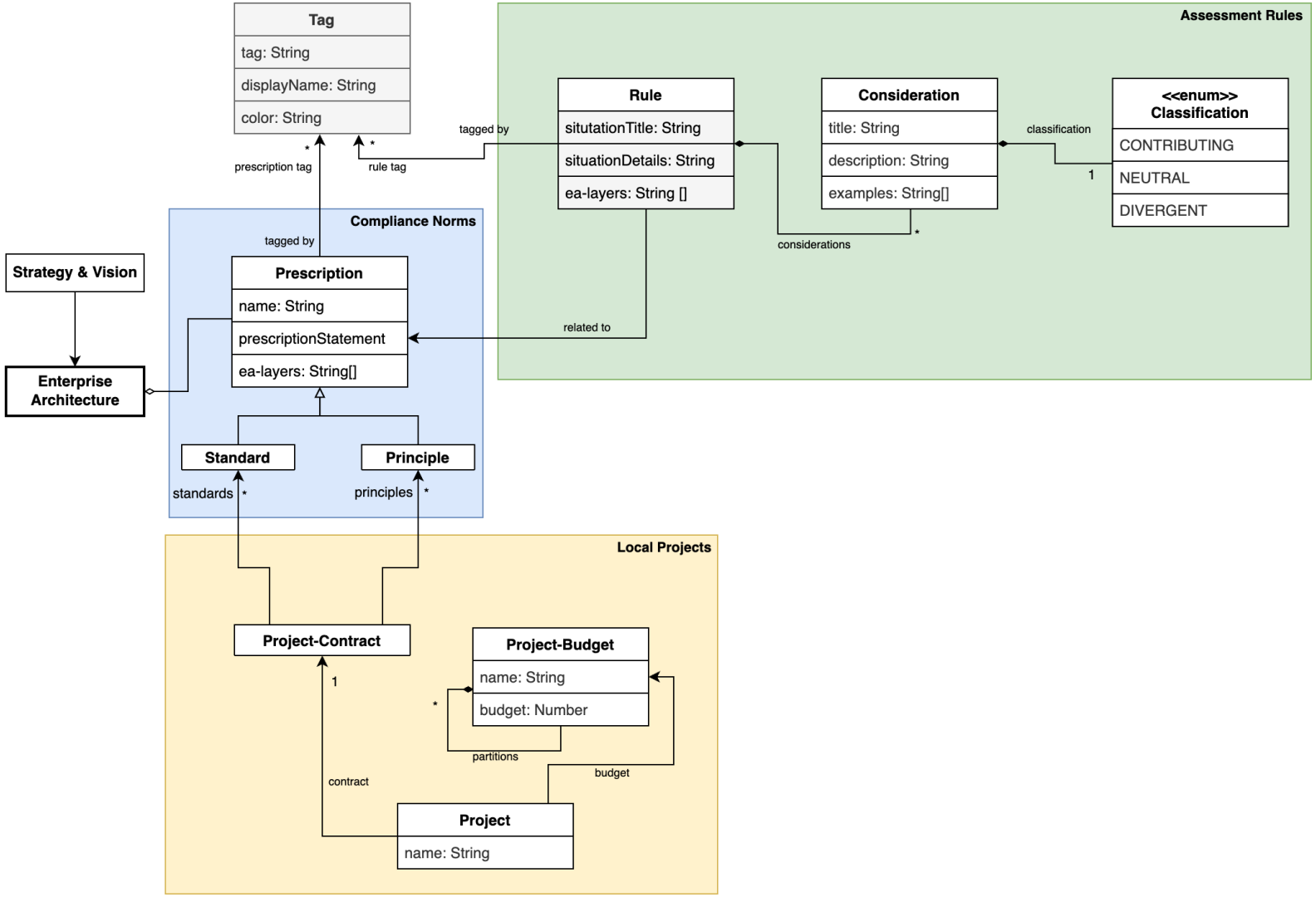
- Manages prescriptions
- Standards & Principles are supported
- Metadata helps to manage a large number of prescriptions

Local Projects



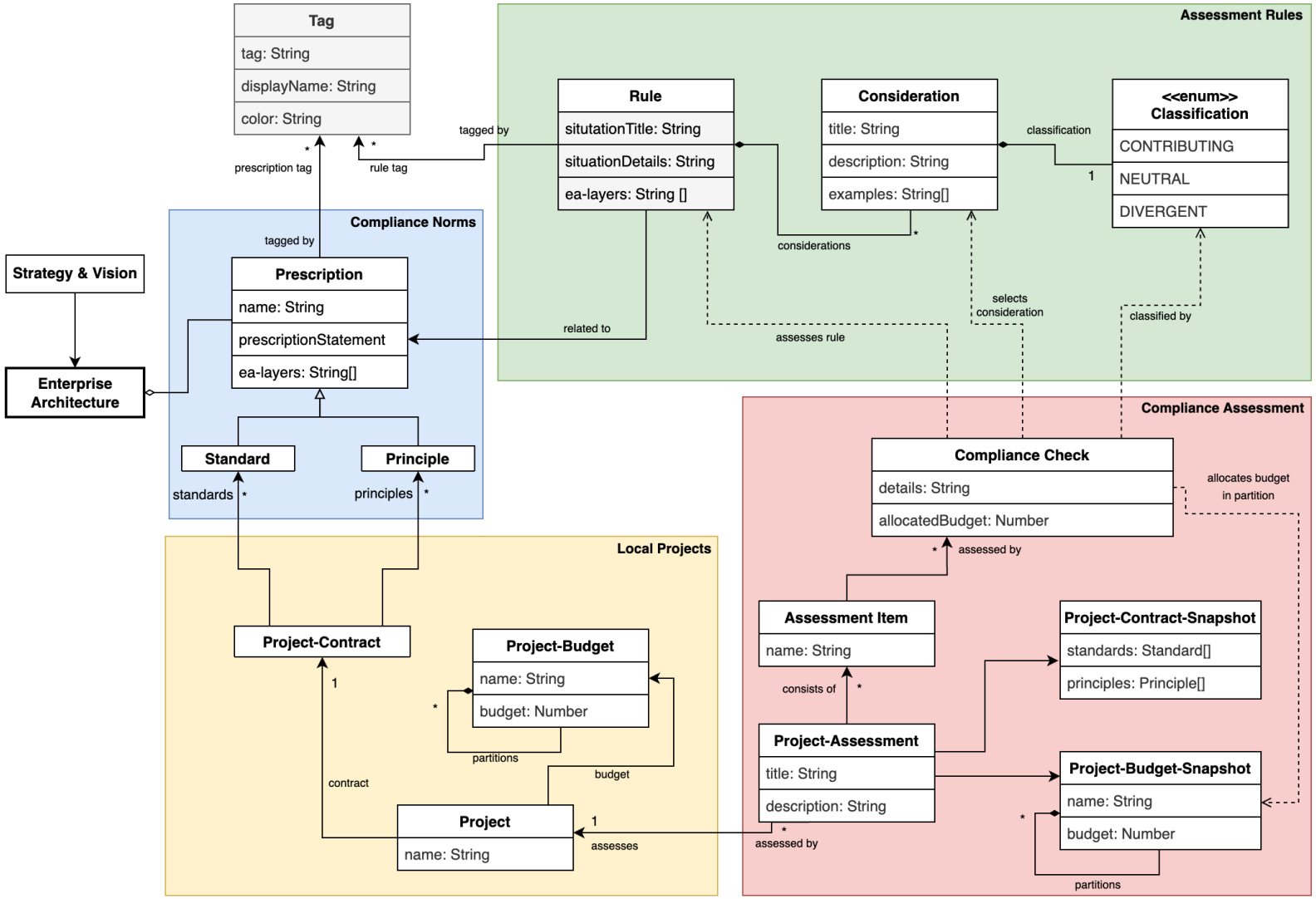
- Local projects carry out transformation initiatives
- Project-Contract manages relevant prescriptions of the project
- Project-Budget represents the budget allocated by the enterprise for the project

Assessment Rules



- Prescriptions are written in abstract language
  - Rules provide additional layer of abstraction
- Rule consist of Situation and Considerations
- Rules have metadata attached to them
- Relationships to prescriptions help during the assessment

Compliance Assessment

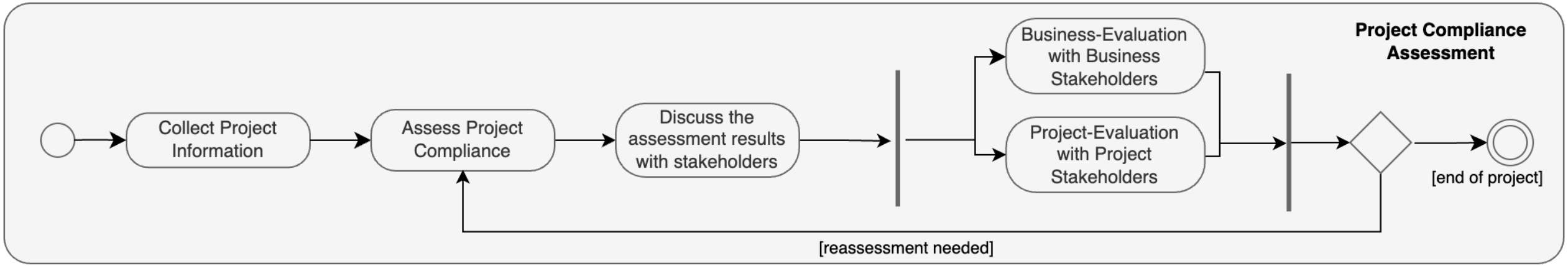


- Projects can be assessed multiple times
- Assessments are split into multiple parts
- Contract & Budget are archived when the assessment is started
- Compliance Checks collects all information of a Rule assessment

Compliance Process

- Describes how the components presented in the model are used
- Two process models
  - *Project Compliance Lifecycle*
    - Covers project assessment, discussion and communication
  - *Project Compliance Assessment Process*
    - Covers **one** architecture assessment iteration
    - Part of the *Project Compliance Lifecycle*

Project Compliance Lifecycle



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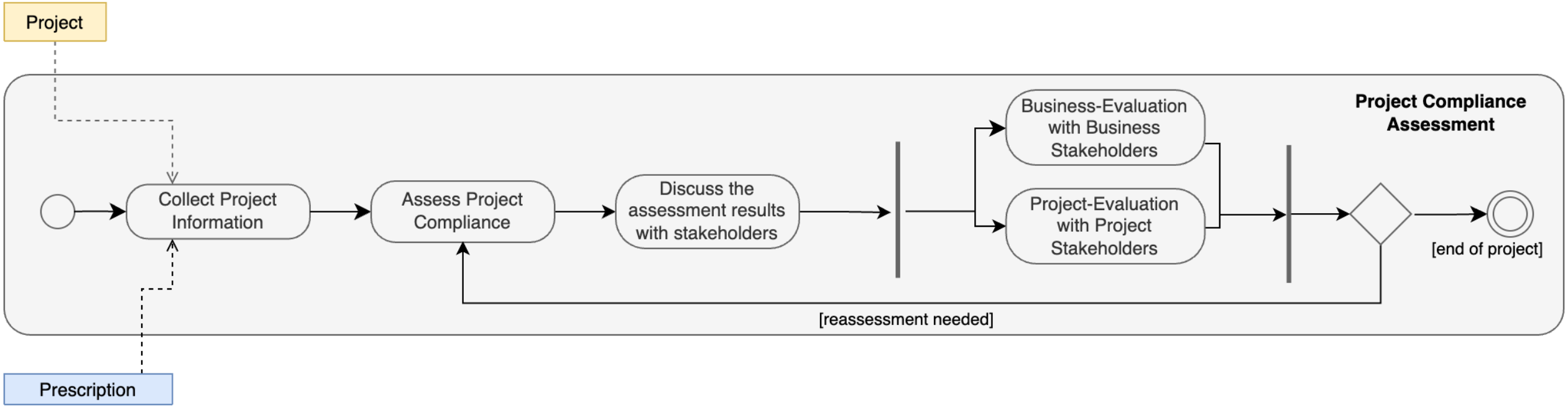

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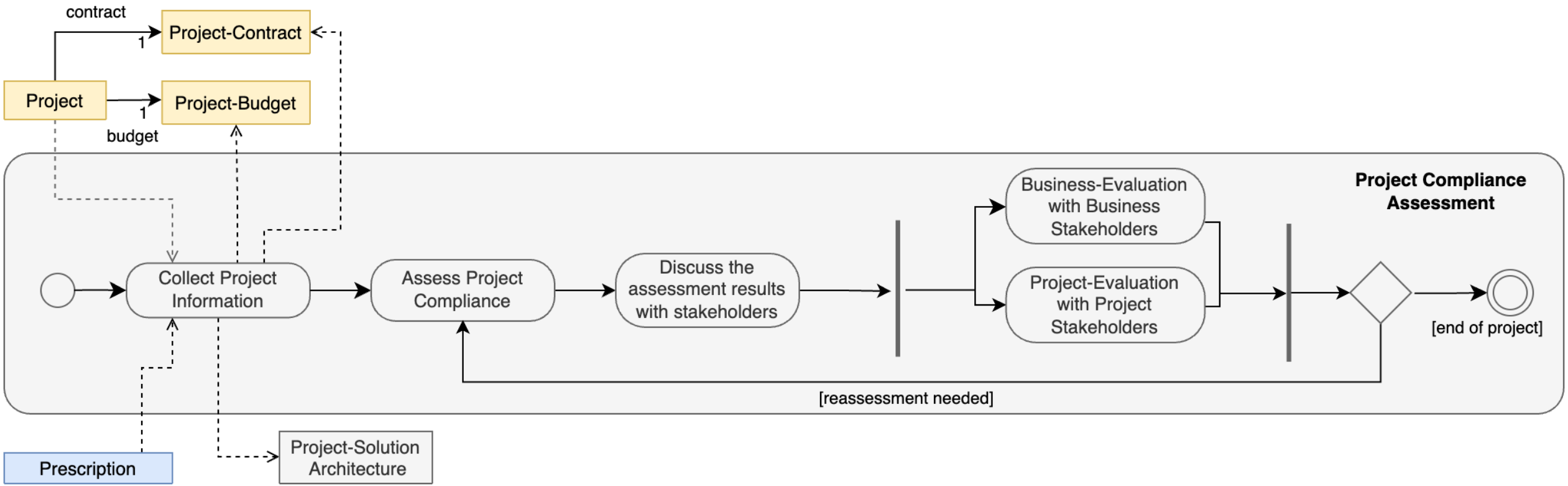

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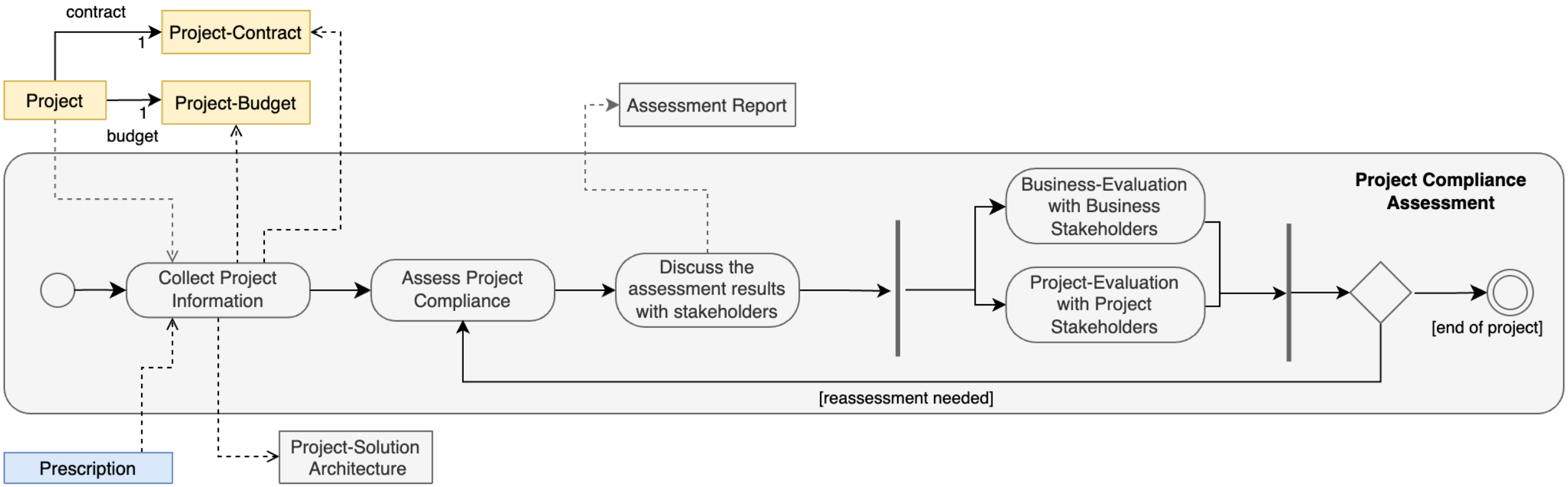

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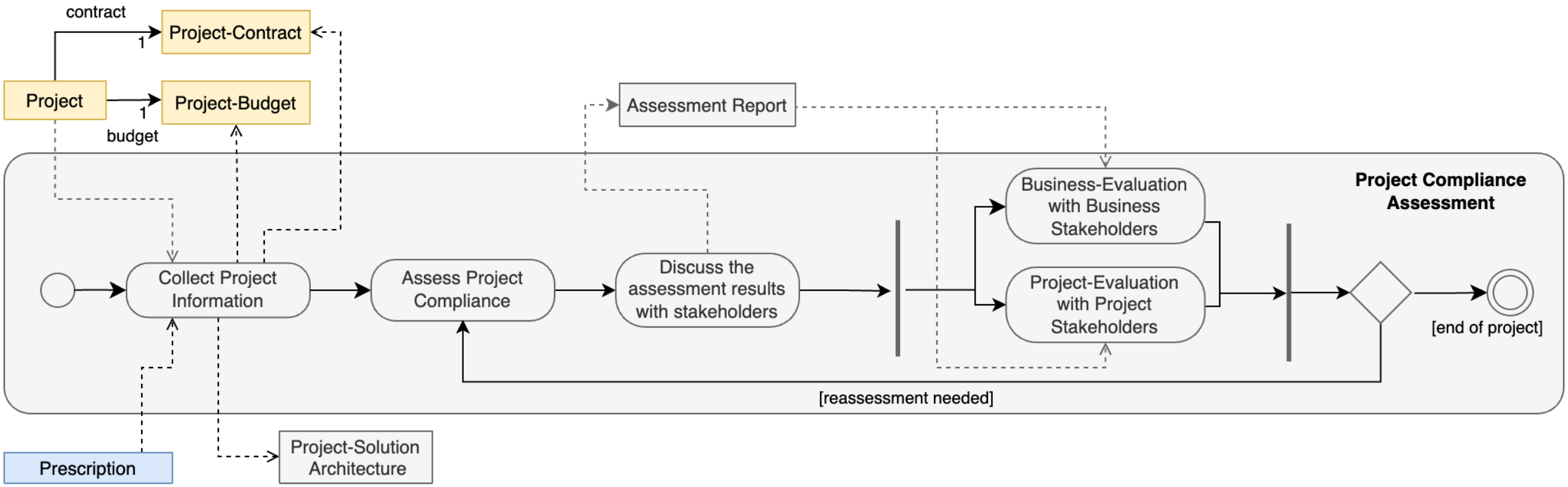

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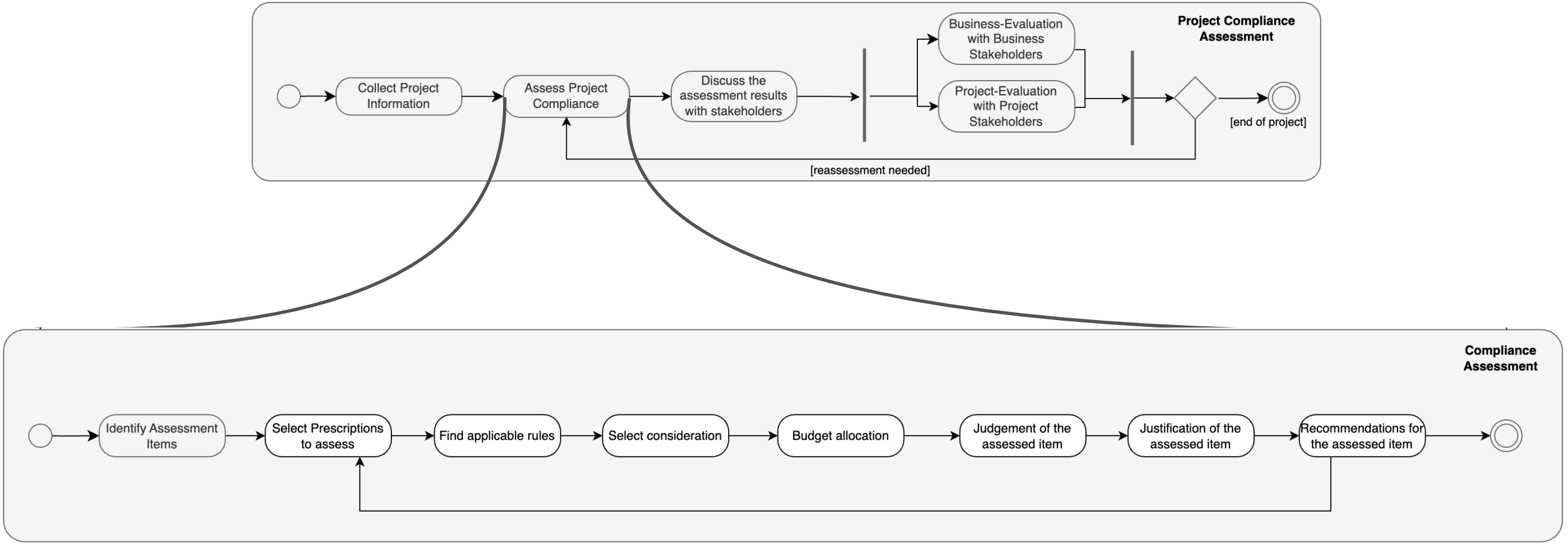
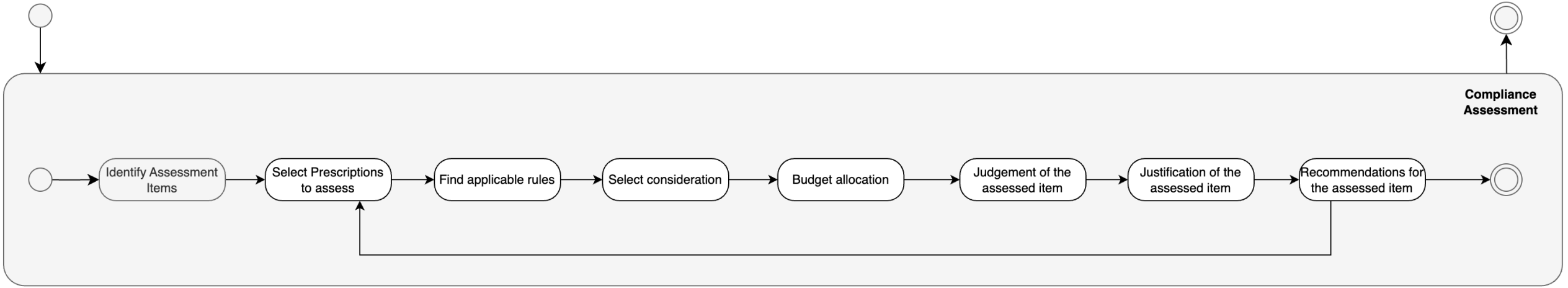


Project Compliance Assessment Process



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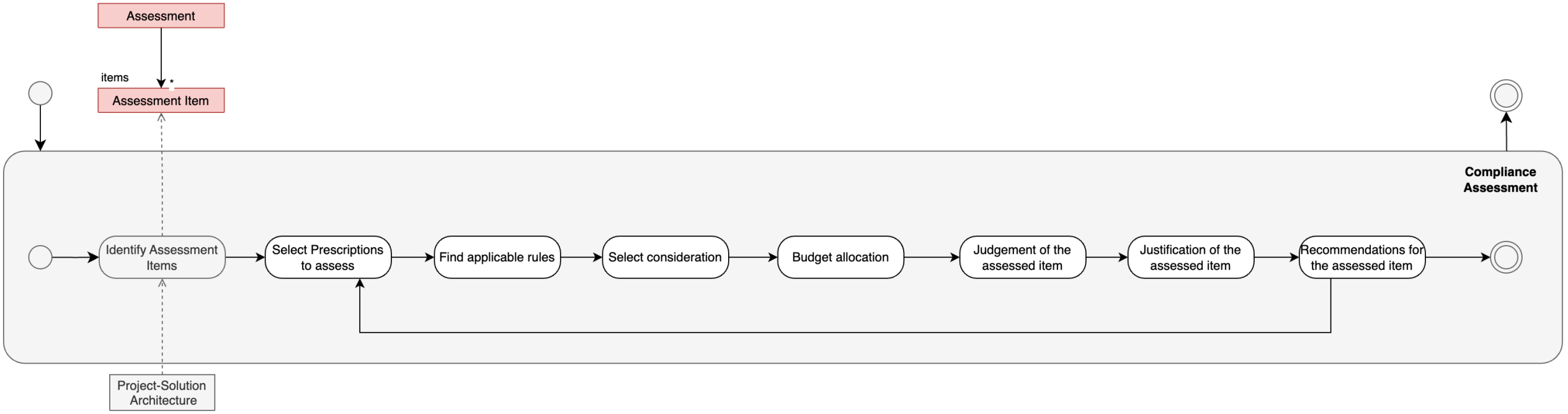

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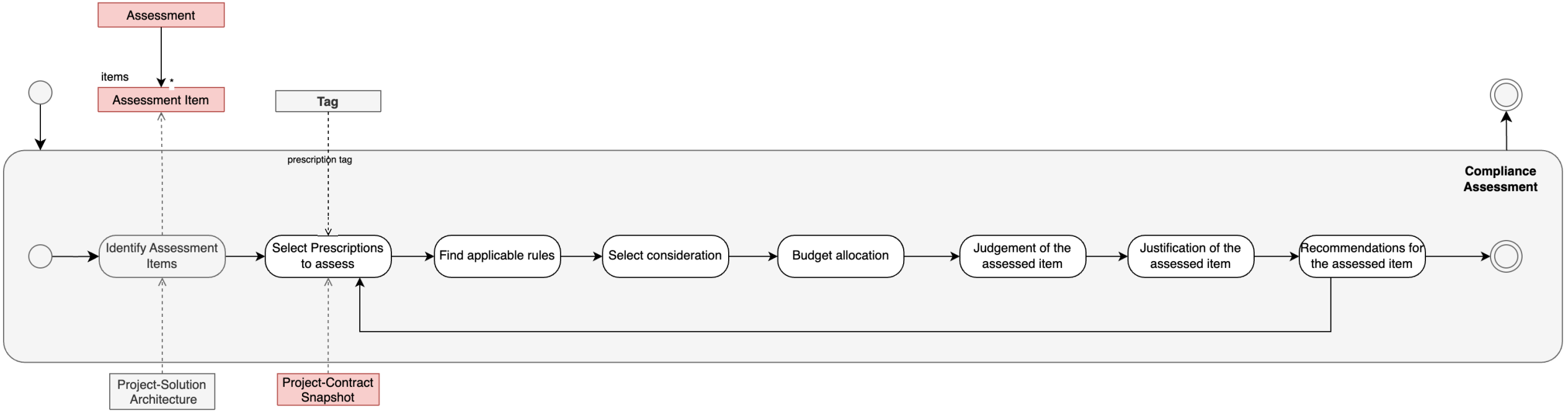

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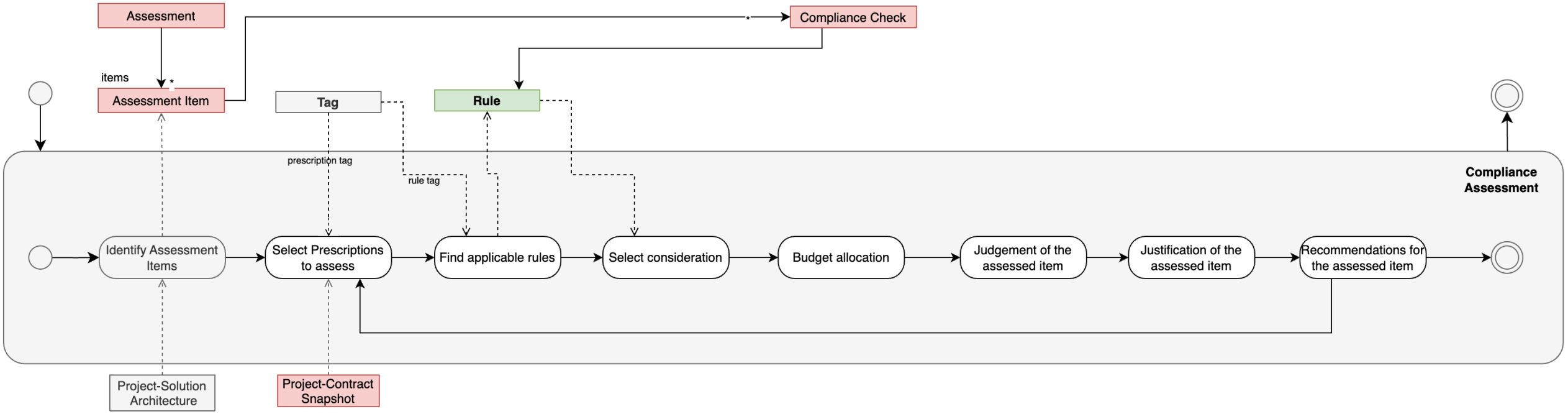

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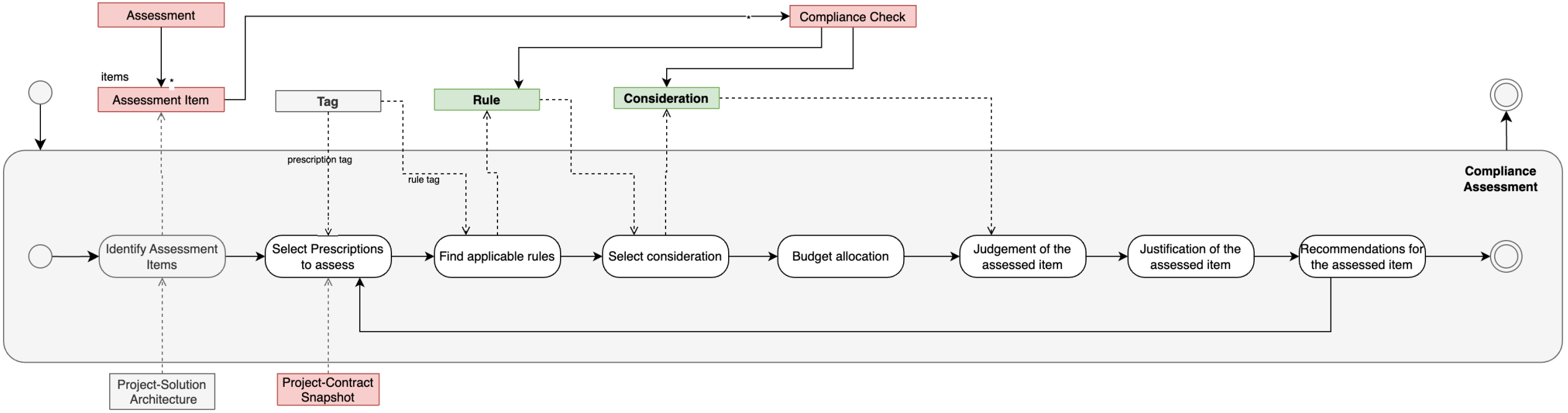

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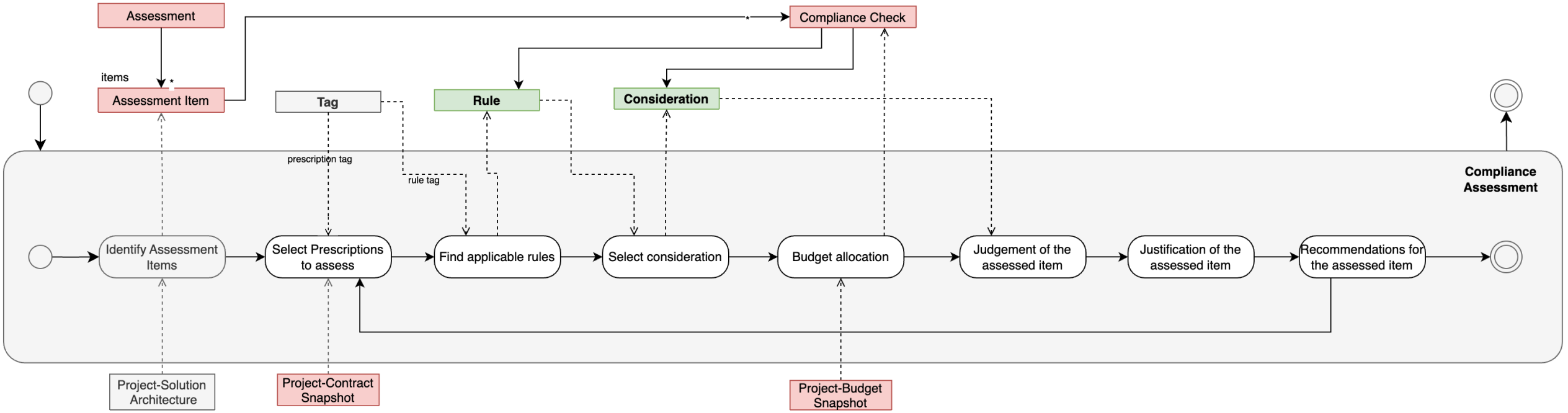

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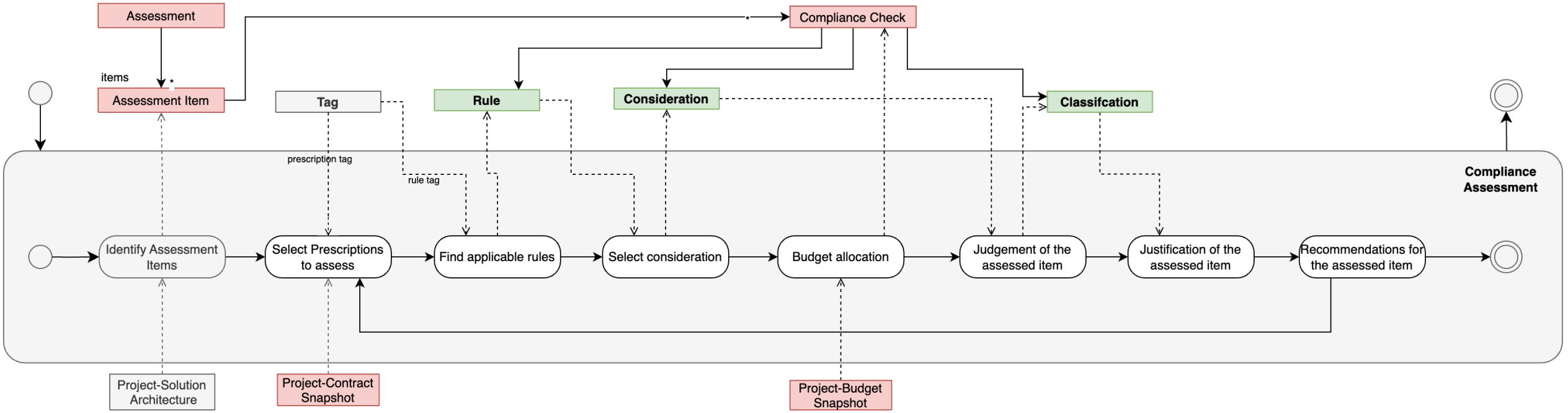

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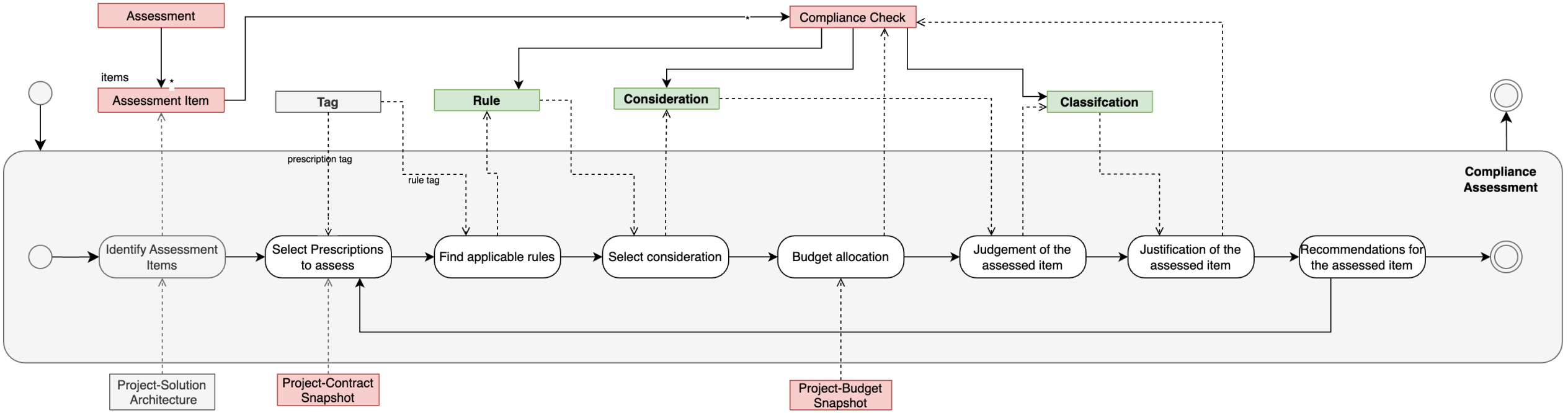

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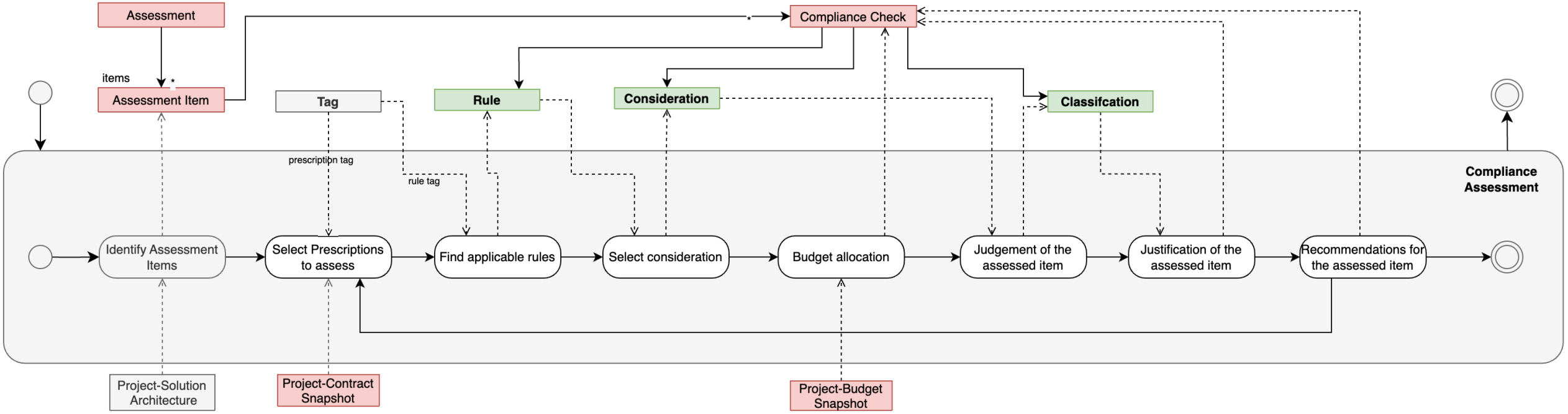

Demonstration

Live-Demonstration

Evaluation & Discussion

Evaluation Setup

- Interactive video
- Questions/ Statements about the Software Prototype
- Answers based on
  - Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
- Only two participants
  - Due to technical issues in the evaluation

Evaluation & Discussion - Principles & Standards

- Evaluation Result:
  - User-defined tags are very useful for the management of the prescriptions
  - Separation of EA-Layers from Tags was not clear
- Discussion:
  - EA-Layers can be used to group & filter prescriptions by their EA-domain
  - Prescriptions can be especially related to a certain EA-Layer
  - The functionality can be implemented only using Tags

Evaluation & Discussion - Local Projects

- Evaluation Result:
  - The project budget might be hard to collect from the financial department
- Discussion:
  - The research is based on the assumption that this information is available
    - Flexible budget structures are supported

Evaluation & Discussion - Assessment Rules

- Evaluation Result:
  - General concept of *Rules* is useful
  - Available classifications might not be sufficient
  - Attaching Tags helps to deal with a large amount of Rules
- Discussion:
  - The available classifications should be revisited, as the *Neutral* classification might be to broad

Evaluation & Discussion - Compliance Checks

- Evaluation Result:
  - Using the metadata helps to find & search for relevant rules
  - The usefulness of the *Contract* was doubted
  - Attaching the financial information is good, collecting them might be hard
- Discussion:
  - In my opinion the Contract is a very efficient way to reduce the search space of the rules to assess

Evaluation & Discussion - Analytics

- Evaluation Result:
  - It was stated that the Analytics tool does not have a target audience
- Discussion:
  - Potential misunderstanding: The tool is designed not to have any specific target audience
  - Rather a tool, that enables the generation of various viewpoints on the data

Threats to Validity

Threats to Internal Validity

- The presented approach still has some subjectivity
  - Rules have to be created and classified by partitioners
  - Might lead to inconsistencies
  - Classification of Considerations is influenced by personal experience & knowledge

Threats to External Validity

- The solution concept and prototype was developed based on a framework used by one organisation
  - Processes & Terms vary between organisations
  - The presented solution might not be applicable to the same extend in other organisations

Future Work

Future Work

- Improve classification of assessment rules
  - Currently, only Contributing, Neutral and Divergent is supported
  - Neutral might cover to many considerations
- Improve the analytical output of the compliance framework
  - It can be analysed whether the Analytics tool meets all stakeholders needs
- Exploit the compliance assessment process in a real-world scenario
  - The process hasn’t been tested to a large extend
    - Further issues might appear

Thank you for your attention!