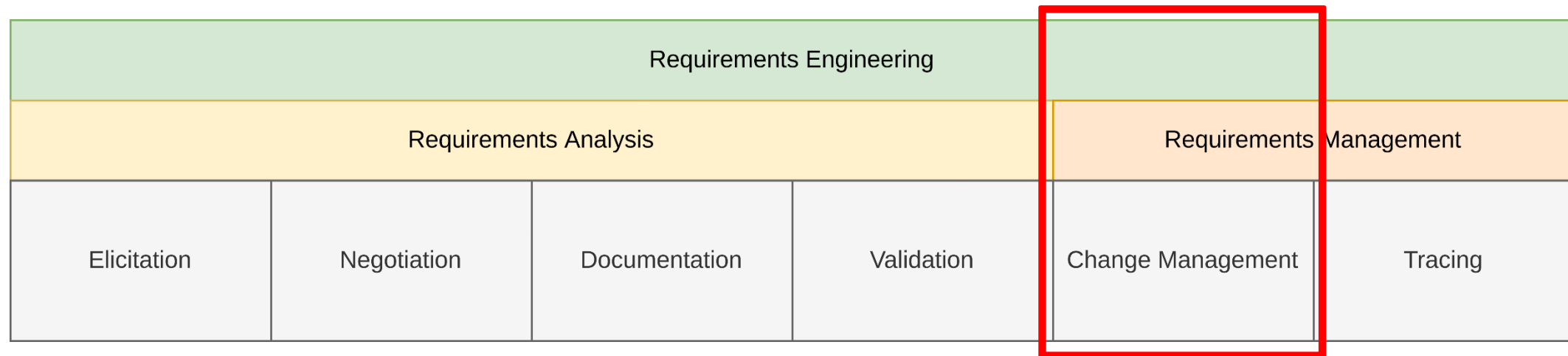


# Requirement Engineering

## Lecture 11: Requirements Management

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# General Requirements Engineering Process Overview





# **Lecture 11: Requirements Management**

## **Content**

1. Manage Requirements
2. Change Management



# MANAGE REQUIREMENTS

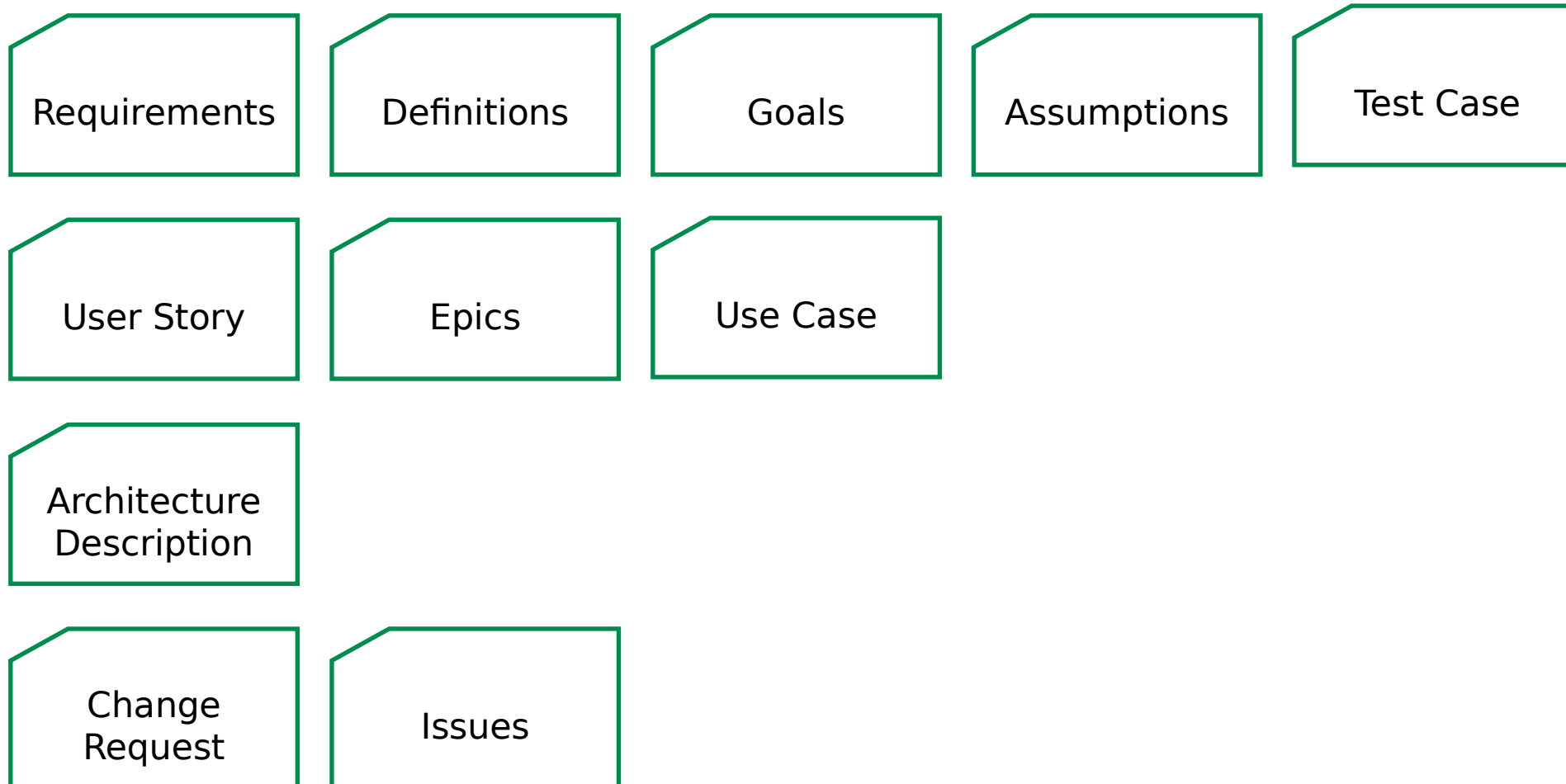
## Manage Requirements

### Motivation – Why do you need to manage requirements?

- Number/scope of requirements and further information
- Expected product lifetime
- Rate of changes to requirements and related docs
- Number of stakeholders
- Availability of stakeholders
- Heterogenous nature of stakeholder opinions
- Future reusability
- Number of expected releases
- Etc.

# Manage Requirements

## Motivation - What exactly needs to be managed?



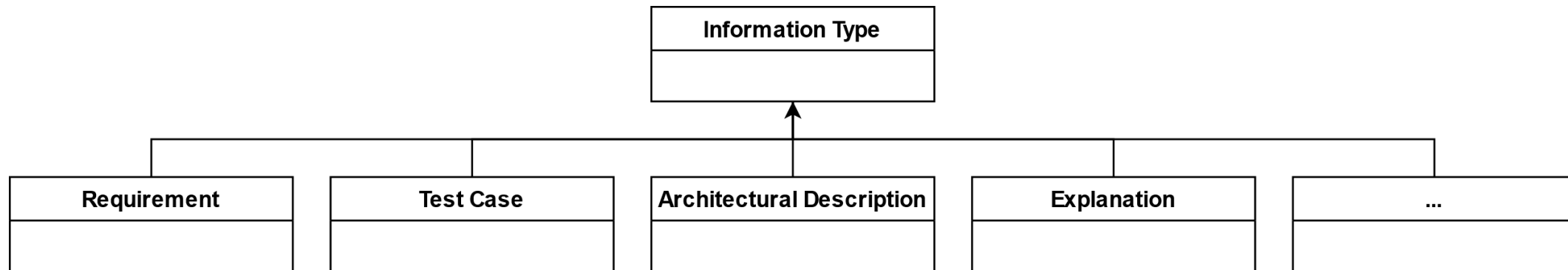
## Manage Requirements

### Definition - Management in Requirements Engineering

“The process of managing existing requirements and requirements related work products, including the storing, changing and tracing of requirements (traceability).”

# Manage Requirements

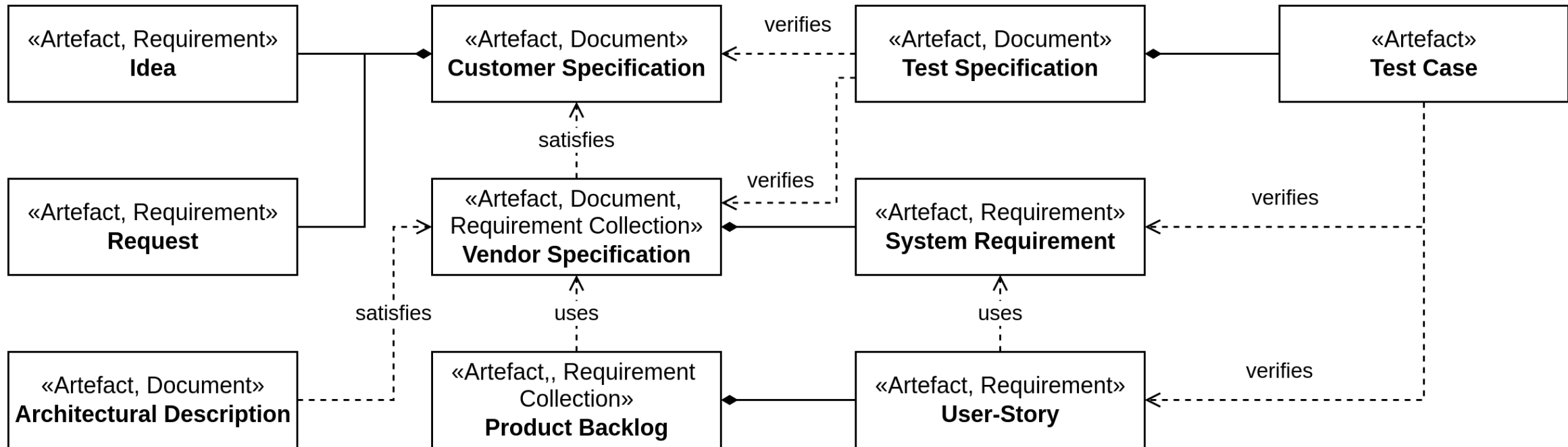
## Information model - Simple





# Manage Requirements

## Information model - More complex



# Manage Requirements

## Standardized structures and templates

- Volere
- V-Modell XT
- IEEE 29148-2018
- Etc.

1. <https://www.volere.org/>

2. Der Beauftragte der Bundesregierung für Informationstechnik. V-Modell XT (o.J.), URL: [https://cio.bund.de/Web/DE/Architekturen-und-Standards/V-Modell-XT/vmodell\\_xt\\_node.html](https://cio.bund.de/Web/DE/Architekturen-und-Standards/V-Modell-XT/vmodell_xt_node.html)

3. <https://standards.ieee.org/ieee/29148/6937/>



# CHANGE MANAGEMENT

# Change Management

## Overview

- Various reasons for changes
  - Errors or incomplete requirements
  - Evolution of context
- Changes are not a bad thing
  - Stakeholders may gain new knowledge at later project stages
  - Proofs interest/involvement of the stakeholders
- Frequent changes are problematic
  - Makes development in agreement with all stakeholders very challenging and time-consuming
  - Indicator for bad process quality

# Change Management

## Overview

- Necessary to properly structure and process change requests for requirements
- Structured process → Justifiable decisions if and how requests are approved
- Changes may refer to:
  - Individual requirements, e.g., change/addition/removal of a feature
  - The requirements document itself, e.g., updating terminology

# Change Management

## Change Control Board

- Change control board as entity responsible for change requests
  - Evaluation
  - Decision making
- May delegate tasks to another party
  - For example, drafting of actual changes to the requirements
- Decisions have to be negotiated and agreed upon
  - Contractor
  - All involved stakeholders

# Change Management

## Change Control Board - Tasks

- Change effort estimation
  - Could be performed by third party
- Evaluate change requests
  - For example, effort/benefit ratio
- Define requirements change and/or new requirements
  - Based on the changed request
  - Changes should be kept to a minimum
- Decide about acceptance or rejection of change requests

# Change Management

## Change Control Board - Tasks

- Classify incoming changes
  - For example, based on their criticality
- Prioritize accepted change requests
  - In which order should accepted changes be implemented?
- Assign accepted change requests
  - Who is responsible for implementing the changes?



# Change Management

## Change Control Board – Members

- The following parties should be represented in the change control board:
  - Change manager
  - Contractor
  - Architect
  - Developer
  - Configuration manager
  - Customer representative
  - Product manager
  - Project manager
  - Quality assurance representative
  - Requirements engineer

# Change Management

## Change Control Board – Change Manager

- Chairperson of the change control board
- Mediates between parties in case of conflicts
- Communicates and documents changes
- Similar to the role of the requirements engineer

# Change Management

## Change Requests

Should contain the following information:

- Identifier
  - Unique identification of change request possible
- Title
  - Summarizes key concern of the change request
- Description
  - Documents change as precisely as possible
  - Also contains information on the expected effect of a change
- Justification
  - Reasons why the change is necessary
- Date filed
  - Date the change request was filed
- Applicant
  - Name of the person who filed the change request
- Priority
  - Importance of the change

# Change Management

## Change Requests

The following information is helpful for the management of changes:

- Change validator
  - Person who is responsible to verify if a change was performed correctly
- Impact analysis status
  - Flag indicating whether an impact analysis has been performed
- Change control board decision status
  - Flag indicating the handling status of the request
  - For example: pending, rejected, accepted

# Change Management

## Change Requests

- Change control board priority
  - Priority of the change request assigned by the change control board
- Responsible
  - Person in charge of performing the change
- System release
  - Version of the system that implements the change

# Change Management

## Change Requests - Classifications

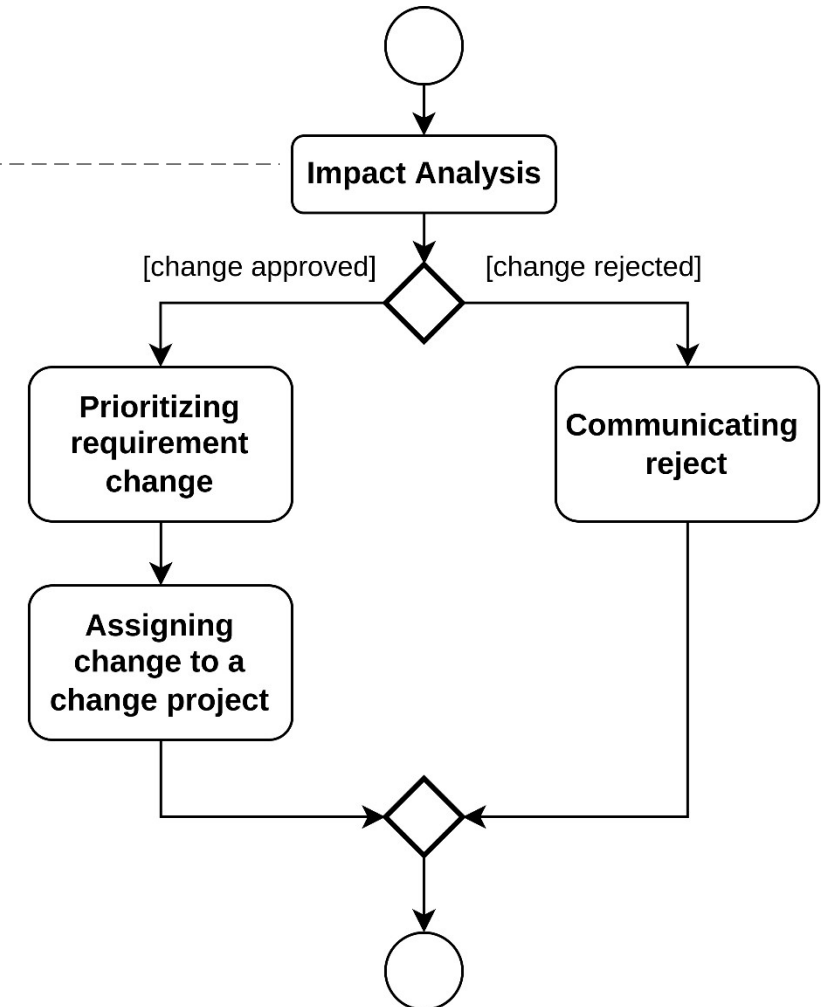
### Three types of change requests:

- Corrective requirement change
  - Failure in the system
  - Reason for failure is an error in the requirements
  - Change fixes the error
- Adaptive requirement change
  - System needs to be amended
  - For example, change in the system context or stakeholder needs
- Exceptional change (hotfix)
  - Must be immediately done at all costs
  - Can be either adaptive or corrective
  - Usually due to critical bugs

# Change Management

## Handling Change Requests

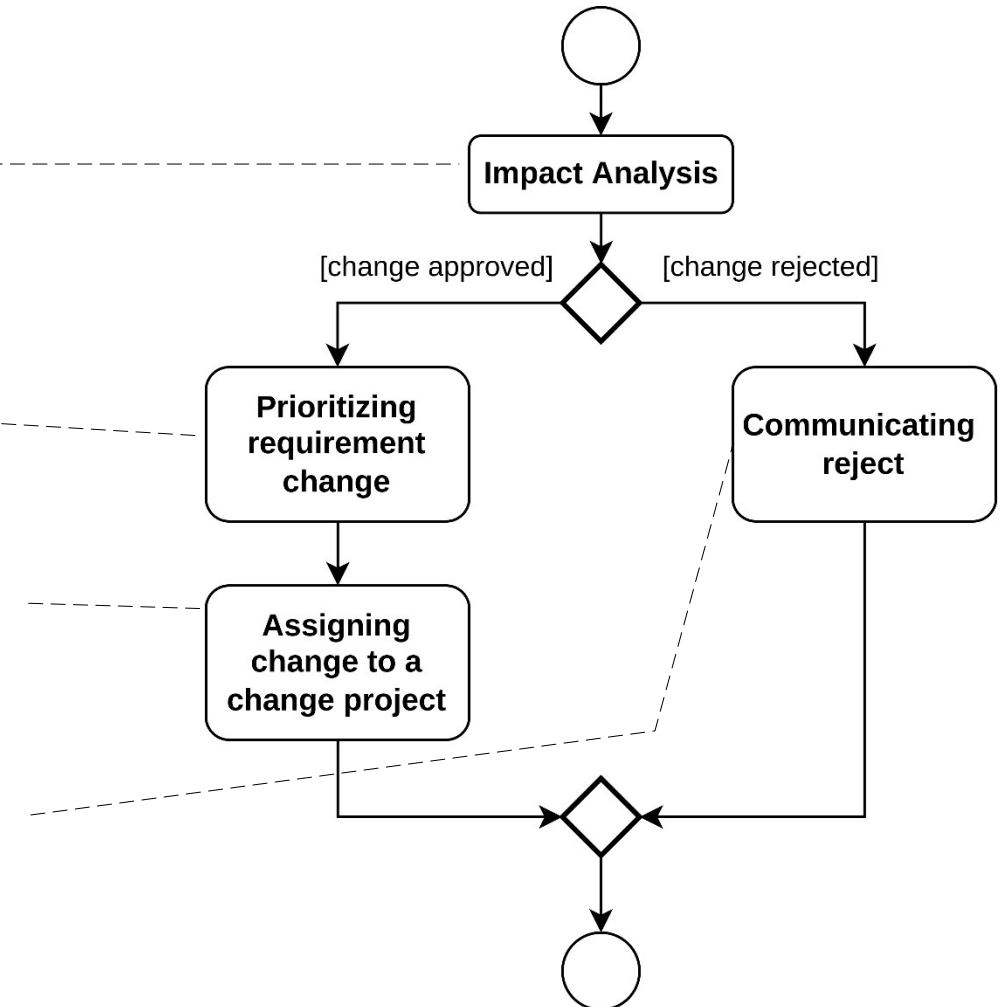
- Effort required for the change is estimated
- Affected requirements are determined
  - Includes new requirements
- Development artifacts that need to be change are determined
- Effort for artifact change usually significantly higher than for requirement changes
  - Maintaining the requirements document is cheap
  - Still often neglected
- Can be supported by traceability information



# Change Management

## Handling Change Requests

- Change evaluation
  - Costs and benefits are compared
  - Available resources are considered
- Prioritizing
  - Importance of the change
- Assigning
  - System release for implementing is decided
- Rejection
  - If a change is rejected it is communicated





# SUMMARY

## Summary

- Requirements of complex projects need to be managed
- Requirements can change throughout a project
- Changes need to be structured and processed
- Change management defines how change requests are handled
- Change control board = Evaluates and approves/rejects changes
- Handling change requests requires a process on its own

# Questions?