

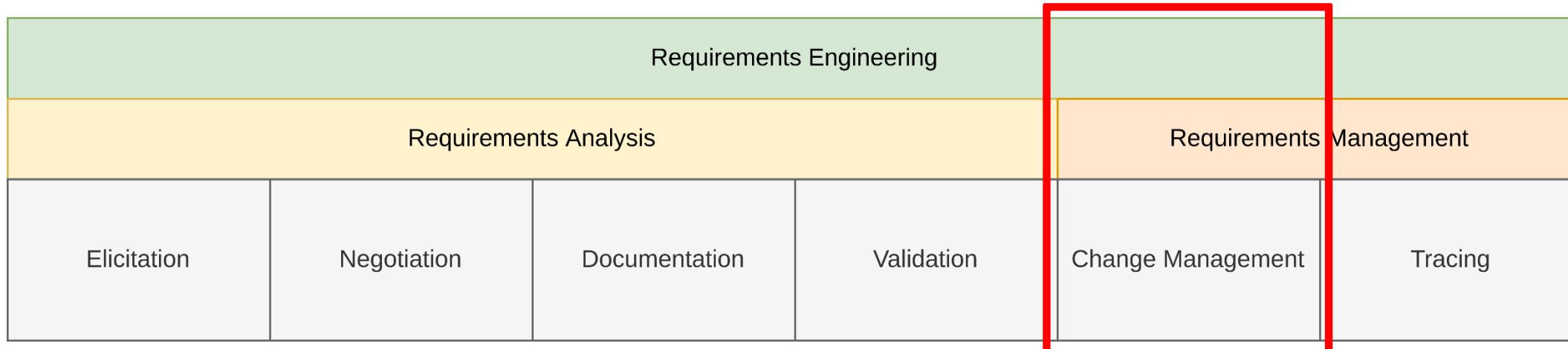
Requirement Engineering

Lecture 11: Requirements Management

Prof. Dr. Benjamin Leiding
M.Sc. Anant Sujatanagarjuna
M.Sc. Chintan Patel

General Requirements Engineering Process

Overview



Lecture 11: Requirements Management

Content

1. Manage Requirements
2. Change Management

MANAGE REQUIREMENTS

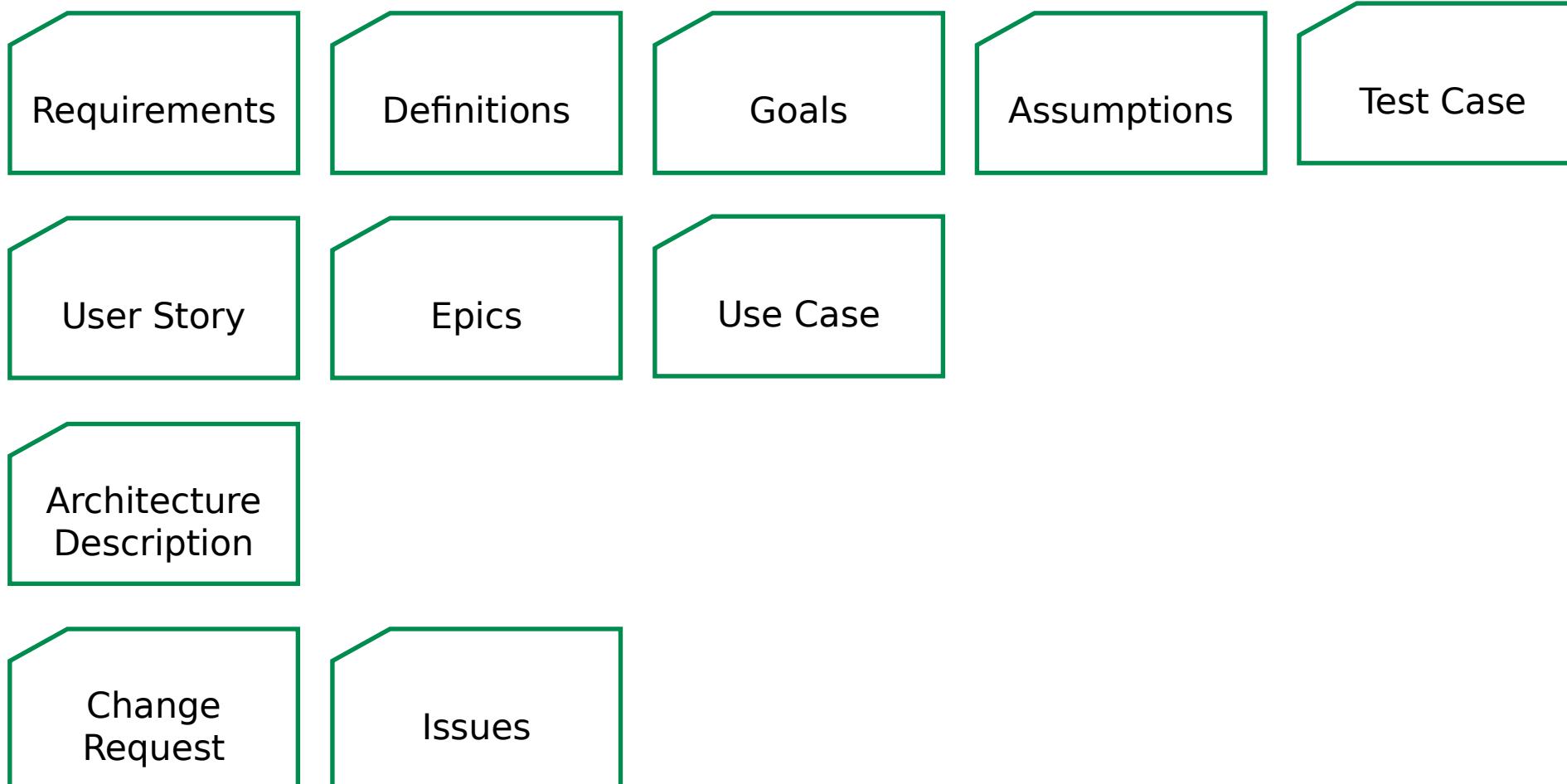
Manage Requirements

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?



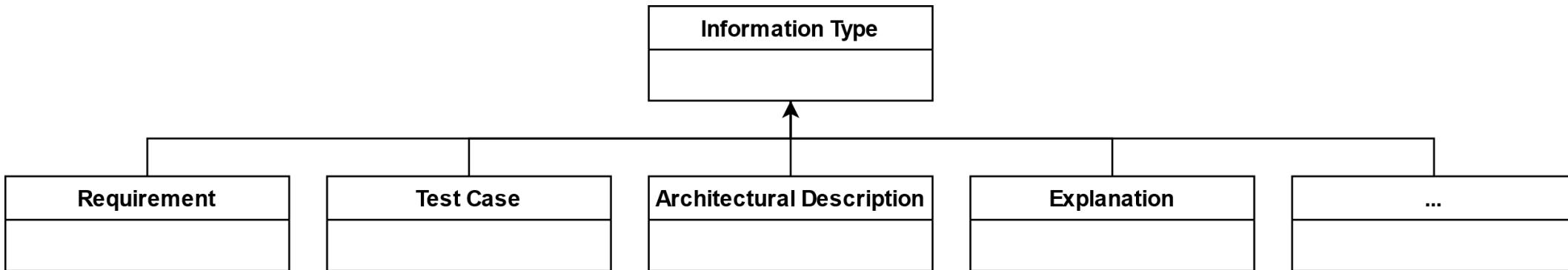
Manage Requirements

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).”

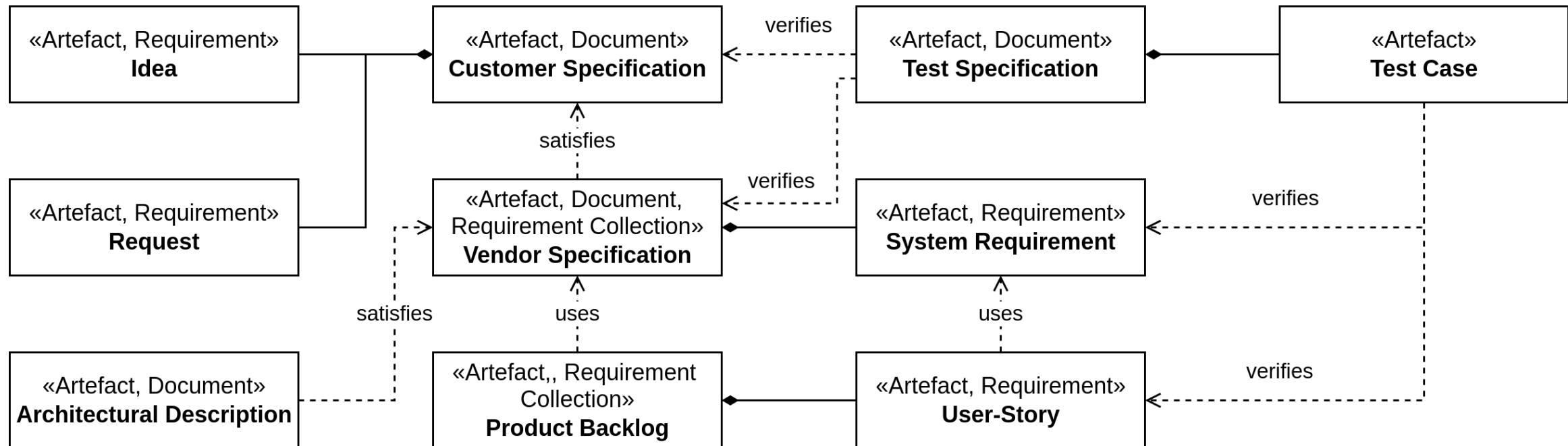
Manage Requirements

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

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

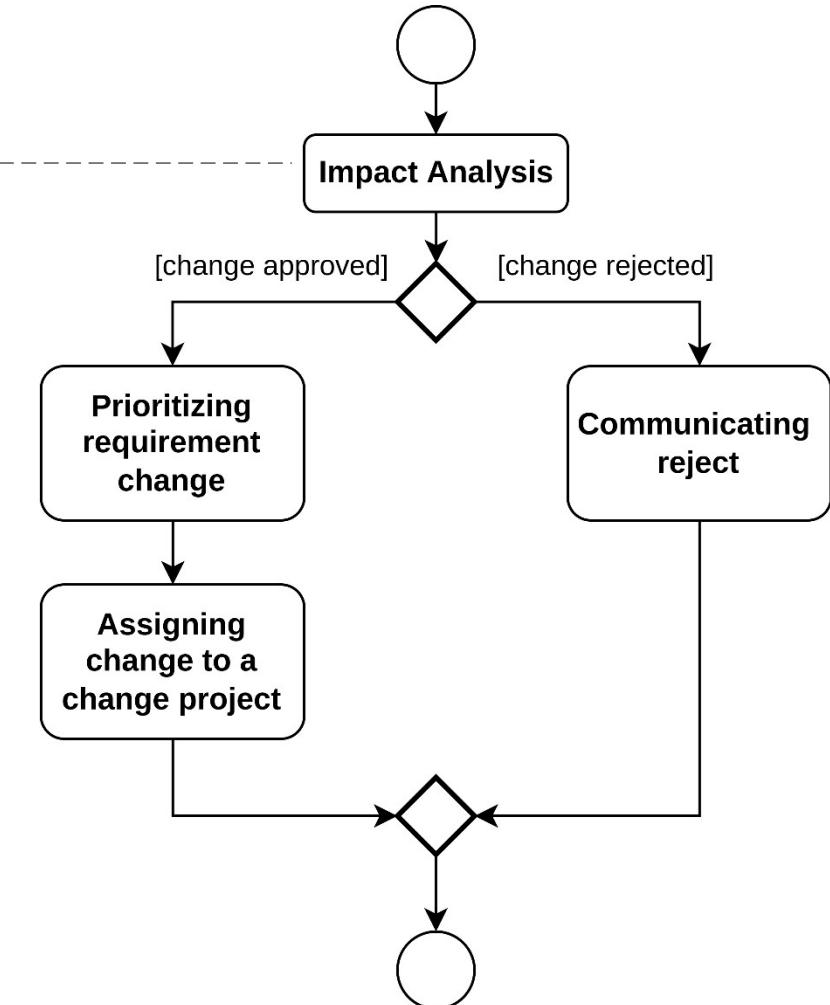
Three types of change requests:

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

Change Management

Handling Change Requests

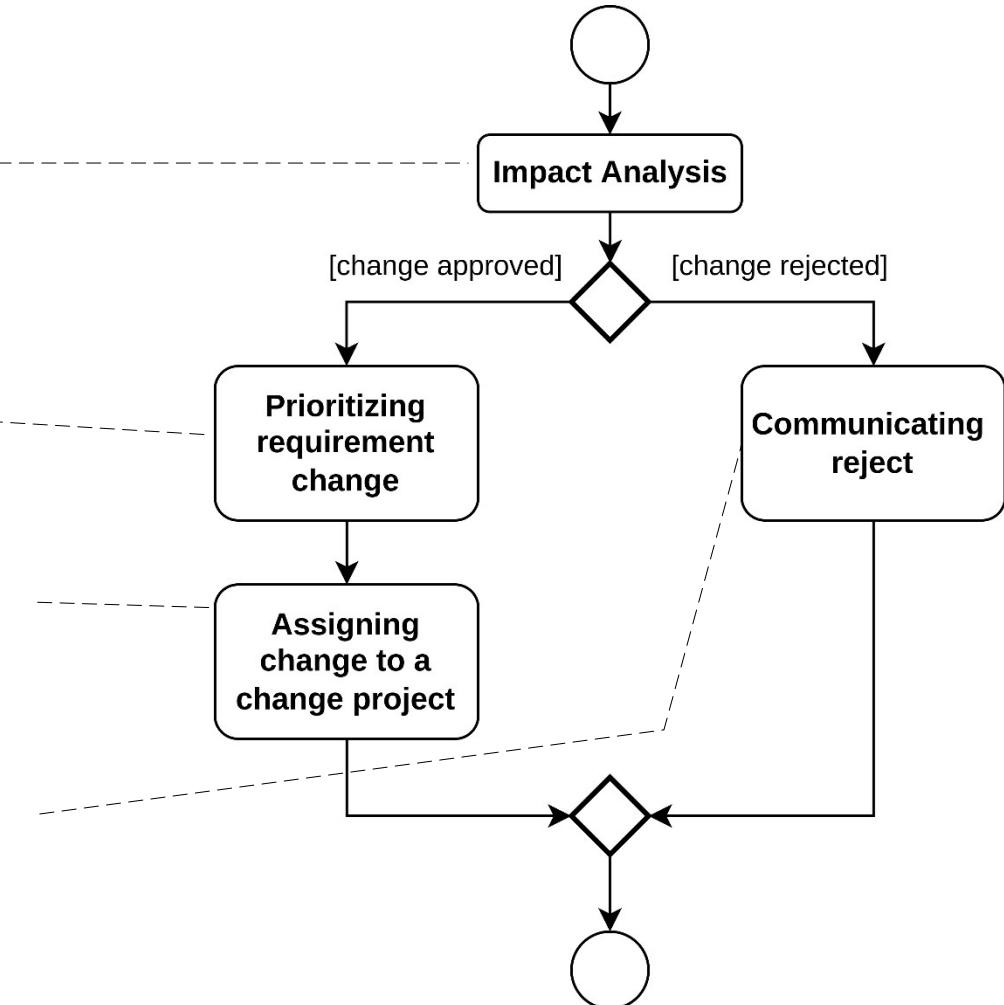
- Effort required for the change is estimated
- Affected requirements are determined
 - Includes new requirements
- Development artifacts that need to be change are determined
- Effort for artifact change usually significantly higher than for requirement changes
 - Maintaining the requirements document 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?