

Software Project Management

Lesson 6 – Planning Phase

Uwe Gühl
Winter 2015 / 2016

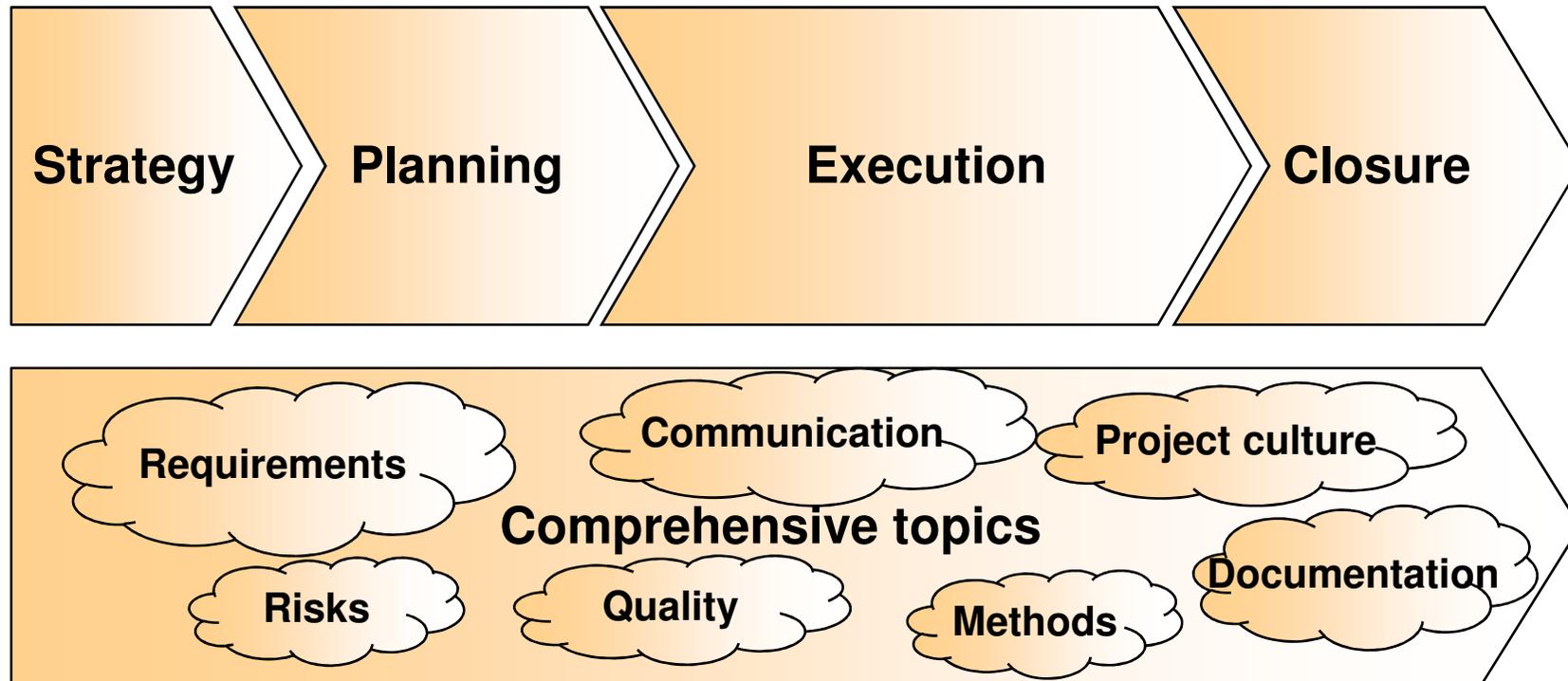




Contents

- Project stage: Planning phase
 - Introduction
 - Goal / Results
 - Planning
 - Work breakdown structure (WBS)
 - Work package
 - Time schedule
 - Resource plan / cost schedule
 - Project organization
 - Plan optimization / alignment
 - Project Kickoff
 - Summary

Introduction



Introduction



Goal / Results



- Project stage: Planning Phase
- Goal of the planning phase is to do and to align a complete planning to be presented in a kickoff event

Goal / Results



- Results:
 - Project plan covering
 - Work breakdown structure (WBS) with work packages at the lowest level
 - Time schedule
 - Resource plan / cost schedule
Resource plan covers personnel planning
 - Project organization
 - Project kickoff carried out



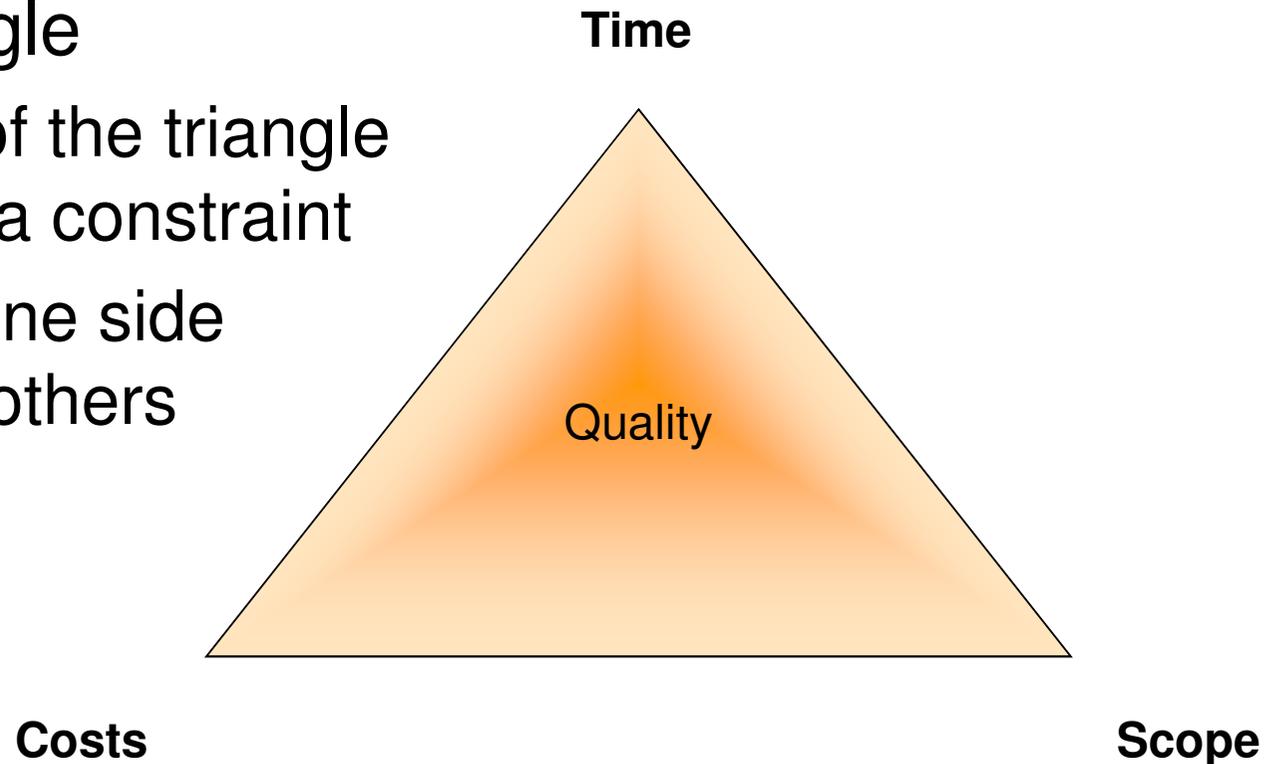
Planning

- Project planning is together with project control the central task of the project manager
- Please keep in mind:
 - Project management means achievement of goals, not meeting plans!
- A plan is an estimation, it is
 - never exact
 - outdated, as soon as finished
- A wrong plan is better than no plan

Planning



- Magical triangle
 - Each side of the triangle represents a constraint
 - Changing one side affects the others



Planning



- Project members need orientation – visualize if applicable
- Always integrate involved people into the planning!
 - Personal goals, expectations, identification with the project?
 - Do the participants have time?



Planning

A project plan should answer following questions:

- What?
 - Identification and depiction of sub projects, working packages, and tasks
 - Result is the work breakdown structure (WBS)
- Until when?
 - Result is time schedule and milestone planning
- How much?
 - Result: resource plan / cost schedule
- Who?
 - Project organization
- What are prerequisites or constraints?
Technical and spatial preconditions, restrictions to be considered

Planning



- Discussion:
 - Changes of requirements (change management)
- Recommendation:
 - Accepting changes from the beginning
 - Establishing of change management
 - Planning buffer for requirement changes, especially in larger projects
 - Simplifies change management as no additional assignment, no additional budget, etc. necessary

Work breakdown structure (WBS)



- Why and for what do I need a WBS?
 - Distribution of responsibilities in the project
 - Basic for
 - estimation of time needed and project costs
 - project control
 - structuring the project documentation

Work breakdown structure (WBS)

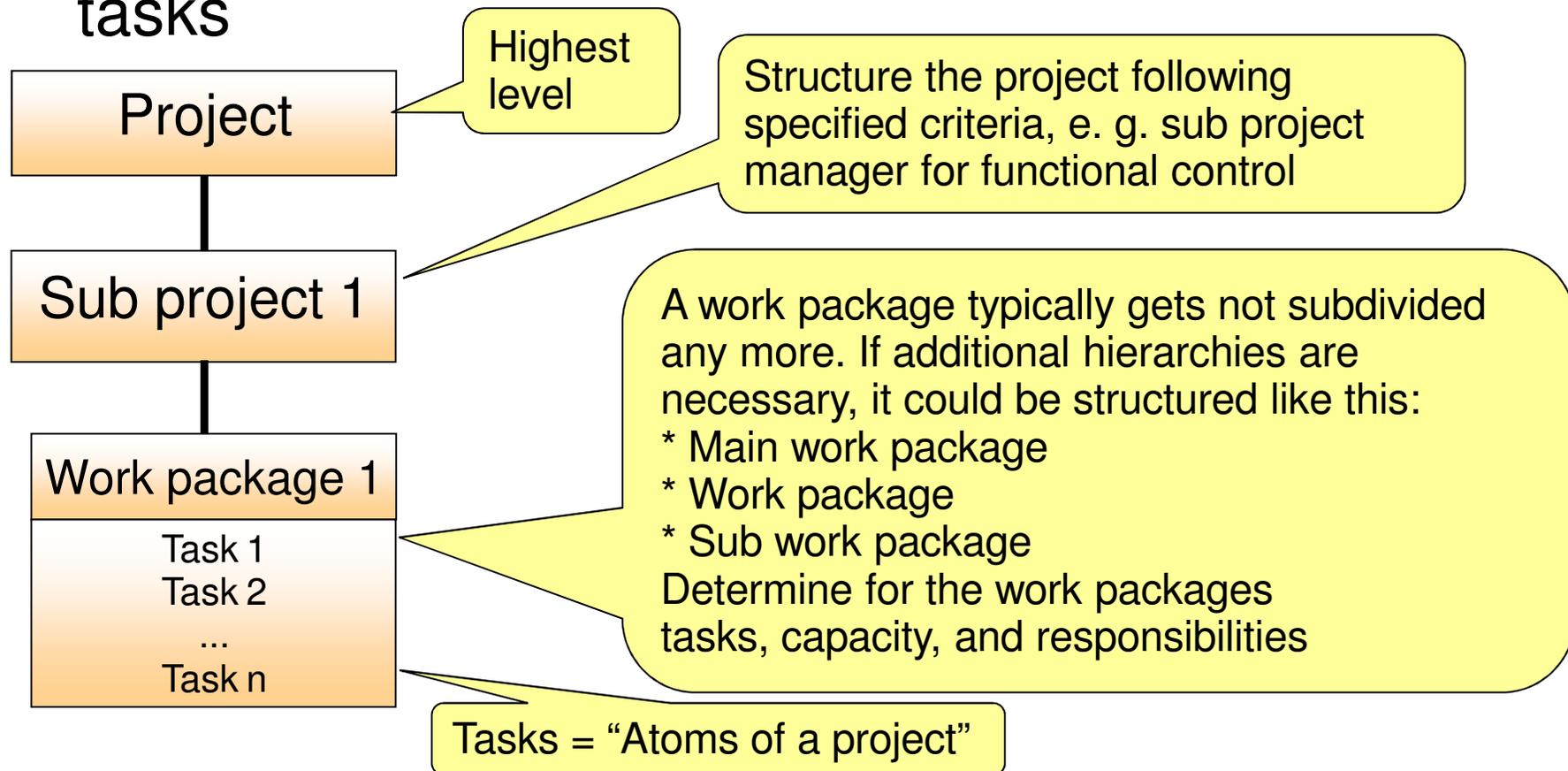


- A work breakdown structure (WBS), is a deliverable-oriented decomposition of a project into smaller components [Wik16]
- Alternative: PRINCE2 defines instead a product breakdown structure as “A hierarchy of all the products to be produced during a plan“ [axe16]
- The structuring of a WBS could be done following
 - functions
 - objects, or
 - processes

Work breakdown structure (WBS)



- A WBS splits a project hierarchically down to the tasks



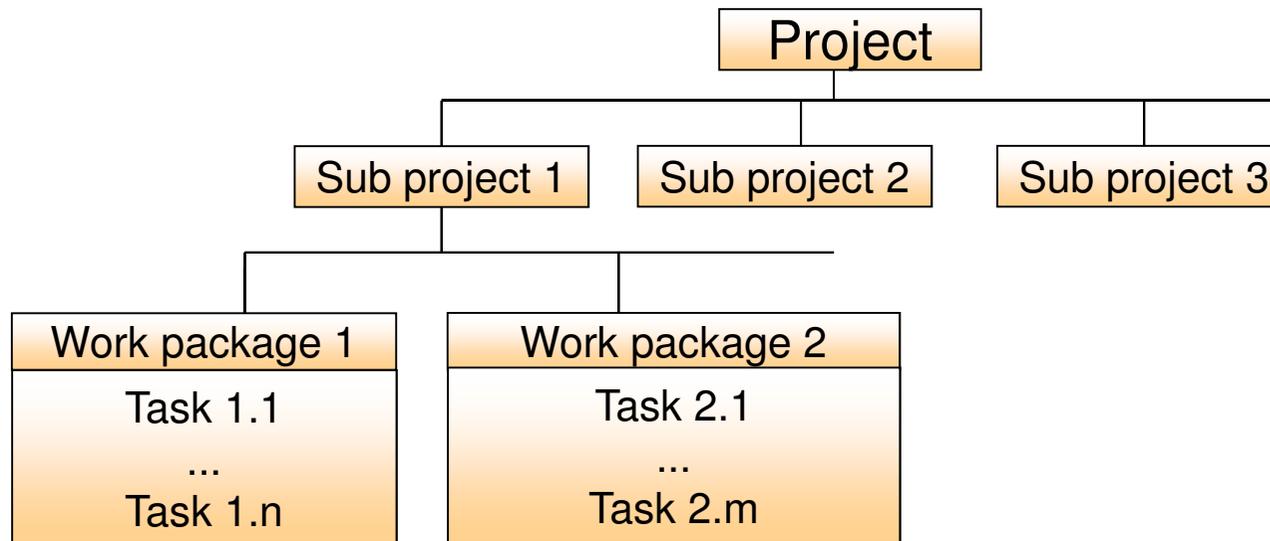
Work breakdown structure (WBS)



The WBS structures a project into smaller items, making it easier to plan and control

- Sub projects
 - Segmentation following regional, organizational, or functional criteria
- Work packages
 - Complete assignment of tasks, that could be done normally by one person
- Optional:
 - Main work package
 - Sub work package
- Tasks
 - "Elementary particles" of a project

Work breakdown structure (WBS)

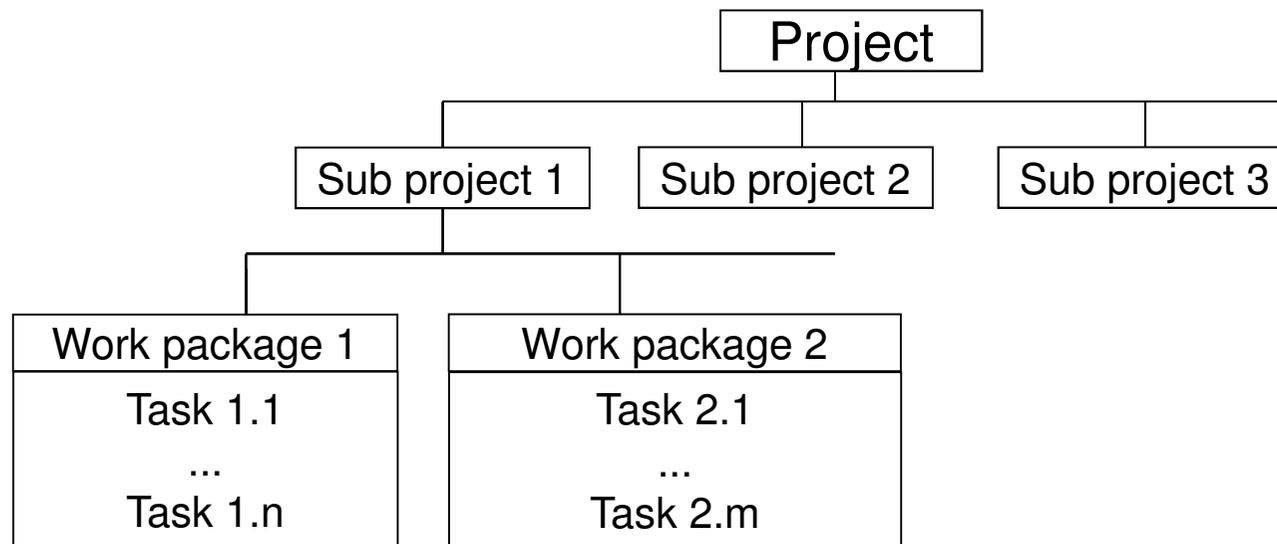


Every structure entity got tasks associated

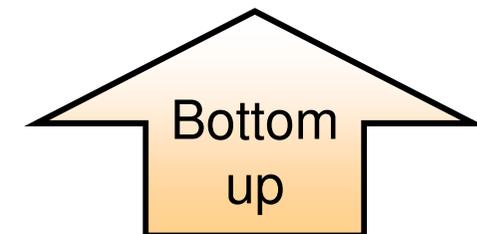
Work breakdown structure (WBS)



How to develop a WBS?
Bottom up / Top down approach



Deductive
from general to specific



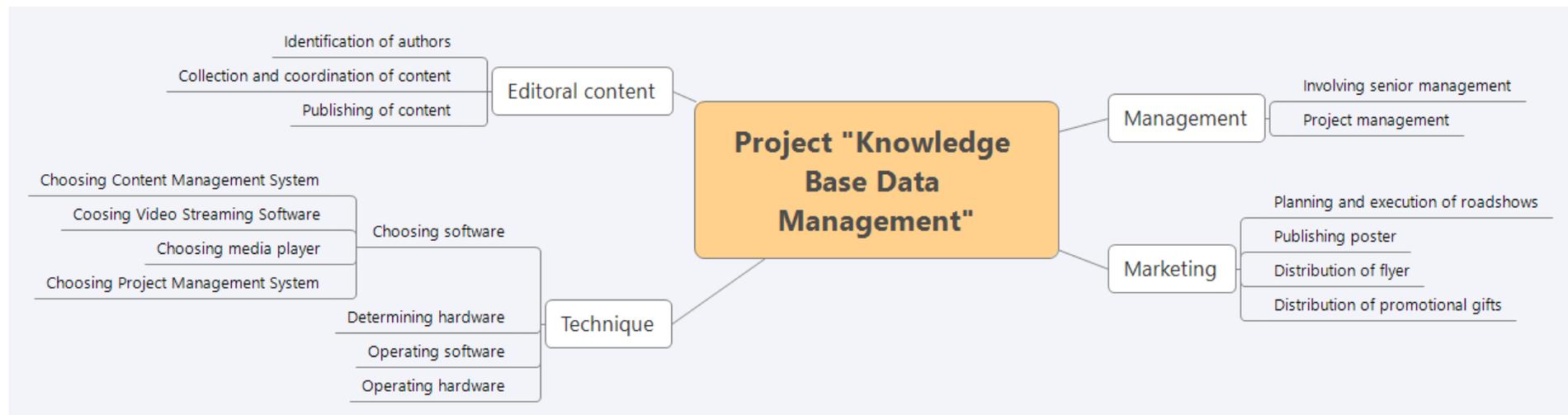
Inductive
from specific to general

Work breakdown structure (WBS)



How to structure a WBS?

- Function oriented
Following functions, makes assignment of tasks to functional areas easier



Work breakdown structure (WBS)



How to structure a WBS?

- Object oriented
Following parts of a product to be designed

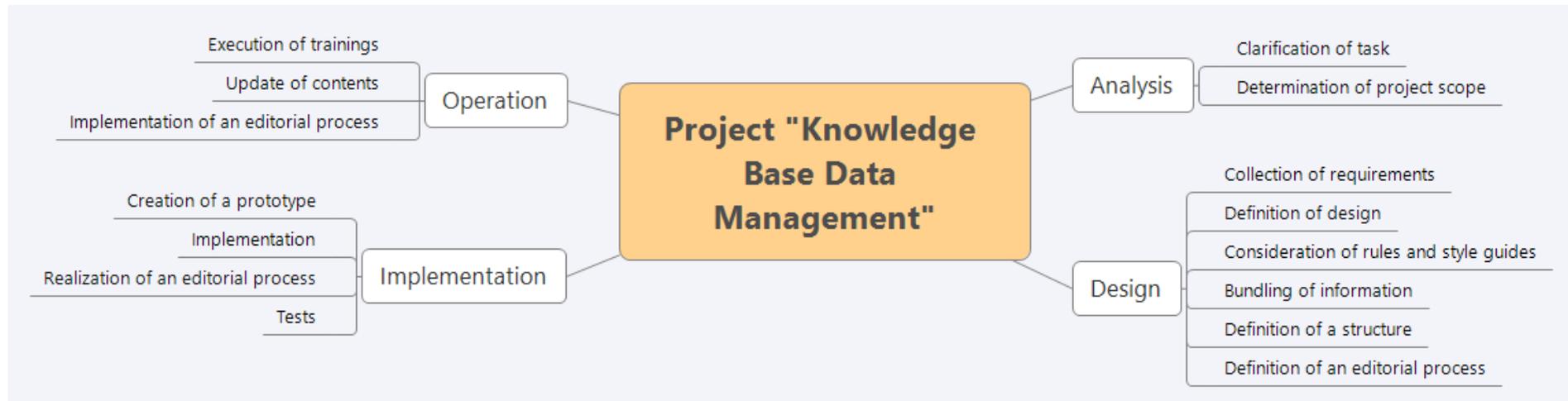


Work breakdown structure (WBS)



How to structure a WBS?

- Process oriented
Following a chronological order



Work breakdown structure (WBS)



How to structure a WBS?

- Mixed oriented
 - Related to practice
 - In example below: first level process oriented, second level partially object oriented





Work package

Project name	<Name of project>	Project No.	<Number of project>
WP name	<Name of work package>	WP Id	<Work package ID>
WP owner	<Name of responsible for work package>		
WP approval	<Name of person who approves the work package>		
Version / Date	<0.0.1 / dd.mm.yyyy>	Status	<initiated, in progress, done, cancelled>

Progress control	Plan		Actual	
	Amount of work	Duration	Amount of work	Duration
	<e.g. 2 person months>	<e. g. 3 weeks>	<e.g. 3.5 person months>	<e.g. 6 weeks>
	Start	End	Start	End
	<dd.mm.yyyy>	<dd.mm.yyyy>	<<dd.mm.yyyy>	<dd.mm.yyyy>
Comments	<Explanations, remarks>			

Work package



Objective	<ul style="list-style-type: none">• <i><Goal 1></i>• <i><Goal 2></i>• ...
Preconditions (Input)	<ul style="list-style-type: none">• <i><e.g. document 1></i>• <i><e.g. working result out of WP nnn2></i>• ...
Scope	<ul style="list-style-type: none">• <i><Task 1></i>• <i><Task 2></i>• ...
Results (Output)	<ul style="list-style-type: none">• <i><Result1></i> <i>Finished on dd.mm.yy., approved by NN ..., available at location ...</i>• <i><Result2></i> <i>Finished on dd.mm.yy., approved by NN ..., available at location ...</i>



Time schedule

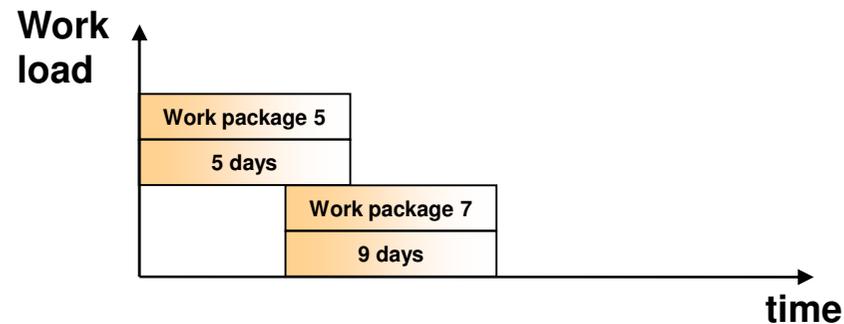
- Alignment of the working packages out of the WBS to a realistic project schedule
- Consider dependencies to resource planning / cost schedule!
- Definition of start and finish date
- Duration of the working packages, buffer time, and constraints have to be considered
- Milestones
 - You can't do everything at once
 - Coordinate stage plan with principal
 - Activities flow together at milestones



Time schedule

- Planning techniques / Methods

- Bar chart



- Network planning technique

- Forward calculation / backward calculation

- Milestone planning

Time schedule



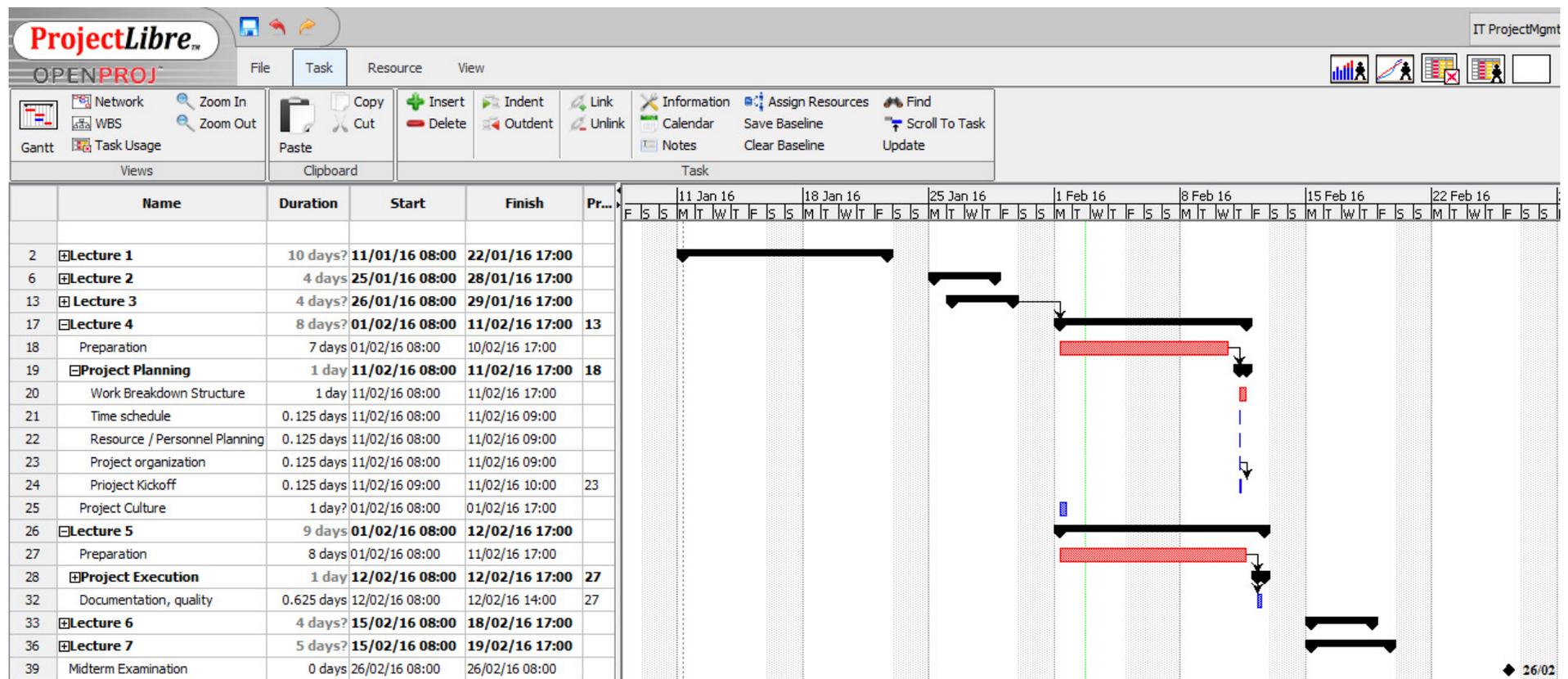
Proposal for proceeding

- Close coordination with resource plan necessary
Define start and end milestones for all work packages
- Chronological arrangement dependent on
 - duration of work packages
 - buffer time
 - access to resources



Time schedule

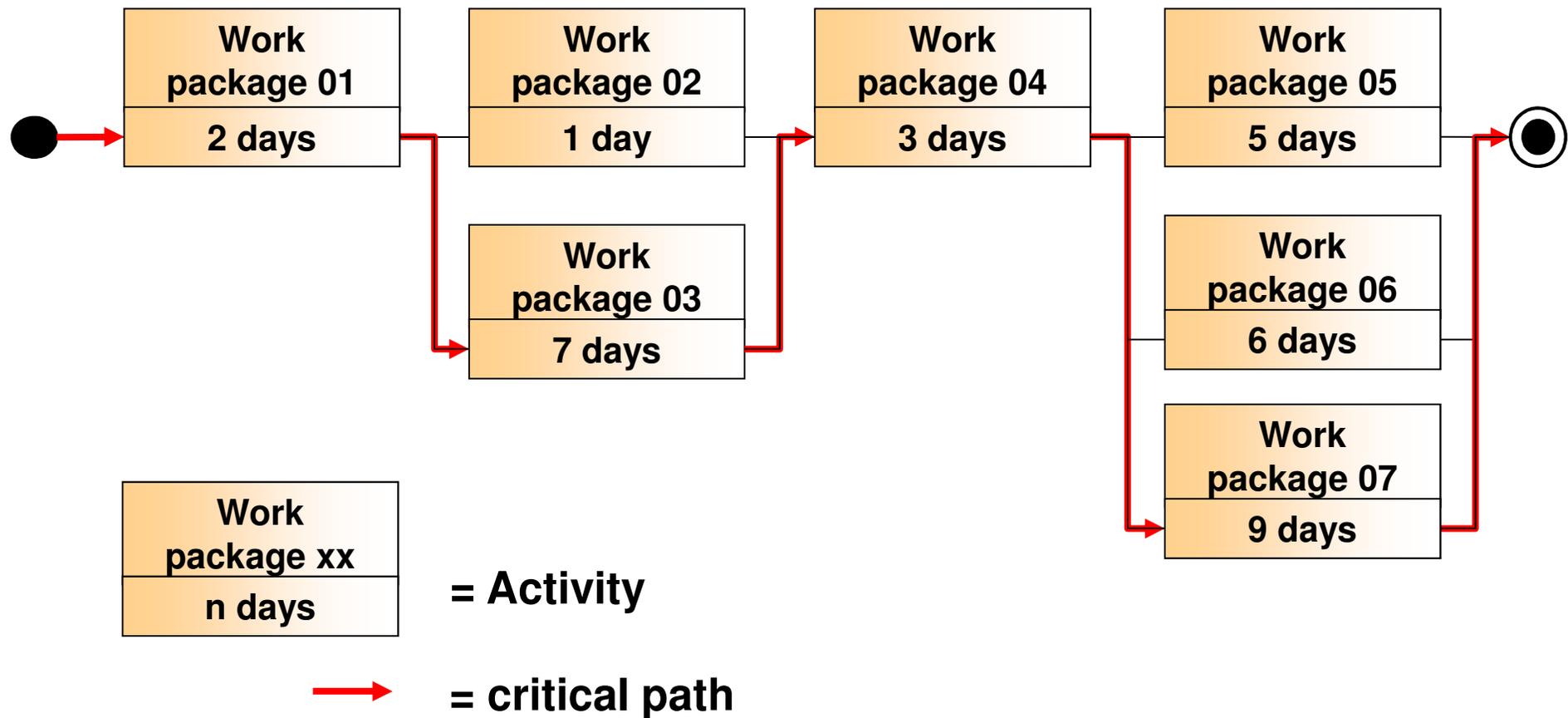
- Example





Time schedule

- Example for critical path





Milestone

- Synonyms: Stop-or-go points, Quality Gates, review points, release, customer approval
- Following DIN 69900-1 a milestone is an "event of special relevance"
- These are typically interim goals with an important project result
- Important part of project management, especially of the project controlling



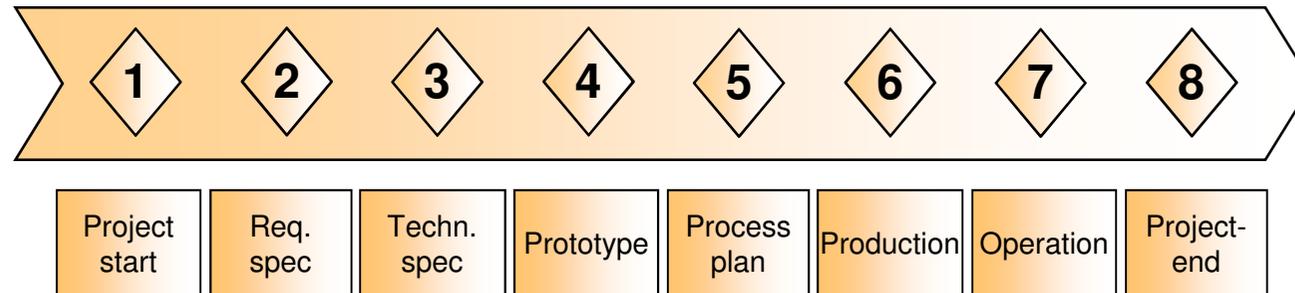
Milestone

- A Milestone includes
 - a due date
 - checkable criteria
- Typical contents of a milestone plan
 - Start date of the project
 - Milestone dates because of important events and their scope
 - End date of the project



Milestone

- Example for a milestone overview





Milestone

- Example for a milestone plan

No.	Plan date	Actual date	Milestone	Id	Criterion	Result
<1>	<dd.mm.yy>	<dd.mm.yy>	<Project start>	<1.1>	<e.g. Project order signed>	<open, in progress, passed, not passed>
<1>				<1.2>		
<n>	<dd.mm.yy>	<dd.mm.yy>	<Project end>	<n.1>	<e.g. Project delivery accepted>	<open, in progress, passed, not passed>

Resource plan

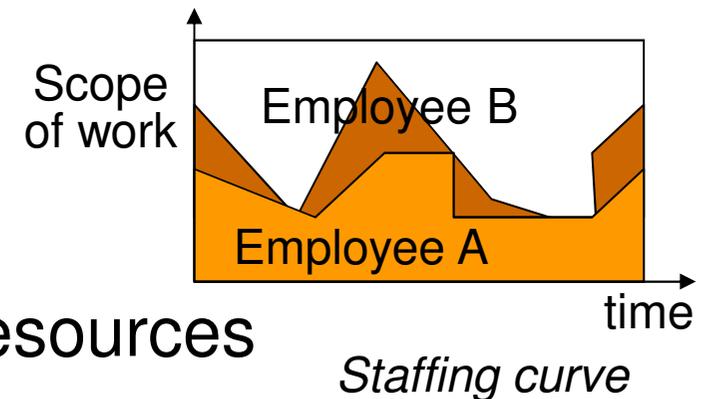


- Definition:
A resource plan is based on the WBS and identifies the quantity of labor, equipment and materials required for a project.
- Additionally objectives and constraints have to be considered.
- Resource plan covers
 - Personal planning
 - Cost schedule



Resource plan

- Goal: Optimal workload of resources
Especially in matrix project management:
 - Clarification, which resources in which volume are available from the Business Units
- Scope:
 - Planning of staff members (Personnel plan), machines, tools, and additional needed resources
 - ... typically done together with cost schedule



Resource plan



Cost schedule

- Goal: Calculating costs of the project
Differentiate
 - Personnel costs (Project management, internal / external staff members)
 - Material costs (Printers, computers, furniture)
 - Consumption costs (rent, electricity, network)
 - Additional costs
- Reasonable is the structuring of the costs following the work packages out of the WBS

Resource plan



Proposal for a personnel planning proceeding

- Determine the staff requirements
- Determine the available capacity
- Compare capacity and requirement
- Do capacity balancing and/or optimizing concerning deadlines (time) and costs

Cost schedule



Definition:

A cost schedule describes the estimated costs of a project.

Proposal for proceeding

- Based on the structures in the WBS each working package delivers target figures
- The target figures of the working packages are added for the subprojects
- Finally the plan for the overall project takes place



Cost schedule

Example Personnel Costs

Personnel costs			Plan			Actual		
WBS No.	Working package / Name	Int. / ext.	Hours	Rate	Costs	Hours	Rate	Costs
<1.1>	<Project management>	<Int>	<20>	<50B>	<1.000B>	<30>	<50B>	<1.500B>
<1.1>	<PMO>	<Int>	<40>	<40B>	<1.600B>	<50>	<40B>	<2.000B>
Sub-total personal costs					<2.600B>			<3.500B>



Cost schedule

Example Material Costs

Material costs			Plan			Actual		
WBS No.	Working package	Item	Quantity	Price	Costs	Quantity	Price	Costs
<6.3>	<Implementation>	<Laptop>	<4>	<5.000 B>	<20.000B>	<4>	<4.500B>	<18.000B>
<7.4>	<Meetings>	<Food>	<60>	<50B>	<3.000B>	<60>	<50B>	<3.000B>
Sub-total material costs					<23.000B>			<21.000B>
Total					<25.600B>			<24.500B>

Project organization



Definition:

The project organization is a “totality of the organizational units and the organizational control to process a defined project.”

- A project organization covers all organizational units and regulations concerning the execution of a project
- The project organization answers, who accepts which results

Project organization



- Roles in the project
 - Principal (synonym Executive, Sponsor)
 - Steering Committee (synonym Project Board)
 - Project Manager (synonym Project Lead)
 - Project team / Core team
 - Controller
 - Quality assurance (synonym Project assurance)
- Further roles (depending on size / area)
 - Documentation
 - Supplier
 - Business User representative ...



Project organization

Possible organization forms

- Pure functional project organization (following division, departments) 
- Functional project organization
Synonyms: Influence project organization, influence project management, project coordination 
- Matrix project organization
Synonym: Matrix project management 
- Pure project organization
Synonyms: Pure project management, Task-Force 
- Project society 

Project organization



Roles of people in possible organization forms

- Pure functional project organization
People stay in the line

- Functional project organization
People work partly in the project and are controlled in the functional unit

- Matrix project organization
People work partly in project, belong to line

- Pure project organization
For a defined time people work only in the project

- Project society


Project organization



Scope concerning setup of a project organization

- Definition of boards and teams like
 - steering committee
 - core team
 - project team
 - working teams
- Organizational regularization like definition of a
 - central communication platform or
 - project handbook



Project organization

- The project organization chart (org chart) shows
 - project roles
 - their relationships among each other
 - Who reports to whom?
 - Who decides?
 - the communication channels in the project
- Additionally it could depict specified meetings and their frequency (see „Communication“)
- Assignment of tasks
Every project role is assigned to work packages and tasks

Project organization

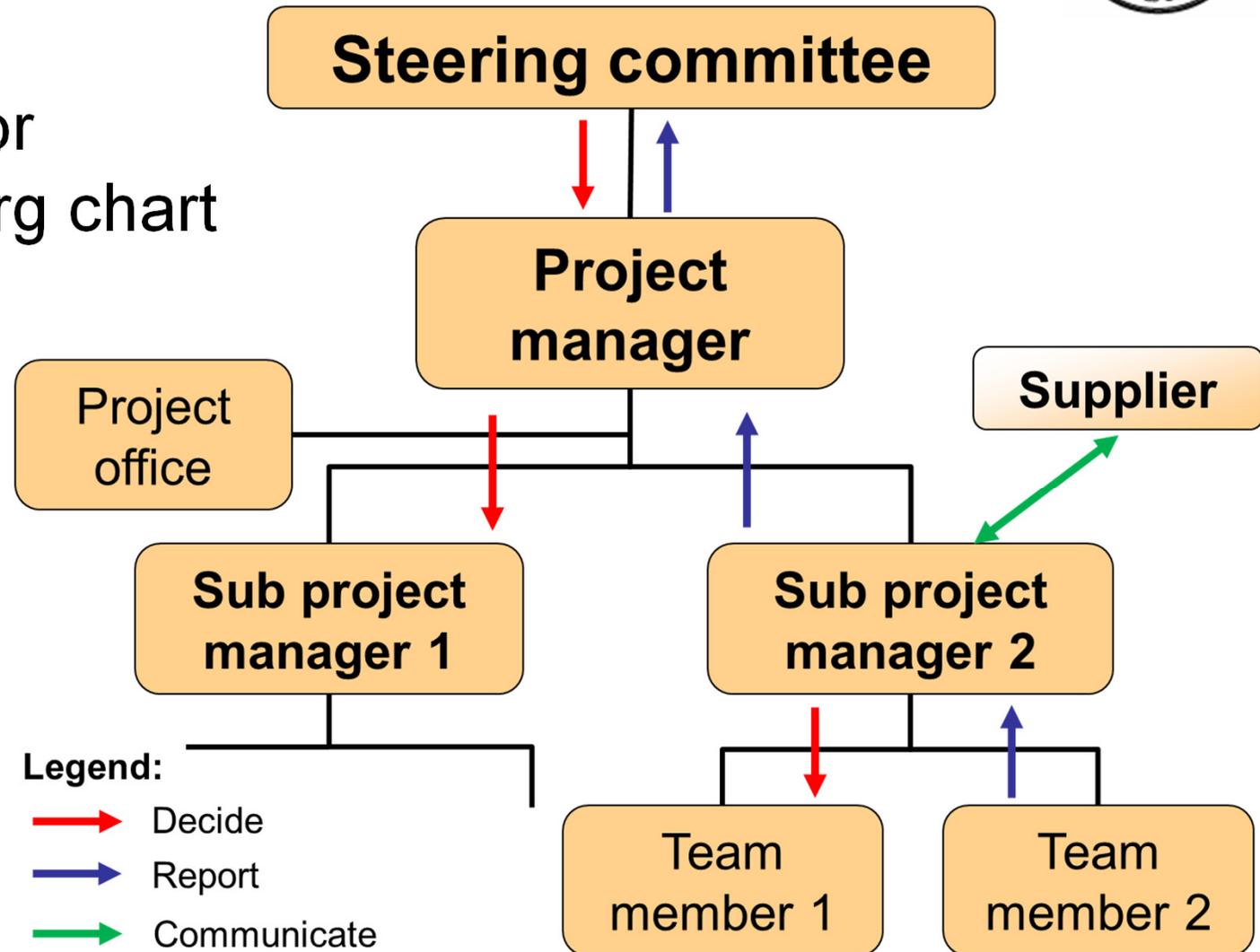


- How do I set up my project team?
 - Structuring the project in manageable sub teams
 - Every sub team should have about 7 people
 - Social mixing:
 - Female / male
 - Old / young (experienced, carefree)
 - International
 - Mixing competence
 - Technical know-how / business know-how
 - Method know-how / expert know-how
 - Generalists / specialists
 - Practical / theoretical
 - Creation of tandems across-the-board (working, reviewing)
 - Collaboration with functional units



Project organization

Example for
a project org chart





Plan optimization

- Project plan iteration – possibilities to optimize
 - Resources
 - Vacation / Sickness / Absence planning (Functional tasks, training needs, other projects)
 - Equalization of load (Avoiding of overload)
 - Time schedule
 - Plan optimization using network planning technique
→ critical path analysis
 - Planning of buffer
 - Costs
 - Start cost intensive work packages as late as possible
 - Start risky work packages as soon as possible



Plan alignment

- Main goal: Get agreement from principal
- Sub goal: Get agreement from project members
 - Plan coordination
 - Communication with supervisors of project members
 - to achieve their commitment to the project
 - Important especially in matrix project management
 - Plan should get reviewed and accepted by the project members
 - Clarification of conflicts in advance



Project kickoff

- Project kickoff, when planning is done:
 - Information about the project objective
Every project member should understand the project goal including sub goals
 - Information about the project plan
 - Motivation
 - Project is important and decision maker support the project
 - To get to know each other
 - Corporate feeling: It could work like this!
 - Conflicts and critical points are solved

Project kickoff



- Scope
 - Information, Motivation
 - Results of planning
 - Next two milestones
- The more political, the more important:
Be consequent!



Summary

- Main goal of planning phase is not the plan but the activity of planning
- Heart of project plan:
Work breakdown structure (WBS)
 - Lowest level: Work package
 - Top down / Bottom up approach
 - Approaches to structure a WBS
 - function oriented
 - object oriented
 - process oriented
 - mixed approach



Summary

- Out of WBS
 - Time schedule
Consolidate activities to milestones
 - Resource plan – focus on personnel plan
Cost schedule
 - personnel costs
 - material costs
- Project organization to define roles and relationships

Summary



- Plan optimization to improve
- Plan alignment
to get an agreement of parties and people involved
- Kickoff as start of the project



Sources

- [AG16] Daud Alam, Uwe Gühl: Projektmanagement für die Praxis, Springer Vieweg Berlin Heidelberg, 2016 (in German)
- [apm16] Association for project management (apm): Glossary, 2016, <https://www.apm.org.uk/glossary>
- [axe16] AXELOS Limited: PRINCE2® Glossary of Terms English, 2016, <https://www.axelos.com/glossaries-of-terms>
- [DIN09] Deutsches Institut für Normung e.V.: DIN 69901 Projektmanagement; Projektmanagementsysteme, 2009
- [Wid15] Max Wideman: Comparative Glossary of Project Management Terms v3.1, 2015, <http://www.maxwideman.com/pmglossary/>
- [Wik16] Wikipedia: Work breakdown structure, 2016, https://en.wikipedia.org/wiki/Work_breakdown_structure