IT Solutions with Software Engineering in Practice
Project Management

Course at TU Darmstadt
Dr. Thomas Kunstmann, 6.7.2015

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AGENDA

1. Introduction
2. Project Planning
3. Project Management Experiences
4. Summary and Exams
5. Final Remarks

Dr. Thomas Kunstmann

- Study and PhD in computer science (Informatik) at TH (!) Darmstadt
- In parallel: 8 years founder and owner of a small Software Company (IT Consulting and Software Development)
- 12 Years at Capgemini sd&m in Frankfurt/M.
- 2006 – 2009 Teaching Assignment at TU Darmstadt „Betriebliche Informationssysteme“
- 2011 – 2015 Teaching Assignment at TU Darmstadt “IT-Lösungen durch praxiserprobtes Software Engineering“
- Today: Senior Vice President “Travel & Logistics” at msg systems
- Office in Eschborn
- Focus on Custom Built Software
- Interests: Project Management, methodological Software Engineering
- Responsibilities: Sales, Project Management, Leadership

Private

- 51 Years old, married, 2 Kids
- Hobbies: Family, Volleyball, Skitouring, Mountainbiking

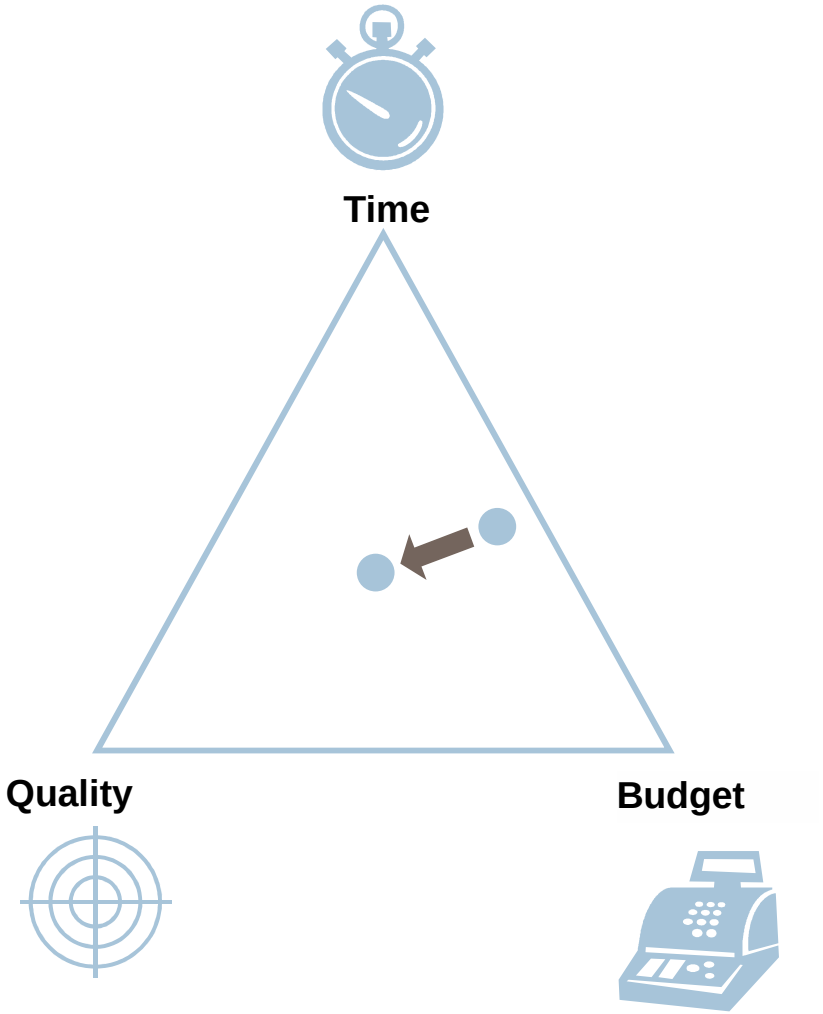
What is a Project?

- DIN 6990:
  „**Undertaking** that is characterized as being **unique** through its circumstances.“
  Uniqueness regarding:
  - **the goal**
  - **time, budget, resoures**
  - organization
  - difference from other undertakings.

- In reality a project is often defined through the following:
  A Project is an undertaking to reach a **defined goal** in a **given time** with **limited resources** whereby the way to the solution is not given or known.
  - A project consists of a high number of separate tasks and therefore is **complex**.
  - Some of these tasks have a yet **unknown content**.
  - A project has a **higher risk** to fail than a routine untertaking.

What is (Project) Management?

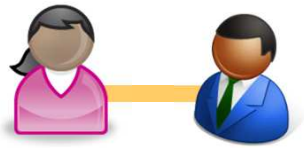
- Duden: Management is **leadership** or guidance of e.g. a company including fundamental decisions.
- Duden: Project Management is the practical, **goal-oriented** solution of a task in a defined **time** and **cost frame** on the basis of theoretical insights.
- Project Management Institute (PMI): Project Management is the application of **knowledge, skills, tools and methods** to project tasks to fulfill project **requirements**.



Small and Large Projects: Increase of Complexity

Different sizes of projects
behave quite differently and
therefore have to be managed differently

Formula: $f(n) = \frac{n * (n - 1)}{2}$



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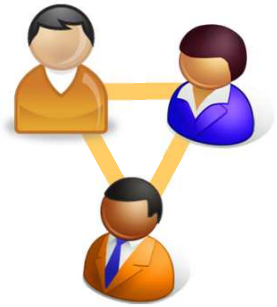

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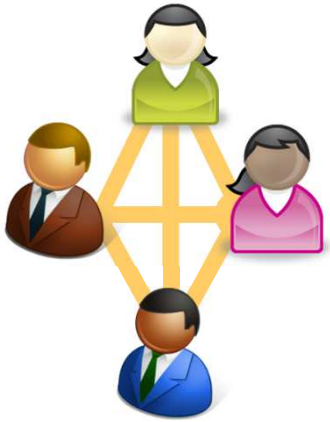

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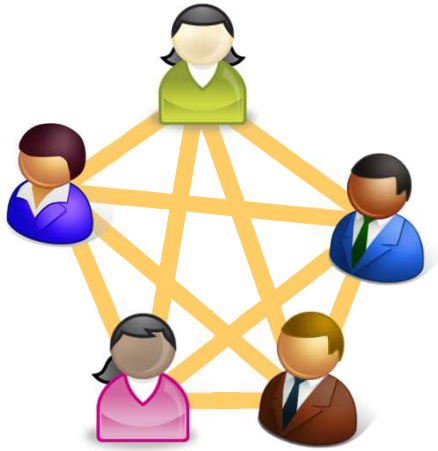
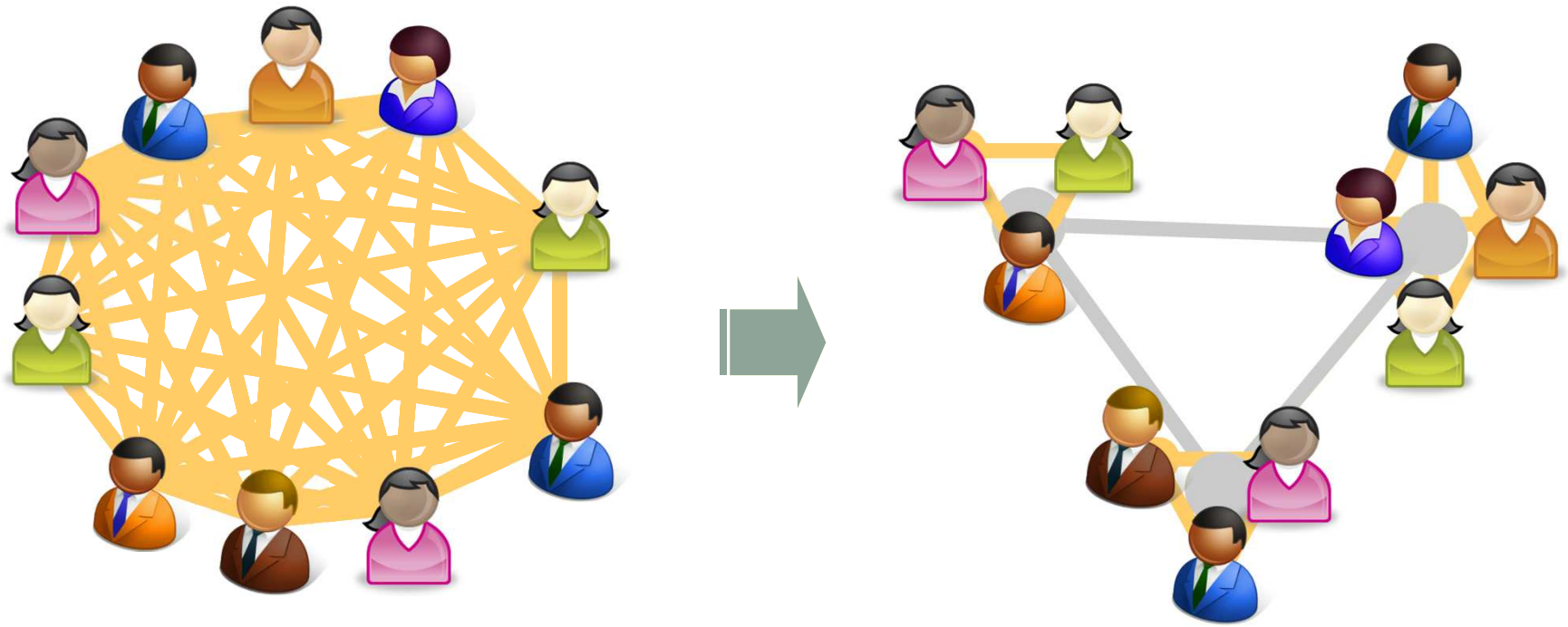


10, (15, 21, 28,...)

Necessity for communication:

- Requirements
- Interfaces
- Functionality
- Technical dependencies
- …

Divide et Impera: Make Complexity Controllable



Break down team into subteams:

- Coordination stays within subteams.
- Synchronization of results throughout lifetime of project.
- Separation of concerns minimizes coordination between subteams.
- **Warning:** Dependencies between subteams have to be managed!

Types of IT-Projects

There are different **types of IT-Projects** that vary a lot, e.g.:

- Development of **custom-built software.**
- Development of a **software product.**
- **Rollout** (incl. enhancement) of a software product.
- running and **maintaining** a software system.
- **IT-Consulting.**
- Answering a **request for proposal.**

⇒ In the following we will focus on projects for the **development of custom-built software.**

Project Manager

What is the **responsibility** of a project manager?

-> **time, budget, quality**.

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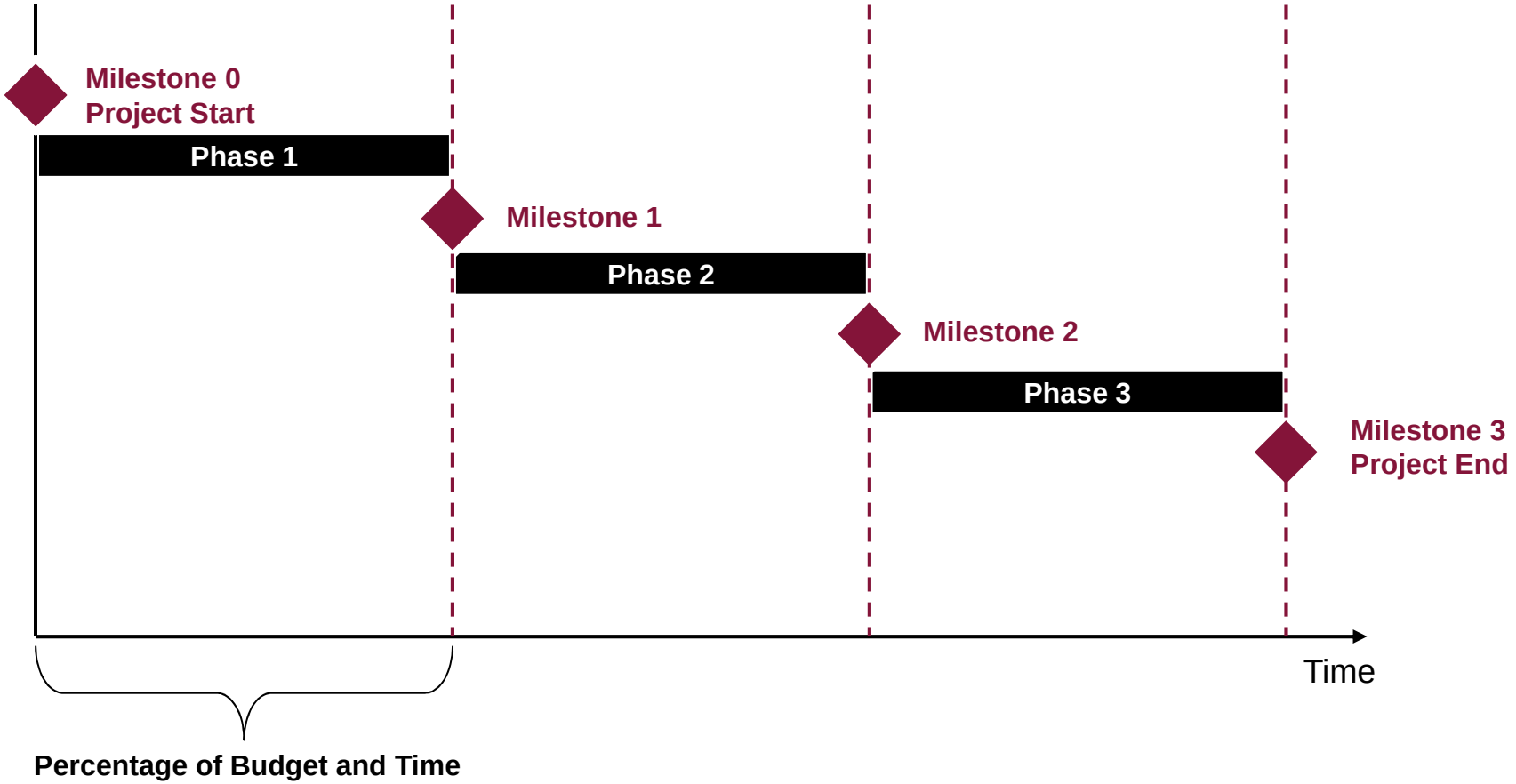
First Level of Planning: Phases

- Planning the **phases of a project** is a first step to reduce complexity.
- Phases are separated by **milestones**.

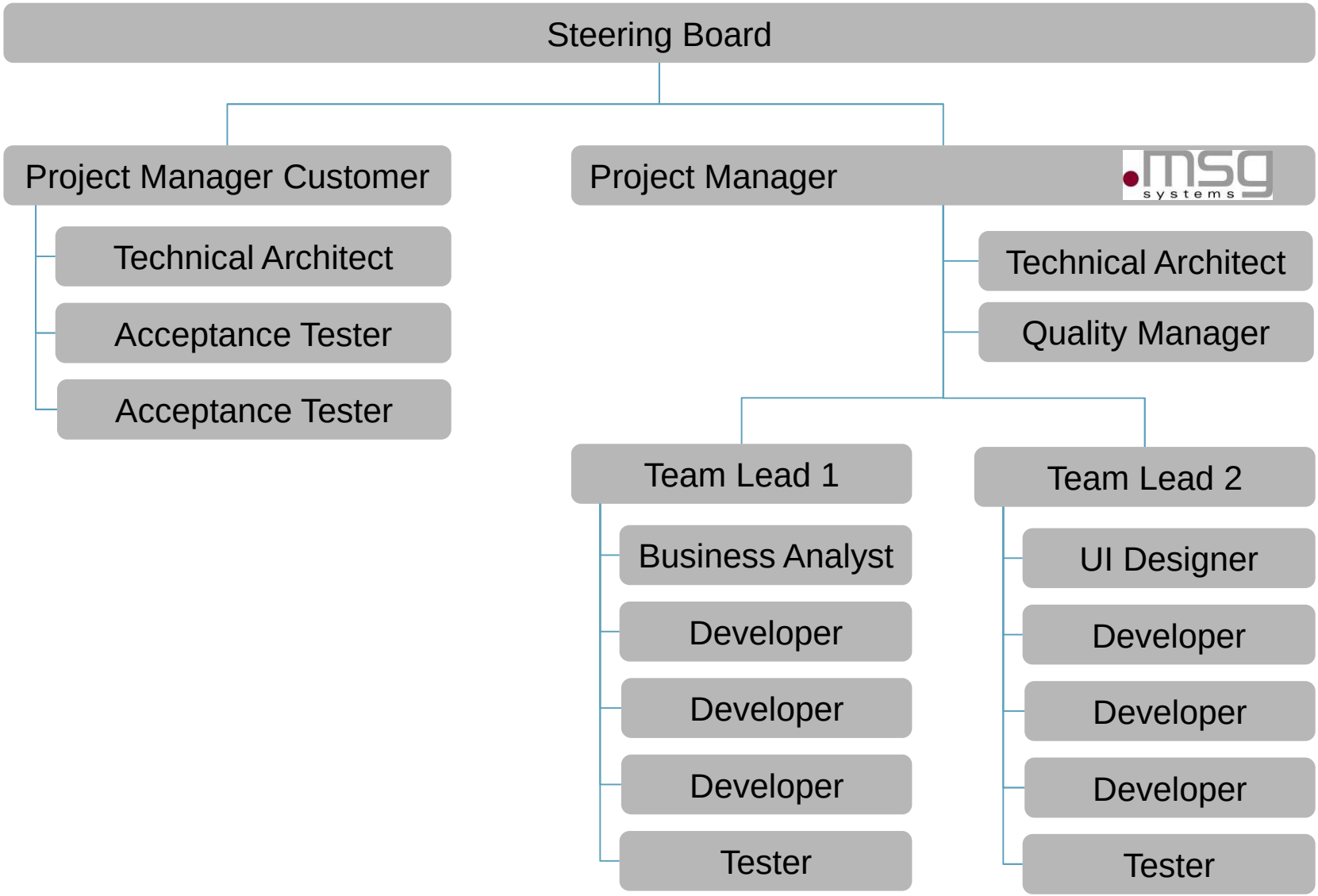
- A phase is a period of time and has
  - goals and
  - main activities.
- A milestone is a special event in the project. It has
  - specific results
  - an approximate deadline (will be detailed during planning) and
  - a status (planned, in progress, achieved, …).

Example of a Phase Plan

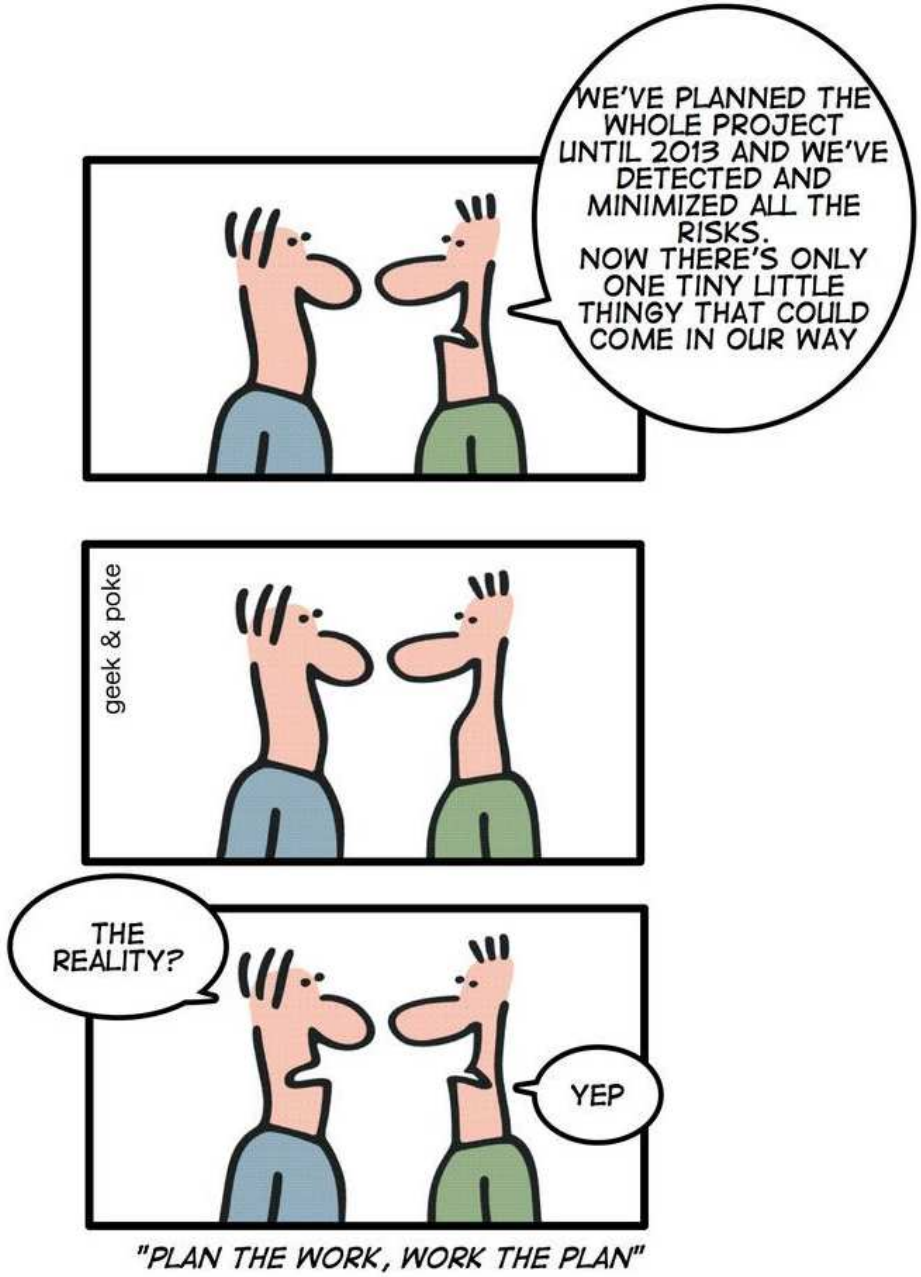
The project phase plan is dependent from the **type of project** and the **process model** (waterfall, incremental, agile, …).



Project Organization - Example

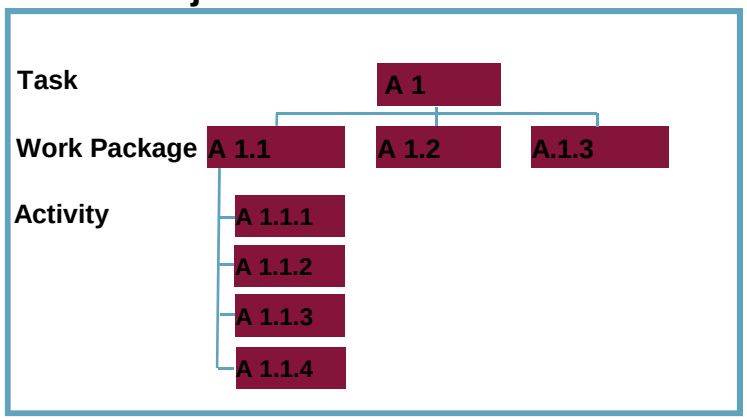


Project Planning



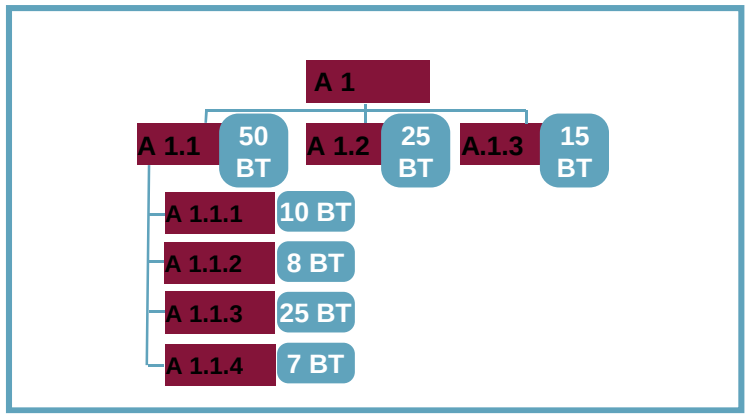
A Project Plan Consists of Numerous Sub Plans and is Built in Multiple Steps.

Basis: Project Structure Plan PSP



Estimate

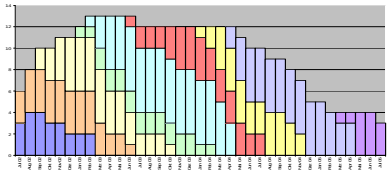
Effort Plan



Dependencies

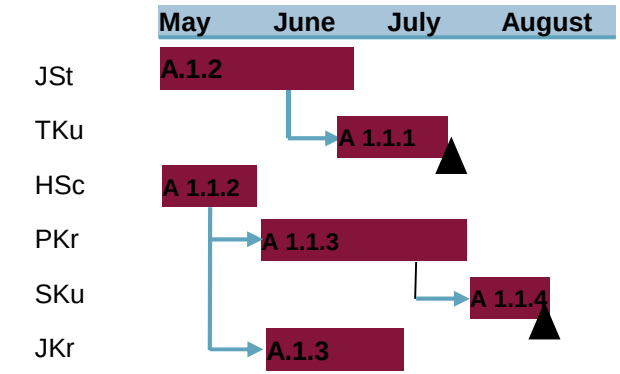
Team Plan

	May	June	July	August
JSt	0,8	0,8	0,8	0,4
TKu	0,8	0,5	0,8	0,4
HSc	0,4	0,3	0,2	0,4
N.N.	0,5	0,5	0,5	0,5



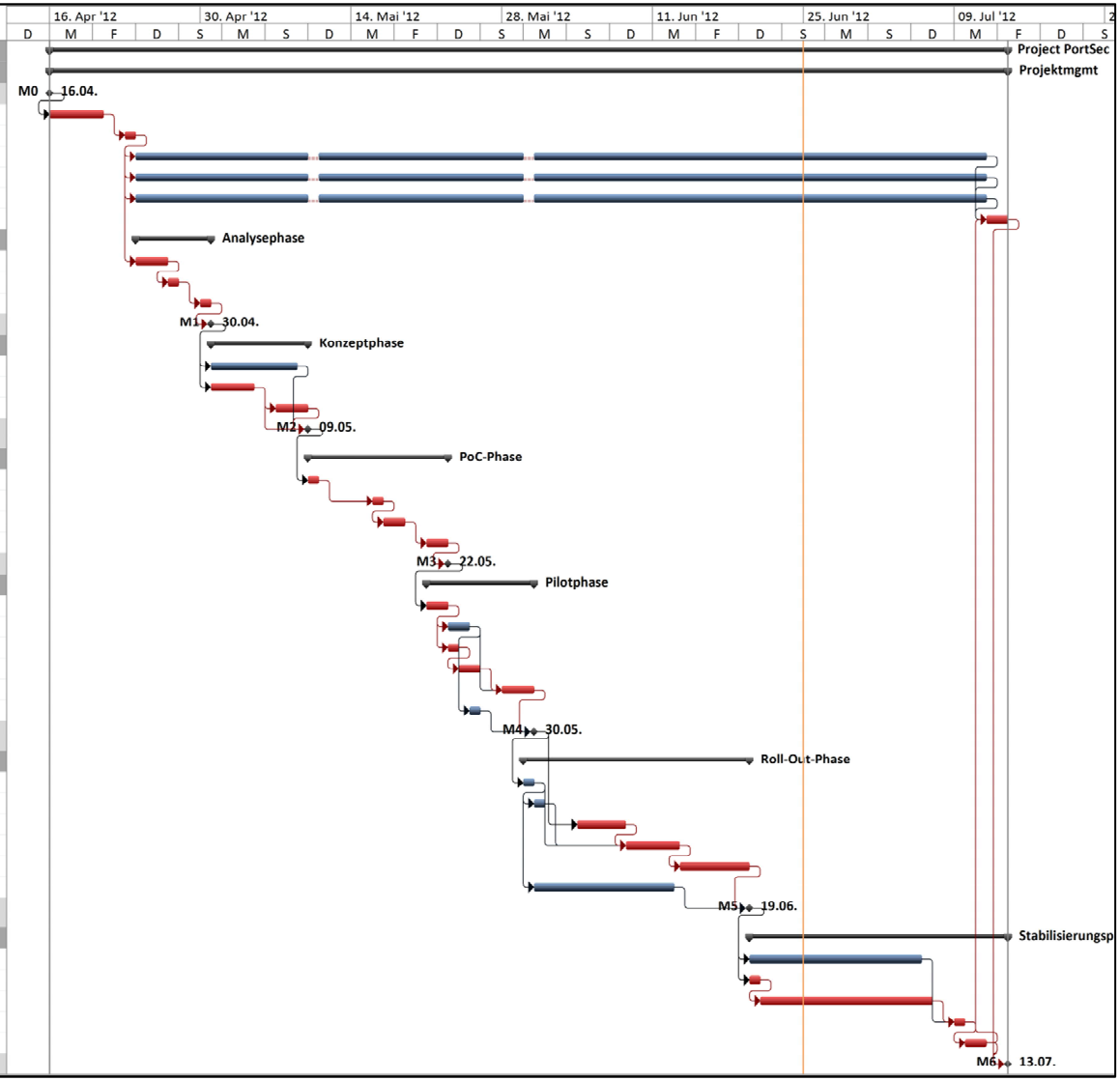
Resources

Time Plan

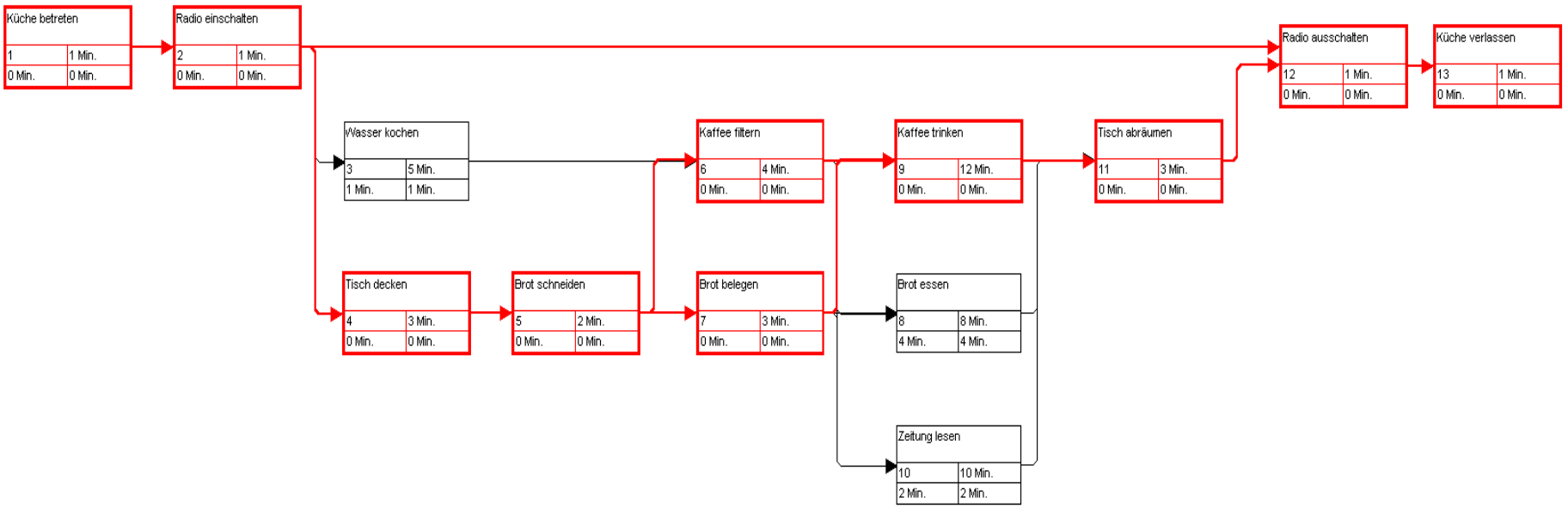


Example Gantt Chart

Nr.	PSP-Code	Vorgangsname	PSP-Code von Vorgängern	Dauer
1	**2012/PS**	**Project PortSec**		**65 Tage**
2	**2012/PS-1**	**Projektmgmt**		**65 Tage**
3	M0	Projektleiter beauftragt		0 Tage
4	2012/PS-1.1	Planung erstellen	M0	5 Tage
5	2012/PS-1.2	Kickoff durchführen	2012/PS-1.1	1 Tag
6	2012/PS-1.3	Controlling durchführen	2012/PS-1.2	57 Tage
7	2012/PS-1.4	Kommunikation durchführen	2012/PS-1.2	57 Tage
8	2012/PS-1.5	Risikomgmt durchführen	2012/PS-1.2	57 Tage
9	2012/PS-1.6	Projekt abschließen	2012/PS-1.3;2012/PS-1.4;2012/PS-1.5;2012/PS-7.5	2 Tage
10	**2012/PS-2**	**Analysephase**		**5 Tage**
11	2012/PS-2.1	Marktanalyse durchführen	2012/PS-1.2	3 Tage
12	2012/PS-2.2	Beratung einholen	2012/PS-2.1	1 Tag
13	2012/PS-2.3	Lösung vorstellen	2012/PS-2.2	1 Tag
14	M1	Lösung zur Umsetzung freigegeben	2012/PS-2.3	0 Tage
15	**2012/PS-3**	**Konzeptphase**		**7 Tage**
16	2012/PS-3.1	Netzwerk-Konzept erstellen	M1	6 Tage
17	2012/PS-3.2	Support-Konzept erstellen	M1	4 Tage
18	2012/PS-3.3	Schulungsunterlagen erstellen	2012/PS-3.2	3 Tage
19	M2	Konzepte zur Umsetzung und Support abgenommen	2012/PS-3.1;2012/PS-3.2;2012/PS-3.3	0 Tage
20	**2012/PS-4**	**PoC-Phase**		**9 Tage**
21	2012/PS-4.1	Bestellung der Netz-Hardware	M2	1 Tag
22	2012/PS-4.2	Aufbau der Testumgebung	2012/PS-4.1[EA+3 Tage]	1 Tag
23	2012/PS-4.3	Konfiguration der Testumgebung	2012/PS-4.2	2 Tage
24	2012/PS-4.4	Testläufe durchführen	2012/PS-4.3	2 Tage
25	M3	Konzept zur Umsetzung getestet	2012/PS-4.4	0 Tage
26	**2012/PS-5**	**Pilotphase**		**8 Tage**
27	2012/PS-5.1	Aufbau der Finalumgebung	M3[EA-2 Tage]	2 Tage
28	2012/PS-5.2	Konfiguration der Finalumgebung	2012/PS-5.1	2 Tage
29	2012/PS-5.3	Pilot-Team-aufbauen	2012/PS-5.1	1 Tag
30	2012/PS-5.4	Support schulen und berechtigen	2012/PS-5.3	2 Tage
31	2012/PS-5.5	Pilotbetrieb durchführen	2012/PS-5.2;2012/PS-5.4	3 Tage
32	2012/PS-5.6	Problemdrucker ermitteln	2012/PS-5.2	1 Tag
33	M4	Konzepte zur Umsetzung und Support pilotiert	2012/PS-5.5;2012/PS-5.6	0 Tage
34	**2012/PS-6**	**Roll-Out-Phase**		**15 Tage**
35	2012/PS-6.1	Rollout-Plan kommunizieren	M4[EA-1 Tag]	1 Tag
36	2012/PS-6.2	IP-Telefone austauschen	2012/PS-6.1	1 Tag
37	2012/PS-6.3	Thin-Clients aufrüsten	M4[EA+2 Tage]	4,5 Tage
38	2012/PS-6.4	Rolout Ismaning	2012/PS-6.1;2012/PS-6.2;2012/PS-6.3	3 Tage
39	2012/PS-6.5	Rollout Rest Deutschland	2012/PS-6.4	4,5 Tage
40	2012/PS-6.6	Rollout International	2012/PS-6.1	9 Tage
41	M5	Konzept zu Umsetzung komplett ausgerollt	2012/PS-6.5;2012/PS-6.6	0 Tage
42	**2012/PS-7**	**Stabilisierungsphase**		**18 Tage**
43	2012/PS-7.1	Übergangszeit monitoren	M5	12 Tage
44	2012/PS-7.2	Kommunikation zur Konfiguration	M5	1 Tag
45	2012/PS-7.3	Konfiguration supporten	2012/PS-7.2	12 Tage
46	2012/PS-7.4	Altes Netzwerk abschalten	2012/PS-7.1;2012/PS-7.3	1 Tag
47	2012/PS-7.5	Abnahme durchführen	2012/PS-7.4	2 Tage
48	M6	Alte Infrastruktur deaktiviert und neue	2012/PS-1.6;2012/PS-7.5	0 Tage

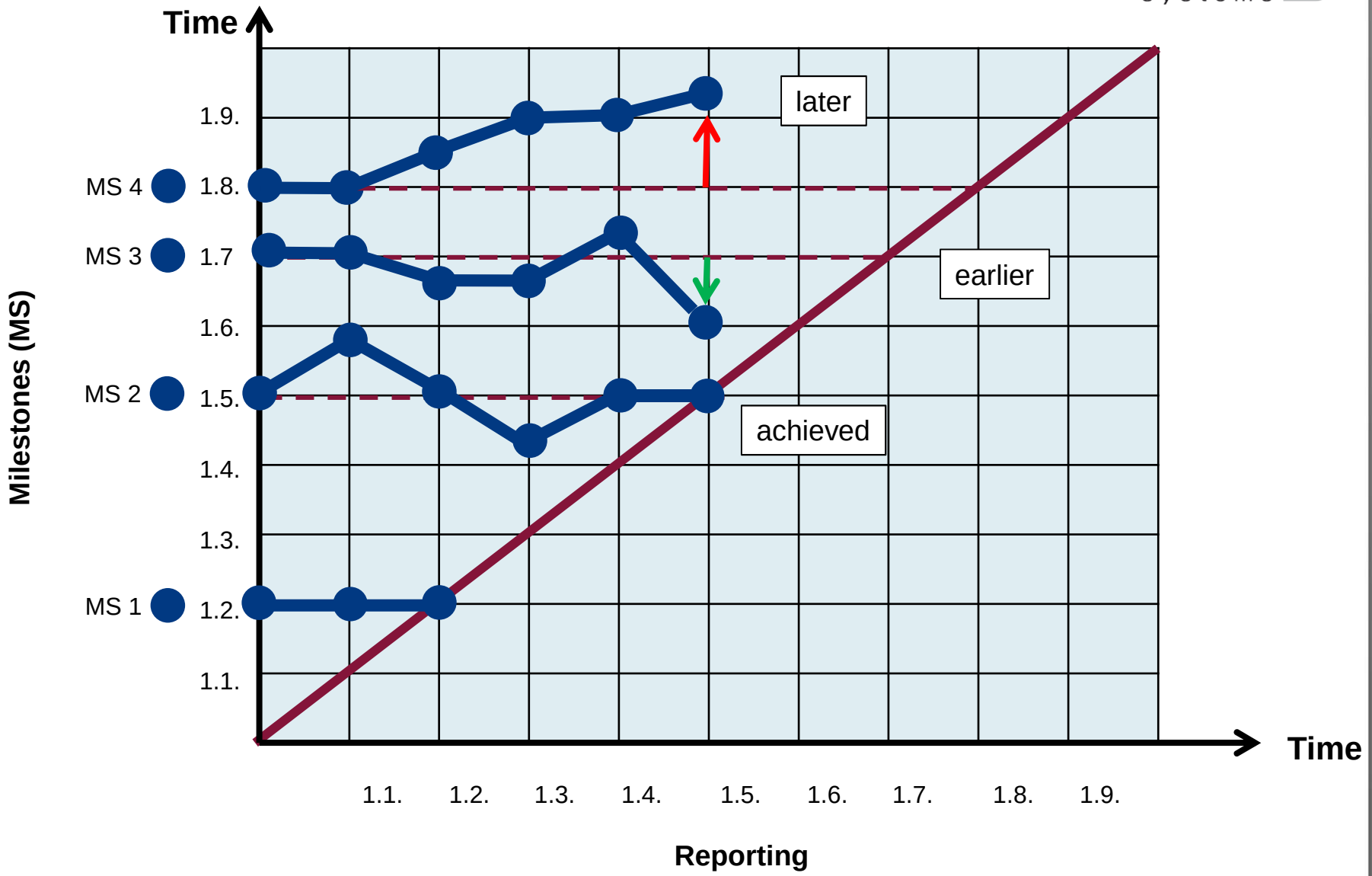


Critcial Path Visualized



The **critical path** is the path through all work packages without any buffer.
Any delay on the critical path jeopardizes the deadline.

Milestone Trend Analysis



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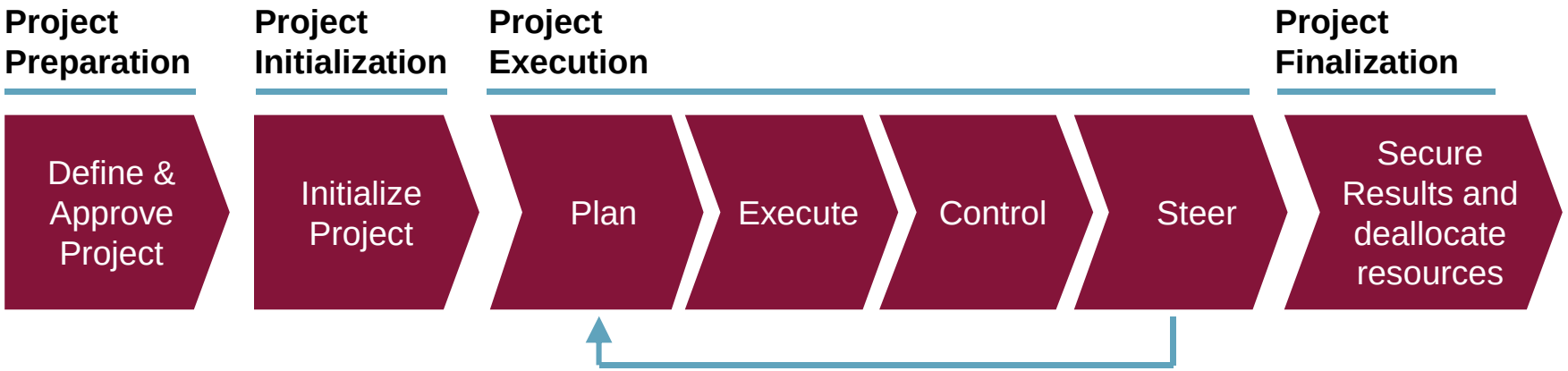
Project Management Models

- The tasks of a Project Manager are different through the life cycle of a project.
- The following project management phases can be distinguished:
  - Project preparation
  - project initialization
  - project execution
  - project finalization
- Project execution includes the iterative processes: planning, execution, controlling, steering.
- Project management models have to be enhanced project specifically!

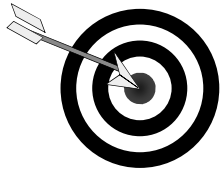


Requirements Management defines the Project

- Mediator between Business and IT
  - In the direction of business:
    - Which new opportunities offers IT (e.g. through innovations)?
    - How can processes be optimized?
  - In the direction of IT:
    - Implications for systems
    - Feasibility, synergies

- Projects have to be covered by a business case.
  - Total cost of ownership
  - Benefits should be quantified

- Priorities
  - Priorities should reflect importance, not urgency.
  - It is never difficult to decide what is important. It is difficult to decide what is not important (and therefore will probably not be done at all).

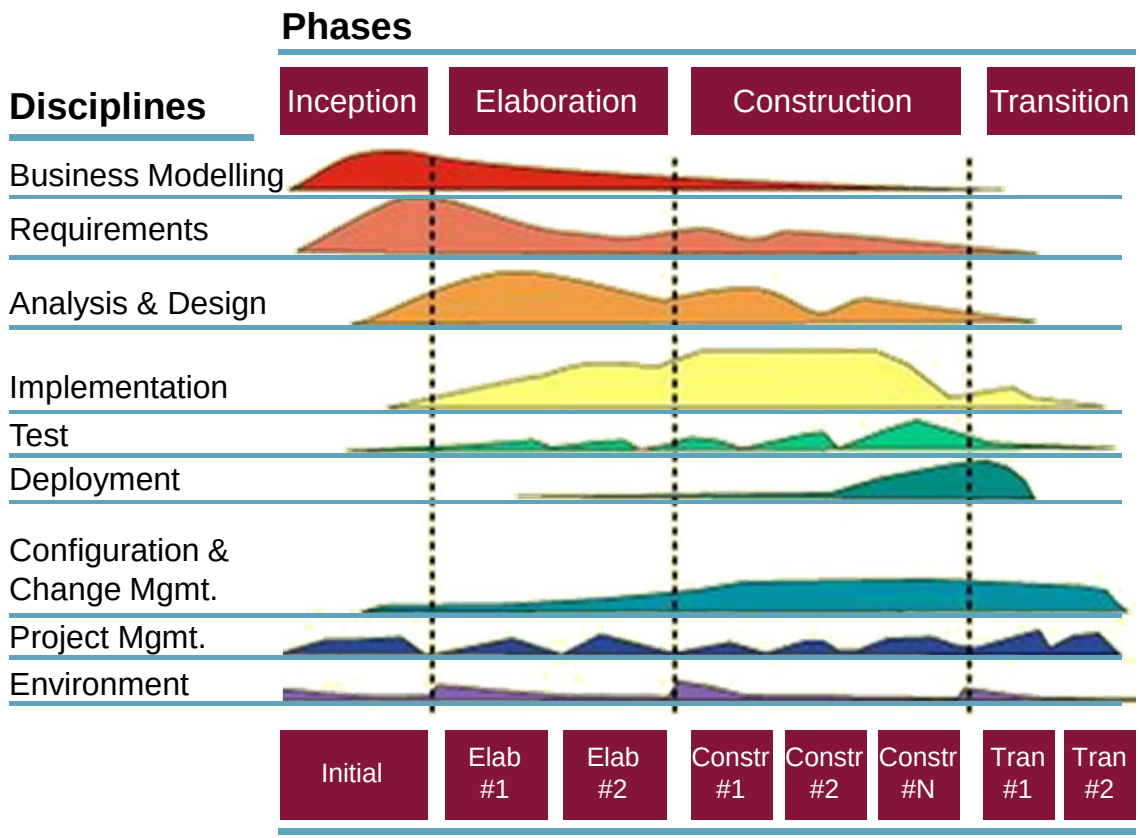


A business case makes a project controllable and steerable when times get rough.

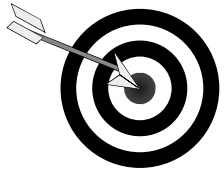
Decide the Process Model

Project Initialization

Initialize Project

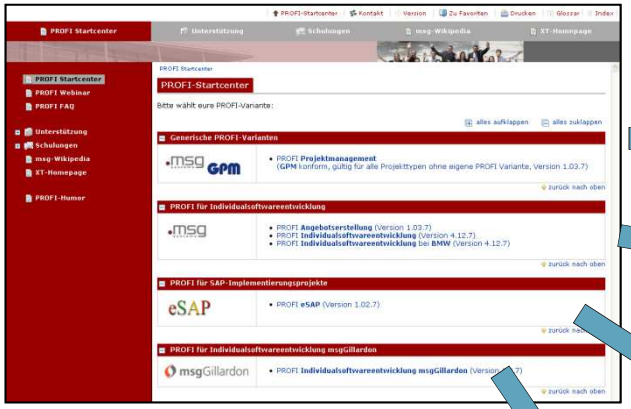


- Rational Unified Process (RUP) – see left side
- V-Model XT
- Extreme Programming (XP)
- Agile Methods
- Feature-Driven Development (FDD)
- Spiral Model
- Waterfall Model
- Scrum
- …



Which is the best Process Model -> Depends on circumstances and Process Models have to be enhanced project specifically.

What is msg.PROFI?



Project Initialization

Initialize Project

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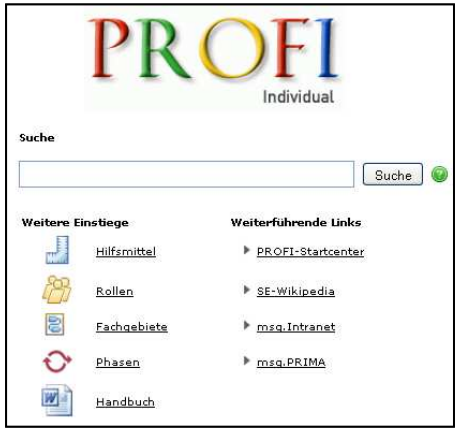
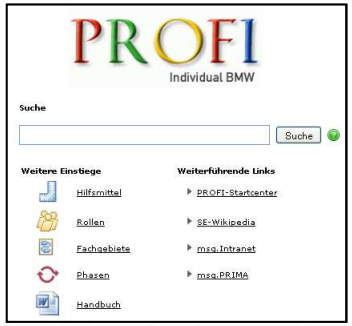




- Family of Process Models for different types of projects.
- Supported by different websites.
- Developed with industry standards EPF / SPEM
- Successful in reality since 2003.

Team Building

Project Initialization

Initialize Project

- „People make Projects“

- Find the right persons
  - Generalists / Specialists
  - Mix different levels of experience
  - Business / Technology / Management
  - Skill matrix

- Kick-off meeting at the beginning
  - Participants: All Stakeholders
  - Goals
  - Static organization (rolls, tasks, team, …)
  - Dynamic organization (plan, reports, meetings, …)

- Information (regularly): Push or Pull?

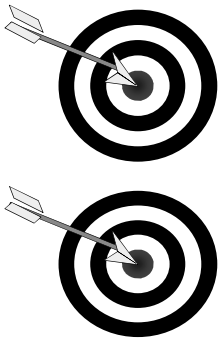
Technology can be mastered …

Project Planning

- „The plan is missing when there are too many plans."
  Publilius Syrus (100 years BC), Roman Poet

- “I think it’s right and important to do a two years planning and consolidate our figures. But I’m convinced that the two years will be in reality totally different from what we have planned.”
  Helmut Sihler (*1930), Austrian Topmanager, 1980-92 Head of Henkel KGaA

- “Against the failure of a plan there’s no better comfort than to build a new plan immediately.”
  Jean Paul (1763-1825), German Narrator



A plan has to be realistic. When your expectations are too high you will never be successful.

Project planning is constructive! If you don’t plan you don’t have a plan. But you also don’t know what to do. When planning you do constructive thinking about what to do. Using a tool to document the plan is not much effort.

Given and actual value? Estimate remaining effort.

Project Execution

Control

msg systems

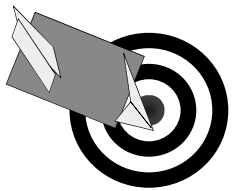
From Project Estimate / Bid

Aggregation from Team Members

Estimation!

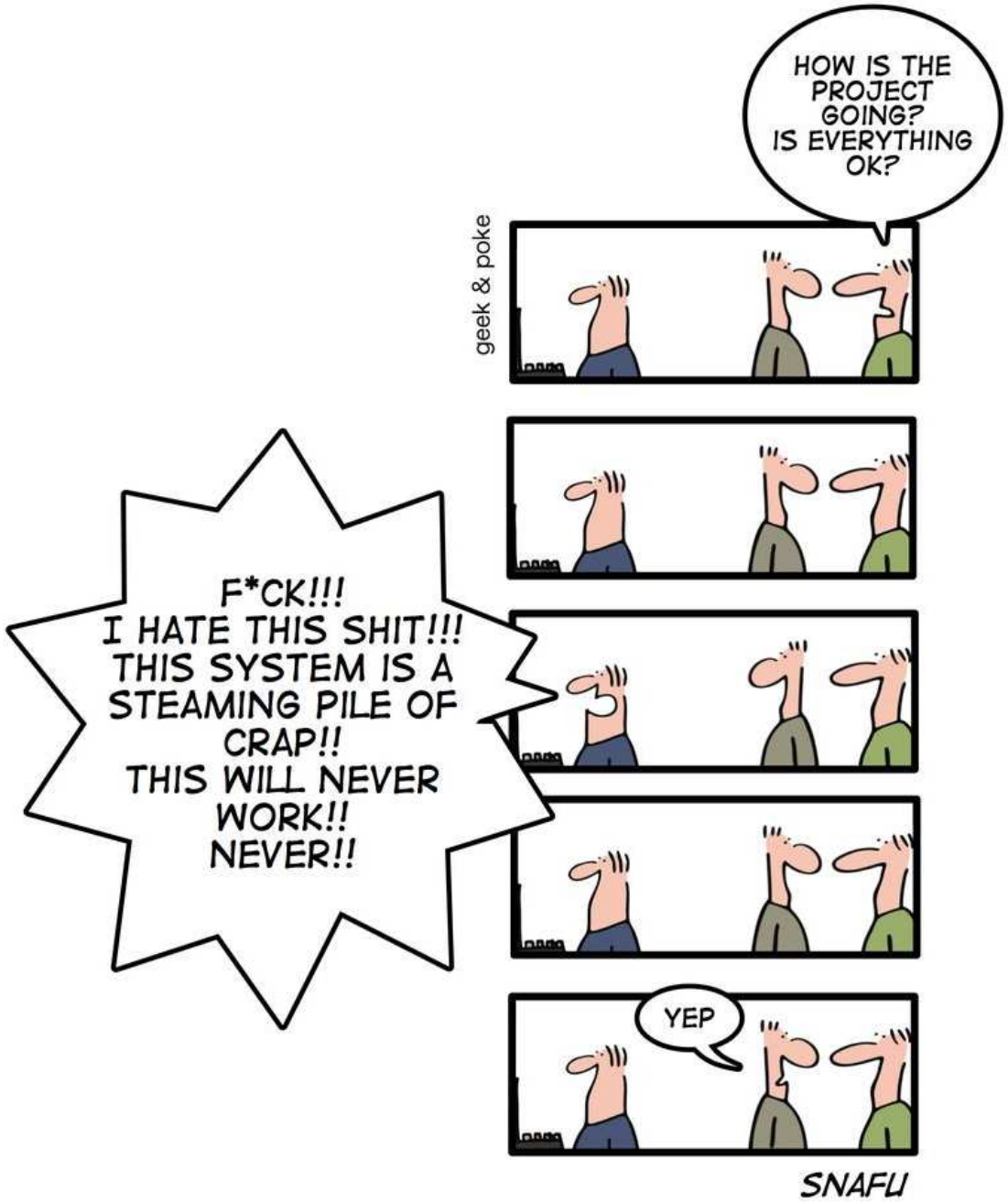
Task	Given	Actual	Remain	Estimate Act. + Rem.	Difference Given ./. Estimate
Function 1	100	35	45	80	20
Function 2	300	120	250	370	-70
Function 3	200	0	200	200	0
Sum	**600**	**155**	**495**	**650**	**-50**
Project Leader	90	25	70	95	-5
Quality Assurance	90	15	75	90	0
Training	30	40	10	50	-20
Administration	90	50	70	120	-30
Travel	42	10	30	40	2
Support	48	0	48	48	0
Sum	**390**	**140**	**303**	**443**	**-53**
Sum Total	**990**	**295**	**798**	**1093**	**-103**
Risk Buffer	198		120	120	78
´Sum Overall	**1.188**	**295**	**918**	**1.213**	**-25**

Risk has to be evalutaed newly



When controlling progress the view has to be focussed on the future, not the past.

Geek& Poke


HOW IS THE PROJECT GOING? IS EVERYTHING OK?
geek & poke
F*CK!!! I HATE THIS SHIT!!! THIS SYSTEM IS A STEAMING PILE OF CRAP!! THIS WILL NEVER WORK!! NEVER!!
YEP
SNAFU

AGENDA

1. Introduction
2. Project Planning
3. Project Management Experiences
4. **Summary and Exams**
5. Final Remarks

Lectures

- Mobile Solutions in Enterprise Environment
- Profitability of IT
- Cost Estimates and Calculation of Projects
- Overview of Client Technologies
- Automated Testing
- SAP Overview
- Scalability and Performance
- Modeling with UML and DSL and Generating Code
- Business Process Modeling
- Agile with Scrum
- Project Management

Information concerning the exam:

- Written Exam
- Date: August 12th, 2015 at 10:00 am
- Rooms
  - S101/A1 Last name starting with A-P
  - S206/030 Last name starting with Q-Z

- Exam will take 90 minutes
- Presented slides are the relevant content for the exam
- Bring your student identification and a pen (black or blue, document-proof)
- Permitted aids: Everything except electronic devices
- All questions of the exam must be answered in English

AGENDA

1. Introduction
2. Project Planning
3. Project Management Experiences
4. Summary and Exams
5. **Final Remarks**

Thank you for your attention

msg systems ag

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