Project Management

Jan Hornwall, Director Project Management, Siemens Digital Industries Software

Key Objectives of this Lecture

- You know more about the Project Management areas
- We have looked at some Best Practices in Project Management
- We have had a discussion on working in software development projects and managing projects

Agenda

- Introduction of the Speaker & Siemens PLM Software
- Introduction to Projects and Project Management
- The Project Management Knowledge Areas and Processes
  - including best practices
- Discussion on main challenges with working in projects and together with a Project Manager
- Key Take Aways

SIEMENS

Introduction of the Speaker

- From Sweden, living in Switzerland since 1992
- Master of Science in Physics Engineering, Chalmers University, Gothenburg
- Background as Software Engineer in Telecom; Unix, C++
- Working internationally in Project-, Program- and Team management since 1994
- In current role as Director Project Management, Siemens PLM Software since 2007
- Certified *Project Management Professional* by PMI & *Senior Project Manager* IPMA
- Founder of PMI chapter Switzerland (www.pmi-switzerland.ch)

- Privately:
  - Family: proud father of three lovely daughters, aged 25, 23 and 7
  - Passionate ski mountaineer, windsurfer, mountain biker and Lindy Hop dancer

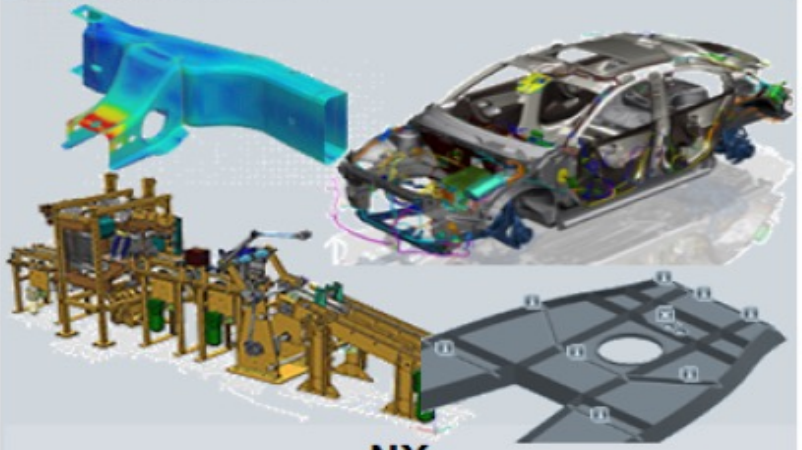
Email: **jan.hornwall@siemens.com**
LinkedIn: **www.linkedin.com/in/jan-hornwall**

Please feel free to contact me for any questions on this material or any other Project Management questions!

Siemens Digital Industries Software

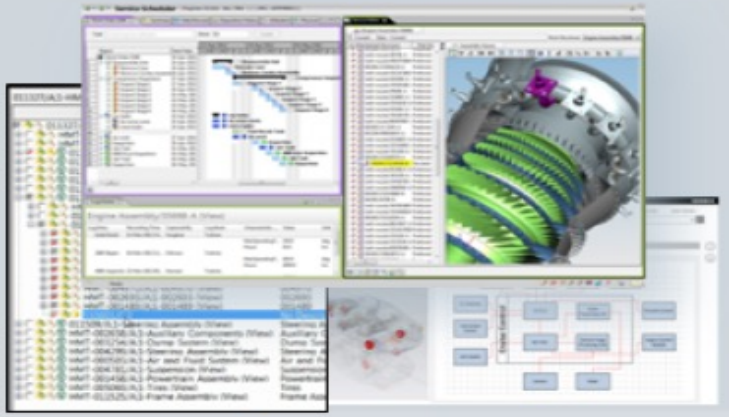
SIEMENS

Product Engineering



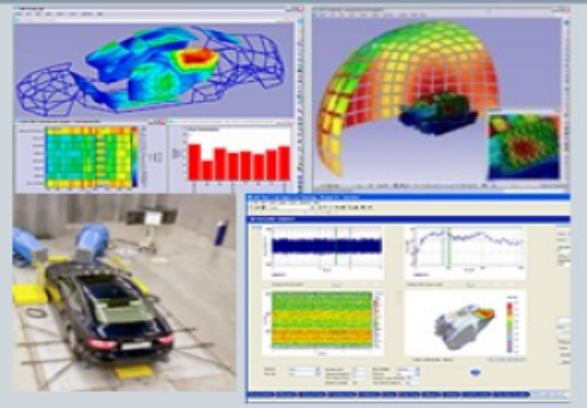
NX

Lifecycle Collaboration



Teamcenter

Simulation & Test



LMS

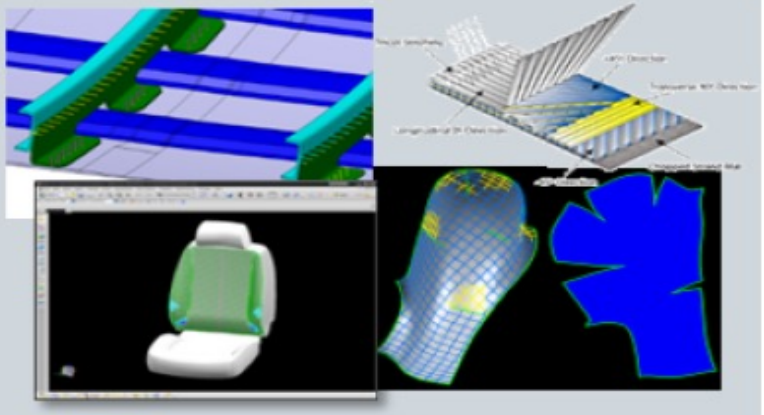
Manufacturing Engineering

Tecnomatix

Mainstream Engineering

Solid Edge

Specialized Engineering



Vistagy

The Largest, Broadest and Most Successful Deployments in the Industry

77’000 Customers and 9 Million Licensed Seats

AEROSPACE

ATK
AVIC
BAE Systems
B/E Aerospace
Boeing
GE
General Dynamics
Goodrich
Honeywell
L3 Communications
Lockheed Martin
NASA & JPL
Rafael
Rolls-Royce
Space Systems Loral
SpaceX
United Aircraft Corporation
ULA
United Technologies
USAF

AUTOMOTIVE

Autocar
BMW
Chrysler
Daihatsu
Daimler
Delphi
FIAT
Ford
GM
Hyundai
Isuzu
Magna
Mazda
Nissan
Renault
Suzuki
TATA
Volkswagen
Volvo
Visteon

CONSUMER

Anheuser Busch
Boots
Delta
Dr. Martens
Estee Lauder
General Mills
Keurig Green Mountain
Kraft
Lego
L’Oreal
Nike
Procter & Gamble
PZ Cussons
RJ Reynolds
The Jones Group
Tiffany & Co.
Toys R Us
Unilever

ELECTRONICS

ASML
Applied Materials
B/S/H
Emerson
Ericsson
Fujitsu
H3C
Haier
Hauer
Lam Research
LG Electronics
Mettler-Toledo
Microsoft
Philips
Ricoh
Samsung
Seagate
Teradyne
Siemens
Xerox

ENERGY

Alstom
Areva Nuclear
Baker Hughes
Balfour Beatty
China Nuclear
Con Ed
FMC
GE Oil & Gas
Max Boegl
Mitsubishi
NOV
Nuclear Waste Mgmt
Siemens Energy
Toshiba

MACHINERY

Altec
Caterpillar
DMG
FMC
GROB
Heidelberg
Hitachi
Husky
Hyundai
JCB
John Deere
KBA
Kone Cranes
Manroland
Mori Seiki
Sany
Windmoeller & Hoelscher
Yuchai Group
Yanmar
Zoomlion

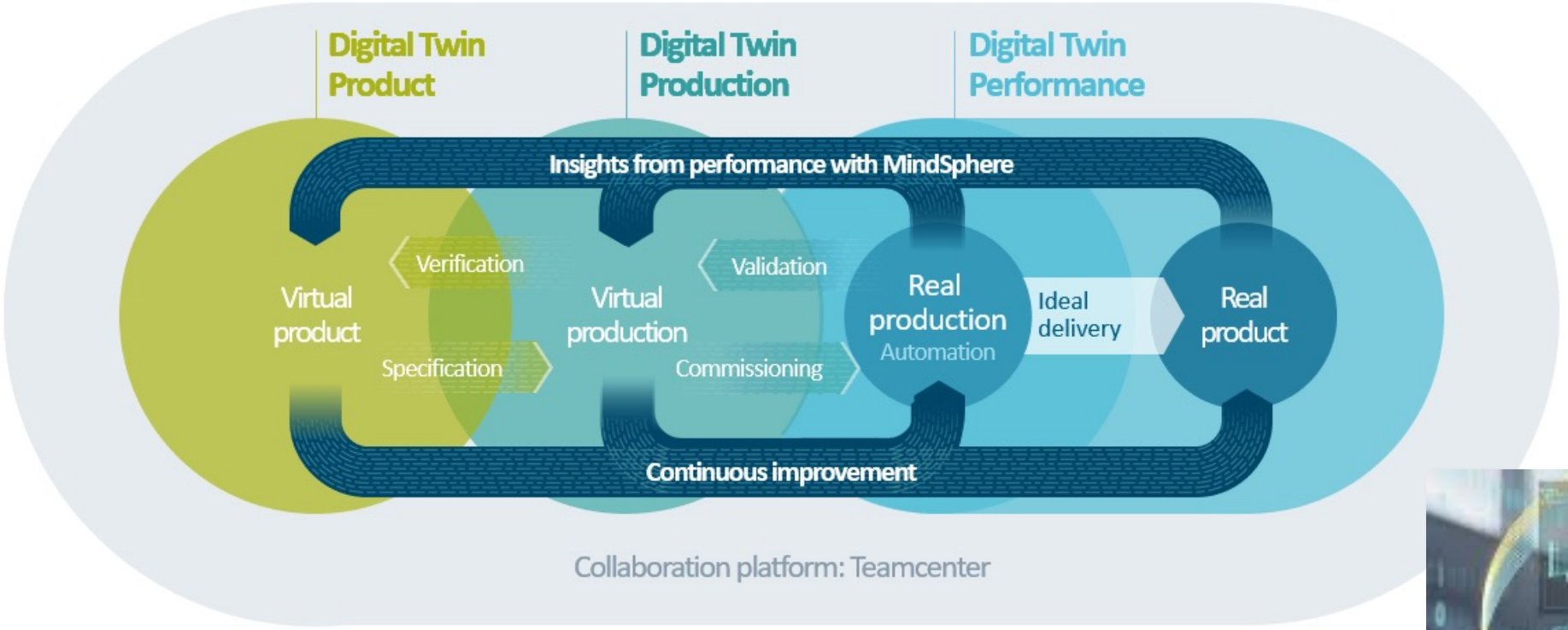
MARINE

BAE Systems Maritime
Damen Group
DSME
Feadship
Fincantieri
Flensburger
GD Electric Boat
HHI
HII
Japan Marine United
Jiangnan Shipyard
Lürssen
MAN Diesel
Newport News Shipbuilding
Rolls Royce Marine
Royal IHC
Schiffbau-Gesellschaft
SHI
Siemens
TKMS
Wärtsilä

MEDICAL

3M
Abbott
Baxter
Biomet
Carefusion
Edwards Lifesciences
Exactech
Hill-rom
Hitachi
Johnson & Johnson
Medin
Olympus
Siemens Healthcare
Smith & Nephew
St Jude Medical
Symmetry Medical
Topcon
Waldemar Link
Zimmer

Digital Enterprise with Digital Twins
Connecting the Digital Twin Product to the Digital Enterprise

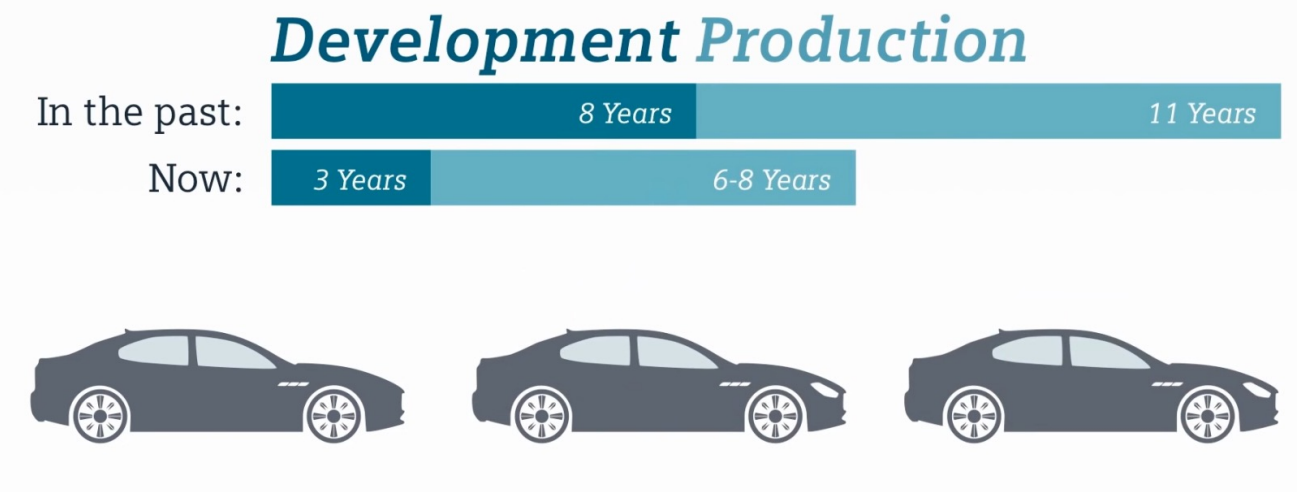


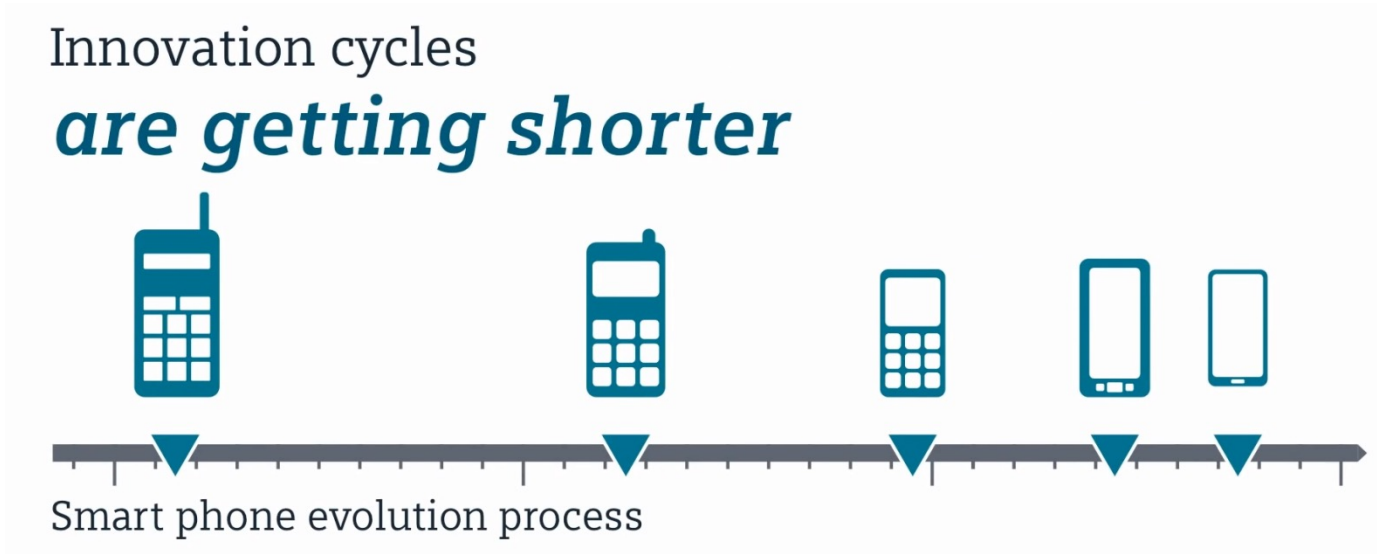
PwC Global 100 Software Leaders (2016)

Rank	Company	Country HQ	2014 Software revenue (US$M)	2014 Total revenue (US$M)
1	Microsoft	USA	$62,014	$93,456
2	Oracle	USA	$29,881	$38,828
3	IBM	USA	$29,286	$92,793
4	SAP	Germany	$18,777	$23,289
5	Symantec	USA	$6,138	$6,615
6	EMC	USA	$5,844	$24,439
7	VMware	USA	$5,520	$6,035
8	Hewlett Packard	USA	$5,082	$110,577
9	Salesforce.com	USA	$4,820	$5,274
10	Intuit	USA	$4,324	$4,573
11	Adobe	USA	$4,061	$4,183.5
12	CA Technologies	USA	$4,053	$4,410
13	SAS*	USA	$2,884	$3,084
14	Cisco Systems	USA	$2,836	$47,823
15	Dassault Systèmes	France	$2,695	$3,038
16	Siemens	Germany	$2,613	$95,542
17	Fujitsu	Japan	$2,527	$43,526
18	Autodesk	USA	$2,413	$2,486
19	Citrix	USA	$2,376	$3,143
20	Google	USA	$2,273	$66,001
21	Hitachi	Japan	$2,159	$91,246
22	Apple	USA	$2,110	$199,800

https://www.pwc.com/gx/en/industries/technology/publications/global-100-software-leaders.html

Trends in our Market





IoT = Internet of Things

Industry 4.0

Digitalization

Digital Twin

Additive Manufacturing (3D Printing)

Introduction to Project Management

- **What is a Project?**

  A project is a temporary endeavor to create a unique product, service or result. (PMI)

- **Why Project Management?**
  - Almost all software products are obtained via projects, as opposed to manufactured products.
  - Enterprise Software is deployed and customized to customer business through projects

- The **challenge** with many projects is to manage the “triple constraints”:
  - Deliver on time
  - Deliver within budget
  - Deliver agreed functionality to agreed quality = performance

Introduction to Project Management

- **What is a Program?**

  A group of related projects and program activities that are managed in a coordinated way to obtain benefits not available from managing them individually (PMI)

- **What is not a project or a program?**

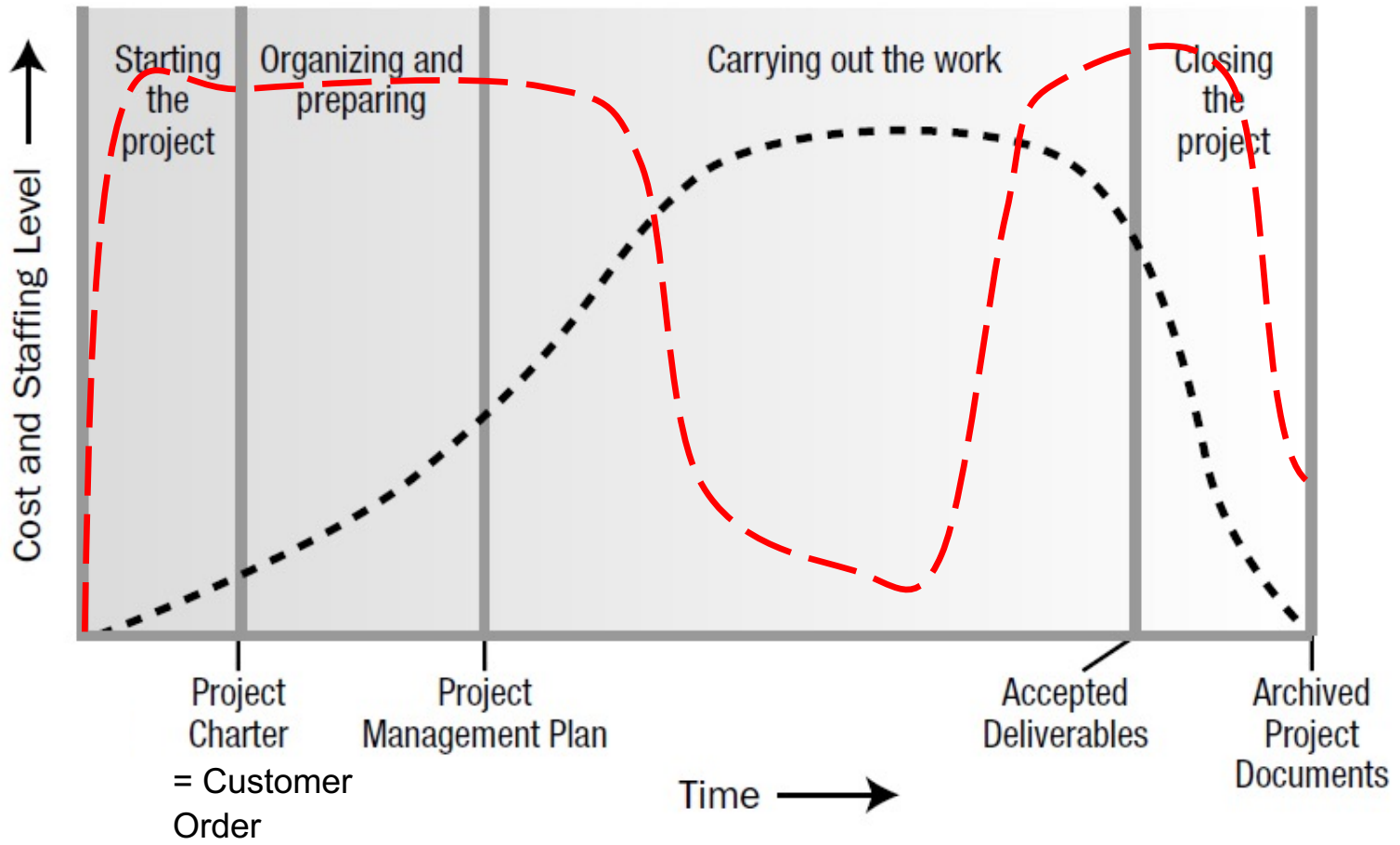
  Examples:

  - Monthly magazine
  - Maintenance / bug fixing of released product
  - Yearly contract for manage data servers

Introduction to Project Management

A typical lifecycle of a Project:

= Stress level of the Project Manager



The Project Management Knowledge Areas & Processes

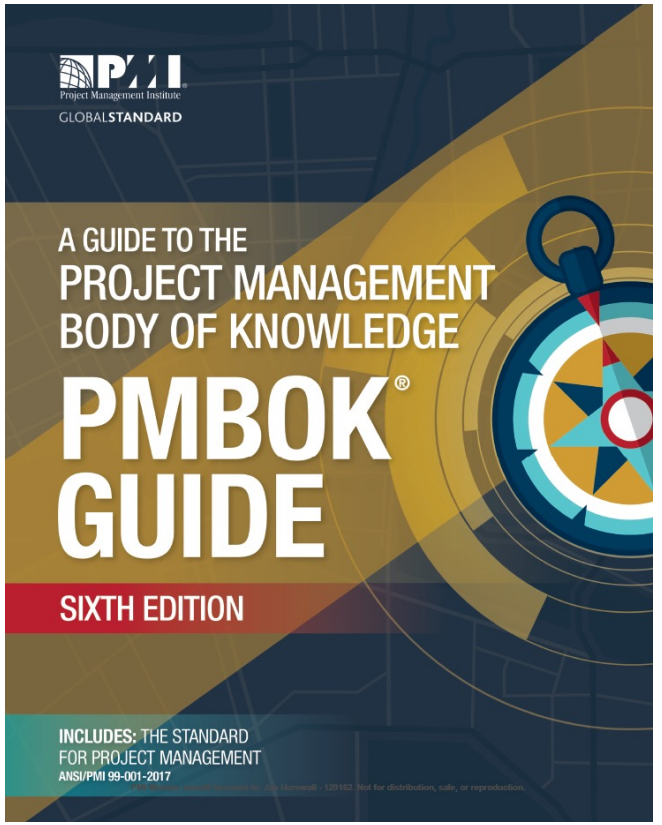
Project Management Institute (PMI) is the world's leading not-for-profit professional membership association for the project, program and portfolio management profession. Founded in 1969. It publishes PMBOK Guide. Over 700’000 members world wide.

We will today review:

The Project Management Processes

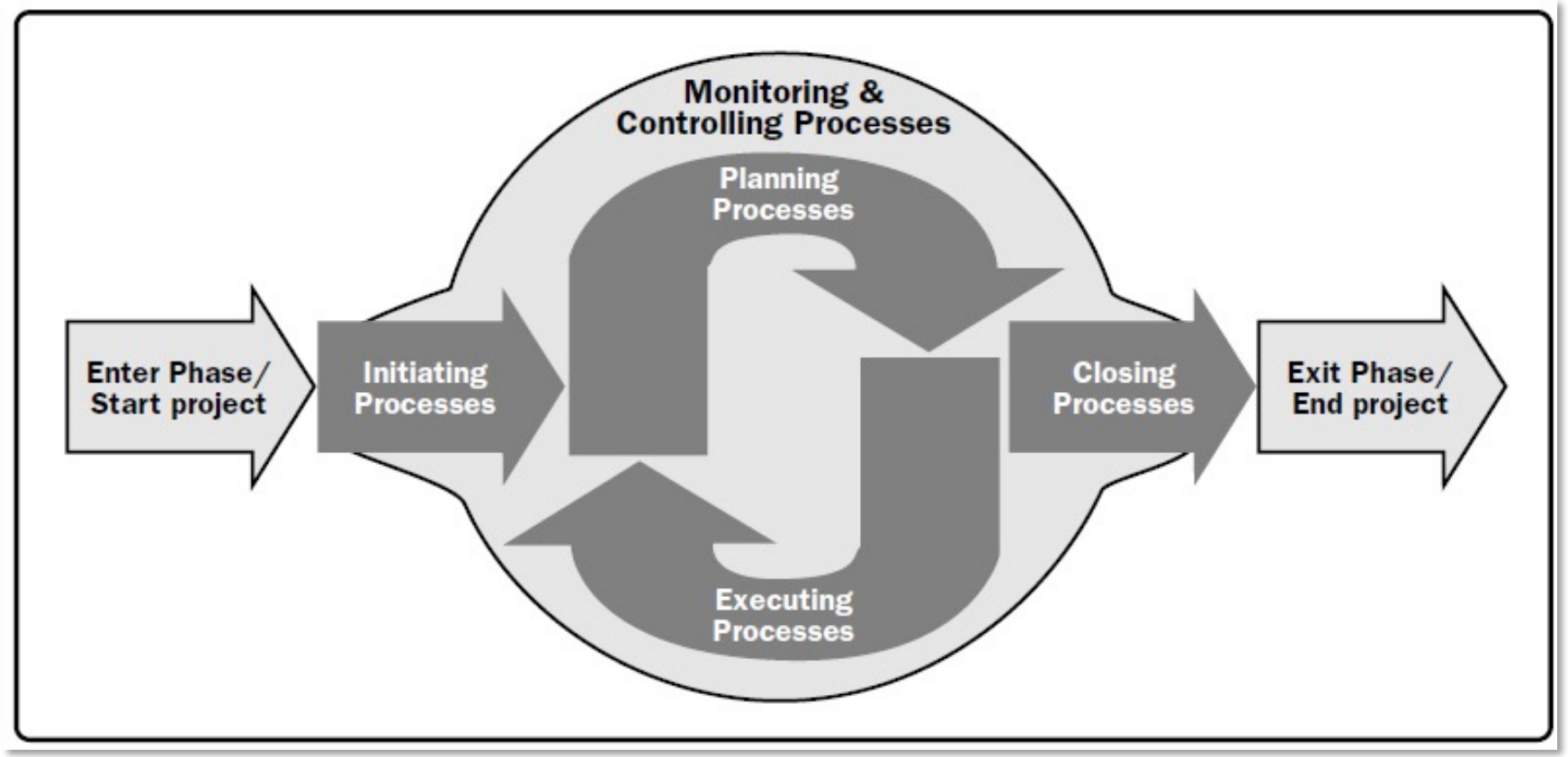
The Project Management Knowledge Areas:

1. Project Integration Management
2. Project Scope Management
3. Project Schedule Management
4. Project Cost Management
5. Project Quality Management
6. Project Resources Management
7. Project Communications Management
8. Project Risk Management
9. Project Procurement Management
10. Project Stakeholder Management

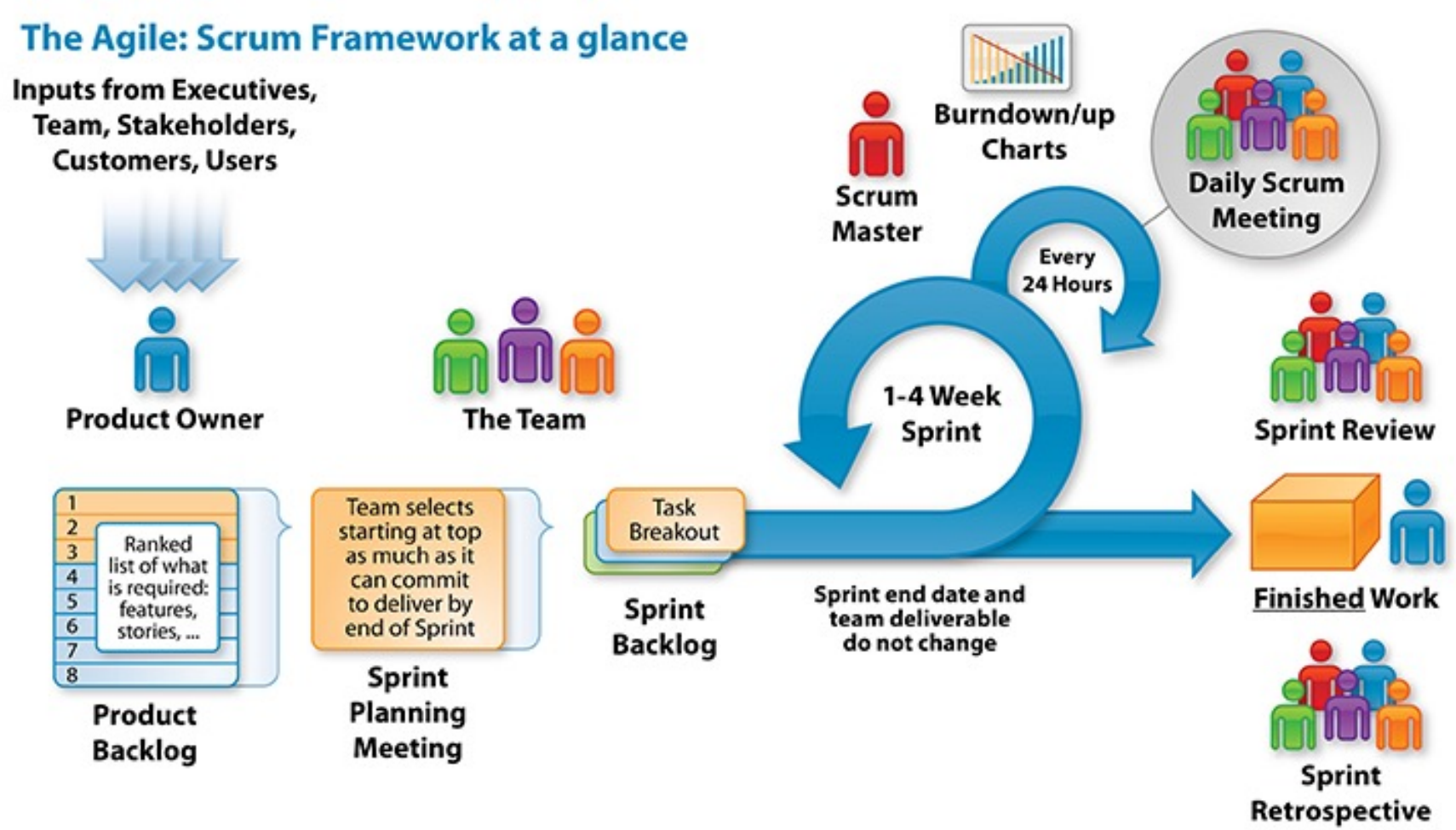


The Project Management Knowledge Areas & Processes - The Project Management Processes

The 5 main process areas are:



Agile Methods



SIEMENS

Let's Start with Your Project

- This year, students in small teams will build a small web application using Angular and Express. In this application, users (fans of a specific topic, e.g., Harry Potter fans, Manchester United fans) can create posts.
- In short, you will build a fan community platform to post related content, such as memes, photos, and buy fan merchandise in an online store.
- We will divide students into teams of 5-6, and each team can pick up a common interest for which they want to build such a platform.
- We will provide the necessary requirements and guide students through the entire process of development and project management.

For this session today, imagine that you have a contract with the customer and you have agreed to a fixed price

Agile Methods

Projects using agile methods are in two different situations:

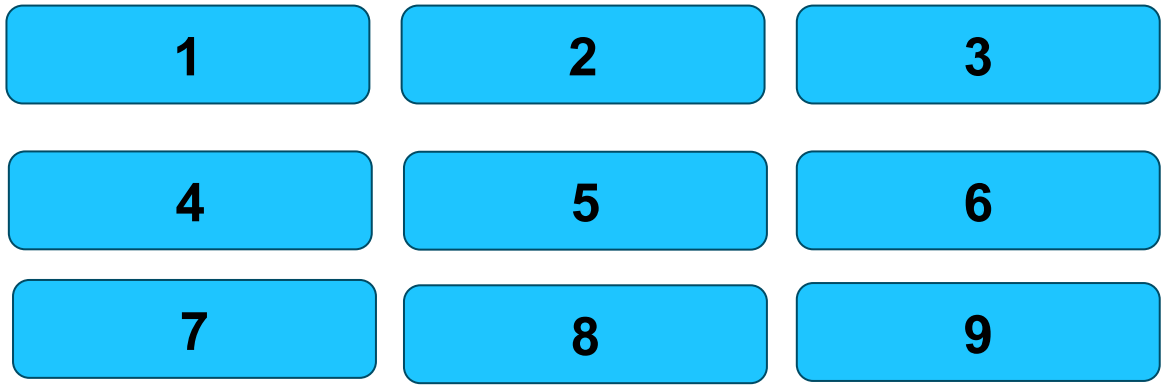
1. In-house software development, or customer is flexible on scope and costs

2. Software is developed by a supplier with a contract with the customer:
   - fixed price / estimated price
   - fixed scope / functionality
   - milestones with deliverables and invoice dates

We will look at this situation

Your Project

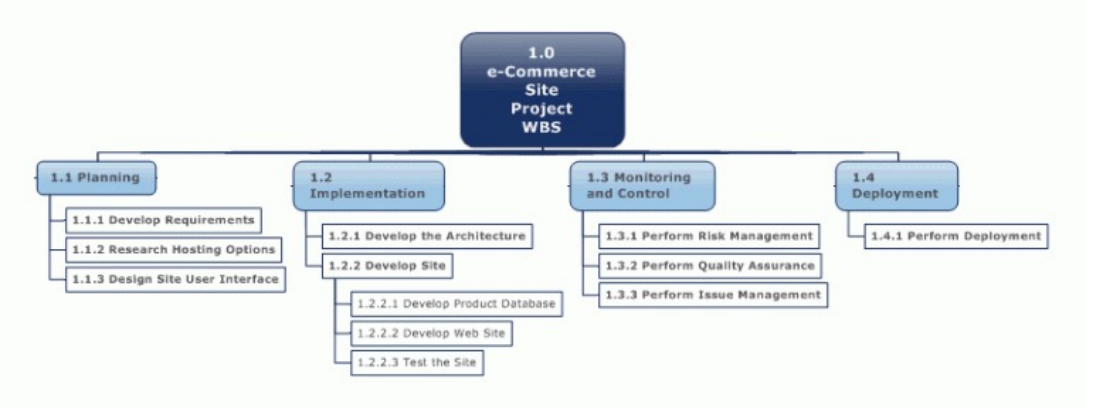
1. How did you start?
2. What did you do next?



The Project Management Knowledge Areas - Project Scope Management

Project Scope Management is about ensuring that the project includes all the work required, and only the work included, to complete the project successfully.

- Plan Scope / Statement of Work
- Collect Requirements / Use Cases / Epics / Scenarios
- Define Objectives / Scope / Deliverables / Acceptance Criteria
  - Establish Scope Baseline
  - Define out-of-scope and assumptions
- **Create the Work Breakdown Structure (WBS)**



Scope covers:

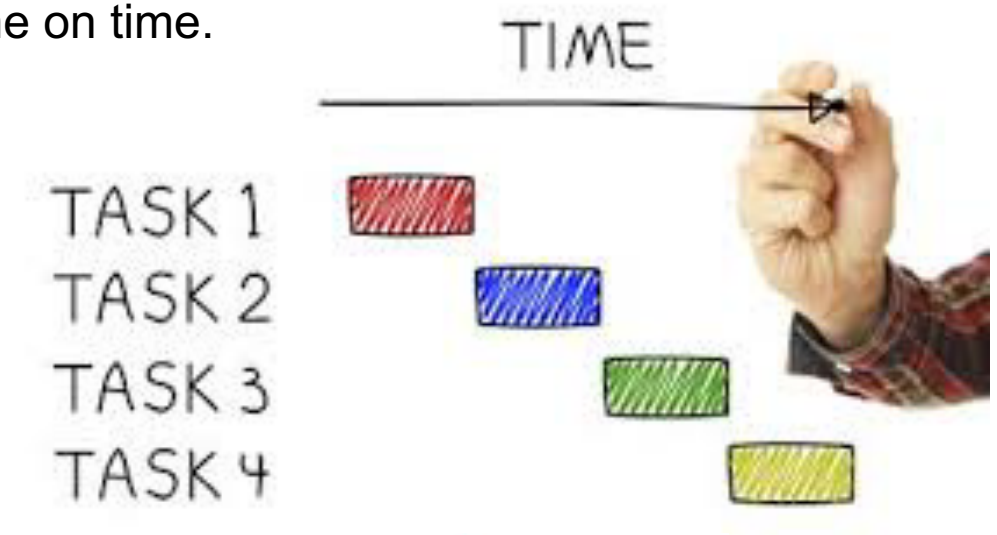
- Product Scope – such as specifications, functions, features
- Project Scope – activities such as testing, data migration, training

back

The Project Management Knowledge Areas - Project Schedule Management

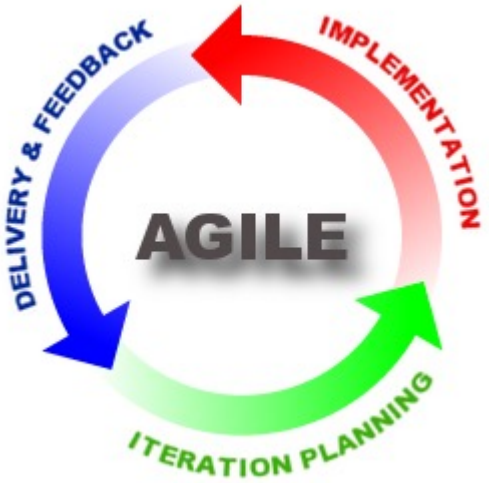
Project Schedule Management is about getting the project done on time.

- Define Activities
- Sequence Activities / Dependencies
- Estimate Activity Resources & Duration
- Develop Schedule
- Define Milestones and Gates
- Control Schedule



Planning is iterative; monitor and revise schedules during the project.

Agile methodologies influence this area of course.



The Project Management Knowledge Areas - Project Schedule Management

Estimation Techniques:

A good Work Breakdown Structure (WBS) is the base for any estimation, down to task level of 1-2 weeks duration.

1. Three-Point Estimating (PERT) uses three estimates to define an approximate range for an activity's duration:

Most likely (M): given the resources likely to be assigned, their productivity, known dependencies and normal interruptions.

Optimistic (O): Based on the best-case scenario for the activity

Pessimistic (P): Based on the worst-case scenario for the activity

Duration = (O + 4*M + P) / 6 (beta distribution)

Example; Estimate of 8 days with 4 days as optimistic and 20 days as pessimistic results in **9.5 days**

Note: it's pointless to use O=4, M=8, P=12

The Project Management Knowledge Areas
- Project Schedule Management

SIEMENS

2. Expert Judgment; consult experts and compare estimates
-> challenge: do they know the skill level of resources available?

3. Estimation by analogy; compare with past projects in the same application domain
-> challenge: limited applicability

4. Algorithmic cost modelling; use historical data, e.g.. lines of code or Function Points
-> challenge: requires strict procedures to capture data, can be very effective

5. Pricing to win; the project costs whatever the customer has to spend on it
-> very risky if fix price contract (unlikely) if not scope is flexible (agile)

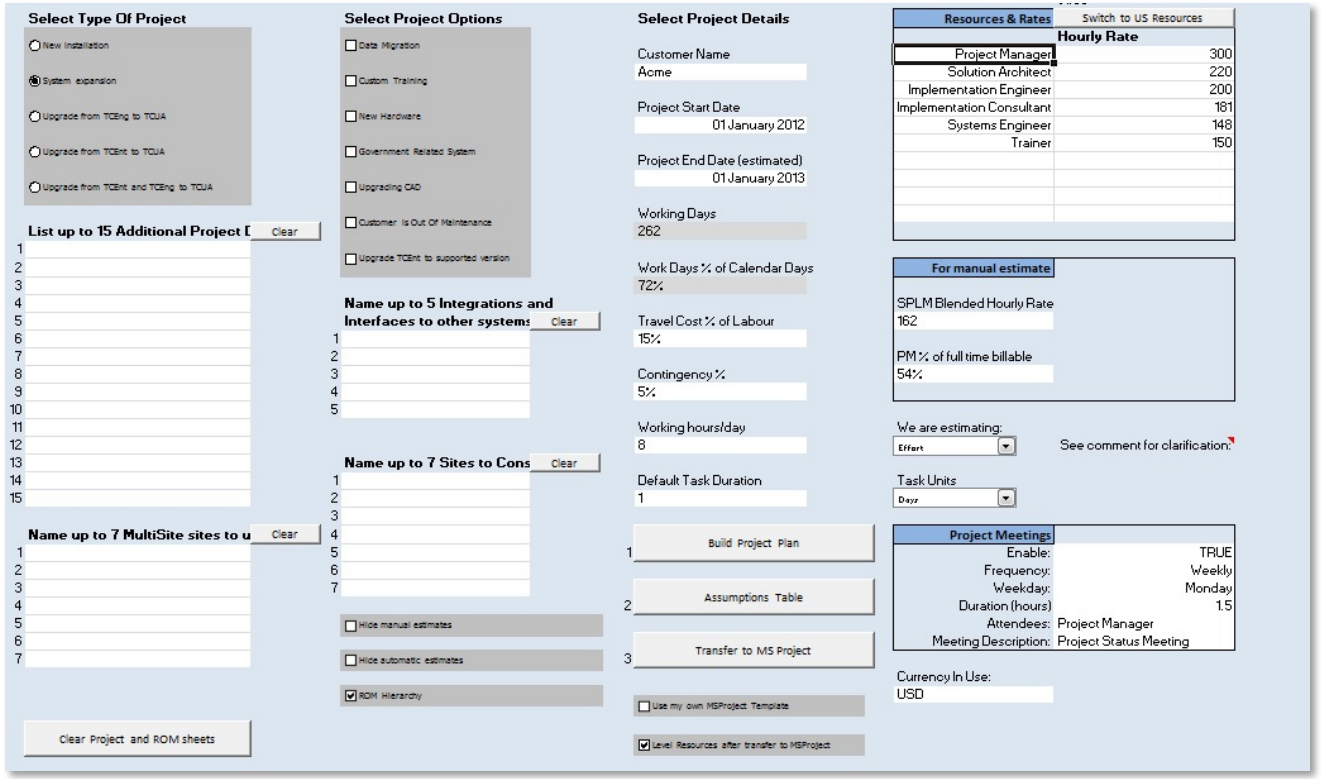
6. Agile estimations; Planning Poker, Story Points, T-Shirt Size…

- Each method has strengths and weaknesses
- Estimation should ideally be based on several methods
- If these do not return approximately the same result, more effort is required to get to one estimate

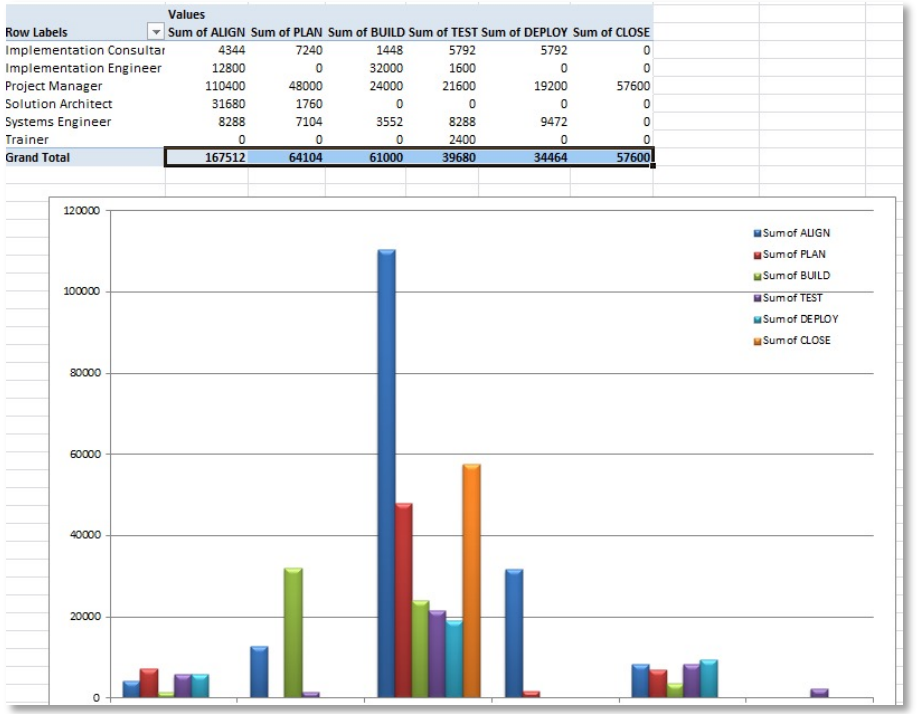
The Project Management Knowledge Areas - Project Schedule Management

Best Practice - Estimation: Build company specific estimator tools:

- Covering time needed for documentation, meetings, review, tests, assist customer tests, travel
- Covering company specific tasks and experiences



Row Labels	Values Sum of ALIGN	Sum of PLAN	Sum of BUILD	Sum of TEST	Sum of DEPLOY	Sum of CLOSE
Implementation Consultar	4344	7240	1448	5792	5792	0
Implementation Engineer	12800	0	32000	1600	0	0
Project Manager	110400	48000	24000	21600	19200	57600
Solution Architect	31680	1760	0	0	0	0
Systems Engineer	8288	7104	3552	8288	9472	0
Trainer	0	0	0	2400	0	0
Grand Total	167512	64104	61000	39680	34464	57600



The Project Management Knowledge Areas - Project Schedule Management

SIEMENS

Let's look at an example:

Task	Duration (days)	Dependencies
T1 App Design	8	
T2 DB Design	15	
T3 App specification	15	T1
T4 Data Cleansing	10	
T5 Data Migration	10	T2, T4
T6 etc....	5	T1, T2
T7	20	T1
T8	25	T4
T9	15	T3, T6
T10	15	T5, T7
T11	7	T9
T12	10	T11

What is the minimum total duration of this project?

The Project Management Knowledge Areas - Project Schedule Management

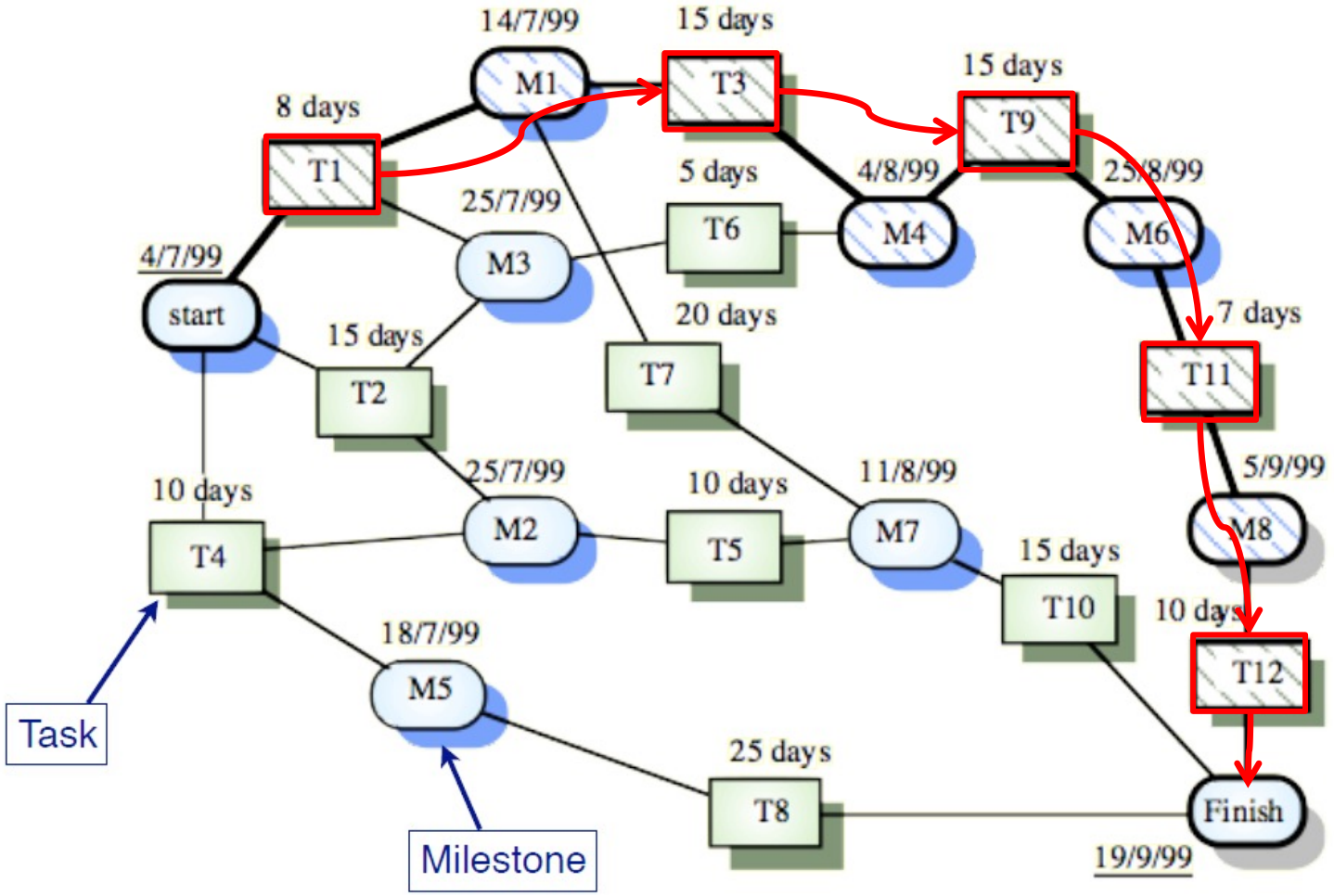
Build Network Diagram

Analyze the Critical Path:

The Critical Path is the sequence of activities that represents the longest path through a project – this determines the shortest duration

Answer is 55 days.

Identify also activities that are close to becoming critical path, ensure those are not delayed.

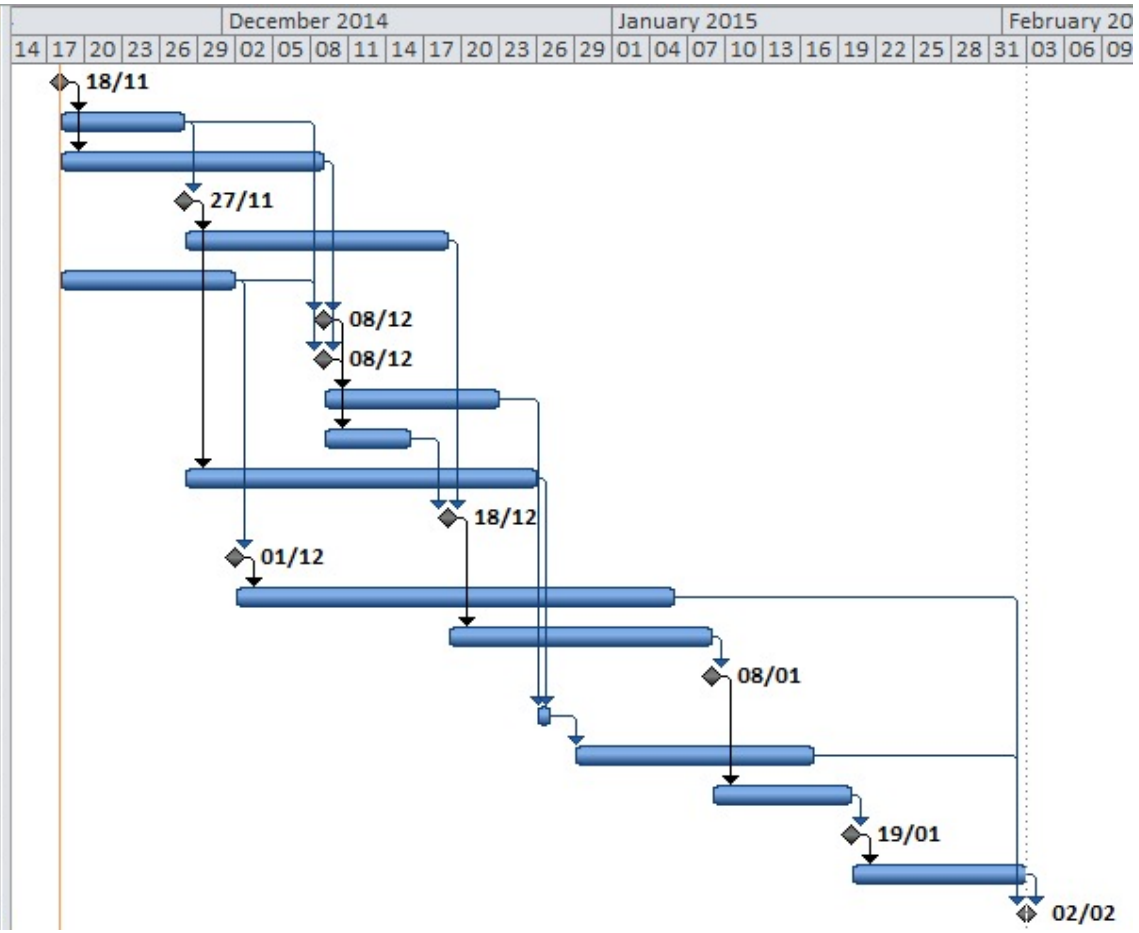


The Project Management Knowledge Areas - Project Schedule Management

SIEMENS

The same example in a Scheduling tool (MS Project) – Gantt Chart view:

Task Name	Duration	Start	Finish	Predeces
Start	0 days	Tue 18/11/14	Tue 18/11/14	
Task 1	8 days	Tue 18/11/14	Thu 27/11/14	1
Task 2	15 days	Tue 18/11/14	Mon 08/12/14	1
Milestone 1	0 days	Thu 27/11/14	Thu 27/11/14	2
Task 3	15 days	Fri 28/11/14	Thu 18/12/14	4
Task 4	10 days	Tue 18/11/14	Mon 01/12/14	
Milestone 2	0 days	Mon 08/12/14	Mon 08/12/14	3,6
Milestone 3	0 days	Mon 08/12/14	Mon 08/12/14	2,3
Task 5	10 days	Tue 09/12/14	Mon 22/12/14	7
Task 6	5 days	Tue 09/12/14	Mon 15/12/14	8
Task 7	20 days	Fri 28/11/14	Thu 25/12/14	4
Milestone 4	0 days	Thu 18/12/14	Thu 18/12/14	5,10
Milestone 5	0 days	Mon 01/12/14	Mon 01/12/14	6
Task 8	25 days	Tue 02/12/14	Mon 05/01/15	13
Task 9	15 days	Fri 19/12/14	Thu 08/01/15	12
Milestone 6	0 days	Thu 08/01/15	Thu 08/01/15	15
Milestone 7	1 day?	Fri 26/12/14	Fri 26/12/14	9,11
Task 10	15 days	Mon 29/12/14	Fri 16/01/15	17
Task 11	7 days	Fri 09/01/15	Mon 19/01/15	16
Milestone 8	0 days	Mon 19/01/15	Mon 19/01/15	19
Task 12	10 days	Tue 20/01/15	Mon 02/02/15	20
Finish	0 days	Mon 02/02/15	Mon 02/02/15	14,18,21

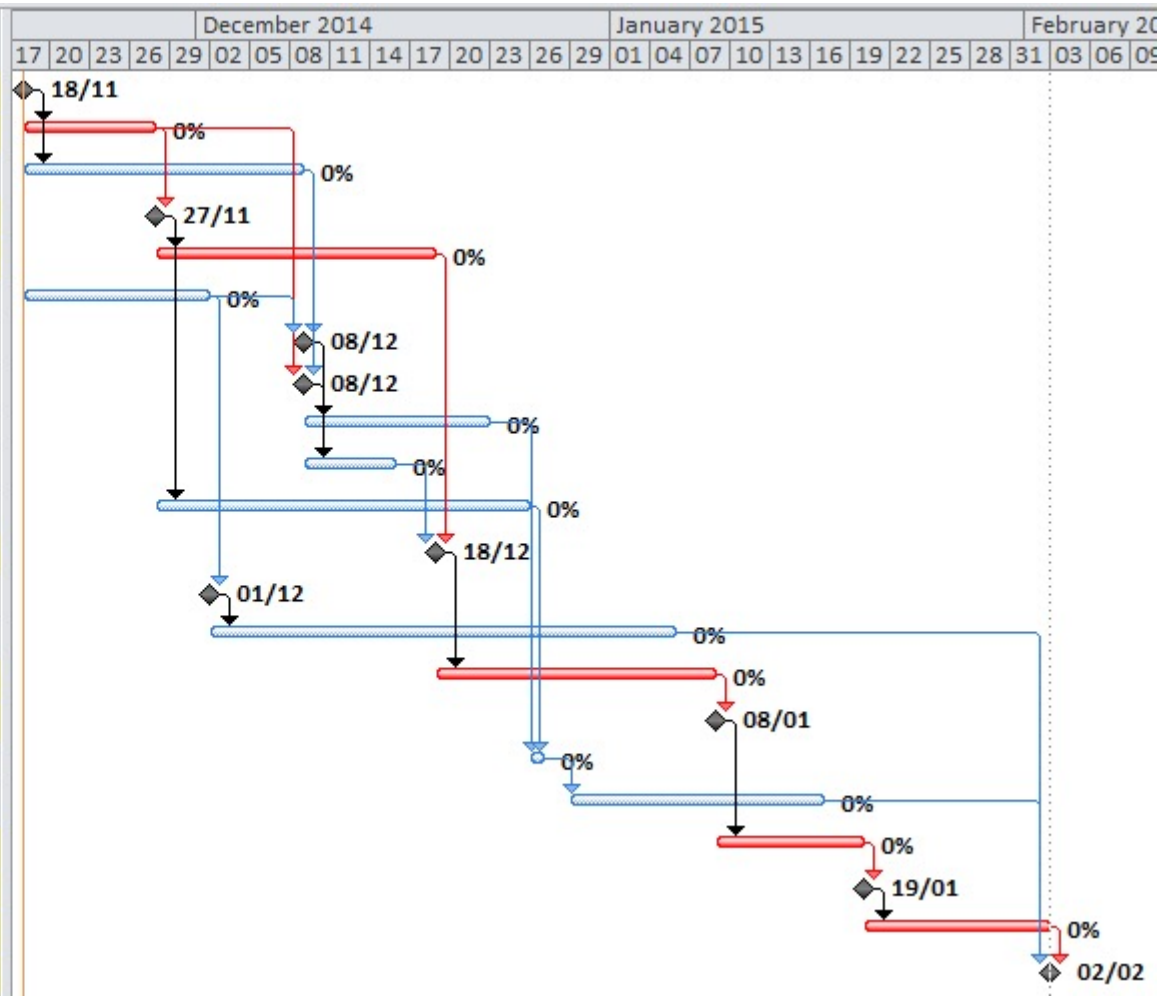


The Project Management Knowledge Areas - Project Schedule Management

SIEMENS

Highlight of Critical Path in Gantt Chart view:

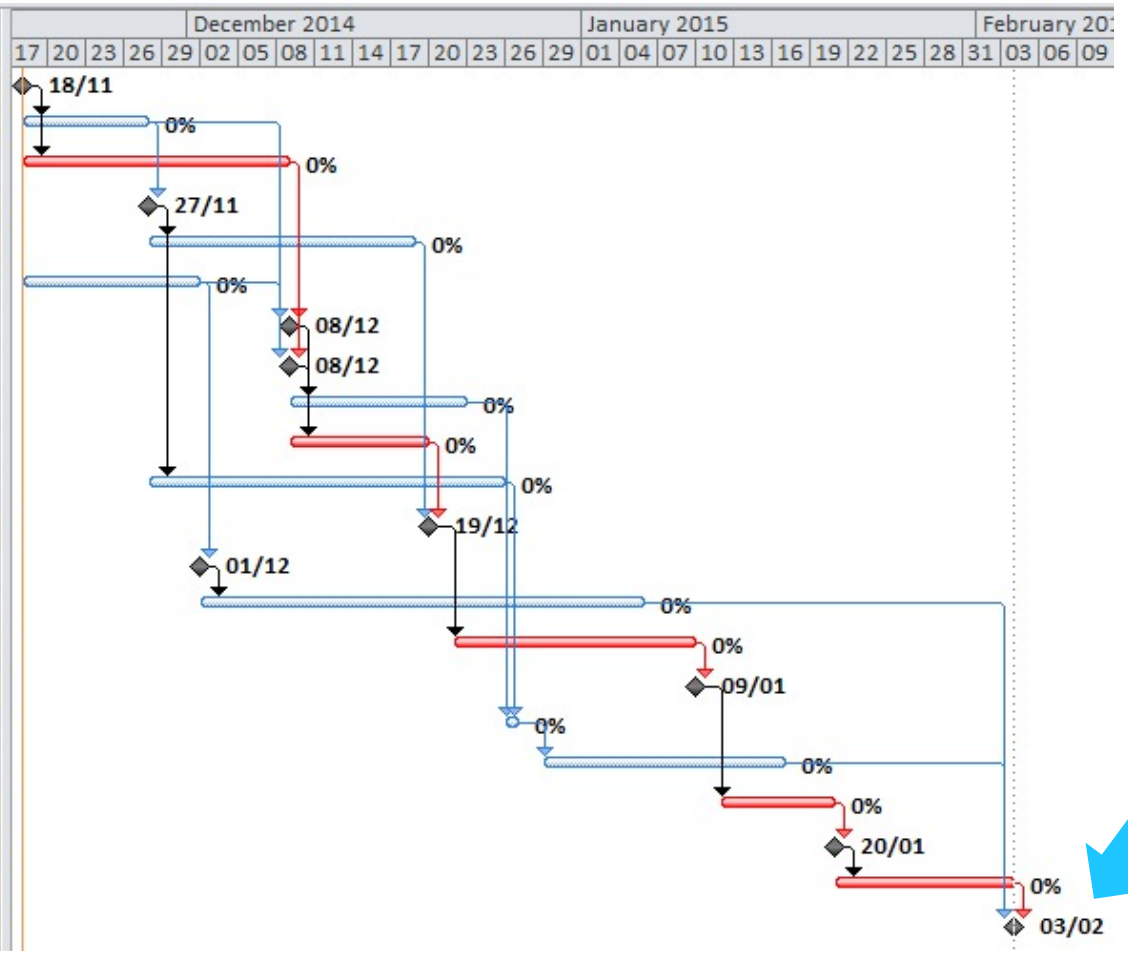
Task Name	Duration	Start	Finish	Predecessors
Start	0 days	Tue 18/11/14	Tue 18/11/14	
Task 1	8 days	Tue 18/11/14	Thu 27/11/14	1
Task 2	15 days	Tue 18/11/14	Mon 08/12/14	1
Milestone 1	0 days	Thu 27/11/14	Thu 27/11/14	2
Task 3	15 days	Fri 28/11/14	Thu 18/12/14	4
Task 4	10 days	Tue 18/11/14	Mon 01/12/14	
Milestone 2	0 days	Mon 08/12/14	Mon 08/12/14	3,6
Milestone 3	0 days	Mon 08/12/14	Mon 08/12/14	2,3
Task 5	10 days	Tue 09/12/14	Mon 22/12/14	7
Task 6	5 days	Tue 09/12/14	Mon 15/12/14	8
Task 7	20 days	Fri 28/11/14	Thu 25/12/14	4
Milestone 4	0 days	Thu 18/12/14	Thu 18/12/14	5,10
Milestone 5	0 days	Mon 01/12/14	Mon 01/12/14	6
Task 8	25 days	Tue 02/12/14	Mon 05/01/15	13
Task 9	15 days	Fri 19/12/14	Thu 08/01/15	12
Milestone 6	0 days	Thu 08/01/15	Thu 08/01/15	15
Milestone 7	1 day?	Fri 26/12/14	Fri 26/12/14	9,11
Task 10	15 days	Mon 29/12/14	Fri 16/01/15	17
Task 11	7 days	Fri 09/01/15	Mon 19/01/15	16
Milestone 8	0 days	Mon 19/01/15	Mon 19/01/15	19
Task 12	10 days	Tue 20/01/15	Mon 02/02/15	20
Finish	0 days	Mon 02/02/15	Mon 02/02/15	14,18,21



The Project Management Knowledge Areas - Project Schedule Management

Changing Task 6 from 5 days to 9 days creates a new critical path, and delays the finish one day:

Task Name	Duration	Start	Finish	Predecessors
Start	0 days	Tue 18/11/14	Tue 18/11/14	
Task 1	8 days	Tue 18/11/14	Thu 27/11/14	1
Task 2	15 days	Tue 18/11/14	Mon 08/12/14	1
Milestone 1	0 days	Thu 27/11/14	Thu 27/11/14	2
Task 3	15 days	Fri 28/11/14	Thu 18/12/14	4
Task 4	10 days	Tue 18/11/14	Mon 01/12/14	
Milestone 2	0 days	Mon 08/12/14	Mon 08/12/14	3,6
Milestone 3	0 days	Mon 08/12/14	Mon 08/12/14	2,3
Task 5	10 days	Tue 09/12/14	Mon 22/12/14	7
Task 6	9 days	Tue 09/12/14	Fri 19/12/14	8
Task 7	20 days	Fri 28/11/14	Thu 25/12/14	4
Milestone 4	0 days	Fri 19/12/14	Fri 19/12/14	5,10
Milestone 5	0 days	Mon 01/12/14	Mon 01/12/14	6
Task 8	25 days	Tue 02/12/14	Mon 05/01/15	13
Task 9	15 days	Mon 22/12/14	Fri 09/01/15	12
Milestone 6	0 days	Fri 09/01/15	Fri 09/01/15	15
Milestone 7	1 day?	Fri 26/12/14	Fri 26/12/14	9,11
Task 10	15 days	Mon 29/12/14	Fri 16/01/15	17
Task 11	7 days	Mon 12/01/15	Tue 20/01/15	16
Milestone 8	0 days	Tue 20/01/15	Tue 20/01/15	19
Task 12	10 days	Wed 21/01/15	Tue 03/02/15	20
Finish	0 days	Tue 03/02/15	Tue 03/02/15	14,18,21



The Project Management Knowledge Areas - Project Schedule Management

SIEMENS

Question: you have estimated **five days** to implement and test a certain function. After **three days** you are finished, it is tested and it works! You face three options now:

A. Review and improve the code for two days to see if you can make it of higher quality and more structured. It will also make it easier to re-use and maintain later. Total effort is 5 days.

B. Develop a cool feature that you came up with, spending two days on this. Total effort is 5 days.

C. Report back to the project manager to start working on another task. Total effort is 3 days.

What would you do?

Parkinson's law is the adage that "work expands so as to fill the time available for its completion".

back

The Project Management Knowledge Areas - Project Resource Management

SIEMENS

Project Resource Management is about organizing, managing, developing and leading the project team.

- **Plan and acquire Project Team**
  - Project Organization
  - Define roles and responsibilities
  - Skills and experiences required
- **Manage & Develop Project Team**
  - Adding and on-boarding team members
  - Plan and develop skills
  - Provide Feedback on performance
  - Manage conflicts & Motivate Team
- **Administration:**
  - Manage & negotiate internal resource agreements
  - Manage & negotiate contracts of external resources
  - Manage work permits

The Project Management Knowledge Areas - Project Resources Management

SIEMENS

Team Organization - Teams should be relatively small (< 8 members)

- minimize communication overhead
- team quality standard can be developed
- programs are regarded as team property (“egoless programming”)
- members can work closely together
- continuity can be maintained if members leave

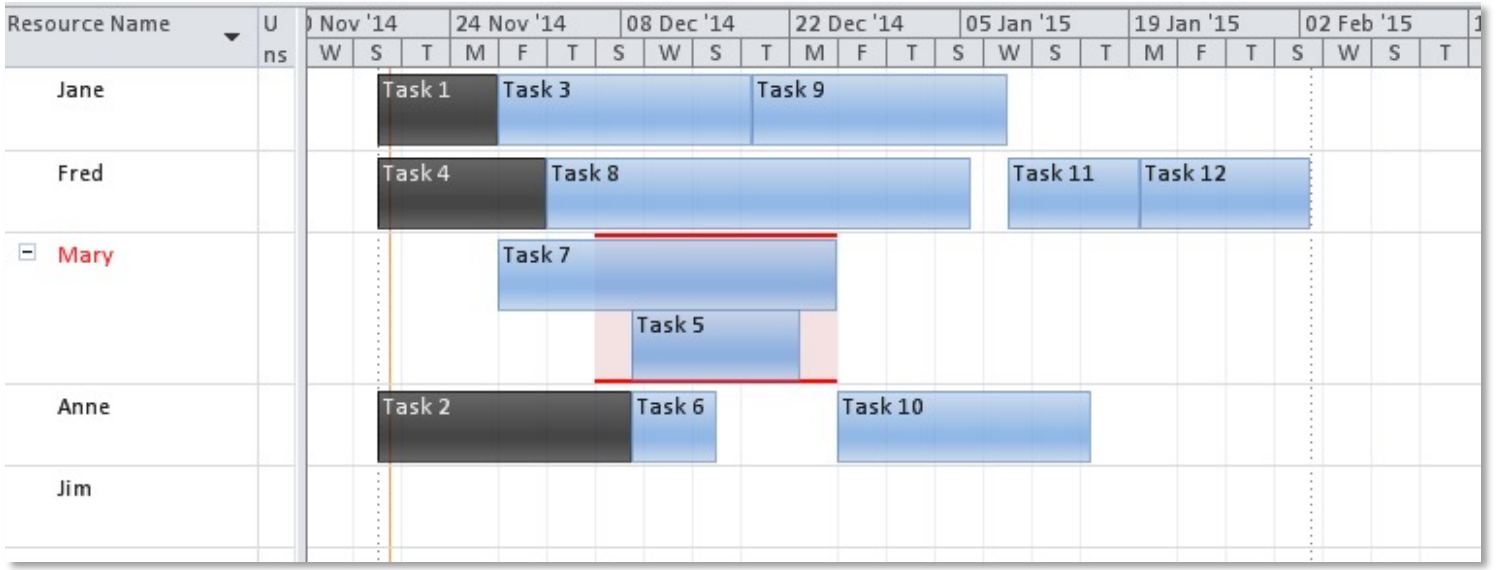
- **Break big projects down into multiple smaller projects**

- **Small teams may be organized in an informal, democratic way**

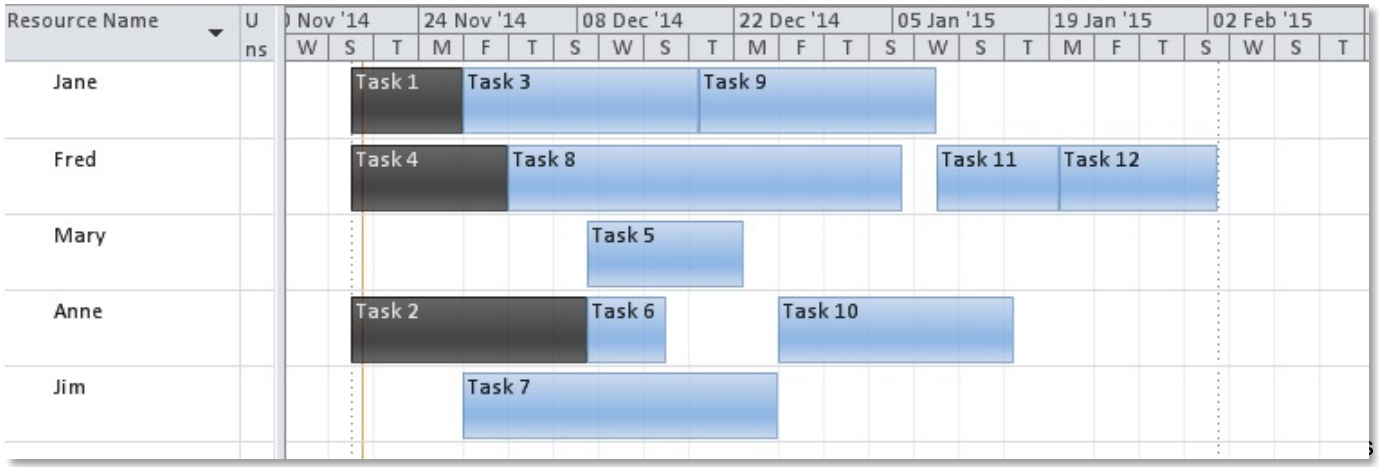
The Project Management Knowledge Areas - Project Resources Management

Best Practice: Resource Management and Levelling in Scheduling Tool

Any over-allocation is shown in tool:



Task 7 assigned to Jim:



back

The Project Management Knowledge Areas - Project Procurement Management

SIEMENS

Project Procurement Management is about purchase or acquire products, services and resources needed in the project.

Examples:

- Resources from external suppliers
- Specialist services
- Hardware, computers, storage
- Cloud services, apps

This also includes evaluation of suppliers and contracting these products and services.

back

The Project Management Knowledge Areas - Project Cost Management

SIEMENS

Project Cost Management is about getting the project done within budget.

- Estimate Costs and Determine Project Budget
- Control Cost - the Project Manager needs to determine actual cost incurred and also make a forecast of total cost.

The Project Manager will ask how much have you spent on an activity and also how much will you need to complete it.

Reserves also affect cost management:

- Risk contingency reserve
- Management reserve

back

The Project Management Knowledge Areas - Project Quality Management

SIEMENS

Project Quality Management is about ensuring that the project will satisfy the needs for which it was undertaken.

- Document review; peer reviews, formal review meetings (plan time for this!)
- Code review (also plan time for this!)
- Usability test lab / Prototyping
- Testing:
    - Unit tests
    - User tests
    - Performance / Stress tests
    - Acceptance tests
- Pilot usage
- Root cause analysis
- Project Retrospectives

Cutting back in testing and reviewing is a recipe for disaster!

The Project Management Knowledge Areas - Project Quality Management

SIEMENS

Best Practice: Project Retrospective

A **project retrospective** review is an in-depth discussion that happens after the completion of a project, event or activity. It is structured to help the people involved reflect on the project in detail.

Lessons Learned and Best Practices are collected and shared afterwards

Agile Retrospective approach; short retrospective after each sprint.

back

The Project Management Knowledge Areas - Project Risk Management

Project Risk Management is about identifying, assessing and controlling risk on a project.

The objectives are to increase the likelihood and impact of positive risks (opportunities) and decrease the likelihood and impact of negative risks in the project.

Risk response strategies (negative risks):

- Avoid
- Transfer
- Mitigate
- Accept
- Escalate

Risks are assessed in terms of Probability and Impact.

The Project Management Knowledge Areas - Project Risk Management

SIEMENS

Risk	Risk Response	Probability	Impact	Score

Values:

Probability: 1-99%

Impact: 1-5 (5 highest)

The Project Management Knowledge Areas - Project Risk Management

SIEMENS

Examples of typical Risks:

Risk	Risk Response	Probability	Impact	Score
1. Lack of skilled resources creates a delay	*Mitigate*: Staffing with top talent and experts, assign resources well in time. *Transfer*: Out-source some well defined work packages	50%	5	2.5
2. Users will not accept application's user interface	*Mitigate*: Invest in Usability Test *Avoid*: review early and/or cut functionality	30%	3	0.9
3. Developing wrong functions leads to unsatisfied customer	*Mitigate*: Agile development, mock-ups, sign-off on requirements	20%	5	1.0
4. Unknown data in customer's DB	*Mitigate*: analyze data upfront *Escalate*: ask customer to provide sample dataset to test against and do acceptance against	40%	5	2.0

The Project Management Knowledge Areas - Project Risk Management

SIEMENS

Best Practice: Risk Assessment Workshop

In addition, this is a great exercise for project members from different areas to understand the whole project and the risks.

- Brain-storm risks on Post-It notes
- Sort into risk categories
- Group similar risks together
- Assess Probability and Impact
- Start identify risk responses for the top risks

The Project Management Knowledge Areas - Project Risk Management

Best Practice: Risk Breakdown Structure

Project X

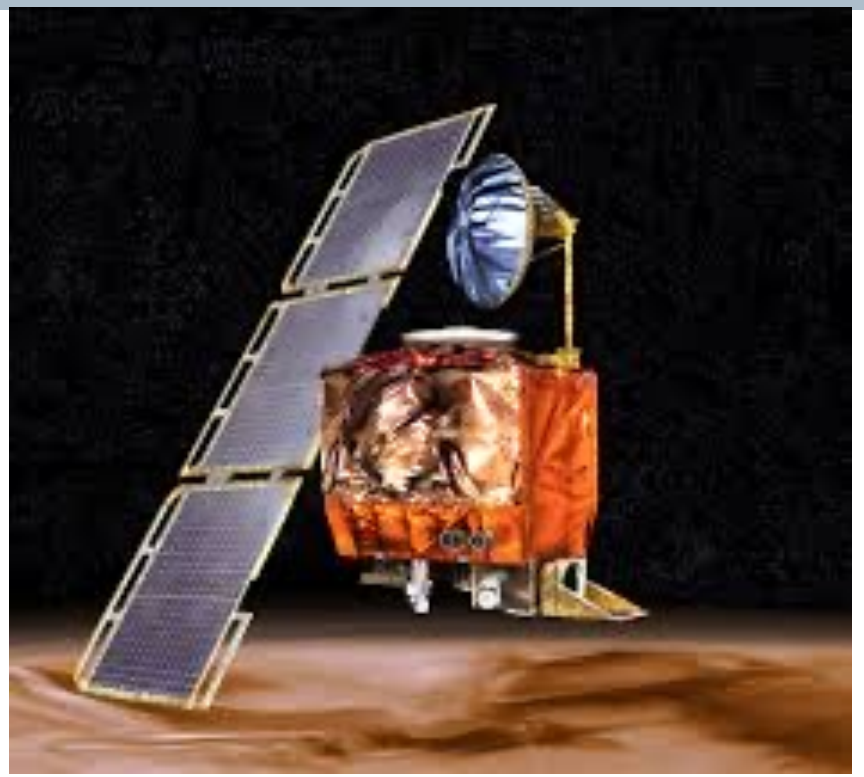
Technical Risks
Number of risks: 10
Percentage: 42%

External Risks
Number of risks: 3
Percentage: 13%

Management Risks
Number of risks: 13
Percentage: 43%

Other Risks
Number of risks: -
Percentage: - %

Commercial Risks
Number of risks: 1
Percentage: 2%



But even companies with the most rigorous risk management in place fail, example:
Mars Climate Orbiter 1999 crashed
Root cause: Metric vs US units

back

The Project Management Knowledge Areas - Project Communications Management

SIEMENS

Project Communications Management is about ensuring that the project team has the necessary information and resources to complete the job.

- Project Kick-Off
- Meetings, stand-up meetings
- Project Progress reporting
- Repositories, keeping documents up to date
- Code sharing
- Sharing knowledge, internal social media, social collaboration
- Newsletters

Quote:
Project teams often detest progress reporting because it manifests their lack of progress.

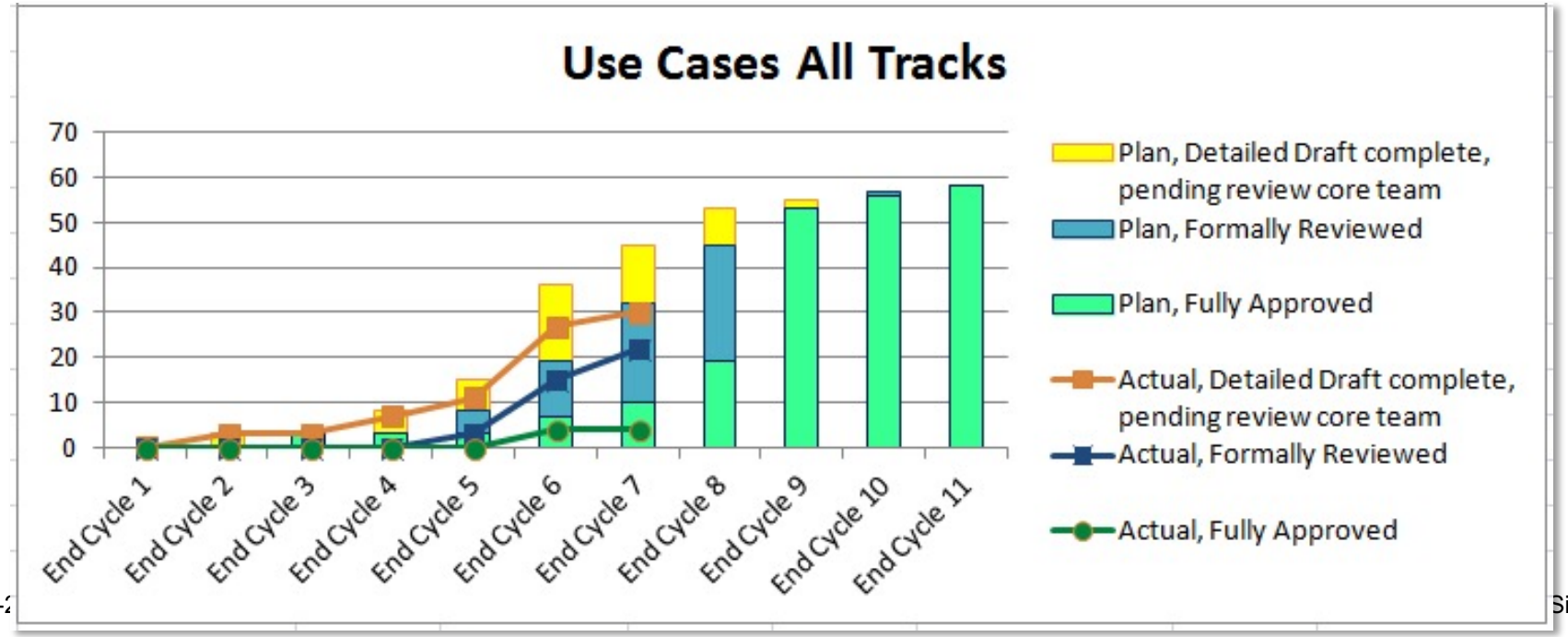
Communication is key, make sure you communicate on all levels!

The Project Management Knowledge Areas - Project Communications Management

Best Practice: Monitor deliverables, also specifications and use cases, and report progress regularly:

This is an excellent way to spot delays early and to communicate plan and progress to project team and to management.

Software development is tricky for management, hard to see progress; make transparent.



The Project Management Knowledge Areas - Project Integration Management

Project Integration Management is about managing all parts of the project to ensure that the project's objectives are met. It spans across all other nine knowledge areas and processes.

Mainly it is about leadership, driving decisions and negotiate, enabling the project team to work effectively.

- Develop Project Charter / Customer Contracts
- Develop Project Management Plan
- Manage, Monitor and Control Project Work
- Coordination
- **Change Control**
- Close Project or Phase

At any instant, the Project manager must know what is the most important now while at the same time looking into the future.

back

Key Take Aways

- Project Management is about managing all parts of the project to ensure that the project's objectives are met, on time and within budget.
- Project Management is about leadership, driving decisions and negotiate, enabling the project team to work effectively.
- Project Management is a team effort; it requires the support of all team members, even though the benefits of some project management processes are not obvious to all
- Typically, the Project Management effort is 10-15% of total project effort

SIEMENS

References, Links

- Agile Retrospectives: www.funretrospectives.com
- “Project Retrospectives: A Handbook for Team Reviews” Norman L. Kerth, www.retrospectives.com
- Function Point estimation technique http://en.wikipedia.org/wiki/Function_point

- Project Management Institute (PMI) www.pmi.org
- PMI Switzerland www.pmi-switzerland.ch

- Mars Climate Orbiter crash http://mars.jpl.nasa.gov/msp98/news/mco990930.html

- PwC Global 100 Software Leaders: http://www.pwc.com/gx/en/industries/technology/publications/global-100-software-leaders.html

- Siemens Digital Industries Software: sw.siemens.com
  - short video: https://www.youtube.com/watch?v=k6mVLaUyO4U

Questions?

Appendix – Additional Information

Literature

Sources

- Software Engineering, I. Sommerville, 7th Edn., 2004.
- Software Engineering — A Practitioner's Approach, R. Pressman, Mc-Graw Hill, 5th Edn., 2001.

Recommended Reading

- The Mythical Man-Month, F. Brooks, Addison-Wesley, 1975
- Peopleware, Productive Projects and Teams (2nd edition), Tom DeMarco and Timothy Lister, Dorset House, 1999.
- Succeeding with Objects: Decision Frameworks for Project Management, A. Goldberg and K. Rubin, Addison-Wesley, 1995
- Extreme Programming Explained: Embrace Change, Kent Beck, Addison Wesley, 1999

Appendix – Additional Information

Chief Programmer Teams (example)

> Consist of a kernel of specialists helped by others as required
- chief programmer takes full responsibility for design, programming, testing and installation of system
- backup programmer keeps track of CP's work and develops test cases
- librarian manages all information
- others may include: project administrator, toolsmith, documentation editor, language/system expert, tester, and support programmers …

> Reportedly successful but problems are:
- Can be difficult to find talented chief programmers
- Might disrupt normal organizational structures
- May be de-motivating for those who are not chief programmers

Appendix – Additional Information

Directing Teams

Managers serve their team

> Managers ensure that team has the necessary information and resources

! "The manager's function is not to make people work, it is to make it possible for people to work"

— Tom DeMarco

Responsibility demands authority

> Managers must delegate

– Trust your own people and they will trust you.

Directing Teams ...

Managers manage

> Managers cannot perform tasks on the critical path

– Especially difficult for technical managers!

Developers control deadlines

> A manager cannot meet a deadline to which the developers have not agreed

Appendix – Additional Information

What you should know!

- How can prototyping help to reduce risk in a project?
- What are milestones, and why are they important?
- What can you learn from an activity network? An activity timeline?
- Why should programming teams have no more than about 8 members?

Can you answer these questions?

- What will happen if the developers, not the customers, set the project priorities?
- What is a good way to measure the size of a project (based on requirements alone)?
- When should you sign a contract with the customer?
- Would you consider bending slip lines as a good sign or a bad sign? Why?
- How would you select and organize the perfect software development team?