

# Software Processes

**Prof. Dr. Dirk Riehle**

**Friedrich-Alexander University Erlangen-Nürnberg**

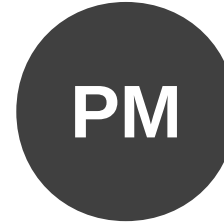
**AMOS C01**

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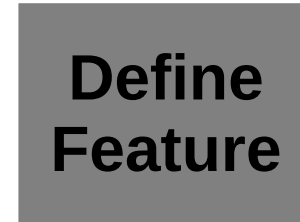
# Key Functions in Software Engineering

1. **Product Management**
2. **Engineering Management**
3. **Software Development**
4. **Quality Assurance**

**Roles**



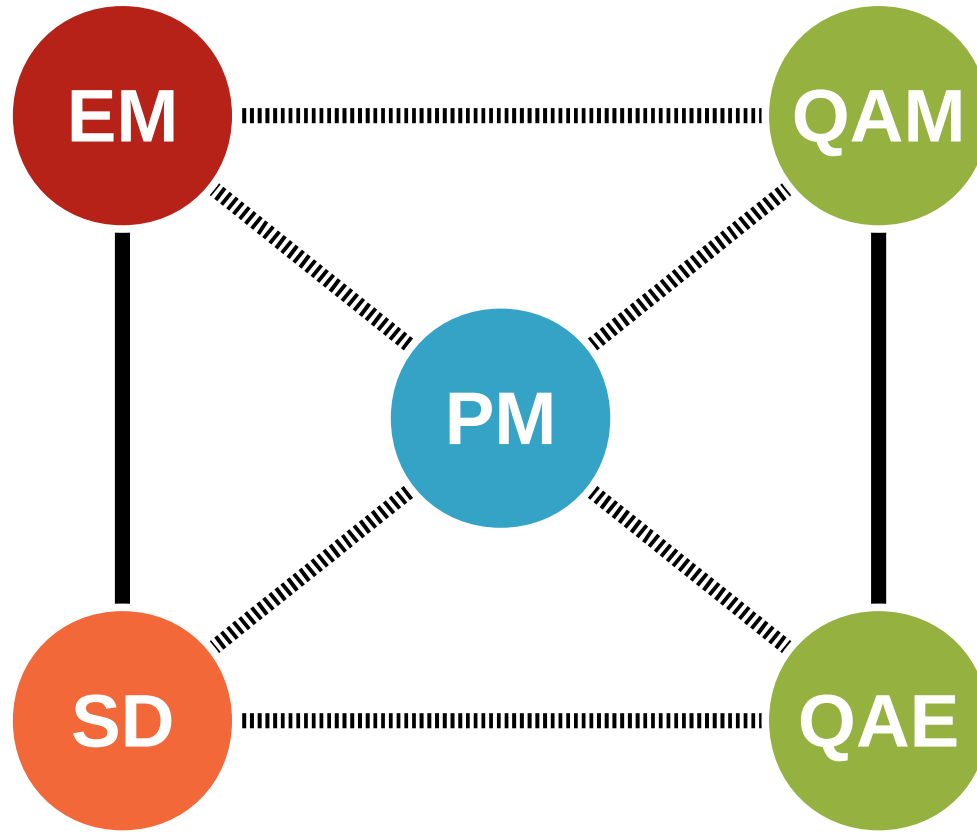
**Practices**



**Artifacts**

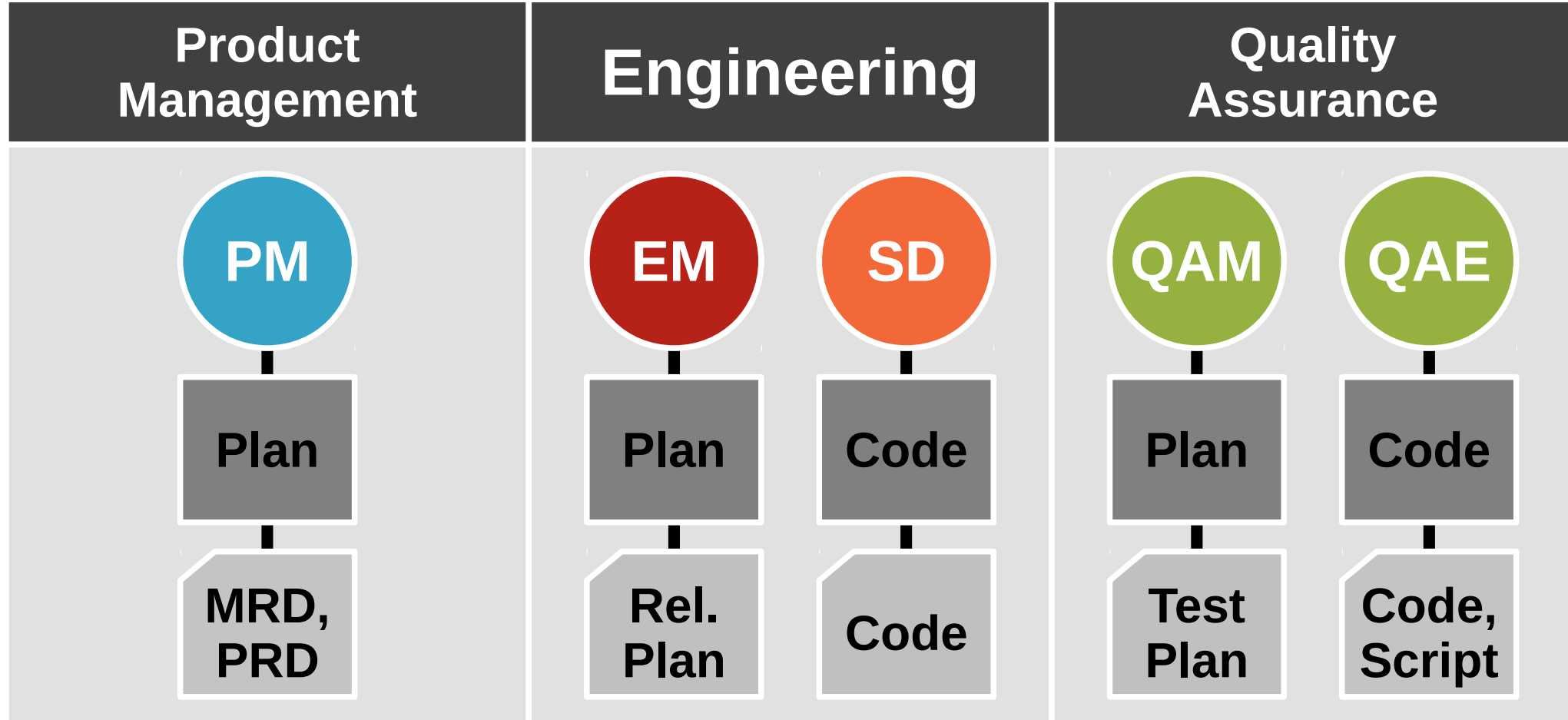


# Key Roles in Software Engineering



PM: Product Manager  
EM: Engineering Manager  
SD: Software Developer  
QAM: Quality Assurance Manager  
QAE: Quality Assurance Engineer

# Key Practices and Artifacts



# Product Management

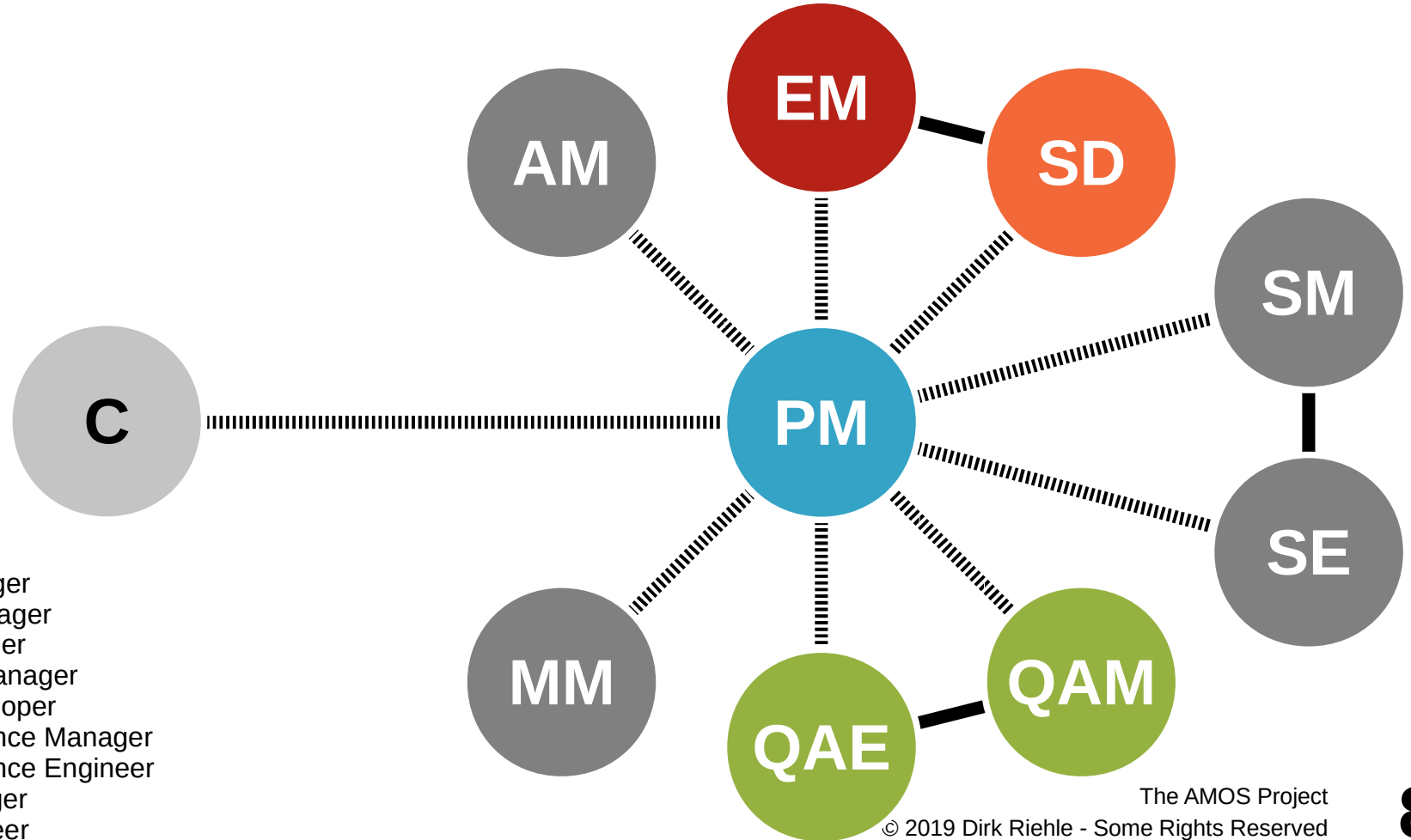
- **Product management**
  - Is the **management** [1] of a company's products
  - Along the **product's life-cycle**
  - Across the **product portfolio** (if any)

[1] The purposeful act, manner, or practice of handling, supervising, or controlling [products, product life-cycles, product portfolios]

**What?**

**What first?**

# Product Manager in Context





## 1. Strategic product management

- Focuses on assessing and defining the opportunity
- “Owns” the Marketing Requirements Document

## 2. Technical product management

- Focuses on defining the product and its features
- “Owns” the Product Requirements Document

# Example Processes and Artifacts

Processes	Artifacts
Opportunity Assessment	Marketing Requirements Document (MRD)
Product Specification	Product Requirements Document (PRD)
Product Roadmapping	Internal Product Roadmap External Product Roadmap
Release Planning	Release Plan

- 1. Basic product idea**
- 2. Market and competition**
- 3. Product architecture**
- 4. Organizational planning**

# Sample Marketing Requirements Document (MRD)

Author/Owner: Rich Mironov, [rich@mironov.com](mailto:rich@mironov.com)  
Version/Date: v3.1, 15-March-2006

**Abstract:**

This product release, code-named "Babylon-6," addresses three top requirements. In order, they are [1] meeting the emerging market need for teleportation, [2] boosting internal quality and supportability through telepathic diagnostics, and [3] increasing networking price-performance. All three are required for successful release and launch, which is planned for next Wednesday.

In addition, a wide variety of other improvements and extensions have been identified. None of these are defined as gating items for the release, so may be postponed if they threaten timeliness or functionality of the release.

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- V2.1 Revised based on initial alpha tests (liability concerns from Corporate Legal), 15-Apr-2003
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- V3.1 Updated links and website information, 15-March-2006

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## 1.0 Strategy and Overview

### 1.1 Goals and Objectives

*(A short, easily measured objective echoed from top page.)*  
This product release, code-named "Babylon-6," addresses three top requirements. In order, they are [1] meeting the emerging market need for teleportation, [2] boosting internal quality and supportability through telepathic diagnostics, and [3] increasing networking price-performance. All three are required for successful release and launch, which is planned for next Wednesday.

In addition, a wide variety of other improvements and extensions have been identified. None of these are defined as gating items for the release, so may be postponed if they threaten timeliness or functionality of the release.

### 1.2 Strategic Road Map

This project is part of the company's overall plan to penetrate financial and supply chain accounts in North America, where early adopters for futuristic capabilities tend to collect. In addition, it helps us in our core decision support base, which has been waiting for performance improvements to move very large files among planetary systems. Non-Earth customers are a secondary target for the company, and this product.

- 1. Functional Specification**
- 2. Technical Specification**
- 3. Whole Product Package**

Web Accessibility in  
WebMail Corporate Edition  
Product Requirements Document

Document ID	
Version	Version 1.1
URL	
Originator	Matt Anderson
Approval Date	
Status	Draft

Modification History:

Version	Date	Author	Description
1.0	07/30/07	Matt Anderson	Initial Version
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6.2. PROTOCOL DOCUMENTATION.....22

6.3. END-USER DOCUMENTATION.....22

1. Introduction

1.1. Definitions, Acronyms and Abbreviations

Definition	
ADA	<b>The Americans with Disabilities Act</b> - Signed into law on July 26 1990, the Americans with Disabilities Act is a wide-ranging legislation intended to make American Society more accessible to people with disabilities.

EPRI

Planning Document

Software Requirements Document (SRD)

Sample Template

Instructions:

- Please elaborate on each subject. You may use your own document(s) instead of this sample template.
- If a topic is not applicable to your software, please enter “Not Applicable.”
- Please submit this document with the Beta software submittal at the latest.

1.0 Introduction ..... 1

2.0 Team Members ..... 1

3.0 Assumptions, Constraints, Schedule and Design..... 1

    1.1 Assumptions .....1

    1.2 Constraints .....1

    1.3 Schedule .....2

    1.4 Design.....2

4.0 General System Description ..... 2

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    1.6 System Environments and Modes .....3

    1.7 User Characteristics .....3

    1.8 Operational Scenarios .....3

    5.5 Standards, Procedures, and Processes Used in this Project .....3

5.0 Functional Requirements ..... 3

6.0 Interface Requirements ..... 4

7.0 Data Management ..... 4

8.0 Non-Functional / Operational Requirements ..... 4

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    1.10 Maintenance and Support .....4

    1.11 Performance, Capacity and Scalability.....4

    1.12 Technical Reviews, Audits, and Walk-Through .....5

9.0 Training ..... 5

10.0 SQA Requirements ..... 5

    1.13 Quality Plan.....5

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Software Name:		Revision #:	
Author:			
Date:			
Revision History:		Date:	

## The New Bradley Design

**(Ten years in the life of a project manager)**

[1] See <https://youtu.be/Jp5japiHAs4>



# Video Lessons

- Multiple stakeholders
  - Bargaining leads to suboptimal results
- Meddling stakeholders
  - Intervening in the tank design process
- Unclear market
  - From US military to foreign markets
- Cost explosion
  - With changing requirements, costs explode
- Inconsistent requirements
  - From fast and small to big with firepower
- Changing requirements
  - Lack of focus invalidates prior work
- Feature creep
  - From troop carrier to tank

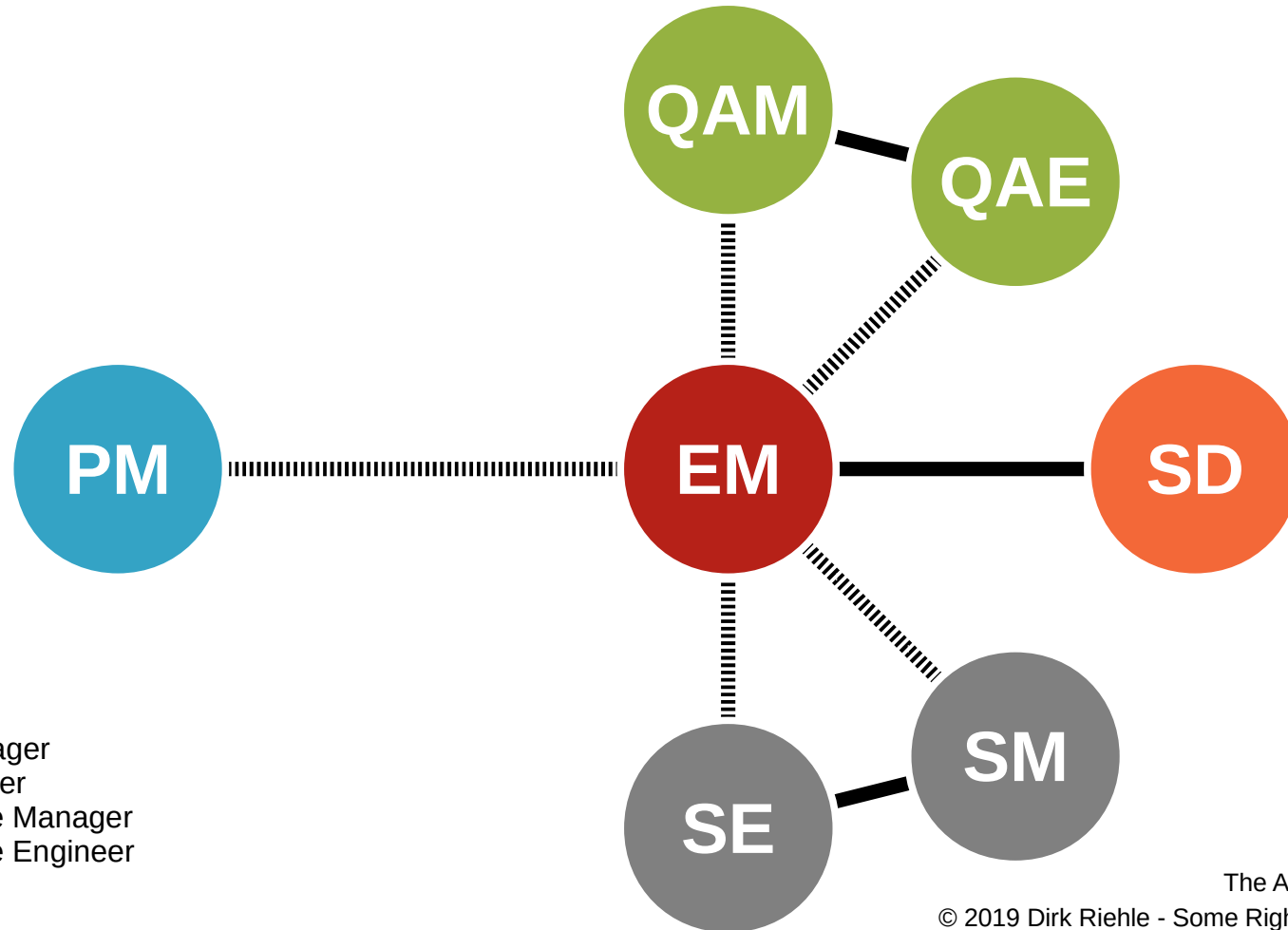
**Engineering management** is the management<sup>[1]</sup> of a company's product development process [along the product life-cycle] [across a product portfolio]. [DR]

[1] The purposeful act, manner, or practice of handling, supervising, or controlling [developers and engineering processes]

**Who?**

**By when?**

# Engineering Manager in Context



PM: Product Manager  
EM: Engineering Manager  
SD: Software Developer  
QAM: Quality Assurance Manager  
QAE: Quality Assurance Engineer  
SM: Support Manager  
SE: Support Engineer

# Example Processes and Artifacts

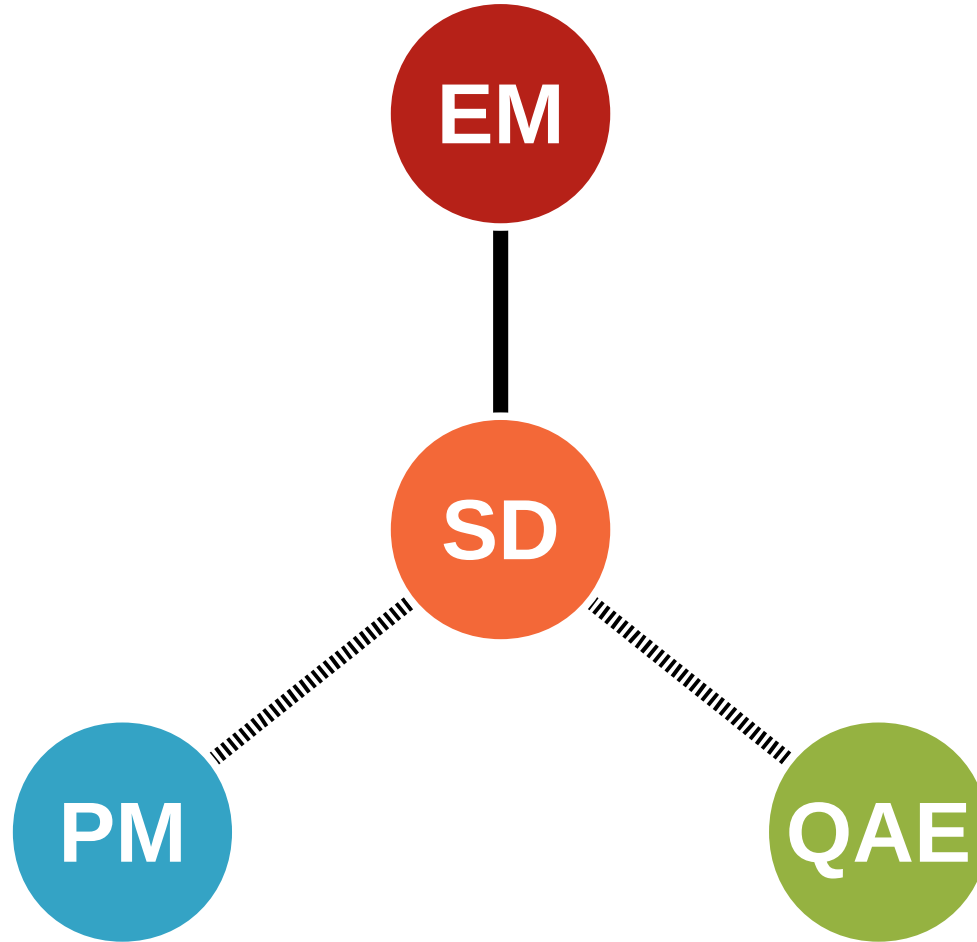
Processes	Artifacts
Release Planning	Release Plan
Resource Allocation	Project Plan Task Board
Outsourcing	Budget Project Plan
Project Retrospective	Note Book

**Software development (programming)** is the process of turning product requirements into working software. [DR]

**How?**

**How fast?**

# Software Developer in Context



PM: Product Manager  
EM: Engineering Manager  
SD: Software Developer  
QAE: Quality Assurance Engineer



# Processes and Artifacts

Processes	Artifacts
Effort Estimation	Release Plan
Programming	Source Code

**Quality assurance** is the process of assuring that the software being developed **has a defined quality.** [DR]

**Releasable?**

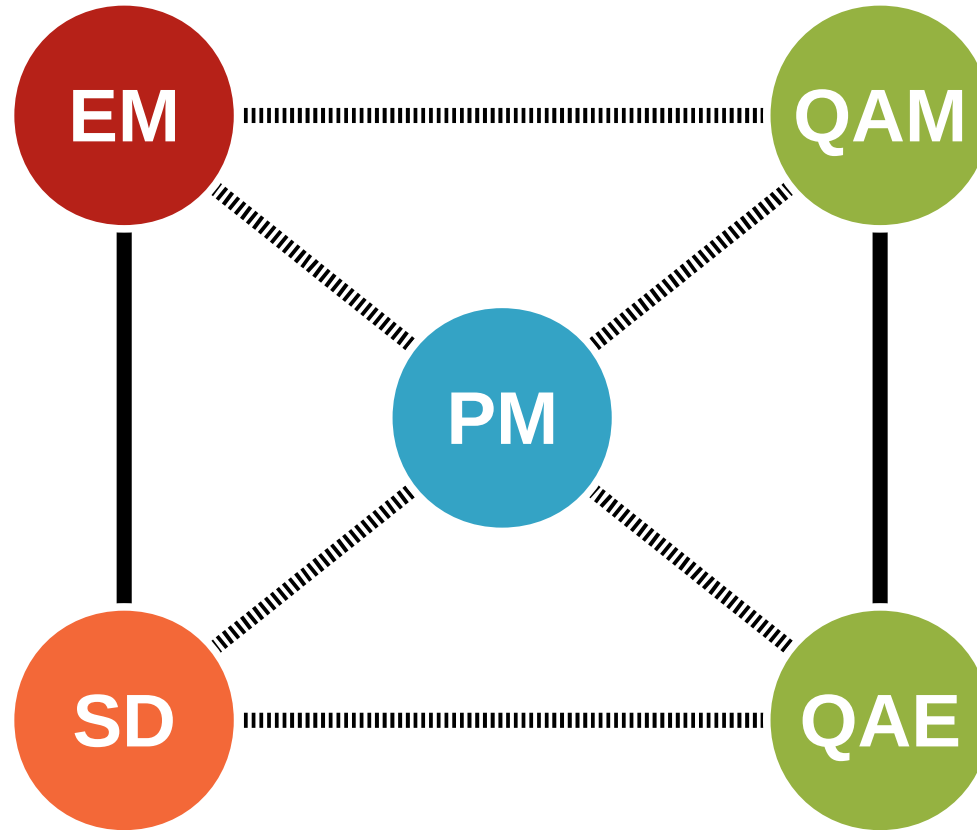
**Good enough?**

The **quality** of a software system is the degree to which it **conforms** to its **stakeholders' expectations**. [DR]

# Stakeholders and Expectations

- Product management
  - Functional requirements
  - Non-functional requirements
- Engineering management
  - Product quality
  - Maintainability and evolution
- Support and operations
  - Operations costs, usability
  - Non-functional requirements

# Quality Assurance in Context



PM: Product Manager  
EM: Engineering Manager  
SD: Software Developer  
QAM: Quality Assurance Manager  
QAE: Quality Assurance Engineer

# Processes and Artifacts

Processes	Artifacts
Automated Test Design and Implementation	Test Plan Test Code
Manual Test Design and Implementation	Test Plan Test Script
Release Sign-off	Email
Release Packaging	Software Release

# Quiz on Organizational Issues

1. Where in the organizational chart to put product management?
  - A) Sales and marketing
  - B) Engineering
  - C) Stand-alone
  
2. Where in the organizational chart to put quality assurance?
  - A) Engineering
  - B) Product management
  - C) Stand-alone



# Review / Summary of Session

- Key functions and roles in software engineering
  - Product management
  - Engineering management
  - Software development
  - Quality assurance
- Describing process models

# Thank you! Questions?

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**[dirk@riehle.org](mailto:dirk@riehle.org) – <http://dirkriehle.com> – [@dirkriehle](#)**

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- Original version
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  - Licensed under [Creative Commons Attribution 4.0 International License](#)
- Contributions
  - ...

# Software Processes

**Prof. Dr. Dirk Riehle**

**Friedrich-Alexander University Erlangen-Nürnberg**

**AMOS C01**

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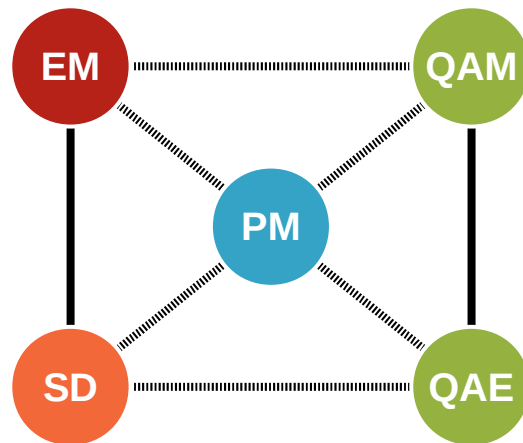
It is Friedrich-Alexander University Erlangen-Nürnberg – FAU, in short.  
Corporate identity wants us to say “Friedrich-Alexander University”.

## Key Functions in Software Engineering

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2. **Engineering Management**
3. **Software Development**
4. **Quality Assurance**



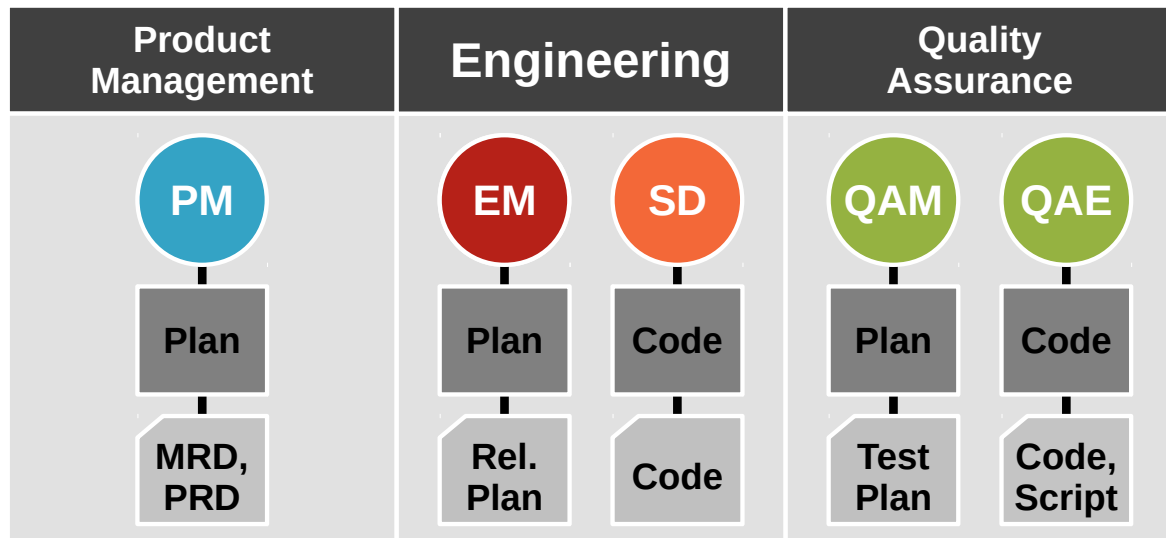
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## Key Practices and Artifacts





# Product Management

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Product Specification	Product Requirements Document (PRD)
Product Roadmapping	Internal Product Roadmap External Product Roadmap
Release Planning	Release Plan

## **Marketing Requirements Document (MRD)**

- 1. Basic product idea**
- 2. Market and competition**
- 3. Product architecture**
- 4. Organizational planning**

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Author/Owner: Rich Mironov, rich@mironov.com  
Version/Date: v3.1, 15-March-2006

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## **Product Requirements Document (PRD)**

- 1. Functional Specification**
- 2. Technical Specification**
- 3. Whole Product Package**



Web Accessibility in  
WebMail Corporate Edition  
Product Requirements Document

Document ID	
Version	Version 1.1
URL	
Originator	Matt Anderson
Approval Date	
Status	Draft

Modification History:			
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[E12]

**EPRI**  
**Planning Document**  
**Software Requirements Document (SRD)**

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- Please submit this document with the Beta software submittal at the latest.

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Author:			
Date:			
Revision History:		Date:	

**Software Requirements Document (SRD)**  
**Sample Template**

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<i>2.0 Team Members .....</i>	<i>1</i>
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<i>6.0 Interface Requirements .....</i>	<i>4</i>
<i>7.0 Data Management .....</i>	<i>4</i>
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1.17 Delivery, Installation, and Acceptance.....	6
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Video From “The Pentagon Wars” [1]

## The New Bradley Design

(Ten years in the life of a project manager)

[1] See <https://youtu.be/Jp5japiHAS4>

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**16**

## Video Lessons

- Multiple stakeholders
  - Bargaining leads to suboptimal results
- Meddling stakeholders
  - Intervening in the tank design process
- Unclear market
  - From US military to foreign markets
- Cost explosion
  - With changing requirements, costs explode
- Inconsistent requirements
  - From fast and small to big with firepower
- Changing requirements
  - Lack of focus invalidates prior work
- Feature creep
  - From troop carrier to tank







## Example Processes and Artifacts

Processes	Artifacts
Release Planning	Release Plan
Resource Allocation	Project Plan Task Board
Outsourcing	Budget Project Plan
Project Retrospective	Note Book









## Processes and Artifacts

Processes	Artifacts
Effort Estimation	Release Plan
Programming	Source Code





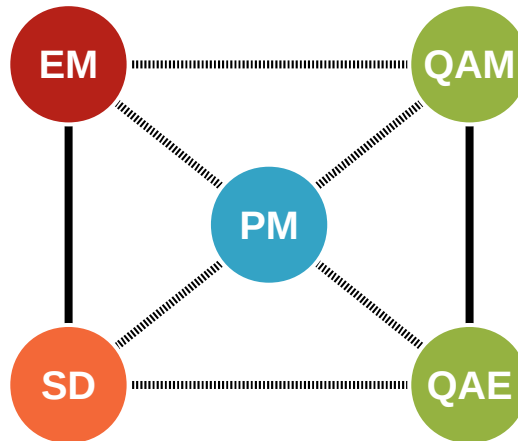
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- Support and operations
  - Operations costs, usability
  - Non-functional requirements



## Quality Assurance in Context



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QAE: Quality Assurance Engineer

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## Processes and Artifacts

Processes	Artifacts
Automated Test Design and Implementation	Test Plan Test Code
Manual Test Design and Implementation	Test Plan Test Script
Release Sign-off	Email
Release Packaging	Software Release

## Quiz on Organizational Issues

1. Where in the organizational chart to put product management?
  - A) Sales and marketing
  - B) Engineering
  - C) Stand-alone
2. Where in the organizational chart to put quality assurance?
  - A) Engineering
  - B) Product management
  - C) Stand-alone

## Review / Summary of Session

- Key functions and roles in software engineering
  - Product management
  - Engineering management
  - Software development
  - Quality assurance
- Describing process models

# Thank you! Questions?

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