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GENERALLY ACCESSIBLE

The UBS Software Development Life Cycle in an Enterprise Environment

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SECTION 1

The Software Development Process at UBS WM&SB IT

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SDLC at a glance

Definition

- The Software Development Life Cycle (SDLC) is a software engineering process based on world-wide industry standard software engineering best practices (IBM Rational Unified Process extended by the Enterprise Unified Process)

Strategy

- The Software Development Life Cycle (SDLC) is intended to provide industry standard roles and state-of-the-art application development methods, processes and tools.

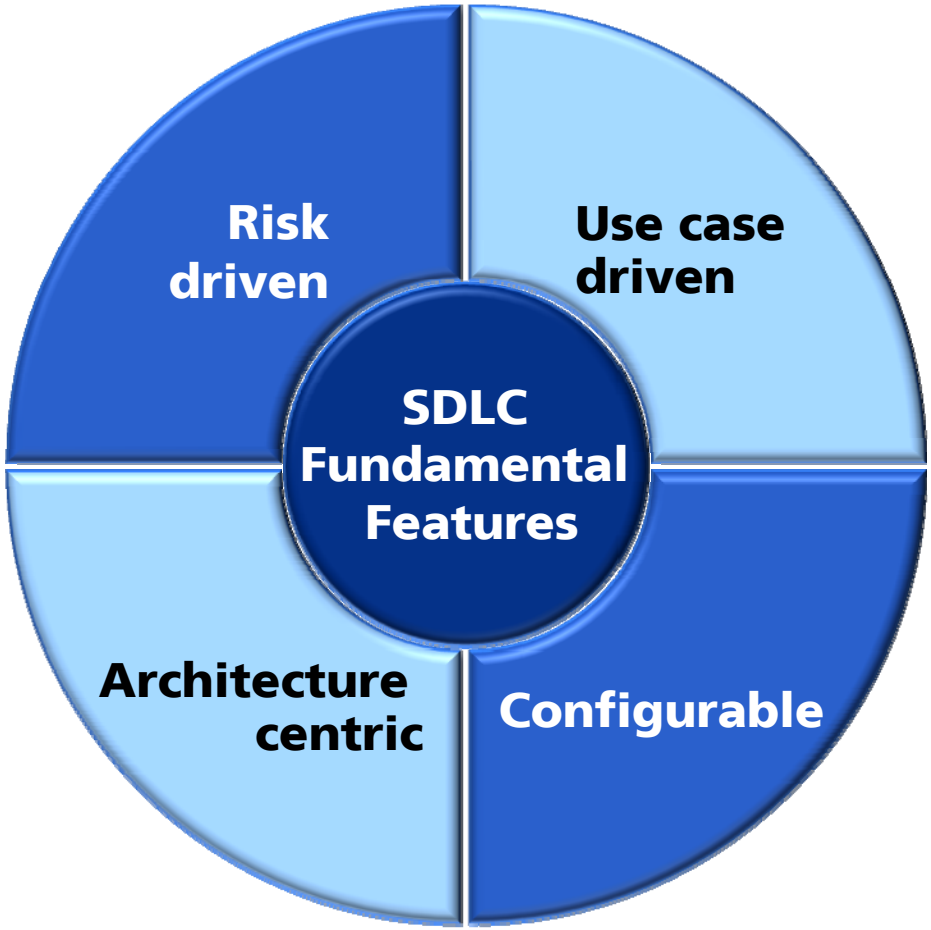
Goal

- Ensure the development of high quality software that meets the needs of its end users within a predictable schedule and budget

SDLC Fundamental Features and their Benefits

Risk driven

- Early major risk mitigation
- User acceptance assurance
- Early problem discovery
- Cost reduction



Use case driven

- Early major risk mitigation
- User acceptance assurance
- Early problem discovery

Architecture centric

- Early major risk mitigation
- Cost reduction
- Reuse assurance

Configurable

- Specific needs lead to process adaptation
- Tailoring

Principles that apply to all SDLC activities

"

UBS is an attractive employer in the IT market.

UBS can save costs due to common skills, know how and tools available on the market.

UBS is a global player.

UBS Global WM&SB IT will become a more competitive software provider.

"

Stefan Arn, SDLC Ambassador, September 2008

Why is the SDLC successful?

Predecessors

- The ERL (Entwicklungsrichtlinien; Development Guidelines) was an UBS internal approach with only limited methodology (roots in mid 90's)
- The SLC (Solution Life Cycle) started in 2004 and was mainly driven by a tool strategy, independent of stakeholder's requests

Possible Alternatives

- Only a very small number of industry standards exist that support the full software development life cycle within an enterprise (most prominent are RUP/EUP and the V-Model)

SDLC is a big step forward (since Q4/2007)

- The SDLC bases on the de-facto industry standards (RUP/EUP) and is adapted to the needs of UBS (adaptations are minimal and restricted to UBS specifics)
- The SDLC is a top management priority of WM&SB IT
- The SDLC is a collaborative effort of all sectors within WM&SB IT with clear delegation of responsibilities and competencies to the appropriate levels
- The SDLC started at the right end – the methodology
- The SDLC enables the consistent and systematic development of software in a large scale environment

SDLC Implementation - Timeline

Set up core team

- Started second half of 2007
- Core team
  - About 10 people
  - External support
  - Build a common understanding
  - Know-how building
- Big Picture
- Mission statement

Tailor the process

- Started 2008
- Tailor the work products
  - Identify the essential ones
  - Adopt to UBS formats
- Setup Working Groups
  - Expert groups for disciplines
  - Lobby with development units
- Verify in pilot projects
  - Set up coaching unit
  - Feedback to working groups

Adopt the process

- Started 2009
- Adopt the process
  - Delegated to development units
  - Project-wise
  - Supported by coaches
  - Education program
- Software improvement process
  - Continuous feedback from adopting projects
  - First step into a learning organization

The Business Units benefit from the SDLC …

… by improved Business/IT alignment, improved quality …

The SDLC

- is **adapted/tailored** to each **individual** project in order to raise the efficiency
- manages the implementation to **quantifiable benefits**
- **involves business people** and their profound knowledge effectively
- emphasizes the importance of **stakeholder buy-in** and delivery of tangible **business benefits** to the customer
- effectively **eliminates risks** in early phases of the project. It ensures that the client's business requirements are realized with a **high reliability**.
- **intenses collaboration and communication** between Business & IT and increases customer satisfaction
- shows value **iteratively**. You can **verify and earn piece-by-piece** what accelerates the development process.
- project can be **transparently assessed** and rated during milestones reviews

… and reduced time to market with shorter delivery time.

SECTION 2

The SDLC Rollout Approach into the WM&SB IT organization

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The SDLC Rollout key principles are the fundament for a manageable, controllable and repeatable SDLC introduction process

- Project based introduction with **SDLC practices approach**
- **Project leader is responsible** for the rollout of the SDLC in his project
- A **SDLC Coach enables** (assess, educated and supports) project members. In particular, he assists the project leader in the planning, execution and tracking of the rollout
- The **SDLC enablement is based on workshops** and specific SDLC enablement materials (documentation, presentation, guidelines)
- Project rollout should go **through all four SDLC phases**
- At beginning of the rollout, a project assessment will be done. Based on assessment, the **tailored SDLC** will be chosen which fulfills the project's needs

The introduction of the SDLC Coach role is crucial for the successful rollout of the SDLC into the SW development projects

- The "Coach Concept" is a **proven best practice** from previous successful large scale RUP Deployments

- The term "Coach" has its origins in sports:
  - A coach is an individual involved in the direction, instruction and training of the operations of a sports team or of individual sportspeople. A coach gets involved in all the aspects of the sport
  - In our case, **the sport is SDLC !**

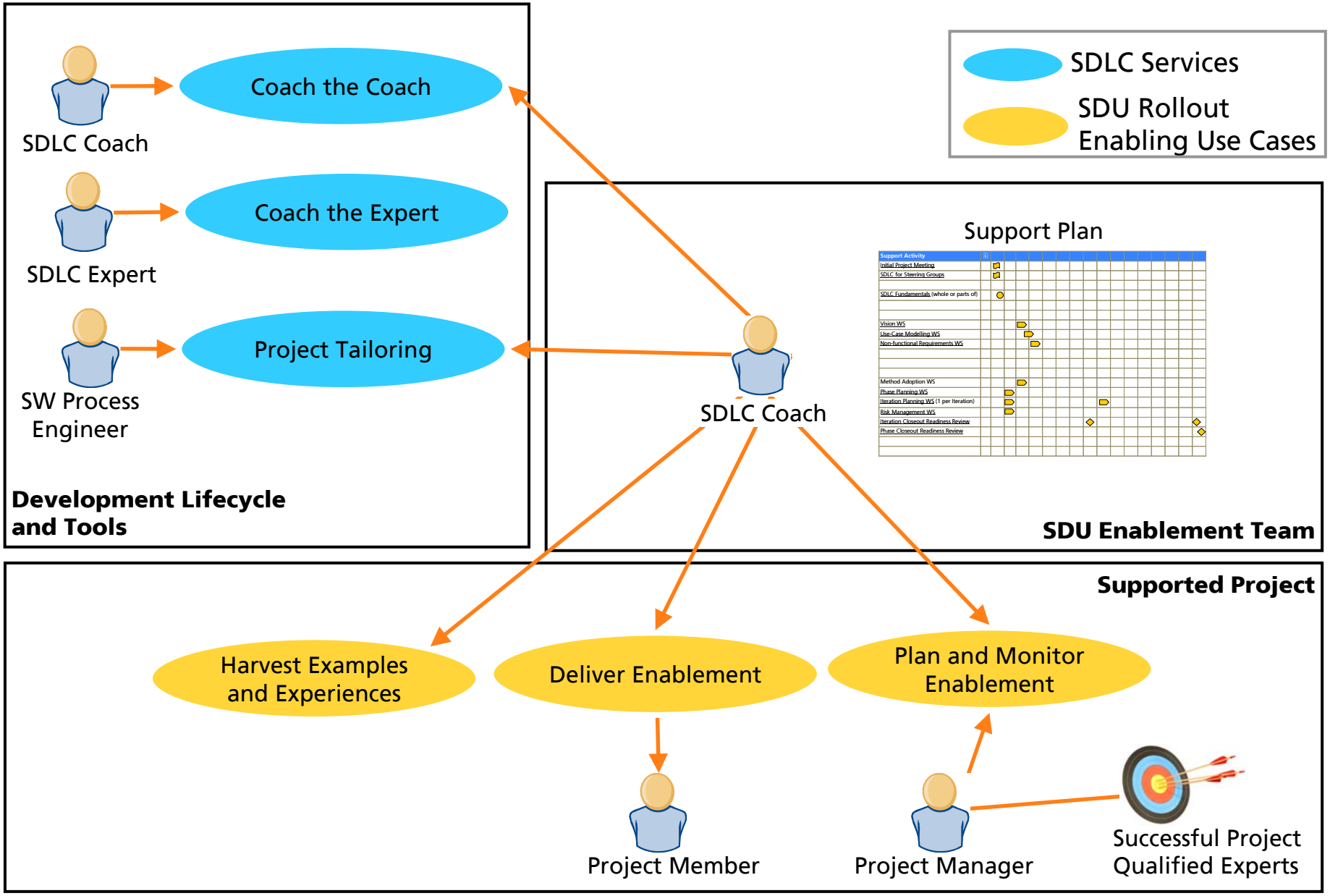
- A SDLC Coach has **many different roles** (e.g. diplomat, facilitator, SME, problem solver, …) and needs to apply the right role in any given situation.

- An SDLC Coach is not necessarily a guru or expert in a given discipline. I.e. typically have more **broad SDLC End2End skills** than deep

Responsibilities & Tasks of the SDLC Coach during the project phases

- Acts as a **change agent / enabler** and supports the project manager during the process migration to SDLC
- Must be **socially competent** and able to represent the project team at all levels as well as make and enforce decisions
- **Ensures information and experience exchange** among SDLC Coaches and the SDLC provider
- Is able to **lead, moderate, and/or review SDLC workshops**
- Will **support the project manager in communication** within the project team and with stakeholders.
- Will work with the project manager to **elaborate a detailed plan of support** and will be responsible for adherence to said plan

SDLC Rollout Approach based on coaching and support plan ensures a standardized SDLC introduction with project-specific customizing



The SDLC rollout planning and coordination is done in each Business Software development unit and not by a central unit

The Business SW development units share the same SDLC objectives and rollout approach, but the focal points and the way of communication are partly different

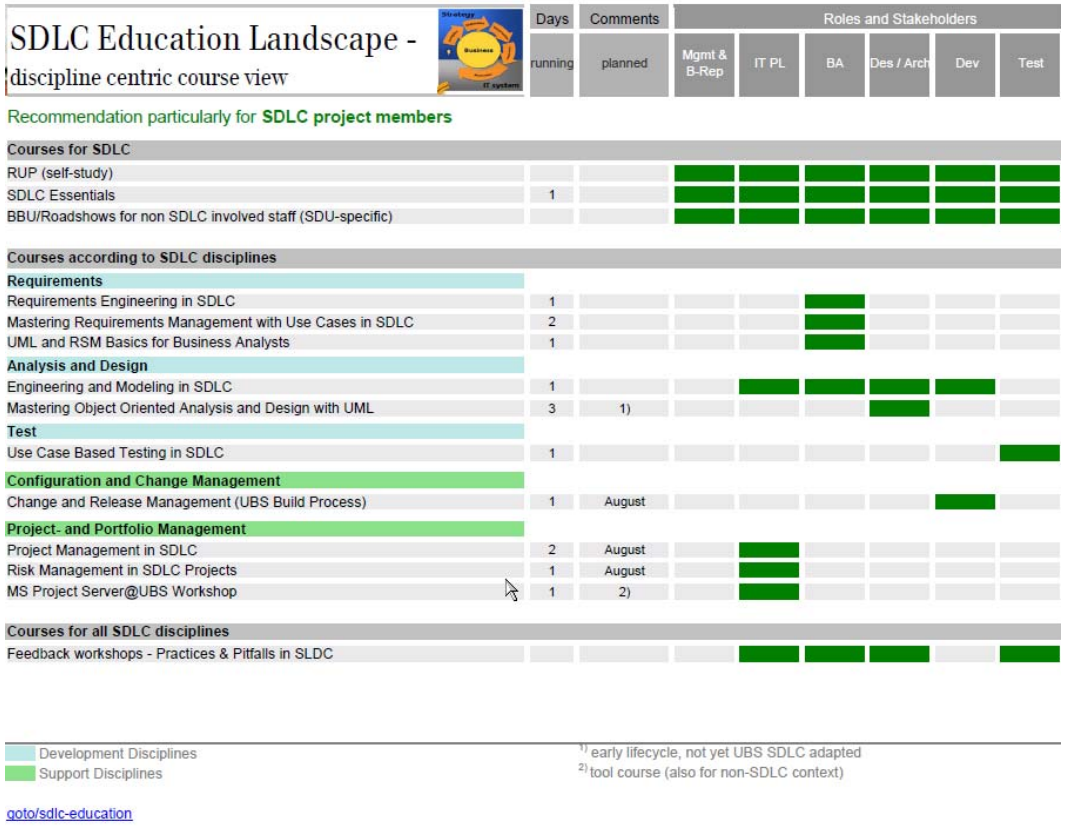
- Main target objectives for all Business SW Development units are:
  - Quality and efficiency improvements
  - Increase of professionalism / standardization
  - Culture change (learning organization / agile Software development)
- Rollout approach in all Business SW Development units are:
  - Stepwise with limited number of projects
  - Coaching model
  - Project assessments
- Different focal points and prioritizations - Different way of communication:
  - Management process harmonization vs. methodology training/improvements
  - Planning/Resource Management harmonization vs. planning methodology improvements tool independently
  - Central vs. de-central communication

The Business & Technical architecture units are heavily involved in all SW development activities and have to be a part of the SDLC rollout

- SDLC is the enabler to implement architecture principles and guidelines systematically in the SW development projects
- SDLC Rollout for Business & Technical architecture has hence the following dimensions:
  - Ensure that '**setting**' activities result in products and processes which are well aligned with the SDLC and its principles to provide a productivity boost to projects
  - Ensure that all architects involved in software development projects understand the SDLC overall and that they can act as **enablers** in their respective domain of expertise
  - Ensure that **conformance** to defined principles and standards relevant to architecture can be checked and verified during the entire software lifecycle
- Conclusion:
  - 'Rollout' in the case of Business & Technical architecture is mainly focused around **skills transfer and education**
  - 'Rollout' has to be in line with the pace of the SDLC

A SDLC aligned education landscape has been elaborated in order to support the know-how build up in the projects

The SDLC education landscape offers education courses alongside the SDLC disciplines and the SDLC roles



SDLC Education Landscape - discipline centric course view

Recommendation particularly for **SDLC project members**

	Days		Comments	Roles and Stakeholders					
	running		planned	Mgmt & B-Rep	IT PL	BA	Des / Arch	Dev	Test
Courses for SDLC									
RUP (self-study)				■	■	■	■	■	■
SDLC Essentials	1			■	■	■	■	■	■
BBU/Roadshows for non SDLC involved staff (SDU-specific)				■	■	■	■	■	■
Courses according to SDLC disciplines									
Requirements									
Requirements Engineering in SDLC	1					■			
Mastering Requirements Management with Use Cases in SDLC	2					■			
UML and RSM Basics for Business Analysts	1					■			
Analysis and Design									
Engineering and Modeling in SDLC	1				■	■	■	■	
Mastering Object Oriented Analysis and Design with UML	3		1)				■		
Test									
Use Case Based Testing in SDLC	1								■
Configuration and Change Management									
Change and Release Management (UBS Build Process)	1		August					■	
Project- and Portfolio Management									
Project Management in SDLC	2		August		■				
Risk Management in SDLC Projects	1		August		■				
MS Project Server@UBS Workshop	1		2)		■				
Courses for all SDLC disciplines									
Feedback workshops - Practices & Pitfalls in SLDC					■	■	■		■

Development Disciplines
Support Disciplines

[1] early lifecycle, not yet UBS SDLC adapted
[2] tool course (also for non-SDLC context)

goto/sdlc-education

- Small and focused set of education courses in order to optimize the off-the-shelf training efforts
- hands-on knowledge provided in SDLC enablement workshops complete the know-how gained in the courses

SECTION 3

The continuous SDLC improvement process

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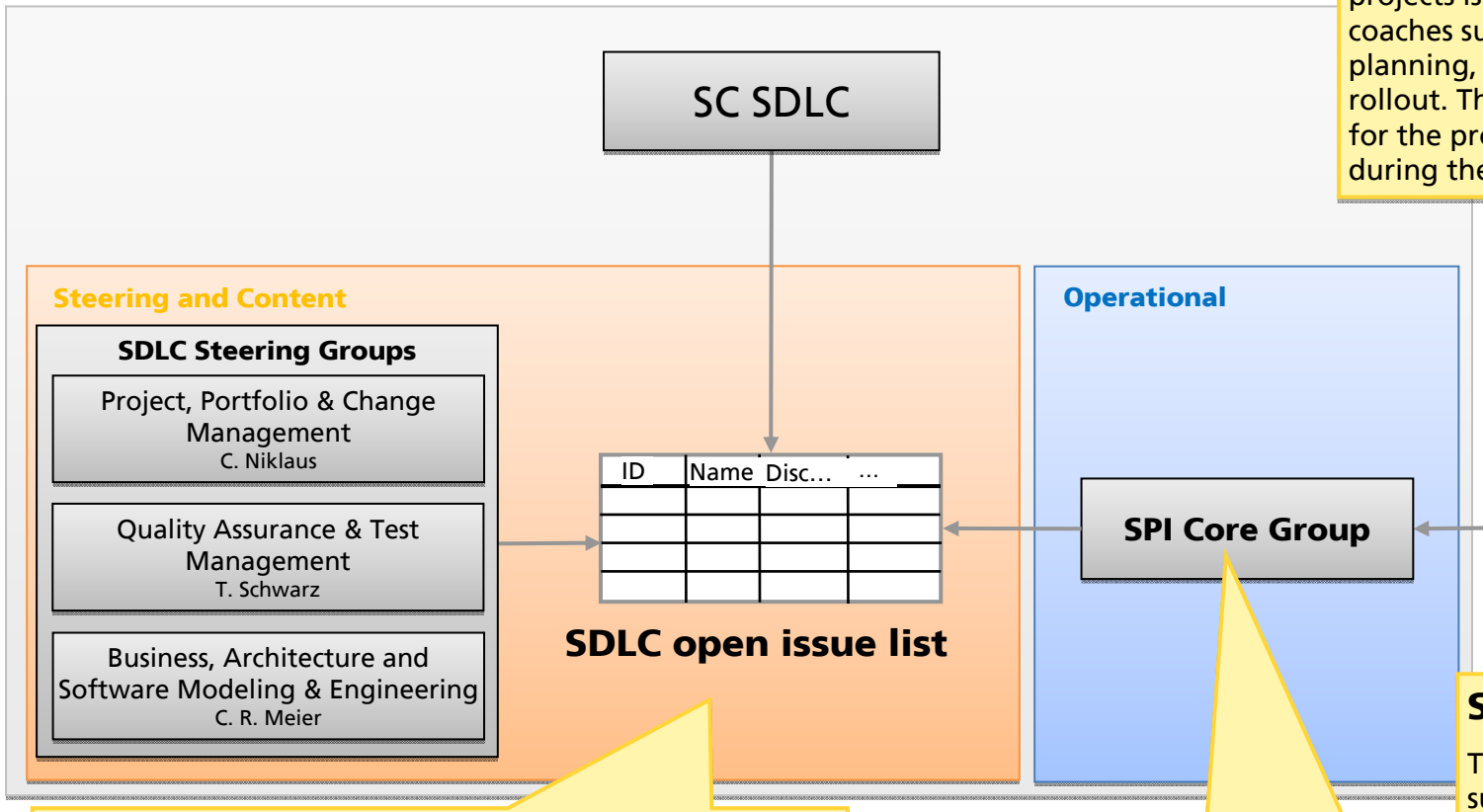
The SDLC improvement process ensures that findings from the projects are continuously verified and flow back into the SDLC



SDLC Coaches

The rollout of the SDLC into the projects is done via coaching. The SDLC coaches support the project in planning, executing and tracking the rollout. The SDLC coaches are the SPOC for the projects for SDLC relevant topics during the SDLC rollout.

SDLC Open issue List

All open SDLC issue will be registered on a specific list. This list provides transparently an overview of all topics in a cross-discipline way. This supports the prioritization process in the SC SDLC as well as the expectation management towards the SDLC Rollout responsibles (what is available and what not).

SDLC SPI Core Group

The SPI Core Group acts as a second level support organization to leverage the defined method and solutions. Open issues are consolidated and forwarded to the respective SG's.

SDLC Coach Forum

This forum acts as a first level support organization for the SDLC coaches in order to tackle and solve SDLC issues or questions directly in the forum. Items which can't be solved in this forum, will be forwarded to the SPI Core Group. The Coach Forum tracks the progress of the issue till its solvement. This forum is organized by DLCT and held on a weekly basis

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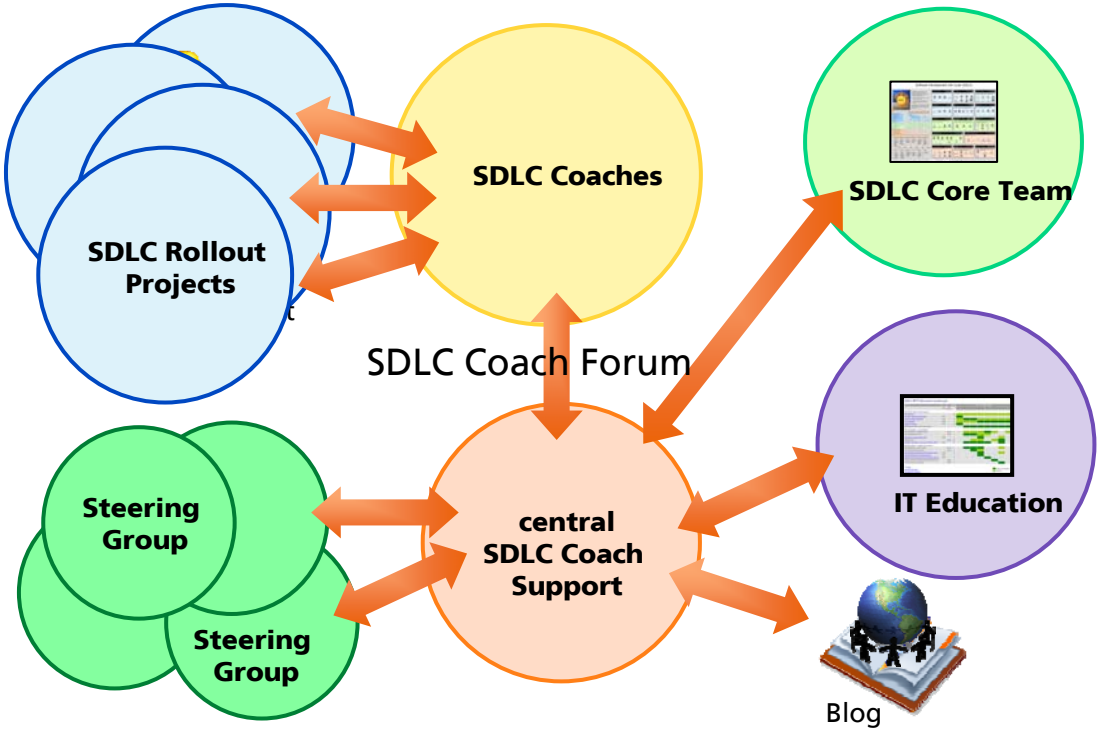
SDLC Coach Forum is an important instrument for the continuous SDLC improvement as well for the SDLC rollout enablement



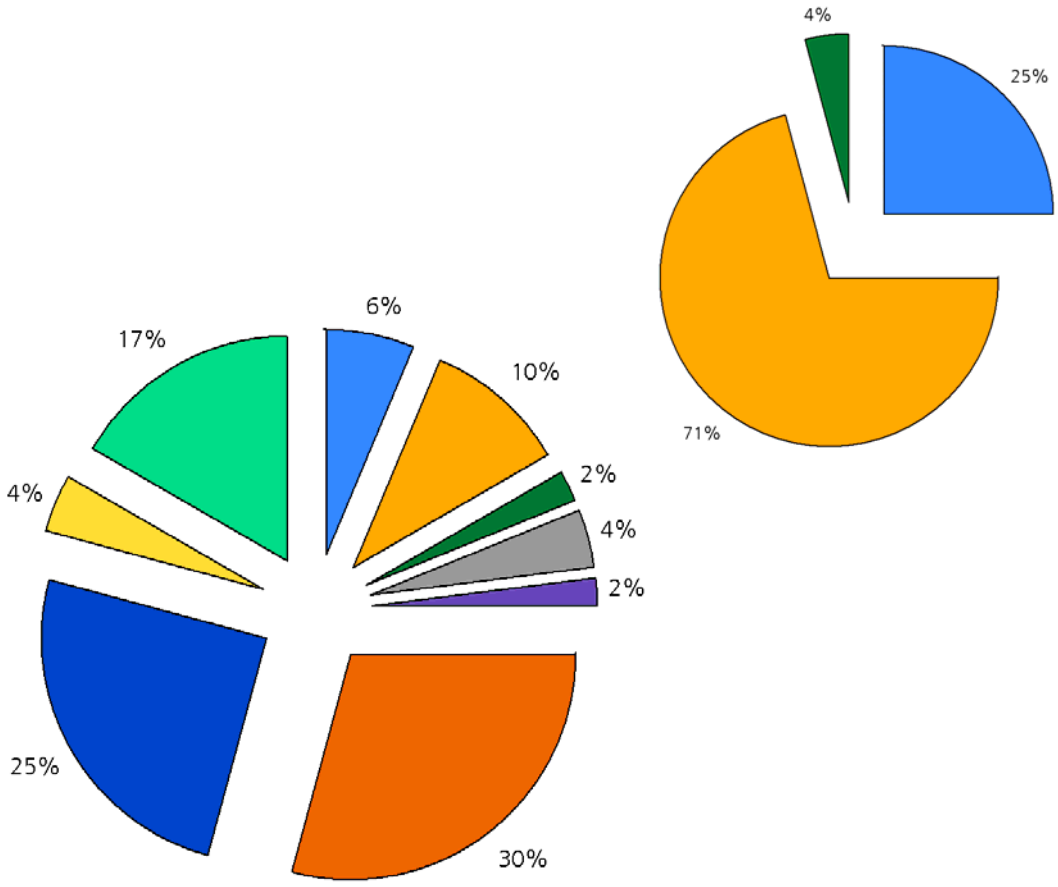
SDLC Coach Forum Context Diagram

- SDLC Coach Forum Topics:
  - An open experience and findings exchange among the SDLC coaches
  - Presentations and discussions to SDLC subjects
  - Regular information to SDLC enhancements and updates directly from the SDLC content responsibles
- The collaboration is done via a central SharePoint platform and weekly meetings

The forum acts as a unbureaucratic and vital platform for experience exchange and communication among the SDLC coaches and between them and the SDLC content responsibles

The statistic of the open issues shows a big interest from the SDLC coaches to improve the SDLC with concrete proposals

- In the period between June and August over 40 Open Issues have been captured by the SDLC Coaches



- The Issues classify as follows
  - Bugs
  - Improvements
  - Questions
- The Issues distribute among disciplines as follows
  - Analysis and Design
  - Config. and Change Mgmt.
  - Deployment
  - Environment
  - Project Management
  - Requirements
  - Software Process Improvement
  - Test

Currently the main focus of the SDLC projects lies in the project management and requirements engineering disciplines

SECTION 4

SDLC Tailoring for SW development projects

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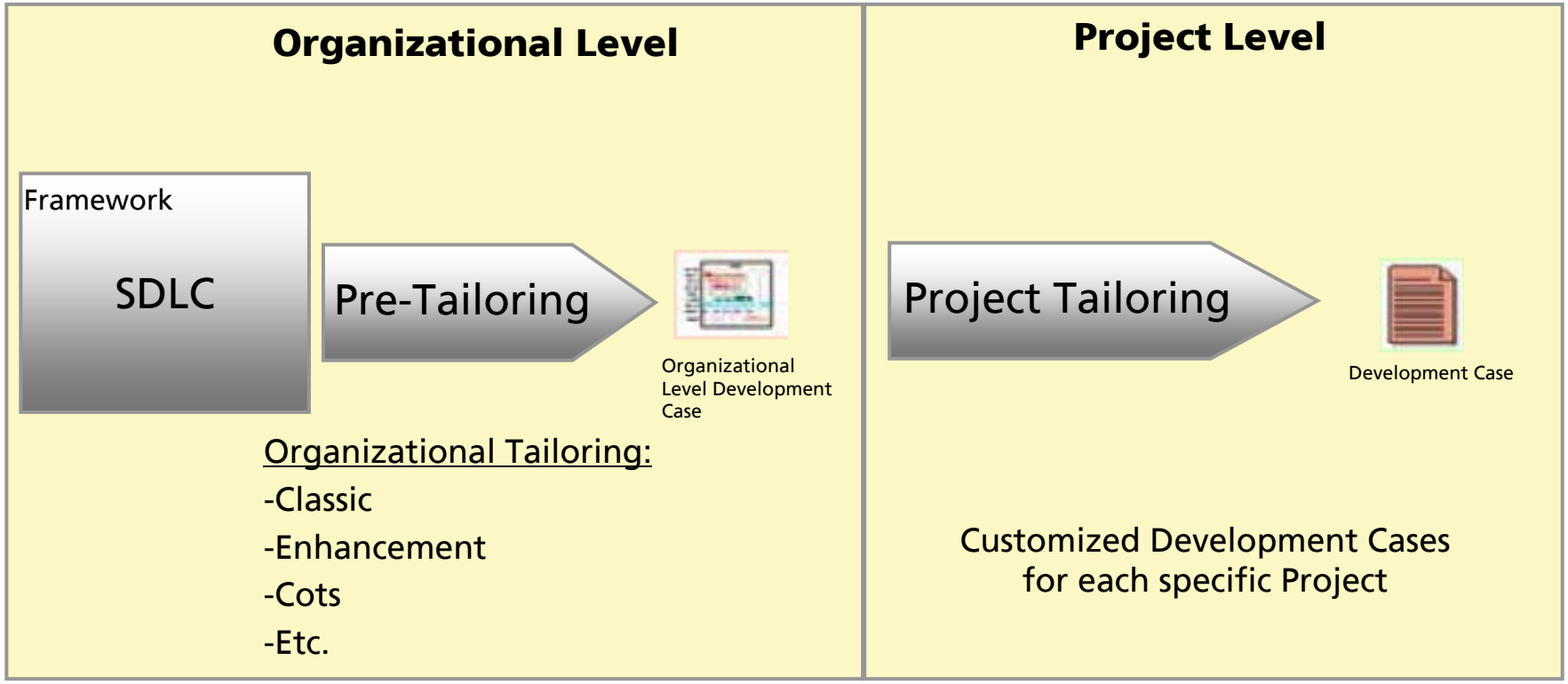
The initial SDLC tailoring to the needs of the project is crucial for the right-sizing of the process to ensure project effectiveness & efficiency

What levels of SDLC tailoring do exist?



Main organizational Project Tailoring Types

Project Type	Description	Criteria
Classic Projects	A project with the objective to build a new system or to change an existing system causing significant architectural changes.	- Building of a new system - Significant architecture changes
Enhancement Projects	Projects working on a release with smaller feature enhancements of an existing application and not changing a stable architecture	- Enhancement of existing system - Not changing the architecture
COTS Projects	Commercial off the shelf Evaluation and Integration of a 3rd party software.	- Evaluation of software - Integration of 3rd party software
Migration Projects	Projects migrating an application to a new platform and technology	- Migration of existing application - Little new development effort
Small Projects	Projects with only a small amount of team members (between one and three)	- 3 People or less in the project - Brief projects (≤ 6 months)

SDLC needs to be tailored to the project's:

Goals, size, technologies, setup, location or around the globe team, single project or a project of projects, project member's skills, etc

SECTION 5

Findings & lessons learned to the SDLC reported by the SDLC rollout projects

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The main general achievements reported by the SDLC Rollout Projects

By implementing SDLC we started to learn working across (IT) borders…

- Risk driven and iterative driven approach succeeds more and more in a much better quality
- Collaboration with business has improved considerably mainly due to the systematic and jointly Use Case modeling approach
  - details are cleared much faster
  - customers discover themselves gaps in their own business processes (which wouldn't have been the case before based on the Business Specifications)
  - project teams start to work with the same basic mindset with more involvement of the business
  - usage of requirements can be challenged without generating an immediate defensive reaction from the business
- Usage of common projects repository is a major milestone achievement

…by using SDLC in projects we now begin to understand what RUP is for

The key findings show that we are on the right track and that the critical points are addressed

SDLC mirrors perfectly maturity of professionalism

- Project Manager, Business Analysts and SW Architects with a **maturity of professionalism** are able to handle SDLC easily
- The **project manager is key** for the correct introduction and application of the SDLC in his project. He acts as a **role model and enabler**
- There are frequently complaints in respect of the **quantity of administrative overhead** (too many work products). The projects have to **challenge the formal aspects** regularly and right-size their SDLC tailoring
- The **involvement and commitment of the Business partners** to the SDLC has to be addressed very early in the project and over all relevant management levels
- In the SDLC, the content matters: tools are cool, forms are great – **the quality of the content makes the difference** (and not the package around the content)

To reach the leverage effect of SDLC, we have to invest in our basic skills first!

A key lesson learned is that by introducing the SDLC Key Principles, we are able to overcome the too formal SDLC application

The six SDLC key principles re-articulate the best practices for the broader lifecycle of continuously evolving systems, in which the primary evolving element is software

Adapt The Process

Balance Competing Stakeholder Priorities

Collaborate Across Teams

Demonstrate Value Iteratively

Elevate Level Of Abstraction

Focus Continuously On Quality

- Mitigate the risk of a too formal application of the SDLC
- Set the focus on some basic and universal best practices for SW development

Detailed findings from the Projects on SDLC discipline level (I)

The iterative planning approach of the Project Management discipline gets more and more accepted but required a mind-change coming from a waterfall approach

- With the first iteration assessments and first iteration planning workshops, the correct understanding of the iterative approach made a significant leap
- The iterative, risk-based approach has been established
  - Partially the thinking is still in "mini-waterfalls"

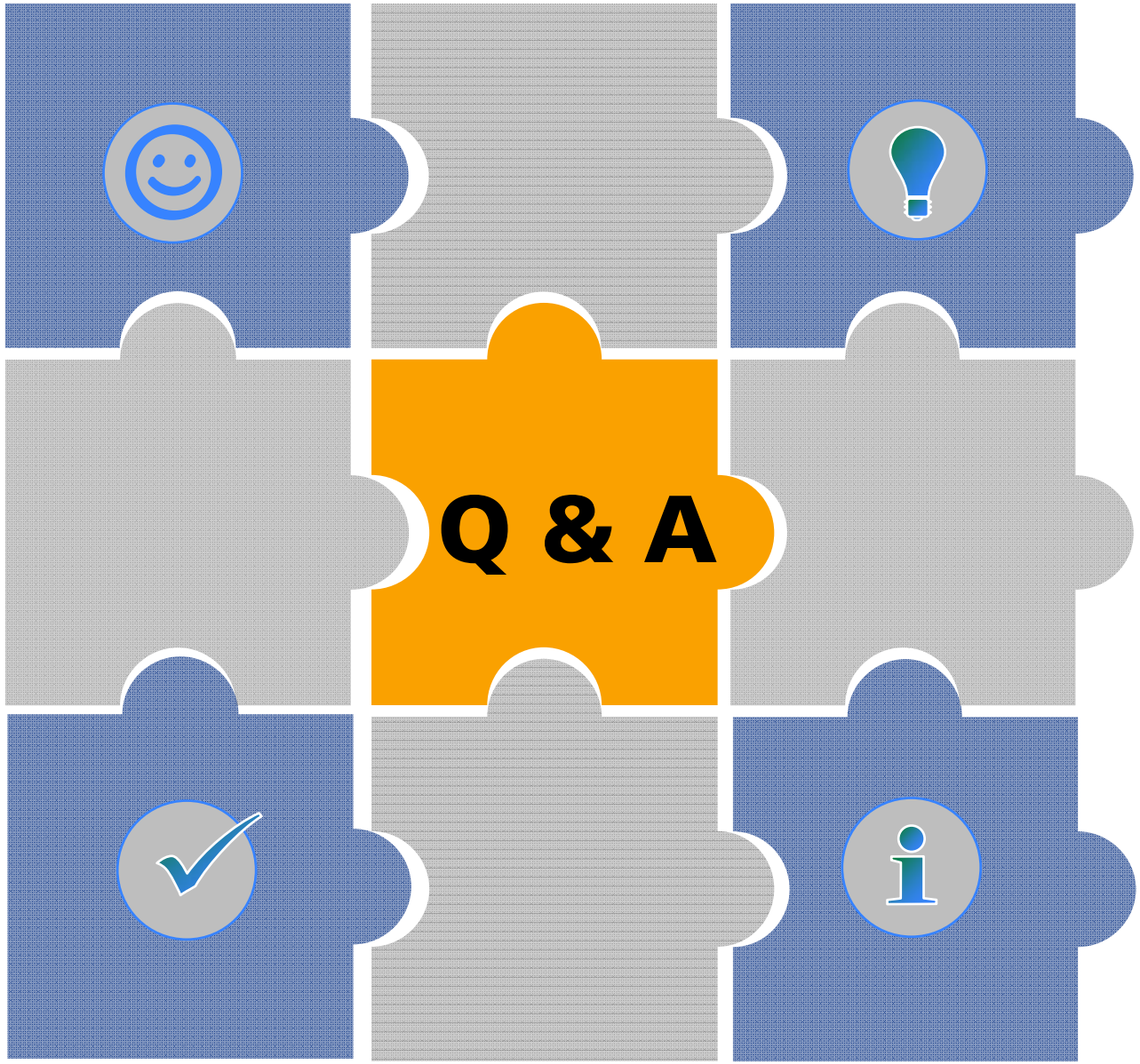
The introduction of Use Case based Requirements Engineering increased the quality as well as the collaboration with the client

- The close collaboration with the business partners is positively evaluated from both sides
- The creation of the Vision document has been seen as helpful where project goals and order weren't clearly set or understood
- Use Cases are regarded as an efficient instrument for the representation of requirements. The use case workshop has turned out as a good entry point for Use Case modeling
- The requirements documentation based on Use Cases raised the quality and transparency of requirements

Detailed findings from the Projects on SDLC discipline level (II)

Testing gets involved much earlier in the project and the test planning is better aligned with the overall project plan, but it requires more coordination effort and more test automation

- Testing gets perceived and more appreciated in the project and is better integrated in the project team
- The needs of the testing are considered in the early phase of the project
- As there are already tests in the first iterations, main risks are quickly identified and mitigated
- The test efforts are spread more smoothly over the whole project life cycle
- Practices as daily build or continuous integration enable a more iterative an quick procedure
- Automated unit tests are necessary to support the continuous testing. The numerous regression tests are expensive without test automation
- Iterative testing requires more coordination. A good coordination between the test manager and project manager is crucial


Q & A

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