Abstraction Layers for the rollout of Automotive SPICE®

ASPICE in 6 / 12 / 18 months

Process Insights US
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Agenda

- Motivation & Scenario
- Core Principles of ASPICE
- Abstraction Layers of Engineering Processes
- ASPICE Rollout Plan
- Summary
Motivation

CCI
Connected Car Innovations
based on the “Innovation Data Base”
of the “Center of Automotive Management”.
CCI includes ADAS and features for autonomous driving.
Motivation

… most **Connected Car Innovations** require ISO26262

… ISO26262 requires Processes

… Processes are defined & improved by **Automotive SPICE®**
... the **Automotive SPICE®** community is growing ...

... and many others
Scenario

First Autonomous Inc. (FAI)

- develops cars for autonomous driving SAE Level 4
- the first model is called “FITON”
- sells ECUs for autonomous driving also to other OEMs

FAI has a standard development process for engineering. The standard process
- defines milestones, quality gates and the reporting to corporate level
- also includes procedures, strategies and guidelines
- does not talk about tooling
- is given as a set of pdf documents

Interviews conducted in the Engineering Department of FAI show that the engineers
- use up to date engineering tools
- do not know about the defined procedures, strategies and guidelines
- try to stick to the milestones, quality gates and implement the reporting to corporate level as defined
Scenario

First Autonomous Inc. (FAI)

- most of the development projects have to show compliance to ISO26262
- therefore FAI decided to implement Automotive SPICE® Level 3 to get ready for ISO26262
Agenda

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- **Core Principles of ASPICE**
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Maturity Models like Automotive SPICE® define the “WHAT” (the goals):

What has to be achieved?
Which Practices have to be implemented?
Maturity Models are not Process Definitions!

Processes define the “HOW“ (the way how achieve the goals):

lifecycle models, tools, templates, methods, metrics, best practice, guidelines, strategies, procedures, roles & skills, tailoring guidelines, workflows, …

Remark: HOW includes WHO, WHEN, WHAT
Core Principles of ASPICE

Level 1
➢ Bilateral traceability including Change Requests
➢ Consistency of traceability
➢ Evaluation of architectures and designs
➢ Plans based on Strategies

Level 1 Performed
PA.1.1 Process Performance

Level 2
➢ Objectives for improvements, planning, monitoring and adjusting
➢ Define and assign roles including skill needs and competencies
➢ Establish communication to involved parties
➢ Define and use templates and checklists
➢ Conduct Reviews
➢ Establish Configuration Management

Level 2 Managed
PA.2.1 Performance Management
PA.2.2 Work Product Management
Core Principles of ASPICE

Level 3

➢ Define a standard process including
  ▪ tailoring guidelines
  ▪ roles
  ▪ infrastructure
  ▪ measures for suitability and effectiveness

➢ Use the tailored standard process

Level 3 Established
PA.3.1 Process Definition
PA.3.2 Process Deployment
Agenda

➢ Motivation & Scenario
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➢ Abstraction Layers of Engineering Processes
➢ ASPICE Rollout Plan
➢ Summary
## Abstraction Layers for Engineering Processes

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<td>Quality Gates</td>
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<sup>(1)</sup> Workflows defined by Activities, Work Products and Roles
Generic ASPICE Process

... for Business Unit Layer compliant to Automotive SPICE®
Generic ASPICE Process

Inputs
- System Requirements Specification
- Change Request Record
- Software Requirements Specification
- Software Requirements Specification
- Software Requirements Specification

Process
- Identify Software Requirements
- Analyse Software Requirements
- Verify Software Requirements Specification
- Approve Software Requirements Specification

Outputs
- Software Requirements Specification
- Software Requirements Specification
- Software Requirements Specification
- Software Requirements Specification

Roles
- Responsible:
  - Software Requirements Engineer
    - [Change] [New]
  - System Architect
    - [Change] [New]
  - Software Architect
    - [Change] [New]
  - Software Leader
    - [Change] [New]
- Support:
  - System Architect
  - Software Architect
  - Software Test Engineer
    - [Change] [New]
- Accountable:
  - Software Leader
- Informed:
  - Stakeholder
    - [Change] [New]
- Consulted:
  - Stakeholder
    - [Change] [New]

Compliance
Reference mappings to Automotive SPICE 3.0:
- SWE: Software Engineering Process Group > SWE.1: Software Requirements Analysis
- SWE.1.BP1: Specify software requirements [Outcome 1, 5, 7]
- SWE: Software Engineering Process Group > SWE.1: Software Requirements Analysis
- SWE.1.BP5: Establish bidirectional traceability [Outcome 6]
Agenda

➢ Motivation & Scenario

➢ Core Principles of ASPICE

➢ Abstraction Layers of Engineering Processes

➢ **ASPICE Rollout Plan**

➢ Summary
ASPICE Rollout Plan

1. GAP Analysis
   - Identify Corporate Process
   - Merge Corporate Process and ASPICE Generic Process

2. Select pilot project

3. ASPICE training for pilot project team

4. Coaching of the pilot project team

5. Rewrite process where necessary, i.e., add and change roles, work products, activities

6. Adjust tools

7. Add templates, checklists, tools, guidelines, practices

Timeline:
- 1st month
- 2nd month
- 3rd month
- 4th month
- 5th month
- 6th month
- 7th month
- 8th month
- 9th month

Levels:
- **Level 2 Managed**
  - PA.2.1 Performance Management
  - PA.2.2 Work Product Management
- **Level 1 Performed**
  - PA.1.1 Process Performance
ASPICE Rollout Plan

**Level 3 Established**
- PA.3.1 Process Definition
- PA.3.2 Process Deployment

**Level 2 Managed**
- PA.2.1 Performance Management
- PA.2.2 Work Product Management

**Level 1 Performed**
- PA.1.1 Process Performance

The diagram outlines the ASPICE Rollout Plan up to Level 2, with phases including:

- **Coaching of the Pilot Project Team**
- **Rewrite process where necessary, i.e. add and change roles, work products, activities**
- **Adjust tools**
- **Add templates, checklists, tools, guidelines, practices**

PHASES:
- **10th month**
- **11th month**
- **12th month**
- **13th month**
- **14th month**
- **15th month**
- **16th month**
- **17th month**
- **18th month**

**Key Phases**:
- **C1-Sample Release Pilot Project**
- **B1-Sample Release Pilot Project**
- **ASPICE Re-Assessment up to Level 2**
- **SOP Pilot Project**
ASPICE Rollout Plan

- Select rollout project
- Tailor process for rollout project
- Coaching of the rollout project team

ASPICE Assessment up to Level 3

B1-Sample Release Pilot Project

Level 3 Established
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19th month 20th month ... 30th month
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- Summary
➢ There are 3 abstraction layers of processes.

➢ The ASPICE compliance can be best established on activities and work products of the workflows on SYS-, HW-, SW-Engineering (Business Unit Level).

➢ The introduction of ASPICE is best done by adjusting a generic ASPICE process to the needs of a pilot project (tools, guidelines, practices, templates, checklists, …)

➢ Besides the GAP-Analysis at the beginning, there should be 2 ASPICE Level 2 Assessments for the pilot project (after B1-Sample & after C1-Sample)

➢ The ASPICE Level 3 ready process is defined throughout the lifetime of the pilot project. The first level 3 Assessment will be conducted after B1-Sample of the first rollout project.
Thank you for your attention
## ASPICE Summary Level 1 - 3

### Level 3

**PA.3.2 Process Deployment**
- use the tailored standard process
- assign roles
- check competencies
- provide plenty human resources
- provide tools & infrastructure
- conduct feedback & measures

**PA.3.1 Process Definition**
- standard process & tailoring guidelines
- process interfaces
- role definition including skills & responsibilities
- tools & infrastructure
- process measures or feedback sessions

### Level 2

**PA.2.2 Work Product Management**
- templates &checklists
- configuration management plan
- reviews
- configuration management

**PA.2.1 Performance Management**
- identify objectives
- plan & monitor
- adjust
- define responsibilities
- make available human and infrastructure resources
- manage the interfaces between involved parties

### Level 1

**PA.1.1 Process Performance**
- all base practices have to be fulfilled, i.e.
  - have plans based on strategies,
  - summarize and communicate results
  - establish bidirectional traceability
  - ensure consistency
Mindset to remember and reuse whatever was good

Mindset to improve the project results

Craftsmanship in Software Engineering