Streamline adherence to Standards

Can a Process become a Product?

Peter Schedl
peter.schedl@de.ibm.com

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Agenda

- The Need
- Yesterday - Starting Point
- Process as Product
- Todays Offering
- Tomorrow

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Manufacturers are struggling to manage complexity amid increasing regulation

Automotive

Lines of code in new Ford F-150 Truck 10 speed transmission = 1 million, in 2003 this was 155 K

QA and testing spend is predicted to increase to 40% of total IT budget by 2019

Aerospace and defense

5 generation F-35 functionality is 90% Software driven compared to F-16 which has 40% functionality driven by Software

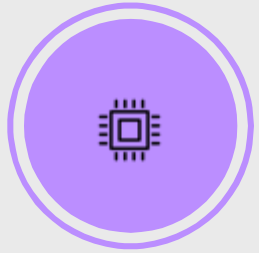
F-35 testing cost overrun $ 1 Billion caused by late identification of Software errors in prior versions of the software

A quarter of the cost of a 787 is due to Software (approx. $ 60 Million)

Medical devices

The da Vinci S surgical robotic system:

- 1.4 million lines of code
- Computing power of 7 laptops
- 10,000 individual parts



Electronics and others

New regulations are perceived to come up every other year

...while the minimum viable product concept works in app development, this is a non-starter for many of your products

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Compliance challenges

- ❑ Proof that all necessary work products exist
- ❑ Proof that created work products satisfy base practices
- ❑ Show documented process
- ❑ Show that documented process is followed
- ❑ Demonstrate traceability across process groups
- ❑ Show mature configuration and version management

✓ **Can you tick all the boxes?**

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Example: Some Automotive Development Standards

ASPICE

ⓘ *Process Maturity Model derived from ISO 15504 (SPICE)*

☛ Maturity in development processes to achieve high work product quality (Usually, Systems and Software Processes require Level 2-3)

ISO-26262

ⓘ *Automotive functional safety standard based on IEC 61508*

☛ Safety concept based on Hazardous Analysis, Safety Goals to prohibit danger that originate from system operation

SOTIF

ⓘ *SOTIF term refers to ISO/PAS 21448 norm*

☛ Safety in the absence of fault (Functionality that relies on situational awareness - autonomous systems)

Cybersecurity

ⓘ *SAE J3061 and ISO/SAE 21434 to satisfy UNECE and EU Regulations*

☛ Security measures to prohibit hacking vulnerabilities

IATF-16949:2016

ⓘ *Quality Management standard is based on EN ISO 9001*

☛ OEMs who are members of the IATF (International Automotive Task Force) require their suppliers to be certified according to IATF 16949

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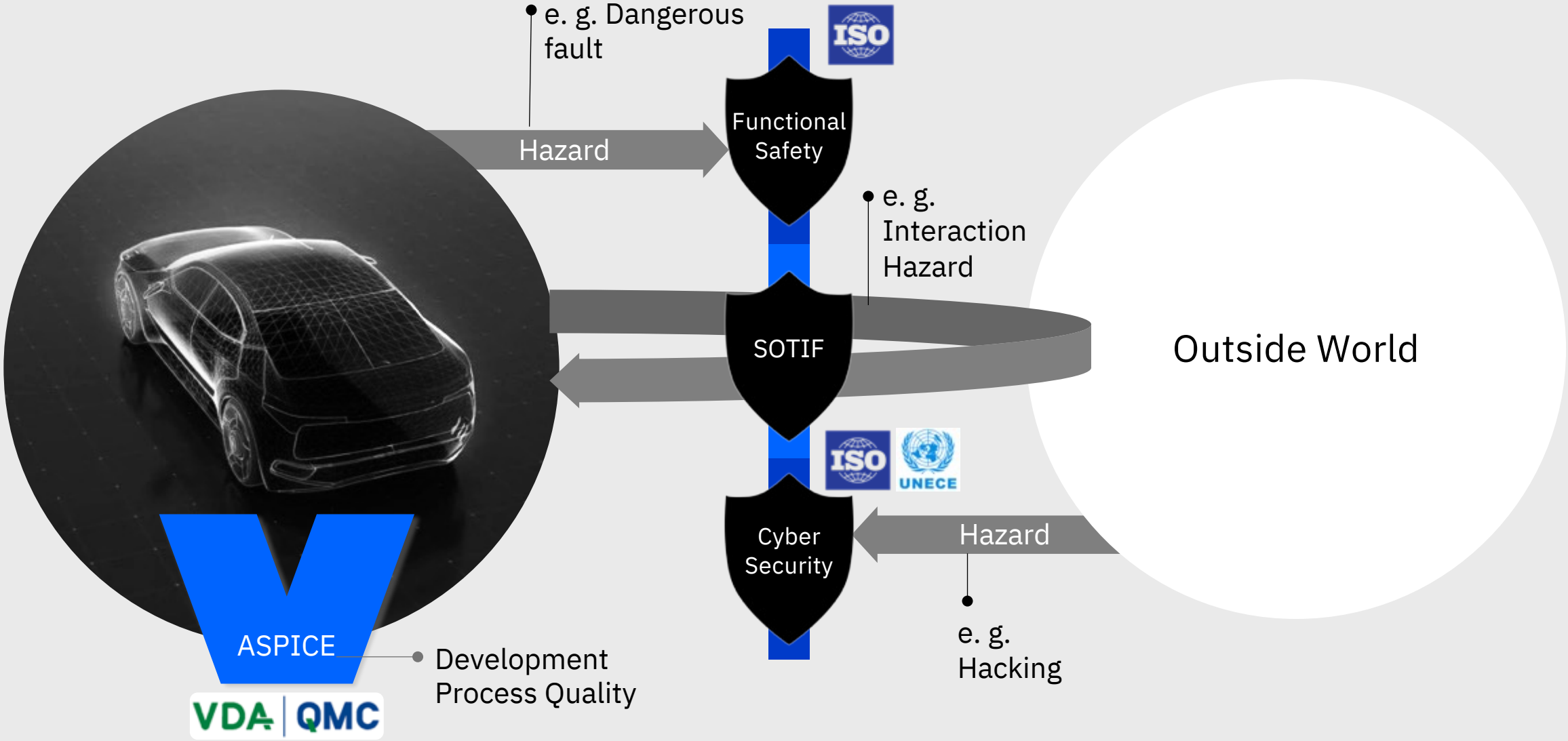
Standards work complementary towards a joint goal: “Absence of unreasonable risks“



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Starting Point

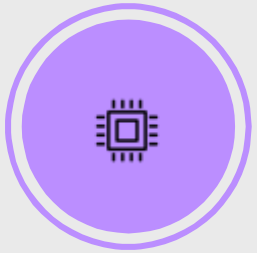
- Compliance per Domain & per Standard
- IBM Best Practice Library

1.0 Overview

An IBM® Solution consists of a specific set of IBM tools and associated process that provides a complete lifecycle management solution for a particular domain.

Solution assets are available for:

- IBM Solutions for IT
  - Disciplined Agile Delivery (DAD)
  - IBM Solution for Engineering Lifecycle Management (ELM)
  - IBM Solution for Agile ALM with Scrum
  - IBM Solution for SAFe(r)
- IBM Solutions for Systems Engineering:
  - IBM Solution for Systems and Software Engineering
  - IBM Solution for Aerospace and Defense - DO-178B/C
  - IBM Solution for Medical Devices
  - IBM Solution for Aerospace and Defense - DoDAF
  - IBM Solution for Electronic Design
  - IBM Solution for Rail Engineering - CENELEC EN 50128 (beta)
  - IBM Solution for Strategic Reuse



- Need for an integrated industry solution
  - Process covering all relevant standards for an industry
  - Include support for agile development
  - Maintained (periodic updates)
  - Sources included for customization

Process as a Product

- Automotive as first industry

- Define content coordinated with user community
  - Real life process with mapping to standards
  - Templates for different domains
  - Reports to track and show compliance

- Bundle complete set as supported product: Automotive Compliance Pack

- Review by external experts

- 2019 released AC V1.0 ASPICE
- 2020 included AC V1.0.2 ISO-26262
- 2021 added AC V1.0.3 UNECE R.155, ISO/SAE-21434

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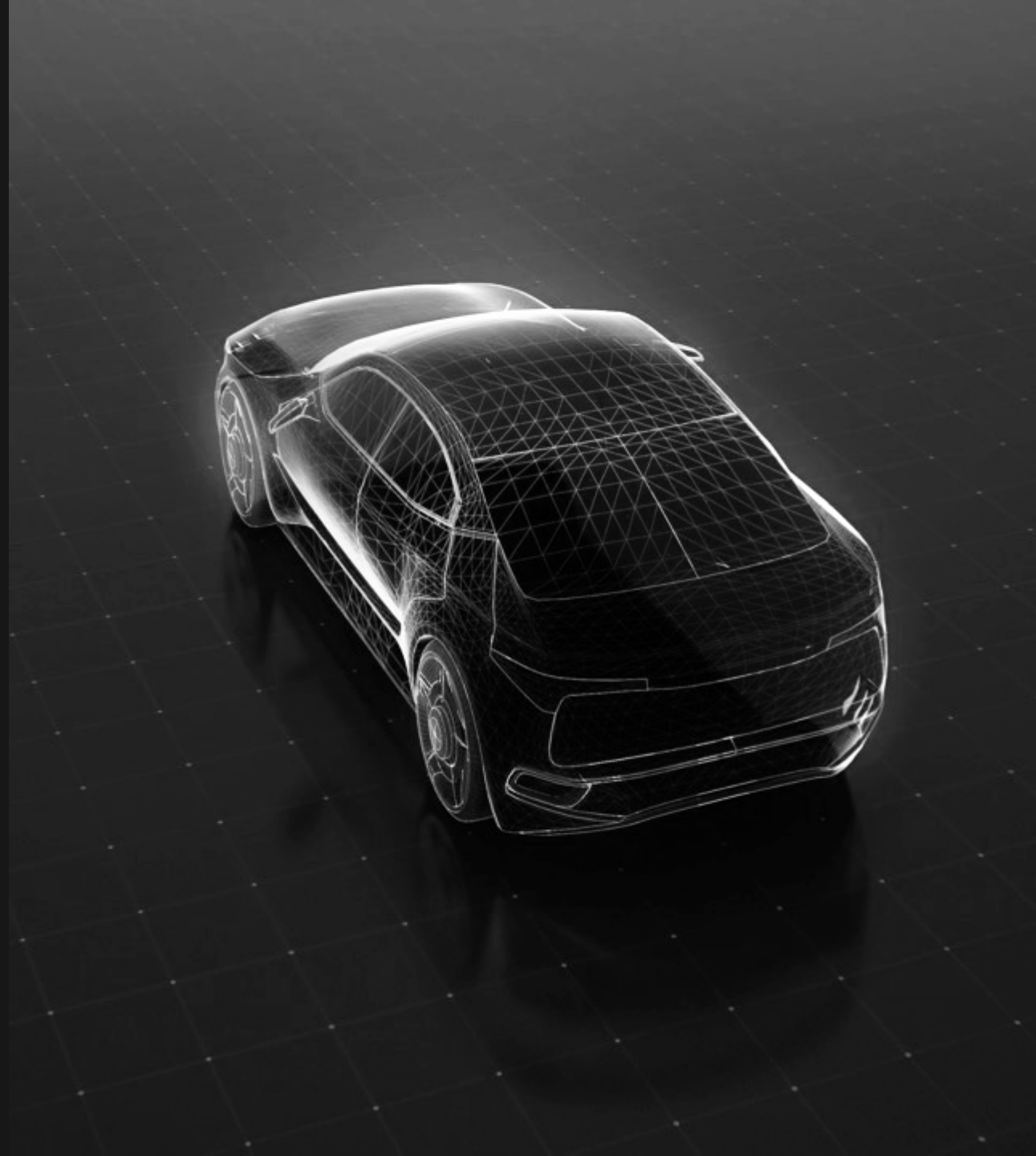
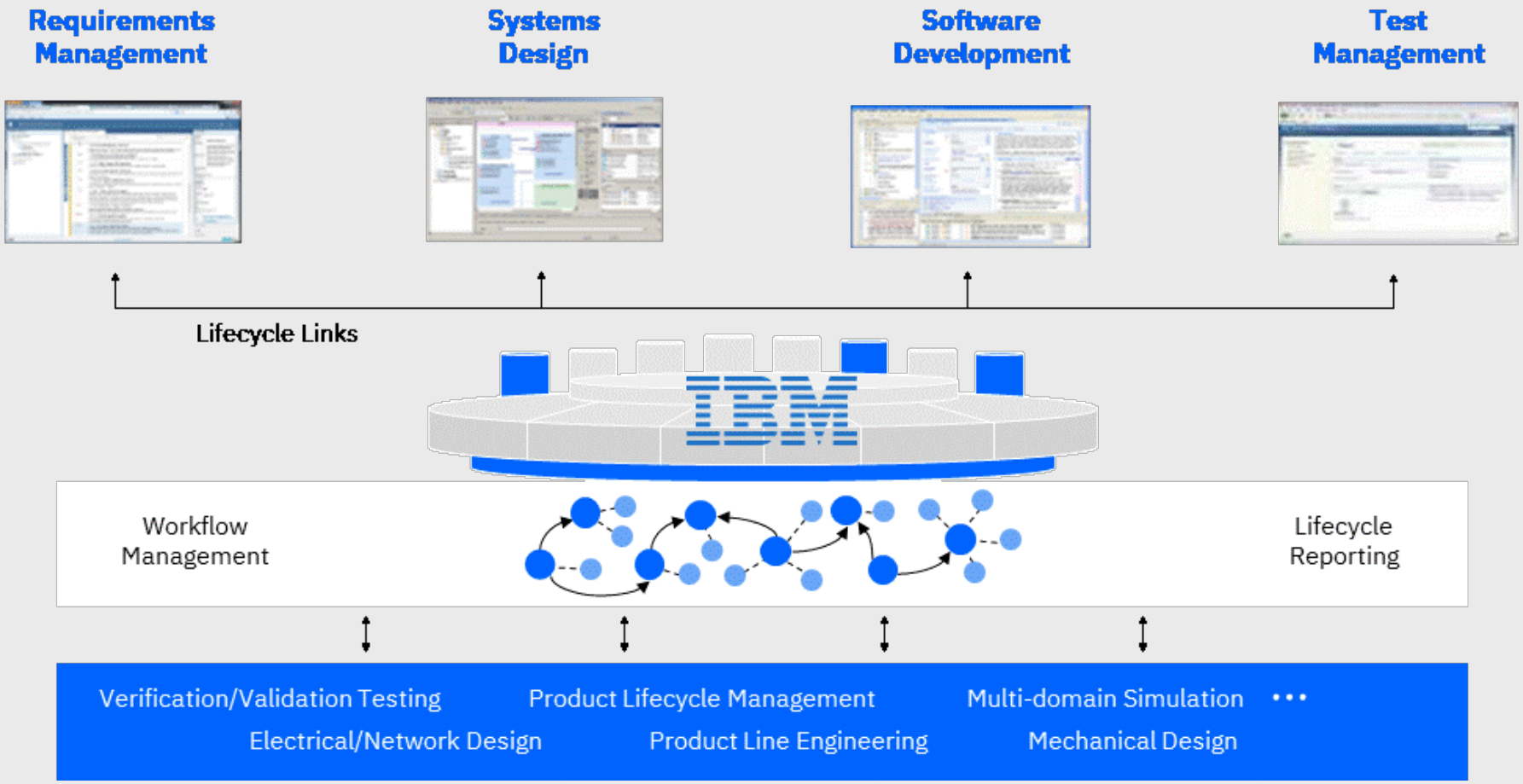
Today

IBM Engineering Automotive Compliance



IBM Engineering Lifecycle Management – a holistic solution



IBM ELM Platform - An integrated, end-to-end development environment

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IBM ELM Automotive Compliance

Services (Expert Labs, Consulting, external Partners)

Provision | Enable | Tailor

Industry Offering

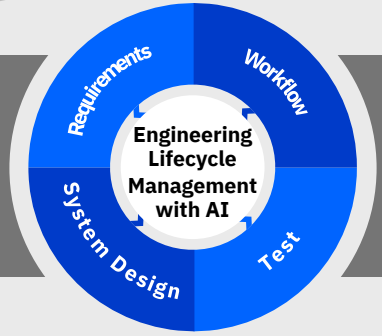
IBM ELM Automotive Compliance

Templates, Reports & Process for ELM

MEC

Simplify Roll-out | Minimize customizing | Accelerate adoption

IBM ELM Platform



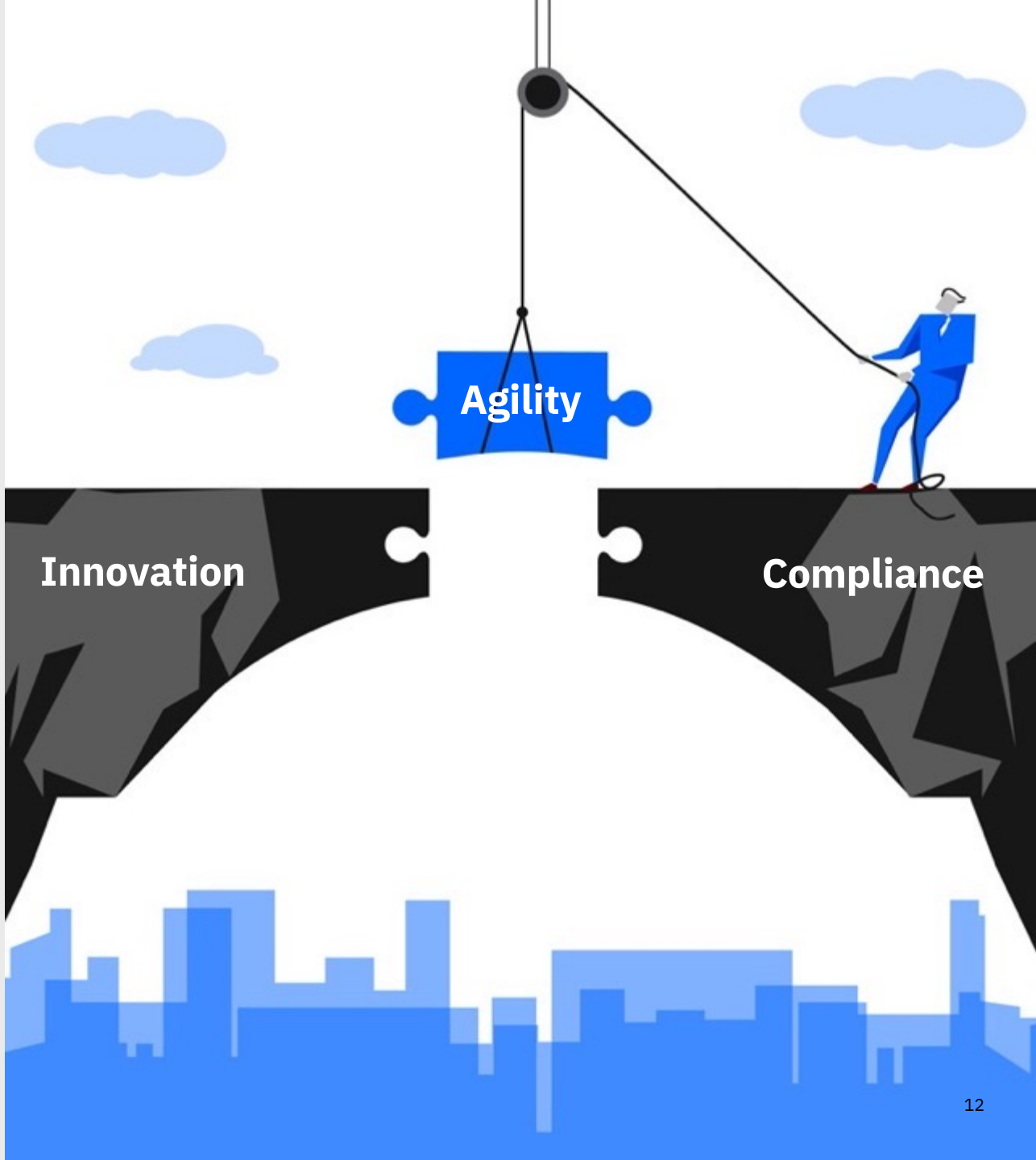
Goals

Primary Themes

- Compliance shall be a by-product, not additional effort
- Simplify audit of automotive process standard ASPICE, ISO 26262 and ISO 21434

Secondary Themes

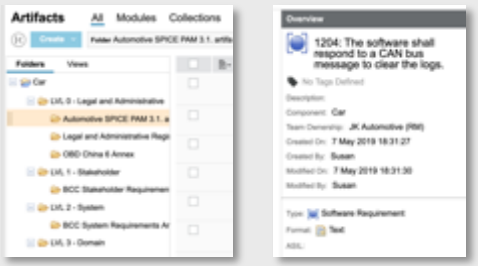
- Support product innovation
- Acknowledge need to reduce time to market
- Manage complexity of product and product development
- Ensure Quality for high complexity
- Break down tool and process barriers



IBM ELM Automotive Compliance

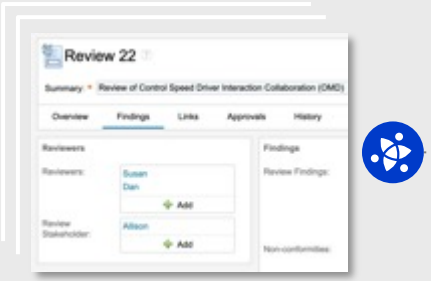
ELM tailored for the Automotive Industry

1 DOORS Next Template

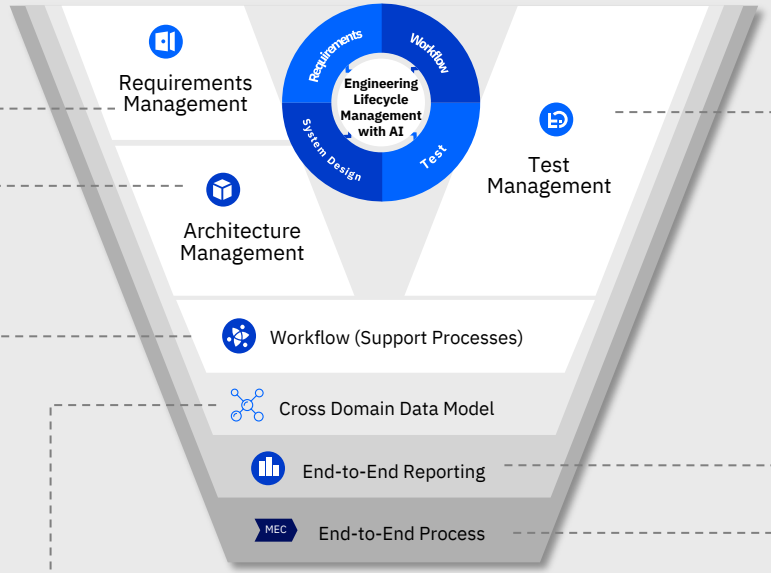


2 Rhapsody Profile

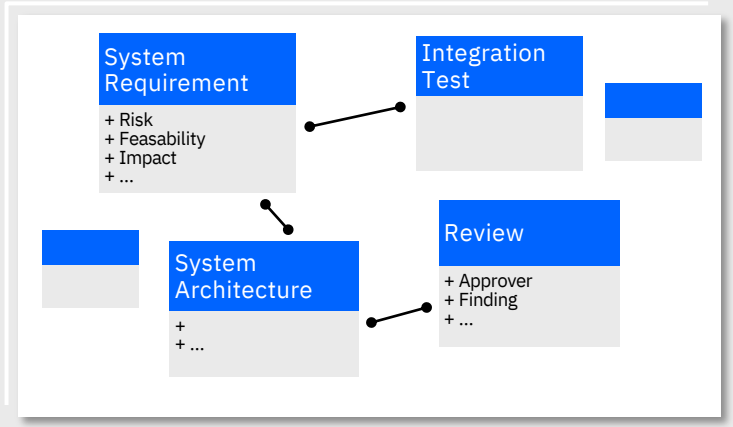
3 EWM Work Item Types



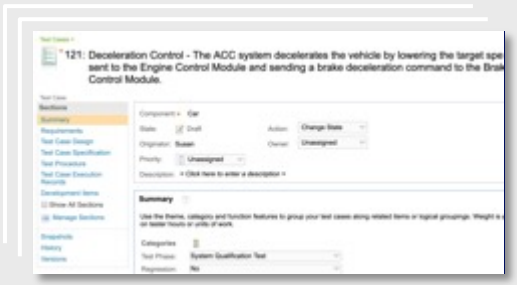
End-to-end Automotive Solution



...built on one cross domain Data & Link Model



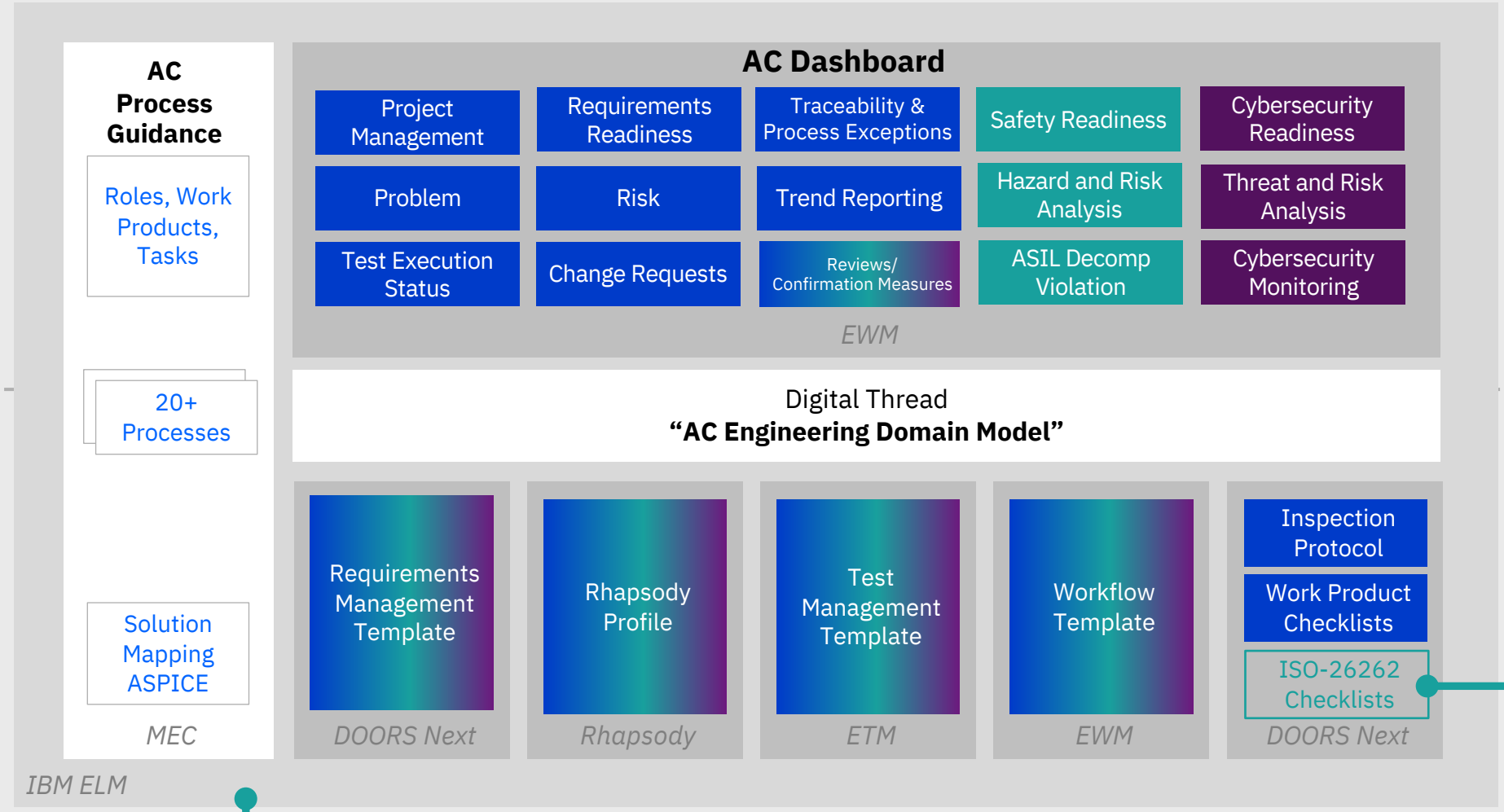
4 ETM Assets



5 Reports (JRS, PUB, ENI)

6 Process & User Guidance

IBM Automotive Compliance - ready for automotive regulations



Designed for ASPICE | Designed for ISO-26262 | Designed for ISO/SAE 21434

AC = Automotive Compliance
DOORS Next = Engineering Requirements Management DOORS Next
EWM = Engineering Worfklow Management
ETM - Engineering Test Management
Rhapsody = Engineering Systems Design Rhapsody
MEC = Method Composer

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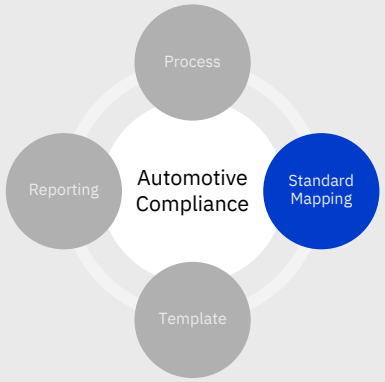
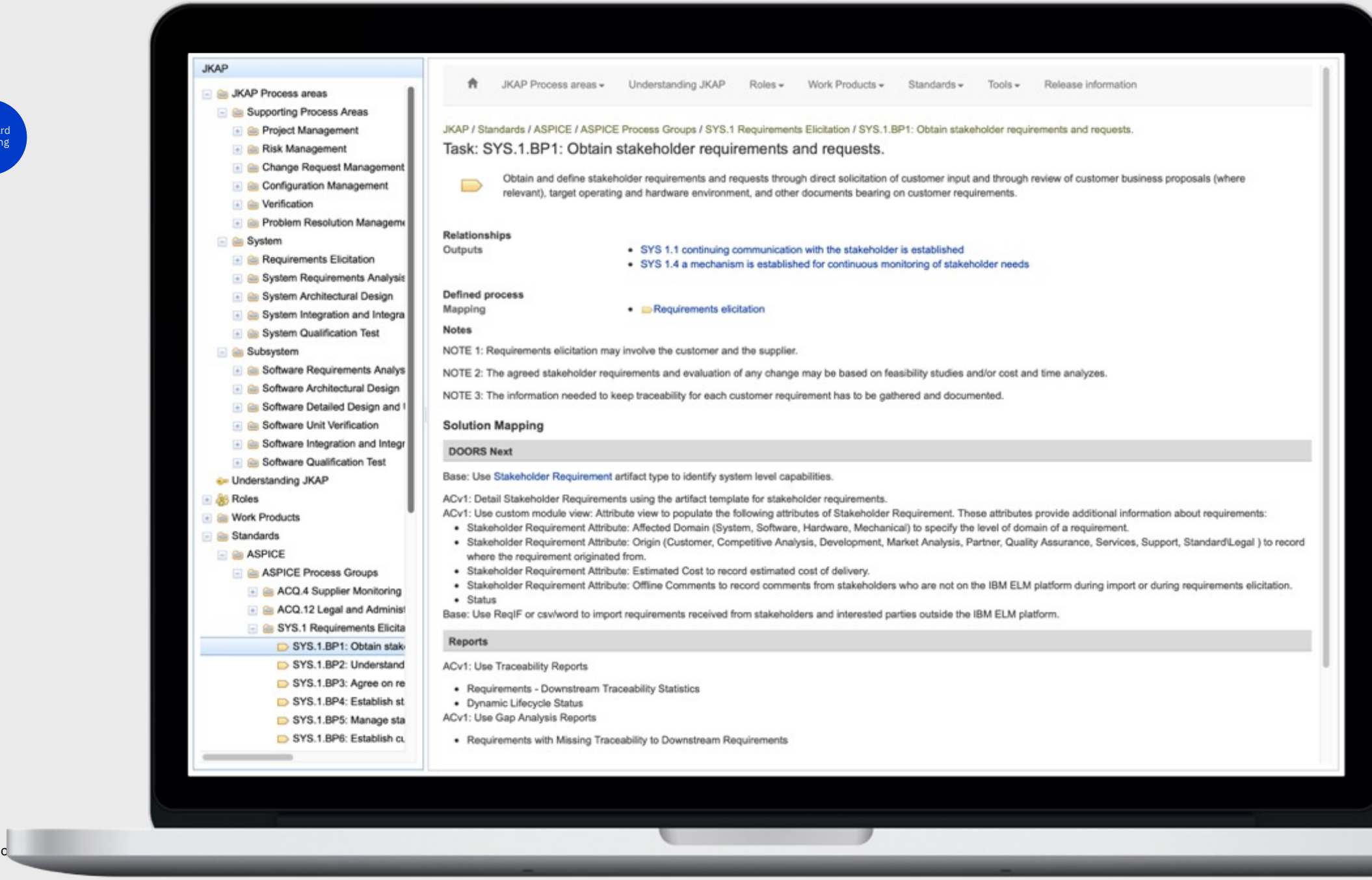


Method Composer

Standard Mapping

Detailed Mapping how Standards are satisfied



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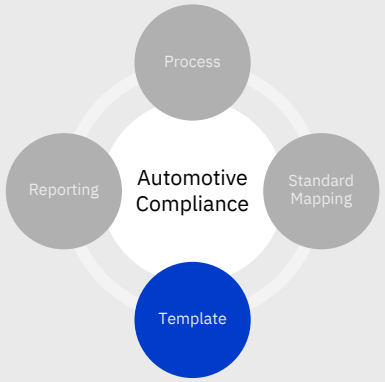
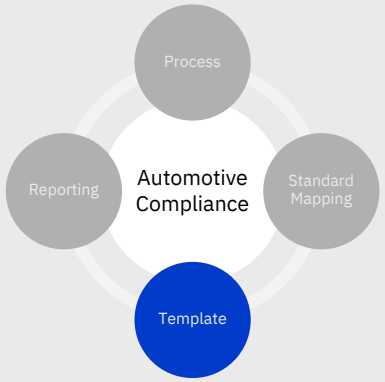


DOORS Next

Template

Pre-configured types to capture all information required for Risk Assessment (HARA & TARA)



DOORS Next

Template

Pre-configured views to manage traceability between artefacts.

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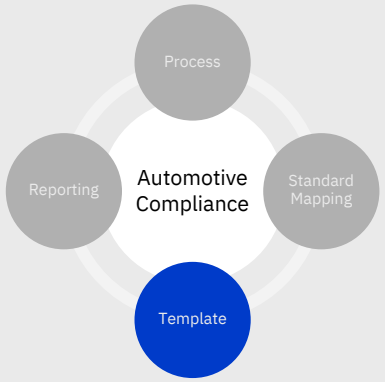

Workflow Management

Template

Pre-defined work items to handle project and risk management

Jazz Reporting

Reporting

Compliance reports to detect process and engineering data violations

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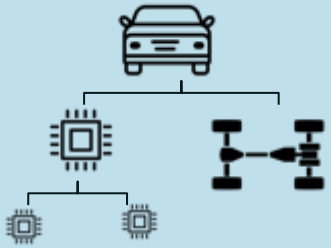
IBM helps automotive companies focus on key goals

Business Goals	IBM Approach
Improve vehicle quality	Explicitly support process and safety standards including the ASPICE framework
Increase reuse 	Enable reuse for EE & software through a single architecture / platform across all vehicles
Improve on-time delivery	Support agile development in systems, software and electrical engineering

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Tomorrow

- What would you be interested in for AC V2.0?
- What other Industry should be covered next?

Let’s discuss the future on our Booth

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Thank You

Peter Schedl
peter.schedl@de.ibm.com

Further information:

[IBM Engineering Lifecycle Management Automotive Compliance]
[IBM Engineering Management Overview]

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