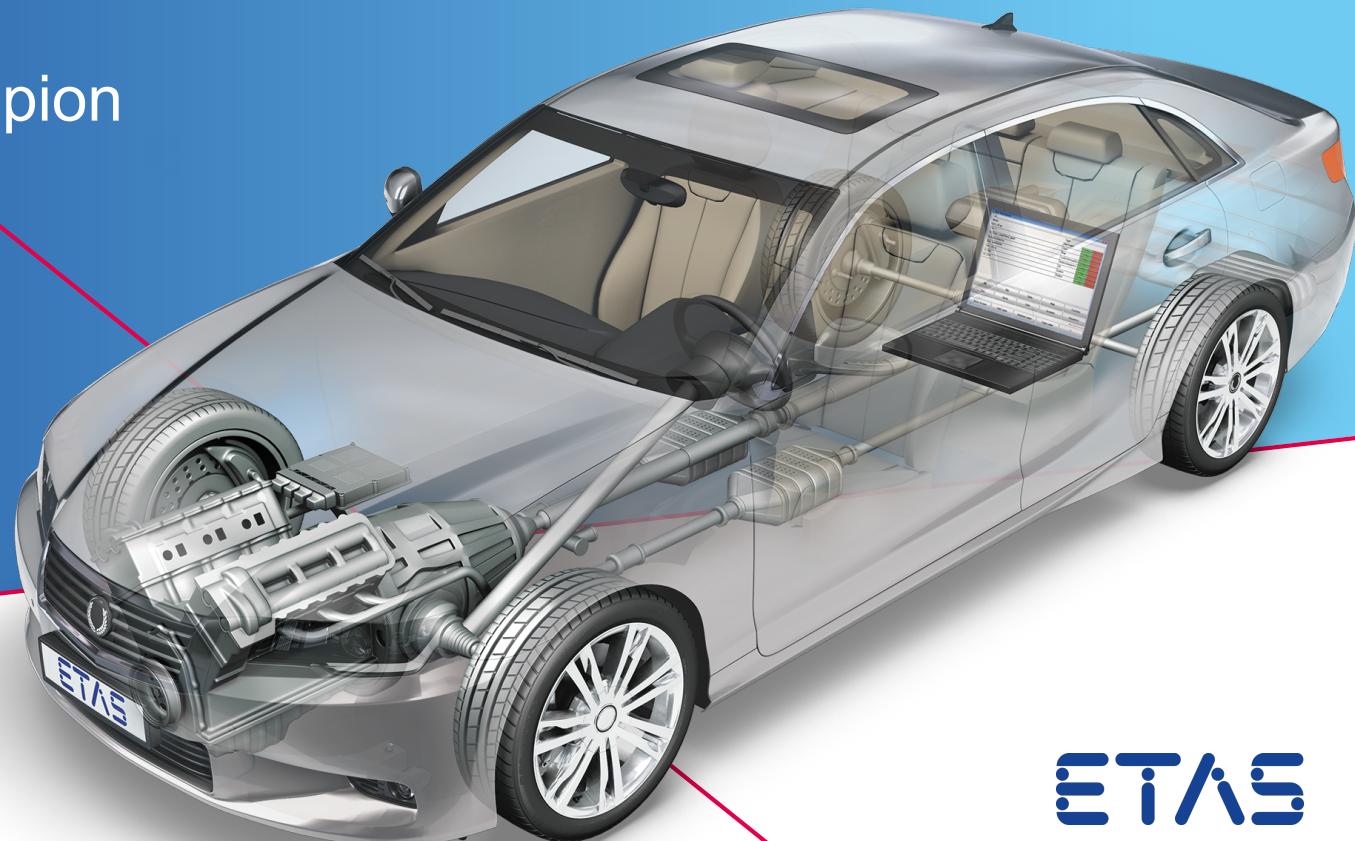


Shifting the paradigm from Quality Gates to continuous quality assessment in Automotive

Rainer Dammers

DevOps Transformation Champion

ETAS GmbH



ETAS

Who is ETAS

Introduction

Founded in 1994, ETAS GmbH is a wholly owned subsidiary of Robert Bosch GmbH, represented in twelve countries in Europe, North and South America, and Asia.

ETAS' portfolio includes **vehicle basic software**, **middleware**, and **development tools** for the realization of **software-defined vehicles**. Our product solutions and services enable vehicle manufacturers and suppliers to develop and operate them with increased efficiency.

Holistic **cybersecurity** solutions in the automotive sector are offered via the ESCRYPt brand.



Welcome to ETAS

Key data



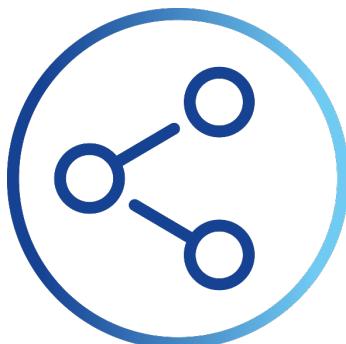
Foundation as subsidiary
of Robert Bosch GmbH

1994



Global presence

**31 locations in
12 countries**



Associated brand

ESCRYPT



Associates

1,500



Sales 2021

**321,5 million
euros**

What ETAS stands for

Our North Star

Empowering Tomorrow's Automotive Software

We provide the solid foundation for automotive players to build their software business in every automotive domain

Our customers focus on function and application development, and we enable them by reducing the complexity of the entire software lifecycle

Together – as partners – we are actively shaping tomorrow's automotive software



Where does ETAS provide value

Customers and domains

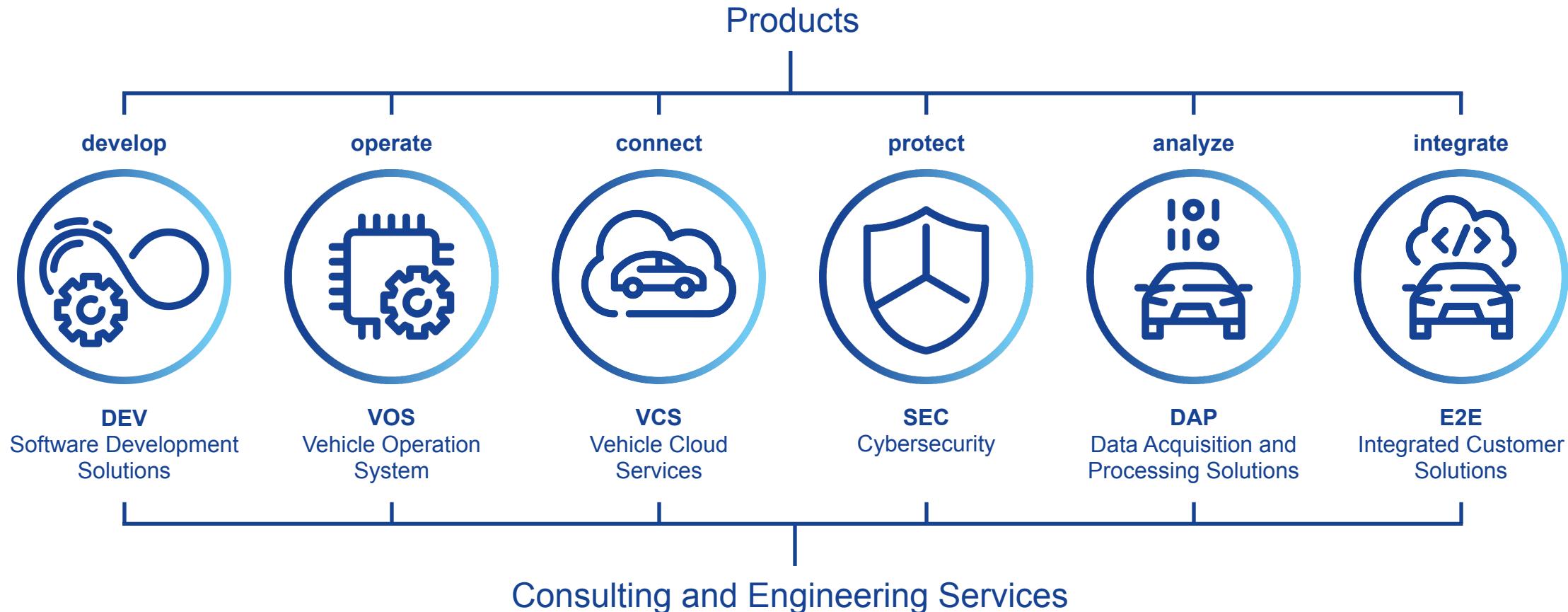
Trusted by OEMs, Tier1s, Tier2s,
the semi-conductor industry,
ECU suppliers as well as
engineering service providers:

- Automotive
- Heavy-duty engines
- Railway
- Construction machinery
- Consumer electronics
- Off-highway
- Manufacturing industry

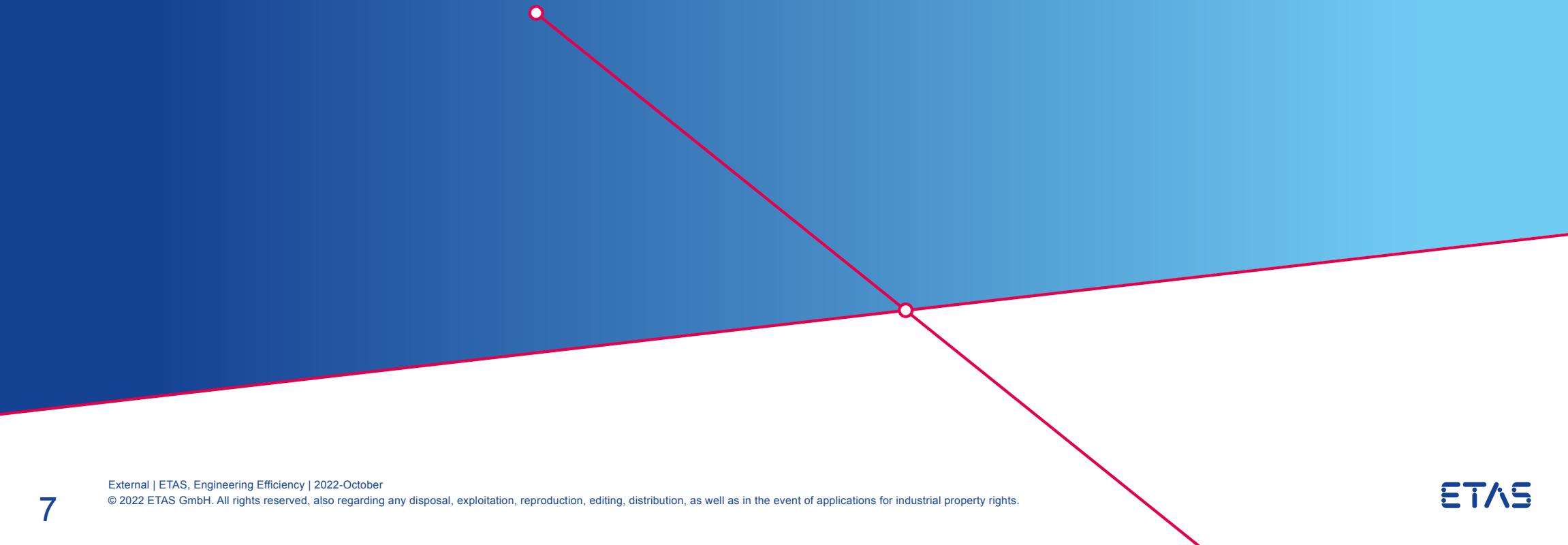


ETAS Portfolio

We are engaged in these six solution fields which enable the software-defined vehicle (SDV)



How did we start to disrupt the current comfort zone



The automotive industry perfected a highly efficient approach...

... producing identical 'physical items' in very high volume & quality

- The industry evolved manufacturing from a fully manual process to an assembly line implementing rigid flow patterns and avoiding risk:
 - High degree of compartmentalization
 - Highly detailed work specifications
 - Strict separation of engineering and manufacturing
 - Multi-supplier strategy providing parts against identical specs
 - Strict Validation & Verification process of final delivery & release decision



manual



partly automated



assembly lines

Excerpt Quality Directive: “*Preceding a release an interdisciplinary team assesses whether the release criteria are met based on attached list of quality criteria...*”

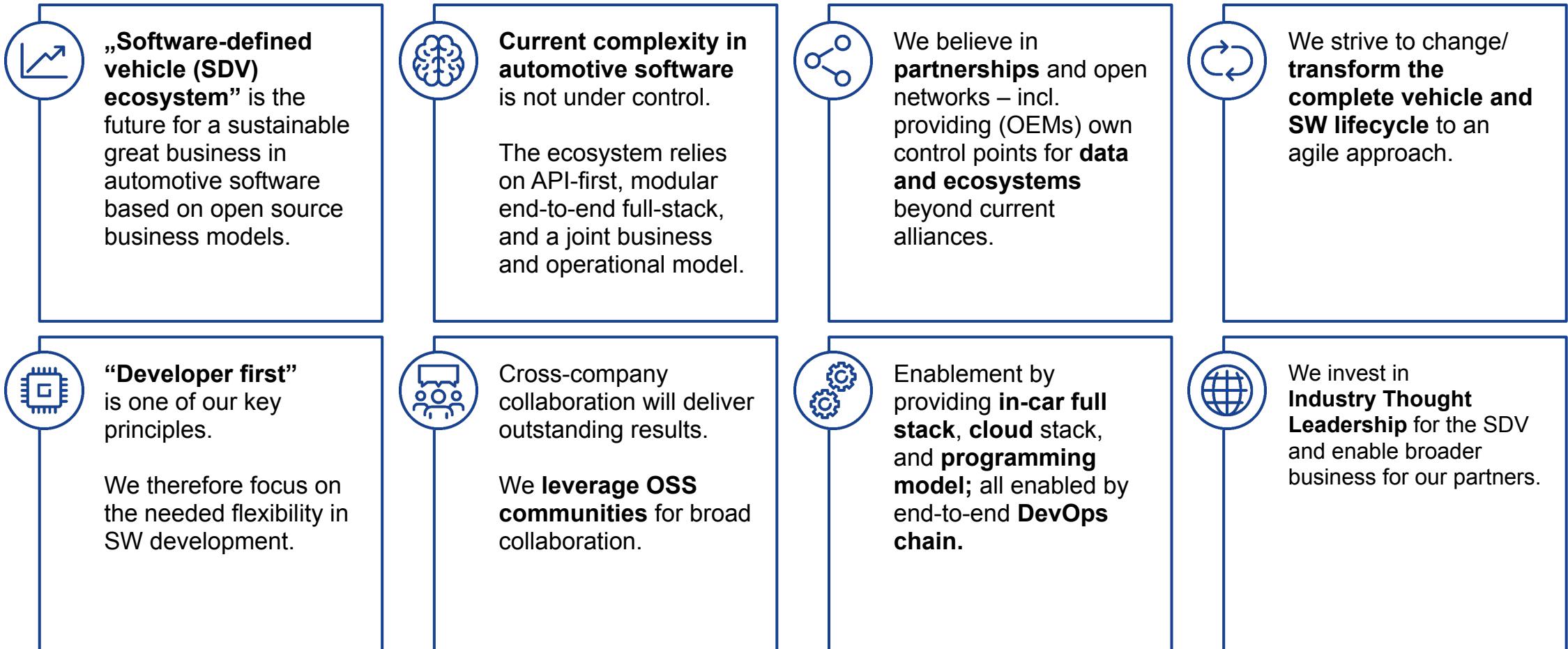
When asked in 2018 how to scale this approach to multiple releases per day per product the Q Manager went pale calculating the staff needed to scale the manual release assessment meetings



Source <https://apifriends.com/digital-strategy/devops-pipeline/>
<https://www.lean.org/WhatsLean/Principles.cfm>

A fundamental paradigm shift is occurring in Automotive

Our shared beliefs to empower the software-defined vehicle



Jointly with our parent company Bosch we developed a Policy

Develop on Cadence - Release on Demand



We establish a **sense of ownership.**

We deliver **small changes** with **fast feedback.**

We integrate **continuous verification** and **validation.**

We promote **transparency** and **visibility.**

We treat **everything as code** under **version control.**

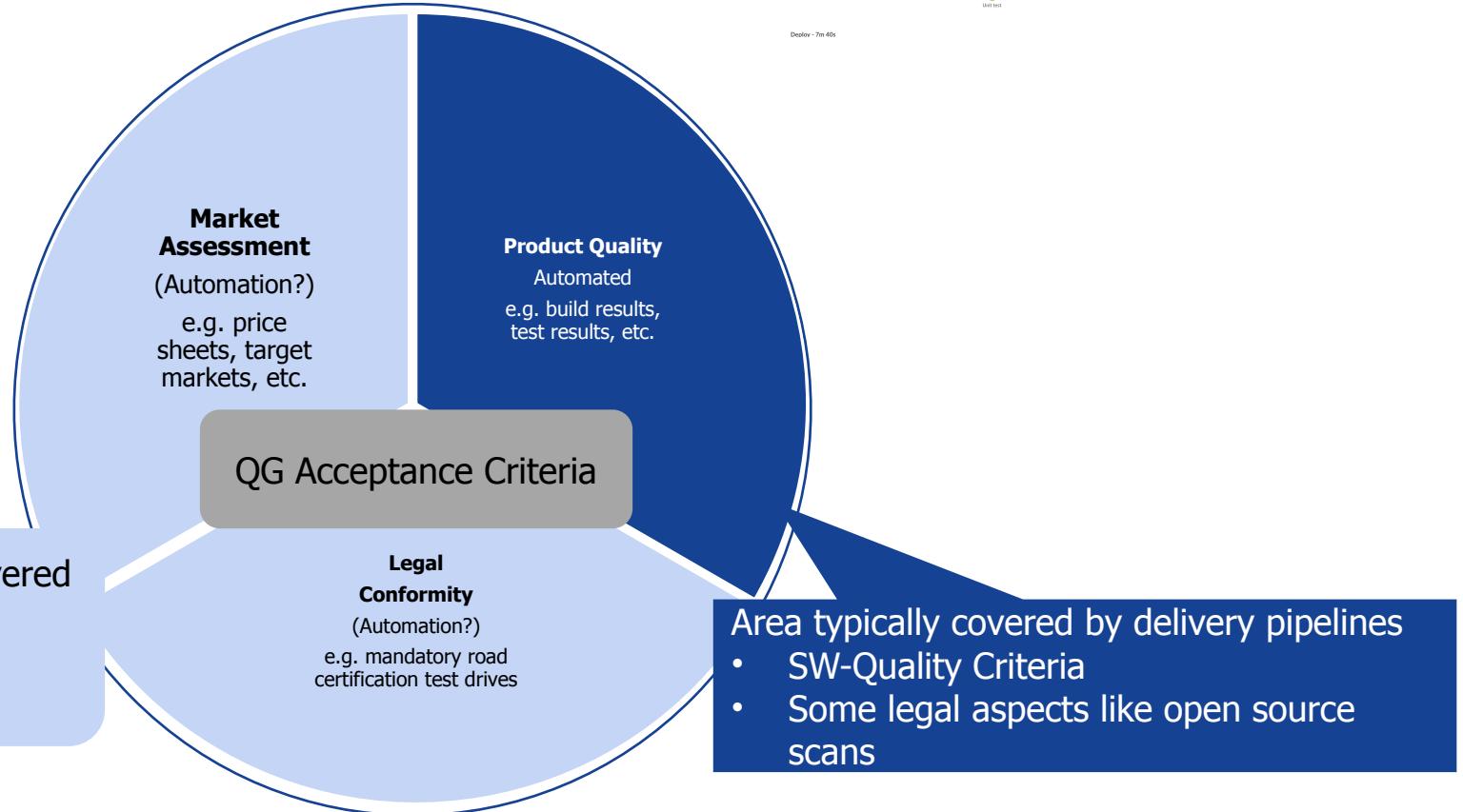
We **optimize** and **automate** everything.

We always maintain a **release-ready state.**

Scope of Analysis

Mapping of existing release criteria to content of Delivery Pipelines

Conclusion:
The key is not invalid or too many criteria, but how to automate collecting the answers.



Why automation of release criteria collection?

Quality Gate (QG) Automation



Problem for customers

- Software cannot be released frequently
- CI/CD is interrupted by manual preparation of Quality Gates (QG)



Problem for Tier 1 / Supplier

- High cost of SW related quality issues found late
- Huge savings potential in removing recurring manual tasks



Problem for Engineering teams and internal stakeholders

- Risk Management information available too late
- Manual QG preparation largely redundant to DoD elements



Benefit for customers

- Frequent delivery
- Early & frequent integration



Benefit for Tier 1 / Supplier

- QM approved framework (PMT)
- Leverages automation potential
- Automated, standardized reporting

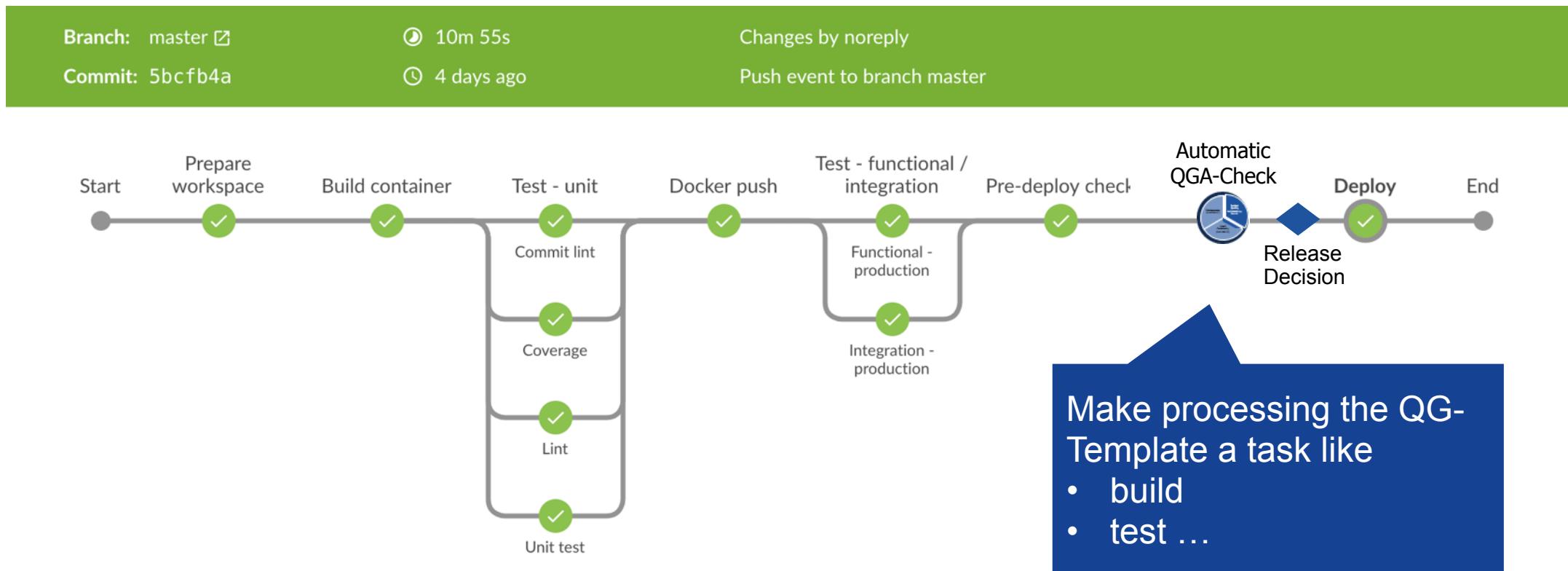


Benefit for Engineering teams & stakeholders

- Fully automated QG preparation
- Continuous visualization of status
- Frequent release of SW

Target State: Continuous Conformance

embed Quality Gate assessment (QGA) acceptance criteria into the Continuous Delivery pipelines



Deploy - 7m 40s

Quality Gate Assessments are...

... somehow Tests

Nature of classic QG Assessment:

QG Requirement -> Check Status -> Assess & document against Acceptance Criteria

A software test worked and works very similar....

Like in former times:

- *We do tests at the end of a development cycle*
- *Tests tracked in Excel*
- *A lot of Red points are detected way to late*
- *Unsatisfied customers*

We all know that this **is not State of the Art!**

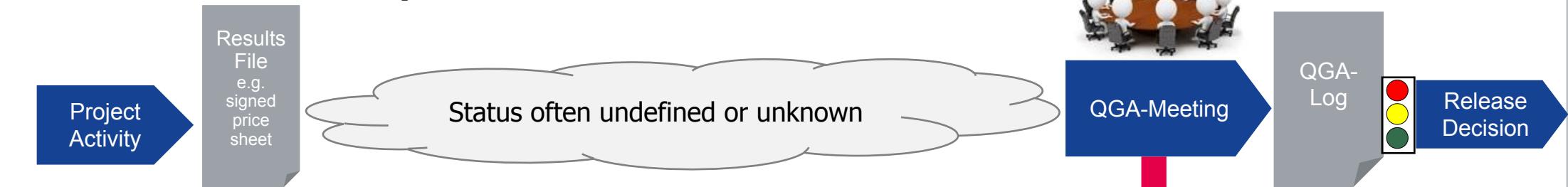
- If Quality Gate Criteria are realized as tests we can
 - utilize test management tools already in use to manage QGs
 - integrate the tooling into development to drive Continuous Improvement, and enable Continuous Delivery including Continuous Conformance
 - keep track of open measures directly linked as ticket
 - automate QG assessments and results
 - reporting of QGAs continuously

Continuous Conformance...

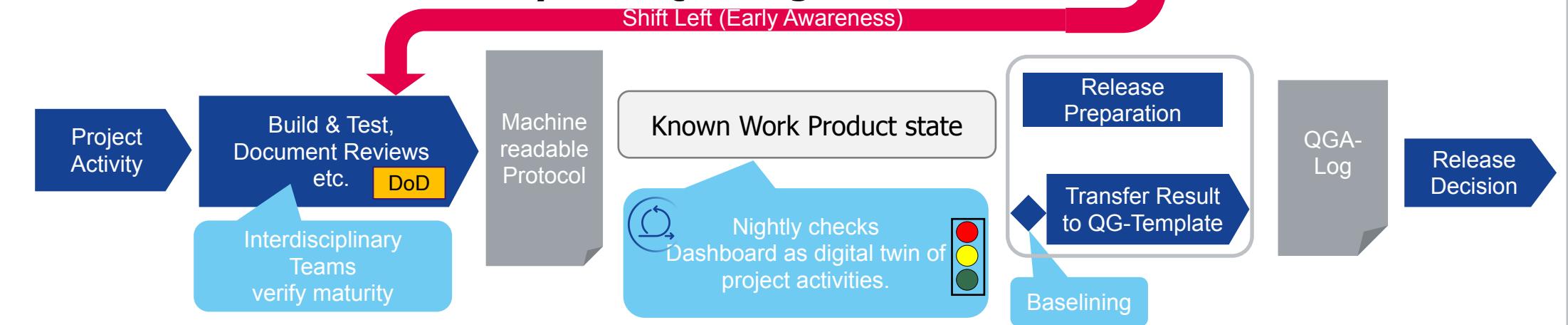
... to replace QG-Assessment (QGA) meetings

Interdisciplinary
QG-Team:
Verifies all
work products

Current Release Concept



Release based on automatically filled QGA-Log



Quality Gate Criteria as tests in Test Management Systems

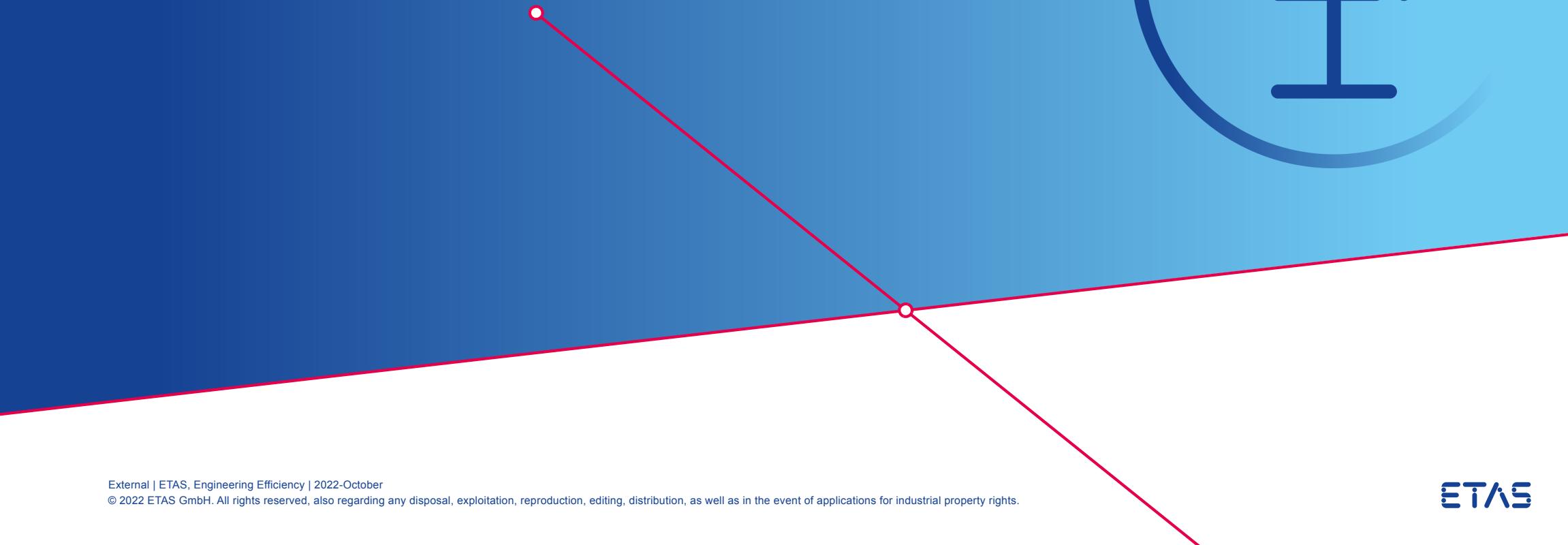
- QG Assessments are implemented as Test Plans
 - a Test Plan contains test executions
 - The Q Org reviews, spot checks and approves Test Plans
- Test executions are
 - QG criteria checks executed automated or manual
 - Each team owns and maintains their executions
- Test plans templates (QGA Questionnaire) can be maintained in a Repository
- Automation is possible in various ways
 - Check for existence, currency, and authorized digital signature on PDF documents
 - Check ticket states by authorized experts (e.g. business risk reviews done)
 - etc.

Key	Summary	#Tests	Issue Assignee	Status
QGM-97	Paccar Solution Check QG4	16		<div style="width: 100%;"><div style="width: 100%;">GREEN</div></div>
QGM-93	Team Symba QG4	26		<div style="width: 100%;"><div style="width: 100%;">GREEN</div></div>
QGM-91	Team Quasar QG4	26		<div style="width: 100%;"><div style="width: 100%;">GREEN</div></div>
QGM-89	Team Mercur QG4	26		<div style="width: 100%;"><div style="width: 100%;">GREEN</div></div>
QGM-88	Team be.ts QG4	26		<div style="width: 100%;"><div style="width: 100%;">GREEN</div></div>
QGM-87	Team BE1 QG4	26		<div style="width: 100%;"><div style="width: 100%;">GREEN</div></div>
QGM-66	MC Platform QG4	27		<div style="width: 100%;"><div style="width: 100%;">GREEN</div></div>

Showing 1 to 7 of 7 entries

Key	Summary	Requirements	#Test Executions	Issue Assignee	Latest Status	...
QGM-5	1.4 The quality targets are achievable (also for subprojects/subcontractors and components).	6	Unassigned	<div style="width: 100%;"><div style="width: 100%;">GREEN</div></div>		...
Key	Summary	Environment	Status			
QGM-88	Team be.ts QG4	be.ts	<div style="width: 100%;"><div style="width: 100%;">GREEN</div></div>	▶	...	
QGM-93	Team Symba QG4	Symba	<div style="width: 100%;"><div style="width: 100%;">GREEN</div></div>	▶	...	
QGM-91	Team Quasar QG4	Connectivity	<div style="width: 100%;"><div style="width: 100%;">GREEN</div></div>	▶	...	
QGM-89	Team Mercur QG4	Mercur	<div style="width: 100%;"><div style="width: 100%;">GREEN</div></div>	▶	...	
QGM-87	Team BE1 QG4	BE1	<div style="width: 100%;"><div style="width: 100%;">GREEN</div></div>	▶	...	
QGM-97	Paccar Solution Check QG4	None	<div style="width: 100%;"><div style="width: 100%;">GREEN</div></div>	▶	...	

What is still ahead of us... ... where we are looking for success patterns



Primarily we are facing a change in industry culture



... some reaction were unexpected

- Anxiety over changing work responsibility and tasks
 - Quality professionals need to change from acting like ‘bouncers’ to becoming consultants
 - Autonomy & Trust needs to be established with the value align team after decades of command & control culture
 - The Quality organization needs to assess the software delivery pipeline instead of attempting to assess the end product
- Desire for stable organization and job definition trumps rationally realization of need to change
- > Good practices to accelerate culture change?!





Thank you

rainer.dammers@etas.com