Release approval automation & regulatory compliance: mission impossible?

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Release approval automation & regulatory compliance: mission impossible?
Agenda

- Bosch Engineering GmbH short presentation
- The challenge of release evaluation of candidates
- Release and release evaluation basics
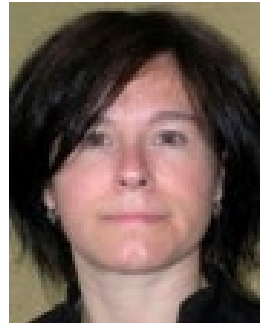- An approach towards automation of evaluation
- Conclusion

Speaker: **Livia Franzitta**

ASPICE Competent Assessor

SAFe Program Consultant (SPC)

ISO Auditor (ISO 27001, ISO 20000)

Process consultant

Speaker: **Valeria Franzitta**

ASPICE Competent Assessor

ISO Auditor (ISO 9001)

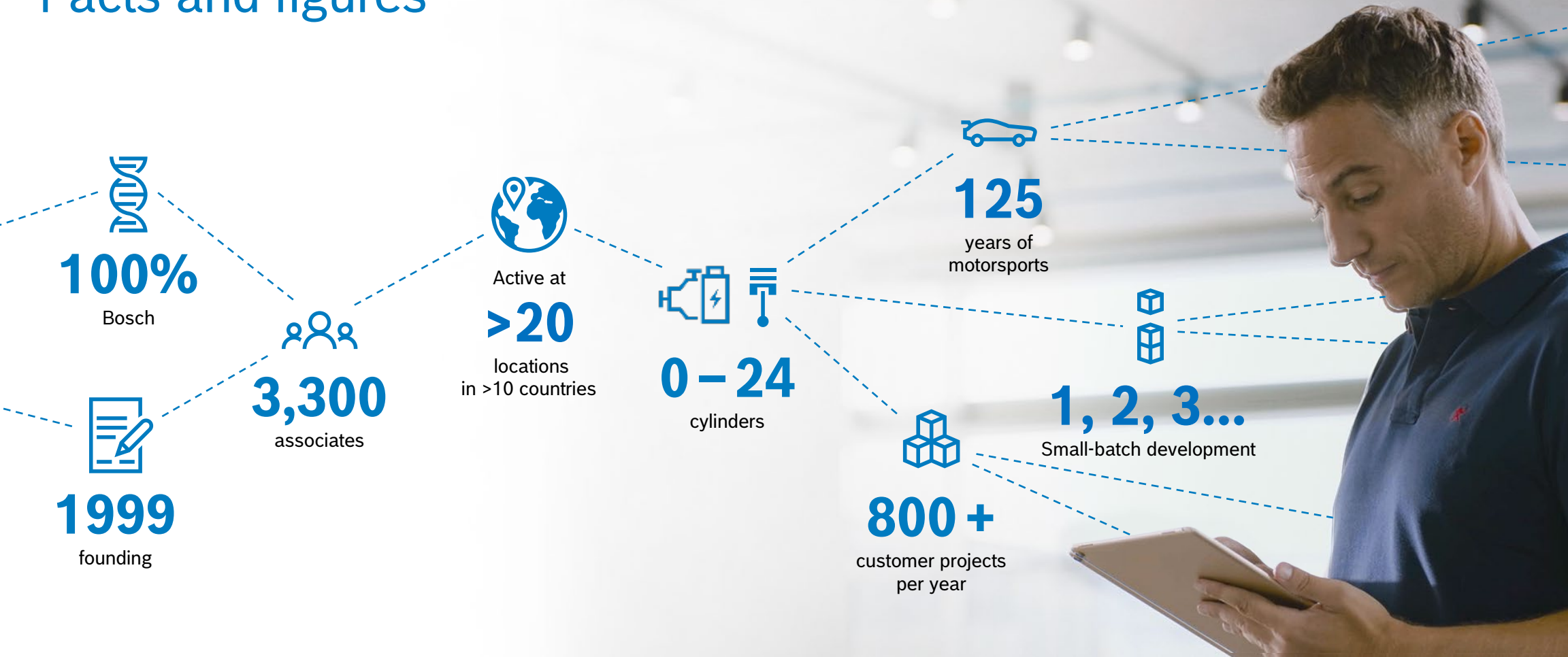Process consultant (automation, Digitalization, AI)

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Bosch Engineering
We engineer the mobility of tomorrow

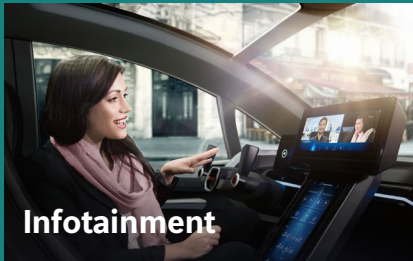**End-to-end solutions ranging from embedded systems to cloud services.**

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Bosch Engineering
Facts and figures

100%
Bosch

1999
founding

3,300
associates

Active at
>20
locations
in >10 countries

0 – 24
cylinders

125
years of
motorsports

800 +
customer projects
per year

1, 2, 3...
Small-batch development

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Bosch Engineering
Customized mobility solutions

Mobility system solutions

ADAS

Motion

Energy

Body and Comfort

Infotainment
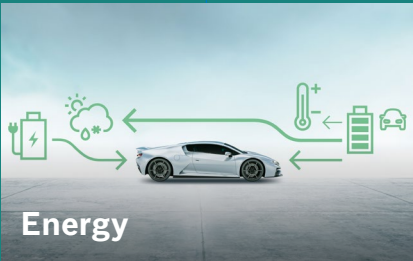
Connected services

With our expertise.
In all areas.

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Engineering, Consulting, Process and Project Management
BEG/ECP1: Our Portfolio

- **Process management**
  - Process architecture
  - Definition and modelling of development processes
  - Analysis and optimization of processes (e.g. automation)
  - Value stream analysis
  - Development and implementation of practice-oriented solutions for model-based process improvement, primarily in product development and application

- **Quality management, Management systems**
  - Consulting and support in setting up and improving your QM-system (QMS), IT service management system (ITMS), information security management system (ISMS), cybersecurity management system
  - Quality Gates Moderation

- **Training**
  - Individual training tailored to customer needs on all topics in our portfolio (ASPICE, Development processes …)

- **Requirements Management and Engineering**
  - Consulting and implementation in practice-oriented processes

- **Coaching**
  - Coaching of projects and organizations on ASPICE interpretation and compliance
  - Coaching of projects and organizations on Bosch internal standards interpretation and compliance
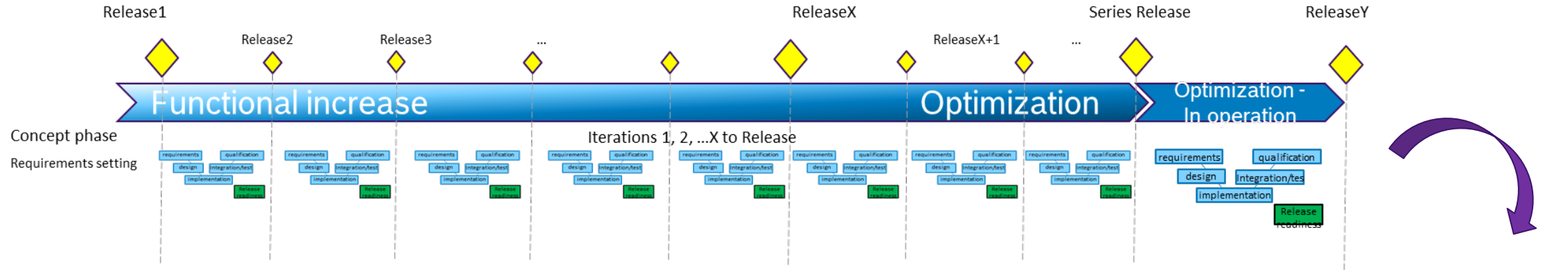
- **Audits and Assessments**
  - Audits (ISO TS 19649, ISO 9001, ISO 20000, ISO 27001, ISO 21434)
  - Preparation for audits
  - ASPICE Assessments
  - internal Assessments

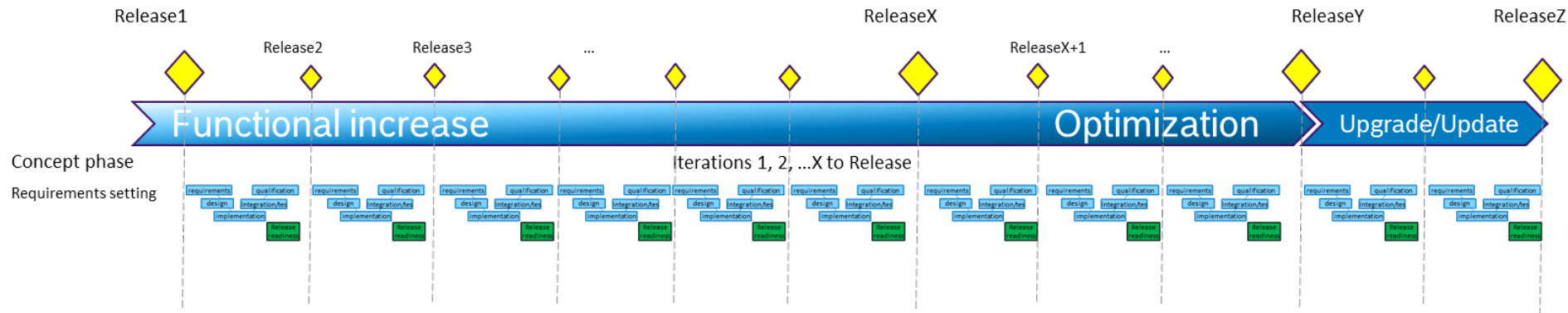- **Visual Facilitation**

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The challenge: software life cycles are getting shorter…
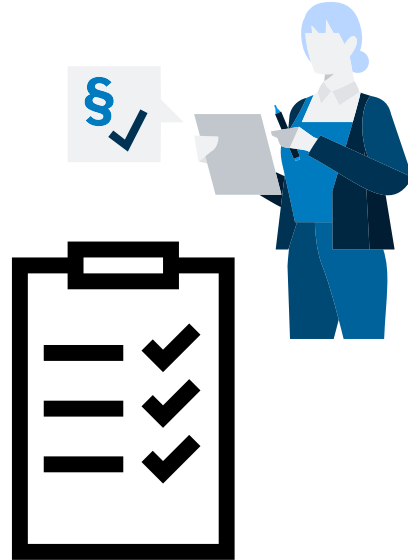

Simplified timeline of conventional Software Development Life Cycle

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The challenge: proving compliance of release candidates to challenging regulatory requirements

Regulatory laws & standards
Safety Standards
Security standards
UNECE regulations ...

VS

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Context: "Release"

3.3382
release
1. particular version of a configuration item that is made available for a specific purpose [IEEE 828-2012 IEEE Standard for Configuration Management in Systems and Software Engineering, 2.12; ISO/IEC 90003:2014 Software engineering — Guidelines for the application of ISO 9001:2008 to computer software, 3.10] 2. collection of new or changed configuration items that are tested and introduced into a live environment together [IEEE 828-2012 IEEE Standard for Configuration Management in Systems and Software Engineering, 2.1; ISO/IEC 19770-1:2012 Information technology — Software asset management — Part 1: Processes and tiered assessment of conformance, 3.12] 3. collection of one or more new or changed configuration items deployed into the live environment as a result of one or more changes [ISO/IEC 19770-5:2015 Information technology — IT asset management — Part 5: Overview and vocabulary, 3.28] 4. software version that is made formally available to a wider community [IEEE 828-2012 IEEE Standard for Configuration Management in Systems and Software Engineering, 2.1] 5. delivered version of an application which includes all or part of an application [IEEE 828-2012 IEEE Standard for Configuration Management in Systems and Software Engineering, 2.1] 6. set of grouped change requests, established in the Application Change Management Process, which are designed, developed, tested, and deployed as a cohesive whole [ISO/IEC 16350-2015 Information technology — Systems and software engineering — Application management, 4.28]
cf. version

EXAMPLE: source code, code for execution, or multiple software assets packaged into an internal production release and tested for a target platform

Note 1 to entry: Release management includes defining acceptable quality levels for release, authority to authorize the release, and release procedures.

Source: "ISO/IEC/IEEE International Standard - Systems and software engineering--Vocabulary," in ISO/IEC/IEEE 24765:2017(E) , vol., no., pp.374, 28 Aug. 2017, doi: 10.1109/IEEESTD.2017.8016712

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Context: Release, Release Approval, Release Type (SPL.2)

4.2.1. SPL.2 Product Release

Process ID
SPL.2
Process name
Product Release
Process purpose
The purpose is to control the release of a product to the intended customer.
Process outcomes

1) The contents of the product releases are determined.
2) The release package is assembled from configured items.
3) The release documentation is defined and produced.
4) Release approval is performed against defined criteria.
5) The release package is made available to the intended customer.

Source: "Automotive SPICE ® Process Reference Model Process Assessment Model Version 4.0", pp.31-32 (SPL.2), 29 Nov. 2023

Base Practices

SPL.2.BP1: Define the functional content of releases. Define the functionality to be included and the release criteria for each release.

Note 1: This may include the hardware elements, software elements, and extra application parameter files (influencing the identified system functionality) that are needed for the release.

SPL.2.BP2: Define release package. Define the release as well as supporting tools and information.

Note 2: The release package may include also programming tools.

SPL.2.BP3: Ensure unique identification of releases. Ensure a unique identification of the release based upon the intended purpose and expectations of the release.

Note 3: Unique identification may be realized by a classification and numbering scheme for product releases.

SPL.2.BP4: Build the release from items under configuration control. Build the release from items under configuration control to ensure integrity.

Note 4: This practice may be supported by the SUP.8 Configuration Management Process.

SPL.2.BP5: Ensure release approval before delivery. Criteria for the release are satisfied before delivery takes place.

SPL.2.BP6: Provide a release note. A release is accompanied by information detailing key characteristics of the release.

Note 5: The release note may include information about legal aspects like relevant target markets, legislation that is considered etc. See also VAL.1 Validation.

SPL2.BP7: Communicate the type, service level and duration of support for a release. Identify and communicate the type, service level and duration of support for a release.

SPL.2.BP8: Deliver the release package to the intended customer. Deliver the release package to the intended customer.
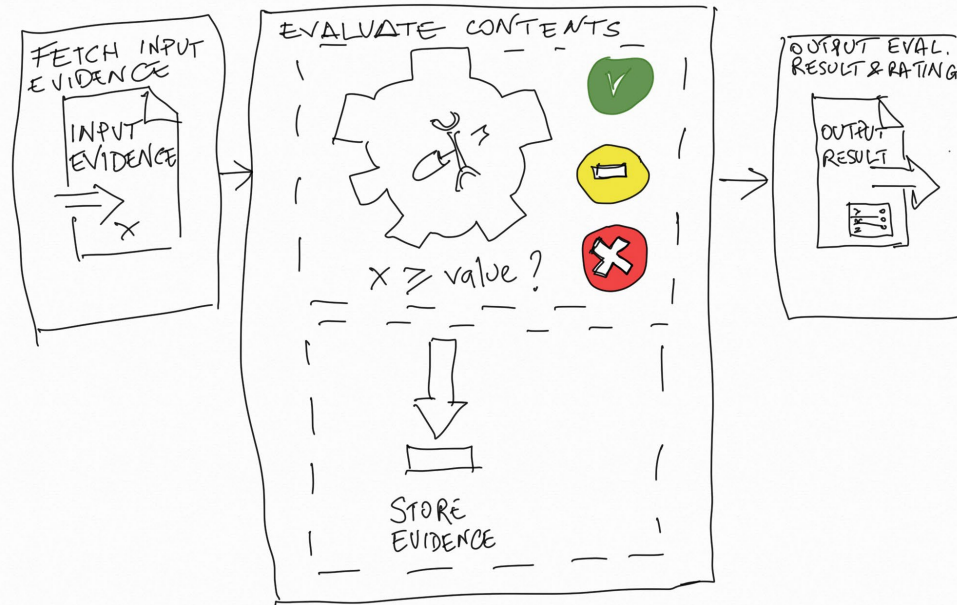
Note 6: The intended customer may be an internal organizational unit or an external organization.

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Release Evaluation: basic steps

Release Evaluation

Basic Steps:

Gather Evidences (e.g. form execution of individual process steps, ideally already in form of measurable data)

Evaluate the data and thus determine the fulfillment degree of release criteria (e.g. by executing release evaluation scripts (implementing evaluation **logic checks**)

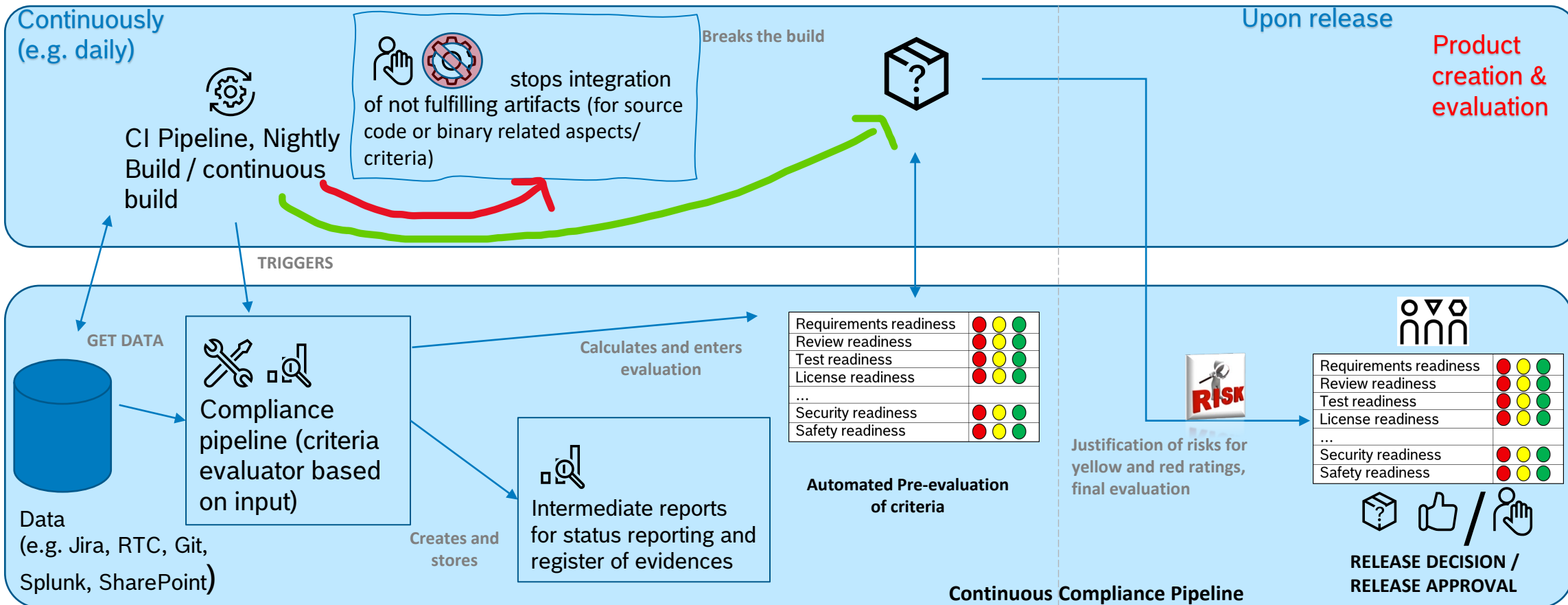Aggregate evidences, evaluations and final assessment in a report for go/no-go decision-making

Automation can be implemented by hard-coding **additional logic/tool checks** into the pipelines (mainly for source code or binary related aspects/criteria) and by designing compliance "release evaluation" pipelines to analyze results and then making decisions or setting priorities based on the analysis

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Automation of release evaluation & approval: one approach

product creation and evaluation /release go hand in hand -> evaluation conducted „continuously"

Continuously (e.g. daily)

CI Pipeline, Nightly Build / continuous build

Breaks the build

stops integration of not fulfilling artifacts (for source code or binary related aspects/ criteria)

TRIGGERS

GET DATA

Compliance pipeline (criteria evaluator based on input)

Data (e.g. Jira, RTC, Git, Splunk, SharePoint)

Calculates and enters evaluation

Creates and stores

Intermediate reports for status reporting and register of evidences

Requirements readiness	🔴🟡🟢
Review readiness	🔴🟡🟢
Test readiness	🔴🟡🟢
License readiness	🔴🟡🟢
...	
Security readiness	🔴🟡🟢
Safety readiness	🔴🟡🟢

Automated Pre-evaluation of criteria

Upon release

Product creation & evaluation

RISK

Justification of risks for yellow and red ratings, final evaluation

Requirements readiness	🔴🟡🟢
Review readiness	🔴🟡🟢
Test readiness	🔴🟡🟢
License readiness	🔴🟡🟢
...	
Security readiness	🔴🟡🟢
Safety readiness	🔴🟡🟢

RELEASE DECISION / RELEASE APPROVAL

Continuous Compliance Pipeline

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Pitfalls and lessons learned

Precondition for automation is data driven defined **release criteria**

development process definitions are usually weak on digital threads

thus „evaluation logic" definition is a complex and time-consuming task (and requires holistic process knowledge)

To be profitable automation need to be scalable: scalability requires standardized processes (i.e. consistent set of steps, tools, tool configuration, meta-data) and upfront investment in tools and resources

IT competences are needed for set up and maintenance od release automation tooling

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Your contact – let's talk!

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