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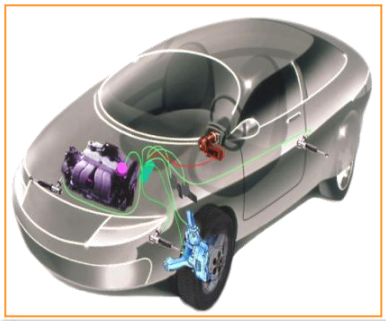
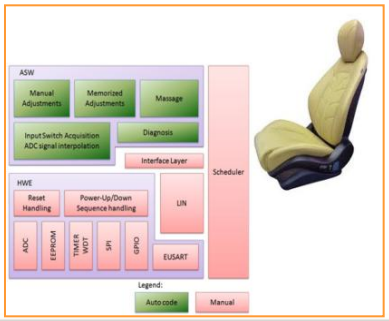
delivered with passion

Embitel Group
Embitel Technologies India Pvt. Ltd.
and embitel GmbH

- LIVE WEBINAR | 09.10.2014 | 3:00 p.m. -

Speaker: Mr. Martin Heininger | ISO 26262: Re-use of Software


We are ISO 9001:2008 and CMMI LEVEL 3 certified!

Embitel is rated as one of the top 21 innovators in India by NASSCOM

Leading technology company award by Deloitte in Fast50 India 2012 program

Juror's Distinction Award for Innovation in Manthan 2008

Nominated for Best UK Entrant in 2009 by UKTI

Introduction

Introduction to Embitel Group

Solid Foundation

- Time in business : since 1995 in Germany, since 2006 in India
- Resources : 250 employees in Germany, 180+ employees in India
- Operation locations : India, Germany, United Kingdom and Sweden
- Traits : positive cash flow, profitable every year since inception
- Revenue : combined revenue of 27,5 million Euro in 2013

Sigma Soft Tech Park, Bangalore, India

Service Portfolio

- Automation and generic embedded services
- Embedded automotive
- Mobile application development
- E-Commerce

Römerkastell, Stuttgart, Germany

Professional HR Management

- Experienced people
- Ability to recruit and retain talent

Management

- Mr. Sharad Bairathi (Managing Director, India)
- Mr. Daniel Rebhorn (Managing Director, Germany)

Embitel Group | Embedded systems offerings

Divisions

Embedded Systems

Domains

Automotive

V

Automation

V

Mobile Applications

H

Our Offerings

Automotive embedded

- Powertrain, body electronics and IVI
- Modeling and simulation
- Protocol development
- Test & validation
- Maintenance & porting

Industrial automation

- BSP and device drivers
- Digital and analog I/Os
- Communication interfaces
- HMI
- Motion control
- M2M and Internet of Things

Mobile engineering apps
Industrial automation

- Power monitoring
- Motion control
- Image processing
- Data analysis

Automotive apps

- Vehicle diagnostic
- Car keyless entry
- Car seating control

Embitel Group - business models

onsite

offshore

fixed price contracts

time & material contracts

Arbeitnehmerüberlassung

fixed price contracts

time & material contracts

account groups

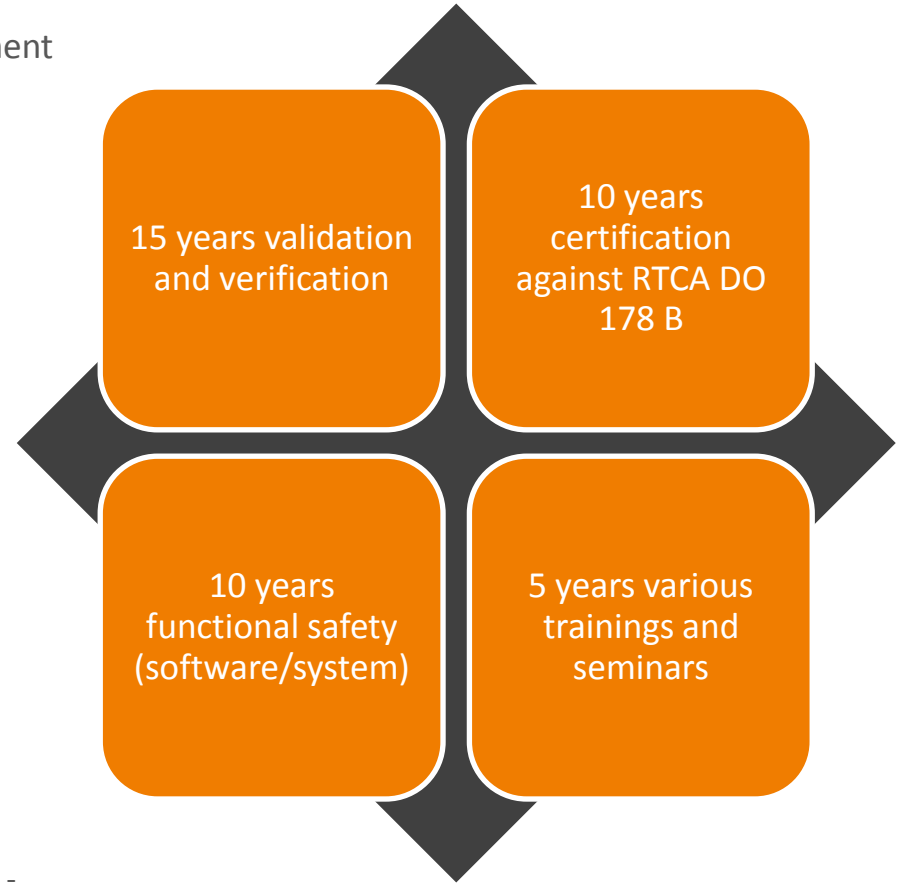
Webinar

Webinar: ISO 26262: Re-use of Software

Mr. Heininger has over 15 years of industry experience and has worked as a Lead and Project Consultant for Functional Safety projects. His expertise and activities include:

- Functional safety seminars (IEC 61508, ISO 26262, RTCA DO 178B)
- Functional safety consulting
- Functional safety on verification activities
- Consulting on strategic technical project management

Mr. Martin Heininger



Qualification of Software Components

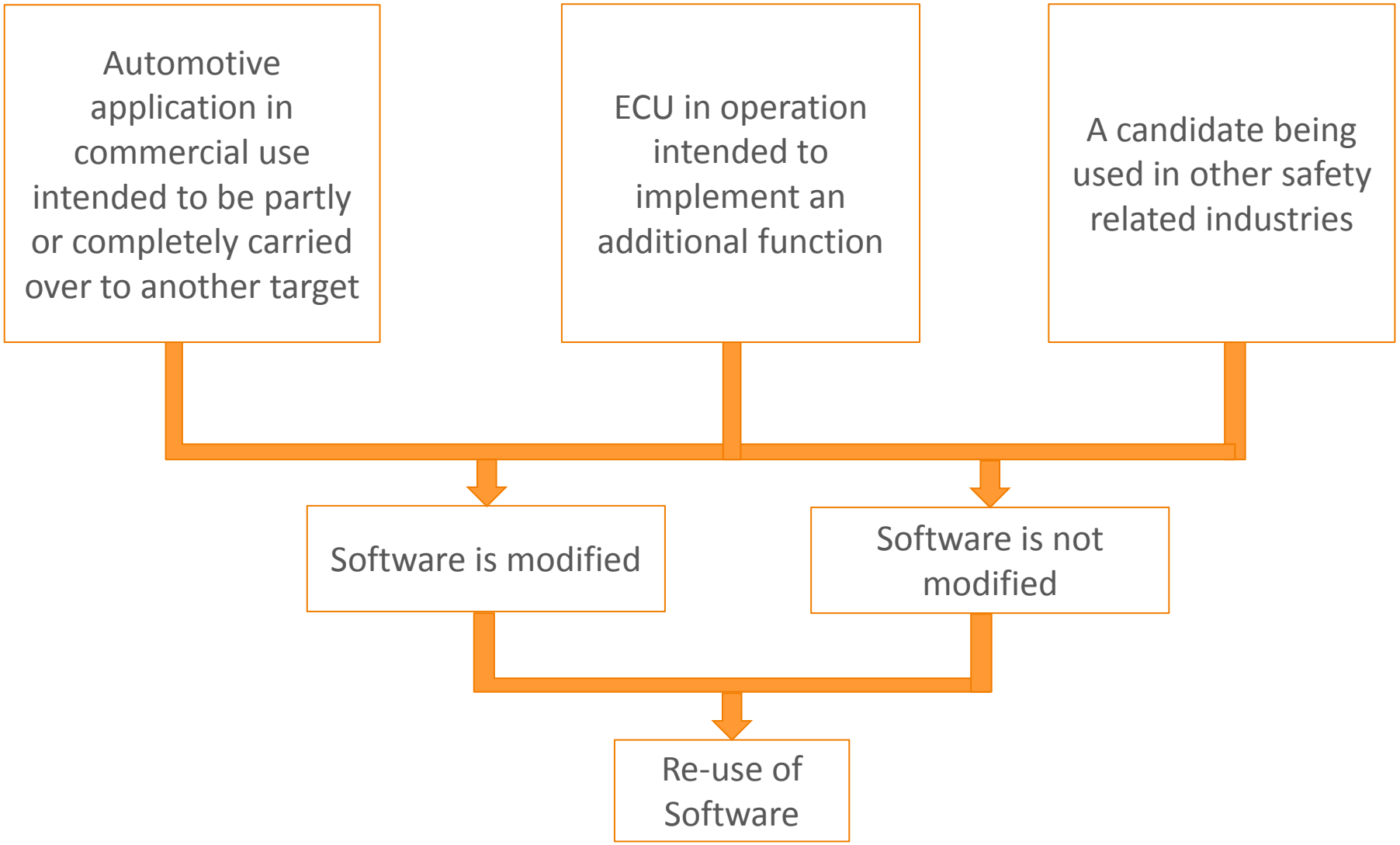
General:

- The objective of qualification of software components is to provide evidence for the suitability for re-use in items developed in compliance with ISO 26262.
- The re-use of qualified software components avoids re-development for software components with similar or identical functionality.
- Software components addressed by this clause include:
  - software libraries from third-party suppliers (COTS Software)
  - In-house components already in use in electronic control units.

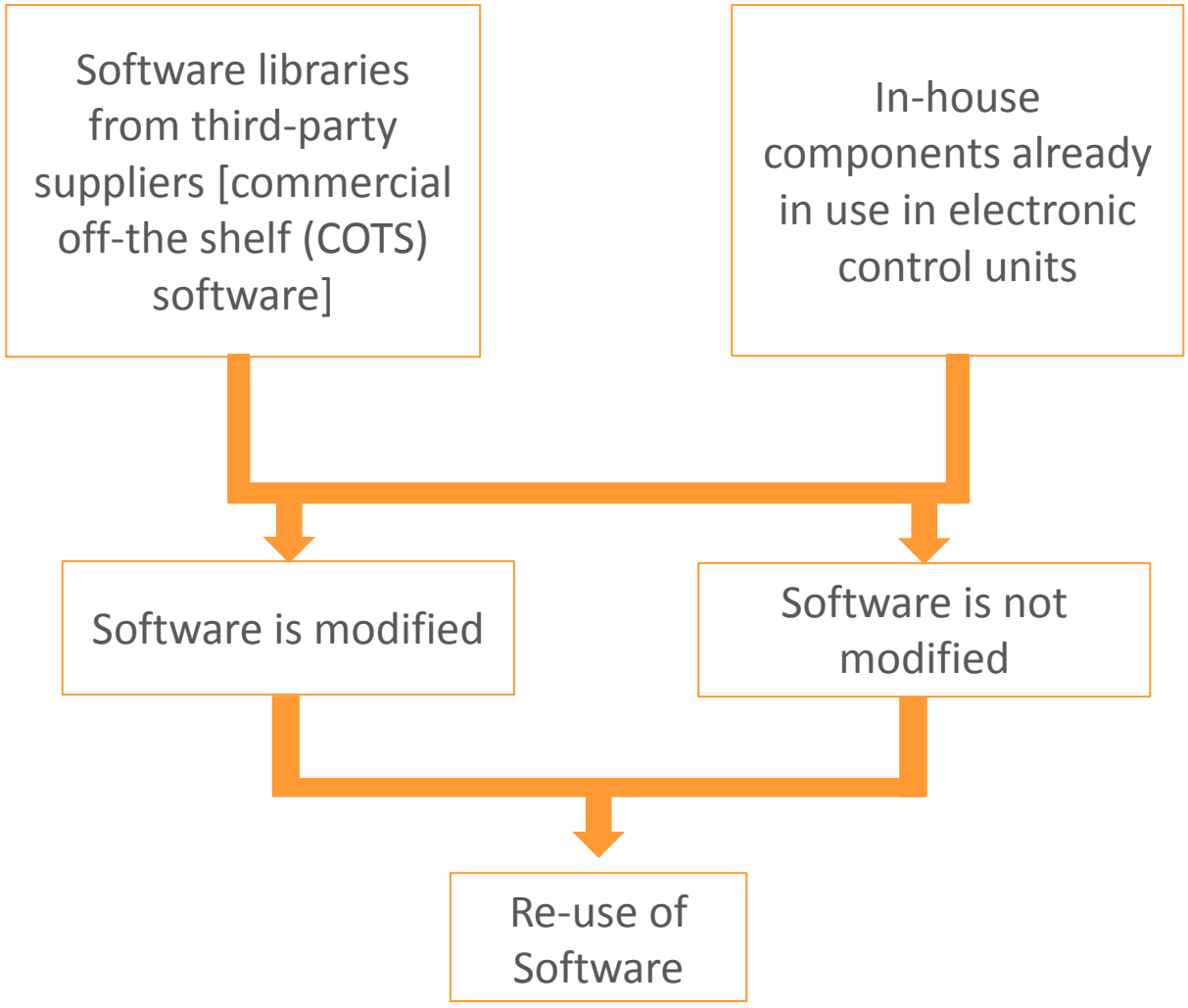
Webinar: ISO 26262: Re-use of Software

- Different Re-use Scenarios - Overview
- Definition of Key Words:
  - Proven in Use Argument
  - Qualification of Software Components
- Activities in chosen Re-use Scenarios
- Embitel-Heicon Collaboration

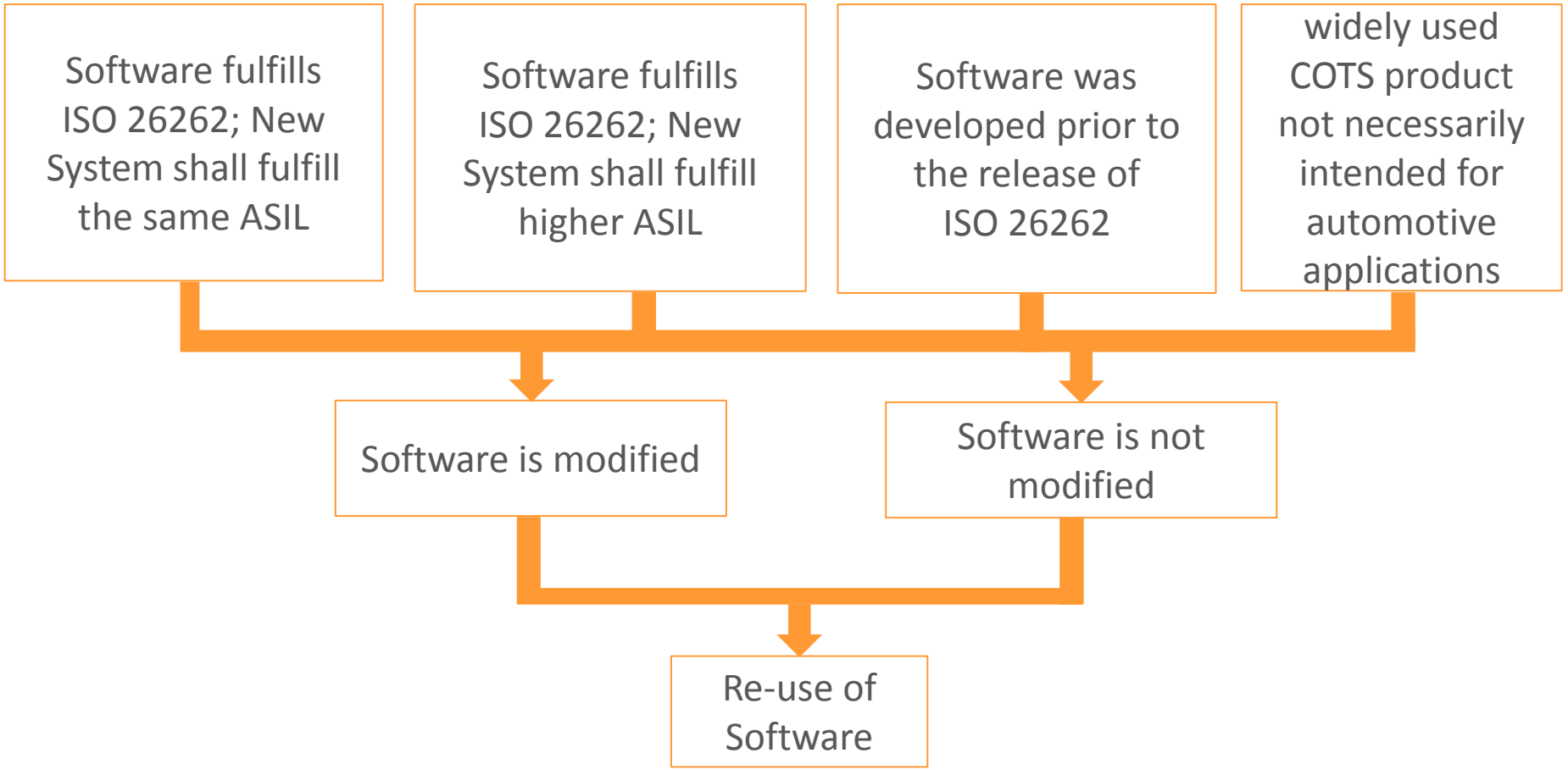
Different Re-use Scenarios (I)



Different Re-use Scenarios (II)



Different Re-use Scenarios (III)



Webinar: ISO 26262: Re-use of Software

- Definition of Key Words:
  - Proven in Use Argument
  - Qualification of Software Components

Proven in Use Argument

General:

- Alternate means of compliance with ISO 26262 that may be used in the case of reuse of existing items or elements, when field data are available.
- Can be applied when definition and conditions of use are identical to or have a very high degree of commonality with a product that is already released and in operation.
- Once a candidate has been defined with the expected proven in use credit two important criteria need to be considered when preparing a proven in use argument:
  - the relevance of field data during the service period of the candidate and
  - the changes, if any, that could have impacted the candidate since its service period
- With regards to the relevance of field data, the proven in use argument is intended to address systematic and random failures of the candidate: it does not address failures related to ageing of the candidate.

Proven in Use Argument

Analysis of field data:

- Evidence needed, that the candidate has been kept under configuration management and change management during and after its service period.
- A rational for the calculation of the service period of the candidate is required (more detailed guidance available in ISO 26262-8 clause 14).
- A problem reporting system ensures that any observed incident with potential safety impact caused by the candidate in the field is recorded (ISO 26262-7).

Workproducts:

- Proven in use aspects in the safety plan.
- Description of candidate for proven in use argument.
- Proven in use analysis report.

Qualification of Software Components

General:

- The objective of qualification of software components is to provide evidence for the suitability for re-use in items developed in compliance with ISO 26262.
- The re-use of qualified software components avoids re-development for software components with similar or identical functionality.

Qualification of Software Components

Prerequisites:

- Requirements of the software component
- Further supporting Information:
  - Design specification
  - Results of verification measures
- The verification is only valid for a unchanged implementation of the software component

Qualification Activities:

- Describe the component configuration
- Describe the interfaces
- Describe the application manual
- Describe the software component integration (e.g. development tools required to integrate and use the software component)
- Describe the reaction of the functions under anomalous operating conditions
- Describe the dependencies with other software components
- Describe the known anomalies with corresponding work-around measures
- The verification of the component shall show requirements coverage and in case of ASIL D also structural coverage (ISO 26262-6 Clause 9)
- Verification covers both normal operating conditions and behavior in the case of failure

Qualification of Software Components

Qualification Activities:

- Verification of the results of the qualification of the software component together with the validity of these results regarding the intended use of the software component. Validity can be influenced when the qualification has been performed in the context of different industrial (e.g. Railway, Civil avionics) or automotive (e.g. Engine control, body control) domain
- Verify that the specification of the software component comply with the requirements of the intended use of the software component.
- The following information have to be documented
  - Unique identification of the software component
  - Unique configuration of the software component
  - Person or organization who carries out the qualification
  - The environment used for the qualification
  - The results of the verification measures applied to qualify the software component
  - The maximum target ASIL of any safety requirement that might be violated if the software component performs incorrectly

Workproducts:

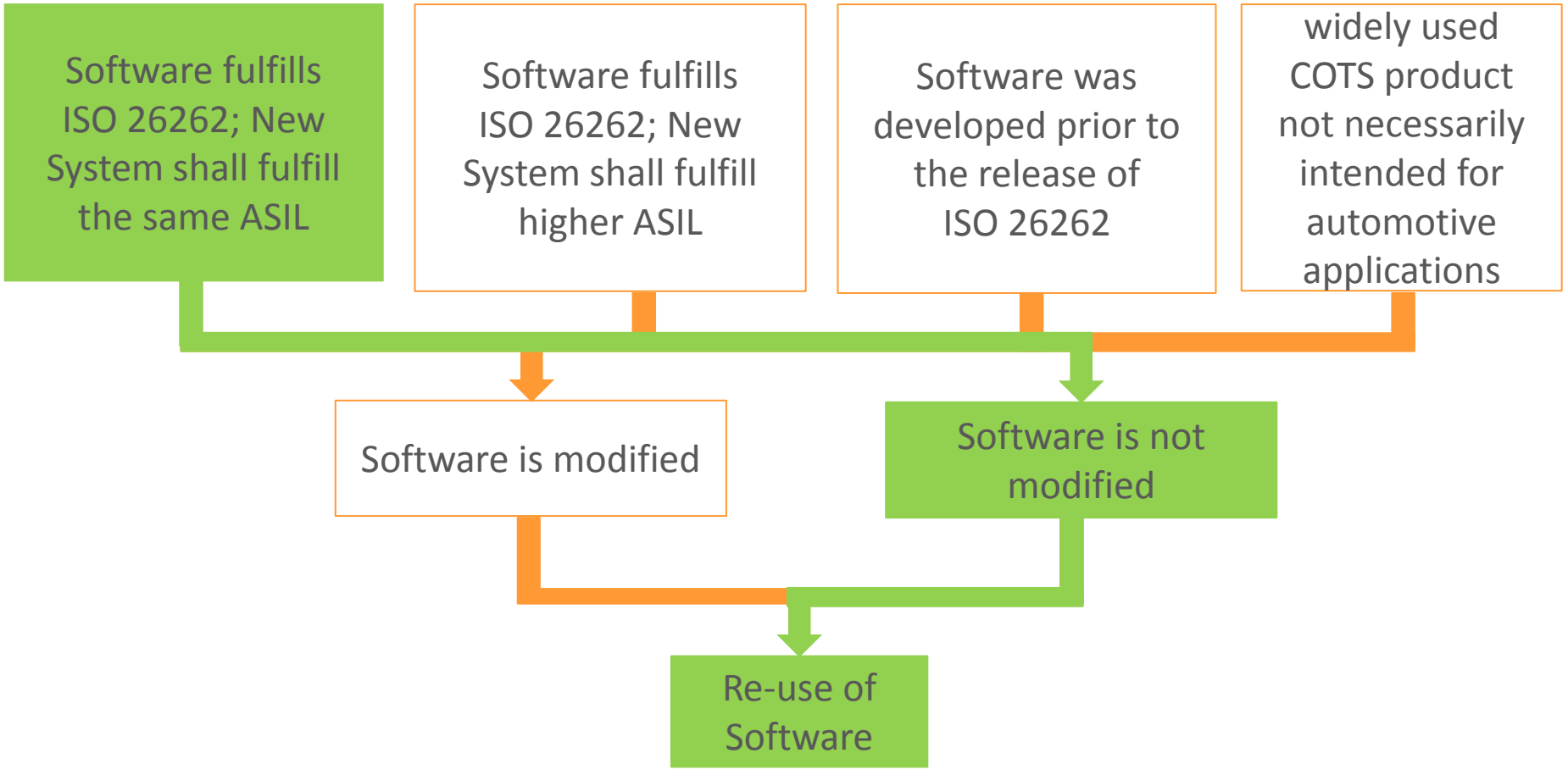
- Software component documentation resulting from the specification
- Software component qualification report resulting from the information to be documented
- Software component qualification aspects in the safety plan

Webinar: ISO 26262: Re-use of Software

Activities in chosen Re-use Scenarios

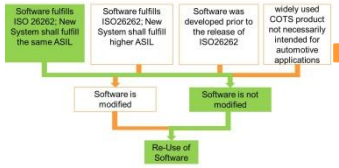
Scenario 1: ISO 26262 compliant; Same ASIL; no modification

Scenario 1:


Software fulfills ISO 26262; New System shall fulfill the same ASIL
Software fulfills ISO 26262; New System shall fulfill higher ASIL
Software was developed prior to the release of ISO 26262
widely used COTS product not necessarily intended for automotive applications
Software is modified
Software is not modified
Re-use of Software

Webinar: ISO 26262: Re-use of Software

Scenario 1:



ISO 26262-8 Clause 12 Qualification of software components does apply

ISO 26262-6 Clause 10 Software Integration and Testing applicable

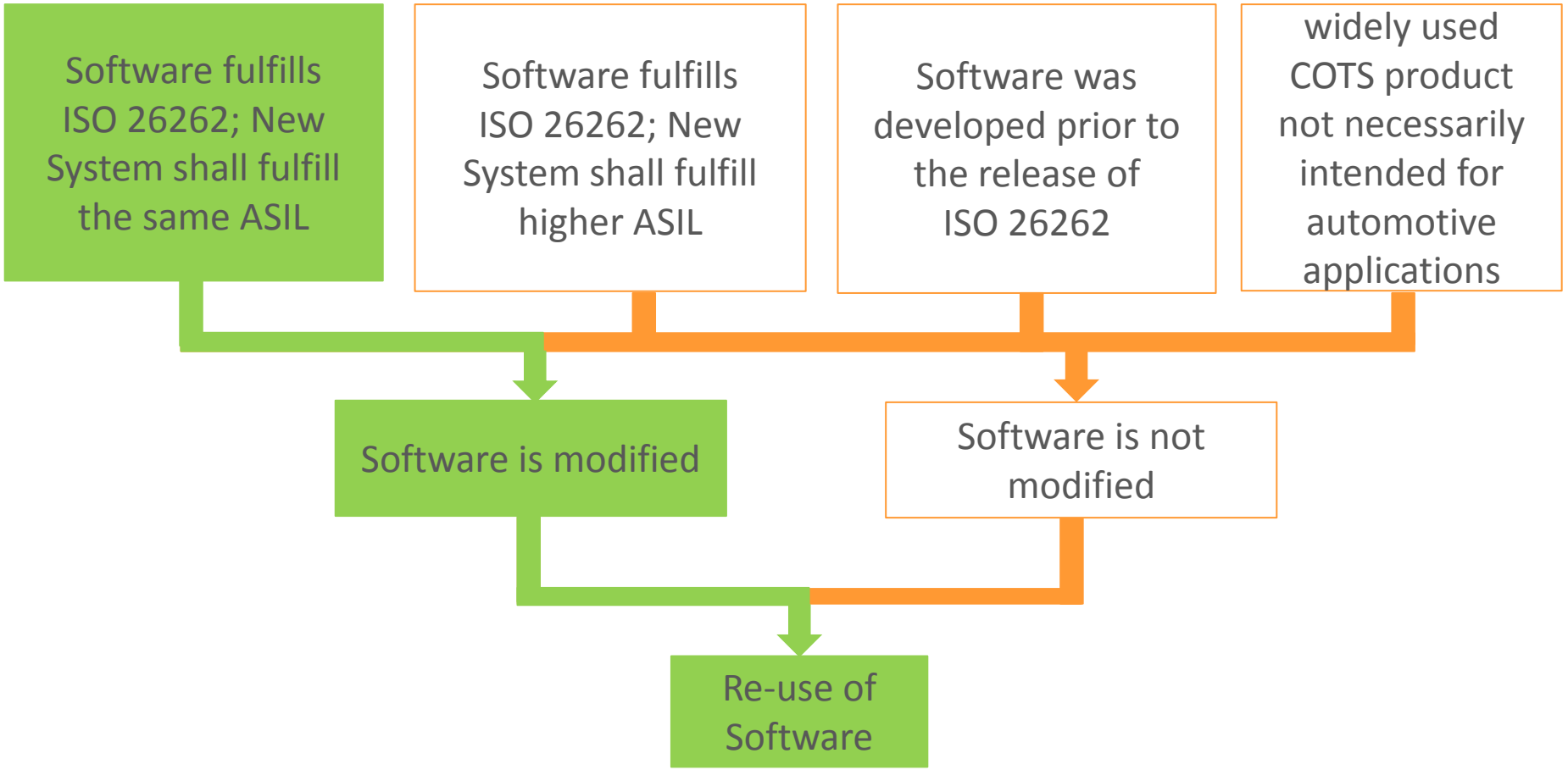
Proven in Use argument is not required

Webinar: ISO 26262: Re-use of Software

Activities in chosen Re-use Scenarios

Scenario 2: ISO 26262 compliant; Same ASIL; With modification

Scenario 2: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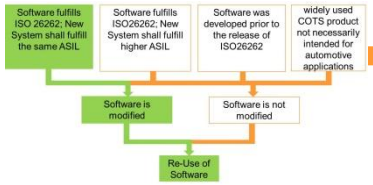
Webinar: ISO 26262: Re-use of Software

Scenario 2:



Impact Analysis required and tailoring of safety lifecycles is possible

ISO 26262-8 Clause 12 Qualification of software components does not apply

Proven in Use argument could not be applied

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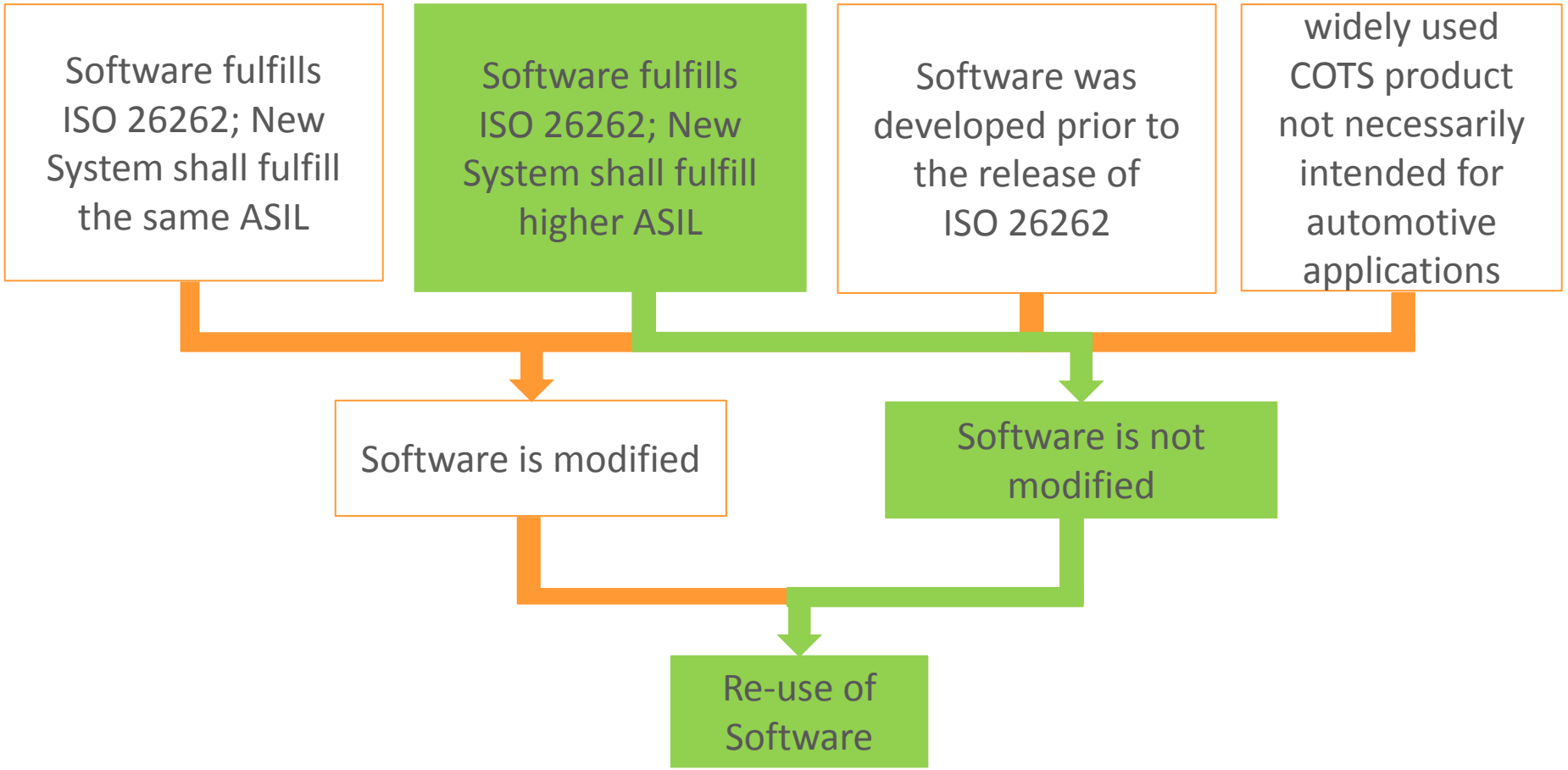
Activities in chosen Re-use Scenarios

Scenario 3: ISO 26262 compliant; Higher ASIL; No modification

Scenario 3: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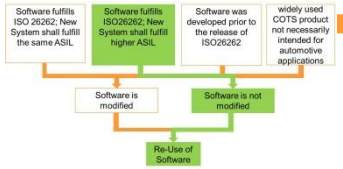
Re-use of Software

Scenario 3:



Analysis required, to identify development and verification activities in order to fulfill higher ASIL requirements

ISO 26262-8 Clause 12 Qualification of software components does apply

ISO 26262-6 Clause 10 Software Integration and Testing applicable

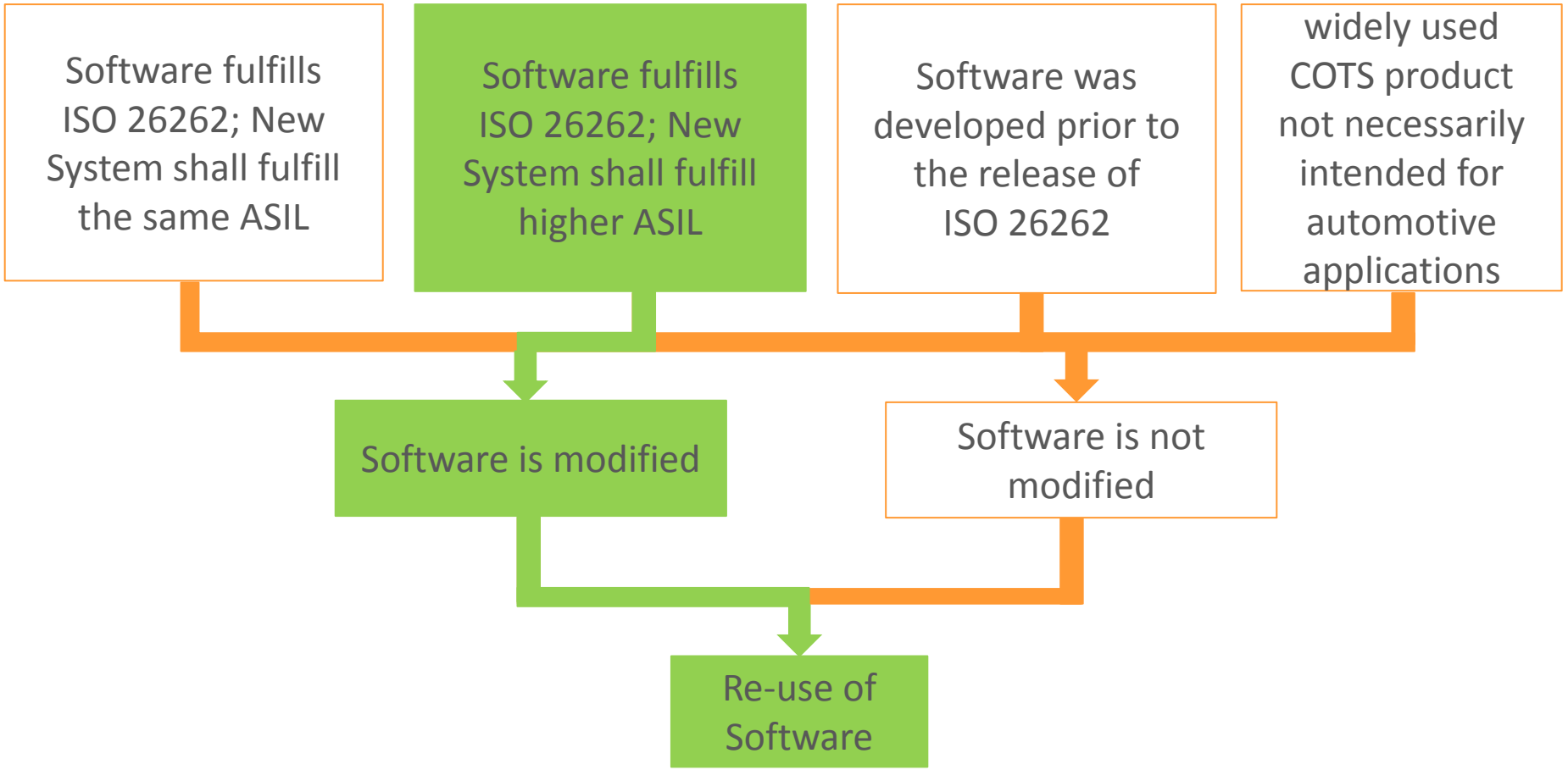
Proven in Use argument can not be applied

Webinar: ISO 26262: Re-use of Software

Activities in chosen Re-use Scenarios

Scenario 4: ISO 26262 compliant; Higher ASIL; With modification

Scenario 4: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Re-use of Software

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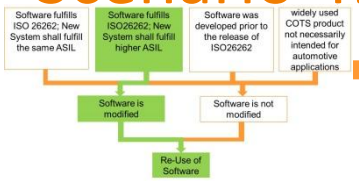
Scenario 4:



Analysis required, to identify development and verification activities in order to fulfill higher ASIL requirements

ISO 26262-8 Clause 12 Qualification of software components does not apply

Proven in Use argument can not be applied

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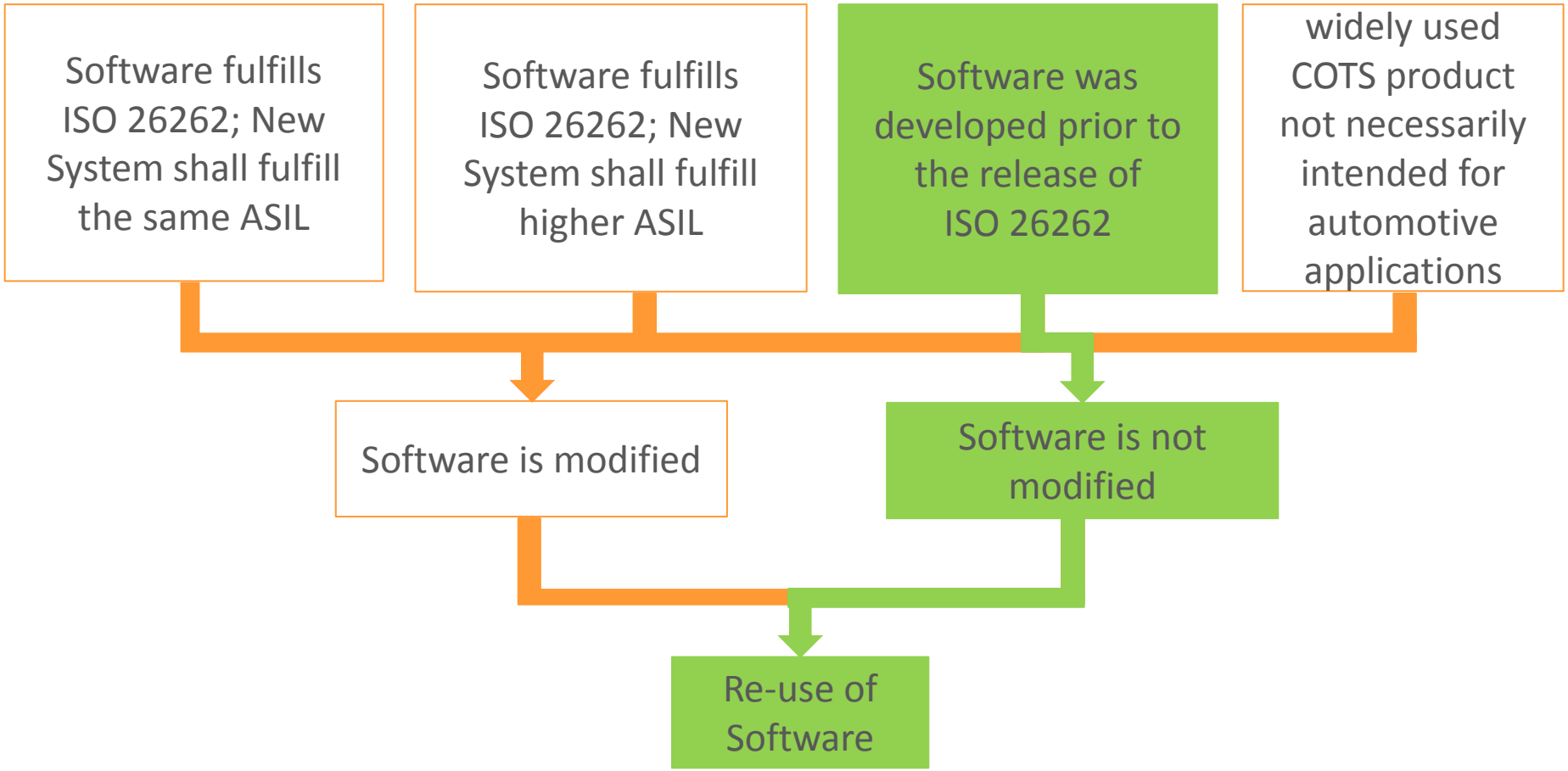
Activities in chosen Re-use Scenarios

Scenario 5: Development prior to ISO 26262 release; No modification

Scenario 5: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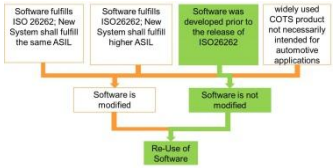
Scenario 5:

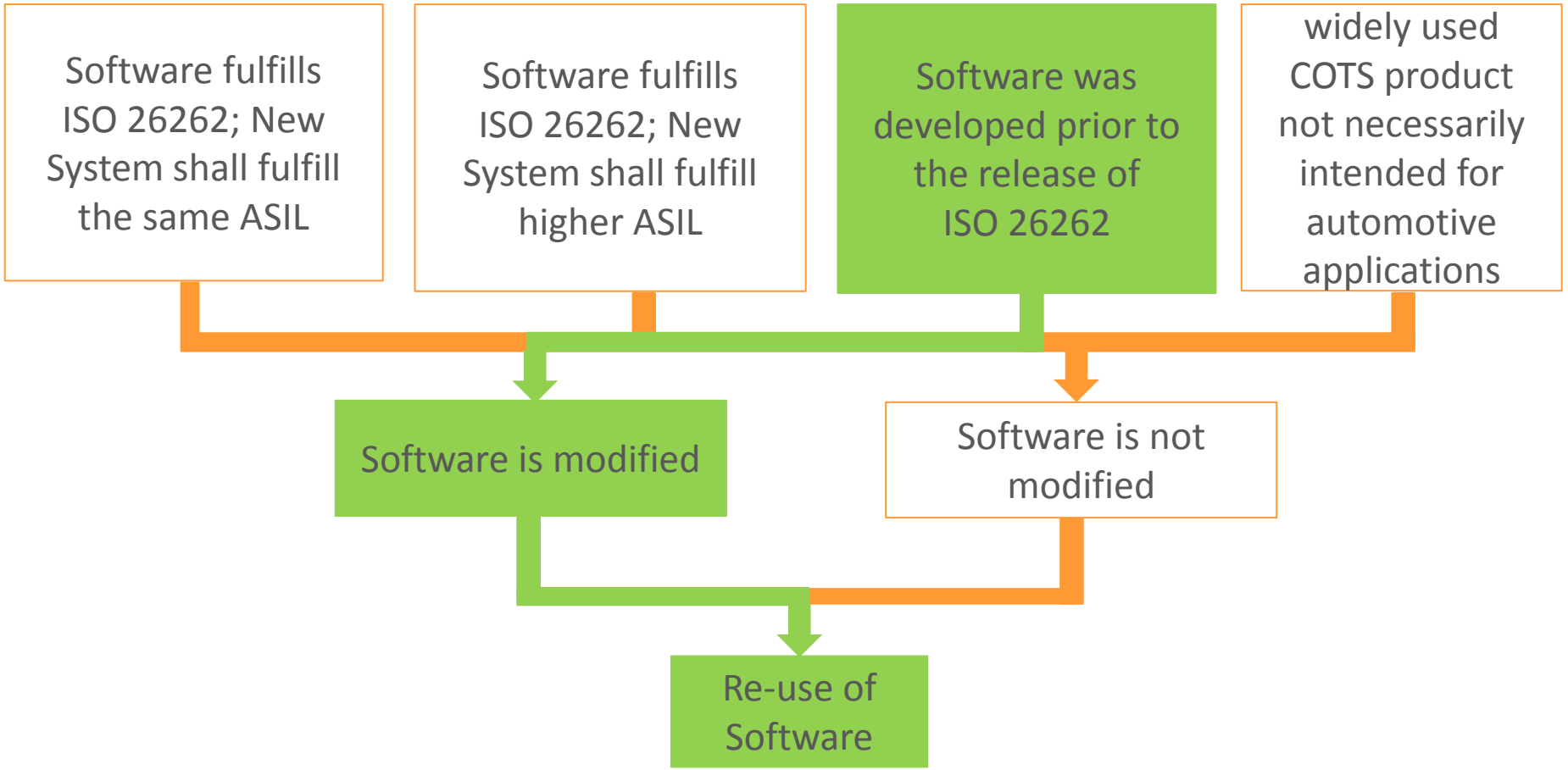


This case is not in scope of ISO 26262; therefore no activities according ISO 26262 are required

Activities in chosen Re-use Scenarios

Scenario 6: Development prior to ISO 26262 release; With modification

Scenario 6: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Re-use of Software

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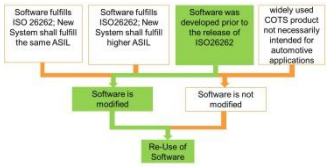
Scenario 6:



Modification has to be developed according to ISO 26262

ISO 26262 is not applicable for unchanged Software part

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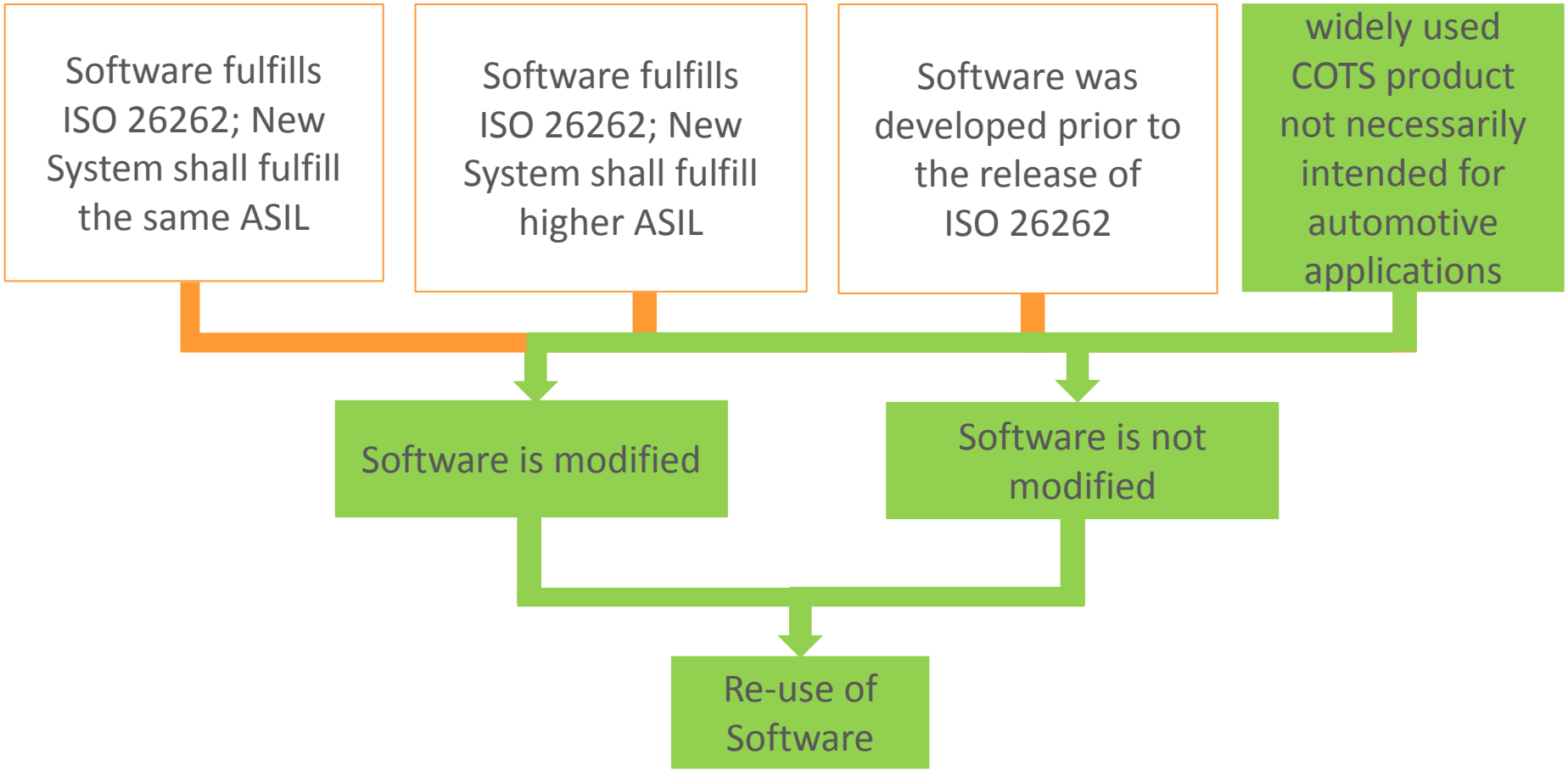
Activities in chosen Re-use Scenarios

Scenario 7: widely used COTS Software

Scenario 6: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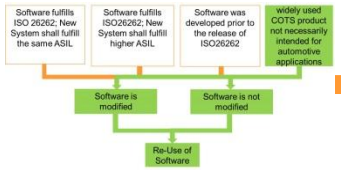
Scenario 7:



Proven in Use argument is applied

Q & A

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Thank you!

international presence