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1 About this document

1.1 Introduction

This document defines requirements on tool interoperability and compliance.

1.2 Terminology

- The **AUTOSAR metamodel** is a UML2.0 model that defines the language for describing AUTOSAR systems. The AUTOSAR metamodel is a graphical representation of a template. UML2.0 class diagrams are used to describe the attributes and their interrelationships. Stereotypes and OCL (object constraint language) are used for defining specific semantics and constraints.
- An **AUTOSAR model** is an instance of the AUTOSAR metamodel. The information contained in the AUTOSAR model can be anything that is representable according to the AUTOSAR metamodel. The AUTOSAR model can be stored in many different ways: it might be a set of files in a file system, an XML stream, a database or memory used by some running software tools, etc.
- The **AUTOSAR XML Schema** is a W3C XML schema that defines the language for exchanging AUTOSAR models. This Schema is derived from the AUTOSAR metamodel and defines the **AUTOSAR data exchange format**.
- An **AUTOSAR XML description** describes the XML representation of an AUTOSAR model. The AUTOSAR XML description can consist of several fragments (e.g. files). Each individual fragment must validate successfully against the AUTOSAR XML schema.
- An **AUTOSAR authoring tool** is a software tool which supports interpreting, processing and creating of AUTOSAR XML descriptions.
- **Metadata** includes pertinent information **about** data, including information about the authorship, versioning, access-rights, timestamps etc.

1.3 About Requirements

Each requirement has its unique identifier starting with the prefix "ATIREQ" (meaning Authoring Tools Interoperability Requirements).

1.3.1 Structure

Each requirement is defined as a table. The structure of the tables is as follows:

| | |
|---------------------|--|
| Initiator: | < number of originating work package, company, etc > |
| Date: | < date of last change > |
| Requirement: | < the normative text of the requirement > |
| Description: | < detailed description of the requirement > |
| Rationale: | < why is this necessary, what its omission could cause > |

| | |
|-----------------------------|--|
| Use Case: | < example to a scenario that makes the requirement necessary or useful > |
| Dependencies: | < reference to depending and depended-on requirements > |
| Conflicts: | < reference to conflicting requirement > |
| Supporting Material: | < links to other documents > |
| Comment: | < additional remarks > |

1.3.2 Conventions used

In requirements, the following specific semantics are used (taken from Request for Comment RFC 2119 from the Internet Engineering Task Force IETF):

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119. Note that the requirement level of the document in which they are used modifies the force of these words.

- **MUST:** This word, or the terms "REQUIRED" or "SHALL", mean that the definition is an absolute requirement of the specification.
- **MUST NOT:** This phrase, or the phrase "SHALL NOT", means that the definition is an absolute prohibition of the specification.
- **SHOULD:** This word, or the adjective "RECOMMENDED", mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
- **SHOULD NOT:** This phrase, or the phrase "NOT RECOMMENDED" mean that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
- **MAY:** This word, or the adjective "OPTIONAL", means that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation, which does not include a particular option, **MUST** be prepared to interoperate with another implementation, which does include the option, though perhaps with reduced functionality. In the same vein an implementation, which does include a particular option, **MUST** be prepared to interoperate with another implementation, which does not include the option (except, of course, for the feature the option provides.)

1.3.3 Guidelines

Existing specifications shall be referenced (in form of a single requirement). Differences to these specifications are specified as additional requirements.

All Requirements shall have the following properties:

- **Redundancy**
Requirements shall not be repeated within one requirement or in other requirements
- **Clearness**
All requirements shall allow one possibility of interpretation only. Used technical terms that are not in the glossary must be defined.
- **Atomicity**
Each Requirement shall only contain one requirement. A Requirement is atomic if it cannot be split up in further requirements.
- **Testability**
Requirements shall be testable by analysis, review or test.
- **Traceability**
The source and status of a requirement shall be visible at all times.

2 Requirements

This chapter provides a definition of the relevant requirements.

2.1 [ATIREQ_001] Support data exchange

| | |
|-----------------------------|---|
| Initiator: | WP1.2 |
| Date: | 04.02.2005, updated 15.07.2005 |
| Requirement: | AUTOSAR SHALL provide a concept for exchanging AUTOSAR models between AUTOSAR authoring tools. The concept SHALL allow for exchanging of AUTOSAR models even if the authoring tools do not support all features defined in the AUTOSAR metamodel or methodology. |
| Description: | All authoring tools SHALL support a common mechanism for exchanging AUTOSAR models. AUTOSAR SHALL define requirements on authoring tools AND requirements on the data exchange format which allow for seamless exchange of data between different authoring tools. A concept for the integration of specialized authoring tools SHALL be defined. |
| Rationale: | Within the AUTOSAR methodology AUTOSAR models will be exchanged between different parties. Each party could use different authoring tools which best fit to the step in the methodology. In order to facilitate seamless exchange of AUTOSAR models, a standardized AUTOSAR data exchange format is required. Additionally further requirements need to be defined on the authoring tools in order to keep AUTOSAR models consistent. |
| Use Case: | Facilitate the use of different authoring tools from different tool vendors within the AUTOSAR methodology. |
| Dependencies: | |
| Conflicts: | |
| Supporting Material: | Main90: Tool-chains, which are developed for or adapted to AUTOSAR, must be compatible with the AUTOSAR-process. |
| Comment: | |

2.2 [ATIREQ_002] Standardize the handling of errors in AUTOSAR models

| | |
|-----------------------------|---|
| Initiator: | WP1.2 |
| Date: | 04.02.2005, updated 28.10.2005 |
| Requirement: | AUTOSAR SHALL provide a concept for standardized handling of errors in AUTOSAR models |
| Description: | AUTOSAR SHALL provide a concept for a standardized mechanism for handling errors in AUTOSAR models. This concept SHALL not only be implemented by AUTOSAR authoring tools but additionally by all tools which interpret, modify or create AUTOSAR models. |
| Rationale: | Without a standard collection of possible errors, each tool would have its own sets, but the difference between these could cause relations created by one tool in a tool-chain be reported later as fatal errors by another tool. |
| Use Case: | |
| Dependencies: | |
| Conflicts: | |
| Supporting Material: | Main90: Tool-chains, which are developed for or adapted to AUTOSAR, must be compatible with the AUTOSAR-process. |
| Comment: | |