



AUTOSAR FileChecker **Documentation for AUTOSAR FileChecker**

User Manual

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V2.3.1 | Released

Document Information

History

Author	Date	Version	Remarks
Emre Berber	08.12.2023	2.0.0	
Emre Berber	21.05.2023	2.1.0	
Emre Berber	29.08.2024	2.2.0	
Emre Berber	18.02.2025	2.3.0	
Emre Berber	19.02.2025	2.3.1	Remove DaVinic Team License

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1 Introduction

1.1 About this Document

This document describes the general introduction into AUTOSAR FileChecker.

1.2 Concepts

The AUTOSAR FileChecker is a versatile command-line utility designed for the validation and analysis of ARXML files, System Descriptions, and System Extracts. It offers a robust set of features, including formal checks such as schema validation and detection of open references. Additionally, it performs semantical checks, encompassing AUTOSAR constraints, traceability assessments, and mandatory parameter validation, ensuring the integrity and compliance of your AUTOSAR projects. Not every constraint from AUTOSAR is implemented. It contains the mostly detected issues by ARXML files from the Vector side. The AUTOSAR FileChecker, with its primary focus on communication data, serves as an indispensable tool for conducting thorough output checks of ARXML files before they are delivered to Tier 1 suppliers. This versatile utility allows for the execution of specific domain checks, including Application, Communication, and Diagnostics, ensuring that your ARXML files adhere to the exacting standards and requirements of your project. By leveraging the AUTOSAR FileChecker, you can enhance the quality and reliability of your AUTOSAR-based communication systems, facilitating smoother collaboration and reducing potential issues in the Tier 1 supply chain.

1.3 Use Case

AUTOSAR FileChecker is a tool which can be used after modeling the ARXML file for e.g. with PREEvision to verify the modeling quality. This step is not mandatory. It serves solely as tools to assess the quality of the ARXML files. The better the quality of the ARXML file, the better results you can achieve when using as configuring DaVinci Configurator. The effort required to address missing or incomplete communication elements after importing the input files into an ECU project in DaVinci Configurator can be substantial and may consume valuable time within the ECU development process. On the other hand, can the AUTOSAR FileChecker tool not ensure the complete correctness of the file. The tool can in some cases only assume the intention of a modeling, especially the completeness of a model is often difficult to judge. Some of the setting of a BSW Stack can simply not be modeled on AUTOSAR System Description level and will therefore always require manual configuration in DaVinci Configurator project.

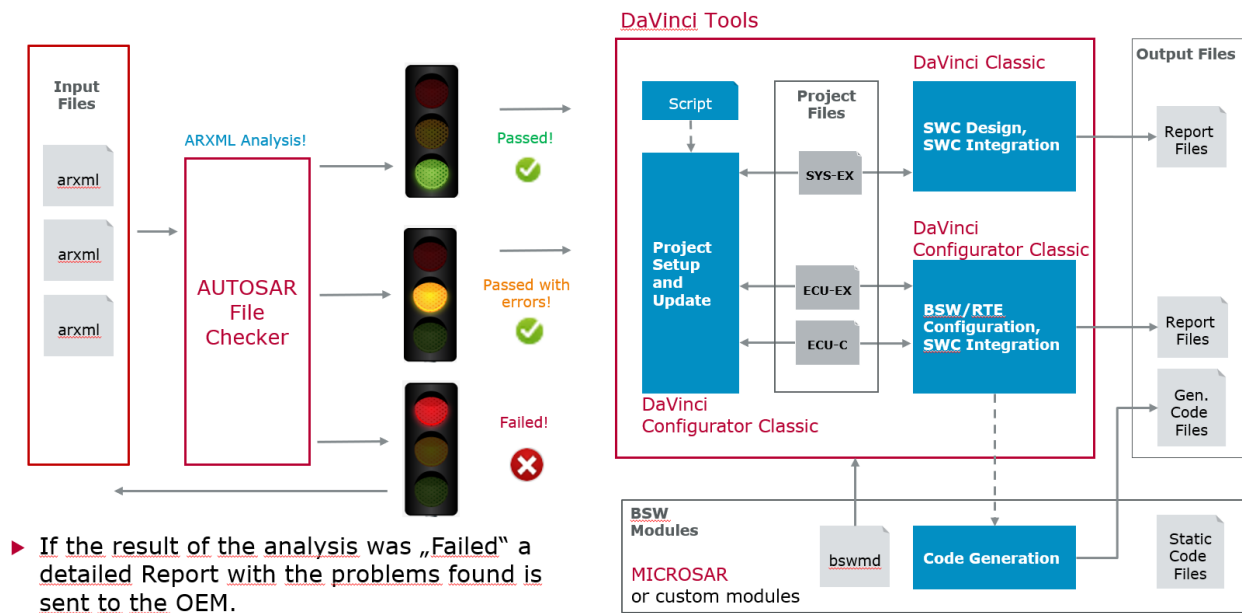


Figure 1: Workflow

1.4 Usage

We currently have two common usage processes:

1. The AUTOSAR FileChecker process is intended as a pre-check before the usage in DaVinci Configurator.
2. Another common approach is debugging low-quality ARXML files to identify issues in the project.

The passed checks can be ignored. These are the checks that are correct in your ARXML file. The user should not manually fix anything from the "passed checks". This information simply shows which checks were performed by the AUTOSAR FileChecker and which were passed without findings. The "Not Passed AUTOSAR Checks" section is the most important part for the user, as it reflects the quality of an ARXML file. The most important part, which is essential, are "fatal errors" and schema errors, which should be fixed in any case.

Result of Analysis: PassedWithErrors

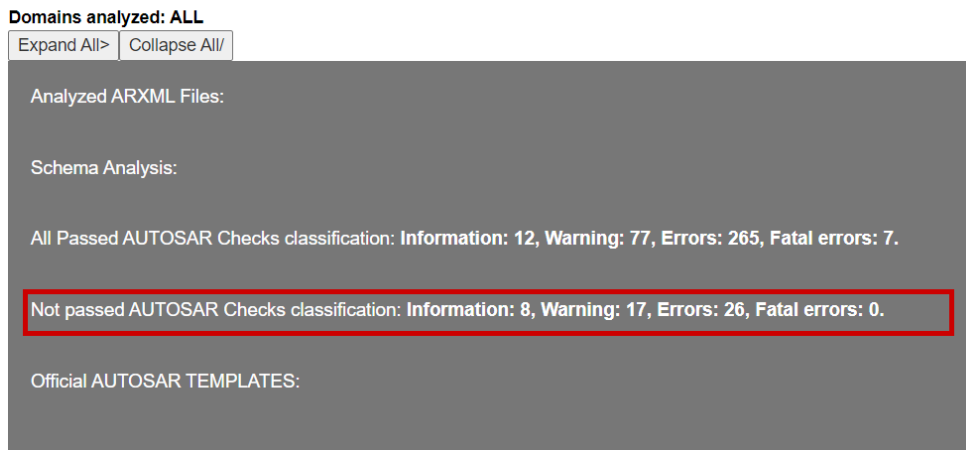


Figure 2 Not Passed

Opening the relevant tab displays information about which check was triggered and the reason for it. The left side contains the domain (e.g., Communication, Diagnostic) and a message providing a brief summary from the description for a quick overview. Severity levels are indicated as follows: Fatal Error > Error > Warning > Information. For more information about the result, please refer to [Chapter 3: Report / Output](#).

The right side includes a description explaining why the check was triggered and what is wrong. The “Affected AUTOSAR Elements” can be opened to display a list of affected elements, with multiple elements potentially being triggered per check. The left side also provides the path to the element and additional error details.

The AUTOSAR FileChecker assesses the quality of the ARXML file but does not automatically correct errors. Errors must be manually fixed, such as by using the AUTOSAR XML Editor. Copy the AsrPath and paste it into the editor to manually resolve the issue.

1.5 System Requirements

To utilize the tool, the following essential prerequisites are necessary:

- the .Net6 execution framework

1.6 Input Files

The AUTOSAR FileChecker can only process ARXML files as input data.

2 Working with AUTOSAR FileChecker

2.1 Using the AUTOSAR FileChecker

No matter which distribution you use, the zip file must be unzipped first.

For the Windows version of the 'ARFileCheckerCmd.exe' is used solely through a command-line interface, such as PowerShell, CMD, etc. With the command './ARFileCheckerCmd.exe -h' the interface throw a series of examples, how you can use the AUTOSAR FileChecker.

To use the ARFileCheckerCmd utility on a **Linux** distribution, follow these instructions.

First, set the file ARFileCheckerCmd to be executable by changing its permissions. Use the following command:

```
chmod 774 ARFileCheckerCmd
```

This command ensures that the file has the necessary permissions for execution.

Once the permissions are set, you can run the ARFileCheckerCmd with the help option to display usage information and available commands. Execute the following command:

```
./ARFileCheckerCmd -h
```

This will provide you with the help details and options for using the ARFileCheckerCmd utility.

2.2 Formal Checks

The AUTOSAR FileChecker checks several formal conditions such as ...

- Schema well formed
- Duplicated shortnames
- Empty shortnames
- Unresolved references

2.3 Semantical Checks

AUTOSAR Templates include Constraints to maintain a coherent model description and Traceables offering AUTOSAR recommendations and necessary configurations for modeling specific use cases. However, it's important to note that we do not review all Traceables and constraints provided by AUTOSAR. Instead, we focus on evaluating a significant subset of them based on our experience, as these have historically been the sources of issues.

2.4 Limitations

The AUTOSAR FileChecker can only check normal ARXML files after AUTOSAR regulations. The tool is not suitable for checking files with variants. The AUTOSAR FileChecker only supports Windows and Linux. We don't guarantee that there will be no errors in the DaVinci project if all findings by the AUTOSAR FileChecker are fixed. First, we have not included all the constraints that exist in AUTOSAR, only those that most frequently cause errors. Second, some things simply can't be modeled in the ECUEXTRACT

and need to be configured directly within the module configuration in DaVinci. Overall, we aim to say if the ARXML file is of good quality, and generally, the AUTOSAR FileChecker is by intention more critical than the DaVinci tools.

3 Report / Output

Please ensure that you have at least the 6.0 runtime of the .NET installed on your computer.

<https://dotnet.microsoft.com/en-us/download/dotnet/thank-you/runtime-6.0.14-windows-x64-installer>

3.1 Generation of Report after Analysis of ARXML files

The tool analyzes ARXML files and provides a comprehensive report summarizing its findings. It conducts schema analysis to ensure compliance with the defined structure. It identifies and flags repeated shortnames, incompatible Reference Types, and instances of repeated UUIDs, allowing for easy correction. The tool also highlights unresolved references, helping users pinpoint and resolve dependencies.

In terms of AUTOSAR checks, it assesses all components against AUTOSAR standards, clearly categorizing them as either having passed or not passed AUTOSAR checks. Additionally, the tool provides convenient links to official AUTOSAR templates, simplifying the process of adhering to industry standards and best practices.

AUTOSAR File Checker is a tool that helps to determine the quality of an ARXML file/Database and verifies, whether it meets the minimum requirements to be imported in our DaVinciConfigurator/Developer tools to create an ECU project.

Attention: Just .ARXML and .xsd Files are recognized by the tool.

Example of how to use the tool in the command line version:

```
-a <filename>      --arxml=<full path filename>    [1..n]: AUTOSAR model files to Load"
-h                --help                        [0..1]: Display this help text"
-v                --verbose                      [0..1]: Output verbose information"
-d                --domain                      [0..1]: Check Filter. Available categories: Application, Communication, Diagnostics,
Common, All
```

Example with automatic schema detection:

```
ARFileCheckerCmd.exe -a "D:\AUTOSARFILE.arxml" -v \n");
```

Example with several ARXML Files in which one check. Only Application checks will be logged out.

```
-a "D:\AUTOSARFILE1.arxml" -a "D:\AUTOSARFILE2.arxml" -a "D:\AUTOSARFILE3.arxml"
```

The checker Tool categorize the findings as Following categories as follows:

-Information: refers to AUTOSAR objects found in the analyzed files, which might be of interest for the user. For example E2EProtections, DataTransformations, unmapped SystemSignals.

-Warning: this category warns about possible missing information in the ARXML being analyzed. For example missing attributes of communication parts.

-Error: An error refers to incomplete communication parts which could lead to a wrong or incomplete derivation of the Ecu Configuration(ECUC) while creating/updating a project in Cfg5. For example incomplete PDUs, wrong layouts, AUTOSAR constraint violations.

-Fatal: Critical errors which most probably impede the creation of a project in Davinci Configurator Classic. For example Schema-Errors, Double-ShortNames, wrong communication description according to AUTOSAR.

3.2 Types of output

The program provides the capability to generate output in multiple formats simultaneously, producing XML, HTML, and TXT files with each run. This flexibility ensures to receive results in all three formats structured data in XML, user-friendly web pages in HTML, and plain text representations in TXT. This makes it a versatile tool for catering to a variety of output preferences and requirements.

3.3 Meaning of the result

The program employs a three-tiered status system for assessing ARXML files, with the first tier denoted as 'passes,' indicating that the files have met all criteria successfully. The second tier, labeled as 'passed with errors,' signifies that the files have been processed but with some detected issues or non-critical errors. In the third tier, referred to as 'failed,' the program identifies that the files have not met the required standards or have significant errors warranting immediate attention and corrective action. The individual checks are categorized into different severity levels. The first level is 'Schema Valid,' signifying that the schema is in compliance and contains no errors. The second level is 'Information,' which provides general suggestions for improvement. Another level is 'Warning,' indicating an error that, while not impeding the process, is not entirely correct. Level 'Error,' denoting a critical schema fault. The determination of whether the ARXML file possesses a valid schema or not hinges upon whether the errors identified during the CGF process can be modified. It is important to note that all errors, nevertheless, are meticulously documented.

4 Contact

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