DaVinci Difference Analyzer

Application Note

Version 1.7

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Version:	1.7
Status:	released

History

Author	Date	Version	Remarks
Ske	2009-05-20	1.0	Initial version
Ske	2009-06-10	1.1	Description of starting DaVinci Difference Analyzer enhanced
Wk	2009-07-29	1.2	Document restructured and completed
Cs	2011-06-28	1.3	Description of filter options added
Dfr	2012-01-24	1.4	Updated figures and added description of view options (3.6), Parent Path (3.7) and DPA compare (3.8)
Cs	2012-05-02	1.5	Additional Copyrights added
Dfr	2014-01-28	1.6	Added description of ‘Filter equal elements’ option (3.5.2 and 4)
Cs	2015-05-28	1.7	Usage of Saxon-PE distributable package

Contents

1 Overview

This document explains the usage of the command line tool “DaVinci Difference Analyzer” Version 2.7 and tells how to interpret the result.

DaVinci Difference Analyzer compares two ARXML files and puts the result into a result file. Additionally you can compare two DaVinci Project Assistant projects by their DPA files. For further information on DPA compare see chapter 3.8.

2 Installation

2.1 Setup program

The DaVinci Difference Analyzer can be installed by starting the setup program DaVinciDiff.msi. This setup is part of a DaVinci tool setup and is installed during the tool installation procedure.

The DaVinci Difference Analyzer is installed into one of the following folders:

- English Windows: C:\Program Files\Common Files\Vector
- German Windows: C:\Programme\Gemeinsame Dateien\Vector

The following executables are installed in the sub-folder “DiffAnalyzer”:

- DVDiffSys.exe: Command line program for comparing AUTOSAR XML files (System Description files, Software Component Description files or ECU Configuration Description files)
- DVDiffView.exe: Program for displaying the differences between two AUTOSAR XML files

2.2 Licensing

In order to run DaVinci Difference Analyzer a license of at least one of the following tools is required on the PC:

- DaVinci Configurator Pro
- DaVinci Developer

3 Using DaVinci Difference Viewer

3.1 Starting the difference analysis

The difference analysis can be started via one of the following options

- Via the Program menu
  Using **Program menu** | **<DaVinci tool, e.g. Vector DaVinci Configurator 4.0>** | **DaVinci Difference Viewer** the DaVinci Difference Viewer is started. Using **File** | **New** you can open a dialog for selecting the two AUTOSAR XML files to be compared. After confirming this dialog, the comparison is started and the differences are displayed.
- Via the Windows Explorer
  After selecting two files with extension .arxml in the Windows Explorer, you can display the differences between these files using the context menu entry **AUTOSAR XML Diff**

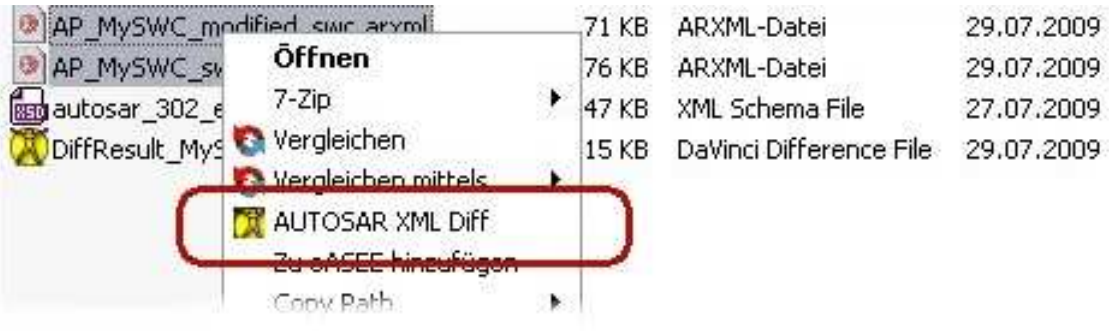

Figure 1: Analyze two files with the shell extension of DaVinci Difference Analyzer

Alternatively, you can select the first file, use the context menu entry **Select as left side for AUTOSAR XML Diff**

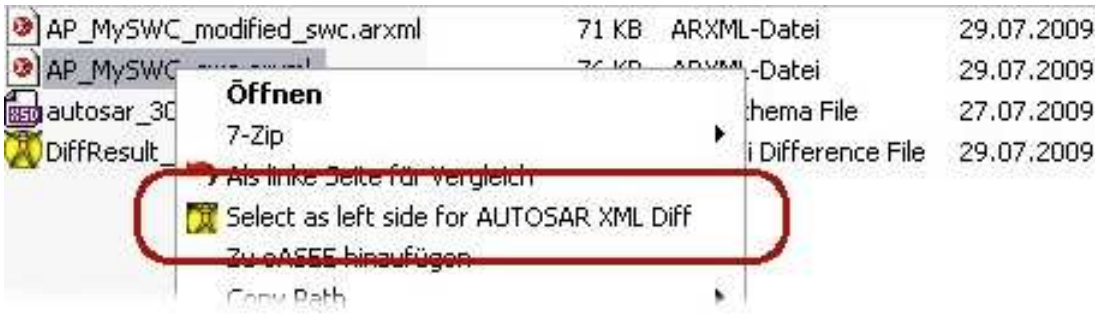

Figure 2: Select source file to compare AUTOSAR files with the DaVinci Difference Analyzer

and then select the second file and context menu entry **AUTOSAR XML Diff with**

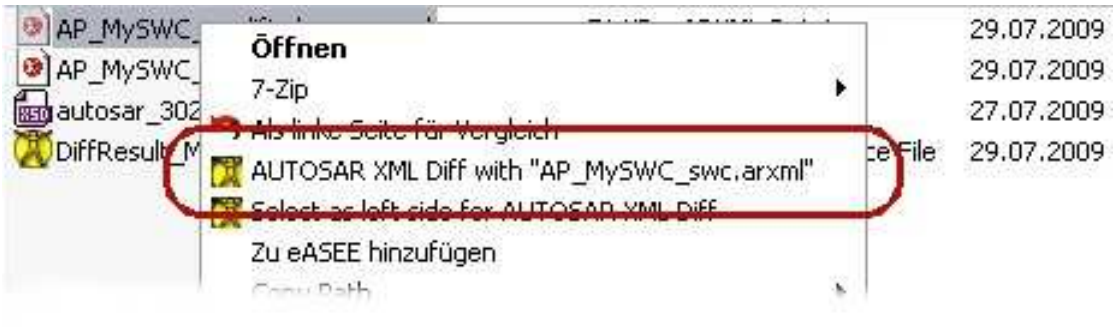

Figure 3: Shell Extension of DaVinci Difference Analyzer

3.2 Display of the differences

The differences are displayed in the DaVinci Difference Viewer (Figure 4: DaVinci Difference Viewer).

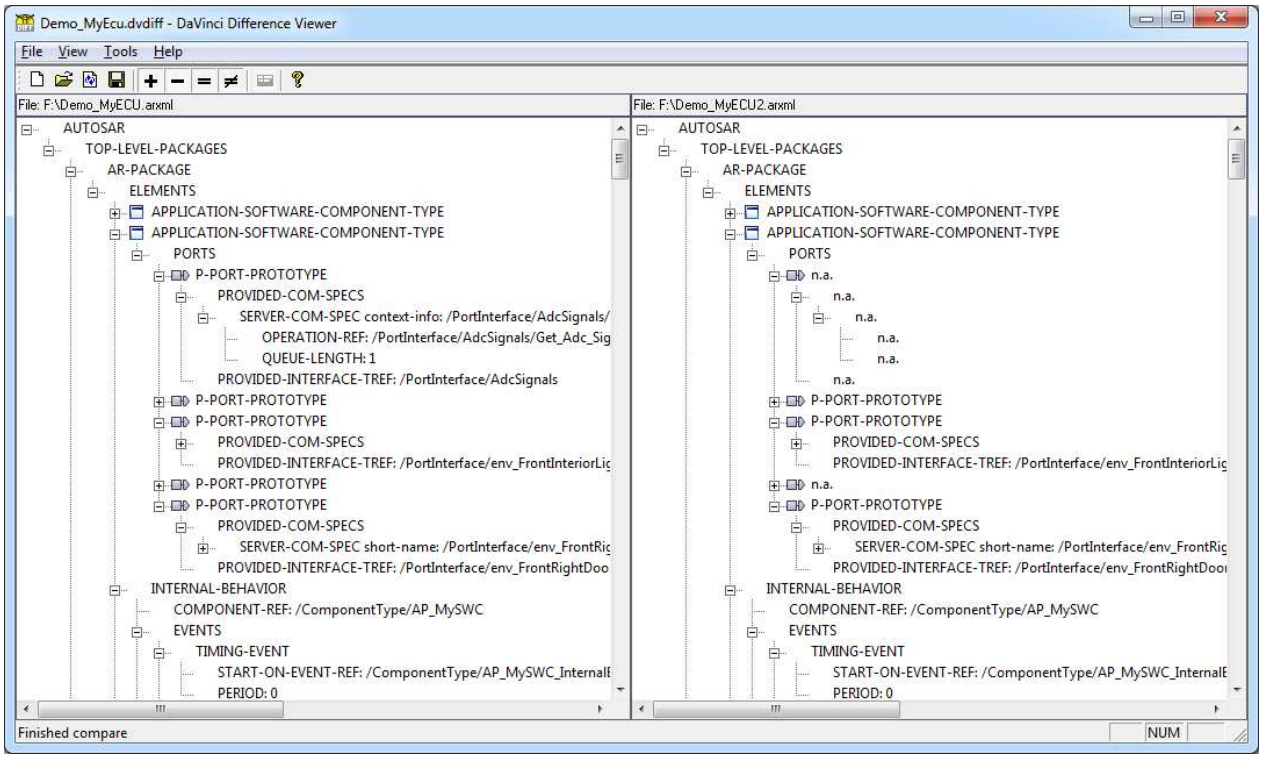

Figure 4: DaVinci Difference Viewer

3.3 Saving the result of a difference analysis

Using **File | Save As** you can save the results of the difference analysis can be saved to a DaVinci Difference File (extension .dvdiff, see chapter 5).

3.4 Opening the result file of a difference analysis

After opening the DaVinci Difference Viewer you can load a DaVinci Difference File using **File | Open**. Alternatively you can doubleclick the DaVinci Difference File in the Windows Explorer.

3.5 Filter Options

A dialog can be opened using **Tools | Options** to specify the element identification and filter for the next comparison.

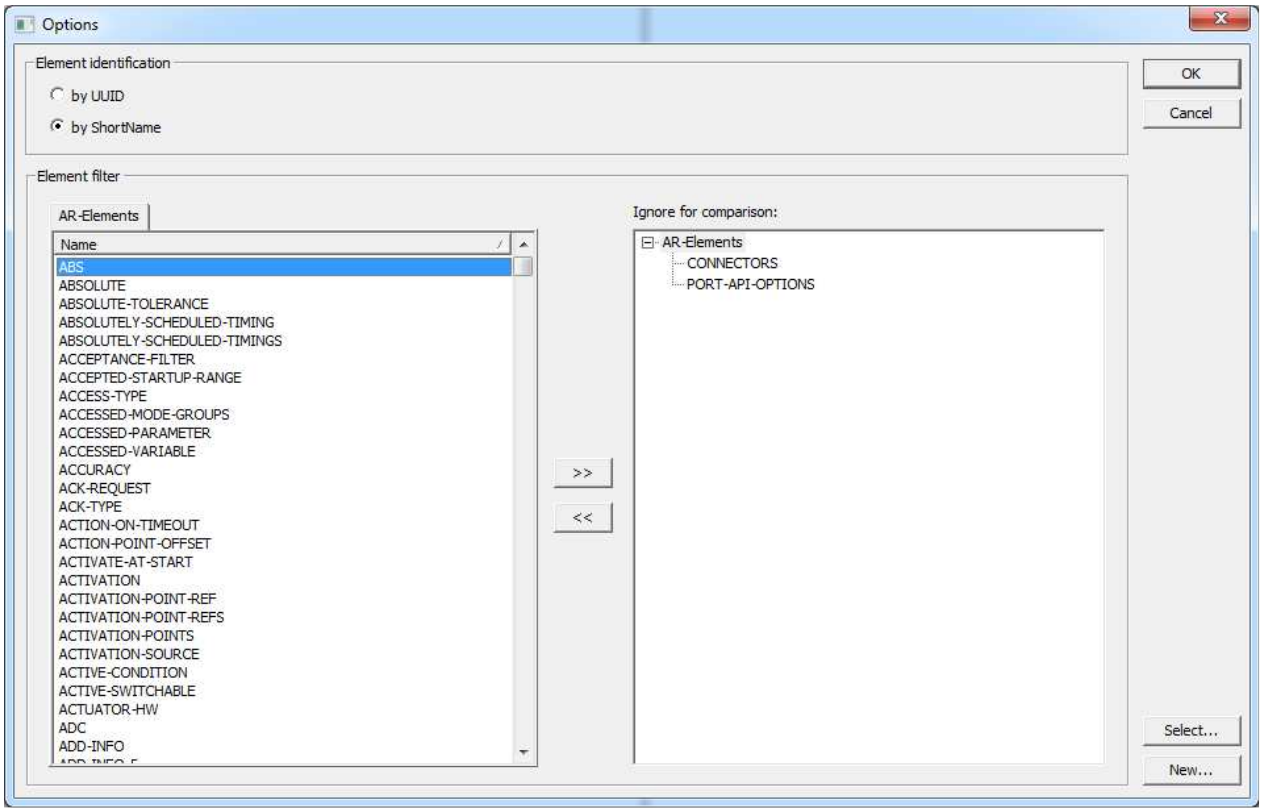

Figure 5: Options Dialog

If options are modified and the dialog has been closed using **OK** you can re-start the comparison process with the currently selected files by using the **File** | **Reload**

3.5.1 Element Identification

Elements can be identified by Short-Name or UUID:

- **Short-Name**

  The elements have to be in the same package and the Short-Name has to be identical. This means if an element is renamed or was moved to another package it will be shown as removed in the source file and added in the changed file.

- **UUID**

  In UUID-Mode the elements are identified by their UUID. Thus Short-Name or package modifications are shown as a usual modification. If an element does not have an UUID, it is identified by Short-Name or if it does not have a Short-Name it is identified according to its position.

3.5.2 Filter equal elements

Enabling filter equal elements (see Figure 6: Filter equal elements option) will remove equal AR-ELEMENTS from differing process. This option will speed up the diff process, but you cannot see equal elements in the DaVinci Difference View (see 3.6 View Options).

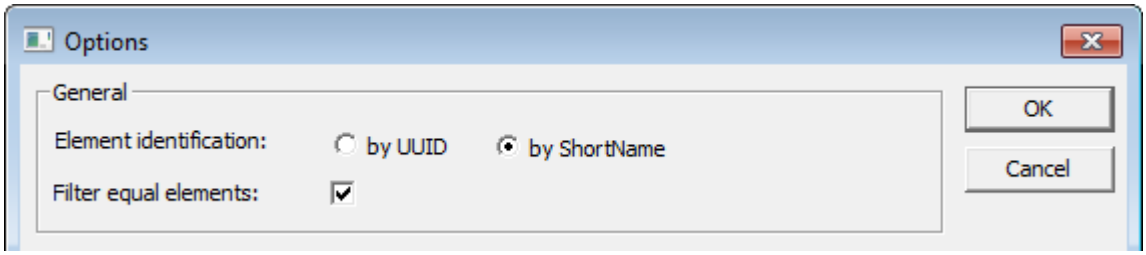

Figure 6: Filter equal elements option

3.5.3 Element Filter

To ignore certain elements during the comparison the XML element can be added to the ignorer list. These ignored elements do not exist in the diff result file. For hierarchical elements all children of ignored elements are ignored too.

3.5.4 Loading/Storing Options

The currently defined options can be stored as a configuration for later usage. By pressing the **New...** button the configuration is created with the given name. With **Select…** the options can be loaded from a stored configuration.
The configurations are stored in the file DVUserDefinedConfiguration.ini located in the shared documents folder for all users:

- English Windows:
  C:\Documents and Settings\All Users\Documents\Vector\DaVinci\DiffAnalyzer
- German Windows:
  C:\Dokumente und Einstellungen\All Users\Dokumente\Vector\DaVinci\DiffAnalyzer

3.6 View Options

The view options enable you to filter elements by their changes. Elements are considered as equal, modified, added or removed. The buttons from the toolbar (Figure 7: View Options) toggle between showing and hiding elements of the specific category. Thus you can configure your specific view of a diff, e.g. show only new elements.

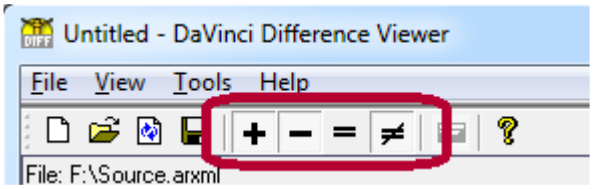

Figure 7: View Options

3.7 Parent path changes

In the options (see chapter 3.5.1) the identification type of an element can be set. While in short-name mode elements are identified by their short-name within the same package, in UUID mode it is possible to identify elements across different packages by UUID. The AUTOSAR path of the parent element is introduced to visualize changes of the package structure.

In the viewer you can define weather you want to care about changes of the package structure or not. If only the parent path was modified and the parent path is set to ignore the element is considered as equal.

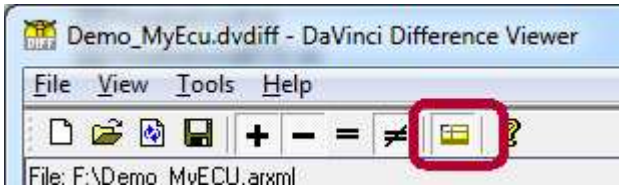

Figure 8: Show/Hide parent path changes

Note: The parent path button is only activated if the file was compared with UUID-identification. A refresh is required if you change the element identification in the options dialog.

3.8 Comparing DPA Projects

3.8.1 Starting the difference analysis

To compare two DPA projects you can choose one of the described starting methods (3.1). In the open file dialog you have to change the file extension filter to ‘DaVinci Files (*.arxml, *.dpa)’. The result is presented in the Result Overview (Figure 9: DPA project comparison) which is immediately opened.

3.8.2 Result Overview

In the Result Overview (Figure 9: DPA project comparison) a listed of items to compare is shown. An item can be a value of the project configuration itself, e.g. the project name or

binary files like DLLs or AUTOSAR files which are part of the project. At any time you can show or hide the Result Overview over the **View** | **Result Overview** menu or pressing the shortcut ‘Ctrl+r’.

The status column signalize if a value was compared. For AUTOSAR files a file icon appears and the difference result view can be shown by double clicking the row.

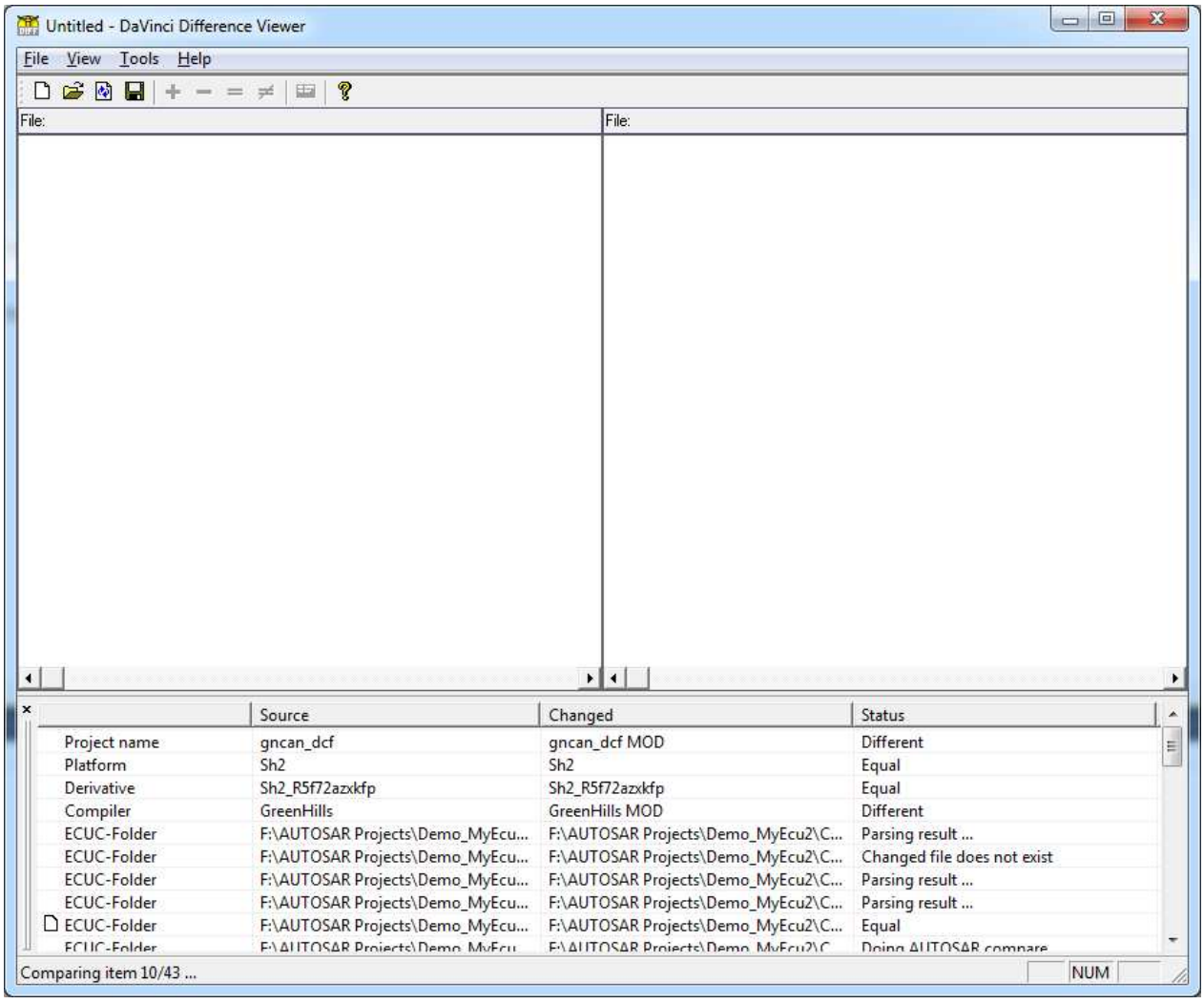

Figure 9: DPA project comparison

4 Command line usage

You can run the difference analysis by the following command:

```
DVDiffSys  -s <arfile1> -c <arfile2> -o <resultfile>
           [-r  [-e < schemafile>]]
           [-u] [-p <presetname>] [-fe <XMLElementName1[,XMLElementNameN]*>]
```

- Mandatory parameters
  - `-s <arfile1>` source file.
  - `-c <arfile2>` AUTOSAR file which is compared with the source file.
  - `-o <resultfile>` path of an xml result file which contains the differences between `<arfile1>` and `<arfile2>`.

- Optional parameters
  - `-p <presetname>` Name of the preconfigured configuration containing the options and filter definitions.
  - `-fe <XMLElementName1[,XMLElementNameN]*>` List of elements to be ignored during comparison. If `-p` and `-fe` is specified the filter list will be appended to the preconfigured filters
  - `-r` validation of AUTOSAR files against the xml schema referenced within the source/changed file. If this parameter is not specified validation is disabled by default.
  - `-r -e <schemafile>` The AUTOSAR files are validated against the defined external xml schema.
  - `-u` use UUID instead of short name to identify objects.
  - `-fee` To speed up the diff process equal AR-ELEMENTs are excluded from diffing. In the Difference Viewer it is not possible to show equal AR-ELEMENTS when enabling the equal elements filter (see 3.6 View Options).

Note: DaVinci Difference Analyzer supports AUTOSAR 2.1, AUTOSAR 3.x, and AUTOSAR 4.x

5 Result file

The results of a difference analysis can be stored in a DaVinci Difference File (XML file with extension .dvdiff).

```
<?xml version="1.0"?>
<RESULT>
  <MASTER-FILE file="C:\Vector\DaVinci Developer\3.0 (SP5)\Data\Demo_MyECU_1.arxml"/>
  <MODIFIED-FILE file="C:\Vector\DaVinci Developer\3.0 (SP5)\Data\Demo_MyECU_2.arxml"/>
  <CONFIGURATION>
    <USE-UUID>0</USE-UUID>
    <ELEMENT-FILTER>PORT-API-OPTIONS</ELEMENT-FILTER>
  </CONFIGURATION>
  <CHANGED type="AUTOSAR">
    <CHANGED type="TOP-LEVEL-PACKAGES">
      <CHANGED short-name="ComponentType" type="AR-PACKAGE">
        <CHANGED type="ELEMENTS">
          <CHANGED short-name="SA_LightDimControl_InternalBehavior" type="INTERNAL-BEHAVIOR">
            <CHANGED type="RUNNABLES">
              <CHANGED short-name="Dim_PwmControl" type="RUNNABLE-ENTITY" parent-info="/ComponentType/SA_LightDimControl">
                <REMOVED type="DATA-SEND-POINTS">
                  <REMOVED short-name="SEND_BackLight_DimControl_BacklightDimControl" type="DATA-SEND-POINT">
                    <REMOVED type="DATA-ELEMENT-IREF">
                      <REMOVED type="P-PORT-PROTOTYPE-REF">
                        <OLD>/ComponentType/SA_LightDimControl/BackLight_DimControl</OLD>
                      </REMOVED>
                      <REMOVED type="DATA-ELEMENT-PROTOTYPE-REF">
                        <OLD>/PortInterface/BackLight_DimControl/BacklightDimControl</OLD>
                      </REMOVED>
                    </REMOVED>
                  </REMOVED>
                </REMOVED>
              </CHANGED>
            </CHANGED>
          </CHANGED>
          <CHANGED short-name="SA_LightDimControl" type="SENSOR-ACTUATOR-SOFTWARE-COMPONENT-TYPE">
            <CHANGED type="PORTS">
              <ADDED short-name="BackLightState" type="P-PORT-PROTOTYPE" parent-info="SA_LightDimControl">
                <ADDED type="PROVIDED-COM-SPECS">
                  <ADDED type="UNQUEUED-SENDER-COM-SPEC" context-info="/PortInterface/FrontLightState/OnOff">
                    <ADDED type="DATA-ELEMENT-REF">
                      <NEW>/PortInterface/FrontLightState/OnOff</NEW>
                    </ADDED>
                    <ADDED type="CAN-INVALIDATE">
                      <NEW>false</NEW>
                    </ADDED>
                  </ADDED>
```

Description of the XML tags:

- MASTER-FILE

  Specifies the master (source) file of the comparison. The attribute “file” specifies an absolute or relative file path.

- MODIFIED-FILE

  Specifies the modified file to compare with the master file. The attribute “file” specifies an absolute or relative file path.

- CONFIGURATION
  Used options for this comparison including the full list of ignored elements
- CHANGED

Specifies that the object itself or one or more if its children had been changed. The attribute “type” specifies the type of the object. The attribute “short-name” specifies the name of the object.

If something is changed somewhere in the sub branch, the object is followed by a <CHANGED>, <ADDED> or <REMOVED> tag.

If the value of the object itself is changed, the object is followed by an <OLD> and <NEW> tag.

- ADDED

Specifies the object and its children have been added to the modified file. The attribute “type” specifies the type of the object. The attribute “short-name” specifies the name of the object.

- REMOVED

Specifies the object and its children have been removed from the master file. The attribute “type” specifies the type of the object. The attribute “short-name” specifies the name of the object.

- OLD

Value of an object in master file.

- NEW

Value of an object in modified file.

- NO_CHANGES

Files are equal.

- NO_AUTOSAR

File is not an AUTOSAR file.

- EQUAL

Elements are equal.

6 Additional Copyrights

6.1 Saxon-PE Redistribution

Difference algorithm is executed using XSLT style-sheets processed by "The Saxon XSLT and XQuery Processor from Saxonica Limited" available at http://www.saxonica.com/.

DaVinci Difference Analyzer links to the Saxon-PE binary libraries. The libraries are distributed as separate binary DLL files. No modifications have been made to the libraries.

6.1.1 IKVM Runtime

Saxon links dynamically to the IKVM Runtime. See http://www.ikvm.net/.
Can be downloaded from http://sourceforge.net/projects/ikvm/files/
License is at http://weblog.ikvm.net/story.aspx/license

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