

RTA Application Note

How to import an LDF file

RTA-CAR

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Document: AN-000/EN-09-2019

Contents

1	Introduction	6
1.1	Scope	6
1.2	Preconditions	6
1.3	Import LDF in ISOLAR-AN-000	6
1.3.1	LDF Importer	6
1.3.2	Select ECU and Frames	7
1.3.3	BSW Configuration	9
1.3.4	BSW Code generation	10
1.3.5	RTE integration	11
1.3.6	MCAL Integration	12
1.3.7	Update build environment	12
2	Contact, Support and Problem Reporting	13

List of Tables

List of Figures

1 Introduction

1.1 Scope

This application note will show how to create a Lin node importing the relative LDF file. In this example, the Lin node will be imported in an existing ECU with CAN node already configured.

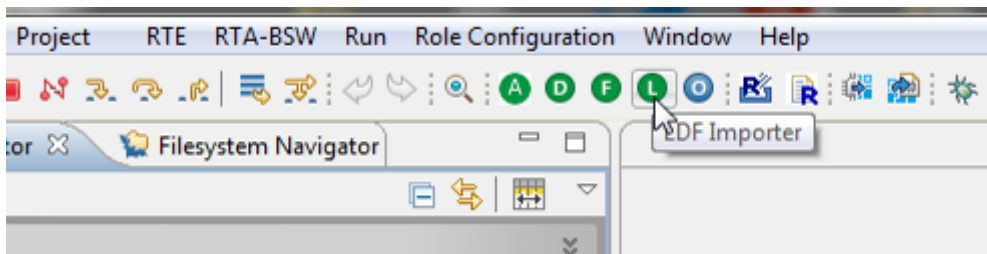
1.2 Preconditions

- ECU name in LDF is matching with the existing ECU in the System
- BSW makes use of the RTA-BSW configurator generator
- RTE, BSW and OS are generating with no issue

1.3 Import LDF in ISOLAR-AN-000

1.3.1 LDF Importer

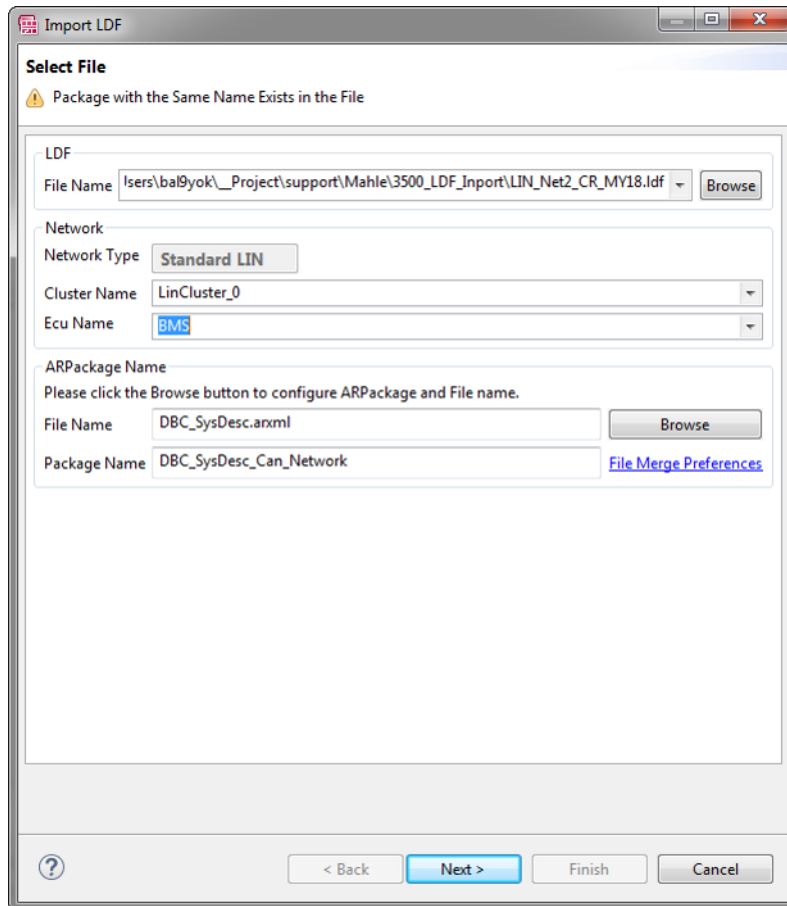
Select LDF import feature from ISOLAR-A



Select the LDF file from your file system. Select the ECU name (even if it's already selected, open the Ecu name menu and select the ECU to activate the merge option):

RTA Application Note

How to import an LDF file



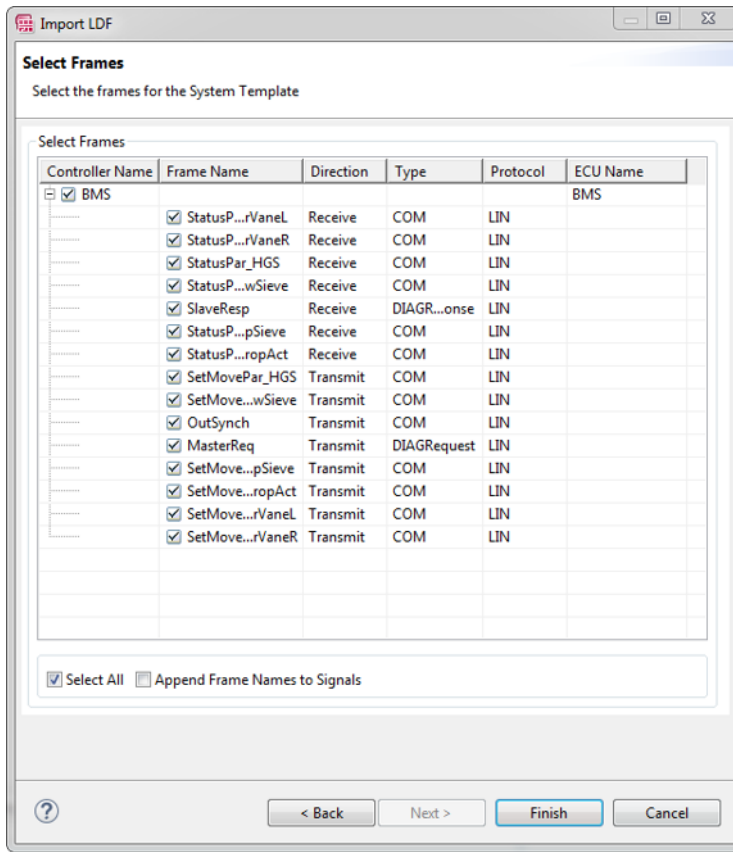
In File Merge Preferences selected the wanted merge option.

1.3.2 Select ECU and Frames

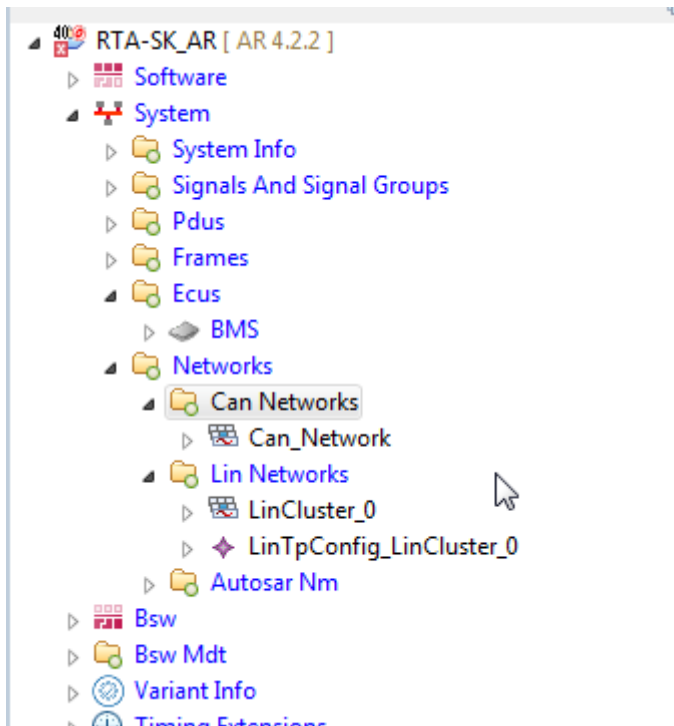
In the next window select the required Master ECU, and then the Lin frames:

RTA Application Note

How to import an LDF file

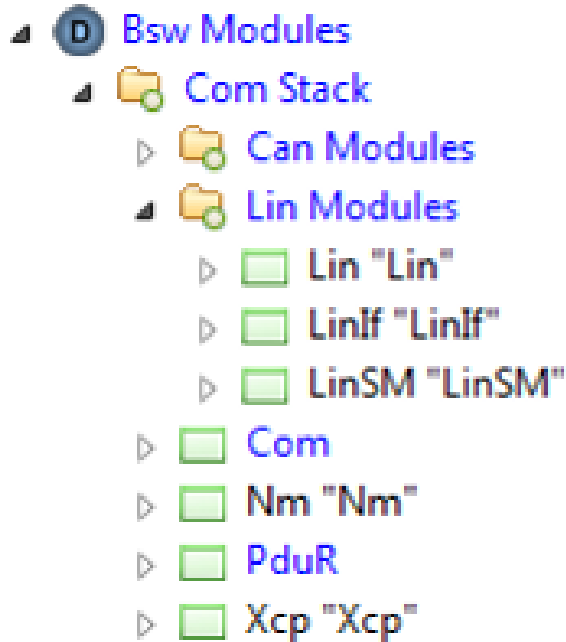


As result of the import, ISOLAR-A will create PDU, Frames and Signals. It will also create a new Lin network:



1.3.3 BSW Configuration

It is now possible to generate the BSW configuration RTA-BSW will create the configuration for the new modules LinIf and LinSM:



The following actions need to be added to the initialization of the ECU to complete the BSW integration:

1. Initialize LinIf
2. Initialize LinSM
3. ComM allow communication on Lin channel
4. ComM set FULL_COMM for Lin channel
5. Lin Schedule tables shall be activated

All these actions can be implemented by BswM adding them in the BswMActions and BswMActionLists.

NB: Point 1 to 4 are same as any ComM channel (e.g. CAN nodes), while point 5 is dedicated for Lin channels.

The following pictures show a sample configuration:

RTA Application Note

How to import an LDF file

The image shows a tree view of BswMActions [30] and BswMActionListItems. The BswMActions tree includes:

- BswMAction "BswM_AI_ComMReqFullComm_User0"
- BswMAction "BswM_AI_ComMReqFullComm_User1"
- BswMAction "BswM_AI_ComMReqNoComm_User0"
- BswMAction "BswM_AI_ComMReqNoComm_User1"
- BswMAction "BswM_AI_ComMCommAllowed_Can0"
- BswMAction "BswM_AI_ComMCommAllowed_Lin0"
- BswMAction "BswM_AI_ComMCommNotAllowed_Can0"
- BswMAction "BswM_AI_ComMCommNotAllowed_Lin0"
- BswMAction "BswM_AI_StartPduGroup_All"
- BswMAction "BswM_AI_StopPduGroup_All"
- BswMAction "BswM_AI_LinInfin"
- BswMAction "BswM_AI_CanInfin"
- BswMAction "BswM_AI_LinInit"
- BswMAction "BswM_AI_CanInit"
- BswMAction "BswM_AI_ComMInit"
- BswMAction "BswM_AI_LinSMInit"
- BswMAction "BswM_AI_CanSMInit"
- BswMAction "BswM_AI_ComMInit"
- BswMAction "BswM_AI_PduRinit"
- BswMAction "BswM_AI_RteStop"
- BswMAction "BswM_AI_RteTimerStart"
- BswMAction "BswM_AI_ComMDelinit"
- BswMAction "BswM_AI_LinRequestSchedule"
 - BswMAvailableActions "BswMAvailableActions"
 - BswMComMAllowCom
 - BswMComMModeLimitation
 - BswMComMModeSwitch
 - BswMDeadlineMonitoringControl
 - BswMEcuMStateSwitch
 - BswMEthfSwitchPortGroupRequestMode
 - BswMJ1939DcmStateSwitch
 - BswMJ1939RmStateSwitch
 - BswMLinScheduleSwitch "BswMLinScheduleSwitch"
 - BswMNMControl
 - BswMPduGroupSwitch
 - BswMPduRouterControl
 - BswMRteModeRequest
 - BswMRteSwitch
 - BswMSchMSwitch
 - BswMSdClientServiceModeRequest
 - BswMSdConsumedEventGroupModeRequest
 - BswMSdServerServiceModeRequest

The BswMActionListItems table shows the following items:

Item	BswMActionList	BswMAbortOn...	BswMActionLi...	BswMActionListRef*
1	BswM_AI_RteTimerStart	<input checked="" type="checkbox"/>	9	BswM_AI_RteTimerStart
2	BswM_AI_BswMStart...	<input type="checkbox"/>	10	BswM_AI_BswMSwitchStartupTwo
3	BswM_AI_LinInit	<input type="checkbox"/>	0	BswM_AI_LinInit
4	BswM_AI_CanInit	<input type="checkbox"/>	1	BswM_AI_CanInit
5	BswM_AI_LinInfin	<input type="checkbox"/>	2	BswM_AI_LinInfin
6	BswM_AI_CanInfin	<input type="checkbox"/>	3	BswM_AI_CanInfin
7	BswM_AI_LinSMInit	<input type="checkbox"/>	4	BswM_AI_LinSMInit
8	BswM_AI_CanSMInit	<input type="checkbox"/>	5	BswM_AI_CanSMInit
9	BswM_AI_PduRinit	<input type="checkbox"/>	6	BswM_AI_PduRinit
10	BswM_AI_ComMInit	<input type="checkbox"/>	7	BswM_AI_ComMInit
11	BswM_AI_ComMInit	<input type="checkbox"/>	8	BswM_AI_ComMInit
bulk		<input type="checkbox"/>		

The BswMActionListItems table shows the following items:

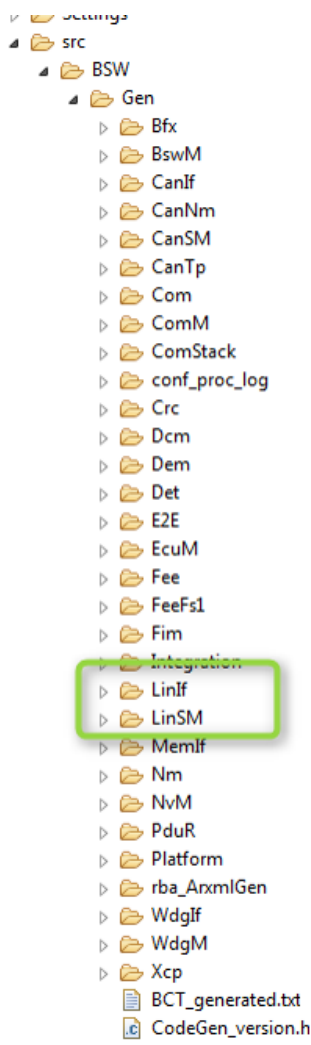
Item	BswMActionList	BswMAbortOn...	BswMActionLi...	BswMActionListRef*
1	BswM_AI_StartPdu	<input type="checkbox"/>	0	BswM_AI_StartPduGroup_All
2	BswM_AI_AllowCom...	<input type="checkbox"/>	1	BswM_AI_ComMCommAllowed_Can0
3	BswM_AI_AllowCom...	<input type="checkbox"/>	2	BswM_AI_ComMCommAllowed_Lin0
4	BswM_AI_RequestC...	<input type="checkbox"/>	4	BswM_AI_ComMReqFullComm_User0
5	BswM_AI_RequestC...	<input type="checkbox"/>	5	BswM_AI_ComMReqFullComm_User1
6	BswM_AI_BswMApp...	<input type="checkbox"/>	7	BswM_AI_BswMSwitchAppRun
bulk		<input type="checkbox"/>		

1.3.4 BSW Code generation

It's now possible to generate the BSW code. RTA-BSW will update the COM stack modules with the new configuration and will create the LinIf and LinSM source code:

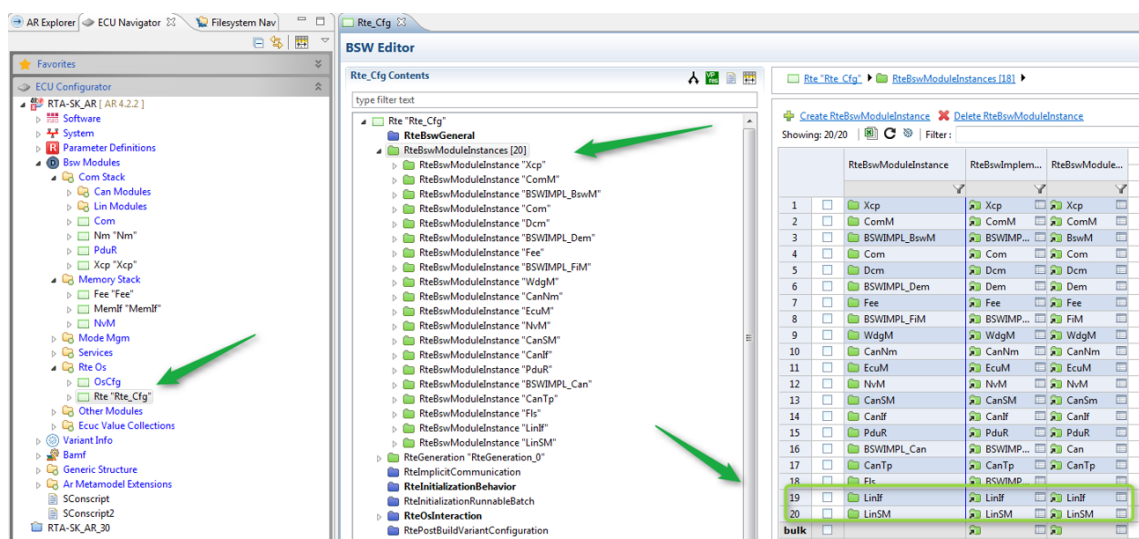
RTA Application Note

How to import an LDF file



1.3.5 RTE integration

From ECU Configurator open the Rte modules and add the LinSM and LinIf module instance. This step is BSW module equivalent of adding a SWC to the Composition



RTA Application Note

How to import an LDF file

Now in the RTE Editor, Entity to Task Mapping window, map the LinIf, LinSM and the new ComM MainFunction to a task

The screenshot displays the 'Entity to Task Mapping' interface in the RTE Editor. It includes configuration fields for OS Conf (OsCfg), RTE Conf (Rte_Cfg), ECU Conf, OS Application, Partition, and Core. Below the configuration is a 'Mapped Entities' table with columns for Os Task/Event Mapping, Os..., Entities, Component Instance Properties, Position, and Swc Event Property. The table lists several mappings, including RE_Com_SWC, RE_Swc_Dem_Periodic, CPT_Com_SWC, CPT_Nag_SWC, and OsTask_BSW. The 'UnMapped Entities' table shows three entries for BSWSE_MainFuncio... mapped to ComM, LinIf, and LinSM, all associated with BswTimingEvent.

Then generate the RTE.

1.3.6 MCAL Integration

Lin driver shall be configured in the MCAL generation tool. The driver configuration does not contains information about frames (which means that frames does not have to be aligned) but it contains Channel configuration that shall be aligned to the BSW configuration. RTA-BSW generates a Lin configuration, but is limited to the LinChannels, this configuration can be imported into MCAL, but the driver will require additional configuration which are not dependent by the BSW. After the Lin has been configured and generated, it may requires to be integrated in the system for: - MainFunciton: scheduled by task - Init: invoked by EcuM in the InitList

1.3.7 Update build environment

When all the new module have been generated, is time to update the build environment to add this module to the building list. During the phase some integration files may required adaption to integrate the BSW with the MCAL.

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