



TRDP

Train Real Time Data Protocol

TCNOpen TRDP 1.0.0.0 Release Notes

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History

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1. Introduction

1.1. Purpose

This document is the Release Notes for the Bombardier* Release of TCNOpen* TRDP* Version 1.0.0.0 as implementation of the communication profile defined in IEC61375-2-3.

1.2. Intended Audience

The audience of this document and the users of the release are software engineers that want to adapt or to use TCNOpen* TRDP* as implementation of the communication profile defined in IEC61375-2-3.

1.3. References/Related Documents

Reference	Number	Title
[Wire]	IEC51375-3-2	TRDP Protocol (Annex A)

Table 1: References

1.4. Abbreviations and Definitions

Abbreviation	Definition
PD	“Process Data” Part of the in [Wire] defined communication protocol used for cyclic data transmissions based on UDP protocol.
UDP-MD	“UDP Message Data” Part of the in [Wire] defined communication protocol used for event driven data transmissions based on UDP protocol.
TCP-MD	“UDP Message Data” Part of the in [Wire] defined communication protocol used for event driven data transmissions based on TCP protocol.
ETBN	Ethernet Train Backbone Node

Table 2: Abbreviations and Definitions

2. Product Definition

2.1. General Description

The TCNOpen TRDP is an open source implementation of communication profile described in [Wire] and includes compiled libraries for primary targets and source code to be used for other platforms as well as examples for reference implementation.

TCNOpen TRDP includes:

- TRDPLight (the communication protocol stack for PD, UDP-MD and TCP-MD)
- TRDP Marshall – a service for marshalling/unmarshalling TRDP user data
- TRDP XML – a service for reading TCNOpen TRDP XML configuration files
- TRDP LADDER – ladder support acc. to IEC61375-3-4
- TRDP SPY – a wireshark plugin to interpret TRDP telegrams

It does not yet include:

- TRDP TTI – a service to access the train topology information data base of the ETBN
- TRDP SDT – a service for safe data transmission according to the definition in [Wire]
- TRDP ADR – a service for IP-URI address translation
- TRDP SDL – a service for SW download support

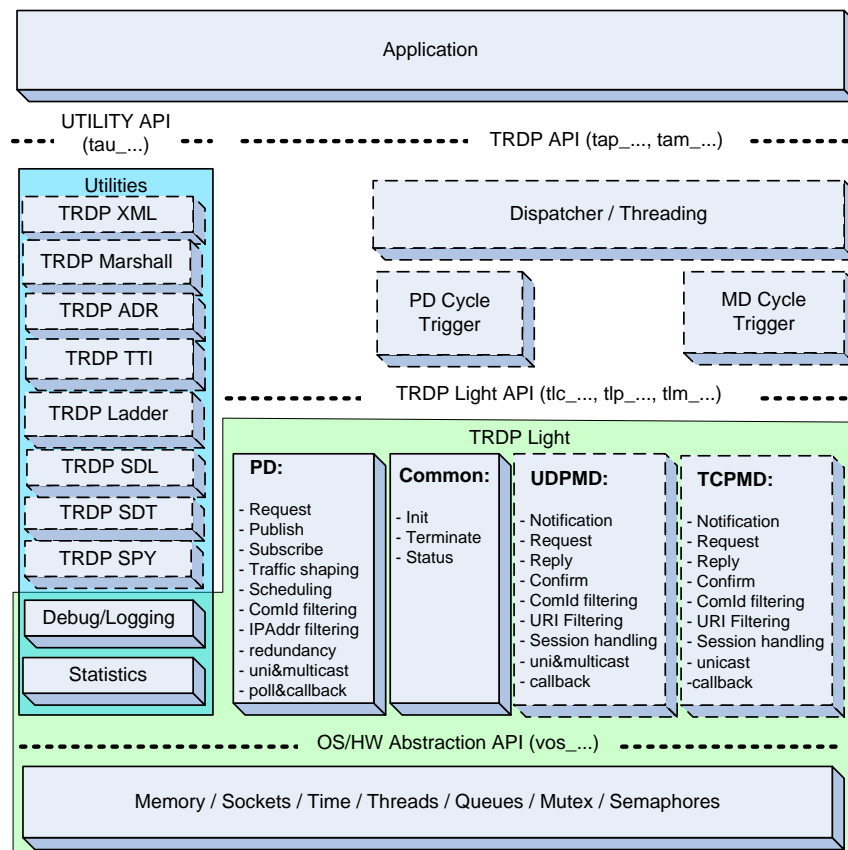


Figure 1 TRDP Modular Structure

2.2. Product Identification

TCNOpen TRDP 1.0.0.0 contains the following parts identified by the following identification numbers:

Abbreviation	Identification	Remark
TRDPLight 1.0.0.0		
TRDPMarshall 1.0.0.0		
TRDPXML 1.0.0.0		
TRDPLadder 1.0.0.0		
TRDPSpy 1.0.0.0		

Table 3: Product Identifications

2.3. Targets

2.3.1. Primary Targets

TCNOpen TRDP is provided for a set of primary targets. Outputs for these have been verified during the release process.

Target	Use	OS	CPU-HW
Linux PC	General	Linux 32	x86
Windows PC	General	Windows XP	x86
MAC	General	MacOS	x86

Table 4: Primary Targets

2.3.2. Secondary Targets

TCNOpen TRDP is also delivered as an SDK with source code and example makefiles only. The makefiles serve as examples for building the binaries for different platforms and can be used as a template for specific platform builds. The following table shows the builds which have not been tested but have been taken care of within the source code.

Target	Use	OS	CPU-HW
Windows PC	General	Windows7 32	x86

Table 5: Secondary Targets

3. Delivery

3.1. Platform

Target	File	Description
None		

Table 6: Platform Delivery Content TRDPLight

Target	File	Description
None		

Table 7: Platform Delivery Content TRDPMarshall

Target	File	Description
None		

Table 8: Platform Delivery Content TRDPXML

Target	File	Description
None		

Table 9: Platform Delivery Content TRDPLadder

Target	File	Description
Linux32	..\trdp\spy\linux32\packet-trdp_spy.so	Linux32 Wireshark plugin
WindowsXP	..\trdp\spy\linux32\trdp_spy.dll	Win32 Wireshark plugin
WindowsXP	..\trdp\spy\win32\libxml2.dll	Resources for Win32 Wireshark plugin
WindowsXP	..\trdp\spy\win32\iconv.dll	Resources for Win32 Wireshark plugin
WindowsXP	..\trdp\spy\win32\readme.txt	Readme for Win32 Wireshark plugin

Table 10: Platform Delivery Content TRDPSPy

3.2. SDK

To support other targets than the platform does, TCNOpen TRDP is also delivered as an SDK (Software Development Kit). The release is enclosed in the archive file “TCNOpenTRDP-SRC 1.0.0.0.zip”. This comprises items according to the tables below using the following file structure:

DirLevel1	DirLevel2	DirLevel3	Description
config			XML configuration structure and build environment configurations
doc			Documentation
resources			Open source resources used within TRDP
	posix		
	windows		
		getopt	getopt functionality for test programs
		iconv	XML Parser functionality
		libxml	XML parser functionality
		pthread	Posix threads for vos functionality
		wireshark	Wireshark win32 1.8.3
src			TRDP source code
	api		TRDP API header files
	common		TRDP source code files
	example		TRDP example application files
	vos		VOS source code and header files
		api	VOS API header files
		common	VOS target independing source code files
		posix	VOS POSIX depending source code files
		vxworks	VOS VXWORKS depending source code files
		windows	VOS WIN32 depending source code files
spy			Wireshark plugin for TRDP
	doc		Documentation
	src		Source code for wireshark plugin
	linux32		Plugin for Linux32
	win32		Plugin for Win32
test			
	diverse		Test diverse functions of the library
	laddermdtest		Test of the TRDP ladder MD functionality
	ladderpdtest		Test of the TRDP ladder MD functionality
	lint		PCLint profile for Windows
	marshalling		Test of marshalling/un-marshalling
	mdpatterns		Test of the TRDP MD patterns
	pdpatterns		Test of the TRDP PD patterns
	udpmdcom		Test of the UDP MD communication

DirLevel1	DirLevel2	DirLevel3	Description
	xml		Test of the TRDP XML configuration
example			Examples for TRDP use
VisualC			VisualC 2010 configuration for TRDP library and related test examples
XCode			Xcode configuration for TRDP library and related test examples

Table 11: SDK Delivery Directory Structure

3.2.1. TRDPLight

The TRDPLight contains the base functionality for PD, UDP-MD and TCP-MD.

File	Description
..\trdp\src\api\trdp_proto.h	TRDP protocol definitions
..\trdp\src\api\trdp_types.h	TRDP type definitions
..\trdp\src\api\trdp_if_light.h	TRDP light API definitions
..\trdp\src\api\tau_addr.h	URI/IP address translation support (not yet implemented)
..\trdp\src\api\tau_tti.h	Train topology information support (not yet implemented)
..\trdp\src\common\trdp_if.c	TRDP light API
..\trdp\src\common\trdp_if.h	TRDP light API internal definitions
..\trdp\src\common\trdp_mdcom.c	TRDP light MD functionality
..\trdp\src\common\trdp_mdcom.h	TRDP light MD functionality definitions
..\trdp\src\common\trdp_pdcom.c	TRDP light PD functionality
..\trdp\src\common\trdp_pdcom.h	TRDP light PD functionality definitions
..\trdp\src\common\trdp_private.h	TRDP light private definitions
..\trdp\src\common\trdp_stats.c	TRDP light statistics functionality
..\trdp\src\common\trdp_stats.h	TRDP light statistics functionality definitions
..\trdp\src\common\trdp_utils.c	TRDP light utilities
..\trdp\src\common\trdp_utils.h	TRDP light MD utilities definitions
..\trdp\src\vos\api\vos_mem.h	VOS memory management functionality definitions
..\trdp\src\vos\api\vos_shared_mem.h	VOS shared memory management functionality definitions
..\trdp\src\vos\api\vos_sock.h	VOS IP network and socket management functionality definitions
..\trdp\src\vos\api\vos_thread.h	VOS thread and timer management functionality definitions
..\trdp\src\vos\api\vos_types.h	VOS type definitions
..\trdp\src\vos\api\vos_utils.h	VOS utility definitions
..\trdp\src\vos\common\vos_mem.c	VOS memory management functionality

File	Description
..\trdp\src\vos\common\utils.c	VOS utilities
..\trdp\src\vos\posix\vos_private.h	VOS private definitions
..\trdp\src\vos\posix\vos_shared_mem.c	VOS shared memory management functionality
..\trdp\src\vos\posix\vos_sock.c	VOS IP network and socket management functionality
..\trdp\src\vos\posix\vos_thread.c	VOS thread and timer management functionality
..\trdp\src\vos\windows\private.h	VOS private definitions
..\trdp\src\vos\windows\vos_shared_mem.c	VOS shared memory management functionality
..\trdp\src\vos\windows\vos_sock.c	VOS IP network and socket management functionality
..\trdp\src\vos\windows\vos_thread.c	VOS thread and timer management functionality

Table 12: SDK Delivery Content - TRDPLight

3.2.2. TRDPMarshall

The TRDPMarshall contains the marshalling/un-marshalling functionality.

File	Description
..\trdp\src\common\tau_marshall.c	Marshalling/un-marshalling functionality
..\trdp\src\api\tau_marshall.h	Marshalling/un-marshalling definitions

Table 13: SDK Delivery Content - TRDPMarshall

3.2.3. TRDPXML

The TRDPXML contains the functionality for reading TRDP XML configuration files.

NOTE: This source code needs the resources iconv and libxml.

File	Description
..\trdp\src\common\tau_xml.c	Read TRDP XML configuration functionality
..\trdp\src\api\tau_xml.h	Read TRDP XML configuration definitions
..\trdp\src\api\trdp-config.xsd	TRDP configuration XML schema

Table 14: SDK Delivery Content – TRDPXML

3.2.4. TRDPLadder

The TRDPLadder contains the functionality for handling TRDP PD in ladder architectures acc. IEC61375-3-4.

File	Description
..\trdp\src\common\tau_ladder.c	Ladder support functionality
..\trdp\src\common\tau_pdcom_ladder.c	Ladder support functionality
..\trdp\src\api\tau_ladder.h	Ladder support definitions

Table 15: SDK Delivery Content – TRDPLadder

3.2.5. TRDPSPy

The TRDPSPy contains the wireshark plugin for interpreting TRDP telegrams.

NOTE: The source code needs the resources iconv and libxml.

File	Description
..\trdp\spy\linux32\packet-trdp_spy.so	Linux32 Wireshark plugin
..\trdp\spy\linux32\trdp_spy.dll	Win32 Wireshark plugin
..\trdp\spy\win32\libxml2.dll	Resources for Win32 Wireshark plugin
..\trdp\spy\win32\iconv.dll	Resources for Win32 Wireshark plugin
..\trdp\spy\win32\readme.txt	Readme for Win32 Wireshark plugin
..\trdp\spy\src\INSTALL.txt	Installation guide for Wireshark plugin SDK
..\trdp\spy\src\trdp_spy\README.txt	Build instruction
..\trdp\spy\src\trdp_spy\plugin.rc.in	
..\trdp\spy\src\trdp_spy\plugin.c	
..\trdp\spy\src\trdp_spy\parsebody.h	
..\trdp\spy\src\trdp_spy\parsebody.c	
..\trdp\spy\src\trdp_spy\packet-trdp_spy.h	
..\trdp\spy\src\trdp_spy\packet-trdp_spy.c	
..\trdp\spy\src\trdp_spy\moduleinfo.nmake	
..\trdp\spy\src\trdp_spy\moduleinfo.h	
..\trdp\spy\src\trdp_spy\Makefile.nmake	
..\trdp\spy\src\trdp_spy\Makefile.common	
..\trdp\spy\src\trdp_spy\Makefile.am	
..\trdp\spy\src\trdp_spy\Makefile	
..\trdp\spy\src\trdp_spy\CMakeLists.txt	
..\trdp\spy\src\trdp_spy\clean.bat	
..\trdp\spy\src\trdp_spy\build.sh	
..\trdp\spy\src\trdp_spy\build.bat	

Table 16: SDK Delivery Content - TRDPSPy

3.2.6. Resources

The following open source resources are needed for the below described functionality of the TRDP library are included in the delivery.

File	Description
..\trdp\resources\windows\getopt*	Windows getopt implementation for testing
..\trdp\resources\windows\iconv*	Iconv for XML configuration interpretation
..\trdp\resources\windows\libxml*	Libxml for XML configuration interpretation
..\trdp\resources\windows\pthread*	Posix thread implementation for Windows for VOS
..\trdp\resources\windows\wireshark*	Wireshark 1.8.3 for TRDP Spy

Table 17: SDK Delivery Content – Resources

3.2.7. Build Environment

The following files for the build environment are included in the delivery.

File	Description
..\trdp\makefile	Makefile for TRDP Light
..\trdp\readme-makefile.txt	Makefile configuration instruction
..\trdp\config\buildsettings_posix_TEMPLATE	Makefile configuration settings
..\trdp\VisualC*	VisualC 2010 configuration files to build the TRDP library as well as the different test applications.
..\trdp\Xcode*	XCode configuration files to build the TRDP library as well as the different test applications.

Table 18: SDK Delivery Content – Build Environment

3.2.8. Tests

The following test programs are included in the delivery.

File	Description
..\trdp\test\diverse*	Diverse tests for TRDP library
..\trdp\test\laddermdtest*	Ladder MD test
..\trdp\test\ladderpdtest*	Ladder PD test
..\trdp\test\lint*	PCLint configuration for Windows
..\trdp\test\marshalling*	Marshalling test
..\trdp\test\mdpatterns*	MD pattern tests
..\trdp\test\pdpatterns*	PD pattern tests
..\trdp\test\udpmdcom*	UDP MD communication test
..\trdp\test\xml*	XML configuration test

Table 19: SDK Delivery Content - Tests

3.2.9. Examples

The following example programs are included in the delivery.

File	Description
..\trdp\example\example.xml	TRDP example configuration
..\trdp\example\echoPolling.c	PD polling example
..\trdp\example\echoSelect.c	PD select example
..\trdp\example\echoSelectCmdLine.c	PD select example
..\trdp\example\ladderApplication.c	Ladder application example
..\trdp\example\mdManager.c	UDP MD example
..\trdp\example\mdManagerTCP.c	TCP MD example
..\trdp\example\receiveHello.c	PD receive example
..\trdp\example\sendHello.c	PD send example

Table 20: SDK Delivery Content - Examples

3.3. Documentation

The following documents are related to the delivered product and part of the delivery.

#	Document	Revision	Identification
1	TRDP Coding Rules	07	TCN-TRDP1-A-BOM-008
2	TRDP SyRS	07	TCN-TRDP1-D-BOM-003
3	TRDP Architecture & Design	01	TCN-TRDP2-D-BOM-019
4	TRDP Conformance Test Specification	00 (not ready)	TCN-TRDP2-D-BOM-031
5	TRDP Conformance Test Report	00 (not ready)	TCN-TRDP2-D-BOM-032
6	TRDP User's Manual	18	TCN-TRDP2-D-BOM-011

Table 21: SDK Delivery Content - Documentation

3.4. Restrictions

None

4. Installation

4.1. Platform

4.2. SDK

1. Unpack the file “TCNOpenTRDP 1.0.0.0.zip” into your development work area.
2. Check the files in src/vos for targets which suites your target
3. Edit the Makefile by adding or changing your configuration.
4. For windows environments, open the VisualC/Win32TRDP_VS2010.sln file with MS Visual Studio 2010.

.
All libraries/executables can be found in the folders described in chapter 3.2.

5. How to use

5.1. Linux

Adapt the delivered configuration for the makefile and compile the TRDP library.

5.2. VxWorks

Not yet supported.

5.3. Windows

Adapt and use the delivered VisualC 2010 configuration and compile the TRDP library.

6. Changes

The following PRs (Problem Report) and NCRs (Non Conformity Reports) have been corrected since the previous release. Column '*PR no.*' contains the PR number, if a PR exists.

6.1. TRDPLight

6.1.1. Corrected Errors

CR	Description
None – first release	

Table 22: Corrected Errors TRDPLight

6.1.2. New or Enhanced Functions

CR	Description
None – first release	

Table 23: New or enhanced functions TRDPLight

6.1.3. Known Errors

CR	Description
#25	vos_shared_mem.c - WIN32 implementation missing
#30	For performance reasons a un-join shall be done after unsubscribing.
#57	vos_thread.c mailbox implementation missing (functionality not used in TRDPLight)
#97	For call/reply/confirm to multicast address and unknown number of repliers there is no callback received (after timeout) with the number of received replies.
#98	Replier can not set an arbitrary value for session time-out in the Reply message as defined in the specification.
#103	When Caller sends Mr resulted in ReplyTimeout, the Caller does not retry to send Mr.
#108	trdp_mdRecvPacket() shall reserve only the in the header required user data size (+alignment+CRC) for receiving the user data part of the packet
#110	If a TCP connection is not used anymore it is closed. In this case no timeout shall be reported by the call back function towards the user

Table 24: Known Errors TRDPLight

6.1.4. Compatibility to Earlier Releases

First release.

6.2. TRDPMarshall

6.2.1. Corrected Errors

CR	Description
None – first release	

Table 25: Corrected Errors TRDPMarshall

6.2.2. New or Enhanced Functions

CR	Description
None – first release	

Table 26: New or enhanced functions TRDPMarshall

6.2.3. Known Errors

CR	Description
None	

Table 27: Known Errors TRDPMarshall

6.2.4. Compatibility to Earlier Releases

First release.

6.3. TRDPXML

6.3.1. Corrected Errors

CR	Description
None – first release	

Table 28: Corrected Errors TRDPXML

6.3.2. New or Enhanced Functions

CR	Description
None – first release	

Table 29: New or enhanced functions TRDPXML

6.3.3. Known Errors

CR	Description
#64	TRDPXML does not yet support mapped devices

Table 30: Known Errors TRDPXML

6.3.4. Compatibility to Earlier Releases

First release.

6.4. TRDPLadder

6.4.1. Corrected Errors

CR	Description
None – first release	

Table 31: Corrected Errors TRDPLadder

6.4.2. New or Enhanced Functions

CR	Description
None – first release	

Table 32: New or enhanced functions TRDPLadder

6.4.3. Known Errors

CR	Description
#25	vos_shared_mem.c - WIN32 implementation missing Ladder support is not available under WIN32 due to missing shared memory functionality

Table 33: Known Errors TRDPLadder

6.4.4. Compatibility to Earlier Releases

First release.

6.5. TRDPSpy

6.5.1. Corrected Errors

CR	Description
None – first release	

Table 34: Corrected Errors TRDPSpy

6.5.2. New or Enhanced Functions

CR	Description
None – first release	

Table 35: New or enhanced functions TRDPSpy

6.5.3. Known Errors

CR	Description
None	

Table 36: Known Errors TRDPSpy

6.5.4. Compatibility to Earlier Releases

First release.

6.6. History

First release.

7. Problem reporting

Detected problems with this release are to be reported to:
armin-hagen.weiss@de.transport.bombardier.com