DNV·GL

UNIGRID SA TEST SUITE 61850 EDITION 2 V1.0 TPCL 1.2.4 SERVER

Release Notes

Version 1.0 build 82

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Contents

1 INTRODUCTION

This document describes the release notes of UniGrid SA Test Suite 61850 Edition 2 version 1.0 TPCL 1.2.4 Server, for UniGrid SA test platform, for performing automated testing based on the official IEC 61850 Test Procedures.

Please note that, from this release onwards, the release procedures of the Test Suite(s) and the UniGrid SA test platform will be separate processes. This means that the versioning of UniGrid SA platform and the Test Suite(s) will no longer match and there will be different processes for the different Test Suite(s), as well as for UniGrid SA platform. There will also be different release documents. This causes some unavoidable inconsistency in the versions however, to avoid any possible initial confusions, versions marked with the 'Integrated' keyword represent versions where the Test Suites and the UniGrid SA platform were managed together.

2 RELEASE NOTES

2.1 Version 1.0 build 82

2.1.1 Features

- Added setting to add a delay after writing values to functional constraint SP
- Added simulator to set the LHPD.Sim
- Added CSV data model extraction (initial version)

2.1.2 Bug Fixes

- Fixed checkLoc function checks both LLN0 and LN.
- Fixed issue where in some of the negative server scripts _XYZ is added to the reference, however in some case this let to exceeding the maximal reference length. In case max length is exceeded only the inverted capitals test will be performed.
- Fixed issue where analog channels where wrongly mapped in GenerateBRCBMxDataChangeA on Omicron CMC
- Fixed issue when reading GOCB from SCL with empty or non-existing dataset attribute
- Fixed substitution where instCVal was used instead of CVal
- Fixed sBr2 timing issue
- Fixed sBrN8 checking wrong dynamic dataset value
- Fixed sDOes5 where TestBlocked expected command termination
- Removed Repetitive action in sCtl7 for all control models
- Fixed SBOns1 wrong stSeld expectation
- Fixed OnBlocked operate setting reference did not fill with proper references
- Fixed Cilo settings mapping
- Fixed sCtl26 DOes timing issue
- Fixed sCtl10 SBOes when selectWithValue with same value is allowed but operate not
- Improved sGop2a by adding more log information
- Improved sGopN2
- Improved sGos4
- Fixed EnumeratedObjRef settings to only fill with writable enum

2.2 Version 1.0 build 54

2.2.1 Features

No new scripts.

2.2.2 Bug Fixes

- PNTSSE-689: sGos5 Removed FCD check
- PNTSSE-676 and PNTSSE-677: BlkEna and CMDBLK have their own equipment simulator instead of using the interlocking one
- PNTSSE-629: changed ResvTms sBr24 step 5 from 0 to 10. Same positive value as step 6.
- PNTSSE-631: sBr23 step 3 with client 2 is fixed with incorrect GI.
- PNTSSE-688: Addcause is not mandatory for SBOns
- PNTSSE-635: Added select after first select to see if SBOns is selected.
- PNTSSE-687: Script flow improved
- PNTSSE-638: Aligned Test case with procedure
- PNTSSE-686: Add Cause is now mandatory
- PNTSSE-685: Fixed loading control settings
- PNTSSE-680: sSrv12: when building from SCL the datatype of enum is enumerated when building from discovery it is int8, both are supported now.
- PNTSSE-682: sSBOns2 flow corrected
- Removed illegal characters
- PNTSSE-681: Excluded CO FC in sSrvN3 settings
- Fixed changes to CheckMltLevel function.
- PNTSSE-679: Added more time of sBr28 to parse large reports
- PNTSSE-673: Fixed more follows after causes null reference
- PNTSSE-675: fixed sSrv6 comparison using direct objects, instead of DataValueComparer.
- PNTSSE-671: Changed the order of publisher creation
- US-496: added multi-level automation
- PNTSSE-670: Fixed issue with endless looping large file lists
- PNTSSE-668: Fixed comparison between DataTimeStamp, entryTime from Reports, raw value vs DateTime.
- PNTSSE-647: Fixed sCtl26 scripts (SBOes, DOes) wrong AddCauseDiag vs CmdTerm.
- PNTSSE-667: fixed sCtl27 (SBOns) script incorrectly linking to sCtl25 script.
- PNTSSE-666: scripts were wrongly validating the AddCauseDiag instead of CmdTerm.

- PNTSSE-646: fixed issue with processing of CmdTerm vs AddCauseDiag and client 1 vs client 2 buffers.
- PNTSSE-654: sSrv12 logic was not completely correct yet.
- GetAllDataValues API is broken, workaround for the time being.
- PNTSSE-665: fixed sDOes1 script to expect CommandTerminations as opposed to AddCausesDiagnosis.
- PNTSSE-664: fixed issue with supported optional fields missing buffer overflow.
- PNTSSE-663: fixed script exception when no Command Termination is received, as well as, wrongly expecting AddCausesDiagnosis.
- PNTSSE-623: Fixed wrong expectation.
- PNTSSE-623: Fixed step messages.
- PNTSSE-660: Fixed sRp3 and sBr3 Data Update, missing the settings initialization code.
- PNTSSE-659: fixed PCTCIOUnit throws exception on DeInitialize function
- PNTSSE-655: fixed issue with Ctl2 and DOns with setting for ctlModel
- PNTSSE-642: fixed issue where intermediate position was not considered.
- PNTSSE-654: fixed issue with sSrv12 not reverting nor testing correctly the setting of Mod/Beh back to On.
- PNTSSE-652: Fixed issue where fill initial script settings script would not refresh the IP addresses correctly.
- PNTSSE-651: Fixed issue where fill initial script settings script would not refresh the IP addresses correctly.
- PNTSSE-649: fixed exception in script sSBOes6 when no AddCause was sent/received.
- PNTSSE-648: fixed issue in script sCtl26 (SBOes) causing an exception.
- PNTSSE-647: fixed exception in script when no AddCause was sent/received.
- PNTSSE-646: added validation of AddCause.
- PNTSSE-645: Fixed script to better match TPCL.
- PNTSSE-644: Fixed issue which would cause a wrong test case result when no AddCause was received.
- PNTSSE-637: Fixed issue with timing which would cause a wrong test case result. (issue was cause due to the Equipment moving)
- PNTSSE-633: script flags wrong test case when DUT rejects the SelectWithValue but does not send optional AddCause.
- PNTSSE-640: fixed index out of bound when script is configured to continue match errors and no AddCause/CmdTerm has been received.
- PNTSSE-623: sBr20 is now sequential and is using new check functions.

- PNTSSE-628: fixed step 4 which did not followed procedure.
- PNTSSE-624: Fixed wrong setting name on user/error message.
- Substitution crashed on getting newValue. DBPos is of type packetlist not ENUM.
- PNTSSE-615: Fixed sCtl5 does check the mode
- PNTSSE-613: Fixed Make the TimeSynch difference configurable (sTm1)
- US-496: Mltlev automation.
- US-534: Added setting to control equipment switch speed. EquipmentSim: Move to new position needs to act faster
- PNTSSE-584: sRp4: No wait time after GI step 2
- PNTSSE-515: fixed sSg3: script takes a long-time filling list of settings
- PNTSSE-618: MaxHierarchyCount function fixed and moved to base class.
- PNTSSE-617: Added the suite project to the Solution

2.3 Version 1.0 build 24

2.3.1 Features

- The following is a detailed list of supported test cases per conformance block
    - Basic Exchange conformance block: sAss1, sAss2, sAss3, sAssN2, sAssN4, sAssN5, sAssN6
    - Server conformance block: sSrv1, sSrv2, sSrv3, sSrv4, sSrv5, sSrv6, sSrv8, sSrv11, sSrv12, sSrv13, sSrvN1abcd, sSrvN1e, sSrvN1f, sSrvN2, sSrvN3, sSrvN4
    - Dataset conformance block: sDs1, sDs10a, sDs15, sDsN1ae
    - Dataset Definition conformance block: sDs2, sDs3, sDs4, sDs5, sDs6, sDs7, sDs8, sDs9, sDs11, sDs12, sDs13, sDs14, sDsN1cd, sDsN2, sDsN3, sDsN4, sDsN5, sDsN6, sDsN7, sDsN8, sDsN9, sDsN10, sDsN11, sDsN12
    - Substitution conformance block: sSub1, sSub2, sSub3
    - Setting Group Selection conformance block: sSg1, sSg3, sSg11, sSgN1
    - Setting Group definition conformance block: sSg2, sSg4, sSg5, sSg6, sSg7, sSg8, sSg9, sSg10, sSg12, sSgN2, sSgN3, sSgN4, sSgN5
    - Unbuffered Reporting conformance block: sRp1, sRp2, sRp3, sRp4, sRp5, sRp6, sRp7, sRp8, sRp9, sRp10, sRp11, sRp12, sRp13, sRp14, sRpN1, sRpN2, sRpN3, sRpN4, sRpN5, sRpN8
    - Buffered Reporting conformance block: sBr1, sBr2, sBr3, sBr4, sBr5, sBr6, sBr7, sBr8, sBr9, sBr10, sBr11, sBr12, sBr13, sBr14, sBr20, sBr21, sBr22, sBr23, sBr24, sBr25, sBr26, sBr27, sBr28, sBrN1, sBrN2, sBrN3, sBrN4, sBrN5, sBrN8
    - GOOSE Publish conformance block: sGop1, sGop2a, sGop3, sGop4, sGop5, sGop6, sGop7, sGop10, sGop11, sGopN1
    - GOOSE Subscribe conformance block: sGos1, sGos2, sGos3, sGos4, sGos5, sGos6a, sGos6b, sGos7, sGosN1, sGosN2, sGosN3, sGosN4, sGosN5, sGosN6

  - Control conformance block: sCtl4, sCtl5, sCtl6, sCtl7, sCtl8, sCtl9, sCtl10, sCtl11, sCtl15, sCtl16, sCtl17, sCtl18, sCtl19, sCtl21, sCtl23, sCtl24, sCtl25, sCtl26, sDOns1, sDOns2, sSBOns1, sSBOns2, sSBOns6, sDOes1, sDOes2, sDOes4, sDOes5, sSBOes1, sSBOes2, sSBOes6, sSBOes8
  - Time Synchronisation conformance block: sTm1, sTm2, sTm3, sTm4, sTm5, sTmN1
  - File Transfer conformance block: sFt1, sFt2ab, sFt2c, sFt3, sFt4, sFt5, sFtN1ab, sFtN1c
- PNTSSE-602: Added controllable enumerated type to control base classes
- PNTSSE-604: sAssN6 script added to Test Suite

2.3.2 Bug Fixes

- PNTSSE-313: sRp11/sBr11 have a timing issue, not enough time to process large reports
- PNTSSE-354: changed the CheckEntryTime function in script sBr25
- PNTSSE-451: sGos2 quality change detected as status change
- PNTSSE-532: sRpN4/sBrN4 is not per TPCL
- PNTSSE-537: sSg4 is not per TPCL
- PNTSSE-539: sSBOes1, sSBOes2, sSBOes4, sSBOes5, sSBOes7, sSBOes8, sSBOns1, sSBOns2, sSBOns4, sSBOns7, sCtl8, sCtl9, sCt26, sDOes1, sDOes4 not per TPCL
- PNTSSE-540: sGop11 not per TPCL
- PNTSSE-541: sGos4 not per TPCL
- PNTSSE-542: sSBOns6 not per TPCL
- PNTSSE-543: sTm1 not per TPCL
- PNTSSE-544: sTm3 not per TPCL
- PNTSSE-545: sCtl16 not per TPCL
- PNTSSE-546: sGos6ab not per TPCL
- PNTSSE-547: sCtl26 not per TPCL
- PNTSSE-548: sGos2 not per TPCL
- PNTSSE-551: sRpN4/sBrN4 scripts not per TPCL
- PNTSSE-552: sSgN4 not per TPCL
- PNTSSE-553: sFtN1 not per TPCL
- PNTSSE-554: sFt2 not per TPCL
- PNTSSE-576: sRpN5 exception when client 2 loses connection
- PNTSSE-577: sFt2c script should delete on specific files based on setting
- PNTSSE-579: sTm3 fails matches due to case
- PNTSSE-581: sCtl10 SBOes executes an Operate even after a failed Select
- PNTSSE-583: sRp3/sBr3 integrity process time of reports caused failed script result
- PNTSSE-585: sBr8 step 8 causes Report to be disabled twice, causing issues on some devices
- PNTSSE-588: sDsN1ae and sDsN1cd produces no trace
- PNTSSE-590: sSBOes8 script with wrong name

- PNTSSE-591: sRpN5 uses the wrong client / adapter
- PNTSSE-592: sTm4 script is not able to set TmUseDT when FC is SP
- PNTSSE-594: sSg6 script does not release the reservation after execution
- PNTSSE-595: sCtl15 (all variants) scripts need rework
- PNTSSE-596: sSBOes6 script Match after association is at wrong location
- PNTSSE-597: sCtl26 (SBOes) script with wrong count of Additional Cause Diagnosis
- PNTSSE-598: sGos4 script merged from 'a' and 'b' scripts
- PNTSSE-599: sFtN1 script does not request all the files when moreFollows flag is true
- PNTSSE-600: sSrv9/sSrv10 scripts missing quality combination for Questionable and Accurate
- PNTSSE-601: sGop2b script missing offset parameter in base classes
- PNTSSE-605: sCtl26 removed from suite per TPCL 1.2.4
- PNTSSE-606: sDsN5 script did not release on step 2, instead deleted the dataset
- PNTSSE-609: SBOns scripts using wrong reference to Loc attribute / functional constraint
- PNTSSE-610: Settings not refreshed when populated from script environment

2.3.3 Known bugs and issues

- The following is a detailed list of test cases which are not supported in this version:
    - Modelling conformance block: sMdl1, sMdl2, sMdl3, sMdl4, sMdl5, sMdl6, sMdl7, sMdl8, sMdl9, sMdl10, sMdl11, sMdl12, sMdl13, sMdl14
    - Server conformance block: sSrv9, sSrv10
    - Dataset conformance block: sDs10b, sDsN1b, sDsN13
    - Unbuffered Reporting conformance block: sRp15
    - Buffered Reporting conformance block: sBr15
    - Logging conformance block: sLog1, sLog2, sLog3, sLog4, sLog5, sLog6, sLog7, sLog8, sLog9, sLog10, sLog11, sLog12, sLogN1, sLogN2
    - GOOSE Publish conformance block: sGop2b, sGop9, sGopN2
    - Control Conformance block: sCtl2, sCtl3, sCtl20, sDOns4, sDOns5, sSBOns4, sSBOns5, sSBOns7, sSBOes4, sSBOes5, sSBOes7
    - Time Synchronisation conformance block: sTmN2
    - Service Tracking conformance block: sTrk1, sTrk2, sTrk3, sTrk4, sTrk5, sTrk6, sTrk7, sTrk8, sTrk9, sTrk10, sTrk11, sTrk12, sTrk13, sTrk14, sTrk15, sTrk16, sTrk17
- sSrv8 is known to have some reliability issues on some systems due to differences in ordering of the variables.
- sSrv11 and sSrv12 are known to be buggy. Please do not rely on the results until a fix is issued.
- Scripts sRp3 and sBr3 do not cover all trigger conditions combinations.

- Several issues found in sSgN2, sSg10 and sSg12.
- Script sTrk7 may crash when deleting a file.

2.4 Version 1.2 build 305 (Integrated)

2.4.1 Features

- The current Test Suite version supports IEC 61850 Test Procedures revision 1.0 TPCL 1.2.4
  The following is a detailed list of supported test cases per conformance block
  - Basic Exchange conformance block: sAss1, sAss2, sAss3, sAssN2, sAssN4, sAssN5
  - Server conformance block: sSrv1, sSrv2, sSrv3, sSrv4, sSrv5, sSrv6, sSrv8, sSrv11, sSrv12, sSrv13, sSrvN1abcd, sSrvN1e, sSrvN1f, sSrvN2, sSrvN3, sSrvN4
  - Dataset conformance block: sDs1, sDs10a, sDs15, sDsN1ae
  - Dataset Definition conformance block: sDs2, sDs3, sDs4, sDs5, sDs6, sDs7, sDs8, sDs9, sDs11, sDs12, sDs13, sDs14, sDsN1cd, sDsN2, sDsN3, sDsN4, sDsN5, sDsN6, sDsN7, sDsN8, sDsN9, sDsN10, sDsN11, sDsN12
  - Substitution conformance block: sSub1, sSub2, sSub3
  - Setting Group Selection conformance block: sSg1, sSg3, sSg11, sSgN1
  - Setting Group definition conformance block: sSg2, sSg4, sSg5, sSg6, sSg7, sSg8, sSg9, sSg10, sSg12, sSgN2, sSgN3, sSgN4, sSgN5
  - Unbuffered Reporting conformance block: sRp1, sRp2, sRp3, sRp4, sRp5, sRp6, sRp7, sRp8, sRp9, sRp10, sRp11, sRp12, sRp13, sRp14, sRpN1, sRpN2, sRpN3, sRpN4, sRpN5, sRpN8
  - Buffered Reporting conformance block: sBr1, sBr2, sBr3, sBr4, sBr5, sBr6, sBr7, sBr8, sBr9, sBr10, sBr11, sBr12, sBr13, sBr14, sBr20, sBr21, sBr22, sBr23, sBr24, sBr25, sBr26, sBr27, sBr28, sBrN1, sBrN2, sBrN3, sBrN4, sBrN5, sBrN8
  - GOOSE Publish conformance block: sGop1, sGop2a, sGop3, sGop4, sGop5, sGop6, sGop7, sGop10, sGop11, sGopN1
  - GOOSE Subscribe conformance block: sGos1, sGos2, sGos3, sGos4, sGos5, sGos6a, sGos6b, sGos7, sGosN1, sGosN2, sGosN3, sGosN4, sGosN5, sGosN6
  - Control conformance block: sCtl4, sCtl5, sCtl6, sCtl7, sCtl8, sCtl9, sCtl10, sCtl11, sCtl15, sCtl16, sCtl17, sCtl18, sCtl19, sCtl21, sCtl23, sCtl24, sCtl25, sCtl26, sDOns1, sDOns2, sSBOns1, sSBOns2, sSBOns6, sDOes1, sDOes2, sDOes4, sDOes5, sSBOes1, sSBOes2, sSBOes6, sSBOes8
  - Time Synchronisation conformance block: sTm1, sTm2, sTm3, sTm4, sTm5, sTmN1
  - File Transfer conformance block: sFt1, sFt2ab, sFt2c, sFt3, sFt4, sFt5, sFtN1ab, sFtN1c
- PNTSSE-499: Added feature to automatically manage the building of the data model
- PNTSSE-563: Added a setting to control if the automatic Data Model building should be done using the SCL (when available) or discovery. Related to PNTSSE-499.
- US-505: At start-up "Client1" is always initialized and "ExtraClient" only on scripts that need it. This prevents a long waiting time when waiting for both data models to be built. Related to PNTSSE-499.
- US-422: Added code to allow rebuilding of a Data Model, both from SCL as well as from Discovery. This was previously not supported and would cause the tool to malfunction. Now the old model is cleaned before the new model is rebuilt.

- PNTSSE-559: Improved the filling of writeable settings list to exclude items that are known not to be writeable, even when no SCL information is present.
- PNTSSE-565: Added feature to automatically convert data type DataObjectReference to a string. This makes unnecessary to call the ToString() method in logging functions and others. The default method is to print the ACSI representation, i.e. "LD/LN.DO.DA [FC]". Cases that require the MMS representation, "LD/LNFCDO$DA" still require explicitly calling the ToMMSString() method.
- PNTSSE-564: Added two new TimeStamp formats to the Log Window. Time (without the date) and Time with milliseconds.
- US-507: Added a feature to create a project directly from the CLI. Now you no longer need to have a previously saved project. Usage, e.g.: "`UniGridCLI.exe --create-project Server61850Ed2Test --testcase sAss1`" or the short form "`UniGridCLI.exe -cp Server61850Ed2Test --tc sAss1`".
- US-508: Addded a feature to import settings directly from the CLI. Related to US-507. Usage e.g.: "`UniGridCLI.exe ... --import-settings "C:\settings.xml" ...`" or the short form "`UniGridCLI.exe ... --is "C:\settings.xml" ...`".

2.4.2 Bug Fixes

- CM-7: Fixed several issues with GetAllDataValues, mainly affecting sSrv8 that was producing many error messages in the Log window, even when communication was ok.
- PNTSSE-440: related to CM-7.
- PNTSSE-566: related to PNTSSE-559.
- US-489: Fixed issue in sSrvN1e that caused an assertion when no settings were configured.
- PNTSSE-503: related to CM-7.
- PNTSSE-464: fixed decoding issue with Dbpos when data model was built using SCL.
- PNTSSE-430: related to CM-7.
- PNTSSE-562: Fixed issue that caused script sDs2 to not find the created datasets.
- US-504: related to PNTSSE-464.
- PNTSSE-522: Fixed issue with parsing some SCL file causing the Data Model building to fail.
- PNTSSE-530: Added extra checks to script sSrvN1e.
- PNTSSE-572: Fixed several issues with scripts sSub1, sSub2 and sSub3. Mainly affecting the MX data types.
- PNTSSE-517: Fixed issue with setting group scripts that required optional settings as mandatory
- PNTSSE-525: Editorial correction on sGopN1 test case description
- PNTSSE-526: Fixed issue causing sBr11 to sometime miss a report
- PNTSSE-518: Fixed sRp11 and sBr11 to follow the test procedure steps more closely
- PNTSSE-529: Fixed issue in sDs11 and sDs12 where the wrong error code was validated
- PNTSSE-527: Fixed sRp14 and sBr14 to follow the test procedure steps more closely
- CM-28: Fixed issue with LocSta attributes. Affects multiple control test cases.
- PNTSSE-520: Fixed issue in sRp3 and sBr3 related to the Data Update event
- PNTSSE-528: Fixed script sTm5 to follow the test procedure steps more closely
- PNTSSE-558: Fixed issue with SetDataValues that would cause the Client Host to crash. Affected, e.g. sSrv6, sSrvN1e, sSrvN4.

- PNTSSE-498: Fixed issue where double / float settings were not saved correctly in the project.

2.4.3 Known bugs and issues

- The current Test Suite version supports IEC 61850 Test Procedures revision 1.0 TPCL 1.2.4 however, the following is a detailed list of test cases which are not supported in this version:
    - Modelling conformance block: sMdl1, sMdl2, sMdl3, sMdl4, sMdl5, sMdl6, sMdl7, sMdl8, sMdl9, sMdl10, sMdl11, sMdl12, sMdl13, sMdl14
    - Basic Exchange conformance block: sAssN6
    - Server conformance block: sSrv9, sSrv10
    - Dataset conformance block: sDs10b, sDsN1b, sDsN13
    - Unbuffered Reporting conformance block: sRp15
    - Buffered Reporting conformance block: sBr15
    - Logging conformance block: sLog1, sLog2, sLog3, sLog4, sLog5, sLog6, sLog7, sLog8, sLog9, sLog10, sLog11, sLog12, sLogN1, sLogN2
    - GOOSE Publish conformance block: sGop2b, sGop9, sGopN2
    - Control Conformance block: sCtl2, sCtl3, sCtl20, sDOns4, sDOns5, sSBOns4, sSBOns5, sSBOns7, sSBOes4, sSBOes5, sSBOes7
    - Time Synchronisation conformance block: sTmN2
    - Service Tracking conformance block: sTrk1, sTrk2, sTrk3, sTrk4, sTrk5, sTrk6, sTrk7, sTrk8, sTrk9, sTrk10, sTrk11, sTrk12, sTrk13, sTrk14, sTrk15, sTrk16, sTrk17
- sSrv8 is known to have some reliability issues on some systems due to differences in ordering of the variables.
- sSrv11 and sSrv12 are known to be buggy. Please do not rely on the results until a fix is issued.
- Some issue was found when installing on a Windows 8 64-bit machine.
- Scripts sRp3 and sBr3 do not cover all trigger conditions combinations.
- When communication to CMC is lost a complete restart of UniGrid SA is required.
- Several issues found in sSgN2, sSg10 and sSg12.
- Script sTrk7 may crash when deleting a file.
- Several scripts are not yet per TPCL 1.2.4, these will be the focus of the next release. E.g., sBrN4, sRpN4, sCtl5, sRp8, sBr8, sDsN11, sDsN12, sCtl11, sSg4, sSrv11, sSBOes1, sGop11, sGos4, sSBOns6, sTm1, sTm3, sCtl16, sGos6ab, sCtl26, sGos2, sGop6, sRp5, sBr5, sSgN4, sFtN1, sTrk7.

2.5 Version 1.1 build 296 (Integrated)

2.5.1 Features

- The current Test Suite version supports IEC 61850 Test Procedures revision 1.0 TPCL 1.2. The following is a detailed list of supported test cases per conformance block
    - Basic Exchange conformance block: sAss1, sAss2, sAss3, sAssN2, sAssN4, sAssN5
    - Server conformance block: sSrv1, sSrv2, sSrv3, sSrv4, sSrv5, sSrv8, sSrv11, sSrv12, sSrv13, sSrvN1abcd, sSrvN1e, sSrvN1f, sSrvN2, sSrvN3, sSrvN4
    - Dataset conformance block: sDs1, sDs10a, sDs15, sDsN1ae
    - Dataset Definition conformance block: sDs2, sDs3, sDs4, sDs5, sDs6, sDs7, sDs8, sDs9, sDs11, sDs12, sDs13, sDs14, sDsN1cd, sDsN2, sDsN3, sDsN4, sDsN5, sDsN6, sDsN7, sDsN8, sDsN9, sDsN10, sDsN11, sDsN12
    - Substitution conformance block: sSub1, sSub2, sSub3
    - Setting Group Selection conformance block: sSg1, sSg3, sSg11, sSgN1
    - Setting Group definition conformance block: sSg2, sSg4, sSg5, sSg6, sSg7, sSg8, sSg9, sSg10, sSg12, sSgN2, sSgN3, sSgN4, sSgN5
    - Unbuffered Reporting conformance block: sRp1, sRp2, sRp3, sRp4, sRp5, sRp6, sRp7, sRp8, sRp9, sRp10, sRp11, sRp12, sRp13, sRp14, sRpN1, sRpN2, sRpN3, sRpN4, sRpN5, sRpN8
    - Buffered Reporting conformance block: sBr1, sBr2, sBr3, sBr4, sBr5, sBr6, sBr7, sBr8, sBr9, sBr10, sBr11, sBr12, sBr13, sBr14, sBr20, sBr21, sBr22, sBr23, sBr24, sBr25, sBr26, sBr27, sBr28, sBrN1, sBrN2, sBrN3, sBrN4, sBrN5, sBrN8
    - GOOSE Publish conformance block: sGop1, sGop2a, sGop3, sGop4, sGop5, sGop6, sGop7, sGop10, sGop11, sGopN1
    - GOOSE Subscribe conformance block: sGos1, sGos2, sGos3, sGos4, sGos5, sGos6a, sGos6b, sGos7, sGosN1, sGosN2, sGosN3, sGosN4, sGosN5, sGosN6
    - Control conformance block: sCtl4, sCtl5, sCtl6, sCtl7, sCtl8, sCtl9, sCtl10, sCtl11, sCtl15, sCtl16, sCtl17, sCtl18, sCtl19, sCtl21, sCtl23, sCtl24, sCtl25, sCtl26, sDOns1, sDOns2, sSBOns1, sSBOns2, sSBOns6, sDOes1, sDOes2, sDOes4, sDOes5, sSBOes1, sSBOes2, sSBOes6, sSBOes8
    - Time Synchronisation conformance block: sTm1, sTm2, sTm3, sTm4, sTm5, sTmN1
    - File Transfer conformance block: sFt1, sFt2ab, sFt2c, sFt3, sFt4, sFt5, sFtN1ab, sFtN1c
- Added feature to export and import settings from and to a project
- Updated the filling of settings from data model with BlkEna references for specific control models
- Updated sSg5 to indicate the number of seconds on the step message
- Updated sSgN4 to indicate the setting name in case of errors are found
- Updated sRp12 script to use the currently configured Buffer Time to be more flexible to changes in timing
- Added settings for BlkEna for specific control models
- Improve description of several settings

- Separated the handling of Loc and LocSta attributes creating new settings and functions. Affects scripts sCtl14 (DOes), sCtl16 (DOes), sCtl17 (DOes), sCtl15 (DOns), sCtl16 (DOns), sCtl17 (DOns), sCtl5 (DOns), sDOns1, sDOns2, sCtl16 (SBOes), sCtl17 (SBOes), sCtl5 (SBOes), sCtl16 (SBOns), sCtl17 (SBOns), sCtl5 (SBOns)
- Changed some settings grouping, i.e. Group Connection Settings renamed to General Settings
- Added direct interface to Omicron CMC engine
- Split sFt2 script into ab and c parts, mandatory and conditional sections
- Added extra checks to sBr23 script to detect more error conditions
- Improved About and licensing screens
- Updated CodeMeter screen and text when out of license
- Added Editable feature, tool will require the Editable feature to be enabled to be able to edit scripts
- Added extra checks to sGop2a script to detect more error conditions regarding the TAL and the slow retransmission
- Minor tweaks to the User Interface (UI)
- Added ValKind processing along with Checks, Guards and Matches for data model validation
- Improved Client module host to prevent running forever under certain conditions
- Improved data model
- Changed default communication channel timeout to 2 hours, this should account for the longest running, single script execution otherwise the setting needs to be increased in the User Interface (UI)
- Added delay, controlled by settings, to sAss3 and sAssN3 scripts
- Added feature to Command Line Interface (CLI) Module so that it is possible to run the selected scripts, previously saved, in the project. Use -rs or --run-selected execution options
- Improved the Command Line Interface (CLI) Module so that all executed scripts are printed to console at end of execution with the name, result, execution start time and execution duration. These are separated by commas so that it is easy to export into a csv file for processing
- Removed several log details to improve readability at the expense of information loss
- Refactored script sCtl17 so that the behaviour is visible on the main test case function
- Improved sTm1 and sTm4 scripts to re-start the Time Server automatically at end of execution to minimize downtime and re-synch time
- Improved performance of dropdown Graphical User Interface (GUI) settings by limiting them to 100 values
- API: improvements to the scripts namespaces, separated the ‘base’ code from the ‘IEC61850’ code specific for IEC 61850 testing

- API: refactored the management of clients, when creating a client (for a two-party association connection) the function SetupClient should always be used. This function requires a client name that should be "ExtraClient" or should follow the convention of "ClientX" where X should be an index. "ExtraClient" uses the configure Secondary IP address/NIC while the remaining clients use the Primary IP address/NIC.

2.5.2 Bugs Fixed

- Fixed issue in ValKind processing in the communication module
- Fixed issue in sCtl10 (DOes) attempting to select a Direct execute object
- Fixed issue in sCtl10 (DOes) where message wrongly referred to DOns object
- Fixed issue in sCtl10 (DOes) where the ability for DUT to operate to the same position, or not, was not considered
- Fixed issue in sCtl14 (DOes) where the operation was not done properly by 2 different clients
- Fixed issue in sCtl16 (DOes) where the operTimeout value was fixed instead of configured or read from data model
- Fixed issue in sCtl19 (DOes) where the BlkEna attribute was not validated properly
- Fixed issue in sCtl19 (DOns) where the BlkEna attribute was not validated properly
- Fixed issue in sDOns1 where the operate was using the wrong command
- Fixed issue in sCtl10 (SBOes) where the ability for DUT to operate to the same position, or not, was not considered
- Fixed issue in sCtl19 (SBOes) where the BlkEna attribute was not validated properly
- Fixed issue in sCtl9 (SBOes) where the operTimeout value was fixed instead of configured or read from data model
- Fixed issue in sCtl11 (SBOns) where the sboTimeout value was not considered
- Fixed issue in sCtl19 (SBOns) where the BlkEna attribute was not validated properly
- Fixed issue in sCtl7 (SBOns) where the operTimeout value was not considered
- Fixed issue in sCtl9 (SBOns) where the operTimeout value was not considered
- Reverted sSrvN3 to require a non-null setting as opposed to randomly select one setting value
- Fixed sSgN3 script to not require settings configuration
- Fixed the control sequence, used in control scripts, so that it rolls over when reaching the maximum value
- Fixed issue with SNTP server module which caused the execution path to be wrong
- Fixed issue with sAssN3 causing more clients than needed to be used in testing
- Fixed issue in sDsN1cd where the association was wrongly managed
- Fixed issue in sDsN1ae where the association was wrongly managed

- Fixed issue in sCtl9 (SBOns) where the select response was not properly validated
- Fixed issue in Check function used in Maximum Hierarchy validation scripts
- Fixed issue in sAss3 and sAssN3 which caused the Analyzer to not start even when enabled
- Fixed issue in sAss3 and sAssN3 which caused the additional processes to not stop correctly
- Fixed issue in sTm5 where the SNTP IP address was wrongly compared to the local IP address
- Removed some unnecessary settings
- Fixed issue in data model causing conflicts and duplication of nodes due to wrong name comparison algorithm
- Fixed issue in sGop4 where the Max and Min Time were unsinged as opposed to integers
- Fixed issue in Check for the Goose destination MAC
- Fixed issue with the handling of sessions
- Fixed issue in sSrv6 regarding the new ValKind processing and validation feature
- Fixed issue Command Line Interface (CLI) Module so that it does not stop on the first error code found
- Fixed issue in Command Line Interface (CLI) Module so that running script groups is possible
- Fixed issue where the SNTP TimeServer module was not disposed correctly
- Fixed issue in data model processing, when building from SCL, where the Setting Group ResvTms had the wrong data type (integer instead of unsigned)
- Fixed issue in Setting Group definition where script result would be flagged as failed when certain settings were not configured (even when not applicable). Affects scripts sSg2, sSg3, sSg4, sSg5, sSg7, sSg8, sSg9, sSg11, sSg10, sSg12, sSgN2, sSgN3, sSgN4
- Fixed issue that could cause the Command Line Interface (CLI) Module to run forever when a script would crash during execution
- Fixed issue in the Command Line Interface (CLI) Module were the starting script could, sometimes, overlap with the previously ending script possibly causing issues
- Fixed issue in Check function to validate data model and if data model has been built from SCL file (as opposed to discovery)
- Fixed timing issues in scripts sRp3 integrity, sGos3, sBr20, sBr8_ST, sCtl26 (DOes), sRp11 and sRp8_ST
- Fixed issue in script sCtl13 (DOes) where the Select result was not validated
- Fixed issue in script sCtl14 (DOes) with retrieving initial script settings
- Fixed issue in scripts sCtl16 (DOes), sCtl17 (DOns), sCtl16 (SBOes), sCtl17 (SBOes), sCtl16 (SBOns) and sCtl17 (SBOns) with using the LocSta as opposed to Loc
- Fixed issue in script sCtl16 (DOns) with using the LocSta as opposed to Loc

- Fixed issue in script sCtl6 (SBOes) operating to the old position as opposed to the new position
- Fixed issue in Check functions for hierarchy, affecting scripts sDs15, sRp15 and sBr15
- Fixed issue in encoding of DataModeBehaviour, particularly noticeable when using the RCB quality change using Controllable equipment. Affected, e.g., sRp3 and sBr3 for Quality Change scripts
- Fixed issue in the management of Clients that could potentially lead to a crash.

2.5.3 Known bugs and issues

- The current Test Suite version supports IEC 61850 Test Procedures revision 1.0 TPCL 1.2 however, the following is a detailed list of test cases which are not supported in this version:
    - Modelling conformance block: sMdl1, sMdl2, sMdl3, sMdl4, sMdl5, sMdl6, sMdl7, sMdl8, sMdl9, sMdl10, sMdl11, sMdl12, sMdl13, sMdl14
    - Basic Exchange conformance block: sAssN6
    - Server conformance block: sSrv6, sSrv9, sSrv10
    - Dataset conformance block: sDs10b, sDsN1b, sDsN13
    - Unbuffered Reporting conformance block: sRp15
    - Buffered Reporting conformance block: sBr15
    - Logging conformance block: sLog1, sLog2, sLog3, sLog4, sLog5, sLog6, sLog7, sLog8, sLog9, sLog10, sLog11, sLog12, sLogN1, sLogN2
    - GOOSE Publish conformance block: sGop2b, sGop9, sGopN2
    - Control Conformance block: sCtl2, sCtl3, sCtl20, sDOns4, sDOns5, sSBOns4, sSBOns5, sSBOns7, sSBOes4, sSBOes5, sSBOes7
    - Time Synchronisation conformance block: sTmN2
    - Service Tracking conformance block: sTrk1, sTrk2, sTrk3, sTrk4, sTrk5, sTrk6, sTrk7, sTrk8, sTrk9, sTrk10, sTrk11, sTrk12, sTrk13, sTrk14, sTrk15, sTrk16, sTrk17

2.6 Version 1.0 build 287 (Integrated)

2.6.1 Features

- The current Test Suite version supports IEC 61850 Test Procedures revision 1.0 TPCL 1.2. The following is a detailed list of supported test cases per conformance block
    - Basic Exchange conformance block: sAss1, sAss2, sAss3, sAssN2, sAssN4, sAssN5
    - Server conformance block: sSrv1, sSrv2, sSrv3, sSrv4, sSrv5, sSrv8, sSrv11, sSrv12, sSrv13, sSrvN1abcd, sSrvN1e, sSrvN1f, sSrvN2, sSrvN3, sSrvN4
    - Dataset conformance block: sDs1, sDs10a, sDs15, sDsN1ae
    - Dataset Definition conformance block: sDs2, sDs3, sDs4, sDs5, sDs6, sDs7, sDs8, sDs9, sDs11, sDs12, sDs13, sDs14, sDsN1cd, sDsN2, sDsN3, sDsN4, sDsN5, sDsN6, sDsN7, sDsN8, sDsN9, sDsN10, sDsN11, sDsN12
    - Substitution conformance block: sSub1, sSub2, sSub3

- Setting Group Selection conformance block: sSg1, sSg3, sSg11, sSgN1
- Setting Group definition conformance block: sSg2, sSg4, sSg5, sSg6, sSg7, sSg8, sSg9, sSg10, sSg12, sSgN2, sSgN3, sSgN4, sSgN5
- Unbuffered Reporting conformance block: sRp1, sRp2, sRp3, sRp4, sRp5, sRp6, sRp7, sRp8, sRp9, sRp10, sRp11, sRp12, sRp13, sRp14, sRpN1, sRpN2, sRpN3, sRpN4, sRpN5, sRpN8
- Buffered Reporting conformance block: sBr1, sBr2, sBr3, sBr4, sBr5, sBr6, sBr7, sBr8, sBr9, sBr10, sBr11, sBr12, sBr13, sBr14, sBr20, sBr21, sBr22, sBr23, sBr24, sBr25, sBr26, sBr27, sBr28, sBrN1, sBrN2, sBrN3, sBrN4, sBrN5, sBrN8
- GOOSE Publish conformance block: sGop1, sGop2a, sGop3, sGop4, sGop5, sGop6, sGop7, sGop10, sGop11, sGopN1
- GOOSE Subscribe conformance block: sGos1, sGos2, sGos3, sGos4, sGos5, sGos6a, sGos6b, sGos7, sGosN1, sGosN2, sGosN3, sGosN4, sGosN5, sGosN6
- Control conformance block: sCtl4, sCtl5, sCtl6, sCtl7, sCtl8, sCtl9, sCtl10, sCtl11, sCtl15, sCtl16, sCtl17, sCtl18, sCtl19, sCtl21, sCtl23, sCtl24, sCtl25, sCtl26, sDOns1, sDOns2, sSBOns1, sSBOns2, sSBOns6, sDOes1, sDOes2, sDOes4, sDOes5, sSBOes1, sSBOes2, sSBOes6, sSBOes8
- Time Synchronisation conformance block: sTm1, sTm2, sTm3, sTm4, sTm5, sTmN1
- File Transfer conformance block: sFt1, sFt2ab, sFt2c, sFt3, sFt4, sFt5, sFtN1ab, sFtN1c

2.6.2 Bug fixes

None to document since it is the initial release.

2.6.3 Known bugs and issues

- The current Test Suite version supports IEC 61850 Test Procedures revision 1.0 TPCL 1.2 however, the following is a detailed list of test cases which are not supported in this version:
  - Modelling conformance block: sMdl1, sMdl2, sMdl3, sMdl4, sMdl5, sMdl6, sMdl7, sMdl8, sMdl9, sMdl10, sMdl11, sMdl12, sMdl13, sMdl14
  - Basic Exchange conformance block: sAssN3, sAssN6
  - Server conformance block: sSrv6, sSrv9, sSrv10
  - Dataset conformance block: sDs10b, sDsN1b, sDsN13
  - Unbuffered Reporting conformance block: sRp15
  - Buffered Reporting conformance block: sBr15
  - Logging conformance block: sLog1, sLog2, sLog3, sLog4, sLog5, sLog6, sLog7, sLog8, sLog9, sLog10, sLog11, sLog12, sLogN1, sLogN2
  - GOOSE Publish conformance block: sGop2b, sGop9, sGopN2
  - Control Conformance block: sCtl2, sCtl3, sCtl20, sDOns4, sDOns5, sSBOns4, sSBOns5, sSBOns7, sSBOes4, sSBOes5, sSBOes7
  - Time Synchronisation conformance block: sTmN2
  - Service Tracking conformance block: sTrk1, sTrk2, sTrk3, sTrk4, sTrk5, sTrk6, sTrk7, sTrk8, sTrk9, sTrk10, sTrk11, sTrk12, sTrk13, sTrk14, sTrk15, sTrk16, sTrk17

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