	STF 533 – Progress Report for ETSI		
	Presented to ETSI meeting	**Author:**	Prof. Jens Grabowski
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		Version	
	Doc ref	page 1 of **9**	

STF	**533**
TB/WG	**MTS**

STF leader	Jens Grabowski
TB responsible	Emmanuelle Chaulot-Talmon
STF Assistant	Elodie Rouveroux

STF title:	TTCN-3 Evolution 2017

Milestone	**C**		**Status Template**	**Covers the period until (cut-off date)**	31/01/2018
Objective	Progress report (incl. achievement status on task 2 and 3) Stable draft of D17 DES/MTS-1029507 TTCN3ext_OOed111 Final drafts of deliverables for TB approval, with the exception of D17 must be uploaded on the TC docbox at least four (4) weeks before the start of the TC plenary and approved by MTS#73				
Achieved	**Yes**				
Remarks					

Achieved dates

Template	Draft report	TB approval	ETSI approval
12/01/2018			

1 Executive summary

The TTCN-3 testing language has intensively been developed by ETSI during the last decade and, by today, it consists of 14 ETSI standards, altogether more than 1400 pages. The language is also endorsed by ITU-T as the Z.16x and Z.17x Recommendation series. By now TTCN-3 is the prevalent formal specification language of standardized test suites and has also become an important testing technology at various ETSI member companies and in several industrial domains (http://www.ttcn-3.org/index.php/about/references/applicatio-domains) and standards organizations (http://www.ttcn-3.org/index.php/about/references).

TTCN-3 has an important role in standardization; it is an enabler technology in many areas. Several conformance and end-to-end/interoperability test standards have been developed and being developed by 3GPP, ETSI TBs INT, ERM, and ITS. 3GPP is using TTCN-3 for UE conformance tests from Rel. 8 and onward to LTE and VoLTE, with NB-IoT on horizon. In the ITS area also several TTCN-3 test suites have been developed and they start playing important roles in ITS Plugtest events as well. In 2016 oneM2M has started using it for IoT/M2M conformance test development.

The purpose of STF533 – “TTCN-3 evolution 2017” is to maintain the high quality of the language – that currently consists of 15 ETSI standards - and at the same time keep it harmonized with the new requirements of the users, new application areas and new ways of working like Agile SW development. In

addition STF533 produces the new TTCN-3 extension “Object-oriented features” and will work on language harmonization issues.

In 2017, the STF team consisted of 6 experts. The expert Julien Deltour, representing PragmaDev, left the STF due to a change of employment. Julien Deltour fulfilled the contractual obligations of PragmaDev by means of additional homework. Until the end of 2017, STF533 implemented and closed 70 CRs in 8 documents. The corresponding documents have been uploaded into the ETSI TB MTS Draft’s area. They require approval from TB MTS. For one CR related to the harmonisation task, the STF needs advice from TB MTS. Further seven CRs are related to the the new TTCN-3 extension of “Object-oriented features” and will be implemented and closed until May 2018. Currently 13 CRs will remain open. They have to be resolved the scope of the next TTCN-3 maintenance STF.

2 Introduction

The TTCN-3 language evolution work will comprise the following tasks:

- Review and resolve change requests reporting technical defects, or requesting clarifications and new language features for all existing TTCN-3 language standards.
- Develop proposals for language extensions requested by 3GPP, OMA, ETSI members and the TTCN-3 community and consent the solution with the contributor(s).
- Implement agreed solutions.
- Manage the change request (CR) process.
- Manage the interim versions of the standard, according to 3GPP needs, and the versions for approval.
- Present the TTCN-3 standards’ status and the work of the STF at the conference(s) associated with ETSI TB MTS and at ETSI TB MTS meetings.
- Work on TTCN-3 language harmonization.
- Develop the new TTCN-3 extension “Object-oriented features”.

The STF consists of 6 experts:

- Jens Grabowski, University of Göttingen (STF Leader)
- Julien Deltour, PragmaDev (STF member until end of 2017)
- Kristóf Szabados, Ericsson
- György Réthy, Ericsson
- Tomáš Urban, Elvior
- Jacob Wieland,Spirent Communications

György Rethy does not physically participate in the STF sessions, but contributes by following the ongoing work in Mantis and providing useful feedback via email and telephone.

3 Contractual milestone

The contractual milestone M3 is related to:

- This Progress Report
- Stable draft of D17 DES/MTS-1029507 TTCN3ext_OOed111
- Final drafts of deliverables for TB approval, with the exception of D17

M2 is achieved by TB MTS approving this progress report and all deliverables described above.

4 Progress of the work

The work of STF 533 is based on the resolution of CRs. The progress of the work on CRs can be followed in detail by using the ETSI's Mantis system at http://oldforge.etsi.org/mantis/set_project.php?ref=view_all_bug_page.php&project_id=22.

The STF session plan in 2017 contained 4 one-week working sessions with all experts present and one week of voluntary work spent for final CR cleaning and editorial work on the draft deliverables. Working sessions of the STF have been:

- W23, 06 - 09 June 2017, Berlin
- W30, 24 - 28 July 2017, Göttingen
- W36, 04 - 08 September 2017, Tallinn
- W43, 23 - 27 October 2017, Budapest

Further working and homework sessions for finalizing the work on language harmonization (see remark on CR 7720 in Clause 12) and the new TTCN-3 extension "Object-oriented features" will be organized in 2018 on demand.

During the four working sessions in Berlin, Göttingen, Tallinn and Budapest STF 533 implemented and closed the following 70 CRs.

Part 01: TTCN-3 Core Language (38 CRs)

7445	usage of encode/variant attributes should be enhanced
7491	confusing/incorrect texts related to anytype behaviour
7496	Formal parameters and return values should also be declarable as arrays.
7530	keywords should be escapable to be used as a TTCN-3 identifier.
7590	BNF for select-case is not correct
7593	Part-1, Sec.15.11: Template concatenation drops omit and type restrictions
7598	Invalid restriction on formal template parameters
7599	Rules for actual parameterers with template restriction
7601	Misspelled word in 20.2.c
7602	Three options of handling blocking multicast and broadcast calls
7603	Delete note on template restriction passing table
7605	Logging of constructive values
7606	Operations missing in the list of TTCN-3 elements that can be logged
7607	Additional restriction for the connect operation
7610	Missing rules for return value of the reply operation
7611	Valid port lists for the procedure operations
7620	Constraining of array types
7624	Local declarations should be allowed to be declared everywhere in a statement block
7628	concatenation with wildcards should be allowed also for charstring types
7630	example creating empty template is wrong
7655	mixed list/assignment-notation should also be allowed for record/set types
7669	wording problem in the definitions
7672	Compatibility of enumerated types
7673	dynamic_encoding parameter missing in encvalue_o and decvalue_o
7677	Additional restriction for the disconnect operation
7678	Rename a module
7680	A matching mechanism term for templates containing other matching mechanisms shall be added.
7683	Keywords (from packages) should be reserved in the Core Standard.
7684	Language version string
7688	The rule for loops inside interleave is too restrictive
7689	Unconditional goto in interleave
7707	Port and timer variables and structured types containing ports and timers
7708	Using dot notation with @default union values
7709	Invalid template in the example on enumerated templates

7710 Superfluous record keywords
7712 Errors in the example on retrieving attribute values
7714 Several issues with the setencode operation
7730 "not_a_number" is not listed as a keyword but is used as such

Part 06: TTCN-3 Control Interface (9 CRs)

7512 XML mapping of matching symbols
7519 Ifpresent and length matching attributes not defined in XML mapping
7552 Invalid C# mapping of tliRnd
7553 Invalid return type in java MatchingMechanism.getMatchingType()
7554 Wrong text in the list of C# abstract data type Value mapping
7594 Wrong parameter type in C mapping of the tliRnd function
7681 adapt TCI to the hanges in any2unistr predefined function changes
7694 dynamic encoding (usage of statement port.setencode(type,"EncodingRule1");
7703 the xml schema for the log events is inconsistent with the rest of the specification

Part 07: Using ASN.1 with TTCN-3 (1 CR)

7728 OER support

Part 09: Using XML schema with TTCN-3 (12 CRs)

7562 Clarification of order of XML to TTCN3 type conversion
7631 Typos in the XML specification
7634 Missing prefixes in facet mapping examples
7653 Incorrect mapping of enumerated type in example 1 on element substitution
7654 Invalid encoding instruction in the example on type substitution
7656 Invalid examples on simple content mapping
7657 Name of anyAttribute and anyElement fields are not encoded
7658 Missing support for leap seconds in mapping of XSD time types
7662 Invalid field names in example on nested sequence inside choice
7664 Example on base64Binary mapping
7665 Missing XSD definition in example on QName
7726 Naming rules for unions with default alternative (used in substitutions)

Part 11: Using JSON with TTCN-3 (5 CRs)

7719 Errors in examples for "Part 11: Using JSON with TTCN-3", "6.4.2 JSON Strings"
7722 "Part 11: Using JSON with TTCN-3":"B.3.4 Name as" syntax is confusing, does not match examples throughout specification
7723 "Part 11: Using JSON with TTCN-3":"7.2.8 Record and set" invalid JSON syntax in example
7724 "Part 11: Using JSON with TTCN-3":"B.3.5 Number of fraction digits" use 0E0 instead of 0E1
7725 "Part 11: Using JSON with TTCN-3":"B.3.6 Use the Minus sign" assumptions for TTCN-3 Core Language spec

Ext Pack: Config & Deployment Support (ES 202 781) (2 CRs)

7626 editorial: syntactical structure parts are not properly "spaced"/"indented"
7711 editorial: syntactical structure parts are not properly "spaced"/"indented"

Ext Pack: Behaviour Types (ES 202 785) (1 CR)

7625 Harminozation: the behaviour extension package does not mention modifiers when describing compatibility.

Ext Pack: Advanced Matching (ES 203 022) (2 CRs)

7525 allow repetition (and maybe other regular expression syntax) also for binary string types
7629 concatenation of arbitrary present list/string templates should be allowed

The following 7 CRs are related to the new TTCN-3 extension “Object-oriented features” and will be implemented until May 2018.

Ext Pack: Object Oriented features (7 CRs)

6801 Visibility of component definitions
7187 Allow null-value for all value variables with the same semantics as uninitialized.
7561 Allow finally block or shutdown hook
7679 Class Concept to be added
7692 Exception handling with less code and less performance overhead
7693 component members with visibility and functions inside the components
7731 Draft document for Object-oriented Extension

The following CR is related to the STF harmonization task. For the resolution, the STF needs advice from TB MTS (see Clause 12).

Part 01: TTCN-3 Core Language (1 CR)

7720 Removal of deprecated features from the TTCN-3 core language

The following 7 CRs require further discussions. They should be resolved in the scope of the next TTCN-3 maintenance STF.

Part 01: TTCN-3 Core Language (7 CRs)

7455 The type of formal in parameters of external functions should be allowed to be 'any'
7465 control part should be able to have a runs on clause and call other control parts
7495 out, inout and return value should be assignable via the done/killed statement redirect
7618 alternative event headers could allow a boolean combinators
7619 No named interleave construct available.
7682 Table with index-operators using keys as indices should be supported
7721 Possibility to catch any exception of a specified signature

The following 6 CRs have been submitted after the last STF session in Budapest. Their resolution will be part of the work of the next TTCN-3 maintenance STF.

Part 01: TTCN-3 Core Language (2 CRs)

7729 There seems to be a mistake in Example 4 on Page 108 (v4.9.1)
7737 Padding bits in encvalue_o result and decvalue_o input

Part 06: TTCN-3 Control Interface (1 CR)

7738 TriMessage should be enhanced with a stream-like API

Ext Pack: Advanced Matching (ES 203 022) (3 CRs)

7733 Dynamic match and default parameter values
7734 Runs on in dynamic matching
7739 Error in the example on dynamic matching

5 Assessment of technical risk, difficulties encountered/expected, unresolved issues

The concepts and features to be implemented in the new TTCN-3 extension “Object-oriented features” have been identified by agreement of the STF team, TB MTS and the TTCN-3 steering group. A stable draft of the new extension package has been produced, but the final implementation requires further work related to TCI, TRI and BNF. The amount of work needed for a proper implementation of the missing parts cannot be predicted today. Problems regarding the development of the new TTCN-3 extension will be

reported instantly to TB MTS and the TTCN-3 steering group. The STF will follow the advice provided by TB MTS and TTCN-3 steering group.

Task 3 “TTCN-3 language harmonization” has been implemented as part of several CRs. For the resolution of CR 7720 “Removal of deprecated features from the TTCN-3 core language”, the STF needs advice from TB MTS.

The number of CRs (13) that have been left open for the next TTCN-3 maintenance STF is reasonable. None of the open CRs look critical.

and that Currently, the number of unresolved CRs is manageable and should not cause major problems. However, new CRs tend to be submitted before work sessions and the number of new CRs submitted in 2017 cannot be predicted. If the number of new CRs becomes big, STF533 may not be able to resolve all open CRs. The resolution of some CRs may be left for succeeding STFs. The STF will then prioritize the open CRs and resolve them in order of priority as long as possible (some high priority CRs may need long discussions, while low priority, e.g. trivial CRs may be handled quickly and thus may overtake the resolution of higher priority CRs).

6 Proposed changes in the STF work plan

No proposed change.

7 Resources requirements

There is no change foreseen in the STF resource requirements related to the STF’s ToR.

8 Changes in the STF Team

Until the end of 2017 STF533 consisted of the following 6 experts:

- Jens Grabowski, University of Göttingen (STF Leader)
- Julien Deltour, PragmaDev
- Kristóf Szabados, Ericsson
- György Réthy, Ericsson
- Tomáš Urban, Elvior
- Jacob Wieland,Spirent Communications

Due to a change of employment, Julien Deltour (representing PragmaDev) and also the STF team at the end of 2017.

By agreement with the other STF team members, the MTS board (chairman, vice-chairmen, and support co-ordinator) and the ETSI Funded Projects Support Director, the tasks assigned to Julien Deltour were adjusted in such a manner that he was able to fulfil the contractual obligations of PragmaDev in form of homework within 2017.

During his homework, Julien Deltour concentrated on proofreading of CR resolutions and assembling CRs related to the new TTCN-3 extension package on object-oriented features into one document. As agreed, Julien Deltour finished his work at the end of 2017.

No further change in the composition of the STF is foreseen or required.

9 Meetings/events attended on behalf of the STF

Date	Place	TB/Orga	Event description	Reason to attend	Expert(s)
06.04.17	online	TTCN-3 SC	TTCN-3 steering group online meeting	Discussing STF working principles	Jens Grabowski, György Réthy
31.05. – 01.06.17	ETSI HQ	TC MTS	MTS#71 regular meeting	Online participation to report STF planning	Jens Grabowski
08.09.17	online	TTCN-3 SC	TTCN-3 steering group online meeting at end of the 3rd STF working session	Selection/discussion of OO-concepts for TTCN-3 and language harmonization	All
26.09 – 27.09.17	University Göttingen	TC MTS	MTS#72 regular meeting	Presentation of progress report (milestone M2)	Jens Grabowski
11.10. – 13.10.17	Berlin	TC MTS	User Conference on Advanced Automated Testing (UCAAT)	Poster presentation of STF work	Jacob Wieland

10 Meetings/events planned to be attended

Date	Place	TB/Orga	Event description	Reason to attend	Expert(s)
23.01. – 24.01.18	Siemens Munich	TC MTS	MTS#73 regular meeting	Presentation of progress report (milestone M3)	Jens Grabowski
May – June 18	tba	TC MTS	MTS#74 regular meeting	Presentation of final report (milestone M4)	Jens Grabowski

11 STF communications, presentations, promotion, inside and outside ETSI, WEB pages etc

- The STF533 webpage can be found on: https://portal.etsi.org/STF/STFs/STFHomePages/STF533
- The work of STF533 has been presented and discussed on the ETSI UCAAT conference (https://ucaat.etsi.org/2017/home) in form of a poster presentation.
- Further external communication is done via Mantis and emails.

12 Technical advice required from the reference Technical Body

Technical advice from TB MTS is required for:

- *Task 3 – TTCN-3 language harmonization.*

  CR 7720 “Removal of deprecated features from the TTCN-3 core language” was considered to be one of the principal duties of this task. The STF requests feedback from all major TTCN-3 tool vendors regarding the removal of deprecated features. Unfortunately, the STF only receives feedback of some tool vendors and didn’t feel comfortable to delete features without further feedback. As a consequence, CR 7720 is still in progress.

  STF533 proposes to resolve CR 7720 until May and to close (i.e., implement) the CR in the scope of the TTCN-3 2018 maintenance STF.

13 Status of the deliverables

New drafts of the following TTCN-3 standard documents have been uploaded to the ETSI MTS Drafts area:

Part 01: TTCN-3 Core Language

Name:	RES/MTS-201873-1v4A1 (ES 201 873-1) TTCN-3 Core V4101
Status:	Final draft for approval
Link	http://docbox.etsi.org/MTS/MTS/07-Drafts/00201873-1v4A1/MTS-201873-1v4A1v493.docx

Part 06: TTCN-3 Control Interface

Name:	RES/MTS-201873-6 T3ed4A1 (ES 201 873-6) TTCN-3 TCI V481
Status:	Final draft for approval
Link	http://docbox.etsi.org/MTS/MTS/07-Drafts/00201873-6_T3ed4A1/MTS-201873-6%20T3ed4A1v492.docx

Part 07: Using ASN.1 with TTCN-3

Name:	RES/MTS-201873-7ed471 (ES 201 873-7) TTCN-3 Edition 4.5.1: the use of ASN.1
Status:	Final draft for approval
Link	http://docbox.etsi.org/MTS/MTS/07-Drafts/00201873-7ed471/MTS-201873-7ed471v462.docx

Part 09: Using XML schema with TTCN-3

Name:	RES/MTS-201873-9 T3ed491 (ES 201 873-9) TTCN-3 XSD V471
Status:	Final draft for approval
Link	http://docbox.etsi.org/MTS/MTS/07-Drafts/00201873-9_T3ed491/MTS-201873-9%20T3ed491v483.docx

Part 11: Using JSON with TTCN-3

Name:	RES/MTS-201873-11ed481 (ES 201 873-11) TTCN-3 ed. V4.7.1: Use of JSON
Status:	Final draft for approval
Link	http://docbox.etsi.org/MTS/MTS/07-Drafts/00201873-11ed481/MTS-201873-11ed481v472.docx

Ext Pack: Config & Deployment Support (ES 202 781)

Name:	RES/MTS-202781ConfDepled161 (ES 202 781) TTCN-3 extension: Configuration & Deployment support
Status:	Final draft for approval
Link	http://docbox.etsi.org/MTS/MTS/07-Drafts/00202781ConfDepled161/MTS-202781ConfDepled161v001.docx

Ext Pack: Behaviour Types (ES 202 785)

Name:	RES/MTS-202785-ed161 (ES 202 785) TTCN-3 extension: Behaviour Types
Status:	Final draft for approval
Link	http://docbox.etsi.org/MTS/MTS/07-Drafts/00202785-ed161/MTS-202785-ed161v001.docx

Ext Pack: Advanced Matching (ES 203 022)

Name:	RES/MTS-203022ed121 (ES 203 022)
Status:	Final draft for approval
Link	http://docbox.etsi.org/MTS/MTS/07-Drafts/00203022ed121/MTS-203022ed121v001.docx

Ext Pack: Object Oriented features

Name:	DES/MTS-203790-00F_ed111 (ES 203 790) TTCN3ext_OOed111
Status:	Stable draft
Link	http://docbox.etsi.org/MTS/MTS/07-Drafts/00203790-00F_ed111/MTS-203790-00F_ed111v002.docx

14 Next report

The next report is scheduled for: TB MTS#74 (expected May-June 2018)

15 Any other business

None