STF573 - Progress Report for ETSI

Presented to ETSI meeting		**Author:**	Prof. Jens Grabowski
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Doc ref		**Version**	

STF	**573**
TB/WG	**MTS**

STF leader	Prof. Jens Grabowski
TB responsible	Mr. Dirk Tepelmann
STF Assistant	Ms. Elodie Rouveroux

STF title:	TTCN-3 Evolution 2019

Milestone	**A**		**Status Template**	**Covers the period until (cut-off date)**	12/09/2019
Objective	Material to be available: · Draft learning material (Task 2) · Concepts for OO extensions (Task 3) · Table of contents for standard library (Task 4) · (optional) Technical issues raised by the harmonization issues and requiring TC decision Progress Report A to be presented and approved at MTS#78				
Achieved	**Yes**				
Remarks					

Achieved dates

Template	**Draft report**	**TB approval**	**ETSI approval**		
19/08/2019					

1 Executive summary

The TTCN-3 testing language has intensively been developed by ETSI during the last decade and, by today, it consists of **17** ETSI standards, altogether more than **1650** pages. The language is also endorsed by ITU-T as the Z.16x and Z.17x Recommendation series. By now TTCN-3 is used exceptionally as the 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 (for further details see http://www.ttcn-3.org/index.php/about/references/applicatio-domains) and standards organizations (for further details see 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**, **ITS** and **oneM2M/smartM2M**. 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 **C-ITS** area also several TTCN-3 test suites have been developed and they start playing important roles in ITS Plugtests™ events, with automated C-ITS interoperability testing being in progress. In 2016 **oneM2M** has started using TTCN-3 for IoT/M2M conformance test development that has been continued in ETSI smartM2M in 2017. oneM2M is also developing an open source test tool to execute the conformance tests.

The purpose of STF573 – "TTCN-3 evolution 2019" is to maintain the high quality of the language – that currently consists of 17 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. The STF team consists of 6 experts. During its first working sessions, STF573 progressed **51** CRs, updated the TTCN-3 leaflet and TTCN-3 web pages, developed draft educational material for the effective usage of the TTCN-3 OO features, identified additional OO features, and started the development of a standard library for OO features.

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.
- Updating TTCN-3 leaflet and web pages.
- Development of educational material for the effective usage of the TTCN-3 OO features.
- Further development of TTCN-3 Language Extensions: Object Oriented features - Implementation of additional features needed for a more efficient use of the TTCN-3 OO features.
- Development of a standard library for OO features supporting the effective use of the TTCN-3 OO features.

The STF consists of six experts:

- Jens Grabowski, University of Göttingen (STF Leader)
- Philip Makedonski, University of Göttingen
- Kristóf Szabados, Testcom OÜ
- György Réthy, Testcom OÜ
- Tomáš Urban, Elvior
- Jacob Wieland,Spirent Communications

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

3 Contractual milestone

The contractual milestone A is related to

- this progress report,
- draft learning material (Task 2),
- concepts for OO extensions (Task 3), and
- a table of contents for a standard library (Task 4).

Milestone A is achieved by TB MTS approving this progress report and accepting the draft learning material (Task 2), the identified concepts for OO extensions (Task 3) and the table of contents for a standard library (Task 4).

4 Progress of the work

The current STF session plan contains 3 working sessions with all experts present, individual homework of the experts and one week of voluntary work spent for final CR cleaning and editorial work on the draft deliverables. Working sessions of the STF are:

- W32, 04 – 09 August 2019, Tallinn (**done**)
- W35, 26 – 28 August 2019 (3 days), Berlin (**done**)

- Week TBA, November/December, Location TBA (planned)

Further working sessions will be organized on demand.

During the first working sessions in Tallinn and Berlin, the **51** CRs listed below have been progressed (resolved CRs are printed in italic):

Part 01: TTCN-3 Core Language (9 CRs)

7455 The type of formal in parameters of external functions should be allowed to be 'any'
7682 Table with index-operators using keys as indices should be supported
7813 Missing template restrictions in return clause declaration
7846 Preprocessing macro _SCOPE_ value "control" to be clarified
7858 Invalid restriction for non-deterministic lazy and fuzzy parameters
7860 CR 7611 wasn't properly added to the specification
7861 Indirect reference to a deprecated feature
7865 the text for union alternatives can be easily missunderstood to support omit being assigned to alternatives
7867 the ispresent, ischosen, isvalue, isbound predefined functions should be moved to operations.

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

7785 Add Mutation annotations to the Value data type
7847 Java mapping of tliPrCatchChecked_c
7849 C++ mapping of address parameter in TCI-TL check operation

Part 09: Using XML with TTCN-3 (2 CRs)

7835 incorrect example?
7848 Mapping XML Schemas: Name clashes in NoTargetNamespace

Ext Pack: Advanced Parametrization (ES 202 784) (2 CRs)

7852 Allow inline type expressions also as actual type parameters

7853 classes should allow type parameterization

Ext Pack: Behaviour Types (ES 202 785) (2 CRs)

7812 mtc and system clauses in behaviour types
7822 Invalid restriction on values of behaviour types

Ext Pack: Extended TRI (ES 202 789) (1 CR)

7816 There should be some way to determine what to log as 'TriMessage' for xtriSend

Ext Pack: Advanced Matching (ES 203 022) (6 CRs)

7818 Dynamic Matching: wrong type used for template mw_closeTo
7819 semantic of (Restriction a):The dynamic matching syntax shall only be used in a typed context.
7820 Wrong definition of templates in EXAMPLE.
7821 Clarify semantic of examples (usage of value-lists and value retrieval assignment)
7827 Semantic of disjunction
7829 Syntax of repetion for arrays and of types

Ext Pack: Object-Oriented Features (Draft ES 203 790) (14 CR)s

7830 Clarification request for OO features (order or member initializer and constructor)
7831 Clarification request for OO features (reaching super super class)
7832 incorrect syntax used in example
7833 typo in comment
7834 case else in the select case is not described
7854 Better BNF derivations for 'this' and this-related entities are necessary
7855 BNF for ClassMember should not allow more than one ConstructorDef
7856 Implicit constructor shall only provide parameters for non-var fields without initializer
7859 Modified BNF/restrictions for functions, external functions and altsteps
7862 Allow trait classes and multiple inheritance
7863 libraries that could be added to OO
7864 Allow overloading for object methods.
7866 Allow nested classes
7868 External classes should be allowed internal members (direct and inherited)

The **progress of the work on Task 2** “Development of educational material for the effective usage of the TTCN-3 OO features” will be presented to MTS#78 in a separate document.

The **progress of the work on Task 3** “Further development of TTCN-3 Language Extensions: Object Oriented features - Implementation of additional features needed for a more efficient use of the TTCN-3 OO features” is related to the progress of the work on the CRs:

7862 Allow trait classes and multiple inheritance,
7864 Allow overloading for object methods,
7866 Allow nested classes, and
7868 External classes should be allowed internal members (direct and inherited).

Each CR defines an additional features needed for a more efficient use of the TTCN-3 OO features. Further additional features may be identified while working on this task. Identified features will be implemented by using the usual CR resolution mechanism.

The **progress of the work on Task 4** “Development of a standard library for OO features supporting the effective use of the TTCN-3 OO features” is related to the work on CR:

7863 libraries that could be added to OO.

Currently the following data structures are discussed to become elements of the standard library:

- Queue (First-in First-out, linked),
- Stack (Last-in First-out),
- RingBuffer (fixed size list whose head indicator can move),
- HashMap (buckets based),
- Free-Busy Queue, and

- Red-Black Tree.

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

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 2018 cannot be predicted. If the number of new CRs becomes big, STF550 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).

At this point in time no action is seen to be required from TC MTS.

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

There was no change in the STF's composition and no change is foreseen or required.

9 Meetings/events attended on behalf of the STF

None

10 Meetings/events planned to be attended

Date	Place	TB/Orga	Event description	Reason to attend	Expert(s)
10.09 – 11.09.19	Munich, Germany	TC MTS	MTS#78 regular meeting	Presentation of progress report (milestone A)	Jens Grabowski
22.10. – 24.10.19	Bordeaux, France	TC MTS	User Conference on Advanced Automated Testing (UCAAT)	Participation at ETSI booth	Kristóf Szabados
Jan/Feb 2020	tba	TC MTS	MTS#79 regular meeting	Presentation of progress report (milestone B)	Jens Grabowski

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

- The STF573 webpage can be found on: https://portal.etsi.org/STF/STFs/STFHomePages/STF573

- The work of STF573 will be presented and discussed on the ETSI UCAAT conference (https://ucaat.etsi.org/) in October 2019. An expert of STF573, i.e., Kristóf Szabados, will be available at the ETSI booth.

- STF573 updated the TTCN-3 leaflet and contributes to the TTCN-3 webpage http://www.ttcn-3.org/.

- Further external communication is done via Mantis and emails.

12 Technical advice required from the reference Technical Body

There is no issue requiring TB decision.

13 Status of the deliverables

TTCN-3 standards are stable documents. The way of working of TTCN-3 evolution STFs is approved by ETSI TC MTS, is based on change requests submitted to ETSI's Mantis CR handling system. Technical resolution and proposed changes in the texts of deliverables are publically available in Mantis during the year. Agreed text of resolved CRs is implemented in drafts of deliverables at, and after the last working session of the STF. Therefore, the output drafts of the deliverables are available at the end of the project.

The actual status of the CRs can be found at http://forge.etsi.org/mantis/main_page.php.

14 Next report

The next report is scheduled for: TB MTS#79 (Jan-Feb 2019)

15 Any other business

None