

TTF T003 - Progress Report for ETSI			
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TTF	T003
TBWG	MTS

TTF leader	Prof. Jens Grabowski
TB responsible	Dr. Philip Makedonski
Administrator	Ms. Elodie Rouveroux

TTF title:	TTCN-3 Maintenance and Testing 2020
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Milestone	C		Status Template	Covers the period until (cut-off date)	31/01/2021
Objective	Progress Report and final draft of deliverables from T1 approved by TC MTS#82				
Achieved	Yes				
Remarks					

Achieved dates

Template	Draft report	TB approval	ETSI approval		
04/01/2021					

1 Executive summary

The TTCN-3 testing language has intensively been developed by ETSI during the last 15 years, by today, it consists of 24 ETSI standards, altogether comprising almost 1800 pages and more than 3300 test cases in TTCN-3 code. 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 (<http://www.ttcn-3.org/index.php/about/references/applicatio-domains>) and standards organizations (<http://www.ttcn-3.org/index.php/about/references>).

Significant number of TTCN-3 test toolsets are available on the market. At least five commercial tools, five free or open source tools and one internal test tool of an industrial ETSI member are known to exist (<http://www.ttcn-3.org/index.php/tools>). This also indicates the high interest and use of the language. TTCN-3, as THE standard test language, serving several domains and application areas, is specified in very detail. For example, the TTCN-3 core language alone is estimated to contain about 5,000 requirements. It is of utmost importance for users of standard test suites as well as for industrial users that the TTCN-3 tools conform to the TTCN-3 language standards. This can be secured by TTCN-3 tool conformance test suites, in a similar way as implementations of other ETSI standards (e.g. protocol specifications) are checked by means of ETSI-developed conformance test suites. In the past, the TTCN-3 tool conformance test suite development process itself has led to several language standard clarifications.

TTF T003 573 “TTCN-3 Maintenance and Testing 2020” has two objectives. The first objective is to maintain the high quality of the language 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 second objective is to maintain and further develop the TTCN-3 tool conformance test suites in order to reach full test coverage of the TTCN-3 series of standards.

The TTF team consists of 9 experts. For health reasons, the expert Axel Rennoch was replaced by Ramon Barakat in January 2021.

During three working session for Task 1 “TTCN-3 maintenance and further development” TTF T003 closed and implemented 50 CRs in 9 final draft documents. 3 CRs will remain open. They have to be resolved in the scope of the next TTCN-3 maintenance project. As part of the work on Task 1, TTF T003 organized two webinars for promoting TTCN-3 in general, the Object Oriented features of TTCN-3 and the TTF work in general. In addition, TTF T003 updated the TTCN-3 leaflet and contributed to the TTCN-3 webpage <http://www.ttcn-3.org/>.

The work on Task 2 “Conformance test suites for TTCN-3 tools and sub-tasks” continues. The involved experts completed writing tests according to their assignments, with the exception of the tests assigned to Axel Rennoch, which are still to be written by Ramon Barakat. The other experts are proceeding with the validation of test cases.

2 Introduction

The work on Task 1 “TTCN-3 maintenance and further development” comprises 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 ETSI TBs, 3GPP, oneM2M, 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 (when requested), and the versions for approval.
- Present the TTCN-3 standards’ status and the work of the TTF (previously STF) at the conference(s) associated with ETSI TB MTS and at ETSI TC MTS meetings.
- Providing input for the updates of the TTCN-3 leaflet and the TTCN-3 web pages.

The work on Task 2 “Conformance test suites for TTCN-3 tools and sub-tasks” comprises the following tasks:

- Analysis of the latest published versions of the relevant TTCN-3 standards and identifying new and changed requirements.
- Identifying affected existing test cases and define new test cases for the new requirements.
- Implement changes and additions in the textual part of the deliverables (PICS, TSS&TP, textual part of the ATS).
- Implement changes and additions in the code of the ATS.

- Verification of the test cases with test tools.

TTF T003 consists of the following experts:

- Jens Grabowski, University of Göttingen (TTF management)
- Ramon Barakat Fraunhofer FOKUS (starting in January 2021)
- Andras Kovacs, Broadbit (TTF management)
- Lénárd Nagy, Ericsson
- Axel Rennoch, Fraunhofer FOKUS (until January 2021)
- György Réthy, Ericsson
- Bogdan Stanca-Kaposta, Spirent Communications
- Kristóf Szabados, Ericsson
- Tomáš Urban, Elvior
- Jacob Wieland, Spirent Communications

For health reasons, Axel Rennoch was replaced by Ramon Barakat in January 2021.

3 Contractual milestone

The contractual milestone C is achieved by TB MTS approving

- (1) this report and
- (2) final drafts of the T1 deliverables.

4 Progress of the work

Progress of the work on Task 1 – TTCN-3 maintenance and further development

The TTF session plan for the work on Task 1 contained three online working sessions where all experts worked in parallel, as well as individual homework of the experts and one week of voluntary work spent for final CR cleaning and editorial work on the draft deliverables.

The following online working sessions for the work on Task 1 have been carried out:

- Week 33: 10. - 14. Aug.2020
- Week 41: 05. - 09. Okt. 2020
- Week 50: 07. - 11. Dec. 2020

During the working sessions, the 50 CRs listed below have been closed and implemented in final draft documents:

Part 01: TTCN-3 Core Language

(21 CRs)

- | | |
|------|--|
| 7874 | Reintroduce restriction on restricted modified templates |
| 7890 | module parameters should behave like variables during control part execution |
| 7892 | Allow modification of matching symbols on static template level |
| 7893 | Allow use of non-deterministic functions in alt-statement header |
| 7910 | Allow parallel control parts/components |
| 7911 | Correct TTCN-3 Parts list in Foreword |
| 7919 | testcase should be possible to be defined without runs on |
| 7925 | Non-abstract signature templates |
| 7958 | semantic of interleave altsteps |
| 7959 | language keyword strings |
| 7964 | Assigning a universal charstring value to a charstring variable is now allowed, but very error prone |
| 7971 | typo in 5.2.2 |

- 7972 bad formatting in 16.1.5
- 7973 Update of Figure 1 in TTCN-3 part 1
- 7986 usage of the "data type" term is a bit confusing
- 7988 Clarification of a restriction on map types
- 7989 Incorrect references to compatibility rules
- 7990 lengthof for maps
- 7991 @nodefault for interleave
- 7992 Only signature parameters are restricted to be data types, return types not
- 7996 Are the keys of a set type unique?

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

- 7974 Update of Figure 1 in TTCN-3 part 7

Part 08: Using IDL with TTCN-3 (1 CR)

- 7975 Update of Figure 1 in TTCN-3 part 8

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

- 7969 Ambiguity with decoding of embed_values
- 7976 Update of Figure 1 in TTCN-3 part 9
- 7982 Ambiguous decoding of xml

Part 11: Using JSON with TTCN-3 (7 CRs)

- 7913 conflicting examples for solidus encoding
- 7914 conflicting definition and examples for usi encoding
- 7915 Wrong field order in the example union
- 7916 The name "Values" does not seem to follow the naming convention of other types
- 7917 please add an example for number forbidden in JSON
- 7968 unclear description on what can be inside of a default
- 7977 Update of Figure 1 in TTCN-3 part 11

Ext Pack: Advanced Parametrization (ES 202 784) (1 CR)

- 7912 Missing reference

Ext Pack: Config & Deployment Support (ES 202 781) (1 CR)

- 7978 Dealing with parallel control components

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

- 7984 sequence of RunsOnSpec, MtcSpec, SystemSpec in BehaviourType definitions

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

- 7862 Allow trait classes and multiple inheritance
- 7864 Allow overloading for object methods.
- 7870 Allow definition of class properties
- 7871 Class templates to be added to the language?
- 7920 Clarification request: how should equality/inequality work for objects?
- 7952 ispresent, isvalue and isbound on objects
- 7957 add equals function to the object
- 7961 type in function description
- 7962 type in Queue description
- 7963 incorrect text formatting in section B.1.0
- 7965 typo in B.1.8
- 7983 tliObj*Enter/Leave events should also get the class scope name
- 7985 allow objects inside record of/array
- 7993 Ambiguous description and example for constructors

Progress of the work on Task 2 – Conformance test suites for TTCN-3 tools and sub-tasks

The work on Task 2 “Conformance test suites for TTCN-3 tools and sub-tasks” continues. The involved experts completed writing tests according to their assignments, with the exception of the tests assigned to Axel Rennoch, which are still to be written by Ramon Barakat. The other experts are currently proceeding with the validation of test cases.

Each expert uses their own TTCN tool for the validation of conformance test cases. One exception is the validation of Object Oriented test cases, as the Object Oriented extensions are presently supported only by Spirent’s compiler. We are grateful for Jacob Wieland’s help, who is validating these test cases (even though not directly involved in the development of the conformance tests).

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

· Task 1 – TTCN-3 maintenance and further development

During the work on Task 1, no technical risks or difficulties have been encountered.

As expected and similar to previous work on TTCN-3 maintenance, the resolution of **13** CRs (11.01.2021), has been left open for a future TTF working on TTCN-3 maintenance. The open CRs are:

- General: TTCN-3 Change Requests (1 CRs)
7981 Support for REST APIs (HTTP)
- Part 01: TTCN-3 Core Language (2 CRs)
7994 Allow coordinated shared access to component variables.
7998 lengthof for maps

· Task 2 – Conformance test suites for TTCN-3 tools and sub-tasks

The preceding TTCN-3 conformance testing STFs have provided a sound methodological basis for the work of this TTF. The TTF work has started late in August 2020, but nevertheless the test case writing was catching up with the original project plan - except for Fraunhofer’s contribution. The main unexpected event was the resignation of Axel Rennoch from Fraunhofer for health reasons from the STF team at the beginning of December. After some delay, it was decided in January 2021 that his contribution will be covered by Ramon Barakat from Fraunhofer. Presently, the main risk is related to Fraunhofer’s contribution, and it entails: i) the risk related to the delayed test case writing, and ii) the risk related to the joining of a new expert who must familiarize with the team’s working methodology. Other team members support for the mitigation of these risks.

6 Proposed changes in the TTF work plan

There are no changes in the TTF work plan proposed.

The change in the STF team (see Section 8) does not require any changes to the work plan. The remaining tasks of Axel Rennoch, who has left the TTF team, will be taken over by the new TTF team member Ramon Barakat.

7 Resources requirements

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

8 Changes in the STF Team

For health reasons, Axel Rennoch from Fraunhofer FOKUS was replaced by Ramon Barakat from Fraunhofer FOKUS in January 2021.

9 Meetings/events attended on behalf of the STF

Date	Place	TB/Orga	Event description	Reason to attend	Expert(s)
08.09. – 09.09.20	Online	TC MTS	MTS#81 regular meeting	Presentation of progress report (milestone A)	Jens Grabowski, Andras Kovacs
06.10.20	Online	TC MTS	Webinar: TTCN-3 General Concepts and Applications	Promotion of TTCN-3 and work of TTF	TTF experts working on Task 1
09.10.20	Online	TC MTS	Webinar: TTCN-3 Language Extensions Object Oriented Features	Promotion of advanced TTCN-3 features and work of TTF	TTF experts working on Task 1

10 Meetings/events planned to be attended

Date	Place	TB/Orga	Event description	Reason to attend	Expert(s)
26.01. – 27.01.21	Online	TC MTS	MTS#82 regular meeting	Presentation of progress report (milestone C)	Jens Grabowski, Andras Kovacs
May/June 2021	tba	TC MTS	MTS#83 regular meeting	Presentation of TTF finalization (milestone D and E)	Jens Grabowski, Andras Kovacs
tba	tba	TC MTS	User Conference on Advanced Automated Testing (UCAAT)	Participation at ETSI booth	tba

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

- TTF T003 organized two webinars for promoting TTCN-3 in general, the Object Oriented features of TTCN-3 and the TTF work in general. The webinars are accessible at:
 - TTCN-3 General Concepts and Applications: <https://www.etsi.org/10-events/1795-2020-10-webinar-ttcn-3-general-concepts-and-applications>
 - TTCN-3 Language Extensions Object Oriented Features: <https://www.etsi.org/events/1790-2020-10-webinar-ttcn-3-language-extensions-object-oriented-features>
- The TTF T003 webpage can be found on: <https://portal.etsi.org/STF/STFs/STF-HomePages/T003>
- TTF T003 continuously updates the TTCN-3 leaflet and contributes to the TTCN-3 webpage <http://www.ttcn-3.org/>.
- Further external communication is done via Mantis (http://forge.etsi.org/mantis/main_page.php) and emails.

12 Technical advice required from the reference Technical Body

There is no issue requiring TB decision.

13 Status of the deliverables

· Task 1 – TTCN-3 maintenance and further development

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 all TTCN-3 related CRs can be found at http://forge.etsi.org/mantis/main_page.php.

For the achievement of milestone C, TTF T003 produced the following final drafts

- ES 201 873-1: Part 1: TTCN 3 Core Language:
Available at: <https://docbox.etsi.org/MTS/MTS/07-Drafts/00201873-1v4.13.1/MTS-201873-1v4.13.1v4123.docx>
- ES 201 873-7 Part 7: Using ASN.1 with TTCN-3
Available at: <https://docbox.etsi.org/MTS/MTS/07-Drafts/00201873-7v491/MTS-201873-7v491v482.docx>
- ES 201 873-8 Part 8: The IDL to TTCN-3 Mapping
Available at: <https://docbox.etsi.org/MTS/MTS/07-Drafts/00201873-8T3ed481/MTS-201873-8T3ed481v472.docx>
- ES 201 873-9 Part 9: Using XML schema with TTCN-3
Available at: <https://docbox.etsi.org/MTS/MTS/07-Drafts/00201873-9v4121/MTS-201873-9v4121v4112.docx>
- ES 201 873-11 Part 11: Using JSON with TTCN-3
Available at: https://docbox.etsi.org/MTS/MTS/07-Drafts/00201873-11_v4.9.1/MTS-201873-11%20v4.9.1v482.docx
- ES 202 781 TTCN-3 Language Extensions: Configuration and Deployment Support
Available at: <https://docbox.etsi.org/MTS/MTS/07-Drafts/00202781ConfDeplv181/MTS-202781ConfDeplv181v172.docx>
- ES 202 784 TTCN-3 Language Extensions: Advanced Parameterization
Available at: <https://docbox.etsi.org/MTS/MTS/07-Drafts/00202784ed181/MTS-202784ed181v172.docx>
- ES 202 785 TTCN-3 Language Extensions: Behaviour Types
Available at: <https://docbox.etsi.org/MTS/MTS/07-Drafts/00202785v181/MTS-202785v181v172.docx>
- ES 203 790 TTCN-3 Language Extensions: Object-Oriented Features
Available at: <https://docbox.etsi.org/MTS/MTS/07-Drafts/00203790v131/MTS-203790v131v001.docx>

- **Task 2 – Conformance test suites for TTCN-3 tools and sub-tasks**

Stable drafts of the T2 deliverables have been made available for the approval of Milestone A in September 2020. The final drafts of the T2 deliverables will be provided as part of Milestone C in March 2021.

14 Next report

The next report (i.e., the final report of the TTF) is scheduled for MTS#83 in May/June 2021.

15 Any other business

None