

TTF T014 - Final Report for ETSI			
Presented to ETSI meeting		Author:	Prof. Jens Grabowski
		Date:	03/03/2022
Doc ref		Version	

TTF	T014
TBWG	MTS

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

TTF title:	TTCN-3 maintenance & evolution of language and conformance test suites 2021
-------------------	---

Milestone	C		Status Template	Covers the period until (cut-off date)	31/03/2022
Objective	Final Report to be approved by TC MTS				
Achieved	Yes/No	<i>Indicate whether the objective has been achieved If the objective is not achieved, give a short explanation in the "remarks"</i>			
Remarks					

Achieved dates

Template	Draft report	TB approval	ETSI approval		
03/03/2022					

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 is one of the most important standardized test languages. TTCN-3 can be used in many domains and areas of application and is specified in great 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 T014 “TTCN-3 maintenance & evolution of language and conformance test suites 2021” 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.

During three working session for Task 1 “TTCN-3 maintenance and further development” TTF T014 closed and implemented 50 CRs in 12 final draft documents. 5 CRs will remain open. They have to be resolved in the scope of the next TTCN-3 maintenance project. TTF T014 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” has been completed. All involved experts completed writing tests for the 2021 release of the TTCN-3 standards, and validated these newly written conformance tests. The test suites were validated on multiple TTCN tools (by Agilent, Elvior, and Ericsson), and we reached consensus on the validation results. Finally, conformance test were written for the changes in version 14 of the TTCN-3 core standard, which currently has stable draft status. These tests for v14 remain unvalidated in this TTF, as there is no tool implementation yet, and will aid the work of software engineers implementing version 14 of the TTCN-3 core standard.

2 Introduction

2.1 Scope, major aims of the TTF work

The main aim of the TTF work was the maintenance and conformance testing of the the TTCN-3 language.

The maintenance task comprises the handling of TTCN-3 CRs which report defects, request clarifications and propose new language features. The CR handling implements the solutions to the CRs in the related ETSI standards. Maintenance also includes updates of the TTCN-3 leaflet and the TTCN-3 web pages.

The work on the TTCN-3 conformance testing task includes the maintenance and further development of the conformance test suites in order to reach full test coverage of the TTCN-3 series of standards. The application of the test suites ensures the conformance of TTCN-3 tools to the TTCN-3 language standards. Specifically, the following parts are validated by the conformance test suite: Core standard, XML, JSON, and Object Oriented extensions.

2.2 TTF activity and expected output

The work on Task 1 “TTCN-3 maintenance and further development” comprises the following assignments:

- 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 assignments:

- 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.

The expected output are

- the revised versions of the TTCN-3 standard documents, for which one or more CRs have been resolved,
- updated versions of the TTCN-3 leaflet and the TTCN-3 web pages, and
- revised and extended versions of the TTCN-3 conformance test deliverables.

Interim versions of TTCN-3 standard documents were not required by 3GPP and therefore not produced.

2.3 Relation with the reference TB and with other bodies, inside and outside ETSI

The reference TB for the TTF is TB MTS. TB MTS supervises the TTF work at regular TB meetings. TB MTS has also established a TTCN-3 Steering Group to resolve technical issues escalated by the TTF or any ETSI member to the TB. The work status of the TTF is reported to TB MTS after each TTF session (by mail correspondence on the MTS-GEN mail exploder list) and at each regular TB MTS meeting. TTF outputs will also be reviewed and approved by TB MTS. Some active TB MTS members have also been involved in this TTF and hence be in direct contact with TB MTS via the usual communication means (e.g., MTS-GEN mailing list, MTS face-to-face meetings, conference calls).

3 Overview of the organization of the activity

3.1 Team composition and experts' qualification

The TTF consists of the following experts:

Name	Organization/Company	Qualification
Gusztáv Adamis	Ericsson Hungary	TTCN-3 user, tool provider
Ramon Barakat	Fraunhofer FOKUS	TTCN-3 user, researcher on test methods
Jens Grabowski	University of Goettingen	Researcher on test methods and test languages
Zoltán Jakó	Broadbit	TTCN-3 user, test consultant
Andras Kovacs	Broadbit	TTCN-3 user, test consultant
Lénárd Nagy	Ericsson Hungary	TTCN-3 user, tool provider
Axel Rennoch	Fraunhofer FOKUS	TTCN-3 user, researcher on test methods
Tomaš Urban	Elvior OU	TTCN-3 tool provider
Jacob Wieland	Spirent Communications	TTCN-3 tool provider

3.2 TTF teamwork, distribution of tasks, working methods

The TTF teamwork has been split into two main tasks:

Task 1 – TTCN-3 maintenance and further development

The work on Task 1 “TTCN-3 maintenance and further development” comprises the following assignments:

- 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.

For working on Task 1, the TTF organized two 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.

During the online working sessions, the TTF work was mainly based on the CR resolution process. Newly identified issues were reported in form of new CRs. The CR resolution process was executed in the following manner:

1. Discussion of the CR within the TTF and, where necessary drafting a rough resolution.
2. Assignment of the CR to a TTF member for developing a resolution.
3. Development of a CR resolution. The development may require:
 - a. Further discussions with individual TTF members or with the whole TTF,
 - b. Perform inquiries to the reporter of the CR in case of ambiguities, or
 - c. Raising related CRs if several TTCN-3 language features or documents are affected.
4. Proofreading of the CR resolution by another TTF expert. Step 3 is re-entered in case of problems.
5. Implementation of the resolution by the editor of the TTCN-3 standard. The implementation includes another proofreading of the resolution.

Please note:

- Interim versions of TTCN-3 language standards were not required by 3GPP and therefore not produced.

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” comprises the following assignments:

- Analysis of the latest published versions of the relevant TTCN-3 standards, and identifying new and changed requirements.
- Analysis of the current stable draft version of the TTCN-3 core standard, 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.

Experts worked individually on the test case writing, with periodic coordination conference calls. The validation was initially run on one type of TTCN tool, and then repeated on an other type of TTCN tool. The unexpected validation outcomes were discussed with the involved test case authors, till a consensus was reached about the needed test case amendments.

3.3 Liaison with the reference TB and/or the Steering Group

There was no need to liaise.

3.4 Meetings attended on behalf of the TTF with the reference TB and other ETSI TBs

Date	Place	TB/Orga	Event description	Reason to attend	Expert(s)
28./29. Sept. 21	Online	TC MTS	MTS#84 regular meeting	Presentation of progress report (milestone A)	Jens Grabowski, Andras Kovacs
18./19. Jan. 22	Online	TC MTS	MTS#85 regular meeting	Presentation of progress report (milestone B)	Jens Grabowski, Andras Kovacs
17./18. May 22	Sophia-Antipolis	TC MTS	MTS#86 regular meeting	Presentation of progress report (milestone C)	Axel Rennoch

3.5 TTF communications, presentations, promotion, inside and outside ETSI, WEB pages etc

- The TTF T014 webpage can be found on: <https://portal.etsi.org/STF/STFs/STF-HomePages/T014>.
- TTF T014 continuously updates the TTCN-3 leaflet and contributes to the TTCN-3 webpage <http://www.tcn-3.org/>.
- Further external communication is done via Mantis (http://forge.etsi.org/mantis/main_page.php) and emails.

4 Final status of the activity

4.1 Overview of the TTF work

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

For working on Task 1, the TTF organized two 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 36: 06. - 10. Sept. 2021
- Week 45: 08. - 12. Nov. 2021

The work of the TTF was mainly based on the resolution of CRs. The progress of the work on CRs can be followed in detail by using ETSI's Mantis system at http://oldforge.etsi.org/mantis/view_all_bug_page.php.

The TTF has delivered the following final drafts for TB approval of the revised ETSI standards in time:

- RES/MTS-201873-1v4.14.1 (ES 201 873-1) TTCN-3 Part 1: TTCN-3 Core Language
- RES/MTS-201873-5 T3ed491 (ES 201 873-5) TTCN-3 Part 5: TTCN-3 Runtime Interface
- RES/MTS-201873-6v4.13.1 (ES 201 873-6) TTCN-3 Part 6: TTCN-3 Control Interface
- RES/MTS-2018737v4101 (ES 201 873-7) TTCN-3 Part 7: Using ASN.1 with TTCN-3
- RES/MTS-202781v191 (ES 202 781) TTCN-3 extension: Configuration & Deployment support
- RES/MTS-202782 ed141RealtPer (ES 202 784) TTCN-3 extension: Perf & Real Time Testing
- RES/MTS-202784V191 (ES 202 784) TTCN-3 extension: Advanced Parameterization
- RES/MTS-202785v191 (ES 202 785) TTCN-3 extension: Behaviour Types
- RES/MTS-202786ed151 (ES 202 786) TTCN-3 extension: Continuous Signal support
- RES/MTS-202789v161 (ES 202 789) TTCN-3 extension: Extended TRI
- RES/MTS-203022v151 (ES 203 022) TTCN-3 extension: Advanced Matching
- RES/MTS-203790v141 (ES 203 790) TTCN-3 extension: Object-Oriented Features

Other deliverables in the ToR didn't receive any CR or no CR was resolved, therefore according to the TTF's ToR, no new version was produced and published.

During the working sessions, the 50 CRs listed below have been closed and implemented in 12 documents:

Part 01: TTCN-3 Core Language

(37 CRs closed)

- 7910 Allow parallel control parts/components
- 7998 lengthof for maps
- 7999 Evaluation of function calls in templates
- 8000 ES 201 873-1, clause 5.4.1.1, EXAMPLE 5 - v_int
- 8003 Typo in Section 6.2.16
- 8004 Unassigned variables in return statements
- 8005 It should be possible to reactivate a default
- 8006 Unnecessary Restriction 15.6.1 should be removed.
- 8007 Nested maps should be allowed
- 8009 Missing rule for no optional attribute (or default value of the optional attribute)
- 8017 Useless restriction for ""
- 8031 TTCN-3 syntax BNF productions – corrections
- 8032 BNF links and formatting
- 8035 Wrong clause reference
- 8036 Definition of "existing TTCN-3 types" missing
- 8037 Wrong assignment in an example
- 8038 Explanation in an example
- 8039 Declarations too far
- 8040 => operator is missing from List of TTCN-3 operators and Precedence of Operators tables
- 8041 Typos in 15.12
- 8042 Wrong reference in 16.1.3
- 8043 typo in 20.2
- 8044 Component creation
- 8045 Start component operation can also be applied on control components
- 8046 master control component
- 8047 Clarification in Kill component operation
- 8048 Keywords shall be bold
- 8049 Value part in receiving operators
- 8050 Typo in 23.1
- 8051 Typo in 26.2
- 8052 Typo in 27.1.2.0
- 8053 Start a previously expired timer
- 8054 What happens if same verdict but with different text is set by setverdict
- 8055 Arguments of External actions shall be same as log
- 8066 Invalid example on modified templates
- 8067 Postfix value notation for templates
- 8068 Wrong table reference in log

Part 05: TTCN-3 Runtime Interface

(1 CR)

8064 add triSUTAction function that gets a parameter list

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

8010 When does tliModulePar trigger?

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

8056 BNF updates and formatting

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

8057 BNF updates and formatting

Ext Pack: Perf & Real Time Testing (ES 202 782) (1 CR)

8058 BNF updates and formatting

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

8059 BNF updates and formatting

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

8060 BNF updates and formatting

Ext Pack: Continuous signal support (ES 202 786) (1 CR)

8061 BNF updates and formatting

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

8065 add xtriSUTAction function that gets a parameter list

Ext Pack: Advanced Matching (ES 203 022) (1 CR)

8062 BNF updates and formatting - V1.4.1 (2020-05)

Ext Pack: Object-Oriented Features (ES 203 790) (3 CRs)

8001 Syntax Error in Constructor invocation

8002 Operatiobn "Select class" is missing in Overview of program statements and operations

8063 BNF updates and formatting - clause A.2

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

The work of Task 2 “Conformance test suites for TTCN-3 tools and sub-tasks” has completed. All experts completed writing and validating the test cases according to their assignments. The test suites were validated on multiple TTCN tools (by Agilent, Elvior, and Ericsson), and we reached consensus on the validation results. Several CRs for Task 1 were raised. Moreover, unvalidated conformance tests were written for the presently stable draft version 14 of the TTCN-3 core standard, which shall aid the work of software engineers implementing version 14 of the TTCN-3 core standard.

Each expert used their own TTCN tool in the first round for the validation of conformance test cases, and then Spirent’s compiler was used for validation in the second round.

4.2 Technical risk, difficulties encountered and corrective actions taken

· 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 5 CRs (16.03.2022), has been left open for a future TTF working on TTCN-3 maintenance. The open CRs are:

- General: TTCN-3 Change Requests (3 CRs)

- 7981 Support for REST APIs (HTTP)
- 8069 Range-based for loop
- 8070 If-else statements with initializers
- o Part 01: TTCN-3 Core Language (2 CRs)
 - 7994 Allow coordinated shared access to component variables.
 - 8078 Incorrect example for present operation (Remove "causes error" comment)

· **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 on time in September 2021: the test case writing and validation have progressed according to the project plan. During the work on Task 2, no technical risks or difficulties have been encountered.

5 ETSI deliverables

5.1 Deliverables of Task 1 – TTCN-3 maintenance and further development

Deliverable: RES/MTS-201873-1v4.14.1 Current status: Start of Membership Vote (2022-03-04) Working title: TTCN-3 Core V4121	Achieved date
Creation of WI by WG/TB	2021-06-02
TB adoption of WI	2021-06-10
Start of work	2021-07-05
Early draft	2021-09-13
Stable draft	2021-12-02
Final draft for approval	2021-12-20
TB approval	2022-02-04
Draft receipt by ETSI Secretariat	2022-02-04
Publication	

- ES 201 873-1: Part 1: TTCN 3 Core Language is available at:
https://www.etsi.org/deliver/etsi_es/201800_201899/20187301/04.14.01_50/es_20187301v041401m.pdf

Deliverable: RES/MTS-201873-5 T3ed491 Current status: Start of Membership Vote (2022-02-23) Working title: TTCN-3: TRI	Achieved date
Creation of WI by WG/TB	2016-11-07
TB adoption of WI	2016-11-18
Start of work	
Early draft	
Stable draft	2021-11-15
Final draft for approval	2022-01-10
TB approval	2022-01-25
Draft receipt by ETSI Secretariat	2022-02-04
Publication	

- ES 201 873-5: Part 05: TTCN-3 Runtime Interface is available at:
https://www.etsi.org/deliver/etsi_es/201800_201899/20187305/04.09.01_50/es_20187305v040901m.pdf

Deliverable: RES/MTS-201873-6v4.13.1 Current status: Start of Membership Vote (2022-02-23) Working title: TTCN-3 TCI V4121	Achieved date
Creation of WI by WG/TB	2020-04-07
TB adoption of WI	2020-04-15
Start of work	2021-11-15
Early draft	
Stable draft	2021-11-15
Final draft for approval	2022-01-10
TB approval	2022-01-25
Draft receipt by ETSI Secretariat	2022-02-04
Publication	

- ES 201 873-6: Part 06: TTCN-3 Control Interface is available at:
https://www.etsi.org/deliver/etsi_es/201800_201899/20187306/04.13.01_50/es_20187306v041301m.pdf

Deliverable: RES/MTS-2018737v4101 Current status: Start of Membership Vote (2022-02-23) Working title: TTCN-3: the use of ASN.1	Achieved date
Creation of WI by WG/TB	2021-06-01
TB adoption of WI	2021-06-10
Start of work	
Early draft	
Stable draft	2021-11-15
Final draft for approval	2022-01-10
TB approval	2022-01-25
Draft receipt by ETSI Secretariat	2022-02-04
Publication	

- ES 201 873-7 Part 7: Using ASN.1 with TTCN-3 is available at:
https://www.etsi.org/deliver/etsi_es/201800_201899/20187307/04.10.01_50/es_20187307v041001m.pdf

Deliverable: RES/MTS-202781v191 Current status: Start of Membership Vote (2022-02-09) Working title: TTCN-3 extension: Configuration & Deployment support	Achieved date
Creation of WI by WG/TB	2021-06-01
TB adoption of WI	2021-06-10
Start of work	
Early draft	
Stable draft	
Final draft for approval	2022-01-10
TB approval	2022-01-25
Draft receipt by ETSI Secretariat	2022-01-25
Publication	

- ES 202 781 TTCN-3 Language Extensions: Configuration and Deployment Support is available at:
https://www.etsi.org/deliver/etsi_es/202700_202799/202781/01.09.01_50/es_202781v010901m.pdf

Deliverable: RES/MTS-202782 ed141RealtPer Current status: TB approval (2022-01-25) Working title: TTCN-3 RealtPerf V131	Achieved date
Creation of WI by WG/TB	2014-10-03
TB adoption of WI	2014-10-03
Start of work	2019-07-25
Early draft	
Stable draft	
Final draft for approval	2022-01-10
TB approval	2022-01-25
Draft receipt by ETSI Secretariat	
Publication	

- ES 202 782 TTCN-3 Language Extensions: Performance and Real-time Testing is available at: https://docbox.etsi.org/MTS/MTS/07-Drafts/00202782_ed141RealtPer/MTS-202782%20ed141RealtPerv001.docx

Deliverable: RES/MTS-202784V191 Current status: Start of Membership Vote (2022-02-09) Working title: TTCN-3 extension: Advanced Parameterization	Achieved date
Creation of WI by WG/TB	2021-06-01
TB adoption of WI	2021-06-10
Start of work	
Early draft	
Stable draft	
Final draft for approval	2022-01-10
TB approval	2022-01-25
Draft receipt by ETSI Secretariat	2022-01-25
Publication	

- ES 202 784 TTCN-3 Language Extensions: Advanced Parameterization is available at: https://www.etsi.org/deliver/etsi_es/202700_202799/202784/01.09.01_50/es_202784v010901m.pdf

Deliverable: RES/MTS-202785v191 Current status: Start of Membership Vote (2022-02-28) Working title: TTCN-3 BehTypes V171	Achieved date
Creation of WI by WG/TB	2021-06-01
TB adoption of WI	2021-06-10
Start of work	
Early draft	2022-01-10
Stable draft	
Final draft for approval	2022-01-10
TB approval	2022-01-25
Draft receipt by ETSI Secretariat	2022-02-04
Publication	

- ES 202 785 TTCN-3 Language Extensions: Behaviour Types is available at: https://www.etsi.org/deliver/etsi_es/202700_202799/202785/01.09.01_50/es_202785v010901m.pdf

Deliverable: RES/MTS-202786ed151 Current status: Start of Membership Vote (2022-02-09) Working title: TTCN-3 extension: Continuous Signal support	Achieved date
Creation of WI by WG/TB	2016-11-07
TB adoption of WI	2016-11-18
Start of work	2019-07-25
Early draft	
Stable draft	
Final draft for approval	2022-01-10
TB approval	2022-01-25
Draft receipt by ETSI Secretariat	2022-01-25
Publication	

- ES 202 786 TTCN-3 Language Extensions: Support of interfaces with continuous signals is available at:
https://www.etsi.org/deliver/etsi_es/202700_202799/202786/01.05.01_50/es_202786v010501m.pdf

Deliverable: RES/MTS-202789v161 Current status: Start of Membership Vote (2022-02-09) Working title: Extended TRI	Achieved date
Creation of WI by WG/TB	2020-04-07
TB adoption of WI	2020-04-15
Start of work	2021-11-15
Early draft	
Stable draft	2021-11-15
Final draft for approval	2022-01-10
TB approval	2022-01-25
Draft receipt by ETSI Secretariat	2022-01-25
Publication	

- ES 202 789 TTCN-3 Language Extensions: Extended TRI is available at
https://www.etsi.org/deliver/etsi_es/202700_202799/202789/01.06.01_50/es_202789v010601m.pdf

Deliverable: RES/MTS-203022v151 Current status: Start of Membership Vote (2022-02-09) Working title: Advanced Matching	Achieved date
Creation of WI by WG/TB	2020-04-07
TB adoption of WI	2020-04-15
Start of work	2022-01-10
Early draft	
Stable draft	
Final draft for approval	2022-01-10
TB approval	2022-01-25
Draft receipt by ETSI Secretariat	2022-01-25
Publication	

- ES 203 022 TTCN-3 Language Extensions: Advanced Matching is available at
https://www.etsi.org/deliver/etsi_es/203000_203099/203022/01.05.01_50/es_203022v010501m.pdf

Deliverable: RES/MTS-203790v141 Current status: Start of Membership Vote (2022-02-09) Working title: TTCN3ext_OOed111	Achieved date
Creation of WI by WG/TB	2021-06-01
TB adoption of WI	2021-06-10
Start of work	2021-11-12
Early draft	
Stable draft	2021-11-12
Final draft for approval	2022-01-10
TB approval	2022-01-25
Draft receipt by ETSI Secretariat	2022-01-25
Publication	

- ES 203 790 TTCN-3 Language Extensions: Object-Oriented Features is available at https://www.etsi.org/deliver/etsi_es/203700_203799/203790/01.04.01_50/es_203790v010401m.pdf

5.2 Deliverables of Task 2 – Conformance test suites for TTCN-3 tools and sub-tasks

Deliverable: TS 102 950-1 Current status: Final draft for approval Working title: TTCN-3 core implementation conformance: ICS	Achieved date
Creation of WI by WG/TB	1/6/2021
TB adoption of WI	10/6/2021
Start of work	1/9/2021
Early draft	13/1/2022
Stable draft	13/1/2022
Final draft for approval	28/3/2022
TB approval	
Draft receipt by ETSI Secretariat	
Publication	

Deliverable: TS 102 950-2 Current status: Final draft for approval Working title: TTCN-3 core implementation conformance: TSS&TP	Achieved date
Creation of WI by WG/TB	1/6/2021
TB adoption of WI	10/6/2021
Start of work	1/9/2021
Early draft	13/1/2022
Stable draft	13/1/2022
Final draft for approval	28/3/2022
TB approval	
Draft receipt by ETSI Secretariat	
Publication	

Deliverable: TS 102 950-3 Current status: Final draft for approval Working title: TTCN-3 core implementation conformance: ATS&IXIT	Achieved date
Creation of WI by WG/TB	1/6/2021
TB adoption of WI	10/6/2021
Start of work	1/9/2021
Early draft	13/1/2022
Stable draft	13/1/2022
Final draft for approval	28/3/2022
TB approval	
Draft receipt by ETSI Secretariat	
Publication	

Deliverable: TS 103 253 Current status: Final draft for approval Working title: TTCN-3 XML schema implementation conformance: ICS	Achieved date
Creation of WI by WG/TB	1/6/2021
TB adoption of WI	10/6/2021
Start of work	1/9/2021
Early draft	13/1/2022
Stable draft	13/1/2022
Final draft for approval	28/3/2022
TB approval	
Draft receipt by ETSI Secretariat	
Publication	

Deliverable: TS 103 254 Current status: Final draft for approval Working title: TTCN-3 XML schema implementation conformance: TSS&TP	Achieved date
Creation of WI by WG/TB	1/6/2021
TB adoption of WI	10/6/2021
Start of work	1/9/2021
Early draft	13/1/2022
Stable draft	13/1/2022
Final draft for approval	28/3/2022
TB approval	
Draft receipt by ETSI Secretariat	
Publication	

Deliverable: TS 103 255 Current status: Final draft for approval Working title: TTCN-3 XML schema implementation conformance: ATS&IXIT	Achieved date
Creation of WI by WG/TB	1/6/2021
TB adoption of WI	10/6/2021
Start of work	1/9/2021
Early draft	13/1/2022
Stable draft	13/1/2022
Final draft for approval	28/3/2022
TB approval	
Draft receipt by ETSI Secretariat	
Publication	

Deliverable: TS 103 663-1 Current status: Final draft for approval Working title: TTCN-3 Object Oriented part implementation conformance: ICS	Achieved date
Creation of WI by WG/TB	1/6/2021
TB adoption of WI	10/6/2021
Start of work	1/9/2021
Early draft	13/1/2022
Stable draft	13/1/2022
Final draft for approval	28/3/2022
TB approval	
Draft receipt by ETSI Secretariat	
Publication	

Deliverable: TS 103 663-2 Current status: Final draft for approval Working title: TTCN-3 Object Oriented part implementation conformance: TSS&TP	Achieved date
Creation of WI by WG/TB	1/6/2021
TB adoption of WI	10/6/2021
Start of work	1/9/2021
Early draft	13/1/2022
Stable draft	13/1/2022
Final draft for approval	28/3/2022
TB approval	
Draft receipt by ETSI Secretariat	
Publication	

Deliverable: TS 103 663-3 Current status: Final draft for approval Working title: TTCN-3 Object Oriented part implementation conformance: ATS&IXIT	Achieved date
Creation of WI by WG/TB	1/6/2021
TB adoption of WI	10/6/2021
Start of work	1/9/2021
Early draft	13/1/2022
Stable draft	13/1/2022
Final draft for approval	28/3/2022
TB approval	
Draft receipt by ETSI Secretariat	
Publication	

Annex A Performance indicators

A.1. Performance Indicators objectives achieved

Contribution from ETSI Members to TTF work

- Voluntary work of experts (free of charge or with partial remuneration)
 - The TTF experts provided voluntary work for email discussions between joint work sessions and for implementing resolutions in the TTCN-3 standard documents.
- Steering Group meetings (number of participants/duration)
 - TTCN-3 steering has been done during TB MTS meetings. There was no issue that needed escalation to the SG.
- Direct contribution of delegates (e.g. number of documents/comments/e-mail)
 - *CRs have been raised from TTCN-3 users, tool providers and ETSI TTFs. All CRs have been treated equally. The number of contributions raised from delegates has not been counted. Experts in this TTF also contributed to other TTF and raised CRs in the scope of the other TTFs.*

Liaison with other stakeholders

- TTCN-3 Change Requests are received in the CR handling tool (Mantis)
 - CRs have been raised from TTCN-3 users, tool providers and ETSI TTFs. All CRs have been treated equally.
- The TTF may liaise with 3GPP MCC TF160 and any other users within or outside ETSI
 - The TTF has regularly exchanged emails with MCC TF160 to clarify urgency of MCC TF160 CRs; also participated at MCC TF160s TTCN-3 tool vendors meetings.

Quality of deliverables

- Approval of deliverables according to schedule
 - The TTF met all deadlines specified in the ToR.
- Respect of time scale, with reference to start/end dates in the approved ToR
 - The TTF met all deadlines specified in the ToR.
- Quality review by TB
 - The quality of the work and progress of the TTF was monitored by the TB based on the mandatory progress reports and on verbal reports of the TTF during the MTS meetings.

Time recording

- The TTF experts reported in the days spent for the performance of the services in TAM.

A.2. Performance Indicators objectives not achieved

- Contribution from other ETSI TBs
 - No CR is received directly from other TB (though several CRs received from MCC TF160).
- Contributing the TTCN-3 standards to ITU-T SG17 for endorsement and assisting the endorsement process
 - This issue didn't require any specific action from the TTF, it will be handled by TB MTS according to the normal procedure.
- TTCN-3 tools implementing newest TTCN-3 features
 - New features added by this TTF will be implemented only after publishing the TTF's deliverables. The TTF does not receive information directly about which language features are implemented by which tool vendor.
- Quality review by ETSI Secretariat
 - The TTF is not aware of specific actions required for a quality review by ETSI

Annex B Resources allocated and spent

Author: ETSI - Funded Activities
Period covered: From: 19/07/2021 To: 31/03/2022
Status: Final
Status date: 03/03/2022

B.1 Summary of resources allocated and spent (real cost)

These have been divided into Manpower and travel budgets. The total expenses are summarized in the table below.

Table 1: Summary of resources spent

	Expertise Service Provision	Travel*	Total
Resource Available	95 300,00€	3 600,00€	98 900,00€
Resource Usage	95 300,00€	0,00€	95 300,00€
Variance (Avail. - Usage)	0,00€	3 600,00€	3 600,00€

* One travel is planned for mid of May 2022 to attend the MTS#86 meeting in Sophia-Antipolis.