|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***TTF T033 - Final Report for ETSI*** | | | | | |
| **Presented to ETSI meeting** | **MTS#89** |  | **Author:** | Jens Grabowski | |
|  |  |  | **Date:** | 25 April 2023 | |
| **Doc ref** | **MTS(23)XXXX** |  | **Version** | 0.1 | |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| **TTF** | **T033** |  | **TTF leader** | Jens Grabowski | |
| **TB/WG** | **MTS** |  | **TB responsible** | Philip Makedonski | |
|  |  |  | **Administrator** | Elodie Rouveroux | |
|  |  |  |  |  |  |
| **TTF title:** | TTCN-3 Maintenance | | | | |
|  |  |  |  |  |  |
| **Milestone** | **C** |  | **Status** | **Covers the period until (cut-off date)** | 20 May 2023 |
| **Template** |
| **Objective** | Final Report and,  Final drafts for T2 approved by TC MTS | | | | |
| **Achieved** | YES | *Indicate whether the objective has been achieved* | | | |
| *If the objective is not achieved, give a short explanation in the “remarks”* | | | |
| **Remarks** |  | | | | |
|  |  |  |  |  |  |
| **Achieved dates** |  |  |  |  |  |
| **Template** | **Draft report** | **TB approval** | **ETSI approval** |  |  |
| 25/04/2023 | 10/05/2023 |  |  |  |  |
|  |  |  |  |  |  |
|  | | | | | |

# Executive summary

The TTCN-3 testing language has intensively been developed by ETSI during the last 20 years. By today, TTCN-3 has become a significantly important testing technology in different domains (see more details at <http://www.ttcn-3.org/index.php/about/references/applicatio-domains>). It is used by standardization bodies (see more details at <http://www.ttcn-3.org/index.php/about/references>) as well as by EU research projects and open source initiatives. TTCN-3 reached very high deployment at various ETSI member companies. The language is also endorsed by ITU-T as the Z.16x and Z.17x Recommendation series.

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 members 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 upmost 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 T023 “Testing Task Force (TTF) T023 on TTCN-3 Maintenance” 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 sessions for Task 1 “TTCN-3 maintenance and further development” TTF T023 implemented 26 CRs in 3 final draft documents. 13 CRs have progressed, but their resolution requires further discussion. TTF T023 identified two technical risks or difficulties which were discussed with ETSI TC MTS. A total of 21 CRs remain open and have to be resolved in the scope of the next TTCN-3 maintenance project. TTF T023 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. The involved experts completed writing and validating tests for the 2022 release of the TTCN-3 standards. The test suites were validated on multiple TTCN tools (by Spirent, Elvior, Ericsson and Nokia), and we reached consensus on the validation results. The conformance test writing for version 4.15.1 (2023 release) of the TTCN-3 core standard included 160 new conformance tests. These tests for this upcoming version need validation during the next TTF (after tools are provided by the manufacturers), but will already aid the work of software engineers implementing version 15 of the TTCN-3 core standard.

# Introduction

## Scope, major aims of the TTF work

The main aim of the TTF work was the maintenance and conformance testing of 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.

## 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.

## 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).

# Overview of the organization of the activity

## Team composition and experts’ qualification

The TTF consists of the following experts:

|  |  |  |
| --- | --- | --- |
| Name | Organization/Company | Qualification |
| Ramon Barakat | Fraunhofer FOKUS | TTCN-3 user, researcher on test methods |
| Jens Grabowski | University of Goettingen | Researcher on test methods and test languages |
| Axel Rennoch | Fraunhofer FOKUS | TTCN-3 user, researcher on test methods |
| Matthias Simon | Nokia | TTCN-3 tool provider |
| Tomaš Urban | Elvior OU | TTCN-3 tool provider |

## 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:
   1. Further discussions with individual TTF members or with the whole TTF,
   2. Perform inquiries to the reporter of the CR in case of ambiguities, or
   3. 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 another 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.

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

There was no need to liaise.

## 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)** |
| 13.-15.10.22 | Munich | UCAAT | Test Conference | TTCN-3 promotion | Matthias Simon |
| 04.10. – 05.10.22 | Tallin | TC MTS | MTS#87 regular meeting | Report on TTF progress | Axel Rennoch |
| 24.-25.01.23 | Thessaloniki | TC MTS | MTS#88 regular meeting | Presentation of progress report (milestone B) | Axel Rennoch |
| 01.-02.06.23 | Sophia-Antipolis | TC MTS | MTS#89 regular meeting | Presentation of TTF finalization (milestone C and D) | Axel Rennoch |

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

* The TTF T023 webpage can be found on: <https://portal.etsi.org/STF/STFs/STF-HomePages/T023>.
* TTF T023 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.

# Final status of the activity

## 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 33: 16. - 17. Aug. 2022
* Week 45: 07. - 11. Nov. 2022
* Week 51: 20. Dec. 2022 (telco for discussing the results of individual homework)

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-201873-1v4.15.1 (ES 201 873-1) TTCN-3 Part 1: TTCN-3 Core Language
* RES/MTS-201873-6v4.14.1 (ES 201 873-6) TTCN-3 Part 6: TTCN-3 Control Interface
* RES/MTS-20187311v4.10.1 (ES 201 873-11) TTCN-3 Part 11: Using JSON with TTCN-3

TTF T023 closed and implemented 26 CRs and progressed 13 CRs.

**Part 01: TTCN-3 Core Language (37 CRs in total, 24 CRs closed, 9 CRs progressed)**

**Closed CRs**

7994 Allow coordinated shared access to component variables.

8069 Range-based for loop

8070 If-else statements with initializers

8078 Incorrect example for present operation (Remove "causes error" comment)

8091 Add the not-implemented-function `???`

8093 object not listed as a keyword in table A.5

8097 Optional return values

8098 Mandatory module prefix for imported module defintitions

8099 Disallow circular imports

8101 Allow trailing comma

8103 Add increment and decrement statement

8104 Automatic type inference

8105 Extend allowed usage of nested types

8107 Support for variadic functions

8109 Examples for map templates needed

8114 Template support for the map type

8115 Explanation fuzzy/lazy is the opposite

8119 Wrong clause references to 16.1.5 -> 16.2.1

8120 activate/deactivate explanation shall be modified

8136 Outdated reference in chapter 5.2.2 "Uniqueness of identifiers"

8151 Update of TTCN-3 version references

8154 Embedded Fields

8183 Wrong BNF rules for enumerated types

8187 Check of Core Language BNF rules

**Progressed CRs**

8090 Deprecate `lengthof` in favor of `length`

8094 Provide a canonical style for source code layout

8100 Inline terminal productions

8106 Provide TTCN-3 defintions for predefined types

8111 Allow UTF-8 for charstrings?

8152 Harmonize string literals

8153 Extend usage of break and continue statements

8155 Issue with the number of elements of templates

8156 Introduce user defined methods

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

**Closed CRs**

8110 When are global constants evaluated?

**Progressed CRs**

8095 Provide a TTCN-3 specification for TCI and TRI

**Part 11: Using JSON with TTCN-3 (1 CR closed)**

8181 object used as an identifier

**General (3 CRs progressed)**

7981 Support for REST APIs (HTTP)

8113 Type traits and user defined methods

8180 Next major version of TTCN-3

8192 Simplify import statement

***Achievements 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” has been completed. The involved experts completed writing and validating tests for the 2022 release of the TTCN-3 standards. The test suites were validated on multiple TTCN tools (by Spirent, Elvior, Ericsson and Nokia), and we reached consensus on the validation results. The conformance test writing for version 4.15.1 of the TTCN-3 core standard included 160 new conformance tests. These tests for v4.15.1 need validation in the next TTF (after tools are provided by the manufacturers), but will already aid the work of software engineers implementing version 15 of the TTCN-3 core standard.

In particular the following 160 tests have been added to the version 4.15.1 conformance test suite (chapter numbers in italic):

*5.4.1.1 Formal parameters of kind value:* Sem\_05040101\_nested\_types\_001

*5.4.1.2 Formal parameters of kind template:* Sem\_05040102\_nested\_types\_001

*5.4.3 Variadic Parameters:* Sem\_050403\_variadic\_parameters\_001 – 011, NegSem\_050403\_variadic\_parameters\_001 - 005

*6.2.0 General:* Sem\_0602\_TopLevel\_025, NegSem\_0602\_TopLevel\_011

*6.2.1.4 Embedded fields:* Sem\_06020104\_embedding\_fields\_001 – 004, NegSem\_06020104\_embedding\_fields\_001 - 002

*6.2.2.4 Embedded Fields:* Sem\_06020204\_embedding\_fields\_001

*6.2.5.4 Embedded Fields:* Sem\_06020504\_embedding\_fields\_001

*6.2.15.2 Indexed Assignment Notation:* Sem\_06021502\_indexed\_assignment\_notation\_004

*6.2.15.3 Unmapping Keys:* Sem\_06021503\_unmapping\_keys\_003 - 004

*6.2.15.4 Index Notation:* Sem\_06021504\_index\_notation\_007 – 010, NegSem\_06021504\_index\_notation\_007 - 008

*6.2.15.9 Optionality of map element values:* Sem\_06021509\_optionality\_of\_map\_element\_values\_001 – 003, NegSem\_06021509\_optionality\_of\_map\_element\_values\_001 - 002

*6.5 Automatic type:* Sem\_0605\_automatic\_type\_001 – 005, NegSem\_0605\_automatic\_type\_001 – 003, Sem\_0605\_expressions\_001 – 004, NegSem\_0605\_expressions\_001, Sem\_0605\_field\_assignment\_lists\_001 – 003, Sem\_0605\_index\_lists\_001 - 003, NegSem\_0605\_index\_lists\_001, Sem\_0605\_literals\_001 – 009, NegSem\_0605\_literals\_001 – 014, NegSem\_0605\_references\_001, Sem\_0605\_return\_values\_001 – 010, Sem\_0605\_value\_lists\_001 - 002

*7.1.3 Relational operators:* Sem\_070103\_RelationalOperators\_054 - 057

*8.2.1 Module parameters:* Sem\_080201\_nested\_types\_001

*10 Declaring constants:* Sem\_10\_nested\_types\_001

*11 Declaring variables:* Sem\_11\_nested\_types\_001

*14 Declaring procedure signatures:* Sem\_14\_nested\_types\_001

*15.6.6 Referencing map elements:* Sem\_150606\_Referencing\_map\_elements\_001 – 006, NegSem\_150606\_Referencing\_map\_elements\_001 - 010

*16.1.0 General:* Sem\_1601\_nested\_types\_001

*16.1.6 The not-implemented function*: Sem\_160106\_the\_not\_implemented\_function\_001 – 005, NegSem\_160106\_the\_not\_implemented\_function\_000 - 008

*19.1.2 Shorthand assignments:* Sem\_190102\_shorthand\_increment, Sem\_190102\_shorthand\_decrement, NegSem\_190102\_shorthand\_increment

*19.2 The If-else statement:* Sem\_1902\_if\_else\_statement\_003

*19.3.1 The Select case statement:* Sem\_190301\_select\_union\_statement\_008

*19.3.2 The Select union statement:* Sem\_190302\_select\_union\_statement\_007

*19.4.2 The range-based loop:* Sem\_190402\_range\_based\_loop\_001

*19.5 The While statement:* Sem\_1905\_while\_statement\_004

*20.5.0/1 Default Handling:* Sem\_200500\_general\_001, Sem\_200501\_the\_default\_mechanism\_009, NegSem\_200501\_the\_default\_mechanism\_002

*A.1.2a Trailing commas:* Syn\_A0102\_TrailingCommas\_001.ttcn

*B.1.2.4 Any value or none:* Sem\_B010204\_any\_value\_or\_none\_006 - 007

*B.1.2.8 Omitting optional fields and map keys:* Sem\_B010208\_omit\_value\_006 - 007

*B.1.3.2 Any number of elements or no element:* Sem\_B010302\_any\_number\_of\_elements\_or\_none\_004 - 005

*B.1.4.2 The IfPresent indicator:* Sem\_B010402\_ifPresent\_indicator\_003 - 005

## Technical risk, difficulties encountered and corrective actions taken

* **Task 1 – TTCN-3 maintenance and further development**

Two technical risks or difficulties arose while working on Task 1. Corrective actions have been taken.

* **Technical risk/difficulty 1:**

TTF T023 implemented the non-backwards compatible CR 8181 in ES 201 873-11 TTCN-3 Part 11: Using JSON with TTCN-3. A resolution was needed because without this resolution it is not possible to use JSON (part 11) together with object-oriented features (Ext Pack: Object-Oriented Features (ES 203 790)). In consultation with TC MTS, TTF T023 has asked all major tool manufacturers whether they can accept the non-backward compatible change. All tool vendors agreed. The final draft was released as planned.

* **Technical risk/difficulty 2:**

Currently, the maintenance of the TTCN-3 language has become complex, since even small corrections and extensions require changes in many different places in the documents. Therefore, the members of TTF T023 believe that 13 years after the last major revision a new major revision should be prepared that cleans up, modernizes and refactors the TTCN-3 language specification. With this in mind, the TTF has identified a number of CRs that should not be implemented in the normal CR resolution process, but should be addressed as part of the work on a new major revision of the TTCN-3 standards:

* 7981: Support for REST APIs (HTTP)
* 8090: Deprecate “lengthof” in favor of “length”
* 8094: Provide a canonical style for source code layout
* 8095: Provide a TTCN-3 specification for TCI and TRI
* 8100: Inline terminal productions
* 8111: Allow UTF-8 for charstrings
* 8113: Type traits and user defined methods
* 8152: Harmonize string literals
* 8153: Extend usage of break and continue statements
* 8180: Next major version of TTCN-3
* 8191: Strict Rules
* 8192: Simplify import statement

TTF T023 discussed the issue with TC MTS. TC MTS agrees that the problem exists but further studies are needed to estimate the effort and consequences for the modernization of TTCN-3. The study should be performed in the scope of the next TTCN-3 maintenance and further development TTF.

In addition to the CRs mentioned in the paragraph on Technical risk/difficulty 2, further 9 CRs remain open because they have been submitted too late or their resolution requires additional discussions. This means that a total of 21 CRs (including CRs dealing with the production of a new major revision of the TTCN-3 language standards) remain open. The processing of these CRs will be shifted to the next TTCN-3 maintenance TTF.

* **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 August 2022: 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.

# ETSI deliverables

|  |  |
| --- | --- |
| Deliverable: **RES/MTS-201873-1v4.15.1**  Current status: **published**  Working title: **TTCN-3 Core V4121** | **Achieved date** |
| Creation of WI by WG/TB | 2022-03-22 |
| TB adoption of WI | 2022-04.05 |
| Start of work |  |
| Early draft |  |
| Stable draft |  |
| Final draft for approval | 2023-01-13 |
| TB approval | 2023-02-07 |
| Draft receipt by ETSI Secretariat |  |
| Publication | 2023-04-25 |

* ES 201 873-1: Part 1: TTCN 3 Core Language is available at:  
  <https://www.etsi.org/deliver/etsi_es/201800_201899/20187301/04.15.01_60/es_20187301v041501p.pdf>

|  |  |
| --- | --- |
| Deliverable: **RES/MTS-201873-6v4.14.1**  Current status: **published**  Working title: **TTCN-3 TCI V4121** | **Achieved date** |
| Creation of WI by WG/TB | 2022-03-22 |
| TB adoption of WI | 2022-04.05 |
| Start of work |  |
| Early draft |  |
| Stable draft |  |
| Final draft for approval | 2023-01-13 |
| TB approval | 2023-02-07 |
| Draft receipt by ETSI Secretariat |  |
| Publication | 2023-04-14 |

* ES 201 873-6: Part 6: TTCN-3 Control Interface (TCI) is available at:  
  <https://www.etsi.org/deliver/etsi_es/201800_201899/20187306/04.14.01_60/es_20187306v041401p.pdf>

|  |  |
| --- | --- |
| Deliverable: **RES/MTS-20187311v4.10.1**  Current status: **published**  Working title: **TTCN-3 ed. V4.9.1: Use of JSON** | **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 | 2023-01-05 |
| Final draft for approval | 2023-01-13 |
| TB approval | 2023-02-21 |
| Draft receipt by ETSI Secretariat |  |
| Publication | 2023-05-04 |

* ES 201 873-11: Part 11: Using JSON with TTCN-3 is available at:  
  <https://www.etsi.org/deliver/etsi_es/201800_201899/20187311/04.10.01_60/es_20187311v041001p.pdf>

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

The tests from the last version (2022 edition) and new tests for the upcoming version (2023 edition) effected the TTCN-3 core (TS 102 950) only. All conformance tests (TTCN-3 source code) are available also at <https://forge.etsi.org/rep/mts/ttcn3-conformance-tests>.

|  |  |
| --- | --- |
| Deliverable: **TS 102 950-1**  Current status: **Draft receipt by ETSI Secretariat**  Working title: **TTCN-3 core implementation conformance: ICS** | **Achieved date** |
| Creation of WI by WG/TB | 2022-04-05 |
| TB adoption of WI | 2022-04-25 |
| Start of work | 2022-08-03 |
| Early draft |  |
| Stable draft | 2023-02-07 |
| Final draft for approval | 2023-04-06 |
| TB approval | 2023-04-27 |
| Draft receipt by ETSI Secretariat | 2023-04-27 |
| Publication (expected date) | 2023-05 |

* TS 102 950-1: Part 1: TTCN-3 core implementation conformance: ICS will be made available at:  
  <https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=65439>

|  |  |
| --- | --- |
| Deliverable: **TS 102 950-2**  Current status: **Draft receipt by ETSI Secretariat**  Working title: **TTCN-3 core implementation conformance: TSS&TP** | **Achieved date** |
| Creation of WI by WG/TB | 2022-04-05 |
| TB adoption of WI | 2022-04-25 |
| Start of work | 2022-08-03 |
| Early draft |  |
| Stable draft | 2023-02-07 |
| Final draft for approval | 2023-04-06 |
| TB approval | 2023-04-27 |
| Draft receipt by ETSI Secretariat | 2023-04-27 |
| Publication (expected date) | 2023-05 |

* TS 102 950-2: Part 2: TTCN-3 core implementation conformance: TSS&TP will be made available at: <https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=65438>

|  |  |
| --- | --- |
| Deliverable: **TS 102 950-3**  Current status: **Draft receipt by ETSI Secretariat**  Working title: **TTCN-3 core implementation conformance: ATS&IXIT** | **Achieved date** |
| Creation of WI by WG/TB | 2022-04-05 |
| TB adoption of WI | 2022-04-25 |
| Start of work | 2022-08-03 |
| Early draft |  |
| Stable draft | 2023-02-07 |
| Final draft for approval | 2023-04-06 |
| TB approval | 2023-04-27 |
| Draft receipt by ETSI Secretariat | 2023-04-27 |
| Publication (expected date) | 2023-05 |

* TS 102 950-3: Part 3: TTCN-3 core implementation conformance: ATS&IXIT will be made available at: <https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=65437>

1. Performance indicators
   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.
  1. 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

1. Resources allocated and spent

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Author:** | **ETSI - Funded Activities** |  |  |  |  |
| **Period covered:** | **From: 18/07/2022** | **To: 30/06/2023** |  |  |  |
| **Status:** | **Final** |  |  |  |  |
| **Status date:** | **25/04/2023** |  |  |  |  |

* 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 | | 66 500,00€ | 3 600,00€ | 70 100,00€ |
| Resource Usage | | 66 500,00€ | 1 292,32€\* | 67 792,32€\* |
| **Variance (Avail. - Usage)** | | **0,00€** | **2 307,68€\*** | **2 307,68€\*** |

\* These amounts will be updated after the trip will be done by Axel Rennoch (see chapter 3.4)

This table provides a detailed view on the travels of the TTF.

Table 2: Travels

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Companies | Meetings | Places | Dates | Amounts |
| Fraunhofer - Fokus | MTS#87 | Tallin, EE | 04-05 Oct 2022 | 523,32€ |
| Fraunhofer - Fokus | MTS#88 | Thessaloniki, GR | 24-25 Jan 2023 | 769,00€ |
| Fraunhofer - Fokus | MTS#89 | Sophia-Antipolis, FR | 01-02 Jun 2023 | to be provided |

Estimated Travels costs spent = 1 292,32€