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| ToR TTF T004 (Ref. Body ISG CIM) |
| Version: 1.15 |
| Author: Lindsay Frost – Date: 2019-09-10Reviewed by ISG CIM Technical Officer ETSI Patrick Guillemin |
| Last updated by: Lindsay Frost – Date: 2019-12-18Updated on 5 February 2020 by Patrick GuilleminUpdated on 10 February 2020 by Ultan Mulligan with ISG CIMUpdated on 1st April 2020 by ETSI Secretariat |
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Terms of Reference –Testing Task Force Proposal

TTF T004 (Ref. Body ISG CIM)

Testing Framework for NGSI-LD

Summary information

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| --- | --- | --- |
| Approval status | Approved by ISG CIM (doc ref: CIM(20)000074r1) | **YES** |
| Reference Body | Ref. Body ISG CIM |
| ETSI Funding | **Maximum budget: 119 000 EUR (including 5k€ travel)** |
| Minimum of 4 ETSI Members Support | **YES** |
| Time scale | **From** | 2020-05-06 |
| **To** | 2021-02-01  |
| Work Items  | [DGR/CIM-0016v111 (GR CIM 016)](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=59341) “NGSI-LD Testing Framework Test Template D1-1”[DGS/CIM-0011v111 (GS CIM 011)](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=58942) “NGSI-LD Testing Framework TPDL D1-2”[DGS/CIM-0012v111 (GS CIM 012)](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=58944) “NGSI-LD Test Suite Structure D2”[DGS/CIM-0013v111 (GS CIM 013)](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=58946) “NGSI-LD Test Purposes Descriptions D3”[DGS/CIM-0014v111 (GS CIM 014)](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=58947) “NGSI-LD Test Suite D4”[DGR/CIM-0015v111 (GR CIM 015)](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=58948) “NGSI-LD Testing Environment Validation D5” |
| TTF Roadmap reference | TTF Budget approved in GA#74: December 2019 |

Part I –TTF Technical Proposal

# Rationale & Objectives

## Rationale

The ISG CIM group has defined an API for exchange of information (data and metadata, including e.g. relationships between entities and properties of properties) with the intent that the associated protocol (called NGSI-LD) become the “glue” between all kinds of applications and databases associated with services for Smart Cities, Smart Agriculture, etc. Furthermore, the protocol makes it easy (indeed, mandatory) to reference the definitions of all the terms and parameters in the data, hence overcoming one of the biggest issues with data exchange: namely that the precise meaning and provenance of the initial information is lost. This will enable a huge improvement for reliability of analytics and AI systems which need to control the scope and quality of their input data. Furthermore, the protocol is intended to be adopted by a very wide range of developers desiring a simple means to let their Apps interact with a variety of data sources.

However, these advantages will not occur if the protocol is not well understood and not well implemented. The community of users will not be solely highly professional engineers employed by big companies, but will include many small teams and SMEs and even hobbyists. Already there are at least three open source implementations (FIWARE Foundation, Sensinov, NEC). Therefore, it is essential that the developers have access to not only the standard but also a test specification and a testing environment to check that their work is (and remains) conformant to the ETSI NGSI-LD specification.

The developers will usually write integration tests to validate the behaviour of their NGSI-LD implementation, but it is important to assert compliance to the specification based on a test suite agreed by the group creating the API specification, i.e. ETSI ISG CIM. Therefore, it is very important to create a set of ETSI-approved test cases.

## Objectives of the work to be executed

The main objective of the project is producing a conformance test suite for the NGSI-LD API specification and a testing environment to enable and validate the test cases.

In order to produce automatized and standardized test suites, the tests need to be implemented in a specific programming language. The selection of the testing programming language is within the scope of the work to be done.

Note: one output of the works is a set of test cases written in a specific programming language. The copyright for such code snippets remains with ETSI. The right of use, modification, inclusion in open source projects, running in commercial or non-commercial test suites is explicitly granted so long as the original source is cited.

Note: Additional test cases may be contributed by ISG CIM participants, using the usual ETSI processes.

## Previous funded activities in the same domain

No previous requests

##

## Consequences if not agreed

As described in the Rationale section, the major risk to avoid is the development of many different implementations of NGSI-LD which are not conformant to the standard.

Due to the expected diverse sources of these implementations, a traditional plugfest approach to interoperability probably does not scale and is not timely enough. Due to the lack of resources in the developer communities, it cannot be expected that they will all be able to go through a rigorous certification process (which is the approach taken within oneM2M).

A side-benefit of this TTF, which would not be available if the work is unfunded, is insertion into the ETSI in-house knowledge base of the experiences in using a (particular) testing programming language.

A final benefit of the work, which is implicit, is that the test cases and testing environment might become cited in various EU research projects, showing once again the value of ETSI as a centre of expertise.

# ETSI Members Support

|  |  |  |
| --- | --- | --- |
| **#** | **ETSI Member** | **Supporting delegate** |
| 1 | NEC | Lindsay Frost |
| 2 | FIWARE Foundation | Ken Zangelin  |
| 3 | Easy Global Market SAS | Franck Le Gall |
| 4 | CNIT (Il Consorzio Nazionale Interuniversitario per le Telecomunicazioni) | Giuseppe Tropea |
| 5 | Sensinov | Ghada Gharbi |
| 6 | University of Murcia | Juan Antonio Martinez |

# Deliverables

## Base documents

|  |  |  |
| --- | --- | --- |
| **Document** | **Title** | **Status** |
| ETSI GS CIM 009 V1.2.1 | Context Information Management (CIM) ; NGSI-LD API : NGSI-LD  | Published |
| ETSI GS CIM 006 V1.1.1 | Context Information Management (CIM) ; Information Model (MOD0) | Published |
| ETSI RGS/CIM-0009v131 | Context Information Management (CIM); NGSI-LD API: NGSI-LD  | If Agreed by the start of D2 |

Note: It should be negotiated with the TTF, if bugs are noted by the TTF and/or ISG CIM during the project, then the ISG CIM will create an open API WI to capture necessary changes

## Deliverable descriptions

### [D1-1 and D1-2] NGSI-LD Testing Framework (GR D1-1 and extra GS D1-2)

Expected output:

**Draft V1.0.1** of [DGR/CIM-0016v111 (GR CIM 016)](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=59341) “NGSI-LD Testing Framework Test Template D1-1”

**Draft V1.0.1** of [DGS/CIM-0011v111 (GS CIM 011)](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=58942) “NGSI-LD Testing Framework TPDL D1-2”

The first part (D1-1) is simply creating a Test Template applying ETSI best practise and should not require much discussion.

The second part (D1-2) is a choice of Test Purposes Description Language (TPDL), with the intention that it must capture all of the information required by the Test Template and *should* be parseable using software (see below).

**The Testing Framework** (document format) specifies a testing framework defining a methodology for the development of the test strategies, test systems and resulting test specifications. The document will identify the implementation under test (scope of the testing), the format for the test specification, the test architecture, the points of control and observation, the naming conventions (e.g. for test case ID and test case grouping ID), etc.

Note: The D1 activity must generate the **Implementation Conformance Statement which is** basically a checklist for a client-owner so they know what parts of the specification will be tested and if any is optional. The ICS will be published as a separate GS.

A requirement is that the chosen Test Template be concise and well-structured, e.g. in tables.

The chosen **Test Template format** for defining test cases will include (for any and all test cases) placeholders to fill in, such as:

* test case ID
* test case grouping ID
* purpose of test (including functionality being tested)
* test configuration (e.g. architecture for this test, including central/federated or number of Sources involved)
* initial conditions
* expected behaviour
* final conditions
* pass/fail criteria
* reference lines in the API standard
* (optional: inclusion of tags, e.g. text copied from the API spec for additional clarity in pass/fail messages)

Note: the initial conditions must include the possibility to reset the NGSI-LD system to initial/empty conditions. This is implementation-dependent but might be done by sending a defined payload to the system under test. Implementors should be warned that most often the Test Suite may require this initialization at the start of every test case.

**The Test Purposes Description Language (TPDL) selection** part requires an analysis of the desirable characteristics for the best testing of the NGSI-LD protocol, including an analysis of the open source tools available to create and translate an Abstract Test Case (based on the Test Template) into an Executable Test Case (using specific pre/post-test payload) which can be run in a Test Execution Environment.

The TPDL must be human-readable.

Examples of tools which might be considered for the Test Purposes Description Language include:

* TDL (Test Description Language)
* Cucumber (<https://cucumber.io/>)
* Karate (<https://intuit.github.io/karate/>)
* ROBOT (https://robotframework.org/#/)
* openAPI with swagger extensions to generate tests
* general programming languages such as Python, Java, Javascript, Perl, TCL.

Consultation must be made, during this task, with relevant experts from the groups listed below, with the intent to identify the advantages/disadvantages of various candidate Test Purposes Description Languages (TPDL):

* ETSI Staff, especially from CTI
* ETSI TTF for RESTful APIs
* SmartM2M STF for Semantic Discovery work (where relevant)

Consultation with developer communities and W3C Groups (e.g. JSON-LD) should be made by ISG CIM via release of interim public documents, in consultation with the TTF and on the ISG CIM open area.

A recommendation of one or more Test Purposes Description Languages (TPDL) will be made to the ISG CIM. Similarly, a recommendation of one or more test execution environments will be made. The final choice of TPDL and Test Execution Environment will be made by ISG CIM, in consultation with the TTF.

Some of the criteria (not prioritized) which need clarification during this task, because they will influence the choice of TPDL and Test Execution Environment, are:

1. is the programming language similar enough to “normal English” that it can be partially or completely used to define the Abstract Tests in [D3]
2. can the programming language be executed in a software environment which is familiar to a majority of web developers, e.g. Eclipse, or does it run as a stand-alone?
3. is the Test Execution Environment offering tools familiar to the developer community such as display of results in a browser window and writing full results in log files , etc.
4. is the Test Execution Environment available as open source or free runtime license?
5. how can the final list of test cases written in the TPDL be extended (under conditions compatible with ETSI IPR rules) by contributions from a developer community?
6. can the tooling environment be integrated with continuous integration tools (e.g. Jenkins) ?
7. the possibility, in the execution environment, to run individual test cases as well as specific sets or the entire set of test cases
8. the execution environment should generate error messages in case the test case cannot be executed due to any cause, including malformed definition of the test case
9. is it able to check that after an entity creation/update and a matching subscription the notifications are correctly delivered to the ip/port specified in the subscription?
10. can it supply detailed step-by-step logs and overall summary of pass/fail/skip?
11. after a complete test suite generates errors/fails, can individual failed tests be re-tried?
12. is it possible to run the NGSI-LD software and the Test Execution Environment on the same host ?

The deliverable should include a matrix of analysed Test Purposes Description Languages (TPDL) and the weighting of the criteria should be agreed with ISG CIM (e.g. criteria “f” above may be given lower weighting). ISG CIM will then make the final choice of TPDL, after one or more teleconference discussions with the TTF group.

Note: selection of consultants to carry out this deliverable should strongly take account of the types of programming skills relevant to testing systems.

Note: the choice of TPDL should be clear two weeks before the final deliverable D1 is scheduled for publishing.

### [D2] NGSI-LD Test Suite Structure (GS)

Expected output: **Draft V1.0.1** of DGS/CIM-00**12**v**111** (GS CIM 012) "NGSI-LD Test Suite Structure D2"

This deliverable defines the organization or grouping of test cases based on the functionality to be tested (e.g. registration, subscription, query, etc.) and - most importantly - selects minimal subsets (“narrower scope”) of functionality to permit testing of the main features of an operating NGSI-LD system.

The test coverage shall include not only valid behaviour test cases but also invalid behaviour test cases.

Note: the manpower estimate includes time needed to discuss with the ISG CIM about the priority of various test cases.

Note: It is suggested that several batches of test cases are listed, such that the first batch can be developed in D3 and D4, before proceeding with the second batch, etc. These batches will help the development process of D3 and D4.

Note: at least one face-to-face meeting with ISG CIM is essential, probably at ETSI but possibly in another city if it minimizes travel costs/time. One representative from the TTF team should be physically present and the others should join by teleconference.

Note: it is expected that various ISG CIM members will make contributions regarding the prioritization of the test groups and test cases and those contributions shall be taken into consideration.

Note: D1 and D2 must be agreed by ISG CIM before proceeding with further tasks.

Note: D2 will not be published until D3 is completed, because D3 may have some impact on the ToC of D2.

### [D3] NGSI-LD Test Purposes Descriptions (GS)

Expected output: **Draft V1.0.1** of DGS/CIM-0013v**111** (GS CIM 013) NGSI-LD Test Purposes Descriptions D3'

This deliverable includes the description of each abstract test case and uses the agreed [D1] Test Template and uses the agreed TPDL. It requires in-depth knowledge of the NGSI-LD API.

This deliverable will contain, in human readable format, **Abstract Test Cases**, so that for each and every Test Case, the conditions are clear. This document achieves and documents a description of exactly what has to be tested and how.

This deliverable also includes defined **concrete payload instances** to be used in D4 to define Executable Test Cases.

In addition to the ETSI deliverable, if a developer-friendly format of the test case descriptions can be generated, for example as html output, then it should be a non-normative addendum to the deliverable.

Note: it is expected that ISG CIM participants may propose Abstract Test Cases, or comments on existing cases, via the usual ETSI contribution mechanisms. Whether to use ETSI forge or ISG CIM contribution documents should be agreed between ISG CIM, ETSI staff and the TTF.

Note: if during this task inconsistencies or clarifications are needed to be fixed in the API, the TTF should notify ISG CIM.

### [D4] NGSI-LD Test Suite (GS)

Expected output: **Draft V1.0.1** of DGS/CIM-0014v**111** (GS CIM 014) NGSI-LD Test Suite D4'

This deliverable uses the decisions of D1, D2 and D3, i.e. the choice of TPDL and Test Execution Environment and the defined Test Purposes Descriptions. This deliverable documents implementation of the Test Purposes Descriptions into Executable Test Cases which are in a form which can be run in the Test Execution Environment.

This requires experts with knowledge on the TPDL and Test Execution Environment.

It is expected that the test cases will be continuously made available to ISG CIM using e.g. ETSI forge to facilitate review.

Note: it is expected that the Executable Test Cases will be modularized as much as feasible, to make them more easily debugged and maintained.

### [D5] NGSI-LD Testing Environment Validation (GR)

Expected output **Draft V1.0.1** of DGR/CIM-0015v**111** (GR CIM 015) NGSI-LD Testing Environment Validation D5'

This deliverable documents the successes and difficulties (“what we learned”) of the previous tasks. It requires running the Executable Test Cases in the chosen Test Execution Environment using one or more of the open-source NGSI-LD systems (chosen or prioritized in agreement with ISG CIM).

This deliverable has the goal to check that the complete test environment runs successfully and to allow ETSI to learn from use of the chosen test description language and operating environment. This deliverable should demonstrate that the Executable Test Cases defined in D4 are able to run.

Additionally, this document should include advice or “best practise” concerning use of the Test Execution Environment, particularly for consideration by organisers of interop events or hackathons. This material would be valuable also for developers. Any operational information, e.g. concerning scalability or latency, should be included.

If confirmed by ETSI CTI, this deliverable shall include a feedback session and presentation with ETSI CTI or ETSI TC MTS to maximise in-house learning from the whole approach.

Note: the actual NGSI-LD software used in this validation should preferably exercise all of the tests, but the performance of the software is out of scope of the reporting and no such results will be presented publicly.

## New deliverables

|  |  |  |  |
| --- | --- | --- | --- |
| **Deliv.** | **Work Item code****Standard number** | **Working title** | **Expected date for** **publication** |
| D1-1 | DGR/CIM-0016v111 (GR CIM 016) | NGSI-LD Testing Framework Test Template D1-1 | 1st March 2021 |
| D1-2 | DGS/CIM-0011v111 (GS CIM 011) | NGSI-LD Testing Framework TPDL D1-2 | 1st March 2021 |
| D2 | DGS/CIM-00121v111 (GS CIM 012) | NGSI-LD Test Suite Structure D2 | 1st March 2021 |
| D3 | DGS/CIM-0013v111 (GS CIM 013) | NGSI-LD Test Purposes Descriptions D3 | 1st March 2021 |
| D4 | DGS/CIM-0014v111 (GS CIM 014) | NGSI-LD Test Suite D4 | 1st March 2021 |
| D5 | DGR/CIM-0015v111 (GR CIM 015) | NGSI-LD Testing Environment Validation D5 | 1st March 2021 |

# Maximum budget

## Task summary/Manpower Budget

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| --- | --- | --- |
|  | **Task short description** | Budget (EUR) |
| T0 | Planning, reporting, f2f meetings & Coordination with ISG CIM | 4000 |
| T1 | NGSI-LD Testing Framework  | 5000 |
| T2 | NGSI-LD Test Suite Structure | 3000 |
| T3 | NGSI-LD Test Purposes Descriptions | 40000 |
| T4 | NGSI-LD Test Suite | 52000 |
| T5 | NGSI-LD Testing Environment Validation | 10000 |
|  | **TOTAL** | 114000 |

Note: depending on choice of TPDL, effort for T4 may be reduced and additional funding provided into T3.

## Travel budget

5000 euros

The TTF is expected to meet f2f with the ISG CIM group on three occasions, for two half-days each, with an additional travel budget of maximum 1000 Euro per person per meeting. It is expected that the team will usually be represented by one person, with others joining by electronic means if needed. Work time is accounted under task T0 above.

Part II – Details on TTF Technical Proposal

# Tasks, Technical Bodies and other stakeholders

## Organization of the work

The ISG CIM will be the steering committee monitoring the work and joint teleconferences will be scheduled on average every two weeks, for 30-60 minutes, initially during the regular ISG CIM teleconference meetings on Mondays. Documents needing discussion and/or approval at those sessions must be uploaded to the ISG CIM at least 3 working days in advance of the call.

The ISG CIM is responsible for contacting other standardisation groups for information or liaison or comment. Suggestions from the TTF experts are welcome. No specific coordination or alignment timetables exist.

## Other interested ETSI Technical Bodies

The ISG CIM will be the body to contact other ETSI bodies and expects to solicit comments from SmartM2M, ISG NFV and ISG MEC regarding their relevant STF work.

## Other stakeholders

There is no consultation of additional stakeholders by the TTF.

Part III: Execution of Work

# Work plan, time scale and resources

## Task description

|  |  |
| --- | --- |
| **Task 0** | **Planning, reporting, f2f meetings & Coordination with ISG CIM** |
| **Objectives** | * Planning of all tasks, including meeting agendas and action lists
* Planning timetable of deliverables, meetings, TTF teleconferences
* Soliciting and noting and acting on comments from ISG CIM about project processes and results
* Request clarifications from ISG CIM of any unclear timetables
* Arrange the required f2f meetings, including if needed additional TTF-internal f2f meetings
 |
| **Input** | * Basis for planning is this ToR
* ISG CIM meeting schedules are in the ETSI meeting scheduler (generally)
 |
| **Output** | * Action lists (and completion info)
* Meetings and Deadlines lists
 |
| **Interactions** | * Interactions are with ISG CIM
 |
| **Resources required** | * Basic project-management skills
* The usual ETSI reporting tools (email accounts, TTF open areas)
 |

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| **Task1** | **NGSI-LD Testing Framework** |
| **Objectives** | * Define the Test Template
* Analyse pro/con various Test Purposes Description Languages (TPDL)
* Obtain agreement from ISG CIM on choice
 |
| **Input** | * NGSI-LD API spec
* The ToR provides a set of examples TPDL setups, to illustrate, however team expertise is needed
* The ToR provides some example criteria, but others could/should be added
 |
| **Output** | * Test Template in tabular format and some example content.D1-1: Draft V1.0.1 of DGR/CIM-0016v111 (GR CIM 016) “NGSI-LD Testing Framework Test Template D1-1”
* For a “short list” of TPDL choices, provide a decision matrix with adjustable weighting factors (values to be agreed with ISG CIM)
* Recommended TPDL and information (links) for obtaining/using it.D1-2: Draft V1.0.1 of DGS/CIM-0011v111 (GS CIM 011) “NGSI-LD Testing Framework TPDL D1-2”
 |
| **Interactions** | * Teleconferences with ISG CIM, at least one jointly with ETSI testing specialists
* Discussions with ISG CIM re criteria
 |
| **Resources required** | * Expertise in TPDLs and associated execution environments
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| **Task2** | **NGSI-LD Test Suite Structure** |
| **Objectives** | * Define the organization or grouping of test cases
* Agree with ISG CIM re minimal subsets (“narrower scope”)
* D1 and D2 must be agreed by ISG CIM before proceeding with further tasks.
 |
| **Input** | * D1-1 and D1-2
* NGSI-LD API spec
 |
| **Output** | * This deliverable defines the organization or grouping of test cases based on the functionality to be tested (e.g. registration, subscription, query, etc.) and - most importantly - selects minimal subsets (“narrower scope”) of functionality to permit testing of the main features of an operating NGSI-LD system. D2: Draft V1.0.1 of DGS/CIM-0012v111 (GS CIM 012) "NGSI-LD Test Suite Structure D2"
 |
| **Interactions** | * One face-to-face meeting with ISG CIM is essential
 |
| **Resources required** | * Expertise in NGSI-LD API.
 |

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| **Task3** | **NGSI-LD Test Purposes Descriptions** |
| **Objectives** | * This deliverable includes the description of each abstract test case and uses the agreed [D1] Test Template and uses the agreed TPDL.
 |
| **Input** | * NGSI-LD API spec
* D1-1, D1-2 and D2
* ISG CIM participants may propose abstract test cases, or comments on existing cases, via the usual ETSI contribution mechanisms. Whether to use ETSI forge or CIM contribution documents should be agreed between ISG CIM, ETSI staff and the TTF.
 |
| **Output** | * This deliverable contains in human readable format, Abstract Test Cases, so that for each and every Test Cases, it is clear exactly what has to be tested and how. If the TPDL allows the information required by the Test Template to be directly input into a file(s) which can later be managed as part of the Test Suite (e.g. in Forge) then such a process is preferred.D3: Draft V1.0.1 of DGS/CIM-0013v111 (GS CIM 013) NGSI-LD Test Purposes Descriptions D3'
* This deliverable also includes defined concrete payload instances to be used in D4 to define Executable Test Cases.
* If during this task inconsistencies or clarifications are needed to be fixed in the API, the TTF should notify ISG CIM.
 |
| **Interactions** | * The TTF will address questions to ISG CIM (email, teleconf). If the ISG CIM agrees that further stakeholders need to be consulted, then the ISG will do so.
 |
| **Resources required** | * Frequent updates with ISG CIM are required
* At least one f2f meeting is required
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| **Task4** | **NGSI-LD Test Suite** |
| **Objectives** | * This deliverable documents implementation of the Test Purposes Descriptions into Executable Test Cases which are in a form which can be run in the Test Execution Environment.
 |
| **Input** | * This deliverable uses the decisions of D1-1, D1-2, D2 and D3, i.e. the choice of TPDL and Test Execution Environment and the defined Test Purposes Descriptions.
* NGSI-LD API spec
 |
| **Output** | * The document lists every Executable Test Case using the TPDL.D4: Draft V1.0.1 of DGS/CIM-0014v111 (GS CIM 014) NGSI-LD Test Suite D4'
 |
| **Interactions** | * It is expected that the test cases will be continuously made available to ISG CIM using e.g. ETSI forge to facilitate review.
 |
| **Resources required** | * This requires experts with knowledge on the TPDL and Test Execution Environment.
* Knowledge of NGSI-LD API is useful but should not be mandatory provided that the D3 document is 100% clear and correct. In case of doubt, ISG CIM must be consulted
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| **Task5** | **NGSI-LD Testing Environment Validation** |
| **Objectives** | * This deliverable documents the successes and difficulties (“what we learned”) of the previous tasks. It requires running the Executable Test Cases in the chosen Test Execution Environment using one or more of the open-source NGSI-LD systems (chosen or prioritized in agreement with ISG CIM).
* The work must check that the complete test environment runs successfully and demonstrate that the Executable Test Cases defined in D4 are able to run.
* Advice or “best practise” concerning use of the Test Execution Environment, particularly for consideration by organisers of interop events or hackathons, is desirable.
 |
| **Input** | * D4 and related Test Execution Environment
 |
| **Output** | * Demonstrate that the complete test environment runs successfully
* A document explaining the successes and difficulties (“what we learned”) of the previous tasks.D5: Draft V1.0.1 of DGR/CIM-0015v111 (GR CIM 015) NGSI-LD Testing Environment Validation D5'
* If time permits, advice or “best practise” concerning use of the Test Execution Environment
 |
| **Interactions** | * Regular teleconferences with ISG CIM and at least one f2f meeting
 |
| **Resources required** | * Team members from task D4 need to provide their feedback.
 |

## Milestones

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| --- | --- | --- |
| **Milestone** | **Description** | **Cut-Off Date** |
| **A** | Define Testing Framework and Test Suite Structure D1-1, D1-2 and D2 Drafts V1.0.1 accepted by ISG CIM | **2020-07-01** |
| Reference Body Deliverable | D1-1, D1-2 and D2 Drafts V1.0.1 accepted by ISG CIM |
| ETSI Deliverable | Progress Report approved by using approved ETSI template approved by ISG CIM |

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| **Milestone** | **Description** | **Cut-Off Date** |
| **B** | D3 and D4 Drafts V1.0.1 accepted by ISG CIM | **2020-11-30** |
| Reference Body Deliverable | D3 and D4 Drafts V1.0.1 accepted by ISG CIM |
| ETSI Deliverable | Progress Report using approved ETSI template approved by ISG CIM  |

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| **Milestone** | **Description** | **Cut-Off Date** |
| **C** | D1-1, D1-2, D2, D3, D4 and D5 Final Drafts approved by ISG CIM | **2021-02-01** |
| Reference Body Deliverable | D1-1, D1-2, D2, D3, D4 and D5 Final Drafts approved by ISG CIM |
| ETSI Deliverable | Final Report using approved ETSI template approved by ISG CIM  |

## Task summary

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| --- | --- | --- | --- |
| **Code** | **Task / Milestone**  | Target Date | Estimated Cost (EUR) |
| From | To |
| T0 | Planning, reporting and Coordination with ISG CIM | May 2020 | Jan 2021 | 4000 |
| T1 | NGSI-LD Testing Framework | May 2020 | Jul 2020 | 5000 |
| T2 | NGSI-LD Test Suite Structure | May 2020 | Jul 2020 | 3000 |
| Milestone A | Progress Report approved by ISG CIMD1-1, D1-2 and D2 **Drafts V1.0.1** accepted by ISG CIM |  | Jul 2020 |  |
| T3 | NGSI-LD Test Purposes Descriptions | Aug 2020 | Nov 2020 | 40 000 |
| T4 | NGSI-LD Test Suite | Oct 2020 | Dec 2020 | 52 000 |
| Milestone B | Progress Report approved by ISG CIM D3 and D4 **Draft V1.0.1** accepted by ISG CIM |  | Dec 2020 |  |
| T5 | NGSI-LD Testing Environment Validation | Oct 2020 | Dec 2020 | 10 000 |
| Milestone*C* | Final Report and D1, D2, D3, D4 and D5 **Final Drafts** approved by ISG CIM |  | Jan 2021 |  |
| Milestone D | D1-1, D1-2, D2, D3, D4 and D5 published and TTF closed |  | Mar 2021 |  |
|  | **114 000** |

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| **Task/ Mil.** | **A** | **M** | **J** | **J** | **A** | **S** | **O** | **N** | **D** | **J** | **F** | **M** |
| T0 |  |  |  |  |  |  |  |  |  |  |  |  |
| T1 |  |  |  | D1-1D1-2 |  |  |  |  |  |  |  |  |
| T2 |  |  |  | D2 |  |  |  |  |  |  |  |  |
| **MA** |  |  |  | X |  |  |  |  |  |  |  |  |
| T3 |  |  |  |  |  |  |  | D3 |  |  |  |  |
| T4 |  |  |  |  |  |  |  |  | D4 |  |  |  |
| **MB** |  |  |  |  |  |  |  | F2F  | X |  |  |  |
| T5 |  |  |  |  |  |  |  |  | D5 |  |  |  |
| **MC** |  |  |  |  |  |  |  |  | F2F | X |  |  |
| **MD** |  |  |  |  |  |  |  |  |  |  |  | X |

# Expertise required

## Team structure

Up to 4 participants are required, to ensure the following mix of competences.

The ISG CIM Chairman appoints a TTF Leader, in consultation with ETSI staff.

|  |  |
| --- | --- |
| **Priority** | **Qualifications and competences** |
| High/ | API Testing expert (1 or 2 persons) |
| High/ | NGSI-LD expert ( at least 1) |

Part IV: TTF performance evaluation criteria

# Performance Indicators

|  |
| --- |
| **Select relevant Performance indicators applicable for these ToR (X)** |
| Contribution from ETSI Members to TTF work |
| Steering Group meetings (number of meetings / participants / duration) | 3 meetings f2f with ISG CIM |
| Number of delegates directly involved in the review of the deliverables | expect minimum 3 delegates on the decision points |
| Number of NGDI-LD implementations (endpoints) made available to TTF for evaluation of the test suite | At least 2 implementations of the NGSI-LD API specification should be tested if available. |
| **Contribution from the TTF to ETSI work** |
| Contributions to ISG CIM meetings (number of documents / meetings / participants) | Updated draft WIs about every 4 – 6 weeks |
| **Quality of deliverables** |
| Respect of time scale. Earlier delivery of results is highly appreciated. | Baseline is start/end dates in the approved ToR |
| Approval of deliverables according to schedule | Baseline is to get agreement of Drafts V1.0.1 by ISG CIM within 4 weeks after deliverable schedule |
| Comments from Quality review by ISG CIM | Note the decisions of CIM on each WI and the handling of any requests for changes. |
| Comments from Quality review by ETSI Secretariat | Stability of decision processes  |
| Deliverables approved by ISG CIM accepted by the ETSI Secretariat for publication | All deliverables published |

# Document history

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Date** | **Author** | **Status** | **Comments** |
| 0.0 | 20191125 | LF | draft | The ISG made a more precise forecasts of the duties  |
| 0.0r5 | 20191127 | BO | Draft | Review of the document |
| 1.0 | 20191218 | LF | Final | Many changes up to v8 were included and this version is waiting for ETSI staff to review if all necessary info is included. |
| 1.1 | 20200206 | ETSI | Final | ETSI review for ToR approval by ISG CIM on 10 and 17 Feb 2020v11 uploaded with additional changes by L. Frost |
| 1.2 | 20200210 | LF | Final | V12 contains a few clarifications. |
| 1.3 | 20200330 | ETSI, LF | Final edits | V13 To prepare the CfE with STFManager and CTI |
| 1.4 | 20200331 | ETSI Secretariat | Final | V14 Update before CL publication |
| 1.5 | 20200401 | ETSI Secretariat | Final for CfE | V15 Update approved by ISG CIM and ready for CfE/CL publication |