ISG CIM TERMS OF REFERENCE

(approved by the Director-General on **19 December 2016** following Board consultation)

1. Scope

The goal of ISG CIM is to develop technical specifications and reports to enable multiple organisations to develop interoperable software implementations of a cross-cutting Context Information Management (CIM) Layer. It is about bridging the gap between abstract standards and concrete implementations.
The CIM Layer enables applications to update, manage, and access context information from many different sources, as well as publishing that information through interoperable data publication platforms.

The work of ISG CIM will be done in a phased manner. The initial phase will be purely informative and result in an ISG CIM Group Report (GR). It will be followed by a second normative phase resulting in several ISG CIM Group Specifications (GS).

Throughout both phases relevant organizations will be considered as appropriate in order to avoid duplication of work.

Phase 1 (informative)

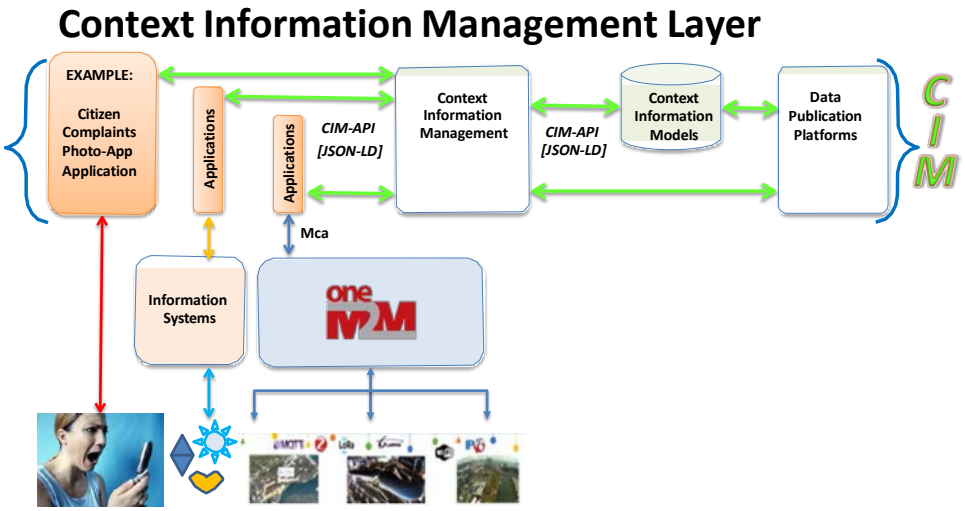

Figure 1: The Context Information Management Layer complementing the oneM2M Service Layer

Figure 1 is informative only and highlights how the Context Information Management Layer may interact between applications and various information sources, one of them being the oneM2M service layer. The Context Information Management Layer is based on context information models and interfaces with data publication platforms.

As CIM interfaces, the abstract NGSI 9 and 10 interface specifications from OMA[1] will be the starting point, with a RESTful binding for the protocol.

Liaisons with relevant organisations will gather input. The Phase 1 ISG CIM Group Report will detect/describe the specification/standardization gaps in order to consider any missing features and to ensure interoperable software implementations, including open source implementations. It is expected that an extension of the RESTful binding of the OMA NGSI API involving expression using JSON-LD could aid interoperability, so this and potentially other extensions will be considered. Developing ISG CIM Group Specifications in Phase 2 will subsequently fill these gaps.

[1] http://technical.openmobilealliance.org/Technical/release_program/docs/NGSI/V1_0-20120529-A/OMA-TS-NGSI_ Context_Management-V1_0-20120529-A.pdf

The ISG CIM Group Report will also include a decomposition of the Context Information Management Layer and the Data Publication Platform into Functional Entities at an appropriate level of detail to indicate what needs to be standardized.

In particular, the Phase 1 work will consist of:

- Collect relevant material from various existing Context Information Management systems and (open) database activities and use cases.
- Investigate use cases and requirements for information coming from many different sources (not only IoT) and data models to allow applications to perform updates on context, register context providers, query information on current and historic context information and subscribe for receiving notifications on context changes.
- Identify a reference architecture which potentially might use the API and show positioning/compatibility to oneM2M
- Note potential gaps in the abstract NGSI 9 and 10 interface specifications, for consideration in the normative Phase 2

Liaisons to major organizations will be established to facilitate a coordinated standardization approach.
Towards the end of Phase 1, joint workshops with ETSI TC SmartM2M, ETSI PP oneM2M and possibly other organizations will be organized to allow complementarity of specifications.

Phase 2 (normative):

The work in Phase 2 will develop normative ISG CIM Group Specifications to fill the standardization gaps identified in the informative Phase 1.

The general approach is to select and specify a set of bindings and instantiate abstract models in sufficient details to ensure interoperability of independent SW implementations, including open source implementations. Topics to be addressed include the following:

- Definition of a standard API for Context Information Management (CIM-API) enabling close to real-time update and access to information coming from many different sources (not only IoT). Such an API will enable applications to perform updates on context, register context providers which can be queried to get updates on context, query information on current and historic context information and subscribe for receiving notifications on context changes.
- Specifications to be fulfilled by Data Publication Platforms supporting open data publication, data privacy and/or authorization of access, including enablers for multi-party access contracts will be considered.
- Cross-domain Context Information Models that will deal with the definition of the models that are common to several of the domains being targeted, together with the metamodels, definition languages and processes needed for the specification, curation, publication and evolution of Context Information Models will be defined and applied.
- Smart Cities Information Models, where the specific models for the Smart Cities domain will be defined.
- Information Models targeting other specific domains besides Smart Cities (for example but not limited to Smart Agrifood, Smart Industry) will also be considered.

Group Specifications developed within the ISG CIM will be public and subject to ETSI IPR policy, especially concerning timely declaration.

In order to facilitate agile and efficient standardization, to maximize the acceptance of the specifications produced, and to ease collaboration with open source initiatives supporting the specifications, ISG CIM Members and ISG CIM Participants will be encouraged during the specification process, including at the time of making a contribution, to declare if they believe that an ETSI IPR Declaration is necessary (in particular Clauses 4.1 and 6.1 but also to copyrights as addressed under Clause 9.2.3 of Annex 6 (ETSI Intellectual Property Rights Policy) of the ETSI rules of Procedure).

ISG CIM Members and ISG CIM Participants are reminded that acting contrary to ETSI IPR policy and/or delaying timely declaration of IPR can only delay the successful completion of the specification(s), undermining a critical success factor for the ISG.

Work in the ISG CIM will follow an implementation-driven approach, as opposed to a "design by committee" approach, and it will be focused on agile delivery. ISG CIM Members and ISG CIM Participants are encouraged to reference to implementations and to take such examples into account in deciding on details of the specification work.

2. Planned deliverables and delivery dates

ISG CIM intends to meet monthly (physical and/or electronic meetings) as needed to draft, discuss, review and approve the deliverables to be developed.

ISG CIM plans to develop an ISG CIM Group Report (informative) and several ISG CIM Group Specifications (normative). A detailed plan will be made in the first meeting when Work Items will be discussed.

According to the ISG CIM time plan, the intent is to finalize an ISG CIM Group Report (GR) and a set of ISG CIM Group Specifications (GS) within one (1) year after the first meeting.

The initial plan involves delivering the following results:

- (T0+01) Liaisons to major organisations informing of the work and requesting comment/input. Invite participation/membership.
- (T0+03) Group Report describing the overall architecture and identifying standardization gaps
- (T0+03) Joint f2f-workshop (with webinar attendance possible) with ETSI SmartM2M and possibly other organisations.
- (T0+05) Group Specification for a Context Information Management API (preliminary) together with a preliminary example data model (e.g. tourism)
- (T0+05) Group Specification for Data Publication platforms to support CIM-API required metadata.
- (T0+05) Group Specification of languages, processes and domains for data modelling
- (T0+07) Group Specification: First set of data models (e.g. mobility, participation, tourism)
- (T0+09) Group Specification for a Context Information Management API (v1.0)
- (T0+09) Group Specification: Second set of data models
- (T0+12) Group Specification: Third set of data models
- (T0+12) ISG CIM Review of Work and proposal to ETSI for next period
- (T0+18) Review of suitability of the Group Specifications and data models based on evidence gathered from (open source) software implementations
- (T0+22) If needed: Create and publish Version 2 of the Group Specifications based on the previous Review.
- (T0+24) ISG CIM Review of Work and (if needed) proposal to ETSI for next period

To maintain a tight focus, the ISG CIM will at the end of the first and of the second year make a review of its work and a proposal to ETSI on how to evolve the ISG CIM's future activities:

- terminate the ISG, or
- transfer the work and continue the activity in a (existing or new) ETSI Technical Body or other standards body, or
- continue the ISG CIM for an additional period with (potentially revised) Terms of Reference.

3. Collaboration with other bodies (both inside and outside ETSI):

In order to avoid duplication of work, close liaisons will be established with following organizations and initiatives. Concepts and specifications from these organizations and initiatives may be reused as appropriate. The ISG CIM regards IoT as one of the major sources of context data for smart applications and will therefore collaborate closely with ETSI TC SmartM2M and oneM2M. The work in ISG CIM will be partly based on OMA NGSI and W3C JSON-LD.

oneM2M

oneM2M specifies the Mca interface, used by applications as shown in Figure1.Therefore particularly close cooperation with oneM2M will be needed.

Additionally, where oneM2M considers use cases, ontology mapping, etc, which may be relevant to the scope of the ISG CIM, that work will be closely followed.

ETSI TC SmartM2M

It has ongoing work on the ontology structure named SAREF, as well as other activities which may relate to context information which would be considered as input for the ISG CIM.

OMA (http://openmobilealliance.org)

NGSI 9 and 10 specifications are abstract and define a common standard interface to manage multiple sources of context information about context entities, including but not limited to IoT data. It comprises functions enabling to register and retrieve the availability of Context Entities and/or Context Information, to update Context Information in accordance to a specified Context Information Model and Query for and subscribe to Context Information about Context Entities.

W3C

JSON-LD extends JSON, a serialization and messaging format, to serialize Linked Data (http://www.w3.org/TR/json-ld/)

Interactions with the Web-of-Things group (http://www.w3.org/WoT/) would particularly benefit enabling interoperability towards other systems.

OASC - Open and Agile Smart Cities (http://oascities.org)

OASC is a global initiative connecting cities, advocating standards, and sharing best practices. The vision is to create a Smart City market based on the needs of cities and communities.

This means first and foremost, to avoid vendor lock-in and thus boost competitiveness through openness and interoperability of systems. The ISG CIM will work closely with OASC when specifying Smart Cities Information Models.

FIWARE (https://www.fiware.org)

The Context Information Management API of FIWARE (FIWARE NGSI API) is based on the abstract OMA NGSI API and can itself be considered as a starting point for the CIM API RESTful binding. FIWARE NGSI API specifications[2] provide a RESTful binding and solve some gaps of the OMA NGSI 9 and 10 specifications[3]. They also bring support to Linked Data by using JSON-LD for representing the semantics of context information and their interrelationships.

It is hoped and expected that FIWARE specifications will evolve based on specifications of the CIM API defined under the ISG CIM, to align to the global community of ISG CIM Members and ISG CIM Participants. An open source reference implementation developed by the FIWARE Open Source community would help the ISG CIM to follow an implementation-driven approach by providing early feedback from developers to ISG CIM. However, such software development and testing is not in the scope of the ISG CIM because multiple alternative implementations of ISG CIM specifications (open source or not) will be possible.

European Data Portal (http://www.europeandataportal.eu)

As for Data Publication Platforms, ISG CIM aims to leverage the Data Catalogue Application Profile (DCAT-AP) for data portals in Europe, which is a specification based on the Data Catalogue (DCAT) vocabulary for describing public sector datasets in Europe. More information is available at https://joinup.ec.europa.eu/asset/dcat_application_profile/description

ISG CIM will in particular investigate how to adapt DCAT-AP to the needs of metadata required by the ISG, with a focus on the description of datasets linked to queries using the CIM API, thus providing the basis for publication of real-time open data.

Work will be backed by experience obtained with an open source data publication platform implementation like CKAN (see http://ckan.org/). However, multiple alternative implementations (open source or not) will be possible.

If required, the ISG CIM may decide to establish additional liaison relationships.

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[2] http://fiware.github.io/context.Orion/api/v2/latest/

[3] http://technical.openmobilealliance.org/Technical/release_program/docs/NGSI/V1_0-20120529-A/OMA-TS-NGSI_Context_Management-V1_0-20120529-A.pdf