

D6.3

Standardization Dissemination

Activities

Deliverable Report



NOTICE

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Authors	Mahesh Sooriyabandara, TREL
Reviewers	Ljupco Jorguseski (TNO)

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SUNSEED project

SUNSEED proposes an evolutionary approach to utilisation of already present communication networks from both energy and telecom operators. These can be suitably connected to form a converged communication infrastructure for future smart energy grids offering open services. Life cycle of such communication network solutions consists of six steps: overlap, interconnect, interoperate, manage, plan and open. Joint communication networking operations steps start with analysis of regional overlap of energy and telecommunications operator infrastructures. Geographical overlap of energy and communications infrastructures identifies vital DSO energy and support grid locations (e.g. distributed energy generators, transformer substations, cabling, ducts) that are covered by both energy and telecom communication networks. Coverage can be realised with known wireline (e.g. copper, fiber) or wireless and mobile (e.g. WiFi, 4G) technologies. Interconnection assures end-2-end secure communication on the physical layer between energy and telecom, whereas interoperation provides network visibility and reach of smart grid nodes from both operator (utility) sides. Monitoring, control and management gathers measurement data from wide area of sensors and smart meters and assures stable distributed energy grid operation by using novel intelligent real time analytical knowledge discovery methods. For full utilisation of future network planning, we will integrate various public databases. Applications build on open standards (W3C) with exposed application programming interfaces (API) to 3rd parties enable creation of new businesses related to energy and communication sectors (e.g. virtual power plant operators, energy services providers for optimizing home energy use) or enable public wireless access points (e.g. WiFi nodes at distributed energy generator locations). SUNSEED life cycle steps promise much lower investments and total cost of ownership for future smart energy grids with dense distributed energy generation and prosumer involvement.

Project Partners

1. TELEKOM SLOVENIJE D.D.; TS; Slovenia
2. AALBORG UNIVERSITET; AAU; Denmark
3. ELEKTRO PRIMORSKA, PODJETJE ZA DISTRIBUCIJO ELEKTRICNE ENERGIJE D.D.; EP; Slovenia
4. ELEKTROSERVISI, ENERGETIKA, MERILNI LABORATORIJ IN NEPREMISLNI D.D.; ES; Slovenia
5. INSTITUT JOZEF STEFAN; JSI; Slovenia
6. GEMALTO SA; GTOSA; France
7. GEMALTO M2M GMBH; GTOM2M; Germany
8. NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO; TNO; The Netherlands
9. TOSHIBA RESEARCH EUROPE LIMITED; TREL; United Kingdom

Project webpage

<http://www.sunseed-fp7.eu/>



Executive Summary

The SUNSEED project consortium recognizes the importance of standardisation. Therefore during the project duration it had carried out a number of activities related to standardisation: either ensuring the technologies developed are in line with the standards already in place or influenced the next generation of standards based on the SUNSEED experience.

This report includes:

- Standardisation activities which have been completed by the time this deliverable was completed. Notably efforts have been done in oneM2M and XMPP standards;
- Planned activities around standards intended to be carried out after the end of the SUNSEED project. Efforts will be made in the standardisations consortiums for the new standards for IoT and 5G technologies to include specifications to accommodate wide-area monitoring systems for power distribution networks such as the one tested in the SUNSEED project.

1 Introduction

1.1 Purpose and Scope of the Deliverable

Standardisation facilitates new integrated solutions and economies of scale. Standardisation was an important exploitation target of the project. This report presents the progress the partners in the SUNSEED consortium have made in the standardisation activities. Furthermore this report presents the standardisation strategy the planned for after the end of the SUNSEED project.

Section 2.1 includes details about the standards which were directly influenced by the SUNSEED partners: the XEP, 3GPP and OneM2M.

In Section 2.2 the partners outline their planned activities or recommendations for standardisation of SUNSEED technologies.

1.2 Acronyms

3GPP	The 3rd Generation Partnership Project (3GPP)
FAN	Flexible power Alliance Network
IoT	Internet of Things
OAuth	Open standard for authorization
OMA	Open Mobile Alliance
SPM	Synchro phasor measurement device
UMA	Unlicensed Mobile Access
WAMS	Wide Area Monitoring System
XEP	XMPP extension protocol
XMPP	Extensible Messaging and Presence Protocol

2 Standardisation

2.1 Completed activities

2.1.1 XEP

TNO has been the first to develop an open source implementation of the XMPP extension protocol standard (XEP) for IoT (<http://xmpp.org/extensions/xep-0347.html>). During this implementation TNO has reviewed this standard and proposed updates to this standard which have been accepted by the XEP standardization committee. (<https://github.com/joachimlindborg/XMPP-IoT/pull/7>). The open source implementation can be found at <http://tno-iot.github.io/ekster/>.

2.1.2 3GPP

TNO actively follows the development of Narrowband IoT (NB-IOT) in 3GPP. NB-IoT is a clean-slate technology (w.r.t. LTE) designed for the Internet of Things (IoT) applications. NB-IoT is part of 3GPP Release 13 finalized in June 2016. Mainly we follow the relevant standardization activities in 3GPP RAN1 group, who is leader of the NB-IoT work item and where the PHY layer of NB-IoT is being specified. We also follow corresponding standardization activities in 3GPP SA2 group (system architecture), RAN3 group (radio access architecture), and RAN 4 group (performance requirements). The technical specification of NB-IoT will be incorporated in existing LTE specifications. Interested readers may refer to the following two 3GPP technical reports for the outcome of 3GPP studies for NB-IoT:

- TR 45. 820, "Cellular system support for ultra-low complexity and low throughput Internet of Things (CIoT)".
- TR 23.720, "Study on architecture enhancements of cellular systems with support for ultra-low complexity and low throughput Internet of Things".

Within SUNSEED we have then compared the delay performance of the legacy LTE and the NB-IoT radio access specifications as defined in TS 36.201, TS 36.211, TS36.212, TS 36.213, and TS 36.300. The simulation analysis revealed 2-3 times longer delays for NB-IoT, for the same number of active nodes reporting smart grid measurements. This result was published in the SUNSEED deliverable D5.3.2.

Gemalto take part in standardization activities in RAN 2 working group (signalling protocols) in the and in 3GPP SA2 group, e.g.:

- R2-1700843 Measurement's in connected mode
- R2-166130 Mobility considerations for NB-IoT

2.1.3 OneM2M

As a new topic for oneM2M Release 2 (following Rel- 1 publication in 01/2015), Gemalto initiated a new Work Item on dynamic authorization scenarios for IoT (referred to as WI-0019) and provided several contributions (e.g. SEC-2015-0605R01 reviewing existing frameworks such as UMA and OAuth, or SEC-2015-0654R01 refining proposed scenarios) to this work item, which resulted in the production of a Technical Report investigating the topic (TR-0019, currently being finalized for publication) and in the inclusion of a flexible token based authorization framework in Release 2 of the oneM2M Security specification, TS-0003 . This work is also reflected in other oneM2M deliverables such as TS-0001 (Reference Architecture) and TS-0004 (Protocols). The Dynamic

authorization capabilities also served as the basis to standardize a Privacy Policy Manager functionality, which allows users to manage their privacy settings across multiple applications in an oneM2M system in a uniform manner.

The oneM2M work item on Dynamic Authorization was undertaken in conjunction with another Work Item, WI-0023 aiming at improving the oneM2M Release 1 authorization architecture and access control policies model. This other Work Item also benefitted from SUNSEED interactions which resulted in Release 2 support for Role-Based Access Control Policies and for flexible distribution of authorization architecture components such as Policy Reference Point, Policy Decision Point and Policy Enforcement points on oneM2M entities such as endpoint devices, intermediate gateways and infrastructure servers.

Overall, the oneM2M authorization architecture enhancements are expected to be a major selling point for Release 2, together with the support for semantics and interworking frameworks with other standards.

2.2 Planned activities

2.2.1 Toshiba

SUNSEED approach for utilising multiple metering devices over telecoms operators network will be presented to potential stakeholders to understand the standardisation requirements from the stakeholder's viewpoint. Efforts will be directed towards contributing to standards development organisations such as International Electrotechnical Commission (IEC) to understand the agenda for standardization and where possible influencing the work in the standards committee through disseminating know-how gained from the SUNSEED project. The IEC SC3D WG2 (within which Toshiba participate) develops standards related for defining common data dictionaries and interoperability between national and regional standards for defining product properties. This approach permits larger markets to be addressed with the same products, for instance global solutions that will conform to the needs of all Countries that participate within the IEC standards. The targeted exploitation within this group is to facilitate global interoperability for SUNSEED solution that make use of sensor and meter equipment (i.e. WAMS node, Smart meters and Communication Gateways (if applicable)). The size of this global market and other application domains offered by standardisation means that SUNSEED based solutions will present much more potential and interest if standardised.

2.2.2 GEMALTO

Gemalto continues to play an active role in the oneM2M Security Working Group. Following inclusion in Release 2 of a dynamic authorization framework enabling interworking with external authorization systems such as OAuth, Gemalto contributes to investigating authorization systems enhancements based on innovative security technologies such as Identity-Based Encryption (work item started for Release 3) and Blockchains. The release 3 security work in oneM2M is also expected to provide additional APIs for enrolment and authentication of devices in the system, and to call security services such as private key generation and signature from a security enclave in a device. oneM2M also projects to integrate GlobalPlatform technology within its management architecture to facilitate secure remote administration of security enclaves in M2M equipments.

Gemalto is also involved in 3GPP standardization for 5G. Its contributions are primarily related to the security aspects of 5G in standardization in the fields of network efficiency, power consumption and

security. Through its combined participations on security aspects in both oneM2M and 3GPP, Gemalto also plans to take an active role in the exposure of 5G network security features toward higher layers (M2M Application layer or oneM2M Service layer) through the SCEF (Service capability Exposure Function) feature currently being specified in 3GPP.

2.2.3 TNO

TNO is playing an important role in standardising the infrastructure interoperability in an uniform and open manner. For that, TNO provides the Flexible Power Application Infrastructure in SUNSEED. This infrastructure is developed within the Flexible power Alliance Network (FAN), which is an open industry alliance for the development and promotion of semantic (de facto) standards, with respect to communication of and communication with energy consuming and producing devices for end users. These standards will facilitate the emergence and use of energy services, on a uniform, accessible and cost-effective manner. The experiences and results of SUNSEED will be exploited within the FAN to improve the application infrastructure.

Within the SUNSEED project the following extensions were made to the FPAI and these are considered to become part of the FAN standards:

- 1) Addition of new profiles meant for measuring the energy consumption of a single or multiple devices
- 2) Addition of new profiles meant for measuring the power grid quality
- 3) Addition of new mechanisms to make profiles available to energy applications using IoT XMPP Publish/Subscribe mechanisms.
- 4) Alternative standards to communicate energy profiles and control commands based on XML descriptions

The FAN standards are available free of charge which leverages the use of these standards.

TNO is also active in IoT standardisation in oneM2M as well as in Broadband Forum on discovery and communication of home appliances via the residential gateway.

Finally, TNO is regularly following 3GPP standardisation, and more concretely 5G standardisation of the ultra-reliable and low-latency (URLLC) communication where future contributions are planned.

2.2.4 Telekom Slovenije

During standardization process of 5G, IoT will play an important part. Therefore, TS will follow the activities in 5G standardization to use the most appropriate methods of connecting the smart-meters and other smart devices in future 5G deployments. TS will also use experience from SUNSEED project in selecting appropriate standards for its future smart-grid projects. Among current IoT standards TS is looking into oneM2M from GSMA and lightweightM2M from Open Mobile Alliance (OMA) to stay compatible with future IoT solutions.

In terms of network convergence of telco and DSO's network, there should also be employed standardized procedures regarding the network itself and services available in it. As the convergence is also perceived as a service level integration, we suggest that ITIL practices should be considered. Since it is expected that converged telco & DSO network will be of substantial size, having good practices incorporated would mean predictable procedure for planning, building, (inter)operating, expanding and managing both the network and services in manner of managed services. Due to previous experiences, TS see such standardized approach as a helpful tool to stay compatible with future technological solutions and challenges as well.