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Smart Lifts IoT System

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Keywords
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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee SmartM2M to support the lift industry with a standard able to support seamless interoperability among the different lift solution to assure sector specific services (e.g. remote diagnostic and predictive maintenance) and the communication and the integrations with other sectors services and solutions (e.g. the integration of the Smart Lift with services from the building, access control and energy sectors, for the citizens and for e impaired people).

At the origin of this work there is a study [i.3] (ETSI TR 103 546 SmartM2M; Requirements & Feasibility study for Smart Lifts in IoT) developed with the collaboration of Smart Lift stakeholders and in particular with EFESME and ELA association.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

1 Scope

The present document specifies the IoT communication aspects for Smart Lifts (i.e. The Smart Lift System). It defines the elements involved in such communications and their relations, from the central cloud level to the Smart Lift installations, including the integration with administrative information, the integration of smart lift systems not conformant to this specification (non-standard and legacy installations), and the integration of application targeting human users.

The present document is intended to enable the use cases in [i.3] (ETSI TR 103 546 SmartM2M; Requirements & Feasibility study for Smart Lifts in IoT and more in general aiming to support all the major use cases and requirements in the context of Smart Lift. It deals with the architectural aspect of the communication and the set of information that is needed to assure interoperability across installations and platforms but is not specifying the specific applications that are using this information. These applications are left to the market together with the extended set of information that are specific of each technology and may differ across providers.

The Smart Lift System communication rely on existing specification that are referenced in the present document (i.e. the oneM2M specification suite), but the definition of the element and the information to be exchanged is kept independent from underlaying communication framework and technology, to minimize the impact of the evolution of the communication framework on the information managed by the smart lift.

This approach allows also the delegation of basic important functionality (e.g. security, management, use of different IT and telecommunication means, platforms and semantic interoperability support) to the underlaying communication framework, to evolve and adapt to the technology evolution without impacting directly the present document.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long-term validity.

The following referenced documents are necessary for the application of the present document;

[1] ETSI TS 103 264: "SmartM2M; Smart Applications; Reference Ontology and oneM2M Mapping";

NOTE: See also https://saref.etsi.org .

[2] ETSI TS 118 111: "oneM2M; Common Terminology (oneM2M TS-0011)";

[3] ETSI TS 118 102: "oneM2M Requirements (oneM2M TS-0002)";

[4] ETSI TS 118 101: "oneM2M; Functional Architecture (oneM2M TS-0001)";

[5] ETSI TS 118 104: "oneM2M; Service Layer Core Protocol Specification (oneM2M TS-0004)";

[6] ETSI TS 118 103: "oneM2M; Security solutions (oneM2M TS-0003)";

[7] ETSI TS 118 105: "oneM2M; Management Enablement (OMA) (oneM2M TS-0005)";

[8] ETSI TS 118 106: "oneM2M; Management Enablement (BBF) (oneM2M TS-0006)";

[9] ETSI TS 118 109: "oneM2M; HTTP Protocol Binding (oneM2M TS-0009)";

[10] ETSI TS 118 120: "oneM2M; WebSocket Protocol Binding (oneM2M TS-0020)";

[11] ETSI TS 118 112: "oneM2M; Base Ontology (oneM2M TS-0012)";

[12] ETSI TS 118 115: "oneM2M; Testing Framework (oneM2M TS-0015)";

[13] ETSI TS 118 113: "oneM2M; Interoperability Testing (oneM2M TS-0013)";

[14] ETSI TS 118 122: "oneM2M Field Device Configuration (oneM2M TS-0022)";

[15] oneM2M TS 0016: "Secure Environment Abstraction";

[16] ETSI TS 118 132: "MAF and MEF Interface Specification (oneM2M TS-0032)";

[17] oneM2M TS 0026: "3GPP Interworking";

[18] oneM2M TS 0030: "Ontology Based Interworking";

[19] oneM2M TS 0031: "Feature Catalogue";

[20] oneM2M TS 0033: "Interworking Framework";

[21] oneM2M TS 0034: "Semantics Support";

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[23] Void;

[24] ETSI TS 103 410 SAREF extensions;

NOTE: See also https://saref;etsi;org .

[25] ETSI TS 103 548 "SmartM2M: Guidelines for consolidating SAREF with new reference ontology patterns, based on the experience from the ITEA SEAS project";

[26] ISO 8601:2004; "Data elements and interchange formats -- Information interchange -- Representation of dates and times";

[27] EN 627:1995: "Specification for data logging and monitoring of lifts, escalators and passenger conveyors";

[28] EN 81.20:2020: "Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Part 20: Passenger and goods passenger lifts";

[29] EN 81.28:2018+AC2019: "Safety rules for the construction and installation of lifts. Lifts for the transport of persons and goods. Remote alarm on passenger and goods passenger lifts";

[30] Void;

[31] EN 81.31:2010 "Safety rules for the construction and installation of lifts. Lifts for the transport of goods only. Accessible goods only lifts";

[32] EN 81.41:2010: "Safety rules for the construction and installation of lifts. Special lifts for the transport of persons and goods. Vertical lifting platforms intended for use by persons with impaired mobility";

[33] Void;

[34] EN 81.72:2020: "Safety rules for the construction and installation of lifts. Particular applications for passenger and goods passenger lifts. Firefighters lifts";

[35] EN 81.73:2020: "Safety rules for the construction and installation of lifts. Particular applications for passenger and goods passenger lifts. Behaviour of lifts in the event of fire";

[36] EN 81.77:2018: "Safety rules for the construction and installations of lifts - Particular applications for passenger and goods passenger lifts - Part 77: Lifts subject to seismic conditions";

[37] ITU-T E.212: The international identification plan for public networks and subscriptions.

[38] ETSI TS 45.008 (3GPP TS 24.008) Radio subsystem link control.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] EFESME, www.efesme.org;

[i.2] ELA www.ela-aisbl.eu;

[i.3] ETSI TR 103 546 SmartM2M; Requirements & Feasibility study for Smart Lifts in IoT;

[i.4] onem2M TR 0001: "Use Cases Collection";

[i.5] oneM2M TR 0025: "Application Developer Guide";

[i.6] oneM2M TR 0035: "Device Management Use Case;

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[i.7] oneM2M TR 0045: "Implementing Semantics";

[i.8] Open oneM2M website, www.oneM2M.org;

[i.9] ISO 16484-5:2017, “Building automation and control systems (BACS) — Part 5: Data communication protocol”;

[i.10] oneM2M TR 0045: "Implementing Semantics";

[i.11] oneM2M TR 0008: "Security";

[i.12] oneM2M TR 0035: " Device Management using external management".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the following terms apply:

Application Dedicated Node: See [2];

Application Entity: See [2];

Application Service Node: See [2];

Capability Service Entity: See [2];

Smart Applications REFerence ontology: See [1];

Smart Lift Administrative Services: See clause 5 of the present document;

Smart Lift Applications: See clause 5 of the present document;

Smart Lift Communication Framework: See clause 5 of the present document;

Smart Lift Core Services: See clause 5 of the present document;

Smart Lift Edge Component: See clause 5 of the present document;

Smart Lift Edge Control Unit: See clause 5 of the present document;

Smart Lift Installation: See clause 5 of the present document;

Smart Lift Group: See clause 5 of the present document;

Smart Lift Interoperability Gateway: See clause 5 of the present document;

Smart Lift Functional Module: See clause 5 of the present document.

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ADN	Application Dedicated Node;
AE	Application Entity;
BCS	Bidirectional Communication System
ASN	Application Service Node;
CSE	Capability Service Entity;
IoT	Internet of Things;

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RTM	Real Time Mode;
SAREF	Smart Applications REFerence ontology;
SDT	Smart Device Template;
SLAPP	Smart Lift APPlication;
SLAS	Smart Lift Administrative Services;
SLCF	Smart Lift Communication Framework
SLCS	Smart Lift Core Services;
SLEC	Smart Lift Edge Component;
SLECU	Smart Lift Edge Control Unit;
SLI	Smart Lift Installation;
SLG	Smart Lift Group
SLIG	Smart Lift Interoperability Gateway
SLS	Smart Lift System;
SLSS	Smart Lift Support Service;
SLUS	Smart Lift User service;

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4 User roles and use cases

4.1 Overview of user roles

In the Smart Lift IoT System there are several type of user roles and there are three main categories:

- The users of the lift (the passengers) that could have different need
- The people and companies that work on the lift market
- The owner of the building or administrator of group of building

4.2 Description of user roles

Building owner

The owner of the building or a group of buildings.

Maintenance companies

The companies that are in charge of the maintenance of the lifts, with the organization to manage every problem that could be arise on the lift.

Maintenance technicians

The technicians of the maintenance companies, they are the people that work often on site to fix problems and perform maintenance-related activities.

Passengers without priority

The standard passenger of the lift.

Passengers with priority

All the other kind of passenger that could have priority to use the lift, e.g. disabled people, elderly people, etc.

Supplier technicians (in particular of the control cabinet)

The control cabinet is the brain of the lift, all the information is managed by the control cabinet; these are the technicians of the company that manufactured the control cabinet.

Control room operator

People located in a (usually remote) control room, whose task is to supervise and control the operations of lifts or group of lifts.

4.3 Use cases

The Smart Lift IoT system is designed to be futureproof respect to service innovation and evolution. Some examples are provided in section 6 of document [i.3] (ETSI TR 103 546 SmartM2M; Requirements & Feasibility study for Smart Lifts in IoT) and are a non-exhaustive list of the ones considered during the current document development.

5 Smart Lift System IoT architecture and supported configurations

5.1 Smart Lift System IoT architecture

The Smart Lift System is the composition of the lift installations and the entities that supports their remote communication and control within a Smart Lift administrative domain. The Smart Lift administrative domain corresponds to a provider of services for the Smart Lifts: a consortium, an association, a maintenance company, a building management company, etc.

The Smart Lift System shall enable the exchange of information and the sharing of services with other Smart Lift Systems based on agreements between their respective providers. This functionality is supported via the communication framework and it is enabled by the oneM2M system as specified in clause 8. The Communication framework may be shared by Multiple Smart Lift Systems.

The current document deals with the IoT communication aspects. It models and specify the components and the exchanges of information required to assure a proper interoperability among the Smart Lift Systems. It does not intend to specify a detailed model of the whole lift components, that typically differs based on technology, manufacturer and installation characteristics. To support the IoT related communications related to these aspects, the SLS supports means to provide flexible and exchange and historization of information among the SLS entities. Some example of use are referenced in clause 4.3 of the current document.

The following picture illustrate the Smart Lift system and the interconnection of its entities.

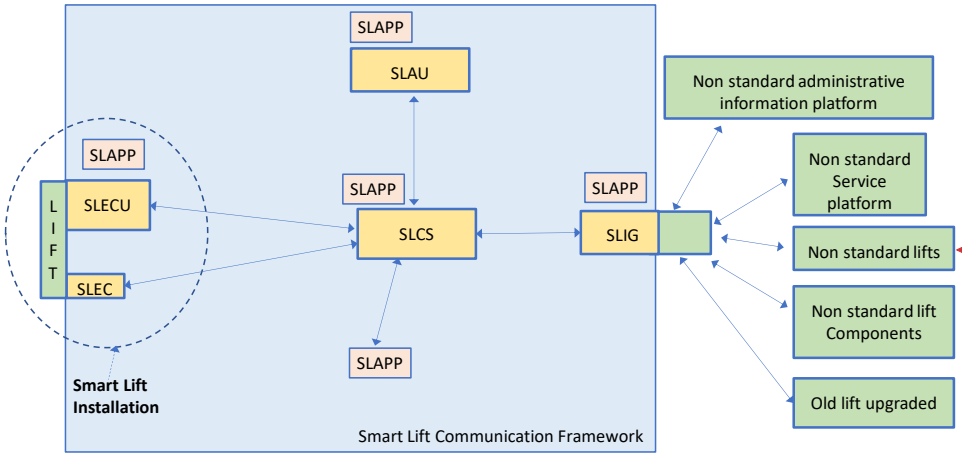

Figure 5.1-1: Smart Lift Systems IoT Architecture

The **Smart Lift System (SLS)** is composed by:

- The **Smart Lift Installation (SLI),** that is composed by:
  - A **Smart Lift Edge Control Unit (SLECU)**, that it is the main element of a SLI and it is typically associated with the lift control cabinet; It host the different SL modules (e.g. the faults signals, the bidirectional Communication systems, etc). The Smart Lift Edge Control Unit takes care of interfacing the

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lift and communicating with the rest of the Smart Lift System via the Bidirectional Communication Module. At the level of oneM2M Communication Framework it maps typically to a ADN (Application Dedicated Node), but it may map also with an ASN (Application Service Node) or a MN (Middle Node) when it hosts additional services or when it shares its communication capabilities with other lift components.

- The SLI may also include several **Smart Lift Edge Component (SLEC)**, dedicated to the hosting of SL additional modules in the case that they are not hosted directly in the SLECU. An example could be the case of an additional earthquake sensor added after the lift deployment and not controlled by the SLECU. At the level of oneM2M Communication Framework it typically maps with an ADN (Application Dedicated Node).

- the **Smart Lift Administrative Unit (SLAU)**, that copes with Smart Lift non-technical information such as the legal owner of the lift, the manager of the building where the lift is installed, the address of installation, etc. At the level of oneM2M Communication Framework it maps with an (Application Dedicated Node) or an ASN (Application Service Node) with one or more AE (Application Entity).

- the **Smart Lift Core Service Support (SLCS), that enables the communication, the data management, the data historization and hosting of the core applications.** At the level of oneM2M Communication Framework the SLCSS maps with the INfrastructure Service Capability Entity (IN-CSE).

- the **Smart Lift Interoperability Gateway (SLIG)**, that takes care of interfacing with non-standard solutions (legacy systems). It may collect information and communicate with existing lifts and administrative units and exchange them with the standard Smart Lift Systems, allowing the Smart lifts Systems to provide services in relation to standard Smart Lift and non-standard legacy lifts. At the level of Communication Framework. It maps with the Interworking Proxy Entity (IPE) defined by oneM2M, a specialized Application Entity (AE) that allows the oneM2M system to interact with any non-oneM2M system, in a seamless way. The non-standard solutions include non-standard administrative platform, non-standard service platforms and non-standard lifts. The non-standard lifts include legacy lifts and older retrofitted lifts. Retrofitted lifts include single control unit lifts as well composed solutions where the supported subset of the signals, alarms, faults, commands and information are detected/actuated separately, sharing only the communication module.
  Each non-standard lift is seen and treated by the system as a standard Smart Lift Installation, and the SLG has the task to perform the interworking and hide the composition of the installation.

- the **Smart Lift Communication Framework (SLCF)**, which supports the communication, the security and the management of the Smart Lift system. It also supports historization of the exchanged information (command, signals etc.).

- The SLS also include **Smart Lift Applications (SLAPP**) that concours to provide the services required by the users, that at the level of the communication framework map to Application Entity(s) (AEs). These AE(s) represents the intelligent services and their clients distributed on the communication framework. Some examples are the predictive maintenance applications, the administrative data applications, the client application in the end of the maintenance operators, etc.
  The present document currently do not specify these applications, but it identifies the following differentiation:
  - The **Smart Lift Support Services (SLSS)** that are the "intelligent" engines that create the services and hosts the more complicated data elaborations.
  - **The Smart Lift User Services (SLUS)** that are typically the clients in the hands of the consumers of the services, including both humans and machines users.

The SLS includes also the concept of **Smart Lifts Group (SLG)**, by introducing the identification of SLI groups. This is not an architectural element in the architecture, it represents the correlation of multiple SLI and it is supported by the introduction of a Smart Lift Group identifier common each SLI belonging to the same Smart Lift Group. Such kind of installations usually presents control units connected one each other to coordinate the movement and position of the different lifts, where the common commands (e.g. the call buttons) are given to one of these control units that acts as a principal master and coordinates the other installations or is composed by peer installations that coordinates one each other. In the latter case the command may be sent to all installations belonging to the group.

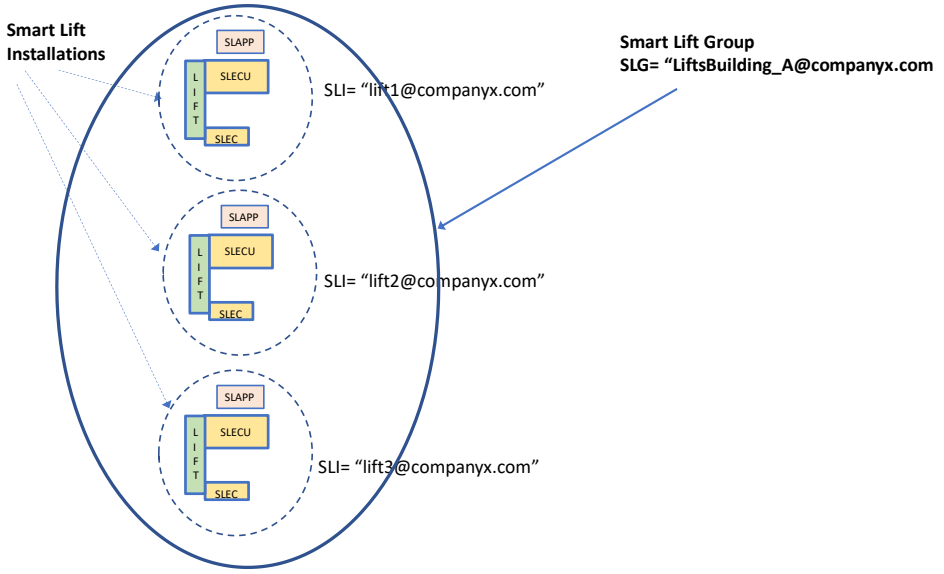

Figure 5.1-2: Smart Lift Group concept

5.2 Supported deployment configurations and numerosity

As described in clause 5.1, the concept of a SLI in the SLS system corresponds to a single lift, with all its elements. The major element in a SLI, from the point of view of the IoT communication aspects, is the Smart Lift Edge Control Unit that is typically associated with the control panel of the lift. As an example, other components may be the alarm management, the power supply system, etc.

Typically, each SLI is connected uniquely with the rest of SLS, so that the SLECU and the SLEC share the same connection hosted in the SLECU (usually the bidirectional Communication System). Other common cases include the one where some SLEC of a lift communicate directly and independently with the rest of the SLS (e.g. the case of additional vibration sensors intended for predictive maintenance or for earthquake detection, installed independently form the control unit).

In the case multiple installations at the same premises (e.g. a building or industrial plant), it is also common the case of a Bidirectional Communication System. SLEC shared among multiple lifts (i.e. multiple SLI).

From the IoT point of view it is important to identify the edge endpoints of these communication channels between the SLI and the rest of the SLS. For a typical installation all the communications go through the Bidirectional Communication System, but as described in the previous paragraphs, it exits also the case of SLEC communicating independently, for this case is introduced also the concept of Communication Module, to cope with communication non-managed by the main Bidirectional Communication System.

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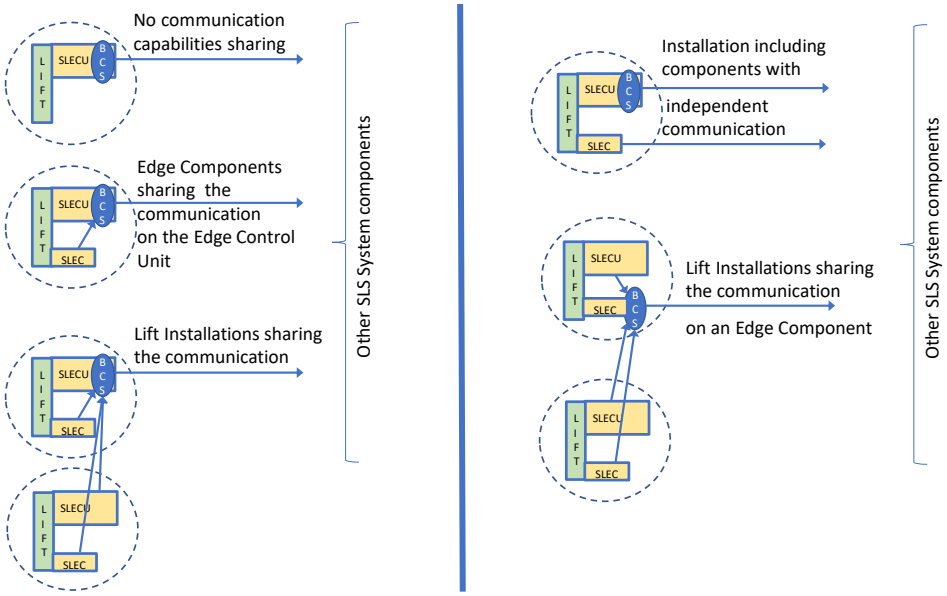

Figure 5.2-1: Smart Lift deployment cases

The concepts of SLI and SLG are not architectural elements and are represented in the SLS by identifiers, so they do not correspond to API, they are carried by the SLS API to allow the correlation of the information across these concepts.

The following table clarify the numerosity relation among the of the SLS architectural elements. Such numerosity relation are intended to be mapped on the oneM2M Communication framework to support the related API identification in the context of the

Table 5.2-1: SLS elements numerosity relations

	SLAPP	SLEC	SLECU	SLIG	SLAU	SLCS	Non Standard Lift Installations
SLAPP			N←→1	N←→1	N←→1	N←→1	
SLEC		Only connectivity	Only connectivity			N←→1	
SLECU			Only connectivity			N←→1	
SLIG						N←→1	Not part of the current document
SLAU					Not part of the current document	N←→1	
SLCS						N←→N	
Non Standard lifts Installations							Not part of the current document

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5.3 SLS mapping one oneM2M Entity and reference points (API)

The element of the SLS make use of oneM2M specification to support communication and interoperability. OneM2M specification are formally and normatively referenced in section 6, while more information and tutorials are available on the oneM2M website www.oneM2M.org [i.8]. For a correct understanding of the oneM2M use in the contest of the present documents, it is recommended to start becoming familiar with the oneM2M architecture and following oneM2M concepts:

- Nodes: AND, ASN, IN
- Entities: AE, CSE, IPE
- Reference points/API: Mca, Mcc, Mcc'

The following picture provide an example of association between SLS elements and the oneM2M Entities with the oneM2M relevant reference points.

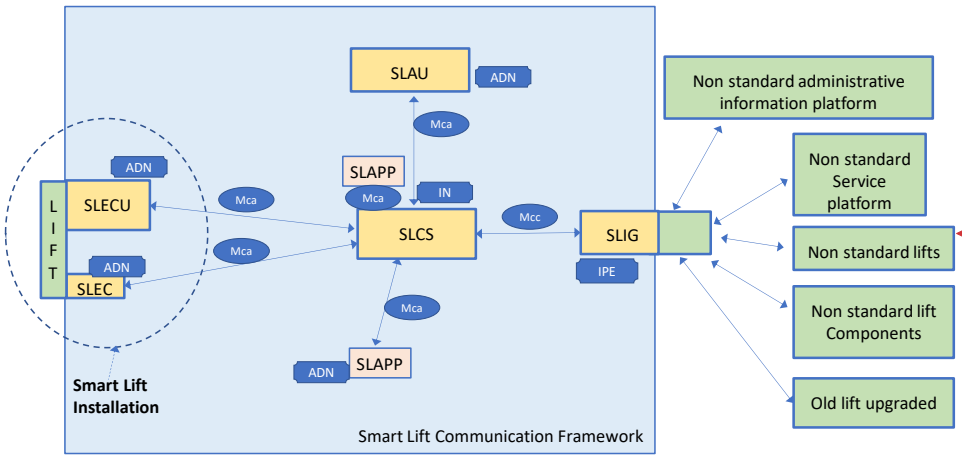

Figure 5.3-1: Smart Lift deployment cases

The provided example is quite complete and supports all use case references in clause 4.3. Additional cases and implementation choices are possible in a very flexible architecture like the one of oneM2M.

To assure interoperability, the SLS elements shall comply to the mappings identified in the following Table 5.3-1 the cells at the crossing of the header rows and header columns indicates the oneM2M reference point to be applied, the header column contains the indication of the SLS entity and the corresponding oneM2M node mapping.

Table 5.3-1: Mapping of SLS on oneM2M elements and reference points

Header row and column	SLAPP	SLEC	SLECU	SLIG	SLAU	SLCS	Non Standard Lift Installations
SLAPP ADN			Mca	Mca	Mca	Mca	
SLEC ADN		Only connectivity bridging	Only connectivity bridging			Mca	

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SLECU ADN (or ASN)			Only connectivity bridging			Mca (or Mcc for ASN)	
SLIG ADN (or ASN) with IPE						Mca (or Mcc for ASN)	
SLAU ADN (or ASN)						Mca (or Mcc for ASN)	
SLCS IN						Mca (intra oneM2M domain) Or Mcc' (inter oneM2M domains)	
Non Standard lifts Installations							

5.4 Security, privacy and cybersecurity support

The security of the Smart Lift System is assured by the communication framework (the oneM2M system) referenced in clause 8. The oneM2M system provide a complete solution for modular security (communication, identification, etc.) and flexible granularity of data access control (access control via identifiers, roles, tokens, etc.). Please refer to the oneM2M system specifications, in particular [6] (oneM2M TS-0003: oneM2M; Security solutions). Additional information about security in oneM2M are available at the oneM2M website [i.8] and some of the security use cases supported are described in [i.11] (oneM2M TR-008: Security).

These capabilities empower the Smart Lift System with the ability to satisfy privacy and cybersecurity needs from the market and from the regulation authorities.

5.5 Management support

The management of the components of the Smart Lift System, in particular the remoted components at the edges of the systems, is assured by the communication framework (the oneM2M system) referenced in clause 8, with specific attention to [8] (oneM2M TS006; Management Enablement (BBF)) and [7] (M2M TS-0005; Management Enablement (OMA)). Additional information about the management support in oneM2M are available at the oneM2M website [i.8] and in [i.12] (oneM2M TR-0035: Device Management using external management).

The oneM2M system provide a flexible solution for management including function such as security configuration and SW updates

6 Configuration, signals, alarms, faults, commands and other Smart Lift information

6.1 Introduction

Clause 6 contains the data to be exchanged by Smart Lift System across its components and with external components from other systems. It has been developed to support the lift industry with a standard capable to provide seamless interoperability among the different lift solution, to assure support for sector specific services (e.g. Smart Lift remote diagnostic and predictive maintenance), and to exchange information with services and solutions belonging to other sectors (e.g. with services in the building, with access control and energy monitoring services, with services for the citizens and for impaired people).

It has been developed with the consultation of Smart Lift stakeholders and their associations, and it is based on the study ETSI TR 103 546 SmartM2M; Requirements & Feasibility study for Smart Lifts in IoT) [i.3]. The Smart Lift System is making use of oneM2M communication framework (see clause 8 of the present document).

The information modules described in table of this clause 6 represent sets of information to be exchanged within the SLS components. Each SL information module represent a group of correlated information that model of certain functional behaviour of the SLI. All together these modules build the digital representation of the SLI in the SLS, i.e. the SLI digital twin of the Smart Lift in the system. Most of the modules are information that are originated-by or target-to the SLI, some modules (the Administrative information) are originated-by or target-to the Administrative Unit.

With respect to the information modules identified in the tables in this clause 6.1 of the current document:

- the SLI shall provide all the mandatory (M) elements to other components of the SLS;
- the SLI shall provide all the mandatory-when-available (MWA) elements to the other components of the SLS if these elements are available in the SLI;
- the SLI may provide all the optional (O) elements to the other components of the SLS;

- the SLAU shall provide all the mandatory (M) elements to other components of the SLS;
- the SLAU shall provide all the mandatory-when-available (MWA) elements to the other components of the SLS if these elements are available in the SLAU;
- the SLAU may provide all the optional (O) elements to the other components of the SLS;

- the SLIG shall provide all the mandatory (M) elements to other components of the SLS;
- the SLIG shall provide all the mandatory-when-available (MWA) elements to the other components of the SLS if these elements are available in the SLIG;
- the SLIG may provide all the optional (O) elements to the other components of the SLS;

- the SLCS shall support all the mandatory (M) elements;
- the SLCS should support all the optional (O) elements.

The Smart Lift is put in an automation context and it is relevant to consider the interoperability with other correlated system interacting with the Smart Lifts. In such a context the interoperability with the building automation system are particularly relevant. Such interworking cases are already partially covered by SAREF [24][25]specifications Suite and oneM2M interoperability capabilities, and may be subject to future extension of the present document (a technical specification TS 103 735). Some initial informational indications regarding the semantic mapping of the SLS is given respect ISO 16484-5 [i.9] specifications.

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6.2 Smart Lift installation identification

Table 6.2-1: Information group name: SmartLiftInstallationIdentification

Information	Type	SLI / SLIG	SLAU	SLCS	Description
SLIUniversalIdentifier	It is composed by a String build as the concatenation of the following: • the keyword "lift" • the separator "." • a string representing a unique identifier within the assigning entity • the separator "@" • a string representing the domain of the assigning entity The total maximum length is 64 characters	M	M	M	Globally unique identifier for the lift The assignment is made by an entity responsible for the lift (e.g. the manufacturer, the installation or the maintenance company, the owner, a lift consortium, etc). It is potentially subject to changes during the lifetime of the lift (e.g. changing of ownership or changing of maintenance company). Examples: lift.1415@company1.com; lift.568999@organization1.org; lift.A1.buiding.135@company2.com; Note: Peer concept in ISO 16484-5 [i.9]: Object_Identifier.
groupUniversalIdentifier	It is composed by a String build as the concatenation of the following: • the keyword "group" • the separator "." • a string representing a unique identifier within the assigning entity • the separator "@" • a string representing the domain of the assigning entity The Total maximum length is 64 character	M when the lift belongs to a lift group	M when the lift belongs to a lift group	M	Globally unique identifier for the group of SLI. The assignment is made by an entity responsible for the lift (e.g. the manufacturer, the installation or the maintenance company, the owner, a lift consortium, etc). It is potentially subject to changes during the lifetime of the lift (e.g. changing of ownership or changing of maintenance company). Examples: group.1415@company1.com; group.lift.568999@organization1.org; group.lift.A1.buiding.135@company2.com; Note: Peer concept in ISO 16484-5 [i.9]: Elevator group.

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Deleted: The SLCU, the SLEC, the SLCS and the ASIG, as well the Smart Lift Applications, shall be identified by their respective oneM2M identifiers, i.e. the AE and CSE identifiers; the SLI and the SLI group identifiers are specified in the following table.Table 6.2-1 Information group name: SLIIdentification

6.3 Administrative Information

Table 6.3-1: Information group name: AdministrativeInformation

Information	Type	SLIG	SLAU	SLCS	Description
liftManufacturingCompanyRepresentitive	String (max 64 characters)	M	M	M	E.g. the local representative of the manufacturing company. Note: Peer concept in ISO 16484-5 [i.9]: Profile_Name.
liftInstallerCompany	String (max 64 characters)	M	M	M	E.g. the representative of the installer company. Note: Peer concept in ISO 16484-5 [i.9]: inclusion in Description Property.
liftMaintenanceCompany	String (max 64 characters)	M	M	M	E.g. the representative of the maintenance company. Note: Peer concept in ISO 16484-5 [i.9]: inclusion in Description Property.
liftLegalOwner	String (max 64 characters)	M	M	M	E.g. the building owner or the building rental party. Note: Peer concept in ISO 16484-5 [i.9]: inclusion in Description Property.
buildingManager	String (max 64 characters)	M	M	M	E.g. the building administration. Note: Peer concept in ISO 16484-5 [i.9]: inclusion in Description Property.
liftAlarmMonitoringCentre	String (max 64 characters)	M	M	M	The monitoring centre of the alarms: user alarms from cars and periodic checks of the bidirectional communication system. Note: Peer concept in ISO 16484-5 [i.9]: inclusion in Description Property.
inspectionAuthority	String (max 64 characters)	M	M	M	The Authority that is entitled to periodically inspect the lift installation and certify its suitability for the intended use. Note: Peer concept in ISO 16484-5 [i.9]: inclusion in Description Property.
geographicLocation	String (defined according to ISO 6709 formats)	M	M	M	Geographic Location where the lift is installed.

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					Note: Peer concept in ISO 16484-5 [i.9]: Profile Location.
geographicLocationValidator	String (max 64 characters)	MWA	MWA	M	Name of who has provided the validation of the correctness of Geographic Location.
typeOfUse	It is defined by one of the following String values: LIFT GOODS LIFT GOODS ONLY LIFT LIFT PLATFORM FIREMAN LIFT OTHER	MWA	MWA	M	Used according the applicable normative. In UE and other applicable countries shall be one of the following: LIFT: EN81.20 [28]; GOODS LIFT: EN81.20 [28]; GOODS ONLY LIFT: -EN81.31 [31]; LIFT PLATFORM: EN81.41 [32]; FIREMAN LIFT: EN81.72 [34]; OTHER: when it the other defined cases do not apply. Note: Peer concept in ISO 16484-5 [i.9]: inclusion in Object Type.

6.4 Smart Lift Installation

Table 6.4-1: Information group name: SLInstallation

Information	Type	SLI	SLIG	SLCS	Description
technologyUsed	It is defined by one of the following String values: ELECTRICAL ELECTRICAL MRL HYDRAULIC HYDRAULIC MRL	M	M	M	It provides an indication of the principle of functioning of the elevator. Note: Peer concept in ISO 16484-5 [i.9]: Tags.

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	OTHER				
liftManufacturer	String (max 64 characters)	M	M	M	Name of the company that manufactures the lift. (max 64 characters) Note: Peer concept in ISO 16484-5 [i.9]: inclusion in Description Property.
plateInformation	String (max 64 characters)	MWA	MWA	M	Usually also inscribed on a plate attached to the lift car. Note: Peer concept in ISO 16484-5 [i.9]: inclusion in Description Property.
groupConfiguration	It is defined by one of the following String values: MASTER SECONDARY PEER NOGROUP	O (M in case the SLI is part of a SLG)	O (M in case the SLI is part of a SLG)	M	MASTER: the SLI is part of an SLG and it acts as master SLI for the common capabilities; SECONDARY: the SLI is part of an SLG and it acts as depends form the master SLI for the common capabilities; PEER: the SLI is part of an SLG and composed by peers SLI respect to the common capabilities; NOGROUP: the SLI is not part of an SLG and composed by peers SLI; Note: Peer concept in ISO 16484-5 [i.9]: Group_Members.
carStops	Integer (range 0 .. 9999)	M	M	M	Number of car stops.
doorsNumber	Integer (range 0 .. 10)	M	M	M	Number of doors in the lift. Note: Peer concept in ISO 16484-5 [i.9]: Car_Door_Text.
carServices	Integer (range 0 .. 9999)	M	M	M	Number of car services, taking care of the case where the car has multiple doors that give independent access to different locations on a given floor. It is expected to be greater or equal to the number of Car Stops.

carloadLimit	Integer (range 0..99999)	M	M	M	Limit load to be safely carried by the car. This is a design parameter. The load is expressed in kg.
emergencyCallSupport	Boolean (TRUE/FALSE)	M	M	M	TRUE if emergency call support is available on the lift. Typically mandatory in new lifts but may be lacking in old installations.
mainPowerSupply	It is defined by one of the following String values: 3-PHASE SINGLE-PHASE	M	M	M	Set accordingly to the kind of power supply, 3-phase or single-phase
powerSupplyVoltage	Integer	M	M	M	Measured in Volts. Examples: 380v, 220v, 110v, etc.
valueOfStandardPowerSupply	Integer	M	M	M	Measured in Volt Examples: 12v, 24v, 48v, etc.

6.5 Smart Lift General Configuration

Table 6.5-1: Information group name: SLConfiguration

Information	Type	SLI	SLIG	SLCS	Description
carServicesDescription	Array (range 0..carServices) of type typeCarService	M	M	M	It provides configuration of the lift at a given service (the correspondent car stop and door opening configuration).
floorNames	Array (range 0.. carStops) of Strings. Each element has a maximum length of 5 characters.	M	M	M	It provides the link between the car stop and the corresponding floor name. the index indicates the car stop.

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					Note: Peer concept in ISO 16484-5 [i.9]: Floor_Text.
openDoorTime	Integer (range 1..100)	M	MWA	M	Measured in Seconds. .
closeDoorTime	Integer (range 1..100)	M	MWA	M	Measured in Seconds.
travelTime	Integer (range 1..100)	M	MWA	M	Measured in Seconds. Note: Peer concept in ISO 16484-5 [i.9]: Time Delay of the elevator object.
realTimeModeDescriptor	String	O	O	M	HTTP address of publicly available Json or XML description of the data sent form the SLI or the IG to the SLCS when the real time mode is activated.

Definition of CarService

	Elements	**Type**	Description
typeCarService	carStop	Integer (range 0..carStops)	It indicates a specific stop
	doorStatus	Array of Boolean (TRUE/FALSE) (range 1..doorsNumber)	TRUE indicates that indicates that the corresponding port identified by the array index is open at the given stop. FALSE indicates that the port is closed.

6.6 General Signals

Table 6.6-1: Information group name: GeneralSignals

Information	**Type**	**SLI**	**SLIG**	**SLCS**	**Description**
currentCarStop	Integer (range 0..9999)	M	MWA	M	Note: Peer concept in ISO 16484-5 [i.9]: Car Position.
currentCarService	Integer (range 0..9999)	M	MWA	M	

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movingUpwardDirection	Boolean (TRUE/FALSE)	M	MWA	M	TRUE when the car is moving upward. Note: Peer concept in ISO 16484-5 [i.9]: Car_Moving_Direction.
movingDownwardDirection	Boolean (TRUE/FALSE)	M	MWA	M	TRUE when the car is moving downward. Note: Peer concept in ISO 16484-5 [i.9]: Car_Moving_Direction
carInUnlockingZone	Boolean (TRUE/FALSE)	M	MWA	M	TRUE when the car position enables door opening. Note: Peer concept in ISO 16484-5 [i.9]: Car_Door_Zone.
doorStatus	Array [1..10] of TRUE/FALSE	M	MWA	M	The Boolean at each position in the array is TRUE if the corresponding door is open. Doors are typically identified by a letter. Door status [1] corresponds to door A, door status [2] corresponds to door B, etc. Note: Peer concept in ISO 16484-5 [i.9]: Car_Door_Status.
Overload	Boolean (TRUE/FALSE)	M	MWA	M	TRUE indicates a condition of overloading in the car.
detectedLoad	Boolean (TRUE/FALSE)	M	MWA	M	TRUE when a load is sensed in the car. Typically, when at least one person is in the car. Note: Peer concept in ISO 16484-5 [i.9]: Car_Mode.

6.7 Status Signals

Table 6.7-1: Information group name: StatusSignals

Information	Type	SLI	SLIG	SLCS	Description
outOfService	Boolean (TRUE/FALSE)	M	MWA	M	TRUE when the lift is in out of service state.

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					Note: Peer concept in ISO 16484-5 [i.9]: Out_Of_Service and Car_Mode.
inspectionOperation	Boolean (TRUE/FALSE)	M	MWA	M	TRUE when the lift is subject to inspection operation by the maintenance technician. Note: Peer concept in ISO 16484-5: Car_Mode.
fireOperation	Boolean (TRUE/FALSE)	M	MWA	M	TRUE when the lift is subject to fire operation. In UE and other applicable countries shall be used according to EN81.73 [35] (EN81.77 [36] for anti-seismic lifts). Note: Peer concept in ISO 16484-5: Car_Mode.
testRideInExecution	Boolean (TRUE/FALSE)	M	MWA	M	TRUE if the test ride is in execution. Note: Peer concept in ISO 16484-5 [i.9]: Car_Mode.
reservedService	Boolean (TRUE/FALSE)	M	MWA	M	TRUE when the reserved operation is on run. Today it is typically related to the use of a key or a proximity badge to reach a specific floor(s) or service(es). Some examples of reserved operation are the access to a hotel guest to the room floor, of the housekeeper to a floor (or a service door) to access a personnel-only area, the access of surgical room area in a hospital, etc. Note: Peer concept in ISO 16484-5 [i.9]: Car_Mode.
realTimeMode	Boolean (TRUE/FALSE)	O	O	M	TRUE when the real time mode is active

6.8 Statistic Signals

Table 6.8-1: Information group name: StatisticSignals

Information	Type	SLI	SLIG	SLCS	Description
numberOfCalls	Integer	M	MWA	M	Total counter from the last reset.

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					Note: Peer concept in ISO 16484-5 [i.9]: historyPeriodic.
upwardTravels	Integer	M	MWA	M	Total counter from the last reset. Note: Peer concept in ISO 16484-5 [i.9]: historyPeriodic.
downwardTravels	Integer	M	MWA	M	Total counter from the last reset. Note: Peer concept in ISO 16484-5 [i.9]: historyPeriodic.
totalFloorsCovered	Integer	M	MWA	M	Total counter from the last reset. Note: Peer concept in ISO 16484-5 [i.9]: historyPeriodic.
numberOfResetSequences	Integer	M	MWA	M	Total counter from the last reset. Note: Peer concept in ISO 16484-5 [i.9]: historyPeriodic.
totalReversalDirection	Integer	M	MWA	M	Total counter from the last reset. Note: Peer concept in ISO 16484-5 [i.9]: historyPeriodic.
totalNumberOfOpeningOfDoor	Integer	M	MWA	M	Total counter from the last reset.
callsPerService	Array [1..Number of car services] of integers	M	MWA	M	Total counter from the last reset. The index is the corresponding car service.
carTemperature	String (6 characters) representing 3 digit and two decimals separated by the character "."	M	MWA	M	Measured in Celsius. Expected maximum error +- 1 degree Celsius. The temperature shall be reported immediately in case of the detection of unexpected conditions. In case of normal condition, it shall be reported with a periodicity of between 3 and 10 minutes. Note: Peer concept in ISO 16484-5 [i.9]: Zone_Temp.
engineRoomTemperature	String (6 characters) representing 3 digit and two decimals separated by the character "."	M	MWA	M	Measured in Celsius. Expected maximum error +- 1 degree Celsius.

					The temperature shall be reported immediately in case of the detection of unexpected conditions. In case of normal condition, it shall be reported with a periodicity of between 3 and 10 minutes. Note: Peer concept in ISO 16484-5 [i.9]: Zone_Temp.
shaftTemperature	String (6 characters) representing 3 digit and two decimals separated by the character "."	M	MWA	M	Measured in Celsius. Expected maximum error +- 1 degree Celsius. The temperature shall be reported immediately in case of the detection of unexpected conditions. In case of normal condition, it should be reported with a periodicity of between 3 and 10 minutes. Note: Peer concept in ISO 16484-5 [i.9]: Zone_Temp.
three-phasePowerConsumption	Integer	O (M when Three Phase power is present)	MAW	M	Measured in kWh. Total counter from the last reset. Note: Peer concept in ISO 16484-5 [i.9]: Energy_Meter.
single-phasePowerConsumption	Integer	O (M when single Phase power is present)	MAW	M	Measured in kWh. For lifts with both three-phase and single-phase power it provides the power consumption for the services in the lift (e.g. the car lights). For lifts with single-phase power if provides the total power consumption of the lift. Note: Peer concept in ISO 16484-5 [i.9]: Energy_Meter.
servicesPowerConsumption	Integer	MAW	MAW	M	Measured in kWh. In case of Single-phase power lifts, it provides the power consumption for the services in the lift (e.g. the car lights). Note: Peer concept in ISO 16484-5 [i.9]: Energy_Meter.

realTimeInformation	String	O	O	M	When Real Time Mode is activated, the information provided shall be sent to the SLCF. Such information are not specified in the current document, but shall comply with the descriptor provided in the real Time Mode Descriptor

6.9 Fault Signals

Table 6.9-1: Information group name: FaultSignals

Information	Type	SLI	SLIG	SLCS	Description
faults	Array of Fault (max 9999 elements)	M	MWA	M	The index indicates the sequence of the faults from the last reset. Note: Peer concept in ISO 16484-5 [i.9]: Fault_Signals.
floodInTheWell	Boolean (TRUE/FALSE)	M	MWA	M	TRUE if a flood has been detected (not present in EN627 [27]). Note: Peer concept in ISO 16484-5 [i.9]: an instance LIFT_SHAFT_DEVICE_FAULT.

DEFINITION OF FAULT

Fault is defined by the fault code and the time of recording of the fault on the recording machine in the lift.

	Elements	Type	Description
Fault	faultCode	In UE and other applicable countries shall be set as defined in EN627[26]	E.g.: “01xx” broken security chain.
	timeUTC	String representing time according to ISO 8601 [27] Complete Representation Basic Format as described here: YYYYMMDDThhmmss,ssssss The String shall not include the Time Zone: Time shall be interpreted as being in UTC.	Time of the recording machine in the lift.

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6.10 General Commands

Table 6.10-1: Information group name: GeneralCommands

Information	Type	SLI	SLIG	SLCS	Description
sendCarToSpecificService	It is defined by one of the following String values: 0.. carServices READY	M (the execution of the command may be inhibited in some installations)	MWA	M	0..n to call the car to a specific service. The command shall be set to READY at bootstrap and after the execution the command.
setOutOfService	It is defined by one of the following String values: OUT_OF_SERVICE READY	M (the execution of the command may be inhibited in some installations)	MWA	M	OUT_OF_SERVICE to set the lift in Out of Service mode. The command shall be set to READY at bootstrap and after the execution the command.
testEmergencyNumber	It is defined by one of the following String values: START READY	M	MWA	M	START to test emergency number. The command shall be set to READY at bootstrap and after the execution the command.
mainBoardReset	It is defined by one of the following String values: START READY	M (the execution of the command may be inhibited in some installations)	MWA	M	START to initiate the board reset. The command shall be set to READY at bootstrap completion.
testRide	It is defined by one of the following String values: START READY	M (the execution of the command may be inhibited in some installations)	MWA	M	START to test emergency number. The command shall be set to READY at bootstrap and after the execution the command.

setRealTimeMode	It is defined by one of the following String values: START STOP READY	O	O	M	START to begin the real time mode. STOP to stop the real time mode. The command shall be set to READY at bootstrap and after the execution the command.

6.11 Real Time Mode Signals

Table 6.11-1: Information group name: RTMSignals

Information	Type	SLI	SLIG	SLCS	Description
realTimeModeSignals	String	O	O	M	This string is deigned to contain information that are not specified in detail in current document, The format shall be accordingly to the realTimeMode Descriptor.

6.12 Power Supply Signals

Table 6.12-1: Information group name: PowerSupplySignals

Information	Type	SLI	SLIG	SLCS	Description
emergencyBatteryPower	It is defined by one of the following String values: GOOD WARN CRITICAL INSUFFICIENT	M	MWA	M	GOOD: the battery power is in good operating conditions; WARN: The Battery is functionally in operating conditions but shows signs of reduced capability; CRITICAL: the battery still has the power to send the car to the closest floor in case in failure, but needs to be replaced; INSUFFICIENT: the battery does not have the power to send the car to the closest floor in case in failure; It needs to be be urgently replaced.

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standardPowerSupply	Boolean (TRUE/FALSE)	M	MWA	M	TRUE indicates that the standard power supply is currently present.
alarmSOSSystemPower	Boolean (TRUE/FALSE)	M	MWA	M	TRUE Indicates that the power supply of the SOS system is currently present.
alarmSOSBatteryPower	It is defined by one of the following String values: GOOD WARN CRITICAL INSUFFICIENT	M	MWA	M	GOOD: the Battery is functionally in operating conditions; WARN: the Battery is functionally in operating conditions but shows signs of reduced capability; CRITICAL: the battery still has the power to sustain the alarm system active for the minimum time defined by applicable regulation, but needs to be replaced; INSUFFICIENT: the battery does not have the power to sustain the alarm system active for the minimum time defined by applicable regulation; It needs to be urgently replaced. In UE and other applicable countries such minimum time is at least one hour (as required by EN 81.28 [29]).

6.13 Bidirectional Communication System Configuration

Table 6.13-1: Information group name: BCSConfiguration

Information	Type	SLI	SLIG	SLCS	Description
homeNetworkOperator	MCC-MNC as defined in ITU-T E.212 [37] (5 Digits)	M	MWA	M	The allocation of MCC-MNC codes in the different nations and regions is officially traced by ITU-T that releases periodic updates. The ITU-T list may be not fully up to date. This information is not configurable, it depends from the Home operator active on the SIM/USIM.
supportedNetworkTechnologies	It is defined by the concatenation of one or more of the following String values separated by a space character:	M	MWA	M	List of supported network technologies 2G, 3G,4G, 5G, fixed, etc

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	FIXED_LINE 2G 3G 4G 5G OTHER				
liftTelephoneNumber	String containing a telephone number. The format of the number is according ITU-T E.164 (max 15 digits)	M	MWA	M	Number corresponding to the lift communication module to be used for call terminated to the lift car.
mainEmergencyNumber	String containing a telephone number. The format of the number is according ITU-T E.164 (max 15 digits).	M	MWA	M	Main emergency numbers to be called in case of emergency.
otherEmergencyNumbers	Array of Strings, each one containing a telephone number. The format of each number is according ITU-T E.164 (max 15 digits).	O	MWA	M	Secondary emergency numbers to be called in case of emergency.

6.14 Bidirectional communication system alarms

Table 6.14-1: Information group name: BCSAlarms

Information	Type	SLI	SLIG	SLCS	Description
alarmInTheCar	Boolean (TRUE/FALSE)	M	MWA	M	TRUE when the alarm in the car has been activated. Reset to FALSE when the alarm is closed.
alarmVoiceCommunicationActivated	Boolean (TRUE/FALSE)	M	MWA	M	TRUE when alarm voice communication has been activated.

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					Reset to FALSE when the voice communication ends or alarm is closed. In UE and other applicable countries alarms shall comply to EN 81.28 [29] [4.1.5 c)] [3.2]
alarmInTheWell	Boolean (TRUE/FALSE)	M	MWA	M	TRUE when the alarm in the well has been activated Reset to FALSE when the alarm is closed.
alarmInTheRoof	Boolean (TRUE/FALSE)	M	MWA	M	TRUE when the alarm in the roof has been activated. Reset to FALSE when the alarm is closed.
alarmInOtherPlace	Boolean (TRUE/FALSE)	M	MWA	M	TRUE when the alarm in another place has been activated. Reset to FALSE when the alarm is closed.
alarmAcknowledgement	Boolean (TRUE/FALSE)	M	MWA	M	In UE and other applicable countries alarms shall comply to EN 81.28 [29] [3.2]. Reset to FALSE when the alarm is closed.

6.15 Bidirectional Communication System Signals

Table 6.15-1: Information group name: BCSSignals

Information	Type	SLI	SLIG	SLCS	Description
timeOfLastPeriodicTest72h Attempt	String representing time according to ISO 8601 [27] Complete Representation Basic Format as described here: YYYYMMDDThhmmss,ssssss The String shall not include the Time Zone: Time shall be interpreted as being in UTC.	M	MWA	M	In UE and other applicable countries, the periodic test shall comply with EN81.28 [29].

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timeOfConfirmationOfLastPeriodicTest72hAttempt	String representing time according to ISO 8601 [27] Complete Representation Basic Format as described here: YYYYMMDDThhmmss,ssssss The String shall not include the Time Zone: Time shall be interpreted as being in UTC..	M	MWA	M	In UE and other applicable countries, the periodic test shall comply with EN81.28 [29].
registeredNetworkOperator	String containing a MCC-MNC as defined in ITU-T E.212 (5 Digits)	MWA	MWA	M	MCC-MNC as defined in ITU-T E.212 (5 Digits); The allocation of MCC-MNC codes in the different nations and regions is officially traced by ITU-T that releases periodic updates.
networkQualityRSSI	Integer (values 0..31, 99)	MWA	MWA	M	Received Signal Strength Indicator (via AT commands from the transmission module): 0: -113 dBm or lower quality; 1: -111dBm; 2 .. 30: -109dBm .. -53dBm; 31: -51 dBm or greater; 99: Not Known or non-detectable.
networkQualityBER	Integer (values 0..7, 99)	MWA	MWA	M	Channel Bit Error Rate (via AT commands from the module); 0..7 as for RXQUAL defined by 3GPP TS 45.008 [38] (ETSI TS 45 008).

7 Semantic interoperability

The Smart lift Systems semantic interoperability is based on [20] (oneM2M TS 0033: "Interworking Framework"), [12] (oneM2M TS-0012 oneM2M; Base Ontology) and [18] (oneM2M TS 0030: Ontology Based Interworking).

In this context the SAREF standard suite become particularly relevant as specified in [1] (ETSI TS 103 264 : SmartM2M; Smart Applications; Reference Ontology and oneM2M Mapping), [25] (ETSI TS103 548) and [24] (ETSI TS 103 410 part 1-10: SAREF Extensions). A dedicated extension for Smart Lift is under development for potential normative reference in in future releases of the present document (TS 103 735).

For the current version of the present document:

Each information group identified in subclause of clause 6 shall be mapped into a oneM2M container named according to the corresponding table title of the corresponding subclause.

Such container shall contain the elements identified in such table in JSON format.

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8 Smart Lifts Communication framework

8.1 Introduction

The oneM2M specifications define a framework for the communication and sharing of information. The major paradigm is often referred to as "store & share". De facto any object and information is mapped to resources that is shared, discovered and accessed via a resource-oriented architecture and its related protocols.

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IP protocols and URI formats are at the basis of the communication and identification, making the solution Internet of Things friendly, so the oneM2M system is a component of IoT.

The following three aspects most characterize the oneM2M solution in the context of Smart Lifts:

- The mentioned store & share mechanism allows information sharing among multiple services, without consuming the data or explicitly addressing the interested applications. In fact, the use of a communication that allows the storage of the information (on devices, gateways and servers) and its retrieval using application identities, removes the need for end to end routing of the information.
- A separation between security and privacy, where security is based on existing security mechanisms, while privacy is enforced by the system flexibly determined by the service application. The service application may decide to which applications/applications sets and under which conditions they choose to share the information.
- Transparency with respect to the application semantics. Data is stored and retrieved transparently from the point of view of the communication framework, which knows very little or nothing about the nature of the data contained and its format. This implies that to provide a full communication interoperability at the application level the service application needs to share a semantic model or to interwork with a common semantic model. In the case of Smart Lifts, the common semantics are defined in ETSI TS 103 264 [**Error! Reference source not found.**].

Everything is then integrated with the required communication feature: among others, security, device management, group managements, location management, communication scheduling, etc., are all part of the oneM2M solution. An intelligent independence from the underlying network: multiple IP based networks can be used, and the M2M System is used to hide (or abstract) the data with respect to the applications. This tries to make conscious & efficient use of the available connectivity means, with the possibility of reusing underlying network functionality where available.

Additionally, the oneM2M Communication Framework allows a flexible deployment. It is designed as a distributed system, where the functionalities and information are be distributed on devices, gateways and centralized servers, according to the specific service needs and optimizations.

8.2 Smart Lift Communication Framework

The Communication Framework for Smart Lifts shall comply with the following specifications:

NOTE: For oneM2M specifications for which the transposition process by ETSI is still ongoing at the date of the present document, only the oneM2M number is provided.

- ETSI TS 118 111 (oneM2M TS-0011) [**Error! Reference source not found.**].
- ETSI TS 118 102 (oneM2M TS-0002) [**Error! Reference source not found.**].
- ETSI TS 118 101 (oneM2M TS-0001) [**Error! Reference source not found.**].
- ETSI TS 118 104 (oneM2M TS-0004) [**Error! Reference source not found.**].
- ETSI TS 118 103 (oneM2M TS-0003) [**Error! Reference source not found.**].
- ETSI TS 118 105 (oneM2M TS-0005) [**Error! Reference source not found.**].
- ETSI TS 118 106 (oneM2M TS-0006) [**Error! Reference source not found.**].
- ETSI TS 118 109 (oneM2M TS-0009) [**Error! Reference source not found.**].

- ETSI TS 118 120 (oneM2M TS-0020) [**Error! Reference source not found.**].
- ETSI TS 118 112 (oneM2M TS-0012) [**Error! Reference source not found.**].
- ETSI TS 118 115 (oneM2M TS-0015) [**Error! Reference source not found.**].
- oneM2M TS 0013 [**Error! Reference source not found.**].
- ETSI TS 118 122 (oneM2M TS-0022 [**Error! Reference source not found.**]).
- oneM2M TS 0016 [**Error! Reference source not found.**].
- ETSI TS 118 132 (oneM2M TS-0032 [**Error! Reference source not found.**]).
- oneM2M TS 0026 [**Error! Reference source not found.**].
- oneM2M TS 0030 [**Error! Reference source not found.**].
- oneM2M TS 0031 [**Error! Reference source not found.**].
- oneM2M TS 0033 [**Error! Reference source not found.**].
- oneM2M TS 0034 [**Error! Reference source not found.**].

The communication framework security may be omitted when reusing an underlying network security (e.g. when the communication is performed on a secure cellular network).

Any proprietary addition/extension to the protocols on Mca, Mcc and Mcc' shall not be included (i.e. no proprietary parameter or resource is admitted on these interfaces). Proprietary extensions may be included by means of specialized applications that operate by associating semantic means to the standard resources (typically application and containers as defined in ETSI TS 118 101 [**Error! Reference source not found.**]). This acts as plug in on the communication framework without impacting the communication framework interoperability.

These specifications apply to all the entities in the Smart Lifts Communication Framework including the Smart Lifts themselves.

Additional guideline and information are included in oneM2M TR 0001 [i.4], oneM2M TR 0025 [i.5], oneM2M TR 0035 [i.6] and oneM2M TR 0045 [i.7].

Annex A (informative): Change History

Date	Version	Information about changes
<Month year>	<#>	<Changes made are listed in this cell>
June 2020	0.1.0	First draft including TOC and initial content mainly derived from [i.3].
September 2020	0.2.0	Updated version of the information exchanged by the Smart Lift System, aligned to draft oneM2M TS0023 SDT Smart Lift Clause
September 2020	0.2.1	Minor correction of editorial mistakes, architecture correction
September 2020	0.2.1	Version agreed as baseline for future contribution at SmartM2M#55 (September 2020)
October 2020	0.2.1	Version agreed as baseline for future contribution at the calls of October 202
November 2020	0.3.1	Version November 2020 including first adaptation of types and the concepts of installation and groups
November 2020	0.4.0	Consolidated document with updated architecture and information modularization. Deployment scenarios and oneM2M architectural mapping have been included. Various editorial enhancements.
January 2021	0.4.1	Consolidated document with updated architecture and information modularization. Deployment scenarios and oneM2M architectural mapping have been included. Various editorial enhancements, introduction included
January 2021	0.4.2	Revision of the Stable version of November after the first call January, 2020
January 2021	0.4.3	Insertion of partial mapping with ISO 16484-5 , editorials, reference update, time format, resolution of remaining notes.
January 2021	0.4.4	Version with few editorial approved by SmartM2M on 26/01/2021. Submitted for RC from 28/01/2020 to 11/02/2021
January 2021	0.4.5	Style corrections/Revisions on V0.4.4 final draft proposed by Technical Officer

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History

Document history		
<Version>	<Date>	<Milestone>
1.1.1	February 2021	Publication

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