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SYSTEMS REFERENCE DELIVERABLE

colour inside

Smart cities reference architecture methodology

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FOREWORD

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IEC SRD 63188, which is a Systems Reference Deliverable, has been prepared by IEC systems committee Smart Cities: Electrotechnical aspects of Smart Cities.

The text of this Systems Reference Deliverable is based on the following documents:

Draft	Report on voting
SyCSmartCities/229/DTS	SyCSmartCities/255/RVDTS

Full information on the voting for the approval of this systems reference document can be found in the report on voting indicated in the above table.

The language used for the development of this Systems Reference Deliverable is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

In this document, the following print types are used.

- In 5.3, 5.4, 5.5, 5.14, 5.16 and 5.17, bold is used for text fragments that will be used in some dependency matrix.
- In 8.7.2, 8.9.2, 8.10.2 and 8.11.2, various colours are used to link interrogatives and placeholders <> within questions.

This document contains attached files in the form of Excel spreadsheets. These files are intended to be used as a complement and do not form an integral part of the document. Three files are attached:

- "SCRAM Figures 1-8, 23 and 24.xlsm";
- "SCRAM Figure 26.xlsm";
- "SCRAM Figure 28.xlsm".

All these files contain some macros for generation of illustrations. However, these macros are not necessary for viewing illustrations.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

The Smart Cities Reference Architecture Methodology (SCRAM) is an adaptation of the summary of the IEC Systems Resource Group (SRG) work on systems approach (see Annex B) for the smart cities system domain. The purpose of the SCRAM is to provide a common methodology for developing the Smart Cities Reference Architecture (SCRA) which will be used as a common and tailorable template for architectures of, practically, any city system.

In 2017, when IEC SyC Smart Cities decided to work on the SCRAM, it was known that there were already various reference architectures for smart cities (see Annex C). However, the majority of these reference architectures were created under different and not publicly agreed methodologies, thus it is very difficult to make them work together. The scope of IEC SyC Smart Cities required the development of a reference architecture which is widely understood and widely used. Therefore, IEC SyC Smart Cities needed to develop the SCRAM as a publicly agreed way of doing this.

Although the primary responsibility of IEC SyC Smart Cities is electrotechnical aspects of smart cities, the SCRAM (and the SCRA) covers city systems as a whole because the electrotechnical aspects can only be properly understood in this wider context. The standardization of system elements defined by the SCRA will be done, depending on the nature of those system elements, within various SDOs Thus, the SCRAM and the SCRA are not limited to electrotechnical aspects only.

The SCRAM provides a methodology for the SCRA to achieve necessary granularity of city system elements to allow the development of practical standards. This is governed by the scope of IEC SyC Smart Cities, which is defined by the IEC SMB as "To foster the development of standards in the field of electrotechnology to help with the integration, interoperability and effectiveness of city systems."

The SCRA covers stages 1 to 4 of summary of the SRG work on systems approach – domain analysis, system architecting, use case analysis and system modelling. Effectively, the SCRA will define for smart cities a set of capabilities, data structures, processes and interfaces which can be standardized to simplify implementation of various smart cities. This set will be used as an input for the stages 5 and 6 of the summary of the SRG work on systems approach – standards analysis and gap analysis – to map the existing standards to this set and to identify standardization opportunities to existing SyCs, TCs/SCs and other SDOs.

SMART CITIES REFERENCE ARCHITECTURE METHODOLOGY

1 Scope

This document, which is a Systems Reference Deliverable, proposes a methodology that defines a coherent structure for developing Smart Cities Reference Architecture (SCRA). The Smart Cities Reference Architecture Methodology (SCRAM) reviews and defines the desired characteristics of Smart Cities, diverse SCRA viewpoints and corresponding SCRA model types in order to promote consistency and uniformity across architectures for various smart cities.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC/IEEE 42010:2011, S*ystems and software engineering – Architecture description*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

NOTE Additional information about some terms can be found in Annex B.

3.1 Information technology

3.1.1
data
symbols and signals such as numbers, words or other signs that represent discrete facts about an objective reality

Note 1 to entry: Data can be in different representations: material, analogue, digital, etc.

Note 2 to entry: Data is without interpretation and has no meaning; thus, some automated computation can be used to capture and process data.

3.1.2
information
structured, contextualized or processed data (3.1.1) that are endowed with meaning

Note 1 to entry: Information may be in different representations: material, analogue, digital, etc.

3.1.3
information security
preservation of confidentiality, integrity and availability of information (3.1.2)

Note 1 to entry: In addition, other properties, such as authenticity, accountability, non-repudiation, and reliability can also be involved.