INTERNATIONAL STANDARD

Information technology – Home network resource management – Part 1: Requirements
# CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOREWORD</td>
<td>4</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>5</td>
</tr>
<tr>
<td>1 Scope</td>
<td>7</td>
</tr>
<tr>
<td>2 Normative references</td>
<td>7</td>
</tr>
<tr>
<td>3 Terms, definitions and abbreviations</td>
<td>8</td>
</tr>
<tr>
<td>3.1 Terms and definitions</td>
<td>8</td>
</tr>
<tr>
<td>3.2 Abbreviations</td>
<td>9</td>
</tr>
<tr>
<td>4 Conformance</td>
<td>9</td>
</tr>
<tr>
<td>5 Usage model</td>
<td>10</td>
</tr>
<tr>
<td>5.1 Overview</td>
<td>10</td>
</tr>
<tr>
<td>5.2 Usage scenarios</td>
<td>10</td>
</tr>
<tr>
<td>5.2.1 Easy configuration of the HES entity</td>
<td>10</td>
</tr>
<tr>
<td>5.2.2 Management of the HES</td>
<td>10</td>
</tr>
<tr>
<td>5.2.3 Smart services with the HES entity</td>
<td>10</td>
</tr>
<tr>
<td>5.2.4 Fault processing of the HES entity</td>
<td>10</td>
</tr>
<tr>
<td>5.2.5 Privacy protection principle</td>
<td>10</td>
</tr>
<tr>
<td>6 Functional requirement</td>
<td>11</td>
</tr>
<tr>
<td>6.1 Overview</td>
<td>11</td>
</tr>
<tr>
<td>6.2 Description of an HES entity</td>
<td>12</td>
</tr>
<tr>
<td>6.2.1 General</td>
<td>12</td>
</tr>
<tr>
<td>6.2.2 Location Information</td>
<td>12</td>
</tr>
<tr>
<td>6.2.3 Device information</td>
<td>12</td>
</tr>
<tr>
<td>6.2.4 Network information</td>
<td>13</td>
</tr>
<tr>
<td>6.2.5 Service information</td>
<td>13</td>
</tr>
<tr>
<td>6.3 Abstraction</td>
<td>13</td>
</tr>
<tr>
<td>6.4 Extensibility</td>
<td>13</td>
</tr>
<tr>
<td>6.5 Consistency</td>
<td>13</td>
</tr>
<tr>
<td>6.6 Privacy protection principle</td>
<td>13</td>
</tr>
<tr>
<td>7 Information model requirements</td>
<td>14</td>
</tr>
<tr>
<td>7.1 General</td>
<td>14</td>
</tr>
<tr>
<td>7.2 Resource description</td>
<td>14</td>
</tr>
<tr>
<td>7.3 Relation description</td>
<td>14</td>
</tr>
<tr>
<td>7.4 Information description</td>
<td>14</td>
</tr>
<tr>
<td>7.5 Management procedure description</td>
<td>15</td>
</tr>
<tr>
<td>7.6 Privacy protection principle</td>
<td>15</td>
</tr>
<tr>
<td>Annex A (informative) Building information model (BIM)</td>
<td>16</td>
</tr>
<tr>
<td>A.1 General</td>
<td>16</td>
</tr>
<tr>
<td>A.2 Relation between BIM and home network resource management</td>
<td>16</td>
</tr>
<tr>
<td>Annex B (informative) Home network management protocols</td>
<td>18</td>
</tr>
<tr>
<td>B.1 General</td>
<td>18</td>
</tr>
<tr>
<td>B.2 TR-069 (ITU-T Recommendation G.9971)</td>
<td>18</td>
</tr>
<tr>
<td>B.3 UPnP DM (UPnP Device Management)</td>
<td>18</td>
</tr>
<tr>
<td>B.4 OSGi RMP (Remote Management Protocol)</td>
<td>19</td>
</tr>
<tr>
<td>B.5 OMA DM</td>
<td>20</td>
</tr>
<tr>
<td>B.6 RDM</td>
<td>20</td>
</tr>
</tbody>
</table>
B.7 SNMP .................................................................21
B.8 Comparison of candidates ..................................................21
Bibliography .............................................................................22

Figure 1 – Some examples of home networking devices and services ........................................5
Figure 2 – Home network resource management model ..........................................................11
Figure 3 – Logical concept of home resource management architecture ................................12
Figure B.1 – TR-069 positioned as an end-to-end architecture ...........................................18
Figure B.2 – Management mechanism of UPnP .................................................................19
Figure B.3 – OSGi remote management protocol ...............................................................19
Figure B.4 – OMA DM protocol stacks ...........................................................................20
Figure B.5 – DMX-5120-A/RDM to ACN over TCP/IP gateways with RDM .....................20

Table B.1 – Standard or technology comparison table .........................................................21
Part 1: Requirements

FOREWORD

1) ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

2) The formal decisions or agreements of IEC and ISO on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees and ISO member bodies.

3) IEC, ISO and ISO/IEC publications have the form of recommendations for international use and are accepted by IEC National Committees and ISO member bodies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC, ISO and ISO/IEC publications is accurate, IEC or ISO cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees and ISO member bodies undertake to apply IEC, ISO and ISO/IEC publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any ISO, IEC or ISO/IEC publication and the corresponding national or regional publication should be clearly indicated in the latter.

5) ISO and IEC do not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. ISO or IEC are not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or ISO or its directors, employees, servants or agents including individual experts and members of their technical committees and IEC National Committees or ISO member bodies for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication of, use of, or reliance upon, this ISO/IEC publication or any other IEC, ISO or ISO/IEC publications.

8) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) Attention is drawn to the possibility that some of the elements of this ISO/IEC publication may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 30100-1 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

A list of all parts in the ISO/IEC 30100 series, published under the general title Information technology – Home network resource management, can be found on the IEC website.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.
INTRODUCTION

Products and services based on a variety of technologies are being installed and connected to existing home networks. Figure 1 illustrates the range of products being adapted to home networks: broadband, low power and high computing processors, reliable networking technology, high quality content services, e-health care, sensing technology, smart grid and robotics technology. These devices, providing a diversity of services and functions, may co-exist on a home network. Such a home network may need to support a multi-protocol environment. Some of these network protocols are based on standards and others use industry-developed specifications. In spite of this complex technology, users want simple, uniform and transparent services from all home network entities.

Interoperability among devices complying with these protocols is essential. The ISO/IEC 18012 series addresses product interoperability. The ISO/IEC 30100 series extends interoperability to the management of network resources. These management services may support fault diagnosis and remote management, and thus require that all available information be integrated. For example, when an audio/video (AV) streaming service has a problem, a diagnostic program should check all related information for the service plus the usage status of physical devices, network connectivity and traffic condition. The collection of this information may involve multiple information types and multiple protocols within each information type. Since home network information is collected and maintained independently for each data type and each protocol, it is very difficult to get access to all required data and to determine the relationship among various data types and protocols. This standard specifies a method for automatically maintaining information about HES entities poly-synthetically. This information provides the precise status of all available home network entities enabling the delivery of intelligent management services.

The ISO/IEC 30100 series of standards specifies an abstract model that accesses and manages home network information for various home network services including remote management and fault diagnosis. To handle different types of information, HES abstracts all HES elements as logical resources and provides a uniform architectural management method for them. Basic resource information for HES is defined as a collection of physical space,
devices, network and service, with optional extensions. The ISO/IEC 30100 series defines an interface to collect this information from all data types and protocols, and to abstract it as logical resource information. The series defines a relationship among the elements of this information. It also provides a uniform interface for representing this information and the relationship among all HES entities. This enables the development of various home network services including remote maintenance and fault diagnosis in multi-domain and multi-protocol home network environments.

This standard specifies the requirements for home resource management to support applications that may span multiple different HESs. Home resource management allows uniform fault processing, diagnostics and configuration management of HES elements in a home environment. This standard

- defines home resources to key elements of a home network such as device, network, service and so on,
- specifies an information model of the relationship among home resources,
- specifies management application procedures based on an information resource model with home resources, and
- specifies privacy methods for network management data to avoid releasing personal user data to external networks.

This standard specifies requirements for a home network resource management model. This standard defines new terminology for home resources (abstraction of device, network, service and location) on a home area network. It also specifies the general information model and relationship among home resources.

There are some standards that include management functions. However, it is impossible to discover, monitor, detect, diagnose, recover and configure all functions across a variety of protocols that may be used with a home network. Even if a service administrator could access a home network remotely, it would be difficult to manage problems. The ISO/IEC 30100 series enables the management of an entire home network without an administrator or technician.

Security and privacy protection should be considered when a user applies this standard. Countermeasures are needed to protect the security and privacy of information from home devices. The management of use cases corresponding to application categories is specified. Therefore, when implementing this standard, security standards and regulations should be applied. Also, some applications such as health data require higher levels of security and/or privacy than others (i.e. control systems). The ISO/IEC 30100 series of standards provides XML schemas as “generic data” that require some methods for security and privacy.

NOTE Some examples of security/privacy requirements are provided in NIST Interagency Report 7628 (smart grids), HIPAA law (health), PCI-DSS (Credit card) and the OECD Guidelines on the protection of privacy and transborder flows of personal data.