INTERNATIONAL STANDARD

ISO/IEC 19395

First edition
2015-01-15

Information technology — Sustainability for and by information technology — Smart data centre resource monitoring and control

Technologies de l'information — Durabilité pour et par les technologies de l'information — Surveillance des ressources et contrôle des centres de données intelligents

Reference number
ISO/IEC 19395:2015(E)

© ISO/IEC 2015



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2015

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword ... **iv**

Introduction ... **v**

1 Scope ... **1**

2 Conformance ... **2**

3 Normative references ... **2**

4 Terms, definitions and acronyms ... **3**

5 Domains ... **4**

5.1 Introduction ... 4

5.2 Base Domain ... 5

5.2.1 CIM_System ... 5

5.2.2 CIM_BaseMetricDefinition ... 5

5.2.3 CIM_BaseMetricValue ... 5

5.2.4 CIM_MetricDefForME ... 6

5.2.5 CIM_MetricInstance ... 6

5.2.6 CIM_RegisteredProfile ... 6

5.2.7 CIM_SystemDevice ... 6

5.2.8 CIM_Component ... 7

5.2.9 Metrics for fluid measurements ... 7

5.2.10 CIM_NumericSensor ... 10

5.2.11 CIM_EnabledLogicalElementCapabilities ... 10

5.2.12 CIM_ElementCapabilities ... 10

5.3 IT Domain ... 10

5.4 Power Domain ... 13

5.5 Fluid Domain ... 13

5.5.1 SDC_FluidConnection ... 15

5.5.2 SDC_FluidElement ... 15

5.5.3 SDC_FluidMeasurementPoint ... 16

5.5.4 SDC_FluidTransferPort ... 16

5.5.5 SDC_CoolingSystem ... 16

5.5.6 SDC_CoolingSettingData ... 16

6 Properties ... **16**

7 Messages ... **22**

7.1 Commands and responses ... 23

7.1.1 GET ... 23

7.1.2 SET ... 23

7.2 Event subscription and notification ... 24

7.2.1 Event subscription ... 24

7.2.2 Event notification ... 25

Annex A (normative) **ECMA-400 Edition 1 Resource configuration options** ... **26**

Annex B (informative) **Resource configuration of a CRAH system's fluid perspective** ... **30**

© ISO/IEC 2015 – All rights reserved

Foreword

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

ISO/IEC 19395 was prepared by Ecma International (as ECMA-400) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

© ISO/IEC 2015 – All rights reserved

Introduction

Operation of data centres requires management of storage, computation, communication, electrical energy and temperature to achieve the required quality of service and efficiency parameters. Often, however, the separate management of Information Technology (IT), electrical energy (or power) and cooling Resource islands yields a sub-optimal result.

This International Standard provides Messages that facilitate integrated or "smart" monitoring and control of Resources in those islands. The Messages are exchanged between the Management Function and Resources. The International Standard acknowledges that those Resources may be composed of other Resources (e.g. a rack may contain servers, ventilators, etc.). In addition, e.g. those servers may be viewed from their computing, energy consumption or dissipation aspects which this International Standard models as Resource Components and groups into IT, power and fluid Domains, respectively.

© ISO/IEC 2015 – All rights reserved

Information technology — Sustainability for and by information technology — Smart data centre resource monitoring and control

1 Scope

In the Smart Data Centre, Management Functions monitor and control Resources. Resources model IT and facility equipment, systems and components in a data centre. To monitor and control the Resources' Properties, Management Functions exchange command, response or event Messages with Resources, see Figure 1.



Figure 1 — Scope

Resources are made up out of Resource Components which this second edition shares Properties with classes in Common Information Models (CIM). Messages refer to Resources and their Properties. Messages are encoded in XML and exchanged in HTTP primitives.

Figure 1 illustrates the functionality that this second edition adds as described above.

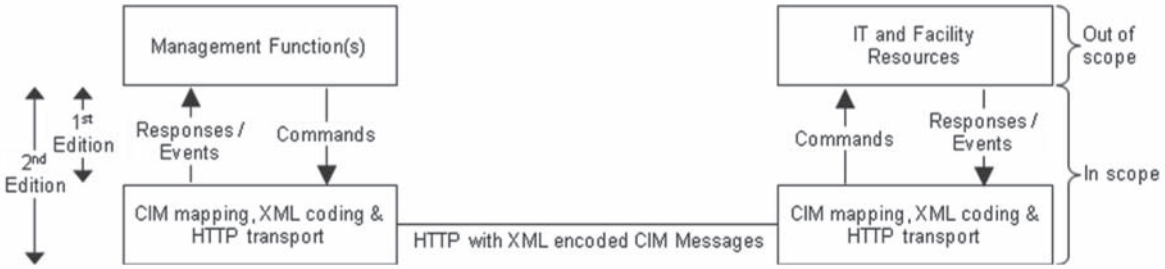


Figure 2 — Functionality that second edition adds

Management Function(s), Resources, IT & facility equipment, systems and components themselves are out of scope as illustrated in Figure 1, Figure 2 and Figure 3. Static information such as location, addressing of Resources and CPU models are out of scope as well.

© ISO/IEC 2015 – All rights reserved

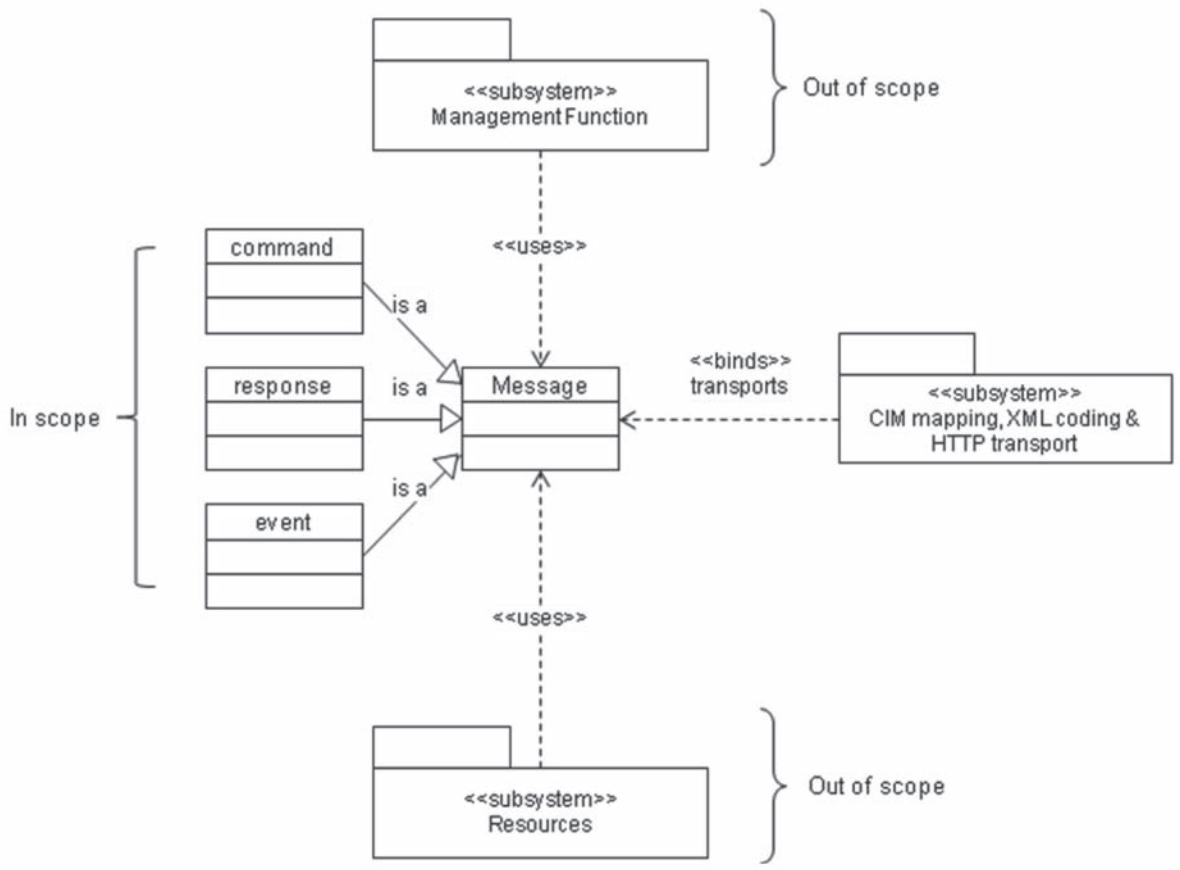


Figure 3 — detailed scope using CIM (UML Notation)

2 Conformance

Conformant Management Functions monitor and control Properties (Clause 6) of Resources using Messages as specified in Clause 7.

In response to the commands, conformant responses and events from Resources use the Messages as specified in Clause 7.

Any of the Resource configurations specified in Annex A may optionally be implemented, in addition to any other configuration using any combination of Resources and Resource Components.

3 Normative references

The following referenced documents are indispensable for the application 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.

DMTF, "CIM Schema", http://dmtf.org/standards/cim

DMTF DSP0004, "CIM Infrastructure Specification"

DMTF DSP0200, "CIM Operations over HTTP"

DMTF DSP1009, "Sensors Profile"

DMTF DSP1011, "Physical Asset Profile"

© ISO/IEC 2015 – All rights reserved

DMTF DSP1014, “Ethernet Port Profile”

DMTF DSP1022, “CPU Profile”

DMTF DSP1027, “Power State Management Profile”

DMTF DSP1029, “OS Status Profile”

DMTF DSP1033, “Profile Registration Profile”

DMTF DSP1035, “Host LAN Network Port Profile”

DMTF DSP1042, “System Virtualization Profile”

DMTF DSP1044, “Processor Resource Virtualization Profile”

DMTF DSP1045, “Memory Resource Virtualization Profile”

DMTF DSP1047, “Storage Resource Virtualization Profile”

DMTF DSP1052, “Computer System Profile”

DMTF DSP1053, “Base Metrics Profile”

DMTF DSP1057, “Virtual System Profile”

DMTF DSP1081, “Virtual System Migration Profile”

4 Terms, definitions and acronyms

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

4.1
Common Information Model
CIM

4.2
CIM Client
emitter of CIM message requests and consumer of CIM message responses

4.3
CIM Listener
consumer of events

4.4
CIM message request
command or event request

4.5
CIM message response
response

4.6
condition query
expression on property value

© ISO/IEC 2015 – All rights reserved