BS ISO/IEC 19770-4:2017

BSI Standards Publication

# Information technology — IT asset management

Part 4: Resource utilization measurement

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 19770-4:2017

# National foreword

This British Standard is the UK implementation of ISO/IEC 19770-4:2017.

The UK participation in its preparation was entrusted to Technical Committee IST/15, Software and systems engineering.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2017
Published by BSI Standards Limited 2017

ISBN 978 0 580 90695 4

ICS 35.080

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 September 2017.

**Amendments/corrigenda issued since publication**

| Date | Text affected |
|---|---|

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 19770-4:2017

INTERNATIONAL STANDARD

# ISO/IEC 19770-4

First edition
2017-09

# Information technology — IT asset management —

## Part 4: Resource utilization measurement

*Technologies de l'information — Gestion de biens de logiciel — Partie 4: Mesure d'utilisation des ressources*

Reference number
ISO/IEC 19770-4:2017(E)

© ISO/IEC 2017

Full document details: BS ISO/IEC 19770-4:2017

**COPYRIGHT PROTECTED DOCUMENT**

© ISO/IEC 2017, Published in Switzerland

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
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org



© ISO/IEC 2017 – All rights reserved

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 19770-4:2017

# Contents

Page

**Foreword** ... **v**

**Introduction** ... **vi**

**1 Scope** ... **1**
1.1 Purpose ... 1
1.2 Field of application ... 1
1.3 Limitations ... 1

**2 Normative references** ... **1**

**3 Terms and definitions** ... **2**

**4 Conformance** ... **4**
4.1 RUM conformance ... 4
4.2 Application conformance ... 4

**5 Key concepts** ... **4**
5.1 General ... 4
5.2 Software asset and IT asset identification ... 5
5.3 Measurements ... 5
5.4 Relationship to other ISO/IEC 19770 family information structures ... 5

**6 Implementation requirements and guidance** ... **5**
6.1 Usage scenario ... 5
6.2 Unique registration ID (regid) ... 6
6.2.1 Overview ... 6
6.2.2 Structure of regid ... 6
6.2.3 Examples of regid ... 6
6.3 XML and XSD ... 6
6.4 Time formats ... 7
6.5 Frequency of generation ... 7
6.6 Filename ... 7
6.7 File extension ... 7
6.8 File location ... 8
6.9 Managing file sizes and file numbers ... 8
6.10 Uninstallation and upgrade ... 8
6.11 Digital signatures ... 8
6.12 Nesting XML documents ... 8

**7 Tool considerations** ... **8**

**8 Schema elements** ... **8**
8.1 Overview ... 8
8.2 Minimum RUM data required ... 9
8.3 XML element and attribute names ... 10
8.4 Data values ... 11
8.4.1 Resource Utilization ... 11
8.4.2 AssetIdentification ... 12
8.4.3 Measurement ... 13
8.4.4 Value ... 13
8.4.5 Link ... 14
8.4.6 Meta ... 15
8.4.7 Asset ... 15
8.4.8 Instance ... 15
8.5 Type definitions ... 15
8.5.1 Ownership ... 15
8.5.2 rel ... 16
8.5.3 NMTOKEN ... 16

**Annex A** (normative) **XML Schema Definition** ... **17**

© ISO/IEC 2017 – All rights reserved



AVA Documents
Document Sharing Hub

Full document details: BS ISO/IEC 19770-4:2017

**Annex B** (informative) **Examples of multiple file RUM and nesting XML documents** ..... **30**
**Annex C** (informative) **Examples of linking related software asset from the RUM** ..... **33**
**Bibliography** ..... **38**


© ISO/IEC 2017 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19770-4:2017

# 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 ISO documents 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 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 voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

A list of all parts in the ISO/IEC 19770 series can be found on the ISO website.

Guidelines for mapping of industry Software Asset Management (SAM) practices with the ISO/IEC 19770 series of standards and guidelines for the application of ISO/IEC 19770-1 for small organizations will form the subjects of future ISO/IEC 19770-8 and ISO/IEC 19770-11, respectively.

© ISO/IEC 2017 – All rights reserved


Documents
Document Sharing Hub

Full document details: BS ISO/IEC 19770-4:2017

# Introduction

## 0.1 Overview

International Standards in the ISO/IEC 19770 series of standards for IT asset management (ITAM) address both the processes and technology for managing IT assets. Because IT is an essential enabler for almost all activity in today's world, these standards should integrate tightly into all of IT. For example, from a process perspective, ITAM standards should be able to be used with all management system standards, because hardware and software, and management of hardware and software management are essential components of any modern management system. From a technology perspective, ITAM standards for information structures provide not only for the interoperability of IT management data, but also provide the basis for many additional benefits such as more effective security in the use of software. ITAM standards for information structures also facilitate significant automation of IT functionality, such as improved authentication of software and easier and more consistent collection of data relating to the use of that software.

## 0.2 Purpose of this document

This document provides an International Standard for Resource Utilization Measurement (RUM). A RUM is a standardized structure containing usage information about the resources that are related to the use of an IT asset. A RUM will often be provided in an XML data file, but the same information may be accessible through other means depending on the platform and the IT asset/product.

This document contains information structures that are designed to align with the identification information defined in ISO/IEC 19770-2, and with the entitlement information defined in ISO/IEC 19770-3. When used together, these three types of information have the capability to significantly enhance and automate the processes of IT asset management.

This document supports the IT asset management processes defined in ISO/IEC 19770-1. This document also supports the other parts of the ISO/IEC 19770 series of standards that define information structures.

The RUM is specifically designed to be general-purpose and usable in a wide variety of situations. Like other information structures defined in the ISO/IEC 19770 series of standards, the consumer of a RUM may be an organization and/or a tool or other consumers. In contrast to the other information structures in the ISO/IEC 19770 series, the entity creating a RUM data on a periodic basis will likely be an IT asset or an automation tool monitoring an IT asset.

The definition of a RUM will benefit all stakeholders involved in the creation, licensing, distribution, releasing, installation, and on-going management of IT assets. Key benefits associated with a RUM for three specific groups of stakeholders include:

— IT asset users

  — RUM data will typically be generated and processed by IT assets and automation tools, within the consumers enterprise boundary, for purpose of IT asset compliance and optimization;

  — RUM data is human readable and can provide improved visibility into resource utilization within IT assets independent of vendor or third-party supplied tools;

  — the ability to combine identification, entitlement, and resource utilization information together to perform quantitative and authoritative IT asset management, for example, to meet compliance requirements;


© ISO/IEC 2017 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19770-4:2017

  - a much-improved ability to perform IT asset management in support of green data center strategies such as optimization of the use of power and air conditioning;

- IT asset manufacturers
  - the ability to consistently and authoritatively generate resource utilization information for consumption by a central facility that is maintained by the creator, or one or more third-party tools, or by the IT asset users;
  - the ability to support multiple instances and types of third-party tools with a single set of functionality within the IT asset;
  - the ability to offer a service to track real-time IT asset usage in the field and, when combined with identification and entitlement information, the ability to give advance warning as resource limits are approached;
  - the ability to offer an alternative approach to asset utilization measurement to traditional techniques that employ key-based, or platform-restricted licenses;

- Tool vendors
  - the ability to support multiple IT assets, and types of IT asset, without having to create and maintain unique instrumentation that is associated with each asset;
  - the ability to more easily aggregate usage information across multiple instances of an asset;
  - a much-improved ability to track resource utilization and IT assets in near real-time.

This document is divided into the following clauses and annexes:

- Clause 1 is the scope;
- Clause 2 describes the normative references;
- Clause 3 describes the terms, definitions, symbols, and abbreviations used in this document;
- Clause 4 defines conformance;
- Clause 5 describes key concepts;
- Clause 6 defines implementation requirements and gives guidance;
- Clause 7 defines tool requirements;
- Clause 8 defines the elements of the RUM;
- Annex A contains the XML schema document (XSD) for the RUM;
- Annex B gives examples of RUMs; and
- Annex C gives methods of linking a RUM to a specific software asset.

This document is not intended to conflict either with any organization's policies, procedures, or standards. Any such conflict should be resolved before using this document.

© ISO/IEC 2017 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19770-4:2017

# Information technology — IT asset management —

# Part 4: Resource utilization measurement

## 1 Scope

### 1.1 Purpose

This document establishes specifications for an information structure to contain Resource Utilization Measurement information to facilitate IT asset management (ITAM).

This document is applicable to all types of organization (for example, commercial enterprises, government agencies, and non-profit organizations).

### 1.2 Field of application

This document applies to the following.

a) IT asset manufacturers: These are the entities that create IT assets for distribution or installation.

b) Tool providers: These are the entities that may provide any number of tools that use the information contained in a Resource Utilization Measurement (RUM). These tools will include aggregation facilities capable of producing consolidated reports of the utilization of resources throughout an organization, and threshold reporting facilities capable of generating an alarm when utilization reaches a predetermined level.

c) IT asset users: These are the entities that purchase, use IT assets, and who are intended as one of the major beneficiaries of the visibility made possible by the information that is contained within the RUM.

### 1.3 Limitations

This document does not detail ITAM processes required for the reconciliation of resource utilization information with other types of information such as identification and entitlement information.

This document only defines an information structure, and does not define how that information is communicated between systems, or how resource measurement information from different systems is reconciled or consolidated.

## 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 19770-5, *Information Technology — Software asset management — Overview and vocabulary*

ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

RFC 3986, *Uniform Resource Identifier (URI): Generic Syntax, January 2005, http://tools.ietf.org/html/rfc3986*

© ISO/IEC 2017 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19770-4:2017

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19770-5 and the following apply.

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

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

NOTE In these definitions, the generic term *{info struct} that* is used in ISO/IEC 19770-5 to reference an ISO/IEC 19770 information structure, is replaced by the term RUM. Unlike ISO/IEC 19770-2, the term "tag" is not used because the information structure defined in this document may not always be realized as an XML file, and thus the term "tag" is not always appropriate.

**3.1**
**asset**
item, thing, or entity that has potential or actual value to an organization

Note 1 to entry: Value can be tangible or intangible, financial, or non-financial, and includes consideration of risks and liabilities. It can be positive or negative at different stages of the asset's life.

Note 2 to entry: For most organizations, physical assets usually refer to equipment, inventory, and properties owned by the organization. Physical assets are the opposite of intangible assets, which are non-physical assets such as leases, brands, digital assets, use rights, licenses, intellectual property rights, reputation or agreements.

Note 3 to entry: A grouping of assets referred to as an asset system could also be considered as an asset.

Note 4 to entry: ISO/IEC 19770-5 incorporated a slightly different definition of asset, taken from a development version of ISO 55000. This definition is sourced from the latest published version ISO/IEC 19770-5, which is in turn aligned with ISO 55000.

[SOURCE: ISO/IEC 19770-5:2015, 3.2]

**3.2**
**element**
component of an *info struct* that provides information related to the entity represented by the *info struct*

[SOURCE: ISO/IEC 19770-5:2015, 3.12]

**3.3**
**extensible markup language**
**XML**
license-free and platform-independent markup language that carries rules for generating text formats that contain structured data

[SOURCE: W3C Recommendation Extensible Markup Language (XML) 1.1 (Second Edition), 1.2]

**3.4**
**globally unique identifier**
**GUID**
16-byte string of characters that is generated in a manner that gives a high probability that the string is unique in any context

Note 1 to entry: Other globally unique identifier algorithms can be used in some situations. In general, alternative algorithms use uniform resource identifier (URI) based structures, so the id owner's *registration identifier (regid)* is included in the identifier.

Note 2 to entry: In this document, GUID as an all capitalized term refers specifically to the 16-byte version. If the term is in lowercase (guid), it refers to a general algorithm that can use either a URI, or a 16-byte-based identifier.

[SOURCE: ISO/IEC 19770-5:2015, 3.16]


© ISO/IEC 2017 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19770-4:2017

**3.6**
**registration identifier**
**regid**
unique identifier for an entity

Note 1 to entry: ISO/IEC 19770-5 incorporated a different definition of regid that defined a specific format.

[SOURCE: ISO/IEC 19770-5:2015, 3.27]

**3.7**
**software identification tag**
**SWID tag**
*information structure* (3.13) containing identification information about a software *configuration item*, which may be authoritative if provided by a *software creator*

[SOURCE: ISO/IEC 19770-5:2015, 3.40]

**3.8**
**Resource Utilization Measurement**
**RUM**
structure that provides information about resources associated with an IT *asset* (3.1) in order to facilitate its management

Note 1 to entry: In the case of a RUM, the structure specifically contains information about the consumption of resources in relation to an IT asset.

[SOURCE: ISO/IEC 19770-5:2015, 3.18, modified – Note 1 to entry has been added.]

**3.9**
**RUM creator**
entity that initially creates a RUM

Note 1 to entry: This entity can be part of the organization that created the IT asset, in which case the RUM creator and IT asset manufacturer will be the same. The RUM creator can also be a third-party organization unrelated to the IT asset manufacturer (such as in the case where tags are created for legacy software by third-party organizations). The RUM creator can also be a separate software tool that is used to measure usage of an IT asset.

[SOURCE: ISO/IEC 19770-5:2015, 3.19, modified – Note 1 to entry has been added.]

**3.10**
**uniform resource identifier**
**URI**
compact sequence of characters that identifies an abstract or physical resource available on the Internet

Note 1 to entry: The syntax that is used for URIs is defined in IETF RFC 3986.

[SOURCE: IETF RFC 3986, 1]

**3.11**
**valid**
status of a RUM that follows the specified *XML Schema document* and is valid from an XML perspective

[SOURCE: ISO/IEC 19770-5:2015, 3.52]

**3.12**
**version**
unique string of number and letter values indicating a unique revision of an item

Note 1 to entry: Versions are often referred to in software to identify revisions of software that provide unique functionality or fixes. A version typically has multiple parts with at least a major version indicating large changes in functionality or user interface changes and a minor version indicating smaller changes in functionality or user interface changes.

© ISO/IEC 2017 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19770-4:2017

[SOURCE: ISO/IEC 19770-5:2015, 3.54]

**3.13**
**information structure**
structure that provides information about an IT *asset* (3.1) in order to facilitate its management

# 4 Conformance

## 4.1 RUM conformance

A Resource Utilization Measurement (RUM) is in conformance as specified in this document when the RUM obeys all normative requirements that are specified in this document.

## 4.2 Application conformance

Application conformance incorporates both syntax and semantics and are defined for producers of RUM and entities that are designed to process RUMs, as follows.

A conforming application (i.e. an IT asset, automation tool, etc.) that is designed to produce RUMs

— shall be able to produce RUMs conforming to this document.

An entity that is designed to process RUMs:

a) shall not reject any RUM conforming to this document which is in XML format and which conforms to the schema provided in Annex A;

b) shall treat the information in the RUM in a manner consistent with the semantic definitions given in this document. Such an application may choose not to process all of the information in the RUM, but any information that it does process shall be processed in a manner that is consistent with the semantic definitions given in this document;

c) shall, when necessary, be able to identify the version of the XML schema document (XSD) that is to be used for the RUM, and thus be able to process information in a manner that is consistent with that XSD. This is important because in the future, RUMs that conform to several different versions of this document may exist in the field concurrently, and it will thus be important that each version is processed with the correct XSD.

# 5 Key concepts

## 5.1 General

A Resource Utilization Measurement (RUM) is an information structure containing authoritative information about the consumption of resources in relation to an IT asset. The structure contains information to identify a particular instance of an IT asset (see 5.2), and one or more sets of resource utilization information that are contained within an element that is called a measurement (see 5.3). This subclause also contains a description of the relationship between the RUM and other information structure definitions within the ISO/IEC 19770 series of standards.

Consumers of RUMs shall be aware that some IT assets will append new measurement information to an existing file for a period in preference to creating a new file for each time. This is how software generally interacts with logs, and RUMs are sufficiently similar to logs that the same mechanism may also be used in this case.


© ISO/IEC 2017 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19770-4:2017

### 5.2 Software asset and IT asset identification

Where a RUM contains resource utilization elements that are related to an IT asset that is referenced by a SWID tag, the RUM shall contain a Link element that references that SWID, and the unique identifier that is used in that SWID shall be employed in the creation of constructs within the RUM.

Where a RUM contains resource utilization elements that are related to an IT asset for which there is no SWID tag, the RUM shall incorporate an Asset element containing a unique identifier for that asset. Where both a Link element and an Asset element containing a unique identifier are included in a RUM, the Link element shall take precedence.

### 5.3 Measurements

A single RUM shall contain one or more elements that define a measurement. This is to support a situation where multiple measurement types may be available with a single IT asset. Specifically, the knowledge of which of those measurement types may be of interest in a particular instantiation may not be available within the IT asset itself, and therefore some assets will always report the measurement data of all of the resources of which they are aware.

Each measurement element shall contain:

a) the time at which the information was captured,

b) the start time of the period over which the utilization was measured,

c) the end time of the period over which the utilization was measured (which shall be equal to the start time for a point in time value),

d) the measurement type, which is defined by a text string, and

e) one or more values, each with an identified type.

Optional information and meta-information may also be associated with each measurement, or each value.

Note that the measurement in a RUM is only defined by a textual description of a metric, a type and a value. No mathematical description for a measurement is included, and no standard set of types are defined. It is expected that IT asset manufacturers will report already existing measurements in a RUM, and thus the textual description of the type will be defined by pre-existing practice.

### 5.4 Relationship to other ISO/IEC 19770 family information structures

This document is intended to complement the information structures that are defined by the other parts of ISO/IEC 19770 series of standards, but also to be usable independently. For instance, while it is preferred that a software asset to which a RUM relates be identified by a link to a SWID as defined by ISO/IEC 19770-2, the RUM also incorporates an optional structure which can contain a string that uniquely identifies an IT asset.

If the measurements that are defined in a RUM have a relationship to the entitlements defined in the ISO/IEC 19770-3, they shall have the same value of metricName (see 8.4.3). The details of that relationship between the measurements and the entitlement are outside of the scope of this document.

## 6 Implementation requirements and guidance

### 6.1 Usage scenario

The RUM is specifically designed to be general-purpose and usable in a wide variety of situations. The entity creating a RUM will be an IT asset or an automation tool monitoring an IT asset, and the information structure will generally be encapsulated within the entity, or within the file system of the

© ISO/IEC 2017 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19770-4:2017

system upon which the entity is executing. In addition, while the RUM information may be deposited in a platform-specific repository, or communicated to a remote system or central facility, the details of both of these mechanisms are outside of the scope of this document.

## 6.2 Unique registration ID (regid)

### 6.2.1 Overview

RUMs may be created by IT assets produced by different organizations and do not strictly require a centralized registration authority. To accommodate these requirements, this document uses a regid. The regid provides a unique naming authority identifier.

### 6.2.2 Structure of regid

A regid shall use a URI reference in accordance with RFC 3986. Once an organization specifies a regid for their organization's IT asset, that regid shall be used consistently for all IT asset from the organization.

To ensure interoperability, allow for open source project support and third-party tag consistency, the following recommendations should be applied when creating a regid.

— Unless otherwise required, the URI should utilize the http scheme.

— If the http scheme is used, the "http://" may be left off the regid string (a string without a URI scheme specified is defined to use the "http://" scheme).

— Unless otherwise required, the URI should use an absolute-URI that includes an authority part, such as a domain name.

— To ensure consistency, the absolute-URI should use the minimum string required (for example, example.com should be used instead of www.example.com).

### 6.2.3 Examples of regid

A regid for a company that creates and sells software is expected to be the HTTP reference to that company. So a regid for the Fabrikam Company is:

"fabrikam.com"

A regid for an open source project called SampleProject that is hosted on sourceMyProject.net may be one of the following:

— sampleproject.sourcemyproject.net;

— sourcemyproject.net/sampleproject;

— sourcemyproject.net/?projectname=sampleproject.

The appropriate regid to choose for the project is dependent on the default reference used by the hosting site for the particular project.

## 6.3 XML and XSD

The RUM shall be defined as an XML data structure. The XML schema definition (XSD) to be used shall be that defined in Annex A, and that schema may be downloaded from:

http://standards.iso.org/iso-iec/19770/-4/ed-1


© ISO/IEC 2017 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19770-4:2017