
**Information technology — User
interfaces — Universal remote
console —**

**Part 1:
Framework**

iTeh STANDARD PREVIEW
*Technologies de l'information — Interfaces utilisateur — Console à
distance universelle —
(standards.iteh.ai)
Partie 1: Cadre général*

ISO/IEC 24752-1:2008

<https://standards.iteh.ai/catalog/standards/sist/e60529b7-fca3-49e3-9932-5adb65bd626d/iso-iec-24752-1-2008>

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO/IEC 24752-1:2008](https://standards.iteh.ai/catalog/standards/sist/e60529b7-fca3-49e3-9932-5adb65bd626d/iso-iec-24752-1-2008)

<https://standards.iteh.ai/catalog/standards/sist/e60529b7-fca3-49e3-9932-5adb65bd626d/iso-iec-24752-1-2008>



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2008

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing 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.....	v
Introduction	vi
1 Scope	1
2 Conformance	1
2.1 URC	1
2.2 Target	2
3 Normative references	3
4 Terms and definitions	4
5 Universal remote console (URC) requirements	11
5.1 General.....	11
5.2 Discovery management	11
5.3 Session management	12
5.4 Socket management.....	14
5.5 Target-URC network link on the URC	18
5.6 Resource-URC network link (RUNL) on the URC	19
5.7 User interface generation	19
5.8 Security and privacy requirements.....	20
6 Target components and requirements	20
6.1 Discovery management	20
6.2 User interface socket	21
6.3 User interface socket description	23
6.4 Target resources.....	23
6.5 Session management.....	26
6.6 Socket management.....	29
6.7 Target-URC network link (TUNL) on the target.....	34
6.8 Security and privacy requirements.....	35
7 Supplemental resources	35
7.1 General.....	35
7.2 Third party supplemental resources.....	35
7.3 Supplemental resources are optional.....	35
7.4 Format of supplemental resources.....	35
7.5 Forms of resource services.....	36
7.6 Supplemental resource sheets.....	36
7.7 Supplemental groupings.....	36
7.8 Supplemental atomic resources	36
7.9 Supplemental user interface implementation descriptions (UIIDs).....	36
8 Networks.....	37
8.1 General.....	37
8.2 Target-URC network (TUN)	37
8.3 Resource-URC network (RUN)	39
9 Security and privacy considerations	40
9.1 General.....	40
9.2 URC considerations.....	40
9.3 Target considerations	40
9.4 Network considerations	40
Annex A (informative) Overview of the universal remote console framework	41

Annex B (informative) Security and privacy – Example scenarios	47
Annex C (informative) XML code examples	48
Bibliography	56

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO/IEC 24752-1:2008](https://standards.iteh.ai/catalog/standards/sist/e60529b7-fca3-49e3-9932-5adb65bd626d/iso-iec-24752-1-2008)
<https://standards.iteh.ai/catalog/standards/sist/e60529b7-fca3-49e3-9932-5adb65bd626d/iso-iec-24752-1-2008>

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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.

ISO/IEC 24752-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 35, *User interfaces*.

ISO/IEC 24752 consists of the following parts, under the general title *Information technology — User interfaces — Universal remote console*:

- *Part 1: Framework* [ISO/IEC 24752-1:2008](https://standards.iteh.ai/catalog/standards/sist/e60529b7-fca3-49e3-9932-5adb65bd626d/iso-iec-24752-1-2008)
- *Part 2: User interface socket description* <https://standards.iteh.ai/catalog/standards/sist/e60529b7-fca3-49e3-9932-5adb65bd626d/iso-iec-24752-1-2008>
- *Part 3: Presentation template*
- *Part 4: Target description*
- *Part 5: Resource description*

Introduction

This part of ISO/IEC 24752 is one of a set of standards to facilitate operation of information and electronic products through remote and alternative interfaces and intelligent agents. The purpose of this part of ISO/IEC 24752 is to facilitate the development and deployment of a wide variety of devices (from different manufacturers) that can act as universal remote consoles (“URCs”) for an equally varied range of target devices and services (“targets”), also from different manufacturers. It allows users to control any number of information and electronic products in their environment.

The **targets** include both devices and services. They can range from things as simple as light switches and thermostats to more complex items such as audio-visual equipment, home appliances, in-car electronics, web-based services, and any other devices or services that can be controlled electronically (or via information technology).

Targets can be in the same location as the individual who desires to control the target through the URC, or at any distance from the URC/user as long as there is some type of network connection between the URC and the target. This is possible since a URC provides the user with all of the necessary controls as well as the prompts and other information displayed by the target.

The **URCs** could be software running on common mainstream devices such as personal computing and information technology devices [laptops, personal digital assistants (PDAs), telecommunications/wireless application protocol (WAP) devices (e.g. cell phones), etc.]. They could also be functions implemented in assistive technology devices, or they could be devices which were specially built to function as URCs. They could be devices which were built to function primarily as a remote console for a particular family of products (e.g. a remote console designed to be part of a home audio-visual system), but could also serve to control any other devices compatible with this part of ISO/IEC 24752. They are similar to the behavior of universal remote controls today, except

- a) they have much greater function and scope,
- b) they synchronize with the target in both directions (i.e. they can display the current status of the target),
- c) they do not need to be programmed by the user (since they will automatically discover devices that are controllable in a user's vicinity, discover the abstracted user interface of the targets and present it in the way preferred by the user and their URC), and
- d) they can be used out of sight of the product they are controlling.

The URCs could be all visual, all tactile, or all verbal in nature (or any combination thereof), because this International Standard specifies the content of a target user interface independently from the form in which it is presented. Thus, URCs could be designed that an individual could talk to and, through the URC, the user could have speech access to any compatible target listed above without any of these targets having any voice recognition or voice control functionality themselves. A person might, therefore, be able to say to their URC, “Record channel 12 and show me ‘Law and Order’”. Or they could lie in bed and say, “Set the alarm to 6:30 AM, start brewing the coffee at 6:00 AM, and now set the home security system to ‘active’ ”. Or, if one’s spouse is already asleep, a person could pick up their PDA or any other compatible URC device and accomplish these same tasks silently either by calling up control panels or by issuing the instructions in writing. (The URC framework does not provide the natural language control, but would provide all of the information and control necessary for control by a natural language processing URC.)

Note that, although a URC implementation can involve hardware, requirements on this hardware such as safety and design requirements are not within the scope of ISO/IEC 24752.

A more detailed overview of the URC framework is provided as Annex A.

Information technology — User interfaces — Universal remote console —

Part 1: Framework

1 Scope

ISO/IEC 24752 is a multi-part International Standard to facilitate operation of information and electronic products through remote and alternative interfaces and intelligent agents.

This part of ISO/IEC 24752 defines a framework of components that combine to enable remote user interfaces and remote control of network-accessible electronic devices and services through a universal remote console (URC). It provides an overview of the URC framework and its components.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

2 Conformance

2.1 URC

[ISO/IEC 24752-1:2008](https://standards.iteh.ai/catalog/standards/sist/e60529b7-fca3-49e3-9932-5adb65bd626d/iso-iec-24752-1-2008)

A conforming URC shall implement <https://standards.iteh.ai/catalog/standards/sist/e60529b7-fca3-49e3-9932-5adb65bd626d/iso-iec-24752-1-2008>

- at least one target-URC network link as specified in 5.5,
- the URC requirements as specified in Clause 5.

Table 1 summarizes the requirements on URCs, as specified in detail in Clause 5.

Table 1 – Summary of URC requirements

Requirement (“A URC shall ...”)	See subclause
Retrieve documents from a target, including recognition of MIME types	5.2.3
Interpret a target description so that it can identify a target and open a control session with one of its sockets	5.2.4
Support an open session request to a target	5.3.2
Support a URC close session event to a target	5.3.5
Support an abort session event from a target	5.3.6
Track connection status information from the underlying network (TUN)	5.3.7
Synchronize values of socket variables	5.4.2
Request invocation of a socket command, including support for local parameters and command state updates	5.4.3

Requirement (“A URC shall ...”)	See subclause
Receive and acknowledge notifications, including support for stacking notifications and their states	5.4.4
Synchronize actual indices of socket sets and elements	5.4.5
Support timeout variables and timeout constants	5.4.7
Provide at least one target-URC network link (see 8.2 for TUN requirements)	5.5.1
Support reception and updating of atomic resources at runtime for those socket elements that come with atomic resources at runtime	5.5.2
Provide a concrete user interface for a control session with a target’s socket	5.7
Implement the security and privacy functions available from the implemented TUNs	9.2

2.2 Target

A conforming target shall implement:

- at least one target-URC network link as specified in 6.7;
- a target description, as specified in 6.1.4;
- one or more sockets that, when considered together, cover the full functionality of the target, as specified in 6.2;
- the target resources required to conform in at least one natural language (see 6.4.5); and
- the target components and requirements as specified in Clause 6.

Alternatively, a target’s manufacturer may provide the above documents separately as supplemental resources, if the target is a legacy product that already provides the necessary communication and control functionality through a networking platform (target-URC network).

Table 2 summarizes the requirements on targets, as specified in detail in Clause 6.

Table 2 – Summary of target requirements

Requirement (“A target shall ...”)	See subclause
Have an instance identifier	6.1.2
Provide a fetch mechanism for its documents to be retrieved by URI, including support for MIME types	6.1.3
Provide exactly one target description with references to all socket descriptions and resource sheets	6.1.4
Provide one or more user interface sockets that collectively provide access to all of the functionality provided by the built-in user interface of the target	6.2.2
Inside a target’s socket: <ul style="list-style-type: none"> • The <i>variables</i> shall include all of the dynamic data on the target socket’s state a user can perceive and/or manipulate • The <i>commands</i> shall include all of the target functions that can be called explicitly or implicitly by users 	6.2.3

Requirement (“A target shall ...”)	See subclause
Provide a user interface socket description for each of the target’s sockets	6.3
Provide the required target resources in at least one natural language: <ul style="list-style-type: none"> • one grouping resource for every socket of the target • label resources (textual) 	6.4.5
Support an open session request from a URC	6.5.1
Support a suspend session request from a URC	6.5.2
Support a resume session request from a URC	6.5.3
Support a close session event from a URC	6.5.4
Send an abort session event in case of user session abortion	6.5.5
Track connection status information from the underlying TUN network	6.5.6
Send a session forward event to the URC in case of session forwarding	6.5.7
Create and maintain a session between a socket and the URC after successful open session request	6.6.1
Indicate to the URC the availability of socket elements at runtime	6.6.3
Synchronize the socket variables between the socket and the URCs that participate in a joint session with the socket	6.6.5
Support command invocation requests from a URC (including handling of local parameters) and synchronization of command states	6.6.6
Support propagation of notification states to the connected URCs, and acceptance of pertinent acknowledgments	6.6.7
Synchronize actual indices of socket sets and elements	6.6.8
Not rely on the URC doing the interpretation of socket element dependencies	6.6.9
Provide general timeout variables and timeout variables for notify elements to represent user response timeouts implemented	6.6.10
Provide atomic resources at runtime for those socket elements that are marked to come with atomic resources at runtime	6.6.11
Provide at least one target-URC network link (see 8.2 for TUN requirements)	6.7

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.

ISO/IEC 24752-2, *Information technology — User interfaces — Universal remote console — Part 2: User interface socket description*

ISO/IEC 24752-3, *Information technology — User interfaces — Universal remote console — Part 3: Presentation template*

ISO/IEC 24752-4, *Information technology — User interfaces — Universal remote console — Part 4: Target description*

ISO/IEC 24752-5, *Information technology — User interfaces — Universal remote console — Part 5: Resource description*

ISO/IEC 10646, *Information technology — Universal Multiple-Octet Coded Character Set (UCS)*

W3C Recommendation: Extensible Markup Language (XML) 1.0 (Third edition), 04 February 2004, <http://www.w3.org/TR/2004/REC-xml-20040204/>

4 Terms and definitions

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

4.1

atomic resource

resource that is used as an atomic entity in the construction of a concrete user interface

EXAMPLE Atomic resources include label resources, help resources, access key resources and keyword resources.

NOTE An atomic resource may be of any form, including text, images, sounds, animations and video clips. See ISO/IEC 24752-5.

4.1.1

supplemental atomic resource

supplemental resource that is used as an atomic entity in the construction of a concrete user interface

4.1.2

target atomic resource

target resource that is used as an atomic entity in the construction of a concrete user interface

4.2

command

socket element representing a core function that a user can request a target to perform that cannot be achieved through the manipulation of the value of a single variable

EXAMPLE a 'reset' or 'submit' operation

NOTE See ISO/IEC 24752-2.

4.3

command parameter

variable whose value is used for the execution of a command

NOTE See ISO/IEC 24752-2.

4.3.1

input parameter

variable whose value is read by the target before execution of a command, to affect the execution and its result(s)

NOTE See ISO/IEC 24752-2.

4.3.2

output parameter

command result

variable whose value is updated by the target after execution of a command, to reflect a result of the execution

NOTE See ISO/IEC 24752-2.

4.3.3**input-output parameter**

variable used as input and output parameter for the same command

NOTE See ISO/IEC 24752-2.

4.3.4**global parameter**

reference from a command to a variable that serves as an input or output parameter for the command

NOTE See ISO/IEC 24752-2.

4.3.5**local parameter**

input or output parameter that is attached to a command

NOTE See ISO/IEC 24752-2.

4.4**constant**

element of a socket description representing fixed or constant information that is known before runtime

EXAMPLE model number

NOTE See ISO/IEC 24752-2.

4.5**connection**

association established between functional units for data transmission

[ANSDIT]

iTeh STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/e60529b7-fca3-49e3-9932-5adb65bd626d/iso-iec-24752-1-2008>

4.6**context of use**

use context

users, tasks, equipment (hardware, software and materials), and the physical and social environments in which a product is used

[ISO 9241-11:1998]

4.7**control phase**

time period during which a URC and a target initiate, maintain and terminate a control session between the URC and a specific target socket

4.8**device**

physical device with a built-in user interface that can also be controlled electronically

EXAMPLES light switches, thermostats, home appliances, audio-visual equipment, vending machines and point-of-sale devices

4.9**discovery**

process by which a URC locates and connects to targets in its environment

4.10**discovery phase**

time period during which a URC scans the environment for available targets and identifies their sockets

**4.11
element**

fundamental logical unit of an XML document

**4.12
extensible markup language**

XML
meta-markup language that provides a format for describing structured data

NOTE XML has no fixed tag set or application semantics.

**4.13
grouping resource**

hierarchical structure of user interface socket elements or user interface implementation description elements in a top-down fashion that is provided externally to a socket description

NOTE See ISO/IEC 24752-5.

**4.13.1
supplemental grouping resource**

grouping resource that is provided externally to the target, by resource services

**4.14
interface generator**

software that generates a user interface for a target that is appropriate for a known context of use

NOTE In the context of ISO/IEC 24752, interface generation is typically based on the socket description, atomic resources and presentation templates provided by the target.

**4.15
notification**

special state of a target in which normal operation is suspended

ISO/IEC 24752-1:2008

<https://standards.iteh.ai/catalog/standards/sist/e60529b7-fca3-49e3-9932-5adb65bd626d/iso-iec-24752-1-2008>

EXAMPLE an exception state

NOTE See ISO/IEC 24752-2.

**4.16
personal digital assistant**

PDA
pocket-sized computer with communication capability, typically used to store an individual's personal information

**4.17
presentation template**

PreT
XML document that contains modality-independent presentation information for a user interface socket

EXAMPLE grouping and ordering of elements

NOTE It is expressed using the presentation template markup language (see ISO/IEC 24752-3).

**4.18
presentation template markup language**

PreTML
XML language for specification of presentation templates

NOTE The language is specified in ISO/IEC 24752-3.

4.19**resource**

object that is used as an entity or to support decision making in the construction of a concrete user interface

EXAMPLE Resources include user interface implementation description, resource sheet, and any kind of atomic resource such as label resources, help resources, access key resources and keyword resources.

NOTE See ISO/IEC 24752-5.

4.19.1**target resource**

resource provided by a target

4.19.2**supplemental resource**

resource made available externally to a target

4.19.3**standard resource**

resource in the format specified in ISO/IEC 24752-5

4.19.4**access key resource**

atomic resource that specifies a single character that can be used in combination with a URC-specific mechanism to move the focus to an element of an interface

NOTE When an access key is bound to a command, entering the access key will activate the command.

4.19.5**help resource**

atomic resource intended to be used to provide help to a user of a target

4.19.6**keyword resource**

atomic resource that specifies a keyword pertaining to a referenced element

4.19.7**label resource**

atomic resource used to label, identify or present an element in a user interface

EXAMPLE The label "John F Kennedy International Airport" could be used to present the value "JFK", or the label "Destination" could be used to identify an input field where the user must enter a travel destination.

4.19.7.1**supplemental label**

label resource made available externally to a target

4.20**resource description**

description of a resource in terms of its properties

NOTE A resource description is described in the Resource Description Framework (RDF) format. See ISO/IEC 24752-5.

4.21**Resource Description Framework**

RDF

specification being developed by the W3C to provide an infrastructure to support metadata on the Internet and WWW

NOTE See <http://www.w3.org/RDF/>.

4.22

resource directory

hierarchical directory of resources and resource services

NOTE Resource directories may contain or reference resource sheets and other resource directories (as subdirectories), and may reference user interface implementation descriptions and resource services. Resource directories facilitate the selection of appropriate resources and resource services for the URC. Each node in the resource directory tree provides hereby a “scent” of the properties of its direct and indirect content. A resource directory description is based on the Resource Description Framework (RDF). See ISO/IEC 24752-5.

4.23

resource service

service that provides resources from target manufacturers and any third parties such as URC manufacturers, beyond the target resources

NOTE See ISO/IEC 24752-5.

4.24

resource service description

description of and reference to a resource service

NOTE A resource service description is given in the Resource Description Framework (RDF) format. See ISO/IEC 24752-5.

4.25

resource sheet

file or part of a file that contains atomic resource descriptions

NOTE A resource sheet is described in the Resource Description Framework (RDF) format. See ISO/IEC 24752-5.

4.26

resource-URC network

RUN

network connecting the URC to sources of supplemental resources and user interface implementation descriptions (UIIDs)

NOTE It may employ any networking and connection technologies.

4.27

service

functionality made available to a user electronically

EXAMPLE an airline reservation service, currency translation services, weather forecasting, restaurant recommendations, etc.

4.28

session

Control Session

period of connection between a target’s socket and a URC for the purpose of user operation of the socket through a URC

4.28.1

shared sessions

sessions of one socket in which the socket element values are common or shared (across sessions) for socket elements with the same identifier

4.29

socket

user interface socket

machine-operable access and control point for a target

NOTE See ISO/IEC 24752-2.

4.30**socket description**

user interface socket description

specification that describes the functions and properties of a socket

NOTE A socket description is expressed in XML with the markup language specified in ISO/IEC 24752-2.

4.31**socket element**

variable, constant, command or notify

NOTE See ISO/IEC 24752-2.

4.31.1**dimensional socket element**

homogenous set of values pertaining to a socket element

NOTE See ISO/IEC 24752-2.

4.32**socket element component**

element component

one value out of a set of values for a dimensional socket element

NOTE See ISO/IEC 24752-2.

4.33**socket set**

set

set composed of socket elements and other sets

NOTE See ISO/IEC 24752-2.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/IEC 24752-1:2008

<https://standards.iteh.ai/catalog/standards/sist/e60529b7-fca3-49e3-9932-5adb65bd626d/iso-iec-24752-1-2008>

4.33.1**dimensional socket set**

repeating socket set

homogenous collection of sets with different indices

NOTE See ISO/IEC 24752-2.

4.34**target**

device or service that the user wishes to use

EXAMPLES video cassette recorder (VCR), online telephone directory

NOTE See ISO/IEC 24752-2.

4.35**target description**

TD

document containing information on a target that is necessary for discovery of and access to the target and its sockets

NOTE There is one target description per target.

4.36**target instance identifier**

identifier for a target instance that is unique among all targets with the same name