
**Information technology —
Interoperability with assistive
technology (AT) —**

Part 2:
**Windows accessibility application
programming interface (API)**

*Technologies de l'information — Interopérabilité avec les
technologies d'assistance —*

*Partie 2: Interface de programmation d'applications (API)
d'accessibilité Windows*



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2016, 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

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Terms and definitions	1
3 General description and architecture of the Microsoft Windows Automation API	7
3.1 General description.....	7
3.1.1 Microsoft Active Accessibility overview.....	7
3.1.2 UI Automation overview.....	8
3.1.3 IAccessibleEx interface.....	9
3.2 Architecture.....	10
4 Using the API	12
4.1 Using the Microsoft Active Accessibility API.....	12
4.1.1 Types of Microsoft Active Accessibility support.....	13
4.1.2 Retrieving an accessible object.....	13
4.1.3 The WM_GETOBJECT message.....	13
4.1.4 Special values of Object Identifier.....	14
4.2 Using the UI Automation API.....	15
4.2.1 UI Automation model.....	15
4.2.2 UI Automation tree.....	16
4.2.3 UI Automation control patterns, control types, properties, and events.....	16
4.3 Using the IAccessibleEx interface.....	21
4.3.1 The IAccessibleEx interface implementation.....	21
5 Exposing User Interface Element Information	24
5.1 General.....	24
5.2 Exposing UI Elements with Microsoft Active Accessibility.....	25
5.2.1 How an MSAA Server exposes relevant properties.....	25
5.2.2 Provide support for the Accessible Object structure.....	26
5.2.3 Support hit testing.....	27
5.2.4 Generate appropriate WinEvents.....	27
5.2.5 Object identifier.....	27
5.2.6 How MSAA clients access exposed UI elements.....	28
5.3 Exposing UI Elements with UI Automation.....	28
5.3.1 Types of providers.....	28
5.3.2 UI Automation provider concepts.....	28
5.3.3 Provider interfaces.....	29
5.3.4 Property values.....	30
5.3.5 Provider navigation.....	30
5.3.6 Provider reparenting.....	31
5.3.7 Provider repositioning.....	31
5.3.8 How UI Automation clients access exposed UI Elements.....	32
6 Exposing UI Element actions	33
6.1 Exposing UI Element actions in MSAA.....	33
6.2 Exposing UI Element actions in UI Automation.....	33
6.2.1 UI Automation control pattern components.....	33
6.2.2 Control patterns in providers and clients.....	34
6.2.3 Dynamic control patterns.....	34
6.2.4 Control patterns and related interfaces.....	34
7 Keyboard focus	36
7.1 MSAA keyboard focus and selection.....	36
7.1.1 Focus and selection properties and methods.....	36
7.1.2 Events triggered in menus.....	37
7.2 UI Automation keyboard focus and selection.....	37

7.2.1	Focus.....	37
7.2.2	Selection.....	38
8	Events.....	44
8.1	WinEvents.....	44
8.1.1	USER's role in WinEvents.....	44
8.1.2	Receiving event notifications.....	45
8.1.3	Sending events.....	45
8.1.4	The allocation of WinEvent IDs.....	45
8.2	UI Automation events.....	46
8.2.1	How providers raise events.....	47
8.2.2	How clients register for and process events.....	48
9	Programmatic modifications of states, properties, values, and text.....	48
9.1	UI Automation specifications.....	48
9.1.1	Introduction.....	48
9.1.2	UI Automation elements.....	49
9.1.3	UI Automation tree.....	49
9.1.4	UI Automation properties.....	50
9.1.5	UI Automation control patterns.....	50
9.1.6	UI Automation control types.....	50
9.1.7	UI Automation events.....	50
10	Design considerations.....	51
10.1	UI Automation design considerations.....	51
10.1.1	UI Automation clients.....	51
10.1.2	UI Automation providers.....	54
10.1.3	Coexistence and interoperability with Microsoft Active Accessibility.....	57
10.2	IAccessibleEx design considerations.....	58
10.2.1	Design consideration for providers before implementing the IAccessibleEx interface.....	58
10.2.2	IAccessibleEx interface for providers.....	58
10.2.3	IAccessibleEx interface for clients.....	59
11	Further Information.....	63
11.1	Microsoft Active Accessibility and Extensibility.....	63
11.2	UI Automation extensibility features.....	63
11.2.1	Registration of custom UI Automation properties, events, and control patterns.....	63
11.2.2	How clients and providers support custom control patterns.....	64
Annex A (informative) Microsoft Active Accessibility to Automation Proxy.....		65
Annex B (informative) UI Automation to Microsoft Active Accessibility Bridge.....		72
Annex C (informative) UI Automation for W3C Accessible Rich Internet Applications (ARIA) Specification.....		77
Annex D (informative) Other Useful APIs for Development and Support of Assistive Technologies.....		81
Bibliography.....		88

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](#).

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 35, *User interfaces*.

This second edition cancels and replaces the first edition (ISO/IEC/TR 13066-2:2012), which has been technically revised.

ISO/IEC/TR 13066 consists of the following parts, under the general title *Information technology — Interoperability with assistive technology (AT)*:

- *Part 1: Requirements and recommendations for interoperability*
- *Part 2: Windows accessibility application programming interface (API)*
- *Part 3: IAccessible2 accessibility application programming interface (API)*
- *Part 4: Linux/UNIX graphical environments accessibility API*
- *Part 6: Java accessibility application programming interface (API)*

Introduction

Individuals with a wide range of functional disabilities, impairments, and difficulties require specific technology to enable computers and software to be accessible to them. This part of ISO/IEC 13066 provides information about the Microsoft® Windows® Automation Frameworks, including Microsoft Active Accessibility, User Interface (UI) Automation, and the common interfaces of these accessibility frameworks including the IAccessibleEx interface specification.

The intent of this part of ISO/IEC 13066 is to provide information and application programming interfaces (APIs) needed to use these frameworks. A primary goal of this part of ISO/IEC 13066 is to ensure that accessible software applications can be written in such a way that they are fully compatible with the Microsoft Accessibility APIs available on the Microsoft Windows operating system.

Information technology — Interoperability with assistive technology (AT) —

Part 2:

Windows accessibility application programming interface (API)

1 Scope

This part of ISO/IEC 13066 specifies services provided in the Microsoft Windows platform to enable assistive technologies (AT) to interact with other software. One goal of this part of ISO/IEC 13066 is to define a set of application programming interfaces (APIs) for allowing software applications to enable accessible technologies on the Microsoft Windows platform. Another goal of this part of ISO/IEC 13066 is to facilitate extensibility and interoperability by enabling implementations by multiple vendors on multiple platforms.

This part of ISO/IEC 13066 is applicable to the broad range of ergonomics and how ergonomics apply to human interaction with software systems.