

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Video surveillance systems for use in security applications –
Part 2-3: Video transmission protocols – IP interoperability implementation
based on Web services**

**Systemes de vidéosurveillance destinés à être utilisés dans les applications
de sécurité –
Partie 2-3: Protocoles de transmission vidéo – Mise en œuvre de
l'interopérabilité IP en fonction des services Web**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

VIDEO SURVEILLANCE SYSTEMS FOR USE IN SECURITY APPLICATIONS –

Part 2-3: Video transmission protocols – IP interoperability implementation based on Web services

FOREWORD

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International Standard IEC 62676-2-3 has been prepared by IEC technical committee 79: Alarm and electronic security systems.

The text of this standard is based on the following documents:

FDIS	Report on voting
79/437/FDIS	79/450/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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

A list of all parts in the IEC 62676 series, published under the general title *Video surveillance systems for use in security applications*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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.

Withdrawn

INTRODUCTION

The IEC Technical Committee 79 in charge of alarm and electronic security systems together with many governmental organisations, test houses and equipment manufacturers have defined a common framework for video surveillance transmission in order to achieve interoperability between products.

The IEC 62676 series of standards on video surveillance system is divided into 4 independent parts:

- Part 1 System requirements
- Part 2: Video transmission protocols
- Part 3: Analog and digital video interfaces
- Part 4 : Application guidelines (to be published)

Each part has its own clauses on scope, references, definitions and requirements.

This IEC 62676-2 series consists of 3 subparts, numbered parts 2-1, 2-2 and 2-3 respectively:

IEC 62676-2-1, *Video transmission protocols – General requirements*

IEC 62676-2-2, *Video transmission protocols – IP interoperability implementation based on HTTP and REST services*

IEC 62676-2-3, *Video transmission protocols – IP interoperability implementation based on Web services*

This third subpart of IEC 62676-2 covers IP Interoperability Implementation Based Web Services. It is based on the requirements for IP video transmission protocols covered in IEC 62676-2-1, which defines protocol requirements to be fulfilled by any high-level IP video device interface.

VIDEO SURVEILLANCE SYSTEMS FOR USE IN SECURITY APPLICATIONS –

Part 2-3: Video transmission protocols – IP interoperability implementation based on Web services

1 Scope

This part 2-3 of IEC 62676 defines procedures for communication between network video clients and video transmitter devices based on Web Services. This new set of specifications makes it possible to build network video systems with devices and receivers from different manufacturers using common and well defined interfaces. These interfaces cover functions such as device management, real-time streaming of audio and video, event handling, Pan, Tilt and Zoom (PTZ) control, video analytics as well as control, search and replay of recordings.

The management and control interfaces defined in this standard are described as Web services. This international standard also contains full XML schema and Web Service Description Language (WSDL) definitions for the introduced network video services.

In order to offer full plug-and-play interoperability, the standard defines procedures for device discovery. The device discovery mechanisms in the standard are based on the WS-Discovery specification with extensions. These extensions have been introduced in order to cover the specific network video discovery needs.

This standard is not limited to discovery, configuration and control functions, but defines precise formats for media and metadata streaming in IP networks using suitable profiling of IETF standards. Furthermore, appropriate protocol extensions have been introduced in order to make it possible for network video manufacturers to offer a fully standardized network video transfer solution to its customers and integrators.

A video transmission device supporting compliance to the requirements of this standard with the help of Web services according to the specification of this part is declared as compatible to IEC 62676-2 Web service Interoperability.

The goal of this standard is to realize a fully interoperable network video implementation comprised of products from different network video vendors. This standard describes the network video model, interfaces, data types and data exchange patterns. The standard reuses existing relevant standards where available, and introduces new specifications only where necessary to support the specific requirements for network video surveillance. This is the Open Network Video Interface Forum (ONVIF) core specification. In addition, ONVIF has released the following related specifications:

- ONVIF Schema [see C.15]
- ONVIF Analytics Service WSDL [see C.1]
- ONVIF Analytics Device Service [see C.2]
- ONVIF Device Service WSDL [see C.4]
- ONVIF DeviceIO Service WSDL [see C.3]
- ONVIF Display Service WSDL [see C.5]
- ONVIF Event Service WSDL [see C.6]
- ONVIF Imaging Service WSDL [see C.7]
- ONVIF Media Service WSDL [see C.8]

- ONVIF PTZ Service WSDL [see C.9]
- ONVIF Receiver Service WSDL [see C.10]
- ONVIF Recording Service WSDL [see C.11]
- ONVIF Remote Discovery WSDL [see C.12]
- ONVIF Replay Service WSDL [see C.13]
- ONVIF Search Service WSDL [see C.14]
- ONVIF Topic Namespace XML [see C.16]

The purpose of this standard is to define the ONVIF specification framework, and is divided into the following sections:

Specification overview: Gives an overview of the different specification parts and how they are related to each other.

Web Services Framework: Offers a brief introduction to Web Services and the Web Services basis for the ONVIF specifications.

IP configuration: Defines the ONVIF network video IP configuration requirements.

Device discovery: Describes how devices are discovered in local and remote networks.

Device management: Defines the network video transmitter management commands.

DeviceIO: Defines commands to handle physical inputs and outputs.

Display: Defines commands to deal with display devices.

Imaging and media: Defines the configuration commands related to imaging and media settings.

Real time streaming: Provides requirements for interoperable video, audio and metadata streaming.

Event handling: Defines how to subscribe to and receive data from network video events (notifications).

PTZ control: Provides commands for pan, tilt and zoom control.

Video analytics: Defines the ONVIF analytics model, analytics object description and analytics rules configurations.

Video analytics device: Defines commands to deal with a video analytics device.

Recording control: Defines mechanism for the configuring of recordings.

Recording search and replay control: Provides commands for retrieval of recorded media including metadata.

Security section: Defines the transport and message level security requirements on ONVIF compliant implementations.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ITU-T G.711, *Pulse code modulation (PCM) of voice frequencies*

<http://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-G.711-198811-I!!PDF-E&type=items>

[X.680] ITU-T Recommendation X.680 (1997) | ISO/IEC 8824-1:2008, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation*

[X.681] ITU-T Recommendation X.681 (1997) | ISO/IEC 8824-2:2008, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification*

[X.682] ITU-T Recommendation X.682 (1997) | ISO/IEC 8824-3:2008, *Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification*

[X.683] ITU-T Recommendation X.683 (1997) | ISO/IEC 8824-4:2008, *Information technology – Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 specifications*

[X.690] ITU-T Recommendation X.690 (1997) | ISO/IEC 8825-1:2008, *Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)*

NIST FIPS 180-2, *SECURE HASH STANDARD*

<<http://csrc.nist.gov/publications/fips/fips180-2/fips180-2.pdf>>

RFC1305, *Network Time Protocol (Version 3), Specification, Implementation and Analysis*

<<http://www.ietf.org/rfc/rfc1305.txt>>

IETF RFC 2131, *Dynamic Host Configuration Protocol*

<<http://www.ietf.org/rfc/rfc2131.txt>>

IETF RFC 2136, *Dynamic Updates in the Domain Name System (DNS UPDATE)*

<<http://www.ietf.org/rfc/rfc2136.txt>>

IETF RFC 2246, *The TLS Protocol Version 1.0*

<<http://www.ietf.org/rfc/rfc2246.txt>>

IETF RFC 2326, *Real Time Streaming Protocol (RTSP)*

<<http://www.ietf.org/rfc/rfc2326.txt>>

IETF RFC 2435, *RTP Payload Format for JPEG-compressed Video*

<<http://www.ietf.org/rfc/rfc2435.txt>>

IETF RFC 2616, *Hypertext Transfer Protocol – HTTP/1.1*

<<http://www.ietf.org/rfc/rfc2616.txt>>

IETF RFC 2617, *HTTP Authentication: Basic and Digest Access Authentication*

<<http://www.ietf.org/rfc/rfc2617.txt>>

IETF RFC 2782, *A DNS RR for specifying the location of services (DNS SRV)*

<<http://www.ietf.org/rfc/rfc2782.txt>>

IETF RFC 3268, *Advanced Encryption Standard (AES) Ciphersuites for Transport Layer Security (TLS)*

<<http://www.ietf.org/rfc/rfc3268.txt>>

IETF RFC 3315, *Dynamic Host Configuration Protocol for IPv6 (DHCPv6)*

<<http://www.ietf.org/rfc/rfc3315.txt>>

IETF RFC 3550, *RTP: A Transport Protocol for Real-Time Applications*

<<http://www.ietf.org/rfc/rfc3550.txt>>

IETF RFC 3551, *RTP Profile for Audio and Video Conferences with Minimal Control*

<<http://www.ietf.org/rfc/rfc3551.txt>>

IETF RFC 3927, *Dynamic Configuration of IPv4 Link-Local Addresses*

<<http://www.ietf.org/rfc/rfc3927.txt>>

IETF RFC 3984, *RTP Payload Format for H.264 Video*

<<http://www.ietf.org/rfc/rfc3984>>

IETF RFC 3986, *Uniform Resource Identifier (URI): Generic Syntax*

<<http://www.ietf.org/rfc/rfc3986.txt>>

IETF RFC 4514, *Lightweight Directory Access Protocol (LDAP):String Representation of Distinguished Names*

<<http://www.ietf.org/rfc/rfc4514.txt>>

IETF RFC 4566, *SDP: Session Description Protocol*

<<http://www.ietf.org/rfc/rfc4566.txt>>

IETF RFC 4571, *Framing Real-time Transport Protocol (RTP) and RTP Control Protocol (RTCP) Packets over Connection-Oriented Transport*

<<http://www.ietf.org/rfc/rfc4571.txt>>

IETF RFC 4702, *The Dynamic Host Configuration Protocol (DHCP) Client Fully Qualified Domain Name (FQDN) Option*

<<http://www.ietf.org/rfc/rfc4702.txt>>

IETF RFC 4861, *Neighbor Discovery for IP version 6 (IPv6)*

<<http://www.ietf.org/rfc/rfc4861.txt>>

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3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1

ad-hoc network

an independent basic service set

[SOURCE: IEEE 802.11:2007]

3.1.2

basic service set

a set of IEEE 802.11 stations that have successfully joined in a common network

[SOURCE: IEEE 802.11:2007]

3.1.3

capability

ability of a device that allows a client to ask for its services

3.1.4

configuration entity

a network video device media abstract component that is used to produce a media stream on the network

Note 1 to entry: The media stream is a video and/or an audio stream.

3.1.5

control plane

plane consisting of media control functions

Note 1 to entry: Media control functions are device control, media configuration and PTZ commands.

3.1.6

digital PTZ

function that diminishes or crops an image to adjust the image position and ratio