

© Copyright SEK. Reproduction in any form without permission is prohibited.

Larmsystem – Utrustning och system för TV-övervakning (CCTV) – Del 2-3: Protokoll för videoöverföring – IP-interoperabilitet baserad på webbtjänster

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

Som svensk standard gäller europastandarden EN 62676-2-3:2014. Den svenska standarden innehåller den officiella engelska språkversionen av EN 62676-2-3:2014.

Nationellt förord

Europastandarden EN 62676-2-3:2014

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 62676-2-3, First edition, 2013 - Video surveillance systems for use in security applications - Part 2-3: Video transmission protocols - IP interoperability implementation based on Web services**

utarbetad inom International Electrotechnical Commission, IEC.

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

**Video surveillance systems for use in security applications -
Part 2-3: Video transmission protocols -
IP interoperability implementation based on Web services
(IEC 62676-2-3:2013)**

Systèmes de vidéosurveillance destinés à
être utilisés dans les applications de
sécurité -
Partie 2-3: Protocoles de transmission
vidéo -
Mise en oeuvre de l'interopérabilité IP en
fonction des services Web
(CEI 62676-2-3:2013)

Videoüberwachungsanlagen für
Sicherungsanwendungen -
Teil 2 3: Videoübertragungsprotokolle -
IP-Interoperabilität auf Basis von
Webservices
(IEC 62676-2-3:2013)

This European Standard was approved by CENELEC on 2013-12-12. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 79/437/FDIS, future edition 1 of IEC 62676-2-3, prepared by IEC TC 79 "Alarm and electronic security systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62676-2-3:2014.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-09-12
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-12-12

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 62676-2-3:2013 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ITU-T G711	-	Pulse code modulation (PCM) of voice frequencies	-	-
ITU-T Recommendation X.680	1997	Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation	-	-
ITU-T Recommendation X.681	1997	Information technology - Abstract Syntax Notation One (ASN.1): Information object specification	-	-
ITU-T Recommendation X.682	1997	Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification	-	-
ITU-T Recommendation X.683	1997	Information technology – Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 specifications	-	-
ITU-T Recommendation X.690	1997	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	-	-
IETF RFC 1305	-	Network Time Protocol, Version 3 - Specification and Implementation	-	-
IETF RFC 2131	-	Dynamic Host Configuration Protocol	-	-
IETF RFC 2136	-	Dynamic Updates in the Domain Name System (DNS UPDATE)	-	-
IETF RFC 2246	-	The TLS Protocol Version 1.0	-	-
IETF RFC 2326	-	Real time Streaming protocol (RTSP)	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IETF RFC 2435	-	RTP Payload Format for JPEG-compressed Video	-	-
IETF RFC 2616	-	Hypertext Transfer Protocol HTTP/1.1.	-	-
IETF RFC 2617	-	HTTP Authentication: Basic and Digest Access Authentication	-	-
IETF RFC 2782	-	A DNS RR for specifying the location of services (DNS SRV)	-	-
IETF RFC 3268	-	Advanced Encryption Standard (AES) Ciphersuites for Transport Layer Security (TLS)	-	-
IETF RFC 3315	-	Dynamic Host Configuration Protocol for IPv6 (DHCPv6)	-	-
IETF RFC 3550	-	A Transport Protocol for Real-Time Applications	-	-
IETF RFC 3551	-	RTP Profile for Audio and Video Conferences with Minimal Control	-	-
IETF RFC 3927	-	Dynamic Configuration of IPv4 Link-Local Addresses	-	-
IETF RFC 3984	-	RTP Payload Format for H.264 Video	-	-
IETF RFC 3986	-	Uniform Resource Identifier (URI): Generic Syntax	-	-
IETF RFC 4514	-	Lightweight Directory Access Protocol (LDAP): String Representation of Distinguished Names	-	-
IETF RFC 4566	-	SDP: Session Description Protocol	-	-
IETF RFC 4571	-	Framing Real-time Transport Protocol (RTP) and RTP Control Protocol (RTCP) Packets over Connection-Oriented Transport	-	-
IETF RFC 4702	-	The Dynamic Host Configuration Protocol (DHCP) Client Fully Qualified Domain Name (FQDN) Option	-	-
IETF RFC 4861	-	Neighbor Discovery for IP version 6 (IPv6)	-	-
IETF RFC 4862	-	IPv6 Stateless Address Autoconfiguration	-	-
W3C SOAP 1.2 Part 1	-	Messaging Framework	-	-
W3C SOAP Version 1.2 Part 2	-	Adjuncts (Second Edition)	-	-
OASIS Web Services Base Notification 1.3	-		-	-
OASIS Web Services Security Username Token Profile 1.0	-		-	-
W3C XML Schema Part 1	-	Structures Second Edition	-	-
W3C XML Schema Part 2	-	Datatypes Second Edition	-	-
W3C XML-binary Optimized Packaging	-		-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
W3C XML Path Language (XPath) Version 1.0	-		-	-
IEEE 802.11	2007	IEEE Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications	-	-
IEEE 802.1X	-	Port Based Network Access Control	-	-
UDDI Version 2.04	-	API Specification UDDI Committee Specification, 19 July 2002	-	-
UDDI Version 2.03	-	Data Structure Reference UDDI Committee Specification, 19 July 2002	-	-
Web Services Security X.509	-	Certificate Token Profile 1.1	-	-

CONTENTS

INTRODUCTION.....	23
1 Scope.....	24
2 Normative references	26
3 Terms, definitions and abbreviations	29
3.1 Terms and definitions	29
3.2 Abbreviations	32
4 Overview	34
4.1 Web services.....	34
4.2 IP configuration	35
4.3 Device discovery	35
4.4 Device types	36
4.5 Device management.....	36
4.5.1 Capabilities	36
4.5.2 Network	37
4.5.3 System	37
4.5.4 Retrieval of system information.....	37
4.5.5 Firmware upgrade	38
4.5.6 System restore	38
4.5.7 Security	38
4.6 DeviceIO	38
4.7 Imaging configuration	39
4.8 Media configuration	39
4.8.1 General	39
4.8.2 Media profiles.....	39
4.9 Real-time streaming	43
4.10 Event handling	44
4.11 PTZ control	44
4.12 Video analytics.....	45
4.13 Analytics device	47
4.14 Display.....	47
4.15 Receiver.....	47
4.15.1 General	47
4.15.2 Synchronization points	48
4.16 Storage	48
4.16.1 Storage model	48
4.16.2 Recording.....	49
4.16.3 Search.....	50
4.16.4 Replay	50
4.17 Security.....	50
5 Web Services framework	51
5.1 Services overview	51
5.1.1 General	51
5.1.2 Services requirements	52
5.2 WSDL overview.....	52
5.3 Namespaces	53

5.4	Types	55
5.5	Messages	55
5.6	Operations	56
5.6.1	One-way operation type	57
5.6.2	Request-response operation type	58
5.7	Port types	58
5.8	Binding	58
5.9	Ports	58
5.10	Services	58
5.11	Error handling	58
5.11.1	Protocol errors	59
5.11.2	SOAP errors	59
5.12	Security	62
5.12.1	User-based access control	62
5.12.2	User token profile	63
6	IP configuration	64
7	Device discovery	65
7.1	General	65
7.2	Modes of operation	65
7.3	Discovery definitions	66
7.3.1	Endpoint reference	66
7.3.2	Hello	66
7.3.3	Probe and probe match	68
7.3.4	Resolve and resolve match	68
7.3.5	Bye	68
7.3.6	SOAP fault messages	69
7.4	Remote discovery extensions	69
7.4.1	Network scenarios	69
7.4.2	Discover proxy (DP)	71
7.4.3	Remote Hello and Probe behaviour	72
7.4.4	Client behaviour	73
7.4.5	Security	73
8	Device management	74
8.1	Capabilities	74
8.1.1	Get WSDL URL	74
8.1.2	Capability exchange	75
8.2	Network	78
8.2.1	Get hostname	78
8.2.2	Set hostname	78
8.2.3	Get DNS settings	79
8.2.4	Set DNS settings	80
8.2.5	Get NTP settings	81
8.2.6	Set NTP settings	82
8.2.7	Get dynamic DNS settings	83
8.2.8	Set dynamic DNS settings	84
8.2.9	Get network interface configuration	85
8.2.10	Set network interface configuration	85
8.2.11	Get network protocols	87
8.2.12	Set network protocols	88

8.2.13	Get default gateway.....	88
8.2.14	Set default gateway.....	89
8.2.15	Get zero configuration.....	90
8.2.16	Set zero configuration.....	90
8.2.17	Get IP address filter.....	91
8.2.18	Set IP address filter.....	92
8.2.19	Add an IP filter address.....	92
8.2.20	Remove an IP filter address.....	93
8.2.21	IEEE 802.11 configuration.....	94
8.3	System.....	99
8.3.1	Device Information.....	99
8.3.2	Get System URIs.....	100
8.3.3	Backup.....	101
8.3.4	Restore.....	101
8.3.5	Start system restore.....	102
8.3.6	Get system date and time.....	103
8.3.7	Set system date and time.....	104
8.3.8	Factory default.....	105
8.3.9	Firmware upgrade.....	106
8.3.10	Start firmware upgrade.....	107
8.3.11	Get system logs.....	108
8.3.12	Get support information.....	109
8.3.13	Reboot.....	110
8.3.14	Get scope parameters.....	110
8.3.15	Set scope parameters.....	111
8.3.16	Add scope parameters.....	112
8.3.17	Remove scope parameters.....	113
8.3.18	Get discovery mode.....	113
8.3.19	Set discovery mode.....	114
8.3.20	Get remote discovery mode.....	114
8.3.21	Set remote discovery mode.....	115
8.3.22	Get remote DP addresses.....	115
8.3.23	Set remote DP addresses.....	116
8.4	Security.....	116
8.4.1	Get access policy.....	116
8.4.2	Set access policy.....	117
8.4.3	Get users.....	117
8.4.4	Create users.....	118
8.4.5	Delete users.....	119
8.4.6	Set users settings.....	120
8.4.7	IEEE 802.1X configuration.....	121
8.4.8	Create self-signed certificate.....	126
8.4.9	Get certificates.....	127
8.4.10	Get CA certificates.....	128
8.4.11	Get certificate status.....	128
8.4.12	Set certificate status.....	129
8.4.13	Get certificate request.....	129
8.4.14	Get client certificate status.....	130
8.4.15	Set client certificate status.....	131

8.4.16	Load device certificate	131
8.4.17	Load device certificates in conjunction with its private key	132
8.4.18	Get certificate information request	133
8.4.19	Load CA certificates	134
8.4.20	Delete certificate	135
8.4.21	Get remote user	136
8.4.22	Set remote user	137
8.4.23	Get endpoint reference	138
8.5	Input/Output (I/O)	138
8.5.1	Get relay outputs	139
8.5.2	Set relay output settings	139
8.5.3	Trigger relay output	140
8.5.4	Auxiliary operation	141
8.6	Service specific fault codes	142
9	Device IO Service	148
9.1	VideoOutputs	148
9.1.1	General	148
9.1.2	GetVideoOutputs	148
9.2	VideoOutputConfiguration	149
9.2.1	GetVideoOutputConfiguration	149
9.2.2	SetVideoOutputConfiguration	149
9.2.3	GetVideoOutputConfigurationOptions	150
9.3	VideoSources	151
9.3.1	General	151
9.3.2	GetVideoSources	151
9.4	VideoSourceConfiguration	152
9.4.1	GetVideoSourceConfiguration	152
9.4.2	SetVideoSourceConfiguration	153
9.4.3	GetVideoSourceConfigurationOptions	153
9.5	AudioOutputs	154
9.5.1	General	154
9.5.2	GetAudioOutputs	154
9.6	AudioOutputConfiguration	155
9.6.1	GetAudioOutputConfiguration	155
9.6.2	SetAudioOutputConfiguration	156
9.6.3	GetAudioOutputConfigurationOptions	156
9.7	AudioSources	157
9.7.1	General	157
9.7.2	GetAudioSources	157
9.8	AudioSourceConfiguration	158
9.8.1	GetAudioSourceConfiguration	158
9.8.2	SetAudioSourceConfiguration	159
9.8.3	GetAudioSourceConfigurationOptions	159
9.9	Relay outputs	160
9.9.1	Get relay outputs	160
9.9.2	Set relay output settings	161
9.9.3	Trigger relay output	162
9.10	Service specific fault codes	163
10	Imaging configuration	164

10.1	Imaging settings	164
10.1.1	Get imaging settings	165
10.1.2	Set imaging settings	166
10.1.3	Get options	167
10.1.4	Move	168
10.1.5	Get move options	169
10.1.6	Stop	170
10.1.7	Get imaging status	171
10.2	Service specific fault codes	172
11	Media configuration	173
11.1	Audio and video codecs	173
11.2	Media profile	173
11.2.1	Create media profile	174
11.2.2	Get media profiles	175
11.2.3	Get media profile	176
11.2.4	Add video source configuration to a profile	177
11.2.5	Add video encoder configuration to a profile	177
11.2.6	Add audio source configuration to a profile	178
11.2.7	Add audio encoder configuration to a profile	179
11.2.8	Add PTZ configuration to a profile	180
11.2.9	Add video analytics configuration to a profile	181
11.2.10	Add metadata configuration to a profile	182
11.2.11	Add audio output configuration	183
11.2.12	Add audio decoder configuration	184
11.2.13	Remove video source configuration from a profile	185
11.2.14	Remove video encoder configuration from a profile	186
11.2.15	Remove audio source configuration from a profile	187
11.2.16	Remove audio encoder configuration from a profile	188
11.2.17	Remove PTZ configuration from a profile	189
11.2.18	Remove video analytics configuration from a profile	190
11.2.19	Remove metadata configuration from a profile	191
11.2.20	Remove audio output configuration	192
11.2.21	Remove audio decoder configuration	193
11.2.22	Delete media profile	194
11.3	Video source	195
11.3.1	General	195
11.3.2	GetVideoSources	195
11.4	Video source configuration	196
11.4.1	Get video source configurations	196
11.4.2	Get video source configuration	197
11.4.3	Get compatible video source configurations	197
11.4.4	Get video source configuration options	198
11.4.5	Modify a video source configuration	199
11.5	Video encoder configuration	200
11.5.1	Get video encoder configurations	201
11.5.2	Get video encoder configuration	201
11.5.3	Get compatible video encoder configurations	202
11.5.4	Get video encoder configuration options	203
11.5.5	Modify a video encoder configuration	204

11.5.6	Get guaranteed number of video encoder instances	205
11.6	Audio source	206
11.6.1	General	206
11.6.2	Get audio sources	206
11.7	Audio source configuration	207
11.7.1	Get audio source configurations	207
11.7.2	Get audio source configuration	208
11.7.3	Get compatible audio source configurations.....	209
11.7.4	Get audio source configuration options.....	210
11.7.5	Modify an audio source configuration.....	211
11.8	Audio encoder configuration	212
11.8.1	Get audio encoder configurations	213
11.8.2	Get audio encoder configuration	213
11.8.3	Get compatible audio encoder configurations	214
11.8.4	Get audio encoder configuration options.....	215
11.8.5	Modify audio encoder configurations.....	217
11.9	Video analytics configuration	217
11.9.1	Get video analytics configurations	218
11.9.2	Get video analytics configuration	218
11.9.3	Get compatible video analytics configurations	219
11.9.4	Modify a video analytics configuration	220
11.10	Metadata configuration	222
11.10.1	Get metadata configurations	222
11.10.2	Get metadata configuration.....	223
11.10.3	Get compatible metadata configurations	223
11.10.4	Get metadata configuration options	224
11.10.5	Modify a metadata configuration	225
11.11	Audio outputs	226
11.11.1	General	226
11.11.2	Get audio outputs	226
11.12	Audio output configuration	227
11.12.1	Get audio output configurations	227
11.12.2	Get audio output configuration	228
11.12.3	Get compatible audio output configurations	229
11.12.4	Get audio output configuration options.....	229
11.12.5	Modify audio output configuration	231
11.13	Audio decoder configuration	231
11.13.1	Get audio decoder configurations	232
11.13.2	Get audio decoder configuration	232
11.13.3	Get compatible audio decoder configurations	233
11.13.4	Get audio decoder configuration options.....	234
11.13.5	Modify audio decoder configuration	235
11.14	Audio channel modes	236
11.15	Stream URI	237
11.15.1	General	237
11.15.2	Request stream URI	237
11.16	Snapshot.....	239
11.16.1	General	239
11.16.2	Request snapshot URI.....	239

11.17 Multicast.....	239
11.17.1 Start multicast streaming	240
11.17.2 Stop multicast streaming	240
11.18 Synchronization points	241
11.18.1 General	241
11.18.2 Set synchronization point.....	241
11.19 Service specific fault codes	242
12 Real time streaming.....	243
12.1 Media stream protocol	244
12.1.1 Transport format.....	244
12.1.2 Media transport	244
12.1.3 Synchronization point	249
12.1.4 JPEG over RTP	249
12.2 Media control protocol	252
12.2.1 Stream control.....	252
12.3 Back channel connection.....	257
12.3.1 RTSP Require – Tag	257
12.3.2 Connection setup for a bi- directional connection.....	258
12.3.3 Multicast streaming.....	260
12.4 Error handling	260
13 Receiver configuration.....	260
13.1 Persistence	260
13.2 Receiver modes	260
13.3 Receiver commands.....	261
13.3.1 Get receivers.....	261
13.3.2 Get receiver.....	261
13.3.3 Create receiver.....	262
13.3.4 Delete receiver	262
13.3.5 Configure receiver	263
13.3.6 SetReceiverMode	263
13.3.7 GetReceiverState	264
13.4 Events.....	264
13.4.1 ChangeState	264
13.4.2 Connection Failed.....	265
13.5 Service specific fault codes	265
14 Display service	265
14.1 Panes.....	266
14.1.1 GetPaneConfigurations.....	266
14.1.2 GetPaneConfiguration	267
14.1.3 SetPaneConfigurations	268
14.1.4 SetPaneConfiguration.....	269
14.1.5 CreatePaneConfiguration	270
14.1.6 DeletePaneConfiguration	271
14.2 Layout	272
14.2.1 GetLayout.....	272
14.2.2 SetLayout.....	273
14.3 Display options.....	274
14.3.1 General	274
14.3.2 LayoutOptions	274

14.3.3	Coding Capabilities.....	274
14.3.4	GetDisplayOptions.....	274
14.4	Events.....	275
14.4.1	General	275
14.4.2	Decoding error event	275
14.5	Service specific fault codes	276
15	Event handling	277
15.1	Basic notification interface.....	277
15.1.1	General	277
15.1.2	Requirements	278
15.2	Real-time Pull-Point Notification Interface	279
15.2.1	Create pull point subscription	280
15.2.2	Pull messages	280
15.3	Notification streaming interface	281
15.4	Properties	281
15.4.1	Property example	282
15.5	Notification structure	282
15.5.1	Notification information.....	283
15.5.2	Message format.....	284
15.5.3	Property example, continued	285
15.5.4	Message description language.....	286
15.5.5	Message content filter	287
15.6	Synchronization point.....	288
15.7	Topic structure	289
15.7.1	ONVIF topic namespace.....	289
15.7.2	Topic type information	290
15.7.3	Topic filter	290
15.8	Get event properties.....	292
15.9	SOAP fault messages.....	293
15.10	Notification example	293
15.10.1	GetEventPropertiesRequest	293
15.10.2	GetEventPropertiesResponse	293
15.10.3	CreatePullPointSubscription	294
15.10.4	CreatePullPointSubscriptionResponse.....	295
15.10.5	PullMessagesRequest	295
15.10.6	PullMessagesResponse.....	296
15.10.7	UnsubscribeRequest	297
15.11	Service specific fault codes	297
16	PTZ control.....	297
16.1	PTZ Model.....	298
16.2	PTZ Node.....	299
16.2.1	GetNodes	300
16.2.2	GetNode.....	300
16.3	PTZ configuration	301
16.3.1	GetConfigurations.....	302
16.3.2	GetConfiguration	303
16.3.3	GetConfigurationOptions	303
16.3.4	SetConfiguration.....	304
16.4	Move operations.....	305

16.4.1	AbsoluteMove.....	306
16.4.2	RelativeMove.....	307
16.4.3	ContinuousMove.....	309
16.4.4	Stop	312
16.4.5	GetStatus	312
16.5	Preset operations	313
16.5.1	SetPreset	313
16.5.2	GetPresets	315
16.5.3	GotoPreset	316
16.5.4	RemovePreset.....	317
16.6	Home position operations	317
16.6.1	GotoHomePosition.....	317
16.6.2	SetHomePosition	318
16.7	Auxiliary operations.....	319
16.7.1	General	319
16.7.2	SendAuxiliaryCommand.....	319
16.8	Predefined PTZ spaces	320
16.8.1	Absolute position spaces	320
16.8.2	Relative translation spaces.....	321
16.8.3	Continuous velocity spaces	323
16.8.4	Speed spaces.....	324
16.9	Service specific fault codes	325
17	Video analytics	327
17.1	Scene description interface	327
17.1.1	Overview	327
17.1.2	Frame related content.....	327
17.1.3	Scene elements	330
17.2	Rule interface.....	334
17.2.1	Rule representation	335
17.2.2	Rule description language	335
17.2.3	Standard rules	336
17.2.4	Operations on rules	338
17.3	Analytics modules interface.....	342
17.3.1	Analytics module configuration	342
17.3.2	Analytics module description language	343
17.3.3	Operations on analytics modules	343
17.4	Service-specific fault codes	347
18	Analytics device	349
18.1	Overview	349
18.2	Analytics engine input	349
18.2.1	GetAnalyticsEngineInputs.....	350
18.2.2	GetAnalyticsEngineInput.....	350
18.2.3	SetAnalyticsEngineInput.....	351
18.2.4	CreateAnalyticsEngineInputs	352
18.2.5	DeleteAnalyticsEngineInputs	353
18.3	Video analytics configuration.....	354
18.3.1	GetVideoAnalyticsConfiguration	354
18.3.2	SetVideoAnalyticsConfiguration.....	355
18.4	Analytics engines	356

18.4.1	GetAnalyticsEngines	356
18.4.2	GetAnalyticsEngine	357
18.5	Analytics engine control	358
18.5.1	GetAnalyticsEngineControls	358
18.5.2	GetAnalyticsEngineControl	359
18.5.3	SetAnalyticsEngineControl	359
18.5.4	CreateAnalyticsEngineControl	360
18.5.5	DeleteAnalyticsEngineControl	362
18.6	GetAnalyticsState	362
18.7	Output streaming configuration	363
18.7.1	General	363
18.7.2	Request stream URI	363
19	Recording control	364
19.1	General	364
19.2	General requirements	366
19.3	Data structures	366
19.3.1	RecordingConfiguration	366
19.3.2	TrackConfiguration	366
19.3.3	RecordingJobConfiguration	366
19.4	CreateRecording	368
19.5	DeleteRecording	369
19.6	GetRecordings	369
19.7	SetRecordingConfiguration	371
19.8	GetRecordingConfiguration	371
19.9	CreateTrack	372
19.10	DeleteTrack	374
19.11	GetTrackConfiguration	374
19.12	SetTrackConfiguration	375
19.13	CreateRecordingJob	376
19.14	DeleteRecordingJob	377
19.15	GetRecordingJobs	378
19.16	SetRecordingJobConfiguration	378
19.17	GetRecordingJobConfiguration	379
19.18	SetRecordingJobMode	380
19.19	GetRecordingJobState	381
19.20	Events	382
19.20.1	Recording job state changes	382
19.20.2	Configuration changes	383
19.20.3	Data deletion	383
19.20.4	Recording and track creation and deletion	383
19.21	Examples	384
19.21.1	Example 1: Setup recording of a single camera	384
19.21.2	Example 2: Record multiple streams from one camera to a single recording	385
20	Recording search	386
20.1	General	386
20.2	Concepts	387
20.2.1	Search direction	387
20.2.2	Recording event	387

20.2.3	Search session	387
20.2.4	Search scope	388
20.2.5	Search filters	388
20.3	Data structures	388
20.3.1	RecordingInformation structure	388
20.3.2	RecordingSourceInformation structure	388
20.3.3	TrackInformation structure	389
20.3.4	SearchState enumeration	389
20.3.5	MediaAttributes structure	389
20.3.6	FindEventResult structure	389
20.3.7	FindPTZPositionResult structure	390
20.3.8	PTZPositionFilter structure	390
20.3.9	MetadataFilter structure	390
20.3.10	FindMetadataResult structure	390
20.4	GetRecordingSummary	390
20.5	GetRecordingInformation	391
20.6	GetMediaAttributes	391
20.7	FindRecordings	392
20.8	GetRecordingSearchResults	393
20.9	FindEvents	394
20.10	GetEventSearchResults	395
20.11	FindPTZPosition	396
20.12	GetPTZPositionSearchResults	397
20.13	FindMetadata	398
20.14	GetMetadataSearchResults	399
20.15	GetSearchState	400
20.16	EndSearch	401
20.17	Recording Event Descriptions	402
20.18	XPath dialect	404
21	Replay control	405
21.1	Use of RTSP	405
21.2	RTP header extension	406
21.2.1	NTP timestamps	406
21.2.2	Compatibility with the JPEG header extension	407
21.3	RTSP feature tag	407
21.4	Initiating Playback	407
21.4.1	Range header field	408
21.4.2	Rate-Control header field	408
21.4.3	Frames header field	409
21.4.4	Synchronization points	409
21.5	Reverse replay	410
21.5.1	Packet transmission order	410
21.5.2	RTP sequence numbers	410
21.5.3	RTP timestamps	410
21.6	RTSP keepalive	411
21.7	Currently recording footage	411
21.8	End of footage	411
21.9	Go to time	411
21.10	Use of RTCP	411

21.11 Replay service commands	412
21.11.1 Request replay URI	412
21.11.2 ReplayConfiguration	413
21.11.3 SetReplayConfiguration	413
21.11.4 GetReplayConfiguration	413
21.11.5 Service specific fault codes	414
22 Security	414
22.1 Transport level security	414
22.1.1 Supported cipher suites	415
22.1.2 Server authentication	415
22.1.3 Client authentication	415
22.2 Message level security	416
22.3 IEEE 802.1X	416
Annex A (informative) Notification topics	417
Annex B (informative) Scene descriptions	420
Annex C (normative) Video IP network interface XML schemata	422
Bibliography	649
Figure 1 – Web Services based development principles	35
Figure 2 – A media profile	40
Figure 3 – Complete profile configuration	41
Figure 4 – Layer structure	43
Figure 5 – PTZ control model	45
Figure 6 – Video analytics architecture	46
Figure 7 – Storage model with tracks	49
Figure 8 – A device, for example a NVT, in an administrative domain (private) and the client (NVC) in a public network	70
Figure 9 – A device, for example a NVT, in public network and the client (NVC) in an administrative domain (private)	70
Figure 10 – A device, for example a NVT, in an administrative domain (private) and the client (NVC) in another administrative domain (private)	70
Figure 11 – Both a device, for example a NVT, and the client (NVC) in a public network	71
Figure 12 – Remote discovery message exchange pattern between a device (for example a NVT) and a Home DP	72
Figure 13 – Message sequence for clients (NVC) pre-configured with home DP address	73
Figure 14 – RTP header	245
Figure 15 – RTCP sequence	247
Figure 16 – RTCP Sender Report	248
Figure 17 – Media synchronization	249
Figure 18 – RTP/JPEG packet structure (only the typical content is listed for the extension payload)	250
Figure 19 – Stream control	253
Figure 20 – Keep Alive	255
Figure 21 – Sequence diagram for the base notification interface	278
Figure 22 – Sequence diagram for the Real-time Pull-Point Notification Interface	279

Figure 23 – Default frame coordinate system	329
Figure 24 – Example of recordings and tracks	365
Figure 25 – Diagram of the RecordingJobConfiguration elements	367
Figure 26 – Diagram of the RecordingJobStateInformation elements	381
Table 1 – Service requirements for the device types	52
Table 2 – Defined namespaces in this standard	53
Table 3 – Referenced namespaces (with prefix).....	54
Table 4 – Referenced namespaces (without prefix).....	55
Table 5 – Operation description outline used in this standard	57
Table 6 – Generic faults.....	61
Table 7 – HTTP errors	62
Table 8 – Scope parameters	67
Table 9 – Get WSDL URL command	74
Table 10 – Get Capabilities command.....	75
Table 11 – The capabilities in the GetCapabilities command.....	76
Table 12 – GetHostname command	78
Table 13 – SetHostname command.....	79
Table 14 – GetDNS command.....	80
Table 15 – Set DNS command.....	81
Table 16 – GetNTP command	82
Table 17 – SetNTP command	83
Table 18 – GetDynamicDNS command	84
Table 19 – SetDynamicDNS command.....	85
Table 20 – GetNetworkInterfaces command.....	85
Table 21 – SetNetworkInterfaces command	86
Table 22 – GetNetworkProtocols command.....	87
Table 23 – SetNetworkProtocols command	88
Table 24 – GetNetworkDefaultGateway command.....	89
Table 25 – SetNetworkDefaultGateway command	89
Table 26 – GetZeroConfiguration command	90
Table 27 – SetZeroConfiguration command	91
Table 28 – GetIPAddressFilter command	91
Table 29 – SetIPAddressFilter command	92
Table 30 – AddIPAddressFilter command	93
Table 31 – RemoveIPAddressFilter command.....	94
Table 32 – GetDot11Capabilities.....	97
Table 33 – IEEE 802.11 capabilities.....	97
Table 34 – GetDot11Status.....	98
Table 35 – ScanAvailable802.11Networks	99
Table 36 – GetDeviceInformation command.....	100
Table 37 – GetSystemUri command	101
Table 38 – GetSystemBackup command	101

Table 39 – RestoreSystem command	102
Table 40 – StartSystemRestore command	103
Table 41 – GetSystemDateAndTime command	104
Table 42 – SetSystemDateAndTime command	105
Table 43 – SetSystemFactoryDefault command	106
Table 44 – UpgradeSystemFirmware command	107
Table 45 – StartFirmwareUpgrade command	108
Table 46 – GetSystemLog command	109
Table 47 – GetSystemSupportInformation command	110
Table 48 – SystemReboot command	110
Table 49 – GetScopes command	111
Table 50 – SetScopes command	112
Table 51 – AddScopes command	112
Table 52 – RemoveScopes command	113
Table 53 – GetDiscoveryMode command	114
Table 54 – SetDiscoveryMode command	114
Table 55 – GetRemoteDiscoveryMode command	115
Table 56 – SetRemoteDiscoveryMode command	115
Table 57 – GetDPAddresses command	116
Table 58 – SetDPAddresses command	116
Table 59 – GetAccessPolicy command	117
Table 60 – SetAccessPolicy command	117
Table 61 – GetUsers command	118
Table 62 – CreateUsers command	119
Table 63 – DeleteUsers command	120
Table 64 – SetUser command	121
Table 65 – CreateDot1XConfiguration command	123
Table 66 – SetDot1XConfigurationRequest command	124
Table 67 – GetDot1XConfiguration command	125
Table 68 – GetDot1XConfigurations command	125
Table 69 – DeleteDot1XConfigurations command	126
Table 70 – CreateCertificate command	127
Table 71 – GetCertificates command	128
Table 72 – GetCACertificates command	128
Table 73 – GetCertificatesStatus command	129
Table 74 – SetCertificatesStatus command	129
Table 75 – GetPkcs10Request command	130
Table 76 – GetClientCertificateMode command	131
Table 77 – SetClientCertificateMode command	131
Table 78 – LoadCertificates command	132
Table 79 – LoadCertificateWithPrivateKey command	133
Table 80 – GetCertificateInformation command	134
Table 81 – LoadCACertificates command	135

Table 82 – DeleteCertificates command	136
Table 83 – GetRemoteUser command	137
Table 84 – SetRemoteUser command	138
Table 85 – GetEndpointReference command	138
Table 86 – GetRelayOutputs command	139
Table 87 – SetRelayOutputSettings command	140
Table 88 – SetRelayOutputState command	141
Table 89 – Send auxiliary command	142
Table 90 – Device service specific fault codes	143
Table 91 – GetVideoOutputs command	149
Table 92 – GetVideoOutputConfiguration command	149
Table 93 – SetVideoOutputConfiguration command	150
Table 94 – GetVideoOutputConfigurationOptions command	151
Table 95 – GetVideoSources command	152
Table 96 – GetVideoSourceConfiguration command	152
Table 97 – SetVideoSourceConfiguration command	153
Table 98 – GetVideoSourceConfiguartionOptions command	154
Table 99 – GetAudioOutputs command	155
Table 100 – GetAudioOutputConfiguration command	155
Table 101 – SetAudioOutputConfiguration command	156
Table 102 – GetAudioOutputConfigurationOptions command	157
Table 103 – GetAudioSources command	158
Table 104 – GetAudioSourceConfiguration command	158
Table 105 – SetAudioSourceConfiguration command	159
Table 106 – GetAudioSourceConfigurationOptions command	160
Table 107 – GetRelayOutputs command	161
Table 108 – SetRelayOutputSettings command	162
Table 109 – SetRelayOutputState command	163
Table 110 – DeviceIO service specific fault codes	164
Table 111 – GetImagingSettings command	166
Table 112 – SetImagingSettings command	167
Table 113 – GetOptions command	168
Table 114 – Move (focus) command	169
Table 115 – GetMoveOptions (focus) command	170
Table 116 – Stop (focus) command	171
Table 117 – GetStatus (focus) command	172
Table 118 – Imaging specific fault codes	172
Table 119 – CreateProfile command	175
Table 120 – GetProfiles command	176
Table 121 – GetProfile command	176
Table 122 – AddVideoSourceConfiguration command	177
Table 123 – AddVideoEncoderConfiguration command	178
Table 124 – AddAudioSourceConfiguration command	179

Table 125 – AddAudioEncoderConfiguration command	180
Table 126 – AddPTZConfiguration command	181
Table 127 – AddVideoAnalytics command.....	182
Table 128 – AddMetadataConfiguration command	183
Table 129 – AddAudioOutputConfiguration	184
Table 130 – AddAudioDecoderConfiguration.....	185
Table 131 – RemoveVideoSourceConfiguration command	186
Table 132 – RemoveVideoEncoderConfiguration command	187
Table 133 – RemoveAudioSourceConfiguration command	188
Table 134 – RemoveAudioEncoderConfiguration command	189
Table 135 – RemovePTZConfiguration command.....	190
Table 136 – RemoveVideoAnalyticsConfiguration command	191
Table 137 – RemoveMetadataConfiguration command.....	192
Table 138 – RemoveAudioOutputConfiguration.....	193
Table 139 – RemoveAudioDecoderConfiguration	194
Table 140 – DeleteProfile command	195
Table 141 – GetVideoSources command	196
Table 142 – GetVideoSourceConfigurations command.....	196
Table 143 – GetVideoSourceConfiguration command	197
Table 144 – GetCompatibleVideoSourceConfigurations command	198
Table 145 – GetVideoSourceConfigurationOptions command	199
Table 146 – SetVideoSourceConfiguration command.....	200
Table 147 – GetVideoEncoderConfigurations command.....	201
Table 148 – GetVideoEncoderConfiguration command.....	202
Table 149 – GetCompatibleVideoEncoderConfigurations command	203
Table 150 – GetVideoEncoderConfigurationOptions command.....	204
Table 151 – SetVideoEncoderConfiguration command.....	205
Table 152 – GetGuaranteedNumberOfVideoEncoderInstances command	206
Table 153 – GetAudioSources command	207
Table 154 – GetAudioSourceConfigurations command.....	208
Table 155 – GetAudioSourceConfiguration command	209
Table 156 – GetCompatibleAudioSourceConfigurations command	210
Table 157 – GetAudioSourceConfigurationOptions command	211
Table 158 – SetAudioSourceConfiguration command.....	212
Table 159 – GetAudioEncoderConfigurations command.....	213
Table 160 – GetAudioEncoderConfiguration command.....	214
Table 161 – GetCompatibleAudioEncoderConfigurations command	215
Table 162 – GetAudioEncoderConfigurationOptions command.....	216
Table 163 – SetAudioEncoderConfiguration command	217
Table 164 – GetVideoAnalyticsConfigurations command.....	218
Table 165 – GetVideoAnalyticsConfiguration command	219
Table 166 – GetCompatibleVideoAnalyticsConfigurations command	220
Table 167 – SetVideoAnalyticsConfiguration command.....	221

Table 168 – GetMetadataConfigurations command	222
Table 169 – GetMetadataConfiguration command	223
Table 170 – GetCompatibleMetadataConfigurations command	224
Table 171 – GetMetadataConfigurationOptions command	225
Table 172 – etMetadataConfiguration command	226
Table 173 – GetAudioOutputs	227
Table 174 – GetAudioOutputConfiguration	228
Table 175 – GetAudioOutputConfiguration	228
Table 176 – GetCompatibleAudioOutputConfiguration	229
Table 177 – GetAudioOutputConfigurationOptions	230
Table 178 – SetAudioOutputConfiguration	231
Table 179 – GetAudioDecoderConfigurations	232
Table 180 – GetAudioDecoderConfiguration	233
Table 181 – GetCompatibleAudioDecoderConfigurations	234
Table 182 – GetAudioDecoderConfigurationOptions	235
Table 183 – SetAudioDecoderConfiguration	236
Table 184 – GetStreamUri command	238
Table 185 – GetSnapshotUri command	239
Table 186 – StartMulticastStreaming command	240
Table 187 – StopMulticastStreaming command	241
Table 188 – SetSynchronizationPoint command	242
Table 189 – Media service specific fault codes	243
Table 190 – RTP header value	245
Table 191 – RTSP methods	254
Table 192 – GetReceivers command	261
Table 193 – GetReceiver command	261
Table 194 – CreateReceiver command	262
Table 195 – DeleteReceiver command	263
Table 196 – ConfigureReceiver command	263
Table 197 – SetReceiverMode command	264
Table 198 – GetReceiverState command	264
Table 199 – Service specific fault codes	265
Table 200 – GetPaneConfigurations	267
Table 201 – GetPaneConfiguration	268
Table 202 – SetPaneConfigurations	269
Table 203 – SetPaneConfiguration	270
Table 204 – CreatePaneConfiguration	271
Table 205 – DeletePaneConfiguration	272
Table 206 – GetLayout	273
Table 207 – SetLayout	273
Table 208 – GetDisplayOptions	275
Table 209 – Service specific fault codes	276
Table 210 – CreatePullPointSubscription command	280

Table 211 – PullMessages command	281
Table 212 – SetSynchronizationPoint command	289
Table 213 – GetEventProperties command	292
Table 214 – GetNodes command	300
Table 215 – GetNode command	301
Table 216 – GetConfigurations command	302
Table 217 – GetConfiguration command	303
Table 218 – GetConfigurationOptions command	304
Table 219 – SetConfiguration command	305
Table 220 – AbsoluteMove command	307
Table 221 – RelativeMove command	309
Table 222 – ContinuousMove command	311
Table 223 – Stop (PTZ) command	312
Table 224 – GetStatus (PTZ) command	313
Table 225 – SetPreset command	314
Table 226 – GetPresets command	315
Table 227 – GotoPreset command	316
Table 228 – RemovePreset command	317
Table 229 – GotoHomePosition command	318
Table 230 – SetHomePosition command	319
Table 231 – Send Auxiliary command	320
Table 232 – PTZspecific fault codes	325
Table 233 – GetSupportedRules command	338
Table 234 – GetRules command	339
Table 235 – CreateRules command	340
Table 236 – ModifyRules command	341
Table 237 – DeleteRules command	342
Table 238 – GetSupportedAnalyticsModules command	344
Table 239 – GetAnalyticsModules command	344
Table 240 – CreateAnalyticsModules command	345
Table 241 – ModifyAnalyticsModules command	346
Table 242 – DeleteAnalyticsModules command	347
Table 243 – The analytics-specific fault codes	348
Table 244 – GetAnalyticsEngineInputs command	350
Table 245 – GetAnalyticsEngineInput command	351
Table 246 – SetAnalyticsEngineInput command	352
Table 247 – CreateAnalyticsEngineInputs command	353
Table 248 – DeleteAnalyticsEngineInputs command	354
Table 249 – GetVideoAnalyticsConfiguration command	355
Table 250 – SetVideoAnalyticsConfiguration command	356
Table 251 – GetAnalyticsEngines command	357
Table 252 – GetAnalyticsEngine command	357
Table 253 – GetAnalyticsEngineControls command	358

Table 254 – GetAnalyticsEngineControl command	359
Table 255 – SetAnalyticsEngineControl command	360
Table 256 – CreateAnalyticsEngineControl command	361
Table 257 – DeleteAnalyticsEngineControl command	362
Table 258 – GetAnalyticsState	363
Table 259 – GetAnalyticsDeviceStreamUri command	364
Table 260 – CreateRecording command	368
Table 261 – DeleteRecording command	369
Table 262 – GetRecordings command	370
Table 263 – SetRecordingConfiguration command	371
Table 264 – GetRecordingConfiguration command	372
Table 265 – CreateTrack command	373
Table 266 – DeleteTrack command	374
Table 267 – GetTrackConfiguration command	375
Table 268 – SetTrackConfiguration command	376
Table 269 – CreateRecordingJob command	377
Table 270 – DeleteRecordingJob command	378
Table 271 – GetRecordingJobs command	378
Table 272 – SetRecordingJobConfiguration command	379
Table 273 – GetRecordingJobConfiguration command	380
Table 274 – SetRecordingJobMode command	380
Table 275 – GetRecordingJobState command	381
Table 276 – GetRecordingSummary command	391
Table 277 – GetRecordingInformation command	391
Table 278 – GetMediaAttributes command	392
Table 279 – FindRecordings command	393
Table 280 – GetRecordingSearchResults command	394
Table 281 – FindEvents command	395
Table 282 – GetEventSearchResults command	396
Table 283 – FindPTZPosition command	397
Table 284 – GetPTZPositionSearchResults command	398
Table 285 – FindMetadata command	399
Table 286 – GetMetadataSearchResults command	400
Table 287 – GetSearchState command	401
Table 288 – EndSearch command	401
Table 289 – RTP packet layout	406
Table 290 – RTP packet with JPEG header layout	407
Table 291 – GetReplayUri command	412
Table 292 – SetReplayConfiguration command	413
Table 293 – GetReplayConfiguration command	413
Table 294 – Replay service specific fault codes	414

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.711-198811-1!!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>](http://www.ietf.org/rfc/rfc4702.txt)

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

[<http://www.ietf.org/rfc/rfc4861.txt>](http://www.ietf.org/rfc/rfc4861.txt)

IETF RFC 4862, *IPv6 Stateless Address Autoconfiguration*

[<http://www.ietf.org/rfc/rfc4862.txt>](http://www.ietf.org/rfc/rfc4862.txt)

W3C SOAP 1.2, Part 1, *Messaging Framework*

[<http://www.w3.org/TR/soap12-part1/>](http://www.w3.org/TR/soap12-part1/)

W3C SOAP Version 1.2 Part 2: Adjuncts (Second Edition)

[<http://www.w3.org/TR/2007/REC-soap12-part2-20070427/>](http://www.w3.org/TR/2007/REC-soap12-part2-20070427/)

OASIS Web Services Base Notification 1.3

[<http://docs.oasis-open.org/wsn/wsn-ws_base_notification-1.3-spec-os.pdf>](http://docs.oasis-open.org/wsn/wsn-ws_base_notification-1.3-spec-os.pdf)

OASIS Web Services Security UsernameToken Profile 1.0

[<http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0.pdf>](http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0.pdf)

W3C XML Schema Part 1: Structures Second Edition

[<http://www.w3.org/TR/xmlschema-1/>](http://www.w3.org/TR/xmlschema-1/)

W3C XML Schema Part 2: Datatypes Second Edition

[<http://www.w3.org/TR/xmlschema-2/>](http://www.w3.org/TR/xmlschema-2/)

W3C XML-binary Optimized Packaging

[<http://www.w3.org/TR/2005/REC-xop10-20050125/>](http://www.w3.org/TR/2005/REC-xop10-20050125/)

W3C XML Path Language (XPath) Version 1.0

[<http://www.w3.org/TR/xpath/>](http://www.w3.org/TR/xpath/)

IEEE 802.11:2007, *IEEE Standard for Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications*

[<http://standards.ieee.org/getieee802/download/802.11-2007.pdf>](http://standards.ieee.org/getieee802/download/802.11-2007.pdf)

IEEE 802.1X, Port-Based Network Access Control

<<http://standards.ieee.org/getieee802/download/802.1X-2004.pdf>>

[UDDI API ver2] “*UDDI Version 2.04 API Specification UDDI Committee Specification, 19 July 2002*”, OASIS standard, 19 July 2002

<<http://uddi.org/pubs/ProgrammersAPI-V2.04-Published-20020719.pdf>>

[UDDI Data Structure ver2] “*UDDI Version 2.03 Data Structure Reference UDDI Committee Specification*”, OASIS standard, 19 July 2002.

<<http://uddi.org/pubs/DataStructure-V2.03-Published-20020719.pdf>>

[WS-X.509Token] “*Web Services Security X.509 Certificate Token Profile 1.1*”, OASIS Standard, 1 February 2006.

<<http://www.oasis-open.org/committees/download.php/16785/wss-v1.1-spec-os-x509TokenProfile.pdf>>