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Broadband, triple-play and advanced multimedia
services – Advanced multimedia services and applications

Protocols for mobile visual surveillance

Recommendation ITU-T H.627.1



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Recommendation ITU-T H.627.1

Protocols for mobile visual surveillance

Summary

Recommendation ITU-T H.627.1 describes the detailed specification of reference points, message flows control methods and overall protocols of a mobile visual surveillance system based on the requirements described in Recommendation ITU-T F.743 and functional architecture described in Recommendation ITU-T H.626.1.

This Recommendation focuses on the protocols of a visual surveillance system with mobile units and the services related to mobile units, such as a mobile customer unit accessing real-time video stream from a visual surveillance system. This Recommendation defines reference points, message syntax and semantics and relevant protocols.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T H.627.1	2017-03-01	16	11.1002/1000/13191

Keywords

Message flows, mobile visual surveillance, protocols, reference points.

* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Recommendation ITU-T H.627.1

Protocols for mobile visual surveillance

1 Scope

This Recommendation focuses on the protocols of a visual surveillance system with mobile units and the services related to mobile units, such as a mobile customer unit accessing real-time video stream from a visual surveillance system.

This Recommendation defines the reference points and focuses on the protocols for a mobile visual surveillance system, based on the architecture defined in [ITU-T H.626.1].

Furthermore, this Recommendation utilizes and extends some existing protocols such as session initiation protocol (SIP), real-time transport protocol (RTP), real-time streaming protocol (RTSP) and hypertext transfer protocol (HTTP) and also defines the message format and text.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T F.743] Recommendation ITU-T F.743 (2009), *Requirements and service description for visual surveillance*.
- [ITU-T H.626] Recommendation ITU-T H.626 (2011), *Architectural requirements for visual surveillance*.
- [ITU-T H.626.1] Recommendation ITU-T H.626.1 (2013), *Architecture for mobile visual surveillance*.
- [ITU-T H.627] Recommendation ITU-T H.627 (2012), *Signalling and protocols for visual surveillance*.
- [IETF RFC 3261] IETF RFC 3261 (2002), *SIP: Session Initiation Protocol*.
<https://datatracker.ietf.org/doc/rfc3261/>
- [IETF RFC 3550] IETF RFC 3550 (2003), *RTP: A Transport Protocol for Real-Time Applications*.
<https://datatracker.ietf.org/doc/rfc3550/>
- [IETF RFC 7231] IETF RFC 7231 (2014), *Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content*. <https://datatracker.ietf.org/doc/rfc7231/>
- [IETF RFC 7826] IETF RFC 7826 (2016), *Real-Time Streaming Protocol Version 2.0*.
<https://datatracker.ietf.org/doc/rfc7826/>

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 application [b-ITU-T Y.101]: A structured set of capabilities, which provide value-added functionality supported by one or more services.

3.1.2 customer [b-ITU-T M.60]: A customer is an entity which receives services offered by a service provider based on a contractual relationship. It may include the role of a network user.

3.1.3 customer unit [ITU-T H.626]: A device located at the customer part of a visual surveillance system and used to present multimedia information (such as audio, video, image, alarm signal, etc.) to the end user.

3.1.4 functional architecture [b-ITU-T Y.2012]: A set of functional entities and the reference points between them used to describe the structure of an NGN. These functional entities are separated by reference points, and thus they define the distribution of functions.

NOTE – The functional entities can be used to describe a set of reference configurations. These reference configurations identify which reference points are visible at the boundaries of equipment implementations and between administrative domains.

3.1.5 interface [b-ITU-T Y.101]: A shared boundary between two functional units.

3.1.6 media [b-ITU-T Y.101]: Plural of medium.

3.1.7 medium [b-ITU-T Y.101]: Specific physical support for transmission or storage of information. Type of presentation of information (i.e., video, audio, text, etc.).

3.1.8 mobile customer unit (M_CU) [ITU-T H.626.1]: Mobile client software installed in customers' mobile devices. The M_CU is used to initiate the service and provide customers with video viewing.

3.1.9 mobile service portal (MSP) [ITU-T H.626.1]: A series of devices and subsystems located at the central part of a mobile visual surveillance system. The MSP is the business application platform of the mobile visual surveillance system. Its main functions include a unified access entrance to the business entrance of user authentication and the display list of users' monitoring permissions. The MSP can carry out user authentication, query the list of monitoring permissions, synchronize user account information, and assist service management through the exchange of information with the centre management unit (CMU).

3.1.10 reference point [b-ITU-T Y.2012]: A conceptual point at the conjunction of two non-overlapping functional entities that can be used to identify the type of information passing between these functional entities.

NOTE – A reference point may correspond to one or more physical interfaces between pieces of equipment.

3.1.11 service [b-ITU-T Y.101]: A structure set of capabilities intended to support applications.

3.1.12 packet-switched streaming service (PSS) [ITU-T H.626.1]: A device located at the central part of a mobile visual surveillance system. The PSS is the stream media server and processes media stream distribution between the M_CU and the VAU. The main functions of PSS include responding to the service request message sent by M_CU, getting the real-time media stream from VAU and distributing the stream to multiple M_CUs.

3.1.13 premises unit [ITU-T H.626]: A device located at the remote part of a visual surveillance system and used to capture multimedia information (such as audio, video, image, alarm signal, etc.) from a surveilled object.

3.1.14 video access unit (VAU) [ITU-T H.626.1]: A device located at the central part of a mobile visual surveillance system. The VAU is used to implement communication between the mobile customer unit (M_CU) and the units defined in [ITU-T H.626]. The VAU's main functions include: requesting the CMU for scheduling information to be used to establish the media session between the media distribution unit (MDU) and the packet-switched streaming service (PSS), processing requests from the agent mobile customer unit for control of pan/tilt/zoom (PTZ) and distributing and transcoding multimedia data.

3.1.15 visual surveillance [ITU-T H.626]: A telecommunication service focusing on video (but including audio) application technology, which is used to remotely capture multimedia (such as audio, video, image, alarm signal, etc.) and present them to the end user in a user-friendly manner, based on a managed broadband network with ensured quality, security and reliability.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

CDMA	Code Division Multi Access
CMU	Centre Management Unit
CU	Customer Unit
GW	Gateway
HTTP	HyperText Transfer Protocol
ID	Identification
IP	Internet Protocol
IPC	IP Camera
M_CU	Mobile Customer Unit
MDN	Mobile Directory Number
MDU	Media Distribution Unit
MIB	Management Information Base
MSP	Mobile Service Portal
NGN	Next Generation Network
NVR	Network Video Recorder
PSS	Packet-switched streaming service
PTZ	Pan/Tilt/Zoom
PU	Premises Unit
PUID	Premises Unit Identifier
R/W	Read/Write
RTCP	Real-time Transport Control Protocol
RTP	Real-time Transport Protocol
RTSP	Real-time Streaming Protocol
SCU	Service Control Unit
SIP	Session Initiation Protocol
SOAP	Simple Object Access Protocol
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
URL	Uniform Resource Locator

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UTF-8	8-bit Unicode Transformation Format
VAU	Video Access Unit
VS	Visual Surveillance
WAP	Wireless Application Protocol
XML	Extensible Markup Language

5 Conventions

In this Recommendation, "String" is a data type used to describe a sequence of characters in UTF-8 format. "Integer" is a datum of integral data type that represents an 8-bit subset of mathematical integers.

6 Message syntax and semantics

[ITU-T H. 626.1] describes the overall architectural framework of mobile visual surveillance as shown in Figure 6-1 and it also introduces reference points of the architecture. This Recommendation gives a more detailed description of these reference points.

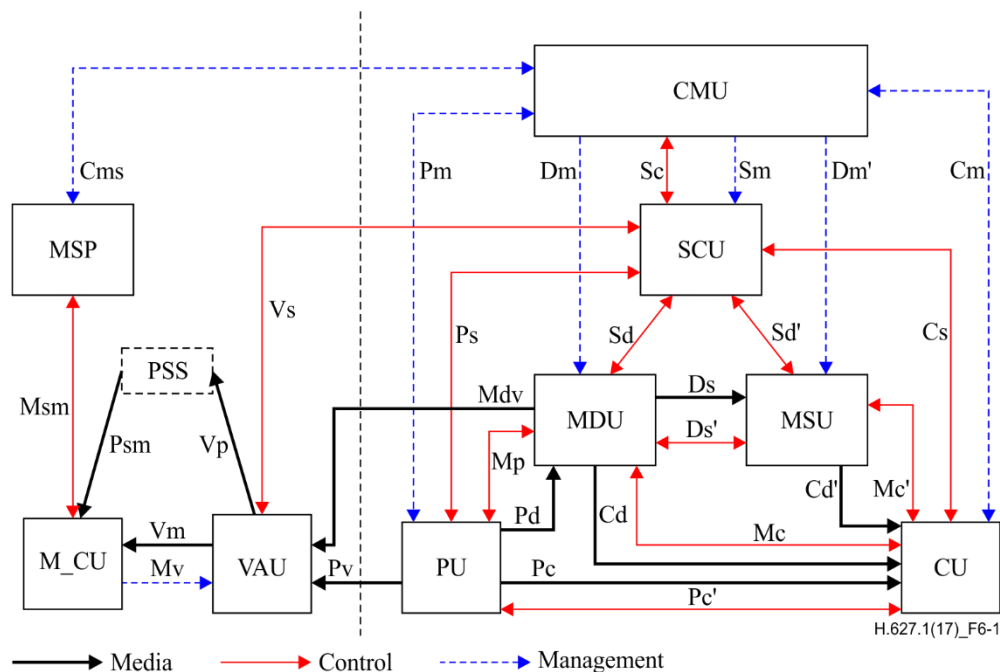


Figure 6-1 – Functional architecture framework of mobile visual surveillance

The interfaces and protocols involved in mobile video surveillance are listed as follows:

- 1) Reference point Cms: CMU-MSP, uses the Web service interface protocol (SOAP/HTTP)
- 2) Reference point Msm: MSP-M_CU, uses the HTTP protocol
- 3) Reference point Mv: M_CU-VAU, uses the user datagram protocol (UDP) communication protocol
- 4) Reference point Vm: VAU-M_CU, uses the HTTP/RTSP, RTP/RTCP protocol
- 5) Reference point Psm: PSS-M_CU, uses the HTTP/RTSP, RTP/RTCP protocol
- 6) Reference point Vs: VAU-SCU, uses the HTTP protocol
- 7) Reference point Mdv: MDU-VAU, uses the RTP/RTCP protocol
- 8) Reference point Pv: PU-VAU, uses the RTP/RTCP protocol

- 9) Reference point Vp: VAU-PSS, uses the RTSP protocol.

6.1 Reference point Cms: CMU-MSP

6.1.1 Interface functions

Reference point Cms is between the centre management unit (CMU) and the mobile service portal (MSP). This interface is used for querying the attributes of the surveillance points when the users log in and to query the information of all surveillance points available for mobile surveillance service:

- User authentication and surveillance point query: When a user logs into the mobile service portal (MSP) using M_CU, the MSP gets the User ID and password of the current user (if the user chooses the universal sign-in way, the MSP needs to translate the mobile directory number (MDN) number into the corresponding User ID and password locally), then the MSP authenticates the user to the centre management unit (CMU) of the video surveillance platform via the User ID and password. If authentication fails, the failed message is returned. If it succeeds, the CMU will query the surveillance point information according to the current User ID, the CMU returns the corresponding surveillance point and parameter list under the User ID in the MSP.
- Query the enterprise surveillance points attribution: When an enterprise user logs into the Enterprise Self-Service system through the MSP, the MSP gets the relevant information of the current surveillance point list that the enterprise has activated on the CMU video surveillance platform through the enterprise account.
- RTSP media stream entrance query: When a user queries certain kinds of media streaming from a surveillance point, the CMU returns the RTSP access address that the user gets through internal query scheduling on the platform.

NOTE – Access to the media requires the access token.

An authorized user requests resources according to the original interface specification, called "reqUserChannelInfo".

6.1.2 Interface protocols

This interface uses IP protocol and the Web service interface protocol (SOAP/HTTP).

6.1.3 Message format

1) The enterprise attribute information query

The MSP queries the enterprise attribute information according to the corporate identity (customerID) with the parameters indicated in Table 6.1-1. The parameters returned are found in Table 6.1-2.

Table 6.1-1 – Interface: MSP→CMU

MSP-CMU interface parameters			
Parameter	Parameter name	Data type	Notes
CustomerId	Enterprise ID	String	Telecom administrator manually input when the MSP service opened (18 bits). The first six bits of customerID refer to the domain ID (platform domain).

Table 6.1-2 – Interface: CMU→MSP

MSP-CMU interface parameters			
Parameter	Parameter name	Data type	Notes
CustomerName	Customer names	String	
CustomerType	Customer type	Integer	Only : Enterprise:1
Address	Customer address	String	
PhoneNumber	Customer phone number	String	
Fax	Customer fax number	String	
ZipCode	Customer zip code	String	
Email	Customer E-mail	String	
TransactPerson	The operator	String	
AdminAccount	Video surveillance admin account	String	
ResultCode	Return code	Integer	0 if enterprise ID does not exist 1 for access success
NOTE – The user uses "adminAccount prefix" to login to the MSP Enterprise Self-Service page, the user ID and user account are in the same format.			

2) Search enterprise information list

The MSP queries the enterprise attribute information according to the corporate identity (customer ID) or customer name with the parameters listed in Table 6.1-3. The returned parameters are listed in Table 6.1-4.

Table 6.1-3 – Interface: MSP→CMU

MSP-CMU interface parameters			
Parameter	Parameter name	Data type	Notes
searchCID	Enterprise ID	String	Telecom administrator manually inputs when the MSP service opened (18). The first six bits of customerID refer to the domain ID (Platform domain).
searchCN	Enterprise name	String	Company name

Table 6.1-4 – Interface: CMU→MSP

MSP-CMU interface parameters			
Parameter	Parameter name	Data type	Notes
CustomerName	Customer names	String	
CustomerType	Customer type	Integer	Only : Enterprise:1
Address	Customer address	String	
PhoneNumber	Customer phone number	String	
Fax	Customer fax number	String	