International Telecommunication Union

# ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

# H.621

**Amendment 1**

(10/2014)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

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

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## Architecture of a system for multimedia information access triggered by tag-based identification

## Amendment 1: Supporting multiple air interfaces

Recommendation ITU-T H.621 (2008) – Amendment 1

International Telecommunication Union

ITU-T H-SERIES RECOMMENDATIONS

**AUDIOVISUAL AND MULTIMEDIA SYSTEMS**

| | |
|---|---|
| CHARACTERISTICS OF VISUAL TELEPHONE SYSTEMS | H.100–H.199 |
| INFRASTRUCTURE OF AUDIOVISUAL SERVICES | |
| General | H.200–H.219 |
| Transmission multiplexing and synchronization | H.220–H.229 |
| Systems aspects | H.230–H.239 |
| Communication procedures | H.240–H.259 |
| Coding of moving video | H.260–H.279 |
| Related systems aspects | H.280–H.299 |
| Systems and terminal equipment for audiovisual services | H.300–H.349 |
| Directory services architecture for audiovisual and multimedia services | H.350–H.359 |
| Quality of service architecture for audiovisual and multimedia services | H.360–H.369 |
| Telepresence | H.420–H.429 |
| Supplementary services for multimedia | H.450–H.499 |
| MOBILITY AND COLLABORATION PROCEDURES | |
| Overview of Mobility and Collaboration, definitions, protocols and procedures | H.500–H.509 |
| Mobility for H-Series multimedia systems and services | H.510–H.519 |
| Mobile multimedia collaboration applications and services | H.520–H.529 |
| Security for mobile multimedia systems and services | H.530–H.539 |
| Security for mobile multimedia collaboration applications and services | H.540–H.549 |
| Mobility interworking procedures | H.550–H.559 |
| Mobile multimedia collaboration inter-working procedures | H.560–H.569 |
| BROADBAND, TRIPLE-PLAY AND ADVANCED MULTIMEDIA SERVICES | |
| Broadband multimedia services over VDSL | H.610–H.619 |
| **Advanced multimedia services and applications** | **H.620–H.629** |
| Ubiquitous sensor network applications and Internet of Things | H.640–H.649 |
| IPTV MULTIMEDIA SERVICES AND APPLICATIONS FOR IPTV | |
| General aspects | H.700–H.719 |
| IPTV terminal devices | H.720–H.729 |
| IPTV middleware | H.730–H.739 |
| IPTV application event handling | H.740–H.749 |
| IPTV metadata | H.750–H.759 |
| IPTV multimedia application frameworks | H.760–H.769 |
| IPTV service discovery up to consumption | H.770–H.779 |
| Digital Signage | H.780–H.789 |
| E-HEALTH MULTIMEDIA SERVICES AND APPLICATIONS | |
| Interoperability compliance testing of personal health systems (HRN, PAN, LAN and WAN) | H.820–H.859 |
| Multimedia e-health data exchange services | H.860–H.869 |

*For further details, please refer to the list of ITU-T Recommendations.*

# Recommendation ITU-T H.621

## Architecture of a system for multimedia information access triggered by tag-based identification

## Amendment 1

## Supporting multiple air interfaces


### Summary

Recommendation ITU-T H.621 defines the system architecture for the multimedia information access triggered by tag-based identification on the basis of Recommendation ITU-T F.771, and serves as a technical introduction to subsequent definition of detailed system components and protocols. The services treated by this Recommendation provide the users with a new method to refer to the multimedia content without typing its address on a keyboard or inputting the name of objects about which relevant information is to be retrieved. This is one of the major communication services using identification (ID) tags such as radio frequency identifications (RFIDs), smart cards and barcodes. International standardization of these services will give a big impact to international multimedia information services using ID tags. It contains the functional model, its constituent components as well as its workflow. An appendix describes how this architecture realizes typical services.

Amendment 1 (2014) clarifies that an ID terminal can have and supports multiple radio frequency (RF) communications.



### History

| Edition | Recommendation | Approval | Study Group | Unique ID* |
|---|---|---|---|---|
| 1.0 | ITU-T H.621 | 2008-08-06 | 16 | 11.1002/1000/9490 |
| 1.1 | ITU-T H.621 (2008) Amd.1 | 2014-10-14 | 16 | 11.1002/1000/12246 |

### Keywords

Multimedia information access, tag-based identification.


* 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.

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## Introduction

This Recommendation defines the system architecture for multimedia information access triggered by tag-based identification and serves as a technical introduction to subsequent specifications of detailed system components and protocols. It contains the functional model, its constituent components as well as its workflow. An appendix describes how this architecture realizes typical services.

# Recommendation ITU-T H.621

## Architecture of a system for multimedia information access triggered by tag-based identification

## Amendment 1

## Supporting multiple air interfaces

*Modifications introduced by this amendment are shown in revision marks. Unchanged text is replaced by ellipsis (…). Some parts of unchanged text (clause numbers, etc.) may be kept to indicate the correct insertion points.*

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### 1 Scope

This Recommendation defines the following issues to cover multimedia information access services triggered by tag-based identification as defined in [ITU-T F.771]:

– a functional architecture reference model with descriptions of corresponding elements;

– interface protocols between communication elements; and

– a generic work flow to support multimedia information access triggered by tag-based identification.

Moreover, this Recommendation describes implementation examples with work flows.

### 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.771] Recommendation ITU-T F.771 (2008), *Service description and requirements for multimedia information access triggered by tag-based identification*~~,~~, including its Amendment 1 (2014).

### 3 Definitions

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### 4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

2D Two Dimensional

…

| | |
|---|---|
| NGN | Next Generation Network |
| ORM | Optically Readable Media |
| P2P | Peer to Peer |

…

## 6 System functional architecture

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#### 6.1.2.1 ID tag R/W

An ID tag R/W is required to provide communication interfaces to an ID tag, and read a single or multiple identifier(s) as well as application data from the ID tag. After reading the identifiers, it sends their information to the MIDF. ~~An ID terminal can optionally contain multiple ID tag R/Ws~~ An ID terminal can optionally contain multiple ID tag R/Ws where a selection function of frequency bands is required to choose a proper ID tag R/W interface against multiple RF types of ID tags such as HF-type ID tags and UHF-type ID tags. The selection function may be provided via a manual selection user interface, an automatic scanning function or other ways which are an implementation issue. Similarly, selection function of optically readable media (ORM) (1-dimentional~~,~~ vs 2-dimentional, different type of 2-dimentional codes, etc.) is an optional feature which can be provided via a manual selection user interface, an automatic scanning function or other manners which are an implementation issue.

#### 6.1.2.2 Multimedia information discovery function (MIDF)

…

# Appendix II

## Workflow examples for multimedia information access triggered by tag-based identification

(This appendix does not form an integral part of this Recommendation.)

This appendix presents ~~five~~ seven typical examples of multimedia information access triggered by tag-based identification included in [ITU-T F.771]. For each example, its application scenario is described, and then the functional architecture and associated workflow are presented. Here, to make the description simple, the service broker is not used in the architecture and workflow.

…

### II.5.3 Workflow

1) ID tag R/W of the theatre seat obtains the visitor identifier from the visitor's ticket.
2) ID tag R/W sends the visitor identifier to the MIDF in the presence management application.

3) MIDF sends the visitor identifier to the IDR to find the theatre management servers associated with the visitor identifier.

4) IDR informs the pointer and transfer protocol of the theatre management servers to the MIDF.

5) MIDF sends the information to the MIHF, which, in turn, requests the theatre management servers to obtain the presence information.

6) The server replies with the presence information.

7) Multimedia information browser updates the presence information according to the received information, and shows it to the theatre manager.

## II.6 Food safety check and purchase

### II.6.1 Application scenario

This application scenario is associated with the use case scenario of I.4, "Food traceability", in Appendix I of [ITU-T F.771].

A consumer wants to check with his/her smartphone the origin of production, the route of supply and the current status of quality for a food item before the purchase. The food item has been attached a UHF-type RFID tag. The smartphone has a dual-band RFID reader/writer to communicate with both HF and UHF ID tags, where the HF communication feature of the dual band reader/writer is provided by the NFC technology.

The user instructs the smartphone to do a food safety check and gets a response containing safety and other information from the food trace information server. If the user is satisfied with the information, he/she proceeds to buy the food item.

The user enables a payment feature of the smartphone and approaches the smartphone to a payment terminal with an HF-type (NFC-type) ID R/W, for the payment. A payment receipt is returned to the user after the payment succeeds.

### II.6.2 System architecture

In this scenario, the configuration of the system is illustrated with the following representation relationships:

– Smartphone: ID terminal

– UHF ID tag: UHF-type RFID tag working as an ID tag

– HF ID tag: HF-type RFID tag working as an ID tag by NFC

– ID tag R/W a): UHF-type RFID R/W

– ID tag R/W b): HF-type RFID R/W

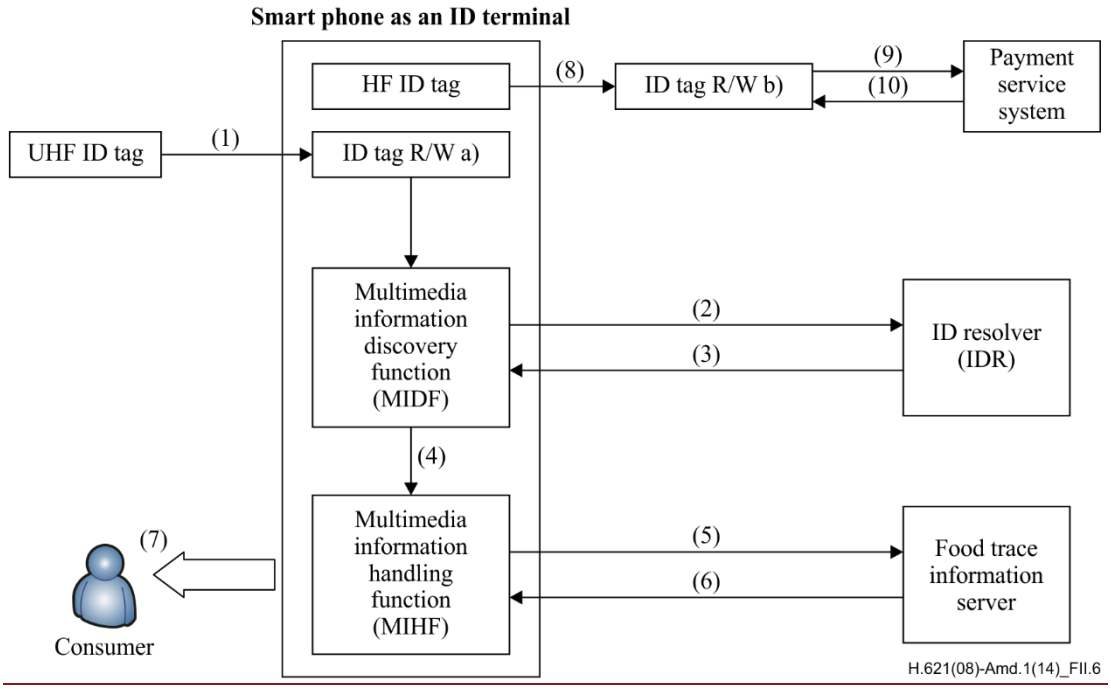


**Figure II.6 – Implementation architecture and workflow of the food safety check and purchase case**

The dual band RFID reader in the ID terminal can work sometimes as a UHF RFID reader, "ID tag R/W a)", sometimes as an NFC reader and sometimes as an NFC tag, "HF ID tag". The "ID tag R/W b)" and the "Payment Service System" correspond to the conventional smart card payment service.

### II.6.3 Workflow

1) ID tag R/W a) in the smartphone reads the food identifier via UHF.

2) MIDF sends the food identifier to the IDR to find the food trace information server associated with food identifier.

3) IDR informs the location and transfer protocol of the food trace information server to the MIDF.

4) MIDF sends the location and transfer protocol information to the MIHF.

5) MIHF requests the food trace information server to obtain the food safety information.

6) The food trace information server replies with the food safety information.

7) The consumer reads the food safety information.

8) In case of buying the food, the consumer enables the payment feature of his/her smart phone and puts his/her smart phone, working as an HF ID tag herein, to ID tag R/W b).

9) ID tag R/W b) sends payment information consisting of a credit card number, for example, to the payment service system.

10) The payment service system sends a payment operation result, i.e. success or failure, back to the ID tag R/W b) which, then, prints out a proper notice for receipt or failure.

## II.7 Visitor identification and guidance service with multimedia information

### II.7.1 Application scenario

In this scenario, ID terminal is a kind of smartphone which has four components of interest: a UHF ID tag R/W, an HF ID tag, an HF ID tag R/W and a human presence management application. In this scenario, a visitor is given a visitor ID tag and the visitor reads that tag by the HF ID tag R/W and

writes that information to the HF ID tag in his/her smartphone. The visitor is guided by UHF ID tags and the presence management system to the final destination in the building. The security building has an HF ID reader at the entrance gate and UHF ID tags are installed on the walls of corridors. The HF ID reader identifies a visitor and the UHF ID R/W of the smartphone reads the UHF ID tags on walls, and the smartphone displays the direction and route to the final destination. Therefore, a visitor who has the smartphone described above can enter the security building by obtaining the admission credentials by using the HF ID tag, and will be guided to the final destination in the building by using the UHF ID tag R/W.

### II.7.2 System architecture

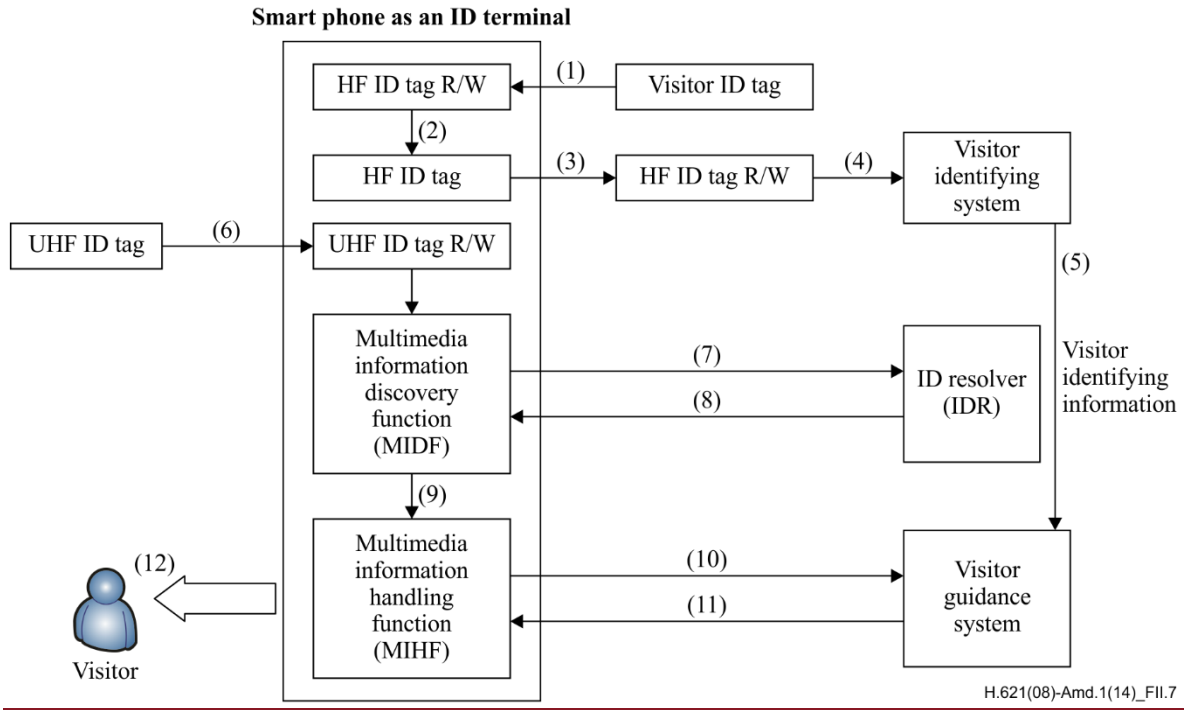


**Figure II.7 – Implementation architecture and workflow of a visitor identification and guidance service with multimedia information**

### II.7.3 Workflow

1) Visitor reads visitor card (HF ID Tag) which is given by a guide of a building by using HF ID tag R/W of his/her smartphone.
2) HF ID tag R/W writes that information to HF ID tag of his/her smartphone.
3) HF ID tag R/W of the visitor identification system reads the HF ID tag which is located in the smartphone of the visitor and obtains the visitor identifier information from that.
4) Identifier of the visitor is sent to the visitor identification system.
5) Visitor identification system sends that information to the visitor guidance system.
6) UHF ID tag reader reads a UHF ID tag which is installed on the wall of corridor.
7) MIDF sends the ID to the IDR.
8) IDR informs the direction and route instructions of the visitor guidance server to the MIDF.
9) MIDF sends the information to the MIHF, which, in turn, requests the visitor management servers to obtain the presence information.
10) MIHF sends presence information to the visitor guidance system.
11) The visitor guidance system updates the presence information according to the received information, and calculates the route to the final destination.

12) Smart phone of the visitor shows the current location and route to the final destination on the screen of the smart phone.

13) The visitor can open the door of the final destination by using the HF ID tag in his/her smartphone.

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[b-ISO/IEC 18000-4] ISO/IEC 18000-4 (2008), *Information technology – Radio frequency identification for item management – Part 4: Parameters for air interface communications at 2,45 GHz*.

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| | |
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| **Series H** | **Audiovisual and multimedia systems** |
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