PD IEC TR 63122-2:2019

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Smart television

Part 2: Framework of integrated service on smart television

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National foreword

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TECHNICAL REPORT

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Smart television –
Part 2: Framework of integrated service on smart television

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SMART TELEVISION –

Part 2: Framework of integrated service on smart television

FOREWORD

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IEC/TR 63122-2, which is a technical report, has been prepared by subcommittee TA 1: Terminals for audio, video and data services and contents, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
100/2904/DTR	100/3054/RVDTR

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

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

A list of all the parts in the IEC 63122 series, published under the general title *Smart television*, can be found on the IEC website.

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

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- withdrawn,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

A bilingual version of this publication may be issued at a later date.

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INTRODUCTION

This Technical Report is formulated based on the current state of the industrialization of smart television and regards open innovation, vertical integration of chain and in-depth incorporation of technology and service as fundamental principles. The intention of this document is to strengthen the innovation of smart television in terms of technology, service mode and system mechanism, to advance compatibility of smart television products, and to speed up the expansion of the application market, thereby putting forward a relevant conceptual model and standardized demand for smart television. This document applies to guide service operations and service mode implementation of smart television.

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SMART TELEVISION –

Part 2: Framework of integrated service on smart television

1 Scope

This part of IEC 63122 specifies the service pattern conceptual model and standardized demand of smart television, illustrates the terms and related to smart television, and describes service reference model of smart television, the reference model of the service pattern as well as interfaces between various platforms.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
smart television service
general designation of many services provided to users through networks that support live broadcast of interactive television programmes, on-demand multimedia content and various interactive application programs

3.2
smart television service operation platform
platform built, maintained and managed by the service provider in the mode of smart television partnership operations and which is responsible for the electronic programme list service, content distribution, etc.

3.3
operations and maintenance support system
service management platform interacted with service management system is used to complete business service information inquiry and related management.

4 Reference model of smart television service

4.1 Description of general smart television service

4.1.1 General

This document specifies various service industry models, various service descriptions and management system frameworks for smart television services, and offers technical guidance and standard specifications for the development and progress of smart television services. This document also specifies data models and technical definitions of smart television services and puts forward a technical specification for the purpose of further specifying a

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reference model of smart television services. A smart television terminal that supports general services needs to meet the following requirements.

- System: by installing a smart operating system, such as Android™[1] or iOS™[2], a user may freely install and uninstall application programs provided by third-party service providers and voluntarily select to accept or expand services, etc.; the user may extend the functions of a traditional television with installed programs, realize somatosensory games, software downloads and installation, multi-screen interaction and voice operation, thereby conducting service for intensive users across regions. The system has a relatively high reliability and availability.
- Openness: openness and consistence in terms of service capacity, service size, network size, user access mode, service access mode and device interconnection. An open platform allows infinite extension of content and applications.
- Mode of delivery: a smart television service may be delivered through smart interactive means, such as voice control and gesture interaction. Such means are important for service improvement and expansion. It can realize integration and interaction of information, entertainment, application and message on the television screen.

4.1.2 Service industrial chain

General smart television service offers the following features.

- One-way interactive information flow: allows the user to search and interact with information, including data flows mainly consisting of audio-video and allows the user to control information mainly containing smart interaction, transformation of traditional one-way viewing into two-way interaction mode, and provide the content along with the appropriate service mode. See Annex B for the typical smart interaction model.
- Provision of streaming service: content cache, distribution and storage. Underpinning "content first", smart home entertainment terminals are becoming the new focus of the development trend of smart television. In consideration of the high level of popularization and development of traditional television, consumption of new smart television is aimed at providing users with funded content services. Current smart television terminals are in strict compliance with the principle of high-level integration between hardware and content in terms of interaction mode, multi-screen interaction and application content download. See Annex E for the typical technical application of smart television.
- Provision of enriched and diversified video/audio resources, entertainment application platforms and content services: smart television developers are encouraged to actively build a unique ecological system, and launch novel content based on consumption habits and actual demand for smart television, thereby creating an ecological system and profit mode truly exclusive to smart television.

Based on the current development of smart television, the industrial chain of smart television services mainly consists of the following components as shown in Figure 1.

---

[1] Android is the trademark of a product supplied by Google. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

[2] iOS is the trademark of a product supplied by Apple. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

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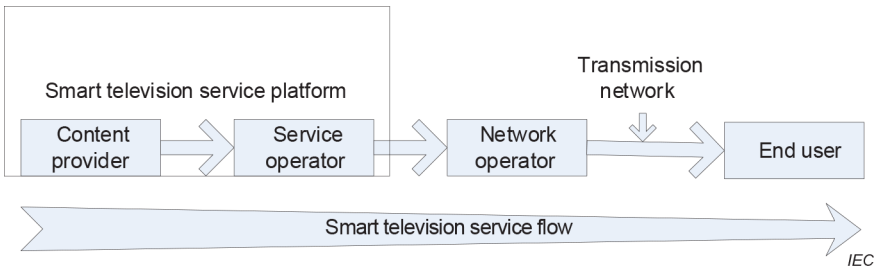

Figure 1 – Model of service industrial chain

- Content provider: the content provider is mainly responsible for the production of content for smart television terminals and the development of various application programs. It provides the content as produced and developed to the service operator. The content provider is the production origin of the entire service industrial chain and integrate the content into a uniform platform of the service operator to allow the content to be used by end user terminals by reaching consumers via smart television terminals. The content provider has the following main responsibilities:
  1) to provide new distribution channels for the content provider;
  2) to request that the content be protected rather than being illegally disseminated and used;
  3) to ensure that the operations of audio/video content are manageable and billable;
  4) to ensure that the operations of installable application programs are manageable and billable.
- Service operator: the service operator is mainly responsible for the integration and operations of the content. It also integrates various contents on its own platform and reaches end consumers via the network of the network operator to offer appropriate services and applications to users. The service operator has the responsibilities described below:
  1) to ensure normal operations of the service and carry out service management;
  2) to guarantee such processes as content review and release and carry out content management;
  3) to guarantee user management and carry out account management for users, such as account opening and cancellation;
  4) to guarantee a certified authorization and billing mechanism during service use to prevent illegal use of the service;
  5) to safeguard the operations of the smart television terminal and carry out terminal management;
  6) to provide the user with a uniform service portal navigation;
  7) to ensure that the network operator provides a transmission network with QoS guarantee;
  8) to ensure that the content provider provides audio/video content that follows the review conducted by the national authority;
  9) to ensure that the content provider provides installable application programs that follows the review conducted by the national authority.
- Network operator: the network operator is mainly responsible for using its own network to transmit the content and service provided by the smart television service operator to end user terminals, and obtaining earnings. The network operator understands the operating condition of the network from the point of the network and clarifies the operating condition of the network from the point of service. The network operator includes an infrastructure operator and an access network operator. The former includes telecommunications, radio

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and television, satellite, etc. The latter includes cable, wireless and satellite network access operator. The network operator has main responsibilities described below:

1) to satisfy the requirements for high availability, high reliability and quick troubleshooting and restoration;
2) to satisfy the requirements for network manageability;
3) to satisfy the requirements for random distribution and random on-demand for a large number of users;
4) to satisfy the requirements for interconnectivity among various network operators;
5) to provide a sufficient QoS guarantee for user service implementation;
6) to provide a sufficient safety guarantee for user service implementation;
7) to provide the method for monitoring content safety and appropriate network monitoring points.

- End-user terminal: an end-user terminal has access to the network and enjoys smart television service via smart television terminals such as smart televisions, large-screen media systems and large-screen news release systems. The demands of an end-user terminal include:

1) powerful hardware configuration, open operating system and open application program platform;
2) interactive experience of audio/video content and smart television application program;
3) response time of operation equivalent to that of radio and television;
4) long-term consistent, stable QoS;
5) that the system may guarantee the safety of user information;
6) enrichment of application program and film/television content;
7) enriched, smart apps store;
8) simple and easy human-machine interoperability, high-accuracy of smart interaction, response time within acceptable range;
9) simple and clear user interface and inspiring smart human-machine interface;
10) that the system may guarantee the billing accuracy and the diversity of rates and the user may obtain the bill via multiple means.

4.1.3 Hierarchical architecture

4.1.3.1 General description

The hierarchical architecture for a general smart television service mainly consists of the parts described in 4.1.3.2 to 4.1.3.5. Interconnection between different layers may be realized by the calling mode of functional modules of loose coupling. Intra-layer may also adopt the structure of a functional module. See Figure 2.

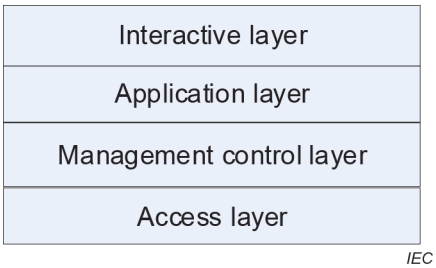

Figure 2 – Model of hierarchical architecture

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4.1.3.2 Access layer

The access layer of a general smart television service uses IP as its basic protocol. It includes broadband access network, urban area network and a backbone network, as well as related control management functions. The access layer can be capable of ensuring sufficient bandwidth and a certain transmission quality and be provided with the following capacities:

- access to the end-user terminal and certification of network layer;
- delivery of each service information stream to the destination end as required by the previous layer;
- calling up network resources as per specific attribute requirements of each service to ensure the function and performance of the service;
- satisfying the special requirements of the streaming media service for access layer;
- satisfying the network access requirements for the installation of application programs;
- monitoring of network administration functions and system equipment.

4.1.3.3 Management control layer

Being responsible for the service execution and control, the management control layer may accept the bottom-layer network function of the access layer and provide service to the application layer. It has the following functions:

- distribution and storage management of media content data, and content management of application program data;
- service subscription and service statistics collection;
- realization of hierarchical level networking and internal load balance mechanism of streaming server;
- provision of streaming service capability to the end user and support and service to end-user applications;
- information maintenance of various services, i.e. one or more content combination.
- packaging of service capacity of the access layer, providing interface to the previous application layer;
- provision of interface with such external systems as the billing system, user management system and network management system.

4.1.3.4 Application layer

By calling up various capacities of the management control layer, the application layer provides end-user terminals and content providers with various services. For instance, video on demand applications and video-based broadcast remote education applications need a basic streaming service capacity, although the service package pattern and service processing logic representation between both applications are different. The application layer needs to use the capacity provided by the service layer and execute application customization and service deployment as required by the operator. It may offer the following features:

- providing the user with a uniform interface and carrying out operations such as service ordering and data inquiry;
- acquiring content metadata and content pricing strategy provided by the content provider.

4.1.3.5 Interactive layer

The layer directly connecting the end-user terminal is located at the top end of the hierarchical architecture, mainly providing customer-facing interaction with the user. End-user terminals may have access to the network via such access means as ADSL, LAN and WLAN, realize relevant services and offer the following features:

- processing user entry, identifying user's intention and getting user's feedback;

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- processing two-way interactive data services and transmitting data to application level.

4.1.4 Model of service data

4.1.4.1 Service metadata

Smart television service metadata is used to describe the basic data specification in general smart television services, satisfying activities of all stages that the users demand, and describing service subscription and execution with such basic data, allowing a set of common definitions and standards to describe simple and complicated services as well as breadth and depth of a service. Metadata contained in this document consists of various elements, each with unique attributes, i.e.

NAME: Name of service

TYPE: Type of service

CLIENT: Service client

BILLING: Billing for service implementation

IDENTIFIER: Unique identifier of service

VERSION: Data version that generates service

REGISTRATION AUTHORITHY: Service authorization agency

CP/SP DESCRIPTION: Content provider (CP) and service provider(SP) of the service

LANGUAGE: Language description

DEFINITION: Description of service concept and implication

OBLIGATION: Type of service obligation

DATATYPE: Data type reflected in service data

COMMENT: Comment of element application

All elements are divided into three groups, shown in Table 1 by the category and scope of the content as described:

1) description of service content;
2) description of intellectual property; and
3) description of external attribute.

Table 1 – Category grouping

Description of service content	Description of intellectual property	Description of external attribute
Title	Creator	Data
Subject	Operator	Type
Description	Contributor	Identifier
Source	Rights	Client
Language		Billing
Coverage		

Description of service element:

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