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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

IPTV multimedia services and applications for IPTV –
IPTV service discovery up to consumption

SIP-based discovery of IPTV services

Recommendation ITU-T H.771

ITU-T H-SERIES RECOMMENDATIONS
AUDIOVISUAL AND MULTIMEDIA SYSTEMS

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Recommendation ITU-T H.771

SIP-based discovery of IPTV services

Summary

Recommendation ITU-T H.771 describes the processes for IPTV service-provider discovery and service discovery based on the session initiation protocol (SIP), described in IETF RFC 3261. The processes enable IPTV terminal devices to acquire information about available IPTV service providers and IPTV services.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T H.771	2011-05-14	16

Keywords

IPTV services, service discovery, service discovery information, service provider, service provider discovery, service provider information, SIP.

FOREWORD

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SIP-based discovery of IPTV services

1 Scope

This Recommendation describes the process for IPTV service provider discovery and service discovery, based on SIP. The processes enable IPTV terminal devices to acquire information about available IPTV service providers and IPTV services.

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 H.770]	Recommendation ITU-T H.770 (2009), *Mechanisms for service discovery and selection for IPTV services*.
[ITU-T Y.1901]	Recommendation ITU-T Y.1901 (2009), *Requirements for the support of IPTV services.*
[ITU-T Y.1910]	Recommendation ITU-T Y.1910 (2008), *IPTV functional architecture.*
[IETF RFC 3261]	IETF RFC 3261 (2002), *SIP: Session Initiation Protocol*.
[IETF RFC 3265]	IETF RFC 3265 (2002), *Session Initiation Protocol (SIP)-Specific Event Notification*.
[ETSI TS 183 063]	ETSI TS 183 063 v2.4.2 (2009), *Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IMS-based IPTV stage 3 specification.*
[ATIS-0800017.v002]	ATIS standard ATIS-0800017.v002 (2009), *Network Attachment and Initialization of Devices and Client Discovery of IPTV Services.*

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 application [ITU-T H.770]: A functional implementation realized as software running in one or spread over several interplaying hardware entities.

3.1.2 end user [ITU-T Y.1910]: The actual user of the products or services.

3.1.3 Internet protocol television (IPTV) [ITU-T Y.1901]: Multimedia services such as television, video, audio, text, graphics and data delivered over IP-based networks managed to support the required level of QoS/QoE, security, interactivity and reliability.

3.1.4 IPTV terminal device [ITU-T Y.1901]: A terminal device which has ITF functionality, e.g., a set-top box (STB).

3.1.5   service [ITU-T Y.101]: A structured set of capabilities intended to support applications.

3.1.6   service provider [ITU-T M.1400]: A general reference to an operator that provides telecommunication services to customers and other users either on a tariff or contract basis. A service provider may or may not operate a network. A service provider may or may not be a customer of another service provider.

3.1.7   terminal device (TD) [ITU-T Y.1901]: An end-user device which typically presents and/or processes the content, such as a personal computer, a computer peripheral, a mobile device, a TV set, a monitor, a VoIP terminal or an audio-visual media player.

3.2   Terms defined in this Recommendation

None.

4   Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

HTTP   Hyper Text Transport Protocol

IMS   IP Multimedia Subsystem

ITF   IPTV Terminal Function

NGN   Next Generation Network

SADS   Service and Application Discovery and Selection

SD   Service Description

SIP   Session Initiation Protocol

SP   Service Provider

SPD   Service Provider Description

TD   Terminal Device

5   Introduction

[ITU-T H.770] describes the various steps for service discovery in order to acquire IPTV contents in the IPTV service as depicted in Figure 1.

[ITU-T H.770] includes service provider description information for the IPTV service provider discovery process and the service information for IPTV service discovery process, and its delivery protocols covering both unicast and multicast transport mechanisms. ITU-T H.771 describes the detailed service provider discovery process and service discovery process, using SIP as an alternative delivery protocol. This Recommendation also describes the message flow for three architectures stated in [ITU-T Y.1910].

Figure 2 is derived from Appendix I of [ITU-T Y.1910] and shows the high-level procedural flows for initialization of IPTV application access. Figure 2 has added IPTV SPD provider and IPTV SD provider in the SADS functional block, to define its position in the IPTV architecture.
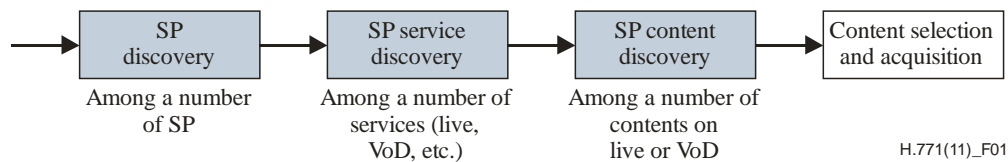
NOTE 1 – SP discovery: Discovery of the service providers available on the network.

NOTE 2 – SP service discovery: Discovery of the services offered by a specific or all service providers.

NOTE 3 – SP content discovery: Discovery of the individual services or contents from a specific service provider.

NOTE 4 – Content selection and acquisition: At the end of the navigation through the offered services and contents, the end user selects a service or content and acquires it.

NOTE 5 – End users and/or devices may be authenticated before service provider attachment or service attachment, as part of the security provisions.

Figure 1 – From service provider discovery to content acquisition
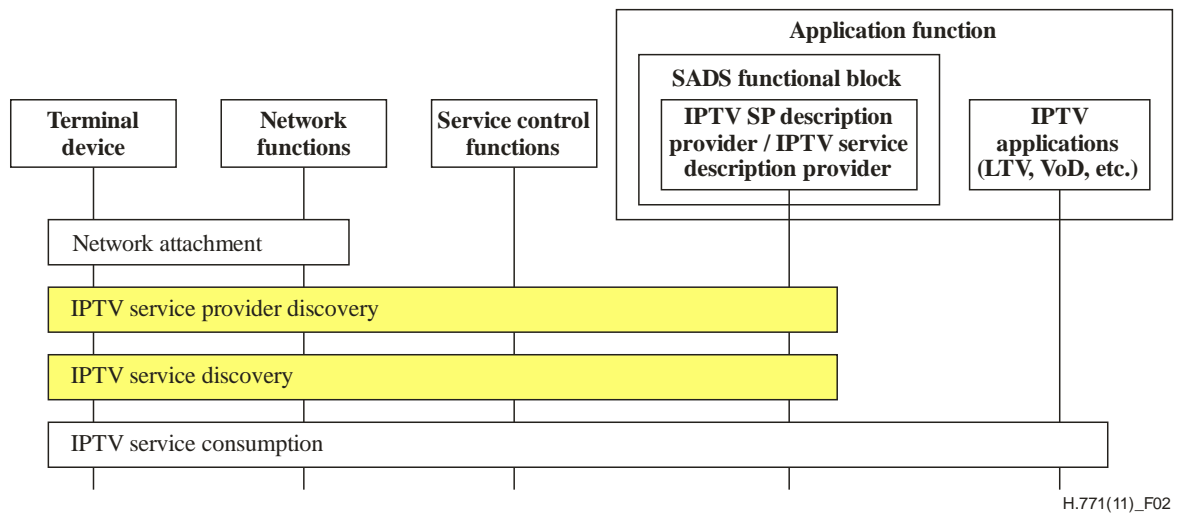
Figure 2 – High-level procedure for initialization of IPTV application access

The terminal device may receive service and application discovery information either in push or pull mode:

–	Push mode [ITU-T Y.1910]: the SADS functional block actively sends the service and application discovery information to the terminal device.

–	Pull mode [ITU-T Y.1910]: the terminal device actively requests the service and application discovery information from the SADS functional block.

## 6	Service provider discovery process using SIP messages

This clause describes the process for an end-user device to get information about available IPTV service providers.

## 6.1	SUBSCRIBE/NOTIFY message

Figure 3 shows the flows for retrieving the description of the available IPTV service providers for the non-NGN and NGN non-IMS IPTV architecture.

SD   Service description
SPD   Service provider description
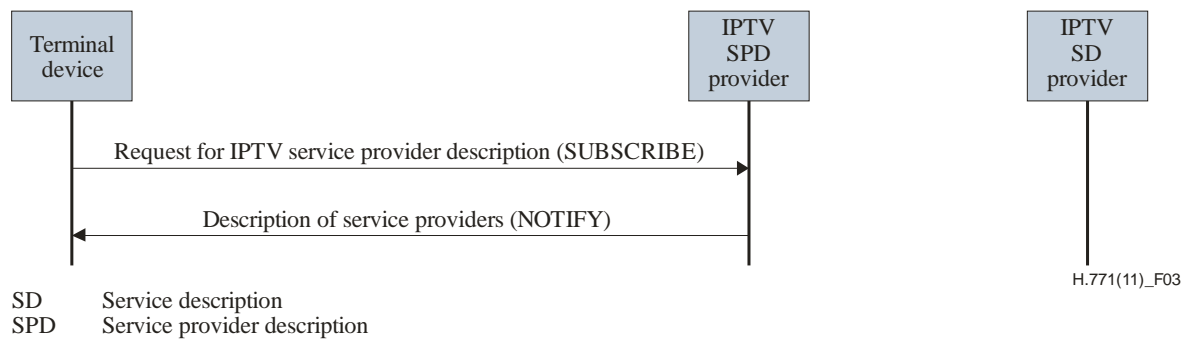
Figure 3 – Flows for retrieving the description of the available IPTV service providers

A service provider discovery process is necessary for an end-user device to discover the IPTV service providers when several service providers are available on the network. This step is also necessary for the case in which end-user devices do not have any preconfigured service provider. This step may be omitted where there is only one IPTV service provider, or in cases where the user is directly registered (or pre-configured) with one particular service provider.

In order to acquire the initial service provider description (SPD) information (and subsequent notifications of updates to that information), the IPTV terminal device connects to the IPTV SPD provider by establishing a standard subscription session based on the SIP notification framework, specified in [IETF RFC 3265]. The SIP notification framework provides a pull mechanism for initial data retrieval and, when the data changes, it uses a push mechanism for notification of changes through the use of a NOTIFY message.

Therefore, the IPTV terminal device sends a SUBSCRIBE message to the IPTV SPD provider in order to acquire SPD information. Then, the IPTV SPD provider periodically sends NOTIFY messages, including SPD information, to the IPTV terminal device. Service provider description information is included in the body part of the NOTIFY messages that expresses information defined in clause 7.1 of [ITU-T H.770].

The IPTV SPD provider and the IPTV service description (SD) provider can reside in a single or separate service provider.

It is possible to define "IPTV-SP-Description" as an example of an event name of an event header for the initial SUBSCRIBE that is delivered to the IPTV SPD provider. A detailed description of the SUBSCRIBE and NOTIFY messages is outside the scope of this Recommendation.

Meanwhile, in the NGN IMS based IPTV architecture, the terminal device may receive service and application discovery information via the core IMS function [ITU-T Y.1910]. Therefore, the IPTV terminal device sends a SUBSCRIBE message through the core IMS to the IPTV SPD provider in order to acquire IPTV SPD information. Then, the IPTV SPD provider periodically sends NOTIFY messages, including IPTV SPD information, via core IMS to the IPTV terminal device.

Figure 4 shows the flows for retrieving the description of the available IPTV service providers according to the NGN IMS IPTV architecture.

Detailed description of the service provider discovery process is provided in clauses 5.1 and 5.2 of [ETSI TS 183 063] and in clause 8.5 of [ATIS-0800017.v002].

SD   Service description
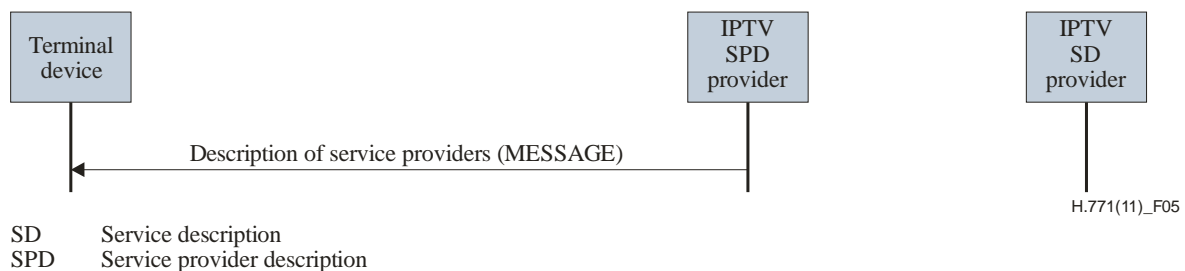SPD   Service provider description
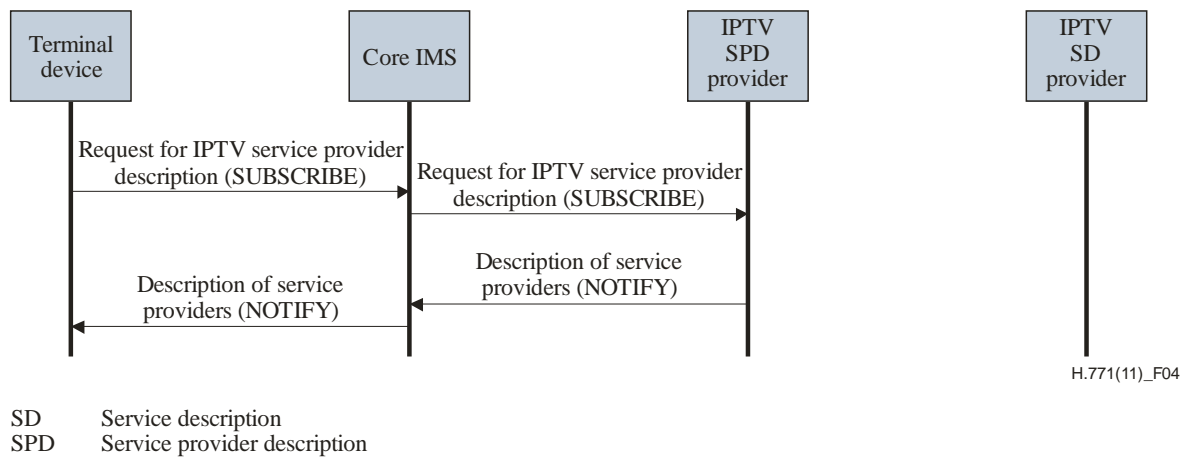
**Figure 4 – Flows for retrieving the description of the available
IPTV service providers via core IMS**

6.2   MESSAGE message

This SUBSCRIBE and NOTIFY mechanism is also necessary in the case that the end-user device does not have any preconfigured service provider. A different mechanism can be used when there is only one IPTV service provider, or when the user is directly registered with one particular service provider.

Figure 5 shows the flows for retrieving the description of the particular IPTV service provider for the non-NGN and NGN non-IMS IPTV architecture.

SD   Service description
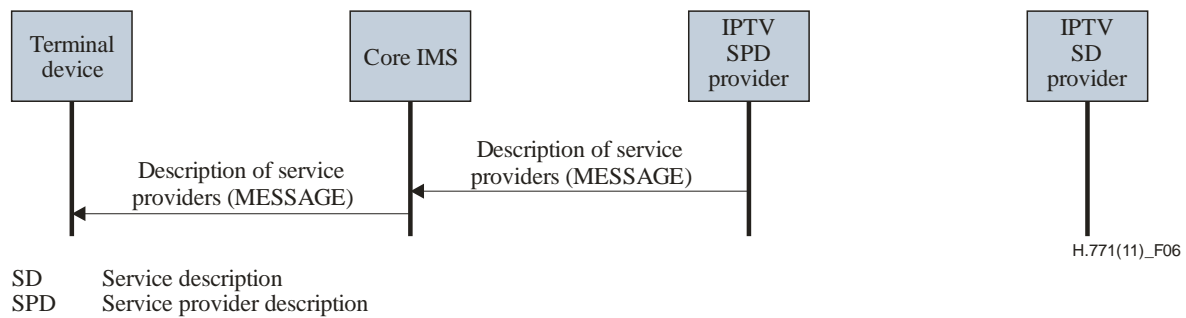SPD   Service provider description

Figure 5 – Flows for retrieving the description of the particular IPTV service provider

When the IPTV terminal device is registered in the IPTV service system through a REGISTER message after network attachment, its IPTV SPD provider immediately sends IPTV service provider description information with MESSAGE message to the IPTV terminal device in push mode. During this process, the IPTV SPD provider acts as a third-party registrar during the IMS registration phase. Service provider description information is included in the body part of MESSAGE message that expresses information defined in clause 7.1 of [ITU-T H.770].

Figure 6 shows flows for retrieving the description of the particular IPTV service provider, according to the NGN IMS IPTV architecture.

Detailed description of the service provider discovery process is found in clauses 5.1 and 5.2 of [ETSI TS 183 063].

SD   Service description
SPD   Service provider description

**Figure 6 – Flows for retrieving the description of the particular
IPTV service provider via core IMS**

7   Service discovery process using SIP messages

This clause describes the process for an end-user device to retrieve information on available IPTV services.

In the SP discovery procedure defined in [ITU-T H.770], one SPD provider may relate to multiple SD providers. Where the SD provider is also a SIP server, the service discovery procedure is described in clause 7.1. Where the SD provider is not a SIP server, the service discovery procedure is described in clause 7.2.

7.1   Procedure in case SD provider has SIP server functionality

This clause addresses the case in which the IPTV SD provider has SIP server functionality.

Figure 7 shows flows for retrieving the description of the available IPTV services for the non-NGN and NGN non-IMS IPTV architecture.

An end user can access the IPTV services from different service providers depending on the services to which the end user is subscribed. The end user can select applications from the same or from a different service provider. This can include the discovery and selection of services from multiple service providers (see [ITU-T Y.1910]).

In order to acquire the initial service description information (and subsequent notifications of updates to that information), the IPTV terminal device connects to IPTV SD provider by establishing a standard subscription session based on the SIP Notification framework specified in [IETF RFC 3265]. The SIP notification framework provides a pull mechanism for initial data retrieval; when data changes, it uses a push mechanism for notification of those changes via a NOTIFY message.

Then, the IPTV terminal device sends a SUBSCRIBE message to the IPTV SD provider in order to acquire service description information. Next, the IPTV SD provider periodically sends a NOTIFY message including service description information to the IPTV terminal device. Service description information is included in the body part of the NOTIFY message which expresses information defined in clause 10 of [ITU-T H.770].

During this process, service description information can be from one IPTV service description provider or multiple IPTV service description providers.

SD   Service description
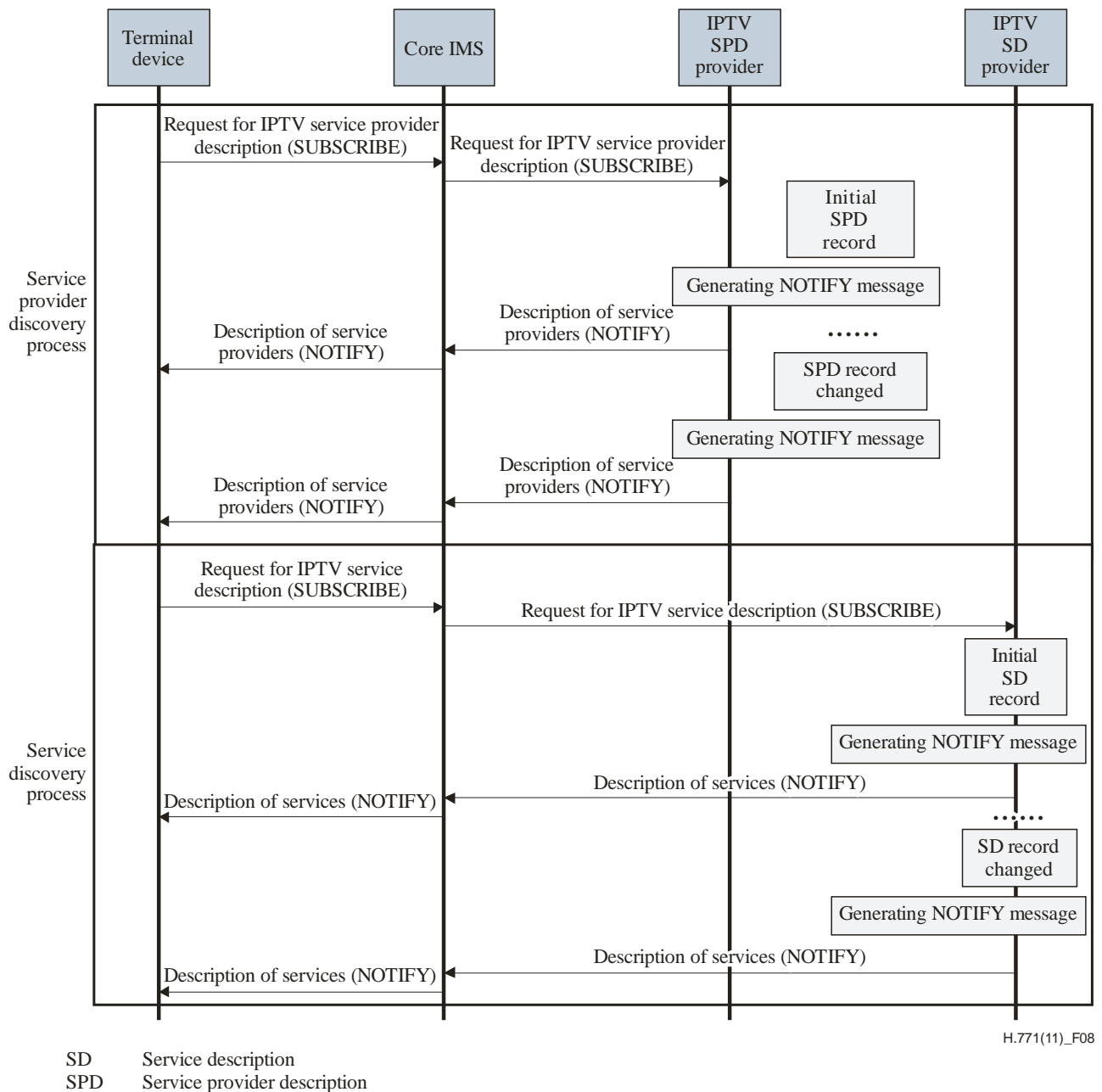SPD   Service provider description
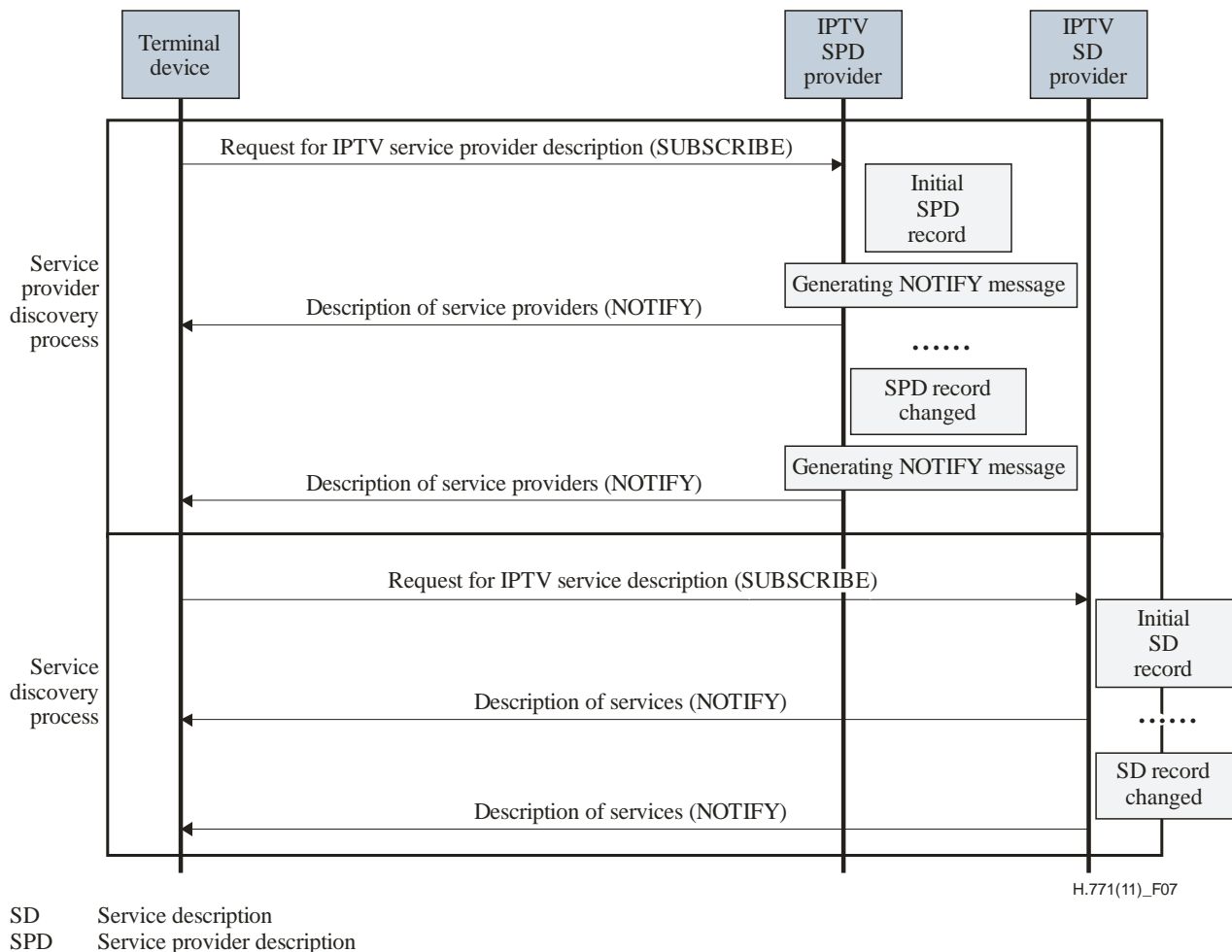
Figure 7 – Flows for retrieving the description of the available IPTV services

It is possible to define "IPTV-Service-Description" as an event name example of an event package for the initial SUBSCRIBE, which is delivered to IPTV SD provider (detailed description of SUBSCRIBE and NOTIFY message is beyond the scope of this Recommendation). Meanwhile, in the NGN IMS based IPTV architecture, ITF may receive service and application discovery information via the core IMS function [ITU-T Y.1910]. Therefore, the IPTV terminal device sends a SUBSCRIBE message through core IMS to the IPTV SD provider requesting IPTV service description information. The IPTV SD provider periodically replies with a NOTIFY message, including IPTV service description information, via core IMS to the IPTV terminal device.

Figure 8 shows flows for retrieving the description of the available IPTV services according to the NGN IMS IPTV architecture.

Relevant aspects of the service discovery process are specified in clause 9.4 of [ATIS-0800017.v002].

SD   Service description
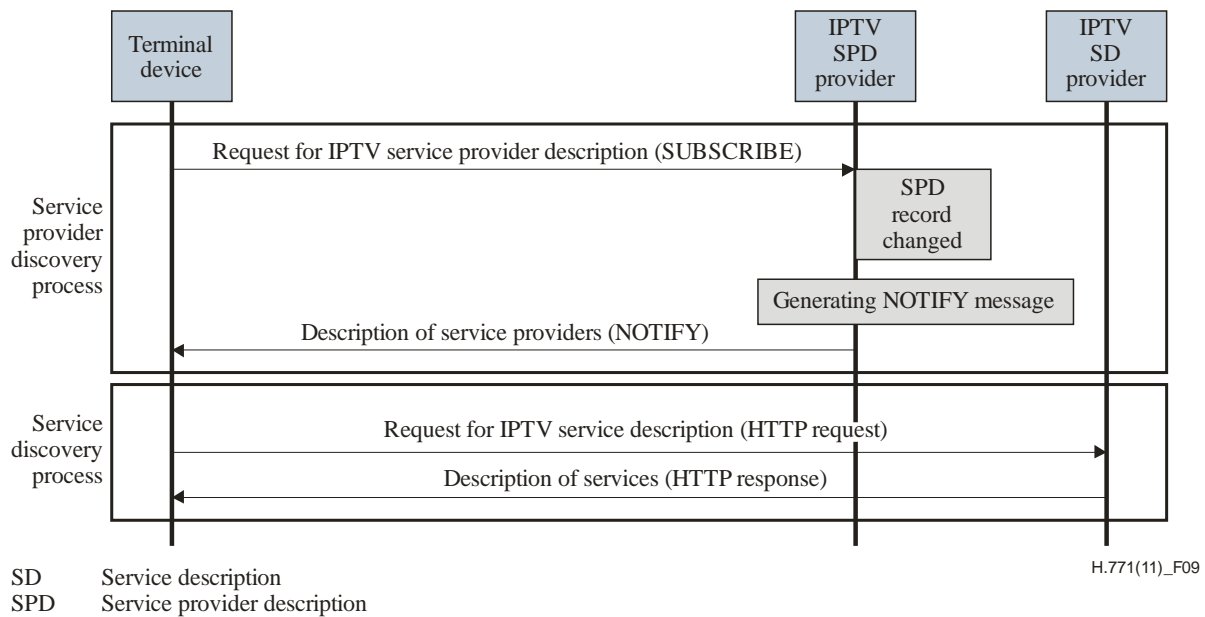SPD   Service provider description

Figure 8 – Flows for retrieving the description of the available IPTV services via core IMS

7.2 Procedure in case SD provider does not have SIP server functionality

This clause addresses the case where the IPTV SD provider does not have SIP server functionality. See Figure 9.

In order to retrieve IPTV service provider description information from IPTV SPD provider, IPTV terminal device uses the SIP SUBSCRIBE/NOTIFY framework as described in clause 6.1.

While powering on, the IPTV TD sends a SIP SUBSCRIBE message to the IPTV SPD provider, and waits for a NOTIFY message, which triggers the IPTV TD to send e.g., a HTTP request to the IPTV SD provider to update the service description.
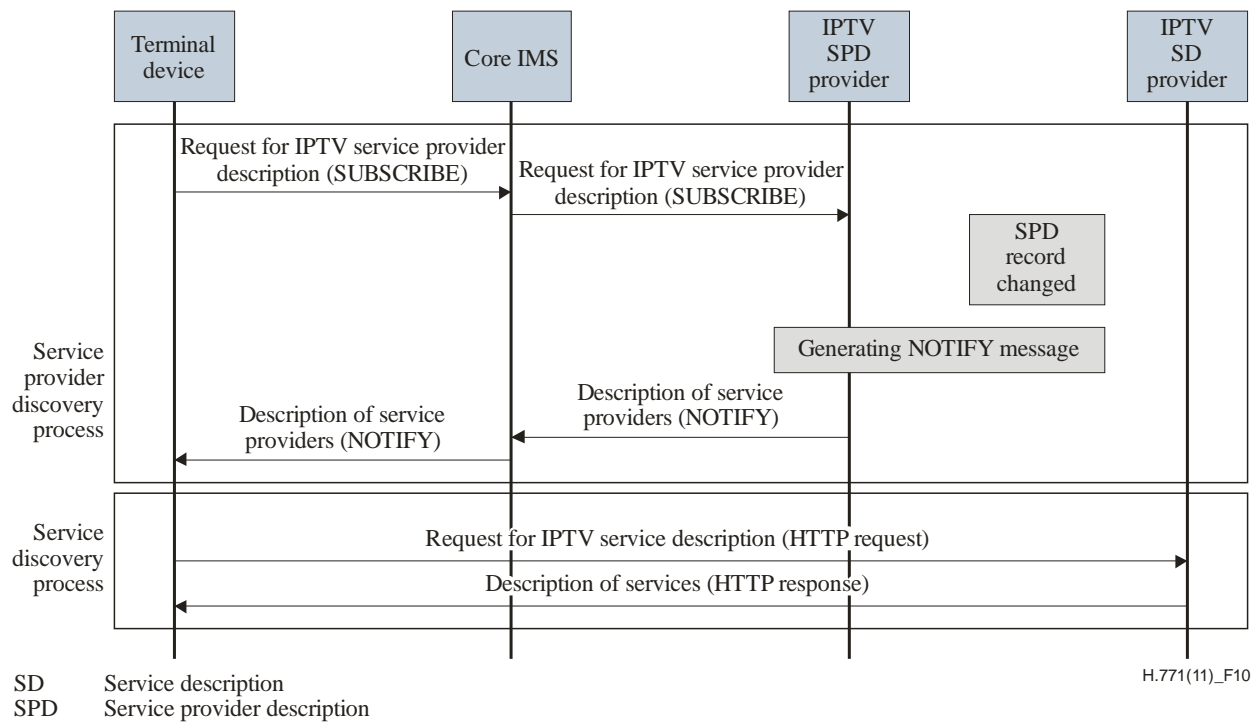
**Figure 9 – Flows for retrieving the description
of the available IPTV services through HTTP**

When updates happen, the IPTV SD provider will send an update request to the IPTV SPD provider, who will then generate and send a SIP NOTIFY message to the IPTV TD. The protocol between the IPTV SD provider and the IPTV SPD provider is out of the scope of this Recommendation.

According to the SIP NOTIFY message from the IPTV SPD provider, the IPTV TD can use HTTP to update the service description information from the appropriate SD provider. HTTP is one of the delivery protocols specified in [ITU-T H.770].

Figure 10 shows the detailed flows for retrieving the available IPTV service description through HTTP where core IMS is involved.

**Figure 10 – Flows for retrieving the description
of the available IPTV services through HTTP**

SD Service description
SPD Service provider description

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