



Introduction to IPTV and OTT



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This document provides the introduction to the digital television (TV) services based on IPTV and OTT.

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1 Purpose

If you want to build a service provider system and need an insight into digital TV technologies, then you are on the right page. This document covers the following topics:

- ▶ Difference between the digital TV technologies, IPTV and OTT.
- ▶ Services that can be offered your subscribers.
- ▶ Required hardware and software.

2 Terms and abbreviations

VoD

Video on Demand – service provided by the digital television.

DVR

Digital Video Recorder – service provided by the digital television.

OSS/BSS

Operation Support System/Business Support System (billing, order management system, etc.).

STB

Set-Top box

SW

Software

CDN

Content Delivery Network

Subscriber and Provider

Provider provides digital TV services. Subscriber contracts Provider in order to use such services.

3 What are digital TV services and how to provide them

Digital television is the modern TV broadcast technology which encodes audio and video signals into digital format and transmits them to a subscriber terminal.

If you want to provide digital TV services, first decide:

1. What features you need to offer your subscribers:

- ▶ **Live TV** – watch broadcasts of TV channels.
- ▶ **VoD (Video on Demand)** – download and watch video content (for example, films, series) on demand. VoD content is stored on a provider's video servers. **Note:** Legacy service nVoD (near VoD) is not supported by SmartLabs.
- ▶ **DVR (Digital Video Recorder)** – watch recorded TV broadcasts. TV broadcasts can be recorded on a provider's video servers (Network DVR) or on a subscriber terminal with a built-in hard disk or memory card (Local DVR).

Live TV requires a system with only basic equipment. VoD and DVR services require additional equipment. See section *What are components of a service provider system?*

2. How you will deliver content to subscriber terminals: using IPTV (Internet Protocol Television) or OTT (Over The Top). See section *Digital TV technologies: IPTV and OTT.*

SmartLabs will assist you in addressing all technical issues of managing and delivering content and you need to acquire, in one of the following ways, the rights to provide this content:

- ▶ Contract copyright owners in order to buy content. To provide services, you will likely need to install additional equipment (for example, video servers, transcoders, head-end equipment, etc.).

or

- ▶ Contract companies aggregating content or other content-owning providers and you will be able to broadcast their content via your solution. In this case, you do not need to contract copyright owners and install some of the equipment. For example, no video servers will probably be required for VoD and DVR content (because you can use video servers of content owners).

4 Digital TV technologies: IPTV and OTT

The digital TV technologies IPTV and OTT have different network features for content delivery:

- ▶ **IPTV** is the content delivery technology for a secure managed IP network of one carrier. Content delivery in a managed network will allow you to fully control the content distribution as the entire infrastructure will be in your ownership with partial or no access from the Internet. Thanks to the full control, you will be able to ensure high quality of the content.

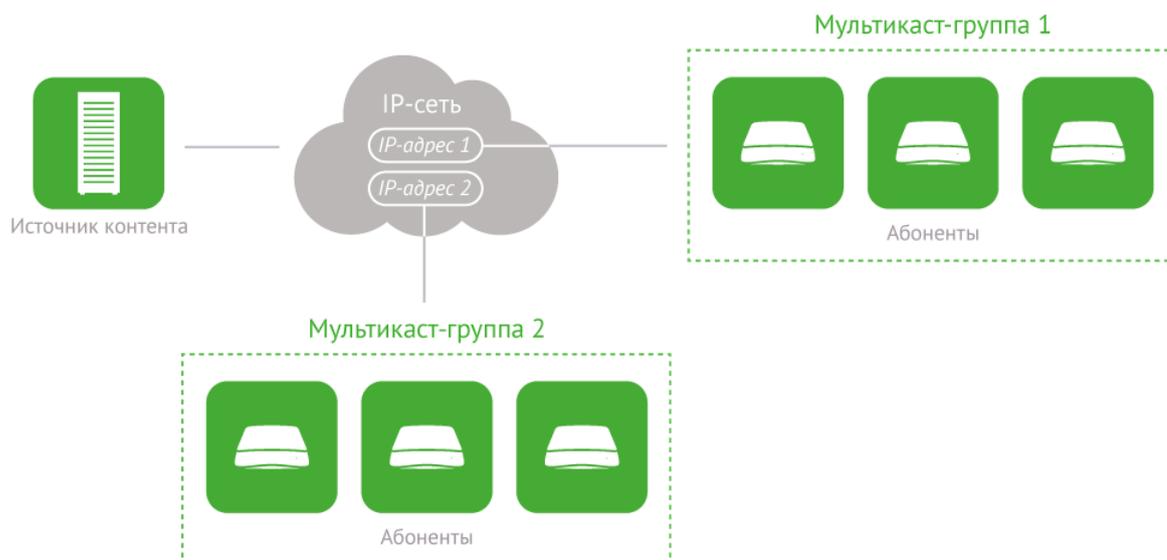
For IPTV solutions, the following options are available for delivering content to terminals: Live TV via multicast, VoD and DVR via unicast.

- ▶ **OTT** is the content delivery technology for the Internet. Content in the Internet is delivered directly from a content source to a subscriber; consequently, no managed network is required and therefore it is easier to configure content broadcast in comparison with IPTV. However, you will have no control over content distribution. This would cause problems with content quality but the use of Adaptive Streaming in OTT solutions allows significantly mitigating restrictions and instability in the Internet.

In OTT solutions, content is delivered via unicast and, as a rule, HTTP-based protocols are employed.

4.1 Multicast

In the case of multicast, you can transmit the same copy of content to multiple subscribers. To receive content, a subscriber terminal joins a multicast group without connecting to a casting server.



Benefits: Lower network load and higher bandwidth.

Drawbacks: If multiple providers manage the same IP network, it is almost impossible to use multicast.

Note: We are often asked, “Is it possible to use a personal computer as repeater to provide multicast?” Answer: It is technically feasible but not reasonable.

4.2 Unicast

In the case of unicast, you need to transmit an individual copy of content to every subscriber. Many content delivery protocols and devices are intended exclusively for unicast. To receive content, a subscriber terminal establishes a connection to a casting server and receives a stream transmitted specifically for this terminal.



Benefits: It is easier to build a network for delivering such content. Content can be delivered to IP networks of other carriers.

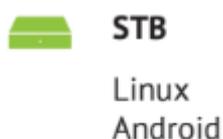
Drawbacks: Content quality immediately depends on bandwidth and therefore cannot be guaranteed.

4.3 What subscriber terminals are supported?

When choosing a technology, it should be taken into account that unicast is supported by a considerably wider range of devices as compared with multicast.

Important: Only certain models of terminals can be used to provide digital TV services.

IPTV solutions support the following terminals



Note: By using Multiscreen in IPTV solutions, content can also be played on mobile devices and TV sets with Smart TV functionality.

OTT solutions support the following terminals

**STB**

Linux
Android

**Mobile**

iPhone
iPad
Android tablet
Android phone

**TV**

Android
Smart TV Samsung
Smart TV LG

**Desktop**

Chrome
Internet Explorer
Firefox
Opera

Note: TV sets with Smart TV are intended for OTT solutions but some models support both unicast and multicast.

5 What are components of a service provider system?

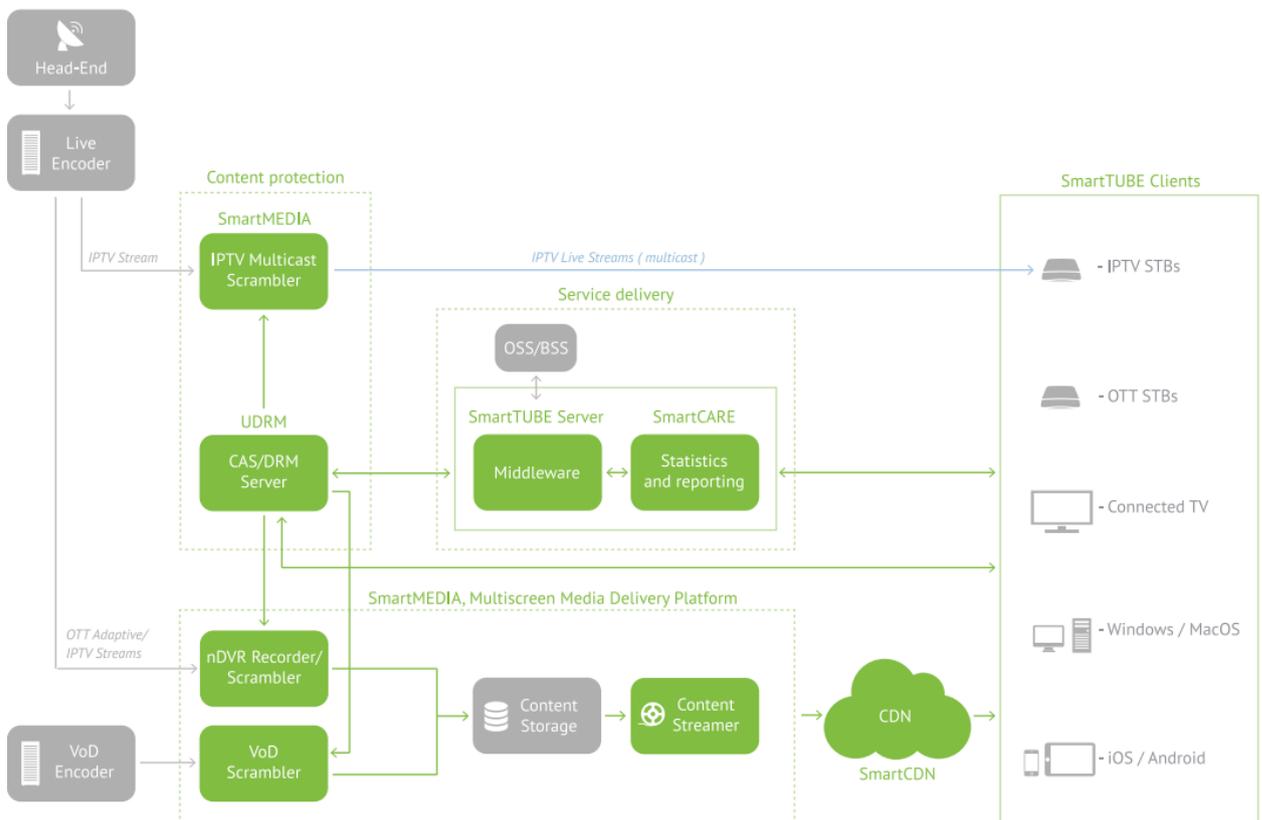
A service provider system needs to address the following needs:

- ▶ Content management:
 - On the subscriber side: selection, purchase, viewing and other operations with content on a subscriber terminal.
 - On the provider side: configuration of content parameters and purchase conditions (billing plans, services, etc.)
- ▶ Content delivery to subscribers: content transmission from a signal source (DVB-S, DVB-T, optic fiber, Internet Protocol) to a subscriber terminal.

System layout

A service provider system can include the following components but some of them are optional. For example, you do not need content storage (video servers) if only LIVE TV is used.

Note: This layout is generic, its structure may vary in individual applications.



■ – components provided by SmartLabs. These show references to their names in SmartLabs.

■ – third-party components that are easy to integrate with SmartLabs components.

5.1 Basic system components

5.1.1 Head end

If you want to provide LIVE TV, install head-end equipment. The head end operates to:

- ▶ Receive signals and generate digital streams for LIVE TV.
- ▶ Transcode digital streams. See section *Content transcoding*.
- ▶ Encrypt digital streams (optional). See section *Content encryption*.

Live streams are transmitted from the head end to a subscriber terminal. When Network DVR is provided, streams are recorded on video servers before transmission.

5.1.2 Content storage: video servers and SW (optional)

If you want to provide VoD and/or Network DVR, install video servers and SW for managing video servers and content delivery.

Video servers and SW are used:

- ▶ To record and store VoD and DVR content. TV shows are automatically recorded on video servers upon broadcasting. Any content is stored on video servers in transcoded form.
- ▶ To generate streams on demand. Streams can be encrypted. See section *Content encryption*.
- ▶ To deliver content to a subscriber terminal

Note: SmartLabs offers SmartMEDIA, a system supporting the above features.

Streams are transmitted from video servers to a subscriber terminal.

5.1.3 Content transcoding

To lower the required network capacity, content is distributed in compressed form. Transcoding is used to change the content compression method and settings. This is a resource-intensive operation because it first decompresses content and then compresses it using a different method or different settings.

Transcoding guarantees you that:

- ▶ Subscriber terminal will play content.
- ▶ Content quality will be high. This is primarily the case with OTT solutions because for IPTV solutions high quality is ensured by content distribution control. In OTT solutions, transcoding allows using Adaptive Streaming which mitigates quality losses occurring during content transmission.

5.1.4 Content encryption (optional)

To protect content from unauthorized viewing and copying, it is recommended to install encryption equipment.

It is the subscriber terminal that decrypts streams; therefore, it should be considered that different subscriber terminals use different encryption methods and receive decryption keys differently: there are no universal methods.

There are two approaches to encryption:

- ▶ [CAS](#) (*Conditional Access System*) guarantees that your content is delivered only to your subscribers.
- ▶ [DRM](#) (*Digital Rights Management*) guarantees that content is delivered only to your subscribers and additionally allows controlling the use of content. For example, by using DRM encryption, you can prohibit content downloads.

Note: Encryption is often a mandatory requirement imposed by copyright owners when content rights are granted. Content protection may vary for different copyright owners.

5.1.5 Subscriber terminals

Offer every subscriber an individual terminal to access your services. See section *What subscriber terminals are supported?*

5.1.6 Client application for subscribers

Install a subscriber application on every subscriber terminal enabling subscribers to use your services.

5.1.7 Middleware

To implement the business logic of service provider, install middleware equipment. It will enable you to maintain content catalogs, configure price plans, service-use conditions, and many more.

To install middleware, you will need:

- ▶ Server for processing requests via API from client applications and from an external OSS/BSS. It is the server that makes the business logic possible.
- ▶ Database for storing all content settings and parameters.
- ▶ Cache server (if you have many subscribers) to enable faster processing of requests from subscriber terminals.

5.1.8 Client application for server administration (optional)

Use client application for server administration to allow quick and easy editing of settings stored on the server using a graphic interface.

5.1.9 Statistics collection system/application (optional)

Install a dedicated application or system to timely detect stream-transmission errors and gather various statistical data.

Note: SmartLabs offers SmartCARE, a system supporting the above features.



5.1.10 Operation Support System/Business Support System

To store subscribers' personal data and bill services, use an external OSS/BSS.

OSS/BSS interacts with middleware using API methods (provided the integration is configured). You will be able to initiate payments in OSS/BSS on the middleware side and control some data stored on the middleware server on the OSS/BSS side.