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VINGTOR  STENTOFON
by ZENITEL GROUP



IPTV Administrator guide

TECHNICAL MANUAL

Vingtor-Stentofon IPTV System

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1. Basic Information

1.1 Revision history

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The WEEE Directive does not legislate that Zenitel, as a 'producer', shall collect 'end of life'. The owner who should use proper treatment and recycling measures should recycle this 'end of life' WEEE appropriately. It should not be disposed to landfill.

Many electrical items that we throw away can be repaired or recycled. Recycling items helps to save our natural finite resources and also reduces the environmental and health risks associated with sending electrical goods to landfill.



Under the WEEE Regulations, all new electrical goods should now be marked with the crossed-out wheeled bin symbol shown below:

Goods are marked with this symbol to show that they were produced after 13th August 2005, and should be disposed of separately from normal household waste so that they can be recycled.

2. Introduction

This manual is intended for IPTV service providers using the Vingtor-Stentofon IPTV solution. An overall knowledge of TV broadcasting systems and IP networking is assumed. The document covers basic functionality of complete IPTV system, as well as the typical necessary actions during its startup, deployment, and operation.

The following elements are emphasized in the text:

Notes

Generic warnings

2.1 IPTV technology

As a rule, an IPTV solution includes components to execute the following tasks:

- Content receiving and processing;
- Content storage and delivery;
- Content encryption;
- Billing;
- System setting and management;
- Receiving and reproduction of the content at the client side.

The main advantages of IPTV include its interactivity and a number of additional services, such as: video on demand, time-shifted TV, electronic program guide, etc. IP protocol abilities allow providing a number of interactive services besides just transmitting the video content.

2.2 NBS architecture

NBS is a scalable platform for development of client-server applications used to build the Vingtor-Stentofon IPTV system. The components of the NBS platform interact via transactions using the application-level NXT protocol. Data encryption and personal authentication are performed via the SSL protocol methods.

When dealing with the TV set-top boxes, due to their limited resources, a binary version of the same protocol is used which is called NBT. NBT also employs SSL for data encryption and personal authentication.

Each transaction may be addressed to one or several components of the system and may contain some events intended for the receiving component to proceed. An event consists of an event type identifier and the accompanying data. NBS guarantees the atomic processing of each transaction. NBS means of clustering and group routing provide a way of easy and transparent scaling (say, an addition a new VoD server) without stopping the production software.

2.3 Vingtor-Stentofon IPTV overview

Vingtor-Stentofon IPTV system is a complete headend solution incorporating the following services:

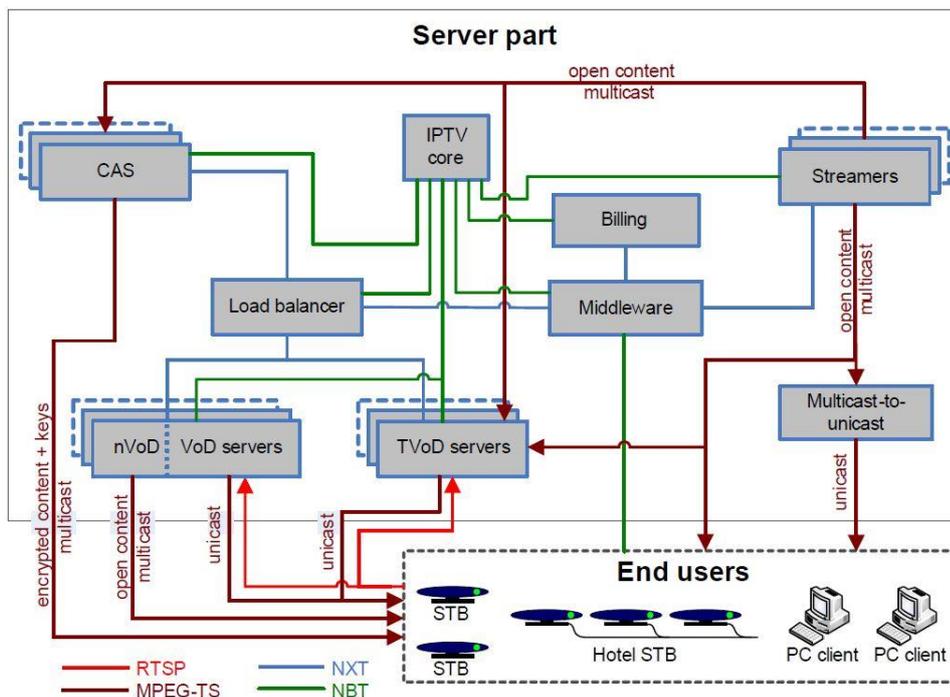
- Satellite, terrestrial and cable TV channels (streaming);
- Video on Demand (VoD);
- Time Shifted TV;
- Middleware & interactive user interface for IP set-top boxes;
- 3D and 4K UHD support (Users can watch live 3D and 4K UHD TV channels as well as 3D and 4K UHD movies from VoD server's media library).

Vingtor-Stentofon IPTV system includes all necessary systems components to provide TV, radio or video over IP networks, all tightly integrated:

- Subscriber Management System;
- Billing System;
- Conditional Access System (CAS/DRM), protection against unauthorized access at different levels;
- Interactive graphic interface for IP set-top boxes (STB client + Middleware server);
- Content source and management (DVB to IP gateways, MPEG and HDMI encoders, VoD servers, etc.).

Scalability is assured as all Vingtor-Stentofon IPTV system elements are connected in cluster architecture. All software is developed on basis of NBS, a robust development platform designed to support client-server applications of any complexity.

Interactions of the system's main components are shown on the figure below.



Different protocols are denoted by links of different color. System servers mostly interact with each other via NXT protocol, and with client devices via NBT. Multimedia content is distributed using MPEG-TS protocol.

All system servers must interact with the outside world solely through their eth0 network interfaces.

3. System Components

3.1 Streamer

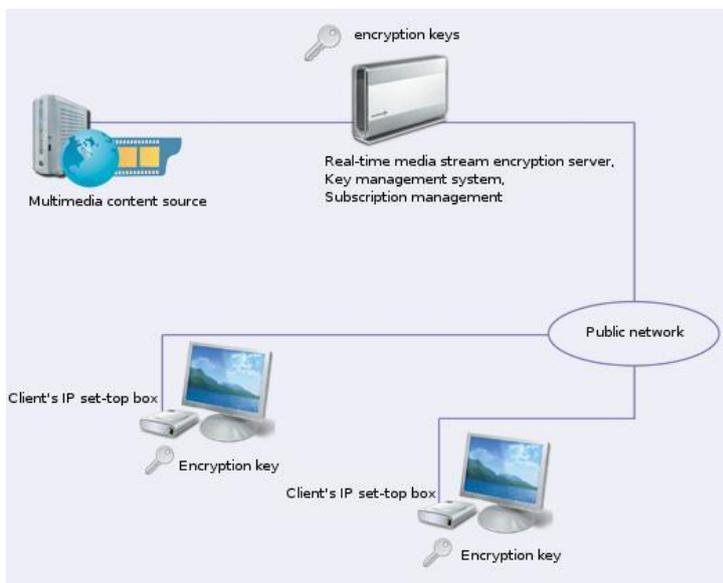
Streamer receives live satellite, terrestrial channels, or cable TV (DVB-S/S2, DVB-T/T2, DVB-C, ATSC). Received streams are multiplexed into MPEG Transport Stream and distributed via IP multicast. Streamer combines the functions of receivers, decoders, multiplexer, IP streamer, and multicast router, all with single management interface. Streamer is fitted into 1U rack-mount server and it's equipped with an LCD panel.

3.2 Conditional Access System

Conditional Access System (CAS) encrypts multimedia streams for transmission over unprotected channels. Only authorized users subscribed to the service can play these streams. CAS allows an IPTV service provider to strictly control access to the content and build financial relations with subscribers and content providers alike. It consists of two parts: the server and the client module.

The client module is loaded into IP set-top boxes and deciphers the streams using the dedicated onboard hardware decoder. Encryption keys are periodically updated from the server.

The server encrypts and controls IP streams, creates encryption keys and manages subscriptions.



3.3 Video on Demand

Video on Demand server is built on an industry-standard platform and supports 100 concurrent non-encrypted streams (1000 subscribers at normal VoD peak take-up rate) at typical MPEG-2 compression rate of 4 Mb/s per stream. Both unicast and multicast modes are supported.

Server storage comprises four hot-swap SATA-II hard disks. The total HDD space in the standard configuration is 3 Terabytes or more than 1000 movies in DVD quality. Movies are stored in HTTP Live Stream (HLS). Both SD, HD and UHD are supported. Video content can be loaded via web interface or ftp. The server is implemented in a 4U rack-mount case. It is possible to connect VoD servers into a cluster. This allows our customers to achieve almost any performance and provide VoD in distributed networks. The VoD server is capable of encrypting the streaming content on the fly in a manner similar to that of CAS. Time Shifted TV and TV on Demand are implemented as a separate server based on the same framework.

3.4 Middleware

User interface of the Middleware system supports the following services:

- TV channels;
- Radio;
- Video on Demand (VoD) with the functions of searching by name, filtering by genre, and viewing annotations;

-
- Television on Demand (TVoD);
 - Time-Shifted TV;
 - Electronic Program Guide.

For normal operation of the Middleware and billing server, it must be working on the round-the-clock basis. Turning it off at night would impede some low-priority service tasks which are scheduled for that time.

3.5 Billing

Billing system performs the following functions:

- Subscriber database maintenance;
- rating of available services;
- creation and management of tariff plans;
- creation of accounting documents;
- access cards management;
- Financial reporting.

3.6 STB Client

Graphical user interface (GUI) of Vingtor-Stentofon IPTV system is designed with the use of native API, which provides an advantage in performance as compared to the browser-based interfaces.

4. Basic objects and processes

This chapter describes the basic system objects and interactions thereof.

4.1 Media content

Media content is a system object containing record of some multimedia data source, which may be a file or a stream. Media content may get united into media groups, and also may be included (as a part of a group or separately) into various services of the corresponding type.

4.2 Services

A service is a system object containing a price definition and regulations for charging. **TV**, **TVoD**, **VoD**, and **Radio** special services also include access to groups or to separate items of media content of corresponding types. Besides that, the system may use general services not linked to any content and one-time bonuses (which are, in fact, services with negative price, so they replenish the user's account when attached to it). Services may be either one-time or periodic, which affects their price definition and charging logic. Bonuses may be only one-time.

4.2.1 Attachment of services

Content-related services, as well as bonuses, may be attached to customers only as a part of tariff plans. Services not linked to any media content may be attached either within tariff plans or separately. Tariff plan services may get attached to customers automatically upon attachment of their parent tariff plans (this is the case if the **Mandatory** flag in the service properties is on), or may be bought and paid for by the customers voluntarily.

4.2.2 Service price

The currency of the service price is selected upon creation of a service. Price of one-time services is defined in currency units. Price of periodic services is defined in currency units either per day or per month (which is also selected upon creation, together with the currency).

4.2.3 Content access

TV, **TVoD**, **VoD**, and **Radio** services provide access to some media content. The access is granted once the customer is charged for the service, and is valid during the time span for which the customer has been charged. Access may be discontinued prematurely in case if the customer's account gets blocked.

4.2.4 Tariffication type

Periodic services are characterized by the **Tariffication type** parameter, which is selected among the following options:

- **Daily prepaid** – implies that after service attachment the customer is charged till the end of day, and then is charged for the next day at the beginning of every day;
- **Periodic prepaid** – implies that after service attachment the customer is charged till the end of month, and then is charged for the next month at the beginning of every month;
- **Monthly prepaid** – implies that the customer is charged for one month, and then is charged for the next month at the same day of every month;
- **Full prepaid** – implies charging for the entire duration at once. Incompatible with the tariff plans which are attached forever.

4.2.5 Charge-off details

One-time services get the customer charged upon attachment. Similarly, bonuses are deposited to the client's account upon attachment. As for the TV, TVoD, VoD, Radio, and content-free periodic services, the charging details are determined by their properties (see Tariffication type). In case of TV services, the tariffication type is defined explicitly upon creation. For TVoD and Radio with automatic attachment, charging is made in a Periodic prepaid manner.

In fact, in the cases described above the actual bonus payment or service charge-off is not made at the precise moment of service attachment or at the end of period, but on the next general tariffication event after that. The said event repeats every hour.

VoD services not attached by default are sold for a fixed time span and charged for in a **Full prepaid** manner. The actual charge-off occurs at the moment of service attachment. When a price of a service is changed, given that the said service has already been attached to some users, by the end of the accounting period the total charge-off is recalculated so as to apply the new price retroactively to the entire lifetime of the service. At that, either the extra charge-off is performed, or the sum of the next regular charge-off is reduced, depending on the sign of the change in price. Basically, this is to be done if the price has been set erroneously from the very beginning. Otherwise, i.e. if one has to adjust price at a certain moment, the service itself should be detached from all relevant users and replaced with the new one, providing the same content for a different price. Charging may be affected by the blocking of the client's account.

4.2.6 Service cost

Periodic service cost is calculated as a product of its price and the duration of the time span for which the service has been provided. If the service price is defined per day, then the charges for the time spans expressed in months (for example, the monthly charge of **Periodic prepaid** type) are calculated considering the actual number of days in the given month. Consequently, the invoices for such a service may vary slightly from month to month.

If the service price is defined per month, it is recalculated in a similar way considering the number of days in the relevant month in case of charges for the periods expressed in days, which are:

- Daily charge of **Daily prepaid** type;
- Payment till the end of current month upon attachment of a service of **Periodic prepaid** type;
- Payment till the end of current month and from the start of the last incomplete month till the end of term for a service of **Full prepaid** type.

4.3 Tariff plans

A tariff plan is a set of services of various types that may be attached to a customer for some time span (maybe forever).

Tariff plan having "forever" instead of the ending date cannot contain services with tariffication type "Full prepaid".

At the end of the accounting period the customers may switch the attached tariff plans on their own, given that the old and new plans are compatible by the roles.

4.4 Customers

A customer is a system object containing record on an end user of the services provided and charged for by the IPTV system. The set of customer's properties depend on its type, which may be **Individual**, **Legal**, or **Sole proprietorship**. A client of the type **Individual** or **Sole proprietorship** have one or several persons; customer of **Legal** type may be linked to one or more legal entities, which are in turn linked to one or more persons each. Every legal entity and every person may be linked to a bank, may have up to three addresses and an arbitrary amount of contacts.

4.4.1 Personal accounts

Each client may have one or more personal accounts. An account may be linked to a tariff plan and probably to some separate additional services. An account may be blocked. Blocking type may be either **Manual** or **Overdraft**, depending on whether the blocking has been imposed manually by the administrator, or automatically by the system due to overdraft. Manual blocking may be lifted manually as well. Automatic blocking persists until terminated by the system, which happens once the account balance (considering the credit) becomes positive. When an account is blocked, so are the attached services with **Blockable** option set. Technically, the charges for these services are still applied, but then rebated. The rebate for the past portion of the accounting period is initiated by every manual de-blocking, payment, or the end of the period.

4.4.2 Settlement accounts

Settlement accounts are created automatically for various operations. Depending on the type of operation, a settlement account may have one of the following **Types**:

- **Payment** – opens when a payment is made;
- **Debt** – opens after balancing on closing the accounting period, if negative balance is revealed;

- **Credit** – opens when a credit limit is changed;
- **Default** – opens for all other kinds of operations, including charge-offs.

Summary balance of all settlement accounts (considering the currency exchange rates for corresponding dates, in case if the accounts are in different currencies) is equal to the balance of the personal account. The settlement account closes after the payment is depleted or the debt is covered.

5. Usage examples

This chapter contains typical scenarios of IPTV usage (in addition to the general description of both administrator's and manager's web interfaces given in chapter 7. **Web interface** and chapter 8. **Manager's Web Interface**).

Initial setup of the IPTV solution generally includes the following operations:

- Creation of content (see **TV channels** and **Radio** in chapter 7 and **IPTV Distribution** in chapter 8)
- Creation of users (see **Customers** in chapter 8);
- Creation of tariff plans (see **Service plans** in Chapter 8);
- Activation of tariff plans (see **Attaching a service plan** and **Changing a service plan** in chapter 5);
- Making payments (see **Replenishing customer's account** in chapter 5).

5.1 Adding a server to IPTV cluster

If want to expand your IPTV cluster with an additional **VoD**, **TVoD**, **DRM**, **Streamer** or **Transcoder** server:

1. Log in to the additional server's web interface and open **System configuration** group, **Network** page
2. Press the **Change Core IP** button and enter the IP address of your IPTV Core server

Your additional server will connect to IPTV Core. You will find it in the **Connections** page of your IPTV Core's web-interface.

5.2 Creating TV or TVoD content

To control the user's access to TV channels broadcast by the streamer, a corresponding TV content must be created in IPTV system. Below is a model pattern of creating a TV content, which may be customized to meet particular circumstances.

1. Open the **TV Channels** page of the web interface.
2. Press **Add**. The **New TV channel** popup window will appear.



3. Specify the media content name.
4. Press OK and select the created TV channel with a left-click. A popup window with the channel properties will appear.
5. Specify either the unicast URL or a multicast IP address of the channel being created.
6. Optionally, press **File** or **Web** under **Logo** and upload the channel logo image from a local file or an URL.
7. Optionally, enter the channel description in any of the available languages.
8. Back on the **TV channels** page press  to create the schedule of telecasts as described in **Setting up telecasts**, or make sure it has properly imported automatically.
9. If the content is intended for encryption of the stream, set up its encryption(see **Setting up stream encryption**).
10. If the content is intended for TVoD service, set up its recording, as described in **Setting up stream recording**.

Further likely appropriate actions are described in the examples **Creating a media group**

5.3 Setting up TV channels streamed with IPTV server

To bind newly created media content to a certain channel transmitted by the streamer:

1. Open the corresponding adapter page within the **DVB adapters** group of the web interface.
2. In the **Channels** block select the desired channel and click the **<no content>** link in the **Content** column.
A popup window will appear.
3. Choose the option **Use existing media content** and select the content just created.
4. Press **Apply**. Now the new TV content is bound with the media stream you need.

5.4 Setting up streaming from HDMI / Mpeg-2 encoders

To set up streaming from a HDMI/Mpeg-2 encoders:

1. Connect the device's DATA output to the network that you're going to stream to
2. Start streaming from the HDMI / Mpeg-2 encoders and make sure that it can be played back inside the network (e.g. with VLC)

When setting up streaming, one should use an unprivileged port (e.g. 1234). Using a privileged port may cause playback problems on some devices. Keep in mind that VLC requires a "@" before the IP address of a media stream. E.g. `udp://@225.1.0.25:1234`

3. Go to the TV channels page of the web interface and create media contents for each of the streamed TV channels (see **Creating TV or TVoD content**)

Then one may add the created to a service plan and attach the plan to a customer's account.

5.5 Setting up telecasts program schedule

There is an optional possibility to create the schedule of telecasts of a channel (unless the channel in question already comes with a schedule distributed by a properly configured streamer).

To do this:

1. Open the **TV channels** page of the web interface.
2. Select the channel of interest.
3. Press . The **Media programs** page will show up.
4. Select the day of interest in the calendar.
5. Enter the schedule line by line, by pressing **Add** for each item and setting the following:
 - **Program code** - a unique program identifier
 - **Since** - program start time
 - **Title** - program name
 - **Duration** - program duration



The schedule is intended to be displayed in the STB client interface (see **Viewing TV channels** on page 102) along with the other channel-related information (description, etc.) during channel selection.

As a rule, this action is a step of TV content creation (see **Creating TV or TVoD content**).

5.6 Setting up stream encryption with CDN server

1. Open the **Scrambling** page of the web interface.
2. Press **Add**. A popup window will appear.
3. Select the TV channel to be encrypted and press **Next**.
4. Select the proper input and output interfaces from the dropdown lists (if some interfaces are missing, add them, see **VLAN window**).

Incoming and outgoing interfaces cannot coincide.

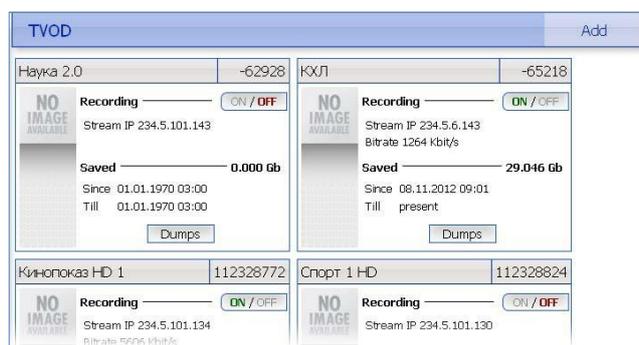
5. Select the encryption method.
6. Press **Encrypt**.

Now the channel is being encrypted. This may be controlled by pressing **ON/OFF** in the channel status popup window. As a rule, this action is a step of TV content creation (see **Creating TV or TVoD content**).

5.7 Setting up stream recording with TVoD server

To control the user's access to the recorded TV content for past dates, the TV content in question must be recorded. Below is a model pattern of setting up the recording.

1. Open the web interface of **TVoD** server.
2. Press **Add**. The **Add new record** window will appear.
3. Select the TV channel to be recorded and press **Next**.
4. Select the incoming interface from the dropdown list (if the required interface is missing, add it, see **VLAN window**) and press **Record**. The channel will appear in the list of TVoD enabled channels on the page.



TVOD		Add	
Hayka 2.0 Recording: ON / OFF Stream IP 234.5.101.143 Saved: 0.000 Gb Since 01.01.1970 03:00 Till 01.01.1970 03:00 Dumps	-62928	КХЛ Recording: ON / OFF Stream IP 234.5.6.143 Bitrate 1264 Kbit/s Saved: 29.046 Gb Since 08.11.2012 09:01 Till present Dumps	-65218
Кинопоказ HD 1 Recording: ON / OFF Stream IP 234.5.101.134 Bitrate 5606 Kbit/s	112328772	Спорт 1 HD Recording: ON / OFF Stream IP 234.5.101.130	112328824

Now the channel is recording, and the recorded portion is made available to the clients in the **TVoD** section of the STB interface. Recording may be controlled by pressing **ON/OFF**. The size of record files, as well as the graphical representation of time span(s) covered by the record, may be monitored by pressing **Dumps**.

Only open (i.e. not encrypted) content may be recorded.

As a rule, this action is a step of TVoD content creation (see **Creating TV or TVoD content**).

5.8 Creating VoD content

To control the user's access to the content stored on the VoD server, a corresponding VoD content must be created in IPTV Server. Below is a model pattern of creating a VoD content, which may be customized to meet particular circumstances.

1. Upload the media file to the VoD server via FTP (login is **vod**, password is the same as administrator password) or Manager web interface. Transcoder supports almost any existing video/audio format.
2. Open the **Video Processing** page of the Manager web interface, find the recently uploaded file in the list and click on it.

3. In the popup window select the name for **media content**, transcoding **Profile** (depends on desired video resolution), **Audio streams** (if there are more than one) and press **Transcode**.

Following likely appropriate actions are described in the examples **Creating a media group**.

5.9 Creating a media group

Media groups are intended to group together items of media content for easier and more effective management (adding a group of media content to a service plan, setting content price etc.)

In order to create a media-group:

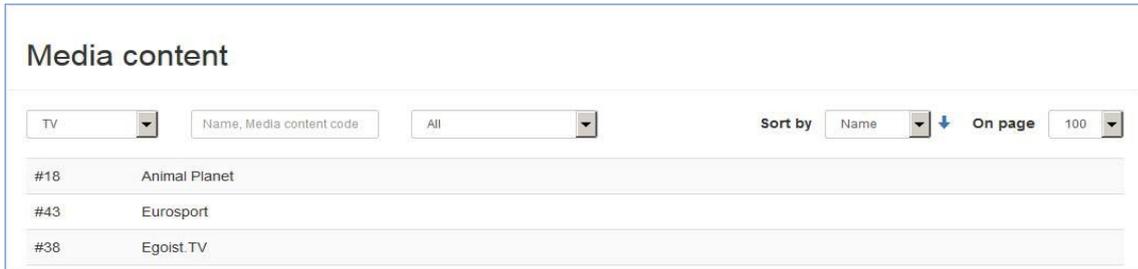
1. In the administrator's web interface go to **Media content / Media groups**
2. Press **Add** to add a new media group



3. Choose the media group type (TV, VoD or Radio) and enter its name
4. Press **Apply** to create the media group

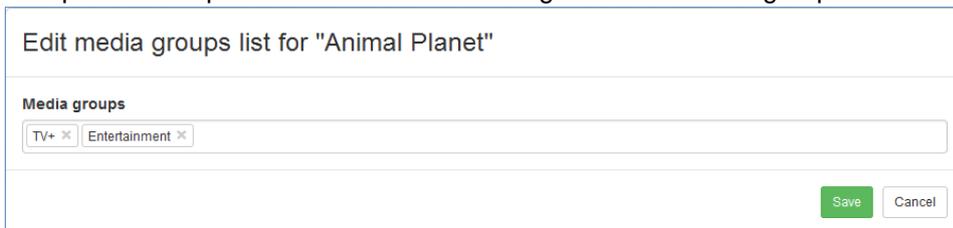
5.10 Adding media content to a media group

Media content can be added to a media group on the Media content groups page in the **Billing group** of the manager's web interface.



To add media content to a media group:

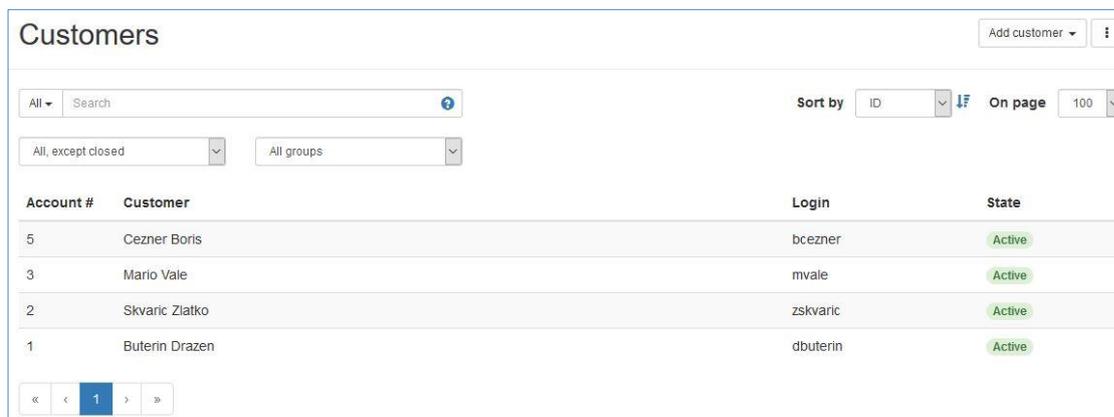
1. Use sorting and filtering to find a media content that you want to add to a media group
2. Left-click the media content
3. In the pop-up window start typing media group name and then select it from the list of media groups. Repeat this step if the content should belong to several media groups



4. Press **Save** to save changes

5.11 Creating a customer

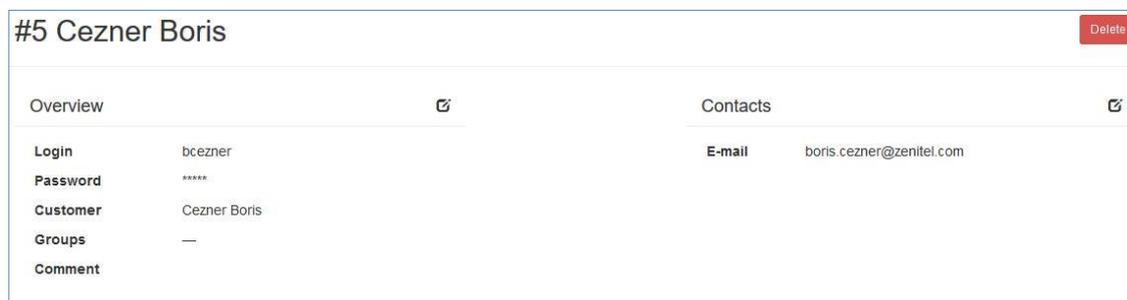
A new customer can be created on the **Customers** page in the **Customers group** of the manager's web interface.



Account #	Customer	Login	State
5	Cezner Boris	bcezner	Active
3	Mario Vale	mvale	Active
2	Skvaric Zlatko	zskvaric	Active
1	Buterin Drazen	dbuterin	Active

To create a customer:

1. Press **Add customer** in the upper-right part of the page and select customer type (natural or legal person)
2. In the pop-up window enter the customer's login and password (one might use an automatically generated password, which is set by default), and, depending on the customer type, their name or the name of the company
3. Press **Create** to create the customer. After that you will automatically get to the customer details page, where some other customer details may be added.



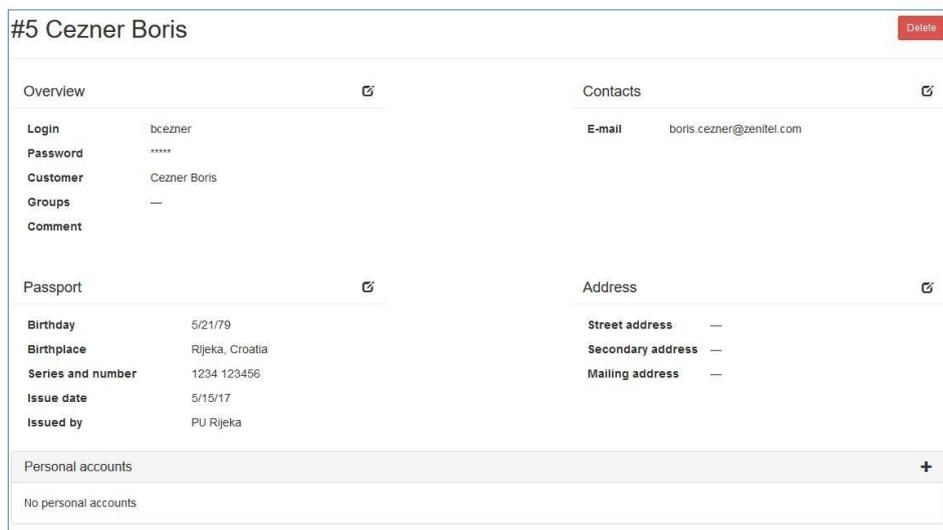
Overview		Contacts	
Login	bcezner	E-mail	boris.cezner@zenitel.com
Password	*****		
Customer	Cezner Boris		
Groups	—		
Comment			

On this page the customer details are divided into sets, which are placed in separate panels. In order to edit these details press  in the upper-right part of a panel

4. Edit the details and press **Save** to save changes

5.12 Creating a personal account

New personal account can be created on the customer details page.



#5 Cezner Boris Delete

Overview		Contacts	
Login	bceznr	E-mail	boris.cezner@zenitel.com
Password	*****		
Customer	Cezner Boris		
Groups	—		
Comment			

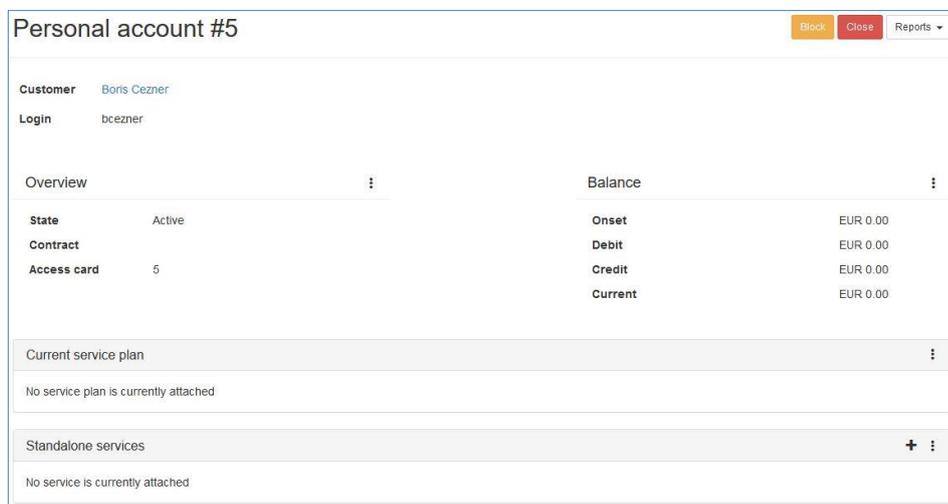
Passport		Address	
Birthday	5/21/79	Street address	—
Birthplace	Rijeka, Croatia	Secondary address	—
Series and number	1234 123456	Mailing address	—
Issue date	5/15/17		
Issued by	PU Rijeka		

Personal accounts	+
No personal accounts	

To get to this page:

1. Open **Customers** page in the **Customers group** of pages, find and left click a customer whom you need to add a new personal account.

If a customer doesn't have a personal account yet, you will automatically get to the customer details page. If the customer has at least one personal account, you will get to the personal account page.



Personal account #5 Block Close Reports

Customer		Balance	
Customer	Boris Cezner	Onset	EUR 0.00
Login	bceznr	Debit	EUR 0.00
		Credit	EUR 0.00
		Current	EUR 0.00

Overview		Current service plan	
State	Active	No service plan is currently attached	
Contract			
Access card	5		

Standalone services	+ :
No service is currently attached	

In case you get to the personal account page, click on the customer's name (company name, if the customer is a legal person).

On the customer details page press **+** on the right side of the Personal accounts panel to create a new personal account. Select the account currency and press **Create** to create the account.

One may select a currency from the list of available currencies. To add a currency, go to the Currencies page in System settings group of pages

5.13 Creating a service plan

Managing service plans is available on Service plans page in Billing group of pages of manager's web interface.



To create a service plan:

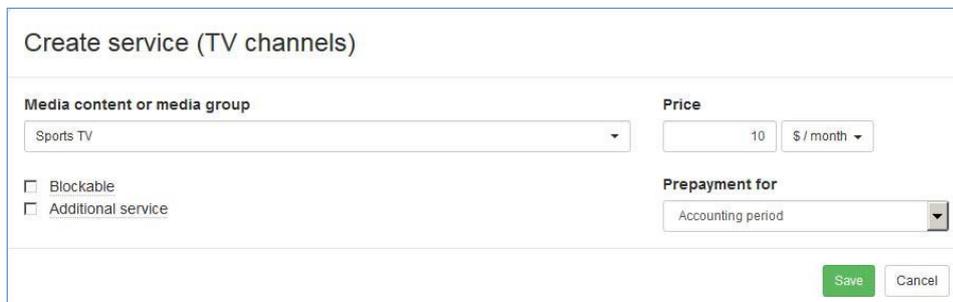
1. Press **+** in the upper right part of the page to open the Create service plan pop-up window
2. In the pop-up window enter the service plan name, change its state, add a comment and press **Create**.

When creating a new service plan, it is, probably, a good idea to set its state to **Setting up**. A service plan in this state can't be attached to a customer. When finished setting up the service plan (finished creating all the necessary services), change its state to Active

A service plan may be deleted only if it has never been attached to a customer

Adding services is explained by the example of IPTV TV channels service

3. Press **Add service** in the upper right part of the page to add a service. Choose **IPTV TV channels**.



4. Start typing a media content or a media group name that the service should provide access to. Then choose the desired content from the list

Names for **IPTV** type services are generated automatically. For **Basic Services** one has to enter a name

5. Next set the service price and select the charging behavior (when and how often the service should be charged for)
6. Set the Blockable flag, if the service should stop being delivered and charged for when the customer's personal account is blocked
7. Set the Additional service flag if the service should NOT be activated when the service plan is attached to the customer (the customer can purchase this service via the STB interface or it can be activated via the service plan settings on the customer's personal account page in the manager's web interface)

Movies (separate or combined into media-groups) can only be added to a service plan as additional services. Which means that a customer has to buy them via STB interface in the Shop section. If a movie is in several

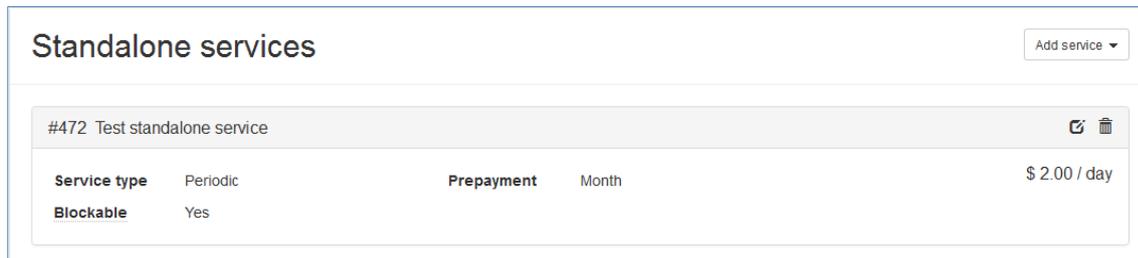
groups, its price is calculated as the lowest price among those groups

A TV channels media group is different from a movies group. If a group of TV channels is added to a service plan as an additional service, when a customer buys this group, it gets access to all the TV channels from this group

8. Press **Save** to finish creating the service

5.14 Creating a standalone service

Standalone services can be created on Standalone services page in Billing group of pages of manager’s web interface.



To create a standalone service:

Press **Add service** in the upper-right part of the page to add a new standalone service and choose the service type between **One-time** or **Periodic**

Enter service name and set its price. If service type is **Periodic**, set the Blockable flag if the service should stop being delivered and charged for when customer’s personal account is blocked and choose the desired prepayment option (daily, monthly or per accounting period)

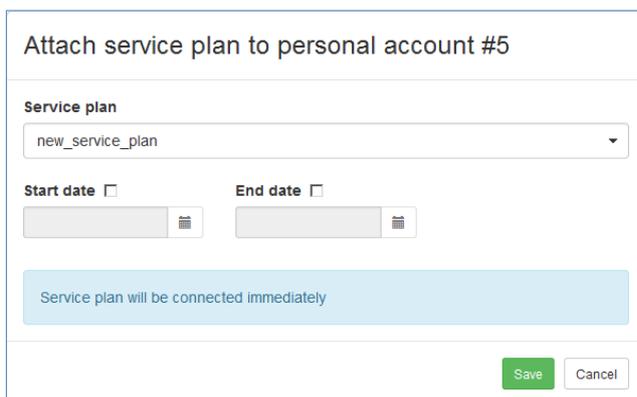
Press **Save** to finish creating the standalone service

Standalone services are attached separately, independently from the service plan

5.15 Attaching a service plan

One can attach a service plan to a customer’s account on the customer’s account page. To attach a service plan to customer’s account, follow below steps:

1. Open **Customers** page in the **Customers** group of pages of the manager’s web interface
2. Use sorting and filtering to find the customer whose account you want to attach a service plan to. Select it with a left click. If the customer has at least one personal account, you will get to the personal account page. If the customer doesn’t have a personal account, see **Creating a personal account**
3. On the customer’s personal account page find the Current service plan panel, press  on the right and



select **Attach**. A pop-up window with attachment parameters will appear.

4. Start typing a service plan name in the Service plan field and then choose one from the list that will appear
5. If the service plan needs to be attached at a certain date, set the Start date flag and select the attachment date
6. If the service plan needs to be detached at a certain date, set the End date flag and select the detachment date
7. Press **Save** to finish attaching the service plan

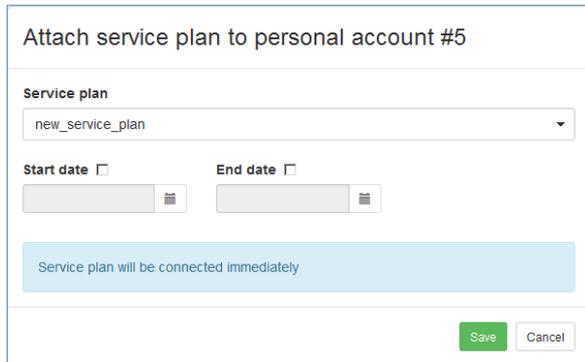
Keep in mind that a customer is able to switch the service plan to a service plan that won't have the End date set for the current plan

5.16 Changing a service plan

A service plan can be changed at the customer's personal account page.

Changing a service plan:

1. Open the **Customers** page in the **Customers** group of pages of the manager's web interface
2. Use sorting and filtering to find the customer that needs a service plan to be switched. Left click the customer which will get you to personal account page.
3. On the personal account page find the Current service plan panel, press **⋮** on the right and select Switch. This will open an Attach service plan pop-up window.



4. Start typing a service plan name in the Service plan field and then choose one from the list that will appear
5. If the service plan needs to be attached at a certain date, set the Start date flag and select the attachment date
6. If the service plan needs to be detached at a certain date, set the End date flag and select the detachment date
7. Press **Save** to change the service plan

A service plan cannot be changed when customer's personal account is blocked

If a service plan switch is scheduled to a specific date, both plans will be shown on the customer's personal account page in different panels - Current service plan and Next service plan.

In order to see the attached service plans history, press **Reports** in the upper-right part of the page and select Attached service history from the drop-down menu.

5.17 Generating activation code

When the customer connects for the first time, it needs to enter an activation code in order to activate STB. In order to connect with another device (e.g. if the first STB is broken), the customer will require another activation code, because the first activation code will be marked as Used.

To generate an activation code:

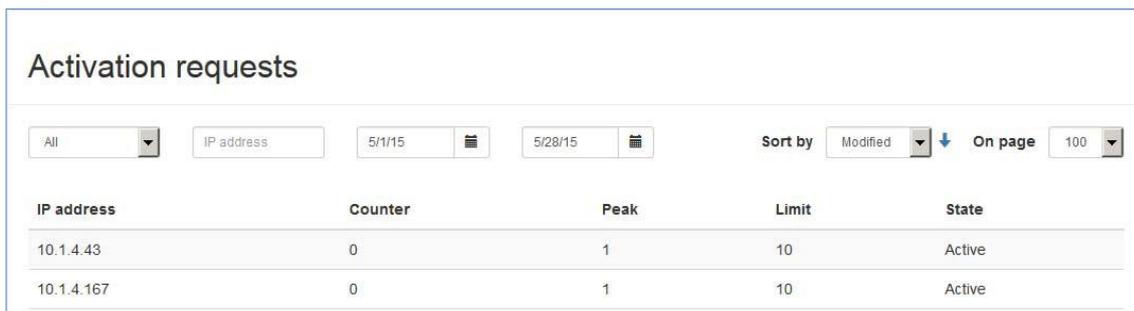
1. Open the **Customers** page in the **Customers** group of pages of the manager's web interface
2. Use sorting and filtering to find the customer who needs a new activation code. Left click the customer,

which will get you to personal account page.

3. On the personal account page find the **Overview panel**, press **:** on the right and select Access card. This will open a pop-up window with access card information
4. In the lower part of the window there is an Activation codes section. Click Generate activation code to generate a new activation code.

5.18 Resetting the activation requests counter

The activation requests counter can be reset on **Activation requests** page in **Security** group of pages of manager's web interface.



IP address	Counter	Peak	Limit	State
10.1.4.43	0	1	10	Active
10.1.4.167	0	1	10	Active

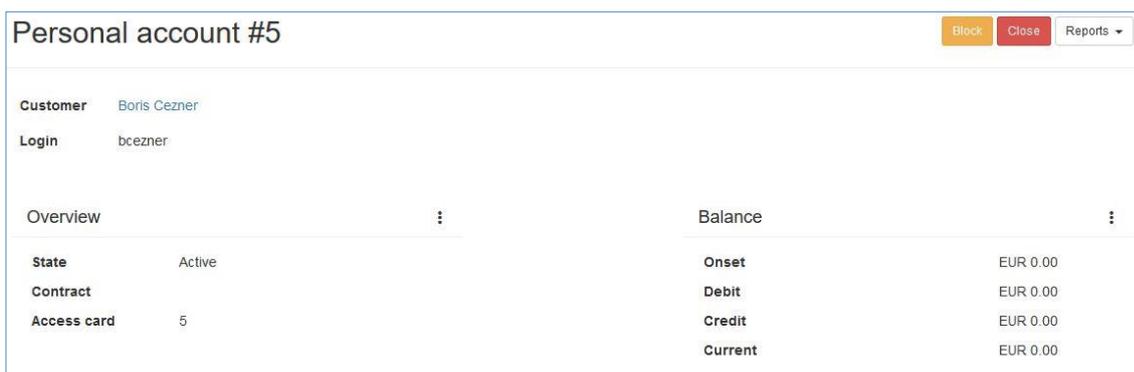
One may need to reset the activation requests counter if a customer failed to enter the correct activation code more than 10 times and all the consequent requests from her IP address are being ignored.

To reset an activation requests counter:

1. On the Activation requests page use sorting and filtering to find the customer's IP address, then left-click to select it.
2. In the pop-up window set the state to Active, set the counter to zero and press **Save** to save the changes. The other way to fix it is to delete selected Activation counter entry by pressing **Delete**

5.19 Replenishing customer's account

Customer's personal account balance can be replenished on the customer's personal account page.



Overview	Balance
State: Active	Onset: EUR 0.00
Contract	Debit: EUR 0.00
Access card: 5	Credit: EUR 0.00
	Current: EUR 0.00

To replenish a customer's account:

1. Open the **Customers** page in the **Customers** group of pages of the manager's web interface
2. Use sorting and filtering to find the customer who needs her personal account balance to be replenished and left-click to select it. If the customer has at least one personal account, you will get to the customer's personal account page.
3. On the customer's personal account page find the Balance panel, press **:** and select Payment
4. Enter the payment document number, its issue date, select payment type, enter payment amount and add a comment if necessary
5. Press **Save** to finish replenishing customer's account

6. LCD panel

To set up the IPTV server equipped with LCD panel, do the following:

1. Plug the network and power cables into the device.
2. Switch power on. You shall see **Starting...** on the LCD panel.
3. Use the LCD manager for the initial setup of the system.

LCD manager provides a convenient way to monitor the CPU and LAN interface load on the device front panel, as well as to assign IP addresses to network adapters.

6.1 Statistics screen

The software contains two statistics screens. The first and principal is the screen that lists the amount of traffic through the network adapters. Lower line of the screen presents the total rate of incoming and outgoing traffic separated by “/”.



```
< IPTV [I/O]^ >
0.15 / 171 MbFs
```

Pressing **Up** switches to the CPU load screen. First number is the total CPU load. Three subsequent numbers give, correspondingly, the portions of CPU load related to user tasks (**u**), system tasks (**s**), and awaiting data from the peripherals (**w**). Pressing **Down** switches back to the traffic statistics screen.



```
< IPTV [CPU]v >
14% 5u 7s 1w
```

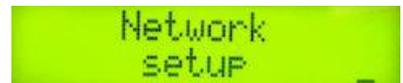
Press **Down** to navigate to the rest of the menu items:

- **Reboot system** – reboot the server
- **Shutdown system** – shutdown the server
- **Generate password** – reset administrator’s password and generate a new one

New administrator’s password is displayed on the LCD until a key is pressed on the front panel

6.2 Network interfaces setup

The LCD panel contains interface for setting up network parameters, i.e. IP address and subnet mask. To do that, press **Fn**, then **Enter** on any statistics screen. The network configuration screen will appear. By pressing **Up** and **Down** select the network interface to be set up.



```
Network
setup _
```



```
Select interface
Interface 1 _
```

After selecting the interface, you want to set up, press **Enter**. Then you will be prompted to change current IP address for the selected interface.

Pressing **Fn**, then **Up** or **Down** selects the byte to change (at that, “>” points to the currently selected byte). Pressing **Up** and **Down**, correspondingly, increases and decreases the selected byte value by 1.



```
IP address:
> 10. 1. 20. 1
```

When you are done with the IP address, press **Enter**. Then you will be prompted to enter the subnet mask. It is entered by pressing **Up** or **Down**, which increases or decreases the number of bits in the mask determining the subnet address.



```
Network mask:
255.255.254. 0_
```

After entering the subnet mask, press **Enter**. Then you will be prompted to keep the changes just made or cancel them. Buttons **Up** and **Down** switch between **Yes** and **No**, with currently selected option emphasized with brackets. Select **Yes** to save the settings just made, or press **Enter** to proceed back to the network interface selection screen.



```
Save changes
[ Discard ]
```

6.3 Generating new administrator's password

Should you require to generate a new administrator's password, starting from the statistics screen, press **Up** or **Down**, until you see the Generate Password menu item. Press **Enter** to generate new password and apply it to all system components. Once generated, the password will be displayed on the LCD screen.



7. Web interface

7.1 Introduction

Web interface is intended for setting up various server parameters of IPTV servers and STB clients. It is accessible by the address <http://10.1.20.1/>.

Left pane of the web interface remains visible on every page and contains links to the following pages organized into groups:

The composition and the very presence of particular interface pages and entire groups may depend on the hardware configuration of the server and on the access privileges of the administrator currently logged in.

1. **Interface** group
 - o **Manager** – opens new tab in browser with following groups
 - 1 **User** group
 - o **Logout**
 - 2 **Customers** group
 - o **Customers**
 - o **Customer groups**
 - 3 **Billing** group
 - o **Service plans**
 - o **Standalone services**
 - o **Media content groups**
 - 4 **Media content** group
 - o **Media groups**
 - o **Languages**
 - 5 **Accounting** group
 - o **Prepaid cards**
 - o **Accounting periods**
 - 6 **Security** group
 - o **Activation requests**
 - 7 **Reports** group:
 - o **Debit** - for generating purchase reports
 - o **Content view rate**
 - 8 **IPTV distribution** group (present only on IPTV Core servers):
 - o **Video Processing** for controlling IPTV content distribution;
 - 9 **Video stream processing** group
 - o **Processing presets**
 - o **Processing setup**
 - 10 **System** group
 - o **System users**
 - o **SNMP + PA/GA**
 - o **Currencies**
 - o **Firmware**
 - 11 **Android_client** group
 - o **Android Client**
2. **DVB adapters** group (present only on streamers):
 - o **DVB adapter** - to control the streamer itself (this page exist in multiple instances by the number of adapters);
3. **Media content** group (present only on Middleware servers):
 - o **Languages** - for the management of languages used for content descriptions;
 - o **TV Channels** - for the TV content management;
 - o **Radio** - for the Radio content management;
 - o **Movies** - for the VoD content management;
 - o **EPG** - for importing EPG;
 - o **Advertising messages**
 - o **Media groups**
 - o **MyTV** - for managing scheduled video files broadcasting;
4. **Set Top Boxes** group - (present only on Middleware servers):

- o **Translations** - to control IP STB interface language;
- o **STB messages** - to send messages to customers;
- 5. **System status** group:
 - o **Connected clients** - showing the clients' connections to the system;
 - o **About** - showing version information;
 - o **Connections** - showing connections between system components;
 - o **Storage** - displaying disk space usage;
- 6. **Android client** group:
 - o **Shop** - for setting up the Android shop;
 - o **Home page** - for setting up the Android home page;
 - o **Settings** – for global STB settings like automatic update, personnel password, etc.
 - o **Main menu**
 - o **Info page**
- 7. **IPTV** group (present only on streamers):
 - o **Multicast to unicast** to control the retranslation of selected multicast streams via unicast;
 - o **SNMP agents** for setting up SNMP;
- 8. **System administration** group:
 - o **Files** for downloading documentation, and miscellaneous STB-related files;
 - o **Power Management** for reboot and shutdown;
 - o **Update** for firmware upgrade;
 - o **Status** shows the system status;
 - o **Backup** containing system backup interface;
- 9. **System configuration** group:
 - o **Network** for network interfaces settings;
 - o **Routing** with routing table;
 - o **Security** for password management;
 - o **Services** for manual start and stop of services;
 - o **Date and time** containing date and time settings;
 - o **License** for uploading the keystore file;
- 10. **Transcoding** group
 - o **Software transcoding**

7.2 Starting web interface

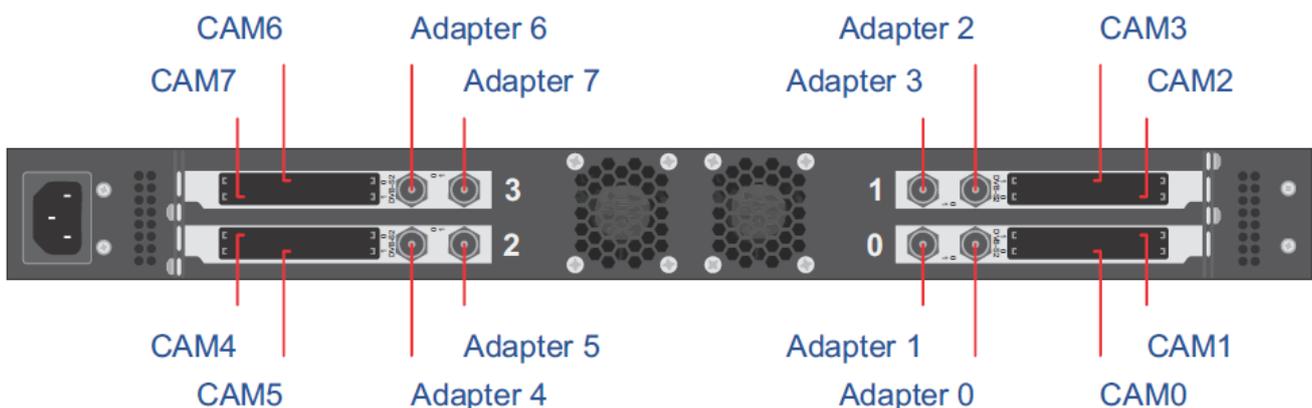
To enter web interface, type <http://10.1.20.1> in your browser's address field. An entrance page will appear. Default username is **admin** and password is **Zenitel!**

It is strongly recommended to change the password immediately after logging in for the first time. This can be done via the **Security** page.

7.3 DVB adapters

This group contains pages for controlling DVB adapters, one for each adapter.

Adapters and CAM slots on the back plate of the actual IPTV Server or Gateway are numbered bottom-to-top, as shown below.



Each adapter-controlling page contains several groups of interface elements.



7.3.1 DVB-S/S2/T/T2/C or ATSC adapter

At the top line of the page there are signal level monitor and the five adapter state indicators:

- **SIGNAL** – denotes presence of the signal (red means no signal);
- **CARRIER** – denotes presence of the carrier frequency (red means no carrier);
- **FEC** – denotes error correction;
- **SYNC** – denotes synchronization with the signal;
- **LOCK** – means that the adapter has locked on the signal and is decoding it successfully;
- **SNR** – signal to noise ratio;
- **BER** – bit error rate.

If the system works correctly, all indicators show green lights. Red lights on some indicators mean that the signal is missing or corrupted. Below follow the adapter parameters. These parameters may be changed only when the adapter is stopped.

- **State** (shown in the group header, repeated by the icon on the left pane) – may be either **Active** or **Stopped**.
- **Standards** – is the adapter type;
- **Frequency** – is the incoming signal frequency in MHz;

Type-specific parameters (see below).

- **Profile** – shows which of the saved profiles is currently applied.
- **Load** (active when the adapter is stopped) – loads another settings profile.
- **Start** (active when the adapter is stopped) – starts the adapter.
- **Stop** (active when the adapter is running) – stops the adapter.

Note that stopping a service would stop transmitting video stream to network from this adapter.

Press **Switch mode** in upper right corner to switch between the adapter's modes. The list of available modes depends on the adapter type. Vingtor-Stentofon Universal Dual DVB-CI supports the following modes: DVB-S, DVB-S2, DVB-T, DVB-T2 and DVB-C.

Parameters specific to the DVB-S/DVB-S2 adapters are:

- **Symbol Rate** – is the rate of symbol transfer;
- **Polarization** – is the polarization type;
- **LNB type** – selects LNB type from the predefined list. Once it is selected, the corresponding values of LNB parameters (**LNB low frequency**, **LNB high frequency**, and **LNB switch frequency**) appear in their fields.
- **LNB low frequency** – is the LO frequency for the low-frequency range of satellite signal.
- **LNB high frequency** – is the LO frequency for the high-frequency range of satellite signal.
- **LNB switch frequency** – is the border between satellite signal frequency ranges.

- **Tone** – enables controlling the LNB by feeding a special 22 kHz tone to it;
- **Manage multiswitch** – enables the selection of:
 - **Ports group** – (a DiSEqC protocol parameter);
 - **Tone Burst** – (a Tone Burst parameter).

Parameters specific to the DVB-T/DVB-T2 adapters are:

- **Modulation** – (QPSK, QAM_16, QAM_64, or auto);
- **Bandwidth** – (8MHz, 7MHz, or 6MHz);
- **Transmission mode** – selects the number of carriers (2K / 8K / auto);
- **Guard interval** – (1/32, 1/16, 1/8, 1/4, or auto selection);
- **Stream ID** – is actually a PLP ID (when using multiple PLP).

Parameters specific to the DVB-C adapters are:

- **Modulation** – (QAM_16, QAM_32, QAM_64, QAM_128, QAM_256, or auto);
- **Symbol Rate** – is the rate of symbol transfer.

Parameters specific to the ATSC adapters are:

- Modulation – 8VSB.

7.3.2 CAM

- **CAM state** (shown in the group header) – is the state of the CAM (**Active** / **Stopped**).
- **Mode** – switches the encryption mode between **Usual** and **DRE Crypt**. The DRE Crypt mode is used with DRE Crypt CAM modules.
- **Supported CAS** – is the list of supported conditional access systems.

Menu button opens the CAM settings menu. **Messages** button opens CAM messages. In both cases the interaction with CAM is done via MMI. If there is no CAM on this adapter, the group header switches to “No CAM” and the group itself is empty.

7.3.3 Channels

Channels						
ID	Program	Media content	PIDs	Transmission		Broadcasting IP
20501	Discovery Channel	Discovery	140.320.400...	scrambled	 free content	224.4.4.4:1234 eth2...
20502	MTV	<no content>	141.321.402...	scrambled	 no broadcast	<no address>
20503	Nick Jr.	Nickelodeon Europe	142.322.404...	scrambled	 free content	229.101.3.3:1234 eth0

This group contains the list of received programs. For each program it contains:

- **ID** – of the program;
- **Program** – name; by clicking the link program parameters are shown, including the ONID and channel name;
- **Media content** – related to this program, or **<no content>** link if there is none; by clicking the link a new media content may be created;
- **PIDs** – of audio, video, and auxiliary streams (the latter may carry EPG or some other kind of service information). Upon clicking the link, a popup window shows up where individual streams may be switched on and off. This may be relevant for channels with multiple audio tracks;
- **Transmission** – state of the program (broadcast / no broadcast, scrambled / open content). Click on the outgoing stream state to start/stop the outgoing stream or to enter a BISS key. The BISS key is eight bytes long. Its 4th and 8th bytes are CRCs for 3 preceding bytes. They might change after you press OK, because the streamer recalculates them and re-places if the previous value is wrong;
- **Broadcasting IP** – of the program (or **<no address>** if there is none). By clicking the link you may add, remove, or modify the IP addresses. Besides, you may appoint one of them as “Main IP”. This address will be communicated to the STBs wanting to receive this channel.

Pids for program "Discovery"

	PID	Type	Info
<input checked="" type="checkbox"/>	189	PMT	Program Map Table
<input checked="" type="checkbox"/>	5090	ECM	Entitlement Control Messages
<input checked="" type="checkbox"/>	320	video	
<input checked="" type="checkbox"/>	400	audio	rus
<input checked="" type="checkbox"/>	401	audio	eng

Apply Close

Broadcast control of program "Discovery Channel"

Start Stop

scrambled Viaccess  free content, 4.67 Mbit/s

Decode the stream using BISS key

A5FF12B6112A306E

Ok Cancel

Broadcasting parameters of program Первый канал

	Out stream IP	Port	Interface	Main IP	Comment
<input type="checkbox"/>	228.110.1.2	1234	eth0	Ⓢ	
<input type="checkbox"/>	228.110.1.11	1234	eth0	Ⓢ	

Add

Apply Close

7.4 Media content

7.4.1 Languages

On this page you may alter the list of system languages used when entering content descriptions on the **Television** and **Video** pages.

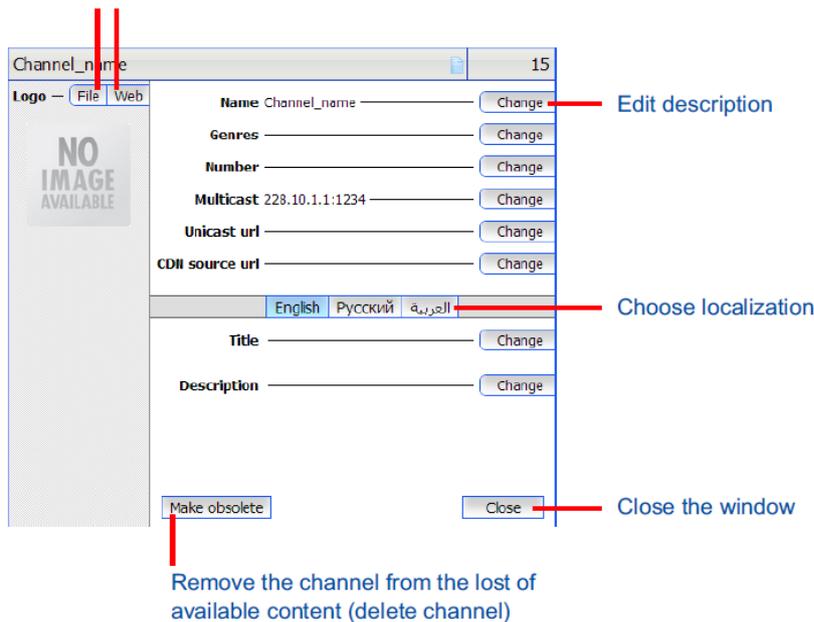
7.4.2 TV Channels

This page contains the list of TV channels:

TV Channels		Add
Discovery	1	Animal_Planet
 Multicast 228.99.1.1:1234		 Multicast 228.99.1.4:1234
Title _____		Title _____
en _____		en _____
ru _____		ru _____
ar _____		ar _____
HTB	4	OPT
 Multicast 228.99.0.15:1234		 Multicast 228.99.3.3:1234

For each channel one can choose a logo, edit the channel's description and remove a channel. To access these functions, left click a channel to open the edit window:

Load logo from a local file Enter logo URL



Channel_name 15

Logo — File Web



Name Channel_name Edit description

Genres

Number

Multicast 228.10.1.1:1234

Unicast url

CDN source url

English Русский العربية Choose localization

Title

Description

Close the window

Remove the channel from the lost of available content (delete channel)

In this window you can choose a logo (select from a local file or insert a logo URL) and edit the channel's description, including the following parameters:

- **Name** – name of the channel in the web interface
- **Genres** – genres for this channel if applicable
- **Number** – this number is used for sorting the channels on the TV channels page and for switching to a channel with a certain number using number keys of the remote control
- **Multicast** – a multicast stream address
- **Unicast URL** – a unicast stream address. The set-top box will use this URL for receiving the stream
- **CDN source URL** – a unicast stream address that will be the content source for the IPTV CDN server
- **Title** – name of the channel, shown on the STB
- **Description** – description of the channel

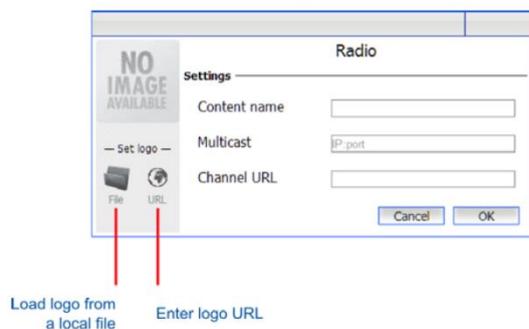
Press a corresponding **change** button to edit a field. One can edit the channel's title and description separately for each available localization. To do so, you'll have to choose each localization and enter the channel's title and description in the localization's language. To remove a channel, press **Make obsolete** button.

7.4.3 Radio

This page contains the list of radio channels.



For each channel you can change its settings (**settings** button), rename it (**rename** button) and remove a channel (**make obsolete**) from the web interface. If you press Settings, the settings window will appear:



In the settings window you can edit the following:

- Content name
- Multicast address
- Channel URL (unicast address)
- Set a logo of the channel (upload from a local file, or insert a logo URL)

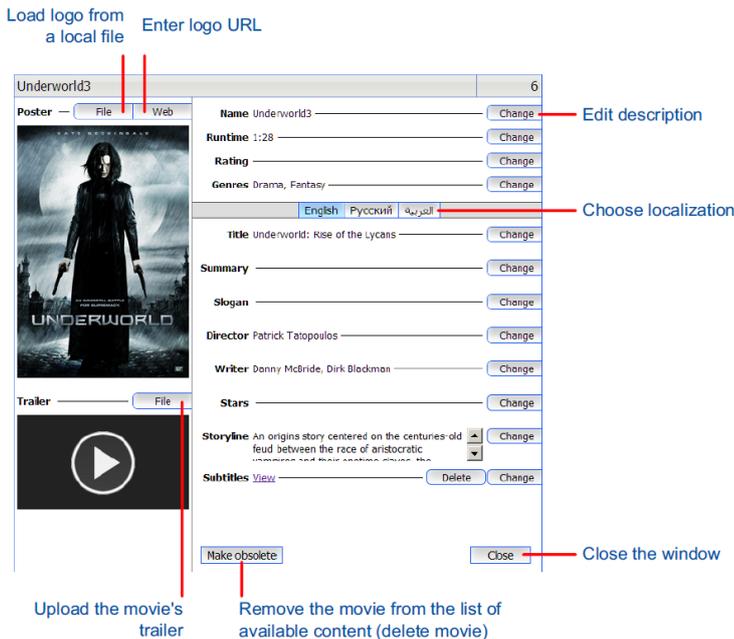
Press **Rename** to change the name that will be shown on the set-top boxes. You can add a name of the radio channel for each of the available localizations. Press **Make obsolete** to remove the channel from the web interface and from set-top boxes.

7.4.4 Movies

This page contains the list of available movies (**VoD** content):



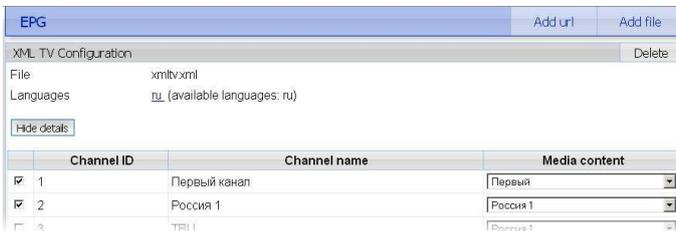
Like in case of TV channels, one can edit the movie's description, choose a logo and remove a movie. To access these functions, left-click a movie to open the edit window:



In this window you can choose a logo (select from a local file or insert a logo URL), edit the movie's description (movie's name, genre, rating, etc.) and delete the movie. To edit a field, press a corresponding **change** button. One can edit the movie's description separately for each available localization. To do so, you'll have to choose each localization, enter the movie's description and upload the subtitles file in the localization's language. To remove a movie, press **Make obsolete** button.

7.4.5 EPG

On this page EPG in XMLTV format may be uploaded from a local file or from an FTP or HTTP URL.



From that point on, the EPG will be updated from the same address according to the customizable schedule (by default, weekly).

Uploading the EPG by FTP is done in active mode, which has to be supported by the router, in case if the IPTV server is connected to internet via NAT.

7.4.6 Advertising messages

This page provides interface for management of advertising messages.



At the top of the page there is the schedule of advertisements for the upcoming week.

- Click **Add show** to create a new show.
- Click **Add recurrent show** to create a weekly show pattern for repeating shows
- Click **Show now** to start advertising messages playback immediately
- Click **Add message** below the list of messages to add a new message to the list
- Click a message number to edit it



Change advertising message

Duration (in seconds)
30

Message

B I U ABC Format Font Family Font Size          

Nice baby English bulldog puppies for adoption to any pet loving home.
perkins765@blumail.org

Delete Cancel Apply

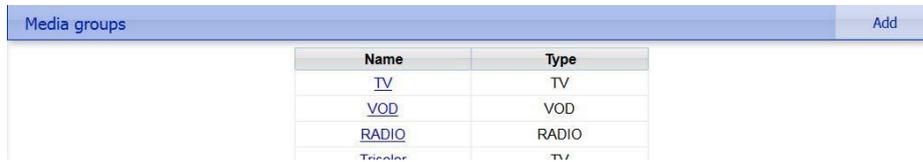
When creating or editing an advertising message, a popup window appears.

This popup window contains a WYSIWYG editor which allows one to format the text and add images. Enter the time in seconds that the message should be shown on STBs in the Duration field.

On each show all messages are scrolled on the screen one by one, in the same order as they are presented on this page. Each message stays on the screen for the certain period of time which is specified during its creation and also displayed in the list. The messages in the list are capable of drag-and-dropping by the handle  for reordering.

7.4.7 Media Groups

This page contains an interface for creating and editing media groups.



- press **Add** in the upper-right corner of the page to add a new media group



- enter media group name and select its type - **TV**, **Radio** or **VoD**. After that press **Apply** to finish creating a media group
- select one of existing media groups by right-clicking it to edit its name or delete it

7.4.8 MyTV

MyTV page contains an interface used to control scheduled video files broadcasting. In the upper part of the channel description one can see the channel's IP address, its current status and the play (▶) and stop (■) buttons. There is the channel logo and the channel name below these buttons. If there is more than one video file in the broadcast block, one will see the jump to previous file (◀) and next file (▶) buttons. The daily schedule of a channel consists of broadcasting blocks. You can add a new block by pressing **New broadcast block** button at the bottom of the schedule. When creating a new block, you have to specify the time when the broadcast of this block starts. A broadcast block is controlled by the buttons at the bottom of it:

- **Add program** – Add a video file. Opens a popup window with the following options:
 - o **Upload** – upload new content (after uploading, video is automatically encoded if it doesn't match the broadcast video format);
 - o **Encode** – Start encoding a video file uploaded some other way;



- o **Reuse** – reuse a content that is already present on the server;

Keep in mind that you can only add files via web-interface, but you can't delete them. Use FTP or SCP for file management.

- o  – loop a broadcast block so that it starts over again as soon as it finishes;
- o  – remove a broadcast block.

Each block contains video files in a specified order. You can adjust the position of each individual video file. The  button opens a popup window which allows you to view the video file properties or delete it from the current block (**Delete** button).



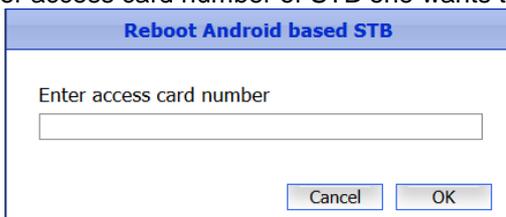
7.5 System status

7.5.1 Connected clients

This page contains the list of all connected clients, including STBs and PCs. Address and state of each client are shown in the list. To see more details about a connected client, click  in the **details** column. In the upper-right corner of the page there are three buttons, **Reboot STB** button (which allows to remotely reboot STB based on their access card number), **Remote channel switch** button (which allows one to remotely switch a TV channel on the set-top boxes) and **STB log** button (which allows one to download logs from STB based on their access card number).

To remotely reboot STB:

- click Reboot STB switch
- enter access card number of STB one wants to reboot and click **Next**

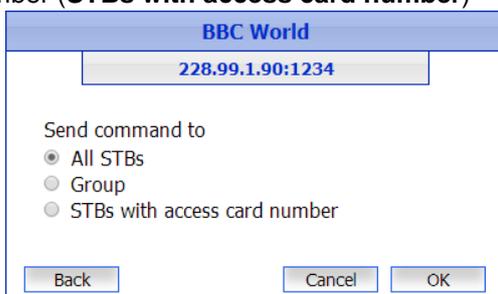


To remotely switch a channel:

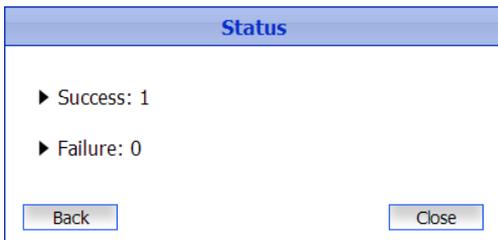
- click Remote channel switch
- select the channel you want to switch to and click **Next**



- select the STBs that you want to switch the channel. One may select all connected STBs (**all STBs**), STBs activated for users that form a certain user group (**Group**) or a particular STB by the access card number (**STBs with access card number**)

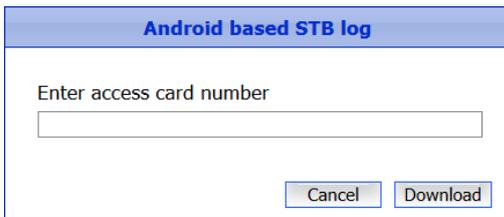


after that you will see a status report which tells how many STBs are connected and how many succeeded to switch the channel



To download STB log:

- click STB log switch
- enter access card number of STB one wants to download logs and click **Next**



7.5.2 About

This page displays the version number of IPTV system and builds numbers of individual systems.

7.5.3 Connections

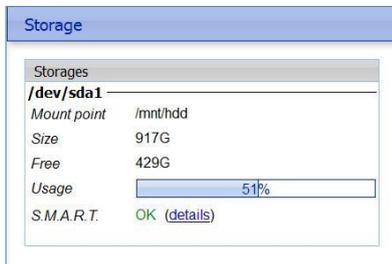
This page displays the addresses and status information for all systems of IPTV (including individual STBs). For each one, it also lists the other systems with which this one interacts.

Connections		
NetUP IPTV Core		
NetUP IPTV Streamer (license 1964)	Connected	10.1.20.1
NetUP IPTV Encryption VoD Server (license 1963)	Connected	10.1.20.1
NetUP IPTV VoD/DRM Balancer (license 1962)	Connected	10.1.20.1
NetUP IPTV Middleware (license 1961)	Connected	10.1.20.1
NetUP IPTV Billing (license 1960)	Connected	10.1.20.1
NetUP Software Transcoder (license 3189)	Offline	10.1.20.1
NetUP IPTV Relay (license 3630)	Connected	10.1.20.1
NetUP IPTV Middleware		
NetUP IPTV Core	Connected	cluster-core
NetUP IPTV VoD/DRM Balancer	Connected	10.1.20.1
NetUP IPTV Billing	Connected	10.1.20.1
NetUP IPTV Billing		
NetUP IPTV Core	Connected	cluster-core
NetUP IPTV Middleware	Connected	10.1.20.1

For this host's system, the addresses of other connected systems are links to the interface by which they may be changed, either manually or by automatic address discovery.

7.5.4 Storage

This page summarizes the disk space usage info.

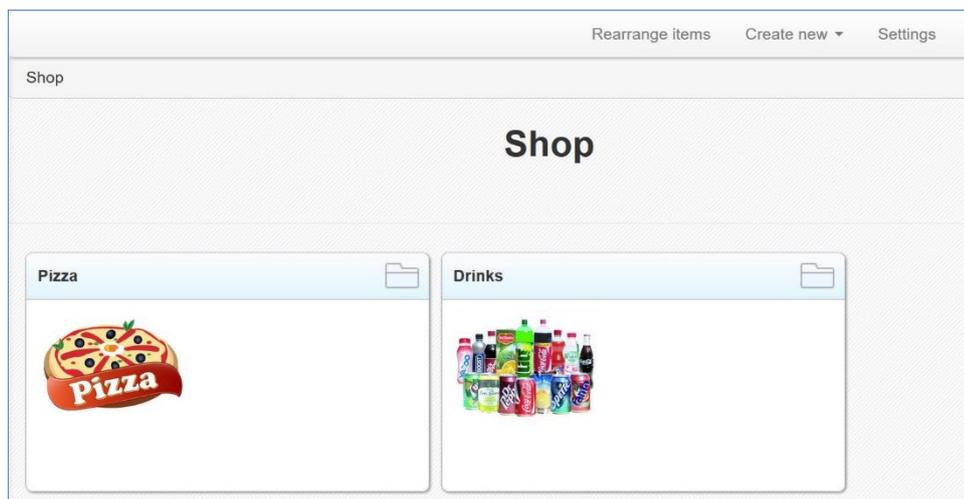


Click on **details** to see the detailed S.M.A.R.T. or RAID condition report.

7.6 Android client

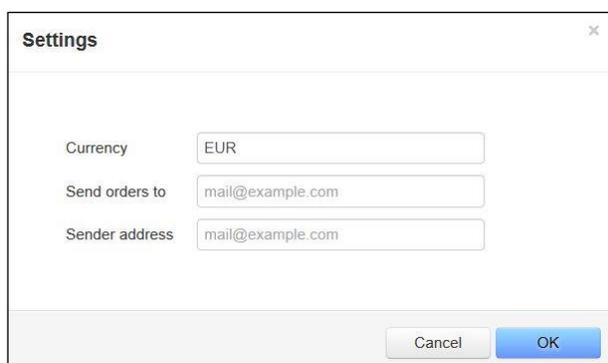
7.6.1 Shop

This page contains the interface for setting up the Android shop.



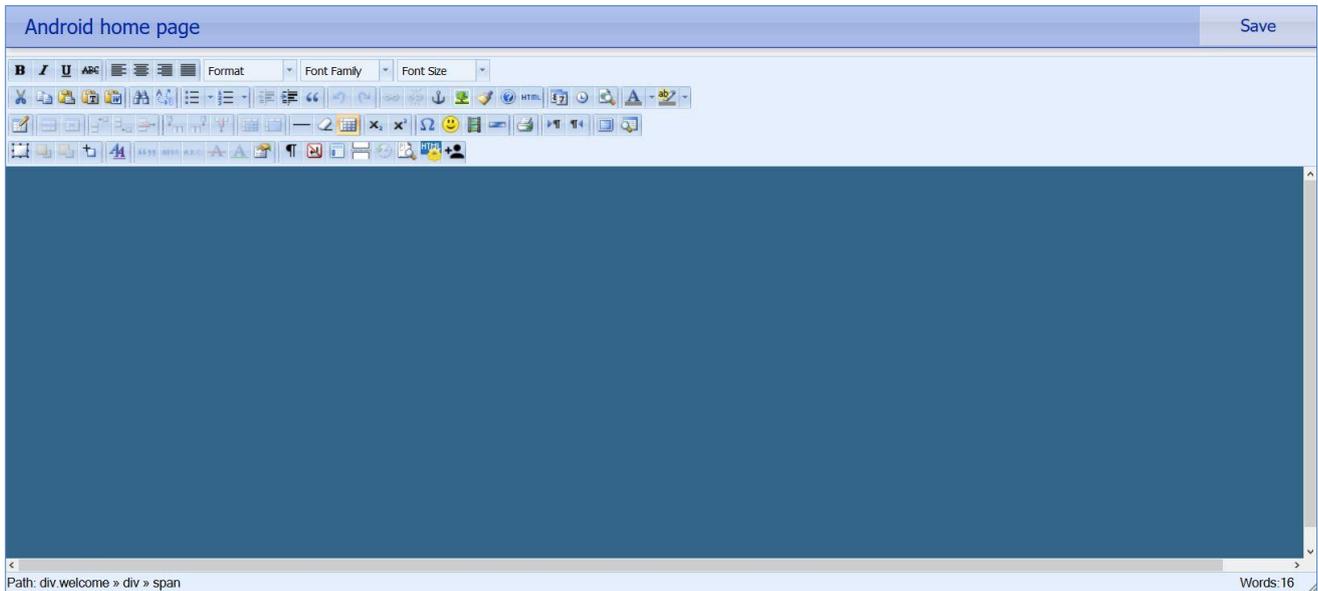
This page contains the following control elements:

- **Create new** button creates a new **item** or a new **category**. In screen-shot above one can see two categories - Pizza and Drinks.
- Use the **Settings** button to set up the name of the currency that will be appended to all the prices in the shop and to enter the e-mail address which will be used for the orders (all the orders will be sent to this e-mail)



- There is also a **Rearrange items** element to the right of the category description. Click **Rearrange items**, place the items in a desired order and click **Save** to save it, or click **Cancel** to cancel the changes.

7.6.2 Home page



The Home page contains an interface for editing the Vingtor-Stentofon Android client home page. It is based on the Tiny MCE editor and it lets one to add HTML widgets to the home page (AccuWeather, Twitter, etc.). Press  to add a widget. Enter the widget's name into the widget name field and paste the widget's code to the HTML content field. Press to insert the widget into the home page.

7.6.3 Settings

This page contains an interface for setting up the IPTV client for Android. The interface allows one to setup the following:

- **Home page URL** – is an address of a web page, shown on the home page
- **Stop playback when idle** – set the flag if you want the TV channels playback to stop when a customer is idle for a certain amount of time. The time limit is set in the next field - Idle time (minutes), which is enabled when the flag is set
- **Start up mode** – allows one to setup the STB startup behavior. It can be set to Regular startup, Resume TV play- back, which will make the STB start playing the last watched TV channel immediately after startup, and Play by URL, which makes the STB playback a stream by a certain URL immediately after startup
- **Home page background** – allows one to select the home page background image. One can insert an image URL, or upload one
- **Allow prepaid cards** – allows customers to use prepaid cards. If the flag is not set, using prepaid cards is forbidden
- **Update URL** – an address where one can get the update file
- **Request confirmation before installing updates** – prompt the customer for confirmation before installing updates
- **Install updates when download finishes** – install updates immediately after download
- **Install updates at next reboot** – install updates when the STB is rebooted
- **Hide “Check for updates” item from the settings menu** – hide the item so that the customers can't see it in the settings menu
- **Download updates automatically** – download updates without prompt
- **Use custom account replenishment notification** – one can create a custom message to notify the customer to replenish her account. The following substitutions are available for this message:
 - **{personal_account}** – is substituted with the personal account number
 - **{access_card}** – is substituted with the access card number

- o **{days_left}** – is substituted with the approximate number of days left before the account is blocked
- **Use custom service plan expiration notification** – one can create a custom message to notify the customer about the service plan expiration. The following substitutions are available for this message:
 - o **{personal_account}** – is substituted with the personal account number
 - o **{access_card}** – is substituted with the access card number
 - o **{days_left}** – is substituted with the approximate number of days left before the account is blocked

At the bottom of the page there is an allowed applications panel

Allowed applications Two lists ▾

Enter a list of application names that you want your customers to be allowed to launch, separated by comas.

Example: com.android.browser, com.android.email, com.facebook.katana, com.myspace.android

Allowed applications list	Applications allowed for blocked customers
com.adobe.flashplayer, com.amlogic.PicturePlayer, com.amlogic.netfilebrowser, com.android.browser,, com.android.calculator2, com.android.calendar, com.android.deskclock, com.android.email, com.android.gallery3d, com.android.music, com.android.providers.downloads.ui, com.android.quicksearchbox, com.android.settings.	com.amlogic.OOBE, com.amlogic.PicturePlayer, com.amlogic.netfilebrowser, com.android.browser, com.android.calculator2, com.android.calendar, com.android.deskclock, com.android.email, com.android.gallery3d, com.android.music, com.android.providers.downloads.ui, com.android.quicksearchbox, com.android.settings.

Choose one of the options in the head of the panel:

- **All** – allows customers to launch all available applications
- **List** – allows customers to launch only the applications present in the list. In the text field below list all the applications that you wish the customers to be able to launch, separated by comas.
- **Two lists** – is the same as List option, but allows one to make a separate list of applications allowed to launch for customers, who have their personal accounts blocked

When finished editing, press **Submit** to submit the changes.

7.6.4 Main menu

Main menu Add

TV channels Edit



TV Guide Edit



Radio Edit



Shop Edit



Movies Edit



This page contains an interface for setting up the home page menu for IPTV client for Android. All the menu items are shown as separate panels.

On this page:

- press **Add** in the upper-right of the page to add a new menu item
- press **Edit** on the right side of a panel to edit an item

When adding a new item, fill in the following:

- **Item type** – is the type of the item. Select what element should be launched when this menu item is selected
- **Item name, Page title** – name of the menu item and the title of the page that opens when the item is selected (for elements like Account, Movies, File manager, etc.)
- **Use custom icons** – is available for elements that have default icons. Set the flag and insert an URL to an icon or upload one (Large icon is the icon, shown in the home page menu, Small icon is the icon shown on the page that opens when the menu item is selected)
- **Media group** – is only available for TV channels. Allows one to select a TV channels group. When this menu item is selected, only TV channels from that TV channels group will be available for playback
- **URL** – is only available for Web Portal. Insert an address of a web page that should be displayed when this menu item is selected
- **Package name** – is only available for External application. Fill in the package name that should be launched when this menu item is selected

When finished setting up a menu item, press **Save** to save the changes

7.7 IPTV

7.7.1 Multicast to unicast

On this page any multicast channel may be retranslated as unicast.

Multicast to unicast			Add
List of channels			
Channels			
RTL Austria	udp://224.1.1.1:1234		http://10.5.110.180:8180/stream?ip=224.1.1.1&port=1234

Add channel

Channel name

Multicast URL

(Examples: 225.0.0.1, 225.0.0.1:1234, udp://225.0.0.1, udp://225.0.0.1:1234)

Once configured, the retranslated channel gets accessible by the URL `http://<server address>:8180/stream?ip=<channel IP>&port=1234`. Meanwhile, the complete list of retranslated channels and their addresses is available at `http://10.1.20.1:8180/channels` as an XML file of the following format:

```
<?xml version="1.0" encoding="UTF-8"?>
<channelLists>

<timestamp>1327324533</timestamp>

<channelList>

<name>All channels</name>

<channel>

<name>Channel 1 (228.110.1.1)</name>

<address>http://10.1.0.121:8180/stream?ip=228.110.1.1&port=1234</address>

<id>7c1342b67c4ed50f361aa045acf0e4f9</id><type>tv</type>

<quality>SD</quality>

<encrypted>no</encrypted>

</channel>

</channelList>

</channelLists>
```

7.7.2 SNMP agents

This page contains the list of communities entitled to make SNMP requests. For each community the corresponding view and IP address are provided. Communities may also be added or removed. A MIB file describing the available information can be downloaded on this page.

The IPTV MIB file contains a template for the variables which are listed below, with explanation. For each CPU in the system:

- **netupCpuIndex** – is the CPU number;
- **netupCpuLoad** – is the CPU load level;
- **netupCpuTemp** – is the CPU temperature.

For each DVB adapter in the system:

- **adapterNumber** – is the adapter number;
- **netupBER** – is the bit error rate;
- **netupSNR** – is the signal to noise ratio;
- **netupLOCK** – is the signal lock status.

For each data storage in the system:

- **netupStorageIndex** – is the storage number;
- **netupStorageDevice** – is the path to the storage (for example, "/dev/sda1");
- **netupStorageMountPoint** – is the mounting point of the storage (for example, "/mnt/hdd");
- **netupStorageFilesystem** – is the file system of the storage;
- **netupStorageBlockSize** – is the block size on the storage;
- **netupStorageFragmentSize** – is the fragment size on the storage;
- **netupStorageSize** – is the storage size;
- **netupStorageFree** – is the free space on the storage.

For the system as a whole:

- **netupMemPhisTotal** – is the total memory size;
- **netupMemPhisFree** – is the free memory size;
- **netupMemPhisBuffers** – is the buffer size;
- **netupMemPhisCached** – is the cache memory size;
- **netupMemSwapTotal** – is the maximum size of the swap file;
- **netupMemSwapFree** – is the free space within the swap file;
- **netupStbClients** – is the number of connected STB clients;
- **netupPcClients** – is the number of connected PC clients;
- **netupTotalClients** – is the total number of connected clients.

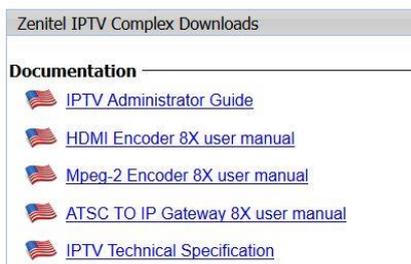
To request all available parameters, download the MIB file, pass it to the SNMP daemon, and run the following command:

```
snmpwalk -v2c -c netuptest 10.1.0.77 NETUP-MIB::netup
```

7.8 System administration

7.8.1 Files

This page contains the download links for various manuals



7.8.2 Power Management

This page contains **Reboot** and **Shutdown** buttons. Whenever the server needs to be reloaded or shut down, this should be done exclusively by means of these controls; abnormal termination may lead to system failure.

7.8.3 Update

This page lists the uploaded firmware files together with their uploading dates, build numbers, and possible actions.

Update			
Installed firmware			
2.0.614, combine, revision 1496, 2017/05/09 12:37:38			
Available firmwares			
Firmware	Version	Revision	Created
firmware-combine.2.0.614-3.14	2.0.614	1496	2017/05/09 12:37:38
firmware-combine.2.0.583-3.14	2.0.583	1484	2017/04/07 15:12:32
firmware-combine.2.0.581-4.4	2.0.581	1484	2017/04/06 14:56:36
firmware-combine.2.0.489-3.14	2.0.489	1450	2017/01/26 17:28:20
firmware-combine.2.0.236-3.14	2.0.236	1400	2016/10/12 15:02:23

This page allows updating the IPTV server firmware. To do that, upload the new firmware file to the server via FTP (login: **update**; password is the same as server administrator password: **Zenitel!**), refresh the page to reveal it in the list, click on desired firmware file and press **Install**.

7.8.4 Status

This page includes:

- Time zone
- License (license holder name and the license number)
- Internet (internet connection status)
- Server password (password for SSH, FTP)
- Cluster password (a password for UCC)
- Adapter status
- System components status (IPTV Core, Middle-ware, Billing, Streamer)
- Connections between systems (status of connection between system components)

Status		Collect diagnostic information
Firmware version 2.0.614 Firmware type combine		
<ul style="list-style-type: none"> ✔ Backup OK ✔ Timezone Europe/Zagreb (CET-1CEST.M3.5.0.M10.5.0/3) ✔ Licence Number 1960 (issued to Zenitel) ✘ Internet <not connected> ✘ Server password <default> ✘ Cluster password <default> ✔ DVB-S adapter 0 Started ✔ DVB-T adapter 1 Started ✔ DVB-S adapter 2 Started ✔ DVB-S2 adapter 3 Started ✔ NetUP IPTV Core Started ✔ NetUP IPTV Middleware Started ✔ NetUP IPTV Billing Started 		

Collect diagnostic information button allows one to collect diagnostic information for one of the services for providing it later to technical support

7.8.5 Backup

This page provides control interface for system backups. **Create** button creates an archive in *.tar.bz2 format containing system settings; also, an automatic backup is made every day. Existing backup files together with their creation dates are listed in the table.

Backup	Created	Type
backup_auto_1494903601.tar.bz2	16.05.2017 05:04	automatic
backup_auto_1494817201.tar.bz2	15.05.2017 05:04	automatic
backup_auto_1494730801.tar.bz2	14.05.2017 05:04	automatic
backup_auto_1494644401.tar.bz2	13.05.2017 05:04	automatic
backup_auto_1494558001.tar.bz2	12.05.2017 05:04	automatic
backup_auto_1494471601.tar.bz2	11.05.2017 05:04	automatic
backup_auto_1494385201.tar.bz2	10.05.2017 05:04	automatic
backup_auto_1494298801.tar.bz2	09.05.2017 05:04	automatic
backup_auto_1494212401.tar.bz2	08.05.2017 05:04	automatic
backup_auto_1494126001.tar.bz2	07.05.2017 05:04	automatic
backup_auto_1494039601.tar.bz2	06.05.2017 05:04	automatic
backup_auto_1493953201.tar.bz2	05.05.2017 05:03	automatic
backup_auto_1493866801.tar.bz2	04.05.2017 05:04	automatic
backup_auto_1493780401.tar.bz2	03.05.2017 05:03	automatic

After clicking on backup file optional window opens with options to **Delete**, **Download** and **Restore Backup** appears



This page is present only on IPTV Core servers.

7.9 System configuration

7.9.1 Network



The **Add VLAN** button opens a popup window of virtual adapters' settings.

The **Change Core IP** button is only present on the servers other than IPTV Core. It lets you enter the IPTV Core IP address. After that the server will connect to the IPTV Core and will appear in the IPTV Core's web-interface on Connections page.

7.9.1.1 Network adapters management

Network page gives the full list of installed network adapters together with their state.

Network connectors on the front panel of IPTV server/streamer are marked as follows:

On the panel	0	1	2	3
In the web	eth0	eth1	eth2	eth3

For each adapter the following information is presented:

- Adapter name
- **Inet address** (IP address) of the adapter
- **MAC** address of the adapter
- Adapter state (**UP** or **DOWN**)
- **Aliases** (alternative IP addresses) of the adapter
- **DHCP server** IP range and state (**UP** or **DOWN**)

Following actions can be done with an adapter

- **Add alias** button adds an alias IP address;
- **Statistics** button displays load statistics for the given adapter in graphic form;
- **Inet address** link provides the way of changing the IP address, or removing it altogether (unless it is unique)
- **DHCP server** link changes the IP address range served by this DHCP. It also allows one to add a static IP address linked to a MAC address.
- DHCP server status indicator (**UP / DOWN**) is also a switch that toggles this DHCP on and off.

The address assigned for the main interface is used for the component's interaction and thus is absolutely crucial for the system's operation. It can never be deleted. One can set the main interface in the interface's IP address edit window.

7.9.1.2 VLAN window

To create new virtual LAN interface based on the selected physical interface, enter **VLAN ID** and press **Add**. A new VLAN with a name composed of the physical LAN's name and the ID will be created. To remove a VLAN, press **Delete VLAN** in the corresponding row.

7.9.2 Routing

This page features user routing rules and the system routing table.

Routing rules		
User routing rules		Add rule
Destination/Mask	Gateway	Interface
Default Gateway	not set	
224.0.0.0/4	N/A	eth0
System routing table		Hide
Destination/Mask	Gateway	Interface
10.1.0.0/16	0.0.0.0	eth0
10.2.0.0/24	0.0.0.0	eth1

Press **Add rule** to add a user routing rule. Left-click Default Gateway to edit it. Left click a user rule to edit or delete it. When you left click a user rule, a Change routing rule window will appear. There you can set an IP address/mask, set a Gateway or choose a Network interface.

- click **Save** to save the changes
- click **Cancel** to cancel the changes
- click **Delete** to delete the user routing rule

The system routing table is needed for correct system operation and can't be edited. **Show/Hide** shows/hides the system routing table.

Note that for internet connection on IPTV server we need to use E3 (in web interface eth3) because by default NAT is enabled only on that interface

7.9.3 Security

This page contains interface for changing the Server administrator passwords. To do so, type the new password twice in the **New Password** and **Repeat Password** fields of the corresponding form and press **Update**.



Server admin password is used for SSH and FTP access.

7.9.4 Services

This page lists existing system components (**Middleware**, **Billing**, etc).

It also provides an interface for the following services:

1. **Multicast Router** acting as an IGMP querier
2. **Virtual Tunnel** – a tunneling connection to the server

Services	
IPTV services	
Service	Status
NetUP IPTV Core	started
NetUP IPTV Middleware	started
NetUP IPTV Billing	started
NetUP IPTV Payment Systems	started
NetUP IPTV Streamer	started
NetUP IPTV Encryption VoD Server	started
NetUP IPTV CDN Balancer	started
NetUP Software Transcoder	started
NetUP IPTV Relay	started
System services	
Service	Status
MySQL Server	started
DNS Server	started
Time Server	started
Tunneling and IGMP services	
Attention! Services keep their state after system reboot	
Service	Status
Multicast Router	started
Virtual Tunnel	started

Status column displays current status of services (**Started / Stopped**).

You can change the status of a component to the opposite by left-clicking the component name (if its status is “started”, it will change to “stopped” and vice versa).

A virtual tunnel is a technology that may be used by the technical support team to remotely control your server.

7.9.5 Date and time

Date and time page contains the time zone setting interface. In the **NTP servers** section one may add or remove the NTP servers to synchronize with. New items get added to the end of the list.

The **Status** column lists the current status of the servers:

- **Failed** – if the last sync attempt has failed;
- **Sync** – if the sync has been performed successfully;
- **Reserved** – if this time server has not been used yet.

Synchronization occurs once per hour. The servers are tried in presented order till the first success.



This page is present only on IPTV Core servers.

7.9.6 License

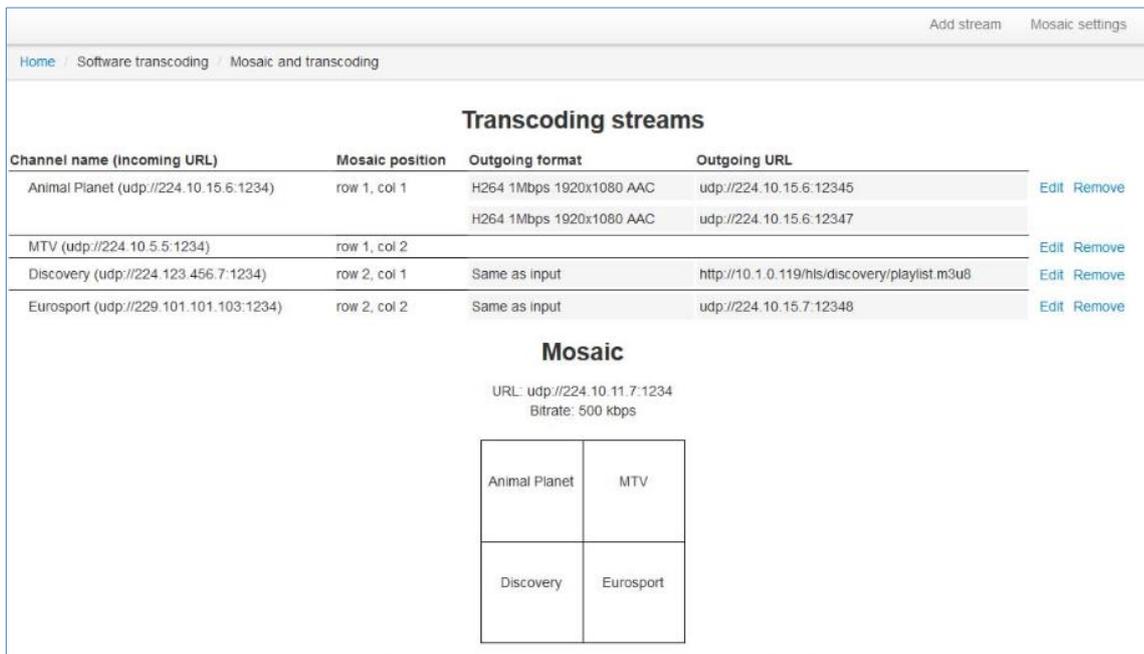
This page contains interface for uploading the security.tgz file (so-called license archive), which is required for working with STBs and the admin interface. This file is preinstalled as factory default.



7.10 Transcoding

7.10.1 Software Transcoding

The Software transcoding page contains an interface for software transcoding:



Channel name (incoming URL)	Mosaic position	Outgoing format	Outgoing URL	
Animal Planet (udp://224.10.15.6:1234)	row 1, col 1	H264 1Mbps 1920x1080 AAC	udp://224.10.15.6:12345	Edit Remove
		H264 1Mbps 1920x1080 AAC	udp://224.10.15.6:12347	
MTV (udp://224.10.5.5:1234)	row 1, col 2			Edit Remove
Discovery (udp://224.123.456.7:1234)	row 2, col 1	Same as input	http://10.1.0.119/his/discovery/playlist.m3u8	Edit Remove
Eurosport (udp://229.101.101.103:1234)	row 2, col 2	Same as input	udp://224.10.15.7:12348	Edit Remove

Mosaic

URL: udp://224.10.11.7:1234
Bitrate: 500 kbps

Animal Planet	MTV
Discovery	Eurosport

This page contains the list of transcoded channels and the mosaic configuration. Press **Add Stream** in the upper right corner of the page to set up transcoding of another stream. Press **Edit** beside one of the streams that are already being transcoded to edit its transcoding parameters:

Home / Software transcoding / Stream details

Stream details

Channel name:

Incoming URL:

Video pid:

Audio pid:

Adaptive stream folder:

Debug level:

Deinterlace:

Mosaic

Position:

Title:

Display audio meter

Outgoing streams

HLS: Mode:

Video size: Video codec: Audio codec: Video quality:

Rate Control: Video bitrate: Kbps Max video bitrate: Kbps Audio bitrate: Kbps

Press **i** to see the list of available audio and video streams

You will need to set the following parameters to setup transcoding of a stream:

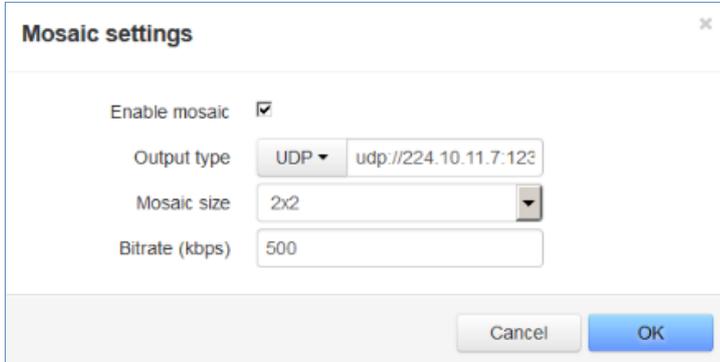
- Stream details – contains incoming stream parameters
 - o Channel name – is the name of the transcoded stream
 - o Incoming URL – is the incoming stream URL
 - o Audio pid – audio stream ID
 - o Video pid – video stream ID

Press **i** to see the list of available audio and video streams. Audio and video stream are highlighted with red and green respectively in this list. Click an ID to add it to a corresponding field

- o Adaptive stream folder – name of a folder that stores adaptive HLS
- o Debug level – highest message level to get to the debug stream for this video stream
- o Deinterlace – deinterlace setting (on/off)
- Mosaic – contains the parameters required for adding this stream to the mosaic
 - o Position – is the position of this stream in the mosaic
 - o Display audio meter – is an option for adding a visual audio meter to the current stream in the mosaic
 - o Title – is the name of the current stream, shown in the mosaic
- Outgoing streams – contains the parameters of the outgoing streams
 - o Add stream – adds another outgoing stream
 - o Remove – removes the outgoing stream
 - o URL – is the outgoing stream URL, or it is a short hls url (hls://<stream_name>, where stream_name is a desired stream name, which is used in the outgoing stream URL for HLS) in case of HLS.

The outgoing stream URL for HLS is http://<middleware IP>/hls/<stream_name>/playlist.m3u8

Every outgoing stream also has its audio and video encoding parameters.
Press **OK** when you finished editing the parameters, to save them.
Press **Remove** beside one of the transcoding streams to remove it.
Press **Mosaic** settings to set up the mosaic:



Mosaic settings

Enable mosaic

Output type UDP

Mosaic size 2x2

Bitrate (kbps) 500

Cancel OK

Mosaic settings include the following parameters:

- URL – is the outgoing stream URL
- Mosaic size – is the size of the mosaic
- Bitrate – is the bitrate of the mosaic stream
- Press OK after setting all the parameters.

8. Manager's Web Interface

8.1 Introduction

Manager's web interface is intended for working with user accounts, setting up and attaching service plans and services. Open a web browser and type in <http://10.1.20.1>/manager> to access the manager's web interface.

Left pane of the web interface remains visible on every page and contains links to the following pages organized into groups

The composition and the very presence of particular interface pages and entire groups may depend on the privileges of the currently logged in system user.

8.1.1 Starting the web interface

Type <http://10.1.20.1/manager> in your browser's address field to enter the manager's web interface. This will get you to the login page. When logging in for the first time, use the server administrator's password, specified in the equipment certificate.

It is strongly recommended to change the password immediately after logging in for the first time. This can be done via the System Users under System group

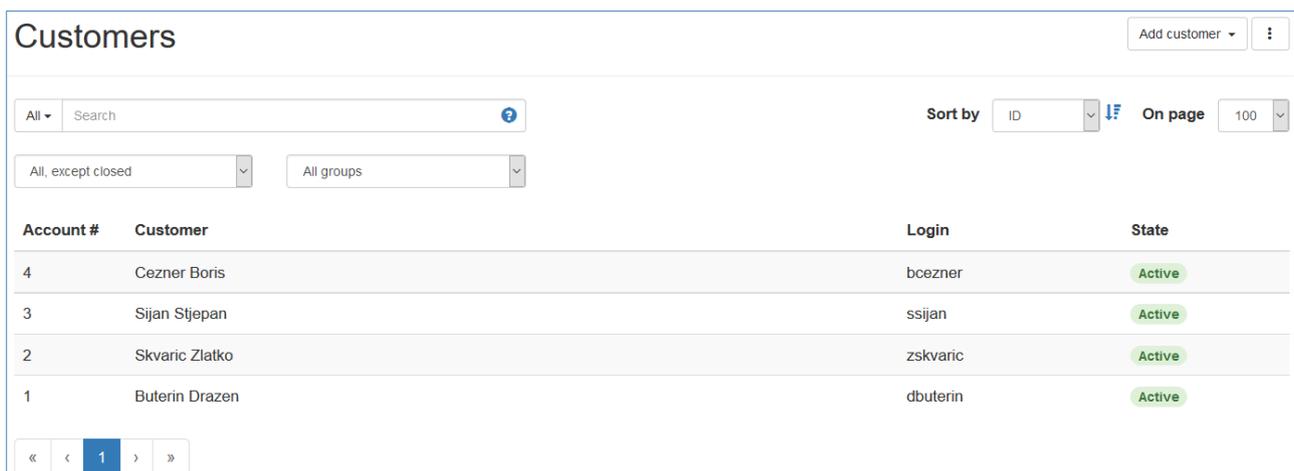
8.2 User

This group doesn't contain any pages, but allows one to log out and get to the login screen.

8.3 Customers

8.3.1 Customers

This page contains an interface for managing customers and their accounts.



The screenshot shows the 'Customers' page in a web interface. At the top right, there is an 'Add customer' button and a menu icon. Below this is a search bar with 'All' selected and a search icon. To the right of the search bar, there are 'Sort by' and 'On page' controls. 'Sort by' is set to 'ID' with a dropdown arrow and a sort icon. 'On page' is set to '100' with a dropdown arrow. Below the search bar, there are two dropdown menus: 'All, except closed' and 'All groups'. The main content is a table with four columns: 'Account #', 'Customer', 'Login', and 'State'. The table contains four rows of data. At the bottom left, there is a pagination control showing '1' in a blue box, with arrows for navigation.

Account #	Customer	Login	State
4	Cezner Boris	bcezner	Active
3	Sijan Stjepan	ssijan	Active
2	Skvaric Zlatko	zskvaric	Active
1	Buterin Drazen	dbuterin	Active

The page contains a list of customers, which has the following columns:

- **Account** is the customer’s personal account number. When a customer doesn’t have an account, there’s a dash in this column. When a customer has several accounts, each one is placed in a separate row.
- **Customer** is the customer’s name. In case of an individual it is her first name and last name. In case of a legal entity, it is the company’s short name.
- **Login** is the customer’s login name
- **State** is the current customer’s account state. A customer’s account may be active, blocked or closed On this page:
- press to create a new customer

Use the search field to filter the customers list by entering a part of customer’s name, login or the account number.



Use sorting to sort the list and set the number of entries per page.



8.3.1.1 Customer information page

#4 Cezner Boris
Delete

<p>Overview ✎</p> <p>Login bcezner</p> <p>Password *****</p> <p>Customer Cezner Boris</p> <p>Groups —</p> <p>Comment</p>	<p>Contacts ✎</p> <p>E-mail boris.cezner@zenitel.com</p>
<p>Passport ✎</p> <p>Birthday 5/21/79</p> <p>Birthplace Rijeka, Croatia</p> <p>Series and number RH 12345678</p> <p>Issue date 5/15/17</p> <p>Issued by PU/Rijeka</p>	<p>Address ✎</p> <p>Street address —</p> <p>Secondary address —</p> <p>Mailing address —</p>

Personal accounts +

#4	Active	Zenitel - Mobile Application	EUR 0.00
----	--------	------------------------------	----------

On the Customers page choose a customer and select it with a left-click. If the customer has at least one personal account, this will open the customer’s personal account page. On that page left click the customer’s name to get to the customer information page. If the customer doesn’t have a personal account (an entry with a dash in the Account column), left-clicking customer in the Customers page will get you directly to the customer information page.

The customer information page, in case of a natural person, contains the following panels:

- **Overview** contains the common details like the customer’s name, login, groups that the customer is in, etc.

- **Contacts** contains customer's contact information
- **Passport** contains customer's passport details
- **Address** contains customer's addresses (may contain several addresses)
- **Personal Accounts** contains a list of the customer's personal accounts (usually it should contain one account). Press **+** on the right side of the panel to add a new personal account

In case of a legal person customer this page contains the following additional panels:

- **Bank details** contains the organization's bank details
- **Contact persons** contains a list of the organization's contact persons with their contact details. Press **+** on the right side of the panel to add a new contact person
- The Passport panel is absent for legal persons.

8.3.1.2 Customer's personal account page

On the Customers page select a customer with a left-click. If the customer has a personal account, this will get you to the customer's personal account page. If the customer doesn't have a personal account, see **Creating a personal account**

Personal account #4
Block Close Reports ▾

Customer Boris Cezner

Login bceznr

Overview ⋮

State	Active
Contract	
Access card	4

Balance ⋮

Onset	EUR 0.00
Debit	EUR 0.00
Credit	EUR 0.00
Current	EUR 0.00

Current service plan : Zenitel - All included — attached on 5/16/17 1:14 PM + ⋮

Access to TV channels group "Satellite TV" <small>attached on 5/16/17 1:14 PM</small>	EUR 0.00 / month <small>detach</small>
Access to radio stations group "Radio" <small>attached on 5/16/17 1:14 PM</small>	EUR 0.00 / month <small>detach</small>
Access to TV channels group "Info Channel (262145)" <small>attached on 5/16/17 1:14 PM</small>	EUR 0.00 / month <small>detach</small>

Customer's personal account page contains the following panels:

- **Overview** shows the account state, contract number and access card number. Click **⋮** to change the account's state, edit contract number or get the access card information (including PIN and license key)
- **Balance** contains financial information such as the current accounting period, account's balance, debit and credit. Press **⋮** to make a payment, provide a credit or make an adjustment.
- **Current service plan** contains information about customer's current service plan. Press **+** to add an additional service. Press **⋮** to switch to another service plan, detach the current plan or see the attached services history
- **Next service plan** appears if a plan switch is scheduled and contains information about the next service plan
- **Standalone services** contain information about services that are not included in a service plan (e.g. an STB rent). Press **+** to add a standalone service. Press **⋮** to see the attached standalone services history

8.3.2 Customer groups

This page contains an interface for managing customer groups.

Customer groups	
#1	group 1
#2	group 2
#3	group 3

On the Customer groups page:

- press **+** to create a new customer group
- click a group to edit its name

8.4 Billing

8.4.1 Service plans

This page contains an interface for creating and editing service plans.

Service plans	
<input type="text" value="ID, Name, Comment"/> <input type="button" value="Except obsolete"/>	
Sort by <input type="button" value="ID"/> <input type="button" value="↓"/> On page <input type="button" value="25"/>	
#5	minimum_charge_tp
#6	minimum_charge_tp_1
#7	new_tariff_plan
#8	new_tariff_plan_1
#9	new_tariff_plan_2

Filters on this page allow one to filter the list of service plans by ID, name, comment or state.

<input type="text" value="ID, Name, Comment"/> <input type="button" value="Active"/>	
#5	minimum_charge_tp
#6	minimum_charge_tp_1

Control elements on the right side of the page allow one to sort the list of service plans by name or ID and one can also change the number of list items per page.

Sort by	<input type="button" value="ID"/>	<input type="button" value="↓"/>	On page	<input type="button" value="100"/>
---------	-----------------------------------	----------------------------------	---------	------------------------------------

Press **+** to create a new service plan:

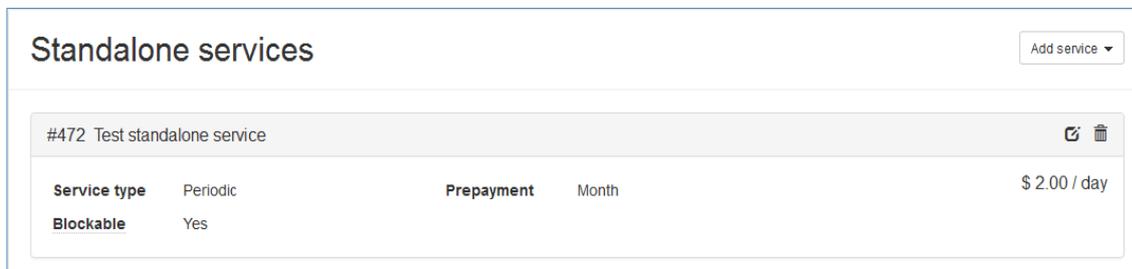
Create service plan	
Name <input type="text" value="Tariff plan name"/>	State <input type="button" value="Active"/>
Comment <input type="text" value="Tariff plan comment"/>	
<input type="button" value="Create"/> <input type="button" value="Cancel"/>	

- enter the new service plan's name
- select service plan's status

- add a comment if needed
- press **Create** to submit all parameters and create the plan

8.4.2 Standalone services

This page contains an interface for creating, editing and removing standalone services.

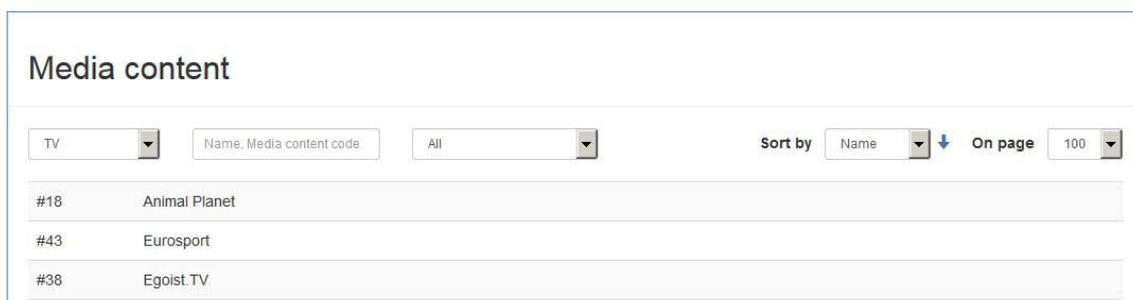


Standalone services				Add service ▾
#472	Test standalone service			
Service type	Periodic	Prepayment	Month	\$ 2.00 / day
Blockable	Yes			

- press **Add service** to add a new service
- press  to edit a service
- press  to remove a service

8.4.3 Media content groups

This page contains an interface for combining media content into groups

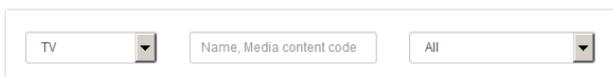


Media content

TV ▾ Name, Media content code All ▾ Sort by Name ▾ ↓ On page 100 ▾

#18	Animal Planet
#43	Eurosport
#38	Egoist.TV

Filters on this page allow one to filter the list of media content by type, name, media content code and by group, which the media content belongs to.



TV ▾ Name, Media content code All ▾

Control elements on the right side of the page allow one to sort the list of media content by name or media content code and one can also change the number of list items per page.



Sort by Name ▾ ↓ On page 100 ▾

Click on a media content in order to edit the list of groups it belongs to.



Edit media groups list for "encode_2012"

Media groups

group2 × group3 ×

Save Cancel

In the Media groups field start typing a media group name and then choose on from the list of matches. Press **Save** to finish editing and save the changes.

8.5 Accounting

8.5.1 Prepaid cards

This page contains an interface for prepaid cards management.

Prepaid cards +					
Series	Quantity	Face value	Expires	Service plan	Detach in (days)
1	11 / 0 / 1	\$ 200.00	11/30/15		
6	10 / 0 / 0	42.00 py6.	7/1/16		
7	100 / 0 / 1	1,000.00 py6.	10/1/15	TestPlan	90

- press **Q** to find a card by entering its number
- press **↓** to export card series in a *.CSV file
- press **⊕** to unblock all blocked cards in a series
- press **⊖** to block all cards in a series
- press **🗑** to delete card series

Create prepaid cards series

Series	Quantity (10-10000)
<input type="text" value="8"/>	<input type="text" value="250"/>
Expires <input type="checkbox"/>	Face value
<input type="text" value="Expires"/>	<input type="text" value="10"/> \$ <input type="text" value=""/>
Attach a service plan <input type="checkbox"/>	Detach in (days)
<input type="text" value="Start typing service plan name"/>	<input type="text" value="Detach in"/>

- press **+** to create a new card series
- Set series number, number of cards in series (10 to 10000 pcs.) and face value.
- set the Expires flag if you want the series to expire and set the expiration date
 - set the Attach a service plan flag if you want the customer to have a certain service plan attached, when she activates the card
 - if the service plan should be only available for a limited amount of time and detach after that, set this amount in the Detach in field

8.5.2 Accounting periods

This page contains a list of accounting periods and allows one to sum up or close accounting periods, marked as Old.

Accounting periods Sum up Close period

#	State	Period	Settlement accounts
19	Next	8/1/15 — 9/1/15	0 / 0 / 0
18	Current	7/1/15 — 8/1/15	63 / 0 / 63
17	Closed	6/1/15 — 7/1/15	58 / 58 / 0
16	Closed	5/1/15 — 6/1/15	49 / 49 / 0

For each accounting period this list shows its state, period and the settlement accounts statistics (total number of settlement accounts, number of closed and number of open settlement accounts). Each accounting period is automatically closed at the end of the period. If that doesn't happen for some reason, its state changes to Old. If there are one or more accounting periods in Old state, that need to be closed, press **Close period** (this will close all accounting periods that are currently in the Old state). If there are one or more accounting periods in the Old state that need the financial documents to be generated without closing these periods, press **Sum up** to accomplish that (this will generate the financial documents for all the accounting periods that are currently in the Old state).

8.6 Security

8.6.1 Activation requests

This page contains the list of activation requests from different IP addresses.

Activation requests

Sort by ↓
On page

IP address	Counter	Peak	Limit	State
10.1.4.43	0	1	10	Active
10.1.4.167	0	1	10	Active

Filters on this page allow one to filter the list of activation requests by state, IP address and by date.

Control elements on the right side of the page allow one to sort the list of activation requests by state or by IP address and one can also change the number of list items per page

Sort by ↓ On page

8.7 Reports

8.7.1 Debit

Debit Download CSV

Time range: 1/1/17 to 5/31/17 | Content type: All | Sort by: Date (Ascending) | On page: 100

Date	Customer name	Personal account	Access card	Service name	Cost
3/14/17 10:51 AM	4K STB	3	2	Access to TV channels group "Satellite TV"	EUR 0.00
3/14/17 10:51 AM	4K STB	3	2	Access to radio stations group "Radio"	EUR 0.00
3/14/17 10:51 AM	4K STB	3	2	Access to TV channels group "Info Channel (262145)"	EUR 0.00
3/14/17 10:51 AM	4K STB	3	2	Access to TV channels group "Test (262150)"	EUR 0.00
5/10/17 11:33 AM	STB2	2	1	Access to movie "Independence Day Resurgence Promo"	EUR 5.00

« 1 »

On this page one can obtain a purchased content and services report for a certain time period. The report is a table that contains the following columns:

- **Date** - the date of purchase
- **Customer name** - the name of the owner of the personal account used for purchasing
- **Personal account** - the number of the personal account used for purchasing
- **Access card** - the number of the access card used for purchasing
- **Service name** - the name of the purchased service
- **Cost** - the purchase cost

Select start date and end date to generate a report:

- **Time range** – select the beginning and the end of the period
- **Content type** – the type of the content, which you would like to generate the report for. If no type is chosen, the report will include all the content types
- **Sort** – the table sorting. Press the button to choose the parameter to sort and press the arrow to choose an ascending or descending sorting type
- **On page** – select between 10. 25. 50 and 100 results per page

The report may be exported to a CSV file. To do so, press **Export to CSV** in the upper-right corner of the page.

8.7.2 Content view rate

Content view rate Download CSV

Time range: 5/1/17 to 5/31/17 | Sort by: Viewing rate (Descending)

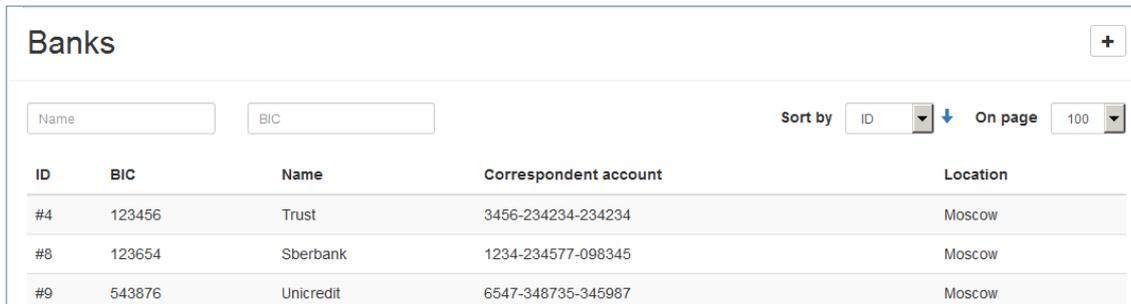
TV channels	Total view duration (hours)	Unique subscribers
Fashion 4K Preview	171	3
Deluxe Music	6	2
NHK World TV	4	2
HTV 1	1	2

On this page one can find the TV channels viewing statistics. The bars show the channel view duration in relation to the most viewed channel. Press **Time Range** to select the time range. Press **Viewing rate** to select the sort type. Press **Viewing rate** to select between ascending and descending sort orders. Press **Download CSV** to export all the available statistical data on the TV channels viewing duration to a *.csv file.

8.8 Dictionaries

8.8.1 Banks

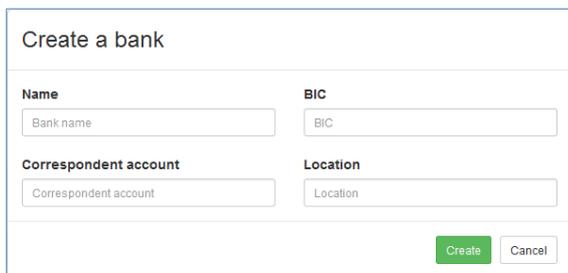
This page contains an interface for managing Banks dictionary.



ID	BIC	Name	Correspondent account	Location
#4	123456	Trust	3456-234234-234234	Moscow
#8	123654	Sberbank	1234-234577-098345	Moscow
#9	543876	Unicredit	6547-348735-345987	Moscow

This dictionary is used to fill in bank details when creating a customer. Use filters to filter the list of banks by Name or BIC. One can also sort the list by bank ID, BIC or Name.

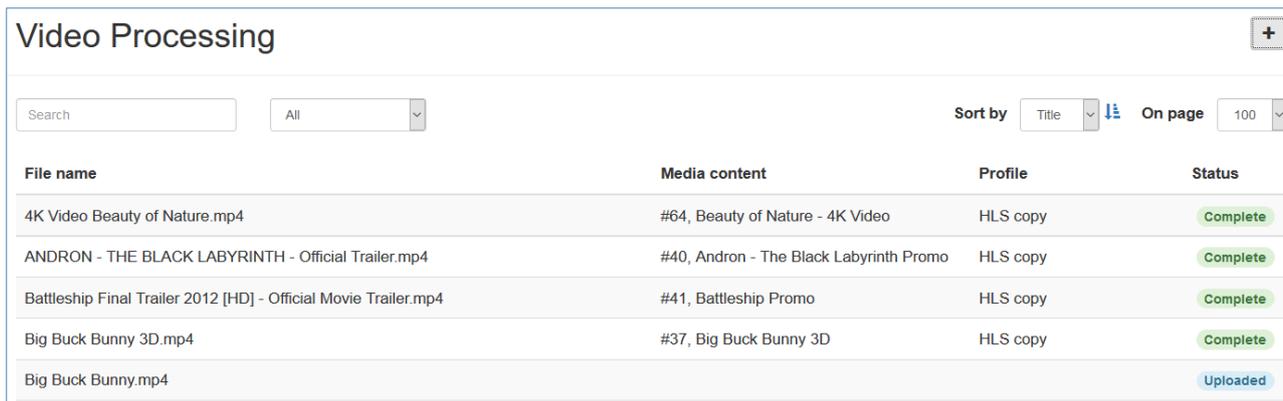
- press **+** in the upper-right part of the page to create a new entry



- fill in the fields in the pop-up window (BIC field is mandatory)
- press **Create** to create new entry

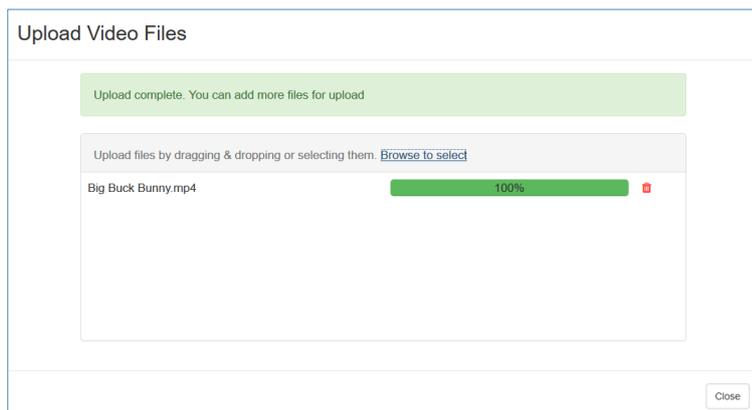
8.9 IPTV distribution

8.9.1 Video Processing



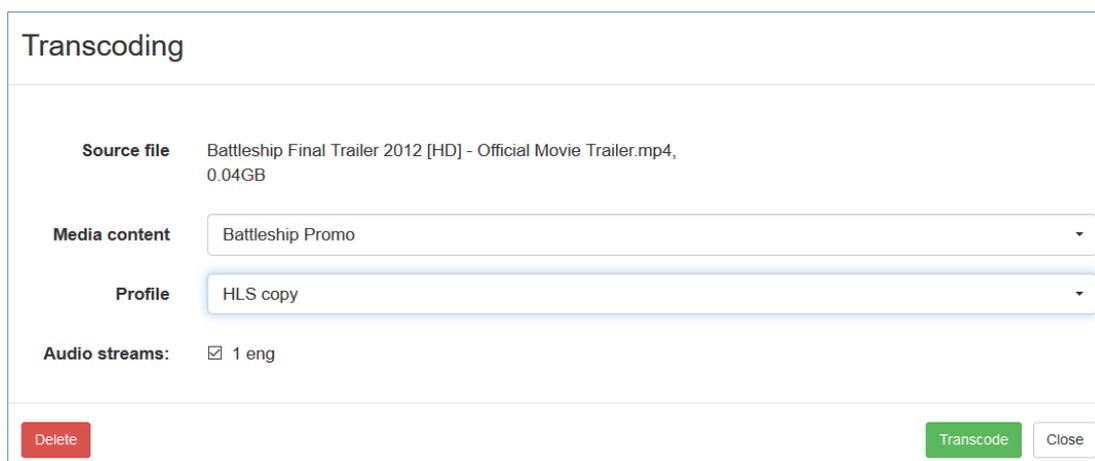
File name	Media content	Profile	Status
4K Video Beauty of Nature.mp4	#64, Beauty of Nature - 4K Video	HLS copy	Complete
ANDRON - THE BLACK LABYRINTH - Official Trailer.mp4	#40, Andron - The Black Labyrinth Promo	HLS copy	Complete
Battleship Final Trailer 2012 [HD] - Official Movie Trailer.mp4	#41, Battleship Promo	HLS copy	Complete
Big Buck Bunny 3D.mp4	#37, Big Buck Bunny 3D	HLS copy	Complete
Big Buck Bunny.mp4			Uploaded

The **Video Processing** page displays the list of media files together with their status. Clicking on **+** will open **Upload Video Files** window. Video files can be uploaded by drag & drop or by browsing and selecting them.



After video file is uploaded, it receives status **New movie**. Every video file needs to have media content code and has to be transcoded before it is ready for use so in video processing list each file that is not yet transcoded will have marking on the right side “Uploaded” and when file is transcoded it will have marking as “Complete”.

In order to do that one should click on file name and in **Transcoding** window type **Media content** name to be created, select **Transcoding Profile** and available audio streams, and click **Transcode**.



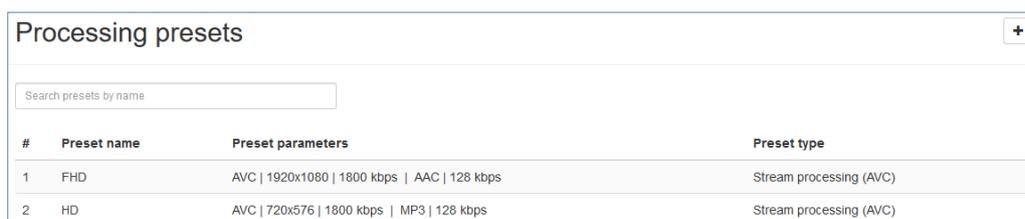
Next step is to add video to tariff plan, see **Media Content Groups**. Optionally one can add poster, trailer, subtitles, description, etc., see **Movies** tab under main web interface

8.10 Video Stream Processing

Video Stream Processing group is used for transcoding channels to HLS

8.10.1 Processing presets

Processing presets are used for creating different transcoding presets.



Clicking on **+** will open window where one can set different **Video** and **Audio** formats for Stream Processing (AVC).

Add processing preset
General **Video** Audio

Output settings:

Video: 720 x 576 | fps as is | 1800 kbps | VBR

Audio: AAC | 128 kbps

Video processing settings

Leave video as is

Frame size: 720x576 (SD PAL) 720 576

Frame rate: Same as input 0 fps

Rate control: Variable bitrate 2000 max kbps

Video bitrate: Custom 1800 avg kbps

Video codec profile: Baseline

Quality: Fast

Deinterlacing algorithm: BOB

Save Close

Add processing preset
General Video **Audio**

Output settings:

Video: 720 x 576 | fps as is | 1800 kbps | VBR

Audio: AAC | 128 kbps

Audio processing settings

Leave audio as is

Audio codec: AAC

Audio bitrate: 128 kbps 128 kbps

Audio channel layout: Same as input

Save Close

After all desired settings are made, one needs to name that Preset and click **Save**.

8.10.2 Processing setup

Processing setup is used to add input stream and transcoded output stream.

To add input stream, one must do following:

- Click on **+** in top right corner of **Processing setup** screen

Processing setup
+

There are no input streams yet, nothing to display here

In **Add input stream** window one must add following:

- **Input name**
- **Source type** (URL or UDP multicast or unicast)
- **Source IP**
- **Source port**

Edit input stream

Input name:

Source type:

Source IP:

Source port:

After all parameters are added, press **Save** and **Manage output streams** window will open

Manage output streams Delete input

[← back to all inputs](#)

Input name: Test

Source: udp://224.1.1.1:1234

Stream details: 28800: MPEG2 | 720x576 | 25.0 fps | 6958 kbps | MP2 | 347 kbps

Output streams +

Add output

Click on **Add output** and select following in General settings:

- **Processing preset** (see **Processing presets**)
- **Stream type** (can be UDP, HLS or HTTP Progressive)
- Optionally stream can be encrypted clicking on **Encrypt stream**

Under Audio tracks click on desired audio and press **Save**

Edit output stream

General
Video
Audio
Advanced

In:

Video: MPEG2 | 720 x 576 | 25.0 fps | 4899 kbps

Audio: MP2 | 194 kbps

Out:

AVC | 1920x1080 | fps as is | 1800 kbps | VBR

AAC | 128 kbps

General settings

Processing preset:

Stream type:

Encrypt stream:

Audio tracks

Keep	Track name	PID	Codec	Channels	Bitrate
<input checked="" type="checkbox"/>	-	202	MP2	stereo	194

Manage output streams Delete input

[← back to all inputs](#)

Input name: Test

Source: udp://224.1.1.1:1234

Stream details: 28800: MPEG2 | 720x576 | 25.0 fps | 4860 kbps | MP2 | 193 kbps

Output streams +

FHD	AVC 1920x1080 fps as is 1800 kbps AAC 128 kbps	started	http://10.5.110.180/hls/relay/1495026728827/index.m3...
-----	--	---------	---

If transcoding is working ok output stream will have **started** mark. On the right side HLS address of output stream is shown.

8.11 System settings

8.11.1 System users

This page contains an interface for managing system users and their privileges.

System users +

User group ROOT +

root	Super user	
1	Administrator	

User group Manager +

test	Danil Kotov	
------	-------------	--

System users are created as members of system user groups. Each system user group has its own set of privileges.

- press in the upper-right part of the page to create a new system user group Each system user group

User group Manager +

test	Danil Kotov	
qwe	Stepan Kuzmenko	

is shown in a separate panel.

- press in the upper-right part of the panel in order to add a new system user
- press to edit group name
- press to edit group privileges
- press on a system user to edit or delete her

8.11.2 Currencies

This page contains an interface for managing system currencies.

Currencies +

840	\$	✖
36	AUD	✖

- press + to add a new currency
- press ✖ to delete currency

8.11.3 Firmware

Firmware

IPTV Server firmware +

Currently installed firmware: combine 2.0.614 (1496), "2017-05-09 10:37:38+00:00"

Firmware	Version	Revision	Created
firmware-combine.2.0.614-3.14	2.0.614	1496	2017/05/09 12:37:38
firmware-combine.2.0.583-3.14	2.0.583	1484	2017/04/07 15:12:32
firmware-combine.2.0.581-4.4	2.0.581	1484	2017/04/06 14:56:36
firmware-combine.2.0.489-3.14	2.0.489	1450	2017/01/26 17:28:20
firmware-combine.2.0.236-3.14	2.0.236	1400	2016/10/12 15:02:23

This page allows updating the IPTV server firmware. To do that click on **+** to upload the new firmware file, refresh the page to reveal it in the list, click on desired firmware file and press **Install**.

8.12 Android Client

8.12.1 STB messages

This page contains an interface for sending messages to IP STB users:

STB messages New message

Date: 15.05.2017

Date	Message	Customer	Status
------	---------	----------	--------

It also shows the list of sent messages.

Press **New message** to send a new message to a customer or a group of customers:

New message

Enter customer or group name

Enter message

Cancel OK

Enter a customer's name to send a message to a customer or enter a group's name to send a message to a group of customers. Then enter the message text and press **OK** to send it.

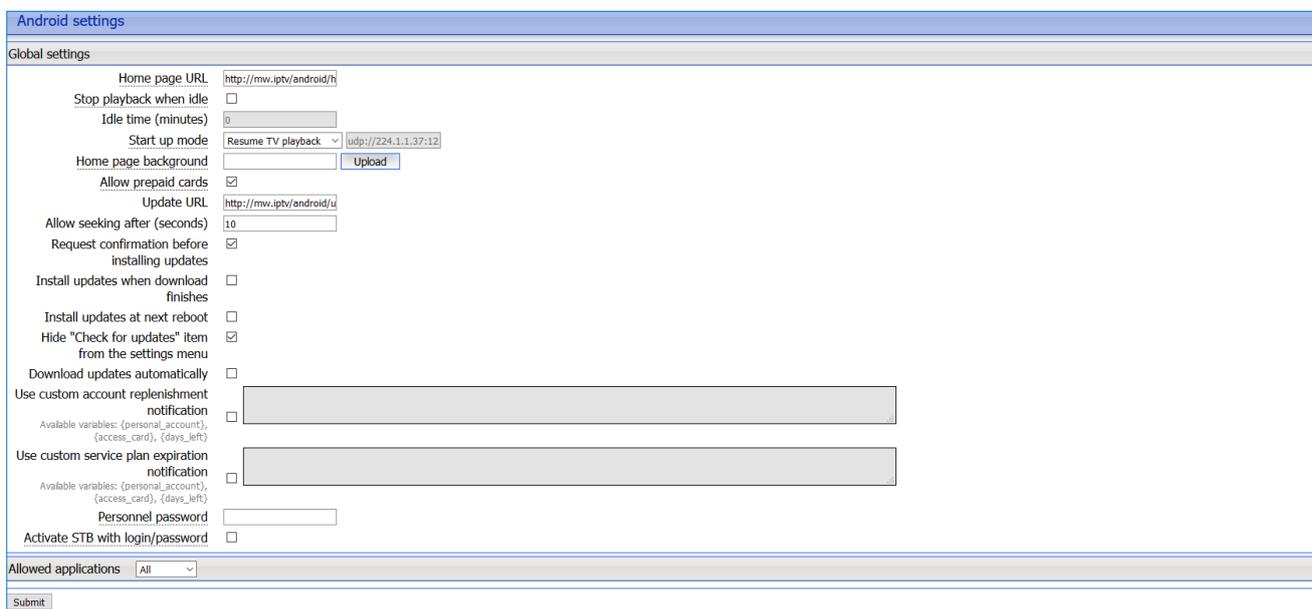
9. STB setup

9.1 Setting STB auto update

Because of new features and functionalities are constantly being developed, it is important to keep all STB's software current so regular update of software is recommended. STB's can be upgraded one by one from USB flash memory or automatic from one central place (IPTV server), with or without user action.

To set STB auto update, one needs to set few parameters.

1. Contact Vingtor-Stentofon technical support and request new STB firmware (if available)
2. Connect with SFTP client to IPTV server (10.1.20.1) and upload new firmware to folder: /mnt/hdd/custom_firmwares/android/Geniatech-stvmx/
3. Login to web interface of IPTV server (<http://10.1.20.1>) and open **Settings** under **Android Client** group



The screenshot shows the 'Android settings' web interface. Under the 'Global settings' section, the following options are visible:

- Home page URL:
- Stop playback when idle:
- Idle time (minutes):
- Start up mode: Resume TV playback (dropdown),
- Home page background:
- Allow prepaid cards:
- Update URL:
- Allow seeking after (seconds):
- Request confirmation before installing updates:
- Install updates when download finishes:
- Install updates at next reboot:
- Hide "Check for updates" item from the settings menu:
- Download updates automatically:
- Use custom account replenishment notification:
- Use custom service plan expiration notification:
- Personnel password:
- Activate STB with login/password:

At the bottom, there is an 'Allowed applications' dropdown set to 'All' and a 'Submit' button.

4. Set **Update URL** to <http://mw.iptv/android/update/update.zip>
5. Uncheck box **Request confirmation before installing updates** if one wants to upgrade all STB's on network without any user intervention.
6. Check box under **Install updates when download finishes**.
7. Uncheck box **Install updates at next reboot** if one wants firmware to be installed immediately after it is downloaded
8. Check box **Download updates automatically**. If this box is unchecked, STB's will display message to users that new firmware is available and option to download.

9.2 Manual firmware upgrade

To manually upgrade the firmware, do the following:

- download the latest firmware in the customer area and write it into the root directory of a USB thumb drive
- attach the thumb drive to the STB
- go to the Applications page and launch the Upgrade application
- choose Local update and select the firmware file

If you can't see the file and you are sure you copied it to the right place, try pressing the Menu button of the remote control 8 times and see if it helps.

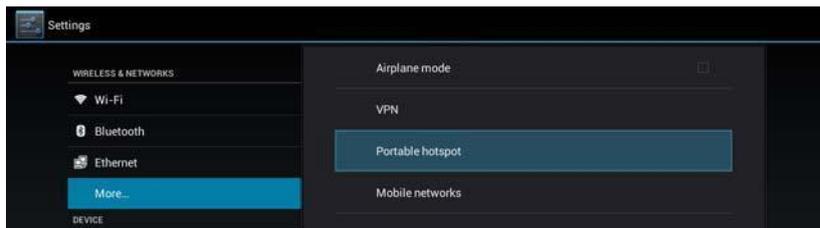
- the STB will reboot after the installation

If the STB doesn't start after the installation and hangs on the startup screen, try upgrading the firmware in recovery mode

9.3 Enabling the STB's Wi-Fi hotspot



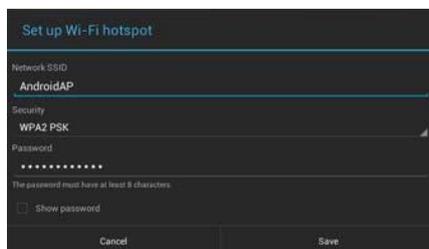
In order to enable the portable Wi-Fi hotspot on your STB, go to Applications and open Settings. In the settings menu, in the Wireless & networks section select More. Then select Portable hotspot on the right side of the page.



In the next page that will appear, activate the Portable Wi-Fi hotspot and select Set up Wi-Fi hotspot.



In the settings window, set the network SSID, select the security option and enter a password.



Press **Save** when finished.
The hotspot is ready to use.

9.4 Remote control

9.4.1 IP STB Remote



9.4.2 Combined TV and IP STB Remote



10. STB Client Interface

The IPTV Android client enables customer to:

- select and watch **TV channels**
- view the **TV Guide**
- listen to **Radio**
- select, order and watch **Movies** (VoD)
- use **Shop** to buy movies, radio stations or live TV channels
- read **News**
- read **Messages**
- launch available Android **Applications**
- view tariff plans and financial transactions in **Account tab**

10.1 Set-top box activation

At first launch one have to do an activation procedure:

- select language in the activation menu



- choose one of the IPTV operation modes



There are 3 modes one can choose from: **Internet TV**, **Local TV** and **Free mode**. In the **Internet TV** mode, the set-top box is connected to the provider's IPTV middleware server over the internet. In the **Local TV** mode, the set-top box is connected to an IPTV middleware server available in the provider's local network. In the **Free mode** there's no connection to an IPTV middleware server.

When choosing the **Free Mode**, user instantly gets access to the main menu of the launcher. For the other 2 modes user is prompted to enter the card number and PIN. To obtain those, see **Customer/Personal accounts**. On subsequent launches the authorization is performed automatically.

To activate **Local TV** mode, choose this mode from the menu, enter card number and PIN:



For correct operation of the system the Middleware server must be used as its DNS server. If a different DNS server is used, it must be set up to resolve the .iptv zone to the Middleware address, and also to include it in the list of default suffixes for substitution.

If the activation number has been entered incorrectly for 10 times, further attempts will be blocked and the requests counter should be reset.

10.2 Resetting IPTV Launcher to default settings

To reset IPTV Launcher app to the default settings one must follow steps below:

- On the main page select “Applications”

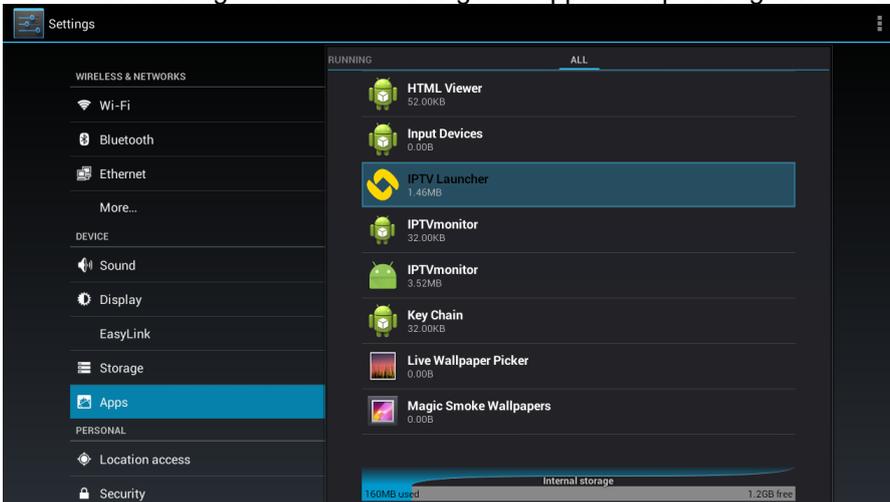


- Then select “Settings”

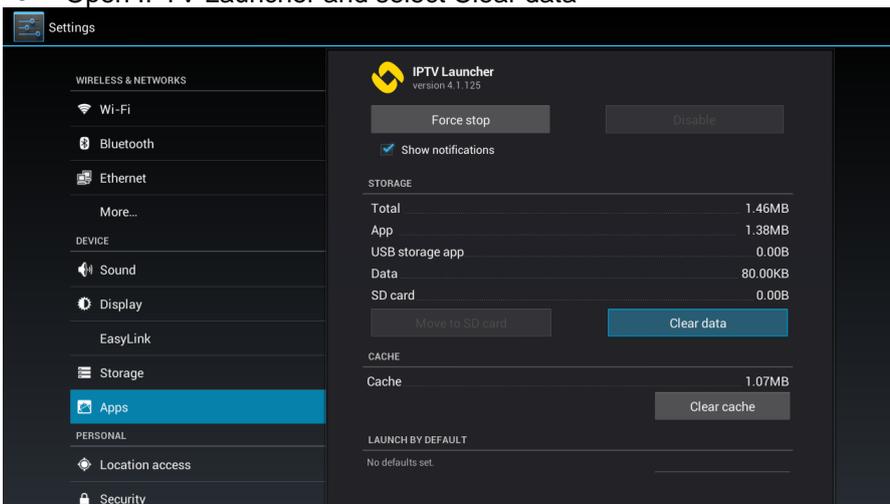
Settings menu under Applications tab is password protected to avoid unauthorized access. In order to enter it, default (personnel) password **8353** has to be used. “Personnel” password can be changed in IPTV Server Web interface under Settings inside Android client group.



- Under Settings menu one has to go to “Apps” and press right on the remote until “All” tab is open



- Open IPTV Launcher and select Clear data



- When clear data is finished press “Home” button on remote (or reboot STB) to go to STB registration window



10.3 Common features

Main menu is at the bottom of the screen. You can get to the main menu during playback by pressing **Home** button on the remote control. Above the menu there is a welcome message, which is an HTML page. This page is located on the IPTV middleware server and can be modified by the IPTV provider.

Navigate through the menu using **Left** and **Right** buttons of the remote control. Press **OK** to select, press **Back** to return.



The Welcome page is customizable. Use WYSIWYG editor in the administrator's web interface to edit its contents

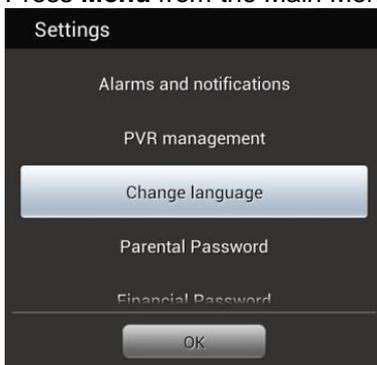
If user needs to enter text, it may be entered with the Android virtual keyboard. In the main menu there are following options:

- **Live TV** - channels delivered using multicast or channels delivered over the Internet using unicast (might be delivered via CDN)
- **TV guide** - here you can check the electronic program guide (EPG)
- **Movies** - here you can watch available video content
- **Shop** - is where you can purchase video content and more
- **Radio** - radio channels, delivered using unicast/multicast
- **News** – for reading news (connection to internet required)
- **Messages** – to read messages sent from IPTV main server
- **Apps** - the list of available Android applications
- **Account** - account information, financial transactions and service plan (“tariff plan”) change option

The IPTV Android STBs can control the power state of TVs that support CEC. Which means that switching the STB on and off with the remote control will also make the TV exit/enter standby mode.

10.4 Settings

Press **Menu** from the Main Menu screen to access the Settings menu.

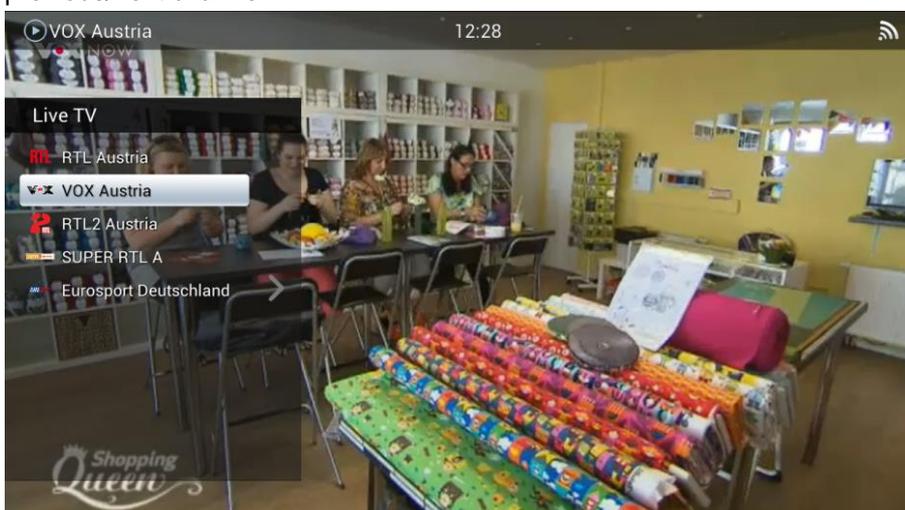


In this menu one can set or change:

- **Alarms and notifications.** Opens a page that allows one to manage alarms and notifications.
- **Change language.** Choose one of the available languages.
- **Parental password.** Once set, it is requested for gaining access to adult content (this property of the content is derived from its genre attribution).
- **Financial password.** Once set, it is requested before every finance-related operation, like buying content, changing the tariff plan, etc.
- **Check for updates.** Manually check for updates.

10.5 TV channels

In the **TV channels** section one can find a list of all channels available (the list of available channels depends on the user’s tariff plan. During playback, pressing **Up/Down** or **PgUp/PgDown** will switch to the previous/next channel.



Press the **right** button on the remote control to maximize the channel list.

If the TV channel numbers are set, one may switch to a certain channel by typing its number using number keys of the remote control. One can set the TV channel numbers in the web interface.

Press **Menu** during playback to get to the TV playback menu. There one can find the following items:

- **Pause**- pause the playback
- **Audio streams** - allows one to choose an audio stream for the current channel
- **TV guide** - opens a small window with a TV guide, where you can find what's coming next on the current channel
- **Refresh channel list**



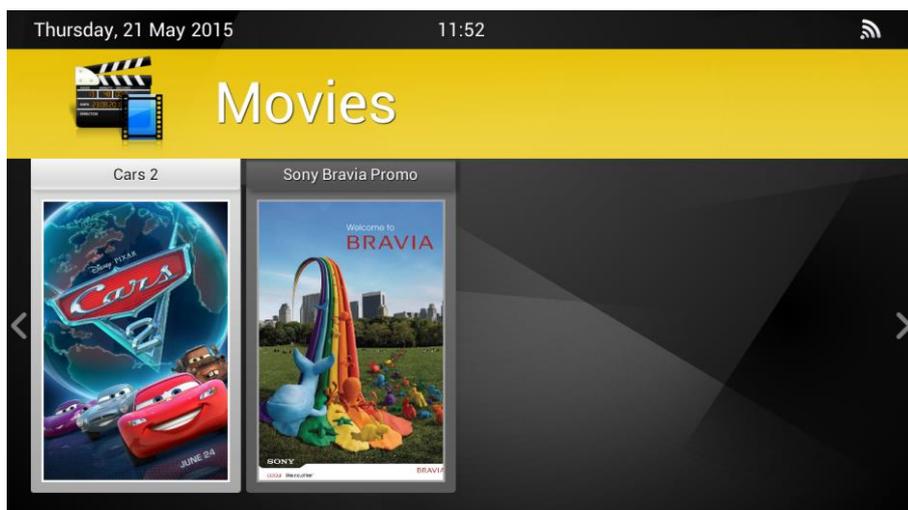
10.6 Radio

In the **Radio** section you can find the list of available radio channels.



10.7 Movies

In **Movies** section you can find the list of available video content that was purchased earlier (you can purchase video content in the **Shop** section). To play a movie, select one and press **OK** on the remote control.



While playback one can navigate the movie forward and backward by pressing **Left** and **Right** buttons and pause playback by pressing **OK** button on the remote control. One can also access the playback menu by pressing **Menu** button while playback. In the menu one will find the following options:

- Video size – available options are Auto, 16:9, 4:3 and Crop 16:9
- Audio streams - allows one to choose an audio stream for the current channel



10.8 TV guide

The **TV Guide** section displays the EPG for all the available channels (it may originate from the streamer or may be entered manually by the administrator).

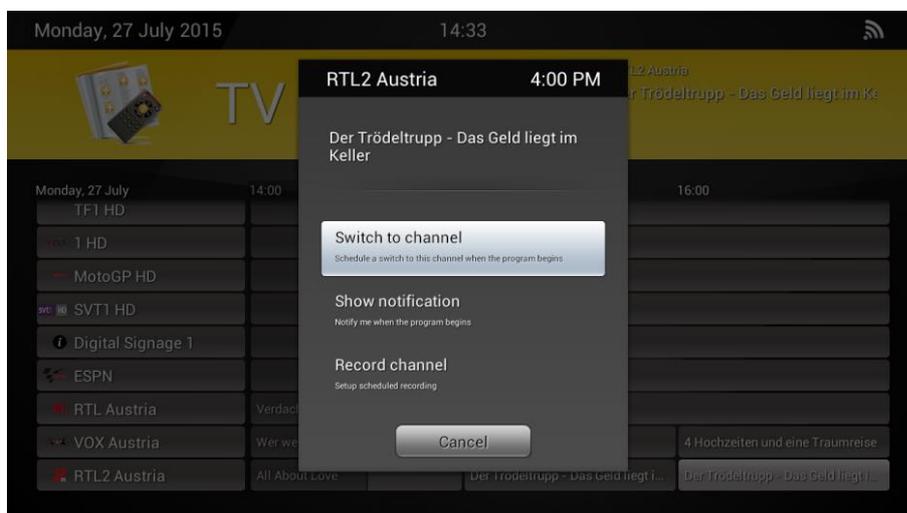


Program names that would not fit into the corresponding table cells are scrolled automatically for convenient viewing. The programs that already passed appear shaded.

If the customer has the TVoD service enabled for certain channels, he can watch the recorded programs on that channels. To watch a recorded program, choose one in the TV guide and press **OK** on the remote control.

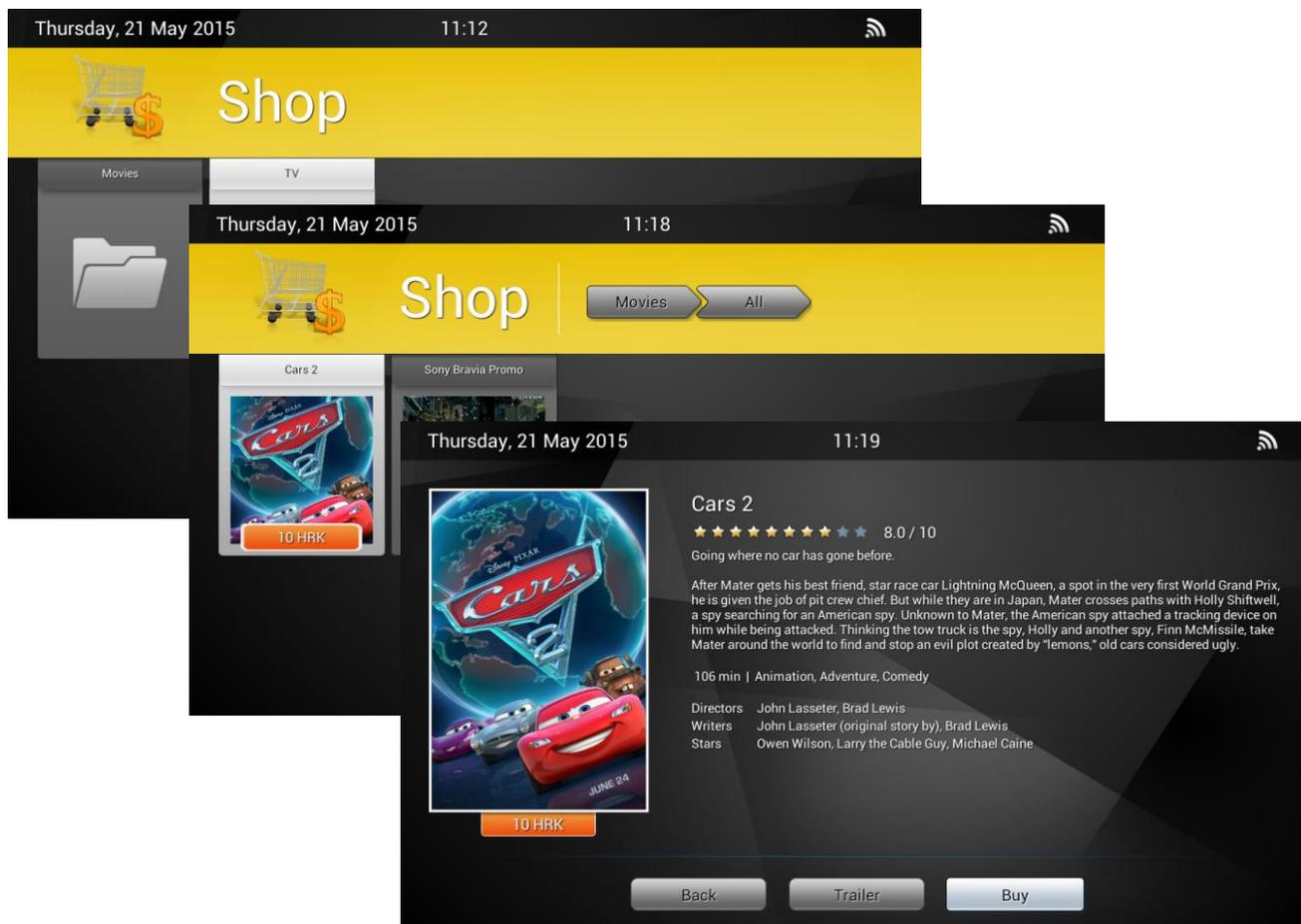
The channels that have the TVoD service enabled, are marked with a  icon.

The TV Guide enables one to schedule a channel switch to a program. To schedule a channel switch, pick a program that hasn't started yet and press **OK** on the remote control. Then select to **switch to channel** or to **show a notification** when the program begins and press **OK** on the remote control.



10.9 Shop

In the **Shop** section one can select and purchase movies (VoD) that instantly become available in the **Movies** section, TV channels and TV channel groups and other, non IPTV goods, like drinks or pizza.



The Shop has the following standard sections:

- **Movies** – the shop section where one can buy movies
- **TV** – the shop section where one can buy groups of TV channels or individual TV channels

10.10 Account

The **Account** section contains financial information and some user settings.



10.11 Applications

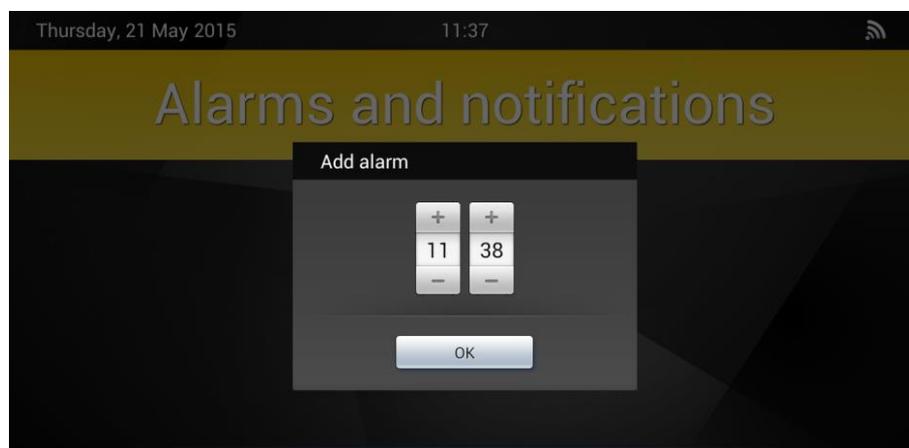
Applications section you can find a list of available Android applications.



10.12 Additional features

10.12.1 Alarms and notifications

This page contains the list of all alarms, notifications and scheduled channel switches. One can access this page via Settings menu.



Press **Add alarm** to add a new alarm.

Select an alarm or an event in the list and press **OK** on the remote control to delete it. The following events may appear in the list:

- an alarm;
- a notification of a program starts;
- a scheduled channel switch at the start of the selected show;

10.12.2 Personal Video Recorder

The IPTV Android client allows us to pause a TV channel. It automatically starts recording the video stream and starts playing back the recorded piece when the TV channel is un-paused. That way the TV channel is played back with a delay. In order to use personal video recorder, we need to connect an external USB drive, or an SD card to the set-top box. The capacity of the external drive should be at least 16Gb. While the delayed playback of a TV channel one may pause it, fast forward and rewind it within the boundaries of the recorded fragment. Press **Back** on the remote control to get back to watching the TV channel in real time.

10.13 Editing the main menu configuration file

To edit the main menu, open the main menu XML configuration file in a text editor. Here is the main menu XML configuration file example:

```
<?xml version="1.0" encoding="utf-8"?>
<launcher locale-url="launcher-menu-locale.xml">
  <launcher-item
    id="tv.channels"
    name="TV channels"
    icon-url="asset://launcher/icon.local-tv.png"
    activity="tv.netup.android.TvPlayer" />
  <launcher-item
    id="tv.guide"
    name="TV Guide"
    title="TV Guide"
    logo-url="asset://launcher/icon.tv-guide.png"
    icon-url="asset://launcher/icon.tv-guide.png"
    activity="tv.netup.android.TvGuide" />
  <launcher-item
    id="radio"
    name="Radio"
    icon-url="asset://launcher/icon.radio.png"
    logo-url="asset://launcher/icon.radio.png"
    activity="tv.netup.android.RadioPlayer" />
  <launcher-item
    id="shop"
    name="Shop"
    icon-url="asset://launcher/icon.shop.png"
    logo-url="asset://launcher/icon.shop.png"
    activity="tv.netup.android.Shop" />
  <launcher-item
    id="movies"
    name="Movies"
    icon-url="asset://launcher/icon.movies.png"
    logo-url="asset://launcher/icon.movies.png"
    activity="tv.netup.android.Movies" />
  <launcher-item
    id="News"
    name="News"
    icon-url="asset://launcher/icon.news.png"
    logo-url="asset://launcher/icon.news.png"
    application="com.diggreader" />
  <launcher-item
    id="apps"
    name="Apps"
    title="Applications"
    logo-url="asset://launcher/icon.apps.png"
    icon-url="asset://launcher/icon.apps.png"
    activity="tv.netup.android.AppFolder" />
  <launcher-item
    id="messages"
    name="Messages"
    icon-url="asset://launcher/icon.mail.png"
    activity="tv.netup.android.WebPortal"
    options="url=messages"/>
  <launcher-item
    id="account"
    name="Account"
```

```

    title="Account"
    logo-url="asset://launcher/icon.account.png"
    icon-url="asset://launcher/icon.account.png"
    activity="tv.netup.android.Account" />
</launcher>

```

Each element tagged `<launcher-item>`, configures one menu item with the parameters defined in its attributes. You can hide unnecessary menu items by deleting corresponding elements from the configuration file. You can also edit all the existing elements, or even add new menu items by adding new elements to the configuration file.

To add a new menu item to the main menu, add a new element tagged `<launcher-item>` to the file. Edit its attributes by setting `id` (used for localization), `name` (the name of the item that is shown in the menu), `icon_url` (a URL to the item's icon), `application` (the name of the third party application that is supposed to launch when this menu item is activated) or `activity` (the name of an Android activity that is supposed to launch when this menu item is activated) in case you want to launch one of the IPTV client components.

When finished editing, save the file.

Example of an element that launches Android settings menu:

```

<launcher-item
    id="settings"
    name="Settings"
    icon-url="<icon_url>"
    logo-url=""
    application="com.android.settings"/>

```

`logo_url` and `title` attributes are used by IPTV Android client and are unnecessary for third party applications. If the item is supposed to launch a third party application, leave those attributes empty.

The list of IPTV client default components (Android activities):

- "tv.netup.android.TvPlayer"
- "tv.netup.android.OttTvPlayer"
- "tv.netup.android.RadioPlayer"
- "tv.netup.android.Movies"
- "tv.netup.android.TvGuide"
- "tv.netup.android.Shop"
- "tv.netup.android.Account"
- "tv.netup.android.AppFolder"

10.13.1 Customizing the list of allowed applications

To edit the list of allowed applications we need to do following actions:

1. We need to create `apps.xml` file containing list of application packages that should be visible inside IPTV Android client

Example of an XML-file with a list of allowed applications:

```

<?xml version="1.0" encoding="UTF-8"?>
<applicationList>
    <application package="com.android.browser"/>
    <application package="com.facebook.katana"/>
    <application package="com.twiter.android"/>
</applicationList>

```

To add an application to the list, insert a line:

```
<application package="<app_name>" />
```

And replace <app_name> with the package name of the application that you want to add. When finished editing, save the file and copy it to /netup/www/android/ folder.

2. After apps.xml file is stored in appropriate folder we need to edit iptv-provider.xml.php file which is also stored in /netup/www/android/ folder.

We need to edit line

```
<applications_url type="string"><?=$applications_url ?></applications_url>
```

to look like this:

```
<applications_url type="string" http://mw.iptv/android/apps.xml</applications_url>
```

List of allowed applications can also be created in IPTV Server Web interface under Settings inside Android client group.

11. IPTV PC Client

PC client is an application for PC that covers the functionality of an STB client running on an STB attached to TV.

For correct operation of the system the Middleware server must be used as its DNS server. If a different DNS server is used, it must be set up to resolve the .iptv zone to the Middleware address, and also to include it in the list of default suffixes for substitution.

The installation files of the PC client for Linux and for Win32 will be delivered on CD or USB memory stick. On first launch the program requests the activation code also known as license key. To obtain one, see **Customer's personal accounts**.



11.1 Common features

All settings and content selection are performed in the main window of the program. Video content, on the other hand, is reproduced in a separate window, which also contains the corresponding controls and is capable of switching to full-screen mode.

The interface elements are grouped into several tabs, namely:

- TV;
- VoD;
- Radio;
- Market;
- Playlists;
- Settings.

The main menu containing the list of tabs always stays on the left and is accessible from any tab.

11.1.1 TV

This tab contains the interface for selecting and viewing TV channels.





On the right there is a list of all channels available according to the user's tariff plan.

Refresh  button refreshes the list of channels. Add to playlist  button add the selected channel (or channels, as the list supports multiple selection) to an existing or new playlist.

The following viewing regimes are available for the list:

- **List**  – mode shows just the list without any extra info;
- **Show TV program**  – also shows the TV program for the selected channel;
- **Show channel description**  – also shows the description of the selected channel.

Pressing **Play**  or double-clicking on a list item starts playback of the selected TV content.

Double-clicking on a TV program item starting in the future causes cyclic change between **Switch to**  and **Notify**  states; double-clicking on a telecast in the past starts playing TVoD, if the said telecast has been recorded.

11.1.2 VoD

This tab contains the interface for selecting and viewing VoD content. On the right there is a list of available content. Movies may be added to playlist. Once a content item is selected, its description appears below. Pressing **Order**  opens the **Market** tab where more movies can be ordered. Pressing **Play**  or double-clicking on a list item starts playback of the selected video content.

11.1.3 Radio

This tab contains the interface for selecting and listening radio content, essentially similar to that for the TV content.

11.1.4 Market

This tab contains the lists of movies and TV channels available for sale, all on separate second-level tabs. The lists may be filtered by genre or by name. Pressing **Buy**  or double-clicking on a list item opens the order confirmation window that shows once more the name of content and its price.



11.1.5 Playlists

This tab contains the register of playlists composed by the user. There is an interface for deleting playlists () or creating new ones (), as well as removing content from playlists (). Pressing **Play** or double-clicking on a list item starts playback of the selected content.

11.1.6 Settings

The settings tab contains four second-level tabs which are explained below.

11.1.6.1 Interface

Interface tab contains the following interface settings flags:

- Playback TV on one click;
- Playback last content on startup.

11.1.6.2 Finances

Finances tab contains the summary of financial information, as listed below.

- Related to the user's personal account:
 - o State (active or blocked);
 - o Balance at the start of current period;
 - o Payments during the current period;
 - o Charges during the current period;
 - o Current balance;
 - o Credit.
- Related to the user's access card:
 - o State;
 - o Period of validity.
- Related to the tariff plan:
 - o Current plan;
 - o Next plan (may be changed).

11.1.6.3 Security

On this tab you may set the following security parameters:

- **Financial password.** – Once set, it is requested before every finance-related operation, like buying content, changing the tariff plan, etc.
- **Parental password.** – Once set, it is requested for gaining access to an adult content.

To unset any password, change it to empty string.

11.1.6.4 Languages

Here you may select a language from the list of installed languages. Upon selection, the new language is applied to the whole program interface immediately.

11.1.7 Mini mode

Minimize  button switches the program's main window to mini mode and back. In this mode the window is sized down to contain the left menu alone. Lists of content items are shown directly inside the menu, and playback is started by single click. Menu items that cannot be shown in this mode (Market), when selected, cause switch back to normal mode.

11.1.8 Playback window

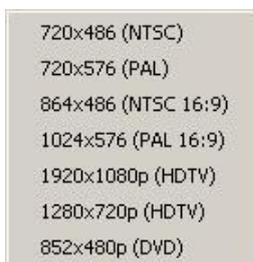
Playback window is intended for video content playback.



The control panel located in the bottom part of the window provides the following functions:

- **Back**  (to the left of the position bar), – depending on the current state, may slow down the forward wind, switch to rewind, or speed up the rewind. The current state, including speed and direction of playback/rewind, is also shown on the panel
- **Forward**  (to the right of the position bar), – depending on the current state, may slow down the rewind, switch to the forward wind, or speed up the forward wind.
- **Show menu**  – brings up the main window of the program.
- **Hide panel**  hides the control panel. Also, the panel hides by itself after 3 seconds of user's inactivity.

- To open the panel, either click once anywhere in the playback window, or hover mouse through the window's bottom area.
- **Full screen**  toggles the full screen mode. Double-clicking anywhere in the playback window has the same effect.
- **Stop**  – stops the playback.
- **Play**  – starts or resumes the playback.
- **Pause**  – pauses the playback.
- **Prev.**  – switches to the previous content item in the playlist or in the content list, depending on the window from which the content has been selected.
- **Next**  – switches to the next content item in the playlist or in the content list.
- **Sound**  – toggles the mute mode.
- **Size**  – may be dragged to resize the window arbitrarily. It also has the context menu with a variety of predefined standard window sizes.



12. Alarm Interface Module

12.1 Overview

Alarm interface module is cost-effective, cutting edge technology product, intended to be used in marine or shore applications where reaction to closed contact events needs to be sent to network devices. This stand-alone device provide solution for environments where alarms or notifications are based on contact/relay technology.

IP contact unit is best suited for Marine bussines, small to medium size enterprises, network or Entertainment solutions.

Design of the unit is very compact, that can be installed on DIN rail as well as on flat or wall surface.

Device is equipped with 6 contact inputs and one relay contact output. Additionally, unit is equipped with a 10/100 Base-TX Ethernet port for connection to the network.

Input contacts are used for dry contact connections and Output connection is relay contact, with both Normal-open / Normal-closed contacts. Unit uses UDP communication protocol for sending commands over network to other devices. Commands for each Input are programmable, with different actions for each input On/Off action. In addition, unit can be connected to USB port and installed through virtual serial port since it sends commands over serial port at the same time.

Example of usage:

- General alarm
- Abandon alarm
- Manual alarm
- Guest notification
- Passenger notification
- Other alarm



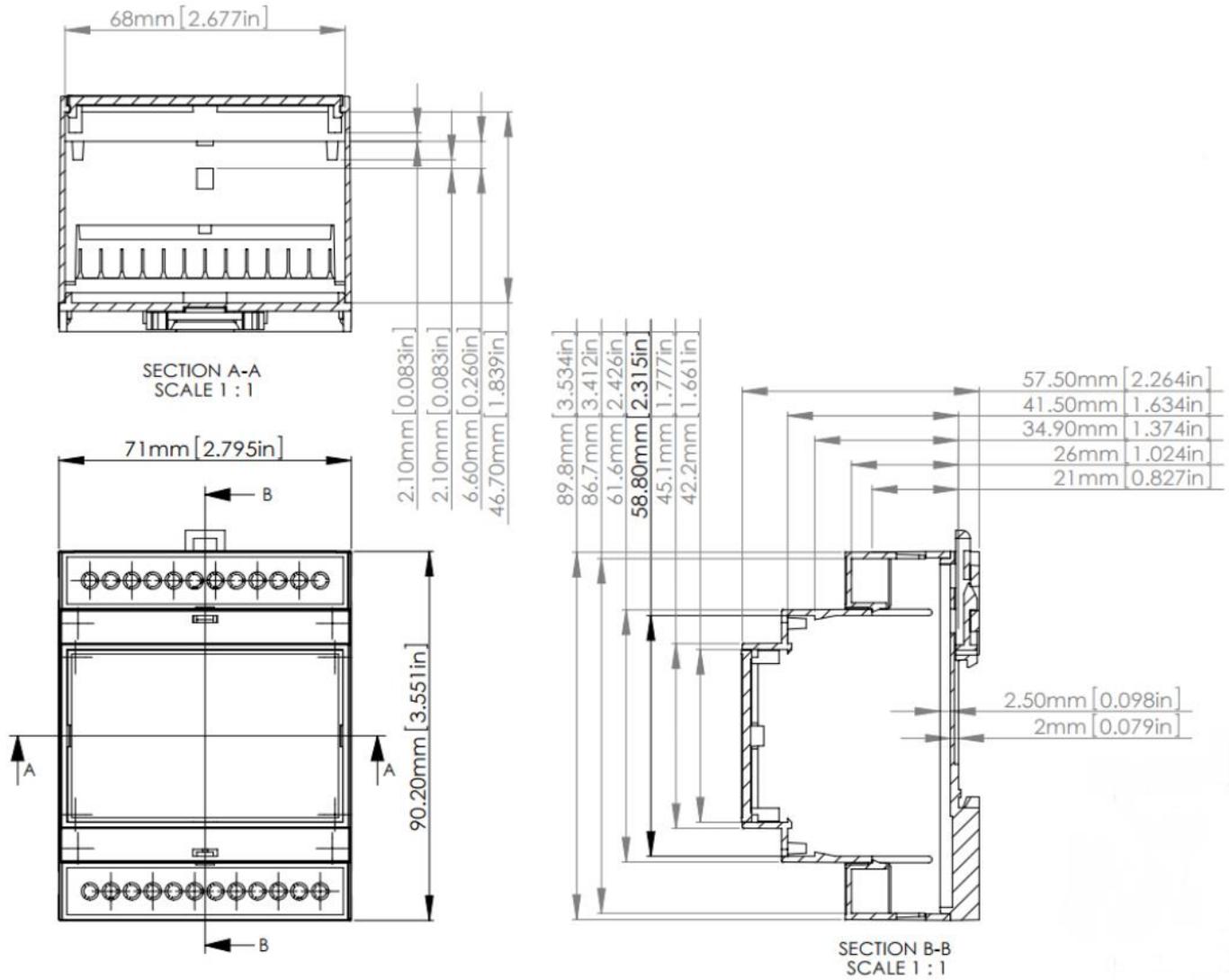
12.2 Features

- 35mm DIN rail or direct surface mount
- 10/100 RJ45 Ethernet port
- 12xTerminals for connecting Alarm contacts
- Power input 24 VDC (18-36 VDC)
- 6 input contacts (Normal open contacts, NC programmable), example:
 - General alarm
 - Abandon alarm
 - Manual alarm
 - Guest notification
 - Passenger notification
 - Other alarm
- When input contact is closed, every alarm input sends different UDP command to network server, for example: "ALARM 1 ON", "ALARM 1 OFF", etc.
- Reaction time app. 1ms
- Commands can be sent every 2ms (to have enough time for network to react)
- Customizable UDP commands up to 38 Characters, for example command could be: "ALARM01 STATUS ACTIV"
- Commands can be sent constantly during closed contact to have fail-safe function
- Priorities between alarms (1st-General, 2nd Abandon, etc.)
- Web interface with all information's
 - Unit local IP address, UDP port,
 - Default gateway
 - Remote IP address, UDP port,
 - On/Off commands for each alarm
 - Unit MAC address
- Fully web customizable
 - Change Unit IP address
 - Change Unit subnet mask
 - Change Default gateway
 - Change Local UDP port
 - Set Remote IP address
 - Set Remote UDP port
 - Customize each alarm command (every alarm ON and OFF commands)

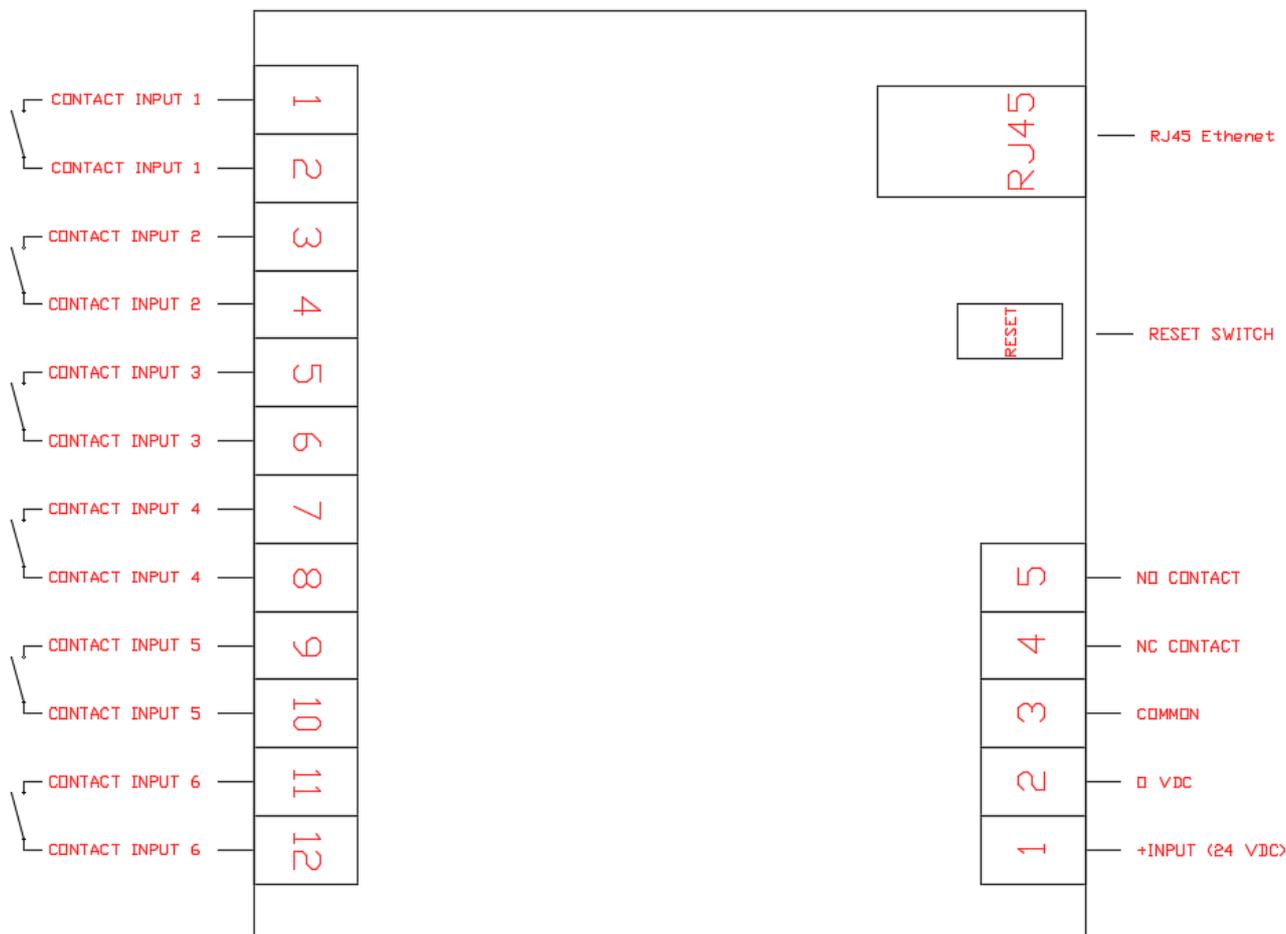
12.3 Physical description

- 35mm DIN Rail or direct surface mounts
- Snap fit terminal covers for IP20 finger protection
- Grey, transparent or clear snap-in covers
- Front panel ideal for screen printing logos (available per request)
- Molded in grey UL94-V0 flame retardant Lexan
- Enclosed base eliminates any need for additional insulation
- Optional adapter for G-Rail mounting

12.4 Unit dimensions



12.5 Terminals



12.6 Getting started

12.6.1 Connecting unit

For normal operation, voltage between 18V and 36V DC must be connected to power terminals (1+, 2-). Before powering the unit, connect LAN patch network cable, Cat.5 or better, to RJ45 connector. Other side of the patch cable connects to network device, network switch, computer or server.

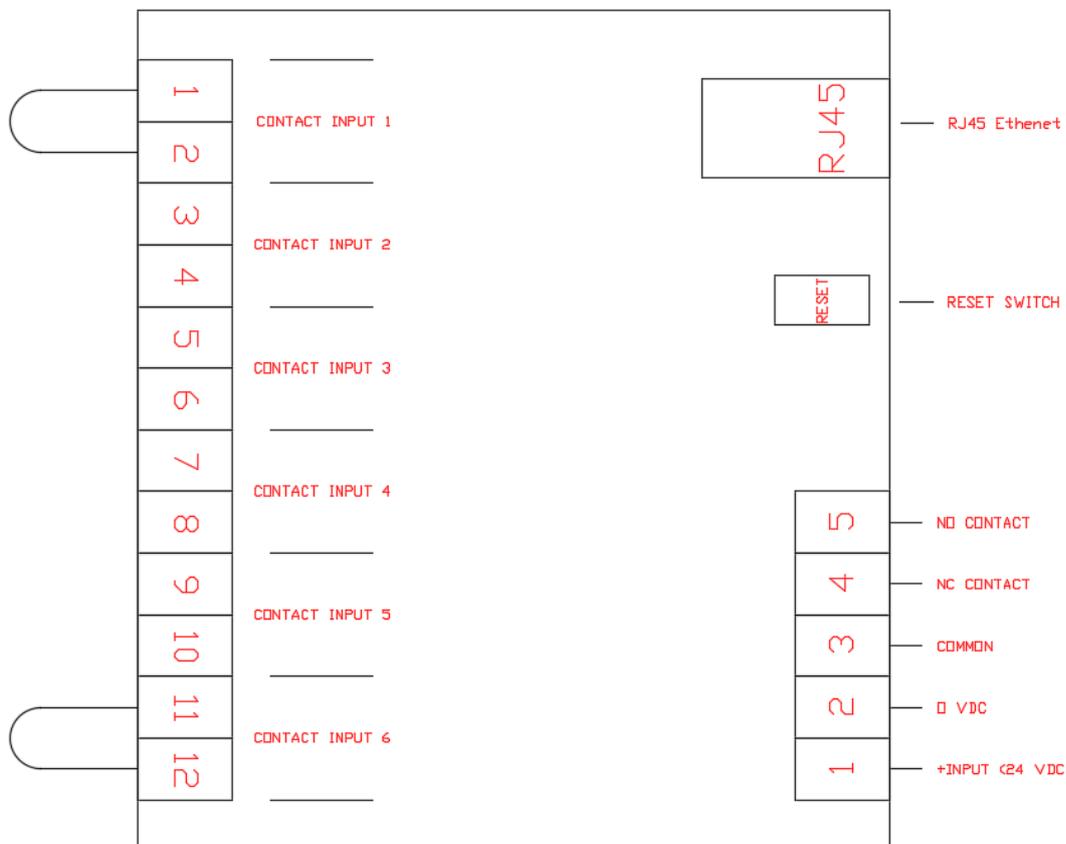
Power on the unit



12.6.2 Reset unit to default values

Prior to configuration, unit should be reset to default values. To reset device, shortcut inputs 1 and 6 on unit. (Shortcut between pins 1-2 and between pins 11-12). Press reset button or switch power off/on. After reset of unit, remove bridges from alarm inputs.

1. Short inputs 1 & 6



2. Press Reset button

Unit will load default values:

- Unit IP Address: 10.1.20.250
- Subnet Mask: 255.255.255.0
- Default gateway: 10.1.20.1
- Local port: 52230
- Remote IP address: 10.1.20.255
- Remote port: 52240

12.7 Web management

12.7.1 Access web management

To configure device set your own IP address to: 10.1.20.9 with subnet mask 255.255.255.0, open web browser and navigate to page: <http://10.1.20.250>. You will get web interface as shown on picture below.

IP Contact unit Settings

Unit IP Address	10	1	20	250
Subnet Mask	255	255	255	0
Default gateway	10	1	20	1
Local port	52230			
Remote IP Address	10	1	20	255
Remote port	52240			

Alarm settings

Alarm 1 ON	A\$0\$11\$General Alarm !\$
Alarm 1 OFF	A\$0\$10\$General Alarm !\$
Alarm 2 ON	A\$0\$11\$Fire Alarm !\$
Alarm 2 OFF	A\$0\$10\$Fire Alarm !\$
Alarm 3 ON	A\$1\$11\$Fire Alarm for CREW !\$
Alarm 3 OFF	A\$1\$10\$Fire Alarm for CREW !\$
Alarm 4 ON	A\$0\$11\$Alarm !\$
Alarm 4 OFF	A\$0\$10\$Alarm !\$
Alarm 5 ON	A\$1\$11\$SafetyVideo !\$
Alarm 5 OFF	A\$1\$10\$SafetyVideo! \$
Alarm 6 ON	A\$0\$11\$SPA Announcement !\$
Alarm 6 OFF	A\$0\$10\$SPA Announcement !\$

Unit MAC address: 00:08:DC:00:01:11 Sw.Ver.2.13

Save changes...

12.7.2 Configure unit parameters

- Change settings by entering values in required fields.
- Press **Save** settings to write settings to permanent memory
- Press **Reset** button to load new settings

Changes to Alarm On/Off commands are affected immediately but changes to IP settings of unit or remote server are stored in permanent memory. In order for new IP settings to be applied, you need to reset device by pressing reset button or switch off/on power supply

12.8 Specifications

- Power supply: 24 VDC (18V-36V DC)
- Power consumption: 70mA @ 24VDC
- Network: 10/100 Mbit RJ45

13. System maintenance

13.1 Backup copies

Automatic backup copies are created daily. Besides, a backup may be created at any time via web interface. To roll forward an older backup copy, first create a current backup, and then stop all IPTV systems. Backup tables should be rolled forward manually one by one via the SQL client. Changed config files should be copied over the current ones. Extreme caution must be taken, since wrong action sequence may lead to loss of data. To set up daily automatic download of the backup files, set up the download program (for example, wget) to get the data from the URL containing the authentication data:

```
http://login:password@10.1.0.102/page/backup/download_backup.php?file=backup_current.tar.bz2
```

13.2 Android based STB diagnostics

Android based STBs have an event log that is kept in RAM. One needs to install adb (Android Debug Bridge) utility in order to access that event log. Adb is a part of Android SDK which is available at the link:

<http://developer.android.com/sdk/index.html>

Besides accessing the event log, adb allows one to do couple of other things. Some of these things are described below.

13.3 Firmware upgrade in recovery mode

For ATV360 STB there is an option of upgrading firmware using the system recovery mode. Press and hold power button on the left side of the STB, connect the power cable and after five seconds release power button to enter the system recovery mode.

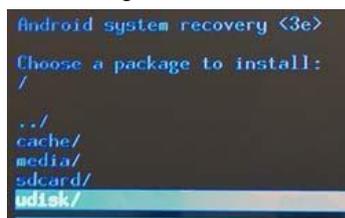


To upgrade the firmware, do the following:

- copy the firmware to the root directory of a USB thumb drive
- insert the thumb drive into the STB
- choose the **Apply update** option from the menu



- navigate to the root directory of the USB thumb drive (udisk/)



- open the firmware file and wait for the firmware to install

- when the installation is complete, choose **Reboot system now** from the menu to reboot the STB



```

Android system recovery <3e>
Up/Down move, OK select, Exit exit

Apply update(*.img)
Wipe data/factory reset
Wipe cache partition
Wipe media partition
Options

## manual mode for Anroid TV Box ##
boot ldr version: 611c2a3(20140118.110619)
recovery version: f051b21(20140118.105949)
board version: MK_S010
board sub version:

-- Install /udisk ...
Formatting /cache...
Backup img file /tmp/sideload/package.zip ...
Finding update package...
Opening update package...
Verifying update package...
Installing update...

Install complete.

```

13.4 IPTV PC Client reactivation

If IPTV PC Client requires reactivation (for example, if it is being connected into an entirely different system), you have to erase **netup.keystore** file from client folder **.netup** in order to reactivate. This file located in folder below but note that it is hidden folder so you have to enable “Show hidden files, folders, and drives” in folder options tab.

- Linux - /home/someuser/.netup
- Win XP - C:\Documents and Settings\someuser\Application Data\.netup\iptv_pc_client
- Win 7 & 8 - C:\Users\someuser\AppData\Roaming\.netup\iptv_pc_client

13.5 Network troubleshooting

If an STB does not play streaming video, this may be due to network errors. To rule out possible communication problems, plug the STB and the streamer into the same switch. If the streaming video still would not show up, attach a PC instead of the STB and check that the media is actually streamed to the specified multicast address, and that no extraneous signal is streamed together with it. The VLC media player (<http://www.videolan.org/vlc/>) may be used to view the video stream on PC (select **Media – Open Network Stream** in the menu).

13.6 IPTV server troubleshooting

When a network connection to the IPTV server is impossible, use the debugging cable supplied with the server. Connect the port on the server’s front panel to the COM port on any PC and open a terminal program. Use the following connection parameters:

Speed (bit/s)	19200
Data bits	8
Parity	None
Stop bits	1
Flow control	None

A Linux console will show up in the terminal window.

13.7 IPTV server factory reset

If your IPTV server needs a factory reset, please contact Vingtor-Stentofon technical support.

14. GLOSSARY

Below is a list of terms used in the description of IPTV system.

14.1 Networking

- **DNS** – (Domain Name Service) is a distributed hierarchical system that stores IP addresses, domain names and various information associated with them.
- **TCP/IP** – (Transmission Control Protocol / Internet Protocol) is a stack of communication protocols used in computer networks.
- **FTP** – (File Transfer Protocol) is an application level network protocol for file transfer.
- **HTTP** – (Hypertext Transport Protocol) is an application level network protocol for data transfer.
- **RTSP** – (Real-time Streaming Protocol) is an application level network protocol that serves for signalling during the multimedia data transfer.
- **RTP** – (Real-time Protocol) is a transport level network protocol for delivering real-time traffic over IP networks.
- **UDP** – (User Datagram Protocol) is a simple transport level network protocol for data transfer.
- **TCP** – (Transmission Control Protocol) is a transport level network protocol for data transfer with guaranteed delivery.
- **DHCP** – (Dynamic Host Configuration Protocol) is a network protocol for obtaining IP addresses and other auxiliary information in TCP/IP networks.
- **IGMP** – (Internet Group Management Protocol) is a network protocol that manages group routing.
- **NTP** – (Network Time Protocol) is a network protocol for synchronizing the internal clocks of computer systems.
- **MAC** – (Media Access Control) is a sub-layer of OSI model that provides addressing and channel access control mechanisms.
- **MAC address** – is a unique identifier assigned to a device in a network.
- **LAN** – is the Local area network.
- **VLAN** – is the Virtual Local area network, standard 802.1q.
- **NFS** – (Network File System) is a file system distributed among multiple machines.
- **SSL** – (Secure Socket Layer) is a cryptographic protocol for communications over TCP/IP networks.
- **Commutator (switch)** – is a device joining several nodes within a network.
- **Unicast** – is a transmission of information packets to a single destination.
- **Broadcast** – is a transmission of information packets to all devices in a network.
- **Multicast** – is a transmission of information packets to a certain group of destinations.
- **Multicast group** – is a group of destinations in a multicast transmission.
- **Multicast router** – is a router capable of routing multicast streams.

14.2 Television

- **Polarization** – is a characteristic of the satellite signal (may be vertical, horizontal, circular left, or circular right).
- **Symbol rate** – is the number of transmitted symbols per second.
- **Transponder** – is an automatic device that may receive and retransmit a signal.
- **LNB converter** – (Low-Noise Block converter) is a device that converts a satellite signal for transmission over a co-axial cable.
- **Receiver** – is a device that receives a converted satellite signal and transforms it into a form usable for the consumer.
- **DiSEqC** – (Digital Satellite Equipment Control) is a special communication protocol for use between a satellite receiver and other devices.
- **Multiswitch** – is a device for connecting several receivers to the same satellite dish.
- **FTA** – (Free-to-air) refers to a non-encoded stream.
- **CSA** – (Common Scrambling Algorithm) is an encryption algorithm used in DVB.
- **Codec** – is a device or computer program capable of encoding and/or decoding a digital data stream.
- **MPEG** – is a suite of data compression standards used for digital multimedia.
- **MPEG TS** – (MPEG transport stream) is a container format used for transmission of multimedia data over networks.
- **MPEG PS** – (MPEG program stream) is a container format used for storage of multimedia data.
- **Audio PID** – in a MPEG-encoded file or stream is an identifier of audio data.
- **Video PID** – in a MPEG-encoded file or stream is an identifier of video data.
- **H.264** – is a standard for video compression (subset of MPEG-4).

- **SD** – (Standard Definition) is the resolution of 720x480 or 720x576.
- **HD** – (High Definition) is the resolution of 1280x720 or 1920x1080.
- **HDTV** – (High Definition Television) is a standard for high-resolution digital TV broadcasting.
- **DVB** – (Digital Video Broadcast) is a suite of standards for digital television. Includes the following subsets:
 - DVB-S for satellite broadcasting;
 - DVB-S2 for high definition satellite broadcasting;
 - DVB-C for cable broadcasting;
 - DVB-T for terrestrial on-air broadcasting;
 - DVB-T2 for terrestrial on-air broadcasting.
- **ATSC** – (Advanced Television Systems Committee) is a suite of standards for digital television.
- **RF** – is a format of analog video signal for on-air transmission.
- **RCA (AV)** – is a format of analog audio and video signal for short-range cable transmission.
- **S-Video** – is a format of analog video signal for short-range cable transmission that carries the luminance and color signals separately.
- **PAL** – is a color-encoding system for analog TV accepted in Europe.
- **SECAM** – is a color-encoding system for analog TV accepted in France, Russia and some other countries.
- **NTSC** – is a color-encoding system for analog TV accepted in USA.

14.3 IPTV

- **Streamer** – is a device that receives an on-air or other signal and transmits it over an IP network. Particular varieties include DVB-to-IP gateway and MPEG encoder.
- **Middleware** – is a set of software that controls the interaction between the components of an IPTV solution (streamer, VoD servers, CAS, and user STBs).
- **CAM** – (Conditional Access Module) is a module that provides restricted access to the broadcast media data.
- **MMI** – (Machine-Machine Interface) is an interface used for interaction between CI and CAM.
- **EMM** – (Entitlement Management Message) is an encrypted message stating the user's right of access to multimedia data.
- **CI** – (Common Interface) is an interface of interaction with CAM (standard EN 50221).
- **CAID** – is the Conditional Access system ID.
- **VoD** – is the Video on demand.
- **TVoD** – is the Television on demand.
- **PVR** – is the Personal Video Recorder.
- **EPG** – is the Electronic Program Guide.
- **PPV** – (Pay-per-view) is a system in which TV viewers can purchase events to be seen on TV.
- **CAS** – (Conditional Access System) is a system that protects the content from unauthorized access.
- **SMS** – is the Subscriber Management System.
- **Time-Shifted TV** – is sort of TV with pause and rewind options.
- **STB** – is the TV set-top box.

14.4 Other terms

- **XML** – (eXtensible Markup Language) is a markup language for storing structured data.
- **RAID** – (Redundant Array of Independent Disks) is a fault-tolerant array of hard disks.
- **Database** – is a structured collection of data records stored in a computer system.
- **Cluster** – is a group of linked computers used as a single hardware resource.
- **DRM** – (Digital Rights Management) is the aggregate of access control technologies used to prevent unauthorized usage of digital media or devices.
- **Billing** – is a system that collects information about services that are going to be billed to the subscriber.
- **Firmware** – is a fixed program that internally controls some electronic device.
- **ISO** – is the International Organization for Standardization.
- **ANSI** – is the American National Standards Institute.

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