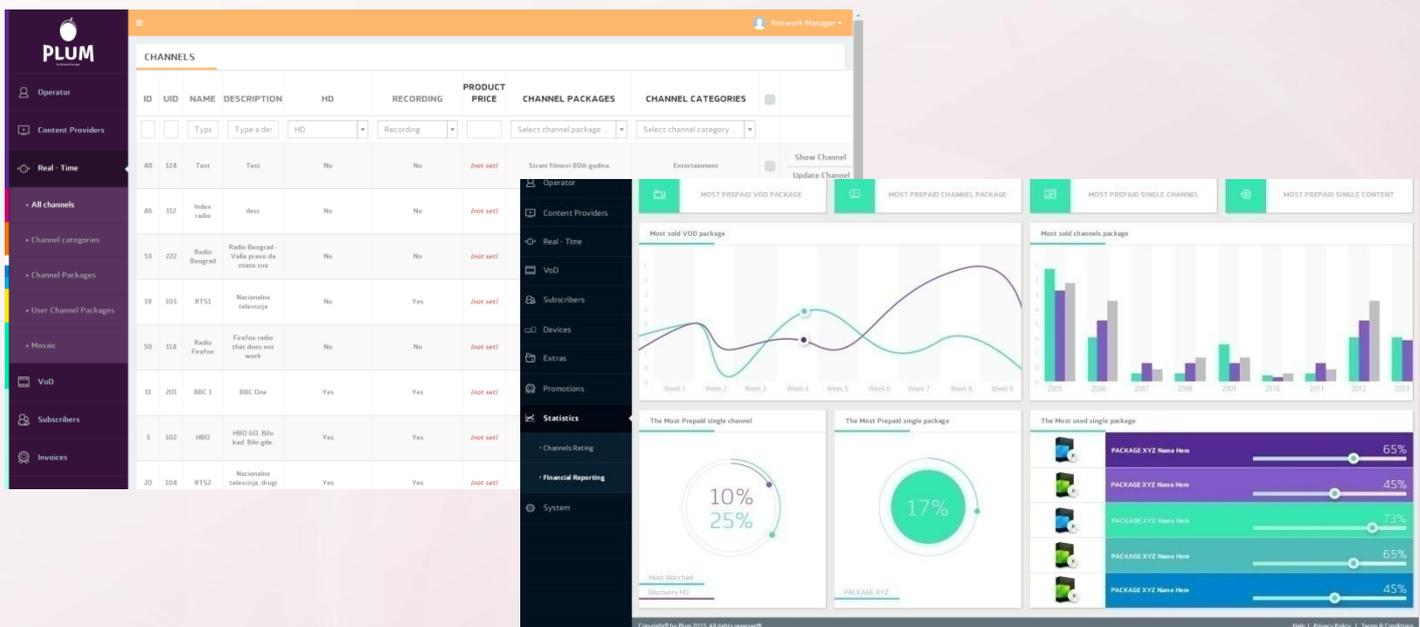


# PLUM Middleware

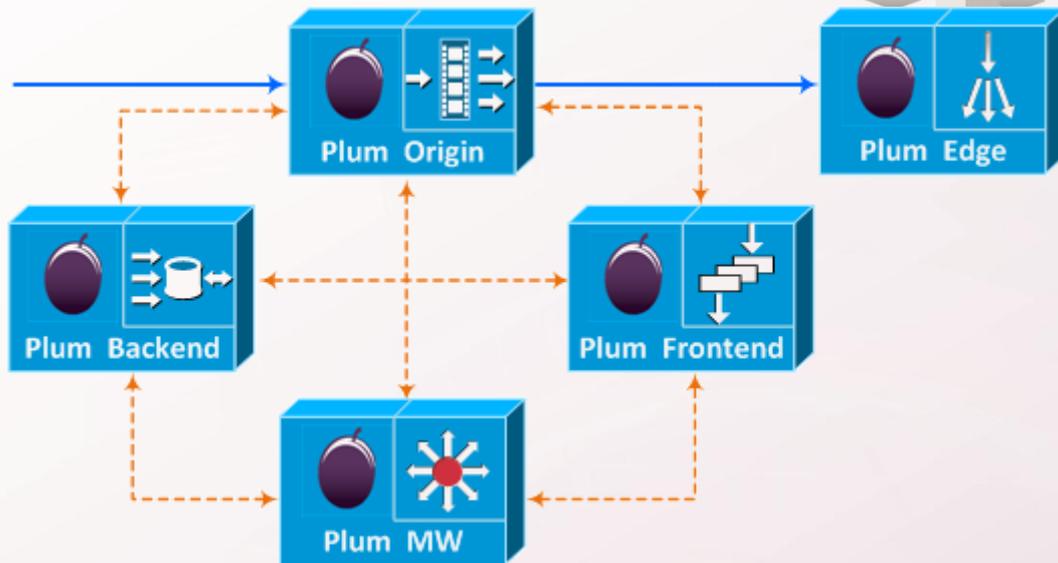
Plum Middleware is a next generation solution for Interactive TV (iTV). As a central component of an iTV system, Plum has a task to present all the options available in the system to the user and to connect the complete system into one whole. No matter if the service is offered by managed (IPTV, Hybrid) or unmanaged (OTT) networks, Plum Middleware makes video content available, easy to find, accessible, and easy to consume anytime, anywhere, on any device.



Plum meets the diverse needs of administrators/operators by providing:

- ◆ RESTfull interface for managing the system and users
- ◆ Mechanism of protection for Live and VoD content from unallowed access
- ◆ A web-based administration portal for OAM&P (Operation, Administration, Management & Provisioning).
- ◆ Detailed statistics for content and users

## Plum Middleware as part of Plum OTT solution:



Plum Middleware is API provider of functions for managing OTT solution. It uses RESTfull interface for managing the system and users. It implements a mechanism of protection from unallowed access for Live and VoD content.

Frontend part of solution communicated directly with Middleware. Frontend is a web based interface for viewing of Live streams, VoD content, EPG and nPVR functions.

Frontend is the only part of the system, except for Edge server, which has a public IP address and end users communicate with him when they establish a connection with Middleware which allows interactivity with available services (Live TV, VoD, Timeshift, Catchup TV, nPVR,..).

Plum uses Clappr player on the web application, html5 player based on native on mobile applications and on STB a player embedded in the device.

Frontend supports HTTP load-balancer mechanism and clusterization, which means that it is possible to have several Frontend instances if a more capacitive system is required.

Backend part of Plum solution implements applicative logic for nPVR (*Network Personal Video Recorder*) functions, it performs processing of recorded user PVR chunks and their shifting to user directories on storage.

Backend performs application queue/stack for managing actions in Middleware (scheduling recording, general notifications and rest) and he is the scheduler for all the actions of Middleware. Backend implements relational databases of users and parameters of OTT system.

Plum Middleware (+Frontend, +Backend), Origin server and Edge server are one whole, but Transcoder can be a third party solution.

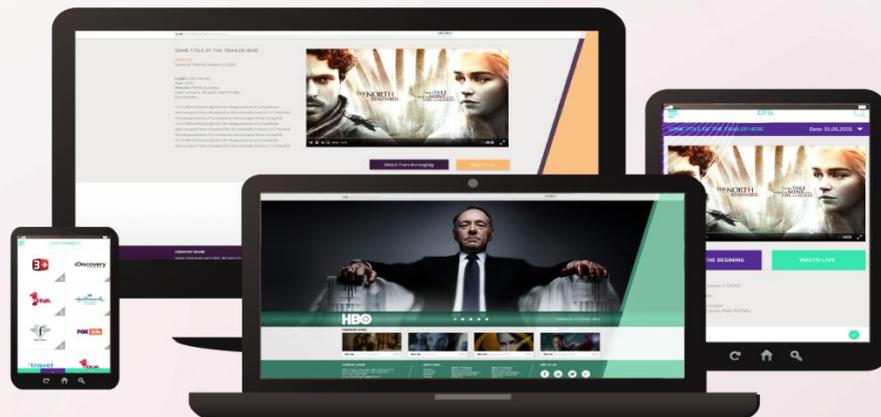
## Key features

### Catchup TV

Plum enables very fast and intuitive use of automatic recording and watching of all or some TV channels with a choice of length of recording (24h, 48h, 72h... backward) for operators.

### Timeshift

When the user pauses the program on Plum client's application, he was watching Live TV but continues watching later at the moment he paused it, as Timeshift. This action basically moves Live channel to Timeshift domain, because the show that user is continuing to watch is actually not Live anymore. The transition is seamlessly done so the user doesn't have any inconveniences in his viewing experience.



### Multiscreen

Plum MW together with other elements of iTV system (Transcoder, Edge server, Origin server) provides the option of watching video content on different devices (SmartTV, STB, iOS/Android phone/tablet, PC/Mac). Using Adaptive Bit Rate (ABR) to stream different profiles allows using the application even in conditions where the bandwidth is limited.

### User recording

Network Personal Video Recorder (nPVR) is fully supported on Plum MW. The subscriber has the opportunity to choose from 3 types of recording:

- ◆ scheduled recording in accordance with EPG
- ◆ scheduled recording independently from EPG (setting the time for recording so that if EPG is incorrect the recording will be complete and later it can be edited and cropped)
- ◆ local recording – while a program is on, with the REC button

## Other features

<b>Video on Demand (VoD)</b>	VoD as one of the classic services, allows offline watching movies or series from a library where subscribers can rent desired content. They have options of prepaid and postpaid paying.
<b>Multiusers</b>	One subscriber can add more profiles to his subscription enabling his family members having their own settings for favorite channels, movies, recordings, reminders and all other settings.
<b>Electronic Program Guide (EPG)</b>	EPG enables users to browse through content that is offered.
<b>Promotions</b>	Operator can define promotions, in administration panel, which he wants to present to his users, offering them new VoD and channel packets, movies, bigger storage packets...
<b>Mosaic</b>	An option that enables users to see multiple channels at the time and decide which one they want to watch. This option is available on STB's.
<b>Reminders</b>	After a reminder is set the user will have a notification for that program 5 minutes (or some other value) before the program starts. Automatic transfer to that program can also be set, so when the program starts STB will automatically switch to that channel.
<b>Parental control</b>	It is possible for a main subscriber (parent) to restrict channels at his profile but also on profiles of other members of his family (children's profiles). Only the main user has the authorization to do these restrictions. Parent can also lock channels in specific interval of the day. There is also an option for a parent to allow or deny other users rights to purchase content or channels or use storage on subscription account.
<b>Protection/Security</b>	Plum MW supports CAS, DRM and Token-based security. Token-based security is currently implemented in whole Plum iTV System. Plum uses SSL with AES 128/256/512 encryption. We implemented our hashing mechanism for stream protection where the hash is generated from backend dynamically in real time for each user.
<b>Statistics</b>	In admin panel the administrator can keep track of user activities, the most watched channels, most commonly rented movies, the most popular packets...
<b>Export of billing data</b>	Plum supports export of billing data via web services to an external billing system. Supported options are postpaid and prepaid.

Different service providers (Internet providers, Cable operators, OTT operators, CDN providers...) can use all the features of Plum iTV system.