



A Rohde & Schwarz Company



White Paper

Customized IPTV Setups with TVCaster Server Appliances

Copyright © 2018 by GMIT GmbH, Berlin, Germany

TVCaster by GMIT represents the next generation of IPTV server appliances. TVCaster is a turn-key solution offering all cutting-edge functionality you expect from an integrated DVB receiver, descrambler, remultiplexer, and IP streaming server.

This White Paper presents an overview of the different application scenarios supported by all TVCaster server appliances. To fully acknowledge the capabilities of each mode, some of the fundamental concepts of DVB tuners and also the clustering features of GMIT's server products are introduced.

Keywords

IPTV, DVB gateway, DVB-S2, DVB-C, DVB-T, DVB-ASI, MPEG, Remultiplexing, Unicast, Multicast, Streaming, UDP, RTP, Corporate mode, Home mode, Middleware mode

Permission to use this White Paper is granted, provided that (1) the above copyright notice appears in all copies and that both the copyright notice and this permission notice appear, (2) use of this White Paper is for informational and non-commercial or personal use only and will not be copied or posted on any network computer or broadcast in any media, and (3) no modifications of any kind are made. Use for any other purpose is expressly prohibited. GMIT, TVCaster, CodecCaster, RelayCaster, PolyCaster, and RCSP are registered trademarks of GMIT GmbH. Flash is a registered trademark of Adobe Systems Incorporated in the United States and/or other countries. Silverlight is either a registered trademark or trademark of Microsoft Corporation in the United States and/or other countries. All other trademarks are the property of their respective owners.

Clustering feature of the TVCaster series

All TVCaster server appliances provide a built-in clustering feature. This means that additional TVCaster servers can be added to an existing network at any time. This allows for seamlessly increasing the number of different TV or radio channels that are available within the network simultaneously.

To fully understand this concept of scalability, it is important to review the capabilities of DVB tuners. Each tuner can only tune to a certain transponder (also called bouquet) at a time, which is specified by a number of technical parameters. On such a transponder, you will find a number of different TV and radio channels. For example, a typical DVB-S2 transponder for SDTV will provide between 5 and 10 different TV channels; for DVB-S2 between 2 and 4 different HDTV channels are available.

How channels are assigned to different transponders is predefined by your DVB provider. You need to consult your satellite, cable or terrestrial provider for a complete list of transponders. Based on this information and the selection of channels you would like to stream, you can then determine how many DVB inputs you need. Then, you can select the types and numbers of TVCaster products to fulfill your requirements.

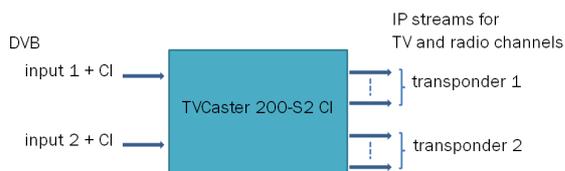
One of the main features of the TVCaster is to be able to re-transmit each TV or radio channel of a transponder as separate IP stream to your network. This is referred to as remultiplexing from MPEG Multi-Program Transport Stream (MPTS) to a number of Single-Program Transport Streams (SPTS), i.e. going from a single DVB bouquet to a number IP streams, one for each TV or radio channel (see Figure 1). This feature is important since a lot of streaming clients only support handling a single program at a time. Providing separate IP streams also allows for a more fine-grained access of content and therefore avoids wasting network bandwidth.

Consider you have a TVCaster 200-S2 CI up and running, and serving the IP streams for two transponders to your network. If now you would like to increase the number of TV channels available by some channels on other transponders, you can simply plug in additional TVCaster servers to your network. With only a single log-in to the web interface you are able to configure all available systems. The different numbers of DVB inputs and CI slots allows customers to choose the combination of TVCaster servers that matches their requirements.

Figure 1

TVCaster server appliances available for DVB-S / S2 and the number of DVB inputs and CI slots available for each model.

Servers for DVB-C, DVB-T/T2 and DVB-ASI are also available, please refer to <https://www.youtube.com/watch?v=rdY9-3mfl6Y>¹



¹ GMIT GmbH, a subsidiary of Munich-based technology group Rohde & Schwarz, has acquired the technology of Motama GmbH.

Corporate mode

Corporate mode is used for streaming live TV (or radio) to a larger number of clients within an IP network. Typical applications include

- Broadband networks of telecommunication providers or content delivery networks,
- Hospitality, such as networks in hotels, cruise ships, hospitals,
- Business, such as networks in companies, universities, schools and other institutions.

In corporate mode, a single stream is typically created for each TV or radio channel to be provided. This is done by specifying a networking address for each stream, either a unicast or multicast address. In addition, the streaming protocol can be configured to be UDP or RTP on top of UDP.

Multicast allows for handling larger number of streaming clients (such as set-top boxes). In contrast to unicast, multicast streams from a single sender will be sent to a group of receivers by automatically creating copies for all registered receivers. A receiver only needs to 'subscribe' to a stream for this to happen.

On the downside, multicast networking requires multicast-enabled network components along the complete patch from sender to receiver. In a local area network this can be achieved by employing multicast enabled switches, which are typically by a factor of 10 more expensive than switches not supporting multicast.

Figure 2 shows a typical setup in corporate mode, for example within a multicast-enabled network of a telecommunications provider, or within the network of a hotel. A number of TVCaster server appliances provide multicast streams for different TV and radio channels. Clients, such as set-top boxes attached to TV sets, are able to access these streams individually by receiving data from the multicast address corresponding to a certain channel. Channel-hopping is done by going from one multicast stream to another.

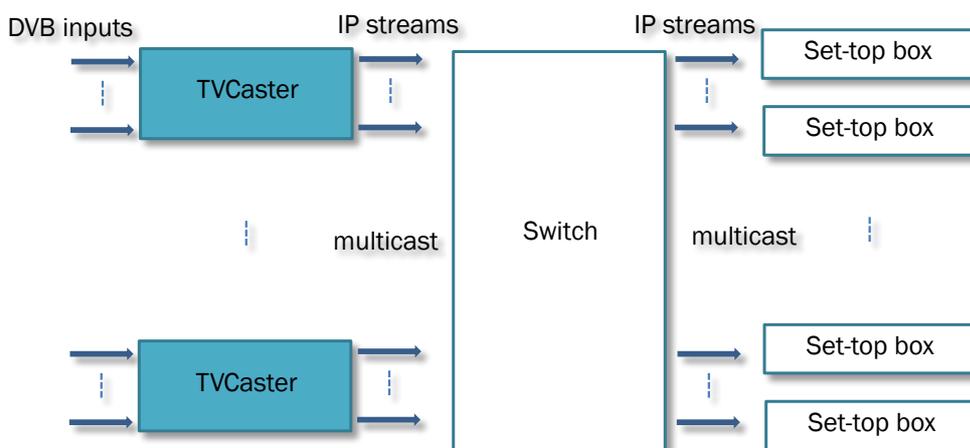


Figure 2

Setup in corporate mode with several TVCaster servers in cluster streaming TV and radio channels using multicast networking to clients (set-top boxes).

But how does the client know which streams are available? Instead of manually configure the clients, the easiest way is to query this information by using the free TVCaster-SDK. This can be done by either using by PHP, or by using the XML-RPC API (both available for almost all platforms). The TVCaster-SDK also provides a number of PHP/HTML pages which can be loaded directly from a set-top box providing a user interface based on a web browser. The examples provided with the TVCaster-SDK also demonstrate how to access a further feature of the TVCaster servers, namely the server-side electronic program guide (EPG), which allows to directly access all related information from the server.

These examples can be used as reference for creating a custom user-interface or for integrating this option into a custom IPTV middleware for managing content in hospitality or other operated network.

GMIT

GMIT - a Rohde & Schwarz company develops multiviewer and automated monitoring products for operating and monitoring broadcast and streaming infrastructures. These products feature top performance and availability and are based on GMIT software components and technologies for processing video, audio and data in realtime. With the acquisition of the technology of Motama GmbH, the product portfolio was extended in the areas of IP contribution, live transcoding, OTT streaming and DVB gateways.

Further information about GMIT is available from <https://www.gmit-gmbh.de/>