Broadcast-to-IP conversion for Wi-Fi indoor coverage

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Videos on mobile devices

- YouTube, Netflix, Facebook, Google, Vevo, Vimeo, are all reaching the mobile devices

- What about Digital Terrestrial Television? DTT2IP?
Our GOAL: DTT2IP
Implementation
Implementation
Our contribution

- Have an open source solution, from which everybody can benefit
- Make available on any hardware platform:
  - Linux / Windows PC (with VM installed)
  - Synology NAS
  - Raspberry Pi
  - Wi-Fi router
- Provide good and stable TV services
DTT2IP - problems

- Which transport protocol to use:
  - RTP/UDP vs. HTTP/TCP

- Architecture for the discovery protocol:
  - SAT>IP/SSDP vs. DLNA/UPnP

- Client applications/decoders

- DVB features
DTT2IP v1.0

- Unicast RTP for transport protocol
- DVBlast (VLC) as a video streamer
- SAT>IP: 1. SSDP server for the discovery protocol
  2. RTSP server for the management/control of DVBlast
<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
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<tbody>
<tr>
<td>Multiple streaming to different users</td>
<td>Unsupported / Poor video quality for HD TV programs</td>
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<tr>
<td>Good video quality for SD TV programs</td>
<td>Scanning for services takes long time</td>
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<tr>
<td>DVB-T features (EPG, subtitles, Teletext)</td>
<td>No support for all devices (Windows phones, TV sets, PC )</td>
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<tr>
<td>2 Client applications available (Elgato and Tivizen)</td>
<td>No transcoding available</td>
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<td>No multicast available</td>
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DTT2IP v2.0

- Unicast HTTP/TCP for the transport protocol
- MuMuDVB as a video streamer
- DLNA/UPnP server: 1. For the discovery on the network
  2. For the management / control of MuMuDVB
## DTT2IP v2.0 - Results

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
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<tbody>
<tr>
<td>Multiple streaming to different users</td>
<td>More bandwidth (~240Kbps)</td>
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<tr>
<td>Good quality for SD TV programs</td>
<td>More overhead compared with RTP</td>
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<tr>
<td>Improved quality for HD TV programs</td>
<td>No DVB-T features</td>
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<td>Scanning of services is done only once (~1min)</td>
<td>More processing power required</td>
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<tr>
<td>Supported by all of the devices</td>
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<tr>
<td>Transcoding now available</td>
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<tr>
<td>More then 2 applications available</td>
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Future work

- Have a stable and compatible UPnP server
- Implement transcoding, and MPEG-DASH, HLS
- Have DLNA clients displaying DVB-T features (i.e. EPG, Subtitles, Teletext, HbbTV)
Question?
Thank you!

https://github.com/ebu/dtt2ip