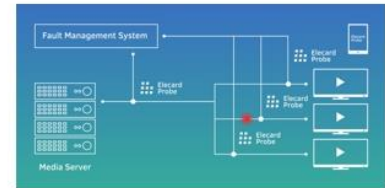


## ELECARD Boro

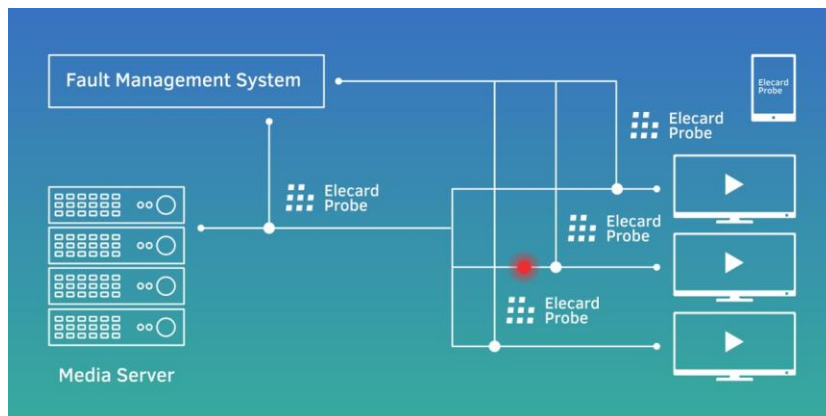
### IPTV MONITORING



ElecCard Boro software probes monitor packet loss, video freeze, SCTE35 labels for UDP/HLS/DASH/RTP/HTTP. The solution provides fast and cost-effective monitoring of content delivery networks and ensures localization of the most common violations. Boro is a client-server application consisting of 2 parts: a software Boro probe and a Boro server designed to collect and process statistics.

### HOW IT WORKS

- 1) Boro probes are distributed over the network: at the head-end station, at input streams monitoring points and after transcoding, multiplexing and encrypting modules; at end-points of main delivery networks, signal distribution points and last mile locations.
- 2) The user starts the probe in the monitoring point. Tasks for analysis are assigned to the probe in the dashboard of the Boro account. Boro probe detects violations in the stream and transfers the detailed statistical information to ElecCard Boro server.
- 3) The server aggregates the received data, provides reports in easy-to-understand graphic form for each segment of the network in the web browser, and ensures fast email notification about network violations.



### KEY FEATURES

#### Manage probes remotely

- Create the projects and share access
- Start several probes in one project
- Configure tasks for each probe (monitoring settings for each video stream)
- Check probe resources (RAM/CPU/HDD/Network)
- Set the project notifications of different types: Visual, Email, SNMP, Webhook, PagerDuty, Telegram
- Create several notification profiles for each notification type
- Manage and restart tasks

## Check statistics

- Check statistics on all probes and tasks of the projects
- Mosaic View to check the whole network on 1 screen
- Display of streams state summary (input stream bit rates, PID bit rate, etc.) in graphic form
- Check statistics on each task: Detailed display of all parameters and metrics for each video stream, video thumbnails
- Detection of ad insertion tags in transport streams and playlists
- Export of Alarm Journal report in CSV format
- Video recording of IPTV and OTT and possibility to download video records from remote probes to the user's browser using WebRTC technology



Live View Layout

## MONITORED PARAMETERS

### QoS

- Signal Loss
- Download/Multicast/PID bitrates
- Continuity Counter / MLR
- Ethernet Descriptors (TOS, TTL Src, Dst, Mapping)
- Inter-Packet Arrival Time (IAT)
- Multiple Broadcasting Sources
- Stream Encryption
- Audio and Video Headers
- ETSI TR 101 290 (priority 1)
- In-depth HLS Analysis (more than 25 parameters and triggers)
- OTT: time to first byte (TTFB) and source IP registration

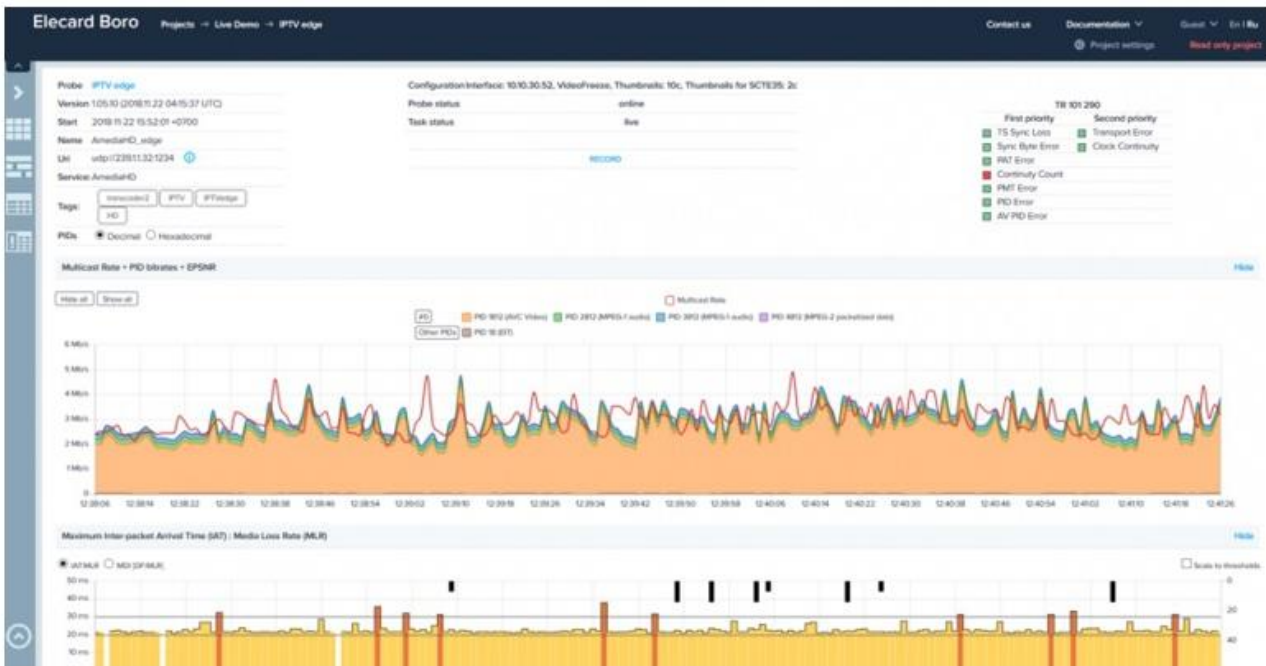
### QoE

- Video Freeze
- Timestamps Discontinuity
- SCTE-35 Analysis
- Video Thumbnails
- Audio and Video Decodability
- Estimated PSNR
- Audio Track Missing
- Audio Silence Error
- EBU R 128
- Video Recording by Event
- IDR Alignment

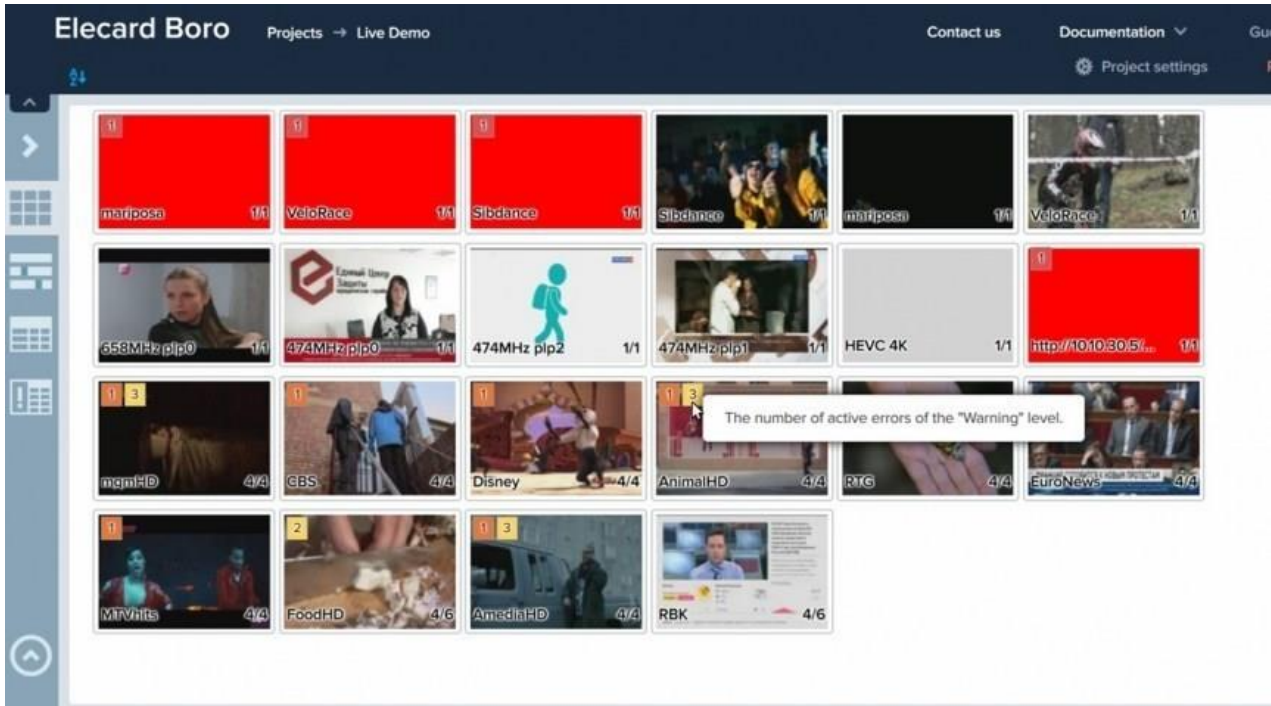
## APPLICATION

<p><b>OTT TV, IPTV and VOD</b></p> <ul style="list-style-type: none"> <li>• Ensure availability of all streams across the network</li> <li>• Localize defective segments of the delivery network</li> <li>• Monitor Head-end signal</li> <li>• Verify stream compliance with technical requirements</li> <li>• Monitor live broadcasting</li> </ul>	<p><b>Transcoding</b></p> <ul style="list-style-type: none"> <li>• Monitoring of transcoding, multiplexing and encrypting systems at head-end broadcasting stations</li> <li>• Check performance, quality and adjust settings of the equipment</li> </ul>	<p><b>DVB-streaming</b></p> <ul style="list-style-type: none"> <li>• Quality monitoring for multi program streams (MPTS)</li> <li>• Control over signal delivery to QAM modulator</li> </ul>
<p><b>Multimedia servers QA</b></p> <ul style="list-style-type: none"> <li>• Load &amp; Stress tests of content distribution servers based on http/HLS protocol</li> <li>• Quality assurance for video equipment</li> </ul>	<p><b>Ad insertion control</b></p> <ul style="list-style-type: none"> <li>• Ad insertion control in the video stream using SCTE-35</li> </ul>	<p><b>CCTV and Surveillance</b></p> <ul style="list-style-type: none"> <li>• Image quality control</li> <li>• Stream integrity control: video substitution and freezing</li> <li>• Localizing defective segments of the delivery network</li> </ul>

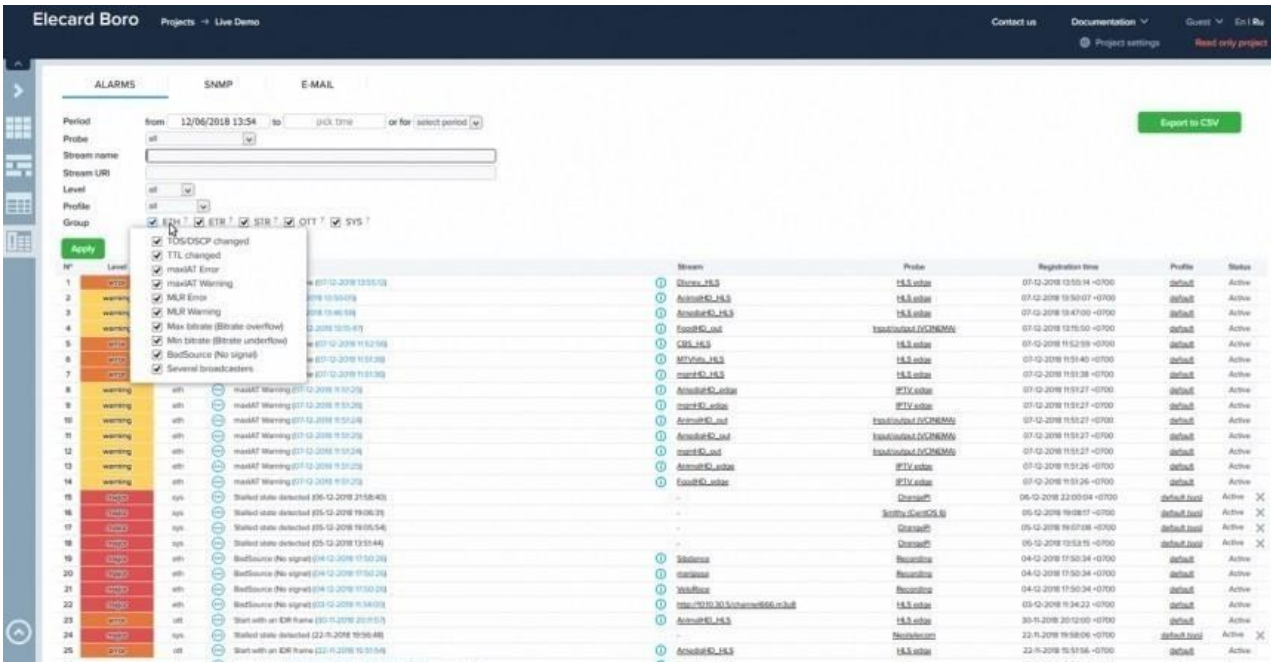
## SCREENSHOTS



Probe Statistics



Mosaic View Layout



Alarm Journal

**ETH**

- TOS/DSCP changed
- TTL changed
- maxAT Error
- maxAT Warning
- MLR Error
- MLR Warning
- Max bitrate (Bitrate overflow)
- Min bitrate (Bitrate underflow)
- BadSource (No signal)
- Several broadcasters

5	секунд в течении	1	мин.	error
5	секунд в течении	1	мин.	warn
20	секунд в течении	1	мин.	error
1	секунд в течении	1	мин.	warn
10	секунд в течении	1	мин.	error
10	секунд в течении	1	мин.	error
3	секунд в течении	1	мин.	error

**ETR**

- TR\_101\_290\_errors
  - TS Sync Loss
  - Sync Byte Error
  - PAT Error
  - Continuity Counter
  - PMT Error
  - PID error
  - PID error (VidAud)
  - Transport error
  - Clock Continuity

3	секунд в течении	1	мин.	error
10	секунд в течении	1	мин.	error
50	ошибок за	1	ч.	error
10	секунд в течении	1	мин.	error
2	секунд в течении	1	мин.	error
2	секунд в течении	1	мин.	error
5	секунд в течении	1	мин.	error
50	ошибок за	1	мин.	error

**STR**

- Invalid Elementary Stream
- Program Specific Information changed
- Encryption map changed
- Video Information changed
- Video Freeze Warning
- Video Freeze Error

3	секунд в течении	1	мин.	error
				warn
				error
				warn
20	секунд в течении	1	мин.	warn
60	секунд в течении	1	ч.	error

**OTT**

- OTT Enable Flag
  - Profile changed
  - The number of profiles changed
  - Minimum profiles
  - Profiles sequence divergence
  - Profile streamtype changed
  - Profile duplicate bandwidth
  - Profile invalid resolution
  - Download bitrate low
  - Download bitrate too low
  - Actual bitrate
  - Bad segment size
  - Manifest sequence discontinuity
  - Static manifest
  - Manifest error
  - Unknown manifest
  - Manifest size
  - Manifest download failure
  - Key download failure
  - Segment download failure
  - Skip segment (low system performance)
  - Start with an IDR frame

Alarm notification triggers