**Overview**

The Gearbox™ Media Platform is a real time multichannel streamer, integrated RF receiver, and transcoder designed to receive satellite and terrestrial RF signals and transform them into streams that are best suited for today’s digital environments. It is designed to be scalable, easily adaptable, and field upgradeable to meet the needs of cable and IP network operators who are very comfortable with embedded Linux® based appliances. It relies on an Intel® 16 Core CPU as an accelerator. We have also optimized the transcode engine for reliability, efficiency, and flexibility.

The Gearbox Media Platform is an MPEG-2 to H.264 transcoder or transcater. It receives transport streams several ways and transcodes them to H.264 or optional H.265, and outputs them to an IP network. Resulting streams can be viewed with standard IP capable set-top boxes, streaming video, smart phones, or software clients such as VLC or JW Player. The system receives transport streams, demultiplexes the requested services and streams these services using UDP, RTP, RTMP, DASH, Adaptive streaming, or HTTP via IP networks as either IP multicast or IP unicast streams. The system transcodes individual streams into H.264 format up to a maximum individual bitrate of 15 Mbps.

The Gearbox Media Platform selects all required PIDs and multiplexes the demultiplexed transport stream packets into IP packets.

The unit provides PID filtering of all unwanted traffic, increasing system performance and the number of channels which can be transmitted per unit.

Programs typically are forwarded (pushed) as transport stream packets via UDP or as RTP (real time protocol) payload (RFC 2250). Pushing can be either unicast or multicast. In addition to push, programs can be forwarded on request (pulled) using HTTP, HTTP Live, RTMP, DASH, etc.
Sample of GUIs

Network Setup

Scheduled IP Input Setup

IP Output Setup

Applications

Encoding/Transcoding
- Up to 16 SD or HD encodes
- Up to 52 SD or 13 HD transcodes
- Supports MPEG, AAC, or AC-3 encoding
- Supports MPEG-2, J2K, H.264, H.265

Receiving
- Up to 16 channels of DVB-T2, 8VSB, QAM, DVB-S2
- Descrambles DVB-S2
- Reduces services by PID filtering
- Remultiplexes streams
- Supports 16 ASI ports in

Stream Processing
- Logo Insertion
- PID filtering
- SCTE 35/104 insertion
- 10 Gig ports
- Fiber optic connectors
- MIL grade security

Input/Outputs Example

Transcodes up to up to 52 SD streams, or 20 720p60 streams, or 13 1080i or 1080p HD streams from MPEG-2 to H.264, or vice-versa.

Throughput

If you have five Mbps bandwidth Internet then you can only stream five one Mbps streams.

CDNs Tested With:

1. Akamai*
2. Limelight
3. Tata
4. Octoshape
5. CDNetworks
6. Internap
7. Highwinds
8. Verizon*
9. Ustream*
10. Mirror Image
11. Tulix*
12. More to come!

Options

- Optional transcoding to H.265
- 4:2:2 10 bit encoding
- Optional DOZER™ Automated UDP Packet Recovery protocol, enabling error-free video delivery over UDP. DOZER ensures smooth MPEG-2, H.264, and optional H.265 delivery through DVEO patented algorithms for automated packet recovery and re-ordering of out-of-sequence packets.
- Optional built-in “Mini Atlas” server supports 1,000+ simultaneous HLS, DASH, and/or RTMP users
### IP Input and Output

**IP Input**

<table>
<thead>
<tr>
<th>Input protocols</th>
<th>Supported Resolutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>UDP, RTP, RTSP, HTTP, HTTP Live, RTMP</td>
<td>Supports NewTek™ NDI® input.</td>
</tr>
</tbody>
</table>

**IP Output**

<table>
<thead>
<tr>
<th>Audio</th>
<th>Supported Resolutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAC, Embedded pass-through, MPEG-1 Layer II, optional MP3, and/or optional “SurCode for Dolby Digital” AC-3</td>
<td>IP Input and Output</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Two GigE, optional 10 GigE</td>
</tr>
<tr>
<td>Output protocols</td>
<td>UDP, RTP, RTMP (Open Flash), HTTP, with DLNA support</td>
</tr>
<tr>
<td>Type</td>
<td>IP-multicast, IP-unicast with “wrappers”</td>
</tr>
<tr>
<td>Bit Rates</td>
<td>Multiple H.264 video streams at different bit rates (.1 to 15 mbps), resolutions, and protocols, wrappers, and containers. Optional H.265: H.265 average bit rate supported. No constant or variable.</td>
</tr>
<tr>
<td>Quality</td>
<td>8 bit encoding with 4:2:0 color sampling; optional 4:2:2</td>
</tr>
<tr>
<td>Video</td>
<td>NTSC or PAL</td>
</tr>
<tr>
<td>Latency</td>
<td>About 1.2 seconds (fixed)</td>
</tr>
<tr>
<td>Optional Multiplexing</td>
<td>Multiplexing transport streams</td>
</tr>
</tbody>
</table>

### Supported Resolutions – Input and Output

- **1920 x 1080**
  - 720 x 480
  - 480 x 480
- **1280 x 720**
  - 704 x 480
  - 480 x 320
  - 320 x 240
- **720 x 576**
  - 640 x 480

Also supports any custom resolution not listed here, including computer formats like 1280 x 1024, etc. Note: Lower resolution results in higher transcodes. Supports PAL TO NTSC conversion but not NTSC to PAL. Supports closed captions for all inputs except HDMI. H.265 output resolutions supported are 1080, 720, 576, 480. H.265 576/480 resolutions only have 4:3 aspect ratio.

### Benchmarks – IP Input

- **MPEG-2 In**
  - SD in at 6 Mbps
  - 480i
  - HD inputs at 12 Mbps
  - 720p
  - 720p 60 frames
  - 1080i
  - 1080p

- **H.264 Out**
  - SD out at 3 Mbps
  - Up to 52 streams
  - HD outputs at 6 Mbps
  - Up to 52 streams
  - Up to 20 streams
  - Up to 13 streams

### Benchmarks – SDI/HD-SDI In, IP Out

- **480i**
  - Up to 12 channels, MPEG-2 or H.264
  - 720p60
  - Up to 8 channels, MPEG-2 or H.264
  - 1080i
  - Up to 6 channels, MPEG-2 or H.264
  - 1080p
  - Up to 6 channels, MPEG-2 or H.264

### Specifications

**DVB-C, QAM Input**

- Modulation: DVB-C, Digital Clear QAM (Annex A, B, or C)
- Inputs: RF from cable
- Frequency range: 55 to 867 MHz
- Maximum raw throughput: 200 Mbps

**8VSB (SMPTE 310M) Input**

- Modulation: 8VSB (SMPTE 310M) – terrestrial digital
- Inputs: RF from antenna
- Frequency range: 54 to 860 MHz
- Maximum raw throughput: 200 Mbps

**DVB-S/S2 Input**

- Modulation: DVB-S, DVB-S2
- Inputs: L-Band, K-Band, Ku Band, etc.
- Symbol rate: 1 to 45 MS/s
- Frequency range: 950 to 2150 MHz
- LNB control: 22 kHz, power H/V
- Spectral inversion: ON/OFF
- Maximum raw throughput: 200 Mbps

**HDMI Input/Output**

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>HDMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: Does not support 608 closed captioning for SDI input. Only 708 is supported.</td>
<td></td>
</tr>
</tbody>
</table>

**DVB-T or DVB-T2 Input**

- Modulation: DVB-T or DVB-T2 – terrestrial digital
- Inputs: RF from antenna
- Frequency range: 54 to 860 MHz
- Maximum raw throughput: 200 Mbps

**ISDB-Tb Input**

- Modulation: ISDB-Tb
- Inputs: RF from antenna

**SDI, HD-SDI Input/Output**

- Input/Output: SDI (SMPTE 259M), HD-SDI (SMPTE 292M)
- Note: Does not support 608 closed captioning for SDI input. Only 708 is supported.

**DVB-ASI Input/Output**

- Input/Output: DVB-ASI, 200 Mbps per port

**Output Bit Rates**

- Bit Rates: Multiple H.264 and/or MPEG-2 video streams at different bit rates (.1 to 15 mbps)

**CPU & Operating System**

- CPU: Intel® Xeon® 16 Core
- OS: DVEO embedded Linux® on SSD

**Power Supply**

- Power Supply: 3U 760W – Redundant

**Physical & Power**

- Size – 3 RU high (W x H x D): 19 x 5.25 x 25.2 inches (48.26 x 13.34 x 64 cm)
- Power Supply: 3U 760W – Redundant
- Temperature Range: Operating: 0°C ~ +50°C on Full Load; Storage: -20°C ~ +70°C
- Non-operating Humidity: 5% to 95% non-condensing
- Weight: 39 lbs. (17.69 kg)

**Conformities**

- UL, BSMI, CSA, FCC, CE, RoHS

**Security**

- Ports security scanned to MIL requirements prior to shipment

**Ad Insertion**

- SCTE Ad Marker insertion via RS232, USB, IP, Contact closures