

## High-density professional transcoder

The Teleste Optimo is a carrier-class, high-density transcoder for Cable TV, broadcast IPTV and OTT applications, which provides leading video quality and unmatched bandwidth efficiency combined with an unlimited output capacity and scalability.



## **More streams. Best quality. Choose both.**

The Teleste Optimo provides a modular and compact carrier-class solution for multi-screen video transcoding plus Internet and mobile video streaming. It is a unified platform for a wide array of advanced video processing applications and it transcodes from any input resolution to any output resolution while maintaining the precise ratio of quality to bit rate. This is all done with unparalleled efficiency and service reliability.

### **Amazing experience on every screen**

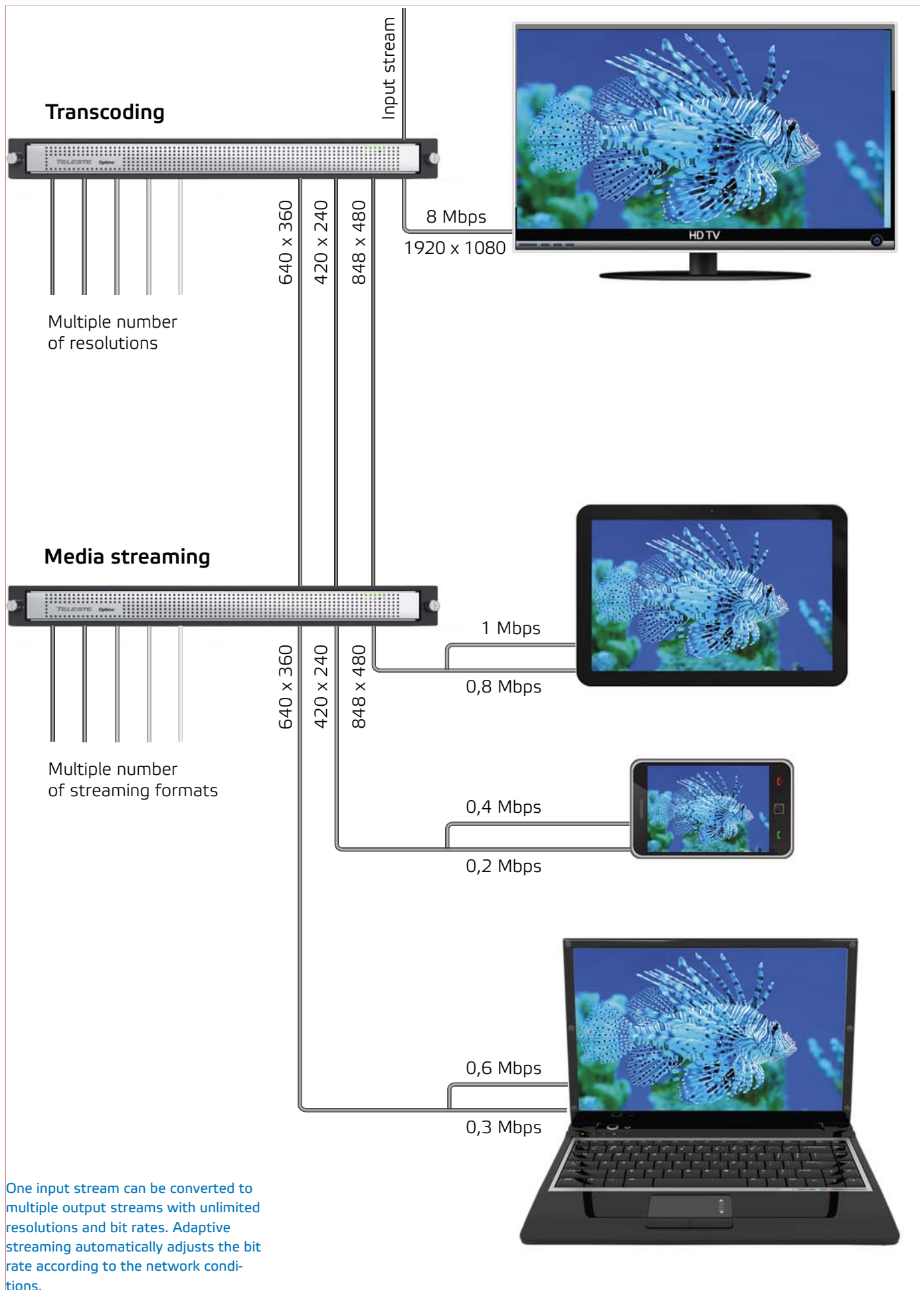
The consumption of TV services is increasing and rapidly spreading across a variety of connected, video-enabled consumer platforms, such as smartphones, tablet computers, PC's, gaming consoles, connected TVs and more. A digital lifestyle increases the need to access entertainment and news in broadcast-quality; this cannot be compromised. The novel ways to access TV and video services set new requirements for a service provider.

The Teleste Optimo, which supports for any type of resolution video transcoding and codec audio transcoding, fits the bill by offering users the highest quality experience available. Adaptive streaming guarantees that viewers will enjoy uncompromised video quality, even in cases involving sudden changes in the network throughput. Uniquely, all the resolutions required for the multi-screen service are available at the same time from a single platform. It gives operators unprecedented amounts of scalability, flexibility and reliability and it is future-proofed to provide advanced video services for current and next-generation consumer devices.

### **No compromises in quality or quantity**

Most consumers today expect a high degree of choice and quality in video. Pay TV providers have long offered extensive channel line-ups; in recent years, they have added high-definition (HD) programming to their linear and on-demand offerings. Large TV screens at home and smaller mobile screens are becoming increasingly common and setting new requirements for video quality.

Quality and quantity may seem contradictory in terms of network capacity, but the limits can be extended. The Teleste Optimo's pre-filters enable the most immersive image environment possible across a wide range of video display devices. Part of a multi-screen, multi-codec solution, these filters sharpen images, remove noise, enhance face detection, reduce the appearance of macroblock artefacts and manage contrast. In short, they reduce random signals and preserve and enhance important visual details.



# Teleste Optimo image enhancement filters

## Detail correction

This application features two filters working in tandem to sharpen images: one enhances the longer edges of an image; the other works on small interior details. These filters can be distinguished from other via "edge enhancement" algorithms, which tend to add haloing or ringing around large silhouettes.

## Contrast management

This filter creates more image contrast by stretching mid-greys, i.e. by using the luma (brightness) range of display devices better. Objects produced without much contrast can become drab and lack separation. This technique expands the source to make better use of the luma range as limited by the ITU's standard HDTV format (Rec. 709). Of all the filters, contrast management provides the most perceptual improvement in image quality.

## Mosquito noise reduction

Additional ringing around the edges of images, such as those of logos, is a natural artefact of quantization and MPEG compression in some low-data-rate streams, such as 3:1 multiplexes that require considerable compression. This filter removes the ringing noise or halos.

## Three-dimensional noise reduction (3DNR)

So-called because it works temporally but combines spatial and motion-compensation, 3DNR removes noise and smoothes fine details. Combined with detail correction, it can aid compression and viewing, particularly on smaller screens such as tablets and mobile phones, where viewers benefit from the enhancement of perceptually significant details.

## Face detection

Given that the human eye perceives faces very well compared to other objects, this filter is combined with an encoder option that allows blocks in a targeted region to be compressed with a lower encode quantizer value (i.e. with higher quality).

## (Pre) De-blocking

Unlike older MPEG standards, H.264 includes an in-band de-blocker as a standard feature to smooth the sharp edges that can form between macroblocks. The Teleste Optimo uses a de-blocker to enable such functionality before applying the standard. This additional filter is especially applicable in cases where source material, for instance from the Internet, is highly compressed and of poor quality.

## Motion compensated temporal filter (MCTF)

This filter removes film grain, the random optical texture that is a by-product of photographic film processing and thus alien to native digital video. For Blu-ray re-release, some studios sharpen films to eliminate this noise. This filter enables that choice. Other content and service providers prefer to keep the grainy artefact.

## The unified platform does it all

Density and multi-functionality in headend equipment often equals efficiency and cost savings. The advantage of low power consumption is multiplied by reduced cooling needs and is reflected in an increased product lifetime and a decreased risk of faults. Not to mention, it offers savings in rack space and cabling and allows for easier maintenance. All of this benefits the service provider.

The Teleste Optimo is a single unified platform for a wide array of advanced video processing applications. Statistical multiplexing and rate-clamping, multi-codec transcoding, real-time and off-line file processing, multi-rate, multi-resolution, multi-screen stream adaptation, IP aggregation, 3D stream synchronization and processing, and other software applications can all be loaded onto the same unified hardware infrastructure. The one RU server supports up to 8 HD channels or 32 SD channels. And because the platform is pure IP/Linux, it is unparalleled in its configuration flexibility and simplified system maintenance.

## Easy to operate, yet provides full access to details

There are various parameters for adjusting the operation and fine-tuning the functionalities of professional equipment. Often, this involves a trade-off between usability and access to details. A simple user interface may lack the possibility for making detail-level adjustments, while a user interface that presents all the details can be complex and require high-level technical expertise on the part of the operating personnel.

The Teleste Optimo strives to combine first-class usability and detailed adjustments. The user interface has intuitive parameters with default profiles that moderate the need for technical expertise. However, an advanced operator will have the option to bypass the default values and fine-tune the details as he pleases. The entire solution can be managed centrally as one solution entity, or else the management can be handled via the web-user interfaces of individual devices.

## Flexibility for your benefit

Varying needs demand different solutions. Saving bandwidth or downscaling HD content to SD require efficient transcoding, whereas OTT and multi-screen services demand fragmenting and streaming. Depending on the needs of the user, systems attempt to cover both transcoding and OTT or just transcoding. Furthermore, it is not uncommon that some system components exist already –and no-one needs duplicates.

From a system point-of-view, the Teleste Optimo offers unparalleled flexibility because the product's architecture allows for separate transcoding and OTT servers. The transcoding server can be complemented with the OTT server when multi-screen delivery is needed. This enables the Teleste Optimo to fit the needs of individual IPTV and cable TV operator in a cost-effective manner; it can also be integrated with any content delivery network (CDN) already having existing streaming servers.

## The best of hardware and software

When it comes to video processing, hardware-based solutions are usually first class in terms of efficiency and powerfulness, but they lack flexibility. They are optimal when harnessed to perform tightly defined operations, which makes them perfect for specialised tasks. Software-based solutions are, in contrast to hardware-based solutions, flexible and can be adapted quickly to suit varying demands, but they cannot reach the same level of performance as hardware – not in a competitive manner anyway.

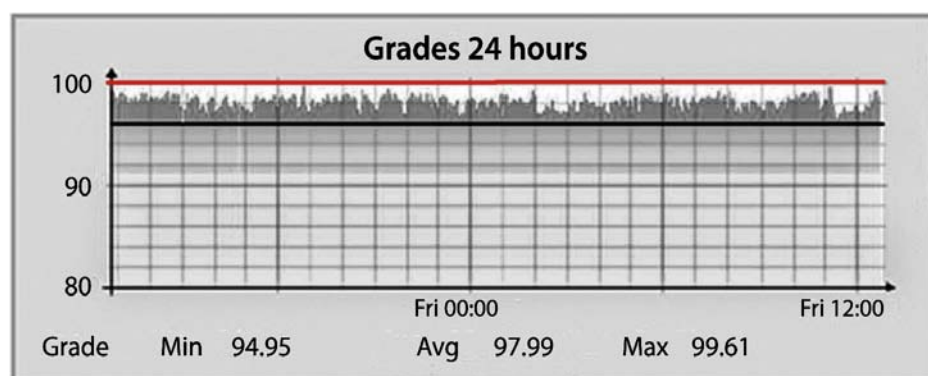
Until now, service providers have been limited to choosing between hardware- or software-based solutions. This has now changed, because the Teleste Optimo brings together the best of both approaches, thereby forming a unique solution offering. Operations requiring a high-processing capacity – like real-time transcoding – are performed by hardware, while software performs less heavy operations – like down-scaling to any resolution. The Teleste Optimo delivers high performance and flexibility and can be quickly and easily upgraded to support future capabilities and requirements.

## Be proactive with quality assurance

Signals received at the video headend can be corrupted in their transmission from the broadcaster and/or programmer. These errors can appear as a discoloration of a macroblock, as a “tear” in the video frame or as stuttering due to lost frames. These quality issues can greatly affect a subscriber’s service experience and should be proactively addressed and corrected before they reach the subscriber.

The Teleste Optimo leverages its unique architecture to repair corrupted input blocks, slices or frames by borrowing or interpolating the profile of the corrupted or missing data from surrounding information. Data from spatially (within the frame) or temporally (between frames) adjacent images are used to repair the corruption, such that the output video has a higher QoE than the input video.

The Teleste Optimo provides operators with a tool to establish a high level of quality for their video services and to maintain and monitor that quality level with regular and detailed quality of experience analysis. It includes highly granular, actionable details about stream health such as corrupted blocks, packets and frames. In addition to these transport stream level details, the quality of each compressed frame is measured and the scores are aggregated into an automatically generated HTML or Excel report template.



All quality grades above the operator-defined threshold over a 24-hour period.



Teleste Optimo combines the best of hardware and software.

## Technical specifications

<p>Video processing:</p> <p><b>ICE Illustrate™ Pixel Processing*</b></p> <p><i>Optional ICE Broadcast System feature</i></p>	<p>Split-screen evaluation mode</p> <p>Sharpness and texture correction</p> <p>Adaptive contrast correction</p> <p>Pixel-accurate, motion-adaptive de-interlacing</p> <p>Face and feature detection</p> <p>Mosquito de-noise (de-ringing)</p> <p>Spatial and Temporal de-noise</p> <p>Frame-rate conversion</p> <p>Aspect ratio correction</p>	<p>Video processing:</p> <p><b>Resolutions</b></p>	<p>MPEG-2 HD (720P, 1080i, 1080P) at full, ¾, and ½ resolutions</p> <p>MPEG-2 SD (576) at full, ¾, and ½ resolutions</p> <p>MPEG-2 SD (480) at full, ¾, and ½ resolutions</p> <p>MPEG-4 HD (720P, 1080i, 1080P) at full, ¾, and ½ resolutions*</p> <p>MPEG-4 SD (576) at full, ¾, and ½ resolutions*</p> <p>MPEG-4 SD (480) at full, ¾, and ½ resolutions*</p> <p>MPEG-4 Mobility: 544 x 960, 480 x 848, 352 x 640, 352 x 480*</p> <p>HD to SD down-conversion (AFD)*</p>
<p>Video processing:</p> <p><b>Encoding and transcoding</b></p>	<p>MPEG-2 High and Main Profile</p> <p>MPEG-4 AVC High, Main and Baseline Profile*</p> <p>IDR alignment across unlimited profiles</p> <p>CBR, VBR, and Capped VBR</p> <p>Frame rate reduction</p>	<p>Video processing:</p> <p><b>Image processing</b></p>	<p>De-interlacing</p> <p>Multi-pass look ahead</p> <p>Structure and feature detection</p> <p>Flash detection</p> <p>Texture detection</p> <p>Scene change detection (automatic I-frame insertion)</p> <p>Any resolution image scaling up to 1920x1080</p> <p>Aspect ratio and frame rate conversion</p>
<p>Audio processing:</p> <p><b>Encoding, transcoding and pass-through</b></p>	<p>Re-code AC-3, AAC, and HE-AAC</p> <p>Transcode from MPEG-1, Layer 2 to AC-3</p> <p>Transcode from MPEG-2, Layer 2 to AAC</p> <p>Transcode from AC-3 to AAC/HE-AAC and HE AAC V2</p> <p>Pass-through and synchronization with processed video streams</p>	<p>Audio processing:</p> <p><b>Capacity</b></p>	<p>Up to 6 audio programs per video program</p>
<p>Adaptive media streaming:</p> <p><b>HTTP streaming</b></p>	<p>Roles: Origin server or edge server</p> <p>Wrappers: Apple HLS, Microsoft Silverlight, Adobe Zeri</p>	<p>Adaptive media streaming:</p> <p><b>Fragmentation &amp; segmentation</b></p>	<p>Media chunks from 1 to 20 seconds</p> <p>1 second increments</p>
<p>Adaptive media streaming:</p> <p><b>Content protection</b></p>	<p>AES128 Encryption</p> <p>Microsoft PlayReady DRM</p>	<p>Adaptive media streaming:</p> <p><b>Capacity</b></p>	<p>Up to 6 Gigabits per second per server</p>
<p>Management:</p> <p><b>Graphical UI</b></p>	<p>Broadcast Management System</p>	<p>Management:</p> <p><b>Video quality</b></p>	<p>ICE-Q® Video Quality Measurement</p> <p>ICE VQA (Video Quality Assurance) Monitoring</p>
<p>Management: <b>SNMP</b></p>	<p>SNMP v2</p>	<p>Management: <b>Security</b></p>	<p>VCAS Encryption</p>
<p>Chassis: <b>Redundancy</b></p>	<p>Signal processing and system</p>	<p>Chassis: <b>Rack size</b></p>	<p>1 RU rack-mountable server chassis</p>
<p>Chassis:</p> <p><b>Dimensions</b></p>	<p>WxHxD</p> <p>437 x 43 x 716 mm</p>	<p>Chassis:</p> <p><b>Stream capacity</b></p>	<p>Flexible to support up to 16 HD channels or 32 SD channels per chassis</p>
<p>Chassis:</p> <p><b>Power</b></p>	<p>AC power only</p> <p>Swappable power module</p> <p>75W per HD, 20W per SD</p>	<p>Chassis:</p> <p><b>Network interface</b></p>	<p>Dual-Port Gigabit Ethernet Controller and input/output interfaces</p> <p>Additional NIC with Dual Port Gigabit Ethernet Controller</p>
<p>Chassis:</p> <p><b>Certifications</b></p>	<p>FCC (U.S. only) Class A</p> <p>ICES (Canada) Class A</p> <p>CE Mark</p> <p>CAN/CSA C22.2 No. 60950-1</p> <p>EN 60950-1, IEC 60950-1</p>	<p>Data services:</p> <p><b>Transcoding and pass-through</b></p>	<p>VBI, closed captioning</p> <p>DPI (multiple SCTE35 PIDs per program)</p> <p>ETV (including synchronization with video streams)</p> <p>PSIP (One channel per MUX)</p> <p>SCTE-127 pass-through</p> <p>DTMF detection and SCTE-35 insertion</p>
<p><b>Environmental</b></p>	<p>Operating temperature 10° C to 35° C</p> <p>Storage temperature -40° C to 70° C</p> <p>Operating relative humidity (non-condensing twmax=28C) 8% to 90% non-condensing</p> <p>Storage relative humidity 5% to 95% non-condensing</p> <p>Operating vibration 0.25 Grms at 5Hz to 200Hz for 15 mins/axis</p> <p>Storage vibration 0.98 Grms at 5 to 200 Hz for 30 mins/axis</p> <p>Operating shock 2.5 ms duration, 20G, half-sine, 1 shock/side</p> <p>Storage shock 10 ms duration, 20G, square wave, 1 shock/side</p>	<p><b>Transports</b></p>	<p>Input from IP network:</p> <p>MPEG2-TS/UDP/IP, MPTS and SPTS, CBR or VBR, Input stream redundancy to support main and backup source</p> <p>Output streaming to IP network:</p> <p>MPEG2-TS/UDP/IP, MPTS and SPTS, CBR, Duplicate streaming to enable redundant system</p> <p>Input for encoding:</p> <p>SDI and HD-SDI according to SMPTE259M, SMPTE344M, SMPTE292M, SMPTE424M</p>

\* Requires HW Acceleration Card

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