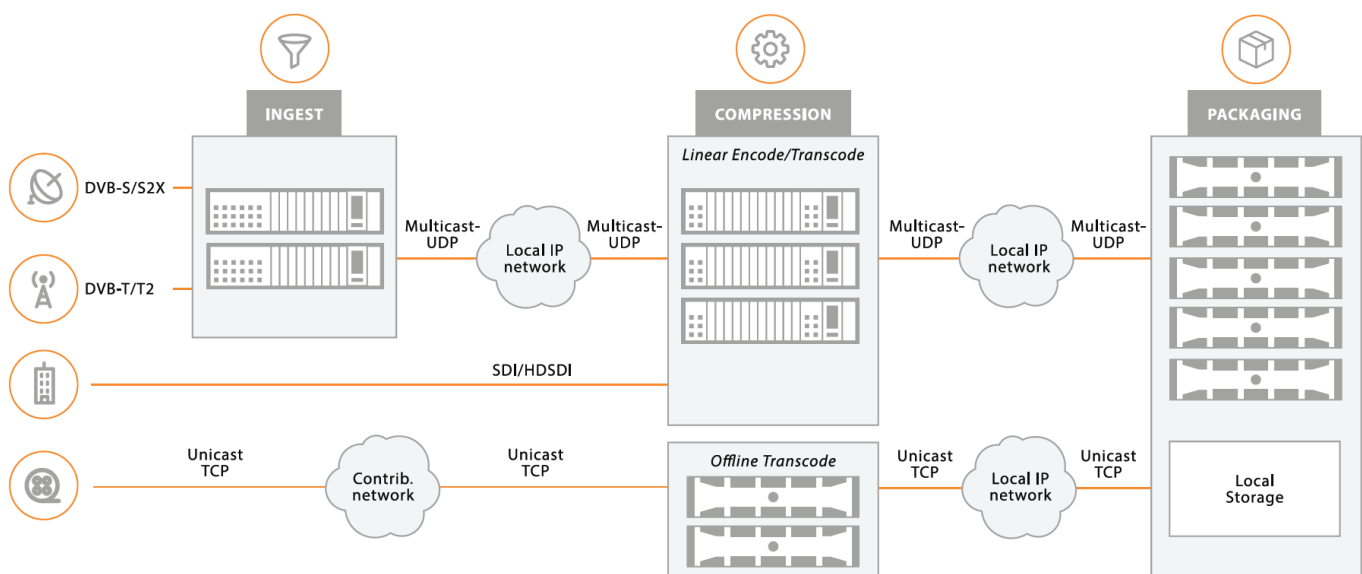# Appear *tv*

ADAPTIVE BITRATE SERVER

THE APPEAR TV LINEAR PACKAGING SOLUTION FOR OTT

Traditional TV delivery is no longer enough for broadcasters, customers want access to content everywhere. Over-the-top (OTT) delivery provides a solution to this by allowing content to be distributed over unmanaged IP networks to all kinds of viewing devices. This type of delivery presents new challenges as unmanaged networks are not necessarily capable of predictably transmitting high quality video. Typical users on a shared network can do any task from watching videos, video conferencing, reading mails, downloading files to playing games. Available bandwidth in shared network environments will therefore vary with time as it is driven by user behaviour.

Adaptive bitrate (ABR) streaming solves this issue by adapting to changing network conditions dynamically. In essence, ABR provides variable video quality depending on available bandwidth. If bandwidth is reduced, video quality is reduced without the customer experiencing constant buffering issues and interrupted transmissions.

Appear TV offers an extensive portfolio of OTT solutions, with the ability to support hybrid broadcast delivery from the same equipment. The OTT product portfolio can be divided into three stages with each stage using industry standard interfaces to maintain multi-vendor interoperability throughout. The three stages are Ingest, Compression and Packaging.

*System overview of live delivery chain.*

APPEAR TV'S EXTENSIVE PORTFOLIO OFFERS EVERYTHING NEEDED TO DELIVER OTT (AND HYBRID BROADCAST) TV

Appear TV implements the **Ingest** (content acquisition from multiple sources, descrambling, stream processing) and *linear compression* stages in hardware as a fully modular appliance. This delivers highly space and power efficient solutions offering full redundancy, the highest standards of performance and exceptionally high reliability. For more information on ingest and compression, please refer to the XC5000/XC5100 datasheet.

The Appear TV ABR system is a modular software solution providing a powerful video segmentation engine, high-performance storage solution, just-in-time packager/DRM engine, origin server and optional offline encoding/transcoding in one complete suite. The ABR system runs on industry standard off-the-shelf server hardware and can be customised to meet the operators´ specific streaming requirements. With its innovative architecture, our ABR Server allows for seamless growth and scalable redundancy – both through vertical brick-by-brick scaling and horizontal functional separation.

The ABR *packaging* server supports a variety of different deployment architectures, including edge deployments without CDN support. It is encoding vendor agnostic and its strict standards compliance allows for easy integration with third-party encoders.
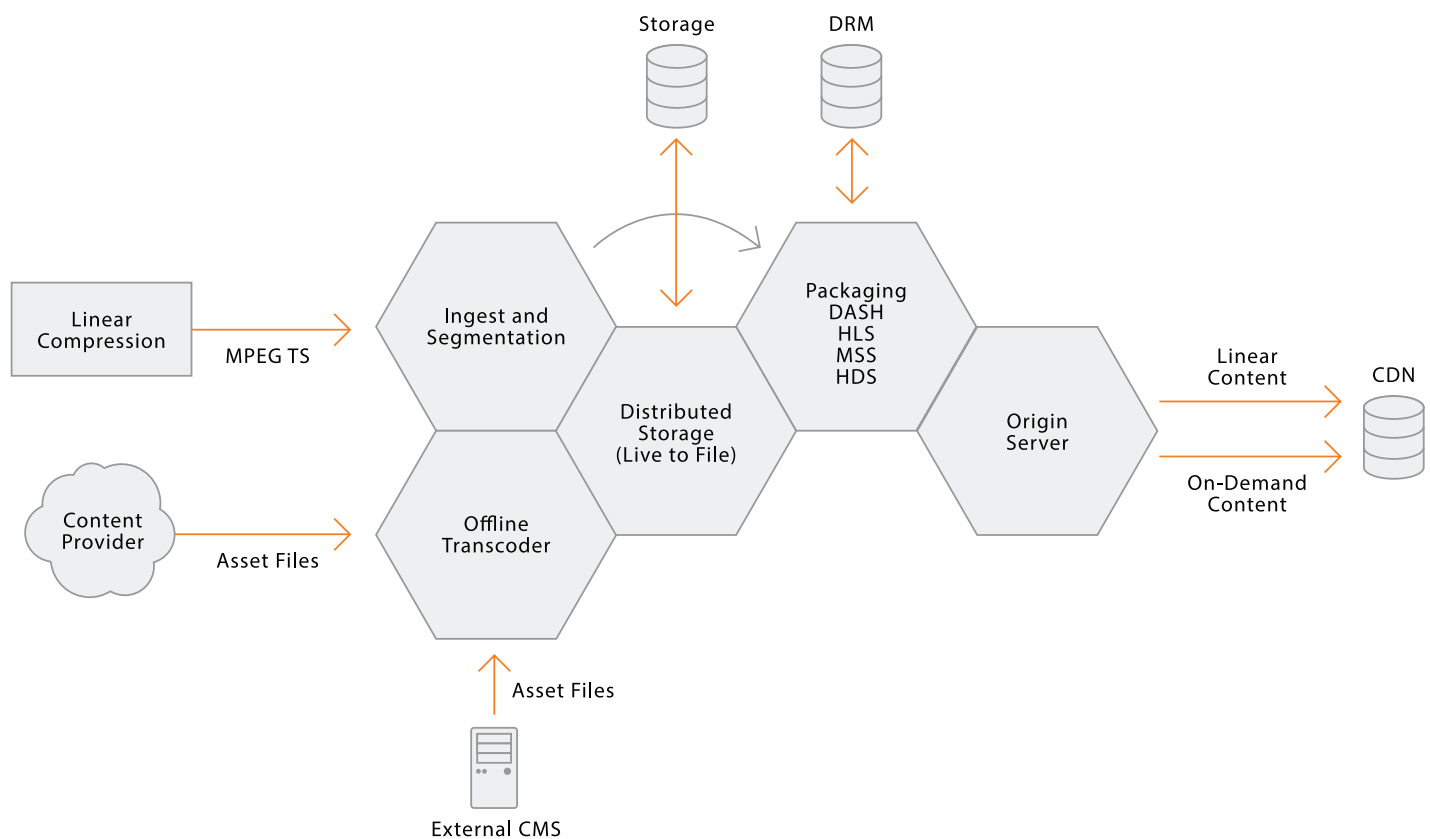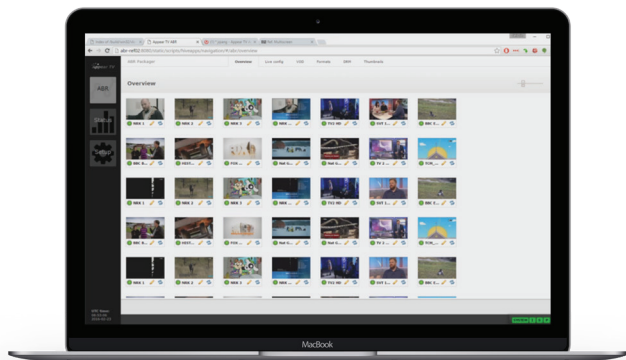
Components that make up the Appear TV delivery solution.

THE ABR PACKAGING SOLUTION FOR DELIVERING LIVE, CATCH-UP AND ON-DEMAND TV

The modular software elements forming the ABR software suite are designed to work together and scale precisely as required. The ingest and segmentation module accepts DVB compliant MPEG transport streams for splicing into chunks of pre-determined duration around IDR or alternative markers. The chunked files are passed to the linear packaging stage, and can be stored internally or externally for catch-up or time-shift using the 'live to file' module. The linear packager module will adapt the generic chunks generated by the ingest and segmentation module to the requested output format (MPEG DASH, HLS, Microsoft MSS and CMAF) including applying DRM to protect the content. The ABR software suite is integrated with major DRM solutions. The packaged content is temporarily stored in the origin and copied to users requesting the same content within the stored timeframe, thus eliminating the need for packaging the same content repeatedly to the same format within a set timeframe.
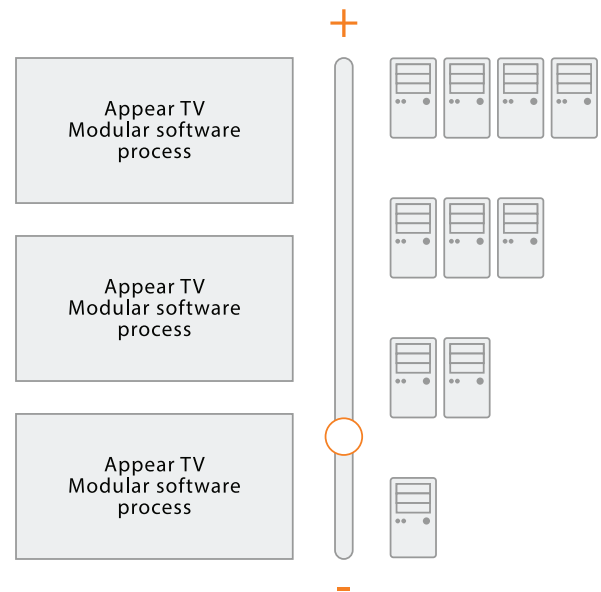
The Appear TV solution scales to meet all needs.

APPEAR TV PACKAGER COMPONENTS ARE SEAMLESSLY SCALED BY ADDING HARDWARE AS REQUIRED

The ABR system is flexible and easily scaled to remove bottlenecks. This is possible because Appear TV has implemented the packager using high performance clustering technology, using a common hardware pool to achieve system redundancy and scalability. This design also makes the solution perfect for implementation within a cloud or virtualized environment.

Thumbnails gives accurate overview of system state.

Ease of use always features as a key priority in Appear TV solutions, and the packager is no exception. Intuitive and clear interfaces with individual service monitoring to keep you informed of status makes it easy to operate. The packager even features a 'Stream auto-interrogation' function enabling it to interrogate any Appear TV compression equipment that might be present to learn the streaming status directly, saving time and effort during configuration.

OTT delivery technology is rapidly changing and Appear TV is fully committed to follow changes in requirements. This 'new from the ground up' approach provides a scalable solution customers can grow with as their OTT streaming demands change. OTT is the future of television and via advertising or subscription models it is capable of delivering the most feature rich and monetised services in television today. The growing penetration of consumer devices with large-screen, high-resolution displays (including connected TV sets), the consumer preference to download rather than purchase content on disc media and the need to offer true broadcast grade services to all devices are driving a step change in OTT opportunities and the technology required to deliver it successfully. Investing in Appear TV packaging will place state of the art technology at the heart of your system and will provide the ideal platform to secure your position in this next chapter of OTT.

OFFLINE MANAGEMENT SYSTEM

The Offline Management System (OMS) software optimizes file-to-file compression resources and enables simple ingest of assets into the Appear TV ABR system. It is a comprehensive tool which allows users to leverage cutting edge encoding technology using our flexible plug-in architecture. Its initial release supports x264 and x265, but it can easily be integrated with any third party vendor or technology such as VP9 and VC1.

The product offers a user-friendly web interface that enables quick and intuitive setup of even complex tasks. The system has a strong operational focus with re-usable profiles for delivery destinations, resource allocation and settings. Compression jobs can be one-offs, recurring using folder watches or completely automated using our extensive and powerful APIs. These APIs are tailored to be easily integrated into any workflow system. The system can perform quality checks before and after a task has been run to ensure that the asset conforms to the original source, dispatching notifications when anomalies are detected.

Encoding operations can be performed on local hardware and/or provisioned on cloud computers such as Amazon Web Services. Cloud operations are intelligently managed using an efficient on-demand algorithm to ensure peak demand is handled at the lowest cost. The hybrid approach of local hardware and on-demand cloud resourcing enables the optimal balance of capital and operational expenses to be reached for scenarios with varying workloads.
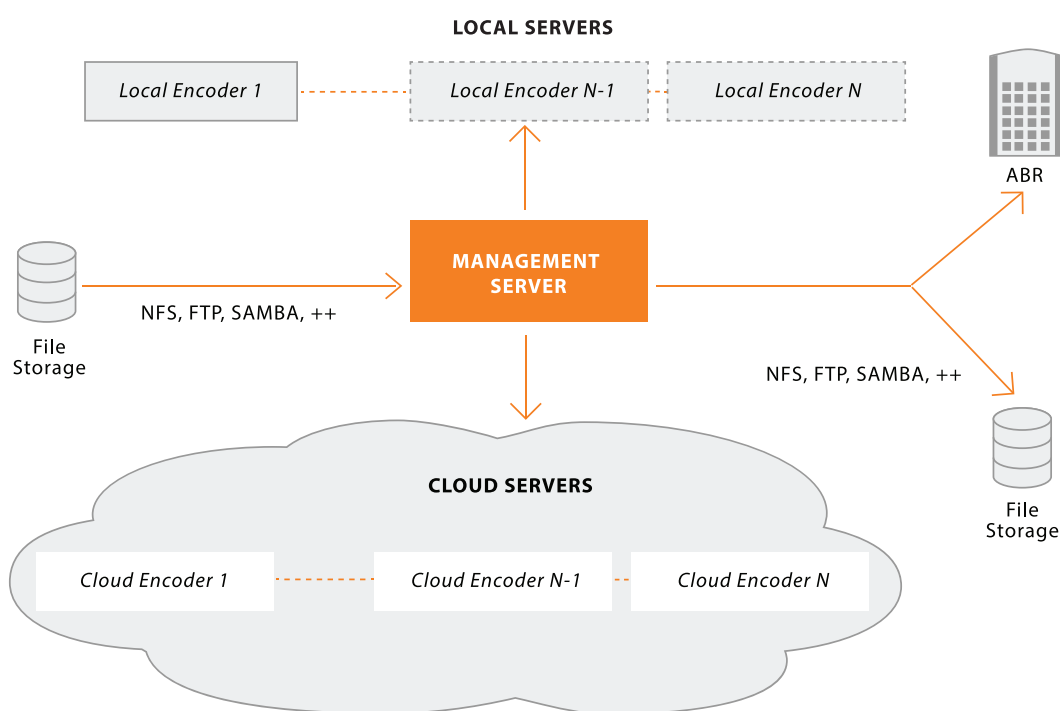
OMS provides a hybrid approach to optimise resources.

SPECIFICATIONS

Services	Multiscreen streaming	: Live HTTP streaming : Time-shift : Start over : VOD : nPVR : Archiving from live to VOD : On-demand content ingest : SCTE35 tagging for Dynamic Ad Insertion
Functionality	Live ingest	: Unicast/multicast TS : RTMP
	File ingest	: MP4 contained video (H.264) to NFS

	Storage	: Both internal and external storage support
		  Appear Media Storage (AMS)
		  Amazon S3
		  NFS3/4

	HTTP adaptive bit-rate streaming	: Just-in-time packaging
		  DASH
		  HLS (version 3 and up)
		  MSS
		  CMAF

	Content protection	: Media encryption schemes
		  Common Encryption support (CTR/CBC)
		  Apple Fairplay
		  Microsoft Playready
		  Google Widevine
		  Fixed key with rotating key support
		: DRM systems
		  Castlabs DRMtoday
		  Nagra Conax
		  KeyOS BuyDRM
		  Microsoft Azure
		  Verimatrix VCAS

Formats	Video	: MPEG-4 (H.264) and HEVC (H.265)

	Audio	: AAC-LC, HE-AAC v1/2
		: Multiple audio bit-rate support
		  HLSv3 audio/video bitrate mapping supported
		  Unlimited number of audio streams per video stream

	Default audio selection (HLSv3)	: Yes, priority list per service

Processing	Live/Catch-Up buffer	: Configurable per service, defined by available storage
		  Continuous timeline
		  External storage support through AMS and S3

	Manifest manipulation	: Sophisticated control : Video and audio bitrate filtering : Audio only playlists : Audio multiplexing control (HLSv3) : UTC based manifest clipping
	CDN integration features	: Origin caching : Access whitelists : Dynamic health check URL : URL prefixing to assist in geo-blocking

Storage	Appear Media Storage	: On-server storage solution for catch-up and start over
		High performance
		Tuneable for SSD and HDD
		Replica- based redundancy
		Tiered archiving support
		Zero-impact maintenance thru read/write prioritization
Monitoring and alarms		: Timeline and thumbnail view in UI
		: Comprehensive Prometheus monitoring export
		: HTTP status APIs
		: Log-aggregation and -forwarding, suitable for ELK
Scaling/Redundancy	Server configuration	: Clustered
	Data protection	: Data replication on different servers.
		Configurable replication factor (3+)
	Ingest redundancy	: Synchronized ingest on multiple servers
	Load distribution	: All servers provide access to same content
	Upgrades	: Zero downtime upgrades
		One server at a time
		Full roll-back support
Performance	Throughput per server	: Typically 2.5-3 Gbit/s (no cache) *
	Number of live ingest channels per server	: Typically up to 100 services or 1 Gbit/s *
Server/Storage HW	Server and storage requirements will vary based on requirements (number of ingest channels, bit-rate per service, number of users, is CDN used or not, duration on time-shift etc.) Please contact us for recommended server configurations.	

* Exact performance will depend on server HW configuration

PlanetComm:

APPEAR TV AS

VERSION 2.0

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