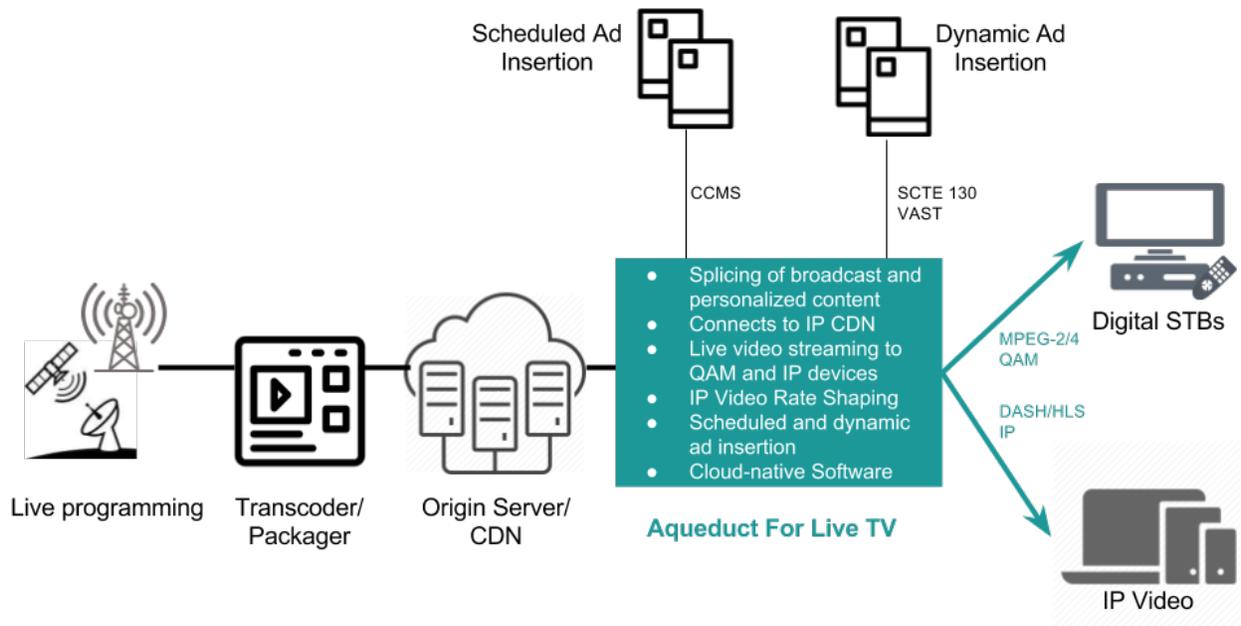


# Aqueduct™ for Live TV

## All-Software Live TV Delivery Solution with Ad Insertion

### Solution Overview

Aqueduct for Live TV is a software solution for video service providers that functionally replaces the ad splicers, ad servers, rate-shapers and re-multiplexers currently used for live TV services today. Operators can replace legacy hardware with Petrichor’s cloud-native software and immediately reclaim large quantities of power, operations budget, and rack space. Aqueduct for Live TV also enables new monetization models such as scheduled ad insertion into broadband streams, and dynamic spot ad insertion into linear broadcast streams.



*Aqueduct for Live TV Solution Workflow*

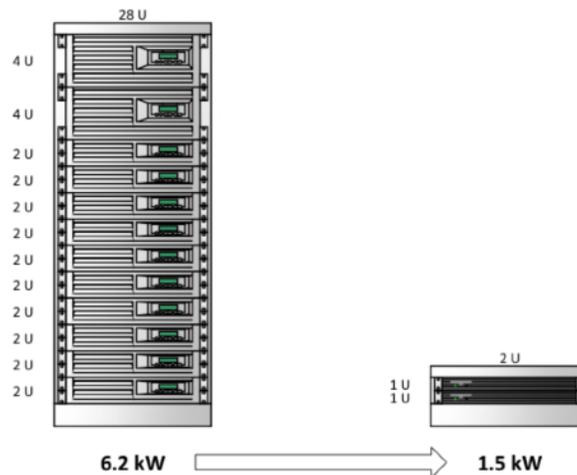
## Solution Description

Aqueduct for Live TV incorporates a highly scalable software based video streaming engine that leverages decades of video algorithm expertise to deliver unprecedented streaming video fidelity. Cloud-native and highly portable, the software is designed to be easily deployed on standard datacenter compute nodes. Petrichor software provides game-changing scalability, with up to 10 Gbps of video processing capability per rack unit. Aqueduct for Live TV can also leverage a provider’s IP Content Delivery Network (CDN) as the source for ALL programming and advertising. This means that the same content can be provided to both legacy STBs and IP devices from a single, unified video workflow. Aqueduct for Live TV additionally provides smart streaming of the content over the operator’s network to enforce a baseline quality of experience (QoE) for all consumers.

Aqueduct for Live TV also includes a highly scalable monetization API, supporting well known business protocols in use today. Rather than integrating into a proprietary advertising environment, an integrated Ad Insertion Manager interfaces to all current traffic and billing systems using the industry de facto CCMS protocol, as well as newer dynamic ad insertion systems using the SCTE 130 or VAST protocols. Aqueduct for Live TV can be operated as a backwards-compatible replacement for existing video equipment, or it can be positioned as a platform for advanced advertising solutions, or both.

Legacy system: 1 ad server and 5 proprietary hardware splicers running in redundant 6+6 configuration

Petrichor software running on standard server in 1+1 configuration



**Rack space/power comparison: 600 channel zoned ad insertion solution, with traditional equipment, and with Petrichor Aqueduct software**

## Key Applications and Benefits

### Scheduled Ad Insertion - Reclaim rack space and power

Aqueduct for Live TV can function as a drop-in replacement for broadcast ad insertion solutions in place today. The solution supports standard video control interfaces. Aqueduct for Live TV is especially powerful in zoned ad insertion schemes, which require dozens or hundreds of channels of stream replication, splicing and video processing. When deploying Aqueduct for Live TV operators can retire legacy hardware and recover large quantities of power, budget and rack space.

### Dynamic Ad Insertion - New monetization models

Aqueduct for Live TV also supports dynamic ad insertion interfaces such as VAST 3.0 and SCTE 130. Dynamic ad insertion allows the operator to explore new tools and models for video monetization, such as targeted and addressable advertising. The solution supports hybrid configurations supporting both scheduled and dynamic interfaces simultaneously, enabling new monetization opportunities and unprecedented flexibility in ad inventory management.

### Unified Video IP Management - Eliminate duplicated resources

Aqueduct for Live TV supports the splicing of live content prepared using HTTP-based content packaging (e.g. HLS, MPEG-DASH), the same packaging used for video delivery to IP devices. Aqueduct for Live TV also supports the output of content using legacy real-time streaming interfaces. This allows an operator to re-use the workflow and infrastructure (origin servers, transcoders, packagers, and CDNs) invested in video delivery to IP devices (e.g. tablets, smartphones, PCs) and unify and manage content delivery to all devices from a single platform.

### Cloud-Based Video Operations - Run a lean ops group

Aqueduct for Live TV was specifically designed for video service providers who prioritize operations considerations and management at scale. Pre-integrated with the leading platforms for cloud computing (e.g. VMWare, OpenStack), Aqueduct for Live TV seamlessly enables dynamic capacity expansion, configuration verification and monitoring, subsystem templating, as well as software upgrades and rollbacks. New services and instances can be deployed in minutes as opposed to weeks.

### Analytics - Know what's going on

Data analytics generation is incorporated as a core feature to provide performance transparency and tuning. Aqueduct for Live TV analytics is designed to be federated with a data science system of the service provider's choosing. Data is transformed into information to improve operations and guide future business planning.

## Key Features

Feature	Description
Video Formats Supported	MPEG-2, H.264, HEVC and Ultra High Definition/High Dynamic Range
Transport/Packaging Supported	UDP/IP, HTTP Live Streaming (HLS), MPEG Dynamic Adaptive Streaming over HTTP (MPEG-DASH) packaging
Video Streaming Throughput	Up to 10 Gbps per rack unit
Client Devices Supported	All in-service QAM set top boxes and all popular IP video devices
Ad Insertion Support	Scheduled (CCMS) and dynamic (SCTE-130, VAST) ad insertion business APIs for all video streams
Data Analytics & Monitoring	Pre-instrumented for Splunk & ELK Stack
DOCSIS & QAM Modulator Support	DOCSIS 2.0,3.0, 3.1, Converged Cable Access Platform, Remote Phy & Legacy QAM
Alternate Content/Blackout Support	CableLabs®-compliant event signaling and management (ESAM)
Cloud OS Support	VMWare, CloudStack, OpenStack, Kubernetes, others on request

## About Petrichor Networks

Petrichor Networks, a privately held company based in Boulder, Colorado, was founded by a team of proven digital video and cable industry experts and veterans to bring new video solutions to service providers using cloud-native software technology. We've leveraged our Technical Emmy-winning experience in the architecture and design of broadcast video, on demand video and switched digital video to re-imagine new software-based video workflows that consolidate video operations for service providers, expand and open new business opportunities, and assure the highest quality video consumption experiences for consumers.