Solution Description for Aquila Perpetual Products (Aquila Streaming v4.0 Aquila Broadcast v4.0)

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Rev B

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1 Introduction

This document presents the Solution Description for the Perpetual Product, Aquila Streaming and Aquila Broadcast.

This document covers the global architecture, the main capabilities of the solution and its deployment.

2 High Level Solution

The Aquila solution for streaming and broadcast assembles multiple components to offer end to end media processing and delivery. Each component provides a part of the processing chain. The diagrams below describe the example systems used to deliver OTT and Broadcast.

Today, Aquila Perpetual can only be offered for units deployed as standalone servers, each with their own separate Controller interface. nCompass Control can be purchased separately in order to provide a system wide control and monitoring option. Support for Aquila Perpetual with shared Controller will be made available in 2022.

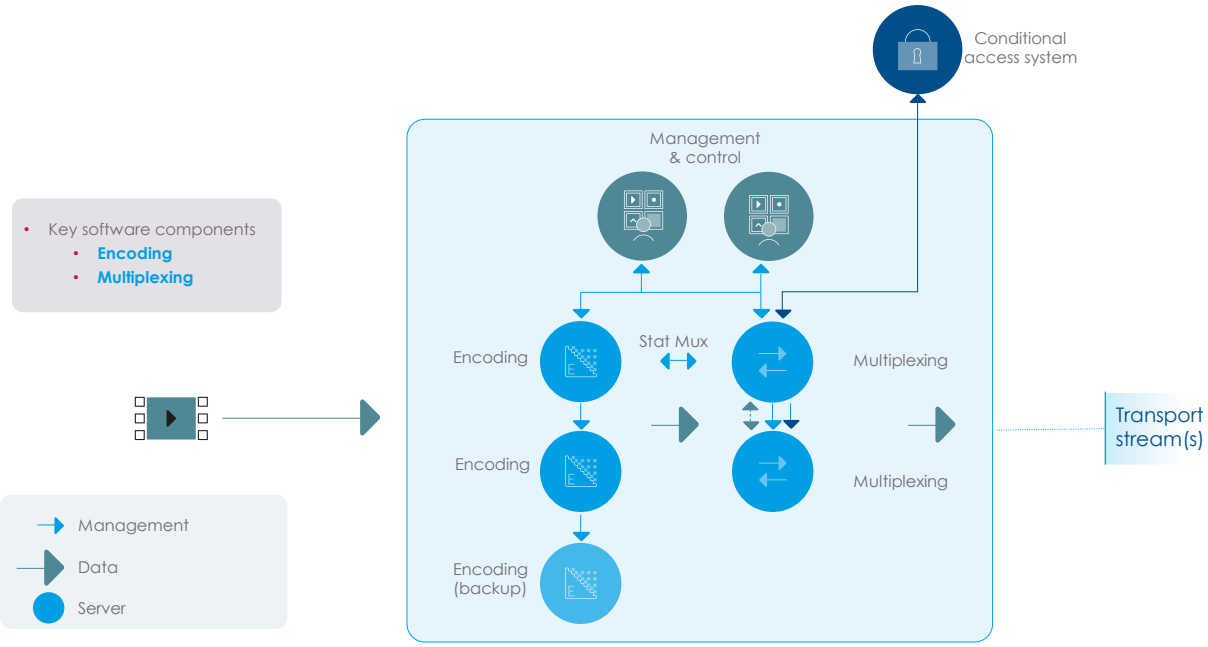


Figure 1 - Aquila Broadcast Headend

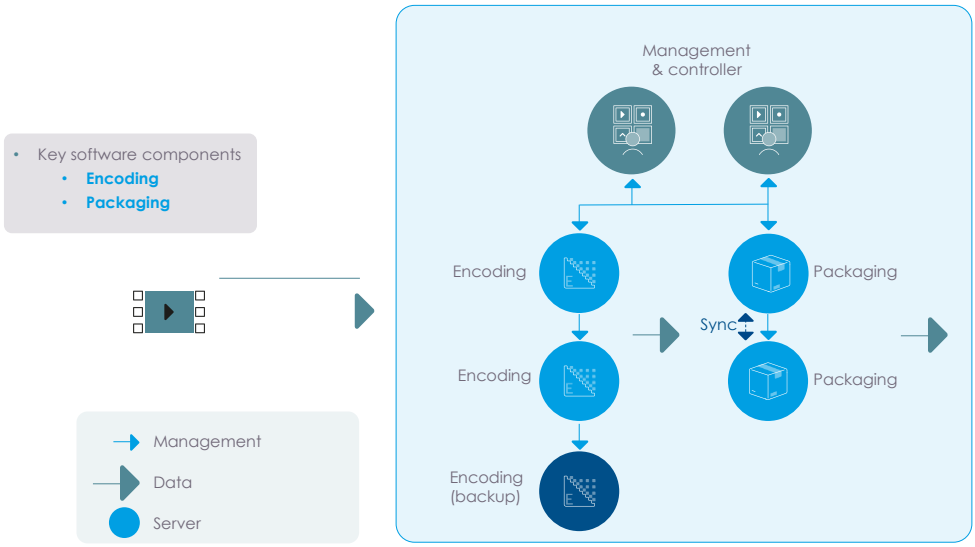


Figure 2 - Aquila Streaming (OTT) Headend

The solutions can be considered to have different layers:

- **The management layer**: Addresses configuration and control, deployment/orchestration of the applications and monitoring of the headend in a centralized way.
- **The processing layer**: Processing applications (i.e. encoding, packaging, multiplexing, licensing).
- Components make use of separate servers for each type of functionality.

Licensing management will usually be deployed on each of the processing nodes.

3 Layers & Components

Each layer comprises multiple components as described below.

3.1 Components

The Mediakind Broadcast and Streaming solution uses the following components:

- Control and monitoring
- Multiplexing and processing
- Encoding
- Packaging

Further Information can be found on the datasheets available via the MediaKind website.

3.2 Management Layer

The management layer is the control/command of the whole headend. This is the single-entry point to access all functions of the headend. This interface (UI & API) is designed to:

- Deploy all the applications on the nodes which are part of the system
- Configure the different services and store the data
- Control services (start, stop, failover, server assignation)
- Aggregate the logs and metrics from all nodes and applications
- Provide licenses to all applications

To provide all these features, the management layer includes the controller, and deployment toolkit. nCompass control can be purchased separately to offer further control options in some circumstances.

To avoid any impact in case of fault in the management layer, it is designed to be high availability. The recommendation is to deploy three instances of this management node to replicate the critical component and avoid any downtime.

Customers using nCompass control on top of this solution should refer to separate recommendations for high availability.

3.2.1 Configuration, Control and Monitoring

Aquila Streaming and Aquila Broadcast benefit from a single entry-point for all operations. The Controller application is the centralized point to configure and command the video headend. It is also possible to layer nCompass Control on top of this solution as an alternative method to control, configure and monitor. Consult separate recommendations for nCompass control usage.

The Management Controller is built upon the following principles:

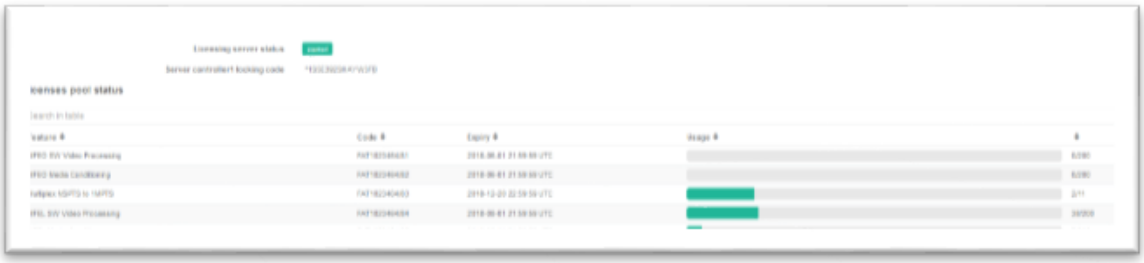
- **Centralized configuration, control and monitoring** for Mediakind SW components that provides an immediate overview of an entire head-end system
- A **service driven approach** for configuration, control and monitoring providing an optimized granularity compared to device level
- A **flexible** service allocation: selection of the resource, combined with a floating licensing model
- A solution that allows production teams to leverage preparation activities in the lab, and during pre-production using **template** mechanisms
- A **micro-services design** matching different deployment patterns, from a single stand-alone node to a distributed and redundant configuration
- A **Web UI** applicable for all supported products, with embedded help solutions aiming at reducing training investment. Note: Access via **REST API** is also provided to offer network integration capabilities.
- A **north bound interface** for integration with any system already in place. This can be done through the RESTful API but also using SNMP trap forwarding. This allows having all alarms for the headend in a central place.

The management nodes gather all the metrics and logs from the full headend to provide a global health of the system. This monitoring layer provides information on the deployed applications and the infrastructure the headend is running on.

The solution comes with built-in short-term monitoring that provides a first level of health information. Logging is also available. This part of our system uses some 3PP components to gather the logs; ElasticSearch and Fluentbit for data gathering and Kibana to display.

3.2.2 License Management

The system works with a license manager deployed on each server that holds all the rights for functionality to run on that server alone. Rights are captured upon service start. They are released when service is stopped.



It may be that in some circumstances a shared license server option will be offered.

3.3 Processing Layer

The processing layer comprises one or multiple components running on any infrastructure. To increase reliability, this layer is designed to be completely independent of the management layer. This independence ensures continuous processing even if the connection with the management layer is lost.

3.3.1 Live Encoding Application

Live Encoding application brings together 25 years of video compression experience to deliver the highest quality, any screen software applications for live video encoding and transcoding. MediaKind's continued investment and focus on the latest compression technologies ensures that the Encoding Live capabilities will efficiently deliver the best picture quality over bandwidth in all encoding environments and networks.

Live Encoding application is ideal for any real-time broadcast application, including IPTV, cable, DTH and Internet TV.

Live Encoding application is a service-oriented software solution designed to address today's key technological and operational challenges:

- Use one software headend for all video applications: DTH/Satellite, IPTV, Cable and Multiscreen
- Provide the highest video quality by leveraging the latest compression standards (MPEG-2, H.264 & HEVC)
- Optimize infrastructure costs by supporting full IP and leveraging the latest IT technologies.
- Reduce operational complexity with a service oriented centralized UI (Single point of entry)
- Deploy with confidence by leveraging MediaKind Encoding guaranteed performances and redundancy schemes

3.3.2 Packaging Application

The Packaging application is a powerful solution designed for the distribution, personalization, and monetization of multiscreen video services. You can also deploy it across your network to drastically reduce the bandwidth, storage or equipment footprint usually required to distribute video services securely to smartphones, tablets, connected TVs, game consoles, PCs or OTT Set-Top-Boxes.

Packaging application architecture is extremely modular and can scale according to your needs. It combines the following key functions:

- Stream ingest with efficient buffer and storage management
- Just in Time Packaging (JITP) and encryption with a wide variety of formats and DRMs
- Highly scalable origin server

3.3.3 Multiplexing Application

The Multiplexing application is a powerful solution designed for efficient processing and encryption of data in broadcast applications.

Multiplexing application architecture is extremely modular and can scale according to your needs. It combines the following key functions:

- Multiplexing of separate services and transport streams to create a single multi-service output
- Real time encryption of data to a variety of standards including Simulcrypt.
- Manipulation of key transport stream parameters

4 Security

4.1 Access & Security Configuration

Controller is the entry point for any action via the UI or the API unless nCompass control has been separately purchased.

It is possible and recommended to activate the HTTPS connection and to use the API in a secured way to secure the access to the system.
By default the user management is activated to access the UI.

NOTE: This user management can be connected to an LDAP service for better integration in your system.

4.2 OS Security

All the products are software products running on Linux operating systems.

To ensure the security of the solutions MediaKind deploys we are using the Nessus® vulnerability scanner tool to highlight any security breach. Based on the results, we regularly (every two months) propose “security packages” to secure the OS the MediaKind products are running on.

Each security package will upgrade some of the libraries present on the OS to ensure products are using the secured version of these. Products are tested with these security packages installed to ensure their behavior with the latest libraries.

OS should not be upgraded outside of these security packages.

5 Node-Locked Software

5.1 Non-portable Software Licensing

The Aquila software for Perpetual models is delivered “node-locked” to the MediaKind hardware it was purchased with, or in the case when customer-provided on-premises hardware is used the software will be “node-locked” to it.

As with other perpetual licenses sold by MediaKind, hardware which experiences failures will still under support may require parts replacements, and those parts replacements may require MediaKind to regenerate new node-locked licenses. The following describes how this license regeneration is managed based upon the hardware used for Aquila Streaming for Perpetual deployments.

When MediaKind hardware is sold with Aquila software for Perpetual deployments:

- If customer buys Hardware from MediaKind, or one of MediaKind’s authorized channel partners, and that Hardware is under an active Orbit support contract, then MediaKind will regenerate the node licenses as part of the MediaKind controlled hardware repair or replacement SLA.

When customer-provided on-premises hardware is used with Aquila software for Perpetual deployments, provided that the customer is actively under SLA for the Aquila software:

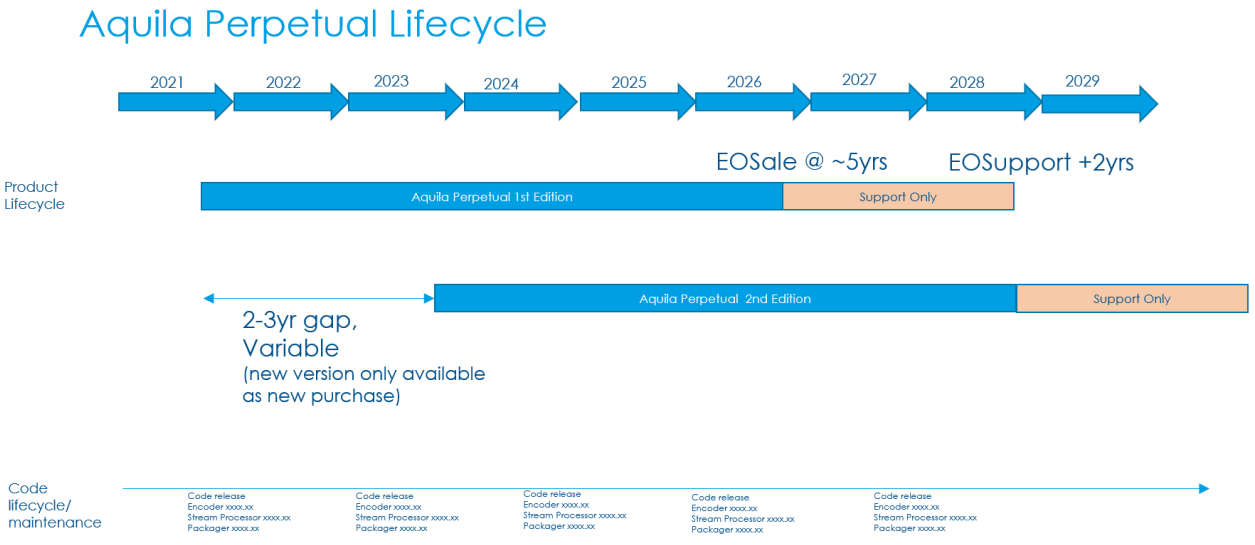
- MediaKind can regenerate a node license, but reserves the right to audit the use of the product before delivering the new node license.

6 Aquila Perpetual Life-Cycle

6.1 Aquila Perpetual Support

The Aquila software for Perpetual models does not mandate the customer to purchase support from MediaKind. However, if an Orbit support contract is purchased by the customer, they will be eligible to receive major and minor Aquila software updates. In order for support to function properly, the customer must remain within the two most recent major releases (n – 2).

6.2 Aquila Perpetual – Fixed Feature Releases

Aquila Perpetual licenses will correspond to a specific set of separately licensed features (called, a “fixed feature” set, or an “Edition”) which are outside of the regular release cycle for major and minor software releases. Customers purchasing Aquila Perpetual licenses are only eligible for the future fixed feature set they were sold in the year in which they purchased their Aquila Perpetual license. In order to obtain future fixed feature sets, the customer can either upgrade their Aquila Streaming or Broadcast channel license (via new purchase) to the new Aquila Perpetual Edition (next fixed feature set) available, or the customer can upgrade their Aquila Streaming or Broadcast channel license to an Aquila Software Subscription or SW Term-Based CAPEX license.

For a graphic representation of how the life-cycle of license purchases and fixed feature sets (Editions) operates, please see the following diagram: