

A man with short, light brown hair is seen from the back, wearing a dark green button-down shirt. He is sitting on a couch, looking at a large television. The TV displays a soccer game in progress on a green field. The room is dimly lit, with a warm lamp visible in the background to the left. The overall atmosphere is cozy and focused on the game.

WHITEPAPER

Cloud Video Platform Grant/Deny Service



The issues

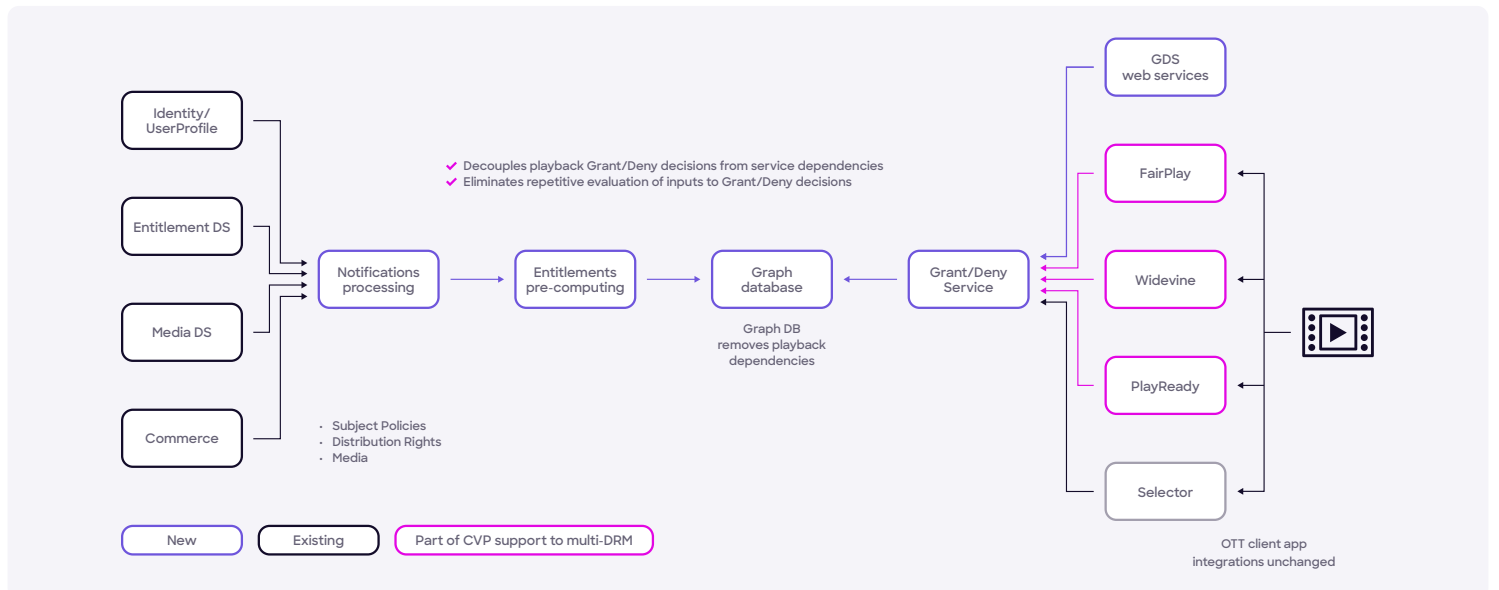
High-profile live sports streaming events are “tentpole” moments for media companies, for their large audience, popularity, and higher profitability potential. However, these big-ticket events introduce increasing technical challenges due to the rising demand for higher availability and superior quality of experience with low-latency streaming KPIs.

The solution

New technologies built on cloud infrastructure have accelerated the rate of transformation in the industry, placing more pressure on content and streaming service providers to protect content rights quickly and accurately with trusted and automated solutions. In 2024, Comcast Technology Solutions (CTS) introduced, and deployed first in the European region, Cloud Video Platform Grant/Deny Service (GDS), a new, robust, and highly resilient cloud-native precomputed entitlements system that helps reduce these challenges at any scale while benefiting the end-user experience. This evolutionary approach is linked to large “built-in” new microservices within the Cloud Video Platform (CVP).

This new precomputed entitlements system clearly links in heavily with the CVP’s entitled playback requests and Digital Rights Management systems, which provides the mechanism to enforce entitlements in on-demand (SVOD, TVOD) and live TV services.

CVP GDS solution architecture





CTS can now leverage from advanced technological evolution under the CVP, including implementation of rapid processing of event-based notifications, live TV and VOD entitlements precomputing, use of a graph database model, and the enhanced features set of the multi-DRM system (i.e., including very fast DRM key rotation). Graph databases store nodes with properties and edges between nodes and allow direct linkage between nodes for faster retrieval — instead of joining via indexes. Graph databases use pointers directly between objects and therefore release information is stored, rather than computed at retrieval time. Precomputed entitlements are stored in a database, meaning there are no playback dependencies.

Outcomes

Integrating a precomputed entitlements cloud platform has provided numerous advantages specifically tailored to the multi-screen video and over-the-top (OTT) markets. By implementing this new approach to precomputed entitlements, we are seeing fivefold faster response times to user playback requests versus the legacy system (i.e., Licensed Web Services), thereby helping to improve viewer experiences while also insulating the accuracy of user verification. Furthermore, the GDS can be scalable to the high surges in demand during high-profile live sports events or peak viewing times. This enables the CVP to dynamically scale resources to help meet requirements across regions, protecting the viewing experience and allowing for uninterrupted content consumption, even during system updates or maintenance.

The GDS stores the information that describes the end users, the protected content they can access, when they can access it, and the devices on which it can be accessed. The entitlements system also manages the individual licenses that protect the required content before end users can view it. Entitlements are at the core of subscription- and transactional-based business models, since they join content to the consumer via the unique rights each individual user has to specific pieces or groups of content. For example, you can create a subscription entitlement that is common to all users in your “bronze” tier, which maps to all entertainment content but not sports content. Subscription entitlements run for the period defined by your business logic, such as one month, before they must be renewed to avoid expiration.

Further to the GDS rollout in the production environment, we have observed the following benefits:

Higher efficiency:

Consistency in entitlements can help streamline content rights validation processes and reduce the need for manual intervention or discretionary decision-making in high-profile sports events. This can lead to greater efficiency in delivering entitlements and can reduce the likelihood of errors or delays.

Decouples playback Grant/Deny decisions

from all current workflow downstream service dependencies.

Grant/Deny decisions are made more quickly

(versus the legacy system) due to much less computation power at request time.

Eliminates the repetitive evaluation

of constructs (i.e., Subject Policy and Distribution Right match rules).

Simplifies the Grant/Deny decision

to a single service at runtime.



Stakeholder view

With a maximized monetization path of SVOD, TVOD, PPV, and live streaming events with large audiences, the new GDS simplifies and accelerates the management of entitlements as a foundation for CVP's anti-piracy services with much greater scalability and high-resiliency service-level indicator metrics. CTS' managed operations team is monitoring network performance and user engagement in real time to promptly identify and address latency issues. This proactive approach helps maintain a high QoS by quickly resolving any issues that may arise under critical importance, low-latency OTT streaming of popular high-profile live TV events. GDS helps ensure that the precomputed entitlement system complies with relevant regulations and standards, and that it maintains appropriate security measures to help protect sensitive data and prevent unauthorized access.

Building on the result

Precomputing entitlements can leverage cloud elasticity for seasonal or special high-profile events. Elasticity enables the TV system to scale resources up or down based on the seasonality of content consumption rules or special events, ensuring optimal performance without overprovisioning. The CVP can dynamically scale resources to meet the increased entitlement verification requirements. Cost-efficiency is crucial for OTT TV systems, and precomputed entitlements can optimize resource usage, potentially reducing operational costs associated with entitlement preverification.

In this context, as per our CVP roadmap items, GDS empowers CTS' future anti-piracy solutions that include a new programmable concurrency management system as well as a very fast DRM key rotation offering.

These positive outcomes are allowing CTS to identify the relevant international standards bodies in the domain of the precomputed entitlement systems, including industry-specific organizations, technical committees, or regulatory bodies.

Summary

The solution computes the relationships between the user entitlement and the content, and stores them in a graph database. As a result, GDS will call the database to check relationships between connected vertices. Consumers expect policies to be correctly enforced and service to include a fast time to first frame, and so the GDS performance heavily impacts how they experience their video playback.

- **Decrease latency and increase efficiency**
- **Scalable multi-DRM and key rotation**
- **Improved resiliency via optimized architecture**
- **Fully managed service**

The world of content rights continues to evolve with new business models, use cases, and multi-screen delivery mechanisms. The evolution of cloud-based systems continues to increase in clear visible operational benefits in terms of availability, resiliency, scalability, and latency resulting from precomputed algorithms.

[Read the full guide →](#)

Power up your platform with CTS

Built on Comcast's know-how, proven facilities, scalable platforms, and infrastructure, Comcast Technology Solutions offers more than 30 years of reliable real-world media and advertising experience. Cloud Video Platform is part of a portfolio of technology solutions that provide companies with the technology, scale, and expertise to expand and succeed in rapidly changing global media and entertainment markets.

Find out more

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