Providing Seamless, On-demand Access in Frame Data Management

Clear Channel implemented a Frame Service to homogenise frame data from multiple business units and provide seamless on-demand access, significantly enhancing operational efficiency.

US-based Clear Channel Outdoor Holdings, Inc. is a global outdoor advertising company, specialising in Out-Of-Home (OOH) advertising, which involves displaying advertisements in public spaces—primarily outdoors—where they are visible to people as they navigate through the urban environment. These advertisements are placed on various types of media, including billboards, transit locations such as subways, airport advertising, and street furniture like bus shelters and signages. Their digital offerings enable brands to utilise real-time, engaging content across high-tech screens, while their traditional formats allow for large-scale, impactful advertising on printed billboards. The company's extensive network of prime advertising locations in urban and suburban environments helps businesses reach broad and diverse audiences effectively. The company operates across several geographies, including the UK and Europe, offering a range of both digital and traditional advertising solutions. Clear Channel's media assets consist of both digital and non-digital frames. Digital frames refer

to advertisements displayed on electronic screens, where the content can be dynamic and updated in real-time. Non-digital frames, often referred to as classic or traditional formats, involve static ads printed on materials like paper or vinyl.

Business Challenge

Clear Channel operates in the UK and several other EU countries, and their frame data is distributed across multiple systems within these geographies. There is no single-source-of-truth for frame data across Clear Channel's operations. Different systems stored frame data in terms of localised domain models, leading to difficulty, inconsistencies, and inefficiencies in how frame data was managed and consumed by applications which needed them. In most cases, applications were duplicated to serve different Business Units even though they would be performing identical business functions. There was also an additional duplicated effort to pull data related to frames from external systems, for example, multiple Supply Side Platforms (SSPs) like Broadsign. This fragmentation led to the following issues:

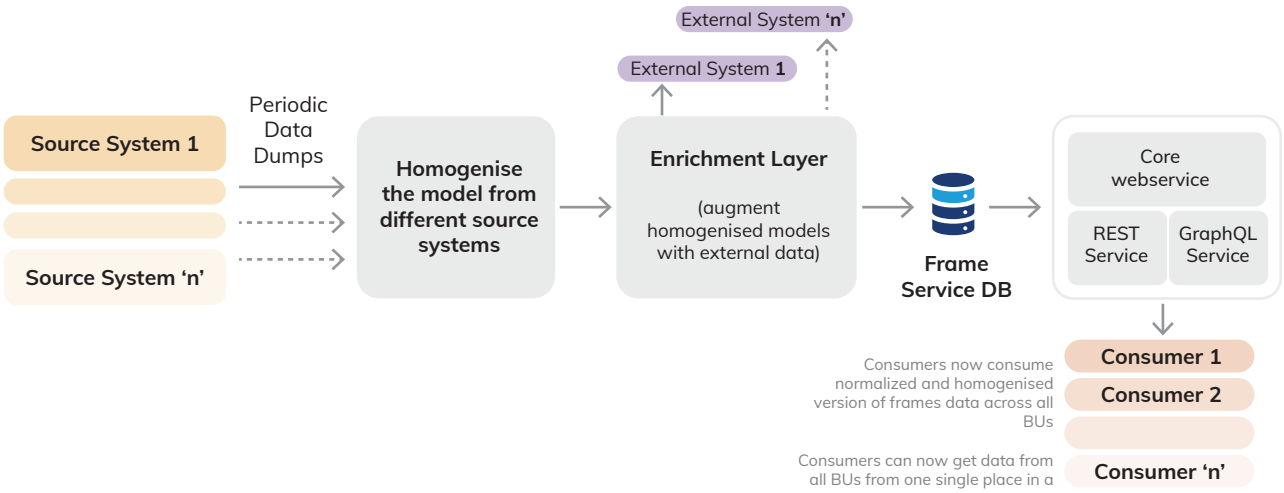
- Heterogeneous models representing frames across different systems
- Duplicated efforts in enriching frames with external data
- Redundant applications catering to identical business functions across
- different business units
- Inefficient processes for pulling frame-related data from external systems like
- multiple SSPs

Clear Channel collaborated with Sahaj Software to develop a unified approach to frame data management that could serve the needs of all business units while eliminating redundancies and inconsistencies.

The Solution

We started with a thorough tech discovery exercise to understand the existing systems serving frame data to different business teams within the client's organisation. It provided insights into the domain-specific needs and the variations in modelling and consumption of frame data across different business units.

Following the discovery phase, we conducted mini-discovery sessions with identified consumers to better understand their specific needs. This helped us with the domain understanding and the variations across different business units of Clear Channel with regards to the modelling and consumption of frames data. With the knowledge gained from these discovery sessions, we conceptualised a high-level solution.



1 Identification of Multiple Data Sources

The team mapped out all the sources of frame data across different business units, creating a comprehensive view of the data landscape.

2 Homogenised Domain Model

A unified domain model was developed to represent frames from all business units consistently. This model was designed to be flexible enough to accommodate the unique needs of each unit while providing a standardised structure for data management and consumption.

3 Centralised Data Repository

We implemented a system to source frame data from multiple origins, transformed it to fit the homogeneous model, and stored it in a centralised, resilient data repository. This approach eliminated the need for multiple, inconsistent data stores.

4 Data Enrichment

The homogenised data was further enhanced with information from external sources, including the various SSPs. This centralised enrichment process eliminated the need for individual business units to perform this task separately.

5 Unified API Endpoints

To serve the diverse needs of different applications
and business units, We developed both REST and GraphQL endpoints. This dual approach allowed for maximum flexibility:

a. The REST endpoint provided a straightforward way to access frame data.
b. The GraphQL endpoint was introduced when it became clear that some consumers, particularly UI applications, needed more control \over the specific data they retrieved.

We took a phased approach after identifying the core of the problem and its solution. We built the system first for UK frames data and then quickly moved over to providing data for other European markets via the service as the UK was where a lot of action was happening in terms of business applications.

Impact

The Frame Service has been more than just a microservice exposing frames data. It has been instrumental in:

1. Enabling a Rapid Application Development environment and culture within Clear Channel.

2. Providing the capability for experimentation of business ideas around frames and understanding their viability and potential across business units. This has enabled Rapid Application Development (RAD) as everything about frames can now be consumed from a singular source.

3. Application developers across business verticals are now able to access frames data on demand. In a way, it also has democratised the access to frames data within Clear Channel's application developers.

4. Business applications now have a seamless approach to support multiple business units. The building of Launchpad Automated and Launchpad Programmatic are examples of this enablement as they are consumers of frames data from the Frame Service.

Clear Channel developers across different business verticals now have an easily accessible way to experiment with frames data.

Before		After
Frame data across BUs varied in data model.	→	Frame data across BUs now have a consistent data model from the perspective of consumers.
Domain language inconsistencies across BUs.	→	Consistent and uniform domain language.
Only data dumps were available for consumers	→	REST and GraphQL end-points now serve the needs of frame data consumers.
Business verticals had to develop either multiple or complex applications to abstract handling of data from different BUs.	→	Business verticals don't have to build in abstraction layers for consuming and exposing frames data via their apps.

Deterrent for Rapid Application Development.	→	Enabler for Rapid Application Development (develop one app for all BUs).
Data was hard to obtain for new use cases and experimentation.	→	Availability of frames data has been democratised.

The Frame Service thus achieved its core goals of homogenising frame data from multiple business units and providing seamless, on-demand access to this data. It has become a cornerstone in the client's data infrastructure, enabling more efficient operations and fostering innovation across the organisation.