

COMMON ADVANCED ADVERTISING SYSTEM

Arthur Orduña
Canoe Ventures LLC

Abstract

The cable industry has a long history of working together to advance our services for the benefit of consumers and our commercial customers, including the advertising community. CableLabs, National Cable Communications (NCC) and the numerous interconnects that dot the map are examples of this cooperative spirit. It is a natural evolution that cable would work together to develop a standardized national platform for advanced digital advertising. That is the prime development task for Canoe Ventures.

At the heart of Canoe's ecosystem will be the Common Advanced Advertising System and its over-arching business process management system. This implies a massive data record keeping system and associated business intelligence capable of aggregating, storing, mining and reporting on extremely high volumes of data. Advanced analytics and inventory management systems are also crucial to reaching the full potential for addressability and adaptive campaign management.

COMMON ADVANCED ADVERTISING SYSTEM

Overview

The Common Advanced Advertising System (CAAS) consists of the national Advertising Stewardship business systems and enabling infrastructure that interfaces with advertisers and advertising agencies, media owners and MSO distribution systems to deliver a range of advanced digital advertising products. The CAAS will be a centralized control center and clearinghouse, and will communicate with many different MSO delivery systems.

To operate within the CAAS, it is generally acknowledged that the Participating MSOs must adhere to common guidelines. MSOs must provide assurances that each of their participating systems will:

- Support uniformity of product and ad formats
- Support the defined business processes
- Provide common system interfaces
- Provide consistent data per the agreed upon interfaces, semantics and policies

Given the difficulty of building the CAAS to support multiple heterogeneous MSO delivery systems, the scope will initially be limited to MSO video services. However, this will be expanded to include other platforms based on market demand (e.g. mobile, HSD portals, other service providers).

Reference Architecture

The reference architecture presents the envisioned end-to-end system and highlights the portion of the system for Canoe. The underlying MSO distribution systems will use a common set of interfaces, however the specific design may vary by MSO or systems within an MSO.

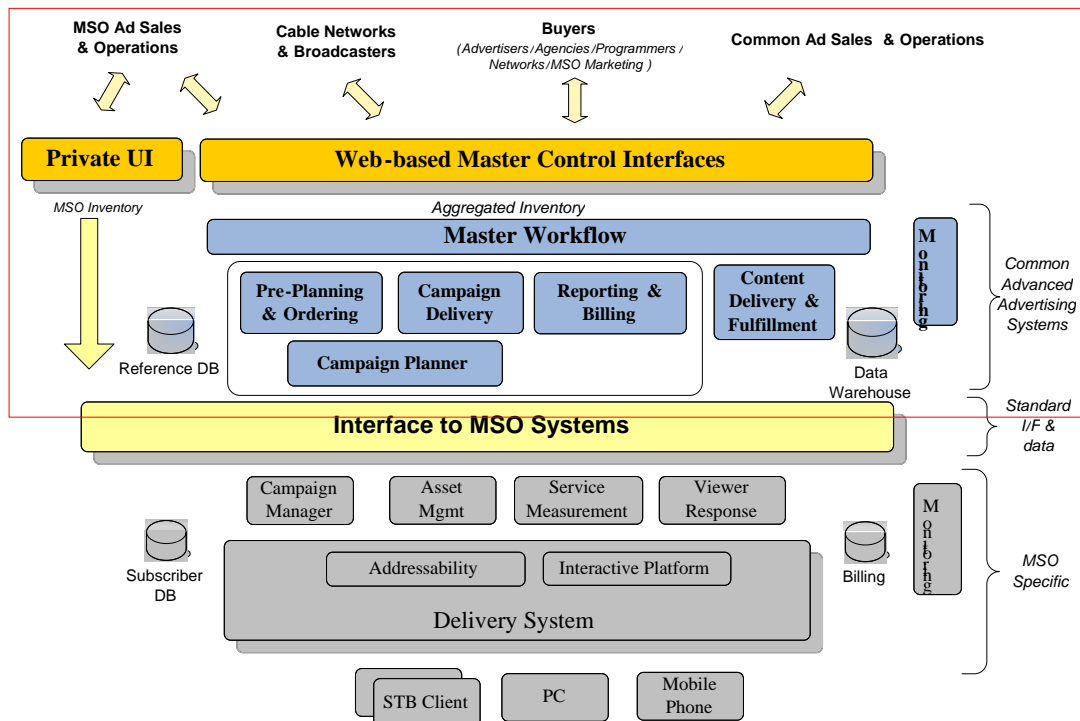


Figure 1 - Reference System Architecture

The following reference diagram deconstructs the CAAS into its primary elements and business processes.

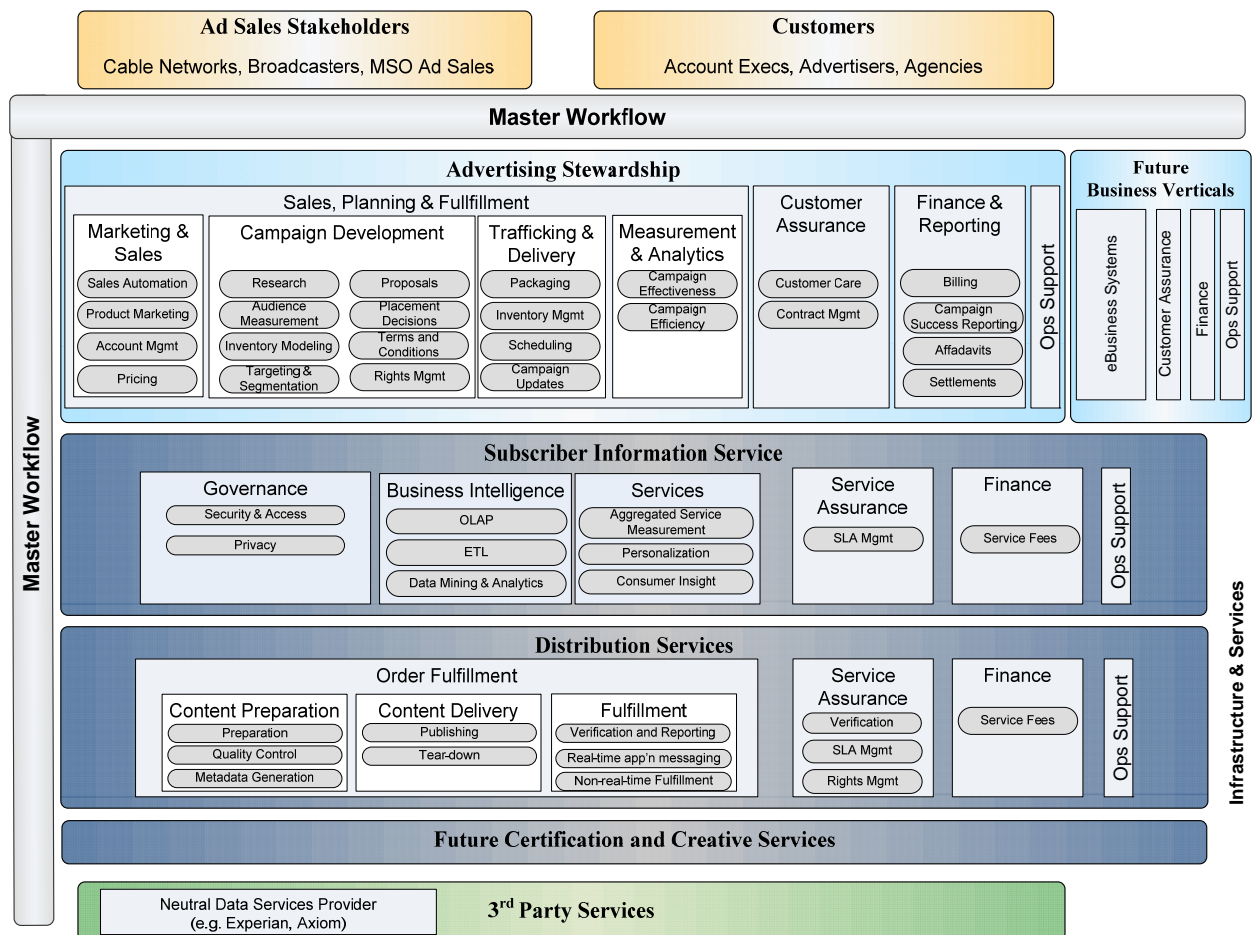


Figure 2 - CAAS Business Processes

Advertising Stewardship enables a national sales organization to manage the complete ad sales lifecycle. Web based interfaces will provide the necessary access for both ad sales stakeholders and customers for sales and campaign development, in-flight campaign management and post-flight reporting and financials. These systems will rely heavily on the underlying infrastructure services as well as interfaces to MSO systems.

The Subscriber Information Service (SIS) is the primary data warehouse aggregating audience and service measurement data from all of the distribution systems. It will supply the necessary storage, processing, and business intelligence functions to support the

Ad Network, and could possibly support future business verticals. The data within the SIS will support a wide range of data mining and analytics process, one of the most important being audience segmentation to support targeting. Through the use of bonded 3rd party data services providers, blind-matching can be performed against MSO and advertiser customer lists while maintaining full consumer privacy.

The Distribution Services are intended to simplify the process of creating, delivering and fulfilling digital advertising across multiple MSOs. While customers could interface directly with the MSO interfaces, this service greatly reduces the complexity

and customer overhead by providing a single organization to handle content preparation and delivery across many different systems, and potentially different target platforms such as wireless or broadband. And, while it is the long-term objective for all MSOs to use common content formats and delivery standards, in practice it will take time for all systems to reach a consistent level of deployment, and this service enables a more manageable migration path.

Tying all these systems together is the Master Workflow. Workflow automation will connect the many business processes and stakeholders with automated and traceable processes. Because of the many stakeholders and complexity of the business processes, a highly sophisticated, flexible, and secure solution based on proven technology is mandatory for successful operation of the system.

Workflow

The following diagram illustrates a high-level workflow between sellers, buyers, the CAAS and MSO systems.

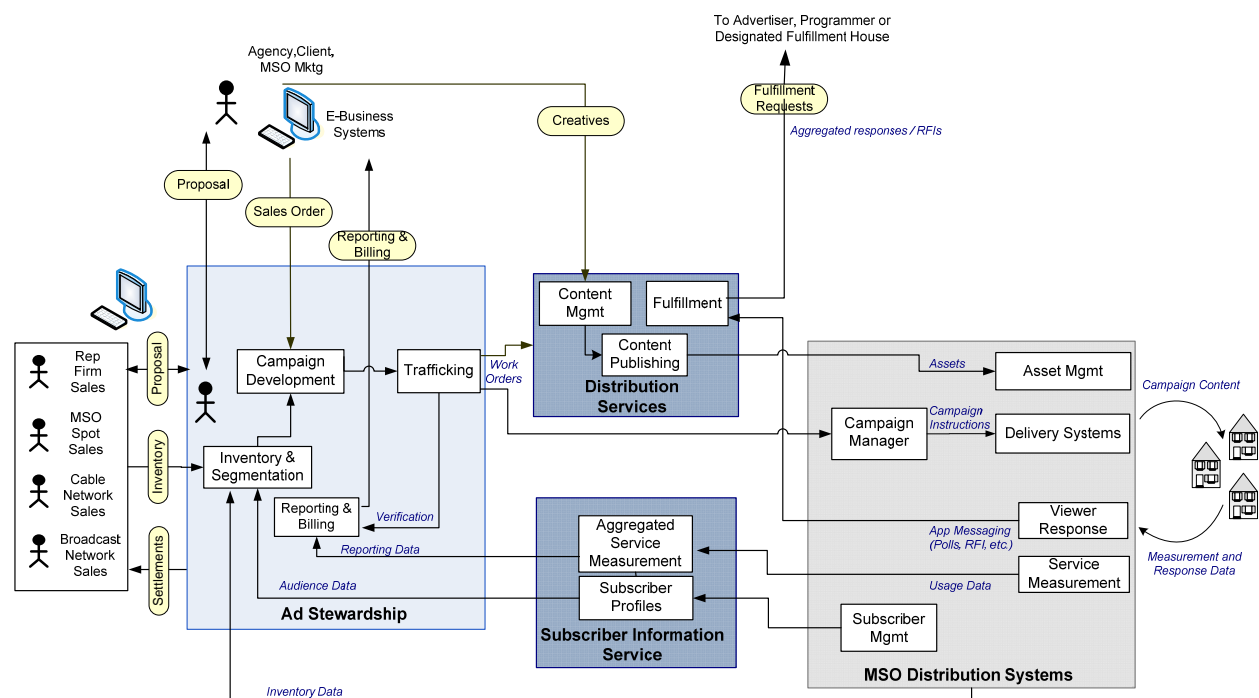


Figure 3 - Example Workflow

Design Objectives

Time to market is of paramount importance for the Common Advanced Advertising System. Therefore, it is highly desirable to minimize custom development, and maximize the use of existing or off-the-shelf systems. However, it is important that the recommended systems meet, or will meet with

modifications or enhancements, the complete set of CAAS requirements.

Within the above overarching guidelines, our design approach has been to:

- Evaluate best of breed products that provide functionality in line with the CAAS requirements and long-term objectives
- Minimize unnecessary custom work
- Enable procurement flexibility and product innovation
- Limit unnecessary dependencies and integrations – balance the benefits of off-the-shelf products against vendor management complexity

The resulting design centers on a loosely coupled architecture framework with open interfaces enabling multi-vendor solutions and independent operation of distinct elements of the system. For example, the Subscriber Information Service is a complex information system that might benefit from different technologies, physical distribution and/or hosting models than the Advertising Network. Part of the design exercise weighed the different models and present trade-offs in terms of reliability, extensibility, scalability, operability, cost and time to market.

It is also crucial to define and automate the business processes using proven workflow automation technology. Because advanced digital advertising is still a nascent business, a flexible rules engine and defined roles and permissions are mandatory in order for the system to keep pace with changing business objectives. The workflow analysis should place equal emphasis on core business processes and operations monitoring and quality control functions.

Design Considerations

There are critical system elements that are expected to require significant new design.

Information Systems

A robust data infrastructure coupled with the business intelligence necessary to extract maximum value is the cornerstone of this effort. As the business objectives for the CAAS evolve, and as Internet advertising continues to experience strong growth, the data required to enable this effort has also increased in magnitude and importance. The ability to accurately target and adapt campaigns, and thus the required Information Systems to effectively manage, analyze and securely govern very large amounts of data are critical to the success of the Common Advanced Advertising System.

Table 1 presents the range of data that passes through the system. The design of the CAAS and MSO system interfaces will cover these as well as anticipated future needs.

Table 1 - Common Advanced Advertising System Data Needs

Reference & Stakeholder	Order & Execution of Order	Operational	Reporting
Agencies Networks System Configuration SYS Code STB MSO Subscriber DB HSD (Broadband) Wireless Historical Orders Planning Proposal data Inventory Dynamic Capacity Product Pricing Business Rules Permissions Reach	Order Details Products Price Rules Financials Content Reference Expected Info Reporting Affidavit Verification Enhancement Approval Order Expressions Confirmation Management Revisions Change orders Cancellations Make Goods RFI Fulfillment Polling Results Performance Capture more than will report Clicks associated with Views Service Delivery VOD STB Raw Data Sets Impressions	Service Level Management Capabilities Availability Monitoring System Wide Regional Full Footprint	Report Types Delivery Confirmation Affidavit Operational Reports Technical Operations Reporting SLA Management Sales Pipeline Complete Financials HR People Reporting MSO Report Types Inventory Utilization Aggregate Financials Dashboards Historical Category Sector Performance Comparative reports Co-op affiliate reporting

Initial Sources for service measurement from MSO subscribers includes but is not limited to:

- Linear ad insertion
- Settop box usage, including linear viewing, DVR and time-shifted viewing, and Interactive usage
- On demand usage

As a service provider, adherence to applicable consumer privacy laws and policies are always of critical importance. Any design must include strict data governance rules and auditing capabilities.

Addressability

National, Regional, and Local Advertisers want to segment customers, develop targeting

profiles and identify targeting groups, deliver specific messages to each targeting group, and determine the efficacy of their messages.

The primary components of the targeting capability include:

- Definition of targeting profiles to match the advertiser's segments of interest using data from multiple sources.
- Identification of the targeting groups in an iterative process of refining the profiles to maximize the reach (e.g. how many households) – through blind matching and generating counts.
- Creation of advertising packages consisting of message, creative, and metadata that are then trafficked and delivered.

Segmentation can be applied to the subscribers' profile for household (and eventually set-top box level) level targeting.

The efficacy of targeting is measured through key metrics that are specific to the advanced advertising product (e.g. linear addressable, RFI, etc.).

The targeting capability is largely a part of the Campaign Development step in the advertising lifecycle. It is applicable to all the products being contemplated within the CAAS advanced advertising tracks (e.g. targeted overlays, linear addressable, etc.).

It is envisioned that the MSO may require a 3rd party data services provider as an infrastructure partner for meeting Personally Identifiable Information (PII) requirements, and to provide support for advertisers in understanding and applying targeting to their advertising campaigns. In most cases, a “blind” data match will be required for qualitative profiling to protect the privacy of the specific subscriber file and information. Clarifying the relationship between MSO data systems, the CAAS and 3rd party partners and enumerating the trade-offs for structuring the underlying data systems is a critical design objective.

Inventory Modeling and Placement Decisions

The inventory management requirements for the CAAS are extremely complex and dynamic given the number of distribution systems and the different types of inventory represented by the envisioned set of products. It is the objective for distribution systems and media owners to communicate inventory status to the CAAS through well-defined interfaces. The CAAS will correlate this information and use it to support inventory modeling during campaign development and to drive trafficking and placement decisions.

Invoicing and Accounting

In order for the CAAS to offer a cohesive buying and tracking mechanism for customers across the Cable footprint, it must provide customers with a single invoice across media

owners and product lines. To accomplish this, the design must include billing and accounting solutions focused on a secure infrastructure that supports accounting standards and provides proven transactional integrity. The billing design will accommodate the creation of customer invoices across companies and products as well as the distribution and tracking of these invoices. Any associated accounting transactions will be tracked in concert with GAAP Accounting standards and support customer collections as well as vendor payments. Finally, the design will allow for periodic reconciliation and settlement of financial transactions between participating companies.

Workflow Automation

As illustrated in the CAAS reference diagram, all of the business processes will be orchestrated through automated workflow. The workflow engine will support flexible and extensible rules definition and will provide multiple views into the current state of any campaign based on stakeholder access rights. Due to the highly distributed nature of the problem, it is very likely for campaigns to encounter errors somewhere in the process. For example, content may not be successfully received at all sites, or rights may not have been cleared by the required date. Therefore, the solution should also provide active monitoring and alerting capabilities for defined error conditions.

Interfaces with MSO Systems

An abstraction level – called the MSO System Interfaces – will be designed to allow data and message exchange between the CAAS and the specific systems and equipment at the MSO delivery sites.

A critical activity during the design phase is to perform a detailed analysis of the data and messages that are used by the MSO delivery

systems shown in Figure 1. Canoe is working with each Participating MSO in order to collect a full set of requirements to describe the data and messages that must be generated for and collected from the MSO delivery system in order to ensure proper operation within their systems. This may require analyzing the capabilities and interfaces of deployed traffic and billing, VOD, and interactive systems to fully understand the how these systems will interoperate within the end-to-end solution. Individual MSOs will make independent technology and procurement decisions regarding their delivery systems, including the portions of those systems that interface to the CAAS.

There is a strong desire that the interchange between the CAAS and the MSO delivery system be governed by standards-based implementation. This covers the current suite of relevant standards and specifications from ANSI, SCTE, CableLabs, IETF, and other involved entities. Of particular interest are SCTE-30, SCTE-35, SCTE-104, SCTE-118, SCTE-130, DVS-766, CableLabs ETV, CableLabs Metrics, and several subprojects of the CableLabs VOD Metadata and OpenCable initiatives. These are key to the development of the MSO delivery system interfaces.

Standard	Specification
SCTE 30	Digital Program Insertion Splicing API, SCTE 30, 2006
SCTE 35	Digital Program Insertion Cueing Message for Cable, SCTE 35, 2004
SCTE 104	Automation System to Compression System Communications Applications Program Interface (API), ANSI/SCTE 104 2004
SCTE 118	Program-Specific Ad Insertion - Data Field Definitions, Functional Overview and Application Guidelines, ANSI/SCTE 118-1 2006
SCTE 130	Digital Program Insertion – Advertising Systems Interfaces, SCTE 130
SCTE 138	Stream Conditioning for Switching of Addressable Content in Digital Television Receivers, SCTE 138 2009
OC-ETV-AM	OpenCable Enhanced TV Application Messaging Specification, OC-SP-ETV-AM1.0-I03-060714
OC-ETV-BIF	OpenCable ETV – Binary Interchange Format 1.0, OC-SP-ETV-BIF1.0-I03-060714
OC-SP-METRICS	OpenCable Receiver Metrics Gathering Specification, OC-SP-Metrics-I02-070416

Table 2 - Standards Reference

Interfaces with Agency and Advertiser Systems

Canoe will also define an approach for data exchange with the Advertiser and Agency community. Again, there is a strong desire that the approach between CAAS and its customers move toward a standards based approach leveraging and driving the creation of standard specifications within the Advertising community (AAAA). However, it also must be recognized that there will be an ongoing need to electronically transact business with this community within the

constraints of the capabilities of legacy stewardship products in use today.

This effort will involve not only defining the system components and communication standards referenced within this document, but also integrating the new products into the document trafficking workflow, protocols and formats currently in place with Legacy Stewardship systems for various documents including proposals, orders, revisions and invoices.

This demands familiarity with existing AAAA common documents and protocols, work with MSO and National Sales, as well as with the

lead software vendors in this space, in order to define an approach for document exchange that can support both current and future capabilities of these platforms.

Conclusion

This paper described at a high-level the functional architecture of Canoe's Common Advanced Advertising System. It is our intent, in publishing this paper, to educate the technical community on what we are designing and building for our various stakeholders.

It is our goal that the successful launch of the CAAS will mark the first iteration of a standardized national platform for advanced digital advertising, resulting in additional and ongoing innovation from multiple parties – not just Canoe and the MSOs - at the services and application levels.