UBIQUITOUS CONTENT DISCOVERY IN A FEDERATED ONLINE ENVIRONMENT

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Abstract

The new paradigm of broadband content delivery brings with it a set of complex challenges. Prominent among them is the need to provide ubiquitous content discovery across a federated online environment.

As both content producers and video service providers rapidly adopt new online services, the challenges of content discovery for the consumer increase exponentially. One constant in this newly connected world is that consumers are neither willing nor able to manage the plethora of locations in which content is made available to them. In order to facilitate the proper discovery of assets throughout an ever changing and evolving environment, an open-standards based platform must be adopted to allow consumers easy access to the content they seek and to which they are entitled. Central to this problem is the hybrid approach a "TV Everywhere" experience brings with it: some content providers wish to both host and deliver content while others wish to distribute and have service providers manage the experience. To facilitate the discovery of content, the consumer must be able to locate assets not only provided through the portal in which they are engaged, but also at the numerous sources located throughout the internet.

*This paper will discuss a standards based approach to allow for ubiquitous content discovery (including search) through*out this fractured, federated environment.

THE NEED FOR A CONTENT CONNECT HUB

Content discovery has been a challenge to Television Provider's since the beginning of the industry. Creative solutions such has the printed TV Guide, electronic programming guide and graphic navigation platforms have been created to assist the consumer in finding the content they desire. Now, consumer desire to watch the television and movie programming they want, when they want it, wherever they are, has never been stronger and continues to grow every day. These first moves to satisfy these consumer desires have emerged as "TV Everywhere" online platforms. As major content producers as well as multi-channel video programming distributors ("MVPD") embrace broadband delivery as a means to satisfy the consumer demand for "TV Everywhere", we find ourselves facing a new set of industry challenges, including content discovery.

There is not a single business model that properly meets the needs of all MVPDs and content producers, thus a hybrid and fractured ecosystem whereby content is delivered from a multitude of locations has been developed. This federated environment works well to meet the needs the numerous business models, but challenges a key value proposition to the consumer: Ease of Use. The consumer's ability to discover content and its location online is the prominent impediment to solve as consumers flock toward online content delivery.

The industry is responding to the consumer demand for access to more content through the development of standards around authentication and authorization. These standards support a federated environment that allows each entity to provide solutions which align with their business desires. With important foundational technologies, these standards leave room for innovative solutions toward other areas such as content discovery. One of the key ways that MVPDs can continue to add value to their subscribers is to facilitate the "TV Everywhere" experience, ensuring that their subscribers can locate and access the content they desire. It is clear that consumers are unwilling to access (browse or search) multiple individual locations in order to locate the content that they desire, thus numerous entities have built proprietary methods for aggregating as well as publishing content availability. While innovative

proprietary solutions embrace the entrepreneurial spirit, utilizing an open-standard infrastructure allows all parties to leverage the scale necessary for success.

The Content Connect Hub is an open-standard based platform providing ubiquitous content discovery for the next-generation of "TV Everywhere." The Content Connect Hub will allow any aggregator, distributor, or provider of "TV Everywhere" services to display and search content from all participating providers throughout the federation. Handling the content discovery in an open, standards based format allows the aggregator to focus on other key aspects of their solution.

Each party in the "TV Everywhere" value chain has slightly differing goals. For the content producer, their key goals are to preserve and drive their content brand as well as control the monetization of their assets. For the MVPD, their key goal is to provide a complete, high quality experience for the consumer along with additional value that they cannot find with other providers. The Content Connect Hub provides critical linkage to the "TV Everywhere" environment that satisfies both of the needs. The Content Connect Hub allows content producers to host the asset themselves, ensuring their ability to secure and monetization it, while still allowing MVPDs to display, search and reference the remotely hosted content utilizing the branding of the content producer. Importantly, the Content Connect Hub does this through an open and cost-free interface.

INSIDE THE CCH GEARBOX

The Content Connect Hub (CCH) utilizes and extends a number of existing standards. At its core, the CCH leverages the SCTE-130 Part 4, Content Information Service (CIS) specification. Just like SCTE-130, CCH leverages standard SOAP XML messaging to allow standardized communication between a client (the consumer portal) and the server (the national CCH service). The CCH provides a basic CIS interface for content queries utilizing the same syntax as a typical CIS, however not all functionality as specified in SCTE-130 is provided through the CCH. For example, the CCH does not allow for the advanced query functionality that CIS does nor does it allow for content notifications (or registration for notification). The CCH is a stateless information service.

The CCH works by maintaining a subset of asset metadata which any hosted provider may publish to. This metadata subset is then used to perform content discovery throughout the federation. When the client (consumer portal) requires detailed asset information, it queries this from the content producer's own CIS environment. This is handled through an extension CIS standard where the CCH will return a Content Metadata Location element as opposed to the standard Content Location element that a CIS would typically return.

To utilize the CCH, a content producer or an MVPD must first register. During the registration process, the content producer is able to setup some basic business rules in addition to generic branding and security information. The content producer is given a Metadata API from which to manage its metadata. The CCH utilizes metadata in the CableLabs ADI v1.1 format. Content Producer's simply publish asset information, including the availability of assets, through the Metadata API. The Metadata API also supports metadata updates through versioning of the ADI files, so content producers are always able to keep their asset information current.

The CCH allows entities to also enforce business rules within the federation. Each entity is allowed to create access control lists (ACL) as to which may permit or restrict their queries. For publishers of metadata, the ACLs may be explicitly exclude certain clients (and therefore everyone else is implicitly allowed access to view/search their content) or explicitly include certain clients (and therefore everyone else is implicitly denied access to view/search their content). Likewise the client of the CCH may limit their searches to a subset of the total providers, either explicitly restricting or selecting the entities to work with.

Once content metadata is published to the CCH, clients (consumer portals) who are also registered with the CCH may then query the CCH for information about remote assets. It's important to note that clients of the CCH must agree to the End User License Agreement which requires the asset branding to be preserved.

Clients can then query the CCH for nearly any metadata criteria. For basic browsing, the client may ask for specific genre or categories. For searches, the title, producer or actor fields are likely targets. Other filters such as the advisories or the rating information may also be specified.

A typical query to the Content Connect Hub looks like this:

```
<ContentQueryRequest
messageId=" consumer_portal.com"
system=" portal_system_1" version
=" 1.1" identity=" 60EA930E-01AF-5050-
A7EB-5D5B4A225311" >
  <ContentQuery expandOutput=" true"
contentQueryId=" 1" >
    <core:ContentDataModel
type=" CLADI_1.1" >URI</core:ContentDat
aModel>
    <QueryFilter>
      <FilterElement name=" Title"
value=" Abyss" />
    </QueryFilter>
  </ContentQuery>
</ContentQueryRequest>
```

And the response from the Content Connect Hub should look similar to the response from an SCTE-130 Content Information Service:

```
<ContentQueryResult resultSetSize=" 2"
contentQueryRef=" 1" >
  <BasicQueryResultList>
    <core:Content>
      <core:AssetRef
providerID=" avail-tvn.com"
assetID=" AABFCA001" />
      <core:ContentMetadataLocation>
        http://cis.avail-tvn.com/cis
      </core:ContentMetadataLocation>
      <core:Ext><ADI> <Metadata> <AMS
Asset_Name=" ..." />
...</Metadata></ADI>
      </core:Ext>
    </core:Content>
    <core:Content>
      <core:AssetRef
providerID=" avail-tvn.com"
assetID=" AA000001" />
      <core:ContentMetadataLocation>
        http://cis.avail-tvn.com/cis
      </core:ContentMetadataLocation>
      <core:Ext><ADI> <Metadata> <AMS
Asset_Name=" ..." />
...</Metadata></ADI>
      </core:Ext>
    </core:Content>
     <core:Ext>

<ProviderBranding>...</ProviderBranding
>
     </core:Ext>
  </BasicQueryResultList>
</ContentQueryResult>
```

While the details are omitted, the response would include the asset metadata in the core:Ext element along with the basic branding information including background color, font, foreground colors for the provider's assets. This information allows the consumer portal display the asset information in the style that the provider intended.

CONCLUSION

The Content Connect Hub is necessary for providing ubiquitous content discovery in a federated environment. By leveraging open-standards, and providing its key services for free, the CCH bridges the gap left open by existing "TV Everywhere" deployments. It is our hope at Avail-TVN that the Content Connect Hub becomes an industry standard for online, multiplatform content discovery and we are eager to work with all parties to ensure its success.