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Streamlined Content Metadata Integration and Management Using Entertainment ID Registry (EIDR)

A Technical Paper prepared for the Society of Cable Telecommunications Engineers
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Overview

As cable operators receive video content and associated metadata from an increasing number of sources, identification, management, tracking, measurement, and integration becomes increasingly more challenging. At the same time cable operators have more options for delivering content to their subscribers beyond traditional linear and VOD. Customers are looking for a highly integrated experience for consuming content in a timely fashion across multiple devices requiring a myriad of different formats. This paper will present the Entertainment ID Registry (EIDR) as the most effective means to provide comprehensive integration of content and metadata.

EIDR is a recently evolved international standard for identifying both discrete video content and video services (i.e. cable networks, stations). The effort has the backing of major production studios, programmers, metadata purveyors and cable operators. EIDR provides a global identifier for various content types and establishes relationships that are important for effective video distribution such as episodic series and movie edits.

This paper will present real world challenges of integrating content across multiple platforms and how EIDR provides an efficient and logical solution. Issues discussed will include content sources, metadata from multiple sources, multi-platform distribution, measurement, and challenges around transition and implementation.

Introduction to EIDR

The Entertainment ID Registry (EIDR) is an industry non-profit organization with the purpose of creating permanent, global identifiers for video entertainment assets. The registry is meant to assist B2B interactions throughout the digital and physical supply chain. It is supported by organizations across the supply chain through annual member contributions. The solution is designed to be the international standard for video asset and service identification.

The EIDR registry is part of a larger ISO-approved initiative called Digital Object Identifier (DOI), which is supported by the International DOI Foundation. DOI is in turn an implementation of the Handle System created by the Corporation for National Research Initiatives. The important aspect of all of this is that just as digital video content is a part of all conceivable digital objects in the world, EIDR is a part of a large community of digital object registries.   The community of registries that make up DOI work together to assure any DOI can be resolved to the appropriate digital object. The DOI or handle remains permanent regardless of the location of the object, associated metadata, or ownership changes.

EIDR maintains its handles within a central registry available to all participants. The handles assigned by EIDR are completely opaque and imply no ownership status or other metadata. This is in contrast to other identifier systems (ISBN, UPC), which issue blocks of identifiers to organizations where the origination can be derived by looking at a part of the identifier. EIDR recognized that digital content frequently changes ownership and decided not to encode this information into the handle itself. Furthermore, EIDR does not charge its members a per transaction fee, so there is no cost benefit to acquiring handles in bulk.

The EIDR registry associates the content handle with a minimal set of metadata required to maintain uniqueness and avoid duplication. The most fundamental type of EIDR record is known as an abstraction as the concept of an original work with no particular manifestation. An asset in the abstract includes enough metadata to establish its identity, such as its canonical title (ideally as defined by the creator), the date or year of release, country of origin, original language and several (but not all) contributing agents. Usually the creator and major distributors are identified along with the director and several key actors. This is typically enough information to uniquely resolve the majority of stand alone content to a single EIDR handle.

Episodic content abstractions are further wrapped in abstractions for television seasons and series. This relationship is necessary to uniquely distinguish the massive library of existing and future episodic content made for television. Episodic records inherit the additional metadata from their related series and seasons making it much easier to definitively match such content.

Once the root creative content records are established, EIDR registrants are able to create additional unique embodiments that derive from the root. This forms a hierarchical tree in EIDR that provides valuable content relationships for its users. Each

variant of a video asset is assigned its own EIDR handle and connected to the parent abstraction. In this way, editions like unrated versions, director's cuts, "edited for TV" and others are preserved as having derived from the same creative work. This is also the way that a language variant, where alternate language audio is dubbed over the video, is traced to its original version.

Beyond variants in content, EIDR provides additional ways to classify assets. EIDR provides unique handles for various digital encodings where needed, which is essential to distinguish formats (SD, HD, 3D) from one another while preserving the relationship between them as a common title. Unique records can be used to specify various codecs, bit rates or included subtitles. Because original content is routinely cut and recombined, EIDR provides record types for clips and composites to maintain those relationships.

While EIDR provides much valuable information for identifying content and its relationships, there is a lot of metadata that is outside its scope. Metadata about a video that is transient, subject to business agreements or provides value beyond identification is not stored or provided by EIDR. This limitation of scope allows business opportunities and innovation to continue to thrive within the video entertainment industry while EIDR only tackles the common industry task of content identification.
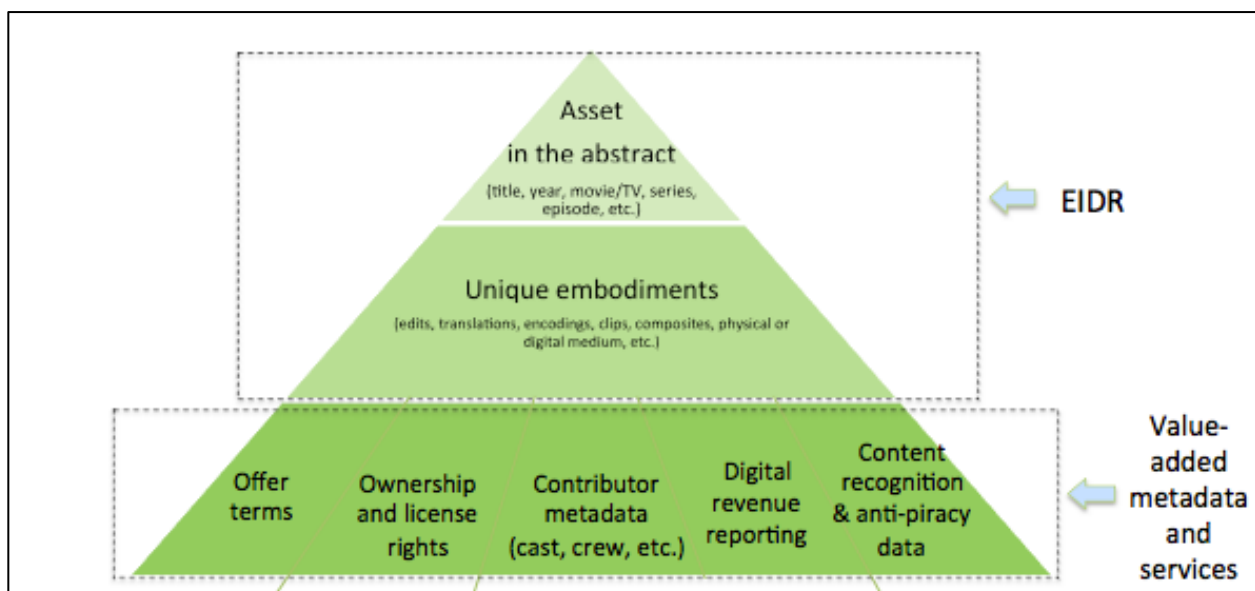
Figure 1 Scope of EIDR

An actual EIDR handle is an IDF-assigned prefix, followed by an EIDR-assigned unique 20 hexadecimal digit suffix and a check character. The canonical format typically includes dashes for readability.
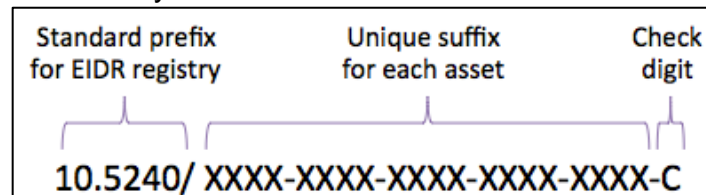

Figure 2 – An EIDR identifier

When the punctuation and extra information is removed, an EIDR handle can be represented as a 96-bit number. The prefix 10.5240 is used for all content handles. EIDR also supports three additional handles for parties (organizations), users and video services.

Video Services and Instances

EIDR provides handles for video services in addition to discrete video content. A video service is an abstract collection of unrelated (or loosely related) video, usually provided as a linear stream. This is critical for the cable television industry as this type of EIDR handle is used to represent a cable network or broadcast station. Where a video asset is delivered as part of a video service there needs to be a way to uniquely and positively identify the service. An EIDR video service handle will always have the DOI prefix of 10.5239 to distinguish it from discrete video content.

The combination of video service handle, video content handle, and additional context identifies a particular instance of video delivered by an operator. This ability to identify video instances is important in authorization and measurement use cases where it is not enough just to know what content was watched, but the service used and conditions under which it was served. The most important context typically cited for an instance of video is the date and time in which it is aired or consumed. Other contextual properties might include neighboring content and device or platform. The relationship between the components of a video instance is shown in Figure 3.
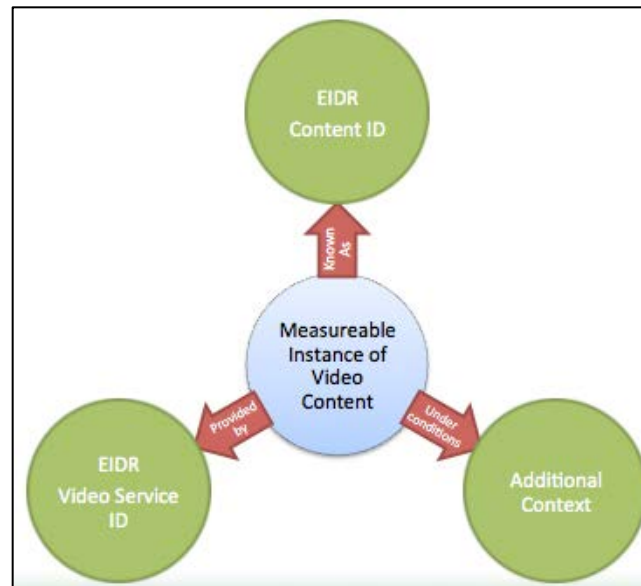
Figure 3 – Identifying an instance of video

Use Cases

The existence and proliferation of global content and service identifiers provide quite a few tangible benefits for cable operators and other distributors of video content. Most of these benefits appear in the form of improved user experiences, but cost-saving operational efficiencies are available as well.

Multi-platform Viewing
Operators already provide multiple ways for their subscribers to consume video and more operator-provided solutions are likely on the way. One of the most important aspects of having multiple viewing platforms is to provide a coordinated user experience that leverages each platform in support of the others. This means allowing viewers to be able to enjoy and discover content on any available platform and seamlessly switch between them. The common EIDR identifier allows platforms to link identical and associated content across platforms without manual intervention. The linkage allows the viewer to switch between the same content on linear television, VOD, and IP delivery networks subject to availability.
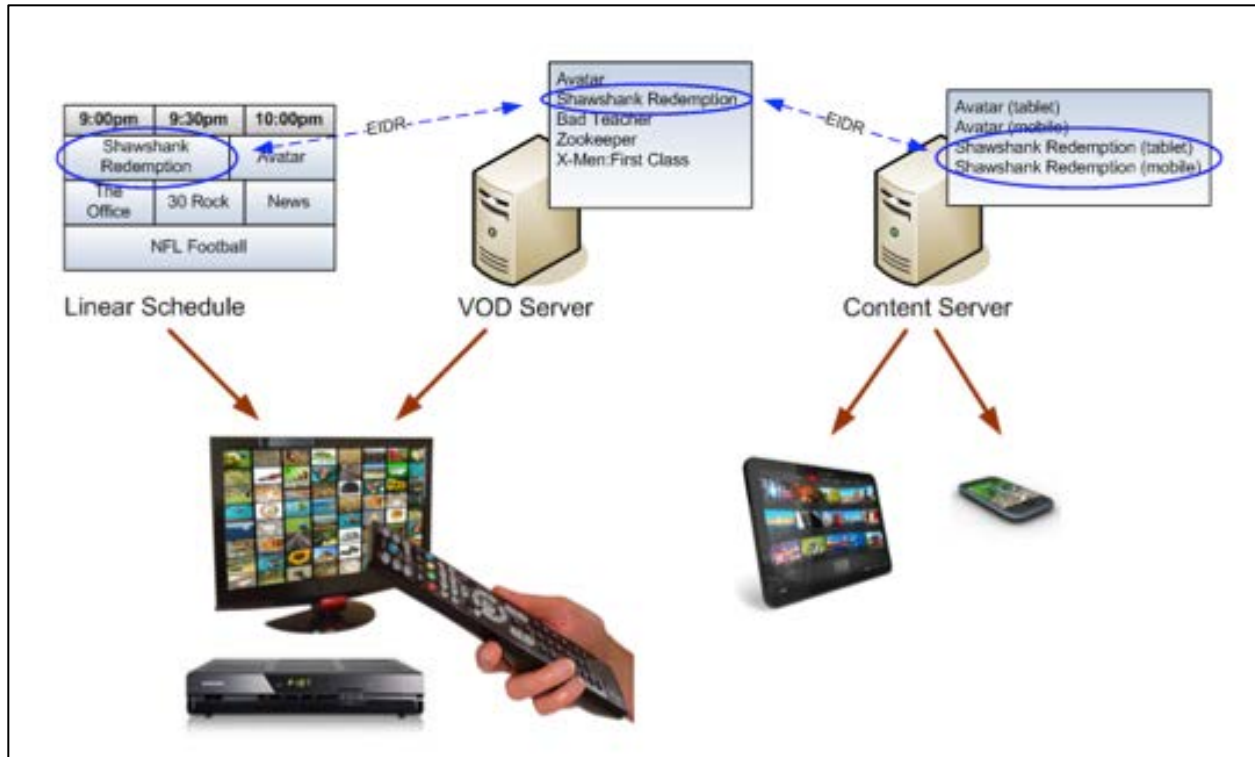
Figure 4 – Multi-platform viewing

Metadata Enrichment

Today's generation of Internet-savvy users have grown accustomed to easy access of information including metadata about content that they enjoy. The challenge for cable operators is to provide an integrated experience that includes rich metadata along with the content. An EIDR-enabled metadata ecosystem enables the operator to license a wide variety of information from 3rd parties and combine it without creating expensive mappings of proprietary identifiers. At a minimum the operator can more seamlessly merge the presentation of linear television guide with VOD. A more engaging experience might include detailed reviews from other sources, cast biographies/filmographies, time-indexed metadata and even comments from the viewer's social network.

Measurement

Effective measurement of content viewership is both timely and accurate. For both of these reasons, EIDR provides instant benefit to the operator and their programming partners. The most efficient measurement cycle requires that all participants have a

common understanding of the identity of the measureable asset including how it relates to other assets that need to be aggregated.
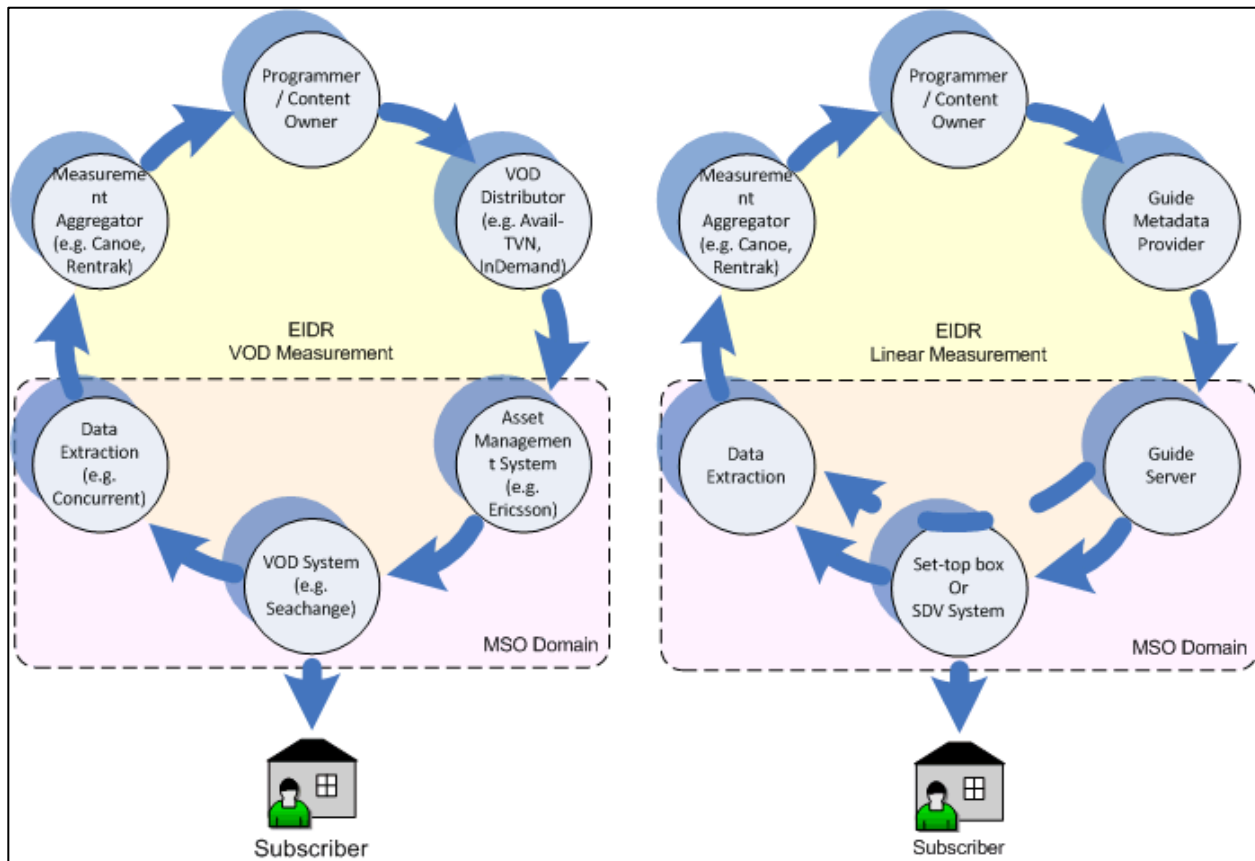

Figure 5 – Measurement cycle for VOD and Linear content

Assets in the VOD space are accompanied by a ProviderID and AssetID (PAID), which should theoretically make reporting straight forward. However, measurement on this basis does not accommodate related assets such as format variations. Furthermore, the same asset may be assigned multiple PAID values if they are re-pitched or even redistributed within an operator's network. Since the EIDR handle is consistent and traceable back to the abstract work, these problems are alleviated.

Linear television measurement is either enabled by coordinating viewership time and service with the available schedule or by inserting proprietary identification markers within the content. While these schemes are somewhat effective, a more universal approach would be to mark the content with EIDR handles, which provide the same

benefits as for VOD. The crafters of the SCTE-35 specification envisioned the use of segmentation descriptors, which carry the EIDR handle as part of the stream. Encryption or obfuscation of the descriptor would probably be warranted in cases where the identification was provided to a client device.
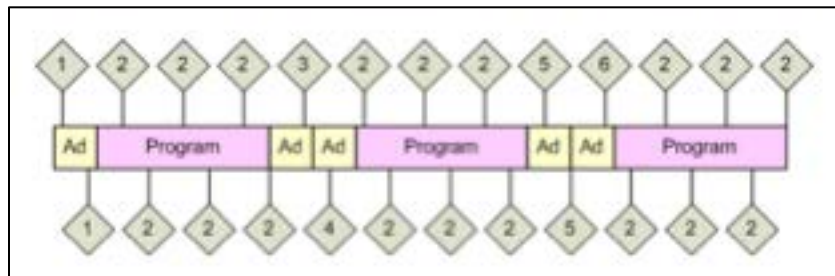
Figure 6 – Using SCTE 35 segmentation descriptors for content identification

Linear television measurement may also take advantage of EIDR video service handles to provide metrics based on service instead of program. Single services may be aggregated with related services to provide more insightful reporting.

Advertising
An important aspect of effective dynamic targeted advertising is that part of the ad placement decision is based on the content being viewed. Having universal content and service identifiers provides an unambiguous basis for an ad decision. The ads themselves may be represented by a complementary identifier space called Ad-ID or EIDR handles can be generated for promotional content.

Authorization
TV Everywhere is an industry concept of having a paid subscriber for television service also be able to acquire entitled content through other platforms – even if not delivered by the operator. This type of transaction requires coordinated authorization between the operator and content provider for the service or content being sought. Once again, the use of universal identifiers for both content and service allows scalable, rather than point-to-point, integration between content providers and operators.

Social Networking
Social networking has become a popular way to share status and recommendations between friends and family. Sharing actionable video content recommendations should be no exception. EIDR provides a means to reference a video asset without regard to location of the asset or associating viewing rights. The EIDR handle serves as the

content or service identifier enabling each recipient to acquire the content from the distributor/operator of their choice based on their subscription.

Comcast Approach

As a founding member of EIDR, Comcast has been quick to initiate proof-of-concept trials using EIDR handles as the centerpiece for content identification. The approach is to receive EIDR handles along with content from upstream sources of video. Comcast receives metadata for both its linear guide and along with VOD assets and is now requesting that EIDR handles accompany that metadata. 3rd party metadata providers will also be asked to provide EIDR-powered metadata.
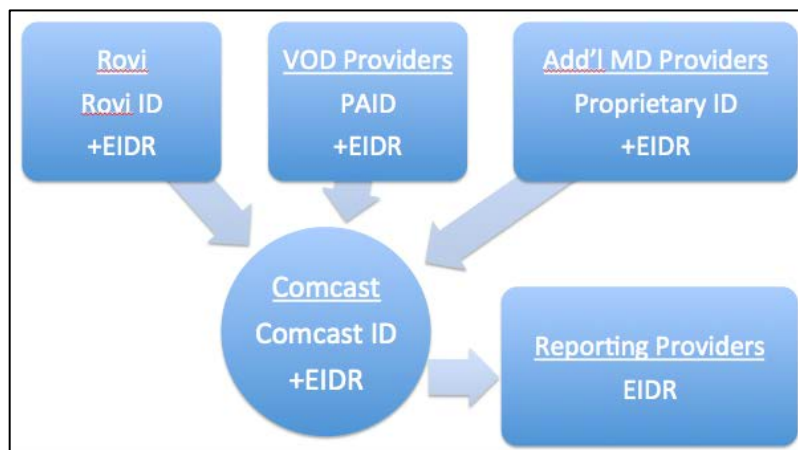
Figure 7 – Comcast using EIDR to connect video content

Providing EIDR handles with VOD assets is conceptually simple for VOD providers. Both the legacy CableLabs ADI 1.1 and the latest Metadata 3.0 specifications provide for the passage of EIDR handles as part of the accompanying metadata. Ideally the VOD provider will receive the EIDR handle from their upstream source and simply pass it on. However, given the volume of content already in circulation, a more realistic approach is that the VOD provider will match their content catalog with EIDR themselves. EIDR allows supply chain participants like VOD providers to match up their catalogs and even register titles that do not already exist. Major VOD providers, such as InDemand and Avail-TVN are already working with Comcast to provide EIDR handles as part of their metadata.

EIDR-connected VOD assets provide several pertinent advantages for the cable operator. The use of EIDR relieves the VOD provider from having to resend metadata when re-pitching assets. Indeed, the VOD provider can eventually omit sending some metadata entirely as the operator can use EIDR to link in 3rd party metadata sources. The use of EIDR will allow the VOD platform to be more seamlessly integrated with the other content delivery platforms (e.g. linear, on-line). EIDR provides linkages of episodic content to a common series thus allowing useful series rollups that were previously assembled manually. Usage reporting from operator back to the VOD content provider is also greatly improved by allowing unambiguous identification and rollups of both series and formats (e.g. SD, HD, 3D).

Linear television content, such as that provided by broadcast stations and cable networks, is identified currently through 3rd party companies that assemble schedules and compile associated metadata. These metadata feeds are historically provided using proprietary IDs that are not easily associated with other content or metadata sources. The benefit of having linear content associated to EIDR allows operators to more easily create the connection with other sources that provide EIDR. By connecting to other metadata sources, an operator can incorporate supplemental material coveted by their users. This material includes helpful reviews and expanded cast and crew lists with extensive ways to cross reference content. Common genres are now enabled to search across multiple platforms and the display of titles and descriptions are also consistent. Increasing use of graphic content navigation necessitates a comprehensive method for acquiring, associating and managing promotional artwork in a consistent and reliable way. Just as with VOD, the operator will roll-up content into common groupings of episodic series, formats and alternate editions of the same base content. Comcast has been working with Rovi, another founding EIDR member and provider of linear guide data, to associate its lineup of television content with EIDR handles.

There are quite a few additional features enabled by EIDR for Comcast:
- Remote tuning and remote DVR capabilities
- The ability to present alternate viewing options:
  - Linear to "Watch On Demand"
  - Standard definition to "Watch in HD"
  - 2 Dimensional content to "Watch in 3D"
- Families of Channels can be rolled up to create network branded and premium tiers of content (Mini-guides)
- 3rd parties can provide more accurate and definitive tune-in recommendations
- Playlists and favorites lists may be shared across various platforms and even among users

- Synchronization with 2nd screen applications are more reliable with definitive content and service identification

Conclusion

The use of EIDR provides a universal, cross-industry approach for identifying both discrete content and video services. The combination of reliable content and service identification allows cable operators and other video distributors to execute new and exciting use cases that were impractical or prohibitively difficult in the past. Comcast is already successfully demonstrating multi-platform, metadata enrichment and measurement use cases through POC trials underway. Increased participation by all video supply chain partners in this cooperative, non-profit effort is essential for industry success.

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Abbreviations and Acronyms

B2B	Business to Business
CNRI	Corporation for National Research Initiatives
DOI	Digital Object Identifier
DVR	Digital Video Recorder
EIDR	Entertainment ID Registry
HD	High Definition
IDF	International DOI Foundation
ISBN	International Standard Book Number
ISO	International Organization for Standardization
UPC	Universal Product Code
VOD	Video On Demand