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The TV-Anytime Content Reference Identifier (CRID)

Status of This Memo

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Abstract

The Uniform Resource Locator (URL) scheme "CRID:" has been devised to allow references to current or future scheduled publications of broadcast media content over television distribution platforms and the Internet.

The initial intended application is as an embedded link within scheduled programme description metadata that can be used by the home user or agent to associate a programme selection with the corresponding programme location information for subsequent automatic acquisition.

This document reproduces the TV-Anytime CRID definition found in the TV-Anytime content referencing specification, and is published as an RFC for ease of access and registration with the Internet Assigned Numbers Authority (IANA).

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1. Introduction

In recent years there has been an expansion in the number of broadcast television and radio services available to the home. In addition to the broadcast services delivered over traditional distribution channels such as Digital Terrestrial, Satellite and Cable, the advent of high-speed Internet connection will give rise to even more information and entertainment services, providing audio-visual programme material sourced directly to the home over the Internet.

Alongside this expansion there has also been increased growth in complexity of devices available to the home user, which will allow the user to operate in a 'search-select-acquire' paradigm. In this model, the user or user agent uses descriptive information about audio visual programmes as a basis for selecting the programme for subsequent acquisition and viewing. Increasingly, home appliances are being furnished with local storage, enabling the automatic capture of programme material through off-air recording or downloading by a home appliance.

The 'CRID:' Uniform Resource Locator is designed to be the bridge between programme-related descriptive metadata and corresponding programme location data that may be published over a different distribution network or at a different time.

Programme location data provides the home user agent with the information required to acquire the programme at the time of publication. In the case of the television distribution model, these locators provide programme broadcast timing and tuning information so that the user appliance can record the programme when it is broadcast in real time. In the case of Internet delivery, the locators have to be of the form associated with streaming protocols or file exchange protocols with the time (or time window) of availability indicated.

Because a content publisher may release audio-video material in the same form on a number of platforms or repeatedly over some time interval, the CRID can be used to aggregate these different publications and associate them with a single description. Furthermore, there may be other meaningful semantic associations between otherwise unrelated programme publications with assigned CRID that can be further aggregated under a higher-level CRID. This higher-level CRID can be described through its own descriptive metadata. The subjective nature of these aggregation decisions is part of the CRID authoring process and is not standardised.

The CRID resolution process ultimately enabling the user agent to acquire audio-visual programme material may be a timely process, with resolution updates delivered dynamically from the service provider. This is to reflect common business practice of adjusting the time of content availability close to the original published time to accommodate a live, managed, reactive broadcast service.

2. Ancestry

The Uniform Resource Locator scheme 'CRID:' is taken from the TV-Anytime forum Content Reference Identifier and is a result of the consensus reached by members of this forum between March 2000 and June 2002. The TV-Anytime CRID and associated supporting data is specified in the TV-Anytime Phase 1 Content Referencing Specification [TVA-CR].

3. Notation Used in This Document

The notation used in this document takes the form

<first>/<second>

in which the component names are in angle brackets and any characters outside angle brackets are literal separators.

4. The CRID URL Scheme

The CRID URL takes the form

crid://<DNS name>/<data>

in which <DNS name> is a registered Internet domain name that takes the form of domain name described in Section 3 of [RFC1034] and Section 2.1 of [RFC1123].

<data> is a free format string that is URI [RFC3986] compliant, and that is meaningful to the authority given by the authority field. The portion of the field is case insensitive. It is recommended that all characters not within the range of characters allowed in a URI must be encoded into UTF-8 and included in the URI as a sequence of escaped octets. An escaped octet is encoded as a character triplet, consisting of the percent character, "%", followed by the two hexadecimal digits representing the octet code.

In its entirety, the CRID is URI compliant as specified in [RFC3986]. As per [RFC3986], the crid:// part of the syntax is case insensitive.

5. Examples of CRID Syntax

The following are examples of a valid CRID:

crid://example.com/foobar

The above CRID was created by "example.com" authority, with data part of foobar:

crid://example.co.jp/%E3%82%A8%E3%82%A4%E3%82%AC

The above CRID was created by "example.co.jp" authority, with a data part of "E", "I", and "GA" (meaning "movie"), represented as KATAKANA LETTERS (Japanese characters) in UTF-8 encoding preceded by "%".

6. Usage

6.1. Normative Specification

The Uniform Resource Locator scheme 'CRID:' identifies the URL as the TV-Anytime Content Reference Identifier and conforms to the TV-Anytime Content Referencing Specification [TVA-CR]. The TV-Anytime CRID is a key component in the TV-Anytime forum specification series as described in the informative overview Systems Description Specification [TVA-Sys]. The normative Content Referencing Specification [TVA-CR] also includes the details of the contents and

format of the associated content referencing tables that resolve the TV-Anytime CRID into further CRID instances or transport system-dependent locations.

6.2. Role of Domain Name System (DNS) Namespace

Note that the use of the registered Internet Domain does not mean that the DNS resolving service is to be employed for the resolution of CRID URL. Indeed the resolution information is fully specified in [TVA-CR] and does not require the use of the DNS resolution service. This is especially important as one key application area is broadcast television and radio distribution services that are not Internet based.

In business scenarios that exploit Internet connectivity to the home, the DNS portion of the CRID can be used to resolve the Internet location of the service provider, who in turn will provide location resolution information in a form described in [TVA-CR].

6.3. CRID Resolving

As addressed in [TVA-CR], the CRID is ultimately resolved either directly by the CRID authority or by another party. If another party is providing resolution, the ability to resolve the CRID requires the flow of some information from the authority to the resolution provider, in order to tie the CRID to its resolution. Examples of relationships between CRID authors and the suppliers of resolution information are given in [TVA-Sys].

As described in [TVA-CR], there will in all likelihood be more than one CRID that can resolve directly or indirectly to a given single locator at a given time.

Also shown in [TVA-CR], CRIDs that resolve directly to the location of the scheduled content are likely to resolve to more than one location, as television and radio programmes are often published repeatedly within broadcast schedules or across different broadcast services or distribution platforms over an extended period of time.

6.4. CRID Related Metadata

TV-Anytime specification [TVA-Met] specifies the format and contents of the programme-related descriptive metadata designed to convey the TV-Anytime CRID for the purpose outlined here, as well as that of other data supporting the publication and usage of programme material.

7. IANA Considerations

7.1. General

The 'crid:' URI scheme is reserved to designate that the URI relates to the TV-Anytime CRID and is to be used in accordance with the TV-Anytime Content Referencing Specification [TVA-CR].

The designation of the value of each CRID is the responsibility of the CRID author, as identified through the 'authority' field.

The policy of assignment of CRID values lies with the CRID author associated with the authority field. It is likely that there will be a number of diverse (and possibly changing) authoring policies as required by various organisations as they address their respective audiences. These individual policies will address resolution target resource designation issues such as the subjective equivalence of programme material available from different locations, the grouping of CRIDs under another CRID for collective description and resolution purposes, the cross referencing of CRID between authorities, CRID lifetime, and CRID reuse.

It is likely that some authoring policies may be set through collaborative business arrangements, localised operational agreements, or national governmental bodies.

7.2. Registration Template in Accordance with [RFC2717]

URL scheme name: crid

URL scheme syntax: See Section 4

Character encoding considerations: TV-Anytime does not specify the character encoding scheme to be adopted by each implementation. However, in the case where Internet interoperability is desired, it is recommended that all characters not within the range of characters allowed in a URI must be encoded into UTF-8 and included in the URI as a sequence of escaped octets. An escaped octet is encoded as a character triplet, consisting of the percent character, "%", followed by the two hexadecimal digits representing the octet code. For example, the character A would be represented as "A", the character LATIN CAPITAL LETTER A WITH GRAVE would be represented as "%C3%80", and the character KATAKANA LETTER A would be represented as "%E3%82%A2".

Intended Use: See Section 6

Application and protocols which use this scheme: See Section 6

Interoperability considerations: None (Section 4 contains the first version of the CRID URL definition)

Security considerations: See Section 8

Relevant publications: See [TVA-CR], [TVA-Met], [TVA-Sys], [TVA-Prt]

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8. Security Considerations

The CRID URL described here provides a referencing mechanism. The values of the URL contain the authoring 'Authority' name as a DNS namespace identifier and a data portion to distinguish it from other CRIDs from the same authority. There should be no reason to prevent disclosure of the values within the CRID and no commercial sensitivity associated with these values.

When the binding conveyed as part of a larger data set which may have commercial value or critical binding between a CRID and the accompanying data, the security and integrity of the binding is a matter for the wider system implementers to judge and protect accordingly. One such method for protecting metadata can be found in [TVA-Prt], though it is not mandated that users adopt this. In any case, there may be other, wider system security functions in place or such precautions may not be seen as necessary.

Tampering with values of CRIDs during transmission or distribution over public or open networks has only nuisance or denial-of-service effects unless it causes alternative location resolution data or programme metadata to be referenced. Again, this can be dealt with as a system delivery of data integrity issue not specific to the CRID.

Impersonating a CRID authority by authoring CRID with an authority portion for which the bogus author does not have permission from the registered DNS name holder would be a misuse of the DNS name holder's identity and should be dealt with through normal business practice.

9. Acknowledgements

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10. References

10.1. Normative References

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10.2. Informative References

[TVA-Sys] European Telecommunications Standards Institute, "ETSI TS 102 822-2 v1.2.1 ; Broadcast and On-line Services: Search, select and rightful use of content on personal storage systems ("TV-Anytime Phase 1"). Part 2 System Description", September 2004.

[TVA-Met] European Telecommunications Standards Institute, "ETSI TS 102 822-3-1 v1.2.1 ; Broadcast and On-line Services: Search, select and rightful use of content on personal storage systems ("TV-Anytime Phase 1"). Part 3 Metadata. Sub-part 1: Metadata Schemas", September 2004.

[TVA-Prt] European Telecommunications Standards Institute, "ETSI TS 102 822-7 v1.1.1 ; Broadcast and On-line Services: Search, select and rightful use of content on personal storage systems ("TV-Anytime Phase 1"). Part 7 Bi-directional Metadata Delivery Protection", October 2003.

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