



**Broadcast and On-line Services: Search, select, and
rightful use of content on personal storage systems
("TV-Anytime");
Part 8: Phase 2 - Interchange Data Format**

EBU
OPERATING EUROVISION

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Foreword

This Technical Specification (TS) has been produced by Joint Technical Committee (JTC) Broadcast of the European Broadcasting Union (EBU), Comité Européen de Normalisation ELECTrotechnique (CENELEC) and the European Telecommunications Standards Institute (ETSI).

NOTE: The EBU/ETSI JTC Broadcast was established in 1990 to co-ordinate the drafting of standards in the specific field of broadcasting and related fields. Since 1995 the JTC Broadcast became a tripartite body by including in the Memorandum of Understanding also CENELEC, which is responsible for the standardization of radio and television receivers. The EBU is a professional association of broadcasting organizations whose work includes the co-ordination of its members' activities in the technical, legal, programme-making and programme-exchange domains. The EBU has active members in about 60 countries in the European broadcasting area; its headquarters is in Geneva.

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The present document is part 8 of a multi-part deliverable covering Broadcast and On-line Services: Search, select and rightful use of content on personal storage systems ("*TV-Anytime*"), as identified below:

- Part 1: "Benchmark Features";
- Part 2: "Phase 1 - System description";
- Part 3: "Metadata";
- Part 4: "Phase 1 - Content referencing";
- Part 5: "Rights Management and Protection (RMP)";
- Part 6: "Delivery of metadata over a bi-directional network";
- Part 7: "Bi-directional metadata delivery protection";
- Part 8: "Phase 2 - Interchange Data Format";**
- Part 9: "Phase 2 - Remote Programming".

Introduction

"*TV-Anytime*" (TVA) is a synchronized set of specifications established by the *TV-Anytime* Forum. TVA features enable the search, selection, acquisition and rightful use of content on local and/or remote personal storage systems from both broadcast and online services.

TS 102 822-1 [1] and TS 102 822-2 [2] set the context and system architecture in which the standards for Metadata, Content referencing, Bi-directional metadata and Metadata protection are to be implemented in the *TV-Anytime* environment. TS 102 822-1 [1] provides benchmark business models against which the *TV-Anytime* system architecture is evaluated to ensure that the specification enable key business applications. TS 102 822-2 [2] presents the *TV-Anytime* System Architecture. These two documents are placed ahead of the others for their obvious introductory value. Note that these first two documents are largely informative, while the remainder of the series is normative.

The features are supported and enabled by the specifications for Metadata (TS 102 822-3 sub-parts 1 [3] to 3 [5]), Content Referencing (TS 102 822-4 [6]), Rights Management (TS 102 822-5 sub-parts 1 [7] and 2 [8]), Bi-directional Metadata Delivery (TS 102 822-6 sub-parts 1 [9] to 3 [11]) and Protection (TS 102 822-7 [12]), Interchange Data Format (TS 102 822-8 (the present document)) and Remote Programming (TS 102 822-9 [13]). This list of Features is to be used as guidance to manufacturers, service providers and content providers regarding the implementation of the Phase 1 and Phase 2 *TV-Anytime* specifications.

Although each in the series of documents is intended to stand alone, a complete and coherent sense of the *TV-Anytime* system standard can be gathered by reading all the specification documents in numerical order.

The *TV-Anytime* Phase 1 metadata specification addresses a data model that allowed a broadcaster to describe the content available within the broadcast system and to therefore "attract" a user to acquire and consume the content.

The present document defines the interchange data format for the delivery of *TV-Anytime* metadata and content referencing information from different data sources.

1 Scope

The present document is one in a series of Technical Specification documents produced by the *TV-Anytime* Forum. These documents establish the fundamental specifications for the services, systems and devices that will conform to the *TV-Anytime* standard, to a level of detail that is implementable for compliant products and services.

TS 102 822-1 [1] and TS 102 822-2 [2] set the context and system architecture in which the standards for Metadata, Content referencing, Bi-directional metadata and metadata protection are to be implemented in the *TV-Anytime* environment. TS 102 822-1 [1] provides benchmark business models against which the *TV-Anytime* system architecture is evaluated to ensure that the specification enable key business applications. TS 102 822-2 [2] presents the *TV-Anytime* System Architecture and the relationship between Phase 1 and Phase 2 technologies. These first two documents are largely informative, while the remainder of the series is normative.

The present document has been developed during the second phase of *TV-Anytime* and covers the definition of the interchange data format for the delivery of *TV-Anytime* metadata and content referencing information from different data sources.

The interchange data format described in the present document was selected in order to satisfy the usage scenarios listed in TS 102 822-1 [1].

The *TV-Anytime* Forum has defined a number of data types that can be exchanged between *TV-Anytime* devices. These include program metadata, content referencing information, and user-centric metadata. The present document addresses data delivery from non *TV-Anytime* sources to *TV-Anytime* clients. A *TV-Anytime* client is typically a PDR, although in the present document the client can be any Internet connected device. These devices do not necessarily need to have the ability to display or store content, since many types of devices can exploit *TV-Anytime* metadata services (e.g. a mobile phone displaying an EPG).

Programme metadata and content referencing information can be delivered unidirectionally (e.g. via traditional broadcast or IP multicast) or via a bi-directional network. A *TV-Anytime* data provider might choose to deliver data using the interchange data format described because it allows:

- a simple adaptation of existing non-*TV Anytime* content selection and location services to provide data for *TV-Anytime* clients;
- the delivery of the *TV-Anytime* data to clients by *TV-Anytime* data providers without access to a broadcast system;
- *TV-Anytime* data providers to personalize the metadata they offer according to the source of the request;
- a range of client devices, which are not necessarily able to receive broadcast data, to access and exploit *TV-Anytime* data. For example, a mobile phone or personal organizer could use the metadata service to show the user an EPG.

Figure 1 shows the relation between non-*TV-Anytime* content selection and location services and *TV-Anytime* clients.

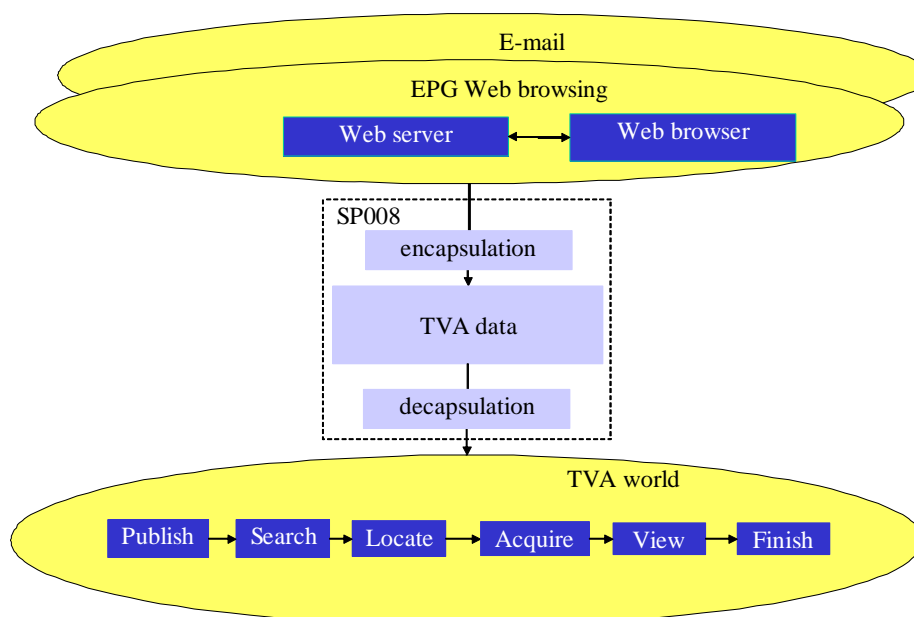


Figure 1: TV-Anytime data delivery from alternate data sources

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

- [1] ETSI TS 102 822-1: "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 1: Benchmark Features".
- [2] ETSI TS 102 822-2: "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 2: Phase 1 - System description".
- [3] ETSI TS 102 822-3-1: "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 3: Metadata; Sub-part 1: Phase 1 - Metadata schemas".
- [4] ETSI TS 102 822-3-2: "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 3: Metadata; Sub-part 2: System aspects in a uni-directional environment".
- [5] ETSI TS 102 822-3-3: "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 3: Metadata; Sub-part 3: Phase 2 - Extended Metadata Schema".
- [6] ETSI TS 102 822-4: "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 4: Phase 1 - Content referencing".

- [7] ETSI TS 102 822-5-1: "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 5: Rights Management and Protection (RMP) Sub-part 1: Information for Broadcast Applications".
- [8] ETSI TS 102 822-5-2: "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 5: Rights Management and Protection (RMP) Sub-part 2: RMPI binding".
- [9] ETSI TS 102 822-6-1: "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 6: Delivery of metadata over a bi-directional network; Sub-part 1: Service and transport".
- [10] ETSI TS 102 822-6-2: "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 6: Delivery of metadata over a bi-directional network; Sub-part 2: Phase 1 - Service discovery".
- [11] ETSI TS 102 822-6-3: "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 6: Delivery of metadata over a bi-directional network; Sub-part 3: Phase 2 - Exchange of Personal Profile".
- [12] ETSI TS 102 822-7: "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".
- [13] ETSI TS 102 822-9: "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 9: Phase 2 - Remote Programming".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

Not applicable.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

acquisition: process of retrieving selected content

client: typically a personal digital recorder or any device connected to the Internet

content: audio, video or other types of material the viewer would like to access

NOTE: Movies, games, TV programmes, radio programmes, etc.

electronic programme guide: means of presenting available content to the consumer and allowing selection of desired content

location resolution: process of establishing the address (location and time) of a specific content instance from its CRID

metadata service: service that provides *TV-Anytime* data via a server on a bi-directional network using the data and protocols defined in the present document

metadata: generally, data about content, such as the title, genre, summary of a television programme consumer preferences and viewing history data

programme: editorially coherent piece of content that is acquired by a PDR as a whole

service provider: aggregator and supplier of content which may include gateway and management roles

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CRID Content Reference IDentifier

NOTE: An identifier for content that is independent of its location specified by TS 102 822-4 [6].

DVB Digital Video Broadcasting project

NOTE: European project providing technical specifications for publication by ETSI.

EPG Electronic Programme Guide

HTTP HyperText Transfer Protocol

IMI Instance Metadata Identifier

MIME Multipurpose Internet Mail Extension

PDR Personal Digital Recorder

TVA *TV-Anytime*

URI Uniform Resource Identifier

URL Uniform Resource Locator

WSIF Web Service Inspection File

WS-Inspection Web Services Inspection language

XML eXtensible Markup Language

4 Core data

4.1 Description

The following elements have been identified to be part of the core data:

- One or more selected contents, each of them containing:
 - a CRID with optionally an IMI;
 - a TVAMain table as specified in TS 102 822-3-1 [3], containing information on a specific content item and/or instance (optional);
 - a content referencing table (optional);
 - an address of the Web server hosting a WS-Inspection file as specified in TS 102 822-6-2 [10] which could be used for further queries as specified in TS 102 822-6-1 [9] (optional);
 - an action (such as "record", "recommend", etc.) defined as a controlled term (optional).

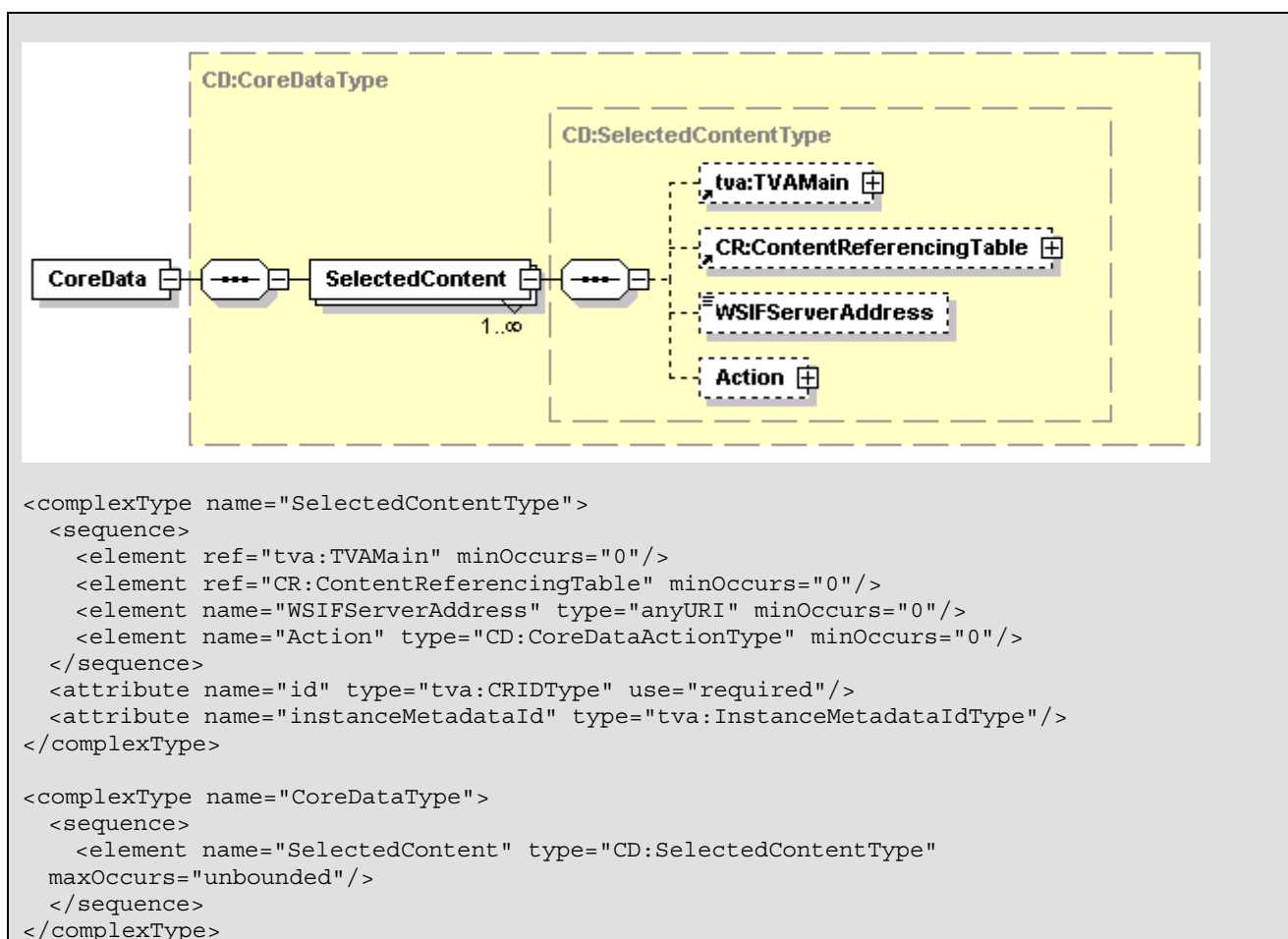
An "acknowledgement" message may be useful, although not absolutely required, in a structure that is not defined in the present document. In some configurations (e.g. where there is no return path), it might be impossible to return an acknowledgement.

4.2 Namespace

The namespace for the *TV-Anytime* CoreData interchange format has been defined as:

```
urn:tva:CoreData:2012
```

4.3 CoreData element



Name	Definition
SelectedContentType	A complex type to describe a list of contents with their associated metadata and the action to be done on them.
tva:TVAMain	A TVAMain table as specified in TS 102 822-3-1 [3].
CR:ContentReferencingTable	A ContentReferencing table as specified in TS 102 822-4 [6].
WSIFServerAddress	A server address referring to a site where the PDR can retrieve a WS Inspection File.
Action	An optional element that describes what the PDR is supposed to do with the selected content. The default value for the action is "Record replacing any existing copy".
id	A mandatory attribute to identify the selected content. The selected content is identified by its Content Referencing Identifier (CRID).
instanceMetadataId	An optional attribute to identify a specific instance of the selected content. This attribute is already defined in TS 102 822-3-1 [3].
CoreDataType	A complex type to describe a list of contents with their associated metadata and the action to be done on them.
SelectedContent	An element used to describe a selected content and all possible information related to this content.

4.4 Action element

```
<complexType name="CoreDataActionType">
  <sequence>
    <element name="Type" type="tva:ControlledTermType"/>
  </sequence>
  <attribute name="instruction" use="optional" default="create">
    <simpleType>
      <restriction base="string">
        <enumeration value="create"/>
        <enumeration value="cancel"/>
      </restriction>
    </simpleType>
  </attribute>
</complexType>
```

Name	Definition
CoreDataActionType	A complex type that describes the intended PDR action on the selected content with the associated metadata.
Type	This element specifies what to do with the selected content (e.g. "Record", "Remind" or "Recommend"). The value is to be chosen from the "CoreDataActionTypeCS" classification scheme listed in clause A.2.
instruction	This optional attribute indicates if this command is a creation or a cancellation of an already sent one. Two values: "create" for a new action (default); "cancel" to cancel an already sent action request on a selected content.

4.5 Examples

4.5.1 CoreData example for a single selected content

Here is an example of a "CoreData" structure containing detailed information about a selected content to be recorded. Content location is included in the ProgramLocationTable.

```
<?xml version="1.0" encoding="UTF-8"?>
<CoreData xmlns="urn:tva:CoreData:2012" xmlns:tva="urn:tva:metadata:2012"
xmlns:CR="urn:tva:ContentReferencing:2012"
xmlns:xsi:schemaLocation="urn:tva:CoreData:2012 CoreData.xsd">
  <SelectedContent Id="CRID://foo.co.uk/Westenders">
    <tva:TVAMain version="03" xml:lang="en" publisher="..." publicationTime="2009-04-
05T21:00:00.00+01:00">
      <tva:CopyrightNotice>...</tva:CopyrightNotice>
      <tva:ProgramDescription>
        <tva:ProgramInformationTable>
          <tva:ProgramInformation programId="CRID://foo.co.uk/Westenders">
            <tva:BasicDescription>
              <tva:Title>Westenders</tva:Title>
              <tva:Keyword>Soap</tva:Keyword>
            </tva:BasicDescription>
          </tva:ProgramInformation>
        </tva:ProgramInformationTable>
        <tva:ProgramLocationTable>
          <tva:BroadcastEvent serviceIDRef="hbc10022311">
            <tva:Program crid="CRID://foo.co.uk/Westenders"/>
            <tva:ProgramURL>dvb://1.4ee2.3f4/</tva:ProgramURL>
            <tva:PublishedStartTime>2009-06-05T18:00:00.00+01:00</tva:PublishedStartTime>
            <tva:PublishedDuration>PT6H</tva:PublishedDuration>
          </tva:BroadcastEvent>
        </tva:ProgramLocationTable>
```

```

    </tva:ProgramDescription>
  </tva:TVAMain>
</SelectedContent>
</CoreData>

```

4.5.2 CoreData example for a set of selected contents

Although this example is not realistic, it is used to illustrate the different actions which can be requested on a selected content. It includes:

- A selected content with the action "recordAllowDuplicates".
- A selected content with the action "remind".
- A selected content with the action "recommend".
- A selected content with the instruction "cancel" to cancel the already sent request for this content.

```

<?xml version="1.0" encoding="UTF-8"?>
<CoreData xmlns="urn:tva:CoreData:2012" xmlns:tva="urn:tva:metadata:2012"
xmlns:CR="urn:tva:ContentReferencing:2012" xmlns:xsi:schemaLocation="urn:tva:CoreData:2012
CoreData.xsd">
  <SelectedContent id="CRID://www.channel1.com/movies/title">
    <tva:TVAMain/>
    <WSIFServerAddress>http://www.TV-Channel1.com</WSIFServerAddress>
    <Action instruction="create">
      <Type href="urn:tva:CoreData:cs:CoreDataActionTypeCS:2005:2">
        <tva:Name xml:lang="en">recordAllowDuplicates</tva:Name>
        <tva:Definition xml:lang="en"> to be recorded, authorize duplicate if a copy
          already exists : CRID for latest news, two media formats</tva:Definition>
      </Type>
    </Action>
  </SelectedContent>

  <SelectedContent id="CRID://www.channel1.com/movies/new_title">
    <tva:TVAMain/>
    <WSIFServerAddress>http://www.TV-Channel1.com</WSIFServerAddress>
    <Action>
      <Type href="urn:tva:CoreData:cs:CoreDataActionTypeCS:2005:4">
        <tva:Name xml:lang="en">remind</tva:Name>
        <tva:Definition xml:lang="en"> >Message coming from another device of the end-
          user or a friend, just for information</tva:Definition>
      </Type>
    </Action>
  </SelectedContent>

  <SelectedContent id="CRID://www.channel2.com/movies/titanic">
    <CR:ContentReferencingTable version="1"/>
    <WSIFServerAddress>http://www.TV-Channel1.com</CRTServerAddress>
    <Action>
      <Type href="urn:tva:CoreData:cs:CoreDataActionTypeCS:2005:5">
        <tva:Name xml:lang="en">recommend</tva:Name>
        <tva:Definition xml:lang="en">preselection coming from me or suggestion coming
          from any user</tva:Definition>
      </Type>
    </Action>
  </SelectedContent>

  <SelectedContent id="CRID://www.channel3.com/series/friends"
InstanceMetadataId="imi:metadataProv.com/2">
    <tva:TVAMain/>
    <CR:ContentReferencingTable version="1"/>
    <WSIFServerAddress>http://www.TV-AllChannels.com</WSIFServerAddress>
    <Action instruction="cancel">
      <Type href="urn:tva:CoreData:cs:CoreDataActionTypeCS:2005:2">
        <tva:Name xml:lang="en">recordAllowDuplicates</tva:Name>
        <tva:Definition xml:lang="en"> to be recorded, authorize duplicate if a copy
          already exists : CRID for latest news, two media formats</tva:Definition>
      </Type>
    </Action>
  </SelectedContent>

```

```
</Type>
</Action>
</SelectedContent>
</CoreData>
```

5 TVA metadata retrieval from web sites

There are many providers of EPG related services on the web who offer information about content in formats that would not be understood by *TV Anytime* enabled devices. Without using the present document, when a consumer sees a piece (or pieces) of content described on the website EPG, and chooses to record that content, they would have to repeat the search and selection process from the beginning on their TVA device.

The present document provides a mechanism that allows these services to include sufficient information that can be transferred to a TVA device so that it can safely capture the consumer's request.

This could be done, for example, if the website displayed a specific button or link on a page offering the ability to download a "CoreData" file, as specified in the present document, for the selected content to their TVA device.

The "Content-Type" in the HTTP header of the response shall contain the following MIME type to launch the TVA recorder programme: "application/x-tva-recorder".

The file extension ".cdt" is allocated to the CoreData Structure.

Annex A (normative): Interchange data scheme and classification scheme

A.1 Interchange data scheme

The following clause contains the tva_core_data_8_v141.xsd file.

```
<?xml version="1.0" encoding="UTF-8"?>
<schema targetNamespace="urn:tva:CoreData:2012" xmlns:cd="urn:tva:CoreData:2012"
xmlns:cr="urn:tva:ContentReferencing:2012" xmlns:tva="urn:tva:metadata:2012"
xmlns="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <annotation>
    <documentation xml:lang="en">This schema consists of datatypes that are normatively
defined in ETSI TS 102 822-8 v1.4.1</documentation>
  </annotation>
  <import namespace="urn:tva:metadata:2012" schemaLocation="tva_metadata_3-1_v181.xsd"/>
  <import namespace="urn:tva:ContentReferencing:2012"
schemaLocation="tva_content_referencing_4_v171.xsd"/>
  <import namespace="urn:tva:mpeg7:2008" schemaLocation="tva_mpeg7_2008.xsd"/>

  <element name="CoreData" type="cd:CoreDataType" />
  <complexType name="CoreDataActionType">
    <sequence>
      <element name="Type" type="tva:ControlledTermType"/>
    </sequence>
    <attribute name="instruction" use="optional" default="create">
      <simpleType>
        <restriction base="string">
          <enumeration value="create"/>
          <enumeration value="cancel"/>
        </restriction>
      </simpleType>
    </attribute>
  </complexType>

  <complexType name="SelectedContentType" >
    <sequence>
      <element ref="tva:TVAMain" minOccurs="0" />
      <element ref="cr:ContentReferencingTable" minOccurs="0"/>
      <element name="WSIFServerAddress" type="anyURI" minOccurs="0" />
      <element name="Action" type="cd:CoreDataActionType" minOccurs="0" />
    </sequence>
    <attribute name="id" type="tva:CRIDType" use="required"/>
    <attribute name="instanceMetadataId" type="tva:InstanceMetadataIdType"/>
  </complexType>

  <complexType name="CoreDataType">
    <sequence >
      <element name="SelectedContent" type="cd:SelectedContentType"
maxOccurs="unbounded"/>
    </sequence>
  </complexType>
</schema>
```

A.2 Core data action type classification scheme

The following clause contains the CoreDataActionTypeCS.xml file.

```
<?xml version="1.0" encoding="UTF-8"?>
<ClassificationScheme uri="urn:tva:CoreData:cs:CoreDataActionTypeCS:2005">
  <Term termID="1">
    <Name xml:lang="en">recordReplace</Name>
    <Definition xml:lang="en"> to be recorded, replacing exiting one if it
exists</Definition>
  </Term>
  <Term termID="2">
    <Name xml:lang="en">recordAllowDuplicates</Name>
    <Definition xml:lang="en"> to be recorded, authorize duplicate if a copy already
exists : CRID for latest news, two media formats</Definition>
  </Term>
  <Term termID="3">
    <Name xml:lang="en">recordIfNotYetExists</Name>
    <Definition xml:lang="en"> to be recorded only if it is not yet recorded. E.g.: to
complete a series without rerecording</Definition>
  </Term>
  <Term termID="4">
    <Name xml:lang="en">remind</Name>
    <Definition xml:lang="en">Message coming from another device of the end-user or a
friend, just for information</Definition>
  </Term>
  <Term termID="5">
    <Name xml:lang="en">recommend</Name>
    <Definition xml:lang="en">preselection coming from me or suggestion coming from any
user</Definition>
  </Term>
</ClassificationScheme>
```

Annex B (normative): *TV-Anytime* description schemes for interchange data format

The *TV-Anytime* DSs listed in the present document have been aggregated into several xsd files identified by the Description Schemes' names, forming the reference documentation, contained in archive ts_10282208v010601p0.zip which accompanies the present document:

- tva_Core_Data_8_v161.xsd contains the interchange data scheme defined in clause A.1.
- CoreDataActionTypeCS.xml contains the Core Data Action Type Classification Scheme defined in clause A.2.

In order to validate, tva_Core_Data_8_v161.xsd imports several description schemes from other parts of the *TV-Anytime* specification:

- tva_metadata_3-1_v181.xsd and tva_mpeg7_2008.xsd and can be found in ts_1028220301v010801p0.zip, which is a file attached to ts_1028220301v010801p.doc.
- tva_content_referencing_4_v171.xsd can be found in ts_10282204v010701p0.zip, which is a file attached to ts_10282204v010701p.doc.

History

Document history		
V1.1.1	January 2006	Publication
V1.2.1	November 2007	Publication
V1.3.1	May 2009	Publication
V1.4.1	July 2010	Publication
V1.5.1	November 2011	Publication
V1.6.1	December 2012	Publication