Open IPTV Forum – Release 1 Specification

Volume 1 – Overview

V1.0, January 6, 2009

Open IPTV Forum

Open IPTV Forum

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The Open IPTV Forum members accept no liability whatsoever for any use of this document.

This specification provides multiple options for some features. The Open IPTV Forum Profiling specification will complement the Release 1 specifications by defining the Open IPTV Forum implementation and deployment profiles. Any implementation based on Open IPTV Forum specifications that does not follow the Profiling specifications cannot claim Open IPTV Forum compliance.

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Foreword

This specification has been produced by the Open IPTV Forum (OIPF).

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The Open IPTV Forum Release 1 Solution specification consists of seven Volumes:

- Volume 1 - Overview (the present document)

- Volume 2 - Media Formats

- Volume 3 - Content Metadata

- Volume 4 - Protocols

- Volume 5 - Declarative Application Environment

- Volume 6 - Procedural Application Environment

- Volume 7 – Authentication, Content Protection and Service Protection

The Overview (Volume 1, the present document) is an informative guide to the other Volumes, which deal with the specific aspects of the Release 1 Solution.

1 Scope (Informative)

The Open IPTV Release 1 Solution provides the specifications for an end-to-end platform for the deployment of the set of Release 1 IPTV Services. Figure 1 shows a high-level logical view of the scope of the Release 1 Solution.

The Open IPTV Forum has developed an end-to-end solution to allow any consumer end-device, compliant to the Open IPTV Forum specifications, to access enriched and personalised IPTV services either in a managed or a non-managed network.

To that end, the Open IPTV Forum focuses on standardising the user-to-network interface (UNI) both for a managed and a non-managed network, as depicted in Figure 1.
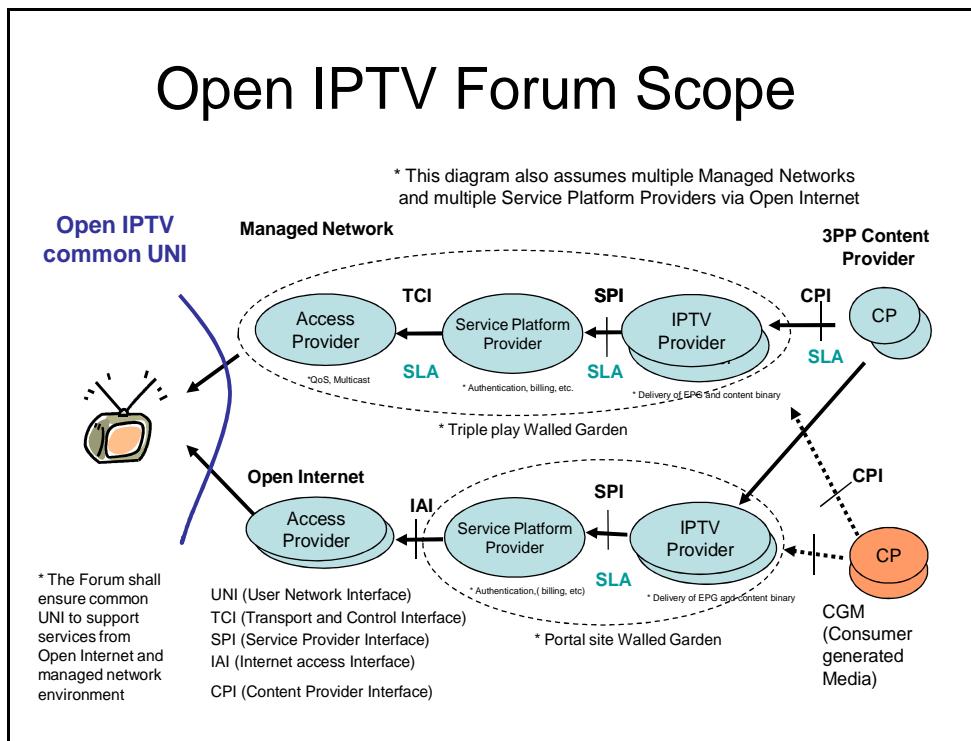
Figure 1 Open IPTV Forum scope

Throughout the specifications, the terms "Open Internet" and "Unmanaged Network" are used interchangeably, to refer to the ability to access any Service Provider using any Access Network Provider without any quality of service guarantees.

Open Internet IPTV Services are accessed via the Internet, without QoS guarantees. Open Internet IPTV services are accessed via a service platform (e.g., a portal) that provides supporting facilities for multiple Service Providers.

2 References

2.1 Normative References

The present document makes no normative references.

2.2 Open IPTV Forum References

[OIPF_SERV]	Open IPTV Forum, "Services and Functions for Release 1", September 2007
[OIPF_REQS]	Open IPTV Forum, "Service and Platform Requirements", September 2007
[OIPF_ARCH]	Open IPTV Forum, "Functional Architecture" V1.2, January 2009
[OIPF_MEDIA]	Open IPTV Forum, "Release 1 Specification, Volume 2 - Media Formats", V1.0, January 2009
[OIPF_META]	Open IPTV Forum, "Release 1 Specification, Volume 3 - Content Metadata", V1.0, January 2009
[OIPF_PROT]	Open IPTV Forum, "Release 1 Specification, Volume 4 – Protocols", V1.0, January 2009
[OIPF_DAE]	Open IPTV Forum, "Release 1 Specification, Volume 5 - Declarative Application Environment", V1.0, January 2009
[OIPF_PAE]	Open IPTV Forum, "Release 1 Specification, Volume 6 - Procedural Application Environment", V1.0, January 2009
[OIPF_CSP]	Open IPTV Forum, "Release 1 Specification, Volume 7 - Authentication, Content Protection and Service Protection", V1.0, January 2009

2.3 Informative References

The present document makes no informative references.

3 Terminology and Conventions

3.1 Conventions

All sections in the present document are informative.

3.2 Definitions

Term	Definition
Access Network	The network infrastructure used by the Access Provider to deliver IPTV services to the Consumer. The access network infrastructure is used for the delivery of the content and may include quality of service management to ensure that appropriate network resources are available for the delivery of the content.
Application	Collection of assets and logic that together provide a Service to the User. Assets and logic may reside either in an application Server or in the ITF or both.
Consumer Domain	The domain where the IPTV services are consumed. A consumer domain can consist of a single terminal or a network of terminals and related devices for service consumption.
Consumer Network	The local area network in which the IPTV Terminal Function is located. Consumer Networks include Residential Networks, hot spots, hotel networks etc.
Consumer(s)	See End User(s).
Content	An instance of audio, video, audio-video information, or data.
Content Guide	An on-screen guide to Scheduled Content and Content on Demand, allowing a User to navigate, select, and discover content by time, title, channel, genre, etc.
Content on Demand (CoD)	A Content on Demand service is a service where a user can select the individual content items they want to watch from the list of available content. Consumption of the content is started upon user request.
Content Protection	Means to protect content from unauthorized usage such as re-distribution, recording, playback, duplication etc
Content Provider	Entity that provides Content and associated usage rights to the IPTV Service Provider.
End User(s)	The individual(s) (e.g., members of the same family) who actually use the IPTV Services.
Internet	The Internet is the worldwide, publicly accessible network of interconnected computer networks that transmit data by packet switching using the standard Internet Protocol (IP).
IPTV Service Provider	Entity that offers IPTV Services and which has a contractual relationship with the Subscriber.
IPTV Solution	Defined by the Forum's specifications.
IPTV Terminal Function (ITF)	The functionality within the Consumer Network that is responsible for terminating the media and control for an IPTV Service.
Local Storage	Content storage within the administrative realm of the IPTV Service Provider, but not in their physical environment (for example, local storage could be a partition of storage located in the residential network and allocated to the Service Provider to pre-load CoD).
nPVR	Network based Personal Video Recorder. Provision of PVR functionality whereby the content is stored in the IPTV Service Provider domain. The nPVR allows a user to schedule recording of scheduled content programs. The user can later select the content they want to watch from the recorded content.
Portal	A function of a Service Platform that provides an entry point to individual IPTV Services to Users via a GUI.
Program	A segment of Scheduled Content with a defined beginning and end.
Program Guide	See Content Guide.
Push CoD	A type of Content on Demand where the content is pre-loaded to the ITF local storage by the Service Provider. The user has no direct control of what content is pre-loaded; however the Service Provider may make the choice based on user preferences and habits. Content is available for direct consumption after the user selection is confirmed.
Residential Network	The local network of devices (gateways and terminals) at the End User's premises.
Scheduled Content	An IPTV Service where the playout schedule is fixed by an entity other than the User. The Content is

	delivered to the user for immediate consumption.
Service	Content and Applications provided by Service Platform Providers and Service Providers.
Service Access Protection	Means to protect IPTV Services from unauthorized usage/access, such as - Access from unauthorized users - DOS attack
Service Platform Provider	Entity which, based on a contractual relationship with IPTV Service Providers, provides the supporting functions for the delivery of IPTV Services, such as charging, access control and other functions which are not part of the IPTV Service, but required for managing its delivery.
Service Protection	Means to protect Contents (files or streams) during their delivery.
Session Portability	Ability of a given Service/Application to be switched from one device to another for a continuation of a session in real time.
Subscriber	The individual that makes the contract (subscription) with a Service Provider for the consumption of certain Services.
Subscriber Profile	Information associated with a subscription.
Trick Mode	Facility to allow the User to control the playback of Content, such as pause, fast and slow playback, reverse playback, instant access, replay, forward and reverse skipping.
User Profile	Information (e.g., viewing preferences) associated with a specific User who is a part of a subscription.
User(s)	See End User(s).

3.3 Abbreviations

Abbreviation	*Definition*
ADSL	Asymmetric Digital Subscriber Line
AG	Application Gateway
AKA	Authentication and Key Agreement
AP	Access Point and Authentication Proxy
API	Application Programming Interface
A-RACF	Access Resource Admission Control Function
AS	Application Server
ASM	Authentication and Session Management
AV	Authentication Vector
A/V	Audio and Video
BCG	Broadband Content Guide (specified by the DVB Project)
BTF	Basic Transport Function
CAC	Connectivity Admission Control
CAS	Conditional Access System
CC	Cluster Controller
CD	Content Delivery
CDC	Connected Device Configuration
CDF	Content Delivery Function
CDN	Content Delivery Network
CDNC	CDN Controller
CDS	Content Directory Service
CE	Consumer Equipment
CG	Content Guide

CK	Ciphering Key
CoD	Content on Demand
CPE	Customer Premise Equipment
CPI	Content Provider Interface
CSP	Content and Service Protection
CSPG	CSP Gateway
DAE	Declarative Application Environment
DHCP	Dynamic Host Configuration Protocol
DLNA	Digital Living Network Alliance
DLNA DMC	DLNA Digital Media Controller
DLNA DMP	DLNA Digital Media Player
DLNA DMR	DLNA Digital Media Renderer
DLNA DMS	DLNA Digital Media Server
DOS	Denial of Service
DRM	Digital Rights Management
DSCP	DIFFServ Code Point
DSL	Digital Subscriber Line
DTCP-IP	Digital Transmission Content Protection over Internet Protocol
DTT	Digital Terrestrial Television
DVB-IP	Digital Video Broadcasting (over) Internet Protocol
ECMA	European Computer Manufacturers Association, ECMA International - European association for standardizing information and communication systems
EPG	Electronic Program Guide
FE	Functional Entity
GBA	Generic Bootstrapping Architecture
GENA	General Event Notification Architecture
GPON	Gigabit Ethernet Passive Optical Network
GUI	Graphical User Interface
HD	High Definition
HDMI	High Definition Multimedia Interface
HLA	High Level Architecture
HN	Home Network
HSS	Home Subscriber Server
HTTP	Hypertext Transfer Protocol
IAI	Internet Access Interface
IG	IMS Gateway
IGMP	Internet Group Management Protocol
IMPI	IMS Private User Identity
IMPU	IMS Public User identity
IMS	IP Multimedia Subsystem
IP	Internet Protocol
IPTV	Internet Protocol Television

ISIM	IMS Subscriber Identity Module
ISP	Internet Service Provider
ITF	IPTV Terminal Function
M/C-U/C	Multicast to Unicast
LAN	Local Area Network
MAC	Message Authentication Code
MDTF	Multicast Data Terminating Function
MSRP	Message Session Relay Protocol
NAT	Network Address Translation
nPVR	Network Personal Video Recorder
OIPF	Open IPTV Forum
OITF	Open IPTV Terminal Function
OMA	Open Mobile Alliance
PAE	Procedural Application Environment
P2P	Peer-to-Peer
PC	Personal Computer
PIM	Protocol Independent Multicast
PLMN	Public Land Mobile Network
POTS	Plain Old Telephony Service
PVR	Personal Video Recorder
QoS	Quality of Service
RAC	Resource and Admission Control
RAND	Random Challenge
RCEF	Resource Control Enforcement Function
RTP	Real Time Protocol
RTCP	Real Time Control Protocol
RTSP	Real Time Streaming Protocol
RMS	Remote Management System
RUI	Remote User Interface
SAA	Service Access Authentication
SCART	Syndicat des Constructeurs d'Appareils Radiorécepteurs et Téléviseurs
S-CSCF	Serving Call Session Control Function
SD	Standard Definition
SD&S	Service Discovery and Selection (specified by the DVB Project)
SDP	Session Description Protocol
SLA	Service Level Agreement
SIM	Subscriber Identity Module
SIP	Session Initiation Protocol
SMS	Short Message Service
SP	Service Provider
SPI	Service Provider Interface

SPDF	Service-based Policy Decision Function
SPP	Service Platform Provider
SSO	Single Sign-On
STB	Set Top Box
TBD	To Be Determined
TCI	Transport and Control Interface
TCP/IP	Transmission Control Protocol/Internet Protocol
UE	User Entity
UI	User Interface
UICC	Universal Integrated Circuit Card
UNI	User Network Interface
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
USIM	Universal Subscriber Identity Module
VoD	Video on Demand
xDSL	Any DSL
WLAN	Wireless LAN
WG	WAN Gateway
WAN	Wide Area Network
XML	eXtensible Markup Language
XHTML	eXtensible Hypertext Markup Language

4 Release 1 Specifications Overview (Informative)

The Release 1 specifications provide an end-to-end solution for the deployment of the set of IPTV services described in [OIPF_SERV]. The solution adheres to the Open IPTV Platform and Service Requirements [OIPF_REQS] and is based on the Release 1 Architecture [OIPF_ARCH].

The IPTV Services can be summarised as:

- Scheduled content services (linear TV), including their recording (PVR), Electronic Programme Guide (EPG) and hybrid services (combining the usage of the IPTV and broadcast channels),

- Content on demand (both streaming and download) services,

- Information services, both with and without any relation to content services, and

- Communication services, including notifications, and their blending with content services.

These IPTV services can be provided generally in both the managed network and open internet modes of operation.

Functions are specified which enable attractive and innovative ways to provide the services listed above. They can be summarised as:

- Service provisioning, including:

    o Network attachment

    o User management, including the management of multiple users within a household, where applicable,

    o Quality-of-Service (QoS) provisioning,

    o Remote management of the devices in the home network, including configuration, fault diagnosis and software upgrade,

- Service access and control,

- Service and content navigation,

- Interactive application platforms,

- Content and service protection, where applicable,

- Interworking with DLNA-compliant home network devices.

Detailed specifications of the Release 1 Solution are provided in separate Volumes. These are:

- Volume 2 – Media Formats [OIPF_MEDIA]. This Volume specifies the complete set of media formats adopted in Release 1, including audio, video and systems layers, also ancillary content like subtitles and resources used by other parts of the Solution, like graphics formats.

- Volume 3 – Content Metadata [OIPF_META]. This Volume specifies all aspects of content metadata, including service provider information and metadata delivery.

- Volume 4 – Protocols [OIPF_PROT]. This Volume specifies the complete set of protocols for the Release 1 Solution corresponding to the set of reference points defined in the Release 1 Architecture [ARCH].

- Volume 5 - Declarative Application Environment [OIPF_DAE]. This Volume specifies the browser-based application environment that runs in the Open IPTV Terminal Function (OITF).

- Volume 6 - Procedural Application Environment [OIPF_PAE]. This Volume specifies the Java-based application environment that runs in the Application Gateway (AG).

- Volume 7 – Authentication, Content Protection and Service Protection [OIPF_CSP]. This Volume specifies the set of tools and methods to protect IPTV services and content, and to authenticate the User.

Annex A provides an informative summary of all XML schema usage in the Release 1 Solution specifications.

Annex A XML Schemas (Informative)

A.1 Imports

Table 1 lists the schema files that are imported into other schemas, but that are not defined by the Open IPTV Forum.

Schema Namespace	Schema Filename
urn:ietf:params:xml:ns:enum-token-1.0	enum-token-1.0.xsd
urn:ietf:params:xml:ns:enum-token-1.0	enum-tokendata-1.0.xsd
http://www.w3.org/2000/09/xmldsig#	xmldsig-core-schema.xsd
urn:tva:metadata:2007	tva_metadata_3-1_v141.xsd
urn:tva:mpeg7:2005	tva_mpeg7.xsd
urn:ietf:params:xml:ns:pidf:data-model	data-model.xsd, common-schema.xsd
urn:dvb:ipi:sdns:2006	sdns3r7.xsd
urn:tva:metadata:2005	tva_metadata_3-1_v131.xsd
urn:dvb:mhp:2006	mhpiptv.xsd
urn:tva:metadata:cs:ActionTypeCS:2004	ActionTypeCS.xml
urn:tva:metadata:cs:AtmosphereCS:2005	AtmosphereCS.xml
urn:tva:metadata:cs:AudioPurposeCS:2007	AudioPurposeCS.xml
urn:tva:metadata:cs:CaptionCodingFormatCS:2007	CaptionCodingFormatCS.xml
urn:tva:metadata:cs:ContentAlertCS:2005	ContentAlertCS.xml
urn:tva:metadata:cs:ContentCommercialCS:2005-03	ContentCommercialCS.xml
urn:tva:metadata:cs:ContentCS:2007	ContentCS.xml
urn:tva:metadata:cs:DerivationReasonCS:2007	DerivationReasonCS.xml
urn:tva:metadata:cs:FormatCS:2007	FormatCS.xml
urn:tva:metadata:cs:HowRelatedCS:2007	HowRelatedCS.xml
urn:tva:metadata:cs:IntendedAudienceCS:2005	IntendedAudienceCS.xml
urn:tva:metadata:cs:IntentionCS:2005	IntentionCS.xml
urn:tva:metadata:cs:MediaTypeCS:2005	MediaTypeCS.xml
urn:tva:metadata:cs:OriginationCS:2005	OriginationCS.xml
urn:tva:metadata:cs:PurchaseTypeCS:2004	PurchaseTypeCS.xml
urn::mpeg:mpeg7:cs:RoleCS:2001	RoleCS.xml
urn:tva:metadata:cs:TVARoleCS:2005	TVARoleCS.xml
urn:tva:metadata:cs:UnitTypeCS:2007	UnitTypeCS.xml

Table 1 Imported XML schema files

A.2 Includes

The following are the schema files that are included into other schemas, i.e. they are not used independently to form XML documents. These schemas are defined by the Open IPTV Forum.

A.2.1 DRMPrivateDataType

This schema is specified normatively in Volume 7 [OIPF_CSP].

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <!-- schema filename is csp-DRMPrivateDataType.xsd -->
    <xs:complexType name="DRMPrivateDataType" abstract="true">
        <!--
        <xs:sequence>
            <any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        -->
        <xs:attribute name="mimeType" type="xs:string" use="optional"/>
        <!-- NOTE: DRMPrivateDataType is an abstract type that can be extended and replaced by a specific instance type
                to carry messages for a particular DRM system. Derived types of <DRMPrivateData> should include an
                <any> construct to be prepared for future extensibility, as is done for example for <MarlinPrivateData>
                in [CSP] -->
    </xs:complexType>
</xs:schema>
```

A.2.2 MarlinPrivateDataType

This schema is specified normatively in Volume 7 [OIPF_CSP].

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <!-- schema filename is  csp-MarlinPrivateDataType.xsd -->
    <xs:include schemaLocation="csp-DRMPrivateDataType.xsd"/>
    <xs:complexType name="MarlinPrivateDataType">
        <xs:complexContent>
            <xs:extension base="DRMPrivateDataType">
                <xs:sequence>
                    <xs:element name="MarlinLicense" type="xs:base64Binary"/>
                    <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
                </xs:sequence>
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>
</xs:schema>
```

A.2.3 HexBinaryPrivateDataType

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <!-- schema filename is  csp-HexBinaryPrivateDataType.xsd -->
    <xs:include schemaLocation="csp-DRMPrivateDataType.xsd"/>
    <xs:complexType name="HexBinaryPrivateDataType">
        <xs:complexContent>
            <xs:extension base="DRMPrivateDataType">
```

```
            <xs:sequence>
                <xs:element name="Message" type="xs:hexBinary"/>
            </xs:sequence>
        </xs:extension>
    </xs:complexContent>
  </xs:complexType>
</xs:schema>
```

A.3 Redefines

The following are the schema files that have types which are used by the Open IPTV Forum through the use of redefine.

A.3.1 ce-html-profiles-1-0.xsd

This schema is specified normatively in Volume 5 [OIPF_DAE].

Due to constraints within the XML schema syntax, this file is also modified to include an additional enumeration value in scalingType, "0.33x0.33".

```
<xs:simpleType name="scalingType">
    <xs:restriction base="xs:string">
            <xs:enumeration value="arbitrary"/>
            <xs:enumeration value="quartersize"/>
            <xs:enumeration value="none"/>
            <xs:enumeration value="0.33x0.33"/>
    </xs:restriction>
</xs:simpleType>
```

A.4 Specification Schemas

A.4.1 urn:oipf:config:ig:2008

This schema is specified normatively in Volume 5 [OIPF_DAE].

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:oipf:config:ig:2008" xmlns:tns="urn:oipf:config:ig:2008"
xmlns:xs="http://www.w3.org/2001/XMLSchema"  xmlns:enumToken="urn:ietf:params:xml:ns:enum-token-1.0">
    <!-- schema filename is  config-ig.xsd -->
    <xs:import namespace="http://www.w3.org/XML/1998/namespace" schemaLocation="xml.xsd"/>
    <xs:import namespace="urn:ietf:params:xml:ns:enum-token-1.0" schemaLocation="imports/enum-token-1.0.xsd"/>
    <xs:element name="IGconfiguration" type="tns:IGconfigurationType"/>
    <xs:complexType name="IGconfigurationType">
        <xs:sequence>
            <xs:element name="AuthenticationTriplet" type="tns:AuthenticationTripletType" maxOccurs="unbounded"/>
            <xs:element name="GatewayAuthentication" type="xs:boolean" minOccurs="0"/>
            <xs:any namespace="##other" processContents="skip" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="AuthenticationTripletType">
        <xs:sequence>
            <xs:element name="Identifier" type="tns:IMSPublicIdType"/>
            <xs:element name="Password" type="xs:string"/>
            <xs:element name="Alias" type="xs:string"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="IMSPublicIdType">
```

```xml
            <xs:choice>
                <xs:element name="e164Number" type="enumToken:e164numberType"/>
                <xs:element name="SIPURI" type="tns:SIPURIType"/>
            </xs:choice>
        </xs:complexType>
    <xs:simpleType name="SIPURIType">
        <xs:annotation>
            <xs:documentation>
                SIP URI pattern is defined based on the SIP URI
                description provided in RFC 3261 (Section 2)
            </xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:string">
            <xs:pattern value="[sS][iI][pP][sS]?:(//([^/?#]*))?([^?#]*)(\?([^#]*))?(#(.*))?"/>
        </xs:restriction>
    </xs:simpleType>
</xs:schema>
```

A.4.2 urn:oipf:config:oitf:oitfCapabilities:2008

This schema is specified normatively in Volume 5 [OIPF_DAE].

```xml
<?xml version="1.0" encoding="ISO-8859-1"?>
<xs:schema targetNamespace="urn:oipf:config:oitf:oitfCapabilities:2008" xmlns="urn:oipf:config:oitf:oitfCapabilities:2008"
xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified" attributeFormDefault="unqualified">
    <!-- schema filename is  config-oitf-oitfCapabilities.xsd -->
    <!-- Redefined uiExtensionsType of the original schema as defined in Annex C of CEA-2014
      (i.e. imports/ce-html-profiles-1-0.xsd) to add the new elements defined in Section 9.2
      of Open IPTV Forum Solution Specification Volume 5 Declarative Application Environment Release 1).
    -->
    <xs:redefine schemaLocation="imports/ce-html-profiles-1-0.xsd">
        <xs:complexType name="uiExtensionType">
            <xs:complexContent>
                <xs:extension base="uiExtensionType">
                    <xs:choice minOccurs="0" maxOccurs="unbounded">
                        <xs:element name="video_broadcast" type="videoBroadcastType"
                            minOccurs="0" maxOccurs="unbounded"/>
                        <xs:element name="overlaylocaltuner" type="overlayType"/>
                        <xs:element name="overlayIPbroadcast" type="overlayType"/>
                        <xs:element name="recording" type="pvrType"/>
                        <xs:element name="parentalcontrol" type="parentalControlType"/>
                        <xs:element name="extendedAVControl" type="xs:boolean"/>
                        <xs:element name="clientMetadata" type="metadataType"/>
                        <xs:element name="configurationChanges" type="xs:boolean"/>
                        <xs:element name="ims" type="xs:boolean"/>
                        <xs:element name="communication_services" type="xs:boolean"/>
                        <xs:element name="drm" type="drmType" minOccurs="0" maxOccurs="unbounded"/>
                        <xs:element name="remote_diagnostics" type="xs:boolean"/>
                    </xs:choice>
                </xs:extension>
            </xs:complexContent>
        </xs:complexType>
        <!-- Redefined downloadType to add attribute manageDownloads -->
        <xs:complexType name="downloadType">
            <xs:simpleContent>
                <xs:extension base="downloadType">
                    <xs:attribute name="manageDownloads" type="manageDownloadsType" default="none"/>
                </xs:extension>
```

```xml
        </xs:simpleContent>
      </xs:complexType>
      <!-- Redefined audioProfileType to add attribute DRMSystemID -->
      <xs:complexType name="audioProfileType">
        <xs:complexContent>
          <xs:extension base="audioProfileType">
            <xs:attribute name="DRMSystemID" type="xs:string"/>
          </xs:extension>
        </xs:complexContent>
      </xs:complexType>
      <!-- Redefined videoProfileType to add attribute DRMSystemID -->
      <xs:complexType name="videoProfileType">
        <xs:complexContent>
          <xs:extension base="videoProfileType">
            <xs:attribute name="DRMSystemID" type="xs:string"/>
          </xs:extension>
        </xs:complexContent>
      </xs:complexType>
  </xs:redefine>
  <!-- ADDED: type definitions for the new xs:elements defined in Section 9.2 of the
      Open IPTV forum Volume 5 Declarative Application Environment Release 1 specification-->
  <xs:simpleType name="manageDownloadsType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="none"/>
      <xs:enumeration value="initiator"/>
      <xs:enumeration value="samedomain"/>
      <xs:enumeration value="all"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="videoBroadcastType">
    <xs:attribute name="type" type="xs:string" use="required"/>
    <xs:attribute name="transport" type="xs:string"/>
    <xs:attribute name="nrstreams" type="xs:unsignedInt" default="1"/>
    <xs:attribute name="scaling" type="scalingType" default="arbitrary"/>
    <xs:attribute name="minSize" type="xs:unsignedInt" default="0"/>
    <xs:attribute name="postList" type="xs:boolean" default="false"/>
  </xs:complexType>
  <xs:complexType name="pvrType">
    <xs:simpleContent>
      <xs:extension base="xs:boolean">
        <xs:attribute name="ipBroadcast" type="xs:boolean" default="false"/>
        <xs:attribute name="manageRecordings" type="xs:boolean" default="false"/>
        <xs:attribute name="postList" type="xs:boolean" default="false"/>
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>
  <xs:complexType name="parentalControlType">
    <xs:simpleContent>
      <xs:extension base="xs:boolean">
        <xs:attribute name="schemes" type="xs:string"/>
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>
  <xs:complexType name="metadataType">
    <xs:simpleContent>
      <xs:extension base="xs:boolean">
        <xs:attribute name="type" type="xs:string"/>
```

```
                </xs:extension>
            </xs:simpleContent>
        </xs:complexType>
        <xs:complexType name="drmType">
            <xs:simpleContent>
                <xs:extension base="xs:string">
                    <xs:attribute name="DRMSystemID" type="xs:string" use="required"/>
                    <xs:attribute name="protectionGateways" type="xs:string"/>
                </xs:extension>
            </xs:simpleContent>
        </xs:complexType>
    </xs:schema>
```

A.4.3 urn:oipf:csp:MIPPVControlMessage:2008

This schema is specified normatively in Volume 7 [OIPF_CSP].

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:oipf:csp:MIPPVControlMessage:2008"
xmlns:tns="urn:oipf:csp:MIPPVControlMessage:2008" xmlns:xs="http://www.w3.org/2001/XMLSchema"
elementFormDefault="qualified" attributeFormDefault="unqualified">
    <!-- schema filename is  csp-MIPPVControlMessage.xsd -->
    <xs:element name="MIPPVControlMessage">
        <xs:complexType>
            <xs:sequence>
                <xs:element name="MarlinLicense" type="xs:base64Binary" minOccurs="0"/>
                <xs:element name="MarlinActionToken" minOccurs="0">
                    <xs:complexType>
                        <xs:simpleContent>
                            <xs:extension base="xs:base64Binary">
                                <xs:attribute name="absoluteAcquisitionTiming" type="xs:dateTime" use="optional"/>
                                <xs:attribute name="relativeAcquisitionTiming" type="xs:duration" use="optional"/>
                            </xs:extension>
                        </xs:simpleContent>
                    </xs:complexType>
                </xs:element>
            </xs:sequence>
        </xs:complexType>
    </xs:element>
</xs:schema>
```

A.4.4 urn:oipf-org:device:ag:1

This schema is specified normatively in Volume 4 [OIPF_PROT].

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:oipf-org:device:ag:1" xmlns:tns="urn:oipf-org:device:ag:1"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
    <!-- schema filename is  device-ag.xsd -->
    <xs:element name="agDescription">
        <xs:complexType>
            <xs:sequence>
                <xs:element name="agDefaultURL" type="xs:anyURI"/>
                <xs:element name="agUIServerURL" type="xs:anyURI" minOccurs="0"/>
            </xs:sequence>
        </xs:complexType>
    </xs:element>
</xs:schema>
```

A.4.5 urn:oipf-org:device:cspg-dtcp:1

This schema is specified normatively in Volume 4 [OIPF_PROT].

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:oipf-org:device:cspg-dtcp:1" xmlns:tns="urn:oipf-org:device:cspg-dtcp:1"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
    <!-- schema filename is  device-cspg.xsd -->
    <xs:element name="cspgdtcpDescription">
        <xs:complexType>
            <xs:sequence>
                <xs:element name="DtcpPort" type="xs:integer"/>
                <xs:element name="HttpProxyPort" type="xs:integer"/>
                <xs:element name="RtspProxyPort" type="xs:integer"/>
                <xs:element name="DRMSystemID" type="xs:anyURI" maxOccurs="unbounded"/>
            </xs:sequence>
        </xs:complexType>
    </xs:element>
</xs:schema>
```

A.4.6 urn:oipf-org:device:ig:1

This schema is specified normatively in Volume 4 [OIPF_PROT].

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:oipf-org:device:ig:1" xmlns:tns="urn:oipf-org:device:ig:1"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
    <!-- schema filename is  device-ig.xsd -->
    <xs:element name="igDescription">
        <xs:complexType>
            <xs:sequence>
                <xs:element name="igURL" type="xs:anyURI"/>
            </xs:sequence>
            <xs:attribute name="SupportedMethod" type="tns:Hexadecimal16bit" use="optional"/>
        </xs:complexType>
    </xs:element>
    <xs:simpleType name="Hexadecimal16bit">
        <xs:restriction base="xs:string">
            <xs:pattern value="[0-9a-fA-F]{1,4}"/>
        </xs:restriction>
    </xs:simpleType>
</xs:schema>
```

A.4.7 ChannelConfig DTD

This DTD is specified normatively in Volume 5 [OIPF_DAE].

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!ELEMENT ChannelConfig (ChannelList,(FavouriteLists,CurrentFavouriteList?)?)>
<!ELEMENT ChannelList (Channel*)>
<!-- List of channels that can be received by the tuner of the OITF; the order of channels in the list corresponds to the
channel order as managed by the OITF -->


<!ELEMENT Channel (((ONID, TSID, SID) | SourceID | (Freq, CNI?) | IPBroadcastID), Name, Favourite?, Recordable?,
Locked?, ManualBlock?)>
<!-- For a DVB digital channel use ONID+TSID+SID,
for an ISDB (ARIB) digital channel use ONID+TSID+SID,
for a ATSC terrestrial channel use SourceID,
```

for analog channel use Freq and CNI (if available). The IPBroadcastID element is only relevant for IPTV broadcasts, as defined in Section 7.5 -->

<!ATTLIST Channel CCID ID #REQUIRED>
<!-- string: Unique identifier of a channel within the scope of the OITF. The format of CCID SHALL have a prefix 'ccid:', e.g., 'ccid:{tuner.}majorChannel{.minorChannel}'. The CCID is defined and managed by the OITF.-->

<!ATTLIST Channel channelType CDATA "TYPE_OTHER">
<!-- string: Indicates the type of media content carried over the channel. Valid values include "TYPE_TV", "TYPE_RADIO" and "TYPE_OTHER". If not included, the default value is "TYPE_OTHER". -->

<!ATTLIST Channel idType CDATA #REQUIRED>
<!-- string: Indicates the type of 'global' identification for the channel. Valid values are "ID_ANALOG", "ID_DVB_C", "ID_DVC_S", "ID_DVB_T", "ID_ISDB_C", "ID_ISDB_S", "ID_ISDB_T", "ID_ATSC_T", and "ID_IPTV_SDS", "ID_IPTV_URI". -->

<!ELEMENT ONID (#PCDATA)>
<!-- integer: DVB or ISDB original network ID (for channels of type ID_DVB_* and ID_ISDB_*) -->

<!ELEMENT TSID (#PCDATA)>
<!-- integer: DVB or ISDB transport stream ID (for channels of type ID_DVB_* and ID_ISDB_*) -->

<!ELEMENT SID (#PCDATA)>
<!-- integer: DVB or ISDB service ID (for channels of type ID_DVB_* and ID_ISDB_*) -->

<!ELEMENT SourceID (#PCDATA)>
<!-- integer: ATSC terrestrial source_ID -->

<!ELEMENT Freq (#PCDATA)>
<!-- integer: frequency of content carrier in KHz -->

<!ELEMENT CNI (#PCDATA)>
<!-- integer: VPS/PDC confirmed network identifier if valid -->

<!ELEMENT IPBroadcastID (#PCDATA)>
<!-- string: if the Channel has idType ID_IPTV_SDS, this element denotes the DVB Textual Service Identifier of the IP broadcast service, specified in the format "ServiceName.DomainName" with the ServiceName and DomainName as defined in TS 102 034 V1.3.1
If the Channel has idType ID_IPTV_URI, this element denotes a URI of the IP broadcast service.
This element is only relevant for IPTV broadcasts, as defined in Section 7.5
-->

<!ELEMENT Name (#PCDATA)>
<!-- string: Name of broadcaster, can be used for linking analog channels without CNI. May be an empty string. -->

<!ELEMENT Favourite EMPTY>
<!-- empty: user has marked this TV channel as favourite -->

<!ATTLIST Favourite FavIDS IDREFS #REQUIRED>
<!-- indicates in which favourite lists this channel is selected, see FavouriteLists -->

<!ELEMENT FavouriteLists (FavouriteList+)>
<!-- collection of more than one favourite lists in OITF -->

<!ELEMENT FavouriteList (FavName)>
<!ATTLIST FavouriteList FavID ID #REQUIRED>
<!-- ID of favourite list, referred to by Channel.Favourite -->

```
<!ELEMENT FavName (#PCDATA)>
<!-- string: Name of favourite list -->
```

```
<!ELEMENT CurrentFavouriteList EMPTY>
<!ATTLIST CurrentFavouriteList FavID IDREF #REQUIRED>
<!-- currently active FavouriteChannelList, IDREF is one of ID in FavouriteLists, if CurrentFavouriteList is not given, not
favourite filter list is currently applied and all channels are 'selected' -->
```

```
<!ELEMENT Recordable (#PCDATA)>
<!-- Flag indicating whether the channel can be recorded; only applicable if the OITF indicated support for control of its
recording functionality. Valid values include "True" or "False". If this element is not included, the default value is "False". --
>
```

```
<!ELEMENT Locked (#PCDATA)>
<!-- Flag indicating whether the current state of the parental control system prevents the channel from being viewed (e.g. a
correct parental control pin has not been entered). Valid values include "True" or "False". If this element is not included,
the default value is "False".-->
```

```
<!ELEMENT ManualBlock (#PCDATA)>
<!-- Flag indicating whether the user has manually blocked viewing of this channel.  Manual blocking of a channel will treat
the channel as if its parental rating value always exceeded the system threshold. Valid values include "True" or "False". If
this element is not included, the default value is "False".-->
```

A.4.8 urn:oipf:iptv:ContentAccessDescriptor:2008

This schema is specified normatively in Volume 5 [OIPF_DAE].

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:oipf:iptv:ContentAccessDescriptor:2008"
xmlns:tns="urn:oipf:iptv:ContentAccessDescriptor:2008" xmlns:xs="http://www.w3.org/2001/XMLSchema"
elementFormDefault="qualified" attributeFormDefault="unqualified">
    <!-- schema filename is  iptv-ContentAccessDescriptor.xsd -->
    <!-- includes the definition for abstract type "DRMPrivateDataType" (as defined in Open IPTV Forum Solution
Specification
    Volume 3 Metadata Release 1)  and its specific instance type "MarlinPrivateDataType" or
"HexBinaryPrivateDataType"
    (as defined in Open IPTV Forum      Solution Specification Volume 7 Authentication, Content Protection and Service
Protection Release 1) -->
    <xs:import namespace="http://www.w3.org/XML/1998/namespace"
schemaLocation="http://www.w3.org/2001/xml.xsd"/>
    <xs:include schemaLocation="csp-MarlinPrivateDataType.xsd"/>
    <xs:include schemaLocation="csp-DRMPrivateDataType.xsd"/>
    <xs:include schemaLocation="csp-HexBinaryPrivateDataType.xsd"/>
    <xs:element name="Contents" type="tns:ContentsType"/>
    <xs:complexType name="ContentsType">
       <xs:sequence>
          <xs:element name="ContentItem" type="tns:ContItemType" maxOccurs="unbounded"/>
       </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ContItemType">
       <xs:sequence>
          <xs:element name="Title" type="tns:TitleType"/>
          <xs:element name="Synopsis" type="tns:SynopsisType" minOccurs="0"/>
          <xs:element name="OriginSite" type="xs:anyURI" minOccurs="0"/>
          <xs:element name="ContentURL" type="tns:ContentURLType" maxOccurs="unbounded"/>
          <xs:element name="MetadataURL" type="xs:anyURI" minOccurs="0"/>
          <xs:element name="NotifyURL" type="xs:anyURI" minOccurs="0"/>
          <xs:element name="ParentalRating" type="tns:ParentalRatingType"
                minOccurs="0" maxOccurs="unbounded"/>
```

```xml
            <xs:element name="DRMControlInformation" type="tns:DRMControlInformationType"
                    minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="TitleType">
        <xs:simpleContent>
            <xs:extension base="xs:string">
                <xs:attribute ref="xml:lang"/>
            </xs:extension>
        </xs:simpleContent>
    </xs:complexType>
    <xs:complexType name="SynopsisType">
        <xs:simpleContent>
            <xs:extension base="xs:string">
                <xs:attribute ref="xml:lang"/>
            </xs:extension>
        </xs:simpleContent>
    </xs:complexType>
    <xs:complexType name="ContentURLType">
        <xs:simpleContent>
            <xs:extension base="xs:anyURI">
                <xs:attribute name="DRMSystemID" type="xs:string" use="optional"/>
                <xs:attribute name="TransferType" type="tns:TransferTypeEnum" default="playable_download"/>
                <xs:attribute name="Size" type="xs:integer" use="required"/>
                <xs:attribute name="MIMEType" type="xs:string" use="required"/>
                <xs:attribute name="MediaFormat" type="xs:string" use="optional"/>
                <xs:attribute name="VideoCoding" type="xs:string" use="optional"/>
                <xs:attribute name="AudioCoding" type="xs:string" use="optional"/>
            </xs:extension>
        </xs:simpleContent>
    </xs:complexType>
    <xs:simpleType name="TransferTypeEnum">
        <xs:restriction base="xs:string">
            <xs:enumeration value="full_download"/>
            <xs:enumeration value="playable_download"/>
            <xs:enumeration value="streaming"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="ParentalRatingType">
        <xs:simpleContent>
            <xs:extension base="xs:string">
                <xs:attribute name="Scheme" type="xs:string" use="optional"/>
                <xs:attribute name="Region" type="xs:string" use="optional"/>
            </xs:extension>
        </xs:simpleContent>
    </xs:complexType>
    <xs:complexType name="DRMControlInformationType">
        <xs:sequence>
            <xs:element name="DRMSystemID" type="xs:string"/>
            <xs:element name="DRMContentID" type="xs:string"/>
            <xs:element name="RightsIssuerURL" type="xs:anyURI" minOccurs="0"/>
            <xs:element name="SilentRightsURL" type="xs:anyURI" minOccurs="0"/>
            <xs:element name="PreviewRightsURL" type="xs:anyURI" minOccurs="0"/>
            <xs:element name="DoNotRecord" type="xs:boolean" minOccurs="0"/>
            <xs:element name="DoNotTimeShift" type="xs:boolean" minOccurs="0"/>
            <xs:element ref="tns:DRMGenericData" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element ref="tns:DRMPrivateData" minOccurs="0" maxOccurs="unbounded"/>
```

```
        </xs:sequence>
    </xs:complexType>
    <xs:element name="DRMGenericData" type="tns:DRMGenericDataType"/>
    <xs:element name="DRMPrivateData" type="tns:DRMPrivateDataType"/>
    <xs:complexType name="DRMGenericDataType">
        <xs:sequence>
            <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:element name="MarlinPrivateData" type="tns:MarlinPrivateDataType" substitutionGroup="tns:DRMPrivateData"/>
    <xs:element name="HexBinaryPrivateData" type="tns:HexBinaryPrivateDataType"
        substitutionGroup="tns:DRMPrivateData"/>
</xs:schema>
```

A.4.9 urn:oipf:iptv:IPTVProfile:2008

This schema is specified normatively in Volume 4 [OIPF_PROT].

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:oipf:iptv:IPTVProfile:2008" xmlns:tns="urn:oipf:iptv:IPTVProfile:2008"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:ueprofile="urn:oipf:iptv:UEProfile:2008"
elementFormDefault="qualified" attributeFormDefault="unqualified">
    <!-- schema filename is  iptv-IPTVProfile.xsd -->
    <xs:import namespace="urn:oipf:iptv:UEProfile:2008" schemaLocation="iptv-UEProfile.xsd"/>
    <xs:element name="IPTVProfile">
        <xs:annotation>
            <xs:documentation>
                XML Schema for representing the IPTV Profile object
            </xs:documentation>
        </xs:annotation>
        <xs:complexType>
            <xs:sequence>
                <xs:element name="UEProfile" type="ueprofile:tUEProfile" minOccurs="0"/>
                <xs:element name="GlobalSettings" type="tns:tGlobalSettings"/>
                <xs:element name="BCProfile" type="tns:tBCProfile" minOccurs="0"/>
                <xs:element name="CoDProfile" type="tns:tCoDProfile" minOccurs="0"/>
                <xs:element name="PVRProfile" type="tns:tPVRProfile" minOccurs="0"/>
                <xs:element name="Extension" type="tns:tExtension" minOccurs="0"/>
                <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="ProfileId" type="xs:ID"/>
            <xs:anyAttribute/>
        </xs:complexType>
    </xs:element>
    <xs:complexType name="tBCProfile">
        <xs:sequence>
            <xs:element name="BCServicePackage" type="tns:tBCServicePackage" maxOccurs="unbounded"/>
            <xs:element name="Extension" type="tns:tExtension" minOccurs="0"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tBCServicePackage">
        <xs:sequence>
            <xs:element name="BCPackageId" type="tns:tBCServicePackageID"/>
            <xs:element name="Description" type="tns:tBCServicePackageDescription" minOccurs="0"/>
            <xs:element name="BCService" type="tns:tBCService" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="Extension" type="tns:tExtension" minOccurs="0"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
```

```xml
        </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="tBCServicePackageID" final="list restriction">
        <xs:restriction base="xs:string">
            <xs:minLength value="0"/>
            <xs:maxLength value="16"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tBCServicePackageDescription" final="list restriction">
        <xs:restriction base="xs:string">
            <xs:minLength value="0"/>
            <xs:maxLength value="64"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="tBCService">
        <xs:sequence>
            <xs:element name="ParentalControl" type="tns:tParentalControlLevel" minOccurs="0"/>
            <xs:element name="BCServiceId" type="tns:tBCServiceID"/>
            <xs:element name="QualityDefinition" type="tns:tQualityDefinition" minOccurs="0"/>
            <xs:element name="Extension" type="tns:tExtension" minOccurs="0"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="tBCServiceID" final="list restriction">
        <xs:restriction base="xs:string">
            <xs:minLength value="0"/>
            <xs:maxLength value="16"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tQualityDefinition" final="list restriction">
        <xs:restriction base="xs:unsignedByte">
            <xs:minInclusive value="0"/>
            <xs:maxInclusive value="1"/>
            <xs:enumeration value="0">
                <xs:annotation>
                    <xs:documentation>
                        <xs:label xml:lang="en">SD</xs:label>
                        <xs:definition xml:lang="en">
                            Standard Definition
                        </xs:definition>
                    </xs:documentation>
                </xs:annotation>
            </xs:enumeration>
            <xs:enumeration value="1">
                <xs:annotation>
                    <xs:documentation>
                        <xs:label xml:lang="en">HD</xs:label>
                        <xs:definition xml:lang="en">
                            High Definition
                        </xs:definition>
                    </xs:documentation>
                </xs:annotation>
            </xs:enumeration>
        </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="tCoDProfile">
        <xs:sequence>
```

```xml
            <xs:element name="ParentalControl" type="tns:tParentalControlLevel" minOccurs="0"/>
            <xs:element name="Extension" type="tns:tExtension" minOccurs="0"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="tParentalControlLevel" final="list restriction">
        <xs:restriction base="xs:unsignedByte">
            <xs:minInclusive value="0"/>
            <xs:maxInclusive value="5"/>
            <xs:enumeration value="0">
                <xs:annotation>
                    <xs:documentation>
                        <xs:label xml:lang="en">ALL</xs:label>
                        <xs:definition xml:lang="en">
                            All contents
                        </xs:definition>
                    </xs:documentation>
                </xs:annotation>
            </xs:enumeration>
            <xs:enumeration value="1">
                <xs:annotation>
                    <xs:documentation>
                        <xs:label xml:lang="en">Level 1</xs:label>
                        <xs:definition xml:lang="en">
                            Level 1 contents
                        </xs:definition>
                    </xs:documentation>
                </xs:annotation>
            </xs:enumeration>
            <xs:enumeration value="2">
                <xs:annotation>
                    <xs:documentation>
                        <xs:label xml:lang="en">Level 2</xs:label>
                        <xs:definition xml:lang="en">
                            Up to level 2
                        </xs:definition>
                    </xs:documentation>
                </xs:annotation>
            </xs:enumeration>
            <xs:enumeration value="3">
                <xs:annotation>
                    <xs:documentation>
                        <xs:label xml:lang="en">Level 3</xs:label>
                        <xs:definition xml:lang="en">
                            Up to level 3
                        </xs:definition>
                    </xs:documentation>
                </xs:annotation>
            </xs:enumeration>
            <xs:enumeration value="4">
                <xs:annotation>
                    <xs:documentation>
                        <xs:label xml:lang="en">Level 4</xs:label>
                        <xs:definition xml:lang="en">
                            Up to level 4
                        </xs:definition>
                    </xs:documentation>
```

```xml
                    </xs:annotation>
                </xs:enumeration>
                <xs:enumeration value="5">
                    <xs:annotation>
                        <xs:documentation>
                            <xs:label xml:lang="en">Level 5</xs:label>
                            <xs:definition xml:lang="en">
                                Up to level 5
                            </xs:definition>
                        </xs:documentation>
                    </xs:annotation>
                </xs:enumeration>
            </xs:restriction>
        </xs:simpleType>
        <xs:complexType name="tPVRProfile">
            <xs:sequence>
                <xs:annotation>
                    <xs:documentation>
                        Unit of the StorageLimitInVolume element is the
                        GigaOctet
                    </xs:documentation>
                </xs:annotation>
                <xs:element name="PVRPreference" type="tns:tPVRPreference"/>
                <xs:element name="StorageLimitInTime" type="tns:tStorageLimitInTime" minOccurs="0"/>
                <xs:element name="StorageLimitInVolume" type="tns:tStorageLimitInVolume" minOccurs="0"/>
                <xs:element name="Extension" type="tns:tExtension" minOccurs="0"/>
                <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
        </xs:complexType>
        <xs:simpleType name="tPVRPreference" final="list restriction">
            <xs:restriction base="xs:unsignedByte">
                <xs:minInclusive value="0"/>
                <xs:maxInclusive value="1"/>
                <xs:enumeration value="0">
                    <xs:annotation>
                        <xs:documentation>
                            <xs:label xml:lang="en">Network</xs:label>
                            <xs:definition xml:lang="en">
                                Recording is done in the network
                            </xs:definition>
                        </xs:documentation>
                    </xs:annotation>
                </xs:enumeration>
                <xs:enumeration value="1">
                    <xs:annotation>
                        <xs:documentation>
                            <xs:label xml:lang="en">User_Equipment</xs:label>
                            <xs:definition xml:lang="en">
                                Recording is done on the user equipment
                            </xs:definition>
                        </xs:documentation>
                    </xs:annotation>
                </xs:enumeration>
            </xs:restriction>
        </xs:simpleType>
        <xs:simpleType name="tStorageLimitInTime">
            <xs:restriction base="xs:duration">
```

```
                    <xs:minInclusive value="PT0H"/>
                    <xs:maxInclusive value="PT1000000000H"/>
                </xs:restriction>
            </xs:simpleType>
            <xs:simpleType name="tStorageLimitInVolume">
                <xs:restriction base="xs:nonNegativeInteger"/>
            </xs:simpleType>
            <xs:complexType name="tGlobalSettings">
                <xs:sequence>
                    <xs:element name="LanguagePreference" type="tns:tLanguage" minOccurs="0"/>
                    <xs:element name="UsersActionRecodable" type="tns:tUserActionRecordable"/>
                    <xs:element name="Extension" type="tns:tExtension" minOccurs="0"/>
                    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
                </xs:sequence>
            </xs:complexType>
            <xs:simpleType name="tLanguage">
                <xs:restriction base="xs:string">
                    <xs:annotation>
                        <xs:documentation>
                            <xs:definition xml:lang="en">
                                ISO 639-2 Language code
                            </xs:definition>
                        </xs:documentation>
                    </xs:annotation>
                    <xs:minLength value="3"/>
                    <xs:maxLength value="3"/>
                </xs:restriction>
            </xs:simpleType>
            <xs:complexType name="tExtension">
                <xs:sequence>
                    <xs:any processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
                </xs:sequence>
            </xs:complexType>
            <xs:simpleType name="tUserActionRecordable">
                <xs:restriction base="xs:boolean"/>
            </xs:simpleType>
</xs:schema>
```

A.4.10   SynchronizeType

This schema is specified normatively in Volume 5 [OIPF_DAE].

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <!-- schema filename is  iptv-SynchronizeType.xsd -->
    <xs:element name="synchronizelist" type="SynchronizeType"/>
    <xs:complexType name="SynchronizeType">
        <xs:sequence>
            <xs:element name="content" type="ContentType" minOccurs="1" maxOccurs="1"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="ContentType">
        <xs:sequence>
            <xs:element name="content_ID" type="xs:string" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
</xs:schema>
```

A.4.11 urn:oipf:iptv:UEProfile:2008

This schema is specified normatively in Volume 4 [OIPF_PROT].

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:oipf:iptv:UEProfile:2008" xmlns:tns="urn:oipf:iptv:UEProfile:2008"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:tva="urn:tva:metadata:2007" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <!-- schema filename is  iptv-UEProfile.xsd -->
    <xs:import namespace="urn:tva:metadata:2007" schemaLocation="imports/tva_metadata_3-1_v141.xsd"/>
    <xs:annotation>
        <xs:documentation xml:lang="en">
            Defines the capabilities of the UE that is currently
            associated with the user
        </xs:documentation>
    </xs:annotation>
    <xs:element name="UEInformation" type="tns:tUEProfile"/>
    <xs:complexType name="tUEProfile">
        <xs:sequence>
            <xs:element name="UserEquipmentID" type="tns:tUEID"/>
            <xs:element name="UserEquipmentClass" type="tns:tUserEquipmentClass"/>
            <xs:element name="Resolution" type="tns:tResolution" minOccurs="0"/>
            <xs:element name="SupportedEncodings" type="tns:tSupportedEncodings" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="IPEncapsulations" type="tns:tIPEncapsulations" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="Extension" type="tns:tExtension" minOccurs="0"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="tUEID" final="list restriction">
        <xs:annotation>
            <xs:documentation>
                <xs:label xml:lang="en">User Equipment ID</xs:label>
                <xs:definition xml:lang="en">
                    Unique Identifier for the UE(to be specified)
                </xs:definition>
            </xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:string">
            <xs:minLength value="0"/>
            <xs:maxLength value="16"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tUserEquipmentClass" final="list restriction">
        <xs:annotation>
            <xs:documentation>
                <xs:label xml:lang="en">User Equipment class</xs:label>
                <xs:definition xml:lang="en">
                    Specifies the type of UE
                </xs:definition>
            </xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:string">
            <xs:enumeration value="OITF-TV"/>
            <xs:enumeration value="OITF-STB"/>
        </xs:restriction>
    </xs:simpleType>
```

```xml
<xs:complexType name="tResolution">
    <xs:attribute name="HorizontalSize" type="xs:integer">
        <xs:annotation>
            <xs:documentation>
                horizontal size in pixels of the screen
            </xs:documentation>
        </xs:annotation>
    </xs:attribute>
    <xs:attribute name="VerticalSize" type="xs:integer">
        <xs:annotation>
            <xs:documentation>
                vertical size in pixels of the screen
            </xs:documentation>
        </xs:annotation>
    </xs:attribute>
    <xs:attribute name="Rotate" type="xs:boolean">
        <xs:annotation>
            <xs:documentation>
                set to TRUE if the screen can be rotated (horizontal
                becomes vertical)
            </xs:documentation>
        </xs:annotation>
    </xs:attribute>
</xs:complexType>
<xs:complexType name="tSupportedEncodings">
    <xs:annotation>
        <xs:documentation>
            <xs:label xml:lang="en">encodings</xs:label>
            <xs:definition xml:lang="en">
                Specifies the supported audio and video encodings
                (eg. MPEG2,H264 AC3, AAC etc)
            </xs:definition>
        </xs:documentation>
    </xs:annotation>
    <xs:sequence>
        <xs:element name="AudioEncoding" type="tns:tAudioEncoding" minOccurs="0" maxOccurs="unbounded"/>
        <xs:element name="UEInformation" type="tns:tVideoEncoding" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="tAudioEncoding">
    <xs:annotation>
        <xs:documentation>
            <xs:label xml:lang="en">Audio Encoding</xs:label>
            <xs:definition xml:lang="en">
                Specifies supported audio encoding Properties
            </xs:definition>
        </xs:documentation>
    </xs:annotation>
    <xs:sequence>
        <xs:element name="Encoding" type="tva:ControlledTermType"/>
        <xs:element name="Extension" type="tns:tExtension" minOccurs="0"/>
        <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="tVideoEncoding">
    <xs:annotation>
        <xs:documentation>
```

```xml
                <xs:label xml:lang="en">Video Encoding</xs:label>
                <xs:definition xml:lang="en">
                    Specifies supported video encoding properties
                </xs:definition>
            </xs:documentation>
        </xs:annotation>
        <xs:sequence>
            <xs:element name="Encoding" type="tva:ControlledTermType"/>
            <xs:element name="SupportedFrameRate" type="tva:FrameRateType" minOccurs="0"
maxOccurs="unbounded"/>
            <xs:element name="Extension" type="tns:tExtension" minOccurs="0"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="tIPEncapsulations" final="list restriction">
        <xs:annotation>
            <xs:documentation>
                <xs:label xml:lang="en">encapsulation</xs:label>
                <xs:definition xml:lang="en">
                    Specifies the IP encapsulation that is supported on
                    the device (UDP/RTP, UDP/M2TS, UDP/RTP/M2TS)
                </xs:definition>
            </xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:string">
            <xs:minLength value="0"/>
            <xs:maxLength value="16"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="tExtension">
        <xs:sequence>
            <xs:any processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
</xs:schema>
```

A.4.12   urn:oipf:service:bcg:2008

This schema is specified normatively in Volume 3 [OIPF_META].

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:oipf:service:bcg:2008" xmlns:tns="urn:oipf:service:bcg:2008"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:tva="urn:tva:metadata:2007" elementFormDefault="qualified"
attributeFormDefault="unqualified">
    <!-- schema filename is  service-bcg.xsd -->
    <xs:import namespace="urn:tva:metadata:2007" schemaLocation="imports/tva_metadata_3-1_v141.xsd"/>
    <xs:include schemaLocation="csp-MarlinPrivateDataType.xsd"/>
    <xs:include schemaLocation="csp-DRMPrivateDataType.xsd"/>
    <xs:complexType name="PurchaseItemType">
        <xs:complexContent>
            <xs:extension base="tva:PurchaseItemType">
                <xs:sequence>
                    <xs:element name="DRMControlInformation" type="tns:DRMControlInformationType" minOccurs="0"
maxOccurs="unbounded"/>
                </xs:sequence>
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>
```

```xml
<xs:complexType name="DRMControlInformationType">
    <xs:sequence>
        <xs:element name="DRMSystemID" type="xs:anyURI"/>
        <xs:element name="DRMContentID" type="xs:anyURI"/>
        <xs:element name="RightsIssuerURL" type="xs:anyURI" minOccurs="0"/>
        <xs:element name="SilentRightsURL" type="xs:anyURI" minOccurs="0"/>
        <xs:element name="PreviewRightsURL" type="xs:anyURI" minOccurs="0"/>
        <xs:element name="DoNotRecord" type="xs:boolean" minOccurs="0"/>
        <xs:element name="DoNotTimeShift" type="xs:boolean" minOccurs="0"/>
        <xs:element ref="tns:DRMGenericData" minOccurs="0" maxOccurs="unbounded"/>
        <xs:element ref="tns:DRMPrivateData" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
</xs:complexType>
<xs:element name="DRMGenericData" type="tns:DRMGenericDataType"/>
<xs:element name="DRMPrivateData" type="tns:DRMPrivateDataType"/>
<xs:element name="MarlinPrivateData" type="tns:MarlinPrivateDataType" substitutionGroup="tns:DRMPrivateData"/>
<xs:complexType name="DRMGenericDataType">
    <xs:sequence>
        <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="OnDemandProgramType">
    <xs:complexContent>
        <xs:extension base="tva:OnDemandProgramType">
            <xs:sequence>
                <xs:element name="Protocol" type="tva:ControlledTermType" minOccurs="0"/>
            </xs:sequence>
        </xs:extension>
    </xs:complexContent>
</xs:complexType>
</xs:schema>
```

A.4.13   urn:oipf:service:oitfpresence:2008

This schema is specified normatively in Volume 4 [OIPF_PROT].

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:oipf:service:oitfpresence:2008" xmlns:tns="urn:oipf:service:oitfpresence:2008"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:pdm="urn:ietf:params:xml:ns:pidf:data-model"
xmlns:profile="urn:oipf:iptv:IPTVProfile:2008" elementFormDefault="qualified" attributeFormDefault="unqualified"
version="0.1">
    <!-- schema filename is  service-oitfpresence.xsd -->
    <xs:import namespace="urn:ietf:params:xml:ns:pidf:data-model" schemaLocation="imports/data-model.xsd"/>
    <!-- OMA extensions to PIDF tuple element for IPTV Presence services-->
    <xs:import namespace="urn:oipf:iptv:IPTVProfile:2008" schemaLocation="iptv-IPTVProfile.xsd"/>
    <!-- Import of the IPTV Profile elements -->
    <!-- list of definition of TISPAN element -->
    <xs:simpleType name="tCurrentBCProgramID" final="list restriction">
        <xs:restriction base="xs:string">
            <xs:minLength value="0"/>
            <xs:maxLength value="16"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="tCurrentContentID" final="list restriction">
        <xs:restriction base="xs:string">
            <xs:minLength value="0"/>
            <xs:maxLength value="16"/>
        </xs:restriction>
```

```xml
    </xs:simpleType>
    <xs:complexType name="tBCServicePresence">
        <xs:sequence>
            <xs:element name="CurrentBCServiceID" type="profile:tBCServiceID" minOccurs="0"/>
            <xs:element name="CurrentBCProgramID" type="tns:tCurrentBCProgramID" minOccurs="0"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tCoDServicePresence">
        <xs:sequence>
            <xs:element name="CurrentCoDContentID" type="tns:tCurrentContentID" minOccurs="0"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="tNPVRServicePresence">
        <xs:sequence>
            <xs:element name="CurrentNPVRContentID" type="tns:tCurrentContentID" minOccurs="0"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <!-- end TISPAN basic element definition -->
    <xs:simpleType name="hybridTechnologyType">
        <xs:restriction base="xs:string">
            <xs:enumeration value="DVB-T"/>
            <xs:enumeration value="DVB-H"/>
            <xs:enumeration value="DVB-S"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="IPTVHybridType">
        <xs:sequence>
            <xs:element name="watchedBroadcast" type="tns:hybridContentType"/>
            <xs:element ref="pdm:deviceID"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="Technology" type="tns:hybridTechnologyType"/>
    </xs:complexType>
    <xs:complexType name="hybridContentType">
        <xs:sequence>
            <xs:element name="currentChannel" type="xs:string"/>
            <xs:element name="currentProgram" type="xs:string"/>
            <xs:element name="serviceID" type="xs:string"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:element name="IPTVHybridService">
        <xs:complexType>
            <xs:sequence maxOccurs="unbounded">
                <xs:element name="IPTVHybrid" type="tns:IPTVHybridType"/>
            </xs:sequence>
        </xs:complexType>
    </xs:element>
</xs:schema>
```

A.4.14   urn:oipf:service:sdns:2008

This schema is specified normatively in Volume 3 [OIPF_META].

```xml
<?xml version="1.0" encoding="UTF-8"?>
```

```xml
<xs:schema xmlns:tns="urn:oipf:service:sdns:2008" xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:tva="urn:tva:metadata:2007" xmlns:dvb="urn:dvb:ipi:sdns:2006" xmlns:dvbmhp="urn:dvb:mhp:2006"
xmlns:oipfbcg="urn:oipf:service:bcg:2008" targetNamespace="urn:oipf:service:sdns:2008">
    <!-- schema filename is  service-sdns.xsd -->
    <xs:import namespace="urn:tva:metadata:2007" schemaLocation="imports/tva_metadata_3-1_v141.xsd"/>
    <xs:import namespace="urn:dvb:ipi:sdns:2006" schemaLocation="imports/sdns3r7.xsd"/>
    <xs:import namespace="urn:dvb:mhp:2006" schemaLocation="imports/mhpiptv.xsd"/>
    <xs:import namespace="urn:oipf:service:bcg:2008" schemaLocation="service-bcg.xsd"/>
    <xs:element name="ServiceDiscovery">
        <xs:complexType>
            <xs:choice>
                <xs:element name="BroadcastDiscovery" type="dvb:BroadcastOffering" maxOccurs="unbounded"/>
                <xs:element name="CoDDiscovery" type="dvb:CoDOffering" maxOccurs="unbounded"/>
                <xs:element name="ServicesFromOtherSP" type="dvb:ReferencedServices" maxOccurs="unbounded"/>
                <xs:element name="PackageDiscovery" type="dvb:PackagedServices" maxOccurs="unbounded"/>
                <xs:element name="ServiceProviderDiscovery" type="tns:ServiceProvider" maxOccurs="unbounded"/>
                <xs:element name="BCGDiscovery" type="dvb:BCGOffering" maxOccurs="unbounded"/>
                <xs:element name="ContentGuideDiscovery" type="tns:ContentGuideOffering" maxOccurs="unbounded"/>
                <xs:element name="CommunicationDiscovery" type="tns:CommunicationOffering"/>
            </xs:choice>
            <xs:attribute name="Version" type="dvb:Version" use="optional"/>
        </xs:complexType>
    </xs:element>
    <xs:complexType name="CommunicationOffering">
        <xs:complexContent>
            <xs:extension base="dvb:OfferingBase">
                <xs:sequence>
                    <xs:element name="InitialAppLoc" type="xs:anyURI"/>
                </xs:sequence>
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>
    <xs:complexType name="ServiceProvider">
        <xs:sequence>
            <xs:element name="ServiceProvider" maxOccurs="unbounded">
                <xs:complexType>
                    <xs:sequence>
                        <xs:element name="Name" type="dvb:MultilingualType" maxOccurs="unbounded"/>
                        <xs:element name="Description" type="dvb:MultilingualType" minOccurs="0"
maxOccurs="unbounded"/>
                        <xs:element name="Offering" type="tns:OfferingListType" minOccurs="0"/>
                        <xs:element name="ApplicationList" type="dvbmhp:ApplicationList" minOccurs="0"/>
                    </xs:sequence>
                    <xs:attribute name="DomainName" type="dvb:DomainType" use="required"/>
                    <xs:attribute name="Version" type="dvb:Version" use="required"/>
                    <xs:attribute name="LogoURI" type="xs:anyURI" use="optional"/>
                </xs:complexType>
            </xs:element>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="OfferingListType">
        <xs:choice maxOccurs="unbounded">
            <xs:element name="Push" type="dvb:DVBSTPTransportModeType"/>
            <xs:element name="Pull">
                <xs:complexType>
                    <xs:complexContent>
                        <xs:extension base="dvb:PayloadList">
                            <xs:attribute name="Location" type="dvb:PullURL" use="required"/>
```

```xml
            </xs:extension>
          </xs:complexContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="WebOfferingLoc" type="dvb:DescriptionLocation"/>
    </xs:choice>
  </xs:complexType>
  <xs:complexType name="ContentGuideOffering">
    <xs:complexContent>
      <xs:extension base="dvb:OfferingBase">
        <xs:sequence>
          <xs:element name="BCG" maxOccurs="unbounded">
            <xs:complexType>
              <xs:sequence>
                <xs:element name="Name" type="dvb:MultilingualType" maxOccurs="unbounded"/>
                <xs:element name="Description" type="dvb:MultilingualType" minOccurs="0"
maxOccurs="unbounded"/>
                <xs:element name="TransportMode" type="tns:TransportModeType"/>
                <xs:element name="Logo" type="xs:anyURI" minOccurs="0"/>
                <xs:element name="Type" type="tva:ControlledTermType" minOccurs="0"/>
                <xs:element name="TargetProvider" type="dvb:DomainType" minOccurs="0"
maxOccurs="unbounded"/>
                <xs:element name="BCGProviderName" type="dvb:MultilingualType" minOccurs="0"
maxOccurs="unbounded"/>
              </xs:sequence>
              <xs:attribute name="Id" type="tva:TVAIDType" use="required"/>
              <xs:attribute name="Version" type="dvb:Version" use="optional"/>
            </xs:complexType>
          </xs:element>
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
  <xs:complexType name="TransportModeType">
    <xs:choice maxOccurs="unbounded">
      <xs:element name="DVBSTP" type="dvb:DVBSTPTransportModeType"/>
      <xs:element name="HTTP" type="dvb:HTTPTransportModeType"/>
      <xs:element name="ContentGuideLoc" type="dvb:DescriptionLocation"/>
    </xs:choice>
  </xs:complexType>
  <xs:complexType name="Package">
    <xs:complexContent>
      <xs:extension base="dvb:Package">
        <xs:sequence>
          <xs:element name="ApplicationList" type="dvbmhp:ApplicationList" minOccurs="0"/>
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
  <xs:complexType name="IPService">
    <xs:complexContent>
      <xs:extension base="dvb:IPService">
        <xs:sequence>
          <xs:element name="TimeToRenegotiate" type="xs:duration" minOccurs="0"/>
          <xs:element name="PurchaseItem" type="oipfbcg:PurchaseItemType" minOccurs="0"/>
          <xs:element name="ApplicationList" type="dvbmhp:ApplicationList" minOccurs="0"/>
          <xs:element name="FileFormat" type="tva:ControlledTermType" minOccurs="0"/>
        </xs:sequence>
```

```xml
                </xs:extension>
            </xs:complexContent>
        </xs:complexType>
        <xs:complexType name="WebApplicationDescriptor">
            <xs:sequence>
                <xs:element name="location" type="dvb:DescriptionLocation"/>
            </xs:sequence>
        </xs:complexType>
        <xs:complexType name="Application">
            <xs:complexContent>
                <xs:extension base="dvbmhp:Application">
                    <xs:sequence>
                        <xs:element name="fluteSessionDescriptor" type="tns:FLUTESessionDescriptor" minOccurs="0"
maxOccurs="unbounded"/>
                    </xs:sequence>
                </xs:extension>
            </xs:complexContent>
        </xs:complexType>
        <xs:complexType name="FLUTESessionDescriptor">
            <xs:sequence>
                <xs:element name="senderIP" type="xs:string"/>
                <xs:element name="numChannels" type="xs:unsignedInt"/>
                <xs:element name="destIP" type="xs:string"/>
                <xs:element name="TSI" type="xs:unsignedInt"/>
                <xs:element name="sessionTimeParam" type="xs:string"/>
                <xs:element name="lang" type="xs:string"/>
            </xs:sequence>
        </xs:complexType>
</xs:schema>
```

A.5 Classification Schemes

A.5.1 urn:oipf:cs:AudioCodingFormatCS:2008

This schema is specified normatively in Volume 3 [OIPF_META].

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ClassificationScheme uri="urn:oipf:cs:AudioCodingFormatCS:2008">
    <!-- schema filename is  cs-AudioCodingFormatCS.xml -->
    <Term termId="HE_AAC">
        <Name xml:lang="en">HE_AAC</Name>
        <Definition xml:lang="en">HE-AAC and AAC audio coding</Definition>
    </Term>
    <Term termId="AC3">
        <Name xml:lang="en">AC3</Name>
        <Definition xml:lang="en">AC3 audio coding</Definition>
    </Term>
    <Term termId="MPEG1_L2">
        <Name xml:lang="en">MPEG1_L2</Name>
        <Definition xml:lang="en">MPEG-1 Layer II audio coding</Definition>
    </Term>
    <Term termId="MPEG1_L3">
        <Name xml:lang="en">MPEG1_L3</Name>
        <Definition xml:lang="en">MPEG-1 Layer III audio coding</Definition>
    </Term>
    <Term termId="WAV">
        <Name xml:lang="en">WAV</Name>
```

```xml
        <Definition xml:lang="en">WAV audio coding</Definition>
    </Term>
</ClassificationScheme>
```

A.5.2 urn:oipf:cs:AVMediaFormatCS:2008

This schema is specified normatively in Volume 3 [OIPF_META].

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ClassificationScheme uri="urn:oipf:cs:AVMediaFormatCS:2008">
    <!-- schema filename is  cs-AVMediaFormatCS.xml -->
    <Term termId="TS">
        <Name xml:lang="en">TS</Name>
        <Definition xml:lang="en">MPEG-2 transport stream</Definition>
    </Term>
    <Term termId="TS_BBTS">
        <Name xml:lang="en">TS_BBTS</Name>
        <Definition xml:lang="en">MPEG-2 transport stream, Marlin BB TS with AES encryption</Definition>
    </Term>
    <Term termId="TS_PF">
        <Name xml:lang="en">TS_PF</Name>
        <Definition xml:lang="en">MPEG-2 protected transport stream</Definition>
    </Term>
    <Term termId="TTS">
        <Name xml:lang="en">TTS</Name>
        <Definition xml:lang="en">MPEG-2 time stamped transport stream</Definition>
    </Term>
    <Term termId="TTS_BBTS">
        <Name xml:lang="en">TTS_BBTS</Name>
        <Definition xml:lang="en">MPEG-2 time stamped transport stream, Marlin BB TS with AES encryption</Definition>
    </Term>
    <Term termId="TTS_PF">
        <Name xml:lang="en">TTS_PF</Name>
        <Definition xml:lang="en">MPEG-2 time stamped protected transport stream</Definition>
    </Term>
    <Term termId="MP4">
        <Name xml:lang="en">MP4</Name>
        <Definition xml:lang="en">MP4 File Format</Definition>
    </Term>
    <Term termId="MP4_PDCF">
        <Name xml:lang="en">MP4_PDCF</Name>
        <Definition xml:lang="en">MP4 File Format, OMA PDCF</Definition>
    </Term>
    <Term termId="MP4_MIPMP">
        <Name xml:lang="en">MP4_MIPMP</Name>
        <Definition xml:lang="en">MP4 File Format, Marlin IP MP format</Definition>
    </Term>
    <Term termId="MP4_DCF">
        <Name xml:lang="en">MP4_DCF</Name>
        <Definition xml:lang="en">MP4 File Format, OMA DCF</Definition>
    </Term>
</ClassificationScheme>
```

A.5.3 urn:oipf:cs:GermanyFSKCS:2008

This schema is specified normatively in Volume 3 [OIPF_META].

```xml
<?xml version="1.0" encoding="UTF-8"?>
```

```xml
<ClassificationScheme uri="urn:oipf:cs:GermanyFSKCS"
domain="//CreationInformation/Classification/ParentalGuidance/ParentalRating">
    <!-- schema filename is  cs-GermanyFSKCS.xml -->
    <Description xml:lang="en">Thesaurus for movie rating</Description>
    <Term termId="0">
        <Name xml:lang="en">0</Name>
        <Definition xml:lang="en">Released without age restriction</Definition>
    </Term>
    <Term termId="6">
        <Name xml:lang="en">6</Name>
        <Definition xml:lang="en">Released to age 6 or older</Definition>
    </Term>
    <Term termId="12">
        <Name xml:lang="en">12</Name>
        <Definition xml:lang="en">Released to age 12 or older and to age 6 or older with parental guidance</Definition>
    </Term>
    <Term termId="16">
        <Name xml:lang="en">16</Name>
        <Definition xml:lang="en">Released to age 16 or older</Definition>
    </Term>
    <Term termId="18">
        <Name xml:lang="en">18</Name>
        <Definition xml:lang="en">No release to youths (released to age 18 or older)</Definition>
    </Term>
</ClassificationScheme>
```

A.5.4 urn:oipf:cs:ProtocolCS:2008

This schema is specified normatively in Volume 3 [OIPF_META].

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ClassificationScheme uri="urn:oipf:cs:ProtocolCS:2008">
    <!-- schema filename is  cs-ProtocolCS.xml -->
    <Term termId="sip-igmp-rtp-udp">
        <Name xml:lang="en">sip-igmp-rtp-udp </Name>
        <Definition xml:lang="en">Scheduled Content over RTP</Definition>
    </Term>
    <Term termId="sip-igmp-udp">
        <Name xml:lang="en">sip-igmp-udp</Name>
        <Definition xml:lang="en">Scheduled Content over UDP</Definition>
    </Term>
    <Term termId="sip-rtsp-rtp-udp">
        <Name xml:lang="en">sip-rtsp-rtp-udp</Name>
        <Definition xml:lang="en">Managed CoD Streaming over RTP</Definition>
    </Term>
    <Term termId="sip-rtsp-udp">
        <Name xml:lang="en">sip-rtsp-udp</Name>
        <Definition xml:lang="en">Managed CoD Streaming over direct UDP</Definition>
    </Term>
    <Term termId="rtsp-rtp-udp">
        <Name xml:lang="en">rtsp-rtp-udp</Name>
        <Definition xml:lang="en">Unmanaged CoD Streaming over RTP</Definition>
    </Term>
    <Term termId="http-get">
        <Name xml:lang="en">http-get</Name>
        <Definition xml:lang="en">Managed/Unmanaged CoD Streaming/Download over HTTP</Definition>
    </Term>
</ClassificationScheme>
```

A.5.5 urn:oipf:cs:VisualCodingFormatCS:2008

This schema is specified normatively in Volume 3 [OIPF_META].

```xml
<?xml version="1.0" encoding="UTF-8"?>
<ClassificationScheme uri="urn:oipf:cs:VisualCodingFormatCS:2008">
    <!-- schema filename is  cs-VisualCodingFormatCS.xml -->
    <Term termId="AVC_HD_25">
        <Name xml:lang="en">AVC_HD_25</Name>
        <Definition xml:lang="en">H.264/AVC video coding, High Definition, 25Hz systems</Definition>
    </Term>
    <Term termId="AVC_HD_30">
        <Name xml:lang="en">AVC_HD_30</Name>
        <Definition xml:lang="en">H.264/AVC video coding, High Definition, 30Hz systems</Definition>
    </Term>
    <Term termId="AVC_SD_25">
        <Name xml:lang="en">AVC_SD_25</Name>
        <Definition xml:lang="en">H.264/AVC video coding, Standard Definition, 25Hz systems</Definition>
    </Term>
    <Term termId="AVC_SD_30">
        <Name xml:lang="en">AVC_SD_30</Name>
        <Definition xml:lang="en">H.264/AVC video coding, Standard Definition, 30Hz systems</Definition>
    </Term>
    <Term termId="MPEG2_HD_25">
        <Name xml:lang="en">MPEG2_HD_25</Name>
        <Definition xml:lang="en">MPEG-2 video coding, High Definition, 25Hz systems</Definition>
    </Term>
    <Term termId="MPEG2_SD_25">
        <Name xml:lang="en">MPEG2_SD_25</Name>
        <Definition xml:lang="en">MPEG-2 video coding, Standard Definition, 25Hz systems</Definition>
    </Term>
</ClassificationScheme>
```