SYSTEM FOR DISTRIBUTING PACKAGES AND CHANNELS TO A DEVICE

BACKGROUND

Field

[0001] The present Application for Patent relates generally to content distribution systems, and more particularly, to a system for distributing content to a device.

Background

[0002] In current content delivery/media distribution systems, providers make services available over proprietary networks, so that devices operating on their networks will have the ability to receive those services. Some providers may be billing and customer service (BCS) providers.

[0003] For a typical portable device, the entire relationship between the customer and the network may be managed by a BCS provider exclusively. Oftentimes, the device has a subsidy associated with the user's agreement relating to the primary or initiating network service agreement. This results in the customer buying all services via the primary network's BCS provider. This situation may be acceptable, when the voice, data, and media networks have a single ownership. However, as devices gain access to multiple networks, there is an increasing need to support multiple content packagers and BCS providers. In addition, BCS providers may decide to change packages and the content of those packages.

[0004] Therefore, what is needed is a system to distribute content to a device on a data network that supports multiple content packagers and customer service entities in a flexible manner.

SUMMARY

[0005] In one or more embodiments, is distribution system is provided that operates to distribute services on a data network while supporting multiple content packagers and customer service entities.

[0006] In an aspect, a method of organizing packages and channels in a device comprises receiving a plurality of packages, at least one package having an associated

weight, wherein each package has a set of associated channels, and ordering the plurality of packages based on associated package weight.

[0007] In an aspect, a method of organizing packages and channels in a device comprises receiving a plurality of ordered packages, wherein at least one package is ordered according to an associated package weight, and displaying each package according to the order of each package.

[0008] In an aspect, a wireless device comprises a transceiver configured to receive a plurality of ordered packages, wherein at least one package is ordered according to an associated weight, a processor configured to process the plurality of ordered packages for display, a user interface configured to select a package from the plurality of ordered packages, a memory coupled to the processor configured to store the plurality of ordered packages, and a display coupled to the processor configured to display the stored plurality of ordered packages according to their order.

[0009] In an aspect, a wireless device comprises means for receiving a plurality of ordered packages, wherein at least one package is ordered according to an associated weight, and means for displaying each package according to the order of each package.

[0010] In an aspect, a server comprises a transceiver configured to receive a plurality of packages, wherein at least one package is ordered according to an associated weight, and a processor configured to order each package of the plurality of package according to an associated package weight, and a memory coupled to the processor configured to store ordered plurality of packages.

[0011] In an aspect, a server, comprising means for receiving a plurality of packages, at least one package having an associated weight, wherein each package has a set of associated channels, and means for ordering the plurality of packages based on their associated weight.

[0012] Other aspects of the embodiments will become apparent after review of the hereinafter set forth Brief Description of the Drawings, Description, and the Claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The foregoing aspects of the embodiments described herein will become more readily apparent by reference to the following detailed description when taken in conjunction with the accompanying drawings wherein:

[0014] **FIG. 1** shows a network that comprises an embodiment of a distribution system;

[0015] **FIG. 2** shows a diagram of an embodiment of a distribution server suitable for use in one or more embodiments of a distribution system;

[0016] **FIG. 3** shows an example of a flexible relationship between packages, tiers, channels and services in accordance with an embodiment;

[0017] **FIG. 4** shows a diagram of an embodiment of a device suitable for use in an embodiment of a distribution system;

[0018] **FIG. 5** shows an embodiment of a method for operating a device in an embodiment of a distribution system;

[0019] **FIG. 6** shows an embodiment of an SI structure for use in an embodiment of a distribution system;

[0020] **FIG. 7** shows an embodiment of a Marketplace Common message schema for use in an embodiment of a distribution system;

[0021] **FIG. 8** shows an embodiment of a Marketplace Content Packager message **800** schema for use in an embodiment of a distribution system;

[0022] **FIG. 9** shows a detailed diagram of an embodiment of a package record schema for use in a Marketplace Content Packager message in an embodiment of a distribution system;

[0023] **FIG. 10** shows an embodiment of a service definition message schema for use in an embodiment of a distribution system; and

[0024] **FIG. 11** shows an embodiment of a service record schema for use in an embodiment of a distribution system.

DESCRIPTION

[0025] The description describes embodiments of a flexible distribution system that supports multiple content packagers and customer service entities on a data network. The system is especially well suited for distributing content to portable devices having limited resources, but may be used with any type of device. The system may also be used in any type of network environment, including but not limited to, communication networks, public networks, such as the Internet, private networks, such as virtual private networks (VPN), local area networks, wide area networks, long haul networks, or any other type of data or communication network.

Definitions

The following definitions apply:

Term	Definition
Activation	The placement of a Device into a state that causes it acquires SI and Services.
Add-on Package	A Package that may be subscribed to after a Parent Package is subscribed to.
Auto-Subscribed Package	A Package that the Device will subscribe to without the user explicitly selecting it, typically as a result of subscription to a different Package.
Auxiliary Presentation	A Presentation on an Auxiliary Service, typically presented at a defined time in relation to a Presentation on the Base Service.
Auxiliary Service	A Service used to customize or provide enhancements to a Base Service. It is not displayed in the MPG.
Barker	A Presentation advertising a Channel or Package that a user is not subscribed to.
Base Service	The primary Service represented by a Channel.
BCS Service Provider	Business entity that provides end user billing and customer support services on behalf of one or more Content Packagers. Each Device is associated with a BCS Provider.
Blackout	A set of LOIs and WOIs in which access to a Presentation is forbidden.
Channel	A view of a Base Service that may be customized through replacement of certain attributes of the Base Service and/or association with one or more Auxiliary Services.
Channel Weight	The Weight to be assigned to MPG Titles of Presentations delivered via the Channel.
Classification Scheme	A set of language-independent terms that defines the vocabulary for a particular application or domain.
Classification Scheme Alias	A string that may be used as short form representation of a Classification Scheme namespace
Classification Scheme Table	An XML Table formatted according to MPEG-7 specifications which defines a set of Classification Schemes and Classification Scheme Aliases.
Closed Package	A Package that is not accepting new subscriptions
Contact Window	An interval of time in which a Non Real Time Presentation is being transmitted.
Content Packager	Business entity that defines Packages and offers them for subscription through one or more associated BCS Service Providers. Also called a Content Retailer.
Content Provider	Business entity that supplies content delivered to the user through Services
Controlled Term	A token that is resolved to an entry in a Classification Scheme Table.
Default Language	The language in which information is to be delivered to a user if the user has not selected some other language in which the information available.
Device	Customer Equipment that can be activated to access Service.

Term	Definition
EULA	End User Licence Agreement – a contract between the User and the BCS Provider that specifies the default terms of subscription. It may be superseded by a Terms of Use Agreement for a particular Content Packager.
Excluded Package	A member of a set of Packages which a user is not permitted to subscribe to if it subscribes to a specified Package
Excluded Service	A Subscribed Service that is not downloaded to or stored on the device, typically as a result of a user action to exclude access to the Service. See also Included Service, Non-excludable Service
Flow	Logical stream within a Multiplex, typically used to deliver a single Media component of a Realtime Presentation, or a file containing a Non Real Time Presentation, or SI Messages.
Icon	A still image that may be overlaid on part of the main image of a Device display screen.
Included Service	A Subscribed Service delivered to the device. See also Excluded Service, Non-excludable Service.
Intro	An Auxiliary Presentation that is delivered to the user before the associated Presentation on the Base Service.
IP Datacast Presentation	A Presentation consisting of IP-formatted content addressed to a defined set of IP multicast addresses.
IP Datacast Service	A Service delivering IP Datacast Presentations.
Local Operations Infrastructure	See LOI
LOI	Logical grouping of infrastructure deployed to provide Network coverage of a specific local-area.
Marketplace Common Message	An SI Message used to deliver information about the BCS Providers associated with the Network and certain Classification Scheme Tables used in the Network.
Marketplace Content Retailer Message	An SI Message used to deliver information about Content Retailers and the Packages, Tiers and Channels available through the Content Retailers.
Marketplace Definition Protocol	The protocol managing transmission and acquisition of MSI.
Marketplace Information	Information describing the BCS Providers, Content Packagers, Packages, Tiers and Channels.
Marketplace & Service Information	Marketplace Common Message, Marketplace Content Packager Messages and Service Definition Message.
Media	Formats for representing information, such as moving or still images, sound, or text, possibly associated with metadata used to assist in interpretation of the media content.
Media Presentation Guide	The schedule of MPG Titles available in the Network, delivered to the Device as a sequence of MPG Blocks.
MIME Type	A media type delivered in a Non Real Time or IP Datacast Presentation and the associated metadata identifying it according to the conventions of RFCs 2045 – 2049 (**Error! Reference source not found. - Error! Reference source not found.**).
MPG	See Media Presentation Guide
MPG Block	An SI Message delivering the set of MPG Titles and Contact Windows available in a Multiplex for a defined time window, the MPG Block Duration.
MPG Delivery Protocol	The protocol managing transmission and acquisition of MPG Blocks.

Term	Definition
MPG Title	The description of an instance of a Presentation that is available for viewing at a specified time.
MSI	See Marketplace and Service Information
Multiplex	The set of Flows available in a given LOI or WOI.
Network	A multicast network using the Physical Layer.
Non-Excludable Service	A Subscribed Service that the Device is not allowed declining delivery of. See also Included Service, Excluded Service.
Non Real Time Presentation	A Presentation that is stored for later retrieval and presentation to the user.
Non Real Time Service	A Service delivering content consisting entirely of Non Real Time Presentations
Outro	An Auxiliary Presentation that is delivered to the user after the associated Presentation on the Base Service.
Package	A Package is a set of Tiers and associated Auxiliary Services. Packages are offered for purchase on the System.
Package Weight	The Weight of a Package.
Parent Package	A Package for which a prior subscription must exist before the user may subscribe to an Add-on Package.
Per MPG Title Service	A Service delivering both Real Time Presentations and Non Real Time Presentations. The type of a particular Presentation is determined from the MPG Title for the Presentation.
Presentation	A set of media segments which may be presented to the user concurrently and/or consecutively and which can be described by a single MPG Title.
Presentation Window	An interval of time in which a user may view a Presentation.
Primary Flow	A Flow delivering, *inter alia*, a list of the current Versions of the various types of SI Message.
Private Content Retailer	A Content Retailer which requires that users establish access right to it by means not specified in the SI.
Private Package	A Package offered by a Private Content Retailer.
Private Channel	A Channel offered through a Private Package.
Private Service	A Service to which access may only be offered as a Private Channel.
Rating	A classification of a Service or Presentation content that provides guidance on the suitability of the content. A Rating is usually a level in a single scale, but may have several dimensions.
Real Time Presentation	A Presentation consisting of Media that is presented to the user as it is received and processed, and need not be stored for later retrieval.
Real Time Service	A Service delivering content consisting entirely of Real Time Presentations.
Service Definition Message	An SI Message delivering information about the Services available in the Network
Service Schedule	The temporal order in which Presentations are available for presentation to the user.
Service	A sequence of Presentations offered under a single label and delivered using a defined set of Flows.
SI	See System Information
SI Flow	A Flow used to deliver SI Messages
SI Framing Protocol	The protocol for transmitting an SI Message

Term	Definition
SI Message	A message containing all the elements of an SI Message schema.
SI Message Fragment	A message containing a copy of the root element and a subset the other elements of an SI Message Instance
Subscribed Service	A Service that a user can access, having subscribed to a Package that includes the right to access the Service.
System Information	The set of information that enables a Device to locate Services or subscribe to Packages on behalf of the user, and to describe Marketplace Information, Services and MPG Titles to the user.
Terms of Use Agreement	A contract between the user and the Content Retailer that controls the terms of subscription to a Package. See also EULA.
Tier	A set of Channels grouped together for subscription purposes. Tiers are combined to create Packages.
Version	An attribute of an SI Message that identifies the particular set of attributes and element values transported by the SI Message, allowing it to be identified as a copy of another SI Message.
Weight	An attribute whose value controls the order in which information about an element is presented to the user in a list of elements of the same type.
Wide Area Operations Infrastructure	See WOI
WOI	Logical grouping of infrastructure deployed to provide Network coverage of a specific wide-area.

[0026] **FIG. 1** shows a network **100** that comprises an embodiment of a distribution system. The network **100** comprises portable devices (**102**, **104** and **106**), BCS providers **110**, content packagers **118**, and content providers **124** all coupled to a distribution network **108**.

[0027] The devices (**102**, **104** and **106**) are portable devices that communicate with the distribution network **108** to allow device users to access the distribution network **108** to subscribe to receive available packages.

[0028] The BCS providers **110** accept and maintain user subscriptions to packages that are received from the distribution network **108**. In an embodiment, each of the devices (**102**, **104** and **106**) is associated with a single BCS provider. For example, the device **102** is associated with BCS **112**, device **104** is associated with BCS **114**, and device **106** is associated with BCS **116**. In another embodiment, a device (**102**, **104** or **106**) may be associated with more than one BCS provider. For clarity, the operation of BCS provider **112** is described in detail; however, the BCS providers **114** and **116** operate in a similar fashion.

[0029] The BCS provider **112** establishes relationships with one or more content packagers **118** through subscription agreements, as illustrated at **120**. These agreements define which content packagers **118** offer packages that a device associated with a BCS

provider **112** may subscribe to receive. In an embodiment, the BCS provider **112** notifies the distribution network **108** of its association with one or more content packagers **118**, as shown at **122**.

[0030] The content packagers **118** define and maintain packages. A package ultimately is a set of services available on the distribution network **108** which may be offered to devices. The device user obtains access to the services by subscribing to the package. The content packagers **118** obtain the right to offer access to services from the content providers **124** through content retail agreements, as shown at **126**. The content packagers **118** notify the distribution network **108** of the definition of the packages created by the content packagers **118**, as shown at **128**.

[0031] The content providers **124** supply the content of the services to the distribution network **108**, as shown at **130**. They also provide descriptions of the content that allows the distribution network **108** to maintain a media presentation guide (MPG) which provides a description to the device users of the services available through the distribution network **108** at any given time.

[0032] In an embodiment, the MPG allows a subscriber to select and play content, but not subscribe. In an alternative embodiment, the MPG may allow a user to subscribe in addition to allowing a user to select and play content.

[0033] The distribution network **108** is responsible for the delivery of the services to the devices (**102**, **104** and **106**). It is also responsible for the creation and delivery of accompanying system information (SI) parameters. In an embodiment, the communications between the distribution network **108** and the devices (**102**, **104** and **106**) are organized into a set of flows, e.g. to carry different media components of a real time service, or IP streams addressed to different IP ports in an IP Datacast service. All flows which are to be made available in a particular local or wide area are grouped into a corresponding multiplex.

[0034] The distribution network **108** comprises any combination of wired and wireless network technologies. For example, the distribution network **108** may be a wireless multicast network. In an embodiment, the distribution network **108** comprises servers (**132**, **134** and **136**). For clarity, the operation of server **132** is described in detail; however, servers **134** and **136** operate in a similar fashion.

[0035] Server **132** operates to receive subscription parameters, as shown at **122**, from one more of the BCS providers **110**. The server **132** also receives package parameters

128 from the content packagers **118**, and programming parameters **130** from the content providers **124**. The server **132** processes the received parameters to generate the system information (SI) parameters **138** and a media presentation guide (MPG) **140**.

[0036] The SI parameters **138** comprise a set of information that enables a device to locate services or subscribe to packages, and to describe subscription information, services, and MPG titles to a device user. The MPG **140** comprises a schedule of available titles that is delivered to a device as a sequence of MPG blocks.

[0037] During operation of an embodiment of the distribution system, the distribution network **108** activates the devices (**102**, **104** and **106**) and transmits the SI **138** and MPG **140**. The devices (**102**, **104** and **106**) then operate to process the SI **138** and MPG **140** to render information to the device users to allow the device users to subscribe to one or more packages. For example, the user of the device **102** selects a package for subscription from the rendered information. The device **102** then transmits a subscription request to the distribution network **108** to subscribe to receive the selected package.

[0038] In one or more embodiments, the distribution server **132** operates in an embodiment of the distribution system by performing one or more of the following functions.

1. Obtain subscription, package, and presentation guide parameters associated with selected BCS providers, content packagers and content providers.
2. Generate SI and MPG parameters.
3. Activate a device to subscribe to packages over the distribution network.
4. Transmit the SI and MPG to the activated device.
5. Receive one or more subscription requests from the device.

[0039] Thus, embodiments of the distribution system operate to support multiple content packagers and BCS providers on a data network to allow devices associated with different BCS providers to subscribe to receive available packages. It should be noted that the network **100** illustrates just one network configuration, and that other network configurations or arrangements are possible within the scope of the described embodiments.

[0040] **FIG. 2** shows a diagram of an embodiment of a distribution server **200** suitable for use in one or more embodiments of a distribution system. For example, the distribution server **200** may be used as the distribution server **132** in **FIG. 1**. The

distribution server **200** comprises processing logic **202**, SI generation logic **204**, MPG generation logic **206**, transceiver logic **208**, and activation logic **210** all coupled to an internal data bus **212**. The server **200** also comprises subscription parameter storage **214**, content package parameter storage **216**, and programming parameter storage **218**, which are all also coupled to the data bus **212**.

[0041] In one or more embodiments, the processing logic **202** comprises a CPU, processor, gate array, hardware logic, memory elements, virtual machine, software, and/or any combination of hardware and software. Thus, the processing logic **202** generally comprises logic to execute machine-readable instructions and to control one or more other functional elements of the server **200** via the internal data bus **212**.

[0042] The transceiver logic **208** comprises hardware and/or software that operates to allow the server **200** to transmit and receive data and/or other information with remote devices or systems via communication channel **220**. For example, in an embodiment, the communication channel **220** comprises any suitable type of communication link to allow the server **200** to communicate with one or more data networks and/or devices coupled to those data networks.

[0043] The storage logic (**214**, **216**, and **218**) comprises any suitable type of storage devices or elements that allow the server **200** to store information parameters. For example, in an embodiment the storage logic (**214**, **216**, and **218**) comprises any type of RAM, Flash memory, hard disk, or any other type of storage device.

[0044] In an embodiment, the processing logic **202** operates to communicate with one or more BCS providers through the transceiver logic **208** and channel **220**. The BCS providers provide subscription parameters that are received by the processing logic **202** and stored in the subscription parameter storage **214**. The processing logic **202** also operates to communicate with one or more content packagers through the transceiver logic **208** and channel **220**. The content packagers provide package parameters that are receive by the processing logic **202** and stored in the package parameter storage **216**. The processing logic **202** also operates to communicate with one or more content providers. The content providers provide programming parameters that are received by the processing logic **202** and stored in the programming parameters storage **218**. A more detailed description of the subscription, package, and programming parameters is provided in another section of the document.

[0045] In one or more embodiments, the SI generation logic **204** comprises a CPU, processor, gate array, hardware logic, memory elements, virtual machine, software, and/or any combination of hardware and software. The SI generation logic **204** operates to retrieve parameters from the storage (**214**, **216**, and **218**) to generate SI parameters **224**. For example, the SI logic **204** retrieves subscription parameters from the storage **214** that are associated with one or more BCS providers. The SI logic also operates to retrieves package parameters from the storage **216** and programming parameters from the storage **218** that are associated with each BCS provider. Thus, the SI generation logic **204** operates to generate SI parameters **224** that are associated with each BCS provider. A more detailed description and format of the SI parameters **224** is provided in another section of this document.

[0046] The MPG generation logic **206** comprises a CPU, processor, gate array, hardware logic, memory elements, virtual machine, software, and/or any combination of hardware and software. The MPG generation logic **206** operates to retrieve parameters from the programming parameters storage **218** to generate a MPG **222** that is associated with one or more BCS providers. A more detailed description and format of the MPG **222** is provided in another section of this document.

[0047] The activation logic **210** comprises a CPU, processor, gate array, hardware logic, memory elements, virtual machine, software, and/or any combination of hardware and software. The activation logic **210** operates to activate a device to allow the device to subscribe to available packages. The activation process need only occur once for each device that desires to subscribe to packages. For example, in an embodiment, the activation logic **210** comprises a client application **226** that is downloaded to the device during the activation process. For example, the client **226** is downloaded to the device using the transceiver logic **208**. Once a device is activated by the activation logic **210**, the client **226** runs on the device and operates to receive and display information about available packages and other related information to the device user. Thus, the activation logic **210** operates to allow the server **200** to identify and authenticate a device, thereby allowing the device to subscribe to one or more available packages.

[0048] During the activation process, the SI parameters **224** and MPG **222** are transmitted to a device being activated. The client executing on the device operates to render information from the SI parameters 224 and the MPG 222 so that the device may subscribe to receive available packages.

[0049] In an embodiment, the distribution system comprises program instructions stored on a computer-readable media, which when executed a processor, for instance, the processing logic **202**, provides the functions of the server **200** described herein. For example, instructions may be loaded into the server **200** from a computer-readable media, such as a floppy disk, CDROM, memory card, FLASH memory device, RAM, ROM, or any other type of memory device or computer-readable media that interfaces to the server **200**. In another embodiment, the instructions may be downloaded into the server **200** from an external device or network resource that interfaces to the sever **200** via the transceiver logic **208**. The instructions, when executed by the processing logic **202**, provide one or more embodiments of a distribution system as described herein.

[0050] In an embodiment, SI services fall into three classes:

[0051] 1. Marketplace Definition services, providing information that allows users to subscribe to Packages.

[0052] 2. Service Definition services, providing information that allows the Device to locate and interpret a Service.

[0053] 3. Media Presentation Guide services, providing information about the content available on the services.

[0054] In an embodiment, Marketplace Definition SI informs a device of Classification Scheme Tables, the capabilities of the BCS Providers, and the packages offered by the Content Providers. The principal function is to communicate information about the packages.

[0055] Marketplace Definition SI defines the Classification Scheme Tables in use in the Network. A Classification Scheme Table is an infrastructural element that defines a set of common terms as used for a specified function in a particular Network, but which may vary between Networks, or which may exist in multiple forms, e.g. differentiated by language. Examples of such terms include Rating Schemes and Genres.

[0056] Classification Scheme Tables allow SI Messages to refer to the terms succinctly and in a controlled fashion.

[0057] Marketplace Definition SI defines the characteristics and capabilities of the BCS Providers related to subscription services. In an embodiment, the Marketplace Definition SI may define:

[0058] - The set of Content Packagers associated with the BCS Provider. In an embodiment, a device can only subscribe to Packages which are provided by Content Packagers associated with the BCS Provider.

[0059] - The Billing Policies available through the BCS Provider and the types of account ID that may be used, such as Credit Card subscriptions through PayPal.

[0060] - Contact details for placing subscriptions to the BCS Provider, such as a telephone number, email address or webpage URL.

[0061] - The Terms of Use agreement for the BCS Provider.

[0062] Marketplace Definition SI defines the characteristics and capabilities of the Content Packager related to subscription services. In an embodiment, it may define:

[0063] - The Name of the Content Packager

[0064] - Whether the Content Packager is Private or not.

[0065] - Currencies in which Packages may be offered by the Content Packager

[0066] - The End User License Agreement for the Content Packager

[0067] Additionally, the SI may define in an embodiment, a set of Auxiliary Services associated with a Content Packager. These services may provide supplemental information related to any channel offered through the Content Packager. They are monitored by a device so long as the device is subscribed to any package offered by the Content Packager.

[0068] In an embodiment, the principal information delivered by the Marketplace SI is the definition of the packages offered by the Content Packagers.

[0069] In principle, a package is a set of services, together with some affiliated characteristics such as the name of the package and its price. However, the package definition is not directly constructed as a list of Services. Instead, the package is defined as a set of tiers. In turn, each Tier is a set of Channels, where a channel is a view of a service.

[0070] An example of the relationship between packages, tiers, channels and services in accordance with an embodiment is shown in figure 3. Figure 3 shows a hierarchal system **300** of packages **302**, tiers **304**, channels **306**, and services **308** in accordance with an embodiment.

[0071] In this example, a Content Packager is creating packages **302** which will be branded for certain operators (here, Verizon **310** and Sprint **312**), while also creating packages targeted at particular groups which may be offered by both operators (here, the

"UK Expat Package" **314**, targeted at a small but presumably high-end demographic). These packages **302** provide access to a number of Real Time Services which carry sports video and continuous reruns of popular television series, reformatted for the devices.

[0072] The tiers **304** shown include a Verizon sports tier **316**, a Sprint sports tier **318**, a tennis tier **320**, a rerun tier **322**, a Verizon rerun tier **324**, and a UK tier **326**. The channels **306** shown include ESPN-Verizon **328**, ESPN-Sprint **330**, tennis **332**, Days of Our Lives **334**, Eastenders **336**, and Python **338**. The services **308** include ESPN **340**, Wimbledon TV **342**, Days of Our Lives **344**, Eastenders **346**, and Python **348**.

[0073] For the premium sports service ESPN, two channels **328**, **330**, are created, which provide different views of the service **340** that serve to brand it in a way that advertises a particular mobile network operator (Verizon and Sprint respectively in this example); otherwise, the channels are direct reflections of the services. The tiers **304** are defined, in this example, to provide logical groupings of channels according to the type of content offered.

[0074] The packages **302** then offer the users the opportunity to subscribe to combinations of tiers than provide access to services **308** likely to be of interest. Thus, the "UK Expat Package" **314** includes access to the "EastEnders" service **346** and to "Wimbledon Tennis" **342**, but no access to general American sports channels, while the Verizon **310** and Sprint **312** packages include access to all sports of interest to their American subscribers, as well as access to reruns that have appeared in the US.

[0075] The Content Packager may choose to restrict access to packages by BCS Provider ID.

[0076] As well as providing access to a set of services **308**, a package may be associated with one or more auxiliary services. These services may provide supplemental information related to any channel offered through the package. They are monitored by the device so long as it is subscribed to the package.

[0077] A tier is a set of channels which is treated as a logical group. A channel offered by a Content Packager shall appear in at least one tier, and may appear in more than one tier.

[0078] A tier has no meaning outside the context of a package. It is provided to allow compact representation of groups of services, and to provide flexibility in service management. For example, if a service which is accessible through multiple packages

becomes unavailable, it can be removed from the packages by redefining the tier(s) that include the service rather than redefining the packages themselves.

[0079] A channel is a view of a service presented to the user that is appropriate for a particular Package or Content Packager. It is the smallest unit of content which a user can subscribe to.

[0080] Subscription to a package automatically provides access to all channels in the package. However, a user may not wish to access certain channels, and a device can include a capability that allows a user to exclude access to such channels. The Content Packager may indicate that certain channels in the package are not excludable.

[0081] The concept of a channel allows the Content Packager to customize the service's appearance to the user. For example, the Content Packager can replace the default name of the service with a channel name, or it can override the service description with different text. Since a service may be offered through more than one package, it is possible to define several channels which resolve to the same service. The service underlying a channel is known as the Base Service.

[0082] As well as providing access to a Base Service, a channel may be associated with one or more Auxiliary services. These services provide supplemental information related to the channel. They are monitored by the device so long as it is accessing the channel.

[0083] In an embodiment, packages and channels are each assigned a weight. The weight is a resource used to manage the ordering of packages and channels within a device. It defines the default position of the package or channel relative to other packages or channels when they are presented to the user in a list. Thus, if packages from all Content Packagers are presented to the user in a single list, the order of presentation, in the absence of other considerations such as a user preference, is determined by the package weight. Similarly, MPG Titles from the MPG are, by default, presented to the user in order of channel weight.

[0084] In an embodiment, a user subscribes to a package via a subscription user interface on the device display. In an embodiment, the default ordering of the packages on the device display is determined according to package weights. Similarly, the default order of channels within a package is determined according to channel weights.

[0085] The values of the weights are agreed between all the Content Packagers and BCS Providers using the network. The means by which this is done is a policy decision.

For example, blocks of weights may be assigned to different Content Packagers, allowing each Content Packager to assign weights freely.

[0086] In an embodiment, the weights may be used to differentiate between different packages and to differentiate between different channels such that specific functions may apply to particular packages and channels based on the weights. Thus, the weights may play a differential function role. In an embodiment, the weights may be encoded with conditions such that the package or channel has associated conditions for a given weight. For example, a weight of "101" may be a binary encoding representing that the associated package or channel has an associated first and third condition. It would be apparent to those skilled in the art that any encoding known in the art may be used to encode information in the form of weights.

[0087] An example of a function encoded in a weight is an embodiment, wherein a weight encodes a not-display function such that an associated package or channel is not displayed on a device. It would be apparent to those skilled in the art that any function known in the art may be encoded in a weight.

[0088] Each Package is assigned one or more prices. The price is associated with a subscription method (e.g. flat fee, weekly, monthly) that is charged to the user when the user subscribed to the package.

[0089] More than one subscription method may be offered. The semantics of the subscription methods are determined by the Content Packagers and the BCS Providers. In an embodiment, all subscription methods used shall refer only to the package being purchased. That is, a subscription method shall not represent an adjustment to the price of another subscription method, such as a percentage discount.

[0090] A package may be offered in more than one currency. Each device supports only one currency, the currency of the home country of the device (e.g. Euros, Pounds, U.S. Dollars, Yen). Only prices in the currency supported by the device are offered to the user.

[0091] Packages posses certain attributes that define their operation and interdependencies as packages, distinct from the services of which they are comprised.

[0092] In an embodiment, packages have states. In an embodiment, packages may be in one of two states: Open and Closed. In the Open state, the BCS Provider may accept new subscriptions to the package. In the Closed state, no new subscriptions are accepted. However, in the Closed state the package continues in existence for existing

subscribers, and it is possible to change any and all characteristics of the package. The Closed state permits a package to be smoothly retired. When the package no longer has any subscribers, it can be removed from the SI.

[0093] Packages may have interdependencies. By default, Packages are offered à la carte. However, certain interdependencies may be defined between packages that restrict the user's ability to subscribe to the Packages independently of each other. As a result, the Packages offered to the user may depend on the user's existing subscriptions.

[0094] It is the responsibility of the Content Packager to define interdependencies that are meaningful and consistent.

[0095] A package may be a Parent Package. A package can be configured as an add-on to another package, which is the Parent Package. In this situation, the user is only permitted to subscribe to the package if the user is already subscribed to the Parent Package.

[0096] A package may have more than one Parent Package, in which case the user can only subscribe to the package if a subscription already exists for at least one of the Parent Packages. A package that does not have a Parent Package is a Root Package.

[0097] A package may be autosubscribed. An Autosubscribed Package is a package that is subscribed to by a device without user intervention. The package is autosubscribed when a device is activated by a BCS Provider associated with the Content Packager offering the package. Only Root Packages may be autosubscribed.

[0098] A package may be excluded. Subscription to a Package may prevent the user from subscribing to other Packages offered by the Content Packager.

[0099] **FIG. 4** shows a diagram of an embodiment of a device **400** suitable for use in an embodiment of a distribution system. The device **400** comprises processing logic **402**, device resources and interface logic **404**, transceiver logic **406**, and a memory **408** all coupled to a data bus **410**.

[00100] In one or more embodiments, the processing logic **402** comprises a CPU, processor, gate array, hardware logic, memory elements, virtual machine, software, and/or any combination of hardware and software. Thus, the processing logic **402** generally comprises logic to execute machine-readable instructions and to control one or more other functional elements of the device **400** via the internal data bus **410**.

[00101] The device resources and interface logic **404** comprise hardware and/or software that allow the device **400** to communicate with internal and external systems.

For example, internal systems may include mass storage systems, memory, display driver, modem, or other internal device resources. The external systems may include user interface devices, printers, disk drives, or other local devices or systems. Thus, the device resources and interface logic **404** allows the device to render information on a device display and to receive user inputs through a user input device, such as a mouse, keypad, touch screen, or any other type of user input device.

[00102] The transceiver logic **408** comprises hardware and/or software that operate to allow the device **400** to transmit and receive data and/or other information with external devices or systems via communication channel **412**. For example the communication channel **412** may comprise a network communication link, a wireless communication link or any other type of communication link.

[00103] During operation of one or more embodiments, the device **400** is activated thereby allowing the device **400** to subscribe to available packages over a distribution network. As part of the activation process, the device **400** receives a client application **414**, SI parameters **416**, and a MPG **418**, which are received by the transceiver logic **406** and stored in the memory **408**. For example, the device user controls the device to communicate with a distribution server (i.e., server **132** in **FIG. 1**) for the purpose of completing a one-time activation process. During the activation process, the client logic **414** is installed on the device. The server then transmits the SI parameters **416** and the MPG **418** to the device.

[00104] The client **414** provides a user interface (UI) that renders the MPG **418** on the device **400** to allow the device user to view the available packages. The client **414** also allows the device user to select one or more packages for subscription. The selected packages are identified in a subscription request that is part of a device-to-server protocol, which is implemented by the client **414**. The client **414** then transmits the subscription request to the distribution server through the transceiver logic **406** and channel **412**.

[00105] In an embodiment, the device **400** performs one or more of the following functions in one or more embodiments of a distribution system. It should be noted that the following functions may be changed, rearranged, modified, added to, or otherwise adjusted within the scope of the embodiments.

1. The device receives and installs a client application.

2. The device is activated with a distribution system.

3. The device receives SI parameters and a MPG.
4. The MPG is rendered on the device and displays the available packages to the device user.
5. After the user selects one or more packages for subscription, the client assembles a subscription request that is transmitted to the distribution system.
6. After the subscription request has been process by the distribution system, the device receives the services for which the user has subscribed.

[00106] For example, it would be apparent to those skilled in the art that steps 1, 2, and 3 above may be executed in any order. In addition, it would also be apparent to those skilled in the art that sub-steps of steps 1, 2, and 3 may be executed in a variety of orders. For example, a sub-step of step 2 may be performed in varying order with respect to a sub-step of step 3. Steps and sub-steps may be ordered to optimize the process.

[00107] In an embodiment, the system to host multiple service providers comprises program instructions stored on a computer-readable media, which when executed by the processing logic **402**, provides the functions of the device **400** described herein. For example, instructions may be loaded into the device **400** from a computer-readable media, such as a floppy disk, CDROM, memory card, FLASH memory device, RAM, ROM, or any other type of memory device or computer-readable media that interfaces to the device **400** via the device I/F logic **404**. In another embodiment, the instructions may be downloaded into the device **400** from a network resource that interfaces to the device **400** via the transceiver logic **406**. The instructions, when executed by the processing logic **402**, provide one or more embodiments of a system to host multiple service providers as described herein.

[0001] **FIG. 5** shows an embodiment of a method **500** for operating a device in one or more embodiments of a distribution system. For clarity, the method **500** will be described with reference to the device **400** shown in **FIG. 4**. For example, the device **400** is suitable for use as any of the devices (**102, 104, 106**) shown in **FIG. 1**. In one or more embodiments, the processing logic **402** executes program instructions to control the device **400** to perform the functions described below.

[0002] At block **500**, a client **414** is installed on a device. In an embodiment, the client **414** is installed and executes to establish communications with the distribution server using a selected communication protocol.

[0003] The device is activated **502** with a distribution server. For example, in an embodiment, the processing logic **402** communicates with a distribution server via the transceiver logic **406** to identify the device and provide any other activation information that may be required.

[0004] At block **504**, the latest SI and MPG are received at the device. For example the distribution server transmits SI parameters **416** and a MPG **418** to the device, which are then stored in the memory **408**.

[0005] At block **506**, the client installed on the device operates to display or render information from the MPG **418** to the device user. The MPG **418** provides information to the device user about the packages available for subscription. For example, the information includes scheduling, pricing, availability, and any other relevant information. In an embodiment, the client **406** operates to display information from the MPG **418** using I/F logic **404**.

[0006] At block **508**, a test is performed to determine if the user wishes to subscribe to one or more available packages. For example the user may select one or more packages from the displayed program guide and request to subscribe to those packages. If the user selects any package for subscription, the method proceeds to block **510**. If the user does not select any packages for subscription, the method proceeds to block **516**.

[0007] At block **516**, a test is performed to determine if there is updated information for the SI or MPG parameters. For example, in an embodiment, the processing logic **402** listens to transmission from the distribution server to determine if the version of the currently broadcast parameters is different than the parameters that are stored in the device memory **408**. If new parameters are available the method proceeds to block **504** to obtain the new information. If no new parameters are available, the method proceeds to block **508** to determine if the device user wishes to subscribe to any available package.

[0008] At block **510**, a subscription request is assembled and transmitted to the distribution network. The subscription request allows the device user to subscribe to the selected packages. For example, the subscription request is assembled in a format that allows one or more packages to be identified for subscription. In an embodiment, the client **414** operates to assemble the subscription request. The subscription request is then transmitted to the distribution server using the transceiver logic **406**.

[0009] At block **512**, services associated with the requested package are received at the device. For example, after the distribution server has processed the subscription request, the services associated with the subscribed package are delivered to the device. For example, in an embodiment, the services are delivered to the device from a content provider through the distribution network and received by the transceiver logic **406**. The method then stops at block **514**.

[00108] Thus, the method **500** operates to allow a device to subscribe to one or more packages provided in a distribution system. It should be noted that the method **500** illustrates just one implementation and that changes, additions, or rearrangements of the functional elements may be made without deviating from the scope of the described embodiments.

SYSTEM INFORMATION

[00109] The following is a detailed description of SI parameters generated in one or more embodiments of a distribution system. In one or more embodiments, the SI parameters are formatted into structures that allow the delivery of customer care and billing and possibly other services to be separated from the retailing of content or other services. These structures allow the BCS providers to control which content packagers provide services to its associated devices, but the BCS providers may not be in control of either the content or the pricing. Provisions are made to allow the BCS providers to sell content and additional services in addition to the initial service contract. The structure of the service offerings from each of the content packagers is such that the offerings can be displayed on a single user interface with a consistent display order. This defined ordering is for the subscription packages that are available across multiple content packagers, which may be associated with multiple and/or different BCS providers.

[00110] System Information structures allow the BCS providers control over which content packagers are available to its associated devices. Cost and terms for each content packager is independent of the BCS provider. The content and subscription options described by each content packager is independently defined, but can be merged into a single user interface. In an embodiment, this is accomplished through records in the SI as described in the following SI specification. It should be noted that the

modifications, changes, deletions, additions, combinations or other minor variations to the described SI are within the scope of the embodiments.

SI MESSAGE SPECIFICATIONS

[00111] **FIG. 6** shows an embodiment of an SI structure **600** for use in an embodiment of a distribution system. In one or more embodiments, the SI information is transmitted as a set of SI messages. The following sections specify the definition, semantics and associated processing of SI information contained in the SI messages. In an embodiment, the SI messages are organized into marketplace information **602**, service information **604**, and a MPG **606** as follows.

Class 1. Marketplace Information that is related to the packaging of service offerings to which a user may subscribe.

Class 2. Service Information that provides information about the attributes of the available services and their location within the distribution network.

Class 3. Media Presentation Guide information that provides information about individual presentations on a service.

COMMON FORMATTING AND PROCESSING

SI Message Syntax

[00112] In one or more embodiments, the structures of the SI Messages are defined as a set of XML schema conformant to XML 1.0.

Identification of SI Message Versions

[00113] Each transmitted SI message contains a version attribute, which distinguishes copies of different SI messages of the same message type. For certain types of SI messages the version may also distinguish SI messages with the same value of a specified attribute, called the Distinguishing Attribute. For example, the Distinguishing Attributes for two messages are as follows:

- Marketplace Content Packager Message: Content Packager ID
- MPG Title Block Message: MPG Block Start Time.

[00114] The value of the version attribute may be the same for all SI messages representing a single set of element and attribute values. The value of the version

attribute may be incremented when any attribute or element of the SI message, other than the Distinguishing Attribute, is modified or created.

[00115] In an embodiment, the version attribute is an unsigned integer. The size of the attribute depends on the type of SI message, as specified for the individual message types. Once the version has changed, the value of the version associated with that version of the SI message may not be reused for a time T_UPDATE. The value of T_UPDATE may be in units of seconds, and in an embodiment, is a configurable system parameter.

Identification of Current SI Message Versions

[00116] The values of the version field for the current versions of SI messages are sent over the distribution network in a primary Flow.

Update of SI Message Versions

[00117] If an SI message contains an update to an attribute or element value, or a new instance of an element, that is scheduled to take effect at a future time, the message may contain a Validity Time value associated with the element being updated, as specified for individual elements. If two versions of an element are being transmitted simultaneously in different Message versions (typically, the current and next versions), each version is associated with a Validity Time. The Validity Time attribute may be a 32-bit count of seconds.

Class 1: Marketplace Information

[00118] In one or more embodiments, the SI provides marketplace information in two message types described as follows.

1. Marketplace Common Messages
2. Marketplace Content Packager Messages

1. Marketplace Common Message

[00119] **FIG. 7** shows an embodiment of a Marketplace Common message schema **700** for use in an embodiment of a distribution system. In one or more embodiments, the Marketplace Common message defines marketplace information that is not specific to any content packager. The Marketplace Common message defines the attributes of the BCS providers configured within the distribution network, references to content packagers associated with each BCS provider, and classification schemes for the controlled terms.

Version

[00120] The Marketplace Common message comprises a unique version **702** identified by the value of a version attribute. In an embodiment, the version attribute is a 16-bit unsigned integer.

Classification Scheme Tables

[00121] The Marketplace Common message **700** comprises classification scheme tables **704** that define classification schemes used by all BCS providers in the network to specify the following.

- Billing Environment
- Service Account Type
- Currencies
- Subscription Method
- Genre
- MIME type
- Rating levels
- Device Class

[00122] The Classification Scheme Table **704** may comprise any suitable structure. In an embodiment, the definitions of Classification Scheme Table **704** are subject to the requirements and capabilities of the BCS provider and the regulatory requirements that the BCS provider is subject to.

BCS Record

[00123] The Marketplace Common message **700** comprises a BCS Record **706** for each BCS provider in the distribution network. In an embodiment, the BCS Record **706** defines a BCS provider and supplies the following items.

- BCS Provider ID
- Validity Time
- CSR Contact
- Billing Policy
- Content Packager Reference
- Terms of Use Table
- Terms of Use Link

BCS Provider ID

[00124] The BCS provider ID **708** attribute is a globally unique ID associated with an individual BCS provider. In an embodiment, the BCS provider ID **708** may be an unsigned 16-bit integer.

Validity Time

[00125] The Validity Time attribute **710** defines a time at which the definition provided in the BCS Record **706** shall become valid, superseding the previous definition. If the Validity Time is absent or it refers to a time in the past, the BCS Record **706** is current. In an embodiment, the Validity Time attribute **710** may be a 32-bit count of seconds elapsed since 00:00:00 on 6 January 1980UTC.

[00126] A BCS record **706** may define one Validity Time. The Validity Time shall be present when multiple records appear for the same BCS provider. In this case, both the current and future record definition contain the Validity Time attribute, with the appropriate value for the record. The validity time may also be present for records defining BCS providers that are not yet active.

Content Packager Reference

[00127] The Content Packager Reference **712** is a list of Content Packager IDs identifying Content Packagers associated with the BCS provider. A subscriber associated with the BCS provider may only subscribe to packages offered by Content Packagers included in the Content Packager Reference **712**. The Content Packager Reference **712** contains at least one Content Packager ID.

CSR Contact

[00128] The CSR Contact **714** element describes possible ways to contact the customer service representatives for the BCS. The BCS Record **706** provides at least one CSR contact **714**. Each CSR Contact may be a URI. The following examples show how different classes of URI may be used for a CSR contact **714**.

- TEL:URI defines a telephone number the subscriber may call for customer assistance.
- MAILTO:URI specifies an email address the subscriber may use for customer assistance.
- HTTP:URI specifies a web site the subscriber may use for customer assistance.

Billing Policies

[00129] The Billing Policy **716** specifies a billing policy supported by the BCS provider on behalf of Content packagers. Each BCS provider supports at least one Billing Policy **716**. In an embodiment, the Billing Policy **716** comprises a Billing Environment and Service Account Type attributes.

a. Billing Environment

[00130] The Billing Environment indicates the particular type of device to which a billing policy applies. Examples of Billing Environment which may be supported include "BREW", "payPal".

b. Service Account Type

[00131] The Service Account Type indicates the identifier used for the service account billing ID. Examples of Service Account Type which may be supported include "MIN", "MDN", "BREW SID", "Credit Card", and "Prepay".

Terms of Use Table

[00132] The Terms of Use Table **718** is provided that represents a classification scheme used by the BCS provider to define controlled terms for accessing Terms of Use associated with the BCS provider.

Terms of Use Link

[00133] The Terms of Use Link **720** is provided that is a reference to an URI that identifies the location of a Terms of Use which the BCS provider requires a user to agree to before providing the user with access to packages offered by the content packager if the content packager does not provide end user license agreement (EULA) information.

2. Marketplace Content Packager Message

[00134] **FIG. 8** shows an embodiment of a Marketplace Content Packager message **800** schema for use in an embodiment of a distribution system. In an embodiment, information specific to a content packager is sent in the Marketplace Content Packager message **800**. Each version of a Marketplace Content Packager message **800** is uniquely identified by the values of its Content Packager ID **802** and version attribute **804**. In an embodiment, the version attribute **804** is a 16-bit unsigned integer. The Marketplace Content Packager **800** message contains the following elements.

- Content Packager ID

- Basic Info
- EULA Table
- Package records
- Tier records
- Channel records
- Auxiliary service references

Content Packager ID

[00135] Each Content Packager is uniquely distinguished from all other Content Packagers in the distribution network by a Content Packager ID **802**. The Content Packager is associated with at least one BCS provider. In an embodiment, the Content Packager ID **802** is an unsigned 16 bit integer.

Basic Info

[00136] In an embodiment, a Basic Information **806** record provides the following information.

- The Content Packager Name.
- A link to the content packager EULA.
- Private Content Packager Indicator.
- Currency Support

There shall be one Basic Information **806** record for each content packager.

- Content Packager Name

[00137] The Content Packager Name **808** is a string that may be used to identify the content packager to a user. The Content Packager Name **808** is unique among content packagers carried in the distribution network.

- EULA Link

[00138] The EULA Link **810** is a reference to a URI that identifies the location of a EULA which the content packager may require a user to agree to before providing the user with access to packages offered by the content packager. In an embodiment, the EULA Link **810** is optional. If the content packager does not provide one, the BCS provider Terms of Use Table **718** for the BCS provider associated with the user may be used.

- Private Content Packager

[00139] The Basic Information record **806** may specify that the content packager is a Private Content Packager **812**. The means by which a user subscribes to packages offered by a private content packager **812** are beyond the scope of this document.

- Currency Support

[00140] The Basic Information record **806** shall specify a Currency **814** element, which defines a list of the currencies that may be used by the content packager to set pricing for packages.

EULA Table

[00141] The EULA Table **816** is a classification scheme table used by the content packager to define terms for accessing the EULA associated with the content packager. In an embodiment, the EULA table **816** is optional. If the content packager does not provide one, the BCS provider Terms of Use Table **718** for the BCS provider associated with the user may be used.

Package Records

[00142] The Marketplace Content Packager message **800** includes at least one Package Record **818**. The Package Record **818** defines a set of content offerings available through the content packager, and certain associated attributes. A more detailed description of the Package Record **818** is provided in another section of this document.

Tier Record

[00143] The Marketplace Content Packager message **800** includes a Tier Record **820** for each Tier referenced by any package. The Tier Record **820** defines a tier, which refers to a group of channels. There is a Tier Record **820** for each tier used by the content packager. In an embodiment, the Tier Record **820** specifies the following information.

- The Tier ID
- The Validity Time of the Record
- The set of Channels included in the Tier.
- The set of Auxiliary Services added to the Tier

- Tier ID

[00144] The Tier ID is an identifier that uniquely distinguishes the tier from all other tiers offered by the same content packager. In an embodiment, the Tier ID is an unsigned 16-bit integer.

- Tier Validity Time

[00145] The Validity Time attribute defines a time at which the definition provided in the Tier Record **820** shall become valid, superseding the previous definition. If the Validity Time is absent or it refers to a time in the past, the Tier Record **820** is current. In an embodiment, the Validity Time attribute is a 32-bit count of seconds elapsed since 00:00:00 on 6 January 1980UTC.

[00146] The Tier Record **820** may define one Validity Time. The Validity Time is present when multiple records appear for the same Tier. In this case, both the current and future record definitions contain the Validity Time attribute, with the appropriate value for the record. The validity time is also present for records defining Tiers that are not yet active.

- Channel References

[00147] The Tier Record **820** specifies a list of channel references that describe the channels in the tier offering. The channels are defined in the Channel Record associated with the content packager. The Tier Record **820** contains at least one channel reference.

- Auxiliary Service References

[00148] The Tier Record **820** specifies the list of service identifiers for Auxiliary Services associated with this Tier. A device subscribed to packages that include the Tier shall acquire any material downloaded through Auxiliary Services while it is active.

Channel Record

[00149] The Marketplace Content Packager message **800** includes a Channel Record **822** for each channel referenced by any Tier. The Channel Record **822** defines a channel, which is a customization of a service for the content packager. In an embodiment, the Channel Record **822** is comprised of the following elements.

- Channel ID
- Channel Validity Time
- Channel Weight
- Channel Language-specific Data
- Basc Scrvicc
- Auxiliary Services
- Channel Icon

- Channel ID

[00150] The Channel ID is an identifier that uniquely distinguishes the Channel from other Channels offered by the same Content Packager. In an embodiment, the Channel ID is an unsigned 16-bit integer.

- Validity Time

[00151] The Validity Time attribute defines a time at which the definition provided in the Channel Record **822** shall become valid, superseding the previous definition. If the Validity Time is absent or it refers to a time in the past, the Channel Record is current. In an embodiment, the Validity Time attribute is a 32-bit count of seconds elapsed since 00:00:00 on 6 January 1980 UTC.

[00152] A Channel Record **822** may define at most one Validity Time. The Validity Time shall be present when multiple records appear for the same Channel. In this case, both the current and future record definition shall contain the Validity Time attribute, with the appropriate value for the record. The validity time shall also be present for records defining Channels that are not yet active.

- Channel Weight

[00153] Each Channel Record **822** shall assign a Channel Weight to the Channel. In an embodiment, the Channel Weight is an unsigned integer. The Channel Weight is used by the device to determine the order in which channels are presented to the user when displaying the MPG. In an embodiment, channels with the lower weight are presented first. Alternatively, channels with the higher weight are presented first.

[00154] The Channel Weight is unique amongst all Channels offered by all Content Packagers over all Multiplexes associated with the BCS provider. There is one Channel Weight associated with each Channel Record **822**.

- Channel Language-specific Data

[00155] The Channel Language Specific Data element specifies a Name and Description of the channel associated with a specific language, and may define URLs where the user can obtain further information about the channel.

[00156] Each Channel record **822** may contain one or more Channel Language-specific Data Elements. If a Channel Language-specific Data Element is present, its content supersedes the Service Language-specific Data Element for the Base Service in the

same language. If there is no Channel Language-specific Data Element in a given language, the device may use the Service Language-specific Data Element for the Base Service in that language. Each Channel record **822** shall contain a Channel Language-specific Data Element per Channel Language.

- Base Service Record

[00157] The Channel Record **822** specifies a Base Service Record. The Base Service Record identifies the Base Service for the Channel, and certain optional characteristics that are Channel-specific:

- Base Service Identifier
- Excludability.
- Channel-specific Capability Requirements

- Base Service Identifier

[00158] The Base Service Record specifies a Base Service Identifier. The Base Service identifier is the service identifier for the Service that the channel customizes.

- Auxiliary Services

[00159] The Channel Record **822** may define a list of Service Identifiers for Auxiliary Services associated with this channel. The device shall acquire any material downloaded through the Auxiliary Services while it is accessing the channel.

- Channel Icon

[00160] The Channel Record **822** may provide a channel Icon element that can be used to identify the channel in a display of the MPG to the user. If present, the channel Icon is used in place of the Service Icon. The Channel Icon may be a reference to a resource that defines an icon for the channel, or an actual Icon of a defined MIME type.

Auxiliary Service References

[00161] The Marketplace Content Packager message **800** may include a list of auxiliary service references **824** for auxiliary services associated with this content packager. The user shall be automatically subscribed to the listed services if the user subscribes to any package associated with the content packager. The device shall acquire any material downloaded through the auxiliary services while it is active.

[00162] FIG. 9 shows a detailed diagram of an embodiment of a package record schema **900** for use in a Marketplace Content Packager message in an embodiment of a

distribution system. The package record schema **900** defines a set of content offerings available through the content packager, and certain associated attributes as follows.

- Package ID
- Package Validity Time
- Package Weight
- Package Default Language
- Language-specific Data
- Package Pricing and subscription methods
- BCS Provider IDs associated with the Package
- Tiers associated with the Package
- Package Characteristics
- Auxiliary Services associated with the Package
- Available Areas

- Package ID

[00163] The Package ID **902** is an identifier that distinguishes a particular package from other packages offered by the same content Packager. In an embodiment, the Package ID **902** is an unsigned 16-bit integer. There is one Package ID **902** associated with each package.

- Validity Time

[00164] The Validity Time attribute **904** defines a time at which the definition provided in the Package Record **900** shall become valid, superseding the previous definition. If the Validity Time **904** is absent or it refers to a time in the past, the Package Record **900** is current. The Validity Time attribute is a 32-bit count of seconds elapsed since 00:00:00 on 6 January 1980UTC.

[00165] A Package Record may define at most one Validity Time. The Validity Time shall be present when multiple records appear for the same package. In this case, both the current and future record definition shall contain the Validity Time attribute, with the appropriate value for the record. The validity time shall also be present for records defining packages that are not yet active.

- Package Weight

[00166] Each Package Record **906** assigns a Package Weight to the package. The Package Weight is an unsigned integer. The Package Weight is used by the device to

determine the order in which packages are presented to the user. In an embodiment, packages with the lower weight are presented first. Alternatively, packages with the higher weight are presented first.

[00167] The Package Weight is unique amongst all packages offered by all content packagers over all multiplexes associated with the BCS provider. There is one Package Weight associated with each Package Record **900**.

- Package Default Language

[00168] The Package Record **900** specifies a Default Language attribute **908**. The Default Language attribute **908** specifies the language of the service that will be provided by default to the user if the user's preferred language is not available, unless otherwise overridden. A Package Default Language will be provided if any service which can be accessed through the package supports more than one language.

- Package Language-specific Data

[00169] The Package Language Specific Data element **910** specifies a name and description of the package associated with a specific language. Each package record contains at least one Package Language-specific Data Element **910**. Each package record contains at most one Package Language-specific Data Element per Package Language.

a. Package Language

[00170] The Package Language attribute **912** specifies the language of the Package Language Specific Data element **910**. Packages that provide descriptions in more than one language specify which language is the default language to use if no language preference is defined on the device.

b. Package Name

[00171] The Package Name attribute **914** is a string that specifies a name for the package that may be displayed to the user.

c. Package Description

[00172] The Package Description attribute **916** is a string that specifies a description for the Package that may be displayed to the user.

Price Method

[00173] The Price Method **918** of a package specifies a cost associated with a given subscription method for the package. It consists of a Subscription Method, a Currency

and an Amount. The Package Record **900** specifies at least one Price Method **918**. The Package Record **900** specifies at most one Price Method per Subscription Method.

a. Subscription Method

[00174] The Subscription Method identifies a subscription method (e.g. monthly, weekly) associated with the cost.

b. Currency

[00175] The Currency identifies the currency applicable to the Amount. The Currency is a currency listed in the Basic Info record for the Content Packager. At least one BCS provider associated with the content packager shall support all currencies applicable to a package.

c. Amount

[00176] The Amount is the actual price of the package in the case of a Root Package, or the incremental price of the Package additional to the price of the Parent Package in the case of an add-on Package. The Amount attribute is a floating point value conforming to the requirements of the associated Currency.

Tier References

[00177] The Package Record **900** shall specify the set of Tier Reference elements **920** that describe the package offering. The Tiers are defined in the Tier Record **820** associated with the Content Packager. The Package Record **900** shall contain at least one Tier Reference **920**.

Package Characteristics

[00178] The Package Characteristics **922** element is an optional element that specifies certain attributes of the package. The element may specify any combination of the following attributes:

- Parent Package.
- Autosubscribe Package
- Closed Package.
- Excluded Packages.

a. Parent Package

[00179] The Package Characteristics **922** element may specify a list of one or more Package IDs representing parent packages. If the package is associated with a Parent Package then the package is an "add-on" package, and the user may only subscribe to

the package if the user is already subscribed to at least one package among the parent packages. If no parent packages are listed then the package is defined to be a "Root" package.

b. Autosubscribe Package

[00180] If the Package is a Root Package, the Package Characteristics **922** element may specify the Autosubscribe attribute to cause the user to be automatically subscribed to the package.

c. Closed Package

[00181] The Package Characteristics **922** element may specify the Closed attribute to indicate that new subscriptions are no longer being accepted for the package.

d. Excluded Packages

[00182] The Package Characteristics **922** element may specify a list of one or more Package IDs representing Excluded Packages. A user subscribed to the package specified in the Package Record shall not be permitted to subscribe to any package in the list of Excluded Packages. It is the responsibility of the content packager to define relationships between packages in such a way that the user will not be offered the package if s/he is already subscribed to a package in the Excluded Packages list.

BCS Provider References

[00183] The Package Record **900** may specify a list of BCS Provider References **924** associated with the Package. The BCS Provider Reference **924** identifies a BCS provider. Only BCS providers associated with the content packager may be included in the list. If the list is provided then only users associated with an identified BCS provider are permitted to subscribe to the package. If the list is not provided then users associated with any BCS provider that is also associated with the content packager are permitted to subscribe to the package.

Auxiliary Service References

[00184] The Package Record **900** may include a list of Auxiliary Service References **926** for Auxiliary Services associated with this Package. The device subscribed to the package shall acquire any material downloaded through the Auxiliary Services while it is active.

Available Areas

[00185] The Package Record **900** may include an Available Areas element **928** comprising of a list of local (LOI) and wide area (WOI) operations infrastructure. The list indicates WOIs and LOIs in which at least one service offered as a channel through the package may be accessed. In an embodiment, the LOI and WOI are 16-bit unsigned integers that uniquely identify a geographical region.

Class 2: Service Information

[00186] In one or more embodiments, the SI provides service information in a single message referred to as a Service Definition Message.

Service Definition Message

[00187] **FIG. 10** shows an embodiment of a service definition message **1000** schema for use in an embodiment of a distribution system. The service definition message **1000** defines those content attributes of a service which are shared between channels offered by different content packagers that use the service as a base service. It also defines default content attributes that may be used in the event that a content packager does not define customized values for the corresponding attributes in the channel definition record.

[00188] The service definition message **1000** defines those content attributes of an auxiliary service which are shared between channels offered by different content packagers that use the auxiliary service. Auxiliary services may be Non Real Time Services. They may be used by the content packager to build up a cache of material such as advertisements, barkers, intros, and outros that can be used to customize the channels defined for the content packager.

- Version

[00189] The service definition message **1000** comprises a version **1002** that is uniquely identified by the value of its version attribute. In an embodiment, the version attribute is a 16-bit unsigned integer.

- Service Record

[00190] The Service Definition message **1000** comprises one or more Service Records **1004**.

- Auxiliary Service Records

[00191] The Service Definition message **1000** may comprise one or more Auxiliary Service Records **1006**. In an embodiment, there is one Auxiliary Service Record for each auxiliary service offered by the distribution network. The Auxiliary Service Record **1006** comprises the following information.

- Auxiliary Service ID
- Auxiliary Service Validity Time
- Auxiliary Capability Requirements
- Auxiliary Flow Records

Service Record

[00192] **FIG. 11** shows an embodiment of a service record **1100** schema for use in an embodiment of a distribution system. For example, the service record **1100** is suitable for use as the service record **1004**. In an embodiment the SI from the distribution network provides one service record for each service offered. The Service Record **1100** comprises of the following information.

- Service ID
- Validity time
- Corporate Affiliation
- Abbreviated Name
- Service Genre
- Default Language
- Private Service
- Service Type
- Service Language Specific Data
- Capability Requirements
- Ratings
- Available Areas
- Flow Records
- Service Icon

- Service ID

[00193] The Service Record **1100** provides a Service ID **1102**. The Service ID **1102** is an identifier that uniquely distinguishes the service from other services and auxiliary services transported in the same Multiplex.

[00194] In an embodiment, the Service ID **1102** is a 16-bit hexadecimal integer. The value of a Service ID **1102** for a service used to transport IP Datacast services may be equal to the destination IP Address.

- Validity Time

[00195] The Validity Time **1104** defines a time at which the definition provided in the Service Record **1100** shall become valid, superseding the previous definition. If the Validity Time is absent or it refers to a time in the past, the Service Record is current.

[00196] In an embodiment, the Validity Time **1104** is a 32-bit count of seconds elapsed since 00:00:00 on 6 January 1980 UTC.

[00197] The Service Record **1100** may define at most one Validity Time. The Validity Time is present when multiple records appear for the same service. In this case, both the current and future record definition shall contain the Validity Time parameter, with the appropriate value for the record. The validity time is also present for records defining Services that are not yet active.

- Corporate Affiliation

[00198] The Service Record **1100** provides a Corporate Affiliation **1106**. The Corporate Affiliation parameter is a string that defines the corporate name for the service. Multiple services may share the same value of Corporate Affiliation.

- Abbreviated Name

[00199] The Service Record **1100** provides an Abbreviated Name **1108**. The Abbreviated Name parameter **1108** is a string that defines a short name for the service that may be displayed to the user. Each service has an Abbreviated Name that is unique within any Multiplex transporting the Service.

- Genre

[00200] The Service Record **1100** provides a Genre parameter **1110**. The Genre parameter **1110** is a reference that describes the semantic class of content provided by the service.

- Default Language

[00201] The Service Record **1100** provides a Default Language parameter **1112**. The Default Language parameter **1112** specifies the language of the service that shall be provided by default to the user if the user's preferred language is not available, unless

overridden by the default language of the Package Record. The Default Language shall be provided if the service supports more than one language.

- Private Service

[00202] The Service Record **1100** may specify that the service is private using the Private parameter **1114**. Access to a private service may be offered through a Private content packager. Information about a private service, including the existence of the service, may not be disclosed to users who are not permitted to access at least one private content packager that offers access to the service.

- Service Type

[00203] The Service Record **1100** provides a Service Type parameter **1116**. The Service Type parameters **1116** indicate the temporal nature of the content provided by the service. There are four possible Service Types: Real Time, Non-real Time, "Per MPG" or IP Datacast.

a. Real Time Service

[00204] All content on a Real Time Service consists of Real Time streaming media.

b. Non Real Time Service

[00205] All content on a Non Real Time Service consists of non-Real Time media downloaded as clip files.

c. Per MPG Service

[00206] Content on a "Per MPG" Service may comprise Real Time streaming media, non-Real Time media, or a mixture of the two, as determined from the Media Presentation Guide (MPG).

d. IP Datacast Service

[00207] The content of an IP Datacast Service consists of one or more Flows transporting generic IP packets. Each Flow supporting the IP Datacast Service transports IP packets for a specific IP Multicast Address and Port. Each IP Address is associated with at least one MIME Type.

[00208] The Service Type parameter **1116** for an IP Datacast Service provides either all IP Addresses and ports associated with the service or none. If no IP Address is provided, the structure and contents of the IP Datacast Service is determined by any suitable means.

- Service Language Specific Data

[00209] The Service Record **1100** provides at least one Service Language Specific Data parameter **1118**. The Service Language Specific Data parameter **1118** specifies the Name and Description of the service associated with a specific language. There also exists a Service Language Specific Data parameters for the Default Language supported by the service

- Capability Requirements

[00210] The Service Record **1100** provides Capability Requirements **1120** for the service if the service is not a Real Time Service. If the device does not meet the Capability Requirements **1120** for subscribed users and the channel using the service is not excludable then the user may not be permitted to subscribe to the package containing the channel. In an embodiment, the Capability Requirements **1120** comprise one or more storage requirements that specify the maximum amount of memory required for a device, in units of kilobytes, to support access to the service for a subscribed user.

- Rating

[00211] The Service Record **1100** provides one or more Ratings **1122** for the service. The Rating defines the parental advisory information for this Service. It typically corresponds to an average or typical Rating level for MPG Titles offered on the Service. The Rating **1122** comprises a Rating Region that specifies the geographical region in which the Rating applies. There may be a separate Rating for each Rating Region in which the service is offered. There shall be at most one Rating for each Rating Region in which the service is offered.

- Available Areas

[00212] The Service Definition Record **1100** comprises an Available Areas element **1124** that comprises a list of LOI and WOI identifiers. The list indicates WOIs and LOIs in which the service may be accessed. There is at least one LOI or WOI ID in the Available Areas element **1124**. In an embodiment, the LOI and WOI identifiers are 16-bit unsigned integers that uniquely identify a geographical region.

- Flow Record

[00213] The Service Record **1100** provides one Flow Record **1126** for each Flow used to transport a component of the service. The Flow Record **1126** is comprised of the following information.

- Flow ID
- Flow Routing Type
- Flow MIME Type
- Flow Language
- Flow Configuration Flags
- IP Datacast Specification.

- Service Icon

[00214] The Service Record **1100** provides a Service Icon parameter **1128** that can be used to identify the service in a display of the MPG to the user. The Service Icon parameter **1128** may be a reference to a resource that defines an icon for the service, or an actual Icon of a defined MIME type.

Class 3: Media Presentation Guide information

[00215] The Media Presentation Guide (MPG) provides information about the contents of the channels which may be displayed to the user or downloaded to the device. The contents of a given channel are divided by time into semantically coherent units which share a common MPG Title. The MPG Title is associated with the Base Service for the channel.

[00216] In an embodiment, the MPG provides MPG Title Records for all services available in a particular multiplex. The MPG may provide MPG Title Records for services available in various Multiplexes in the network.

[00217] Therefore various illustrative logics, logical blocks, modules, and circuits described in connection with the embodiments disclosed herein may be implemented or performed with a general purpose processor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic device, discrete gate or transistor logic, discrete hardware components, or any combination thereof designed to perform the functions described herein. A general-purpose processor may be a microprocessor, but, in the alternative, the processor may be any conventional processor, controller, microcontroller, or state

machine. A processor may also be implemented as a combination of computing devices, e.g., a combination of a DSP and a microprocessor, a plurality of microprocessors, one or more microprocessors in conjunction with a DSP core, or any other such configuration.

[00218] The steps of a method or algorithm described in connection with the embodiments disclosed herein may be embodied directly in hardware, in a software module executed by a processor, or in a combination of the two. A software module may reside in RAM memory, flash memory, ROM memory, EPROM memory, EEPROM memory, registers, a hard disk, a removable disk, a CD-ROM, or any other form of storage medium known in the art. An exemplary storage medium is coupled to the processor, such that the processor can read information from, and write information to, the storage medium. In the alternative, the storage medium may be integral to the processor. The processor and the storage medium may reside in an ASIC. The ASIC may reside in a user terminal. In the alternative, the processor and the storage medium may reside as discrete components in a user terminal.

[00219] The description of the disclosed embodiments is provided to enable any person skilled in the art to make or use the present invention. Various modifications to these embodiments may be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other embodiments, e.g., in an instant messaging service or any general wireless data communication applications, without departing from the spirit or scope of the invention. Thus, the present invention is not intended to be limited to the embodiments shown herein but is to be accorded the widest scope consistent with the principles and novel features disclosed herein. The word "exemplary" is used exclusively herein to mean "serving as an example, instance, or illustration." Any embodiment described herein as "exemplary" is not necessarily to be construed as preferred or advantageous over other embodiments.

[00220] Accordingly, while one or more embodiments of a decoding system have been illustrated and described herein, it will be appreciated that various changes can be made to the embodiments without departing from their spirit or essential characteristics. Therefore, the disclosures and descriptions herein are intended to be illustrative, but not limiting, of the scope of the invention, which is set forth in the following claims.

CLAIMS

WHAT IS CLAIMED IS:

1. A method of organizing packages and channels in a device, the method comprising:

receiving a plurality of packages, at least one package having an associated weight, wherein each package has a set of associated channels; and

ordering the plurality of packages based on associated package weight.

2. The method of claim 1, further comprising ordering the plurality of channels for a given package based on associated channel weight.

3. The method of claim 1, further comprising applying a function to a package based on associated package weight.

4. The method of claim 1, further comprising applying a condition to a package based on associated package weight.

5. The method of claim 1, further comprising generating system information parameters including the ordered plurality of packages.

6. The method of claim 2, further comprising applying a function to a channel based on associated channel weight.

7. The method of claim 2, further comprising applying a condition to a channel based on associated channel weight.

8. The method of claim 3, further comprising applying a condition to a package based on associated package weight.

9. The method of claim 6, further comprising applying a condition to a channel based on associated channel weight.

10. The method of claim 5, further comprising transmitting the generated system information.

11. A method of organizing packages and channels in a device, the method comprising:

receiving a plurality of ordered packages, wherein at least one package is ordered according to an associated package weight; and

displaying each package according to the order of each package.

12. The method of claim 11, wherein each package has a set of associated channels.

13. The method of claim 11, further comprising applying a function to a package based on associated package weight.

14. The method of claim 11, further comprising applying a condition to a package based on associated package weight.

15. The method of claim 12, further comprising receiving an ordered plurality of channels for a given package based on weights associated channel weight.

16. The method of claim 15, further comprising applying a function to a package based on associated package weight.

17. The method of claim 15, further comprising applying a condition to a package based on its associated package weight.

18. The method of claim 15, further comprising displaying each channel according to the order of each channel.

19. A wireless device, comprising:

a transceiver configured to receive a plurality of ordered packages, wherein at least one package is ordered according to an associated weight;

a processor configured to process the plurality of ordered packages for display;

a user interface configured to select a package from the plurality of ordered packages;

a memory coupled to the processor configured to store the plurality of ordered packages; and

a display coupled to the processor configured to display the stored plurality of ordered packages according to their order.

20. A wireless device, comprising:

means for receiving a plurality of ordered packages, wherein at least one package is ordered according to an associated weight; and

means for displaying each package according to the order of each package.

21. A server, comprising:

a transceiver configured to receive a plurality of packages, wherein at least one package is ordered according to an associated weight; and

a processor configured to order each package of the plurality of package according to an associated package weight; and

a memory coupled to the processor configured to store ordered plurality of packages.

22. A server, comprising:

means for receiving a plurality of packages, at least one package having an associated weight, wherein each package has a set of associated channels; and

means for ordering the plurality of packages based on their associated weight;