Dynamic Content Delivery Requirements

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Open Mobile Alliance

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1. Scope (Informative)

This document defines the requirements for the Dynamic Content Delivery Enabler.

The Dynamic Content Delivery (DCD) Enabler is expected to enhance a mobile user's experience through the periodic delivery of personalised or customized content to a device. Such content may be based on the subscription and preferences of the user, operator or service provider. As a complementary delivery mechanism to the existing mechanisms, e.g. browsing, messaging, etc., it will reuse as much existing technology as possible, while providing the added benefits of delivery control management, and an enhanced user experience.

The content delivery should support various network technologies (i.e. network types and/or bearers), and may operate autonomously in the background. The content types and formats used by DCD will, wherever possible, be consistent with those of the established mechanisms.

The DCD Enabler enables an application and its delivery to be enhanced by making it available asynchronously and through automatic means though it does not specify detailed DCD applications, or how to render those applications.

2. References

2.1 Normative References

[RFC2119] "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt

2.2 Informative References

[3GPP-Voc] Vocabulary for 3GPP Specifications; 3GPP TR 21.905
URL: http://www.3gpp.org/ftp/Specs/html-info/21905.htm

[OMA-BCAST] OMA Broadcast Specification, OMA-TS-BCAST-V1_0, Open Mobile Alliance™
URL: http://www.openmobilealliance.org

[OMA-CP] OMA Client Provisioning V1.1, Open Mobile Alliance™
URL: http://www.openmobilealliance.org

[OMA-DICT] "OMA Dictionary", Open Mobile Alliance™, OMA-Dictionary-V2_4, URL:http://www.openmobilealliance.org/

[OMA-DM] OMA Device Management V1.2 , Open Mobile Alliance™
URL: http://www.openmobilealliance.org

[OMA-MCC] OMA Charging Vx.x , Open Mobile Alliance™
URL: http://www.openmobilealliance.org

[OMA-DRM] OMA Digital Rights Management V1.0, OMA Digital Rights Management V2.x , Open Mobile Alliance™
URL: http://www.openmobilealliance.org

[OMA-SIMPLE] Presence SIMPLE Specification, OMA-TS-Presence_SIMPLE-V1_0, Open Mobile Alliance™
URL: http://www.openmobilealliance.org

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

Activation	A DCD Service state change in which DCD Content delivery becomes enabled (i.e. the DCD Service is moved to Active state). Activation may be triggered by Application Registration.
Active	A DCD Service state in which DCD Content delivery is enabled. This is the normal service state for a DCD Service.
Advice Of Charge (AOC)	Advice of Charge is a notification of service charges, with optional interaction (e.g. confirmation, payment).
Application Deregistration	The process of terminating the association of a DCD Enabled Client Application with a DCD Server.
Application Profile (AP)	The Application Profile (AP) is the set of static definitions and rules that allow the DCD Enabler to handle the delivery of the DCD Content for a particular DCD-Enabled Client Application. The AP consists of the collection of Channel Metadata plus application specific parameters common for multiple DCD Channels (e.g. application-id). The AP facilitates the processing of dynamic metadata (i.e. Content Metadata).
Application Registration	The process of establishing the association of a DCD Enabled Client Application with a DCD Server, and disclosure of its Application Profile, to facilitate DCD Enabled service establishment.
Authentication	The process of validating the identity of a DCD Client.
Broadcast Channel	Channel targeted for delivery on a non-individual basis. (see OMA BCAST RD)
Channel	A set of Content Items that the user selects or is automatically provided, and is updated periodically or on-demand.
Channel Guide	Information describing DCD Services available to the user.
Connection Profile	A set of parameters controlling the data path used by the DCD service, e.g. DCD Service Provider address and / or proxy / gateway address.
Content Details	Details on the Content Item.
Content Item	A single unit of data such as a short news-styled content initially delivered and presented to the user as e.g. news-ticker text or news flash providing summary of latest news, update or other useful information.
Content Selection	The current set of DCD Content which is provided to a user by default or by subscription.
Content Subscription	Content Subscription is an agreement to deliver a given content to a subscriber by schedule, on demand, or any other possibilities.
Content Update	The process of delivering content to DCD Enabled Client Applications.
Customization	The tailoring of a channel and its associated content items to satisfy a user's specified preference, e.g. a user’s manual Channel or Content Item selection, selection based on user’s / user group’s user-profile. A customized Channel or Content Item is presented to a user in the same way (i.e. remains static) until the user re-specifies his / her preference.
DCD Client Device	It is a device (see [OMA-DICT]) hosting a DCD Client and one or more DCD-Enabled Client Applications.
DCD Content	A Collection of Content (see [OMA-DICT]) and associated DCD-defined data structures delivered by the DCD Service.

DCD Content Packaging	The enveloping of DCD Content with associated Content Metadata within DCD transactions.
DCD Content Provider	A source for DCD content to the end users or to the DCD Service Provider.
DCD-Enabled Client Application	An application (see [OMA-DICT]) that enables the DCD Service using the DCD Client, e.g. by rendering DCD Content. Examples of DCD-Enabled Client Applications are news-ticker and news-flash applications, active wall-paper applications and active ringtones applications.
DCD Client	A client (see [OMA-DICT]) that acts as the receiver of a DCD service (e.g. the reception, personalization, customization, charging, notification and storage of DCD Content as well as authentication of the DCD Server). The DCD Client does not render (e.g. display, play etc) DCD Content, but provide DCD Service management and delivery functions for the DCD-Enabled Client Aplications
DCD Server	A Server (see [OMA-DICT]) capable of communicating with any DCD Client for the purpose of delivery of DCD Content and control information over various of mobile networks and bearers (e.g. Point-To-Point and Point-To-MultiPoint).
DCD Service	A DCD enabler deployment, via which a DCD Service Provider offers DCD enabled services.
DCD Service Provider	An entity that provides and administers DCD Service to a DCD subscriber and / or DCD user. The DCD Service Provider may or may not be the provider of the network and DCD content.
Deactivation	A DCD Service state change in which DCD Content delivery becomes disabled (i.e. the DCD Service is moved to Inactive state).
Disabled	A DCD Service state in which no DCD Service is being provided. In this state, the DCD Client is not running on the device, and the DCD Server does not initiate content delivery.
Dynamic Content Delivery	A client-server based content service intended to deliver personalized content on a periodic basis to a mobile device.
Inactive	Inactive state is the initial state of a DCD Service, in which DCD Content delivery is disabled. A DCD service is in inactive state prior to activation or after deactivation.
Management Authority	An entity that has the right to perform a specific function on a DCD Client Device or manipulate a given data element or parameter. For example, the Network Operator, handset manufacturer, enterprise, or Device owner may be the authority or share authority for managing the DCD Client Device. One Management Authority may own all DCD Client Device resources or may share or delegate all or parts of these with/to other Management Authorities.
Personalization	Usage of technologies and the understanding of the user's needs to specifically tailor the content to be delivered to the user. Personalization of content occurs when the content is dynamically adapted based on a user's profile.
Personalized Content	Content which is modified by personalization.
Registered	A DCD Service state in which a DCD Client has registered with a DCD Server and DCD Service has been initialized.
Resumption	A DCD Service state change in which server-initiated DCD Content delivery and client-initiated DCD Content delivery requests are re-enabled (i.e. the DCD Service is moved from Suspended state to Active state).
RSS	A family of web feed formats, including Really Simple Syndication (RSS 2.0) and RDF Site Summary (RSS 1.0)
Service Options	The current set of DCD Service preferences for a user, e.g. content delivery schedule, roaming delivery control, content filters, location-based content preferences, etc.
Subscription	An arrangement to receive or be given access to content and services delivered via DCD.
Suspended	A DCD Service state in which DCD Content delivery is temporarily disabled. In this state the DCD Server does not initiate content delivery, and the DCD Client does not request DCD Content delivery. In this state, the DCD-Enabled Client Application may continue displaying DCD Content already on the device, but no additional content will be delivered.
Suspension	A DCD Service state change in which server-initiated DCD Content delivery and client-initiated DCD Content delivery requests are temporarily disabled.

Ticker	A scrolling display of some information related to the latest DCD Content
Topical Content	Content that relates to a particular topic.
User-selectable Channel	Channel which is specifically selectable by the user. (see OMA BCAST RD)
Wi-Fi	Trade name for a collection of wireless technology specifications for private and public wireless networks operating in unlicensed frequency bands.

3.3 Abbreviations

BCAST	The OMA BCAST enabler
DCD	Dynamic Content Delivery
HTTP	Hypertext Transport Protocol
IP	Internet Protocol
MCC	Mobile Charging and Commerce
MIME	Multipurpose Internet Mail Extensions
OMA	Open Mobile Alliance
RSS	Really Simple Syndication
URL	Universal Resource Locator

4. Introduction (Informative)

The Dynamic Content Delivery (DCD) Enabler is expected to enhance a mobile user's experience through the periodic delivery of personalised or customized content to a device. Such content may be based on the subscription and preferences of the user, operator or service provider.

Figure 1 describes the overall system of the DCD Enabler.

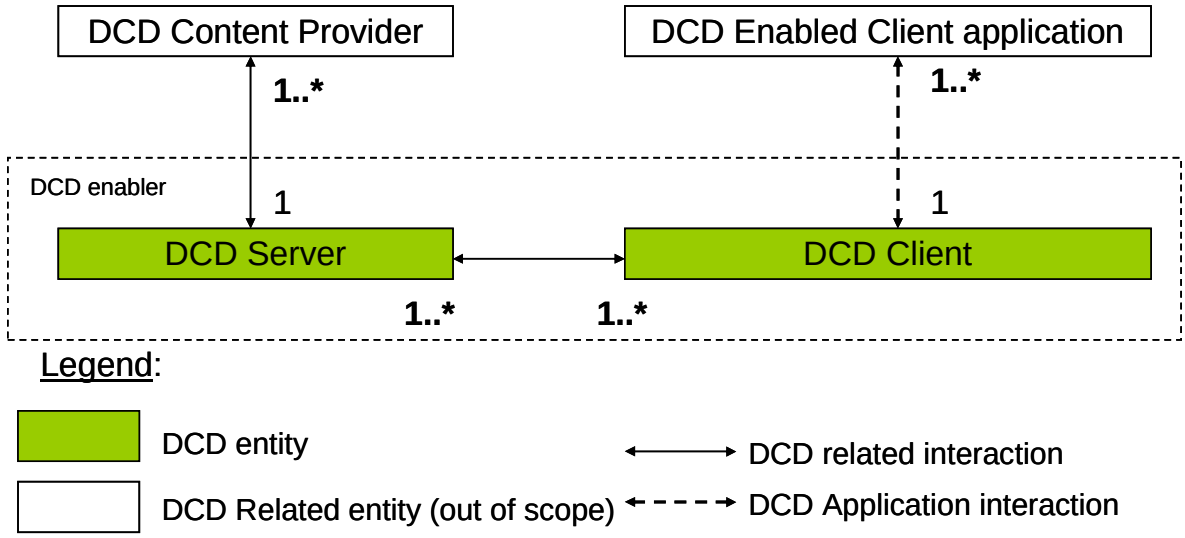

Figure 1 Overall DCD System

The DCD-Enabled Client Application on the mobile device receives the content from a network server for rendering. Within this application, the user can interact with the content, initiate requests for more detailed content, subscribe to additional content channels, and launch other applications.

The DCD Client is acting as an agent that enables the DCD functionality on the handset and serves one or more DCD-Enabled Client Application(s).

As a complementary delivery mechanism to the existing mechanisms, e.g. browsing, messaging, etc., DCD will reuse as much existing technology as possible while providing the added benefits of delivery control management and an enhanced user experience. The content delivery should support various network technologies, i.e. network types and/or bearers, and may operate autonomously in the background without user interaction. The content types and formats used by DCD will, wherever possible, be consistent with those of the established mechanisms.

The DCD Enabler does not specify detailed applications, or how to render those applications. Rather it enables an application and its delivery to be enhanced by making it available asynchronously and through automatic means. Subsequent actions once the DCD Enabler delivered content is presented, e.g. requesting additional content, etc., is a function of the existing mechanisms. By way of example, with a service based on DCD, users may subscribe to services that provide continually updated news, weather, traffic, or financial information, all of which could be personalised for the user. These services could be tied to a user's location in order to increase the value of the content to the user. Such a service may support delivery of the DCD Content to the user no matter which mobile device is used through awareness of the user's identity, e.g. such as that stored on a smart card. However many of these aspects are beyond the scope of the DCD Enabler per se but leverage other OMA and other organisation's work to achieve the service realisation.

This specification contains use cases to illustrate some of the requirements for the DCD Enabler.

As illustrated in the use cases and specified in the requirements, the DCD Enabler's primarily responsibilities are for establishment and management of arrangements for periodic / on-demand content delivery between a DCD Server and a DCD-Enabled Client Application. These responsibilities integrate with, but are not limited to, the key functions of:

- Content (channel) selection / subscription
- Content personalization and customization
- Content storage management
- Content charging

The content delivered by DCD may be presented to the user or otherwise used by the DCD-Enabled Client Application, depending upon the nature of the DCD-Enabled Client Application. User interaction with the content may result in further content delivery within the scope of the DCD Enabler, or outside the scope of the DCD Enabler (through other OMA enabler clients).

The DCD Enabler will leverage other OMA enablers for these functions, as available and supported by the other enablers.

5. Use Cases (Informative)

5.1 Initial Use of DCD Client Application

5.1.1 Short Description

The first time a User interacts with the DCD Client Application, they should be presented with a default content display or with actual live content, if the Client Application has already successfully downloaded content from a Content Server.

5.1.2 Actors

- User: Begins interaction with the DCD Client Application.
- DCD Client Application: Presents default content or downloaded / pushed content to the User.

5.1.3 Pre-conditions

The DCD Client Application should be provisioned, but may or may not have downloaded an initial set of content.

5.1.4 Post-conditions

The DCD Client Application displays default or initial content to the user.

5.1.5 Normal Flow

- User powers on the DCD Client Device.
- The User views the screen, upon which the DCD Client Application displays a short summary of content within one or more graphical groupings.
- If the DCD Client Application has not yet retrieved an initial set of content from the Content Server, default content should be shown to the User.
- The content within each grouping in the DCD Client Application display contains a limited amount of text and graphical information. The information shown for each grouping may change dynamically to show multiple content items over time.
- If the User finds a content item that is of interest to them, it can be selected in order to invoke a display of more information about that item.

5.1.6 Alternative Flow

1. A user powers on the DCD Client Device.
2. A default set of content items are pushed to the device without user interaction and the DCD Client Application displays the content.
3. The user clicks a URL embedded in one of the content items (e.g. latest news content item) that initiates the device's browser, which in turn allows the user to consume the full news report as summarised in the content item.
4. The default set of content items are periodically refreshed and displayed on the device.

5.2 Initial Activation

5.2.1 Short Description

The initial activation experience described here is an example of the experience possible when a DCD handset is purchased. Upon SIM insertion and power-up, the DCD service will initialize, and default content delivered within 5 minutes. No other user or salesperson initiated step is required for DCD service activation and presentation of default content. The content will be designed to the capabilities of the DCD client and handset in use, and can be personalized for the user. The user is presented with a non-intrusive offer to add additional DCD content or personalize the current content, which they accept, adding additional DCD content and selecting content options. The new and personalized content is delivered and made available via the DCD client within one minute of being added. During this process, the user is not prevented from making or accepting a phone call, or accessing other on-device menu functions.

5.2.2 Actors

- End User – using a mobile Device
- DCD Service Provider – a mobile operator (or another Service Provider) that offers DCD services

5.2.3 Pre-conditions

- The End User has purchased a DCD-capable device and SIM from a mobile operator offering DCD service.
- The DCD-capable device is pre-configured for access to the DCD service.
- Mobile service is immediately available to the DCD-capable device upon purchase and activation.

5.2.4 Post-conditions

- The DCD service is active, and content is being provided to the user according to the selected options.

5.2.5 Normal Flow

- Upon SIM insertion and power-up, the DCD client registers with the DCD service. The DCD client indicates its client type, device type, and client/device capabilities when it contacts the DCD service.
- The DCD service identifies the user based upon the network identity of the device in use.
- The DCD service delivers default content to the DCD client.
- While the default DCD content is being delivered, the user explores the device menus and takes a picture with the device camera, and receives a service welcome MMS message. During this time, the DCD content delivery either continues, or is paused as necessary and resumed automatically when possible.
- The DCD content is designed to the capabilities of the DCD client and handset in use. It includes a welcome message “Welcome to your DCD service, Mary”, and describes the service, indicating which content is free. It also includes a notice that additional content and options can be provided upon user request, via an HTTP link.
- The user selects the link, and the default browser for the device opens and retrieves the content referenced by the link. The user is presented with options for additional DCD content that can be subscribed, with some free and some for a charge. The user is also presented with options for DCD content personalization, and other options such as controls on DCD content delivery.
- The user selects some sports teams to receive news about, how often the news updates should be sent.
- The user exits the browser and returns to the DCD Client Application. The new content is delivered and made available via the DCD client within one minute of being added.
- While the DCD client is receiving the new content, the user receives a phone call and answers. The DCD content delivery is paused, and resumes automatically when the call is ended.

5.2.6 Alternative Flow 1

- When the DCD client contacts the DCD service, it includes the subscriber's identity, which has been provisioned by the Operator as a secure value on the SIM card.

5.2.7 Alternative Flow 2

- Upon SIM insertion and power-up, the DCD enabled device authenticates with the DCD Service Provider for network access (assuming DCD Service Provider is also providing network connectivity, e.g. they are a mobile network operator). During this time the DCD enabled device also advertises its capabilities, e.g. client type, device type, and client/device capabilities) with the DCD service.
- Default DCD content is automatically detected and retrieved by the DCD enabled device (i.e. DCD enabled device detects the broadcast DCD content).
- The DCD content is displayed on the DCD enabled device and the user views the delivered content items. The delivered content items may either be default content items, content items based upon the user's profile (i.e. it is personalized content), or specific content based on the user's specific request (i.e. it is customised content).
- The user consumes the received content. The user is provided with an advice of charge before they retrieve the full content (e.g. by clicking an embedded URL within the content item).
- In addition the user has the ability to subscribe to additional DCD channels (either through the DCD Client Application, through Web access, or through the DCD Service Provider customer care). Depending on the type of channel the user may be charged to subscribe to that channel.

5.3 Priority Presentation

5.3.1 Short Description

The experience described here focuses on the conditions in which DCD content is displayed. In special cases, high-priority DCD content display can pre-empt other currently displayed DCD content. In the latter this case, the user is provided with simple means to return to the normal view, e.g. a timeout on the display of the DCD content, or use of the back key.

5.3.2 Actors

- End User – using a mobile Device
- DCD Service Provider – a mobile operator (or another Service Provider) that offers DCD services

5.3.3 Pre-conditions

- The End User has purchased a DCD-capable device and (U)SIM (e.g. GSM based example) from a mobile operator offering DCD service.
- The DCD service is active, and content is being provided to the user according to the selected options.

5.3.4 Post-conditions

5.3.5 Normal Flow

- While normal-priority DCD content is being displayed, high-priority DCD content is received. The DCD high-priority content pre-empts the display of the current content. The high-priority DCD content is displayed for a timed period, after which the previous display is restored.
- Later, while normal-priority DCD content is being displayed, high-priority DCD content is again received. The DCD high-priority content again pre-empts the display of the current content. This time the user selects the back key to exit the high-priority DCD content display, after which the previous display is restored.

5.4 Suspend / Resume

5.4.1 Short Description

A currently active DCD service is suspended by user request. The request may be manual, e.g. via the DCD client or a web-based tool, or automatic, e.g. upon a specific schedule or roaming status. Depending on the technology used by the DCD Service Provider (e.g. point-to-point or broadcast), content delivery is suspended by the user and remains suspended until the user requests that it be resumed.

While a user's DCD service is active, the user travels outside of the mobile service area, or the device is shutoff. DCD content delivery to the user's device is suspended. When the user returns to the mobile service area or the device is turned back on, DCD service is resumed.

When DCD service is resumed, newer content if any is displayed on the device.

5.4.2 Actors

- User of a Device with active DCD service
- DCD Service Provider – a mobile operator (or another Service Provider) that offers DCD services

5.4.3 Pre-conditions

- The user's DCD service is active, and content is being provided according to the selected options.

5.4.4 Post-conditions

- The user's DCD service is active, and content is being provided according to the selected options.

5.4.5 Normal Flow

- A currently active DCD service is suspended by user request. The request may be manual, e.g. via the DCD client or a web-based tool. It may also have been pre-configured as a service option based upon a specific schedule or roaming status.
- Content delivery ceases, and DCD service remains suspended.
- The user requests that DCD service be resumed, by manual request or service option.
- Newer content if any is displayed on the device.

5.4.6 Alternative Flow 1

- While a user's DCD service is active, the user travels outside of the mobile service area, or the device is shutoff.
- The DCD content server detects that the DCD client is inaccessible, and suspends server-initiated DCD content delivery.
- The DCD client detects that the DCD content server is inaccessible, and suspends client-initiated DCD content delivery.
- The user returns to the mobile service area or the device is turned back on.
- The DCD content server detects that the DCD client is accessible, and DCD service is resumed.
- The DCD client detects that the DCD content server is accessible, and DCD service is resumed.
- Newer content if any is displayed on the device.

5.4.7 Alternative Flow 2

- A DCD Service Provider broadcasts DCD content as part of their DCD Service to their users.

- A user of the offered DCD Service suspends the deliver of DCD content to their DCD enabled device (i.e. they configure their DCD enabled device to ignore/stop reception of the broadcast content). The request may be manual, e.g. via the DCD client or a web-based tool. It may also have been pre-configured as a service option based upon a specific schedule or roaming status. The user roaming outside their service area or going out of mobile coverage area may also result in DCD content not being delivered to a device.
- Other users of the offered DCD Service continue to receive the DCD content.
- The DCD enabled device prohibits the reception of DCD Content (i.e. DCD content delivery is suspended).
- Some time later the same user resumes the reception of DCD Content, e.g. by manual request or through service options.
- New (i.e. most recent) DCD Content is received and displayed at the DCD enabled device.
- The user continues to consume the content.

5.5 Subscriber Swap on Previously Activated Device

5.5.1 Short Description

When a DCD-enabled device for which DCD service has been activated is given to a new subscriber, the prior subscriber's DCD service-related data is cleared and DCD service is activated for the new subscriber. The data clearing and service activation is automatic and requires no user input. If the new subscriber had previously been a DCD service user on another device, their current content selections and other service options are activated on the new device. If the user has a device with a smart card, their current content selections and other service options may become available immediately on the new device, without first establishing a network connection.

5.5.2 Actors

- Subscriber A – previous user of a Device with active DCD service
- Subscriber B – new user of the device previously used by subscriber A
- DCD Service Provider – a mobile operator (or another Service Provider) that offers DCD services

5.5.3 Pre-conditions

- Subscriber A has given subscriber B a DCD-enabled device for which DCD service has been activated.

5.5.4 Post-conditions

- The DCD service is active for subscriber B, and content is being provided according to the selected options.

5.5.5 Normal Flow

- A device with previously activated DCD service is given to subscriber B by subscriber A. Upon power on, the subscriber change is detected.
- Subscriber A's DCD service-related data on the device is automatically cleared.
- DCD service is automatically activated for Subscriber B.

5.5.6 Alternative Flow

- Subscriber B had a previously active DCD service. The currently selected content is delivered, and other service options are activated for the new device upon power-on.
- Subscriber B had a previously active DCD service. Upon smart card insertion and power-on of the new device, subscriber B's currently selected content and service options are loaded from the smart card, and become immediately available on the new device.

5.6 Multiple DCD Connection Profiles

5.6.1 Short Description

DCD content update for different channels can occur using different data paths, e.g. proxy servers or DCD content servers. This will enable flexibility in DCD service network deployment and charging, e.g. for:

- load balancing/distribution: multiple DCD server complexes may be operated, each serving a number of channels. This enables:
    - Deployment of smaller DCD server complexes, improving the infrastructure cost of operating the DCD service
    - DCD server complex geographic diversity/redundancy, improving the reliability and maintainability of the DCD service
- channel-specific data path requirements, e.g. to support:
    - higher levels of security in some channels, e.g. due to the delivery of private information; such channels may require routing over VPN connections to the DCD server complex
    - selection of special proxy/gateway for some channels, e.g. so additional information can be passed to the DCD server from the proxy/gateway, or other special proxy/gateway handling provided
- differential charging of data usage for DCD service, e.g. to support:
    - use of established methods for data usage charging record collection and mediation, based upon IP core network elements, e.g. service modules in IP network switches, that create charging records based upon destination IP address (proxy/gateway/server) or hostname.
    - differentiate channels using multiple rate plans, e.g. free or monthly-recurring-charge(MRC)-based (with usage unrecorded, zero-rated, or backed out), pay-per-use (per-KB charge), prepaid, where established deployments require different network data paths through core IP network elements

In practice, only a few such specific connection profiles would probably be configured, since the variety of connections needed would be few. Most channels would probably be associated with a couple of main profiles, and special channels provided with additional profiles as needed (e.g. for special data connection requirements or charging). These profiles could be managed at the application level through DCD service control data, e.g. via metadata associated with each channel.

5.6.2 Actors

- User of a Device with active DCD service
- DCD Service Provider – a mobile operator (or another Service Provider) that offers DCD services

5.6.3 Pre-conditions

- A user is receiving DCD service that requires different connection profiles for some channels.

5.6.4 Post-conditions

- The DCD service has been provided per the special requirements of each channel.

5.6.5 Normal Flow

- Most DCD channels provided to the user are served from one of two DCD server complexes (A & B) in different data centers. Service is distributed between these complexes in the normal case, enabling them to provide redundancy for each other, and diversity for network load balancing.
    - When a channel update is required, the DCD client requests the content from the configured DCD server address (A or B).

  - During a maintenance window, DCD server complex A is taken out of service for an upgrade. Complex B begins serving all requests at both DCD server addresses. After the maintenance, complex A returns to serving requests at DCD server address A.

- A user subscribes to a personalized channel that provides a dashboard of sensitive personal information, e.g. stock positions, wireless data account information, location of the user's children, etc. The privacy/security policy of the DCD service provider requires that this information be delivered over a secure private network connection from the DCD server C to the user. Other channels provided to the user are not affected by privacy/security concerns, and can be delivered over the Internet from DCD server D.
  - A channel update from DCD server C is required, and is routed over the secured private network connection, preserving the privacy and security of the content.
  - A channel update from DCD server D is required, and is routed over the Internet. This prevents the need to use the more costly private network connection, enabling the private network connections to be cost-effectively scaled.
- A user receives a free DCD channel used for DCD service provider promotional purposes, another channel which is charged at per-KB rates, and a third channel which is usage-free and charged by a MRC. The free and MRC channels are served via proxy/gateway A, and the per-KB channel are served via proxy/gateway B. The DCD service provider uses IP network switches for data usage collection based upon the proxy/gateway IP address used by clients.

5.7 Personalized Content

5.7.1 Short Description

The use case described focus on the specific experience offered by providing personalized content to the user applied to openly broadcasted content. Based on the user's profile the delivery of the content is adapted to the user's needs. The user's profile might be applied manually by the user or dynamically on context-aware detection mechanisms (not part of this Use Case). The scenario given describes the personalized traffic news delivery. The traffic information update is given as broadcast channel offered by the DCD Service Provider. User preferences as well as his previous content usage is applied to personalized the content of the traffic channel to the user (if requested).

5.7.2 Actors

- End-users Tom and Martin – using a mobile device issues with a DCD client
- DCD Service Provider – service provider offering the DCD service.

5.7.2.1 Actor Specific Issues

- Tom and Martin subscribe to specific user-selectable content channels (like music or sports). In addition, they also receive the traffic and world news broadcast channel offered by the service provider without specific selection.
- Tom is already an experienced DCD user and use the personalization options over his user profile to adapt the content of the traffic channel for his daily journey between home and work.
- Martin is a new subscriber and has not yet used any personalization options.
- DCD Service Provider offers traffic and world news broadcast channel. Based on location or personalization settings of the user, the DCD Service Providers offer the option to personalize the content of the traffic channel for the user's needs.

5.7.2.2 Actor Specific Benefits

- Based on his personal user profile used, Tom received receives general or specifically tailored content of individual channels. The personalization options offer him a more specific information delivery based on his current needs.
- The DCD Service Provider increase its market options by providing optimized user experience as well as open content delivery for different content providers (e.g. direct product marketing, advertisement)

5.7.3 Pre-conditions

- End-users have DCD-enabled mobile device.
- DCD Service Provider offers both content categories for user-selectable as well as broadcast content, with the option of personalization in both categories.

5.7.4 Post-conditions

- Content is delivered accordingly to user's needs.

5.7.5 Normal Flow

- Tom and Martin are receiving the content of their specific selected channels. Tom watches the sports channel and Martin received in addition the latest music charts news. In addition, they also receive the periodically delivered traffic and world news channel every 30mins.
- Leaving home for getting to work, Tom picks up Martin and they are heading for the Hwy to get to the office. As Tom is now driving, his phone is now specifically set to the travel profile.
- Based on Tom's current profile, the DCD server recognizes the specific need to personalize the traffic information and suppress during the mode any content of entertainment channels to be delivered. As Tom normally just uses the traffic news for the Hwy 5, the content of the traffic channel is filtered to provide this information only. Martin however still receives the regular content as he has no specific settings or content usage behavior stored/known by the DCD server.
- The traffic news report a problem on Hwy 5 via Content Item news ticker, which warns of traffic jam ahead of them in about 20mins. Tom selects the delivered Content Item to receive more information. On his selection, the client shows an "advice of charge" for additional costs involved. As Tom always accepted in the past, the advice is shown for short period and the client accepts automatically. The Content Detail is requested by and delivered to the client on instant demand.
- Tom follows the traffic guidance offered and arrives finally with Martin in the office. After setting back the phone to the standard mode, the delivery of the personalized content stops and the normal periodic news delivery will be received.

5.8 User Notification by DCD Client Application

5.8.1 Short Description

When the DCD Client receives a new content, the Client application shall alert the User that new content has been received. The User may be notified in two ways: a DCD icon display on the device status bar; or by the use of a DCD Ticker.

5.8.2 Actors

- User: Interacts with Client Application and selects notification method
- Client Application: Presents DCD notification based on user settings.

5.8.2.1 Actor Specific Benefits

- The User shall be notified of new content delivery in the Active and Inactive states.

5.8.3 Pre-conditions

- The DCD Client Application should be provisioned.

5.8.4 Post-conditions

- The DCD Client Application displays the selected DCD notifications to the User.

5.8.5 Normal Flow

- User enables DCD notification methods using the menu settings in the Client Device.
- The DCD Client receives new content for the subscribed DCD channels.
- The DCD Client displays the appropriate notifications per user settings.
- If the User has selected the Ticker method, the DCD Client shall display channel and the headlines of the content item. New contents delivered on the selected channel will replace the previous ticker display.
- If the User has selected the Icon method, the DCD Client shall display the appropriate DCD icon in the device status bar. This icon will disappear when the DCD application is launched.

5.9 Active Wallpaper

5.9.1 Short Description

The active wall paper is understood as the ability to render rich-media contents including AV content, Text, graphics, images, altogether on the wall paper of mobile phones. These contents can be retrieved from distant sources, like web servers, RSS feeds and from local sources as well, like the last SMS or MMS received by the user, contacts or meetings from the agenda for instance. The service must provide ways to build a consistent scene taking into account the screen size and multimedia capabilities. It must also provide the user with customisation features like skin mechanism to modify easily the theme of the global scene. Such themes could be downloaded from operators' portals or from service editors.

5.9.2 Actors

- End-User: individual setting and using the active wall paper
- Service Providers and operators: company providing the service and the access to the service.
- Content Providers: company providing the data and themes for the active wall paper.

5.9.2.1 Actor Specific Issues

- End-User: wishes to use a rich-media capable device to set and use an active wall paper.
- Service Providers and Operators: may need Content generation, DRM, authentication tools and devices capable to provide the active wall paper Mobile services

5.9.2.2 Actor Specific Benefits

- End -User: The end-user is provided with a convenient aggregation of rich-media content. The global scene will be built in an optimized (because it always active and consumes some resources) and consistent manner, whatever are the sizes of the screen. The end – user can set up and customize easily the wall paper by specifying distant or local sources for contents and applying thematic skins.
- Service Providers and Operators: subscription to this service may rapidly grow thanks to these personalization features which the end-user will be ready to pay for. It can be seen as an extension of the ring tones and logos services.
- Content Providers: A lot of thematic contents could be delivered through such a service.

5.9.3 Pre-conditions

- End – User: Must have a mobile device that can display rich-media content and/or access to rich-media services. This could be a browser integrating rich-media codecs as plug-in or a local application supporting content updates or the ability to receive a rich-media enabler OTA or by download. The End –User may need to subscribe to a data service and to the wall paper mobile service. This service could be originally supplied by the manufacturers.
- Service Providers and Operators: May need to find an agreement with content providers to provide DRM tools.
- Content Providers: May be willing to protect their content with DRM tools

5.9.4 Post-conditions

- End – User: can store its parameters for the wall paper locally or in the network for use on another device.
- Service Providers and Operators: may ensure that rights have been provided to the end-user and allow him to display contents, can store end-user preferences.

5.9.5 Normal Flow

The following flow shows the interaction of all actors involved in an active wall paper mobile service.

Steps and behaviour	End User Local application	Wall paper Service Provider	Cellular Operator, Billing, Access control	Content provider: Rich Media content	Content Provider: other content (RSS feeds for instance)
1.The user retrieves the active wall paper software from the network or the mobile itself if supplied by the manufacturer.		X	X		
2. The user set up its wall paper with local resources or distant resources for which he may have to subscribe first. Access and billing is ensured by the operator.	X		X	X	X
3. The parameters are stored locally or in the network by the operator.	X		X		
4. The contents are dynamically and regularly retrieved from the various sources.	X		X	X	X
5. The user can customize the wall paper through thematic skins supplied by the service provider	X	X	X		

5.10 Rich Mobile Applications

5.10.1 Short Description

A Rich Mobile Application is an application that is downloaded and stored on the user's device once or at a low frequency. This application can be provided through the network, a cradle plugged to the PC, a Wi-Fi hotspot, etc… or supplied by the manufacturer. The application is specific to a usage (watching a sports magazine or managing photos stored on the mobile for instance) and has a dedicated, powerful and relevant rich-media interface for that usage.

It displays contents retrieved regularly from the network or other downloading mechanism and is supplied by a content provider that could be the application supplier or partners. The user can browse the downloaded content off line. Because it is a local application, it can access to local contents and merge them with downloaded ones if needed (in the case of a photo album client for instance).

The application renders the data in a consistent and rich-media manner. It can be skinned with various mechanisms. The data may be modified by the user and should be uploaded back to the content provider through synchronisation mechanisms.

Finally, the user can be notified if a new package (a new version of the application, data, skins…) is available for download.

5.10.2 Actors

- End-User: individual using an Rich Mobile Application
- Service Providers and Operators: company providing the application and the access to the application.
- Content Providers: company providing data for the application.

5.10.2.1 Actor Specific Issues

- End-User: wishes to use a rich-media capable device to access Rich Mobile Application.
- Service Providers and Operators: may need Content generation, DRM, authentication tools and devices capable to provide Rich Mobile Applications

5.10.2.2 Actor Specific Benefits

- End-User: The end-user is provided with a dedicated and powerful navigation within rich-media content. Content will be provided in a more readable manner, whatever are the sizes of the screen. The interactivity provided within the application is optimized for the content the application has been built for. The end – user can access to local resources and store the downloaded data locally. He can customize through skin mechanism or update the application with add-ons as well.
- Service Providers and Operators: by providing powerful and specialized rich-media applications to the user, they may increase their revenues and generate more data traffic while the data packages or downloaded.
- Content Providers: have the opportunity to provide added-value contents which the user is ready to pay for and customisation tools.

5.10.3 Pre-conditions

- End-User: Must have a mobile device that can display rich-media content and/or access to rich-media services. This could be a browser integrating rich-media codecs as plug-in or a local application supporting content updates or the ability to receive a rich-media enabler OTA or by download. The End –User may need to subscribe to a data service to download the application and the data updates.
- Service Providers and Operators: May need to find an agreement with content providers to provide DRM tools.
- Content Providers: May be willing to protect their content with DRM tools

5.10.4 Post-conditions

- End-User: can store the downloaded data and browse them off line.
- Service Providers and Operators: may ensure that rights have been provided to the end-user and allow him to reconnect, can store end-user preferences.

5.10.5 Normal Flow

The following flow shows the interaction of all actors involved in a Rich Media Application.

Steps and behaviour	End User Local	RMA Service Provider	Cellular Operator, Billing, Access control	Content provider: Rich Media content

	application			
1.The user access to the subscription service to download the application (not needed if supplied by the manufacturer)		X	X	
2. Once the application is downloaded, the content can be downloaded without user intervention.	X		X	X
3. The user browses the content locally.	X			
4. The user can be notified if a new data package is available (software update or content).	X	X	X	**X**
5. The user can customize the application thematic skin supplied by the service provider	X	X	X	

6. Requirements (Normative)

6.1 High-Level Functional Requirements

6.1.1 DCD Features and Functions

6.1.1.1 Content Delivery

Label	Description	Enabler Release
DCD-FUNC-001	The DCD Enabler SHALL support the delivery of DCD Content when initiated. This occurs in the following cases: a) upon the demand from the DCD-Enabled Client Application. b) upon expiration of currently stored content. c) upon a pre-defined schedule for requesting content updates.	DCD 1.0
DCD-FUNC-002	The DCD Enabler SHALL support the delivery of DCD Content when initiated by a DCD Service Provider including on behalf of any authorized actor.	DCD 1.0
DCD-FUNC-003	The DCD Enabler SHALL support the re-establishment of DCD Service upon master-reset in the mobile device where sufficient information allows.	DCD 1.0
DCD-FUNC-004	The DCD Enabler SHALL support the re-establishment of DCD Service upon master-clear in the mobile device where sufficient information allows.	DCD 1.0
DCD-FUNC-005	The DCD Enabler SHALL support the partial transfer and resumption of content transfers that are interrupted before completion.	DCD 1.0
DCD-FUNC-006	The DCD Enabler SHOULD support the bandwidth efficiency through both transport level and content level compression using standard techniques, e.g. GZIP compression.	DCD 1.0
DCD-FUNC-007	The DCD Enabler SHALL support transaction efficiency through DCD Content packaging using standard techniques, e.g. multipart MIME encoding.	DCD 1.0
DCD-FUNC-008	The DCD Enabler SHALL enable the user and service provider, including on behalf of authorized actor, to manage the DCD Content delivery options, e.g. content delivery schedule, channel / content selection etc.	DCD 1.0
DCD-FUNC-009	The DCD Enabler SHALL support the content expiry and replacement information along with the content delivery.	DCD 1.0
DCD-FUNC-010	The DCD Enabler SHALL support the delivery of differential content, i.e. only those content that have been changed SHALL be delivered.	DCD 1.0
DCD-FUNC-011	The DCD Enabler SHALL support the background delivery of additional related content initiated by the DCD-Enabled Client Application and the DCD Server.	DCD 1.0
DCD-FUNC-012	Under normal conditions, the DCD Client SHALL be able to receive the content and deliver it to the DCD-Enabled Client Application without user interaction.	DCD 1.0
DCD-FUNC-013	The DCD Enabler SHALL support delivery of DCD Contents to multiple DCD-Enabled Client Applications on a device.	DCD 1.0
DCD-FUNC-014	The DCD Enabler SHALL support simultaneous delivery of DCD Content to multiple end-users, e.g. broadcast.	DCD 1.0
DCD-FUNC-015	The DCD Enabler SHALL provide the ability to deliver DCD Content and related meta data to the DCD-Enabled Client Application.	DCD 1.0
DCD-FUNC-016	The DCD Enabler SHOULD have the ability to support progressive download	DCD 1.0
DCD-FUNC-017	The DCD Client SHOULD support the update of its software via the relevant OMA enablers.	DCD 1.0

DCD-FUNC-018	The DCD Enabler SHOULD provide the ability to personalize and customize DCD Content for users subscribed to a DCD Service such as based upon OMA presence and location information. Note that the content transformation is out of the scope.	DCD 1.0
DCD-FUNC-019	The DCD Enabler SHALL support content filtering via relevant OMA enablers.	DCD 1.0
DCD-FUNC-020	The DCD Enabler SHALL support transport level delivery confirmation upon the receipt of the DCD Content by the DCD Client.	DCD 1.0
DCD-FUNC-021	The DCD Enabler SHALL allow DCD-Enabled Client Application to provide application level delivery confirmation to the DCD Service Provider upon the receipt of the DCD Content.	DCD 1.0
DCD-FUNC-022	The DCD Enabler SHOULD support notification of new DCD Content delivery regardless of application state.	DCD 1.0
DCD-FUNC-023	The DCD Enabler SHALL allow the DCD-Enabled Client Application to submit content to the enabler and/or Content Providers.	DCD 1.0

Table 1: High-Level Functional Requirements – Content Delivery

6.1.1.2 Service Activation

Label	Description	Enabler Release
DCD-SVCR-001	The DCD Client SHALL have the ability to perform activation with a DCD Server upon detection of the change of subscription identity, including upon SIM insertion and power-up.	DCD 1.0
DCD-SVCR-002	The DCD Enabler SHALL provide the ability for the DCD Service Provider to deliver default channels and content items to DCD Clients on initial SIM insertion and power-on.	DCD 1.0
DCD-SVCR-003	The user interaction in the DCD Service activation SHALL be required only in the case of “Advice Of Charge”.	DCD 1.0

Table 2: High-Level Functional Requirements – Service Activation

6.1.1.3 Service and Content Subscription

Label	Description	Enabler Release
DCD-CSUB-001	The DCD Enabler SHALL provide the capability for a user to subscribe to additional channels provided by the DCD Content Provider.	DCD 1.0
DCD-CSUB-002	The DCD Enabler SHALL provide the capability for a user to self-subscribe to the DCD-Enabled content services.	DCD 1.0
DCD-CSUB-003	The DCD Enabler SHALL provide the ability for a user to cancel their subscription to an existing content channel.	DCD 1.0
DCD-CSUB-004	The DCD Enabler SHALL provide the capability to establish the content delivery when initiated by Content Providers on behalf of users.	DCD 1.0
DCD-CSUB-005	The DCD Enabler SHALL be informed of a change of subscriber identity, e.g. (U)SIM as defined in 3GPP.	DCD 1.0
DCD-CSUB-006	The DCD Client SHALL support the portability of subscription information and service options between devices (e.g. using smart cards, (U)SIM, removable disks, network storage).	DCD 1.0
DCD-CSUB-007	Upon detection that a change of subscriber has occurred for a device with previously activated DCD Service, the DCD Enabler SHALL have the capability to automatically activate the DCD Service for the latest subscriber, as a new subscriber to DCD.	DCD 1.0
DCD-CSUB-008	Upon DCD subscriber-change detection, if the new subscriber had a previously active subscription to a DCD Service, the DCD Enabler SHALL	DCD 1.0

	have the capability to automatically activate the DCD Service with the content selections and service options for the current subscriber.	
DCD-CSUB-009	The DCD Enabler SHALL provide the capability to terminate the content delivery when requested by Content Providers on behalf of users.	DCD 1.0
DCD-CSUB-010	The DCD Enabler SHALL stop delivery of the DCD Content upon notifying the Content Provider of subscription termination.	DCD 1.0
DCD-CSUB-011	Upon subscription cancellation to a DCD Content Item, the DCD Client SHALL prevent this content from being delivered to the user.	DCD 1.0

Table 3: High-Level Functional Requirements – Service and Content Subscription

6.1.1.4 Content Presentation

Label	Description	Enabler Release
DCD-CPRE-001	Content types supported by the DCD Enabler SHALL be handled in an interoperable manner between the DCD Client and DCD Server.	DCD 1.0
DCD-CPRE-002	The DCD Enabler SHALL support multiple delivery channel.	DCD 1.0
DCD-CPRE-003	The DCD Enabler SHALL allow a single application to subscribe to more than one delivery channel.	DCD 1.0
DCD-CPRE-004	The DCD Enabler SHOULD allow the DCD-Enabled Client Application to provide pre-emptive presentation of high priority content.	DCD 1.0
DCD-CPRE-005	The DCD-Enabled Client Application SHALL enable the user to switch between Channels.	DCD 1.0

Table 4: High-Level Functional Requirements – Content Presentation

6.1.1.5 Content

Label	Description	Enabler Release
DCD-CONT-001	The DCD Enabler SHALL provide the capability to distinguish between different priorities of of DCD Content, e.g. high-priority and normal-priority.	DCD 1.0
DCD-CONT-002	The DCD Enabler SHALL support the DCD-Enabled Client Application retrieval of cached content or persistently stored content for an item from the DCD Client Device's local content storage.	DCD 1.0
DCD-CONT-003	The DCD Enabler SHOULD ensure content location transparency to DCD-Enabled Client Application.	DCD 1.0
DCD-CONT-004	The DCD Enabler SHALL support the defined time-spans for DCD Channel and Content Item availability.	DCD 1.0
DCD-CONT-005	The DCD Enabler SHALL support the means of associating additional content related to a Content Item.	DCD 1.0
DCD-CONT-006	The DCD Client SHALL support retrieving additional content related to a Content Item.	DCD 1.0
DCD-CONT-007	The DCD Client SHALL support a content storage period for each Content Item delivered via DCD.	DCD 1.0
DCD-CONT-008	The DCD Server SHALL support content delivery based on DCD Client content storage availability.	DCD 1.0
DCD-CONT-009	The DCD Client SHALL be able to rely on a minimum set of dedicated content storage / cache.	DCD 1.0
DCD-CONT-010	The DCD-Enabled Client SHALL support the ability to delete locally cached content manually.	DCD 1.0

Table 5: High-Level Functional Requirements – Content

6.1.1.6 Content Personalization and Customization

Label	Description	Enabler Release
DCD-PERS-001	The DCD Server and the DCD Client SHALL be able to integrate with other OMA Enablers to enable content customization and personalization.	DCD 1.0
DCD-PERS-002	The DCD Enabler SHALL provide the ability for the DCD Service Provider to personalize DCD Content based upon a user's latest profile.	DCD 1.0

Table 6: High-Level Functional Requirements – Content Personalizaton and Customization

6.1.1.7 States and Operations

Label	Description	Enabler Release
DCD-STAT-001	The DCD Enabler SHALL enable the user to manually suspend and resume DCD Service, either from the DCD-Enabled Client Application or e.g. web-based service.	DCD 1.0
DCD-STAT-002	The DCD Enabler SHALL enable the suspension and resumption of both server-initiated and client-initiated DCD Content delivery requests, based on dynamic and static conditions, e.g. on a set schedule or based on roaming status.	DCD 1.0
DCD-STAT-003	It SHALL be possible to suspend a DCD Service without additional content buffering by the DCD Client.	DCD 1.0
DCD-STAT-004	A DCD Client MAY support buffering of DCD Content upon DCD Service Suspension.	DCD 1.0
DCD-STAT-005	The DCD Enabler SHALL minimize ineffective content delivery attempts when either the DCD Server or DCD Client is inaccessible	DCD 1.0
DCD-STAT-006	When a previously suspended DCD Service is resumed, any content that is ready to be delivered SHALL be delivered except for expired or outdated content.	DCD 1.0

Table 7: High-Level Functional Requirements – States and Operations

6.1.1.8 Integration with Native Functions

Label	Description	Enabler Release
DCD-INTG-001	The user SHOULD be able to use the device for any purpose without either waiting for DCD client-server interaction to complete, or impacting the reliability of the DCD Service.	DCD 1.0
DCD-INTG-002	The DCD-Enabled Client Application SHALL be capable of launching the device browser through a direct URL, e.g. to access a Service Guide, content discovery, selection and subscription.	DELETED
DCD-INTG-003	The DCD-Enabled Client Application MAY be capable of launching a client other than the device browser to access a Service Guide.	DELETED
DCD-INTG-004	The DCD-Enabled Client Application MAY be capable of launching a client other than the device browser for DCD Content discovery, selection, and subscription.	DELETED
DCD-INTG-005	The DCD-Enabled Client Application SHALL be capable of interworking with other clients present in the device, as specified by the "URI Schemes" RD [OMA-URI] launching other present clients in the device (e.g. web site containing full news story following the selection of an embedded url within a content item).	DELETED

Table 8: High-Level Functional Requirements – Integration with Native Functions

6.1.1.9 Device and Network Capabilities

Label	Description	Enabler Release
DCD-CAPA-001	The DCD Enabler SHALL advertise the device capabilities.	DCD 1.0
DCD-CAPA-002	The DCD Client SHOULD support UTC time synchronization for the content cache.	DCD 1.0
DCD-CAPA-003	The DCD Enabler SHOULD support various network technologies, such as point-to-point and broadcast network technologies.	DCD 1.0

Table 9: High-Level Functional Requirements – Device and Network Capabilities

6.1.1.10 Miscellaneous DCD Functions

Label	Description	Enabler Release
DCD-MISC-001	The DCD Service SHALL support device and subscriber identification, and be aware of client version.	DCD 1.0
DCD-MISC-002	The Devices supporting DCD Client SHALL support the related (to be specified) DM client features.	DCD 1.0
DCD-MISC-003	The DCD Enabler SHALL NOT duplicate functionality available through other OMA enablers.	DCD 1.0
DCD-MISC-004	The DCD Enabler SHALL allow association of a Connection Profile to each DCD Channel.	DCD 1.0
DCD-MISC-005	When a change of subscriber has occurred for a device with previously activated DCD Service, the DCD Client SHOULD hide the DCD Content of the previous subscriber.	DCD 1.0
DCD-MISC-006	The DCD Client SHALL support the manual launch of the DCD-Enabled Client Application	DCD 1.0
DCD-MISC-007	The DCD Enabler SHALL NOT limit the mechanisms used to establish the subscriber identification.	DCD 1.0

Table 10: High-Level Functional Requirements – Miscellaneous DCD Functions

6.1.2 Security

Label	Description	Enabler Release
DCD-SEC-001	The DCD Enabler SHALL support an authentication relationship between the DCD Client and the DCD Server for all interactions over DCD Enabler.	DCD 1.0
DCD-SEC-002	The DCD Enabler SHALL support an authorization relationship between the DCD Client and the DCD Server for all interactions over DCD Enabler.	DCD 1.0
DCD-SEC-003	The DCD Enabler SHALL ensure that only authorized actors are permitted to update DCD provisioning information on client devices, e.g. with user's confirmation if necessary.	DCD 1.0
DCD-SEC-004	Upon detection that a change of subscriber has occurred for a device with previously activated DCD Service, the DCD Enabler SHALL prevent access to all device-resident DCD subscription information of the previous subscriber, as specified by previous subscriber.	DCD 1.0
DCD-SEC-005	The DCD Enabler SHALL support secure delivery of DCD Content if required.	DCD 1.0
DCD-SEC-006	The DCD Enabler SHALL support specification of security requirements on a per Channel basis.	DCD 1.0
DCD-SEC-007	The DCD Content SHOULD be possible to be protected by utilizing the OMA DRM [OMA-DRM].	DCD 1.0

Table 11: High-Level Functional Requirements – Security Items

6.1.3 Charging

Label	Description	Enabler Release
DCD-CHAR-001	The DCD Enabler SHALL support different charging models for different categories of content.	DCD 1.0
DCD-CHAR-002	The DCD Enabler SHOULD provide an "Advice of Charge" to the user (e.g. [OMA-MCC]) if applicable to the content or action.	DCD 1.0
DCD-CHAR-003	The DCD Enabler SHOULD utilize the OMA Charging enabler [OMA-MCC] for its needed charging functionalities.	DCD 1.0
DCD-CHAR-004	The DCD Enabler SHALL enable DCD Service Providers to use various content charging models for different groups of content, e.g. free-of-charge channels, per-KB-charge channels, or Monthly-Recurring-Charge channels that are KB-usage-free.	DCD 1.0

Table 12: High-Level Functional Requirements – Charging Items

6.1.4 Administration and Configuration

Label	Description	Enabler Release
DCD-ADM-001	The DCD Enabler SHOULD support initial and continuous client provisioning using the OMA Client Provisioning [OMA-CP] and / or OMA Device Management [OMA-DM].	DCD 1.0
DCD-ADM-002	The DCD Enabler SHALL provide the ability to administrate and configure the DCD Client and the DCD-Enabled Client Application using OTA mechanisms.	DCD 1.0
DCD-ADM-003	The DCD Enabler SHALL support registration and deregistration of the DCD-Enabled Client Application in the mobile device either initiated by the mobile device or by the server.	DCD 1.0
DCD-ADM-004	The DCD-Enabled Client Application SHALL support the enabling and disabling the display of the content in the mobile device, initiated in the mobile device.	DCD 1.0
DCD-ADM-005	The DCD Enabler SHALL support the DCD Service Provider to provision and un-provision the service channel contents.	DCD 1.0
DCD-ADM-006	The DCD Enabler SHALL support the DCD Service Provider or the DCD Client to limit the frequency of the content update from a mobile device.	DCD 1.0
DCD-ADM-007	The DCD Enabler SHALL support the DCD Service Provider or the DCD Client to specify the frequency of the content update from a mobile device.	DCD 1.0
DCD-ADM-008	The DCD Enabler SHALL report error information back to the DCD Service Provider.	DCD 1.0

Table 13: High-Level Functional Requirements – Administration and Configuration Items

6.1.5 Usability

Label	Description	Enabler Release
DCD-USA-001	The DCD Enabler SHALL provide the user with a means to discover the available contents for subscription.	DCD 1.0
DCD-USA-002	The DCD Enabler SHALL provide the user with a means to have access to a list of contents that the user currently has subscribed.	DCD 1.0
DCD-USA-003	The DCD Enabler SHALL provide the user with a means to request an immediate content update for selected channels.	DCD 1.0
DCD-USA-004	The DCD Client SHALL have a means to request the content update automatically from the DCD Server.	DCD 1.0
DCD-USA-005	The DCD Server SHALL be able to push the content update to the DCD Client.	DCD 1.0

Table 14: High-Level Functional Requirements – Usability Items

6.1.6 Interoperability

Label	Description	Enabler Release
DCD-IOP-001	Any DCD Client SHALL be able to communicate to any DCD Server	DCD 1.0
DCD-IOP-002	The DCD Enabler SHALL be operational when roaming.	DCD 1.0
DCD-IOP-003	The DCD Enabler MAY support standard international character sets.	DCD 1.0

Table 15: High-Level Functional Requirements – Interoperability Items

6.1.7 Privacy

Label	Description	Enabler Release
DCD-PRV-001	The DCD Client SHALL support subscriber selection of privacy options for DCD Content, e.g. to block access to the content on the subscriber's device unless the subscriber's identity can be verified.	DCD 1.0

Table 16: High-Level Functional Requirements – Privacy Items

6.2 Overall System Requirements

Label	Description	Enabler Release
DCD-SYS-001	Without prior configuration, the DCD Client SHALL support the discovery of a DCD Service.	DCD 1.0
DCD-SYS-002	The DCD Enabler SHALL provide the ability for a DCD Service Provider to multiplex channels and content originating from different sources, e.g. different content providers.	DCD 1.0
DCD-SYS-003	The DCD Enabler SHALL provide the ability for a DCD Service Provider to manage the subscription to each multiplex channel and content originating from different sources, e.g. different Content Providers.	DCD 1.0
DCD-SYS-004	The DCD Enabler SHALL provide the ability for different Management Authorities (e.g. Enterprise, Network Operator, Service Provider etc.) to manage their content for delivery by the DCD Service Provider.	DCD 1.0

Table 17: High-Level System Requirements

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
n/a	n/a	No prior version –or- No previous version within OMA

A.2 Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-RD-DCD-V1_0	13 May 2005		Initial draft template
	20 May 2005		Updated draft according to comments from members (minutes 0083)
	31 May 2005		Updated draft according to comments from members (minutes 0093)
	04 Jun 2005		Updated draft according to 0089R01 and 0090R01 (minutes 0098)
	14 Jun 2005		Updated draft according to 0102R01, 0110R01, 0111R01, 0114R01, 0115R01, 0116R01, 0117R01, 0118R01, 0119R01, 0120R01 and 0122R01 (minutes 0133, 0134 and 0136)
	12 Jul 2005		Updated draft according to 0149R01 and 0152 (minutes 0154)
	20 Jul 2005		Updated draft according to 0159R01, 0160, 0162R01, 0163R01 and 0165 (minutes 0175)
	18 Aug 2005		Updated draft according to 0183 (minutes 0196)
	24 Aug 2005		Updated draft according to 0161R01, 0164R01, 0195, 0200R01, 0201R01, 0202R01, 0204R01, 0205R01, 0210R01 and 0213R01 (minutes 0221R01). Alphabetical ordering of 3.2 Definitions.
	21 Sept 2005		Updated draft according to 0209, 0227, 0219R01, 0189R03, 0190R02, and proposed FUNC-002 (ID 007) in 0244 (minutes 0228, 0237 and 0247).
	10 Oct 2005		Updated draft according to 0254R01, 0264, 0233, 0234R01, and 0248 (minutes 0255 and 0266).
	18 Oct 2005		Updated draft according to 0230R03, 0277R01, 0278R01, 0279R01 / 0309, 0280R01 / 0305, 0281R01 / 0308, 0285R01, 0290R01, 0292R02 and 0303 (minutes 0311).
	19 Oct 2005		Updated draft according to 0296 and 0304 (minutes 0311).
	20 Oct 2005		Cleanup version
	02 Nov 2005		Updated draft according to 0316, 0322R01, 0323R01, 0324R01, 0325R01 and 0326R01 (minutes 0328)
	05 Dec 2005		Updated draft according to 0342 and 0352 (minutes 0341 and 0353)
	16 Dec 2005		Updated draft according to 0307R01, 0333R02, 0346R01, 0374, 0378 and 0381 (minutes 0328 and 0375)
	18 Dec 2005		Updated draft for consistent terminologies in Scope (Section 1), Definition (Section 3.2), Introduction (Section 4), Normative Requirements (Section 6) and Appendix B (editorial changes).
	19 Jan 2006		Updated draft according to 0007R01, 0008, 0009R01, 0010R02 (minutes 0018 and 0026).
	20 Jan 2006		A clean version based on OMA-RD-DCD-V1_0-20060119-D
	22 Feb 2006		Updated draft according to RDRR-20060222, and minutes 0070 and 0078
	01 Mar 2006		Updated draft according to RDRR-20060301, and minutes 0086
	13 Mar 2006		Updated draft according to RDRR-20060309, and minutes 0101R01
	15 Mar 2006		Updated draft according to RDRR-20060315, 0105 and minutes 0106
	23 Mar 2006		Updated draft according to RDRR-20060323, and minutes 0118 (Mar 22) and 0120 (Mar 23).
	29 Mar 2006		Updated draft according to RDRR-20060329, and minutes 0131.
	04 Apr 2006		Updated draft according to RDRR-20060404.
	11 Apr 2006		Editorial changes: headers and footers, IPR text, 2006 template, table of contents
Candidate Version: OMA-RD-DCD-V1_0	30 May 2006		Candidate Approval by TP OMA-TP-2006-0134R01-RD-DCD-V1_0-for-Candidate-Approval

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Candidate Version OMA-RD-DCD-V1_0	06 Jul 2007	All	Back to Candidate status as changes above are class2/3 changes. Was mistakenly demoted back to draft on 23 April 2007. Fixed history box .
	16 July 2007	2.2 3.2	Fixed references with the addition of “Open Mobile AllianceTM” Fixed removal of strike-through text in Definitions section
	08 Sept 2008	All	Updated according to resolutions of all “CLOSED” CONR comments in OMA-CONRR-DCD-V1_0-20080903-I.
Draft Versions OMA-RD-DCD-V1_0	09 Sep 2008	All	Back to draft status
	26 Nov 2008	All	Editorial fixes: 2008 copyright/ template Empty sections removed from Section 5 History box fixed
Candidate Version OMA-RD-DCD-V1_0	23 Dec 2008	All	Status changed to Candidate by TP OMA-TP-2008-0493-INP_DCD_V1_0_ERP_for_Candidate_Approval

Appendix B. DCD State Model (Informative)

The use cases and related requirements in Chapter 5 and Chapter 6 include capabilities that can be included in a "DCD State Model" as described here. This is intended as an example illustrating how the DCD Enabler can meet the following goals:

- Enable the user to self-manage the dynamic nature of the DCD Enabler, e.g. determine when a DCD Client should be running on the device, or when the DCD Enabler is actively delivering content.
- Enable the DCD Client and Server to effectively use network and device resources, by not attempting content retrieval / delivery when it is unlikely to be successful.

The following key aspects are addressed by the state model in support of those goals:

- The status of association between the DCD Client and DCD Server: an un-associated DCD Client is "unregistered" and is not able to receive the DCD Service. Once an association has been established, the DCD Client is "registered". The status of association is called here the "DCD Operational State".
- The status of content delivery by DCD Client and display by the DCD-Enabled Client Application, called here the "DCD Service State". "DCD Service" refers to the content delivery service provided by the DCD Client to DCD-Enabled Client Applications. Four states are defined to address these controls provided on the DCD Client, and the resulting effect of the controls on the operation of the DCD enabler:

Ability to control whether the DCD Client is running in the device. This allows the user to startup and shutdown the DCD Client. Shutdown is represented by entry into the "Disabled" state. Startup is represented by re-entry into the "Active" state.

Ability to control whether content is displayed by the DCD-Enabled Client Application when running. This allows the user to temporarily deactivate the display of content by the DCD-Enabled Client Application, but allow the DCD Client to continue receiving content updates from the DCD Server. Display deactivation is represented by entry into the "Inactive" state. Display reactivation is represented by re-entry into the "Active" state.

Ability to control whether content is delivered to the DCD Client. This allows the user to temporarily suspend the reception of content from the DCD Server, but allow the DCD-Enabled Client Application to continue to display content previously received. Delivery suspension is represented by entry into the "Suspended" state. Delivery resumption is represented by re-entry into the "Active" state.

The following table and figure provide an overview of the state model.

State Type	State	Delivery	Displaying	Client active
Service states	ACTIVE	Yes	Yes	Yes
	INACTIVE	Yes	No	Yes (for receiving content)
	DISABLED	No	No	No
	SUSPENDED	No	Yes (local content in device)	Yes
Operational states	REGISTERED	Per Service state	Per Service state	Per Service state
	UNREGISTERED	No	No	No

Table 18: State Model

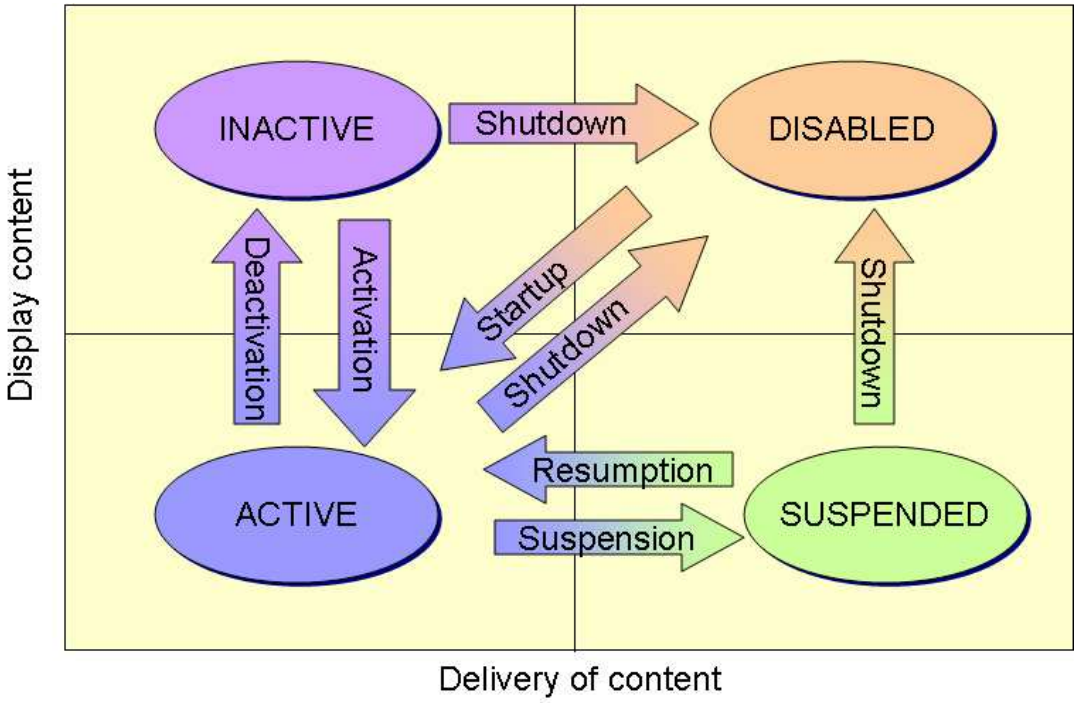

Figure 2 State Transition Diagram