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Dynamic Content Delivery Technical Specification – BCAST Adaptation

Approved Version 1.0 – 05 Jul 2011

Open Mobile Alliance
OMA-TS-DCD_BCAST_Adaptation-V1_0-20110705-A

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1. Scope

This document is intended to supplement the core Dynamic Content Delivery (DCD) technical specification by describing additional behaviors and metadata necessary to enable the operation of the DCD Version 1.0 Enabler over the Mobile Broadcast Services (BCAST) Enabler.

The scope of this document is limited to the interfaces and metadata required to achieve interoperability between a DCD Server operating over BCAST and a DCD Client operating over BCAST.

The interfaces between the DCD Server and BCAST Service Distribution / Adaptation function are considered out of scope for this document. The interfaces between the DCD Client and BCAST File Delivery Client are also considered out of scope for this document. These interfaces may be specified in future releases of the DCD Enabler.

2. References

2.1   Normative References

[BCAST10-Distribution]	"File and Stream Distribution for Mobile Broadcast Services ", Open Mobile Alliance™, OMA-TS-BCAST_Distribution-V1_0, URL: http://www.openmobilealliance.org/
[BCAST10-SG]	"Service Guide for Mobile Broadcast Services", Open Mobile Alliance™, OMA-TS-BCAST_ServiceGuide-V1_0, URL: http://www.openmobilealliance.org/
[BCAST10-XMLSchema-FD-FDT]	"Mobile Broadcast Services – XML Schema for File Description Table", Open Mobile Alliance™, OMA-SUP-XSD_bcast_fd_fdt-V1_0, URL: http://www.openmobilealliance.org/
[DCD-AD]	"OMA Dynamic Content Delivery Architecture", Version 1.0, Open Mobile Alliance™, OMA-AD-DCD-V1_0, URL:http://www.openmobilealliance.org/
[DCD-TS-Semantics]	"Dynamic Content Delivery Technical Specification – Session and Transactions", Open Mobile Alliance™, OMA-TS-DCD_Semantics-V1_0, , URL:http://www.openmobilealliance.org/
[RFC2119]	"Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt
[RFC 3266]	"Support for IPv6 in Session Description Protocol (SDP)", S. Olson, G. Camarillo, A.B. Roach, June 2002, URL:http://www.ietf.org/rfc/rfc3266.txt
[RFC3926]	"FLUTE - File Delivery over Unidirectional Transport", T. Paila, M. Luby, R. Lehtonen, V. Roca, R. Walsh, October 2004, http://www.ietf.org/rfc/rfc3926.txt
[RFC4234]	"Augmented BNF for Syntax Specifications: ABNF". D. Crocker, Ed., P. Overell. October 2005, URL:http://www.ietf.org/rfc/rfc4234.txt
[RFC 4566]	"SDP – Session Description Protocol", M. Handley, July 2006, URL: URL: http://www.ietf.org/rfc/rfc4566.txt
[SCRRULES]	"SCR Rules and Procedures", Open Mobile Alliance™, OMA-ORG-SCR_Rules_and_Procedures, URL:http://www.openmobilealliance.org/

2.2   Informative References

[OMADICT]	"Dictionary for OMA Specifications", Version x.y, Open Mobile Alliance™, OMA-ORG-Dictionary-Vx_y, URL:http://www.openmobilealliance.org/
[BCAST10-Architecture]	"Mobile Broadcast Services Architecture", Open Mobile Alliance™, OMA-AD- BCAST-V1_0, 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

3.3 Abbreviations

BCAST	Mobile Broadacst Services
DCD	Dynamic Content Delivery
OMA	Open Mobile Alliance
SDP	Session Description Protocol

4. Introduction

The OMA Dynamic Content Delivery (DCD) 1.0 Enabler provides a set of interfaces designed to enable subscription, personalization, and delivery of content to mobile users on a one-to-one (point-to-point) or one-to-many (broadcast) basis. The content delivery functionality of the DCD Enabler is designed to support multiple underlying network technologies (i.e. network types and or bearers).

The OMA Mobile Broadcast Services (BCAST) Enabler provides a set of functions which enable the delivery of content over broadcast/multicast networks, including but not limited to: file distribution, stream distribution, service protection, and content protection. The BCAST Enabler can be used by other enablers to distribute content over broadcast/multicast networks.

This document describes the necessary metadata and interactions between the DCD Enabler and BCAST Enabler to facilitate the delivery of DCD content over BCAST. Section 5 of the document defines the required adaptations to DCD operations to enable delivery over BCAST. Section 6 of the document specifies the FLUTE transport binding for delivery of DCD Content and DCD-3 administrative messaging over BCAST. Section 7 of the document outlines the interfaces to be used for interaction between the DCD and BCAST architecture entities. Finally, Section 8 of the document describes the DCD metadata elements that should be used to supply access information for BCAST file delivery sessions in DCD metadata.

The behaviors described in this document are designed to be implemented in conjunction with the behaviors described in the core DCD Sessions and Transactions Technical Specification to produce a complete DCD over BCAST implementation. The interfaces and behaviors described in this document should be treated as additions to the interfaces and behaviors specified in the core DCD Sessions and Transactions Technical Specification, except where explicitly noted in this document.

5. BCAST Adaptation for DCD Operations

5.1   Establishing a BCAST File Delivery Session

The DCD Server MAY establish BCAST file delivery sessions to be used for delivery of content for DCD channels and for delivery of administrative messaging via the DCD-3 interface. The decision to initiate BCAST delivery for a specific DCD channel or the DCD-3 interface will be made by the DCD Server based on service provider provisioning or other mechanisms and is considered out of scope for this specification.

The DCD Server SHALL interact with the BCAST Service Distribution / Adaptation function via the DCD-BCAST-1 interface to provision BCAST file delivery sessions for delivery of DCD content or DCD-3 administrative messaging over BCAST. The DCD Server SHOULD provision a separate BCAST file delivery session for each DCD channel or interface to be delivered via BCAST. Multiplexing of multiple DCD channels over a single BCAST file delivery session is considered out of scope for this specification.

Upon successful establishment of a BCAST file delivery session, the DCD server SHALL obtain from the BCAST Service Distribution / Adaptation function the necessary access information to populate DCD metadata for the channel or interface with BCAST access information as described in Section 7 of this document. If the BCAST file delivery session will be used to deliver content for a DCD channel, the DCD Server SHALL add a 'bcast-access-info' element to the 'dcd-2-broadcast-profile' in the Channel Metadata for the channel containing the BCAST access information obtained from the BCAST Service Distribution / Adaptation.

5.2   Terminating a BCAST File Delivery Session

The DCD Server MAY terminate delivery of a DCD channel or DCD-3 administrative messaging over BCAST at any point during the lifetime of the channel or interface. The decision to terminate BCAST delivery for a specific DCD channel or the DCD-3 interface will be made by the DCD Server based on service provider provisioning or other mechanisms and is considered out of scope for this specification.

Upon deciding to terminate BCAST delivery for a DCD channel or for the DCD-3 interface, the DCD Server SHALL interact with the BCAST Service Distribution / Adaptation function via the DCD-BCAST-1 interface to terminate all BCAST file delivery sessions associated with the channel or interface which are not being used to deliver content for any other DCD channel or interface.

When delivery over BCAST is terminated for an active DCD Channel, the DCD Server SHALL remove the 'bcast-access-info' element from the 'dcd-2-broadcast-profile' in the Channel Metadata for the channel. The DCD Server SHALL then send a ChannelMetadataUpdate message with the updated Channel Metadata according the procedures described in [OMA-TS-DCD].

5.3   Registration

5.3.1   Application Registration

The DCD Client SHALL enable DCD Enabled Client Applications to register with the DCD Client over the DCD-CAR interface as described in [DCD-TS-Semantics]. During the registration process, the DCD Client SHALL allow DCD Enabled Client Applications to supply BCAST access parameters for the broadcast instantiation of the DCD-3 interface and for the broadcast DCD-2 interface associated with specific DCD channels by including the DCD over BCAST metadata described in Section 8 of this document in the Application Profile.

5.3.2   Channel Registration

The DCD Server SHALL enable DCD Content Providers to register DCD channels with the DCD Server over DCD-CPR as described in [DCD-TS-Semantics]. Upon successful registration of a DCD channel which is to be delivered over BCAST, the DCD Server SHALL establish a new BCAST file delivery session for the channel using the procedures described in Section 5.1 of this specification or SHALL associate the DCD channel with an existing BCAST file delivery session.

Multiplexing of multiple DCD channels over a single BCAST file delivery session is considered out of scope for this specification.

5.4 Deregistration

5.4.1 Application Deregistration

The DCD Client SHALL enable DCD Enabled Client Applications to deregister from the DCD Client over the DCD-CAR interface as described in [DCD-TS-Semantics]. Upon successful deregistration of a DCD Enabled Client Application, the DCD Client SHOULD terminate content reception for all remaining BCAST file delivery sessions associated with the application which are not being used to service subscriptions for any other DCD Enabled Client Applications.

5.4.2 Channel Deregistration

The DCD Server SHALL enable DCD Content Providers to deregister DCD channels from the DCD Server over the DCD-CPR interface as described in [DCD-TS-Semantics]. Upon successful deregistration of a DCD channel, the DCD Server SHOULD terminate all BCAST file delivery sessions associated with the DCD channel which are not being used to deliver content for any other DCD channel or to deliver DCD-3 administrative messaging.

5.5 Subscription

5.5.1 DCD Client

5.5.1.1 Provisioning of BCAST Access Parameters for Default Subscriptions

If OMA Device Management is available on the device, then:

The DCD Client SHALL support provisioning of BCAST access parameters as part of the default DCD-3 connection profile using OMA Device Management [OMA DM].

5.5.1.2 Subscription to a DCD Channel Delivered over BCAST

Upon receiving a ChannelSubscriptionResponse for a DCD Channel where the 'dcd-2-broadcast-profile' includes the 'bcast-access-info' element, the DCD Client MAY initiate content reception over BCAST or MAY choose to use other available delivery bearers. The mechanism through which the DCD Client determines whether to receive DCD content over BCAST or other available delivery bearers is considered out of scope for this specification.

If the DCD Client chooses to receive content over BCAST, the DCD Client SHALL initiate content reception for the BCAST file delivery session associated with the DCD Channel either immediately or during the scheduled distribution window for the session according to the procedures described in Section 5.6.1.1.

5.5.1.3 Channel Metadata Update

Upon receiving a ChannelUpdate message for a DCD Channel for which content is currently being received over BCAST, the DCD Client SHALL process the message according the following procedures:

- If the 'dcd-2-broadcast-profile' in the Channel Metadata contained in the ChannelUpdate message contains a 'bcast-access-info' element which is empty, the DCD Client SHALL indicate to the BCAST FD-C via the DCD-BCAST-3 interface that it should terminate content reception for the BCAST file delivery session associated with the DCD Channel .

- If the 'dcd-2-broadcast-profile' in the Channel Metadata contained in the ChannelUpdate message contains a 'bcast-access-info' element with updated BCAST access information, the DCD Client SHALL indicate to the BCAST FD-C via the DCD-BCAST-3 interface that it should terminate content reception for the BCAST file delivery session on which the content for the DCD channel is currently being received. The DCD Client SHALL then indicate to the BCAST FD-C via the DCD-BCAST-3 interface that it should initiate content reception for the BCAST file delivery session specified in the updated channel metadata and provide the BCAST FD-C with the BCAST access information for the channel contained in the 'bcast-access-info' element.

Upon receiving a ChannelUpdate message for a DCD Channel for which content is not currently being received over BCAST, the DCD Client SHALL process the message according the following procedures:

- If the 'dcd-2-broadcast-profile' in the Channel Metadata contained in the ChannelUpdate message contains a 'bcast-access-info' element with BCAST access information, the DCD Client MAY initiate content reception over BCAST or MAY continue to use other available delivery bearers. If the DCD Client chooses to initiate content reception over BCAST, the DCD Client SHALL indicate to the BCAST FD-C via the DCD-BCAST-3 interface that it should initiate content reception for the BCAST file delivery session associated with the channel and provide the BCAST FD-C with the BCAST access information for the channel contained in the 'bcast-access-info' element.

5.5.1.4 Unsubscription from a DCD Channel Received over BCAST

Upon receiving a ChannelUnsubscriptionResponse for a DCD Channel for which content is currently being received over BCAST, the DCD Client SHALL indicate to the BCAST FD-C via the DCD-BCAST-3 interface that it should terminate content reception for the BCAST file delivery session associated with the channel.

5.5.2 DCD Server

5.5.2.1 Internal Subscription to a Channel Delivered over BCAST

Upon receiving a ChannelSubscriptionRequest message for a DCD Channel not currently delivered over BCAST, the DCD Server MAY choose to initiate delivery over BCAST for the DCD Channel. The mechanism through which the DCD Server determines whether to initiate delivery over BCAST for a DCD channel on subscription request is considered out of scope for this specification. If the DCD Server chooses to initiate delivery over BCAST for the DCD Channel, the DCD Server SHALL follow the procedures described in Section 5.1 of this document to establish a BCAST file delivery session to be used for delivering content for the channel.

Upon creating a ChannelSubscriptionResponse message for a DCD channel delivered over BCAST, the DCD Server SHALL include a 'bcast-access-info' element in the 'dcd-2-broadcast-profile' of the Channel Metadata provided in the response. The 'bcast-access-info' element SHALL contain access information for the BCAST file delivery session associated with the DCD channel as described in Section 7 of this document.

5.5.2.2 External Subscription to a Channel Delivered over BCAST

Upon receiving a SubscriptionNotification message for a DCD Channel not currently delivered over BCAST, the DCD Server MAY choose to initiate delivery over BCAST for the DCD Channel. The mechanism through which the DCD Server determines whether to initiate delivery over BCAST for a DCD channel on subscription notification is considered out of scope for this specification. If the DCD Server chooses to initiate delivery over BCAST for a DCD Channel, the DCD Server SHALL follow the procedures described in Section 5.1 of this document to establish a BCAST file delivery session for the channel.

Upon creating a SubscriptionNotification message for a DCD channel delivered over BCAST, the DCD Server SHALL include a 'bcast-access-info' element in the 'dcd-2-broadcast-profile' of the Channel Metadata provided in the message. The 'bcast-access-info' element SHALL contain access information for the BCAST file delivery session associated with the DCD channel as described in Section 7 of this document.

5.5.2.3 Unsubscription from a Chanel Delivered over BCAST

Upon receiving a ChannelUnsubscriptionRequest message for a DCD channel delivered over BCAST, the DCD Server MAY choose to terminate delivery over BCAST for the channel. If the DCD Server chooses to terminate delivery over BCAST for the DCD Channel, the DCD Server SHALL follow the procedures described in Section 5.2 of this document to terminate the BCAST file delivery session associated with the channel

5.6   Content Delivery

5.6.1   DCD Client

5.6.1.1   Initiating Content Reception over BCAST

If the BCAST file delivery session for which content reception is to be initiated is within its scheduled distribution window or does not have a schedule, the DCD Client SHALL indicate to the BCAST FD-C via the DCD-BCAST-3 interface that it should immediately initiate content reception for the file delivery session and provide the BCAST FD-C with the BCAST access information for the channel contained in the 'bcast-access-info' element.

If the BCAST File Delivery Session for which content reception is to be initiated is not within its scheduled distribution window, the DCD Client SHALL either:

- Indicate to the BCAST FD-C that it should initiate content reception at the appropriate time based on the schedule associated with the access information for the channel and provide the BCAST FD-C with the BCAST access information for the channel contained in the 'bcast-access-info' element. OR,

- Wait until the beginning of the scheduled distribution window for the BCAST file delivery session, then indicate to the BCAST FD-C via the DCD-BCAST-3 interface that it should immediately initiate content reception for the BCAST file delivery session associated with the channel and provide the BCAST FD-C with the BCAST access information for the channel contained in the 'bcast-access-info' element.

5.6.1.2   Retrieving Content Delivered over BCAST

When the DCD Client receives a notification from the BCAST FD-C that a new FLUTE FDT instance as defined in [BCAST10-Distribution] is available for a BCAST File Delivery Session to which it is subscribed, the DCD Client SHALL examine the FDT instance to determine whether content should be retrieved from the file delivery session according to the procedures described below.

If the FLUTE FDT instance describes unretrieved or updated file(s) for which the 'Content-Location' attribute matches the DCD Channel ID for a subscribed DCD Channel, the DCD Client SHALL request that the BCAST FD-C retrieve the file(s). The DCD Client SHALL then proceed with the processing of the retrieved file(s) according to the rules and procedures in Section 6.1.5.4 - Content Update Push of [DCD-TS-Semantics] with the following modification: the DCD Client SHALL ignore the requirement for a valid session-id. The DCD Client SHALL use the procedures described in Section 5.2.4 of [BCAST10-Distribution] when examining the FLUTE FDT instance to determine whether an updated version of a file is available.

If the FLUTE FDT instance describes unretrieved or updated file(s) for which the 'Content-Location' attribute does not match the DCD Channel ID for a subscribed DCD Channel, the DCD Client MAY request that the BCAST FD-C retrieve all of the files or a subset of the files prior to the receipt of a related DCD ContentUpdatePush message. If the DCD Client requests that file(s) be retrieved, it SHALL proceed with the processing of the retrieved file(s) according to the rules and procedures in Section 6.1.5.4 of [DCD-TS-Semantics] with the following modification: the DCD Client SHALL ignore the requirement for a valid session-id.

5.6.1.3   Delivery Confirmation for Content Delivered over BCAST

The DCD Client SHALL send a ContentDeliveryConfirmation for DCD Content delivered over BCAST if content confirmation is requested through the Content Metadata or Channel Metadata and the DCD Client is not a receive-only client. The DCD Client SHALL create the ContentDeliveryConfirmation message according to the rules and procedures described in Section 7.1.2.1 of [DCD-TS-Semantics].

5.6.2   DCD Server

5.6.2.1   Delivering DCD Content over BCAST

Prior to delivering content over BCAST, the DCD Server SHALL verify that a BCAST file delivery session is associated with the DCD Channel for which the content is to be delivered. If a BCAST File Delivery Session is not associated with the DCD Channel, the DCD Server SHALL follow the procedures described in Section 5.1 to establish a BCAST file delivery session for the channel.

When delivering DCD Content over BCAST, the DCD Server SHOULD verify that content for exactly one DCD Channel is delivered over exactly one BCAST file delivery session. Any other approach for mapping DCD Channels to BCAST file delivery sessions is considered out of scope for this specification.

The DCD Server SHALL encapsulate DCD messaging for a DCD Channel in a single DCD-XML document in the format described in Section 9.4 of [DCD-TS-Semantics]. This document SHALL be added to the BCAST file delivery session associated with the DCD Channel with the FLUTE 'Content-Location' attribute set to the DCD Channel ID, according to the rules and procedures described in Section 6 – FLUTE Transport Binding.

The DCD Server MAY separately publish referenced content items associated with a DCD Channel to the BCAST file delivery session associated with the channel. The DCD Server SHALL encapsulate content items in one of the content packaging formats described in Section 9 of [DCD-TS-Semantics] prior to publishing them to the BCAST file delivery session. The DCD Server SHALL then add the referenced content items to the BCAST File Delivery Session with the FLUTE 'Content-Location' attribute set to the DCD Content ID, according to the rules and procedures described in Section 6 – FLUTE Transport Binding.

5.7   DCD-3 Administrative Messaging

5.7.1   DCD Client

The DCD Client SHALL support reception of DCD-3 adminstrative messaging over BCAST for mandatory functions shown in Section 5.9 – Operation Interface Mapping of [DCD-TS-Semantics] as applicable for delivery over broadcast. The DCD Client MAY support reception of DCD-3 adminstrative messaing over BCAST for optional functions shown in Section 5.9 of [DCD-TS-Semantics] as applicable for delivery over broadcast.

5.7.1.1   Retrieving DCD-3 Administrative Messaging Delivered over BCAST

If the applicable DCD-3 connection profile for the DCD Client includes BCAST access information through the 'bcast-access-info' element, the DCD Client SHALL be prepared to receive DCD-3 transactions over BCAST. If a DCD Client chooses to receive DCD-3 administrative messaging over BCAST, the DCD Client SHALL follow the procedures described below.

The DCD Client SHALL initiate reception of DCD-3 administrative messaging over BCAST by indicating to the BCAST FD-C via the DCD-BCAST-3 interface that it should initiate content reception on the BCAST file delivery session associated with the DCD-3 interface and providing the BCAST FD-C with the BCAST access information contained in the 'bcast-access-info' element of the dcd-3-connection-profile.

When the DCD Client receives a notification from the BCAST FD-C that a new FLUTE FDT instance as defined in [BCAST10-Distribution] is available for the BCAST file delivery session associated with DCD-3 interface, the DCD Client SHALL examine the FDT instance to determine whether new administrative messaging should be retrieved from the file delivery session according to the procedures described below.

If the FLUTE FDT instance describes unretrieved or updated files, the DCD Client SHALL request that the BCAST FD-C retrieve the unretrieved or updated files. The DCD Client SHALL then proceed with the processing of the retrieved files according to the rules and procedures described in [DCD-TS-Semantics] with the following modification: the DCD Client SHALL ignore the requirement for a valid session-id for all messages contained in the retrieved files. The DCD Client SHALL use the procedures described in Section 5.2.4 of [BCAST10-Distribution] in examining the FLUTE FDT instance to determine whether an updated file version is available.

5.7.2   DCD Server

The DCD Server MAY support delivery of DCD-3 administrative messaging over BCAST for functions shown in Section 5.9 – Operation Interface Mapping of [DCD-TS_Semantics] as applicable for delivery over broadcast.

The DCD Server server SHALL ensure the uniqueness of the transaction identifier portion of the message-ID for messages sent over BCAST (e.g., by using a unique prefix for messages sent via BCAST). The DCD Server SHALL ensure that the message-ID is not reused over a reasonably long period of time (e.g., one week). The DCD Server SHALL reissue messages with a new message-ID when needed to avoid message-ID conflict.

5.7.2.1   Delivering DCD-3 Administrative Messaging over BCAST

Prior to delivering DCD-3 administrative messaging over BCAST, the DCD Server SHALL verify that a BCAST file delivery session is associated with the DCD-3 interface. If a BCAST file delivery session is not associated with the DCD-3 interface, the DCD Server SHALL follow the procedures described in Section 5.1 to establish a BCAST file delivery session for the DCD-3 interface.

When delivering DCD-3 administrative messaging over BCAST, the DCD Server SHALL verify that messaging for the DCD-3 interface is delivered over exactly one BCAST file delivery session. The BCAST file delivery session associated with the DCD-3 interface SHALL be used exclusively to deliver files containing DCD-3 administrative messaging.

The DCD Server SHALL encapsulate DCD-3 administrative messaging in one or more DCD-XML documents in the format described in Section 9.4 of [DCD-TS-Semantics]. Each document SHALL be added to the BCAST file delivery session associated with the DCD-3 interface with a FLUTE 'Content-Location' chosen by the DCD Server, according to the rules and procedures described in Section 6.

6. FLUTE Transport Binding

The DCD Client SHALL be capable of interfacing with BCAST FD-C via the DCD-BCAST-3 interface for the purpose of receiving DCD Content and DCD-3 administrative messaging over BCAST.

The DCD Server SHALL be capable of acting as a BCAST Service Application and interfacing with the BCAST BSD/A via the DCD-BCAST-1 interface for the purpose of delivering DCD Content and DCD-3 administrative messaging over BCAST

The usage of FLUTE is defined in [RFC3926] and [BCAST10-Distribution] and the FLUTE Schema for OMA BCAST is defined in [BCAST10-XMLSchema-FD-FDT].

6.1   FLUTE FDT Mapping

In order to publish DCD Content or DCD-3 administrative messaging to a BCAST File Delivery Session, the DCD Server SHALL create a FLUTE FDT File element for the document containing the DCD Content or DCD-3 administrative messaging according to the rules and procedures of [RFC3926] and [BCAST10-Distribution]. The DCD Server SHALL establish the values of the attributes for the File element according to the following procedures:

- For the DCD-XML document containing DCD messaging for a DCD channel as described in Section 5.6.2.1 the DCD Server SHALL proceed as follows:
    - The DCD Server SHALL set the 'Content-Location' attribute of the File element to the DCD Channel ID.
    - The DCD Server SHALL set the 'Content-Type' attribute of the File element to the appropriate MIME type for the document.

- For referenced DCD Content items published to the BCAST File Delivery Session separately as described in Section 5.6.2.1, the DCD Server SHALL proceed as follows:
    - The DCD Server SHALL set the 'Content-Location' attribute of the File element to the DCD Content ID.
    - The DCD Server SHALL set the 'Content-Type' attribute of the File element to the appropriate MIME type for the document.

- For DCD-XML documents containing DCD-3 administrative messaging as described in Section 5.7.2.1, the DCD Server SHALL proceed as follows:
    - The DCD Server SHALL set the 'Content-Location' attribute of the File element to a URI which is unique within the BCAST file delivery session associated with the DCD-3 interface.
    - The DCD Server SHALL set the 'Content-Type' attribute of the File element to the appropriate MIME type for the document.
    :

7. DCD over BCAST Interfaces

The DCD over BCAST adaptation includes a set of adaptation specific interfaces through which DCD enabler entities interact with BCAST entities to provision BCAST file delivery sessions and manage content delivery over BCAST. This section describes the adaptation specific interfaces and the degree of standardization of these interfaces in this release of the DCD enabler.
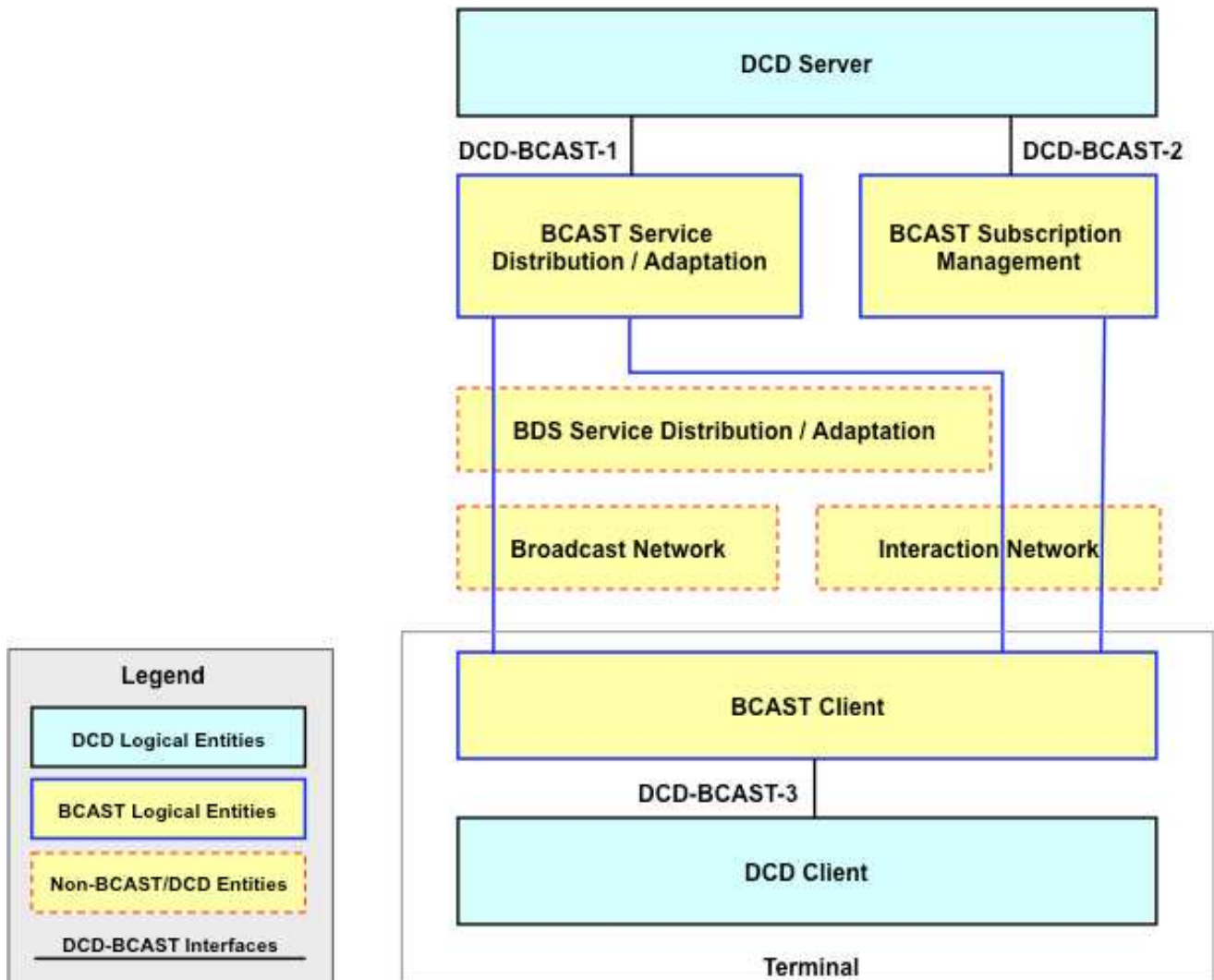
Figure 1 - DCD over BCAST Adaptation Interface Diagram

Figure 1 provides an overview of the DCD over BCAST adaptation interfaces. A description of each of the interfaces shown in Figure 1 and their roles in enabling the DCD over BCAST Adaptation is provided in the sections that follow.

7.1 DCD-BCAST-1 Interface

The DCD-BCAST-1 interface SHALL allow the DCD Server to interact with the BCAST Service Distribution / Adaptation function to provision broadcast sessions and to insert DCD content into the BCAST enabler.

This interface is expected to allow the DCD Server to perform the following functions:

- Establish a BCAST file delivery session

- Submit DCD content to be delivered on a specific BCAST file delivery session

- Remove DCD content from a specific BCAST file delivery session

- Terminate a BCAST file delivery session

- Obtain or specify access parameters or a service guide fragment reference for a BCAST file delivery session

The details of this interface are left unspecified in this release of the DCD enabler, but this interface may be subject to specification in future releases of the enabler.

7.2 DCD-BCAST-2 Interface

The DCD-BCAST-2 interface SHALL allow the DCD Server to interact with the BCAST Subscription Management function to provision BCAST subscription information for DCD channels distributed over BCAST. . This interface is expected to allow the DCD Server to perform the following functions:

- Provision BCAST subscription and authorization related information required by the BCAST subscription management function

The details of this interface are left unspecified in this release of the DCD enabler, but may be subject to specification in future releases of the enabler.

7.3 DCD-BCAST-3 Interface

The DCD-BCAST-3 interface SHALL allow the DCD Client to interact with the BCAST Client to initiate content reception and to receive DCD content delivered over BCAST. This interface is expected to allow the DCD Client to perform the following functions:

- Initiate content reception on a specific BCAST file delivery session by providing BCAST access parameters obtained through DCD metadata

- Obtain DCD Content or DCD-3 administrative messaging delivered on BCAST file delivery sessions for which content reception has been initiated

- Terminate content reception on a specific BCAST file delivery session

The details of this interface are left unspecified in this release of the DCD enabler, but this interface may be subject to specification in future releases of the enabler.

8. DCD over BCAST Metadata

The DCD Client initiates content reception for a DCD channel delivered over BCAST by providing the BCAST File Delivery Client with access information for the BCAST service associated with the DCD channel through the DCD-BCAST-3 interface. In order for the DCD Client to provide BCAST access information for a channel to the BCAST FD-C, it must first obtain this information through DCD metadata. This section discusses the DCD metadata format used to describe BCAST access information and the mechanisms through which the DCD Client can obtain this information for DCD channels delivered over BCAST.

8.1   Metadata Format for BCAST Access Information

BCAST Access Information is encapsulated in DCD metadata through the 'bcast-access-info' element in the Application Profile and Channel Metadata described in Sections 8.1 and 8.2 of [DCD-TS-Semantics] respectively. This element defines three mutually exclusive sub-elements through which BCAST access information for a specific channel or interface may be provided. DCD entities providing BCAST access information via DCD metadata SHALL include one of the three sub-elements described below for each DCD channel or interface for which access information is provided.

8.1.1   service-reference Element

DCD entities using the 'service-reference' element to describe the BCAST access information associated with a DCD channel or the DCD-3 interface SHALL include this element with a URI matching the 'globalServiceID' of the OMA BCAST service associated with the DCD channel or DCD-3 interface.

This element SHOULD be used when a BCAST Service Guide instance containing access information for the BCAST service associated with a DCD channel or the DCD-3 interface is already available to the BCAST FD-C. This element allows the DCD enabler to provide a URI referencing a BCAST service which is described through an existing BCAST Service Guide instance as defined in [BCAST10-SG]. If the 'service-reference' element is used, BCAST access information for the channel SHOULD be provided through one or more BCAST Service Guide 'Access' fragments associated with the referenced service.

If required, schedule information for the BCAST file delivery session can be provided through one or more BCAST Service Guide 'Schedule' fragments associated with the referenced service.. The 'Schedule' fragment can be used to specify the distribution window and the automatic activation time for DCD content reception. The DCD Client can utilize this schedule information to indicate to the BCAST FD-C to initiate content reception or the BCAST FD-C can use this information directly to initiate content reception at the appropriate time.

8.1.2   access-fragment Element

DCD entities using the 'access-fragment' element to describe the BCAST access information associated with a DCD channel or the DCD-3 interface SHALL include this element with a complete, well-formed BCAST Service Guide 'Access' fragment as described in Section 5.1.2.4 of [BCAST10-SG] indicating the access information for the BCAST service associated with the DCD channel or interface. One or more instances of the 'access-fragment' element may be instantiated for a given DCD channel or interface, each containing a separate BCAST Service Guide 'Access' fragment.

8.1.3   sdp-description Element

DCD entities using the 'sdp-description' element to describe the BCAST access information associated with a DCD channel or the DCD-3 interface SHALL include this element with a complete, well-formed SDP description as described in [RFC 4566] indicating the access information for the BCAST service associated with the DCD channel or interface. One or more instances of the 'sdp-description' element may be instantiated for a given DCD channel or interface, each containing a separate SDP session description, with the following restrictions:

The SDP attribute for session time SHOULD be set to t=0 0 as described in [RFC 4566] to allow the DCD Server to maintain control over the channel lifetime of the session.

8.2   DCD-2 BCAST Access Information Metadata

BCAST Access Information for the DCD-2 interface associated with DCD channels delivered over BCAST SHALL be provided through the 'dcd-2-broadcast-profile' in the Channel Metadata for each channel as described in Section 8.2 of [DCD-TS-Semantics].

The DCD Server SHALL populate the 'bcast-access-info' element in the 'dcd-2-broadcast-profile' of the Channel Metadata for each channel as described in Section 8.1 of this document.

8.3   DCD-3 BCAST Access Information Metadata

BCAST Access Information for the broadcast instantiation of the DCD-3 delivered over BCAST SHALL be provided through the 'broadcast-profile' in the 'dcd-3-connection-profile' of the Application Profile as described in Section 8.1 of [DCD-TS-Semantics].

Appendix A.   Change History   (Informative)

A.1   Approved Version History

Reference	Date	Description
OMA-TS-DCD_BCAST_Adaptation-V1_0-20110705-A	05 Jul 2011	Status changed to Approved by TP: OMA-TP-2011-0224-INP_DCD_V1_0_ERP_for_Final_Approval

Appendix B.   Static Conformance Requirements   (Normative)

The notation used in this appendix is specified in [SCRRULES].

B.1   SCR for DCD Client

Item	Function	Reference	Status	Requirement
DCD-BCAST-C-001	Support DCD over BCAST Adaptation		M	DCD-BCAST-C-002 AND DCD-BCAST-C-003 AND DCD-BCAST-C-005 AND DCD-BCAST-C-007 AND DCD-BCAST-C-008
DCD-BCAST-C-002	Support DCD-CAR application registration with DCD-3 broadcast profile	Section 5.3.1	M	
DCD-BCAST-C-003	Support termination of BCAST content reception on Application Deregistration	Section 5.4.1	M	
DCD-BCAST-C-004	Support provisioning of BCAST access parameters for default channels through OMA DM	Section 5.5.1.1	O	
DCD-BCAST-C-005	Support initiation of BCAST content reception on subscription to a DCD Channel delivered over BCAST	Section 5.5.1.2	M	
DCD-BCAST-C-006	Support initiation or termination of BCAST content reception on Channel Metadata Update	Section 5.5.1.3	O	
DCD-BCAST-C-007	Support termination of BCAST content reception on Channel Unsubscription	Section 5.5.1.4	M	
DCD-BCAST-C-008	Support reception of DCD Content delivered over BCAST	Section 5.6	M	DCD-BCAST-C-010
DCD-BCAST-C-009	Support reception of DCD-3 administrative messaging delivered over BCAST	Section 5.7	O	DCD-BCAST-C-010
DCD-BCAST-C-010	Support interfacing with BCAST FD-C via DCD-BCAST-3 interface	Section 6.3	M	DCD-BCAST-C-011
DCD-BCAST-C-011	Support providing BCAST access information to BCAST FD-C via DCD-BCAST-	Section 7	M	

Item	Function	Reference	Status	Requirement
	3 interface			

B.2 SCR for DCD Server

Item	Function	Reference	Status	Requirement
DCD-BCAST-S-001	Support DCD over BCAST Adaptation		M	DCD-BCAST-S-002 AND DCD-BCAST-S-004 AND DCD-BCAST-S-005 AND DCD-BCAST-S-006 AND DCD-BCAST-S-007 AND DCD-BCAST-S-008 AND DCD-BCAST-S-009
DCD-BCAST-S-002	Support establishment of BCAST File Delivery Sessions for DCD Channels	Section 5.1	M	
DCD-BCAST-S-003	Support establishment of BCAST File Delivery Session for DCD-3 administrative messaging	Section 5.1	O	
DCD-BCAST-S-004	Support termination of BCAST File Delivery Sessions used for DCD Content or messaging	Section 5.2	M	
DCD-BCAST-S-005	Support initiation of BCAST content delivery on Channel Registration	Section 5.3.2	M	
DCD-BCAST-S-006	Support termination of BCAST content delivery on Channel Deregistration	Section 5.4.2	M	
DCD-BCAST-S-007	Support initiation of BCAST content delivery on Channel Subscription	Section 5.5.2	M	
DCD-BCAST-S-008	Support termination of BCAST content delivery on Channel Unsubscription	Section 5.5.2.3	M	
DCD-BCAST-S-009	Support delivery of DCD Content over BCAST	Section 5.6	M	DCD-BCAST-S-011 AND DCD-BCAST-S-012 AND DCD-BCAST-S-013
DCD-BCAST-S-010	Support delivery of DCD-3 administrative messaging over BCAST	Section 5.7	O	DCD-BCAST-S-011 AND DCD-BCAST-S-012 AND DCD-BCAST-S-013
DCD-BCAST-S-011	Support interfacing with BCAST BSD/A via DCD-BCAST-1 interface	Section 6.1	M	
DCD-BCAST-S-012	Support interfacing with BCAST Subscription Management via DCD-	Section 6.2	M	

Item	Function	Reference	Status	Requirement
	BCAST-2 interface			
DCD-BCAST-S-013	Support insertion of BCAST access parameters into DCD Channel Metadata	Section 7	M	

Appendix C.   Using SDP to describe the connection Profile

The IP destination address shall be defined according to the "connection data" field ("c=") of SDP [RFC 4566] The destination port number shall be defined according to the <port> sub-field of the media announcement field ("m=") of SDP.

Here is a full example of SDP description describing a FLUTE session:

```
v=0
o=user123 2890844526 2890842807 IN IP6 2201:056D::112E:144A:1E24
s=File delivery session example
i=More information
t=2873397496 2873404696
a=mbms-mode:broadcast 1234 1
a=FEC-declaration:0 encoding-id=1
a=source-filter: incl IN IP6 * 2001:210:1:2:240:96FF:FE25:8EC9
a=flute-tsi:3
m=application 12345 FLUTE/UDP 0
c=IN IP6 FF1E:03AD::7F2E:172A:1E24/1
b=64
a=lang:EN
a=FEC:0
```