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| Project | **IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>** | |
| Title | **Add new Data Path Management Primitives** | |
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|---|---|
| Re: | Contribution on comments to P802.16g-D5 |
| Abstract | In this contribution, we propose to add Data Path Management Primitives to support both Data Path Management Service and MBS Service |
| Purpose | Adoption |
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# Amendment for add new Data Path Management Primitives

## 1. Introduction

In the current baseline document, Data Path Management Primitives has not been defined. In this

contribution, we propose to add new Data Path Management Primitives to support both Data Path Management Service and MBS Service

# 2. Proposed Text Changes

**14.2.14 Data Path management**

Data Path Management is used for create/modify/delete data path among corresponding network entities. These data paths are data bearer links between BS and NCMS. It will be mapped to radio connection (s) and data path (s) when a service is initiated or handover has happened. The Data Path Management Primitives are a set of primitives for supporting Data Path management between BS and NCMS (access network). Data Path management primitives can either use 2-way or 3-way handshake style based on needs.

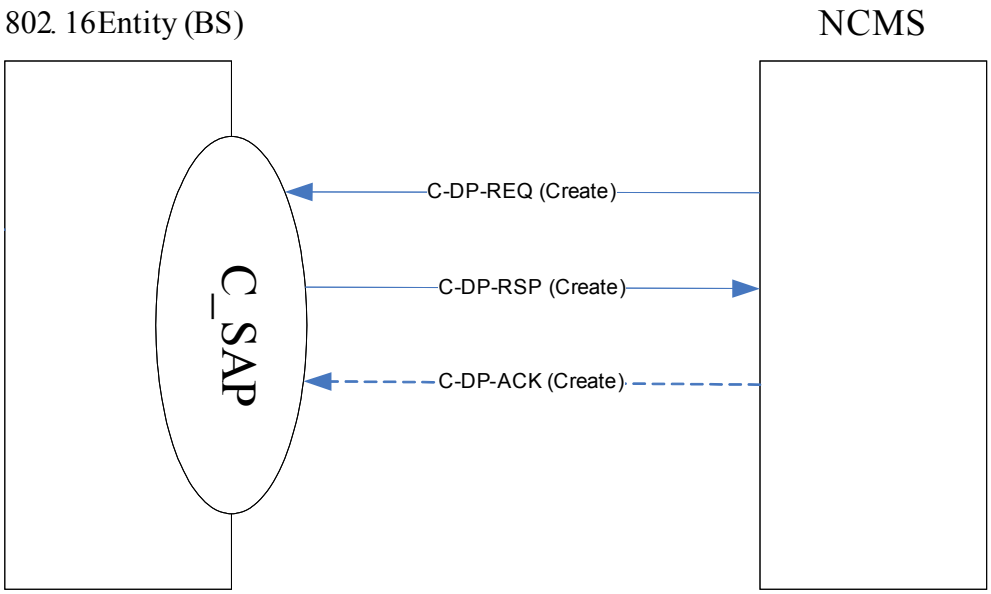


**Figure xxx C-DP-REQ/RSP/ACK (Create) Network Initiated**

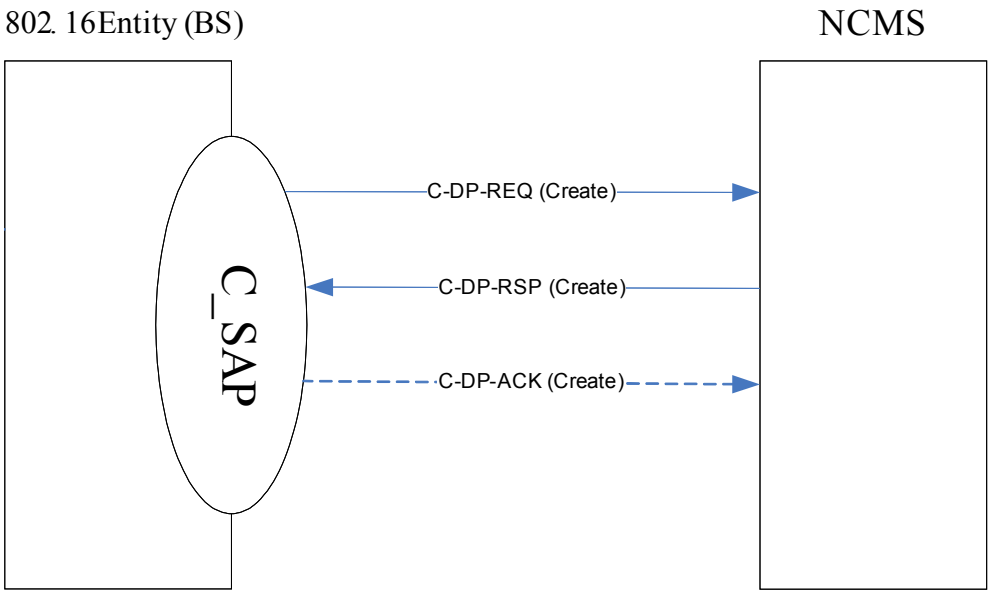


**Figure xxx C-DP-REQ/RSP/ACK (Create) BS Initiated**

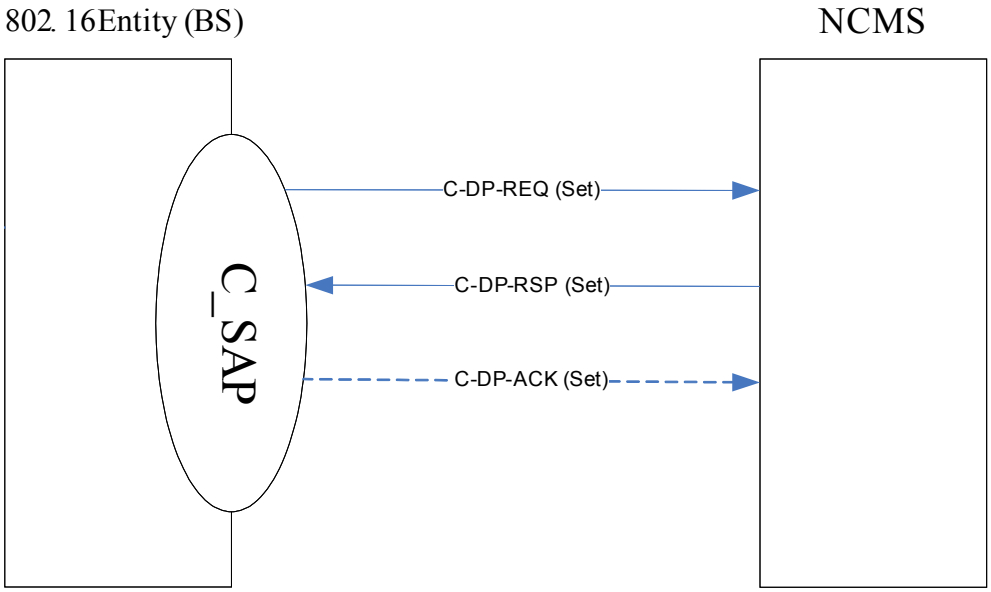


**Figure xxx C-DP-REQ/RSP/ACK (Set) Network Initiated**

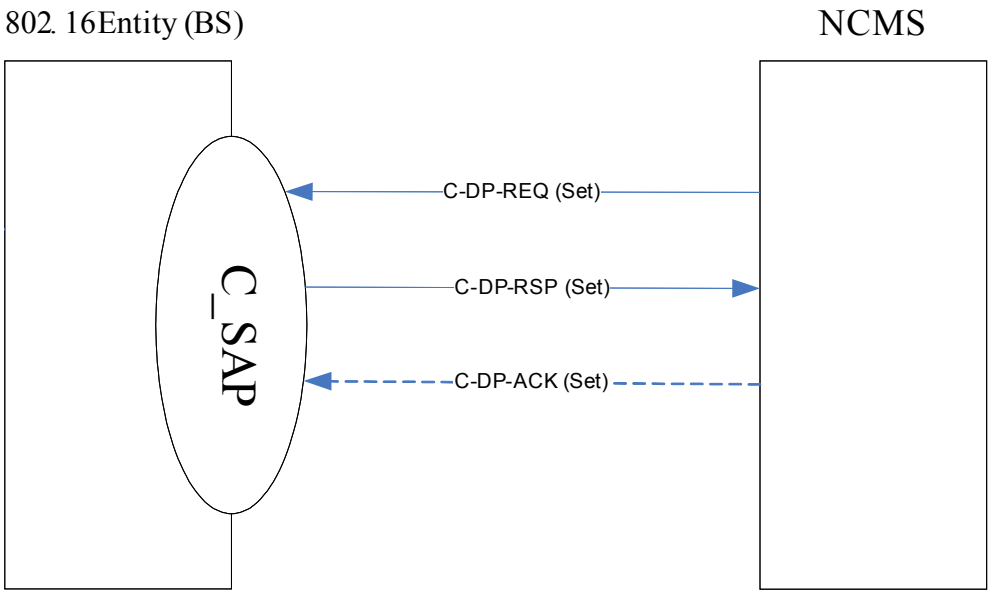


**Figure xxx C-DP-REQ/RSP/ACK (Set) BS Initiated**

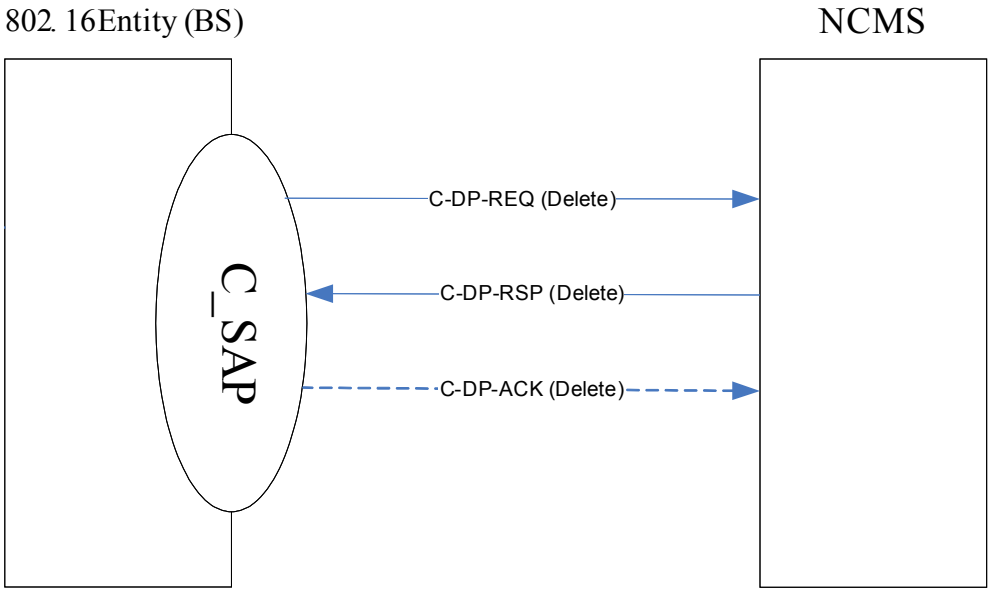


**Figure xxx C-DP-REQ/RSP/ACK (Delete) Network Initiated**

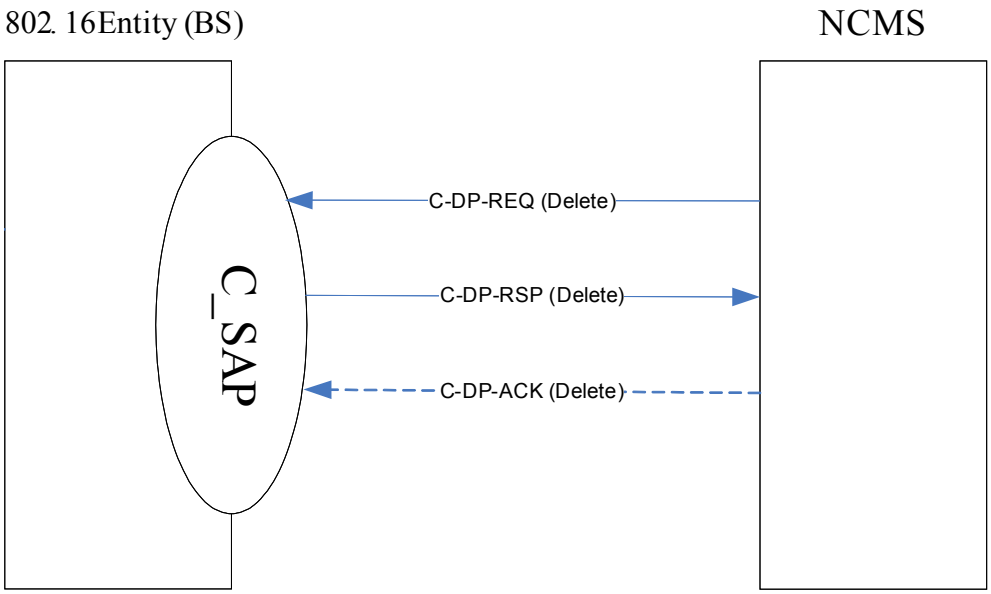


**Figure xxx C-DP-REQ/RSP/ACK (Delete) BS Initiated**

#### 14.2.14.1 C-DP-REQ

This primitive is used by an 802.16 entity (BS) or NCMS to trigger a data path management procedure. The Operation Type included in this primitive defines the type of data path management procedure to be performed. The possible Operation Types for this primitive are listed in Table below.

| Operation Type | Description |
|---|---|
| Create | Create a new data path |
| Set | Change parameters of existing data path |
| Delete | Deletion of an existing data path |

The following sub-sections define the primitive when its operation type is set to a specific operation.

##### 14.2.14.1.1 C-DP-REQ (Operation_Type==Create)

## Function:

When Operation Type is set to Create, this primitive shall be used to initiate a new data path creation by either an 802.16 entity or NCMS. This primitive shall contain Data Path information for the new data path.

## Semantics of the service primitive:

The parameters of the primitives are as follows:

**C-DP-REQ**

(
Message_id,
Operation_Type(Create),
Action_Type(Null),
Object_id(BSID, or NCMS),
Attribute _list:
MS Information
Data path information
Service Flow Information
)

**MS Information**

Contain MS related context

**Data path information**

It describes the Data Path in the direction opposite to that in which the primitive is sent. It potentially includes:

- **Data Path Type** specifies the type of the Data Path (e.g. GRE, MPLS, VLAN, etc.)
- **Data Path ID** specifies Data Path ID (e.g. LSP identification for MPLS, GRE Key for GRE, LAN ID for VLAN, etc.). This ID can be used as unique idendifier to identify a single data path between BS and NCMS or can be used as MBSZoneID to identify multiple data paths for this MBSZone.
- **List of Classifiers** that identify what data SHOULD be classified onto the Data Path and allows optional negotiating Data Path IDs on per flow (IEEE 802.16 Connection) basis.
- **Multicast Info**. Specifies relation of the Data Path to the IP Multicast Group.
- **Endpoint Identifier.** Specifies the addressable subscriber-side endpoint for which the Data Path is being established or maintained.
- **Data Integrity informaton:** data integrity related information for this data path

**Service Flow Information**

Approved complete QoS information of a service flow such as service class name, QoS parameter set type, maximum sustained traffic rate, maximum traffic burst, minimum reserved traffic rate, minimum tolerable traffic rate, tolerate jitter and maximum latency. In case of MBS flow set originated by NCMS, the service flow information shall additionally contain the connection identifier CID, Logical Channel ID and security association.

## When generated:

- 802.16 entity (BS) to NCMS:

This primitive is generated when the 802.16 entity creates a data path

- NCMS to 802.16 entity (BS):

This primitive is used when the data path management entity in NCMS triggers the creation of a new data path.

## Effect of receipt:

- 802.16 entity (BS)to NCMS:

The Data path management entity in NCMS shall respond to this primitive by using C-DP-RSP(Create). The management entity for data paths checks the validity of the request from the point of view of its own resources. If the request is accepted, it will store the data path info into its own database.

- NCMS to 802.16 entity (BS):

The Data path management entity in BS shall respond to this primitive by using C-DP-RSP(Create). The management entity for data paths checks the validity of the request from the point of view of its own resources. If the request is accepted, it will store the data path info into its own database.

**14.2.14.1.2 C-DP-REQ (Operation_Type==Set)**

## Function:

When Operation Type is set to Set, this primitive shall be used to initiate the modification of an existing data path parameters by either an 802.16 entity or NCMS. This primitive shall contain the new information for the modifying data path.

## Semantics of the service primitive:

The parameters of the primitive are as follows:

**C-DP-REQ**
(
Message_id,
Operation_Type(Set),
Action_Type(Null),
Object_id (BSID, or NCMS),
Attribute _list:
MS Information
Data path information
Service Flow Information
)

**MS Information**
Contain MS related context
**Data path information**

It describes the Data Path in the direction opposite to that in which the primitive is sent. It potentially includes:

- **Data Path Type** specifies the type of the Data Path (e.g. GRE, MPLS, VLAN, etc.)
- **Data Path ID** specifies Data Path ID (e.g. LSP identification for MPLS, GRE Key for GRE, LAN ID for VLAN, etc.). This ID can be used as unique idendifier to identify a single data path between BS and NCMS or can be used as MBSZoneID to identify multiple data paths for this MBSZone.
- **List of Classifiers** that identify what data SHOULD be classified onto the Data Path and allows optional negotiating Data Path IDs on per flow (IEEE 802.16 Connection) basis.
- **Multicast Info**. Specifies relation of the Data Path to the IP Multicast Group.

- **Endpoint Identifier.** Specifies the addressable subscriber-side endpoint for which the Data Path is being established or maintained.
- **Data Integrity informaton:** data integrity related information for this data path

**Service Flow Information**

Approved complete QoS information of a service flow such as service class name, QoS parameter set type, maximum sustained traffic rate, maximum traffic burst, minimum reserved traffic rate, minimum tolerable traffic rate, tolerate jitter and maximum latency. In case of MBS flow set originated by NCMS, the service flow information shall additionally contain the connection identifier CID, Logical Channel ID and security association.

## When generated:

• 802.16 entity to NCMS:

This primitive is generated when the 802.16 entity change the parameters of an existing data path

• NCMS to 802.16 entity:

This primitive is generated when the Data path management entity in NCMS informs the 802.16 entity of the Data path information modification.

## Effect of receipt:

• 802.16 entity to NCMS:

The Data path management entity in NCMS shall respond to this primitive by sending C-DP-RSP (Set). The management entity for data paths checks the validity of the request from the point of view of its own resources.

• NCMS to 802.16 entity:

The Data path management entity in BS shall respond to this primitive by sending C-DP-RSP (Set). The management entity for data paths checks the validity of the request from the point of view of its own resources.

#### 14.2.14.1.3 C-DP-REQ (Operation_Type==Delete)

## Function:

When Operation Type is set to Delete, this primitive shall be used to initiate an existing data path deletion by either an 802.16 entity or NCMS.

## Semantics of the service primitive:

The parameters of the primitive are as follows:

**C-DP-REQ**
(

Message_id,
Operation_Type(Delete),
Action_Type(Null),
Object_id(BSID, or NCMS),
Attribute _list:
MS Information
Data path information
Service Flow Information
)

**MS Information**
Contain MS related context
**Data path information**

It describes the Data Path in the direction opposite to that in which the primitive is sent. It potentially includes:

- **Data Path Type** specifies the type of the Data Path (e.g. GRE, MPLS, VLAN, etc.)
- **Data Path ID** specifies Data Path ID (e.g. LSP identification for MPLS, GRE Key for GRE, LAN ID for VLAN, etc.). This ID can be used as unique idendifier to identify a single data path between BS and NCMS or can be used as MBSZoneID to identify multiple data paths for this MBSZone.
- **List of Classifiers** that identify what data SHOULD be classified onto the Data Path and allows optional negotiating Data Path IDs on per flow (IEEE 802.16 Connection) basis.
- **Multicast Info**. Specifies relation of the Data Path to the IP Multicast Group.
- **Endpoint Identifier.** Specifies the addressable subscriber-side endpoint for which the Data Path is being established or maintained.
- **Data Integrity informaton:** data integrity related information for this data path

**Service Flow Information**
Approved complete QoS information of a service flow such as service class name, QoS parameter set type, maximum sustained traffic rate, maximum traffic burst, minimum reserved traffic rate, minimum tolerable traffic rate, tolerate jitter and maximum latency. In case of MBS flow set originated by NCMS, the service flow information shall additionally contain the connection identifier CID, Logical Channel ID and security association.

## When generated:

- 802.16 entity to NCMS:

This primitive is generated when the 802.16 entity delete an existing data path.

- NCMS to 802.16 entity:

This primitive is generated when the Data path management entity in NCMS informs the 802.16 entity of the deletion of an existing data path.

## Effect of receipt:

- 802.16 entity to NCMS:

The Data path management entity in NCMS shall respond to this primitive by sending C-DP-RSP(Delete).

The management entity for data paths release assigned resources for the data path ID.

- NCMS to 802.16 entity:

The Data path management entity in BS shall respond to this primitive by sending C-DP-RSP(Delete). The management entity for data paths release assigned resources for the data path ID.

#### 14.2.14.2 C-DP-RSP

This primitive is used by an 802.16 entity or NCMS to respond to the request to begin a data path management procedure. The Operation Type included in this primitive defines the type of data path management procedure to be performed. The possible Operation Types for this primitive are listed in Table below:

| Operation Type | Description |
|---|---|
| Create | Create a new data path |
| Set | Change parameters of existing data path |
| Delete | Deletion of an existing data path |

The following sub-sections define the primitive when its operation type is set to a specific operation.

#### 14.2.14.2.1 C-DP-RSP (Operation_Type==Create)

## Function:

This primitive is used by the 802.16 entity or the Data path management entity in NCMS to respond to the C-DP-REQ for a data path creation. Data path information in this primitive contains approved Data path information if the.request is accepted.

## Semantics of the service primitive:

The parameters of the primitives are as follows:

**C-DP-RSP**
(
Message_id,
Operation_Type(Create),
Action_Type(Null),
Object_id(BSID, or NCMS),
Attribute _list:
MS Information
Data path information
Service Flow Information
)

**MS Information**
Contain MS related context
**Data path information**

It describes the Data Path in the direction opposite to that in which the primitive is sent. It potentially includes:

- **Data Path Type** specifies the type of the Data Path (e.g. GRE, MPLS, VLAN, etc.)
- **Data Path ID** specifies Data Path ID (e.g. LSP identification for MPLS, GRE Key for GRE, LAN ID for VLAN, etc.). This ID can be used as unique idendifier to identify a single data path between BS and NCMS or can be used as MBSZoneID to identify multiple data paths for this MBSZone.
- **List of Classifiers** that identify what data SHOULD be classified onto the Data Path and allows optional negotiating Data Path IDs on per flow (IEEE 802.16 Connection) basis.
- **Multicast Info**. Specifies relation of the Data Path to the IP Multicast Group.
- **Endpoint Identifier.** Specifies the addressable subscriber-side endpoint for which the Data Path is being established or maintained.
- **Data Integrity informaton:** data integrity related information for this data path

**Service Flow Information**

Approved complete QoS information of a service flow such as service class name, QoS parameter set type, maximum sustained traffic rate, maximum traffic burst, minimum reserved traffic rate, minimum tolerable traffic rate, tolerate jitter and maximum latency. In case of MBS flow set originated by NCMS, the service flow information shall additionally contain the connection identifier CID, Logical Channel ID and security association.

## When generated:

- 802.16 entity to NCMS:

This primitive is generated when an 802.16 entity receives a C-DP-REQ(create) message from NCMS.

- NCMS to 802.16 entity:

This primitive is generated when the Data path management entity in NCMS responds to C-DP-REQ(Create) primitive.

## Effect of receipt:

- 802.16 entity to NCMS:

This primitive informs the result of the data path creation to the Data path management entity in NCMS.

- NCMS to 802.16 entity:

This primitive informs the result of the data path creation to an 802.16 entity.

**14.2.14.2.2 C-DP-RSP (Operation_Type==Set)**

## Function:

This primitive is used by the 802.16 entity or the Data path management entity in NCMS to respond to the C-DP-REQ (Set) for a change in an existing data path. Data path information in this primitive contains approved Data path information if the request is accepted.

## Semantics of the service primitive:

The parameters of the primitives are as follows:

**C-DP-RSP**

(
Message_id,
Operation_Type(Set),
Action_Type(Null),
Object_id (BSID, or NCMS),
Attribute _list:
MS Information
Data path information
Service Flow Information
)

**MS Information**

Contain MS related context

**Data path information**

It describes the Data Path in the direction opposite to that in which the primitive is sent. It potentially includes:

- **Data Path Type** specifies the type of the Data Path (e.g. GRE, MPLS, VLAN, etc.)
- **Data Path ID** specifies Data Path ID (e.g. LSP identification for MPLS, GRE Key for GRE, LAN ID for VLAN, etc.). This ID can be used as unique idendifier to identify a single data path between BS and NCMS or can be used as MBSZoneID to identify multiple data paths for this MBSZone.
- **List of Classifiers** that identify what data SHOULD be classified onto the Data Path and allows optional negotiating Data Path IDs on per flow (IEEE 802.16 Connection) basis.
- **Multicast Info**. Specifies relation of the Data Path to the IP Multicast Group.
- **Endpoint Identifier.** Specifies the addressable subscriber-side endpoint for which the Data Path is being established or maintained.
- **Data Integrity informaton:** data integrity related information for this data path

**Service Flow Information**

Approved complete QoS information of a service flow such as service class name, QoS parameter set type, maximum sustained traffic rate, maximum traffic burst, minimum reserved traffic rate, minimum tolerable traffic rate, tolerate jitter and maximum latency. In case of MBS flow set originated by NCMS, the service flow information shall additionally contain the connection identifier CID, Logical Channel ID and security association.

## When generated:

- 802.16 entity to NCMS:

This primitive is generated when an 802.16 entity receives a C-DP-REQ(Set) from NCMS.

- NCMS to 802.16 entity:

This primitive is generated when the Data path management entity in NCMS responds to C-DP-REQ(Set) primitive.

## Effect of receipt:

- 802.16 entity to NCMS:

This primitive informs the result of the data path modification to the Data path management entity in NCMS.

- NCMS to 802.16 entity:

This primitive informs the result of the data path modification to an 802.16 entity.

**14.2.14.2.3 C-DP-RSP(Operation_Type==Delete)**

## Function:

This primitive is used by the 802.16 entity or the Data path management entity in NCMS to respond to the data path deletion request.

## Semantics of the service primitive:

The parameters of the primitives are as follows:

**C-DP-RSP**
(
Message_id,
Operation_Type(Delete),
Action_Type(Null),
Object_id(MS MAC Address, or BSID, or NCMS),
Attribute _list:
MS Information
Data path information
Service Flow Information
)

**MS Information**
Contain MS related context

**Data path information**

It describes the Data Path in the direction opposite to that in which the primitive is sent. It potentially includes:

- **Data Path Type** specifies the type of the Data Path (e.g. GRE, MPLS, VLAN, etc.)
- **Data Path ID** specifies Data Path ID (e.g. LSP identification for MPLS, GRE Key for GRE, LAN ID for VLAN, etc.). This ID can be used as unique idendifier to identify a single data path between BS and NCMS or can be used as MBSZoneID to identify multiple data paths for this MBSZone.
- **List of Classifiers** that identify what data SHOULD be classified onto the Data Path and allows optional negotiating Data Path IDs on per flow (IEEE 802.16 Connection) basis.
- **Multicast Info**. Specifies relation of the Data Path to the IP Multicast Group.
- **Endpoint Identifier.** Specifies the addressable subscriber-side endpoint for which the Data Path is being established or maintained.
- **Data Integrity informaton:** data integrity related information for this data path

**Service Flow Information**

| | |
|---|---|
| | Approved complete QoS information of a service flow such as service class name, QoS parameter set type, maximum sustained traffic rate, maximum traffic burst, minimum reserved traffic rate, minimum tolerable traffic rate, tolerate jitter and maximum latency. In case of MBS flow set originated by NCMS, the service flow information shall additionally contain the connection identifier CID, Logical Channel ID and security association. |

## When generated:

- 802.16 entity to NCMS:

This primitive is generated when an 802.16 entity receives C-DP-REQ(Delete) primitive from NCMS.

- NCMS to 802.16 entity:

This primitive is generated when the Data path management entity in NCMS responds to C-DP-REQ(Delete) primitive.

## Effect of receipt:

- 802.16 entity to NCMS:

This primitive informs the result of the data path deletion of the Data path management entity in NCMS. The Data path management entity in NCMS deletes assigned resources for data path ID.

- NCMS to 802.16 entity:

This primitive informs the result of the data path deletion to an 802.16 entity.

#### 14.2.14.3 C-DP-ACK

This primitive is used by an 802.16 entity or NCMS to acknowledge to the response for a data path management procedure. The Operation Type included in this primitive defines the type of data path management procedure to be performed. The possible Operation Types for this primitive are listed in Table below:

| Operation Type | Description |
|---|---|
| Create | Create a new data path |
| Set | Change parameters of existing data path |
| Delete | Deletion of an existing data path |

The following sub-sections define the primitive when its operation type is set to a specific operation.

#### 14.2.14.2.1 C-DP-ACK (Operation_Type==Create)

## Function:

This primitive is used by the 802.16 entity or the Data path management entity in NCMS to acknowledge to the C-DP-RSP for a data path creation. Data path information in this primitive contains approved Data path information if the.response is accepted.

## Semantics of the service primitive:

The parameters of the primitives are as follows:

**C-DP-ACK**
(
Message_id,
Operation_Type(Create),
Action_Type(Null),
Object_id(BSID, or NCMS),
Attribute _list:
MS Information

)

**MS Information**
Contain MS related context

## When generated:

- 802.16 entity to NCMS:

This primitive is generated when an 802.16 entity receives a C-DP-RSP(create) message from NCMS.

- NCMS to 802.16 entity:

This primitive is generated when the Data path management entity in NCMS receives a C-DP-RSP(Create) primitive.

## Effect of receipt:

- 802.16 entity to NCMS:

This primitive confirms the transaction of the data path creation to the Data path management entity in NCMS.

- NCMS to 802.16 entity:

This primitive confirms the transaction of the data path creation to an 802.16 entity.

**14.2.14.2.2 C-DP-ACK (Operation_Type==Set)**

## Function:

This primitive is used by the 802.16 entity or the Data path management entity in NCMS to acknowledge the C-DP-RSP(Set) for a change in an existing data path.

## Semantics of the service primitive:

The parameters of the primitives are as follows:

**C-DP-ACK**
(
Message_id,
Operation_Type(Set),
Action_Type(Null),
Object_id (BSID, or NCMS),

Attribute _list:
MS Information

)

**MS Information**
Contain MS related context

## When generated:

- 802.16 entity to NCMS:

This primitive is generated when an 802.16 entity receives a C-DP-RSP(Set) from NCMS.

- NCMS to 802.16 entity:

This primitive is generated when the Data path management entity in NCMS receives a C-DP-RSP(Set) primitive.

## Effect of receipt:

- 802.16 entity to NCMS:

This primitive acknowledges the transaction of the data path modification to the Data path management entity in NCMS.

- NCMS to 802.16 entity:

This primitive acknowledges the transaction of the data path modification to an 802.16 entity.

**14.2.14.2.3 C-DP-ACK(Operation_Type==Delete)**

## Function:

This primitive is used by the 802.16 entity or the Data path management entity in NCMS to acknowledge the data path deletion response.

## Semantics of the service primitive:

The parameters of the primitives are as follows:

**C-DP-ACK**
(
Message_id,
Operation_Type(Delete),
Action_Type(Null),
Object_id(BSID, or NCMS),
Attribute _list:
MS Information

)

**MS Information**
Contain MS related context

## When generated:

- 802.16 entity to NCMS:

This primitive is generated when an 802.16 entity receives C-DP-RSP(Delete) primitive from NCMS.

- NCMS to 802.16 entity:

This primitive is generated when the Data path management entity in NCMS acknowledges to C-DP-RSP(Delete) primitive.

## Effect of receipt:

- 802.16 entity to NCMS:

This primitive acknowledges the transaction of the data path deletion of the Data path management entity in NCMS.

- NCMS to 802.16 entity:

This primitive acknowledges the transaction of the data path deletion to an 802.16 entity.