



## **Linux-based Mobile Phone Middleware**

### **Application Programming Interface**

#### **Packet-Switched Communication Service**

Document: CELF\_MPP\_PS\_D\_v2.2.6\_20060706

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## Revision History

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## 0. Introduction

Packet-Switched Communication Service (PS Service) has the function of the packet call control and the packet data sending and receiving.

Packet-Switched Communication Service includes PPP dial-up communication service and IP connection data transfer service.

### *Exclusions and restrictions*

The following exclusions and restrictions apply to this specification:

- This specification has been written for packet-switched communication in WCDMA context. It may be applicable to other bearers and technologies however it has not been studied in the current version.
- In the current version, only one PDP context could be active at a time
- An application shall not call several PS services in parallel using the same app\_id

## 0.1 References

### 0.1.1 Normative

RFC 2119: "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner. March 1997, URL: <http://www.ietf.org/rfc/rfc2119.txt>

RFC 2234: "Augmented BNF for Syntax Specifications: ABNF". D. Crocker, P. Overell. November 1997, URL: <http://www.ietf.org/rfc/rfc2234.txt>

RFC 2396: "Uniform Resource Identifiers (URI): Generic Syntax". T. Berners-Lee, R. Fielding, U.C. Irvine, L. Masinter. August 1998, URL: <http://www.ietf.org/rfc/rfc2396.txt>

### 0.1.2 Informative

3GPP TS 23.060 General Packet Radio Service (GPRS); Service Description; Stage 2  
URL: [http://www.3gpp.org/ftp/Specs/2005-09/Rel-5/23\\_series/23060-5b0.zip](http://www.3gpp.org/ftp/Specs/2005-09/Rel-5/23_series/23060-5b0.zip)

# 1. Primitives

## 1.1 Constants

### 1.1.1 CELF\_MP\_PS\_HOST\_MAX

**Description:** Maximum length of the character string for the ISP (Internet Service Provider) URL

### 1.1.2 CELF\_MP\_PS\_APN\_MAX

**Description:** Maximum length of the character string for the APN

### 1.1.3 CELF\_MP\_PS\_TITLE\_MAX

**Description:** Maximum length of the character string for the APN title string

### 1.1.4 CELF\_MP\_PS\_DNS\_RECORD\_MAX

**Description:** Maximum length of the character string for the DNS record

## 1.2 Enums

### 1.2.1 CelfMpPsEvent

**Description:** Packet-Switched events. Refer to section 1.4 for detailed description.

**Definition:**

CELF\_MP\_PS\_IN\_START\_IND  
CELF\_MP\_PS\_OUT\_START\_IND  
CELF\_MP\_PS\_IN\_REJECTED\_IND  
CELF\_MP\_PS\_OUT\_REJECTED\_IND  
CELF\_MP\_PS\_CONNECT\_START\_IND  
CELF\_MP\_PS\_DISCONNECT\_REQ  
CELF\_MP\_PS\_DEACTIVATE\_CNF  
CELF\_MP\_PS\_DEACTIVATE\_IND  
CELF\_MP\_PS\_IN\_REJECT\_REQ  
CELF\_MP\_PS\_IN\_STOPPED\_IND  
CELF\_MP\_PS\_SERVICE\_RING  
CELF\_MP\_PS\_SERVICE\_ERROR  
CELF\_MP\_PS\_SERVICE\_OK  
CELF\_MP\_PS\_CONTROL\_DISCONNECT  
CELF\_MP\_PS\_DATA\_SEND\_IND  
CELF\_MP\_PS\_DATA\_RECV\_IND  
CELF\_MP\_PS\_APN\_INIT\_END\_IND

### 1.2.2 CelfMpPsApnId

**Description:** APN configuration identifier. The default APN is a fixed APN configuration personalized at implementation / factory. The other 10 APN configurations could be modified and a PS configuration application should exist to allow the user to edit these configurations using `celf_mp_ps_apn_set()`.

**Definition:**

CELF\_MP\_PS\_APN\_DEFAULT : Default setting  
CELF\_MP\_PS\_APN\_USERSET1 : User-specified 1  
CELF\_MP\_PS\_APN\_USERSET2 : User-specified 2  
CELF\_MP\_PS\_APN\_USERSET3 : User-specified 3  
CELF\_MP\_PS\_APN\_USERSET4 : User-specified 4  
CELF\_MP\_PS\_APN\_USERSET5 : User-specified 5  
CELF\_MP\_PS\_APN\_USERSET6 : User-specified 6  
CELF\_MP\_PS\_APN\_USERSET7 : User-specified 7  
CELF\_MP\_PS\_APN\_USERSET8 : User-specified 8  
CELF\_MP\_PS\_APN\_USERSET9 : User-specified 9  
CELF\_MP\_PS\_APN\_USERSET10 : User-specified 10

### 1.2.3 CelfMpPsApnInit

**Description:** result of the APN initialization

**Definition:**

CELF\_MP\_PS\_UIM\_UPDATED : Successful, UIM updated  
 CELF\_MP\_PS\_UIM\_NOT\_UPDATED : Successful, UIM not updated  
 CELF\_MP\_PS\_AUTH\_ERR : Failure returned from the authentication service

### 1.2.4 CelfMpPsConn

**Description:** accept or reject an incoming PS connection

**Definition:**

CELF\_MP\_PS\_COM\_CONN\_ACCEPT : Accept incoming PS connection  
 CELF\_MP\_PS\_COM\_CONN\_REJECT : Reject incoming PS connection

### 1.2.5 CelfMpPsApnMode

**Description:** default APN settings

**Definition:**

CELF\_MP\_PS\_DEFAULT\_APN\_MS : APN settings stored in the mobile phone  
 CELF\_MP\_PS\_DEFAULT\_APN\_UIM : APN settings stored in the UIM

### 1.2.6 CelfMpPsExtEventSet

**Description:** External Equipment Event Notification class

**Definition:**

CELF\_MP\_PS\_EXT\_EVENT\_APN\_INIT\_END : Notification of APN initialization completed  
 CELF\_MP\_PS\_EXT\_EVENT\_CLASS\_ALL : All

### 1.2.7 CelfMpPsPdpType

**Description:** PDP type

**Definition:**

CELF\_MP\_PS\_PDP\_TYPE\_X25 : X.25 connection  
 CELF\_MP\_PS\_PDP\_TYPE\_IP : IP connection  
 CELF\_MP\_PS\_PDP\_TYPE\_OSPIH : OSPIH connection  
 CELF\_MP\_PS\_PDP\_TYPE\_PPP : PPP (IP based PPP)  
 CELF\_MP\_PS\_PDP\_TYPE\_IPv6 : IPv6 connection

### 1.2.8 CelfMpPsEventClass

**Description:** Event notification class

**Definition:**

CELF\_MP\_PS\_CLASS\_CALL\_STATE\_MSG : PS call status message notification (except for data emission / reception)  
 CELF\_MP\_PS\_CLASS\_SERVICE\_STATE\_MSG : PS service status message notification  
 CELF\_MP\_PS\_CLASS\_CALL\_DATA\_MSG : PS call activity (data emission / reception) message notification  
 CELF\_MP\_PS\_CLASS\_ALL : All

### 1.2.9 CelfMpPsUPlane

**Description:** User Plane connection status

**Definition:**

CELF\_MP\_PS\_UPLANE\_ON : U-Plane connected  
 CELF\_MP\_PS\_UPLANE\_OFF : U-Plane not connected

### 1.2.10 CelfMpPsStatus

**Description:** status of the current PS communication. Refer to Annex 3 – Packet-Switched communication status

**Definition:**



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CELF\_MP\_PS\_STATUS\_IDLE : Communication ended (idle)  
 CELF\_MP\_PS\_STATUS\_INCOMING\_CONNECTION : Connecting for incoming call  
 CELF\_MP\_PS\_STATUS\_CONNECTION\_ACTIVATION : Activation of the connection  
 CELF\_MP\_PS\_STATUS\_ACTIVE : Communication active (C-Plane active)  
 CELF\_MP\_PS\_STATUS\_DISCONNECT : Disconnecting

## 1.3 Data Types and Structures

### 1.3.1 CelfMpPsHost

**Description:** It contains the ISP (Internet Service Provider) URL string terminated by a NULL character '\0'. The allowable size is 1 to CELF\_MP\_PS\_HOST\_MAX.

**Definition:** unsigned char[ CELF\_MP\_PS\_HOST\_MAX + 1 ]

### 1.3.2 CelfMpPsApn

**Description:** It contains the Access Point Name string terminated by a NULL character '\0'. The allowable size is 1 to CELF\_MP\_PS\_APN\_MAX.

**Definition:** unsigned char[ CELF\_MP\_PS\_APN\_MAX + 1 ]

### 1.3.3 CelfMpPsDnsRec

**Description:** It contains the DNS record name string terminated by a NULL character '\0'. The allowable size is 1 to CELF\_MP\_PS\_DNS\_RECORD\_MAX.

**Definition:** unsigned char [CELF\_MP\_PS\_DNS\_RECORD\_MAX + 1]

### 1.3.4 CelfMpPsTitle

**Description:** It contains the title string for the APN terminated by a NULL character '\0'. The allowable size is 1 to CELF\_MP\_PS\_TITLE\_MAX.

**Definition:** unsigned char[ CELF\_MP\_PS\_TITLE\_MAX + 1 ]

### 1.3.5 CelfMpPsApnHostData

**Description:** APN/host data structure

**Definition:**

```

APN/host data structure
typedef struct {
    CelfMpPsApnId    apn_id ;
    CelfMpPsApn     apn ;
    CelfMpPsHost    host ;
    CelfMpPsTitle   title ;
} CelfMpPsApnHostData;
    
```

### 1.3.6 CelfMpPsEventSet

**Description:** Bit field where each bit corresponds to a PS event class to be registered. The PS event classes are defined by the enum CelfMpPsEventClass.

**Definition:** unsigned int

## 1.4 Events type

### 1.4.1 Packet-switched call state notification event

In this sub-section, the associated data structure is CelfMpEvent with the following values:

```

category = PacketNotify;
subtype = Call_State;
    
```

The value of the field 'info' is the event from enum CelfMpPsEvent.

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**1.4.1.1 CELF\_MP\_PS\_IN\_START\_IND**

**Description:** It notifies the start of incoming Packet-Switched connection

**1.4.1.2 CELF\_MP\_PS\_OUT\_START\_IND**

**Description:** It notifies the start of outgoing packet-switched connection

**1.4.1.3 CELF\_MP\_PS\_IN\_REJECTED\_IND**

**Description:** It notifies the rejection of incoming packet-switched connection

**1.4.1.4 CELF\_MP\_PS\_OUT\_REJECTED\_IND**

**Description:** It notifies the rejection of outgoing packet-switched connection

**1.4.1.5 CELF\_MP\_PS\_CONNECT\_START\_IND**

**Description:** It notifies the start of packet-switched connection

**1.4.1.6 CELF\_MP\_PS\_DISCONNECT\_REQ**

**Description:** Notification of packet disconnecting (on mobile station) indication started

**1.4.1.7 CELF\_MP\_PS\_DEACTIVATE\_CNF**

**Description:** Notification of packet disconnecting indication ended

**1.4.1.8 CELF\_MP\_PS\_DEACTIVATE\_IND**

**Description:** Notification of packet disconnecting (on network) completed

**1.4.1.9 CELF\_MP\_PS\_CALLED\_REJ\_REQ**

**Description:** Notification of missed termination record registered

**1.4.1.10 CELF\_MP\_PS\_CALLED\_END\_IND**

**Description:** Notification of packet termination indication ended

**1.4.2 Packet-Switched service status notification event**

In this sub-section, the associated data structure is CelfMpEvent with the following parameters:

```
category = PacketNotify;  
subtype = Service_State;
```

The value of the field 'info' is the event from enum CelfMpPsEvent.

**1.4.2.1 CELF\_MP\_PS\_SERVICE\_RING**

**Description:** packet-switched service establishment

**1.4.2.2 CELF\_MP\_PS\_SERVICE\_ERROR**

**Description:** packet-switched service ERROR

**1.4.2.3 CELF\_MP\_PS\_SERVICE\_OK**

**Description:** packet-switched service OK (successful completion of primitive)

**1.4.2.4 CELF\_MP\_PS\_CONTROL\_DISCONNECT**

**Description:** packet-switched service DISCONNECT

**1.4.3 Packet-switched call activity notification event**

In this sub-section, the associated data structure is CelfMpEvent with the following parameters:

```
category = PacketNotify;  
subtype = Call_Data;
```

The value of the field 'info' is the event from enum CelfMpPsEvent.

These events are generated periodically (for example every second) to inform the applications there is data activity on the packet connection. The application may use these events to inform the user of data activity with a specific display (an icon for example).

#### **1.4.3.1 CELF\_MP\_PS\_DATA\_SEND\_IND**

**Description:** Data sending activity notification

#### **1.4.3.2 CELF\_MP\_PS\_DATA\_RECV\_IND**

**Description:** Data receiving activity notification

### **1.4.4 APN initialization status notification event**

In this sub-section, the associated data structure is CelfMpEvent with the following parameters:

```
category = PacketNotify;  
subtype = Apn_Initialization;
```

The value of the field 'info' is the event from enum CelfMpPsEvent.

#### **1.4.4.1 CELF\_MP\_PS\_APN\_INIT\_END\_IND**

**Description:** APN initialization complete notification.

## 2. Start packet-switched communication notification

### 2.1 Symbol: `celf_mp_ps_notification_start`

#### 2.1.1 Syntax

```
CelfMpStatus   celf_mp_ps_notification_start (
    CelfMpAppId    app_id,
    CelfMpPsEventSet event_set,
    CelfMpCallback callback_func );
```

#### 2.1.2 Argument

**Name:** `app_id`

**Type:** `CelfMpAppId`

**I/O:** |

**Description:** Application identifier.

**Name:** `event_set`

**Type:** `CelfMpPsEventSet`

**I/O:** |

**Description:** Set of PS event classes . Events belonging to one of the `CelfMpPsEventClass` classes **may** be registered to have a callback function called when the event occurs for the application identified by `app_id`. Classes of events are selected by setting the corresponding bit in `event_set`.

**Name:** `callback_func`

**Type:** `CelfMpCallback`

**I/O:** |

**Description:** The callback function that shall be called when an event occurs from one of the classes registered in `event_set`.

#### 2.1.3 Return Value

**Type:** `CelfMpStatus`

**Description:** `celf_mp_ps_notification_start ()` **shall** return one of the following values :

`CELF_MP_STATUS_OK`: Successful completion

`CELF_MP_STATUS_APP_ID_ERR`: Invalid Application ID

`CELF_MP_STATUS_EVENT_SET_ERR`: The set of event is invalid

`CELF_MP_STATUS_ERR`: Other unsuccessful completion

#### 2.1.4 Include File

`/usr/include/celf/mp_ps.h`

#### 2.1.5 Functional Description

This function is a synchronous service.

This function is used to start notification for events related to packet-switched communication. Events from a registered class **shall** cause the registered callback function to be called when the event occurs for the application identified by `app_id`. If a class of events does not have a registered callback function, no callback shall occur for those events.

Different callback functions **may** be registered for different classes of events. Only the most recently registered callback for an event class **shall** be called when an event of that class occurs, and no notification shall be given when a callback for an event class is superseded. Callbacks **may** be canceled using the `celf_mp_ps_notification_stop()` function.

The following notification event classes **shall** be supported:

`CELF_MP_PS_CLASS_CALL_STATE_MSG`

`CELF_MP_PS_CLASS_SERVICE_STATE_MSG`

`CELF_MP_PS_CLASS_CALL_DATA_MSG`

**Classification: Packet-Switched Communication Service**

A callback may be registered for all classes of events using the special event class `CELF_MP_PS_CLASS_ALL`, however to reduce overhead it is recommended that only the needed event classes should be registered.

In case the parameter `event_set` contains a bit set not defined in `CelfMpPsEventClass` the error `CELF_MP_STATUS_EVENT_SET_ERR` shall be returned.

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## 3. Stop packet-switched communication notification

### 3.1 Symbol: `celf_mp_ps_notification_stop`

#### 3.1.1 Syntax

```
CelfMpStatus  celf_mp_ps_notification_stop (
    CelfMpAppId  app_id,
    CelfMpPsEventSet  event_set );
```

#### 3.1.2 Argument

**Name:** `app_id`  
**Type:** `CelfMpAppId`  
**I/O:** |  
**Description:** Application identifier.

**Name:** `event_set`  
**Type:** `CelfMpPsEventSet`  
**I/O:** |  
**Description:** Set of PS event classes (see 2. Start packet-switched communication notification).

#### 3.1.3 Return Value

**Type:** `CelfMpStatus`

**Description:** `celf_mp_ps_notification_stop ()` shall return one of the following values :

`CELF_MP_STATUS_OK`: Successful completion  
`CELF_MP_STATUS_APP_ID_ERR`: Invalid Application ID  
`CELF_MP_STATUS_EVENT_SET_ERR`: The set of event is invalid  
`CELF_MP_STATUS_ERR`: Other unsuccessful completion

#### 3.1.4 Include File

`/usr/include/celf/mp_ps.h`

#### 3.1.5 Functional Description

This function is a synchronous service.

This function stops notification callbacks for the selected event classes related to packet-switched communication.

Events from the classes identified by `event_set` shall have their callbacks cancelled for the application identified by `app_id`. If no callback is registered for a selected class, no error shall occur.

To restart callbacks for these event classes, the application must call `celf_mp_ps_notification_start()` again.

For more information about packet communication classes see 2. Start packet-switched communication notification.

## 4. Get packet-switched communication status

### 4.1 Symbol: `celf_mp_ps_com_status_get`

#### 4.1.1 Syntax

```
CelfMpStatus celf_mp_ps_com_status_get (
    CelfMpAppId app_id,
    CelfMpPsPdpType pdp_type,
    CelfMpPsStatus * status);
```

#### 4.1.2 Argument

**Name:** `app_id`  
**Type:** `CelfMpAppId`  
**I/O:** I  
**Description:** Application identifier.

**Name:** `pdp_type`  
**Type:** `CelfMpPsPdpType`  
**I/O:** I  
**Description:** This parameter **shall** have one of the following values :  
`CELf_MP_PS_PDP_TYPE_X25`  
`CELf_MP_PS_PDP_TYPE_IP`  
`CELf_MP_PS_PDP_TYPE_OSPIH`  
`CELf_MP_PS_PDP_TYPE_PPP`  
`CELf_MP_PS_PDP_TYPE_IPv6`

**Name:** `status`  
**Type:** `CelfMpPsStatus`  
**I/O:** O  
**Description:** packet-switched communication status :  
`CELf_MP_PS_EMPTY`: Communication ended (idle)  
`CELf_MP_PS_ACCEP_CONN`: Connected for incoming call  
`CELf_MP_PS_CONNECT`: Connected for outgoing call  
`CELf_MP_PS_ACTIVE`: Communication active (C-Plane active)  
`CELf_MP_PS_DISCONNECT`: Disconnected

#### 4.1.3 Return Value

**Type:** `CelfMpStatus`  
**Description:** `celf_mp_ps_com_status_get ()` **shall** return one of the following values :  
`CELf_MP_STATUS_OK`: Successful completion  
`CELf_MP_STATUS_APP_ID_ERR`: Invalid Application ID  
`CELf_MP_STATUS_PS_PDP_TYPE_ERR`: unsupported PDP type  
`CELf_MP_STATUS_ERR`: Other unsuccessful completion

#### 4.1.4 Include File

`/usr/include/celf/mp_ps.h`

#### 4.1.5 Functional Description

This function is a synchronous service.

This function **shall** return the current packet communication status of the specified PDP type for the application identified by `app_id`. It is not necessary to call `celf_mp_ps_notification_start ()` to use `celf_mp_ps_com_status_get()`.

`pdp_type` **must** be an individual enumerator (`pdp_type` does not allow the OR operator)

## 5. Request packet-switched communication connection

### 5.1 Symbol: `celf_mp_ps_connect`

#### 5.1.1 Syntax

```
CelfMpStatus   celf_mp_ps_connect (
    CelfMpAppId   app_id,
    CelfMpPsPdpType pdp_type);
```

#### 5.1.2 Argument

**Name:** `app_id`  
**Type:** `CelfMpAppId`  
**I/O:** |  
**Description:** Application identifier.

**Name:** `pdp_type`  
**Type:** `CelfMpPsPdpType`  
**I/O:** |  
**Description:** This parameter **shall** have one of the following values :

- `CELf_MP_PS_PDP_TYPE_X25`
- `CELf_MP_PS_PDP_TYPE_IP`
- `CELf_MP_PS_PDP_TYPE_OSPIH`
- `CELf_MP_PS_PDP_TYPE_PPP`
- `CELf_MP_PS_PDP_TYPE_IPv6`

#### 5.1.3 Return Value

**Type:** `CelfMpStatus`  
**Description:** `celf_mp_ps_connect ()` **shall** return one of the following values :

|  |  |
|--|--|
| <code>CELf_MP_STATUS_OK:</code>              | Successful completion  |
| <code>CELf_MP_STATUS_APP_ID_ERR:</code>      | Invalid Application ID   |
| <code>CELf_MP_STATUS_PS_PDP_TYPE_ERR:</code> | unsupported PDP type   |
| <code>CELf_MP_STATUS_PS_DENIED:</code>       | Request rejected by network due to no subscription to packet communication service |
| <code>CELf_MP_STATUS_ERR:</code>             | Other error  |

#### 5.1.4 Include File

`/usr/include/celf/mp_ps.h`

#### 5.1.5 Functional Description

This function is an asynchronous service.

This function **shall** open a packet communication channel of the specified type for the application specified by `app_id`. The APN setting to be used for packet-switched communication should have been selected using `celf_mp_ps_apn_select()`.

The application is notified through events of the progress and the completion of the processing, refer to sequence chart in Annex 1.

The start of the connection procedure **is** notified by the event `CELf_MP_PS_OUT_START_IND`. Applications **should** wait for this message before starting another MPP packet-switched service related function call.

The activation of the PDP context is notified by the event `CELf_MP_PS_CONNECT_START_IND` containing the call reference.



**Classification: Packet-Switched Communication Service**

If the channel is successfully opened, it **shall** cause the CELF\_MP\_PS\_SERVICE\_OK event to occur.

If the channel is not successfully opened, it **shall** cause the CELF\_MP\_PS\_CONTROL\_ERR event to occur.

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## 6. Response to a network request for packet-switched connection

### 6.1 Symbol: `celf_mp_ps_connect_rsp`

#### 6.1.1 Syntax

```
CelfMpStatus   celf_mp_ps_connect_rsp (
    CelfMpAppId      app_id,
    CelfMpPsConn     type,
    CelfMpCallRef    call_ref );
```

#### 6.1.2 Argument

**Name:** `app_id`  
**Type:** `CelfMpAppId`  
**I/O:** I  
**Description:** Application identifier.

**Name:** `type`  
**Type:** `CelfMpPsConn`  
**I/O:** I  
**Description:** `CELF_MP_PS_COM_CONN_ACCEPT`: Accept incoming  
`CELF_MP_PS_COM_CONN_REJECT`: Reject incoming

**Name:** `call_ref`  
**Type:** `CelfMpCallRef`  
**I/O:** I  
**Description:** Call Reference for incoming call

#### 6.1.3 Return Value

**Type:** `CelfMpStatus`  
**Description:** `celf_mp_ps_connect_rsp ()` shall return one of the following values :  
`CELF_MP_STATUS_OK`: Successful completion  
`CELF_MP_STATUS_APP_ID_ERR`: Invalid Application ID  
`CELF_MP_STATUS_CALL_REF_ERR`: Invalid Call reference  
`CELF_MP_STATUS_ERR`: Other unsuccessful completion

#### 6.1.4 Include File

`/usr/include/celf/mp_ps.h`

#### 6.1.5 Functional Description

This function is an asynchronous service.

This function accepts or rejects the packet communication depending on the parameter 'type'. If the parameter 'type' is incorrect the function shall return the error `CELF_MP_STATUS_ERR`.

The application is notified through events of the progress and the completion of the processing, refer to sequence chart in Annex 2.

The start of processing by MPP shall be notified by the following event:  
`CELF_MP_PS_IN_START_IND`

The completion of this function shall be notified by the following event:  
`CELF_MP_PS_SERVICE_OK`

Unsuccessful processing of this function shall be notified by the following event:  
`CELF_MP_PS_SERVICE_ERROR`

## 7. Request the deactivation of packet-switched communication

### 7.1 Symbol: `celf_mp_ps_call_disconnect`

#### 7.1.1 Syntax

```
CelfMpStatus   celf_mp_ps_disconnect (  
    CelfMpAppId   app_id,  
    CelfMpCallRef call_ref );
```

#### 7.1.2 Argument

**Name:** `app_id`  
**Type:** `CelfMpAppId`  
**I/O:** I  
**Description:** Application identifier.

**Name:** `call_ref`  
**Type:** `CelfMpCallRef`  
**I/O:** I  
**Description:** Call Reference of the packet-switched call to be disconnected

#### 7.1.3 Return Value

**Type:** `CelfMpStatus`  
**Description:** `celf_mp_ps_disconnect ()` shall return one of the following values :  
`CELF_MP_STATUS_OK`: Successful completion  
`CELF_MP_STATUS_APP_ID_ERR`: Invalid Application ID  
`CELF_MP_STATUS_CALL_REF_ERR`: Invalid Call reference  
`CELF_MP_STATUS_ERR`: Other unsuccessful completion

#### 7.1.4 Include File

`/usr/include/celf/mp_ps.h`

#### 7.1.5 Functional Description

This function is an asynchronous service.  
This function disconnects a packet-switched communication.

The application is notified through events of the progress and the completion of the processing.

The start of processing by MPP shall be notified by the following event:  
`CELF_MP_PS_DISCONNECT_REQ`

The completion of this function shall be notified by the following event:  
`CELF_MP_PS_SERVICE_OK`

Unsuccessful processing of this function shall be notified by the following event:  
`CELF_MP_PS_SERVICE_ERROR`

## 8. Specify APN settings

### 8.1 Symbol: celf\_mp\_ps\_apn\_set

#### 8.1.1 Syntax

```
CelfMpStatus celf_mp_ps_apn_set (
    CelfMpAppld app_id,
    CelfMpPsApnHostData * apn_data );
```

#### 8.1.2 Argument

**Name:** app\_id  
**Type:** CelfMpAppld  
**I/O:** |  
**Description:** Application identifier.

**Name:** apn\_data  
**Type:** CelfMpPsApnHostData \*  
**I/O:** |  
**Description:** APN data where apn\_id specifies the user APN to set:

- CELF\_MP\_PS\_APN\_USERSET1: User-specified 1
- CELF\_MP\_PS\_APN\_USERSET2: User-specified 2
- CELF\_MP\_PS\_APN\_USERSET3: User-specified 3
- CELF\_MP\_PS\_APN\_USERSET4: User-specified 4
- CELF\_MP\_PS\_APN\_USERSET5: User-specified 5
- CELF\_MP\_PS\_APN\_USERSET6: User-specified 6
- CELF\_MP\_PS\_APN\_USERSET7: User-specified 7
- CELF\_MP\_PS\_APN\_USERSET8: User-specified 8
- CELF\_MP\_PS\_APN\_USERSET9: User-specified 9
- CELF\_MP\_PS\_APN\_USERSET10: User-specified 10

#### 8.1.3 Return Value

**Type:** CelfMpStatus  
**Description:** `celf_mp_ps_apn_set ()` shall return one of the following values :  
 CELF\_MP\_STATUS\_OK: Successful completion  
 CELF\_MP\_STATUS\_APP\_ID\_ERR: Invalid Application ID  
 CELF\_MP\_STATUS\_ERR: Other unsuccessful completion

#### 8.1.4 Include File

/usr/include/celf/mp\_ps.h

#### 8.1.5 Functional Description

This function is a synchronous service.

This function allows the modification of the APN, host and title data of one of the 10 user-specified APNs.

If the values in parameter 'apn\_data' are incorrect, the function shall return the error CELF\_MP\_STATUS\_ERR.

## 9. Get APN settings

### 9.1 Symbol: `celf_mp_ps_apn_get`

#### 9.1.1 Syntax

```
CelfMpStatus celf_mp_ps_apn_get (  
    CelfMpAppId app_id,  
    CelfMpPsApnHostData * apn_data );
```

#### 9.1.2 Argument

**Name:** `app_id`  
**Type:** `CelfMpAppId`  
**I/O:** I  
**Description:** Application identifier.

**Name:** `apn_data`  
**Type:** `CelfMpPsApnHostData`  
**I/O:** O  
**Description:** APN/host data structure

#### 9.1.3 Return Value

**Type:** `CelfMpStatus`

**Description:** `celf_mp_ps_apn_get ()` shall return one of the following values :

`CELF_MP_STATUS_OK`: Successful completion  
`CELF_MP_STATUS_APP_ID_ERR`: Invalid Application ID  
`CELF_MP_STATUS_ERR`: Other unsuccessful completion

#### 9.1.4 Include File

`/usr/include/celf/mp_ps.h`

#### 9.1.5 Functional Description

This function is a synchronous service.

This function returns the current APN data, host data and title data.

## 10. Select APN for packet-switched communication

### 10.1 Symbol: `celf_mp_ps_apn_select`

#### 10.1.1 Syntax

```
CelfMpStatus celf_mp_ps_apn_select (
    CelfMpAppld app_id,
    CelfMpPsApnId apn_id);
```

#### 10.1.2 Argument

**Name:** `app_id`  
**Type:** `CelfMpAppld`  
**I/O:** |  
**Description:** Application identifier.

**Name:** `apn_id`  
**Type:** `CelfMpPsApnId`  
**I/O:** |  
**Description:** APN setting to be used

|  |                   |
|--|-------------------|
| <code>CELf_MP_PS_APN_DEFAULT :</code>  | Default setting   |
| <code>CELf_MP_PS_APN_USERSET1:</code>  | User-specified 1  |
| <code>CELf_MP_PS_APN_USERSET2:</code>  | User-specified 2  |
| <code>CELf_MP_PS_APN_USERSET3:</code>  | User-specified 3  |
| <code>CELf_MP_PS_APN_USERSET4:</code>  | User-specified 4  |
| <code>CELf_MP_PS_APN_USERSET5:</code>  | User-specified 5  |
| <code>CELf_MP_PS_APN_USERSET6:</code>  | User-specified 6  |
| <code>CELf_MP_PS_APN_USERSET7:</code>  | User-specified 7  |
| <code>CELf_MP_PS_APN_USERSET8:</code>  | User-specified 8  |
| <code>CELf_MP_PS_APN_USERSET9:</code>  | User-specified 9  |
| <code>CELf_MP_PS_APN_USERSET10:</code> | User-specified 10 |

#### 10.1.3 Return Value

**Type:** `CelfMpStatus`  
**Description:** `celf_mp_ps_apn_select ()` shall return one of the following values :

|   |                               |
|---|-------------------------------|
| <code>CELf_MP_STATUS_OK:</code>         | Successful completion         |
| <code>CELf_MP_STATUS_APP_ID_ERR:</code> | Invalid Application ID        |
| <code>CELf_MP_STATUS_ERR:</code>        | Other unsuccessful completion |

#### 10.1.4 Include File

`/usr/include/celf/mp_ps.h`

#### 10.1.5 Functional Description

This function is a synchronous service.  
 This function selects the APN setting to be used for packet-switched communication.

If the parameter 'apn\_id' is incorrect, the function shall return the error `CELf_MP_STATUS_ERR`.

# 11. Get APN used for packet-switched communication

## 11.1 Symbol: `celf_mp_ps_apn_id_get`

### 11.1.1 Syntax

```
CelfMpStatus          celf_mp_ps_apn_id_get (  
    CelfMpAppld       app_id,  
    CelfMpPsApnId *  apn_id );
```

### 11.1.2 Argument

**Name:** `app_id`  
**Type:** `CelfMpAppld`  
**I/O:** I  
**Description:** Application identifier.

**Name:** `apn_id`  
**Type:** `CelfMpPsApnId`  
**I/O:** O  
**Description:** APN id currently used for packet-switched communication:

- CELf\_MP\_PS\_APN\_DEFAULT: Default setting
- CELf\_MP\_PS\_APN\_USERSET1: User-specified 1
- CELf\_MP\_PS\_APN\_USERSET2: User-specified 2
- CELf\_MP\_PS\_APN\_USERSET3: User-specified 3
- CELf\_MP\_PS\_APN\_USERSET4: User-specified 4
- CELf\_MP\_PS\_APN\_USERSET5: User-specified 5
- CELf\_MP\_PS\_APN\_USERSET6: User-specified 6
- CELf\_MP\_PS\_APN\_USERSET7: User-specified 7
- CELf\_MP\_PS\_APN\_USERSET8: User-specified 8
- CELf\_MP\_PS\_APN\_USERSET9: User-specified 9
- CELf\_MP\_PS\_APN\_USERSET10: User-specified 10

### 11.1.3 Return Value

**Type:** `CelfMpPsApnId`

**Description:** `celf_mp_ps_apn_id_get ()` shall return one of the following values :

- CELf\_MP\_STATUS\_OK: Successful completion
- CELf\_MP\_STATUS\_APP\_ID\_ERR: Invalid Application ID
- CELf\_MP\_STATUS\_ERR: Other unsuccessful completion

### 11.1.4 Include File

`/usr/include/celf/mp_ps.h`

### 11.1.5 Functional Description

This function is a synchronous service.

This function returns the APN being used for packet-switched communication.

## 12. Request the deactivation of external equipment packet communication

### 12.1 Symbol: `celf_mp_ps_ext_equipment_disconnect`

#### 12.1.1 Syntax

```
CelfMpStatus celf_mp_ps_ext_equipment_disconnect (
    CelfMpAppId app_id,
    CelfMpCallRef call_ref );
```

#### 12.1.2 Argument

**Name:** `app_id`  
**Type:** `CelfMpAppId`  
**I/O:** |  
**Description:** Application identifier.

**Name:** `call_ref`  
**Type:** `CelfMpCallRef`  
**I/O:** |  
**Description:** Packet-switched call reference to be disconnected.

#### 12.1.3 Return Value

**Type:** `CelfMpStatus`  
**Description:** `celf_mp_ps_force_disconnect ()` shall return one of the following values :  
`CELf_MP_STATUS_OK`: Successful completion  
`CELf_MP_STATUS_APP_ID_ERR`: Invalid Application ID  
`CELf_MP_STATUS_CALL_REF_ERR`: Invalid Call reference  
`CELf_MP_STATUS_ERR`: Other unsuccessful completion

#### 12.1.4 Include File

`/usr/include/celf/mp_ps.h`

#### 12.1.5 Functional Description

This function is an asynchronous service.  
This function disconnects the external equipment packet communication (typically PC using the ME as modem)..

The application is notified through events of the completion of the processing.

The completion of this function shall be notified by the following event:  
`CELf_MP_PS_DEACTIVATE_IND`

Unsuccessful processing of this function shall be notified by the following event:  
`CELf_MP_PS_SERVICE_ERROR`



## 13. Get User Plane connection status

### 13.1 Symbol: `celf_mp_ps_uplane_status_get`

#### 13.1.1 Syntax

```
CelfMpStatus      celf_mp_ps_uplane_status_get (  
    CelfMpAppId   app_id  
    CelfMpPsUPlane * status );
```

#### 13.1.2 Argument

**Name:** `app_id`  
**Type:** `CelfMpAppId`  
**I/O:** I  
**Description:** Application identifier.

**Name:** `status`  
**Type:** `CelfMpPsUPlane`  
**I/O:** O  
**Description:** U-Plane connection status:  
    `CELF_MP_PS_UPLANE_ON` : U-Plane connected  
    `CELF_MP_PS_UPLANE_OFF`: U-Plane not connected

#### 13.1.3 Return Value

**Type:** `CelfMpStatus`  
**Description:** `celf_mp_ps_uplane_status_get ()` shall return one of the following values :  
    `CELF_MP_STATUS_OK`: Successful completion  
    `CELF_MP_STATUS_APP_ID_ERR`: Invalid Application ID  
    `CELF_MP_STATUS_ERR`: Other unsuccessful completion

#### 13.1.4 Include File

`/usr/include/celf/mp_ps.h`

#### 13.1.5 Functional Description

This function is a synchronous service.  
This function gets the current U-Plane connection status.

## 14. Get DNS record name

### 14.1 Symbol: celf\_mp\_ps\_dns\_record\_get

#### 14.1.1 Syntax

```
CelfMpStatus celf_mp_ps_dns_record_get (  
    CelfMpAppId app_id,  
    CelfMpPsDnsRec * dns_record );
```

#### 14.1.2 Argument

**Name:** app\_id  
**Type:** CelfMpAppId  
**I/O:** I  
**Description:** Application identifier.

**Name:** dns\_record  
**Type:** CelfMpPsDnsRec  
**I/O:** O  
**Description:** DNS record name.

#### 14.1.3 Return Value

**Type:** CelfMpStatus

**Description:** celf\_mp\_ps\_dns\_record\_get () shall return one of the following values :

CELLF\_MP\_STATUS\_OK: Successful completion  
CELLF\_MP\_STATUS\_APP\_ID\_ERR: Invalid Application ID  
CELLF\_MP\_STATUS\_ERR: Other unsuccessful completion

#### 14.1.4 Include File

/usr/include/celf/mp\_ps.h

#### 14.1.5 Functional Description

This function is a synchronous service.

This function retrieves the name of the DNS for the APN currently being used.

## 15. Get default APN mode

### 15.1 Symbol: `celf_mp_ps_apn_mode_get`

#### 15.1.1 Syntax

```
CelfMpStatus celf_mp_ps_apn_mode_get (  
    CelfMpAppId app_id,  
    CelfMpPsApnMode * apn_mode );
```

#### 15.1.2 Argument

**Name:** `app_id`

**Type:** `CelfMpAppId`

**I/O:** I

**Description:** Application identifier.

**Name:** `apn_mode`

**Type:** `CelfMpPsApnMode`

**I/O:** O

**Description:** U-Plane connection status:

`CELF_MP_PS_DEFAULT_APN_MS`: Settings in the mobile phone

`CELF_MP_PS_DEFAULT_APN_UIM`: Settings in the UIM

#### 15.1.3 Return Value

**Type:** `CelfMpStatus`

**Description:** `celf_mp_ps_apn_mode_get ()` shall return one of the following values :

`CELF_MP_STATUS_OK`: Successful completion

`CELF_MP_STATUS_APP_ID_ERR`: Invalid Application ID

`CELF_MP_STATUS_ERR`: Other unsuccessful completion

#### 15.1.4 Include File

`/usr/include/celf/mp_ps.h`

#### 15.1.5 Functional Description

This function is a synchronous service.

This function gets the type of default APN settings. The default APN could be set to UIM or to Mobile phone.

## 16. Force deactivation of all packet-switched communications

### 16.1 Symbol: `celf_mp_ps_service_shutdown`

#### 16.1.1 Syntax

```
CelfMpStatus celf_mp_ps_service_shutdown (  
    CelfMpAppId app_id );
```

#### 16.1.2 Argument

**Name:** `app_id`

**Type:** `CelfMpAppId`

**I/O:** I

**Description:** Application identifier.

#### 16.1.3 Return Value

**Type:** `CelfMpStatus`

**Description:** `celf_mp_ps_service_shutdown ()` shall return one of the following values :

`CELF_MP_STATUS_OK`: Successful completion

`CELF_MP_STATUS_APP_ID_ERR`: Invalid Application ID

`CELF_MP_STATUS_ERR`: Other unsuccessful completion

#### 16.1.4 Include File

`/usr/include/celf/mp_ps.h`

#### 16.1.5 Functional Description

This function is an asynchronous service.

This function disconnects all packet-switched communications currently being used by the application.

The applications are notified through events of the progress and the completion of the processing.

The start of processing by MPP **shall** be notified by the following event:

`CELF_MP_PS_DISCONNECT_REQ`

The completion of this function **shall** be notified by the following event:

`CELF_MP_PS_SERVICE_OK`

Unsuccessful processing of this function **shall** be notified by the following event:

`CELF_MP_PS_SERVICE_ERROR`

## 17. Request APN initialization

### 17.1 Symbol: `celf_mp_ps_apn_initialize`

#### 17.1.1 Syntax

```
CelfMpStatus celf_mp_ps_apn_initialize (
    CelfMpAppld app_id,
    CelfMpPsApnInit * result );
```

#### 17.1.2 Argument

**Name:** `app_id`

**Type:** `CelfMpAppld`

**I/O:** I

**Description:** Application identifier.

**Name:** `result`

**Type:** `CelfMpPsApnInit *`

**I/O:** O

**Description:** Result of the APN initialization:

`CELF_MP_PS_UIM_UPDATED`: Successful, UIM updated

`CELF_MP_PS_UIM_NOT_UPDATED`: Successful, UIM not updated

`CELF_MP_PS_AUTH_ERR`: Failure returned from the authentication service

#### 17.1.3 Return Value

**Type:** `CelfMpStatus`

**Description:** `celf_mp_ps_apn_initialize()` shall return one of the following values :

`CELF_MP_STATUS_OK`: Successful completion

`CELF_MP_STATUS_APP_ID_ERR`: Invalid Application ID

`CELF_MP_STATUS_ERR`: Other unsuccessful completion

#### 17.1.4 Include File

`/usr/include/celf/mp_ps.h`

#### 17.1.5 Functional Description

This function is an asynchronous service.

Apn init: checking and initi of APN in mobile or external module (UIM)

Ps\_app: 1) register to event `apn_init`

2) request `apn_init`

3) use ps service

This function initializes APN, this initialized APN is called default APN.

When the power is turned on, this function starts APN initialization according to a request from an authentication application which initializes APN according to the process below:

(case1) When the APN information in the UIM is not the same as the APN information requested by the authentication application,

the APN information requested by the authentication application is stored in the UIM or in the mobile phone.

(case2) When the APN information in UIM is same as the APN information requested by authentication application,

the information in the UIM is not changed.

(case3) In case of an error such as failure of reading the UIM information,

the APN information requested by the authentication application is set in the mobile phone.

The APN initialization completion is notified as an event

`CELF_MP_PS_EXT_EVENT_APN_INIT_END`

Additional information to it is used to post the APN used.

DRAFT

## 18.Start monitoring APN initialisation

### 18.1 Symbol: celf\_mp\_ps\_apn\_init\_notification\_start

#### 18.1.1 Syntax

```
CelfMpStatus celf_mp_ps_apn_init_notification_start (
    CelfMpAppId app_id,
    CelfMpPsExtEventSet mask,
    CelfMpCallback callback_func);
```

#### 18.1.2 Argument

**Name:** app\_id  
**Type:** CelfMpAppId  
**I/O:** |  
**Description:** Application identifier.

**Name:** mask  
**Type:** CelfMpPsExtEventSet  
**I/O:** |  
**Description:** Set of external notification events.  
 Enabled with the bit turned ON  
 CELF\_MP\_PS\_EXT\_EVENT\_APN\_INIT\_END : Notification of APN initialization completed  
 CELF\_MP\_PS\_EXT\_EVENT\_CLASS\_ALL : All

**Name:** callback\_func  
**Type:** CelfMpCallback  
**I/O:** |  
**Description:** Callback function used to notify the event.

#### 18.1.3 Return Value

**Type:** CelfMpStatus  
**Description:** celf\_mp\_ps\_ext\_device\_notification\_start () shall return one of the following values :  
 CELF\_MP\_STATUS\_OK: Successful completion  
 CELF\_MP\_STATUS\_APP\_ID\_ERR: Invalid Application ID  
 CELF\_MP\_STATUS\_EVENT\_SET\_ERR: The set of event is invalid  
 CELF\_MP\_STATUS\_ERR: Other unsuccessful completion

#### 18.1.4 Include File

/usr/include/celf/mp\_ps.h

#### 18.1.5 Functional Description

This function is a synchronous service.  
 This function start sending event notification regarding the external equipment i.e. external TE for packet communication.  
 Applications may be notified of the following events:

- APN initialization completed: Notifies the APN initialization completed .

## 19. Stop monitoring APN initialization

### 19.1 Symbol: `celf_mp_ps_apn_init_notification_stop`

#### 19.1.1 Syntax

```
CelfMpStatus  celf_mp_ps_apn_init_notification_stop (
    CelfMpAppId  app_id,
    CelfMpPsExtEventSet  mask );
```

#### 19.1.2 Argument

**Name:** `app_id`

**Type:** `CelfMpAppId`

**I/O:** |

**Description:** Application identifier.

**Name:** `mask`

**Type:** `CelfMpPsExtEventSet`

**I/O:** |

**Description:** Set of external notification events.

Stops the notification when the bit is set

`CELF_MP_PS_EXT_EVENT_APN_INIT_END` : Notification of APN initialization completed

`CELF_MP_PS_EXT_EVENT_CLASS_ALL` : All

#### 19.1.3 Return Value

**Type:** `CelfMpStatus`

**Description:** `celf_mp_ps_ext_device_notification_stop ()` shall return one of the following values :

`CELF_MP_STATUS_OK`: Successful completion

`CELF_MP_STATUS_APP_ID_ERR`: Invalid Application ID

`CELF_MP_STATUS_EVENT_SET_ERR`: The set of event is invalid

`CELF_MP_STATUS_ERR`: Other unsuccessful completion

#### 19.1.4 Include File

`/usr/include/celf/mp_ps.h`

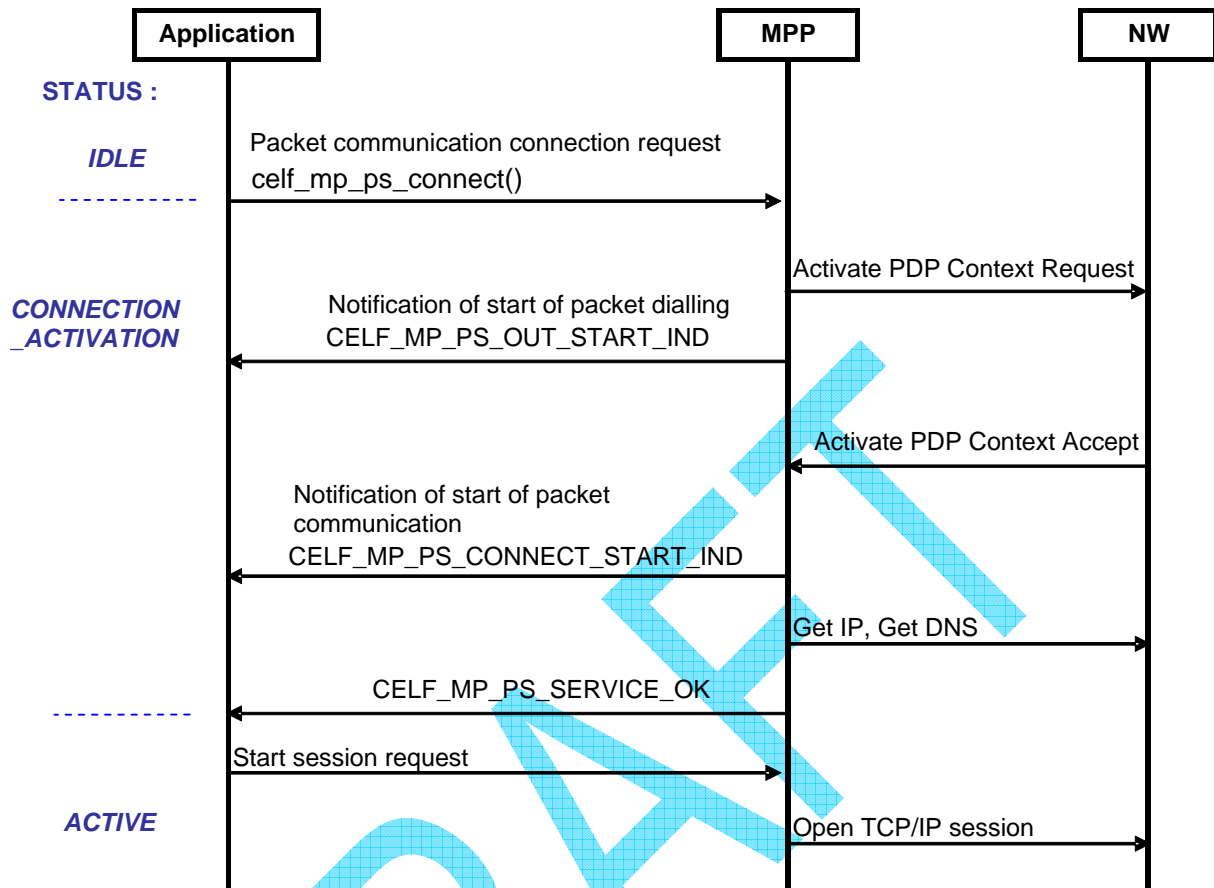
#### 19.1.5 Functional Description

This function is a synchronous service.

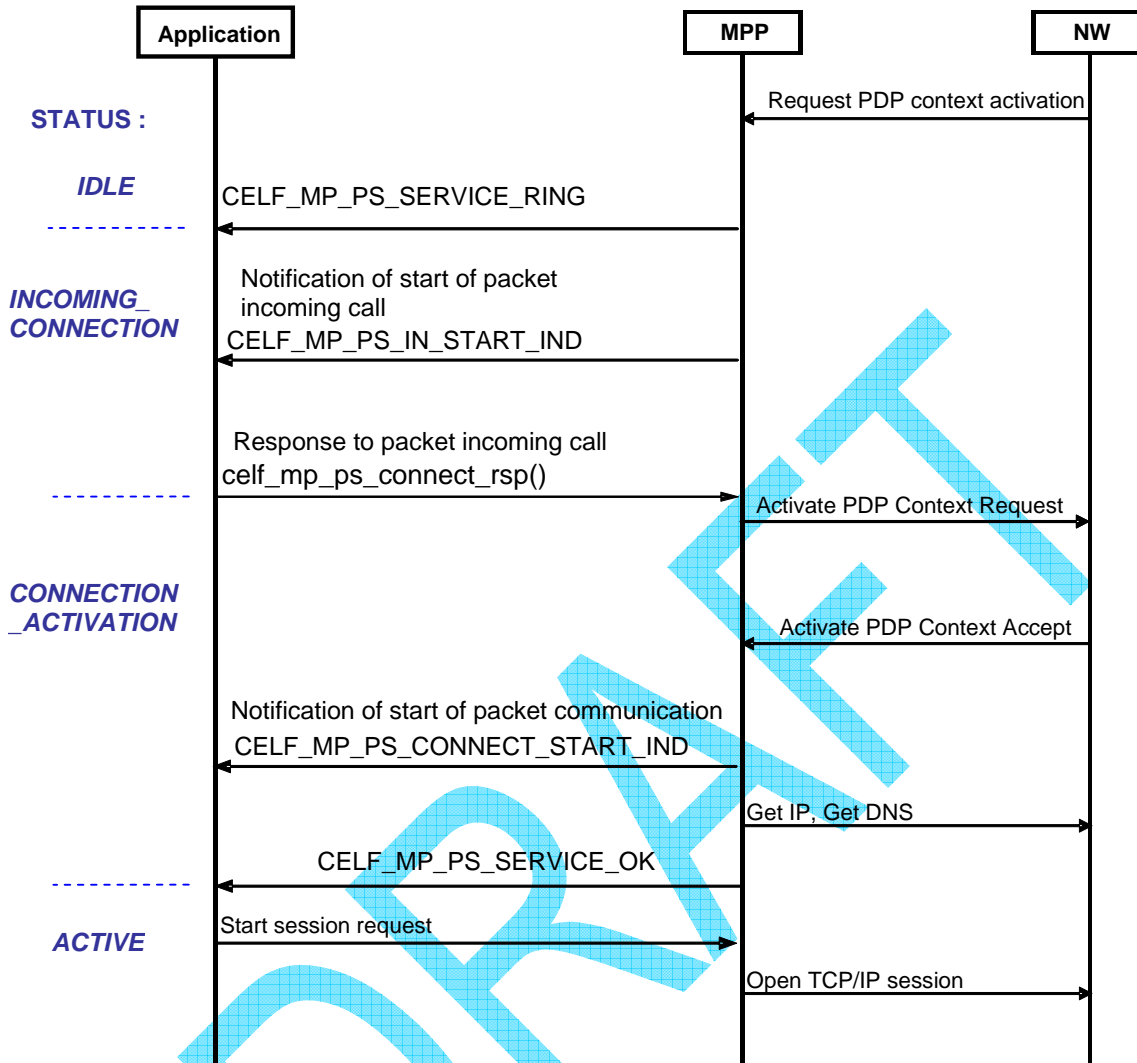
This function stops sending event notification for the events specified in `celf_mp_ps_ext_device_notification_start`.



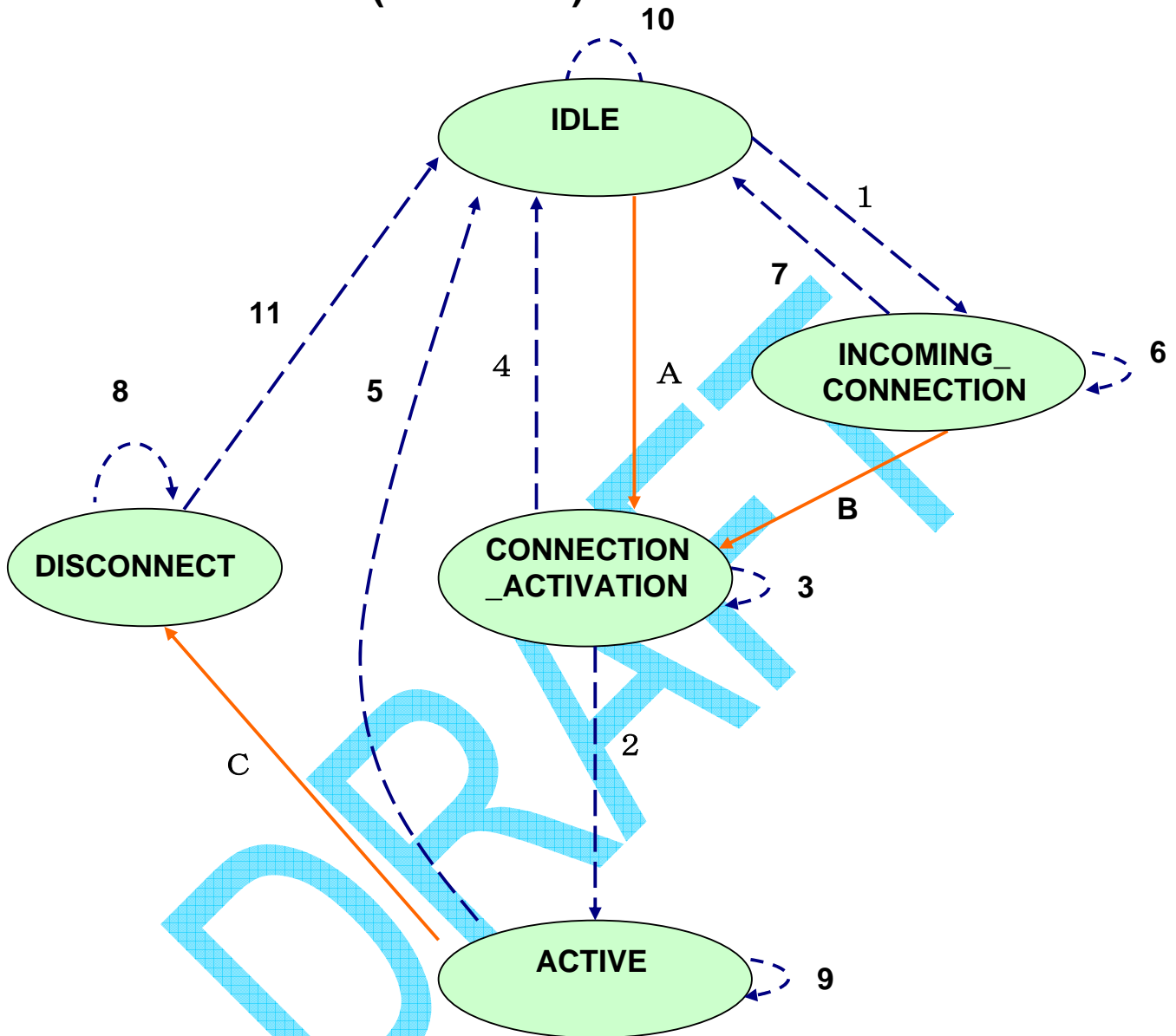
## 20. Annex 1 - PS outgoing connection (normative)



## 21. Annex 2 – PS incoming connection (normative)



## 22. Annex 3 – Packet-switched communication status and events (normative)



A: celf\_mp\_ps\_connect

B: celf\_mp\_ps\_connect\_rsp

C: celf\_mp\_ps\_call\_disconnect  
celf\_mp\_ps\_service\_shutdown

1: CELF\_MP\_PS\_SERVICE\_RING

2: CELF\_MP\_PS\_SERVICE\_OK

3: CELF\_MP\_PS\_OUT\_START\_IND

CELF\_MP\_PS\_CONNECT\_START\_IND

CELF\_MP\_PS\_DISCONNECT\_REQ

4: CELF\_MP\_PS\_OUT\_REJECTED\_IND

5: CELF\_MP\_PS\_DEACTIVATE\_IND

6: CELF\_MP\_PS\_IN\_START\_IND

7: CELF\_MP\_PS\_IN\_REJECTED\_IND

CELF\_MP\_PS\_IN\_STOPPED\_IND

8: CELF\_MP\_PS\_DISCONNECT\_REQ

9: CELF\_MP\_PS\_DATA\_SEND\_IND

CELF\_MP\_PS\_DATA\_RECV\_IND

10: CELF\_MP\_PS\_APN\_INIT\_END\_IND

11: CELF\_MP\_PS\_DEACTIVATE\_CNF

All: CELF\_MP\_PS\_SERVICE\_ERROR