Embedded Linux Conference

Multimedia Mobile Phone Working Group Session

The Five Base Specifications

André Krützfeldt (Aplix)

Christophe Guinet (NEC)

Specification Editors

Agenda

- API introduction
- Circuit Switched Service (CS)
- Short Message Service (SMS)
- Packet Switched Service (PS)
- Equipment Service (ES)
- Lighting Service (LS)
- Programming model

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How the spec is written

- Section 1
  - Constants
  - Enums
  - Data Types and Structures
  - Event Types
- Section 2 and following
  - Specific Functions

Logistics

- The header files are in:
  - /usr/include/celf
- The ones for the specifications are:
  - mp_cs.h
  - mp_ps.h
  - mp_sm.h
  - mp_es.h

How does it work?

- MPP is an event driven system
  - Events to process must be registered
  - The registration is called
    - Notification Callbacks
  - Applications identify their interest

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CS Overview

- Contains over 60 functions
- For Call Control and Includes:
  - Voice Communication Service
  - Video Communication Service
  - Unrestricted Digital Com. Service

What can be registered?

- CELF_MP_CS_CLASS_COM_STATUS
  - Voice communication status notification
- CELF_MP_CS_CLASS_TLK_TIME
  - Call duration notification
- CELF_MP_CS_CLASS_DISC_CAUSE
  - Disconnection cause notification
- CELF_MP_CS_CLASS_FW_RESULT
  - Call forwarding result notification
- CELF_MP_CS_CLASS_OFFHK_TO
  - Off-hook originating timeout notification
- Or CELF_MP_CS_CLASS_ALL
  - To generally register to all events

What can be registered?

- DCF (Device Control Function)
- CCP (Circuit Switched Connection Management Protocol)
- Notification Type
- Restriction Status

Quite a lot of settings

What is the Result?

- A Call Back Function must be provided (CelfMpCallback)
  - This function handles the occurrence of the registered event
  - Results are passed in specific Data Structures for the event
    - CELF_MP_EVENT

CELF_MP_EVENT

- The structure contains
  - "category" for the CS system called
    - E.g. VoiceNotify
  - "subtype" for the specific event that occurred
    - E.g. VoiceNotify_ConnInfo
  - "data" for optional additional values
    - Depending on the event

Starting / Stopping

- All Notifications do have a
  - _start method
  - _stop method
  - E.g. celf_mp_cs_line_status_notification_start()

Method Status Return

All methods return a status: CelfMpStatus

- CELF_MP _STATUS_OK
  - successful completion
- CELF_MP_STATUS_APP_ID_ERR
  - Application ID is not valid.
- CELF_MP_STATUS_EVENT_SET_ERR
  - Notification event set is not valid
- CELF_MP_STATUS_ERR
  - Other unsuccessful completion.
- CELF_MP_STATUS_CALL_NO_ERR
  - Call number is not valid
- CELF_MP_STATUS_COM_TYPE_ERR
  - Communication type is not valid
- CELF_MP_STATUS_MON_TYPE_ERR
  - Monitor type is not valid

Communication Status

- Several Status Indicators are available
  - General Communication Status
  - Call Reference Status
  - Call Status
  - Line Status
  - Area Status
  - Service Status
  - Restriction Status

Placing a Call

- Functionality like the following are supported
  - Dial / Multi Party Call / Call Selection
  - Dial Complete
  - Disconnect
  - Off Hook Operation
  - Respond / Reject Call
  - Forward Call / Forward to Mailbox
  - Hold Call

Voice Mail / Hold Tones

- Function to get notified if a Voicemail is received
- Set and Get Voicemail Information

- Functions for Hold Tone Settings
  - Starting and Stopping

Data / Video Calls

- Status of Data / Video Calls
  - Incoming
  - Outgoing
  - Alert
  - Hold
  - Disconnected

Monitoring

- The performance of the connection can be monitored
  - CELF_CS_MONITOR_LINE_STATUS
    - Line status change notification
  - CELF_CS_MONITOR_RESTRICT
    - Restriction status change notification
  - CELF_CS_MONITOR_RSSI
    - Receive level change notification
  - CELF_CS_MONITOR_ALL
    - All notified

Coverage and Service

- Several Methods support
- Coverage
  - Information on the current status of within- and out-of-communication area
    - Get
- Services
  - Supplementary service information is the service name and Dial data for accessing the service
    - Get, Set, Delete and Remove

Response Message and Tones

- Response Message
  - Can be set and send to the network
  - And of course be removed

Same more or less for

- Response Tones

Operational Features

- Set the Noise Canceling
  - Off, On
- Set Quality Alarm
  - Hi, Low and Off
- High Priority Mode
  - Voice, Packet or no preference
- Tone Settings
  - Different tones for different functions

Operational Feature (2)

- Automatic answer / timer
  - Answer the call within a period of time
- Date / Time functions
  - Get/Set Start Time for a Call
    - Silent time: time between incoming call and ring sound
  - Recorded Call
    - Criteria to log an incoming call for the call log

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SMS (in work)

This specification is currently in progress

But here the first results

Overview

- This Specification covers the operation of Text Messaging

Events

- The same event structure (CELF_MP_EVENT) is used
- “category” is SMSNotify
- “subtype” is set to the message structure

SMS Notification

- Like all other notifications
  - SM_Notification
  - Can be started and stopped

Send / Receive SMS

- Initiate the send of a message
- Respond to a received message
- Act up on failure
- Memory check
- Communication status
- Abort SMS communication

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Packet Switched Communication API overview

The main services offered by the Packet Switched Communication API are:

- Control APN (access point name) setting
- Establish Packet Switched connection
- Respond to incoming Packet Switched communication
- Get Packet Switched Communication status
- Register to Packet Switched Communication events

Status of the specification

- First version proposed for review in Nov-05
- New version proposed for review end of Dec-05
- Formal review agreed 2-Feb-06
- Public review from 14-Mar-06 to 23-April-06

What can be registered?

- PS Service State
  Connected, disconnected, not available
- PS Call State
  Outgoing/incoming setup started, disconnection started
- PS Data transfer state
  Send data, receive data

PS call status

- Connecting for incoming call
- Connecting for outgoing call
- Communication active
- Disconnected

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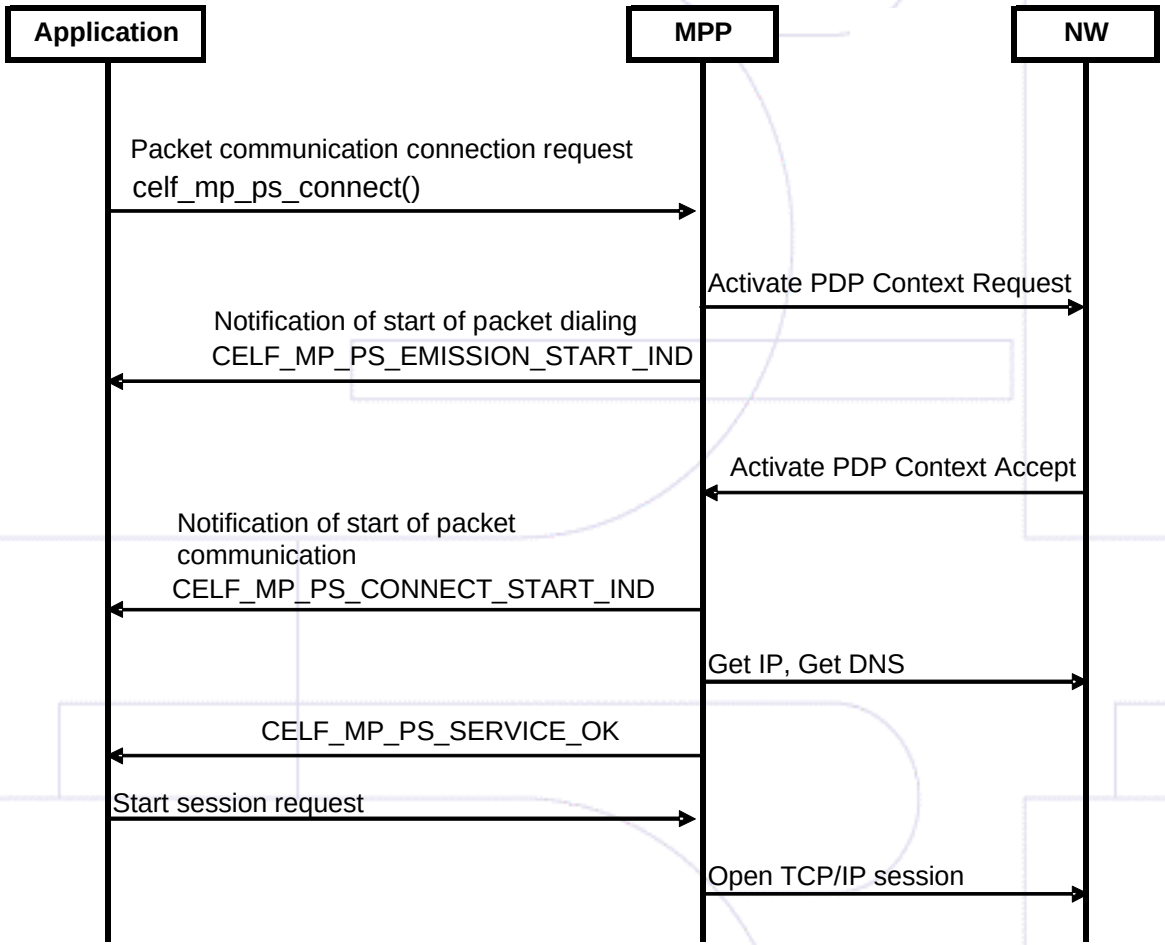
PS outgoing connection



The start of processing is notified by the event CELF_MP_PS_EMISSION_START_IND.

If the channel is successfully opened, the event CELF_MP_PS_SERVICE_OK is sent.

If the channel is not successfully opened, the event CELF_MP_PS_CONTROL_ERR is sent.

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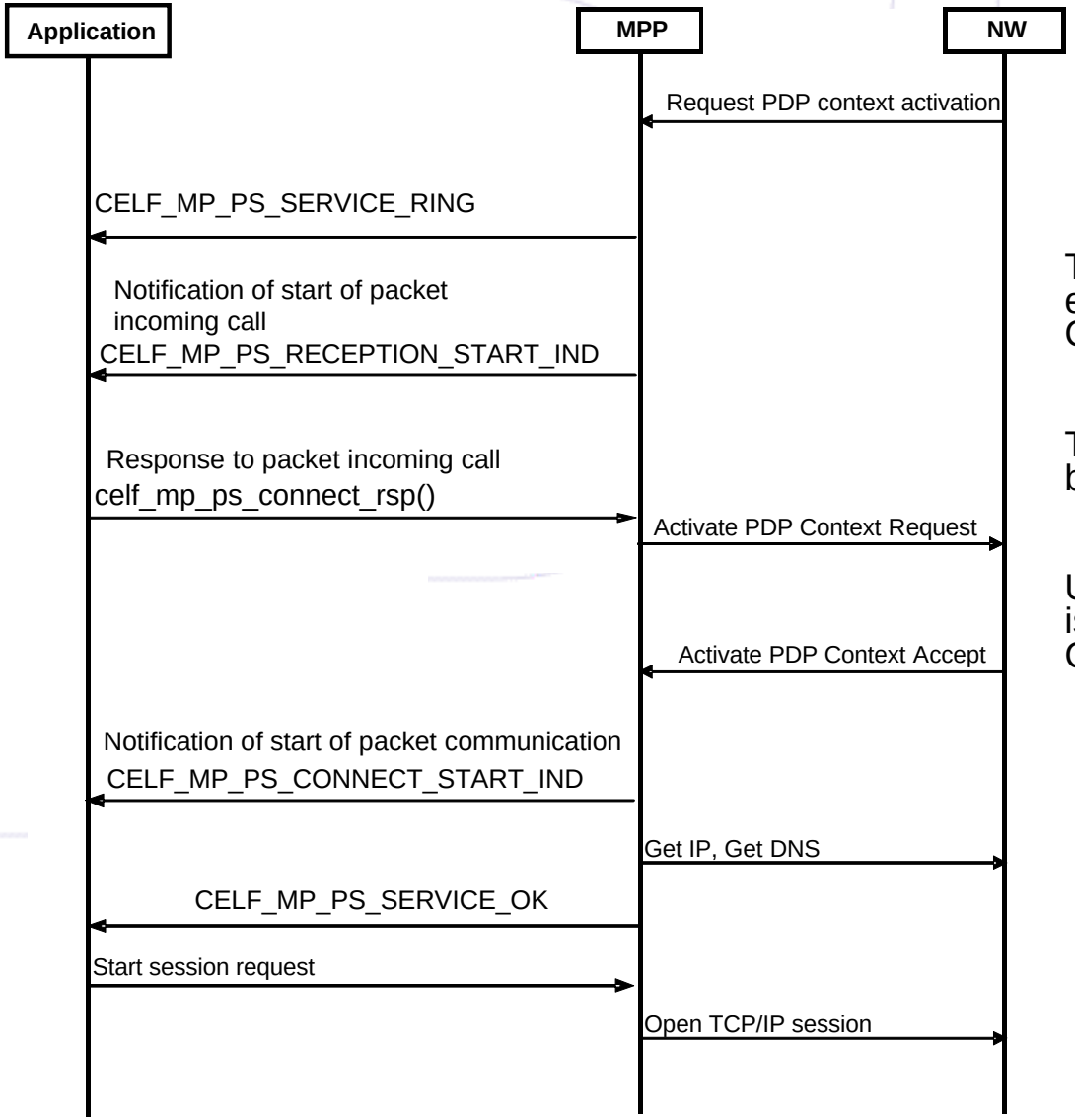
PS incoming connection



The start of processing is notified by the event CELF_MP_PS_RECEPTION_START_IND

The completion of the connection is notified by the event CELF_MP_PS_SERVICE_OK

Unsuccessful processing of the connection is notified by the event CELF_MP_PS_SERVICE_ERROR

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Equipment Service (in work)

Equipment service overview:

- Control handsfree mode
- Control silent mode (manner mode)
- Control vibrator and vibration patterns for each call type
- Control secret mode (hidden phonebook entries)
- Locking/Unlocking mobile phone (keypad)
- Get battery level and charging status
- Get USB, Ir, UIM connection status

Equipment Service notifications

Application can register to each events individually or to all events:

- Battery level change
- Earphone connection status change
- Terminal open status change
- Charger status change
- UIM connection information
- USB connection status change
- Ir connection status change
- Secret status change

Phone mode

- Handsfree: Earphone only or earphone and speaker
- Silent mode (manner mode): ON / OFF
- Vibrator pattern: could be set for voice call, video call, SMS message, CBS message

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Lighting Service (in work)

Lighting service overview:

- Control backlight of main screen and 2nd screen
- Control LED including color definition, blinking mode and durations
- Define illumination for incoming call, in-call
- Get backlight / LED status and configuration

The lighting service deals with the possible conflict taking into account the context

Backlight control

Backlight options are:

- Always on
- Off
- On during a period of time
- Blinking
- Color of backlight

Illumination control

It is possible to specify illumination options for the following call types:

- Voice Call
- Video Call
- Email
- SMS
- MMS

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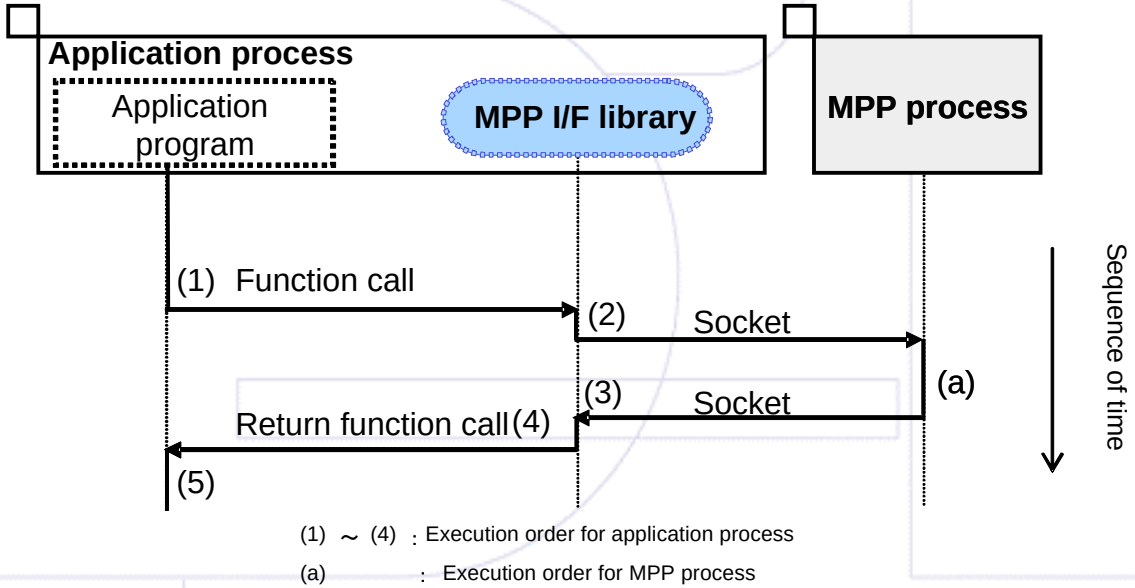
Programming model

This section is an introduction to the programming guideline for development of applications using API standardized by CELF Mobile Phone Profile Working Group

It explains how to use API to develop applications.

- The MPP services are accessible to the applications by calling functions of MPP interface library.
- The application is identified by an application ID.
- There are two types of services: synchronous and asynchronous.
- To use asynchronous services and to register to events the application have to provide a callback function.

1. Synchronous service

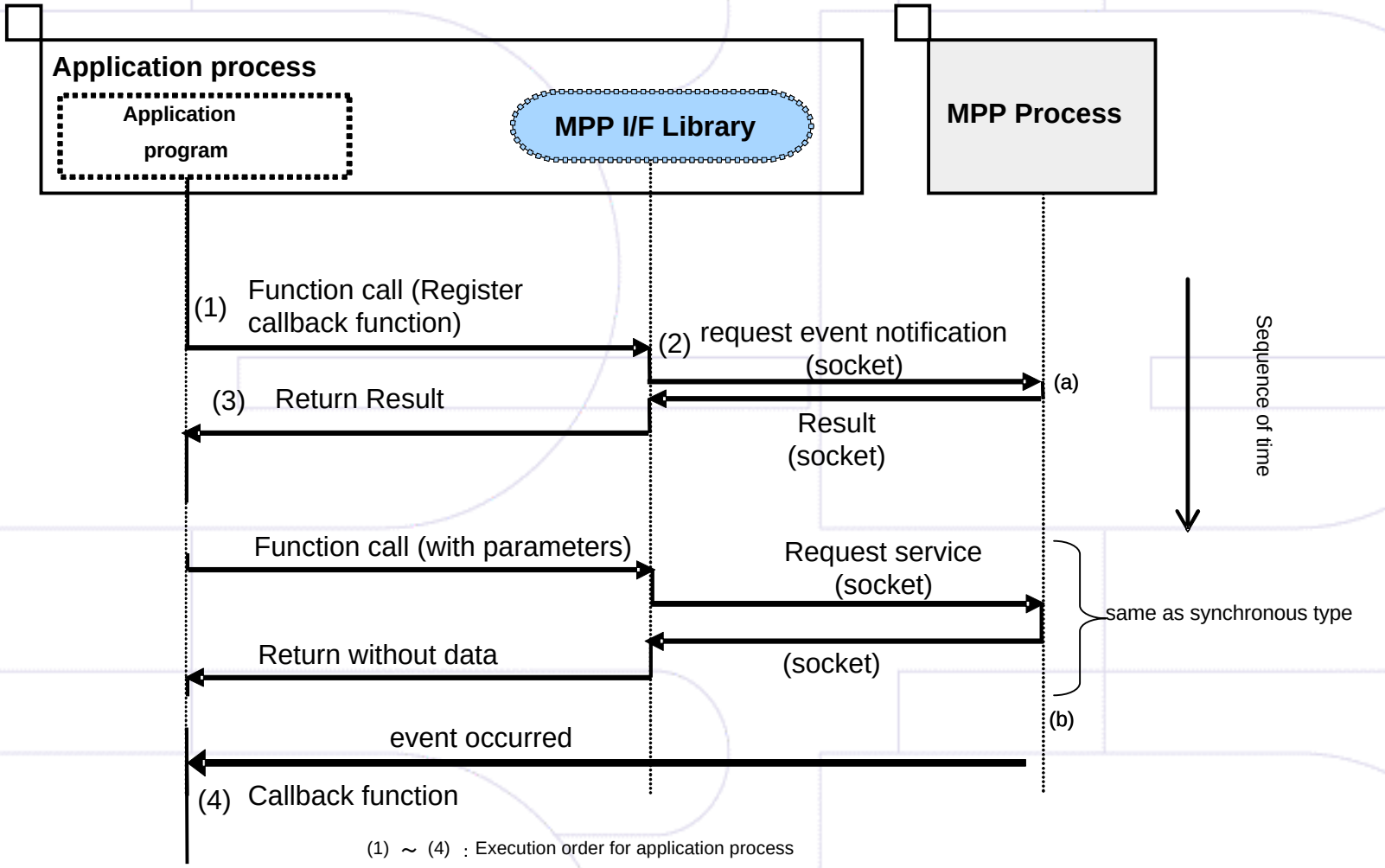


1. The application requests a synchronous service provided by the MPP I/F library
2. The MPP I/F function sends the data to the MPP process (inter-process communication, typically a socket).

(a) The MPP process executes the requested service.

3. The MPP process sends back the expected data (inter-process communication) to the MPP library.
4. Result of the execution is returned and the data are retrieved by the application thanks to the I/O pointer passed in the initial function call.
5. The application processes the returned data.

2. Asynchronous service



1. The application passes the list of events to be registered and the associated callback function by calling a function of MPP I/F library.
2. The MPP I/F library within the application process communicates to MPP process typically through a socket. The response here is only a confirmation stating that the event list and the callback function have been correctly registered.
3. The application process continues its normal processing.

(a) MPP process saves the event list and call back function name, and starts to monitor the occurrence of any event.

(b) When an event occurs, MPP process decides whether to notify or not. In case a notification is needed, the event is reported to the application. This is resulting in the execution of the associated callback function in the Application process.

4. The callback function is then executed with the event data.

Questions?

Thank you for your attention.