Lot 3 - Développements

MNGT to FAC-CM Interface

Version 3

Generic Information

- For all the packets defined herein,
  - Byte-order is Big Endian
  - Packet exchange is done through a UDP socket
  - Unless stated otherwise there is padding for variable-size fields to make entire packet‘s size multiples of DWORD

Message Header

- Bit 0: vendor/extended message flag (E)
  - Used to indicate that a custom message format is used
  - For vendor specific extension capabilities
- Bit 1: Validity flag (used to indicate of non-existent data)
- Version information (4 bits)
- Priority (Optional, 3 bits)
- Event Type (8 bits)
- Event Subtype (8 bits)

0								1								2								3							
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
E	V	R	R	Version				Priority			R	R	R	R	R	Event Type								Event Subtype							

Message type & subtype

Event Type (ET)	Event Sub-type (EST)	Direction	Encoding	Description
ANY			0	Unspecified
	UNSPECIFIED	Unspecified	0	Unspecified
LOCATION			1	Location Event
	LOCATION _TABLE_REQ	FAC-CM←MGMT	3	Location Table Request
	LOCATION _TABLE_RES	FAC-CM→MGMT	4	Location Table Response
CONFIGURATION			3	Configuration Event
	CONFIGURATION_UPDATE_AVAILABLE	FAC-CM←MGMT	0	Indication: New configuration available
	CONFIGURATION_REQ	FAC-CM→MGMT	11	Configuration Request
	CONFIGURATION_RES_CONT	FAC-CM←MGMT	12	Configuration Request Continuous mode
	CONFIGURATION_RES_BULK	FAC-CM←MGMT	13	Configuration Request Bulk mode
	CONFIGURATION_NOTIFICATION	FAC-CM→MGMT	14	Configuration Notification
	COMM_PROF_REQ	FAC-CM→MGMT	15	Communication Profile Table Request
	COMM_PROF_REP	FAC-CM←MGMT	16	Communication Profile Table Response
	COMM_PROF_SELECTION_REQ	FAC-CM→MGMT	17	Communication Profile Selection Request
	COMM_PROF_SELECTION_RES	FAC-CM←MGMT	18	Communication Profile Selection Response

Location

Location Table Request

- Queries the location table for the position vector of a node, given by its GN_Addr
- Query location event generates a Update Location Event.
  - All Location Table can be requested by setting a GN_ADDR with all bytes set to 0xFF

0								1								2								3							
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
E	V	R	R	Version				Priority		R	R	R	R	R		Event Type								Event Subtype							
GN_ADDR																															

Location Table Response

- First entry is always EGO vehicle
- Network Flags: TBD

0								1								2								3							
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
E	V	R	R	Version				Priority			R	R	R	R	R	Event Type								Event Subtype							
LPV Count																Network Flags								Reserved							
GN_ADDR																															
Timestamp																															
Latitude																															
Longitude																															
Speed																Heading															
Altitude																TAcc				PodAcc				SAcc				Hacc			AltAcc
Sequence Number																LPV Flags								Reserved							
... (continues up to „LPV count“)																															

Location Table Response

- LVP Flags' octet is encoded as follows
- First two bits have true and false (1 and 0, respectively) values

LPV Flags							
Bit 0	1	2	3	4	5	6	7
Is Neighbour?	Is Pending?	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved

Configuration

Configuration Available Event

- Used to notify clients of ITS MGMT of
  - available configurations
  - configuration changes
- Key count indicates the amount of configuration keys available for this client (server always provides this info, but client can ignore this field if this info is not required)

0								1								2								3							
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
E	V	R	R	Version				Priority			R	R	R	R	R	Event Type								Event Subtype							
Reserved																Key count (optional)															

Configuration Request

- Used to request MGMT to initiate transmission of a configuration
  - Request single key: continuous transmission mode and conf-id
  - Request all configuration groups: **0xFFFF** as conf-id
  - Request NET layer configuration group: **0xAAAA** as conf-id
  - Request FAC layer configuration group: **0xBBBB** as conf-id

- Transmission mode flag:
  - 0 for continuous transmission mode (default): each key is wrapped in its own message
  - 1 for bulk mode: all-in-1 data blob (a single big message containing all keys)

0								1								2								3							
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
E	V	R	R	Version				Priority			R	R	R	R	R	Event Type								Event Subtype							
Conf ID																Trasmission Mode															

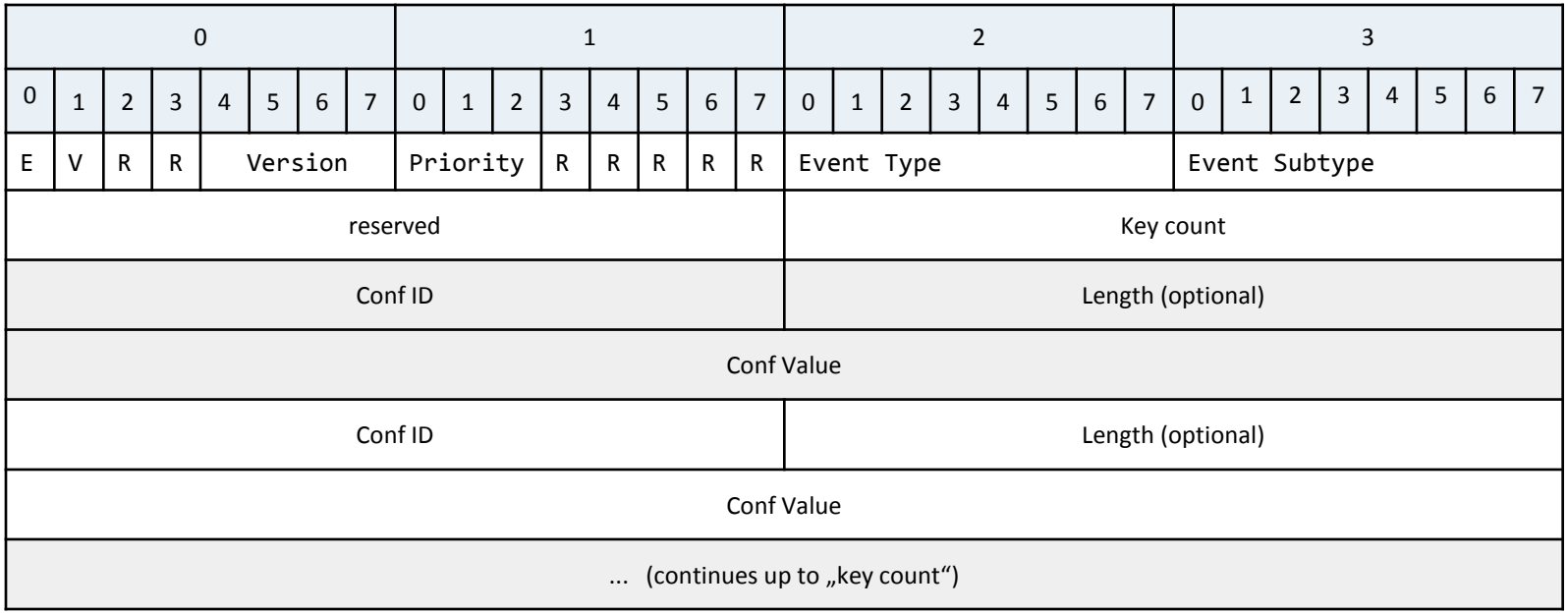
Configuration Response Continuous

- Used to declare configuration parameters
- ConfID is mapped to name of configuration parameter
- Encoding of ConfValue determined by Conf-ID
- Size of ConfValue is indicated in Length
  - Field: Length (bytes 6+7) -> is mandatory. Length indicates DWORD-length of „Conf Value“, e.g. Length=2 means ConfValue is actually 8 bytes long

0								1								2								3							
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
E	V	R	R	Version				Priority			R	R	R	R	R	Event Type								Event Subtype							
Conf ID																Length															
Conf Value (of size ‘Length’)																															

Configuration Response Bulk

- Bulk transfer message incorporates as many configuration item as indicated by „Key Count“ field



Configuration Notification

- Configuration Notification is used to keep MGMT up to date regarding configuration changes
- There is no continuous version of this message, a single message is goint to be sent for every change
- `Length' field denotes number of bytes (not DWORDS)
- String values are not NULL-terminated, `Length' field should help to parse it properly

0								1								2								3							
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
E	V	R	R	Version				Priority			R	R	R	R	R	Event Type								Event Subtype							
Conf ID																Length															
Conf Value (of size 'Length')																															

Communication Profile

Communication Profile Request

- The request allows to filter part of the communication profile table setting the bit to 1 where necessary.

- Transport: |BTP_A|BTP_B|TCP|UDP|RTP|STCP|Res|Res|
- Network: |GN|IPv6_GN|IPv6|IPv4| IPv4/v6 |DSMIPv4/v6|Res|Res|
- Access: |ITSG5|3G|11n|Ethernet|Res|Res|Res|Res|
- Channel: |CCH|SCH1|SCH2|SCH3|SCH4|Res|Res|Res|

0								1								2								3							
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
E	V	R	R	Version				Priority			R	R	R	R	R	Event Type								Event Subtype							
Transport								Network								Access								Channel							

Communication Profile Response

Transport	Network	Access	Channel
BTP_A = 0x1 BTP_B = 0x2 TCP = 0x3 UDP = 0x4 RTP = 0x5 STCP = 0x6	GN = 0x1 IPv6_GN = 0x2 IPv6 = 0x3 IPv4 = 0x4 IPv4/v6 = 0x5 DSMIPv4/v6 = 0x6	ITSG5 = 0x1 3G = 0x2 11n = 0x3 Ethernet = 0x4	CCH = 0x1 SCH1 = 0x2 SCH2 = 0x3 SCH3 = 0x4 SCH4 = 0x5

0								1								2								3							
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
E	V	R	R	Version				Priority			R	R	R	R	R	Event Type								Event Subtype							
CP Count																Reserved								Reserved							
Communication Profile ID																															
Transport								Network								Access								Channel							
... (continues up to „CP Count“)																															

Communication Profile Selection Request

- The request allows MGMT client to select a communication profile according to its needs listed below,

- Latency
- Relevance
- Reliability

0								1								2								3							
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
E	V	R	R	Version				Priority			R	R	R	R	R	Event Type								Event Subtype							
Latency								Relevance								Reliability								reserved							

Communication Profile Selection Response

- The response allows MGMT to offer a communication profile based on the criteria set by client

- Request parameters *latency*, *relevance, reliability*, and are sent back to let MGMT client match requests and relevant responses

0								1								2								3							
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
E	V	R	R	Version				Priority			R	R	R	R	R	Event Type								Event Subtype							
Latency								Relevance								Reliability								reserved							
Communication Profile ID																															

FAC Group Configuration Keys

ITS KEY NAME	CONF ID	DESCRIPTION / VALUES
itsStationType	0	See PREDRIVE VehicleType list for info (default: 1=CAR, or 30=RSU)
itsStationSubType	1	0=public, 1=private
itsVehicleWidth	2	scale 0,1m, max 63
itsVehicleLength	3	scale 0,1m, max 1023
CAM BTP Port	3010	Unsigned integer 0 - 65535
DENM BTP Port	3011	Unsigned integer 0 - 65535
LDM Garbage Collection Interval	3020	Unsigned integer [ms]