Lot 3 - Développements

MNGT to FAC-CM Interface

Version 4

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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
  - Reserved fields should be zeroed

Socket Interface

- MGMT listens to the port number 1402 (by default) for incoming UDP data
- This port number may be altered through the configuration file of MGMT (see SCOREF-MGMT_Configuration.pdf)
- FAC shall bind() to a certain port throughout the data exchange, i.e. all the packets should be sent from the same port number

Message Header

- Bit 0: *vendor specific* or *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_UPDATE	FAC-CM→MGMT	10	Update EGO Location Position Vector
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 Update

- Location Update is sent from FACilities to MGMT
- Carries position vector
- All position vector fields are described in **102 636-4-1**
  - Timestamp (ms) = Timestamp(UET)mod2^32

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							
Timestamp																															
Latitude																															
Longitude																															
Speed																Heading															
Altitude																TAcc				PodAcc				SAcc				Hacc			AltAcc

Configuration

Configuration Available Event

- Is used to notify clients of MGMT of
  - available configurations
  - configuration changes
- Key count indicates the number of configuration keys available/changed relevant to the recipient (server always provides this info, but client can ignore this field if it 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

- Is 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															

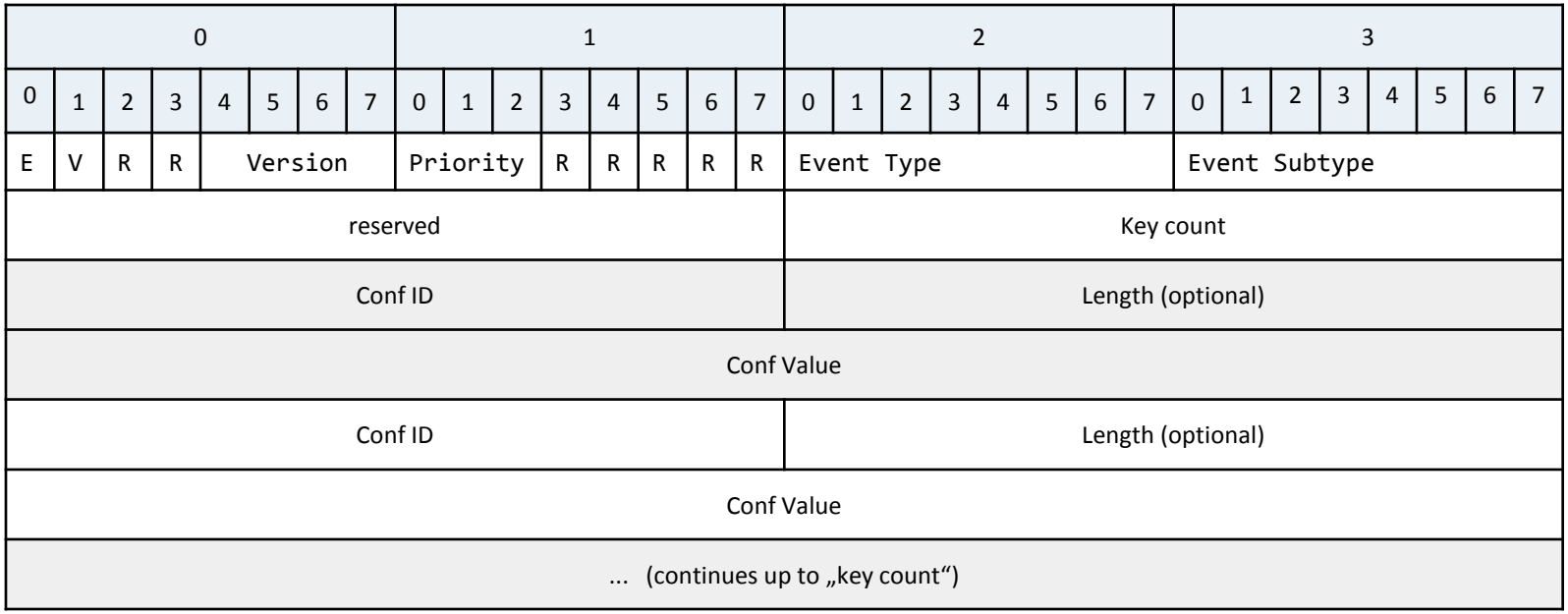
Configuration Response Continuous

- Is 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 „Key Count“ number of configuration items



Configuration Notification

- Configuration Notification is used to keep MGMT up to date in case of a configuration change in another module
- 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* as in Configuration Response Continuous message)
- 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

- This packet allows sender to ask either all or a subset of the communication profile table by setting all filter fields to 0xff, or by setting relevant bitmap fields to 1, respectively
- 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

- This packet contains those communication profiles asked through sending a Communication Profile Request
- Indexes of the bitmaps are the same and given in the next page

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 Response

Index numbers for protocols are as follows,

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

Communication Profile Selection Request

- This packet allows MGMT client to ask for a suitable communication profile according to its requirements expressed in,

- 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 given 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]