Lot 3 - Développements

MNGT to FAC-CM Interface

Version 5

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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
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

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

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															

- Is used to request MGMT to initiate transmission of the 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)

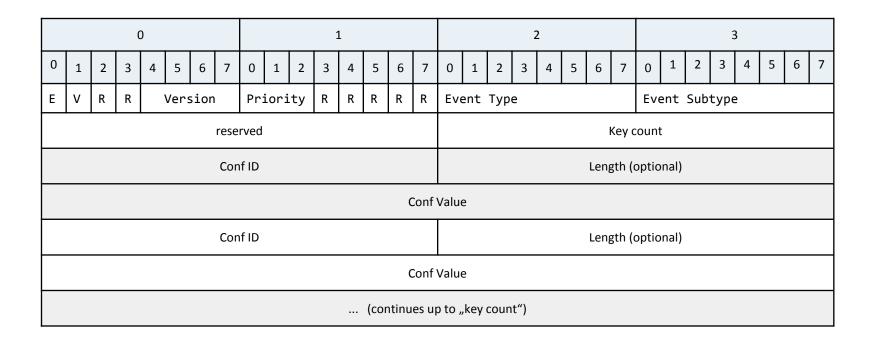| 0								1								2								3							
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
E	V	R	R	Version				Priority			R	R	R	R	R	Event Type								Event Subtype							
Conf ID																Trasmission Mode															

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')																															

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Configuration Response Bulk

- Bulk transfer message incorporates „Key Count" indicating the number of configuration items

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															
Conf ID																Length (optional)															
Conf Value																															
Conf ID																Length (optional)															
Conf Value																															
… (continues up to „key count")																															

Configuration Notification

- Configuration Notification is used to keep MGMT up to date in case of a configuration change

- 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

Configuration Notification

- Data type of the payload will be extracted from ITS key ID, so Configuration Notification packets carrying unknown/unrecognized ITS key IDs will be discarded

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							

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Communication Profile Indexes

Following index numbers are common for both Communication Profile Request and Communication Profile Response packets

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

Communication Profile Response

- This packet contains those communication profiles asked through sending a Communication Profile Request

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

- 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]