

Lot 3 - Développements

MNGT To CM-GN Interface

Version 7

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Message Header

- Bit 0: vendor/extended msg 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, 3bits)
- 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	GN-CM←MGMT	0	Update EGO Location Position Vector
	LOCATION_TABLE_REQ	GN-CM←MGMT	1	Location Table Request
	LOCATION_TABLE_RES	GN-CM→MGMT	2	Location Table Response
CONFIGURATION			3	Configuration Event
	CONFIGURATION_UPDATE_AVAILABLE	GN-CM←MGMT	0	Indication: New configuration available
	CONFIGURATION_REQ	GN-CM→MGMT	1	Configuration Request
	CONFIGURATION_RES_CONT	GN-CM←MGMT	2	Configuration Request Continuous mode
	CONFIGURATION_RES_BULK	GN-CM←MGMT	3	Configuration Request Bulk mode
	COMM_PROF_REQ	GN-CM→MGMT	4	Communication Profile Table Request
	COMM_PROF_RES	GN-CM←MGMT	5	Communication Profile Table Response
STATE			4	State Event
	WIRELESS_STATE_REQ	GN-CM←MGMT	2	Wireless State Event Request
	WIRELESS_STATE_RES	GN-CM→MGMT	3	Wireless State Event Response
	NETWORK_STATE	GN-CM→MGMT	4	Network State Event

Location

Location Update

- Update Position Event sent from MGMT component to GN
- Carries node's position vector
- All position vector fields are described in 102 636-4-1
 - $\text{Timestamp (ms)} = \text{Timestamp(UET)} \bmod 2^{32}$

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			

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
- LVP Flags: | is_neighbour (0/1) | is_pending (0/1) | RES | RES | RES | 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	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“)																																			

Configuration

Configuration Available Event

- Used to notify clients of ITS MGMT of
 - available configurations
 - configuration changed
- 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: each key is wrapped in its own msg, default
 - 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 set configuration parameters
- ConfID is mapped to name of configuration parameter
- Encoding of ConfValue determined by Conf-ID, default: integer
- 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.
- “continuous transmission” mode

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																															

Configuration Response Bulk

- bulk transfer mode

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	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“)																															

NET 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
itsGnLocalAddrConfMethod	1000	0=auto, 1=managed
itsGnDefaultHopLimit	1001	Default Hop Limit (0-255)
itsGnMaxPktLifetime	1002	Upper Limit of Packet Lifetime (1-6300000) [ms]
itsGnMinPktRepetitionInterval	1003	Lower Limit of the Packet Repetition Interval [ms]
itsGnGeoBcastForwardingAlg	1010	0: Unspecified, 1: Simple, 2 Advanced (optional)
itsGnGeoUcastForwardingAlg	1011	0: Unspecified, 1: Greedy, 2: ETSI-CBF, 3: Revised-CB
itsGnTrafficClassRelevance	1020	0-7 [High 0 <--> 7 Low]
itsGnTrafficClassReliability	1021	0-3 [High 0 <--> 3 Low]
itsGnTrafficClassLatency	1022	0-3 [Low 0 <--> 3 High]
itsGnCbfMinTTS	1030	Minimum time-to-send [ms]
itsGnCbfMaxTTS	1031	Maximum time-to-send [ms]
itsGnMaxCommRange	1040	Theoretical radio communication range [m]
itsGnDefTxPower	1050	TxPower [in 1dBm steps]
itsGnDefBitrate	1051	Bitrate [in Mbps -- 3, 4.5, 6, 9, 12, 18, 24, 27]
itsGnDefChannel	1052	Channel number [176, 178, 180]
itsGnDefPriority	1053	Priority [0-7]
itsGnDefChannelBW	1054	BandWidth [MHz]
itsSecAllowUnsecure	2000	0=security OFF, 1=security ON
itsSecEnd2End	2001	0=disabled, 1=enabled
itsSecPseudonym	2002	0=disabled, 1=enabled

Communication Profile Request

- This packet allows sender to ask either all or a subset of the communication profile table by setting all fields to 0xff, or by setting relevant bitmap fields to 1, respectively
- See next page for the indexes of Transport, Network, Access, and Channel bitmap fields

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							
Sequence Number								Reserved																							

Communication Profile Indexes

- Indexes of profiles are given below for Transport, Network, Access, and Channel fields, respectively
- These index numbers are common for Communication Profile Request and Communication Profile Response packets

	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7
Transport	BTP_A	BTP_B	TCP	UDP	RTP	STCP	<i>Reserved</i>	<i>Reserved</i>
Network	GN	IPv6_GN	IPv6	IPv4	IPv4/v6	DSMIPv4/v6	<i>Reserved</i>	<i>Reserved</i>
Access	ITSG5	3G	11n	Ethernet	<i>Reserved</i>	<i>Reserved</i>	<i>Reserved</i>	<i>Reserved</i>
Channel	CCH	SCH1	SCH2	SCH3	SCH4	<i>Reserved</i>	<i>Reserved</i>	<i>Reserved</i>

Communication Profile Response

- This packet contains those communication profiles asked through sending a Communication Profile Request
- Sequence number here is merely the value parsed from the corresponding Communication Profile Request, MGMT does not verify this value as it does not have a windowing mechanism

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																Sequence Number								Reserved							
Communication Profile ID																															
Transport								Network								Access								Channel							
... (continues up to „CP Count“)																															

State

Wireless State Request

- It contains only the Header.

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	R	Event Type						Event Subtype									

Wireless State Response

- The response contains all the Wireless Interfaces
- The message can be unsolicited if major change
- Access Technology
 - consistent with widely used NAS-Port-Type
<http://www.iana.org/assignments/radius-types/radius-types.xml#radius-types-13>

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								
IF Count								Reserved								Reserved								Reserved							
Interface ID																Access Technology															
Channel Frequency																Bandwidth															
Channel Busy Ratio								Status								Average TX Power								Reserved							
... (continues up to „IF Count“)																															

Network State Event

- Periodically generated information about the status of the network layer
- Default every 10 seconds, **used as a heartbeat**. The timer can be set by appropriate configuration value
- ToUpperLayerPackets – all packets send to GNBTPAPI
- Discarded packets – (duplicate, error in header, verification failed, etc)
- Timestamp (ms) = Timestamp(UET) mod 2^{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																															
RxPackets																															
RxBytes																															
TxPackets																															
TxBytes																															
ToUpperLayerPackets																															
DiscardedPackets																															
DuplicatePackets																															
ForwardedPackets																															

Extension to FAC-CM

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]