Lot 3 - Développements

MNGT To CM-GN Interface

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_REP	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

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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
  - 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

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	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

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Configuration Available Event

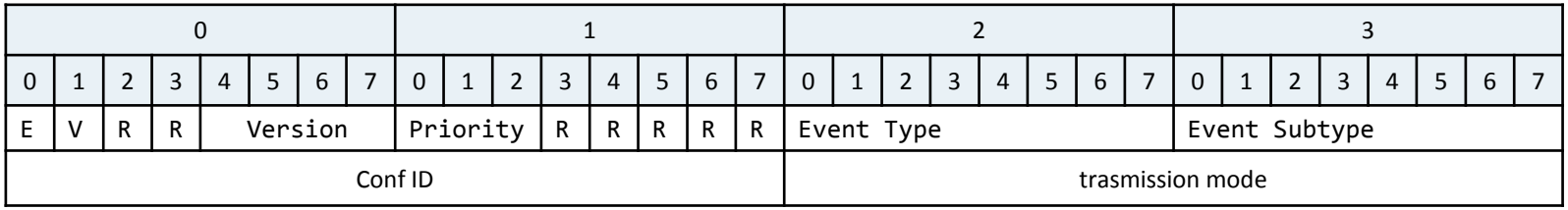
- Used to notify clients of ITS MGMT of
  - available configurations
  - configuration changed
- Key count indicates the amount of configuration keys available for this client (server always provides this info, but client can ignore this field if this info is not required)

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: **OxFFFF** 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)



Configuration Response Continous

- 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	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

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

<table>
<tr><td colspan="8">0</td><td colspan="8">1</td><td colspan="8">2</td><td colspan="8">3</td></tr>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>E</td><td>V</td><td>R</td><td>R</td><td colspan="4">Version</td><td colspan="4">Priority</td><td>R</td><td>R</td><td>R</td><td>R</td><td>R</td><td colspan="8">Event Type</td><td colspan="8">Event Subtype</td></tr>
<tr><td colspan="16">CP Count</td><td colspan="8">Reserved</td><td colspan="8">Reserved</td></tr>
<tr><td colspan="32">Communication Profile ID</td></tr>
<tr><td colspan="8">Transport</td><td colspan="8">Network</td><td colspan="8">Access</td><td colspan="8">Channel</td></tr>
<tr><td colspan="32">... (continues up to „CP Count“)</td></tr>
</table>

State

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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	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 – possible reasons are duplicate, error in header, verification failed and other

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							
RxPackets																															
RxBytes																															
TxPackets																															
TxBytes																															
ToUpperLayerPackets																															
DiscardedPackets																															
DuplicatePackets																															
ForwardedPackets																															

Extension to FAC-CM

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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]