ACP Test Server

HTTP Interface Specification

CONFIDENTIAL

Revisions

1.0	07/13/09	Initial release
1.1	07/24/09	Described allowed integer formats. Added entity_id parameter description to send_track_cmd
1.2	07/28/09	Added documentation of TCU-side commands. Renamed REST interface to HTTP interface to avoid confusion. Renamed VTS to TCU to use ACP 245 standard terms.
1.3	08/12/09	Added remarks about commands and parameter name case sensitivity. Added ZPL license information for RestrictedPython.

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HTTP Interface Specification,

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Contents

1   References

[ACP245]   ACP 245 – Application Communication Protocol v 1.2.1
                http://www.denatran.gov.br/download/ACP_245_V1_2_1_19_05_09.pdf

[ACP_HD]   High level PDU Library Documentation, TCU ACP Server, EDANTECH Suite
                13005_ACPSRV_HD_1_3.pdf

[ACP_UG]   ACP Test Server User Guide.
                13003_ACPSRV_UG_2_2.pdf

1.1   HTTP Interface Specification

The HTTP interface provides a high-level interface that allows external applications to perform operations on the ACP Server (creation, sending of messages, receiving of results, etc.).

The operations supported by the HTTP interface are based on the interactions supported by the ACP protocol according to [ACP245].

1.1.1   Invoking a HTTP Operation

To invoke a HTTP operation, the external application must perform an HTTP GET operation against the ACP suite specifying the operation ID and parameters.

Request example:

```
GET /cmd_name?p1=<...>&...&pN=<...>&[user=<...>&password=<...>]
```

Where `cmd_name` is the name of the command to execute, `p1..N` are the parameters specified for each operation, and `user` and `password` are optional parameters that must be provided if the gateway requires authentication to send commands. Notice that the `cmd_name` and parameter names are case sensitive, you must provide them exactly as it's described on this document.

Every query will return a result that includes a `'result'` field that will report `OK`, `ERROR`, or `TIMEOUT` depending if the request was successfully performed. If an `ERROR` result is returned, the additional result fields specified for each request type will not be present, instead a single `error` field will be included with a descriptive error message.

Response example:

```
HTTP/1.1 200 OK

Content-type: text/plain


result=OK&par1=<...>&par2=<...>&...&parN=<...>
```

Where `result` includes the command result (`OK`, `ERROR` or `TIMEOUT`), `par1..N` are the parameters specified for each operation result. These results can be easily parsed and interpreted using a HTTP library, available in almost all computing languages.

The TIMEOUT result indicates that the server didn't received the expected the event in the specified

timeout, as described in the Operation Timeout section.

Other HTTP response codes are reserved for cases in which there's a server malfunction or invalid or unauthorized HTTP requests.

1.1.2   Authentication and Security

The server can be configured to require that a user and password fields are included on each command. If the provided user and password don't match the ones configured on the server, the command will fail with a `401 HTTP` error.

Additionally, the server supports SSL connections on a different port to encrypt the data sent and received from the ACP Test Server.

The server can be instructed to listen and open connections to different IPs and port numbers to test a specific TCUs/SOs, however, for security reasons, these IPs and ports must be previously been enabled by a server administrator. Please read the ACP User Guide [ACP_UG] for additional information.

1.1.3   Supported Operations

The following operations represent granular interactions that the server can perform with the TCU.

For each operation, the URL of the operation and its parameters are provided. All the parameters, except user and password when required, are optional, sensible default values will be used if they are not provided (generally 0).

The URL should be appended to the server hostname and port on an HTTP request, for example `http://<server_ip>:<server_port>/<URL>`.

The following parameter types are accepted:

- **Time**: A number of millisecond since epoch.

- **String**: A string of characters.

- **Integer**: An integer number.

  The number can be provided as a decimal number or as an hexadecimal number by prefixing '0x' to the value. For examples, "`15`" and "`0xF`" will both represent the integer 15.

  Alternatively, on some cases, when an integer value is accepted, you can use a symbolic name instead of a number. For example, for the `send_func_cmd` gateway command, you can specify "`DISABLE`", "`3`" or "`0x03`" in the `function_command` parameter, and they all will refer to the value 3 (DISABLE) defined in the ACP 245 specification.

  When an integer is sent as response to a command, it always be represented as a decimal value, or, if defined, as the symbolic constant that represents that value.

- **Hexadecimal String**: A hexadecimal string representing a binary value. For example, "`BC`" will represent the binary 10111100.

- **Lists**: A comma separated list of values of one of the previous types.

1.1.3.1   Test Bench Commands

Start New Test		
URL	`gateway/start_test`	
Description	This operation signals the ACP Test Server that a new test is starting. It should be used so the ACP Server can later show the messages exchanged during a certain test.	
Parameters		
Name	**Type**	**Notes**
`name`	String	A descriptive name for the test

Stop current test		
URL	`gateway/stop_test`	
Description	This operation signals the ACP Test Server that a test has finished it's execution. It should be used so the ACP Server knows when a given test has ended. If it's not called, the ACP Test Server will assume that a test ends when the next one starts.	

1.1.3.2   Service Operator (Server) Commands

Start Server		
URL	`gateway/server/start`	
Description	Starts a new server that listens to the specified port. The ports that can be used to listen connections must have been previously configured on the ACP Test Server, otherwise the command will fail.	
Parameters		
Name	**Type**	**Notes**
`port`	Integer 1025-65535	Port number. If not provided, the server will listen to a default port configured on the ACP Test Server.

Stop Server		
URL	`gateway/server/stop`	
Description	Stops the running server. Clients that are currently connected will not be disconnected	

Disconnect TCU	
URL	`gateway/server/disconnect_tcu`

Description	Disconnect the connected TCU. If no TCU is connected, blocks until a TCU connects to the server and then immediately disconnects it.	
Response		
Name	**Type**	**Notes**
`host`	String	TCU IP or host name
`port`	Integer 0-65535	TCU Port number

Pop Alarm Keepalive		
URL	`gateway/server/pop_alarm_ka`	
Description	Gets and removes the first KeepAlive message queued by the server. The operation blocks until there's an available message.	
Response		
Name	**Type**	**Notes**
`hdr_msg_ctrl`	Integer 0-255 or one of the following string constants: RESP_EXP	
`hdr_test_flag`	Integer 0-255	
`hdr_version`	Integer 0-255	
`vin_number`	String	
`tcu_serial_number`	String	
`imei_number`	String	
`sim_card_id`	String	
`authorization_key`	Hexadecimal String	

Pop Alarm Notification		
URL	`gateway/server/pop_alarm_notif`	
Description	Gets and removes the first Alarm Notification message queued by the server. The operation blocks until there's an available message.	
Response		
Name	**Type**	**Notes**
`hdr_msg_ctrl`	Integer 0-255 or one of the following string constants: RESP_EXP	
`hdr_test_flag`	Integer 0-255	
`hdr_version`	Integer 0-255	
`car_manufacturer_id`	Integer 0-255	
`tcu_manufacturer_id`	Integer 0-255	
`major_hardware_release`	Integer 0-255	
`major_software_release`	Integer 0-255	
`timestamp`	Number of seconds since epoch (01/01/1970 00:00:00).	
`curr_area`	Integer 0-255	

`curr_location`	Integer 0-255	
`curr_lat`	Integer 0-4294967296	
`curr_lon`	Integer 0-4294967296	
`curr_alt`	Integer 0-65535	
`curr_velocity`	Integer 0-255	
`curr_heading`	Integer 0-255	
`curr_pos_uncert`	Integer 0-255	
`curr_sats`	comma separated list of int	
`vin_number`	String	
`tcu_serial_number`	String	
`imei_number`	String	
`sim_card_id`	String	
`authorization_key`	Hexadecimal String	
`sources`	comma separated list of int	
`sensor`	Integer 0-255	
`data`	Hexadecimal String	
`info_type`	Integer 0-255	
`info_data`	Hexadecimal String	

Pop Track Position		
URL	`gateway/server/pop_track_pos`	
Description	Gets and removes the first Track Position message queued by the server. The operation blocks until there's an available message.	
Response		
Name	**Type**	**Notes**
`hdr_msg_ctrl`	Integer 0-255 or one of the following string constants: RESP_EXP	
`hdr_test_flag`	Integer 0-255	
`hdr_version`	Integer 0-255	
`car_manufacturer_id`	Integer 0-255	
`tcu_manufacturer_id`	Integer 0-255	
`major_hardware_release`	Integer 0-255	
`major_software_release`	Integer 0-255	
`timestamp`	Number of seconds since epoch (01/01/1970 00:00:00).	
`curr_area`	Integer 0-255	
`curr_location`	Integer 0-255	
`curr_lat`	Integer 0-4294967296	
`curr_lon`	Integer 0-4294967296	
`curr_alt`	Integer 0-65535	
`curr_velocity`	Integer 0-255	
`curr_heading`	Integer 0-255	

curr_pos_uncert	Integer 0-255	
curr_sats	comma separated list of int	
vin_number	String	
tcu_serial_number	String	
imei_number	String	
sim_card_id	String	
authorization_key	Hexadecimal String	
sources	comma separated list of int	
sensor	Integer 0-255	
data	Hexadecimal String	
info_type	Integer 0-255	
info_data	Hexadecimal String	

Send Alarm Reply		
URL	gateway/server/send_alarm_reply	
Description	Sends an Alarm Reply message to a connected TCU. If no TCU is connected, this operation will block until one connects.	
Parameters		
Name	Type	Notes
hdr_msg_ctrl	Integer 0-255 or one of the following string constants: RESP_EXP	
hdr_test_flag	Integer 0-255	
hdr_version	Integer 0-255	
car_manufacturer_id	Integer 0-255	
tcu_manufacturer_id	Integer 0-255	
major_hardware_release	Integer 0-255	
major_software_release	Integer 0-255	
error	Integer 0-255	
confirmation	Integer 0-255 or one of the following string constants: ACCEPTED, START_TRACKING, TURN_SPEAKER	
transmit_unit	Integer 0-255 or one of the following string constants: HOUR, MINUTE, ONE_MORE_TIME, ONLY_ONE, SECOND	
ecall_update	Integer 0-255 or one of the following string constants: CANCEL_ALARM, DISABLE_VOICE_CALL, RESEND_REQUEST	

Send Configuration Update 245	
URL	gateway/server/send_cfg_upd_245

Description	Sends a Configuration Update 245 message to a connected TCU. If no TCU is connected, this operation will block until one connects. The operation waits for a reply and returns it, discarding every other received message which is not a reply to this one.	
Parameters		
Name	**Type**	**Notes**
hdr_msg_ctrl	Integer 0-255 or one of the following string constants: RESP_EXP	
hdr_test_flag	Integer 0-255	
hdr_version	Integer 0-255	
car_manufacturer_id	Integer 0-255	
tcu_manufacturer_id	Integer 0-255	
major_hardware_release	Integer 0-255	
major_software_release	Integer 0-255	
target_application_id	Integer 0-255	
action	Integer 0-255 or one of the following string constants: ACTIVATE, CHANGE, DEACTIVATE, QUERY	
start_time	Number of seconds since epoch (01/01/1970 00:00:00).	
end_time	Number of seconds since epoch (01/01/1970 00:00:00).	
grace_time	Number of seconds since epoch (01/01/1970 00:00:00).	
device_id	Integer 0-255	
version_id	Integer 0-255	
vin_number	String	
tcu_serial_number	String	
imei_number	String	
sim_card_id	String	
authorization_key	Hexadecimal String	
p_cnt	Integer(32)	Number of "p" elements
cod	Integer 0-255	
val	Hexadecimal String	
Response		
Name	**Type**	**Notes**
hdr_msg_ctrl	Integer 0-255 or one of the following string constants: RESP_EXP	
hdr_test_flag	Integer 0-255	
hdr_version	Integer 0-255	
car_manufacturer_id	Integer 0-255	
tcu_manufacturer_id	Integer 0-255	

`major_hardware_release`	Integer 0-255	
`major_software_release`	Integer 0-255	
`target_application_id`	Integer 0-255	
`vin_number`	String	
`tcu_serial_number`	String	
`imei_number`	String	
`sim_card_id`	String	
`authorization_key`	Hexadecimal String	
`error`	Integer 0-255	
`errors_cnt`	Integer(32)	Number of "errors" elements
`type`	Integer 0-255	
`data`	Hexadecimal String	
`code`	Integer 0-255	

Send Function Command		
URL	`gateway/server/send_func_cmd`	
Description	Sends a Function Command message to a connected TCU. If no TCU is connected, this operation will block until one connects. The operation waits for a reply and returns it, discarding every other received message which is not a reply to this one.	
Parameters		
Name	**Type**	**Notes**
`hdr_msg_ctrl`	Integer 0-255 or one of the following string constants: RESP_EXP	
`hdr_test_flag`	Integer 0-255	
`hdr_version`	Integer 0-255	
`car_manufacturer_id`	Integer 0-255	
`tcu_manufacturer_id`	Integer 0-255	
`major_hardware_release`	Integer 0-255	
`major_software_release`	Integer 0-255	
`entity_id`	Integer 0-255	
`transmit_unit`	Integer 0-255 or one of the following string constants: HOUR, MINUTE, ONE_MORE_TIME, ONLY_ONE, SECOND	
`transmit_interval`	Integer 0-255	
`function_command`	Integer 0-255 or one of the following string constants: DISABLE, ENABLE, PERMIT, REJECT, REQUEST	
`raw_data`	Hexadecimal String	
`vin_number`	String	

tcu_serial_number	String	
imei_number	String	
sim_card_id	String	
authorization_key	Hexadecimal String	

Response		
Name	**Type**	**Notes**
hdr_msg_ctrl	Integer 0-255 or one of the following string constants: RESP_EXP	
hdr_test_flag	Integer 0-255	
hdr_version	Integer 0-255	
error	Integer 0-255	
car_manufacturer_id	Integer 0-255	
tcu_manufacturer_id	Integer 0-255	
major_hardware_release	Integer 0-255	
major_software_release	Integer 0-255	
vin_number	String	
tcu_serial_number	String	
imei_number	String	
sim_card_id	String	
authorization_key	Hexadecimal String	
entity_id	Integer 0-255	
transmit_unit	Integer 0-255 or one of the following string constants: HOUR, MINUTE, ONE_MORE_TIME, ONLY_ONE, SECOND	
transmit_interval	Integer 0-255	
function_status	Integer 0-255 or one of the following string constants: COMPLETED, DISABLED, ENABLED, PERMITTED, REJECTED	
raw_data	Hexadecimal String	

Send Provision Update		
URL	gateway/server/send_prov_upd	
Description	Sends a Provision Update message to a connected TCU. If no TCU is connected, this operation will block until one connects. The operation waits for a reply and returns it, discarding every other received message which is not a reply to this one.	
Parameters		
Name	**Type**	**Notes**
hdr_msg_ctrl	Integer 0-255 or one of the following string constants: RESP_EXP	
hdr_test_flag	Integer 0-255	

`hdr_version`	Integer 0-255	
`car_manufacturer_id`	Integer 0-255	
`tcu_manufacturer_id`	Integer 0-255	
`major_hardware_release`	Integer 0-255	
`major_software_release`	Integer 0-255	
`target_application_id`	Integer 0-255	
`action`	Integer 0-255 or one of the following string constants: ACTIVATE, CHANGE, DEACTIVATE, QUERY	
`start_time`	Number of seconds since epoch (01/01/1970 00:00:00).	
`end_time`	Number of seconds since epoch (01/01/1970 00:00:00).	
`device_id`	Integer 0-255	
`version_id`	Integer 0-255	
`vin_number`	String	
`tcu_serial_number`	String	
`imei_number`	String	
`sim_card_id`	String	
`authorization_key`	Hexadecimal String	
Response		
Name	**Type**	**Notes**
`hdr_msg_ctrl`	Integer 0-255 or one of the following string constants: RESP_EXP	
`hdr_test_flag`	Integer 0-255	
`hdr_version`	Integer 0-255	
`error`	Integer 0-255	
`target_application_id`	Integer 0-255	
`action`	Integer 0-255 or one of the following string constants: ACTIVATE, CHANGE, DEACTIVATE, QUERY	
`vin_number`	String	
`tcu_serial_number`	String	
`imei_number`	String	
`sim_card_id`	String	
`authorization_key`	Hexadecimal String	

Send Track Command	
URL	`gateway/server/send_track_cmd`
Description	Sends a Track Command message to a connected TCU. If no TCU is connected, this operation will block until one connects. The operation waits for a reply and returns it, discarding every other received

	message which is not a reply to this one.	
Parameters		
Name	**Type**	**Notes**
`hdr_msg_ctrl`	Integer 0-255 or one of the following string constants: RESP_EXP	
`hdr_test_flag`	Integer 0-255	
`hdr_version`	Integer 0-255	
`car_manufacturer_id`	Integer 0-255	
`tcu_manufacturer_id`	Integer 0-255	
`major_hardware_release`	Integer 0-255	
`major_software_release`	Integer 0-255	
`entity_id`	Integer 0-255	
`transmit_unit`	Integer 0-255 or one of the following string constants: HOUR, MINUTE, ONE_MORE_TIME, ONLY_ONE, SECOND	
`transmit_interval`	Integer 0-255	
`function_command`	Integer 0-255 or one of the following string constants: DISABLE, ENABLE, PERMIT, REJECT, REQUEST	
`raw_data`	Hexadecimal String	
`vin_number`	String	
`tcu_serial_number`	String	
`imei_number`	String	
`sim_card_id`	String	
`authorization_key`	Hexadecimal String	
Response		
Name	**Type**	**Notes**
`hdr_msg_ctrl`	Integer 0-255 or one of the following string constants: RESP_EXP	
`hdr_test_flag`	Integer 0-255	
`hdr_version`	Integer 0-255	
`car_manufacturer_id`	Integer 0-255	
`tcu_manufacturer_id`	Integer 0-255	
`major_hardware_release`	Integer 0-255	
`major_software_release`	Integer 0-255	
`timestamp`	Number of seconds since epoch (01/01/1970 00:00:00).	
`curr_area`	Integer 0-255	
`curr_location`	Integer 0-255	
`curr_lat`	Integer 0-4294967296	
`curr_lon`	Integer 0-4294967296	
`curr_alt`	Integer 0-65535	
`curr_velocity`	Integer 0-255	

`curr_heading`	Integer 0-255	
`curr_pos_uncert`	Integer 0-255	
`curr_sats`	comma separated list of int	
`vin_number`	String	
`tcu_serial_number`	String	
`imei_number`	String	
`sim_card_id`	String	
`authorization_key`	Hexadecimal String	
`sources`	comma separated list of int	
`sensor`	Integer 0-255	
`data`	Hexadecimal String	
`info_type`	Integer 0-255	
`info_data`	Hexadecimal String	

Send Track Reply		
URL	`gateway/server/send_track_reply`	
Description	Sends a Track Reply message to a connected TCU. If no TCU is connected, this operation will block until one connects.	
Parameters		
Name	**Type**	**Notes**
`hdr_msg_ctrl`	Integer 0-255 or one of the following string constants: RESP_EXP	
`hdr_test_flag`	Integer 0-255	
`hdr_version`	Integer 0-255	
`car_manufacturer_id`	Integer 0-255	
`tcu_manufacturer_id`	Integer 0-255	
`major_hardware_release`	Integer 0-255	
`major_software_release`	Integer 0-255	
`error`	Integer 0-255	
`confirmation`	Integer 0-255 or one of the following string constants: ACCEPTED, START_TRACKING, TURN_SPEAKER	
`transmit_unit`	Integer 0-255 or one of the following string constants: HOUR, MINUTE, ONE_MORE_TIME, ONLY_ONE, SECOND	
`ecall_update`	Integer 0-255 or one of the following string constants: CANCEL_ALARM, DISABLE_VOICE_CALL, RESEND_REQUEST	

Wait for TCU connection

URL	gateway/server/wait_for_connection		
Description	Blocks until a connection is established from a TCU. If a connection is already established, the operation returns immediately.		
Response			
Name	**Type**		**Notes**
host	String		TCU IP or host name
port	Integer 0-65535		TCU Port number

Wait for TCU disconnection			
URL	gateway/server/wait_for_disconnection		
Description	Blocks until a TCU disconnects from the server. If a TCU is not connected, the operation blocks until one connects and then disconnects.		
Response			
Name	**Type**		**Notes**
host	String		TCU IP or host name
port	Integer 0-65535		TCU Port number

1.1.3.3   TCU (Client) Commands

Start Client			
URL	gateway/client/start		
Description	Starts a new client that connects to the specified port. The allowed IPs and ports must have been previously configured on the ACP Test Server, otherwise the command will fail.		
Parameters			
Name	**Type**		**Notes**
port	Integer 1025-65535		Port number
ip	Host name or IP address		Host name or IP address

Stop Client	
URL	gateway/client/stop
Description	Disconnects the client.

Pop Alarm Reply	
URL	gateway/client/pop_alarm_reply
Description	Gets and removes the first Alarm Reply message queued by the server. The operation blocks until there's an available message.
Response	

Name	Type	Notes
hdr_msg_ctrl	Integer 0-255 or one of the following string constants: RESP_EXP	
hdr_test_flag	Integer 0-255	
hdr_version	Integer 0-255	
car_manufacturer_id	Integer 0-255	
tcu_manufacturer_id	Integer 0-255	
major_hardware_release	Integer 0-255	
major_software_release	Integer 0-255	
error	Integer 0-255	
confirmation	Integer 0-255 or one of the following string constants: ACCEPTED, START_TRACKING, TURN_SPEAKER	
transmit_unit	Integer 0-255 or one of the following string constants: HOUR, MINUTE, ONE_MORE_TIME, ONLY_ONE, SECOND	
ecall_update	Integer 0-255 or one of the following string constants: CANCEL_ALARM, DISABLE_VOICE_CALL, RESEND_REQUEST	

Pop Track Reply		
URL	gateway/client/pop_track_reply	
Description	Gets and removes the first Track Reply message queued by the server. The operation blocks until there's an available message.	
Response		
Name	Type	Notes
hdr_msg_ctrl	Integer 0-255 or one of the following string constants: RESP_EXP	
hdr_test_flag	Integer 0-255	
hdr_version	Integer 0-255	
car_manufacturer_id	Integer 0-255	
tcu_manufacturer_id	Integer 0-255	
major_hardware_release	Integer 0-255	
major_software_release	Integer 0-255	
error	Integer 0-255	
confirmation	Integer 0-255 or one of the following string constants: ACCEPTED, START_TRACKING, TURN_SPEAKER	
transmit_unit	Integer 0-255 or one of the following string constants: HOUR, MINUTE, ONE_MORE_TIME, ONLY_ONE,	

	SECOND	
`ecall_update`	Integer 0-255 or one of the following string constants: CANCEL_ALARM, DISABLE_VOICE_CALL, RESEND_REQUEST	

Send Alarm Notification		
URL	`gateway/client/send_alarm_notif`	
Description	Sends an Alarm Notification message to a connected SO. If no SO is connected, this operation will block until one connects.	
Parameters		
Name	**Type**	**Notes**
`hdr_msg_ctrl`	Integer 0-255 or one of the following string constants: RESP_EXP	
`hdr_test_flag`	Integer 0-255	
`hdr_version`	Integer 0-255	
`car_manufacturer_id`	Integer 0-255	
`tcu_manufacturer_id`	Integer 0-255	
`major_hardware_release`	Integer 0-255	
`major_software_release`	Integer 0-255	
`timestamp`	Number of seconds since epoch (01/01/1970 00:00:00).	
`curr_area`	Integer 0-255	
`curr_location`	Integer 0-255	
`curr_lat`	Integer 0-4294967296	
`curr_lon`	Integer 0-4294967296	
`curr_alt`	Integer 0-65535	
`curr_velocity`	Integer 0-255	
`curr_heading`	Integer 0-255	
`curr_pos_uncert`	Integer 0-255	
`curr_sats`	comma separated list of int	
`vin_number`	String	
`tcu_serial_number`	String	
`imei_number`	String	
`sim_card_id`	String	
`authorization_key`	Hexadecimal String	
`sources`	comma separated list of int	
`sensor`	Integer 0-255	
`data`	Hexadecimal String	
`info_type`	Integer 0-255	
`info_data`	Hexadecimal String	

Send Track Position		
URL	`gateway/client/send_track_pos`	
Description	Sends an Track Position message to a connected SO. If no SO is connected, this operation will block until one connects.	
Parameters		
Name	**Type**	**Notes**
`hdr_msg_ctrl`	Integer 0-255 or one of the following string constants: RESP_EXP	
`hdr_test_flag`	Integer 0-255	
`hdr_version`	Integer 0-255	
`car_manufacturer_id`	Integer 0-255	
`tcu_manufacturer_id`	Integer 0-255	
`major_hardware_release`	Integer 0-255	
`major_software_release`	Integer 0-255	
`timestamp`	Number of seconds since epoch (01/01/1970 00:00:00).	
`curr_area`	Integer 0-255	
`curr_location`	Integer 0-255	
`curr_lat`	Integer 0-4294967296	
`curr_lon`	Integer 0-4294967296	
`curr_alt`	Integer 0-65535	
`curr_velocity`	Integer 0-255	
`curr_heading`	Integer 0-255	
`curr_pos_uncert`	Integer 0-255	
`curr_sats`	comma separated list of int	
`vin_number`	String	
`tcu_serial_number`	String	
`imei_number`	String	
`sim_card_id`	String	
`authorization_key`	Hexadecimal String	
`sources`	comma separated list of int	
`sensor`	Integer 0-255	
`data`	Hexadecimal String	
`info_type`	Integer 0-255	
`info_data`	Hexadecimal String	

Send alarm keepalive	
URL	`gateway/client/send_alarm_ka`
Description	Sends an Alarm Keepalive message to a connected SO. If no SO is connected, this operation will block until one connects.
Parameters	

Name	Type	Notes
hdr_msg_ctrl	Integer 0-255 or one of the following string constants: RESP_EXP	
hdr_test_flag	Integer 0-255	
hdr_version	Integer 0-255	
vin_number	String	
tcu_serial_number	String	
imei_number	String	
sim_card_id	String	
authorization_key	Hexadecimal String	

Wait for Configure Update 245		
URL	gateway/client/wait_for_cfg_upd_245	
Description	Waits for a Configure Update 245 message and sends a Configure Reply to the connected SO. The parameters of this command indicate the field values of the reply.	
Parameters		
Name	Type	Notes
hdr_msg_ctrl	Integer 0-255 or one of the following string constants: RESP_EXP	
hdr_test_flag	Integer 0-255	
hdr_version	Integer 0-255	
car_manufacturer_id	Integer 0-255	
tcu_manufacturer_id	Integer 0-255	
major_hardware_release	Integer 0-255	
major_software_release	Integer 0-255	
target_application_id	Integer 0-255	
vin_number	String	
tcu_serial_number	String	
imei_number	String	
sim_card_id	String	
authorization_key	Hexadecimal String	
error	Integer 0-255	
Response		
Name	Type	Notes
hdr_msg_ctrl	Integer 0-255 or one of the following string constants: RESP_EXP	
hdr_test_flag	Integer 0-255	
hdr_version	Integer 0-255	
car_manufacturer_id	Integer 0-255	
tcu_manufacturer_id	Integer 0-255	
major_hardware_release	Integer 0-255	

`major_software_release`	Integer 0-255	
`target_application_id`	Integer 0-255	
`action`	Integer 0-255 or one of the following string constants: ACTIVATE, CHANGE, DEACTIVATE, QUERY	
`start_time`	Number of seconds since epoch (01/01/1970 00:00:00).	
`end_time`	Number of seconds since epoch (01/01/1970 00:00:00).	
`grace_time`	Number of seconds since epoch (01/01/1970 00:00:00).	
`device_id`	Integer 0-255	
`version_id`	Integer 0-255	
`vin_number`	String	
`tcu_serial_number`	String	
`imei_number`	String	
`sim_card_id`	String	
`authorization_key`	Hexadecimal String	
`p_cnt`	Integer(32)	Number of "p" elements
`cod`	Integer 0-255	
`val`	Hexadecimal String	

Wait for Configure Update 245, reply with Reply 245		
URL	`gateway/client/wait_for_cfg_upd_245_reply_245`	
Description	Waits for a Configure Update 245 message and sends a Configure Reply 245 to the connected SO. The parameters of this command indicate the field values of the reply.	
Parameters		
Name	**Type**	**Notes**
`hdr_msg_ctrl`	Integer 0-255 or one of the following string constants: RESP_EXP	
`hdr_test_flag`	Integer 0-255	
`hdr_version`	Integer 0-255	
`car_manufacturer_id`	Integer 0-255	
`tcu_manufacturer_id`	Integer 0-255	
`major_hardware_release`	Integer 0-255	
`major_software_release`	Integer 0-255	
`target_application_id`	Integer 0-255	
`vin_number`	String	
`tcu_serial_number`	String	

imei_number	String	
sim_card_id	String	
authorization_key	Hexadecimal String	
errors_cnt	Integer(32)	Number of "errors" elements
type	Integer 0-255	
data	Hexadecimal String	
code	Integer 0-255	

Response

Name	Type	Notes
hdr_msg_ctrl	Integer 0-255 or one of the following string constants: RESP_EXP	
hdr_test_flag	Integer 0-255	
hdr_version	Integer 0-255	
car_manufacturer_id	Integer 0-255	
tcu_manufacturer_id	Integer 0-255	
major_hardware_release	Integer 0-255	
major_software_release	Integer 0-255	
target_application_id	Integer 0-255	
action	Integer 0-255 or one of the following string constants: ACTIVATE, CHANGE, DEACTIVATE, QUERY	
start_time	Number of seconds since epoch (01/01/1970 00:00:00).	
end_time	Number of seconds since epoch (01/01/1970 00:00:00).	
grace_time	Number of seconds since epoch (01/01/1970 00:00:00).	
device_id	Integer 0-255	
version_id	Integer 0-255	
vin_number	String	
tcu_serial_number	String	
imei_number	String	
sim_card_id	String	
authorization_key	Hexadecimal String	
p_cnt	Integer(32)	Number of "p" elements
cod	Integer 0-255	
val	Hexadecimal String	

Wait for Function Command

URL	gateway/client/wait_for_func_cmd
Description	Waits for a Function Command message and sends a Function Status to the connected SO. The parameters of this command indicate the field values of the reply.

Parameters		
Name	**Type**	**Notes**
hdr_msg_ctrl	Integer 0-255 or one of the following string constants: RESP_EXP	
hdr_test_flag	Integer 0-255	
hdr_version	Integer 0-255	
error	Integer 0-255	
car_manufacturer_id	Integer 0-255	
tcu_manufacturer_id	Integer 0-255	
major_hardware_release	Integer 0-255	
major_software_release	Integer 0-255	
vin_number	String	
tcu_serial_number	String	
imei_number	String	
sim_card_id	String	
authorization_key	Hexadecimal String	
entity_id	Integer 0-255	
transmit_unit	Integer 0-255 or one of the following string constants: HOUR, MINUTE, ONE_MORE_TIME, ONLY_ONE, SECOND	
transmit_interval	Integer 0-255	
function_status	Integer 0-255 or one of the following string constants: COMPLETED, DISABLED, ENABLED, PERMITTED, REJECTED	
raw_data	Hexadecimal String	
Response		
Name	**Type**	**Notes**
hdr_msg_ctrl	Integer 0-255 or one of the following string constants: RESP_EXP	
hdr_test_flag	Integer 0-255	
hdr_version	Integer 0-255	
car_manufacturer_id	Integer 0-255	
tcu_manufacturer_id	Integer 0-255	
major_hardware_release	Integer 0-255	
major_software_release	Integer 0-255	
entity_id	Integer 0-255	
transmit_unit	Integer 0-255 or one of the following string constants: HOUR, MINUTE, ONE_MORE_TIME, ONLY_ONE,	

	SECOND	
`transmit_interval`	Integer 0-255	
`function_command`	Integer 0-255 or one of the following string constants: DISABLE, ENABLE, PERMIT, REJECT, REQUEST	
`raw_data`	Hexadecimal String	
`vin_number`	String	
`tcu_serial_number`	String	
`imei_number`	String	
`sim_card_id`	String	
`authorization_key`	Hexadecimal String	

Wait for Provision Request		
URL	`gateway/client/wait_for_prov_upd`	
Description	Waits for a Provision Request message and sends a Provision Reply to the connected SO. The parameters of this command indicate the field values of the reply.	
Parameters		
Name	**Type**	**Notes**
`hdr_msg_ctrl`	Integer 0-255 or one of the following string constants: RESP_EXP	
`hdr_test_flag`	Integer 0-255	
`hdr_version`	Integer 0-255	
`error`	Integer 0-255	
`target_application_id`	Integer 0-255	
`action`	Integer 0-255 or one of the following string constants: ACTIVATE, CHANGE, DEACTIVATE, QUERY	
`vin_number`	String	
`tcu_serial_number`	String	
`imei_number`	String	
`sim_card_id`	String	
`authorization_key`	Hexadecimal String	
Response		
Name	**Type**	**Notes**
`hdr_msg_ctrl`	Integer 0-255 or one of the following string constants: RESP_EXP	
`hdr_test_flag`	Integer 0-255	
`hdr_version`	Integer 0-255	
`car_manufacturer_id`	Integer 0-255	
`tcu_manufacturer_id`	Integer 0-255	
`major_hardware_release`	Integer 0-255	
`major_software_release`	Integer 0-255	

`target_application_id`	Integer 0-255	
`action`	Integer 0-255 or one of the following string constants: ACTIVATE, CHANGE, DEACTIVATE, QUERY	
`start_time`	Number of seconds since epoch (01/01/1970 00:00:00).	
`end_time`	Number of seconds since epoch (01/01/1970 00:00:00).	
`device_id`	Integer 0-255	
`version_id`	Integer 0-255	
`vin_number`	String	
`tcu_serial_number`	String	
`imei_number`	String	
`sim_card_id`	String	
`authorization_key`	Hexadecimal String	

Wait for Track Command		
URL	`gateway/client/wait_for_track_cmd`	
Description	Waits for a Track Command message and sends a Track Position to the connected SO. The parameters of this command indicate the field values of the reply.	
Parameters		
Name	Type	Notes
`hdr_msg_ctrl`	Integer 0-255 or one of the following string constants: RESP_EXP	
`hdr_test_flag`	Integer 0-255	
`hdr_version`	Integer 0-255	
`car_manufacturer_id`	Integer 0-255	
`tcu_manufacturer_id`	Integer 0-255	
`major_hardware_release`	Integer 0-255	
`major_software_release`	Integer 0-255	
`timestamp`	Number of seconds since epoch (01/01/1970 00:00:00).	
`curr_area`	Integer 0-255	
`curr_location`	Integer 0-255	
`curr_lat`	Integer 0-4294967296	
`curr_lon`	Integer 0-4294967296	
`curr_alt`	Integer 0-65535	
`curr_velocity`	Integer 0-255	
`curr_heading`	Integer 0-255	
`curr_pos_uncert`	Integer 0-255	
`curr_sats`	comma separated list of int	
`vin_number`	String	

tcu_serial_number	String	
imei_number	String	
sim_card_id	String	
authorization_key	Hexadecimal String	
sources	comma separated list of int	
sensor	Integer 0-255	
data	Hexadecimal String	
info_type	Integer 0-255	
info_data	Hexadecimal String	
Response		
Name	**Type**	**Notes**
hdr_msg_ctrl	Integer 0-255 or one of the following string constants: RESP_EXP	
hdr_test_flag	Integer 0-255	
hdr_version	Integer 0-255	
car_manufacturer_id	Integer 0-255	
tcu_manufacturer_id	Integer 0-255	
major_hardware_release	Integer 0-255	
major_software_release	Integer 0-255	
entity_id	Integer 0-255	
transmit_unit	Integer 0-255 or one of the following string constants: HOUR, MINUTE, ONE_MORE_TIME, ONLY_ONE, SECOND	
transmit_interval	Integer 0-255	
function_command	Integer 0-255 or one of the following string constants: DISABLE, ENABLE, PERMIT, REJECT, REQUEST	
raw_data	Hexadecimal String	
vin_number	String	
tcu_serial_number	String	
imei_number	String	
sim_card_id	String	
authorization_key	Hexadecimal String	

Wait for connection	
URL	gateway/client/wait_for_connection
Description	Waits until the client connects to an SO.

1.1.4   Operation Timeout

All described operations accept an additional parameter called timeout whose value is an integer that provides a timeout in seconds to execute the operation. If more than timeout seconds elapse since the start of the operation, the operation will abort and result=TIMEOUT will be returned.

1.1.5   Sample Interaction Using an Automated Test Bench

The following interaction represents how to test that the right messages are received by the server upon main battery disconnection. The example represents the expected behavior of the TCU, deviations from this behavior should be considered test failures.

The example is provided to use as a basis for discussion and requirements elicitation, but is not described using any modeling formalism.

!ATTENTION: Additional examples can be provided on request that illustrate how the interface could be used from other programming languages (ie. Java, C#, PHP, Python, etc.).

Notation	
`TB`	The testbench.
`AS`	The ACP Server.
`[ action ]`	Represents an external action. These will usually represent actions performed manually by an operator, automatically by the test bench, or by the TCU.
`X -> Y: content`	Represents a message that is being sent from X to Y with the given expected content. Normally the test bench must check that the content matches the expected one.
`/* comment */`	A comment implying a condition that should be met before running the test or just as a clarification of the test steps.

```
/* TCU starts disconnected from the server */

[ Operator executes test case at test bench ]
TB-> AS: start_test("TCU_power_supply")
TB-> AS: start(port=12005)
[ Operator Disconnect TCU power supply ]

TB-> AS: wait_for_connection(timeout=X)
[ TCU initiates a connection to the server ]
AS-> TB: OK, tcu_ip, tcu_port
```

```
TB-> AS: pop_alarm_notif(timeout=X)
[ TCU sends a theft alarm notification to the server ]
AS-> TB: OK, sources=1,0,8,
     sensor=1,data=?0


TB-> AS: pop_alarm_notif(timeout=X)
[ TCU sends a theft alarm notification to the server ]
AS-> TB: OK, sources=2,
     sensor=1,data=?0


repeat for 2 hours:
     /* 2 hours value */
    TB->  AS: pop_track_pos(timeout=track_interval)
    [ TCU sends position to server ]
    AS->  TB: OK,
         timestamp="yyyy-mm-dd hh:mm:ss",
         sensor=1,data=?0
    /* TB should check that messages are received in the
       interval configured in the TCU */


TB-> AS: pop_alarm_notif()
[ Operator Reconnects TCU power supply ]
[ TCU sends theft alarm notification to server ]
AS-> TB: OK, sources=0,0,16,sensor=1,data=?0


TB-> AS: pop_alarm_notif(timeout=X)
[ Operator sets KL15 to ON ]
[ TCU sends theft alarm notification to server ]
AS-> TB: OK, sources=0,64,0, sensor=1,data=?0


TB-> AS: pop_theft_alarm_message(timeout=X)
[ TCU sends theft alarm notification to server ]
AS-> TB: OK, sources=0,0,1,
```

```
sensor=1,breakdown_data[0x?0]
```

```
TB-> AS: stop
TB-> AS: end_test
```

2   Contacting support

Support is provided under the following conditions:

- An incident must be reported by the Customer to Edantech using email, phone or an alternative mechanism proposed by Edantech (ie. Support. Web site). Contact information will be provided on the commercial proposal.

  Email contact information: support@edantech.com

- After the incident is reported, Edantech is bound to answer and solve the incident in the terms specified on the commercial proposal (Supplier Statement of Work or Services Contract document).

- Edantech will only resolve incidents relating to the system described on this document or on the base software used on a Edantech installed equipment required to support the system (operating system, database systems, etc.).

- All support will be provided remotely, by establishing a SSH connection to the equipment running the system.

- Once the equipment is installed at the Customer site, network and hardware issues that impede Edantech for connecting to the server must be fixed by the Customer (by reinstalling or replacing the equipment, or fixing their network configuration).

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