cyclarity-in-vehicle-sdk

Release 1.1.3

Cymotive

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CONTENTS

CHAPTER

ONE

IN-VEHICLE SDK PACKAGE

This package provides the In-Vehicle SDK, offering a range of functionalities to support communication and operations with in-vehicle systems.

1.1 Features

The In-Vehicle SDK package includes the following interfaces and implementations:

1. **Communication**
    1. **CommunicatorBase**: Provides the capability to send and receive byte data over various protocols. The following implementations are available:
        - `TcpCommunicator`
        - `UdpCommunicator`
        - `MulticastCommunicator`
        - `IsoTpCommunicator`
        - `DoipCommunicator`
    2. **RawSocketCommunicatorBase**: Offers send, receive, and srp (send and receive answer) operations for `py_pcapplusplus.Packet` types. The following implementations are available:
        - `Layer2RawSocket`
        - `Layer3RawSocket`
        - `WiFiRawSocket`
    3. **CanCommunicatorBase**: Exposes the python-can functionality, offering operations like send, receive, sniff, and more. The following implementation is available:
        - `CanCommunicatorSocketCan` - A specific implementation for the socketcan driver
2. **DoipUtils**: A utility library for performing Diagnostic over IP (DoIP) operations, such as vehicle identity requests, routing activation, and more.
3. **UdsUtilsBase**: Used for performing Unified Diagnostic Services (UDS) operations, such as ECU reset, read DIDs, session change, and more. The following implementation is available:
    - `UdsUtils` - Can be initialized to work over DoIP/ISO-TP
4. **IDeviceShell**: Allows for the execution of shell commands. The following implementations are available:
    - `AdbDeviceShell`

- `SerialDeviceShell`
- `SshDeviceShell`

5. **SomeipUtils**: A utility library for SOME/IP operations, allowing the receive and parse services, and in these services invoke methods and subscribe to eventgroups
6. **Plugins**:
   - `SessionChangeCrashDetector`: a plugin that detects ECU crash based on UDS session change
   - `UnrespondedTesterPresentCrashDetector`: a plugin that detects ECU crash based on UDS TP that is not being responded
   - `UdsEcuRecoverPlugin`: a plugin responsible of recovering the ECU back to predefined UDS state - session and elevation
   - `RelayResetPlugin`: a plugin that resets a device via relay
   - `UdsBasedEcuResetPlugin`: a plugin that resets a device via UDS ECU Reset
7. **ConfigurationManager**: An API allowing to perform configuration of the IOT Device.
   - configure_actions(action/s) - can perform the following configuration actions on the device:
     1. `IpAddAction` - add an IP to an Ethernet interface, and optionally configure a route for this IP.
     2. `IpRemoveAction` - remove an existing IP from an Ethernet interface.
     3. `CanConfigurationAction` - configure CAN interface parameters. e.g. bitrate, sample-point, cc-len8-dlc flag and state.
     4. `EthInterfaceConfigurationAction` - configure the Ethernet interface: mtu, state and flags.
     5. `WifiConnectAction` - connect to a WiFi access point
     6. `CreateVlanAction` - creating a VLAN interface
   - get_device_configuration() - retrieves the current device configurations:
     1. Ethernet interface configuration: state, IPs, flags and MTU.
     2. CAN interface configurations: state, bitrate, sample-point and cc-len8-dlc flag.
     3. The available WiFi access points.

The complete user manual can be found in *here*

1.2 Installation

You can install the In-Vehicle SDK package using pip: `pip install cyclarity-in-vehicle-sdk`

1.3 Usage

Example for importing and using `CanCommunicatorSocketCan` for sending a Message

```
from cyclarity_in_vehicle_sdk.communication.can.base.can_communicator_base import␣
↪CanMessage
from cyclarity_in_vehicle_sdk.communication.can.impl.can_communicator_socketcan import␣
↪CanCommunicatorSocketCan

canmsg = CanMessage(
```

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```
            arbitration_id=0x123,
            is_extended_id = False,
            is_rx=False,
            data=b"\x00" * 8,
            is_fd=False,
            bitrate_switch=False,
        )

socket = CanCommunicatorSocketCan(channel="vcan0", support_fd=True)
with socket:
    socket.send(can_msg=canmsg)
```

CHAPTER

TWO

COMMUNICATION OBJECTS

cyclarity_in_vehicle_sdk.communication.can.impl.can_communicator_socketcan.CanCommunicatorSocketCan	This class handles the communication over the CAN bus using the SocketCAN interface."
cyclarity_in_vehicle_sdk.communication.ip.raw.raw_socket.Layer2RawSocket	This class handles layer 2 raw socket communication.
cyclarity_in_vehicle_sdk.communication.ip.raw.raw_socket.Layer3RawSocket	Layer 3 raw socket for communicator
cyclarity_in_vehicle_sdk.communication.ip.tcp.tcp.TcpCommunicator	TCP Communicator.
cyclarity_in_vehicle_sdk.communication.ip.udp.udp.UdpCommunicator	A class used for UDP communication over IP networks.
cyclarity_in_vehicle_sdk.communication.ip.udp.multicast.MulticastCommunicator	A class used for multicast communication over IP networks.
cyclarity_in_vehicle_sdk.communication.isotp.impl.isotp_communicator.IsoTpCommunicator	This class handles communication over IsoTP protocol.
cyclarity_in_vehicle_sdk.communication.doip.doip_communicator.DoipCommunicator	This class handles communication over DoIP protocol.

2.1 cyclarity_in_vehicle_sdk.communication.can.impl.can_communicator_sock

pydantic model cyclarity_in_vehicle_sdk.communication.can.impl.can_communicator_socketcan.**CanCommunicatorSocketCan**

This class handles the communication over the CAN bus using the SocketCAN interface."

Fields

- *blacklist_ids (set[int])*
- *channel (str)*
- *support_fd (bool)*

field blacklist_ids: set[int] = {}

Incoming CAN IDs to ignore

field channel: str [Required]

Name of CAN interface to work with. (e.g. can0, vcan0, etc...)

field support_fd: bool [Required]

CAN bus supports CAN-FD.

add_to_blacklist(*canids*)

adds can IDs to a list of blacklist IDs to be ignore when sniffing or receiving

Parameters
canids (*Sequence[int]*) – CAN IDs to be added to the blacklist

close()

Closes the communicator.

Return type
None

get_bus()

get the underling CAN bus

Returns
the CAN bus implementation - should be an implementation of BusABC

Return type
Type[BusABC]

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

open()

Opens the communicator. this method must be called before usage.

Return type
None

receive(*timeout=None*)

receive a CAN message over the channel

Parameters
timeout (*Optional[float], optional*) – timeout in seconds to try and receive. None means indefinably.

Returns
CAN message if a message was received, None otherwise.

Return type
Optional[CanMessage]

send(*can_msg*, *timeout=None*)

Transmit a message to the CAN bus.

Parameters

- **can_msg** (*CanMessage*) – CAN message in the python-can format *CanMessage*
- **timeout** (*Optional[float], optional*) – time out in seconds. Defaults to None.

send_periodically(*msgs*, *period*, *duration=None*)

Send periodically CAN message(s)

Parameters

- **msgs** (*Union[CanMessage, Sequence[CanMessage]]*) – single message or sequence of messages to be sent periodically
- **period** (*float*) – time period in seconds between sending of the message(s)

- **duration** (*Optional[float], optional*) – duration time in seconds tp be sending the message(s) periodically. None means indefinitely.

sniff(*sniff_time*)

sniff CAN messages from the channel for specific time

Parameters
sniff_time (*float*) – time in seconds to be sniffing the channel

Returns
list of CAN messages sniffed, None if none was sniffed

Return type
Optional[list[CanMessage]]

2.2 cyclarity_in_vehicle_sdk.communication.ip.raw.raw_socket.Layer2RawSocket

pydantic model cyclarity_in_vehicle_sdk.communication.ip.raw.raw_socket.**Layer2RawSocket**

This class handles layer 2 raw socket communication.

Fields

- *if_name (str)*

field if_name: str [Required]

Name of ethernet interface to work with. (e.g. eth0, eth1 etc…)

close()

Close the raw socket.

Returns
True if successful, False otherwise.

Return type
bool

is_open()

Check if the raw socket is open.

Returns
True if the socket is open, False otherwise.

Return type
bool

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

open()

Open the raw socket for communication.

Returns
True if successful, False otherwise.

Return type
bool

receive(*timeout=2*)

read a single packet from the socket

Parameters
timeout (*float*) – timeout in seconds for the operation, 0 for blocking receive.

Returns
the read packet, None if timeout reached.

Return type
Packet | None

receive_answer(*is_answer*, *timeout=2*)

sniff communication and return a packet that satisfy the "is_answer" callback.

Parameters

- **(Callable[[Packet]** – A callback that receives a packet and returns True if this packet is the answer looking for.
- **bool])** – A callback that receives a packet and returns True if this packet is the answer looking for.
- **timeout** (*float*) – The duration of the sniffing to locate the answer packet.

Returns
The first packet that satisfy the "is_answer" callback, None if not found.

Return type
Packet | None

receive_answers(*is_answer*, *timeout=2*)

Read a multiple packets and returns all packets that satisfy the "is_answer" callback provided.

Parameters

- **is_answer** (*Callable[[Packet], bool]*) – A callback that receives a packet and returns True if this packet is the answer looking for.
- **timeout** (*int*) – The duration of the sniffing to locate the answer packets.

Returns
All packets received that satisfy the "is_answer" callback.

Return type
list[Packet]

send_packet(*packet*)

Send a packet over the raw socket.

Parameters
packet (*Packet*) – The Packet to be sent.

Returns
True if the packet was sent successfully, False otherwise.

Return type
bool

send_packets(*packets*)

Send multiple packets over the raw socket.

Parameters
packets (*Sequence[Packet]*) – The list of Packets to be sent.

Returns
True if the packets were sent successfully, False otherwise.

Return type
bool

send_receive_packet(*packet*, *is_answer*, *timeout=2*)

send packet or a sequence of packets and read an answer The answer is one packet that satisfy the "is_answer" callback provided.

Note: This function uses the implementation of 'send_receive_packets', Optionally override this function to have a better implementation (stop after the first valid packet arrives).

Parameters

- **packet** (*Packet | Sequence[Packet] | None*) – the packet/packets to send. None to skip the sending operation.
- **is_answer** (*Callable[[Packet], bool]*) – callback that receives a packet and returns True if this packet is the answer to sent one
- **timeout** (*int*) – timeout for the operation

Returns
The first packet that satisfy the "is_answer" callback, None if not found.

Return type
Packet | None

send_receive_packets(*packet*, *is_answer*, *timeout=2*)

send packet or a sequence of packets and read a multiple packets answer The answer is a list of packets that satisfy the "is_answer" callback provided.

Parameters

- **packet** (*Packet | Sequence[Packet] | None*) – the packet/packets to send. None to skip the sending operation.
- **is_answer** (*Callable[[Packet], bool]*) – callback that receives a packet and returns True if this packet is the answer to sent one
- **timeout** (*int*) – timeout for the operation

Returns
All packets received that satisfy the "is_answer" callback.

Return type
list[Packet]

2.3 cyclarity_in_vehicle_sdk.communication.ip.raw.raw_socket.Layer3RawSocl

pydantic model cyclarity_in_vehicle_sdk.communication.ip.raw.raw_socket.**Layer3RawSocket**

Layer 3 raw socket for communicator

Fields

- *if_name (str)*
- *ip_version (cyclarity_in_vehicle_sdk.communication.ip.base.ip_communicator_base.IpVersion)*

field if_name: str [Required]

Name of ethernet interface to work with. (e.g. eth0, eth1 etc…)

field ip_version: IpVersion [Required]

IP version. IPv4/IPv6

close()

Close the raw socket.

Returns
True if successful, False otherwise.

Return type
bool

is_open()

inform the state of the raw socket

Returns
True if the socket is open and ready for send/receive operations, False otherwise.

Return type
bool

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

open()

Open the raw socket for communication.

Returns
True if successful, False otherwise.

Return type
bool

receive(*timeout=2*)

read a single packet from the socket

Parameters
timeout (*float*) – timeout in seconds for the operation, 0 for blocking receive.

Returns
the read packet, None if timeout reached.

Return type
Packet | None

send_packet(*packet*)

send a packet to the raw socket

Parameters
packet (*Packet*) – packet to send.

Returns
True if sent successfully, False otherwise

Return type
bool

send_receive_packets(*packet*, *is_answer*, *timeout*)

send packet or a sequence of packets and read a multiple packets answer The answer is a list of packets that satisfy the "is_answer" callback provided.

Parameters

- **packet** (*Packet | Sequence[Packet] | None*) – the packet/packets to send. None to skip the sending operation.
- **is_answer** (*Callable[[Packet], bool]*) – callback that receives a packet and returns True if this packet is the answer to sent one
- **timeout** (*int*) – timeout for the operation

Returns
All packets received that satisfy the "is_answer" callback.

Return type
list[Packet]

2.4 cyclarity_in_vehicle_sdk.communication.ip.tcp.tcp.TcpCommunicator

pydantic model cyclarity_in_vehicle_sdk.communication.ip.tcp.tcp.**TcpCommunicator**

TCP Communicator. The class provides methods to open, close, send, receive data over a TCP connection.

Fields

close()

Close the TCP socket.

Returns
True if successful, False otherwise.

Return type
bool

connect()

Connects the socket to the destination IP and port.

Returns
rue on successful completion.

Return type
bool

get_type()

get the communicator type

Returns
enum type of the communicator

Return type
CommunicatorType

is_open()

inform the state of the TCP socket

Returns
True if the socket is open and ready for send/receive operations, False otherwise.

Return type
bool

`model_post_init`(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

`open`()

Open the TCP socket for communication.

Returns
True if successful, False otherwise.

Return type
bool

`recv`(*recv_timeout=0*, *size=4096*)

Receives data from the socket.

Parameters

- **recv_timeout** (*float, optional*) – The optional timeout in seconds for receiving data.. Defaults to 0.
- **size** (*int, optional*) – The maximum amount of data to receive.

Returns
The received bytes, or an empty bytes object if an exception occurred.

Return type
bytes

`send`(*data*, *timeout=None*)

Sends data over the socket.

Parameters

- **data** (*bytes*) – The bytes to send.
- **timeout** (*Optional[float], optional*) – The optional timeout in seconds for sending data.

Returns
The number of bytes sent, or 0 if an exception occurred.

Return type
int

2.5 cyclarity_in_vehicle_sdk.communication.ip.udp.udp.UdpCommunicator

pydantic model cyclarity_in_vehicle_sdk.communication.ip.udp.udp.**UdpCommunicator**

A class used for UDP communication over IP networks.

Fields

`close`()

Closes the socket.

Returns
A boolean indicating if the socket was successfully closed.

Return type
bool

`get_type()`

get the communicator type

Returns
enum type of the communicator

Return type
CommunicatorType

`model_post_init(*args, **kwargs)`

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

`open()`

Opens the socket. :returns: A boolean indicating if the socket was successfully opened. :rtype: bool

`receive_from(size=4096, recv_timeout=0)`

Receives data from the socket

Parameters

- **size** (*int, optional*) – The size of the data to be received.
- **recv_timeout** (*int, optional*) – The timeout for the receive operation.

Returns
The data received and the sender's IP address.

Return type
tuple[bytes, IPvAnyAddress]

`recv(recv_timeout=0, size=4096)`

Receives data from the socket.

Parameters

- **recv_timeout** (*float, optional*) – The timeout for the receive operation.
- **size** (*int, optional*) – The size of the data to be received.

Returns
The data received.

Return type
bytes

`send(data, timeout=None)`

Sends data to the specified IP address and port.

Parameters

- **data** (*bytes*) – data The data to be sent.
- **timeout** (*Optional[float], optional*) – The timeout for the send operation.

Returns
The number of bytes sent.

Return type
int

send_to(*target_ip*, *data*)

Sends data to a specific IP address and port.

Parameters

- **target_port** (*int*) – The target port.
- **target_ip** (*IPvAnyAddress*) – The target IP address.
- **data** (*bytes*) – The data to be sent.

Returns
The number of bytes sent.

Return type
int

2.6 cyclarity_in_vehicle_sdk.communication.ip.udp.multicast.MulticastCommu

pydantic model
cyclarity_in_vehicle_sdk.communication.ip.udp.multicast.**MulticastCommunicator**

A class used for multicast communication over IP networks.

Fields

- *interface_name (str | None)*

Validators

- *validate_destination_ip* » all fields

field interface_name: Optional[str] = None

Network interface name - needed for IPv6 multicast

Validated by

- *validate_destination_ip*

close()

Closes both sockets.

Returns
True if sockets were successfully closed.

Return type
bool

get_type()

get the communicator type

Returns
enum type of the communicator

Return type
CommunicatorType

is_open()

Check if the communicator is open and ready.

Returns
True if both sockets are open and ready.

Return type
bool

`model_post_init`(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

`open`()

Opens the sockets for multicast communication.

Creates separate sockets for receiving (bound to multicast group) and sending (bound to source IP for proper source address).

Returns
True if both sockets were successfully opened.

Return type
bool

Raises
RuntimeError – If the communicator failed to open.

`receive_from`(*size*, *recv_timeout=0*)

Receives data from any source and returns sender information.

Parameters

- **size** (*int*) – The size of the data to be received.
- **recv_timeout** (*int, optional*) – The timeout for the receive operation.

Returns
The data received and the sender's IP address.

Return type
tuple[bytes, IPvAnyAddress]

Raises

- **RuntimeError** – If the communicator is not open.
- **TimeoutError** – If timeout occurs and no data is received.

`recv`(*recv_timeout=0*, *size=4096*)

Receives data from the multicast group.

Parameters

- **recv_timeout** (*float, optional*) – The timeout for the receive operation.
- **size** (*int, optional*) – The size of the data to be received.

Returns
The data received, or None if no data or timeout.

Return type
Optional[bytes]

Raises
RuntimeError – If the communicator is not open.

`send`(*data*, *timeout=None*)

Sends data to the multicast group.

Parameters

- **data** (*bytes*) – The data to be sent.
- **timeout** (*Optional[float], optional*) – The timeout for the send operation.

Returns
The number of bytes sent.

Return type
int

Raises
RuntimeError – If the communicator is not open.

send_to(*target_ip*, *data*)

Sends data to a specific IP address using the destination port.

Parameters

- **target_ip** (*IPvAnyAddress*) – The target IP address.
- **data** (*bytes*) – The data to be sent.

Returns
The number of bytes sent.

Return type
int

Raises
RuntimeError – If the communicator is not open.

validator validate_destination_ip » *all fields*

Return type
MulticastCommunicator

2.7 cyclarity_in_vehicle_sdk.communication.isotp.impl.isotp_communicator.Iso

pydantic model
cyclarity_in_vehicle_sdk.communication.isotp.impl.isotp_communicator.**IsoTpCommunicator**

This class handles communication over IsoTP protocol.

Fields

- *bitrate_switch (bool | None)*
- *can_communicator (cyclarity_in_vehicle_sdk.communication.can.impl.can_communicator_socketcan.CanCommunicatorSocketCan)*
- *can_fd (bool | None)*
- *padding_byte (int | None)*
- *rxid (int)*
- *txid (int)*

field bitrate_switch: Optional[bool] = False

BRS, defaults to False

field can_communicator: *CanCommunicatorSocketCan* [Required]

CAN Communicator

field can_fd: Optional[bool] = False

whether it is can FD, defaults to False

field padding_byte: Optional[int] = None

Optional byte to pad TX messages with, defaults to None meaning no padding, should be in range 0x00-0xFF

Constraints

- **ge** = 0
- **le** = 255

field rxid: int [Required]

Receive CAN id.

field txid: int [Required]

Transmit CAN id.

close()

Closes the socket.

Returns
A boolean indicating if the socket was successfully closed.

Return type
bool

get_type()

get the communicator type

Returns
enum type of the communicator

Return type
CommunicatorType

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

open()

Opens the socket. :returns: A boolean indicating if the socket was successfully opened. :rtype: bool

recv(*recv_timeout*)

Receives data from the socket.

Parameters

- **recv_timeout** (*float, optional*) – The timeout for the receive operation.
- **size** (*int, optional*) – The size of the data to be received.

Returns
The data received.

Return type
bytes

send(*data*, *timeout=1*)

sends bytes over the communication layer

Parameters

- **data** (*bytes*) – data to send in bytes format
- **timeout** (*Optional[float]*) – timeout in seconds for send operation. defaults to None

Returns
amount of bytes sent

Return type
int

set_address(*address*)

Set the address of the communicator.

Parameters
address (*Address*) – The address to be set.

teardown()

Close the communicator.

2.8 cyclarity_in_vehicle_sdk.communication.doip.doip_communicator.DoipCom

pydantic model
cyclarity_in_vehicle_sdk.communication.doip.doip_communicator.**DoipCommunicator**

This class handles communication over DoIP protocol.

Fields

- *client_logical_address (int)*
- *routing_activation_needed (bool)*
- *target_logical_address (int)*
- *tcp_communicator (cyclarity_in_vehicle_sdk.communication.ip.tcp.tcp.TcpCommunicator)*

field client_logical_address: int [Required]

field routing_activation_needed: bool [Required]

field target_logical_address: int [Required]

field tcp_communicator: *TcpCommunicator* [Required]

close()

Closes the communicator.

Return type
bool

get_type()

Get the type of the communicator.

Returns
CommunicatorType.DOIP

Return type
CommunicatorType

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

open()

Open the communicator.

Returns
True on successful initialization, False otherwise.

Return type
bool

recv(*recv_timeout*)

Receive data from the target.

Parameters
recv_timeout (*float*) – Time to wait for a response.

Returns
Received data.

Return type
bytes

send(*data*, *timeout=1*)

Send data to the target.

Parameters

- **data** (*bytes*) – Data to be sent.
- **timeout** (*Optional[float], optional*) – Timeout for the send operation in seconds. Defaults to 1.

Returns
Number of bytes sent.

Return type
int

CHAPTER

THREE

CYCLARITY DATA MODELS

3.1 UDS models

class cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**AuthenticationAction**(*value*)

Types of authentication actions

pydantic model
cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**AuthenticationConfigurationParams**

Model for the parameters of the AuthenticationConfiguration action

Fields

- *param_type (Literal['AuthenticationConfigurationParams'])*

field param_type: Literal['AuthenticationConfigurationParams'] = 'AuthenticationConfigurationParams'

authentication_action()

Return type
AuthenticationAction

pydantic model
cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**AuthenticationParamsBase**

abstract authentication_action()

Return type
AuthenticationAction

classmethod get_non_abstract_subclasses()

Return type
list[Type]

class cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**AuthenticationReturnParameter**(*value*)

Model defining the authentication return codes

pydantic model cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**BaseAPCEParams**

Base class defining parameters for UDS Authentication based on asymmetric public certificate exchange

Fields

- *asym_padding_type (cyclarity_in_vehicle_sdk.utils.crypto.models.AsymmetricPaddingType)*

- *certificate_client (bytes | cyclarity_sdk.sdk_models.models.CyclarityFile)*
- *communication_configuration (int)*
- *hash_algorithm (cyclarity_in_vehicle_sdk.utils.crypto.models.HashingAlgorithm)*
- *private_key_der (bytes | cyclarity_sdk.sdk_models.models.CyclarityFile)*

field asym_padding_type: AsymmetricPaddingType [Required]

The padding type to use in signature creation for challenge signing

field certificate_client: Union[Annotated[bytes], CyclarityFile] [Required]

The client's certificate to send to the server for authentication

field communication_configuration: int = 0

Configuration information about how to proceed with security in further diagnostic communication after the Authentication (vehicle manufacturer specific)

Constraints

- **ge** = 0
- **le** = 255

field hash_algorithm: HashingAlgorithm [Required]

The hashing algorithm to use in signature creation for challenge signing

field private_key_der: Union[Annotated[bytes], CyclarityFile] [Required]

The private key for authentication in DER format

pydantic model cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**DID_INFO**

Model containing information regarding a UDS Data Identifier

Fields

- *accessible (bool)*
- *current_data (str | None)*
- *did (int)*
- *maybe_supported_error (cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.ERROR_CODE_AND_NAME | None)*
- *name (str | None)*

field accessible: bool [Required]

field current_data: Optional[str] = None

field did: int [Required]

field maybe_supported_error: Optional[*ERROR_CODE_AND_NAME*] = None

The error code if there is uncertainty that this DID is supported

field name: Optional[str] = None

pydantic model cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**DeAuthenticateParams**

Model for the parameters of the DeAuthenticate action

Fields

- *param_type (Literal['DeAuthenticateParams'])*

field param_type: Literal['DeAuthenticateParams'] = 'DeAuthenticateParams'

authentication_action()

Return type
AuthenticationAction

pydantic model cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**ELEVATION_INFO**

Model for defining the needed elevation information for a UDS session

Fields

- *need_elevation (bool | None)*
- *security_algorithm (cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.SECURITY_ALGORITHM_XOR | cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.SECURITY_ALGORITHM_PIN | None)*

field need_elevation: Optional[bool] = None

Whether this session requires elevation

field security_algorithm: Union[*SECURITY_ALGORITHM_XOR*, *SECURITY_ALGORITHM_PIN*, None] = None

The security elevation algorithm

pydantic model cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**ERROR_CODE_AND_NAME**

Model defining the error code and its name

Fields

- *code (int)*
- *code_name (str)*

field code: int [Required]

Error code number

field code_name: str [Required]

Error code name

pydantic model cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**ROUTINE_INFO**

Model containing information regarding a UDS routine

Fields

- *operations (list[cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.ROUTINE_OPERATION_INFO])*
- *routine_id (int)*

field operations: list[*ROUTINE_OPERATION_INFO*] [Required]

field routine_id: int [Required]

pydantic model
cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**ROUTINE_OPERATION_INFO**

Model containing information regarding a UDS routine subfunction

Fields

- *accessible (bool)*
- *control_type (int)*
- *maybe_supported_error (cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.ERROR_CODE_AND_NAME | None)*
- *routine_status_record (str | None)*

field accessible: bool [Required]

field control_type: int [Required]

field maybe_supported_error: Optional[*ERROR_CODE_AND_NAME*] = None

The error code if there is uncertainty that this routine control type is supported

field routine_status_record: Optional[str] = None

Additional data associated with the response.

pydantic model
cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**SECURITY_ALGORITHM_BASE**

Base model for security access algorithms

Fields

- *key_subfunction (int | None)*
- *seed_subfunction (int | None)*

field key_subfunction: Optional[int] = None

The subfunction for the send key operation

field seed_subfunction: Optional[int] = None

The subfunction for the get seed operation

pydantic model
cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**SECURITY_ALGORITHM_PIN**

Model for PIN based security access

Fields

- *pin (int)*

field pin: int [Required]

Integer value to be added to the seed for security key generation

pydantic model
cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**SECURITY_ALGORITHM_XOR**

Model for XOR based security access

Fields

- *xor_val (int)*

field xor_val: int [Required]

Integer value to XOR the seed with for security key generation

pydantic model cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**SERVICE_INFO**

Model containing information regarding a UDS service

Fields

- *accessible (bool)*
- *error (cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.ERROR_CODE_AND_NAME | None)*
- *name (str)*
- *sid (int)*

field accessible: bool = False

Whether this UDS service is accessible

field error: Optional[*ERROR_CODE_AND_NAME*] = None

The error code if exists

field name: str [Required]

The name of the UDS service

field sid: int [Required]

The SID of the UDS service

pydantic model cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**SESSION_ACCESS**

Model containing information regarding how to access a UDS session

Fields

- *elevation_info (cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.ELEVATION_INFO | None)*
- *id (int)*

field elevation_info: Optional[*ELEVATION_INFO*] = None

Elevation info for this UDS session, if needed

field id: int [Required]

ID of this UDS session

pydantic model cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**SESSION_INFO**

Model containing information regarding a UDS session

Fields

- *accessible (bool)*
- *elevation_info (cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.ELEVATION_INFO | None)*
- *route_to_session (list[cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.SESSION_ACCESS])*

field accessible: bool = False

Whether this UDS session is accessible

field elevation_info: Optional[*ELEVATION_INFO*] = None

Elevation info for this UDS session

field route_to_session: list[*SESSION_ACCESS*] = []

The UDS session route to reach this session

pydantic model cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**TransmitCertificateParams**

Model defining the parameters for UDS Authentication - Transmit Certificate

Fields

- *certificate_data (bytes)*
- *certificate_evaluation_id (int)*
- *param_type (Literal['TransmitCertificateParams'])*

field certificate_data: Annotated[bytes] [Required]

The Certificate to verify

Constraints

- **func** = <function <lambda> at 0x7f38424edea0>
- **json_schema_input_type** = typing.Any
- **return_type** = PydanticUndefined
- **when_used** = always
- **json_schema** = {'type': 'string'}

field certificate_evaluation_id: int [Required]

Optional unique ID to identify the evaluation type of the transmitted certificate

Constraints

- **ge** = 0
- **le** = 65535

field param_type: Literal['TransmitCertificateParams'] = 'TransmitCertificateParams'

authentication_action()

Return type
AuthenticationAction

class cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**UdsSid**(*value*)

The service IDs standardized by UDS.

For additional information, see https://en.wikipedia.org/wiki/Unified_Diagnostic_Services

class cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**UdsStandardVersion**(*value*)

Model defining the UDS standard versions

pydantic model cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.**UnidirectionalAPCEParams**

Model defining the parameters for UDS Authentication based on unidirectional asymmetric public certificate exchange

Fields

- *param_type (Literal['UnidirectionalAPCEParams'])*

field param_type: Literal['UnidirectionalAPCEParams'] = 'UnidirectionalAPCEParams'

authentication_action()

Return type
AuthenticationAction

3.2 DoIP models

pydantic model cyclarity_in_vehicle_sdk.protocol.doip.impl.doip_models.**DOIP_ENTITY_STATUS**

Model containing information regarding a DoIP entity status response

Fields

- *currently_open_sockets (int)*
- *max_concurrent_sockets (int)*
- *max_data_size (int)*
- *node_type (int)*

field currently_open_sockets: int [Required]

Currently open sockets

field max_concurrent_sockets: int [Required]

Max. concurrent sockets

field max_data_size: int [Required]

Max. data size

field node_type: int [Required]

Node type - DoIP node or a DoIP gateway

pydantic model cyclarity_in_vehicle_sdk.protocol.doip.impl.doip_models.**DOIP_ROUTING_ACTIVATION**

Model containing information regarding a DoIP routing activation response

Fields

- *response_code (int)*
- *source_logical_address (int)*
- *src_addr_range_desc (str)*

field response_code: int [Required]

Routing activation response code

field source_logical_address: int [Required]

Logical address of client DoIP entity

field src_addr_range_desc: str [Required]

Description of the source address

pydantic model cyclarity_in_vehicle_sdk.protocol.doip.impl.doip_models.**DOIP_TARGET**

Model containing information regarding a DoIP entity

Fields

- *destination_port (int)*

- *entity_status_response (cyclarity_in_vehicle_sdk.protocol.doip.impl.doip_models.DOIP_ENTITY_STATUS | None)*
- *routing_activation_response (cyclarity_in_vehicle_sdk.protocol.doip.impl.doip_models.DOIP_ROUTING_ACTIVATION | None)*
- *routing_vehicle_id_response (cyclarity_in_vehicle_sdk.protocol.doip.impl.doip_models.DOIP_VEHICLE_IDENTIFICATION)*
- *source_ip (str)*
- *source_port (int)*
- *target_ip (str)*

field destination_port: int [Required]

target port

field entity_status_response: Optional[*DOIP_ENTITY_STATUS*] = None

DoIP entity status response

field routing_activation_response: Optional[*DOIP_ROUTING_ACTIVATION*] = None

DoIP routing activation response

field routing_vehicle_id_response: *DOIP_VEHICLE_IDENTIFICATION* [Required]

DoIP vehicle announcement/identification message

field source_ip: str [Required]

IP address of the client DoIP entity

field source_port: int [Required]

source port

field target_ip: str [Required]

IP address of the server DoIP entity

pydantic model cyclarity_in_vehicle_sdk.protocol.doip.impl.doip_models.**DOIP_VEHICLE_IDENTIFICATION**

Model containing information regarding DoIP vehicle announcement/identification message

Fields

- *eid (str)*
- *further_action_required (int)*
- *gid (str)*
- *target_address (int)*
- *vin (str)*
- *vin_gid_sync_status (int | None)*

field eid: str = 'This is a unique identification of the DoIP entity'

field further_action_required: int [Required]

Further action required

field gid: str [Required]

This is a unique identification of a group of DoIP entity

field target_address: int [Required]

This is the logical address that is assigned to the responding DoIP entity

field vin: str [Required]

the vehicle's VIN

field vin_gid_sync_status: Optional[int] [Required]

VIN/GID sync. status

3.3 SOME/IP models

class cyclarity_in_vehicle_sdk.protocol.someip.models.someip_models.**Layer4ProtocolType**(*value*)

An enumeration.

pydantic model
cyclarity_in_vehicle_sdk.protocol.someip.models.someip_models.**SOMEIP_ENDPOINT_OPTION**

Model containing information regarding SOME/IP endpoint

Fields

- *endpoint_addr (str)*
- *port (int)*
- *port_type (cyclarity_in_vehicle_sdk.protocol.someip.models.someip_models.Layer4ProtocolType)*

field endpoint_addr: str [Required]

The SOME/IP end point IP address

field port: int [Required]

The SOME/IP end point port

field port_type: *Layer4ProtocolType* [Required]

The SOME/IP end point protocol type either UDP or TCP

pydantic model
cyclarity_in_vehicle_sdk.protocol.someip.models.someip_models.**SOMEIP_EVTGROUP_INFO**

Model containing information regarding SOME/IP event group

Fields

- *eventgroup_id (int)*
- *initial_data (bytes | None)*

field eventgroup_id: int [Required]

The Eventgroup ID

field initial_data: Optional[Annotated[bytes]] = None

Initial data associated with the eventgroup if got received

pydantic model
cyclarity_in_vehicle_sdk.protocol.someip.models.someip_models.**SOMEIP_METHOD_INFO**

Model containing information regarding SOME/IP method

Fields

- *method_id (int)*

- *payload (bytes)*
- *return_code (cyclarity_in_vehicle_sdk.protocol.someip.models.someip_models.SomeIpReturnCode)*

field method_id: int [Required]

The Method ID

field payload: Annotated[bytes] [Required]

The payload associated with the method

Constraints

- **func** = <function <lambda> at 0x7f38424edea0>
- **json_schema_input_type** = typing.Any
- **return_type** = PydanticUndefined
- **when_used** = always
- **json_schema** = {'type': 'string'}

field return_code: *SomeIpReturnCode* [Required]

The return code of the method

pydantic model cyclarity_in_vehicle_sdk.protocol.someip.models.someip_models.**SOMEIP_SERVICE_INFO**

Model containing information regarding service

Fields

- *endpoints (list[cyclarity_in_vehicle_sdk.protocol.someip.models.someip_models.SOMEIP_ENDPOINT_OPTION])*
- *instance_id (int)*
- *major_ver (int)*
- *minor_ver (int)*
- *service_id (int)*
- *ttl (int)*

field endpoints: list[*SOMEIP_ENDPOINT_OPTION*] = []

List of endpoints offered by the service

field instance_id: int [Required]

The instance ID

field major_ver: int [Required]

Major version of the service

field minor_ver: int [Required]

Minor version of the service

field service_id: int [Required]

The Service ID

field ttl: int [Required]

Life time of the entry in seconds

class cyclarity_in_vehicle_sdk.protocol.someip.models.someip_models.**SomeIpReturnCode**(*value*)

An enumeration.

class cyclarity_in_vehicle_sdk.protocol.someip.models.someip_models.**SomeIpSdOptionFlags**(*value*)

An enumeration.

CHAPTER

FOUR

PROTOCOL SPECIFICS APIS

cyclarity_in_vehicle_sdk.protocol.uds.impl.uds_utils.UdsUtils
cyclarity_in_vehicle_sdk.protocol.someip.impl.someip_utils.SomeipUtils
cyclarity_in_vehicle_sdk.protocol.doip.impl.doip_utils.DoipUtils

4.1 cyclarity_in_vehicle_sdk.protocol.uds.impl.uds_utils.UdsUtils

pydantic model cyclarity_in_vehicle_sdk.protocol.uds.impl.uds_utils.**UdsUtils**

Fields

- *attempts (int)*
- *data_link_layer (cyclarity_in_vehicle_sdk.communication.isotp.impl.isotp_communicator.IsoTpCommunicator | cyclarity_in_vehicle_sdk.communication.doip.doip_communicator.DoipCommunicator)*

field attempts: int = 1

Number of attempts to perform the UDS operation if no response was received

Constraints

- **ge** = 1

field data_link_layer: Union[*IsoTpCommunicator*, *DoipCommunicator*] [Required]

authentication(*params*, *timeout=2*)

Initiate UDS Authentication service sequence

Parameters

- **params** (*Type[AuthenticationParamsBase]*) – Set of parameters defined for the desired authentication task
- **timeout** (*float*) – timeout for the UDS operation in seconds

Raises

- **NotImplementedError** – for operations that are not supported yet
- **RuntimeError** – If failed to send the request
- **ValueError** – If parameters are out of range, missing or wrong type

- **NoResponse** – If no response was received
- **InvalidResponse** – with invalid reason, if invalid response has received

Returns
The results code of the authentication action

Return type
AuthenticationReturnParameter

clear_diagnostic_information(*group=16777215*, *memory_selection=None*, *timeout=2*, *standard_version=UdsStandardVersion.ISO_14229_2020*)

Clear Diagnostic Information service (0x14)

Parameters

- **group** (*int, optional*) – DTC mask ranging from 0 to 0xFFFFFF. 0xFFFFFF means all DTCs. Defaults to 0xFFFFFF.
- **memory_selection** (*Optional[int], optional*) – Number identifying the respective DTC memory. Only supported in ISO-14229-1:2020 and above. Defaults to None.
- **timeout** (*float, optional*) – Timeout for the UDS operation in seconds. Defaults to DEFAULT_UDS_OPERATION_TIMEOUT.
- **standard_version** (UdsStandardVersion, *optional*) – the version of the UDS standard we are interacting with. Defaults to ISO_14229_2020.

Raises

- **RuntimeError** – If failed to send the request
- **ValueError** – If parameters are out of range, missing or wrong type
- **NoResponse** – If no response was received
- **InvalidResponse** – with invalid reason, if invalid response has received
- **NegativeResponse** – with error code and code name, If negative response was received

Returns
True if the clear operation was successful, False otherwise

Return type
bool

ecu_reset(*reset_type*, *timeout=2*)

The service "ECU reset" is used to restart the control unit (ECU)

Parameters

- **timeout** (*float*) – timeout for the UDS operation in seconds
- **reset_type** (*int*) – type of the reset (1: hard reset, 2: key Off-On Reset, 3: Soft Reset, .. more manufacture specific types may be supported)

Raises

- **RuntimeError** – If failed to send the request
- **ValueError** – If parameters are out of range, missing or wrong type
- **NoResponse** – If no response was received
- **InvalidResponse** – with invalid reason, if invalid response has received
- **NegativeResponse** – with error code and code name, If negative response was received

Returns
True if ECU request was accepted, False otherwise.

Return type
bool

`model_post_init`(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

`raw_uds_service`(*sid*, *timeout=2*, *sub_function=None*, *data=None*)

sends raw UDS service request and reads response

Parameters

- **sid** (UdsSid) – Service ID of the request
- **timeout** (*float*) – timeout for the UDS operation in seconds
- **sub_function** (*Optional[int], optional*) – The service subfunction. Defaults to None.
- **data** (*Optional[bytes], optional*) – The service data. Defaults to None.

Raises

- **RuntimeError** – If failed to send the request
- **ValueError** – If parameters are out of range, missing or wrong type
- **NoResponse** – If no response was received
- **InvalidResponse** – with invalid reason, if invalid response has received

Returns
Raw UdsResponse

Return type
RawUdsResponse

`read_did`(*didlist*, *timeout=2*)

Read Data By Identifier

Parameters

- **timeout** (*float*) – timeout for the UDS operation in seconds
- **didlist** (*Union[int, list[int]]*) – List of data identifier to read.

Raises

- **RuntimeError** – If failed to send the request
- **ValueError** – If parameters are out of range, missing or wrong type
- **NoResponse** – If no response was received
- **InvalidResponse** – with invalid reason, if invalid response has received
- **NegativeResponse** – with error code and code name, If negative response was received

Returns
Dictionary mapping the DID (int) with the value returned

Return type
dict[int, str]

read_dtc_information(*subfunction*, *status_mask=None*, *severity_mask=None*, *dtc=None*, *snapshot_record_number=None*, *extended_data_record_number=None*, *memory_selection=None*, *timeout=2*, *standard_version=UdsStandardVersion.ISO_14229_2020*)

Read DTC Information service (0x19)

Parameters

- **subfunction** (*int*) – The service subfunction. Values are defined in ReadDTCInformation.Subfunction
- **status_mask** (*Optional[int], optional*) – A DTC status mask used to filter DTC. Defaults to None.
- **severity_mask** (*Optional[int], optional*) – A severity mask used to filter DTC. Defaults to None.
- **dtc** (*Optional[int], optional*) – A DTC mask used to filter DTC. Defaults to None.
- **snapshot_record_number** (*Optional[int], optional*) – Snapshot record number. Defaults to None.
- **extended_data_record_number** (*Optional[int], optional*) – Extended data record number. Defaults to None.
- **memory_selection** (*Optional[int], optional*) – Memory selection for user defined memory DTC. Defaults to None.
- **timeout** (*float, optional*) – Timeout for the UDS operation in seconds. Defaults to DEFAULT_UDS_OPERATION_TIMEOUT.
- **standard_version** (UdsStandardVersion, *optional*) – the version of the UDS standard we are interacting with. Defaults to ISO_14229_2020.

Raises

- **RuntimeError** – If failed to send the request
- **ValueError** – If parameters are out of range, missing or wrong type
- **NoResponse** – If no response was received
- **InvalidResponse** – with invalid reason, if invalid response has received
- **NegativeResponse** – with error code and code name, If negative response was received

Returns
The DTC information response data containing the requested DTC information

Return type
DtcInformationData

request_download(*address*, *memorysize*, *enc_comp=0*, *address_format=4*, *memorysize_format=4*, *timeout=2*)

Send a Request Download UDS message

Parameters

- **timeout** (*float, optional*) – Timeout for the UDS operation in seconds. Defaults to DEFAULT_UDS_OPERATION_TIMEOUT.
- **address** (*int*) – Block ID or address of the relevant memory region to update.
- **memorysize** (*int*) – Size of the memory region to update.

- **enc_comp** (*int, optional*) – Encription and Compression info. Defaults to 0 (no encription and no compression).
- **address_format** (*int, optional*) – Length in bytes of the Address field. Defaults to 4.
- **memorysize_format** (*int, optional*) – Length in bytes of the Size field. Defaults to 4.

Raises

- **RuntimeError** – If failed to send the request
- **ValueError** – If parameters are out of range, missing or wrong type
- **NoResponse** – If no response was received
- **InvalidResponse** – with invalid reason, if invalid response has received
- **NegativeResponse** – with error code and code name, If negative response was received

Returns
Maximum block length for following transfer data.

Return type
int

routine_control(*routine_id*, *control_type*, *timeout=2*, *data=None*)

Sends a request for RoutineControl

Parameters

- **timeout** (*float*) – timeout for the UDS operation in seconds
- **routine_id** (*int*) – The routine ID
- **control_type** (*int*) – Service subfunction
- **data** (*Optional[bytes], optional*) – Optional additional data to provide to the server. Defaults to None.

Raises

- **RuntimeError** – If failed to send the request
- **ValueError** – If parameters are out of range, missing or wrong type
- **NoResponse** – If no response was received
- **InvalidResponse** – with invalid reason, if invalid response has received
- **NegativeResponse** – with error code and code name, If negative response was received

Return type
ResponseData

Returns
RoutingControlResponseData

security_access(*security_algorithm*, *timeout=2*)

Sends a request for SecurityAccess

Parameters

- **timeout** (*float*) – timeout for the UDS operation in seconds

- **security_algorithm** (*Type[SECURITY_ALGORITHM_BASE]*) – security algorithm to use for security access

Raises

- **RuntimeError** – If failed to send the request
- **ValueError** – If parameters are out of range, missing or wrong type
- **NoResponse** – If no response was received
- **InvalidResponse** – with invalid reason, if invalid response has received
- **NegativeResponse** – with error code and code name, If negative response was received

Returns
True if security access was allowed to the requested level. False otherwise

Return type
bool

session(*session*, *timeout=2*, *standard_version=UdsStandardVersion.ISO_14229_2020*)

Diagnostic Session Control

Parameters

- **timeout** (*float*) – timeout for the UDS operation in seconds
- **session** (*int*) – session to switch into
- **standard_version** (*UdsStandardVersion, optional*) – the version of the UDS standard we are interacting with. Defaults to ISO_14229_2020.

Raises

- **RuntimeError** – If failed to send the request
- **ValueError** – If parameters are out of range, missing or wrong type
- **NoResponse** – If no response was received
- **InvalidResponse** – with invalid reason, if invalid response has received
- **NegativeResponse** – with error code and code name, If negative response was received

Return type
ResponseData

Returns
SessionControlResultData

setup()

setup the library

Return type
bool

teardown()

Teardown the library

tester_present(*timeout=2*)

Sends a request for TesterPresent

Parameters
timeout (*float*) – timeout for the UDS operation in seconds

Raises

- **RuntimeError** – If failed to send the request
- **ValueError** – If parameters are out of range, missing or wrong type
- **NoResponse** – If no response was received
- **InvalidResponse** – with invalid reason, if invalid response has received
- **NegativeResponse** – with error code and code name, If negative response was received

Returns
True if tester preset was accepted successfully. False otherwise

Return type
bool

transfer_data(*seq*, *data*, *timeout=2*)

Transfer a block of data as part of Upload or Download session

Parameters

- **timeout** (*float, optional*) – Timeout for the UDS operation in seconds. Defaults to DEFAULT_UDS_OPERATION_TIMEOUT.
- **seq** (*int*) – Sequence nuber of the current TransferData.
- **data** (*bytes*) – Data to be transfered.

Raises

- **RuntimeError** – If failed to send the request
- **ValueError** – If parameters are out of range, missing or wrong type
- **NoResponse** – If no response was received
- **InvalidResponse** – with invalid reason, if invalid response has received
- **NegativeResponse** – with error code and code name, If negative response was received

Return type
None

transfer_exit(*data=None*, *timeout=2*)

Finish transfer session

Parameters

- **data** (*bytes, optional*) – Additional optional data to send to the server
- **timeout** (*float, optional*) – Timeout for the UDS operation in seconds. Defaults to DEFAULT_UDS_OPERATION_TIMEOUT.

Raises

- **RuntimeError** – If failed to send the request
- **ValueError** – If parameters are out of range, missing or wrong type
- **NoResponse** – If no response was received
- **InvalidResponse** – with invalid reason, if invalid response has received
- **NegativeResponse** – with error code and code name, If negative response was received

Returns
The parameter records received from the transfer exit response.

Return type
bytes

transit_to_session(*route_to_session*, *timeout=2*, *standard_version=UdsStandardVersion.ISO_14229_2020*)

Transit to the UDS session according to route

Parameters

- **route_to_session** (*list[SESSION_ACCESS]*) – list of UDS SESSION_ACCESS objects to follow
- **timeout** (*float*) – timeout for the UDS operation in seconds
- **standard_version** (*UdsStandardVersion, optional*) – the version of the UDS standard we are interacting with. Defaults to ISO_14229_2020.

Returns
True if succeeded to transit to the session, False otherwise

Return type
bool

write_did(*did*, *value*, *timeout=2*)

Sends a request for WriteDataByIdentifier

Parameters

- **timeout** (*float*) – timeout for the UDS operation in seconds
- **did** (*int*) – The data identifier to write
- **value** (*str*) – the value to write

Raises

- **RuntimeError** – If failed to send the request
- **ValueError** – If parameters are out of range, missing or wrong type
- **NoResponse** – If no response was received
- **InvalidResponse** – with invalid reason, if invalid response has received
- **NegativeResponse** – with error code and code name, If negative response was received

Returns
True if WriteDataByIdentifier request sent successfully, False otherwise

Return type
bool

4.2 cyclarity_in_vehicle_sdk.protocol.someip.impl.someip_utils.SomeipUtils

pydantic model cyclarity_in_vehicle_sdk.protocol.someip.impl.someip_utils.**SomeipUtils**

find_service(*socket*, *service_id*, *recv_retry=1*, *recv_timeout=0.01*)

SOME/IP Find Service

Parameters

- **socket** (UdpCommunicator | MulticastCommunicator) – A SOME/IP SD socket (UDP) for sending FindService queries A SOME/IP SD socket for receiving offered services response (UDP) from broadcast (Multicast)
- **service_id** (*int*) – The Service ID to try query
- **recv_retry** (*int*) – Retries for receiving data from the SD socket. defaults to 1.
- **recv_timeout** (*float*) – Timeout in seconds for the read operation. defaults to 0.01

Return type
list[*SOMEIP_SERVICE_INFO*]

Returns
list[SOMEIP_SERVICE_INFO] list of found services

method_invoke(*socket*, *service_info*, *method_id*, *recv_timeout=0.01*)

Invoke SOME/IP Method

Parameters

- **socket** (*Union[UdpCommunicator, TcpCommunicator]*) – the end point communicator for method request/response
- **service_info** (SOMEIP_SERVICE_INFO) – information regarding the service in which the method is located
- **method_id** (*int*) – The Method ID
- **recv_timeout** (*float*) – Timeout in seconds for the read operation. defaults to 0.01

Return type
SOMEIP_METHOD_INFO | None

Returns
SessionControlResultData

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

subscribe_evtgrp(*sd_socket*, *ep_socket*, *service_info*, *evtgrpid*, *transport_protocol*, *recv_timeout=0.01*)

Subscribing to an eventgroup and fetch some initial data

Parameters

- **sd_socket** (UdpCommunicator) – A SOME/IP SD socket (UDP) for sending FindService queries
- **ep_socket** (*Union[UdpCommunicator, TcpCommunicator]*) – the end point communicator for receiving the eventgroup data
- **service_info** (SOMEIP_SERVICE_INFO) – information regarding the service in which the event group is located
- **evtgrpid** (*int*) – the event group ID
- **transport_protocol** (Layer4ProtocolType) – the layer 4 protocol type UDP/TCP
- **recv_timeout** (*float*) – Timeout in seconds for the read operation. defaults to 0.01

Return type
SOMEIP_EVTGROUP_INFO | None

Returns
SOMEIP_EVTGROUP_INFO if found. None otherwise

4.3 cyclarity_in_vehicle_sdk.protocol.doip.impl.doip_utils.DoipUtils

pydantic model cyclarity_in_vehicle_sdk.protocol.doip.impl.doip_utils.**DoipUtils**

Fields

- *raw_socket (cyclarity_in_vehicle_sdk.communication.ip.raw.raw_socket.Layer3RawSocket)*

field raw_socket: *Layer3RawSocket* **[Required]**

initiate_routing_activation_req(*source_address*, *target_address*, *client_logical_address*, *timeout=2*, *activation_type=ActivationType.Default*, *protocol_version=DoipProtocolVersion.DoIP_13400_2012*, *vm_specific=None*)

Initiate Routing activation request

Parameters

- **source_address** (*IPvAnyAddress*) – source IP address
- **target_address** (*IPvAnyAddress*) – target IP address
- **client_logical_address** (*int*) – client's logical address
- **timeout** (*float, optional*) – timeout in seconds for the operation
- **activation_type** (*ActivationType, optional*) – The activation type. Defaults to ActivationType.Default.
- **protocol_version** (*DoipProtocolVersion, optional*) – the Doip Protocol Version. Defaults to DoipProtocolVersion.DoIP_13400_2012.
- **vm_specific** (*int, optional*) – optional vm specific argument. Defaults to None.

Returns
RoutingActivationResponse if got a response, None otherwise

Return type
Optional[RoutingActivationResponse]

static initiate_routing_activation_req_bound(*communicator*, *client_logical_address*, *timeout=2*, *activation_type=ActivationType.Default*, *protocol_version=DoipProtocolVersion.DoIP_13400_2012*, *vm_specific=None*)

Initiate Routing activation request via the provided communicator

Parameters

- **communicator** (*Type[CommunicatorBase]*) – communicator to perform the request over
- **client_logical_address** (*int*) – client's logical address
- **timeout** (*float, optional*) – timeout in seconds for the operation
- **activation_type** (*ActivationType, optional*) – The activation type. Defaults to ActivationType.Default.

- **protocol_version** (*DoipProtocolVersion, optional*) – the Doip Protocol Version. Defaults to DoipProtocolVersion.DoIP_13400_2012.
- **vm_specific** (*int, optional*) – optional vm specific argument. Defaults to None.

Returns
RoutingActivationResponse if got a response, None otherwise

Return type
Optional[RoutingActivationResponse]

initiate_vehicle_identity_req(*source_address*, *source_port*, *target_address*, *protocol_version=DoipProtocolVersion.DoIP_13400_2012*, *eid=None*, *vin=None*)

Initiate Vehicle identification request

Parameters

- **source_address** (*IPvAnyAddress*) – source IP address for the request
- **source_port** (*int*) – source port for the request
- **target_address** (*IPvAnyAddress*) – target IP address
- **protocol_version** (*DoipProtocolVersion, optional*) – the Doip Protocol Version. Defaults to DoipProtocolVersion.DoIP_13400_2012.
- **eid** (*bytes, optional*) – eid. Defaults to None.
- **vin** (*str, optional*) – vin. Defaults to None.

Returns
if got a response, None otherwise

Return type
VehicleIdentificationResponse

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

static read_uds_response(*communicator*, *timeout*)

Reads a UDS response

Parameters

- **communicator** (*Type[CommunicatorBase]*) – communicator to read the response over
- **timeout** (*float*) – timeout in seconds for the operation

Returns
UDS response in bytes if received a valid response, False otherwise

Return type
Optional[bytes]

req_entity_status(*source_address*, *source_port*, *target_address*, *protocol_version=DoipProtocolVersion.DoIP_13400_2012*)

Initiate Entity status request

Parameters

- **source_address** (*IPvAnyAddress*) – source IP address
- **source_port** (*int*) – source port

- **target_address** (*IPvAnyAddress*) – target IP address
- **protocol_version** (*DoipProtocolVersion, optional*) – the Doip Protocol Version. Defaults to DoipProtocolVersion.DoIP_13400_2012.

Returns
if got a response, None otherwise

Return type
EntityStatusResponse

static send_uds_request(*logger*, *communicator*, *payload*, *client_logical_address*, *target_logical_address*, *timeout*)

Sends a UDS request

Parameters

- **communicator** (*Type[CommunicatorBase]*) – communicator to perform the request over
- **payload** (*bytes*) – the UDS request payload
- **client_logical_address** (*int*) – client's logical address
- **target_logical_address** (*int*) – target's logical address
- **timeout** (*float*) – timeout in seconds for the operation

Returns
number of bytes actually sent

Return type
int

setup()

Opens the socket for communicating with the target

Returns
True if succeeded False otherwise

Return type
bool

teardown()

Closes communications with the target

Returns
True if succeeded False otherwise

Return type
bool

CHAPTER

FIVE

SHELL DEVICES

cyclarity_in_vehicle_sdk.utils.shell_device.impl.adb_device_shell.AdbDeviceShell
cyclarity_in_vehicle_sdk.utils.shell_device.impl.serial_device_shell.SerialDeviceShell
cyclarity_in_vehicle_sdk.utils.shell_device.impl.ssh_device_shell.SshDeviceShell

5.1 cyclarity_in_vehicle_sdk.utils.shell_device.impl.adb_device_shell.AdbDevic

pydantic model
cyclarity_in_vehicle_sdk.utils.shell_device.impl.adb_device_shell.**AdbDeviceShell**

Fields

- *adb_authentication_method (Literal['None', 'Key'])*
- *adb_ip (str)*
- *adb_port (int | None)*
- *adb_private_key (str | None)*
- *adb_public_key (str | None)*

Validators

- *validate_ip* » *adb_ip*

field adb_authentication_method: Literal['None', 'Key'] [Required]

Authentication method for interface

field adb_ip: str [Required]

shell interface ip OR 'usb'

Validated by

- *validate_ip*

field adb_port: Optional[int] = 5555

shell interface port

field adb_private_key: Optional[str] = None

private key (RSA-2048) for shell interface in base64

field adb_public_key: Optional[str] = None

public key (RSA-2048) for shell interface in base64

exec_command(*command*, *testcase_filter=None*, *return_stderr=False*, *verbose=False*)

This method executes a given command via adb interface and returns the output. If a testcase_filter is provided, it only returns lines that contain the filter string. If return_stderr is True, it also returns the stderr content (Not yet implemented!!!).

Parameters

- **command** (str) – String that represents the command to be executed.
- **testcase_filter** (Optional[str]) – Optional string used to filter the command's output.
- **return_stderr** (bool) – Optional boolean used to determine if stderr should be returned.
- **verbose** (bool) – Optional boolean used to log execution data

Return type

Union[Tuple[str, ...], Tuple[Tuple[str, ...], str]]

Returns

A tuple containing the command's output lines that match the testcase_filter and optionally stderr content. If no filter is provided, it returns all output lines.

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

teardown()

This method is intended to close the adb session. If an error occurs during the operation, it is logged and re-raised.

validator validate_ip » adb_ip

5.2 cyclarity_in_vehicle_sdk.utils.shell_device.impl.serial_device_shell.SerialD

pydantic model
cyclarity_in_vehicle_sdk.utils.shell_device.impl.serial_device_shell.**SerialDeviceShell**

Fields

- *serial_authentication_method (Literal['None', 'Password'])*
- *serial_boudrate (int | None)*
- *serial_bytesize (Literal[5, 6, 7, 8] | None)*
- *serial_device_name (str)*
- *serial_dsrdtr (bool | None)*
- *serial_parity (Literal['N', 'E', 'O', 'M', 'S'] | None)*
- *serial_password (str | None)*
- *serial_rtscts (bool | None)*
- *serial_stopbits (Literal[1, 1.5, 2] | None)*

- *serial_timeout (float | None)*
- *serial_username (str | None)*
- *serial_write_inter_byte_timeout (float | None)*
- *serial_write_timeout (float | None)*
- *serial_xonxoff (bool | None)*

field serial_authentication_method: Literal['None', 'Password'] [Required]

Authentication method for interface

field serial_boudrate: Optional[int] = 115200

serial interface baud rate such as 9600 or 115200 etc

field serial_bytesize: Optional[Literal[5, 6, 7, 8]] = 8

serial interface Number of data bits. Possible values: 5, 6, 7, 8

field serial_device_name: str [Required]

serial device name e.g. /dev/ttyUSB0

field serial_dsrdtr: Optional[bool] = False

serial interface enable hardware (DSR/DTR) flow control.

field serial_parity: Optional[Literal['N', 'E', 'O', 'M', 'S']] = 'N'

serial interface enable parity checking. Possible values: 'N', 'E', 'O', 'M', 'S'

field serial_password: Optional[str] = None

Password for shell interface

field serial_rtscts: Optional[bool] = False

serial interface enable hardware (RTS/CTS) flow control

field serial_stopbits: Optional[Literal[1, 1.5, 2]] = 1

serial interface number of stop bits. Possible values: 1, 1.5, 2

field serial_timeout: Optional[float] = 1

serial interface read timeout value.

field serial_username: Optional[str] = None

Username for shell interface

field serial_write_inter_byte_timeout: Optional[float] = None

serial interface inter-character timeout, None to disable (default).

field serial_write_timeout: Optional[float] = None

serial interface write timeout value.

field serial_xonxoff: Optional[bool] = False

serial interface enable software flow control.

exec_command(*command*, *testcase_filter=None*, *return_stderr=False*, *verbose=False*)

This method executes a given command via serial interface and returns the output. If a testcase_filter is provided, it only returns lines that contain the filter string. If return_stderr is True, it also returns the stderr content (Not yet implemented!!!).

Parameters

- **command** (str) – String that represents the command to be executed.

- **testcase_filter** (Optional[str]) – Optional string used to filter the command's output.
- **return_stderr** (bool) – Optional boolean used to determine if stderr should be returned.
- **verbose** (bool) – Optional boolean used to log execution data

Return type
Union[Tuple[str, ...], Tuple[Tuple[str, ...], str]]

Returns
A tuple containing the command's output lines that match the testcase_filter and optionally stderr content. If no filter is provided, it returns all output lines.

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

teardown()

This method is intended to logout the serial session. If an error occurs during the operation, it is logged and re-raised.

5.3 cyclarity_in_vehicle_sdk.utils.shell_device.impl.ssh_device_shell.SshDevic

pydantic model
cyclarity_in_vehicle_sdk.utils.shell_device.impl.ssh_device_shell.**SshDeviceShell**

Fields

- *ssh_authentication_method (Literal['None', 'Password', 'Key'])*
- *ssh_ip (pydantic.networks.IPvAnyAddress)*
- *ssh_password (str | None)*
- *ssh_port (int | None)*
- *ssh_private_key (str | None)*
- *ssh_username (str | None)*

field ssh_authentication_method: Literal['None', 'Password', 'Key'] [Required]
Authentication method for interface

field ssh_ip: IPvAnyAddress [Required]
shell interface ip

field ssh_password: Optional[str] = None
Password for shell interface

field ssh_port: Optional[int] = 22
shell interface port

field ssh_private_key: Optional[str] = None
private key for shell interface in base64

field ssh_username: Optional[str] = None
Username for shell interface

exec_command(*command*, *testcase_filter=None*, *return_stderr=False*, *verbose=False*)

This method executes a given command via ssh and returns the output. If a testcase_filter is provided, it only returns lines that contain the filter string. If return_stderr is True, it also returns the stderr content.

Parameters

- **command** (str) – String that represents the command to be executed.
- **testcase_filter** (Optional[str]) – Optional string used to filter the command's output.
- **return_stderr** (bool) – Optional boolean used to determine if stderr should be returned.
- **verbose** (bool) – Optional boolean used to log execution data

Return type
Union[Tuple[str, ...], Tuple[Tuple[str, ...], str]]

Returns
A tuple containing the command's output lines that match the testcase_filter and optionally stderr content. If no filter is provided, it returns all output lines.

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

open_file(*filepath*, *mode='r'*, *bufsize=-1*)

Return type
SFTPFile

pull_file(*remote_filepath*, *local_filepath*)

push_file(*localpath*, *remotepath*)

teardown()

This method is intended to close the ssh connection. If an error occurs during the operation, it is logged and re-raised.

CHAPTER

SIX

PLUGINS

cyclarity_in_vehicle_sdk.plugin.crash_detection.session_change_detector.SessionChangeCrashDetector
cyclarity_in_vehicle_sdk.plugin.crash_detection.unresponded_tp_crash_detector.UnrespondedTesterPresentCrashDetector
cyclarity_in_vehicle_sdk.plugin.recover_ecu.uds_ecu_recover.UdsEcuRecoverPlugin
cyclarity_in_vehicle_sdk.plugin.reset.relay.relay_reset_plugin.RelayResetPlugin
cyclarity_in_vehicle_sdk.plugin.reset.uds_ecu_reset.uds_ecu_reset.UdsBasedEcuResetPlugin

6.1 cyclarity_in_vehicle_sdk.plugin.crash_detection.session_change_detector.

pydantic model cyclarity_in_vehicle_sdk.plugin.crash_detection.session_change_detector.**SessionChangeCrashDetector**

Fields

- *current_session (int)*
- *operation_timeout (float)*
- *uds_utils (cyclarity_in_vehicle_sdk.protocol.uds.impl.uds_utils.UdsUtils)*

field current_session: int [Required]

Session ID of current session

Constraints

- **gt** = 1
- **le** = 127

field operation_timeout: float = 2

Timeout for the UDS operation in seconds

Constraints

- **gt** = 0

field uds_utils: *UdsUtils* **[Required]**

check_crash()

Return type
bool

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

setup()

Setup the plugin

Return type
None

teardown()

Teardown the plugin

Return type
None

6.2 cyclarity_in_vehicle_sdk.plugin.crash_detection.unresponded_tp_crash_de

pydantic model cyclarity_in_vehicle_sdk.plugin.crash_detection.unresponded_tp_crash_detector.**UnrespondedTesterPresentCrashDetector**

Fields

- *operation_timeout (float)*
- *uds_utils (cyclarity_in_vehicle_sdk.protocol.uds.impl.uds_utils.UdsUtils)*

field operation_timeout: **float = 2**

Timeout for the UDS operation in seconds

Constraints

- **gt** = 0

field uds_utils: *UdsUtils* **[Required]**

check_crash()

Return type
bool

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

setup()

Setup the plugin

Return type
None

teardown()

Teardown the plugin

Return type
None

6.3 cyclarity_in_vehicle_sdk.plugin.recover_ecu.uds_ecu_recover.UdsEcuRecc

pydantic model
cyclarity_in_vehicle_sdk.plugin.recover_ecu.uds_ecu_recover.**UdsEcuRecoverPlugin**

Fields

- *operation_timeout (float)*
- *session_info (cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.SESSION_INFO)*
- *uds_standard_version (cyclarity_in_vehicle_sdk.protocol.uds.models.uds_models.UdsStandardVersion)*
- *uds_utils (cyclarity_in_vehicle_sdk.protocol.uds.impl.uds_utils.UdsUtils)*

field operation_timeout: float = 2

Timeout for the UDS operation in seconds

Constraints

- **gt** = 0

field session_info: *SESSION_INFO* [Required]

The information of the session to recover to

field uds_standard_version: *UdsStandardVersion* = 'ISO_14229_2020'

The standard version of the UDS in the target, defaults to latest (2020)

field uds_utils: *UdsUtils* [Required]

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

recover()

Recover the ECU to a predefined state :returns: True if recovery operation succeeded, False otherwise. :rtype: bool

setup()

Setup the plugin

Return type
None

teardown()

Teardown the plugin

Return type
None

6.4 cyclarity_in_vehicle_sdk.plugin.reset.relay.relay_reset_plugin.RelayResetPl

pydantic model
cyclarity_in_vehicle_sdk.plugin.reset.relay.relay_reset_plugin.**RelayResetPlugin**

Fields

- *boot_sleep (float)*
- *gpio_chip (cyclarity_in_vehicle_sdk.plugin.reset.relay.relay_reset_plugin.GpioChip | str)*
- *reset_pin (int)*
- *shutdown_sleep (float)*

field boot_sleep: float = 1

Sleep after boot request, default to 1 second

Constraints

- **gt** = 0

field gpio_chip: Union[GpioChip, str] [Required]

The gpio chip connected to the relay e.g. /dev/gpiochip4

field reset_pin: int [Required]

Reset relay gpio pin

Constraints

- **ge** = 0

field shutdown_sleep: float = 1

Sleep after shutdown request, default to 1 second

Constraints

- **gt** = 0

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

reset()

Resets the target device :returns: True if reset operation succeeded, False otherwise. :rtype: bool

setup()

Setup the plugin

Return type
None

teardown()

Teardown the plugin

Return type
None

6.5 cyclarity_in_vehicle_sdk.plugin.reset.uds_ecu_reset.uds_ecu_reset.UdsBa

pydantic model
cyclarity_in_vehicle_sdk.plugin.reset.uds_ecu_reset.uds_ecu_reset.**UdsBasedEcuResetPlugin**

Fields

- *operation_timeout (float)*
- *reset_type (int)*
- *uds_utils (cyclarity_in_vehicle_sdk.protocol.uds.impl.uds_utils.UdsUtils)*

field operation_timeout: float = 2

Timeout for the UDS operation in seconds

Constraints

- **gt** = 0

field reset_type: int = 1

Reset type (1: hard reset, 2: key Off-On Reset, 3: Soft Reset, ..). Allowed values are from 0 to 0x7F

Constraints

- **ge** = 0
- **le** = 127

field uds_utils: *UdsUtils* [Required]

model_post_init(**args*, ***kwargs*)

Override this method to perform additional initialization after *__init__* and *model_construct*. This is useful if you want to do some validation that requires the entire model to be initialized.

reset()

Resets the target device :returns: True if reset operation succeeded, False otherwise. :rtype: bool

setup()

Setup the plugin

Return type
None

teardown()

Teardown the plugin

Return type
None

CHAPTER

SEVEN

CONFIGURATION MANAGEMENT

7.1 ConfigurationManager

pydantic model
cyclarity_in_vehicle_sdk.configuration_manager.configuration_manager.**ConfigurationManager**

Fields

- *actions (list[cyclarity_in_vehicle_sdk.configuration_manager.actions.IpAddAction | cyclarity_in_vehicle_sdk.configuration_manager.actions.IpRemoveAction | cyclarity_in_vehicle_sdk.configuration_manager.actions.WifiConnectAction | cyclarity_in_vehicle_sdk.configuration_manager.actions.CanConfigurationAction | cyclarity_in_vehicle_sdk.configuration_manager.actions.EthInterfaceConfigurationAction | cyclarity_in_vehicle_sdk.configuration_manager.actions.CreateVlanAction] | None)*

field actions: Optional[list[Union[*IpAddAction*, *IpRemoveAction*, *WifiConnectAction*, *CanConfigurationAction*, *EthInterfaceConfigurationAction*, *CreateVlanAction*]]] = None

configure_actions(*actions*)

Configures the received actions

Parameters
actions (*Union[ConfigurationAction, list[ConfigurationAction]]*) – list of configuration actions to configure

get_device_configuration()

Get the current device configuration

Returns
the device's current configurations

Return type
DeviceConfiguration

setup()

Configures the received actions from the initialization

teardown()

Cleanup internal objects

7.2 Configuration Management - Models

EthIfFlags(value)	Enum for Ethernet interface flags
InterfaceState(value)	Enum for the state of the Ethernet interface
IpRoute	
CanFdOptions	
CanInterfaceConfigurationInfo	Model of the parameters for the CAN interface configurations
IpConfigurationParams	Model of the parameters for the IP configuration
EthInterfaceParams	Model of the parameters for the Ethernet interface configurations
EthernetInterfaceConfigurationInfo	Model of the parameters for the Ethernet interface information
WifiAccessPointConfigurationInfo	Model of the parameters for the Wifi interface information
DeviceConfiguration	Model of the parameters for the device configuration information

7.2.1 cyclarity_in_vehicle_sdk.configuration_manager.models.EthIfFlags

class cyclarity_in_vehicle_sdk.configuration_manager.models.**EthIfFlags**(*value*)

Enum for Ethernet interface flags

__init__()

Methods

conjugate	Returns self, the complex conjugate of any int.
bit_length()	Number of bits necessary to represent self in binary.
bit_count()	Number of ones in the binary representation of the absolute value of self.
to_bytes(length, byteorder, *[, signed])	Return an array of bytes representing an integer.
from_bytes(byteorder, *[, signed])	Return the integer represented by the given array of bytes.
as_integer_ratio()	Return integer ratio.
get_flags_from_int(flags)	

Attributes

real	the real part of a complex number
imag	the imaginary part of a complex number
numerator	the numerator of a rational number in lowest terms
denominator	the denominator of a rational number in lowest terms
IFF_UP	
IFF_BROADCAST	
IFF_DEBUG	
IFF_LOOPBACK	
IFF_POINTOPOINT	
IFF_NOTRAILERS	
IFF_RUNNING	
IFF_NOARP	
IFF_PROMISC	
IFF_ALLMULTI	
IFF_MASTER	
IFF_SLAVE	
IFF_MULTICAST	
IFF_PORTSEL	
IFF_AUTOMEDIA	
IFF_DYNAMIC	
IFF_LOWER_UP	
IFF_DORMANT	
IFF_ECHO	

7.2.2 cyclarity_in_vehicle_sdk.configuration_manager.models.InterfaceState

class cyclarity_in_vehicle_sdk.configuration_manager.models.**InterfaceState**(*value*)

Enum for the state of the Ethernet interface

__init__()

Methods

encode([encoding, errors])	Encode the string using the codec registered for encoding.
replace(old, new[, count])	Return a copy with all occurrences of substring old replaced by new.
split([sep, maxsplit])	Return a list of the substrings in the string, using sep as the separator string.
rsplit([sep, maxsplit])	Return a list of the substrings in the string, using sep as the separator string.
join(iterable, /)	Concatenate any number of strings.
capitalize()	Return a capitalized version of the string.
casefold()	Return a version of the string suitable for caseless comparisons.
title()	Return a version of the string where each word is titlecased.
center(width[, fillchar])	Return a centered string of length width.
count(sub[, start[, end]])	Return the number of non-overlapping occurrences of substring sub in string S[start:end].
expandtabs([tabsize])	Return a copy where all tab characters are expanded using spaces.
find(sub[, start[, end]])	Return the lowest index in S where substring sub is found, such that sub is contained within S[start:end].
partition(sep, /)	Partition the string into three parts using the given separator.
index(sub[, start[, end]])	Return the lowest index in S where substring sub is found, such that sub is contained within S[start:end].
ljust(width[, fillchar])	Return a left-justified string of length width.
lower()	Return a copy of the string converted to lowercase.
lstrip([chars])	Return a copy of the string with leading whitespace removed.
rfind(sub[, start[, end]])	Return the highest index in S where substring sub is found, such that sub is contained within S[start:end].
rindex(sub[, start[, end]])	Return the highest index in S where substring sub is found, such that sub is contained within S[start:end].
rjust(width[, fillchar])	Return a right-justified string of length width.
rstrip([chars])	Return a copy of the string with trailing whitespace removed.
rpartition(sep, /)	Partition the string into three parts using the given separator.
splitlines([keepends])	Return a list of the lines in the string, breaking at line boundaries.
strip([chars])	Return a copy of the string with leading and trailing whitespace removed.
swapcase()	Convert uppercase characters to lowercase and lowercase characters to uppercase.
translate(table, /)	Replace each character in the string using the given translation table.
upper()	Return a copy of the string converted to uppercase.
startswith(prefix[, start[, end]])	Return True if S starts with the specified prefix, False otherwise.
endswith(suffix[, start[, end]])	Return True if S ends with the specified suffix, False otherwise.

continues on next page

Table 1 – continued from previous page

removeprefix(prefix, /)	Return a str with the given prefix string removed if present.
removesuffix(suffix, /)	Return a str with the given suffix string removed if present.
isascii()	Return True if all characters in the string are ASCII, False otherwise.
islower()	Return True if the string is a lowercase string, False otherwise.
isupper()	Return True if the string is an uppercase string, False otherwise.
istitle()	Return True if the string is a title-cased string, False otherwise.
isspace()	Return True if the string is a whitespace string, False otherwise.
isdecimal()	Return True if the string is a decimal string, False otherwise.
isdigit()	Return True if the string is a digit string, False otherwise.
isnumeric()	Return True if the string is a numeric string, False otherwise.
isalpha()	Return True if the string is an alphabetic string, False otherwise.
isalnum()	Return True if the string is an alpha-numeric string, False otherwise.
isidentifier()	Return True if the string is a valid Python identifier, False otherwise.
isprintable()	Return True if the string is printable, False otherwise.
zfill(width, /)	Pad a numeric string with zeros on the left, to fill a field of the given width.
format(*args, **kwargs)	Return a formatted version of S, using substitutions from args and kwargs.
format_map(mapping)	Return a formatted version of S, using substitutions from mapping.
maketrans	Return a translation table usable for str.translate().
state_from_string(str_state)	

Attributes

UP
DOWN
UNKNOWN

7.2.3 cyclarity_in_vehicle_sdk.configuration_manager.models.IpRoute

pydantic model cyclarity_in_vehicle_sdk.configuration_manager.models.**IpRoute**

Fields

- *gateway (str | None)*

field gateway: Optional[str] = None

Optional parameter the route gateway, none for default gateway

7.2.4 cyclarity_in_vehicle_sdk.configuration_manager.models.CanFdOptions

pydantic model cyclarity_in_vehicle_sdk.configuration_manager.models.**CanFdOptions**

Fields

- *dbitrate (int)*

field dbitrate: int = 2000000

The data bitrate

7.2.5 cyclarity_in_vehicle_sdk.configuration_manager.models.CanInterfaceConfigurationInfo

pydantic model
cyclarity_in_vehicle_sdk.configuration_manager.models.**CanInterfaceConfigurationInfo**

Model of the parameters for the CAN interface configurations

Fields

- *bitrate (int)*
- *cc_len8_dlc (bool)*
- *channel (str)*
- *fd (cyclarity_in_vehicle_sdk.configuration_manager.models.CanFdOptions | None)*
- *sample_point (float)*
- *state (cyclarity_in_vehicle_sdk.configuration_manager.models.InterfaceState)*

field bitrate: int = 500000

Bitrate

field cc_len8_dlc: bool [Required]

cc-len8-dlc flag value

field channel: str [Required]

The CAN interface e.g. can0

field fd: Optional[*CanFdOptions*] = None

Set interface to support CAN-FD

field sample_point: float = 0.875

Sample-point

field state: *InterfaceState* = 'UP'

The state of the CAN interface - UP/DOWN

7.2.6 cyclarity_in_vehicle_sdk.configuration_manager.models.IpConfigurationParams

pydantic model cyclarity_in_vehicle_sdk.configuration_manager.models.**IpConfigurationParams**

Model of the parameters for the IP configuration

Fields

- *interface (str)*
- *ip (pydantic.networks.IPvAnyAddress)*
- *route (cyclarity_in_vehicle_sdk.configuration_manager.models.IpRoute | None)*
- *suffix (int)*

Validators

- *validate_ip_subnet* » all fields

field interface: str [Required]

The network interface for the IP to be configured

Validated by

- *validate_ip_subnet*

field ip: IPvAnyAddress [Required]

The IP to configure, IPv4/IPv6

Validated by

- *validate_ip_subnet*

field route: Optional[*IpRoute*] = None

Optional parameter for setting a route for the IP

Validated by

- *validate_ip_subnet*

field suffix: int [Required]

The subnet notation for this IP address

Validated by

- *validate_ip_subnet*

validator validate_ip_subnet » *all fields*

property cidr_notation: str

7.2.7 cyclarity_in_vehicle_sdk.configuration_manager.models.EthInterfaceParams

pydantic model cyclarity_in_vehicle_sdk.configuration_manager.models.**EthInterfaceParams**

Model of the parameters for the Ethernet interface configurations

Fields

- *flags (list[cyclarity_in_vehicle_sdk.configuration_manager.models.EthIfFlags])*
- *interface (str)*

- *mtu (int | None)*
- *state (cyclarity_in_vehicle_sdk.configuration_manager.models.InterfaceState | None)*

field flags: list[*EthIfFlags*] = ['IFF_BROADCAST', 'IFF_MULTICAST', 'IFF_UP', 'IFF_LOWER_UP', 'IFF_RUNNING']

Flags to apply on the interface

field interface: str [Required]

The Eth interface to be configured

field mtu: Optional[int] = None

MTU (maximum transmission unit)

field state: Optional[*InterfaceState*] = None

Interface State to configure

7.2.8 cyclarity_in_vehicle_sdk.configuration_manager.models.EthernetInterfaceConfigurationIn

pydantic model
cyclarity_in_vehicle_sdk.configuration_manager.models.**EthernetInterfaceConfigurationInfo**

Model of the parameters for the Ethernet interface information

Fields

- *if_params (cyclarity_in_vehicle_sdk.configuration_manager.models.EthInterfaceParams)*
- *ip_params (list[cyclarity_in_vehicle_sdk.configuration_manager.models.IpConfigurationParams])*

field if_params: *EthInterfaceParams* [Required]

field ip_params: list[*IpConfigurationParams*] [Required]

7.2.9 cyclarity_in_vehicle_sdk.configuration_manager.models.WifiAccessPointConfigurationIn

pydantic model
cyclarity_in_vehicle_sdk.configuration_manager.models.**WifiAccessPointConfigurationInfo**

Model of the parameters for the Wifi interface information

Fields

- *connected (bool)*
- *security (str)*
- *ssid (str)*

field connected: bool [Required]

Is the device connected to this access point

field security: str [Required]

The security access of the access point

field ssid: str [Required]

The SSID of the access point

7.2.10 cyclarity_in_vehicle_sdk.configuration_manager.models.DeviceConfiguration

pydantic model cyclarity_in_vehicle_sdk.configuration_manager.models.**DeviceConfiguration**

Model of the parameters for the device configuration information

Fields

- *configurations_info (list[cyclarity_in_vehicle_sdk.configuration_manager.models.ConfigurationInfoBase])*

field configurations_info: list[ConfigurationInfoBase] = []

7.3 Configuration Management - Actions

IpAddAction	Action for adding an IP address to an ethernet interface
IpRemoveAction	Action for removing an IP address to an ethernet interface
WifiConnectAction	Action for connecting to a wifi network
CanConfigurationAction	Action for configuring the CAN interface
EthInterfaceConfigurationAction	Action for configuring the Ethernet interface
CreateVlanAction	Action for creating a VLAN interface linked to an actual Eth interface

7.3.1 cyclarity_in_vehicle_sdk.configuration_manager.actions.IpAddAction

pydantic model cyclarity_in_vehicle_sdk.configuration_manager.actions.**IpAddAction**

Action for adding an IP address to an ethernet interface

Fields

- *action_type (Literal['add_ip'])*

Validators

field action_type: Literal['add_ip'] = 'add_ip'

Validated by

- *validate_ip_subnet*

7.3.2 cyclarity_in_vehicle_sdk.configuration_manager.actions.IpRemoveAction

pydantic model cyclarity_in_vehicle_sdk.configuration_manager.actions.**IpRemoveAction**

Action for removing an IP address to an ethernet interface

Fields

- *action_type (Literal['del_ip'])*

Validators

field action_type: Literal['del_ip'] = 'del_ip'

Validated by

- *validate_ip_subnet*

7.3.3 cyclarity_in_vehicle_sdk.configuration_manager.actions.WifiConnectAction

pydantic model cyclarity_in_vehicle_sdk.configuration_manager.actions.**WifiConnectAction**

Action for connecting to a wifi network

Fields

- *action_type (Literal['wifi_connect'])*
- *password (str)*
- *ssid (str)*

field action_type: Literal['wifi_connect'] = 'wifi_connect'

field password: str [Required]

The pass phrase to use for connecting

field ssid: str [Required]

The SSID of the access point to connect to

7.3.4 cyclarity_in_vehicle_sdk.configuration_manager.actions.CanConfigurationAction

pydantic model
cyclarity_in_vehicle_sdk.configuration_manager.actions.**CanConfigurationAction**

Action for configuring the CAN interface

Fields

- *action_type (Literal['con_conf'])*

field action_type: Literal['con_conf'] = 'con_conf'

7.3.5 cyclarity_in_vehicle_sdk.configuration_manager.actions.EthInterfaceConfigurationAction

pydantic model
cyclarity_in_vehicle_sdk.configuration_manager.actions.**EthInterfaceConfigurationAction**

Action for configuring the Ethernet interface

Fields

- *action_type (Literal['eth_conf'])*

field action_type: Literal['eth_conf'] = 'eth_conf'

7.3.6 cyclarity_in_vehicle_sdk.configuration_manager.actions.CreateVlanAction

pydantic model cyclarity_in_vehicle_sdk.configuration_manager.actions.**CreateVlanAction**

Action for creating a VLAN interface linked to an actual Eth interface

Fields

- *action_type (Literal['vlan_create'])*
- *if_link (str)*
- *if_name (str)*
- *vlan_id (int)*

field action_type: Literal['vlan_create'] = 'vlan_create'

field if_link: str [Required]

The physical interface to link to

field if_name: str [Required]

The new vlan interface name

field vlan_id: int [Required]

The vlan ID

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