Requirement Specification for
`Module socket_protocol`

August 12, 2025

Contents

1 SEC-0001: Message Object **2**

1.1 REQ-0001: Status . . . 2

1.2 REQ-0002: Service-ID . . . 2

1.3 REQ-0003: Data-ID . . . 2

1.4 REQ-0004: Data . . . 2

2 SEC-0002: Communication **2**

2.1 REQ-0005: A full Message Object including the defined properties and data shall be transfered. . . . 2

2.2 REQ-0006: A checksumm shall ensure the correct transmition . . . 3

2.3 REQ-0007: An authentification between server and client shall be possible including status feedback methods . . . 3

2.4 REQ-0014: An automatic authentification shall available . . . 3

2.5 REQ-0008: Communication (rx and tx) shall be disabled, if a secret is given but no authentification had been successfully performed. . . . 3

2.6 REQ-0009: A whitelist for communication (rx and tx) shall be available to enable communication for unauthorised counterparts . . . 3

2.7 REQ-0010: Define a channel name for the server and client after connection is established . . . 4

2.8 REQ-0011: The User shall be able to define a new service . . . 4

2.9 REQ-0012: Registration of already registered request Service-ID or response Service-ID shall not be possible . . . 4

3 SEC-0003: Callbacks **5**

3.1 REQ-0013: It shall be possible to register a callback for a specific Service- and Data-ID . . . 5

3.2 REQ-0015: It shall be possible to register a callback for a specific Service-ID and all Data-IDs . . . 5

3.3 REQ-0016: It shall be possible to register a callback for a specific Data-IDs and all Service-IDs . . . 5

3.4 REQ-0017: It shall be possible to register a callback for all incomming messages . . . 5

3.5 REQ-0018: Callback choice, if several callbacks are available (caused by wildcard callbacks) . . . 5

4 SEC-0004: Some additional Information and Passthrough Methods **5**

4.1 REQ-0020: Connection established information . . . 5

4.2 REQ-0021: Is connected information . . . 5

4.3 REQ-0022: Reconnect Method . . . 5

5 SEC-0005: Depreceated struct protocol **5**

5.1 REQ-0023: A full Message Object including the defined properties and data shall be transfered. . . . 5

1 SEC-0001: Message Object

1.1 REQ-0001: Status

The Status shall hold some general information (in most cases it is used by the responder). Examples: Okay, Service or Data unknown, Operation not permitted, Authentification required, ...

Reason	Give the possibility to transfer additional status information (e.g. to explain negative responses).
Fitcriterion	A Status is part of the Message Object and it is holding the Status information.

1.2 REQ-0002: Service-ID

The Service-ID shall hold information about the type of the request / corresponding response. Examples: read request, write request, read response, write response, ...

Reason	Give the requestor the possibility to use different types (Services) for a transfer.
Fitcriterion	A Service-ID is part of the Message Object and it is holding the Service-ID information.

1.3 REQ-0003: Data-ID

The Data-ID shall hold information to differtiate the data for a specific Service.

Reason	Give the possibility to transfer different information for each Service.
Fitcriterion	A Data-ID is part of the Message Object and it is holding the Data-ID information.

1.4 REQ-0004: Data

The Data shall hold the data to be transfered. For the most requests not data is transmitted.

Reason	Give the possibility to transfer Data.
Fitcriterion	Data is part of the Message Object and it is holding the Data information.

2 SEC-0002: Communication

2.1 REQ-0005: A full Message Object including the defined properties and data shall be transfered.

Every Communication shall transfer a complete message with its content.

Reason	See Reasons for every single information of the Message Object.
Fitcriterion	Send two different messages and compare the received message with each sent message.

2.2 REQ-0006: A checksumm shall ensure the correct transmition

If the checksum does not fit to the checksum of the transferred data, the message will be ignored, because the complete content including the Service- and Data-ID is possibly corrupted.

Reason	Ensure correct data transfer.
Fitcriterion	Corrupted message is not in the receive buffer after transmission.

2.3 REQ-0007: An authentification between server and client shall be possible including status feedback methods

The Client shall have a method to initiate the authentification. In case that the server and the client do have identical secrets, the authentification shall be successfull.

Reason	Message protection (e.g. for secure functions or data)
Fitcriterion	Check authentification method feedback (client) and authentification feedback (client and server), in case of differing and identical secrets.

2.4 REQ-0014: An automatic authentification shall available

An authentification is executed by the client on every connect.

Reason	Simplify handling for authentification.
Fitcriterion	Check authentification feedback (client and server) after connect has been triggered.

2.5 REQ-0008: Communication (rx and tx) shall be disabled, if a secret is given but no authentification had been successfully performed.

Communication (rx and tx) shall be disabled, if a secret is given. Except of a response for registered services, saying that a Authentification is required.

Reason	Message protection (e.g. for secure functions or data)
Fitcriterion	RX and TX is not possible, till a successfull authentification has been performed.

2.6 REQ-0009: A whitelist for communication (rx and tx) shall be available to enable communication for unauthorised counterparts

It shall be possible to add a specific message, identified by Service-ID and Data-ID, to a whitelist. All messages added to that whitelist shall be transmitted and received, if no authentification was successfull performed.

Reason	Give the user the possibility to define messages which will not be protected behind the authentification mechanism.
Fitcriterion	Transmition and Reception will be enabled, after the message has been added to the whitelist.

2.7 REQ-0010: Define a channel name for the server and client after connection is established

After the connection is established, the client will initiate the channel name exchange. The channel name defined on the client side will be dominant.

Reason	Structured logging by creating logger childs for each channel.
Fitcriterion	Perform a channel name exchange with no channel name definition, differing channel name definition and identical channel name definition. In all cases, the channel name of the client will be used. Perform two channel name exchanges with only one channel name definition. This definition will be used.

2.8 REQ-0011: The User shall be able to define a new service

The service is defined by a Request Service-ID and a Response Service-ID.

Reason	Definition of Request and Response SIDs.
Fitcriterion	Define a service and check, that the server will respond on the new Service-ID. The Status shall be "Request has no callback. Data buffered.", because no callback is registered for that request.

2.9 REQ-0012: Registration of already registered request Service-ID or response Service-ID shall not be possible

An exception shall be raised, if a service registration with an existing request SID or response SID is performed.

Reason	Changing existing services will create strange situations with already registered callbacks.
Fitcriterion	Catch exception for registration of existing request and response SID.

3 SEC-0003: Callbacks

3.1 REQ-0013: It shall be possible to register a callback for a specific Service- and Data-ID

3.2 REQ-0015: It shall be possible to register a callback for a specific Service-ID and all Data-IDs

3.3 REQ-0016: It shall be possible to register a callback for a specific Data-IDs and all Service-IDs

3.4 REQ-0017: It shall be possible to register a callback for all incomming messages

3.5 REQ-0018: Callback choice, if several callbacks are available (caused by wildcard callbacks)

4 SEC-0004: Some additional Information and Passthrough Methods

4.1 REQ-0020: Connection established information

4.2 REQ-0021: Is connected information

4.3 REQ-0022: Reconnect Method

5 SEC-0005: Depreceated struct protocol

5.1 REQ-0023: A full Message Object including the defined properties and data shall be transfered.

Every Communication shall transfer a complete message with its content.

Reason	See Reasons for every single information of the Message Object.
Fitcriterion	Send two different messages and compare the received message with each sent message.