

CPTT

Message Lists

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Introduction

What is a Message List?

- Each Message List has a name.
- There are reserved Message List names. A Message List with a reserved name is started under a certain condition. In the following chapters the conditions to start the different Message Lists are described.
- A Message Lists contains Meta Messages.
- Meta Messages are:
 - + AL Message descr.text (Human readable Application Layer Message)
 - + AL Message transparent (Application Layer Message, hex string)
 - + LL Frame transparent (Link Layer Frame, hex string)
 - + User String (text for documentation)
 - + Shutdown link (controlled shutdown of a connection)
 - + Abort link (abort connection)
 - + Delay (delay in milliseconds before next Meta Message is processed)

With IEC 60870-5-101 and -104

There are two different approaches to use Message Lists:

Simple approach

To use Message Lists in the simple approach you need to:

- Navigate to the IEC 60870-5-101 resp. -104 protocol profile window
- Change „Invoke qualified Message List to respond“ to „No“ (Dt. „Zum Antworten starte qual.Nachrichtenliste“ auf „Nein“)

With the simple approach you get the following behavior:

- On Controlling Station:
 - + After the IEC 60870-5-101 Link Layer is normalized resp. IEC 60870-5-104 Data Transfer is started, the Message List „M_EI message“ is started.
 - If no Message List with this name exists you get a warning and no Message is sent.
 - This Message List may contain a IEC 60870-5-101/-104 Message which indicates the (re)start of the device/connection to the opposite station.
 - + After the IEC 60870-5-101 Link Layer is normalized resp. IEC 60870-5-104 Data Transfer is started, the Message List „C_IC command“ is started.
 - If no Message List with this name exist you get a warning and no Message is sent.
 - This Message List should contain a IEC 60870-5-101/-104 Message which activates an interrogation.
- On Controlled Station:
 - + After the IEC 60870-5-101 Link Layer is normalized resp. IEC 60870-5-104 Data Transfer is started, the Message List „M_EI message“ is started.
 - If no Message List with this name exists you get a warning and no Message is sent.
 - This Message List may contain a IEC 60870-5-101/-104 Message which indicates the (re)start of the device/connection to the opposite station.
 - + „C_IC response“
 - If a C_IC_NA_1 ACT Message is received the Message List „C_IC response“ is started.
 - If no Message List with this name exists you get a warning and no Message is sent.
 - This Message List should contain IEC 60870-5-101/-104 Messages which confirm the activation of the interrogation, which deliver the Information Objects of the device and which terminate the activation of the interrogation.
 - + „C_CS response“
 - If a C_CS_NA_1 ACT Message is received the Message List „C_CS response“ is started.
 - If no Message List with this name exists you get a warning and no Message is sent.
 - This Message List should contain a IEC 60870-5-101/-104 Message which confirms the activation of the clock synchronization and returns the current time tag.
 - + „C_RP response“
 - If a C_RP_NA_1 ACT Message is received the Message List „C_RP response“ is started.
 - If no Message List with this name exists you get a warning and no Message is sent.
 - This Message List should contain a IEC 60870-5-101/-104 Message which confirms the activation of the reset process command.

Additionally you can control whether CPTT sends a response with ACTCON, ACTTERM or DEACTCON on an activation/deactivation Message of C_SC_NA_1, C_DC_NA_1, C_RC_NA_1, C_SE_NA_1, C_SE_NB_1, C_SE_NC_1, C_BO_NA_1, C_SC_TA_1, C_DC_TA_1, C_RC_TA_1, C_SE_TA_1, C_SE_TB_1, C_SE_TC_1, C_BO_TA_1, C_TS_NA_1 and C_TS_TA_1:

- Navigate to the of the IEC 60870-5-101 resp. -104 protocol profile window
- Change „Invoke qualified Message List to respond“ to „No“ (Dt. „Zum Antworten starte qual.Nachrichtenliste“ auf „Nein“)
- Change „Auto ACTCON, ACTTERM, DEACTCON“ to „Yes“

You get the following behavior:

- A received Message of the Type Idents mentioned above is mirrored, positive/negative bit and test bit keep unchanged.
- For all Type Idents if the Cause Of Transmission is ACT, the mirrored Message gets COT ACT-CON.
- For C_SC_NA_1, C_DC_NA_1, C_RC_NA_1, C_SC_TA_1, C_DC_TA_1, C_RC_TA_1 with COT ACT+ and qualifier execute you additionally get a Message with ACTTERM+.
- For C_SC_NA_1, C_DC_NA_1, C_RC_NA_1, C_SE_NA_1, C_SE_NB_1, C_SE_NC_1, C_BO_NA_1, C_SC_TA_1, C_DC_TA_1, C_RC_TA_1, C_SE_TA_1, C_SE_TB_1, C_SE_TC_1 and C_BO_TA_1 if the Cause Of Transmission is DEACT, the mirrored Message gets COT DEACTCON.

Advanced approach

To use Message Lists in the advanced approach you need to:

- Navigate to the IEC 60870-5-101 resp. -104 protocol profile window
- Change „Invoke qualified Message List to respond“ to „Yes“ (Dt. „Zum Antworten starte qual.Nachrichtenliste“ auf „Ja“)
- If you change „Auto gen. Response“ to „Yes“ (Dt. „Auto. Generierung Antworten“ auf „Ja“) then if no Message List with the desired name exists then this Message List is automatically created. One or two suitable Messages are put in the automatically generated Message List.

The difference between the simple and the advanced approach is, that with the advanced approach the names of the Message List are qualified. The names contain

- The full Type Ident mnemonic (C_IC_NA_1, ...) of the received Message.
- The Cause Of Transmission including positive/negative bit and test bit.
- The Common Address of the ASDU (the station address).
- The Information Object Address.
- The Message qualifier.

By this you can respond on Messages much more precisely. Now it is possible

- to setup interrogation responses for different stations,
- to control the command response on a object-by-object base,
- to transmitted the new value of an associated Information Object in monitoring direction of a command (e.g. M_SP_NA_1 [retrem+] to a C_SC_NA_1 [act+]).

The notation for the following Message List examples is:

- <cot> is the placeholder for the Cause Of Transmission, e.g. „act+“, „deact+“, „act-“, ...
- <ca> is the placeholder for the Common Address
- <ioa> is the placeholder for the Information Object Address
- <qualifier> is the placeholder for any Message qualifier

With the advanced approach you get the following behavior:

- On Controlling Station:
 - + After the IEC 60870-5-101 Link Layer is normalized resp. IEC 60870-5-104 Data Transfer is started, the Message List „M_EI message“ is started.
 - If no Message List with this name exists you get a warning and no Message is sent.
 - This Message List may contain a IEC 60870-5-101/-104 Message which indicates the (re)start of the device/connection to the opposite station.
 - + After the IEC 60870-5-101 Link Layer is normalized resp. IEC 60870-5-104 Data Transfer is

started, the Message List „C_IC command“ is started.

- If no Message List with this name exists you get a warning and no Message is sent.
- This Message List should contain a IEC 60870-5-101/-104 Message which activates an interrogation.

- On Controlled Station:

- + After the IEC 60870-5-101 Link Layer is normalized resp. IEC 60870-5-104 Data Transfer is started, the Message List „M_EI message“ is started.
 - If no Message List with this name exists you get a warning and no Message is sent.
 - This Message List may contain a IEC 60870-5-101/-104 Message which indicates the (re)start of the device/connection to the opposite station.
- + „C_IC_NA_1 [<cot>] <ca> <ioa>: <qualifier> response“
 - If a C_IC_NA_1 Message with Cause Of Transmission <cot>, Common Address <ca> and Information Object Address <ioa> is received this Message List is started.
 - If no Message List with this name exists you get a warning and no Message is sent.
 - This Message List should contain IEC 60870-5-101/-104 Messages which are appropriate to the received Message, e.g. for „C_IC_NA_1 [act] 1 0: 20 response“ (general interrogation for device 1) Messages which confirm the activation of the interrogation, which deliver the Information Objects of the device and which terminate the activation of the interrogation.
- + „C_CL_NA_1 [<cot>] <ca> <ioa>: <qualifier> response“
 - See above.
- + „C_RD_NA_1 [<cot>] <ca> <ioa> response“
 - <cot> needs to be „req“.
 - If no Message List with this name exists and automatic Message List generation is on, then an empty Message List is created because CPTT doesn't know the Type Ident of the Information Object at <ca> <ioa>.
- + „C_CS_NA_1 [<cot>] <ca> <ioa> response“
 - See above.
- + „C_TS_NA_1 [<cot>] <ca> <ioa>: <qualifier> response“
 - See above.
- + „C_RP_NA_1 [<cot>] <ca> <ioa>: <qualifier> response“
 - See above.
- + „C_TS_TA_1 [<cot>] <ca> <ioa>: <qualifier> response“
 - See above.

To get the same behavior some C_SC_NA_1, C_DC_NA_1, C_SC_TA_1 and C_DC_TA_1 too:

- Navigate to the IEC 60870-5-101 resp. -104 protocol profile window
- Change „Auto ACTCON, ACTTERM, DEACTCON“ to „Yes“

With this you have:

- + „C_SC_NA_1 [<cot>] <ca> <ioa>: <qualifier> response“
 - Here are some examples:
 - „C_SC_NA_1 [act+] 1 2: off response“
 - „C_SC_TA_1 [act+] 1 2: select,off response“
 - „C_SC_NA_1 [act+] 1 2: select,0x4,off response“
- + „C_DC_NA_1 [<cot>] <ca> <ioa>: <qualifier> response“
 - Here are some examples:
 - „C_DC_NA_1 [act+] 1 3: ON response“
 - „C_DC_TA_1 [act+] 1 3: ON response“

For all others you have the same behavior like the simple approach: CPTT sends a response with ACTCON, ACTTERM or DEACTCON on an activation/deactivation Message of C_RC_NA_1, C_SE_NA_1, C_SE_NB_1, C_SE_NC_1, C_BO_NA_1, C_RC_TA_1, C_SE_TA_1, C_SE_TB_1, C_SE_TC_1 and C_BO_TA_1:

You get the following behavior:

- A received Message of the Type Idents mentioned above is mirrored, positive/negative bit and test bit keep unchanged.

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- For all Type Idents if the Cause Of Transmission is ACT, the mirrored Message gets COT ACT-CON.
 - For C_RC_NA_1, C_RC_TA_1 with COT ACT+ and qualifier execute you additionally get a ACT-TERM+.
 - For C_RC_NA_1, C_SE_NA_1, C_SE_NB_1, C_SE_NC_1, C_BO_NA_1, C_RC_TA_1, C_SE_TA_1, C_SE_TB_1, C_SE_TC_1 and C_BO_TA_1 if the Cause Of Transmission is DEACT, the mirrored Message gets COT DEACTCON.

With Landis&Gyr TG 809

Advanced approach

To use Message Lists in the advanced approach you need to:

- Navigate to the Landis&Gyr TG 809 protocol profile window
- Change „Invoke qualified Message List to respond“ to „Yes“ (Dt. „Zum Antworten starte qual.Nachrichtenliste“ auf „Ja“)

The notation for the following Message List examples is:

- <station no> is the placeholder for the Station No.
- <cabinet no> is the placeholder for the Cabinet No. resp. Cubicle No.
- <chassis no> is the placeholder for any Chassis No.
- <slot no> is the placeholder for any Slot No.
- <point no> is the placeholder for any Point No.

With the advanced approach you get the following behavior:

- On Master:
 - + After the Link Layer is normalized, the Message List „GI request“ is started.
 - If no Message List with this name exists you get a warning and no Message is sent.
 - This Message List should contain TG 809 Messages which activates an interrogation.
- On Slave:
 - + „GI Indications response“
 - If no Message List with this name exists you get a warning and no Message is sent.
 - This Message List should contain TG 809 Messages which are appropriate to the received Message.
 - + „GI Measured values response“
 - If no Message List with this name exists you get a warning and no Message is sent.
 - This Message List should contain TG 809 Messages which are appropriate to the received Message.
 - + Response to a Pulse command:
 - With SW = 0:
 - With S = 0 and E = 0 address format: „Pulse command <chassis no>-<slot no>-<point no> response“
 - With S = 0 and E = 1 address format: „Pulse command <cabinet no>-<chassis no>-<slot no>-<point no> response“
 - With S = 1 and E = 0 address format: „Pulse command <station no>---<chassis no>-<slot no>-<point no> response“
 - With S = 1 and E = 1 address format: „Pulse command <station no>-<cabinet no>-<chassis no>-<slot no>-<point no> response“
 - With SW = 1:
 - With S = 0 address format: „Pulse command <point no> response“
 - With S = 1 address format: „Pulse command <station no>-<point no> response“
 - If no Message List with this name exists you get a warning and no Message is sent.
 - This Message List should contain TG 809 Messages which are appropriate to the received Message.
 - + Response to a Setpoint:
 - With SW = 0:
 - With S = 0 and E = 0 address format: „Setpoint <chassis no>-<slot no>-<point no> response“

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- With S = 0 and E = 1 address format: „Setpoint <cabinet no>-<chassis no>-<slot no>-<point no> response“
 - With S = 1 and E = 0 address format: „Setpoint <station no>---<chassis no>-<slot no>-<point no> response“
 - With S = 1 and E = 1 address format: „Setpoint <station no>-<cabinet no>-<chassis no>-<slot no>-<point no> response“
- With SW = 1:
 - With S = 0 address format: „Setpoint <point no> response“
 - With S = 1 address format: „Setpoint <station no>-<point no> response“
 - If no Message List with this name exists you get a warning and no Message is sent.
 - This Message List should contain TG 809 Messages which are appropriate to the received Message.