Solution to redmine 6724

### GOOSE subscribe without publish

May 6, 2024

The expected result of mandatory sGos12 demands that DUT sends (so, it publishes) a GOOSE message. What if DUT does not have Publisher services, or its GoCB do not refer dataset with the subscribed state change?

Some devices only support GOOSE subscribe. To verify the subscription is working it can’t send GOOSE nor a report. For example it may display the value on a webpage. This requires a general change:

To perform the DUT subscribe test procedures in a client device (without GOOSE publish nor report) the DUT shal display the values from the dataset in some method.

To proof a subscribed GOOSE message is processed the test engineer can compare GOOSE value versus the displayed value.

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| **cGos1** | **Subscribe GOOSE message with/without VLAN and Reserverd1 R>0** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 18.2.3IEC 61850-8-1 Subclause 18.1, Annex BPIXIT: Gs8 |
| Expected result1,2,3,4. DUT displays the new value (PIXIT) |
| Test descriptionTest engineer configures the DUT with subscribed GOOSE (ping-pong mechanism) with destination MAC-Address in the recommended range and Reserved fields all zero1. Publisher sends GOOSE message with new data value with the VLAN tag2. Publisher sends GOOSE message with new data value without the VLAN tag3. Publisher sends GOOSE message with new data value with VLAN ID = 04. Publisher sends GOOSE message with new data value with the VLAN tag and Reserved1 R not zero |
| Comment |

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| **cGos2** | **Subscribe GOOSE with ndsCom set** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 18.2.3IEC 61850-8-1 Subclause 18.1 |
| Expected result4. DUT does NOT display the new value (PIXIT) |
| Test description1. Test engineer configures the DUT as specified (without a "safe position" mechanism)
2. Publisher sends GOOSE message with old data value with NdsCom=F
3. Publisher sends GOOSE message with old data value with NdsCom=T
4. Publisher sends GOOSE message with new data value with NdsCom=T
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| CommentNote: The GOOSE subscribe test procedures can only be performed when the device under test does not set a GOOSE subscribe depending value to a safe position in case GOOSE message is lost |

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| **cGos3** | **SqNum roll-over with/without status change** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 18.2.3IEC 61850-8-1 Subclause 18.1PIXIT: Gs4 |
| Expected result1. DUT indicates no error
2. DUT indicates no error
3. DUT displays the new value
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| Test description1. Publisher sends GOOSE message with sqNum = max–1, max and 1 without status change
2. Publisher sends GOOSE message with sqNum = max–1, max
3. Publisher forces a status change stNum and sends a GOOSE message with incremented stNum and sqNum=0
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| Comment |

sGos4 LGOS is not applicable for client device

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| **cGos5** | **Subscribe to data set with structured data (FCD) and destination MAC-address outside recommended range** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 18.2.3IEC 61850-8-1 Subclause 18.1PIXIT: Gs8 |
| Expected result2. DUT displays the new value |
| Test descriptionTest engineer configures the DUT with subscribed GOOSE ping-pong mechanism with destination MAC-Address outside the recommended range1. Publisher sends GOOSE message with structured data
2. Publisher sends GOOSE message with a data change in a data attribute in the structured data
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| Comment |

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| **cGos6** | **Subscribe GOOSE with simulation parameter set** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-1 Subclause 7.8.2IEC 61850-7-2 Subclause 18.2.3.8IEC 61850-8-1 Subclause 18.1PIXIT: Gs9 |
| Expected result1. LPHD.Sim.stVal = FALSE or not present
2. DUT accepts the normal GOOSE messages,
3. DUT ignores the simulated data value change
4. DUT indicates missing GOOSE
5. LPHD.Sim.stVal = TRUE
6. DUT accepts the Publisher 1 GOOSE messages because no simulated GOOSE messages have been received yet, state: subscription normal goose as long as no simulated goose received.DUT accepts GOOSE messages from Publisher 3, LGOS3.St=TRUE and does not change in following steps
7. DUT changes state: subscription simulated GOOSE
8. DUT accepts the simulated data value change
9. DUT state: wait for simulated GOOSE
10. DUT ignores the normal GOOSE messages
11. DUT continues to accept GOOSE messages from Publisher 3
12. DUT wait for normal GOOSE
13. DUT state: subscription normal GOOSE
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| Test descriptionBelow, Publisher 1 and Publisher 2 send same GOOSE differing only in Simulation bits. Publisher 3 sends different GOOSE messages. Publisher 1/2 are supervised by LGOS, publisher 3 is supervised by LGOS3.1. LPHD.Sim=FALSE or not present
2. Force the DUT to ignore simulated GOOSE messages when LPHD.Sim is present
3. Publisher1 sends GOOSE message with a new data value with Simulation off
4. Publisher2 sends GOOSE message with a new data value with Simulation set
5. Publisher1 stops sending GOOSE message, Publisher2 stops sending GOOSE messages
6. LPHD.Sim=TRUE
7. Force the DUT to accept simulated GOOSE messages
8. Publisher1 and Publisher 3 sends GOOSE message with a new data value with Simulation off
9. Then publisher2 starts sending GOOSE message with Simulation set
10. Publisher2 sends GOOSE message with a new data value with Simulation set
11. Publisher2 stops sending GOOSE messages with Simulation set
12. Publisher1 sends GOOSE message with a new data value with Simulation off
13. Publisher1 stops sending GOOSE message with Simulation off
14. Force DUT to accept normal GOOSE messages
15. Publisher1 sends GOOSE message with a new data value with Simulation off
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| CommentPart a) is mandatory; part b) is required only if LPHD.Sim can ever be reported as TRUE |

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| **cGos7** | **GOOSE with maximum name length for DatSet, GoCBRef and GoID** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 18.2.3.8IEC 61850-8-1 Subclause 18.1 |
| Expected result1. The DUT accepts the GOOSE messages and displays data changes  |
| Test description1. Configure the DUT to accept GOOSE messages with maximum name length for DatSet (32), GoCBRef (containing a GoCB of

 32) and GoID (129) |
| Comment |

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| **cGos8** | **Subscribe GOOSE message with non-1 as boolean “true” value** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 18.2.3IEC 61850-8-1 Subclause 18.1 |
| Expected result1. DUT displays the new value
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| Test descriptionTest engineer configures the DUT with subscribed GOOSE (ping-pong mechanism) 1. Publisher sends GOOSE message with boolean “false” as value 0x00
2. Publisher sends GOOSE message withboolean “true” as value 0x02
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| CommentNote the goal is to verify that the subscriber accepts any boolean value >0 as “true” |

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| **cGos9** | **Subscribe GOOSE message with “fixed length” GOOSE** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 18.2.3IEC 61850-8-1 Subclause A.3PIXIT Gs8 |
| Expected result1. DUT displays the new integer value

4. DUT displays the new boolean value  |
| Test descriptionTest engineer configures the DUT with subscribed GOOSE (ping-pong mechanism) containing a “Beh” structure and an integer value and a boolean value. The pong dataset need not need to contain every ping attribute.When INS or ENS subscribe is supported (PIXIT Gs8)1. Publisher sends “fixed length” GOOSE with initial integer value
2. Publisher sends “fixed length” GOOSE with other integer value

When INS subscribe is not supported3. Publisher sends “fixed length” GOOSE with initial boolean value4. Publisher sends “fixed length” GOOSE with other boolean value |

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| **cGos10** | **Subscribe GOOSE message with ldName** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 18.2.3IEC 61850-8-1 Subclause 18.1 |
| Expected result1. DUT displays the new value
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| Test descriptionTest engineer configures the DUT with subscribed GOOSE (ping-pong mechanism) from a GoCB with dataset elements from a logical device with a configured ldName.1. Publisher sends GOOSE messages with boolean “false” value
2. Publisher sends GOOSE messages with boolean “true” value
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| Comment |

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| **cGos11** | **Subscribe GOOSE message with private DO** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 18.2.3IEC 61850-8-1 Subclause 18.1 |
| Expected result1. DUT displays the new value
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| Test descriptionTest engineer configures the DUT with subscribed GOOSE (ping-pong mechanism) from a GoCB with dataset elements from a private logical node and private DO.1. Publisher sends GOOSE messages with boolean “false” value
2. Publisher sends GOOSE messages with boolean “true” value
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| Comment |

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| **cGos12** | **Process first GOOSE message after state change** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 18.2.3.6 |
| Expected result1. DUT displays the new value within 1 second
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| Test descriptionTest engineer configures the DUT with subscribed GOOSE (ping-pong mechanism) 1. Publisher sends multiple GOOSE messages with incremented sqNum, timeAllowedToLive=2000 milliseconds
2. Publisher sends one GOOSE message with incremented stNum, sqNum=0, timeAllowedToLive=2000 milliseconds and wait for 2 seconds (the publisher does not re-transmit the GOOSE message in these 2 seconds)
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| Comment |

Etc…

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| **cGosN1** | **Missing GOOSE message** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 18.2.3IEC 61850-8-1 Subclause 18.1PIXIT: Gs3 |
| Expected result3. DUT may indicate a missing GOOSE and displays the new value |
| Test description1. Test engineer configures the DUT as specified
2. Publisher sends correct GOOSE message with no value changes (same stNum)
3. Publisher sends GOOSE message with data value change with incremented stNum, starting with sqNum=1 (simulating a

 missing sqNum=0) |
| Comment |

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| **cGosN5** | **No GOOSE message** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 18.2.3IEC 61850-8-1 Subclause 18.1, PIXIT: Gs2 |
| Expected result1. DUT indicates that subscribed GOOSE message isn’t received (PIXIT)
2. DUT indicates that subscribed GOOSE message is received again (PIXIT)
3. DUT indicates that subscribed GOOSE message isn’t received (PIXIT)
4. DUT shall display the new value(s)
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| Test description1. Test engineer configures the DUT as specified
2. Publisher sends correct GOOSE message with no value changes (same stNum)
3. Publisher is disconnected from the network, continues to send GOOSE messages for 30 seconds with no state change

 (e.g. same stNum as step 2).1. Publisher is reconnected to the network and continues to send GOOSE messages (same stNum)
2. Publisher is disconnected from the network, continues to send GOOSE messages for 30 seconds with no state change

 (e.g. same stNum as step 2).1. Publisher is reconnected to the network and continues sends GOOSE messages indicating a state change (incremented

 stNum, sqNum other than 0) |
| Comment |

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| **cGosN6** | **Invalid GOOSE message** | [ ]  Passed[ ]  Failed[ ]  Inconclusive |
| IEC 61850-7-2 Subclause 18.2.1, 18.2.3IEC 61850-8-1 Subclause 18.1, Annex C, PIXIT: Gs1 |
| Expected resultDUT processes the GOOSE message values as specified in the PIXIT  |
| Test descriptionTest engineer configures the DUT as specified below and Publisher sends several GOOSE message with data value change with correct status & sequence numbers with: 1. GoCB reference = mismatch with SCL, NULL
2. timeAllowedtoLive = 0
3. datSet reference = mismatch with GoCB from SCL, NULL
4. goID reference = mismatch with GoCB from SCL, NULL
5. timestamp of status change = plus one hour, minus one hour, 0
6. confRev = mismatching with GoCB from SCL
7. numDatSetEntries = mismatch with the expected number of DataSet element members from SCL. The confRev remains as expected, but the numDatSetEntries changes +1 and then -1 and the allData matches the number of numDatSetEntries (+1 add one value at the end and -1 remove last value)
8. values of allData entries (same DatSetReference, same expected ConfRev) = data type values out-of-order
9. APPID = mismatch from GoCB from SCL and 0
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| Comment |

PIXIT Entry

Describe how the values in a GOOSE message are visible to the test engineer

Describe how the GOOSE message errors are visible to the test engineer