Title: Final Disposition of Comments on CD 10747

Source: Project Editor (C. A. Kunzinger, USA)

Project: 1.06.41.05

Reference: 1) CD 10747: *Information Processing Systems - Telecommunications and Information Exchange between Systems - Protocol for the Exchange of Inter-domain Routeing Information among Intermediate Systems to Support Forwarding of ISO 8473 PDUs*

2) SC6 N7089: *Summary of Voting on CD 10747...*

3) SC6 N7089Add: *Summary of Voting on CD 10747...*

4) SC6 N7196: *Editor's Revised Text for CD 10747*

5) SC6 N7195: *Disposition of Comments Report on CD 10747*

6) SC6 N7435: *An Approach to Route Aggregation within RDCs*

7) 2S10: *Use of NLSP in Conjunction with IDRP*

8) SC6 N7430: *Comments on Flow Control Procedures in SC6 N7196*

9) SC6 N7432: *Enhancements to ISO/IEC CD 10747 (IDRP)*

10) 2S26: *Miscellaneous IDRP Comments*

11) SC6 N7441: *Error in IDRP (CD 10747) Tie-breaking Procedure*

12) SC6 N7520: *Instructions to Editor of DIS 10747*

At the July 1992 of SC6 WG2 in San Diego, the editor's revised text (SC6 N7196) and disposition of comments (SC6 N7195) were used as base documents for review of ballot comments contained in the Summary of Voting (SC6 N7089 and 7089 Add.).

Additional comments on SC6 N7196 (contained in references 6 through 11 above) were also considered. All major technical issues upon which the DISAPPROVAL votes had been based were resolved, and pursuant to San Diego resolution 2.8, the editor has produced both revised text SC6 N7692 (DIS 10747) and this updated Disposition of Comments report (SC6 N7693).

This report supersedes the preliminary Disposition of Comments (SC6 N7195), and reflects all agreements reached at the San Diego meeting. This report indicates the comments from SC6 N7089 and SC6 N7089Add by prefixing each comment number with the 2 character code of the country that submitted it.

Major Technical Issues

The two disapproval votes from the USA and the UK were based on the following seven issues, which were resolved as indicated:

1. **Longest Prefix Matching (US 1):** Normative text to require that longest-match prefixes take precedence over shorter appears as the last paragraph of 7.1.2.2 and in the first paragraph of 8.4.

2. **Overlapping Routes (US 2):** Normative text, as proposed by the USA, appears in7.14 (items d-2-i, ii, and iii) and 7.15.3.1.

3. **Efficient Route Withdrawal (GB 1.1):** The editor has incorporated the features desired by the UK into the revised text, but not in the exact form asked for in this comment. In particular, the editor has opted to include new *fields* in the UPDATE PDU to list routes to be withdrawn, rather than creating a new WITHDRAW PDU. This will allow a single UPDATE PDU to both advertise a new route and to withdraw previously advertised routes.

   The UNREACHABLE field has been dropped, and the new fields *Unfeasible Route Count* and *Withdrawn Routes* have been added to the UPDATE PDU. A new path attribute, ROUTE-ID, has also been added, and its usage is described in 7.12.1.

   The function intended for the suggested ROUTE_REPLACES attribute has been incorporated by the resolution of US 2, which provides for implicit route replacement. Hence, the ROUTE_REPLACES attribute was not added to the UPDATE PDU.

   New text to clarify how to handle an aggregated route when one or more of its constituent routes becomes unfeasible has been added to 7.18.2.1.

   The UK concern about clause 8.11 of CD 10747 has become moot, since this clause has been deleted in response to US 5.

4. **Flow Control (GB 1.2, SC6 N7430):** The approach to flow control outlined in this comment has been incorporated in 7.5.3, as modified by the suggestions contained in SC6 N7430. This new text is a complete replacement for clauses 8.5.3, 8.5.4, and 8.5.5 of CD 10747.

5. **Network Independent/Dependent Protocol Aspects (GB 1.3):** This concern has been satisfied by deleting clause 6.12 of CD 10747, and then renaming clause 7 of DIS 10747 ″Elements of Procedure″. Since IDRP runs directly over ISO 8473, which it uses as a SNICP, there appears to be no need to develop a solution which is artificially partitioned into ″network dependent″ and ″network independent″ parts, when in fact IDRP will be run only in conjunction with ISO 8473.

6. **Modifications to ISO 8473 (GB 1.4):** The suggested text changes were made, and appear in clause 9 and Table 5.

   The editor did not delete CD 10747′s clause 8.18.1 in its entirety: to have done so would have deleted all reference to the SPI for IDRP, as well as material on packet bombs. This material was moved to 7.20, and the remainder of CD 10747′s 8.18.1 was then deleted.

7. **Route Aggregation within RDCs (GB 1.5, SC6 N7425):**

   This issue had been left unresolved in the editor′s draft DIS-text (SC6 N7196), with a call for member body comment and discussion. As a result of several technical exchanges between US and UK experts, the solution proposed in SC6 N7435 was reached and agreed on. All text changes outlined in SC6 N7435 have been incorporated into DIS 10747, and the deletions suggested the Appendix of SC6 N7195, item 3, have been made.

As a result of these changes, route aggregation is supported within confederations, and detection of routeing loops is provided for confederations as well as routeing domains. The new aggregation procedures appear in 7.18.2.3, 7.18.2.3.1, and 7.18.2.3.2.

US Comments (Non-major)

The disposition of the non-major comments from the USA was accomplished as follows:

1. (US 3, SC6 N7441) In resolving other comments, the editor found it useful to describe the Decision Process with a 3-phase model, thus requiring editorial rearrangement of existing clauses. Thus, the material suggested by the US for ″Breaking Ties in the Internal Update Process″ actually appears in 7.17.1.1, while the material suggested for ″Breaking Ties among Routes with Equal Degrees of Preference″ actually appears in 7.16.2.1 with the new heading ″Breaking Ties (Phase 2).
2. (US 4) The suggested changes appear in 7.16. For consistency with the remainder of the document, the editor has changed ″path selection″ to ″route selection″ in several places.
3. (US 5) The deletions suggested by the US have been made.
4. (US 6) The material asked to be removed by the US no longer appears in 7.17.2.
5. (US 7) The suggested warning appears as Note 33.
6. (US 8) The suggested changes appear in the description in 6.2 of the OPEN PDU's ″Maximum PDU Size″ field, along with further clarifying material about the BISPDU types to which ″Maximum PDU Size″ will apply. The editor also added text to note that as a minimum, a BIS should be able to handle BISPDUs with lengths up to at least 1024 octets.
7. (US 9) This comment has been answered by the incorporation of the new flow control text suggested by the UK in comment GB 1.2.
8. (US 10) The suggested text appears in 7.17.3.1.
9. (US 11) The MinRouteAdvertisementInterval has been deleted from Table 6, and a new minRouteAdvertisementTimer is described in the GDMO. .
10. (US 12) Text to make the field Error Subcode a mandatory part of the IDRP ERROR PDU has been added to 6.4. Throughout the document, the editor has changed NOTIFICATION PDU to IDRP ERROR PDU in all places where he found the outdated term still in use.
11. (US 13) The text in 7.1.2.1 has been deleted as suggested. However, the editor found it necessary to add a new second paragraph in order to satisfactorily implement the change requested by the USA. In particular, the new text restricts the granularity to semi-octets for those DSPs that have decimal abstract syntax.

    Support of bit-level granularity of prefixes also needed to be brought in line with the convention that fields of BISPDUs must end on octet boundaries: if the prefix length is not an integral number of octets, trailing 0s are now appended to the field as padding.
12. (US 14) The suggested text has been added to 7.11.2, with minor rewording for clarity. The editor also added text to note that the the Empty Distinguishing Attribute is also permissible.
13. (US 15) This concern is satisfied by the new FSM table and the revised descriptions of the FSM states in clauses 7.6ff.
14. (US 16) Suggested changes were made in 5.6.
15. (US 17) Suggested change appears in 7.7.
16. (US 18) The editor believes that this comment should have referenced clause 8.12.2 of CD 10747, rather than 8.12.3. This comment therefore is addressed by the editor's response to US 14.
17. (US 19) The editor has removed all ″CO/CL″ references that he has found within the text.

18. (US 20) Old Annex L (CD 10757) has been deleted, and the suggested note appears as Note 3.

19. (US 21) The material has been rearranged for clarity of presentation. The editor has chosen to present the Decision Process as having three phases, and has arranged the order of presentation to follow the order with which routeing updates are processed. It is believed that this order of presentation is easier to understand than the order of presentation in CD 10747. This material now appears in clause 7.16 and its subclauses.

20. (US 22) A new clause 7.18 (Efficient Organization of Routeing Information) has been created, which includes the material from clauses 8.17.4 through 8.17.5.6 of CD 10747, as requested.

21. (US 23) The requested table appears as Table 1. Entries for *Route-ID* were added by the editor as a result of the resolution of comment GB 1.1.

22. (US 24) References to MD4 have been updated, as suggested.

23. (US 25) Numbering of attributes has been made consistent throughout the standard.

24. (US 26) The corrections suggested in regard to length units have been made--units of octets are used consistently. The term ″RDI prefix″ has been replaced with ″RDI″ wherever it occurred.

25. (US 27) Header length has been corrected throughout the document.

26. (US 28) In resolving this comment, the editor has drawn from the US input, and from the Canadian input contained in SC6 N7069Addendum. The consolidated text was checked as follows:

    a. A separate check of the GDMO had two syntax errors which the editor was unable to resolve. The syntax checker notes errors in the PARAMETERS line of the startEvent and the stopEvent actions in clause 12.5.

    b. A separate check of the ASN.1 syntax showed no errors .

    c. A check of the combined ASN.1 and GDMO showed only the same 2 syntax errors noted above.

27. (US 29) The requested information appears as new Note 17.

28. (US 30,31,32,33,34,35,36) This block of comments all dealt with deficiencies in the description of the IDRP FSM and/or the associated error handling procedures. In reviewing the suggested text, the editor found that there were still many holes in the FSM descriptions.

    As a result, rather than incorporate the US comments as written, the editor generated an exhaustive tabular description of the IDRP FSM, which appears as Table 2. Then, he edited the text of 8.6 and its subclauses as necessary to match the new table.

    As a byproduct of these changes, Figure 6 of CD 10747 has been deleted, and Annex L (Pseudocode) was also deleted. A revised figure would have been too cluttered to convey meaningful information, and informative Annex L was no longer consistent with the revised text that describes the FSM.

    The addition of an ″FSM Error″ to the IDRP ERROR PDU has been included. In reviewing the error handling procedures for RIB REFRESH PDUs, the editor found that it was also necessary to add new fields to the IDRP ERROR PDU description in order to bring the PDU in line with the error procedures: namely, RIB REFRESH PDU error and RIB_REFRESH_PDU_Error Subcode fields were added.

    Finally, any changes to the FSM that were outlined in SC6 N7430 (Flow Control) have been incorporated.

29. (US 37) All miscellaneous changes were accommodated, as appropriate.

US Comments (Non-major)

The disposition of the non-major comments from the UK was accomplished as follows:

1. (GB 2.1) This comment appears to be based on the notion that RDIs are expressed as prefixes within the distribution lists. In fact, the text of CD 10747 was in error, because RDIs should not be expressed as prefixes—this error was also noted in comment US 25.

   The editor has amended the description of the UPDATE PDU to show that RDIs are not encoded as prefixes. Having made this change, the editor believes that GB 2.1 is then made moot.

2. (GB 2.2) New text has been added to 7.12.5 and 7.12.6 to clarify the semantics of an RDI that appears in a distribution list.

   The editor has retained the HIERARCHICAL ATTRIBUTE in the revised text, because the transitivity constraints that can be enforced with HIERARCHICAL RECORDING are not the same as those that can be enforced with distribution lists. For example, constraints imposed by HIERARCHICAL RECORDING are set by the originator of the attribute, and can not be modified by a BIS that receives it. In contrast, a recipient BIS can modify the transitivity constraints carried in a distribution list: that is, the recipient can always impose tighter constraints if it desires to do so.

3. (GB 2.3) No action was felt to be needed on this comment. ISO 8473 is very vague about its usage—for example, ISO 8473 does not include a section equivalent to its discussion of Globally Unique QoS (see ISO 8473, clause 7.6.5.3).

4. (GB 2.4, 2.5) No action was felt to be needed on this comment.

5. (GB 2.6) Although it may seem strange to define high capacity values as indicating lower traffic handling capability than lower values, this is exactly the way things are defined in IS 10589 (see its clause 7.2.2a). To maintain consistency with the Intra-domain routeing protocol, the editor has let the text of CD 10747 stand as written.

6. (GB 3.1) The editor has added text to address the topic of FIB maintenance in new clause 7.18. In reviewing this material, the editor also noticed that nowhere in CD 10747 was there any text to address the updating of the Adj-RIB-Out. Thus, the editor added appropriate text to 7.16.3, 7.17.1, and 7.17.2.

7. (GB 3.2) The editor amended the text of 5.5 to make it clear that confederation members are either individual RDs or confederations. The last sentence of 6.5 in CD 10747 was deleted, as part of the editor's response to GB 3.32.

8. (GB 3.3) The SPI of X'85' has been secured for IDRP. Based on precedent, it appears proper to list it as an architectural constant since this is the approach taken for the protocol identifier in IS 10589.

9. (GB 3.4) The suggested text now appears in clause 6.

10. (GB 3.5) The editor is somewhat confused by this comment--in fact, the text of CD 10747's 8.1.2.1 is taken almost verbatim from clause 7.1.6a of IS 10589--where it apparently has been considered to be correct. Hence, no changes were necessary.

11. (GB 3.7) As in 3.6, the offending text is taken almost verbatim from IS 10589 (see its clause 7.1.7). Hence, the editor has taken no action on this comment.

12. (GB 3.8) The editor sees no harm in retaining the first and third bulleted items of 8.2.1, but does agree that the second item is superfluous. The revised text no longer contains the 2nd item on TRDs, and the heading of the section heading has been given a new name.

The text of 7.2.2 was reworded for clarity, making use of the definition of ″route origin″ suggested in GB 6.2.

The editor agrees that item ″b″ and the third paragraph are informative, but notes that the entire clause itself is informative. Hence, he sees no need either to delete item ″b″ or to demote the last paragraph to a note.

In the absence of a specific reason to do so, and in view of the fact that IS 10589 contains a clause addressing similar issues within the bounds of intra-domain routeing (see IS 10589, clause 7.1.4), the editor has retained clause 7.2 in the revised text.

13. (GB 3.9) ″Tear down″ has been changed to ″close″.

14. (GB 3.10) The CloseWaitDelay timer does take into account the lifetime of BISPDUs originated by the local BIS. Since BISPDUs are encapsulated within 8473 NPDUs, and the maximum lifetime of an 8473 NPDU is 128 seconds, the value of 150 seconds guarantees that any of its outstanding BISPDUs′ lifetimes will have expired before the new sequence numbers are used.

    The lifetime of responses to BISPDUs originated by the local BIS is accommodated by the new FSM state table and accompanying descriptions--a BIS cannot leave the CLOSE-WAIT state until allowing sufficient time for the lifetimes of BISPDUs received from its peer BIS to have expired, nor can it transit into the CLOSED state except from the CLOSE-WAIT state. The editor believes that any exceptional cases are now adequately described by the new FSM state table--that is, the response of an FSM to all input BISPDUs is now unambiguously defined.

15. (GB 3.11) The size of an OPEN PDU has been addressed in the response to US 8.

16. (GB 3.12) This comment is no longer relevant, since 8.5.4 of CD 10747 has been replaced by the new text on Flow Control.

17. (GB 3.13) The last two sentences of the first paragraph of 6.2 have deleted. The contents of the Acknowledgement field of the OPEN PDU are now specified in the description of the FSM, which covers the cases noted in this comments.

18. (GB 3.14, 3.15) These concerns are covered by the new FSM table and the revised descriptions of the FSM states.

19. (GB 3.16) The material in 7.6 about waiting for a CEASE PDU to be acknowledged has been deleted. The behavior upon receipt of an IDRP ERROR PDU has been expanded in the new FSM table, and the FSM state descriptions have been amended accordingly.

20. (GB 3.17) The offending values have been changed in resolving US 11.

21. (GB 3.18) The requirement that a routeing protocol should periodically check the integrity of its RIBs is within the scope of the standard, and has not been removed from the revised text. Note, for example, that a similar clause (7.3.18 of IS 10589) is normative text in the intra-domain routeing standard.

    Finally, the editor notes that GB 3.31 contradicts comment 3.18, since GB 3.31 recommends retaining the text of 8.10.2, but relocating it elsewhere.

22. (GB 3.19) The changes suggested in this comment appear in 7.12.3, the description of the RD_PATH attribute.

23. (GB 3.20) New material appears in 7.12.4 to clarify that a BIS can only advertise to a peer BIS those SNPAs that are associated with the subnetwork to which the local BIS and the peer BIS are attached.

24. (GB 3.21) Text has been added to the third paragraph of both 7.12.5 and 7.12.6 to recognize that a BIS may originate a distribution list and append it to an UPDATE PDU that was received without containing such a list.

25. (GB 3.22, 3.23, 3.24) The last paragraph of 7.12.19 has been changed to indicate that the higher value of priority should be used. A similar change was made in 7.18.2.3 in regard to aggregation of the PRIORITY attribute. These changes make comments GB 3.23 and GB 3.24 no longer valid concerns.

26. (GB 3.25) The selection of a route for subsequent advertisement is determined by local policy. Without knowledge of a BIS's policies, one can not state "a priori" that a given route will or will not be preferred over another. In the example given for the Denial of Service attack, for example, it may well be that the local BIS will have a policy that rejects routes that have an empty distribution list.

    Since policies are not exchanged within the framework of IDRP, it appears that there is nothing that can be done with respect to this comment.

27. (GB 3.26) Clearly, clause 8.17.6 of CD 10747 is informative in nature. The editor notes that it is modelled after clause 7.3.20.1 of IS 10589, which is also informative in nature. Given that this generic type of information is included in IS 10589, it has not been deleted. It appears as clause 7.15.4 in DIS 10747.

28. (GB 3.27) "Version" has been moved from the fixed header to the OPEN PDU.

29. (GB 3.28) The length of the authentication data can be determined by subtracting the lengths of the preceding fields from the total length of the OPEN PDU, as contained in the BISPDU Length field of the fixed header. Hence, no fields beyond the Authentication Data field are considered to be part of the OPEN PDU.

    The editor sees no specific actions that need to be taken to satisfy this comment, and also notes that protocol extensions can be handled via IDRP's version negotiation methods.

30. (GB 3.29) Based on the results of the San DIego session on "Routeing and Security", no action needs to be taken.

31. (GB 3.30) The introductory text for the Update-Receive Process now notes that this process is active only while the BIS is in the ESTABLISHED state. The text in clause 6 now notes that the Update-Receive process is a subset of the Receive process.

32. (GB 3.31) Receipt of a RIB REFRESH PDU has been described included in the description of the Update-Receive process (see item "a" in 7.14), and references to the CHECKSUM PDU have been deleted.

33. (GB 3.32) Clause 7.13, 2nd paragraph, has been amended as suggested.

34. (GB 3.33) No action was deemed necessary on this comment.

35. (GB 3.34) Clause 7.3(a) has been retained. The fact that it is "static" information is not sufficient reason to delete it. Just as IS 10589 makes provision for "static inter-domain routeing" for sending NPDUs out of a routeing domain, so also does CD 10747 support static methods for sending an NPDU into a routeing domain.

36. (GB 3.35) 7.3 d is not concerned with how the information in **INTERNAL-SYSTEMS** was gathered, and hence does not preclude acquiring it through a local interface with an intra-domain routeing protocol, for example. Hence, no action was taken since use of a managed object does not limit the methods by which the information can be acquired.

37. (GB 4.1) A PICS question on size of incoming OPEN PDU has been added to Table A.4.7.

38. (GB 4.2) A PICS question of maximum size of UPDATE, RIB REFRESH, and IDRP ERROR PDUs has been added to Table A.4.7.

39. (GB 4.3) Timers appear in the GDMO descriptions. Timer-related questions were already present in the PICS of CD 10747: see Table A.4.4, items RTSEL and RTORG. It is believed that the CloseWaitDelay timer is already included under Table A.4.3, question FSM.

40. (GB 5.1, 5.2) Both the USA and Canada have submitted revised GDMO and ASN.1 text, which the editor has incorporated, See response to US 28.

41. (GB 6.1) The material is clause 7.21 deals with errors that occur for given types of BISPDUs, not with errors that occur in given FSM states. Hence, the editor has not incorporated this text directly into the textual descriptions of the FSM. Since the FSM table and descriptions now cross-reference the PDU error conditions, and define the effect that they will have on the FSM, no further action is needed.

42. (GB 6.2) The suggested definition now appears in 3.6.

43. (GB 6.3) The editor has corrected those misuses of UPDATE PDU/route that he has found.

44. (GB 7) All minor editorial comments were accommodated, as appropriate.

Resolution of Belgian Comments

1. (BE 1) Accepted
2. (BE 2) Accepted
3. (BE 3) The referenced clause (6.3 of CD 10747) has only one paragraph. Therefore, it appears that the clause reference in this comment is not correct. The editor has therefore taken no action.
4. (BE 4) The type code 5 was previously assigned to a CHECKSUM PDU, which was deleted when the CD-text was produced. The editor agrees that consecutive numbering is preferable, and has adjusted the numbering of BISPDU types accordingly.
5. (BE 5) Consecutive path attribute numbering has been provided (see response to US 25).
6. (BE 6, 7, 8) These comments are handled as part of the new FSM state table and its associated text.
7. (BE 9) The note appears to be superfluous, and has been removed from the revised text.
8. (BE 10) See response to UK 1.4, which the editor believes will satisfy Belgium's concern.

Resolution of Japanese Comments

1. (JP I.1) Based on the discussions in the San Diego session on ″Security and Routeing Protocols″, no action is needed on this comment.
2. (JP I.2) The editor has obtained the identifier X′85′ (see response to GB 3.3).
3. (JP I.3) The text now in 7.1.2.1 in response to comment US 13 resolves this concern.
4. (JP I.4) The problem arose because it was not clear from the typography that NSAP and NSAP′ were actually different quantities. To correct this, the term NSAP′ now appears with underlining and italics.
5. (JP I.5) According to guidelines given to project editors, the section previously labelled ″Informative References″ now appears as Annex B, ″Bibliography″. Since IDRP does not require the use of ISO 10589, it is appropriate to include references to it in the bibliography, rather than in clause 2 of DIS 10747.
6. (JP II) At San Diego, national bodies accepted an outline of an approach for information exchange between ISO 10589 and DIS 10747. The agreement was that this material should be handled as Amendments to the respective routeing protocol standards, and that detailed work would begin after the NPs are approved. Hence, no action is needed now.

   As a result of this decision, Annex H of CD 10747 has been deleted.
7. (JP II.1 and II.2) All occurrences of the word ″Appendix″ have been changed to ″Annex″.
8. (JP III.3) The offending sentence was rewritten and moved to 7.1.2.2.

Resolution of Canadian Comments

1. (CA 1.1) A revised definition for ″inter-domain link″ appears in 3.6.
2. (CA 1.2) The correct value for MinBISPDU length has been used throughout the text.
3. (CA 1.3) In the absence of a strong case for moving the authentication field elsewhere, the editor has left it in its present location.
4. (CA 1.4)

   The checksum function is mandatory because correct operation of the protocol is dependent upon receiving BISPDUs whose data is received without error. Note that this approach is common in routeing algorithms: for example, IS 10589 employs a mandatory checksum in its protocol LSPs.

   Figure 6 has been corrected as suggested.
5. (CA 1.5) Expanded description of the use of CloseWaitDelay is provided by the new FSM Table and the revised FSM descriptions.
6. (CA 1.6) The new FSM table and associated descriptive text is believed to satisfy this concern.
7. (CA 2) Accepted.

   The revised GDMO mentioned in CA 2.16 appeared in SC6 N7089 Add, and has been merged with the US-provided GDMO revision.

Items Arising at the San Diego Meeting

The changes requested in the following documents were incorporated into the DIS text: SC6 N7435, 2S10, SC6 N7430, SC6 N7432, 2S26, and SC6 N7441.

Other Actions

1. All notes throughout the body of the text have been numbered consecutively.
2. Misspellings and bad punctuation have been corrected, where found.
3. A PICS question has been added for the flow control functions.
4. An explicit PICS question has been added to note that peer-entity authentication is an optional function, as agreed in the session on ″Security and Routeing″ held in San Diego.