Title: Alternative to the Methods of X3S3.3/91-293R1

Source: IBM

Reference: X3S3.3/89-267, SEPTEMBER 1989

In its review of 91-293R1, IBM has attempted to separate the functionality from the detailed methods for providing it. If the desired functionality is ″8473-like partial source routeing function on an RD-basis″, this contribution outlines a way to provide this without the necessity for source-based routeing, hierarchical assignment of NSAP addresses based upon the backbones to which a given end-RD is associated, or the introduction of new BISPDUs into IDRP.

An earlier IBM contribution (89-267) outlined a simple way to obtain an RD-based source-routeing function by using the existing source routeing function of ISO 8473 in conjunction with generic NETs. However, since there was no ISO inter-domain routeing project in place at the time of its submission, X3S3.3 took no action on it.

In light of CD 10747, which defines an RDI to be a generic NET, the method proposed in 89-267 is well-suited for use in conjunction with IDRP. For reference, I am reproducing the operative text from 89-267:

Excerpt from 89-267, September 1989

In describing the source routeing function, ISO 8473 states in the second paragraph of clause 6.14:

> Only the titles of intermediate systems network-entities are included in the list; the network entity title of the destination of the PDU is not included in the list.

A literal reading of this text would lead one to conclude that each network entity title in the list must identify an intermediate system. However, we assume that it was not an explicit aim of this clause to preclude the use of generic network entity titles, especially since ISO 7498 provides for their use [7498-1, clause 5.4.1.9]. Rather, we feel that the clause was intended to indicate that neither the network entity title of the source system nor the network entity title of the destination system should be included in a source routeing list.

Therefore, we submit the following text for consideration as a technical corrigendum to replace the text of ISO 8473, clause 6.14, second paragraph, second sentence:

> **Only network entity titles are included in the list; the network entity title of the source and of the destination of the PDU are not included in the list.**

Adoption of this corrigendum will not change the operation of the source routeing function in cases where the source route is specified by network entity titles corresponding to individual intermediate systems; neither will it exclude the use of generic titles to point to sets of systems in cases where this may be advantageous, such as for specifying a path in terms of a sequence of routeing domains to be traversed.

Given that the corrigendum proposed is made, then an an RD-based partial source routeing function can be implemented as follows: *include the RDI of each RD that it is desired to visit in the 8473 partial source routeing list.*

The complementary function that IDRP must provide is the ability to compute routes to a destination RD. This function can be provided within the framework of IDRP by providing a flag in the NLRI field to indicate if the associated information depicts an NSAP address or an RDI. The flag is provided principally so that appropriate aggregation rules can be applied to each type of information. For example, RDIs are never expressed as prefixes, and thus reachable RDs can not be aggregated into a short ″RDI prefix″.

By including RDIs in the NLRI field, it then becomes possible for IDRP to compute routes ″to a given RD″ by the same methods that it uses to compute routes to a destination system.

Finally, ISO 7498-3, clause 5.6, says that ″Generic names are defined to identify sets of objects, with the intent that when a generic name is used to denote an object, the result is that exactly one member of the set of objects will be chosen.″ Let us interpret the generic name (the RDI) as collectively identifying any of the BISs contained in the routeing domain (or RDC). This interpretation is consistent with the last piece of functionality that is needed: namely, that a BIS should advance the indicator in an 8473 source route list whenever the current NET in the list matches either a)its own NET, or b) the RDI of any RD or confederation to which it belongs. Hence, no changes are needed in the basic 8473 source routeing mechanisms to accommodate the desired behavior.

Therefore, IBM concludes that the functionality desired in 91-293 can be accommodated by a minor corrigendum for ISO 8473 and the addition of a flag in IDRP′s NLRI field. Should this function (source routeing on an RD-basis) be desired, IBM feels that the approach defined in this contribution should be considered, including issuance of an appropriate Error Report against ISO 8473.

Fundamental Limitation:

The approached outlined above relies on an extension of the 8473 complete and partial source routeing functions. As such, it inherits their simplicity, but also is subject to their weaknesses. Placement of a desired route in the ISO 8473 source route parameter offers no assurance that the route will actually be taken by the NPDUs. It is the user′s responsibility, not ISO 8473′s, to provide a route that ″makes sense″: that is, it is quite legitimate for the 8473 source route parameter to depict a path that can not be followed (for example, a complete source route that listed non-adjacent NETs, or a partial source route that leads to a ″dead-end″ with respect to reaching the final destination system). In short, ISO 8473 alone provides no guarantee that a requested source route exists, or that, if it exists, it is feasible. It merely guarantees that if the requested route exists and is feasible, then it will be followed.