

Table 4. NPDU-Derived Attribute Set. Some NPDU-derived Distinguishing attributes are by examining the QoS Maintenance Parameter octet for 1 or 0 in the bit positions shown below. The symbol "-" indicates that the corresponding bit does not enter into the determination.

QoS Maintenance Parameter								NPDU-Derived Attributes
b ₈	b ₇	b ₆	b ₅	b ₄	b ₃	b ₂	b ₁	
1	1	-	-	-	1	0	0	Transit Delay
1	1	-	-	-	1	0	1	Transit Delay
1	1	-	-	-	0	0	0	Expense
1	1	-	-	-	0	1	0	Expense
1	1	-	-	-	0	1	1	Residual Error
1	1	-	-	-	1	1	1	Residual Error

— The first two bits of the ISO 8473 QoS Maintenance parameter are decoded:

- a) If they equal '01' then the responsible QoS Authority is indicated by the source NSAP Address, and the NPDU-Derived Distinguishing attribute is determined using the remaining octets of the QoS Maintenance parameter and by applying the rules specified by the QoS Authority and contained in the PIB for selection of the NPDU-Derived Distinguishing attribute. If no such rules exist then no NPDU-Derived Distinguishing attribute shall be associated with this QoS Maintenance parameter.
- b) If they equal '10' then the responsible QoS Authority is indicated by the destination NSAP Address, and the NPDU-Derived Distinguishing attribute is determined using the remaining octets of the QoS Maintenance parameter and by applying the rules specified by the QoS Authority and contained in the PIB for selection of the NPDU-Derived Distinguishing attribute. If no such rules exist then no NPDU-Derived Distinguishing attribute shall be associated with this QoS Maintenance parameter.
- c) If they equal '11' then the NPDU-Derived Distinguishing attribute is as shown in Table 4.

If examination of the 8473 header shows that no NPDU-Derived Distinguished Attributes are present, then the NPDU shall be associated with the Empty Distinguishing Attribute.

8.3 Matching RIB-Att to NPDU-derived Distinguishing Attributes

Within the BIS, each of its FIB(s) has an unambiguous RIB-Att (see clause 7.9.1) which is constructed from the set of Distinguishing Attributes that the local BIS supports. The set of NPDU-derived Distinguishing

Attributes matches a given RIB-Att (which is itself a set of Distinguishing Attributes) when all of the following conditions are satisfied:

- a) Both sets contain the same number of attributes.
 - b) Each instance of a type-specific attribute in the NPDU-derived Distinguishing Attributes must have an equivalent instance in the FIB-Att. The type-specific path attributes supported by IDR are:
 - Transit delay
 - Residual error
 - Expense
 - Priority
 - c) Each instance of a type-value specific attribute in the NPDU-Derived Distinguishing Attributes has a corresponding instance in an FIB's RIB-Att, and, depending on the type of the NPDU-Derived Distinguishing Attribute:
 - LOCALLY DEFINED QOS:** The NSAP Address prefixes and QoS Values are identical.
 - SECURITY:** The same Security Authority is identified in each case.
- Provided that such a RIB-Att can be found then the contents is inspected to find an entry such that:
- a) the NLRI contains the NPDU's destination NSAP Address, or an NSAP Address prefix which is a prefix of the NPDU's destination NSAP Address;
 - b) the subnetwork hop's priority, if present, is less than or equal to the NPDU's priority
 - c) with reference to the applicable Security Policy rules contained in the PIB, the subnetwork hop provides sufficient protection for the NPDU, and the NPDU is permitted to use the subnetwork hop.
 - d) when a type specific NPDU-Derived Distinguishing Attribute has been selected by a rule specified by a QoS Authority from a source or destination spe-

4 cific QoS Maintenance parameter, then an addi-
4 tional matching rule may also be specified that
4 determines whether the value of the QoS metric
4 is acceptable.

4 If such a RIB-Att or entry cannot be found, then
4 perform the following procedure in the order indi-
4 cated, terminating when either a match is found or all
4 three steps have been executed:

4 a) if the NPDU's security parameter does not
4 express a requirement for protection, the SECUR-
4 ITY attribute may be removed from the NPDU-
4 Derived Distinguishing attributes, and the above
4 procedures repeated in order to find a match.

4 b) the PRIORITY attribute may be removed from the
4 NPDU-Derived Distinguishing attributes, and the
4 above procedures repeated in order to find a
4 match.

4 c) LOCALLY DEFINED QOS, EXPENSE, TRANSIT
4 DELAY, or RESIDUAL ERROR (only one of which
4 can be present in a valid set of distinguishing
4 attributes) may be removed from the
4 NPDU-Derived Distinguishing attributes, and the
4 above procedures repeated to find a match.

4 **NOTE 33:** If no match was found in the first two steps,
4 the third step will reduce the NPDU-Derived
4 distinguishing attributes to either an empty
4 set or a single security attribute. In the first
4 case, the empty set will match the Empty
4 RIB-Att; in the second case, there can be
4 either a match or a mismatch with the secu-
4 rity parameter.

8.4 Forwarding to External Destinations

If the destination address of the incoming NPDU depicts a system located in a different routeing domain from the receiving BIS, then the receiving BIS shall use the FIB identified by the FIB-Att that matches the NDPDU-derived Distinguishing Attributes of the incoming NPDU. The incoming NPDU shall be forwarded based on the longest address prefix that matches (as in 7.1.2.2) the destination NSAP address of the incoming NPDU, as follows:

a) If the entry in the inter-domain FIB that corresponds to the destination address of the incoming NPDU contains a NEXT_HOP entry that identifies a BIS which is located on at least one common subnetwork with the local BIS, then the NPDU shall be forwarded directly to the BIS indicated in the NEXT_HOP entry.

b) If the entry in the inter-domain FIB that corresponds to the destination address of the incoming NPDU contains a NEXT_HOP entry that identifies a BIS which is not located on at least one common subnetwork with the local BIS, then the local BIS has the following options:

- 1) **Encapsulate the NPDU:** The local BIS may encapsulate the NPDU, using its own NET as the source address and the NET of the next-hop BIS as the destination address. Copy the following, when present in the header of the encapsulated (inner) NPDU, to the header of the encapsulating (outer) NPDU: QOS Maintenance parameter, Segmentation Permitted Flag, Error Report Flag, and PDU Lifetime field. When the inner NPDU is decapsulated, replace its PDU Lifetime field with PDU Lifetime field of the outer NPDU. The encapsulated NPDU shall then be handed over to the intra-domain routeing protocol.

NOTE 34: It is a local responsibility to insure that the NPDU is encapsulated appropriately for the RD's intra-domain protocol. Since this international standard does not mandate the use of a specific intra-domain protocol, encapsulation details for specific intra-domain protocols are outside its scope.

- 2) **Use Paths Provided by the Intra-domain Routeing Protocol:** The local BIS may query the intra-domain FIB to ascertain if the intra-domain protocol is aware of a route to the destination system⁴. If there is an intra-domain route that supports the QOS Maintenance parameter of the NPDU and will deliver the NPDU to the appropriate next-hop BIS, then the NPDU may be forwarded along this route.

NOTE 35: This case makes use of the intra-domain protocol's knowledge of suitable paths through the local RD which support the specified QOS parameter. It does not require encapsulation of the NPDU.

Details of the mapping between the QOS parameters of used by a given intra-domain protocol and the QOS Maintenance parameter of the NPDU must be determined by the intra-domain routeing protocol; this mapping is not within the scope of IDR. P.

⁴ For example, if ISO 10589 were used as the intra-domain routeing protocol, it would be able to calculate path segments through the RD for systems contained in its "reachable address prefixes".