Network Working Group
Request for Comments: 534
NIC: 17453
References: 512, 516, 533

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17 July 1973

Lost Message Detection

As an aside to RFC 533, note that if sending Hosts do uniquely identify messages on a given link using the extra four bits and receiving Hosts do look at these bits, a lost message detection system such as those suggested in RFCs 512 and 516 drops right out of using of the unique message-id. These extra four bits can be treated as Hathaway's SCB of RFC 512 providing a 16 element sequence number on a per connection basis. A 16 element sequence is sufficient as the IMPs never allow more than four outstanding messages at one time between a given pair of Hosts. As Hathaway also suggests, the 0 element in the sequence can be used to indicate to the receiving Host that sequence numbers are not being used.

To summarize, there appear to be three modes of using the message-id number under Host/Host protocol:

1. The sender can always set the extra four bits to 0 and only transmit one message over a given link at a time -- this is slow but it allows orderly retransmission of messages without any help from the receiver.

2. The receiver can give no help to the sender. In this case it doesn't matter whether the sender uses the extra four bits to uniquely identify the messages or not -- the sender has no method of orderly retransmission, although the sender can accurately identify which message was lost if the sender has uniquely identified the messages.

3. The sender can have multiple messages outstanding (i.e., RFNMs not received) on a given link and the receiver can help the sender. In this case, if the sender uses the extra four bits to uniquely identify the messages in a way which can be synchronized with the receiver (e.g., sequential id numbers), the receiver can reliably detect lost messages.

Although it probably will seem insufficient to some, if the sender and receiver use synchronized unique message-id numbers, very reliable retransmission schemes are readily available. For instance, the sender can retransmit the appropriate messages in response to incomplete transmissions and the receiver can use the unique message-ids to sort the retransmitted messages into the proper order

with the other received messages. Alternatively, the receiver can discard all messages received out of order and the sender can back up and retransmit a message for which an incomplete transmission was received and all subsequent messages.