Comments on IMP/HOST and HOST/IMP Protocol Changes

With reference to RFC's 687, 690, and 692 (NIC's 32564, 32699, and
32734, respectively) by D.C. Walden, J. Postel, and S. Wolfe
(respectively), I would like to offer some observations relative to
current international standards recommendations from working group
6.1 of the International Federation of Information Processing. In a
meeting held last May at the NCC, this working group voted to present
a recommendation to CCITT (International Consultative Committee on
Telephony and Telegraphy of the International Telegraphics Union) for
a standard packet (or DATAGRAM) header.

The proposed packet header format is meant to interface hosts to
packet networks. It is not a header for Host-to-Host protocol, nor
is it an IMP-to-IMP header. The bulk of the header is taken up with
addressing space(96 bits!) since this will be compatible with the
current maximum address space of the telephone system (14 digits).

LOCAL NETWORK FIELD - 4 bits

   This field allows local networks to operate easily on multiple
   formats, since the 4 bits can be used in any fashion desired by
   the local network.

DATAGRAM FORMAT - 4 bits

   This field could be used by ARPANET to contain "1001" binary, so
   as to maintain backward compatibility with the existing message
   leader format.

PACKET TYPE CODE - 8 bits

   This could be used for the HOST/IMP and IMP/HOST code.

FACILITIES - 16 bits

   These bits have not yet been specifically allocated. Some will no
   doubt be for international services (e.g., tracing at gateways
   between networks, accounting, class of service). It was the
   feeling of WG 6.1 members that some of these bits (e.g., 8) might
   be allocated to the originating network (or destination network)
   for its own use.

TEXT LENGTH - 16 bits

   These bits count the number of octets in the text of the packet,
   not including octets in the header (which is fixed in length for
   any particular format).

DESTINATION ADDRESS - 48 bits [1]

   These bits could be allocated in the following way: Destination
   Network Identifier - 8 bits; Destination Host Identifier - 8 bits;
   Destination IMP identifier - 16 bits; Reserved- 16 bits.

SOURCE ADDRESS - 48 bits

   These bits would be used in a fashion similar to the destination
   address bits.

The resulting packet is 144 bits long and adding the present 40-bit
Host-to-Host header results in a total of 184 bits, which is not very
pleasant. A temporary fix (until we can introduce a new NCP design)
might be to squeeze out the reserved 16-bit fields in the source and
destination address fields, giving 32 bits to carry the byte size and
byte count information for the present Host/Host protocol.
Alternatively, the length field of the packet header and one of the
facilities flags (or a whole field) could be used to indicate byte
size and byte count. Either idea would require some fairly
substantial modification of existing NCP programs, so is probably not
very palatable.

Another alternative would be to add a dummy byte after the 144th bit
of header, followed by 40 bits of NCP header, giving a total length
of message leader and NCP header of 192 bits, a number divisible by
12, 16, 24, 32, 48.

With respect to the proposed text length field, although bit lengths
are the most flexible, it seems reasonable to admit that nearly all
data transmission is done in 8-bit quantities, and therefore that bit
lengths are, in fact, an unnecessary luxury. This is a weak argument
when 36-bit and 32-bit machines must interface.

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