IEN: 42
Section: 2.2.2.5.1

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SATNET Information

Addresses

Definitions

The internet gateway is that part of the PDP-11 code which passes messages between networks. It is a Host on two different nets.

The speech host is a different piece of PDP-11 code.

The internal gateway is part of the SIMP code which performs limited gateway functions. It is a Host both on SATNET and one other network.

List of Hosts on SATNET.

At Etam:

The BBN gateway is ARPANET Host 3 on IMP 40 and is SATNET Host 61 (75 octal).
The PDP-11 speech Host is SATNET Host 31.
There is an internal gateway, ARPANET Host 4 on IMP 39 (SDAC) and SATNET Host 32.

At Goonhilly:

The UCL gateway is ARPANET Host 3 on IMP 42 (LONDON), and is SATNET Host 60 (74).
The PDP-11 speech Host is SATNET Host 32.

At Tanum:

The NDRE gateway is ARPANET Host 3 on IMP 41 (NORSAR), and is SATNET Host 38 (46).
The PDP-11 speech host is SATNET Host 33.

At Clarksburg:

The PDP-11 internet gateway is SATNET Host 39.
The PDP-11 speech Host is SATNET Host 34.
There is an internal gateway, RCCNET (Net 3) Host 1 on IMP 51 (63), and SATNET Host 30 (36).

In summary then:

SATNET	ETAM	Goonhilly	Tanum	Clarksburg
Internet Gateway	61 (75)	60 (74)	38 (46)	39 (47)
Speech Host	31 (37)	32 (40)	33 (41)	34 (42)
Internal Gateway	21 (25)	-	-	30 (36)

The notation "xx (yy)" indicates the Host number where xx is the decimal value and yy is the octal value.

ARPANET	ETAM	Goonhilly	Tanum	Clarksburg
Internet Gateway	40-3	42-3	41-3	-
Speech Host	-	-	-	-
Internal Gateway	39-4	-	-	RCC-51-1

The notation "xx-y" means IMP xx and Host y on that IMP (both expressed in decimal).

There are also some permanently assigned group names which may be used to broadcast a message. These group names are valid as Destination addresses, but are not valid as Source addresses.

Group ID	Rate	Members
128. (200)	16K	E G T C
129. (201)	64K	E G T
130. (202)	16K	E G C
131. (203)	16K	E T C
132. (204)	16K	G T C
133. (205)	64K	E G
134. (206)	64K	E T
135. (207)	16K	E C
136. (210)	64K	G T
137. (211)	16K	G C
138. (212)	16K	T C
140. (214)	16K	Etam and Clarksburg, internal gateways

For groups 128 to 138, it is the PDP-11 Host that is the member of the group at the specified location. For example, group ID 134 sends a message to the PDP-11 at Etam and the PDP-11 at Tanum. The

PDP-11 will determine which of its internal parts is to process the message.

Note that when the Host-SIMP protocol arrives, the message will be delivered to the destination with the group ID in the destination field.

Buffer Size

The current size of the buffer used for satellite channel communication is 425 (octal) words. Of this, 400 (256.) words are for data. "Data" is considered to begin immediately following the three word Host-SIMP leader, and continues to the last word of the message. The Internet-Header, if any, is counted as part of the data area. For those who think in terms of bits, 256. words = 4096 bits.

Timestamps

Below is a description of each timestamp implemented in SIMP 3. The order is the order in which a message would ordinarily be stamped.

1. VDH interface (Input from Host to SIMP)

(A) Implementation

When the hardware detects the end of a packet, it initiates an interrupt at level 2 (0 is highest priority, 7 is lowest). Very shortly after the interrupt happens, local time (10us clock) is read, and the time is saved with the incoming packet. The packet is then passed down to a lower processing level.

A little while later, the lower level will take the packet. If it should turn out that this packet was the last packet of a message (and if the message was not previously rejected by the Host-SIMP protocol) then the local time will be converted to global time and written as the value of the timestamp.

This stamp is called level 3.

(B) Comments

If the message is more than one VDH packet long, the earlier packets may have already been copied over into chunk buffers by the time the last packet arrives. This means the stamp ignores the time the SIMP has already spent on the message. This time will show up as a general processing delay. If the VDH line is continuously receiving messages, the intermessage delay time

may be used to estimate the time spent. If the message fits entirely in one packet (SIMP 3.1) the problem vanishes.

It would not be too difficult to timestamp the message with the arrival time of the first packet, if this should prove preferable.

2. Satellite channel output

(A) Implementation

The time that the message is to be sent out is known in advance by the chosen protocol. That time is used for the timestamp. It is the time when the satellite channel will be turned on for the sending of the message.

This stamp is called level 0.

(B) Notes.

The message is timestamped only the first time it is sent. Retransmissions will not cause additional stamping.

3. Satellite channel input.

(A) Implementation

When the first sixteen data bits of an incoming message have been received from the satellite channel, the hardware records the time. This time is later noted and kept with the incoming message.
If the message is from the leader, global time will be updated. This means the relationship between local and global time may change! This change will cause the local SIMP's global time to be brought into line with that of the leader, if it was not already.
The hardware receive time of the message is then converted to global time, and this value is used for the timestamp.

This stamp is called level 0.

(B) Notes

To figure out when the packet has fully arrived in the SIMP, one must add the packet transmission time to the declared receive time. In the case of a mixed rate incoming message, this calculation may be moderately complex.

4. VDH transmit side -- SIMP to Host.

(A) Implementation

When the message is removed from the Host output queue, global time is computed and written as the value of the timestamp.

This stamp is called level 3.

(B) Notes

The following events occur after the timestamp time:

1) Host-SIMP to 1822 leader conversion;

2) Copying message from chunk buffer to VDH packets;

3) Sending packets across VDH line.

Items (2) and (3) occur in parallel. Processing for the next message may be begun when the last packet of the previous message has been queued (software) for eventual output.

5. Message Received

(A) Implementation

When a message is received from the satellite channel, it is in a contiguous buffer. If the message is not destined for a Host on this SIMP, it is thrown away. If kept, it is passed to a lower interrupt level. There the message is copied into chunk buffers and some processing of poda header info occurs. The chunk buffer message is then taken off the queue by the background code, the current time in global time is computed, and this value is used for the timestamp. It is timestamp level 2.

After the message is stamped, the message's checksum will be computed. The message is discarded if the checksum test fails. An ACK will then be created, if one is wanted, to acknowledge the correct receipt of the message. Finally, the message will be handed to Delivery, in the Host protocol module.

(B) Notes

This timestamp may be used to estimate:

1) when the SIMP has finally decided to accept the message;

2) when the ACK for the message is entered;

3) when the message is given to the HPM.

Host Status Measurements

There is a cryptic printout in the Host Status line printed by MON25. Perhaps this will clarify what's happening.

"PS-1/45" means "packets sent". Specifically, the SIMP VDH sent 45 total data packets, 1 of which was a retransmission, during the last reporting interval (approx. one minute intervals).

"PR=2/67" means "packets received". During the last reporting interval, the SIMP VDH received 67 good packets other than Hello/I-heard-You packets. Two packets arrived with hardware checksum errors, and it is unknown what type of packet these might have been originally.

"HI=67/66" means "Hello/I-Heard-You". These packets are required by the VDH protocol. They are used to determine that the VDH connection works well enough to send real data. They are also used to detect the other host going down in the absence of other traffic. In the example, during the last reporting interval, the reporting SIMP received 67 Hellos and received 66 I-Heard-You's.