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The GNOME Controller

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ABSTRACT: This note contains a description of the interfaces that a GNOME controller is expected to satisfy. While it is intended as a specification for the TOPS controller, it is not intended as an implementation guide.

This specification is to be read in conjunction with TR 41, the GNOME User's Guide.

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1. USER COMMAND INTERFACE

This section of the specification describes the terminal interface presented to the user by SANTA, the version of the GNOME controller implemented by UCL on ISIE. As such, it can be taken both as a user guide to that particular implementation and as a guide to other implementations that may be constructed by other experimenters.

Commands issued by the user fall into two classes - firstly, commands intended for the GNOMEs, which is the minimal set that any controller must provide, and secondly a number of local commands. These mostly control the information displayed on the user terminal at various stages, but there are also commands associated with creating and using command file packages.

The ISIE SANTA also contains a set of data collection software. The only direct contact that the user has with this is on entering SANTA. At this point he will be asked whether he wishes data to be appended to an existing file or whether he wishes to create a new file for it. He will also be asked for the file name.

There are several points which apply generally. For all commands, only the amount needed to achieve recognition need be typed, in upper or lower case. The same applies to strings given in answer to prompts for parameters. Comments may be inserted at any point; these are preceded by semi-colons. Where string replies are expected in response to prompts, an incorrect reply will elicit a list of acceptable answers (by first letter only) - otherwise, no help information is currently available outside this document and the GNOME user's guide. Finally, we wish to reemphasise that SANTA cannot be used intelligently without a detailed understanding of the GNOMEs, and therefore the GNOME user's guide is required reading for this document.

1.1. GNOME COMMANDS

The commands described in this section are commands to be relayed to the Head GNOME. In general, the controller will format a command packet for the Head GNOME, inserting user supplied parameters where necessary. Unless it is running in DEBUG mode (see section 1.2.1.2), the packet will automatically be transmitted to the Head GNOME, and the user will shortly afterwards be informed of the result on the command. In DEBUG mode, the transmission process must be handled manually, as will be described in section 1.2.1.2. Between the time the packet is transmitted and the time a reply is received from the GNOME no command input will be accepted (except for control characters) if commands are being read from command files (see section 1.2.2).

1.1.1 SEIZE

This command generates a SEIZE command packet which is sent to the designated Head GNOME. The GNOMEs must be SEIZEd before any other commands will be accepted from SANTA. The user will be prompted to provide the controller with the following information:

Data collection site
Head GNOME
GNOME 2
GNOME 3
etc.

In the SEIZE command, the data collection site and the GNOME sites may be identified either by internet ID or by a string mnemonic. The internet ID consists of three octal integers separated by commas which have the following significance:

<Net Number>,<Host Number>,<IMP Number>

The mnemonic 'here' will identify the data collection site as ISIE. The acceptable mnemonics for the GNOMEs are currently UCL, BBN, NDRE and COMSAT, which will generate the SATNET addresses for these GNOMEs. The order in which the GNOMEs are given to SANTA is important. The first GNOME given is the Head GNOME, and the GNOMEs are referred to internally by their position in the list. In subsequent dialogues involving GNOME IDs, GNOMEs initially identified by internet ID can only be described by their GNOME number; GNOMEs initially identified by mnemonic can be described either by mnemonic or GNOME number.

The list of GNOMEs is terminated by typing <cr> in response to a request for GNOME n. Note that not all the GNOMEs which have been loaded need be included in a SEIZE list.

Thus a sample dialogue might be:

SEIZE<cr>
Data Collection Site: 12,3,52<cr>
Head GNOME: UCL<cr>
GNOME 2: BBN<cr>
GNOME 3: <cr>

If SANTA terminates while the GNOMEs have been SEIZEd but before they have been RELEASEd, the user may recover communication with the GNOMEs by reissuing the original SEIZE command. This will be rejected by the GNOMEs, but it will reinitialise the internal tables in SANTA. Subsequent commands will be accepted by the GNOMEs as they are coming from the site that the GNOMEs recognise as the controller. An alternative (and preferable) method for reinitialising SANTA's internal tables correctly is to request that data be appended to an existing data file when SANTA is reentered. If this is done, SANTA assumes that an experiment is already is progress, and if the user confirms this

assumption it will request information on the configuration if the user confirms this assumption. This information is given through a SEIZE dialogue, but no packet will be created.

1.1.2 LOAD

This command formats a parameter change packet for the GNOMEs. There are two modes for this command - setup mode, in which a traffic pattern is being specified, and change mode, in which the user changes individual parameters. The user is prompted for the GNOME ID of the GNOME in which changes are to be made, and then for the number of the NETACT on that GNOME which is the object of the first parameter change. The controller then prompts for the traffic type, to which the reply Bulk, Stream or Interactive selects setup mode for these traffic types. On selecting these, the user will be prompted for the individual parameters. The prompts in setup mode will include the parameter number of the parameter being set. (The short form of these prompts will consist entirely of these numbers.)

Change mode may be selected by typing None in response to the request for a traffic type, and the user will then be prompted for NETACT Numbers, Parameter Numbers, and Parameter Values until E is typed in response to a request for NETACT Number. Replying <cr> selects the following default values:

NETACT Number - NETACT Number of previous parameter
Parameter Number - No default; prompt is retyped
Parameter Value - 0

A full list of the traffic parameters together with exact details of their interpretation is given in the GNOME user's guide, which we strongly urge the reader to consult before issuing his first LOAD command. The observant reader will notice that GNOME parameter 15 is given two interpretations. In the ISIE SANTA's user interface, these are split into two parameters - parameter 16 becomes the maximum messages outstanding code. Accordingly, in this interface, CPODA priority and delay become parameters 17 and 18 instead of 16 and 17. However, the correct codes for the packet interface are generated.

Two sample dialogues follow.

LOAD<cr>
GNOME: UCL<cr>
NETACT: 1<cr>
(1) Traffic Type: BULK<cr>
(2) Destination GNOME: BBN<cr>
(3) Timestamp Selector: 83<cr>
(4) Delay Before Starting: <cr>
(5) Active Time: 10<cr>
(6) Maximum no. of messages: <cr>
(9) Mean Message Length: 100<cr>

(16) Window Size: 15<cr>
(17) Priority(CPODA only): 7<cr>
(18) Delay(CPODA only): 7<cr>

This dialogue would set up a bulk transfer lasting for 10 seconds across the channel. If we wished to set the mean message size to 50 bytes, we might undertake the following dialogue, selecting change mode:

LOAD<cr>
GNOME: UCL<cr>
NETACT: 1<cr>
(1) Traffic Type: None<cr>
Parameter Code: 9<cr>
(9) Mean message length: 50<cr>

NETACT: E<cr>

1.1.3 LOG

This command formats a packet for the GNOMEs which specifies the data to be collected and returned to the data collection site, as described in section 4.2.2 of the GNOME User's Guide, which we again urge the reader to consult before issuing a LOG command. The user will be prompted to provide the following information:

Number of collecting GNOME
Histogram Action Code (see below)
Number of GNOME generating the traffic being monitored
Number of NETACT on source GNOME
First Statistics Vector Item (see below)
Second Statistics Vector Item (see below)
Frequency of histogram return to data collection site (seconds)
Lower Bound of Histogram
Size of Histogram Bucket

The Action Code indicates the action the GNOMEs are to take in regard to this histogram. The legal responses are Temporary, Permanent or Delete (T, P or D). T specifies that the histogram will be collected for one run only, and will be deleted at the next STOP command. P indicates that the histogram is to be collected until it is deleted or the GNOMEs are released. D indicates that the specified histogram is to be deleted (in this case the last three prompts will not be given).

The two statistics vector items are selected from the list given in section 4.2.6 of the GNOME User's Guide. If the second item is specified as 0 , then the histogram operates in 'successive' mode, i.e. it contains differences between the same data item in successive packets. Otherwise, it is in 'difference' mode, and the value of the second statistics item for a packet is subtracted from the value of the

first. It is emphasised that there are many possible combinations of statistics items which are meaningless; neither SANTA nor the GNOMEs will check your choices for reasonableness.

A sample dialogue, for histogrammong the interarrival times of traffic being sent from COMSAT to BBN, is given below:

```
LOG<cr>
Histogram Site: BBN<cr>
Action Code: PERMANENT<cr>
Traffic Source GNOME: COMSAT<cr>
Traffic Source Netact: 1<cr>
First Statistics Value: 19<cr>
Second Statistics Value: 0<cr>
Send Back Time: 5<cr>
Histogram Lower Bound: 0<cr>
Increment: 5<cr>
```

1.1.4 START

This command formats a packet containing a START command to be sent to the Head GNOME. No additional dialogue is required.

1.1.5 STOP

This command formats a packet containing a STOP command to be sent to the Head GNOME. No additional dialogue is required. The user is reminded that provided maximum time or data limits have been specified, the GNOME Autostop facility will be the normal termination of an experimental run, and the STOP command should be regarded as a manual over-ride.

1.1.6 SYNC

This command formats a packet containg a SYNC command to be sent to the Head GNOME. The SYNC command reestablishes the synchronisation between SIMP and Gateway clocks in the SATNET. Two parameters are requested - the number of times gateways must exchange synchronisation messages with their local SIMPs, and the second is the number of times the SIMPs must exchange synchronisation messages. In both cases, a <cr> response gives a default value of 3.

A typical dialogue follows:

```
SYNC<cr>
```

Number of Gateway-SIMP tries: 5<cr>
Number of SIMP-SIMP tries: 5<cr>

1.1.7 RELEASE

This command formats a packet containing a RELEASE command to be sent to the Head GNOME. No additional dialogue is required.

1.2 LOCAL COMMANDS

The commands described in this section control the internal actions of the controller in relation to the user interface and to command files.

1.2.1 User Interface Commands

1.2.1.1 FORMAT

This command controls the form of the user prompts which SANTA issues. There are two forms - short and full. The user is requested to select which mode he wishes the output to appear in. The possible responses to this are Short and Full. Initially SANTA messages are given in the full form.

A sample dialogue is given below:

FORMAT<cr>
Prompt type: SHORT<cr>

This selects a short typeout form.

1.2.1.2 DEBUG

This command switches the controller in and out of DEBUG mode in a fashion similar to the FORMAT command. In the case of DEBUG, the two modes are D and N (for 'debug' and 'no debug' respectively). In DEBUG mode, all transmissions to the GNOME require explicit user intervention. After a command has been formatted, the user will be asked if he wishes to inspect the command packet. If so, an octal dump of the packet will be displayed on his terminal. The default reply, obtained by <cr>, is No. If the user has requested a typeout, he is then asked if he wishes the packet to be transmitted. The default reply to this question is an optimistic Yes. Initially the controller is in 'no debug' mode.

A sample dialogue for DEBUG follows:

DEBUG<cr>
Mode: DEBUG<cr>

For the example of the LOG command, the typeouts would read:

Type packet? yes<cr>

No	Value	
0	000	350
1	233	000
2	012	003
3	000	050
4	012	001
5	000	064
6	000	016
7	014	140
8	006	000
9	001	001
10	003	001
11	023	000
12	005	000
13	000	000
14	005	000

Transmit packet? no<cr>

1.2.1.3 DISPLAY

This command causes all messages received from the GNOME to be displayed on the user's terminal as raw packet dumps, which is useful for debugging purposes and for an instant inspection of the data to a skilled user. SANTA will prompt for a mode. The two modes are Display and None, which turn the display on and off. The display may also be turned off by typing ^O (see 1.2.3 on Control Characters below). Currently, DISPLAY is completely nonselective. Future versions of this command will enable the user to inspect command replies, or incoming histograms on particular traffic streams, if so desired. The SATNET Fast Analysis program (SFA) can be used to inspect results after an experiment in a summary form.

The incoming data will be displayed as decimal numbers, 13 to a line, split according to the significant fields in the appropriate message.

A sample dialogue is given below:

DISPLAY<cr>
Mode: DISPLAY<cr>

A typical histogram appears as follows:

```
37 65535    1    1    1    1   19    1    5    0    5    0    0
 9     0    0    0    0    0    0    1    0    0    0    1    0
 5     3    0    0    0    0    0    1    0    0    0    0
```

1.2.1.4 QUIT

This command terminates execution of the controller and returns the user to EXEC level. The data file is closed, and any information received from the GNOMEs after QUITting is lost.

1.2.2 Command Files

In addition to submitting commands to the controller through the user terminal directly, it is possible to request that commands be read from a previously prepared batch command file using the READ command. The records in this file consist of the desired commands and associated parameters, entered a line at a time. Command files can be prepared using the RECORD command, which will emulate a normal terminal dialogue to assist the experimenter. When a command file is being run, both the command file entries and the appropriate user prompts will be displayed on a user terminal, so that the transcript will read like a normal controller dialogue. Each command will be processed when the previous command is completed. In the case of all GNOME commands (except START), the controller will wait until a reply is received from the Head GNOME before processing the next command. After a START, the controller waits until the GNOMEs indicate that traffic generation has automatically stopped, or until the user interrupts the terminal (using ^E - see section 1.2.3).

1.2.2.1 READ

This command causes the controller to accept the associated command file as the source of further command input. The user is prompted to provide the name of the command file. A default file name of CANNED.GNM is provided. Only one level of command files is supported - i.e. an attempt to do a READ command from within a command file is ignored. On finishing execution of a command file, new command input is taken from the user terminal.

A sample dialogue follows:

```
READ<cr>
File Name (<cr> defaults to CANNED.GNM) : TEST.EXP<cr>
```

1.2.2.2 RECORD

RECORD causes the controller to create a command file. All subsequent input from the terminal (except control characters) is entered into the file, which can later be replayed using the READ command. The user is prompted to provide the file name. Again, the default name of CANNED.GNM is provided. He is also asked whether he wishes the commands to be transmitted to the GNOMEs during the recording process (a real run) or whether he is just creating a file for later playback (a dummy run).

A sample dialogue follows:

```
RECORD<cr>
Type of run: DUMMY<cr>
File name (<cr> defaults to CANNED.GNM):<cr>
```

1.2.3 Control Characters

SANTA supports a number of control characters. ^C, as usual, will return the user to EXEC. ^O causes DISPLAY output to be suppressed. ^Q gives the time the controller has been waiting for a reply from the last command sent to the GNOME (in the case of START, the controller waits for the Autostop signal - this makes ^Q a useful indicator of how long an experiment has been running). ^E aborts the current command dialogue. This is used with command file input to force the controller to give up waiting for a reply from the GNOME if necessary.

The other control characters are editorial ones. ^A deletes the last character typed from the input buffer, ^W the last word and ^U the whole buffer. These cause the appropriate number of backspaces to be output to the user terminal. ^R causes the current line to be retyped. Note that <DEL> and <ALT-MODE> are not supported for any purpose.

2. DATA COLLECTION INTERFACE

All command replies and all histograms returned to SANTA from the GNOMEs are recorded in a data file for subsequent analysis. Histograms need not be sent to SANTA - any data collection site may be specified in the SEIZE command, and data will be returned there. On SANTA, the user is prompted to provide the name of this file (the default is GNOME.DAT), and is also asked whether he wants the data to be appended to and existing file or to be put into a new one. The file is designed to be FORTRAN-compatible and the records are line-images with maximum length of 80 Characters.

Each group of records describing an individual packet from the GNOME has the following fixed format:

Line 1: This is a general description of the packet in the following form -

Date and time the record was made in format DD/MM/YY HH:MM:SS, where the symbols have the obvious meanings.

Four blank spaces.

A ten character left-justified description of the packet type padded with blanks as necessary, where the packet type is either HISTOGRAM or the name of the command being logged.

Lines 2 to N: These lines contain all the word or byte data fields in the packet as given by the formats in section 3, preded by a count of the total number of items in the packet. The data fields are in character format, but compressed as much as possible. Each item is separated from the next by a comma, and where two or more adjacent items with the same value, these are stored in the format i*j, where j is the item and i the number of occurrences. In practise, N never exceeds 3.

A typical histogram as recorded in the file follows:

```
21/04/78 04:24:00    HISTOGRAM
37,65535,2*1,2,1,12,0,10,0,5,2*0,18,8*0,3*1,0,5,7,0,3,8*0,
```

SANTA has the feature that a <BEL> (^G) is returned to the user terminal each time a histogram arrives at ISIE. This feature is a useful way of gauging the rate of progress of an experiment.

3. SANTA/GNOME PACKET INTERFACE

3.1 Header Formats

All packets exchanged between SANTA and the GNOMEs are raw internet packets, and therefore require the raw internet headers defined below to precede the data portions of the packet, which contain the command formats defined in section 3.2. All packets returned by the GNOME will also be preceded by a raw internet header. This header will be preceded by a local network leader; for SANTAs and Head GNOMEs on the ARPANET, this will set up communication to the ARPANET ID of the Head GNOME on link 233 (octal). This direct datagram communication requires that the controller be run with NETWIZARD capability on TOPS systems.

The convention adopted in this description is that fields are identified by byte numbers for 8 bit bytes starting at 0 for the first byte in the data field and bytes are numbered from left to right in ascending order where necessary. Thus for 16 bit binary values, the even byte is the high 8 bits, and the odd byte is the low 8 bits. Note that 16-bit word field will have to be constructed so that they will arrive in the PDP-11s containing the GNOMEs with the high and low order bytes swapped, so that the PDP-11 will correctly interpret their value.

Byte number	Description
0	NET ID: DESTINATION (Head GNOME/SANTA)
1-3	HOST ID: DESTINATION
4	NET ID: SOURCE (SANTA/Head GNOME)
5-7	HOST ID: SOURCE
8-9	DATA LENGTH (in bytes)
10	HEADER LENGTH (= 12 bytes)
11	FORMAT FIELD (= 140 (octal))

Note that the value given to the 'format field' is that necessary for transmitting data from SANTA to the Head GNOME, as the GNOMEs are fake hosts within the gateway machines. In practise, the entire internet header may be ignored in processing packets received from the Head GNOME.

3.2 Command Packet Formats

The packet formats described in this section refer to the data portion of the internet packet. With the exception of the histogram packets returned by the GNOMEs, all packets are either commands or responses to commands exchanged between SANTA and the HEAD GNOME. In general, the response packets are identical to the command packets with the REPLY FIELD (byte 1) set according to the following convention:

Value	Meaning
1	The command was successfully executed.
2	You do not have authority to use the network: either you have not sent a SEIZE command, or someone else is running an experiment.
3	The command was invalid for some reason. Usually, this means that you have either tried to set some parameter to an impossible value, or that the GNOMEs are busy generating traffic, and you must first issue a STOP command.
4	The HEAD GNOME has timed out waiting for a response from some other GNOME to the command. This is usually an indication of serious trouble.

The detailed command formats are described in the following pages.

3.2.1 SEIZE

Byte number	Description
0	COMMAND CODE (=1)
1	REPLY FIELD
2	NET ID: DATA COLLECTION HOST
3-5	HOST ID: DATA COLLECTION HOST
6-7	NUMBER OF PARTICIPATING GNOMES (G>0)
8	NET ID: GNOME 1 (home of the HEAD GNOME)
9-11	HOST ID: GNOME 1
12	NET ID: GNOME 2
13-15	HOST ID: GNOME 2
.	.
.	.
.	.
.	.
4+4G	NET ID: GNOME G
5+4G - 7+4G	HOST ID: GNOME G

3.2.2 RELEASE

Byte number	Description
0	COMMAND CODE(=2)
1	REPLY FIELD

3.2.3 LOAD

Byte number	Description
0	COMMAND CODE (=3)
1	REPLY FIELD
2	GATEWAY NUMBER (<=G - see SEIZE)
3	NUMBER OF PARAMETERS TO BE LOADED (P>0)
4	NETACT NUMBER: PARAMETER 1
5	PARAMETER CODE: PARAMETER 1
6-7	VALUE: PARAMETER 1
8	NETACT NUMBER: PARAMETER 2
9	PARAMETER CODE: PARAMETER 2
10-11	VALUE: PARAMETER 2
.	.
.	.
.	.
.	.
4P	NETACT NUMBER: PARAMETER P
4P+1	PARAMETER CODE: PARAMETER P
4P+2 - 4P+3	VALUE: PARAMETER P

The following table gives the program-accessible parameters in the GNOME traffic generator tables. The parameter number is the identifying code given in the LOAD command. If no limits on values are given, any non-negative value will be acceptable. Parameters which are only meaningful for certain traffic types are indicated by the numbers of those traffic types.

Parameter Number	Description
1	Traffic type : 1 = Bulk 2 = Stream 3 = Interactive
2	Destination Gateway Number (<= G - types 2&3)
3	Timestamps to be collected (< 256; bit-selected)
4	Time before generation commences (seconds)
5	Maximum active time for this user (seconds)
6	Maximum number of messages to be sent
7	Mean inter message delay (milliseconds)
8	Spread of inter message delay (ms - type 3)
9	Mean message size (bytes)
10	Spread in message size (bytes - types 2&3)
11	Mean reply delay (ms - type 3)
12	Spread in reply delay (ms - type 3)
13	Mean reply message size (bytes - type 3)
14	Spread in reply message size (bytes - type 3)
15	Maximum data outstanding (bytes - type 1) OR Maximum time outstanding (ms - type 3)
16	CPODA priority
17	CPODA delay class

3.2.4 START

Byte number	Description
0	COMMAND CODE (=4)
1	REPLY FIELD

3.2.5 STOP

Byte number	Description
0	COMMAND CODE (=5)
1	REPLY FIELD

3.2.6 LOG

Byte number	Description
0	COMMAND CODE (=6)
1	REPLY FIELD
2	MONITORING GATEWAY NUMBER (<=G - see SEIZE)
3	HISTOGRAM TYPE : 0 - once only 1 - permanent 2 - delete
4	GATEWAY NUMBER OF TRAFFIC SOURCE (<=G - see SEIZE)
5	NETACT NUMBER OF TRAFFIC SOURCE (<=32)
6	FROM TIMESTAMPS
7	TO TIMESTAMPS
8-9	RETURN INTERVAL (SECONDS > 0)
10-11	LOWER BOUND (>= 0)
11-12	INCREMENT FOR HISTOGRAM (UNITS OF 10.24 ms)

Note that bytes 8-12 are not required for type DELETE packets.

3.2.7 SYNC

Byte number	Description
0	COMMAND CODE (=8)
1	REPLY FIELD
2	NUMBER OF TRIES GATEWAY/SIMP
3	NUMBER OF TRIES BETWEEN SIMPS

3.2.8 HISTOGRAM

Byte number	Description
0	HISTOGRAM CODE (=-1)
1	REPLY CODE (=-1)
2	COLLECTING GATEWAY (as set by LOG command)
3	ACTION CODE (" " " " ")
4	SOURCE GATEWAY (" " " " ")
5	SOURCE NETACT (" " " " ")
6	FROM TIMESTAMP (" " " " ")
7	TO TIMESTAMP (" " " " ")
8-9	COLLECTION INTERVAL (" " " " ")
10-11	LOWER BOUND (" " " " ")
12-13	INCREMENT (" " " " ")
14-15	NUMBER OF INTERVALS SINCE START OF EXPERIMENT
16-17	SEQUENCE NUMBER OF THIS HISTOGRAM
18-19	TOTAL NUMBER OF ITEMS IN HISTOGRAM
20-21	NUMBER OF SEQUENCE ERRORS OBSERVED
22-23	SUM OF SQUARES OF SEQUENCE ERRORS
24-25	NUMBER OF TIMESTAMP DIFFERENCES BELOW LOWER BOUND
26-65	HISTOGRAM
66-67	NUMBER OF TIMESTAMP DIFFERENCES ABOVE HISTOGRAM RANGE

This packet format describes the data returned by the GNOMEs to the data collection site. The information in bytes 0 to 13 is identification information, used to determine which items are being histogrammed and on what scales.

4. Sample Session.

The following is an annotated experiment run using the SANTA on ISIE. It is a simple experiment running stream traffic in a loop from the UCL GNOME to itself. 100 packets are sent at intervals of half a second. Statistics on the interarrival times of these packets are collected and returned to SANTA. The data file is printed, and the results summarised using the SFA program.

```
@santa

    GNOME Controller

Data in new or old file: new ; we are running a fresh experiment
File name (<cr> defaults to GNOME.DAT): ; select the default

; first we get control of the UCL GNOME
seize
Data Collection Site: here ; i.e. ISIE
Head GNOME: ucl
GNOME 2: ; no other GNOMEs required
Send OK

Done

; now specify the traffic wanted
load
GNOME: ucl
Netact: 1 ; the first simulated network activity
(1) Traffic type: stream
(2) Destination GNOME: ucl ; i.e. the traffic is looped
(3) Timestamp Selector: 83 ; select all available timestamps
(4) Delay before starting: 0 ; as soon as possible
(5) Active time: 0 ; i.e. look at next to determine experiment duration
(6) Maximum no. of messages: 100
(7) Mean inter-message delay: 500 ; ms
(9) Mean message length: 50 ; bytes
(15) Maximum holding time: 250 ; ms - packets discarded if held longer
(17) Priority (CPODA only): ; not applicable in SIMP I
(18) Delay (CPODA only): ; ditto
Send OK

Done

; describe the data to be histogrammed
log
Histogram Site: ucl ; the traffic destination
Action Code: permanent
Traffic Source GNOME: ucl
Traffic Source Netact: 1
First Statistics Value: 19 ; we look at interarrival times
Second Statistics Value: 0
```

```
Send Back Time: 5 ; every 5 seconds
Histogram Lower Bound: 0
Histogram Increment: 5 ; units of 10.24 ms
Send OK

Done

; now start the traffic generation
start
Send OK

Done
Autostop

; the experiment has stopped. Now release control
release
Send OK

Done

; now quit the controller
quit
```

```
@; the raw data file looks like this
@
27/04/78 01:51:19    SEIZE
11,2*1,10,1,0,52,1,4,2*0,60,
27/04/78 01:55:34    LOAD
37,3,2*1,11,2*1,2,1,2,2*1,3,83,1,4,0,1,5,0,1,6,100,1,7,500,1,9,50,1,
15,250,1,16,0,1,17,0,
27/04/78 01:59:19    LOG
11,6,5*1,19,0,5,0,5,
27/04/78 02:00:51    START
3,4,1,128,
27/04/78 02:01:16    HISTOGRAM
37,65535,4*1,19,0,5,0,5,2*0,9,10*0,1,0,5,3,10*0,
27/04/78 02:01:21    HISTOGRAM
37,65535,4*1,19,0,5,0,5,2*1,10,12*0,10,11*0,
27/04/78 02:01:26    HISTOGRAM
37,65535,4*1,19,0,5,0,5,2*2,10,12*0,9,1,10*0,
27/04/78 02:01:31    HISTOGRAM
37,65535,4*1,19,0,5,0,5,2*3,10,12*0,10,11*0,
27/04/78 02:01:36    HISTOGRAM
37,65535,4*1,19,0,5,0,5,2*4,10,12*0,10,11*0,
27/04/78 02:01:41    HISTOGRAM
37,65535,4*1,19,0,5,0,3*5,10,12*0,8,2,10*0,
27/04/78 02:01:46    HISTOGRAM
37,65535,4*1,19,0,5,0,5,2*6,10,12*0,10,11*0,
27/04/78 02:01:51    HISTOGRAM
37,65535,4*1,19,0,5,0,5,2*7,10,12*0,10,11*0,
27/04/78 02:01:56    HISTOGRAM
37,65535,4*1,19,0,5,0,5,2*8,10,12*0,9,1,10*0,
27/04/78 02:02:00    HISTOGRAM
37,65535,4*1,19,0,5,0,5,3*9,12*0,7,2,10*0,
27/04/78 02:02:01    STOP
2,5,1,
27/04/78 02:02:50    RELEASE
2*2,1,
@
```

```
@; the results can be inspected using the SFA program
@sfa
                    SATNET Fast Analysis
Specify data file name:  (CR defaults to GNOME.DAT)
Please wait while data file is scanned...
Scan now complete.
Main Experiment Index
Expt     Date     Time    Histograms
   1   27/ 4/78  2: 0:51    1
End of Main Index
index 1
Sub-index  1 for experiment run on 27/ 4/78  2: 0:51;   1 histograms
 Num   Gnm NTA Values Back  Low Incr Totalled  U/F  O/F
  1     1   1  19- 0    5    0    5    10
End of Sub-Index
1
P   100.0+
e       I
r       I                                      ***
c       I                                      ***
e       I                                      ***
n    75.0+                                     ***
t       I                                      ***
        I                                      ***
o       I                                      ***
f       I                                      ***
     50.0+                                     ***
M       I                                      ***
e       I                                      ***
s       I                                      ***
s       I                                      ***
a    25.0+                                     ***
g       I                                      ***
e       I                                      ***
s       I                                      ******
        I                              ***     ******
      0.0+--+-------------+-------------+-------------+-----------
Seconds:   0.000          0.256          0.512          0.768
        Hist  1, Expt  1, Gnm 1, NTA  1, Stats 19- 0. Total items:  98
quit
```

References

[UCL77] - GNOME User's Guide, UCL TR 41, June 1977