

Echo Delay Measurements With GGP Packets

IEN 163

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1. Introduction

This IEN is intended to facilitate discussion of internet delays as seen from the UK. It presents a series of measurements of round trip times for GGP echo packets.

The GGP packet generator was an LSI-11 host on the UCL Port Expander (the UCLnet/SATNET/Nullnet gateway is another host on this Port Expander). Round-trip times were measured by timestamping the packet on initiation of output and again on completion of input. The time reference was a programmable clock with 1 millisecond resolution (based on a 10 MHz crystal).

Echo delays were measured for the following destinations:

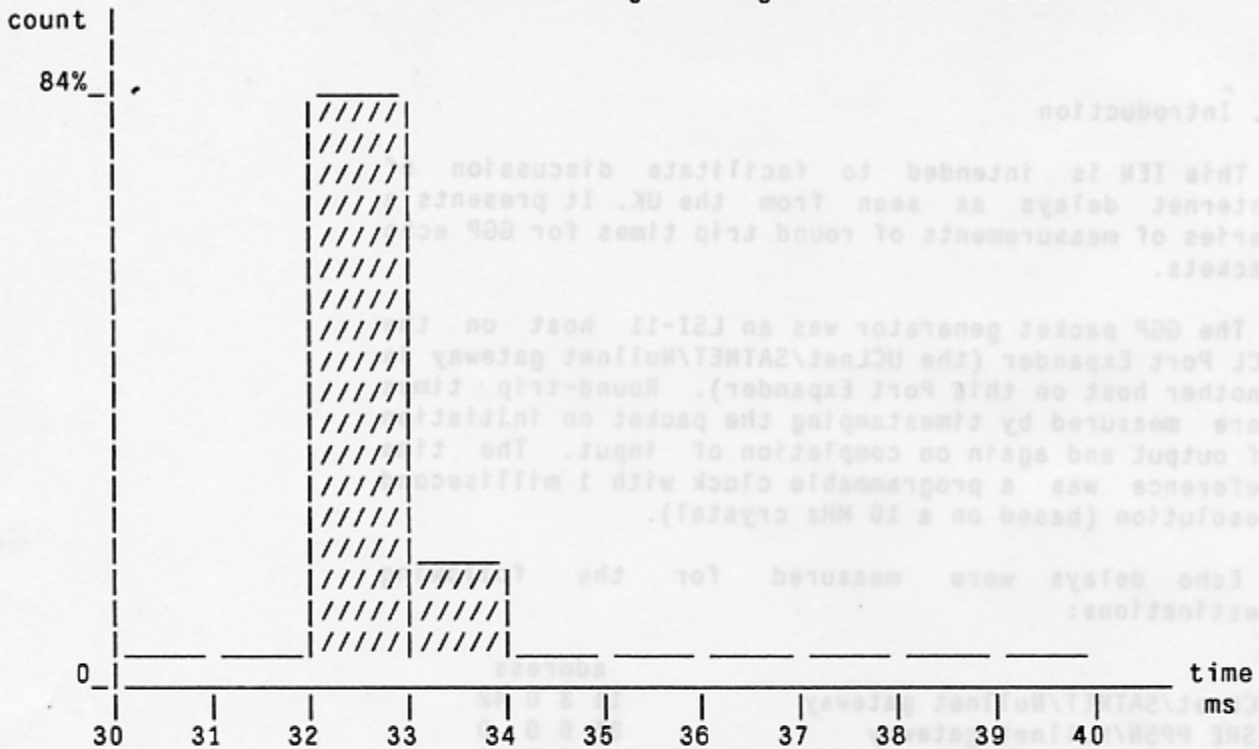
	address
UCLnet/SATNET/Nullnet gateway	11 3 0 42
RSRE PPSN/Nullnet gateway	35 6 0 0
Goonhilly SIMP	4 0 0 63
BBN SATNET/ARPANET gateway	4 0 0 61
Bragg PR/ARPANET gateway	10 0 0 38
SRI PR1/ARPANET gateway	10 3 0 51
SRI PR2/ARPANET gateway	10 1 0 51

For each destination, 1000 packets were sent at 4 second intervals.

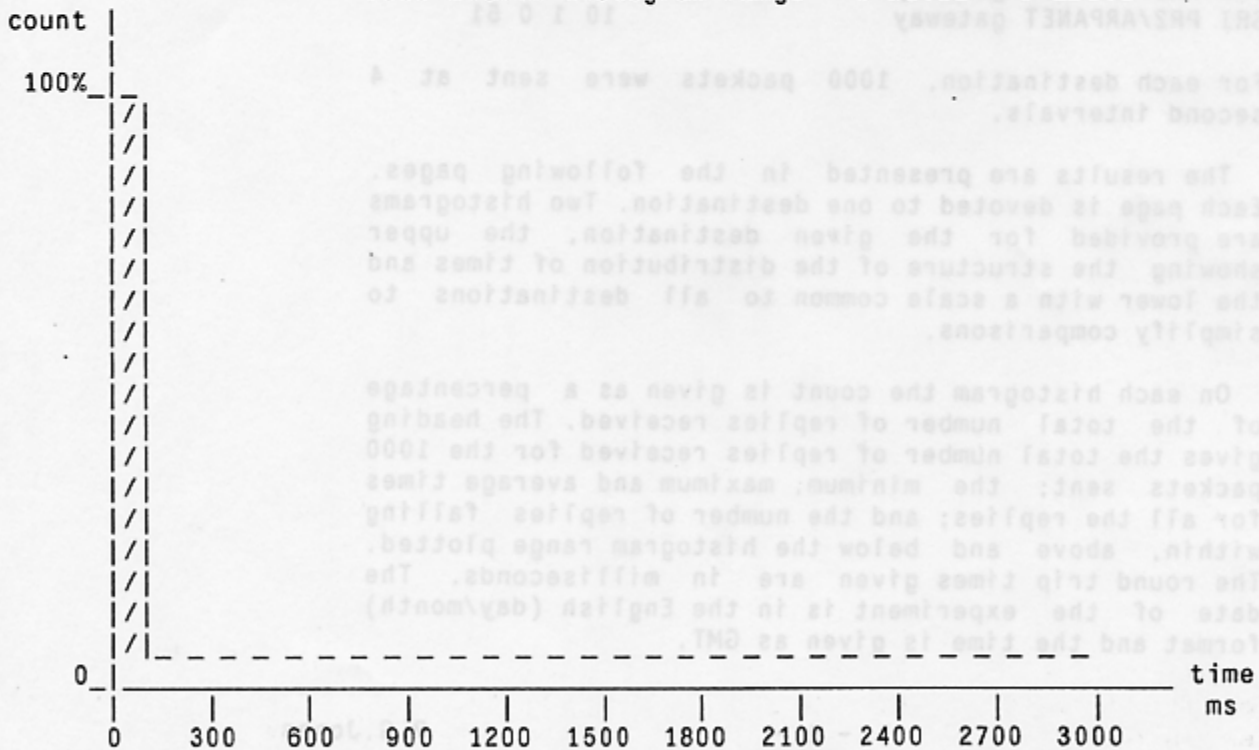
The results are presented in the following pages. Each page is devoted to one destination. Two histograms are provided for the given destination, the upper showing the structure of the distribution of times and the lower with a scale common to all destinations to simplify comparisons.

On each histogram the count is given as a percentage of the total number of replies received. The heading gives the total number of replies received for the 1000 packets sent; the minimum, maximum and average times for all the replies; and the number of replies falling within, above and below the histogram range plotted. The round trip times given are in milliseconds. The date of the experiment is in the English (day/month) format and the time is given as GMT.

ECHO DESTINATION UCL UCL/SAT gway DATE 17/11/80 TIME 14.00-15.07
 1000 packets minimum time 30 maximum 40 average 32
 999 within histogram range 0 below 1 above



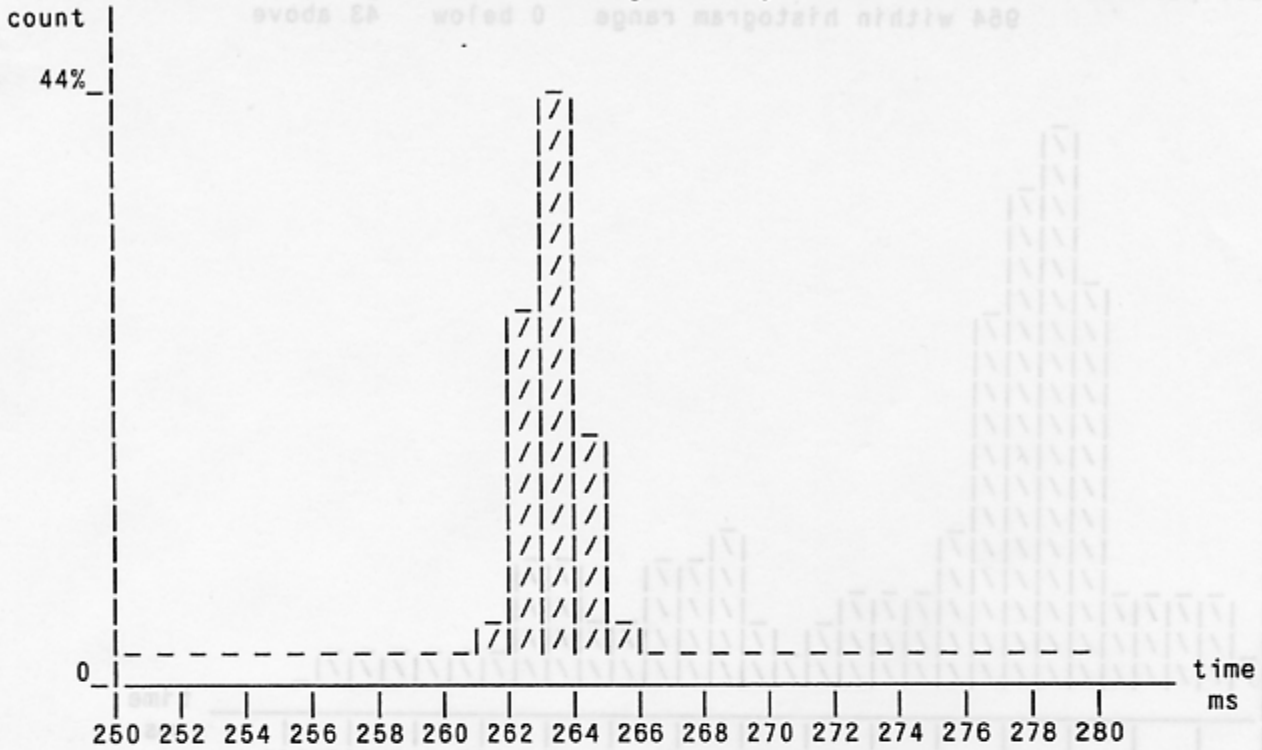
ECHO DESTINATION UCL UCL/SAT gway DATE 17/11/80 TIME 14.00-15.07
 1000 packets minimum time 30 maximum 40 average 32
 1000 within histogram range 0 below 0 above



ECHO DESTINATION RSRE PPSN/N gway DATE 14/11/80 TIME 12.15-13.22

1000 packets minimum time 244 maximum 346 average 263

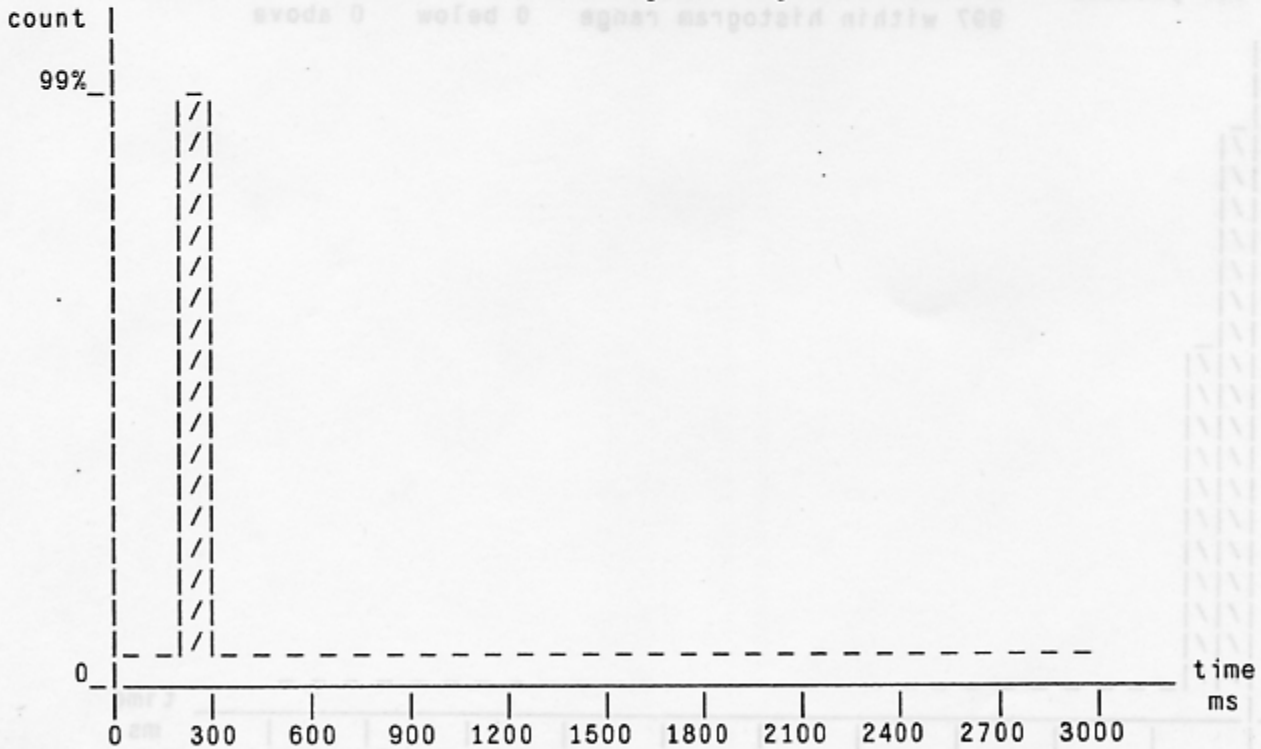
983 within histogram range 5 below 12 above



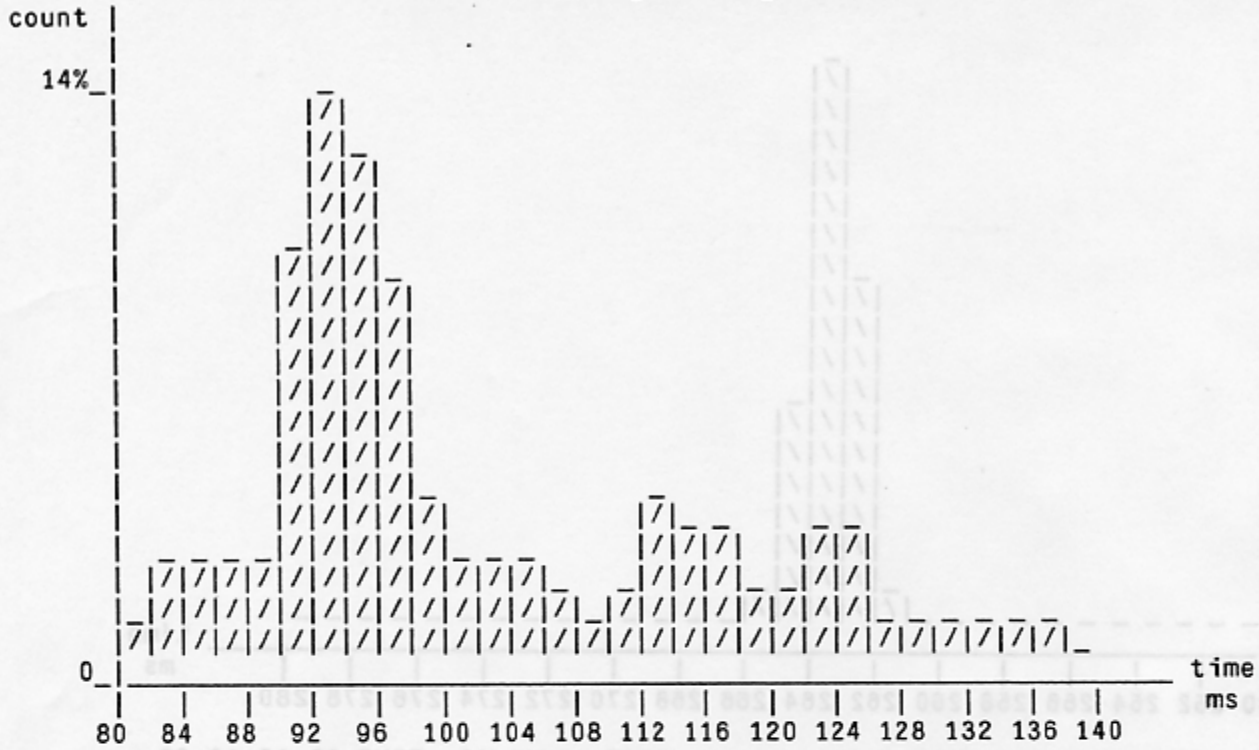
ECHO DESTINATION RSRE PPSN/N gway DATE 14/11/80 TIME 12.15-13.22

1000 packets minimum time 244 maximum 346 average 263

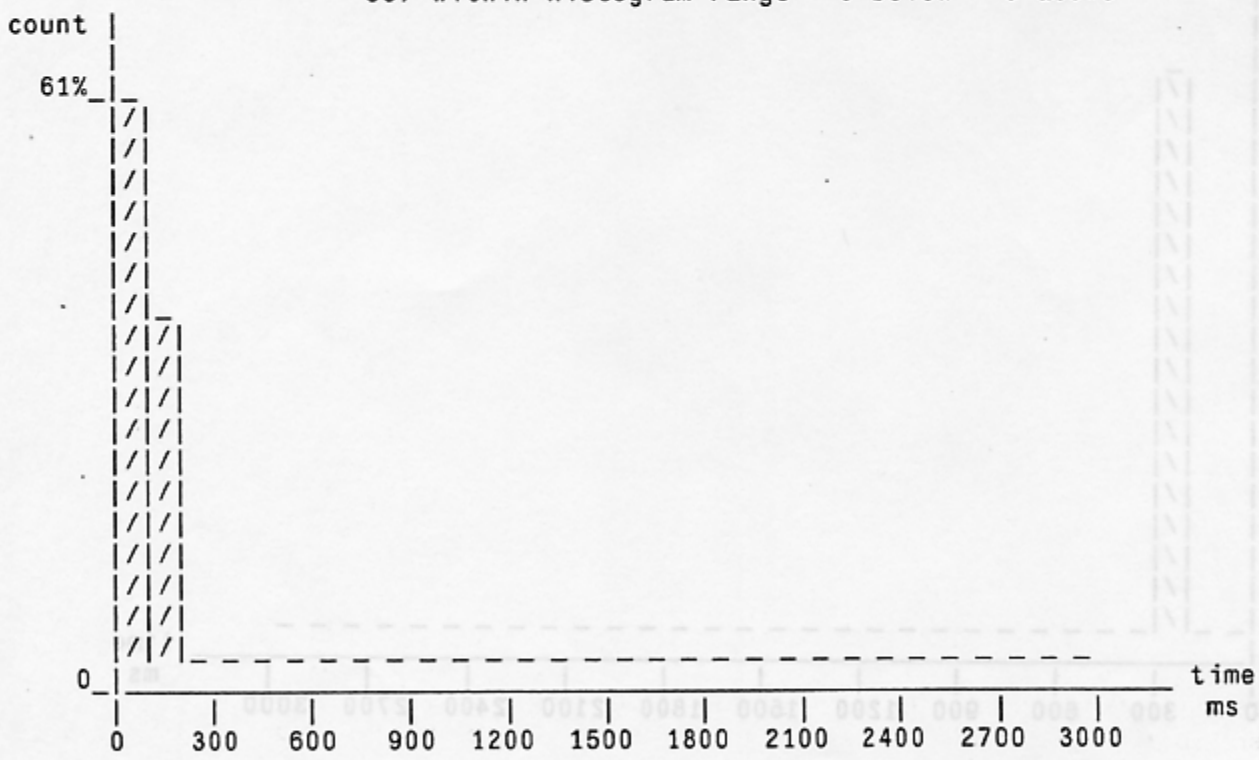
1000 within histogram range 0 below 0 above



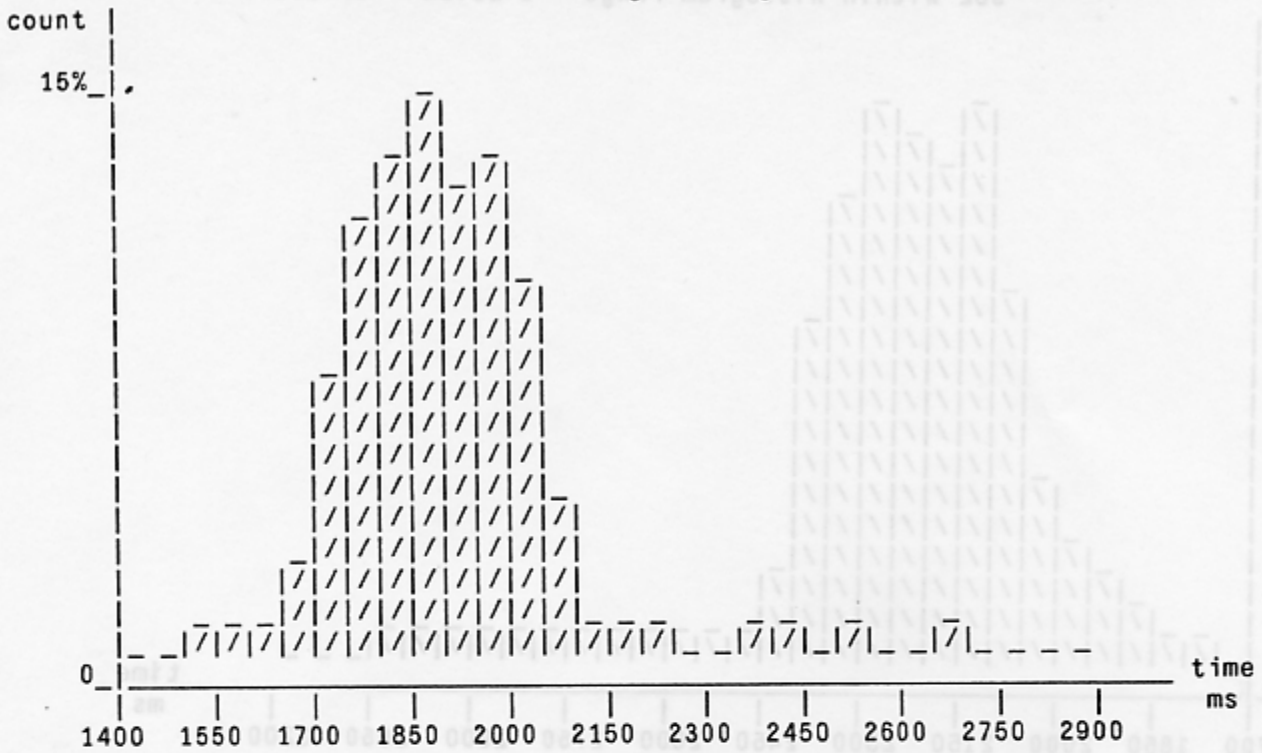
ECHO DESTINATION Goonhilly SIMP DATE 17/11/80 TIME 10.05-11.12
 997 packets minimum time 80 maximum 284 average 104
 954 within histogram range 0 below 43 above



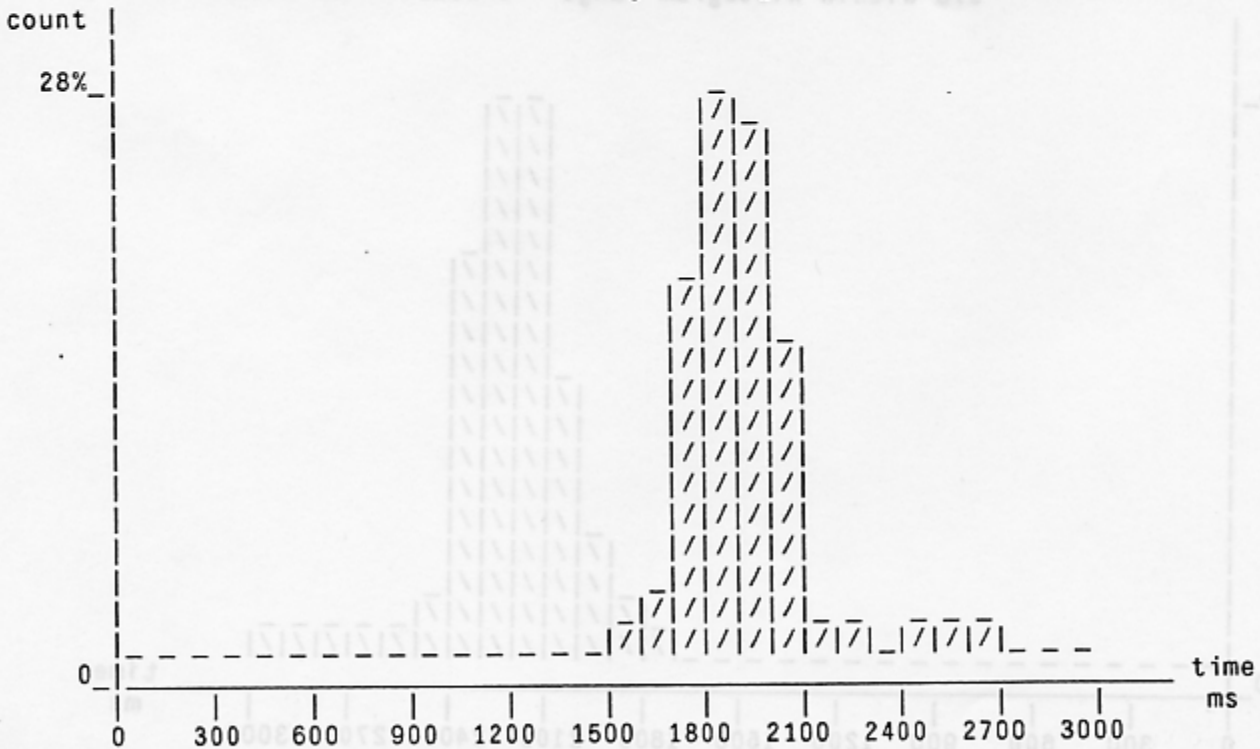
ECHO DESTINATION Goonhilly SIMP DATE 17/11/80 TIME 10.05-11.12
 997 packets minimum time 80 maximum 284 average 104
 997 within histogram range 0 below 0 above



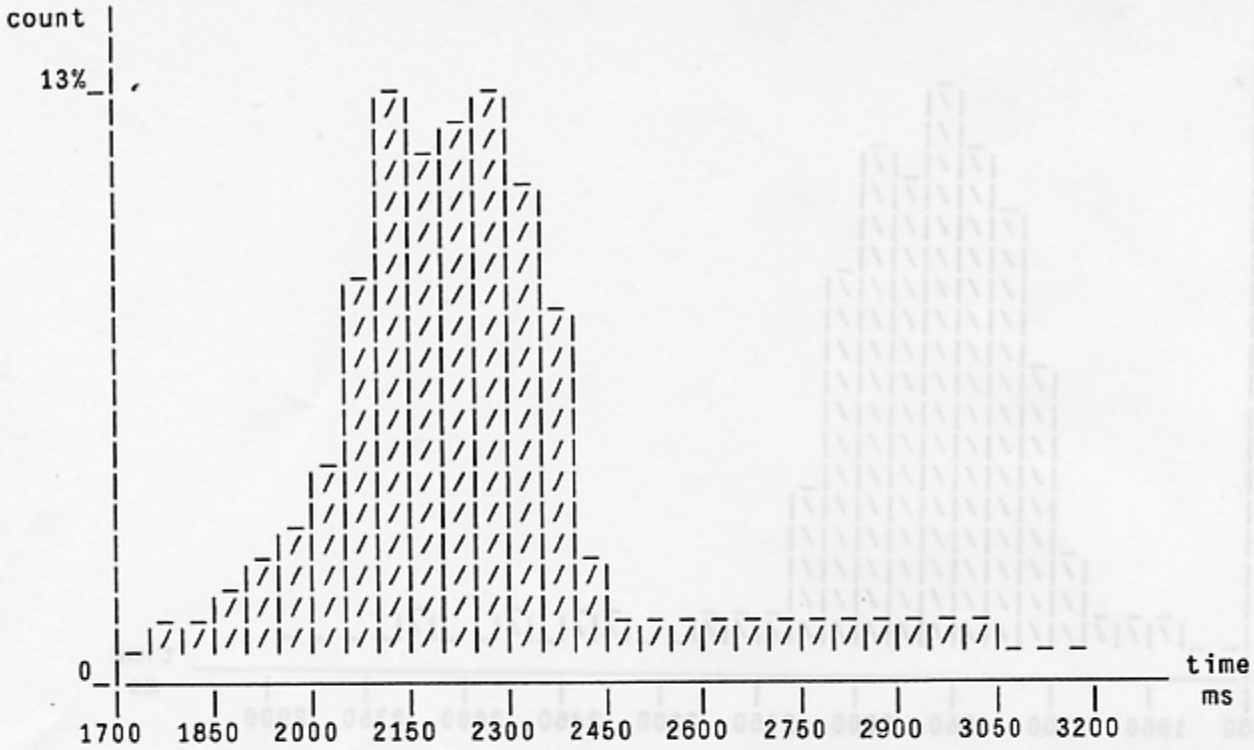
ECHO DESTINATION BBN SATNET/A gway DATE 17/11/80 TIME 8.40-9.47
 994 packets minimum time 1443 maximum 4344 average 1929
 983 within histogram range 0 below 11 above



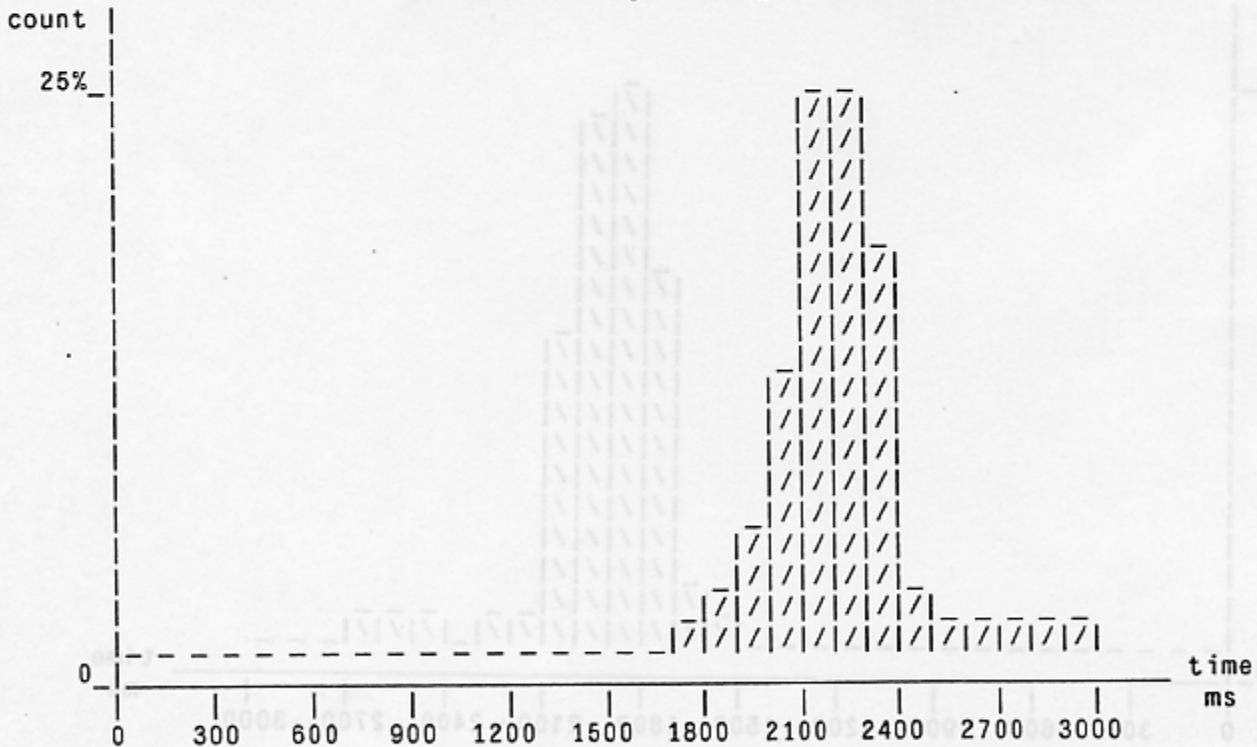
ECHO DESTINATION BBN SATNET/A gway DATE 17/11/80 TIME 8.40-9.47
 994 packets minimum time 1443 maximum 4344 average 1929
 985 within histogram range 0 below 9 above



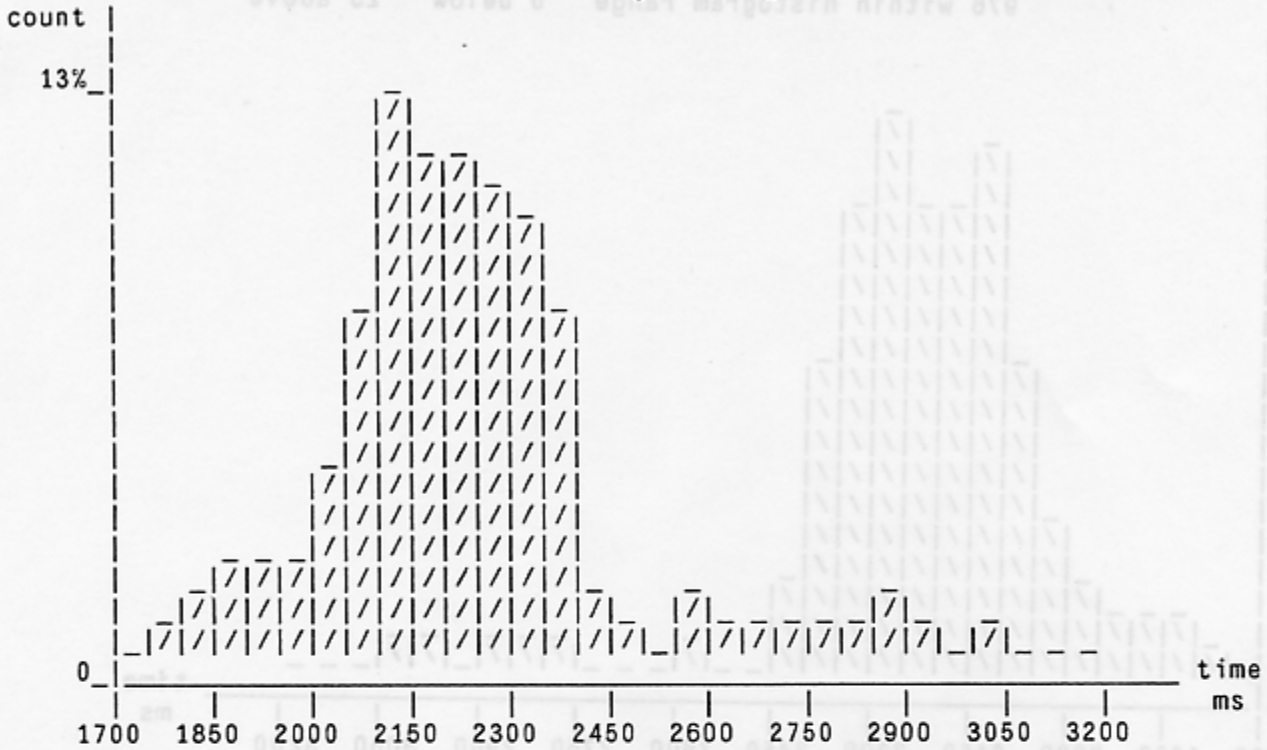
ECHO DESTINATION Bragg PR/A gway DATE 12/11/80 TIME 9.45-10.52
 1000 packets minimum time 1689 maximum 8402 average 2270
 982 within histogram range 1 below 17 above



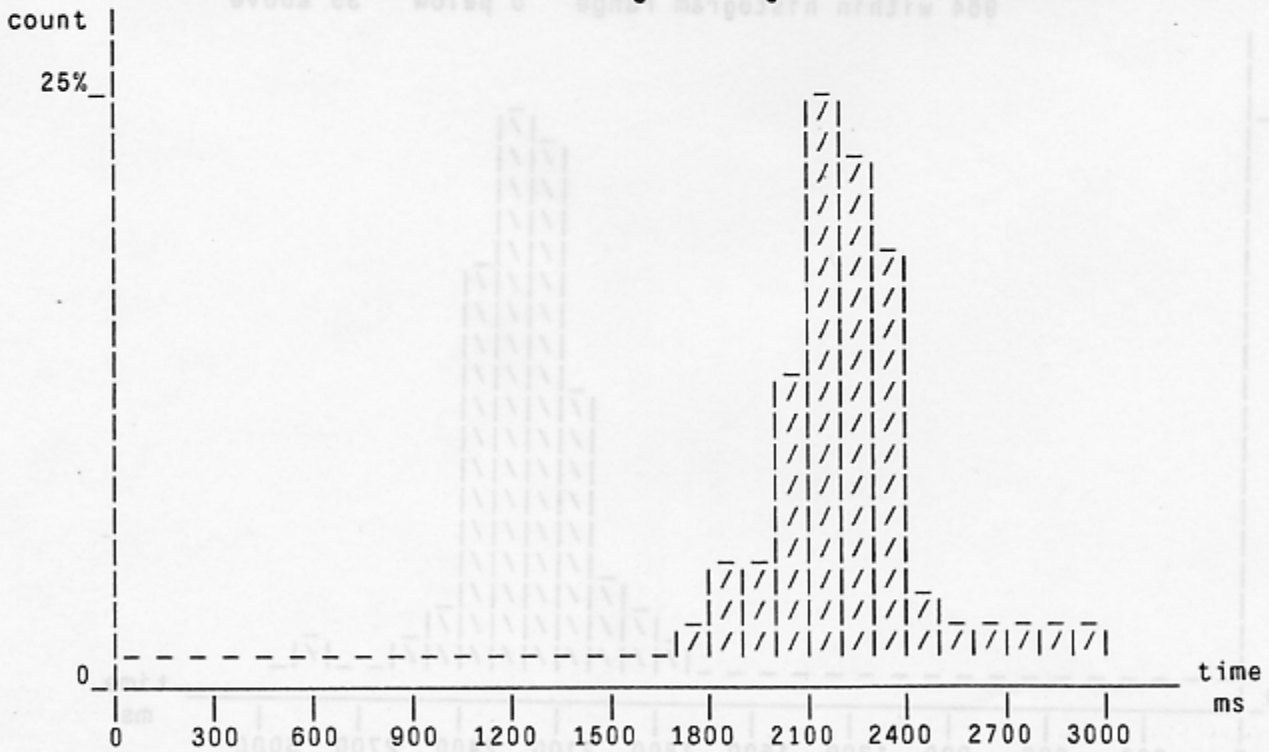
ECHO DESTINATION Bragg PR/A gway DATE 12/11/80 TIME 9.45-10.52
 1000 packets minimum time 1689 maximum 8402 average 2270
 975 within histogram range 0 below 25 above



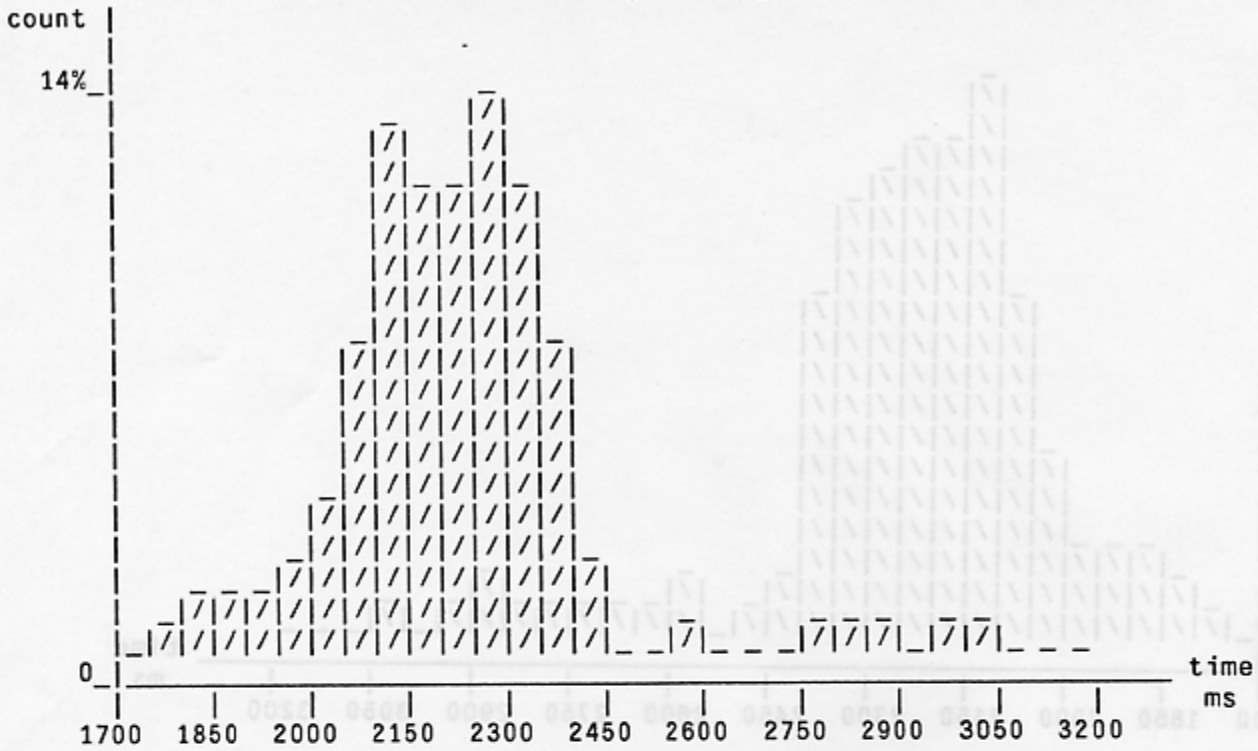
ECHO DESTINATION SRI PR1/A gway DATE 14/11/80 TIME 11.00-12.07
998 packets minimum time 1715 maximum 5574 average 2266
978 within histogram range 0 below 20 above



ECHO DESTINATION SRI PR1/A gway DATE 14/11/80 TIME 11.00-12.07
998 packets minimum time 1715 maximum 5574 average 2266
970 within histogram range 0 below 28 above



ECHO DESTINATION SRI PR2/A gway DATE 14/11/80 TIME 9.50-10.57
 999 packets minimum time 1764 maximum 5438 average 2265
 976 within histogram range 0 below 23 above



ECHO DESTINATION SRI PR2/A gway DATE 14/11/80 TIME 9.50-10.57
 999 packets minimum time 1764 maximum 5438 average 2265
 964 within histogram range 0 below 35 above

