CERN - DATA HANDLING DIVISION
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H. von Eicken

A SURVEY OF SELECTED USER JOBS

1. INTRODUCTION

In early January 1974, 21 members of the Data Handling Division, representing the Programming Groups of that Division, were asked to participate in a survey concerning their jobs run on the CDC 7600/6400 computer system.

The aim was to monitor all jobs submitted by this group. So-called "Job Run Sheets" and "Job Failure Sheets" had to be filled in for all jobs run by these users. The data collected this way were used to obtain a quantitative analysis of user quoted turnaround time and user defined classification of job behaviour.

It became obvious, after the first week, that the spectrum of jobs submitted by this group did not adequately cover the use of magnetic tapes. It was decided to seek the help of two other divisions, namely NP and TC, as principal users of tapes. Seven selected users from these divisions joined in after two weeks of running for another two weeks.

The total period of time covered by this survey was from Monday, 14th January until and including Sunday, 10th February 1974. A total of 43,333 jobs were processed by the CDC 7600/6400 computer system in that period, out of which 2412 jobs, representing 5.5% of the total load, were monitored.

This report outlines the procedures followed and tries to give a first interpretation of the results obtained.

2. THE JOB SHEETS

A meeting was held with representatives from the programming groups involved to discuss the procedures to be followed and to design forms for proper logging. The emphasis was put on ease of operation without losing too much on accuracy. Two principal sheets were designed:

Job Run Sheet

and

Job Failure Sheet

The Job Run Sheet was supposed to be filled in for each job submitted by a particular user. A job was to be classed successful, if the user was satisfied with the result(s) obtained. Errors made by the user (logical errors, mispunching, language errors, etc.) were not supposed to be measured, hence jobs of this nature were classed successful.

If a job failed due to input deck or file lost or due to output file or listing lost the remarks column of the Job Run Sheet was supposed to be used,

while for all other errors a Job Failure Sheet had to be filled in. For the latter it was also requested to add, if possible, the dayfile output of the failing job.

2.1 Job Run Sheet (see Appendix A for a copy)

To minimize the amount of paper work to be done for each run, it was suggested to log all runs having the same basic characteristics on the same sheet. Only those fields that changed from run to run had to be filled in. Besides obvious information like user and job name the following was requested:

2.1.1 Basic job characteristics

Use of magnetic tapes

A detailed breakdown as to number of tape drives, number of tape reels and recording operating system for input and/or output operation was requested. Although some of the information might not be particularly relevant, due to the way the CDC 7600/6400 computer system handles tapes, it was felt that this would be the easiest way to present the information.

Use of permanent files

Information about the total number of permanent files handled by this job was requested, detailed by residency (7600 or 6400 data base) and operation (Catalog or Attach).

Use of the FIND control statement

The FIND control statement allows a user to access tape and/or permanent files on the CDC 6400 front end machine. These files will be staged over to the CDC 7600 permanent file base for a, generally, one day residency, when the FIND control statement is executed first time. Subsequent use will then attach the file directly from the CDC 7600 data base, thus avoiding staging of the file. The users were asked to indicate under this heading how many of the already quoted tape and/or permanent files they access using FIND. This was, however, not understood by all of them, as could be seen from the filled-in sheets.

Use of unit record equipment

The users were asked just to indicate whether their job generates punched cards, paper tape and plotting output.

2.1.2 Job run characteristics

Job card parameters

The job card contains essential information such as:

computer to be used	(CP)
priority level	(P)
tape parameter	(TP)
requested run time	(T)
maximum amount of central memory	(CM)

The CM parameter, however, is only relevant if the CDC 6400 computer is to be used for execution of the job.

Job submittal information

Jobs can either be submitted to the Central Site to be handled by operators or can be directly read in by the user at various Remote Input/Output Stations (RIOS) distributed on the CERN site. The printed output of a job can be routed to any of the RIOS or to the central printers. The following information was deemed necessary:

date of run	(DATE)
input location	(READ AT)
submittal time	(ATTEMPT, IN)
termination time	(OUT, DELAY)
printing location	(AT, VOL, BAD)

Since the number of RIOS is still limited it was felt necessary to allow an indication when a first attempt was made to submit the job, but failed since the RIOS and/or the Central Computer was down during scheduled working hours. Similarly it was experienced that sometimes a longer delay can occur between the actual printing time and the time when the output listing is available on the output racks for jobs printed centrally.

In general there was a problem with the termination time. Jobs printed centrally and on the RIOS in the computer centre have a dayfile message added quoting the time of printing. Jobs printed on the other RIOS, however, have only the time recorded when the output is disposed to the printing queue for that RIOS. There is, however, a message printed on the command console of each RIOS when a job finishes printing.

It was, therefore, agreed to use the time of entering the queue for these RIOS as job termination time. The location of the printer, the volume of the output, and an indication if the print quality was bad, were also requested.

Job result and remarks column

As pointed out earlier, a job should be classified "OK" if the user is satisfied with the result, irrespective of user caused failures. The remarks column was used to indicate failures in input or output operation or to give other information relevant to that particular run.

2.2 Job Failure Sheet (see Appendix A for a copy)

The Job Failure Sheet tries to offer various categories of failures, to allow a quick classification. By the nature of computers, some failures are so complex that a detailed study would be necessary to isolate the cause. This, however, was not the subject of the survey and users were therefore asked always to use the services provided by the System and Users Support Group to notify all errors irrespective of filling in this Job Failure Sheet. This occasionally is the reason that no dayfile output was appended to the sheet and that extensive use was made of the remarks column for some of the jobs.

2.3 User Instruction Sheet (see Appendix A for a copy)

A user instruction sheet was written trying to give the basic guide-lines on how to fill in the above forms. Either it was not detailed enough, or not concise, or the users had not read it carefully. The result was that some of the sheets were improperly filled in and caused some problems when punching the data and analysing some of it.

3. THE ANALYSIS CRITERIA

It became obvious after the first week of running that the initially envisaged manual analysis had been too optimistic a hope. All essential information contained on the job sheets was punched, creating one punched card per job run. This sometimes caused a problem, if numbers quoted by the users exceeded the field length allocated. In such cases an X was punched.

Three goals were to be met by the first analysis:

a) Separate the jobs into suitable classes and quote the failure rates per class.

b) Obtain the turnaround distribution of the "good" jobs in each of the above classes.

c) Present the results in such a way that obvious additional questions can hopefully be answered from the detailed output of the analysis program.

For this purpose the following philosophy was adopted. The job scheduler on the CDC 7600 groups all jobs into seven classes, depending upon the execution time requirements and the use of magnetic tapes. No similar scheme however exists

for jobs executed on the CDC 6400. For simplicity of programming the rules used by the CDC 7600 scheduler have been applied to the analysis of the jobs run on the CDC 6400. These job classes are:

Class 0, no tapes, $0 \leq T \leq 10_8$ sec.
Class 1, no tapes, $11_8 \leq T \leq 40_8$ sec.
Class 3, no tapes, $41_8 \leq T \leq 300_8$ sec.
Class 5, no tapes, more than 300_8 sec requested.

Class 2, tapes, $0 \leq T \leq 40_8$ sec.
Class 4, tapes, $41_8 \leq T \leq 300_8$ sec.
Class 6, tapes, more than 300_8 sec requested.

The failure distribution was done using the user quoted failure reasons. They have been grouped as follows:

I/O File	00 General problem	Permanent files	10 General problem
	01 Input deck problems		11 File lost on 6000
	02 Input file lost		12 Corrupted on 6000
	05 Output incomplete		13 File lost on 7000
	06 Output file lost		14 Corrupted on 7000
	07 Punched card problem		
	08 Plotting problem		
	09 Paper tape problem		
Tapes	20 General problem	Service problem	30 General problem
	21 Bad staging		31 Operations
	22 Bad read/write (Rec. Man.)		32 Program library
	23 Bad contents		33 Advice
	24 Parity errors		
	25 Tape broken		
	26 Tape not there		
	27 Operator error		
	28 Others (see failure sheet)		
Manuf.	40 General problem	Other problems	50 (See sheets)
Related	41 Hardware		
	42 Operating system		
	43 System package		

Principally three types of output were generated, a weekly and daily summary accounting and a detailed daily accounting. The first two give general information, such as number of jobs run per class, the percentage of failure, the failure

distribution according to the six basic error groups and the scaled distribution of turnaround times split into ten bins.

The detailed daily accounting not only gives the above information but also presents the details of all jobs belonging to a given class sorted by result and turnaround time. This output is to be consulted for the more detailed questions as to which jobs failed or had extraordinary long turnaround times.

4. RESULTS OBTAINED

The following eight pages present the weekly summary accounting carried out for these selected user jobs using the above criteria. It should be pointed out that integer arithmetic was used to obtain the percentage figures. This is the reason that they do not always add up to 100%.

These weekly accounting sheets are then followed by tables representing the over-all accounting for the jobs run on the CDC 7600 which is the main production computer. The failure distribution table is more detailed, but should be taken with care in what concerns the figures under the heading "All jobs" in the area of magnetic tape errors; the percentages quoted there are computed based on all jobs and not just on jobs using tapes.

Sample copies of the much more detailed daily accounting are given in Appendix B. The full listing of this output is kept in the workroom of the Systems and Users Support Group, Building 31, First Floor, Room 1-011, together with all information supplied by the participants of the survey.

PERFORMANCE OF THE 7600 COMPUTER IN THE WEEK FROM 14-JAN-74 TO 20-JAN-74 FOR SELECTED USER JOBS.

CLASS 0 TOTAL NUMBER OF JOBS 274, 4% FAILED, THE AVERAGE TURNAROUND FOR THE 263 GOOD JOBS WAS 6 MIN.

TURNAROUND DISTRIBUTION IS

94%	2%	1%	0%	0%	0%	0%	0%	0%	0%

0,0 16,7 33,4 50,1 66,8 83,5 100,2 116,9 133,6 150,3 167,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 18%, PERM. FILES 18%, TAPES 0%, SERVICE 0%, MANUF. 63%, OTHER 0%

CLASS 1 TOTAL NUMBER OF JOBS 39, 7% FAILED, THE AVERAGE TURNAROUND FOR THE 36 GOOD JOBS WAS 25 MIN.

TURNAROUND DISTRIBUTION IS

83%	5%	0%	2%	0%	2%	2%	0%	0%	2%

2,0 26,2 50,4 74,6 98,8 123,0 147,2 171,4 195,6 219,8 244,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 33%, PERM. FILES 0%, TAPES 0%, SERVICE 0%, MANUF. 66%, OTHER 0%

CLASS 3 TOTAL NUMBER OF JOBS 17, 5% FAILED, THE AVERAGE TURNAROUND FOR THE 16 GOOD JOBS WAS 241 MIN.

TURNAROUND DISTRIBUTION IS

31%	12%	25%	6%	0%	6%	0%	6%	6%	6%

3,0 83,2 163,4 243,6 323,8 404,0 484,2 564,4 644,6 724,8 805,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 100%, PERM. FILES 0%, TAPES 0%, SERVICE 0%, MANUF. 0%, OTHER 0%

CLASS 2 TOTAL NUMBER OF JOBS 26, 7% FAILED, THE AVERAGE TURNAROUND FOR THE 24 GOOD JOBS WAS 56 MIN.

TURNAROUND DISTRIBUTION IS

75%	12%	4%	0%	0%	0%	4%	0%	0%	4%

5,0 48,0 91,0 134,0 177,0 220,0 263,0 306,0 349,0 392,0 435,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM. FILES 0%, TAPES 100%, SERVICE 0%, MANUF. 0%, OTHER 0%

CLASS 4 TOTAL NUMBER OF JOBS 13, 30% FAILED, THE AVERAGE TURNAROUND FOR THE 9 GOOD JOBS WAS 117 MIN.

TURNAROUND DISTRIBUTION IS

66%	0%	11%	11%	0%	0%	0%	0%	0%	11%

0,0 64,1 128,2 192,3 256,4 320,5 384,6 448,7 512,8 576,9 641,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 25%, PERM. FILES 0%, TAPES 0%, SERVICE 0%, MANUF. 75%, OTHER 0%

CLASS 6 TOTAL NUMBER OF JOBS 12, 25% FAILED, THE AVERAGE TURNAROUND FOR THE 9 GOOD JOBS WAS 406 MIN.

TURNAROUND DISTRIBUTION IS

66%	0%	0%	0%	0%	0%	0%	11%	0%	22%

42,0 155,2 268,4 381,6 494,8 608,0 721,2 834,4 947,6 1060,8 1174,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 33%, PERM. FILES 0%, TAPES 33%, SERVICE 0%, MANUF. 33%, OTHER 0%

PERFORMANCE OF THE 7600 COMPUTER IN THE WEEK FROM 21-JAN-74 TO 27-JAN-74 FOR SELECTED USER JOBS.

CLASS 0 TOTAL NUMBER OF JOBS 176, 5% FAILED, THE AVERAGE TURNAROUND FOR THE 166 GOOD JOBS WAS 9 MIN.

TURNAROUND DISTRIBUTION IS

78%	8%	4%	4%	0%	0%	1%	0%	0%	0%
0.0	10.2	20.4	30.6	40.8	51.0	61.2	71.4	81.6	91.8	102.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 30%, PERM. FILES 0%, TAPES 0%, SERVICE 10%, MANUF. 40%, OTHER 20%

CLASS 1 TOTAL NUMBER OF JOBS 29, 6% FAILED, THE AVERAGE TURNAROUND FOR THE 27 GOOD JOBS WAS 74 MIN.

TURNAROUND DISTRIBUTION IS

81%	14%	0%	0%	0%	0%	0%	0%	0%	3%
1.0	101.5	202.0	302.5	403.0	503.5	604.0	704.5	805.0	905.5	1006.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 50%, PERM. FILES 0%, TAPES 0%, SERVICE 0%, MANUF. 50%, OTHER 0%

CLASS 3 TOTAL NUMBER OF JOBS 31, 12% FAILED, THE AVERAGE TURNAROUND FOR THE 27 GOOD JOBS WAS 204 MIN.

TURNAROUND DISTRIBUTION IS

37%	29%	3%	22%	0%	3%	0%	0%	0%	3%
1.0	107.9	214.8	321.7	428.6	535.5	642.4	749.3	856.2	963.1	1070.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 25%, PERM. FILES 0%, TAPES 0%, SERVICE 0%, MANUF. 75%, OTHER 0%

CLASS 2 TOTAL NUMBER OF JOBS 14, 0% FAILED, THE AVERAGE TURNAROUND FOR THE 14 GOOD JOBS WAS 119 MIN.

TURNAROUND DISTRIBUTION IS

42%	7%	7%	7%	21%	7%	0%	0%	0%	7%
2.0	46.0	90.0	134.0	178.0	222.0	266.0	310.0	354.0	398.0	442.0 MIN.

CLASS 4 TOTAL NUMBER OF JOBS 17, 23% FAILED, THE AVERAGE TURNAROUND FOR THE 13 GOOD JOBS WAS 469 MIN.

TURNAROUND DISTRIBUTION IS

38%	0%	7%	0%	7%	30%	0%	7%	0%	7%
128.0	222.2	316.4	410.6	504.8	599.0	693.2	787.4	881.6	975.8	1070.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 75%, PERM. FILES 0%, TAPES 0%, SERVICE 0%, MANUF. 0%, OTHER 0%

CLASS 6 TOTAL NUMBER OF JOBS 15, 20% FAILED, THE AVERAGE TURNAROUND FOR THE 12 GOOD JOBS WAS 725 MIN.

TURNAROUND DISTRIBUTION IS

41%	0%	0%	0%	0%	0%	0%	0%	50%	8%
19.0	151.3	283.6	415.9	548.2	680.5	812.8	945.1	1077.4	1209.7	1342.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM. FILES 66%, TAPES 33%, SERVICE 0%, MANUF. 0%, OTHER 0%

PERFORMANCE OF THE 7600 COMPUTER IN THE WEEK FROM 28-JAN-74 TO 3-FEB-74 FOR SELECTED USER JOBS.

CLASS 0 TOTAL NUMBER OF JOBS 204, 8% FAILED. THE AVERAGE TURNAROUND FOR THE 186 GOOD JOBS WAS 13 MIN.

TURNAROUND DISTRIBUTION IS	96%	1%	1%	0%	0%	0%	0%	0%	0%	0%	
	0.0	49.5	99.0	148.5	198.0	247.5	297.0	346.5	396.0	445.5	495.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 50%, PERM. FILES 0%, TAPES 0%, SERVICE 11%, MANUF. 33%, OTHER 5%

CLASS 1 TOTAL NUMBER OF JOBS 103, 9% FAILED. THE AVERAGE TURNAROUND FOR THE 93 GOOD JOBS WAS 23 MIN.

TURNAROUND DISTRIBUTION IS	75%	6%	8%	5%	1%	2%	0%	0%	0%	1%	
	0.0	26.3	52.6	78.9	105.2	131.5	157.8	184.1	210.4	236.7	263.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 40%, PERM. FILES 20%, TAPES 0%, SERVICE 10%, MANUF. 20%, OTHER 0%

CLASS 3 TOTAL NUMBER OF JOBS 33, 0% FAILED. THE AVERAGE TURNAROUND FOR THE 33 GOOD JOBS WAS 84 MIN.

TURNAROUND DISTRIBUTION IS	63%	15%	3%	0%	6%	6%	0%	0%	0%	6%	
	3.0	50.8	98.6	146.4	194.2	242.0	289.8	337.6	385.4	433.2	481.0 MIN.

CLASS 5 TOTAL NUMBER OF JOBS 14, 7% FAILED. THE AVERAGE TURNAROUND FOR THE 13 GOOD JOBS WAS 50 MIN.

TURNAROUND DISTRIBUTION IS	30%	0%	0%	0%	30%	15%	0%	0%	0%	23%	
	4.0	14.4	24.8	35.2	45.6	56.0	66.4	76.8	87.2	97.6	108.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM. FILES 0%, TAPES 0%, SERVICE 0%, MANUF. 100%, OTHER 0%

CLASS 2 TOTAL NUMBER OF JOBS 144, 26% FAILED. THE AVERAGE TURNAROUND FOR THE 106 GOOD JOBS WAS 93 MIN.

TURNAROUND DISTRIBUTION IS	73%	12%	4%	3%	2%	0%	0%	0%	0%	1%	
	0.0	90.0	180.0	270.0	360.0	450.0	540.0	630.0	720.0	810.0	900.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 21%, PERM. FILES 21%, TAPES 39%, SERVICE 0%, MANUF. 15%, OTHER 0%

CLASS 4 TOTAL NUMBER OF JOBS 33, 12% FAILED. THE AVERAGE TURNAROUND FOR THE 29 GOOD JOBS WAS 381 MIN.

TURNAROUND DISTRIBUTION IS	31%	24%	0%	0%	10%	10%	6%	3%	3%	10%	
	13.0	115.9	218.8	321.7	424.6	527.5	630.4	733.3	836.2	939.1	1042.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 25%, PERM. FILES 25%, TAPES 25%, SERVICE 25%, MANUF. 0%, OTHER 0%

CLASS 6 TOTAL NUMBER OF JOBS 10, 10% FAILED. THE AVERAGE TURNAROUND FOR THE 9 GOOD JOBS WAS 224 MIN.

TURNAROUND DISTRIBUTION IS	55%	11%	22%	0%	0%	0%	0%	0%	0%	11%	
	62.0	144.5	227.0	309.5	392.0	474.5	557.0	639.5	722.0	804.5	887.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 100%, PERM. FILES 0%, TAPES 0%, SERVICE 0%, MANUF. 0%, OTHER 0%

PERFORMANCE OF THE 7600 COMPUTER IN THE WEEK FROM 4-FEB-74 TO 10-FEB-74 FOR SELECTED USER JOBS,

CLASS 0 TOTAL NUMBER OF JOBS 208, 0% FAILED, THE AVERAGE TURNAROUND FOR THE 206 GOOD JOBS WAS 8 MIN,

TURNAROUND DISTRIBUTION IS	95%	3%	0%	0%	0%	0%	0%	0%	0%	0%
	0,0	34,5	69,0	103,5	138,0	172,5	207,0	241,5	276,0	310,5	345,0 MIN,

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM, FILES 0%, TAPES 0%, SERVICE 0%, MANUF, 100%, OTHER 0%

CLASS 1 TOTAL NUMBER OF JOBS 68, 0% FAILED, THE AVERAGE TURNAROUND FOR THE 68 GOOD JOBS WAS 35 MIN,

TURNAROUND DISTRIBUTION IS	94%	0%	2%	1%	0%	0%	0%	0%	0%	1%
	0,0	96,0	192,0	288,0	384,0	480,0	576,0	672,0	768,0	864,0	960,0 MIN,

CLASS 3 TOTAL NUMBER OF JOBS 6, 0% FAILED, THE AVERAGE TURNAROUND FOR THE 6 GOOD JOBS WAS 183 MIN,

TURNAROUND DISTRIBUTION IS	50%	0%	0%	16%	0%	0%	16%	0%	0%	16%
	5,0	58,3	111,6	164,9	218,2	271,5	324,8	378,1	431,4	484,7	538,0 MIN,

CLASS 2 TOTAL NUMBER OF JOBS 77, 14% FAILED, THE AVERAGE TURNAROUND FOR THE 66 GOOD JOBS WAS 49 MIN,

TURNAROUND DISTRIBUTION IS	56%	24%	9%	3%	3%	3%	0%	0%	0%	1%
	1,0	39,9	78,8	117,7	156,6	195,5	234,4	273,3	312,2	351,1	390,0 MIN,

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM, FILES 0%, TAPES 63%, SERVICE 9%, MANUF, 9%, OTHER 18%

CLASS 4 TOTAL NUMBER OF JOBS 40, 2% FAILED, THE AVERAGE TURNAROUND FOR THE 39 GOOD JOBS WAS 217 MIN,

TURNAROUND DISTRIBUTION IS	30%	20%	7%	2%	5%	5%	10%	5%	7%	5%
	0,0	63,5	127,0	190,5	254,0	317,5	381,0	444,5	508,0	571,5	635,0 MIN,

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM, FILES 0%, TAPES 0%, SERVICE 0%, MANUF, 0%, OTHER 0%

CLASS 6 TOTAL NUMBER OF JOBS 8, 0% FAILED, THE AVERAGE TURNAROUND FOR THE 8 GOOD JOBS WAS 60 MIN,

TURNAROUND DISTRIBUTION IS	75%	12%	0%	0%	0%	0%	0%	0%	0%	12%
	0,0	37,1	74,2	111,3	148,4	185,5	222,6	259,7	296,8	333,9	371,0 MIN,

PERFORMANCE OF THE 6000 COMPUTER IN THE WEEK FROM 14-JAN-74 TO 20-JAN-74 FOR SELECTED USER JOBS.

CLASS 0 TOTAL NUMBER OF JOBS 192, 3% FAILED. THE AVERAGE TURNAROUND FOR THE 185 GOOD JOBS WAS 17 MIN.

TURNAROUND DISTRIBUTION IS

96%	1%	0%	0%	0%	1%	0%	0%	0%	0%
0,0	60,8	121,6	182,4	243,2	304,0	364,8	425,6	486,4	547,2	608,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 57%, PERM. FILES 0%, TAPES 0%, SERVICE 0%, MANUF. 14%, OTHER 28%

CLASS 1 TOTAL NUMBER OF JOBS 19, 0% FAILED, THE AVERAGE TURNAROUND FOR THE 19 GOOD JOBS WAS 15 MIN.

TURNAROUND DISTRIBUTION IS

47%	0%	26%	5%	0%	10%	0%	0%	0%	10%
1,0	7,0	13,0	19,0	25,0	31,0	37,0	43,0	49,0	55,0	61,0 MIN.

CLASS 3 TOTAL NUMBER OF JOBS 56, 1% FAILED, THE AVERAGE TURNAROUND FOR THE 55 GOOD JOBS WAS 64 MIN.

TURNAROUND DISTRIBUTION IS

72%	7%	3%	1%	0%	0%	0%	3%	0%	10%
1,0	36,8	72,6	108,4	144,2	180,0	215,8	251,6	287,4	323,2	359,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM. FILES 0%, TAPES 0%, SERVICE 0%, MANUF. 100%, OTHER 0%

CLASS 5 TOTAL NUMBER OF JOBS 14, 7% FAILED, THE AVERAGE TURNAROUND FOR THE 13 GOOD JOBS WAS 28 MIN.

TURNAROUND DISTRIBUTION IS

15%	46%	15%	15%	0%	0%	0%	0%	0%	7%
0,0	12,8	25,6	38,4	51,2	64,0	76,8	89,6	102,4	115,2	128,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM. FILES 0%, TAPES 0%, SERVICE 100%, MANUF. 0%, OTHER 0%

CLASS 2 TOTAL NUMBER OF JOBS 13, 15% FAILED, THE AVERAGE TURNAROUND FOR THE 11 GOOD JOBS WAS 26 MIN.

TURNAROUND DISTRIBUTION IS

18%	18%	27%	0%	9%	0%	0%	0%	18%	9%
8,0	12,8	17,6	22,4	27,2	32,0	36,8	41,6	46,4	51,2	56,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM. FILES 0%, TAPES 100%, SERVICE 0%, MANUF. 0%, OTHER 0%

CLASS 6 TOTAL NUMBER OF JOBS 7, 28% FAILED, THE AVERAGE TURNAROUND FOR THE 5 GOOD JOBS WAS 60 MIN.

TURNAROUND DISTRIBUTION IS

20%	20%	0%	0%	20%	0%	20%	0%	0%	20%
34,0	40,1	46,2	52,3	58,4	64,5	70,6	76,7	82,8	88,9	95,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM. FILES 0%, TAPES 0%, SERVICE 100%, MANUF. 0%, OTHER 0%

CLASS 0 TOTAL NUMBER OF JOBS 72, 2% FAILED, THE AVERAGE TURNAROUND FOR THE 70 GOOD JOBS WAS 9 MIN,

TURNAROUND DISTRIBUTION IS

51%	24%	4%	8%	1%	1%	2%	2%	1%	1%
0,0	5,7	11,4	17,1	22,8	28,5	34,2	39,9	45,6	51,3	57,0 MIN,

FAILURE DISTRIBUTION IS I/O FILE 100%, PERM, FILES 0%, TAPES 0%, SERVICE 0%, MANUF, 0%, OTHER 0%

CLASS 1 TOTAL NUMBER OF JOBS 15, 6% FAILED, THE AVERAGE TURNAROUND FOR THE 14 GOOD JOBS WAS 136 MIN,

TURNAROUND DISTRIBUTION IS

85%	0%	0%	0%	0%	0%	0%	0%	0%	14%
0,0	93,1	186,2	279,3	372,4	465,5	558,6	651,7	744,8	837,9	931,0 MIN,

FAILURE DISTRIBUTION IS I/O FILE 100%, PERM, FILES 0%, TAPES 0%, SERVICE 0%, MANUF, 0%, OTHER 0%

CLASS 3 TOTAL NUMBER OF JOBS 64, 6% FAILED, THE AVERAGE TURNAROUND FOR THE 60 GOOD JOBS WAS 39 MIN,

TURNAROUND DISTRIBUTION IS

95%	1%	1%	0%	0%	0%	0%	0%	0%	1%
0,0	100,8	201,6	302,4	403,2	504,0	604,8	705,6	806,4	907,2	1008,0 MIN,

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM, FILES 50%, TAPES 0%, SERVICE 25%, MANUF, 0%, OTHER 0%

CLASS 5 TOTAL NUMBER OF JOBS 36, 11% FAILED, THE AVERAGE TURNAROUND FOR THE 32 GOOD JOBS WAS 66 MIN,

TURNAROUND DISTRIBUTION IS

93%	0%	3%	0%	0%	0%	0%	0%	0%	3%
0,0	102,6	205,2	307,8	410,4	513,0	615,6	718,2	820,8	923,4	1026,0 MIN,

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM, FILES 50%, TAPES 0%, SERVICE 25%, MANUF, 25%, OTHER 0%

CLASS 2 TOTAL NUMBER OF JOBS 4, 0% FAILED, THE AVERAGE TURNAROUND FOR THE 4 GOOD JOBS WAS 25 MIN,

TURNAROUND DISTRIBUTION IS

25%	0%	0%	25%	0%	0%	0%	25%	0%	25%
2,0	6,5	11,0	15,5	20,0	24,5	29,0	33,5	38,0	42,5	47,0 MIN,

CLASS 6 TOTAL NUMBER OF JOBS 5, 0% FAILED, THE AVERAGE TURNAROUND FOR THE 5 GOOD JOBS WAS 32 MIN,

TURNAROUND DISTRIBUTION IS

20%	20%	20%	20%	0%	0%	0%	0%	0%	20%
6,0	13,8	21,6	29,4	37,2	45,0	52,8	60,6	68,4	76,2	84,0 MIN,

PERFORMANCE OF THE 6000 COMPUTER IN THE WEEK FROM 28-JAN-74 TO 3-FEB-74 FOR SELECTED USER JOBS.

CLASS 0 TOTAL NUMBER OF JOBS 52, 5% FAILED, THE AVERAGE TURNAROUND FOR THE 49 GOOD JOBS WAS 23 MIN.

TURNAROUND DISTRIBUTION IS

65%	10%	2%	0%	0%	8%	4%	4%	2%	4%

0,0 12,0 24,0 36,0 48,0 60,0 72,0 84,0 96,0 108,0 120,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 66%, PERM. FILES 0%, TAPES 0%, SERVICE 0%, MANUF. 33%, OTHER 0%

CLASS 3 TOTAL NUMBER OF JOBS 90, 8% FAILED, THE AVERAGE TURNAROUND FOR THE 82 GOOD JOBS WAS 61 MIN.

TURNAROUND DISTRIBUTION IS

84%	9%	1%	0%	0%	0%	2%	0%	0%	2%

0,0 75,5 151,0 226,5 302,0 377,5 453,0 528,5 604,0 679,5 755,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 12%, PERM. FILES 50%, TAPES 0%, SERVICE 25%, MANUF. 12%, OTHER 0%

CLASS 5 TOTAL NUMBER OF JOBS 27, 0% FAILED, THE AVERAGE TURNAROUND FOR THE 27 GOOD JOBS WAS 123 MIN.

TURNAROUND DISTRIBUTION IS

81%	3%	3%	0%	0%	0%	0%	0%	0%	11%

0,0 81,0 162,0 243,0 324,0 405,0 486,0 567,0 648,0 729,0 810,0 MIN.

CLASS 2 TOTAL NUMBER OF JOBS 7, 14% FAILED, THE AVERAGE TURNAROUND FOR THE 6 GOOD JOBS WAS 155 MIN.

TURNAROUND DISTRIBUTION IS

83%	0%	0%	0%	0%	0%	0%	0%	0%	16%

20,0 89,7 159,4 229,1 298,8 368,5 438,2 507,9 577,6 647,3 717,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM. FILES 0%, TAPES 100%, SERVICE 0%, MANUF. 0%, OTHER 0%

CLASS 4 TOTAL NUMBER OF JOBS 31, 9% FAILED, THE AVERAGE TURNAROUND FOR THE 28 GOOD JOBS WAS 22 MIN.

TURNAROUND DISTRIBUTION IS

96%	0%	0%	0%	0%	0%	0%	0%	0%	3%

1.0 44,5 88,0 131,5 175,0 218,5 262,0 305,5 349,0 392,5 436,0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 33%, PERM. FILES 66%, TAPES 0%, SERVICE 0%, MANUF. 0%, OTHER 0%

PERFORMANCE OF THE 6000 COMPUTER IN THE WEEK FROM 4-FEB-74 TO 10-FEB-74 FOR SELECTED USER JOBS,

CLASS 0 TOTAL NUMBER OF JOBS 32, 6% FAILED, THE AVERAGE TURNAROUND FOR THE 30 GOOD JOBS WAS 6 MIN,

TURNAROUND DISTRIBUTION IS	46%	26%	6%	10%	3%	3%	0%	0%	0%	3%
	0.0	3.6	7.2	10.8	14.4	18.0	21.6	25.2	28.8	32.4	36.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM. FILES 0%, TAPES 0%, SERVICE 0%, MANUF, 100%, OTHER 0%

CLASS 1 TOTAL NUMBER OF JOBS 1, 0% FAILED, THE AVERAGE TURNAROUND FOR THE 1 GOOD JOBS WAS 5 MIN,

TURNAROUND DISTRIBUTION IS	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0 MIN.

CLASS 3 TOTAL NUMBER OF JOBS 36, 22% FAILED, THE AVERAGE TURNAROUND FOR THE 28 GOOD JOBS WAS 54 MIN,

TURNAROUND DISTRIBUTION IS	89%	7%	0%	0%	0%	0%	0%	0%	0%	3%
	2.0	75.3	148.6	221.9	295.2	368.5	441.8	515.1	588.4	661.7	735.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 12%, PERM. FILES 0%, TAPES 0%, SERVICE 25%, MANUF, 62%, OTHER 0%

CLASS 5 TOTAL NUMBER OF JOBS 23, 4% FAILED, THE AVERAGE TURNAROUND FOR THE 22 GOOD JOBS WAS 45 MIN,

TURNAROUND DISTRIBUTION IS	18%	9%	18%	31%	9%	0%	4%	0%	4%	4%
	10.0	21.0	32.0	43.0	54.0	65.0	76.0	87.0	98.0	109.0	120.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 100%, PERM. FILES 0%, TAPES 0%, SERVICE 0%, MANUF, 0%, OTHER 0%

CLASS 2 TOTAL NUMBER OF JOBS 4, 0% FAILED, THE AVERAGE TURNAROUND FOR THE 4 GOOD JOBS WAS 17 MIN,

TURNAROUND DISTRIBUTION IS	50%	0%	0%	0%	0%	0%	0%	25%	25%
	4.0	6.8	9.6	12.4	15.2	18.0	20.8	23.6	26.4	29.2	32.0 MIN.

CLASS 6 TOTAL NUMBER OF JOBS 1, 0% FAILED, THE AVERAGE TURNAROUND FOR THE 1 GOOD JOBS WAS 62 MIN,

TURNAROUND DISTRIBUTION IS	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0 MIN.

7600 Summary analysis

CDC 7600	14.1.-20.1.		21.1.-27.1.		28.1.-3.2.		4.2.-10.2.		Total period		Turnaround*)		
	No. of jobs	Failure	No. of jobs	Failure	No. of jobs	Failure	No. of jobs	Failure	No. of jobs	Failure	Worst	% *)	Min.*)
Class 0	274	4%	176	5%	204	8%	208	0%	862	5%	495	84	10
1	39	7%	29	6%	103	9%	68	0%	239	6%	1006	79	30
3	17	5%	31	12%	33	0%	6	0%	87	6%	1070	70	180
5	-	-	-	-	14	7%	-	-	14	7%	108	-	-
Class 2	26	7%	14	0%	144	26%	77	14%	261	19%	900	83	120
4	13	30%	17	23%	33	12%	40	2%	103	12%	1042	58	240
6	12	25%	15	20%	10	10%	8	0%	45	16%	1342	63	240

*) The last two columns should be as follows: i% of the jobs had a turnaround of less than j min.

The mean time between failures for the CDC 7600/6400 computer system for the above period is as follows:

7600/6400	Week 1	Week 2	Week 3	Week 4
MTBF	6 h	5 h	3.7 h	12.5 h

7600 Failure distribution for total report period

Failure reason	Classes without tapes 0	1	3	5	Classes with tapes 2	4	6	All jobs
Input/Output	34%	43%	40%	0%	16%	45%	28%	30%
General problem	2%	-	-	-	-	-	-	1.5%
Input deck problem	12%	21%	20%	-	-	9%	-	7.6%
Input file lost	10%	-	-	-	10%	36%	14%	11.5%
Output incomplete	3%	21%	20%	-	2%	-	-	1.5%
Output lost	7%	-	-	-	4%	-	14%	7.6%
Permanent files	5%	14%	-	-	16%	9%	28%	11.5%
General problem	-	7%	-	-	10%	9%	-	5.3%
File lost on 6000	2%	7%	-	-	2%	-	28%	3.8%
Corrupted on 6000	-	-	-	-	-	-	-	-
File lost on 7000	3%	-	-	-	-	-	-	0.7%
Corrupted on 7000	-	-	-	-	4%	-	-	1.5%
Magnetic tapes	-	-	-	-	48%	9%	28%	20.6% [b]
General problem	-	-	-	-	6%	-	-	2.3%
Bad staging	-	-	-	-	6%	-	14%	3.1%
Bad read/write	-	-	-	-	-	-	-	-
Bad contents	-	-	-	-	2%	9%	-	1.5%
Parity errors	-	-	-	-	24%	-	14%	9.9%
Tape broken	-	-	-	-	4%	-	-	1.5%
Tape not there	-	-	-	-	4%	-	-	1.5%
Operator error	-	-	-	-	-	-	-	-
Others	-	-	-	-	2%	-	-	0.7%
Service problem	7%	7%	-	-	2%	9%	-	4.5%
General problem	-	-	-	-	-	-	-	-
Operations	7%	7%	-	-	-	9%	-	3.8%
Program library	-	-	-	-	-	-	-	-
Advice	-	-	-	-	2%	-	-	0.7%
Manufacturer related	46%	43%	60%	100%	14%	27%	14%	29.7%
Hardware [a]	17%	21%	-	100%	4%	27%	14%	12.2%
Operating system	12%	-	-	-	10%	-	-	7.6%
System package	17%	22%	60%	-	-	-	-	9.9%
Other errors	7%	-	-	-	4%	-	-	3.8%

a) This includes also non-CDC equipment.

b) This figure is based on all failing jobs.

JOB RUN SHEET

USER NAME: _____

JOB NAME: _____

BASIC JOB CHARACTERISTICS

TAPES	# of drives		# of reels by system		
	7-tr	9-tr	CDC	CERN	OTHER
INPUT					
OUTPUT					

Perman. Files	# on 6000	# on 7000
ATTACH		
CATALOG		

FIND	#
Perm. File	
Tape File	

CARDS	
PLOTTING	
PAPERTAPE	

JOB RUN CHARACTERISTICS

JOB CARD					DATE	READ AT	TIME OF				PRINTING			RUN		REMARKS
CP	P	TP	T	CM			ATTEMPT	IN	OUT	DELAY	AT	VOL	BAD	OK	BAD	

Please use the following abbreviations for READ/PRINT : OPER. CDC-RD DOC-RD ISR WH TTY JOB as source indications.

JOB FAILURE SHEET

ONE PER JOB WITH DAYFILE

USER NAME : _____ JOB NAME : _____ DATE : _____ IDENT : _____

Please fill in this form, giving the possible reasons for the failure of the above job.

Perm. File	on 6000	on 7000
l o s t		
corrupted		

Output on :	bad	lost
Punched cards		
Plotting		
Paper tape		

Tape problems : (circle field please)

bad staging bad read/write bad contents

parity errors tape broken tape not there

operator problems others (please explain)

Service problems: (circle field please, explain under remarks)

Operations Program Library Advice

Manufacturer related : (circle field please, explain under remarks)

Hardware Oper. System System package

Changes since last run :

Remarks :

DD-HVE-jh

14.1.1974
H. von Eicken

COVER NOTE

Basic Job Characteristics

The job characteristics to be entered on the form should be those of a successful run with regard to use of tapes, permanent files, punched cards, plotting and paper tape.

The number of tapes should be separated, irrespective of the mechanism of staging, into the number of drives needed and the number of reels anticipated. The latter should be grouped to indicate the operating system under which the tape was written.

The numbers quoted in the table of permanent files should be the total number of permanent files used. They should be separated by their main residency. The FIND table should only give additional information on the way they are used.

Note: If any of the above characteristics are changed, a new sheet must be started.

Job Run Characteristics

It is not necessary to repeat unchanged information in the columns of the run characteristic, i.e. if all 12 runs logged on a sheet are executed on the same day, it is sufficient to give the data only for the first run.

The number of possible job card parameters on the form has been limited to those essential for the survey. The "TP" parameter should be the sum of all tape parameters used.

READ AT
PRINTING AT

Use the abbreviations listed at the bottom of the sheet to indicate the location of input and main output

TIME OF
Attempt

This parameter is to be used with care.
This should be the time at which you first tried to submit your job, but failed due to input station being down. This is only useful if

a) you do not submit your job to be read by somebody else as soon as the station goes up.

b) you check more or less regularly the status of the station.

IN — Time of job submittal. Cases:

a) job read at RIOS

b) job submitted to RIOS for reading by operator or next user

c) job submitted to input belt to be read by operator.

OUT — Time quoted by JANUS on front page where printing starts or time quoted by MOD 1 software on teletype when printing was done.

DELAY — This parameter is to be used with care. It should give a measure of delay of the main job output (printing, punched cards, etc.) caused by slow operations within the computer area. (Not at user-accessible devices) Use the remark field to specify output. This column should be used only if you believe this delay was excessive.

PRINTING AT VOL — See above
Use s for small (i.e. up to 5 mm -)
m for medium (between 5 and 15 mm -)
l for large (more than 15 mm -) of printed output

BAD — Indicate the printer if you feel that the quality of printing is unusually bad.

RUN OK — Tick here if you, as a user, are satisfied with the results obtained. If you made a mistake in the job set-up due to your own fault, you should class it as O.K.

BAD — Tick here if you believe the run was wasted. Use the remark field to classify the following cases:

INPUT DECK LOST
FILE LOST

OUTPUT LISTING LOST
FILE LOST

For all other cases use the job failure sheet to give the reasons.

Should you have any questions, comments or suggestions please contact:

H. von Eicken - DD
Telephone 2363 or 4966.

PERFORMANCE OF THE 7600 COMPUTER ON 29-JAN-1974 FOR SELECTED USER JOBS WITHOUT TAPES.

CLASS 0 TOTAL NUMBER OF JOBS 38, 7% FAILED. THE AVERAGE TURNAROUND FOR THE 35 GOOD JOBS WAS 34 MIN.

TURNAROUND DISTRIBUTION IS

91%	0%	2%	0%	0%	0%	2%	0%	0%	2%
0.0	49.5	99.0	148.5	198.0	247.5	297.0	346.5	396.0	445.5	495.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 66%, PERM. FILES 0%, TAPES 0%, SERVICE 0%, MANUF. 33%, OTHER 0%

LIST OF JOBS

USER NAME	JOB NAME	T	A	P	E	S				ATTACH		CATAL		FIND		JOB CARD PARAM.															
		7	9	CD	CF	OT	7	9	CD	6	7	6	7	P	T	CPT	C	P	TP	TIME	CM	DATE	C-RD	TI.IN	TI.OUT	PRI	V	QL	RUN	TUR
BROLL	READNSN										1				1		7	2		10		29.1	OC	14.45	14.45	OC	S		B05	
VON EICKEN	HVE4																					29.1	CDC	16.28	16.28	CDC	S		B02	
ERSKINE	G GAE1									1				1								29.1	DOC	13.13	13.16	CDC	S	X	B41	
ERSKINE	G GAE1									1				1								29.1	DOC	13.20	13.20	OP	S		0	0
																						29.1	DOC	09.51	09.52	CDC	S		0	1
FORNBERG	FOG1																													
TOWNSEND	PECAL										6		1	4						10		29.1	WH	13.50	13.51	WH	S		0	1
VON EICKEN	HVE4																					29.1	DOC	16.32	16.33	CDC	S		0	1
DAUM	LUTJS									3							7					29.1	CDC	11.05	11.07	OP	S		0	2
																						29.1	DOC	11.18	11.20	OP	S		0	2
FORNBERG	FOG1																					29.1	DOC	16.06	16.08	CDC	S		0	2
FORNBERG	FOG1																													
TOWNSEND	PECAL										6		1	4						10		29.1	WH	13.14	13.16	WH	S		0	2
TOWNSEND	MINUIT																			10		29.1	WH	13.58	14.00	WH	S		0	2
BROLL	READNSN										1				1		7	2		10		29.1	OC	14.40	14.43	OC	S		0	3
																						29.1	CDC	16.24	16.27	OP	S		0	3
ERSKINE	G GAE1									1				1																
GROTE	GROTE									2				2						2		29.1	DOC	11.00	11.03	OP	S		0	3
BROLL	READNSN										1				1		7	2		10		29.1	OC	15.10	15.15	OC	S		0	5
DAUM	WEILH									3							7					29.1	DOC	11.03	11.08	OP	S		0	5
DAUM	WEILH									3							7					29.1	DOC	11.15	11.20	OP	S		0	5
DAUM	WEILH									3							7					29.1	OC	15.25	15.30	OC	S		0	5
GROTE	GROTE									5	1			5						7		29.1	DOC	15.09	15.14	OP	S		0	5
GROTE	GROTE									5	1			5						7		29.1	DOC	17.38	17.44	CDC	S		0	6
BROLL	READNSN										1				1		7	2		10		29.1	OC	14.20	14.27	OC	S		0	7
GROTE	GROTE									5	1			5						7		29.1	DOC	16.57	17.04	CDC	S		0	7
DAUM	LUTJS									3							7					29.1	OC	12.15	12.24	OP	S		0	8
DAUM	WEILH									3							7					29.1	OC	12.17	12.25	OP	S		0	8
GROTE	GROTE									2		2		2						6		29.1	DOC	10.38	10.46	OP	S	X	0	8
GROTE	GROTE									5	1			5						7		29.1	DOC	17.07	17.15	CDC	S		0	8
ERSKINE	G GAE1									1				1								29.1	CDC	16.05	16.14	OP	S		0	9
TOWNSEND	MINUIT																			10		29.1	WH	15.23	15.32	WH	S		0	9
GROTE	GROTE									5	1			5						7		29.1	DOC	17.48	17.58	CDC	S		0	10
GROTE	GROTE									2		2		2						6		29.1	DOC	10.35	10.51	OP	S	X	0	16
BROLL	TRACMS									5				5			7	2		10		29.1	OC	17.40	18.10	OC	S		0	30
GROTE	GROTE									5	1			5						7		29.1	DOC	11.50	12.21	OP	M		0	31
DAUM	WEILH									3							7					29.1	OC	17.31	18.06	OC	S		0	35
FORNBERG	FOG1																					29.1	OP	13.35	14.12	OP	S		0	37
ERSKINE	G GAE1									1				1								29.1	DOC	17.00	19.06	OP	S		0	126
BRUN	PRUN													4						10		29.1	CDC	14.26	19.32	OP	M		0	306
FRANCESCI	FRGET									1		1		1								29.1	CDC	11.15	19.30	OP	M		0	495

PERFORMANCE OF THE 7600 COMPUTER ON 31-JAN-1974 FOR SELECTED USER JOBS WITH TAPES.

CLASS 2 TOTAL NUMBER OF JOBS 24, 8% FAILED. THE AVERAGE TURNAROUND FOR THE 22 GOOD JOBS WAS 101 MIN.

TURNAROUND DISTRIBUTION IS 54% 27% 4% 0% 9% 0% 0% 0% 0% 4%

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----I-------I-------I-------I-------I-------I-------I-------I-------I-------I-------I--
   4.0     59.8   115.6   171.4   227.2   283.0   338.8   394.6   450.4   506.2   562.0  MIN.
```

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM. FILES 0%, TAPES 50%, SERVICE 0%, MANUF. 50%, OTHER 0%

LIST OF JOBS

USER NAME	JOB NAME	TAPES 7	TAPES 9	TAPES CD	TAPES CE	TAPES OT	ATTACH 7	ATTACH 9	ATTACH CD	CATAL 6	CATAL 7	FIND 6	FIND 7	JOB CARD PARAM. P	T	CPT	C	P	TP	TIME	CM	DATE	C-RD	TI.IN	TI.OUT	PRI	V	OL	RUN	TUR
ADAMS	ACCCP		1				1			3					1			2	1	40		31.1	OC	13.10	13.28	OC	S		B21	
WILSON	FOMEO		1			1				3	1		3	1						7		31.1	WH	10.44	10.49	WH	S	X	B41	
STEINBERGER	ALFFY	1		1								1		1						10		31.1	OC	15.26	15.30	OC	M		0	4
STEINBERGER	X1PIC	3 2		1			2							3						10		31.1	OC	11.26	11.34	OC	M		0	8
STEINBERGER	ALFFY	1		1						1				1				2	1	10		31.1	OC	14.31	14.42	OC	S		0	11
ADAMS	AMEGA		1							1		1		1				2		40		31.1	OC	13.17	13.46	OC	M		0	29
KLEIN	X3PG2						1		1		X		2		X			2		37		31.1	TC	16.55	17.32	TC	M		0	37
STEINBERGER	BOARD	X												X				2	2	10		31.1	OC	10.11	10.49	OC	S		0	38
KLEIN	GRAF X3	1				X					2		3		Y			3	1	37		31.1	TC	15.57	16.45	TC	M		0	48
BROLL	READNSN		1	1										1		7		2	1	10		31.1	OC	12.20	13.10	OC	S		0	50
ADAMS	ACCCP		1				1			3				1				2	1	40		31.1	OC	17.25	18.18	OC	S	X	0	53
ADAMS	AMEGA		1							1		1		1				2		40		31.1	OC	17.25	18.19	OC	M	X	0	54
KLEIN	X3 PP2						1	1		X			2		X			2		37		31.1	TC	09.39	10.33	TC	M		0	54
KLEIN	X3 PP2						1	1		X			2		Y			2		37		31.1	TC	16.55	17.50	TC	M		0	55
STEINBERGER	BOARD	X												X				2	2	10		31.1	OC	10.26	11.35	OC	S		0	69
KLEIN	X3PG2						1		1		X		2		Y			2		37		31.1	TC	09.39	10.53	TC	M		0	74
HELGAKER	X1HEL		2	2						2	2		2	2		7		2		40		31.1	OC	17.12	18.40	OP	M		0	88
KLEIN	X3PG1						1		1		X		2		X			2		37		31.1	TC	09.39	11.23	TC	M		0	104
KLEIN	KLEIN X3	1				1					2		3		X			3	1	37		31.1	TC	14.23	16.10	TC	M		0	107
STEINBERGER	XIPIC	3		2		1				1		1		3				2	1	10		31.1	OC	17.30	19.20	OC	M		0	110
KLEIN	X3 PP1							1	1		X		2		Y			2		37		31.1	TC	17.04	19.20	TC	S		0	136
GROTE	GROTE			1															1	4		31.1	OOC	14.00	18.25	COC	S		0	265
HELGAKER	X1HEL						1	1	4				4			7			1	40		31.1	OC	11.00	15.35	OC	S		0	275
HELGAKER	X1HEL		1	1								1		1		7	2	1	1	40		31.1	OP	17.59	03.21	OP	S		0	562

PERFORMANCE OF THE 7600 COMPUTER ON 1-FEB-1974 FOR SELECTED USER JOBS WITH TAPES.

CLASS 2 TOTAL NUMBER OF JOBS 33, 21% FAILED. THE AVERAGE TURNAROUND FOR THE 26 GOOD JOBS WAS 51 MIN.

TURNAROUND DISTRIBUTION IS

76%	7%	7%	0%	0%	3%	0%	0%	3%

0.0 41.3 82.6 123.9 165.2 206.5 247.8 289.1 330.4 371.7 413.0 MIN.

FAILURE DISTRIBUTION IS I/O FILE 0%, PERM. FILES 14%, TAPES 85%, SERVICE 0%, MANUF. 0%, OTHER 0%

LIST OF JOBS

USER NAME	JOB NAME	TAPES 7	9	CD	CE	OT	ATTACH 7	9	CD	CATAL 6	7	FIND 6	7	P	T	CPT	JOB C	P	TP	CARD PARAM. TIME	CM	DATE	C-RD	TI.IN	TI.OUT	PRI	V	QL	RUN	TUR
STEINBERGER	BOARD	X													X			2	1	10		01.2	OC	10.58	12.31	OC	S		E10	
STEINBERGER	BOARD	X													X			2	1	10		01.2	OC	11.34	11.34	OC	S		B28	
STEINBERGER	XIHAR	5		5			1		1	1					F			2	1	40		01.2	OC	12.45	12.45	OC	S		B24	
STEINBERGER	XIHAR	5		5			1		1	1					5			2	1	40		01.2	OC	12.51	13.40	OC	S		B24	
STEINBERGER	BOARD	X													X			2	1	10		01.2	OC	10.55	12.14	OC	S		B20	
STEINBERGER	BOARD	X													X			2	1	10		01.2	OC	10.57	12.36	OC	S		B24	
STEINBERGER	X1BA1	2		2						3					2			2	1	40		01.2	OC	14.42	17.54	OC	L		B23	
STEINBERGER	XICTR	1		1						1					1					10		01.2	OC	15.05	15.05	OC	S		0	0
STEINBERGER	XICTR	1		1						1					1					10		01.2	OC	15.06	15.06	OC	S		0	0
STEINBERGER	XICTR	1		1						1					1					10		01.2	OC	15.04	15.05	OC	S		0	1
STEINBERGER	XICTR	1		1						1					1					17		01.2	OC	18.26	18.32	OC	S		0	6
STEINBERGER	XICTR	1		1						1					1					17		01.2	OC	18.26	18.32	OC	S		0	6
STEINBERGER	XICTR	1		1						1					1					17		01.2	OC	18.26	18.32	OC	S		0	6
BROLL	NICOLE		1	1						7			1	6	1		7	2	1	10		01.2	OP	20.30	20.40	OP	S		0	10
STEINBERGER	FRACT	1		1											1					10		01.2	OC	15.08	15.18	OC	S		0	10
STEINBERGER	BOARD	X													X			2	1	10		01.2	OC	12.54	13.06	OC	S		0	12
STEINBERGER	FRACT	1		1											1					17		01.2	OC	18.26	18.40	OC	S		0	14
STEINBERGER	FRACT	1		1											1					10		01.2	OC	17.10	17.25	OC	S		0	15
ADAMS	ADAMS		1							1		1			1			2		40		01.2	OP	17.30	17.50	OP	M		0	20
STEINBERGER	XICTR	1		1						1					1					17		01.2	OC	17.17	17.39	OC	S		0	22
STEINBERGER	XICTR	1		1						1					1					17		01.2	OC	17.17	17.39	OC	S		0	22
STEINBERGER	XICTR	1		1						1					1					17		01.2	OC	17.17	17.39	OC	S		0	22
ADAMS	ACCCP		1					1		3					1			2	1	40		01.2	OP	17.00	17.25	OP	S		C	25
BROLL	NICOLE		1	1						7			1	6	1		7	2	1	10		01.2	OP	19.40	20.05	OP	S		0	25
ADAMS	ACCCP		1					1		3					1			2	1	40		01.2	OC	10.10	10.36	OP	S		C	26
STEINBERGER	FRACT	1		1											1					17		01.2	OC	17.30	17.57	OC	S		C	27
HELGAKER	X1HEL		2	2						2	2			2	2		7	2		40		01.2	OC	10.57	11.37	OP	M		0	40
KLEIN	X3PG1						1		1		X			2		X		2		37		01.2	TC	09.55	10.48	TC	S		0	53
STEINBERGER	BOARD	X													X			2	1	10		01.2	OC	11.35	12.56	OC	S		C	81
STEINBERGER	BOARD	X													X			2	1	10		01.2	OC	11.26	13.04	OC	S		0	98
HELGAKER	X1HEL		2	2						2	2			2	2		7			40		01.2	OC	01.45	03.41	OC	M		0	116
KLEIN	X3 PP1							1	1		X			2		X		2		37		01.2	TC	14.07	18.43	TC	S		0	276
STEINBERGER	XIHAR	5		5			1		1	1					F			1	1	40		01.2	OP	19.00	01.53	OP	S		C	413

PERFORMANCE OF THE 7600 COMPUTER ON 5-FEB-1974 FOR SELECTED USER JOBS WITHOUT TAPES.

CLASS 8 TOTAL NUMBER OF JOBS 41, 0% FAILED. THE AVERAGE TURNAROUND FOR THE 41 GOOD JOBS WAS 14 MIN.

TURNAROUND DISTRIBUTION IS

95%	0%	2%	0%	0%	0%	0%	0%	0%	2%

0.0 34.5 69.0 103.5 138.0 172.5 207.0 241.5 276.0 310.5 345.0 MIN.

LIST OF JOBS

USER NAME	JOB NAME	TAPES 7	TAPES 9	CD	CE	OT	ATTACH 7	ATTACH 9	CD	CATAL 6	CATAL 7	FIND 6	FIND 7	P	T	OPT	JOB CARD PARAM. C	P	TP	TIME	CM	DATE	C-RD	TI.IN	TI.OUT	PRI	V	QL	RUN	TUR
ERSKINE	G GAE1																					05.2	CDC	10.09	10.09	CDC	S	0	0
FRANCESCI	FRTST										1	2										05.2	DOC	11.04	11.04	OP	S	0	0
ERSKINE	G GAE4																					05.2	DOC	18.59	19.00	OP	S	0	1
ERSKINE	G GAE4																					05.2	CDC	15.29	15.30	OP	S	0	1
ERSKINE	G GAE4																					05.2	CDC	15.29	15.30	OP	S	0	1
ERSKINE	G GAE4																					05.2	CDC	15.30	15.31	OP	S	0	1
ERSKINE	G GAE4																					05.2	CDC	16.33	16.34	OP	S	0	1
ERSKINE	G GAE4																					05.2	CDC	18.54	18.55	OP	S	0	1
FRANCESCI	FRANCE						1	1			1											05.2	CDC	09.50	09.51	OP	S	0	1
SANTIAGO	SMERG							3				3					7				7	05.2	DOC	10.51	10.52	CUP	S	0	1
ERSKINE	G GAE4																					05.2	CDC	15.11	15.13	OP	S	0	2
ERSKINE	G GAE4																					05.2	CDC	18.49	18.51	OP	S	0	2
GROTE	GROTE						1			1		1									4	05.2	DOC	14.06	14.08	CDC	S	0	2
SANTIAGO	SMERG							3				3					7				7	05.2	DOC	10.45	10.47	CUP	S	0	2
ERSKINE	G GAE4																					05.2	CDC	16.29	16.32	OP	S	0	3
ERSKINE	G GAE4																					05.2	CDC	16.38	16.41	OP	S	0	3
GROTE	GROTE						1			1		1									4	05.2	DOC	14.18	14.21	CDC	S	0	3
GROTE	GROTE						1			1		1									4	05.2	DOC	14.22	14.25	CDC	S	0	3
GROTE	GROTE						7	1				7									7	05.2	DOC	15.06	15.09	CDC	S	0	3
ERSKINE	G GAE4																					05.2	DOC	17.56	18.00	OP	S	0	4
ERSKINE	G GAE4																					05.2	CDC	18.20	18.24	OP	S	0	4
FRANCESCI	FRACT																					05.2	DOC	16.00	16.04	OP	M	0	4
GROTE	GROTE						1			1		1									7	05.2	DOC	10.48	10.52	CDC	S	0	4
GROTE	GROTE						7	1				7									7	05.2	DOC	10.02	10.06	CDC	S	0	4
SANTIAGO	SMERG							3				3					7				7	05.2	DOC	10.54	10.58	CUP	S	0	4
ERSKINE	G GAE1																					05.2	CDC	10.24	10.29	CDC	S	0	5
GROTE	GROTE						7	1				7									7	05.2	DOC	11.30	11.35	CDC	S	0	5
GROTE	GROTE						7	1				7									7	05.2	DOC	14.33	14.38	CDC	S	0	5
BRUN	PRUN											5									5	05.2	CDC	16.37	16.43	OP	S	0	6
ERSKINE	G GAE1																					05.2	DOC	10.10	10.16	CDC	S	0	6
GROTE	GROTE						7	1				7									7	05.2	DOC	10.04	10.10	CDC	S	0	6
GROTE	GROTE						7	1				7									10	05.2	DOC	11.59	12.05	CDC	S	0	6
GROTE	GROTE						1			1		1									7	05.2	DOC	10.53	11.00	CDC	S	0	7
GROTE	GROTE						7	1				7									7	05.2	DOC	11.50	11.58	CDC	S	0	8
BROLL	LIBEDIT						1			1		1					7	2			10	05.2	OC	11.30	11.40	OC	S	0	10
BROLL	NICOLE						8					6	1				7	2			10	05.2	OC	17.45	17.55	OC	S	0	10
FRANCESCI	FRANCE						1	1			1											05.2	CDC	09.50	10.02	OP	S	0	12
ERSKINE	G GAE4																					05.2	CDC	15.43	15.57	OP	S	0	14
BROLL	NICOLE						8					7					7	2			10	05.2	OC	17.15	17.30	OC	M	0	15
FRANCESCI	FRACC							1				1										05.2	CDC	11.12	12.24	OP	M	0	72
ERSKINE	G GAE4																					05.2	CDC	19.06	00.51	OP	S	0	345