Proceedings of the 1995 Winter Simulation Conference
ed. C. Alexopoulos, K. Kang, W. R. Lilegdon, and D. Goldsman

THE CUSTOMER SERVICE OFFICE SIMULATION

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ABSTRACT

This paper presents the analysis of our Customer Service Office (CSO) process. The CSO was undergoing many changes and needed to look at automating more of their process. Under the "as-is" process, they were not keeping up with the customers' inquiries. They were averaging about 13,500 inquiries a year and a backlog of about 75 inquiries. Though 75 inquiries does not suggest an excessive backlog, when you are a customer waiting, it is. The Corporate Modeling and Simulation (CMS) Office reviewed the "as-is" process and then performed "what-if" analysis on the proposed automated effort. Looking at the proposed automation through simulation would let the CSO determine if there were any problems that might occur and correct prior to implementation.

1 INTRODUCTION

The Defense Logistics Services Center (DLSC) plays an integral part in the Department of Defense's (DOD) mission. At DLSC, we provide support to all military services, other defense agencies, industry, NATO, other foreign governments and federal civil agencies for the management and dissemination of logistics information. In this role, we must perform our processes efficiently to meet our customers' requirements. In this light, one of the most critical processes at DLSC is our CSO.

In the early 1980's, DLSC established the CSO. Its mission is to serve as the focal point for receiving, controlling, evaluating and processing all inquiries regarding the Federal Catalog System (FCS), Military Engineering Data Asset Locator System (MEDALS), Federal Logistics Information System (FLIS) and any related DLSC products or services. In the beginning, it was a total manual effort with research being done through mountains of paper. The response time to the customer was hours or days. Since then, the CSO has evolved into an almost paperless environment and the response time now is within minutes. To insure that the CSO continues to operate efficiently, the DLSC CMS Office conducted simulation analysis. We developed an "as-is" simulation model, and validated it with the current process. We then conducted "what-if" analysis on alternatives to the process. In this paper, we will describe the simulation model with different "what-if" scenarios and the results of the simulations.

2 PROBLEM

The CSO receives about 13,500 inquiries a year, and increasing, via many means; e.g., telephone, fax, the electronic bulletin board system, letters, e-mails, etc. Under the current process, the technician would manually annotate the inquiry on a preprinted form. If unable to answer the inquiry immediately, the technician will research for the problem and then respond to the customer. Types of inquiries can range from "when will the next publication be produced?" to specific information on an item or National Stock Number. The technician is also responsible for inputting each inquiry into the CSO database. Use of the database is for tracking the number of inquiries received, from whom, the type of inquiry and the amount of time it took to respond to the inquiry. Because of the time spent in manual research and answering inquiries, there is always a delay in inputting entries into the database. This delay results in technicians making mass entries to the database at the end of the month. Monthly reports from this database are grouped as follows:

a. Referrals - inquiries referring customers to another agency or activity.

b. General - inquiries that do not fall within any of the specific categories, e.g., technical assistance, other assistance, etc.

c. Bulletin Board System (BBS) - provides assistance for inquiries received via the BBS.

d. Federal Logisitcs Data on Compact Disc (FEDLOG) - inquiries on distribution, set-up, hardware/

software problems and information presented on CD-ROM.

e. Logistics Remote Users Network (LOGRUN) - inquiries requesting on-line access, problems accessing, and how to use the system.

f. Publications - inquiries about products other than FEDLOG.

g. Rejects - inquiries regarding cataloging transactions that did not process.

h. Daily Report - a morning report giving interest items and number of LOGRUN access requests from the previous day.

3 SIMULATION MODEL ANALYSIS

Since the CSO needed to improve their process, the CMS Office received a tasking to perform simulation analysis on a proposed improvement. Using simulation allows the CMS Office to determine if the proposed improvement will allow the CSO to perform more efficiently. It also allows us to review the results within a few minutes rather three to six months. We in the CMS Office use a software called Hand or Computer Universal Simulator (HOCUS) to perform this analysis (PE Inbucon, Ltd. 1994).

Before developing the actual simulation, we needed to analyze the steps taken by the technicians to perform the CSO function. The CMS Office accomplishes this using flow charts developed on a software called EasyFlow (HeavenTree Software 1991). The CSO developed six flow charts (one for each type of inquiry) documenting the sequential steps necessary to respond to an inquiry. In analyzing the flow charts, we looked for similar steps in each function. By identifying similar steps, we were able to consolidate steps for preparing the model for simulation. Figure 1, is a macro level flow chart of the six CSO flow charts.

We then looked at the changes submitted for the new process. Included were on-line access to many of the publications and manuals used for research in responding to an inquiry, and development of a database containing an inventory of customers. These changes

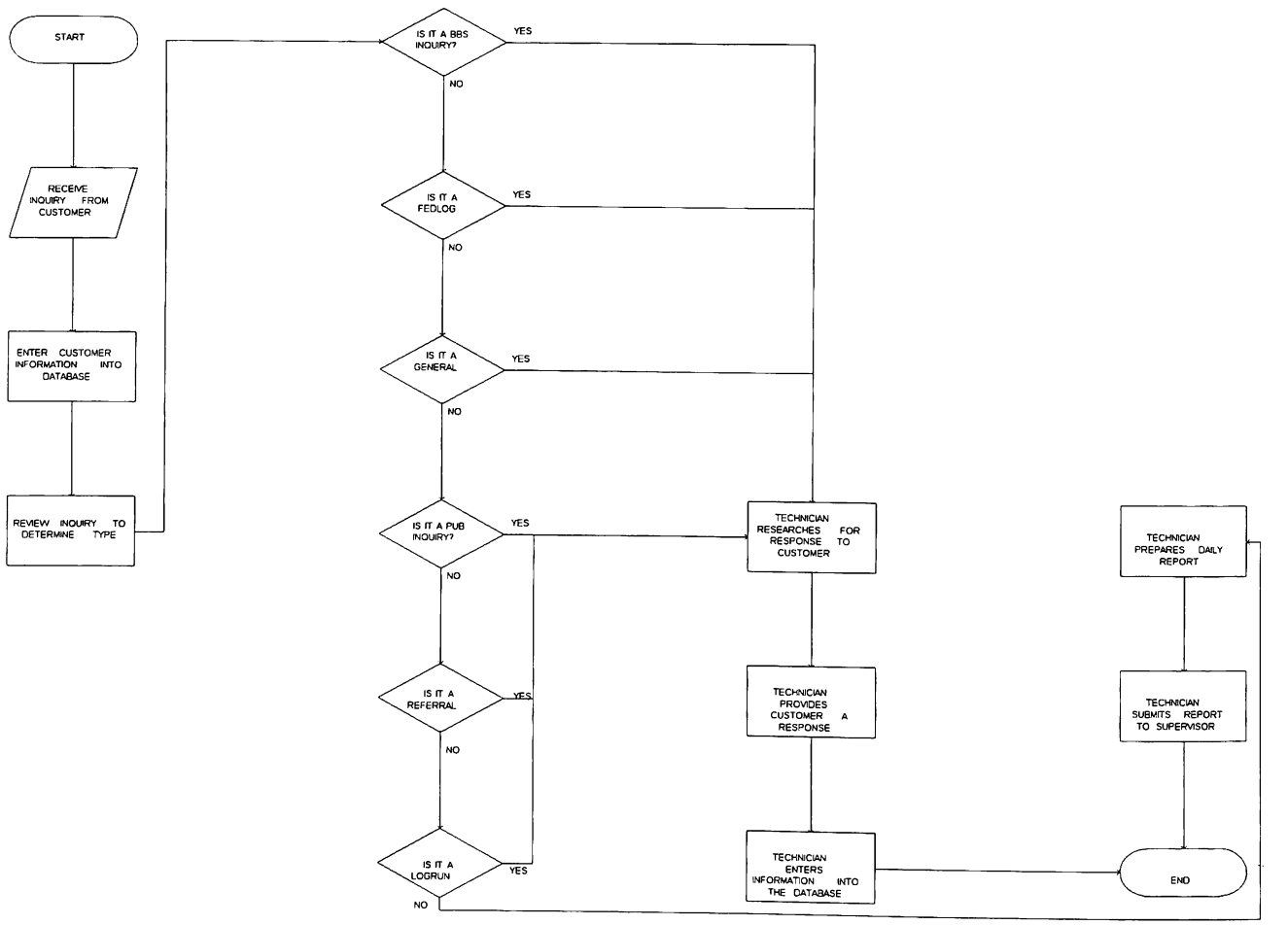

Figure 1: Macro Customer Service Office Flow Chart

enabled the CSO technician in completing their on-line activity log sheet.

The CMS Office ran three scenarios of the CSO process (current, new and new with 25% increase in inquiries). We used the current process model as the baseline. We modified the baseline model to conduct sensitivity analysis with the new configurations. These models reflected a decrease in resources, reduction in processing times for the flow chart steps, elimination of manual input of the activity log and holding the log sheet for mass input at the end of the month. In each of these variations, we were looking for the effects on resources, number of inquiries processed, and the processing time of each inquiry.

Standard parameters for these simulations were:

a. Simulations run for 90,480 minutes for an equivalent of 260 eight-hour days (one year). We base this on a personal, fatigue and delay standard of 5.8 productive hours or 348 minutes for one day.

b. The models begin with no backlogs. (Unless necessary to determine length of time needed to eliminate current backlog.)

c. Dividing the number of inquiries by available time for a month determines when an inquiry generates in the model. However, development of batch inputs are done if it would better represent reality.

d. The process owner provides average processing times for each step of the flow chart. In some instances, time ranges are needed. These can be weighted tables to show shorter or longer times as required.

Following are the results of the three simulations.

3.1 Resources

First we wanted to determine if our resources were adequate. In the current process model, we had six technicians at 100% of their time, one technician at 50%, one technician at 25% and one supervisor at 5%. In running the model with this input, the 100% technicians' time was at 92% utilization (see Figure 2). Special work assignments make up for the 8% difference. Unless CSO can acquire additional resources, there is no room for growth. This is not an option. In looking at the new proposed process, we can reduce resources as follows: five technicians at 100% of their time and two technicians for 50%. As result of process changes and decrease in resources, utilization dropped to 74% for full-time technicians and 44% for the half-time technicians. With this reduction in utilization time, we increase the number of inquiries received by 25%. The results increased to 87% and 63% respectively for the technicians. Yes, the 50% technicians were over about 13%. Why did this occur when the full-time technicians still have about 13% of their time left? Occasionally, when the 50% technicians cycle is complete they are still processing a step in the simulation and cannot immediately return to their downtime. In reality, we feel that the full-time technicians could assist whenever the 50% technicians did not have the time to complete. The 100% technicians still had around 12% under-utilized time. Based on this information, the reduced resources support the proposed enhancements.

3.2 Inquiries Processed

We then analyzed the number of inquiries processed in a year (Figure 3). The current process resulted in 13,495 inquiries processed. Two steps of the process resulted in a backlog totaling 75 inquiries (those steps were: processing calls received; and inputting the information into the database). When performing "what-if" analysis for the new process, the number of inquiries processed in

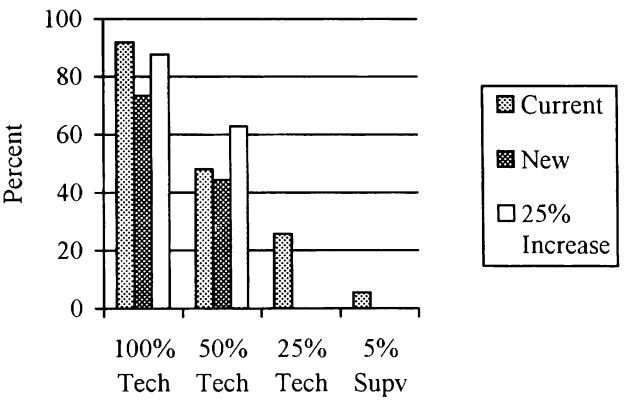

Figure 2: Resources

a year remained at around 13,500. This was done to coincide with the reduction of resources. The results indicate that it is possible for us to receive additional inquiries. Therefore, we performed another "what-if" analysis by increasing the number of inquiries by 25% for a total of about 17,000. Again, the results indicate that the technicians can complete these inquiries without any significant backlog.

3.3 Inquiry Processing Times

Figure 4 reflects the average processing time for each type of inquiry. We used the total number of inquiries processed in a year for each group as the basis for these figures. In all but one case, the processing time decreased by almost half. Even when the number of inquiries increased by 25%, the processing time only

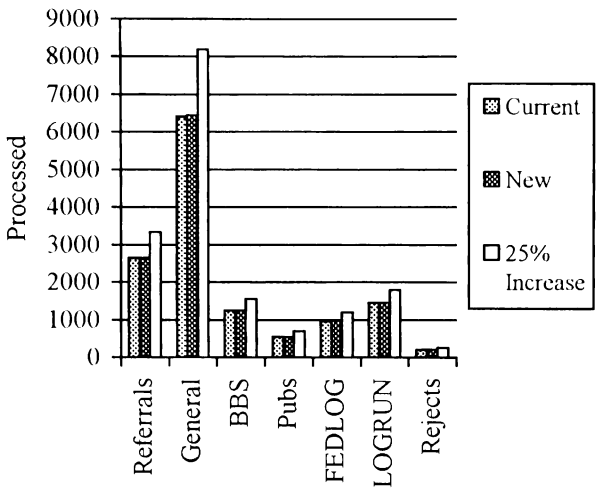

Figure 3: Inquiry Processed

increased approximately 1% over the new processing times. The reject inquiry was the only area that increased in processing time when the 25% increase was considered. We attribute this to reject inquiries being considered the lowest priority when running the simulation.

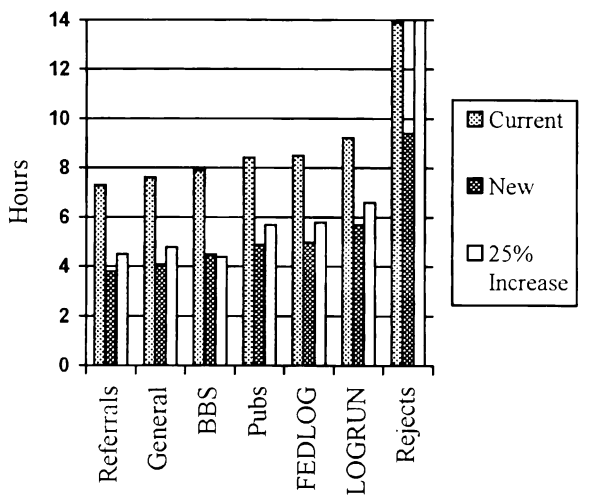

Figure 4: Inquiry Processing Times

4 SUMMARY

Based on the above analysis, we concluded that the CSO should continue to pursue the automated process. The efficiency of the process will not only improve but customers will also receive responses in a more timely manner. Completion of this simulation occurred about one year ago. Since then, the CSO implemented the automated system. They are handling customers' inquiries in less time and the efficiency of the process is continually improving. The automated system generates all monthly reports. The CSO's automated system is a DLSC success story.

REFERENCES

HavenTree Software Ltd, 1991. *EasyFlow*. Kingston, Ontario, Canada or Pineview, NY

PE Inbucon, Ltd., 1994. *Hand or Computer Universal Simulator (HOCUS)*. Egham Surrey, United Kingdom or Hampstead, MD.

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