

A SIMULATION STUDY OF ALTERNATIVES TO
UPGRADING LARGE COMPUTER SYSTEMS

by

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A MASTER'S REPORT

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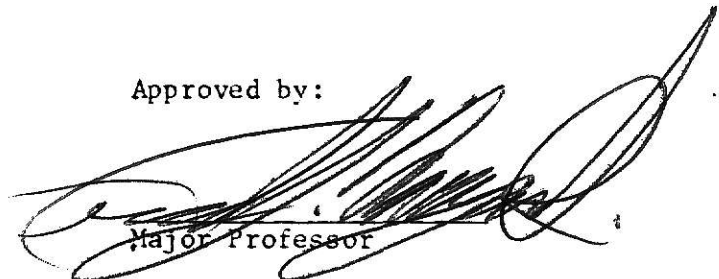
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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

In this chapter some problems associated with the growth of computer systems will be reviewed. These problems are created by the increase in demand for a computer's resources. This increase requires that a system evolve from one configuration to another; that is, the system must be continuously expanded or upgraded to handle a larger workload. Two questions will be considered:

1) What is meant by throughput in a computer system and how is it measured?

2) Can this measure of throughput be used to determine the most cost-effective configuration of a computer system at any moment in its growth cycle?

1.2 BACKGROUND

This project evolved from a study performed for the Naval Education and Training Information Systems Activity (NETISA) by this author and Dr. Fred Maryanski. The purpose of the study was to determine a suitable replacement for a computer system which has reached the limits of its

processing capabilities. The system is shown in Figure 1.1.

The hardware consists of an IBM 360/65 with 2.5 MB of real memory. On-line disk storage is equivalent to 36 IBM-3330-type drives. Twelve of these drives are devoted to an on-line data base system. Several tape drives, card readers and printers are available for batch input/output operations. Approximately 150 remote interactive terminals and 10 remote batch terminals are attached through an IBM-3705-compatible communications controller. It is planned that in the future over 500 terminals will be supported with an on-line data base of possibly 30 disk units.

The operating system currently in use is OS/MVT. One fixed partition of 500 KB is used to support a telecommunications monitor, ENVIRON/1 (1), which is marketed by CINCOM INC. This monitor (described in Appendix I) provides on-line data base inquiry/update capability for the remote terminals. The TOTAL data base system (2) is used for data management and BTAM is used for terminal access.

Approximately 1.4 MB of memory is devoted to batch processing. An average of 4 batch jobs are run concurrently and the job mix is varied between compute-bound and I/O-bound jobs. Jobs which access the data base have their own separate copies of TOTAL so careful scheduling must be used to avoid conflicts between the batch jobs and the on-line programs.