# A COMPUTER COMMUNICATIONS SYSTEM

by

KIM W. JANNE

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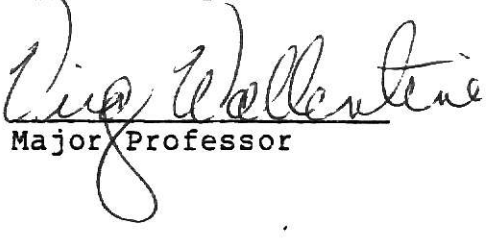

Major Professor

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# I. INTRODUCTION

The increase in popularity of personal computers has significantly altered the distribution of computing resources. Traditionally, the "computer center" was the sole source for utilizing these resources. However, with the abundance of microprocessor technology, the costs of traditional computing power have diminished to such an extent that many individuals can now justify the acquisition of personal computer equipment.

This developing trend has brought about new ideas regarding the role of the "computer center". Historically, the trend was to build bigger and bigger systems. Recently this trend has reversed itself to where current implementations have tended to promote decentralized resources. Examples of such configurations are the linking of smaller, more application dependent computers to a single large system acting primarily as a resource environment.

Within this decentralized computing environment, the small systems are able to function independently of the large system. The smaller systems may only require the services of the larger system for specialized resources that generally are not cost effective to be distributed. Such resources could entail high speed line printers, letter quality printers, and expensive high speed, large capacity storage devices.

While the theoretical basis for such distributions are

relatively sound, the implementational aspects of such resource sharing have proven to be a very undeveloped area of current computing technology. Partially due to the extreme variation of available remote computing systems, generalized distributed support environments are indeed rare. The MAILMAN / MAILLINK, (Mail Manager - Mail Manager Communication Link), project was an attempt to provide such an environment for the Kansas State University, Department of Computer Science.

The MAILMAN / MAILLINK systems are not a truly universal solution to the distributed resource problem. They do however, provide to a substantially large base, the ability to communicate and remotely operate in a compatible environment with the Interdata 8/32 system in the Computer Science Department's minicomputer laboratory.

To provide this resource for more than a single architectural system, the need for a heterogeneous computer solution to this communication system was a high requirement. The ability to meet this goal is provided with the UCSD "P" system.[9,16] The University of California at San Diego has developed a non-machine dependent operating system. The essence of this system is to provide a pseudo pascal compiler which generates a universal object "P" code. This "P" code is then executed by a machine dependent run time interpreter. By restricting machine dependent features to the run time

interpreter, source code compatibility is insured for all systems running in a "P" code environment. Because of this source code compatibility, the UCSD "P" system has become a very popular system and therefore, its utilization for the remote systems will provide for a large application base.

To expand upon the distribution concept, the ability to communicate across machines was also desired. Uses for such communication are to transfer information across media incompatibilities. While the source code to a "P" system program is execution compatible with differing machines, the media format on which these source listings may be exchanged are frequently not compatible. With the MAILMAN / MAILLINK system, information can be transmitted in its pure ASCII form, and converted by the target machine into its own compatible format.

Because this distribution potential should not be contingent upon simultaneous connection of the transferring users, some mechanism for information storage and retrieval was desired. The functional description of this run time support closely paralleled that of current electronic mail systems. Therefore, the design also included the ability for the system to act as a stand alone mail system. This implementation would allow users operating locally to utilize its applicable features.

The MAILMAN / MAILLINK environment is composed around a host