COMMAND PROCESSORS FOR THE DYNAMIC CONTROL OF SOFTWARE CONFIGURATIONS

by

ROXANNA MAY FUNDIS

B.M., Kansas State University, 1974

A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

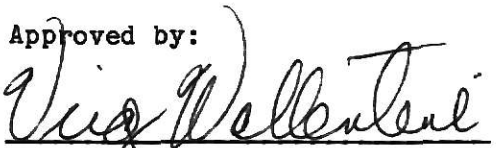
MASTER OF SCIENCE

Department of Computer Science

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1980

Approved by:



Major Professor

TABLE OF CONTENTS

ILLUSTRATIONS

ACKNOWLEDGEMENTS

This research was supported in part by the Army Institute for Research in Management, Information, and Computer Systems under grant number DAAG 29-78-G-0200 from the Army Research Office.

Special thanks go to Dr. Virgil Wallentine, Dr. Elizabeth Unger, Dr. Paul Fisher, Quincy, and the OS Group for their contributions to this work in the areas of critiques, moral support, picture drawing programs, and the Symbolic Debugger.

INTRODUCTION

Command language facilities for the construction and execution of software configurations--networks of communicating processes--are very limited today because current operating systems do not support this level of complexity. The Network Adaptable Executive (NADEX)[11] is an operating system which was designed to support dynamic configurations--those configurations which are constructed at command interpretation time--of cooperating processes. These dynamic configurations may be composed of arbitrary graphs which can contain cycles. Three command processors have been developed to explore the sufficiency of the NADEX facilities to support dynamic configurations. Users' guides to these command processors will be presented in this document, together with syntax graphs and sample user sessions.

A command allows the user to query the state of a program and/or the computer and to manipulate its resources. For example, file maintenance may be achieved through a command such as

DELETE MYFILE

which deletes a file named MYFILE from the file system; or programs may be executed with a command like

PAS32 MYFILE

which compiles the Pascal program named MYFILE. The program which reads and interprets these commands as requests to execute operations or other programs is commonly known as a command processor, command interpreter, or shell.

In chapter I, NADEX facilities, an overview of the Job Control System, and the command processor configuration are presented. Much of the basic structure of the NADEX command processors is taken from a command processor called DO which was written by Per Brinch Hansen[3]. This command processor originally ran under the Solo[3] operating system and the parts of it that prove relevant to further command processor development are described in chapter II. Although the Solo operating system does run under NADEX, it is not used for practical purposes. Chapter III contains a description of the NADEX version of DO.

Since the UNIX* shell[2] seems to be the only commercially available command processor that allows the user to dynamically configure commands, a small subset of the UNIX command processor was implemented to test the sufficiency of and demonstrate the use of NADEX facilities. This subset of UNIX is documented in chapter IV. In chapter V, the NADEX implementation of Gray's MIRACLE[5] (Machine Independent Resource Allocation and Control Language) is described. This network command language supports named ports which allows arbitrary configurations to be constructed. Implementation features and conclusions are found in chapter VI. Syntax graphs for the command languages, the NADEX Native Prefix, and sample user sessions are listed in the appendices.

*UNIX is a trademark of Bell Laboratories