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# Annotated Bibliography of the Literature on Resource Sharing Computer Networks

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[1] Headquarters and Laboratories at Gaithersburg, Maryland, unless otherwise noted; mailing address Washington, D.C. 20234.
[2] Part of the Center for Radiation Research.
[3] Located at Boulder, Colorado 80302.
[4] Part of the Center for Building Technology.

# Annotated Bibliography of the Literature on Resource Sharing Computer Networks

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CONTENTS


| | | Page |
|---|---|---|
| 1. | INTRODUCTION | 1 |
| 2. | CLASSIFICATION SCHEME | 4 |
| 3. | ANNOTATED BIBLIOGRAPHY | 10 |
| 4. | AUTHOR INDEX | 56 |
| 5. | CORPORATE AUTHOR INDEX | 61 |
| 6. | NETWORK INDEX | 67 |
| 7. | KWOC INDEX | 69 |
| 8. | REPORT NUMBER INDEX | 88 |

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# Annotated Bibliography of the Literature on Resource Sharing Computer Networks*

R. P. Blanc
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T. N. Pyke, Jr.
S. W. Watkins

This bibliography consists of references with critical annotations to the literature on computer networks. A classification scheme has been developed to place each annotation in a category reflective of its content. Five indexes to the bibliography are included: author index, corporate author index, network index, key word out of context index, and report number index.

Key Words: Bibliography; computer network; data communications; resource sharing.

## 1. INTRODUCTION

A fully annotated bibliography on resource sharing computer networks has been prepared by the Computer Systems Section of the Institute for Computer Sciences and Technology. Its purpose is to serve as a working tool for the National Bureau of Standards and other efforts devoted to the planning for the Networking for Science Program of the National Science Foundation. The operating objective has been to produce a continually updated and usable collection of documents together with a set of indexes and critical annotations. These can then be used to support the planning and development of the Networking for Science Program.

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*This work has been supported by the National Science Foundation under Grant AG-350.

In addition, it became clear as the bibliography was prepared that no coverage of similar scope and depth has been heretofore provided. Numerous requests for the completed bibliography have indicated a widespread need for it, and therefore, it has been produced in this readily available form as an NBS Special Publication.

The bibliography covers computer networks consisting of independent computer systems which communicate with one another and share resources such as hardware, programs, or data and excludes, for example, articles on time-sharing and multi-processing which deal specifically and exclusively with those topics. Ancillary topics are covered if they are sufficiently relevant. Errors of exclusion have been considered by the authors to be more serious than errors of inclusion. All articles which are clearly topical are included without regard to quality; one purpose of the annotations is to identify particularly worthwhile articles.

Sources for inclusion in the bibliography have included all available related bibliographies, including those in Computing Reviews and those available through the ARPA Network Information Center. Complete coverage of the personal collections of individuals at NBS who have been working in the computer networking area for some time is also included. As papers and reports were made a part of this collection citations made within them were checked for potential additional documents for the collection. In addition, recent

literature that may contain appropriate papers has been and is continually being searched. No documents of a classified nature are included; however, some reports that may be rather difficult to obtain but are formal reports of recognized organizations are included.

No document is referenced in this bibliography unless it has actually been obtained for the collection at NBS. These documents are not, however, available from NBS except for internal use.

As each document was catalogued, the bibliographic data and annotations were placed in machine-readable form through the use of a key-to-tape terminal. The magnetic tapes resulting from this operation were then converted to industry compatible tapes and used as input to a special set of programs on the NBS Univac 1108 service computer. These programs, developed by the Office of Computer Information of the NBS Institute for Computer Sciences and Technology, have been designated collectively as the "CHAOTIC" system for the organization and management of documents in a technical information center.

The computer-produced output for this collection is a master listing ordered by category and, within category, by author. It includes the annotations. The annotation is included only in the primary category and is cross-referenced when an entry appears in secondary categories. Additional outputs comprise an author index, a corporate author index,

a network index consisting of entries concerned with specific networks, a key word out of context index, and a report number index. Where Defense Documentation Center "AD" numbers are known these are included in the report number index. Annotations are only included in the master listing but can be cross-referenced by category number in all other listings.

The method of developing the bibliography has been to obtain potential documents through all possible sources and to evaluate their appropriateness for the collection according to the criteria stated above. All documents are annotated in a reasonably critical manner relative to this general subject area and placing particular attention on the currency of the information contained. All documents are categorized according to a classification scheme that has been developed for this specialized collection. This scheme permits each document to be placed in one primary category and one or more secondary categories as appropriate.

## 2. CLASSIFICATION SCHEME

The classification scheme for this bibliography of resource-sharing computer networks has been designed to satisfy both a reflection of the field as it seems to be structured as well as pragmatic considerations of covering the "collection" evenly. This was accomplished by a hierarchical classification scheme, which first permitted the field to be structured, and then permitted discrimination between groups of articles to as great a detail as seemed

warranted. Since articles may be multiply classified, there was a minimal concern that all classes be mutually exclusive. An article is assigned to as many classes as seem useful for researchers interested in that particular class. A distinction is made between primary classification and secondary classification only for reasons of efficiency in the production of the bibliography; a full reference appears in all cases, but the annotation appears only at the primary reference. Secondary references point to the primary reference so that the annotation may be located.

This taxonomy is not considered to be definitive; the authors would prefer to see it adapted in future editions to the content of the bibliography and the needs of researchers. New categories may be added as required and/or existing categories further subdivided.

The following notes describe the authors' intent for each entry in the classification scheme:

1. INTRODUCTORY - all articles of a general, introductory, survey or tutorial nature. Note, however, that general descriptions of specific networks are assigned to section 3. All articles in this section are assigned to one of the following classes:

   1.0 General - self-explanatory

   1.1 Objectives - articles dealing with goals, purposes, objectives of resource-sharing computer networks.

Why are such networks being built; what are the expected benefits?

1.2 Survey - comparison articles describing two or more networks

1.3 Tutorial - tutorial articles dealing with computer networks and tutorial articles dealing with ancillary subjects (e.g., data communications)

1.4 Bibliographies - other bibliographies

1.5 Social Issues - such issues as are raised by computer networks

1.6 Forecasts - prognostications regarding the growth or future development of computer networks

1.9 Other - anything else which properly falls in the introductory section

2. THEORY - all analyses, simulations, algorithms, theoretical formulations and results of any sort dealing with computer networks. The main distinction to be made is from the next section on architecture.

This section is broken down into the following classes:

2.0 General - self-explanatory

2.1 Analysis - divided further as follows:

2.1.0 General

2.1.1 Simulation

2.1.2 Analysis - all analytic work which is not based on simulations

2.1.3 Routing - all articles dealing with routing algorithms, computations or simulation. (This class was pragmatically established).

2.2 Measurement - any results of observing the operation of existing networks, or techniques of measurement which could be applied

2.3 User Considerations - human factors, response time considerations, system friendliness discussions

2.9 Other - anything else

3. ARCHITECTURE - all articles dealing with the actual design of networks, components, implementation issues

3.0 General

3.1 Specific networks - descriptions of specific networks, further categorized as follows:

3.1.0 General descriptions - distinguished from the next class by judgment only

3.1.1 Technical descriptions - including interim reports

3.1.2 Evaluation - performance analyses, reported results of operating, introspective articles

3.2 Telecommunications - all articles dealing with data communications

3.2.0 General

3.2.1 Transmission Facilities - lines, circuits, common carrier and specialized facilities (but not modems, multiplexers, etc.)

3.2.2 System design - of data communications systems

3.2.3 Hardware components - components of a data communication system: modems, multiplexers, etc.

3.2.9 Other - anything else dealing with telecommunications (telecommunications software, however, is assigned to 3.4)

3.3 Hardware - components for computer networks, excluding specific communications hardware covered in the previous class

3.3.0 General

3.3.1 Interfaces - between processors or between a processor and the data communications system

3.3.2 Processors - including front-ends and switching computers

3.3.9 Other

3.4 Software - of any type: network control programs, communications control (but line disciplines are reserved for 3.5). Application programs will be classed under applications.

3.5 Protocols - including line discipline and communications control procedures

3.9 Other

4. APPLICATIONS - all articles dealing with uses of computer networks

   4.0 General

   4.1 Functional - packages, services or capabilities likely to have widespread use (e.g., text editing systems)

   4.2 Discipline-oriented - applications common to a specific field (e.g., an engineering package, a chemical analysis service)

   4.3 Computer Utility - this category is usually claimed by the article itself

   4.9 Other

5. MANAGEMENT - all articles dealing in any way with the operation or business of computer networks

   5.0 General

   5.1 Operations - day to day management

   5.2 Market Analysis - who are the users?

   5.3 Financial - capitalization, billing, finance

   5.4 Regulatory - public policy, tariffs, etc.

   5.5 Standards

   5.6 Security - systems, requirements

   5.7 User Services

   5.9 Other

# 3. ANNOTATED BIBLIOGRAPHY

Complete through October 1972

Index of Categories


| | Page |
|---|---|
| 1. INTRODUCTORY | |
| 1.0 General | 13 |
| 1.1 Objectives | 13 |
| 1.2 Survey | 15 |
| 1.3 Tutorial | 17 |
| 1.4 Bibliographies | 18 |
| 1.5 Social Issues | 18 |
| 1.6 Forecasts | 19 |
| 1.9 Other | 19 |
| 2. THEORY | |
| 2.0 General | 20 |
| 2.1 Analysis | 20 |
| 2.1.0 General | 20 |
| 2.1.1 Simulation | 21 |
| 2.1.2 Analysis | 21 |
| 2.1.3 Routing | 24 |
| 2.2 Measurement | 25 |
| 2.3 User Considerations | 25 |
| 2.9 Other | 25 |
| 3. ARCHITECTURE | |
| 3.0 General | 27 |
| 3.1 Specific Networks | 28 |

3.1.0 General Descriptions 28
3.1.1 Technical Descriptions 31
3.1.2 Evaluation 34
3.2 Telecommunications 34
3.2.0 General 34
3.2.1 Transmission Facilities 35
3.2.2 System Design 37
3.2.3 Hardware Components 38
3.2.9 Other 38
3.3 Hardware 38
3.3.0 General
3.3.1 Interfaces 38
3.3.2 Processors 39
3.3.9 Other 40
3.4 Software 40
3.5 Protocols 42
3.9 Other
4. APPLICATIONS
4.0 General 44
4.1 Functional 44
4.2 Discipline-oriented 46
4.3 Computer Utility 47
4.9 Other 48
5. MANAGEMENT
5.0 General 50
5.1 Operations 50

5.2 Market Analysis 51

5.3 Financial 51

5.4 Regulatory 52

5.5 Standards 54

5.6 Security 55

5.7 User Services 55

5.9 Other

1. INTRODUCTORY

1.0 GENERAL

BARAN, PAUL, ON DISTRIBUTED COMMUNICATIONS: I. INTRODUCTION TO DISTRIBUTED COMMUNICATIONS NETWORKS, RAND CORP., SANTA MONICA, CA, AUG 64, RC RM-3420-PR, AF 49(638)-700, (AD-444 830), 37P, 3 REFS

THIS IS THE INTRODUCTORY REPORT TO THE SERIES OF DOCUMENTS THAT FOR THE FIRST TIME PRESENT THE MESSAGE-SWITCHED DISTRIBUTED NETWORK AS CLEARLY SUPERIOR TO CENTRALIZED AND HIERARCHICAL NETWORKS FOR SURVIVABILITY. A STANDARD MESSAGE BLOCK IS PROPOSED TO SIMPLIFY NETWORK DESIGN AND ARGUMENTS ARE MADE FOR DYNAMIC ROUTING AND LOW COST COMMUNICATION LINKS THAT IN A DISTRIBUTED CONFIGURATION CAN PROVIDE RELIABLE COMMUNICATIONS.
(ALSO UNDER 3.0)

BARAN, PAUL, ON DISTRIBUTED COMMUNICATIONS: XI. SUMMARY OVERVIEW, RAND CORP., SANTA MONICA, CA, AUG 64, RC RM-3767-PR, AF 49(638)-700, (AD-444 837), 23P
(ANNOTATION UNDER 3.0)

BAUER, WALTER F., COMPUTER/COMMUNICATIONS SYSTEMS: PATTERNS AND PROSPECTS, (INFORMATICS INC., SHERMAN OAKS, CA), GRUENBERGER, F., COMPUTERS AND COMMUNICATIONS--TOWARD A COMPUTER UTILITY, PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1968, (TK S101.C67, LC 68-16776), P 13-37, 11 REFS

AN OVERVIEW OF THE IMPACT OF THE MARRIAGE OF COMPUTERS AND COMMUNICATIONS IS PROVIDED. THE HISTORY OF COMPUTER COMMUNICATIONS AND THE ECONOMIC AND SOCIAL IMPLICATIONS OF THE MARRIAGE ARE TOUCHED UPON. SOME PARTICULARLY INTERESTING PREDICTIONS CONCERNING THE ROLE OF MESSAGE SWITCHING ARE MADE.
(ALSO UNDER 4.3)

BENOICK, MARC, FINAL REPORT OF THE COMMITTEE ON NETTING COMPUTER SYSTEMS, SYSTEM DEVELOPMENT CORP., SANTA MONICA, CA, ELECTRONIC INDUSTRIES ASSOCIATION, WASHINGTON, DC, DEFENSE COMMUNICATIONS COUNCIL, JUL 70, 52P

A SELECTION OF PROBLEMS AND A VARIETY OF GENERALIZATIONS ARE PROVIDED THAT RELATE TO THE NETWORKING OF STAND-ALONE COMPUTER SYSTEMS FOR MILITARY APPLICATIONS.

BORKO, H., NATIONAL AND INTERNATIONAL INFORMATION NETWORKS IN SCIENCE AND TECHNOLOGY, (CALIFORNIA, UNIV. OF, LOS ANGELES),
AFIPS PROCEEDINGS, 1968 FALL JOINT COMPUTER CONFERENCE, VOLUME 33, PART 2, (SAN FRANCISCO, CA, DECEMBER 9-11, 1968), THOMPSON BOOK CO., WASHINGTON, DC, 1968, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 1469-1472, 3 REFS

THE NEED FOR AND PROBLEMS OF A NATIONAL AND INTERNATIONAL SCIENCE NETWORK ARE INTRODUCED. THE DIFFICULTIES ASSOCIATED WITH THE MASSIVENESS OF TECHNOLOGICAL INFORMATION AS WELL AS THE MAGNITUDE OF THE GOVERNMENTAL AND PRIVATE EFFORTS AIMED AT SOLVING THESE DIFFICULTIES ARE PRESENTED. IT IS STATED THAT ALTHOUGH THE EFFORTS ARE COORDINATED, THEY ARE NOT TRULY INTEGRATED, AND THEREFORE THE INDIVIDUAL ENTITIES SHOULD BECOME INTERCONNECTED AND COOPERATIVE IN SHARING PROBLEM SOLVING RESOURCES. THE TECHNICAL PROBLEMS OF A NATIONAL AND INTERNATIONAL NETWORK ARE CATEGORIZED AS NOT INSURMOUNTABLE, BUT MANAGEMENT PROBLEMS ARE CONSIDERED MORE DIFFICULT AND SOME ARE EXPLICITLY STATED. THE CONCLUDING STATEMENTS CONCERNING THE IMPLICATIONS OF COMPUTER NETWORKS MAY BE A BIT OVERLY OPTIMISTIC.

CASTLE, JAMES C., SYSTEM CONTROL IN MULTIPLE ACCESS COMPUTER NETWORKS, (GENERAL ELECTRIC CO., BETHESDA, MD, DEPT. OF INFORMATION NETWORKS),
INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P S-3-1--S-3-11, 30 REFS

A TERMINOLOGY FOR COMPUTER NETWORKS IS PRESENTED AND NETWORK STRUCTURES AND ALTERNATIVE NETWORK CONTROL SCHEMES ARE BRIEFLY DISCUSSED. THE GENERAL ELECTRIC CENTRALIZED NETWORK SERVES AS AN EXAMPLE FOR THE DISCUSSION.
(ALSO UNDER 3.0)

FLOOD, MERRILL M., COMMERCIAL INFORMATION PROCESSING NETWORKS--PROSPECTS AND PROBLEMS IN PERSPECTIVE,
HUXLEY, JUDITH, THE OUTLOOK FOR TECHNOLOGICAL CHANGE AND EMPLOYMENT, APPENDIX VOLUME I, TECHNOLOGY AND THE AMERICAN ECONOMY, AND ECONOMIC PROGRESS, THE REPORT OF THE COMMISSION, NATIONAL COMMISSION ON TECHNOLOGY, AUTOMATION, AND ECONOMIC PROGRESS, FEB 66, (HC 106.5.A56B2), P I-233--I-252

THIS ANALYSIS REVIEWS COMMERCIAL NETWORK ACTIVITIES AND RELATED IMPLICATIONS. SPECIAL PROJECTS IN THE AREAS OF LIBRARIES, EDUCATION, BIOMEDICINE, ENGINEERING, LAW, PRODUCT DISTRIBUTION, FINANCE, TRANSPORTATION, AND RELATED IMPLICATIONS AND IMPACTS ARE DISCUSSED. THEN A NUMBER OF PROBLEMS ASSOCIATED WITH NETWORKING ARE PUT FORTH, PARTICULARLY THOSE DEALING WITH LEGAL ISSUES. THE PAPER CONCLUDES WITH A LIST OF RECOMMENDATIONS FOR FEDERAL GOVERNMENT ACTION.
(ALSO UNDER 5.0)

O'SULLIVAN, THOMAS C., TERMINAL NETWORKS FOR TIME-SHARING, (RAYTHEON CO., SUDBURY, MA, DATA SYSTEMS SECTION), DATAMATION, VOL 13, ISSUE 7, JUL 67, P 34-43, 1 REFS

THIS IS ANOTHER ARTICLE ON THE RAYTHEON TERMINAL NETWORK. SEE O'SULLIVAN'S ARTICLE 'EXPLOITING THE TIME-SHARING ENVIRONMENT' IN CATEGORY 3.1.2.

PROBST, LESTER A., COMMUNICATIONS DATA PROCESSING SYSTEMS: DESIGN CONSIDERATIONS, (FAIM, NEW YORK),
COMPUTERS AND AUTOMATION, VOL 17, ISSUE 5, MAY 68, P 18-21

A CHECKLIST OF CONSIDERATIONS IS PROVIDED RELATIVE TO THE SUCCESSFUL IMPLEMENTATION AND EVENTUAL OPERATION OF A 'COMMUNICATION DATA PROCESSING SYSTEM'. A COMMUNICATION DATA PROCESSING SYSTEM IS DEFINED AS AN ON-LINE SYSTEM CONSISTING OF: INQUIRY RESPONSE, DATA COLLECTION, DATA DISSEMINATION, AND MESSAGE SWITCHING.

ROBERTS, LAWRENCE G., O. R. PADEN, NETWORK OF COMPUTERS, SESSION II. DEFINITION, MODELING AND EVALUATION--SESSION SUMMARY, (ADVANCED RESEARCH PROJECTS AGENCY, WASHINGTON, DC, NATIONAL SECURITY AGENCY, FORT MEADE, MD),
PROCEEDINGS OF INVITATIONAL WORKSHOP ON COMPUTERS, NATIONAL SECURITY AGENCY, FORT MEADE, MD, OCT 68, P S7-65

A DISCUSSION SESSION AIMED AT DEFINING NETWORKS OF COMPUTERS (NOC) IS SUMMARIZED, IDENTIFYING THE MAIN PROBLEMS, AND REVIEWING THE CURRENT APPROACHES TO SOLUTIONS. THE SUMMARY REPORTS AGREEMENT THAT A RESOURCE SHARING NETWORK OF COMPUTERS SHOULD HAVE THE FOLLOWING FEATURES:
(1) EACH COMPUTER SHOULD BE CAPABLE OF EXTENDING LOCALLY AVAILABLE SERVICE TO THE ENTIRE NETWORK,
(2) USER-DESIGNED PROCEDURES SHOULD BE ABLE TO REQUEST ANY SERVICES AVAILABLE IN THE NETWORK, AND
(3) EACH COMPUTER MUST BE CAPABLE OF ACCEPTING AND EXECUTING AN ARBITRARY PROCEDURE.
THE DISCUSSION THEN CONSIDERS SOME DESIGN QUESTIONS, MODELING ALTERNATIVES, AND PERFORMANCE MEASURES. THE FINALE IS A LIST OF INTERESTING UNANSWERED QUESTIONS CONCERNING NETWORKS.
(ALSO UNDER 2.0)

1.1 OBJECTIVES

AUFENKAMP, D. D., NATIONAL SCIENCE (COMPUTER) NETWORK, (NATIONAL SCIENCE FOUNDATION, WASHINGTON, DC, OFFICE OF COMPUTING ACTIVITIES),
NETWORKS FOR HIGHER EDUCATION, PROCEEDINGS OF THE EDUCOM SPRING CONFERENCE, (WASHINGTON, DC, APRIL 13, 1972), INTERUNIVERSITY COMMUNICATIONS COUNCIL INC. (EDUCOM), PRINCETON, NJ, 1972, P 29-35

THIS IS AN INTRODUCTION TO THE CONCEPT OF THE NATIONAL SCIENCE COMPUTER NETWORK LINKING USERS AT ACADEMIC AND OTHER INSTITUTIONS TO SPECIALIZED RESOURCES FOR COMPUTING AND SCIENCE INFORMATION SERVICES. THE EMPHASIS IN THIS PRESENTATION IS ON THE STRUCTURED SHARING OF COMPUTER RESOURCES AND THE RELATED BENEFITS RATHER THAN ACCENTUATING THE COMPUTER NETWORK TECHNOLOGY.
(ALSO UNDER 4.2)

BARBER, D. L. A., THE EUROPEAN COMPUTER NETWORK PROJECT, (NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-698-8C, NSF GJ-33239, P 192-200, 16 REFS
(ANNOTATION UNDER 3.1.0)

BELL, C. G., A. N. HABERMANN, J. MCCREDIE, RONALD M. RUTLEDGE, W. WULF, COMPUTER NETWORKS, (CARNEGIE-MELLON UNIV., PITTSBURGH, PA, DEPT. OF COMPUTER SCIENCE),
COMPUTER, VOL 3, ISSUE 5, SEP-OCT 70, P 13-23

1.1 OBJECTIVES

(ANNOTATION UNDER 3.1.0)

BENOIT, JOHN W., S. B. MAHLE, P. H. MESSING, D. C. WOOD, EVALUATION OF THE NETWORK FEATURES REQUIRED TO ATTAIN THE APPROVED NMCS OBJECTIVES, MITRE CORP., WASHINGTON, DC, 2S JUN 71, MC WP-9742, SSP

MITRE IS A CONSULTANT TO THE DEFENSE COMMUNICATIONS AGENCY ASSISTING IN PREPARING FOR THE DEVELOPMENT OF A COMPUTER NETWORK IN THE NATIONAL MILITARY COMMAND SYSTEM (NMCS). THIS PAPER DISCUSSES THE OBJECTIVES TO BE MET BY AN NMCS NETWORK AND EVALUATES THE CAPABILITIES WHICH CHARACTERIZE NETWORKS TO IDENTIFY THOSE FEATURES WHICH WILL BE REQUIRED TO ATTAIN THE NMCS OBJECTIVES.

BENVENUTO, A. A., J. R. GOODROE, R. P. MORTON, SYSTEM LOAD SHARING STUDY, MITRE CORP., WASHINGTON, DC, 2S MAR 69, MTR 5062, AF F19628-68-C-036S, 95P
(ANNOTATION UNDER 1.2)

BROWN, GEORGE W., AN INTERUNIVERSITY INFORMATION NETWORK. II. EVALUATION, (CALIFORNIA, UNIV. OF, IRVINE), KENT, ALLEN, ORRIN E. TAULBEE, ELECTRONIC INFORMATION HANDLING, (PITTSBURGH, PA, OCTOBER 7-9, 1964), SPARTAN BOOKS INC., WASHINGTON, DC, 1965, KNOWLEDGE AVAILABILITY SYSTEMS SERIES, (LC 65-17306), P 269-278

IN A RATHER GENERAL WAY SOME OF THE IMPORTANT PROBLEMS INVOLVED IN THE EVALUATION OF AN INTER-UNIVERSITY NETWORK ARE PRESENTED.
(ALSO UNDER 3.1,2)

BROWN, GEORGE W., JAMES G. MILLER, THOMAS A. KEENAN, EDUNET REPORT OF THE SUMMER STUDY ON INFORMATION NETWORKS, WILEY (JOHN) AND SONS INC., NEW YORK, 1967, (LC 67-21328), 440P

(ANNOTATION FROM 'INFORMATION NETWORKS' BY BECKER AND OLSEN IN THE 'ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY' (EDITOR: C. A. CUADRA). PP 296-297.) 'THIS BOOK IS A REPORT OF THE SUMMER STUDY ON INFORMATION NETWORKS CONDUCTED BY THE INTERUNIVERSITY COMMUNICATIONS COUNCIL (EDUCOM). IT RECOUNTS THE DELIBERATIONS AND DISCUSSIONS OF A GROUP OF 181 ACADEMICIANS, COMMUNICATIONS SPECIALISTS, COMPUTER CENTER DIRECTORS, ENGINEERS, LIBRARIANS, AND OTHERS, WHO MET AT THE UNIVERSITY OF COLORADO IN JULY 1966 TO CONSIDER WHETHER AN ADVANCED EDUCATIONAL NETWORK USING ALL MEDIA--FROM DIGITAL TRANSMISSION TO COLOR TELEVISION--WOULD MAKE AMERICAN HIGHER EDUCATION MORE EFFICIENT AND MORE ECONOMICAL AND IMPROVE THE QUALITY OF INSTRUCTION AND RESEARCH.
THE BOOK EXPLORES EDUCATIONAL NETWORKING FROM THREE POINTS OF VIEW: (1) IT IDENTIFIES THE INFORMATION NEEDS OF VARIOUS CAMPUS DISCIPLINES; (2) IT CATALOGS THE TYPES OF APPLICATIONS THAT LEND THEMSELVES TO NETWORKING; AND (3) IT INVESTIGATES THE CAPABILITIES OF ADVANCED TECHNOLOGY TO MANIPULATE AND DISTRIBUTE MULTIMEDIA INFORMATION.
THE BOOK ALSO DELVES INTO ORGANIZATIONAL PROBLEMS THAT MUST BE SOLVED IF AN INFORMATION NETWORK FOR HIGHER EDUCATION IS TO BE ESTABLISHED.
THESE PROBLEMS INCLUDE NOT ONLY THE INTERNAL ORGANIZATION OF THE NETWORK OPERATION IN TERMS OF THE FUNCTIONS IT IS EXPECTED TO PERFORM, BUT ALSO ITS RELATIONSHIPS TO EDUCOM MEMBER INSTITUTIONS AND TO NON-EDUCOM INSTITUTIONS; THE NEGOTIATIONS THAT MUST TAKE PLACE TO ACQUIRE RESOURCES AND TO ENTER INTO SERVICE AGREEMENTS; AND THE IMPLICATIONS OF SUCH NEGOTIATIONS ON FINANCE, ACCOUNTING, ASSURANCE OF PRIVACY, ASSURANCE OF COMPENSATION TO ORIGINATORS OF MATERIALS; QUESTIONS OF PRIORITY AND SYSTEM CONTROL; AS WELL AS THE QUESTION OF HOW TO EVALUATE THE EFFECT OF THE NETWORK ON INSTRUCTION AND RESEARCH (P. 165).
THE CONFEREES CONCLUDED THAT NONE OF THE DEMANDS OF THE EDUNET (EDUCATIONAL NETWORK) CONCEPT IS BEYOND THE CAPABILITY OF TECHNOLOGY, ALTHOUGH SOME DEMANDS WOULD REQUIRE NEW COMBINATIONS OF TECHNOLOGIES AND HARDWARE. SPECIFICATION AND DEVELOPMENT OF RELATED SOFTWARE, HOWEVER, ARE RECOGNIZED TO BE THE MAJOR PROBLEMS.
TWO NETWORK DESIGNS ARE PRESENTED AND ANALYZED IN THE BOOK, TOGETHER WITH THEIR RESPECTIVE COST ESTIMATES. BOTH INVOLVE MULTIMEDIA PLANNING, AND THEY PROVIDE VERY USEFUL SUMMARIES OF SYSTEM CONSIDERATIONS FOR ANYONE INTERESTED OR ENGAGED IN PRELIMINARY NETWORK PLANNING.
THE SUMMER STUDY WAS A WIDE-RANGING SURVEY OF VAST TERRAIN BUT IT ALSO FOCUSED SHARPLY UPON A SINGLE CONCEPT FOR AN EDUCATIONAL NETWORK--THE EDUNET PLAN PRESENTED IN THE FINAL CHAPTER. IT GIVES THE LOGICAL REASONS FOR A THREE-NODE BACKBONE NETWORK CAPABLE OF HANDLING NARROW-BAND, AND, LATER, BROAD-BAND COMMUNICATION TRAFFIC. EDUNET IS AN EVOLUTIONARY PLAN TO PROVIDE THE RESEARCH AND DEVELOPMENT ENVIRONMENT THAT CAN GRADUALLY LEAD TO THE ESTABLISHMENT OF AN OPERATING PILOT INFORMATION NETWORK FOR HIGHER EDUCATION.'

DAVIS, RUTH M., PRACTICALITIES OF NETWORK USE, (NATIONAL BUREAU OF STANDARDS, WASHINGTON, DC, INST. FOR COMPUTER SCIENCES AND TECHNOLOGY),
NETWORKS FOR HIGHER EDUCATION. PROCEEDINGS OF THE EDUCOM SPRING CONFERENCE, (WASHINGTON, DC, APRIL 13, 1972), INTERUNIVERSITY COMMUNICATIONS COUNCIL INC. (EDUCOM), PRINCETON, NJ, 1972, P 13-28
(ANNOTATION UNDER 4.0)

DEGRASSE, RICHARD W., REMOTE COMPUTING IN HIGHER EDUCATION: PROSPECTS FOR THE FUTURE, VERMONT, UNIV. OF, BURLINGTON, ACADEMIC COMPUTING CENTER, DEC 71, NSF GJ-947, 103P, 53 REFS

DIRECTIONS FOR EDUCATIONAL COMPUTING NETWORKS ARE IDENTIFIED, SOME BASED ON CITED SURVEYS AND OTHER PAPERS, SOME WITHOUT APPARENT JUSTIFICATION. ALSO CONTAINED ARE SUMMARIES OF TECHNOLOGICAL AND REGULATORY TRENDS IN COMPUTERS AND COMMUNICATIONS. GREAT CONCERN IS NOTED FOR THE 1250 EDUCATIONAL INSTITUTIONS WITHOUT ACCESS TO COMPUTING FACILITIES, AND IT IS TO SERVE THEM THAT A PRIMARY JUSTIFICATION FOR NETWORKING IS MADE. THE REPORT VIEWS SUCH NETWORKS AS TEMPORARY, HOWEVER, UNTIL USER SITES HAVE OBTAINED THEIR OWN COMPUTER FACILITIES, AT WHICH POINT THE NETWORK MAY NOT BE NEEDED. ECONOMY OF SCALE IS MENTIONED BUT NOT EXPLORED OTHER THAN TO INTRODUCE THE CONCEPT OF REGIONAL NETWORKS AS MORE LIKELY TO SUCCEED THAN LARGER, PERHAPS NATIONAL NETS. ALTHOUGH THE CONCLUSIONS STATED AT THE BEGINNING OF THE REPORT CALL FOR A NATIONAL EDUCATIONAL NETWORK, LITTLE SUPPORTING MATERIAL IS PRESENTED TOWARD THIS CONCLUSION. THE USE OF PPBS MANAGEMENT FOR A NETWORK, OR NETWORK COMMUNITY, IS PROPOSED.
(ALSO UNDER 4.2)

GOLDSTEIN, BERNARD, THE CASE FOR NETWORKS, (UNITED DATA CENTERS INC., NEW YORK),
DATAMATION, VOL 16, ISSUE 3, MAR 70, P 62-64

NETWORKING OFFERS A SOLUTION TO INDEPENDENT DATA PROCESSING INSTALLATIONS WHICH SUFFER FROM THE PROBLEMS OF UNDERCAPITALIZATION AND LACK OF TECHNICAL TALENT. OTHER BENEFITS CLAIMED FOR NETWORKS ARE PROTECTION FOR INVESTMENTS THROUGH MARKET DOMINANCE AND AMORTIZATION OF PACKAGE DEVELOPMENT OVER A LARGER MARKETPLACE. THE ARGUMENT IS SOMEWHAT GENERAL AND SPECIFIC EXAMPLES ARE LACKING.
(ALSO UNDER 5.3)

HERNDON, EDWIN S., E. PEREZ, NOREEN O. WELCH, CONCEPTS FOR A WWMCCS INTERCOMPUTER NETWORK, MC MTR-5122, AF F19628-71-C-0002, 122P, 40 REFS

THE PROBLEMS THAT ARISE WHEN IMPLEMENTING A DISTRIBUTED DATA BASE SYSTEM IN AN INTERCOMPUTER NETWORK ARE ADDRESSED IN THIS PAPER. THREE PROBLEM AREAS ARE DISCUSSED: THE DETERMINATION OF THE NODE AT WHICH DESIRED INFORMATION RESIDES, THE USER AND SYSTEM CAPABILITIES NECESSARY TO ACCESS AND MAINTAIN THESE (DISTRIBUTED) DATA BASES, AND THE IMPACT OF SUCH SCHEMES ON THE HARDWARE AND SOFTWARE CONFIGURATIONS OF THE HOST SITES. THE DISCUSSION DEALS SPECIFICALLY WITH THE WWMCCS (WORLD WIDE MILITARY COMMAND AND CONTROL SYSTEM) NETWORK OF HONEYWELL 6000 COMPUTERS, BUT THE CONCEPTS ARE DEVELOPED IN A REASONABLY GENERAL MANNER.

KIMBEL, DIETER, PLANNING OF DATA COMMUNICATIONS NETWORKS--ECONOMIC, TECHNOLOGICAL AND INSTITUTIONAL ISSUES, (ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT, PARIS, (FRANCE)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 251-259, 19 REFS
(ANNOTATION UNDER 5.4)

MERIT PROPOSAL SUMMARY, MERIT COMPUTER NETWORK, ANN ARBOR, MI, FEB 70, 9P
(ANNOTATION UNDER 3.1.0)

MILLER, JAMES G., EDUCOM: INTERUNIVERSITY COMMUNICATIONS COUNCIL, INTERUNIVERSITY COMMUNICATIONS COUNCIL INC. (EDUCOM), PRINCETON, NJ, MAY 66, 22P

A BRIEF DESCRIPTION OF EDUCOM, THE INTERUNIVERSITY COMMUNICATIONS COUNCIL, IS FOLLOWED BY A PRESENTATION OF PLANS AND HOPES FOR INVOLVEMENT IN THE DEVELOPMENT OF NATIONAL INFORMATION NETWORKS.
(ALSO UNDER 4.2)

NIELSEN, NORMAN R., THE MERIT OF REGIONAL COMPUTING NETWORKS, (STANFORD UNIV., CA),
COMMUNICATIONS OF THE ACM, VOL 14, ISSUE 5, MAY 71, P 319-326, 3 REFS

THIS PAPER DESCRIBES SOME OF THE EXPERIENCES RELATED TO THE STANFORD REGIONAL COMPUTING NETWORK, A NATIONAL

1.1 OBJECTIVES

SCIENCE FOUNDATION FUNDED NETWORK PROVIDING TERMINALS TO HIGH SCHOOLS AND COLLEGES IN THE AREA FOR ACCESS TO THE IBM 360/67 AT STANFORD. THE DISTINCTION BETWEEN SUPPLYING SERVICE TO THE NETWORK USERS AND JUST RAW COMPUTING POWER IS WELL DISPLAYED. PROBLEMS RELATED TO FACULTY INVOLVEMENT, COST JUSTIFICATION, ADEQUATE CAPACITY, AND CONSULTATION ARE POINTED OUT. ONE OF THE ADVANTAGEOUS OUTCOMES OF THE NETWORK HAS BEEN THE STIMULATION OF INTEREST IN COMPUTING BY LARGE COMMUNITIES OF PREVIOUSLY UNEXPOSED INDIVIDUALS.
(ALSO UNDER 3.1.2)

PECK, PAUL L., EFFECTIVE CORPORATE NETWORKING, ORGANIZATION, AND STANDARDIZATION, (MITRE CORP., WASHINGTON, DC), AFIPS PROCEEDINGS. 1971 FALL JOINT COMPUTER CONFERENCE. VOLUME 39, (LAS VEGAS, NV, NOVEMBER 16-18, 1971), AFIPS PRESS, MONTVALE, NJ, 1971, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 561-569, 24 REFS

WITH AN EMPHASIS ON CORPORATE COMPUTING NETWORKS, THE NEGATIVE EFFECTS OF INCOMPATIBILITIES INTRODUCED WHEN NETWORKING DISSIMILAR SYSTEMS ARE DESCRIBED. HARDWARE, OPERATING SYSTEM, AND PROGRAMMING LANGUAGE INCOMPATIBILITIES ARE PRIMARY, WHILE DATA INCOMPATIBILITY IS CONSIDERED SECOND ORDER. THE ADVANTAGES OF NETWORKING ARE LISTED, CONCLUDING WITH AN ECONOMY OF SCALE ARGUMENT USING THE SUCCESSFUL TRIANGLE UNIVERSITY COMPUTER CENTER AS AN EXAMPLE. HOMOGENEOUS NETWORKS ARE INTRODUCED AS MOST DESIRABLE FOR CORPORATIONS, WITH CAREFUL ATTENTION GIVEN TO IMPLEMENTATION AND OPERATING PROCEDURES, ESPECIALLY STANDARDS.

PECK, PAUL L., THE IMPLICATIONS OF ADP NETWORKING STANDARDS FOR OPERATIONS RESEARCH, MITRE CORP., BEDFORD, MA, JUN 69, MC MTP-333, AF F19628-68-C-0365, (AD-696 675), 15P, 5 REFS

THIS DOCUMENT PRESENTS AN ELEMENTARY DISCUSSION OF SOME OF THE PROBLEMS PRESENTLY BEING EXPERIENCED BY OPERATIONS RESEARCHERS IN LARGE DECENTRALIZED ORGANIZATIONS (PRIMARILY IN A MILITARY ENVIRONMENT). NETWORKING IS SEEN AS A SOLUTION TO MANY OF THEIR PROBLEMS, BUT ONLY IF ADEQUATE ADP STANDARDS CAN BE ESTABLISHED AND ENFORCED FIRST. THE NEED FOR THE USER COMMUNITY TO PARTICIPATE IN THIS STANDARDIZATION IS EMPHASIZED.
(ALSO UNDER 5.5)

POWELL, J. J., D. C. WOOD, ANALYSIS OF NMCS PROBLEM AREAS RELATED TO COMPUTER NETWORKS AND PROPOSED NMCS NETWORK OBJECTIVES, MITRE CORP., WASHINGTON, DC, 1 APR 71, MC WP-9707, AF F19628-71-C-0002, 34P, 7 REFS

OPERATIONAL PROBLEM AREAS OF THE NATIONAL MILITARY COMMAND SYSTEM (NMCS) ARE ANALYZED AND CAPABILITIES OF COMPUTER NETWORKS WHICH COULD ALLEVIATE THESE PROBLEMS ARE IDENTIFIED. POTENTIAL PROBLEMS RAISED BY THE AVAILABILITY OF SUCH CAPABILITIES ARE ADDRESSED. OBJECTIVES OF AN NMCS COMPUTER NETWORK ARE PROPOSED AND THEIR IMPLICATIONS DISCUSSED. THE DISCUSSION IS WELL THOUGHT OUT AND NOT LIMITED IN APPLICABILITY TO THE NMCS.

ROBERTS, LAWRENCE G., MULTIPLE COMPUTER NETWORKS AND INTERCOMPUTER COMMUNICATION, ADVANCED RESEARCH PROJECTS AGENCY, WASHINGTON, DC, JUN 67, 12P, 3 REFS

ONE OF THE EARLIER WORKS DESCRIBING SOME OF THE CHARACTERISTICS OF THE THEN-PROPOSED ARPA NETWORK, THE PAPER INCLUDES SOME OF THE REASONS FOR A NETWORK: LOAD SHARING, INTERPERSONAL MESSAGE SERVICE, DATA SHARING, PROGRAM SHARING, AND REMOTE SERVICE. BENEFITS WERE EXPECTED THROUGH THE USE OF SPECIALIZED HARDWARE AND SYSTEM SOFTWARE AND THE DISTRIBUTED COOPERATION OF LARGE NUMBERS OF PEOPLE ON SPECIFIC PROBLEMS. IT IS INTERESTING TO NOTE THAT THE NETWORK WAS ORIGINALLY INTENDED TO BE BASED ON DIAL-UP SERVICE.

RUTLEDGE, RONALD M., ALBIN L. VAREHA, LEE C. VARIAN, ALLAN H. WEIS, SALOMON F. SEROUSSI, JAMES W. MEYER, JOAN F. JAFFE, MARY ANNE K. ANGELL, AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS, (CARNEGIE-MELLON UNIV., PITTSBURGH, PA, PRINCETON UNIV., NJ, INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER), PROCEEDINGS OF 24TH NATIONAL CONFERENCE. ASSOCIATION FOR COMPUTING MACHINERY, (AUGUST 26-28, 1969), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, 1969, ACM P-69, P 431-441, 13 REFS
(ANNOTATION UNDER 3.1.0)

SEDELOW, SALLY YEATES, WALTER A. SEDELOW, JR., LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR COMPUTATIONAL RESEARCH ON LANGUAGE (CE-NCOREL), KANSAS, UNIV. OF, LAWRENCE, 1972, NSF GJ-28599, 467P, 41 REFS
(ANNOTATION UNDER 4.2)

SILVERSTEIN, MARTIN E., COMPUTERS, COMMUNICATIONS, AND DISTRIBUTED HEALTH CARE SYSTEMS, (HEALTH ANALYSIS INC., BETHESDA, MD),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 463-464

THIS IS A GENERAL INTRODUCTION TO THE POTENTIAL USE OF COMPUTER COMMUNICATIONS IN THE HEALTH FIELD. IT CONCLUDES WITH A SPECIFIC EXAMPLE IN THE AREA OF EMERGENCY CARE WHERE A COMPUTER MAINTAINS CONSTANT INVENTORY OF TRAFFIC ROUTES AND EMERGENCY DEPARTMENT STATUS, ANALYSES INCOMING PHYSIOLOGICAL SIGNALS FROM PORTABLE DIAGNOSTIC EQUIPMENT, AND DIRECTS EMERGENCY VEHICLE TRAFFIC.
(ALSO UNDER 4.2)

SUNG, R., J. B. WOODFORD, STUDY OF COMMUNICATION LINKS FOR THE BIOMEDICAL COMMUNICATIONS NETWORK, AEROSPACE CORP., EL SEGUNDO, CA, DIV. OF SATELLITE SYSTEMS, 29 MAY 69, AC ATR-69(7130-06)-1, NIH PH-43-68-991, 278P, 56 REFS
(ANNOTATION UNDER 3.2.1)

WEEG, GERARD P., THE ROLE OF REGIONAL COMPUTER NETWORKS, (IOWA, UNIV. OF, IOWA CITY, COMPUTER CENTER),
LEVIEN, ROGER E., COMPUTERS IN INSTRUCTION: THEIR FUTURE FOR HIGHER EDUCATION, (OCTOBER 1-3, 1970), RAND CORP., SANTA MONICA, CA, JUL 71, RC R-718-NSF-CCOM-RC, P 55-66, 6 REFS

THOSE FACTORS THAT INFLUENCE THE DIRECTION OF REGIONAL COMPUTER NETWORKS IN HIGHER EDUCATION ARE ENUMERATED. A DESCRIPTIVE SECTION IS INCLUDED ON THE ADMINISTRATIVE PROBLEMS OF REGIONAL NETWORKS. THE DARTMOUTH, OREGON STATE, AND UNIVERSITY OF IOWA NETWORKS ARE DESCRIBED, INCLUDING A GOOD SUMMARY OF USAGE STATISTICS.
(ALSO UNDER 5.0)

1.2 SURVEY

AUFENKAMP, D. D., E. C. WEISS, NSF ACTIVITIES RELATED TO A NATIONAL SCIENCE COMPUTER NETWORK, (NATIONAL SCIENCE FOUNDATION, WASHINGTON, DC),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 226-232, 1 REFS

THE NATIONAL SCIENCE FOUNDATION IS MOUNTING AN EXPANDED RESEARCH PROGRAM WHICH COULD LEAD TO THE DEVELOPMENT OF A NATIONAL SCIENCE COMPUTER NETWORK LINKING UNIVERSITIES, COLLEGES AND OTHER INSTITUTIONS IN SUPPORT OF RESEARCH AND EDUCATION. THIS ARTICLE IS A BRIEF COMPENDIUM OF PRESENTLY SUPPORTED PROJECTS AND ACTIVITIES WHICH RELATE TO SUCH A NATIONAL NETWORK.
(ALSO UNDER 4.0)

BECKER, J., W. C. OLSEN, INFORMATION NETWORKS, (INTERUNIVERSITY COMMUNICATIONS COUNCIL INC. (EDUCOM), PRINCETON, NJ), CUADRA, C. A., ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY. VOLUME 3, ENCYCLOPEDIA BRITANNICA INC., CHICAGO, IL, 1968, (Z699.A1A65, LC 66-25096), P 289-327, 190 REFS

THIS REVIEW PRESENTS AN EXHAUSTIVE SURVEY OF DEVELOPMENTS IN THE AREA OF NETWORKING FOR THE YEAR 1967-68. DEVELOPMENTS ARE GROUPED INTO THREE MAIN AREAS FOR DISCUSSION: (1) EDUCATION, (2) LIBRARIES, AND (3) GOVERNMENT, INDUSTRY AND PROFESSIONAL SOCIETIES. THE COVERAGE, THOUGH BY NOW SOMEWHAT DATED, IS IMPRESSIVE. THE BIBLIOGRAPHY CONTAINS 190 ENTRIES. IT IS PERHAPS MOST INTERESTING TO NOTE THE DIVERSITY OF PLANS FOR NETWORKS PUT FORTH FOUR YEARS AGO, AND SEE WHICH HAVE COME TO FRUITION TODAY.
(ALSO UNDER 4.2)

BENVENUTO, A. A., J. R. GOODROE, R. P. MORTON, SYSTEM LOAD SHARING STUDY, MITRE CORP., WASHINGTON, DC, 25 MAR 69, MTR 5062, AF F19628-68-C-0365, 95P

WHILE ONLY SUPERFICIALLY DESCRIBING THE BENEFITS, CONSTRAINTS, AND GENERAL CONSIDERATIONS IMPORTANT IN DECIDING WHETHER TO UTILIZE COMPUTER NETWORKING (IN THIS CASE FOR THE NATIONAL MILITARY COMMAND CENTER AND ASSOCIATED FACILITIES), THIS DOCUMENT CONTAINS SEVERAL SUMMARIES OF OPERATING NETWORKS, CIRCA 1968. THESE SUMMARIES ARE NON-CRITICAL IN NATURE AND THE FAST-PACED DEVELOPMENTS IN NETWORKING RENDER THE BASIC CONFIGURATIONS SHOWN OBSOLETE IN AT LEAST A FEW CASES.

1.2 SURVEY

(ALSO UNDER 1.1)

CANADA MEETS COMPUTER COMMUNICATION NEEDS, (TELECOMMUNICATIONS, DEDHAM, MA),
TELECOMMUNICATIONS, VOL 6, ISSUE 9, SEP 72, P 52, 54

RECENT AND ANTICIPATED FUTURE DEVELOPMENTS IN DATA COMMUNICATIONS IN CANADA CAN BE FOUND IN THIS INTERESTING SURVEY. A DESCRIPTION OF A COMMUNICATION SERVICE IS INCLUDED WHICH USES MINICOMPUTERS AS COMMUNICATIONS CONTROLLERS, FRONT-ENDS FOR LARGER HOST COMPUTERS, REMOTE CONCENTRATORS FOR TERMINALS, STORE-AND-FORWARD MESSAGE-SWITCHING NODES, OR FOR COMBINATIONS OF THESE FUNCTIONS.
(ALSO UNDER 3.1.0)

CHAMBLEE, J. A., OPERATIONAL CONSIDERATIONS FOR THE IMPLEMENTATION OF COMPUTER NETWORKS IN THE NMCSSC, MITRE CORP., WASHINGTON, DC, 1 JUL 70, MC WP-9598, AF F1962B-68-C-036S, 59P, S REFS

THREE OPERATIONAL COMPUTER FACILITIES OF THE NATIONAL MILITARY COMMAND SYSTEM (NMCS) ARE DESCRIBED IN TERMS OF EXISTING CONNECTIVITY, WORK FLOW, WORKLOAD CHARACTERISTICS, HARDWARE, SOFTWARE, DATA BASES, OPERATING RULES, AND OPERATIONAL PROBLEMS. THE FACILITIES ARE THE NATIONAL MILITARY COMMAND SYSTEM SUPPORT CENTER (NMCSSC), THE NATIONAL MILITARY COMMAND CENTER (NMCC), AND THE ALTERNATE NATIONAL MILITARY COMMAND CENTER (ANMCC). DESIRABLE FEATURES OF ANY NETWORKING SCHEME TO BE INSTALLED IN THE NMCS ARE IDENTIFIED. THREE EXISTING PROPOSED NETWORKING APPROACHES, ATTACHED SUPPORT PROCESSOR (ASP), DATA LINK SUPPORT (DLS), AND THE ARPA NETWORK, ARE DISCUSSED RELATIVE TO THE DESIRABLE FEATURES.

DAVIS, RUTH M., MAN-MACHINE COMMUNICATION, (ADVANCED RESEARCH PROJECTS AGENCY, WASHINGTON, DC),
CAUDRA, CARLOS A., ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY, VOLUME I, WILEY (JOHN) AND SONS, NEW YORK, 1966, ADI ANNUAL REVIEW SERIES, (LC 66-25096), P 221-254, 99 REFS

THIS 'FIRST ANNUAL REVIEW OF THE FIELD OF MAN-MACHINE COMMUNICATION' IS A STRAIGHTFORWARD DISCUSSION OF CONCEPTS IN MAN-MACHINE COMMUNICATION AND THE LITERATURE RELEVANT TO THOSE CONCEPTS. TIME-SHARING, INTERACTIVE LANGUAGES, ON-LINE APPLICATIONS, INTERACTIVE DISPLAYS, PROBLEM SOLVING, AND APPLICATIONS TO SPECIFIC USER GROUPS ARE COVERED. LITERATURE IS CONSIDERED PERTINENT TO ONE OF THE CONCEPTS IF IT CONTAINS DESCRIPTIONS OF PARTICULAR APPLICATIONS, EQUIPMENT OR PROBLEM AREAS; PROVIDES COMPREHENSIVE COVERAGE OF A TOPIC; ADVANCES A WORTHY APPROACH OR CONCEPT; OR HIGHLIGHTS AN IMPORTANT POINT MADE BY THE REVIEWER.
(ALSO UNDER 2.3)

ELIE, MICHEL, GENERAL PURPOSE NETWORKS OF COMPUTERS, CALIFORNIA, UNIV. OF, LOS ANGELES, 1970, 125P, 46 REFS

THIS THESIS IS A SURVEY OF THE FIELD OF GENERAL PURPOSE COMPUTER NETWORKS AND A DISCUSSION OF SOME OF THE RELEVANT CONCEPTS. A VARIETY OF NETWORKS ARE DISCUSSED AND AN ATTEMPT IS MADE TO CATEGORIZE THEM. MODELING TECHNIQUES IN COMPUTER NETWORKS ARE SURVEYED AND APPLIED TO DATA SHARING AND LOAD SHARING. SOME OF THE PRESENT DAY IDEAS ON INTERPROCESS COMMUNICATION ARE REVIEWED. FINALLY THE HOST-HOST PROTOCOL OF THE ARPANET IS DESCRIBED AND A SPECIFIC SITE IMPLEMENTATION IS ANALYZED.
(ALSO UNDER 2.1.2)

FARBER, DAVID J., NETWORKS: AN INTRODUCTION, (CALIFORNIA, UNIV. OF, IRVINE),
DATAMATION, VOL 18, ISSUE 4, APR 72, P 36-39

A BRIEF COMPARISON OF SEVERAL COMPUTER NETWORKS IS PRESENTED. THE DIAGRAM OF THE ARPA NETWORK IS NOW OUT OF DATE AND CYBERNET HAS ALSO SINCE BEEN RESTRUCTURED. SOME INTERESTING SUMMARIZING COMMENTS ARE MADE AND THE ARTICLE IS USEFUL AS A 'SNAP SHOT' INTRODUCTION TO SOME OF THE EXISTING COMPUTER NETWORKS.

GAINES, EUGENE C., JR., JANET M. TAPLIN, THE EMERGENCE OF NATIONAL NETWORKS REMOTE COMPUTING--YEAR VI,
(TIME-SHARING ENTERPRISES INC., PHILADELPHIA, PA),
TELECOMMUNICATIONS, VOL 5, ISSUE 12, DEC 71, P 27-29, 44-46

DEVELOPMENTS FOR THE YEAR 1971 IN THE AREA OF PUBLIC NATIONAL COMPUTER-COMMUNICATIONS NETWORKS ARE SUMMARIZED. A NUMBER OF SUCH NETWORKS ARE BRIEFLY SURVEYED INCLUDING CYBERNET, UCC, DATRAN, GE, ON-LINE SYSTEMS, SBC, COM-SHARE, TYMSHARE, AND INFONET.

HIRSCH, PHIL, MULTI-ACCESS COMPUTER NETWORKS,
DATAMATION, VOL 16, ISSUE 6, JUN 70, P 153-154
(ANNOTATION UNDER 4.3)

KIRSTEIN, PETER T., ON THE DEVELOPMENT OF COMPUTER AND DATA NETWORKS IN EUROPE, (LONDON, UNIV. OF, (ENGLAND)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 240-244, 10 REFS

AS AN INTRODUCTION TO ATTEMPTS TO START GENERAL PURPOSE DISTRIBUTED COMPUTER NETWORKS IN EUROPE, THE MORE SUCCESSFUL CENTRALIZED NETWORKS AND SPECIAL PURPOSE NETWORKS ARE DISCUSSED. PROPOSALS FOR SPECIAL DATA NETWORKS TO HANDLE LOW AND MEDIUM SPEED TRAFFIC ARE DESCRIBED AND PREDICTIONS ARE MADE ON THE WAY THAT COMPUTER NETWORKS WILL DEVELOP IN EUROPE.
(ALSO UNDER 4.3)

LISSANDRELLO, GEORGE J., WORLD DATA COMMUNICATIONS AS SEEN BY THE DATA PROCESSING SYSTEMS DESIGNER, (IBM WORLD TRADE CORP., NEW YORK),
JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS; 1971, IEEE CAT-71C59-C, P 130-136
(ANNOTATION UNDER 3.2.1)

MAKINO, YASUO, DATA COMMUNICATION IN JAPAN, (MINISTRY OF POSTS AND TELECOMMUNICATIONS, TOKYO, (JAPAN)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 8-16

THE GROWTH OF TELECOMMUNICATIONS SERVICES IN JAPAN IS SUMMARIZED, WITH SPECIAL ATTENTION TO HOW THAT GROWTH HAS BEEN LIMITED BY REGULATION. THE REVIEW PROVIDED IN THIS ARTICLE SEEMS TO BE COMPREHENSIVE.
(ALSO UNDER 5.4)

MUENCH, P. E., COMMON CARRIER APPROACH TO DIGITAL DATA TRANSMISSION: TERMINALS, TRANSMISSION EQUIPMENT AND FUTURE PLANS FOR THE COMPUTER UTILITY, (BELL TELEPHONE LABS, INC., HOLMDEL, NJ),
GRUENBERGER, F., COMPUTERS AND COMMUNICATIONS--TOWARD A COMPUTER UTILITY, PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1968, (TK 5101.C67, LC 68-16776), P 79-94, 1 REFS

A HISTORY OF DATA COMMUNICATIONS IS GIVEN DURING THE SECOND GENERATION COMPUTER ERA, IN ADDITION TO SOME INSIGHT INTO 'RECENT' (1968) INNOVATIONS, AND A PREDICTION FOR THE FUTURE.
(ALSO UNDER 4.3)

NORWOOD, FRANK W., TELECOMMUNICATIONS PROGRAMS AFFECTING NETWORK DEVELOPMENT,
BECKER, JOSEPH, PROCEEDINGS OF THE CONFERENCE ON INTERLIBRARY COMMUNICATIONS AND INFORMATION NETWORKS, (WARRENTON, VA, SEPTEMBER 28-OCTOBER 2, 1970), AMERICAN LIBRARY ASSOCIATION, CHICAGO, IL, 1971, OEC 0-9-230288-4235(095), (LC 70-185896), P 59-68, 24 REFS

AN IN-DEPTH SURVEY OF EVENTS AND ISSUES IN THE TELECOMMUNICATIONS FIELD FOR THE PERIOD 1968-1970 IS PRESENTED. THE TREATMENT IS PRIMARILY FROM AN ENTREPRENEURAL POINT OF VIEW AND EMPHASIZES PUBLIC POLICY AS REPRESENTED BY DECISIONS AND CONCERNS OF THE FEDERAL COMMUNICATIONS COMMISSION.
(ALSO UNDER 5.4)

OVERHAGE, CARL F. J., INFORMATION NETWORKS, (MASSACHUSETTS INST. OF TECH., CAMBRIDGE),
CUADRA, C. A., ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY, VOLUME 4, ENCYCLOPEDIA BRITANNICA INC., CHICAGO, IL, 1969, (Z699.A1A6S.V.4, LC 66-25096), P 339-377, 145 REFS

THIS IS A GOOD OVERVIEW OF ACTIVITIES RELATED TO INFORMATION NETWORKS. THE PAPER FIRST FUNCTIONALLY DESCRIBES THE VARIOUS CONTEXTS OF THE WORD 'NETWORKS'. THEN, SPECIFIC NETWORKS ARE REVIEWED AS TO UTILITY, INCLUDING LIBRARY NETWORKS,

1.2 SURVEY

MEDICAL NETWORKS, HOSPITAL NETWORKS, GOVERNMENT AND BUSINESS NETWORKS, AND REAL-TIME INFORMATION NETWORKS. PROBLEMS OF COMPATIBILITY AND REGULATION ARE ALSO DISCUSSED.
(ALSO UNDER 4.2)

PETERSON, JACK J., SANDRA A. VEIT, SURVEY OF COMPUTER NETWORKS, MITRE CORP., WASHINGTON, DC, SEP 71, MC MTP-357, AF F19628-71-C-0002, 87P, 37 REFS

A GOOD, OBJECTIVE SURVEY OF EXISTING NETWORKS IS PRESENTED. THE NETWORKS COVERED ARE: ARPA, COINS, CYBERNET, DCS (IRVINE), DLS (MILITARY), MERIT, NETWORK/440, OCTOPUS, TSS, AND TUCC. EACH NETWORK IS DESCRIBED IN TERMS OF CONFIGURATION, COMMUNICATIONS, USAGE, AND MANAGEMENT.

ROSE, GORDON A., COMPUTER GRAPHICS COMMUNICATION SYSTEMS, (NEW SOUTH WALES, UNIV. OF, KENSINGTON, (AUSTRALIA), DEPT. OF ELECTRONIC COMPUTATION);
INFORMATION PROCESSING 68; PROCEEDINGS OF IFIP CONGRESS 1968, VOLUME 2--HARDWARE, APPLICATIONS, (EDINBURGH, (SCOTLAND), AUGUST 5-10, 1968), NORTH-HOLLAND PUBLISHING CO., AMSTERDAM, (NETHERLANDS), 1969, IFIP CONGRESS PROCEEDINGS, (LC 65-24118), P 692-703, 20 REFS

AN EARLY DISPLAY COUPLED DIRECTLY TO A COMPUTER AND A BUFFERED DISPLAY WITH A LOCAL PROCESSOR ARE REVIEWED. THREE RECENT SCHEMES WHICH HAVE EVOLVED FROM THESE ARE THEN COMPARED. EACH AIMS FOR LOW-COST GRAPHICAL COMMUNICATION WITHIN A MULTI-TERMINAL SYSTEM. THE THREE DISPLAY SYSTEMS DISCUSSED ARE THE ADVANCED REMOTE DISPLAY STATION II PROJECT, THE INTERGRAPHIC PROJECT, AND THE IBM 1500 INSTRUCTIONAL DISPLAY SYSTEM. THE PAPER ASSERTS THAT THE TECHNIQUES OF THESE RECENT SCHEMES, SUPPLEMENTED WITH WIRED VIDEO BROADCASTING TECHNIQUES, COULD BE USED TO LINK THOUSANDS OF TERMINALS TO A CENTRAL COMPUTER(S) AT LOW COST. A POSSIBLE CONFIGURATION IS PROPOSED.
(ALSO UNDER 4.3)

SIMMS, ROBERT L., JR., TRENDS IN COMPUTER/COMMUNICATION SYSTEMS, (BELL TELEPHONE LABS, INC., HOLMOEL, NJ, DEPT. OF COMPUTER COMMUNICATIONS ENGINEERING),
COMPUTERS AND AUTOMATION, VOL 17, ISSUE 5, MAY 68, P 22-25

A NUMBER OF TRENDS IN COMMUNICATIONS AND THE IMPLICATIONS OF THOSE TRENDS ARE VERY BRIEFLY DISCUSSED INCLUDING THE INCREASE IN REMOTE ON-LINE ACCESS TO COMPUTERS, HIGHER DATA TRANSMISSION RATES, CLUSTERING OF COMPUTING POWER, USE OF INTEGRATED CIRCUITS AND MODEM PACKAGING TECHNIQUES, PUSH-BUTTON TELEPHONES AS DATA TERMINALS, AND DIGITAL TRANSMISSION SYSTEMS.

SWANSON, ROWENA W., INFORMATION SYSTEM NETWORKS--LET'S PROFIT FROM WHAT WE KNOW, (PRESENTED AT, THIRD ANNUAL COLLOQUIUM ON INFORMATION RETRIEVAL, PHILADELPHIA, PA, MAY 12-13, 1966), AIR FORCE OFFICE OF SCIENTIFIC RESEARCH, ARLINGTON, VA, DIRECTORATE OF INFORMATION SCIENCES, JUN 66, AFOSR 66-0873, (AD-637 488), 48P, 217 REFS

A USEFUL SURVEY OF LARGE SCALE INFORMATION SYSTEMS CIRCA 1966 IMPLEMENTED IN MANY SECTORS OF GOVERNMENT AND INDUSTRY IS PRESENTED.

THE COMMUNICATIONS MINICOMPUTER, (TELECOMMUNICATIONS, DEDHAM, MA),
TELECOMMUNICATIONS, VOL 6, ISSUE 10, OCT 72, P 15-16, 18, 20, 22
(ANNOTATION UNDER 3.2.3)

1.3 TUTORIAL

BALL, CHRISTOPHER J., COMMUNICATIONS AND THE MINICOMPUTER,
COMPUTER, VOL 4, ISSUE 5, SEP-OCT 71, P 13-21, 5 REFS

THE VARIETY OF FUNCTIONS THAT A MINICOMPUTER CAN PERFORM IN A DATA COMMUNICATIONS NETWORK ARE DISCUSSED. GOOD DESCRIPTIONS OF MESSAGE CONCENTRATION, ADAPTIVE LINE SPEED CONTROL, LINE POLLING, ERROR DETECTION AND CORRECTION, FRONT-END PROCESSING, AND MESSAGE-SWITCHING ARE INCLUDED.
(ALSO UNDER 3.3.2)

DORFF, ERVIN K., COMPUTERS AND COMMUNICATIONS: COMPLEMENTING TECHNOLOGIES, (COMPUTER COMMUNICATIONS INC., INGLEWOOD, CA),
COMPUTERS AND AUTOMATION, VOL 18, ISSUE 5, MAY 69, P 22-23

THIS ARTICLE PROVIDES ONLY THE BRIEFEST SKETCH OF THE DEVELOPMENTS LEADING TO INTEGRATED COMPUTER/COMMUNICATIONS SYSTEMS. MESSAGE SWITCHING SYSTEMS AND TIME-SHARING ARE VIEWED AS THE MOST SIGNIFICANT MILESTONES. THE MOST INTERESTING PREDICTION DESCRIBES 'DISTRIBUTED' COMPUTER SYSTEMS AS PROVIDING LOCAL STORAGE AT EACH TERMINAL SITE WHICH IS ADDRESSABLE BY THE CENTRAL COMPUTER IN A MANNER SIMILAR TO ADDRESSING ITS OWN INTERNAL STORAGE.

ELMENDORF, C. H., P. E. MUENCH, K. W. SUSSMAN, DATA COMMUNICATIONS NETWORK ARCHITECTURE, (AMERICAN TELEPHONE AND TELEGRAPH CO., NEW YORK),
INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P 3-4-1--3-4-6, 3 REFS
(ANNOTATION UNDER 3.0)

GOURLEY, DAVID E., DATA COMMUNICATIONS: INITIAL PLANNING, (DATA TRANSMISSION CO., VIENNA, VA),
DATAMATION, VOL 18, ISSUE 10, OCT 72, P 59-64

AN INTRODUCTION TO DATA COMMUNICATIONS PLANNING IS PRESENTED. ITEMS COVERED INCLUDE DEFINING WORKLOAD REQUIREMENTS, EVALUATING CONFIGURATIONS IN TERMS OF PROJECTED COST EFFECTIVENESS, CHANNEL BANDWIDTH CONSIDERATIONS, MODEMS, MULTIPLEXERS AND CONCENTRATORS, AND TERMINALS. EACH ITEM IS INTRODUCED IN ONE OR TWO PARAGRAPHS.

HAMAKER, R. F., DISTRIBUTED COMPUTER SYSTEMS, (INTERNATIONAL BUSINESS MACHINES CORP., RESEARCH TRIANGLE PARK, NC, SYSTEMS DEVELOPMENT DIV.),
TELECOMMUNICATIONS, VOL 4, ISSUE 3, MAR 70, P 25-30

A SHORT DISSERTATION ON THE PHILOSOPHY OF A DISTRIBUTED NETWORK AND SOME ASSOCIATED TECHNICAL CONSIDERATIONS ARE PRESENTED.

HITTEL, L. A., SOME PROBLEMS IN DATA COMMUNICATIONS BETWEEN THE USER AND THE COMPUTER, (GENERAL ELECTRIC CO., PHOENIX, AZ),
AFIPS PROCEEDINGS, 1966 FALL JOINT COMPUTER CONFERENCE, VOLUME 29, (SAN FRANCISCO, CA, NOVEMBER 7-10, 1966), SPARTAN BOOKS INC., WASHINGTON, DC, 1966, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 395-402

THIS SOMEWHAT DATED TUTORIAL ON DATA COMMUNICATIONS SYSTEMS DESIGN AND IMPLEMENTATION NEVERTHELESS CONTAINS SOME INTERESTING INFORMATION. A SECTION ON 'PROGRAMMING FOR DATA SET CONTROL' IS INFORMATIVE AND STILL CURRENT, AS ARE THE SECTIONS ON 'INSTALLATION' AND 'MAINTAINABILITY AND OPERATION CONSIDERATIONS.' IT IS PERHAPS MOST INTERESTING TO NOTE THAT THE MAJORITY OF THE PROBLEMS IN DATA COMMUNICATIONS WHICH WERE RECOGNIZED SIX YEARS AGO ARE STILL WITH US TODAY.
(ALSO UNDER 3.2.2)

KLEINROCK, LEONARD, COMPUTER NETWORKS, (CALIFORNIA, UNIV. OF, LOS ANGELES, DEPT. OF COMPUTER SCIENCE), CARDENAS, A. F., DR., L. PRESSLER, M. A. MARTIN, COMPUTER SCIENCE, WILEY-INTERSCIENCE, NEW YORK, 1972, (LC 71-169162), P 241-284, 40 REFS

THIS IS A VERY INTERESTING EXPOSITION EMPHASIZING MODELING OF COMPUTER NETWORKS. FOLLOWING A SKETCHY HISTORY OF NETWORKING AND OF THE ARPA NETWORK AN INTRODUCTION TO THE MODELING OF INDIVIDUAL TIME-SHARING SYSTEMS AS NETWORK NODES IS GIVEN. NETWORK DELAY AS A FUNCTION OF THE MIX OF SHORT AND LONG MESSAGES IS DISCUSSED. AN INTERESTING PROPOSAL IS MADE THAT SIMULATION MODELS OF NETWORKS BE COMBINED WITH MODELS OF THEIR TIME-SHARING NODES TO REALISTICALLY SIMULATE OVERALL NETWORK BEHAVIOR. SOME INTRIGUING SUMMARY COMMENTS ABOUT THE NATURE OF THE MAN-NETWORK INTERFACE ARE INCLUDED.
(ALSO UNDER 2.1.0)

KLEINROCK, LEONARD, MODELS FOR COMPUTER NETWORKS, (CALIFORNIA, UNIV. OF, LOS ANGELES, DEPT. OF ENGINEERING),
IEEE INTERNATIONAL CONFERENCE ON COMMUNICATIONS, VOLUME 2, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS INC., NEW YORK, JUN 69, P 21-9--21-16, 13 REFS

THIS INTRODUCTION TO DIFFERENT APPROACHES TO THE STUDY OF COMPUTER NETWORKS INCLUDES BOTH ANALYTIC AND SIMULATION METHODS. THE EXAMPLES GIVEN ARE ALL BASED ON THE ARPA NETWORK. THIS ARTICLE IS SLIGHTLY OUT OF DATE NOW, BUT IS STILL VERY USEFUL AND INFORMATIVE AS A TUTORIAL INTRODUCTION.
(ALSO UNDER 2.1.0)

1.3 TUTORIAL

KLEINROCK, LEONARD, SURVEY OF ANALYTICAL METHODS IN QUEUEING NETWORKS, (CALIFORNIA, UNIV. OF, LOS ANGELES), RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3, COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 185-205, 11 REFS

A SET OF ANALYTICAL METHODS FOR ESTIMATING THE PERFORMANCE OF A NETWORK IS DESCRIBED. WITH A GIVEN TOPOLOGY, ROUTING PROCEDURE, AND TRAFFIC MATRIX, THE LENGTH OF TIME IT TAKES A MESSAGE TO TRANSIT THE NETWORK IS ANALYZED. OPTIMIZATION TECHNIQUES RELATING CHANNEL CAPACITIES, MESSAGE DELAYS, AND COSTS TO A GIVEN TOPOLOGY AND ROUTING PROCEDURE ARE ALSO DISCUSSED.
(ALSO UNDER 2.1.2)

LARSSON, T., DATA COMMUNICATION IN SWEDEN--AND SOME ASPECTS OF THE SITUATION IN EUROPE, (SWEDISH TELECOMMUNICATIONS ADMINISTRATION, FARSTA),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 17-25

THIS ARTICLE SURVEYS THE DEVELOPMENT OF DATA COMMUNICATIONS FACILITIES IN SWEDEN. THE AUTHOR IDENTIFIES A NEED FOR AND A TREND TOWARDS REPLACING PRIVATE DATA COMMUNICATIONS NETWORKS WITH A PUBLIC NETWORK. SOME EFFORTS AT INTERNATIONAL COOPERATION (WITHIN EUROPE) IN THE DATA COMMUNICATION FIELD ARE DESCRIBED, ALONG WITH RESULTS OF A LARGE MARKET SURVEY. THE AUTHOR RECOGNIZES THAT EUROPE IS BEHIND AMERICA IN THE DEVELOPMENT OF DATA COMMUNICATIONS FACILITIES, BUT SINCE THEY HAVE THE ADVANTAGE OF BEING ABLE TO STUDY THE DEVELOPMENT IN THE U.S. THEY SHOULD BE ABLE TO MOVE RAPIDLY IN THIS AREA.

MARTIN, J., TELECOMMUNICATIONS AND THE COMPUTER, PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1969, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 78-76038), 470P, 47 REFS

COMPUTER-COMMUNICATIONS CONCEPTS ARE PRESENTED IN AN EASY-TO-READ MANNER IN THIS POPULAR INTRODUCTION TO TELECOMMUNICATIONS. SOME OF THE MORE IMPORTANT CONCEPTS INTRODUCED INCLUDE: TYPES OF LINES AND TARIFFS, TRANSMISSION MEDIA, MODULATION AND DEMODULATION, PULSE CODE MODULATION, MULTIPLEXING, WIDEBAND COMMUNICATIONS, AND DATA ERROR TREATMENT.
(ALSO UNDER 3.2.0)

PETERSON, JACK J., SANDRA A. VEIT, CATALOG OF NETWORK FEATURES, MITRE CORP., WASHINGTON, DC, IS MAR 71, MC WP-969S, AF F19628-71-C-0002, 47P, 10 REFS

DEFINITIONS OF A NUMBER OF TERMS RELATED TO COMPUTER NETWORKING ARE GIVEN. THE ORDERING OF TERMS IS LOGICAL RATHER THAN ALPHABETICAL, AND EXAMPLES AND OPINIONS ARE GIVEN WITH EACH ITEM. THE CATALOG IS CERTAINLY USEFUL, BUT THE SET OF TERMS IS INCOMPLETE AND THE SUBSET CHOSEN CANNOT EASILY BE CHARACTERIZED. IT IS WORTHWHILE READING, HOWEVER, AS AN INTRODUCTION TO NETWORKING CONCEPTS.

SHAFRITZ, ARNOLD B., THE USE OF COMPUTERS IN MESSAGE SWITCHING NETWORKS, (AUERBACH CORP., PHILADELPHIA, PA, INFORMATION SCIENCES DIV.),
PROCEEDINGS OF THE 19TH NATIONAL CONFERENCE, ASSOCIATION FOR COMPUTING MACHINERY, (PHILADELPHIA, PA, AUGUST 25-27, 1964), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, 1964, ACM P-64, (LC 64-25615), P N2.3-1--N2.3-6

THIS PAPER PROVIDES A USEFUL DESCRIPTION OF CONCEPTS IN MESSAGE SWITCHING COMPARING THEM TO AND DISTINGUISHING THEM FROM CIRCUIT SWITCHING. THE ADVANTAGES OF ONE APPROACH OVER THE OTHER ARE ALSO CLARIFIED.

STIMLER, SAUL, PLANNING A DATA COMMUNICATION SYSTEM, PART 1: A BROAD OVERVIEW AND BASIC CONCEPTS, (STIMLER ASSOCIATES, MOORESTOWN, NY),
MODERN DATA, VOL 3, ISSUE 4, APR 70, P 134-135, 138-140, 2 REFS

THIS ARTICLE IS AN INTRODUCTION TO SOME OF THE MORE BASIC CONCEPTS OF DATA COMMUNICATIONS. COVERAGE IS BRIEF AND SUPERFICIAL.

TOWNSEND, MICHAEL J., COMMUNICATION CONTROL BY COMPUTER--AN INTRODUCTION, (GTE INFORMATION SYSTEMS INC., HUNTINGTON BEACH, CA, TEMPO COMPUTERS DIV.),
TELECOMMUNICATIONS, VOL 6, ISSUE 5, MAY 72, P 33-34, 36-38, 60, 62

THE COMMUNICATION CONTROL FUNCTIONS WHICH ARE REQUIRED IN A TELEPROCESSING SYSTEM ARE IDENTIFIED AND EXPLAINED. AFTER SOME BACKGROUND MATERIAL, THE SURVEY OF FUNCTIONS IS WELL-PRESENTED AT THE TUTORIAL LEVEL.

1.4 BIBLIOGRAPHIES

SEDELOW, SALLY YEATES, WALTER A. SEDELOW, JR., LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR COMPUTATIONAL RESEARCH ON LANGUAGE (CF-NCOREL), KANSAS, UNIV. OF, LAWRENCE, 1972, NSF GJ-28599, 467P, 41 REFS
(ANNOTATION UNDER 4.2)

1.5 SOCIAL ISSUES

BARAN, PAUL, COMMUNICATIONS, COMPUTERS AND PEOPLE, (PREPARED FOR, AFIPS FALL JOINT COMPUTER CONFERENCE, LAS VEGAS, NV, DECEMBER 2, 1965), RAND CORP., SANTA MONICA, CA, NOV 65, RC P-3235, (AD-624-431), 20P

ALTHOUGH THE PRIMARY INTEREST IN THIS EXPOSITION IS ON PROBABLE NEGATIVE SOCIETAL EFFECTS OF COMPUTERS AND COMMUNICATIONS, SOME ATTENTION IS GIVEN TO THE USE OF COMPUTERS AND COMPUTER-LIKE EQUIPMENT IN COMMUNICATIONS NETWORKS AND ON THE IMPACT OF LESS EXPENSIVE DIGITAL COMMUNICATIONS CIRCUITS ON THE USE OF COMPUTERS. MOST OF BARAN'S COMMENTS CONCERNING SOCIETAL IMPACT ARE INVOLVED WITH AGGREGATION EFFECTS BROUGHT ABOUT THROUGH THE USE OF COMPUTERS AND COMMUNICATIONS TOGETHER. HE PROPOSES A NUMBER OF PROTECTIVE MEASURES AND STATES THE NEED FOR STILL MORE.

JOHNSON, LELAND L., SOME IMPLICATIONS OF NEW COMMUNICATIONS TECHNOLOGIES FOR NATIONAL SECURITY IN THE 1970S, RAND CORP., SANTA MONICA, CA, SEP 67, RC P-3639, (AD-658 424), 24P, 14 REFS
(ANNOTATION UNDER 5.4)

KIMBEL, DIETER, PLANNING OF DATA COMMUNICATIONS NETWORKS--ECONOMIC, TECHNOLOGICAL AND INSTITUTIONAL ISSUES, (ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT, PARIS, (FRANCE)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 251-259, 19 REFS
(ANNOTATION UNDER 5.4)

MAISEL, HERBERT, RESPONSIBILITY FOR THE HUMANISTIC USE OF THE INFORMATION REVOLUTION: WHERE WILL THE BATTLE BE FOUGHT?, (GEORGETOWN UNIV., WASHINGTON, DC),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 47-48, 8 REFS

THIS ESSAY IDENTIFIES SOME NON-OBVIOUS PLACES WHERE THE REAL 'BATTLES' WILL BE FOUGHT REGARDING THE WAY IN WHICH INFORMATION SYSTEMS (PARTICULARLY COMPUTER-COMMUNICATIONS BASED SYSTEMS) WILL BE USED AND THEIR IMPACT ON SOCIETY. SOME OF THESE ARE THE CONGRESS, THE EXECUTIVE OFFICE OF THE PRESIDENT, EDUCATIONAL INSTITUTIONS, AND WITHIN THE STRUCTURES OF MANY PRIVATE ORGANIZATIONS.

ROCKOFF, MAXINE L., HEALTH CARE COMMUNICATION SYSTEMS, (HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION, ROCKVILLE, MD),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 465-467
(ANNOTATION UNDER 4.2)

THOMPSON, GORDON B., THREE CHARACTERIZATIONS OF COMMUNICATIONS REVOLUTIONS, (BELL-NORTHERN RESEARCH, OTTAWA, (CANADA)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 36-37

1.5 SOCIAL ISSUES

THIS ESSAY DEALS WITH THE PROBLEM OF DEVELOPING TOOLS FOR THE ASSESSMENT OF THE IMPACT OF COMMUNICATIONS SYSTEMS ON SOCIETY AS A WHOLE. THE THREE CHARACTERIZATIONS DISCUSSED ARE (1) THE INCREASE IN THE EASE WITH WHICH STORED HUMAN EXPERIENCE CAN BE ACCESSED; (2) THE INCREASE IN THE SIZE OF THE COMMON INFORMATION SPACE SHARED BY THE COMMUNICANTS; AND (3) THE INCREASE IN THE EASE OF DISCOVERY AND DEVELOPMENT OF NASCENT CONSENSUS. TESTS OF SIGNIFICANCE CORRESPONDING TO THE THREE CHARACTERIZATIONS ARE GIVEN.

1.6 FORECASTS

A TRANS-CANADA COMPUTER COMMUNICATIONS NETWORK. PHASE I OF A MAJOR PROGRAM ON COMPUTERS, SCIENCE COUNCIL OF CANADA, AUG 71, SCC R-13, SCC S522-1971-13, 41P
(ANNOTATION UNDER 3.1.0)

ALDEN, R. M., THE WIRED CITY: THE ROLE OF AN INDEPENDENT TELEPHONE COMPANY, (UNITED TELECOMMUNICATIONS INC., KANSAS CITY, MO),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 417-419
(ANNOTATION UNDER 4.3)

CUADRA, CARLOS A., COMPUTER TECHNOLOGY AND LIBRARIES OF THE FUTURE, (SYSTEM DEVELOPMENT CORP., SANTA MONICA, CA);
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 472-476
(ANNOTATION UNDER 4.2)

DAVIES, D. W., TELEPROCESSING AND DATA COMMUNICATION OF THE FUTURE, (NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE),
ELECTRONICS AND POWER, VOL 17, DEC 71, P 464-467

THE NEED FOR SPECIAL NETWORKS FOR DATA COMMUNICATION IS DEVELOPED, AND PACKET-SWITCHING IS SUGGESTED AS A PARTICULARLY VIABLE TECHNOLOGY.

HAMMER, CARL, COMPUTER COMMUNICATIONS: THE FUTURE, (SPERRY RAND CORP., WASHINGTON, DC, UNIVAC DIV.),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 31-35, 8 REFS

A FORECAST OF THE DIRECTION WHICH DEVELOPMENTS IN THE COMPUTER COMMUNICATIONS AREA WILL BE TAKING IS PRESENTED, BASED ON THE REALIZATION 'THAT TOMORROW'S TECHNOLOGY IS FOUNDED UPON THAT OF TODAY'. BRIEF FORECASTS ARE MADE IN EACH OF THREE AREAS: HARDWARE, SOFTWARE, AND THE SUPPORTING DISCIPLINES.

MASON, W. F., R. K. LAY, THE WIRED CITY: SERVICES FOR HOME DELIVERY VIA INTERACTIVE CABLE TV, (MITRE CORP., WASHINGTON, DC),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 420-424
(ANNOTATION UNDER 4.3)

OHLMER, AUGUST, SUMMARY OF THE EXISTING DATA COMMUNICATIONS SERVICES IN WESTERN EUROPE AND TENTATIVE FORECAST OF NEW SERVICES FOR THE NEXT DECADE, (BUNDESMINISTERIUM FUER DAS POST UND FERNMELDEWESEN, (WEST GERMANY)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 260-266

DATA SETS, TELEX STATIONS, AND SIMILAR FACILITIES ARE COUNTED FOR SOME EUROPEAN COUNTRIES AND SOME PROJECTIONS ARE MADE FOR GROWTH OVER THE NEXT TEN YEARS. A FEW PROJECTED NEW SERVICES ARE ALSO DISCUSSED.
(ALSO UNDER 3.2.1)

PARTICIPATING DEMONSTRATIONS OF A MULTI-PURPOSE NETWORK LINKING DISSIMILAR COMPUTERS AND TERMINALS,
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 41-42

SOME OF THE DEMONSTRATIONS PROVIDED DURING THE ARPA NETWORK SPECIAL PROJECT AT THE INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATIONS HELD IN WASHINGTON, D.C., ARE BRIEFLY DESCRIBED. A NETWORK MAP COMPLETE AS OF AUGUST 1972 IS INCLUDED.

ROCKOFF, MAXINE L., HEALTH CARE COMMUNICATION SYSTEMS, (HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION, ROCKVILLE, MD),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 465-467
(ANNOTATION UNDER 4.2)

THOMPSON, JOHN P., THE WIRED CITY: COMMERCIAL SERVICES TO BE PROVIDED BY BROADBAND TELECOMMUNICATIONS SYSTEMS, (LITTLE (ARTHUR D.) INC., CAMBRIDGE, MA),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 425-428
(ANNOTATION UNDER 5.2)

WALKER, PHILIP M., STUART L. MATHISON, SPECIALIZED COMMON CARRIERS, (GEORGETOWN, UNIV. OF, WASHINGTON, DC, LAW CENTER, LITTLE (ARTHUR D.) INC., CAMBRIDGE, MA),
TELEPHONE ENGINEER AND MANAGEMENT, 15 OCT 71, P 41-60, 8 REFS

ISSUES ASSOCIATED WITH THE INTRODUCTION OF SPECIALIZED COMMON CARRIERS FOR DATA COMMUNICATION ARE ADDRESSED. THE FEATURES OF THE MICROWAVE COMMUNICATION, INC. (MCI) AND THE DATA TRANSMISSION COMPANY (DATRAN) PROPOSALS ARE DISCUSSED AND THEN THE POTENTIAL IMPACT IS CONSIDERED. POLICY ISSUES AND THE BENEFITS OF COMPETITION ARE COVERED, INCLUDING SOME REASONABLE PREDICTIONS ON THE FUTURE OF DATA COMMUNICATION PROVIDED BY SPECIALIZED AND COMMON CARRIERS.
(ALSO UNDER 3.1.0, 3.2.1)

1.9 OTHER

MITCHELL, H. F., JR., DR.; THE FUTURE OF THE SWITCHING COMPUTER, (BUNKER-RAMO CORP., CANOGA PARK, CA, BUSINESS AND INDUSTRY DIV.),
DATAMATION, VOL 11, ISSUE 2, FEB 65, P 24-25

INTENDED FOR A GENERAL AUDIENCE, THIS SHORT ARTICLE PREDICTS SOME OF THE CAPABILITIES TO BE PROVIDED BY COMPUTER/COMMUNICATIONS SYSTEMS. IT'S WORTH A GLANCE JUST TO SEE WHERE WE ARE TODAY VIS A VIS THE PREDICTIONS.

ZAKARIAN, Z. V., THE MAD MAD WORLD OF DATA COMMUNICATIONS, (WESTERN UNION DATA SERVICES CO.),
INFOSYSTEMS, VOL 19, ISSUE 8, AUG 72, P 18-21

A DISCUSSION OF THE FRUSTRATIONS IN USING A VARIETY OF DATA COMMUNICATIONS FACILITIES IS PRESENTED, FOLLOWED BY THE CONCLUSION THAT DATA COMMUNICATIONS USERS NEED A SINGLE VENDOR WITH TOTAL COMMUNICATIONS SYSTEM RESPONSIBILITY.

## 2. THEORY

### 2.0 GENERAL

BARAN, PAUL, ON DISTRIBUTED COMMUNICATIONS: XI. SUMMARY OVERVIEW, RAND CORP., SANTA MONICA, CA, AUG 64, RC RM-3767-PR, AF 49(638)-700, (AD-444 837), 23P
(ANNOTATION UNDER 3.0)

COFFMAN, E. G., JR., M. J. ELPHICK, A. SHOSHANI, SYSTEM DEADLOCKS, (PENNSYLVANIA, STATE UNIV. OF, UNIVERSITY PARK, NEWCASTLE UPON TYNE, UNIV. OF, (ENGLAND)), SYSTEM DEVELOPMENT CORP., SANTA MONICA, CA),
COMPUTING SURVEYS, VOL 3, ISSUE 2, JUN 71, P 67-78, 18 REFS

THIS PAPER ON DEADLOCK SITUATIONS WITHIN INDIVIDUAL COMPUTER SYSTEMS CONTAINS A SURVEY OF TECHNIQUES ALSO APPLICABLE TO A COMPUTER NETWORKING ENVIRONMENT.

FRANK, HOWARD, LEONARD KLEINROCK, ROBERT E. KAHN, COMPUTER COMMUNICATION NETWORK DESIGN--EXPERIENCE WITH THEORY AND PRACTICE, (NETWORK ANALYSIS CORP., GLEN COVE, NY, CALIFORNIA, UNIV. OF, LOS ANGELES, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA),
AFIPS CONFERENCE, 1972 SPRING JOINT COMPUTER CONFERENCE, VOLUME 40, (ATLANTIC CITY, NJ, MAY 16-18, 1972), AFIPS PRESS, MONTVALE, NJ, 1972, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 255-270, 52 REFS
(ANNOTATION UNDER 3.0)

KAHN, ROBERT E., WILLIAM R. CROWTHER, FLOW CONTROL IN A RESOURCE-SHARING COMPUTER NETWORK, (BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71CS9-C, P 108-116, 13 REFS
(ANNOTATION UNDER 3.4)

KLEINROCK, LEONARD, COMPUTER NETWORK RESEARCH, CALIFORNIA, UNIV. OF, LOS ANGELES, DEPT. OF COMPUTER SCIENCE, 15 AUG 70, DAHC 15-69-C-0285, (ARPA 1380, AD-711 342), 122P, 26 REFS

INCLUDED IN THIS REPORT ARE BOTH GENERAL REFERENCE TO NETWORKING RESEARCH IN PROGRESS AND, IN APPENDIX F, SPECIFIC APPETITIZING COMMENTS ABOUT NETWORK PERFORMANCE MEASURES, MODELING (ESPECIALLY FOR LONG MESSAGES), NODE STORAGE ESTIMATES, ROUTING ALGORITHMS, AND FLOW CONTROL. UNFORTUNATELY, MOST OF THIS MATERIAL IS ONLY A PRELUDE TO A MORE DETAILED DESCRIPTION AND FUTURE WORK.

ROBERTS, LAWRENCE G., D. R. PADEN, NETWORK OF COMPUTERS, SESSION II, DEFINITION, MODELING AND EVALUATION--SESSION SUMMARY, (ADVANCED RESEARCH PROJECTS AGENCY, WASHINGTON, DC, NATIONAL SECURITY AGENCY, FORT MEADE, MD),
PROCEEDINGS OF INVITATIONAL WORKSHOP ON COMPUTERS, NATIONAL SECURITY AGENCY, FORT MEADE, MD, OCT 68, P 57-65
(ANNOTATION UNDER 1.0)

### 2.1 ANALYSIS

BENES, V. E., MATHEMATICAL THEORY OF CONNECTING NETWORKS AND TELEPHONE TRAFFIC, ACADEMIC PRESS INC., NEW YORK, 1965, MATHEMATICS IN SCIENCE AND ENGINEERING, VOLUME 17, (TK5101.B38, LC 65-21156), 325P, 90 REFS

RIGOROUS MATHEMATICAL THEORIES AND MODELS FOR TELEPHONE TYPE NETWORKS ARE DEVELOPED IN THIS TEXT. THE EMPHASIS IS ON COMBINATIONAL PROBLEMS OF NETWORK DESIGN AND PROBABILISTIC PROBLEMS OF TRAFFIC ANALYSIS INCLUDING STATISTICAL ANALYSIS OF TRAFFIC MEASUREMENT DATA AND ANALYTICAL APPROACHES TO DETERMINING THE GRADE OF SERVICE. PROBLEMS OF NETWORK DELAY ARE NOT ADDRESSED.

FRANK, HOWARD, RESEARCH IN STORE AND FORWARD COMPUTER NETWORKS, NETWORK ANALYSIS CORP., GLEN COVE, NY, 15 DEC 71, 15 JUN-15 DEC 71, ARPA DAHC-15-70-C-0120, (AD-737 403), 123P, 10 REFS

DESIGN ALTERNATIVES ARE INVESTIGATED FOR NETWORKS OF THE ARPANET TYPE IN TERMS OF NETWORK SIZE, TOPOLOGY, AND DATA RATE CONSIDERATIONS FOR THE HIGH SPEED LINKS. IN ADDITION, QUESTIONS OF ROUTING AND RELIABILITY IN STORE-AND-FORWARD NETWORKS ARE ADDRESSED. A DISCUSSION ON THE USE OF THE 50 KILOBIT ARPANET LINKS TO SERVE USERS REQUIRING A THROUGHPUT OF 6 KB IS PARTICULARLY INTERESTING. AN ANALYSIS IS PRESENTED JUSTIFYING THE USE OF 50 KB LINKS RATHER THAN 9.6 KB LINKS.

#### 2.1.0 GENERAL

BARAN, PAUL, ON DISTRIBUTED COMMUNICATIONS NETWORKS, (PRESENTED AT, FIRST CONGRESS OF THE INFORMATION SYSTEMS SCIENCES, HOT SPRINGS, VA, NOVEMBER 1962), (RAND CORP., SANTA MONICA, CA),
IEEE TRANSACTIONS ON COMMUNICATION SYSTEMS, VOL CS-12, ISSUE 1, MAR 64, P 1-9, 1 REFS

THIS IS AN INTERESTING EXPOSITION BECAUSE IT INTRODUCES MANY OF THE BASIC CONCEPTS WHICH WERE LATER IMPLEMENTED IN THE ARPANET. THE DISCUSSION IS CHIEFLY CONCERNED WITH DISTRIBUTED NETWORK ANALYSIS AND THE SURVIVABILITY OF NODES AND LINKS IN THE EVENT OF AN ENEMY THERMO-NUCLEAR ATTACK. A RUDIMENTARY COST ANALYSIS IS PERFORMED ON A VARIETY OF COMMUNICATION TECHNIQUES INCLUDING PULSE REGENERATIVE REPEATERS AND 'MINI-COST' MICROWAVE. A DISCUSSION ON STORE AND FORWARD TECHNIQUES FOLLOWS AND A HEURISTIC ROUTING SCHEME IS DESCRIBED.

FRANK, HOWARD, ANALYSIS AND OPTIMIZATION OF STORE-AND-FORWARD COMPUTER NETWORKS, NETWORK ANALYSIS CORP., GLEN COVE, NY, 15 JUN 70, DAHC 15-70-C-0120, (AD-707 438), 62P, 7 REFS

THIS IS A GENERAL DESCRIPTION OF A COMPUTER PROGRAM WHICH SIMULATES AN ARPA-LIKE NETWORK. THE EMPHASIS IS ON FINDING LOW COST TOPOLOGIES WHICH SATISFY CONSTRAINTS ON NETWORK TIME DELAY, RELIABILITY, CONGESTION, AND OTHER PERFORMANCE PARAMETERS. SOME OF THE ASSUMPTIONS EMBODIED IN THE MODEL ARE BASED ON THE INTERNAL OPERATION OF THE IMP, INCLUDING STRATEGIES FOR BUFFER ALLOCATION. IN ADDITION TO PRESENTING THE RESULTS OF A NUMBER OF RUNS THAT DERIVE ALTERNATIVE ARPA NETWORK CONFIGURATIONS UNDER VARIOUS LOADING ASSUMPTIONS THE REPORT ALSO INTRODUCES TECHNIQUES FOR DESIGN OF CENTRALIZED COMPUTER NETWORKS.

HANSLER, EBERHARD, GERALD K. MCAULIFFE, ROBERT S. WILKOV, OPTIMIZING THE RELIABILITY IN CENTRALIZED COMPUTER NETWORKS, (INTERNATIONAL BUSINESS MACHINES CORP., ZURICH, (SWITZERLAND), RESEARCH LAB., INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER),
IEEE TRANSACTIONS ON COMMUNICATIONS, VOL COM-20, ISSUE 3, JUN 72, P 640-644, 9 REFS

THE RELIABILITY OF COMPUTER NETWORKS CONSISTING OF CLUSTERS OF TERMINALS CONNECTED TO REMOTE CONCENTRATORS WHICH ARE CONNECTED TO A CENTRAL HOST IS DISCUSSED. IT IS SHOWN THAT CONFIGURATIONS OTHER THAN THE FREQUENTLY USED STAR MAY BE MORE RELIABLE AND LESS EXPENSIVE.

KLEINROCK, LEONARD, ANALYTIC AND SIMULATION METHODS IN COMPUTER NETWORK DESIGN, (CALIFORNIA, UNIV. OF, LOS ANGELES), AFIPS PROCEEDINGS, 1970 SPRING JOINT COMPUTER CONFERENCE, VOLUME 36, (ATLANTIC CITY, NJ, MAY 5-7, 1970), AFIPS PRESS, MONTVALE, NJ, 1970, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 569-579, 12 REFS

AN ANALYTICAL MODEL FOR A COMPUTER NETWORK IS DERIVED FROM KLEINROCK'S EARLIER MODEL OF A COMMUNICATIONS NETWORK FOR THE PURPOSE OF OPTIMIZING THE SELECTION OF CHANNEL CAPACITIES UNDER PRESENT DAY COST FUNCTIONS. A NEW, ASYNCHRONOUS UPDATING PROCEDURE FOR ROUTING TABLES IN THE IMP'S OF THE ARPANET IS ALSO DESCRIBED IN WHICH UPDATES TAKE PLACE ONLY WHEN SIGNIFICANT CHANGES OCCUR.

KLEINROCK, LEONARD, COMPUTER NETWORK RESEARCH, CALIFORNIA, UNIV. OF, LOS ANGELES, DEPT. OF COMPUTER SCIENCE, 15 FEB 70, DAHC 15-69-C-0285, (AD-705 149), 75P, 41 REFS

TWO TECHNICAL PAPERS ARE INCLUDED IN THIS REPORT. 'ANALYTICAL AND SIMULATION METHODS IN COMPUTER NETWORK DESIGN' BY KLEINROCK IS ANNOTATED IN CATEGORY 2.1.0 AND IN CATEGORY 3.5 IS CARR'S PAPER, 'HOST-HOST COMMUNICATIONS PROTOCOL IN THE ARPA NETWORK'.

KLEINROCK, LEONARD, COMPUTER NETWORKS, (CALIFORNIA, UNIV. OF, LOS ANGELES, DEPT. OF COMPUTER SCIENCE), CARDENAS, A. F., DR., L. PRESSLER, M. A. MARTIN, COMPUTER SCIENCE, WILEY-INTERSCIENCE, NEW YORK, 1972, (LC 71-169162), P 241-284, 40 REFS
(ANNOTATION UNDER 1.3)

KLEINROCK, LEONARD, MODELS FOR COMPUTER NETWORKS, (CALIFORNIA, UNIV. OF, LOS ANGELES, DEPT. OF ENGINEERING); IEEE INTERNATIONAL CONFERENCE ON COMMUNICATIONS. VOLUME 2, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS INC., NEW YORK, JUN 69, P 21-9--21-16, 13 REFS
(ANNOTATION UNDER 1.3)

WHITNEY, V. KEVIN MOORE, COMPARISON OF NETWORK TOPOLOGY OPTIMIZATION ALGORITHMS, (GENERAL MOTORS CORP., WARREN, MI), WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 332-337, 10 REFS

ANALYTICAL COMPARISONS OF PROCEDURES THAT OPTIMIZE CENTRALIZED COMMUNICATIONS NETWORKS OF MULTI-DROP LINES ARE IMPOSSIBLE EXCEPT IN A FEW VERY SPECIAL CASES. TO FACILITATE COMPARISON, SEVERAL TOPOLOGY OPTIMIZATION PROCEDURES WERE UNIFORMLY CODED AND APPLIED TO A VARIETY OF TEST CONFIGURATIONS. THE TEST CASES WERE CHOSEN TO REPRESENT REAL COMMUNICATIONS NETWORKS HAVING BETWEEN FIFTY AND FIVE HUNDRED TERMINAL LOCATIONS. THE PROCEDURES SELECTED ARE COMPARED WITH RESPECT TO FINAL NETWORK COST, PROCEDURE EXECUTION TIME, AND PROCEDURE FLEXIBILITY.

2.1.1 SIMULATION

BOEHM, B. W., R. MOBLEY, A COMPUTER SIMULATION OF ADAPTIVE ROUTING TECHNIQUES FOR DISTRIBUTED COMMUNICATIONS SYSTEMS, RAND CORP., SANTA MONICA, CA, FEB 66, RC MEMO RM-4782-PR, AF 49(638)-1700, 44P, 2 REFS

A SIMULATION PROGRAM TO TEST VARIOUS ADAPTIVE TECHNIQUES FOR A MODEL OF A DISTRIBUTED COMMUNICATIONS SYSTEM IS DESCRIBED. THE PROGRAM SIMULATES THE PROGRESS OF MESSAGES THROUGH THE SYSTEM AND MEASURES THE EFFECTS OF ADAPTATION OF THE ROUTING TECHNIQUES TO VARIOUS DEGREES OF LINK AND NODE DESTRUCTION.

BOEHM, SHARLA P., PAUL BARAN, ON DISTRIBUTED COMMUNICATIONS: II. DIGITAL SIMULATION OF HOT-POTATO ROUTING IN A BROADBAND DISTRIBUTED COMMUNICATIONS NETWORK, RAND CORP., SANTA MONICA, CA, AUG 64, RC RM-3103-PR, AF 49(638)-700, (AD-444 834), 49P

THIS IS A DESCRIPTION OF A SIMULATION OF A DISTRIBUTED MESSAGE-SWITCHED NETWORK EXAMINING THE EFFECTIVENESS OF 'HOT-POTATO' ROUTING ON NETWORK MESSAGE DELAY AND OVERALL NETWORK RELIABILITY.

BORTELS, W. H., SIMULATION OF INTERFERENCE OF PACKETS IN THE ALOHA TIME-SHARING SYSTEM, HAWAII, UNIV. OF, HONOLULU, MAR 70, HU TR-B70-2, AF F44620-69-C-0030, 26P, 4 REFS

A SIMULATION OF THE RANDOM ACCESS COMMUNICATION METHOD PROPOSED IN THE UNIVERSITY OF HAWAII ALOHA TIME-SHARING SYSTEM IS REPORTED. INSIGHT IS PROVIDED INTO THE UPPER LIMIT OF ACTIVE USERS THE ACCESS TECHNIQUE CAN SUPPORT ON A GIVEN CHANNEL, THE AVERAGE NUMBER OF RETRANSMISSIONS REQUIRED AS A FUNCTION OF ACTIVE USERS, AND THE NUMBER OF TIMES A GIVEN PACKET NEEDS TO BE RETRANSMITTED DUE TO INTERFERENCE WITH OTHER PACKETS.

DEMERCADO, JOHN, RENE GUINDON, JOHN DASILVA, MICHEL KADOCH, THE CANADIAN UNIVERSITIES COMPUTER NETWORK TOPOLOGICAL CONSIDERATIONS, (MINISTRY OF COMMUNICATIONS, OTTAWA, (CANADA)), WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 220-225, 10 REFS

IN CANADA PLANS ARE BEING DEVELOPED FOR A CANADIAN UNIVERSITIES COMPUTER NETWORK (CANUNET). THIS PAPER REVIEWS THE RESULTS OF THE STUDY PREPARED WITHIN THE MINISTRY OF COMMUNICATIONS ON THE TOPOLOGICAL ANALYSIS OF VARIOUS POSSIBLE NETWORK CONFIGURATIONS FOR CANUNET. IN PARTICULAR, SIMULATION RESULTS FOR TWO POSSIBLE 18 NODE CANUNET TOPOLOGIES ARE PRESENTED. ONE OF THESE TOPOLOGIES IS BASED ON THE USE OF PURELY TERRESTRIAL COMMUNICATION FACILITIES, AND THE OTHER IS BASED ON A COMBINATION OF TERRESTRIAL AND SATELLITE FACILITIES.

PRICE, W. L., SIMULATION OF DATA TRANSIT NETWORKS, NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE, APR 72, NPL-DCS COM-SCI-S6, 10P, 5 REFS

THE USE OF AN EVENT-BASED NETWORK SIMULATION PACKAGE IS DESCRIBED IN THIS BRIEF REPORT. THE NETWORK BEING STUDIED IS A STORE-AND-FORWARD PACKET-SWITCHING NETWORK WITH EIGHTEEN NODES JOINED BY THIRTY-ONE 1.5 MBIT/SEC LINKS.

REDDING, J. L., COMPUTER NETWORK SIMULATOR, NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD, SEP 71, NSROC R-3650, (AD-730 053), 35P, 14 REFS

A COMPUTER NETWORK MODEL TO ANALYZE DISTRIBUTED DATA BASES IS DESCRIBED. A COMPUTER NODE IS PARAMETERIZED IN TERMS OF MULTIPROGRAMMING CAPABILITY, NUMBER OF I/O CHANNELS, AND THE JOB STREAM CHARACTERISTICS. THE NETWORK IS DESCRIBED TO THE COMPUTER MODEL BY INTER-NODE CONNECTIONS. THE SIMULATOR ALLOWS FOR TRADEOFF ANALYSIS BETWEEN CENTRALIZED AND DISTRIBUTED DATA BASES IN TERMS OF COMMUNICATION LINE AND DATA BASE UTILIZATION.

TRIPATHI, PRABODH C., SIMULATION OF A RANDOM ACCESS DISCRETE ADDRESS COMMUNICATION SYSTEM, HAWAII, UNIV. OF, HONOLULU, APR 70, UH TN-70-1, AF F44620-69-C-0030, 16P, 9 REFS

THIS PAPER DISCUSSES RESULTS OBTAINED FROM THE SIMULATION OF A RANDOM ACCESS COMMUNICATION SYSTEM FOR THE ALOHA SYSTEM. SINCE DEVICES CAN ACCESS THE CHANNEL AT RANDOM THERE IS A CERTAIN PROBABILITY OF COLLISION OF MESSAGE PACKETS. THE PROBABILITY OF NO COLLISIONS IS PLOTTED AGAINST THE NUMBER OF ACTIVE USER TERMINALS, AND THE PROBABILITY OF SUCCESSFUL PACKET TRANSMISSION WITH THE NUMBER OF RETRANSMISSIONS FOR INCREASING NUMBERS OF ACTIVE USER TERMINALS IS PLOTTED. THE ADVANTAGES OF THIS RANDOM ACCESS TECHNIQUE OVER TIME-DIVISION AND FREQUENCY-DIVISION MULTIPLEXING AND POLLING ARE INDICATED.

WEBER, J. H., L. A. GIMPELSON, UNISIM--A SIMULATION PROGRAM FOR COMMUNICATIONS NETWORKS, (BELL TELEPHONE LABS. INC., HOLMDEL, NJ), AFIPS PROCEEDINGS, 1964 FALL JOINT COMPUTER CONFERENCE, VOLUME 26, (SAN FRANCISCO, CA, OCTOBER 1964), SPARTAN BOOKS INC., BALTIMORE, MD, 1964, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 233-249, 2 REFS

A SIMULATION PROGRAM IS DESCRIBED WHICH PERMITS THE INVESTIGATION OF POSSIBLE ROUTING CONFIGURATIONS AND CONTROL SCHEMES FOR COMMUNICATION NETWORKS. THE PROGRAM ACCOMMODATES NETWORKS WITH MAXIMUM DIMENSIONS OF 63 NODES AND 1953 TRUNK GROUPS AND HANDLES BOTH DIRECT AND STORE AND FORWARD TRAFFIC.

WEBER, J. H., A SIMULATION STUDY OF ROUTING AND CONTROL IN COMMUNICATIONS NETWORKS, (PRESENTED AT, FOURTH INTERNATIONAL TELETRAFFIC CONFERENCE, LONDON, (ENGLAND), JULY 1964), BELL SYSTEM TECHNICAL JOURNAL, VOL 43, ISSUE 6, NOV 64, P 2639-2676, 6 REFS

THIS REPORT DESCRIBES A STUDY PERFORMED WITH THE AID OF A SIMULATION PROGRAM IN WHICH LARGE NETWORKS ARE EXAMINED TO PROVIDE A GUIDE TO NETWORK DESIGN UNDER VARIOUS CIRCUMSTANCES OF GEOGRAPHY AND LOAD LEVELING. COMPARISONS ARE MADE CONCERNING ENGINEERED COSTS AND OVERLOAD CAPABILITY OF NETWORKS USING SEVERAL ALTERNATE ROUTING CONFIGURATIONS AND EMPLOYING A NUMBER OF DIFFERENT OPERATING AND CONTROL PROCEDURES.

2.1.2 ANALYSIS

BARBER, D. L. A., THE CHOICE OF PACKET PARAMETERS FOR PACKET SWITCHED NETWORKS, NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE, NOV 70, NPL-DCS TM-51, 7P

TRADEOFFS IN THE DETERMINATION OF PACKET LENGTH AND CONTROL PROCEDURES FOR PACKET SWITCHED NETWORKS ARE DISCUSSED, WITH AN EMPHASIS ON MINIMIZING NETWORK DELAY.

BOWDON, EDWARD K., SR., NETWORK COMPUTER ANALYSIS, (PRESENTED AT, FIFTH HAWAII INTERNATIONAL CONFERENCE ON SYSTEM SCIENCES, ), ILLINOIS, UNIV. OF, URBANA, DEPT. OF COMPUTER SCIENCE, JAN 72, IU-DCS R72-505, NSF GJ-28289, (PB-207 417), 28P, 64 REFS

LOAD SHARING ON A GEOGRAPHICALLY DISTRIBUTED NETWORK OF COMPUTERS IS DISCUSSED. AVERAGE INTERARRIVAL RATES AND PROCESSING TIMES FOR PRIORITY CLASSES ARE USED TO DETERMINE WHAT FRACTION OF THE JOBS IN EACH CLASS SHOULD BE TRANSMITTED BETWEEN CENTERS IN ORDER TO BALANCE THE AVERAGE WAITING TIMES FOR EACH PRIORITY CLASS THROUGHOUT THE NETWORK.

BOWDON, EDWARD K., SR., PRIORITY ASSIGNMENT IN A NETWORK OF COMPUTERS, IEEE COMPUTER GROUP CONFERENCE, (MINNEAPOLIS, MN, JUNE 17-19, 1969), INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS INC., NEW YORK, JUN 69, IEEE 69C-30-C, P 60-66, 11 REFS

A PRIORITY JOB SCHEDULING ALGORITHM IS DEVELOPED FOR A MULTIPROCESSOR, SINGLE QUEUE SYSTEM. THE ANALYSIS IS

2.1.2 ANALYSIS

EXTENDED TO THE CASE OF A GEOGRAPHICALLY DISTRIBUTED PROCESSOR SYSTEM TO SELECT THE PRIORITY CLASS MOST SUITABLE FOR TRANSMISSION TO A REMOTE PROCESSOR FOR THE BEST NETWORK PERFORMANCE. THE ALGORITHM DEVELOPED IS DEPENDENT UPON STATISTICS GENERATED LOCALLY AT EACH PROCESSOR WITHOUT ANALYZING THE NETWORK OF DISTRIBUTED PROCESSORS AS A WHOLE. THE ARTICLE IS SHORT ON NON-MATHEMATICAL SUPPORT MATERIAL WHICH WOULD HELP THE READER TO BETTER APPRECIATE THE EFFORT.

BOWDON, EDWARD K., SR., PRIORITY ASSIGNMENT IN A NETWORK OF COMPUTERS, (PRESENTED AT, 1969 IEEE COMPUTER GROUP CONFERENCE, MINNEAPOLIS, MN, JUNE 17-19, 1969), (ILLINOIS, UNIV. OF, URBANA, DEPT. OF COMPUTER SCIENCE), IEEE TRANSACTIONS ON COMPUTERS, VOL C-18, ISSUE 11, NOV 69, P 1021-1026, 12 REFS

BOWDEN PRESENTS A MATHEMATICAL DEVELOPMENT OF AN ANALYTIC TOOL FOR ALLOCATING TASKS ACCORDING TO PRIORITIES AMONG SERVING COMPUTER CENTERS IN A LOAD-SHARING COMPUTER NETWORK. THE RESULTS ARE INTENDED TO BE DIRECTLY APPLICABLE TO THE COLLINS C SYSTEM, A DISTRIBUTED NETWORK OF FOUR COMPUTER CENTERS.

CASEY, R. G., ALLOCATION OF COPIES OF A FILE IN AN INFORMATION NETWORK, (INTERNATIONAL BUSINESS MACHINES CORP., SAN JOSE, CA), AFIPS CONFERENCE, 1972 SPRING JOINT COMPUTER CONFERENCE, VOLUME 40, (ATLANTIC CITY, NJ, MAY 16-18, 1972), AFIPS PRESS, MONTVALE, NJ, 1972, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 617-625, 7 REFS

A LINEAR COST MODEL IS DERIVED FOR AN INFORMATION NETWORK RELATIVE TO THE ALLOCATION OF THE COPIES OF A FILE. BOUNDS ARE DERIVED FOR THE NUMBER OF COPIES OF THE FILE THAT SHOULD EXIST IN THE NETWORK AS A FUNCTION OF THE RELATIVE VOLUME OF QUERY AND UPDATE TRAFFIC DIRECTED TO THAT FILE.

CHU, WESLEY W., DEMULTIPLEXING CONSIDERATIONS FOR STATISTICAL MULTIPLEXORS, (CALIFORNIA, UNIV. OF, LOS ANGELES, DEPT. OF COMPUTER SCIENCE), JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 32-38, 7 REFS
(ANNOTATION UNDER 3.2.9)

CHU, WESLEY W., OPTIMAL FILE ALLOCATION IN A MULTIPLE COMPUTER SYSTEM, (PRESENTED AT, IFIP CONGRESS 68, EDINBURGH, (SCOTLAND), AUGUST 5-10, 1968), (BELL TELEPHONE LABS, INC., HOLMDEL, NJ), IEEE TRANSACTIONS ON COMPUTERS, VOL C-18, ISSUE 10, OCT 69, P 885-889, 5 REFS

THIS CHALLENGING PAPER INTRODUCES A NON-LINEAR INTEGER PROGRAM AS A MODEL FOR FILE ALLOCATION IN A DISTRIBUTED COMPUTER NETWORK. THE SINGLE MEASURE OF OPTIMALITY IS COST, TAKING INTO ACCOUNT STORAGE, UPDATING, TRANSMISSION, REQUEST RATES AND ALLOWABLE FILE ACCESS TIMES.

CRAIG, L. J., I. S. REED, OVERLAPPING TESSELLATED COMMUNICATIONS NETWORKS, RAND CORP., SANTA MONICA, CA, DEPT. OF COMPUTER SCIENCES, RAND CORP., SANTA MONICA, CA, DEPT. OF ELECTRONICS, 13 JUN 61, RC P-2359, (AD-676 259), 18P

THIS PAPER INVESTIGATES BANDWIDTH REQUIREMENTS FOR 'MOSAIC' NETWORKS. FOR THE MATHEMATICAL MODEL USED IT IS ASSUMED THAT THE NODES PERFORM A SWITCHING FUNCTION AND THAT NO STORE-AND-FORWARD FACILITIES EXIST.

DOLL, DIXON R., EFFICIENT ALLOCATION OF RESOURCES IN CENTRALIZED COMPUTER-COMMUNICATION NETWORK DESIGN, MICHIGAN, UNIV. OF, ANN ARBOR, SYSTEMS ENGINEERING LAB., NOV 69, MI-SEL TR-36, MI-RADC TR-69-305, AF 30(602)-3953, AF F30602-69-C-0214, 330P, 82 REFS

A THOROUGH TREATMENT OF ANALYTIC DESIGN PROCEDURES FOR CENTRALIZED COMPUTER COMMUNICATION NETWORKS IS PRESENTED. FOLLOWING A NUMBER OF CLEAR AND COMPLETE DEFINITIONS OF RELEVANT TERMS, THE FACTORS INFLUENCING SELECTION OF A CENTRALIZED OR DISTRIBUTED NETWORK ARE DISCUSSED, LEADING TO A CONCLUSION THAT A COMPREHENSIVE STUDY OF THE DESIGN OF CENTRALIZED NETWORKS IS STILL NEEDED. SEVERAL ASSUMPTIONS ARE MADE AND JUSTIFIED IN THE REPORT, INCLUDING POISSON INTER-ARRIVAL DISTRIBUTIONS FOR DATA FLOW INTO SUCH NETWORKS. FUTURE WORK IS SUGGESTED IN WHICH SOME OF THESE ASSUMPTIONS ARE MODIFIED TO REPRESENT DIFFERENT AND, PERHAPS, STILL MORE REALISTIC CONFIGURATIONS, INCLUDING SUPERIMPOSED CENTRALIZED NETWORKS.

DUDICK, A. L., C. D. PACK, ROUND ROBIN SCHEDULING IN A COMPUTER COMMUNICATIONS SYSTEM WITH FINITE SWAP TIME AND STATISTICALLY MULTIPLEXED ARRIVALS, (BELL TELEPHONE LABS, INC., HOLMDEL, NJ), JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 58-64, 15 REFS

ANALYTIC AND SIMULATION TECHNIQUES ARE EMPLOYED TO INVESTIGATE THE EFFECT OF ASYNCHRONOUS TIME DIVISION MULTIPLEXING (ATDM) ON THE PERFORMANCE OF A COMPUTER-COMMUNICATIONS SYSTEM. SOME INTERESTING RESULTS CONCERNING ATDM ARE PRESENTED INCLUDING SOME POSSIBLE DETRIMENTAL EFFECTS ON NETWORK DELAYS.
(ALSO UNDER 2.1.3, 3.2.9)

ELIE, MICHEL, GENERAL PURPOSE NETWORKS OF COMPUTERS, CALIFORNIA, UNIV. OF, LOS ANGELES, 1970, 125P, 46 REFS
(ANNOTATION UNDER 1.2)

ELSPAS, B., J. GOLDBERG, R. A. SHORT, H. S. STONE, INVESTIGATION OF PROPAGATION-LIMITED COMPUTER NETWORKS, STANFORD RESEARCH INST., MENLO PARK, CA, JUL 65, SRI 4523, AF 19(628)-2902, (AD-621 039), 203P, 30 REFS

THIS REPORT DETAILS THE MODELING TECHNIQUES USED FOR THE ANALYSIS, ORGANIZATION, AND DESIGN OF LOGICAL NETWORKS IN WHICH PROPAGATION DELAYS ON THE LINES CONNECTING THE NODES OF THE NETWORK ARE APPRECIABLE COMPARED TO DELAYS WITHIN THE NODES. TECHNIQUES FOR EMBEDDING NONPROPAGATION-LIMITED NETWORKS WITHIN PROPAGATION-LIMITED NETWORKS ARE DEVELOPED AND GRAPHICAL MODELS OF PROPAGATION-LIMITED NETWORKS ARE DESIGNED.

ESAU, L. R., K. C. WILLIAMS, ON TELEPROCESSING SYSTEM DESIGN. PART II. A METHOD FOR APPROXIMATING THE OPTIMAL NETWORK, IBM SYSTEMS JOURNAL, VOL 5, ISSUE 3, 1966, P 142-147, 2 REFS

AN ALGORITHM IS DEVELOPED FOR OPTIMIZING A MULTIPOINT NETWORK WHERE A SINGLE CONTROL CENTER IS CONNECTED TO A NUMBER OF TERMINALS IN A MULTI-DROP CONFIGURATION. FIXED LINE CAPACITY, TRAFFIC, AND THE DISTANCE BETWEEN THE PROCESSOR AND THE TERMINALS ARE CONSIDERED.

FISHER, C. R., R. L. SLIGH, THE DATRAN NETWORK, (DATA TRANSMISSION CO., VIENNA, VA), JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 65-72
(ANNOTATION UNDER 3.1.0)

FRANK, HOWARD, I. T. FRISCH, W. CHOU, TOPOLOGICAL CONSIDERATIONS IN THE DESIGN OF THE ARPA COMPUTER NETWORK, (NETWORK ANALYSIS CORP., GLEN COVE, NY), AFIPS PROCEEDINGS, 1970 SPRING JOINT COMPUTER CONFERENCE, VOLUME 36, (ATLANTIC CITY, NJ, MAY 5-7, 1970), AFIPS PRESS, MONTVALE, NJ, 1970, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 581-587, 7 REFS

A BASIC DISCUSSION OF THE MODELING THAT IS PERFORMED IN THE TOPOLOGICAL DESIGN OF THE ARPA NETWORK IS PRESENTED. THE GOAL OF THE MODELING IS TO MINIMIZE THE COST/BIT TRANSMITTED WHILE SATISFYING NETWORK END-TO-END RESPONSE CRITERIA OF LESS THAN 0.2 SECOND FOR A SHORT MESSAGE UNDER PROJECTED NETWORK LOAD. DIFFICULTY IS ACKNOWLEDGED IN ESTIMATING TRAFFIC IN THE NETWORK AND REASONABLE ASSUMPTIONS ARE MADE. EMPHASIS IS PLACED ON THE EFFECT OF DIFFERENT CAPACITY COMMUNICATION CIRCUITS, AS PRESENTLY TARIFFED, ON OVERALL COST/BIT OF THE NETWORK APPROPRIATELY LOADED.

FRANK, HOWARD, OPTIMAL DESIGN OF COMPUTER NETWORKS, (NETWORK ANALYSIS CORP., GLEN COVE, NY), RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3, COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 167-183

THIS PAPER DISCUSSES PROCEDURES TO DEVELOP MINIMAL COST NETWORKS CAPABLE OF FULFILLING TRAFFIC AND MAXIMUM ALLOWABLE TIME DELAY REQUIREMENTS FOR BOTH CENTRALIZED AND DISTRIBUTED NETWORKS. THESE TECHNIQUES WERE APPLIED IN THE ARPANET DESIGN.

FRISCH, I. T., D. K. SEN, ALGORITHMS TO REALIZE DIRECTED COMMUNICATION NETS, CALIFORNIA, UNIV. OF, BERKELEY, DEPT. OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE, LENKURT ELECTRIC CO., SAN CARLOS, CA, DEC 67, CU-DEECS S177.29, DA-ARO

2.1.2 ANALYSIS

0-31-124-G776, (A0-674 0B6), 10P, 7 REFS
REPRINT FROM/IEEE TRANSACTIONS ON CIRCUIT THEORY, CT-14:4 (DEC 67) 370-379/

MATHEMATICAL THEORIES ARE FORMULATED FOR A REAL SQUARE UNSYMMETRICAL MATRIX REPRESENTING THE TERMINAL CAPACITY MATRIX OF A DIRECTED COMMUNICATION NET.

HANSLER, EBERHARD, GERALD K. MCAULIFFE, ROBERT S. WILKOV, RELIABILITY CONSIDERATIONS IN CENTRALIZED COMPUTER NETWORKS, (INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER), JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS; 1971, IEEE CAT-71C59-C, P 96-101, 9 REFS

AN ANALYSIS OF THE RELIABILITY OF COMPUTER NETWORKS IN WHICH CLUSTERS OF TERMINALS ARE CONNECTED THROUGH REMOTE CONCENTRATORS TO DATA PROCESSING CENTERS IS PRESENTED. IT IS SHOWN THAT NETWORK TOPOLOGIES DIFFERENT FROM A STAR MAY HAVE SIGNIFICANTLY HIGHER RELIABILITY AT NO INCREASE IN COST.

HAYES, J. F., D. N. SHERMAN, TRAFFIC AND DELAY IN A CIRCULAR DATA NETWORK, (BELL TELEPHONE LABS. INC., HOLMDEL, NJ), JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS; 1971, IEEE CAT-71C59-C, P 102-107, 8 REFS

THE OPERATION AND TRAFFIC BEHAVIOR FOR A DATA TRANSMISSION SYSTEM USING A RING TOPOLOGY ARE STUDIED. DATA IS BLOCKED INTO FIXED LENGTH PACKETS AND MUST BE BUFFERED UNTIL AN EMPTY SLOT ARRIVES ON THE RING. FORMULAS ARE DERIVED FROM WHICH APPROXIMATIONS TO AVERAGE MESSAGE DELAY THROUGH THE RING CAN BE CALCULATED.
(ALSO UNDER 3.2.1)

HOSFORD, JOHN E., OPTIMAL ALLOCATION OF LEASED COMMUNICATION LINES, (LOCKHEED MISSILES AND SPACE CO., SUNNYVALE, CA), MANAGEMENT SCIENCE, VOL 9, ISSUE 4, JUL 63, P 613-622, 4 REFS

SOME PRACTICAL COMMENTS, ANALYTICAL TECHNIQUES, AND TABLES FOR MULTI-SERVER QUEUING APPLIED TO MULTIPLE COMMUNICATION LINES BETWEEN TWO POINTS IN SUPPORT OF A NETWORK ARE INCLUDED IN THIS ARTICLE. THE DISCUSSION IS ALSO APPLICABLE TO DETERMINING THE NUMBER OF PORTS NEEDED ON A TIME-SHARING SYSTEM OR CONCENTRATOR TO SUPPORT ESTIMATED TERMINAL LOADING.

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, APR 72, 1 JAN-30 APR 72, BBN R-2353, BBN OTR-13, DAHC 15-69-C-0179, 31P
(ANNOTATION UNDER 3.1.1)

IRANI, K. B., I. S. UPPAL, J. W. BOYSE, D. M. COLEMAN, D. L. HINSHAW, G. A. MCCLAIN, L. S. RANDALL, A. M. WOOLF, A STUDY OF INFORMATION IN MULTIPLE-COMPUTER AND MULTIPLE-CONSOLE DATA PROCESSING SYSTEMS, MICHIGAN, UNIV. OF, ANN ARBOR, SYSTEMS ENGINEERING LAB., AUG 71, MI-SEL AR-4, AF F30602-69-C-0214, (AD-729 194), 176P, 57 REFS

THIS AMBITIOUS REPORT DEVELOPS MATHEMATICAL TECHNIQUES FOR ANALYZING MULTIPLE COMPUTER, MULTIPLE TERMINAL ON-LINE SYSTEMS FOR THE PURPOSE OF DETERMINING OPTIMAL CONFIGURATION AND EFFICIENT SCHEDULING OF RESOURCES IN THIS TYPE OF SYSTEM.

JACKSON, P. E., CHARLES D. STUBBS, A STUDY OF MULTIACCESS COMPUTER COMMUNICATIONS, (BELL TELEPHONE LABS. INC., HOLMDEL, NJ), AFIPS PROCEEDINGS. 1969 SPRING JOINT COMPUTER CONFERENCE. VOLUME 34, (BOSTON, MA, MAY 14-16, 1969), AFIPS PRESS, MONTVALE, NJ, 1969, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 491-504, 13 REFS

A USEFUL MODEL OF MAN-COMPUTER DIALOGUE AND THE RESULTS OF DATA COLLECTED AND INTERPRETED RELATIVE TO THIS MODEL IS PRESENTED. A 'DATA STREAM MODEL' IS DEVELOPED TO INVESTIGATE HOLDING TIMES ACROSS DIFFERENT TYPES OF SYSTEMS IN RELATION TO USER/COMPUTER SEND TIMES, USER/COMPUTER IDLE TIMES, USER/COMPUTER DELAY TIMES AND COMMUNICATION BURST CHARACTERISTICS. INTERESTING CONCLUSIONS ARE DRAWN FOR THE SYSTEMS STUDIED AND THE MODEL IS APPLICABLE IN GENERAL TO USER-COMPUTER INTERACTIONS. THE MODEL IS SOMEWHAT LIMITED. THERE IS NO TREATMENT OF FULL DUPLEX, FOR EXAMPLE, BUT THE MODEL STILL DESERVES CAREFUL ATTENTION. ALL DESIGNERS OF INTERACTIVE REMOTE ACCESS SYSTEMS AND OF COMMUNICATIONS FACILITIES TO SUPPORT THEM SHOULD BE FAMILIAR WITH THIS MATERIAL.

KLEINROCK, LEONARD, SURVEY OF ANALYTICAL METHODS IN QUEUEING NETWORKS, (CALIFORNIA, UNIV. OF, LOS ANGELES), RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3. COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 185-205, 11 REFS
(ANNOTATION UNDER 1.3)

KONHEIM, ALAN G., BERND MEISTER, POLLING IN A MULTIDROP COMMUNICATION SYSTEM: WAITING LINE ANALYSIS, (INTERNATIONAL BUSINESS MACHINES, ZURICH, (SWITZERLAND), RESEARCH LAB.), JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS; 1971, IEEE CAT-71C59-C, P 124-129

A COMMUNICATIONS SYSTEM CONTAINING DATA INPUT TERMINALS, BUFFERED AND MULTIDROPPED, CONNECTED TO A CENTRAL STATION WHICH PERFORMS SEQUENTIAL POLLING OF THE TERMINALS IS ANALYZED. THE DISTRIBUTION OF QUEUE LENGTHS THROUGHOUT THE SYSTEM IS CALCULATED.

LIPNER, S. B., P. MELANSON, COMPUTATION OF MESSAGE DELAYS IN A COMMUNICATIONS NETWORK, MITRE CORP., BEDFORD, MA, 10 DEC 71, MC WP-4083, AF F19(628)-71-C-0002, 17P, 2 REFS

A COMPUTER PROGRAM IS DESCRIBED THAT MAY BE USED TO EVALUATE THE DELAYS EXPERIENCED BY TRAFFIC FLOWING IN A COMPUTER COMMUNICATIONS NETWORK. THE PROGRAM IS BASED ON KLEINROCK'S MODEL (SEE 'ANALYTIC AND SIMULATION METHODS IN COMPUTER NETWORK DESIGN,' IN CATEGORY 2.1.0) FOR DELAYS IN THE ARPA NETWORK. LISTINGS, FLOWCHARTS AND OPERATING INSTRUCTIONS ARE PROVIDED, AS WELL AS AN EXAMPLE OF THE USE OF THE PROGRAM.

MARCHESE, J. F., W. GERHARD, SOME EFFECTS OF SWITCHED NETWORK TIME DELAYS AND TRANSMISSION SPEED ON DATA BASED/DATA COMMUNICATION SYSTEMS, (INTERNATIONAL BUSINESS MACHINES CORP., ZURICH, (SWITZERLAND), RESEARCH LAB.), WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 352-357, 3 REFS

THE EFFECTS ON THE USER OF COMMUNICATION NETWORK SWITCHING SPEED AND DATA RATES ARE EXAMINED AND THE SENSITIVITY OF SWITCHING COST TO SWITCHING SPEED IS ANALYZED. THE CONCLUSIONS ARE INTUITIVE, BUT ANALYTICAL MATERIAL IS DEVELOPED IN SUPPORT OF THEM.

SEGAL, M., A PREEMPTIVE PRIORITY MODEL WITH TWO CLASSES OF CUSTOMERS, (BELL TELEPHONE LABS. INC., HOLMDEL, NJ), JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS; 1971, IEEE CAT-71C59-C, P 168-174, 3 REFS

A MODEL OF A TRUNK GROUP SERVING VOICE AND DATA COMMUNICATIONS IS ANALYZED. THE MODEL SERVICES TWO KINDS OF CUSTOMERS: PRIMARY CUSTOMERS WHO RECEIVE PREEMPTIVE PRIORITY AND SECONDARY CUSTOMERS WHO ARE SERVED ONLY WHEN THE FACILITY IS NOT FULLY OCCUPIED BY PRIMARY CUSTOMERS. EXAMPLES ARE GIVEN OF THE EFFECT OF QUEUING OF SECONDARY CUSTOMERS.
(ALSO UNDER 3.2.1)

SMITH, J. W., ON DISTRIBUTED COMMUNICATIONS: III. DETERMINATION OF PATH-LENGTHS IN A DISTRIBUTED NETWORK, RAND CORP., SANTA MONICA, CA, AUG 64, RC RM-3578-PR, AF 49(638)-700, (AD-444 833), 91P, 1 REFS

THIS IS A DETAILED DESCRIPTION OF MODELING A DISTRIBUTED MESSAGE-SWITCHED NETWORK UNDER HEAVY LOADING TO DETERMINE MESSAGE PATHS.

SPRAGINS, JOHN D., ANALYSIS OF LOOP TRANSMISSION SYSTEMS, (INTERNATIONAL BUSINESS MACHINES CORP., RALEIGH, NC), JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA

2.1.2 ANALYSIS

COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS; 1971, IEEE CAT-71C59-C, P 17S-182, 7 REFS

AN ANALYTICAL MODEL OF A RING TRANSMISSION SYSTEM WITH RANDOM SLOT ASSIGNMENT AND FIXED SLOT SIZE IS DEVELOPED. IT IS ASSUMED THAT ALL TRANSMISSION ORIGINATES FROM OR TERMINATES AT A SINGLE CENTRAL PROCESSOR, THUS ESTABLISHING A PRIORITY RELATIVE TO POSITION. THAT IS, UPSTREAM TERMINALS HAVE PRIORITY OVER DOWNSTREAM. ANALYSIS FOR MULTIPLE PROCESSORS IS NOT COVERED.
(ALSO UNDER 3.2.1)

STAMBLER, LEON, ELEMENTARY TELEPHONE SWITCHING THEORY APPLIED TO THE DESIGN OF MESSAGE SWITCHING SYSTEMS, (RADIO CORP. OF AMERICA, NEW YORK, DIV. OF COMMUNICATION SYSTEMS),
AFIPS PROCEEDINGS, 1966 FALL JOINT COMPUTER CONFERENCE, VOLUME 29, (SAN FRANCISCO, CA, NOVEMBER 7-10, 1966), SPARTAN BOOKS INC., WASHINGTON, DC, 1966, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 413-423, 5 REFS
(ANNOTATION UNDER 3.2.1)

TREHAN, RANVIR K., PROJECTED RESPONSE CHARACTERISTICS OF THE WWMCCS INTERCOMPUTER NETWORK, MITRE CORP., WASHINGTON, DC, 8 MAY 72, MC WP-9845, AF F1962B-71-C-0002, 54P, 5 REFS

THIS PAPER PRESENTS AN ANALYTIC COMPUTER MODEL FOR ANALYZING AND ESTIMATING RESPONSE CHARACTERISTICS OF AN INTERCOMPUTER NETWORK UTILIZING STORE-AND-FORWARD COMMUNICATIONS. THE MODEL ANALYZES THE NETWORK ON A LINK-BY-LINK BASIS, COMPUTING EXPECTED DELAY FROM SUCH FACTORS AS BANDWIDTH, AVERAGE MESSAGE LENGTH AND MESSAGE DEMAND DISTRIBUTION (LINE LOADING). SUCH VARIABLES AS THOSE INTRODUCED BY ADAPTIVE ROUTING ALGORITHMS ARE NOT CONSIDERED. THE MODEL IS APPLIED TO ONE POSSIBLE DESIGN OF AN INTERCOMPUTER NETWORK TO DERIVE APPROXIMATE ANTICIPATED MESSAGE RESPONSE CHARACTERISTICS. PARAMETRIC SENSITIVITY ANALYSIS IS PERFORMED, AND A GENERALIZED COMPUTER MODEL (INCLUDING A FORTRAN PROGRAM LISTING) FOR STOCHASTIC NETWORK ANALYSIS IS DESCRIBED.

WHITE, LEE J., OPTIMUM CONCENTRATOR LOCATION IN TELECOMMUNICATIONS DESIGN, (OHIO, STATE UNIV. OF, COLUMBUS);
1972 PROCEEDINGS OF THE ACM, VOLUME I, (BOSTON, MA, AUGUST 1972), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, 1972, P S34-S42, 15 REFS

A MATHEMATICAL ANALYSIS OF THE ALLOCATION OF CONCENTRATORS IN A NETWORK IS PRESENTED. A GENERAL MODEL FOR ANALYSIS BASED ON A STAR SUBGRAPH IS PROPOSED.

WILKOV, ROBERT S., ANALYSIS AND DESIGN OF RELIABLE COMPUTER NETWORKS, (INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY; THOMAS J. WATSON RESEARCH CENTER),
IEEE TRANSACTIONS ON COMMUNICATIONS, VOL COM-20, ISSUE 3, JUN 72, P 660-678, 86 REFS

THIS IS A SURVEY OF CURRENT RESEARCH IN GRAPH THEORY APPLIED TO CHARACTERIZE COMPUTER NETWORK RELIABILITY. SIGNIFICANT RELIABILITY CRITERIA AND THEIR RELEVANCE TO DIFFERENT APPLICATIONS ARE DISCUSSED AND THE DIFFICULTIES AND LIMITATIONS ASSOCIATED WITH EACH RELIABILITY MEASURE ARE INDICATED.

ZEIGLER, JACK F., LEONARD KLEINROCK, NODAL BLOCKING IN LARGE NETWORKS, (CALIFORNIA, UNIV. OF, LOS ANGELES, DEPT. OF COMPUTER SCIENCE),
BLACKER, HARRY L., IEEE INTERNATIONAL CONFERENCE ON COMMUNICATIONS, VOLUME 7, (MONTREAL, (CANADA), JUNE 14-16, 1971), INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS INC., NEW YORK, 1971, IEEE CAT-71C2B-COM, (LC 64-23226), P 39-9--39-15, 10 REFS

A MODEL IS PRESENTED TO ANALYZE STORE-AND-FORWARD COMMUNICATION NETWORKS IN WHICH THE NODES HAVE A FINITE STORAGE CAPACITY FOR MESSAGES. A NODE IS BLOCKED WHEN ITS STORAGE IS FILLED; OTHERWISE IT IS FREE. ARPANET TERMINOLOGY IS USED IN THIS VERY PRACTICAL AND USEFUL ANALYSIS. THE THEORETICAL CONCLUSIONS ARE SUBSTANTIATED BY COMPUTER-BASED SIMULATION./

ZEIGLER, JACK F., NODAL BLOCKING IN LARGE NETWORKS, CALIFORNIA, UNIV. OF, LOS ANGELES, COMPUTER SYSTEMS MODELING AND ANALYSIS GROUP, OCT 71, CU-CSMAG ENG-7167, DAHC 15-69-C-0285, 152P, 27 REFS

NODAL BLOCKING (THE SATURATION OF REASSEMBLY OR STORE-AND-FORWARD BUFFERS IN INTERMEDIATE OR DESTINATION PROCESSORS) IN LARGE NETWORKS IS DISCUSSED RELATIVE TO THE ARPANET. A MARKOVIAN NETWORK MODEL IS DEVELOPED TO PREDICT THE FRACTION OF BLOCKED NODES IN A LARGE-SCALE STORE-AND-FORWARD NETWORK.

2.1.3 ROUTING

BARAN, PAUL, ON DISTRIBUTED COMMUNICATIONS: IV. PRIORITY, PRECEDENCE, AND OVERLOAD, RAND CORP., SANTA MONICA, CA, AUG 64, RC RM-3638-PR, AF 49(638)-700, (AD-444 840), 63P, 6 REFS

THIS REPORT PRESENTS A DETAILED DISCUSSION OF THE DESIGN OF A DISTRIBUTED MESSAGE-SWITCHED NETWORK UNDER OVERLOAD CONDITIONS. THE GOAL IS TO DETERMINE THE EFFECTS OF PRIORITY SCHEMES TO REDUCE LOAD, YET ALLOW IMPORTANT TRAFFIC TO PASS IN AN OVERLOADED NETWORK.

BARAN, PAUL, ON DISTRIBUTED COMMUNICATIONS: V. HISTORY, ALTERNATIVE APPROACHES, AND COMPARISONS, RAND CORP., SANTA MONICA, CA, AUG 64, RC RM-3097-PR, AF 49(638)-700, (AD-444 838), 51P, 6 REFS

BARAN DESCRIBES AND COMPARES SEVERAL ROUTING STRATEGIES FOR DISTRIBUTED MESSAGE SWITCHED NETWORKS. HE DISCUSSES THE DIFFICULTY OF DIFFERENTIATING BETWEEN MESSAGE AND CIRCUIT SWITCHED NETWORKS.

DAVIES, D. W., THE CONTROL OF CONGESTION IN PACKET SWITCHING NETWORKS, (NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND)),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS; 1971, IEEE CAT-71C59-C, P 46-49, 2 REFS

THE CONCEPT OF CONGESTION PREVENTION IN A PACKET-SWITCHING NETWORK THROUGH 'ISARITHMIC' OPERATION IS INTRODUCED AND ANALYZED. THIS TERM IS USED TO REFER TO THE TECHNIQUE OF HOLDING CONSTANT THE NUMBER OF PACKETS IN THE NETWORK. WHEN DATA CARRYING PACKETS ARRIVE AT A DESTINATION, THEY ARE REPLACED BY EMPTY PACKETS WHICH ARE PUT BACK INTO THE NETWORK. WHEN DATA IS TO BE ENTERED INTO THE NETWORK, AN EMPTY PACKET IS FOUND AND REPLACED BY A DATA PACKET.

DUDICK, A. L., C. D. PACK, ROUND ROBIN SCHEDULING IN A COMPUTER COMMUNICATIONS SYSTEM WITH FINITE SWAP TIME AND STATISTICALLY MULTIPLEXED ARRIVALS; (BELL TELEPHONE LABS, INC., HOLMDEL, NJ),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS; 1971, IEEE CAT-71C59-C, P 58-64, 15 REFS
(ANNOTATION UNDER 2.1.2)

POLLACK, M., MESSAGE ROUTE CONTROL IN A LARGE TELETYPE NETWORK,(PRESENTED AT, SYMPOSIUM ON 'OPTIMUM ROUTING IN LARGE NETWORKS' (IFIP CONGRESS 62), MUNICH, (GERMANY), AUGUST 27-SEPTEMBER 1,1962), (PLANNING RESEARCH CORP., LOS ANGELES, CA),
JOURNAL OF THE ASSOCIATION FOR COMPUTING MACHINERY, VOL 11, ISSUE 1, JAN 64, P 104-116, 5 REFS

REAL-TIME METHODS FOR OBTAINING OPTIMAL TRAFFIC ROUTES FOR DIRECTED NETWORKS ARE DETAILED. THE THREE METHODS PRESENTED, ALL UTILIZING DIGITAL COMPUTERS, ARE THE LINK-FLOW METHOD, THE ROUTE-FLOW METHOD, AND THE NEAREST-NEIGHBOR METHOD. THE ADVANTAGES OF THE THIRD METHOD FOR LARGER NETWORKS ARE DISCUSSED.

PROSSER, REESE T., ROUTING PROCEDURES IN COMMUNICATIONS NETWORKS--PART II: DIRECTORY PROCEDURES, (MASSACHUSETTS INST. OF TECH., LEXINGTON, LINCOLN LAB.);
IRE TRANSACTIONS ON COMMUNICATIONS SYSTEMS, VOL CS-10, ISSUE 4, DEC 62, P 329-335, 8 REFS

SEE ANNOTATION FOR PART I OF THIS 2-PART ARTICLE.

PROSSER, REESE T., ROUTING PROCEDURES IN COMMUNICATIONS NETWORKS--PART I: RANDOM PROCEDURES, (MASSACHUSETTS INST. OF TECH., LEXINGTON, LINCOLN LAB.),
IRE TRANSACTIONS ON COMMUNICATIONS SYSTEMS, VOL CS-10, ISSUE 4, DEC 62, P 322-329, 6 REFS

THIS REPORT REPRESENTS A STUDY OF POSSIBLE ROUTING PROCEDURES IN A MILITARY COMMUNICATION NETWORK IN ORDER TO EVALUATE THE PROCEDURES IN TERMS OF FUTURE TACTICAL REQUIREMENTS. ESTIMATES OF THE AVERAGE TRAVERSE TIME OF EACH MESSAGE AND AVERAGE TRAFFIC FLOW THROUGH EACH NODE ARE DERIVED BY STATISTICAL METHODS. PART ONE IS DEVOTED TO ROUTING PROCEDURES

2.1.3 ROUTING

INVOLVING RANDOM SELECTION AND PART TWO TO PROCEDURES DETERMINED BY DIRECTORY INFORMATION. THE ADVANTAGES OF THE DIRECTORY PROCEDURES ARE EXPRESSED QUANTITATIVELY BY RESULTS OBTAINED IN A LARGE-SCALE SIMULATION EXPERIMENT. THE PROCEDURES ARE STATED TO BE APPLICABLE TO A MILITARY COMMUNICATIONS SYSTEM SUITABLE FOR COMBAT UNITS OPERATING IN A HOSTILE ENVIRONMENT./

2.2 MEASUREMENT

BARBER, D. L. A., SOME OBSERVATIONS ON STORE-AND-FORWARD AND CIRCUIT-SWITCHED DATA NETWORKS, NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE, JAN 70, NPL-DCS COM-SCI-T.M.-36, 26P

HERE IS A VERY INTERESTING COMPARISON OF MESSAGE AND CIRCUIT SWITCHING CONCERNED PRIMARILY WITH TECHNICAL MEASURES OF PERFORMANCE. BASED ON A SET OF REASONABLE ASSUMPTIONS, THE REPORT SHOWS MESSAGE-SWITCHING PREFFRABLE FOR SHORT MESSAGES AND CIRCUIT-SWITCHING WHEN LONG MESSAGES ARE PREDOMINANT. UNFORTUNATELY, IT IS NOT UNTIL THE END OF THE REPORT THAT THE SEMANTIC DIFFICULTIES IN DIFFERENTIATING BETWEEN MESSAGE AND CIRCUIT SWITCHING ARE INTRODUCED.

COLE, GERALD D., COMPUTER NETWORK MEASUREMENTS: TECHNIQUES AND EXPERIMENTS, CALIFORNIA, UNIV. OF, LOS ANGELES, COMPUTER SYSTEMS MODELING AND ANALYSIS GROUP, OCT 71, CU-CSMAG ENG-716S, DAHC 15-69-C-02BS, (AD-739 344), 3SOP, B9 REFS

THIS THESIS PROVIDES A COMPREHENSIVE DESCRIPTION OF THE MEASUREMENT PROGRAM BEING CONDUCTED AT UCLA FOR THE ARPA NETWORK. THE INTERNAL NETWORK MECHANISMS FOR 'INSTRUMENTATION' ARE DESCRIBED, EMPIRICAL MEASUREMENT DATA ARE PRESENTED, AND THE RELATIONSHIP OF THE MEASUREMENT EFFORT TO MODEL BUILDING AND THE ANALYTIC APPROACH IS EXPLAINED. FOR AN OVERVIEW OF THE MATERIAL IN THIS REPORT SEE COLE'S ARTICLE 'PERFORMANCE MEASUREMENTS ON THE ARPA COMPUTER NETWORK' IN CATEGORY 2.2.

COLE, GERALD D., PERFORMANCE MEASUREMENTS ON THE ARPA COMPUTER NETWORK, (CALIFORNIA, UNIV. OF, LOS ANGELES, DEPT. OF COMPUTER SCIENCE),
JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 39-45, 3 REFS

THE ACTIVITIES OF THE ARPA NETWORK MEASUREMENT CENTER AT UCLA ARE DISCUSSED. THE AVAILABLE TOOLS ARE DESCRIBED WITH SAMPLE COMPUTER PRINTOUTS TO ILLUSTRATE THEIR APPLICATION. THE RESULTS OF SOME EXPERIMENTS WHICH ARE ALSO PRESENTED GIVE A GOOD FEEL FOR THE VALUE OF THE MEASUREMENT PROGRAM IN PROVIDING INSIGHT INTO NETWORK PERFORMANCE. THIS ARTICLE IS A GOOD OVERVIEW! FOR AN EXHAUSTIVE TREATMENT SEE COLE'S THESIS, 'COMPUTER NETWORK MEASUREMENTS: TECHNIQUES AND EXPERIMENTS' IN CATEGORY 2.2.

DATA TRAFFIC MEASUREMENTS GUIDE IMPROVEMENTS TO RESOURCE-SHARING NETWORK,
COMMUNICATIONS EQUIPMENT AND SYSTEMS DESIGN, JUN 72, P 2-4

THIS DESCRIPTION OF THE UCLA NETWORK MEASUREMENT CENTER IN THE ARPA NETWORK WAS APPARENTLY BASED ON AN INTERVIEW WITH GERALD COLE. THE ARTICLE CONSISTS OF A BRIEF DESCRIPTION OF THE CAPABILITIES OF THE CENTER, FOLLOWED BY A FAIRLY DETAILED EXAMPLE WHICH ILLUSTRATES THE SCOPE OF THE MEASUREMENT FACILITIES. FOR MORE DETAILED INFORMATION, REFER TO OTHER ARTICLES BY COLE HIMSELF, IN PARTICULAR, 'COMPUTER NETWORK MEASUREMENTS: TECHNIQUES AND EXPERIMENTS' IN CATEGORY 2.2.

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, JUL 69, 1 APR-30 JUN 69, BBN R-1837, BBN QTR-2, DAHC 15-69-0179, 1SP
(ANNOTATION UNDER 3.1.1)

KLEINROCK, LEONARD, COMPUTER NETWORK RESEARCH, CALIFORNIA, UNIV. OF, LOS ANGELES, DEPT. OF COMPUTER SCIENCE, 31 DEC 71, 1 JUL-31 DEC 71, ARPA DAHC-15-69-C-0285, (AD-739 70S), 11SP, 79 REFS

ACTIVITIES AT UCLA IN NETWORK MODELING AND MEASUREMENT ARE SUMMARIZED. THE RESULTS IN GRAPHICAL FORM FOR ARPA NETWORK LOADING EXPERIMENTS ARE GIVEN. THE CAPABILITIES OF PRESENT AND PLANNED MEASUREMENT TOOLS FOR THE ARPA NETWORK ARE DESCRIBED. THE APPENDIXES CONTAIN FIVE GOOD RELATED PAPERS INCLUDING 'PERFORMANCE MEASUREMENTS ON THE ARPA COMPUTER NETWORK'.

MCKENZIE, ALEXANDER A., BERNARD P. COSELL, JOHN M. MCQUILLAN, MARTIN J. THROPE, THE NETWORK CONTROL CENTER FOR THE ARPA NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, 1972, DAHC 15-69-C-0179, 2BP
(ANNOTATION UNDER S.1)

O'NEIL, D. R., ERROR CONTROL FOR DIGITAL DATA TRANSMISSION OVER TELEPHONE NETWORKS, MITRE CORP., BEDFORD, MA, MAY 65, MC TM-04113, AF 19(628)-2390, (AF-ESD TR-65-87, AD-616 678), 48P, 27 REFS
(ANNOTATION UNDER 3.2.1)

2.3 USER CONSIDERATIONS

DAVIS, RUTH M., MAN-MACHINE COMMUNICATION, (ADVANCED RESEARCH PROJECTS AGENCY, WASHINGTON, DC),
CAUDRA, CARLOS A., ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY, VOLUME 1, WILEY (JOHN) AND SONS, NEW YORK, 1966, ADI ANNUAL REVIEW SERIES, (LC 66-2S096), P 221-254, 99 REFS
(ANNOTATION UNDER 1.2)

MILLER, ROBERT B., RESPONSE TIME IN MAN-COMPUTER CONVERSATIONAL TRANSACTIONS, (INTERNATIONAL BUSINESS MACHINES CORP., POUGHKEEPSIE, NY),
AFIPS PROCEEDINGS. 1968 FALL JOINT COMPUTER CONFERENCE. VOLUME 33, PART 1, (SAN FRANCISCO, CA, DECEMBER 9-11, 1968), THOMPSON BOOK CO., WASHINGTON, DC, 1968, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 267-277, 5 REFS

INTERACTIVE MAN/COMPUTER SYSTEMS HAVE GENERALLY BEEN DESIGNED WITH ONLY INTUITIVELY DERIVED SPECIFICATIONS FOR RESPONSE CRITERIA. IN THIS PAPER, THE AUTHOR, A BEHAVIORAL SCIENTIST, ATTEMPTS TO LIST AND DEFINE THE DIFFERENT CLASSES OF OPERATOR ACTION AND PURPOSE AT INTERACTIVE TERMINALS. THE IMPLICATION IS THAT DIFFERENT ACTIONS AND PURPOSES HAVE DIFFERENT ACCEPTABLE RESPONSE TIMES. FOR EACH CATEGORY IDENTIFIED THE AUTHOR PRESENTS, WITH A RATHER THOROUGH DISCUSSION, ACCEPTABLE RESPONSE CRITERIA.
THE 16 CATEGORIES OF ACTIVITIES WHICH THE AUTHOR IDENTIFIES CAN ACTUALLY BE CHARACTERIZED BY MORE GENERAL CLASSES OF ACTIVITY. ONE SUCH CLASS IS THE INPUT OF DATA TO THE SYSTEM, AS BY KEYBOARD OR LIGHT-PEN. AN IMMEDIATE RESPONSE OF NO LONGER THAN 0.1 TO 0.2 SECONDS IS DEMANDED FOR THIS CLASS. A SECOND CLASS IS CHARACTERIZED BY A USER ENGAGED IN INTENSE INTERACTION REQUIRING THE READY ACCESS OF DATA FROM HIS OWN 'SHORTTERM MEMORY'. SUCH ACTIVITY REQUIRES NO LONGER THAN A TWO-SECOND RESPONSE IN ORDER THAT THE CHAIN OF THOUGHT NOT BE BROKEN. A FINAL CLASS INCLUDES THOSE ACTIVITIES WHICH COMPLETE A SUBJECTIVE (SUB)TASK OR (SUB)PURPOSE. MORE EXTENDED DELAYS (UP TO 15 SECONDS OR MORE) MAY BE PERMITTED FOLLOWING SUCH AN ACTIVITY COMPLETION, OR 'CLOSURE', THAN IN THE PROCESS OF OBTAINING A CLOSURE.
THIS PAPER IS RECOMMENDED TO ALL INVOLVED IN INTERACTIVE MAN/COMPUTER SYSTEM DESIGN.

2.9 OTHER

FREEMAN, DAVID N., ROBERT R. PEARSON, EFFICIENCY VS. RESPONSIVENESS IN A MULTIPLE-SERVICES COMPUTER FACILITY, (TRIANGLE UNIVERSITIES COMPUTATION CENTER, RESEARCH TRIANGLE PARK, NC, WEST GEORGIA COLLEGE, CAROLLTON), PROCEEDINGS OF 23RD NATIONAL CONFERENCE. ASSOCIATION FOR COMPUTING MACHINERY, (AUGUST 27-29, 1968), BRANDON-SYSTEMS PRESS INC., PRINCETON, NJ, 1968, ACM P-68, P 25-348, 9 REFS

JOB SCHEDULING ALGORITHMS IN A MULTIPROGRAMMING ENVIRONMENT--OS ON AN IBM 360/75--ARE DISCUSSED. THE TRIANGLE UNIVERSITIES COMPUTER CENTER (TUCC) NETWORK IS USED AS A CASE IN POINT TO DEVELOP THE ANALYSIS. THIS NETWORK IS NOT THE MAIN TOPIC, BUT SOME INSIGHT TO THE STRUCTURE OF THIS APPARENTLY SUCCESSFUL SERVICE CENTER CAN BE GAINED.

FREEMAN, DAVID N., DR., JOE R. RAGLAND, THE RESPONSE-EFFICIENCY TRADE-OFF IN A MULTIPLE-UNIVERSITY SYSTEM, (PENNSYLVANIA, UNIV. OF, PHILADELPHIA, TRIANGLE UNIVERSITIES COMPUTATION CENTER),
DATAMATION, VOL 16, ISSUE 3, MAR 70, P 112-113, 116

THE PRINCIPAL FEATURES OF THE CENTRAL SERVICE FACILITY FOR THE TRIANGLE UNIVERSITIES COMPUTATION CENTER (TUCC) REGIONAL COMPUTER NETWORK ARE SUMMARIZED. A WIDE MIX OF JOBS IS HANDLED EFFICIENTLY BY PLACING HEAVY EMPHASIS ON FAST-BATCH AND BY UTILIZING LARGE CORE STORAGE TO PROVIDE COST-EFFECTIVE OPERATION. OVER 90% OF THE SYSTEM LOAD IS FROM REMOTE TERMINALS.

LEFKOVITS, H. C., CHARACTERISTICS OF DATABASE SYSTEMS IN A COMPUTER NETWORK ENVIRONMENT, (GENERAL ELECTRIC CO., BRIDGEPORT, CT, ADVANCED SYSTEMS AND TECHNOLOGY OPERATION), INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P 3-1-1--3-1-8

THIS SHORT ARTICLE ILLUSTRATES THE DIFFERENCES BETWEEN A TREE-STRUCTURED DATA BASE AND MORE GENERAL GRAPH-STRUCTURED DATA BASES. DESPITE ADDITIONAL DIFFICULTIES, GRAPH-STRUCTURED DATA BASES ARE FELT TO BE NECESSARY IN A NETWORK ENVIRONMENT.
(ALSO UNDER 4.1)

RAYMOND, RICHARD C., A MODEL WHICH AIDS IN THE DESIGN OF CENTRAL STATIONS FOR LARGE COMPUTER NETWORKS, (GENERAL ELECTRIC CO., NEW YORK, RESEARCH AND DEVELOPMENT CENTER), INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P 3-5-1--3-5-8, 3 REFS

A CONVERSATIONAL MODEL TO AID IN THE DESIGN OF THE COMPUTER SYSTEMS WHICH SERVE LARGE, MULTI-USER COMPUTER NETWORKS IS DESCRIBED. SAMPLE RESULTS INCLUDE A NUMBER OF OPTIONAL SYSTEMS BALANCED IN RELATION TO PROCESSOR, MEMORY, I/O CONTROL, FILE STORAGE, PAGING, AND OTHER PARAMETERS FOR VARIOUS TYPES OF JOB REQUIREMENTS. RESULTS ARE OBTAINED BY SETTING PARAMETERS DESCRIBING A JOB MIX ENVIRONMENT IN SOME DETAIL TO A SIMULATOR IMPLEMENTED IN FORTRAN ON THE GE MARK II TIME-SHARING SYSTEM. OUTPUT IS VERY DETAILED AND INCLUDES COST INFORMATION FOR THE SYSTEMS DESCRIBED.

WHITNEY, V. KEVIN MOORE, A STUDY OF OPTIMAL FILE ASSIGNMENT AND COMMUNICATION NETWORK CONFIGURATION IN REMOTE-ACCESS COMPUTER MESSAGE PROCESSING AND COMMUNICATION SYSTEMS, MICHIGAN, UNIV. OF, ANN ARBOR, DEPT. OF ELECTRICAL ENGINEERING, SEP 70, MI-DEE SEL-48, AF F30602-69-C-0214, 408P, 187 REFS

A RESEARCH PROJECT IS DESCRIBED FOR FILE DISTRIBUTION IN NETWORKS HAVING THE FOLLOWING CHARACTERISTICS: LARGE DATA BASES ORGANIZED INTO RECORD FILES, WIDELY DISTRIBUTED USERS, AN ON-LINE COMMUNICATION NETWORK JOINING USERS TO DATA BASE SITES, AND SPECIFIED PERFORMANCE CONSTRAINTS (E.G., RESERVATION SYSTEMS, TIME-SHARING SYSTEMS). THE PROBLEMS ADDRESSED INCLUDE: (1) OPTIMAL NUMBERS AND LOCATION OF SITES FOR SYSTEM FILES; (2) OPTIMAL DESIGN OF COMMUNICATIONS CHANNELS AND NETWORKS OF THESE CHANNELS; (3) OPTIMAL DESIGN OF COMMUNICATIONS NETWORK TOPOLOGIES. THE SOLUTION PROCEDURES ARE INTEGRATED INTO A TOTAL DESIGN PROCEDURE AND AN EXAMPLE OF ITS APPLICATION TO A LARGE SYSTEM IS GIVEN.
(ALSO UNDER 4.1)

3. ARCHITECTURE

3.D GENERAL

BALZER, R., W. DUVAL, R. BRESSLER, INTERENTITY COMMUNICATION, RAND CORP., SANTA MONICA, CA, 13 OCT 71, 5P

A DISCUSSION OF INTER-PROCESS, INTER-USER COMMUNICATION IN A NETWORK ENVIRONMENT IS CONTAINED IN THIS REPORT. IT PRESENTS SOME INTRIGUING IDEAS, BOTH IN GENERAL AND FOR A PROPOSED EXPERIMENT IN WHICH TWO GEOGRAPHICALLY SEPARATED USERS CAN COMMUNICATE WITH THE SAME PROGRAM IN EXECUTION AND POSSIBLY WITH A RECORD OF PRIOR INTERACTION WITH THE PROGRAM.

BARAN, PAUL, ON DISTRIBUTED COMMUNICATIONS: I. INTRODUCTION TO DISTRIBUTED COMMUNICATIONS NETWORKS, RAND CORP., SANTA MONICA, CA, AUG 64, RC RM-342D-PR, AF 49(638)-700, (AD-444 830), 37P, 3 REFS
(ANNOTATION UNDER 1.0)

BARAN, PAUL, ON DISTRIBUTED COMMUNICATIONS: XI. SUMMARY OVERVIEW, RAND CORP., SANTA MONICA, CA, AUG 64, RC RM-3767-PR, AF 49(638)-700, (AD-444 837), 23P

THIS VOLUME OF 'ON DISTRIBUTED COMMUNICATIONS' SUMMARIZES WORK PERFORMED ON THIS PROJECT AS OF AUGUST 1964. IT IS CLAIMED THAT A HIGHLY RELIABLE ERROR-FREE DIGITAL COMMUNICATIONS SYSTEM USING NOISY LINKS AND UNRELIABLE COMPONENTS CAN BE BUILT USING THEN STATE-OF-THE-ART ELECTRONIC COMPONENTS. BARAN CLAIMS TO HAVE BEGUN TO UNDERSTAND SOME OF THE PHENOMENA ASSOCIATED WITH TIME DELAYS, ROUTING ALGORITHMS, AND THE LIKE, FOR SUCH NETWORKS. ALTHOUGH SOME OF THE MATERIAL IN THIS REPORT IS VALID ONLY FOR BARAN'S ORIGINAL INTENT FOR A SPECIFIC TYPE OF SYSTEM FOR A MILITARY ENVIRONMENT, SOME OF THE CONCLUSIONS AND HIS GENERAL APPROACH IN SUMMARIZING THE ADVANTAGES AND DISADVANTAGES OF THIS TYPE OF NETWORK ARE USEFUL IN EVALUATING ALTERNATIVE APPROACHES TO RESOURCE-SHARING COMPUTER NETWORKS OF THE 1970'S.
(ALSO UNDER 2.0, 1.0)

BARTLETT, K. A., TRANSMISSION CONTROL IN A LOCAL DATA NETWORK, (NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND)),
INFORMATION PROCESSING 68; PROCEEDINGS OF IFIP CONGRESS 1968, VOLUME 2--HARDWARE, APPLICATIONS, (EDINBURGH, (SCOTLAND), AUGUST 5-10, 1968), NORTH-HOLLAND PUBLISHING CO., AMSTERDAM, (NETHERLANDS), 1969, IFIP CONGRESS PROCEEDINGS, (LC 65-24118), P 7D4-708, 3 REFS

A NETWORK IS DESCRIBED CONNECTING A VARIETY OF COMPUTERS, PERIPHERALS, AND TERMINALS TO A CENTRAL ROUTING COMPUTER. THIS CENTRAL ROUTING COMPUTER IS A MESSAGE-SWITCHING COMPUTER ACTING AS A NODE IN A NATIONAL DISTRIBUTED COMPUTER NETWORK. OTHER THAN NOTING ITS EXISTENCE, THE CONCERN IS NOT WITH THE NATIONAL NET, BUT ONLY WITH LOCAL NETS THAT CONNECT TO IT. THE MESSAGE-SWITCHING COMPUTER IS DESIGNED TO HANDLE HIGH SPEED SUBSCRIBERS. LOWER SPEED DEVICES ARE FIELDED THROUGH A HIERARCHY OF MULTIPLEXORS, EACH PERFORMING TRANSMISSION CONTROL AND ERROR CORRECTION, LARGELY THROUGH HARDWARE. THE HARDWARE DEVICES DESCRIBED APPEAR SUITABLE FOR HALF DUPLEX TRANSMISSION.

BELYAKOV-BODIN, V. I., YU. I. TORGOV, ON THE STRUCTURE OF A HETEROGENEOUS COMPUTING SYSTEM, CONTROLLED BY A LARGE DIGITAL COMPUTER, AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OH, FOREIGN TECHNOLOGY DIV., ACADEMY OF SCIENCES OF THE USSR, COMPUTER CENTER, 1 OCT 69, AFSC-FTD HT-23-1450-68, AF F33657-68-D-1287, (AD-699 640), 8P, 4 REFS
REPRINT FROM WORKS ON TECHNICAL CYBERNETICS (1967) 6D-66/

SOME INTERESTING CONCEPTS IN HIERARCHICAL COMPUTING ARE PRESENTED RELATIVE TO A CONFIGURATION WITH A NUMBER OF MEDIUM SCALE COMPUTERS INTEGRATED INTO A SYSTEM CONTROLLED BY A LARGER COMPUTER.

BENNETT, J. M., C. S. WALLACE, J. W. WININGS, A GRAFTED MULTI-ACCESS NETWORK, (SYDNEY, UNIV. OF, (AUSTRALIA), DEPT. OF BASSER COMPUTING),
INFORMATION PROCESSING 68; PROCEEDINGS OF IFIP CONGRESS 1968, VOLUME 2--HARDWARE, APPLICATIONS, (EDINBURGH, (SCOTLAND), AUGUST 5-10, 1968), NORTH-HOLLAND PUBLISHING CO., AMSTERDAM, (NETHERLANDS), 1969, IFIP CONGRESS PROCEEDINGS, (LC 65-24118), P 917-922, 2 REFS

A NETWORK IS DESCRIBED WHERE A SMALL COMPUTER IS GRAFTED ONTO A LARGE ONE (I.E. LITTLE INTERFERENCE IS INTRODUCED INTO THE NORMAL OPERATING SYSTEM OF THE LARGE MACHINE) TO PROVIDE NECESSARY FUNCTIONS NOT ORIGINALLY INCLUDED IN THE LARGE SYSTEM INCLUDING ON-LINE FILE STORAGE, INTERACTIVE CONSOLE COMMUNICATION, JOB SCHEDULING, FILE EDITING, AND COMMAND LANGUAGE INTERPRETATION.

BIRNBAUM, J., A TIME SHARED SYSTEM FOR MULTIPLE INDEPENDENT LABORATORIES, (INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER),
IEEE TRANSACTIONS ON NUCLEAR SCIENCE, VOL NS-18, ISSUE 1, FEB 71, P 287-291, 6 REFS

A COMPUTER BASED DATA ACQUISITION NETWORK IS DESCRIBED FOR THE TRANSMISSION OF INFORMATION BETWEEN REMOTE INDEPENDENT LABORATORIES AND A TIME-SHARED IBM 360. SATELLITE COMPUTERS, WHICH WOULD NORMALLY BE USED FOR PERFORMING THE REAL-TIME TASKS, ARE REPLACED BY LESS EXPENSIVE CONTROLLERS WITH A MORE LIMITED INSTRUCTION SET, BUT WITH ENHANCED FACILITIES FOR INFORMATION TRANSFER.

CASTLE, JAMES C., SYSTEM CONTROL IN MULTIPLE ACCESS COMPUTER NETWORKS, (GENERAL ELECTRIC CO., BETHESDA, MD, DEPT. OF INFORMATION NETWORKS),
INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P 5-3-1--5-3-11, 30 REFS
(ANNOTATION UNDER 1.0)

DAVIS, RUTH M., THE NATIONAL BIOMEDICAL COMMUNICATIONS NETWORK AS A DEVELOPING STRUCTURE, (NATIONAL BUREAU OF STANDARDS, WASHINGTON, DC, CENTER FOR COMPUTER SCIENCES AND TECHNOLOGY),
BECKER, JOSEPH, PROCEEDINGS OF THE CONFERENCE ON INTERLIBRARY COMMUNICATIONS AND INFORMATION NETWORKS, (WARRENTON, VA, SEPTEMBER 28-OCTOBER 2, 1970), AMERICAN LIBRARY ASSOCIATION, CHICAGO, IL, 1971, OEC D-9-2302BB-4235(095), (LC 70-18596), P 294-309, 4 REFS

ALTHOUGH THE PRIMARY TOPIC OF THIS PAPER IS THE PLANNING FOR A BIOMEDICAL COMMUNICATIONS NETWORK, CONSIDERABLE MATERIAL OF MUCH MORE GENERAL INTEREST IS PRESENTED. A GENERAL DESCRIPTION OF NETWORK STRUCTURES AND PERFORMANCE OBJECTIVES INCLUDES COVERAGE OF CENTRALIZED, COMPOSITE-CENTRALIZED, AND HIERARCHICAL NETWORKS.
(ALSO UNDER 4.2)

ELMENDORF, C. H., P. E. MUENCH, K. W. SUSSMAN, DATA COMMUNICATIONS NETWORK ARCHITECTURE, (AMERICAN TELEPHONE AND TELEGRAPH CO., NEW YORK),
INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P 3-4-1--3-4-6, 3 REFS

THE OPTIMAL BALANCE IN TTHE SELECTION OF COMMUNICATIONS COMPONENTS OF A NETWORK IS DISCUSSED. VARIOUS BELL SYSTEM OFFERINGS ARE DESCRIBED AND THEIR POTENTIAL APPLICATION IN COMPUTER NETWORKS ARE DISCUSSED.
(ALSO UNDER 1.3)

FARBER, DAVID J., DATA RING ORIENTED COMPUTER NETWORKS, (CALIFORNIA, UNIV. OF, IRVINE),
RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3, COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 79-93

THIS IS A VERY INTERESTING AND TECHNICALLY ORIENTED PAPER ON THE DISTRIBUTED COMPUTING SYSTEM (DCS) AT THE UNIVERSITY OF CALIFORNIA, IRVINE. SOME GOOD INSIGHT INTO RING CONFIGURED SYSTEMS IS GIVEN.

FRANK, HOWARD, LEONARD KLEINROCK, ROBERT E. KAHN, COMPUTER COMMUNICATION NETWORK DESIGN--EXPERIENCE WITH THEORY AND PRACTICE, (NETWORK ANALYSIS CORP., GLEN COVE, NY, CALIFORNIA, UNIV. OF, LOS ANGELES, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA),
AFIPS CONFERENCE, 1972 SPRING JOINT COMPUTER CONFERENCE, VOLUME 40, (ATLANTIC CITY, NJ, MAY 16-18, 1972), AFIPS PRESS, MONTVALE, NJ, 1972, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 255-270, 52 REFS

THIS IS AN EXCELLENT REVIEW OF THE STATE-OF-THE-ART OF THE DESIGN OF MESSAGE SWITCHED NETWORKS. WITH AN EMPHASIS ON THE INITIAL AND CONTINUING DESIGN OF THE ARPANET, THE CAPABILITIES AND LIMITATIONS OF PRESENT DESIGN TECHNIQUES ARE CLEARLY SUMMARIZED. LITTLE ATTENTION IS GIVEN TO IMPLEMENTATION DETAILS OR TO COMPARISON WITH CIRCUIT-SWITCHED NETWORKS, BUT THE CONCEPTUAL PROBLEMS IN DESIGNING AND IMPLEMENTING ARPA-TYPE NETWORKS ARE IDENTIFIED AND DISCUSSED FORTHRIGHTLY AND IN AN ACADEMICALLY SATISFYING MANNER.
(ALSO UNDER 2.0)

HOWE, W. GERRY, TOM R. KIBLER, CONTROL CONCEPTS OF A LOGICAL NETWORK MACHINE, INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER, 22 APR 71, IBM-TJWRC RC-3331, 13P

3.0 GENERAL

THE CONTROL CONCEPTS AND THE COMMAND LANGUAGE CONSIDERATIONS THAT FORM THE BASIS FOR THE NETWORK OPERATING SYSTEM ARCHITECTURE FOR THE IBM NETWORK/440 ARE DESCRIBED.

MARILL, THOMAS, LAWRENCE G. ROBERTS, TOWARD A COOPERATIVE NETWORK OF TIME-SHARED COMPUTERS, (COMPUTER CORP. OF AMERICA, CAMBRIDGE, MA, MASSACHUSETTS INST. OF TECH., LEXINGTON, LINCOLN LAB.), AFIPS PROCEEDINGS. 1966 FALL JOINT COMPUTER CONFERENCE. VOLUME 29, (SAN FRANCISCO, CA, NOVEMBER 7-10, 1966), SPARTAN BOOKS INC., WASHINGTON, DC, 1966, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 425-431, 3 REFS

THE CONTENT OF THIS PAPER IS ALMOST IDENTICAL TO MARILL'S ARTICLE, 'A COOPERATIVE NETWORK OF TIME-SHARING COMPUTERS' IN CATEGORY 3.0. AN APPENDIX IS ADDED WHICH DESCRIBES THE MESSAGE PROTOCOL EMPLOYED IN THE NETWORK.

MARILL, THOMAS, A COOPERATIVE NETWORK OF TIME-SHARING COMPUTERS: PRELIMINARY STUDY, COMPUTER CORP. OF AMERICA, CAMBRIDGE, MA, 1 JUN 66, CCA TR-11, 52P, 6 REFS

FACILITIES FOR THE INTERCONNECTION OF TIME-SHARING SYSTEMS ARE DISCUSSED. THE FACILITIES ARE OFF-THE-SHELF, VINTAGE 1966. A 'DICTIONARY' OF MODEMS, COMMON CARRIERS, AND COMMUNICATIONS TECHNIQUES IS PROVIDED. THE RECOMMENDED CONFIGURATION CALLS FOR THE CONNECTION OF COMPUTERS VIA 1200 BAUD DIALUP LINES. DISTANT SYSTEMS WOULD LOOK LIKE TERMINALS TO A HOST SYSTEM AND NO MONITOR CHANGES WOULD BE REQUIRED.
(ALSO UNDER 3.2.0)

MCKAY, DOUGLAS B., DONALD P. KARP, JAMES W. MEYER, ROBERT S. NACHBAR, EXPLORATORY RESEARCH ON NETTING IN IBM, INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER, 14 JUN 71, IBM-TJWRC RC-3486, 43P

TWO TYPES OF NETWORKS ARE DESCRIBED. THE FIRST IS A DISTRIBUTED NETWORK OF HOMOGENEOUS COMPUTERS--IBM 360/67'S. A TERMINAL FROM ONE HOST IS ABLE TO INTERACT WITH ANOTHER HOST THROUGH A SWITCHED CONNECTION ESTABLISHED ON DEMAND BETWEEN THE HOSTS. THE SECOND NETWORK IS NETWORK/440, WHICH IS CLASSIFIED BY THE AUTHOR AS ONE OF NON-HOMOGENEOUS HARDWARE AND OPERATING SYSTEMS, THE OBJECT BEING TO VIEW THE NETWORK AS ONE MULTIPROCESSOR. THE NETWORK IS CENTRAL SWITCHED, CONNECTING FOUR DIFFERENT MODEL 360'S AT THE IBM RESEARCH CENTER, EACH OPERATING UNDER OS/360 AND ACCESSING EACH OTHER THROUGH THE BASIC TELECOMMUNICATIONS ACCESS METHOD. A NETWORK CONTROL LANGUAGE CALLED 'ACL' IS DEFINED AND APPEARS CONVENIENT TO USE. EACH PROCESSOR MUST BE ABLE TO COMPILE AND INTERPRET ACL. THE NETWORK IS DESIGNED FOR CONVENIENT REMOTE PROGRAMMING AND FOR LARGE OR SMALL FILE TRANSMISSION. PROGRAM EXECUTION CAN OCCUR EITHER LOCALLY OR REMOTELY WITH APPARENT EASE. THE STORE AND FORWARD TECHNIQUES USED BY THE NETWORK CONTROL ARE TOLERANT OF HOST CRASHES AND CAN SAVE TRANSMISSIONS ON DISK UNTIL A HOST HAS RECOVERED. INTERACTIVE USERS, IF THEY DESIRE, CAN OBTAIN A DIRECT LOGICAL CONNECTION TO A REMOTE HOST. A DRAWBACK TO THE NETWORK IS THAT ALL COMMUNICATIONS PROCESSING AND ERROR RECOVERY INVOLVES THE HOST COMPUTERS. FRONT END PROCESSORS ARE UNDER CONSIDERATION TO IMPROVE EFFICIENCY.

PHISTER, MONTGOMERY, JR., SYSTEM DESIGN OF ON-LINE SERVICE SYSTEMS, (SCIENTIFIC DATA SYSTEMS, SANTA MONICA, CA), GRUENBERGER, F., COMPUTERS AND COMMUNICATIONS--TOWARD A COMPUTER UTILITY, PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1968, (TK 5101.C67, LC 68-16776), P 135-149
(ANNOTATION UNDER 4.3)

SCANTLEBURY, R. A., P. T. WILKINSON, THE DESIGN OF A SWITCHING SYSTEM TO ALLOW REMOTE ACCESS TO COMPUTER SERVICES BY OTHER COMPUTERS AND TERMINAL DEVICES, (NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND)), JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS; 1971, IEEE CAT-71C59-C, P 160-167, 8 REFS

A PROPOSAL FOR A NATIONAL DATA NETWORK FOR THE UNITED KINGDOM IS DESCRIBED. THE PROPOSED NETWORK IS ORGANIZED HIERARCHICALLY AND IS INTENDED TO MEET THE REQUIREMENTS OF GENERALIZED COMPUTER TO COMPUTER COMMUNICATIONS. CONCEPTUALLY, THE PROPOSED NETWORK HAS MANY SIMILARITIES TO THE EXISTING ARPANET.

SMITH, B. T., MIXED COMPUTER NETWORKS: BENEFITS, PROBLEMS AND GUIDELINES, (CIVIL SERVICE DEPT., LONDON, (ENGLAND)), WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 201-209, 4 REFS

THE ADVANTAGES OF HAVING HETEROGENEOUS COMPUTER NETWORKS RATHER THAN NETWORKS OF IDENTICAL COMPUTERS ARE DISCUSSED. SOME NINE SEPARATE BENEFITS ARE IDENTIFIED, FOLLOWED BY EIGHT PROBLEM AREAS. NO SUBSTANTIVE SOLUTIONS TO THESE PROBLEMS ARE PRESENTED OTHER THAN A BRIEF EXPOSITION OF THE LAYERED APPROACH TO INTERFACES AND PROTOCOLS ALREADY IN USE IN A NUMBER OF NETWORKS. A 'FEASIBILITY' CHART FOR VARIOUS FUNCTIONS ON VARIOUS TYPES OF NETWORKS (HETEROGENEOUS OR HOMOGENEOUS) IS PRESENTED.

STEADMAN, HOWARD L., GEORGE R. SUGAR, SOME WAYS OF PROVIDING COMMUNICATION FACILITIES FOR TIME-SHARED COMPUTING, (ESSA RESEARCH LABS., BOULDER, CO), AFIPS PROCEEDINGS. 1968 SPRING JOINT COMPUTER CONFERENCE. VOLUME 32, (ATLANTIC CITY, NJ, APRIL 30-MAY 2, 1968), THOMPSON BOOK CO., WASHINGTON, DC, 1968, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 23-29

ALTERNATIVE APPROACHES TO MEETING THE COMMUNICATIONS REQUIREMENTS FOR THE TIME-SHARED COMPUTING NETWORK OF THE ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION ARE SUMMARIZED, WITH ATTENTION GIVEN TO TERMINALS, COMMUNICATIONS LINES, SWITCHING FACILITIES, AND DATA SETS.

3.1.0 GENERAL DESCRIPTION

A TRANS-CANADA COMPUTER COMMUNICATIONS NETWORK. PHASE I OF A MAJOR PROGRAM ON COMPUTERS, SCIENCE COUNCIL OF CANADA, AUG 71, SCC R-13, SCC SS22-1971-13, 41P

THIS IS AN INTERESTING PROPOSAL DOCUMENTING THE NEED FOR THE TRANS-CANADA COMPUTER COMMUNICATION NETWORK (TCCN). ECONOMIC FORCES AND TECHNICAL PROSPECTS ARE OUTLINED AND SOME SOCIAL ISSUES ARE ADDRESSED. A SECTION ON POLICY OPTIONS FOR OWNERSHIP AND ORGANIZATION OF THE ENTIRE NETWORK OPERATION IS INCLUDED. THE PROJECT APPEARS TO BE MOTIVATED IN PART FROM A CONCERN THAT WITHOUT A NATIONAL POLICY TO CONTROL AND DIRECT NETWORKING, COMPUTER AND INFORMATION SERVICES IN CANADA WILL EVENTUALLY BE AVAILABLE ONLY VIA SPUR LINES TO U.S. COMPUTER COMMUNICATIONS NETWORKS.
(ALSO UNDER 1.6, 5.0)

ABRAMSON, NORMAN, THE ALOHA SYSTEM--ANOTHER ALTERNATIVE FOR COMPUTER COMMUNICATIONS, (HAWAII, UNIV. OF, HONOLULU), AFIPS PROCEEDINGS. 1970 FALL JOINT COMPUTER CONFERENCE. VOLUME 37, (HOUSTON, TX, NOVEMBER 17-19, 1970), AFIPS PRESS, MONTVALE, NJ, 1970, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 281-285, 13 REFS

ABRAMSON DESCRIBES A MULTIPLE ACCESS METHOD FOR SHARING A RADIO CHANNEL AMONG A NUMBER OF USERS. HIS TECHNIQUE DEPENDS ON THE BURST TYPE COMMUNICATION CHARACTERISTIC OF MAN-COMPUTER INTERACTION. A TYPE OF RANDOM ACCESS CHANNEL WITH ACKNOWLEDGEMENTS IS DESCRIBED, FOLLOWED BY APPROPRIATE ANALYSIS, AND THE CONCEPTS MAY BE ESPECIALLY APPLICABLE FOR SATELLITE COMMUNICATION.
(ALSO UNDER 3.2.1)

AN EXPERIMENTAL COMPUTER NETWORK, COMPUTER CORP. OF AMERICA, CAMBRIDGE, MA, 30 MAR 69, 1 JAN 67-31 MAR 69, AF 19(628)-5167, (MIT ESD-TR-69-74, AD-694 055), 50P, 12 REFS

AN EXPERIMENT IN COMPUTER NETWORKING IS DESCRIBED IN WHICH THE TX-2 COMPUTER AT LINCOLN LABS WAS CONNECTED AS A USER TO THE Q-32 COMPUTER AT THE SYSTEM DEVELOPMENT CORPORATION UTILIZING A SPECIALLY DEVELOPED TRANSMISSION PROTOCOL. BESIDES DESCRIBING RELATIVELY STRAIGHTFORWARD EXPERIMENTS CONDUCTED WITH THIS LINK, THE REPORT MENTIONS OTHERS PLANNED IN WHICH THE Q-32 WOULD USE THE TX-2 AND IN WHICH A DEC 338 DISPLAY SYSTEM AT THE ARPA OFFICE IN WASHINGTON WOULD ALSO BE INVOLVED. THERE IS ALSO A BRIEF DISCUSSION OF THE PROBLEMS INVOLVED IN COMPUTER-TO-COMPUTER NETWORKING. SPECIFICALLY MENTIONED IS THE INCREASED NEED FOR DOCUMENTATION WHEN USERS OF REMOTE ACCESS SYSTEMS ARE VERY REMOTE FROM THAT SYSTEM. AN ARGUMENT IS MADE THAT THE ASCII CODE AND ASSOCIATED PROTOCOL ARE INEFFICIENT AND INAPPROPRIATE FOR COMPUTER-TO-COMPUTER COMMUNICATIONS.

BARBER, D. L. A., D. W. DAVIES, THE NPL DATA NETWORK, NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE, OCT 70, NPL-DCS COM-SCI-T.M.-47, 14P, 12 REFS

A GENERAL PURPOSE LABORATORY DATA NETWORK IS DESCRIBED THAT IS DESIGNED AS A PROTOTYPE OF A PROPOSED LOWER LEVEL PORTION OF A BRITISH DATA NETWORK. IT IS PACKET-SWITCHED, CENTRALIZED, AND INCORPORATES A SPECIALIZED HARDWARE INTERFACE TO TERMINALS.

3.I.0 GENERAL DESCRIPTION

BARBER, O. L. A., THE EUROPEAN COMPUTER NETWORK PROJECT, (NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-BC, NSF GJ-33239, P I92-200, I6 REFS

IN NOVEMBER 197I THE MINISTERS OF EIGHT EUROPEAN COUNTRIES SIGNED AN AGREEMENT TO START A PROJECT AIMED AT BUILDING A EUROPEAN COMPUTER NETWORK. THE NETWORK, WHICH WILL USE STORE-AND-FORWARD PACKET-SWITCHING TECHNIQUES, WILL INITIALLY JOIN FIVE DATA PROCESSING RESEARCH CENTERS IN FOUR COUNTRIES, BUT LATER IS EXPECTED TO BE EXTENDED TO INCLUDE CENTERS IN OTHER NATIONS. THIS PAPER OUTLINES THE REASONS THAT LED TO THE DECISION TO GO AHEAD WITH A EUROPEAN COMPUTER NETWORK, AND DISCUSSES THE FORM IT WILL TAKE, THE FUNCTIONS IT WILL PERFORM, AND THE WAY THE PROJECT WILL BE CONDUCTED.
(ALSO UNDER I.I)

BELL, C. G., A. N. HABERMANN, J. MCCREDIE, RONALD M. RUTLEDGE, W. WULF, COMPUTER NETWORKS, (CARNEGIE-MELLON UNIV., PITTSBURGH, PA, DEPT. OF COMPUTER SCIENCE),
COMPUTER, VOL 3, ISSUE 5, SEP-OCT 70, P I3-23

COMPUTER NETWORK RESEARCH IS RATIONALIZED IN TERMS OF THE POTENTIAL LONG-TERM CAPABILITIES THAT WILL RESULT. LONG TERM ADVANTAGES OF NETWORKS ARE DISCUSSED ALONG WITH THOSE HAVING MORE IMMEDIATE COST AND PERFORMANCE PAYOFF. CONCEPTS ARE WELL SUPPORTED ANALYTICALLY.
(ALSO UNDER 1.1)

BLACK, G., D. R. JUDD, COMPUTER NETWORKS, (NATIONAL COMPUTING CENTRE, MANCHESTER, (ENGLAND)),
SCIENCE JOURNAL, VOL 3, ISSUE 9, SEP 67, P 35-40

IN THIS PAPER A BRITISH NATIONAL COMPUTER NETWORK IS PROPOSED AND SUPERFICIALLY DESCRIBED. IT IS BASED ON THE INTERCONNECTION OF AREA COMPUTER SYSTEMS THAT EACH MAY HAVE DIFFERENT FUNCTIONS. TWO POINTS BROUGHT OUT ARE THE POTENTIAL USE OF SUCH A NETWORK TO PROVIDE BEFORE-THE-FACT CONVERSION TO A NEW MACHINE AT ONE SITE THROUGH THE USE OF A REMOTE COMPUTER AND THE CONTINUAL ESTIMATION AND PROPAGATION OF 'SURPLUS CAPACITY' REPORTS BY PARTICIPATING COMPUTER SYSTEMS.

CANADA MEETS COMPUTER COMMUNICATION NEEDS, (TELECOMMUNICATIONS, DEDHAM, MA),
TELECOMMUNICATIONS, VOL 6, ISSUE 9, SEP 72, P S2, S4
(ANNOTATION UNDER 1.2)

CLARK, DAVID D., ROBERT M. GRAHAM, JEROME H. SALTZER, MICHAEL D. SCHROEDER, THE CLASSROOM INFORMATION AND COMPUTING SERVICE, MASSACHUSETTS INST. OF TECH., CAMBRIDGE, PROJECT MAC, 11 JAN 71, MIT-MAC TR-80, NONR 4102(01), 278P
(ANNOTATION UNDER 4.3)

DAVIES, D. W., THE PRINCIPLES OF A DATA COMMUNICATION NETWORK FOR COMPUTERS AND REMOTE PERIPHERALS, (NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND)),
INFORMATION PROCESSING 68; PROCEEDINGS OF IFIP CONGRESS 1968, VOLUME 2--HARDWARE, APPLICATIONS, (EDINBURGH, (SCOTLAND), AUGUST 5-10, 1968), NORTH-HOLLAND PUBLISHING CO., AMSTERDAM, (NETHERLANDS), 1969, IFIP CONGRESS PROCEEDINGS, (LC 65-24118), P 709-714, 4 REFS

THIS PROPOSAL FOR A NATIONAL PHYSICS LABORATORY COMPUTER NETWORK IN THE UNITED KINGDOM PRESENTS A DESIGN SIMILAR IN MANY RESPECTS TO THE ARPA NETWORK.

DELL, F. R. E., FEATURES OF A PROPOSED SYNCHRONOUS DATA NETWORK, (UNITED KINGDOM POST OFFICE, LONDON, DEPT. OF TELECOMMUNICATIONS DEVELOPMENT),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 50-57

THIS PROPOSAL DESCRIBES A DATA COMMUNICATIONS NETWORK CAPABLE OF EITHER CIRCUIT-SWITCHING OR PACKET-SWITCHING. DATA RATES AND FORMATS ARE DESCRIBED, THE USE OF PULSE CODE MODULATION IN THE LOCAL AND MAIN NETWORKS IS CONSIDERED, THE PACKET FORMAT IS SPECIFIED, AND ECONOMIC CONSIDERATIONS ARE LISTED.
(ALSO UNDER 3.2.2)

DENES, JOHN E., BROOKNET--AN EXTENDED CORE STORAGE ORIENTED NETWORK OF COMPUTERS AT BROOKHAVEN NATIONAL LABORATORY, (BROOKHAVEN NATIONAL LAB., UPTON, NY, DEPT. OF APPLIED MATHEMATICS),
INFORMATION PROCESSING 68; PROCEEDINGS OF IFIP CONGRESS 1968, VOLUME 2--HARDWARE, APPLICATIONS, (EDINBURGH, (SCOTLAND), AUGUST 5-10, 1968), NORTH-HOLLAND PUBLISHING CO., AMSTERDAM, (NETHERLANDS), 1969, IFIP CONGRESS PROCEEDINGS, (LC 65-24118), P 928-932, 4 REFS

BROOKNET IS A CENTRALIZED NETWORK IN WHICH A CDC6600 IS USED TO COMMUNICATE WITH AND SUPPORT A NUMBER OF MINI COMPUTERS IN A LABORATORY ENVIRONMENT. AT THE TIME OF THIS PAPER, BROOKNET HAD ONLY TWO PDP-8'S CONNECTED TO THE 6600. ONE OF THESE WAS BEING USED TO SUPPORT HARDWARE AND SOFTWARE CHECKOUT FOR THE NETWORK'S SUPPORT MECHANISM IN THE 6600. TWO SIGMA 7'S THAT SUPERVISE AND COLLECT DATA FROM ON-LINE EXPERIMENTS AND DRIVE CRT DISPLAYS WERE BEING PREPARED FOR CONNECTION TO THE 6600.

ELLIS, T. D., E. F. HARSLEM, JOHN F. HEAFNER, K. U. UNCAPHER, ARPA NETWORK SERIES: I. INTRODUCTION TO THE ARPA NETWORK AT RAND AND TO THE RAND VIDEO GRAPHICS SYSTEM, RAND CORP., SANTA MONICA, CA, SEP 71, RC R-664-ARPA, ARPA DAHC-15-67-C-0141, (AD-733 049), 48P, 32 REFS

THE FIRST SECTION OF THIS REPORT PROVIDES A GENERAL OVERVIEW OF THE ARPANET. A SECOND SECTION DESCRIBES THE RAND VIDEO GRAPHICS SYSTEM AND ITS INTERFACE TO THE ARPANET THROUGH AN IBM I800 CONNECTED TO AN IMP (INTERFACE MESSAGE PROCESSOR).
(ALSO UNDER 3.3.2)

FISHER, C. R., R. L. SLIGH, THE DATRAN NETWORK, (DATA TRANSMISSION CO., VIENNA, VA),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 65-72

THE PLANNED DATRAN NATIONWIDE ALL DIGITAL SWITCHED NETWORK DESIGNED TO LINK SUBSCRIBER TERMINALS IN 35 METROPOLITAN AREAS IS DISCUSSED. THE SYSTEM DESIGN AND SERVICES AND A NETWORK SIMULATOR ARE BRIEFLY DESCRIBED. THE SIMULATOR IS USED TO EVALUATE THE PROJECTED PERFORMANCE OF THE NETWORK RELATIVE TO DESIGN SPECIFICATIONS.
(ALSO UNDER 2.I.2)

FLETCHER, J. G., LAWRENCE RADIATION LABORATORY OCTOPUS SYSTEM, (CALIFORNIA, UNIV. OF, LIVERMORE, LAWRENCE RADIATION LAB.),
PROCEEDINGS OF INVITATIONAL WORKSHOP ON COMPUTERS, NATIONAL SECURITY AGENCY, FORT MEADE, MD, OCT 68, P 225-231

THIS IS AN INTRODUCTION TO SOME FEATURES OF THE LAWRENCE RADIATION LABORATORY (LRL) OCTOPUS NETWORK, WHICH INCLUDES CDC 6600'S AND A CDC 7600. CONTROL IS INITIALLY CENTRALIZED IN A DEC PDP-6, BUT PLANS CALL FOR THE DISTRIBUTION OF CONTROL TO A NETWORK OF PDP-8'S (A FACT NOW) EACH CAPABLE OF SERVING 128 TELETYPES AND ALLOWING EACH TELETYPE ACCESS TO ANY CDC MACHINE. FILE CONTROL IS CENTRAL AND IS PERFORMED BY THE PDP-6. THE NETWORK CONTAINS A NUMBER OF STORAGE DEVICES, BUT THE MOST INTERESTING IS THE IBM PHOTOSTORE, ONE TRILLION BIT, 5 SEC ACCESS PER 4100 WORDS, NON ERASABLE. THE FILE STRUCTURE IS SIMILAR TO THAT OF MULTICS, WITH ROOTS AND DIRECTORIES WITHIN DIRECTORIES. LRL HAS CRITICAL SECURITY PROBLEMS AND HAS DEVELOPED SOME INTERESTING MEASURES TO PROTECT FILES. THE AUTHOR SUGGESTS APPLICATION OF THE CONCEPTS EMBODIED IN OCTOPUS TO ANY DISTRIBUTED NETWORK OF HETEROGENEOUS COMPUTERS.

GABLER, HERMANN G., THE GERMAN EDS NETWORK, (DEUTSCHE BUNDESPOST, DARMSTADT, (WEST GERMANY), FERNMELDETECHNISCHES ZENTRALAMT),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 80-85, 8 REFS

A PLANNED ELECTRONIC DATA SWITCHING SYSTEM FOR DATA COMMUNICATIONS IN GERMANY IS DESCRIBED. A STORED PROGRAM SWITCHING SYSTEM IS DESCRIBED AND JUSTIFIED. FREQUENCY DIVISION MULTIPLEXING, RATHER THAN DIGITAL TECHNIQUES, ARE USED FOR CHANNELS BETWEEN SWITCHING CENTERS.

3.1.0 GENERAL DESCRIPTION

(ALSO UNDER 3.2.0)

HEHN, EARL L., JR., MAC INTEGRATED MANAGEMENT SYSTEM (MACIMS), (DEPARTMENT OF THE AIR FORCE, SCOTT AFB, IL, MILITARY AIRLIFT COMMAND),
INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P 2-1-1--2-1-6

THIS IS A NON-TECHNICAL DESCRIPTION OF THE SYSTEM DEVELOPMENT PLAN AND THE DEVELOPMENT STATUS OF THE MILITARY AIRLIFT COMMAND'S INTEGRATED MANAGEMENT SYSTEM (MACIMS).

HERZOG, BERTRAM, COMPUTER NETWORKS, MERIT COMPUTER NETWORK, ANN ARBOR, MI, MAY 72, MCN 0572-TP-8, 21P, 10 REFS

THIS DOCUMENT CONTAINS A GENERAL DESCRIPTION OF THE MERIT COMPUTER NETWORK WHICH INTERCONNECTS THE COMPUTER CENTERS OF THREE MICHIGAN UNIVERSITIES.

HERZOG, BERTRAM, MERIT COMPUTER NETWORK, (MICHIGAN, UNIV. OF, ANN ARBOR),
RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3, COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 45-48

A BRIEF INTRODUCTION TO THE MERIT NETWORK IS PROVIDED AND THE OBJECTIVES OF THE PROJECT ARE STATED. ONE INTERESTING OBJECTIVE IS TO PROVIDE A MODEL TO STUDY THE ADMINISTRATIVE PROBLEMS ASSOCIATED WITH THE EXCHANGE OF COMPUTING DOLLARS IN A NETWORK COMMUNITY.

HOWELL, R. H., THE INTEGRATED COMPUTER NETWORK SYSTEM, (BRISTOL. UNIV. OF, (ENGLAND)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 214-219

A COMPUTER NETWORK LINKING THE UNIVERSITIES OF SOUTH WEST ENGLAND AND SOUTH WALES IS BRIEFLY DESCRIBED.

KARP, P. M., PROPOSAL FOR THE DEVELOPMENT OF A SECURE PILOT NETWORK FOR THE WORLD-WIDE MILITARY COMMAND AND CONTROL SYSTEM (WWMCCS) BASED ON THE ARPA COMPUTER NETWORK TECHNOLOGY, MITRE CORP., WASHINGTON, DC, 7 JUL 71, MC MTR-6019, 41P, 13 REFS

THIS DOCUMENT CONTAINS A PROPOSAL FOR THE DESIGN AND DEVELOPMENT OF A SECURE PILOT INTER-COMPUTER NETWORK FOR THE WORLD WIDE MILITARY COMMAND AND CONTROL SYSTEM (WWMCCS) BASED ON THE TECHNOLOGY OF THE ARPA NETWORK. IT IS SUGGESTED THAT THE APPLICABILITY OF ARPA-DEVELOPED PRINCIPLES BE VERIFIED FOR THE WWMCCS VIA AN EXPERIMENTATION PROGRAM ON THE ARPA NETWORK ITSELF PRIOR TO THE IMPLEMENTATION OF THE SECURE PILOT NETWORK. THIS PROGRAM CENTERS ON THE EVALUATION OF USER-ORIENTED FEATURES AND EXPERIMENTS WITH DISTRIBUTED DATA HANDLING.

LANCE, G. N., AUSTRALIAN COMPUTING NETWORK, (COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION, (AUSTRALIA), COMPUTING RESEARCH SECTION),
DATAMATION, VOL II, ISSUE 3, MAR 65, P 31-33

IN 1965 AUSTRALIA WAS SETTING UP A NATIONAL COMPUTING NETWORK. THIS IS A GENERAL DISCUSSION LACKING MUCH DETAIL.

LAWRENCE, D. E., A PROPOSED COMPUTER NETWORK FOR THE AUSTRALIAN NATIONAL UNIVERSITY, AUSTRALIAN NATIONAL UNIV., CANBERRA, COMPUTER CENTRE, AUG 71, ANU-CC TR-38, 44P, 2 REFS

A PROPOSAL FOR A CENTRALIZED REGIONAL NETWORK IS PRESENTED. IT MOST CLOSELY RESEMBLES THE TRIANGLE UNIVERSITIES COMPUTER CENTER (TUCC) NETWORK WITH THE ADDITION OF A FEW ATTRACTIVE FEATURES FOR DEVICE SUPPORT AND AUTOMATIC LOAD-SHARING. IMPRESSIVE FIGURES FOR PROJECTED PERFORMANCE ARE GIVEN AND A DETAILED DESIGN OF NETWORK COMPONENTS IS PROVIDED.

LESSER, RICHARD C., ANTHONY RALSTON, THE DEVELOPMENT OF A MULTI-CAMPUS REGIONAL COMPUTING CENTER, (NEW YORK, STATE UNIV. OF, ALBANY),
INFORMATION PROCESSING 68: PROCEEDINGS OF IFIP CONGRESS 1968, VOLUME 2--HARDWARE, APPLICATIONS, (EDINBURGH, (SCOTLAND), AUGUST 5-10, 1968), NORTH-HOLLAND PUBLISHING CO., AMSTERDAM, (NETHERLANDS), 1969, IFIP CONGRESS PROCEEDINGS, (LC 65-24118), P 935-944

A MULTI-CAMPUS REGIONAL COMPUTING CENTER WHICH IS DEVELOPED AROUND A CENTRALIZED NETWORK WITH ONE VERY LARGE COMPUTER AND A NUMBER OF REMOTE BATCH AND INTERACTIVE TERMINALS DISTRIBUTED AMONG THE PARTICIPATING CAMPUSES IS DESCRIBED. A RATIONALE FOR REGIONAL COMPUTING IS PRESENTED, BUT FEW PROBLEMS RELATING TO QUESTIONS OF ECONOMICS, MANAGERIAL ORGANIZATION OR OPERATION OF SUCH NETWORKS ARE DISCUSSED.

LUTHER, W. J., CONCEPTUAL BASES OF CYBERNET, (CONTROL DATA CORP.),
RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3, COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 111-146

CDC'S CYBERNET IS THE CENTRAL TOPIC OF THIS PAPER, BUT MUCH OF THE MATERIAL IS APPLICABLE TO OTHER NETWORKING EFFORTS. A SCHEME FOR CLASSIFYING NETWORK USERS IN RELATION TO THEIR NETWORK DEMANDS IS DESCRIBED, ALONG WITH SOME INTERESTING COMMENTS ON NETWORK ACCOUNTING, ACCESSIBILITY, AND RELIABILITY. CYBERNET ITSELF IS A DISTRIBUTED NETWORK OF CDC 6600'S AND SERVICES INTERACTIVE AND REMOTE JOB ENTRY USERS. THE COMMUNICATIONS, NODES, AND CDC 6600 'CENTROIDS' ARE DISCUSSED IN DETAIL.

MCKAY, DOUGLAS B., DONALD P. KARP, IBM COMPUTER NETWORK/440, (INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER),
RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3, COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 27-43, 1 REFS

NETWORK/440, AN IBM RESEARCH PROJECT, IS DESCRIBED. THIS NETWORK IS CLASSIFIED AS HETEROGENOUS BECAUSE AT EACH OF THE NODES A DIFFERENT MODEL OF THE IBM 360 IS USED. AN INTERESTING AND SEEMINGLY POWERFUL CONTROL LANGUAGE (ACL) FOR PROGRAMMING ANY COMPUTER ON THE NETWORK IS DESCRIBED. NETWORK CONTROL IS CENTRALIZED, ACHIEVING SOME IMPLEMENTATION AND MAINTENANCE SIMPLICITIES. THE COMMUNICATION METHOD IS STORE-AND-FORWARD, MESSAGE-SWITCHED WITH ALL MESSAGES DESTINED FOR PROCESSES REMOTE FROM THE ORIGINATING COMPUTER PASSING THROUGH THE CENTRAL CONTROLLER.

MCKAY, DOUGLAS B., DONALD P. KARP, NETWORK/440--IBM RESEARCH COMPUTER SCIENCES DEPARTMENT COMPUTER NETWORK, INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER, 2 JUL 71, IBM-TJWRC RC-3431, 15P

THIS PAPER DESCRIBES THE DESIGN, IMPLEMENTATION, AND PROBLEMS ENCOUNTERED IN IBM'S NETWORK RESEARCH PROJECT, NETWORK/440. NETWORK/440 IS A NETWORK WITH CENTRALIZED CONTROL AND DISTRIBUTED COMPUTING POWER WHICH PROVIDES A USER, VIA A NETWORK CONTROL LANGUAGE, WITH THE ABILITY TO CONTROL GEOGRAPHICALLY SEPARATED PROCESSES. PROBLEMS WHICH REMAIN TO BE SOLVED ARE CONCERNED WITH EFFICIENT UTILIZATION OF THE COMMUNICATIONS FACILITY BY FRONT END PROCESSING AND FULL-DUPLEX OPERATION, AS WELL AS MORE CONVENIENT REMOTE DATA ACCESS WITH MINIMUM USER EFFORT.

MENDICINO, SAMUEL F., OCTOPUS: THE LAWRENCE RADIATION LABORATORY NETWORK, (CALIFORNIA, UNIV. OF, LIVERMORE, LAWRENCE RADIATION LAB.),
RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3, COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 95-110

THIS PAPER DESCRIBES THE OCTOPUS NETWORK AT THE LAWRENCE RADIATION LABORATORY (LRL) WHICH INCLUDES THE LARGE CDC MACHINES (2-CDC 6600'S, 2-CDC 7600'S) LOCATED AT LRL. THE NETWORK IS DISTRIBUTED AND HAS THREE FUNCTIONAL ENTITIES: A REMOTE TERMINAL SYSTEM, A SHARED DATA STORAGE SYSTEM, AND A REMOTE JOB ENTRY SYSTEM. THE TERMINAL SYSTEM CONSISTS OF PDP-8 CONCENTRATORS EACH CAPABLE OF HANDLING 128 TERMINALS. THERE ARE PRESENTLY 350 TELETYPES ON THE SYSTEM. THE DATA STORAGE SYSTEM INCORPORATES A PDP-6 CONTROLLER WITH DISK AND AN IBM PHOTOSTORE. THE PROPOSED REMOTE JOB ENTRY SYSTEM WILL HAVE UP TO 18 STATIONS CONSISTING OF A 600 LPM PRINTER AND 300 CPM READER CONTROLLED BY A PDP-8.

MENOICINO, SAMUEL F., THE LAWRENCE RADIATION LABORATORY OCTOPUS, CALIFORNIA, UNIV. OF, LIVERMORE, LAWRENCE RADIATION LAB., APR 71, CU-LRL 73149, 17P

A NETWORK CONTAINING FOUR LARGE CDC COMPUTERS, ALL IN CLOSE PROXIMITY AND UNDER SINGLE ADMINISTRATIVE CONTROL, IS DESCRIBED. THE FIRST ITERATION OF THE NETWORK CONTAINED A SINGLE COMMUNICATIONS CONTROLLER TO SERVE ALL TERMINALS AND INTERFACE TO THE FOUR COMPUTERS. DUE TO RELIABILITY CONSIDERATIONS, THE TERMINAL CONTROL FUNCTION IS REVISED TO BE DISTRIBUTED AMONG A NUMBER OF SMALL PROCESSORS. THE RESULT IS A SYSTEM OF 350 TERMINALS WITH REDUNDANT PATHS OF

3.1.0 GENERAL DESCRIPTION

CONNECTION TO THE FOUR COMPUTERS. A PROPOSED ADDITION FOR REMOTE BATCH ENTRY IS ALSO DESCRIBED.

MERIT PROPOSAL SUMMARY, MERIT COMPUTER NETWORK, ANN ARBOR, MI, FEB 70, 9P

SOME OF THE POTENTIAL BENEFITS FROM NETWORKS ARE OUTLINED AS A PRELUDE TO A PROPOSAL FOR INTERCONNECTING THREE UNIVERSITIES IN THE STATE OF MICHIGAN. THE GENERAL APPROACH IS TO USE OFF-THE-SHELF TECHNOLOGY IN AN EFFORT TO MINIMIZE THE DEVELOPMENT EFFORT AND TO FOCUS ON THE MANAGEMENT AND UTILIZATION PROBLEMS INSTEAD. THE NETWORK HAS BEEN IMPLEMENTED AND IS DESCRIBED IN SUBSEQUENT PAPERS.
(ALSO UNDER 1.1)

NOWAKOSKI, DONALD B., STATE INTEGRATED INFORMATION NET (SIINET). A CONCEPT, (WESTERN UNION TELEGRAPH CO., ARLINGTON, VA),
JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 137-147

A NETWORK IS DESCRIBED TO MEET THE REQUIREMENTS FOR TIMELY INFORMATION ABOUT THE INTERNAL OPERATIONS OF STATE GOVERNMENTS. A GENERAL DISCUSSION OF THE STATE INTEGRATED INFORMATION NET (SIINET) IS FOLLOWED BY DESCRIPTIONS OF THE THREE POTENTIAL MAJOR COMPONENTS OF SIINET: THE STATE RECORD INFORMATION SYSTEM, THE ECOLOGICAL MONITOR AND CONTROL SYSTEM, AND THE STATE CRIME INFORMATION SYSTEM.
(ALSO UNDER 4.2)

RICHARDSON, D. J., THE A.A.E.C. COMPUTER NETWORK DESIGN, (AUSTRALIAN ATOMIC ENERGY COMMISSION, LUCAS HEIGHTS, RESEARCH ESTABLISHMENT),
AUSTRALIAN COMPUTER JOURNAL, VOL 3, ISSUE 2, MAY 71, P 55-59, 4 REFS

AUSTRALIAN PLANS FOR A LOCAL DATA COMMUNICATION NETWORK ARE DESCRIBED. THE NETWORK IS BASED ON A PARALLEL BUS SCHEME UTILIZING SYNCHRONOUS TRANSMISSION WITH A CENTRALIZED CONTROLLER. THIS BUS, REFERRED TO AS A 'DATA WAY', IS PLANNED TO OPERATE AT A HIGH ENOUGH DATA RATE TO PERMIT 50,000 BITS/SECOND TO BE TRANSFERRED FROM PORT TO PORT ON THE NETWORK. NETWORK TERMINALS INCLUDE AN IBM 360 AND OTHER SMALLER COMPUTERS, AS WELL AS TERMINAL CONTROL COMPUTERS. A LIMITED RATIONALE FOR THE NETWORK IS GIVEN AND A MECHANISM FOR RESOLVING PRIORITIES ON THE BUS IS PRESENTED.

ROBERTS, LAWRENCE G., BARRY O. WESSLER, COMPUTER NETWORK DEVELOPMENT TO ACHIEVE RESOURCE SHARING, (ADVANCED RESEARCH PROJECTS AGENCY, WASHINGTON, DC),
AFIPS PROCEEDINGS. 1970 SPRING JOINT COMPUTER CONFERENCE. VOLUME 36, (ATLANTIC CITY, NJ, MAY 5-7, 1970), AFIPS PRESS, MONTVALE, NJ, 1970, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 543-549, 7 REFS

AN EXCELLENT OVERVIEW OF THE ARPA NETWORK IS PROVIDED IN THIS KEY PAPER. THE DESIGN PHILOSOPHY IS JUSTIFIED IN TERMS OF COST, CAPACITY, RESPONSIVENESS, AND RELIABILITY. THE READER GETS A GOOD GENERAL PICTURE OF THE ARPANET AND AN INDICATION OF THE DESIGN OBJECTIVES.

RUSSELL, J. J., D. C. KNIGHT, COMMUNICATION AND SYSTEMS DEVELOPMENT IN THE C.S.I.R.O. NETWORK, (COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION, MELBOURNE, (AUSTRALIA), COMPUTING RESEARCH SECTION; COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION, ADELAIDE, (AUSTRALIA), COMPUTING RESEARCH SECTION),
PROCEEDINGS OF THE THIRD AUSTRALIAN COMPUTER CONFERENCE. (CANBERRA, (AUSTRALIA), MAY 16-20, 1966), AUSTRALIAN TRADE PUBLICATIONS, 1966, P 384-388, CSIRO REFS

A DISCUSSION OF THE CSIRO COMPUTER NETWORK OF AUSTRALIA IS PRESENTED HERE. THE NETWORK CONSISTS OF A LARGE CENTRAL COMPUTER CONNECTED TO THREE SATELLITE COMPUTERS. BESIDES THE TECHNICAL DESCRIPTION, THE HISTORY OF THE DECISION TO DEVELOP THE NET, THE STAFF RESPONSIBILITIES, AND COMPATIBILITY PROBLEMS ARE DESCRIBED.

RUTLEDGE, RONALD M., ALBIN L. VAREHA, LEE C. VARIAN, ALLAN H. WEIS, SALOMON F. SEROUSSI, JAMES W. MEYER, JOAN F. JAFFE, MARY ANNE K. ANGELL, AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS, (CARNEGIE-MELLON UNIV., PITTSBURGH, PA, PRINCETON UNIV., NJ, INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER),
PROCEEDINGS OF 24TH NATIONAL CONFERENCE. ASSOCIATION FOR COMPUTING MACHINERY, (AUGUST 26-28, 1969), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, 1969, ACM P-69, P 431-441, 13 REFS

THE TSS NETWORK, A NETWORK OF IBM 360/67'S LOCATED AT CARNEGIE-MELLON AND PRINCETON UNIVERSITIES AND AT IBM IS DESCRIBED. THE COMPUTERS ARE CONNECTED THROUGH IBM 2702 SYNCHRONOUS INTERFACES OVER LEASED OR DIAL-UP LINES AT 2000 BAUD OR HIGHER DATA RATES. TRANSMISSION IS HALF DUPLEX AND NO LINE MULTIPLEXING IS PERFORMED. A NETWORK COMMAND LANGUAGE ALLOWS A USER AT ONE SITE TO RUN PROCESSES AT OTHER SITES ASYNCHRONOUSLY, RECEIVING NOTIFICATION OF TASK COMPLETION. THE STATED GOALS OF THE NETWORK ARE PROGRAM SHARING, DATA SHARING, SPECIAL FACILITIES ACCESS, AND LOAD SHARING.
(ALSO UNDER 1.1)

THE MERIT COMPUTER NETWORK. PROGRESS REPORT FOR THE PERIOD JULY 1969-MARCH 1971, MERIT COMPUTER NETWORK, ANN ARBOR, MI, MAY 71, JUL 69-MAR 71, MCN 0571-PR-4, (PB-200 674), 61P

THE OBJECTIVES AND GENERAL IMPLEMENTATION PLANS FOR THE MERIT NETWORK ARE INTRODUCED. PLANS CALL FOR A MINICOMPUTER BASED THREE NODE NETWORK IN WHICH THE INTERCONNECTED THREE 'HOST' COMPUTERS ARE NETWORKED WITH NO HARDWARE OR SOFTWARE MODIFICATIONS TO THE HOST SYSTEMS. ACCESS BY USERS OF EACH SYSTEM IS PROVIDED TO THE RESOURCES OF THE OTHER TWO SYSTEMS. THE EFFORT IS COORDINATED BY A BOARD OF DIRECTORS REPRESENTING THE THREE PARTICIPATING UNIVERSITIES.

TYMES, LA RDY, TYMNET--A TERMINAL ORIENTED COMMUNICATION NETWORK, (TYMSHARE INC., CUPERTINO, CA),
AFIPS CONFERENCE PROCEEDINGS. VOLUME 38, 1971. SPRING JOINT COMPUTER CONFERENCE, (ATLANTIC CITY, NJ, MAY 18-20, 1971), AFIPS PRESS, MONTVALE, NJ, 1971, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 211-216, 5 REFS

THE TYMNET COMMERCIAL COMPUTER NETWORK IS INTRODUCED. THE NETWORK IS SPECIFICALLY DESIGNED FOR TERMINAL TO COMPUTER COMMUNICATIONS. IT INCORPORATES SPEED RECOGNITION, FULL-DUPLEX SUPPORT, HALF-DUPLEX SUPPORT AND SOME SPECIAL DEVICE FEATURES INCLUDING A 'CHARACTER GOBBLER' TO FLUSH THE PIPE-LINE OF OUTPUT ON A USER GENERATED BREAK. THE SAME MACHINE (VARIAN 620 MINICOMPUTER) IS USED AS A FRONT END TO THE HOSTS (XDS 940'S) IN THIS DISTRIBUTED NETWORK AND AS A REMOTE TERMINAL CONCENTRATOR TO ACCOMMODATE DIAL-UP USERS. THE NETWORK CONTROLLER RESIDES IN ONE OF THE HOSTS BUT IS AUTOMATICALLY TRANSFERRABLE TO AN ALTERNATE HOST IN THE EVENT OF FAILURE. THIS NETWORK IS NOT DESIGNED TO ACCOMMODATE ALL FORMS OF COMPUTER INPUT--NO BATCH OR GRAPHICS SUPPORT FOR EXAMPLE--BUT IS GEARED TOWARD THE INTERACTIVE TERMINAL USER.

WALKER, PHILIP M., STUART L. MATHISON, SPECIALIZED COMMON CARRIERS, (GEORGETOWN, UNIV. OF, WASHINGTON, DC, LAW CENTER, LITTLE (ARTHUR D.) INC., CAMBRIDGE, MA),
TELEPHONE ENGINEER AND MANAGEMENT, 15 OCT 71, P 41-60, 8 REFS
(ANNOTATION UNDER 1.6)

WEIS, ALLAN H., DISTRIBUTED NETWORK ACTIVITY AT IBM, (INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, DEPT. OF COMPUTING SYSTEMS),
RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3. COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 1-25, 4 REFS

IN THIS PAPER WEIS DESCRIBES THE TSS NETWORK OF IBM COMPUTERS AND DISCUSSES SOME PROBLEMS OF NETWORKING IN GENERAL. OF INTEREST, BUT LACKING IN DETAIL, IS THE MENTION OF TDCAM (TABLE DRIVEN COMPUTER ACCESS METHOD) WHICH PERMITS SIMULTANEOUS COMMUNICATION WITH DIFFERENT SYSTEMS AND MACHINES. THE NETWORKING PROBLEMS WHICH RECEIVE TREATMENT ARE ARCHITECTURE, RESOURCE CONTROL, DATA INTERCHANGE, TELECOMMUNICATIONS, AND TECHNICAL MANAGEMENT.

3.1.1 TECHNICAL

ABRAMSON, NORMAN, THE ALOHA SYSTEM, HAWAII, UNIV. OF, HONOLULU, JAN 72, UH TR-B72-1, NASA NAS2-6700, AF F44620-69-C-0030, 30P, 16 REFS
(ANNOTATION UNDER 3.2.1)

ATKINSON, O. M., U. C. STRAHLENDORF, THE PROBABLE FUTURE OF CANADIAN LONG HAUL DIGITAL DATA NETWORK CONNECTIONS WITH THE U.S.A., (BELL CANADA),
JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 10-15

3.1.1 TECHNICAL

THE SOCIO-ECONOMIC CONDITION IN CANADA WHICH WILL RESULT IN NETWORK CONFIGURATIONS DIFFERENT FROM THOSE EVOLVING IN THE U.S. IS OUTLINED. THE FUTURE OF TELECOMMUNICATIONS AND THE OBJECTIVES OF A DIGITAL NETWORK IN CANADA ARE COVERED IN SOME DETAIL.
(ALSO UNDER 3.2.0)

AUPPERLE, ERIC M., MERIT COMPUTER NETWORK: HARDWARE CONSIDERATIONS, (MICHIGAN, UNIV. OF, ANN ARBOR), RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3. COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 49-63

THE HARDWARE USED IN THE COMMUNICATIONS SUBNET OF THE MERIT NETWORK IS DESCRIBED AND THE CHOSEN CONFIGURATION IS COMPARED TO ALTERNATIVES. A RATHER INTERESTING ARRANGEMENT IS MENTIONED THAT ALLOWS A SINGLE AUTOMATIC CALLING UNIT TO BE MULTIPLEXED AMONG EIGHT LINES.
(ALSO UNDER 3.3.2)

BEERE, MAX P., NEIL C. SULLIVAN, TYMNET--A SERENDIPITOUS EVOLUTION, (TYMSHARE INC., CUPERTINO, CA), IEEE TRANSACTIONS ON COMMUNICATIONS, VOL COM-20, ISSUE 3, JUN 72, P 511-515, 2 REFS

THE TYMNET COMMERCIAL COMPUTER NETWORK AND SOME OF THE EARLY PROBLEMS WITH ITS USAGE AND RESULTANT CHANGES IN THE NETWORK ARE DESCRIBED. THE TRANSITION TO MINICOMPUTERS AS HOST COMPUTER INTERFACES, INTERACTIVE TERMINAL USER INTERFACES, AND STORE-AND-FORWARD NODES IN THE NETWORK IS DISCUSSED. ALSO DESCRIBED ARE THE TYMNET CONCERTS OF A VIRTUAL CIRCUIT AND A CENTRALIZED NETWORK CONTROLLER.

BENOIT, JOHN W., IRA W. COTTON, D. C. WOOD, PROPOSED IMPLEMENTATION PLAN FOR A WWMCCS INTERCOMPUTER NETWORK, MITRE CORP., WASHINGTON, DC, 2 DEC 71, MC WR-9807, AF F1962B-71-C-0002, 41R

THIS DOCUMENT PRESENTS A DEVELOPMENT PLAN FOR A PROTOTYPE WWMCCS (WORLD WIDE MILITARY COMMAND AND CONTROL SYSTEM) COMPUTER NETWORK LINKING THREE NEW WWMCCS STANDARD SYSTEMS (HONEYWELL 6000 COMPUTERS). THE NETWORK DESIGN IS BASED ON THE TECHNOLOGY OF THE ARPA NETWORK. TASK AREAS ARE IDENTIFIED, SCHEDULES DEVELOPED, AND BUDGETARY INFORMATION PRESENTED.
(ALSO UNDER 5.0)

COCANOWER, ALFRED B., MERIT COMPUTER NETWORK: SOFTWARE CONSIDERATIONS, (MICHIGAN, UNIV. OF, ANN ARBOR), RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3. COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 65-77, 1 REFS

A DESCRIPTION OF THE COMMUNICATIONS SOFTWARE FOR THE MERIT NETWORK IS PROVIDED. THE FUNCTIONAL RELATIONSHIPS OF THE MODULES IN BOTH THE HOST AND COMMUNICATIONS COMPUTERS ARE DETAILED.
(ALSO UNDER 3.4, 3.3.2)

COCANOWER, ALFRED B., WAYNE FISCHER, W. S. GERSTENBERGER, BRIAN S. READ, THE COMMUNICATIONS COMPUTER OPERATING SYSTEM--THE INITIAL DESIGN, MERIT COMPUTER NETWORK, ANN ARBOR, MI, OCT 70, MCN M-1070-TN-3, (PB-203 552), 94R

THE OPERATING SYSTEM OF THE MERIT NETWORK COMMUNICATIONS COMPUTER (CC) IS DESCRIBED IN DETAIL. THE CC IS THE INTERFACE BETWEEN A COMPUTER NODE AND THE NETWORK AND ITS PRIMARY FUNCTION IS TO MULTIPLEX CONNECTIONS BETWEEN PAIRS OF PROCESSES AT SEPARATE NODES. SEMAPHORES ARE USED TO SYNCHRONIZE TASKS AND REGULATE RECORD TRAFFIC, AND THEY ARE AUGMENTED SO THAT BLOCKED TASKS CAN BE ASYNCHRONOUSLY RESTARTED.

FARBER, DAVID J., FRANK HEINRICH, THE STRUCTURE OF A DISTRIBUTED COMPUTER SYSTEM--THE DISTRIBUTED FILE SYSTEM, (CALIFORNIA, UNIV. OF, IRVINE), WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 364-370, 8 REFS

AMONG ITS MULTIPLE PROCESSORS IS DISCUSSED. THE DCS DISTRIBUTED FILE SYSTEM, IS DESCRIBED IN DETAIL. THE FILE SYSTEM IS A HIERARCHICAL STRUCTURE WITH ONE IMPORTANT ADDITION: EACH LEVEL OF THE STRUCTURE BECOMES A SINGLE LEVEL DESCRIPTION OF THE ENTIRE STRUCTURE ABOVE IT. THE INTERESTING ASSOCIATED FAIL-SOFT CAPABILITIES ARE ALSO DISCUSSED.
(ALSO UNDER 4.1)

HEART, FRANK E., ROBERT E. KAHN, S. M. ORNSTEIN, WILLIAM R. CROWTHER, DAVID C. WALDEN, THE INTERFACE MESSAGE PROCESSOR FOR THE ARPA COMPUTER NETWORK, (BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA), AFIPS PROCEEDINGS. 1970 SPRING JOINT COMPUTER CONFERENCE. VOLUME 36. (ATLANTIC CITY, NJ, MAY 5-7, 1970), AFIRS PRESS, MONTVALE, NJ, 1970, AFIRS CONFERENCE PROCEEDINGS, (LC 55-44701), P 551-567, 35 REFS

THIS IS THE PRIMARY PUBLISHED DETAILED DESCRIPTION OF THE ARPA NETWORK COMMUNICATIONS SUBNET. CONSIDERABLE ATTENTION WAS GIVEN IN THE DESIGN TO ELIMINATING CONGESTION THROUGH THE USE OF 'LINKS', BUT THE PRECAUTIONS STILL WERE INADEQUATE TO ELIMINATE MASSIVE CONGESTION UNDER CERTAIN CONDITIONS, NECESSITATING REDESIGN AND MODIFICATIONS IN 1972 BEFORE SIGNIFICANT NET LOADING COULD BE SUPPORTED. THERE IS EMPHASIS ON THE SELECTION OF THE RUGGEDIZED HONEYWELL DDP 516 TO REDUCE MEAN TIME BETWEEN FAILURE. A PRACTICE THAT HAS SINCE BEEN FOUND UNNECESSARY. AN APPARENT WEAKNESS OF THE PAPER IS THE SHOWING OF CHARTS OF NETWORK TRANSIT TIMES FOR AN UNLOADED (LIGHTLY LOADED) NET, WITH AN IMPLICATION THAT THE DESIGN GOAL OF LESS THAN A HALF SECOND AVERAGE ONE WAY TRANSIT TIME FOR THE LOADED NET HAS BEEN OR WILL BE MET.

HERNDON, EDWIN S., HERBERT J. STERNICK, JOHN W. BENOIT, ROY D. BEVERIDGE, PAUL BRUCE, IRA W. COTTON, JOHN ISELI, RANVIR K. TREHAN, NOREEN O. WELCH, D. C. WOOD, PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN, MITRE CORP., WASHINGTON, DC, 1 MAY 71, MC MTR-6181, AF F19628-71-C-0002, 149P, 13 REFS

A DETAILED PLAN FOR DEVELOPMENT OF A PROTOTYPE WWMCCS (WORLD WIDE MILITARY COMMAND AND CONTROL SYSTEM) INTERCOMPUTER NETWORK IS CONTAINED IN THIS REPORT. IT INCLUDES A DESCRIPTION OF THE PROCUREMENT AND DEVELOPMENT ACTIVITIES TO BE UNDERTAKEN BY THE DEFENSE COMMUNICATIONS SYSTEM (DCS) AND THE JOINT TECHNICAL SUPPORT ACTIVITY (JTSA) AS WELL AS AN EXTENSIVE EXPERIMENTATION PROGRAM. THIS DEVELOPMENT PLAN IS BASED UPON AN EARLIER VERSION 'PROPOSED IMPLEMENTATION PLAN FOR A WWMCCS INTERCOMPUTER NETWORK' IN CATEGORY 3.1.1, WHICH HAS BEEN EXTENSIVELY REVISED TO PLACE THE NETWORK PLANS IN THE CONTEXT OF TOTAL DEFENSE COMMUNICATIONS AGENCY OBJECTIVES.
(ALSO UNDER 5.0)

INITIAL DESIGN FOR INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, JAN 69, BBN R-1763, DAHC 15-69-0179, 76P

THIS GENERAL DESCRIPTION OF BOTH THE HARDWARE AND SOFTWARE DESIGN OF THE ARPA NETWORK INTERFACE MESSAGE PROCESSOR (IMP) IS A RATHER EARLY DOCUMENT REFERRING TO A NON-RUGGEDIZED IMP AND MAKING MINIMAL REFERENCE TO RECOGNIZED BUT UNRECONCILED PROBLEMS SUCH AS REASSEMBLY MESSAGE QUEUING. THE MECHANISM FOR RESOLVING HOST COMPUTER WORD LENGTH DIFFERENCES AND THE GENERAL IMP-TO-IMP PROTOCOL ARE DESCRIBED. OVERALL MESSAGE FLOW AND THE CONCEPT OF MESSAGES DIVIDED INTO PACKETS ARE SUMMARIZED.

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, ARR 69, 2 JAN-31 MAR 69, BBN R-1783, BBN QTR-1, DAHC 15-69-0179, 14R

THE CONTENTS OF THIS QUARTERLY TECHNICAL REPORT ARE AS FOLLOWS: HARDWARE DESIGN, SOFTWARE DEBUGGING, MULTIPLE HOSTS ON AN IMP, AND ROUTING ALGORITHMS. THE HARDWARE DESIGN SECTION CONTAINS A LISTING OF FEATURES WHICH HAVE BEEN MODIFIED ON THE HONEYWELL 516 FOR USE IN THE ARPA NETWORK. THIS INFORMATION DOES NOT APPEAR IN ANY OTHER DOCUMENT AND MAY BE OF INTEREST. THE OTHER SECTIONS OF THE REPORT HAVE BEEN OBSOLETED BY LATER DEVELOPMENTS.

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, ARR 70, 1 JAN-31 MAR 70, BBN R-1966, BBN QTR-5, ARPA DAHC-15-69-C-0179, 14R

THE CONTENTS OF THIS QUARTERLY TECHNICAL REPORT ARE AS FOLLOWS: SOFTWARE DEVELOPMENT, HARDWARE DEVELOPMENT, NETWORK TESTING, PHONE LINE TEST PROGRAM. ITEMS OF INTEREST IN THIS REPORT INCLUDE A MODEM SIMULATOR BEING BUILT TO SIMULATE SIX FULL-DUPLEX COMMUNICATION CIRCUITS TOGETHER WITH ATTACHED MODEMS AND EXTENSIONS TO THE PHONE LINE TEST PROGRAM DESCRIBED IN QUARTERLY TECHNICAL REPORT NO. 4.

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, ARR 71, 1 JAN-31 MAR 71, BBN R-2123, BBN QTR-9, ARPA DAHC-15-69-C-0179, 11P

THIS QUARTERLY TECHNICAL REPORT CONTAINS A DESCRIPTION OF THE TERMINAL IMP (TIP) MULTI-LINE CONTROLLER. THE OTHER

3.1.1 TECHNICAL

SECTIONS ON NETWORK THROUGHPUT AND PROTOCOLS ARE OBSOLETE.

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, APR 72, 1 JAN-30 APR 72, BBN R-2353, BBN QTR-13, DAHC 15-69-C-0179, 31P

THE CONTENTS OF THIS QUARTERLY TECHNICAL REPORT ARE AS FOLLOWS: TIP MAGNETIC TAPE OPTION, BUFFERING REQUIREMENTS FOR SPECIAL CIRCUITS, TRANSMISSION AND FLOW CONTROL. THE SECTION ON TIP MAGNETIC TAPE OPTION DESCRIBES THE OPTION'S CAPABILITIES AND COMMANDS FOR USING THIS FEATURE. THE SECTION ON BUFFERING REQUIREMENTS CONTAINS A DETAILED ANALYTIC DISCUSSION OF THE EFFECT OF USING LINE SPEEDS OTHER THAN THE STANDARD 50 KILOBIT/SECOND FOR IMP TO IMP COMMUNICATIONS. EXTENSIVE TABLES AND GRAPHS ARE PRESENTED FOR THE DATA WHICH IS DEVELOPED. THE ALGORITHM EMPLOYED PROVIDES FOR THE PRIOR ALLOCATION OF SPACE FOR MESSAGES FROM IMP TO IMP AND FOR CONTROL OVER THE TOTAL NUMBER OF MESSAGES WHICH MAY BE IN TRANSIT BETWEEN ANY TWO PARTICULAR IMP'S.
(ALSO UNDER 2.1.2)

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, JAN 70, 1 OCT-31 DEC 69, BBN R-1928, BBN QTR-4, OAHC 15-69-C-0179, 10P

THE CONTENTS OF THIS QUARTERLY TECHNICAL REPORT ARE AS FOLLOWS: SOFTWARE DEVELOPMENT, HARDWARE DEVELOPMENT, PHONE LINE TEST PROGRAM, HOST PROTOCOL. FEATURES IN THE IMP SOFTWARE ALLOWING FOR FOUR SETS OF MEASUREMENT FACILITIES ARE DESCRIBED. THE BRIEF DESCRIPTION OF A PHONE LINE TEST PROGRAM FOR THE 50 KILOBIT COMMUNICATION CIRCUITS MAY ALSO BE OF INTEREST. THE OTHER SECTIONS HAVE BEEN SUPERCEDED BY SUBSEQUENT REPORTS.

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, JAN 71, 1 OCT-31 DEC 70, BBN R-2103, BBN QTR-8, DAHC 15-69-C-0179, 13P

THE CONTENTS OF THIS QUARTERLY TECHNICAL REPORT ARE AS FOLLOWS: TERMINAL IMP, NETWORK CONTROL CENTER, THROUGHPUT AND PROTOCOL STUDY. THIS QUARTERLY TECHNICAL REPORT IS MOST NOTABLE FOR ITS SAMPLE OF HOURLY SUMMARY INFORMATION PRODUCED BY THE NETWORK CONTROL CENTER.
(ALSO UNDER 5.1)

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, JUL 69, 1 APR-30 JUN 69, BBN R-1837, BBN QTR-2, DAHC 15-69-0179, 15P

PROGRAM DESIGN FOR THE OPERATIONAL INTERFACE MESSAGE PROCESSOR (IMP) AND NETWORK MEASUREMENTS ARE COVERED IN THIS QUARTERLY TECHNICAL REPORT. MUCH OF THE INFORMATION PRESENTED IS NOW OBSOLETE.
(ALSO UNDER 2.2)

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, JUL 70, 1 APR-30 JUN 70, BBN R-2003, BBN QTR-6, ARPA DAHC-15-69-C-0179, 13P

THE CONTENTS OF THIS QUARTERLY TECHNICAL REPORT ARE AS FOLLOWS: SOFTWARE DEVELOPMENT, HARDWARE, NETWORK TESTING, NETWORK CONTROL CENTER. ITEMS OF INTEREST IN THIS QUARTERLY TECHNICAL REPORT INCLUDE DESCRIPTION OF A NETWORK LOAD SIMULATOR AND SOME EMPIRICAL DATA REGARDING THROUGHPUT.

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, JUL 71, 1 APR-30 JUN 71, BBN R-2175, BBN QTR-10, ARPA DAHC-15-69-C-0179, 17P

THE CONTENTS OF THIS QUARTERLY TECHNICAL REPORT ARE AS FOLLOWS: NETWORK WORKING GROUP PARTICIPATION, TERMINAL IMP. THE CONTENTS OF THIS QUARTERLY TECHNICAL REPORT ARE OBSOLETE.

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, JUL 72, 1 APR-30 JUN 72, BBN QTR-14, BBN R-2396, ARPA DAHC-15-69-C-0179, 18P

THE FIRST PART OF THIS REPORT IS DEVOTED TO PROBLEMS ENCOUNTERED IN LOADING AND PROPAGATING A NEW VERSION OF THE ARPANET IMP OPERATING SYSTEM. SOLUTIONS ARE PROPOSED TO MAKE TRANSITIONS TO NEW VERSIONS OF THE SOFTWARE SMOOTHER. THE SECOND PART OF THE REPORT DESCRIBES THE HIGH SPEED MODULAR IMP (HSMIMP) AND JUSTIFIES ITS DESIGN. THE HSMIMP HAS A THROUGHPUT OF 10 TIMES THAT OF A NORMAL IMP. A MULTIPROCESSOR CONFIGURATION WITH SHARED MEMORIES WAS CHOSEN. THE PROCESSOR SELECTED IS A LOCKHEED SUE MINICOMPUTER.

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, OCT 69, 1 JUL-30 SEP 69, BBN R-1890, BBN QTR-3, DAHC 15-69-C-0179, 10P

THIS QUARTERLY TECHNICAL REPORT COVERS IMP HARDWARE CHECKOUT AND INSTALLATION, SOFTWARE DEVELOPMENT, AND PROJECTED IMP PERFORMANCE. THE FIRST TWO SECTIONS OF THIS REPORT ARE NOW OBSOLETE. THE SECTION ON PROJECTED IMP PERFORMANCE MAY BE OF INTEREST; HOWEVER, NOTE THAT FIGURE 2 WHICH SHOULD SHOW A CURVE OF MAXIMUM THROUGHPUT AS A FUNCTION OF MESSAGE LENGTH HAS BEEN OMITTED.

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, OCT 70, 1 JUL-30 SEP 70, BBN R-2059, BBN QTR-7, DAHC 15-69-C-0179, 12P

THE CONTENTS OF THIS QUARTERLY TECHNICAL REPORT ARE AS FOLLOWS: IMP PROGRAM DEVELOPMENT, TERMINAL IMP, NETWORK CONTROL CENTER, HOST PROTOCOL. THE PRELIMINARY DESIGN OF THE TERMINAL IMP IS DESCRIBED. HOWEVER, ALL OF THE CONTENTS OF THIS QUARTERLY TECHNICAL REPORT HAVE BEEN SUPERCEDED BY SUBSEQUENT REPORTS.
(ALSO UNDER 5.1)

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, OCT 71, 1 JUL-30 SEP 71, BBN R-2270, BBN QTR-11, ARPA DAHC-15-69-C-0179, 7P

THIS QUARTERLY TECHNICAL REPORT PRIMARILY COVERS THE TERMINAL IMP (TIP). ALL OF THE INFORMATION IN THIS QUARTERLY TECHNICAL REPORT HAS BEEN SUPERSEDED BY SUBSEQUENT DOCUMENTS.

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, OCT 72, 1 JUL-30 SEP 72, BBN QTR-15, BBN R-2468, ARPA DAHC-15-69-C-0179, 15P

THIS QUARTERLY PROGRESS REPORT COVERS THE FOLLOWING TOPICS: TIP MAGNETIC TAPE OPTION, SATELLITE TRANSMISSION FLOW CONTROL TECHNIQUES, AND PROGRAM ORGANIZATION FOR THE HIGH SPEED MODULAR IMP (HSMIMP). REVISIONS TO THE PROTOCOLS FOR THE MAGNETIC TAPE OPTION ARE DESCRIBED. VARIOUS CONTROL TECHNIQUES FOR A SATELLITE CHANNEL ARE DESCRIBED AND ONE IS RECOMMENDED. A NEW PROGRAMMING TECHNIQUE THAT REDUCES THE OVERHEAD IN INTERRUPT-DRIVEN SYSTEMS IS DESCRIBED FOR THE HSMIMP.

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, QUARTERLY TECHNICAL REPORT NO. 12, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, JAN 72, 1 OCT-31 DEC 71, BBN R-2309, BBN QTR-12, DAHC 15-69-C-0179, (AD-736 213), 14P

A SUMMARY OF IMP/TIP PROBLEMS AND DEVELOPMENTS IS PRESENTED. THE DIFFICULTY IN SERVICING REMOTE BATCH TERMINALS THROUGH THE TIP IS DISCUSSED AND A SOLUTION RELATED TO HAVING AN ATTACHED MODEM PERFORM ERROR DETECTION/CORRECTION IS PROPOSED. A DISCUSSION OF A NEW TYPE OF IMP CALLED A HIGH SPEED MODULAR IMP IS GIVEN BUT DETAILS ARE LACKING. USER REACTIONS TO THE TIP ARE SUMMARIZED AS FAVORABLE TO THE TIP, BUT DISSATISFIED WITH THE LACK OF AVAILABILITY OF NETWORK RESOURCES. A DETAILED DESCRIPTION OF THE IMP-TO-DISTANT-HOST INTERFACE IS GIVEN.

PEHRSON, DAVID L., AN ENGINEERING VIEW OF THE LRL OCTOPUS COMPUTER NETWORK, CALIFORNIA, UNIV. OF, LIVERMORE, LAWRENCE RADIATION LAB., 17 NOV 70, CU-LRL UCID-15754, 32P

A COMPLETE DESCRIPTION OF THE LAWRENCE RADIATION LABORATORY (LRL) OCTOPUS NETWORK IS GIVEN. THE FILE SYSTEM, WHICH IS COMMON TO ALL OF THE PROCESSORS (CDC 6600'S AND 7600'S), AND THE TELETYPE NETWORK, ALSO COMMON AND CONTROLLED BY MINICOMPUTERS, ARE DESCRIBED IN DETAIL. PROBLEMS ARE WELL DOCUMENTED AND FUTURE PLANS ARE OUTLINED, INCLUDING A REMOTE JOB ENTRY SYSTEM, A CRT BASED SYSTEM TO SUPPLEMENT THE TELETYPES, AND AN OPTICAL MASS MEMORY.

SCANTLEBURY, R. A., P. T. WILKINSON, K. A. BARTLETT, THE DESIGN OF A MESSAGE SWITCHING CENTRE FOR A DIGITAL COMMUNICATION NETWORK, (NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND)), INFORMATION PROCESSING 68; PROCEEDINGS OF IFIP CONGRESS 1968, VOLUME 2--HARDWARE, APPLICATIONS, (EDINBURGH, (SCOTLAND), AUGUST 5-10, 1968), NORTH-HOLLAND PUBLISHING CO., AMSTERDAM, (NETHERLANDS), 1969, IFIP CONGRESS PROCEEDINGS, (LC 65-24118), P 723-727, 3 REFS

THIS IS AN EARLY DESCRIPTION OF THE PROPOSED NATIONAL PHYSICS LABORATORY NETWORK IN ENGLAND. THE PORTION OF THE NETWORK DISCUSSED HERE IS THE STORE-AND-FORWARD TRUNK NETWORK AND THE SWITCHING CENTERS WHICH PERFORM THAT FUNCTION.

3.1.1 TECHNICAL

THE SWITCHING CENTERS ARE SMALL GENERAL PURPOSE COMPUTERS WITH SPECIAL HARDWARE JOINED BY HIGH SPEED LINKS INTO A DISTRIBUTED NETWORK. AN ADAPTIVE ROUTING SCHEME TO ACCOMMODATE OVERLOADS AND FAILURES IS ALSO DESCRIBED.

SCANTLEBURY, R. A., A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--OBJECTIVES AND HARDWARE ORGANIZATION, NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE, OCT 69, NPL-DCS COM-SCI-T.M.29, 17P, 10 REFS

A FUNCTIONAL DESCRIPTION OF THE COMPONENTS OF A MESSAGE SWITCHED NETWORK PRESENTLY BEING IMPLEMENTED BY THE NATIONAL PHYSICAL LABORATORY IS PROVIDED. THE DISCUSSION CONCENTRATES ON THE LOCAL NETWORK WHERE ALL USERS CONNECT TO A SINGLE SWITCHING CENTER. THE INTERCONNECTION OF THESE LOCAL NETWORKS RECEIVES LITTLE ATTENTION.
(ALSO UNDER 3.2.2, 3.2.3)

WILKINSON, P. T., A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--SOFTWARE ORGANIZATION, NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE, OCT 69, NPL-DCS COM-SCI-T.M.29, 20P, 6 REFS

THE NATIONAL PHYSICAL LABORATORY NETWORK IS DESCRIBED IN TERMS OF THE INTERACTION OF TERMINALS WITH THE NETWORK. THE NETWORK IS STAR CONNECTED AND ALLOWS ANY TERMINAL TO EXCHANGE INFORMATION WITH ANY OTHER TERMINAL VIA THE MESSAGE SWITCHING COMPUTER (MSC). THE CHARACTERISTICS OF THE OPERATING SYSTEM FOR THE MSC ARE SUMMARIZED.
(ALSO UNDER 3.2.2, 3.4)

3.1.2 EVALUATION

BROWN, GEORGE W., AN INTERUNIVERSITY INFORMATION NETWORK. II. EVALUATION, (CALIFORNIA, UNIV. OF, IRVINE), KENT, ALLEN, ORRIN E. TAULBEE, ELECTRONIC INFORMATION HANDLING, (PITTSBURGH, PA, OCTOBER 7-9, 1964), SPARTAN BOOKS INC., WASHINGTON, DC, 1965, KNOWLEDGE AVAILABILITY SYSTEMS SERIES, (LC 65-17306), P 269-278
(ANNOTATION UNDER 1.1)

HOBGOOD, W. SANDS, EVALUATION OF AN INTERACTIVE-BATCH SYSTEM NETWORK, (INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER), IBM SYSTEMS JOURNAL, VOL 11, ISSUE 1, 1972, P 2-15, 7 REFS

THE COMBINATION OF TWO COMPUTER NETWORKS AS DESCRIBED IN THIS PAPER ILLUSTRATES THE POTENTIAL FOR SIMILAR COMPLEMENTARY INTERCONNECTIONS IN A LARGER AND MORE GENERAL NETWORK. AN INTERACTIVE IBM 360/67 WITH A GOOD DATA MANAGEMENT SYSTEM IS CONNECTED TO AN IBM 360/91, A HIGH THROUGHPUT BATCH SYSTEM. THE CONNECTION IS HIERARCHICAL IN THAT TERMINAL USERS OF THE 67 CAN SUBMIT BATCH JOBS THROUGH TO THE 91. IN ADDITION, SMALLER COMPUTERS HAVE BEEN CONNECTED HIERARCHICALLY TO THE 67 AS AN INTERMEDIARY IN TRANSMITTING DATA TO THE 91, USING THE 67 TO PROVIDE A FRIENDLIER INTERFACE TO THE SMALLER COMPUTERS. OF PARTICULAR INTEREST ARE THE DISCUSSIONS OF MEASUREMENT OF DATA SET SIZE FOR TRANSFERS TO AND FROM THE 91 IN THIS CONFIGURATION AND OF THE STAGES OF SYSTEM (NETWORK) TIMING THAT WERE NECESSARY TO ACHIEVE SUCCESSFUL OPERATION.

KAHN, ROBERT E., WILLIAM R. CROWTHER, A STUDY OF THE ARPA NETWORK DESIGN AND PERFORMANCE, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, AUG 71, BBN 2161, DAHC 15-69-C-0179, 32P

THIS IS A VERY GOOD STUDY OF KNOWN PROBLEMS IN THE ARPANET COMMUNICATIONS NETWORK AFTER ONE AND ONE-HALF YEAR'S EXPERIENCE. PROBLEMS ADDRESSED INCLUDE REASSEMBLY LOCKUP, STORE AND FORWARD LOCKING, CONGESTION, AND ROUTING FOR HIGH DATA RATES. SOLUTIONS TO EACH PROBLEM ARE POSED. IT IS ACKNOWLEDGED THAT FURTHER INVESTIGATION WHICH MAY TAKE SOME TIME WILL BE NECESSARY TO SUCCESSFULLY SOLVE ALL OF THE PROBLEMS. THE DEPENDENCE OF THE COMMUNICATIONS NETWORK ON THE ATTACHED HOST COMPUTERS TO ACCEPT DATA IS EMPHASIZED. THUS, NETWORK THROUGHPUT DEPENDS IN PART ON EXTERNAL PROCEDURAL FLOW RESTRICTIONS.

KORFHAGE, R. R., THE INDIANA REGIONAL COMPUTING NETWORK, (PURDUE UNIV., LAFAYETTE, IN), A FIRST REPORT OF AN EXPLORATORY PROGRAM OF REGIONAL COOPERATIVE COMPUTING ACTIVITIES, NATIONAL SCIENCE FOUNDATION, WASHINGTON, DC, JAN 70, NSF CCR-70-12, P 101-108

THE EXPERIENCES OF THE INDIANA REGIONAL COMPUTING NETWORK IN ITS FIRST YEAR OF OPERATION ARE REPORTED. THIS NETWORK HAS A CENTRAL COMPUTER AT PURDUE UNIVERSITY SERVING TERMINALS THROUGHOUT INDIANA.

LARSEN, A., E. MCWILLIAMS, S. SALTZMAN, THE FINGER LAKES REGIONAL COMPUTING ORGANIZATION: CREATING A REGIONAL, ACADEMIC COMPUTING NETWORK, (CORNELL UNIV., ITHACA, NY, MASSACHUSETTS INST. OF TECH., CAMBRIDGE), A FIRST REPORT OF AN EXPLORATORY PROGRAM OF REGIONAL COOPERATIVE COMPUTING ACTIVITIES, NATIONAL SCIENCE FOUNDATION, WASHINGTON, DC, JAN 70, NSF CCR-70-12, P 29-42, 5 REFS

THIS REPORT ON THE OPERATION OF THE FINGER LAKES REGIONAL COMPUTING ORGANIZATION (BASED ON A CENTRAL COMPUTER AT CORNELL UNIVERSITY) STRESSES THE NEED TO ALLOW AMPLE TIME FOR THE SYSTEM AND ITS USERS TO ACHIEVE A RELATIVELY STEADY-STATE CONDITION. A NUMBER OF CONCLUSIONS AND OBSERVATIONS REGARDING THE SETUP AND OPERATION OF SUCH A REGIONAL NETWORK ARE PRESENTED.

MCQUILLAN, JOHN M., WILLIAM R. CROWTHER, BERNARD P. COSELL, DAVID C. WALDEN, FRANK E. HEART, IMPROVEMENTS IN THE DESIGN AND PERFORMANCE OF THE ARPA NETWORK, (PREPARED FOR, AFIPS FALL JOINT COMPUTER CONFERENCE, 1972), BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, 1972, ARPA DAHC-15-69-C-0172, 36P, 13 REFS

SOME ARPANET IMPLEMENTATION PROBLEMS AND ACCOMPANYING SOLUTIONS ARE DESCRIBED. DISCUSSIONS ON THE REASSEMBLY LOCKOUT PROBLEM, THE ELIMINATION OF THE LINK MECHANISM, SOME REFINEMENT IN THE ACKNOWLEDGEMENT SYSTEM TO INCREASE THE EFFECTIVE TRANSMISSION RATE, THE DEVELOPMENT OF A VERY DISTANT HOST INTERFACE, IMPROVED BUFFER MANAGEMENT FOR LINES WITH A WIDE RANGE OF SPEEDS, AND BETTER NETWORK DIAGNOSTICS ARE INCLUDED. THE HYPOTHETICAL PERFORMANCE OF THE NETWORK IS THEN RE-EVALUATED TO SHOW THE POTENTIAL IMPROVEMENTS BROUGHT ABOUT BY THE CHANGES.

NIELSEN, NORMAN R., THE MERIT OF REGIONAL COMPUTING NETWORKS, (STANFORD UNIV., CA), COMMUNICATIONS OF THE ACM, VOL 14, ISSUE 5, MAY 71, P 319-326, 3 REFS
(ANNOTATION UNDER 1.1)

NIELSEN, NORMAN R., THE STANFORD REGIONAL COMPUTING NETWORK, (STANFORD UNIV., CA), A FIRST REPORT OF AN EXPLORATORY PROGRAM OF REGIONAL COOPERATIVE COMPUTING ACTIVITIES, NATIONAL SCIENCE FOUNDATION, WASHINGTON, DC, JAN 70, NSF CCR-70-12, P 137-148

THE STANFORD UNIVERSITY PILOT REGIONAL EDUCATIONAL COMPUTING NETWORK CONSISTS OF A CENTRAL TIME-SHARING SYSTEM AT STANFORD SERVING TERMINALS AT FIVE INSTITUTIONS IN THE SAN FRANCISCO AREA. THIS ARTICLE DWELLS ON THE LESSONS LEARNED IN THE DEVELOPMENT OF THIS REGIONAL ACADEMIC NETWORK. THE NEED FOR FACULTY INVOLVEMENT, THE NEED FOR GOOD DOCUMENTATION, THE PROBLEMS OF PRICING, AND OTHER TOPICS ARE BRIEFLY COVERED.
(ALSO UNDER 5.1)

O'SULLIVAN, THOMAS C., EXPLOITING THE TIME-SHARING ENVIRONMENT, (RAYTHEON CO., SUDBURY, MA), PROCEEDINGS OF 22ND NATIONAL CONFERENCE, ASSOCIATION FOR COMPUTING MACHINERY, THOMPSON BOOK CO., WASHINGTON, DC, 1967, ACM CONFERENCE PROCEEDINGS, A.C.M. P-67, (LC 64-25615), P 169-175, 3 REFS

THE EXPERIENCES OF THE RAYTHEON SPACE AND INFORMATION DIVISION IN USING A NUMBER OF COMMERCIAL TIME-SHARING SYSTEMS ARE DISCUSSED. THE SYSTEMS ARE BRIEFLY COMPARATIVELY ANALYZED. AN UNSOPHISTICATED PBX TERMINAL NETWORK IS DESCRIBED WHICH ALLOWS ANY OF THE TERMINALS TO CONNECT TO ANY OF THE AVAILABLE SYSTEMS. ALSO INCLUDED IS THE DESCRIPTION OF A DESIGN OF A REMOTE TERMINAL INTERFACE COMPUTER WHICH CAN ALLOW A 'STANDARD' TERMINAL TO CONNECT TO ANY ACCESSIBLE COMPUTER SYSTEM.

3.2.0 GENERAL

AN INTRODUCTION TO THE USE OF DATA COMMUNICATIONS IN THE UNITED KINGDOM, PLIENER ASSOCIATES LTD., LEEDS, (ENGLAND), 1972, 39P

THIS DOCUMENT ADDRESSES TELECOMMUNICATIONS AT THE INTRODUCTORY LEVEL. PRACTICAL INFORMATION IS PRESENTED AND TERMINOLOGY DISCUSSED AT THE NOVICE LEVEL IN COMMUNICATIONS. TARIFF SUMMARIES AND TECHNIQUES DESCRIBED ARE RELATED TO ACTIVITIES IN THE UNITED KINGDOM.

ATKINSON, D. M., U. C. STRAHLENDORF, THE PROBABLE FUTURE OF CANADIAN LONG HAUL DIGITAL DATA NETWORK CONNECTIONS WITH THE U.S.A., (BELL CANADA), JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON

3.2.0 GENERAL

COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 10-15
(ANNOTATION UNDER 3.1.1)

FARBER, DAVID J., KENNETH C. LARSON, THE SYSTEM ARCHITECTURE OF THE DISTRIBUTED COMPUTER SYSTEM--THE COMMUNICATIONS SYSTEM, (PRESENTED AT, SYMPOSIUM ON COMPUTER NETWORKS, APRIL 1972), CALIFORNIA, UNIV. OF, IRVINE, 1972, NSF GJ-1045, 169P, 9 REFS

THIS IS A GENERAL DESCRIPTION OF THE COMMUNICATIONS SYSTEM FOR A RING STRUCTURE EXPERIMENTAL COMPUTER NETWORK. IT INTRODUCES A MECHANISM FOR AN ASSOCIATIVE STORE AT THE NETWORK INTERFACE FOR EACH PROCESSOR THAT CONTAINS THE 'NAMES' OF ALL PROCESSES PRESENTLY RESIDING WITHIN THE ATTACHED PROCESSOR TO FACILITATE INTER-PROCESS MESSAGE ADDRESSING.

GABLER, HERMANN G., THE GERMAN EOS NETWORK, (DEUTSCHE BUNDESPOST, DARMSTADT, (WEST GERMANY)), FERNMELDETECHNISCHES ZENTRALAMT),
JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 80-85, 8 REFS
(ANNOTATION UNDER 3.1.0)

HINKELMAN, ROBERT M., PLANNING A DATA COMMUNICATIONS SYSTEM. PART 2: COMMON CARRIER FACILITIES (CONTINUED), (AMERICAN TELEPHONE AND TELEGRAPH CO., CAMDEN, NJ),
MODERN DATA, VOL 3, ISSUE 6, JUN 70, P 62-64, 66

THIS IS A CONTINUATION OF THE ARTICLE BY HINKELMAN, 'PLANNING A DATA COMMUNICATIONS SYSTEM, PART 2-COMMON CARRIER FACILITIES.'

HINKELMAN, ROBERT M., PLANNING A DATA COMMUNICATIONS SYSTEM. PART 2: COMMON CARRIER FACILITIES, (AMERICAN TELEPHONE AND TELEGRAPH CO., CAMDEN, NJ),
MODERN DATA, VOL 3, ISSUE 5, MAY 70, P 76-80

THE USE OF THE PUBLIC SWITCHED NETWORK TO CONNECT TELETYPEWRITER TERMINALS TO REMOTELY ACCESSIBLE COMPUTERS IS OUTLINED.

MARILL, THOMAS, A COOPERATIVE NETWORK OF TIME-SHARING COMPUTERS: PRELIMINARY STUDY, COMPUTER CORP. OF AMERICA, CAMBRIDGE, MA, 1 JUN 66, CCA TR-11, 52P, 6 REFS
(ANNOTATION UNDER 3.0)

MARTIN, J., TELECOMMUNICATIONS AND THE COMPUTER, PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1969, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 78-76038), 470P, 47 REFS
(ANNOTATION UNDER 1.3)

3.2.1 FACILITIES

ABRAMSON, NORMAN, THE ALOHA SYSTEM--ANOTHER ALTERNATIVE FOR COMPUTER COMMUNICATIONS, (HAWAII, UNIV. OF, HONOLULU), AFIPS PROCEEDINGS. 1970 FALL JOINT COMPUTER CONFERENCE. VOLUME 37, (HOUSTON, TX, NOVEMBER 17-19, 1970), AFIPS PRESS, MONTVALE, NJ, 1970, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 281-285, 13 REFS
(ANNOTATION UNDER 3.1.0)

ABRAMSON, NORMAN, THE ALOHA SYSTEM, HAWAII, UNIV. OF, HONOLULU, JAN 72, UH TR-B72-1, NASA NAS2-6700, AF F44620-69-C-0030, 30P, 16 REFS

A RADIO FREQUENCY COMMUNICATIONS SYSTEM IS DESCRIBED USING AN UNCONVENTIONAL MULTIPLEXING TECHNIQUE. RANDOM ACCESS MULTIPLEXING IS ALLOWED AND RETRANSMISSION WITH TIME DELAYS IS USED TO RESOLVE PROBLEMS OF INTERFERENCE. A MATHEMATICAL ARGUMENT IS PRESENTED ATTEMPTING TO DEFINE PRACTICAL CHANNEL UTILIZATION (LOW PROBABILITY OF INTERFERENCE) USING THE RANDOM MULTIPLEXING TECHNIQUE, BUT THE ARGUMENT IS DEVELOPED FOR A VERY SPECIFIC TYPE OF DATA TRANSFER -- 80 OR 40 CHARACTERS AT A TIME. THE SYSTEM DESERVES ATTENTION BECAUSE IT IS A DEFINITE ATTEMPT TO GEAR THE COMMUNICATIONS SYSTEM TO THE CHARACTERISTICS OF THE USER (BURST USAGE IS THE ASSUMPTION) AND MORE FULLY UTILIZE CHANNEL CAPACITY.
(ALSO UNDER 3.1.1)

ANDREAE, SYPKO W., ROBERT W. LAFORE, JR., AN ERROR-CORRECTING DATA LINK BETWEEN SMALL AND LARGE COMPUTERS, (CALIFORNIA, UNIV. OF, BERKELEY, LAWRENCE RADIATION LAB.),
AFIPS PROCEEDINGS. 1968 SPRING JOINT COMPUTER CONFERENCE. VOLUME 32, (ATLANTIC CITY, NJ, APRIL 30-MAY 2, 1968), THOMPSON BOOK CO., WASHINGTON, DC, 1968, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 105-110

A UNIQUE SOLUTION TO A CRUCIAL DESIGN PROBLEM IN CREATING HIERARCHICAL COMPUTER NETWORKS UTILIZING SMALL COMPUTERS IN LABORATORY OR OTHER SETTINGS IS PRESENTED. THIS SCHEME USES MULTIPLE PARALLEL TWISTED PAIRS AND FULL ECHOING FOR ERROR DETECTION. SPECIAL ATTENTION IS GIVEN TO MINIMIZING THE HARDWARE AND SOFTWARE REQUIRED FOR ERROR CHECKING. IN DIVERTING FROM MORE CONVENTIONAL COMMUNICATIONS FACILITIES THE PAPER SHOWS LITTLE APPRECIATION FOR THE 'UNDETECTED ERROR' CONCEPT IN EVALUATING COMMUNICATION LINK PERFORMANCE.

ANSLOW, N. G., J. HANSCOTT, IMPLEMENTATION OF INTERNATIONAL DATA EXCHANGE NETWORKS, (BOAC, LONDON AIRPORT, (ENGLAND)), WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 181-184

SOME OF THE PROBLEMS INVOLVED WITH CONSTRUCTING A DATA TRANSMISSION NETWORK FOR USE ON AN INTERNATIONAL AND INTERCONTINENTAL BASIS ARE REVIEWED. THE PAPER DISCUSSES THE TECHNICAL DIFFICULTIES OF GETTING STANDARD VOICE GRADE TELEPHONE CHANNELS SUITABLY CONDITIONED FOR THE TRANSMISSION OF DATA AT MEDIUM/HIGH SPEEDS, PARTICULARLY IN THE ABSENCE OF AGREED UPON INTERNATIONAL STANDARDS FOR SOME PARAMETERS WHICH ARE ESSENTIAL TO ACHIEVING A SATISFACTORY BIT ERROR RATE. THE PAPER ALSO DISCUSSES THE ADMINISTRATIVE AND CONTROL PROBLEMS OF OPERATING A DATA NETWORK TOGETHER WITH THE PRACTICAL DIFFICULTIES OF ACHIEVING AND MAINTAINING ITS PERFORMANCE TO A CONSISTENTLY HIGH STANDARD. THE INTER-RELATIONSHIP BETWEEN MEDIUM/HIGH SPEED DATA TRANSMISSION FACILITIES AND THE CONVENTIONAL LOW SPEED TELEGRAPH NETWORK IS NOTED AND SOME THOUGHTS ARE OFFERED FOR FUTURE DEVELOPMENTS.
(ALSO UNDER 5.1)

CHU, WESLEY W., A STUDY OF ASYNCHRONOUS TIME DIVISION MULTIPLEXING FOR TIME-SHARING COMPUTER SYSTEMS, (CALIFORNIA, UNIV. OF, LOS ANGELES, DEPT. OF COMPUTER SCIENCE),
AFIPS PROCEEDINGS. 1969 FALL JOINT COMPUTER CONFERENCE. VOLUME 35, (LAS VEGAS, NV, NOVEMBER 18-20, 1969), AFIPS PRESS, MONTVALE, NJ, 1969, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 669-678, 17 REFS

THIS IMPORTANT CONTRIBUTION TO THE LITERATURE ON COMPUTER-TO-TERMINAL COMMUNICATIONS IS CONCERNED WITH ASYNCHRONOUS TIME DIVISION MULTIPLEXING TO EFFICIENTLY USE A TRANSMISSION CIRCUIT ON A TIME-SHARED BASIS. EACH TRANSMITTED MESSAGE REQUIRES AN ADDRESS, AND BUFFERING IS REQUIRED TO HANDLE RANDOM MESSAGE ARRIVALS, BOTH AT THE COMPUTER AND USER ENDS OF THE CIRCUIT. SINCE THE FEASIBILITY OF ASYNCHRONOUS MULTIPLEXING DEPENDS ON AN ACCEPTABLY LOW BUFFER OVERFLOW PROBABILITY AND EXPECTED MESSAGE QUEUING DELAY DUE TO BUFFERING, AN ANALYSIS OF THE STATISTICAL BEHAVIOR OF THE BUFFER IS PRESENTED. THIS IS DONE BOTH FOR THE USER-TO-COMPUTER BUFFER AND FOR THE COMPUTER-TO-USER BUFFER.

COX, KENNETH A., THE PROMISE AND PERIL OF COMPETITION IN INTERCITY COMMUNICATIONS, (MCI COMMUNICATIONS CORP., WASHINGTON, DC),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 434-440, 8 REFS
(ANNOTATION UNDER 5.4)

DATA TRANSMISSION NETWORK COMPUTER-TO-COMPUTER STUDY, COMPUTER SCIENCES CORP., FALLS CHURCH, VA, 1971, (AD-729 695), 153P, 24 REFS

DATA TRANSMISSION METHODS FOR 50 KILOBIT PER SECOND COMPUTER-TO-COMPUTER COMMUNICATIONS USING PRIMARILY SATELLITE LINKS ARE DISCUSSED. THERE IS NO EXPLANATION OF THE NEED FOR THIS HIGH DATA RATE. THE EMPHASIS IS ON VARIOUS APPROACHES TO MINIMIZING THE END-TO-END ERROR RATE FOR SUCH HIGH BANDWIDTH DATA COMMUNICATIONS.

GAN, DIWAKAR G., OPTICAL LINKS FOR COMMUNICATIONS IN LOCAL DISTRIBUTION, (DATA TRANSMISSION CO., VIENNA, VA),
JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS,

3.2.1 FACILITIES

(PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 86-95, 12 REFS

THE ADVANTAGES OF OPTICAL DATA COMMUNICATION LINKS ARE DESCRIBED, ATMOSPHERIC EFFECTS ARE ANALYZED, AND OPTICAL DETECTION TECHNIQUES ARE EVALUATED.

HAYES, J. F., D. N. SHERMAN, TRAFFIC AND DELAY IN A CIRCULAR DATA NETWORK, (BELL TELEPHONE LABS. INC., HOLMDEL, NJ), JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 102-107, 8 REFS
(ANNOTATION UNDER 2.1.2)

HUSTED, JOHN M., CURRENT AND NEAR FUTURE DATA TRANSMISSION VIA SATELLITES OF THE INTELSAT NETWORK, (COMSAT LABS., CLARKSBURG, MD),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 358-363, 6 REFS

DATA TRANSMISSION PERFORMANCE CHARACTERISTICS FOR THE INTELSAT SATELLITE NETWORK, WHICH PRESENTLY USES CONVENTIONAL FREQUENCY-DIVISION MULTIPLEXING, ARE DETAILED. IN ADDITION, PROJECTIONS ARE MADE FOR THE VERY NEAR FUTURE FOR OPERATIONAL SERVICE WHICH WILL PROVIDE DATA CHANNELS WHOSE QUALITY CAN BE VARIED TO SATISFY A RANGE OF BIT ERROR RATE PERFORMANCE SPECIFICATIONS.

KAPLAN, SIDNEY J., THE ADVANCING COMMUNICATION TECHNOLOGY AND COMPUTER COMMUNICATION SYSTEMS, (WESTERN UNION TELEGRAPH CO., MAHWAH, NJ),
AFIPS PROCEEDINGS, 1968 SPRING JOINT COMPUTER CONFERENCE, VOLUME 32, (ATLANTIC CITY, NJ, APRIL 30-MAY 2, 1968), THOMPSON BOOK CO., WASHINGTON, DC, 1968, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 119-133, 3 REFS

RECENT ADVANCES IN COMMUNICATIONS TECHNOLOGY ALONG WITH NEW AND IMPROVED COMMUNICATIONS SERVICES PERMITTED BY THESE ADVANCES ARE OUTLINED. THE CHANGING COMPUTER COMMUNICATIONS REQUIREMENTS ARE ALSO PRESENTED. T1 CARRIER, MICROWAVE TRANSMISSION, MULTIPLEXING, SWITCHING AND STORE-AND-FORWARD TECHNIQUES ARE ALL BRIEFLY DESCRIBED.

KRETZMER, E. R., MODERN TECHNIQUES FOR DATA COMMUNICATION OVER TELEPHONE CHANNELS, (BELL TELEPHONE LABS. INC., HOLMDEL, NJ),
INFORMATION PROCESSING 68; PROCEEDINGS OF IFIP CONGRESS 1968, VOLUME 2--HARDWARE, APPLICATIONS, (EDINBURGH, (SCOTLAND), AUGUST 5-10, 1968), NORTH-HOLLAND PUBLISHING CO., AMSTERDAM, (NETHERLANDS), 1969, IFIP CONGRESS PROCEEDINGS, (LC 65-24118), P 716-722, 10 REFS

METHODS FOR INCREASING COMMUNICATION CHANNEL UTILIZATION ARE DESCRIBED. PHASE-SHIFT KEYING AND OTHER TECHNIQUES AND THEIR UTILITY IN MULTIPLYING EFFECTIVE BANDWIDTH ARE DISCUSSED. ALSO DISCUSSED ARE EQUALIZATION AND ERROR CONTROL TO COPE WITH THE INCREASED SENSITIVITY OF THOSE TECHNIQUES TO NOISE AND OTHER CIRCUIT PARAMETERS.

LISSANDRELLO, GEORGE J., WORLD DATA COMMUNICATIONS AS SEEN BY THE DATA PROCESSING SYSTEMS DESIGNER, (IBM WORLD TRADE CORP., NEW YORK),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 130-136

THE COMPARATIVE ECONOMICS OF DATA COMMUNICATIONS IN SEVERAL COUNTRIES IS DISCUSSED. DIFFERENCES IN THE TARIFF STRUCTURES IN THESE COUNTRIES ARE PRESENTED ALONG WITH A COMPARISON OF BREAK-EVEN COST JUSTIFICATION OF LEASED VERSUS SWITCHED FACILITIES. ALSO INCLUDED ARE AVAILABILITY STATISTICS BY COUNTRY OF LEASED POINT-TO-POINT, LEASED MULTIPOINT, SWITCHED TELEPHONE, AND SWITCHED TELETYPEWRITER FACILITIES.
(ALSO UNDER 1.2)

MAKINO, YASUO, COMPETITION IN THE FIELDS OF COMPUTERS AND COMMUNICATIONS IN JAPAN, (MINISTRY OF POSTS AND TELECOMMUNICATIONS, TOKYO, (JAPAN)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 441-444
(ANNOTATION UNDER 5.4)

OHLMER, AUGUST, SUMMARY OF THE EXISTING DATA COMMUNICATIONS SERVICES IN WESTERN EUROPE AND TENTATIVE FORECAST OF NEW SERVICES FOR THE NEXT DECADE, (BUNDESMINISTERIUM FUER DAS POST UND FERNMELDEWESEN, (WEST GERMANY)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 260-266
(ANNOTATION UNDER 1.6)

O'NEIL, D. R., ERROR CONTROL FOR DIGITAL DATA TRANSMISSION OVER TELEPHONE NETWORKS, MITRE CORP., BEDFORD, MA, MAY 65, MC TM-04113, AF 19(628)-2390, (AF-ESD TR-65-87, AD-616 678), 48P, 27 REFS

THE PRESENTATION OF ERROR CONTROL TECHNIQUES FOR BINARY DIGITAL DATA TRANSMISSION OVER COMMERCIAL TELEPHONE NETWORKS CONTAINED IN THIS REPORT COVERS ERROR CONTROL ALGORITHMS, ERROR STATISTICS FOR DIGITAL DATA ON TELEPHONE LINES, AND PERFORMANCE EVALUATION OF THE RELEVANT STATISTICAL TECHNIQUES. HARDWARE ERROR CONTROL DEVICES ARE ALSO SURVEYED.
(ALSO UNDER 2.2)

SEGAL, M., A PREEMPTIVE PRIORITY MODEL WITH TWO CLASSES OF CUSTOMERS, (BELL TELEPHONE LABS. INC., HOLMDEL, NJ),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 168-174, 3 REFS
(ANNOTATION UNDER 2.1.2)

SPRAGINS, JOHN D., ANALYSIS OF LOOP TRANSMISSION SYSTEMS, (INTERNATIONAL BUSINESS MACHINES CORP., RALEIGH, NC),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 175-182, 7 REFS
(ANNOTATION UNDER 2.1.2)

STAMBLER, LEON, ELEMENTARY TELEPHONE SWITCHING THEORY APPLIED TO THE DESIGN OF MESSAGE SWITCHING SYSTEMS, (RADIO CORP. OF AMERICA, NEW YORK, DIV. OF COMMUNICATION SYSTEMS),
AFIPS PROCEEDINGS, 1966 FALL JOINT COMPUTER CONFERENCE, VOLUME 29, (SAN FRANCISCO, CA, NOVEMBER 7-10, 1966), SPARTAN BOOKS INC., WASHINGTON, DC, 1966, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 413-423, 5 REFS

THE AUTHOR SYSTEMATICALLY DEVELOPS A MODEL OF A MESSAGE SWITCHED SYSTEM BASED ON TELEPHONE SWITCHING THEORY. EFFECTIVENESS OF THE MESSAGE SWITCH IS MEASURED IN TERMS OF TRUNK UTILIZATION. THE TECHNIQUES PROVIDE A MEANS FOR STUDYING CHANNEL COORDINATION AND HARDWARE/SOFTWARE TRADEOFFS.
(ALSO UNDER 2.1.2)

SUNG, R., J. B. WOODFORD, STUDY OF COMMUNICATION LINKS FOR THE BIOMEDICAL COMMUNICATIONS NETWORK, AEROSPACE CORP., EL SEGUNDO, CA, DIV. OF SATELLITE SYSTEMS, 29 MAY 69, AC ATR-69(7130-06)-1, NIH PH-43-68-991, 278P, 56 REFS

THE TECHNICAL AND ECONOMIC ASPECTS OF PROVIDING THE COMMUNICATIONS LINKS FOR A BIOMEDICAL COMMUNICATIONS NETWORK ARE OUTLINED. A VARIETY OF POTENTIAL COMMUNICATION LINKS ARE CONSIDERED, BUT SATELLITE LINKS RECEIVE SPECIAL ATTENTION, AND IT IS SHOWN UNDER WHAT CONDITIONS THEY BECOME ECONOMICALLY FAVORABLE. THE TECHNOLOGICAL DISCUSSION IS PRECEDED BY A DESCRIPTION OF BIOMEDICAL COMMUNICATIONS APPLICATIONS.
(ALSO UNDER 1.1)

TRAFTON, P. J., H. A. BLANK, N. F. MCALLISTER, DATA TRANSMISSION NETWORK COMPUTER-TO-COMPUTER STUDY, (COMPUTER SCIENCES CORP., FALLS CHURCH, VA),

3.2.1 FACILITIES

JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS; 1971, IEEE CAT-71C59-C, P 183-191, 16 REFS

ERROR CONTROL IS STUDIED FOR COMPUTER-TO-COMPUTER COMMUNICATIONS USING A SATELLITE LINK WITH INTERCONNECTING LAND LINES. THE OBJECTIVE IS TO ACHIEVE AN EFFECTIVE ERROR RATE OF ONE IN ONE HUNDRED MILLION BITS. THE TECHNIQUES ANALYZED ARE FORWARD ERROR CORRECTING (FEC) AND AUTO REPEAT REQUEST (ARQ). THE CONCLUSIONS ARE THAT ARQ IS A CLEAR CHOICE FOR SEPARATE ERROR CONTROL ON INDIVIDUAL INTERCONNECTING LINKS. FEC WINS IN THE END ERROR CONTROL CASE.

WALKER, PHILIP M., STUART L. MATHISON, SPECIALIZED COMMON CARRIERS, (GEORGETOWN, UNIV. OF, WASHINGTON, DC, LAW CENTER, LITTLE (ARTHUR D.) INC., CAMBRIDGE, MA), TELEPHONE ENGINEER AND MANAGEMENT, 15 OCT 71, P 41-60, 8 REFS
(ANNOTATION UNDER 1.6)

3.2.2 SYSTEM DESIGN

DAVIES, D. W., COMMUNICATION NETWORKS TO SERVE RAPID-RESPONSE COMPUTERS, (NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND)), INFORMATION PROCESSING 68; PROCEEDINGS OF IFIP CONGRESS 1968, VOLUME 2--HARDWARE, APPLICATIONS, (EDINBURGH, (SCOTLAND), AUGUST 5-10, 1968), NORTH-HOLLAND PUBLISHING CO., AMSTERDAM, (NETHERLANDS), 1969, IFIP CONGRESS PROCEEDINGS, (LC 65-24118), P 650-658, 4 REFS

STORE-AND-FORWARD TECHNIQUES ARE PROPOSED AS A PROMISING ALTERNATIVE FOR DATA COMMUNICATIONS IN A NETWORKING ENVIRONMENT. EXISTING NETWORK SCHEMES ARE IDENTIFIED AND THE ADVANTAGES OF THE MESSAGE CONCENTRATION NETWORK OVER THE MULTI-DROP NETWORK ARE DETAILED. A DISCUSSION ON AVAILABLE COMMUNICATION TECHNIQUES IS INSERTED AND PULSE CODE MODULATION IS DISCUSSED IN SOME DETAIL.

DELL, F. R. E., FEATURES OF A PROPOSED SYNCHRONOUS DATA NETWORK, (UNITED KINGDOM POST OFFICE, LONDON, DEPT. OF TELECOMMUNICATIONS DEVELOPMENT), JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS; 1971, IEEE CAT-71C59-C, P 50-57
(ANNOTATION UNDER 3.1.0)

DESPRES, REMI F., A PACKET SWITCHING NETWORK WITH GRACEFUL SATURATED OPERATION, (CENTRE, NATIONAL D'ETUDES DES TELECOMMUNICATIONS (CNET), ISSY LES MOULINEAUX, (FRANCE)), WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 345-351, 14 REFS

A CONCEPTUAL SPECIFICATION FOR A PACKET SWITCHING NETWORK DESIGNED TO OPERATE UNDER A SATURATED CONDITION IS PRESENTED. IT COMPRISES FIXED ROUTING, I.E., A VIRTUAL CIRCUIT IS ESTABLISHED BETWEEN TWO CORRESPONDENTS, PRIVATE BUFFERING ALLOCATING A BUFFER FOR EACH CIRCUIT, PACKET HANDSHAKING INDICATING THE FREEING OF A BUFFER FOR THE NEXT TRANSMISSION, AND VARIABLE PACKET LENGTH. PRIVATE BUFFERING HAS ADVANTAGES, BUT IT REQUIRES CONSIDERABLE STORAGE SPACE. PACKET HANDSHAKING REQUIRES ADDITIONAL STORAGE SPACE TO GUARANTEE ACCEPTANCE OF THE ACKNOWLEDGMENT AND TO AVOID A LOCKOUT. VARIABLE PACKET LENGTH REQUIRES OVERHEAD IN BUFFER ALLOCATION AND COLLECTION. THESE FACTORS SHOULD BE CONSIDERED IN EVALUATING THIS PROPOSAL.
(ALSO UNDER 3.4)

FOSTER, D. F., L. S. NIDUS, J. M. VENE, MACIMS COMMUNICATION NETWORK CONFIGURATION, MITRE CORP., BEDFORD, MA, 31 JUL 71, MC MTR-2176, AF F1962B-71-C-0002, 168P, 20 REFS

THE MILITARY AIRLIFT COMMAND (MAC) INFORMATION MANAGEMENT SYSTEM (MACIMS) IS A FUNCTIONALLY INTEGRATED COMMAND, CONTROL AND MANAGEMENT INFORMATION SYSTEM WHICH WILL AID MAC IN ACHIEVING A MAJOR IMPROVEMENT IN CONTROL AND MANAGEMENT OF THE MAC FLEET. THE MACIMS SYSTEM INCLUDES THREE DATA PROCESSING CENTERS TOGETHER WITH FIFTEEN REMOTE BASES WHICH HAVE ACCESS TO THE PROCESSING CENTERS ON AN INTERACTIVE BASIS. MACIMS RELIES EXTENSIVELY ON A COMMUNICATION NETWORK FOR DATA EXCHANGE BETWEEN PROCESSING CENTERS AND TO PROVIDE REMOTE USERS WITH INTERACTIVE ACCESS TO THE DATA PROCESSING EQUIPMENT. A DATA COMMUNICATIONS SUBSYSTEM FOR MACIMS IS DESCRIBED IN THIS REPORT WHICH WILL MEET CURRENTLY DEFINED REQUIREMENTS. THE TECHNICAL DESCRIPTION IS BASED ON INDIVIDUAL CONSIDERATIONS AT EACH REMOTE SITE. THE PROPOSED TERMINAL CONFIGURATIONS FOR THE REMOTE BASES INCLUDE A MIXTURE OF MULTIPLEXERS, MINICOMPUTERS AND CONTROLLERS FOR MULTI-DROP LINES. A DESCRIPTION OF THE TERMINALS IS ALSO INCLUDED.

GRISETTI, ROBERT S., THE SYNTHESIS OF COMMUNICATIONS AND COMPUTERS, (WESTERN UNION TELEGRAPH CO.), GRUENBERGER, F., COMPUTERS AND COMMUNICATIONS--TOWARD A COMPUTER UTILITY, PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1968, (TK 5101.G67, LC 68-16776), P 209-219

WESTERN UNION'S ISCS (INFORMATION SERVICE COMPUTER SYSTEM) WHICH IS A PUBLIC MESSAGE SERVICE IS DESCRIBED. THE ISCS CONSISTS OF PROCESSOR CENTERS (PC'S) AT SAN FRANCISCO, CHICAGO, AND NEW YORK WHICH PERFORM ALL LOGICAL FUNCTIONS ASSOCIATED WITH PROCESSING AND TRANSMITTING MESSAGES. EACH PC IS CONNECTED TO A COMMUNICATION CENTER (CC) AND ALL CC'S ARE INTERCONNECTED. THE CC'S ARE USED FOR TERMINAL SERVICING AND LINE INTERACTIONS. BOTH PC'S AND CC'S ARE UNIVAC 418'S. NO INFORMATION IS GIVEN ON THE HOW PC'S AND CC'S ACTUALLY PROCESS MESSAGES INTERNALLY.
(ALSO UNDER 4.3)

HITTEL, L. A., SOME PROBLEMS IN DATA COMMUNICATIONS BETWEEN THE USER AND THE COMPUTER, (GENERAL ELECTRIC CO., PHOENIX, AZ), AFIPS PROCEEDINGS. 1966 FALL JOINT COMPUTER CONFERENCE. VOLUME 29, (SAN FRANCISCO, CA, NOVEMBER 7-10, 1966), SPARTAN BOOKS INC., WASHINGTON, DC, 1966, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 395-402
(ANNOTATION UNDER 1.3)

JANSKY, CURTIS M., STRATEGIES FOR MAXIMUM COST EFFECTIVENESS OF A SWITCHED NETWORK, (ADVANCED TECHNOLOGY SYSTEMS INC., ARLINGTON, VA), TELECOMMUNICATIONS, VOL 6, ISSUE 4, APR 72, P 25-28, 30, 32, 21 REFS

THIS ARTICLE CONTAINS A POTPOURRI OF INFORMATION OF INTEREST TO THE DESIGNER OF DATA COMMUNICATIONS SYSTEMS. THE SYSTEM CONCEPTS EMPHASIZED HERE ARE BASED ON THE STRATEGY OF UTILIZING 'TIME' AS AN OPERATIONAL PARAMETER IN THE FUNCTIONING OF THE SYSTEM. THIS PARAMETER IS APPLIED TO SUCH DIVERSE ANALYSES AS SATISFYING HUMAN REAL-TIME REQUIREMENTS AND DETERMINING THE NUMBER OF GATES IN THE LOGIC CIRCUITRY NEEDED FOR A DATA TERMINAL.

OSSANNA, JOSEPH F., IDENTIFYING TERMINALS IN TERMINAL-ORIENTED SYSTEMS, (BELL TELEPHONE LABS. INC., MURRAY HILL, NJ), JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS; 1971, IEEE CAT-71C59-C, P 148-152, 9 REFS

AN AUTOMATIC TERMINAL RECOGNITION ALGORITHM IS PRESENTED. TERMINAL PROPERTIES THAT PERMIT UNIQUE IDENTIFICATION ARE DISCUSSED AND AN ALGORITHM IS DESCRIBED WHICH ALLOWS AUTOMATIC RECOGNITION EITHER WHEN A TERMINAL IS CONNECTED (IF IT SPONTANEOUSLY SENDS A CHARACTER) OR AFTER THE USER SENDS A CHARACTER. THE LOW ORDER BITS OF THIS FIRST CHARACTER ARE USED FOR AUTOMATIC SPEED RECOGNITION AND THE REMAINING BITS CAN BE USED TO IDENTIFY OTHER PROPERTIES OF THE TERMINAL AS REQUIRED BY THE SYSTEM DESIGNER.

PAN, GEORGE S., CONFIGURATION OF AN EFFICIENT DATA COMMUNICATION SYSTEM, (SYSTEMS ARCHITECTS INC., RANDOLPH, MA); TELECOMMUNICATIONS, VOL 6, ISSUE 6, JUN 72, P 43-44, 48, 50, 52, 70

THE PROBLEMS OF COMMUNICATION SYSTEM PLANNING AND COST MINIMIZATION ARE ADDRESSED. GENERAL CONCEPTS AND A CHECKLIST OF RELEVANT CONSIDERATIONS ARE PRESENTED, BUT SPECIFIC TECHNIQUES ARE NOT DESCRIBED IN DETAIL.

SCANTLEBURY, R. A., A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--OBJECTIVES AND HARDWARE ORGANIZATION, NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE, OCT 69, NPL-DCS COM-SCI-T.M.29, 17P, 10 REFS
(ANNOTATION UNDER 3.1.1)

WILKINSON, P. T., A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--SOFTWARE ORGANIZATION, NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE, OCT 69, NPL-DCS COM-SCI-T.M.29, 20P, 6 REFS

3.2.2 SYSTEM DESIGN

(ANNOTATION UNDER 3.1.1)

3.2.3 HARDWARE

BARAN, PAUL, ON DISTRIBUTED COMMUNICATIONS: VIII. THE MULTIPLEXING STATION, RAND CORP., SANTA MONICA, CA, AUG 64, RC RM-3764-PR, AF 49(638)-700, (AD-444 831), 103P, 3 REFS

THIS REPORT PRESENTS THE DESIGN OF A MULTIPLEXER THAT INTERFACES BOTH TELETYPEWRITER AND SYNCHRONOUS CIRCUITS TO A DISTRIBUTED MESSAGE-SWITCHED NETWORK. A CORE PLUS DRUM MACHINE IS PROPOSED WITH A PUSH-BUTTON MANUAL SIGNALING SCHEME FOR MESSAGE ADDRESSING.

SCANTLEBURY, R. A., A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--OBJECTIVES AND HARDWARE ORGANIZATION, NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE, OCT 69, NPL-DCS COM-SCI-T.M.29, 17P, 10 REFS
(ANNOTATION UNDER 3.1.1)

SOBOLEWSKI, J. S., PROGRAMMABLE COMMUNICATION PROCESSORS, (WASHINGTON, STATE UNIV. OF, PULLMAN),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 380-389, 15 REFS

VARIOUS ASPECTS OF MINICOMPUTERS USED AS COMMUNICATION PROCESSORS ARE DESCRIBED. THE CONCEPTS OF CONCENTRATORS, COMMUNICATIONS CONTROLLERS, AND MESSAGE SWITCHERS ARE SUMMARIZED AND THE USE OF MINICOMPUTERS IN THESE ROLES IS DISCUSSED.

THE COMMUNICATIONS MINICOMPUTER, (TELECOMMUNICATIONS, DEDHAM, MA),
TELECOMMUNICATIONS, VOL 6, ISSUE 10, OCT 72, P 15-16, 18, 20, 22

THIS SURVEY IS USEFUL AS A GUIDE TO MINICOMPUTER SELECTION FOR USE IN DATA COMMUNICATIONS NETWORKS. AFTER A BRIEF INTRODUCTION TO THE CONCEPTS OF FRONT END PROCESSING, INTELLIGENT TERMINALS, MESSAGE SWITCHERS, AND CONCENTRATORS, A FACTUAL ONE LINE PER ENTRY SUMMARY IS PRESENTED ON MINICOMPUTERS SURVEYED THAT ARE USED IN THESE ROLES.
(ALSO UNDER 1.2)

3.2.9 OTHER

BHUSHAN, ABHAY K., ROBERT H. STOTZ, PROCEDURES AND STANDARDS FOR INTER-COMPUTER COMMUNICATIONS, (MASSACHUSETTS INST. OF TECH., CAMBRIDGE, ELECTRONICS SYSTEMS LAB.),
AFIPS PROCEEDINGS, 1968 SPRING JOINT COMPUTER CONFERENCE, VOLUME 32, (ATLANTIC CITY, NJ, APRIL 30-MAY 2, 1968), THOMPSON BOOK CO., WASHINGTON, DC, 1968, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 95-104, 24 REFS
(ANNOTATION UNDER 3.5)

BIRKE, DENNIS M., STATE-TRANSITION PROGRAMMING TECHNIQUES AND THEIR USE IN PRODUCING TELEPROCESSING DEVICE CONTROL PROGRAMS, (PITTSBURGH, UNIV. OF, PA, COMPUTER CENTER),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 21-31, 8 REFS

THE USE OF STATE-TRANSITION TECHNIQUES IN WRITING PROGRAMS FOR COMPLEX, TIMING DEPENDENT PROCESSES, E.G., TELEPROCESSING DEVICE CONTROL PROGRAMS, IS DESCRIBED. IT IS SHOWN HOW THESE TECHNIQUES MAY CONTRIBUTE TO SIMPLIFYING THE DEFINITION, IMPLEMENTATION, AND DEBUGGING OF CONTROL PROGRAMS.

CHU, WESLEY W., DEMULTIPLEXING CONSIDERATIONS FOR STATISTICAL MULTIPLEXORS, (CALIFORNIA, UNIV. OF, LOS ANGELES, DEPT. OF COMPUTER SCIENCE),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 32-38, 7 REFS

SOME VERY USEFUL INFORMATION IS PROVIDED FOR THE DESIGN OF STATISTICAL MULTIPLEXERS ABOUT BEHAVIOR OF THE DEMULTIPLEXER (REASSEMBLY) BUFFERS. THE RELATIONSHIPS AMONG BUFFER OVERFLOW PROBABILITY, BUFFER SIZE, TRAFFIC VOLUME, AVERAGE MESSAGE LENGTH, AND MESSAGE DESTINATION ARE ANALYZED.
(ALSO UNDER 2.1.2)

DUDICK, A. L., C. D. PACK, ROUND ROBIN SCHEDULING IN A COMPUTER COMMUNICATIONS SYSTEM WITH FINITE SWAP TIME AND STATISTICALLY MULTIPLEXED ARRIVALS, (BELL TELEPHONE LABS, INC., HOLMDEL, NJ),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 58-64, 15 REFS
(ANNOTATION UNDER 2.1.2)

HIROTA, KEN'ICHIRO, PUBLIC TELEPHONE NETWORK AND COMPUTER-COMMUNICATION, (NIPPON TELEGRAPH AND TELEPHONE PUBLIC CORP., TOKYO, (JAPAN)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 267-271

THE PUBLIC TELEPHONE NETWORK IN JAPAN IS DESCRIBED, EMPHASIZING ITS USE FOR DATA COMMUNICATION. A PUBLIC CALCULATION SERVICE CALLED 'DIALS' AVAILABLE THROUGH THE TELEPHONE NETWORK IS BRIEFLY DESCRIBED.

MANNING, ERIC G., NEWHALL LOOPS AND PROGRAMMABLE TDM TWO FACETS OF CANADIAN RESEARCH IN COMPUTER COMMUNICATIONS, (WATERLOO, UNIV. OF, (CANADA)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 338-342, 9 REFS

TWO CANADIAN RESEARCH PROPOSALS ARE PRESENTED. THESE ARE THE DEVELOPMENT OF THE NEWHALL LOOP CONCEPT TO SERVE AS THE COMMUNICATIONS SUBNET INTERCONNECTING THE SWITCHES OF A DISTRIBUTED STORE-AND-FORWARD NETWORK AND THE PROGRAMMABLE TIME DIVISION MULTIPLEXING CONCEPT AS A METHOD OF DYNAMICALLY VARYING THE BANDWIDTH ASSIGNED TO DATA 'CALLS'.

O'SULLIVAN, THOMAS C., SHADOW TELEPHONE NETWORKS FOR TIME-SHARING TERMINALS, (RAYTHEON CO., SUDBURY, MA, DEPT. OF ADVANCED SYSTEMS),
COMPUTERS AND AUTOMATION, VOL 15, ISSUE 10, OCT 66, P 38-39

DESCRIBED IN THIS BRIEF ARTICLE IS THE RAYTHEON TERMINAL SWITCHING NETWORK WHICH ALLOWS A NUMBER OF TERMINALS TO ACCESS A VARIETY OF TIME-SHARING SYSTEMS THROUGH A SIMPLE PBX SWITCHBOARD. SEE O'SULLIVAN'S ARTICLE 'EXPLOITING THE TIME-SHARING ENVIRONMENT' IN CATEGORY 3.1.2.

3.3 HARDWARE

SEDELOW, SALLY YEATES, WALTER A. SEDELOW, JR., LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR COMPUTATIONAL RESEARCH ON LANGUAGE (CE-NCOREL), KANSAS, UNIV. OF, LAWRENCE, 1972, NSF GJ-28599, 467P, 41 REFS
(ANNOTATION UNDER 4.2)

3.3.1 INTERFACES

BARBER, D. L. A., EASING THE INTRODUCTION OF A PACKET SWITCHING SERVICE, NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE, MAR 71, NPL-CSO COM-SCI-T.M.-52, 20P

3.3.1 INTERFACES

IT IS PROPOSED THAT NEW DATA NETWORKS BE DESIGNED WITH SOME COMPATIBILITY WITH EXISTING NETWORKS AND THAT EARLY AGREEMENT BE REACHED ON STANDARDS OF ALL TYPES. THEN THE REPORT GOES INTO DETAIL ON A PARTICULAR HARDWARE APPROACH FOR THE USER-NETWORK INTERFACE. A PHYSICAL BOX WITH BUTTONS AND LIGHTS IS DESCRIBED IN DETAIL AS THE SOLUTION TO BOTH FLOW CONTROL INTO THE NET AND SUCCESSFUL ESTABLISHMENT OF CONNECTIONS THROUGH THE NET. THE DISCUSSION IS QUITE DETAILED./ (ALSO UNDER 5.5)

BARBER, D. L. A., EXPERIENCE WITH THE USE OF THE B.S. INTERFACE IN COMPUTER PERIPHERALS AND COMMUNICATION SYSTEMS, NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE, OCT 69, NPL-DCS COM-SCI-T.M.29. 15P, 9 REFS

EXPERIENCE WITH THE USE OF THE BRITISH STANDARD SPECIFICATION 4422 WHICH IS A 'DIGITAL INPUT/OUTPUT INTERFACE FOR DATA COLLECTION SYSTEMS' IS DESCRIBED. ITS APPLICATION WITH PERIPHERAL DEVICES, COMPUTER I/O BUSES, CONNECTIONS TO DIRECT STORE, AND, OF SPECIAL INTEREST, ITS USE IN THE NATIONAL PHYSICAL LABORATORY NETWORK ARE ALL DISCUSSED. (ALSO UNDER 5.5)

TRIPATHI, PRABODH C., DESIGN CONSIDERATIONS FOR THE MENEHUNE-KAHUNA INTERFACE FOR THE ALOHA SYSTEM. A PRELIMINARY REPORT
DESIGN CONSIDERATIONS FOR THE MENEHUNE-KAHUNA INTERFACE FOR THE ALOHA SYSTEM. A PRELIMINARY REPORT, HAWAII, UNIV. OF, HONOLULU, AUG 69, UH TN-69-7, AF F44620-69-C-0030, 7P

THE ALOHA SYSTEM HARDWARE INTERFACE BETWEEN AN IBM 360/65 COMPUTER AND ITS NETWORK COMMUNICATIONS FRONT END, AN HP 2115A, IS DESCRIBED. THE STANDARD INTERFACE BETWEEN THE IBM 1827 DATA CONTROL UNIT AND THE IBM 360/65 IS BRIEFLY DESCRIBED AND A SPECIAL INTERFACE BETWEEN THE IBM 1827 AND THE HP 2115A IS DETAILED.

3.3.2 FRONT END & SWITCHING COMPUTERS

AMSTUTZ, STANFORD R., DISTRIBUTED INTELLIGENCE IN DATA COMMUNICATIONS NETWORKS, (HONEYWELL INFORMATION SYSTEMS INC., FRAMINGHAM, MA),
COMPUTER, VOL 4, ISSUE 6, NOV-DEC 71, P 26-32

THIS IS AN INFORMATIVE SUMMARY ON THE USE OF MINICOMPUTERS AS COMMUNICATIONS PROCESSORS BOTH AS FRONT ENDS TO CENTRAL COMPUTERS AND AS REMOTE TERMINAL CONCENTRATORS. IT IS SHOWN WHERE THE PROPER EMPLOYMENT OF MINICOMPUTERS CAN REMOVE SOME OF THE LOAD FROM A CENTRAL COMPUTER AND CAN REDUCE COMMUNICATIONS LINE CHARGES WHEN USED AS CONCENTRATORS. THE FUNCTIONS THAT A MINICOMPUTER CAN PERFORM AT THE CENTRAL COMPUTER AND REMOTE TERMINAL SITES ARE SPECIFIED.

AUPPERLE, ERIC M., MERIT COMPUTER NETWORK: HARDWARE CONSIDERATIONS, (MICHIGAN, UNIV. OF, ANN ARBOR),
RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3. COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 49-63
(ANNOTATION UNDER 3.1.1)

BALL, CHRISTOPHER J., COMMUNICATIONS AND THE MINICOMPUTER,
COMPUTER, VOL 4, ISSUE 5, SEP-OCT 71, P 13-21, 5 REFS
(ANNOTATION UNDER 1.3)

BARAN, PAUL, ON DISTRIBUTED COMMUNICATIONS: VII. TENTATIVE ENGINEERING SPECIFICATIONS AND PRELIMINARY DESIGN FOR A HIGH-DATA-RATE DISTRIBUTED NETWORK SWITCHING NODE, RAND CORP., SANTA MONICA, CA, AUG 64, RC RM-3763-PR, AF 49(638)-700, (AD-444 832), 85P, 5 REFS

THIS ENGINEERING SPECIFICATION FOR A SMALL COMPUTER BASED SWITCHING NODE FOR A MESSAGE SWITCHED DISTRIBUTED NETWORK UNFORTUNATELY WAS DONE SHORTLY BEFORE THE WIDESPREAD USE OF MINICOMPUTERS. CONSIDERABLE SPACE IS DEVOTED TO THE DESIGN OF SUCH A MACHINE AS THE BASE FOR A SWITCHING NODE.

BECHER, WILLIAM O., ERIC M. AUPPERLE, THE COMMUNICATIONS COMPUTER HARDWARE OF THE MERIT COMPUTER NETWORK, (MICHIGAN, UNIV. OF, DEARBORN, ENGINEERING DIV., MICHIGAN, UNIV. OF, ANN ARBOR, DEPT. OF ELECTRICAL ENGINEERING), IEEE TRANSACTIONS ON COMMUNICATIONS, VOL COM-20, ISSUE 3, JUN 72, P 516-526, 11 REFS

THIS ARTICLE DESCRIBES THE COMMUNICATIONS COMPUTER AND RELATED INTERFACES FOR THE MERIT COMPUTER NETWORK. THE MERIT NETWORK INTERCONNECTS THREE MICHIGAN UNIVERSITIES VIA DIALABLE VOICE-GRADE PHONE LINES. THE UNIVERSITY CENTERS ARE AUTONOMOUS AND INCLUDE TWO IBM 360 SYSTEMS AND A CDC 6600. THE COMMUNICATIONS COMPUTER IS A PDP-11. DETAILS OF THE HOST AND COMMUNICATIONS INTERFACES ARE PRESENTED.

BINDER, RICHARD, MULTIPLEXING IN THE ALOHA SYSTEM: MENEHUNE - KEIKI DESIGN CONSIDERATIONS, HAWAII, UNIV. OF, HONOLULU, NOV 69, HU TR-869-3, AF F4462D-69-C-0030, 41P, 4 REFS

A COMMUNICATIONS FRONT END IS DESCRIBED USING A TECHNOLOGY SIMILAR TO THAT OF THE ARPANET INTERFACE MESSAGE PROCESSOR. THE COMMUNICATIONS PROTOCOL IS SIMPLE WITH FIXED MESSAGE LENGTHS AND A ONE-WAY (FRONT END TO TERMINAL) ACKNOWLEDGEMENT SCHEME. THE OTHER SIGNIFICANT CONCEPTS IN ALOHA, NAMELY THE REPLACEMENT OF WIRE BY A RADIO CHANNEL AND THE RANDOM ACCESS CHANNEL, ARE VERY WELL DESCRIBED IN THE ABRAMSON ARTICLE 'THE ALOHA SYSTEM' IN CATEGORY 3.2.1.

BURNER, H. B., R. MILLION, O. W. RICHARD, J. S. SOBOLEWSKI, THE USE OF A SMALL COMPUTER AS A TERMINAL CONTROLLER FOR A LARGE COMPUTING SYSTEM, (WASHINGTON, STATE UNIV. OF, PULLMAN),
AFIPS PROCEEDINGS. 1969 SPRING JOINT COMPUTER CONFERENCE. VOLUME 34, (BOSTON, MA, MAY 14-16, 1969), AFIPS PRESS, MONTVALE, NJ, 1969, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 775-776

THIS ARTICLE BRIEFLY DESCRIBES THE USE OF AN INTERDATA MODEL 3 TO REPLACE AN IBM 2702 TERMINAL CONTROL UNIT.

COCANOWER, ALFRED B., MERIT COMPUTER NETWORK: SOFTWARE CONSIDERATIONS, (MICHIGAN, UNIV. OF, ANN ARBOR),
RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3. COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 65-77, 1 REFS
(ANNOTATION UNDER 3.1.1)

DORFF, ERVIN K., A MULTIPLE MINICOMPUTER MESSAGE SWITCHING SYSTEM, (COMPUTER COMMUNICATIONS INC., CULVER CITY, CA),
COMPUTER DESIGN, VOL 11, ISSUE 4, APR 72, P 67-73

HAVING FOUND MINICOMPUTERS TO BE IDEALLY SUITED FOR A VARIETY OF MESSAGE-SWITCHING AND FRONT-END COMMUNICATIONS TASKS, THE TREND IS NOW TO ASSIGN THEM ADDITIONAL TASKS. THIS ARTICLE DESCRIBES SUCH AN APPROACH BASED ON A MULTI-PROCESSOR MINICOMPUTER SYSTEM. EACH PROCESSOR IN THE COMPLEX IS DEDICATED TO A PARTICULAR SET OF FUNCTIONS, RATHER THAN BEING DYNAMICALLY ALLOCATED TO TASKS. AN ADDITIONAL SINGLE PROCESSOR IN THE SYSTEM CAN ACT AS BACKUP FOR ANY OF THE OTHERS.

ELLIS, T. O., E. F. HARSLEM, JOHN F. HEAFNER, K. U. UNCAPHER, ARPA NETWORK SERIES: I. INTRODUCTION TO THE ARPA NETWORK AT RAND AND TO THE RAND VIDEO GRAPHICS SYSTEM, RAND CORP., SANTA MONICA, CA, SEP 71, RC R-664-ARPA, ARPA DAHC-15-67-C-0141, (AD-733 049), 48P, 32 REFS
(ANNOTATION UNDER 3.1.D)

HEBDITCH, D. L., SOFTWARE DISPERSION: THE MINICOMPUTER IN DATA COMMUNICATIONS.(PRESENTED AT, SOFTWARE 72, CANTERBURY, (ENGLAND), JULY 24-26, 1972), (PLIENER ASSOCIATES LTD., LEEDS, (ENGLAND)),
VARIOUS ARTICLES AND PAPERS, PLIENER ASSOCIATES LTD., LEEDS, (ENGLAND), 1972, 15P, 11 REFS

THIS IS A REASONABLY GOOD TREATMENT OF THE VARIETY OF APPLICATIONS OF MINICOMPUTERS IN DATA COMMUNICATIONS SYSTEMS. THE EMPHASIS IS ON PROGRAMMING CONSIDERATIONS FOR MINICOMPUTERS TO PERFORM COMMUNICATIONS CONTROL TASKS. INCLUDED IS SOME SPECULATION ON THE LIKELY EFFECT OF MINICOMPUTERS AS COMMUNICATIONS CONTROLLERS ON EXISTING CPU COMMUNICATIONS CONTROL SOFTWARE.
(ALSO UNDER 3.4)

HOLMES, JAMES F., SPECIFYING A MESSAGE-SWITCHING COMPUTER, (BOOZ, ALLEN AND HAMILTON),
CONTROL ENGINEERING, VOL 12, ISSUE 2, FEB 65, P 89-92, 4 REFS

A SET OF SPECIFICATIONS IS PRESENTED FOR A MESSAGE SWITCHING COMPUTER DESIGNED TO TRANSFER DATA VARYING IN CODE, PRIORITY, AND SPEED AMONG DIFFERENT INPUT AND OUTPUT DEVICES. A SHORT JUSTIFICATION FOLLOWS EACH ELEMENT OF THE SPECIFICATION.

KAHN, ROBERT E., TERMINAL ACCESS TO THE ARPA COMPUTER NETWORK, (BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA),
RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3. COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 147-166

3.3.2 FRONT END & SWITCHING COMPUTERS

THIS PAPER DESCRIBES SOME OF THE FEATURES OF THE TERMINAL INTERFACE MESSAGE PROCESSOR (TIP) FOR THE ARPANET. TERMINALS ARE ABLE TO CONNECT TO THE ARPANET DIRECTLY THROUGH THE TIP WITHOUT THE NECESSITY OF A HOST COMPUTER. SOME INTERESTING QUESTIONS AND ANSWERS CONCERNING ERROR HANDLING ON THE ARPANET ARE INCLUDED.

NEWPORT, C. B., SMALL COMPUTERS IN DATA NETWORKS, (HONEYWELL INC., FRAMINGHAM, MA),
AFIPS PROCEEDINGS, 1969 SPRING JOINT COMPUTER CONFERENCE, VOLUME 34, (BOSTON, MA, MAY 14-16, 1969), AFIPS PRESS, MONTVALE, NJ, 1969, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 773-775

THE USE OF A MINICOMPUTER AS A REMOTE CONCENTRATOR IN THE AMERICAN AIRLINES SABRE SYSTEM AND AS A COMMUNICATIONS CONTROLLER IN A HONEYWELL H-164B TIME-SHARING SYSTEM IS BRIEFLY DESCRIBED. IT IS AN INTERESTING, BUT DATED, REPORT.

ORNSTEIN, S. M., FRANK E. HEART, WILLIAM R. CROWTHER, H. K. RISING, S. B. RUSSELL, A. MICHEL, THE TERMINAL IMP FOR THE ARPA COMPUTER NETWORK, (BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA),
AFIPS CONFERENCE, 1972 SPRING JOINT COMPUTER CONFERENCE, VOLUME 40, (ATLANTIC CITY, NJ, MAY 16-18, 1972), AFIPS PRESS, MONTVALE, NJ, 1972, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 243-254, 15 REFS

THE TERMINAL INTERFACE MESSAGE PROCESSOR (TIP) FOR THE ARPANET IS DESCRIBED. THE TIP PERMITS DIRECT TERMINAL ACCESS TO THE NETWORK, I.E., THE NETWORK CAN BE ACCESSED BY A TERMINAL USER WITHOUT A HOST COMPUTER. THE TIP IS ACTUALLY AN IMP (INTERFACE MESSAGE PROCESSOR) WITH THE ADDITION OF A MULTI-LINE CONTROLLER (MLC) TOGETHER WITH ADDITIONAL CORE AND SOFTWARE WHICH ALLOWS FOR THE CONNECTION OF TERMINALS TO THE IMP.

3.3.9 OTHER

GENTILE, R. B., J. R. LUCAS, JR., THE TABLON MASS STORAGE NETWORK, (DEPARTMENT OF DEFENSE, WASHINGTON, DC),
AFIPS CONFERENCE PROCEEDINGS, VOLUME 38, 1971, SPRING JOINT COMPUTER CONFERENCE, (ATLANTIC CITY, NJ, MAY 18-20, 1971), AFIPS PRESS, MONTVALE, NJ, 1971, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 345-356, 6 REFS

THE TABLON MASS STORAGE NETWORK WHICH PROVIDES SEVERAL TRILLION BITS OF ON-LINE STORAGE TO A NUMBER OF DISSIMILAR COMPUTERS CONNECTED TO THE NETWORK IS DESCRIBED. USER COMPUTERS, LOCAL OR REMOTE, SHARE THE COMMON STORAGE SYSTEM, WHICH INCORPORATES A PAIR OF PDP-10'S FOR NETWORK CONTROL, AN AMPEX TERABIT MEMORY, AND TWO IBM 1360 PHOTO STORAGE SYSTEMS. ALL COMPONENTS OF THE MASS STORAGE SYSTEM AND THE CONTROL SOFTWARE ARE DESCRIBED IN DETAIL.
(ALSO UNDER 4.3)

ROBERTS, LAWRENCE G., EXTENSIONS OF PACKET COMMUNICATION TECHNOLOGY TO A HAND HELD PERSONAL TERMINAL, (ADVANCED RESEARCH PROJECTS AGENCY, WASHINGTON, DC),
AFIPS CONFERENCE, 1972 SPRING JOINT COMPUTER CONFERENCE, VOLUME 40, (ATLANTIC CITY, NJ, MAY 16-18, 1972), AFIPS PRESS, MONTVALE, NJ, 1972, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 295-298, 11 REFS

THE FEASIBILITY OF A HAND HELD PERSONAL TERMINAL IS DISCUSSED AND ITS METHOD OF TRANSMITTING AND RECEIVING DATA USING RANDOM ACCESS RADIO TRANSMISSION TECHNIQUES IS DESCRIBED. THE TERMINAL AND ITS FUNCTIONAL CHARACTERISTICS ARE DESCRIBED IN DETAIL. THE PACKET COMMUNICATION TECHNOLOGY FOR THE TERMINAL WAS DEVELOPED UNDER THE ARPANET PROJECT.

3.4 SOFTWARE

ANDERSON, R. H., E. F. HARSLEM, JOHN F. HEAFNER, VINTON G. CERF, JAMES MADDEN, ROBERT M. METCALFE, A. SHOSHANI, JAMES WHITE, D. C. WOOD, THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION, (RAND CORP., SANTA MONICA, CA, CALIFORNIA, UNIV. OF, LOS ANGELES, ILLINOIS, UNIV. OF, URBANA, MASSACHUSETTS INST. OF TECH., CAMBRIDGE, SYSTEM DEVELOPMENT CORP., SANTA MONICA, CA, CALIFORNIA, UNIV. OF, SANTA BARBARA, MITRE CORP., WASHINGTON, DC),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 1-9, 9 REFS

IN INTRODUCTION TO THE PROBLEMS OF DATA COMPATIBILITY IN A NETWORK OF DISSIMILAR COMPUTERS LEADS TO A DESCRIPTION OF A DATA RECONFIGURATION SERVICE (DRS) BEING IMPLEMENTED ON THE ARPANET. THE DRS ALLOWS A PROGRAMMER TO DEFINE 'FORMS' THAT DESCRIBE DATA TRANSFORMATIONS AND STORES THE FORMS BY NAME. A USER CAN THEN EMPLOY THE SERVICE BY CALLING THE FORM TO ACCOMPLISH A PARTICULAR TRANSFORMATION OF A NETWORK DATA STREAM PASSING BETWEEN A USING PROCESS AND A SERVING PROCESS.

BENOIT, JOHN W., E. PEREZ, DESIGN SPECIFICATIONS FOR PWIN NON-FUNCTIONAL NETWORK CONTROL SOFTWARE, MITRE CORP., WASHINGTON, DC, 30 JUN 72, MC WP-9858, AF F1962B-71-C-0002, 245P, 4 REFS

THIS DOCUMENT CONTAINS THE DESIGN SPECIFICATIONS FOR THE NETWORK CONTROL SOFTWARE TO BE IMPLEMENTED ON THE HONEYWELL 6000 SERIES COMPUTERS FOR THE INITIAL PHASE OF THE PROTOTYPE WWMCCS (WORLD WIDE MILITARY COMMAND AND CONTROL SYSTEM) INTERCOMPUTER NETWORK. THIS NETWORK IS MODELED ON THE ARPA NETWORK, AND THIS DOCUMENT DESCRIBES IN DETAIL THE DESIGN OF THE NETWORK CONTROL PROGRAM. OF POSSIBLE INTEREST IS THE DESIGN DECISION TO LOCATE THE IMP INTERFACE SOFTWARE IN A FRONT-END COMPUTER (DATANET 355) WHILE THE SOFTWARE TO IMPLEMENT THE PROTOCOLS AND PROVIDE INTER-PROCESS COMMUNICATIONS IS LOCATED IN THE MAINFRAME.

BRANCH, JACK, DEFINE YOUR MESSAGE SWITCHING SOFTWARE NEEDS BEFORE YOU BUY, (INCOTEL LTD., NEW YORK),
COMPUTER DECISIONS, VOL 4, ISSUE 6, JUN 72, P 37-39

THIS BRIEF 'COOKBOOK' ARTICLE GIVES A SUGGESTED PROCEDURE FOR SPECIFYING MESSAGE-SWITCHING SOFTWARE: 1. DEFINE THE SYSTEM'S PURPOSE, 2. DETERMINE THE TYPES AND NUMBERS OF CIRCUITS NEEDED, 3. SPECIFY MESSAGE FORMATS, 4. ESTIMATE MESSAGE STATISTICS, 5. DESIGN A HANDLING METHOD FOR MESSAGES WITH IMPROPER FORMAT, 6. LIST ROUTING REQUIREMENTS, 7. LIST ALTERNATE ROUTING NEEDS, 8. PROVIDE MESSAGE PROTECTION DATA, 9. LIST REQUIREMENTS FOR A JOURNAL OF MESSAGE STATISTICS, 10. STATE MESSAGE RETRIEVAL NEEDS. THE TREATMENT IS SOMEWHAT SUPERFICIAL.

COCANOWER, ALFRED B., MERIT COMPUTER NETWORK: SOFTWARE CONSIDERATIONS, (MICHIGAN, UNIV. OF, ANN ARBOR),
RUSTIN, RANDALL, COURANT COMPUTER SCIENCE SYMPOSIUM 3, COMPUTER NETWORKS, (NOVEMBER 30-DECEMBER 1, 1970), PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1972, PRENTICE-HALL SERIES IN AUTOMATIC COMPUTATION, (LC 79-39373), P 65-77, 1 REFS
(ANNOTATION UNDER 3.1.1)

DESPRES, REMI F., A PACKET SWITCHING NETWORK WITH GRACEFUL SATURATED OPERATION, (CENTRE, NATIONAL D'ETUDES DES TELECOMMUNICATIONS (CNET), ISSY LES MOULINEAUX, (FRANCE)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 345-351, 14 REFS
(ANNOTATION UNDER 3.2.2)

FARBER, DAVID J., KENNETH C. LARSON, THE STRUCTURE OF A DISTRIBUTED COMPUTING SYSTEM--SOFTWARE, (PRESENTED AT, SYMPOSIUM ON COMPUTER-COMMUNICATIONS NETWORKS AND TELETRAFFIC, 1972), CALIFORNIA, UNIV. OF, IRVINE, 1972, NSF GJ-1045, 17P, 2 REFS

THIS WELL PREPARED DESCRIPTION OF A DISTRIBUTED NETWORK OF SMALL COMPUTERS ORGANIZED IN A RING CONFIGURATION UTILIZING HIGH BANDWIDTH COMMUNICATION CIRCUITS DESCRIBES BOTH HARDWARE AND SOFTWARE. MESSAGE ADDRESSING BETWEEN PROCESSES WITHIN ONE CPU OR BETWEEN CPU'S IS HANDLED IN A GENERAL, WELL-THOUGHT-OUT MANNER. SIMULATION AND PROTOTYPE IMPLEMENTATION OF THE NETWORK HAS ALREADY BEGUN.

FREDERICKSEN, D., R. W. RYNIKER, A COMPUTER NETWORK INTERFACE FOR OS/MVT, INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER, 5 APR 71, IBM-TJWRC RC-3317, 13P

SOFTWARE IMPLEMENTED UNDER OS/MVT (OPERATING SYSTEM FOR THE IBM 360/370) TO PROVIDE NETWORK FUNCTIONS FOR USER PROGRAMS IS DESCRIBED. THE REPORT PRESENTS A GENERAL DISCUSSION OF THE STRUCTURE OF THAT SOFTWARE. ITS RELATIONSHIP TO THE OPERATING SYSTEM AND THE DESIGN DECISIONS WHICH WERE MADE TO PROVIDE FOR CONVERSATIONAL COMMUNICATION AND THE TRANSFER OF JOBS AND DATA SETS BETWEEN SYSTEMS.

FREED, ROY N., PROTECTION OF PROPRIETARY SOFTWARE PROGRAMS IN THE UNITED STATES, (WIDETT AND WIDETT, BOSTON, MA),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 403-408, 6 REFS
(ANNOTATION UNDER 5.6)

HAIBT, L., A. MULLERY, DATA DESCRIPTIVE LANGUAGE FOR SHARED DATA, INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER, 28 JUL 71, IBM-TJWRC RC-3476, 1SP
(ANNOTATION UNDER 4.3)

HARRIS, DAVID O., JAMES A. HOWARD, ROGER C. WOOD, RESEARCH IN ON-LINE COMPUTATION, CALIFORNIA, UNIV. OF, SANTA BARBARA, 30 SEP 71, 1 JUL 70-31 AUG 71, AF F19620-70-C-0314, (AFCRL 71-0530, AD-735 300), 86P, 30 REFS
(ANNOTATION UNDER 4.2)

HEBDITCH, D. L., SOFTWARE DISPERSION: THE MINICOMPUTER IN DATA COMMUNICATIONS,(PRESENTED AT, SOFTWARE 72, CANTERBURY, (ENGLAND), JULY 24-26, 1972), (PLIENER ASSOCIATES LTD., LEEDS, (ENGLAND)),
VARIOUS ARTICLES AND PAPERS, PLIENER ASSOCIATES LTD., LEEDS, (ENGLAND), 1972, 1SP, 11 REFS
(ANNOTATION UNDER 3.3.2)

KAHN, ROBERT E., WILLIAM R. CROWTHER, FLOW CONTROL IN A RESOURCE-SHARING COMPUTER NETWORK, (BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 108-116, 13 REFS

THIS PAPER IS A TECHNICAL DISCUSSION DEVOTED TO NETWORK FLOW CONTROL, SPECIFICALLY IN RELATION TO THE ARPANET, AND IS PARTICULARLY CONCERNED WITH LOCKOUT AND LOCKOUT PREVENTION. SOURCE/DESTINATION FLOW CONTROL IS DISCUSSED FIRST AND THE MANIPULATION OF REASSEMBLY BUFFERS, RFNM'S (REQUEST FOR NEXT MESSAGE), AND PRIORITY HANDLING ARE EXPLAINED AND THEIR USE IN REASSEMBLY LOCKOUT IS DETAILED. STORE AND FORWARD FLOW CONTROL IS THEN CONSIDERED, INCLUDING LOCKOUT PROBLEMS AND SOLUTIONS USING BUFFER ALLOCATION, ACKNOWLEDGEMENT SCHEMES, AND OVERFLOW BUFFER ALLOTMENT.
(ALSO UNDER 2.0)

METCALFE, ROBERT M., STRATEGIES FOR OPERATING SYSTEMS IN COMPUTER NETWORKS, (MASSACHUSETTS INST. OF TECH., CAMBRIDGE, PROJECT MAC),
1972 PROCEEDINGS OF THE ACM, VOLUME I, (BOSTON, MA, AUGUST 1972), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, 1972, P 27B-281, 16 REFS

IN THIS SHORT BUT INFORMATIVE PAPER THREE STRATEGIES FOR CONSIDERATION IN THE FUTURE DEVELOPMENT OF OPERATING SYSTEMS WHICH WILL MAKE THEM MORE AMENABLE TO NETWORKING ARE DEVELOPED. FIRST, SYSTEMS SHOULD BE MORE CAPABLE OF DETECTING AND RECOVERING FROM COMPONENT MALFUNCTIONS. IT IS POINTED OUT THAT IN THE ARPANET AT THE HOST LEVEL REQUESTS FROM THE IMP FOR HOST RETRANSMISSION SOMETIMES RESULT IN CRASHES. SECOND, SINCE CONTROL PROGRAMS IN THE HOSTS RUN AS DAEMONS (BACKGROUND PROCESSES RESPONSIBLE FOR RECURRING EVENTS IN SYSTEMS SERVICES), OPERATING SYSTEMS SHOULD ALLOW DAEMONS TO FUNCTION EFFICIENTLY. THIRD, INTERPROCESS COMMUNICATION IN AN OPERATING SYSTEM SHOULD BE THROUGH 'THIN WIRE' COMMUNICATIONS INTERFACES, THAT IS, EXPLICIT DATA EXCHANGES OVER A CONTROLLABLE COMMUNICATIONS PATH USING WELL-DEFINED PROTOCOLS.

OLIVER, PAUL, DESIGN SPECIFICATIONS FOR A GENERALIZED TELEPROCESSING SYSTEM, (SPERRY RAND CORP., WASHINGTON, DC, UNIVAC DIV.),
IAG JOURNAL, VOL 4, ISSUE 4, 1971, P 350-359, 3 REFS

A TELEPROCESSING SYSTEM IS SPECIFIED WHICH IS DESIGNED TO ALLOW ANY APPLICATION OR SYSTEMS PROGRAM TO CONNECT TO ANY TERMINAL DEVICE. THE TELEPROCESSING SYSTEM SOFTWARE MODULES ARE FUNCTIONALLY DESCRIBED, INCLUDING A DISCUSSION OF THE 'DESCRIPTOR LIBRARY' WHICH CONTAINS INFORMATION NECESSARY FOR THE PROPER HANDLING OF DIFFERENT TERMINAL TYPES.

PICKERING, G. E., E. G. MUTSCHLER, G. A. ERICKSON, MULTICOMPUTER PROGRAMMING FOR A LARGE SCALE REAL-TIME DATA PROCESSING SYSTEM, (SPERRY RAND CORP., SAN DIEGO, CA, UNIVAC DIV.),
AFIPS PROCEEDINGS, 1964 SPRING JOINT COMPUTER CONFERENCE, VOLUME 25, (WASHINGTON, DC, APRIL 1964), SPARTAN BOOKS INC., BALTIMORE, MD, 1964, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 445-461

THIS REPORT DISCUSSES MULTICOMPUTER PROGRAMMING TECHNIQUES CONCEIVED AND IMPLEMENTED IN A LARGE SCALE TACTICAL DATA SYSTEM DEVELOPED FOR THE U. S. NAVY. TWO MAIN AREAS RECEIVE CONSIDERATION: EXECUTIVE CONTROL IN A MULTICOMPUTER COMPLEX AND DATA TRANSFER BETWEEN COMPUTERS. ASSIGNMENT AND DISTRIBUTION OF TASKS IS NOT DISCUSSED. ON THE SUBJECTS OF CONTROL AND TRANSFER, CONSIDERABLE DETAIL IS PROVIDED.

SEDELOW, SALLY YEATES, WALTER A. SEDELOW, JR., LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR COMPUTATIONAL RESEARCH ON LANGUAGE (CE-NCOREL), KANSAS, UNIV. OF, LAWRENCE, 1972, NSF GJ-28599, 467P, 41 REFS
(ANNOTATION UNDER 4.2)

SINGER, C. R. M., THE USER DEPARTMENT AND THE COMPUTER, (INTERNATIONAL COMPUTERS LTD., MIDDLESEX, (ENGLAND)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-BC, NSF GJ-33239, P 397-402

A DATA COLLECTION SYSTEM CALLED 'DATASTREAM' IS DESCRIBED AND ITS ADVANTAGES OVER MANUAL TECHNIQUES ARE CITED. THE PAPER SOUNDS VERY MUCH LIKE A SALES-PITCH AND IS NOT PARTICULARLY EXCITING TECHNOLOGICALLY.

SOMIA, MONIQUE, THE APPROACH OF SOFTWARE PROBLEMS IN THE SOC EXPERIMENTAL COMPUTER NETWORK, (IBM-FRANCE, PARIS),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-BC, NSF GJ-33239, P 390-396, 10 REFS

THE SOFTWARE FACILITIES PROVIDED THE USER OF THE SOC SYSTEM (FRENCH ABBREVIATION FOR CONNECTED COMPUTER SYSTEM) ARE DESCRIBED. THE NETWORK CONNECTS, IN A DISTRIBUTED FASHION, SIX IBM 360'S (DIFFERENT MODELS) THROUGH THEIR 2701 INTERFACES. A NETWORK CONTROL LANGUAGE IS DESCRIBED WHICH SUPPORTS FILE COPYING AND TRANSMISSION OF JOBS TO REMOTE COMPUTERS AND IS APPARENTLY LIMITED TO USE ON IBM 360'S RUNNING UNDER THE 'OS' OPERATING SYSTEM.

SPIER, MICHAEL J., ELLIOTT I. ORGANICK, THE MULTICS INTERPROCESS COMMUNICATION FACILITY, (MASSACHUSETTS INST. OF TECH., CAMBRIDGE, PROJECT MAC, MASSACHUSETTS INST. OF TECH., CAMBRIDGE, DEPT. OF ELECTRICAL ENGINEERING),
PROCEEDINGS, ACM 2ND SYMPOSIUM ON OPERATING SYSTEMS PRINCIPLES, (PRINCETON, NJ, OCTOBER 20-22, 1969), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON OPERATING SYSTEMS, PRINCETON UNIV., NJ, DEPT. OF ELECTRICAL ENGINEERING, 1969, P 83-91, 10 REFS

THE MULTICS CAPABILITY FOR INTERPROCESS COMMUNICATION, WHICH OFFERS A CLEAN FACILITY FOR COMMUNICATING BETWEEN PROCESSES WITH MINIMUM EFFORT, IS DISCUSSED. THE METHODOLOGY DESCRIBED APPEARS APPLICABLE TO INTERPROCESS COMMUNICATIONS ACROSS MULTIPLE HOST COMPUTERS IN A NETWORK.

VAN VLECK, THOMAS H., COMPUTER LANGUAGES FOR THE COMPUTER UTILITY, (MASSACHUSETTS INST. OF TECH., CAMBRIDGE),
INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P S-2-1--5-2-5, 8 REFS

A FEW TECHNICAL AND ECONOMIC CONSIDERATIONS ARE INTRODUCED RELATED TO MAKING LANGUAGE COMPILERS AVAILABLE FOR 'THE COMPUTER UTILITY', LOOSELY DEFINED AS AN INTERACTIVE SYSTEM. THESE CONCEPTS ARE THEN APPLIED TO NETWORKS OF COMPUTERS WITH THE STATED BENEFITS OF LOAD SHARING AND MULTI-PROCESS SOLUTIONS TO A PROBLEM. ALL DISCUSSIONS ARE BRIEF AND INCOMPLETE.
(ALSO UNDER 4.3)

WILKINSON, P. T., R. A. SCANTLEBURY, THE CONTROL FUNCTIONS IN A LOCAL DATA NETWORK, (NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND)),
INFORMATION PROCESSING 68; PROCEEDINGS OF IFIP CONGRESS 1968, VOLUME 2--HARDWARE, APPLICATIONS, (EDINBURGH, (SCOTLAND), AUGUST 5-10, 1968), NORTH-HOLLAND PUBLISHING CO., AMSTERDAM, (NETHERLANDS), 1969, IFIP CONGRESS PROCEEDINGS, (LC 65-24118), P 734-738, 3 REFS

THE OPERATING PRINCIPLES OF A PROPOSED INTERFACE COMPUTER AND FACILITIES THAT IT SHOULD OFFER IN RELATION TO A NATIONAL NETWORK ARE DESCRIBED. THE INTERFACE COMPUTER CONTROLS THE LOCAL NETWORK AND ACTS AS THE INTERFACE BETWEEN THE LOCAL AND NATIONAL NETWORKS. THE NETWORK CONCEPT IS A STORE-AND-FORWARD SYSTEM CONNECTING A NUMBER OF LOCAL OR REGIONAL NETWORKS. THE REGIONAL NETS JOIN A NUMBER OF SUBSCRIBER TERMINALS WITHIN A GEOGRAPHICAL REGION.

WILKINSON, P. T., A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--SOFTWARE ORGANIZATION, NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE, OCT 69, NPL-DCS COM-SCI-T.M.29, 20P, 6 REFS
(ANNOTATION UNDER 3.1.1)

3.5 PROTOCOLS

BHUSHAN, ABHAY K., ROBERT H. STOTZ, PROCEDURES AND STANDARDS FOR INTER-COMPUTER COMMUNICATIONS, (MASSACHUSETTS INST. OF TECH., CAMBRIDGE, ELECTRONICS SYSTEMS LAB.),
AFIPS PROCEEDINGS. 196B SPRING JOINT COMPUTER CONFERENCE. VOLUME 32, (ATLANTIC CITY, NJ, APRIL 30-MAY 2, 1968), THOMPSON BOOK CO., WASHINGTON, DC, 196B, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 95-104, 24 REFS

THIS DISCUSSION OF CHARACTER CODES AND TRANSMISSION PROCEDURES ATTEMPTS TO ISOLATE THE FACTORS INVOLVED IN INTER-COMPUTER COMMUNICATION THAT MAY JUSTIFY ADDITIONS TO AND DEVIATIONS FROM ANSI STANDARDS AND DRAFT STANDARDS. SPECIAL ATTENTION IS GIVEN TO COMMUNICATION CONTROL PROCEDURES, CHARACTER AND BINARY DATA TRANSPARENCY AND ERROR CONTROL MECHANISMS, INCLUDING A COMPARISON OF THE LONGITUDINAL BLOCK PARITY CHECK TO THE MORE CAPABLE CYCLIC REDUNDANCY CHECK. (ALSO UNDER 3.2.9, 5.5)

CARR, STEPHEN, STEPHEN D. CROCKER, VINTON G. CERF, HOST-HOST COMMUNICATION PROTOCOL IN THE ARPA NETWORK, (UTAH, UNIV. OF, SALT LAKE CITY, CALIFORNIA, UNIV. OF, LOS ANGELES),
AFIPS PROCEEDINGS. 1970 SPRING JOINT COMPUTER CONFERENCE. VOLUME 36, (ATLANTIC CITY, NJ, MAY 5-7, 1970), AFIPS PRESS, MONTVALE, NJ, 1970, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 589-598, 3 REFS

THIS RELATIVELY EARLY DESCRIPTION OF THE ARPA NETWORK HOST-HOST PROTOCOL DOES NOT INCLUDE HOST-HOST FLOW CONTROL, WHICH WAS OVERLOOKED AT THAT TIME. IN THIS PAPER IT WAS ASSUMED THAT ALL HOSTS ARE INTERACTIVE TIME-SHARING SYSTEMS. THIS SHOWS THE LACK OF ATTENTION GIVEN TO REMOTE JOB ENTRY AND DATA TRANSFER AT THAT TIME, ALTHOUGH A PRINCIPAL EARLY NETWORK NODE, THE UCLA IBM 360/91 WAS NOT A TIME-SHARING SYSTEM. THE BASIC ASSUMPTION OF PROLONGED CONVERSATION ON EACH HOST-HOST LINK IS MADE. THE NETWORK INTERFACE LANGUAGE CONCEPT, IN WHICH INTERACTIVE FRONT ENDS ARE PLACED AT USER SITES, HAS SINCE FALLEN BY THE WAYSIDE, ESPECIALLY WITH THE INTRODUCTION OF THE TIP.

CROCKER, STEPHEN D., JOHN F. HEAFNER, ROBERT M. METCALFE, JONATHAN B. POSTEL, FUNCTION-ORIENTED PROTOCOLS FOR THE ARPA COMPUTER NETWORK, (ADVANCED RESEARCH PROJECTS AGENCY, WASHINGTON, DC, RAND CORP., SANTA MONICA, CA, MASSACHUSETTS INST. OF TECH., CAMBRIDGE, CALIFORNIA, UNIV. OF, LOS ANGELES),
AFIPS CONFERENCE. 1972 SPRING JOINT COMPUTER CONFERENCE. VOLUME 40, (ATLANTIC CITY, NJ, MAY 16-18, 1972), AFIPS PRESS, MONTVALE, NJ, 1972, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 271-279, 13 REFS

THIS PAPER DESCRIBES SOME OF THE USER LEVEL PROTOCOLS ON THE ARPANET, INCLUDING THE EXISTING TELNET AND THE PROPOSED FILE TRANSFER AND REMOTE JOB ENTRY (RJE) PROTOCOLS. TELNET FEATURES DISCUSSED ARE THE CHARACTER SET, CHARACTER ECHOING, ESTABLISHING CONNECTIONS, AND SOME INTRIGUING THOUGHTS ON ATTENTION HANDLING. THE FILE TRANSFER PROTOCOL WAS UNSPECIFIED WHEN THIS WAS WRITTEN, BUT A METHOD OF TRANSFERRING FILES THROUGH THE USE OF TELNET IS DESCRIBED. IMPLEMENTATION PLANS ARE DESCRIBED THAT WOULD GIVE A USER THE ABILITY TO LIST A REMOTE DIRECTORY, SEND A LOCAL FILE, RETRIEVE A REMOTE FILE, RENAME A REMOTE FILE, AND DELETE A REMOTE FILE. REMOTE JOB ENTRY, WHICH USES THE FILE TRANSFER PROTOCOL, IS ALSO DESCRIBED.

KARP, DONALD P., SALOMON F. SEROUSSI, A COMMUNICATIONS INTERFACE FOR COMPUTER NETWORKS, (INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, DEPT. OF COMPUTER SCIENCE),
JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 117-123, 3 REFS

A COMMUNICATIONS DISCIPLINE OR FIRST LEVEL PROTOCOL FOR NETWORKS OF COMPUTERS IS DESCRIBED. IT IS ESPECIALLY SUITABLE FOR HALF-DUPLEX, ALTHOUGH ADAPTABLE TO FULL-DUPLEX TRANSMISSION. IT IS STATED THAT IMPLEMENTATION IS UNDER WAY FOR IBM NETWORK/440.

KARP, DONALD P., SALOMON F. SEROUSSI, A COMMUNICATIONS INTERFACE FOR COMPUTER NETWORKS, INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER, 24 JUN 71, IBM-TJWRC RC-3417, 15P, 1 REFS

THE COMMUNICATIONS LINE PROTOCOL FOR IBM'S RESEARCH NETWORK/440 IS PRESENTED. THE PROTOCOL IS DESIGNED TO FACILITATE INTERPROCESS COMMUNICATIONS AND IS DEFINED WITH FLEXIBILITY AS THE FOREMOST REQUIREMENT.

MCKAY, DOUGLAS B., DONALD P. KARP, A NETWORK/440 PROTOCOL CONCEPT, INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER, JUL 71, IBM RC-3432, 15P

THE PROTOCOLS ARE DESCRIBED FOR DATA TRANSFER BETWEEN INDEPENDENT SYSTEMS ON NETWORK/440, A NETWORK WITH CENTRAL CONTROL, INCLUDING ERROR HANDLING, MESSAGE FORMAT AND FILE TRANSFER PROTOCOL.

ROSENBLUM, STANLEY R., PROGRESS IN CONTROL PROCEDURE STANDARDIZATION, (HONEYWELL INFORMATION SYSTEMS INC., FRAMINGHAM, MA),
JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 153-159, 2 REFS

STANDARDIZATION OF DATA COMMUNICATIONS CONTROL PROCEDURES IS DISCUSSED. A BRIEF HISTORY AND DESCRIPTION OF THE PHILOSOPHY OF CHARACTER-ORIENTED CONTROL PROCEDURES IS GIVEN. A PROPOSAL IS THEN PRESENTED FOR A BIT-ORIENTED CONTROL PROCEDURE. THIS PROCEDURE ALLOWS FOR LINK TRANSMISSION WITH A FORMAT INVARIANT EXCEPT FOR THE PRESENCE OR ABSENCE OF AN EXTENSION FIELD. THE EXTENSION MECHANISM HAS NOT BEEN DEFINED.
(ALSO UNDER 5.5)

SHAW, R. T., BASIC CONTROL PROCEDURES FOR DIGITAL DATA TRANSMISSION, (INTERNATIONAL COMPUTERS LTD., LONDON, (ENGLAND)),
INFORMATION PROCESSING 68; PROCEEDINGS OF IFIP CONGRESS 1968. VOLUME 2--HARDWARE, APPLICATIONS, (EDINBURGH, (SCOTLAND), AUGUST 5-10, 1968), NORTH-HOLLAND PUBLISHING CO., AMSTERDAM, (NETHERLANDS), 1969, IFIP CONGRESS PROCEEDINGS, (LC 65-24118), P 728-733, 2 REFS

DIGITAL DATA TRANSMISSION OVER PHONE LINES AND RELATED CONTROL PROCEDURES ARE DISCUSSED. A SYSTEM IS DESCRIBED IN WHICH A COMMON PATH INTERCONNECTS A NUMBER OF TERMINAL INSTALLATIONS AND INCLUDES AT LEAST ONE COMPUTER. INDIVIDUAL TERMINALS ARE GIVEN DETAILED RESPONSIBILITIES THROUGH WELL-DEFINED PROCEDURES AND MESSAGE STRUCTURES. POLLING SELECTION AND INFORMATION TRANSFER PROCESSES ARE DETAILED FOR A MULTI-POINT LINK WITH ONE CONTROL TERMINAL.

WALDEN, DAVID C., A SYSTEM FOR INTERPROCESS COMMUNICATION IN A RESOURCE SHARING COMPUTER NETWORK, (BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA),
COMMUNICATIONS OF THE ACM, VOL 15, ISSUE 4, APR 72, P 221-230, 10 REFS

IN THIS PAPER WALDEN BEGINS WITH A RATHER CLEAR PRESENTATION OF A MECHANISM FOR PROCESS TO PROCESS COMMUNICATION WITHIN A SINGLE TIME-SHARING SYSTEM AND EXTRAPOLATES THE MECHANISM FOR REMOTE PROCESSES LOCATED AT DIFFERENT SITES IN A RESOURCE-SHARING COMPUTER NETWORK. ALTHOUGH EXTENSIVE USE OF THE 'PORT' CONCEPT FOR INTERCONNECTING PROCESSES IS MADE THERE IS NO REFERENCE TO BALZER'S IMPORTANT WORK IN THIS AREA. THE PAPER REMAINS INTERESTING, BUT BECOMES UNEVEN WHEN DISCUSSING A HYPOTHETICAL APPLICATION--AN ARPA-LIKE NETWORK. A NUMBER OF POINTS ARE MADE, SOME FOLLOWING FROM THE EARLIER PART OF THE PAPER, OTHERS APPARENTLY OPINIONS OFFERED WITH LITTLE RATIONALE TO BACK THEM UP. THE POINTS ARE:
1) PLACE THE BULK OF THE NETWORK CONTROL PROGRAM (NCP) IN THE IMP, RATHER THAN IN THE HOST COMPUTER. THIS 'NETWORK CONTROLLER' WOULD OCCUPY NO MORE THAN 4K ADDITIONAL IMP CORE AND WOULD HANDLE ALL NCP FUNCTIONS EXCEPT FLOW CONTROL, FOR WHICH HOSTS WOULD REMAIN RESPONSIBLE.
2) MAKE THE NETWORK MESSAGE-SWITCHED AT THE HIGHEST LEVEL. WHILE THE ARPA NETWORK IS ACTUALLY 'CIRCUIT SWITCHED' FROM HOST TO HOST BY ESTABLISHING 'CONNECTIONS' FROM NCP TO NCP, WALDEN PROPOSES ESTABLISHING A CONNECTION BETWEEN PROCESSES IN DIFFERENT HOSTS ONLY FOR THE DURATION OF A SINGLE MESSAGE TRANSFER. THIS, OF COURSE, WOULD INTRODUCE ADDITIONAL SET-UP OVERHEAD ESPECIALLY WHERE TWO PROCESSES REQUIRE CONTINUING COMMUNICATION.
3) THE NUMBER OF BITS PER TRANSMISSION FROM THE SENDING HOST BUFFER IS TO BE A MULTIPLE OF THE SENDING AND RECEIVING HOST AND IMP WORDS LENGTHS. THIS MIGHT ELIMINATE SOME OF THE PRESENT HARDWARE/SOFTWARE MECHANISMS FOR SMOOTHING DATA TRANSFER ACROSS HOST/IMP INTERFACES.
4) SPECIFIC IDENTIFICATION OF PORTS OF A BUFFER FOR TRANSMISSION FOR MULTIPLE 'MESSAGE' TRANSMISSION MIGHT LEAD TO THE POSSIBILITY OF PARALLEL TRANSMISSION FOR PORTS THROUGH THE NETWORK, THUS INCREASING THE EFFECTIVE MAXIMUM DATA RATE FOR A SINGLE 'CONNECTION'.
5) THROUGH DIRECT PROCESS TO PROCESS COMMUNICATION, LOGGING PROCESSES AND OTHER INTERMEDIARIES CAN BE BYPASSED. HOW DOES ONE THEN DO ACCOUNTING?
6) COMPUTER NETWORKS SHOULD BE CONSIDERED SINGLE ENTITIES. THE PARTICIPATING HOST COMPUTERS SHOULD HAVE VERY SIMILAR IF NOT IDENTICAL OPERATING SYSTEMS, ALTHOUGH THE MACHINES COULD BE DIFFERENT. NO RATIONALE AT ALL IS GIVEN FOR THIS STRONG CONCLUDING STATEMENT.

WHITE, GEORGE W., MESSAGE FORMAT PRINCIPLES, (NATIONAL COMMUNICATIONS SYSTEM, WASHINGTON, DC),
JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 192-198, 3 REFS

3.5 PROTOCOLS

THE TRANSMISSION OF DATA OVER TELECOMMUNICATION CIRCUITS REQUIRES AGREED UPON MESSAGE FORMATS. THIS PAPER IS A DEFINITIVE AND TUTORIAL DISCUSSION OF THE PRINCIPLES TO BE USED FOR DEVELOPING MESSAGE FORMATS. ALL OF THE SUBFIELDS OF MESSAGE HEADERS AND TRAILERS ARE IDENTIFIED AND DEFINED. THE DISCUSSION IS BASED ON THE CURRENT EFFORTS OF AMERICAN NATIONAL STANDARDS INSTITUTE TASK GROUP X3S33, MESSAGE HEADER FORMATS.
(ALSO UNDER 5.5)

# 4. APPLICATIONS

## 4.0 GENERAL

AUFENKAMP, D. D., E. C. WEISS, NSF ACTIVITIES RELATED TO A NATIONAL SCIENCE COMPUTER NETWORK, (NATIONAL SCIENCE FOUNDATION, WASHINGTON, DC),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 226-232, I REFS
(ANNOTATION UNDER I.2)

CARROLL, TOM W., SEYMOUR J. WOLFSON, KARL L. ZINN, PROGRESS ON APPLICATIONS DEVELOPMENT, 1970-71, A REPORT OF THE ASSOCIATE DIRECTORS OF MERIT PROJECT, MICHIGAN, STATE UNIV. OF, EAST LANSING, WAYNE, STATE UNIV. OF, DETROIT, MI, MICHIGAN, UNIV. OF, ANN ARBOR, DEC 71, MCN 1271-PR-7, 33P, 6 REFS

THE SPECIAL COMPUTER RESOURCES THAT HAVE BEEN DEVELOPED AT EACH OF THE THREE UNIVERSITIES IN THE MERIT NETWORK, AND MADE AVAILABLE THROUGH THE NETWORK, ARE DESCRIBED.

DAVIS, RUTH M., PRACTICALITIES OF NETWORK USE, (NATIONAL BUREAU OF STANDARDS, WASHINGTON, DC, INST. FOR COMPUTER SCIENCES AND TECHNOLOGY),
NETWORKS FOR HIGHER EDUCATION, PROCEEDINGS OF THE EDUCOM SPRING CONFERENCE, (WASHINGTON, DC, APRIL 13, 1972), INTERUNIVERSITY COMMUNICATIONS COUNCIL INC. (EDUCOM), PRINCETON, NJ, 1972, P 13-28

SOME OF THE CHALLENGES INVOLVED IN ACHIEVING A SUCCESSFUL INTERFACE BETWEEN USERS AND PROVIDERS IN THE MARKETPLACE FOR NETWORK SERVICES ARE OUTLINED. THE EMPHASIS HERE IS ON SERVICES THAT NETWORKS OFFER RATHER THAN COMPUTER NETWORKS PER SE. SOME OF THE TOPICS COVERED INCLUDE: STANDARDS APPLICABLE TO THE COMPUTER NETWORK SERVICE AREA, SEMANTIC DIFFICULTIES IN NETWORK TERMINOLOGY, DETERMINING COST AND PERFORMANCE OF NETWORK SERVICES, NETWORK USER DOCUMENTATION AND USER ASSISTANCE, AND LACK OF COMPATIBILITY AMONG DIFFERENT SERVICES OFFERED THROUGH A NETWORK.
(ALSO UNDER 1.1, 5.7)

DUGGER, EDWARD, THE MATERIALS INFORMATION NETWORK, (AIR FORCE SYSTEMS COMMAND, AIR FORCE MATERIALS LAB.),
AMERICAN DOCUMENTATION INSTITUTE 26TH ANNUAL MEETING, AUTOMATION AND SCIENTIFIC COMMUNICATION, PART 2, (CHICAGO, IL, OCTOBER 6-11, 1963), AMERICAN DOCUMENTATION INST., WASHINGTON, DC, 1963, P 217-218

A BRIEF DESCRIPTION OF ACTIVITIES RELATED TO THE AIR FORCE MATERIALS INFORMATION CENTER WHICH PROVIDES COMPUTERIZED INFORMATION ON MATERIALS TECHNOLOGY IS PRESENTED. THE REPORT IS SOMEWHAT OUTDATED AND DESCRIBES FEW INTERESTING TECHNOLOGICAL INNOVATIONS.

EICK, HARRY A., SEYMOUR J. WOLFSON, KARL L. ZINN, DEVELOPMENT OF APPLICATIONS FOR THE MERIT COMPUTING NETWORK, MICHIGAN, STATE UNIV. OF, EAST LANSING, WAYNE, STATE UNIV. OF, DETROIT, MI, MICHIGAN, UNIV. OF, ANN ARBOR, 2 JUN 72, 6P, 3 REFS TO APPEAR IN ACM SIGCUE BULLETIN ON COMPUTER USES IN EDUCATION (JUN 72)/

SOME APPLICATIONS IN VARIOUS STAGES OF DEVELOPMENT FOR THE MERIT COMPUTER NETWORK, WHICH LINKS THREE MICHIGAN UNIVERSITIES, ARE BRIEFLY SKETCHED. FOUR PROJECTS ARE DESCRIBED, INCLUDING SHARING OF DATA FILES FROM DIFFERENT INFORMATION SERVICES AND PROVIDING COMPILERS FOR VARIOUS LANGUAGES NOT AVAILABLE ON ALL MACHINES. MANY REFERENCES, BOTH EXPLICIT AND IMPLICIT, ARE MADE TO THE METHOD OF ORGANIZATION AND MANAGEMENT OF THE NETWORK, WHICH IS COOPERATIVE WITH EACH OPERATING CENTER RETAINING COMPLETE AUTONOMY.
(ALSO UNDER 5.0)

## 4.1 FUNCTIONAL

BOOTH, GRAYCE M., THE USE OF DISTRIBUTED DATA BASES IN INFORMATION NETWORKS, (HONEYWELL INFORMATION SYSTEMS INC., PHOENIX, AZ),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 371-376

THE CONCEPT OF DISTRIBUTING DATA BASES THROUGHOUT A NETWORK OF COMPUTERS IS DISCUSSED. A NUMBER OF ALTERNATIVES ARE PRESENTED FOR DISTRIBUTED DATA BASE CREATION, ASSOCIATION OF FILES WITH JOBS, FILE ACCESS METHODS, AND FILE INTEGRITY. ANALYSIS OF ALTERNATIVES IS LEFT OPEN FOR FURTHER WORK.

CONRATH, DAVID W., TELECONFERENCING: THE COMPUTER, COMMUNICATION, AND ORGANIZATION, (WATERLOO, UNIV. OF, (CANADA)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 145-146

THIS ARTICLE IS A BRIEF INTRODUCTION TO SEVERAL OTHER ARTICLES (LIPINSKI, LIPINSKI AND RANDOLPH, SCHUYLER AND JOHANSEN, TUROFF, CONSTANT AND SELLEY) GIVEN IN A SESSION OF THE SAME NAME AT THE INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATIONS HELD IN WASHINGTON, D.C.

ENGELBART, DOUGLAS C., NETWORK INFORMATION CENTER AND COMPUTER AUGMENTED TEAM INTERACTION, STANFORD RESEARCH INST., MENLO PARK, CA, AUGMENTATION RESEARCH CENTER, 30 JUN 71, 8 FEB 70-8 FEB 71, AF F30602-70-C-0219, (RADC TR-71-175, AD-737 131), 105P, 21 REFS

THIS REPORT SUMMARIZES THE ACTIVITIES OF STANFORD RESEARCH INSTITUTE IN RELATION TO THE NETWORK INFORMATION CENTER OF THE ARPA NETWORK THROUGH JUNE 1971. SOME OF THE EVENTS DESCRIBED ARE THE CONVERSION OF THE PROCESSOR FROM AN XDS-940 TO A DEC PDP-10, THE REDESIGN OF THE ON-LINE SYSTEM, DEVELOPMENT OF HIGHER LEVEL PROCESSES SUCH AS EXECUTABLE TEXT, CONTENT ANALYZERS IN AUTOMATED CLERICAL PROCEDURES, AN ON-LINE JOURNAL, AND AN ON-LINE CALCULATOR.

FARBER, DAVID J., FRANK HEINRICH, THE STRUCTURE OF A DISTRIBUTED COMPUTER SYSTEM--THE DISTRIBUTED FILE SYSTEM, (CALIFORNIA, UNIV. OF, IRVINE),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 364-370, 8 REFS
(ANNOTATION UNDER 3.1.1)

HARSLEM, E. F., JOHN F. HEAFNER, THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION, RAND CORP., SANTA MONICA, CA, NOV 71, RC R-860-ARPA, 22P, 9 REFS

A DATA RECONFIGURATION SERVICE (DRS) WHICH HAS BEEN IMPLEMENTED AND IS CURRENTLY RUNNING AT MIT, UCLA, UCSB, AND RAND IS DESCRIBED, AND ITS SYNTAX IS SPECIFIED IN DETAIL. THE SERVICE ALLOWS A USER TO SPECIFY FORMS IN THE DRS LANGUAGE WHICH ARE USED TO RECONFIGURE DATA BETWEEN USER AND SERVER SITES. THE CURRENT RECONFIGURATIONS ALLOW FOR CHARACTER SET CONVERSIONS, MESSAGE LEADER ADDITION OR DELETION, DATA COMPRESSION AND EXPANSION, GENERATION OF MESSAGE COUNTERS AND FLAGS, GRAPHIC DEVICE CODE CONVERSIONS, DATA FIELD-TRANSPOSITION, AND FILE REFORMATTING. EXAMPLES OF EACH ARRLICATION ARE GIVEN./

HEINRICH, FRANK, THE STRUCTURE OF A DISTRIBUTED COMPUTING SYSTEM--THE DISTRIBUTED FILE SYSTEM, CALIFORNIA, UNIV. OF, IRVINE, 1972, NSF GJ-1045, 16P, 8 REFS

A DISTRIBUTED FILE SYSTEM DESIGNED TO PROVIDE RELIABLE, FAIL-SOFT FILE MANAGEMENT IN A DISTRIBUTED COMPUTER NETWORK IS DESCRIBED. THE DESIGN IS MODULAR AND USES A 'SATURATION SIGNALING' MECHANISM TO BROADCAST FOR THE 'OWNER' OF A DESIRED FILE. A DETAILED DISCUSSION OF THE SYSTEM FAIL-SOFT CAPABILITY IS PRESENTED.

KARP, P. M., DOUGLAS B. MCKAY, D. C. WOOD, VIEWS ON ISSUES RELEVANT TO DATA SHARING ON COMPUTER NETWORKS, MITRE CORP., WASHINGTON, DC, INTERNATIONAL BUSINESS MACHINES CORP., 12 MAY 71, NIC-6742, 7P

THIS REPORT SUMMARIZES PLANS AND IDEAS FOR DATA SHARING ON COMPUTER NETWORKS, WITH PARTICULAR INTEREST IN THE ARPA NETWORK. ALTERNATIVES SUCH AS DIRECT CONNECTION BY USERS TO EACH HOST, INTERMEDIATE PROCESSES FOR ASSISTING IN DATA BASE ACCESS, AND AN OVERALL UNIFIED DATA MANAGEMENT APPROACH IN THE NETWORK ARE INTRODUCED. CONCERN IS EXPRESSED FOR A DATA DESCRIPTIVE LANGUAGE, A DATA RECONFIGURATION SERVICE, FILE TRANSFER, AND DATA MANAGEMENT PROBLEMS IN A COMPUTER NETWORK ENVIRONMENT.

LEFKOVITS, H. C., CHARACTERISTICS OF DATABASE SYSTEMS IN A COMPUTER NETWORK ENVIRONMENT, (GENERAL ELECTRIC CO., BRIDGEPORT, CT, ADVANCED SYSTEMS AND TECHNOLOGY OPERATION),
INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, ARR 70, P 3-1-1--3-1-8

4.1 FUNCTIONAL

(ANNOTATION UNDER 2.9)

LIPINSKI, ANDREW J., HUBERT M. LIPINSKI, ROBERT H. RANDOLPH, COMPUTER-ASSISTED EXPERT INTERROGATION: A REPORT ON CURRENT METHODS DEVELOPMENT, (INSTITUTE FOR THE FUTURE, MENLO PARK, CA),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 147-154, 11 REFS

A MAJOR PROGRAM CURRENTLY UNDER WAY AT THE INSTITUTE FOR THE FUTURE TO DEVELOP AND TEST A SYSTEM FOR ON-LINE INTERACTION AMONG EXPERTS VIA A NETWORK OF COMPUTER TERMINALS IS SUMMARIZED. THE AUTHORS REVIEW THE INSTITUTE'S EXISTING METHODS FOR ELICITING AND PROCESSING EXPERT JUDGMENTS, THEN DISCUSS THE OPERATIONAL PROCEDURES BY WHICH THESE METHODS HAVE CONVENTIONALLY BEEN IMPLEMENTED. IN LIGHT OF THE SHORTCOMINGS OF THESE EXISTING PROCEDURES, THE AUTHORS ARGUE AN URGENT NEED FOR ON-LINE GROUP MODELING CAPABILITIES AS THE NEXT LEAP FORWARD IN JUDGMENTAL-RESEARCH METHODOLOGY. A DESCRIPTION IS GIVEN OF THE INSTITUTE'S RECENTLY COMPLETED PROTOTYPE COMPUTER CONFERENCING SYSTEM, WHEREBY REMOTELY SITUATED RESPONDENTS CAN PARTICIPATE IN INSTITUTE INQUIRIES VIA THE ARPA NETWORK AND THE RAND CORPORATION'S PDP-10 COMPUTER. PROBLEMS ENCOUNTERED THUS FAR ARE DISCUSSED, AS ARE FUTURE PLANS FOR SYSTEM REFINEMENT AND EXTENSION. THE PAPER CONCLUDES WITH SOME BRIEF PHILOSOPHICAL OBSERVATIONS ON THE STATE OF THE ART, ACKNOWLEDGING THAT MUCH WORK REMAINS TO BE DONE ON THE STILL-PRIMITIVE TOOLS OF DECISION MAKING.

MARILL, THOMAS, NETWORK DATA HANDLING SYSTEM. SEMI-ANNUAL TECHNICAL REPORT, COMPUTER CORP. OF AMERICA, CAMBRIDGE, MA, 1 SEP 71, DAHC 04-71-C-0011, (AD-730 724), 56P

THE DATACOMPUTER, DESIGNED TO PROVIDE A CENTRALIZED SPECIALIZED DATA HANDLING NODE WITHIN A COMPUTER COMMUNICATIONS NETWORK, IS DESCRIBED. FOLLOWING AN OVERVIEW OF THE DATACOMPUTER, THE PRIMARY SOFTWARE MODULES ARE DETAILED, INCLUDING THE INPUT-OUTPUT MANAGER, THE REQUEST HANDLER, THE SUPERVISOR, AND THE STORAGE MANAGER.

MELTZER, HERBERT S., HUBERT F. ICKES, INFORMATION INTERCHANGE BETWEEN DISSIMILAR SYSTEMS, (INTERNATIONAL BUSINESS MACHINES CORP., SAN JOSE, CA, SYSTEMS DEVELOPMENT LAB., INTERNATIONAL BUSINESS MACHINES CORP., POUGHKEEPSIE, NY, SYSTEMS DEVELOPMENT DIV.),
MODERN DATA, VOL 4, ISSUE 4, APR 71, P 56-57, 59-60, 63, 66-67

THE PROBLEMS OF INFORMATION INTERCHANGE BETWEEN DISSIMILAR SYSTEMS ARE ADDRESSED. VARIOUS CODES AND INTERCHANGE MECHANISMS ARE EXAMINED. THE PROBLEMS OF TRANSFERRING DATA FILES FROM ONE SYSTEM TO ANOTHER AND OF TRANSFERRING A HIGH-LEVEL LANGUAGE APPLICATION PROGRAM BETWEEN SYSTEMS ARE DISCUSSED.

MORENOFF, EDWARD, THE TRANSFERABILITY OF COMPUTER PROGRAMS AND THE DATA ON WHICH THEY OPERATE, (ROME AIR DEVELOPMENT CENTER, GRIFFISS AFB, NY),
AFIPS PROCEEDINGS, 1969 SPRING JOINT COMPUTER CONFERENCE, VOLUME 34, (BOSTON, MA, MAY 14-16, 1969), AFIPS PRESS, MONTVALE, NJ, 1969, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 609-610, 8 REFS

THIS BRIEF ARTICLE, REPORTING ON THE PRELIMINARY FINDINGS OF AN AIR FORCE STUDY GROUP, PRESENTS AN EXCELLENT SUMMARY OF THE PROBLEMS INVOLVED IN SOFTWARE TRANSFERABILITY AND SOME POSSIBLE SOLUTIONS. THE MAIN OBSTACLES TO SOFTWARE TRANSFERABILITY ARE SUGGESTED TO BE LOOSE SPECIFICATION OF DATA STRUCTURES, LACK OF PROGRAMMING STANDARDIZATION, AND EXCESSIVE PROGRAMMER FREEDOM WHEN HIGHER LEVEL LANGUAGES ARE USED. POSSIBLE SOLUTIONS TO THESE PROBLEMS ARE: (1) ADMINISTRATIVE CONTROL OF PROGRAMMING AND DOCUMENTATION; (2) EXTENSIONS TO CURRENT LANGUAGES; (3) USE OF A NEW PROGRAMMING ENVIRONMENT WHICH WOULD ELIMINATE THE CONSTRAINTS OF THE OLDER SYSTEM.
(ALSO UNDER 5.5)

ROBERTS, LAWRENCE G., ACCESS CONTROL AND FILE DIRECTORIES IN COMPUTER NETWORKS, (ADVANCED RESEARCH PROJECTS AGENCY, WASHINGTON, DC),
IEEE INTERNATIONAL CONVENTION, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS INC., NEW YORK, MAR 68, 4P

AN ARGUMENT IS PRESENTED IN THIS BRIEF PAPER FOR THE NEED TO KEEP DUPLICATE FILE DIRECTORIES CONTAINING OWNERSHIP AND ACCESSABILITY INFORMATION IN MULTI-COMPUTER NETWORKS. SOME ADDITIONAL PROBLEMS REGARDING ACCESS CONFLICTS ARE BRIEFLY SUMMARIZED.

SABLE, JEROME D., TRANSFERABILITY OF DATA AND PROGRAMS BETWEEN COMPUTER SYSTEMS, (AUERBACH CORP., PHILADELPHIA, PA),
AFIPS PROCEEDINGS, 1969 SPRING JOINT COMPUTER CONFERENCE, VOLUME 34, (BOSTON, MA, MAY 14-16, 1969), AFIPS PRESS, MONTVALE, NJ, 1969, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 611-612

A HIERARCHY OF DATA STRUCTURE TYPES WHICH RANGE FROM MACHINE AND STORAGE-ORIENTED STRUCTURES TO LOGICAL DATA STRUCTURES TRANSMITTABLE AS CHARACTER STRINGS INDEPENDENT OF PHYSICAL REPRESENTATION IS PRESENTED. THE OBJECT IS TO BE ABLE TO WRITE PROGRAMS FOR ONE OF SEVERAL STANDARD ENVIRONMENTS AND TO DESCRIBE IN A STANDARD WAY THE DATA STRUCTURES WHICH ARE TO BE TRANSMITTED AND INTERPRETED.

SATTLEY, KIRK, ROBERT MILLSTEIN, STEPHEN MARSHALL, ON PROGRAM TRANSFERABILITY, MASSACHUSETTS COMPUTER ASSOCIATES, WAKEFIELD, 24 NOV 70, MCA CA-7011-2411, AF F30602-69-C-0286, 47P, 2 REFS

THE PROBLEM OF PROGRAM TRANSFERABILITY IS ADDRESSED, WHERE 'PROGRAMS' INCLUDE SOURCE CODE, FILE DECLARATIONS, LINK-EDIT COMMANDS, JOB CONTROL CARDS, AND RELATED ESSENTIALS. THE APPROACH IS TO DEFINE A PROCESS DESCRIPTION FOR SOME WIDE CLASS OF CONVENTIONAL HARDWARE WHICH IS DELIVERED TO THE MAPPING SOFTWARE OF THE TARGET MACHINE. THE MAPPING SOFTWARE CREATES A REPRESENTATION OF THE PROCESS IN THE TARGET MACHINE.

SCHUYLER, JAMES A., ROBERT JOHANSEN, 'ORACLE': COMPUTERIZED CONFERENCING IN A COMPUTER-ASSISTED-INSTRUCTION SYSTEM, (NORTHWESTERN UNIV., EVANSTON, IL, UPSALA COLLEGE, EAST ORANGE, NJ),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 155-160, 10 REFS

THE EVOLUTION AND OPERATION OF ORACLE, A COMPUTER PROGRAM FOR COMPUTERIZED CONFERENCING AND RESEARCH, IS DESCRIBED. ORACLE EXISTS AS AN ESSENTIAL PART OF THE COMPUTER-ASSISTED INSTRUCTION SYSTEM AT NORTHWESTERN UNIVERSITY. THE PAPER DESCRIBES THE OPERATION OF ORACLE AS A COMMUNICATIONS FACILITY FOR TEACHERS AND SYSTEMS DESIGNERS, AS A RESEARCH TOOL, AS A RECORD-KEEPER, AND AS AN INSTRUMENT FOR CURRICULAR FEEDBACK. THUS, ORACLE EXTENDS BEYOND THE TRADITIONAL REALM OF COMPUTER-ASSISTED INSTRUCTION SYSTEMS, AND SUGGESTS ALTERNATIVE USES FOR COMPUTERS IN EDUCATION. BOTH THE SYSTEM REQUIREMENTS FOR THE PROGRAM AND ITS SOCIOLOGICAL DIMENSIONS ARE DISCUSSED.

TUROFF, MURRAY, DR., 'PARTY-LINE' AND 'DISCUSSION'--COMPUTERIZED CONFERENCE SYSTEMS, OFFICE OF EMERGENCY PREPAREDNESS, WASHINGTON, DC, 20 JAN 72, 40P, 4 REFS

THIS PAPER DESCRIBES A COMPUTER-BASED MODE OF GROUP COMMUNICATION AND EXAMINES THE COST/EFFECTIVENESS OF VARIOUS OTHER COMMUNICATIONS MODES TO ARRIVE AT THE CIRCUMSTANCES LEADING TO ECONOMIC ADVANTAGES OF THE COMPUTER-BASED MODE. THE SYSTEM ALLOWS TWO OR MORE PARTIES TO CONVERSE ASYNCHRONOUSLY VIA TERMINALS AT THEIR RESPECTIVE LOCATIONS. THE COST/EFFECTIVENESS IS MEASURED IN TERMS OF NUMBER OF CONFERENCES AND THE VALUE OF INDIVIDUALS' TIME. A HARD COPY RECORD OF THE CONFERENCE IS AN ADDITIONAL BENEFIT.
(ALSO UNDER 5.3)

TUROFF, MURRAY, 'PARTY-LINE' AND 'DISCUSSION' COMPUTERIZED CONFERENCE SYSTEMS, (OFFICE OF EMERGENCY PREPAREDNESS, WASHINGTON, DC),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 161-171, 10 REFS

TWO COMPUTERIZED VERSIONS OF THE BASIC TELEPHONE CONFERENCE CALL ARE OUTLINED. THE PAPER FIRST EXPLAINS THE OPERATION OF THIS COMPUTERIZED MODE OF GROUP COMMUNICATION BY LEADING THE READER THROUGH AN ILLUSTRATIVE EXAMPLE. THEN AN EXAMPLE OF RELATIVE EFFECTIVENESS AND COSTS OF VARIOUS COMMUNICATION MODES IS PRESENTED IN ORDER TO ILLUSTRATE UNDER WHAT CIRCUMSTANCES THE COMPUTER-BASED MODE OFFERS ECONOMIC ADVANTAGES OVER OTHER COMMUNICATION MODES.

WHITNEY, V. KEVIN MOORE, A STUDY OF OPTIMAL FILE ASSIGNMENT AND COMMUNICATION NETWORK CONFIGURATION IN REMOTE-ACCESS COMPUTER MESSAGE PROCESSING AND COMMUNICATION SYSTEMS, MICHIGAN, UNIV. OF, ANN ARBOR, DEPT. OF ELECTRICAL ENGINEERING, SEP 70, MI-DEE SEL-48, AF F30602-69-C-0214, 408P, 187 REFS
(ANNOTATION UNDER 2.9)

WINETT, JOEL M., ON-LINE DOCUMENTATION OF THE COMPATIBLE TIME-SHARING SYSTEM, MASSACHUSETTS INST. OF TECH., LEXINGTON,

4.1 FUNCTIONAL

LINCOLN LAB., 12 MAY 65, MIT-LL TR-387, MIT-ESD TDR-65-68, AF 19(628)-500, (AD-624 110), 46P, 7 REFS

AN ON-LINE SYSTEM IS DESCRIBED WHICH WAS USED FOR STORING AND RETRIEVING INFORMATION ABOUT THE PROGRAMS ASSOCIATED WITH THE MIT COMPATIBLE TIME-SHARING SYSTEM. THE SYSTEM HELPS TO DOCUMENT THE SYSTEM COMMANDS, SUPERVISOR ENTRIES, LIBRARY SUBROUTINES, AND PUBLIC PROGRAMS. THIS SYSTEM IS AN ATTEMPT TO SOLVE THE PROBLEMS OF LACK OF UNIFORMITY IN DOCUMENTATION, DELAYS IN DISTRIBUTION, AND THE INABILITY TO SELECTIVELY RETRIEVE INFORMATION ABOUT A PARTICULAR PROGRAM./

4.2 DISCIPLINE-ORIENTED

AUFENKAMP, D. D., NATIONAL SCIENCE (COMPUTER) NETWORK, (NATIONAL SCIENCE FOUNDATION, WASHINGTON, DC, OFFICE OF COMPUTING ACTIVITIES),
NETWORKS FOR HIGHER EDUCATION. PROCEEDINGS OF THE EDUCOM SPRING CONFERENCE, (WASHINGTON, DC, APRIL 13, 1972), INTERUNIVERSITY COMMUNICATIONS COUNCIL INC. (EDUCOM), PRINCETON, NJ, 1972, P 29-35
(ANNOTATION UNDER 1.1)

BECKER, J., W. C. OLSEN, INFORMATION NETWORKS, (INTERUNIVERSITY COMMUNICATIONS COUNCIL INC. (EDUCOM), PRINCETON, NJ), CUADRA, C. A., ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY. VOLUME 3, ENCYCLOPEDIA BRITANNICA INC., CHICAGO, IL, 1968, (Z699.A1A6S, LC 66-25096), P 289-327, 190 REFS
(ANNOTATION UNDER I.2)

BYSTROM, JOHN, TELECOMMUNICATION NETWORKS FOR LIBRARIES AND INFORMATION SYSTEMS: APPROACHES TO DEVELOPMENT, BECKER, JOSEPH, PROCEEDINGS OF THE CONFERENCE ON INTERLIBRARY COMMUNICATIONS AND INFORMATION NETWORKS, (WARRENTON, VA, SEPTEMBER 28-OCTOBER 2, 1970), AMERICAN LIBRARY ASSOCIATION, CHICAGO, IL, 1971, OEC 0-9-230288-4235(095), (LC 70-185967), P 27-43, 17 REFS

THIS STUDY OF LIBRARY INFORMATION NETWORKING ENCOMPASSES POLITICAL AND ECONOMIC IMPLICATIONS AS WELL AS TECHNOLOGICAL INNOVATIONS IN GENERAL TERMS.

CUADRA, CARLOS A., COMPUTER TECHNOLOGY AND LIBRARIES OF THE FUTURE, (SYSTEM DEVELOPMENT CORP., SANTA MONICA, CA); WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 472-476

THE CURRENT USE OF COMPUTERS IN LIBRARIES IS OUTLINED, AND THEN REASONABLE PREDICTIONS ARE MADE FOR AN EXPANDED ROLE. INCLUDED IN THE EXPANDED ROLE ARE THE FOLLOWING: ON-LINE CATALOGS, COMPUTER SUPPLEMENTED REFERENCE AND CIRCULATION FUNCTIONS, AND ADDITIONAL INTERNAL LIBRARY PROCESSING.
(ALSO UNDER I.6)

DAVIS, RUTH M., THE NATIONAL BIOMEDICAL COMMUNICATIONS NETWORK AS A DEVELOPING STRUCTURE, (NATIONAL BUREAU OF STANDARDS, WASHINGTON, DC, CENTER FOR COMPUTER SCIENCES AND TECHNOLOGY), BECKER, JOSEPH, PROCEEDINGS OF THE CONFERENCE ON INTERLIBRARY COMMUNICATIONS AND INFORMATION NETWORKS, (WARRENTON, VA, SEPTEMBER 28-OCTOBER 2, 1970), AMERICAN LIBRARY ASSOCIATION, CHICAGO, IL, 1971, OEC 0-9-230288-4235(095), (LC 70-185967), P 294-309, 4 REFS
(ANNOTATION UNDER 3.0)

DEGRASSE, RICHARD W., REMOTE COMPUTING IN HIGHER EDUCATION: PROSPECTS FOR THE FUTURE, VERMONT, UNIV. OF, BURLINGTON, ACADEMIC COMPUTING CENTER, DEC 71, NSF GJ-947, 103P, 53 REFS
(ANNOTATION UNDER I.1)

GABRIELI, E. R., DR., MEDICAL NETWORK, (E. J. MEYER MEMORIAL HOSPITAL, BUFFALO, NY, CLINICAL INFORMATION CENTER), DATAMATION, VOL 16, ISSUE 4, 15 OCT 70, P 42-45

THIS PAPER DESCRIBES THE APPLICATION OF COMPUTERS FOR PROCESSING PRIMARY MEDICAL DATA, EMPHASIZING THE NEED FOR COMPUTER NETWORKS TO PROVIDE RELIABLE ACCESS TO LARGE REFERENCE FILES.

HARRIS, DAVID O., JAMES A. HOWARD, ROGER C. WOOD, RESEARCH IN ON-LINE COMPUTATION, CALIFORNIA, UNIV. OF, SANTA BARBARA, 30 SEP 71, 1 JUL 70-31 AUG 71, AF F19620-70-C-0314, (AFCRL 71-0530, AD-735 300), 86P, 30 REFS

THE CONNECTION OF THE UCSB IBM 360 COMPUTER SYSTEM TO THE ARPANET IS DOCUMENTED. THE NETWORK CONTROL PROGRAM AND VARIOUS ASPECTS OF THE UCSB OPERATING SYSTEM ARE DESCRIBED, INCLUDING THE UCSB 'ON-LINE SYSTEM'. OF INTEREST IS A DISCUSSION OF THE DIGITIZED SPEECH RESEARCH EFFORT, PARTICULARLY THE DATA COMPRESSION STUDIES PERMITTING COMPRESSION WITHOUT NOTICEABLE SPEECH DEGRADATION.
(ALSO UNDER 3.4)

KILGOUR, F. G., A REGIONAL NETWORK--OHIO COLLEGE LIBRARY CENTER, (OHIO COLLEGE LIBRARY CENTER), DATAMATION, VOL 16, ISSUE 2, FEB 70, P 87-89

THE OHIO COLLEGE LIBRARY CENTER NETWORK IS DESCRIBED. THE NETWORK, BEING PLANNED WHEN THIS ARTICLE WAS WRITTEN, WILL OFFER OHIO COLLEGES AND UNIVERSITIES ON-LINE RETRIEVAL FROM A CENTRAL CATALOG, SERIALS CONTROL, AND COMPUTERIZED ACQUISITION AND CATALOGING SUPPORT.

LICKLIDER, J. C. R., THE ON-LINE INTELLECTUAL COMMUNITY, (INTERNATIONAL BUSINESS MACHINES CORP.), PROCEEDINGS--SECOND NATIONAL SYMPOSIUM ON ENGINEERING INFORMATION, (NEW YORK, OCTOBER 27, 1965), ENGINEERS JOINT COUNCIL, NEW YORK, OCT 65, (LC 64-5057), P 29-36

THIS PRESENTATION DISCUSSES AN INFORMATION NETWORK FOR SCIENCE AND TECHNOLOGY SPANNING DISCIPLINE AND APPLICATION AREAS AS WELL AS GEOGRAPHY. THE PAPER PRESENTS SOME THOUGHTS ON THE FACILITIES, FUNCTIONS, SERVICES, PRINCIPLES, TECHNIQUES, AND PROBLEMS OF NETWORKING. DETAILED TECHNICAL CONSIDERATIONS AND QUESTIONS OF NETWORK MANAGEMENT ARE NOT GIVEN ATTENTION.

MILLER, JAMES G., EDUCOM: INTERUNIVERSITY COMMUNICATIONS COUNCIL, INTERUNIVERSITY COMMUNICATIONS COUNCIL INC. (EDUCOM), PRINCETON, NJ, MAY 66, 22P.
(ANNOTATION UNDER 1.1)

NOWAKOSKI, DONALD B., STATE INTEGRATED INFORMATION NET (SIINET). A CONCEPT, (WESTERN UNION TELEGRAPH CO., ARLINGTON, VA), JACKSON, PETER E., PROCEEDINGS. ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 137-147
(ANNOTATION UNDER 3.1.0)

OVERHAGE, CARL F. J., INFORMATION NETWORKS, (MASSACHUSETTS INST. OF TECH., CAMBRIDGE), CUADRA, C. A., ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY. VOLUME 4, ENCYCLOPEDIA BRITANNICA INC., CHICAGO, IL, 1969, (Z699.A1A6S.V.4, LC 66-25096), P 339-377, 145 REFS
(ANNOTATION UNDER 1.2)

ROCKOFF, MAXINE L., HEALTH CARE COMMUNICATION SYSTEMS, (HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION, ROCKVILLE, MD), WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 465-467

THE POTENTIAL USES OF BROADBAND COMMUNICATIONS IN THE HEALTH CARE FIELD ARE PRESENTED. INCLUDED ARE APPLICATIONS FOR VOICE, VIDEO, AND DATA SIGNALS. A NUMBER OF VERY INTERESTING POSSIBLE SOCIOLOGICAL CONSEQUENCES OF COMMUNICATIONS TECHNOLOGY IN HEALTH CARE ARE ALSO DISCUSSED, CENTERING MOSTLY ON DEPERSONALIZATION.
(ALSO UNDER 1.5, 1.6)

SEDELOW, SALLY YEATES, WALTER A. SEDELOW, JR., LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR COMPUTATIONAL RESEARCH ON LANGUAGE (CE-NCOREL), KANSAS, UNIV. OF, LAWRENCE, 1972, NSF GJ-28599, 467P, 41 REFS

THIS REPORT IS THE RESULT OF AN EXTENSIVE STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR COMPUTATIONAL RESEARCH ON LANGUAGE (CE-NCOREL) THAT INCLUDED DISCUSSIONS WITH SCIENTISTS, SCHOLARS, AND ADMINISTRATORS AT A VARIETY

4.2 DISCIPLINE-ORIENTED

OF INSTITUTIONS AROUND THE COUNTRY. THREE CHAPTERS ARE PARTICULARLY INTERESTING FOR THEIR NETWORKING IMPLICATIONS. ONE DISCUSSES AVAILABILITY AND RELIABILITY (IN ORDER OF IMPORTANCE) OF SOFTWARE SUITABLE FOR LANGUAGE RESEARCH AND OF VALIDATION AND STANDARDIZATION PROBLEMS IN MAKING IT NATIONALLY AVAILABLE. ANOTHER CONSIDERS HARDWARE COMPATIBLE WITH THE NEEDS OF LANGUAGE AND RELATED RESEARCH, INCLUDING TERMINAL DEVICES, INTERMEDIATE STORAGE DEVICES, AND CORE REQUIREMENTS. THE THIRD DISCUSSES ORGANIZATIONAL MATTERS OF A NATIONAL LANGUAGE RESEARCH NETWORK OR CENTER, CONCLUDING THAT A MAJOR CENTER FOR RESEARCH CONNECTED TO SATELLITE CENTERS THROUGH A NETWORK IS THE MOST ADVANTAGEOUS ARRANGEMENT. SINCE SUCH AN EXTENSIVE SURVEY WAS CONDUCTED IT WOULD HAVE BEEN INTERESTING TO INCLUDE A SECTION ON EXISTING CENTERS OF EXCELLENCE IN PARTICULAR AREAS OF LANGUAGE RESEARCH AND TO CONSIDER THE POSSIBILITY OF ORGANIZING THEM INTO A NETWORK.
(ALSO UNDER 1.1, 1.4, 3.3, 3.4, 5.1)

SILVERSTEIN, MARTIN E., COMPUTERS, COMMUNICATIONS, AND DISTRIBUTED HEALTH CARE SYSTEMS, (HEALTH ANALYSIS INC., BETHESDA, MD),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 463-464
(ANNOTATION UNDER 1.1)

THE FBI'S COMPUTER NETWORK, (FEDERAL BUREAU OF INVESTIGATION, WASHINGTON, DC),
DATAMATION, VOL 16, ISSUE 6, JUN 70, P 146-147, ISI

THE NATIONAL NETWORK THAT PROVIDES ACCESS TO THE FBI NATIONAL CRIME INFORMATION CENTER (NCIC) IS DESCRIBED. AN IBM 360/50 AT NCIC IS CONNECTED TO OVER 90 TERMINALS, BOTH TELETYPES AS WELL AS STATE AND LOCAL COMPUTERS, AND ITS RESPONSE TO INQUIRIES AVERAGES 5-10 SECONDS. OTHER FBI COMPUTER APPLICATIONS ARE BRIEFLY COVERED.

THOMAS, ROBERT H., D. AUSTIN HENDERSON, MCROSS--A MULTI-COMPUTER PROGRAMMING SYSTEM, (BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA),
AFIPS CONFERENCE, 1972 SPRING JOINT COMPUTER CONFERENCE, VOLUME 40, (ATLANTIC CITY, NJ, MAY 16-18, 1972), AFIPS PRESS, MONTVALE, NJ, 1972, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 281-293, 10 REFS

ONE OF THE FEW REPORTED INSTANCES OF A DISTRIBUTED PROCESSING SYSTEM FOR A SINGLE APPLICATION, I.E., AN APPLICATION REQUIRING THE EXECUTION OF PROGRAMS SIMULTANEOUSLY ON SEVERAL PROCESSORS AND GENERATING TRUE PROCESS TO PROCESS COMMUNICATION, IS DESCRIBED. THE APPLICATION IS AN AIR TRAFFIC CONTROL SIMULATION, AND THE HOST PROCESSORS ARE ALL PDP-10 TENEX SYSTEMS ON THE ARPA NETWORK. THE PAPER DOES NOT DWELL ON THE AIR TRAFFIC CONTROL APPLICATION, BUT FOCUSES ON THE SYSTEM DESIGN AND DETAILS OF THE INTERPROCESS COMMUNICATIONS.

TORREY, S. E., IOEEA NETWORK IMPLEMENTATION FISCAL YEAR 1965, FRANKFORD ARSENAL, PHILADELPHIA, PA, FIRE CONTROL ENGINEERING DIRECTORATE, JAN 66, FA-FCED M66-16-1, DA 2P023201A720, (AD-629 225), 21P, 1 REFS

A CONCEPTUAL PLAN FOR A FIVE STATION EXPERIMENTAL SYSTEM FOR THE STORAGE, RETRIEVAL, AND DISSEMINATION OF CHEMICAL DATA IS DESCRIBED. A NUMBER OF DIFFERENT MILITARY COMPUTERS ARE TO BE CONNECTED VIA THE PUBLIC SWITCHED NETWORK.

4.3 COMPUTER UTILITY

ALOEN, R. M., THE WIRED CITY: THE ROLE OF AN INDEPENDENT TELEPHONE COMPANY, (UNITED TELECOMMUNICATIONS INC., KANSAS CITY, MO),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 417-419

THE CONCEPT OF A WIRED CITY FOR MAKING ACCESSIBLE AN ENORMOUS RESERVOIR OF COMMUNICATIONS RESOURCES TO HOMES AND BUSINESSES SCATTERED OVER AN ENTIRE CITY IS DISCUSSED. THE ASPECTS CONSIDERED RELATE TO GEOGRAPHY, AVAILABILITY OF SPACE, ELECTRICAL INTERFERENCE, MULTIPLEXING TECHNIQUES, AND MARKET DEMAND. AN INTERESTING CONCLUDING STATEMENT DECLARES THAT THOSE WHO PROVIDE THE FACILITIES WILL NECESSARILY BE COMMON CARRIERS.
(ALSO UNDER 1.6)

BACHRACH, MORTON W., COPYRIGHT ASPECTS OF CATV AS UTILIZED IN INFORMATION NETWORKING,
BECKER, JOSEPH, PROCEEDINGS OF THE CONFERENCE ON INTERLIBRARY COMMUNICATIONS AND INFORMATION NETWORKS, (WARRENTON, VA, SEPTEMBER 28-OCTOBER 2, 1970), AMERICAN LIBRARY ASSOCIATION, CHICAGO, IL, 1971, DEC 0-9-230288-4235(095), (LC 70-185896), P 153-159, 46 REFS

THE LEGAL CONSTRAINTS RELATED TO THE USE OF CABLE TV AS PART OF FUTURE NATIONAL INFORMATION NETWORKS ARE SUMMARIZED. THE DISCUSSION IS CONCENTRATED ON COPYRIGHT PROBLEMS OF TV PROGRAM RETRANSMISSION AND DOES NOT EXPLICITLY ADDRESS ASPECTS OF DATA TRANSMISSION.
(ALSO UNDER 5.4)

BARAN, PAUL, THE COMING COMPUTER UTILITY--LAISSEZ-FAIRE, LICENSING OR REGULATION?, RAND CORP., SANTA MONICA, CA, APR 67, 27P
(ANNOTATION UNDER 5.4)

BAUER, WALTER F., COMPUTER/COMMUNICATIONS SYSTEMS: PATTERNS AND PROSPECTS, (INFORMATICS INC., SHERMAN OAKS, CA),
GRUENBERGER, F., COMPUTERS AND COMMUNICATIONS--TOWARD A COMPUTER UTILITY, PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1968, (TK 5101.G67, LC 68-16776), P 13-37, 11 REFS
(ANNOTATION UNDER 1.0)

BEERE, MAX P., TELEPROCESSING--THE UTILITY OF THE COMPUTER UTILITY NEW PROBLEMS? NEW CHALLENGE!, (TYMSHARE INC., CUPERTINO, CA),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 235-236

'WE (COMPUTER COMMUNICATION'S ENTREPRENEURS) ARE KNEE DEEP IN WEEDS AND THOUGH HELP IS IN SIGHT, IT IS NOT AVAILABLE AT PRESENT. AND THERE ARE INDIANS IN THE WOODS TOO - THE FCC, PUC, OTP, AND THE BELL SYSTEM - ...,' AND THEY HAVE MANY SCALPS HANGING IN THEIR LODGES.' READ THIS ONE FOR THE PROSE AND FOR SOME INTRIGUING VIEWPOINTS.

CLARK, DAVID D., ROBERT M. GRAHAM, JEROME H. SALTZER, MICHAEL D. SCHROEDER, THE CLASSROOM INFORMATION AND COMPUTING SERVICE, MASSACHUSETTS INST. OF TECH., CAMBRIDGE, PROJECT MAC, 11 JAN 71, MIT-MAC TR-80, NONR 4102(01), 27AP

A HYPOTHETICAL TIME-SHARING SYSTEM THAT SATISFIES THE EDUCATIONAL REQUIREMENTS FOR A COURSE IN COMPUTER SCIENCE IS PRESENTED. ITS STATED GOALS ARE: TO ACT AS A TOOL FOR COMPUTER SCIENCE STUDENTS, LEAN ENOUGH FOR A ONE SEMESTER COMPREHENSION, BUT COMPLETE ENOUGH TO TRACE THE SERVICE OBJECTIVES OF THE SYSTEM ORGANIZATION; TO DOCUMENT MECHANISMS IN MULTICS WHICH ARE GENERAL SOLUTIONS TO SERVICE OBJECTIVES; AND THE SIMPLIFICATION OF MULTICS WITHOUT SACRIFICING BASIC SERVICE OBJECTIVES. DETAILED DESCRIPTIONS OF THE SOFTWARE, CIMPL (THE SYSTEM IMPLEMENTATION LANGUAGE WHICH LOOKS LIKE PL/1), THE HARDWARE, AND THE FILE SYSTEM (LIKE MULTICS) ARE GIVEN. ALL ARE CLOSELY RELATED TO MULTICS.
(ALSO UNDER 3.1.0)

FEENEY, GEORGE J., THE FUTURE OF COMPUTER UTILITIES, (GENERAL ELECTRIC CO., BETHESDA, MD),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 237-239

THIS IS A POLEMIC IN SUPPORT OF CENTRALIZATION OF PROCESSING POWER IN A COMPUTER NETWORK. PROCESSING POWER FOR GENERAL ELECTRIC'S TIMESHARING NETWORK, ORIGINALLY DISTRIBUTED OVER 17 CENTERS, HAS NOW BEEN CENTRALIZED IN ONE 'SUPERCENTER'. A NUMBER OF ARGUMENTS IN SUPPORT OF THIS APPROACH AND SOME REMARKS ON NETWORK MANAGEMENT ARE PRESENTED. THE PAPER'S MAJOR SHORTCOMING IS A LACK OF NUMBERS TO BACK UP ECONOMIC ARGUMENTS.
(ALSO UNDER 5.0)

GENTILE, R. B., J. R. LUCAS, JR., THE TABLON MASS STORAGE NETWORK, (DEPARTMENT OF DEFENSE, WASHINGTON, DC),
AFIPS CONFERENCE PROCEEDINGS, VOLUME 38, 1971, SPRING JOINT COMPUTER CONFERENCE, (ATLANTIC CITY, NJ, MAY 18-20, 1971), AFIPS PRESS, MONTVALE, NJ, 1971, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 345-356, 6 REFS
(ANNOTATION UNDER 3.3.9)

GRISETTI, ROBERT S., THE SYNTHESIS OF COMMUNICATIONS AND COMPUTERS, (WESTERN UNION TELEGRAPH CO.),
GRUENBERGER, F., COMPUTERS AND COMMUNICATIONS--TOWARD A COMPUTER UTILITY, PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ,

4.3 COMPUTER UTILITY

1968, (TK 5101.C67, LC 68-16776), P 209-219
(ANNOTATION UNDER 3.2.2)

HAIBT, L., A. MULLERY, DATA DESCRIPTIVE LANGUAGE FOR SHARED DATA, INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER, 28 JUL 71, IBM-TJWRC RC-3476, 15P

A DATA DESCRIPTION LANGUAGE IS DESCRIBED WHICH PERMITS THE SPECIFICATION OF THOSE ASPECTS OF DATA REPRESENTATION WHICH WOULD BE SUBJECT TO TRANSFORMATION WHEN TRANSFERRING DATA IN A NETWORK. TWO DESCRIPTIONS ARE GIVEN TO A 'DATA MANAGER': ONE INDICATES HOW THE DATA IS NOW REPRESENTED; THE OTHER INDICATES HOW IT SHOULD LOOK AFTER TRANSFORMATION. THIS DIFFERS FROM THE RAND APPROACH OF SPECIFYING THE PARTICULAR TRANSLATION ALGORITHMS FOR TRANSFORMING FROM ONE FORM TO THE OTHER.
(ALSO UNDER 3.4)

HEATH, FRANK R., FACTORS FOR EVALUATION OF INTEGRATED ON-LINE INFORMATION SYSTEMS, (CARRIER CORP., SYRACUSE, NY),
GRUENBERGER, F., COMPUTERS AND COMMUNICATIONS--TOWARD A COMPUTER UTILITY, PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1968, (TK 5101.C67, LC 68-16776), P 151-172
(ANNOTATION UNDER 5.0)

HIRSCH, PHIL, MULTI-ACCESS COMPUTER NETWORKS.
DATAMATION, VOL 16, ISSUE 6, JUN 70, P 153-154

SOME ISSUES IN COMPUTER NETWORKING ARE DISCUSSED THROUGH EXTENSIVE RELIANCE ON EXAMPLES. THE TOPICS INCLUDE THE LEGAL ISSUES RELATIVE TO COMMON AND SPECIALIZED CARRIERS, PROBLEMS OF NETWORK STANDARDS, AND ALTERNATIVE IMPLEMENTATIONS./
(ALSO UNDER 1.2)

JOHNSON, LELAND L., SOME IMPLICATIONS OF NEW COMMUNICATIONS TECHNOLOGIES FOR NATIONAL SECURITY IN THE 1970S, RAND CORP., SANTA MONICA, CA, SEP 67, RC P-3639, (AD-658 424), 24P, 14 REFS
(ANNOTATION UNDER 5.4)

KIRSTEIN, PETER T., ON THE DEVELOPMENT OF COMPUTER AND DATA NETWORKS IN EUROPE, (LONDON, UNIV. OF, (ENGLAND)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 240-244, 10 REFS
(ANNOTATION UNDER 1.2)

MASON, W. F., R. K. LAY, THE WIRED CITY: SERVICES FOR HOME DELIVERY VIA INTERACTIVE CABLE TV, (MITRE CORP., WASHINGTON, DC),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 420-424

THE USES OF TIME SHARED INTERACTIVE COMPUTER CONTROLLED INFORMATION TELEVISION (TICCIT) ARE EXPLORED FROM THE STANDPOINT OF BENEFITS TO USERS AND PROFITS TO SERVERS. AN APPENDIX SUPPLIES SOME COST PROJECTIONS.
(ALSO UNDER 1.6, 5.2)

MUENCH, P. E., COMMON CARRIER APPROACH TO DIGITAL DATA TRANSMISSION: TERMINALS, TRANSMISSION EQUIPMENT AND FUTURE PLANS FOR THE COMPUTER UTILITY, (BELL TELEPHONE LABS. INC., HOLMDEL, NJ),
GRUENBERGER, F., COMPUTERS AND COMMUNICATIONS--TOWARD A COMPUTER UTILITY, PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1968, (TK 5101.C67, LC 68-16776), P 79-94, 1 REFS
(ANNOTATION UNDER 1.2)

PARKHILL, DOUGLAS F., THE CHALLENGE OF THE COMPUTER UTILITY, ADDISON-WESLEY PUBLISHING CO., NEW YORK, 1966, (HF 5548.2.P27, LC 66-24245), 207P, 45 REFS

A VARIETY OF MATERIAL IS PRESENTED IN THIS BOOK, MUCH OF IT OUTDATED DUE TO THE FAST MOVING NATURE OF THE FIELD (EXAGGERATED BY THE TIME SCALE FOR BOOK PRODUCTION). AS AN INTRODUCTION TO EARLY COMPUTING, IT IS INTERESTING BUT NOT TOTALLY RELEVANT. BY 'COMPUTER UTILITY,' PARKHILL APPARENTLY MEANS ANY COMBINATION OF REMOTE BATCH OR INTERACTIVE COMPUTING SERVICE. PERHAPS THE TERM 'UTILITY' SEEMS ESPECIALLY OUT OF VOGUE NOW SINCE IT NEVER DID REALLY CATCH ON AND HAS FREQUENTLY BEEN LOOSELY USED. THE DESCRIPTION OF 'PUBLIC UTILITY' IS INTERESTING. THE SECTION ON APPLICATIONS AND THE GENERAL CONCLUSION ARE NOT PARTICULARLY STRONG.

PHISTER, MONTGOMERY, JR., SYSTEM DESIGN OF ON-LINE SERVICE SYSTEMS, (SCIENTIFIC DATA SYSTEMS, SANTA MONICA, CA),
GRUENBERGER, F., COMPUTERS AND COMMUNICATIONS--TOWARD A COMPUTER UTILITY, PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1968, (TK 5101.C67, LC 68-16776), P 135-149

SYSTEM REQUIREMENTS AND DESIGN CONSIDERATIONS OF SINGLE AND MULTI-COMPUTER COMPUTER NETWORKS SERVING MANY REMOTE USERS ARE PRESENTED. THE PROPERTIES OF ON-LINE SERVICES AND THE SYSTEM REQUIREMENTS TO ACCOMMODATE THOSE SERVICES ARE DISCUSSED AT LENGTH.
(ALSO UNDER 3.0)

ROSE, GORDON A., COMPUTER GRAPHICS COMMUNICATION SYSTEMS, (NEW SOUTH WALES, UNIV. OF, KENSINGTON, (AUSTRALIA), DEPT. OF ELECTRONIC COMPUTATION),
INFORMATION PROCESSING 68; PROCEEDINGS OF IFIP CONGRESS 1968, VOLUME 2--HARDWARE, APPLICATIONS, (EDINBURGH, (SCOTLAND), AUGUST 5-10, 1968), NORTH-HOLLAND PUBLISHING CO., AMSTERDAM, (NETHERLANDS), 1969, IFIP CONGRESS PROCEEDINGS, (LC 65-24118), P 692-703, 20 REFS
(ANNOTATION UNDER 1.2)

THOMPSON, JOHN P., THE WIRED CITY: COMMERCIAL SERVICES TO BE PROVIDED BY BROADBAND TELECOMMUNICATIONS SYSTEMS, (LITTLE (ARTHUR D.) INC., CAMBRIDGE, MA),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 425-428
(ANNOTATION UNDER 5.2)

VAN VLECK, THOMAS H., COMPUTER LANGUAGES FOR THE COMPUTER UTILITY, (MASSACHUSETTS INST. OF TECH., CAMBRIDGE).
INTEROISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P 5-2-1--5-2-5, 8 REFS
(ANNOTATION UNDER 3.4)

WITHINGTON, FREDERIC G., THE MARKET FOR A COMPUTER UTILITY INDUSTRY, (LITTLE (ARTHUR D.) INC., CAMBRIDGE, MA),
GRUENBERGER, F., COMPUTERS AND COMMUNICATIONS--TOWARD A COMPUTER UTILITY, PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1968, (TK 5101.C67, LC 68-16776), P 67-77
(ANNOTATION UNDER 5.2)

4.9 OTHER

BENJAMIN, RICHARD T., P. M. KARP, ARPA NETWORK EXPERIMENTATION USING EXISTING DATA MANAGEMENT SYSTEMS, MITRE CORP., WASHINGTON, DC, 21 JUN 71, MC WP-7809, 22P

A PROGRAM OF EXPERIMENTATION USING EXISTING DATA MANAGEMENT SYSTEMS ON THE ARPA NETWORK IS SUMMARIZED. THE WORK DESCRIBED IS REPRESENTATIVE OF PLANNED EXPERIMENTATION AND PROTOTYPE DEVELOPMENT EFFORTS PERFORMED IN CONJUNCTION WITH THE MITRE ENTRY TO THE ARPA NETWORK.

BRUCE, PAUL, D. HIGGINS, E. PEREZ, HERBERT J. STERNICK, NOREEN O. WELCH, A RECOMMENDED RESEARCH AND DEVELOPMENT PLAN FOR DATA EXCHANGE IN THE WORLD WIDE MILITARY COMMAND AND CONTROL SYSTEM, MITRE CORP., WASHINGTON, DC, 8 APR 71, MC WP-9710, AF F19628-71-C-0002, 42P

THE STATED OBJECTIVE OF THIS PLAN IS TO DEVELOP ALTERNATIVE SYSTEM CONCEPTS FOR IMPROVING THE WWMCCS (WORLD WIDE MILITARY COMMAND AND CONTROL SYSTEM) DATA EXCHANGE CAPABILITIES THROUGH THE USE OF DIRECT COMPUTER-TO-COMPUTER COMMUNICATIONS. FIVE TASK AREAS ARE DESCRIBED: (1) INTERCOMPUTER NETWORK; (2) DATA DISTRIBUTION; (3) DATA DESCRIPTION LANGUAGE; (4) MULTI-LEVEL SECURITY; AND (5) ON-LINE TECHNOLOGY STUDIES. THE PURPOSE OF EACH OF THE TASK AREAS IS EXPLAINED; AND SUBTASKS ARE IDENTIFIED AND DESCRIBED.

KARP, P. M., EXPERIMENTATION ON THE ARPA COMPUTER NETWORK, MITRE CORP., WASHINGTON, DC, 29 JAN 71, MC WP-7447, AF

4.9 OTHER

F1962B-71-C-0002, 41P, 11 REFS

A PROGRAM OF EXPERIMENTATION ON THE ARPA NETWORK IS BEING CONDUCTED BY MITRE. THE OBJECTIVE OF THIS PROGRAM IS TO DEMONSTRATE A RESEARCH CAPABILITY SUITABLE TO OBTAIN SPONSORED RESEARCH PROJECTS IN COMPUTER NETWORKING. THIS DOCUMENT PRESENTS PLANS FOR CONDUCTING INITIAL EXPERIMENTS IN TECHNIQUES OF DATA SHARING AND DATA DISTRIBUTION.

PETERSEN, GERALD A., AFOS: A PROGRAM FOR NATIONAL WEATHER SERVICE FIELD AUTOMATION, (NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SILVER SPRING, MD),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 127-131

THE DESIGN OF A NETWORK FOR USE IN AUTOMATING THE FIELD OPERATIONS OF THE NATIONAL WEATHER SERVICE IS DESCRIBED.

PROPOSAL FOR CONTINUATION OF RESEARCH ON NATURAL COMMUNICATION WITH COMPUTERS, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, MAY 72, BBN P72-CSC-12, 60P

A NETWORK OF TENEX SYSTEMS (PDP 10'S WITH PAGING HARDWARE AND SOFTWARE) INTERCONNECTED THROUGH FRONT END PDP-11'S IS DESCRIBED. THE FRONT END HANDLES ALL COMMUNICATIONS TO ITS HOST SYSTEM INCLUDING THE CONTROL OF PERIPHERALS--READERS PRINTERS, DISKS, AND TAPES. IN ADDITION, THE NETWORK CONTROL PROGRAM FOR NETWORK ACCESS IS IN THE FRONT END. IT WILL BE INTERESTING TO SEE HOW THIS WORKS OUT SINCE THE CONCEPTS MAY BE APPLICABLE TO A WIDE VARIETY OF NETWORKS AND COULD CONTRIBUTE TO REDUCING THE LOAD OF NETWORK CONTROL ON THE HOST COMPUTER. THE APPLICATION TO A NETWORK HAVING HETERDGENEOUS HOSTS IS MENTIONED AS A FUTURE POSSIBILITY.

5. MANAGEMENT

5.0 GENERAL

A TRANS-CANADA COMPUTER COMMUNICATIONS NETWORK. PHASE I OF A MAJOR PROGRAM ON COMPUTERS, SCIENCE COUNCIL OF CANADA, AUG 71, SCC R-13, SCC SS22-1971-13, 41P
(ANNOTATION UNDER 3.1.0)

BENOIT, JOHN W., IRA W. COTTON, D. C. WOOD, PROPOSED IMPLEMENTATION PLAN FOR A WWMCCS INTERCOMPUTER NETWORK, MITRE CORP., WASHINGTON, DC, 2 DEC 71, MC WP-9807, AF F19628-71-C-0002, 41P
(ANNOTATION UNDER 3.1.1)

BROOKS, FREDERICK P., JR., JAMES K. FERRELL, THOMAS M. GALLIE, ORGANIZATIONAL, FINANCIAL, AND POLITICAL ASPECTS OF A THREE-UNIVERSITY COMPUTING CENTER, (NORTH CAROLINA, UNIV. OF, CHAPEL HILL, DEPT. OF COMPUTER AND INFORMATION SCIENCE, NORTH CAROLINA, STATE UNIV. OF, RALEIGH, DEPT. OF CHEMICAL ENGINEERING, NATIONAL SCIENCE FOUNDATION, WASHINGTON, DC, OFFICE OF COMPUTING ACTIVITIES),
INFORMATION PROCESSING 68: PROCEEDINGS OF IFIP CONGRESS 1968. VOLUME 2--HARDWARE, APPLICATIONS, (EDINBURGH, (SCOTLAND), AUGUST 5-10, 1968), NORTH-HOLLAND PUBLISHING CO., AMSTERDAM, (NETHERLANDS), 1969. IFIP CONGRESS PROCEEDINGS, (LC 65-24118), P 923-927

SOME OF THE PRACTICAL CONSIDERATIONS THAT HAVE LED TO THE STABLE, SUCCESSFUL OPERATION OF THE TRIANGLE UNIVERSITIES COMPUTATION CENTER ARE DISCUSSED IN THIS ARTICLE. SOME OF THE INTERESTING DECISIONS INCLUDE THE SELECTION OF A NEUTRAL LOCATION, DESPITE THE ADDITIONAL SETUP COSTS INVOLVED, AND THE METHOD OF JOINT MANAGEMENT OF THE CENTER. ALSO, COSTS ARE SPLIT THREE WAYS AMONG THE PRINCIPAL PARTICIPANTS INDEPENDENT OF USE. ECONOMY OF SCALE IS EXHIBITED OVER THE USE OF SMALLER, SEPARATE CAMPUS FACILITIES ALONG WITH OTHER BENEFITS SUCH AS THE ABILITY TO OFFER RESEARCHERS MORE POWERFUL COMPUTING SUPPORT THAN WOULD OTHERWISE BE POSSIBLE.

DENNIS, JACK B., A POSITION PAPER ON COMPUTING AND COMMUNICATIONS, (PRESENTED AT, ACM SYMPOSIUM ON OPERATING SYSTEM PRINCIPLES, GATLINBURG, TN, OCTOBER 1-4, 1967), (MASSACHUSETTS INST. OF TECH., CAMBRIDGE, PROJECT MAC), COMMUNICATIONS OF THE ACM, VOL 11, ISSUE 5, MAY 68, P 370-377, 12 REFS

THE PROBLEMS AND PROPOSED SOLUTIONS ASSOCIATED WITH MANY INFORMATION SERVICE SYSTEMS SHARING A COMMON COMPUTER INSTALLATION ARE EXPLORED. THE DEVELOPMENT OF GENERAL PURPOSE HARDWARE AND OPERATING SYSTEMS SUITABLE FOR INFORMATION SERVICE SYSTEMS DEVELOPMENT IS PREDICTED AND MULTICS IS GIVEN AS PROOF OF THE FEASIBILITY. TO PROTECT COMPETITION AND GUARANTEE THAT NO SERVICE SYSTEM HAS AN UNFAIR ADVANTAGE, IT IS ADVISED THAT RESPONSIBILITY FOR TASKS BE WELL SPECIFIED TO COMPUTER MANUFACTURER, COMMON CARRIER, INFORMATION SYSTEMS DESIGNER, INFORMATION SYSTEMS MANAGER, AND INSTALLATION OPERATOR. DENNIS PREDICTS THAT COMPUTER NETWORKS WILL DEVELOP AS DISTRIBUTED SYSTEMS RATHER THAN THE PRESENT (1968) CENTRALIZED SYSTEMS.

EICK, HARRY A., SEYMOUR J. WOLFSON, KARL L. ZINN, DEVELOPMENT OF APPLICATIONS FOR THE MERIT COMPUTING NETWORK, MICHIGAN, STATE UNIV. OF, EAST LANSING, WAYNE, STATE UNIV. OF, DETROIT, MI, MICHIGAN, UNIV. OF, ANN ARBOR, 2 JUN 72, 6P, 3 REFS TO APPEAR IN ACM SIGCUE BULLETIN ON COMPUTER USES IN EDUCATION (JUN 72)/
(ANNOTATION UNDER 4.0)

FEENEY, GEORGE J., THE FUTURE OF COMPUTER UTILITIES, (GENERAL ELECTRIC CO., BETHESDA, MD),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 237-239
(ANNOTATION UNDER 4.3)

FLOOD, MERRILL M., COMMERCIAL INFORMATION PROCESSING NETWORKS--PROSPECTS AND PROBLEMS IN PERSPECTIVE,
HUXLEY, JUDITH, THE OUTLOOK FOR TECHNOLOGICAL CHANGE AND EMPLOYMENT. APPENDIX VOLUME I. TECHNOLOGY AND THE AMERICAN ECONOMY, AND ECONOMIC PROGRESS. THE REPORT OF THE COMMISSION, NATIONAL COMMISSION ON TECHNOLOGY, AUTOMATION, AND ECONOMIC PROGRESS, FEB 66, (HC 106.5.A5682), P I-233--I-252
(ANNOTATION UNDER 1.0)

HEATH, FRANK R., FACTORS FOR EVALUATION OF INTEGRATED ON-LINE INFORMATION SYSTEMS, (CARRIER CORP., SYRACUSE, NY),
GRUENBERGER, F., COMPUTERS AND COMMUNICATIONS--TOWARD A COMPUTER UTILITY, PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1968, (TK 5101.C67, LC 68-16776), P 151-172

THIS PAPER DISCUSSES THE FACTORS THAT INFLUENCE MANAGEMENT'S WILLINGNESS OR RELUCTANCE TO PLACE TRUST IN A COMPUTER UTILITY. FIRST THE GENERAL CHARACTERISTICS OF A COMPUTER UTILITY ARE DISCUSSED AND THE NETWORK AT CARRIER CORPORATION IS DESCRIBED. THEN SOME INTERESTING PLUS AND MINUS FACTORS PERTAINING TO CORPORATE ACCEPTANCE OF COMPUTER UTILITIES ARE DESCRIBED.
(ALSO UNDER 4.3)

HERNDON, EDWIN S., HERBERT J. STERNICK, JOHN W. BENOIT, ROY D. BEVERIDGE, PAUL BRUCE, IRA W. COTTON, JOHN ISELI, RANVIR K. TREHAN, NOREEN O. WELCH, D. C. WOOD, PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN, MITRE CORP., WASHINGTON, DC, 1 MAY 71, MC MTR-6181, AF F19628-71-C-0002, 149P, 13 REFS
(ANNOTATION UNDER 3.1.1)

MONTGOMERY, EDISON, AN INTERUNIVERSITY INFORMATION NETWORK. I. EDUCOM, (INTERUNIVERSITY COMMUNICATIONS COUNCIL INC. (EDUCOM), PRINCETON, NJ),
KENT, ALLEN, ORRIN E. TAULBEE, ELECTRONIC INFORMATION HANDLING, (PITTSBURGH, PA, OCTOBER 7-9, 1964), SPARTAN BOOKS INC., WASHINGTON, DC, 1965, KNOWLEDGE AVAILABILITY SYSTEMS SERIES, (LC 65-17306), P 261-268

THIS ARTICLE DESCRIBES THE HISTORY AND ORGANIZATION OF EDUCOM, THE INTERUNIVERSITY COMMUNICATIONS COUNCIL. THE TASK FORCES, ONE OF WHICH IS ON INFORMATION NETWORKS, ARE ALSO BRIEFLY DESCRIBED.

STEFFERUD, EINAR, MANAGEMENT'S ROLE IN NETWORKING, (EINAR STEFFERUD AND ASSOCIATES, SANTA MONICA, CA),
DATAMATION, VOL 18, ISSUE 4, APR 72, P 40-42

THIS VERY GOOD CONTRIBUTION TO THE NETWORKING LITERATURE IDENTIFIES CRUCIAL MANAGERIAL PROBLEMS FACED IN THE DEVELOPMENT AND OPERATION OF NETWORKS. A MAJOR POTENTIAL CONFLICT IS THAT BY USING SERVICES SUPPLIED THROUGH NETWORKS, CONTROL WITHIN THE USING ORGANIZATION MAY BE WEAKENED. THE NECESSARY MARKETPLACE ACTION AMONG PROVIDERS/USERS OF SERVICE, SERVICE BROKERS, AND NETWORK OPERATORS IS OUTLINED.

WEEG, GERARD P., THE ROLE OF REGIONAL COMPUTER NETWORKS, (IOWA, UNIV. OF, IOWA CITY, COMPUTER CENTER),
LEVIEN, ROGER E., COMPUTERS IN INSTRUCTION: THEIR FUTURE FOR HIGHER EDUCATION, (OCTOBER 1-3, 1970), RAND CORP., SANTA MONICA, CA, JUL 71, RC R-718-NSF-CCOM-RC, P 55-66, 6 REFS
(ANNOTATION UNDER 1.1)

5.1 OPERATIONS

ANSLOW, N. G., J. HANSCOTT, IMPLEMENTATION OF INTERNATIONAL DATA EXCHANGE NETWORKS, (BOAC, LONDON AIRPORT, (ENGLAND)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 181-184
(ANNOTATION UNDER 3.2.1)

DAVIS, M. S., ECONOMICS--POINT OF VIEW OF DESIGNER AND OPERATOR, (NORTH CAROLINA, UNIV. OF, CHAPEL HILL),
INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P 4-1-1--4-1-7
(ANNOTATION UNDER 5.3)

GLASER, GEORGE, THE CENTRALIZATION VS. DECENTRALIZATION ISSUE: ARGUMENTS, ALTERNATIVES, AND GUIDELINES, (MCKINSEY AND CO. INC., SAN FRANCISCO, CA),
IAG JOURNAL, VOL 4, ISSUE 1, 1971, P 15-28, 6 REFS

CENTRALIZATION VERSUS DECENTRALIZATION OF DATA PROCESSING STAFF, EQUIPMENT, AND AUTHORITIES IS DISCUSSED. THE ADVANTAGES AND DISADVANTAGES OF EACH APPROACH ARE PRESENTED AND CRITERIA FOR MAKING DECISIONS RELATIVE TO DEGREE OF CENTRALIZATION ARE DEVELOPED. THIS IS GOOD TREATMENT OF AN IMPORTANT ISSUE.

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, JAN 71, 1 OCT-31 DEC 70, BBN R-2103, BBN QTR-8, DAHC 15-69-C-0179, 13P

5.1 OPERATIONS

(ANNOTATION UNDER 3.1.1)

INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, OCT 70, 1 JUL-30 SEP 70, BBN R-2059, BBN QTR-7, DAHC 15-69-C-0179, 12P
(ANNOTATION UNDER 3.1.1)

MCKENZIE, ALEXANDER A., BERNARD P. COSELL, JOHN M. MCQUILLAN, MARTIN J. THROPE, THE NETWORK CONTROL CENTER FOR THE ARPA NETWORK, (BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-69D-8C, NSF GJ-33239, P 185-191, 6 REFS

THE NETWORK CONTROL CENTER (NCC) CONTAINS A HOST COMPUTER ON THE ARPA NETWORK TO WHICH THE IMP'S PERIODICALLY REPORT AND WHICH SERVES AS A DIAGNOSTIC AND MAINTENANCE-COORDINATING CENTER FOR THE NETWORK. THIS PAPER BRIEFLY DESCRIBES THE NCC HARDWARE AND DISCUSSES SUCH SOFTWARE ISSUES AS NCC-RELATED ROUTINES IN THE IMP'S, DATA COLLECTION AND INTERPRETATION MECHANISMS, LINE STATUS DETERMINATION, IMP STATUS AND PROGRAM RELOADING, AND HOST AND LINE THROUGHPUT. DETAILS OF NCC OPERATIONS (STAFFING, PROBLEM-HANDLING PROCEDURES, TRACK RECORD) AND A SUMMARY OF OVERALL NCC EXPERIENCE AND FUTURE PLANS IS INCLUDED. THE PAPER IS AN EXCELLENT GUIDE TO SOME OF THE TYPES OF CONTROL SERVICES WHICH MUST BE PROVIDED FOR AN OPERATIONAL NETWORK OF THIS TYPE.

MCKENZIE, ALEXANDER A., BERNARD P. COSELL, JOHN M. MCQUILLAN, MARTIN J. THROPE, THE NETWORK CONTROL CENTER FOR THE ARPA NETWORK, BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA, 1972, DAHC 15-69-C-0179, 28P

ALONG WITH A GENERAL DESCRIPTION OF THE DESIGN AND OPERATION OF THE ARPA NETWORK 'NETWORK CONTROL CENTER', THIS PAPER FRANKLY STATES BOTH SUCCESSES AND LIMITATIONS IN THE OPERATION OF THE ARPA NETWORK. AN ANALYSIS OF DATA REPORTING ITS OPERATION, TYPICAL NETWORK LOADING AND UP-TIME SUMMARY ARE INCLUDED. ONE NOTED MISLEADING STATEMENT IS THAT ALL IMP'S HAVE BOOT STRAP PROGRAMS IN PROTECTED MEMORY. H-316 IMP'S, INCLUDING TIP'S, DO NOT HAVE SUCH PROTECTED MEMORY AND REQUIRE MANUAL PAPER TAPE REBOOTING. IT IS IRONIC THAT FOR A SOPHISTICATED EFFORT SUCH AS THIS, MANUAL NETWORK SUMMARIES ARE STILL NECESSARY, DUE IN PART TO THE NEED FOR SEVERAL NETWORK HOSTS TO BE 'RELIABLY UP AROUND THE CLOCK'. THE MECHANISM DESCRIBED FOR NETWORK TESTING AND MONITORING APPEARS TO BE VERY WELL DONE.
(ALSO UNDER 2.2)

NIELSEN, NORMAN R., THE STANFORD REGIONAL COMPUTING NETWORK, (STANFORD UNIV., CA),
A FIRST REPORT OF AN EXPLORATORY PROGRAM OF REGIONAL COOPERATIVE COMPUTING ACTIVITIES, NATIONAL SCIENCE FOUNDATION, WASHINGTON, DC, JAN 70, NSF CCR-70-12, P 137-148
(ANNOTATION UNDER 3.1.2)

SEDELOW, SALLY YEATES, WALTER A. SEDELOW, JR., LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR COMPUTATIONAL RESEARCH ON LANGUAGE (CF-NCOREL), KANSAS, UNIV. OF, LAWRENCE, 1972, NSF GJ-28599, 467P, 41 REFS
(ANNOTATION UNDER 4.2)

STEVENS, MARY ELIZABETH, PROBLEMS OF NETWORK ACCOUNTING, MONITORING AND PERFORMANCE MEASUREMENT, NATIONAL BUREAU OF STANDARDS, WASHINGTON, DC, CENTER FOR COMPUTER SCIENCES AND TECHNOLOGY, SEP 70, NBS REPORT 10-559, NBS 60D6400, 133P, 162 REFS
(ANNOTATION UNDER 5.3)

5.2 MARKET ANALYSIS

ANDREWS, GLENN E., FITZROY KENNEDY, THE DATA COMMUNICATIONS MARKET IN THE UNITED STATES, LITTLE (ARTHUR D.) INC., CAMBRIDGE, MA, SEP 66, 58P, 39 REFS

THIS MARKET SURVEY, THOUGH SOMEWHAT DATED, STILL CONTAINS MUCH INFORMATION OF INTEREST. THE REPORT COVERS THREE MAIN AREAS: THE PROJECTED DATA COMMUNICATIONS MARKET IN THE U.S. THROUGH 1970, INDUSTRY STRUCTURE, AND SYSTEM CHARACTERISTICS AND COSTS.

DUNN, D. A., ALTERNATIVE FUTURE COMPUTER-COMMUNICATION MARKETS, (STANFORD UNIV., CA),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-69D-8C, NSF GJ-33239, P 63-67, 11 REFS
(ANNOTATION UNDER 5.4)

MASON, W. F., R. K. LAY, THE WIRED CITY: SERVICES FOR HOME DELIVERY VIA INTERACTIVE CABLE TV, (MITRE CORP., WASHINGTON, DC),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-69D-8C, NSF GJ-33239, P 420-424
(ANNOTATION UNDER 4.3)

THOMPSON, JOHN P., THE WIRED CITY: COMMERCIAL SERVICES TO BE PROVIDED BY BROADBAND TELECOMMUNICATIONS SYSTEMS, (LITTLE (ARTHUR D.) INC., CAMBRIDGE, MA),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-69D-8C, NSF GJ-33239, P 425-428

THE RESULTS OF A MARKET STUDY OF THE POTENTIAL USE OF COMPUTERS IN THE HOME (THROUGH USE OF TERMINALS) TO PROVIDE, FOR EXAMPLE, ELECTRONIC MAIL, THE ELECTRONIC NEWSPAPER, EDUCATION IN THE HOME, AND HOME SHOPPING SERVICES ARE PRESENTED. THE PROJECTIONS ARE OPTIMISTIC.
(ALSO UNDER 4.3, 1.6)

WITHINGTON, FREDERIC G., THE MARKET FOR A COMPUTER UTILITY INDUSTRY, (LITTLE (ARTHUR D.) INC., CAMBRIDGE, MA),
GRUENBERGER, F., COMPUTERS AND COMMUNICATIONS--TOWARD A COMPUTER UTILITY, PRENTICE-HALL INC., ENGLEWOOD CLIFFS, NJ, 1968, (TK 5101.C67, LC 68-16776), P 67-77

THIS ARTICLE IDENTIFIES SEVERAL CHARACTERISTICS OF POTENTIAL MARKETS FOR COMPUTER UTILITIES (PARTICULARLY NOTABLE OF SMALLER USERS): RELUCTANCE TO ACQUIRE COMPUTERS, RELUCTANCE TO DEVELOP PROGRAMS, AND DESIRE FOR RESPONSIVE INDIVIDUAL SERVICE. POTENTIAL SERVICES ARE IDENTIFIED AS THE EQUIPMENT UTILITY, SUBSCRIPTION SERVICES, AND TIME-SHARED SERVICES. THE MARKET IS NOT SEEN DEVELOPING ACCORDING TO ANY PLAN, BUT IN RESPONSE TO THE ACTIONS OF A DIVERSE GROUP OF ENTREPRENEURS.
(ALSO UNDER 4.3)

5.3 FINANCIAL

BAUER, WALTER F., DR., RICHARD H. HILL, ECONOMICS OF TIME-SHARED COMPUTING SYSTEMS, PART 1, (INFORMATICS INC., MA), DATAMATION, VOL 13, ISSUE 11, NOV 67, P 48-52, 55, 2 REFS

THIS IS AN INTERESTING COLLECTION OF COMMENTS AND GENERALLY SOUNDLY BASED OBSERVATIONS ON BENEFITS AND PROBLEMS OF TIME-SHARING. TOPICS ON ECONOMIES OF SCALE AND ACCOUNTING FOR SYSTEM RESOURCES USED ARE RELEVANT TO MORE GENERAL NETWORK PLANNING.

BAUER, WALTER F., DR., RICHARD H. HILL, ECONOMICS OF TIME-SHARED COMPUTING SYSTEMS, PART 2, (INFORMATICS INC., MA), DATAMATION, VOL 13, ISSUE 12, DEC 67, P 41, 43, 46-49

SEE ANNOTATION FOR PART 1 OF THIS 2-PART ARTICLE.

DAVIS, M. S., ECONOMICS--POINT OF VIEW OF DESIGNER AND OPERATOR, (NORTH CAROLINA, UNIV. OF, CHAPEL HILL), INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P 4-1-1--4-1-7

THIS PAPER PROVIDES SOME EXCELLENT INSIGHT INTO THE ECONOMIC CONSIDERATIONS OF THE TRIANGE UNIVERSITIES COMPUTER CENTER (TUCC) A NETWORK SERVING THE UNIVERSITY OF NORTH CAROLINA, N. C. STATE, AND DUKE). THE INTRODUCTION GIVES THE REASONS FOR THE EXISTENCE OF TUCC -- ECONOMIES OF SCALE, SHARING OF PERSONNEL, AND COMMUNALITY OF PROGRAMS -- AND THE

5.3 FINANCIAL

CONFIGURATION AND SERVICES. THE ANALYSIS OF THE ECONOMIC AND POLITICAL PROBLEMS FACING TUCC COULD BE GENERALIZED TO THE MANAGEMENT OF OTHER NETWORK COMPUTING FACILITIES.
(ALSO UNDER 5.1)

DEI ROSSI, J. A., G. F. MILLS, G. C. SUMNER, A TELEPHONE-ACCESS BIOMEDICAL INFORMATION CENTER, (NATIONAL BUREAU OF STANDARDS, WASHINGTON, DC, CENTER FOR COMPUTER SCIENCES AND TECHNOLOGY, RAND CORP., SANTA MONICA, CA), OPERATIONS RESEARCH, VOL 20, ISSUE 3, MAY-JUN 72, P 643-667, 4 REFS

TELEPHONE-ACCESS INFORMATION SYSTEMS ARE ANALYZED, PARTICULARLY WITH REGARD TO RECORDED MESSAGES ON SUBJECTS OF INTEREST TO PHYSICIANS, BUT WITH GENERAL APPLICABILITY. QUEUING THEORY IS USED TO ARRIVE AT THE NUMBER OF LINES REQUIRED FOR ACCOMMODATING PEAK TRAFFIC. RATE STRUCTURES ARE ANALYZED IN RELATION TO VOLUME OF CALLS. ALSO EXAMINED ARE THE SENSITIVITIES OF COMMUNICATIONS COSTS TO ERRORS IN USAGE ESTIMATES, VARIATIONS IN SERVICE TIME, AND CHANGES IN PEAK HOUR CONDITIONS.

DITTBERNER, DONALD L., TELECOMMUNICATIONS COSTS,
BECKER, JOSEPH, PROCEEDINGS OF THE CONFERENCE ON INTERLIBRARY COMMUNICATIONS AND INFORMATION NETWORKS, (WARRENTON, VA, SEPTEMBER 28-OCTOBER 2, 1970), AMERICAN LIBRARY ASSOCIATION, CHICAGO, IL, 1971, OEC 0-9-230288-4235(095), (LC 70-18596), P 160-162

THIS SHORT PAPER PROVIDES A GOOD INTRODUCTION OF FACTORS AFFECTING TELECOMMUNICATIONS COSTS. THE DISCUSSION FOCUSES ON THE ISSUES THEMSELVES, RATHER THAN BECOMING ENMESHED IN A PRESENTATION OF THE DETAILS OF CURRENT RATE STRUCTURES.

GOLDSTEIN, BERNARD, THE CASE FOR NETWORKS, (UNITED DATA CENTERS INC., NEW YORK),
DATAMATION, VOL 16, ISSUE 3, MAR 70, P 62-64
(ANNOTATION UNDER 1.1)

HOOTMAN, JOSEPH T., THE COMPUTER NETWORK AS A MARKETPLACE,
DATAMATION, VOL 18, ISSUE 4, APR 72, P 43-46

IN THIS INTERESTING DISCUSSION ABOUT THE COMPUTER NETWORKING MARKETPLACE THE BASIC QUESTION OF NETWORKS AS 'VIABLE ECONOMIC ENTITIES' IS RAISED. ALTHOUGH CONTAINING AN AWKWARD CATEGORIZATION OF NETWORKS, THE ARTICLE LISTS QUESTIONS AND GENERAL ISSUES THAT SHOULD CONCERN NETWORK SERVICE SELLERS, BUYERS, AND BROKERS. THIS IS GOOD MATERIAL FOR NETWORK PLANNERS AS WELL AS PROSPECTIVE SERVICE BUYERS AND SELLERS.

NIELSEN, NORMAN R., FLEXIBLE PRICING: AN APPROACH TO THE ALLOCATION OF COMPUTER RESOURCES, (STANFORD UNIV., CA), AFIPS PROCEEDINGS, 1968 FALL JOINT COMPUTER CONFERENCE, VOLUME 33, PART 1, (SAN FRANCISCO, CA, DECEMBER 9-11, 1968), THOMPSON BOOK CO., WASHINGTON, DC, 1968, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 521-531, 6 REFS

THIS PAPER DISCUSSES THE MANAGEMENT PROBLEMS OF RESOURCE ALLOCATION IN SINGLE COMPUTING CENTERS, BUT THE CONCEPTS APPEAR READILY APPLICABLE TO MULTI-COMPUTER, DISTRIBUTED NETWORKS. THE DISCUSSION IS WELL ORGANIZED, DEFINING A SET OF POSSIBLE UTILIZATION MEASUREMENTS, THAT IS, THE MEASUREMENTS CONCERNING A JOB'S UTILIZATION OF THE COMPONENTS OF A COMPUTING SYSTEM. RESOURCES ARE RELATED TO THOSE MEASUREMENTS, AND FINALLY PRICES ARE ASSIGNED TO THE CHOSEN MEASURES. THEN, A CASE FOR FLEXIBLE PRICING IS PRESENTED IN WHICH A USER CAN SELECT AMONG PRIORITY QUEUES AND BE BILLED ACCORDINGLY.

RICHARDSON, LYMAN E., SYSTEM ECONOMICS FROM THE POINT OF VIEW OF THE USER, (T-SCAN LTD., ONTARIO, (CANADA)), INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P 4-2-1--4-2-9

THE ECONOMICS OF SYSTEMS IS DISCUSSED, INCLUDING CONSIDERATIONS FOR TERMINAL EQUIPMENT, COMMUNICATIONS, AND PROCESSING, WITH AN EMPHASIS ON RESPONSIVE SYSTEMS FOR BUSINESS USE. SOME INTERESTING POINTS ARE MADE CONCERNING TERMINAL UTILIZATION AND COMMUNICATIONS TRADE-OFFS.

STEVENS, MARY ELIZABETH, PROBLEMS OF NETWORK ACCOUNTING, MONITORING AND PERFORMANCE MEASUREMENT, NATIONAL BUREAU OF STANDARDS, WASHINGTON, DC, CENTER FOR COMPUTER SCIENCES AND TECHNOLOGY, SEP 70, NBS REPORT 10-559, NBS 6006400, 133P, 162 REFS

SOME OF THE IMPORTANT MANAGERIAL CONTROL PROBLEMS FACED BY THE PLANNERS OF A BIOMEDICAL COMMUNICATIONS NETWORK ARE DISCUSSED. NETWORK ACCOUNTING, NETWORK PERFORMANCE MONITORING, AND APPLYING APPROPRIATE MEASURES OF PERFORMANCE EFFECTIVENESS ARE CONSIDERED. ALTHOUGH MORE QUESTIONS ARE RAISED THAN SOLUTIONS PROVIDED, THE ISSUES SHOULD BE OF IMPORTANCE TO ALL NETWORK PLANNERS AND USERS.
(ALSO UNDER 5.1)

THOMPSON, GORDON B., POTENTIAL IMPACT OF USER/AUTHOR RELATIONSHIPS ON PUBLIC DATA NETWORK DESIGN, (BELL-NORTHERN RESEARCH, OTTAWA, (CANADA)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 248-250, 3 REFS

THE THESIS OF THIS ARTICLE IS THAT LACK OF ATTENTION TO THE BUSINESS RELATIONSHIPS BETWEEN USERS AND SUPPLIERS IN TODAY'S TIME-SHARING SYSTEMS HAVE PRODUCED A MECHANISM WHICH IS FAR FROM OPTIMAL FOR PROMOTING NETWORK USAGE. COMPARISONS ARE MADE TO THE PUBLIC SWITCHED NETWORK, WHERE A SINGLE BILL IS RENDERED FOR SERVICES WHICH MAY BE PROVIDED BY A NUMBER OF SUPPLIERS, AND TO THE OPERATION OF THE COPYRIGHT LAWS IN THE MUSIC BUSINESS, WITH PERFORMANCE RIGHT FEES BEING PAID WHENEVER A SELECTION IS PLAYED. THE AUTHOR ARGUES THAT CURRENT NETWORKS FAIL TO PROVIDE ADEQUATE MECHANISMS NEEDED TO REWARD AUTHORS AND STIMULATE FURTHER OFFERINGS. THE ROLE OF SUCH AUTHORS AND OF TIME-SHARING AS A SERVICE INDUSTRY IS ALSO DISCUSSED.

TUROFF, MURRAY, DR., 'PARTY-LINE' AND 'DISCUSSION'--COMPUTERIZED CONFERENCE SYSTEMS, OFFICE OF EMERGENCY PREPAREDNESS, WASHINGTON, DC, 20 JAN 72, 40P, 4 REFS
(ANNOTATION UNDER 4.1)

5.4 REGULATORY

BACHRACH, MORTON W., COPYRIGHT ASPECTS OF CATV AS UTILIZED IN INFORMATION NETWORKING,
BECKER, JOSEPH, PROCEEDINGS OF THE CONFERENCE ON INTERLIBRARY COMMUNICATIONS AND INFORMATION NETWORKS, (WARRENTON, VA, SEPTEMBER 28-OCTOBER 2, 1970), AMERICAN LIBRARY ASSOCIATION, CHICAGO, IL, 1971, OEC 0-9-230288-4235(095), (LC 70-18596), P 153-159, 46 REFS
(ANNOTATION UNDER 4.3)

BAKER, DONALD I., ACCESS TO LARGE COMPUTER SYSTEMS, (DEPARTMENT OF JUSTICE, WASHINGTON, DC),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 431-433, 19 REFS

COMPETITION IS CONSIDERED IN THE AREA OF REMOTE ACCESS DATA PROCESSING. OF PARTICULAR INTEREST ARE THE MONOPOLISTIC POSSIBILITIES OF LARGE, HIGHLY SPECIALIZED COMPUTER SYSTEMS COMBINED WITH THE ADVANTAGE OF REMOTE ACCESS. FAIR AND EQUAL ACCESS FOR ALL CUSTOMERS, INCLUDING LATECOMERS, IS PROPOSED WHERE COMPETITION IS IMPOSSIBLE.

BARAN, PAUL, THE COMING COMPUTER UTILITY--LAISSEZ-FAIRE, LICENSING OR REGULATION?, RAND CORP., SANTA MONICA, CA, APR 67, 27P

THIS IS A VERY INTERESTING CONTRIBUTION DISCUSSING SOME OF THE PROBLEMS FACING THE DEVELOPMENT OF NEW COMPUTER COMMUNICATION TECHNOLOGIES WITHIN THE CONSTRAINTS OF PRESENT REGULATION (OR LACK THEREOF) AND CONTAINING RECOMMENDATIONS FOR FUTURE REGULATORY POLICIES. THE CONFLICT ADDRESSED IS THE ONE CREATED BY THE MARRIAGE OF THE UNREGULATED AND ESSENTIALLY OPENLY COMPETITIVE COMPUTER COMPANIES WITH THE HIGHLY REGULATED AND MONOPOLISTIC COMMUNICATIONS UTILITIES. THE ARGUMENTS ARE WELL DEVELOPED WITH EXAMPLES AND ANALOGIES (OFTEN AT THE LAYMAN'S LEVEL) AND LEAD TO RECOMMENDATIONS INTENDED TO ENCOURAGE TECHNOLOGICAL INNOVATIONS, PRESERVE COMPETITION, AND PROTECT AGAINST THE ABUSE OF DATA PRIVACY.
(ALSO UNDER 4.3)

BIGELOW, ROBERT P., SOME LEGAL AND REGULATORY PROBLEMS OF MULTIPLE ACCESS COMPUTER NETWORKS, (HENNESSY, MCCLUSKEY, EARLE AND KILBURN, BOSTON, MA),
INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P 4-5-1--4-5-11, 12 REFS

5.4 REGULATORY

LEGAL PROBLEMS IN COMPUTING AND COMMUNICATIONS ARE PRESENTED IN AN INTERESTING AND INFORMATIVE MANNER. THE AGENCIES WHICH HAVE A DIRECT AND INDIRECT EFFECT ON POLICIES AFFECTING THE COMPUTER AND COMMUNICATIONS INDUSTRIES ARE IDENTIFIED. THE VARIETY OF LEGAL PROBLEMS EFFECTING COMPUTER MANAGEMENT, COMMUNICATIONS MANAGEMENT, AND NETWORK MANAGEMENT ARE THEN DISCUSSED, COVERING SUCH AREAS AS HARDWARE AND SOFTWARE PROCUREME, FOREIGN ATTACHMENTS, SPECIALIZED DATA CARRIERS, THE PRIVACY ISSUE, AND ANTI-TRUST CONSIDERATIONS.

COX, KENNETH A., THE PROMISE AND PERIL OF COMPETITION IN INTERCITY COMMUNICATIONS, (MCI COMMUNICATIONS CORP., WASHINGTON, DC),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-BC, NSF GJ-33239, P 434-440, 8 REFS

A STRONG CASE FOR COMPETITION IN DATA COMMUNICATIONS IS PRESENTED. THE PRIMARY BENEFIT IS THAT THE PUBLIC MAY CHOOSE, ON THE BASIS OF COMPARATIVE PERFORMANCE, BETWEEN THE ESTABLISHED CARRIERS AND THE OFFERERS OF NEW SERVICES. COMPETITORS, IT IS STATED, WILL BE STIMULATED TO PROVIDE INNOVATION, RELIABILITY, ECONOMY, AND IMPROVED QUALITY FOR THE CUSTOMER. THE PERILS OF STIFLING COMPETITION ARE ALSO COVERED.
(ALSO UNDER 3.2.1)

CUTLER, CHARLES R., BEYOND THE COMPUTER INQUIRY (WHO SHOULD BE REGULATED IN COMPUTER/COMMUNICATIONS), (DISTRICT OF COLUMBIA BAR, WASHINGTON),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-BC, NSF GJ-33239, P 453-460, 10 REFS

TAKING INTO ACCOUNT PAST PRECEDENCES OF THE FCC AND TRADITIONALLY ACCEPTED CONDITIONS FOR UTILITY REGULATION, GUIDELINES ARE PROPOSED TO BE APPLIED IN REGULATING COMPUTER/COMMUNICATIONS ACTIVITIES. INITIALLY THE FCC POLICIES ON DATA COMMUNICATIONS ARE DISCUSSED, RAISING SOME INTRIGUING CONTROVERSIES ON THE ROLE OF MESSAGE-SWITCHING SYSTEMS AND THE ANTI-RESALE TARIFF. THE RATIONALES OF REGULATION ARE OUTLINED AND APPLIED TO THE CONTROVERSIAL ISSUES TO ARRIVE AT A SET OF RECOMMENDATIONS STRESSING THE USE OF AS LITTLE REGULATION AS POSSIBLE.

DUNN, D. A., ALTERNATIVE FUTURE COMPUTER-COMMUNICATION MARKETS, (STANFORD UNIV., CA),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-BC, NSF GJ-33239, P 63-67, 11 REFS

THE MARKET STRUCTURE UNDER WHICH COMPUTER-COMMUNICATIONS SYSTEMS WILL OPERATE IS SEEN AS STRONGLY DEPENDENT ON THE REGULATORY ENVIRONMENT UNDER WHICH CABLE TELEVISION DEVELOPS AND THE REGULATIONS GOVERNING COMPETITION BETWEEN THE TELEPHONE CARRIERS AND CABLE TELEVISION SYSTEM OPERATORS. THE AUTHOR SHOWS HOW SEVERAL REALISTIC REGULATORY ALTERNATIVES WHICH COULD BE ADOPTED WOULD RESULT IN WIDELY DIFFERING COMPETITIVE ENVIRONMENTS.
(ALSO UNDER 5.2)

ENSLOW, PHILIP H., JR., MINI-TUTORIAL ON TELECOMMUNICATIONS MANAGEMENT AND POLICY, (EXECUTIVE OFFICE OF THE PRESIDENT, WASHINGTON, DC, OFFICE OF TELECOMMUNICATIONS POLICY),
NETWORKS FOR HIGHER EDUCATION. PROCEEDINGS OF THE EDUCOM SPRING CONFERENCE, (WASHINGTON, DC, APRIL 13, 1972), INTERUNIVERSITY COMMUNICATIONS COUNCIL INC. (EDUCOM), PRINCETON, NJ, 1972, P 36-41

THE OFFICE OF TELECOMMUNICATIONS POLICY (OTP) IS INTRODUCED AND ITS ROLE IN POLICY-MAKING ON DATA COMMUNICATIONS IS DISCUSSED. OTP'S FUNCTION WITHIN THE GOVERNMENT, ITS RELATIONSHIP TO THE FEDERAL COMMUNICATIONS COMMISSION (FCC), AND ITS CONCERN FOR BASIC POLICY ISSUES ARE DESCRIBED.

IRWIN, MANLEY R., MULTIPLE ACCESS COMPUTER NETWORKS: THE ROLE OF THE COMMON CARRIER, (NEW HAMPSHIRE, UNIV. OF, DURHAM, WHITTEMORE SCHOOL OF BUSINESS AND ECONOMICS),
INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P 4-4-1--4-4-8, 24 REFS

THIS IS A WELL ORGANIZED AND IN-DEPTH DISCUSSION OF THE ROLE OF COMMON CARRIERS IN THE DEVELOPMENT OF MULTIPLE ACCESS COMPUTER NETWORKS. THE AUTHOR SUGGESTS THAT THIS ROLE IS CURRENTLY UNDERGOING REASSESSMENT. THE NATURAL MONOPOLY OF THE CARRIERS IS BEING CHALLENGED, AND, AS THEY THEMSELVES ATTEMPT TO DIVERSIFY HORIZONTALLY BY OFFERING DATA PROCESSING SERVICES, THE VERTICAL INTEGRATION APPROACH WHICH THEY HAVE FOSTERED IS BEING CHALLENGED BY OTHERS. NO CONCLUSIONS ARE REACHED, EXCEPT THAT PUBLIC POLICY DECISIONS OF CONSIDERABLE IMPORTANCE WILL HAVE TO BE MADE WITHIN A DECADE.

IRWIN, MANLEY R., TIME-SHARED INFORMATION SYSTEMS: MARKET ENTRY IN SEARCH OF A POLICY, (NEW HAMPSHIRE, UNIV. OF, DURHAM),
AFIPS PROCEEDINGS, 1967 FALL JOINT COMPUTER CONFERENCE, VOLUME 31, (ANAHEIM, CA, NOVEMBER 14-16, 1967), THOMPSON BOOK CO., WASHINGTON, DC, 1967, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 523-520, 27 REFS

THIS PAPER DISCUSSES THE FCC INVESTIGATION INTO THE POLICY IMPLICATIONS OF COMPUTER TIME-SHARING. THE APPROACH IS TO (1) STATE THE REGULATORY ISSUES AS THE FCC SEES THEM; (2) DISCUSS THE BACKGROUND EVENTS THAT PROMPTED THE INQUIRY; AND (3) EVALUATE SOME OF THE COMPETITIVE ISSUES ASSOCIATED WITH TIME-SHARED COMPUTER SERVICES. THE AUTHOR CONCLUDES THAT THE GROUND RULES FOR MARKET ENTRY ARE AT STAKE IN THE FCC INVESTIGATION.

JOHNSON, LELAND L., SOME IMPLICATIONS OF NEW COMMUNICATIONS TECHNOLOGIES FOR NATIONAL SECURITY IN THE 1970S, RAND CORP., SANTA MONICA, CA, SEP 67, RC P-3639, (AD-658 424), 24P, 14 REFS

THIS DISCUSSION FOCUSES ON SATELLITE COMMUNICATIONS AND ITS POSSIBLE IMPACT ON POLICY IN THE PUBLIC AND MILITARY SECTORS.
(ALSO UNDER 1.5, 4.3)

KIMBEL, DIETER, PLANNING OF DATA COMMUNICATIONS NETWORKS--ECONOMIC, TECHNOLOGICAL AND INSTITUTIONAL ISSUES, (ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT, PARIS, (FRANCE)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-BC, NSF GJ-33239, P 251-259, 10 REFS

TECHNICAL, ECONOMIC AND INSTITUTIONAL ISSUES ARISING FROM THE INTERACTION OF COMPUTERS AND TELECOMMUNICATIONS ARE IDENTIFIED. THE PAPER POINTS OUT THAT SUCH SYSTEMS DEPEND ENTIRELY UPON TELECOMMUNICATIONS FACILITIES, AND EXPRESSES THE FEAR THAT THE TELECOMMUNICATIONS INDUSTRY MIGHT BECOME THE LIMITING FACTOR, BOTH FOR THE EXPLOITATION OF THE PROMISES OF THE MERGED TECHNOLOGIES AND FOR THE INDUSTRIAL GROWTH OF THE SYSTEMS. IN PLACE OF THE PRESENT VERTICAL POLICY CONCEPT, AN INTEGRATED HORIZONTAL POLICY APPROACH IS SUGGESTED TO NEGOTIATE THIS POTENTIAL PROBLEM. THE CASE IS MADE FOR LARGE SCALE NATIONAL PROJECTS AND AN EXAMPLE OF SUCH AN EFFORT IN JAPAN IS CITED.
(ALSO UNDER 1.1, 1.5)

LEE, ROBERT E., THE ROLE OF THE FEDERAL COMMUNICATIONS COMMISSION, (FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, DC),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-BC, NSF GJ-33239, P 49-50

THE FCC'S INTERESTS AND AREAS OF RESPONSIBILITY IN REGULATING COMPUTER COMMUNICATION SYSTEMS ARE BRIEFLY OUTLINED.

MAKINO, YASUO, COMPETITION IN THE FIELDS OF COMPUTERS AND COMMUNICATIONS IN JAPAN, (MINISTRY OF POSTS AND TELECOMMUNICATIONS, TOKYO, (JAPAN)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-BC, NSF GJ-33239, P 441-444

THE EFFECTS OF COMPETITION AND THE FACTORS INFLUENCING COMPETITION IN REMOTE ACCESS DATA PROCESSING AND TELECOMMUNICATIONS IN JAPAN ARE DESCRIBED. IT IS INTERESTING THAT NO COMPETITION IS EXPECTED IN THE FIELD OF TELECOMMUNICATIONS SERVICE, INCLUDING DATA TRANSMISSION.
(ALSO UNDER 3.2.1)

MAKINO, YASUO, DATA COMMUNICATION IN JAPAN, (MINISTRY OF POSTS AND TELECOMMUNICATIONS, TOKYO, (JAPAN)),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-BC, NSF GJ-33239, P B-16

S.4 REGULATORY

(ANNOTATION UNDER 1.2)

MELODY, WILLIAM H., INTERCONNECTION: IMPACT ON COMPETITION-CARRIERS AND REGULATION, (PENNSYLVANIA, UNIV. OF, PHILADELPHIA),
WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION. THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 445-452, 38 REFS

THE ISSUES OF INTERCONNECTION TO COMMON CARRIER FACILITIES ARE ADDRESSED, INCLUDING A HISTORICAL PERSPECTIVE; CURRENT IMPLICATIONS; MARKET, CARRIER, AND REGULATORY RESPONSES; AND TECHNICAL STANDARDS AND ECONOMIC BARRIERS. THE ISSUE OF INTERCONNECTION IS COVERED IN DETAIL UNDER THE PREMISE THAT IT IS AN AREA WHERE MONOPOLY POWER HAS FAR EXCEEDED ANY POSSIBLE RATIONALIZATION ON THE BASIS OF TECHNOLOGICALLY DETERMINED NATURAL MONOPOLY.

NORWOOD, FRANK W., TELECOMMUNICATIONS PROGRAMS AFFECTING NETWORK DEVELOPMENT,
BECKER, JOSEPH, PROCEEDINGS OF THE CONFERENCE ON INTERLIBRARY COMMUNICATIONS AND INFORMATION NETWORKS, (WARRENTON, VA, SEPTEMBER 28-OCTOBER 2, 1970), AMERICAN LIBRARY ASSOCIATION, CHICAGO, IL, 1971, OEC 0-9-230288-4235(095), (LC 70-185961, P 59-68, 24 REFS
(ANNOTATION UNDER 1.2)

SIMONSON, W. E., COMMUNICATION NEEDS OF REMOTELY ACCESSED COMPUTER, (SOUTHERN CALIFORNIA, UNIV. OF, LOS ANGELES),
AFIPS PROCEEDINGS, 1967 FALL JOINT COMPUTER CONFERENCE, VOLUME 31, (ANAHEIM, CA, NOVEMBER 14-16, 1967), THOMPSON BOOK CO., WASHINGTON, DC, 1967, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 522-523

THIS SHORT PAPER DEVELOPS THE THESIS THAT REGULATION SHOULD BE AIMED AT CREATING AND MAINTAINING A COMPETITIVE ENVIRONMENT IN THE AREA OF DATA COMMUNICATIONS.

S.5 STANDARDS

BARBER, D. L. A., EASING THE INTRODUCTION OF A PACKET SWITCHING SERVICE, NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE, MAR 71, NPL-CSD COM-SCI-T.M.-52, 20P
(ANNOTATION UNDER 3.3.1)

BARBER, D. L. A., EXPERIENCE WITH THE USE OF THE B.S. INTERFACE IN COMPUTER PERIPHERALS AND COMMUNICATION SYSTEMS, NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), DIV. OF COMPUTER SCIENCE, OCT 69, NPL-OCS COM-SCI-T.M.29, 15P, 9 REFS
(ANNOTATION UNDER 3.3.1)

BHUSHAN, ABHAY K., ROBERT H. STOTZ, PROCEDURES AND STANDARDS FOR INTER-COMPUTER COMMUNICATIONS, (MASSACHUSETTS INST. OF TECH., CAMBRIDGE, ELECTRONICS SYSTEMS LAB.),
AFIPS PROCEEDINGS, 1968 SPRING JOINT COMPUTER CONFERENCE, VOLUME 32, (ATLANTIC CITY, NJ, APRIL 30-MAY 2, 1968), THOMPSON BOOK CO., WASHINGTON, DC, 1968, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 95-104, 24 REFS
(ANNOTATION UNDER 3.5)

BONN, THEODORE H., A STANDARD FOR COMPUTER NETWORKS, (SPERRY RAND RESEARCH CENTER, SUDBURY, MA, DIGITAL TECHNIQUES LAB.),
COMPUTER, VOL 4, MAY-JUN 71, P 10-14, 3 REFS

THIS BRIEF DESCRIPTION OF STANDARDS EFFORTS RELATING TO COMPUTER NETWORK DEVELOPMENT AND USE INCLUDES A STATEMENT OF OBJECTIVES OF SUCH EFFORTS IN ADDITION TO CALLING FOR GOVERNMENT SUPPORT OF STANDARDS DEVELOPMENT ACTIVITIES AND A 'REGISTER' OF DE FACTO STANDARDS.

BONN, THEODORE H., STANDARDS AND INTERCONNECTION, (HONEYWELL INC., WALTHAM, MA),
INTERDISCIPLINARY CONFERENCE ON MULTIPLE ACCESS COMPUTER NETWORKS, (AUSTIN, TX, APRIL 20-22, 1970), TEXAS, UNIV. OF, AUSTIN, MITRE CORP., BEDFORD, MA, APR 70, P 4-3-1--4-3-8

THE OBJECTIVES AND IMPLICATIONS OF STANDARDIZATION IN DATA TRANSFER, SYSTEM CONTROL, AND DATA BASE DEFINITION FOR COMPUTER NETWORKS ARE OUTLINED. SOME OF THE ORGANIZATIONAL AND POLITICAL PROBLEMS OF STANDARDIZATION ARE WELL DESCRIBED.

FITZSIMONS, THOMAS F., ASCII EXTENSION AND EXPANSION AND THEIR IMPACT ON DATA COMMUNICATIONS, (BELL TELEPHONE LABS. INC., PISCATAWAY, NJ),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 73-79

PROPOSED ASCII-RELATED STANDARDS FOR COMPUTER-COMMUNICATIONS ARE DISCUSSED. THE HISTORY OF THE EFFORT, THE CURRENT PROPOSALS, AND THE POTENTIAL IMPACT ON DATA COMMUNICATION ARE INTRODUCED. PARTICULAR ATTENTION IS GIVEN TO VARIOUS PROPOSALS FOR EXTENSIONS OF THE ASCII CODE.

LITTLE, JOHN L., CALVIN N. MOOERS, STANDARDS FOR USER PROCEDURES AND DATA FORMATS IN AUTOMATED INFORMATION SYSTEMS AND NETWORKS, (NATIONAL BUREAU OF STANDARDS, WASHINGTON, DC, ROCKFORD RESEARCH INST., CAMBRIDGE, MA),
AFIPS PROCEEDINGS, 1968 SPRING JOINT COMPUTER CONFERENCE, VOLUME 32, (ATLANTIC CITY, NJ, APRIL 30-MAY 2, 1968), THOMPSON BOOK CO., WASHINGTON, DC, 1968, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 89-94, 4 REFS

'ONCE A TELEPHONE CONNECTION TO A REMOTE AUTOMATED STORAGE UNIT AND PROCESSOR UNIT HAS BEEN ESTABLISHED, THE USER IS ABSOLUTELY HELPLESS UNLESS HE IS THOROUGHLY FAMILIAR WITH THE PARTICULAR KEYBOARD RITUALS AND INCANTATIONS REQUIRED TO ELICIT PERFORMANCE FROM THE SPECIFIC REMOTE MACHINE.' THE PURPOSE OF THE PAPER, THEN, IS TO ATTEMPT TO AMELIORATE THE SITUATION BY THE DEVELOPMENT OF STANDARDS FOR USER CONTROL PROCEDURES AND FOR DATA FORMATS TO BE USED IN AUTOMATED INFORMATION NETWORKS. ELEMENTAL LOGICAL CONTROL ACTIONS FOR A USER ENTERING AN AUTOMATED INFORMATION SYSTEM ARE IDENTIFIED AND IT IS SUGGESTED THAT THEY CAN BE STANDARDIZED AS TO FUNCTION AND CAN BE GIVEN STANDARD KEYBOARD ASSIGNMENTS.

MORENOFF, EDWARD, THE TRANSFERABILITY OF COMPUTER PROGRAMS AND THE DATA ON WHICH THEY OPERATE, (ROME AIR DEVELOPMENT CENTER, GRIFFISS AFB, NY),
AFIPS PROCEEDINGS, 1969 SPRING JOINT COMPUTER CONFERENCE, VOLUME 34, (BOSTON, MA, MAY 14-16, 1969), AFIPS PRESS, MONTVALE, NJ, 1969, AFIPS CONFERENCE PROCEEDINGS, (LC 55-44701), P 609-610, 8 REFS
(ANNOTATION UNDER 4.1)

PECK, PAUL L., THE IMPLICATIONS OF ADP NETWORKING STANDARDS FOR OPERATIONS RESEARCH, MITRE CORP., BEDFORD, MA, JUN 69, MC MTP-333, AF F19628-68-C-0365, (AD-696 675), 15P, 5 REFS
(ANNOTATION UNDER 1.1)

ROSENBLUM, STANLEY R., PROGRESS IN CONTROL PROCEDURE STANDARDIZATION, (HONEYWELL INFORMATION SYSTEMS INC., FRAMINGHAM, MA),
JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS, 1971, IEEE CAT-71C59-C, P 153-159, 2 REFS
(ANNOTATION UNDER 3.5)

STAFFORD, SAMUEL, SERIOUS COMPATIBILITY PROBLEMS IN COMPUTER NETWORKING CHALLENGE NBS, INDUSTRY,
GOVERNMENT EXECUTIVE, VOL 3, ISSUE 7, JUL 71, P 64-66

BASED ON COMMENTS BY DR. RUTH DAVIS OF THE NATIONAL BUREAU OF STANDARDS, THIS ARTICLE HIGHLIGHTS THE PROBLEMS OF IMPROVING NETWORKS IN TERMS OF COST-EFFECTIVENESS AND COMFORTABLE USE BY CUSTOMERS. COMPATIBILITY PROBLEMS AND STANDARDIZATION EFFORTS ARE DISCUSSED AND CLARIFIED. INADEQUATE REPRESENTATION ON STANDARDS COMMITTEES AND TIME LAGS BETWEEN DECISIONS ON STANDARDIZATION AND IMPLEMENTATION ARE TWO SERIOUS PROBLEMS. FURTHER IT IS STATED THAT A FEDERAL COMMUNICATIONS COMMISSION RULING ALLOWING COMPETITION IN DIGITAL DATA TRANSMISSION WILL BE IMPORTANT FROM THE STANDPOINT OF INTRODUCING LOWER-COST COMMUNICATIONS.

STEVENS, MARY ELIZABETH, COMPATIBILITY PROBLEMS OF NETWORK INTERFACING, (NATIONAL BUREAU OF STANDARDS, WASHINGTON, DC, CENTER FOR COMPUTER SCIENCES AND TECHNOLOGY),
BECKER, JOSEPH, PROCEEDINGS OF THE CONFERENCE ON INTERLIBRARY COMMUNICATIONS AND INFORMATION NETWORKS, (WARRENTON, VA, SEPTEMBER 28-OCTOBER 2, 1970), AMERICAN LIBRARY ASSOCIATION, CHICAGO, IL, 1971, OEC 0-9-230288-4235(095), (LC 70-185961,

5.5 STANDARDS

P 202-212, 49 REFS

THIS REPORT IDENTIFIES A POTPOURRI OF PROBLEMS AND QUESTIONS CONCERNING COMPATIBILITY AT THE VARIOUS INTERFACES ASSOCIATED WITH A NETWORK BROADLY CLASSIFIED AS MACHINE-MACHINE AND MAN-MACHINE PROBLEMS. THIS REPORT SCRATCHES THE SURFACE OF A LARGE NUMBER OF PROBLEMS, BUT IS WEAK WHEN IT COMES TO USEFUL SOLUTIONS.

STEVENS, MARY ELIZABETH, STANDARDIZATION, COMPATIBILITY AND/OR CONVERTIBILITY REQUIREMENTS IN NETWORK PLANNING, NATIONAL BUREAU OF STANDARDS, WASHINGTON, DC, CENTER FOR COMPUTER SCIENCES AND TECHNOLOGY, MAY 70, NBS REPORT 10-252, NBS 6006400, (PB-194 179), 249P, 469 REFS

STANDARDIZATION REQUIREMENTS RELATIVE TO A PROPOSED BIOMEDICAL COMMUNICATIONS NETWORK ARE CONSIDERED. THIS VERY COMPLETE DOCUMENT COVERS THE AREAS OF APPLICABILITY OF STANDARDS, INFORMATION CONTROL REQUIREMENTS, AND MANAGEMENT CONTROL REQUIREMENTS. THIS INFORMATION SHOULD BE USEFUL TO ALL NETWORK DESIGNERS AND PARTICIPANTS.

WHITE, GEORGE W., MESSAGE FORMAT PRINCIPLES, (NATIONAL COMMUNICATIONS SYSTEM, WASHINGTON, DC), JACKSON, PETER E., PROCEEDINGS, ACM/IEEE SECOND SYMPOSIUM ON PROBLEMS IN THE OPTIMIZATION OF DATA COMMUNICATION SYSTEMS, (PALO ALTO, CA, OCTOBER 20-22, 1971), ASSOCIATION FOR COMPUTING MACHINERY, NEW YORK, SPECIAL INTEREST GROUP ON DATA COMMUNICATIONS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, COMPUTER SOCIETY - TECHNICAL COMMITTEE ON COMPUTER COMMUNICATIONS; 1971, IEEE CAT-71C59-C, P 192-198, 3 REFS
(ANNOTATION UNDER 3.5)

5.6 SECURITY

BARAN, PAUL, ON DISTRIBUTED COMMUNICATIONS: IX. SECURITY, SECRECY, AND TAMPER-FREE CONSIDERATIONS, RAND CORP., SANTA MONICA, CA, AUG 64, RC RM-3765-PR, AF 49(638)-700, (AD-444 839), 39P, 3 REFS

THIS REPORT DESCRIBES A NUMBER OF TECHNIQUES THAT CAN ASSURE SECURITY OF DATA TRANSMISSION IN A DISTRIBUTED MESSAGE SWITCHED NETWORK. ALTHOUGH INTENDED AS AN OPEN DISCUSSION OF MATERIAL PARTICULARLY RELEVANT FOR MILITARY SECURITY APPLICATIONS, THE METHODS FOR ASSURING ADEQUACY AND EFFECTIVENESS OF CONTROLS ON DATA ACCESSIBILITY ARE ALSO OF POTENTIAL INTEREST IN MANY APPLICATIONS OF NON-MILITARY RESOURCE SHARING COMPUTER NETWORKS.
TECHNIQUES PROPOSED IN THIS REPORT INCLUDE CONVENTIONAL CRYPTOGRAPHIC TECHNIQUES THAT CAN BE IMPLEMENTED IN THE MESSAGE SWITCHED NETWORK ITSELF. IN ADDITION TO PROPOSING THE INTRODUCTION OF FRAUDULENT TRAFFIC, THE REPORT ALSO MENTIONS A FEW TECHNIQUES SUCH AS TRANSMISSION OF SUCCESSIVE MESSAGE BLOCKS BY EVER CHANGING OR CONTINUOUSLY CHANGING PATHS AS AN EXAMPLE OF THOSE TECHNIQUES PARTICULARLY APPLICABLE TO THIS TYPE OF NETWORK.

FREED, ROY N., PROTECTION OF PROPRIETARY SOFTWARE PROGRAMS IN THE UNITED STATES, (WIDETT AND WIDETT, BOSTON, MA), WINKLER, STANLEY, COMPUTER COMMUNICATIONS: IMPACTS AND IMPLEMENTATION, THE FIRST INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION, (WASHINGTON, DC, OCTOBER 24-26, 1972), INTERNATIONAL CONFERENCES ON COMPUTER COMMUNICATION, 1972, ICCC 72-CHO-690-8C, NSF GJ-33239, P 403-408, 6 REFS

THIS IS A VERY INTERESTING DISCUSSION OF LEGAL TECHNIQUES FOR PROTECTING PROPRIETARY SOFTWARE FROM UNAUTHORIZED USE. PATENTING, COPYRIGHTING, TRADE SECRETS, LICENSING, LEASING, NON-DISCLOSURE COMMITMENTS, AND PROGRAM REGISTRATION ALL RECEIVE TREATMENT, GIVING A GOOD PERSPECTIVE OF THE PRESENT STATE OF LEGAL DEVELOPMENTS AND ISSUES.
(ALSO UNDER 3.4)

5.7 USER SERVICES

DAVIS, RUTH M., PRACTICALITIES OF NETWORK USE, (NATIONAL BUREAU OF STANDARDS, WASHINGTON, DC, INST. FOR COMPUTER SCIENCES AND TECHNOLOGY), NETWORKS FOR HIGHER EDUCATION, PROCEEDINGS OF THE EDUCOM SPRING CONFERENCE, (WASHINGTON, DC, APRIL 13, 1972), INTERUNIVERSITY COMMUNICATIONS COUNCIL INC. (EDUCOM), PRINCETON, NJ, 1972, P 13-28
(ANNOTATION UNDER 4.0)

DOLKAS, JAMES B., MODERN EDUCATION MEDIA CUT COSTS AT THE COMPUTER CENTER, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, MOFFETT FIELD, CA, AMES RESEARCH CENTER, 1972, 15R, 7 REFS

THE FUNCTIONAL ROLE OF THE USER SERVICES ORGANIZATION THAT SUPPORTS A NETWORK IS DISCUSSED. SPECIAL ATTENTION IS GIVEN TO THE NASA AMES VIDEOTAPE EXPERIMENT AS USED FOR USER EDUCATIONAL PURPOSES RELATED TO THE ILLIAC IV AND CDC 6600/7600. COMPUTER ASSISTED INSTRUCTION IS ALSO MENTIONED. THE PROBLEMS OF INFORMATION COLLECTION AND DISSEMINATION FOR USERS OF A NATIONAL NETWORK ARE NOT ADDRESSED.

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|---|---|---|
| ABRAMSON, NORMAN | THE ALOHA SYSTEM | 3.2.1 |
| | THE ALOHA SYSTEM--ANOTHER ALTERNATIVE FOR COMPUTER COMMUNICATIONS. | 3.1.0 |
| ALDEN, R. M. | THE WIRED CITY: THE ROLE OF AN INDEPENDENT TELEPHONE COMPANY | 4.3 |
| AMSTUTZ, STANFORD R. | DISTRIBUTED INTELLIGENCE IN DATA COMMUNICATIONS NETWORKS. | 3.3.2 |
| ANDERSON, R. H. | THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMM | 3.4 |
| ANDREAE, SYPKO W. | AN ERROR-CORRECTING DATA LINK BETWEEN SMALL AND LARGE COMPUTERS | 3.2.1 |
| ANDREWS, GLENN E. | THE DATA COMMUNICATIONS MARKET IN THE UNITED STATES | 5.2 |
| ANGELL, MARY ANNE K. | AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS | 3.1.0 |
| ANSLOW, N. G. | IMPLEMENTATION OF INTERNATIONAL DATA EXCHANGE NETWORKS | 3.2.1 |
| ATKINSON, D. M. | THE PROBABLE FUTURE OF CANADIAN LONG HAUL DIGITAL DATA NETWORK CONNECTIONS WITH TH | 3.1.1 |
| AUFENKAMP, D. D. | NATIONAL SCIENCE (COMPUTER) NETWORK. | 1.1 |
| | NSF ACTIVITIES RELATED TO A NATIONAL SCIENCE COMPUTER NETWORK | 1.2 |
| AUPPERLE, ERIC M. | MERIT COMPUTER NETWORK: HARDWARE CONSIDERATIONS. | 3.1.1 |
| | THE COMMUNICATIONS COMPUTER HARDWARE OF THE MERIT COMPUTER NETWORK | 3.3.2 |
| BACHRACH, MORTON W. | COPYRIGHT ASPECTS OF CATV AS UTILIZED IN INFORMATION NETWORKING | 4.3 |
| BAKER, DONALD I. | ACCESS TO LARGE COMPUTER SYSTEMS. | 5.4 |
| BALL, CHRISTOPHER J. | COMMUNICATIONS AND THE MINICOMPUTER. | 1.3 |
| BALZER, R. | INTERENTITY COMMUNICATION | 3.0 |
| BARAN, PAUL | COMMUNICATIONS, COMPUTERS AND PEOPLE | 1.5 |
| | ON DISTRIBUTED COMMUNICATIONS NETWORKS. | 2.1.0 |
| | ON DISTRIBUTED COMMUNICATIONS: II. DIGITAL SIMULATION OF HOT-POTATO ROUTING IN A B | 2.1.1 |
| | ON DISTRIBUTED COMMUNICATIONS: IV. PRIORITY, PRECEDENCE, AND OVERLOAD | 2.1.3 |
| | ON DISTRIBUTED COMMUNICATIONS: IX. SECURITY, SECRECY, AND TAMPER-FREE CONSIDERATIO | 5.6 |
| | ON DISTRIBUTED COMMUNICATIONS: I. INTRODUCTION TO DISTRIBUTED COMMUNICATIONS NETWO | 1.0 |
| | ON DISTRIBUTED COMMUNICATIONS: VIII. THE MULTIPLEXING STATION | 3.2.3 |
| | ON DISTRIBUTED COMMUNICATIONS: VII. TENTATIVE ENGINEERING SPECIFICATIONS AND PRELI | 3.3.2 |
| | ON DISTRIBUTED COMMUNICATIONS: V. HISTORY, ALTERNATIVE APPROACHES, AND COMPARISONS | 2.1.3 |
| | ON DISTRIBUTED COMMUNICATIONS: XI. SUMMARY OVERVIEW | 3.0 |
| | THE COMING COMPUTER UTILITY--LAISSEZ-FAIRE, LICENSING OR REGULATION?. | 5.4 |
| BARBER, D. L. A. | EASING THE INTRODUCTION OF A PACKET SWITCHING SERVICE. | 3.3.1 |
| | EXPERIENCE WITH THE USE OF THE B.S. INTERFACE IN COMPUTER PERIPHERALS AND COMMUNIC | 3.3.1 |
| | SOME OBSERVATIONS ON STORE-AND-FORWARD AND CIRCUIT-SWITCHED DATA NETWORKS | 2.2 |
| | THE CHOICE OF PACKET PARAMETERS FOR PACKET SWITCHED NETWORKS | 2.1.2 |
| | THE EUROPEAN COMPUTER NETWORK PROJECT | 3.1.0 |
| | THE NPL DATA NETWORK. | 3.1.0 |
| BARTLETT, K. A. | THE DESIGN OF A MESSAGE SWITCHING CENTRE FOR A DIGITAL COMMUNICATION NETWORK | 3.1.1 |
| | TRANSMISSION CONTROL IN A LOCAL DATA NETWORK. | 3.0 |
| BAUER, WALTER F. | COMPUTER/COMMUNICATIONS SYSTEMS: PATTERNS AND PROSPECTS | 1.0 |
| | ECONOMICS OF TIME-SHARED COMPUTING SYSTEMS. PART 1. | 5.3 |
| | ECONOMICS OF TIME-SHARED COMPUTING SYSTEMS. PART 2. | 5.3 |
| BECHER, WILLIAM D. | THE COMMUNICATIONS COMPUTER HARDWARE OF THE MERIT COMPUTER NETWORK | 3.3.2 |
| BECKER, J. | INFORMATION NETWORKS. | 1.2 |
| BEERE, MAX P. | TELEPROCESSING--THE UTILITY OF THE COMPUTER UTILITY NEW PROBLEMS? NEW CHALLENGE?. | 4.3 |
| | TYMNET--A SERENDIPITOUS EVOLUTION | 3.1.1 |
| BELL, C. G. | COMPUTER NETWORKS. | 3.1.0 |
| BELYAKOV-BODIN, V. I. | ON THE STRUCTURE OF A HETEROGENEOUS COMPUTING SYSTEM, CONTROLLED BY A LARGE DIGITA | 3.0 |
| BENOICK, MARC | FINAL REPORT OF THE COMMITTEE ON NETTING COMPUTER SYSTEMS | 1.0 |
| BENES, V. E. | MATHEMATICAL THEORY OF CONNECTING NETWORKS AND TELEPHONE TRAFFIC | 2.1 |
| BENJAMIN, RICHARD T. | ARPA NETWORK EXPERIMENTATION USING EXISTING DATA MANAGEMENT SYSTEMS | 4.9 |
| BENNETT, J. M. | A GRAFTED MULTI-ACCESS NETWORK | 3.0 |
| BENOIT, JOHN W. | DESIGN SPECIFICATIONS FOR PWIN NON-FUNCTIONAL NETWORK CONTROL SOFTWARE | 3.4 |
| | EVALUATION OF THE NETWORK FEATURES REQUIRED TO ATTAIN THE APPROVED NMCS OBJECTIVES | 1.1 |
| | PROPOSED IMPLEMENTATION PLAN FOR A WWMCCS INTERCOMPUTER NETWORK | 3.1.1 |
| | PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN. | 3.1.1 |
| BENVENUTO, A. A. | SYSTEM LOAD SHARING STUDY | 1.2 |
| BEVERIDGE, ROY D. | PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN. | 3.1.1 |
| BHUSHAN, ABHAY K. | PROCEDURES AND STANDARDS FOR INTER-COMPUTER COMMUNICATIONS | 3.5 |
| BIGELOW, ROBERT P. | SOME LEGAL AND REGULATORY PROBLEMS OF MULTIPLE ACCESS COMPUTER NETWORKS. | 5.4 |
| BINDER, RICHARD | MULTIPLEXING IN THE ALOHA SYSTEM: MENEHUNE - KEIKI DESIGN CONSIDERATIONS | 3.3.2 |
| BIRKE, DENNIS M. | STATE-TRANSITION PROGRAMMING TECHNIQUES AND THEIR USE IN PRODUCING TELEPROCESSING | 3.2.9 |
| BIRNBAUM, J. | A TIME SHARED SYSTEM FOR MULTIPLE INDEPENDENT LABORATORIES | 3.0 |
| BLACK, G. | COMPUTER NETWORKS. | 3.1.0 |
| BLANK, H. A. | DATA TRANSMISSION NETWORK COMPUTER-TO-COMPUTER STUDY | 3.2.1 |
| BOEHM, B. W. | A COMPUTER SIMULATION OF ADAPTIVE ROUTING TECHNIQUES FOR DISTRIBUTED COMMUNICATION | 2.1.1 |
| BOEHM, SHARLA P. | ON DISTRIBUTED COMMUNICATIONS: II. DIGITAL SIMULATION OF HOT-POTATO ROUTING IN A B | 2.1.1 |
| BONN, THEODORE H. | A STANDARD FOR COMPUTER NETWORKS. | 5.5 |
| | STANDARDS AND INTERCONNECTION. | 5.5 |
| BOOTH, GRAYCE M. | THE USE OF DISTRIBUTED DATA BASES IN INFORMATION NETWORKS | 4.1 |
| BORKO, H. | NATIONAL AND INTERNATIONAL INFORMATION NETWORKS IN SCIENCE AND TECHNOLOGY | 1.0 |
| BORTELS, W. H. | SIMULATION OF INTERFERENCE OF PACKETS IN THE ALOHA TIME-SHARING SYSTEM | 2.1.1 |
| BOWDON, EDWARD K., SR. | NETWORK COMPUTER ANALYSIS | 2.1.2 |
| | PRIORITY ASSIGNMENT IN A NETWORK OF COMPUTERS | 2.1.2 |
| | PRIORITY ASSIGNMENT IN A NETWORK OF COMPUTERS | 2.1.2 |
| BOYSE, J. W. | A STUDY OF INFORMATION IN MULTIPLE-COMPUTER AND MULTIPLE-CONSOLE DATA PROCESSING S | 2.1.2 |
| BRANCH, JACK | DEFINE YOUR MESSAGE SWITCHING SOFTWARE NEEDS BEFORE YOU BUY. | 3.4 |
| BRESSLER, R. | INTERENTITY COMMUNICATION | 3.0 |
| BROOKS, FREDERICK P., JR. | ORGANIZATIONAL, FINANCIAL, AND POLITICAL ASPECTS OF A THREE-UNIVERSITY COMPUTING C | 5.0 |
| BROWN, GEORGE W. | AN INTERUNIVERSITY INFORMATION NETWORK. II. EVALUATION | 1.1 |
| | EDUNET REPORT OF THE SUMMER STUDY ON INFORMATION NETWORKS | 1.1 |
| BRUCE, PAUL | A RECOMMENDED RESEARCH AND DEVELOPMENT PLAN FOR DATA EXCHANGE IN THE WORLD WIDE MI | 4.9 |
| | PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN. | 3.1.1 |
| BURNER, H. B. | THE USE OF A SMALL COMPUTER AS A TERMINAL CONTROLLER FOR A LARGE COMPUTING SYSTEM | 3.3.2 |
| BYSTROM, JOHN | TELECOMMUNICATION NETWORKS FOR LIBRARIES AND INFORMATION SYSTEMS: APPROACHES TO DE | 4.2 |
| CARROLL, TOM W. | PROGRESS ON APPLICATIONS DEVELOPMENT, 1970-71. A REPORT OF THE ASSOCIATE DIRECTORS | 4.0 |
| CARR, STEPHEN | HOST-HOST COMMUNICATION PROTOCOL IN THE ARPA NETWORK | 3.5 |
| CASEY, R. G. | ALLOCATION OF COPIES OF A FILE IN AN INFORMATION NETWORK. | 2.1.2 |
| CASTLE, JAMES C. | SYSTEM CONTROL IN MULTIPLE ACCESS COMPUTER NETWORKS | 1.0 |
| CERF, VINTON G. | HOST-HOST COMMUNICATION PROTOCOL IN THE ARPA NETWORK | 3.5 |
| | THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMM | 3.4 |
| CHAMBLEE, J. A. | OPERATIONAL CONSIDERATIONS FOR THE IMPLEMENTATION OF COMPUTER NETWORKS IN THE NMCS | 1.2 |
| CHOU, W. | TOPOLOGICAL CONSIDERATIONS IN THE DESIGN OF THE ARPA COMPUTER NETWORK | 2.1.2 |
| CHU, WESLEY W. | A STUDY OF ASYNCHRONOUS TIME DIVISION MULTIPLEXING FOR TIME-SHARING COMPUTER SYSTE | 3.2.1 |
| | DEMULTIPLEXING CONSIDERATIONS FOR STATISTICAL MULTIPLEXORS | 3.2.9 |
| | OPTIMAL FILE ALLOCATION IN A MULTIPLE COMPUTER SYSTEM. | 2.1.2 |
| CLARK, DAVID D. | THE CLASSROOM INFORMATION AND COMPUTING SERVICE. | 4.3 |
| COCANOWER, ALFRED B. | MERIT COMPUTER NETWORK: SOFTWARE CONSIDERATIONS. | 3.1.1 |
| | THE COMMUNICATIONS COMPUTER OPERATING SYSTEM--THE INITIAL DESIGN | 3.1.1 |
| COFFMAN, E. G., JR. | SYSTEM DEADLOCKS | 2.0 |
| COLEMAN, D. M. | A STUDY OF INFORMATION IN MULTIPLE-COMPUTER AND MULTIPLE-CONSOLE DATA PROCESSING S | 2.1.2 |
| COLE, GERALD D. | COMPUTER NETWORK MEASUREMENTS: TECHNIQUES AND EXPERIMENTS | 2.2 |
| | PERFORMANCE MEASUREMENTS ON THE ARPA COMPUTER NETWORK. | 2.2 |
| CONRATH, DAVID W. | TELECONFERENCING: THE COMPUTER, COMMUNICATION, AND ORGANIZATION | 4.1 |
| COSELL, BERNARD P. | IMPROVEMENTS IN THE DESIGN AND PERFORMANCE OF THE ARPA NETWORK. | 3.1.2 |
| | THE NETWORK CONTROL CENTER FOR THE ARPA NETWORK. | 5.1 |
| | THE NETWORK CONTROL CENTER FOR THE ARPA NETWORK. | 5.1 |
| COTTON, IRA W. | PROPOSED IMPLEMENTATION PLAN FOR A WWMCCS INTERCOMPUTER NETWORK | 3.1.1 |
| | PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN. | 3.1.1 |
| COX, KENNETH A. | THE PROMISE AND PERIL OF COMPETITION IN INTERCITY COMMUNICATIONS | 5.4 |
| CRAIG, L. J. | OVERLAPPING TESSELLATED COMMUNICATIONS NETWORKS. | 2.1.2 |
| CROCKER, STEPHEN D. | FUNCTION-ORIENTED PROTOCOLS FOR THE ARPA COMPUTER NETWORK | 3.5 |
| | HOST-HOST COMMUNICATION PROTOCOL IN THE ARPA NETWORK | 3.5 |
| CROWTHER, WILLIAM R. | A STUDY OF THE ARPA NETWORK DESIGN AND PERFORMANCE. | 3.1.2 |
| | FLOW CONTROL IN A RESOURCE-SHARING COMPUTER NETWORK | 3.4 |
| | IMPROVEMENTS IN THE DESIGN AND PERFORMANCE OF THE ARPA NETWORK. | 3.1.2 |
| | THE INTERFACE MESSAGE PROCESSOR FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | THE TERMINAL IMP FOR THE ARPA COMPUTER NETWORK | 3.3.2 |

| | | |
|---|---|---|
| CUADRA, CARLOS A. | COMPUTER TECHNOLOGY AND LIBRARIES OF THE FUTURE. | 4.2 |
| CUTLER, CHARLES R. | BEYOND THE COMPUTER INQUIRY (WHO SHOULD BE REGULATED IN COMPUTER/COMMUNICATIONS?. | 5.4 |
| DASILVA, JOHN | THE CANADIAN UNIVERSITIES COMPUTER NETWORK TOPOLOGICAL CONSIDERATIONS | 2.1.1 |
| DAVIES, D. W. | COMMUNICATION NETWORKS TO SERVE RAPID-RESPONSE COMPUTERS. | 3.2.2 |
| | TELEPROCESSING AND DATA COMMUNICATION OF THE FUTURE | 1.6 |
| | THE CONTROL OF CONGESTION IN PACKET SWITCHING NETWORKS | 2.1.3 |
| | THE NPL DATA NETWORK. | 3.1.0 |
| | THE PRINCIPLES OF A DATA COMMUNICATION NETWORK FOR COMPUTERS AND REMOTE PERIPHERAL | 3.1.0 |
| DAVIS, M. S. | ECONOMICS--POINT OF VIEW OF DESIGNER AND OPERATOR | 5.3 |
| DAVIS, RUTH M. | MAN-MACHINE COMMUNICATION | 1.2 |
| | PRACTICALITIES OF NETWORK USE. | 4.0 |
| | THE NATIONAL BIOMEDICAL COMMUNICATIONS NETWORK AS A DEVELOPING STRUCTURE | 3.0 |
| DEGRASSE, RICHARD W. | REMOTE COMPUTING IN HIGHER EDUCATION: PROSPECTS FOR THE FUTURE. | 1.1 |
| DEI ROSSI, J. A. | A TELEPHONE-ACCESS BIOMEDICAL INFORMATION CENTER | 5.3 |
| DELL, F. R. E. | FEATURES OF A PROPOSED SYNCHRONOUS DATA NETWORK. | 3.1.0 |
| DEMERCADO, JOHN | THE CANADIAN UNIVERSITIES COMPUTER NETWORK TOPOLOGICAL CONSIDERATIONS | 2.1.1 |
| DENES, JOHN E. | BROOKNET--AN EXTENDED CORE STORAGE ORIENTED NETWORK OF COMPUTERS AT BROOKHAVEN NAT | 3.1.0 |
| DENNIS, JACK B. | A POSITION PAPER ON COMPUTING AND COMMUNICATIONS | 5.0 |
| DESPRES, REMI F. | A PACKET SWITCHING NETWORK WITH GRACEFUL SATURATED OPERATION | 3.2.2 |
| DITTBERNER, DONALD L. | TELECOMMUNICATIONS COSTS | 5.3 |
| DOLKAS, JAMES B. | MODERN EDUCATION MEDIA CUT COSTS AT THE COMPUTER CENTER | 5.7 |
| DOLL, DIXON R. | EFFICIENT ALLOCATION OF RESOURCES IN CENTRALIZED COMPUTER-COMMUNICATION NETWORK DE | 2.1.2 |
| DORFF, ERVIN K. | A MULTIPLE MINICOMPUTER MESSAGE SWITCHING SYSTEM | 3.3.2 |
| | COMPUTERS AND COMMUNICATIONS: COMPLEMENTING TECHNOLOGIES. | 1.3 |
| DUDICK, A. L. | ROUND ROBIN SCHEDULING IN A COMPUTER COMMUNICATIONS SYSTEM WITH FINITE SWAP TIME A | 2.1.2 |
| DUGGER, EDWARD | THE MATERIALS INFORMATION NETWORK | 4.0 |
| DUNN, D. A. | ALTERNATIVE FUTURE COMPUTER-COMMUNICATION MARKETS | 5.4 |
| DUVAL, W. | INTERENTITY COMMUNICATION | 3.0 |
| EICK, HARRY A. | DEVELOPMENT OF APPLICATIONS FOR THE MERIT COMPUTING NETWORK. | 4.0 |
| ELIE, MICHEL | GENERAL PURPOSE NETWORKS OF COMPUTERS | 1.2 |
| ELLIS, T. O. | ARPA NETWORK SERIES: I. INTRODUCTION TO THE ARPA NETWORK AT RAND AND TO THE RAND V | 3.1.0 |
| ELMENDORF, C. H. | DATA COMMUNICATIONS NETWORK ARCHITECTURE | 3.0 |
| ELPHICK, M. J. | SYSTEM DEADLOCKS | 2.0 |
| ELSPAS, B. | INVESTIGATION OF PROPAGATION-LIMITED COMPUTER NETWORKS | 2.1.2 |
| ENGELBART, DOUGLAS C. | NETWORK INFORMATION CENTER AND COMPUTER AUGMENTED TEAM INTERACTION | 4.1 |
| ENSLOW, PHILIP H., JR. | MINI-TUTORIAL ON TELECOMMUNICATIONS MANAGEMENT AND POLICY | 5.4 |
| ERICKSON, G. A. | MULTICOMPUTER PROGRAMMING FOR A LARGE SCALE REAL-TIME DATA PROCESSING SYSTEM | 3.4 |
| ESAU, L. R. | ON TELEPROCESSING SYSTEM DESIGN. PART II. A METHOD FOR APPROXIMATING THE OPTIMAL N | 2.1.2 |
| FARBER, DAVID J. | DATA RING ORIENTED COMPUTER NETWORKS | 3.0 |
| | NETWORKS: AN INTRODUCTION | 1.2 |
| | THE STRUCTURE OF A DISTRIBUTED COMPUTER SYSTEM--THE DISTRIBUTED FILE SYSTEM | 3.1.1 |
| | THE STRUCTURE OF A DISTRIBUTED COMPUTING SYSTEM--SOFTWARE | 3.4 |
| | THE SYSTEM ARCHITECTURE OF THE DISTRIBUTED COMPUTER SYSTEM--THE COMMUNICATIONS SYS | 3.2.0 |
| FEENEY, GEORGE J. | THE FUTURE OF COMPUTER UTILITIES. | 4.3 |
| FERRELL, JAMES K. | ORGANIZATIONAL, FINANCIAL, AND POLITICAL ASPECTS OF A THREE-UNIVERSITY COMPUTING C | 5.0 |
| FISCHER, WAYNE | THE COMMUNICATIONS COMPUTER OPERATING SYSTEM--THE INITIAL DESIGN | 3.1.1 |
| FISHER, C. R. | THE DATRAN NETWORK | 3.1.0 |
| FITZSIMONS, THOMAS F. | ASCII EXTENSION AND EXPANSION AND THEIR IMPACT ON DATA COMMUNICATIONS | 5.5 |
| FLETCHER, J. G. | LAWRENCE RADIATION LABORATORY OCTOPUS SYSTEM. | 3.1.0 |
| FLOOD, MERRILL M. | COMMERCIAL INFORMATION PROCESSING NETWORKS--PROSPECTS AND PROBLEMS IN PERSPECTIVE | 1.0 |
| FOSTER, D. F. | MACIMS COMMUNICATION NETWORK CONFIGURATION | 3.2.2 |
| FRANK, HOWARD | ANALYSIS AND OPTIMIZATION OF STORE-AND-FORWARD COMPUTER NETWORKS | 2.1.0 |
| | COMPUTER COMMUNICATION NETWORK DESIGN--EXPERIENCE WITH THEORY AND PRACTICE. | 3.0 |
| | OPTIMAL DESIGN OF COMPUTER NETWORKS. | 2.1.2 |
| | RESEARCH IN STORE AND FORWARD COMPUTER NETWORKS. | 2.1 |
| | TOPOLOGICAL CONSIDERATIONS IN THE DESIGN OF THE ARPA COMPUTER NETWORK | 2.1.2 |
| FREDERICKSEN, D. | A COMPUTER NETWORK INTERFACE FOR OS/MVT | 3.4 |
| FREED, ROY N. | PROTECTION OF PROPRIETARY SOFTWARE PROGRAMS IN THE UNITED STATES | 5.6 |
| FREEMAN, DAVID N. | EFFICIENCY VS. RESPONSIVENESS IN A MULTIPLE-SERVICES COMPUTER FACILITY | 2.9 |
| FRISCH, I. T. | THE RESPONSE-EFFICIENCY TRADE-OFF IN A MULTIPLE-UNIVERSITY SYSTEM. | 2.9 |
| | ALGORITHMS TO REALIZE DIRECTED COMMUNICATION NETS | 2.1.2 |
| | TOPOLOGICAL CONSIDERATIONS IN THE DESIGN OF THE ARPA COMPUTER NETWORK | 2.1.2 |
| GABLER, HERMANN G. | THE GERMAN EDS NETWORK | 3.1.0 |
| GABRIELI, E. R. | MEDICAL NETWORK | 4.2 |
| GAINES, EUGENE C., JR. | THE EMERGENCE OF NATIONAL NETWORKS REMOTE COMPUTING--YEAR VI | 1.2 |
| GALLIE, THOMAS M. | ORGANIZATIONAL, FINANCIAL, AND POLITICAL ASPECTS OF A THREE-UNIVERSITY COMPUTING C | 5.0 |
| GAN, DIWAKAR G. | OPTICAL LINKS FOR COMMUNICATIONS IN LOCAL DISTRIBUTION | 3.2.1 |
| GENTILE, R. B. | THE TABLON MASS STORAGE NETWORK | 3.3.9 |
| GERHARD, W. | SOME EFFECTS OF SWITCHED NETWORK TIME DELAYS AND TRANSMISSION SPEED ON DATA BASED/ | 2.1.2 |
| GERSTENBERGER, W. S. | THE COMMUNICATIONS COMPUTER OPERATING SYSTEM--THE INITIAL DESIGN | 3.1.1 |
| GIMPELSON, L. A. | UNISIM--A SIMULATION PROGRAM FOR COMMUNICATIONS NETWORKS. | 2.1.1 |
| GLASER, GEORGE | THE CENTRALIZATION VS. DECENTRALIZATION ISSUE: ARGUMENTS, ALTERNATIVES, AND GUIDEL | 5.1 |
| GOLDBERG, J. | INVESTIGATION OF PROPAGATION-LIMITED COMPUTER NETWORKS | 2.1.2 |
| GOLDSTEIN, BERNARD | THE CASE FOR NETWORKS | 1.1 |
| GOODROE, J. R. | SYSTEM LOAD SHARING STUDY | 1.2 |
| GOURLEY, DAVID E. | DATA COMMUNICATIONS: INITIAL PLANNING | 1.3 |
| GRAHAM, ROBERT M. | THE CLASSROOM INFORMATION AND COMPUTING SERVICE. | 4.3 |
| GRISETTI, ROBERT S. | THE SYNTHESIS OF COMMUNICATIONS AND COMPUTERS | 3.2.2 |
| GUINDON, RENE | THE CANADIAN UNIVERSITIES COMPUTER NETWORK TOPOLOGICAL CONSIDERATIONS | 2.1.1 |
| HABERMANN, A. N. | COMPUTER NETWORKS. | 3.1.0 |
| HAIBT, L. | DATA DESCRIPTIVE LANGUAGE FOR SHARED DATA. | 4.3 |
| HAMAKER, R. F. | DISTRIBUTED COMPUTER SYSTEMS | 1.3 |
| HAMMER, CARL | COMPUTER COMMUNICATIONS: THE FUTURE. | 1.6 |
| HANSCOTT, J. | IMPLEMENTATION OF INTERNATIONAL DATA EXCHANGE NETWORKS | 3.2.1 |
| HANSLER, EBERHARD | OPTIMIZING THE RELIABILITY IN CENTRALIZED COMPUTER NETWORKS. | 2.1.0 |
| | RELIABILITY CONSIDERATIONS IN CENTRALIZED COMPUTER NETWORKS. | 2.1.2 |
| HARRIS, DAVID O. | RESEARCH IN ON-LINE COMPUTATION | 4.2 |
| HARSLEM, E. F. | ARPA NETWORK SERIES: I. INTRODUCTION TO THE ARPA NETWORK AT RAND AND TO THE RAND V | 3.1.0 |
| | THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMM | 3.4 |
| | THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMM | 4.1 |
| HAYES, J. F. | TRAFFIC AND DELAY IN A CIRCULAR DATA NETWORK. | 2.1.2 |
| HEAFNER, JOHN F. | ARPA NETWORK SERIES: I. INTRODUCTION TO THE ARPA NETWORK AT RAND AND TO THE RAND V | 3.1.0 |
| | FUNCTION-ORIENTED PROTOCOLS FOR THE ARPA COMPUTER NETWORK | 3.5 |
| | THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMM | 3.4 |
| | THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMM | 4.1 |
| HEART, FRANK E. | IMPROVEMENTS IN THE DESIGN AND PERFORMANCE OF THE ARPA NETWORK. | 3.1.2 |
| | THE INTERFACE MESSAGE PROCESSOR FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | THE TERMINAL IMP FOR THE ARPA COMPUTER NETWORK | 3.3.2 |
| HEATH, FRANK R. | FACTORS FOR EVALUATION OF INTEGRATED ON-LINE INFORMATION SYSTEMS | 5.0 |
| HEBDITCH, D. L. | SOFTWARE DISPERSION: THE MINICOMPUTER IN DATA COMMUNICATIONS | 3.3.2 |
| HEHN, EARL L., JR. | MAC INTEGRATED MANAGEMENT SYSTEM (MACIMS). | 3.1.0 |
| HEINRICH, FRANK | THE STRUCTURE OF A DISTRIBUTED COMPUTER SYSTEM--THE DISTRIBUTED FILE SYSTEM | 3.1.1 |
| | THE STRUCTURE OF A DISTRIBUTED COMPUTING SYSTEM--THE DISTRIBUTED FILE SYSTEM | 4.1 |
| HENDERSON, D. AUSTIN | MCROSS--A MULTI-COMPUTER PROGRAMMING SYSTEM | 4.2 |
| HERNDON, EDWIN S. | CONCEPTS FOR A WWMCCS INTERCOMPUTER NETWORK | 1.1 |
| | PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN. | 3.1.1 |
| HERZOG, BERTRAM | COMPUTER NETWORKS. | 3.1.0 |
| | MERIT COMPUTER NETWORK | 3.1.0 |
| HIGGINS, D. | A RECOMMENDED RESEARCH AND DEVELOPMENT PLAN FOR DATA EXCHANGE IN THE WORLD WIDE MI | 4.9 |
| HILL, RICHARD H. | ECONOMICS OF TIME-SHARED COMPUTING SYSTEMS, PART 1. | 5.3 |
| | ECONOMICS OF TIME-SHARED COMPUTING SYSTEMS, PART 2. | 5.3 |
| HINKELMAN, ROBERT M. | PLANNING A DATA COMMUNICATIONS SYSTEM, PART 2: COMMON CARRIER FACILITIES | 3.2.0 |
| | PLANNING A DATA COMMUNICATIONS SYSTEM, PART 2: COMMON CARRIER FACILITIES (CONTINUE | 3.2.0 |
| HINSHAW, D. L. | A STUDY OF INFORMATION IN MULTIPLE-COMPUTER AND MULTIPLE-CONSOLE DATA PROCESSING S | 2.1.2 |
| HIROTA, KEN'ICHIRO | PUBLIC TELEPHONE NETWORK AND COMPUTER-COMMUNICATION | 3.2.9 |
| HIRSCH, PHIL | MULTI-ACCESS COMPUTER NETWORKS | 4.3 |

| | | |
|---|---|---|
| HITTEL, L. A. | SOME PROBLEMS IN DATA COMMUNICATIONS BETWEEN THE USER AND THE COMPUTER | 1.3 |
| HOBGOOD, W. SANOS | EVALUATION OF AN INTERACTIVE-RATCH SYSTEM NETWORK | 3.1.2 |
| HOLMES, JAMES F. | SPECIFYING A MESSAGE-SWITCHING COMPUTER | 3.3.2 |
| HOOTMAN, JOSEPH T. | THE COMPUTER NETWORK AS A MARKETPLACE | 5.3 |
| HOSFORD, JOHN E. | OPTIMAL ALLOCATION OF LEASED COMMUNICATION LINES | 2.1.2 |
| HOWARD, JAMES A. | RESEARCH IN ON-LINE COMPUTATION | 4.2 |
| HOWELL, R. H. | THE INTEGRATED COMPUTER NETWORK SYSTEM. | 3.1.0 |
| HOWE, W. GERRY | CONTROL CONCEPTS OF A LOGICAL NETWORK MACHINE | 3.0 |
| HUSTED, JOHN M. | CURRENT AND NEAR FUTURE DATA TRANSMISSION VIA SATELLITES OF THE INTELSAT NETWORK. | 3.2.1 |
| ICKES, HUBERT F. | INFORMATION INTERCHANGE BETWEEN DISSIMILAR SYSTEMS. | 4.1 |
| IRANI, K. B. | A STUDY OF INFORMATION IN MULTIPLE-COMPUTER AND MULTIPLE-CONSOLE DATA PROCESSING S | 2.1.2 |
| IRWIN, MANLEY R. | MULTIPLE ACCESS COMPUTER NETWORKS: THE ROLE OF THE COMMON CARRIER. | 5.4 |
| | TIME-SHARED INFORMATION SYSTEMS: MARKET ENTRY IN SEARCH OF A POLICY | 5.4 |
| ISELI, JOHN | PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN. | 3.1.1 |
| JACKSON, P. E. | A STUDY OF MULTIACCESS COMPUTER COMMUNICATIONS | 2.1.2 |
| JAFFE, JOAN F. | AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS | 3.1.0 |
| JANSKY, CURTIS M. | STRATEGIES FOR MAXIMUM COST EFFECTIVENESS OF A SWITCHED NETWORK | 3.2.2 |
| JOHANSEN, ROBERT | 'ORACLE': COMPUTERIZED CONFERENCING IN A COMPUTER-ASSISTED-INSTRUCTION SYSTEM. | 4.1 |
| JOHNSON, LELAND L. | SOME IMPLICATIONS OF NEW COMMUNICATIONS TECHNOLOGIES FOR NATIONAL SECURITY IN THE | 5.4 |
| JUDD, O. R. | COMPUTER NETWORKS. | 3.1.0 |
| KADOCH, MICHEL | THE CANADIAN UNIVERSITIES COMPUTER NETWORK TOPOLOGICAL CONSIDERATIONS | 2.1.1 |
| KAHN, ROBERT E. | A STUDY OF THE ARPA NETWORK DESIGN AND PERFORMANCE. | 3.1.2 |
| | COMPUTER COMMUNICATION NETWORK DESIGN--EXPERIENCE WITH THEORY AND PRACTICE. | 3.0 |
| | FLOW CONTROL IN A RESOURCE-SHARING COMPUTER NETWORK | 3.4 |
| | TERMINAL ACCESS TO THE ARPA COMPUTER NETWORK. | 3.3.2 |
| | THE INTERFACE MESSAGE PROCESSOR FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| KAPLAN, SIDNEY J. | THE ADVANCING COMMUNICATION TECHNOLOGY AND COMPUTER COMMUNICATION SYSTEMS | 3.2.1 |
| KARP, DONALD P. | A COMMUNICATIONS INTERFACE FOR COMPUTER NETWORKS | 3.5 |
| | A COMMUNICATIONS INTERFACE FOR COMPUTER NETWORKS | 3.5 |
| | A NETWORK/440 PROTOCOL CONCEPT | 3.5 |
| | EXPLORATORY RESEARCH ON NETTING IN IBM. | 3.0 |
| | IBM COMPUTER NETWORK/440 | 3.1.0 |
| | NETWORK/440--IBM RESEARCH COMPUTER SCIENCES DEPARTMENT COMPUTER NETWORK. | 3.1.0 |
| KARP, P. M. | ARPA NETWORK EXPERIMENTATION USING EXISTING DATA MANAGEMENT SYSTEMS | 4.9 |
| | EXPERIMENTATION ON THE ARPA COMPUTER NETWORK. | 4.9 |
| | PROPOSAL FOR THE DEVELOPMENT OF A SECURE PILOT NETWORK FOR THE WORLD-WIDE MILITARY | 3.1.0 |
| | VIEWS ON ISSUES RELEVANT TO DATA SHARING ON COMPUTER NETWORKS | 4.1 |
| KEENAN, THOMAS A. | EDUNET REPORT OF THE SUMMER STUDY ON INFORMATION NETWORKS | 1.1 |
| KENNEDY, FITZROY | THE DATA COMMUNICATIONS MARKET IN THE UNITED STATES | 5.2 |
| KIBLER, TOM R. | CONTROL CONCEPTS OF A LOGICAL NETWORK MACHINE | 3.0 |
| KILGOUR, F. G. | A REGIONAL NETWORK--OHIO COLLEGE LIBRARY CENTER. | 4.2 |
| KIMBEL, DIETER | PLANNING OF DATA COMMUNICATIONS NETWORKS--ECONOMIC, TECHNOLOGICAL AND INSTITUTIONA | 5.4 |
| KIRSTEIN, PETER T. | ON THE DEVELOPMENT OF COMPUTER AND DATA NETWORKS IN EUROPE | 1.2 |
| KLEINROCK, LEONARD | ANALYTIC AND SIMULATION METHODS IN COMPUTER NETWORK DESIGN | 2.1.0 |
| | COMPUTER COMMUNICATION NETWORK DESIGN--EXPERIENCE WITH THEORY AND PRACTICE. | 3.0 |
| | COMPUTER NETWORK RESEARCH | 2.0 |
| | COMPUTER NETWORK RESEARCH | 2.1.0 |
| | COMPUTER NETWORK RESEARCH | 2.2 |
| | COMPUTER NETWORKS. | 1.3 |
| | MODELS FOR COMPUTER NETWORKS | 1.3 |
| | NODAL BLOCKING IN LARGE NETWORKS. | 2.1.2 |
| | SURVEY OF ANALYTICAL METHODS IN QUEUEING NETWORKS | 1.3 |
| KNIGHT, D. C. | COMMUNICATION AND SYSTEMS DEVELOPMENT IN THE C.S.I.R.O. NETWORK | 3.1.0 |
| KONHEIM, ALAN G. | POLLING IN A MULTIDROP COMMUNICATION SYSTEM: WAITING LINE ANALYSIS | 2.1.2 |
| KORFHAGE, R. R. | THE INDIANA REGIONAL COMPUTING NETWORK. | 3.1.2 |
| KRETZMER, E. R. | MODERN TECHNIQUES FOR DATA COMMUNICATION OVER TELEPHONE CHANNELS | 3.2.1 |
| LAFORE, ROBERT W., JR. | AN ERROR-CORRECTING DATA LINK BETWEEN SMALL AND LARGE COMPUTERS | 3.2.1 |
| LANCE, G. N. | AUSTRALIAN COMPUTING NETWORK | 3.1.0 |
| LARSEN, A. | THE FINGER LAKES REGIONAL COMPUTING ORGANIZATION: CREATING A REGIONAL, ACADEMIC CO | 3.1.2 |
| LARSON, KENNETH C. | THE STRUCTURE OF A DISTRIBUTED COMPUTING SYSTEM--SOFTWARE | 3.4 |
| | THE SYSTEM ARCHITECTURE OF THE DISTRIBUTED COMPUTER SYSTEM--THE COMMUNICATIONS SYS | 3.2.0 |
| LARSSON, T. | DATA COMMUNICATION IN SWEDEN--AND SOME ASPECTS OF THE SITUATION IN EUROPE | 1.3 |
| LAWRENCE, D. E. | A PROPOSED COMPUTER NETWORK FOR THE AUSTRALIAN NATIONAL UNIVERSITY | 3.1.0 |
| LAY, R. K. | THE WIRED CITY: SERVICES FOR HOME DELIVERY VIA INTERACTIVE CABLE TV | 4.3 |
| LEE, ROBERT E. | THE ROLE OF THE FEDERAL COMMUNICATIONS COMMISSION | 5.4 |
| LEFKOVITS, H. C. | CHARACTERISTICS OF DATABASE SYSTEMS IN A COMPUTER NETWORK ENVIRONMENT | 2.9 |
| LESSER, RICHARD C. | THE DEVELOPMENT OF A MULTI-CAMPUS REGIONAL COMPUTING CENTER. | 3.1.0 |
| LICKLIDER, J. C. R. | THE ON-LINE INTELLECTUAL COMMUNITY | 4.2 |
| LIPINSKI, ANDREW J. | COMPUTER-ASSISTED EXPERT INTERROGATION: A REPORT ON CURRENT METHODS DEVELOPMENT | 4.1 |
| LIPINSKI, HUBERT M. | COMPUTER-ASSISTED EXPERT INTERROGATION: A REPORT ON CURRENT METHODS DEVELOPMENT | 4.1 |
| LIPNER, S. B. | COMPUTATION OF MESSAGE DELAYS IN A COMMUNICATIONS NETWORK | 2.1.2 |
| LISSANDRELLO, GEORGE J. | WORLD DATA COMMUNICATIONS AS SEEN BY THE DATA PROCESSING SYSTEMS DESIGNER | 3.2.1 |
| LITTLE, JOHN L. | STANDARDS FOR USER PROCEDURES AND DATA FORMATS IN AUTOMATED INFORMATION SYSTEMS AN | 5.5 |
| LUCAS, J. R., JR. | THE TABLON MASS STORAGE NETWORK | 3.3.9 |
| LUTHER, W. J. | CONCEPTUAL BASES OF CYBERNET | 3.1.0 |
| MADDEN, JAMES | THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMM | 3.4 |
| MAHLE, S. B. | EVALUATION OF THE NETWORK FEATURES REQUIRED TO ATTAIN THE APPROVED NMCS OBJECTIVES | 1.1 |
| MAISEL, HERBERT | RESPONSIBILITY FOR THE HUMANISTIC USE OF THE INFORMATION REVOLUTION: WHERE WILL TH | 1.5 |
| MAKINO, YASUO | COMPETITION IN THE FIELDS OF COMPUTERS AND COMMUNICATIONS IN JAPAN | 5.4 |
| | DATA COMMUNICATION IN JAPAN | 1.2 |
| MANNING, ERIC G. | NEWHALL LOOPS AND PROGRAMMABLE TDM TWO FACETS OF CANADIAN RESEARCH IN COMPUTER COM | 3.2.9 |
| MARCHESE, J. F. | SOME EFFECTS OF SWITCHED NETWORK TIME DELAYS AND TRANSMISSION SPEED ON DATA BASED/ | 2.1.2 |
| MARILL, THOMAS | A COOPERATIVE NETWORK OF TIME-SHARING COMPUTERS: PRELIMINARY STUDY | 3.0 |
| | NETWORK DATA HANDLING SYSTEM. SEMI-ANNUAL TECHNICAL REPORT | 4.1 |
| | TOWARD A COOPERATIVE NETWORK OF TIME-SHARED COMPUTERS. | 3.0 |
| MARSHALL, STEPHEN | ON PROGRAM TRANSFERABILITY. | 4.1 |
| MARTIN, J. | TELECOMMUNICATIONS AND THE COMPUTER. | 1.3 |
| MASON, W. F. | THE WIRED CITY: SERVICES FOR HOME DELIVERY VIA INTERACTIVE CABLE TV | 4.3 |
| MATHISON, STUART L. | SPECIALIZED COMMON CARRIERS | 1.6 |
| MCALLISTER, N. F. | DATA TRANSMISSION NETWORK COMPUTER-TO-COMPUTER STUDY | 3.2.1 |
| MCAULIFFE, GERALD K. | OPTIMIZING THE RELIABILITY IN CENTRALIZED COMPUTER NETWORKS. | 2.1.0 |
| | RELIABILITY CONSIDERATIONS IN CENTRALIZED COMPUTER NETWORKS. | 2.1.2 |
| MCCLAIN, G. A. | A STUDY OF INFORMATION IN MULTIPLE-COMPUTER AND MULTIPLE-CONSOLE DATA PROCESSING S | 2.1.2 |
| MCCREDIE, J. | COMPUTER NETWORKS. | 3.1.0 |
| MCKAY, DOUGLAS B. | A NETWORK/440 PROTOCOL CONCEPT | 3.5 |
| | EXPLORATORY RESEARCH ON NETTING IN IBM. | 3.0 |
| | IBM COMPUTER NETWORK/440 | 3.1.0 |
| | NETWORK/440--IBM RESEARCH COMPUTER SCIENCES DEPARTMENT COMPUTER NETWORK. | 3.1.0 |
| | VIEWS ON ISSUES RELEVANT TO DATA SHARING ON COMPUTER NETWORKS | 4.1 |
| MCKENZIE, ALEXANDER A. | THE NETWORK CONTROL CENTER FOR THE ARPA NETWORK. | 5.1 |
| | THE NETWORK CONTROL CENTER FOR THE ARPA NETWORK. | 5.1 |
| MCQUILLAN, JOHN M. | IMPROVEMENTS IN THE DESIGN AND PERFORMANCE OF THE ARPA NETWORK. | 3.1.2 |
| | THE NETWORK CONTROL CENTER FOR THE ARPA NETWORK. | 5.1 |
| | THE NETWORK CONTROL CENTER FOR THE ARPA NETWORK. | 5.1 |
| MCWILLIAMS, E. | THE FINGER LAKES REGIONAL COMPUTING ORGANIZATION: CREATING A REGIONAL, ACADEMIC CO | 3.1.2 |
| MEISTER, BERND | POLLING IN A MULTIDROP COMMUNICATION SYSTEM: WAITING LINE ANALYSIS | 2.1.2 |
| MELANSON, P. | COMPUTATION OF MESSAGE DELAYS IN A COMMUNICATIONS NETWORK | 2.1.2 |
| MELODY, WILLIAM H. | INTERCONNECTION: IMPACT ON COMPETITION-CARRIERS AND REGULATION. | 5.4 |
| MELTZER, HERBERT S. | INFORMATION INTERCHANGE BETWEEN DISSIMILAR SYSTEMS. | 4.1 |
| MENDICINO, SAMUEL F. | OCTOPUS: THE LAWRENCE RADIATION LABORATORY NETWORK. | 3.1.0 |
| | THE LAWRENCE RADIATION LABORATORY OCTOPUS. | 3.1.0 |
| MESSING, P. H. | EVALUATION OF THE NETWORK FEATURES REQUIRED TO ATTAIN THE APPROVED NMCS OBJECTIVES | 1.1 |
| METCALFE, ROBERT M. | FUNCTION-ORIENTED PROTOCOLS FOR THE ARPA COMPUTER NETWORK | 3.5 |
| | STRATEGIES FOR OPERATING SYSTEMS IN COMPUTER NETWORKS. | 3.4 |
| MEYER, JAMES W. | THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMM | 3.4 |
| | AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS | 3.1.0 |

CONTINUATION OF MEYER, JAMES W.
EXPLORATORY RESEARCH ON NETTING IN IBM. . . . . 3.0
MICHEL, A. THE TERMINAL IMP FOR THE ARPA COMPUTER NETWORK . . . . . 3.3.2
MILLER, JAMES G. EDUCOM: INTERUNIVERSITY COMMUNICATIONS COUNCIL . . . . . 1.1
FOUNET REPORT OF THE SUMMER STUDY ON INFORMATION NETWORKS . . . . . 1.1
MILLER, ROBERT B. RESPONSE TIME IN MAN-COMPUTER CONVERSATIONAL TRANSACTIONS . . . . . 2.3
MILLION, R. THE USE OF A SMALL COMPUTER AS A TERMINAL CONTROLLER FOR A LARGE COMPUTING SYSTEM 3.3.2
MILLSTEIN, ROBERT ON PROGRAM TRANSFERABILITY. . . . . 4.1
MILLS, G. F. A TELEPHONE-ACCESS BIOMEDICAL INFORMATION CENTER . . . . . 5.3
MITCHELL, H. F., JR. THE FUTURE OF THE SWITCHING COMPUTER . . . . . 1.9
MOBLEY, R. A COMPUTER SIMULATION OF ADAPTIVE ROUTING TECHNIQUES FOR DISTRIBUTED COMMUNICATION 2.1.1
MONTGOMERY, EDISON AN INTERUNIVERSITY INFORMATION NETWORK. I. EDUCOM . . . . . 5.0
MOOERS, CALVIN N. STANDARDS FOR USER PROCEDURES AND DATA FORMATS IN AUTOMATED INFORMATION SYSTEMS AN 5.5
MORENDFF, EDWARD THE TRANSFERABILITY OF COMPUTER PROGRAMS AND THE DATA ON WHICH THEY OPERATE . . 4.1
MORTON, R. P. SYSTEM LOAD SHARING STUDY . . . . . 1.2
MUENCH, P. E. COMMON CARRIER APPROACH TO DIGITAL DATA TRANSMISSION: TERMINALS, TRANSMISSION EQUI 1.2
DATA COMMUNICATIONS NETWORK ARCHITECTURE . . . . . 3.0
MULLERY, A. DATA DESCRIPTIVE LANGUAGE FOR SHARED DATA. . . . . 4.3
MUTSCHLER, E. G. MULTICOMPUTER PROGRAMMING FOR A LARGE SCALE REAL-TIME DATA PROCESSING SYSTEM . . 3.4
NACHBAR, ROBERT S. EXPLORATORY RESEARCH ON NETTING IN IBM. . . . . 3.0
NEWPORT, C. B. SMALL COMPUTERS IN DATA NETWORKS. . . . . 3.3.2
NIDUS, L. S. MACIMS COMMUNICATION NETWORK CONFIGURATION . . . . . 3.2.2
NIELSEN, NORMAN R. FLEXIBLE PRICING: AN APPROACH TO THE ALLOCATION OF COMPUTER RESOURCES . . . . 5.3
THE MERIT OF REGIONAL COMPUTING NETWORKS . . . . . 1.1
THE STANFORD REGIONAL COMPUTING NETWORK . . . . . 3.1.2
NORWOOD, FRANK W. TELECOMMUNICATIONS PROGRAMS AFFECTING NETWORK DEVELOPMENT . . . . . 1.2
NOWAKOSKI, DONALD B. STATE INTEGRATED INFORMATION NET (SIINET). A CONCEPT . . . . . 3.1.0
OHLMER, AUGUST SUMMARY OF THE EXISTING DATA COMMUNICATIONS SERVICES IN WESTERN EUROPE AND TENTATI 1.6
OLIVER, PAUL DESIGN SPECIFICATIONS FOR A GENERALIZED TELEPROCESSING SYSTEM . . . . . 3.4
OLSEN, W. C. INFORMATION NETWORKS. . . . . 1.2
ORGANICK, ELLIOTT I. THE MULTICS INTERPROCESS COMMUNICATION FACILITY. . . . . 3.4
ORNSTEIN, S. M. THE INTERFACE MESSAGE PROCESSOR FOR THE ARPA COMPUTER NETWORK . . . . . 3.1.1
THE TERMINAL IMP FOR THE ARPA COMPUTER NETWORK . . . . . 3.3.2
OSSANNA, JOSEPH F. IDENTIFYING TERMINALS IN TERMINAL-ORIENTED SYSTEMS. . . . . 3.2.2
OVERHAGE, CARL F. J. INFORMATION NETWORKS. . . . . 1.2
O'NEIL, D. R. ERROR CONTROL FOR DIGITAL DATA TRANSMISSION OVER TELEPHONE NETWORKS . . . . . 3.2.1
O'SULLIVAN, THOMAS C. EXPLOITING THE TIME-SHARING ENVIRONMENT . . . . . 3.1.2
SHADOW TELEPHONE NETWORKS FOR TIME-SHARING TERMINALS . . . . . 3.2.9
TERMINAL NETWORKS FOR TIME-SHARING . . . . . 1.0
PACK, C. D. ROUND ROBIN SCHEDULING IN A COMPUTER COMMUNICATIONS SYSTEM WITH FINITE SWAP TIME A 2.1.2
PADEN, D. R. NETWORK OF COMPUTERS. SESSION II. DEFINITION, MODELING AND EVALUATION--SESSION SUM 1.0
PAN, GEORGE S. CONFIGURATION OF AN EFFICIENT DATA COMMUNICATION SYSTEM . . . . . 3.2.2
PARKHILL, DOUGLAS F. THE CHALLENGE OF THE COMPUTER UTILITY . . . . . 4.3
PEARSON, ROBERT R. EFFICIENCY VS. RESPONSIVENESS IN A MULTIPLE-SERVICES COMPUTER FACILITY . . . . 2.9
PECK, PAUL L. EFFECTIVE CORPORATE NETWORKING, ORGANIZATION, AND STANDARDIZATION. . . . . 1.1
THE IMPLICATIONS OF ADP NETWORKING STANDARDS FOR OPERATIONS RESEARCH. . . . . 1.1
PEHRSON, DAVID L. AN ENGINEERING VIEW OF THE LRL OCTOPUS COMPUTER NETWORK . . . . . 3.1.1
PEREZ, E. A RECOMMENDED RESEARCH AND DEVELOPMENT PLAN FOR DATA EXCHANGE IN THE WORLD WIDE MI 4.9
CONCEPTS FOR A WWMCCS INTERCOMPUTER NETWORK . . . . . 1.1
DESIGN SPECIFICATIONS FOR PWIN NON-FUNCTIONAL NETWORK CONTROL SOFTWARE . . . . . 3.4
PETERSEN, GERALD A. AFOS: A PROGRAM FOR NATIONAL WEATHER SERVICE FIELD AUTOMATION . . . . . 4.9
PETERSON, JACK J. CATALOG OF NETWORK FEATURES . . . . . 1.3
SURVEY OF COMPUTER NETWORKS . . . . . 1.2
PHISTER, MONTGOMERY, JR. SYSTEM DESIGN OF ON-LINE SERVICE SYSTEMS . . . . . 4.3
PICKERING, G. E. MULTICOMPUTER PROGRAMMING FOR A LARGE SCALE REAL-TIME DATA PROCESSING SYSTEM . . 3.4
POLLACK, M. MESSAGE ROUTE CONTROL IN A LARGE TELETYPE NETWORK . . . . . 2.1.3
POSTEL, JONATHAN B. FUNCTION-ORIENTED PROTOCOLS FOR THE ARPA COMPUTER NETWORK . . . . . 3.5
POWELL, J. J. ANALYSIS OF NMCS PROBLEM AREAS RELATED TO COMPUTER NETWORKS AND PROPOSED NMCS NETW 1.1
PRICE, W. L. SIMULATION OF DATA TRANSIT NETWORKS, . . . . . 2.1.1
PROBST, LESTER A. COMMUNICATIONS DATA PROCESSING SYSTEMS: DESIGN CONSIDERATIONS . . . . . 1.0
PROSSER, REESE T. ROUTING PROCEDURES IN COMMUNICATIONS NETWORKS--PART II: DIRECTORY PROCEDURES . . 2.1.3
ROUTING PROCEDURES IN COMMUNICATIONS NETWORKS--PART I: RANDOM PROCEDURES . . . 2.1.3
RAGLAND, JOE R. THE RESPONSE-EFFICIENCY TRADE-OFF IN A MULTIPLE-UNIVERSITY SYSTEM. . . . . 2.9
RALSTON, ANTHONY THE DEVELOPMENT OF A MULTI-CAMPUS REGIONAL COMPUTING CENTER. . . . . 3.1.0
RANDALL, L. S. A STUDY OF INFORMATION IN MULTIPLE-COMPUTER AND MULTIPLE-CONSOLE DATA PROCESSING S 2.1.2
RANDOLPH, ROBERT H. COMPUTER-ASSISTED EXPERT INTERROGATION: A REPORT ON CURRENT METHODS DEVELOPMENT . 4.1
RAYMOND, RICHARD C. A MODEL WHICH AIDS IN THE DESIGN OF CENTRAL STATIONS FOR LARGE COMPUTER NETWORKS. 2.9
READ, BRIAN S. THE COMMUNICATIONS COMPUTER OPERATING SYSTEM--THE INITIAL DESIGN . . . . . 3.1.1
REDDING, J. L. COMPUTER NETWORK SIMULATOR. . . . . 2.1.1
REED, I. S. OVERLAPPING TESSELLATED COMMUNICATIONS NETWORKS. . . . . 2.1.2
RICHARDSON, D. J. THE A.A.E.C. COMPUTER NETWORK DESIGN . . . . . 3.1.0
RICHARDSON, LYMAN E. SYSTEM ECONOMICS FROM THE POINT OF VIEW OF THE USER . . . . . 5.3
RICHARD, O. W. THE USE OF A SMALL COMPUTER AS A TERMINAL CONTROLLER FOR A LARGE COMPUTING SYSTEM 3.3.2
RISING, H. K. THE TERMINAL IMP FOR THE ARPA COMPUTER NETWORK . . . . . 3.3.2
ROBERTS, LAWRENCE G. ACCESS CONTROL AND FILE DIRECTORIES IN COMPUTER NETWORKS. . . . . 4.1
COMPUTER NETWORK DEVELOPMENT TO ACHIEVE RESOURCE SHARING. . . . . 3.1.0
EXTENSIONS OF PACKET COMMUNICATION TECHNOLOGY TO A HAND HELD PERSONAL TERMINAL . 3.3.9
MULTIPLE COMPUTER NETWORKS AND INTERCOMPUTER COMMUNICATION . . . . . 1.1
NETWORK OF COMPUTERS. SESSION II. DEFINITION, MODELING AND EVALUATION--SESSION SUM 1.0
TOWARD A COOPERATIVE NETWORK OF TIME-SHARED COMPUTERS. . . . . 3.0
ROCKOFF, MAXINE L. HEALTH CARE COMMUNICATION SYSTEMS . . . . . 4.2
ROSENBLUM, STANLEY R. PROGRESS IN CONTROL PROCEDURE STANDARDIZATION . . . . . 3.5
ROSE, GORDON A. COMPUTER GRAPHICS COMMUNICATION SYSTEMS . . . . . 1.2
RUSSELL, J. J. COMMUNICATION AND SYSTEMS DEVELOPMENT IN THE C.S.I.R.O. NETWORK . . . . . 3.1.0
RUSSELL, S. B. THE TERMINAL IMP FOR THE ARPA COMPUTER NETWORK . . . . . 3.3.2
RUTLEDGE, RONALD M. AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS . . . . . 3.1.0
COMPUTER NETWORKS. . . . . 3.1.0
RYNIKER, R. W. A COMPUTER NETWORK INTERFACE FOR OS/MVT . . . . . 3.4
SABLE, JEROME D. TRANSFERABILITY OF DATA AND PROGRAMS BETWEEN COMPUTER SYSTEMS . . . . . 4.1
SALTZER, JEROME H. THE CLASSROOM INFORMATION AND COMPUTING SERVICE. . . . . 4.3
SALTZMAN, S. THE FINGER LAKES REGIONAL COMPUTING ORGANIZATION: CREATING A REGIONAL, ACADEMIC CO 3.1.2
SATTLEY, KIRK ON PROGRAM TRANSFERABILITY. . . . . 4.1
SCANTLEBURY, R. A. A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--OBJECTIVES AND HARDWAR 3.1.1
THE CONTROL FUNCTIONS IN A LOCAL DATA NETWORK . . . . . 3.4
THE DESIGN OF A MESSAGE SWITCHING CENTRE FOR A DIGITAL COMMUNICATION NETWORK . . 3.1.1
THE DESIGN OF A SWITCHING SYSTEM TO ALLOW REMOTE ACCESS TO COMPUTER SERVICES BY OT 3.0
SCHROEDER, MICHAEL D. THE CLASSROOM INFORMATION AND COMPUTING SERVICE. . . . . 4.3
SCHUYLER, JAMES A. 'ORACLE': COMPUTERIZED CONFERENCING IN A COMPUTER-ASSISTED-INSTRUCTION SYSTEM. . 4.1
SEDELOW, SALLY YEATES LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR 4.2
SEDELOW, WALTER A., JR. LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR 4.2
SEGAL, M. A PREEMPTIVE PRIORITY MODEL WITH TWO CLASSES OF CUSTOMERS . . . . . 2.1.2
SEN, D. K. ALGORITHMS TO REALIZE DIRECTED COMMUNICATION NETS . . . . . 2.1.2
SEROUSSI, SALOMON F. A COMMUNICATIONS INTERFACE FOR COMPUTER NETWORKS . . . . . 3.5
A COMMUNICATIONS INTERFACE FOR COMPUTER NETWORKS . . . . . 3.5
AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS . . . . . 3.1.0
SHAFRITZ, ARNOLD B. THE USE OF COMPUTERS IN MESSAGE SWITCHING NETWORKS. . . . . 1.3
SHAW, R. T. BASIC CONTROL PROCEDURES FOR DIGITAL DATA TRANSMISSION . . . . . 3.5
SHERMAN, D. N. TRAFFIC AND DELAY IN A CIRCULAR DATA NETWORK. . . . . 2.1.2
SHORT, R. A. INVESTIGATION OF PROPAGATION-LIMITED COMPUTER NETWORKS . . . . . 2.1.2
SHOSHANI, A. SYSTEM DEADLOCKS . . . . . 2.0
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMM 3.4
SILVERSTEIN, MARTIN E. COMPUTERS, COMMUNICATIONS, AND DISTRIBUTED HEALTH CARE SYSTEMS. . . . . 1.1
SIMMS, ROBERT L., JR. TRENDS IN COMPUTER/COMMUNICATION SYSTEMS . . . . . 1.2
SIMONSON, W. E. COMMUNICATION NEEDS OF REMOTELY ACCESSED COMPUTER . . . . . 5.4
SINGER, C. R. M. THE USER DEPARTMENT AND THE COMPUTER . . . . . 3.4
SLIGH, R. L. THE DATRAN NETWORK . . . . . 3.1.0

| | | |
|---|---|---|
| SMITH, B. T. | MIXED COMPUTER NETWORKS: BENEFITS, PROBLEMS AND GUIDELINES | 3.0 |
| SMITH, J. W. | ON DISTRIBUTED COMMUNICATIONS: III. DETERMINATION OF PATH-LENGTHS IN A DISTRIBUTED | 2.1.2 |
| SOBOLEWSKI, J. S. | PROGRAMMABLE COMMUNICATION PROCESSORS | 3.2.3 |
| | THE USE OF A SMALL COMPUTER AS A TERMINAL CONTROLLER FOR A LARGE COMPUTING SYSTEM | 3.3.2 |
| SOMIA, MONIQUE | THE APPROACH OF SOFTWARE PROBLEMS IN THE SOC EXPERIMENTAL COMPUTER NETWORK. | 3.4 |
| SPIER, MICHAEL J. | THE MULTICS INTERPROCESS COMMUNICATION FACILITY. | 3.4 |
| SPRAGINS, JOHN D. | ANALYSIS OF LOOP TRANSMISSION SYSTEMS | 2.1.2 |
| STAFFORD, SAMUEL | SERIOUS COMPATIBILITY PROBLEMS IN COMPUTER NETWORKING CHALLENGE NBS, INDUSTRY. | 5.5 |
| STAMBLER, LEON | ELEMENTARY TELEPHONE SWITCHING THEORY APPLIED TO THE DESIGN OF MESSAGE SWITCHING S | 3.2.1 |
| STEADMAN, HOWARD L. | SOME WAYS OF PROVIDING COMMUNICATION FACILITIES FOR TIME-SHARED COMPUTING | 3.0 |
| STEFFERUD, EINAR | MANAGEMENT'S ROLE IN NETWORKING | 5.0 |
| STERNICK, HERBERT J. | A RECOMMENDED RESEARCH AND DEVELOPMENT PLAN FOR DATA EXCHANGE IN THE WORLD WIDE MI | 4.9 |
| | PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN. | 3.1.1 |
| STEVENS, MARY ELIZABETH | COMPATIBILITY PROBLEMS OF NETWORK INTERFACING | 5.5 |
| | PROBLEMS OF NETWORK ACCOUNTING, MONITORING AND PERFORMANCE MEASUREMENT | 5.3 |
| | STANDARDIZATION, COMPATIBILITY AND/OR CONVERTIBILITY REQUIREMENTS IN NETWORK PLANN | 5.5 |
| STIMLER, SAUL | PLANNING A DATA COMMUNICATION SYSTEM, PART I: A BROAD OVERVIEW AND BASIC CONCEPTS | 1.3 |
| STONE, H. S. | INVESTIGATION OF PROPAGATION-LIMITED COMPUTER NETWORKS | 2.1.2 |
| STOTZ, ROBERT H. | PROCEDURES AND STANDARDS FOR INTER-COMPUTER COMMUNICATIONS | 3.5 |
| STRAHLENDORF, D. C. | THE PROBABLE FUTURE OF CANADIAN LONG HAUL DIGITAL DATA NETWORK CONNECTIONS WITH TH | 3.1.1 |
| STUBBS, CHARLES D. | A STUDY OF MULTIACCESS COMPUTER COMMUNICATIONS | 2.1.2 |
| SUGAR, GEORGE R. | SOME WAYS OF PROVIDING COMMUNICATION FACILITIES FOR TIME-SHARED COMPUTING | 3.0 |
| SULLIVAN, NEIL C. | TYMNET--A SERENDIPITOUS EVOLUTION | 3.1.1 |
| SUMNER, G. C. | A TELEPHONE-ACCESS BIOMEDICAL INFORMATION CENTER | 5.3 |
| SUNG, R. | STUDY OF COMMUNICATION LINKS FOR THE BIOMEDICAL COMMUNICATIONS NETWORK | 3.2.1 |
| SUSSMAN, K. W. | DATA COMMUNICATIONS NETWORK ARCHITECTURE | 3.0 |
| SWANSON, ROWENA W. | INFORMATION SYSTEM NETWORKS--LET'S PROFIT FROM WHAT WE KNOW. | 1.2 |
| TAPLIN, JANET M. | THE EMERGENCE OF NATIONAL NETWORKS REMOTE COMPUTING--YEAR VI | 1.2 |
| THOMAS, ROBERT H. | MCROSS--A MULTI-COMPUTER PROGRAMMING SYSTEM | 4.2 |
| THOMPSON, GORDON B. | POTENTIAL IMPACT OF USER/AUTHOR RELATIONSHIPS ON PUBLIC DATA NETWORK DESIGN | 5.3 |
| | THREE CHARACTERIZATIONS OF COMMUNICATIONS REVOLUTIONS. | 1.5 |
| THOMPSON, JOHN R. | THE WIRED CITY: COMMERCIAL SERVICES TO BE PROVIDED BY BROADBAND TELECOMMUNICATIONS | 5.2 |
| THROPE, MARTIN J. | THE NETWORK CONTROL CENTER FOR THE ARPA NETWORK. | 5.1 |
| | THE NETWORK CONTROL CENTER FOR THE ARPA NETWORK. | 5.1 |
| TORGOV, YU. I. | ON THE STRUCTURE OF A HETEROGENEOUS COMPUTING SYSTEM, CONTROLLED BY A LARGE DIGITA | 3.0 |
| TORREY, S. E. | IDEEA NETWORK IMPLEMENTATION FISCAL YEAR 1965 | 4.2 |
| TOWNSEND, MICHAEL J. | COMMUNICATION CONTROL BY COMPUTER--AN INTRODUCTION. | 1.3 |
| TRAFTON, P. J. | DATA TRANSMISSION NETWORK COMPUTER-TO-COMPUTER STUDY | 3.2.1 |
| TREHAN, RANVIR K. | PROJECTED RESPONSE CHARACTERISTICS OF THE WWMCCS INTERCOMPUTER NETWORK | 2.1.2 |
| | PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN. | 3.1.1 |
| TRIPATHI, PRABODH C. | DESIGN CONSIDERATIONS FOR THE MENEHUNE-KAHUNA INTERFACE FOR THE ALOHA SYSTEM, A PR | 3.3.1 |
| | SIMULATION OF A RANDOM ACCESS DISCRETE ADDRESS COMMUNICATION SYSTEM | 2.1.1 |
| TUROFF, MURRAY | 'PARTY-LINE' AND 'DISCUSSION' COMPUTERIZED CONFERENCE SYSTEMS | 4.1 |
| | 'PARTY-LINE' AND 'DISCUSSION'--COMPUTERIZED CONFERENCE SYSTEMS. | 4.1 |
| TYMES, LA ROY | TYMNET--A TERMINAL ORIENTED COMMUNICATION NETWORK | 3.1.0 |
| UNCAPHER, K. W. | ARPA NETWORK SERIES: I. INTRODUCTION TO THE ARPA NETWORK AT RAND AND TO THE RAND V | 3.1.0 |
| UPPAL, I. S. | A STUDY OF INFORMATION IN MULTIPLE-COMPUTER AND MULTIPLE-CONSOLE DATA PROCESSING S | 2.1.2 |
| VAN VLECK, THOMAS H. | COMPUTER LANGUAGES FOR THE COMPUTER UTILITY | 3.4 |
| VAREHA, ALBIN L. | AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS | 3.1.0 |
| VARIAN, LEE C. | AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS | 3.1.0 |
| VEIT, SANDRA A. | CATALOG OF NETWORK FEATURES | 1.3 |
| | SURVEY OF COMPUTER NETWORKS | 1.2 |
| VENE, J. M. | MACIMS COMMUNICATION NETWORK CONFIGURATION | 3.2.2 |
| WALDEN, DAVID C. | A SYSTEM FOR INTERPROCESS COMMUNICATION IN A RESOURCE SHARING COMPUTER NETWORK | 3.5 |
| | IMPROVEMENTS IN THE DESIGN AND PERFORMANCE OF THE ARPA NETWORK. | 3.1.2 |
| | THE INTERFACE MESSAGE PROCESSOR FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| WALKER, PHILIP M. | SPECIALIZED COMMON CARRIERS | 1.6 |
| WALLACE, C. S. | A GRAFTED MULTI-ACCESS NETWORK | 3.0 |
| WEBER, J. H. | A SIMULATION STUDY OF ROUTING AND CONTROL IN COMMUNICATIONS NETWORKS. | 2.1.1 |
| | UNISIM--A SIMULATION PROGRAM FOR COMMUNICATIONS NETWORKS. | 2.1.1 |
| WEEG, GERARD P. | THE ROLE OF REGIONAL COMPUTER NETWORKS. | 1.1 |
| WEISS, E. C. | NSF ACTIVITIES RELATED TO A NATIONAL SCIENCE COMPUTER NETWORK | 1.2 |
| WEIS, ALLAN H. | AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS | 3.1.0 |
| | DISTRIBUTED NETWORK ACTIVITY AT IBM. | 3.1.0 |
| WELCH, NOREEN O. | A RECOMMENDED RESEARCH AND DEVELOPMENT PLAN FOR DATA EXCHANGE IN THE WORLD WIDE MI | 4.9 |
| | CONCERTS FOR A WWMCCS INTERCOMPUTER NETWORK | 1.1 |
| | PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN. | 3.1.1 |
| WESSLER, BARRY D. | COMPUTER NETWORK DEVELOPMENT TO ACHIEVE RESOURCE SHARING. | 3.1.0 |
| WHITE, GEORGE W. | MESSAGE FORMAT PRINCIPLES | 3.5 |
| WHITE, JAMES | THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMM | 3.4 |
| WHITE, LEE J. | OPTIMUM CONCENTRATOR LOCATION IN TELECOMMUNICATIONS DESIGN | 2.1.2 |
| WHITNEY, V. KEVIN MOORE | A STUDY OF OPTIMAL FILE ASSIGNMENT AND COMMUNICATION NETWORK CONFIGURATION IN REMO | 2.9 |
| | COMPARISON OF NETWORK TOPOLOGY OPTIMIZATION ALGORITHMS | 2.1.0 |
| WILKINSON, P. T. | A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--SOFTWARE ORGANIZATION | 3.1.1 |
| | THE CONTROL FUNCTIONS IN A LOCAL DATA NETWORK | 3.4 |
| | THE DESIGN OF A MESSAGE SWITCHING CENTRE FOR A DIGITAL COMMUNICATION NETWORK | 3.1.1 |
| | THE DESIGN OF A SWITCHING SYSTEM TO ALLOW REMOTE ACCESS TO COMPUTER SERVICES BY OT | 3.0 |
| WILKOV, ROBERT S. | ANALYSIS AND DESIGN OF RELIABLE COMPUTER NETWORKS | 2.1.2 |
| | OPTIMIZING THE RELIABILITY IN CENTRALIZED COMPUTER NETWORKS. | 2.1.0 |
| | RELIABILITY CONSIDERATIONS IN CENTRALIZED COMPUTER NETWORKS. | 2.1.2 |
| WILLIAMS, K. C. | ON TELEPROCESSING SYSTEM DESIGN, PART II. A METHOD FOR APPROXIMATING THE OPTIMAL N | 2.1.2 |
| WINETT, JOEL M. | ON-LINE DOCUMENTATION OF THE COMPATIBLE TIME-SHARING SYSTEM. | 4.1 |
| WININGS, J. W. | A GRAFTED MULTI-ACCESS NETWORK | 3.0 |
| WITHINGTON, FREDERIC G. | THE MARKET FOR A COMPUTER UTILITY INDUSTRY | 5.2 |
| WOLFSON, SEYMOUR J. | DEVELOPMENT OF APPLICATIONS FOR THE MERIT COMPUTING NETWORK. | 4.0 |
| | PROGRESS ON APPLICATIONS DEVELOPMENT, 1970-71. A REPORT OF THE ASSOCIATE DIRECTORS | 4.0 |
| WOODFORD, J. B. | STUDY OF COMMUNICATION LINKS FOR THE BIOMEDICAL COMMUNICATIONS NETWORK | 3.2.1 |
| WOOD, D. C. | ANALYSIS OF NMCS PROBLEM AREAS RELATED TO COMPUTER NETWORKS AND PROPOSED NMCS NETW | 1.1 |
| | EVALUATION OF THE NETWORK FEATURES REQUIRED TO ATTAIN THE APPROVED NMCS OBJECTIVES | 1.1 |
| | PROPOSED IMPLEMENTATION PLAN FOR A WWMCCS INTERCOMPUTER NETWORK | 3.1.1 |
| | PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN. | 3.1.1 |
| | THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMM | 3.4 |
| | VIEWS ON ISSUES RELEVANT TO DATA SHARING ON COMPUTER NETWORKS | 4.1 |
| WOOD, ROGER C. | RESEARCH IN ON-LINE COMPUTATION | 4.2 |
| WOOLF, A. M. | A STUDY OF INFORMATION IN MULTIPLE-COMPUTER AND MULTIPLE-CONSOLE DATA PROCESSING S | 2.1.2 |
| WULF, W. | COMPUTER NETWORKS. | 3.1.0 |
| ZAKARIAN, Z. V. | THE MAD MAD WORLD OF DATA COMMUNICATIONS | 1.9 |
| ZEIGLER, JACK F. | NODAL BLOCKING IN LARGE NETWORKS. | 2.1.2 |
| | NODAL BLOCKING IN LARGE NETWORKS. | 2.1.2 |
| ZINN, KARL L. | DEVELOPMENT OF APPLICATIONS FOR THE MERIT COMPUTING NETWORK. | 4.0 |
| | PROGRESS ON APPLICATIONS DEVELOPMENT, 1970-71. A REPORT OF THE ASSOCIATE DIRECTORS | 4.0 |

ACADEMY OF SCIENCES OF THE USSR, COMPUTER CENTER
ON THE STRUCTURE OF A HETEROGENEOUS COMPUTING SYSTEM, CONTROLLED BY A LARGE DIGITAL COMPUTER. . . . . 3.0
ADVANCED RESEARCH PROJECTS AGENCY, WASHINGTON, DC
ACCESS CONTROL AND FILE DIRECTORIES IN COMPUTER NETWORKS. . . . . 4.1
COMPUTER NETWORK DEVELOPMENT TO ACHIEVE RESOURCE SHARING. . . . . 3.1.0
EXTENSIONS OF PACKET COMMUNICATION TECHNOLOGY TO A HAND HELD PERSONAL TERMINAL . . . . . 3.3.9
FUNCTION-ORIENTED PROTOCOLS FOR THE ARPA COMPUTER NETWORK . . . . . 3.5
MAN-MACHINE COMMUNICATION . . . . . 1.2
MULTIPLE COMPUTER NETWORKS AND INTERCOMPUTER COMMUNICATION . . . . . 1.1
NETWORK OF COMPUTERS, SESSION II. DEFINITION, MODELING AND EVALUATION--SESSION SUMMARY. . . . . 1.0
ADVANCED TECHNOLOGY SYSTEMS INC., ARLINGTON, VA
STRATEGIES FOR MAXIMUM COST EFFECTIVENESS OF A SWITCHED NETWORK . . . . . 3.2.2
AEROSPACE CORP., EL SEGUNDO, CA, DIV. OF SATELLITE SYSTEMS
STUDY OF COMMUNICATION LINKS FOR THE BIOMEDICAL COMMUNICATIONS NETWORK . . . . . 3.2.1
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH, ARLINGTON, VA, DIRECTORATE OF INFORMATION SCIENCES
INFORMATION SYSTEM NETWORKS--LET'S PROFIT FROM WHAT WE KNOW. . . . . 1.2
AIR FORCE SYSTEMS COMMAND, AIR FORCE MATERIALS LAB.
THE MATERIALS INFORMATION NETWORK . . . . . 4.0
AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OH, FOREIGN TECHNOLOGY DIV.
ON THE STRUCTURE OF A HETEROGENEOUS COMPUTING SYSTEM, CONTROLLED BY A LARGE DIGITAL COMPUTER. . . . . 3.0
AMERICAN TELEPHONE AND TELEGRAPH CO., CAMDEN, NJ
PLANNING A DATA COMMUNICATIONS SYSTEM. PART 2: COMMON CARRIER FACILITIES . . . . . 3.2.0
PLANNING A DATA COMMUNICATIONS SYSTEM. PART 2: COMMON CARRIER FACILITIES (CONTINUED) . . . . . 3.2.0
AMERICAN TELEPHONE AND TELEGRAPH CO., NEW YORK
DATA COMMUNICATIONS NETWORK ARCHITECTURE . . . . . 3.0
AUERBACH CORP., PHILADELPHIA, PA
TRANSFERABILITY OF DATA AND PROGRAMS BETWEEN COMPUTER SYSTEMS . . . . . 4.1
AUERBACH CORP., PHILADELPHIA, PA, INFORMATION SCIENCES DIV.
THE USE OF COMPUTERS IN MESSAGE SWITCHING NETWORKS. . . . . 1.3
AUSTRALIAN ATOMIC ENERGY COMMISSION, LUCAS HEIGHTS, RESEARCH ESTABLISHMENT
THE A.A.E.C. COMPUTER NETWORK DESIGN . . . . . 3.1.0
AUSTRALIAN NATIONAL UNIV., CANBERRA, COMPUTER CENTRE
A PROPOSED COMPUTER NETWORK FOR THE AUSTRALIAN NATIONAL UNIVERSITY . . . . . 3.1.0
BELL CANADA
THE PROBABLE FUTURE OF CANADIAN LONG HAUL DIGITAL DATA NETWORK CONNECTIONS WITH THE U.S.A. . . . . 3.1.1
BELL TELEPHONE LABS, INC., HOLMDEL, NJ
A PREEMPTIVE PRIORITY MODEL WITH TWO CLASSES OF CUSTOMERS . . . . . 2.1.2
A STUDY OF MULTIACCESS COMPUTER COMMUNICATIONS . . . . . 2.1.2
COMMON CARRIER APPROACH TO DIGITAL DATA TRANSMISSION: TERMINALS, TRANSMISSION EQUIPMENT AND FUTURE PLANS FOR TH 1.2
MODERN TECHNIQUES FOR DATA COMMUNICATION OVER TELEPHONE CHANNELS . . . . . 3.2.1
OPTIMAL FILE ALLOCATION IN A MULTIPLE COMPUTER SYSTEM. . . . . 2.1.2
ROUND ROBIN SCHEDULING IN A COMPUTER COMMUNICATIONS SYSTEM WITH FINITE SWAP TIME AND STATISTICALLY MULTIPLEXED 2.1.2
TRAFFIC AND DELAY IN A CIRCULAR DATA NETWORK. . . . . 2.1.2
UNISIM--A SIMULATION PROGRAM FOR COMMUNICATIONS NETWORKS. . . . . 2.1.1
BELL TELEPHONE LABS. INC., HOLMDEL, NJ, DEPT. OF COMPUTER COMMUNICATIONS ENGINEERING
TRENDS IN COMPUTER/COMMUNICATION SYSTEMS . . . . . 1.2
BELL TELEPHONE LABS. INC., MURRAY HILL, NJ
IDENTIFYING TERMINALS IN TERMINAL-ORIENTED SYSTEMS. . . . . 3.2.2
MATHEMATICAL THEORY OF CONNECTING NETWORKS AND TELEPHONE TRAFFIC . . . . . 2.1
BELL TELEPHONE LABS. INC., PISCATAWAY, NJ
ASCII EXTENSION AND EXPANSION AND THEIR IMPACT ON DATA COMMUNICATIONS . . . . . 5.5
BELL-NORTHERN RESEARCH, OTTAWA, (CANADA)
POTENTIAL IMPACT OF USER/AUTHOR RELATIONSHIPS ON PUBLIC DATA NETWORK DESIGN . . . . . 5.3
THREE CHARACTERIZATIONS OF COMMUNICATIONS REVOLUTIONS. . . . . 1.5
BOAC, LONDON AIRPORT, (ENGLAND)
IMPLEMENTATION OF INTERNATIONAL DATA EXCHANGE NETWORKS . . . . . 3.2.1
BOLT, BERANEK AND NEWMAN INC., CAMBRIDGE, MA
A STUDY OF THE ARPA NETWORK DESIGN AND PERFORMANCE. . . . . 3.1.2
A SYSTEM FOR INTERPROCESS COMMUNICATION IN A RESOURCE SHARING COMPUTER NETWORK . . . . . 3.5
COMPUTER COMMUNICATION NETWORK DESIGN--EXPERIENCE WITH THEORY AND PRACTICE. . . . . 3.0
FLOW CONTROL IN A RESOURCE-SHARING COMPUTER NETWORK . . . . . 3.4
IMPROVEMENTS IN THE DESIGN AND PERFORMANCE OF THE ARPA NETWORK. . . . . 3.1.2
INITIAL DESIGN FOR INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK. . . . . 3.1.1
INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK . . . . . 3.1.1
INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK. QUARTERLY TECHNICAL REPORT NO. 12 . . . . . 3.1.1
MCROSS--A MULTI-COMPUTER PROGRAMMING SYSTEM . . . . . 4.2
PROPOSAL FOR CONTINUATION OF RESEARCH ON NATURAL COMMUNICATION WITH COMPUTERS. . . . . 4.9
TERMINAL ACCESS TO THE ARPA COMPUTER NETWORK. . . . . 3.3.2
THE INTERFACE MESSAGE PROCESSOR FOR THE ARPA COMPUTER NETWORK . . . . . 3.1.1
THE NETWORK CONTROL CENTER FOR THE ARPA NETWORK. . . . . 5.1
THE TERMINAL IMP FOR THE ARPA COMPUTER NETWORK . . . . . 3.3.2
BOOZ, ALLEN AND HAMILTON
SPECIFYING A MESSAGE-SWITCHING COMPUTER . . . . . 3.3.2
BRISTOL, UNIV. OF, (ENGLAND)
THE INTEGRATED COMPUTER NETWORK SYSTEM. . . . . 3.1.0
BROOKHAVEN NATIONAL LAB., UPTON, NY, DEPT. OF APPLIED MATHEMATICS
BROOKNET--AN EXTENDED CORE STORAGE ORIENTED NETWORK OF COMPUTERS AT BROOKHAVEN NATIONAL LABORATORY. . . . . 3.1.0
BUNDESMINISTERIUM FUER DAS POST UND FERNMELDEWESEN, (WEST GERMANY)
SUMMARY OF THE EXISTING DATA COMMUNICATIONS SERVICES IN WESTERN EUROPE AND TENTATIVE FORECAST OF NEW SERVICES F I.6
BUNKER-RAMO CORP., CANOGA PARK, CA, BUSINESS AND INDUSTRY DIV.
THE FUTURE OF THE SWITCHING COMPUTER . . . . . 1.9
CALIFORNIA, UNIV. OF, BERKELEY, DEPT. OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
ALGORITHMS TO REALIZE DIRECTED COMMUNICATION NETS . . . . . 2.1.2
CALIFORNIA, UNIV. OF, BERKELEY, LAWRENCE RADIATION LAB.
AN ERROR-CORRECTING DATA LINK BETWEEN SMALL AND LARGE COMPUTERS . . . . . 3.2.1
CALIFORNIA, UNIV. OF, IRVINE
AN INTERUNIVERSITY INFORMATION NETWORK. II. EVALUATION . . . . . 1.1
DATA RING ORIENTED COMPUTER NETWORKS . . . . . 3.0
NETWORKS: AN INTRODUCTION . . . . . 1.2
THE STRUCTURE OF A DISTRIBUTED COMPUTER SYSTEM--THE DISTRIBUTED FILE SYSTEM . . . . . 3.1.1
THE STRUCTURE OF A DISTRIBUTED COMPUTING SYSTEM--SOFTWARE . . . . . 3.4
THE STRUCTURE OF A DISTRIBUTED COMPUTING SYSTEM--THE DISTRIBUTED FILE SYSTEM . . . . . 4.1
THE SYSTEM ARCHITECTURE OF THE DISTRIBUTED COMPUTER SYSTEM--THE COMMUNICATIONS SYSTEM . . . . . 3.2.0
CALIFORNIA, UNIV. OF, LIVERMORE, LAWRENCE RADIATION LAB.
AN ENGINEERING VIEW OF THE LRL OCTOPUS COMPUTER NETWORK . . . . . 3.1.1
LAWRENCE RADIATION LABORATORY OCTOPUS SYSTEM. . . . . 3.1.0
OCTOPUS: THE LAWRENCE RADIATION LABORATORY NETWORK. . . . . 3.1.0
THE LAWRENCE RADIATION LABORATORY OCTOPUS. . . . . 3.1.0
CALIFORNIA, UNIV. OF, LOS ANGELES
ANALYTIC AND SIMULATION METHODS IN COMPUTER NETWORK DESIGN . . . . . 2.1.0
COMPUTER COMMUNICATION NETWORK DESIGN--EXPERIENCE WITH THEORY AND PRACTICE. . . . . 3.0
FUNCTION-ORIENTED PROTOCOLS FOR THE ARPA COMPUTER NETWORK . . . . . 3.5
GENERAL PURPOSE NETWORKS OF COMPUTERS . . . . . 1.2
HOST-HOST COMMUNICATION PROTOCOL IN THE ARPA NETWORK . . . . . 3.5
NATIONAL AND INTERNATIONAL INFORMATION NETWORKS IN SCIENCE AND TECHNOLOGY . . . . . I.0
SURVEY OF ANALYTICAL METHODS IN QUEUEING NETWORKS . . . . . I.3
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION . . . . . 3.4
CALIFORNIA, UNIV. OF, LOS ANGELES, COMPUTER SYSTEMS MODELING AND ANALYSIS GROUP
COMPUTER NETWORK MEASUREMENTS: TECHNIQUES AND EXPERIMENTS . . . . . 2.2
NODAL BLOCKING IN LARGE NETWORKS. . . . . 2.1.2
CALIFORNIA, UNIV. OF, LOS ANGELES, DEPT. OF COMPUTER SCIENCE
A STUDY OF ASYNCHRONOUS TIME DIVISION MULTIPLEXING FOR TIME-SHARING COMPUTER SYSTEMS . . . . . 3.2.1
COMPUTER NETWORK RESEARCH . . . . . 2.0
COMPUTER NETWORK RESEARCH . . . . . 2.1.0
COMPUTER NETWORK RESEARCH . . . . . 2.2
COMPUTER NETWORKS. . . . . I.3

CALIFORNIA, UNIV. OF, LOS ANGELES, DEPT. OF COMPUTER SCIENCE (CONTINUED)
DEMULTIPLEXING CONSIDERATIONS FOR STATISTICAL MULTIPLEXORS . . . . . 3.2.9
NODAL BLOCKING IN LARGE NETWORKS. . . . . 2.1.2
PERFORMANCE MEASUREMENTS ON THE ARPA COMPUTER NETWORK. . . . . 2.2
CALIFORNIA, UNIV. OF, LOS ANGELES, OEPT. OF ENGINEERING
MODELS FOR COMPUTER NETWORKS . . . . . 1.3
CALIFORNIA, UNIV. OF, SANTA BARBARA
RESEARCH IN ON-LINE COMPUTATION . . . . . 4.2
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION . . . . . 3.4
CARNEGIE-MELLON UNIV., PITTSBURGH, PA
AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS . . . . . 3.1.0
CARNEGIE-MELLON UNIV., PITTSBURGH, PA, OEPT. OF COMPUTER SCIENCE
COMPUTER NETWORKS. . . . . 3.1.0
CARRIER CORP., SYRACUSE, NY
FACTORS FOR EVALUATION OF INTEGRATED ON-LINE INFORMATION SYSTEMS . . . . . 5.0
CENTRE, NATIONAL D'ETUOES OEO TELECOMMUNICATIONS (CNET), ISSY LES MOULINEAUX, (FRANCE)
A PACKET SWITCHING NETWORK WITH GRACEFUL SATURATEO OPERATION . . . . . 3.2.2
CIVIL SERVICE DEPT., LONOON, (ENGLAND)
MIXEO COMPUTER NETWORKS: BENEFITS, PROBLEMS AND GUIOELINES . . . . . 3.0
COMMONWEALTH SCIENTIFIC ANO INOUSTRIAL RESEARCH ORGANISATION, (AUSTRALIA), COMPUTING RESEARCH SECTION
AUSTRALIAN COMPUTING NETWORK . . . . . 3.1.0
COMMONWEALTH SCIENTIFIC ANO INOUSTRIAL RESEARCH ORGANIZATION, ADELAIDE, (AUSTRALIA), COMPUTING RESEARCH SECTION
COMMUNICATION AND SYSTEMS DEVELOPMENT IN THE C.S.I.R.O. NETWORK . . . . . 3.1.0
COMMONWEALTH SCIENTIFIC ANO INOUSTRIAL RESEARCH ORGANIZATION, MELBOURNE, (AUSTRALIA), COMPUTING RESEARCH SECTION
COMMUNICATION ANO SYSTEMS DEVELOPMENT IN THE C.S.I.R.O. NETWORK . . . . . 3.1.0
COMPUTER COMMUNICATIONS INC., CULVER CITY, CA
A MULTIPLE MINICOMPUTER MESSAGE SWITCHING SYSTEM . . . . . 3.3.2
COMPUTER COMMUNICATIONS INC., INGLEWOOD, CA
COMPUTERS AND COMMUNICATIONS: COMPLEMENTING TECHNOLOGIES. . . . . 1.3
COMPUTER CORP. OF AMERICA, CAMBRIDGE, MA
A COOPERATIVE NETWORK OF TIME-SHARING COMPUTERS: PRELIMINARY STUDY . . . . . 3.0
AN EXPERIMENTAL COMPUTER NETWORK. . . . . 3.1.0
NETWORK DATA HANDLING SYSTEM. SEMI-ANNUAL TECHNICAL REPORT . . . . . 4.1
TOWARD A COOPERATIVE NETWORK OF TIME-SHAREO COMPUTERS. . . . . 3.0
COMPUTER SCIENCES CORP., FALLS CHURCH, VA
DATA TRANSMISSION NETWORK COMPUTER-TO-COMPUTER STUDY . . . . . 3.2.1
COMSAT LABS., CLARKSBURG, MD
CURRENT AND NEAR FUTURE OATA TRANSMISSION VIA SATELLITES OF THE INTELSAT NETWORK. . . . . 3.2.1
CONTROL DATA CORP.
CONCEPTUAL BASES OF CYBERNET . . . . . 3.1.0
CORNELL UNIV., ITHACA, NY
THE FINGER LAKES REGIONAL COMPUTING ORGANIZATION: CREATING A REGIONAL, ACADEMIC COMPUTING NETWORK . . . . . 3.1.2
DATA TRANSMISSION CO., VIENNA, VA
DATA COMMUNICATIONS: INITIAL PLANNING . . . . . 1.3
OPTICAL LINKS FOR COMMUNICATIONS IN LOCAL DISTRIBUTION . . . . . 3.2.1
THE DATRAN NETWORK . . . . . 3.1.0
DEPARTMENT OF DEFENSE, WASHINGTON, DC
THE TABLON MASS STORAGE NETWORK . . . . . 3.3.9
DEPARTMENT OF JUSTICE, WASHINGTON, OC
ACCESS TO LARGE COMPUTER SYSTEMS. . . . . 5.4
DEPARTMENT OF THE AIR FORCE, SCOTT AFB, IL, MILITARY AIRLIFT COMMAND
MAC INTEGRATED MANAGEMENT SYSTEM (MACIMS). . . . . 3.1.0
DEUTSCHE BUNDESPOST, DARMSTADT, (WEST GERMANY), FERNMELDETECHNISCHES ZENTRALAMT
THE GERMAN EOS NETWORK . . . . . 3.1.0
DISTRICT OF COLUMBIA BAR, WASHINGTON
BEYOND THE COMPUTER INQUIRY (WHO SHOULD BE REGULATED IN COMPUTER/COMMUNICATIONS). . . . . 5.4
EINAR STEFFERUD AND ASSOCIATES, SANTA MONICA, CA
MANAGEMENT'S ROLE IN NETWORKING . . . . . 5.0
ELECTRONIC INDUSTRIES ASSOCIATION, WASHINGTON, OC, DEFENSE COMMUNICATIONS COUNCIL
FINAL REPORT OF THE COMMITTEE ON NETTING COMPUTER SYSTEMS . . . . . 1.0
ESSA RESEARCH LABS., BOULOER, CO
SOME WAYS OF PROVIDING COMMUNICATION FACILITIES FOR TIME-SHARED COMPUTING . . . . . 3.0
EXECUTIVE OFFICE OF THE PRESIDENT, WASHINGTON, OC, OFFICE OF TELECOMMUNICATIONS POLICY
MINI-TUTORIAL ON TELECOMMUNICATIONS MANAGEMENT AND POLICY . . . . . 5.4
E. J. MEYER MEMORIAL HOSPITAL, BUFFALO, NY, CLINICAL INFORMATION CENTER
MEDICAL NETWORK . . . . . 4.2
FAIM, NEW YORK
COMMUNICATIONS DATA PROCESSING SYSTEMS: OESIGN CONSIDERATIONS . . . . . 1.0
FEOERAL BUREAU OF INVESTIGATION, WASHINGTON, OC
THE FBI'S COMPUTER NETWORK. . . . . 4.2
FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, OC
THE ROLE OF THE FEDERAL COMMUNICATIONS COMMISSION . . . . . 5.4
FRANKFORO ARSENAL, PHILAOELPHIA, PA, FIRE CONTROL ENGINEERING DIRECTORATE
IDEEA NETWORK IMPLEMENTATION FISCAL YEAR 1965 . . . . . 4.2
GENERAL ELECTRIC CO., BETHESOA, MD
THE FUTURE OF COMPUTER UTILITIES. . . . . 4.3
GENERAL ELECTRIC CO., BETHESOA, MO, DEPT. OF INFORMATION NETWORKS
SYSTEM CONTROL IN MULTIPLE ACCESS COMPUTER NETWORKS . . . . . 1.0
GENERAL ELECTRIC CO., BRIDGEPORT, CT, AOVANCED SYSTEMS AND TECHNOLOGY OPERATION
CHARACTERISTICS OF OATABASE SYSTEMS IN A COMPUTER NETWORK ENVIRONMENT . . . . . 2.9
GENERAL ELECTRIC CO., NEW YORK, RESEARCH AND DEVELOPMENT CENTER
A MOOEL WHICH AIOS IN THE OESIGN OF CENTRAL STATIONS FOR LARGE COMPUTER NETWORKS. . . . . 2.9
GENERAL ELECTRIC CO., PHOENIX, AZ
SOME PROBLEMS IN DATA COMMUNICATIONS BETWEEN THE USER AND THE COMPUTER . . . . . 1.3
GENERAL MOTORS CORP., WARREN, MI
COMPARISON OF NETWORK TOPOLOGY OPTIMIZATION ALGORITHMS . . . . . 2.1.0
GEORGETOWN UNIV., WASHINGTON, OC
RESPONSIBILITY FOR THE HUMANISTIC USE OF THE INFORMATION REVOLUTION: WHERE WILL THE BATTLE BE FOUGHT?. . . . 1.5
GEORGETOWN, UNIV. OF, WASHINGTON, DC, LAW CENTER
SPECIALIZED COMMON CARRIERS . . . . . 1.6
GTE INFORMATION SYSTEMS INC., HUNTINGTON BEACH, CA, TEMPO COMPUTERS DIV.
COMMUNICATION CONTROL BY COMPUTER--AN INTROOUCTION. . . . . 1.3
HAWAII, UNIV. OF, HONOLULU
DESIGN CONSIDERATIONS FOR THE MENEHUNE-KAHUNA INTERFACE FOR THE ALOHA SYSTEM. A PRELIMINARY REPORT. . . . . 3.3.1
MULTIPLEXING IN THE ALOHA SYSTEM: MENEHUNE - KEIKI DESIGN CONSIOERATIONS . . . . . 3.3.2
SIMULATION OF A RANDOM ACCESS DISCRETE AOORESS COMMUNICATION SYSTEM . . . . . 2.1.1
SIMULATION OF INTERFERENCE OF PACKETS IN THE ALOHA TIME-SHARING SYSTEM . . . . . 2.1.1
THE ALOHA SYSTEM . . . . . 3.2.1
THE ALOHA SYSTEM--ANOTHER ALTERNATIVE FOR COMPUTER COMMUNICATIONS. . . . . 3.1.0
HEALTH ANALYSIS INC., BETHESOA, MO
COMPUTERS, COMMUNICATIONS, AND DISTRIBUTED HEALTH CARE SYSTEMS. . . . . 1.1
HEALTH SERVICES AND MENTAL HEALTH AOMINISTRATION, ROCKVILLE, MO
HEALTH CARE COMMUNICATION SYSTEMS . . . . . 4.2
HENNESSY, MCCLUSKEY, EARLE AND KILBURN, BOSTON, MA
SOME LEGAL AND REGULATORY PROBLEMS OF MULTIPLE ACCESS COMPUTER NETWORKS. . . . . 5.4
HONEYWELL INC., FRAMINGHAM, MA
SMALL COMPUTERS IN DATA NETWORKS. . . . . 3.3.2
HONEYWELL INC., WALTHAM, MA
STANOARDS AND INTERCONNECTION. . . . . 5.5
HONEYWELL INFORMATION SYSTEMS INC., FRAMINGHAM, MA
DISTRIBUTED INTELLIGENCE IN DATA COMMUNICATIONS NETWORKS. . . . . 3.3.2
PROGRESS IN CONTROL PROCEOURE STANDAROIZATION . . . . . 3.5
HONEYWELL INFORMATION SYSTEMS INC., PHOENIX, AZ
THE USE OF OISTRIBUTED OATA BASES IN INFORMATION NETWORKS . . . . . 4.1
IBM WORLO TRAOE CORP., NEW YORK
WORLO OATA COMMUNICATIONS AS SEEN BY THE OATA PROCESSING SYSTEMS OESIGNER . . . . . 3.2.1

IBM-FRANCE, PARIS
THE APPROACH OF SOFTWARE PROBLEMS IN THE SOC EXPERIMENTAL COMPUTER NETWORK. . . . . 3.4
ILLINOIS, UNIV. OF, URBANA
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION . . . . . 3.4
ILLINOIS, UNIV. OF, URBANA, DEPT. OF COMPUTER SCIENCE
NETWORK COMPUTER ANALYSIS . . . . . 2.1.2
PRIORITY ASSIGNMENT IN A NETWORK OF COMPUTERS . . . . . 2.1.2
INCOTEL LTD., NEW YORK
DEFINE YOUR MESSAGE SWITCHING SOFTWARE NEEDS BEFORE YOU BUY. . . . . 3.4
INFORMATICS INC., MA
ECONOMICS OF TIME-SHARED COMPUTING SYSTEMS, PART 1. . . . . 5.3
ECONOMICS OF TIME-SHARED COMPUTING SYSTEMS, PART 2. . . . . 5.3
INFORMATICS INC., SHERMAN OAKS, CA
COMPUTER/COMMUNICATIONS SYSTEMS: PATTERNS AND PROSPECTS . . . . . 1.D
INSTITUTE FOR THE FUTURE, MENLO PARK, CA
COMPUTER-ASSISTED EXPERT INTERROGATION: A REPORT ON CURRENT METHODS DEVELOPMENT . . . . . 4.1
INTERNATIONAL BUSINESS MACHINES CORP.
THE ON-LINE INTELLECTUAL COMMUNITY . . . . . 4.2
VIEWS ON ISSUES RELEVANT TO DATA SHARING ON COMPUTER NETWORKS . . . . . 4.1
INTERNATIONAL BUSINESS MACHINES CORP., NEW YORK, SYSTEMS RESEARCH INST.
TELECOMMUNICATIONS AND THE COMPUTER. . . . . 1.3
INTERNATIONAL BUSINESS MACHINES CORP., POUGHKEEPSIE, NY
RESPONSE TIME IN MAN-COMPUTER CONVERSATIONAL TRANSACTIONS . . . . . 2.3
INTERNATIONAL BUSINESS MACHINES CORP., POUGHKEEPSIE, NY, SYSTEMS DEVELOPMENT DIV.
INFORMATION INTERCHANGE BETWEEN DISSIMILAR SYSTEMS. . . . . 4.1
INTERNATIONAL BUSINESS MACHINES CORP., RALEIGH, NC
ANALYSIS OF LOOP TRANSMISSION SYSTEMS . . . . . 2.1.2
INTERNATIONAL BUSINESS MACHINES CORP., RESEARCH TRIANGLE PARK, NC, SYSTEMS DEVELOPMENT DIV.
DISTRIBUTED COMPUTER SYSTEMS . . . . . 1.3
INTERNATIONAL BUSINESS MACHINES CORP., SAN JOSE, CA
ALLOCATION OF COPIES OF A FILE IN AN INFORMATION NETWORK. . . . . 2.1.2
INTERNATIONAL BUSINESS MACHINES CORP., SAN JOSE, CA, SYSTEMS DEVELOPMENT LAB.
INFORMATION INTERCHANGE BETWEEN DISSIMILAR SYSTEMS. . . . . 4.1
INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, DEPT. OF COMPUTER SCIENCE
A COMMUNICATIONS INTERFACE FOR COMPUTER NETWORKS . . . . . 3.5
INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, DEPT. OF COMPUTING SYSTEMS
DISTRIBUTED NETWORK ACTIVITY AT IBM. . . . . 3.1.D
INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, NY, THOMAS J. WATSON RESEARCH CENTER
A COMMUNICATIONS INTERFACE FOR COMPUTER NETWORKS . . . . . 3.5
A COMPUTER NETWORK INTERFACE FOR OS/MVT . . . . . 3.4
A NETWORK/440 PROTOCOL CONCEPT . . . . . 3.5
A TIME SHARED SYSTEM FOR MULTIPLE INDEPENDENT LABORATORIES . . . . . 3.0
AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS . . . . . 3.1.D
ANALYSIS AND DESIGN OF RELIABLE COMPUTER NETWORKS . . . . . 2.1.2
CONTROL CONCEPTS OF A LOGICAL NETWORK MACHINE . . . . . 3.0
DATA DESCRIPTIVE LANGUAGE FOR SHARED DATA. . . . . 4.3
EVALUATION OF AN INTERACTIVE-BATCH SYSTEM NETWORK . . . . . 3.1.2
EXPLORATORY RESEARCH ON NETTING IN IBM. . . . . 3.0
IBM COMPUTER NETWORK/440 . . . . . 3.1.D
NETWORK/440--IBM RESEARCH COMPUTER SCIENCES DEPARTMENT COMPUTER NETWORK. . . . . 3.1.D
OPTIMIZING THE RELIABILITY IN CENTRALIZED COMPUTER NETWORKS. . . . . 2.1.D
RELIABILITY CONSIDERATIONS IN CENTRALIZED COMPUTER NETWORKS. . . . . 2.1.2
INTERNATIONAL BUSINESS MACHINES CORP., ZURICH, (SWITZERLAND), RESEARCH LAB.
OPTIMIZING THE RELIABILITY IN CENTRALIZED COMPUTER NETWORKS. . . . . 2.1.0
SOME EFFECTS OF SWITCHED NETWORK TIME DELAYS AND TRANSMISSION SPEED ON DATA BASED/DATA COMMUNICATION SYSTEMS . 2.1.2
INTERNATIONAL BUSINESS MACHINES, ZURICH, (SWITZERLAND), RESEARCH LAB.
POLLING IN A MULTIDROP COMMUNICATION SYSTEM: WAITING LINE ANALYSIS . . . . . 2.1.2
INTERNATIONAL COMPUTERS LTD., LONDON, (ENGLAND)
BASIC CONTROL PROCEDURES FOR DIGITAL DATA TRANSMISSION . . . . . 3.5
INTERNATIONAL COMPUTERS LTD., MIDDLESEX, (ENGLAND)
THE USER DEPARTMENT AND THE COMPUTER . . . . . 3.4
INTERUNIVERSITY COMMUNICATIONS COUNCIL INC. (EDUCOM), PRINCETON, NJ
AN INTERUNIVERSITY INFORMATION NETWORK, I. EDUCOM . . . . . 5.D
EDUCOM: INTERUNIVERSITY COMMUNICATIONS COUNCIL . . . . . 1.1
EDUNET REPORT OF THE SUMMER STUDY ON INFORMATION NETWORKS . . . . . 1.I
INFORMATION NETWORKS. . . . . I.2
IOWA, UNIV. OF, IOWA CITY, COMPUTER CENTER
THE ROLE OF REGIONAL COMPUTER NETWORKS. . . . . 1.1
KANSAS, UNIV. OF, LAWRENCE
LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR COMPUTATIONAL RE 4.2
LENKURT ELECTRIC CO., SAN CARLOS, CA
ALGORITHMS TO REALIZE DIRECTED COMMUNICATION NETS . . . . . 2.I.2
LITTLE (ARTHUR D.) INC., CAMBRIDGE, MA
SPECIALIZED COMMON CARRIERS . . . . . 1.6
THE DATA COMMUNICATIONS MARKET IN THE UNITED STATES . . . . . 5.2
THE MARKET FOR A COMPUTER UTILITY INDUSTRY . . . . . 5.2
THE WIRED CITY: COMMERCIAL SERVICES TO BE PROVIDED BY BROADBAND TELECOMMUNICATIONS SYSTEMS . . . . . 5.2
LOCKHEED MISSILES AND SPACE CO., SUNNYVALE, CA
OPTIMAL ALLOCATION OF LEASED COMMUNICATION LINES . . . . . 2.I.2
LONDON, UNIV. OF, (ENGLAND)
ON THE DEVELOPMENT OF COMPUTER AND DATA NETWORKS IN EUROPE . . . . . 1.2
MASSACHUSETTS COMPUTER ASSOCIATES, WAKEFIELD
ON PROGRAM TRANSFERABILITY. . . . . 4.I
MASSACHUSETTS INST. OF TECH., CAMBRIDGE
COMPUTER LANGUAGES FOR THE COMPUTER UTILITY . . . . . 3.4
FUNCTION-ORIENTED PROTOCOLS FOR THE ARPA COMPUTER NETWORK . . . . . 3.5
INFORMATION NETWORKS. . . . . 1.2
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION . . . . . 3.4
THE FINGER LAKES REGIONAL COMPUTING ORGANIZATION: CREATING A REGIONAL, ACADEMIC COMPUTING NETWORK . . . . 3.1.2
MASSACHUSETTS INST. OF TECH., CAMBRIDGE, DEPT. OF ELECTRICAL ENGINEERING
THE MULTICS INTERPROCESS COMMUNICATION FACILITY. . . . . 3.4
MASSACHUSETTS INST. OF TECH., CAMBRIDGE, ELECTRONICS SYSTEMS LAB.
PROCEDURES AND STANDARDS FOR INTER-COMPUTER COMMUNICATIONS . . . . . 3.5
MASSACHUSETTS INST. OF TECH., CAMBRIDGE, PROJECT MAC
A POSITION PAPER ON COMPUTING AND COMMUNICATIONS . . . . . 5.0
STRATEGIES FOR OPERATING SYSTEMS IN COMPUTER NETWORKS. . . . . 3.4
THE CLASSROOM INFORMATION AND COMPUTING SERVICE. . . . . 4.3
THE MULTICS INTERPROCESS COMMUNICATION FACILITY. . . . . 3.4
MASSACHUSETTS INST. OF TECH., LEXINGTON, LINCOLN LAB.
ON-LINE DOCUMENTATION OF THE COMPATIBLE TIME-SHARING SYSTEM. . . . . 4.1
ROUTING PROCEDURES IN COMMUNICATIONS NETWORKS--PART II: DIRECTORY PROCEDURES . . . . . 2.1.3
ROUTING PROCEDURES IN COMMUNICATIONS NETWORKS--PART I: RANDOM PROCEDURES . . . . . 2.1.3
TOWARD A COOPERATIVE NETWORK OF TIME-SHARED COMPUTERS. . . . . 3.0
MCI COMMUNICATIONS CORP., WASHINGTON, DC
THE PROMISE AND PERIL OF COMPETITION IN INTERCITY COMMUNICATIONS . . . . . 5.4
MCKINSEY AND CO. INC., SAN FRANCISCO, CA
THE CENTRALIZATION VS. DECENTRALIZATION ISSUE: ARGUMENTS, ALTERNATIVES, AND GUIDELINES. . . . . 5.1
MERIT COMPUTER NETWORK, ANN ARBOR, MI
COMPUTER NETWORKS. . . . . 3.1.0
MERIT PROPOSAL SUMMARY . . . . . 3.1.D
THE COMMUNICATIONS COMPUTER OPERATING SYSTEM--THE INITIAL DESIGN . . . . . 3.1.1
THE MERIT COMPUTER NETWORK, PROGRESS REPORT FOR THE PERIOD JULY 1969-MARCH 1971 . . . . . 3.1.0
MICHIGAN, STATE UNIV. OF, EAST LANSING
DEVELOPMENT OF APPLICATIONS FOR THE MERIT COMPUTING NETWORK. . . . . 4.0
PROGRESS ON APPLICATIONS DEVELOPMENT, 1970-71. A REPORT OF THE ASSOCIATE DIRECTORS OF MERIT PROJECT . . . . 4.0

MICHIGAN, UNIV. OF, ANN ARBOR
DEVELOPMENT OF APPLICATIONS FOR THE MERIT COMPUTING NETWOPK. . . . . 4.0
MERIT COMPUTER NETWORK . . . . . 3.1.0
MERIT COMPUTER NETWORK: HAROWARE CONSIDERATIONS. . . . . 3.1.1
MERIT COMPUTER NETWORK: SOFTWARE CONSIDERATIONS. . . . . 3.1.1
PROGRESS ON APPLICATIONS DEVELOPMENT, 1970-71. A REPORT OF THE ASSOCIATE DIRECTORS OF MERIT PROJECT . . . . 4.0
MICHIGAN, UNIV. OF, ANN ARBOR, DEPT. OF ELECTRICAL ENGINEEPING
A STUOY OF OPTIMAL FILE ASSIGNMENT ANO COMMUNICATION NETWORK CONFIGURATION IN REMOTE-ACCESS COMPUTER MESSAGE PR 2.9
THE COMMUNICATIONS COMPUTER HAROWARE OF THE MERIT COMPUTER NETWORK . . . . . 3.3.2
MICHIGAN, UNIV. OF, ANN ARBOR, SYSTEMS ENGINEERING LAB.
A STUOY OF INFORMATION IN MULTIPLE-COMPUTER ANO MULTIPLE-CONSOLE OATA PROCESSING SYSTEMS . . . . . 2.I.2
EFFICIENT ALLOCATION OF RESOURCES IN CENTRALIZEO COMPUTER-COMMUNICATION NETWORK DESIGN. . . . . 2.1.2
MICHIGAN, UNIV. OF, OEARBORN, ENGINEERING OIV.
THE COMMUNICATIONS COMPUTER HAROWAPE OF THE MERIT COMPUTER NETWORK . . . . . 3.3.2
MINISTRY OF COMMUNICATIONS, OTTAWA, (CANAOA)
THE CANAOIAN UNIVERSITIES COMPUTER NETWORK TOPOLOGICAL CONSIDERATIONS . . . . . 2.1.1
MINISTRY OF POSTS ANO TELECOMMUNICATIONS, TOKYO, (JAPAN)
COMPETITION IN THE FIELDS OF COMPUTERS ANO COMMUNICATIONS IN JAPAN . . . . . 5.4
OATA COMMUNICATION IN JAPAN . . . . . 1.2
MITRE CORP., BEOFORO, MA
COMPUTATION OF MESSAGE OELAYS IN A COMMUNICATIONS NETWORK . . . . . 2.1.2
ERROR CONTROL FOR DIGITAL OATA TRANSMISSION OVEP TELEPHONE NETWOPKS . . . . . 3.2.1
MACIMS COMMUNICATION NETWORK CONFIGURATION . . . . . 3.2.2
THE IMPLICATIONS OF AOP NETWORKING STANDAROS FOR OPERATIONS RESEARCH. . . . . 1.I
MITRE CORP., WASHINGTON, DC
A RECOMMENOED PESEARCH ANO OEVELOPMENT PLAN FOR DATA EXCHANGE IN THE WOPLD WIOE MILITARY COMMANO ANO CONTROL SY 4.9
ANALYSIS OF NMCS PROBLEM AREAS RELATEO TO COMPUTER NETWOPKS ANO PROPOSEO NMCS NETWORK OBJECTIVES . . . . . 1.1
ARPA NETWORK EXPERIMENTATION USING EXISTING DATA MANAGEMENT SYSTEMS . . . . . 4.9
CATALOG OF NETWORK FEATURES . . . . . 1.3
DESIGN SPECIFICATIONS FOR PWIN NON-FUNCTIONAL NETWORK CONTROL SOFTWARE . . . . . 3.4
EFFECTIVE CORPORATE NETWORKING, ORGANIZATION, AND STANDARDIZATION. . . . . 1.I
EVALUATION OF THE NETWORK FEATURES REQUIREO TO ATTAIN THE APPPOVED NMCS OBJECTIVES . . . . . 1.1
EXPERIMENTATION ON THE ARPA COMPUTER NETWORK. . . . . 4.9
OPERATIONAL CONSIDERATIONS FOR THE IMPLEMENTATION OF COMPUTER NETWOPKS IN THE NMCSSC . . . . . 1.2
PROJECTEO RESPONSE CHARACTERISTICS OF THE WWMCCS INTERCOMPUTER NETWORK . . . . . 2.I.2
PROPOSAL FOR THE OEVELOPMENT OF A SECURE PILOT NETWOPK FOR THE WORLD-WIOE MILITARY COMMAND AND CONTROL SYSTEM ( 3.1.0
PROPOSED IMPLEMENTATION PLAN FOR A WWMCCS INTERCOMPUTER NETWORK . . . . . 3.1.I
PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN. . . . . 3.1.1
SURVEY OF COMPUTER NETWORKS . . . . . 1.2
SYSTEM LOAD SHARING STUOY . . . . . 1.2
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION . . . . . 3.4
THE WIREO CITY: SERVICES FOR HOME OELIVERY VIA INTERACTIVE CABLE TV . . . . . 4.3
VIEWS ON ISSUES RELEVANT TO OATA SHARING ON COMPUTER NETWORKS . . . . . 4.1
NATIONAL AERONAUTICS AND SPACE AOMINISTPATION, MOFFETT FIELO, CA, AMES RESEARCH CENTER
MODEPN EDUCATION MEDIA CUT COSTS AT THE COMPUTER CENTER . . . . . 5.7
NATIONAL BUREAU OF STANDAROS, WASHINGTON, DC
STANDARDS FOR USER PROCEOURES ANO OATA FORMATS IN AUTOMATED INFORMATION SYSTEMS AND NETWORKS. . . . . 5.5
NATIONAL BUREAU OF STANDAROS, WASHINGTON, OC, CENTER FOR COMPUTER SCIENCES AND TECHNOLOGY
A TELEPHONE-ACCESS BIOMEDICAL INFORMATION CENTER . . . . . 5.3
COMPATIBILITY PROBLEMS OF NETWORK INTERFACING . . . . . 5.5
PROBLEMS OF NETWORK ACCOUNTING, MONITORING ANO PERFORMANCE MEASUREMENT . . . . . 5.3
STANOAROIZATION, COMPATIBILITY AND/OR CONVERTIBILITY REQUIREMENTS IN NETWORK PLANNING . . . . . 5.5
THE NATIONAL BIOMEDICAL COMMUNICATIONS NETWOPK AS A OEVELOPING STRUCTURE . . . . . 3.0
NATIONAL BUREAU OF STANOAROS, WASHINGTON, OC, INST. FOR COMPUTER SCIENCES AND TECHNOLOGY
PRACTICALITIES OF NETWORK USE. . . . . 4.0
NATIONAL COMMUNICATIONS SYSTEM, WASHINGTON, DC
MESSAGE FORMAT PRINCIPLES . . . . . 3.5
NATIONAL COMPUTING CENTPE, MANCHESTER, (ENGLANO)
COMPUTER NETWORKS. . . . . 3.1.0
NATIONAL OCEANIC ANO ATMOSPHERIC AOMINISTRATION, SILVER SPRING, MO
AFOS: A PROGRAM FOR NATIONAL WEATHER SERVICE FIELO AUTOMATION . . . . . 4.9
NATIONAL PHYSICAL LAB., TEDOINGTON, (ENGLAND)
COMMUNICATION NETWORKS TO SERVE RAPIO-RESPONSE COMPUTERS. . . . . 3.2.2
THE CONTROL FUNCTIONS IN A LOCAL DATA NETWORK . . . . . 3.4
THE CONTROL OF CONGESTION IN PACKET SWITCHING NETWORKS . . . . . 2.I.3
THE DESIGN OF A MESSAGE SWITCHING CENTRE FOR A DIGITAL COMMUNICATION NETWORK . . . . . 3.1.I
THE DESIGN OF A SWITCHING SYSTEM TO ALLOW REMOTE ACCESS TO COMPUTER SERVICES BY OTHER COMPUTERS ANO TERMINAL OF 3.0
THE EUROPEAN COMPUTER NETWORK PROJECT . . . . . 3.I.0
THE PRINCIPLES OF A DATA COMMUNICATION NETWORK FOR COMPUTERS ANO REMOTE PEPIPHERALS. . . . . 3.I.0
TRANSMISSION CONTROL IN A LOCAL OATA NETWORK. . . . . 3.0
NATIONAL PHYSICAL LAB., TEDDINGTON, (ENGLAND), OIV. OF COMPUTER SCIENCE
A MODEL FOR THE LOCAL AREA OF A OATA COMMUNICATION NETWORK--OBJECTIVES AND HARDWARE ORGANIZATION . . . . . 3.I.1
A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--SOFTWARE ORGANIZATION . . . . . 3.I.1
EASING THE INTRODUCTION OF A PACKET SWITCHING SERVICE. . . . . 3.3.1
EXPERIENCE WITH THE USE OF THE B.S. INTERFACE IN COMPUTER PERIPHERALS AND COMMUNICATION SYSTEMS. . . . . 3.3.1
SIMULATION OF DATA TRANSIT NETWORKS. . . . . 2.1.1
SOME OBSERVATIONS ON STORE-ANO-FORWARD ANO CIRCUIT-SWITCHED DATA NETWORKS . . . . . 2.2
TELEPROCESSING ANO DATA COMMUNICATION OF THE FUTURE . . . . . 1.6
THE CHOICE OF PACKET PARAMETERS FOR PACKET SWITCHEO NETWORKS . . . . . 2.1.2
THE NPL DATA NETWORK. . . . . 3.1.0
NATIONAL SCIENCE FOUNDATION, WASHINGTON, DC
NSF ACTIVITIES RELATEO TO A NATIONAL SCIENCE COMPUTER NETWORK . . . . . 1.2
NATIONAL SCIENCE FOUNDATION, WASHINGTON, DC, OFFICE OF COMPUTING ACTIVITIES
NATIONAL SCIENCE (COMPUTER) NETWORK. . . . . 1.1
ORGANIZATIONAL, FINANCIAL, AND POLITICAL ASPECTS OF A THREE-UNIVERSITY COMPUTING CENTER . . . . . 5.0
NATIONAL SECURITY AGENCY, FORT MEADE, MD
NETWORK OF COMPUTERS, SESSION II. DEFINITION, MODELING ANO EVALUATION--SESSION SUMMAPY. . . . . 1.0
NAVAL SHIP RESEARCH AND OEVELOPMENT CENTEP, BETHESOA, MD
COMPUTER NETWORK SIMULATOR. . . . . 2.I.I
NETWORK ANALYSIS CORP., GLEN COVE, NY
ANALYSIS ANO OPTIMIZATION OF STORE-AND-FORWARO COMPUTER NETWORKS . . . . . 2.I.0
COMPUTER COMMUNICATION NETWORK DESIGN--EXPERIENCE WITH THEORY AND PRACTICE. . . . . 3.0
OPTIMAL DESIGN OF COMPUTER NETWORKS. . . . . 2.I.2
RESEARCH IN STORE ANO FORWARD COMPUTER NETWORKS. . . . . 2.1
TOPOLOGICAL CONSIOEPATIONS IN THE OESIGN OF THE ARPA COMPUTER NETWORK . . . . . 2.1.2
NEW HAMPSHIRE, UNIV. OF, OURHAM
TIME-SHAREO INFORMATION SYSTEMS: MARKET ENTRY IN SEARCH OF A POLICY . . . . . 5.4
NEW HAMPSHIRE, UNIV. OF, DURHAM, WHITTEMORE SCHOOL OF BUSINESS ANO ECONOMICS
MULTIPLE ACCESS COMPUTER NETWORKS: THE POLE OF THE COMMON CARRIER. . . . . 5.4
NEW SOUTH WALES, UNIV. OF, KENSINGTON, (AUSTRALIA), DEPT. OF ELECTRONIC COMPUTATION
COMPUTER GRAPHICS COMMUNICATION SYSTEMS . . . . . I.2
NEW YORK, STATE UNIV. OF, ALBANY
THE DEVELOPMENT OF A MULTI-CAMPUS REGIONAL COMPUTING CENTER. . . . . 3.1.0
NEWCASTLE UPON TYNE, UNIV. OF, (ENGLAND)
SYSTEM DEADLOCKS . . . . . 2.0
NIPPON TELEGRAPH AND TELEPHONE PUBLIC CORP., TOKYO, (JAPAN)
PUBLIC TELEPHONE NETWORK AND COMPUTER-COMMUNICATION . . . . . 3.2.9
NORTH CAROLINA, STATE UNIV. OF, RALEIGH, OEPT. OF CHEMICAL ENGINEERING
ORGANIZATIONAL, FINANCIAL, ANO POLITICAL ASPECTS OF A THREE-UNIVERSITY COMPUTING CENTER . . . . . 5.0
NORTH CAROLINA, UNIV. OF, CHAPEL HILL
ECONOMICS--POINT OF VIEW OF DESIGNER ANO OPERATOR . . . . . 5.3
NORTH CAROLINA, UNIV. OF, CHAPEL HILL, OEPT. OF COMPUTER AND INFORMATION SCIENCE
ORGANIZATIONAL, FINANCIAL, AND POLITICAL ASPECTS OF A THREE-UNIVERSITY COMPUTING CENTER . . . . . 5.0
NORTHWESTERN UNIV., EVANSTON, IL
'ORACLE': COMPUTERIZEO CONFERENCING IN A COMPUTEP-ASSISTED-INSTRUCTION SYSTEM. . . . . 4.I

OFFICE OF EMERGENCY PREPAREDNESS, WASHINGTON, DC
'PARTY-LINE' AND 'DISCUSSION' COMPUTERIZED CONFERENCE SYSTEMS . . . . . 4.1
'PARTY-LINE' AND 'DISCUSSION'--COMPUTERIZED CONFERENCE SYSTEMS. . . . . 4.1
OHIO COLLEGE LIBRARY CENTER
A REGIONAL NETWORK--OHIO COLLEGE LIBRARY CENTER. . . . . 4.2
OHIO, STATE UNIV. OF, COLUMBUS
OPTIMUM CONCENTRATOR LOCATION IN TELECOMMUNICATIONS DESIGN . . . . . 2.1.2
ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT, PARIS, (FRANCE)
PLANNING OF DATA COMMUNICATIONS NETWORKS--ECONOMIC, TECHNOLOGICAL AND INSTITUTIONAL ISSUES . . . . . 5.4
PENNSYLVANIA, STATE UNIV. OF, UNIVERSITY PARK
SYSTEM DEADLOCKS . . . . . 2.0
PENNSYLVANIA, UNIV. OF, PHILADELPHIA
INTERCONNECTION: IMPACT ON COMPETITION-CARRIERS AND REGULATION. . . . . 5.4
THE RESPONSE-EFFICIENCY TRADE-OFF IN A MULTIPLE-UNIVERSITY SYSTEM. . . . . 2.9
PITTSBURGH, UNIV. OF, PA, COMPUTER CENTER
STATE-TRANSITION PROGRAMMING TECHNIQUES AND THEIR USE IN PRODUCING TELEPROCESSING DEVICE CONTROL PROGRAMS . . 3.2.9
PLANNING RESEARCH CORP., LOS ANGELES, CA
MESSAGE ROUTE CONTROL IN A LARGE TELETYPE NETWORK . . . . . 2.1.3
PLIENER ASSOCIATES LTD., LEEDS, (ENGLAND)
AN INTRODUCTION TO THE USE OF DATA COMMUNICATIONS IN THE UNITED KINGDOM. . . . . 3.2.0
SOFTWARE DISPERSION: THE MINICOMPUTER IN DATA COMMUNICATIONS . . . . . 3.3.2
PRINCETON UNIV., NJ
AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS . . . . . 3.1.0
PURDUE UNIV., LAFAYETTE, IN
THE INDIANA REGIONAL COMPUTING NETWORK. . . . . 3.1.2
RADIO CORP. OF AMERICA, NEW YORK, DIV. OF COMMUNICATION SYSTEMS
ELEMENTARY TELEPHONE SWITCHING THEORY APPLIED TO THE DESIGN OF MESSAGE SWITCHING SYSTEMS . . . . . 3.2.1
RAND CORP., SANTA MONICA, CA
A COMPUTER SIMULATION OF ADAPTIVE ROUTING TECHNIQUES FOR DISTRIBUTED COMMUNICATIONS SYSTEMS . . . . . 2.1.1
A TELEPHONE-ACCESS BIOMEDICAL INFORMATION CENTER . . . . . 5.3
ARPA NETWORK SERIES: I. INTRODUCTION TO THE ARPA NETWORK AT RAND AND TO THE RAND VIDEO GRAPHICS SYSTEM . . 3.1.0
COMMUNICATIONS, COMPUTERS AND PEOPLE . . . . . 1.5
FUNCTION-ORIENTED PROTOCOLS FOR THE ARPA COMPUTER NETWORK . . . . . 3.5
INTERENTITY COMMUNICATION . . . . . 3.0
ON DISTRIBUTED COMMUNICATIONS NETWORKS. . . . . 2.1.0
ON DISTRIBUTED COMMUNICATIONS: III. DETERMINATION OF PATH-LENGTHS IN A DISTRIBUTED NETWORK . . . . . 2.1.2
ON DISTRIBUTED COMMUNICATIONS: II. DIGITAL SIMULATION OF HOT-POTATO ROUTING IN A BROADBAND DISTRIBUTED COMMUNIC 2.1.1
ON DISTRIBUTED COMMUNICATIONS: IV. PRIORITY, PRECEDENCE, AND OVERLOAD . . . . . 2.1.3
ON DISTRIBUTED COMMUNICATIONS: IX. SECURITY, SECRECY, AND TAMPER-FREE CONSIDERATIONS . . . . . 5.6
ON DISTRIBUTED COMMUNICATIONS: I. INTRODUCTION TO DISTRIBUTED COMMUNICATIONS NETWORKS . . . . . 1.0
ON DISTRIBUTED COMMUNICATIONS: VIII. THE MULTIPLEXING STATION . . . . . 3.2.3
ON DISTRIBUTED COMMUNICATIONS: VII. TENTATIVE ENGINEERING SPECIFICATIONS AND PRELIMINARY DESIGN FOR A HIGH-DATA 3.3.2
ON DISTRIBUTED COMMUNICATIONS: V. HISTORY, ALTERNATIVE APPROACHES, AND COMPARISONS . . . . . 2.1.3
ON DISTRIBUTED COMMUNICATIONS: XI. SUMMARY OVERVIEW . . . . . 3.0
SOME IMPLICATIONS OF NEW COMMUNICATIONS TECHNOLOGIES FOR NATIONAL SECURITY IN THE 1970S . . . . . 5.4
THE COMING COMPUTER UTILITY--LAISSEZ-FAIRE, LICENSING OR REGULATION?. . . . . 5.4
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION . . . . . 3.4
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION . . . . . 4.1
RAND CORP., SANTA MONICA, CA, DEPT. OF COMPUTER SCIENCES
OVERLAPPING TESSELLATED COMMUNICATIONS NETWORKS. . . . . 2.1.2
RAND CORP., SANTA MONICA, CA, DEPT. OF ELECTRONICS
OVERLAPPING TESSELLATED COMMUNICATIONS NETWORKS. . . . . 2.1.2
RAYTHEON CO., SUDBURY, MA
EXPLOITING THE TIME-SHARING ENVIRONMENT . . . . . 3.1.2
RAYTHEON CO., SUDBURY, MA, DATA SYSTEMS SECTION
TERMINAL NETWORKS FOR TIME-SHARING . . . . . 1.0
RAYTHEON CO., SUDBURY, MA, DEPT. OF ADVANCED SYSTEMS
SHADOW TELEPHONE NETWORKS FOR TIME-SHARING TERMINALS . . . . . 3.2.9
ROCKFORD RESEARCH INST., CAMBRIDGE, MA
STANDARDS FOR USER PROCEDURES AND DATA FORMATS IN AUTOMATED INFORMATION SYSTEMS AND NETWORKS. . . . . 5.5
ROME AIR DEVELOPMENT CENTER, GRIFFISS AFB, NY
THE TRANSFERABILITY OF COMPUTER PROGRAMS AND THE DATA ON WHICH THEY OPERATE . . . . . 4.1
SCIENCE COUNCIL OF CANADA
A TRANS-CANADA COMPUTER COMMUNICATIONS NETWORK. PHASE I OF A MAJOR PROGRAM ON COMPUTERS . . . . . 3.1.0
SCIENTIFIC DATA SYSTEMS, SANTA MONICA, CA
SYSTEM DESIGN OF ON-LINE SERVICE SYSTEMS . . . . . 4.3
SOUTHERN CALIFORNIA, UNIV. OF, LOS ANGELES
COMMUNICATION NEEDS OF REMOTELY ACCESSED COMPUTER . . . . . 5.4
SPERRY RAND CORP., SAN DIEGO, CA, UNIVAC DIV.
MULTICOMPUTER PROGRAMMING FOR A LARGE SCALE REAL-TIME DATA PROCESSING SYSTEM . . . . . 3.4
SPERRY RAND CORP., WASHINGTON, DC, UNIVAC DIV.
COMPUTER COMMUNICATIONS: THE FUTURE. . . . . 1.6
DESIGN SPECIFICATIONS FOR A GENERALIZED TELEPROCESSING SYSTEM . . . . . 3.4
SPERRY RAND RESEARCH CENTER, SUDBURY, MA, DIGITAL TECHNIQUES LAB.
A STANDARD FOR COMPUTER NETWORKS. . . . . 5.5
STANFORD RESEARCH INST., MENLO PARK, CA
INVESTIGATION OF PROPAGATION-LIMITED COMPUTER NETWORKS . . . . . 2.1.2
STANFORD RESEARCH INST., MENLO PARK, CA, AUGMENTATION RESEARCH CENTER
NETWORK INFORMATION CENTER AND COMPUTER AUGMENTED TEAM INTERACTION . . . . . 4.1
STANFORD UNIV., CA
ALTERNATIVE FUTURE COMPUTER-COMMUNICATION MARKETS . . . . . 5.4
FLEXIBLE PRICING: AN APPROACH TO THE ALLOCATION OF COMPUTER RESOURCES . . . . . 5.3
THE MERIT OF REGIONAL COMPUTING NETWORKS . . . . . 1.1
THE STANFORD REGIONAL COMPUTING NETWORK . . . . . 3.1.2
STIMLER ASSOCIATES, MOORESTOWN, NY
PLANNING A DATA COMMUNICATION SYSTEM. PART 1: A BROAD OVERVIEW AND BASIC CONCEPTS . . . . . 1.3
SWEDISH TELECOMMUNICATIONS ADMINISTRATION, FARSTA
DATA COMMUNICATION IN SWEDEN--AND SOME ASPECTS OF THE SITUATION IN EUROPE . . . . . 1.3
SYDNEY, UNIV. OF, (AUSTRALIA), DEPT. OF BASSER COMPUTING
A GRAFTED MULTI-ACCESS NETWORK . . . . . 3.0
SYSTEM DEVELOPMENT CORP., SANTA MONICA, CA
COMPUTER TECHNOLOGY AND LIBRARIES OF THE FUTURE. . . . . 4.2
FINAL REPORT OF THE COMMITTEE ON NETTING COMPUTER SYSTEMS . . . . . 1.0
SYSTEM DEADLOCKS . . . . . 2.0
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION . . . . . 3.4
SYSTEMS ARCHITECTS INC., RANDOLPH, MA
CONFIGURATION OF AN EFFICIENT DATA COMMUNICATION SYSTEM . . . . . 3.2.2
TELECOMMUNICATIONS, DEDHAM, MA
CANADA MEETS COMPUTER COMMUNICATION NEEDS. . . . . 1.2
THE COMMUNICATIONS MINICOMPUTER . . . . . 3.2.3
TIME-SHARING ENTERPRISES INC., PHILADELPHIA, PA
THE EMERGENCE OF NATIONAL NETWORKS REMOTE COMPUTING--YEAR VI . . . . . 1.2
TRIANGLE UNIVERSITIES COMPUTATION CENTER
THE RESPONSE-EFFICIENCY TRADE-OFF IN A MULTIPLE-UNIVERSITY SYSTEM. . . . . 2.9
TRIANGLE UNIVERSITIES COMPUTATION CENTER, RESEARCH TRIANGLE PARK, NC
EFFICIENCY VS. RESPONSIVENESS IN A MULTIPLE-SERVICES COMPUTER FACILITY . . . . . 2.9
TYMSHARE INC., CUPERTINO, CA
TELEPROCESSING--THE UTILITY OF THE COMPUTER UTILITY NEW PROBLEMS? NEW CHALLENGE!. . . . . 4.3
TYMNET--A SERENDIPITOUS EVOLUTION . . . . . 3.1.1
TYMNET--A TERMINAL ORIENTED COMMUNITY NETWORK . . . . . 3.1.0
T-SCAN LTD., ONTARIO, (CANADA)
SYSTEM ECONOMICS FROM THE POINT OF VIEW OF THE USER . . . . . 5.3
UNITED DATA CENTERS INC., NEW YORK
THE CASE FOR NETWORKS . . . . . 1.1
UNITED KINGDOM POST OFFICE, LONDON, DEPT. OF TELECOMMUNICATIONS DEVELOPMENT
FEATURES OF A PROPOSED SYNCHRONOUS DATA NETWORK. . . . . 3.1.0

UNITED TELECOMMUNICATIONS INC., KANSAS CITY, MO
THE WIRED CITY: THE ROLE OF AN INDEPENDENT TELEPHONE COMPANY . . . . . 4.3
UPSALA COLLEGE, EAST ORANGE, NJ
'ORACLE': COMPUTERIZED CONFERENCING IN A COMPUTER-ASSISTED-INSTRUCTION SYSTEM. . . . . 4.1
UTAH, UNIV. OF, SALT LAKE CITY
HOST-HOST COMMUNICATION PROTOCOL IN THE ARPA NETWORK . . . . . 3.5
VERMONT, UNIV. OF, BURLINGTON, ACADEMIC COMPUTING CENTER
REMOTE COMPUTING IN HIGHER EDUCATION: PROSPECTS FOR THE FUTURE. . . . . 1.1
WASHINGTON, STATE UNIV. OF, PULLMAN
PROGRAMMABLE COMMUNICATION PROCESSORS . . . . . 3.2.3
THE USE OF A SMALL COMPUTER AS A TERMINAL CONTROLLER FOR A LARGE COMPUTING SYSTEM . . . . . 3.3.2
WATERLOO, UNIV. OF, (CANADA)
NEWHALL LOOPS AND PROGRAMMABLE TOM TWO FACETS OF CANADIAN RESEARCH IN COMPUTER COMMUNICATIONS . . . . . 3.2.9
TELECONFERENCING: THE COMPUTER, COMMUNICATION, AND ORGANIZATION . . . . . 4.1
WAYNE, STATE UNIV. OF, DETROIT, MI
DEVELOPMENT OF APPLICATIONS FOR THE MERIT COMPUTING NETWORK. . . . . 4.0
PROGRESS ON APPLICATIONS DEVELOPMENT, 1970-71. A REPORT OF THE ASSOCIATE DIRECTORS OF MERIT PROJECT . . . . 4.0
WEST GEORGIA COLLEGE, CAROLLTON
EFFICIENCY VS. RESPONSIVENESS IN A MULTIPLE-SERVICES COMPUTER FACILITY . . . . . 2.9
WESTERN UNION DATA SERVICES CO.
THE MAO MAO WORLD OF DATA COMMUNICATIONS . . . . . 1.9
WESTERN UNION TELEGRAPH CO.
THE SYNTHESIS OF COMMUNICATIONS AND COMPUTERS . . . . . 3.2.2
WESTERN UNION TELEGRAPH CO., ARLINGTON, VA
STATE INTEGRATED INFORMATION NET (SIINET). A CONCEPT . . . . . 3.1.0
WESTERN UNION TELEGRAPH CO., MAHWAH, NJ
THE ADVANCING COMMUNICATION TECHNOLOGY AND COMPUTER COMMUNICATION SYSTEMS . . . . . 3.2.1
WIDETT AND WIDETT, BOSTON, MA
PROTECTION OF PROPRIETARY SOFTWARE PROGRAMS IN THE UNITED STATES . . . . . 5.6

ALOHA
DESIGN CONSIDERATIONS FOR THE MENEHUNE-KAHUNA INTERFACE FOR THE ALOHA SYSTEM. A PRELIMINARY REPORT. . . . . 3.3.1
MULTIPLEXING IN THE ALOHA SYSTEM: MENEHUNE - KEIKI DESIGN CONSIDERATIONS . . . . . 3.3.2
SIMULATION OF A RANDOM ACCESS DISCRETE ADDRESS COMMUNICATION SYSTEM . . . . . 2.1.1
SIMULATION OF INTERFERENCE OF PACKETS IN THE ALOHA TIME-SHARING SYSTEM . . . . . 2.1.1
THE ALOHA SYSTEM . . . . . 3.2.1
THE ALOHA SYSTEM--ANOTHER ALTERNATIVE FOR COMPUTER COMMUNICATIONS. . . . . 3.1.0
ARPA
A STUDY OF THE ARPA NETWORK DESIGN AND PERFORMANCE. . . . . 3.1.2
A SYSTEM FOR INTERPROCESS COMMUNICATION IN A RESOURCE SHARING COMPUTER NETWORK . . . . . 3.5
ANALYSIS AND OPTIMIZATION OF STORE-AND-FORWARD COMPUTER NETWORKS . . . . . 2.1.0
ANALYTIC AND SIMULATION METHODS IN COMPUTER NETWORK DESIGN . . . . . 2.1.0
ARPA NETWORK EXPERIMENTATION USING EXISTING DATA MANAGEMENT SYSTEMS . . . . . 4.9
ARPA NETWORK SERIES: I. INTRODUCTION TO THE ARPA NETWORK AT RAND AND TO THE RAND VIDEO GRAPHICS SYSTEM . . . 3.1.0
COMPUTER COMMUNICATION NETWORK DESIGN--EXPERIENCE WITH THEORY AND PRACTICE. . . . . 3.0
COMPUTER NETWORK DEVELOPMENT TO ACHIEVE RESOURCE SHARING. . . . . 3.1.0
COMPUTER NETWORK MEASUREMENTS: TECHNIQUES AND EXPERIMENTS . . . . . 2.2
COMPUTER NETWORK RESEARCH . . . . . 2.0
COMPUTER NETWORK RESEARCH . . . . . 2.1.0
COMPUTER NETWORKS. . . . . 1.3
DATA TRAFFIC MEASUREMENTS GUIDE IMPROVEMENTS TO RESOURCE-SHARING NETWORK . . . . . 2.2
EVALUATION OF AN INTERACTIVE-BATCH SYSTEM NETWORK . . . . . 3.1.2
EXPERIMENTATION ON THE ARPA COMPUTER NETWORK. . . . . 4.9
FLOW CONTROL IN A RESOURCE-SHARING COMPUTER NETWORK . . . . . 3.4
FUNCTION-ORIENTED PROTOCOLS FOR THE ARPA COMPUTER NETWORK . . . . . 3.5
HOST-HOST COMMUNICATION PROTOCOL IN THE ARPA NETWORK . . . . . 3.5
IMPROVEMENTS IN THE DESIGN AND PERFORMANCE OF THE ARPA NETWORK. . . . . 3.1.2
INITIAL DESIGN FOR INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK. . . . . 3.1.1
INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK . . . . . 3.1.1
INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK. QUARTERLY TECHNICAL REPORT NO. 12 . . . . . 3.1.1
MCROSS--A MULTI-COMPUTER PROGRAMMING SYSTEM . . . . . 4.2
MODELS FOR COMPUTER NETWORKS . . . . . 1.3
MULTIPLE COMPUTER NETWORKS AND INTERCOMPUTER COMMUNICATION . . . . . 1.1
NETWORK DATA HANDLING SYSTEM. SEMI-ANNUAL TECHNICAL REPORT . . . . . 4.1
NETWORK INFORMATION CENTER AND COMPUTER AUGMENTED TEAM INTERACTION . . . . . 4.1
NODAL BLOCKING IN LARGE NETWORKS. . . . . 2.1.2
OPTIMAL DESIGN OF COMPUTER NETWORKS. . . . . 2.1.2
PARTICIPATING DEMONSTRATIONS OF A MULTI-PURPOSE NETWORK LINKING DISSIMILAR COMPUTERS AND TERMINALS. . . . . 1.6
PERFORMANCE MEASUREMENTS ON THE ARPA COMPUTER NETWORK. . . . . 2.2
RESEARCH IN ON-LINE COMPUTATION . . . . . 4.2
RESEARCH IN STORE AND FORWARD COMPUTER NETWORKS. . . . . 2.1
STRATEGIES FOR OPERATING SYSTEMS IN COMPUTER NETWORKS. . . . . 3.4
TERMINAL ACCESS TO THE ARPA COMPUTER NETWORK. . . . . 3.3.2
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION . . . . . 3.4
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION . . . . . 4.1
THE INTERFACE MESSAGE PROCESSOR FOR THE ARPA COMPUTER NETWORK . . . . . 3.1.1
THE NETWORK CONTROL CENTER FOR THE ARPA NETWORK. . . . . 5.1
THE TERMINAL IMP FOR THE ARPA COMPUTER NETWORK . . . . . 3.3.2
TOPOLOGICAL CONSIDERATIONS IN THE DESIGN OF THE ARPA COMPUTER NETWORK . . . . . 2.1.2
VIEWS ON ISSUES RELEVANT TO DATA SHARING ON COMPUTER NETWORKS . . . . . 4.1
BIOMEDICAL
PROBLEMS OF NETWORK ACCOUNTING, MONITORING AND PERFORMANCE MEASUREMENT . . . . . 5.3
STANDARDIZATION, COMPATIBILITY AND/OR CONVERTIBILITY REQUIREMENTS IN NETWORK PLANNING . . . . . 5.5
STUDY OF COMMUNICATION LINKS FOR THE BIOMEDICAL COMMUNICATIONS NETWORK . . . . . 3.2.1
BROOKNET
BROOKNET--AN EXTENDED CORE STORAGE ORIENTED NETWORK OF COMPUTERS AT BROOKHAVEN NATIONAL LABORATORY. . . . . 3.1.0
CANUNET
THE CANADIAN UNIVERSITIES COMPUTER NETWORK TOPOLOGICAL CONSIDERATIONS . . . . . 2.1.1
CE-NCOREL
LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR COMPUTATIONAL RE 4.2
CLICS
THE CLASSROOM INFORMATION AND COMPUTING SERVICE. . . . . 4.3
CMU
COMPUTER NETWORKS. . . . . 3.1.0
CYBERNET
CONCEPTUAL BASES OF CYBERNET . . . . . 3.1.0
DATRAN
OPTICAL LINKS FOR COMMUNICATIONS IN LOCAL DISTRIBUTION . . . . . 3.2.1
SPECIALIZED COMMON CARRIERS . . . . . 1.6
THE DATRAN NETWORK . . . . . 3.1.0
DCS
THE STRUCTURE OF A DISTRIBUTED COMPUTER SYSTEM--THE DISTRIBUTED FILE SYSTEM . . . . . 3.1.1
DDN
THE PROBABLE FUTURE OF CANADIAN LONG HAUL DIGITAL DATA NETWORK CONNECTIONS WITH THE U.S.A. . . . . 3.1.1
GE
SYSTEM CONTROL IN MULTIPLE ACCESS COMPUTER NETWORKS . . . . . 1.0
THE FUTURE OF COMPUTER UTILITIES. . . . . 4.3
INTELSAT
CURRENT AND NEAR FUTURE DATA TRANSMISSION VIA SATELLITES OF THE INTELSAT NETWORK. . . . . 3.2.1
ISCS
THE SYNTHESIS OF COMMUNICATIONS AND COMPUTERS . . . . . 3.2.2
MACIMS
MAC INTEGRATED MANAGEMENT SYSTEM (MACIMS). . . . . 3.1.0
MACIMS COMMUNICATION NETWORK CONFIGURATION . . . . . 3.2.2
MCI
SPECIALIZED COMMON CARRIERS . . . . . 1.6
MERIT
COMPUTER NETWORKS. . . . . 3.1.0
MERIT COMPUTER NETWORK . . . . . 3.1.0
MERIT COMPUTER NETWORK: HARDWARE CONSIDERATIONS. . . . . 3.1.1
MERIT COMPUTER NETWORK: SOFTWARE CONSIDERATIONS. . . . . 3.1.1
MERIT PROPOSAL SUMMARY . . . . . 3.1.0
PROGRESS ON APPLICATIONS DEVELOPMENT, 1970-71. A REPORT OF THE ASSOCIATE DIRECTORS OF MERIT PROJECT . . . 4.0
THE COMMUNICATIONS COMPUTER HARDWARE OF THE MERIT COMPUTER NETWORK . . . . . 3.3.2
THE COMMUNICATIONS COMPUTER OPERATING SYSTEM--THE INITIAL DESIGN . . . . . 3.1.1
THE MERIT COMPUTER NETWORK, PROGRESS REPORT FOR THE PERIOD JULY 1969-MARCH 1971 . . . . . 3.1.0
MULTICS
THE MULTICS INTERPROCESS COMMUNICATION FACILITY. . . . . 3.4
NCIC
THE FBI'S COMPUTER NETWORK. . . . . 4.2
NETWORK 440
A COMMUNICATIONS INTERFACE FOR COMPUTER NETWORKS . . . . . 3.5
A NETWORK/440 PROTOCOL CONCEPT . . . . . 3.5
DATA DESCRIPTIVE LANGUAGE FOR SHARED DATA. . . . . 4.3
EXPLORATORY RESEARCH ON NETTING IN IBM. . . . . 3.0
IBM COMPUTER NETWORK/440 . . . . . 3.1.0
NETWORK/440--IBM RESEARCH COMPUTER SCIENCES DEPARTMENT COMPUTER NETWORK. . . . . 3.1.0
NMCS
ANALYSIS OF NMCS PROBLEM AREAS RELATED TO COMPUTER NETWORKS AND PROPOSED NMCS NETWORK OBJECTIVES . . . . . 1.1
EVALUATION OF THE NETWORK FEATURES REQUIRED TO ATTAIN THE APPROVED NMCS OBJECTIVES . . . . . 1.1
OPERATIONAL CONSIDERATIONS FOR THE IMPLEMENTATION OF COMPUTER NETWORKS IN THE NMCSSC . . . . . 1.2
SYSTEM LOAD SHARING STUDY . . . . . 1.2
NPL
A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--OBJECTIVES AND HARDWARE ORGANIZATION . . . . . 3.1.1
A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--SOFTWARE ORGANIZATION . . . . . 3.1.1
EASING THE INTRODUCTION OF A PACKET SWITCHING SERVICE. . . . . 3.3.1

NPL (CONTINUED)
EXPERIENCE WITH THE USE OF THE B.S. INTERFACE IN COMPUTER PERIPHERALS AND COMMUNICATION SYSTEMS. . . . . 3.3.1
SIMULATION OF DATA TRANSIT NETWORKS. . . . . 2.1.1
SOME OBSERVATIONS ON STORE-AND-FORWARD AND CIRCUIT-SWITCHED DATA NETWORKS . . . . . 2.2
THE CHOICE OF PACKET PARAMETERS FOR PACKET SWITCHED NETWORKS . . . . . 2.1.2
THE CONTROL OF CONGESTION IN PACKET SWITCHING NETWORKS . . . . . 2.1.3
THE DESIGN OF A MESSAGE SWITCHING CENTRE FOR A DIGITAL COMMUNICATION NETWORK . . . . . 3.1.1
THE DESIGN OF A SWITCHING SYSTEM TO ALLOW REMOTE ACCESS TO COMPUTER SERVICES BY OTHER COMPUTERS AND TERMINAL DE 3.0
THE NPL DATA NETWORK. . . . . 3.1.0
THE PRINCIPLES OF A DATA COMMUNICATION NETWORK FOR COMPUTERS AND REMOTE PERIPHERALS. . . . . 3.1.0
TRANSMISSION CONTROL IN A LOCAL DATA NETWORK. . . . . 3.0
OCTOPUS
AN ENGINEERING VIEW OF THE LRL OCTOPUS COMPUTER NETWORK . . . . . 3.1.1
LAWRENCE RADIATION LABORATORY OCTOPUS SYSTEM. . . . . 3.1.0
OCTOPUS: THE LAWRENCE RADIATION LABORATORY NETWORK. . . . . 3.1.0
THE LAWRENCE RADIATION LABORATORY OCTOPUS. . . . . 3.1.0
SCCS
CANADA MEETS COMPUTER COMMUNICATION NEEDS. . . . . 1.2
SIINET
STATE INTEGRATED INFORMATION NET (SIINET). A CONCEPT . . . . . 3.1.0
SOC
THE APPROACH OF SOFTWARE PROBLEMS IN THE SOC EXPERIMENTAL COMPUTER NETWORK. . . . . 3.4
TCCN
A TRANS-CANADA COMPUTER COMMUNICATIONS NETWORK. PHASE I OF A MAJOR PROGRAM ON COMPUTERS . . . . . 3.1.0
TCTS
THE PROBABLE FUTURE OF CANADIAN LONG HAUL DIGITAL DATA NETWORK CONNECTIONS WITH THE U.S.A. . . . . 3.1.1
TICCIT
THE WIRED CITY: SERVICES FOR HOME DELIVERY VIA INTERACTIVE CABLE TV . . . . . 4.3
TSS
AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS . . . . . 3.1.0
DISTRIBUTED NETWORK ACTIVITY AT IBM. . . . . 3.1.0
TUCC
ECONOMICS--POINT OF VIEW OF DESIGNER AND OPERATOR . . . . . 5.3
EFFICIENCY VS. RESPONSIVENESS IN A MULTIPLE-SERVICES COMPUTER FACILITY . . . . . 2.9
ORGANIZATIONAL, FINANCIAL, AND POLITICAL ASPECTS OF A THREE-UNIVERSITY COMPUTING CENTER . . . . . 5.0
THE RESPONSE-EFFICIENCY TRADE-OFF IN A MULTIPLE-UNIVERSITY SYSTEM. . . . . 2.9
TX-2
AN EXPERIMENTAL COMPUTER NETWORK. . . . . 3.1.0
TOWARD A COOPERATIVE NETWORK OF TIME-SHARED COMPUTERS. . . . . 3.0
TYMNET
TYMNET--A SERENDIPITOUS EVOLUTION . . . . . 3.1.1
TYMNET--A TERMINAL ORIENTED COMMUNICATION NETWORK . . . . . 3.1.0
WWMCCS
A RECOMMENDED RESEARCH AND DEVELOPMENT PLAN FOR DATA EXCHANGE IN THE WORLD WIDE MILITARY COMMAND AND CONTROL SY 4.9
CONCEPTS FOR A WWMCCS INTERCOMPUTER NETWORK . . . . . I.1
DESIGN SPECIFICATIONS FOR PWIN NON-FUNCTIONAL NETWORK CONTROL SOFTWARE . . . . . 3.4
PROJECTED RESPONSE CHARACTERISTICS OF THE WWMCCS INTERCOMPUTER NETWORK . . . . . 2.1.2
PROPOSAL FOR THE DEVELOPMENT OF A SECURE PILOT NETWORK FOR THE WORLD-WIDE MILITARY COMMAND AND CONTROL SYSTEM ( 3.1.0
PROPOSED IMPLEMENTATION PLAN FOR A WWMCCS INTERCOMPUTER NETWORK . . . . . 3.1.1
PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN. . . . . 3.1.1

ACADEMIC
THE FINGER LAKES REGIONAL COMPUTING ORGANIZATION: CREATING A REGIONAL, [ACADEMIC] COMPUTING NETWORK 3.1.2

ACCESS
SOME LEGAL AND REGULATORY PROBLEMS OF MULTIPLE [ACCESS] COMPUTER NETWORKS 5.4
SYSTEM CONTROL IN MULTIPLE [ACCESS] COMPUTER NETWORKS 1.0
MULTIPLE [ACCESS] COMPUTER NETWORKS: THE ROLE OF THE COMMON CARRIER 5.4
[ACCESS] CONTROL AND FILE DIRECTORIES IN COMPUTER NETWORKS 4.1
SIMULATION OF A RANDOM [ACCESS] DISCRETE ADDRESS COMMUNICATION SYSTEM 2.1.1
THE DESIGN OF A SWITCHING SYSTEM TO ALLOW REMOTE [ACCESS] TO COMPUTER SERVICES BY OTHER COMPUTERS AND TERMINAL DEVICES 3.0
[ACCESS] TO LARGE COMPUTER SYSTEMS 5.4
TERMINAL [ACCESS] TO THE ARPA COMPUTER NETWORK 3.3.2

ACCESSED
COMMUNICATION NEEDS OF REMOTELY [ACCESSED] COMPUTER 5.4

ACCOUNTING
PROBLEMS OF NETWORK [ACCOUNTING], MONITORING AND PERFORMANCE MEASUREMENT 5.3

ADAPTABLE
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN [ADAPTABLE], PROCESS/PROCESS COMMUNICATION 4.1
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN [ADAPTABLE], PROCESS/PROCESS COMMUNICATION 3.4

ADAPTIVE
A COMPUTER SIMULATION OF [ADAPTIVE] ROUTING TECHNIQUES FOR DISTRIBUTED COMMUNICATIONS SYSTEMS 2.1.1

ADDRESS
SIMULATION OF A RANDOM ACCESS DISCRETE [ADDRESS] COMMUNICATION SYSTEM 2.1.1

ADP
THE IMPLICATIONS OF [ADP] NETWORKING STANDARDS FOR OPERATIONS RESEARCH 1.1

AFOS
[AFOS]: A PROGRAM FOR NATIONAL WEATHER SERVICE FIELD AUTOMATION 4.9

ALGORITHMS
COMPARISON OF NETWORK TOPOLOGY OPTIMIZATION [ALGORITHMS] 2.1.0
[ALGORITHMS] TO REALIZE DIRECTED COMMUNICATION NETS 2.1.2

ALLOCATION
OPTIMAL FILE [ALLOCATION] IN A MULTIPLE COMPUTER SYSTEM 2.1.2
FLEXIBLE PRICING: AN APPROACH TO THE [ALLOCATION] OF COMPUTER RESOURCES 5.3
[ALLOCATION] OF COPIES OF A FILE IN AN INFORMATION NETWORK 2.1.2
OPTIMAL [ALLOCATION] OF LEASED COMMUNICATION LINES 2.1.2
EFFICIENT [ALLOCATION] OF RESOURCES IN CENTRALIZED COMPUTER-COMMUNICATION NETWORK DESIGN 2.1.2

ALOHA
THE [ALOHA] SYSTEM 3.2.1
THE [ALOHA] SYSTEM--ANOTHER ALTERNATIVE FOR COMPUTER COMMUNICATIONS 3.1.0
MULTIPLEXING IN THE [ALOHA] SYSTEM: MENEHUNE - KEIKI DESIGN CONSIDERATIONS 3.3.2
DESIGN CONSIDERATIONS FOR THE MENEHUNE-KAHUNA INTERFACE FOR THE [ALOHA] SYSTEM, A PRELIMINARY REPORT 3.3.1
SIMULATION OF INTERFERENCE OF PACKETS IN THE [ALOHA] TIME-SHARING SYSTEM 2.1.1

ANALYSIS
POLLING IN A MULTIDROP COMMUNICATION SYSTEM: WAITING LINE [ANALYSIS] 2.1.2
NETWORK COMPUTER [ANALYSIS] 2.1.2
[ANALYSIS] AND DESIGN OF RELIABLE COMPUTER NETWORKS 2.1.2
[ANALYSIS] AND OPTIMIZATION OF STORE-AND-FORWARD COMPUTER NETWORKS 2.1.0
[ANALYSIS] OF LOOP TRANSMISSION SYSTEMS 2.1.2
[ANALYSIS] OF NMCS PROBLEM AREAS RELATED TO COMPUTER NETWORKS AND PROPOSED NMCS NETWORK OBJECTIVES 1.1

ANALYTIC
[ANALYTIC] AND SIMULATION METHODS IN COMPUTER NETWORK DESIGN 2.1.0

ANALYTICAL
SURVEY OF [ANALYTICAL] METHODS IN QUEUEING NETWORKS 1.3

APPLICATIONS
PROGRESS ON [APPLICATIONS] DEVELOPMENT, 1970-71. A REPORT OF THE ASSOCIATE DIRECTORS OF MERIT PROJECT 4.0
DEVELOPMENT OF [APPLICATIONS] FOR THE MERIT COMPUTING NETWORK 4.0

APPROXIMATING
ON TELEPROCESSING SYSTEM DESIGN, PART II. A METHOD FOR [APPROXIMATING] THE OPTIMAL NETWORK 2.1.2

ARCHITECTURE
DATA COMMUNICATIONS NETWORK [ARCHITECTURE] 3.0
THE SYSTEM [ARCHITECTURE] OF THE DISTRIBUTED COMPUTER SYSTEM--THE COMMUNICATIONS SYSTEM 3.2.0

ARPA
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
INITIAL DESIGN FOR INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
TOPOLOGICAL CONSIDERATIONS IN THE DESIGN OF THE [ARPA] COMPUTER NETWORK 2.1.2
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
THE INTERFACE MESSAGE PROCESSOR FOR THE [ARPA] COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
PERFORMANCE MEASUREMENTS ON THE [ARPA] COMPUTER NETWORK 2.2
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
FUNCTION-ORIENTED PROTOCOLS FOR THE [ARPA] COMPUTER NETWORK 3.5
EXPERIMENTATION ON THE [ARPA] COMPUTER NETWORK 4.9
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
THE TERMINAL IMP FOR THE [ARPA] COMPUTER NETWORK 3.3.2
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK 3.1.1
TERMINAL ACCESS TO THE [ARPA] COMPUTER NETWORK 3.3.2
PROPOSAL FOR THE DEVELOPMENT OF A SECURE PILOT NETWORK FOR THE WORLD-WIDE MILITARY COMMAND AND CONTROL SYSTEM (WWMCCS) BASED ON THE [ARPA] COMPUTER NETWORK TECHNOLOGY 3.1.0
INTERFACE MESSAGE PROCESSORS FOR THE [ARPA] COMPUTER NETWORK, QUARTERLY TECHNICAL REPORT NO. 12 3.1.1
HOST-HOST COMMUNICATION PROTOCOL IN THE [ARPA] NETWORK 3.5
THE NETWORK CONTROL CENTER FOR THE [ARPA] NETWORK 5.1
IMPROVEMENTS IN THE DESIGN AND PERFORMANCE OF THE [ARPA] NETWORK 3.1.2
THE NETWORK CONTROL CENTER FOR THE [ARPA] NETWORK 5.1
ARPA NETWORK SERIES: 1. INTRODUCTION TO THE [ARPA] NETWORK AT RAND AND TO THE RAND VIDEO GRAPHICS SYSTEM 3.1.0
A STUDY OF THE [ARPA] NETWORK DESIGN AND PERFORMANCE 3.1.2
[ARPA] NETWORK EXPERIMENTATION USING EXISTING DATA MANAGEMENT SYSTEMS 4.9
[ARPA] NETWORK SERIES: 1. INTRODUCTION TO THE ARPA NETWORK AT RAND AND TO THE RAND VIDEO GRAPHICS SYSTEM 3.1.0

ARRIVALS
ROUND ROBIN SCHEDULING IN A COMPUTER COMMUNICATIONS SYSTEM WITH FINITE SWAP TIME AND STATISTICALLY MULTIPLEXED [ARRIVALS] ARRIVALS 2.1.2

ASCII
[ASCII] EXTENSION AND EXPANSION AND THEIR IMPACT ON DATA COMMUNICATIONS 5.5

ASSIGNMENT
A STUDY OF OPTIMAL FILE [ASSIGNMENT] AND COMMUNICATION NETWORK CONFIGURATION IN REMOTE-ACCESS COMPUTER MESSAGE PROCESSING AND COMMUNICATION SYSTEMS 2.9
PRIORITY [ASSIGNMENT] IN A NETWORK OF COMPUTERS 2.1.2
PRIORITY [ASSIGNMENT] IN A NETWORK OF COMPUTERS 2.1.2

ASYNCHRONOUS
A STUDY OF [ASYNCHRONOUS] TIME DIVISION MULTIPLEXING FOR TIME-SHARING COMPUTER SYSTEMS 3.2.1

AUGMENTED
NETWORK INFORMATION CENTER AND COMPUTER [AUGMENTED] TEAM INTERACTION 4.1

AUSTRALIAN
[AUSTRALIAN] COMPUTING NETWORK 3.1.0
A PROPOSED COMPUTER NETWORK FOR THE [AUSTRALIAN] NATIONAL UNIVERSITY 3.1.0

AUTOMATED
STANDARDS FOR USER PROCEDURES AND DATA FORMATS IN [AUTOMATED] INFORMATION SYSTEMS AND NETWORKS 5.5

AUTOMATION
AFOS: A PROGRAM FOR NATIONAL WEATHER SERVICE FIELD [AUTOMATION] 4.9

A.A.E.C
THE [A.A.E.C]. COMPUTER NETWORK DESIGN 3.1.0

BENEFITS
MIXED COMPUTER NETWORKS: [BENEFITS], PROBLEMS AND GUIDELINES 3.0

BIOMEDICAL
STUDY OF COMMUNICATION LINKS FOR THE [BIOMEDICAL] COMMUNICATIONS NETWORK 3.2.1
THE NATIONAL [BIOMEDICAL] COMMUNICATIONS NETWORK AS A DEVELOPING STRUCTURE 3.0
A TELEPHONE-ACCESS [BIOMEDICAL] INFORMATION CENTER 5.3

BLOCKING
NODAL [BLOCKING] IN LARGE NETWORKS 2.1.2
NODAL [BLOCKING] IN LARGE NETWORKS 2.1.2

BROADBAND
ON DISTRIBUTED COMMUNICATIONS: II. DIGITAL SIMULATION OF HOT-POTATO ROUTING IN A [BROADBAND] DISTRIBUTED COMMUNICATIONS NETWORK 2.1.1
THE WIRED CITY: COMMERCIAL SERVICES TO BE PROVIDED BY [BROADBAND] TELECOMMUNICATIONS SYSTEMS 5.2

BROOKHAVEN
BROOKNET--AN EXTENDED CORE STORAGE ORIENTED NETWORK OF COMPUTERS AT [BROOKHAVEN] NATIONAL LABORATORY 3.1.0

BROOKNET
[BROOKNET]--AN EXTENDED CORE STORAGE ORIENTED NETWORK OF COMPUTERS AT BROOKHAVEN NATIONAL LABORATORY 3.1.0

B.S
EXPERIENCE WITH THE USE OF THE [B.S]. INTERFACE IN COMPUTER PERIPHERALS AND COMMUNICATION SYSTEMS 3.3.1

CABLE
THE WIRED CITY: SERVICES FOR HOME DELIVERY VIA INTERACTIVE [CABLE] TV 4.3

CANADA
[CANADA] MEETS COMPUTER COMMUNICATION NEEDS 1.2

CANADIAN
THE PROBABLE FUTURE OF [CANADIAN] LONG HAUL DIGITAL DATA NETWORK CONNECTIONS WITH THE U.S.A. 3.1.1
NEWHALL LOOPS AND PROGRAMMABLE TDM TWO FACETS OF [CANADIAN] RESEARCH IN COMPUTER COMMUNICATIONS 3.2.9
THE [CANADIAN] UNIVERSITIES COMPUTER NETWORK TOPOLOGICAL CONSIDERATIONS 2.1.1

CARE
HEALTH [CARE] COMMUNICATION SYSTEMS 4.2
COMPUTERS, COMMUNICATIONS, AND DISTRIBUTED HEALTH [CARE] SYSTEMS 1.1

CARRIER
MULTIPLE ACCESS COMPUTER NETWORKS: THE ROLE OF THE COMMON [CARRIER] 5.4
COMMON [CARRIER] APPROACH TO DIGITAL DATA TRANSMISSION: TERMINALS, TRANSMISSION EQUIPMENT AND FUTURE PLANS FOR THE COMPUTER UTILITY 1.2
PLANNING A DATA COMMUNICATIONS SYSTEM, PART 2: COMMON [CARRIER] FACILITIES 3.2.0
PLANNING A DATA COMMUNICATIONS SYSTEM, PART 2: COMMON [CARRIER] FACILITIES (CONTINUED) 3.2.0

CARRIERS
SPECIALIZED COMMON [CARRIERS] 1.6

CASE
THE [CASE] FOR NETWORKS 1.1

CATALOG
[CATALOG] OF NETWORK FEATURES 1.3

CATV
COPYRIGHT ASPECTS OF [CATV] AS UTILIZED IN INFORMATION NETWORKING 4.3

CENTER
THE DEVELOPMENT OF A MULTI-CAMPUS REGIONAL COMPUTING [CENTER] 3.1.0
ORGANIZATIONAL, FINANCIAL, AND POLITICAL ASPECTS OF A THREE-UNIVERSITY COMPUTING [CENTER] 5.0
A REGIONAL NETWORK--OHIO COLLEGE LIBRARY [CENTER] 4.2
MODERN EDUCATION MEDIA CUT COSTS AT THE COMPUTER [CENTER] 5.7
A TELEPHONE-ACCESS BIOMEDICAL INFORMATION [CENTER] 5.3
NETWORK INFORMATION [CENTER] AND COMPUTER AUGMENTED TEAM INTERACTION 4.1
THE NETWORK CONTROL [CENTER] FOR THE ARPA NETWORK 5.1
THE NETWORK CONTROL [CENTER] FOR THE ARPA NETWORK 5.1
LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL [CENTER] OR NETWORK FOR COMPUTATIONAL RESEARCH ON LANGUAGE (CE-NCOREL) 4.2

CENTRAL
A MODEL WHICH AIDS IN THE DESIGN OF [CENTRAL] STATIONS FOR LARGE COMPUTER NETWORKS 2.9

CENTRALIZATION
THE [CENTRALIZATION] VS. DECENTRALIZATION ISSUE: ARGUMENTS, ALTERNATIVES, AND GUIDELINES 5.1

CENTRALIZED
RELIABILITY CONSIDERATIONS IN [CENTRALIZED] COMPUTER NETWORKS 2.1.2
OPTIMIZING THE RELIABILITY IN [CENTRALIZED] COMPUTER NETWORKS 2.1.0
EFFICIENT ALLOCATION OF RESOURCES IN [CENTRALIZED] COMPUTER-COMMUNICATION NETWORK DESIGN 2.1.2

CENTRE
THE DESIGN OF A MESSAGE SWITCHING [CENTRE] FOR A DIGITAL COMMUNICATION NETWORK 3.1.1

CE-NCOREL
LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR COMPUTATIONAL RESEARCH ON LANGUAGE ([CE-NCOREL]) 4.2

CHANNELS
MODERN TECHNIQUES FOR DATA COMMUNICATION OVER TELEPHONE [CHANNELS] 3.2.1

CIRCUIT-SWITCHED
SOME OBSERVATIONS ON STORE-AND-FORWARD AND [CIRCUIT-SWITCHED] DATA NETWORKS 2.2

CIRCULAR
TRAFFIC AND DELAY IN A [CIRCULAR] DATA NETWORK 2.1.2

CITY
THE WIRED [CITY]: COMMERCIAL SERVICES TO BE PROVIDED BY BROADBAND TELECOMMUNICATIONS SYSTEMS 5.2
THE WIRED [CITY]: SERVICES FOR HOME DELIVERY VIA INTERACTIVE CABLE TV 4.3
THE WIRED [CITY]: THE ROLE OF AN INDEPENDENT TELEPHONE COMPANY 4.3

CLASSROOM
THE [CLASSROOM] INFORMATION AND COMPUTING SERVICE 4.3

COLLEGE
A REGIONAL NETWORK--OHIO [COLLEGE] LIBRARY CENTER 4.2

COMMAND
A RECOMMENDED RESEARCH AND DEVELOPMENT PLAN FOR DATA EXCHANGE IN THE WORLD WIDE MILITARY [COMMAND] AND CONTROL SYSTEM 4.9
PROPOSAL FOR THE DEVELOPMENT OF A SECURE PILOT NETWORK FOR THE WORLD-WIDE MILITARY [COMMAND] AND CONTROL SYSTEM (WWMCCS) BASED ON THE ARPA COMPUTER NETWORK TECHNOLOGY 3.1.0

COMMERCIAL
[COMMERCIAL] INFORMATION PROCESSING NETWORKS--PROSPECTS AND PROBLEMS IN PERSPECTIVE 1.0
THE WIRED CITY: [COMMERCIAL] SERVICES TO BE PROVIDED BY BROADBAND TELECOMMUNICATIONS SYSTEMS 5.2

COMMON
MULTIPLE ACCESS COMPUTER NETWORKS: THE ROLE OF THE [COMMON] CARRIER 5.4
[COMMON] CARRIER APPROACH TO DIGITAL DATA TRANSMISSION: TERMINALS, TRANSMISSION EQUIPMENT AND FUTURE PLANS FOR THE COMPUTER UTILITY 1.2
PLANNING A DATA COMMUNICATIONS SYSTEM, PART 2: [COMMON] CARRIER FACILITIES 3.2.0
PLANNING A DATA COMMUNICATIONS SYSTEM, PART 2: [COMMON] CARRIER FACILITIES (CONTINUED) 3.2.0
SPECIALIZED [COMMON] CARRIERS 1.6

COMPARISON
[COMPARISON] OF NETWORK TOPOLOGY OPTIMIZATION ALGORITHMS 2.1.0

COMPARISONS
ON DISTRIBUTED COMMUNICATIONS: V. HISTORY, ALTERNATIVE APPROACHES, AND [COMPARISONS] 2.1.3

COMPATIBILITY
STANDARDIZATION, [COMPATIBILITY] AND/OR CONVEPTIBILITY REQUIREMENTS IN NETWORK PLANNING 5.5
SERIOUS [COMPATIBILITY] PROBLEMS IN COMPUTER NETWORKING CHALLENGE NBS, INDUSTRY 5.5
[COMPATIBILITY] PROBLEMS OF NETWORK INTERFACING 5.5

COMPATIBLE
ON-LINE DOCUMENTATION OF THE [COMPATIBLE] TIME-SHARING SYSTEM 4.1

COMPETITION
THE PROMISE AND PERIL OF [COMPETITION] IN INTERCITY COMMUNICATIONS 5.4
[COMPETITION] IN THE FIELDS OF COMPUTERS AND COMMUNICATIONS IN JAPAN 5.4

COMPLEMENTING
COMPUTERS AND COMMUNICATIONS: [COMPLEMENTING] TECHNOLOGIES 1.3

COMPUTATION
RESEARCH IN ON-LINE [COMPUTATION] 4.2
[COMPUTATION] OF MESSAGE DELAYS IN A COMMUNICATIONS NETWORK 2.1.2

COMPUTATIONAL
LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR [COMPUTATIONAL] RESEARCH ON LANGUAGE (CE-NCDREL) 4.2

COMPUTERIZED
'PARTY-LINE' AND 'DISCUSSION'--[COMPUTERIZED] CONFERENCE SYSTEMS 4.1
'PARTY-LINE' AND 'DISCUSSION' [COMPUTERIZED] CONFEPENCE SYSTEMS 4.1
'ORACLE': [COMPUTERIZED] CONFERENCING IN A COMPUTER-ASSISTED-INSTRUCTION SYSTEM 4.1

COMPUTER-ASSISTED
[COMPUTER-ASSISTED] EXPERT INTERROGATION: A REPORT ON CURRENT METHODS DEVELOPMENT 4.1

COMPUTER-ASSISTED-
'ORACLE': COMPUTERIZED CONFERENCING IN A [COMPUTER-ASSISTED-INSTRUCTION] SYSTEM 4.1

COMPUTER-COMMUNICA
ALTERNATIVE FUTURE [COMPUTER-COMMUNICATION] MARKETS 5.4
EFFICIENT ALLOCATION OF RESOURCES IN CENTRALIZED [COMPUTER-COMMUNICATION] NETWORK DESIGN 2.1.2
PUBLIC TELEPHONE NETWORK AND [COMPUTER-COMMUNICATION] 3.2.9

COMPUTER-TO-COMPUT
DATA TRANSMISSION NETWORK [COMPUTER-TO-COMPUTER] STUDY 3.2.1
DATA TRANSMISSION NETWORK [COMPUTER-TO-COMPUTER] STUDY 3.2.1

COMPUTER/COMMUNICA
TRENDS IN [COMPUTER/COMMUNICATION] SYSTEMS 1.2
[COMPUTER/COMMUNICATIONS] SYSTEMS: PATTERNS AND PROSPECTS 1.0
BEYOND THE COMPUTER INQUIRY (WHO SHOULD BE REGULATED IN [COMPUTER/COMMUNICATIONS]) 5.4

CONCENTRATOR
OPTIMUM [CONCENTRATOR] LOCATION IN TELECOMMUNICATIONS DESIGN 2.1.2

CONFERENCE
'PARTY-LINE' AND 'DISCUSSION'--COMPUTERIZED [CONFEPENCE] SYSTEMS 4.1
'PARTY-LINE' AND 'DISCUSSION' COMPUTERIZED [CONFERENCE] SYSTEMS 4.1

CONFERENCING
'ORACLE': COMPUTERIZED [CONFERENCING] IN A COMPUTER-ASSISTED-INSTRUCTION SYSTEM 4.1

CONFIGURATION
MACIMS COMMUNICATION NETWORK [CONFIGURATION] 3.2.2
A STUDY OF OPTIMAL FILE ASSIGNMENT AND COMMUNICATION NETWORK [CONFIGURATION] IN REMOTE-ACCESS COMPUTER MESSAGE PROCESSING AND COMMUNICATION SYSTEMS 2.9
[CONFIGURATION] OF AN EFFICIENT DATA COMMUNICATION SYSTEM 3.2.2

CONGESTION
THE CONTROL OF [CONGESTION] IN PACKET SWITCHING NETWORKS 2.1.3

CONNECTING
MATHEMATICAL THEORY OF [CONNECTING] NETWORKS AND TELEPHONE TRAFFIC 2.1

CONNECTIONS
THE PROBABLE FUTURE OF CANADIAN LONG HAUL DIGITAL DATA NETWORK [CONNECTIONS] WITH THE U.S.A. 3.1.1

CONTROL
ACCESS [CONTROL] AND FILE DIRECTORIES IN COMPUTER NETWORKS 4.1
COMMUNICATION [CONTROL] BY COMPUTER--AN INTRODUCTION 1.3

CONTROL (CONTINUED)

THE NETWORK [CONTROL] CENTER FOR THE ARPA NETWORK 5.1
THE NETWORK [CONTROL] CENTER FOR THE ARPA NETWORK 5.1
[CONTROL] CONCEPTS OF A LOGICAL NETWORK MACHINE 3.0
ERROR [CONTROL] FOR DIGITAL DATA TRANSMISSION OVER TELEPHONE NETWORKS 3.2.1
THE [CONTROL] FUNCTIONS IN A LOCAL DATA NETWORK 3.4
MESSAGE ROUTE [CONTROL] IN A LARGE TELETYPE NETWORK 2.1.3
TRANSMISSION [CONTROL] IN A LOCAL DATA NETWORK 3.0
FLOW [CONTROL] IN A RESOURCE-SHARING COMPUTER NETWORK 3.4
A SIMULATION STUDY OF ROUTING AND [CONTROL] IN COMMUNICATIONS NETWORKS 2.1.1
SYSTEM [CONTROL] IN MULTIPLE ACCESS COMPUTER NETWORKS 1.0
THE [CONTROL] OF CONGESTION IN PACKET SWITCHING NETWORKS 2.1.3
PROGRESS IN [CONTROL] PROCEDURE STANDARDIZATION 3.5
BASIC [CONTROL] PROCEDURES FOR DIGITAL DATA TRANSMISSION 3.5
STATE-TRANSITION PROGRAMMING TECHNIQUES AND THEIR USE IN PRODUCING TELEPROCESSING DEVICE [CONTROL] PROGRAMS 3.2.9
DESIGN SPECIFICATIONS FOR PWIN NON-FUNCTIONAL NETWORK [CONTROL] SOFTWARE 3.4
A RECOMMENDED RESEARCH AND DEVELOPMENT PLAN FOR DATA EXCHANGE IN THE WORLD WIDE MILITARY COMMAND AND [CONTROL] SYSTEM 4.9
PROPOSAL FOR THE DEVELOPMENT OF A SECURE PILOT NETWORK FOR THE WORLD-WIDE MILITARY COMMAND AND [CONTROL] SYSTEM (WWMCCS) BASED ON THE ARPA COMPUTER NETWORK TECHNOLOGY 3.1.0

CONTROLLER
THE USE OF A SMALL COMPUTER AS A TERMINAL [CONTROLLER] FOR A LARGE COMPUTING SYSTEM 3.3.2

CONVERSATIONAL
RESPONSE TIME IN MAN-COMPUTER [CONVERSATIONAL] TRANSACTIONS 2.3

CONVERTIBILITY
STANDARDIZATION, COMPATIBILITY AND/OR [CONVERTIBILITY] REQUIREMENTS IN NETWORK PLANNING 5.5

COOPERATIVE
TOWARD A [COOPERATIVE] NETWORK OF TIME-SHARED COMPUTERS 3.0
A [COOPERATIVE] NETWORK OF TIME-SHARING COMPUTERS: PRELIMINARY STUDY 3.0

COPIES
ALLOCATION OF [COPIES] OF A FILE IN AN INFORMATION NETWORK 2.1.2

COPYRIGHT
[COPYRIGHT] ASPECTS OF CATV AS UTILIZED IN INFORMATION NETWOPKING 4.3

CORE
BROOKNET--AN EXTENDED [CORE] STORAGE ORIENTED NETWORK OF COMPUTERS AT BROOKHAVEN NATIONAL LABORATORY 3.1.0

CORPORATE
EFFECTIVE [CORPORATE] NETWORKING, ORGANIZATION, AND STANDARDIZATION 1.1

COST
STRATEGIES FOR MAXIMUM [COST] EFFECTIVENESS OF A SWITCHED NETWORK 3.2.2

COSTS
TELECOMMUNICATIONS [COSTS] 5.3
MODERN EDUCATION MEDIA CUT [COSTS] AT THE COMPUTER CENTER 5.7

CURRENT
[CURRENT] AND NEAR FUTURE DATA TRANSMISSION VIA SATELLITES OF THE INTELSAT NETWORK 3.2.1
COMPUTER-ASSISTED EXPERT INTERROGATION: A REPORT ON [CURRENT] METHODS DEVELOPMENT 4.1

CUSTOMERS
A PREEMPTIVE PRIORITY MODEL WITH TWO CLASSES OF [CUSTOMERS] 2.1.2

CYBERNET
CONCEPTUAL BASES OF [CYBERNET] 3.1.0

C.S.I.R.O
COMMUNICATION AND SYSTEMS DEVELOPMENT IN THE [C.S.I.R.O]. NETWORK 3.1.0

DATABASE
CHARACTERISTICS OF [DATABASE] SYSTEMS IN A COMPUTER NETWORK ENVIRONMENT 2.9

DATRAN
THE [DATRAN] NETWORK 3.1.0

DEADLOCKS
SYSTEM [DEADLOCKS] 2.0

DECENTRALIZATION
THE CENTRALIZATION VS. [DECENTRALIZATION] ISSUE: ARGUMENTS, ALTERNATIVES, AND GUIDELINES 5.1

DEFINITION
NETWORK OF COMPUTERS. SESSION II. [DEFINITION], MODELING AND EVALUATION--SESSION SUMMARY 1.0

DELAY
TRAFFIC AND [DELAY] IN A CIRCULAR DATA NETWORK 2.1.2

DELAYS
SOME EFFECTS OF SWITCHED NETWORK TIME [DELAYS] AND TRANSMISSION SPEED ON DATA BASED/DATA COMMUNICATION SYSTEMS 2.1.2
COMPUTATION OF MESSAGE [DELAYS] IN A COMMUNICATIONS NETWORK 2.1.2

DELIVERY
THE WIRED CITY: SERVICES FOR HOME [DELIVERY] VIA INTERACTIVE CABLE TV 4.3

DEMULTIPLEXING
[DEMULTIPLEXING] CONSIDERATIONS FOR STATISTICAL MULTIPLEXORS 3.2.9

DESCRIPTIVE
DATA [DESCRIPTIVE] LANGUAGE FOR SHARED DATA 4.3

DESIGNER
WORLD DATA COMMUNICATIONS AS SEEN BY THE DATA PROCESSING SYSTEMS [DESIGNER] 3.2.1
ECONOMICS--POINT OF VIEW OF [DESIGNER] AND OPERATOR 5.3

DEVICE
STATE-TRANSITION PROGRAMMING TECHNIQUES AND THEIR USE IN PRODUCING TELEPROCESSING [DEVICE] CONTROL PROGRAMS 3.2.9

DIGITAL
THE DESIGN OF A MESSAGE SWITCHING CENTRE FOR A [DIGITAL] COMMUNICATION NETWORK 3.1.1
ON THE STRUCTURE OF A HETEROGENEOUS COMPUTING SYSTEM, CONTROLLED BY A LARGE [DIGITAL] COMPUTER 3.0
THE PROBABLE FUTURE OF CANADIAN LONG HAUL [DIGITAL] DATA NETWORK CONNECTIONS WITH THE U.S.A. 3.1.1
BASIC CONTROL PROCEDURES FOR [DIGITAL] DATA TRANSMISSION 3.5
ERROR CONTROL FOR [DIGITAL] DATA TRANSMISSION OVER TELEPHONE NETWORKS 3.2.1
COMMON CARRIER APPROACH TO [DIGITAL] DATA TRANSMISSION: TERMINALS, TRANSMISSION EQUIPMENT AND FUTURE PLANS FOR THE COMPUTER UTILITY 1.2
ON DISTRIBUTED COMMUNICATIONS: II. [DIGITAL] SIMULATION OF HOT-POTATO ROUTING IN A BROADBAND DISTRIBUTED COMMUNICATIONS NETWORK 2.1.1

DIRECTED
ALGORITHMS TO REALIZE [DIRECTED] COMMUNICATION NETS 2.1.2

DIRECTORIES
ACCESS CONTROL AND FILE [DIRECTORIES] IN COMPUTER NETWORKS 4.1

DIRECTORY
ROUTING PROCEDURES IN COMMUNICATIONS NETWORKS--PART II: [DIRECTORY] PROCEDURES 2.1.3

DISCRETE
SIMULATION OF A RANDOM ACCESS [DISCRETE] ADDRESS COMMUNICATION SYSTEM 2.1.1

DISCUSSION
'PARTY-LINE' AND '[DISCUSSION]' COMPUTERIZED CONFERENCE SYSTEMS 4.1
'PARTY-LINE' AND '[DISCUSSION]'--COMPUTERIZED CONFERENCE SYSTEMS 4.1

DISPERSION
SOFTWARE [DISPERSION]: THE MINICOMPUTER IN DATA COMMUNICATIONS 3.3.2

DISSIMILAR
PARTICIPATING DEMONSTRATIONS OF A MULTI-PURPOSE NETWORK LINKING [DISSIMILAR] COMPUTERS AND TERMINALS 1.6
INFORMATION INTERCHANGE BETWEEN [DISSIMILAR] SYSTEMS 4.1

DISTRIBUTED
ON DISTRIBUTED COMMUNICATIONS: II. DIGITAL SIMULATION OF HOT-POTATO ROUTING IN A BROADBAND [DISTRIBUTED] COMMUNICATIONS NETWORK 2.1.1
ON DISTRIBUTED COMMUNICATIONS: I. INTRODUCTION TO [DISTRIBUTED] COMMUNICATIONS NETWORKS 1.0
ON [DISTRIBUTED] COMMUNICATIONS NETWORKS 2.1.0
A COMPUTER SIMULATION OF ADAPTIVE ROUTING TECHNIQUES FOR [DISTRIBUTED] COMMUNICATIONS SYSTEMS 2.1.1
ON [DISTRIBUTED] COMMUNICATIONS: III. DETERMINATION OF PATH-LENGTHS IN A DISTRIBUTED NETWORK 2.1.2
ON [DISTRIBUTED] COMMUNICATIONS: II. DIGITAL SIMULATION OF HOT-POTATO ROUTING IN A BROADBAND DISTRIBUTED COMMUNICATIONS NETWORK 2.1.1
ON [DISTRIBUTED] COMMUNICATIONS: IV. PRIORITY, PRECEDENCE, AND OVERLOAD 2.1.3
ON [DISTRIBUTED] COMMUNICATIONS: IX. SECURITY, SECRECY, AND TAMPER-FREE CONSIDERATIONS 5.6
ON [DISTRIBUTED] COMMUNICATIONS: I. INTRODUCTION TO DISTRIBUTED COMMUNICATIONS NETWORKS 1.0
ON [DISTRIBUTED] COMMUNICATIONS: VIII. THE MULTIPLEXING STATION 3.2.3
ON [DISTRIBUTED] COMMUNICATIONS: VII. TENTATIVE ENGINEERING SPECIFICATIONS AND PRELIMINARY DESIGN FOR A HIGH-DATA-RATE DISTRIBUTED NETWORK SWITCHING NODE 3.3.2
ON [DISTRIBUTED] COMMUNICATIONS: V. HISTORY, ALTERNATIVE APPROACHES, AND COMPARISONS 2.1.3
ON [DISTRIBUTED] COMMUNICATIONS: XI. SUMMARY OVERVIEW 3.0
[DISTRIBUTED] COMPUTER SYSTEMS 1.3
THE SYSTEM ARCHITECTURE OF THE [DISTRIBUTED] COMPUTER SYSTEM--THE COMMUNICATIONS SYSTEM 3.2.0
THE STRUCTURE OF A [DISTRIBUTED] COMPUTER SYSTEM--THE DISTRIBUTED FILE SYSTEM 3.1.1
THE STRUCTURE OF A [DISTRIBUTED] COMPUTING SYSTEM--SOFTWARE 3.4
THE STRUCTURE OF A [DISTRIBUTED] COMPUTING SYSTEM--THE DISTRIBUTED FILE SYSTEM 4.1
THE USE OF [DISTRIBUTED] DATA BASES IN INFORMATION NETWORKS 4.1
THE STRUCTURE OF A DISTRIBUTED COMPUTING SYSTEM--THE [DISTRIBUTED] FILE SYSTEM 4.1
THE STRUCTURE OF A DISTRIBUTED COMPUTER SYSTEM--THE [DISTRIBUTED] FILE SYSTEM 3.1.1
COMPUTERS, COMMUNICATIONS, AND [DISTRIBUTED] HEALTH CARE SYSTEMS 1.1
[DISTRIBUTED] INTELLIGENCE IN DATA COMMUNICATIONS NETWORKS 3.3.2
ON DISTRIBUTED COMMUNICATIONS: III. DETERMINATION OF PATH-LENGTHS IN A [DISTRIBUTED] NETWORK 2.1.2
[DISTRIBUTED] NETWORK ACTIVITY AT IBM 3.1.0
ON DISTRIBUTED COMMUNICATIONS: VII. TENTATIVE ENGINEERING SPECIFICATIONS AND PRELIMINARY DESIGN FOR A HIGH-DATA-RATE [DISTRIBUTED] NETWORK SWITCHING NODE 3.3.2

DISTRIBUTION
OPTICAL LINKS FOR COMMUNICATIONS IN LOCAL [DISTRIBUTION] 3.2.1

DOCUMENTATION
ON-LINE [DOCUMENTATION] OF THE COMPATIBLE TIME-SHARING SYSTEM 4.1

ECONOMIC
PLANNING OF DATA COMMUNICATIONS NETWORKS--[ECONOMIC], TECHNOLOGICAL AND INSTITUTIONAL ISSUES 5.4

ECONOMICS
SYSTEM [ECONOMICS] FROM THE POINT OF VIEW OF THE USER 5.3
[ECONOMICS] OF TIME-SHARED COMPUTING SYSTEMS, PART 2 5.3
[ECONOMICS] OF TIME-SHARED COMPUTING SYSTEMS, PART I 5.3
[ECONOMICS]--POINT OF VIEW OF DESIGNER AND OPERATOR 5.3

EDS
THE GERMAN [EDS] NETWORK 3.1.0

EDUCATION
REMOTE COMPUTING IN HIGHER [EDUCATION]: PROSPECTS FOR THE FUTURE 1.1
MODERN [EDUCATION] MEDIA CUT COSTS AT THE COMPUTER CENTER 5.7

EDUCOM
AN INTERUNIVERSITY INFORMATION NETWORK, I. [EDUCOM] 5.0
[EDUCOM]: INTERUNIVERSITY COMMUNICATIONS COUNCIL 1.1

EDUNET
[EDUNET] REPORT OF THE SUMMER STUDY ON INFORMATION NETWORKS 1.1

EFFECTIVENESS
STRATEGIES FOR MAXIMUM COST [EFFECTIVENESS] OF A SWITCHED NETWORK 3.2.2

EFFICIENCY
[EFFICIENCY] VS. RESPONSIVENESS IN A MULTIPLE-SERVICES COMPUTER FACILITY 2.9

EFFICIENT
[EFFICIENT] ALLOCATION OF RESOURCES IN CENTRALIZED COMPUTER-COMMUNICATION NETWORK DESIGN 2.1.2
CONFIGURATION OF AN [EFFICIENT] DATA COMMUNICATION SYSTEM 3.2.2

ENGINEERING
ON DISTRIBUTED COMMUNICATIONS: VII. TENTATIVE [ENGINEERING] SPECIFICATIONS AND PRELIMINARY DESIGN FOR A HIGH-DATA-RATE DISTRIBUTED NETWORK SWITCHING NODE 3.3.2
AN [ENGINEERING] VIEW OF THE LRL OCTOPUS COMPUTER NETWORK 3.1.1

ENVIRONMENT
EXPLOITING THE TIME-SHARING [ENVIRONMENT] 3.1.2
CHARACTERISTICS OF DATABASE SYSTEMS IN A COMPUTER NETWORK [ENVIRONMENT] 2.9

ERROR
[ERROR] CONTROL FOR DIGITAL DATA TRANSMISSION OVER TELEPHONE NETWORKS 3.2.1

ERROR-CORRECTING
AN [ERROR-CORRECTING] DATA LINK BETWEEN SMALL AND LARGE COMPUTERS 3.2.1

EUROPE
DATA COMMUNICATION IN SWEDEN--AND SOME ASPECTS OF THE SITUATION IN [EUROPE] 1.3
ON THE DEVELOPMENT OF COMPUTER AND DATA NETWORKS IN [EUROPE] 1.2
SUMMARY OF THE EXISTING DATA COMMUNICATIONS SERVICES IN WESTERN [EUROPE] AND TENTATIVE FORECAST OF NEW SERVICES FOR THE NEXT DECADE 1.6

EUROPEAN
THE [EUROPEAN] COMPUTER NETWORK PROJECT 3.1.0

EVALUATION
AN INTERUNIVERSITY INFORMATION NETWORK, II. [EVALUATION] 1.1
[EVALUATION] OF AN INTERACTIVE-BATCH SYSTEM NETWORK 3.1.2
FACTORS FOR [EVALUATION] OF INTEGRATED ON-LINE INFORMATION SYSTEMS 5.0
[EVALUATION] OF THE NETWORK FEATURES REQUIRED TO ATTAIN THE APPROVED NMCS OBJECTIVES 1.1

EVALUATION (CONTINUED)

NETWORK OF COMPUTERS. SESSION II. DEFINITION, MODELING AND [EVALUATION]--SESSION SUMMARY 1.0

EXCHANGE
A RECOMMENDED RESEARCH AND DEVELOPMENT PLAN FOR DATA [EXCHANGE] IN THE WORLD WIDE MILITARY COMMAND AND CONTROL SYSTEM 4.9
IMPLEMENTATION OF INTERNATIONAL DATA [EXCHANGE] NETWORKS 3.2.1

EXPERIENCE
[EXPERIENCE] WITH THE USE OF THE R.S. INTERFACE IN COMPUTER PERIPHERALS AND COMMUNICATION SYSTEMS 3.3.1
COMPUTER COMMUNICATION NETWORK DESIGN--[EXPERIENCE] WITH THEORY AND PRACTICE 3.0

EXPERIMENT
THE DATA RECONFIGURATION SERVICE--AN [EXPERIMENT] IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION 3.4
THE DATA RECONFIGURATION SERVICE--AN [EXPERIMENT] IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION 4.1

EXPERIMENTAL
AN [EXPERIMENTAL] COMPUTER NETWORK 3.1.0
THE APPROACH OF SOFTWARE PROBLEMS IN THE SDC [EXPERIMENTAL] COMPUTER NETWORK 3.4

EXPERIMENTATION
[EXPERIMENTATION] ON THE ARPA COMPUTER NETWORK 4.9
ARPA NETWORK [EXPERIMENTATION] USING EXISTING DATA MANAGEMENT SYSTEMS 4.9

EXPERIMENTS
COMPUTER NETWORK MEASUREMENTS: TECHNIQUES AND [EXPERIMENTS] 2.2

EXPERT
COMPUTER-ASSISTED [EXPERT] INTERROGATION: A REPORT ON CURRENT METHODS DEVELOPMENT 4.1

EXPLOITING
[EXPLOITING] THE TIME-SHARING ENVIRONMENT 3.1.2

EXPLORATORY
[EXPLORATORY] RESEARCH ON NETTING IN IBM 3.0

EXTENDED
BROOKNET--AN [EXTENDED] CORE STORAGE ORIENTED NETWORK OF COMPUTERS AT BROOKHAVEN NATIONAL LABORATORY 3.1.0

EXTENSIONS
[EXTENSIONS] OF PACKET COMMUNICATION TECHNOLOGY TO A HAND HELD PERSONAL TERMINAL 3.3.9

FACILITIES
PLANNING A DATA COMMUNICATIONS SYSTEM, PART 2: COMMON CARRIER [FACILITIES] 3.2.0
SOME WAYS OF PROVIDING COMMUNICATION [FACILITIES] FOR TIME-SHARED COMPUTING 3.0
PLANNING A DATA COMMUNICATIONS SYSTEM, PART 2: COMMON CARRIER [FACILITIES] (CONTINUED) 3.2.0

FACILITY
THE MULTICS INTERPROCESS COMMUNICATION [FACILITY] 3.4
EFFICIENCY VS. RESPONSIVENESS IN A MULTIPLE-SERVICES COMPUTER [FACILITY] 2.9

FBI'S
THE [FBI'S] COMPUTER NETWORK 4.2

FEDERAL
THE ROLE OF THE [FEDERAL] COMMUNICATIONS COMMISSION 5.4

FILE
OPTIMAL [FILE] ALLOCATION IN A MULTIPLE COMPUTER SYSTEM 2.1.2
A STUDY OF OPTIMAL [FILE] ASSIGNMENT AND COMMUNICATION NETWORK CONFIGURATION IN REMOTE-ACCESS COMPUTER MESSAGE PROCESSING AND COMMUNICATION SYSTEMS 2.9
ACCESS CONTROL AND [FILE] DIRECTORIES IN COMPUTER NETWORKS 4.1
ALLOCATION OF COPIES OF A [FILE] IN AN INFORMATION NETWORK 2.1.2
THE STRUCTURE OF A DISTRIBUTED COMPUTING SYSTEM--THE DISTRIBUTED [FILE] SYSTEM 4.1
THE STRUCTURE OF A DISTRIBUTED COMPUTER SYSTEM--THE DISTRIBUTED [FILE] SYSTEM 3.1.1

FINANCIAL
ORGANIZATIONAL, [FINANCIAL], AND POLITICAL ASPECTS OF A THREE-UNIVERSITY COMPUTING CENTER 5.0

FINGER
THE [FINGER] LAKES REGIONAL COMPUTING ORGANIZATION: CREATING A REGIONAL, ACADEMIC COMPUTING NETWORK 3.1.2

FINITE
ROUND ROBIN SCHEDULING IN A COMPUTER COMMUNICATIONS SYSTEM WITH [FINITE] SWAP TIME AND STATISTICALLY MULTIPLEXED ARRIVALS 2.1.2

FISCAL
IDEEA NETWORK IMPLEMENTATION [FISCAL] YEAR 1965 4.2

FLEXIBLE
[FLEXIBLE] PRICING: AN APPROACH TO THE ALLOCATION OF COMPUTER RESOURCES 5.3

FLOW
[FLOW] CONTROL IN A RESOURCE-SHARING COMPUTER NETWORK 3.4

FORECAST
SUMMARY OF THE EXISTING DATA COMMUNICATIONS SERVICES IN WESTERN EUROPE AND TENTATIVE [FORECAST] OF NEW SERVICES FOR THE NEXT DECADE 1.6

FORMAT
MESSAGE [FORMAT] PRINCIPLES 3.5

FORMATS
STANDARDS FOR USER PROCEDURES AND DATA [FORMATS] IN AUTOMATED INFORMATION SYSTEMS AND NETWORKS 5.5

FORWARD
RESEARCH IN STORE AND [FORWARD] COMPUTER NETWORKS 2.1

FUNCTIONS
THE CONTROL [FUNCTIONS] IN A LOCAL DATA NETWORK 3.4

FUNCTION-ORIENTED
[FUNCTION-ORIENTED] PROTOCOLS FOR THE ARPA COMPUTER NETWORK 3.5

FUTURE
TELEPROCESSING AND DATA COMMUNICATION OF THE [FUTURE] 1.6
REMOTE COMPUTING IN HIGHER EDUCATION: PROSPECTS FOR THE [FUTURE] 1.1
COMPUTER COMMUNICATIONS: THE [FUTURE] 1.6
COMPUTER TECHNOLOGY AND LIBRARIES OF THE [FUTURE] 4.2
ALTERNATIVE [FUTURE] COMPUTER-COMMUNICATION MARKETS 5.4
CURRENT AND NEAR [FUTURE] DATA TRANSMISSION VIA SATELLITES OF THE INTELSAT NETWORK 3.2.1
THE PROBABLE [FUTURE] OF CANADIAN LONG HAUL DIGITAL DATA NETWORK CONNECTIONS WITH THE U.S.A. 3.1.1
THE [FUTURE] OF COMPUTER UTILITIES 4.3
THE [FUTURE] OF THE SWITCHING COMPUTER 1.9
COMMON CARRIER APPROACH TO DIGITAL DATA TRANSMISSION: TERMINALS, TRANSMISSION EQUIPMENT AND [FUTURE] PLANS FOR THE COMPUTER UTILITY 1.2

GENERAL
[GENERAL] PURPOSE NETWORKS OF COMPUTERS 1.2

GENERALIZED
DESIGN SPECIFICATIONS FOR A [GENERALIZED] TELEPROCESSING SYSTEM 3.4

GERMAN
THE [GERMAN] FDS NETWORK 3.1.D

GRAFTED
A [GRAFTED] MULTI-ACCESS NETWORK 3.0

GRAPHICS
COMPUTER [GRAPHICS] COMMUNICATION SYSTEMS 1.2
ARPA NETWORK SERIES: I. INTRODUCTION TO THE ARPA NETWORK AT RAND AND TO THE RAND VIDEO [GRAPHICS] SYSTEM 3.1.D

HAND
EXTENSIONS OF PACKET COMMUNICATION TECHNOLOGY TO A [HAND] HELD PERSONAL TERMINAL 3.3.9

HARDWARE
MERIT COMPUTER NETWORK: [HARDWARE] CONSIDERATIONS 3.1.1
THE COMMUNICATIONS COMPUTER [HARDWARE] OF THE MERIT COMPUTER NETWORK 3.3.2
A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--OBJECTIVES AND [HARDWARE] ORGANIZATION 3.1.1

HEALTH
[HEALTH] CARE COMMUNICATION SYSTEMS 4.2
COMPUTERS, COMMUNICATIONS, AND DISTRIBUTED [HEALTH] CARE SYSTEMS 1.1

HETEROGENEOUS
ON THE STRUCTURE OF A [HETEROGENEOUS] COMPUTING SYSTEM, CONTROLLED BY A LARGE DIGITAL COMPUTER 3.0

HIGHER
REMOTE COMPUTING IN [HIGHER] EDUCATION: PROSPECTS FOR THE FUTURE 1.1

HIGH-DATA-RATE
ON DISTRIBUTED COMMUNICATIONS: VII. TENTATIVE ENGINEERING SPECIFICATIONS AND PRELIMINARY DESIGN FOR A [HIGH-DATA-RATE] DISTRIBUTED NETWORK SWITCHING NODE 3.3.2

HISTORY
ON DISTRIBUTED COMMUNICATIONS: V. [HISTORY], ALTERNATIVE APPROACHES, AND COMPARISONS 2.1.3

HOME
THE WIRED CITY: SERVICES FOR [HOME] DELIVERY VIA INTERACTIVE CABLE TV 4.3

HOST-HOST
[HOST-HOST] COMMUNICATION PROTOCOL IN THE ARPA NETWORK 3.5

HOT-POTATO
ON DISTRIBUTED COMMUNICATIONS: II. DIGITAL SIMULATION OF [HOT-POTATO] ROUTING IN A BROADBAND DISTRIBUTED COMMUNICATIONS NETWORK 2.1.1

HUMANISTIC
RESPONSIBILITY FOR THE [HUMANISTIC] USE OF THE INFORMATION REVOLUTION: WHERE WILL THE BATTLE BE FOUGHT? 1.5

IBM
EXPLORATORY RESEARCH ON NETTING IN [IBM] 3.0
DISTRIBUTED NETWORK ACTIVITY AT [IBM] 3.1.D
[IBM] COMPUTER NETWORK/440 3.1.0
NETWORK/440--[IBM] RESEARCH COMPUTER SCIENCES DEPARTMENT COMPUTER NETWORK 3.1.0

IDEEA
[IDEEA] NETWORK IMPLEMENTATION FISCAL YEAR 1965 4.2

IDENTIFYING
[IDENTIFYING] TERMINALS IN TERMINAL-ORIENTED SYSTEMS 3.2.2

IMP
THE TERMINAL [IMP] FOR THE ARPA COMPUTER NETWORK 3.3.2

IMPACT
POTENTIAL [IMPACT] OF USER/AUTHOR RELATIONSHIPS ON PUBLIC DATA NETWORK DESIGN 5.3
INTERCONNECTION: [IMPACT] ON COMPETITION-CARRIERS AND REGULATION 5.4
ASCII EXTENSION AND EXPANSION AND THEIR [IMPACT] ON DATA COMMUNICATIONS 5.5

IMPLEMENTATION
IDEEA NETWORK [IMPLEMENTATION] FISCAL YEAR 1965 4.2
OPERATIONAL CONSIDERATIONS FOR THE [IMPLEMENTATION] OF COMPUTER NETWORKS IN THE NMCSSC 1.2
[IMPLEMENTATION] OF INTERNATIONAL DATA EXCHANGE NETWORKS 3.2.1
PROPOSED [IMPLEMENTATION] PLAN FOR A WWMCCS INTERCOMPUTER NETWORK 3.1.1

IMPLICATIONS
THE [IMPLICATIONS] OF ADP NETWORKING STANDARDS FOR OPERATIONS RESEARCH 1.1
SOME [IMPLICATIONS] OF NEW COMMUNICATIONS TECHNOLOGIES FOR NATIONAL SECURITY IN THE 1970S 5.4

IMPROVEMENTS
[IMPROVEMENTS] IN THE DESIGN AND PERFORMANCE OF THE ARPA NETWORK 3.1.2
DATA TRAFFIC MEASUREMENTS GUIDE [IMPROVEMENTS] TO RESOURCE-SHARING NETWORK 2.2

INDEPENDENT
A TIME SHARED SYSTEM FOR MULTIPLE [INDEPENDENT] LABORATORIES 3.0
THE WIRED CITY: THE ROLE OF AN [INDEPENDENT] TELEPHONE COMPANY 4.3

INDIANA
THE [INDIANA] REGIONAL COMPUTING NETWORK 3.1.2

INDUSTRY
THE MARKET FOR A COMPUTER UTILITY [INDUSTRY] 5.2
SERIOUS COMPATIBILITY PROBLEMS IN COMPUTER NETWORKING CHALLENGE NBS, [INDUSTRY] 5.5

INFORMATION
THE CLASSROOM [INFORMATION] AND COMPUTING SERVICE 4.3
A TELEPHONE-ACCESS BIOMEDICAL [INFORMATION] CENTER 5.3
NETWORK [INFORMATION] CENTER AND COMPUTER AUGMENTED TEAM INTERACTION 4.1
A STUDY OF [INFORMATION] IN MULTIPLE-COMPUTER AND MULTIPLE-CONSOLE DATA PROCESSING SYSTEMS 2.1.2
[INFORMATION] INTERCHANGE BETWEEN DISSIMILAR SYSTEMS 4.1
STATE INTEGRATED [INFORMATION] NET (SIINET), A CONCEPT 3.1.0
THE MATERIALS [INFORMATION] NETWORK 4.0
ALLOCATION OF COPIES OF A FILE IN AN [INFORMATION] NETWORK 2.1.2
COPYRIGHT ASPECTS OF CATV AS UTILIZED IN [INFORMATION] NETWORKING 4.3
[INFORMATION] NETWORKS I.2
[INFORMATION] NETWORKS 1.2
EDUNET REPORT OF THE SUMMER STUDY ON [INFORMATION] NETWORKS 1.1
THE USE OF DISTRIBUTED DATA BASES IN [INFORMATION] NETWORKS 4.1
NATIONAL AND INTERNATIONAL [INFORMATION] NETWORKS IN SCIENCE AND TECHNOLOGY I.0
AN INTERUNIVERSITY [INFORMATION] NETWORK. II. EVALUATION 1.1
AN INTERUNIVERSITY [INFORMATION] NETWORK. I. EDUCOM 5.D
COMMERCIAL [INFORMATION] PROCESSING NETWORKS--PROSPECTS AND PROBLEMS IN PERSPECTIVE 1.0
RESPONSIBILITY FOR THE HUMANISTIC USE OF THE [INFORMATION] REVOLUTION: WHERE WILL THE BATTLE BE FOUGHT? I.5
[INFORMATION] SYSTEM NETWORKS--LET'S PROFIT FROM WHAT WE KNOW I.2
FACTORS FOR EVALUATION OF INTEGRATED ON-LINE [INFORMATION] SYSTEMS 5.0

INFORMATION (CONTINUED)

STANDARDS FOR USER PROCEDURES AND DATA FORMATS IN AUTOMATED [INFORMATION] SYSTEMS AND NETWORKS 5.5
TELECOMMUNICATION NETWORKS FOR LIBRARIES AND [INFORMATION] SYSTEMS: APPROACHES TO DEVELOPMENT 4.2
TIME-SHARED [INFORMATION] SYSTEMS: MARKET ENTRY IN SEARCH OF A POLICY 5.4

INQUIRY
BEYOND THE COMPUTER [INQUIRY] (WHO SHOULD BE REGULATED IN COMPUTER/COMMUNICATIONS) 5.4

INSTITUTIONAL
PLANNING OF DATA COMMUNICATIONS NETWORKS--ECONOMIC, TECHNOLOGICAL AND [INSTITUTIONAL] ISSUES 5.4

INTEGRATED
THE [INTEGRATED] COMPUTER NETWORK SYSTEM 3.1.0
STATE [INTEGRATED] INFORMATION NET (SIINET), A CONCEPT 3.1.0
MAC [INTEGRATED] MANAGEMENT SYSTEM (MACIMS) 3.1.0
FACTORS FOR EVALUATION OF [INTEGRATED] ON-LINE INFORMATION SYSTEMS 5.0

INTELLECTUAL
THE ON-LINE [INTELLECTUAL] COMMUNITY 4.2

INTELLIGENCE
DISTRIBUTED [INTELLIGENCE] IN DATA COMMUNICATIONS NETWORKS 3.3.2

INTELSAT
CURRENT AND NEAR FUTURE DATA TRANSMISSION VIA SATELLITES OF THE [INTELSAT] NETWORK 3.2.1

INTERACTION
NETWORK INFORMATION CENTER AND COMPUTER AUGMENTED TEAM [INTERACTION] 4.1

INTERACTIVE
THE WIRED CITY: SERVICES FOR HOME DELIVERY VIA [INTERACTIVE] CABLE TV 4.3
AN [INTERACTIVE] NETWORK OF TIME-SHARING COMPUTERS 3.1.0

INTERACTIVE-BATCH
EVALUATION OF AN [INTERACTIVE-BATCH] SYSTEM NETWORK 3.1.2

INTERCHANGE
INFORMATION [INTERCHANGE] BETWEEN DISSIMILAR SYSTEMS 4.1

INTERCITY
THE PROMISE AND PERIL OF COMPETITION IN [INTERCITY] COMMUNICATIONS 5.4

INTERCOMPUTER
MULTIPLE COMPUTER NETWORKS AND [INTERCOMPUTER] COMMUNICATION 1.1
CONCEPTS FOR A WWMCCS [INTERCOMPUTER] NETWORK 1.1
PROJECTED RESPONSE CHARACTERISTICS OF THE WWMCCS [INTERCOMPUTER] NETWORK 2.1.2
PROPOSED IMPLEMENTATION PLAN FOR A WWMCCS [INTERCOMPUTER] NETWORK 3.1.1
PROTOTYPE WWMCCS [INTERCOMPUTER] NETWORK (RWIN) DEVELOPMENT PLAN 3.1.1

INTERCONNECTION
STANDARDS AND [INTERCONNECTION] 5.5
[INTERCONNECTION]: IMPACT ON COMPETITION-CARRIERS AND REGULATION 5.4

INTERENTITY
[INTERENTITY] COMMUNICATION 3.0

INTERFACE
A COMMUNICATIONS [INTERFACE] FOR COMPUTER NETWORKS 3.5
A COMMUNICATIONS [INTERFACE] FOR COMPUTER NETWORKS 3.5
A COMPUTER NETWORK [INTERFACE] FOR OS/MVT 3.4
DESIGN CONSIDERATIONS FOR THE MENEHUNE-KAHUNA [INTERFACE] FOR THE ALOHA SYSTEM, A PRELIMINARY REPORT 3.3.1
EXPERIENCE WITH THE USE OF THE B.S. [INTERFACE] IN COMPUTER PERIPHERALS AND COMMUNICATION SYSTEMS 3.3.1
THE [INTERFACE] MESSAGE PROCESSOR FOR THE ARPA COMPUTER NETWORK 3.1.1
INITIAL DESIGN FOR [INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
[INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
[INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
[INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
[INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
[INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
[INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
[INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
[INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK, QUARTERLY TECHNICAL REPORT NO. 12 3.1.1
[INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
[INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
[INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
[INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
[INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
[INTERFACE] MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1

INTERFACING
COMPATIBILITY PROBLEMS OF NETWORK [INTERFACING] 5.5

INTERFERENCE
SIMULATION OF [INTERFERENCE] OF PACKETS IN THE ALOHA TIME-SHARING SYSTEM 2.1.1

INTERNATIONAL
IMPLEMENTATION OF [INTERNATIONAL] DATA EXCHANGE NETWORKS 3.2.1
NATIONAL AND [INTERNATIONAL] INFORMATION NETWORKS IN SCIENCE AND TECHNOLOGY 1.0

INTERPROCESS
THE MULTICS [INTERPROCESS] COMMUNICATION FACILITY 3.4
A SYSTEM FOR [INTERPROCESS] COMMUNICATION IN A RESOURCE SHARING COMPUTER NETWORK 3.5

INTERROGATION
COMPUTER-ASSISTED EXPERT [INTERROGATION]: A REPORT ON CURRENT METHODS DEVELOPMENT 4.1

INTERUNIVERSITY
EDUCOM: [INTERUNIVERSITY] COMMUNICATIONS COUNCIL 1.1
AN [INTERUNIVERSITY] INFORMATION NETWORK, II. EVALUATION 1.1
AN [INTERUNIVERSITY] INFORMATION NETWORK, I. EDUCOM 5.0

INTER-COMPUTER
PROCEDURES AND STANDARDS FOR [INTER-COMPUTER] COMMUNICATIONS 3.5

INTRODUCTION
COMMUNICATION CONTROL BY COMPUTER--AN [INTRODUCTION] 1.3
NETWORKS: AN [INTRODUCTION] 1.2
EASING THE [INTRODUCTION] OF A PACKET SWITCHING SERVICE 3.3.1
ON DISTRIBUTED COMMUNICATIONS: I. [INTRODUCTION] TO DISTRIBUTED COMMUNICATIONS NETWORKS 1.0
ARPA NETWORK SERIES: I. [INTRODUCTION] TO THE ARPA NETWORK AT RAND AND TO THE RAND VIDEO GRAPHICS SYSTEM 3.1.0
AN [INTRODUCTION] TO THE USE OF DATA COMMUNICATIONS IN THE UNITED KINGDOM 3.2.0

INVESTIGATION
[INVESTIGATION] OF PROPAGATION-LIMITED COMPUTER NETWORKS 2.1.2

ISSUE
THE CENTRALIZATION VS. DECENTRALIZATION [ISSUE]: ARGUMENTS, ALTERNATIVES, AND GUIDELINES 5.1

ISSUES
PLANNING OF DATA COMMUNICATIONS NETWORKS--ECONOMIC, TECHNOLOGICAL AND INSTITUTIONAL [ISSUES] 5.4
VIEWS ON [ISSUES] RELEVANT TO DATA SHARING ON COMPUTER NETWORKS 4.1

JAPAN
DATA COMMUNICATION IN [JAPAN] 1.2
COMPETITION IN THE FIELDS OF COMPUTERS AND COMMUNICATIONS IN [JAPAN] 5.4

KEIKI
MULTIPLEXING IN THE ALOHA SYSTEM: MENEHUNE - [KEIKI] DESIGN CONSIDERATIONS 3.3.2

KINGDOM
AN INTRODUCTION TO THE USE OF DATA COMMUNICATIONS IN THE UNITED [KINGDOM] 3.2.0

LABORATORIES
A TIME SHARED SYSTEM FOR MULTIPLE INDEPENDENT [LABORATORIES] 3.0

LABORATORY
BROOKNET--AN EXTENDED CORE STORAGE ORIENTED NETWORK OF COMPUTERS AT BROOKHAVEN NATIONAL [LABORATORY] 3.1.0
OCTOPUS: THE LAWRENCE RADIATION [LABORATORY] NETWORK 3.1.0
THE LAWRENCE RADIATION [LABORATORY] OCTOPUS 3.1.0
LAWRENCE RADIATION [LABORATORY] OCTOPUS SYSTEM 3.1.0

LAISSEZ-FAIRE
THE COMING COMPUTER UTILITY--[LAISSEZ-FAIRE], LICENSING OR REGULATION? 5.4

LAKES
THE FINGER [LAKES] REGIONAL COMPUTING ORGANIZATION: CREATING A REGIONAL, ACADEMIC COMPUTING NETWORK 3.1.2

LANGUAGE
DATA DESCRIPTIVE [LANGUAGE] FOR SHARED DATA 4.3
[LANGUAGE] RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR COMPUTATIONAL RESEARCH ON LANGUAGE (CE-NCOREL) 4.2
LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR COMPUTATIONAL RESEARCH ON [LANGUAGE] (CE-NCOREL) 4.2

LANGUAGES
COMPUTER [LANGUAGES] FOR THE COMPUTER UTILITY 3.4

LARGE
A MODEL WHICH AIDS IN THE DESIGN OF CENTRAL STATIONS FOR [LARGE] COMPUTER NETWORKS 2.9
ACCESS TO [LARGE] COMPUTER SYSTEMS 5.4
AN ERROR-CORRECTING DATA LINK BETWEEN SMALL AND [LARGE] COMPUTERS 3.2.1
THE USE OF A SMALL COMPUTER AS A TERMINAL CONTROLLER FOR A [LARGE] COMPUTING SYSTEM 3.3.2
ON THE STRUCTURE OF A HETEROGENEOUS COMPUTING SYSTEM, CONTROLLED BY A [LARGE] DIGITAL COMPUTER 3.0
NODAL BLOCKING IN [LARGE] NETWORKS 2.1.2
NODAL BLOCKING IN [LARGE] NETWORKS 2.1.2
MULTICOMPUTER PROGRAMMING FOR A [LARGE] SCALE REAL-TIME DATA PROCESSING SYSTEM 3.4
MESSAGE ROUTE CONTROL IN A [LARGE] TELETYPE NETWORK 2.1.3

LAWRENCE
OCTOPUS: THE [LAWRENCE] RADIATION LABORATORY NETWORK 3.1.0
THE [LAWRENCE] RADIATION LABORATORY OCTOPUS 3.1.0
[LAWRENCE] RADIATION LABORATORY OCTOPUS SYSTEM 3.1.0

LEASED
OPTIMAL ALLOCATION OF [LEASED] COMMUNICATION LINES 2.1.2

LEGAL
SOME [LEGAL] AND REGULATORY PROBLEMS OF MULTIPLE ACCESS COMPUTER NETWORKS 5.4

LIBRARIES
TELECOMMUNICATION NETWORKS FOR [LIBRARIES] AND INFORMATION SYSTEMS: APPROACHES TO DEVELOPMENT 4.2
COMPUTER TECHNOLOGY AND [LIBRARIES] OF THE FUTURE 4.2

LIBRARY
A REGIONAL NETWORK--OHIO COLLEGE [LIBRARY] CENTER 4.2

LICENSING
THE COMING COMPUTER UTILITY--LAISSEZ-FAIRE, [LICENSING] OR REGULATION? 5.4

LINE
POLLING IN A MULTIDROP COMMUNICATION SYSTEM: WAITING [LINE] ANALYSIS 2.1.2

LINES
OPTIMAL ALLOCATION OF LEASED COMMUNICATION [LINES] 2.1.2

LINK
AN ERROR-CORRECTING DATA [LINK] BETWEEN SMALL AND LARGE COMPUTERS 3.2.1

LINKING
PARTICIPATING DEMONSTRATIONS OF A MULTI-PURPOSE NETWORK [LINKING] DISSIMILAR COMPUTERS AND TERMINALS 1.6

LINKS
OPTICAL [LINKS] FOR COMMUNICATIONS IN LOCAL DISTRIBUTION 3.2.1
STUDY OF COMMUNICATION [LINKS] FOR THE BIOMEDICAL COMMUNICATIONS NETWORK 3.2.1

LOAD
SYSTEM [LOAD] SHARING STUDY 1.2

LOCAL
A MODEL FOR THE [LOCAL] AREA OF A DATA COMMUNICATION NETWORK--SOFTWARE ORGANIZATION 3.1.1
A MODEL FOR THE [LOCAL] AREA OF A DATA COMMUNICATION NETWORK--OBJECTIVES AND HARDWARE ORGANIZATION 3.1.1
TRANSMISSION CONTROL IN A [LOCAL] DATA NETWORK 3.0
THE CONTROL FUNCTIONS IN A [LOCAL] DATA NETWORK 3.4
OPTICAL LINKS FOR COMMUNICATIONS IN [LOCAL] DISTRIBUTION 3.2.1

LOCATION
OPTIMUM CONCENTRATOR [LOCATION] IN TELECOMMUNICATIONS DESIGN 2.1.2

LOGICAL
CONTROL CONCEPTS OF A [LOGICAL] NETWORK MACHINE 3.0

LONG
THE PROBABLE FUTURE OF CANADIAN [LONG] HAUL DIGITAL DATA NETWORK CONNECTIONS WITH THE U.S.A. 3.1.1

LOOP
ANALYSIS OF [LOOP] TRANSMISSION SYSTEMS 2.1.2

LOOPS
NEWHALL [LOOPS] AND PROGRAMMABLE TDM TWO FACETS OF CANADIAN RESEARCH IN COMPUTER COMMUNICATIONS 3.2.9

LRL
AN ENGINEERING VIEW OF THE [LRL] OCTOPUS COMPUTER NETWORK 3.1.1

MAC
[MAC] INTEGRATED MANAGEMENT SYSTEM (MACIMS) 3.1.0

MACHINE
CONTROL CONCEPTS OF A LOGICAL NETWORK [MACHINE] 3.0

MACIMS
MAC INTEGRATED MANAGEMENT SYSTEM ([MACIMS]) 3.1.0
[MACIMS] COMMUNICATION NETWORK CONFIGURATION 3.2.2

MAD
THE [MAD] MAD WORLD OF DATA COMMUNICATIONS 1.9
THE MAD [MAD] WORLD OF DATA COMMUNICATIONS 1.9

MANAGEMENT
MINI-TUTORIAL ON TELECOMMUNICATIONS [MANAGEMENT] AND POLICY 5.4
MAC INTEGRATED [MANAGEMENT] SYSTEM (MACIMS) 3.1.0
ARPA NETWORK EXPERIMENTATION USING EXISTING DATA [MANAGEMENT] SYSTEMS 4.9

MANAGEMENT'S
[MANAGEMENT'S] ROLE IN NETWORKING 5.0

MAN-COMPUTER
RESPONSE TIME IN [MAN-COMPUTER] CONVERSATIONAL TRANSACTIONS 2.3

MAN-MACHINE
[MAN-MACHINE] COMMUNICATION 1.2

MARKET
TIME-SHARED INFORMATION SYSTEMS: [MARKET] ENTRY IN SEARCH OF A POLICY 5.4
THE [MARKET] FOR A COMPUTER UTILITY INDUSTRY 5.2
THE DATA COMMUNICATIONS [MARKET] IN THE UNITED STATES 5.2

MARKETPLACE
THE COMPUTER NETWORK AS A [MARKETPLACE] 5.3

MARKETS
ALTERNATIVE FUTURE COMPUTER-COMMUNICATION [MARKETS] 5.4

MASS
THE TABLON [MASS] STORAGE NETWORK 3.3.9

MATERIALS
THE [MATERIALS] INFORMATION NETWORK 4.0

MATHEMATICAL
[MATHEMATICAL] THEORY OF CONNECTING NETWORKS AND TELEPHONE TRAFFIC 2.1

MAXIMUM
STRATEGIES FOR [MAXIMUM] COST EFFECTIVENESS OF A SWITCHED NETWORK 3.2.2

MCROSS
[MCROSS]--A MULTI-COMPUTER PROGRAMMING SYSTEM 4.2

MEASUREMENT
PROBLEMS OF NETWORK ACCOUNTING, MONITORING AND PERFORMANCE [MEASUREMENT] 5.3

MEASUREMENTS
COMPUTER NETWORK [MEASUREMENTS]: TECHNIQUES AND EXPERIMENTS 2.2
DATA TRAFFIC [MEASUREMENTS] GUIDE IMPROVEMENTS TO RESOURCE-SHARING NETWORK 2.2
PERFORMANCE [MEASUREMENTS] ON THE ARPA COMPUTER NETWORK 2.2.

MEDIA
MODERN EDUCATION [MEDIA] CUT COSTS AT THE COMPUTER CENTER 5.7

MEDICAL
[MEDICAL] NETWORK 4.2

MENEHUNE
MULTIPLEXING IN THE ALOHA SYSTEM: [MENEHUNE] - KEIKI DESIGN CONSIDERATIONS 3.3.2

MENEHUNE-KAHUNA
DESIGN CONSIDERATIONS FOR THE [MENEHUNE-KAHUNA] INTERFACE FOR THE ALOHA SYSTEM, A PRELIMINARY REPORT 3.3.1

MERIT
[MERIT] COMPUTER NETWORK 3.1.0
THE COMMUNICATIONS COMPUTER HARDWARE OF THE [MERIT] COMPUTER NETWORK 3.3.2
[MERIT] COMPUTER NETWORK: HARDWARE CONSIDERATIONS 3.1.1
[MERIT] COMPUTER NETWORK: SOFTWARE CONSIDERATIONS 3.1.1
THE [MERIT] COMPUTER NETWORK, PROGRESS REPORT FOR THE PERIOD JULY 1969-MARCH 1971 3.1.0
DEVELOPMENT OF APPLICATIONS FOR THE [MERIT] COMPUTING NETWORK 4.0
THE [MERIT] OF REGIONAL COMPUTING NETWORKS 1.1
PROGRESS ON APPLICATIONS DEVELORMENT, 1970-71. A REPORT OF THE ASSOCIATE DIRECTORS OF [MERIT] PROJECT 4.0
[MERIT] PROPOSAL SUMMARY 3.1.0

MESSAGE
COMPUTATION OF [MESSAGE] DELAYS IN A COMMUNICATIONS NETWORK 2.1.2
[MESSAGE] FORMAT PRINCIPLES 3.5
A STUDY OF OPTIMAL FILE ASSIGNMENT AND COMMUNICATION NETWORK CONFIGURATION IN REMOTE-ACCESS COMPUTER [MESSAGE] PROCESSING AND COMMUNICATION SYSTEMS 2.9
THE INTERFACE [MESSAGE] PROCESSOR FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
INITIAL DESIGN FOR INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK, QUARTERLY TECHNICAL REPORT NO. 12 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE [MESSAGE] PROCESSORS FOR THE ARPA COMPUTER NETWORK 3.1.1
[MESSAGE] ROUTE CONTROL IN A LARGE TELETYPE NETWORK 2.1.3
THE DESIGN OF A [MESSAGE] SWITCHING CENTRE FOR A DIGITAL COMMUNICATION NETWORK 3.1.1
THE USE OF COMPUTERS IN [MESSAGE] SWITCHING NETWORKS 1.3
DEFINE YOUR [MESSAGE] SWITCHING SOFTWARE NEEDS BEFORE YOU BUY 3.4
A MULTIPLE MINICOMPUTER [MESSAGE] SWITCHING SYSTEM 3.3.2
ELEMENTARY TELEPHONE SWITCHING THEORY APPLIED TO THE DESIGN OF [MESSAGE] SWITCHING SYSTEMS 3.2.1

MESSAGE-SWITCHING
SPECIFYING A [MESSAGE-SWITCHING] COMPUTER 3.3.2

MILITARY
A RECOMMENDED RESEARCH AND DEVELOPMENT PLAN FOR DATA EXCHANGE IN THE WORLD WIDE [MILITARY] COMMAND AND CONTROL SYSTEM 4.9
PROPOSAL FOR THE DEVELOPMENT OF A SECURE PILOT NETWORK FOR THE WORLD-WIDE [MILITARY] COMMAND AND CONTROL SYSTEM (WWMCCS) BASED ON THE ARPA COMPUTER NETWORK TECHNOLOGY 3.1.0

MINICOMPUTER
THE COMMUNICATIONS [MINICOMPUTER] 3.2.3
COMMUNICATIONS AND THE [MINICOMPUTER] 1.3
SOFTWARE DISPERSION: THE [MINICOMPUTER] IN DATA COMMUNICATIONS 3.3.2
A MULTIPLE [MINICOMPUTER] MESSAGE SWITCHING SYSTEM 3.3.2

MINI-TUTORIAL
[MINI-TUTORIAL] ON TELECOMMUNICATIONS MANAGEMENT AND POLICY 5.4

MIXED
[MIXED] COMPUTER NETWORKS: BENEFITS, PROBLEMS AND GUIDELINES 3.0

MODEL
A [MODEL] FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--SOFTWARE ORGANIZATION 3.1.1
A [MODEL] FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--OBJECTIVES AND HARDWARE ORGANIZATION 3.1.1
A [MODEL] WHICH AIDS IN THE DESIGN OF CENTRAL STATIONS FOR LARGE COMPUTER NETWORKS 2.9
A PREEMPTIVE PRIORITY [MODEL] WITH TWO CLASSES OF CUSTOMERS 2.1.2

MODELING
NETWORK OF COMPUTERS, SESSION II, DEFINITION, [MODELING] AND EVALUATION--SESSION SUMMARY 1.0

MODELS
[MODELS] FOR COMPUTER NETWORKS 1.3

MONITORING
PROBLEMS OF NETWORK ACCOUNTING, [MONITORING] AND PERFORMANCE MEASUREMENT 5.3

MULTIACCESS
A STUDY OF [MULTIACCESS] COMPUTER COMMUNICATIONS 2.1.2

MULTICOMPUTER
[MULTICOMPUTER] PROGRAMMING FOR A LARGE SCALE REAL-TIME DATA PROCESSING SYSTEM 3.4

MULTICS
THE [MULTICS] INTERPROCESS COMMUNICATION FACILITY 3.4

MULTIDROP
POLLING IN A [MULTIDROP] COMMUNICATION SYSTEM: WAITING LINE ANALYSIS 2.1.2

MULTIPLE
SOME LEGAL AND REGULATORY PROBLEMS OF [MULTIPLE] ACCESS COMPUTER NETWORKS 5.4
SYSTEM CONTROL IN [MULTIPLE] ACCESS COMPUTER NETWORKS 1.0
[MULTIPLE] ACCESS COMPUTER NETWORKS: THE ROLE OF THE COMMON CARRIER 5.4
[MULTIPLE] COMPUTER NETWORKS AND INTERCOMPUTER COMMUNICATION 1.1
OPTIMAL FILE ALLOCATION IN A [MULTIPLE] COMPUTER SYSTEM 2.1.2
A TIME SHARED SYSTEM FOR [MULTIPLE] INDEPENDENT LABORATORIES 3.0
A [MULTIPLE] MINICOMPUTER MESSAGE SWITCHING SYSTEM 3.3.2

MULTIPLEXED
ROUND ROBIN SCHEDULING IN A COMPUTER COMMUNICATIONS SYSTEM WITH FINITE SWAP TIME AND STATISTICALLY [MULTIPLEXED] ARRIVALSED ARRIVALS 2.1.2

MULTIPLEXING
A STUDY OF ASYNCHRONOUS TIME DIVISION [MULTIPLEXING] FOR TIME-SHARING COMPUTER SYSTEMS 3.2.1
[MULTIPLEXING] IN THE ALOHA SYSTEM: MENEHUNE - KEIKI DESIGN CONSIDERATIONS 3.3.2
ON DISTRIBUTED COMMUNICATIONS: VIII. THE [MULTIPLEXING] STATION 3.2.3

MULTIPLEXORS
DEMULTIPLEXING CONSIDERATIONS FOR STATISTICAL [MULTIPLEXORS] 3.2.9

MULTIPLE-COMPUTER
A STUDY OF INFORMATION IN [MULTIPLE-COMPUTER] AND MULTIPLE-CONSOLE DATA PROCESSING SYSTEMS 2.1.2

MULTIPLE-CONSOLE
A STUDY OF INFORMATION IN MULTIPLE-COMPUTER AND [MULTIPLE-CONSOLE] DATA PROCESSING SYSTEMS 2.1.2

MULTIPLE-SERVICES
EFFICIENCY VS. RESPONSIVENESS IN A [MULTIPLE-SERVICES] COMPUTER FACILITY 2.9

MULTIPLE-UNIVERSIT
THE RESPONSE-EFFICIENCY TRADE-OFF IN A [MULTIPLE-UNIVERSITY] SYSTEM 2.9

MULTI-ACCESS
[MULTI-ACCESS] COMPUTER NETWORKS 4.3
A GRAFTED [MULTI-ACCESS] NETWORK 3.0

MULTI-CAMPUS
THE DEVELOPMENT OF A [MULTI-CAMPUS] REGIONAL COMPUTING CENTER 3.1.0

MULTI-COMPUTER
MCROSS--A [MULTI-COMPUTER] PROGRAMMING SYSTEM 4.2

MULTI-PURPOSE
PARTICIPATING DEMONSTRATIONS OF A [MULTI-PURPOSE] NETWORK LINKING DISSIMILAR COMPUTERS AND TERMINALS 1.6

NATIONAL
[NATIONAL] AND INTERNATIONAL INFORMATION NETWORKS IN SCIENCE AND TECHNOLOGY 1.0
THE [NATIONAL] BIOMEDICAL COMMUNICATIONS NETWORK AS A DEVELOPING STRUCTURE 3.0
LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A [NATIONAL] CENTER OR NETWORK FOR COMPUTATIONAL RESEARCH ON LANGUAGE (CE-NCOREL) 4.2
BROOKNET--AN EXTENDED CORE STORAGE ORIENTED NETWORK OF COMPUTERS AT BROOKHAVEN [NATIONAL] LABORATORY 3.1.0
THE EMERGENCE OF [NATIONAL] NETWORKS REMOTE COMPUTING--YEAR VI 1.2
NSF ACTIVITIES RELATED TO A [NATIONAL] SCIENCE COMPUTER NETWORK 1.2
[NATIONAL] SCIENCE (COMPUTER) NETWORK 1.1
SOME IMPLICATIONS OF NEW COMMUNICATIONS TECHNOLOGIES FOR [NATIONAL] SECURITY IN THE 1970S 5.4
A PROPOSED COMPUTER NETWORK FOR THE AUSTRALIAN [NATIONAL] UNIVERSITY 3.1.0
AFOS: A PROGRAM FOR [NATIONAL] WEATHER SERVICE FIELD AUTOMATION 4.9

NATURAL
PROPOSAL FOR CONTINUATION OF RESEARCH ON [NATURAL] COMMUNICATION WITH COMPUTERS 4.9

NBS
SERIOUS COMPATIBILITY PROBLEMS IN COMPUTER NETWORKING CHALLENGE [NBS], INDUSTRY 5.5

NET
STATE INTEGRATED INFORMATION [NET] (SIINET), A CONCEPT 3.1.0

NETS
ALGORITHMS TO REALIZE DIRECTED COMMUNICATION [NETS] 2.1.2

NETTING
FINAL REPORT OF THE COMMITTEE ON [NETTING] COMPUTER SYSTEMS 1.0
EXPLORATORY RESEARCH ON [NETTING] IN IBM 3.0

NETWORKING
MANAGEMENT'S ROLE IN [NETWORKING] 5.0
COPYRIGHT ASPECTS OF CATV AS UTILIZED IN INFORMATION [NETWORKING] 4.3
EFFECTIVE CORPORATE [NETWORKING], ORGANIZATION, AND STANDARDIZATION 1.1
SERIOUS COMPATIBILITY PROBLEMS IN COMPUTER [NETWORKING] CHALLENGE NBS, INDUSTRY 5.5
THE IMPLICATIONS OF AOP [NETWORKING] STANDARDS FOR OPERATIONS RESEARCH 1.1

NETWORK/440
IBM COMPUTER [NETWORK/440] 3.1.0
A [NETWORK/440] PROTOCOL CONCEPT 3.5
[NETWORK/440]--IBM RESEARCH COMPUTER SCIENCES DEPARTMENT COMPUTER NETWORK 3.1.0

NEWHALL
[NEWHALL] LOOPS AND PROGRAMMABLE TDM TWO FACETS OF CANADIAN RESEARCH IN COMPUTER COMMUNICATIONS 3.2.9

NMCS
ANALYSIS OF NMCS PROBLEM AREAS RELATED TO COMPUTER NETWORKS AND PROPOSED [NMCS] NETWORK OBJECTIVES 1.1
EVALUATION OF THE NETWORK FEATURES REQUIRED TO ATTAIN THE APPROVED [NMCS] OBJECTIVES 1.1
ANALYSIS OF [NMCS] PROBLEM AREAS RELATED TO COMPUTER NETWORKS AND PROPOSED NMCS NETWORK OBJECTIVES 1.1

NMCSSC
OPERATIONAL CONSIDERATIONS FOR THE IMPLEMENTATION OF COMPUTER NETWORKS IN THE [NMCSSC] 1.2

NODAL
[NODAL] BLOCKING IN LARGE NETWORKS 2.1.2
[NODAL] BLOCKING IN LARGE NETWORKS 2.1.2

NODE
ON DISTRIBUTED COMMUNICATIONS: VII. TENTATIVE ENGINEERING SPECIFICATIONS AND PRELIMINARY DESIGN FOR A HIGH-DATA-RATE DISTRIBUTED NETWORK SWITCHING [NODE] 3.3.2

NON-FUNCTIONAL
DESIGN SPECIFICATIONS FOR PWIN [NON-FUNCTIONAL] NETWORK CONTROL SOFTWARE 3.4

NPL
THE [NPL] DATA NETWORK 3.1.0

NSF
[NSF] ACTIVITIES RELATED TO A NATIONAL SCIENCE COMPUTER NETWORK 1.2

OBJECTIVES
ANALYSIS OF NMCS PROBLEM AREAS RELATED TO COMPUTER NETWORKS AND PROPOSED NMCS NETWORK [OBJECTIVES] 1.1
EVALUATION OF THE NETWORK FEATURES REQUIRED TO ATTAIN THE APPROVED NMCS [OBJECTIVES] 1.1
A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--[OBJECTIVES] AND HARDWARE ORGANIZATION 3.1.1

OCTOPUS
THE LAWRENCE RADIATION LABORATORY [OCTOPUS] 3.1.0
[OCTOPUS]: THE LAWRENCE RADIATION LABORATORY NETWORK 3.1.0
AN ENGINEERING VIEW OF THE LRL [OCTOPUS] COMPUTER NETWORK 3.1.1
LAWRENCE RADIATION LABORATORY [OCTOPUS] SYSTEM 3.1.0

OHIO
A REGIONAL NETWORK--[OHIO] COLLEGE LIBRARY CENTER 4.2

ON-LINE
RESEARCH IN [ON-LINE] COMPUTATION 4.2
[ON-LINE] DOCUMENTATION OF THE COMPATIBLE TIME-SHARING SYSTEM 4.1
FACTORS FOR EVALUATION OF INTEGRATED [ON-LINE] INFORMATION SYSTEMS 5.0
THE [ON-LINE] INTELLECTUAL COMMUNITY 4.2
SYSTEM DESIGN OF [ON-LINE] SERVICE SYSTEMS 4.3

OPERATING
STRATEGIES FOR [OPERATING] SYSTEMS IN COMPUTER NETWORKS 3.4
THE COMMUNICATIONS COMPUTER [OPERATING] SYSTEM--THE INITIAL DESIGN 3.1.1

OPERATIONAL
[OPERATIONAL] CONSIDERATIONS FOR THE IMPLEMENTATION OF COMPUTER NETWORKS IN THE NMCSSC 1.2

OPERATIONS
THE IMPLICATIONS OF ADP NETWORKING STANDARDS FOR [OPERATIONS] RESEARCH 1.1

OPERATOR
ECONOMICS--POINT OF VIEW OF DESIGNER AND [OPERATOR] 5.3

OPTICAL
[OPTICAL] LINKS FOR COMMUNICATIONS IN LOCAL DISTRIBUTION 3.2.1

OPTIMAL
[OPTIMAL] ALLOCATION OF LEASED COMMUNICATION LINES 2.1.2
[OPTIMAL] DESIGN OF COMPUTER NETWORKS 2.1.2
[OPTIMAL] FILE ALLOCATION IN A MULTIPLE COMPUTER SYSTEM 2.1.2
A STUDY OF [OPTIMAL] FILE ASSIGNMENT AND COMMUNICATION NETWORK CONFIGURATION IN REMOTE-ACCESS COMPUTER MESSAGE PROCESSING AND COMMUNICATION SYSTEMS 2.9
ON TELEPROCESSING SYSTEM DESIGN, PART II: A METHOD FOR APPROXIMATING THE [OPTIMAL] NETWORK 2.1.2

OPTIMIZATION
COMPARISON OF NETWORK TOPOLOGY [OPTIMIZATION] ALGORITHMS 2.1.0
ANALYSIS AND [OPTIMIZATION] OF STORE-AND-FORWARD COMPUTER NETWORKS 2.1.0

OPTIMIZING
[OPTIMIZING] THE RELIABILITY IN CENTRALIZED COMPUTER NETWORKS 2.1.0

OPTIMUM
[OPTIMUM] CONCENTRATOR LOCATION IN TELECOMMUNICATIONS DESIGN 2.1.2

ORACLE
'[ORACLE]': COMPUTERIZED CONFERENCING IN A COMPUTER-ASSISTED-INSTRUCTION SYSTEM 4.1

ORGANIZATION
A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--SOFTWARE [ORGANIZATION] 3.1.1
A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--OBJECTIVES AND HARDWARE [ORGANIZATION] 3.1.1
TELECONFERENCING: THE COMPUTER, COMMUNICATION, AND [ORGANIZATION] 4.1
EFFECTIVE CORPORATE NETWORKING, [ORGANIZATION], AND STANDARDIZATION 1.1
THE FINGER LAKES REGIONAL COMPUTING [ORGANIZATION]: CREATING A REGIONAL, ACADEMIC COMPUTING NETWORK 3.1.2

ORGANIZATIONAL
[ORGANIZATIONAL], FINANCIAL, AND POLITICAL ASPECTS OF A THREE-UNIVERSITY COMPUTING CENTER 5.0

OS/MVT
A COMPUTER NETWORK INTERFACE FOR [OS/MVT] 3.4

OVERLAPPING
[OVERLAPPING] TESSELLATED COMMUNICATIONS NETWORKS 2.1.2

OVERLOAD
ON DISTRIBUTED COMMUNICATIONS: IV. PRIORITY, PRECEDENCE, AND [OVERLOAD] 2.1.3

PACKET
EXTENSIONS OF [PACKET] COMMUNICATION TECHNOLOGY TO A HAND HELD PERSONAL TERMINAL 3.3.9
THE CHOICE OF [PACKET] PARAMETERS FOR PACKET SWITCHED NETWORKS 2.1.2
THE CHOICE OF PACKET PARAMETERS FOR [PACKET] SWITCHED NETWORKS 2.1.2
A [PACKET] SWITCHING NETWORK WITH GRACEFUL SATURATED OPERATION 3.2.2
THE CONTROL OF CONGESTION IN [PACKET] SWITCHING NETWORKS 2.1.3
EASING THE INTRODUCTION OF A [PACKET] SWITCHING SERVICE 3.3.1

PACKETS
SIMULATION OF INTERFERENCE OF [PACKETS] IN THE ALOHA TIME-SHARING SYSTEM 2.1.1

PARAMETERS
THE CHOICE OF PACKET [PARAMETERS] FOR PACKET SWITCHED NETWORKS 2.1.2

PARTY-LINE
'[PARTY-LINE]' AND 'DISCUSSION' COMPUTERIZED CONFERENCE SYSTEMS 4.1
'[PARTY-LINE]' AND 'DISCUSSION'--COMPUTERIZED CONFERENCE SYSTEMS 4.1

PATH-LENGTHS
ON DISTRIBUTED COMMUNICATIONS: III. DETERMINATION OF [PATH-LENGTHS] IN A DISTRIBUTED NETWORK 2.1.2

PATTERNS
COMPUTER/COMMUNICATIONS SYSTEMS: [PATTERNS] AND PROSPECTS 1.0

PEOPLE
COMMUNICATIONS, COMPUTERS AND [PEOPLE] 1.5

PERFORMANCE
A STUDY OF THE ARPA NETWORK DESIGN AND [PERFORMANCE] 3.1.2
PROBLEMS OF NETWORK ACCOUNTING, MONITORING AND [PERFORMANCE] MEASUREMENT 5.3
[PERFORMANCE] MEASUREMENTS ON THE ARPA COMPUTER NETWORK 2.2
IMPROVEMENTS IN THE DESIGN AND [PERFORMANCE] OF THE ARPA NETWORK 3.1.2

PERIPHERALS
THE PRINCIPLES OF A DATA COMMUNICATION NETWORK FOR COMPUTERS AND REMOTE [PERIPHERALS] 3.1.0
EXPERIENCE WITH THE USE OF THE B.S. INTERFACE IN COMPUTER [PERIPHERALS] AND COMMUNICATION SYSTEMS 3.3.1

PERSONAL
EXTENSIONS OF PACKET COMMUNICATION TECHNOLOGY TO A HAND HELD [PERSONAL] TERMINAL 3.3.9

PHASE
A TRANS-CANADA COMPUTER COMMUNICATIONS NETWORK. [PHASE] I OF A MAJOR PROGRAM ON COMPUTERS 3.1.0

PILOT
PROPOSAL FOR THE DEVELOPMENT OF A SECURE [PILOT] NETWORK FOR THE WORLD-WIDE MILITARY COMMAND AND CONTROL SYSTEM (WWMCCS) BASED ON THE ARPA COMPUTER NETWORK TECHNOLOGY 3.1.0

PLANNING
STANDARDIZATION, COMPATIBILITY AND/OR CONVERTIBILITY REQUIREMENTS IN NETWORK [PLANNING] 5.5
DATA COMMUNICATIONS: INITIAL [PLANNING] 1.3
[PLANNING] A DATA COMMUNICATION SYSTEM. PART 1: A BROAD OVERVIEW AND BASIC CONCEPTS 1.3
[PLANNING] A DATA COMMUNICATIONS SYSTEM. PART 2: COMMON CARRIER FACILITIES (CONTINUED) 3.2.0
[PLANNING] A DATA COMMUNICATIONS SYSTEM. PART 2: COMMON CARRIER FACILITIES 3.2.0
[PLANNING] OF DATA COMMUNICATIONS NETWORKS--ECONOMIC, TECHNOLOGICAL AND INSTITUTIONAL ISSUES 5.4

POLICY
TIME-SHARED INFORMATION SYSTEMS: MARKET ENTRY IN SEARCH OF A [POLICY] 5.4
MINI-TUTORIAL ON TELECOMMUNICATIONS MANAGEMENT AND [POLICY] 5.4

POLITICAL
ORGANIZATIONAL, FINANCIAL, AND [POLITICAL] ASPECTS OF A THREE-UNIVERSITY COMPUTING CENTER 5.0

POLLING
[POLLING] IN A MULTIDROP COMMUNICATION SYSTEM: WAITING LINE ANALYSIS 2.1.2

POSITION
A [POSITION] PAPER ON COMPUTING AND COMMUNICATIONS 5.0

PRACTICALITIES
[PRACTICALITIES] OF NETWORK USE 4.0

PRECEDENCE
ON DISTRIBUTED COMMUNICATIONS: IV. PRIORITY, [PRECEDENCE], AND OVERLOAD 2.1.3

PREEMPTIVE
A [PREEMPTIVE] PRIORITY MODEL WITH TWO CLASSES OF CUSTOMERS 2.1.2

PRICING
FLEXIBLE [PRICING]: AN APPROACH TO THE ALLOCATION OF COMPUTER RESOURCES 5.3

PRINCIPLES
MESSAGE FORMAT [PRINCIPLES] 3.5
THE [PRINCIPLES] OF A DATA COMMUNICATION NETWORK FOR COMPUTERS AND REMOTE PERIPHERALS 3.1.0

PRIORITY
ON DISTRIBUTED COMMUNICATIONS: IV. [PRIORITY], PRECEDENCE, AND OVERLOAD 2.1.3
[PRIORITY] ASSIGNMENT IN A NETWORK OF COMPUTERS 2.1.2
[PRIORITY] ASSIGNMENT IN A NETWORK OF COMPUTERS 2.1.2
A PREEMPTIVE [PRIORITY] MODEL WITH TWO CLASSES OF CUSTOMERS 2.1.2

PROCEDURE
PROGRESS IN CONTROL [PROCEDURE] STANDARDIZATION 3.5

PROCEDURES
ROUTING PROCEDURES IN COMMUNICATIONS NETWORKS--PART II: DIRECTORY [PROCEDURES] 2.1.3
ROUTING PROCEDURES IN COMMUNICATIONS NETWORKS--PART I: RANDOM [PROCEDURES] 2.1.3
STANDARDS FOR USER [PROCEDURES] AND DATA FORMATS IN AUTOMATED INFORMATION SYSTEMS AND NETWORKS 5.5
[PROCEDURES] AND STANDARDS FOR INTER-COMPUTER COMMUNICATIONS 3.5
BASIC CONTROL [PROCEDURES] FOR DIGITAL DATA TRANSMISSION 3.5
ROUTING [PROCEDURES] IN COMMUNICATIONS NETWORKS--PART II: DIRECTORY PROCEDURES 2.1.3
ROUTING [PROCEDURES] IN COMMUNICATIONS NETWORKS--PART I: RANDOM PROCEDURES 2.1.3

PROCESSING
A STUDY OF OPTIMAL FILE ASSIGNMENT AND COMMUNICATION NETWORK CONFIGURATION IN REMOTE-ACCESS COMPUTER MESSAGE [PROCESSING] AND COMMUNICATION SYSTEMS 2.9
COMMERCIAL INFORMATION [PROCESSING] NETWORKS--PROSPECTS AND PROBLEMS IN PERSPECTIVE 1.0
MULTICOMPUTER PROGRAMMING FOR A LARGE SCALE REAL-TIME DATA [PROCESSING] SYSTEM 3.4
A STUDY OF INFORMATION IN MULTIPLE-COMPUTER AND MULTIPLE-CONSOLE DATA [PROCESSING] SYSTEMS 2.1.2
WORLD DATA COMMUNICATIONS AS SEEN BY THE DATA [PROCESSING] SYSTEMS DESIGNER 3.2.1
COMMUNICATIONS DATA [PROCESSING] SYSTEMS: DESIGN CONSIDERATIONS 1.0

PROCESSOR
THE INTERFACE MESSAGE [PROCESSOR] FOR THE ARPA COMPUTER NETWORK 3.1.1

PROCESSORS
PROGRAMMABLE COMMUNICATION [PROCESSORS] 3.2.3
INITIAL DESIGN FOR INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK 3.1.1

PROCESSORS (CONTINUED)

INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK 3.1.1
INTERFACE MESSAGE [PROCESSORS] FOR THE ARPA COMPUTER NETWORK, QUARTERLY TECHNICAL REPORT NO. 12 3.1.1

PROCESS/PROCESS
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, [PROCESS/PROCESS] COMMUNICATION 3.4
THE DATA RECONFIGURATION SERVICE--AN EXPERIMENT IN ADAPTABLE, [PROCESS/PROCESS] COMMUNICATION 4.1

PROFIT
INFORMATION SYSTEM NETWORKS--LET'S [PROFIT] FROM WHAT WE KNOW 1.2

PROGRAM
UNISIM--A SIMULATION [PROGRAM] FOR COMMUNICATIONS NETWORKS 2.1.1
AFOS: A [PROGRAM] FOR NATIONAL WEATHER SERVICE FIELD AUTOMATION 4.9
A TRANS-CANADA COMPUTER COMMUNICATIONS NETWORK, PHASE I OF A MAJOR [PROGRAM] ON COMPUTERS 3.1.0
ON [PROGRAM] TRANSFERABILITY 4.1

PROGRAMMABLE
[PROGRAMMABLE] COMMUNICATION PROCESSORS 3.2.3
NEWHALL LOOPS AND [PROGRAMMABLE] TDM TWO FACETS OF CANADIAN RESEARCH IN COMPUTER COMMUNICATIONS 3.2.9

PROGRAMMING
MULTICOMPUTER [PROGRAMMING] FOR A LARGE SCALE REAL-TIME DATA PROCESSING SYSTEM 3.4
MCROSS--A MULTI-COMPUTER [PROGRAMMING] SYSTEM 4.2
STATE-TRANSITION [PROGRAMMING] TECHNIQUES AND THEIR USE IN PRODUCING TELEPROCESSING DEVICE CONTROL PROGRAMS 3.2.9

PROGRAMS
STATE-TRANSITION PROGRAMMING TECHNIQUES AND THEIR USE IN PRODUCING TELEPROCESSING DEVICE CONTROL [PROGRAMS] 3.2.9
TELECOMMUNICATIONS [PROGRAMS] AFFECTING NETWORK DEVELOPMENT 1.2
THE TRANSFERABILITY OF COMPUTER [PROGRAMS] AND THE DATA ON WHICH THEY OPERATE 4.1
TRANSFERABILITY OF DATA AND [PROGRAMS] BETWEEN COMPUTER SYSTEMS 4.1
PROTECTION OF PROPRIETARY SOFTWARE [PROGRAMS] IN THE UNITED STATES 5.6

PROJECTED
[PROJECTED] RESPONSE CHARACTERISTICS OF THE WWMCCS INTERCOMPUTER NETWORK 2.1.2

PROPAGATION-LIMITE
INVESTIGATION OF [PROPAGATION-LIMITED] COMPUTER NETWORKS 2.1.2

PROPRIETARY
PROTECTION OF [PROPRIETARY] SOFTWARE PROGRAMS IN THE UNITED STATES 5.6

PROTECTION
[PROTECTION] OF PROPRIETARY SOFTWARE PROGRAMS IN THE UNITED STATES 5.6

PROTOCOL
A NETWORK/440 [PROTOCOL] CONCEPT 3.5
HOST-HOST COMMUNICATION [PROTOCOL] IN THE ARPA NETWORK 3.5

PROTOCOLS
FUNCTION-ORIENTED [PROTOCOLS] FOR THE ARPA COMPUTER NETWORK 3.5

PROTOTYPE
[PROTOTYPE] WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN 3.1.1

PUBLIC
POTENTIAL IMPACT OF USER/AUTHOR RELATIONSHIPS ON [PUBLIC] DATA NETWORK DESIGN 5.3
[PUBLIC] TELEPHONE NETWORK AND COMPUTER-COMMUNICATION 3.2.9

PWIN
PROTOTYPE WWMCCS INTERCOMPUTER NETWORK ([PWIN]) DEVELOPMENT PLAN 3.1.1
DESIGN SPECIFICATIONS FOR [PWIN] NON-FUNCTIONAL NETWORK CONTROL SOFTWARE 3.4

QUEUEING
SURVEY OF ANALYTICAL METHODS IN [QUEUEING] NETWORKS 1.3

RADIATION
OCTOPUS: THE LAWRENCE [RADIATION] LABORATORY NETWORK 3.1.0
THE LAWRENCE [RADIATION] LABORATORY OCTOPUS 3.1.0
LAWRENCE [RADIATION] LABORATORY OCTOPUS SYSTEM 3.1.0

RAND
ARPA NETWORK SERIES: I. INTRODUCTION TO THE APPA NETWORK AT [RAND] AND TO THE RAND VIDEO GRAPHICS SYSTEM 3.1.0
ARPA NETWORK SERIES: I. INTRODUCTION TO THE ARPA NETWORK AT RAND AND TO THE [RAND] VIDEO GRAPHICS SYSTEM 3.1.0

RANDOM
SIMULATION OF A [RANDOM] ACCESS DISCRETE ADDRESS COMMUNICATION SYSTEM 2.1.1
ROUTING PROCEDURES IN COMMUNICATIONS NETWORKS--PART I: [RANDOM] PROCEDURES 2.1.3

RAPID-RESPONSE
COMMUNICATION NETWORKS TO SERVE [RAPID-RESPONSE] COMPUTERS 3.2.2

REAL-TIME
MULTICOMPUTER PROGRAMMING FOR A LARGE SCALE [REAL-TIME] DATA PROCESSING SYSTEM 3.4

RECONFIGURATION
THE DATA [RECONFIGURATION] SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION 3.4
THE DATA [RECONFIGURATION] SERVICE--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION 4.1

REGIONAL
THE FINGER LAKES REGIONAL COMPUTING ORGANIZATION: CREATING A [REGIONAL], ACADEMIC COMPUTING NETWORK 3.1.2
THE ROLE OF [REGIONAL] COMPUTER NETWORKS 1.1
THE DEVELOPMENT OF A MULTI-CAMPUS [REGIONAL] COMPUTING CENTER 3.1.0
THE INDIANA [REGIONAL] COMPUTING NETWORK 3.1.2
THE STANFORD [REGIONAL] COMPUTING NETWORK 3.1.2
THE MERIT OF [REGIONAL] COMPUTING NETWORKS 1.1
THE FINGER LAKES [REGIONAL] COMPUTING ORGANIZATION: CREATING A REGIONAL, ACADEMIC COMPUTING NETWORK 3.1.2
A [REGIONAL] NETWORK--OHIO COLLEGE LIBRARY CENTER 4.2

REGULATED
BEYOND THE COMPUTER INQUIRY (WHO SHOULD BE [REGULATED] IN COMPUTER/COMMUNICATIONS) 5.4

REGULATION
THE COMING COMPUTER UTILITY--LAISSEZ-FAIRE, LICENSING OR [REGULATION]? 5.4
INTERCONNECTION: IMPACT ON COMPETITION-CARRIERS AND [REGULATION] 5.4

REGULATORY
SOME LEGAL AND [REGULATORY] PROBLEMS OF MULTIPLE ACCESS COMPUTER NETWORKS 5.4

RELIABILITY
[RELIABILITY] CONSIDERATIONS IN CENTRALIZED COMPUTER NETWORKS 2.1.2
OPTIMIZING THE [RELIABILITY] IN CENTRALIZED COMPUTER NETWORKS 2.1.0

RELIABLE
ANALYSIS AND DESIGN OF [RELIABLE] COMPUTER NETWORKS 2.1.2

REMOTE
THE DESIGN OF A SWITCHING SYSTEM TO ALLOW [REMOTE] ACCESS TO COMPUTER SERVICES BY OTHER COMPUTERS AND TERMINAL DEVICES 3.0
[REMOTE] COMPUTING IN HIGHER EDUCATION: PROSPECTS FOR THE FUTURE 1.1
THE EMERGENCE OF NATIONAL NETWORKS [REMOTE] COMPUTING--YEAR VI 1.2
THE PRINCIPLES OF A DATA COMMUNICATION NETWORK FOR COMPUTERS AND [REMOTE] PERIPHERALS 3.1.0

REMOTELY
COMMUNICATION NEEDS OF [REMOTELY] ACCESSED COMPUTER 5.4

REMOTE-ACCESS
A STUDY OF OPTIMAL FILE ASSIGNMENT AND COMMUNICATION NETWORK CONFIGURATION IN [REMOTE-ACCESS] COMPUTER MESSAGE PROCESSING AND COMMUNICATION SYSTEMS 2.9

RESEARCH
COMPUTER NETWORK [RESEARCH] 2.1.0
THE IMPLICATIONS OF ADP NETWORKING STANDARDS FOR OPERATIONS [RESEARCH] 1.1
COMPUTER NETWORK [RESEARCH] 2.0
COMPUTER NETWORK [RESEARCH] 2.2
A RECOMMENDED [RESEARCH] AND DEVELOPMENT PLAN FOR DATA EXCHANGE IN THE WORLD WIDE MILITARY COMMAND AND CONTROL SYSTEM 4.9
LANGUAGE [RESEARCH] AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR COMPUTATIONAL RESEARCH ON LANGUAGE (CE-NCOREL) 4.2
NETWORK/440--IBM [RESEARCH] COMPUTER SCIENCES DEPARTMENT COMPUTER NETWORK 3.1.0
NEWHALL LOOPS AND PROGRAMMABLE TDM TWO FACETS OF CANADIAN [RESEARCH] IN COMPUTER COMMUNICATIONS 3.2.9
[RESEARCH] IN ON-LINE COMPUTATION 4.2
[RESEARCH] IN STORE AND FORWARD COMPUTER NETWORKS 2.1
LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR NETWORK FOR COMPUTATIONAL [RESEARCH] ON LANGUAGE (CE-NCOREL) 4.2
PROPOSAL FOR CONTINUATION OF [RESEARCH] ON NATURAL COMMUNICATION WITH COMPUTERS 4.9
EXPLORATORY [RESEARCH] ON NETTING IN IBM 3.0

RESOURCE
COMPUTER NETWORK DEVELOPMENT TO ACHIEVE [RESOURCE] SHARING 3.1.0
A SYSTEM FOR INTERPROCESS COMMUNICATION IN A [RESOURCE] SHARING COMPUTER NETWORK 3.5

RESOURCES
FLEXIBLE PRICING: AN APPROACH TO THE ALLOCATION OF COMPUTER [RESOURCES] 5.3
EFFICIENT ALLOCATION OF [RESOURCES] IN CENTRALIZED COMPUTER-COMMUNICATION NETWORK DESIGN 2.1.2

RESOURCE-SHARING
FLOW CONTROL IN A [RESOURCE-SHARING] COMPUTER NETWORK 3.4
DATA TRAFFIC MEASUREMENTS GUIDE IMPROVEMENTS TO [RESOURCE-SHARING] NETWORK 2.2

RESPONSE
PROJECTED [RESPONSE] CHARACTERISTICS OF THE WWMCCS INTERCOMPUTER NETWORK 2.1.2
[RESPONSE] TIME IN MAN-COMPUTER CONVERSATIONAL TRANSACTIONS 2.3

RESPONSE-EFFICIENC
THE [RESPONSE-EFFICIENCY] TRADE-OFF IN A MULTIPLE-UNIVERSITY SYSTEM 2.9

RESPONSIBILITY
[RESPONSIBILITY] FOR THE HUMANISTIC USE OF THE INFORMATION REVOLUTION: WHERE WILL THE BATTLE BE FOUGHT? 1.5

RESPONSIVENESS
EFFICIENCY VS. [RESPONSIVENESS] IN A MULTIPLE-SERVICES COMPUTER FACILITY 2.9

REVOLUTION
RESPONSIBILITY FOR THE HUMANISTIC USE OF THE INFORMATION [REVOLUTION]: WHERE WILL THE BATTLE BE FOUGHT? 1.5

REVOLUTIONS
THREE CHARACTERIZATIONS OF COMMUNICATIONS [REVOLUTIONS] 1.5

RING
DATA [RING] ORIENTED COMPUTER NETWORKS 3.0

ROBIN
ROUND [ROBIN] SCHEDULING IN A COMPUTER COMMUNICATIONS SYSTEM WITH FINITE SWAP TIME AND STATISTICALLY MULTIPLEXED ARRIVALS 2.1.2

ROUND
[ROUND] ROBIN SCHEDULING IN A COMPUTER COMMUNICATIONS SYSTEM WITH FINITE SWAP TIME AND STATISTICALLY MULTIPLEXED ARRIVALS 2.1.2

ROUTE
MESSAGE [ROUTE] CONTROL IN A LARGE TELETYPE NETWORK 2.1.3

ROUTING
A SIMULATION STUDY OF [ROUTING] AND CONTROL IN COMMUNICATIONS NETWORKS 2.1.1
ON DISTRIBUTED COMMUNICATIONS: II. DIGITAL SIMULATION OF HOT-POTATO [ROUTING] IN A BROADBAND DISTRIBUTED COMMUNICATIONS NETWORK 2.1.1
[ROUTING] PROCEDURES IN COMMUNICATIONS NETWORKS--PART I: RANDOM PROCEDURES 2.1.3
[ROUTING] PROCEDURES IN COMMUNICATIONS NETWORKS--PART II: DIRECTORY PROCEDURES 2.1.3
A COMPUTER SIMULATION OF ADAPTIVE [ROUTING] TECHNIQUES FOR DISTRIBUTED COMMUNICATIONS SYSTEMS 2.1.1

SATELLITES
CURRENT AND NEAR FUTURE DATA TRANSMISSION VIA [SATELLITES] OF THE INTELSAT NETWORK 3.2.1

SATURATED
A PACKET SWITCHING NETWORK WITH GRACEFUL [SATURATED] OPERATION 3.2.2

SCHEDULING
ROUND ROBIN [SCHEDULING] IN A COMPUTER COMMUNICATIONS SYSTEM WITH FINITE SWAP TIME AND STATISTICALLY MULTIPLEXED ARRIVALS 2.1.2

SCIENCE
NATIONAL AND INTERNATIONAL INFORMATION NETWORKS IN [SCIENCE] AND TECHNOLOGY 1.0
NSF ACTIVITIES RELATED TO A NATIONAL [SCIENCE] COMPUTER NETWORK 1.2
NATIONAL [SCIENCE] (COMPUTER) NETWORK 1.1

SCIENCES
NETWORK/440--IBM RESEARCH COMPUTER [SCIENCES] DEPARTMENT COMPUTER NETWORK 3.1.0

SECRECY
ON DISTRIBUTED COMMUNICATIONS: IX. SECURITY, [SECRECY], AND TAMPER-FREE CONSIDERATIONS 5.6

SECURE
PROPOSAL FOR THE DEVELOPMENT OF A [SECURE] PILOT NETWORK FOR THE WORLD-WIDE MILITARY COMMAND AND CONTROL SYSTEM (WWMCCS) BASED ON THE ARPA COMPUTER NETWORK TECHNOLOGY 3.1.0

SECURITY
ON DISTRIBUTED COMMUNICATIONS: IX. [SECURITY], SECRECY, AND TAMPER-FREE CONSIDERATIONS 5.6
SOME IMPLICATIONS OF NEW COMMUNICATIONS TECHNOLOGIES FOR NATIONAL [SECURITY] IN THE 1970S 5.4

SERENDIPITOUS
TYMNET--A [SERENDIPITOUS] EVOLUTION 3.1.1

SERVICE
EASING THE INTRODUCTION OF A PACKET SWITCHING [SERVICE] 3.3.1
THE CLASSROOM INFORMATION AND COMPUTING [SERVICE] 4.3

SERVICE (CONTINUED)

AFOS: A PROGRAM FOR NATIONAL WEATHER [SERVICE] FIELD AUTOMATION 4.9
SYSTEM DESIGN OF ON-LINE [SERVICE] SYSTEMS 4.3
THE DATA RECONFIGURATION [SERVICE]--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION 3.4
THE DATA RECONFIGURATION [SERVICE]--AN EXPERIMENT IN ADAPTABLE, PROCESS/PROCESS COMMUNICATION 4.1

SERVICES
THE DESIGN OF A SWITCHING SYSTEM TO ALLOW REMOTE ACCESS TO COMPUTER [SERVICES] BY OTHER COMPUTERS AND TERMINAL DEVICES 3.0
THE WIRED CITY: [SERVICES] FOR HOME DELIVERY VIA INTERACTIVE CABLE TV 4.3
SUMMARY OF THE EXISTING DATA COMMUNICATIONS SERVICES IN WESTERN EUROPE AND TENTATIVE FORECAST OF NEW [SERVICES] FOR THE NEXT DECADE 1.6
SUMMARY OF THE EXISTING DATA COMMUNICATIONS [SERVICES] IN WESTERN EUROPE AND TENTATIVE FORECAST OF NEW SERVICES FOR THE NEXT DECADE 1.6
THE WIRED CITY: COMMERCIAL [SERVICES] TO BE PROVIDED BY BROADBAND TELECOMMUNICATIONS SYSTEMS 5.2

SHADOW
[SHADOW] TELEPHONE NETWORKS FOR TIME-SHARING TERMINALS 3.2.9

SHARED
DATA DESCRIPTIVE LANGUAGE FOR [SHARED] DATA 4.3
A TIME [SHARED] SYSTEM FOR MULTIPLE INDEPENDENT LABORATORIES 3.0

SHARING
COMPUTER NETWORK DEVELOPMENT TO ACHIEVE RESOURCE [SHARING] 3.1.0
A SYSTEM FOR INTERPROCESS COMMUNICATION IN A RESOURCE [SHARING] COMPUTER NETWORK 3.5
VIEWS ON ISSUES RELEVANT TO DATA [SHARING] ON COMPUTER NETWORKS 4.1
SYSTEM LOAD [SHARING] STUDY 1.2

SIINET
STATE INTEGRATED INFORMATION NET ([SIINET]). A CONCEPT 3.1.0

SIMULATION
ANALYTIC AND [SIMULATION] METHODS IN COMPUTER NETWORK DESIGN 2.1.0
[SIMULATION] OF A RANDOM ACCESS DISCRETE ADDRESS COMMUNICATION SYSTEM 2.1.1
A COMPUTER [SIMULATION] OF ADAPTIVE ROUTING TECHNIQUES FOR DISTRIBUTED COMMUNICATIONS SYSTEMS 2.1.1
[SIMULATION] OF DATA TRANSIT NETWORKS 2.1.1
ON DISTRIBUTED COMMUNICATIONS: II. DIGITAL [SIMULATION] OF HOT-POTATO ROUTING IN A BROADBAND DISTRIBUTED COMMUNICATIONS NETWORK 2.1.1
[SIMULATION] OF INTERFERENCE OF PACKETS IN THE ALOHA TIME-SHARING SYSTEM 2.1.1
UNISIM--A [SIMULATION] PROGRAM FOR COMMUNICATIONS NETWORKS 2.1.1
A [SIMULATION] STUDY OF ROUTING AND CONTROL IN COMMUNICATIONS NETWORKS 2.1.1

SIMULATOR
COMPUTER NETWORK [SIMULATOR] 2.1.1

SMALL
AN ERROR-CORRECTING DATA LINK BETWEEN [SMALL] AND LARGE COMPUTERS 3.2.1
THE USE OF A [SMALL] COMPUTER AS A TERMINAL CONTROLLER FOR A LARGE COMPUTING SYSTEM 3.3.2
[SMALL] COMPUTERS IN DATA NETWORKS 3.3.2

SOC
THE APPROACH OF SOFTWARE PROBLEMS IN THE [SOC] EXPERIMENTAL COMPUTER NETWORK 3.4

SOFTWARE
DESIGN SPECIFICATIONS FOR PWIN NON-FUNCTIONAL NETWORK CONTROL [SOFTWARE] 3.4
THE STRUCTURE OF A DISTRIBUTED COMPUTING SYSTEM--[SOFTWARE] 3.4
MERIT COMPUTER NETWORK: [SOFTWARE] CONSIDERATIONS 3.1.1
[SOFTWARE] DISPERSION: THE MINICOMPUTER IN DATA COMMUNICATIONS 3.3.2
DEFINE YOUR MESSAGE SWITCHING [SOFTWARE] NEEDS BEFORE YOU BUY 3.4
A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--[SOFTWARE] ORGANIZATION 3.1.1
THE APPROACH OF [SOFTWARE] PROBLEMS IN THE SOC EXPERIMENTAL COMPUTER NETWORK 3.4
PROTECTION OF PROPRIETARY [SOFTWARE] PROGRAMS IN THE UNITED STATES 5.6

SPECIALIZED
[SPECIALIZED] COMMON CARRIERS 1.6

SPECIFICATIONS
ON DISTRIBUTED COMMUNICATIONS: VII. TENTATIVE ENGINEERING [SPECIFICATIONS] AND PRELIMINARY DESIGN FOR A HIGH-DATA-RATE DISTRIBUTED NETWORK SWITCHING NODE 3.3.2
DESIGN [SPECIFICATIONS] FOR A GENERALIZED TELEPROCESSING SYSTEM 3.4
DESIGN [SPECIFICATIONS] FOR PWIN NON-FUNCTIONAL NETWORK CONTROL SOFTWARE 3.4

SPECIFYING
[SPECIFYING] A MESSAGE-SWITCHING COMPUTER 3.3.2

SPEED
SOME EFFECTS OF SWITCHED NETWORK TIME DELAYS AND TRANSMISSION [SPEED] ON DATA BASED/DATA COMMUNICATION SYSTEMS 2.1.2

STANDARD
A [STANDARD] FOR COMPUTER NETWORKS 5.5

STANDARDIZATION
PROGRESS IN CONTROL PROCEDURE [STANDARDIZATION] 3.5
EFFECTIVE CORPORATE NETWORKING, ORGANIZATION, AND [STANDARDIZATION] 1.1
[STANDARDIZATION], COMPATIBILITY AND/OR CONVERTIBILITY REQUIREMENTS IN NETWORK PLANNING 5.5

STANDARDS
[STANDARDS] AND INTERCONNECTION 5.5
PROCEDURES AND [STANDARDS] FOR INTER-COMPUTER COMMUNICATIONS 3.5
THE IMPLICATIONS OF ADP NETWORKING [STANDARDS] FOR OPERATIONS RESEARCH 1.1
[STANDARDS] FOR USER PROCEDURES AND DATA FORMATS IN AUTOMATED INFORMATION SYSTEMS AND NETWORKS 5.5

STANFORD
THE [STANFORD] REGIONAL COMPUTING NETWORK 3.1.2

STATE
[STATE] INTEGRATED INFORMATION NET (SIINET). A CONCEPT 3.1.0

STATES
THE DATA COMMUNICATIONS MARKET IN THE UNITED [STATES] 5.2
PROTECTION OF PROPRIETARY SOFTWARE PROGRAMS IN THE UNITED [STATES] 5.6

STATE-TRANSITION
[STATE-TRANSITION] PROGRAMMING TECHNIQUES AND THEIR USE IN PRODUCING TELEPROCESSING DEVICE CONTROL PROGRAMS 3.2.9

STATISTICAL
DEMULTIPLEXING CONSIDERATIONS FOR [STATISTICAL] MULTIPLEXORS 3.2.9

STATISTICALLY
ROUND ROBIN SCHEDULING IN A COMPUTER COMMUNICATIONS SYSTEM WITH FINITE SWAP TIME AND [STATISTICALLY] MULTIPLEXED ARRIVALS 2.1.2

STORAGE
THE TABLON MASS [STORAGE] NETWORK 3.3.9
BROOKNET--AN EXTENDED CORE [STORAGE] ORIENTED NETWORK OF COMPUTERS AT BROOKHAVEN NATIONAL LABORATORY 3.1.0

STORE
RESEARCH IN [STORE] AND FORWARD COMPUTER NETWORKS 2.1

STORE-AND-FORWARD
SOME OBSERVATIONS ON [STORE-AND-FORWARD] AND CIRCUIT-SWITCHED DATA NETWORKS 2.2
ANALYSIS AND OPTIMIZATION OF [STORE-AND-FORWARD] COMPUTER NETWORKS 2.1.0

STRATEGIES
[STRATEGIES] FOR MAXIMUM COST EFFECTIVENESS OF A SWITCHED NETWORK 3.2.2
[STRATEGIES] FOR OPERATING SYSTEMS IN COMPUTER NETWORKS 3.4

STRUCTURE
THE NATIONAL BIOMEDICAL COMMUNICATIONS NETWORK AS A DEVELOPING [STRUCTURE] 3.0
THE [STRUCTURE] OF A DISTRIBUTED COMPUTER SYSTEM--THE DISTRIBUTED FILE SYSTEM 3.1.1
THE [STRUCTURE] OF A DISTRIBUTED COMPUTING SYSTEM--SOFTWARE 3.4
THE [STRUCTURE] OF A DISTRIBUTED COMPUTING SYSTEM--THE DISTRIBUTED FILE SYSTEM 4.1
ON THE [STRUCTURE] OF A HETEROGENEOUS COMPUTING SYSTEM, CONTROLLED BY A LARGE DIGITAL COMPUTER 3.0

SURVEY
[SURVEY] OF ANALYTICAL METHODS IN QUEUEING NETWORKS 1.3
[SURVEY] OF COMPUTER NETWORKS 1.2

SWAP
ROUND ROBIN SCHEDULING IN A COMPUTER COMMUNICATIONS SYSTEM WITH FINITE [SWAP] TIME AND STATISTICALLY MULTIPLEXED ARRIVALS 2.1.2

SWEDEN
DATA COMMUNICATION IN [SWEDEN]--AND SOME ASPECTS OF THE SITUATION IN EUROPE 1.3

SWITCHED
STRATEGIES FOR MAXIMUM COST EFFECTIVENESS OF A [SWITCHED] NETWORK 3.2.2
SOME EFFECTS OF [SWITCHED] NETWORK TIME DELAYS AND TRANSMISSION SPEED ON DATA BASED/DATA COMMUNICATION SYSTEMS 2.1.2
THE CHOICE OF PACKET PARAMETERS FOR PACKET [SWITCHED] NETWORKS 2.1.2

SWITCHING
THE DESIGN OF A MESSAGE [SWITCHING] CENTRE FOR A DIGITAL COMMUNICATION NETWORK 3.1.1
THE FUTURE OF THE [SWITCHING] COMPUTER 1.9
A PACKET [SWITCHING] NETWORK WITH GRACEFUL SATURATED OPERATION 3.2.2
THE USE OF COMPUTERS IN MESSAGE [SWITCHING] NETWORKS 1.3
THE CONTROL OF CONGESTION IN PACKET [SWITCHING] NETWORKS 2.1.3
ON DISTRIBUTED COMMUNICATIONS: VII. TENTATIVE ENGINEERING SPECIFICATIONS AND PRELIMINARY DESIGN FOR A HIGH-DATA-RATE DISTRIBUTED NETWORK [SWITCHING] NODE 3.3.2
EASING THE INTRODUCTION OF A PACKET [SWITCHING] SERVICE 3.3.1
DEFINE YOUR MESSAGE [SWITCHING] SOFTWARE NEEDS BEFORE YOU BUY 3.4
A MULTIPLE MINICOMPUTER MESSAGE [SWITCHING] SYSTEM 3.3.2
THE DESIGN OF A [SWITCHING] SYSTEM TO ALLOW REMOTE ACCESS TO COMPUTER SERVICES BY OTHER COMPUTERS AND TERMINAL DEVICES 3.0
ELEMENTARY TELEPHONE SWITCHING THEORY APPLIED TO THE DESIGN OF MESSAGE [SWITCHING] SYSTEMS 3.2.1
ELEMENTARY TELEPHONE [SWITCHING] THEORY APPLIED TO THE DESIGN OF MESSAGE SWITCHING SYSTEMS 3.2.1

SYNCHRONOUS
FEATURES OF A PROPOSED [SYNCHRONOUS] DATA NETWORK 3.1.0

SYNTHESIS
THE [SYNTHESIS] OF COMMUNICATIONS AND COMPUTERS 3.2.2

TABLON
THE [TABLON] MASS STORAGE NETWORK 3.3.9

TAMPER-FREE
ON DISTRIBUTED COMMUNICATIONS: IX. SECURITY, SECRECY, AND [TAMPER-FREE] CONSIDERATIONS 5.6

TDM
NEWHALL LOOPS AND PROGRAMMABLE [TDM] TWO FACETS OF CANADIAN RESEARCH IN COMPUTER COMMUNICATIONS 3.2.9

TEAM
NETWORK INFORMATION CENTER AND COMPUTER AUGMENTED [TEAM] INTERACTION 4.1

TECHNICAL
NETWORK DATA HANDLING SYSTEM. SEMI-ANNUAL [TECHNICAL] REPORT 4.1
INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK. QUARTERLY [TECHNICAL] REPORT NO. 12 3.1.1

TECHNIQUES
COMPUTER NETWORK MEASUREMENTS: [TECHNIQUES] AND EXPERIMENTS 2.2
STATE-TRANSITION PROGRAMMING [TECHNIQUES] AND THEIR USE IN PRODUCING TELEPROCESSING DEVICE CONTROL PROGRAMS 3.2.9
MODERN [TECHNIQUES] FOR DATA COMMUNICATION OVER TELEPHONE CHANNELS 3.2.1
A COMPUTER SIMULATION OF ADAPTIVE ROUTING [TECHNIQUES] FOR DISTRIBUTED COMMUNICATIONS SYSTEMS 2.1.1

TECHNOLOGICAL
PLANNING OF DATA COMMUNICATIONS NETWORKS--ECONOMIC, [TECHNOLOGICAL] AND INSTITUTIONAL ISSUES 5.4

TECHNOLOGIES
COMPUTERS AND COMMUNICATIONS: COMPLEMENTING [TECHNOLOGIES] 1.3
SOME IMPLICATIONS OF NEW COMMUNICATIONS [TECHNOLOGIES] FOR NATIONAL SECURITY IN THE 1970S 5.4

TECHNOLOGY
NATIONAL AND INTERNATIONAL INFORMATION NETWORKS IN SCIENCE AND [TECHNOLOGY] 1.0
PROPOSAL FOR THE DEVELOPMENT OF A SECURE PILOT NETWORK FOR THE WORLD-WIDE MILITARY COMMAND AND CONTROL SYSTEM (WWMCCS) BASED ON THE ARPA COMPUTER NETWORK [TECHNOLOGY]Y 3.1.0
THE ADVANCING COMMUNICATION [TECHNOLOGY] AND COMPUTER COMMUNICATION SYSTEMS 3.2.1
COMPUTER [TECHNOLOGY] AND LIBRARIES OF THE FUTURE 4.2
EXTENSIONS OF PACKET COMMUNICATION [TECHNOLOGY] TO A HAND HELD PERSONAL TERMINAL 3.3.9

TELECOMMUNICATION
[TELECOMMUNICATION] NETWORKS FOR LIBRARIES AND INFORMATION SYSTEMS: APPROACHES TO DEVELOPMENT 4.2

TELECOMMUNICATIONS
[TELECOMMUNICATIONS] AND THE COMPUTER 1.3
[TELECOMMUNICATIONS] COSTS 5.3
OPTIMUM CONCENTRATOR LOCATION IN [TELECOMMUNICATIONS] DESIGN 2.1.2
MINI-TUTORIAL ON [TELECOMMUNICATIONS] MANAGEMENT AND POLICY 5.4
[TELECOMMUNICATIONS] PROGRAMS AFFECTING NETWORK DEVELOPMENT 1.2
THE WIRED CITY: COMMERCIAL SERVICES TO BE PROVIDED BY BROADBAND [TELECOMMUNICATIONS] SYSTEMS 5.2

TELECONFERENCING
[TELECONFERENCING]: THE COMPUTER, COMMUNICATION, AND ORGANIZATION 4.1

TELEPHONE
MODERN TECHNIQUES FOR DATA COMMUNICATION OVER [TELEPHONE] CHANNELS 3.2.1
THE WIRED CITY: THE ROLE OF AN INDEPENDENT [TELEPHONE] COMPANY 4.3
PUBLIC [TELEPHONE] NETWORK AND COMPUTER-COMMUNICATION 3.2.9
ERROR CONTROL FOR DIGITAL DATA TRANSMISSION OVER [TELEPHONE] NETWORKS 3.2.1
SHADOW [TELEPHONE] NETWORKS FOR TIME-SHARING TERMINALS 3.2.9
ELEMENTARY [TELEPHONE] SWITCHING THEORY APPLIED TO THE DESIGN OF MESSAGE SWITCHING SYSTEMS 3.2.1
MATHEMATICAL THEORY OF CONNECTING NETWORKS AND [TELEPHONE] TRAFFIC 2.1

TELEPHONE-ACCESS
A [TELEPHONE-ACCESS] BIOMEDICAL INFORMATION CENTER 5.3

TELEPROCESSING
[TELEPROCESSING] AND DATA COMMUNICATION OF THE FUTURE 1.6
STATE-TRANSITION PROGRAMMING TECHNIQUES AND THEIR USE IN PRODUCING [TELEPROCESSING] DEVICE CONTROL PROGRAMS 3.2.9
DESIGN SPECIFICATIONS FOR A GENERALIZED [TELEPROCESSING] SYSTEM 3.4
ON [TELEPROCESSING] SYSTEM DESIGN, PART II, A METHOD FOR APPROXIMATING THE OPTIMAL NETWORK 2.1.2
[TELEPROCESSING]--THE UTILITY OF THE COMPUTER UTILITY NEW PROBLEMS? NEW CHALLENGE! 4.3

TELETYPE
MESSAGE ROUTE CONTROL IN A LARGE [TELETYPE] NETWORK 2.1.3

TERMINAL
EXTENSIONS OF PACKET COMMUNICATION TECHNOLOGY TO A HAND HELD PERSONAL [TERMINAL] 3.3.9
[TERMINAL] ACCESS TO THE ARPA COMPUTER NETWORK 3.3.2
THE USE OF A SMALL COMPUTER AS A [TERMINAL] CONTROLLER FOR A LARGE COMPUTING SYSTEM 3.3.2
THE DESIGN OF A SWITCHING SYSTEM TO ALLOW REMOTE ACCESS TO COMPUTER SERVICES BY OTHER COMPUTERS AND [TERMINAL] DEVICES 3.0
THE [TERMINAL] IMP FOR THE ARPA COMPUTER NETWORK 3.3.2
[TERMINAL] NETWORKS FOR TIME-SHARING 1.0
TYMNET--A [TERMINAL] ORIENTED COMMUNICATION NETWORK 3.1.0

TERMINALS
SHADOW TELEPHONE NETWORKS FOR TIME-SHARING [TERMINALS] 3.2.9
PARTICIPATING DEMONSTRATIONS OF A MULTI-PURPOSE NETWORK LINKING DISSIMILAR COMPUTERS AND [TERMINALS] 1.6
COMMON CARRIER APPROACH TO DIGITAL DATA TRANSMISSION: [TERMINALS], TRANSMISSION EQUIPMENT AND FUTURE PLANS FOR THE COMPUTER UTILITY 1.2
IDENTIFYING [TERMINALS] IN TERMINAL-ORIENTED SYSTEMS 3.2.2

TERMINAL-ORIENTED
IDENTIFYING TERMINALS IN [TERMINAL-ORIENTED] SYSTEMS 3.2.2

TESSELLATED
OVERLAPPING [TESSELLATED] COMMUNICATIONS NETWORKS 2.1.2

THEORY
COMPUTER COMMUNICATION NETWORK DESIGN--EXPERIENCE WITH [THEORY] AND PRACTICE 3.0
ELEMENTARY TELEPHONE SWITCHING [THEORY] APPLIED TO THE DESIGN OF MESSAGE SWITCHING SYSTEMS 3.2.1
MATHEMATICAL [THEORY] OF CONNECTING NETWORKS AND TELEPHONE TRAFFIC 2.1

THREE-UNIVERSITY
ORGANIZATIONAL, FINANCIAL, AND POLITICAL ASPECTS OF A [THREE-UNIVERSITY] COMPUTING CENTER 5.0

TIME
ROUND ROBIN SCHEDULING IN A COMPUTER COMMUNICATIONS SYSTEM WITH FINITE SWAP [TIME] AND STATISTICALLY MULTIPLEXED ARRIVALS 2.1.2
SOME EFFECTS OF SWITCHED NETWORK [TIME] DELAYS AND TRANSMISSION SPEED ON DATA BASED/DATA COMMUNICATION SYSTEMS 2.1.2
A STUDY OF ASYNCHRONOUS [TIME] DIVISION MULTIPLEXING FOR TIME-SHARING COMPUTER SYSTEMS 3.2.1
RESPONSE [TIME] IN MAN-COMPUTER CONVERSATIONAL TRANSACTIONS 2.3
A [TIME] SHARED SYSTEM FOR MULTIPLE INDEPENDENT LABORATORIES 3.0

TIME-SHARED
TOWARD A COOPERATIVE NETWORK OF [TIME-SHARED] COMPUTERS 3.0
SOME WAYS OF PROVIDING COMMUNICATION FACILITIES FOR [TIME-SHARED] COMPUTING 3.0
ECONOMICS OF [TIME-SHARED] COMPUTING SYSTEMS, PART 1 5.3
ECONOMICS OF [TIME-SHARED] COMPUTING SYSTEMS, PART 2 5.3
[TIME-SHARED] INFORMATION SYSTEMS: MARKET ENTRY IN SEARCH OF A POLICY 5.4

TIME-SHARING
TERMINAL NETWORKS FOR [TIME-SHARING] 1.0
A STUDY OF ASYNCHRONOUS TIME DIVISION MULTIPLEXING FOR [TIME-SHARING] COMPUTER SYSTEMS 3.2.1
AN INTERACTIVE NETWORK OF [TIME-SHARING] COMPUTERS 3.1.0
A COOPERATIVE NETWORK OF [TIME-SHARING] COMPUTERS: PRELIMINARY STUDY 3.0
EXPLOITING THE [TIME-SHARING] ENVIRONMENT 3.1.2
SIMULATION OF INTERFERENCE OF PACKETS IN THE ALOHA [TIME-SHARING] SYSTEM 2.1.1
ON-LINE DOCUMENTATION OF THE COMPATIBLE [TIME-SHARING] SYSTEM 4.1
SHADOW TELEPHONE NETWORKS FOR [TIME-SHARING] TERMINALS 3.2.9

TOPOLOGICAL
THE CANADIAN UNIVERSITIES COMPUTER NETWORK [TOPOLOGICAL] CONSIDERATIONS 2.1.1
[TOPOLOGICAL] CONSIDERATIONS IN THE DESIGN OF THE ARPA COMPUTER NETWORK 2.1.2

TOPOLOGY
COMPARISON OF NETWORK [TOPOLOGY] OPTIMIZATION ALGORITHMS 2.1.0

TRADE-OFF
THE RESPONSE-EFFICIENCY [TRADE-OFF] IN A MULTIPLE-UNIVERSITY SYSTEM 2.9

TRAFFIC
MATHEMATICAL THEORY OF CONNECTING NETWORKS AND TELEPHONE [TRAFFIC] 2.1
[TRAFFIC] AND DELAY IN A CIRCULAR DATA NETWORK 2.1.2
DATA [TRAFFIC] MEASUREMENTS GUIDE IMPROVEMENTS TO RESOURCE-SHARING NETWORK 2.2

TRANSACTIONS
RESPONSE TIME IN MAN-COMPUTER CONVERSATIONAL [TRANSACTIONS] 2.3

TRANSFERABILITY
ON PROGRAM [TRANSFERABILITY] 4.1
THE [TRANSFERABILITY] OF COMPUTER PROGRAMS AND THE DATA ON WHICH THEY OPERATE 4.1
[TRANSFERABILITY] OF DATA AND PROGRAMS BETWEEN COMPUTER SYSTEMS 4.1

TRANSIT
SIMULATION OF DATA [TRANSIT] NETWORKS 2.1.1

TRANSMISSION
BASIC CONTROL PROCEDURES FOR DIGITAL DATA [TRANSMISSION] 3.5
COMMON CARRIER APPROACH TO DIGITAL DATA [TRANSMISSION]: TERMINALS, TRANSMISSION EQUIPMENT AND FUTURE PLANS FOR THE COMPUTER UTILITY 1.2
[TRANSMISSION] CONTROL IN A LOCAL DATA NETWORK 3.0
COMMON CARRIER APPROACH TO DIGITAL DATA TRANSMISSION: TERMINALS, [TRANSMISSION] EQUIPMENT AND FUTURE PLANS FOR THE COMPUTER UTILITY 1.2
DATA [TRANSMISSION] NETWORK COMPUTER-TO-COMPUTER STUDY 3.2.1
DATA [TRANSMISSION] NETWORK COMPUTER-TO-COMPUTER STUDY 3.2.1
ERROR CONTROL FOR DIGITAL DATA [TRANSMISSION] OVER TELEPHONE NETWORKS 3.2.1
SOME EFFECTS OF SWITCHED NETWORK TIME DELAYS AND [TRANSMISSION] SPEED ON DATA BASED/DATA COMMUNICATION SYSTEMS 2.1.2
ANALYSIS OF LOOP [TRANSMISSION] SYSTEMS 2.1.2
CURRENT AND NEAR FUTURE DATA [TRANSMISSION] VIA SATELLITES OF THE INTELSAT NETWORK 3.2.1

TRANS-CANADA
A [TRANS-CANADA] COMPUTER COMMUNICATIONS NETWORK, PHASE I OF A MAJOR PROGRAM ON COMPUTERS 3.1.0

TRENDS
[TRENDS] IN COMPUTER/COMMUNICATION SYSTEMS 1.2

TYMNET
[TYMNET]--A SERENDIPITOUS EVOLUTION 3.1.1
[TYMNET]--A TERMINAL ORIENTED COMMUNICATION NETWORK 3.1.0

UNISIM
[UNISIM]--A SIMULATION PROGRAM FOR COMMUNICATIONS NETWORKS 2.1.1

UNITED
AN INTRODUCTION TO THE USE OF DATA COMMUNICATIONS IN THE [UNITED] KINGDOM 3.2.0
THE DATA COMMUNICATIONS MARKET IN THE [UNITED] STATES 5.2
PROTECTION OF PROPRIETARY SOFTWARE PROGRAMS IN THE [UNITED] STATES 5.6

UNIVERSITIES
THE CANADIAN [UNIVERSITIES] COMPUTER NETWORK TOPOLOGICAL CONSIDERATIONS 2.1.1

UNIVERSITY
A PROPOSED COMPUTER NETWORK FOR THE AUSTRALIAN NATIONAL [UNIVERSITY] 3.1.0

USE
PRACTICALITIES OF NETWORK [USE] 4.0
STATE-TRANSITION PROGRAMMING TECHNIQUES AND THEIR [USE] IN PRODUCING TELEPROCESSING DEVICE CONTROL PROGRAMS 3.2.9
THE [USE] OF A SMALL COMPUTER AS A TERMINAL CONTROLLER FOR A LARGE COMPUTING SYSTEM 3.3.2
THE [USE] OF COMPUTERS IN MESSAGE SWITCHING NETWORKS 1.3
AN INTRODUCTION TO THE [USE] OF DATA COMMUNICATIONS IN THE UNITED KINGDOM 3.2.0
THE [USE] OF DISTRIBUTED DATA BASES IN INFORMATION NETWORKS 4.1
EXPERIENCE WITH THE [USE] OF THE B.S. INTERFACE IN COMPUTER PERIPHERALS AND COMMUNICATION SYSTEMS 3.3.1
RESPONSIBILITY FOR THE HUMANISTIC [USE] OF THE INFORMATION REVOLUTION: WHERE WILL THE BATTLE BE FOUGHT? 1.5

USER
SYSTEM ECONOMICS FROM THE POINT OF VIEW OF THE [USER] 5.3
SOME PROBLEMS IN DATA COMMUNICATIONS BETWEEN THE [USER] AND THE COMPUTER 1.3
THE [USER] DEPARTMENT AND THE COMPUTER 3.4
STANDARDS FOR [USER] PROCEDURES AND DATA FORMATS IN AUTOMATED INFORMATION SYSTEMS AND NETWORKS 5.5

USER/AUTHOR
POTENTIAL IMPACT OF [USER/AUTHOR] RELATIONSHIPS ON PUBLIC DATA NETWORK DESIGN 5.3

USING
ARPA NETWORK EXPERIMENTATION [USING] EXISTING DATA MANAGEMENT SYSTEMS 4.9

UTILITIES
THE FUTURE OF COMPUTER [UTILITIES] 4.3

UTILITY
THE CHALLENGE OF THE COMPUTER [UTILITY] 4.3
COMPUTER LANGUAGES FOR THE COMPUTER [UTILITY] 3.4
COMMON CARRIER APPROACH TO DIGITAL DATA TRANSMISSION: TERMINALS, TRANSMISSION EQUIPMENT AND FUTURE PLANS FOR THE COMPUTER [UTILITY] 1.2
THE MARKET FOR A COMPUTER [UTILITY] INDUSTRY 5.2
TELEPROCESSING--THE UTILITY OF THE COMPUTER [UTILITY] NEW PROBLEMS? NEW CHALLENGE! 4.3
TELEPROCESSING--THE [UTILITY] OF THE COMPUTER UTILITY NEW PROBLEMS? NEW CHALLENGE! 4.3
THE COMING COMPUTER [UTILITY]--LAISSEZ-FAIRE, LICENSING OR REGULATION? 5.4

UTILIZED
COPYRIGHT ASPECTS OF CATV AS [UTILIZED] IN INFORMATION NETWORKING 4.3

U.S.A
THE PROBABLE FUTURE OF CANADIAN LONG HAUL DIGITAL DATA NETWORK CONNECTIONS WITH THE [U.S.A]. 3.1.1

VIDEO
ARPA NETWORK SERIES: I. INTRODUCTION TO THE ARPA NETWORK AT RAND AND TO THE RAND [VIDEO] GRAPHICS SYSTEM 3.1.0

WAITING
POLLING IN A MULTIDROP COMMUNICATION SYSTEM: [WAITING] LINE ANALYSIS 2.1.2

WEATHER
AFOS: A PROGRAM FOR NATIONAL [WEATHER] SERVICE FIELD AUTOMATION 4.9

WESTERN
SUMMARY OF THE EXISTING DATA COMMUNICATIONS SERVICES IN [WESTERN] EUROPE AND TENTATIVE FORECAST OF NEW SERVICES FOR THE NEXT DECADE 1.6

WIRED
THE [WIRED] CITY: COMMERCIAL SERVICES TO BE PROVIDED BY BROADBAND TELECOMMUNICATIONS SYSTEMS 5.2
THE [WIRED] CITY: SERVICES FOR HOME DELIVERY VIA INTERACTIVE CABLE TV 4.3
THE [WIRED] CITY: THE ROLE OF AN INDEPENDENT TELEPHONE COMPANY 4.3

WORLD
[WORLD] DATA COMMUNICATIONS AS SEEN BY THE DATA PROCESSING SYSTEMS DESIGNER 3.2.1
THE MAD MAD [WORLD] OF DATA COMMUNICATIONS 1.9
A RECOMMENDED RESEARCH AND DEVELOPMENT PLAN FOR DATA EXCHANGE IN THE [WORLD] WIDE MILITARY COMMAND AND CONTROL SYSTEM 4.9

WORLD-WIDE
PROPOSAL FOR THE DEVELOPMENT OF A SECURE PILOT NETWORK FOR THE [WORLD-WIDE] MILITARY COMMAND AND CONTROL SYSTEM (WWMCCS) BASED ON THE ARPA COMPUTER NETWORK TECHNOLOGY 3.1.0

WWMCCS
PROPOSAL FOR THE DEVELOPMENT OF A SECURE PILOT NETWORK FOR THE WORLD-WIDE MILITARY COMMAND AND CONTROL SYSTEM ([WWMCCS]) BASED ON THE ARPA COMPUTER NETWORK TECHNOLOGY 3.1.0
PROPOSED IMPLEMENTATION PLAN FOR A [WWMCCS] INTERCOMPUTER NETWORK 3.1.1
PROJECTED RESPONSE CHARACTERISTICS OF THE [WWMCCS] INTERCOMPUTER NETWORK 2.1.2
CONCEPTS FOR A [WWMCCS] INTERCOMPUTER NETWORK 1.1
PROTOTYPE [WWMCCS] INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN 3.1.1

| | | |
|---|---|---|
| AC ATR-69(7130-06)-I | STUDY OF COMMUNICATION LINKS FOR THE BIOMEDICAL COMMUNICATIONS NETWORK | 3.2.1 |
| AD-444 830 | ON DISTRIBUTED COMMUNICATIONS: I. INTRODUCTION TO DISTRIBUTED COMMUNICATIONS NETWO | 1.0 |
| AD-444 831 | ON DISTRIBUTED COMMUNICATIONS: VIII. THE MULTIPLEXING STATION | 3.2.3 |
| AD-444 832 | ON DISTRIBUTED COMMUNICATIONS: VII. TENTATIVE ENGINEERING SPECIFICATIONS AND PRELI | 3.3.2 |
| AD-444 833 | ON DISTRIBUTED COMMUNICATIONS: III. DETERMINATION OF PATH-LENGTHS IN A DISTRIBUTED | 2.1.2 |
| AD-444 834 | ON DISTRIBUTED COMMUNICATIONS: II. DIGITAL SIMULATION OF HOT-POTATO ROUTING IN A B | 2.1.1 |
| AD-444 837 | ON DISTRIBUTED COMMUNICATIONS: XI. SUMMARY OVERVIEW | 3.0 |
| AD-444 838 | ON DISTRIBUTED COMMUNICATIONS: V. HISTORY, ALTERNATIVE APPROACHES, AND COMPARISONS | 2.1.3 |
| AD-444 839 | ON DISTRIBUTED COMMUNICATIONS: IX. SECURITY, SECRECY, AND TAMPER-FREE CONSIDERATIO | 5.6 |
| AD-444 840 | ON DISTRIBUTED COMMUNICATIONS: IV. PRIORITY, PRECEDENCE, AND OVERLOAD | 2.1.3 |
| AD-616 678 | ERROR CONTROL FOR DIGITAL DATA TRANSMISSION OVER TELEPHONE NETWORKS | 3.2.1 |
| AD-621 039 | INVESTIGATION OF PROPAGATION-LIMITED COMPUTER NETWORKS | 2.1.2 |
| AD-624 110 | ON-LINE DOCUMENTATION OF THE COMPATIBLE TIME-SHARING SYSTEM. | 4.1 |
| AD-624-431 | COMMUNICATIONS, COMPUTERS AND PEOPLE | 1.5 |
| AD-629 225 | IDEEA NETWORK IMPLEMENTATION FISCAL YEAR 1965 | 4.2 |
| AD-637 488 | INFORMATION SYSTEM NETWORKS--LET'S PROFIT FROM WHAT WE KNOW. | I.2 |
| AD-658 424 | SOME IMPLICATIONS OF NEW COMMUNICATIONS TECHNOLOGIES FOR NATIONAL SECURITY IN THE | 5.4 |
| AD-674 086 | ALGORITHMS TO REALIZE DIRECTED COMMUNICATION NETS | 2.1.2 |
| AD-676 259 | OVERLAPPING TESSELLATED COMMUNICATIONS NETWORKS. | 2.1.2 |
| AD-694 055 | AN EXPERIMENTAL COMPUTER NETWORK. | 3.1.0 |
| AD-696 675 | THE IMPLICATIONS OF ADP NETWORKING STANDARDS FOR OPERATIONS RESEARCH. | 1.1 |
| AD-699 640 | ON THE STRUCTURE OF A HETEROGENEOUS COMPUTING SYSTEM, CONTROLLED BY A LARGE DIGITA | 3.0 |
| AD-705 149 | COMPUTER NETWORK RESEARCH | 2.1.0 |
| AD-707 438 | ANALYSIS AND OPTIMIZATION OF STORE-AND-FORWARD COMPUTER NETWORKS | 2.1.0 |
| AD-711 342 | COMPUTER NETWORK RESEARCH | 2.0 |
| AD-729 194 | A STUDY OF INFORMATION IN MULTIPLE-COMPUTER AND MULTIPLE-CONSOLE DATA PROCESSING S | 2.1.2 |
| AD-729 695 | DATA TRANSMISSION NETWORK COMPUTER-TO-COMPUTER STUDY | 3.2.1 |
| AD-730 053 | COMPUTER NETWORK SIMULATOR. | 2.1.1 |
| AD-730 724 | NETWORK DATA HANDLING SYSTEM. SEMI-ANNUAL TECHNICAL REPORT | 4.1 |
| AD-733 049 | ARPA NETWORK SERIES: I. INTRODUCTION TO THE ARPA NETWORK AT RAND AND TO THE RAND V | 3.1.0 |
| AD-735 300 | RESEARCH IN ON-LINE COMPUTATION | 4.2 |
| AD-736 213 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK. QUARTERLY TECHNICAL RE | 3.1.1 |
| AD-737 131 | NETWORK INFORMATION CENTER AND COMPUTER AUGMENTED TEAM INTERACTION | 4.1 |
| AD-737 403 | RESEARCH IN STORE AND FORWARD COMPUTER NETWORKS. | 2.1 |
| AD-739 344 | COMPUTER NETWORK MEASUREMENTS: TECHNIQUES AND EXPERIMENTS | 2.2 |
| AD-739 705 | COMPUTER NETWORK RESEARCH | 2.2 |
| AF F19(628)-71-C-0002 | COMPUTATION OF MESSAGE DELAYS IN A COMMUNICATIONS NETWORK | 2.1.2 |
| AF F19620-70-C-0314 | RESEARCH IN ON-LINE COMPUTATION | 4.2 |
| AF F19628-68-C-0365 | OPERATIONAL CONSIDERATIONS FOR THE IMPLEMENTATION OF COMPUTER NETWORKS IN THE NMCS | 1.2 |
| | SYSTEM LOAD SHARING STUDY | 1.2 |
| | THE IMPLICATIONS OF ADP NETWORKING STANDARDS FOR OPERATIONS RESEARCH. | 1.1 |
| AF F19628-71-C-0002 | A RECOMMENDED RESEARCH AND DEVELOPMENT PLAN FOR DATA EXCHANGE IN THE WORLD WIDE MI | 4.9 |
| | ANALYSIS OF NMCS PROBLEM AREAS RELATED TO COMPUTER NETWORKS AND PROPOSED NMCS NETW | 1.1 |
| | CATALOG OF NETWORK FEATURES | 1.3 |
| | CONCEPTS FOR A WWMCCS INTERCOMPUTER NETWORK | 1.1 |
| | DESIGN SPECIFICATIONS FOR PWIN NON-FUNCTIONAL NETWORK CONTROL SOFTWARE | 3.4 |
| | EXPERIMENTATION ON THE ARPA COMPUTER NETWORK. | 4.9 |
| | MACIMS COMMUNICATION NETWORK CONFIGURATION | 3.2.2 |
| | PROJECTED RESPONSE CHARACTERISTICS OF THE WWMCCS INTERCOMPUTER NETWORK | 2.1.2 |
| | PROPOSED IMPLEMENTATION PLAN FOR A WWMCCS INTERCOMPUTER NETWORK | 3.1.1 |
| | PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN. | 3.1.1 |
| | SURVEY OF COMPUTER NETWORKS | 1.2 |
| AF F30602-69-C-0214 | A STUDY OF INFORMATION IN MULTIPLE-COMPUTER AND MULTIPLE-CONSOLE DATA PROCESSING S | 2.1.2 |
| | A STUDY OF OPTIMAL FILE ASSIGNMENT AND COMMUNICATION NETWORK CONFIGURATION IN REMO | 2.9 |
| | EFFICIENT ALLOCATION OF RESOURCES IN CENTRALIZED COMPUTER-COMMUNICATION NETWORK DE | 2.1.2 |
| AF F30602-69-C-0286 | ON PROGRAM TRANSFERABILITY. | 4.1 |
| AF F30602-70-C-0219 | NETWORK INFORMATION CENTER AND COMPUTER AUGMENTED TEAM INTERACTION | 4.1 |
| AF F33657-68-D-1287 | ON THE STRUCTURE OF A HETEROGENEOUS COMPUTING SYSTEM, CONTROLLED BY A LARGE DIGITA | 3.0 |
| AF F44620-67-C-0058 | AN INTERACTIVE NETWORK OF TIME-SHARING COMPUTERS | 3.1.0 |
| AF F44620-69-C-0030 | DESIGN CONSIDERATIONS FOR THE MENEHUNE-KAHUNA INTERFACE FOR THE ALOHA SYSTEM. A PR | 3.3.1 |
| | MULTIPLEXING IN THE ALOHA SYSTEM: MENEHUNE - KEIKI DESIGN CONSIDERATIONS | 3.3.2 |
| | SIMULATION OF A RANDOM ACCESS DISCRETE ADDRESS COMMUNICATION SYSTEM | 2.1.1 |
| | SIMULATION OF INTERFERENCE OF PACKETS IN THE ALOHA TIME-SHARING SYSTEM | 2.1.1 |
| | THE ALOHA SYSTEM | 3.2.1 |
| | THE ALOHA SYSTEM--ANOTHER ALTERNATIVE FOR COMPUTER COMMUNICATIONS. | 3.1.0 |
| AF 19(604)-5200 | ROUTING PROCEDURES IN COMMUNICATIONS NETWORKS--PART II: DIRECTORY PROCEDURES | 2.1.3 |
| | ROUTING PROCEDURES IN COMMUNICATIONS NETWORKS--PART I: RANDOM PROCEDURES | 2.1.3 |
| AF 19(628)-2390 | ERROR CONTROL FOR DIGITAL DATA TRANSMISSION OVER TELEPHONE NETWORKS | 3.2.1 |
| AF 19(628)-2902 | INVESTIGATION OF PROPAGATION-LIMITED COMPUTER NETWORKS | 2.1.2 |
| AF 19(628)-500 | ON-LINE DOCUMENTATION OF THE COMPATIBLE TIME-SHARING SYSTEM. | 4.1 |
| AF 19(628)-5167 | AN EXPERIMENTAL COMPUTER NETWORK. | 3.1.0 |
| AF 30(602)-3953 | EFFICIENT ALLOCATION OF RESOURCES IN CENTRALIZED COMPUTER-COMMUNICATION NETWORK DE | 2.1.2 |
| AF 30(602)-4277 | HOST-HOST COMMUNICATION PROTOCOL IN THE ARPA NETWORK | 3.5 |
| AF 49(638)-1700 | A COMPUTER SIMULATION OF ADAPTIVE ROUTING TECHNIQUES FOR DISTRIBUTED COMMUNICATION | 2.1.1 |
| AF 49(638)-700 | ON DISTRIBUTED COMMUNICATIONS: III. DETERMINATION OF PATH-LENGTHS IN A DISTRIBUTED | 2.1.2 |
| | ON DISTRIBUTED COMMUNICATIONS: II. DIGITAL SIMULATION OF HOT-POTATO ROUTING IN A B | 2.1.1 |
| | ON DISTRIBUTED COMMUNICATIONS: IV. PRIORITY, PRECEDENCE, AND OVERLOAD | 2.1.3 |
| | ON DISTRIBUTED COMMUNICATIONS: IX. SECURITY, SECRECY, AND TAMPER-FREE CONSIDERATIO | 5.6 |
| | ON DISTRIBUTED COMMUNICATIONS: I. INTRODUCTION TO DISTRIBUTED COMMUNICATIONS NETWO | 1.0 |
| | ON DISTRIBUTED COMMUNICATIONS: VIII. THE MULTIPLEXING STATION | 3.2.3 |
| | ON DISTRIBUTED COMMUNICATIONS: VII. TENTATIVE ENGINEERING SPECIFICATIONS AND PRELI | 3.3.2 |
| | ON DISTRIBUTED COMMUNICATIONS: V. HISTORY, ALTERNATIVE APPROACHES, AND COMPARISONS | 2.1.3 |
| | ON DISTRIBUTED COMMUNICATIONS: XI. SUMMARY OVERVIEW | 3.0 |
| AFCRL 71-0530 | RESEARCH IN ON-LINE COMPUTATION | 4.2 |
| AFOSR 66-0873 | INFORMATION SYSTEM NETWORKS--LET'S PROFIT FROM WHAT WE KNOW. | 1.2 |
| AFSC-FTD HT-23-1450-68 | ON THE STRUCTURE OF A HETEROGENEOUS COMPUTING SYSTEM, CONTROLLED BY A LARGE DIGITA | 3.0 |
| AF-ESD TR-65-87 | ERROR CONTROL FOR DIGITAL DATA TRANSMISSION OVER TELEPHONE NETWORKS | 3.2.1 |
| ANU-CC TR-38 | A PROPOSED COMPUTER NETWORK FOR THE AUSTRALIAN NATIONAL UNIVERSITY | 3.1.0 |
| ARPA DAHC-15-60-C-0285 | DEMULTIPLEXING CONSIDERATIONS FOR STATISTICAL MULTIPLEXORS | 3.2.9 |
| ARPA DAHC-15-67-C-0141 | ARPA NETWORK SERIES: I. INTRODUCTION TO THE ARPA NETWORK AT RAND AND TO THE RAND V | 3.1.0 |
| ARPA DAHC-15-69-C-0172 | IMPROVEMENTS IN THE DESIGN AND PERFORMANCE OF THE ARPA NETWORK. | 3.1.2 |
| ARPA DAHC-15-69-C-0179 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWOPK | 3.1.1 |
| | TERMINAL ACCESS TO THE ARPA COMPUTER NETWORK. | 3.3.2 |
| | THE NETWORK CONTROL CENTER FOR THE ARPA NETWORK. | 5.1 |
| ARPA DAHC-15-69-C-0285 | COMPUTER NETWORK RESEARCH | 2.2 |
| | NODAL BLOCKING IN LARGE NETWORKS. | 2.1.2 |
| ARPA DAHC-15-70-C-0120 | RESEARCH IN STORE AND FORWARD COMPUTER NETWORKS. | 2.1 |
| ARPA 1380 | COMPUTER NETWORK RESEARCH | 2.0 |
| BBN P72-CSC-12 | PROPOSAL FOR CONTINUATION OF RESEARCH ON NATURAL COMMUNICATION WITH COMPUTERS. | 4.9 |
| BBN QTR-1 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN QTR-10 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN QTR-11 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN QTR-12 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK. QUARTERLY TECHNICAL RE | 3.1.1 |
| BBN QTR-13 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN QTR-14 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN QTR-15 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN QTR-2 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN QTR-3 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN QTR-4 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN QTR-5 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |

| | | |
|---|---|---|
| BBN QTR-6 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN QTR-7 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN QTR-8 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN QTR-9 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN R-1763 | INITIAL DESIGN FOR INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK. | 3.1.1 |
| BBN R-1783 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN R-1837 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN R-1890 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN R-1928 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN R-1966 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN R-2003 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN R-2059 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN R-2103 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN R-2123 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN R-2175 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN R-2270 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN R-2309 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK. QUARTERLY TECHNICAL RE | 3.1.1 |
| BBN R-2353 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN R-2396 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN R-2468 | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| BBN 2161 | A STUDY OF THE ARPA NETWORK DESIGN AND PERFORMANCE. | 3.1.2 |
| CCA TR-11 | A COOPERATIVE NETWORK OF TIME-SHARING COMPUTERS: PRELIMINARY STUDY | 3.0 |
| CU-CSMAG ENG-7165 | COMPUTER NETWORK MEASUREMENTS: TECHNIQUES AND EXPERIMENTS | 2.2 |
| CU-CSMAG ENG-7167 | NODAL BLOCKING IN LARGE NETWORKS. | 2.1.2 |
| CU-DEECS 5177.29 | ALGORITHMS TO REALIZE DIRECTED COMMUNICATION NETS | 2.1.2 |
| CU-LRL UCID-15754 | AN ENGINEERING VIEW OF THE LRL OCTOPUS COMPUTER NETWORK | 3.1.1 |
| CU-LRL 73149 | THE LAWRENCE RADIATION LABORATORY OCTOPUS. | 3.1.D |
| DA 2P023201A720 | IDEEA NETWORK IMPLEMENTATION FISCAL YEAR 1965 | 4.2 |
| DA 36-039-SC-85052 | MESSAGE ROUTE CONTROL IN A LARGE TELETYPE NETWORK | 2.1.3 |
| DAHC 04-71-C-0011 | NETWORK DATA HANDLING SYSTEM. SEMI-ANNUAL TECHNICAL REPORT | 4.1 |
| DAHC 15-69-C-0179 | A STUDY OF THE ARPA NETWORK DESIGN AND PERFORMANCE. | 3.1.2 |
| | A SYSTEM FOR INTERPROCESS COMMUNICATION IN A RESOURCE SHARING COMPUTER NETWORK | 3.5 |
| | COMPUTER COMMUNICATION NETWORK DESIGN--EXPERIENCE WITH THEORY AND PRACTICE. | 3.0 |
| | FLOW CONTROL IN A RESOURCE-SHARING COMPUTER NETWORK | 3.4 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK. QUARTERLY TECHNICAL RE | 3.1.1 |
| | THE INTERFACE MESSAGE PROCESSOR FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | THE NETWORK CONTROL CENTER FOR THE ARPA COMPUTER NETWORK. | 5.1 |
| | THE TERMINAL IMP FOR THE ARPA COMPUTER NETWORK | 3.3.2 |
| DAHC 15-69-C-0285 | ANALYTIC AND SIMULATION METHODS IN COMPUTER NETWORK DESIGN | 2.1.0 |
| | COMPUTER COMMUNICATION NETWORK DESIGN--EXPERIENCE WITH THEORY AND PRACTICE. | 3.0 |
| | COMPUTER NETWORK MEASUREMENTS: TECHNIQUES AND EXPERIMENTS | 2.2 |
| | COMPUTER NETWORK RESEARCH | 2.0 |
| | COMPUTER NETWORK RESEARCH | 2.1.0 |
| | HOST-HOST COMMUNICATION PROTOCOL IN THE ARPA NETWORK | 3.5 |
| | NODAL BLOCKING IN LARGE NETWORKS. | 2.1.2 |
| | PERFORMANCE MEASUREMENTS ON THE ARPA COMPUTER NETWORK. | 2.2 |
| DAHC 15-69-0179 | INITIAL DESIGN FOR INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK. | 3.1.1 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| | INTERFACE MESSAGE PROCESSORS FOR THE ARPA COMPUTER NETWORK | 3.1.1 |
| DAHC 15-7D-C-D120 | ANALYSIS AND OPTIMIZATION OF STORE-AND-FORWARD COMPUTER NETWORKS | 2.1.D |
| | COMPUTER COMMUNICATION NETWORK DESIGN--EXPERIENCE WITH THEORY AND PRACTICE. | 3.D |
| | TOPOLOGICAL CONSIDERATIONS IN THE DESIGN OF THE ARPA COMPUTER NETWORK | 2.1.2 |
| DAHC 71-C-0088 | COMPUTER COMMUNICATION NETWORK DESIGN--EXPERIENCE WITH THEORY AND PRACTICE. | 3.0 |
| | MCROSS--A MULTI-COMPUTER PROGRAMMING SYSTEM | 4.2 |
| DA-ARD D-31-124-G776 | ALGORITHMS TO REALIZE DIRECTED COMMUNICATION NETS | 2.1.2 |
| DCA 1D0-70-C-0009 | DATA TRANSMISSION NETWORK COMPUTER-TO-COMPUTER STUDY | 3.2.1 |
| FA-FCED M66-16-1 | IDEEA NETWORK IMPLEMENTATION FISCAL YEAR 1965 | 4.2 |
| HF 5548.2.P27 | THE CHALLENGE OF THE COMPUTER UTILITY | 4.3 |
| HU TR-869-3 | MULTIPLEXING IN THE ALOHA SYSTEM: MENEHUNE - KEIKI DESIGN CONSIDERATIONS | 3.3.2 |
| HU TR-870-2 | SIMULATION OF INTERFERENCE OF PACKETS IN THE ALOHA TIME-SHARING SYSTEM | 2.1.1 |
| IBM RC-3432 | A NETWORK/440 PROTOCOL CONCEPT | 3.5 |
| IBM-TJWRC RC-3317 | A COMPUTER NETWORK INTERFACE FOR OS/MVT | 3.4 |
| IBM-TJWRC RC-3331 | CONTROL CONCEPTS OF A LOGICAL NETWORK MACHINE | 3.0 |
| IBM-TJWRC RC-3417 | A COMMUNICATIONS INTERFACE FOR COMPUTER NETWORKS | 3.5 |
| IBM-TJWRC RC-3431 | NETWORK/440--IBM RESEARCH COMPUTER SCIENCES DEPARTMENT COMPUTER NETWORK. | 3.1.0 |
| IBM-TJWRC RC-3476 | DATA DESCRIPTIVE LANGUAGE FOR SHARED DATA. | 4.3 |
| IBM-TJWRC RC-3486 | EXPLORATORY RESEARCH ON NETTING IN IBM. | 3.D |
| IU-DCS R72-505 | NETWORK COMPUTER ANALYSIS | 2.1.2 |
| LC 65-21156 | MATHEMATICAL THEORY OF CONNECTING NETWORKS AND TELEPHONE TRAFFIC | 2.1 |
| LC 66-24245 | THE CHALLENGE OF THE COMPUTER UTILITY | 4.3 |
| LC 67-21328 | EDUNET REPORT OF THE SUMMER STUDY ON INFORMATION NETWORKS | 1.1 |
| LC 78-76038 | TELECOMMUNICATIONS AND THE COMPUTER. | 1.3 |
| MC MTP-333 | THE IMPLICATIONS OF ADP NETWORKING STANDARDS FOR OPERATIONS RESEARCH. | 1.1 |
| MC MTP-357 | SURVEY OF COMPUTER NETWORKS | 1.2 |
| MC MTR-2176 | MACIMS COMMUNICATION NETWORK CONFIGURATION | 3.2.2 |
| MC MTR-5122 | CONCEPTS FOR A WWMCCS INTERCOMPUTER NETWORK | 1.1 |
| MC MTR-6019 | PROPOSAL FOR THE DEVELOPMENT OF A SECURE PILOT NETWORK FOR THE WORLD-WIDE MILITARY | 3.1.0 |
| MC MTR-6181 | PROTOTYPE WWMCCS INTERCOMPUTER NETWORK (PWIN) DEVELOPMENT PLAN. | 3.1.1 |
| MC TM-04113 | ERROR CONTROL FOR DIGITAL DATA TRANSMISSION OVER TELEPHONE NETWORKS | 3.2.1 |
| MC WP-4083 | COMPUTATION OF MESSAGE DELAYS IN A COMMUNICATIONS NETWORK | 2.1.2 |
| MC WP-7447 | EXPERIMENTATION ON THE ARPA COMPUTER NETWORK. | 4.9 |
| MC WP-7809 | ARPA NETWORK EXPERIMENTATION USING EXISTING DATA MANAGEMENT SYSTEMS | 4.9 |
| MC WP-9598 | OPERATIONAL CONSIDERATIONS FOR THE IMPLEMENTATION OF COMPUTER NETWORKS IN THE NMCS | 1.2 |
| MC WP-9695 | CATALOG OF NETWORK FEATURES | 1.3 |
| MC WP-9707 | ANALYSIS OF NMCS PROBLEM AREAS RELATED TO COMPUTER NETWORKS AND PROPOSED NMCS NETW | 1.1 |
| MC WP-9710 | A RECOMMENDED RESEARCH AND DEVELOPMENT PLAN FOR DATA EXCHANGE IN THE WORLD WIDE MI | 4.9 |
| MC WP-9742 | EVALUATION OF THE NETWORK FEATURES REQUIRED TO ATTAIN THE APPROVED NMCS OBJECTIVES | 1.1 |
| MC WP-98D7 | PROPOSED IMPLEMENTATION PLAN FOR A WWMCCS INTERCOMPUTER NETWORK | 3.1.1 |
| MC WP-9845 | PROJECTED RESPONSE CHARACTERISTICS OF THE WWMCCS INTERCOMPUTER NETWORK | 2.1.2 |
| MC WP-9858 | DESIGN SPECIFICATIONS FOR PWIN NON-FUNCTIONAL NETWORK CONTROL SOFTWARE | 3.4 |
| MCA CA-7D11-2411 | ON PROGRAM TRANSFERABILITY. | 4.1 |
| MCN M-1070-TN-3 | THE COMMUNICATIONS COMPUTER OPERATING SYSTEM--THE INITIAL DESIGN | 3.1.1 |
| MCN 0571-PR-4 | THE MERIT COMPUTER NETWORK. PROGRESS REPORT FOR THE PERIOD JULY 1969-MARCH 1971 | 3.1.0 |
| MCN 0572-TP-8 | COMPUTER NETWORKS. | 3.1.D |
| MCN 1271-PR-7 | PROGRESS ON APPLICATIONS DEVELOPMENT, 1970-71. A REPORT OF THE ASSOCIATE DIRECTORS | 4.D |
| MIT ESD-TR-69-74 | AN EXPERIMENTAL COMPUTER NETWORK. | 3.1.0 |
| MIT-ESD TDR-65-68 | ON-LINE DOCUMENTATION OF THE COMPATIBLE TIME-SHARING SYSTEM. | 4.1 |
| MIT-LL TR-387 | ON-LINE DOCUMENTATION OF THE COMPATIBLE TIME-SHARING SYSTEM. | 4.1 |
| MIT-MAC TR-80 | THE CLASSROOM INFORMATION AND COMPUTING SERVICE. | 4.3 |
| MI-DEE SEL-48 | A STUDY OF OPTIMAL FILE ASSIGNMENT AND COMMUNICATION NETWORK CONFIGURATION IN REMO | 2.9 |
| MI-RADC TR-69-305 | EFFICIENT ALLOCATION OF RESOURCES IN CENTRALIZED COMPUTER-COMMUNICATION NETWORK DE | 2.1.2 |
| MI-SEL AR-4 | A STUDY OF INFORMATION IN MULTIPLE-COMPUTER AND MULTIPLE-CONSOLE DATA PROCESSING S | 2.1.2 |
| MI-SEL TR-36 | EFFICIENT ALLOCATION OF RESOURCES IN CENTRALIZED COMPUTER-COMMUNICATION NETWORK DE | 2.1.2 |
| MTR 5062 | SYSTEM LOAD SHARING STUDY | 1.2 |
| NASA NAS2-6700 | THE ALOHA SYSTEM | 3.2.1 |
| NBS REPORT 10-252 | STANDARDIZATION, COMPATIBILITY AND/OR CONVERTIBILITY REQUIREMENTS IN NETWORK PLANN | 5.5 |
| NBS REPORT 10-559 | PROBLEMS OF NETWORK ACCOUNTING, MONITORING AND PERFORMANCE MEASUREMENT | 5.3 |
| NBS 6D064D0 | PROBLEMS OF NETWORK ACCOUNTING, MONITORING AND PERFORMANCE MEASUREMENT | 5.3 |
| | STANDARDIZATION, COMPATIBILITY AND/OR CONVERTIBILITY REQUIREMENTS IN NETWORK PLANN | 5.5 |
| NIC-6742 | VIEWS ON ISSUES RELEVANT TO DATA SHARING ON COMPUTER NETWORKS | 4.1 |
| NIH PH-43-68-991 | STUDY OF COMMUNICATION LINKS FOR THE BIOMEDICAL COMMUNICATIONS NETWORK | 3.2.1 |

| | | |
|---|---|---|
| NONR 4102(01) | A POSITION PAPER ON COMPUTING AND COMMUNICATIONS | 5.0 |
| | PROCEDURES AND STANDARDS FOR INTER-COMPUTER COMMUNICATIONS | 3.5 |
| | THE CLASSROOM INFORMATION AND COMPUTING SERVICE | 4.3 |
| | THE MULTICS INTERPROCESS COMMUNICATION FACILITY | 3.4 |
| NPL-CSD COM-SCI-T.M.-52 | EASING THE INTRODUCTION OF A PACKET SWITCHING SERVICE | 3.3.1 |
| NPL-OCS COM-SCI-T.M.-36 | SOME OBSERVATIONS ON STORE-AND-FORWARD AND CIRCUIT-SWITCHED DATA NETWORKS | 2.2 |
| NPL-OCS COM-SCI-T.M.-47 | THE NPL DATA NETWORK | 3.1.0 |
| NPL-DCS COM-SCI-T.M.29 | A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--OBJECTIVES AND HARDWAR | 3.1.1 |
| | A MODEL FOR THE LOCAL AREA OF A DATA COMMUNICATION NETWORK--SOFTWARE ORGANIZATION | 3.1.1 |
| | EXPERIENCE WITH THE USE OF THE B.S. INTERFACE IN COMPUTER PERIPHERALS AND COMMUNIC | 3.3.1 |
| NPL-OCS COM-SCI-56 | SIMULATION OF DATA TRANSIT NETWORKS | 2.1.1 |
| NPL-DCS TM-51 | THE CHOICE OF PACKET PARAMETERS FOR PACKET SWITCHED NETWORKS | 2.1.2 |
| NSF GJ-1045 | THE STRUCTURE OF A DISTRIBUTED COMPUTER SYSTEM--THE DISTRIBUTED FILE SYSTEM | 3.1.1 |
| | THE STRUCTURE OF A DISTRIBUTED COMPUTING SYSTEM--SOFTWARE | 3.4 |
| | THE STRUCTURE OF A DISTRIBUTED COMPUTING SYSTEM--THE DISTRIBUTED FILE SYSTEM | 4.1 |
| | THE SYSTEM ARCHITECTURE OF THE DISTRIBUTED COMPUTER SYSTEM--THE COMMUNICATIONS SYS | 3.2.0 |
| NSF GJ-28289 | NETWORK COMPUTER ANALYSIS | 2.1.2 |
| NSF GJ-28599 | LANGUAGE RESEARCH AND THE COMPUTER: A STUDY OF THE CONCEPT OF A NATIONAL CENTER OR | 4.2 |
| NSF GJ-947 | REMOTE COMPUTING IN HIGHER EDUCATION: PROSPECTS FOR THE FUTURE | 1.1 |
| NSF GK-5256 | OPTIMUM CONCENTRATOR LOCATION IN TELECOMMUNICATIONS DESIGN | 2.1.2 |
| NSF GR-86 | ALTERNATIVE FUTURE COMPUTER-COMMUNICATION MARKETS | 5.4 |
| NSROC R-3650 | COMPUTER NETWORK SIMULATOR | 2.1.1 |
| ONR N00014-69-A-0200-4027 | DEMULTIPLEXING CONSIDERATIONS FOR STATISTICAL MULTIPLEXORS | 3.2.0 |
| PB-194 179 | STANDARDIZATION, COMPATIBILITY AND/OR CONVERTIBILITY REQUIREMENTS IN NETWORK PLANN | 5.5 |
| PB-200 674 | THE MERIT COMPUTER NETWORK, PROGRESS REPORT FOR THE PERIOD JULY 1969-MARCH 1971 | 3.1.0 |
| PB-203 552 | THE COMMUNICATIONS COMPUTER OPERATING SYSTEM--THE INITIAL DESIGN | 3.1.1 |
| PB-207 417 | NETWORK COMPUTER ANALYSIS | 2.1.2 |
| RADC TR-71-175 | NETWORK INFORMATION CENTER AND COMPUTER AUGMENTED TEAM INTERACTION | 4.1 |
| RC MEMO RM-4782-PR | A COMPUTER SIMULATION OF ADAPTIVE ROUTING TECHNIQUES FOR DISTRIBUTED COMMUNICATION | 2.1.1 |
| RC P-2359 | OVERLAPPING TESSELLATED COMMUNICATIONS NETWORKS | 2.1.2 |
| RC P-3235 | COMMUNICATIONS, COMPUTERS AND PEOPLE | 1.5 |
| RC P-3639 | SOME IMPLICATIONS OF NEW COMMUNICATIONS TECHNOLOGIES FOR NATIONAL SECURITY IN THE | 5.4 |
| RC RM-3097-PR | ON DISTRIBUTED COMMUNICATIONS: V. HISTORY, ALTERNATIVE APPROACHES, AND COMPARISONS | 2.1.3 |
| RC RM-3103-PR | ON DISTRIBUTED COMMUNICATIONS: II. DIGITAL SIMULATION OF HOT-POTATO ROUTING IN A B | 2.1.1 |
| RC RM-3420-PR | ON DISTRIBUTED COMMUNICATIONS: I. INTRODUCTION TO DISTRIBUTED COMMUNICATIONS NETWO | 1.0 |
| RC RM-3578-PR | ON DISTRIBUTED COMMUNICATIONS: III. DETERMINATION OF PATH-LENGTHS IN A DISTRIBUTED | 2.1.2 |
| RC RM-3638-PR | ON DISTRIBUTED COMMUNICATIONS: IV. PRIORITY, PRECEDENCE, AND OVERLOAD | 2.1.3 |
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