

Automating Operations at the National Energy Software Center*

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INTRODUCTION

The National Energy Software Center (NESC) is the U.S. Department of Energy's (DOE) software exchange and information center operated by Argonne National Laboratory for the DOE Office of Scientific and Technical Information. Software exchange and information center activities for the U.S. Nuclear Regulatory Commission (NRC) are carried out with support from the NRC. The Center's main objectives are:

- to provide a central computer software information and resource facility in support of DOE research and development programs,
- to manage the transfer of computer software developed under DOE sponsorship to outside organizations, and
- to serve as the DOE focal point for software exchange with other U.S. and foreign agencies.

To achieve these objectives, the Center:

- collects, packages, maintains, and distributes a library of computer software and data compilations in subject areas relevant to DOE's missions,
- prepares and publishes abstracts describing the software included in the NESC collection,
- checks software packages to make certain they are complete and runs test cases to verify they operate as described,
- assists users in identifying software available to meet their needs and implementing NESC software packages in their local computing environments, and
- maintains communications and exchange agreements with other U.S. and foreign government centers.

In addition to information services, the Center offers two products--the program abstract and the program "package". The abstract describes a computer program or data compilation, the problem it is intended to solve, the hardware required, and the material contained in the program package. The program "package" consists of the computer media containing the software and auxiliary files and machine-readable or hard-copy documentation.

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HISTORY

Under the auspices of the American Nuclear Society and the U.S. Atomic Energy Commission (AEC), the Argonne Code Center was established in 1960 to serve as a central facility for collection and dissemination of information on programs written in the area of nuclear physics, reactor design, and engineering. In 1972 the Center was designated as the AEC-wide software exchange and information facility and its scope expanded to cover the entire AEC research and development activity. The Center's role was broadened further with the transition from the AEC to the Energy Research and Development Administration (ERDA) and, later, to the Department of Energy in 1977. The Argonne Code Center was renamed the National Energy Software Center in July 1978 to reflect its present program and current computing technology. DOE cost recovery policies for the Center's services were implemented in August 1978 and revised in August 1982; a full cost recovery policy was implemented in 1986.

ACCESS - AN OVERVIEW

Within the first nine years of operation the Center was distributing over 900 program packages annually to requestors. Requests for programs and maintenance of the program abstracts were handled manually. As the number of requests and software contributions continued to climb, the need to reduce the amount of time spent on record keeping and request processing activities became critical.

In response to this need the Argonne Code Center Exchange and Storage System, or ACCESS, was written to automate the assimilation and distribution of the software packages. As initially designed, ACCESS contained six interrelated but distinct databases.

Abstracts (ABS)

An abstract may describe more than one program package since the NESC collection includes separate program packages for each unique machine version of a program. Each abstract has 18 items including a description of the problem solved by the package, the machine hardware and software required for execution, and the material available from the Center. This database, containing over 1323 abstracts, replaced voluminous punched card files.

Table-of-Contents (TOC)

The TOC file is a directory of one-line entries describing every program in the NESC collection. Each TOC entry contains information such as accession number, KeyWord-In-Context (KWIC) description, machine version, contributing installation, programming language, package contents and size, and subject category. There are nearly 1600 entries in the active TOC database and over 1000 entries in the archival TOC file. These records were previously stored on punched cards.

Package (PKG)

The largest database is the Package file which contains the computer-readable portion of many NESC packages. Each Package file entry is stored as a contiguous block of records that can contain up to six different types of information: source records, object or executable records, sample problem input or output, data libraries,

auxiliary information, and control information. Filling a request through the Package file enables more rapid disk-to-tape copying and automatic updating of the Request and Statistics files. There are 16 active and 14 archival package files currently in ACCESS.

Installations (INS)

The Installation file consists of three sections: registered installations or subscribers, other recipients of Center services, and data on library holdings distributed to requestors. The INS file replaced a Rolodex of mailing addresses, index cards of library transmittals filed by installation, and several notebooks containing transmittal information by accession number. There are over 2800 installation entries and associated holdings data for fiscal years 1962 through 1990 in this database.

Requests (REQ)

The Request file assigns a unique number to each package request filled by the Center. This file replaced portions of a manual "pending" file maintained by Center personnel. The number of entries in this file is quite volatile, changing daily as requests are entered upon receipt and removed upon transmittal.

Statistics (STA)

The Statistics file receives Request file entries once a request is filled. The file contains detailed recipient information, the date and package contents sent, as well as how the transmittal medium was recorded. This data is used to generate detailed distribution statistics and mailing labels for NESC announcements of bug fixes and updates. Statistics from fiscal year 1977 to date are kept on disk while data for fiscal years 1973 through 1976 are archived on tape.

ACCESS is written as a collection of modular programs, each written to perform a specific function or task using one or more of the databases. Three basic types of modules are used in ACCESS:

- file construction and maintenance modules,
- file editing and report generation modules, and
- special function or task modules.

Use of standardized nomenclature such as file maintenance verbs ADD, MODIFY, DELETE, and PRINT and report generator verbs SELECT, ORDER, and EDIT is employed throughout the ACCESS system.

TRANSITIONS

As the NESC scope and program evolved in the 1970's and 80's, so did ACCESS. Some of the earliest features were replaced by newer technology. E.g., distribution media evolved from 7-track tapes, punched cards, and paper tape to data cartridges, flexible diskettes, and CD-ROMs. Some files are not implemented today as first envisioned. One case is the Request database, initially designed to contain all program requests received

whether the program was in the library or not. As it became apparent that not all agency-sponsored software could or would be made available for distribution, the Request file's range was narrowed solely to requests for packages in the NESC collection.

Many modifications were made to ACCESS to accommodate the Center's changing scope. In response to implementation of the cost recovery policy, NESC users were divided into classes in the Installation database and two separate pricing algorithms were added to the TOC database for DOE and NRC software. Five of the six databases were affected when the Center's growth demanded expansion of the NESC accession number field from 3 to 4 digits and addition of an availability date as part of each program package's unique identifying key.

Most recently an entire database was added (Figure 1). Obtaining approval for distribution of U.S. technology to sensitive countries is often a time-consuming process. In recent years, as the number of foreign requests and the list of sensitive countries grew, the need for monitoring these requests became critical. Last year the Sensitive Country Approval (SCA) database was added to ACCESS to keep track of requests received from sensitive countries which are awaiting DOE approval for distribution. The SCA includes information extracted from the Request, Installation, and TOC databases to eliminate redundant keying of data and reduce the amount of error checking required.

The availability of new services has also necessitated changes to ACCESS. Users on the Bitnet network can submit requests to NESC SERV, the Center's on-line server, and receive files containing the requested information. The ABS and TOC databases are currently available for queries via this method. Through use of ACCESS report generators and auxiliary postprocessors, on-line searches of NESC and OECD Nuclear Energy Data Bank abstracts on the DOE OSTI Automated Retrieval System (OARS) are available to DOE offices and contractors and other government agencies.

FUTURE PLANS

A long-awaited feature still to be implemented is the ability to perform Boolean searches on selected abstract items such as keywords. This feature will help Information Services personnel answer questions on the appropriate NESC software for solution of specific problems.

Today responses to many inquiries are still handled manually. With a more flexible on-line service, many of these routine questions can be answered automatically. Plans to automate this process include acquisition of a front-end workstation to the Center's IBM 4331. This will enable expanded on-line access to NESC information resources to:

- browse through the Abstract database,
- perform queries on software currently available as well as software under review,
- access instructions for acquiring software,
- notify software recipients of new versions or editions being processed, and
- directly download software to users' systems in some cases.

ACCESS

Database Management
System

Database Interaction

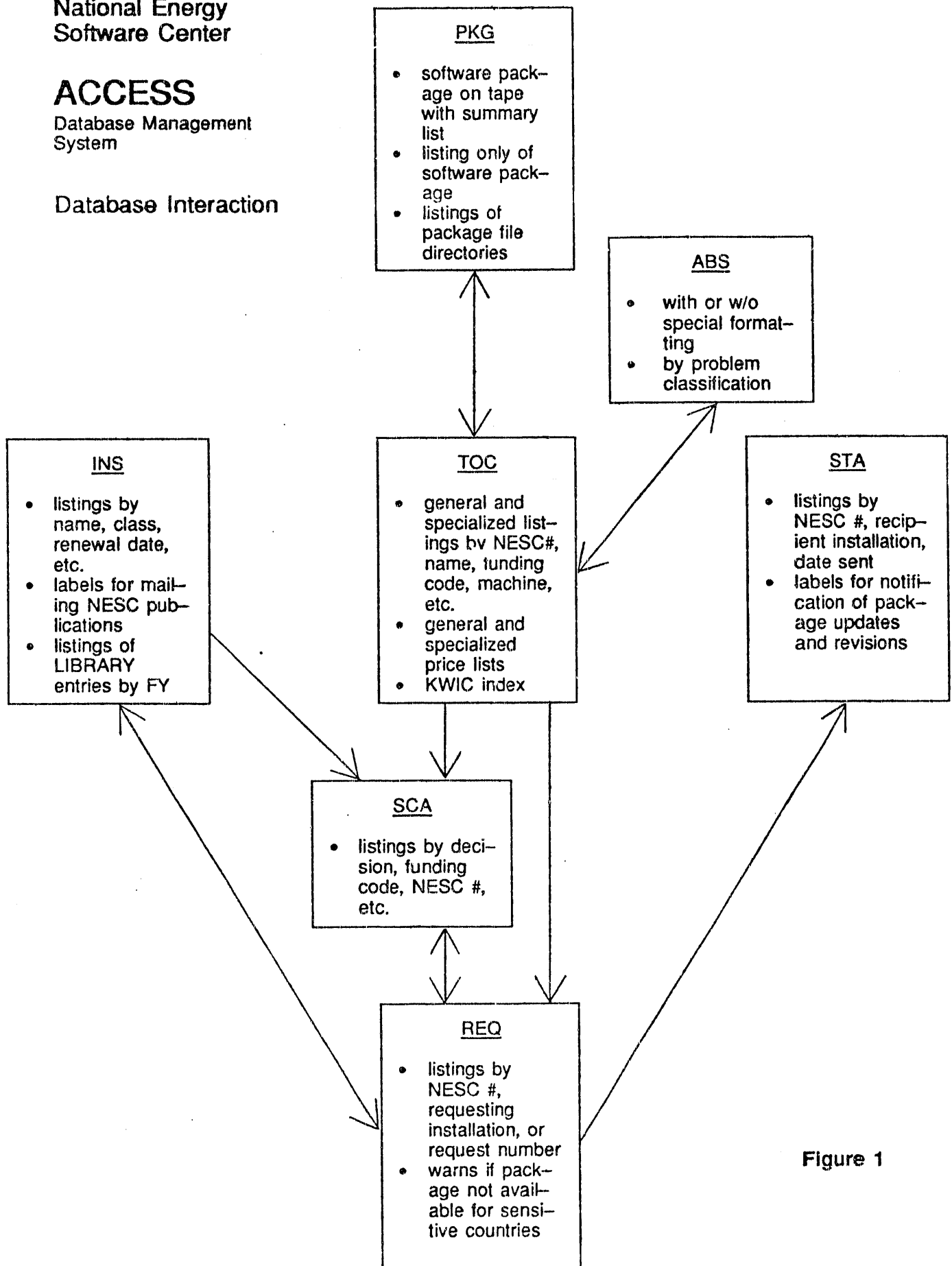


Figure 1

REFERENCES

1. J. M. Brown, M. K. Butler, M. M. DeBruler, F. K. Degges, H. S. Edwards, L. R. Eyberger, C. E. Hughes, P. L. Johnson, M. Legan, J. Mockler, L. L. Reed, and A. J. Strecok, National Energy Software Center: Compilation of Program Abstracts, ANL-7411 Revised, May 1979.
2. M. Birgersson, M. K. Butler, M. M. DeBruler, F. K. Degges, H. S. Edwards, C. E. Eyberger, L. R. Eyberger, P. L. Johnson, J. Mockler, J. M. Pietrzak, L. L. Reed, and A. J. Strecok, National Energy Software Center: Compilation of Program Abstracts, ANL-7411 Revised, Supplement 1, September 1982.
3. M. Birgersson, M. K. Butler, J. Carter, M. M. DeBruler, F. K. Degges, C. E. Eyberger, L. R. Eyberger, P. L. Johnson, and L. L. Reed, National Energy Software Center: Compilation of Program Abstracts, ANL-7411 Revised, Supplement 2, March 1986.
4. M. K. Butler, C. Harrison, Jr., and William J. Snow, "ACCESS--Automation Progress at the Argonne Code Center," Israel Society of Special Libraries and Information Centres, International Conference on Information Science, August 29-September 3, 1971, Tel Aviv, Israel.
5. Margaret K. Butler, "Networks--A Medium for Sharing," American Nuclear Society Topical Meeting on "Computational Methods in Nuclear Engineering," April 15-17, 1975, Charleston, South Carolina.
6. Larry R. Eyberger, "The National Energy Software Center," VIM-44 Conference, April 7-10, 1986, Columbus, Ohio.

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