LOGISTICS DATA INTEGRATION SYSTEM (LOGDIS):
CONNECTING LOGISTICIANS TO THEIR DATA

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ABSTRACT
This paper provides an overview of the LOGDIS prototyped at Wright-Patterson and Hill Air Force Bases. The LOGDIS prototype effort grew from an AFLC requirement for a common interface to logistics databases residing on dissimilar hosts in geographically-distributed locations. AFLC with the assistance of the Lawrence Livermore National Laboratory (LLNL), installed two prototype systems connected via the Defense Data Network (DDN). The prototype effort concentrated on the development of specialized networking applications to satisfy specific logistics data gathering requirements of the functional users. The success of the prototype systems convinced AFLC to proceed into a three year proof-of-concept phase involving all the Air Force Logistics Centers. This three year period gives AFLC the ability to measure intersite and intrasite logistics data traffic loads and define specific logistics data interface requirements for the production phase.

INTRODUCTION
In 1985, AFLC implemented two LOGDIS prototypes at Wright-Patterson and Hill Air Force Bases. The LOGDIS prototypes incorporated the Technology Information Systems (TIS) software developed by the LLNL for data communications and connectivity between dissimilar computers. The TIS software runs under the UNIX operating system. UNIX was chosen because of it's portability to a full range of computer workstations and mainframes and flexibility for connectivity to dissimilar hosts. The LOGDIS prototypes provided logisticians at Wright-Patterson and Hill: single terminal access to multiple incompatible, remote hosts; automatic login for authorized users to specific remote hosts; automatic login for authorized users to specific remote hosts, including computers in the Pentagon and at other Air Force Bases; capability to download files from hosts; extraction of data from multiple hosts and downloading to the LOGDIS computer and personal computers for data manipulation and reformatting; uploading of commercial wordprocessing files to the LOGDIS computer and file sharing with multiple users; file or information exchange between users via DDN's file transfer protocol and/or the TIS Electronic Mail program; capability to develop customized user application to improve productivity; security features such as individual user IDs and passwords, password aging, system accounting software, 60-second login timeout, and three attempts to login; support for AFLC's personal computers and terminals to connect to the LOGDIS computers; and login accounts for several thousand AFLC users.

USER'S SYSTEM
The LOGDIS prototype was designed to meet the needs of the functional logistician; those individuals working in one of AFLC's four primary logistics functions: Procurement, Material Management, Distribution and Maintenance. The system was not designed to solve a specific logistics application. Rather, the system was designed to provide AFLC's logisticians the tools needed to integrate with and get access to the other Logistics Management Systems (LMS) without disrupting the integrity of those systems. Figure 1 shows how LOGDIS interfaces with other LMS computers. LOGDIS was designed not to replace any existing or planned LMS or other data system, but rather to improve the utilization of the information within these systems.

AFLC logisticians have long awaited the benefits and productivity improvements inherent with the major LMS Modernization projects. However, not all of the user needs are solved with these systems. Some of the user's needs addressed and solved by LOGDIS include:

- Single terminal on-line access to current logistics data, wherever located.
- Data collection and integration onto a single host.
- Tools to manipulate the data for analysis and decision support.

DATA ACCESS
The LOGDIS prototype provides users of over 160 different terminals or personal computers with access to logistics data. This capability is accomplished using the TIS developed Network Access Machine (NAM) software. Using applications written with the NAM, a LOGDIS user can connect to one or more dissimilar computers simultaneously to transfer data from or perform other authorized activities on the connected computers. The LOGDIS computer uses a variety of communication methods to connect to the desired computer systems: DDN, Ethernet links, Broadband Local Area Network 1553

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link, commercial networks, and direct dialing over commercial telephone lines. The desired connections are accomplished automatically. The software is programmed to try alternative paths until a connection is made. The logisticians start a session by selecting a programmed menu option or typing a single command. The logisticians do not need to know the networking protocols, telephone numbers, or target system login procedures. The NAM software routine includes all these essential elements from information provided by host systems and data administrators. The NAM software solves two of the basic needs of AFLC logisticians. However, a NAM routine is written only after authority is granted by appropriate system and data administrators to access the target computers and data. This is essential to ensure the integrity and security of the logistics system and prevent any unauthorized access to or release of logistics information.

CONFIGURATION

Figure 2 shows the basic configuration of the LOGDIS. LOGDIS is a two processor, two operating system complex. The connectivity processor runs under the UNIX operating system. This processor includes the NAM software for the gateway functions and other software to provide menuing, electronic mail, and other office information systems (OIS) tools. The data manipulation processor runs under VM, MVS/XA, VMS and other operating systems. This processor includes the database software and other software needed for the processing of logistics data. The advantage of the dual operating environment configuration is quite apparent. AFLC has a system configuration that is open which leads to many vendor hardware solutions. As the production phase requirements mature this becomes an added advantage for AFLC. The open configuration allows the users to capitalize on existing resources. With the proper connection, each ALC can have a LOGDIS configuration with a minimum investment in new hardware and software. This is the approach the User Support Systems (USS) program office has taken in implementing proof-of-concept LOGDIS for each ALC. Using this implementation approach, the LOGDIS becomes the user's system - the foundation on which the system was designed from the beginning.

PROVEN APPLICATIONS

The LOGDIS prototype at Hill Air Force Base is used extensively for development and evaluation of applications using the NAM software. To date, several tailored applications have been developed; each to satisfy specific functional user needs for logistics data from multiple dissimilar computers. Each application was written after the data and systems administrators of the target system authorized access. Each application was developed to satisfy specific data access and gathering needs of the functional users. All applications were developed on the LOGDIS as a menu driven option to facilitate use by several logisticians.

The experience at Hill Air Force Base shows that LOGDIS has the capability to satisfy the three needs earlier listed. Experiments conducted by LLNL evaluators document an overall time savings of 20% using LOGDIS to accomplish procedures previously performed manually. These savings are an average of only four of the applications evaluated by LLNL. The limited sample was used to obtain an indication of the potential savings and benefits LOGDIS provides. Additional analysis is planned after the proof-of-concept configuration is fully installed in July 1988.

CONCLUSION

The prototype LOGDIS has proven it satisfies the functional logisticians need to get to their data. LOGDIS provides the access to data, collects the data, integrates the data, and the tools to manipulate the data for analysis and decision support. The proof-of-concept configuration will be used to demonstrate data access and connectivity on an intersite and intrasite basis. The proof-of-concept configuration serves as the basis to define specific data interface requirements and provides the needed information to quantify production phase requirements.
Central Logdis Complex

Batch Data

DDN

DATA MANIPULATION PROCESSOR

CONNECTIVITY PROCESSOR

(2 OPERATING ENVIRONMENTS)

LAN