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LANMAS: A NEW GENERATION COMPUTERIZED MC&A SYSTEM FOR THE DOE COMPLEX*

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Abstract

The Local Area Network Material Accountability System (LANMAS) is a network-based nuclear material accountability system that runs in a client/server mode. The LANMAS core software was developed at Los Alamos National Laboratory and released in a production mode in March 1996. Several Department of Energy sites are working to implement the core program and modify it by adding additional functionality and customizing the user interface. These modifications to the core software are made to meet site-specific accountability needs and to adapt the system to conform to the work environment at the individual sites. The result is the successful implementation of a new computerized accounting system at each site. This paper will provide an update on current activities, performance issues, core software support issues, and the status of the various site systems and will discuss the future direction of the LANMAS project.

Introduction

It has been over two years since the software development team at Los Alamos National Laboratory (LANL) was formed and began the design and coding of the core software for the Local Area Network Material Accountability System (LANMAS). Previous progress of this development project has been documented.1,2 The original budget and schedule defined a software product to be completed by the end of calendar year 1995. A beta software product was completed on time and the first production release (Version 1.0) of the software occurred in March of 1996. The schedule was revised and approved by Department of Energy (DOE) sponsors when customer sites expressed an interest in reviewing development by evaluating pre-release software versions.

Version 1.0 has undergone independent verification and validation by Quest Applied Technologies, Inc. in Dallas, Texas. This version of the software had sample screens that were intended to be modified by the customer, but which were usable without modification. The graphical user interface provided extensive nuclear material accounting functionality and a friendly system to interact with the database. Provisions were included to interface the software with any site-specific required software. Several DOE sites have started their site-specific development and have created custom screens (forms) for their application. This site-specific development was jump-started as a result of the early beta releases of the LANMAS software in 1995.

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LANMAS Program Status

An expanded version of LANMAS (Version 1.1) was begun in January 1996. This version was released in June 1996. Version 1.1 includes upgrading of the database design and additional functionality to expand the original core functionality. This expansion includes improved accounting period closing, shipper/receiver differences, non-accountable material support, and material balance area structure improvement. In addition to updates to the database structure, new screens and forms were developed to accommodate this additional functionality. Several formal documents were also updated to coincide with the upgraded Version 1.1. These document upgrades included the project management plan, the software requirements specification, and the software design description. The Los Alamos software development team is working closely with the software developers at Rocky Flats and Savannah River Site to make this upgrading as efficient as possible. Any other implementing sites will be taking advantage of the Version 1.1 release of LANMAS. Version 1.1 has also undergone independent verification and validation as a part of quality assurance for the software.

Limited performance tests have been performed using simulated databases and simulated operating conditions. Preliminary results of these tests indicate that the software performs satisfactorily with a large database. The complete evaluation of performance will not be done until the software has been fully implemented and operated under real working conditions with a real database.

LANMAS Features

LANMAS includes much of the functionality needed for a site to track DOE-reportable nuclear materials as well as nonreportable items. LANMAS tracks the movement of material throughout its life at the site. Containerization and packaging information can be associated with each item. Material processing is accomplished with user-defined scripts that can accommodate any site processing situation. LANMAS provides monthly closing processing including material decay and Nuclear Material Management and Safeguards System (NMMSS) reporting. Additional features of LANMAS comprise instrument control, physical inventory, and tamper seals tracking, as well as administrative functions to manage user authorizations, table maintenance, and legacy data conversion.

Status of Site Implementation

Several DOE sites have received the early beta versions of the LANMAS software and have continued their site-specific application development with Version 1.0 and Version 1.1 of the software. Savannah River Site and Rocky Flats are the two sites that are the closest to implementation of a computerized accounting system based on the LANMAS core software. Savannah River Site is replacing their sitewide reporting system, CLAS, with a system to integrate site material information called CNMMS. Rocky Flats is replacing their SAN system. Both sites have converted a majority of their legacy accounting data to the new systems and are in the process of migrating to their new accounting systems. Software developers at Hanford and Idaho Nuclear Engineering Laboratory have begun site-specific extensions to the core LANMAS software and other sites such as Nevada Test Site and Argonne National Laboratory are in the planning stages for implementing accounting systems based on the core LANMAS software.

Any DOE site that has interest can receive the latest release of the core software via FTP.
A users manual has been produced and is available to all candidate sites. This users manual provides guidance to the use of the core software screens. Training material for site programmer guidance on extending LANMAS has been developed by Quest Applied Technologies, Inc. and is available for any site interested in LANMAS. A workshop for site programmers at LANL is planned for the fall of 1996.

Future Directions

Plans are underway to add functionality to the core LANMAS software as the schedule and budget permit. Two identified modules are variance propagation and measurement control. Variance propagation is a recommended statistical technique to evaluate control limits for inventory differences. Automating variance propagation procedures in LANMAS makes good use of the other capabilities that are contained in LANMAS. Applicable measurement control programs are required for all sites that are performing accountability measurements on their inventories of nuclear material. LANMAS is a logical place to automate measurement control programs. Other features that are being considered for development for LANMAS are bar code data entry, automated anomaly detection, and integration with nondestructive assay instrumentation.

We are anticipating that other user needs may be identified with the implementation of new systems at the various DOE sites. Through the forum of a LANMAS users group, input will be collected and upgrades to the core LANMAS software will be identified for possible inclusion at some future date. Regular maintenance upgrades of the core software are planned so that the code stays current with subsequent releases of the Windows NT operating system, the SQL Server database, and Visual Basic. DOE has committed to supporting the core software as long as there is interest in the complex to implement it.

References
