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Author(s):

D. Sandoval
R. Strittmatter
J. Abeyta
J. Brown
T. Marks
B. Martinez
D. Jones
W. Hsue

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D. Sandoval, R. Strittmatter, J. Abeyta, J. Brown, T. Marks, B. Martinez, D. Jones,
and W. Hsue

Los Alamos National Laboratory
Los Alamos, NM 87545, USA, 505-665-3108

Abstract

The initial objectives of this effort were to provide a hardware and software platform that can address the requirements for the accountability of classified removable electronic media and vault access logging. The Media Tracker system software assists classified media custodian in managing vault access logging and Media Tracking to prevent the inadvertent violation of rules or policies for the access to a restricted area and the movement and use of tracked items. The MediaTracker system includes the software tools to track and account for high consequence security assets and high value items. The overall benefits include:

- real-time access to the disposition of all Classified Removable Electronic Media (CREM),
- streamlined security procedures and requirements,
- removal of ambiguity and managerial inconsistencies,
- prevention of incidents that can and should be prevented,
- alignment with the DOE's initiative to achieve improvements in security and facility operations through technology deployment, and
- enhanced individual responsibility by providing a consistent method of dealing with daily responsibilities.

Introduction

In response to initiatives to enhance the control of classified removable electronic media (CREM), the Media Tracker software suite was developed, piloted and implemented at the Los Alamos National Laboratory beginning in July 2000. The Media Tracker software suite assists in the accountability and tracking of CREM and other high-value assets. One component of the MediaTracker software suite provides a Laboratory-approved media tracking system. Using commercial touch screen and bar code technology, the MediaTracker (MT) component of the MediaTracker software suite provides an efficient and effective means to meet current Laboratory requirements and provides new-engineered controls to help assure compliance with those requirements. It also establishes a computer infrastructure at vault entrances for vault access logging, and can accommodate several methods of positive identification including smart cards and biometrics.

Currently, we have three mechanisms that provide added security for accountability and tracking purposes. One mechanism consists of a portable, hand-held inventory scanner, which allows the custodian to physically track the items that are not accessible within a particular area. The second mechanism is a radio frequency identification (RFID) consisting of a monitoring portal, which tracks and logs in a database all activity tagged of items that pass through the portals. The third mechanism consists of an electronic tagging of a flash memory device for automated inventory of

CREM in storage. By modifying this USB device the user is provided with added assurance, limiting the data from being obtained from any other computer.

Background

The Media Tracker and Vault Access Logging modules integrate bar code scanning and touch screens to facilitate and speed up the user's entry of vault access logging and classified removable electronic media tracking information. In response to Laboratory initiatives to enhance the verification procedures to enhance the control of classified removable electronic media (CREM) the MediaTracker software suite was developed, piloted and implemented at the Los Alamos National Laboratory. Using commercial touch screen computers and bar code technology, the MediaTracker (MT) component of the MediaTracker software suite provides an efficient and effective means to meet current Laboratory requirements and provides new-engineered controls to help assure compliance. The MediaTracker System implementation project was initiated in June of 2001 to provide control of classified electronic media for vaults utilizing paper logs to document classified removable electronic media activity. As of June 2004 there were 97 systems being used to track CREM and 54 vault logging systems used to automate the entry into high-security areas at Los Alamos National Laboratory. Currently, new devices such as the portable hand-held scanner, monitoring portals and the modified USB flash memory have been evaluated or implemented with the MediaTracker suite in the accountability and tracking of CREM and other high-value assets.

System Description

The MediaTracker system is a module of the MediaTracker software suite that includes the software tools to track and account for high-value items. It maintains records and transactions of item description, location, and ownership, and access logging for restricted areas consistent with Department of Energy requirements for the accounting and tracking of accountable classified items and vault access logging.

Media Tracker offers users a wide selection of tracking capabilities. An owner of the media can record the removal of media for use including its new location, review an item's current location and user, or browse the inventory records using a combination of sorting and filtering arrays. A capability to record a digital image of each item is available.

The Media Tracker software includes:

- a history of all transactions for each tracked item;
- the ability to browse item history by user, user organization, date range or transaction type;
- adding additional media users;
- browsing the status of classified electronic media; and
- a capability for automated backup to a remote data archive.

The Media Tracker and Vault Access Logging modules integrate bar code scanning and touch screens to facilitate and speed up the user's entry of vault access logging and classified removable electronic media tracking information. The use of a bar code scanner also eliminates keyboarding errors. Currently, identification of individuals is based on a bar code scan of LANL or

“registered/known” non-LANL security badge. A typical touch screen and bar code hardware configuration used in retail environments provides media tracking at the entrance of the vault/VTR (Figure 1).



Figure 1. Touch screen CPU, a laser bar code scanner, and the MediaTracker software provides media tracking at the entrance of the vault/VTR.

The Media Tracker applications suite of programs can be installed on PCs with Internet Explorer 5.0 or greater and running on Windows NT 4.0 SP5, Windows 2000 or Windows XP. A bar code scanner connected to the PC via a serial port or USB port is recommended but not necessary for running the Media Tracker Manager module. A bar code scanner and a touch screen are required to run the Media Tracker and Vault Access Logging modules. The programs can run stand-alone or as a suite and can be used on a single or networked group of computers.

Depending on the local system configuration, additional capability can be provided by the host organization including a local backup capability, spare components or UPS. These additional capabilities were discussed with the host organizations; however, the procurement and installation of these additional capabilities were not included in the MediaTracker project work scope.

The Media Tracker suite of applications—Media Tracker, Media Tracker Manager and Media Automated Vault Access Logging—was developed by the Nonproliferation and International Security Division of the Los Alamos National Laboratory operated by the University of California for the Department of Energy, National Nuclear Security Administration.

Operating Environments

The most common environment for the initial AVAL installations has been a stand-alone environment. Currently, the vault access logging systems are operated as unclassified data systems. All components located in a vault/VTR were approved for use in a vault/VTR.

The MediaTracker Manager (MTM) software is used for initial data entry and maintenance. The MTM software can be installed on an existing PC or on the AVAL computer if a keyboard is added to the MediaTracker system. If an existing PC is used for data entry, a data transfer mechanism

meeting the security requirements for the work area must be provided to transfer data between the MTM and AVAL computers.

Automated backup of the Media Tracker (MT) database can be provided in various ways:

- 1) If the MT is on a network, the host organization can use its normal backup procedures to back up the MT data. If the MT is not connected to a network, the host organization can provide a local, external Zip / JAZ, etc. drive, and the MT program will automatically make a backup copy of the data once per day.
- 2) If the MT system is not connected to a network and there is not a local external backup disk available, MT can make backup copies of the data once per day onto the internal hard disk. This will protect against major data loss because of a file corruption problem but it will not protect against a massive disk failure.

As of June 2004 there were 97 systems being used to track CREM and 54 vault logging systems used to automate the entry into high security areas.

Alternative Devices

These devices are designed to assist accountability and tracking of CREM within the MediaTracker suite.

Portable Identification Devices

Portable Identification Devices, such as hand-held scanners are used to automate the process of conducting a physical inventory. These devices increase the efficiency of the process by allowing for automatic and instantaneous reconciliation of inventory discrepancies. Additionally, this portable equipment facilitates seamless and electronic transaction capabilities.



Figure 2. Hand-held Inventory Scanner.

Conducting a physical inventory may be required for annual or special inventories, custodial changes, and/or resolving system anomalies. Traditionally, these exercises have required an individual to physically identify an item and validate the identification number of the item against a paper list of the book inventory. Through this process, a physical location to be inventoried was selected; all items were identified; and all anomalies were reported. This process would be automated.

When performing a physical inventory, discrepancies must be reconciled. Previously, this has required transactions to be created to correct the status of the item being inventoried. This process is also automated.

Bulk transactions allow for an “operation” to occur on one or multiple items. An operation might be to destroy, transfer, check-in, check-out, originate, reproduce, change class, receive, transmit, and/or verify an item or group of items. This once cumbersome process of tracking the movement of items is also - automated.

Monitoring Portals

The use of RFID tags on variety of computer media formats has been tested in a non-classified test environment. The portal monitors would be placed at strategic locations in pedestrian corridors where CREM are commonly transported. The primary and immediate purpose of the pedestrian portals is to manage and track CREM assets. The portals would, therefore, provide engineered controls for the confirmation of compliance with CREM archival and distribution-release procedures. Portals assist in identifying instances where a distracted or forgetful CREM-distribution patron has neglected to record a transaction, or episodes where a record of a transaction was not successfully completed or archived because of hardware or software difficulties at the distribution transaction workstation.



Figure 3: RFID tags applied to a CD are shown being monitored using a pedestrian portal. A similar application of RFID tagging could be implemented with the flash memory drive.

As engineered controls relied upon for security applications, the monitor systems need to be robust against the anticipated measures that a malicious individual might take to defeat detection by the system. Reliable deployment of RF portal monitors in security applications greatly increases the demands upon the RF monitor system performance in terms of the penetration-depths and spatial uniformities of the interrogation signals to maintain adequate RF couplings among system components for successful detections. The greater performance and more detailed scenario evaluation demands make the qualification of RF pedestrian portal monitor systems for CREM inventory security applications more remote than for use in innocent-infraction and warning applications.

The pedestrian portal monitoring technologies considered in this document exclusively operate on radio-frequency (RF) communication principles. Conceivably, contact-based (e.g., i-wire) and line-of-sight (e.g., barcode readers) technologies can be used for identifying items. The reasons for the limitation to RF technologies are the non-intrusive proximity detection capabilities, the ability for identification without line-of-sight between item and reader, and the high degree of spatial uniformity for reliable ID tag detection within the interrogation zone that is theoretically achievable with RF monitoring technologies. Additionally, RF systems allow one to introduce multiple items for survey simultaneously and while in transit, whereas technologies such as barcode scanners require one to survey items individually.

Modified USB Flash Memory

The modified USB flash memory with visual and electronic tagging provides a high level of accountability and engineered control where CREM must be used.

This mechanism is under operational pilot testing as part of an overall LANL CREM reduction and enhanced control program to reduce the number and varieties of CREM used for classified data and assure tight control of the allowable CREM. The pilot system has the following elements:

- highly visible classification marking while in use,
- electronic tagging to provide continuous and on-demand inventorying, and
- modified USB flash drive to assure distinction of classified and unclassified media.

A second generation application is proposed in a “classified information library” that serves as a transition path to a fully “diskless computer environment.”



Figure 4: Modified USB flash drive, serial number chip device and high visibility tag (or Smartcard).

USB flash memory devices have emerged as a device of choice for storage or transfer of files within the last several years. The reason for this is its compact geometry (key chain size), no external power necessary, and relatively large capacity (several gigabytes). Utilizing a modification to the USB connection, and the external placement of the flash memory to the computer provides an efficient solution for controlling and monitoring CREM not available to most other forms of electronic media in use today.

The flash memory serves to reduce the amount of CREM and to enhance the control of the remaining CREM. In a second-generation implementation the goal is to transfer data from existing CREM to a central storage device, located in a local “information library.” This is similar to a central server media-less desktop computing environment using need-to-know controls. In the

absence of a classified network connection the user transfers the needed files physically using the flash memory device as a highly controlled transfer media.

The USB flash drive connectors can be modified to provide incompatibility between classified media/readers and unclassified media/readers.

Reference

- [1] Ninety Percent Conceptual Design Report: Enterprise Accountability System for Classified Removable Electronic Media, LA-CP 03-0969, December 2003.