CASE STUDY

ISSUED 11/08

National Capital Region Data Exchange Hub

NATIONAL CAPITAL REGION DATA EXCHANGE HUB PROGRAM

SYNOPSIS

In an effort to establish the technology architecture needed across the jurisdictions, the National Capital Region (NCR) created a Data Exchange Hub (DEH) to act as a switching station for providing secure access to communications systems and applications. As a part of this effort, four information exchanges were identified as priorities and documented—NCR Resource Typing, Crisis Incident Management System (CIMS) Data Exchange, Records Management System (RMS) Exchange, and Computer-Aided Dispatch Exchange. These exchanges were developed using the National Information Exchange Model (NIEM), and the resulting Information Exchange Package Documentation (IEPDs) successfully demonstrated the utility of NIEM in the NCR project. The Computer-Aided Dispatch Exchange will be the first production exchange and will be implemented in March 2010. All of the message structures and the IEPDs to support the exchange are complete and awaiting implementation.

AGENCY OVERVIEW

NCR encompasses the District of Columbia and parts of Maryland and Virginia, including the cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park; the counties of Arlington, Fairfax, Loudoun, and Prince William in Virginia; and the counties of Frederick, Montgomery, and Prince George's in Maryland, which include the municipalities of Bladensburg, Bowie, College Park, Frederick, Gaithersburg, Greenbelt, Rockville, and Takoma Park. These jurisdictions, operating as a regional partnership—Metropolitan Washington Council of Governments (MWCOG)—have been working together since 1957 to implement "intergovernmental policies, plans, and programs."

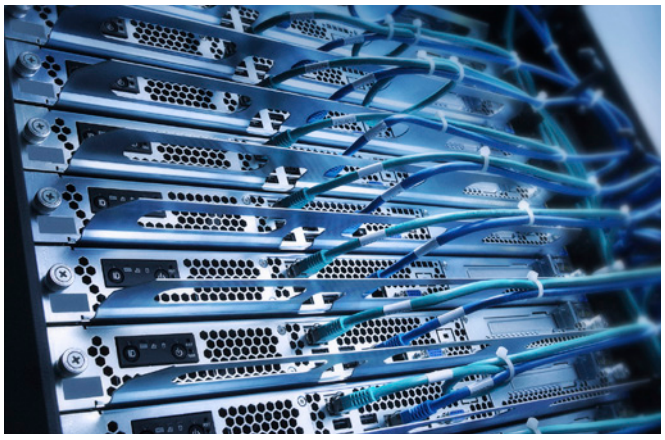
EXECUTIVE SUMMARY

CHALLENGE: The NCR needed to establish an information technology architecture across the region to strengthen the flow of information between Emergency Support Functions (ESFs) across independent governmental entities. These first responders need the ability to share information and data in a reliable and secure manner. As part of the regional interoperability infrastructure, the Data Exchange Hub (DEH) acts as a switching station of sorts, providing secure, noncommercial, restricted access to critical regional communications systems and applications to facilitate real-time, anytime, interoperable data communications.

SOLUTION: The DEH is predicated on a comprehensive framework that addresses not only the technology needs but also the business, applications, and data requirements for regional interoperability. Using NIEM, the program focused on four initial IEPDs to define certain electronic transmissions of information from one computer system to another—NCR Resource Typing, Crisis Incident Management System (CIMS) Data Exchange, Records Management System (RMS) Exchange, and Computer-Aided Dispatch Exchange.

RESULTS: The first three IEPDs were demonstration projects. The Computer-Aided Dispatch Exchange will be the first production exchange and will be implemented in March 2010. All of the message structures and the IEPD to support the exchange are complete and awaiting implementation. The Computer-Aided Dispatch Exchange IEPD is NIEM-conformant and leverages the Law Enforcement Information Technology Standards Council (LEITSC) NIEM 2.0 CAD RMS IEPDs. The NCR DEH development team worked directly with LEITSC representatives to improve the NIEM 2.0 CAD RMS IEPDs to support additional functionality required in the CAD Exchange.

In 2005, the Metropolitan Washington Council of Governments (MWCOG) Chief Information Officers (CIOs) Committee established the NCR Interoperability Program, www.ncrnet.us, a regional initiative to create a common communications infrastructure and systems interoperability for public safety and emergency response using funding from the U.S. Department of Homeland Security (DHS) Urban Area Security Initiative Grant Program.



CHALLENGE

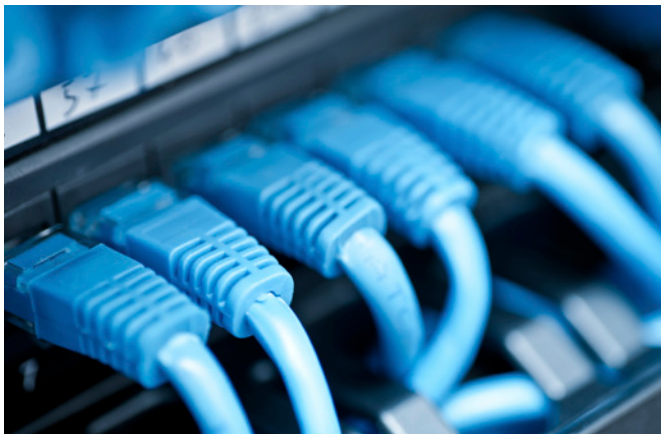
The objective of the program was to establish the information technology architecture needed across the region to strengthen the flow of information between Emergency Support Functions (ESFs). These first responders need the ability to share information and data in a reliable and secure manner to save lives, preserve property, and ensure that proper communications systems and processes are available on demand to support organized emergency response. As part of the regional interoperability infrastructure, the DEH acts as a switching station of sorts, providing secure, noncommercial, restricted access to critical regional communications systems and applications to facilitate realtime, anytime, interoperable data communications.

SOLUTION

The DEH is predicated on a comprehensive framework that addresses not only the technology needs but also the business, applications, and data requirements for regional interoperability. The DEH enterprise architecture aligns the emergency support processes, IT software and hardware, local and wide area networks, people, operations, and projects within the NCR's overall mission of "building and sustaining an integrated effort to prepare for, prevent, protect against, respond to, and recover from 'all-hazards,' threats, or events."

The NCR focused on information exchanges to define certain electronic transmissions of information from one computer system to another:

1. **NCR Resource Typing**—This NIEM IEPD is proposed as a baseline for developing a message set to support the typing and exchange of Emergency Management Resource Information. The JIEM Conceptual Framework was used to identify the information to be exchanged between sending and receiving agencies, including data elements, data types, links between data elements, and data usage. A follow-on session was held to define a specific Web-based user interface for the inventory and to refine the schema to support that specific exchange of data elements. Several meetings were held with the Federal Emergency Management Agency (FEMA) Disaster Management Team that supported the evolution of the Emergency Management (EM) domain (derived from EDXL) within NIEM based on the findings of our requirements sessions.
2. **Crisis Incident Management System (CIMS) Data Exchange**—This exchange demonstrates the feasibility of sharing incident information between CIMS systems in the Emergency Operations Centers (EOCs) within the NCR (such as WebEOC) and other regional and federal systems (such as the DHS Homeland Security Information Network (HSIN), Frederick County, Maryland Office of Emergency Management (OEM) SharePoint portal).
3. **Records Management System (RMS) Exchange**—This exchange demonstrates the feasibility of extracting incident data from existing Records Management Systems (RMS) or Computer-Aided Dispatch (CAD) systems, translating it into a NIEM-compliant data standard, and making it available to consuming applications, such as a prototype NCR regional mapping application, using the DEH Service Oriented Architecture (SOA). The goal of this exchange is to improve situational awareness for emergency managers in the region.
4. **Computer-Aided Dispatch Exchange**—The Fire Departments of Alexandria City, Arlington County, and Fairfax County, signatories of the Northern Virginia (NoVA) Emergency Services Mutual Response Memorandum of Agreement, have been operating as one department in utilization of resources since the early 1970s.



Over time, the NoVA agreement has been amended to encompass virtually all fire suppression, EMS, and command units. Currently, all requests for resources are handled manually. Implementing interoperability between these CAD systems reduces dispatch times, improves response times, and results in better service to citizens. Following the NCR Exchange Development Life Cycle (EDLC), once a Project Charter was executed, technical sessions were held with fire/EMS personnel from Alexandria, Arlington, and Fairfax to develop detailed functional and technical requirements. Currently, the development team and jurisdictional operational and technical representatives are conducting technical meetings with each respective CAD vendor to discuss the technical requirements required to implement functionality. Follow-on meetings will be scheduled to discuss the level of effort and schedule for development and implementation.

RESULTS

The NIEM IEPDs developed for the NCR served as a successful demonstration of NIEM's ability to meet the needs of a complex, multijurisdictional project. The Computer-Aided Dispatch Exchange will be the first production exchange and will be implemented in March 2010. All of the message structures and the IEPD to support the exchange are complete and awaiting implementation. The Computer-Aided Dispatch Exchange IEPD is NIEM-conformant and leverages the Law Enforcement Information Technology Standards Council (LEITSC) NIEM 2.0 CAD RMS IEPDs. The NCR DEH development team worked directly with LEITSC representatives to improve the NIEM 2.0 CAD RMS IEPDs to support additional functionality required in the CAD Exchange. As a result, the feedback provided enabled LEITSC to update its core set of CAD and RMS NIEM 2.0 IEPDs to make them more effective tools for others.

To gain the situational awareness necessary to respond to emergency incidents, emergency responders are dependent on data from a variety of resources. And although these disparate systems store data differently, with different software and data structures, the DEH allows communication between systems via a mutually understood IT structure and terminology. The DEH architecture is designed to achieve implementation of this common IT structure across all ESFs in the region and provides the following benefits to first responders:

- **Improved Situational Awareness**—The DEH provides increased awareness of the available data stores within the region and the business processes they support. Data is structured using a common vocabulary describing both the data and emergency resources available in the region.
- **Secure, Reliable, and Flexible Access**—The DEH provides secure access to the heterogeneous data stores held around the region.
- **Increased Productivity and Reduction in Response Times**—The DEH provides a framework that maps data to processes. As the overlap between processes performed across ESFs in the region becomes apparent, the processes can be refined to facilitate timely decision making.
- **Improved Ability to Plan for Future Business Needs**—The DEH provides a structured approach for implementing, monitoring, and maintaining regional IT systems and applications, ensuring interoperability at the data level. Strategies, policies, processes, and procedures for implementing regional IT systems promote interoperability.

This project was supported by Grant No. 2007-NC-BX-K001 awarded by the Bureau of Justice Assistance, in collaboration with the U.S. Department of Justice's Global Justice Information Sharing Initiative. The Bureau of Justice Assistance is a component of the Office of Justice Programs, which also includes the Bureau of Justice Statistics, the National Institute of Justice, the Office of Juvenile Justice and Delinquency Prevention, and the Office for Victims of Crime. Points of view or opinions in this document are those of the author and do not represent the official position or policies of the U.S. Department of Justice.