

From Stove-pipe to Network Centric Leveraging Technology to Present a Unified View

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Abstract

In today's Command and Control (C2) environment critical information is located in many disparate data sources. C2 decision-making can be adversely affected by insufficient or unavailable access to information located in these disparate data sources. This paper will provide an overview of the problems surrounding this issue, a real-world scenario representing the problem, and how the problem was overcome using a network centric approach. The paper will also demonstrate how the application of current technology can be leveraged to present a unified view of data from disparate data sources, and how our organization is leveraging technology to help the Warfighter eliminate the stove-piping of information to increase network centricity. The objective of this paper is to present the reader with insight on how to utilize today's technology to allow leaders to make well-informed decisions, thus increasing their effectiveness in fighting the Global War on Terrorism (GWOT). By understanding our use of technology in support of the Warfighter, the reader will gain key insights on how to improve their own organization's capabilities to support C2 decision-making.

1.0 Introduction

In a recent article in National Defense magazine, Lawrence P. Farrell Jr. stated:

... new agencies—as well as existing ones with new missions—tend to stove-pipe their activities, especially with respect to information. It is important to counter this tendency and to promote collaborative sharing of information.

(Farrell, 2002)

The introduction of technology to the battlefield has been both boom and bust. For the Army, the transition from intelligence spot reports called in over the command net to an automated intelligence feed—directly from intelligence collectors and sensors to the intelligence analyst—has led to significant advances in situational awareness. One major challenge that the Army still faces is the stove-piping of information. With stove-piping, information travels up and down in an organization, with little sharing horizontally

between organizations. Many advances have been made in tactical information sharing; however, with each new mission there is a recurring tendency to stove-pipe information.

2.0 Background

The U.S. Army Communications-Electronics Command (CECOM) Software Engineering Center (SEC) Battlespace Systems Support Directorate (BSSD), Intelligence Fusion Systems (IFS) Division at Fort Huachuca, Arizona, is a recognized Department of Defense (DoD) leader in software development, maintenance, enhancement, integration, configuration management, test services, and field support for U.S. Army tactical systems. Our goal is to provide timely, reliable and maintainable software support services and products to the U.S. Army Military Intelligence, Terrain and Weather communities worldwide and to multiple Program Executive Office (PEO) and Program Manager (PM)'s in support of their systems' development, training and fieldings.

The IFS mission is to:

Provide life-cycle software products and services that enhance Army/Joint warfighting, management, and support capabilities, to ensure that America's warfighters continue to own the decisive edge from the battlespace through the sustaining base.

During Operation Iraqi Freedom (OIF), CECOM SEC had in excess of seventy engineers embedded with Army units in the Area of Operations (AO). These engineers provided direct and timely support to the Warfighter. The CECOM SEC engineers investigated, isolated, repaired, and reported software anomalies. They also assisted the Warfighter with rapidly adapting the intelligence architecture to meet new mission demands.

3.0 Scenario

Intelligence analysts operating in geographically distributed locations have a limited capability to interact and collaborate on intelligence products. Stove-piped intelligence dissemination systems limit access to intelligence products and provide a limited capability to search or browse databases and perform comparative analysis.

(Alberts, 1999, p. 114)

The All Source Analysis System-Light (ASAS-L) is a U.S Army automation solution for tracking tactical intelligence data. The ASAS-L consists of a robust set of tools that allow the intelligence analyst to track enemy units, equipment, facilities, individuals, events and organizations as well as the relationships among them. The system can receive data from multiple sources using various communications mediums: Tactical Local Area Networks (TACLAN), Wide Area Networks (WAN) and tactical radio communications. The intelligence information that is received is stored in various databases within the ASAS-L. One of these databases, called the Stability and Support Operations Integrated Database (SASOIDB), stores Stability and Support Operations (SASO) entity data such as information about Individuals, Events, and Organizations (IE&O) and their

relationships.

Prior to the commencement of combat operations in OIF U.S. Army V Corps intelligence personnel began to use the ASAS-L and the SASOIDB database to track enemy SASO data. As the operation progressed, the database continued to grow, and after the completion of major combat operations in Iraq the database became even more important as OIF switched in earnest to tracking SASO data within the country.

With the commencement of the SASO phase, and to some extent during the combat phase, the intelligence analysts were presented with a new challenge—how to track enemy detainees. They also quickly realized that they had a large and rapidly growing SASO database from which they could not easily share information to other units. The only person that could directly view or query information in the database was the analyst who was actually sitting behind the keyboard. Once again, as in previous operations, they were stove-piping information, which was unacceptable to the senior leadership. To remedy the problem a decision was made to create a web application that would provide access to the data utilizing a standard web browser.

CECOM SEC personnel were embedded with the unit to provide software support for the ASAS-L and other ASAS systems. Some of the CECOM SEC personnel had experience with creating web applications using Macromedia ColdFusion. ColdFusion is a scalable web application server that allows users to rapidly develop web-based products. It runs on a variety of platforms such as Windows, Linux, and Unix, and supports all of the major standards including Extensible Mark-up Language (XML), web services, Java, and Microsoft .NET, and is easily integrated into an existing infostructure. ColdFusion was selected as the weapon of choice to rapidly create a web-based interface to provide access to the SASO data on the ASAS-L giving the Warfighter a complete historical record on individuals and affiliations, providing timely, actionable, and vetted intelligence to the commander.

CECOM SEC engineers created an initial capability, using ColdFusion, to allow web users to view lists of each of the three main SASO entity types: IE&O, along with the ability to view most of the details about each selected entity type. The application also provided the capability to perform limited keyword searches against the SASO data, or view data within predefined geographical areas. To track detainee information the intelligence analysts added metadata to an existing subject field in the ASAS-L SASOIDB. The ColdFusion application could then query against this data to track detainees within the web interface.

The ColdFusion application resided on a separate server, which connected to the ASAS-L and retrieved SASO data at regularly defined intervals, and stored the data on the ColdFusion Server in what Macromedia calls a Collection. The use of Collections reduced the load on the ASAS-L while keeping the information displayed relevant for the web users.

As operations progressed in the theater, the same capability was implemented at the Combined Joint Task Force-7 (CJTF-7) headquarters. The C2 CJTF-7 gave a high

priority to the implementation and enhancement of the ColdFusion application to support the CJTF-7 mission. In addition to the ability to store textual data about SASO entity types, the ASAS-L can store multimedia data as well, i.e., images, audio files, Microsoft Word documents, etc., to which the Warfighter wanted access. In response to these new requirements our organization utilized its Rapid Application Development (RAD) Team to create an enhanced version of the ColdFusion application, in order to meet the Warfighter's needs.

4.0 Leveraging Technology

CECOM SEC solicited requirements from the theater commanders and intelligence personnel, and began the development of an enhanced ColdFusion application. This enhanced version was completed and delivered in a 30-day period, meeting a critical February 2004 deadline for CJTF-7. The enhanced ColdFusion Application included the following capabilities:

- Integrate display of relationships between IE&O
- Ability to view all details of a record
- Link to any multimedia data associated with an entity
- Display the source of the information for each entity
- Make query results exportable as a Microsoft Excel spreadsheet or Comma Delimited text
- Ability to track detained and detained/subsequently released individuals

The enhanced ColdFusion application also included the ability to track detainees within a separate database that was synchronized with the SASOIDB individual data on the ASAS-L. The application was optimized for low-bandwidth applications, by limiting the number of images on a page, and providing paged views of the lists of entity data and query results. Several predefined queries were created to quickly access information that analysts wished to view on a frequent basis. The enhanced application included the ability to view all SASO entity types in a common format, providing a consistent user-friendly interface.

5.0 Conclusion

Much of the success in tracking SASO entities within the OIF AO can be attributed to the successful application of technology to eliminate the stove-piping of information in theater. By creating a web-based application that meets the demands of the Warfighter, CECOM SEC has created a powerful tool to aid the commander in C2 decision-making, simplifying the process, and virtually eliminating the stove-piping of SASO information. The addition of the ColdFusion enhanced web interface to the intelligence architecture quickly and efficiently transformed SASO tracking in theater from a stove-piped, limited capability to a network centric enabler. The use of the enhanced ColdFusion application has significantly improved the situational awareness of the Warfighter in the continued fight of the Global War on Terrorism.

References

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