Web-based Information Infrastructure for Homeland Security

During the recent operation Iraqi Freedom, a new approach called "Blue Force Tracking" was successfully tested and applied. One of the great challenges of modern joint and combined warfare is that the information needed to make decisions is distributed to a variety of information systems, which have been procured and developed in a stove-piped manner. Until recently, the only thing we could do about this was "punching holes into the stove-pipes and connecting them using lots of duct-tape." The underlying problem was that systems were not designed with the idea of information sharing and net-centricity in mind. Procurement was project-driven, and not portfolio driven.

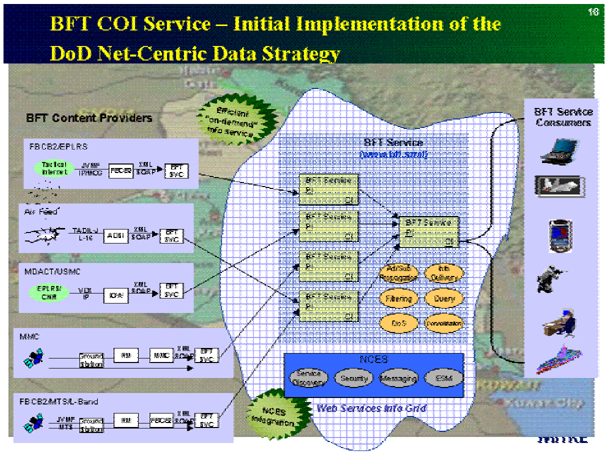
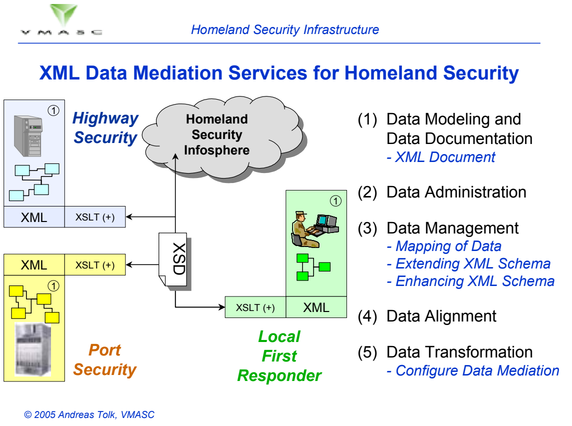

BFT COI Service – Initial Implementation of the DoD Net-Centric Data Strategy

Figure 1: Concept of Blue Force Tracking, © MITRE

The idea of "Blue Force Tracking" was to analyze the information structure needed to make good decisions first and capture the structure in a common schema. Next, the information hosted in existing systems was mapped to this schema. The commercially supported standard of Extensible Mark-up Languages (XML) enabled this approach. As XML is a common communication language of the Internet, this information could be brought together from the various systems and displayed using standard web browsers on standard PCs. In other words: the decision maker had all information he needed at hand in a consistent display, no matter in which system the information was originally hosted. Furthermore, the update of this picture was near real-time and the updates were distributed to all subscribed users immediately.

Within Homeland Security, we have a similar challenge. All participating organizations are using their own information systems and databases, rarely designed to exchange information. However, commercially available tools enable the easy definition of XML interfaces to these systems. VMASC developed an XML data mediation service, which can be used to map this interfaces into one common, federated scheme. Furthermore, VMASC developed a PC based display for common operational pictures, which can easily be adapted to Homeland Security applications. Both services are based on open standards and are platform and operating system independent. Together with partners, VMASC also developed the necessary web service infrastructure to ensure secure and preferment information exchange.

Within the first year of the project, VMASC assisted by partners – in particular by the C3I Center of George Mason University – will select two systems supporting Homeland Security and generate a common operational Homeland security picture accessible via a secure web browser so that both systems share the same information. In the second year, the methodology will be documented and a tool suite recommended to integrate more systems into this information sharing pool. At least one more system will be integrated to prove the feasibility and practicability of the recommended solution. Beside the prototypical federation, the tool set and underlying methodology will be delivered at the end of the project, enabling the core of a new Homeland Security infrastructure based on commercially viable, inexpensive off-the shelf, but nonetheless secure solutions. This infrastructure will allow integrating real systems as well as training systems and can become a hub between community center for training, education, and real world operations. PCs, workstations, High-Performance Clusters, or Handhelds can access it.


Homeland Security Infrastructure

XML Data Mediation Services for Homeland Security

(1) Data Modeling and Data Documentation
- XML Document

(2) Data Administration

(3) Data Management
- Mapping of Data
- Extending XML Schema
- Enhancing XML Schema

(4) Data Alignment

(5) Data Transformation
- Configure Data Mediation

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Figure 2: Concept of the Homeland Security Infrastructure, © VMASC