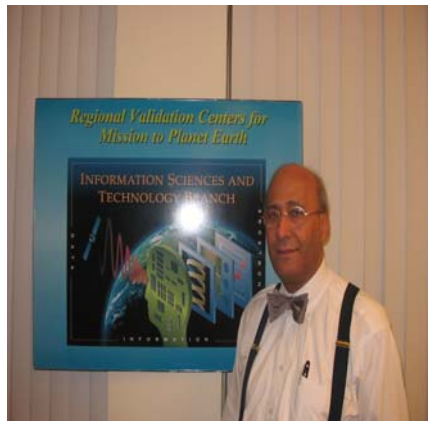# Secure Information Sharing and Dissemination in the Context of Public Security

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Abstract

In the context of homeland security, one of the key challenges in such environment is achieving effective, timely and orderly collaboration and information sharing among various government agencies at the Federal, state, and local levels. These agencies are using the Web as one of the means for sharing related information that is of different forms. In case of a crisis, a virtual response team needs to be formed in an ad-hoc manner. Members of this virtual response team come from various government agencies and private organizations. Depending on various factors, including the location and the nature of the crisis, the composition of this virtual multi-agency response team may change from one crisis to another. Furthermore, during the course of a given crisis the membership of this virtual multi-agency response team (VMART) may change dynamically to accommodate various needs (e.g., public health versus fire) and to confirm to certain constraints, such as jurisdictions, e.g., as the crisis extended from only New York, initially to New Jersey.

Members of the VMART are both information providers and information consumers. As an information provider, an agency will send information, such as a situation report, to the rest of the team as soon as it is created/acquired. As this information is "pushed" to the various agencies, there is a need to be concerned about access to such information both at the agency level (intra-agency) as well as within a given agency (inter-agency). In this talk we present the detail of the problem, discuss related research issues and outline some solution approaches to address these issues.

At the intra-agency level, each agency that is member of the VMART fulfils a certain role and is accordingly, privileged to access certain information that is necessary to

discharge its duties and fulfill its responsibilities within the overall efforts. For example, the public health agency would need to have access only to information related to public health. Assuming an XML document, the public health agency would need to access only the portions of the document that pertain to public health.   Without loss of generality, we assume that the role structure within the VMART is of hierarchical nature.

Due to the dynamic nature of the environment, a situation may arise where there is a need to admit as a member of the VMART an agency that was not part of the overall predefined set of agencies. For example, as certain crisis evolves, the DHS might find it necessary to include the State Department as a member of the current VMART. In this case, DHS should be able to assign the State Department an appropriate role together with matching privileges that enable it, the State Department, to fulfill it function in the overall efforts. Clearly, in this case, the DHS can not grant to the State Department privileges that they themselves do not own.

At the inter-agency level, each of those agencies that make up a virtual multi-agency response team, has its own complex security policy. In addition, within each of these agencies there are individuals who perform a certain role (e.g., chief, first responder), possess different credentials and have different levels of access privileges that match their duties and their roles within the agency. Adherence and enforcement of these distributed policies that determine who can access what information at what level of granularity, (e.g., the entire situation report, or only the part of the report that pertains to public health) are essential in order to ensure effective interagency and inter-governmental response.

In this talk, we develop a Role-based access control model and associated mechanism for fine-grained accessing and dissemination of XML documents in such distributed and heterogeneous environment. Specifically, the model supports distributed policy enforcement of fine-grained access and selective dissemination of XML documents (the entire document and individual XML elements) in dynamically formed virtual organizations.

Bio: of Dr. Nabil R. Adam
At Rutgers University in Newark, New Jersey, Dr. Nabil R. Adam is a Professor of Computers and Information Systems; the Founding Director of the Rutgers University Center for Information Management, Integration and Connectivity (CIMIC); past Director of the Meadowlands Environmental Research Institute; and the Director of the Laboratory for Water Security. Dr. Adam has published numerous technical papers in such journals as *IEEE Transactions on Software Engineering*, *IEEE Transactions on Knowledge and Data Engineering*, *ACM Computing Surveys*, *Communications of the ACM*, *Journal of Management Information Systems*, and *International Journal of Intelligent and Cooperative Information Systems*. He has coauthored/co-edited ten books. Dr. Adam is the co-founder and the Executive-Editor-in-Chief of the International Journal on Digital Libraries and serves on the editorial board of a number of journals including *Journal of Management Information Systems*, the *Journal of Electronic Commerce*, and the *Journal of Electronic Commerce Research and Applications*. He is also the co-founder and past chair of the IEEE Technical Committee on Digital Libraries.

Dr. Adam's research work has been supported by over $15 million from various federal and state agencies, including the National Science Foundation (NSF), the National Security Agency (NSA), NOAA, the U.S. Environmental Protection Agency, the Defense Logistics Agency (DLA), the National Library of Medicine, the New Jersey Meadowlands Commission, and NASA.

He has been invited lecture at several national and international institutions/forum including: The first US-China International Workshop on Digital Government Research and Practice (IntDG 2006), Beijing, China, Sponsored by U.S. National Science Foundation, the Chinese Academy of Sciences, and the National Natural Science Foundation of China, 2006; The Seventh World Congress on the Management of e-Business, Halifax, Canada, 2006; ETRIC, International Conference on Emerging Trends in Information and Communication Security, Germany 2006; IEEE Workshop Working Together: R&D Partnership in Homeland Security, the National Conference on Digital Government Research, 2005; Digital Library Colloquium Speaker Series, Carnegie Mellon School of Computer Science AND Lab of Education and Research on Security Assured Information Systems, University of Pittsburgh, 2005; Hungarian US R&D Workshop - Information Society technology and Research Challenges, Sponsored by NSF and ELTE Ithaka, Budapest, Hosted by Hungarian Ministry for Information &Telecommunications and Ministry of Education, Hungary, 2004; The National Conference for Digital Government Research, May 2002; The National Research Council's Workshop on Coping with Increasing Demands on Government Data Centers, 2002; The IEEE/ARL/NASA Workshop on Information Assurance, 2001; The International Symposium on Government and Ecommerce Development, Ningbo, China, April 2001, Co-sponsored by the United Nations Department of Economic and Social Affairs, the Ningbo Municipality, the Chinese Academy of Science, the Chinese Academy of Engineering, the Ministry of Information Industry of China, and Zhejiang University of China.