

Data and Applications Security and Privacy Developments and Directions

**Dr. Bhavani Thuraisingham
The University of Texas at Dallas**

February 23, 2011

Developments in Data and Applications Security: 1975 - Present

- **Access Control for Systems R and Ingres (mid 1970s)**
- **Multilevel secure database systems (1980 – 1995)**
 - Relational database systems: research prototypes and products; Distributed database systems: research prototypes and some operational systems; Object data systems; Inference problem and deductive database system; Transactions
- **Recent developments in Secure Data Management (1995-2010)**
 - Secure data warehousing, Security Models (RBAC/UCON/ABAC), Trust Models (Trust-X); XML security and Secure Semantic Web; Data mining for intrusion detection and national security; Dependable data management; Secure knowledge management and collaboration, 3Ps (Privacy, Provenance, Polices)
- **Some Interdisciplinary Research**
 - Bioinformatics, Geroingormatics and security

Directions for Data and Applications Security: 2011 and Beyond

- **Policies: Confidentiality, Trust, Privacy, Provenance**
 - What are the tradeoffs, How can we develop flexible systems?
- **Economics**
 - What are the costs of incorporating security?
- **What are the special attacks in Data and Applications?**
 - How can we build a secure data management system from untrusted components? (e.g., query processor, Transaction manager)
- **New kind of Data Management System based on Scientific Principles? (Science of Data Security?)**
- **Interdisciplinary Research**
 - **Social Scientists (incentives, game theory) and Management Scientists (risk analysis)**

Some Action Items?

- **NSF Data and Applications Security Workshop was held in February 2009 and the Workshop Report was completed in June 2010.**
- **<http://www.utdallas.edu/~jxr061100/nsf.html>**
- **Workshop Groups**
 - **Policies, Governance and Compliance**
 - **Pervasive Computing and Social Networks**
 - **Specialized applications – Geospatial, Bioinformatics, Energy, Healthcare security**
 - **Building next generation secure data systems and applications**
 - **Semantics, Information Sharing and Incentives**
- **Keep this report as a starting point and have another workshop in 2012 – focused on specific topics (e.g, science of data security, interdisciplinary); Invite participants from multiple areas.**