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14. ABSTRACT
The main objective of this project is to research, design, and prototype the integrated, secure, embedded, and fine-grained security frameworks that can be used to provide self-protecting security for assured information sharing applications. These frameworks extend and use a variety of open standards, including eXensible Access Control Markup Language, XML Encryption, and XML Signature, in an integrated manner such that the access control policies, encrypted data, and digital signatures are all embedded and secured with the digital content to be protected. In addition, these security mechanisms are applied in a fine-grained manner such that different parts of

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Report Title

Self-Protecting Security for Assured Information Sharing (2013 Progress Report)

ABSTRACT

The main objective of this project is to research, design, and prototype the integrated, secure, embedded, and fine-grained security frameworks that can be used to provide self-protecting security for assured information sharing applications. These frameworks extend and use a variety of open standards, including eXensible Access Control Markup Language, XML Encryption, and XML Signature, in an integrated manner such that the access control policies, encrypted data, and digital signatures are all embedded and secured with the digital content to be protected. In addition, these security mechanisms are applied in a fine-grained manner such that different parts of the digital content can be protected using different access control policies or encryption algorithms/keys.

We are extending our general-purpose self-protecting security framework, which can be used to protect digital content of any type or format, by adding support for data governance and publish-subscribe service. We are also extending our domain-specific framework for protecting electronic medical records by integrating advanced cryptographic schemes, such as attribute-based encryption and privacy-preserving keyword search capabilities, for patient-controlled and cloud-based personal health record applications.

Self-Protecting Security Framework for Assured Information Sharing

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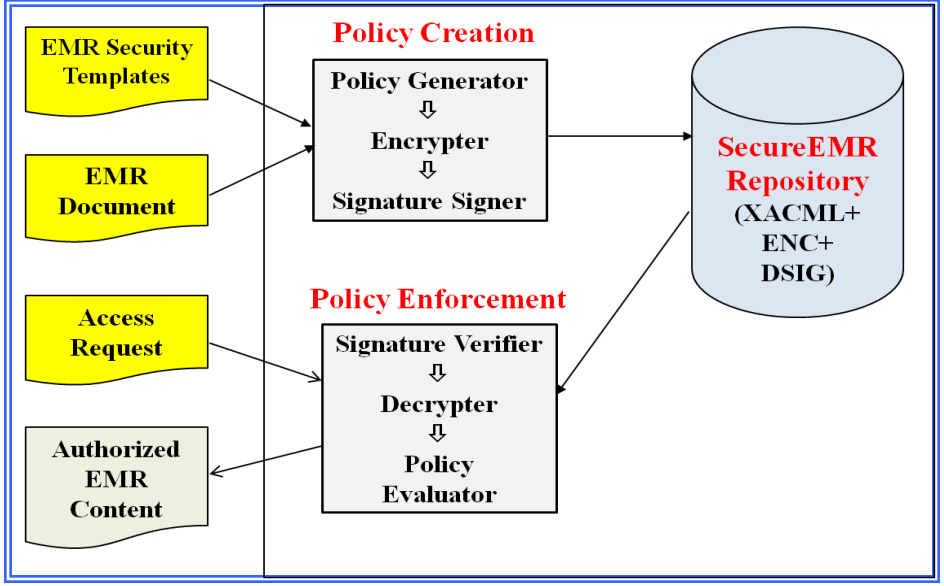
Objective:

Design and develop secure, integrated, embedded, and fine-grained security frameworks for Assured Information Sharing applications:

- ❑ Design a new domain-specific framework for protecting electronic medical records
- ❑ Extend frameworks to support secure data governance and publish-subscribe interaction
- ❑Incorporate new policy-driven security capabilities
- ❑Develop and enhance prototype software systems



Scientific/Technical Approach:

Extend and integrate XML based security standards to provide self-protecting security:

- ❑ Embedding - Content and security related information embedded in a single data object
- ❑ Fine-grained - Different parts of content can be protected with different rules, crypto keys, etc.
- ❑ Open standards - XACML for access control, XML Encryption for confidentiality, XML Signature for integrity

Enable lifetime protection no matter where data resides.

Accomplishments/Highlights (FY13):

- ❑ Completed Version 1 prototype software system for EMR self-protecting security framework
- ❑ Proposed a design for a cloud-based personal health record service using the security framework and advanced cryptographic schemes
- ❑ Published 5 peer-reviewed papers; supported 2 students; engaged 9 students in related research

Next Steps for Research:

- ❑ Continue with work on data governance and publish-subscribe
- ❑ Integrate advanced crypto schemes into prototype