Secure Information Sharing and Access Control in PLM Systems
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Product Lifecycle Management (PLM) System

Problems with current model
- Disparate Protection mechanisms: Lack of common data sharing and protection mechanisms
- Loss of control: No control over how sensitive data are used, shared and protected by partners
- Lack of Policies: Lack of mechanisms to communicate owner policies and ensure policy enforcement
- Lack of trust: Inability to track or audit shared data in external domains
- Information disclosure for subpoenas
- Insider abuse: No protection against insider attacks

Problem Statement
How to provide control over shared data in an external domain?

General Solution
- Encrypt data
- Define Policies for data sharing, access and usage
- Setup Policy Enforcement Mechanism to control data interaction

Policy Enforcement at Owner
- Client-server paradigm
- Lot of exchange of messages
- Requires source availability

Policy Enforcement in Middle
- Pub/Sub model
- Trusted Third Party (TTP) related issues
- Single point of trust and failure

Policy Enforcement at Receiver
- DRM solutions
- Requires the presence of a Trusted Component
- Restricted to known/trusted hosts

Data are considered passive entities unable to protect themselves
Require another active and trusted entity – a trusted processor, memory module, application or a third party

Proposed Approach
- Metadata
  - Access control policies
  - Identity information
  - Life duration
  - ...
- Virtual Machine
  - Policy enforcement
  - Self-Integrity check
  - Filtering
  - Apoptosis

AB Interaction
- Host S → Host A
- Host C → Host B
- Selective dissemination: Organize data into separate items(versions) and encrypt each item with a different key
- Independence of a dedicated TTP: Use secret sharing to split keys into shares and store them in a DHT
- Protection against compromised or malicious receivers: Utilize Trusted Platform Module (TPM) and use code obfuscation

AB Challenges