CERIAS

The Center for Education and Research in Information Assurance and Security

Secure Information Sharing and Access Control in PLM Systems

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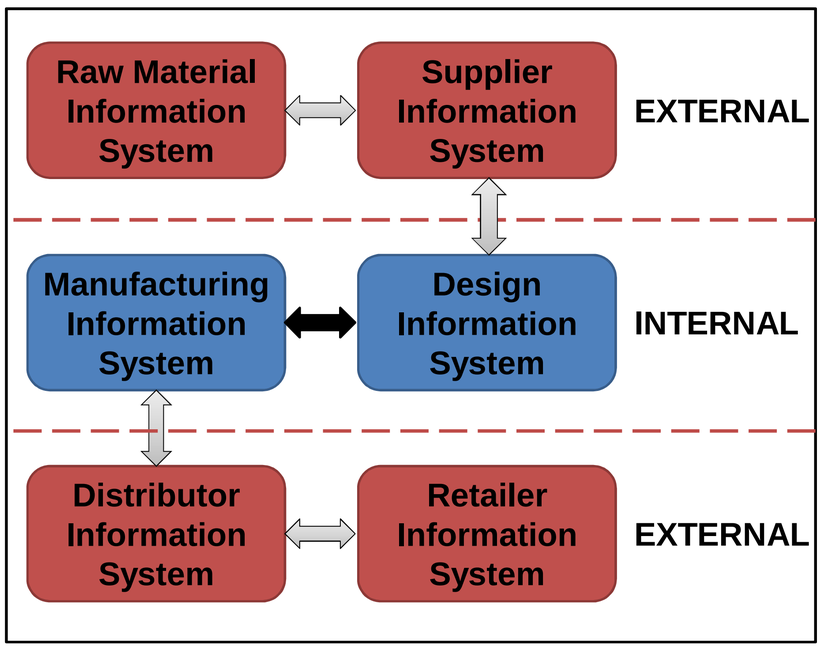
Product Lifecycle Management (PLM) System



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

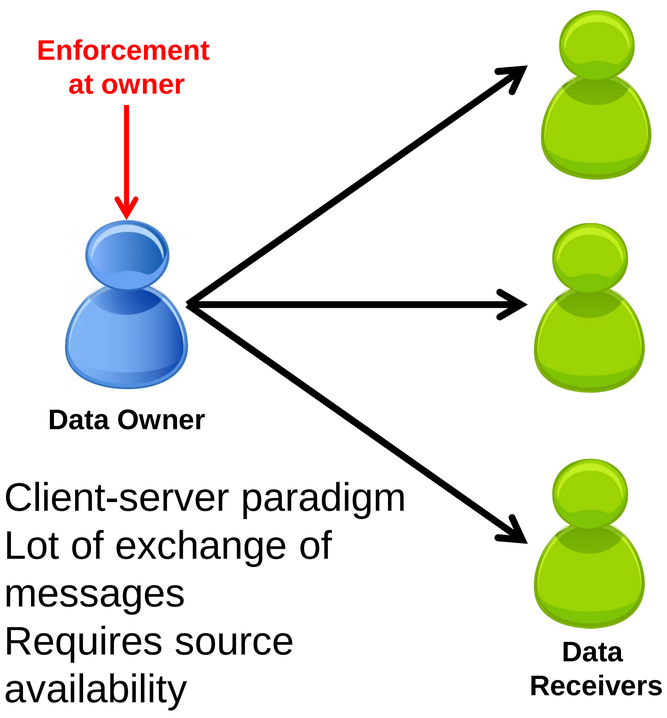
Problem Statement

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

General Solution

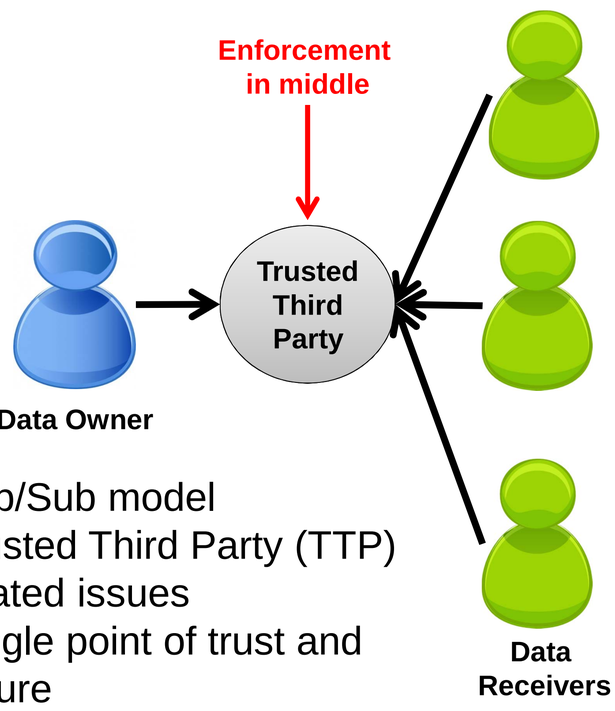
- Encrypt data
- Define Policies for data sharing, access and usage
- Setup Policy Enforcement Mechanism to control data interaction

Policy Enforcement at Owner



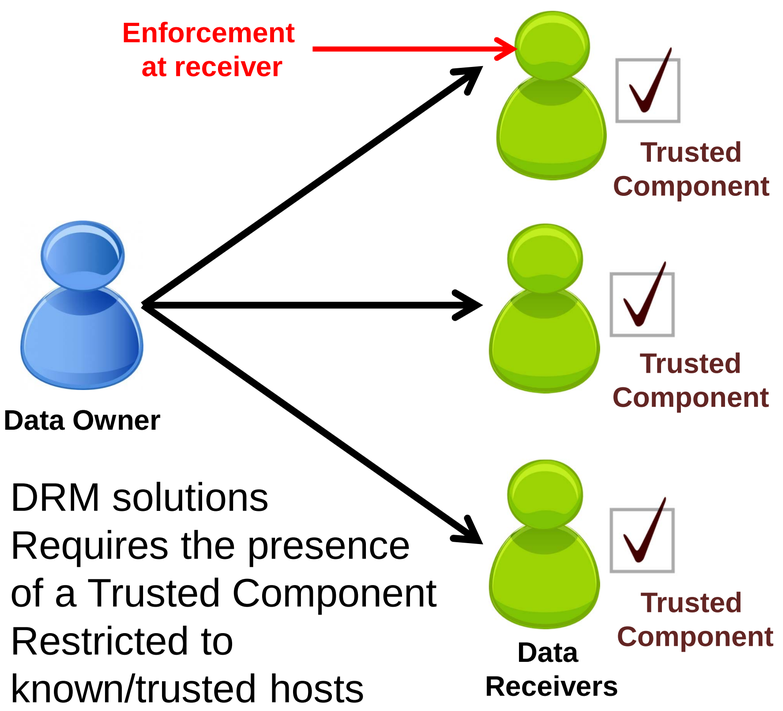
- Client-server paradigm
- Lot of exchange of messages
- Requires source availability

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

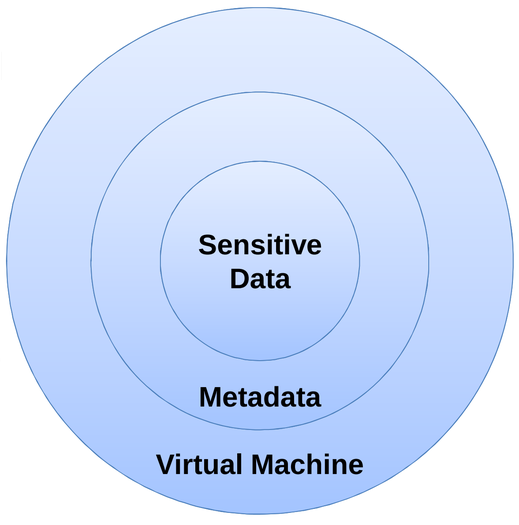
Proposed Approach

Metadata

- Access control policies
- Identity information
- Life duration
- …

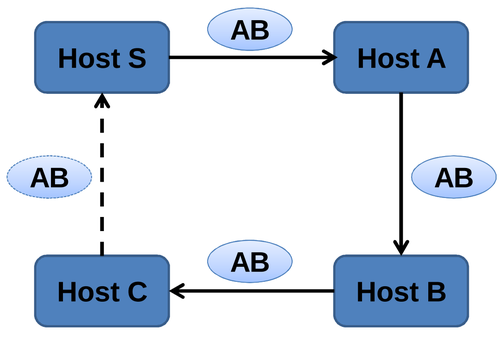
Virtual Machine

- Policy enforcement
- Self-Integrity check
- Filtering
- Apoptosis



Active Bundle (AB)

AB Interaction



- Decentralized distributed asynchronous communication
- No dependence on a dedicated TTP
- Works in unknown/untrusted environment
- No requirement to install a Trusted Component on receivers
- Controlled and Selective data dissemination

AB Challenges

- **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

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