CERIAS

The Center for Education and Research in Information Assurance and Security

Sustainable Secure Data Dissemination in Distributed Environments

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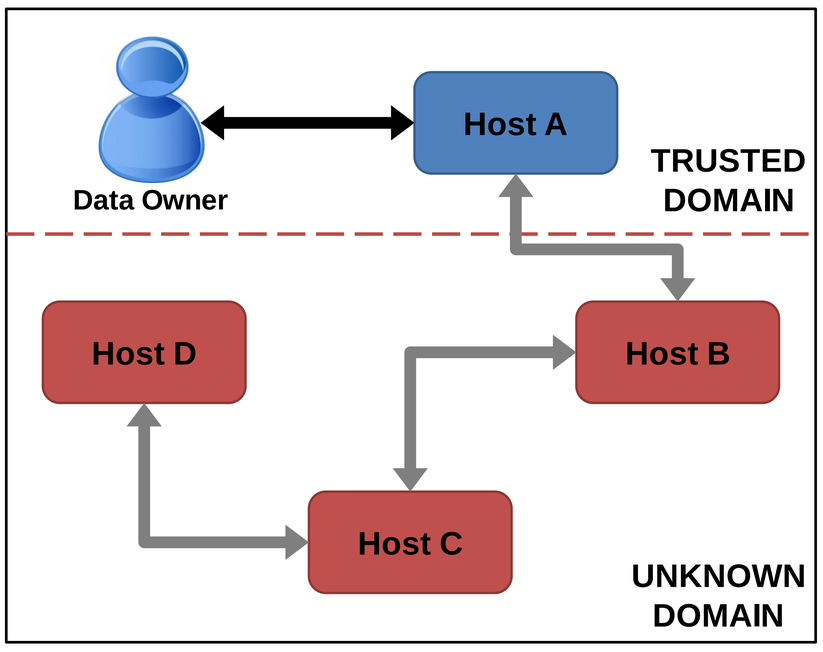
Distributed Interaction



Problems with current model

- Lack of visibility on interactions in unknown domains
- Loss of control over shared data in unknown domains
- Disparate protection mechanisms used by different parties
- Lack of policy communication and enforcement mechanisms
- Lack of tracking and auditing mechanisms
- Lack of trust in interactions

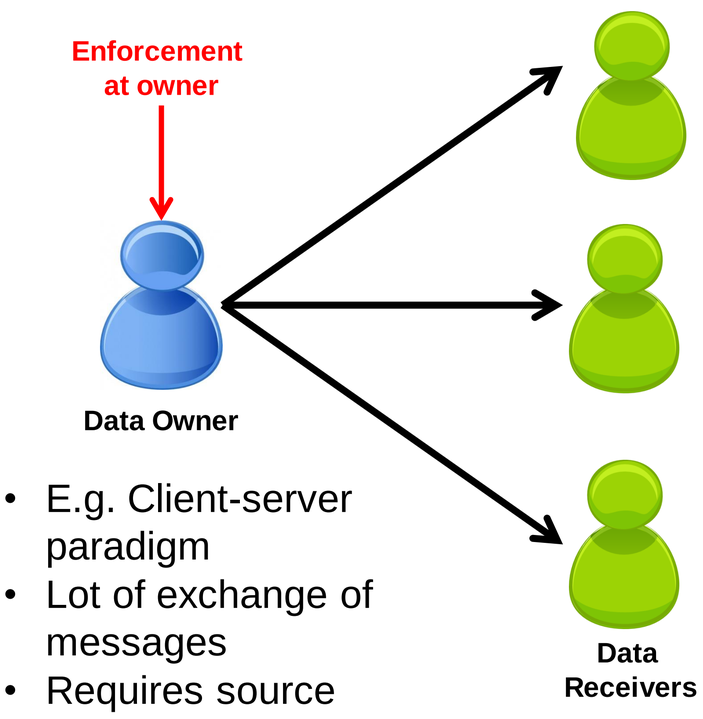
Problem Statement

- **To sustain data confidentiality outside owner's trust domain**

General Solution

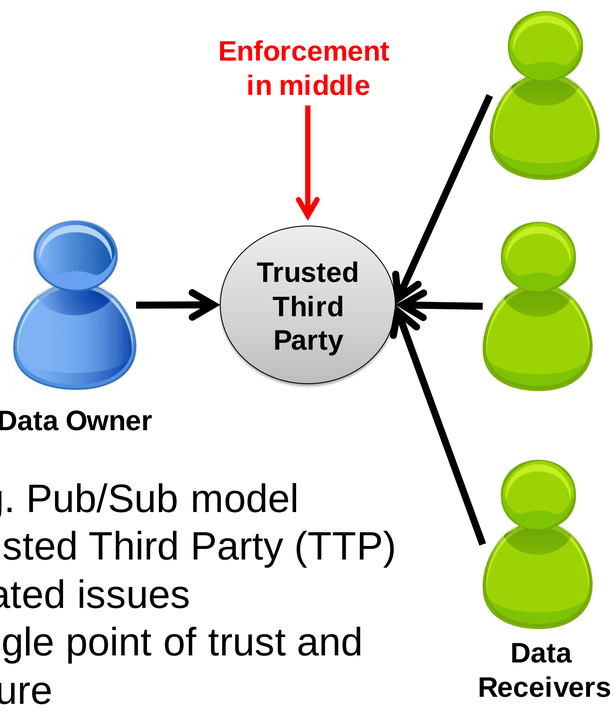
- Encrypt data
- Define policies for data dissemination, access and usage
- Setup policy enforcement mechanism to control data interaction

Policy Enforcement at Owner



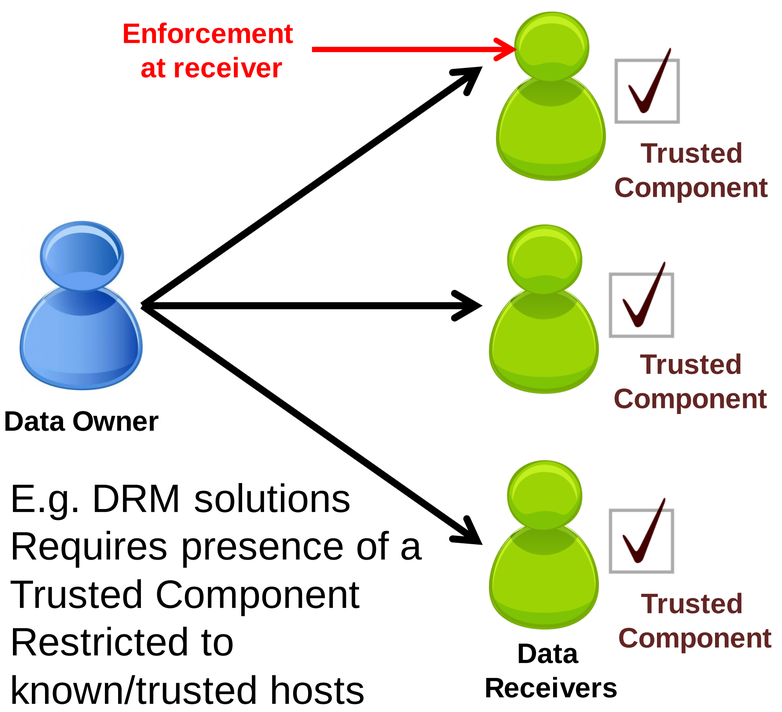
- E.g. Client-server paradigm
- Lot of exchange of messages
- Requires source availability

Policy Enforcement in Middle



- E.g. Pub/Sub model
- Trusted Third Party (TTP) related issues
- Single point of trust and failure

Policy Enforcement at Receiver



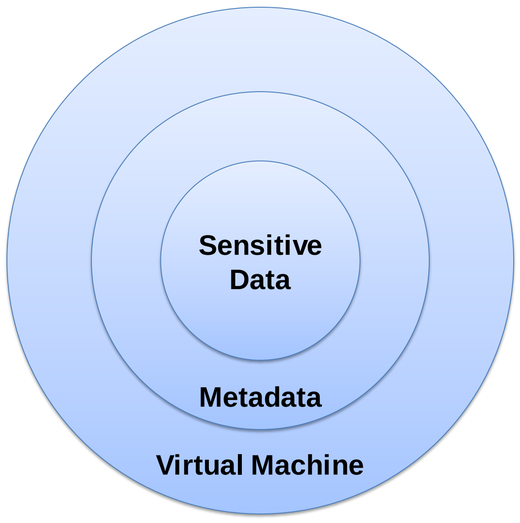
- E.g. DRM solutions
- Requires presence of a Trusted Component
- Restricted to known/trusted hosts

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

Proposed Approach

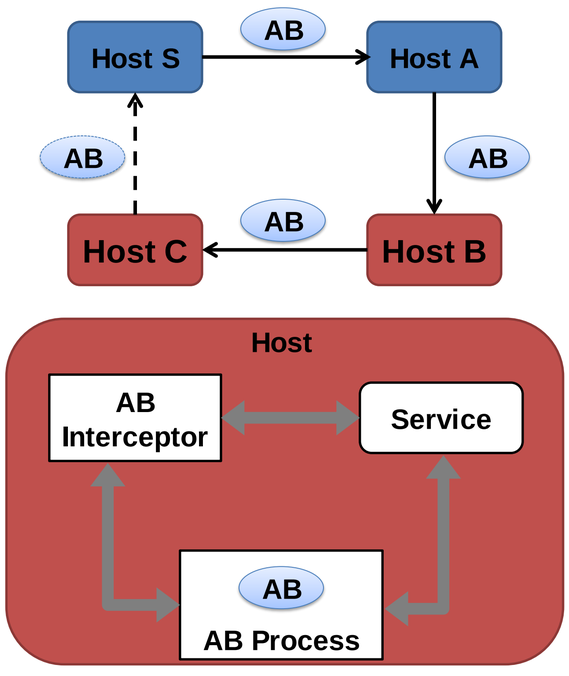
Metadata
- Access control policies
- Life duration
- Other policies

Virtual Machine
- Policy enforcement
- Self-Integrity check
- Filtering



Active Bundle (AB)

AB Interaction



AB Properties

- Decentralized distributed asynchronous communication
- Independent of Trusted Third Party
- Enables secure data dissemination in unknown/untrusted environment
- No requirement of a Trusted Component on receivers
- Controlled and Selective data dissemination

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