Policy Augmented S/MIME

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Email Data Leakage Example

- US Air Force sent email to EADS with information about the Boeing bid for the Air Tanker
- US Air Force had to “level the playing field” by sending the EADS bid data to Boeing

Todays Problems

ESS

- Label at same level as data
  - Cannot discover label without access to data
  - Cryptographic access granted before access check
  - No guarantee client performs the check
- Access policy must be distributed to all recipients
  - Sender had not information about state of recipients client
- ESS only supports a single label per message

S/MIME

- S/MIME only supports a single credential type
- Encryption certificate discovery
- No MTA content scanning

Plasma Scenarios

- Business to Business
  - Collaboration
  - Supply chain
  - Ad-hoc
- Business to Consumer, Government to Consumer
  - Doctor-patient
  - Bank-customer
  - Agency-citizen
- MTA based AV content scanning

Plasma Requirements

- Multiple policies per message
  - Cannot assume logical combination of policies
- Policies for different authorities
- Policies can define multiple scopes
  - Access control, integrity, authentication, retention, etc.
- Support varying levels of identify assurance
- Be authentication technology independent
- Support recipients on varying service types
  - On-premise
  - Private or public cloud services
- Support MTA access to protected messages

Simple vs. Complex Polices

Simple

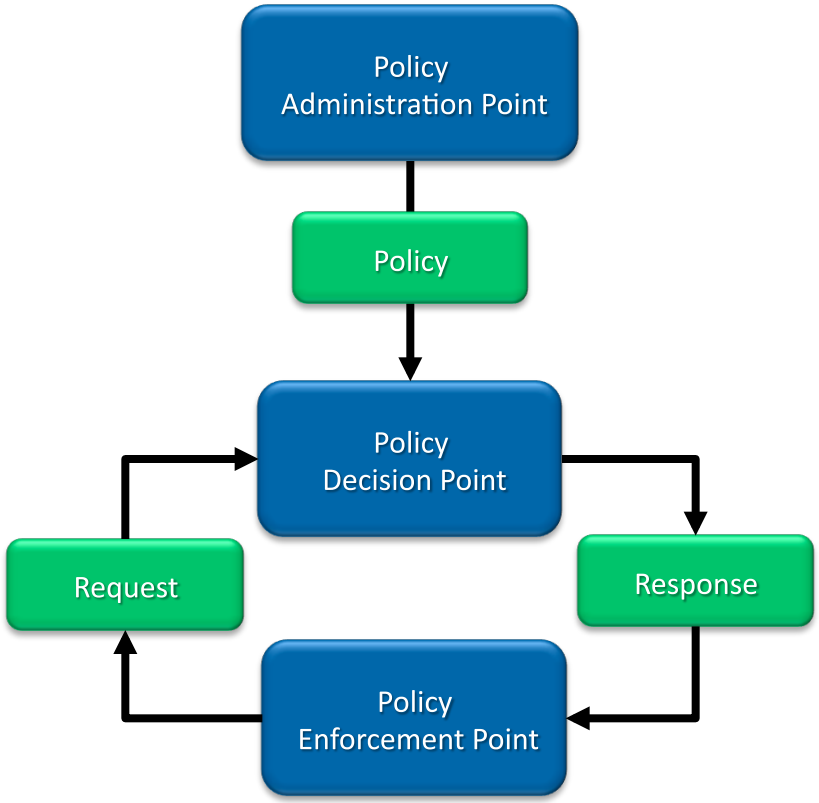
- Equivalent to S/MIME today
- Authenticated recipient of the message
- Define level of assurance of authentication
  - NIST SP800-63
- Examples
  - Doctor-patient, Bank-Customer
- Single policy per message

Complex

- Arbitrary complex access control policy
- Same as access to on-line content
- Policy defines attributes required for access
- Examples
  - Regulatory, organization
- Multiple polices per message

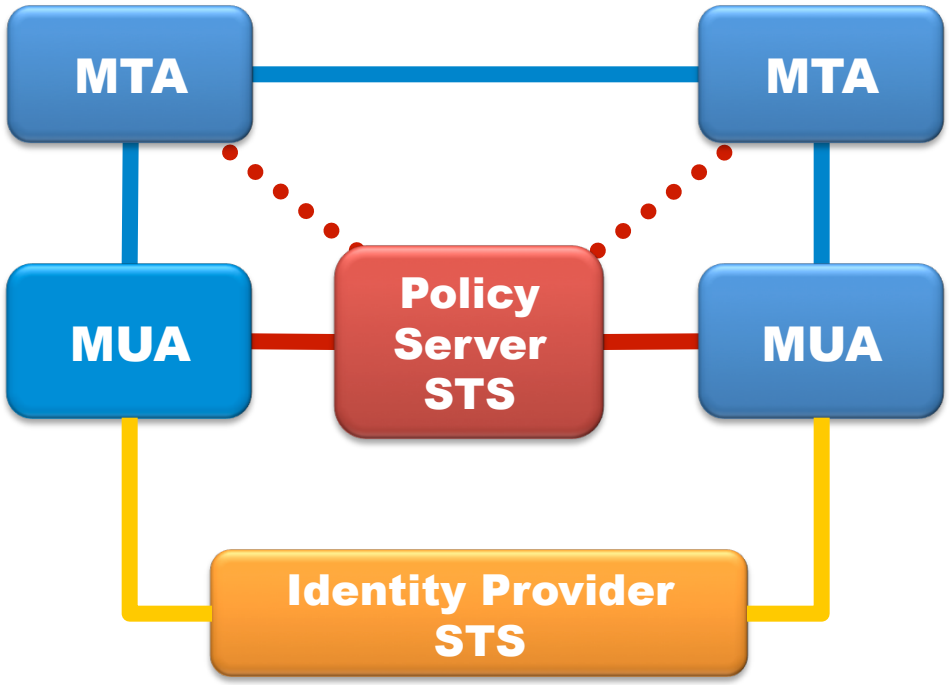
Plasma Access Control Model

- Email Policy Server is a PDP
- Email MUA is a PEP
- Senders MUA makes request to get list of policies
  - List is a set of policy references
- Senders MUA makes request to send message
- Recipient MUA makes request to decrypt message



Plasma Mail Flow

- Sender MUA encrypts message and sends key and policies to PDP
- PDP gives sender MUA message blob
- Senders MUA sends message with blob
- MTA scans message contents
- Recipient MUA discovers senders PDP from message blob
- Recipient MUA presents message blob and requests decryption key from senders PDP
- PDP asks recipients MUA for claims
- Recipient MUA supplies claims
- PDP releases message key to recipients MUA once compliance is verified



Plasma Goals

- Define protocol for interaction with email policy server
  - Protocol can be used by MUA or MTA
- Define how to include policy data to CMS enveloped data
- Abstract authentication and key exchange from S/MIME to remove dependency on X.509
- Define mechanism for publication of MTA keys for pre-authorization