Enterprise communications need to be efficient, exclusive and intensional.

**Efficiency** minimizes burden on employees

**Exclusivity** ensures that only targeted recipients receive messages

**Intensionality** lets the sender succinctly specify the exact set of recipients in high-level terms.

Furthermore, practical messaging systems that provide these capabilities must also ensure protection of efficiency and exclusivity.

### Policies for Attribute-Based Messaging

- **Receiving Policy:** sender specifies the set of users entitled to receive the message (i.e., an attribute address); enforced by ABM server
- **Read Policy:** sender specifies the set of users who can read the message; enforced by ABE.
- **Sending policy:** system wide policy, specifies set of users entitled to target a message to a given attribute address; enforced by ABM server via ABAC

### Approach and Impact

#### Research Impact

- Efficient, exclusive and intensional messaging

#### Experiments

**Policy enforcement:** Secure ABE (with a trusted Attribute Authority) suffices for enforcing read policy. Limited vulnerability during attribute updates.

**Compromise tolerance:** Secure against multiple user or single internal component compromise. Compromise of multiple internal components affects security/functionality to varying extents.

**Results:** Confidential ABM messages with ABAC review can be delivered in a mid-size enterprise of up to 60,000 users with only a few seconds of additional latency over traditional messages.

### Security Analysis

- Efficient, exclusive and intensional messaging

### Future Work: Enhanced Privacy

- **Current Limitation:** Sender’s attributes are revealed to the ABM server and the read policy is revealed to the receivers. Receiving (and reacting to) a message can reveal attributes unintentionally.

- **Privacy of Attributes:** Design AB Signatures to protect senders. Develop and use **Private Reflective Access Control** ("when deciding access needs access") to protect receivers.

- **Privacy of Policies:** Duality of attributes and policies demands policy privacy. Develop and use ABE that can hide policies as well as messages.

Reference: Using Attribute Based Access Control to Enable Attribute Based Messaging, Bobba, Fatemeh, Khan, Gunter, Khurana, ACSAC'06.