Privacy in Context
A panel discussion

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Overview

- Sollins: Introduction, some thoughts for framing
- Panelists: Tschofenig, Sowell, Clark
- Discussion: Everyone

What is “privacy”?

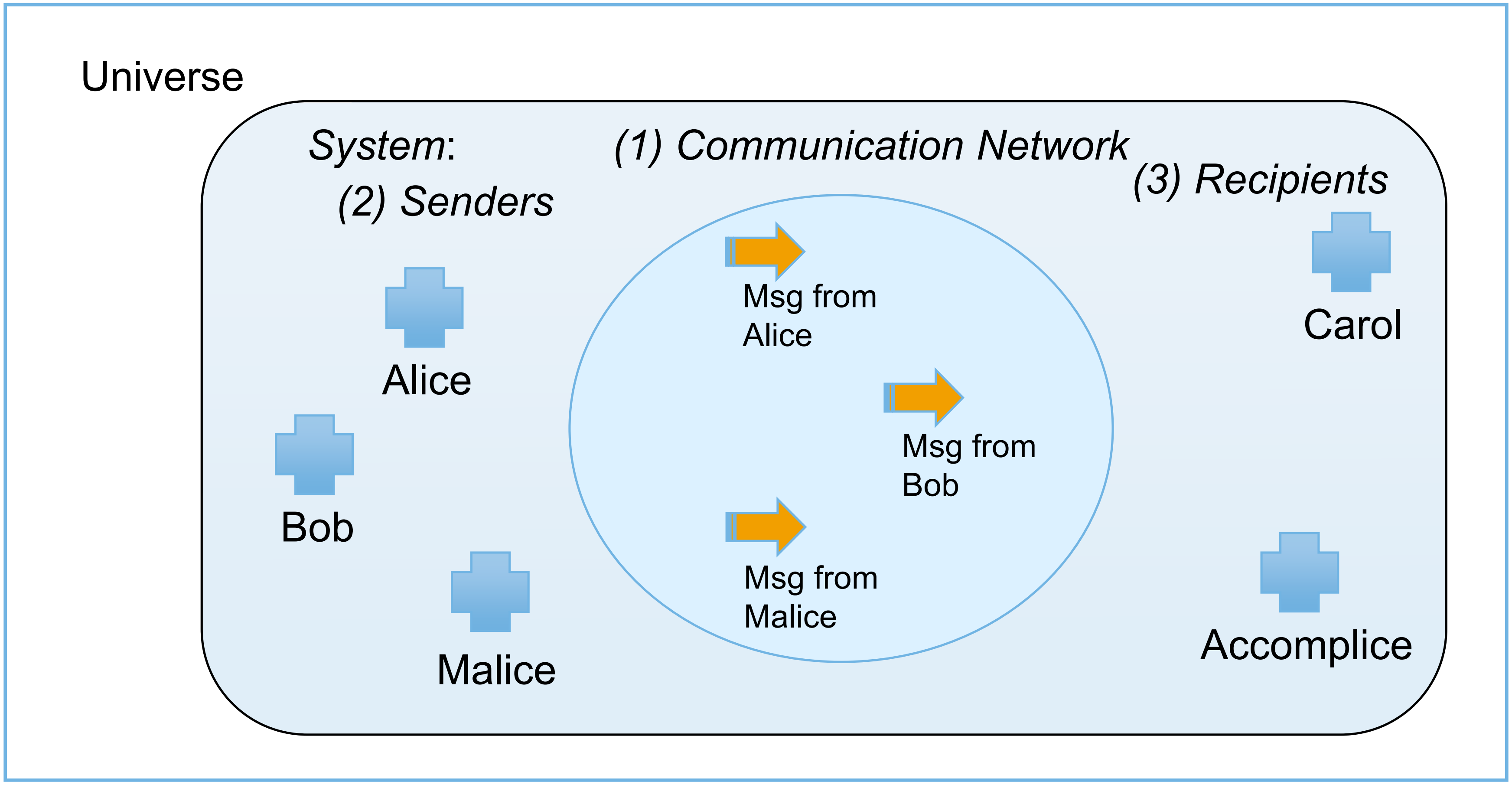
Information privacy concerns the protection of information about individuals and other entities. The environment for privacy is dynamic, reflecting social shifts…, varying and evolving attitudes…, and discontinuities… as well as technological change.

Toward Better Usability, Security, and Privacy of Information Technology, National Research Council, 2010

Introduction

- Paper by Hansen and Pfitzmann, and more recently Tschofenig: **Terminology for Talking about Privacy by Data Minimization: Anonymity, Unlinkability, Undetectability, Unobservability, Pseudonymity, and Identity Management**, August 11, 2010, Internet Draft

The Scenario



The basis

- From perspective attacker interested in:
  - What communications occur
  - Patterns of communication
  - Manipulation of communication
- Perspective
  - All possible observations must be considered
  - Focus on items of interest (IOI): subjects, messages, actions
  - Can learn (actor, action, object)
  - Later can learn attributes/values of an IOI

Anonymity

- Definition of anonymity: attacker cannot sufficiently identify the subject from with a set of subjects, the *anonymity set*.
  - Shared observable attributes
- Definition of anonymity delta: specifies subject's anonymity difference between
  - Subject's anonymity given the attacker's observations
  - Subject's anonymity given the attacker's a priori knowledge only

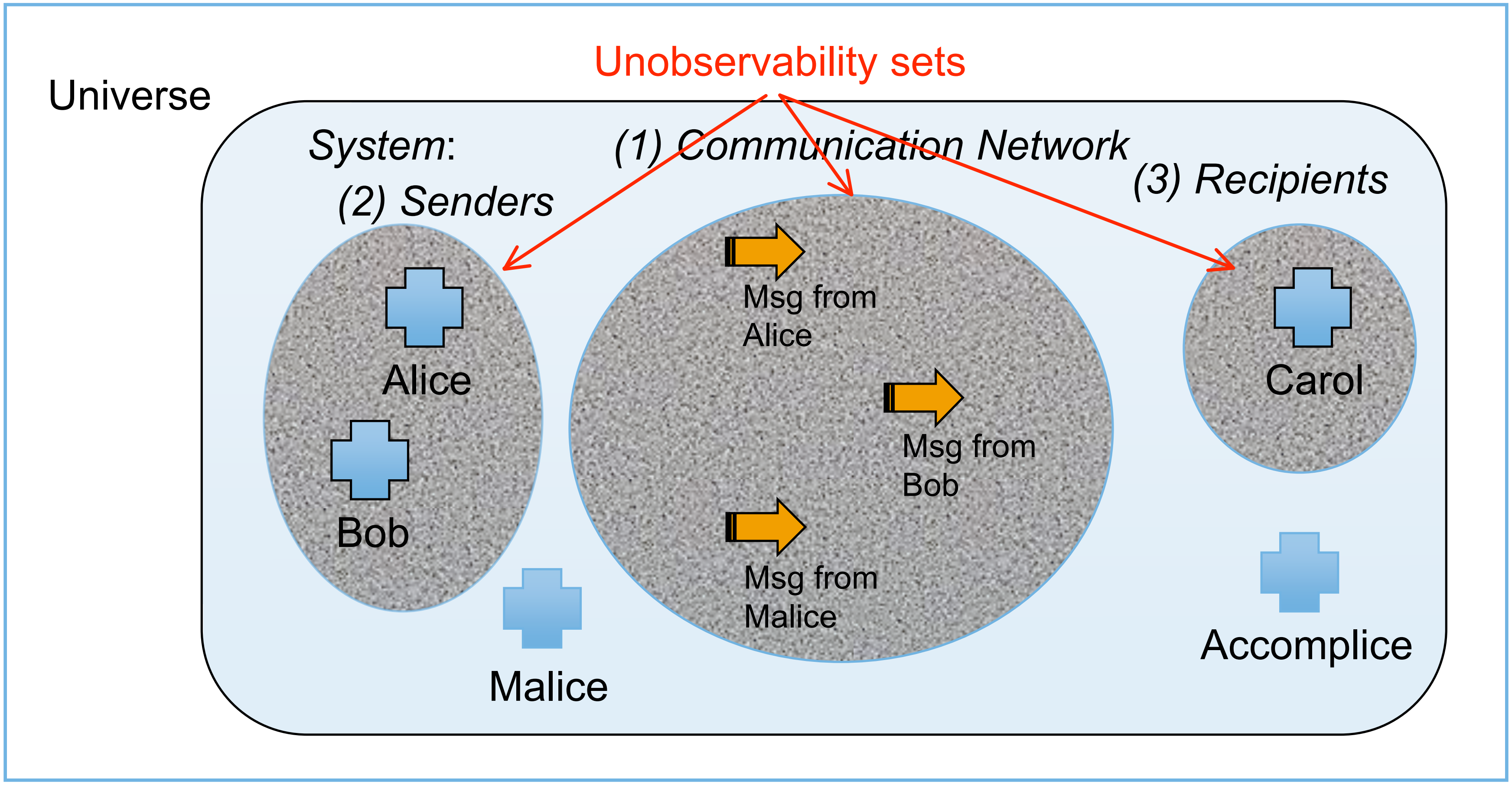
Unlinkability

- Definition of unlinkability: given two IOIs, from within the system the attacker cannot sufficiently distinguish whether they are related or not.
- Reconsidering anonymity:
  - Anonymity: unlinkability of subject and attribute
  - Consider attribute of “having sent a message *m*”
  - New def. of Anonymity: whether subject is anonymous within the “sender-of-*m* anonymity set”

Undetectability and Unobservability

- Definition of undetectability: from the attacker's perspective, the attacker cannot sufficiently detect whether a particular IOI exists or not. (Example: steganography)
- Unobservability of communication (IOI)
  - Two parts
    - Subjects not involved can know nothing about the IOI or subjects
    - Subjects involved can only know about the IOI itself, but nothing about the other subjects (preserves anonymity)
  - Definition: (a) preserves undetectability of IOI from all uninvolved subjects, (b) preserves anonymity of all subjects in IOI including other participants in the IOI.

Unobservability



The spectrum

- Accountability and anonymity: extremes from each other
- Pseudonymity
  - Identifier used instead of real identifier
  - Can be used for subsets of IOIs and attributes
  - Can be used in credentials
  - Can be used for: person, role, relationship, role-relationship, transaction
  - Fills the gap between accountability and anonymity

What next:

- Hannes Tschofenig, NSN: Privacy and Standards
- Jesse Sowell, MIT: Privacy and Regulation
- Dave Clark, MIT: Privacy and Accountability
- Open discussion