

# Have I Met You Before? Using Cross-Media

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# Outline

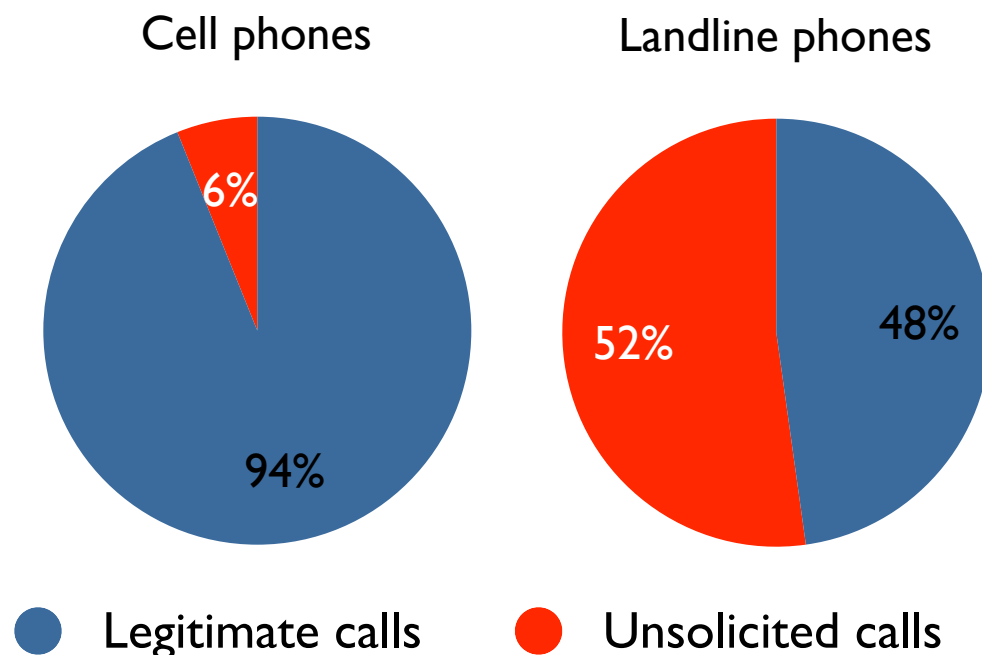
## 1. Introduction

- Results of our quick survey
  - Legitimate calls from those with weak social ties
  - Legitimate calls with no Caller IDs

## 2. Proposal: Labeling calls using cross-media relations

## 3. Conclusions

# Survey of Incoming Calls

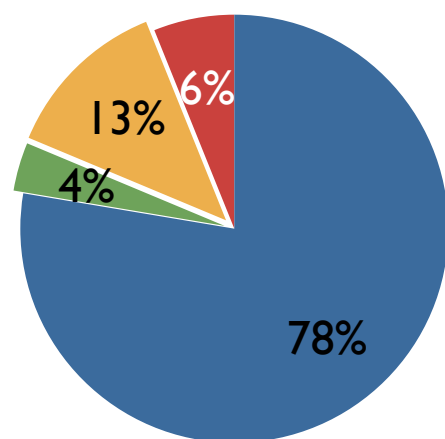


- Fewer unsolicited calls to cell phones
- Effect of national regulations

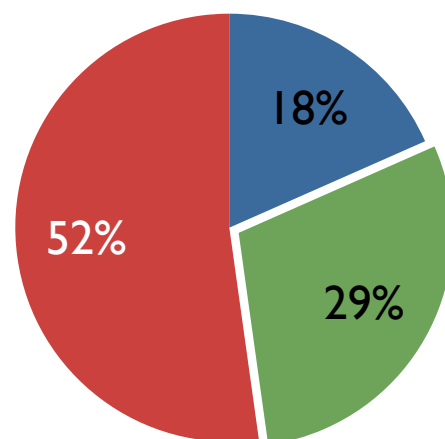
Data: Calls to students in our lab in Feb. 2009 (246 calls to cell, 136 calls to landlines)

# Survey of Incoming Calls

Cell phones



Landline phones



- Known caller IDs
- Unknown caller IDs from known persons
- No caller IDs from known persons
- Unsolicited calls

• 17-29 % could not be labeled legitimate before answering.

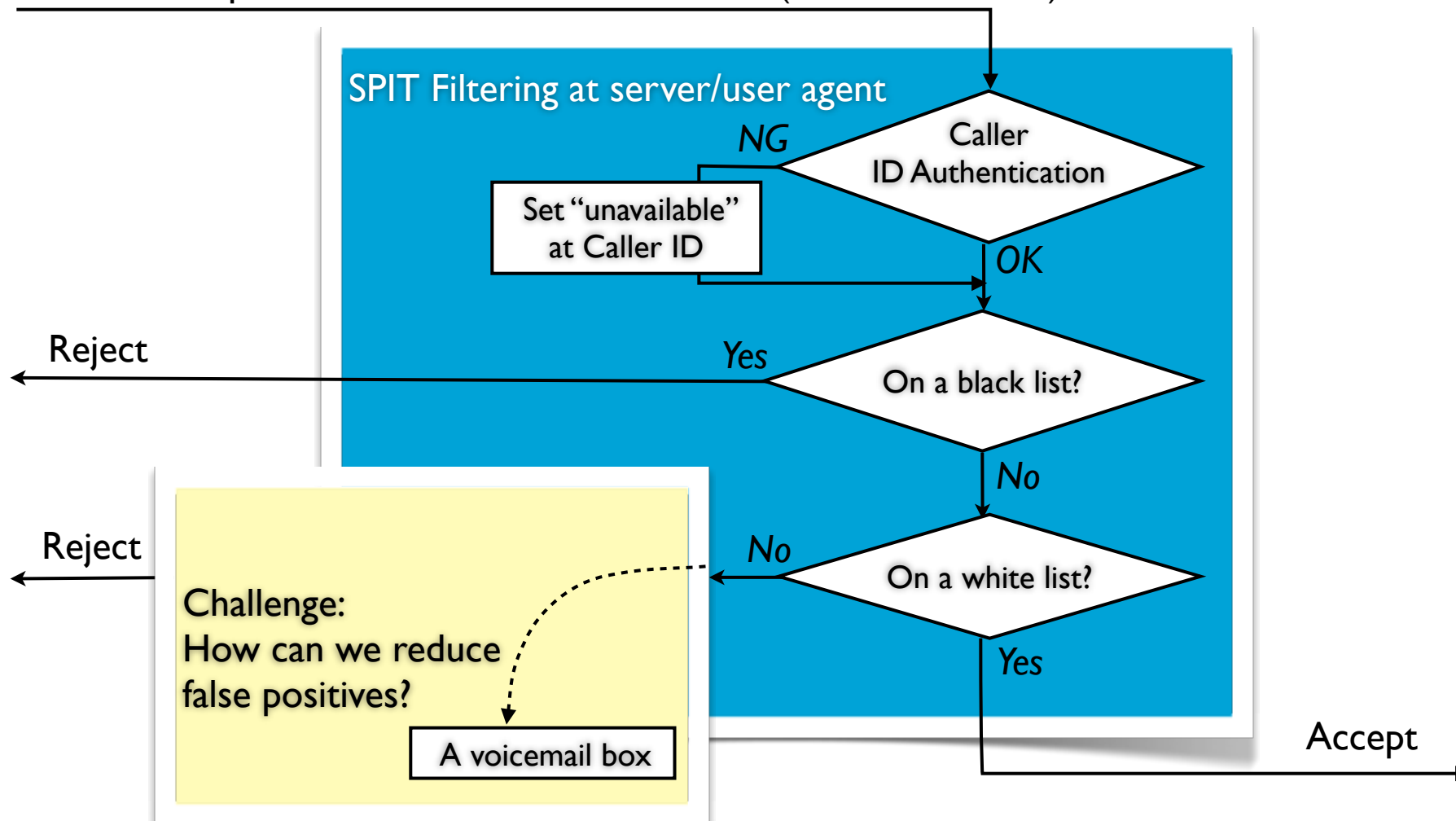
- w/o caller IDs:  
international calls
- w/unknown caller IDs:  
from persons/companies  
having prior contact via  
web or email

Cross-media  
relations

Data: Calls to students in our lab in Feb. 2009 (246 calls to cell, 136 calls

# Typical SPIT Filter

Receive a request for real-time communication (audio/video/text)



# Black List and White List

- Black list: to reject requests
  - Block list
  - Known SPIT caller addresses at a reputation service
- White list: to accept requests
  - Buddy list
  - Addresses of outgoing requests in call history
  - Directory service, e.g., LDAP server

Limits to  
“strong ties”

# Problem and Approaches

- Problem
  - How to label incoming requests
    - Legitimate calls from those with weak social ties
    - Legitimate calls with no Caller IDs
- Approaches
  - Focus on prior contact when delivering callee's contact address through different media
  - Enhance white list beyond caller IDs

Cross-media  
relations

# Anti-SPIT Work

- A collection of solutions is needed.

## I: Places burdens on callers

- Do-Not-Call registry service
- Turing tests to detect a prerecorded message

## II: Labels incoming requests at callees or service providers

- Blacklists/Whitelists based on Caller ID: how to learn/share/expand lists

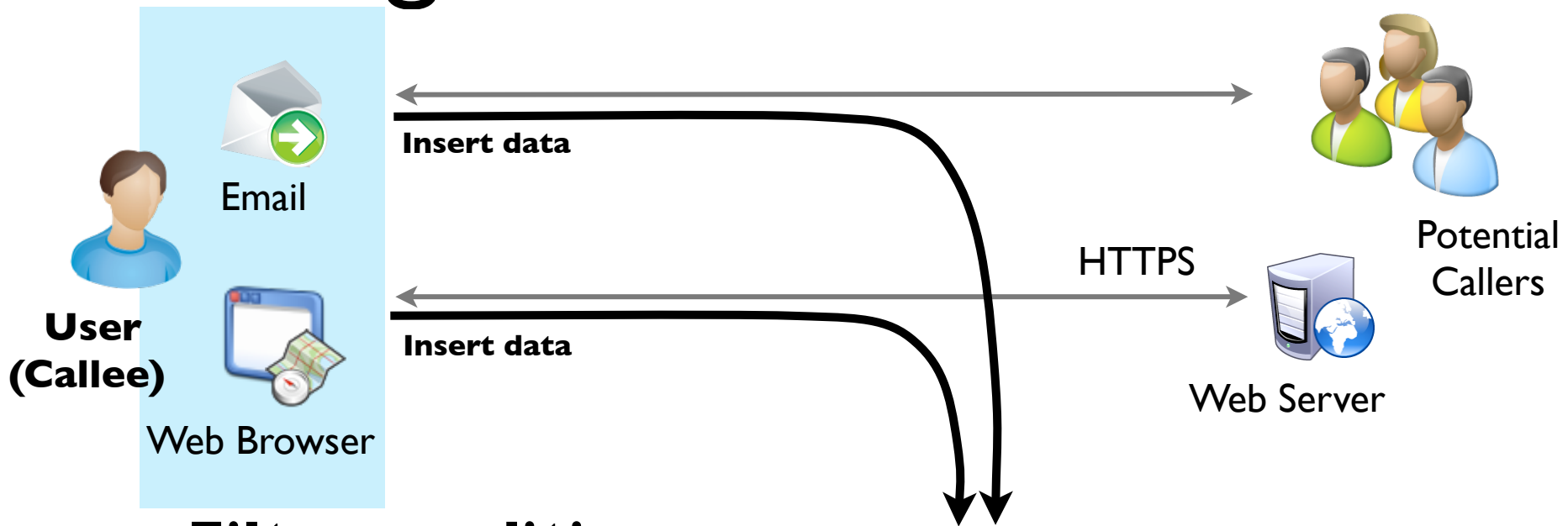
- Suspicious traffic

## I&II:

- Prior permissions from callee to caller in SIP
- Using HTTP responses to publish caller IDs for future calls



# Proposal: Using Cross-media Relations



## Filter conditions

Cross-media relations 1:  
Information offered by potential callers

Contact addresses (plain)

Contact addresses (hashed)

Cross-media relations 2:  
Weakly-secret information offered by callee

Outgoing Message-IDs

Tokens in customized  
callee's addresses

# Cross-Media Relations Offered by Callers

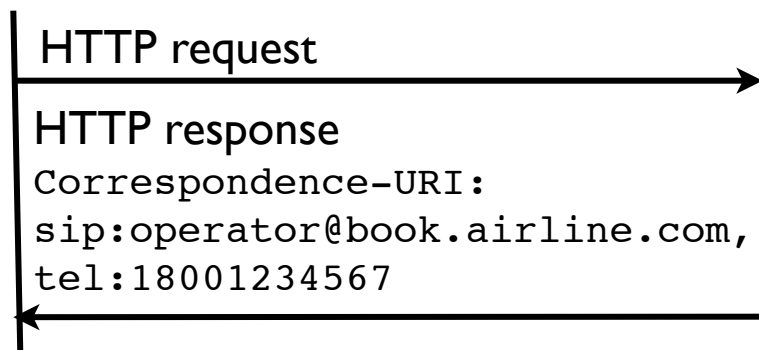
## Callee

Web client

## Potential caller

Web server

e.g., <https://book.airline.com>



- Forms: Caller's contact addresses in plain text or hashed
  - Hashed are only for labeling.
    - ▶ Better for callers privacy to avoid publishing routable addresses

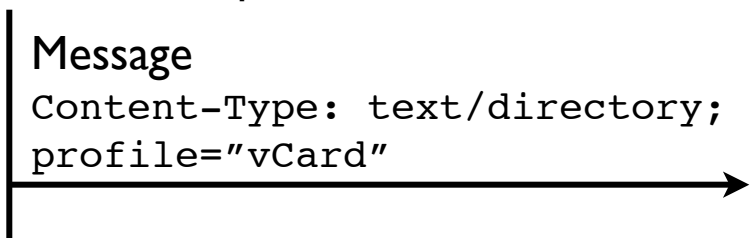
## Potential caller

Email client

e.g., [service@opentable.com](mailto:service@opentable.com)

## Callee

Email client



- Containers
  - An HTTP header in response
  - V-card in email message body

# Cross-Media Relations Offered by Callees

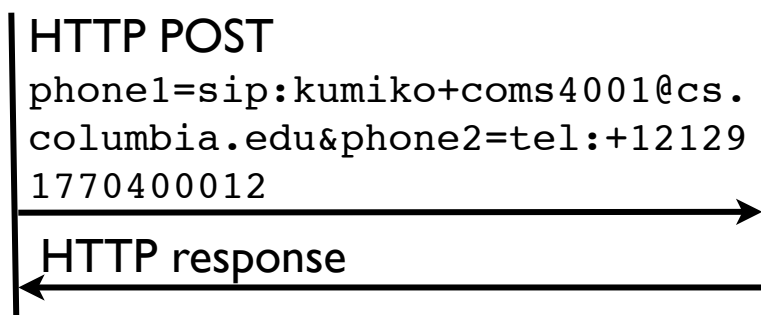
## Callee

Web client

## Potential caller

Web server

e.g., <https://ffp.airline.com/join>



- Weak-secret as a proof of prior contact
- Subaddressing in callee's contact address in HTTP POST form
  - A field in sign-up form in message body
  - Similar to subaddressing in email addresses or extensions of phone numbers
- Message-IDs of outgoing emails

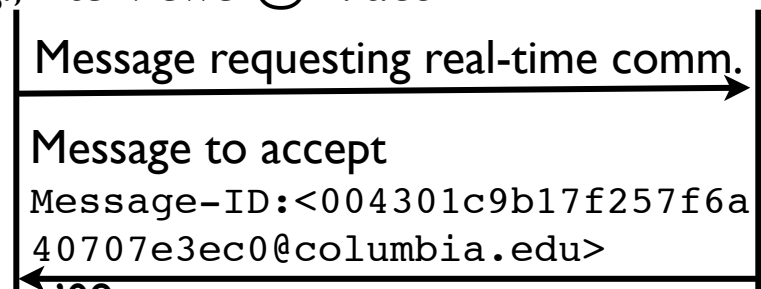
## Potential caller

Email client

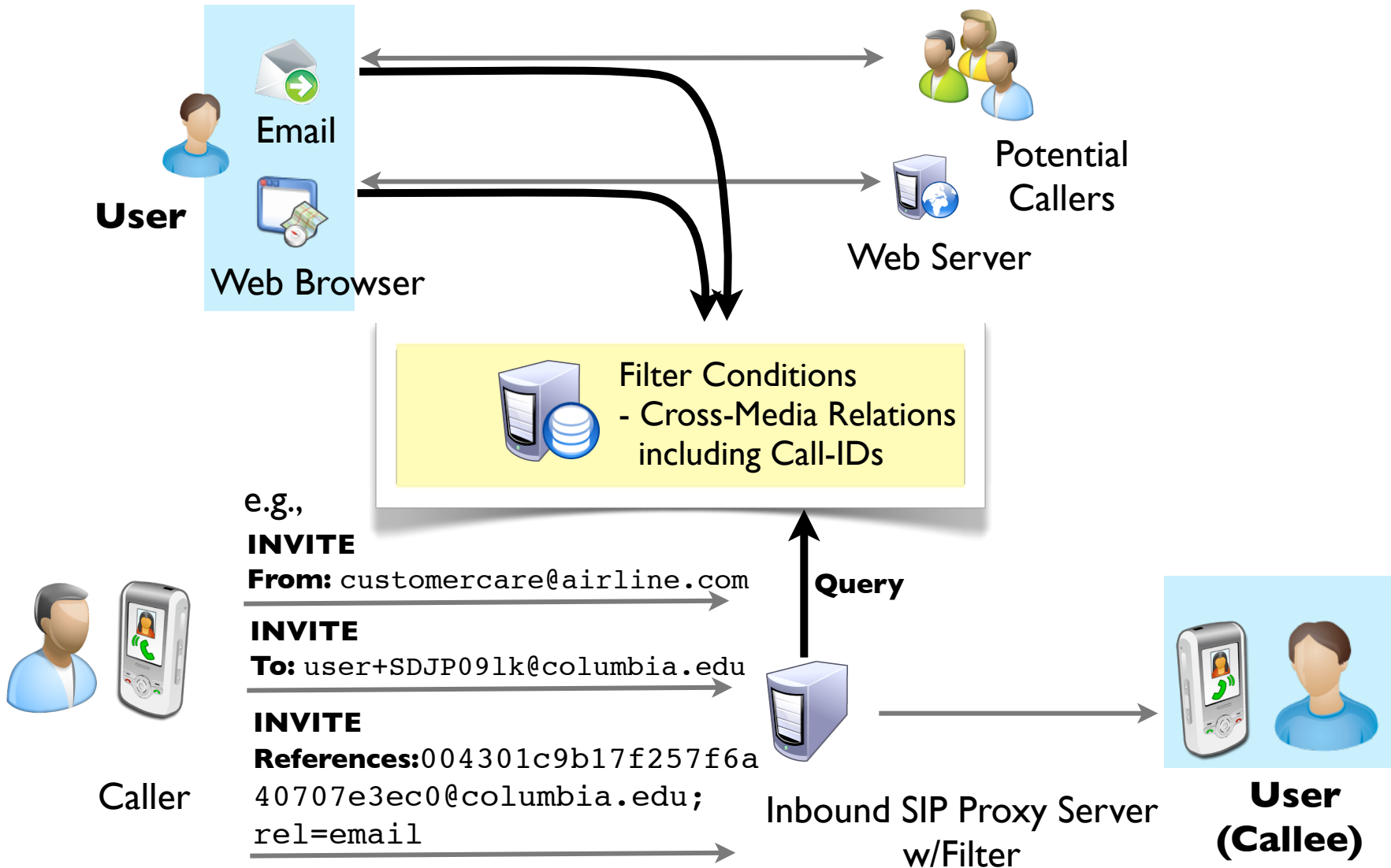
e.g., [interviewer@hr.it.com](mailto:interviewer@hr.it.com)

## Callee

Email client

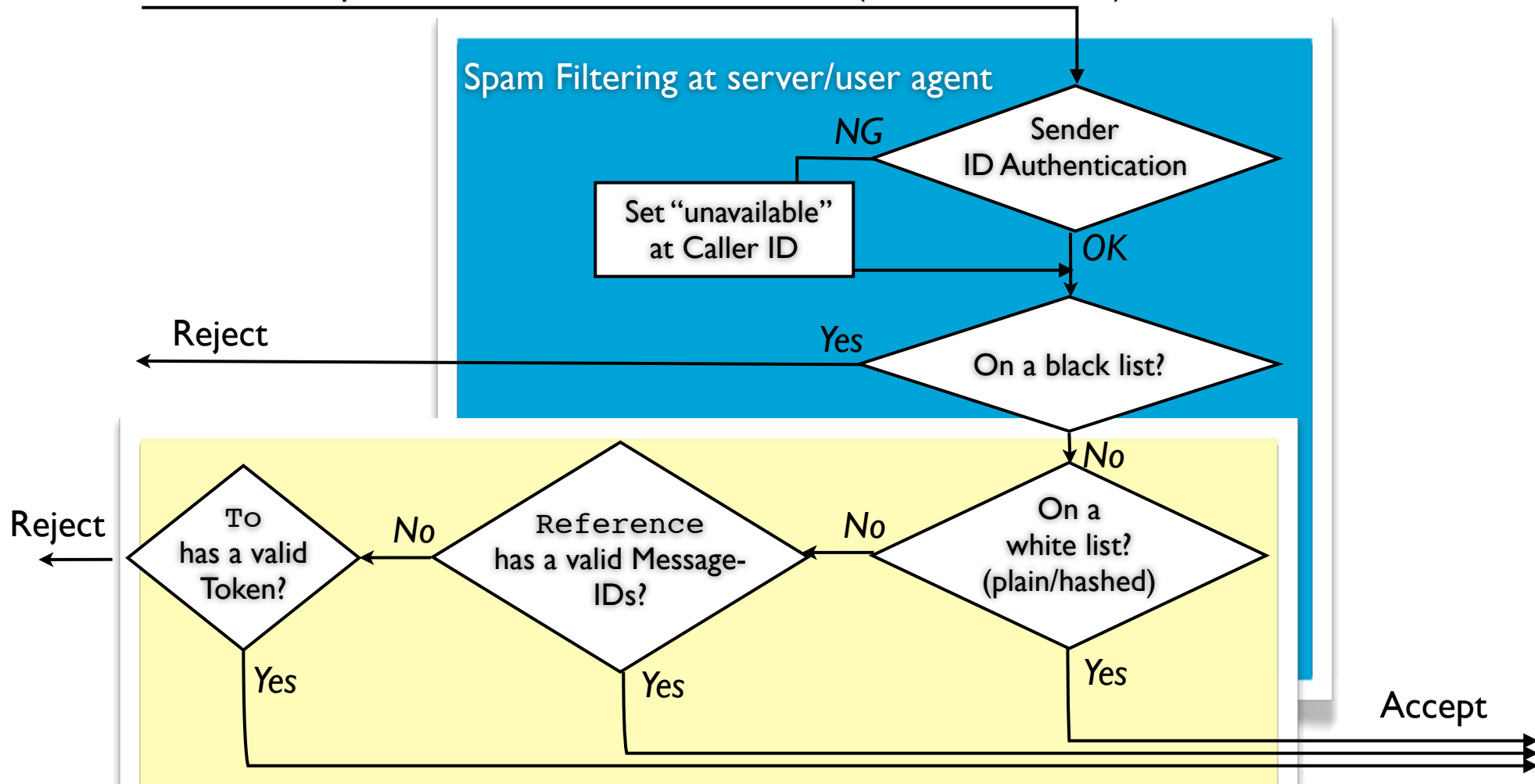


# Calls w/Cross-Media Relations



# Proposed SPIT Filter

Receive a request of real-time communication (audio/video/text)



# Conclusions

- Summary
  - Goal: Reduce false positive filtering by enabling callees to label incoming requests from weak social ties
  - Approach: Use cross-media relations as a proof of prior contact
    - Caller ID in plain text or hashed format, customized callee's ID, and Message-ID
- Next Step
  - Evaluation of usability and effectiveness using prototype