# Net Trust: User-Centered Detection of Pharming, Phishing and Fraud

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# Core Problem Statement

How to inform individual assessments of trustworthiness of a potential online transaction.

# Design for Trust

- Start with human trust behaviors
- Trust
  - Used for simplification
  - Encompasses discrete technical problems
    - privacy, integrity, data security
  - Embeds discrete policy problems
    - business behavior, customer service, quality of goods, privacy

# Human vs. Computer Trust

- Computers
  - Process data
  - Store data
  - Transmit data
  - Distinguish
    - atomicity, privacy, availability,
- Humans
  - Understand context
  - Evaluate uncertainty
  - Make lumping decisions based on context
- Begin with the human as the basis of the design
  - Examine human interactions
  - Signal humans using pre-existing social capital

# Net Trust Goals

- Detect fraud
  - Notification
    - Warning the user
  - Prevention
    - Refuse to connect or require coping the url
  - Remediation
    - Connection to a remediation service

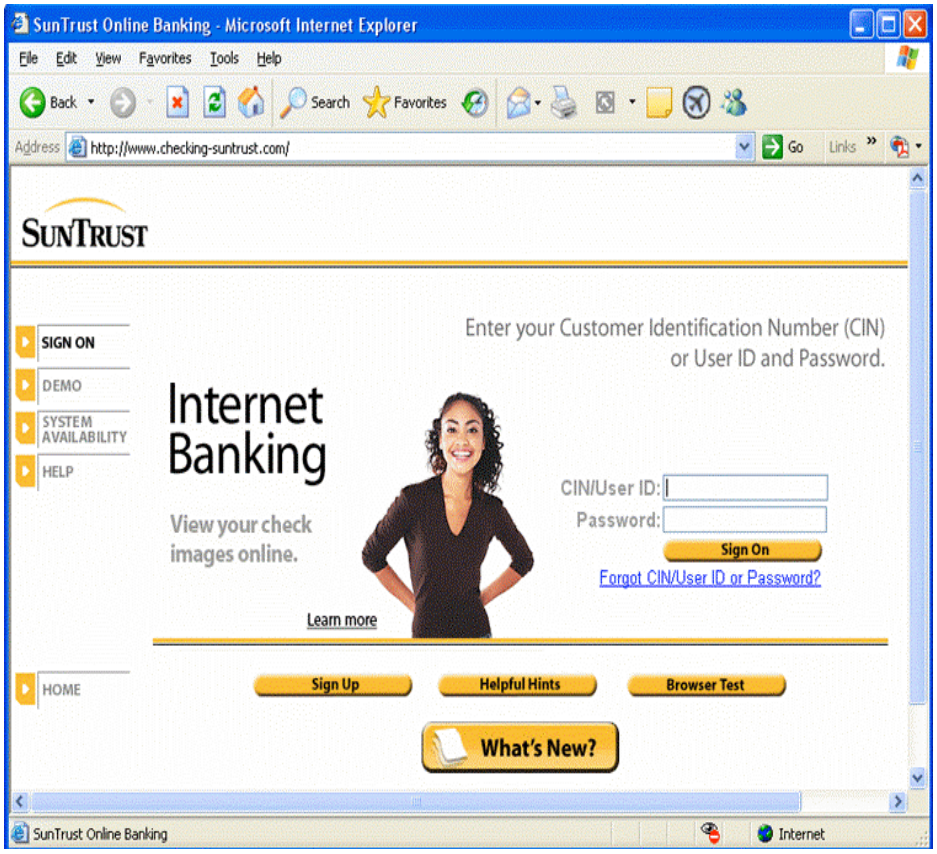
# Trust and Context


vs.


# Resource Verification

Resources are often fairly easy to identify as "good" or "bad" in physical realms

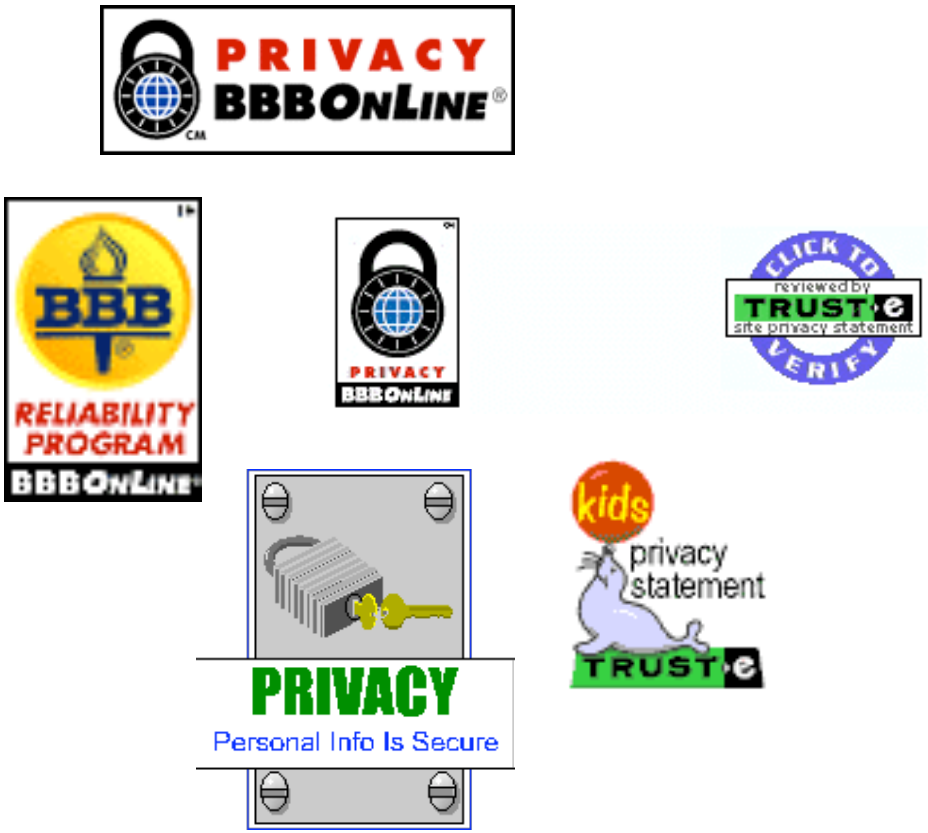
# Trust and Context





# Identity Verification

# Current Signaling



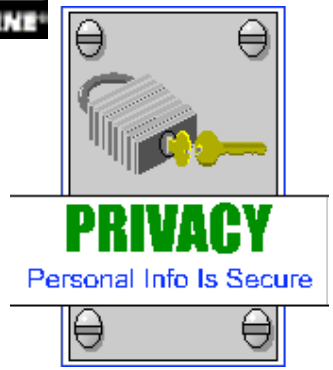

Seals

Traditional mechanisms to communicate trustworthiness.

# Signaling Requires Malicious Party to Cooperate









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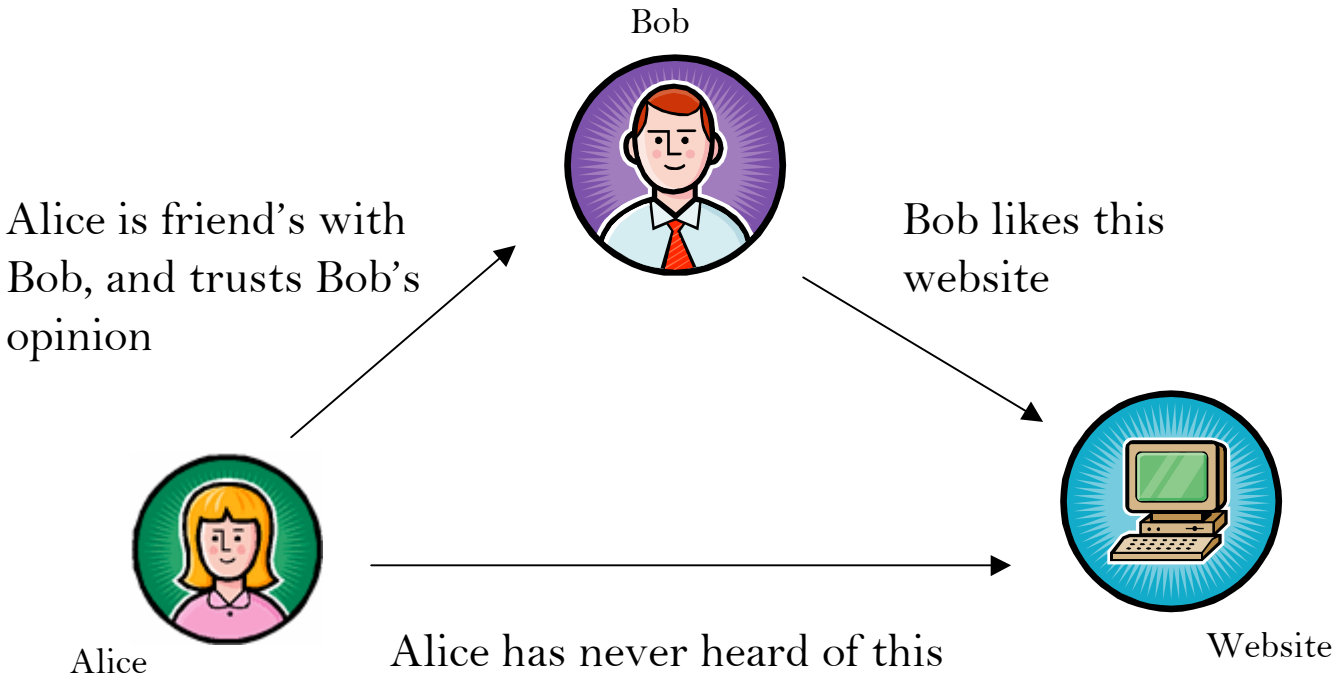
# Social Ratings Don't Depend on Third Parties



# Net Trust Reputations

- Do not require explicit user action, but are created by observations of user behaviors.
- Variables underlying the ratings are neither under control of attackers nor subject to highly parallel attacks.
- The ratings integrate personal, social network, and centralized information sources.
- The identity of the participants in a social network used for ratings are known only to members of that social network

# Done & Working

- Ratings Engine
  - Implicit ratings (history-based)
  - Explicit ratings (manual interaction), comments
  - Local evaluation with age threshold adjustment
- Toolbar UI
  - Correct updates; coherent over tabs & windows
- Social Network
  - Manual email invitation and buddy ID entry
  - Self-enforcement of rating partition over personas
- Synchronization
  - Local ratings storage
  - Immediate server read/write on persona load/unload

# Views


http://www.ljean.com/NetTrust/
Google
Net Trust
Persona:
Alex-main
Ratings:
Comments: 1/2
Broadcasters:
Bank? :
http://www.xulplanet.com/
Google
Net Trust
Persona:
Alex-main
Ratings:
Comments: 0/1
Broadcasters:
Bank? :
http://www.citibank.com/us/d.htm
Google
Net Trust
Persona:
Alex-main
Ratings:
Comments: 0/2
Broadcasters:
Bank? :
http://www.ebay.com/
Google
Net Trust
Persona:
Alex-main
Ratings:
Comments: 1/2
Broadcasters:
Bank? :
http://www.cs.indiana.edu/~atsow/
Google
Net Trust
Persona:
Alex-main
Ratings:
Comments: 0/1
Broadcasters:
Bank? :

# Security & Privacy Properties

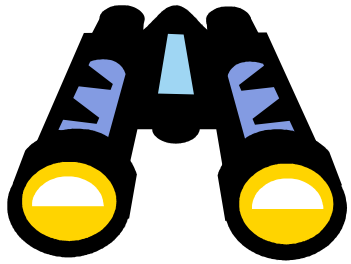
- Sybil attack resistance
- Web scripting resistance
- Server authentication (anti-spoofing)
- Write authentication for peer records
- NT ID to email address commitment
- NT ID deniability ("That's not *my* ID")
- Linking resistance (NT ID and personal info)
- Social network confidentiality

# Short Term Objectives

- Synchronization (protecting social network)
  - Time delays for server access on persona change
  - Anonymous server access via Tor
- Third-Party rating assurance
  - Net Trust Certificate Authority
  - Signed rating lists
- Social Network
  - Mandatory history partition over multiple personas
  - Invite automation & validation

# Longer Term Initiatives

- Expand rating sets for client-side pharming detection
  - Include server IP address & certs in history
- Blend rating sets across social networks
  - Deter unauthorized sharing of NT IDs
  - Improves ID deniability
  - Improves information diffusion
  - Enable server intersection attack on social network
- Narrative risk communication
  - Rich warnings: cartoons, video, animation



# Architectural Overview