Social Networking Security

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CSE 4471: Information Security
Outline

• Overview of Social Networking
  – On-line Social Networking
  – Mobile Social Networking

• Threats and Attacks

• Defense Measures
Online Social Networking (OSN)

• Online Web services enabling people to connect with each other, share information
  – Common friends, interests, personal info, …
  – Post photos, videos, etc. for others to see
  – Communicate via email, instant message, etc.

• Major OSN services: Facebook, Twitter, MySpace, LinkedIn, etc.
“Giving people the power to share and make the world more open and connected.”
OSN Popularity

• Over 900 million Facebook users worldwide [6]
  – Over 150 million in U.S. [5]
  – Over 450 million access via mobile [6]
  – 300 million pictures uploaded to Facebook daily [6]
• Over 140 million Twitter users; over 340 million Tweets sent daily [7]
• Over 175 million LinkedIn members in over 200 countries [8]
Benefits of OSN Communication

• Vast majority of college students use OSNs
  – Organizations want to market products, services, etc.
    to this demographic
  – OSNs can help them reach these potential buyers

• OSNs provide communal forum for expression
  (self, group, mass), collaboration, etc.
  – Connect with old friends, find new friends and connect
  – Play games with friends, e.g., Mafia Wars, Scrabulous
  – Commerce in “virtual items”

• But using OSNs poses security issues for orgs as well as individuals
Mobile Social Networking

- E-SmallTalker
- E-Shadow
Application Scenario: Conference
Small Talk

• People come into contact opportunistically
• Face-to-face interaction
  – Crucial to people's social networking
  – Immediate non-verbal communication
  – Helps people get to know each other
  – Provides the best opportunity to expand social network
• Small talk is an important social lubricant
  – Difficult to identify significant topics
  – Superficial
A Naive Approach of Smartphone-based Small Talk

• Store all user’s information, including each user’s full contact list
• User report either his own geo-location or a collection of phone IDs in his physical proximity to the server using internet connection or SMS
• Server performs profile matching, finds out small talk topics (mutual contact, common interests, etc.)
• Results are pushed to or retrieved by users
However......

• Require costly data services (phone’s internet connection, SMS)

• Require report and store sensitive personal information in 3rd party

• Trusted server may not exist

• Server is a bottleneck, single point of failure, target of attack
E-SmallTalker – A Fully Distributed Approach

- No Internet connection required
- No trusted 3\textsuperscript{rd} party
- No centralized server

- Information stored locally on mobile phones
- Original personal data never leaves a user’s phone
- Communication only happens in physical proximity
E-Shadow

• Enhanced E-SmallTalker
  – Local profiles
  – Mobile phone based local social interaction tools
    • E-Shadow publishing
    • E-Shadow localization
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OSN Security Threats/Attacks

- Malware distribution
- Cyber harassment, stalking, etc.
- Information “shelf life” in cyberspace
- Privacy issues:
  - Information about person posted by him/herself, others
  - Information about people collected by OSNs
- Information posted on OSNs impacts unemployment, insurance, etc.
- Organizations’ concerns: brand, laws, regulations
MSN Security Threat/Attacks

• Personal information leakage
  – Particularly dangerous because of physical proximity

• Malware distribution
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“Common Sense” Measures (1)

• Use strong, unique passwords
• Provide minimal personal information: avoid entering birthdate, address, etc.
• Review privacy settings, set them to “maximum privacy”
  – “Friends of friends” includes far more people than “friends only”
• Exercise discretion about posted material:
  – Pictures, videos, etc.
  – Opinions on controversial issues
  – Anything involving coworkers, bosses, classmates, professors
  – Anything related to employer (unless authorized to do so)
• Be wary of 3rd party apps, ads, etc. (P.T. Barnum’s quote)
• Supervise children’s OSN activity
“Common Sense” Measures (2)

• “If it sounds too good to be true, it probably is”
• Use browser security tools for protection:
  – Anti-phishing filters (IE, Firefox)
  – Web of Trust (crowdsourced website trust)
  – AdBlock/NoScript/Do Not Track Plus
• Personal reputation management:
  – Search for yourself online, look at the results…
  – Google Alerts: emails sent daily to you about results for any search query (free), e.g., your name
• Extreme cases:
  – Cease using OSNs, delete accounts
  – Contact law enforcement re. relentless online harassment
E-SmallTalker: Privacy-Preserved Information Exchange

- Example of Alice’s Bloom filter
- Alice has multiple contacts, such as Bob, Tom, etc.
- Encode contact strings, Firstname.lastname@phone_number, such as “Bob.Johnson@5555555555” and “Tom.Mattix@6141234567”
E-Shadow: Layered Publishing

• Spatial Layering
  – WiFi SSID
    • at least 40-50 meters, 32 Bytes
  – Bluetooth Device (BTD) Name
    • 20 meters, 2k Bytes
  – Bluetooth Service (BTS) Name
    • 10 meters, 1k Bytes

• Temporal Layering
  – For people being together long or repeatedly
  – Erasure Code
Final Remarks

• On-line social networking systems are very popular and mobile social networking systems are emerging
• Malware distribution and personal information leakage are two most prominent threats and attacks
• Personal countermeasures are most effective
References (1)


References (2)

17. https://twitter.com/BPglobalPR