Packet Tracker: Finding the Source of Network Traffic

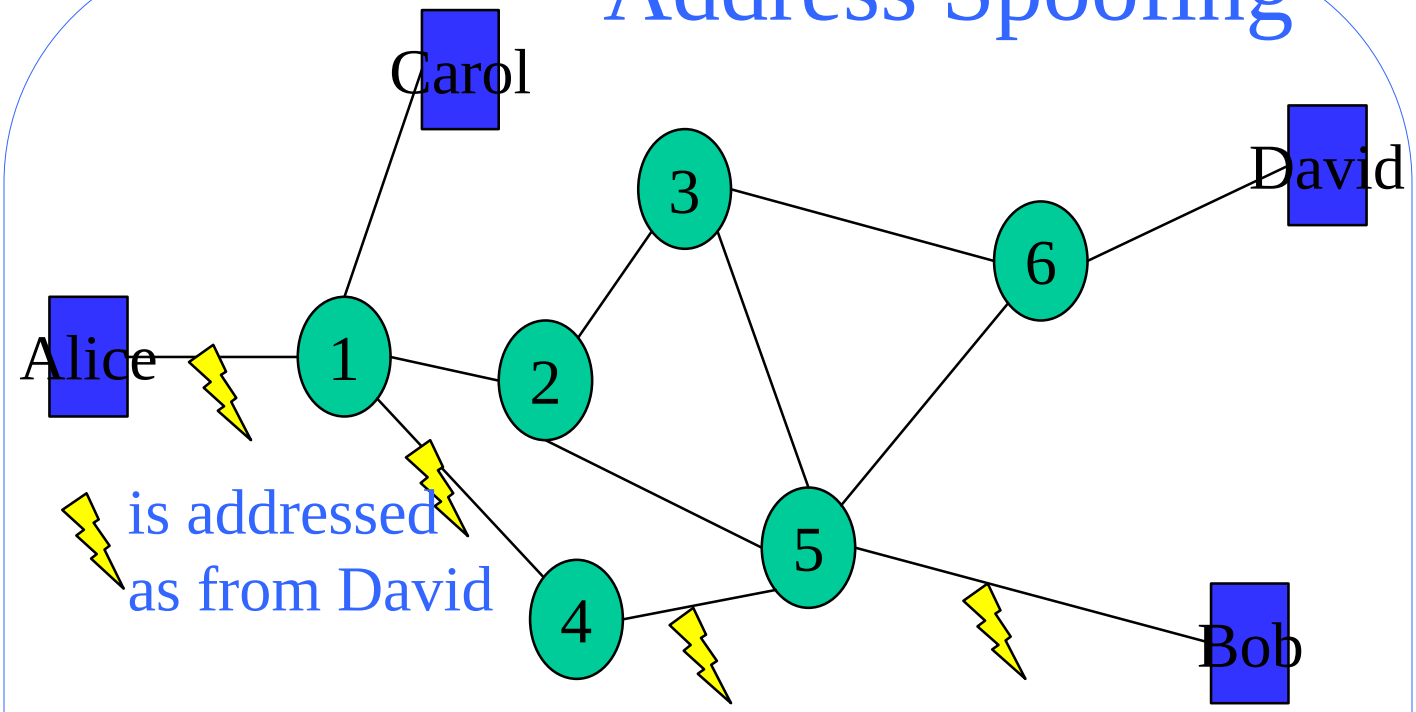
Tom Daniels, Benjamin Kuperman, Florian Buchholz

PI: Clay Shields

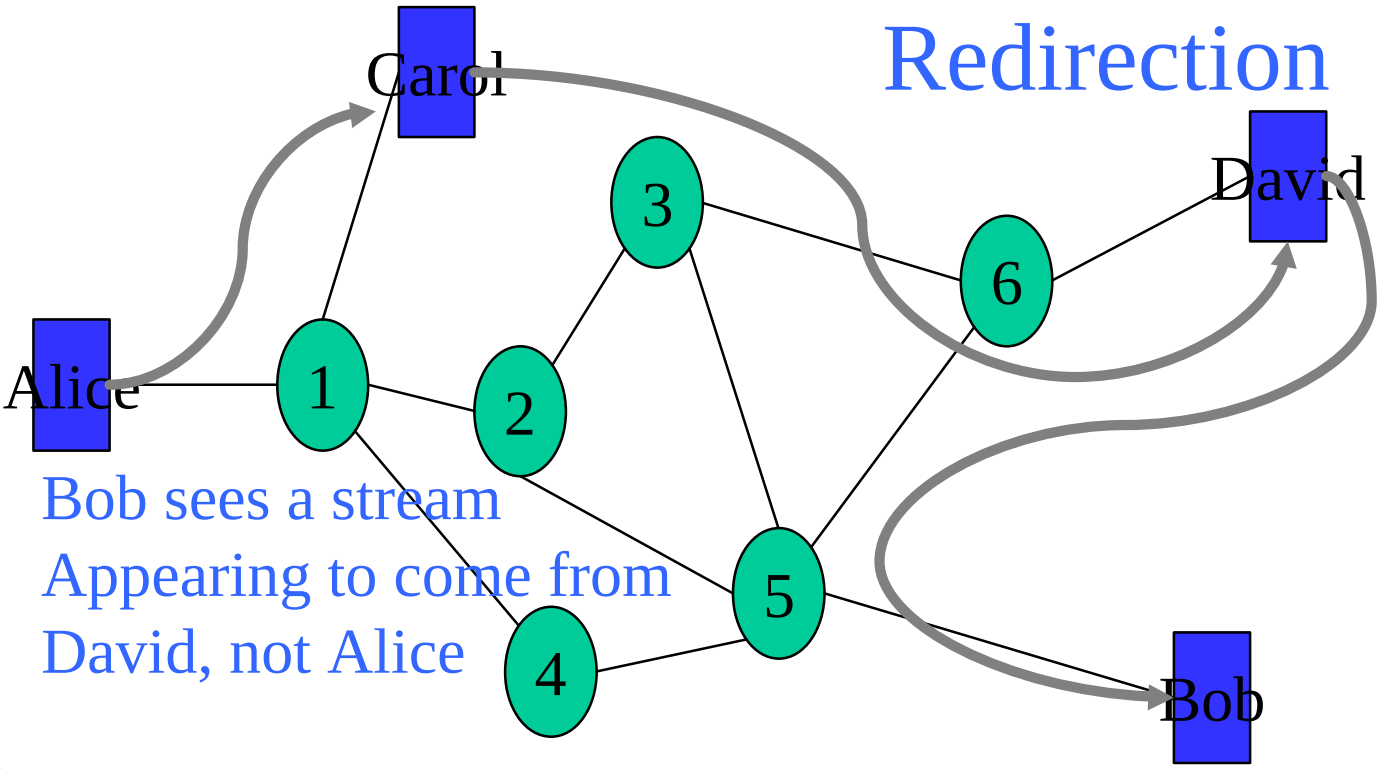
The Problems

- Anonymity in the network
  - Address Spoofing
    - Attackers are able to falsify the source address of their traffic
  - Redirection
    - Attackers may send their traffic through multiple (possibly compromised) hosts to hide their location
  - Sophisticated anonymity systems
    - Crowds, Onion Routing, etc.

Address Spoofing



Redirection



The Goals of Packet Tracker

- Better understanding of:
  - Mechanisms behind network anonymity
  - Previously suggested solution
  - The issues both social and technical
  - How to design the next round of solutions
- Encourage other work in this area

Approach

- Literature review
  - found few known solutions
- Reproduce prior work
  - confirms findings
  - increases our understanding
- Enhance prior work
  - fix problems/adding features
- Propose new solutions
- Academic outreach
  - Workshop planned

Caller ID System in the Internet (CISIE)*

- Host-based, active system for tracing extended login connections
- Only useful in limited, well controlled networks

*Jung, et.al. Caller Identification in the Internet Environment. UNIX Security Symposium IV. 1993

Network Traffic Thumbprinting*

- Technique for correlating login streams captured at different points in the net.
- Uses a statistical thumbprint of each minute of a stream

*Staniford-Chen, Stuart. Distributed Tracing of Intruders. Masters Thesis. University of California-Davis. 1995.

Modeling Network Anonymity and Identity

- Based on OSI model
- Relates the entity at each level with the entities below it.
- The model should
  - concisely present the general problem of net. anonymity
  - identify what information should be kept and from where

Results So Far

- CISIE appears to never have been built
  - paper lacks key information
  - may require kernel info.
- Thumbprinting is not well understood
  - many arbitrarily chosen parameters
  - technique is unproven
- The Model
  - still under development

Future Work

- CISIE
  - complete an implementation of the system
  - add authentication
- Thumbprinting
  - evaluate in a “real world” environment
  - evaluate changes to parameters
- Modeling of Identity…
  - continue to develop the model