Trustworthy Infrastructure, Mechanisms, and Experimentation for Diffuse Computing (TIME DC)

U Penn, Stanford, Cornell, Yale

MURI, June 2004

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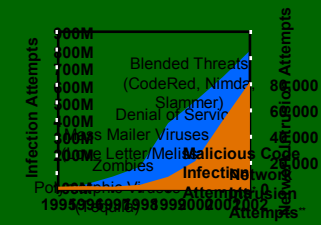


Exponentially Increasing Threats

Protected Information Assets

Information Security Alert Sharing

TIME DC Objective

Effective, timely, and confidential sharing of security-related information

Enable information network defenders to collaboratively share information better than attackers, without compromising sensitive information

DoD Capabilities

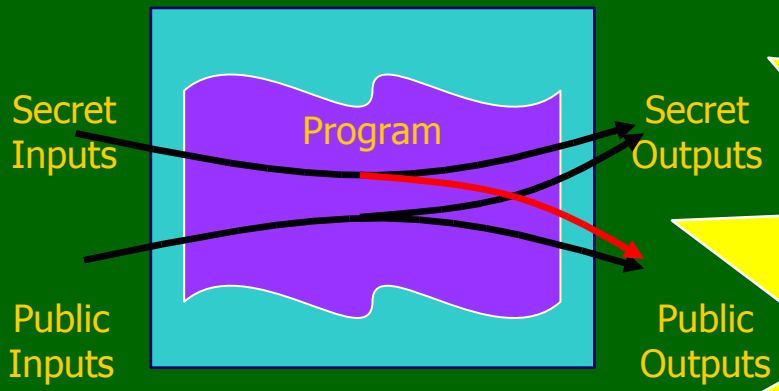
- **DoD network administrators will be able to share Intrusion Detection, Firewall, Anti-Virus, and other information security alert information across domains.**
- **More effective and rapid response to widespread threats such as email viruses, internet worms, and concerted intrusive attacks on DoD networks.**

Scientific/Technical Approaches

- **Cryptographic cleansing techniques**
- **Secure multiparty computation**
- **Incentive-compatible communication protocols**
- **Language-enforced security methodology with policy and programming language aspects**
- **Scalable response to malicious code outbreaks**
- **Leveraging current information security infrastructure, and state-of-the-art antivirus and antiworm research**

TIME DC New Investigator Steve Zdancewic

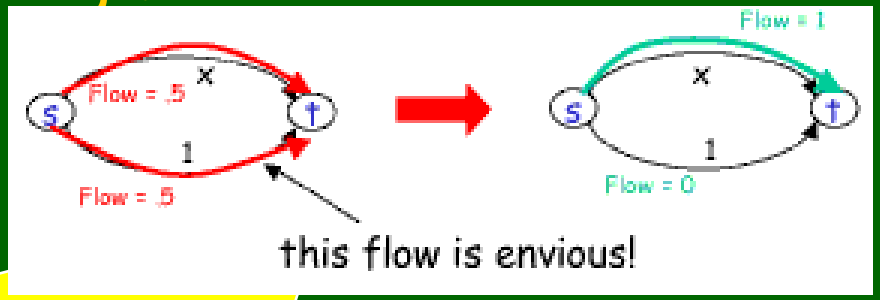
- **University of Pennsylvania**
  - Ph.D. Cornell University 2002
- **NSF CAREER Award**
  - Language-based Distributed System Security



Theorem: A program certified by the compiler will not transmit any secret inputs over a public channel.

TIME DC New Investigator
Tim Roughgarden

- **ACM Thesis Award** (Honorable Mention)
  - Selfish Routing, Cornell University
- Stanford faculty, starting Fall 2004



★ Compare two routing situations
- Every router is selfish
- Every router contributes to global welfare

★ Amazing result
- If we double the hardware, selfish is as good as optimal

Recent TIME DC Theses

- Stanford
  - Changhua He Ph.D.

    (supervisor: John Mitchell, 802.11i presentation this afternoon)
  - Mukund Sundararajan M.S.

    (jointly supervised by Tim Roughgarden and John Mitchell)

Today

- Information security alert sharing
  - Pat Lincoln, SRI
  - Vitaly Shmatikov, U Texas
- Algorithmic mechanisms
  - Mukund Sundararajan, Stanford