# Secure Data Charging Architecture for Mobile Devices in 3G/4G Cellular Networks: Vulnerabilities and Solutions

http://web.cse.ohio-state.edu/~chunyi/projects/secmdc.html



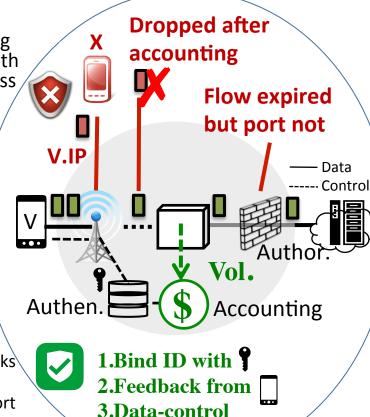
Cellular networks are functioning as a closed, black-box system with limited information and no access to data charging architecture.

Charging subsystem is tightly coupled with other subsystems and depend on complex control functions.

## **Solution:**

Research investigates AAA (authentication, authorization and accounting) in

- Identifying security loopholes
- Devising proof-of-concept attacks and assessing real threats
- Defense through concerted effort in network infrastructure and mobile devices



coordination

# **Scientific Impact:**

- Systematic disclosure of security loopholes
- Root cause analysis in both cellular network and Internet design fundamentals
- Solution leveraging three guidelines: cross-layer binding, coordinated controldata planes and end-user feedback

## **Broader Impact:**

- ✓ Led to nationwide network upgrade in US carriers
- ✓ Disseminated findings to the public through media coverage (news and TV)
- ✓ Education and outreach via
- Lectures in two courses to introduce the stateof-the-art and lessons learned
- DIY tool released to replay identified attacks in the controlled environment
  - Talks at GSMA events (industry) and conference (academy and industry)

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