

# Integrating Cybersecurity Education with Cloud Computing



## 1. Motivation

As a new computing paradigm, cloud computing has been widely used to provide Information Technology (IT) services for various enterprises and organizations. However, the computation inside clouds has posed new security and Privacy threats and challenges to cybersecurity communities.



We are currently short of well educated and skillful cybersecurity workforce to protect enterprise and online users' security and privacy, ensure financial and medical information assurance, and guarantee public critical infrastructures' safety.

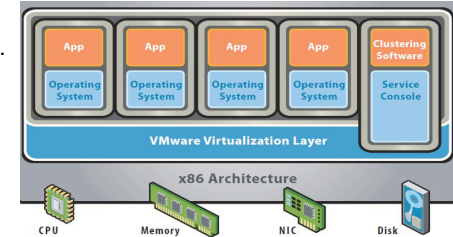
## 2. Objectives

- Integrate the cybersecurity education with the latest security research activities in cloud computing
  - Enhance the undergraduate and graduate security curriculum by developing a series of laboratory exercises under the context of cloud computing environments.
  - Allow students to be familiar with the major security and privacy issues in cloud computing.
  - Know the latest progress in cloud security research, deepen their understanding on the basic concepts of network and system security.
  - Learn the important programming and system skills via hands-on experience.
- Increase the overall awareness and knowledge of cybersecurity and cloud computing in our local communities.

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## 3. Educational Tasks in a Nutshell

1. Preparation for Cloud Virtualization.
2. Memory Deduplication Lab Design.
3. Cloud Cartography Lab Design.
4. Co-Residence Lab Design.
5. Virtual Private Cloud Lab Design.



These topics present important and challenging cloud security problems that have not been introduced to classroom in the past.

## 4. Broader Impact

### Undergraduate and Graduate Training      Extracurricular/Outreach Activities

- Our proposed lab exercises will play an important role in the existing network and system security classes .
- They are essential to our recently created new course “Cloud Computing and Security”.
- Introducing undergraduate students to the latest security research is the primary step in cultivating young researchers for the future.
- There are wo Ph.D. students who are actively participating in the proposed educational tasks.
- The proposed labs in cloud security are viable as enhancements to seven existing and three additional courses being introduced.
- Industrial interactions are growing both in student attendance from local employee stakeholders such as CERDEC and the financial services industry such as JPMorgan Chase & Co.
- These cloud security topics are very timely and would fit well in evening short courses we often teach at the summer camps.

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