



# MAKING INFORMATION SAFE: Past, Present, and Future

SEI/CERT

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CONFESSSION:

I'm a Trojan Horse!



# THREE CRITICAL QUESTIONS

- How did we get to where we are today?
- What is it that we are living through?
- What lies over the horizon?

Shamelessly borrowed from  
former Fed chief Alan Greenspan



# TALK AGENDA

- Reflect on 40+ years in and out of information security (and software engineering)
- Share some observations and lessons learned
- Suggest some future issues and approaches



PAST



# OUTLINE OF THE PAST via PERSONAL HISTORY

- CIT (aka CMU) 1965-1971
  - TSS 360/67, birth of SE
- UC Irvine 1971-1990
  - Rand Corp., DoD proposal, SE education
- NSF 1987-1989
  - crypto, Morris worm, HPC strategy
- Georgia Tech 1990-2002
  - IRS study, Nunn Forum, GTISC
- NSF 2002-2007
  - CSRDA, cyberinfrastructure



# PRESENT



# IS THERE MORE THAN FIRE- FIGHTING?

- Sometimes seems like that is all there is
- Some commercial R&D aimed at prevention
- NSF supporting longer-range work in various aspects of cybersecurity
- GENI as an example of a larger effort



# THE GENI PROJECT

(Global Environment for Networked  
Innovations)

*An effort under way by NSF to  
encourage and enable research to  
provide a body of knowledge for  
future network design*



# The Future Global Network

## Should

- **Be worthy of society's trust, even for managing and operating critical infrastructures**
  - Provide a bridge between physical and virtual worlds
    - Via instrumented and managed sensorized physical environments
  - Support pervasive computing
    - From wireless devices to supercomputers
    - From wireless channels to all optical light-paths
  - Enable further innovations in research and commerce
    - Seamless access to networked instruments, supercomputers, storage, etc
  - Create a world in which we would want to live



# FUTURE



## WHAT HAVE I LEARNED?

- Security problems are increasingly critical
- Security problems are like washing dishes
- Security problems are almost always multi-dimensional at some level
- Problems don't usually go away - they just morph into a new form
- Solutions are also persistent - if you morph them



## HOW DID WE GET HERE?

- Rapid growth of computing
- Repurposing of systems
- Functional expansion
- Incorrect or too limited assumptions
- Failure to account for unforeseen consequences



# WHAT ARE WE LIVING THROUGH?

- Rapid change in usage patterns and equipment
- Exponential increase in number of users
- Highly non-linear growth in applications
- New application modalities
- Naiveté, gullibility and massive carelessness, leading to exploitation
- Lack of underlying concepts, theories, data
- Untrained staff



# WHAT LIES OVER THE HORIZON?

- Near-term (3-5 years): More of the same!
- Mid-term (5-10 years): Visible increase in security and privacy mechanisms
- Long-term (>10 years): Security becomes built-in, routine, but never perfect; CERT disappears; security “specialists” out of a job (but become regular software engineers, analysts, etc.)



*One person's constant is another  
person's variable.*

*- A. J. Perlis*



# CONTACT

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