

# Privacy and Security: The *Enemy* of The Future

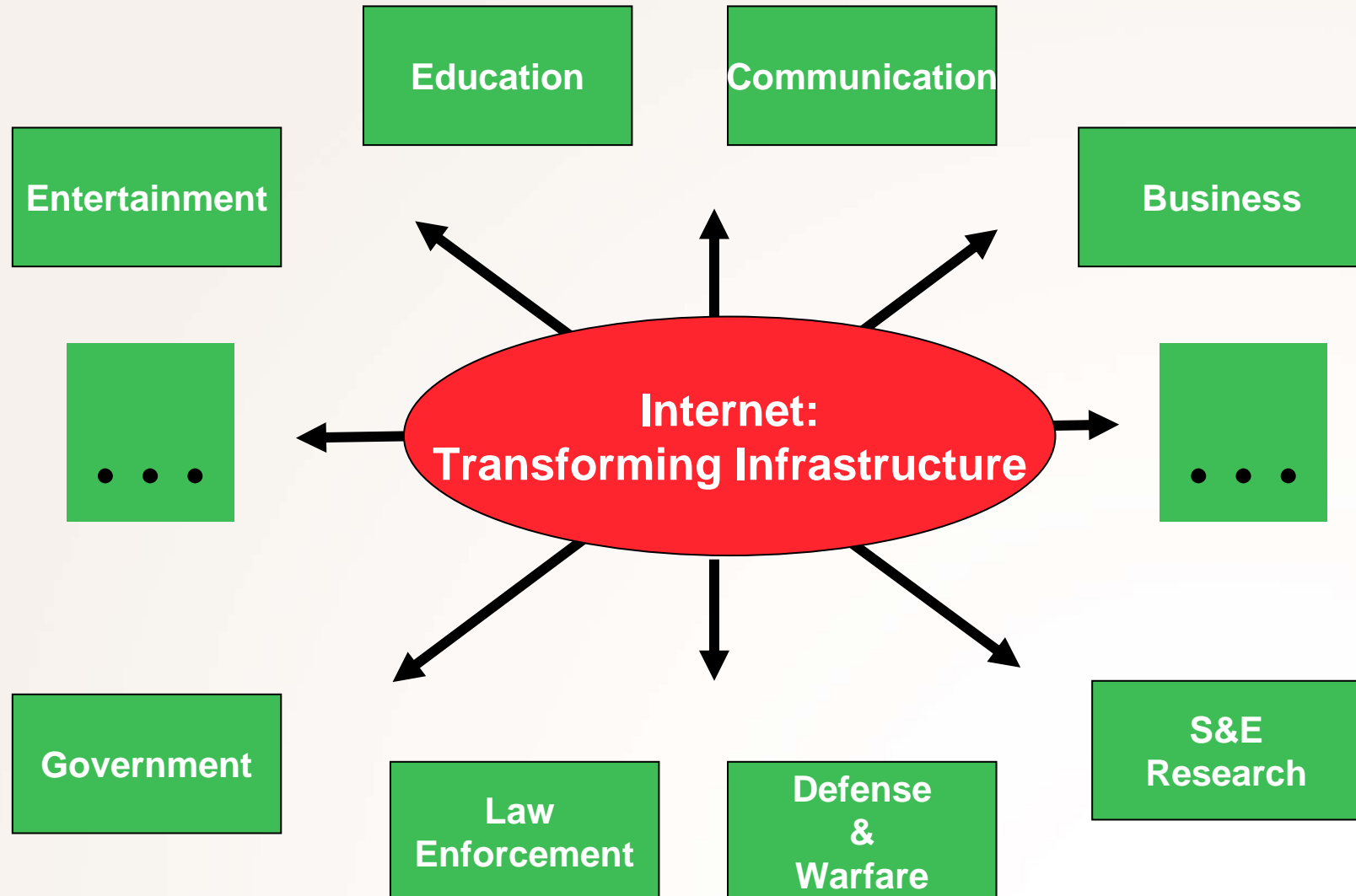
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# THE INTERNET ALSO BRINGS...

- Undesired information
- Intrusive advertising
- Erosion of cultural identity
- Intellectual property & identity theft
- Fraud
- Extremism
- Terrorism
- Potential bodily harm or even death



## HOW DID WE GET HERE?

- Bad things & even some benefits lead to loss of privacy
- This leads to a loss of trust in systems
- Even loss of trust in friends
- These are just symptoms
- Security (or lack thereof) is the root cause

*No privacy without security!*



# NEW TECHNOLOGY

- Near ubiquitous network access & usage
- Convergence, mashups, vast databases
- The Internet of Things
- Vastly increased bandwidth
- Video, advanced software, sophisticated sensors ...

*We have only begun to see the problems!*



THE **FUTURE** OF THE  
**INTERNET**  
AND HOW TO STOP IT

**JONATHAN ZITTRAIN**

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# ZITTRAIN'S THESIS

- Underlying most of the benefits of the Internet are

*“Generativity: a system’s capacity to produce unanticipated change through unfiltered contributions from broad and varied audiences”*

and

*Openness: to innovation in usage, to change in technology, and to new and unanticipated connections to the network [PF’s interpretation]*



- Problems motivate users to utilize locked-down appliances (e.g. mobile phones) and services (e.g. many Web 2.0 applications) that prevent problems
- Security and privacy are gained, but generativity and openness are lost
- A security/privacy watershed will cause a rapid move to appliances and closed environments
- The result will be to go over the cliff - lose the immense, future advantages of the Internet



# WILL THIS HAPPEN?

- Nothing is certain, but the probability is that an extreme public and political reaction will occur
- Consider some of the reactions to the illegal copying of copyrighted material
- Other, powerful interests pose various threats to an open and generative future



## WILL THIS STOP *EVERYTHING*?

- Zittrain does not assert that
- I exaggerate to make a point
- Any innovation is based on information, communication, and exploratory tools
- The Internet provides these as nothing else does
- If we restrict the Internet unduly then we are restricting these foundations of innovation
- We will be restricting the future



# ORIGINS OF THE GENI PROJECT

- Growing concern was expressed in the technical community about future network capabilities
- At the same time, rapid expansion of critical use of the Internet for many purposes by many users was taking place
- Extent and severity of problems were growing exponentially (still are!)
- NSF took the lead in addressing the situation



## NSF's RESPONSE IN 2004-2005 WAS:

- Emphasize experimentation and theoretical development
- The GENI Research Program, focused on experimental/theoretical foundations for future network design
- The GENI Facility, to provide an instrument for at-scale experimentation

# THE FUTURE GLOBAL NETWORK

## Should

- Be worthy of society's trust
- Provide a bridge between physical and virtual worlds
- Support pervasive computing
- Enable further innovations in research and commerce
- Create a world in which we would want to live



# CHALLENGES

- Technical (e.g. security)
- Social (e.g. children's use)
- Political (e.g. posting false info)
- Policy (e.g. access)
- Legal (e.g. copyright)

*These fundamental issues are closely intertwined and must be addressed if we are to realize the opportunities before us.*



# SPAFFORD'S OBSERVATIONS

- Politicians require a crisis before acting
- Authority and responsibility are usually separated
- We lose privacy a tiny bit at a time, to our surprise
- Global problems are also local
- Getting the job done usually trumps security



# SPAFFORD'S OPERATIONAL CONCERNS

- Lack of metrics
- Lack of balance between privacy and security
- Obscured side-effects
- Unforeseen consequences
- Overdependence on technical measures



## SOME QUESTIONS TO ASK ABOUT A POLICY

- Does it balance security and openness & generativity?
- Is it proportional to the benefit?
- Are broader interests served?
- Does it infringe basic rights?
- Will it be applicable in other countries & cultures?
- Is it based on evidence?



*Do no harm.  
Enhance basic mechanisms!*



*THANK YOU!*



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