



National Science Foundation
WHERE DISCOVERIES BEGIN

The Future of IT Security and Privacy: Dreams of an IT Practitioner

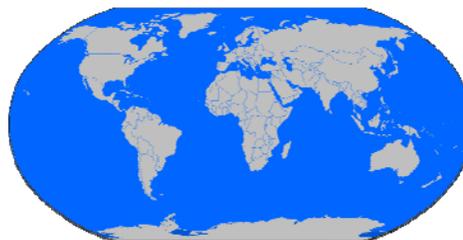
George O. Strawn
NSF CIO



1

Outline

- Historical contexts
- IT and its applications
- IT Security and Privacy



2

Accelerating History



5,000,000,000	Earth is born
500,000,000	Multi-cell life forms
50,000,000	Rise of mammals
5,000,000	Humanoids
500,000	Large brains
50,000	Homo sapiens
5,000	Civilization
500	Western civilization
50	Digital computers



3

The three evolutionary periods

Bio Evolution: 5,000,000,000--50,000



Cultural Evolution: 50,000—500



Technological Evolution: 500--

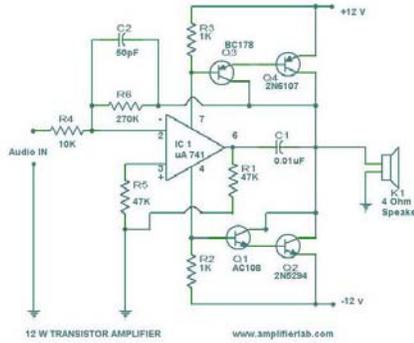


4

IT over time

1970

tech	pre Chip
\$	1,000,000
CPU	1 mips
Disk	\$1 /kCh
Net	10 kbps



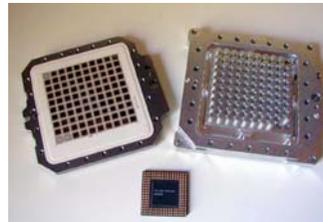
5

IT over time

1970

2000

tech	pre Chip	Chip
\$	1,000,000	1,000
CPU	1 mips	1 gips
Disk	\$1 /kCh	\$1 /gCh
Net	10 kbps	10 gbps



6

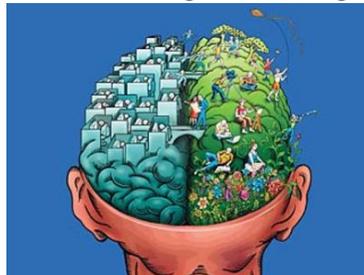
IT over time

	1970	2000	2030
tech	pre Chip	Chip	post Chip
\$	1,000,000	1,000	1
CPU	1 mips	1 gips	1 tips
Disk	\$1 /kCh	\$1 /gCh	\$1 /pCh
Net	10 kbps	10 gbps	10 pbps

7

New IT applications

- Simulation and modeling
- Sensors and actuators
- Collaboration and social computing
- Information and knowledge
- Brain science and engineering
- Education
- IAI



8

Secure IT applications?

- Email
- Web surfing
- Amazon, eBay, etc
- Banking
- Airlines, rental cars, hotels

- Proposal submission and processing
- Award fund draw down

9

My just desserts

- I was part of the NSF team that took the ARPAnet experiment to the NSFnet higher education infrastructure which led to the global Internet we know today

- As such, my friends said it was my just desserts to become NSF CIO (in 2003) and have to use the (insecure!) Internet that I had helped to popularize!

10

Three laws of IT security

- Don't buy a computer

11

Three laws of IT security

- Don't buy a computer
- If you buy one, don't turn it on

12

Three laws of IT security

- Don't buy a computer
- If you buy one, don't turn it on
- If you turn it on, don't connect it to a network

13

CIA Security and Crypto

- | | |
|-------------------|-------------------|
| • Confidentiality | • Confidentiality |
| • Integrity | • Integrity |
| • Availability | • Nonrepudiation |

14

Identity management and crypto

- Identify
- Authenticate
- Authorize
- One-time big expense
- 1-, 2- or 3-factor
- Database big expense

15

NSF Security Program

- Firewalls
- Intrusion detection
- Pen testing & scanning
- Auto patching
- C&A
- Laptop++ *encryption*
- 2-factor authentication
- Standard desktop
- Biz cont & disas recov
- Mix mgmt and security
- SecPrivWG
- Policies & procedures
- SecAware training
- Visitor Net
- SSN begone
- PII (first)
- *https*

16

Government rules

- Never do anything for the first time
- Compliance precedes performance

17

Trusted IT services in 2020?

- More OMB/NIST mandates
- IPv6?
- More vendor responsibility (liability?)
- Ubiquitous Identity management services?
- Move to “protecting the Internet” rather than “protecting from the Internet?”
- Security designed-in rather than bolted-on?
- A Shannon-like law proving that we can build secure systems from insecure components?

18

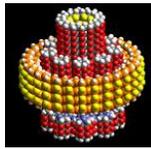
Technology in 2020?

- Very high speed Internet connections are available everywhere
- All scholarly literature is web-accessible to the public
- Cloud computing has replaced personal computing (organizations' software and data are on vendors' "clouds")
- One-half of all high school courses are taught over the Internet
- Drugs are matched to persons based on DNA (eg, a miracle drug for 90% of the people that would kill the other 10% can continue to be marketed)

19

Life in 2050?

- Autopilot-cars, space-planes
- Nano science/technology
- Virtual life
- Augmented reality
- Post-work age
- 115 year life expectancy
- Designer life
- Silicon-based life



20

In conclusion

- Predictions are hard, especially about the future...
- There have been more changes in the last 200 years than in the previous 5000 years
- These changes began with automation of muscle (by industry) and spread to automation of mind (by IT)
- The 21st century might see:
 - the automation of education
 - the automation of (possibly almost all) work
 - the creation of new life forms, some carbon-based, some silicon-based



21

**For those viewing
via webcast,
please submit questions
for this presentation to
kmwquestions@nist.gov**

22