

Privacy & Security

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May 4, 2010





Why does this keep coming up?

“Shifts in technology require us to rethink our attitude towards privacy, as suddenly our abilities to see, hear, detect, record, find, and manipulate others and their lives is greatly enhanced.”

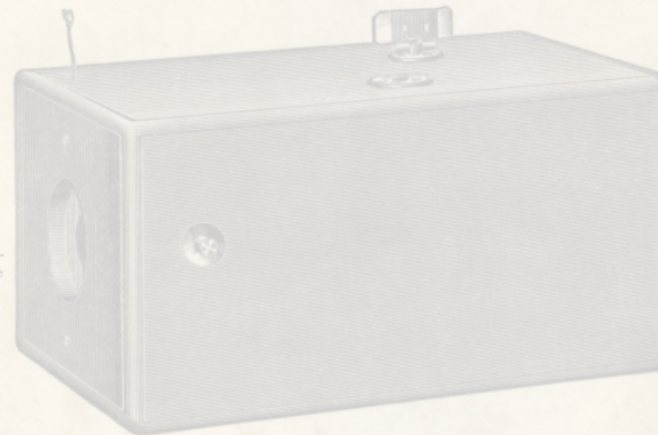
- Langheinrich, 2009 “Privacy in Ubiquitous Computing”

Size:
 $3\frac{1}{4} \times 3\frac{1}{4} \times 6\frac{1}{2}$ inches.
Weight:
1 lb., 10 oz.

PRICE, \$25.00.

Loaded for 100 pictures, including Sole Leather Carrying Case with Strap.

Size of Picture:
 $2\frac{1}{4}$ inches diameter.



ONE-HALF LENGTH.

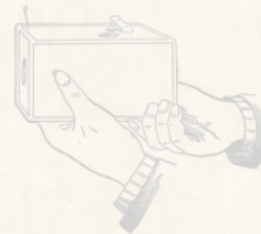
THE KODAK CAMERA.

ANYBODY who can wind a watch can use the Kodak Camera. It is a magazine camera, and will make one hundred pictures without reloading. The operation of taking the picture is simply to point the camera and press a button. The picture is taken instantaneously on a strip of sensitive film, which is moved into position by turning a knob.

Advantages. One of the advantages of the Kodak Camera is that after the picture has been taken, the strip of film (which is wound on a spool) may be removed, and sent by mail to the factory to have the pictures finished. Any amateur can finish his own pictures, and any number of duplicates can be made of each picture. A spool of film to reload the camera costs only two dollars.

No tripod is required, and the camera can be used anywhere, whatever. Rapid rectilinear lens. The Kodak will photograph anything, still or moving, indoors or out.

A PICTURESQUE DIARY of your trip to Europe, to the mountains, or the sea-shore, may be obtained without trouble with a Kodak Camera, that will be worth a hundred times its cost in after years.



A BEAUTIFUL INSTRUMENT is the Kodak, covered with dark Turkey morocco, nickel and lacquered brass trimmings, enclosed in a neat sole leather carrying case with shoulder-strap—about the size of a large field-glass.

Send for a copy of the KODAK PRIMER with Kodak photograph.

THE EASTMAN DRY PLATE AND FILM CO.,

Branch: 115 Oxford St., London.

ROCHESTER, N. Y.



Privacy != Security

“Ensuring the confidentiality and authenticity of a particular information does not say anything about how and when this particular piece of information will be *used* by its designated recipient.”

- Langheinrich, 2009 “Privacy in Ubiquitous Computing”

Security

Framework for information control

Privacy

State achieved when the framework suits the needs of its users

Privacy as a balancing act

Being “let alone” vs. Participation in society
[Langheinrich, 2009]

Authorization vs. Intrusion of authorization
[Satyanarayanan, 2003]

Crowding vs. Isolation
[Langheinrich, 2009]

Information availability vs. Exposure to threats
[Dragovic & Crowcroft, 2004]



In theory...

“Information Exposure Control through Data Manipulation for
Ubiquitous Computing” Dragovic & Crowcroft, 2004

Initial assumption

“...it is unfeasible to expect humans to be able to reason and act effectively to protect the information themselves.”

Do you agree?

Ideas for “calm” privacy management

Privacy: The Achilles Heel of Pervasive Computing?

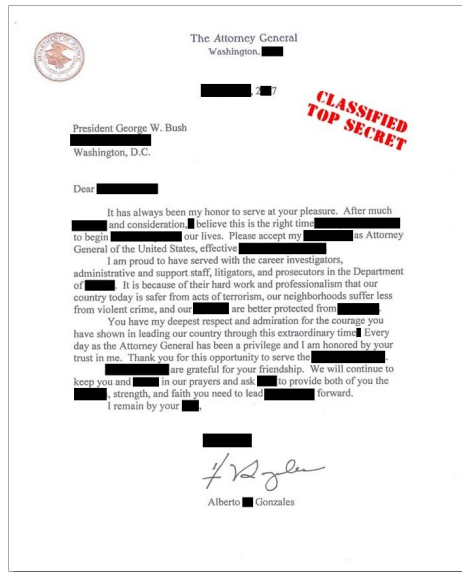
M. Satyanarayanan, 2003

Increasing awareness

Maintaining and Audit Trail

Creating a “Sixth Sense”

General approach



Segment data into clearance levels

Describe the context of data



Major flaw: too general!

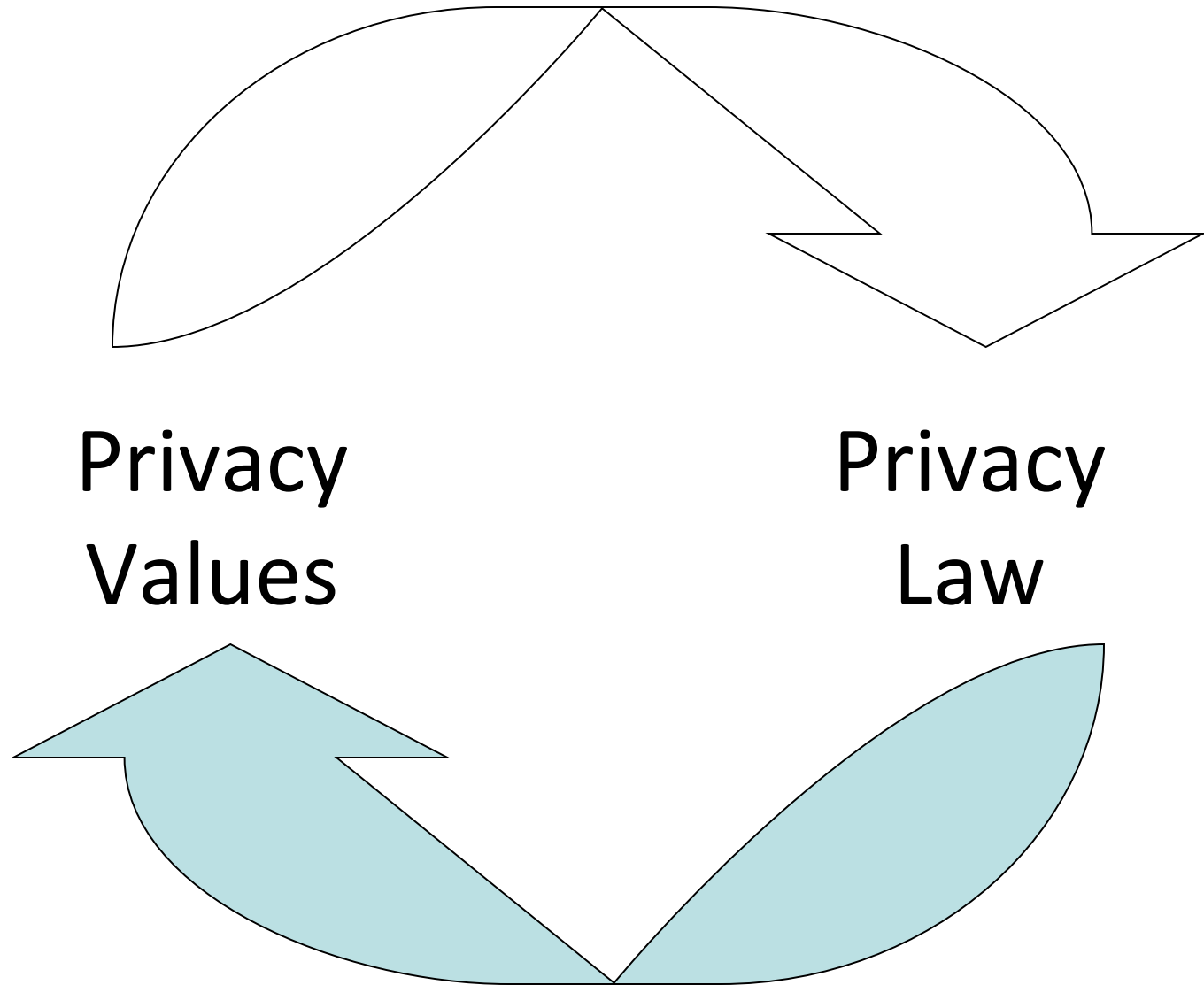
Maybe this reflects:

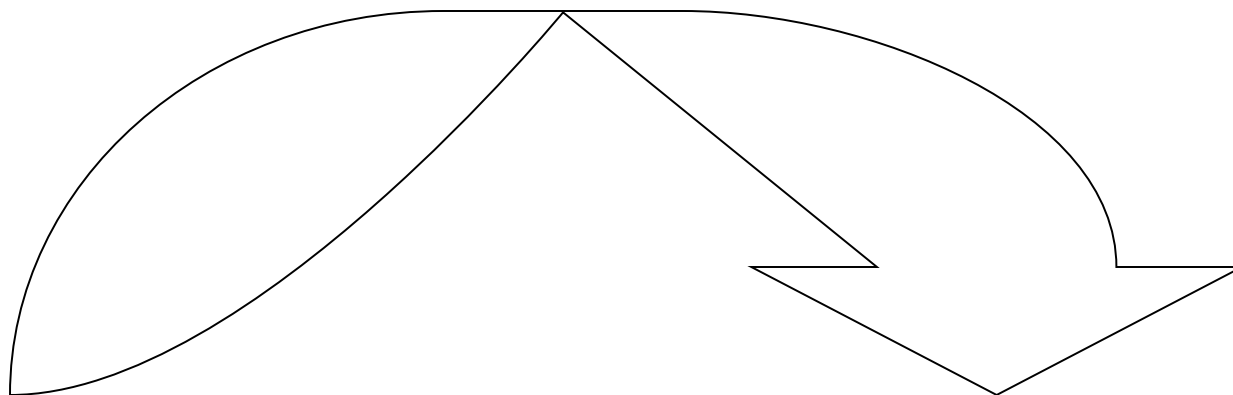
- The state of ubiquitous computing today
- The amount of planning necessary to attain such a vision



In democracy...

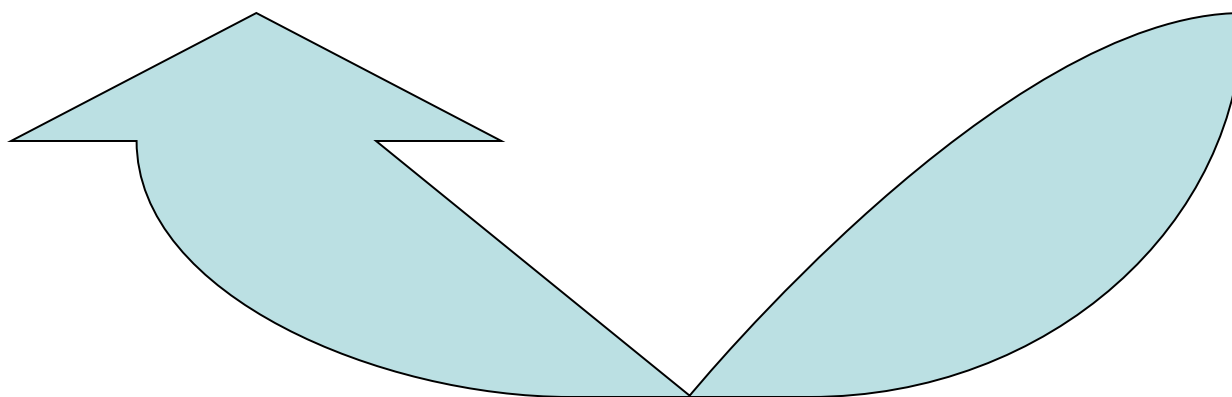
“We Like to Watch” Goldstein, 2004

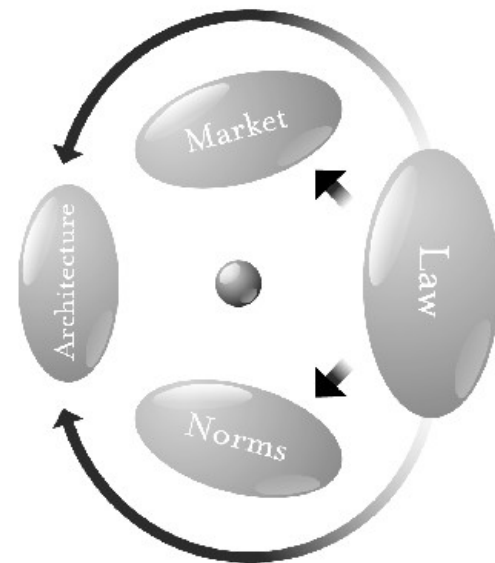
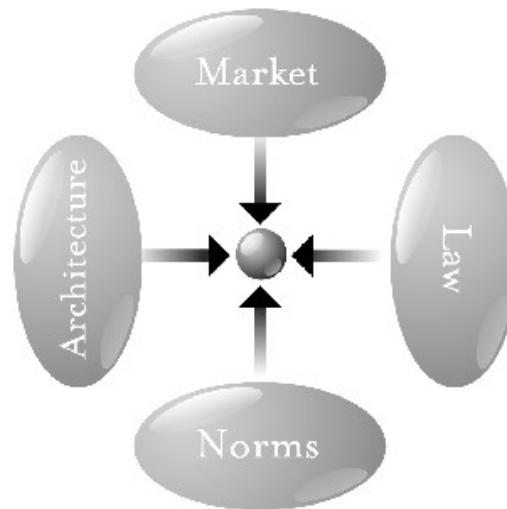
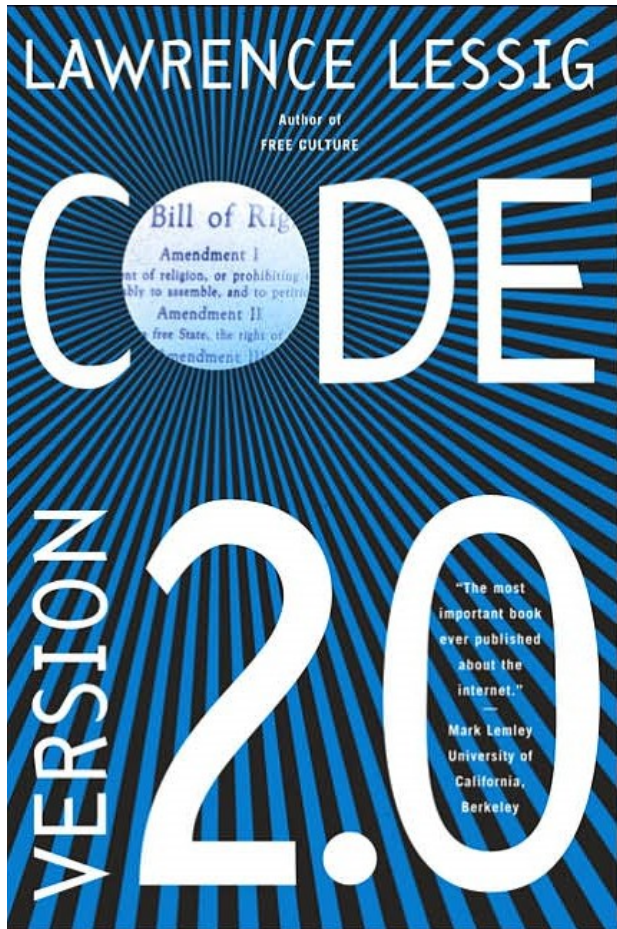




Values

Law





<http://www.socialtext.net/codev2/>

Total Information Awareness program

US Dept. of Defense Research program

January 2002

Charged with helping to detect terrorist activities

18 data-mining projects described in detail on the program's web site

Working to create tools capable of sifting through vast amounts of information

Information Awareness Office

HumanID

Genisys

TIDES


EARS

Babylon




Privacy Legislation: United States vs. Europe

“Sectorial approach”

A light gray silhouette map of the United States, showing the continental United States and Alaska.

Strong, overarching laws for the federal government, while state and local governments are regulated “as needed”

“Omnibus approach”

A light gray silhouette map of Europe, showing the continent and surrounding islands.

Overarching frameworks that apply to both governments and commercial entities





In practice...

“Denial-of-Service Attacks on Battery-powered Mobile Computers” Martin et al.

“Shake well before use: two implementations for implicit context authentication” Mayrhofer & Gellersen

Shake well before use:

Two implementations for implicit context authentication



Implementation

Interesting interaction (calm)

Only appropriate for small
devices that fit securely in
the hand

Devices must be co-located

Discussion

How reliably could the
connection be
established?

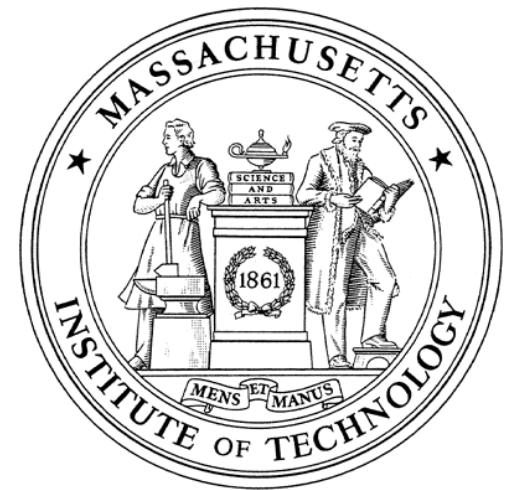
Could you “fake the shake”?

Denial-of-Service Attacks on Battery-powered Mobile Computers

“One of the goals of this paper is to raise the awareness of the pervasive computing community...”

“...the first real examples of these attacks on general purpose mobile computers in the literature.”

Denial-of-Service Attacks on Battery-powered Mobile Computers



Denial-of-Service Attacks on Battery-powered Mobile Computers

1. Service request power attacks

Target wastes energy denying services

1. Benign power attacks

Target completes valid but energy-hungry tasks repeatedly

1. Malignant power attacks

Target is infected with virus and runs inefficient code

Denial-of-Service Attacks on Battery-powered Mobile Computers

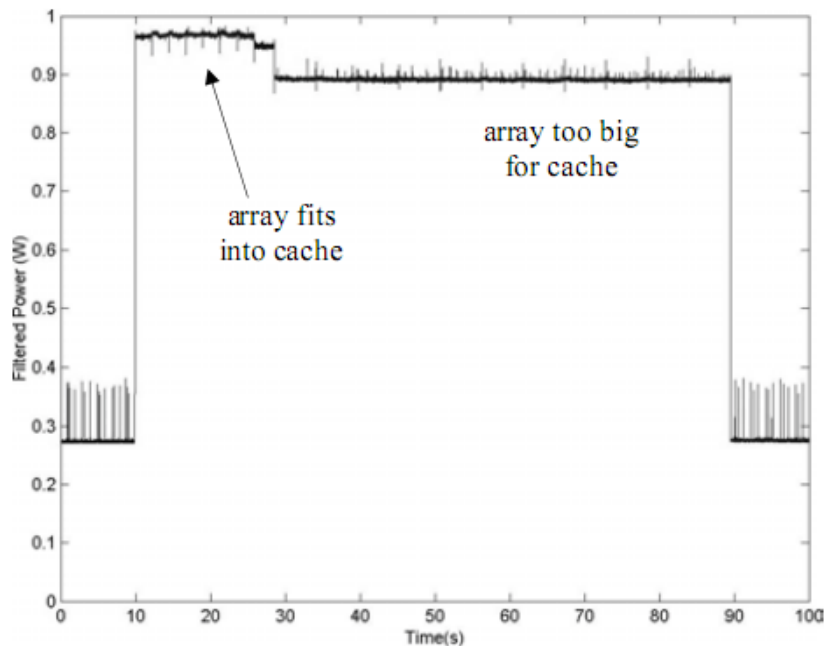


Figure 7. Power consumption during malignant power attack on the Itsy at 206 MHz

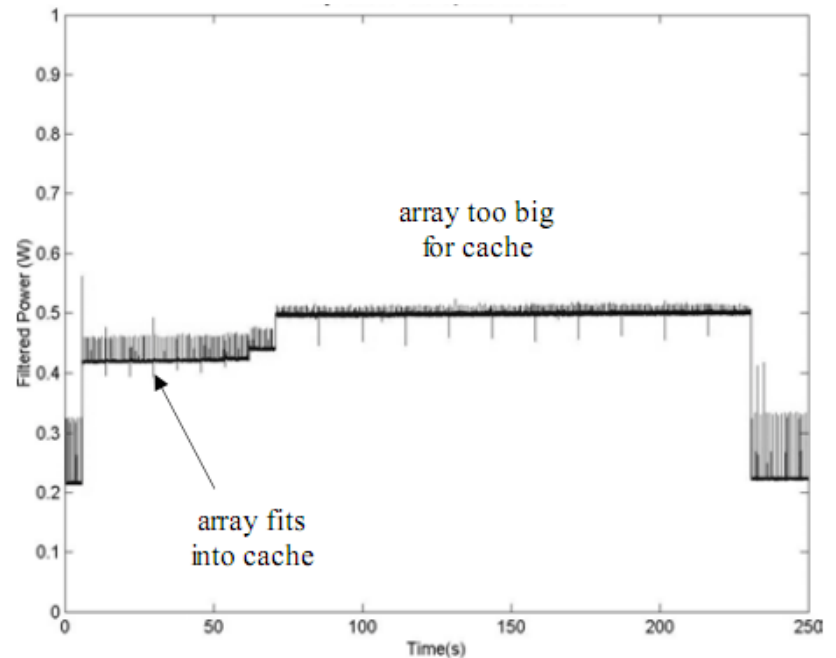


Figure 8. Power consumption during malignant power attack on the Itsy at 59 MHz



Discussion

Is ubiquitous computing a state?

Can we reach it? (“There, we’re done.”)

Is it inevitable?



“Data and Information in the Palm of Our Hands”

“Incentivize buy-in to large systems with small steps”

Does this apply to

- Ubiquitous computing?
- Security?

Privacy & Security

