

# Ubiquity – Your Future Environment

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# Isn't Cyber the next big thing?

- ◆ All the buzz has been about cyber ...
  - ◆ Cybersecurity, Cyberwarfare, Cyberspace, US Cyber Command
- ◆ ... but it's misplaced, cyber is but just *one* means that networks use, they also use others...

"Networks are pervasive in all aspects of life: biological, physical, and social. They are indispensable to the workings of a global economy and to the defense of the United States against both conventional military threats and the threat of terrorism."

- National Research Council, 2005, *"Network Science"*



# The real buzz should be about what's next...

- ◆ *It will be ubiquitous*: u-computing·u-networking·u-sensors·u-linking·u-information·u-communications
- ◆ *Networks converge*: Social + Physical + Biological Networks
- ◆ *The human aspect*: how will we interact with a converged & ubiquitous network?
- ◆ *U-Collaboration*: heterarchical vs hierarchical, Wikipedia, crowd sourcing
- ◆ *Ubiquity as a Critical Infrastructure*: how will we protect it?
- ◆ *Technology convergence & drivers*: miniaturization, neuroscience, nanotechnology, machine learning, GPS, data farms, virtualization, cloud computing ... **and the exponential pace at which it is developing...**

**“Ubiquitous computing will be enabled** by widespread tagging and networking of mundane objects (the Internet of Things) such as food packages, furniture, room sensors, and paper documents. Such items will be located and identified, monitored, and remotely controlled through enabling technologies—including RFIDs, sensor networks ...”

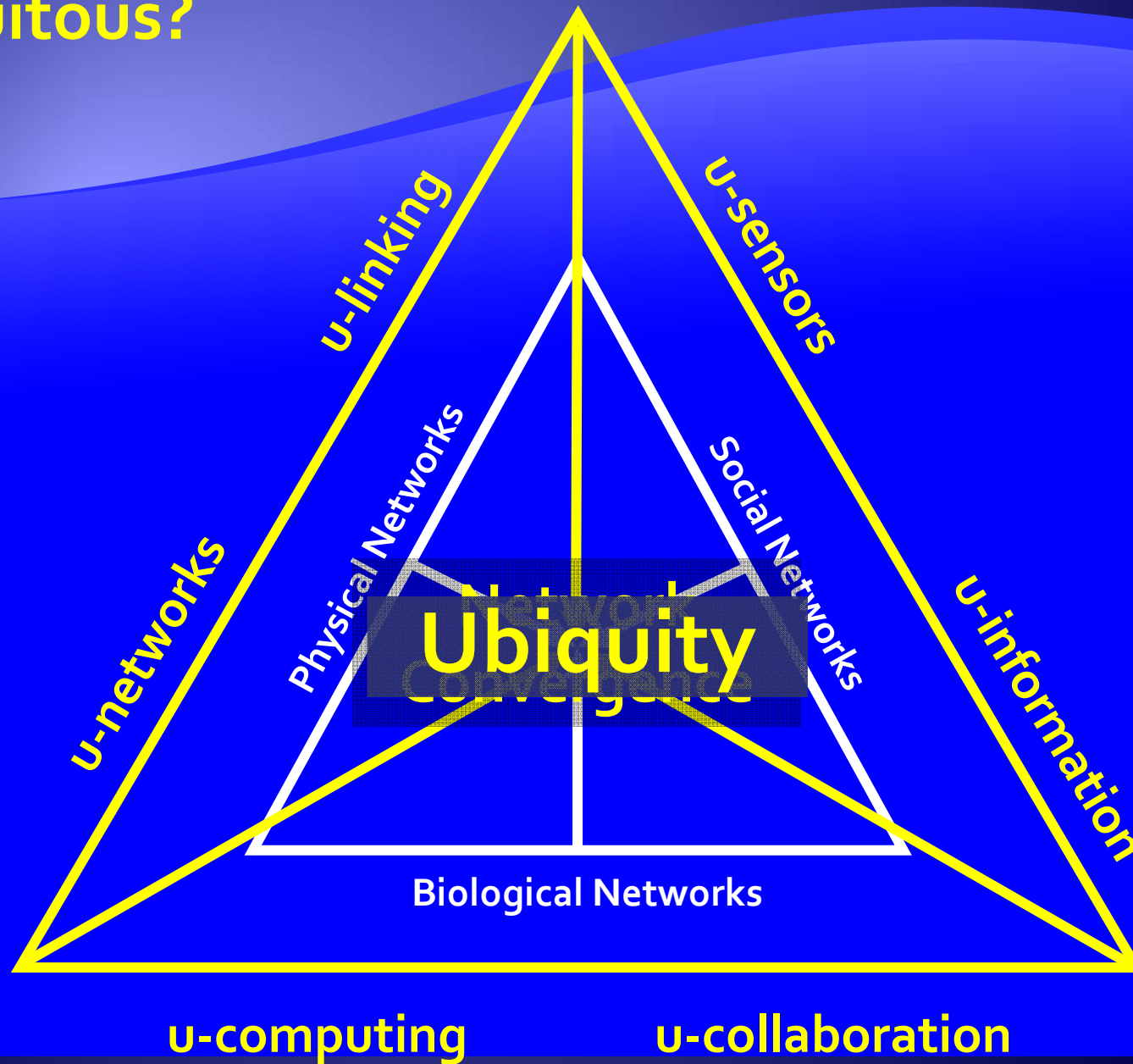
- National Intelligence Council, 2008,

“*Global Trends 2025: A Transformed World*”

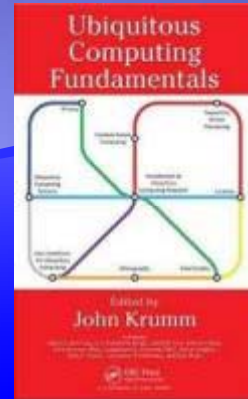
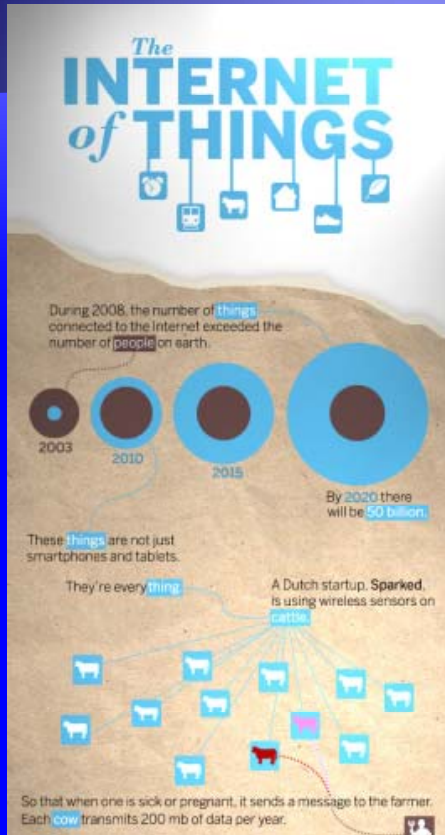
# What is Ubiquity?

- ◆ *A continually evolving interdependent ecosystem in which sensing, computing and communicating between humans, machines, objects and networks converge to the point where they are mobile, transparent and become a seamless part of the social fabric.*
- ◆ *But what does it mean?*

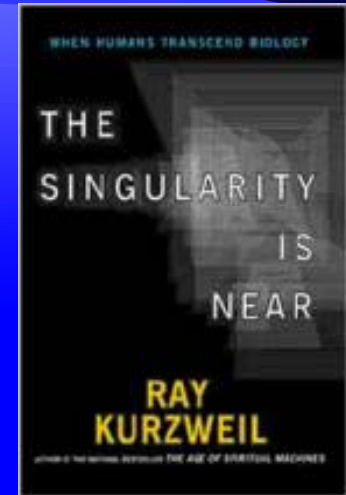
# What happens when networks converge and are ubiquitous?



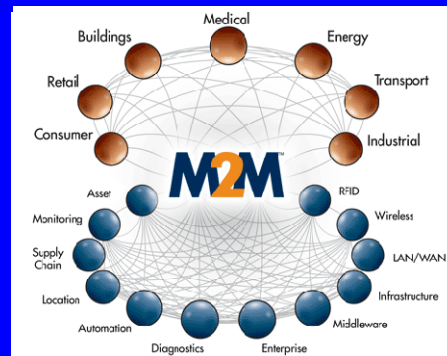
# Ubiquity – not a unique concept



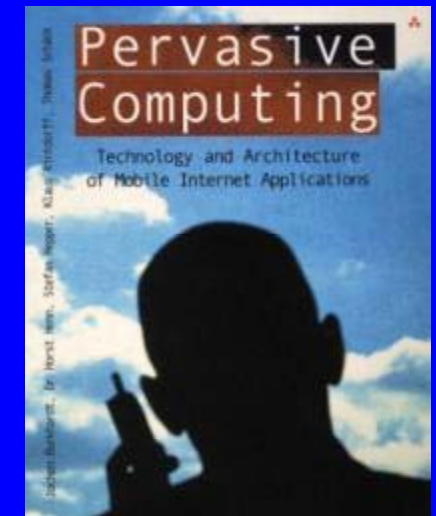
Mark Weiser



Ambient Intelligence



Wireless Sensor Networks



# Industry's view of the trend

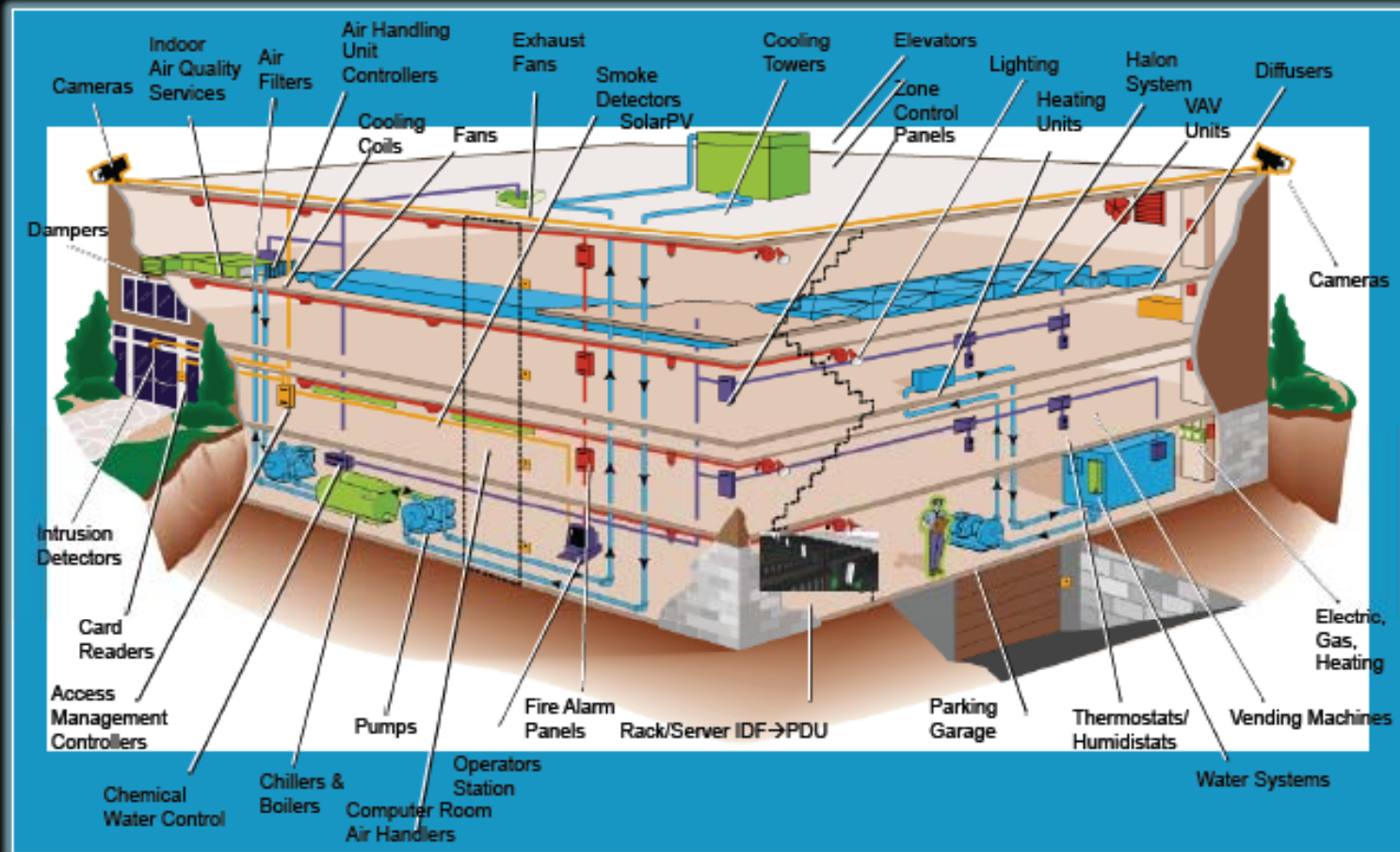


Slide presented at Internet of Things 2010 by Patrick Wetterwald - Cisco

# Smart Buildings – objects take on identities

One Building – Multiple Industries → Smart Buildings

lighting, HVAC, metering, industrial, access control, and more



C35-452149-00

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Slide presented at Internet of Things 2010 by Patrick Wetterwald - Cisco

# LBS & RTLS\*



\* Location Based Services & Real Time Location Services

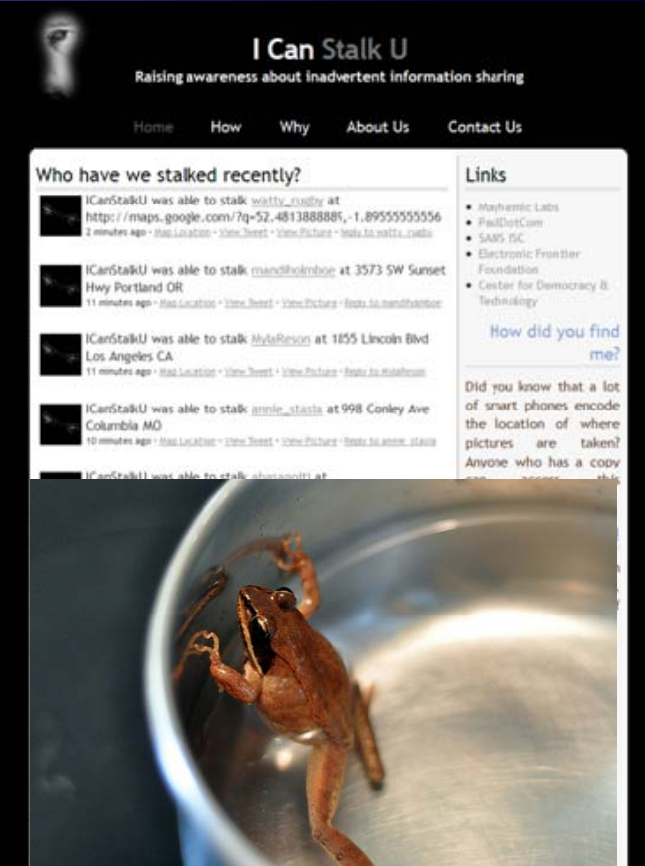
# Wireless standards and protocols

- ◆ 802.11A/B/G/N
- ◆ 802.16 – 4G – WIMAX – LTE
- ◆ 802.15.4 Zigbee
- ◆ Bluetooth
- ◆ Near Field Communication
- ◆ RFIDs
- ◆ IPv4 / IPv6
- ◆ 6LoWPAN



# What does this mean?

- ◆ Where will Ubiquity take us?
  - ◆ Will we feel more or less secure?
  - ◆ What will change in society as a result?
- ◆ Personal Privacy? A thing of the past
  - ◆ It's happening now, many don't realize it
  - ◆ "Government won't be Big Brother, each of us will be Little Brother" – Prof Bill Griswold, UCSD
  - ◆ Track anyone, anything, anywhere, anytime
  - ◆ Understand the masses



The image shows a screenshot of the website "I Can Stalk U". The website's header includes the title "I Can Stalk U" and the tagline "Raising awareness about inadvertent information sharing". Below the header is a navigation menu with links for "Home", "How", "Why", "About Us", and "Contact Us". The main content area is divided into two columns. The left column is titled "Who have we stalked recently?" and lists several stalked users with their names, locations, and timestamps. The right column is titled "Links" and lists several organizations. Below the links is a section titled "How did you find me?" and a paragraph of text. At the bottom of the screenshot is a large image of a brown frog sitting in a metal bowl.

I Can Stalk U  
Raising awareness about inadvertent information sharing

Home How Why About Us Contact Us

Who have we stalked recently?


- I Can Stalk U was able to stalk [wally\\_rugby](#) at <http://maps.google.com/?q=52.4813888885,-1.895555555556> 2 minutes ago • [Map Location](#) • [View Tweet](#) • [View Picture](#) • [Reply to wally\\_rugby](#)
- I Can Stalk U was able to stalk [mand@holnhoe](#) at 3573 SW Sunset Hwy Portland OR 11 minutes ago • [Map Location](#) • [View Tweet](#) • [View Picture](#) • [Reply to mand@holnhoe](#)
- I Can Stalk U was able to stalk [MylaReison](#) at 1155 Lincoln Blvd Los Angeles CA 11 minutes ago • [Map Location](#) • [View Tweet](#) • [View Picture](#) • [Reply to MylaReison](#)
- I Can Stalk U was able to stalk [arnie\\_stark](#) at 998 Conley Ave Columbia MO 10 minutes ago • [Map Location](#) • [View Tweet](#) • [View Picture](#) • [Reply to arnie\\_stark](#)
- I Can Stalk U was able to stalk [shespot11](#) at

Links

- Staphenetic Labs
- PaulDotCom
- SANS ISC
- Electronic Frontier Foundation
- Center for Democracy & Technology

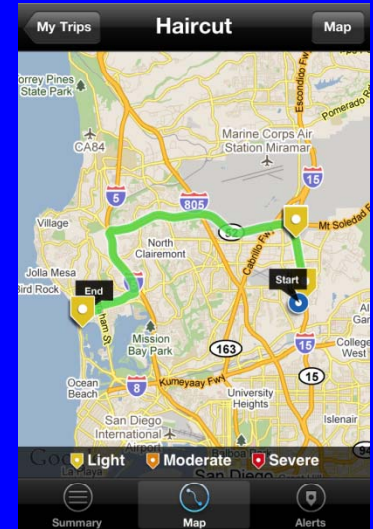
How did you find me?

Did you know that a lot of smart phones encode the location of where pictures are taken? Anyone who has a copy



# Would you be willing to....

- ◆ Let retailers track you in their stores if it got you a discount or free stuff?
- ◆ Let your health care provider know your DNA and habits in return for lower insurance costs?
- ◆ Pay for remote health monitoring?
- ◆ Let your auto insurer track your speed and driving techniques for lower insurance costs?



# Discussion