2002

The "X Internet" and PANs: Technologies of the Future Connect Consumers and Possibly Their Identities

Kathryn Smetana

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I. Introduction

As an organized society, we recognize that certain limitations on our privacy are necessary. Clearly, privacy on the Internet is not a new issue. In an increasingly interconnected world, however, our privacy interests are compromised. By being connected to each other, we invariably give up some level of information about who we are and what we do when connected to the web.

Ultimately, however, it is anonymity we seek, not merely privacy, a goal driven by the fear of "Big Brother" tracking our every move on the Internet.[1] Anonymity is a valuable component of social and political freedom.[2] When we log onto the Internet, we expect to be an anonymous user until we voluntarily reveal ourselves. What most of us may not understand is that we never truly maintain our anonymity on the Web. In fact, we give information unwittingly, and new technological advances further break down the anonymity barriers.

Today, the Internet is used to gather information or to conduct typical consumer transactions such as buying, selling, or auctioning goods. Consumers want information such as their credit card numbers and home addresses to be private and securely held, and pop-up messages warn them of potentially unsecured sites. Even with precautions, cookies, messages sent from our computers to each website we visit, confound our best efforts at privacy, and ultimately anonymity.

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[*] J.D. candidate, May 2002, Loyola University Chicago School of Law; B.S. Advertising, 1995, University of Illinois Urbana-Champaign.

[1] Shawn C. Helms, *Translating Privacy Values With Technology,* 7 B.U. J. Sci & Tech. L. 288, 301 (2001).

[2] *Id.* at 303.

The Internet has revolutionized how we view a connected world, but imagine a new world where your car reminds you to run errands, your refrigerator makes your grocery list, a college student receives an email notification that their load of laundry is finished, and where a farmer can guarantee a perfect corn crop. Sound like science fiction? With the "X-Internet," it is no longer a question of how, but when. In addition to a new way of functioning online, PANs (Personal Area Networks) will connect consumers everywhere over radio wave frequencies utilizing PDAs, cell phones and simple sensors. PANs will enable constant connectivity, in any environment. However, with these new technologies, it is certain that new issues regarding privacy and anonymity will arise, for can we be certain that our new Internet can be connected to everything we own and still keep our identities confidential online, and will we be able to safely and anonymously connect over radio waves using PANs? Whatever the risk, technological dreamers are making these technologies a reality.

II. The "X-Internet"

Most of us consider the Web and the Internet one and the same; however, according to Forrester, an independent business and technology research firm, we are confused.[3] The Web is the interface, the pictures we see when we get online, while the Internet is the wire that connects us to the Web. It is the Internet that will take us beyond what Forrester considers the "dumb," "boring," and "isolated" Web, to a life we have thus far only imagined in science fiction.[4] What Forrester calls the "X Internet" is comprised of two ideas they term "waves of innovation": the "extended internet," where Internet connectivity reaches beyond the traditional PC, and the "executable internet," where online websites act like software in terms of interactivity and of the moment user to internet communication.[5]

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[3] Carl D. Howe, *The X Internet*, THE FORRESTER REPORT, May 2001, at 2, *available at* http://www.forrester.com (last visited Feb. 18, 2002).

[4] *Id.* at 5.

[5] Jeremy Schlosberg, *Web's Dying, to be Reborn as 'X Internet'*, NEW MEDIA, *available at* http://www.medialifemagazine.com/news2001/may01/may28/2_tues/ news2tuesday.html (last visited Feb. 18, 2002).

A. The "Extended Internet"

The "extended internet" will connect appliances such as refrigerators, thermostats, and other consumer products, such as cars, using simple sensors so that these items will actually communicate with owners, as well as manufacturers.[6] Forrester defines the "extended internet" as "Internet devices and applications that sense, analyze, and control the real world."[7] Using this technology, consumers can have Internet controlled thermostats, such that if they leave their home unattended or have a weekend home hours away, logging onto the Internet could provide the opportunity to check and adjust home temperatures from any location.[8] It is forecasted that this form of the Internet will pervade every aspect of our daily life. For example, the refrigerator will notice when we're out of milk and will send a message to our car reminding us to stop at the store on the way home to pick up more milk.[9] Additionally, it is foreseen that our computers will become more like appliances that will turn on instantly without taking time to boot up, and "commands [will be] flying through the air, controlling devices, sharing information and computer files and more."[10]

This technology will reach consumers in indirect ways as well. For example, it is envisioned that companies such as BP Amoco will utilize the "extended internet" to monitor gasoline pumps at service stations to send such information as maintenance needs to the station and to BP Amoco operations without human action.[11] Additionally, a company like Dupont may utilize agricultural sensors, currently in

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[6] Rebecca Sausner, *Meet the Future: the 'X Internet'*, OSOPINION, *available at* http://www.osopinion.com/ perl/story/10012.html (last visited Feb. 18, 2002).

[7] Howe, *supra* note 3, at 11.

[8] *Id.*

[9] Kevin Featherly, *Forget the Web, Make Way for 'X Internet' – Report*, NEWSBYTES, May 7, 2001, *available at* http://www.newsbytes.com/news/01/ 165405.html (last visited Feb. 18, 2002).

[10] Melanie Axelrod, *Analysts: The Web Will Become More Convenient and Omnipresent*, Aug. 10, 2001, *available at* http://www.abcnews.go.com/sections/ scitech/CuttingEdge/pcanniversary_xnet 010810.html (last visited Feb. 19, 2002).

[11] Howe, *supra* note 3, at 13.

development at Motorola, to regulate soil properties such as moisture and pH, which could "ensure a near-perfect corn crop to farmers."[12]

B. The "Executable Internet"

The second wave of innovation provided by the "X Internet" is the "executable internet," which would perform like an interactive software styled experience – something akin to video games, but via the Internet – glimpses of which have been seen in such phenomena as "Napster" or "SmartMoney.com's Map of the Market."[13] Forrester envisions this technology functioning as a virtual conversation, rather than the current Internet functionality of mere information gathering and reading different articles for each task. For example, in building a house, one could have a "conversation" about plumbing with a virtual plumber, and carpentry with a virtual carpenter. [14] Ultimately, this technology, according to Forrester, would provide users with a more sophisticated Internet experience, allowing them to perform tasks more quickly and with higher quality and precision.[15]

III. PANs

Taking the "X-Internet" a step further, Personal Area Networks, or PANs (think Local Area Networks, LANs, common in business networking), would connect individuals by way of personal technology devices.[16] Today, personal technology devices include PDAs and cell phones. In the future, they can include the means to connect via sensors embedded in articles of clothing.[17] The chief technology behind PANs is called Bluetooth, a wireless technology

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[12] *Id.*

[13] *Id.* at 8.

[14] *Id.*

[15] *Id.*

[16] Virgil L. Hovar, *Personal Area Networks – How Personal are They?*, SANS INSTITUTE, July 19, 2001, *available at* http://rr.sans.org/wireless/PAN.php (last visited Feb. 19, 2002).

[17] *Introducing Technology Enabled Clothing, available at* http://www. scottevest.com/press/technology_enabled_clothing.pdf (last visited Feb. 19, 2002).

that operates over radio waves, with a currently limited distance range for sending data.[18]

PANs will give users the ability to customize communications capabilities, to have everyday devices act as a "smart, tetherless" network. Preliminarily, PAN technology will allow an individual to beam print jobs to a printer with a PDA, and send an email without downloading via a docking station. [19] It is envisioned that over time, PANs will provide the capability of "plug[ing] into any environment . . . to interact."[20] This would allow consumers to spontaneously network with airlines, hotels and car rental agencies for such services as seating/room assignments, purchases, and electronic payment via PDAs or other personal wireless devices.[21] This technology enables PANs to be created at home, the office and even in public places, so consumers can be connected anywhere, all the time.

Ultimately, PANs will become what some call "wearable computers." [22] The foreseeable reach of PANs is best seen by way of illustration: individuals meeting somewhere, for example, at a business conference, who would normally exchange business cards, are equipped with PANs. When the individuals shake hands, their "wearable computers" receive signals through the skin of their hands, sending each other's respective business card information to the "wearable computers" on the other.[23] This information is available for use within moments and is stored in a contact database for later use.[24] If the "wearable computers" are equipped with a "digital 'wearcam' camera," a digital photo of the person is taken and attached to the

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[18] Albert Proust, *Personal Area Network: A Bluetooth Primer*, O'Reilly Network, Nov. 3, 2000, *available at* http://www.oreillynet.com/pub/a/wireless/2000/11/03/bluetooth.html (last visited Feb. 19, 2002).

[19] Hovar, *supra* note 16.

[20] Bob Weinstein, *What's this about an x Internet?*, TECH WATCH, *available at* http://www.jsonline.com/bym/career/jun01/techcol25062501a.asp (last visited Feb. 19, 2002).

[21] *Welcome to Our 'Connected' World, available at* http://www.motorola.com/bluetooth/pan/pan.html (last visited Feb. 19, 2002).

[22] *Personal Area Network*, Digiman human-computer interface research, *available at* http://www.digiman.org/html/pan.html (last visited Feb. 19, 2002).

[23] *Id.*

[24] *Id.*

business card information received via handshake.[25] With this digital image, if the two are to meet again years later, their "wearable computers" would recognize the person, pull up the business card information as well as information including the last time they met, and what they talked about.[26]

IV. Conclusion

As new technologies are developed connecting consumers with other consumers, businesses, and even household appliances, the notion of anonymity will be invariably altered. At what price comes increased productivity, enhanced Internet experience, and personal and business efficiencies only available through connectivity? The "X Internet" and PANs will have the capability to track people not only by computers, but also by devices that can be worn in articles of clothing. Though these technologies will bring convenience and connectivity once only imagined in science fiction, attendant to such amazing technological advances is the increasing loss of, and perhaps necessary compromise in, anonymity.

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[25] *Id.*

[26] *Id.*