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Five innovations that will change the way we live over the next five years

As the calendar flips from 2006 to 2007, it's the time for "Top Ten" lists and predictions for the future. IBM is introducing its own "Next Five in Five", a view on five innovations that will change how people around the world work, play and live over the next five years.



Here are our predictions:

- We will be able to access healthcare remotely, from just about anywhere in the world
- Real-time speech translation—once a vision only in science fiction—will become the norm
- There will be a 3-D Internet
- Technologies the size of a few atoms will address areas of environmental importance
- Our mobile phones will start to read our minds

These five innovations were selected based on projects in our Research labs, research conducted by our business think-tank, and ideas pooled from more than 150,000 people from 104 countries who took part in a recent online brainstorming session called "IBM InnovationJam."

Healthcare prognosis: more flexible, accessible, affordable



Wireless innovations coupled with the ability to securely capture sensitive medical data are allowing healthcare to move from the traditional doctor's office to wherever the patient happens to be.

- Millions of people with chronic diseases, such as diabetes and heart ailments, will be able to have their conditions monitored as they go about their daily lives, through sensors in the home, worn on the person or in devices and packaging.
- **The Helping Hand** pill dispenser can help patients track compliance with their drug regimen and automatically transmit the data to caregivers.
- **Virtual Doctor Check-Ups at Home** add convenience, a sense of independence and security for the elderly and chronically ill. A blood pressure or pulse reading can be taken on a remote device and the results sent directly to a care provider's mobile phone, who can then follow up as needed.
- **Doc in a Box** offers people access to healthcare even in the most remote geographical locations. Doctors will be able to transmit medical images and data instantly, without elaborate equipment to major medical institutions thousands of miles away. Specialists can assist in diagnoses and treatments that might otherwise have taken weeks to obtain.

Electronic medical records (EMRs) provide immediate, current, secure access to patient information. And an electronic record can't be destroyed in a fire or natural disaster, such as happened when Hurricane Katrina left thousands of people without their medical histories.

EMRs are a critical enabler to any healthcare innovation. They have been enhanced with two new technologies:

- Web-enabled tablets allow doctors and care providers to update a patient's medical records at the bedside, while making their rounds.
- A digital pen automatically stores words, numbers, even pictures written by a patient on a medical form and transfers the data to his health record.

Real time speech translation will become the norm



The movement towards globalization needs to take into account basic human factors, such as differences in language. IBM speech innovations are already allowing travelers using PDAs to translate menus in Japanese and doctors to communicate with patients in Spanish. Real-time translation technologies will be embedded into mobile phones, handheld devices and cars. These services will pervade every part of society, eliminating the language barrier in our new smaller, faster-paced world.

This year, IBM announced two new technologies from our Research labs that are already impacting our lives. Just listen...

- **IBM MASTOR** software was designed to improve communication between U.S. military personnel and Iraqi forces and citizens. It provides bi-directional English to Iraqi Arabic translation. MASTOR works just like a human translator -you talk, and your conversation is translated instantly. It can be used for exchanging simple courtesies to providing support for more sophisticated conversations. MASTOR is also available in two-way English to Modern Standard Arabic and Mandarin Chinese; additional languages are planned.

Accessing video or audio programming from around the world is easy with cable TV and the Internet. The problem is translating the information. While translation software exists for Web site text, the ability to translate video and audio-often the more interactive and engaging content-is still an obstacle.

- **IBM TALES** (Translingual Automatic Language Exploitation System) **software** provides real-time monitoring and translation of Arabic broadcast media. TALES software allows users to search, and then view or listen to, news from foreign language broadcasts and Web sites around the world.

The Internet moves to the 3rd dimension



The popular online immersive destinations, such as Second Life, will evolve into the 3-D Internet, much like the early work by AOL and Prodigy evolved into the World Wide Web. The 3-D Internet will enable new kinds of interactive education, remote medicine and consumer experiences, transforming how we interact with our friends and family, doctors, teachers, and more.

Working with a broad community, and leveraging our decades of experience in super-computing, visualization and work with the three major game platforms (Microsoft's XBOX 360, Nintendo's Wii and Sony's Playstation 3), IBM hopes to help build out this next generation Internet.

Our ultimate aim is for inter-world integration. Instead of separate islands of virtual worlds, IBM's vision is to allow your virtual persona to move seamlessly from one world to another, enabling all sorts of new applications.

Already, IBM is working with major companies to transform experiences for everyday people:

- A major UK grocer is looking at building a virtual grocery store to allow people to walk the aisles, fill their basket with items available in inventory, check out and then receive a delivery of those groceries at their home.
- The action at this year's Wimbledon was, for the first time, replicated in a virtual tennis court built by IBM in Second Life. While the game was played out in reality, spectators could sit with their friends or even walk on the court to view the game, and see the actual shot-by-shot movement of the ball from any angle.

Micromanaging our environment down to the nano-level



Early this year, IBM will undertake new research projects focused on the environment: advanced water distribution, water filtration via nanotechnology and efficient solar power systems.

Advanced water modeling, distribution and management systems

The ability to support economic and population growth has been contingent upon whether urban planners can ensure a reliable supply of water to residential and commercial establishments.

With the ubiquity of IP-based technology today, it is possible to envision a technologically-enabled "smart" water distribution system that helps manage the end-to-end distribution, from reservoirs to pumping stations to smart pipes to holding tanks to intelligent metering at the user site so consumption could be managed in a responsible way.

The water distribution system would serve as a grid, much like a utility grid, at multiple levels: federal/central, regional, city/town and even down to a single residence or commercial establishment. Such a system would integrate business processing, decision-making, utilization, diagnostics, and remote monitoring type applications.

Water desalination using carbon nanotubes

The current methods of desalinating water, reverse osmosis and distillation, are both expensive and high maintenance. IBM will research methods of filtering water at the molecular level, using carbon nanotubes or molecular configurations, which can potentially remove the salt and impurities with less energy and money per gallon.

Efficient solar power systems

The high cost of fossil fuels, reliance on supply from areas suffering from political instability and worries about global warming have increased interest in alternative energies. IBM Research's unique semiconductor knowledge, nanostructure fabrication and testing, and packaging technology may be applied toward more efficient, simpler, lower-cost solar power production.

Get ready for mind-reading phones



Presence" technology allows you to be found on the network, whether it's a computer network, mobile phone network or any other kind. Presence technology in its current form amounts to instant messaging applications. In five years, however, mobile devices will have the ability to continually learn about and adapt to your preferences and needs.

IBM and Norway's biggest telecommunications group are testing technology to allow mobile devices and networks to learn about users' whereabouts and preferences as they commute, work and travel. The system works with a variety of wireless networks including GSM, GPS, RFID and WiFi. It relies on sensors like GPS, processing software to filter information, an intuitive interface and uses important events to adapt to the user's preferences. For example, when a user enters a meeting room with several people, the mobile phone will automatically divert to voice mail. Your favorite pizza joint will know when you're on your way home after a late night and ping you with a special-price, take-home meal just for you.
