

potentially communicate wirelessly with each other. Phones will have sensing and even control capabilities. For example, a software robot in the phone will "sense" what friends are doing, and connect those who are, say, watching the same TV program or downloading the same song. Once companies realize they can sell more products and services to consumers by creating social activities (including virtual ones) around their products or services, even more types of things will be given communication capabilities.

Furthermore, Chuah sees the physical and virtual worlds interconnecting, with social networks in one moving to the other. People in virtual worlds already hold parties over the Internet. Such socializing in one world will flow to socializing in the other. Furthermore, items in one world will move to the other. Chuah cites the example of the virtual sword won by an advanced player in the online game *Everquest* being sold on eBay. Wireless communications will eventually link both worlds, she believes, and the nexus will be the cell phone.

A current-day example of using IM to sell products is Keebler's RecipeBuddie.

CASE EXAMPLE

KEEBLER

www.keebler.com

Founded in 1853, Keebler is today the second-largest cookie and cracker manufacturer in the United States, and a subsidiary of Kellogg.com. In September 2002, Keebler launched RecipeBuddie on its Web site, notes Gordon Bass.²⁰ "She" is an instant-messenger bot that converses with people who IM her. But she only talks about recipes, using her database of 700 recipes to, say, help someone figure out what to cook for dinner. Keebler's goal, of course, is for her to get people to buy more Keebler products. She has been given the personality of a humor-filled suburban housewife, which seems to best fit the demographics of Keebler's audience: suburban women ages 25 to 54.

Her origin is ActiveBuddy, a company founded by Timothy Kay that builds interactive agents (bots) to run on IM networks, private networks, and wireless

networks. RecipeBuddie, for example, sits on someone's AOL IM buddy list and can answer natural-language questions about recipes. She can be accessed at www.keebler.com.

Emedia, the developer of Keebler's Web site, built RecipeBuddie using the scripting language BuddyScript (from ActiveBuddy). Development entailed writing scripts to reply to user questions. For RecipeBuddie, each natural-language response acknowledges the other party, repeats the request, and makes a suggestion, which is often one or more recipes. Scripting entailed making the link between what people might ask about (cooking dinner for the kids, a picnic lunch, no onions, feeling sad, etc.) and recipes in the database. Emedia initially wrote 2,000 pieces of dialog for RecipeBuddie, notes Bass.

(Case Continued)

Once developed, Emedia had to get permission to launch RecipeBuddie on the three major IM networks: AOL, MSN, and Yahoo! ActiveBuddy receives a fee every time RecipeBuddie is accessed. Keebler tracks the number of people who put RecipeBuddie on their buddy list, the number of messages exchanged with RecipeBuddie, and the number of recipes viewed and printed.

RecipeBuddie has been very successful, exceeding Keebler's expectations. The main developer, Anna Murray of Emedia, notes three lessons she learned from building the bot. One, users

really like to converse with bots, so a lot more can be done with them. Two, scripting is like writing a novel, so it needs to be done by just a couple of people, and they need to work together very closely. And three, others, besides the original scripters, should be able to add their own content, such as answers to frequently asked questions.

In 2006, Kesebler launched another similar concept. HollowTree4Kids, an interactive online game, is an entertainment platform for children, and, along the interaction, promotes Keebler's line of products. ■

An Internet of Appliances, Traffic Prioritization, and Network Neutrality

Wireless communications are not just for people, of course. A machine-to-machine Internet is coming, notes Andy Reinhardt²¹ and Heather Green.¹¹ Machines will likely use Wi-Fi as one wireless communication protocol. Another protocol is ZigBee, a radio-based communication standard used by tiny sensors. Such sensors might monitor the main systems in a vehicle; the inventory of ice cream in vending machines; a building's HVAC system; or the soil moisture, nutrients, and temperature in a field as well as a myriad of other uses.

The sensors are designed to send specific bits of information, be long lasting, require little energy, and communicate efficiently. With ZigBee, the sensors pass their information on to the next sensor in a sort of bucket-brigade fashion, with the last one passing the data to a computer for analysis or communication, notes Green.

Yet another protocol that involves communication among things is radio-frequency identification (RFID), which is discussed in Chapter 11. Like the bar code, it is a technology that involves small tags affixed to objects that provide information about the object. For example, an RFID tag on a package could tell a scanner where it is going, where it has been, the temperature range it has experienced (if that is important to the contents), and so on.

The problem CIOs face is tying such new sensor-based systems into their corporate databases. It is likely that the communication systems will use a mix of wired and wireless technologies, as appropriate. That is just one challenge.

Another challenge is Internet traffic prioritization. When Internet traffic loads exceed the routing and transmission capabilities of the networks, network administrators