



THE EDITORIAL VIEW

EMBEDDED INTERNET: WHAT PROBLEM ARE WE SOLVING?

By Michael Slater {3/27/00-01}

There is a lot of talk these days about embedding Internet connections in all kinds of appliances. Not just Internet appliances, but ordinary appliances—like dishwashers and coffee makers. No doubt there will be some compelling applications for such things, but

I'm concerned that there is more technology push going on here than consumer pull. Are any of these products going to actually enhance our lives? I'm skeptical.

The Internet makes it possible to connect virtually every electronic device on the planet that has even a modest amount of computing power. Software developers are putting TCP/IP stacks into 8-bit microcontrollers, and others—such as iReady—are putting Internet interfaces directly into logic gates. Web servers can be built on tiny PC boards. The magic of semiconductor technology is driving the cost of an Internet connection to just a few dollars.

For industrial automation, pervasive Internet connections are compelling. For office equipment and building automation, they probably make sense. But I'm having trouble with the kinds of applications that advocates are discussing for consumers.

At one recent conference, two panelists discussed—with straight faces—how your alarm clock could communicate with your coffee maker so the coffee would get started at the right time. Am I missing something here? I personally don't have a lot of trouble turning on the coffee maker manually. Having to wait three minutes for the coffee to brew is not a problem worth solving.

Next the discussion turned to how your washing machine could be automatically updated by the manufacturer—perhaps to add a new cycle to handle a new type of

fabric. I have a hard time believing that there is much value in this. And it seems all too likely that the manufacturer would use such “upgrades” to try to extract ongoing revenue from its customers.

Then there is the much-discussed smart refrigerator that notices when I've run out of milk and orders more. But what if I didn't want more milk? Maybe I'm going out of town for a week. (And please don't tell me that it would know that from my calendar and respond accordingly.) On the other hand, a kitchen appliance that will—on request, not automatically—scan the bar codes from things I'm about to throw away and add them to my shopping list could be genuinely useful.

In the discussions about intelligent appliances, there seems to be remarkably little appreciation for real consumer benefits—or for the tradeoffs between simplicity and convenience. Having my alarm clock communicate with my coffee maker is far more likely to create frustration than it is likely to improve my life. The more communication and automation that is attempted, the more potential there is for the system to automatically do something I don't want it to do. And there is no existing proof that the user interface can be crafted in such a way that ordinary people will find it easy to override the defaults and correct anomalous automatic behavior.

I remain a big believer in information appliances—devices that allow us to interact easily with digital media. I



think such devices can offer real, compelling consumer benefits: I would like to be able to read news from the Web at the dining table; to look up phone numbers electronically instead of in fat, outdated phone books; and to find nearby restaurants (and reviews of them) when I'm traveling. There is real benefit in connecting my TV to the Internet so it knows what shows are on when. The CD changer too can benefit from a Web connection that would enable it to know the name of the CD, the artists, and the titles. There may be

a few isolated instances where some benefit can be had by connecting ordinary devices to the Internet—but I'm happy with my dumb appliances. Designers should focus on solving real problems, not on pushing Internet technology into every conceivable corner. ♦



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