

From the Editor-in-Chief . . .

Trusting Our Electronic Assistants

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With the rapid deployment of the Internet, we now routinely interact with strangers—at both personal and corporate levels—and increasingly with the strangers' electronic minions. It is not uncommon to buy goods—even mundane items such as groceries—online. Innovations in computing provide tools that can help us as we interact with others. For example, programs can reside not only on our desktops but also in smart phones, PDAs, and even refrigerators, to help with our shopping (<http://www.usatoday.com/life/cyber/tech/review/ctd560.htm>). These programs serve end users while also meeting certain business needs, such as supply chain management.

All interacting parties face dynamically changing situations. Let's say you need unusual groceries for a special recipe, but the grocery store is out of those particular ingredients. You may want your refrigerator to contact stores other than your regular grocer

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or decide whether to accept substitute ingredients. In other words, for online interactions to succeed without continual human hand-holding, all interacting parties need programs with sufficient autonomy to represent their interests. For the interactions to be controllable and predictable despite the programs' autonomy, our electronic assistants must be able to enter into and abide by contracts they make with each other on our behalf.

Endowing our software with the capability to act autonomously and to enter into contracts leads naturally to the question of trust. Ultimately, trust underlies all interactions—in this case with our refrigerator and our grocery store.

Elements of Trust

Trust goes beyond security in that it concerns managing interactions at the application level. Security is about authenticating another party and authorizing its actions. Trust is about the given party's acting in our best interest and choosing the right actions from among those authorized.

We sometimes see trust as the belief that all parties will comply with legal contracts. Obviously, contracts are important in maintaining social order and stability; however, being trustworthy entails quite a bit more. Many activities are performed without an explicit contract, so trust involves other important elements.

To begin with, trustworthiness is having the right capabilities. Nobody likes to trust someone who is incompetent or simply unaware of important material facts. With friends who are klutzes—even well-intentioned klutzes—who needs enemies? If my refrigerator doesn't notice that I am running out of milk—or does notice but doesn't place the order in time—then I can't trust it to manage my grocery purchases.

Trustworthy peers are not only aware of the facts, but they also apply them in a way that serves the needs of those with whom they interact. For example, the grocery store should send me milk whose expiration date allows sufficient time for consumption.

Trustworthiness is being truthful, sincere, and well-intentioned. It is also being honest—that is, not deceptive or misleading. It is difficult to trust someone who may be, strictly speaking, truthful but conveys information (or conveys it in a manner) that leads to incorrect conclusions. For example, if the grocery store promotes a brand of milk that yields it greater profits instead of the one I prefer, I will have little trust in its recommendations. Of course, this aspect of trust has already been breached by the practice of search engines' ranking Web sites on the basis of payments received from those sites.


Thus, in philosophical terms, trustworthiness can be of three major kinds. One, a person or corporation is trustworthy if it is ethical and adheres to a higher standard than explicitly required by whatever contracts apply. Two, trustworthiness is support-

ing one's collaborators by looking out for their interests and those of others in our shared world. For example, instead of waiting for an order to lapse, we might cancel it as soon as we realize it is no longer needed, thereby freeing the resources of our business partners. Three, failing all else, trustworthiness is being rational. If you can model an entity as rational, you will find its actions more predictable than if you lacked the assumption of rationality. You can constrain the actions of a rational entity by persuading it that to act in your interest is also to act in its own interest.

From Concept to Practice

Can we achieve all these varieties of trust in our online interactions? I don't expect that we will need to achieve them all at the same time. However, if we *are* to achieve them, we must build interfaces that enable the user and the software to communicate unambiguously. We also need to endow the software with stronger powers of reasoning so that when equipped with knowledge of its user's desires, it can proceed in a trustworthy manner. ■

New Column ...




Stuart Feldman
on E-Commerce

Coming to *IC* in the
May/June 2000 issue

IC is expanding coverage of critical issues in Internet development with the addition of our newest column. Stuart Feldman is director of the IBM Institute for Advanced Commerce, where he manages a staff of more than 90 researchers in network-related technologies including e-commerce, Internet media, and antivirus systems.

Feldman was a member of the original Unix research team, and has published numerous research papers in software engineering, programming languages, and scientific computing.



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