From the Editor in Chief...

Working the Flow

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Mobility creates challenges and opportunities for user interfaces. By increasing the depth of the computational representations we can build of our users, the new telecom infrastructure enables a range of services. Personalizable services raise new privacy concerns, however, because they often reveal user data to third-party service providers. Last issue, I described an agent-based approach for protecting subscriber privacy. This issue, I address a more practical question: Given that the infrastructure exists (and assuming that privacy concerns are addressed), what improvements in user interfaces can mobility enable?

Presence and Availability

To the programmer, the contributions of the new infrastructure can be summed up in two words: *presence* and *availability*. (See the Presence and Availability Forum's Web site at www.pamforum.org for standardization work in this area.) Presence is about knowing if a device (phone, PDA, laptop, or such) is online and, if so, where. Depending on the device and the installed infrastructure, we can determine presence through the traditional or wireless phone network, IP telephony devices and switches, or a wired or wireless LAN. There are important differences among these modalities, but I will not delve into them here. Rather, assuming that the infrastructure supports some form of mobility, I will concentrate on availability, which is about knowing if a user is free to perform a certain action at a specified time using a particular device.

Presence and availability are poised to play important roles in the next generation of Internet-based applications and services. Mobile users will have several devices they use at different times and places. Although the underlying network can determine a device's presence, an application needs to know the user's availability regarding a given action in order to act properly. Therein lies the connection to user interfaces: Your availability for an action depends partly on the device you are using at a given time and its connection to the network.

An Optimal Workflow Experience

When people describe the applications of availability, they cite a range of new examples, from pushing advertisements based on consumers' locations to scheduling conference calls among participants with known availability. I'm all for new applications, but I think this technology's greatest successes will be in applications, such as workflow management, that build on existing usage scenarios.

Alternately much hyped and much maligned, workflow continues to present important challenges to enterprise developers. The underlying problem of enabling complex business processes in the face of heterogeneity remains as demanding and urgent as ever. Unfortunately, solutions that focus on low-level connectivity and data access are generally too inflexible to support real work, and they give the whole arena a bad name. Without denying the value of data access and automation, I would say the most important aspect of workflow is how humans engage in different business processes.

Processes inevitably require human participation at key stages. You can either force people to obey the machine or you can let them guide it. The first is easier technologically, but users prefer — and extensive management research on staff empowerment supports — the second. Not only are people happier when their preferences and judgments are respected, but they are also more productive when they get into and maintain their "flow."

University of Chicago psychology professor Mihaly Csikszentmihalyi describes flow as a state where attention can be freely invested to achieve one's goals.[1] More clearly, he writes, "attention is our most important tool in the task of improving the quality of experience" and "when we feel that

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we are investing attention in a task against our will, it is as if our psychic energy is being wasted."[1] There is a lot more that goes into flow, but the two consequences of flow that matter here are improved experience of work and potentially higher productivity.

Availability-Based Interfaces

Although a purely technological approach cannot guarantee psychological flow, improved technology can at least reduce unnecessary disruptions to flow. But how? The answer lies in availability-based technologies.

I propose that workflow interfaces incorporate knowledge of the tasks users are engaged in and the tasks they need to consider. Using this knowledge along with infrastructural bases for availability (presence, location, and such), the application can determine when the user is (maximally) available for a specific workflow task. Note that user availability is not merely a function of infrastructural components, but also depends in potentially subtle ways on ongoing interactions with the application.

After computing the user's availability, the application can decide how to interact with the user. Engaging users in a task when they are most available for it could improve productivity. The design, however, must recognize that the application can be wrong: the user might not be available. In other words, the user should remain in charge and should be able to act in ways that surprise the application, rather than the other way around as, unfortunately, is all too often the case in current systems.

And, finally, this can lead to improvements in the user interfaces mobility supports, which will begin to offset the obvious limitations of mobile devices.

References

1. M. Csikszentmihalyi, *Flow: The Psychology of Optimal Experience*, Harper & Row, New York, 1990.

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